PULSES EMITTER
ENCODER EM6422

INSTALLATION MANUAL

CODE	:	***600/00/EN/03***
REVISION	:	***03/2009***

Isoil Impianti S.p.A. - Italy

Sede e stabilimento
Head office and factory
24061 Albano S.Alessandro (BG)
74, via Madonna delle Rose
Tel. +39 035 4239.011
Fax +39 035 582078
E-mail: albano@isoil-impianti.it
Web : www.isoilmeter.com

Uffici Commerciali
Sales office
20092 Cinisello Balsamo (MI)
27, via F.lli Gracchi
Tel. +39 02 66027.1
Fax +39 02 6123202
E-mail: sales@isoil-impianti.it

Sede legale
Registered office
20124 Milano
24, viale Vittorio Veneto
Capitale soc. int. Sottoscritto 774.000 Euro
Codice Fisc. e part. IVA 13066900153
C.C.I.A.A. MI - Reg. Impr. 86449/2000
R.E.A. Milano 1612783

INDEX

1 RECEIPT OF EQUIPMENT

When the equipment is received the packaging should be checked immediately for any shipping damage. If the packaging has been damaged the local carrier should be notified evidencing the problem. Then with cure open the pack and verify that the equipment is not damaged or that they do not lack the parts. If a damaging is found or lacks the parts send report of the state of the equipment to ISOIL IMPIANTI SPA.
Before being installed the equipment must be stored in its original pack and protected.

2 SAFETY INFORMATIONS

- **The EM6422 must only be installed by process qualified technicians who must apply all the indicationsreported in this manual.**
- **This equipment, if not installed and used in accordance with this instruction manual, may cause interference to radio communications and also can be noised from them.**
- **Some parts of the instruments (such as circuit boards) may be damaged by static electricity. Therefore, when carrying out any work that involves the risk of static damage to the instrument you must wear an earthed wrist strap at all times to protect the instrument against static shock.**

WARNING

3 VADILITY OF INSTALLATION AND OPERATING INSTRUCTIONS

The manufacturer is not responsible for damage caused by incorrect or unauthorised use. Conversions and changes to the instrument must not be made, otherwise the certification and guarantee become invalid.

4 GENERAL FEATURES

Pulse emitter “Encoder EM6422”, developed by ISOIL IMPIANTI, converts the rotary motion of a Positive Displacement Meter into electric pulses representing the delivered volume. It allows the pdmeter to interface with an electronic control device (electronic register, flow computer).
The “ENCODER EM6422” has been designed and manufactured according to EN 50014, 50018 and 50281-1-2 standards. The type of protection is EEx d IIB. Degree of mechanical protection is IP 66 according to EN 60529 standard.
The pulse emitter can be factory installed directly on to the front cover af any new Isoil pdmeter. By the use of suitable flanges it can be retrofitted onto any existing ISOIL pdmeter, in place of the mechanical register or other pulse emitter. Installation on most other manufacturer’s pdmeter is possible as well by means of special adaptors.
Unlike most similar devices, which use optical sensors, the EM6422 utilizes a state-of–the-art method, that detects the rotary motion of the pdmeter’s shaft through a thin separating wall.
The electronic circuit is placed in a sealed housing completely insulated from the process fluid in the pdmeter. The housing is closed by a cover with o-ring seal and there is a threaded female inlet for cable glands or counduit entrance.

5 INSTALLATION IN HAZARDOUS AREA

AREA OF SAFE INSTALLATION			
Hazardous area/Zone		**Category according to 94/9/CE directive**	**Allowed**
Gas, mists or vapours	Zone 0	1G	**NOT**
Gas, mists or vapours	Zone 1	2G	YES
Gas, mists or vapours	Zone 2	3G	YES
Air dusts mists	Zone 20	1D	**NOT**
Air dusts mists	Zone 21	2D	YES
Air dusts mists	Zone 22	3D	YES

The pulse emitter EM6422 must be installed & maintained according to the applicable standards regarding electrical installations in hazardous area classified Zone 1 or Zone 2 (example: EN 60079-14, EN 60079-17,etc...) or Zone 11 or 21 (EN 50281-1-2)
Before the installation READ CAREFULLY the INSTALLATION MANUAL.
The user can not perform any UNAUTHORISED MODIFICATION of the apparatus.

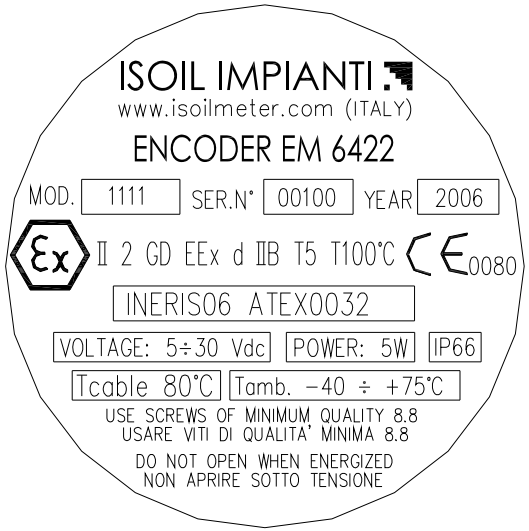
DO NOT OPEN WHEN ENERGIZED
USE SCREWS HAVING OF MINIMUM QUALITY 8.8

Above warning are reported on the plate; the installing position of the unit must allow an easy reading.
The user is responsible for a good reading in the time: clean periodically without using solvents; don't over paint

5.1 ATEX APPROVAL

Ex II 2 GD EEx d IIB T5 T100°C IP 66 CE 0080

LABEL	DESCRIPTION
II	Group II (surface)
2	CATEGORY 2 APPARATUS
GD	Explosive atmospheres with caused by gas, mists or vapours and dusts
EEx d IIB	Type of protection, gas group
T5	Temperature class
Tamb. - 40÷ + 75 °C	Working environmental temperature
IP 66	Degree of mechanical protection
0080	Number of Notified Body involved in ATEX/Q surveillance (INERIS)
Tcable 80°C	Indicates that the cable must be suitable for≥80°C if Tamb >70°C
INERIS06 ATEX0032	Certificate number



