USER MANUAL
FOR ATEX CYLINDER

FLAMEPROOF ENCLOSURES FOR SENSORS ON CYLINDERS, ACCUMULATORS AND DAMPERS

For Model Type sensor:
Analog, Profibus

Ex db IIB T4 Gb

EC-TYPE CERTIFICATE: Presafe 15 ATEX 6670 X
IECEx CERTIFICATE of CONFORMITY: IECEx PRE 15.0034 X

CE 2460 Ex II 2 G

Manufacturer:

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INTRODUCTION

Flameproof enclosures for sensors on cylinders, accumulators, and dampers type “Area1”, “Area2” and “Area3” are ATEX and IECEx approved for use in potentially explosive atmospheres.

The control system communicates with Analog or Profibus, depending on type. All types have a series of analogue inputs for use when bus communication is not required.

The unit has been manufactured in compliance with applicable regulations and standards, see Declaration of Conformity for details. As the unit has been type approved according to these standards, any alteration or modification of the unit which is not specifically described in this User Manual will void the type approval, and relieve the manufacturer/distributor of any responsibility.

This User Manual is intended for personnel with relevant training, and it is essential that any person installing, commissioning, or adjusting the unit has knowledge of the contents in the User Manual and the following technical data sheets:

KEY DATA

Type Approval:	Presafe 15 ATEX 6670 X, CE 2460 IECEx PRE 15.0034 X
Identification:	Ex db IIB T4 Gb, T_{amb} -20°C to + 60°C
Temperature Range:	Ambient: -20°C to +60°C *(-4 to +140°F)*
IP Class:	IP67
Max. Current:	180mA
Max. Voltage:	36 VDC SELV DC supply with max. 36VDC +10%
BUS Protocols:	Profibus Analog (proprietary, internal communication between the units)

MARKING PLATES

Manufacturer Servi AS-Rissa, 7100 Rissa, Norway			
Flameproof enclosures for sensores on cylinders accumulators and dampers Type :			
CE 2460	Ex II -/2 G	Ex db IIB T4 Gb, T_{amb} -20°C to +60°C	
V: A:			Year :
Presafe 15 ATEX 6670 X IECEx PRE 15.0034 X	AREA 1	Serial : ORDRE POS NR.: ANTALL (X)	
Position sensor type:			

Manufacturer Servi AS-Rissa, 7100 Rissa, Norway			
Flameproof enclosures for sensores on cylinders accumulators and dampers Type :			
CE 2460	Ex II -/2 G	Ex db IIB T4 GB, T_{amb} -20°C to + 60°C	
V: A:			Year :
Presafe 15 ATEX 6670 X IECEx PRE 15.0034 X	AREA 2	Serial : ORDRE POS NR.: ANTALL (X)	
Position sensor type:			

Manufacturer Servi AS-Rissa, 7100 Rissa, Norway			
Flameproof enclosures for sensores on cylinders accumulators and dampers Type :			
CE 2460	Ex II -/2 G	Ex db IIB T4 Gb, T_{amb} -20°C to +60°C	
V: A:			Year :
Presafe 15 ATEX 6670 X IECEx PRE 15.0034 X	AREA 3	Serial : ORDRE POS NR.: ANTALL (X)	
Position sensor type:			

Description of the EX marking code

General

CE	2460	Ex	II	2G
CE Conformity Marking	Identification Number of Notified Body involved in Production Control Stage	Explosion Protection Marking	Equipment Group	Equipment Category

Electrical

Ex	d	IIB	T4	Gb
Explosion Protection Marking	Type of Protection	Equipment Gas Group	T-class	Equipment Protection Level (EPL)

Type of Ex protection used (electrical):

“d” – equipment protection by flameproof enclosure

Gas group IIB-representative gas (ethylene), suitable also for gas group IIA.

T4-class-maximum surface temperature +135°C

EPL/Equipment Category

Definition	EPL	Category	Group	Typical Zone of Application
Gas atmospheres, "high" level of protection	Gb	2G	II	1

ATEX, IECEX – POTENTIALLY EXPLOSIVE ENVIRONMENT

Equipment has been approved according to the following EX Standards:

IEC 60079-0:2017, Edition: 7.0 EN IEC 60079-0:2018
IEC 60079-1:2014-06, Edition: 7.0 EN 60079-1:2014
and directive 2014/34/EU

Equipment is delivering with permanently connected cable (no free threaded entries).

AREA 1, AREA 2

Maximum allowed number is up to 3 x “M20x1.5”, “M18x1.5 or “M16x1.5”.

AREA 3

Maximum allowed number is up to 5 x “M20x1.5”, “M18x1.5 or “M16x1.5”.

Electrical scheme for applicable sensors

The maximum surface temperature of the sensors evaluated for max. power of ca. 3W has been estimated to +120°C with the high margin of safety. The sensors listed in table below are going to be used and will be mounted completely inside the metallic enclosure.

Table 2.

