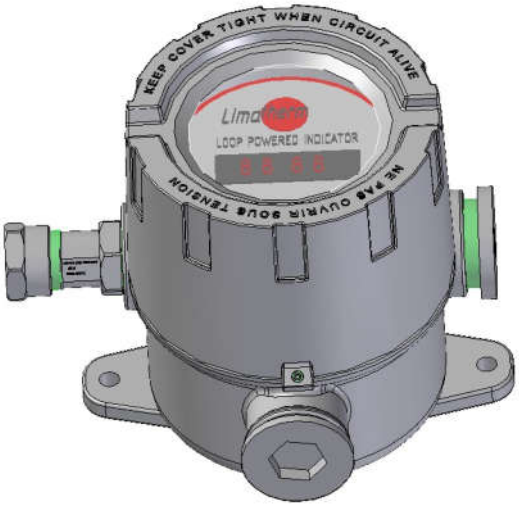
N-L3826

Updated 27.01.2022



APPLICATION MANUAL

Flameproof Ex d, Intrinsically safe Ex ia

Field mounted transmitter ***XD-80TR***

Field mounted transmitter with indicator ***XD-80TIR***

Contents:

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1.Technical data.

Type	Type of protection	Transmitter, display type	ATEX marking
XD-80TR **XD-80TIR**	Ex d	non Ex ia	CE 1026 Ex II 2G Ex db IIC T6...T5 Gb CE 1026 Ex II 2D Ex tb IIIC T50...80°C Db, IP68
XD-80TR	Ex ia	Ex ia	CE 1026 Ex II 2G Ex ia IIC T6...T5 Gb CE 1026 Ex II 2D Ex tb IIIC T50...80°C Db, IP68

Ambient temperature T_{amb} [°C]	Temperature class	Surface temp. Ts [°C]
$-40 \le T_{amb} \le +50°C$	T6	-
$-40 \le T_{amb} \le +85°C$	T5	-
$-40 \le T_{amb} \le +40°C$	-	T50°C
$-40 \le T_{amb} \le +55°C$	-	T60°C
$-40 \le T_{amb} \le +70°C$	-	T80°C

	XD-80TR	XD-80TIR
Example of transmitter types Ex ia	FlexTop 2211, FlexTop 2221, FlexTop 2231, IPAQ-HX, dTRANS T01 956555, dTRANS T01 956556, T32.1S.0IS, Rosemount 248, Rosemount 644	-
Example of transmitter types non Ex ia	FlexTop 2211-1, FlexTop 2221-1 Hart HCF, FlexTop 2231-1 Profibus PA, IPAQ-H, APAQ-HCF, APAQ-HRF, MESO-H Hart, dTrans T01, dTrans T01 Hart, dTrans T03 B956531, dTrans T03 BU956533	FlexTop 2211-1, FlexTop 2221-1 Hart HCF, IPAQ-H, APAQ-HCF, APAQ-HRF, MESO-H Hart, dTrans T01, dTrans T01 Hart, dTrans T03 B956531
Electrical parameters of transmitters	See data sheet	
Type of enclosure	XD-I80	XD-I80win
Process openings D_1	M20x1.5, M24x1.5, M25x1.5, M27x1.5, 1/2NPT, 3/4NPT	
Conduit openings: D_2, D_3	M20x1.5, M24x1.5, M25x1.5, 1/2NPT, 3/4NPT	
Material, surface, finishing	Copper-free aluminium, conversion layers, Cal, chemical resistant paint	
Mounting holes	2 x Ø7, spacing 108mm	
Weight	~ 1000g	~1300g
Indicator type	-	LPI-01

! CAUTION !
Besides listed transmitters any another one which satisfy conditions could be used: **- for Ex d sensors, max. internal power of transmitters can not break 2,0 W** **- for Ex ia sensors, used transmitters must be Ex ia.**

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2.Technical data of transmitters.

Table 1. Non intrinsically safe transmitters used exchangeable in the sensors.

Parameter		FlexTop 2211-1	FlexTop 2221-1	FlexTop 2231-1	IPAQ-H	APAQ-HCF	APAQ-HRF
Output signal		4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA
Supply voltage		6,5..30 VDC	8..30 VDC	9..17,5 VDC	6,5..30 VDC	6,5..32 VDC	6,5..32 VDC
Burden resistance		$R_{obc.}=\frac{U-6,5V}{23mA}$	$R_{obc.}=\frac{U-12V}{23mA}$	$R_{obc.}=\frac{U-9V}{23mA}$	$R_{obc.}=\frac{U-6,5V}{22mA}$	$R_{obc.}=\frac{U-6,5V}{25mA}$	$R_{obc.}=\frac{U-6,5V}{25mA}$
Circuit galvanic isolation	**U**	< 30 VDC	< 30 VDC	< 20 VDC	1500VAC\1min	-	-
	I	< 0,1 A	< 0,1 A	< 100 mA	-	-	-
	P	< 0,75 W	< 0,75 W	< 0,75 W	-	-	-
Communica-tion way		-	HART HCF	Profibus PA ver. 3,0 VPD 1	-	-	-
Explosion protection concept		Non intrinsically safe	Non intrinsically safe	Non intrinsically safe	Non intrinsically safe	Non intrinsically safe	Non intrinsically safe
Interference emission		EN-50 982-2	EN-50 982-2	EN 61 326	-	-	-
Noise immunity		EN-50 981-1	EN-50 981-1	EN 61 326	-	-	-

Parameter		MESO-H	JUMO dTRANS T01	JUMO dTRANS T01 HART	JUMO dTRANS T03 B 956531	JUMO dTRANS T03 BU 956533
Output signal		4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA
Supply voltage		10..42 VDC	-	10..35 VDC	7,5..30 VDC	15..30 VDC
Burden resistance		$R_{obc.}=\frac{U-10V}{23mA}$	$R_{obc.}=\frac{U-8V}{22mA}$	$R_{obc.}=\frac{U-10V}{22mA}$	$R_{obc.}=\frac{U-7,5V}{22mA}$	$R_{obc.}=\frac{U-15V}{22mA}$
Circuit galvanic isolation	**U**	1500 VAC/1min	-	2,0kV / 50Hz	-	-
	I	-	-	-	-	-
	P	-	-	-	-	-
Communica-tion way		HART	-	HART	-	-
Explosion protection concept		Non intrinsically safe	Non intrinsically safe	Non intrinsically safe	Non intrinsically safe	Non intrinsically safe
Interference emission		-	-	EN 61 326 Class B	EN 61 326 Class B	EN 61 326 Class B
Noise immunity		-	-	Industrial requirements	Industrial requirements	Industrial requirements

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Table 2. Transmitters with galvanic isolated circuits. On request sensor can be equipped with other types of ATEX approved transmitters with or not circuits galvanic isolator.

