

Design and products for safety problem solving in medium and high voltage electrical installations

Type SGM/ABS

evision B of 18.03.2019

SF₆/Dry-Air Gas density transmitter





APPLICATIONS

- Reading of SF6 gas density or Dry-Air or any gas mixture
- Monitoring of critical parameter of SF6 such as pressure, temperature, density
- Digital version with RS485 Modbus RTU for smart grid application
- Predictive signals available for digital version
- Suitable to work with pure SF6 or mix without any adaptation*
- Suitable for indoor or outdoor, IP67 protection
- Industrial, medical or aerospace fields

High voltage or medium voltage circuit breakers commonly used for distribution and transmission are reliable if they are able to operate in steady and controlled conditions.

The use of SF6 or Dry-Air as quenching gas is extremely important to guarantee a safe operation during the life of equipment.

In order to have continuous check of gas filling and immediate warning in case of leakage the EMD transmitter is suitable to be connected to most standard monitoring systems.

It is ready to operate immediately after installation because of our technology based on ceramic primary element capable of reading the temperature and pressure of gas and calculate density.

All the materials used, such as thick ceramic and stainless steel are insensitive to chemical attach of corrosive and polluted gases.

The case is very robust and it is tested to face heavy duty conditions, so all the inner parts are immersed into resin to guarantee resistance to moisture and vibrations.

The sensor is available with both analog or digital output.

The analog version is a two wires loop powered and the digital is a standard Modbus RTU 485.

Density calculation is based on measurement of two physical data: pressure and temperature; proprietary algorithm is used to convert these data into density and can be customized by changing some coefficients to meet specific request.

HIGHLIGHTS

- Absolute compensated pressure reading
- High accuracy +/- 1°C FSO over a wide temperature range
- Ceramic primary element chemically resistant
- · Excellent long term stability
- Quick response time
- Factory calibration by laser trimming and automated process
- 14 bit ASIC core
- Multiple transmission data output customizable on request

