

INTRODUCTION: ٦

This instruction manual contains important information regarding the safety instructions, installation, operation, maintenance and storage of the Guardbox+limit switch boxes.

The limit switch boxes may only be mounted, wired and installed by qualified and trained personnel, according to International standards requirements for hazardous areas. If you require any additional information or assistance, please contact the manufacturer or its representative. All contacts are listed in the footnote together with the QR code for an easy access to the complete product documentation. Please read these instructions carefully before proceeding with the limit switch box installation and save them for future reference.

2. **PRODUCT DESCRIPTION:**

Guardbox Limit switch boxes are electromechanical devices ideal for monitoring the remote operation of industrial valves in plants, designed and manufactured for demanding applications in extreme environments and where there are requested high standards for safety and reliability products. The Guardbox devices are used to control the position of the valve and provide high accuracy electrical feedback signal of valve status to plant control systems. Guardbox devices are equipped in standard configuration with a 3D high visibility position indicator that represent a true indication of valve position. The indicator is visible on all 4 sides and is fully adjustable on 360° without disassembly. Guardbox limit switch boxes are built to be installed on valves or actuators which drive the process valves from closed to open position (Normal acting) or from open to closed position (Reverse acting) . Normal acting is considered full CW when the process valve is closed and CCW when the process valve is open. Reverse acting is full CW when the process valve is open and CCW when the process valve is closed.

(Ex) SAFETY INSTRUCTIONS:

Guardbox Limit switch boxes are electromechanical devices ideal for monitoring the remote operation of industrial valves in plants, designed and manufactured for demanding applications in extreme environments and where there are requested high standards for safety and reliability products. The Guardbox devices are used to control the position of the valve and provide high accuracy electrical feedback signal of valve status to plant control systems. GI Guardbox intrinsic safety Exi series limit switch box are specially projected and built to withstand the most extreme weather conditions and be installed into hazardous areas with flammable gases, vapours and mist, according with the relevant Union harmonization legislation of ATEX Directive 2014/34/EU, and to IECEx Scheme and applicable standards. Reference standards are the IEC60079-0:2011 (Ed6.0), IEC60079-11:2011+Corr1:2012 (Ed6.0), and the applied marking of Group, category and applied Ex protection is:

Ex Ë Equipment marking

II*G Ex ia II* T6Å Å T1 G* (Tamb. - *°C/+*°C) II1D Ex ia IIIC T135°C Da

II1G Ex ia IIB/IIC T6Å T1 Ga or II2G Ex ia IIB/IIC T6Å T1 Gb (Tamb. - 60°C +105°C) In case of II1D Ex ia IIIC T135°C Da simple apparatus T6Å Å Å Å Å Å T1 Ex Ë Marks Ш G 11* G* Ex ia IEMPERATURE CLASS FLAMMABLE GAS GAS GROUP DUST-FLAMMABLE SYMBOL EMPERATURE SURFACE GROUP CONCEP GLOUP ×ш סקק PUST DUST \bot П 1

On the outside of the Exi box cover there are two adhesive labels on which are marked the Ex-marking and all the information and references about the manufacturer, electrical and ambient range of use of the specific product, together with a QR code for a quick link and easy access to the product documentation including wiring diagram, drawings, datasheet and certificates:

IIIC

Ex ia



D



T135°C



Da



Ex Ë Equipment Marking



The certification relies upon the following materials used in its construction: Box housing made up of body and cover is in Stainless Steel AISI316L, or Aluminium Alloy EN AB ed AC 44300 AI Si 12 (Fe) (a). In order to comply with the requirements for the equipment protection level (EPL), the material of the enclosure must be chosen as follow:

EPL (EXPLOSION PROTECTION LEVEL)	ENCLOSURE MATERIAL
Ga	Stainless steel 316L (CF3M)
Gb / Gc	Aluminium Alloy EN AB ed AC 44300 Al Si 12 (Fe) (a) or Stainless steel 316L (CF3M)

Box gasket is in silicone rubber. It is the responsibility of the user to ensure that all the following safety instructions, essential health and safety requirements and warnings Δ are observed during installation, operation and maintenance of the product:

- **3.1** These instructions must carefully read before proceeding with the limit switch box installation and saved for future reference.
- **3.2** Installation should be carried out by suitably trained personnel to an applicable Code of Practice (eg IEC/EN60079-14 & IEC/EN61241-14).
- **3.3** If the box is integrated in a system or in a plant, the customer shall ensure that the local safety regulations are observed.
- **3.4** Before proceeding with the wiring, make sure that the characteristics of the electrical connection are compatible with electrical operation parameters of operation of the box.
- **3.5** Do not exceed the limit switch box performance limitation. Exceeding the limitation may cause damage to the limit switch, actuator and valve.
- **3.6** Use wiring suitable for temperature higher than maximum GI-series device declared ambient temperature +9°C.
- **3.7** Connection for limit switch box shall be provide with cable of thermal stability not less than maximum ambient temperature of particular configuration + 9°C and minimum cross sectional area of 0,14mm².
- **3.8** Operating the box over temperature limits will damage internal and external components.
- 3.9 ARISK OF SEVERE INJURIES!: Do not open the box when energized or in presence of explosive atmospheres
- **3.10** Guardbox products are supplied with plastic caps fitted on the customer requested cable entries. Task of these caps is to protect the internal circuits of the products in the time between manufacturing and commissioning. It is responsibility of the installing personnel to replace the protective caps with suitably certified and temperature rated cable glands and blanking plugs permitted for use with ATEX/IECEx intrinsic safety enclosures.
- **3.11** Product IP rating is ensured only by the use of suitable IP rated cable glands and plugs.
- **3.12** All cable entry devices shall be certified in type of explosion protection $\pm q$ and suitable for the area classification in accordance with the National Electrical Code.
- **3.13** Any unused cable entries must be sealed with suitably certified stopping plugs.
- **3.14** The box is provided with two grounding connection facilities, one inside and one outside the housing. The facilities allow for the effective connection of at least one conductor with a cross-sectional area given below in table (2):









Table 2 Ë minimum cross-sectional area of protective conductors

CROSS-SECTIONAL AREA OF PHASE CONDUCTOR, S	
[1111-]	
S m16	S
16 < S m35	16
S ⁻ 35	0,5S

- **3.15** For Ex installations, the internal ground connection shall be used. The external ground connection, is an additional wiring allowed where local authorities permit, or is required. Use a ground wire of proper cross section.
- **3.16** Both internal and external grounding connections are clearly identified and permanently marked on the box housing and are projected to facilitate the installation of the ground cable preventing it from rotating.
- **3.17** A grounding connection kit composed by n°2 phillips head screws plus n°2 toothed washers, is provided in a sealed bag, available inside the box. The two anti-vibration washers help to ensure the securing of the cable.
- **3.18 (ARNING!** : Risk of electrostatic charges accumulation of static charge on non-conductive parts of the box (eg. Plastic indicator dome). The external surfaces of the box must be preserved by the accumulation of dust through periodic cleaning. Clean Only with a Damp Cloth.
- 3.19 CAUTION!: The metallic alloy used for the housing material may be at the accessible surface of this equipment; in the event of rare accidents, ignition sources due to impact and friction sparks could occur.
- **3.20 CAUTION!**: The box can work in plants in presence of extreme environments and in contact with highly aggressive and corrosive substances that may affect the integrity of the product and its protection mode. To operate in such conditions the box is projected to be realized in different materials that ensure durability and reliability in operation. For the right choice of the available options, please contact Eisenbau.
- **3.21** A single intrinsically safe circuit may be connected to the provided extra terminal_block (labelled +,- / +,-). This circuit has not to exceed the following parameters: Ui:30V, Ii: 250mA and shall be powered by a barrier with output suitable for use in gas group IIC.
- 3.22 For the maximum values of the circuits according to Type of protection intrinsically safe for sensors, simple apparatus or other devices, please refer to type certificate of components installed into the box and listed into table shown in the following section of the manual. The certificates are subjected to periodic reviews, for the latest release please visit the manufactureras website. The certificates for Pepperl & Fuchs sensors are available at this link http://www.pepperl-fuchs.com/great_britain/en/index.htm, for IFM sensors are available on https://www.ifm.com/ifmuk/web/home.htm. For transmitters, encoders or other devices certificates, please contact the device manufacturer or Eisenbau.