ATEX PLATE

MECHANICAL CHARACTERISTICS AND DIMENSION

PULSE EMITTER EM6422

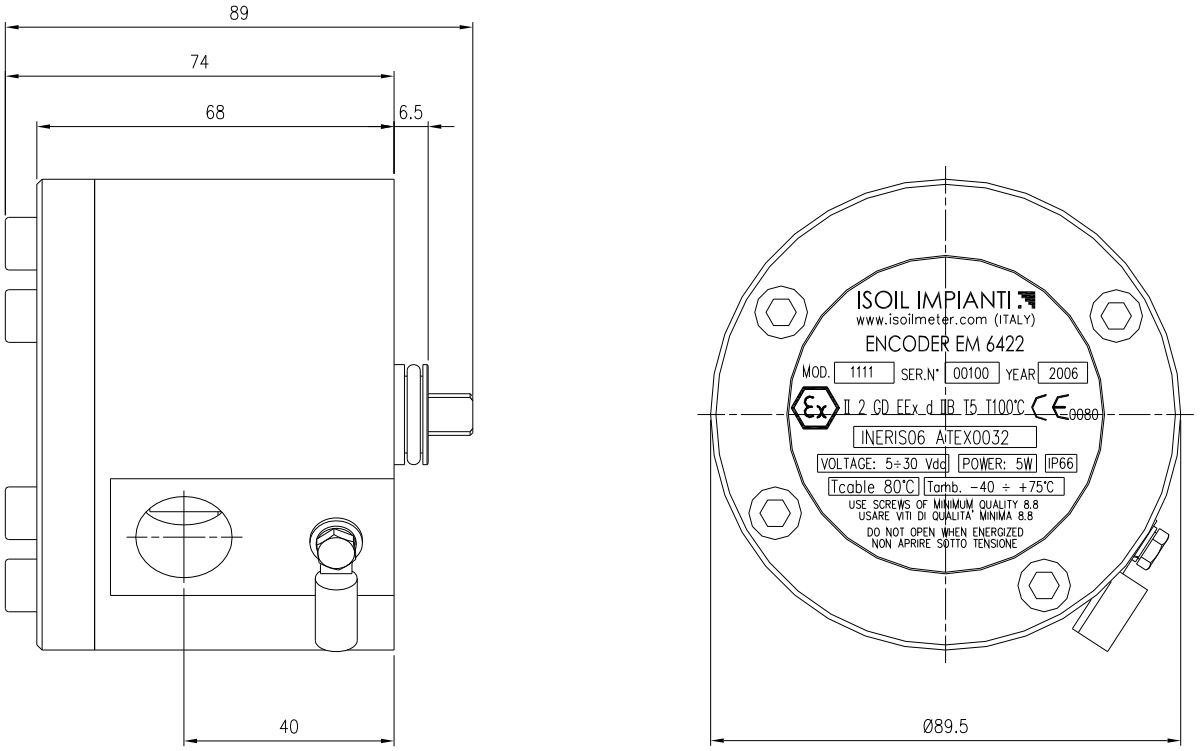


fig.1

MECHANICAL CHARACTERISTICS	
Housing material:	Anodised aluminium alloy
Dimensions:	See fig.1
Weight:	1 Kg
Fixing:	See fig.3
Cable entry:	n° 1 ½" NPT
Operating speed:	0÷2000 rpm
Degree of protection:	IP66
Operating temperature:	-40÷75°C
Humidity:	0÷100% non-condensing

PULSE EMITTER EM6422
+
RETROFIT KIT FOR ISOIL PDMETERS

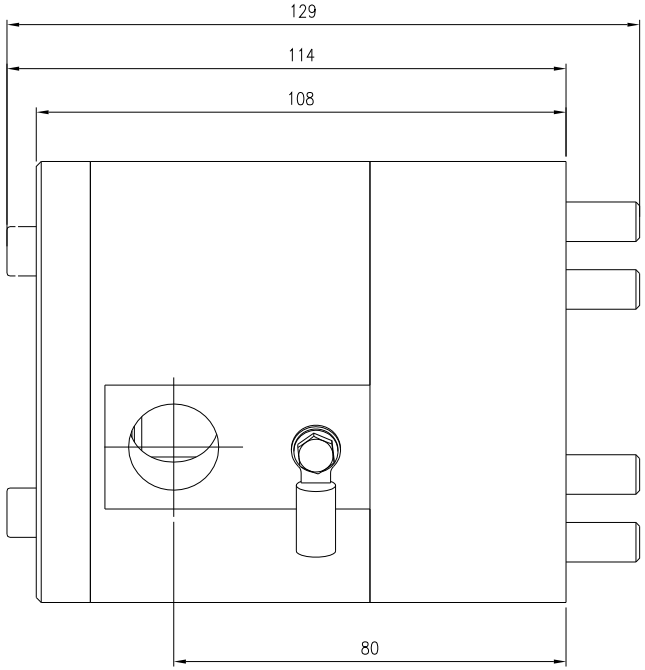


fig.2

MECHANICAL CHARACTERISTICS	
Housing material:	Anodised aluminium alloy
Dimensions:	See fig.2
Weight:	1,3 Kg
Fixing:	See fig.4
Cable entry:	n° 1 ½" NPT
Operating speed:	0÷2000 rpm
Degree of protection:	IP66
Operating temperature :	-40÷75°C
Humidity:	0÷100% non-condensing

7 MECHANICAL INSTALLATION

7.1 MECHANICAL INTALLATION PROCEDURE FOR “EM 6422”

PROCEDURE (see fig.3)

1) Insert the shaft of the ENCODER (7) inside the hole of the PDMETER (8)
2) Fix the ENCODER (6) with the FLANGE by using the four SCREWS (5)
3) Wiring the ENCODER (see ELECTRICAL CONNECTIONS paragraph)
4) Insert the O-RING (4) inside the COVER (3)
5) Close the ENCODER (6) with the COVER (3) by using the four SCREWS (1 and 2)