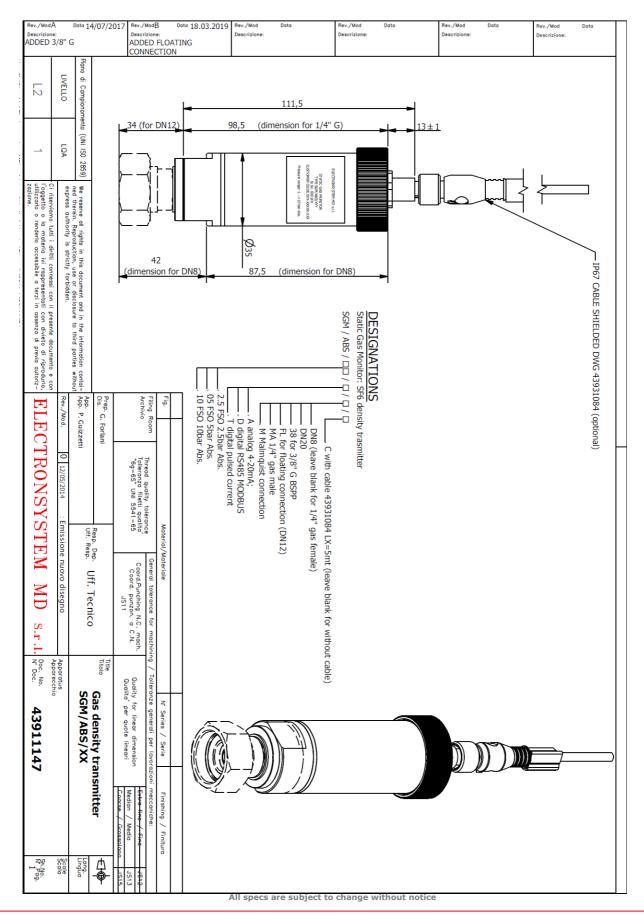
*density g/l depending on type of gas



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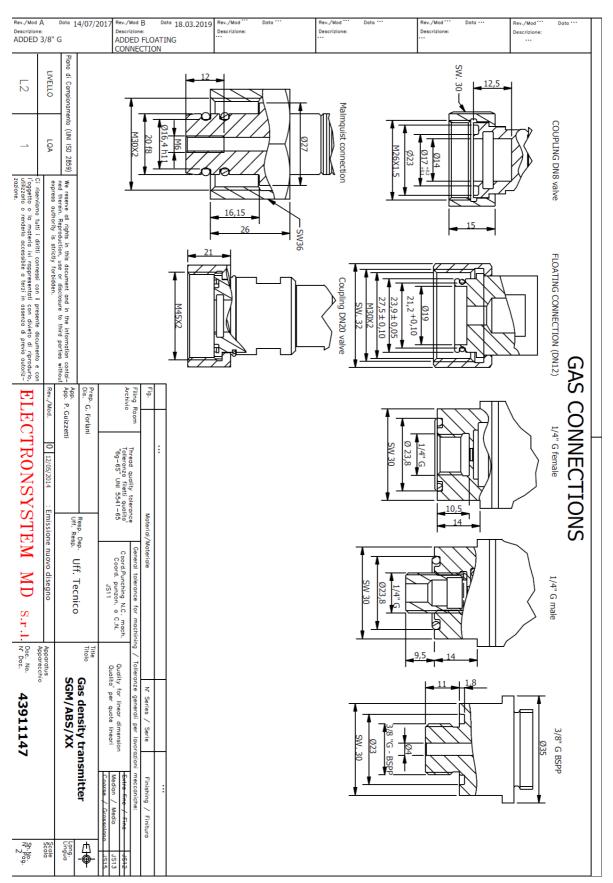