4. CE EX DECLARATION OF CONFORMITY IN ACCORDANCE WITH THE RELEVANT UNION HARMONIZATION LEGISLATION ATEX DIRECTIVE 2014/34/EU

The manufacturer Eisenbau s.r.l. herewith declare under his sole responsibility, that the limit switch boxes GI-series complies, when installed in accordance with the installation and safety instruction, with all the following applicable EU directives, Regulations and all the essential Health and Safety requirements:

Ex Equipment marking (for certified switches and components)

Table 3 Ë List of installed certified components

Swi	tch series		Manufacturer	ATEX gas certificate	IECEx gas certificate
Cylindrical inductive proximity	sensors of types NC	and NJ	Pepperl&Fuchs	PTB 00 ATEX 2048X	IECEx PTB 11.0037X
SN-type proximity sensors seri	es NJand SJ		Pepperl&Fuchs	PTB 00 ATEX 2049X	IECEx PTB 11.0092X
Slot-type proximity sensors ser	ries SJand SC		Pepperl&Fuchs	PTB 99 ATEX 2219X	IECEx PTB 11.0091X
Cuboidal inductive proximity se	ensors series FJand	1 NB	Pepperl&Fuchs	PTB 00 ATEX 2032X	IECEx PTB 11.0021X
Cuboidal inductive proximity se	ensors series NCar	nd NJ	Pepperl&Fuchs	PTB 00 ATEX 2032X	IECEx PTB 11.0021X
Valve position sensors type NC	N, N4, PL.F25N	14,NCF31N5	Pepperl&Fuchs	TUV 99 ATEX 1479X	IECEx TUN 04.0014X
Inductive proximity switch serie	es N*50*A		IFM electronics GmbH	BVS 04 ATEX E091X	IECEx BVS 06.0003X
Transmitter/encoder type	Manufacturer	De	scription	Approvals ATEX	Approvals IECEx
ST-1509-V1-B ST-1509-V1-A ST-1910-V1-A	ZETTLEX	Program	mable encoder	FTZU09ATEX0221X	-
5333D	PR electronics	2-wire progra	ammable transmitter	KEMA 03ATEX1535X	DEK 13.0036X
5335D, 5337D	PR electronics	2-wire transmit	ter with Hart protocol	KEMA 03ATEX1537	KEM 10.0083X
5350B	PR electronics	Profibus PA/ Found	ation Fieldbus transmitter	KEMA 02ATEX1318	BVS 12.0035X









Ex Ë Equipment marking (in case of simple apparatus) IIIG Ex ia IIB/IIC T6Å T1 Ga or II2G Ex ia IIB/IIC T6Å T1 Gb II1D Ex ia IIIC T135°C Da

	l'able 4 E List of installed simple apparatus								
	Micromechanical switch SPDT/ DPDT gold plated	As applicable	Simple apparatus	Simple apparatus	Simple apparatus				
Micromechanical switch SPDT/ DPDT gold plated and sealed		As applicable	Simple apparatus	Simple apparatus	Simple apparatus				
	Reed switches SPDT/DPDT	As applicable	Simple apparatus	Simple apparatus	Simple apparatus				
	Reed switches SPDT/DPDT	Eisenbau	Simple apparatus	Simple apparatus	Simple apparatus				

IEC60079-0:2011 (Ed6.0); IEC60079-11:2011 (Ed6.0) EN 60079-0:2012/ A11:2013; EN 60079-11:2012

ATEX EC Ë Type examination certificate: EXA 15 ATEX 0040X IECEx Ë Certificate of Conformity: IECEx EXA 15.0007X

ATEX - Production Quality Assurance Notification: EXA 15 ATEX Q051 IECEx - Product Quality Assessment Report : HR/EXA/QAR15.0001/00

Guardbox GI-series Limit switch boxes are also available, on request, with the following certification:

LHL - Customs union certificate of conformity : N° TC **RU C-IT.BH02.B.00123** Series RU N° 0325960

