

TEPEX d.o.o. 10090 Zagreb, Medarska 69 e-mail: tepex@tepex.hr	USER MANUAL FOR EXPLOSION PROTECTED CONTROL UNITS TYPE SKX 12, SKX 13, SKX 14, SKX 15		
	No: TEPEX.RS.025	Rev : 04	Date: 03.2017.

MANUFACTURER

TEP Ex d.o.o. , Medarska 69, HR-10090 Zagreb
T 00385 49 222900, F 00385 49 426450
e-mail: tepex@tepex.hr, www.tepex.hr

PURPOSE

Explosion protected control units type SKX 12 - SKX 15 are intended for use in control, distribution and signaling circuits in areas where an explosive gas and/or dust atmosphere may be present, respectively in hazardous areas 1, 2, 21, 22 in accordance with the standards EN 60079-10-1:2009 and EN 60079-10-2:2009.

DEGREE OF PROTECTION

Explosion protection is in accordance with the "General requirements" in the types of protection "Flameproof enclosure", "Increased safety", "Intrinsic safety", "Encapsulation" and "Protection by enclosure" in accordance with standards: EN 60079-0:2012, EN 60079-1:2007, EN60079-7:2007, EN 60079-11:2012, EN 60079-18:2009, EN 60079-31:2009.

Explosion protection marking:



II 2G Ex de IIC T6 Gb
II 2G Ex de mb IIC T6 Gb
II 2G Ex e IIC T6 Gb
II 2G Ex ia/ib IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

Ambient temperature: -20°C ÷ +40°C or -20°C ÷ +50°C - depends of component I_{the}

Mechanical protection: IP 66 category 1, in accordance with EN 60529:1991/C1:1993/A1:2000

Resistance to shock: IK 08 in accordance with EN 62262:2002

Degree of protection: I (protective grounding) in accordance with EN 60947-1:2007/A1:2011

Design and construction of products are in accordance with apparatus standards EN 60947-1:2007/A1:2011, EN 60947-5-1:2004/C1:2005/A1:2009, EN 60947-5-5:2007, EN 60204:2006/C1:2010 and all other related standards.

Control units are in conformity with EU Directives: ATEX Directive 94/9 EC, LV Directive 2006/95/EC, EMC Directive 2004/108 EC, RoHS Directive 2002/95/EC.

Control units are designed, produced and tested in conformity with the Quality management systems in accordance with EN ISO 9001:2008 and EN ISO/IEC 80079-34:2011.

TECHNICAL DATA

Rated insulation voltage U _i :	- 630 V AC (type with mantle terminals type SL U _i = 400V AC)
Rated operational voltage U _e :	- depends on the built-in components
Conventional enclosed component thermal current I _{the} :	- 16 A max. for ambient temperature -20°C ÷ +40°C - 10 A max. for ambient temperature -20°C ÷ +50°C
PE terminals (inside of the enclosure):	- 2x6 mm ² max. solid, stranded, flexible, - tightening torque 2,5 Nm
Tightening torque for build-in component terminals:	- 0,8 Nm
PE/N bus bar, SKX 15 only:	- max. 11 x (2x2,5 mm ²) solid, stranded, flexible; Tightening torque 0,8 Nm
Cover fixing:	- four cheese head screw M5x25/10-Z4 A2 ISO 7045 with plate 4,5 A2 DIN 6905, - tightening torque 2,0 Nm
The outer cable diameter for cable gland SPU 25:	- Ø 6-10/15 mm
Tightening torque for cable gland SPU 25 pressing screw:	- 2,5 Nm
Tightening torque for plug SPC 25:	- 4,0 Nm
Wiring:	- H07V-K 1.5mm ²
Enclosure:	- SMC black, RAL 9005 - resistance to impact 7 J - surface resistance < 10 ⁹ Ω - TPE 35 ShA
Gasket:	
Dimension (without cable glands):	SKX 12 : 100 x 100 x 80 mm SKX 13 : 150 x 100 x 80 mm SKX 14 : 200 x 100 x 80 mm SKX 15 : 200 x 150 x 80 mm SKX 15H: 200 x 150 x 135 mm
Mounting:	SKX 12: 75 x 50 mm SKX 13: 75 x 100 mm SKX 14: 75 x 150 mm SKX 15/15H: 125 x 150 mm

MODEL CODE

The program consists of serial control units and control units according to customer's request.