Parameter		FlexTop 2211	FlexTop 2221	FlexTop 2231		IPAQ-HX
Output signal		4...20 mA	4...20 mA	Digital		4...20 mA
Supply voltage		6,5...30 VDC	8...30 VDC	9...32VDC		8...30 VDC
Burden resistance [Kohm]		R_{obc} = U - 6,5 V / 23 mA	R_{obc} = U - 12 V / 23 mA	Zener Barier	FISCO coupler	R_{obc} = U - 8 V / 22 mA
Max internal voltage U_i		T 30 VDC	T 30 VDC	T20 VDC	T17,5 VDC	T 30 VDC
Max internal current I_i		100 mA	100 mA	T100mA	T215mA	T 100 mA
Max internal power P_i		0,75 W	0,75 W	T0,75 W	T2 W	T 900 mW
Internal capacitance L_i		T 15 µH	T 15 µH	10 µH		~ 0
Internal inductance C_i		T 2 nF	T 2 nF	2 nF		~ 0
Circuit galvanic isolation	**U**	T 30 VDC	T 30 VDC	-		1500 VAC / 1 min
	I	T 0,1 A	T 0,1 A	-		-
	P	T 0,75 W	T 0,75 W	-		-
Temperature class for Ex II 1 G	**T6**	-40 <T_{amb}< 50°C	-40 <T_{amb}< 50°C	-40 <T_{amb}< 50°C		-40 <T_{amb}< 50°C
	T5	-40 <T_{amb}< 85°C	-40 <T_{amb}< 85°C	-40 <T_{amb}< 85°C		-40 <T_{amb}< 65°C
	T4	-	-	-		-40 <T_{amb}< 85°C
Communication way		-	Hart HCF	Profibus PA ver. 3.0 DPV1		-
Explosion protection concept		Ex ia II C T5/T6 Ex II 1 GD	Ex ia II C T5/T6 Ex II 1 GD	Ex ia II C T5/T6 Ex II 1 GD		Ex ia II C T4/T5/T6 Ex II 1 GD
ATEX Certificate		Demko 03 ATEX 134045 X	Demko 03 ATEX 134045 X	Demko 01 ATEX 129013X		Demko 03 ATEX 133946 X

Parameter		dTRANS T01 956555	dTRANS T01 956556	T32.1*.0IS	Rosemount 248	Rosemount 644
Output signal		4...20 mA	4...20 mA	4...20 mA	4...20 mA	4...20 mA
Supply voltage		8...30 VDC	10...30 VDC	10,5...30 VDC	12...42,4 VDC	12...42,4 VDC
Burden resistance [Kohm]		R_{obc} = U - 8 V / 0,022 A	R_{obc} = U - 8 V / 22 mA	R_{obc} = U -11,5V / 0,023 A	R_{obc} = 40,8 × (U - 12)	R_{obc} = 40,8 × (U - 12)
Max internal voltage U_i		T 30 VDC	T 30 VDC	30 VDC	30 VDC	30 V
Max internal current I_i		T 100 mA	T 100 mA	130 mA	130 mA	200 mA
Max internal power P_i		T 750 mW	T 750 mW	800 mW	1,0 W	0,67W or 1,0W
nternal capacitance L_i		~ 0	~ 0	100 µH	0	0
Internal inductance C_i		~ 0	~ 0	7,8 nF	3,6 nF	10 nF
Circuit galvanic isolation	**U**	3,75 kV / 50 Hz	3,75 kV / 50 Hz	1200 VAC / 1s	500 VAC / 50/60Hz	500 VAC / 50/60Hz
	I	-	-	-	-	-
	P	-	-	-	-	-
Temperature clas for Ex II 1 G	**T6**	-20 <T_{amb}< 40°C	-20 <T_{amb}< 40°C	-50 <T_{amb}< 60°C	-60 <T_{amb}< 60°C	-60 <T_{amb}< 40°C (0,67W)
	T5	-20 <T_{amb}< 50°C	-20 <T_{amb}< 50°C	-50 <T_{amb}< 75°C	-60 <T_{amb}< 80°C	-60 <T_{amb}< 50°C (0,67W) -60 <T_{amb}< 40°C (1,0W)
	T4	-20 <T_{amb}< 60°C	-20 < T_{amb}< 60°C	-50 <T_{amb}< 85°C	-	-60 <T_{amb}< 80°C (1,0 W)
Temperature class for Ex II 2 G Ex II 3 G	**T6**	-40 <T_{amb}< 55°C	-40 <T_{amb}< 55°C	-	-	-
	T5	-40 <T_{amb}< 70°C	-40 <T_{amb}< 70°C	-	-	-
	T4	-40 <T_{amb}< 85°C	-40 <T_{amb}< 85°C	-	-	-
Communication way		-	Hart	Hart	Hart	Hart
Explosion protection concept		Ex ia II C T4/T5/T6 Ex II 1 G	Ex ia II C T4/T5/T6 Ex II 1G, Ex II 2G	Ex ia II C T4/T5/T6 Ex II 1 G	Ex ia II C T5/T6 Ex II 1 GD	Ex ia II C T4/T5/T6 Ex II 1 GD
ATEX Certificate		ZELM 99 ATEX 0018 X	PTB 01 ATEX 2124	BVS 08 ATEX E 019 X	Baseefa 03 ATEX 0030X	BAS 00 ATEX 1033X