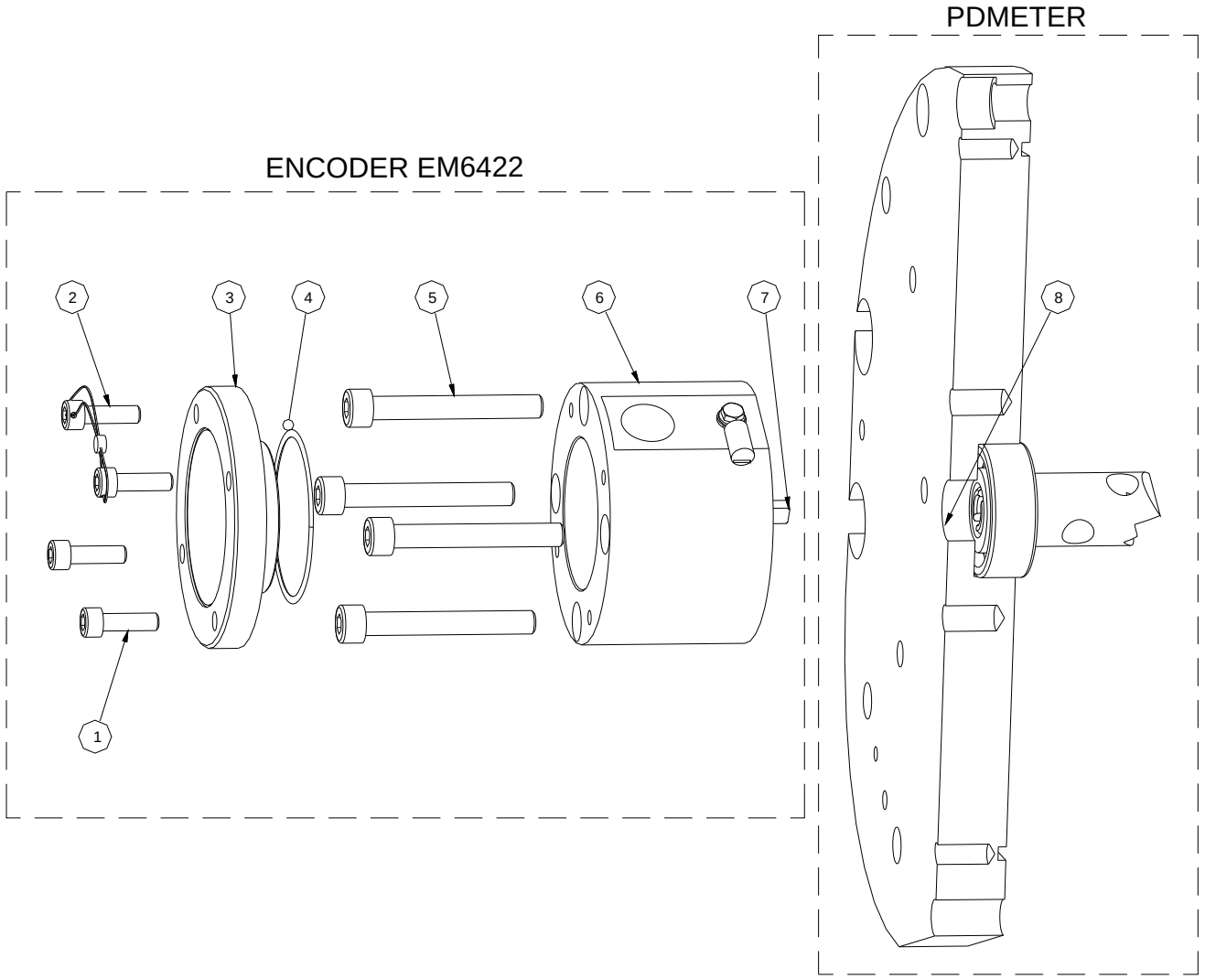


fig.3

7.2 MECHANICAL INSTALLATION PROCEDURE FOR EM 6422 WITH KIT RETROFIT

PROCEDURE (see fig.4)

1) Remove the SEAL (15) from the PDMETER
2) Insert the FLANGE (13) on the SHAFT (14)
3) Fix the SCUFFER (11) to the SHAFT (14) with the two GRUB SCREWS (12)
4) Insert the O-RING (10) inside the FLANGE (9)
5) Fix the FLANGE (9) to PDMETER by using the four SCREWS (8)
6) Join the shaft of the ENCODER (6) with the SCUFFER (11)
7) Fix the ENCODER (6) with the FLANGE by using the four SCREWS (5)
8) Wiring the ENCODER (see ELECTRICAL CONNECTIONS paragraph)
9) Insert the O-RING (4) inside the COVER (3)
10) Close the ENCODER (6) with the COVER (3) by using the four SCREWS (1 and 2)