Model code of serial control units:

Enclosure / Type no.	Built-in components - Actuating components - Cable glands and plugs
Control unit SKX 12/1	SLP - SPO 02/1 - SPU 25
Control unit SKX 12/2	SLP - SPO 02/2 - SPU 25
Control unit SKX 12/3	SLP - SPO 02/4 - SPU 25
Control unit SKX 12/21	SMS 03/1 - SMO 17/1 - SPU 25
Control unit SKX 12/22	SMS 03/8 - SMO 17/2 - SPU 25
Control unit SKX 12/23	SMS 03/6 - SMO 17/4 - SPU 25
Control unit SKX 12/31	PBT 01 - GHG 410 1906 R0005 - SPU 25
Control unit SKX 12/32	PBT 01 - SPO 01/1 - SPU 25
Control unit SKX 12/33	PBT 01 - SPO 01/2 - SPU 25
Control unit SKX 12/34	PBT 01 - GHG 410 1905 R0005 - SPU 25
Control unit SKX 12/35	PBT 01 - GHG 410 1906 R0005 with protector - 2xGHG 960 1955 R0002
Control unit SKX 12/36	PBT 011 - GHG 410 1906 R0005 - 2xGHG 960 1955 R0002
Control unit SKX 12/37	GHG 4101901 R0193 - GHG 410 1944 R0010 - SPU 25
Control unit SKX 12/62	5x4 mm2 EURO 4/35 grey on rail TH 35-7,5 - 2x SPU 25
Control unit SKX 12/63	5x4 mm2 EURO 4/35 blue on rail TH 35-7,5 - 2x SPU 25 blue
Control unit SKX 13/1	2xPBT 01 - SPO 01/1 - SPO 01/2 - SPU 25
Control unit SKX 13/11	PBT 01 - SPO 01/1 - SLP - SPO 02/2 - SPU 25
Control unit SKX 13/21	SL8 - 6xSPU 25
Control unit SKX 13/71	GHG 23. ...R.... (Ex 23 4 024) - SMO 17/2 - SPU 25
Control unit SKX 13/72	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - SPU 25
Control unit SKX 13/10	SMS 03/1 - SMO 17/1 - SPU 25
Control unit SKX 13/20	SMS 03/4 - SMO 17/2 - SPU 25
Control unit SKX 13/30	SMS 03/5 - SMO 17/2 - SPU 25
Control unit SKX 13/40	SMS 03/6 - SMO 17/2 - SPU 25
Control unit SKX 13/60	SMS 03/3 - SMO 17/3 - SPU 25
Control unit SKX 13/70	SMS 03/2 - SMO 17/1 - SPU 25
Control unit SKX 13/80	SMS 03/7 - SMO 17/1 - SPU 25
Control unit SKX 13/100	SMS 03/8 - SMO 17/5 - SPU 25
Control unit SKX 13/110	SMS 03/9 - SMO 17/1 - SPU 25
Control unit SKX 13/120	SMS 03/11 - SMO 17/2 - SPU 25
Control unit SKX 14/1	2xPBT 01 - SPO 01/1 - SPO 01/2 - SLP - SPO 02/2 - SPU 25
Control unit SKX 14/11	3xPBT 01 - SPO 01/1 - SPO 01/2 - SPO 01/3 - SPU 25
Control unit SKX 14/21	SL 8 - 8xSPU 25
Control unit SKX 14/22	3xSLP - SPO 02/1 - SPO 02/2 - SPO 02/3 - SPU 25
Control unit SKX 14/31	3xPBT 01 - SPO 01/1 - SPO 01/2 - GHG 410 1906 R0005 - SPU 25
Control unit SKX15/1	2xPBT 01 - SPO 01/1 - SPO 01/2 - 2xSLP - SPO 02/1 - SPO 02/2 - 2xSPU 25
Control unit SKX15/11-11	2xPBT 01 - SPO 01/1 - SPO 01/2 - AM 72 100/1 A - 2xSPU 25
Control unit SKX15/11-12	2xPBT 01 - SPO 01/1 - SPO 01/2 - AM 72 50/1 A - 2xSPU 25
Control unit SKX15/11-21	2xPBT 01 - SPO 01/1 - SPO 01/2 - AM 72 100/5 A - 2xSPU 25
Control unit SKX15/11-22	2xPBT 01 - SPO 01/1 - SPO 01/2 - AM 72 50/1 A - 2xSPU 25
Control unit SKX15/21-11	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - AM 72 100/1 A - 2xSPU 25
Control unit SKX15/21-12	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - AM 72 50/1 A - 2xSPU 25
Control unit SKX15/21-21	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - AM 72 100/5 A - 2xSPU 25
Control unit SKX15/21-22	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - AM 72 50/5 A - 2xSPU 25
Control unit SKX15/34	4xPBT/1 - 2xSPO 01/1 - 2xSPO 01/2 - 2xSPU 25
Control unit SKX15/41	SMS 03/1 - 2xCTS16U - 2xSPU 25
Control unit SKX15/50	SMS 03/12 - SMO 17/2 - SPU 25
Control unit SKX15/90	SMS 03/10 - SMO 17/3 - SPU 25
Control unit SKX15/51	SMS 03/9 - SMO 17/1 - 2xPBT/1 - SPO 01/1 - SPO01/2 - 2xSPU 25
Control unit SKX15/61	GHG 23. ...R.... (Ex 23 4 024) - SMO 17/2 - 5xCTS4UN - SPU 25
Control unit SKX15/62	GHG 23. ...R.... (Ex 23 8 067) - SMO 17/1 - 5xCTS4UN - SPU 25
Control unit SKX15/65	4xSL5 - 8xSPU 25