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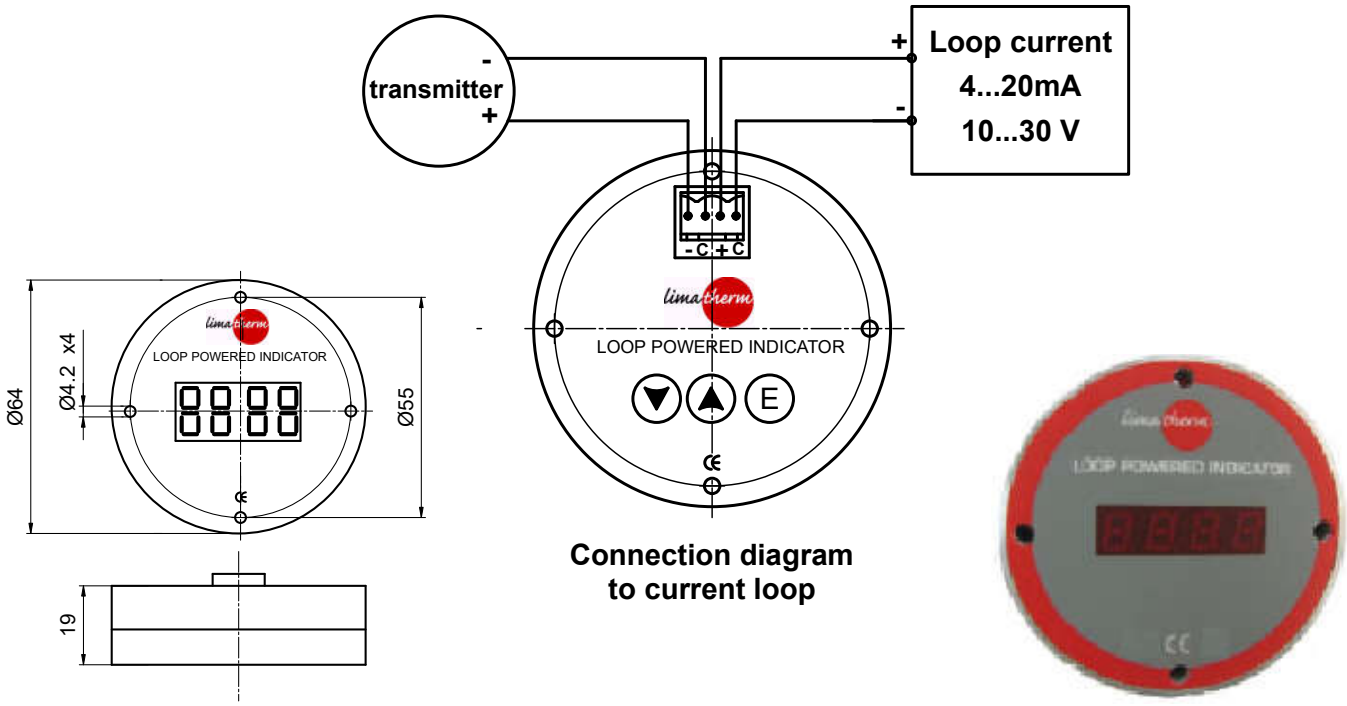
3. Technical data of indicator.

Programmable loop powered LED display – type LPI-01 to assembling in Ex d version



Connection diagram to current loop

TECHNICAL DATA			
Performances		**Functionalities**	
Reference operating condition	25ºC	Parameters	Zero, span, decimal, point, refresh rate, unit
Max. Measured error	0,1% of the programmed range +/- 1 digit	Indication limits	-1999 to +9999
		Programmable range	-1999 to +9999
Influence of ambient temperature (tem. drift)	20ppm/ºC of measuring range at 20ºC as reference temperature	Decimal points position	0, 1, 2, 3 decimals
Output signal	4...20 mA		
Supply voltage	24V (10...30V)	Over-load limits	From 3.5 to 20.5 mA
Voltage drop out	3,3V at 4 mA and 3,7V at 20 mA	Refresh rate	From 1 to 10 second
Minimum current of LED activation	3.5 mA	Calibration points	Zero (4 mA) and span (20 mA), stored on FLASCH
Digits	LED, 4 digits7 segments, height 9,5mm	Unit	ºC, ºF, ºK, % in cycle: 4sec. value – 2sec. unit
Visible dimension	30x14	**Mechanical construction**	
Display characteristics	6400ucd for If=10mA	Electrical loop connection	2 terminals, max. wire section 1mm² (16 AWG)
Data storage	FLASCH		
Storage period	10 years (non powered)	Dimension	Ø64 x 19 mm
Mounting	4 holes/90 Ø 4,2 on Ø 55	Weight	65g
Collaboration with Hart protocol transmitter	Yes	Application, Fixing	XD-I80win Fixing kit: KDL-1
Operating conditions			
Ambient temperature	-20...80ºC		
Storage temperature	-30...80ºC		
Moisture	25 bei 95% non condensating		
Ingress protection	IP 20		
Electromagnetic compatibility	Carried out with positive results EN 61000, EN 55022		

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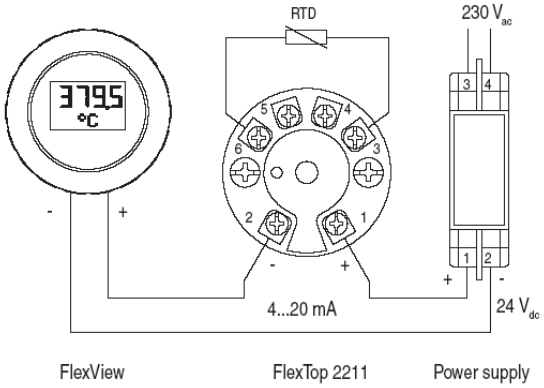
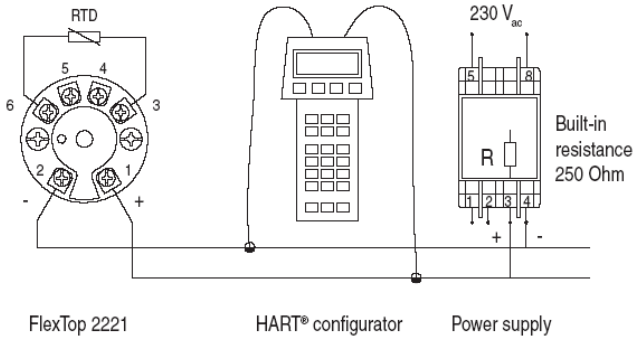
4. Connection of sensor with transmitter to the intrinsically safe circuit.