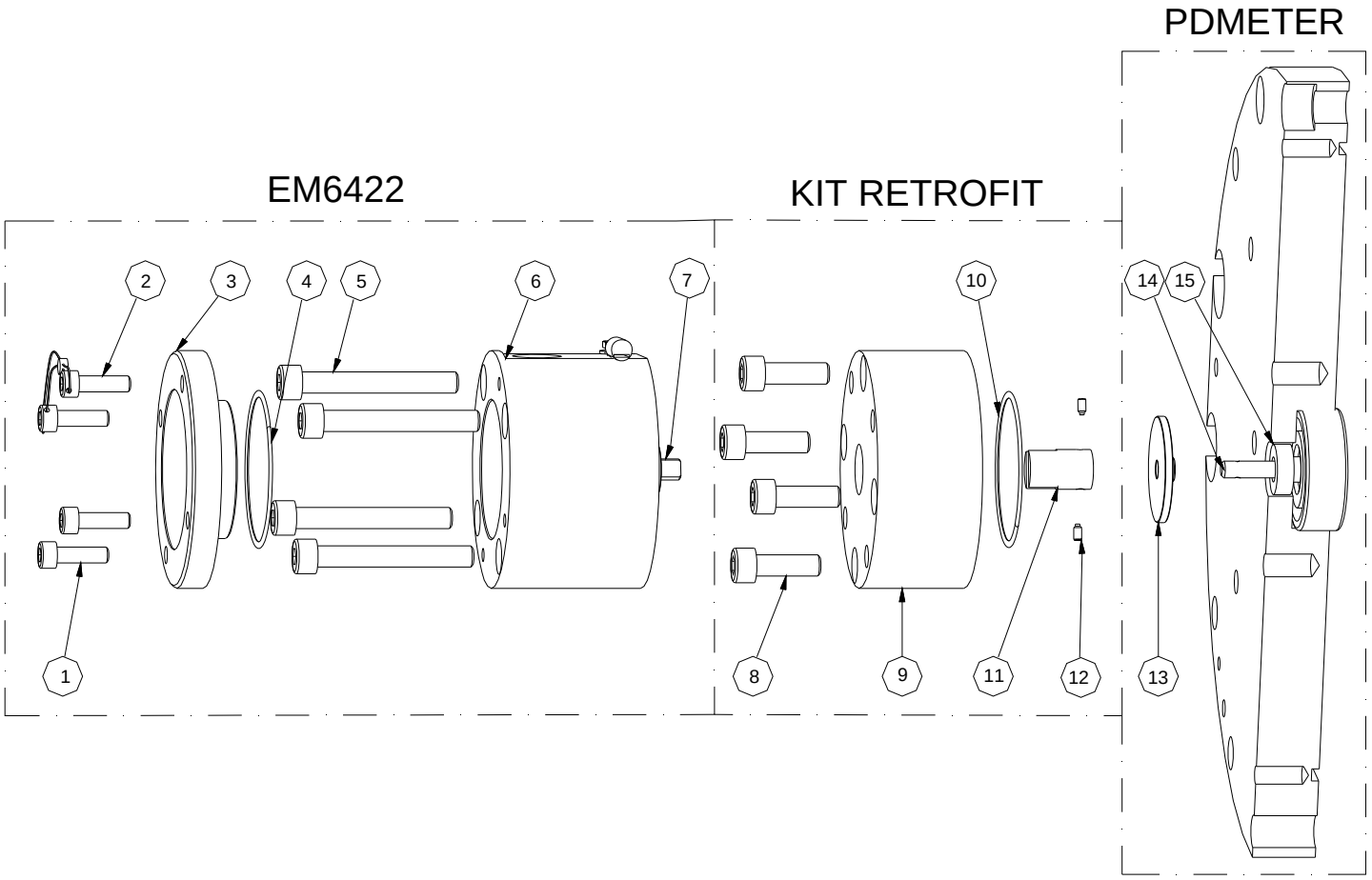


fig.4

8 ELECTRICAL INSTALLATION

Power supply voltage:	5÷30 Vdc
Power consuption:	0,2 W
Output Signal Resolution:	64 pulses for revolution, unscaled. For ISOIL's pdmeter resolution, see table 1.
Type of output:	• Open drain FET (+ 30 Vdc max and 200mA max) without internal pull-up resistor (default) • Open drain FET with internal pull-up 4,7 Kohm resistor (see fig.9 and 10 to set it FET = Field Effect Transistor
Pulse frequency:	2KHz max
Square Wave:	Single or dual quadrature channel output
Rise/Fall Time of Pulse:	< 10 μS
Operating:	Bidirectional
Terminal block:	Pull-out, 5 positions for wires 15AWG (1,5 mm^2) max.
Recommended cable:	5 wires, 24÷15AWG (0,2÷1,5 mm^2), shielded

8.2 CABLE ENTRY

The plastic screw-cap used to close the cable entry hole can't be used as cable entry.

The entrance of cable can be done in two ways by using the predisposed holes with conical threading ½" NPT:

1) with CABLE GLAND
2) with SEALING FITTING COUPLING

8.2.1 CABLES ENTRY WITH CABLE GLAND

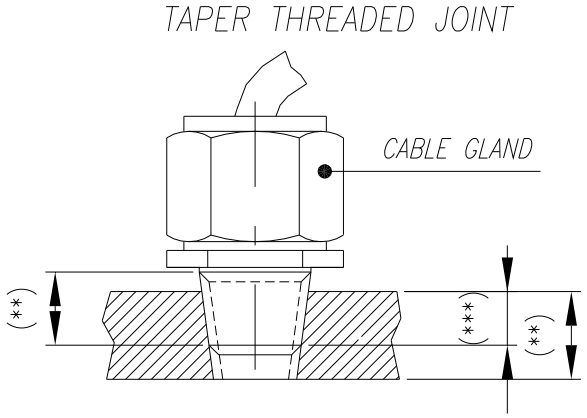


fig. 5 - EXAMPLE OF CABLE GLAND

Use thermoplastic, thermosetting or elastomeric cable which is substantially compact and circular, has extruded bedding and the fillers, if any, are non-hygroscopic, may utilize flameproof cable entry devices with a sealing ring (cable gland).

Multi-wire cable with an overall shield is recommended for EM6422 wiring. Use cable with individual wires between 24÷15AWG (0,32÷1,5 mm^2).
Cable that has a metalized foil plastic shield with a drain wire is recommended over cable with woven shields because it is easier to terminate the drain wire type cable.

(**) n°6 threads minimum
(***) Taking the maximum permissive tolerances the maximum of the used taper thereading standard, the number of engaged threads may be less than five.

8.2.2 CABLES ENTRY USING SEALING FITTING COUPLING

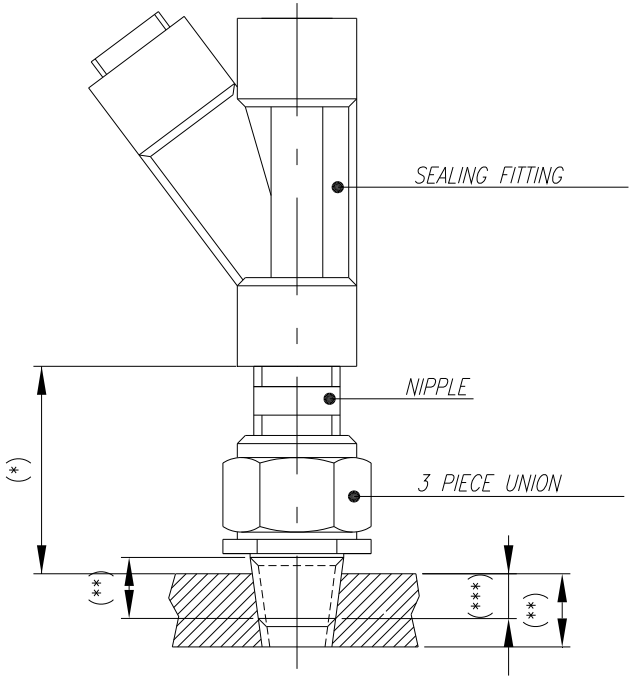


fig.6- EXAMPLE OF A SEALING FITTING

The SEALING FITTING shall incorporate compound or other appropriate seals which permit stopping around individual cores.

(*) SEALING FITTING shall be fitted at a distance of 50mm max from the outside wall.

Multi-wire cable with an overall shield is recommended for EM6422 wiring. Use cable with individual wires between 24÷15AWG (0,32÷1,5 mm^2).
Cable that has a metalized foil plastic shield with a drain wire is recommended over cable with woven shields because it is easier to terminate the drain wire type cable

(*) sealing fitting must be fitted according to EN 60079-14
(**) n°6 threads minimum
(***) Taking the maximum permissive tolerances the maximum of the used taper thereading standard, the number of engaged threads may be less than five.