5. INSTALLATION



6. MOUNTING



WWW FISENBAU IT

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GUARDBOX - GI SERIES

IOM (Installation, Operating & Maintenance Manual) 0101-ENG rev.5

- ATTENTION! : Consider the rotation direction of the actuator. The box is factory presetted to be installed parallel to CCW rotating actuators (Normal acting). For installation on reverse acting actuator or perpendicular to the actuator, the cams inside the box need to be reset before operating the system to avoid damages to the cams or to the sensors.
- **6.1** The box has on the bottom surface a drilling according to ISO 5211, as shown in the image. Fix the proper mounting bracket (supplied in option by Eisenbau) to the box using M6 screws (6).
- **6.2** Move the actuator to a completely pen+or lose+position, then align the box shaft (3) to actuator slot (7) ensuring of their correct coupling.
- **6.3** The box is designed, assembled and controlled to ensure a maximum operating torque, at the shaft, lower than 0,5Nm. An excessive misalignment of the two shafts during coupling, may result in the increase of this torque value until reaching the complete seizure of the shaft in the worst cases. Eccentricity between the two shafts must not exceed 0.2 mm.
- **6.4** The motion transmission from the actuator or valve to the box GI is attained by a mechanical coupling. Before installation on a valve or an actuator, make sure that the orientation of the position indicator is correct.
- **6.5** Operate the actuator before making the electrical wiring to ensure proper alignment between box and actuator. If it should be necessary, re-align box by loosening mounting bolts (6) and retighten bolts to the actuator (8) according to the required direction of rotation when satisfied with alignment.
- **6.6** Replace the protective caps with suitably certified and temperature rated cable glands and blanking plugs permitted for use with ATEX/IECEx intrinsic safety enclosures.

7. INPUT PARAMETERS AND LIST OF POSSIBLE CONFIGURATIONS:

Ex Ë Equipment marking (for certified switches and components)

II*G Ex ia II* T6Å Å T1 G* (Tamb. - *°C/+*°C) II1D Ex ia IIIC T135°C Da

ATTENTION!: Category, gas group and the EPL depends on type of certified sensor installed inside the box. The asterisk option on the outside label refer to the values listed on the label inside the box according to sensor or component intrinsically safe parameters. For gas the upper ambient temperature range of the equipment shall be not greater than the upper ambient temperature of the individual Ex sensor (according to Type, Category and temperature class of use) reduced by a value of T rise (see table 5) related to the box heating calculated in the worst operating case. The max ambient temperature must be determined by crossing the sensor/components values with the max ambient temperature of the limit switch box indicated in the external label not exceeding this value in any case. In most cases the switch installed belong to the same series, however can be installed a combination of switch plus a certified position transmitter or encoder and in rare cases a combination of switch of different series as shown in following table (5). In these cases the internal label will report all input parameters of the different switch series or components connected to the intrinsically safe circuits and the max ambient temperature must be determined by crossing all the values of single different sensors and components choosing the lowest values according to the type, temperature class and category of use.

7.1 The sensors or the other components can be provided installed on a PCB circuit board or wired directly into terminals fixed on a metallic board. The PCB board option can have up to 4 independent intrinsically safe circuits reserved to the installation of sensors and components plus an extra terminal block (marked +,- / +,-) reserved to the customer for connection of an single intrinsically safe circuit (e.g. an external solenoid) not exceeding the following parameters: Ui:30V, Ii:250mA powered by a barrier with output suitable for use in gas group IIC. Side A of the PCB allow to install 3-wire sensors, while side B is suitable for 2-wire sensors. The metallic board version allow to have more flexibility on configurations due to direct wiring on terminal blocks and allow to install up to 4 sensors plus a position transmitter. Extra terminal blocks for customer connection are installed also on the metallic board when there is enough available space.



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Metallic board for all sensors and components