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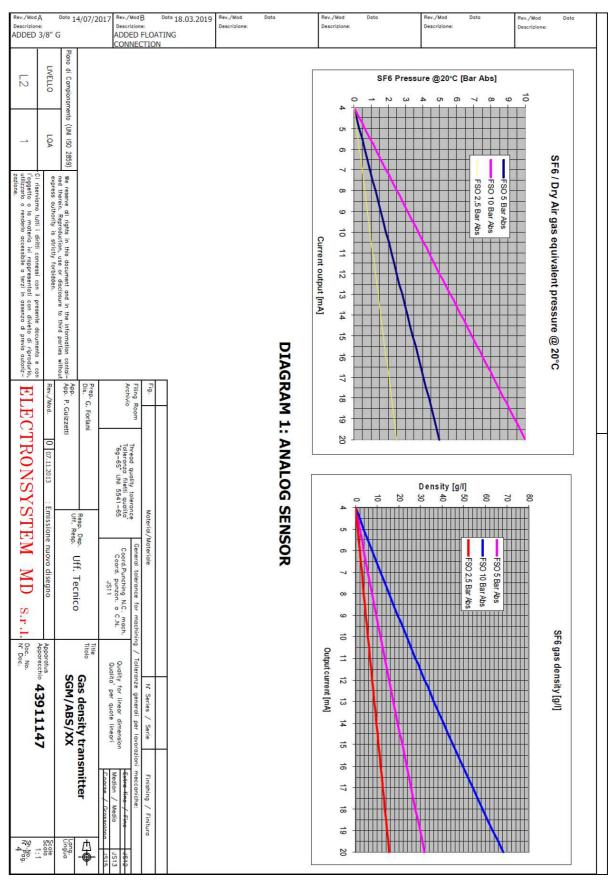
Rev./Mod A Descrizione ADDED	10		1/07/2	/	Rev./Mod Descrizion ADDED CONNE	e: FLOA	TING	03.2019	Rev./Mod Descrizione:	Date			Rev./M Descriz		Data		Rev./Mod Descrizione:	Data	Rev./Mod Descrizione:	Data		
L2	LIVELLO	Piano di Campionamento		* available o	5.4 Tempera	3.3 Density:	3 Output range: 3.1 Pressure: 0	2.4.13 Ga (sec	2.4.9 Rep 2.4.10 Iso 2.4.11 Res 2.4.12 Tei	2.4.8 Acct	2.4.5 Resp 2.4.6 Resp 2.4.7 Stab	2.4.4 Inpu 2.4.4 Inpu	2.3.4 Cur	2.3.1 Outp 2.3.2 Data	2.2.3 Rloa 2.3 Electrica	2.2 Electrica 2.2.1 Outp 2.2.2 Inpu	2 Electrical of 2.1 Electrical of 2.1.1 Output	4 7	1 Materials: 1.1 Housing 1.2 Inner o. 1.3 Primary	DESCRIPITION: TEMPERATUR	TECHNIC	
	LQA	nto (UNI ISO 2859)		only for SGM/ABS	dure: -40 - 100	3.3 Density: 56,4g/l @ 8,5 Bar ABS *	nge: 2: 0 - 2.5, 0 - 5 c	Gas condensation: measu (see isochores diagram 5)	2.4.9 kepeatitivity: < 10^-3 2.4.10 Isolation: max 250Vac 50Hz against 2.4.11 Resistance of insulation: >10Mohm 2.4.12 Terminal block: circular shielded M	ıracy : < ± 1% (2.4.5 Response time: < 30 msec. 2.4.6 Resolution: < 0.1% of full scale 2.4.7 Stability: < 0.2% of full scale po	2.4.4 Input protection: ov	2.3.4 Current Consumption: 20 4 Common electrical data:	out signal : RTU a protocol: baudi	2.2.3 Rload: Rin< 100 ohm 3 Electrical data digital version:	Electrical data digital pulsed con 2.1 Output signal: PWM pulse 2.2 Input voltage: 15-30 Vdc	Liectrical data analog version 1. Electrical data analog version 2.1.1 Output signal: 4 - 20 mA 2.1.2 Input voltage: 15-30 Vdc 2.1.3 Rload: Rin< 250 ohm	Cable connection material: alumin Conformity to 2002/95/CE (RoHS)	1 Materials: 1.1 Housing material : AISI 316 1.2 Inner o.rings material : EPDM70 p 1.3 Primary sensing element: Ceramic	N: JRE COMPENSAT	TECHNICAL FEATURES:	
Ci riserviamo tutti i dritit connessi con il presente documento e con l'aggetto o la materia ivi rappresentati con divieto di riprodurio, utilizzario o renderio accessibile a terzì in assenza di previa autoriz- zazione.	express authority is strictly forbidden.	We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without		available only for SGM/ABS/T or SGM/ABS/D		ידיים אין היין מילים און היין מילים	3 Output range: 3.1 Pressure: 0 - 2.5, 0 - 5 or 0 - 10 Bar ABS @20°C compensated 3.1 Pressure: 0 - 2.5, 0 - 5 or 0 - 10 Bar ABS @20°C compensated	2.4.13 Gas condensation: measurement of SF6 in liquid phase is not allowed (see isochores diagram 5)	2.4.9 kepeatitivity: < 10^-5 2.4.10 Isolation: max 250Vac 50Hz against mass 2.4.11 Resistance of insulation: >10Mohm 2.4.12 Terminal block: circular shielded M12x1 connector (see diagram 4)	2.4.8 Accuracy : $< \pm 1\%$ @ T=0÷40°C ($\pm 0.3\%/10$ °C extended temp. range)	2.4.5 Resolution : < 0.1% of full scale 2.4.7 Stability : < 0.2% of full scale 2.4.7 Stability : < 0.2% of full scale per yearù	2.4.4 Input protection: overvoltage supressor and reverse voltage diode	3.4 Current Consumption: 20mA typ. / 40mA max.	2.3.1 Output