8.3 TERMINAL CONNECTIONS

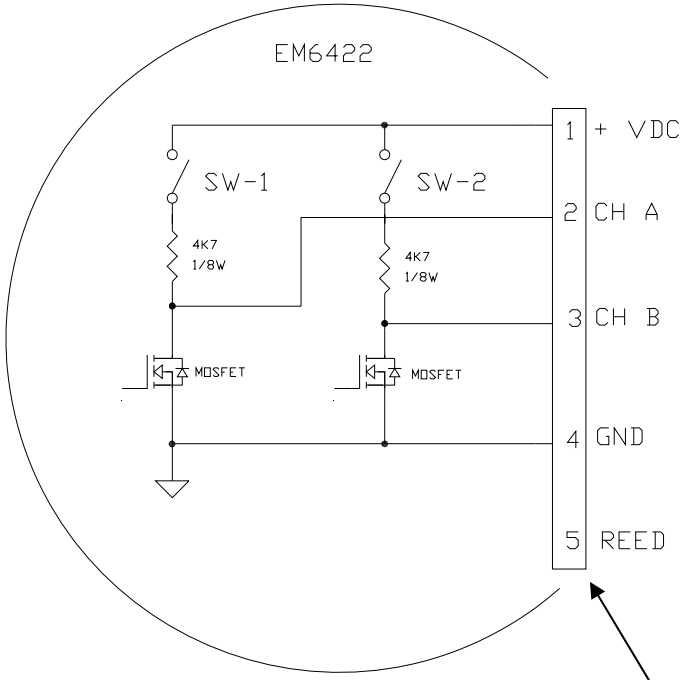


fig.7

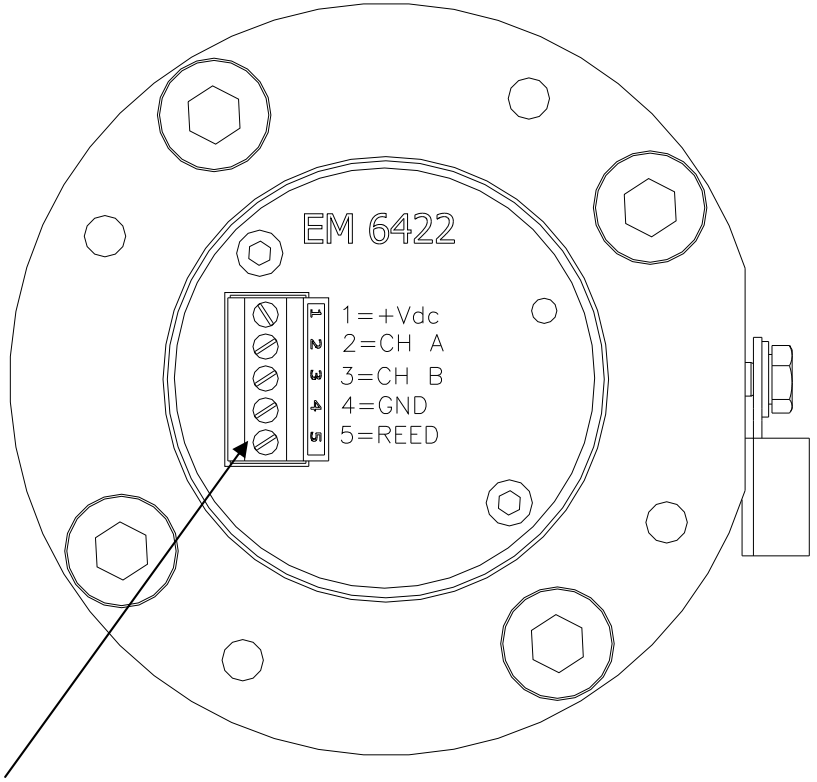


fig.8

WIRING CABLE ON TERMINAL BLOCK

- By removing the cover you can access to a 5 positions terminal block for wiring.
- The terminal block can be unplugged from the board for ease of wiring. Pull it straight up to remove.
- The terminal block screws require a straight blade screwdriver with a tip less than 3mm wide.
- Before inserting wires into the terminal block, strip 6mm of insulation off each wire.
- Turn each terminal screw clockwise a few turns to make sure that the wiring slot is fully open to accept wire.
- Insert the stripped end of the wire and tighten the terminal block screw.
- Plug the terminal block back into the board.
- Be sure it is properly oriented.

8.4 PULSE OUTPUTS SETUP

EM6422 is supplied with the CHANNEL A and CHANNEL B outputs predisposed with SW 1 and SWS 2 open (see figures).
If is necessary to have a pull-up resistor (4,7 Kohm) connected to power supply, change the position of SW1 and SW2 from open to close “ON”.