Table 5 E Possible circuit configurations

Configuration	Switch type and max qty	and max qty Encoder/Transmitter type and max qty qty		* Temperature rise T [°C]	
1	Max n°2 - Electromechanical SPDT	0			
2	Max n°4 - Electromechanical SPDT or Max n°3 Electromechanical DPDT	0	For every	/	
3	Max n°4 - Reed switches SPDT or Max n°3 Reed switches DPDT	0	compilation		
4	Max n°4 - Cuboidal inductive proximity	0	1	2°C	
5	Max nº4 - Cylindrical inductive proximity	0	2	3°C	
			3	4°C	
6	Max n°4 - Slot-type inductive proximity	0	4	5°C	
7	0	Max n°1. Programmable encoder Zettlex ST-1509 or ST1910 series	/	5°C	
8	Max n°2 - Slot-type or cylindrical	Max n°1. Programmable encoder Zettlex	1	6°C	
0	inductive proximity	ST-1509 or ST1910 series	2	7°C	
			1	6°C	
9	Max n°4 - Cuboidal inductive proximity	Max n°1. Programmable encoder Zettlex	2	7°C	
		ST-1509 or ST1910 series	3	8°C	
			4	9°C	
10	Max n°4 - Electromechanical SPDT or Max n°2 Electromechanical DPDT Max n°3 - Reed switches SPDT or Max	Max n°1 - Programmable encoder Zettlex ST-1509 or ST1910 series Max n°1 - Programmable encoder	For every combination	5°C	
11	n°3 Reed switches DPDT	Zettlex ST-1509 or ST1910 series			
12	0	Max n°1 - 2 wire transmitter PR electronics 5333D, 5335D, 5337D or 5350B + Max n°1 - Honeywell 640 series or Contelec W/AI 305 series	1	5°C	
10	Max n°2 - Slot-type or cylindrical	Max n°1 - 2 wire transmitter PR electronics 5333D, 5335D, 5337D or 5350B	1	6°C	
13	proximity	+ Max n°1 - Honeywell 640 series or Contelec WAL305 series	2	7°C	
		Max n°1 - 2 wire transmitter PR	1	6°C	
14	May nº4. Cubaidal industiva provinsity	electronics 5333D, 5335D, 5337D or 5350B	2	7°C	
14	Max 114 - Cuboidal Inductive proximity	+ Max n°1 - Honeywell 640 series	3	8°C	
		or Contelec WAL305 series	4	9°C	
15	Max n°4 - Electromechanical SPDT or Max n°2 Electromechanical DPDT Max n°3 - Reed switches SPDT or Max	Max n°1 - 2 wire transmitter PR electronics 5333D, 5335D, 5337D or 5350B + Max n°1 - Honeywell 640 series or Contelec WAL305 series Max n°1 - 2 wire transmitter PR electronics 5333D, 5335D, 5337D or 5350B	For every combination	5°C	
16	n°3 Reed switches DPDT	+ Max n°1 - Honeywell 640 series or Contelec WAL305 series			

* T is the internal temperature rise of the GI box in Celsius degrees, depending on installed components, that must be taken into consideration in the calculation of max ambient operating temperature of the box. The certified housing temperature coefficient used to calculate T rise is 4,97°C/W, while the component power dissipation considered to calculate the T is:

Simple apparatus \rightarrow 0W (Does not to be considerate because switches dong produce heat)

Encoder/transmitter \rightarrow 0,84W (according to device certificates)

Inductive sensors \rightarrow 0,242W (according to type 4 intrinsic safety barrier)

For gas, when simple apparatus or a configuration containing simple apparatus is installed, the max ambient temperature of the limit switch box is decreased by manufacturer by a T of 45°C, according to IEC60079-11. When certified components and sensors are installed, the max ambient temperature of the limit switch box is equal to max ambient temperature of the certified components and sensors installed, indicated into their corresponding certificates, reduced by manufacturer by a T according to specific configuration as listed in the table above. The max ambient temperature of the limit switch box, has already been calculated according to temperature class by the manufacturer and printed on the label stuck inside the box cover, so the customer must refer to this internal label. When Pepperl & Fuchs certified sensors are installed, more than one max ambient temperature values are printed on label, divided by temperature class according to different types of intrinsic safe barriers. The customer must select the correct value depending on type of intrinsic safe barrier used. It is possible in same cases to have a combination of different certified sensor series installed into the same box. In these cases on the label are printed only the final reference values for customer already calculated by the manufacturer by crossing all the different max ambient temperature of the installed sensors.