signal : RTU MOUBBUS RS-885 (see diagram 3) 2.3.2 Data protocol: baudrate 19200, databits 8, parity even, stopbit 1 2.3.2 Tourk voltage : 15.20 Vd-	sion:	2 Electrical data digital pulsed current version: 2.2.1 Output signal : PWM pulse current (see diagram 2) 2.2.2 Input voltage : 15-30 Vdc	rsion 0 mA 2 wires loop system (see diagram 1) 0 Vdc 0	Cable connection material: aluminium alloy nickel-plated Conformity to 2002/95/CE (RoHS)	iaterials: Housing material : AISI 316 Inner o.rings material : EPDM70 peroxide cured Primary sensing element: Ceramic	DESCRIPTION: TEMPERATURE COMPENSATED SF6 GAS DENSITY TRANSMITTER	ES:	
ELEC	Rev./Mod.	App. App. P. Guizzett	Prep. G. Forlani Dis.		Filing Room Archivio	Fig.	8 W	7.2	7 L: 7.1	6.4	6.3	6.1				6 E	5.1 5.2 5.3	4.4 4.5 4.6	4.1 4.2 4.3			
ELECTRONSYSTEM	0 12/05/2014 : Em				Thread quality tolerance Tolleranza filetti qualita' "6a-6S" UNI 5541-65	M	8 Weight : ≈ 250 gr	7.2 Leakage test with helium gas	7 Leakage rate 7.1 Leakage rate: < 1x10^ -9	b) Outdoor: C5-M/I highProtection degree (DIN EN 60529): IP65;	Corrosion class (accorda) Indoor: C4, high	6.1 Pollution Class III IEC 60815, table 1	Wind: <= 34 m/s Altitude: <= 2000 m	Relative air humidity in yearly average Solar radiation: <= 1000 W/ma	Standard: -25°C to +80°C (LT version:	Environmetal conditions:	5.1 Mechanical stresses: Shockproof 30G on 3 axys 5.2 MTBF indoor: 20 years, MTBF outdoor: 15 5.3 Max allowable pressure: 16 bar ABS	4.4 EN61000-4-5: Surge 4kV withstand on the 4.5 EN61000-4-6: Conducted immunity 10V/m 4.6 EN61000-6-4: Radiated disturbances 30MH 4.6 EN61000-6-4: Radiated disturbances 4.0 E	4 Electromagnetic protection: 4.1 EN61000-4-2: ESD air 15kV 4.2 EN61000-4-3: Radiated imn 4.3 EN61000-4-4: Burst 4kV wit			
TEM MD s.r.1	Emissione nuovo disegno	Uff. Resp. Utt. Tecnico			General tolerance for machining Coord-Punching N.C. mach.	Material/Materiale		ım gas	^ -9 mbar x l/s.	h I EN 60529): IP65; IP67 on request	ng to DIN EN ISO 1	nedias		Relative air humidity in yearly average <80%, occasionally 100% Solar radiation: <= 1000 W/ma	80°C (LT version: -40°C to +80°C)	:	xys , MTBF outdoor: 15 years :: 16 bar ABS	Surge 4kV withstand on the shield of 10m cord Conducted immunity 10V/m Radiated disturbances 30MHz-1000MHz class B	4 Electromagnetic protection: 4.1 EN61000-4-2: ESD air 15kV 4.2 EN61000-4-3: Radiated immunity AM 10V/m 801000MHz, PM 10V/m 9002700MHz with 10m cord 4.3 EN61000-4-4: Burst 4kV withstand of the communication & power supply interfaces with 10m cord			
Doc. No.	Apparatus	S	Title Titolo G a		_					lest		such as N2/SE6 are allowable		nally 100%	Ċ			m cord class B	MHz, PM 10V on & power s			
43911147		SGM/ABS/XX	s density tra	Qualita' per quote lineari	Tolleranze generali per lavorazioni Quality for linear dimension	N' Series / Serie						vable							/m 9002700MHz upply interfaces wi			
				Coarse / Grossolana	Extre fine	Finishing / Finitura													: with 10m cord ith 10m cord			
Sh.No. 3 Pag.	Scale Scala	Lang. Lingua	4	JS13 JS15	612				All specs													