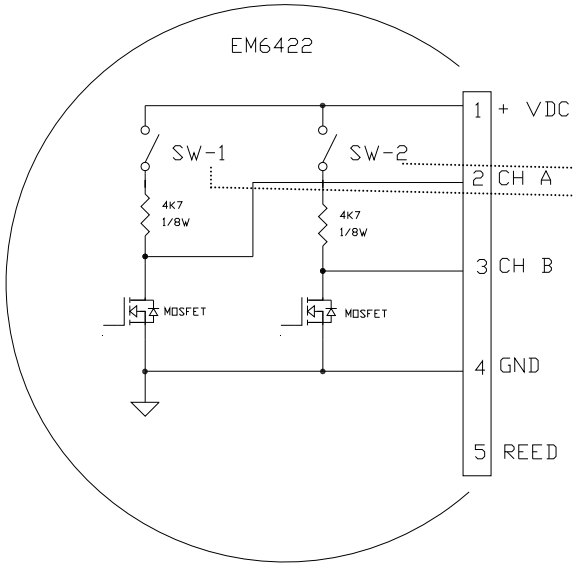


fig.9

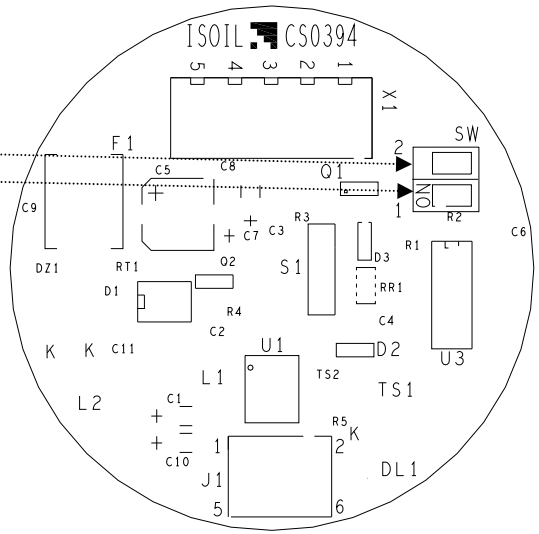


fig.10

8.5 ELECTRICAL CONNECTIONS WITH VEGA II AND VEGA T

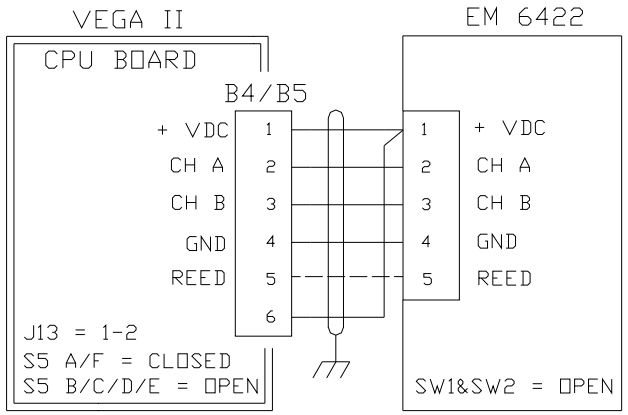


fig. 11- VEGA II → EM6422

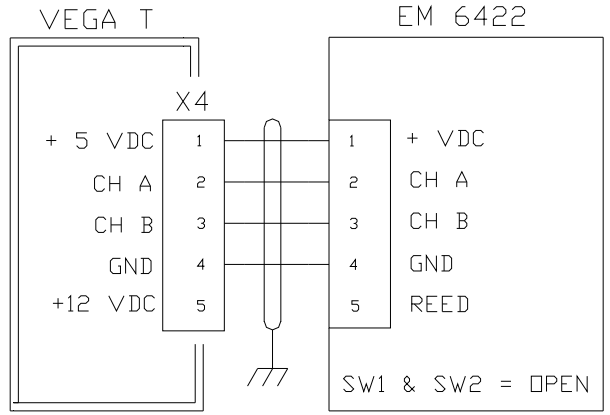


fig.12 - VEGA T (VAC) → EM6422

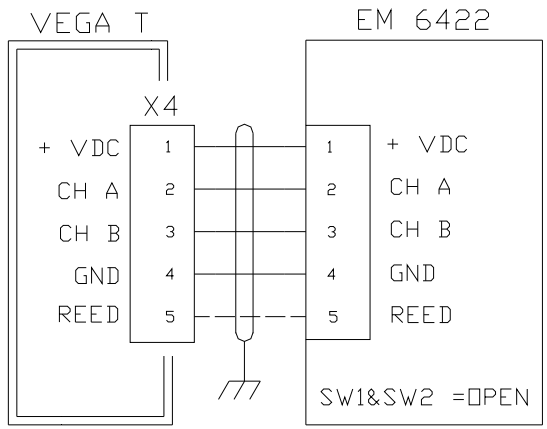


Fig. 13- VEGA T (VDC) → EM6422

8.6 QUADRATURE OUTPUS SEQUENCY

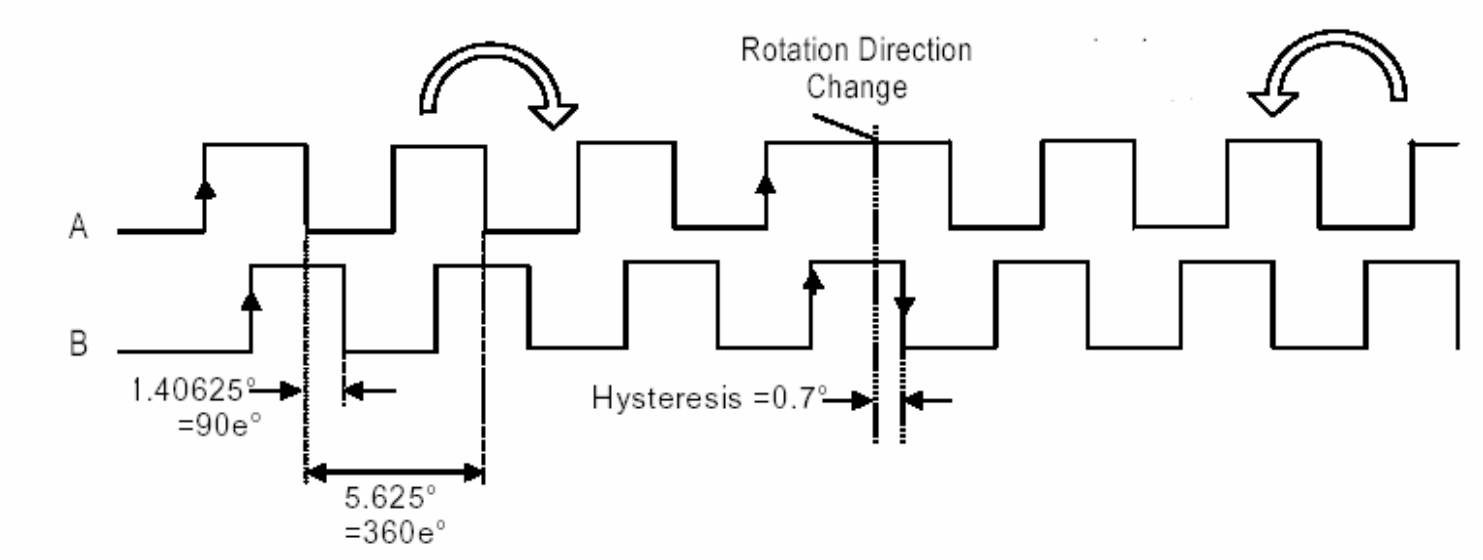


fig.14

8.7 PULSES RESOLUTION FOR ISOIL PDMETERS

The resolution changes from pdmeter to pdmeter . See table below for the main ISOIL/OIL PDMETER models. Every single pdmeter can generate a small different resolution because the TABLE 1 gives the theoretical value and not the real value.