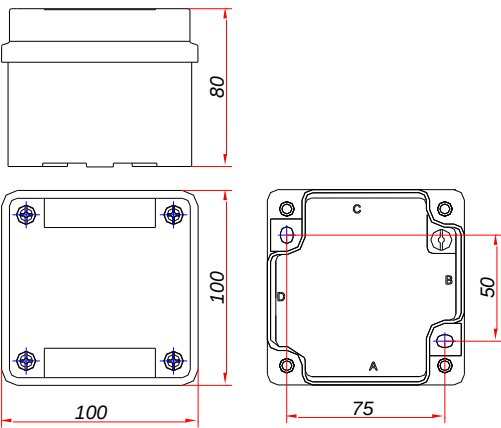
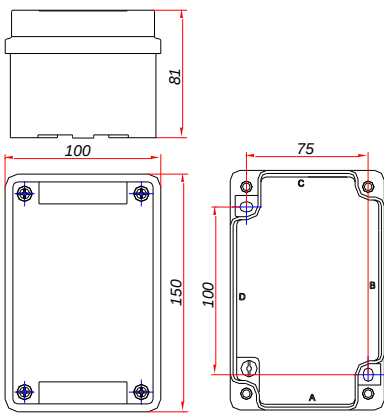
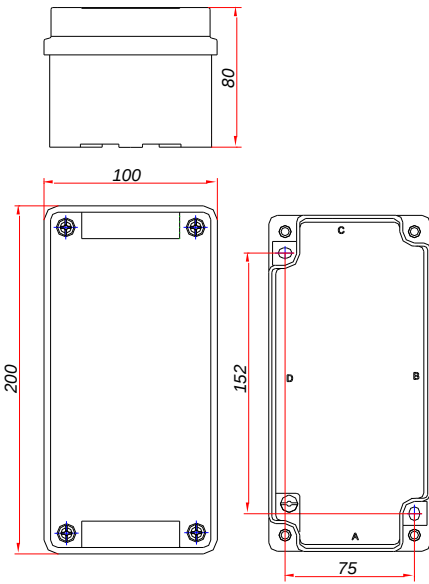
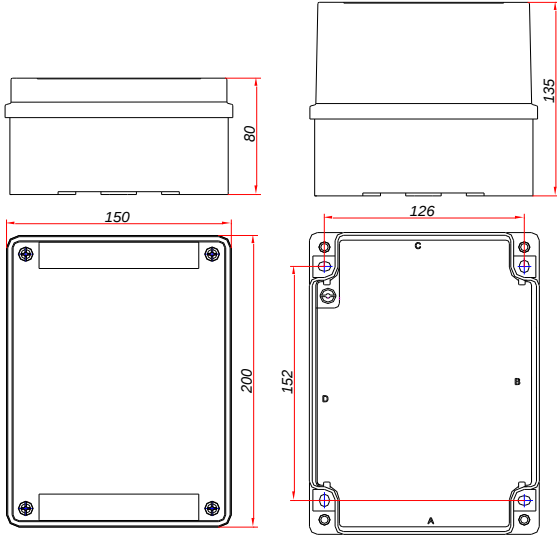
Control unit according to customer's request is marked with standard model code - SKX 12, SKX13, SKX 14, SKX 15 and MSRU number. MSRU number represents the factory serial number.