DIAGRAM OF TRANSMITTERS' CONNECTION TO THE CIRCUIT

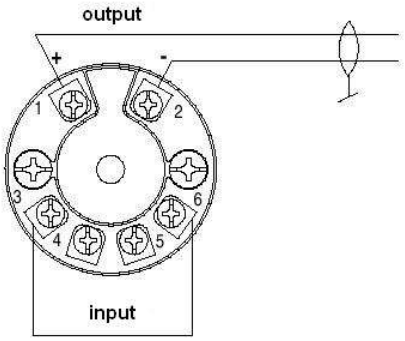
Connection of FlexTop 2211



Connection of FlexTop 2221



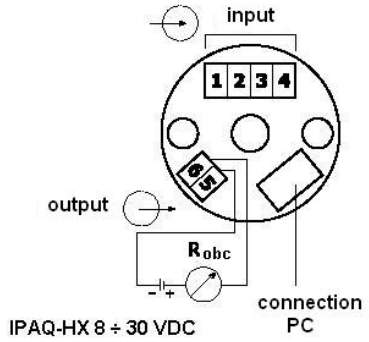
Connection of FlexTop 2231 to the Profibus PA

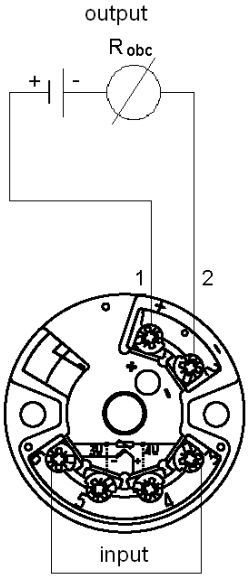


Cable Profibus® PA
2 - connector shielded strand

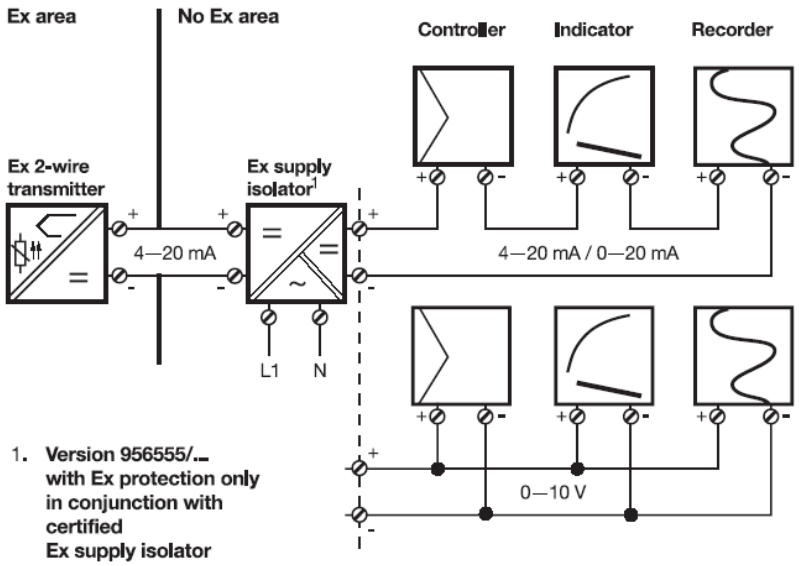
NOTICE: to minimize electrical noise is suggested to connect cable shield to the metall housing