TABLE 1

PD-meter model	pulses/ liter	PD-meter model	pulses/ liter	PD-meter model	pulses/ liter
SBM 32	133,056	BM 200	28,131	LBM 1000	4,33
SBM 75	102,4	BM 400	14,065	LBM 3000	2,166
SBM 150	28,131	BM 600	9,377		
S 9000	13,0	P 4000	13,0		

9 PARTS LIST OF “EM 6422” AND SUBSTITUTION PROCEDURE OF THE ELECTRONIC BOARD

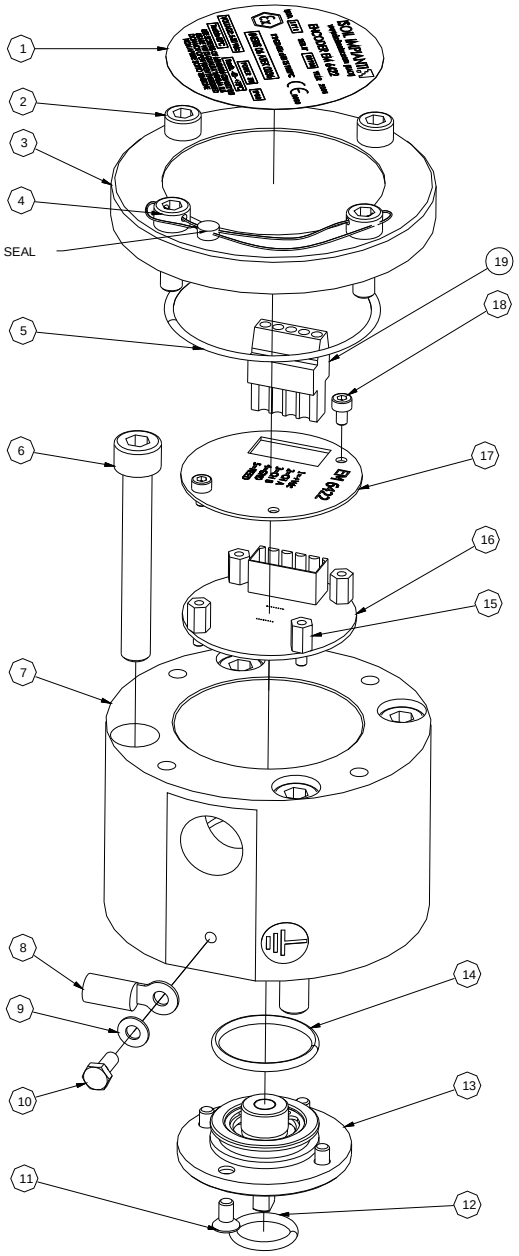


fig.15

PARTS LIST FOR EM6422 VITON VERSION (see fig.15)		
ITEM	Q.TY	DESCRIPTION
1	1	ATEX PLATE OF EM6422 D.101777
2	4	SCREW TCEI M6x20 ST. STEEL (MINIMUM CLASS 70)
3	1	COVER FOR EM6422
4	4	SCREW M6x20 UNI5931 ST. STEEL WITH HOLE (CLASS 70)
5	1	GASKET O-RING
6	4	SREW TCEI M8x60 UNI5931 CARBON STEEL
7	1	ENCLOSURE EM6422
8	1	CRIMP TERMINAL CEMBRE “GF-M4”
9	1	SPRING WASHER DIAM. 4 C.S.
10	1	SCREW TE M4x10 EN 24017 CARBON STEEL
11	4	SCREW TSEI M4X8 UNI 5933 ST. STEEL
12	1	GASKET OR 3056 VITON
13	1	ASSEMBLY FOR EM6422
14	1	GASKET OR 3100 VITON
15	1	ELECTRONIC BOARD CS0394
16	4	HEXAGONAL SPACER M3 L=8mml
17	1	INTERNAL PLATE EM6422 D.101776
18	2	SCREW TCEI M3x6 UNI5931 ST. STEEL
19	1	TERMINAL BLOCK WEIDMULLER N.1639730000

DIFFERENCES FOR NITRILE VERSION (see fig. 15)		
ITEM	Q.TY	DESCRIPTION
12	1	GASKET O-RING 3056 NBR
14	1	GASKET O-RING 3100 NBR

SUBSTITUTION PROCEDURE OF THE ELECTRONIC BOARD

In case of any fault the authorised technician must:

- *Switch off the power supply of the unit*
- *Unscrew the four screws (2 and 4) and put them in safe position*
- *Open the ENCLOSURE by removing the COVER (3).*
- *Avoiding that rain or dust can enter inside the ENCLOSURE*
- *Remove the TERMINAL BLOCK (19)*
- *Remove the INTERNAL PLATE (17) by unscrewing the two screws (18)*
- *Remove the ELECTRONIC BOARD (16) by unscrewing the four HEXAGONAL SPACER (16)*
- *Substitute the ELECTRONIC BOARD (16) with a new one*
- *Restore the INTERNAL PLATE and TERMINAL BLOCK*
- *Clean the joints and spread a thin layer of silicone grease on the o-ring seal*
- *Close the COVER, pay attention to maintain the GASKET O RING (5) in his own seat, by screwing all the original screws (2 and 3); in case of lost screws replace them with “M6X20 stainless steel having minimum class 70 or M6x20 UNI5931 Carbon Steel having minimum quality 8.8.*
- *Switch on the power supply of the unit*

The substituted board has to be sent to ISOIL IMPIANTI for repair. Only original spare parts can be used.

10 PARTS LIST FOR “KITS RETROFIT” ISOIL PDMETERS

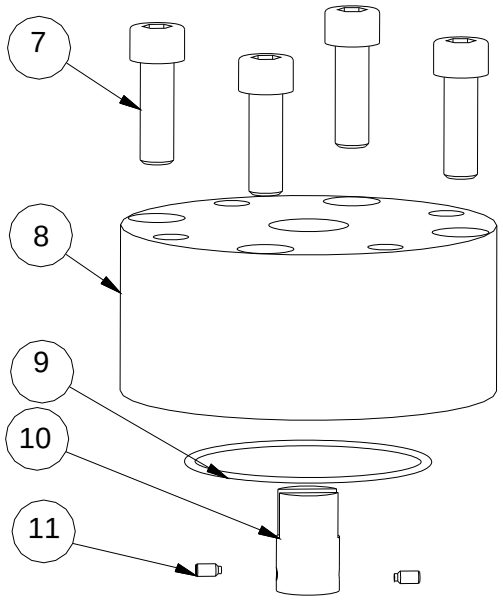


fig.16

PARTS LIST FOR KIT RETROFIT VITON VERSION (see fig.16)		
ITEM	Q.TY	DESCRIPTION
7	4	SCREW TCEI M 8X20 CARBON STEEL
8	1	FLANGE D.6427
9	1	GASKET OR 3168 VITON
10’	1	SCUFFER D.6431
11	2	GROB SCREW M3x6 INOX UNI5925

PARTS LIST FOR KIT RETROFIT NITRILE VERSION (see fig.16)		
ITEM	Q.TY	DESCRIPTION
7	4	SCREW TCEI M 8X20 CARBON STEEL
8	1	FLANGE D.6427
9	1	GASKET O-RING 3168 NBR
10’	1	SCUFFER D.6431
11	2	GROB SCREW M3x6 INOX UNI5925

(2) Equipment and protective systems intended for use in potentially explosive atmospheres
Directive 94/9/EC

(1) EC-TYPE EXAMINATION CERTIFICATE

(3) Number of the EC type examination certificate: **INERIS 06ATEX0032**

(4) Equipment or protective system:

PULSES EMITTER TYPE ENCODER EM6422

(5) Manufacturer: **ISOIL IMPIANTI s.p.a**

(6) Address: via Madonna delle Rose 74
I - 24061 ALBANO SAN ALLESSANDRO (BG)

(7) This equipment or protective system and any other acceptable alternative of this one are described in the annex of this certificate and the descriptive documents quoted in this annex.