For example SKX 15/MSRU 1234.12

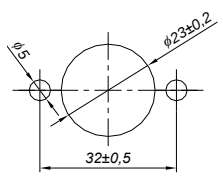
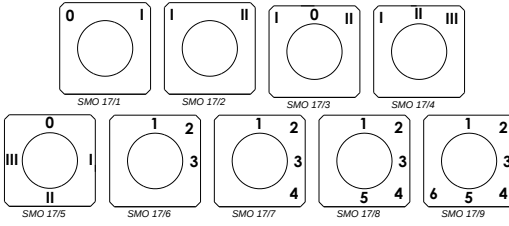
Control unit, as a single unit formed of more enclosures, are marked with standard model code of each used enclosure - SKX 12, SKX13, SKX 14, SKX 15 and MSRU number. MSRU number represents the factory serial number.

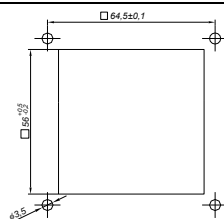
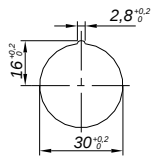
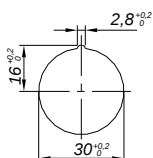
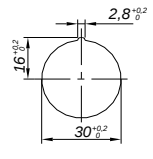
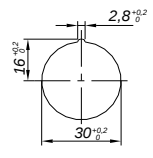
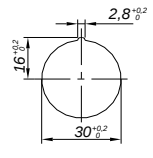
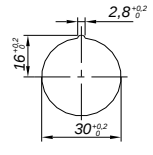
For example SKX 14-15/MSRU 1235.13

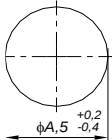
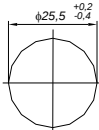
CONTROL UNIT COMPONENTS
Enclosures (without cable glands):

SKX 12/ ..	SKX 13/ ..
	
SKX 14/ ..	SKX 15/ .. , SKX 15 H/ ..
	

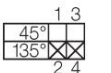
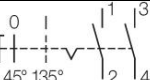
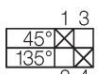
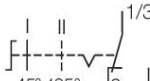
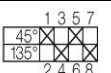
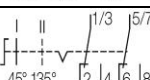
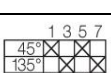
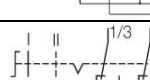
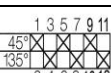
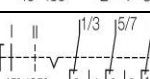
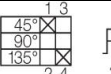
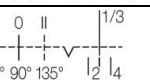
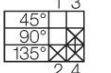
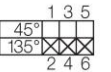
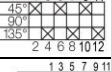
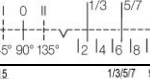
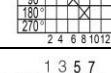
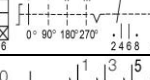
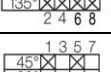
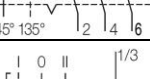
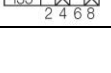
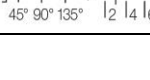
Actuator and indicator:

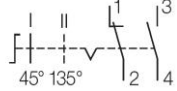
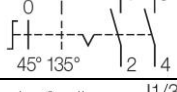
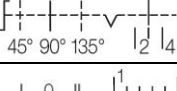
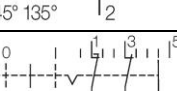
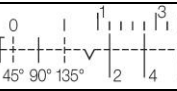
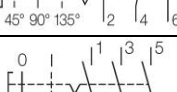
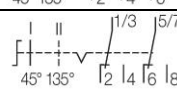
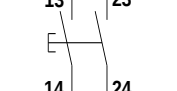
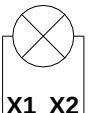
Type	Technical data	Mounting	Review
SMO 17/.	SWITCH ACTUATOR Explosion protection: II 2G Ex e IIC Gb II 2D Ex tb IIIC Db		 