Connection of IPAQ-HX





Connection of dTRANS T01 956555



1. Version 956555/... with Ex protection only in conjunction with certified Ex supply isolator

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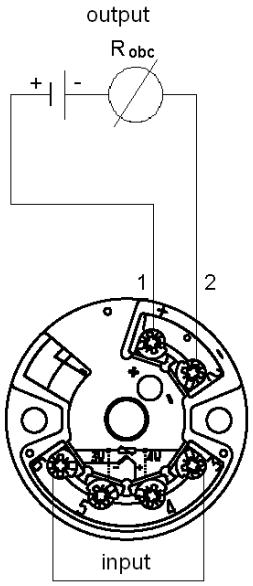
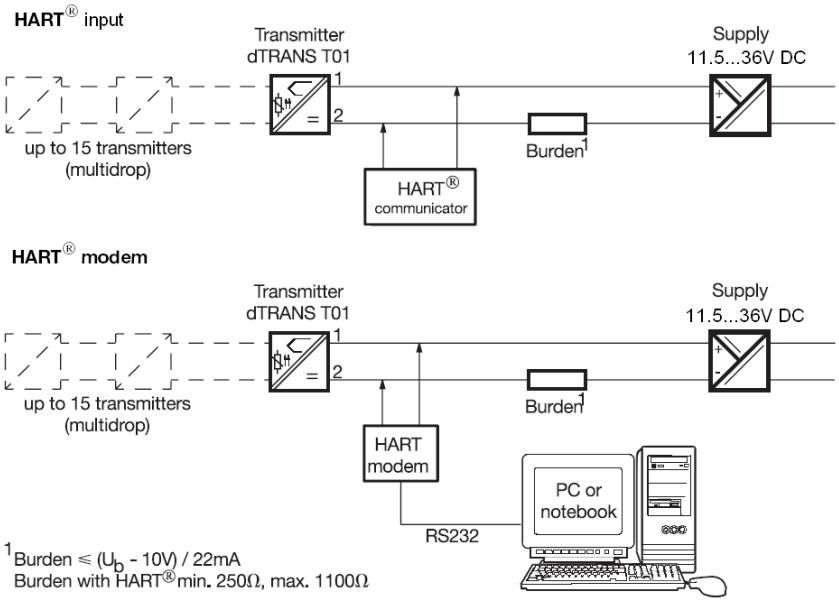
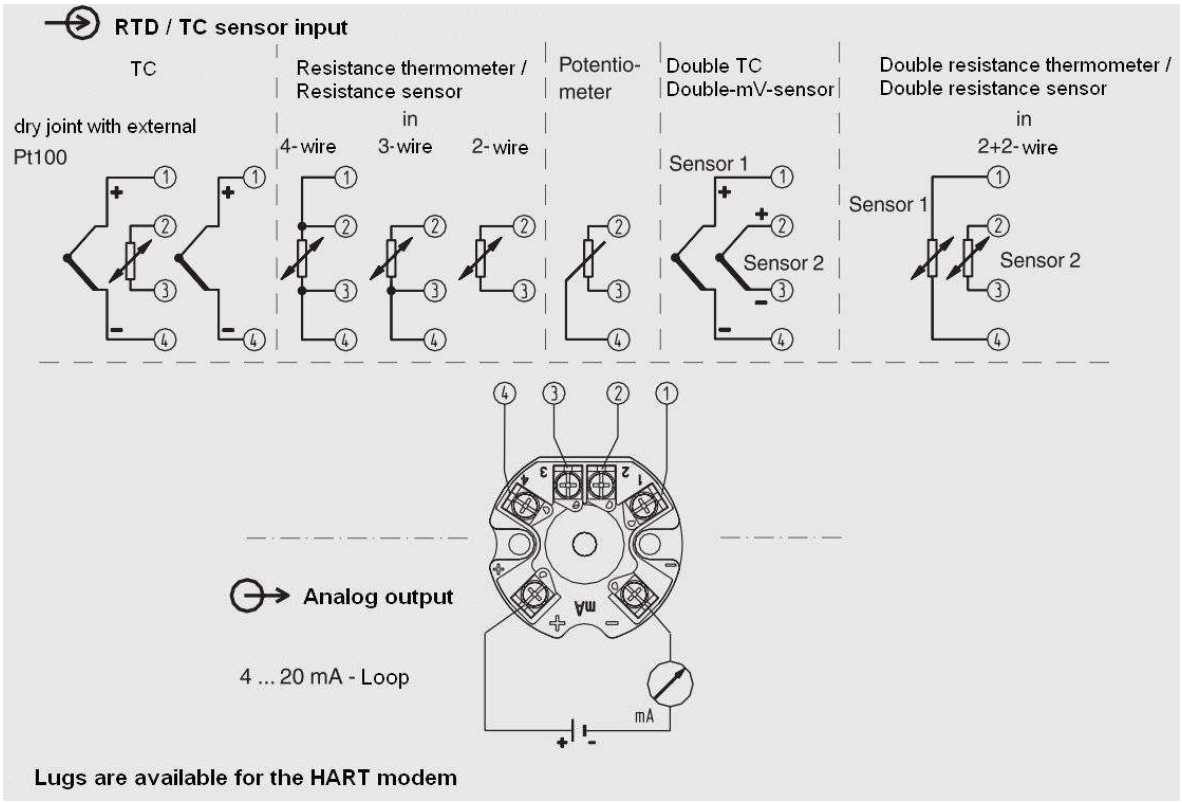


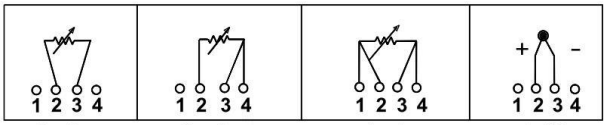
Connection of dTRANS T01 956556



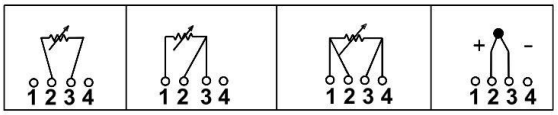
Connection of T32.1S



248 Sensors connection diagram



644 Sensors connection diagram



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! CAUTION !
If Zener barriers are used to the equalization of ground potential between instrument and earth grounding to grounding terminals of Zener barrier must be carried out.
When the instrument is equipped with transmitter with galvanic insulator, housing of the sensor do not need to be grounded.

5. Temperature class, maximum surface temperature.

The power dissipation cannot break 2,0W for conditions:

Ambient temperature Tamb	Temperature class
Category Ex II 2G, Ex II 3G	
-40 ÷ 50°C	T6
-40 ÷ 85°C	T5

Ambient temperature Tamb	Maximum surface temperature
Category Ex II 2D, Ex II 3D	
-40 ÷ 40°C	T50°C
-40 ÷ 55°C	T60°C
-40 ÷ 70°C	T80°C

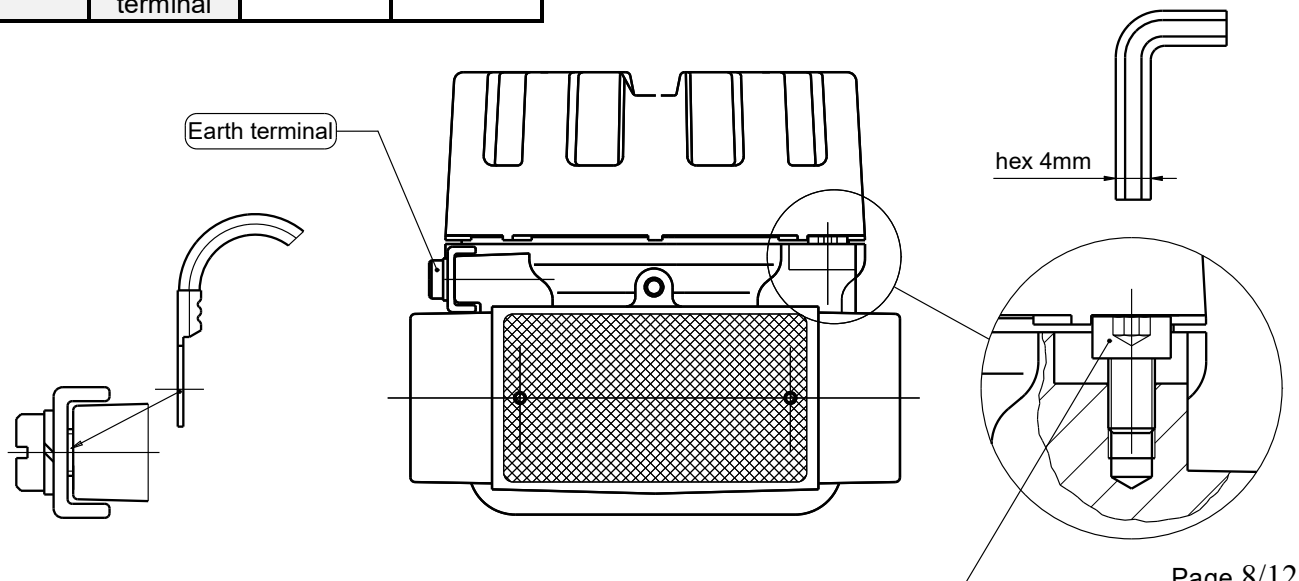
! CAUTION !
When complete final assembly of the sensor using XD-80TR and XD-80TIR is created, temperature class and maximum surface temperature must be established for them, corresponding with process temperature and ambient temperature.