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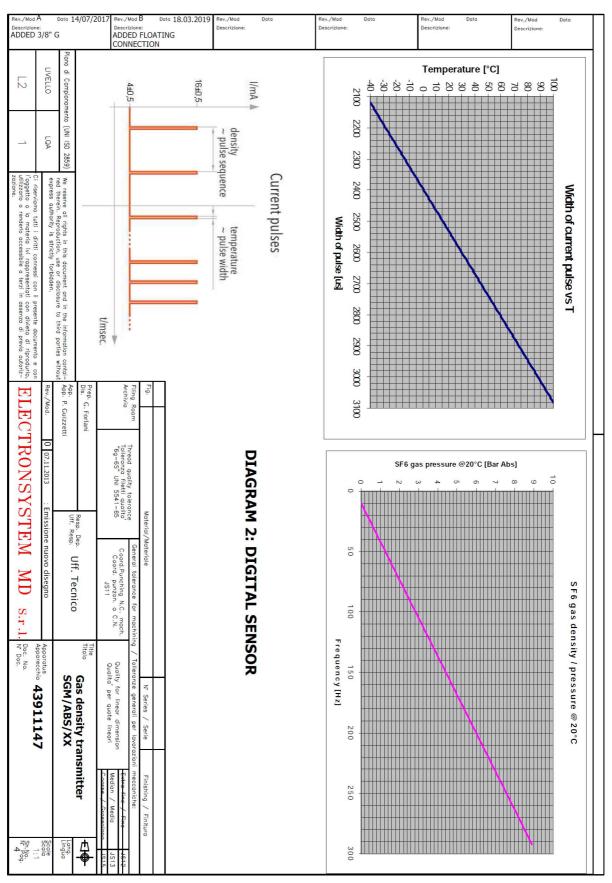
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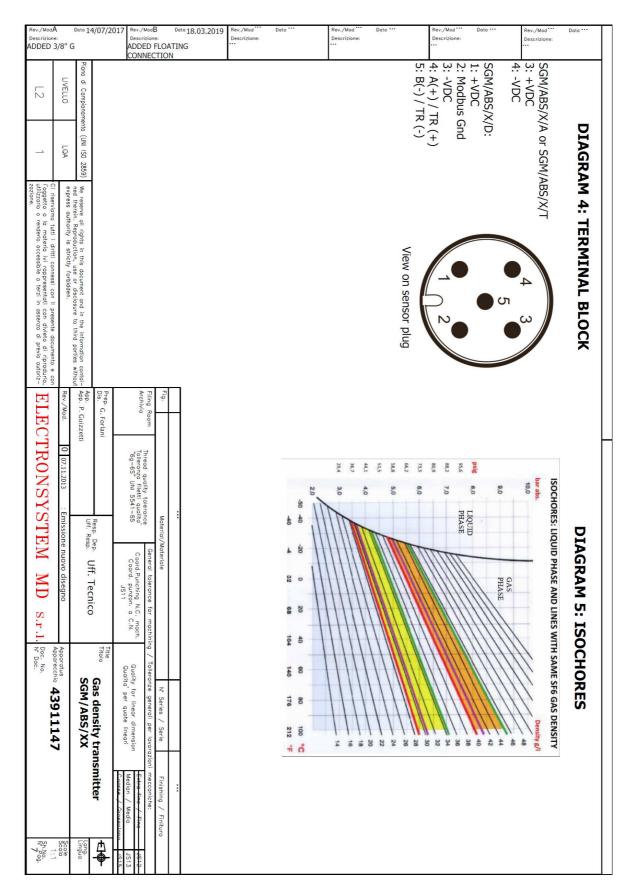
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L2	LIVELLO	Piano di Campionamento (UNI ISO 2859)																											
→	LQA	nto (UNI ISO 2859)				Delay	Response time out	Scan rate	Stop	Parity	Data	Speed	Protocol	ADDRESS		Protocol settings	9	*		Add_7	Add_6*	Add_5*	Add_4*	Add_3	Add_2	Add_1	Add_0	Address	
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ELECT	Rev./Mod.	App. P. Guizzetti	Prep. G. Forlani Dis.		Filing Room Archivio	Fig.			/	6	5	4	3	2	1	0	Registry	Example						BS @20°C]					3: TABL
ELECTRONSYSTEM	0 07.11.2013 : Emiss	Uff.	Res	"6g-6S" UNI 5541-65	Thread quality tolerance Tolleranza filetti auglita'	Mate			304	100	0	<u>5</u> 970	981	2945	987	127	bit reading			Unsigned Int	Unsigned Int	Unsigned Int	Unsigned Int	Unsigned Int	Signed Int	Unsigned Int	Unsigned Int	Type	DIAGRAM 3: TABLE OF TELEGRAM
MD	Emissione nuovo disegno	Uff. Resp. UTT. LECNICO		Coord. punzon. a C.N. JS11	General tolerance for	Material/Materiale			304	100	0	5,97	981	294,5	987	127	value			Read only	Read only	Read only	Read only	Read only	Read only	Read only	Read/Write	Function	RAM
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L2	LIVELLO	Piano di Campionamento		įcon	VINEC	.1101	N																																						
Ci risen l'oggett utilizzari	LQA	(UNI ISO 2859)		B - Good: Minor Effect, sl	A - Excellent			Carbolic Acid (Phenol)	Calcium Sulfate	Calcium Hypochlorite	Calcium Chioride Calcium Hydroxide	Calcium Chlorate	Calcium Carbonate	Boric Acid	Benzol	Benzene Sulfonic Acid	Benzene	Benzaldehyde	Barium Sulfate	Barium Hydroxide	Barium Carbonate	Antimony Trichloride	Aniline	Amyl Alcohol	Amyl Acetate	Ammonium Sulfate	Ammonium Nitrate	Ammonium Hydroxide	Ammonium Chloride	Ammonia, liquid	Ammonia 10%	Aluminum Chloride 20%	Aluminum Chloride	Alcohols: Propyl	Alcohols: Isopropyl	Alcohols: Ethyl	Alcohols: Benzyl	Alcohols: Amyl	Acetone	Acetic Anhydride	Acetic Acid Glacial	Acetic Acid 20%	Acetic Acid	CHEMICAL	