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EXTERNAL LABELS

MODEL : GIARORGSEPNES7 SWITCH TYPE : Provinc Namu SJ3,5 - SN RATING : Oper. Volt. 8Vdc MAX AMBIENT TEMP: - 25°C + 85°C It. 132 CABLE ENTRIES W :1/2"NPT Y :1/2"NPT BATCH N° SAMPLE K : - Z :-FOR SAFETY INSTRUCTIONS REFER TO DOCUMENT "IOMODO"

	_	5	Switch	type		М	odel		Ci (nF	-)	Li (µH)	_
	(Pro	oxy ind	ductive	Э	SJ3,5-SN			30		100	<i>`</i>	
	🔺 * M	lax ar	mbien	it tem	perati	ure [°(C] in t	emp	erature	e clas	ss for t	he ga	as
	ſ	Switch type Model Ci (nF) Li (μH) Proxy inductive SJ3,5-SN 30 100 * Max ambient temperature [°C] in temperature class for the gas gory Pi=34mW Pi=64mW Pi=242mW Base Ui=16V li=25mA Ui=16V li=25mA Ui=16V li=52mA Ui=16V li=25mA Ui=16V li=25mA Ui=16V li=52mA Ui=16V li=76mA T6 T5 T4 T6 T5 T4 3 56 68 96 49 61 89 28 40 68 13 25 53 Batch n°: Gasket material: Silicone EI. rating: 8Vdc Marxiv Maggio, 13 - IT Ta XXIV Maggio, 13 - IT For safety instructions and certifications refer to											
	Category	P	i=34m'	w	Р	i=64m'	w	Р	i=169m	w	Pi	=242m	ηM
1	/ gas	Ui=16V li=25mA		Ui=16V li=25mA Ui=			Ui=1	16V li=5	2mA	Ui=16V li=76mA			
		Т6	T5	T4	T6	T5	T4	T6	T5	T4	T6	T5	T4
/	2G	73	88	100	66	81	100	45	60	89	30	45	74
	1G	56	68	96	49	61	89	28	40	68	13	25	53
	25017- Via X wwv	Sede XIV M w.gua	na di L laggio, rdbox	onato 13 -	(BS) T om		認知		Batch Gaske El. rat For sa cer docu	n°: et ma ing: 8 afety i tificat ument	terial: S 3Vdc instructi ions ref t "IOM	Silicon ons a er to 0101"	nd

INTERNAL LABEL

		Table 6 Ë Intrinsically safe parameters for certified sensors and components																	
		-	۲.					Туре	1			Type 2			Туре 3			Type 4	4
type	eries	ture	ent tego neni	Ci	11		Р	9i=34n	n₩		P	Pi=64m∖	N	Р	i=169m	W	Р	i=242m	۱W
vitch 1	itch s	nufac	luipm /Ca	(nF)	μH)	l	Ji : 16	SV .	li: 25n	nA	Ui : 16	V li:	25mA	Ui : 16	5V I	: 52mA	Ui : 16	5V I	i: 76mA
ŇS	Sw	Ма	B B E			٦	Г6	т	-	T4	т6	Т5	Т4	т6	Т5	Т4	т6	Т5	Т4
	Cilindrical inductive proximity sensors of type NCand NJ		IIC 1G or 2G	*	*		*	*		*	*	*	*	*	*	*	*	*	*
	SN-type proximity sensors series NJand SJ	2	IIC 1G or 2G	*	*		*	*		*	*	*	*	*	*	*	*	*	*
	Slot-type proximity sensors series SJand SC	perl & Fuch	IIC 1G or 2G	*	*	→ [*]	*	*		*	*	*	*	*	*	*	*	*	*
PI / PN	Cuboidal inductive proximity sensors series FJand NB	Рер	IIC 1G or 2G	*	*	:	*	*		*	*	*	*	*	*	*	*	*	*
	Cuboidal inductive proximity sensors series NCand NJ		IIC 1G or 2G	*	*	:	*	*		*	*	*	*	*	*	*	*	*	*
	Valve position sensors type NCN, N4,PL.F25 .N4,NCF31N5	Pepperl & Fuchs	*	*	*	:	*	*		*	*	*	*	*	*	*	*	*	*
	Inductive proximity switch series N*50*A	IFM electroni cs GmbH	IIC 1G or 2G	*	*			Ui	: 15V				li : 50)mA			Pi : 12	20mW	