6. Earth and protection terminals.

Place	Type	Cable cross section [mm^2]	
		Standed wire	Solid wire
Inside	Protection terminal	1,5	2,5
Outside	Earth terminal	4.0	6.0

7. Cover locking.

Lock the cover by screw with hex socked using hex spanner with across flat 4mm.



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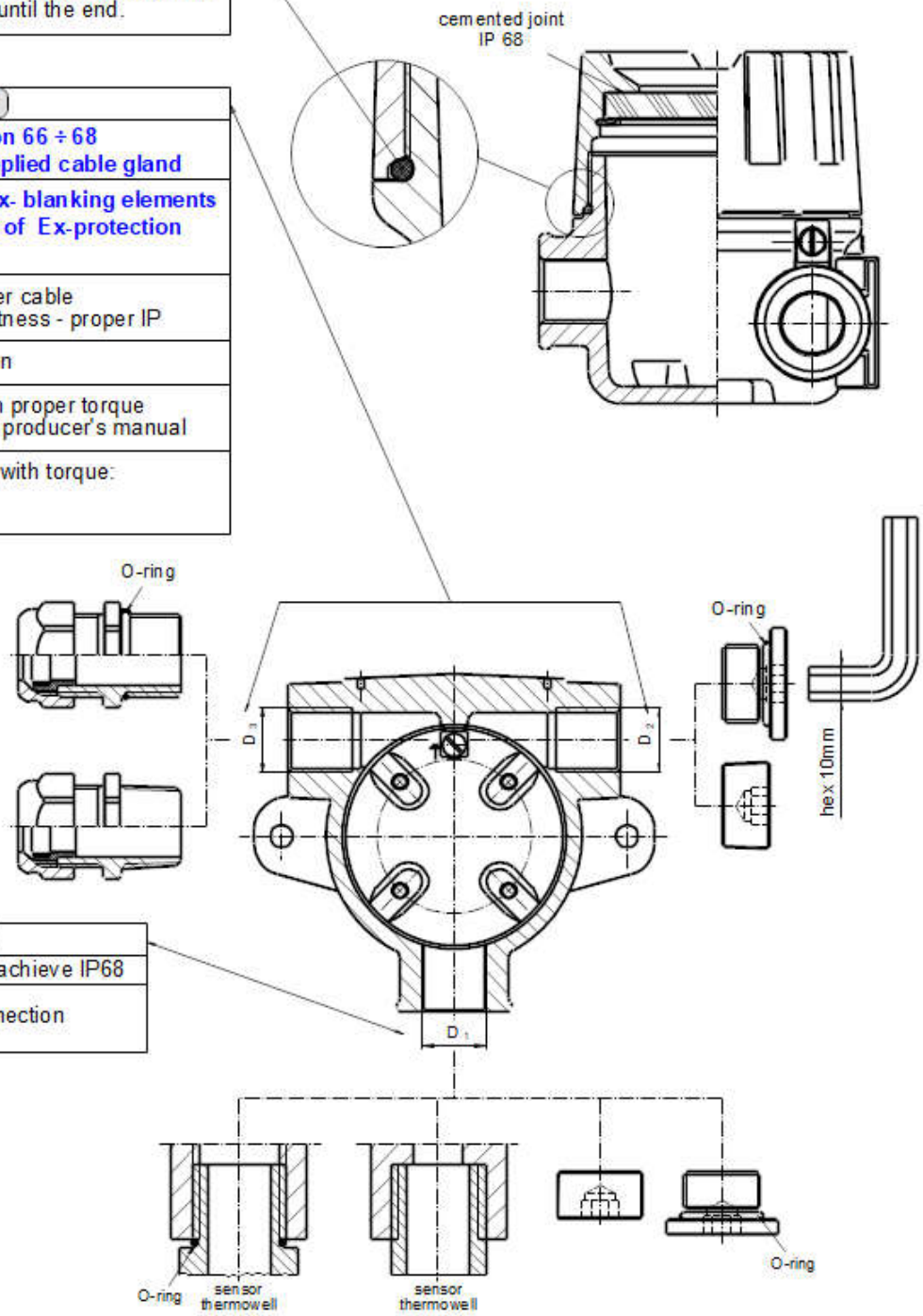
8. Tightness IP degree.

There are three connections of assembled device deciding about IP degree:
1 – cover,
2 – conduit openings,
3 – process opening.

1
max. possible to achieve IP68
Tighten up the cover with normal hand force until the end.

2
IP protection 66 ÷ 68 is depending on applied cable gland
Ex- cable glands and Ex- blanking elements shall be used with type of Ex-protection according to cl.1.
Choose cable gland under cable diameter and proper tightness - proper IP
Seel up thread connection
Tighten up press cap with proper torque in accordance with gland producer's manual
Tighten up stopping plug with torque: min. 7 Nm max. 15 Nm

3
max. possible to achieve IP68
Seal up thread connection



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Threaded connection sealing	Possible IP
Without sealing - standard accuracy class thread	54
Use of a sealant, e.g. Loctite 577	68
Thread tightened with O-ring	68

If IP for each connection			IP of assembled device
1	2	3	
68	54		IP 54
	66		IP 66
	67		IP 67
	68		IP 68