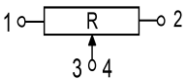
SAM 72	FRONT ELEMENT OF MEASURING INSTRUMENTS Explosion protection: II 2G Ex e IIC Gb II 2D Ex tb IIIC Db																								
SPO 01/.	PUSHBUTTON ACTUATOR Explosion protection: II 2G Ex e IIC Gb II 2D Ex tb IIIC Db		<table><tr><th colspan="2">Type SPO 01/.</th></tr><tr><td>SPO 01/01</td><td>0</td></tr><tr><td>SPO 01/02</td><td>I</td></tr><tr><td>SPO 01/03</td><td>II</td></tr><tr><td>SPO 01/04</td><td>RED</td></tr><tr><td>SPO 01/05</td><td>GREEN</td></tr><tr><td>SPO 01/06</td><td>WHITE</td></tr><tr><td>SPO 01/07</td><td>START</td></tr><tr><td>SPO 01/08</td><td>STOP</td></tr><tr><td>SPO 01/09</td><td>ON</td></tr><tr><td>SPO 01/10</td><td>OFF</td></tr></table>	Type SPO 01/.		SPO 01/01	0	SPO 01/02	I	SPO 01/03	II	SPO 01/04	RED	SPO 01/05	GREEN	SPO 01/06	WHITE	SPO 01/07	START	SPO 01/08	STOP	SPO 01/09	ON	SPO 01/10	OFF
Type SPO 01/.																									
SPO 01/01	0																								
SPO 01/02	I																								
SPO 01/03	II																								
SPO 01/04	RED																								
SPO 01/05	GREEN																								
SPO 01/06	WHITE																								
SPO 01/07	START																								
SPO 01/08	STOP																								
SPO 01/09	ON																								
SPO 01/10	OFF																								
SPO 02/.	SIGNAL LAMP FRONT ELEMENT Explosion protection: II 2G Ex e IIC Gb,II 2D Ex tb IIIC Db		<table><tr><th colspan="2">Type SPO 02/.</th></tr><tr><td>SPO 02/01</td><td>RED</td></tr><tr><td>SPO 02/02</td><td>GREEN</td></tr><tr><td>SPO 02/03</td><td>YELLOW</td></tr><tr><td>SPO 02/04</td><td>TRANSPARENT</td></tr></table>	Type SPO 02/.		SPO 02/01	RED	SPO 02/02	GREEN	SPO 02/03	YELLOW	SPO 02/04	TRANSPARENT												
Type SPO 02/.																									
SPO 02/01	RED																								
SPO 02/02	GREEN																								
SPO 02/03	YELLOW																								
SPO 02/04	TRANSPARENT																								
GHG 410 1904 R0012	KEY-OPERATED PUSHBUTTON ACTUATOR Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66																								
GHG 410 1905 R0005	MUSHROOM-HEAD PUSHBUTTON ACTUATOR (EMERGENCY-STOP) Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66																								
GHG 410 1906 R0005	KEY-OPERATED MUSHROOM-HAED PUSHBUTTON ACTUATOR (EMERGENCY-STOP) Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66																								
GHG 410 1944 R0010	POTENTIOMETER ACTUATOR Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66																								
SPU 25 GHG 96092...P...	Cable gland ISO 25 SPU 25 Explosion protection: II 2D Ex e IIC Gb II 2D Ex tb IIIC Db Cable gland ISO 16 – ISO 40 Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66																								

FGA1 – FGA4	CABLE GLAND ISO 16 - ISO 40 Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66/67		
SPC 25 GHG 960 663 P...	PLUG ISO 25 SPC 25 Explosion protection: II 2D Ex e IIC Gb II 2D Ex tb IIIC Db PLUG ISO 16 – ISO 40 GHG 960 663 P... Explosion protection: II 2G Ex e II II 2D Ex tD A21 IP66		

Build-in components:

Type	Technical data	Sheme	Review
SMS 03/.	CONTROL SWITCH Explosion protection: Rated insulation voltage: 690 V Rated thermal current: 16 A Switching capacity AC 23: 690 V/8 A Switching capacity AC 3: 380 V/10 A Switching capacity DC 21: 60 V/10 A 110 V/1,85 A 220 V/0,6 A Terminals: 2 x 1,0 - 2,5mm ²	  SMS 03/1	
		  SMS 03/4	
		  SMS 03/5	
		  SMS 03/6	
		  SMS 03/12	
		  SMS 03/3	
		  SMS 03/2	
		  SMS 03/7	
		  SMS 03/10	
		  SMS 03/8	
		  SMS 03/9	
		  SMS 03/11	

GHG 23. ... R....	CONTROL SWITCH Explosion protection: II 2G Ex de IIC Rated insulation voltage: 690 V Rated thermal current: 10 A Switching capacity AC 11: 230 V/10 A 500 V/6 A Switching capacity DC 11: 24 V/2 A 230 V/0,4 A Terminals: 2 x 1,0 - 2,5mm ²	 	060	
		 	062	
		 	065	
		 	061	
		 	063	
		 	067	
		 	011	
		 	034	
		 	037	
		 	049	
		 	023	
		 	019	
		 	033	
		 	024	
PBT/ . PTB/ . G	PUSHBUTTON Explosion protection: II 2G Ex de IIC Gb I M2 Ex de I Mb Rated insulation voltage: 690 V Rated thermal current: 16 A Switching capacity AC 15: 250 V/6 A 500 V/4 A Switching capacity DC 13: 24 V/6 A 60 V/0,8 A 110 V/0,5 A Terminals: 2 x 1,0 - 2,5mm ² PTB/ . G - gold plated contacts For voltages up to 60 V and currents 1,0 mA to 200 mA	  	PBT/01 PBT/02 PBT/03	
SLP	SIGNAL LAMP Explosion protection: II 2G Ex de IIC Gb I M2 Ex de I Mb Rated insulation voltage: 690 V Rated voltage: 12 to 250 V AC/DC Rated current: 12 to 2,5 mA Terminals: 2 x 1,0 - 2,5 mm ²			

GHG 410 1901 R....	POTENTIOMETER Explosion protection: II 2G Ex de IIC Rated voltage: up to 250 V Rating: 1 W Turning range: 270° Scale: 0-100% Terminals: 2 x 1,0 - 2,5 mm ²		
AM 72	MEASURING INSTRUMENT Explosion protection: II 2G Ex e II Movement: moving iron Measuring range: n / 1 A, up to 25 A direct Overload range: 1 : 1,5 Measuring accuracy: class 2,5 Terminals: 2 x 1,5 - 4 mm ² Explosion protection: II 2G Ex ib IIC Movement: moving coil Measuring range: 0 - 20 mA, 4 - 20 mA Measuring accuracy: class 1,5 Overload range: 1 : 1,2 Terminals: 2 x 1,5 - 4 mm ² Intrinsically parameters: L _i = 0,1 mH max. C _i = 0,1 nF max. U _i = 30 V max. U _i = 150 mA max. U _m = 690 V _{rms}	-	
VM 72	MEASURING INSTRUMENT Explosion protection: II 2G Ex e mb II Movement: moving iron Measuring range: 6 - 660 V Measuring accuracy: class 2,5 Overload range: 1 : 1,5 Terminals: 2 x 1,5 - 4 mm ²	-	
SL 5	MANTLE TERMINALS BLOCK Explosion protection: II 2G Ex e IIC Gb Rated voltage: 400 V Thermal current: 10/16 A Terminals: 3 x 4 mm ² , 2 x 4 mm ² + 2 x 2,5 mm ²	-	
SL 8	MANTLE TERMINALS BLOCK Explosion protection: II 2G Ex e IIC Gb Rated voltage: 400 V Thermal current: 10/16 A Terminals: 3 x 4 mm ² , 2 x 4 mm ² + 2 x 2,5 mm ²	-	
2 x 16 mm ² CTS16U 5 x 4 mm ² CTS4UN 5 x 4 mm ² CTS4UN RAL 5012	TERMINAL BLOCK Terminals 2x16 mm ² or 5 x 4 mm ² on rail TH 35-7,5 Explosion protection: II 2G II(2) D Ex e IIC Rated voltage: 630 V Thermal current: 10/16 A Terminals 5 x 4 mm ² RAL 5012 on rail TH 35-7,5 Explosion protection: II 2G Ex ia/ib IIC Maximum safe voltage: 60 V	-	