(8) The INERIS, notified body and identified under number 0080, in accordance with article 9 of Council Directive 94/9/EC of the 23rd March 1994, certifies that this equipment or protective system fulfils the Essential of Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, described in annex II of the Directive.

The examinations and the tests are consigned in confidential report No P77789/06.

(9) The respect of the Essential Health and Safety Requirements is ensured by:

- conformity with:

EN 50 014	of	June	1997 + Amendments 1 and 2
EN 50 018	of	November	2000 + Amendment 1
EN 50 281-1-1	of	September	1998 + Amendment 1

- specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents.

IM1337AA

Parc Technologique Alata BP 2 F-60550 Verneuil-en-Halatte
tél + 33(0)3 44 55 66 77 fax + 33(0)3 44 55 66 99 internet www.ineris.fr
Institut national de l'environnement industriel et des risques
Etablissement public à caractère industriel et commercial - RCS Senlis B 381 984 921 - Siret 381 984 921 00019 - APE 7438

(10) Sign X, when it is placed following the Number of the EC type examination certificate, indicates that this equipment and protective system is subjected to the special conditions for safe use, mentioned in the annex of this certificate.

(11) This EC type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system, these are not covered by this certificate.

(12) The marking of the equipment or the protective system will have to contain:

 II 2GD EEx d IIB T6 T85°C IP66 or T5 T100°C IP66

Verneuil-en-Halatte, 2006 05 17

X. LEFEBVRE

Project Manager at the ATEX
Equipment Certification Laboratory

Director of the Certifying Body,
By delegation
B. PIQUETTE
Deputy Manager of Certification

(13) # ANNEX

(14) EC TYPE EXAMINATION CERTIFICATE N° INERIS 06ATEX0032

(15) DESCRIPTION OF THE EQUIPMENT OR THE PROTECTIVE SYSTEM

This equipment contains a flameproof box fitted with an electronic card.

PARAMETERS RELATING TO THE SAFETY

- Supply voltage : 5/30 Volts DC.
- Power : 5 W

MARKING

Marking has to be readable and indelible; it has to include the following indications:

ISOIL IMPIANTI s.p.a
I - 24061 ALBANO SAN ALLESSANDRO (BG)
ENCODER EM6422
INERIS 06ATEX0032
(Serial number)
(Year of construction)
Ex II 2 G D
EEx d IIB T6 IP66T85°C(Tamb :-40°C/+55°C)
or
EEx d IIBT5 IP66T100°C(Tamb :-40°C/+75°C) Tcable :80°C

DO NOT OPEN WHEN ENERGIZED
USE SCREWS OF MINIMUM QUALITY 8.8

Marking may be carried out in the language of the country of use.

The protective system or equipment has also to carry the marking normally stipulated by its construction standards.

ROUTINE EXAMINATIONS AND TESTS

The equipment is exempt from any individual overpressure test in conformity with the 16.2 of the EN 50 018 standard due to the fact that it has undergone a type test under four times of the reference pressure.

(16) DESCRIPTIVE DOCUMENTS

The descriptive documents quoted hereafter constitute the technical documentation of the equipment, subject of this certificate.

– Technical descriptive notice TNEM6422 Rev B	signed on 2006.03.17
– Safety instruction notice EM6422 Rev B	signed on 2006.03.23
– Drawing 6470 Rev B	signed on 2006.02.28
– Drawing 5840/5	signed on 2006.03.23

(17) SPECIAL CONDITIONS FOR SAFE USE

None.

(18) ESSENTIAL SAFETY AND HEALTH REQUIREMENTS

The respect of the Essential Health and Safety Requirements is ensured by:

- Conformity to the European standards EN 50 014, EN 50 018 and EN 50 281-1-1
- All provisions adopted by the manufacturer and defined in the descriptive documents.

ISOIL IMPIANTI

CONFORMITY DECLARATION
CE MARKING

Isoil Impianti S.p.A., Via Madonna delle rose, 74 – 24061 Albano Sant'Alessandro – BG
Tel. 035-4239011 – Fax 035-582078 - e-mail albano@isoil-impianti.it
hereby declare upon its own responsibility that the CE marking as indicated on the plates of the following electrical equipment:

- PULSE EMITTER TYPE "EM 6422"

states the conformity of the essential safety requirements as listed in the following EU directives:

- Directive 89/336/CE "EMC" (electro-magnetic compatibility)
- Directive 94/9/CE "ATEX" (explosive atmospheres).

The conformity evaluation to Directive 94/9 "ATEX " has been carried out by the fulfillment of the requirements stated in Annex IV (notification by INERIS, document ***INERIS06 ATEX0032*** dated 2006/05/17).

Marking on equipment	EC type certificate
CE 0080 Ex **II 2 GD EEx d IIB T5 100°C IP66** or CE 0080 Ex **II 2 GD EEx d IIB T6 85°C IP66**	**INERIS06 ATEX0032**

The relevant test reports are recorded in our archives

Albano Sant'Alessandro, 2009/03/31

Isoil Impianti S.p.A.
Dott. Ing. Marco Blumer
President

Isoil Impianti S.p.A. - Italy
Sede e stabilimento
Head office and factory
24041 Albano S.Alessandro (BG)
74, Via Madonna delle Rose
Tel. +39 035 4239 011
Fax +39 035 581978
E-mail : albano@isoil.it
Web : www.isoilmetal.com

Uffici Commerciali
Sales office
20092 Cinisello Balsamo (MI)
27, Via F.lli Gracchi
Tel. +39 02 6607.1
Fax +39 02 61 30592
E-mail : commerciale@isoil.it
isoil@isoil.it

Sede legale
Registered office
20124 Milano
24, Viale Vittorio Veneto
Capitale sociale i.v. € 774.000
Codice Fisc. e part. IVA 13644760158
C.C.I.A.A. MI - Reg. Imp. 844/2000
R.E.A. Milano 1612788