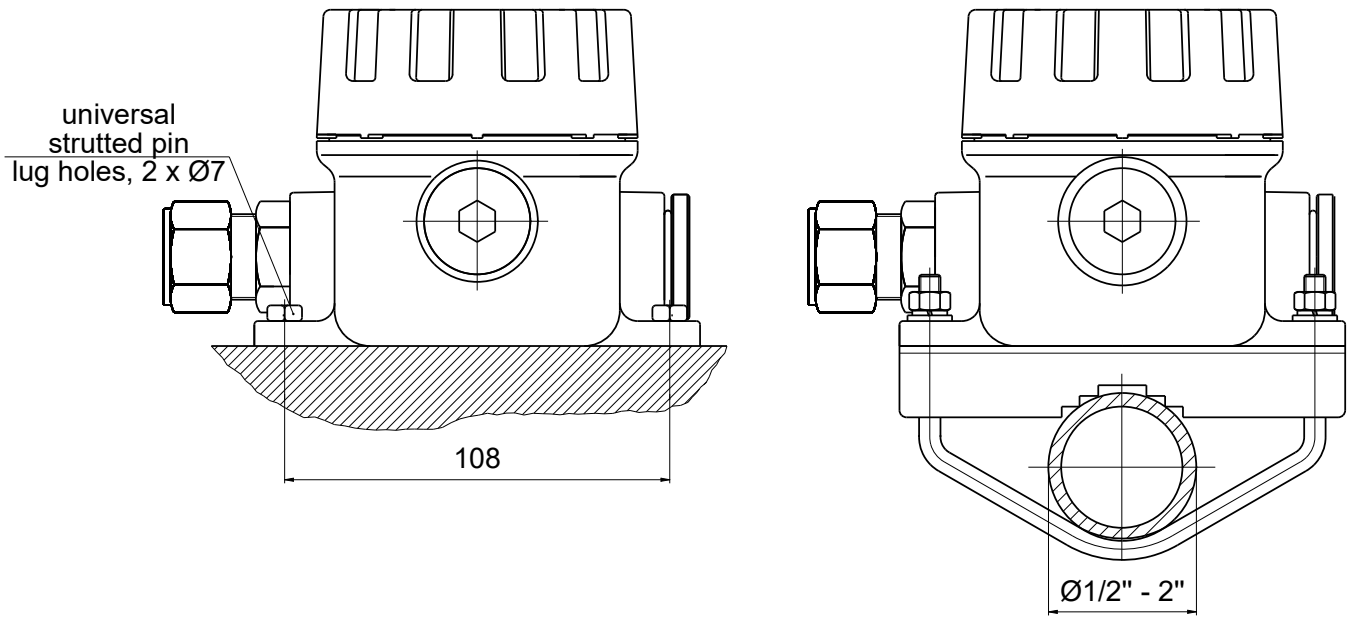
! CAUTION !
Protection IP68 refers to depth 1,0m of submersion under water.
It is required min IP65 protection for instruments designed for dust zones. (Besides zone 22, non-conductive dust, where min IP54 protection is required)

! Tightening with appropriate moment of cable gland press cup, cover screw and stopping plugs is especially important in the sensor intended for use in potential dust D explosive atmospheres.

! Do not open housing cover of the during operation in the presence dust cloud or when dust is stored on the housing.

! The enclosure shall be installed to avoid a risk from propagating brush discharges for application in explosive dust atmosphere.

9. Way of fixing XD-80TR and XD-80TIR to the wall or pipe.



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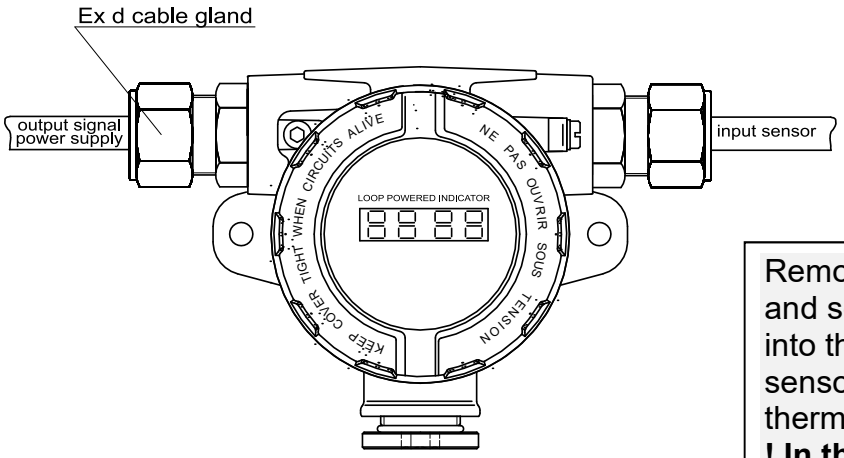
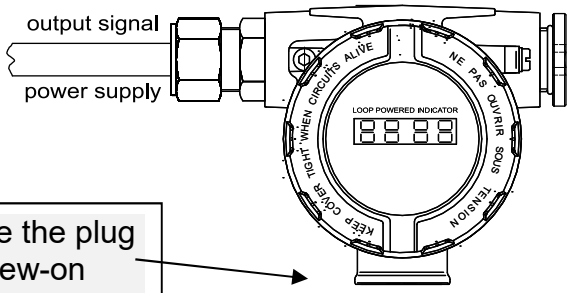
10. Possible application with sensor.

As remote version

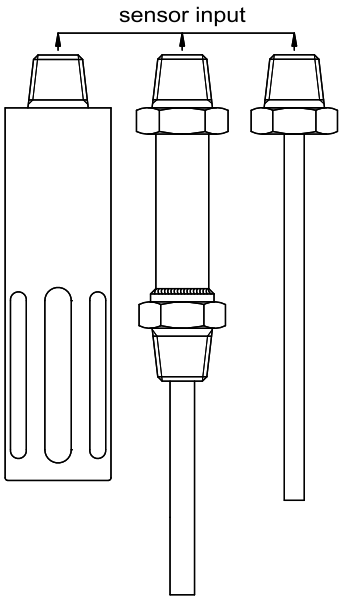


! This is finally certified product !