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LECTRONSYSTEM	0 07.11.2013 : Emission	Uff. Resp.	Resp. [Tolleranza filetti qualita "6g—6S" UNI 5541—65	Thread quality tolerance	Material,		Potassium Sulfate Potassium Sulfide	Potassium Permanganate	Potassium Nitrate	Potassium Ferrocyanide Potassium Iodide	Potassium Ferricyanide	Potassium Dichromate	Potassium Chlorate		Plating Solutions, Lead Fluoborate Plating Plating Solutions. Rhodium Plating 120°F	1 1	Photographic Developer	Phosphoric Acid (>40%)	Phenol (Carbolic Acid)	Perchloroethylene	Paraffin	Oxalic Acid (cold)	Oleic Acid	Olls: Mineral	Oils: Linseed	Oils: Castor	Nitric Acid (Concentrated)	Nitric Acid (5-10%)	Nitric Acid (20%)	Nickel Sulfate	Nickel Chloride	Naphthalene	Motor oil	Milk	Methyl Ethyl Ketone	Methanol (Methyl Alcohol)	Mercury	Mercurous Nitrate	Mercuric Cyanide	Marcuric Chlorida (diluta)	Magnesium Nitrate	Magnesium Hydroxide	CHEMICAL	l Compatibility
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	Apparatus	SGM/ABS/XX	Title Titolo Gas dens	ach. Quality for linear dimension Qualita per quote lineari	for machining / Tolleranze generali per lavorazioni	N' Series / Serie		Whiskey & Wines Xylene	Weed Killers	Water, Fresh	Water, Acid, Mine Water, Deionized	Vinyl Chloride	Vinyl Acetate	Vegetable Juice	Urea	Turpentine	Trichloroethylene	Trichloroacetic Acid	Tetrahydrofuran	Tartaric Acid	Sulfuric Acid (hot concentrated) Tannic Acid	Sulfuric Acid (75-100%)	Sulfuric Acid (10-75%)	Starch Stuffuric Acid (<10%)	Stannous Chloride	Stannic Chloride	Sodium Sulfide	Sodium Silicate	Sodium Nitrate	Sodium Hypochlorite (<20%)	Sodium Hydroxide (80%)	Sodium Hydroxide (20%)	Sodium Fluoride	Sodium Cyanide Sodium Ferrocyanide	Sodium Chloride	Sodium Chlorate	Sodium Borate (Borax)	Sodium Bisulfite	Sodium Bisulfate	Sodium Bicarbonate	Sodium Acetate	Pyridine	Propylene GI	CHEMICAL	
14/	147	5/XX	Gas density transmitter	lineari Coarse / Grassola		Serie Finishing / Finitura		A - Excellent A - Excellent	B - Good	A - Excellent	B - Good	A - Excellent	B - Good	A - Excellent	B - Good	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	Н	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent		A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	A - Excellent	COMPATIBILITY	
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STORAGE