Switch type / ansmitter type	Transmitter / encoder / potentiometer	Manufacturer	Equipment roup/Category Environment	Ci (nF)	Li (µH)	ntrinsically safe input parameters	Min Ambient temperature [°C]	Max Ambient temperature for temperature class [°C]		
tra			Ū					Т6	T4	
	Programmable encoder	Zettlex	IIC 1G or 2G	0	5	Ui : 28V li: 120mA Pi : 0,84W	-40	60	85	
тх	2-wire transmitter 5333D, 5335D, 5337D or 5350B	PR Electronics	IIC 1G or 2G	1	10	Ui : 30V li: 120mA Pi : 0,84W	-40	60	85	
-	Potentiometer 640 Series	Honeywell	/	/	/	Works with 2-wire	-40	66	116	
	Potentiometer WAL 305 Series	Contelec	/	/	/	electronics	-25	66	75	

Ex Ë Equipment marking (in case of simple apparatus)



II1G Ex ia IIB/IIC T6Å T1 Ga or II2G Ex i II1D Ex ia IIIC T135°C Da

II2G Ex ia IIB/IIC T6Å T1 Gb

		•		bare parametere rer	emple appara	luo					
Switch type	Switch series & Contact type		Max nominal operating Ambient temp. **	Max nominal switching voltage/current ***	anufacturer	t terr	Max a cemper peratu	ambier rature ure clas	iquipment Group - Category	Intrinsically safe input parameters for dry contact	
	Micromechanical switch SPDT/DPDT gold plated	Reed switch SPDT or DPDT			Ŵ	Т6	T5	Т4	Т3	8 2	simple apparatus
	D41 series		-40 + 85/125°C	0.14-250\/ac	Cherry						
	DC3 series (sealed)		-40 +85/120°C	0,1A-250Vac	cherry	40	55	90	105		11i · 16V
ES	V3D series		-50 + 85/125°C	0,1A-250Vac	Crouset						01.100
(SPDT)	V3 series		-60 + 85/125°C	0,1A-30Vdc	Crouzet					IIC	
	V15W series (sealed IP67)		-40 + 85°C	0,1A-250Vac		40	55	85	85	2G	li: 76mA
	SM series		-54 +121°C	0,1A-30Vdc	Holleywell						
ED (DPDT)	DB3 series		-40 + 85/120°C	0,1A-250Vac	Cherry	40	55	90	105		Pi:
MS (SPDT)		MS series	-60 +125°C	0,1A-250Vac	As applicable	40	55	90	105	IIC 1G	242mW
(DPDT)		MD series	-00 1123 C	1A-24Vdc	or Eisenbau	40	55	30	105	or 2G	

NOTE:

For the maximum values of the circuits according to Type of protection intrinsically safe for sensors, simple apparatus or other devices, please refer to type certificate of components installed into the box. The certificates are subjected to periodic reviews, for the latest release please visit the manufactureros website. The certificates for Pepperl & Fuchs sensors are available at this link http://www.pepperl-fuchs.com/great_britain/en/index.htm, for IFM sensors are available on https://www.ifm.com/ifmuk/web/home.htm. For transmitters, encoders or other devices certificates, please contact the device manufacturer or Eisenbau

** Max operating temperature for simple apparatus must be reduced, according to the type, temperature class and category of use as shown in the last column of the table

*** Do not exceed the intrinsically safe input parameters shown in the table.









8. ELECTRICAL WIRING:

CAUTION! : The electric components inside the box may carry dangerous voltage. The box must not be electrically connected during installation.

Follow switch adjustment, wiring instructions (if present) and indicator setting before servicing the limit switch box. Make sure that the characteristics of the electrical connection are compatible with electrical parameters of operation of the Limit switch box. Do not exceed the limit switch performance limitation. Exceeding the limitation may cause damage to the limit switch, actuator and valve. Connect earth conductor.

ATTENTION! : the minimum clearance required to remove the box cover is 60mm.



- 8.1 Replace the protective caps with suitably certified and temperature rated cable glands and blanking plugs permitted for use with ATEX/IECEx intrinsic safety enclosures.
- 8.2 Product IP rating is ensured only by the use of suitable IP rated cable glands and plugs
- **8.3** Make sure that the cable glands are steadily tightened so that the sealing ring reaches the proper compression to avoid the transmission of mechanical stresses to the terminals (4).
- **8.4** Number, position and size of the provided cable entries are specified in the adhesive label outside the box cover. Number and type of cable entries can also be determined by reference to the 4th digit of limit switch box model marked on both internal and external labels. The certified cable entry options in the following table (8):