As sensor version



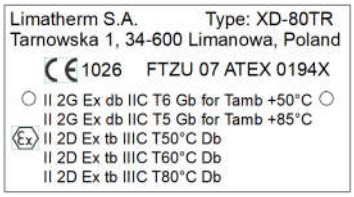
Remove the plug and screw-on into the hole your sensor's thermowell.
! In this case assembly with the thermowell has to be certified additionally !



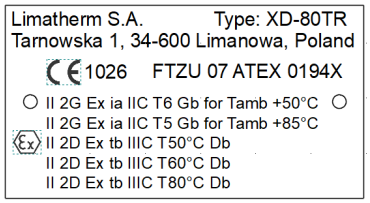
11. Marking.

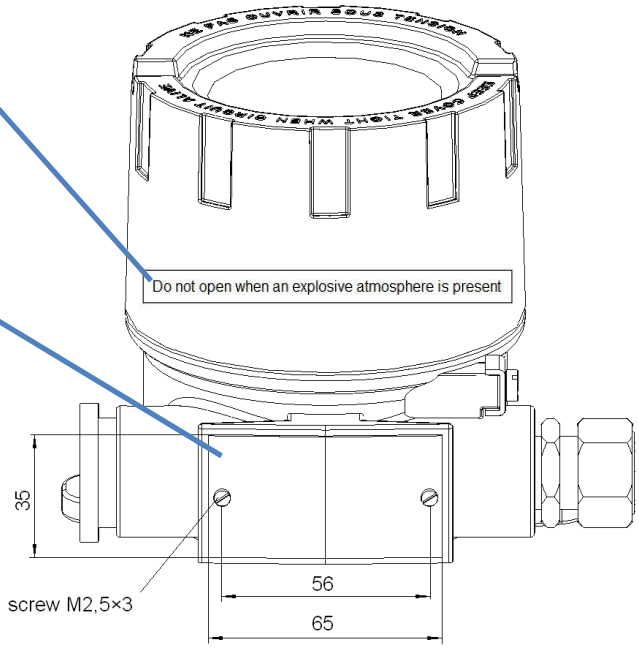
Warning label

Limatherm metal label



or





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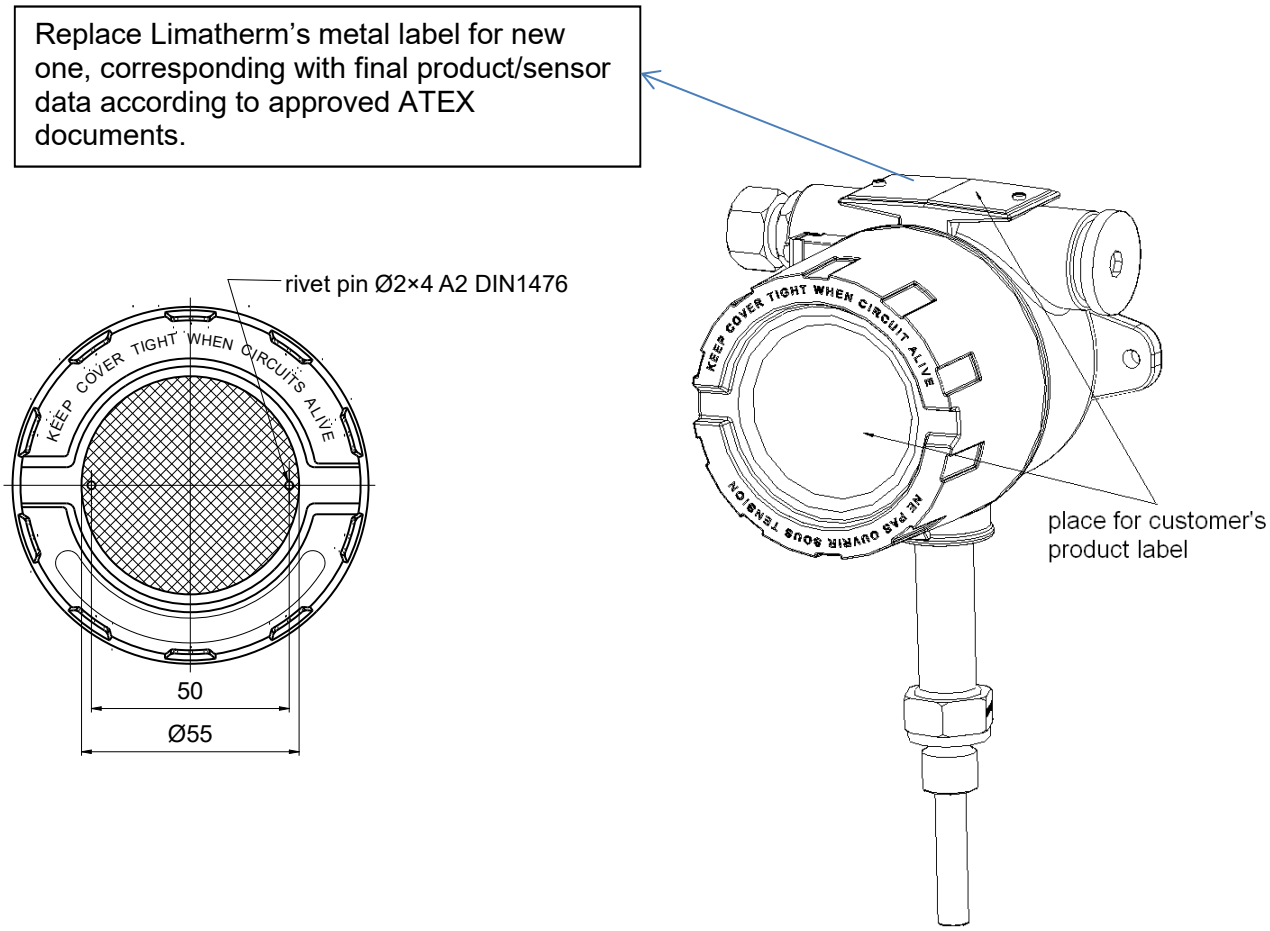
For sensor version



13. Documents.

To the batch of sensor is enclosed:

- Application manual for XD-80T...,
- Application manual for cable gland ATEX approved,
- Application manual for transmitter,
- Diagram of transmitters connection to the circuit,
- Application manual for indicator LP-01,
- Warranty,
- Declaration of conformity.

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