If the complex must be storage before use, please keep dry and repaired.

Do not leave outdoor.

Device is strongly sensitive to humidity hence avoid to store where relative humidity is more than 90%

STORAGE TEMPERATURE: -30°C ÷ +70°C RELATIVE HUMIDITY: max 90% @ +40°C

MAINTENANCE

Maintenance of transmitter must be done compulsory in factory. We recommend every 5 years to send back transmitter for calibration check and inspection.

WARRANTY

Device is covered by 24 months after installation or max 36 months after delivery. In case of service the transmitter must be sent back to factory for inspection.

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WARNINGS

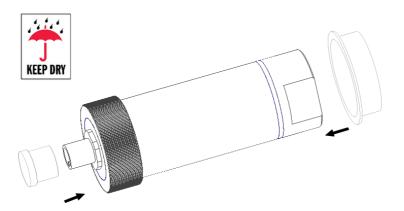
CAUTION

Do not drop or hit the transmitter. The sensor is fragile and may break from sudden shock. When transporting the transmitter, use the original shipping box from Electronsystem MD.

NOTE

Keep the transmitter dry and clean.

Do not remove the transparent transport protection caps before you are ready to install the transmitter.



NOTE

Connect the transmitter directly to the main SF₆ gas volume, not behind a sampling line because this is the area where high humidity tends to accumulate and where the temperature of gas is not the imagine of gas near breaker.

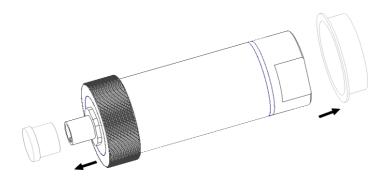
The use of original cable wiring is advised to have the better protection performances.

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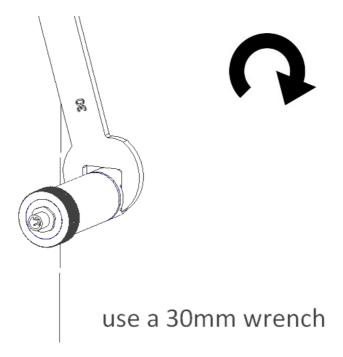
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INSTALLATION

1. Remove the transparent transport caps when you are ready to install the transmitter. Check o-ring is clean without dust and properly assembled.

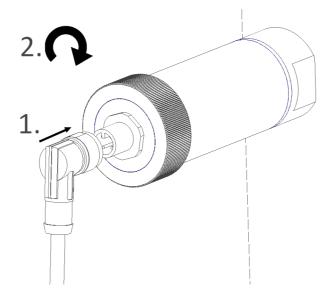


2. Install the transmitter to the mechanical coupling and tighten gently by hand. Then use a 30mm wrench to tighten the connection. Use a sufficient force to achieve a tight installation (recommended 10-15Nm). The system must be leak-free for accurate measurement.



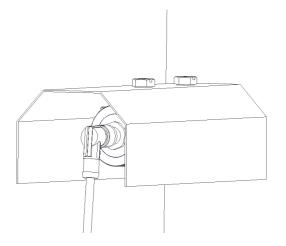
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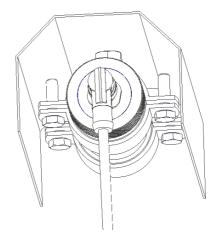
 Connect proper circular wiring into the output port checking the correct polarization of the connector then turn firmly the rotating crown of the cable.
 Use a cable with a suitable outdoor IP67 connector for your installation (straight or angled)



4. In case the weather shield is needed (optional), can be added to the transmitter by fitting the two rubber clamps on the body of transmitter and tightening to assure it can remain in place.

Assure that the stainless roof completely cover the transmitter and the cable connection.







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DISCLAIMER NOTE:

While we provide application assistance it is up to the customer to determine the suitability for its use.

Specification may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However we assume no responsibility for its use.

The quality of ElectronsystemMD products is guaranteed by a Quality, Safety and Environmental management system certified by DNV according to ISO 9001, ISO 18001 and ISO 14001. Electronsystem MD works in partnership with its customers in designing customized executions in order to meet specific requirements, please contact us.