Table 8 E Cable entry options	

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	MAX QUANTITY *			
M20x1,5				
Me	N°4			
NPT thr	ead conform t	o ANSI/ASME	E B1.20.1:1983	

* Every box housing can be customized with a various combination , in quantity and size, of cable entries up to a maximum of 4 , depending on customer request

- **8.5** Unscrew the six box cover captive screws (8), then remove the box cover (7).
- **8.6** Connect field wiring to the terminals (4) within the circuit board (9) according to the wiring diagram and terminal labelling available inside the box.
- **8.7** Make sure that the electrical wires are steadily tightened and totally inserted into the terminals (4) and that there isnq non-insulated conductor material.
- 8.8 For box with circuit board (9) installed, the terminals (4) must be tightened using a torque value between 0,5÷0,6Nm
- 8.9 Make sure that the box is connected to the ground with the proper screw (3) using a ground cable with a suitable section
- 8.10 For switch adjustment and cams (5) setting, please refer to following section (9. SWITCH AND CAM SETTING).
- 8.11 Check the cams (5) position before replacing the box cover (7).

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- 8.12 ATTENTION! : During the steps of removal and adjustment it is possible that the body gasket moves from its operating position. Verify that it is in the seat during assembly because the incorrect positioning of the gasket may cause malfunctions in the box.
- **8.13** Replace the cover (7) making sure that the orientation of the position indicator (10) is correct. If the cover (7) is hard to engage on the box shaft, the indicator (10) could have moved during box coverce opening. Use a phillips screwdriver to match the 3D indicator slot with the box shaft, than reassemble the cover (7).
- 8.14 Fasten the six captive screws (8) using a torque of 3,5Nm.

9. SWITCH AND CAM SETTING:

NOTE I: Cams are factory presetted in order to operate in a box installed parallel (See section **6**. **MOUNTING**) to CCW rotating actuators (Normal acting). The lower cam (1) is regulated to operate the switch in the full CW position, when the process valve is **CLOSED**. The cam above (2) is regulated to operate the switch in the full CCW position, when the process valve is **OPEN**. All installation are suitably accompanied by dedicated instructions, due to the size of the installed sensor, cams may have the opposite regulation. Some applications moreover require the use of additional or special cams. These cams, placed above the cam (2), can be set for signaling intermediate positions or as a redundant signaling of valve **OPEN** or **CLOSED**. Where necessary, will be provided dedicated additional instructions for the proper setting of the special cams or electrical components. Following table represents the main cam configurations divided by specific type of switch, for applications not represented below, please refer to additional instructions provided inside the box packaging:













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10. INDICATOR SETTING:

- **10.1** The 3D indicator (2) is visible on all 4 sides and is fully adjustable on 360° without disassembly.
- 10.2 Loosen indicator M5 captive screws and rotate transparent indicator dome (1) to desired viewing angle according to valve position. (OPEN or CLOSED appearing through indicator window).
- **10.3** Retighten the four captive M5 screws (3) using a torque of 3,5Nm.

11. STORAGE AND MAINTENANCE:

- 11.1 Store the boxes away from UV rays and atmospheric agents, in an environment with temperature between 0°C and 40°C.
- 11.2 The Guardbox devices require no servicing during normal working life if properly installed, except the normal inspection of mounting screws/bolts, O-rings and terminal wiring for signs of loosening or corrosion as part of the routine plant maintenance.
- **11.3** Guardbox boxes have been projected to withstand the most severe mechanical fatigue test (more than 1000000 cycles) and accelerated corrosion test (up to 500 hours according to UNI EN ISO9227). However for long-time outdoor usage expecially in aggressive environments or if subjected to an elevate number of operations, is recommended to periodically check the correct functionality and integrity of the box. If some parts are damaged, please contact the manufacturer or the local distributor for certified replacement parts.
- 11.4 Maintenance should be carried out by suitably trained personnel to an applicable Code of Practice (eg. IEC/EN60079-14 & IEC/EN61241-14).
- 11.5 Ensure safety warnings 🛆 are observed during maintenance.
- **11.6** Eisenbau reserves the right to change or modify products without prior notice or without incurring any obligation to make some changes on products previously or subsequently sold.
- **11.7** All trademarks are property of their respective owners.

12. WARRANTY:

For warranty conditions, please refers to section 7 of document General terms and condition of sale+.



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