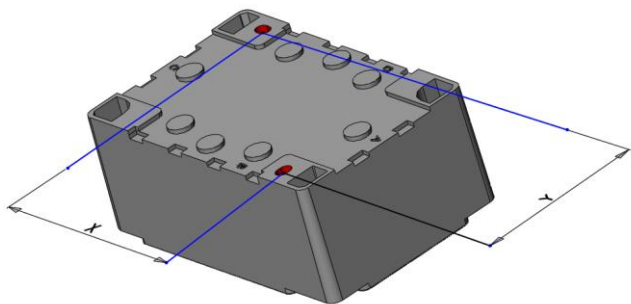
INSPECTION, MAINTENANCE, REPAIR, OVERHAUL

Inspection and maintenance have to be performed in accordance with standard EN 60079-17:2007/C1:2008, manufacturer's user manual, national regulations, and user policy.

Repair should be done by the manufacturer or a person legally authorized by the manufacturer, with original parts according to products documentation, in accordance with standard EN 60079-19:2011.

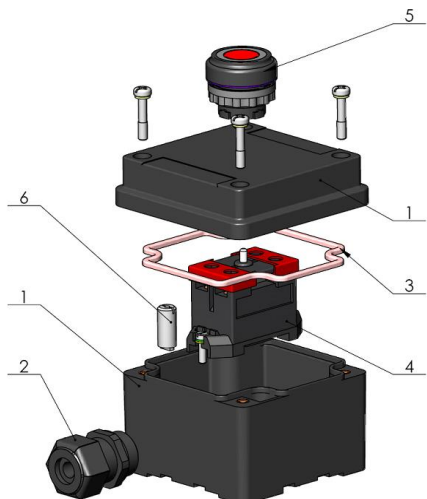
In case of improper installation, failure of inspection and maintenance, unauthorized repair or any overhaul on the product, the manufacturer is free of all responsibility, and the Declaration of Conformity becomes invalid

MOUNTING:



Kućiste	dimenzije	
	X[mm]	Y[mm]
SKX 12	75	50
SKX 13	100	75
SKX 14	152	75
SKX 15/15H	152	126

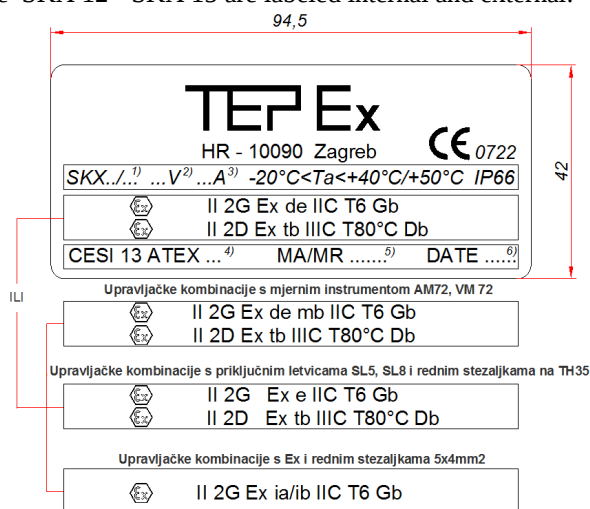
SPARE PARTS (according component specification)



1. Enclosure and cover SKX 12-15 with cover screw and PE terminal body
2. Cable glands and plugs; according to specification
3. Cover gasket SKX . .
4. Build-in components; according to specification
5. Actuators and indicators; according to specification
6. Terminal PE

MARKING

Explosion protected control units type SKX 12 - SKX 15 are labeled internal and external:



¹⁾ Model code

²⁾ Rated voltage U_e - depends on the built-in components

³⁾ Thermal current I_{the} - depends on the built-in components and ambient temperature

⁴⁾ Type examination certificate number

⁵⁾ Factory number

⁶⁾ Date, month/year

Warning label:

WARNING
DO NOT OPEN WHEN ENERGIZED