	Sensor	Rated Voltage	Rated Current/ current consumption	Max. Power Dissipation
1	Temposonic Analog Temposonic Profibus	0-10V DC 0-36V DC	4-20 mA 0-90 mA	0.2W 3.2W
2	Balluff	0-10 V DC	4-20 mA	0.2W
3	RotaTransducer LK	9-32V DC	3 wire 4-20 mA	0.6W
4	ASM Sensor	0-10V DC	4-20 mA	0.2W
5	KS-Penny&Giles	10V DC	20 mA	0.2W

Intention
Describe how the installation and testing of length sensors (measuring rods / sensors) and inductive sensors should be performed to determine whether the product meets specified requirements and functions satisfactorily.

Responsibility
Anyone who performs installation and testing of the measuring sticks / sensors and inductive sensors at Servi AS-Rissa has responsibility to follow this procedure.

Authority
Production Manager has the authority to implement and follow up that provision in the procedure being followed.

Scope
The procedure involves the installation and testing of the measuring sticks / sensors and inductive sensors supplied by Servi AS-Rissa.
The basis of the procedure.
The provision of the procedure is based on information about the testing of vendors' books and software.

Description
Installation of length sensors and inductive sensors made in accordance with the descriptions in the product data sheets and brochures and is not described further in this procedure.
Time in our defined methods for testing the length sensors (measuring rods / sensors) are described in detail in this procedure and also shown in the wiring diagrams in this procedure. Before shipment of products with length sensor shall checklist for handling and assembly (7.3.2.4) be completed. REMEMBER that serial number shall be entered on the checklist. For products with Atex equipment shall additionally procedure Atex products (3.1.3.4.1) followed and checklist for Atex products must be completed

GENERAL PRECAUTIONS

1.1 Testing of length sensors (measuring rods / sensors) and inductive sensors are part of the general quality of the enterprise. The testing will help to reveal defects in cables and measuring rods / sensors that cannot be found otherwise.
1.2 General before testing: -
1.2.1. Check test object visually, check IF the technical documents are correct.
1.2.2. Check that the cables are free from external damage and cable length is minimum 10m from measuring rod / inductive sensors.
1.2.3. Check depth measuring drilling rod to ensure that sensor rod length is not longer than the drilling rod and the measuring rod / sensor length will never come out of the magnet.
1.2.4. It must be taken the utmost care so that measuring rod / sensor and inductive sensor is not physically damaged during testing. Inductive sensor mounted so that the distance from the measurement range is in accordance with the supplier's recommendations, i.e. maximum 1,22mm, but it must be ensured that there is no physical contact between the donor and stamp. Use dedicated instrument from provider to check this.
1.2.5. Power must already be set to the desired value according to type (see wiring diagram for the various measuring rod / sensor types and inductive sensors) and control measured before measuring rod / sensor and inductive sensors connected and tested.
1.2.6. Assembly instructions for cable Penny & Giles sensors.

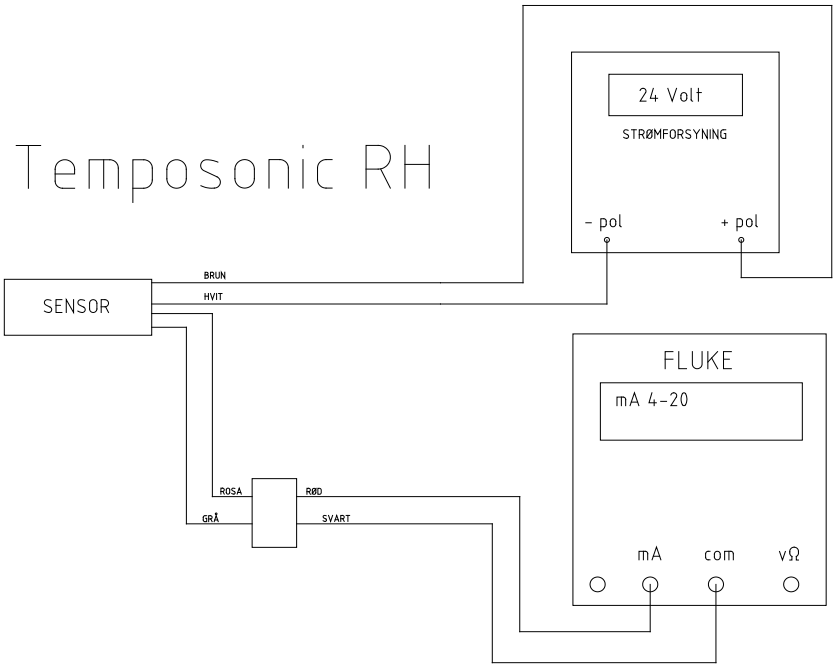
TESTING

1 Temposonic Profibus 24V

General precautions section. 1 Shall be reviewed every single test of measuring rod / sensor. Sensor connected to Profibus test PC in the wiring diagram on the test bench Ensure that dipstick / sensor is "connected" WITH Profibus test PC, and test Both cables (cable pairs) for ensuring that both are CORRECT connected PCB. Values read by Profibus test PC. Cylinder run in and out To ensure that the measurements are accurate with respect stroke. Report taken out and stored with TP and Serial Number (Example TP100100-1-1, for orders 100 100, Item 1 and cylinder No. 1). Store in order folder. programming: By Wrong Shall measuring rod / sensor value set to "0". NB: Double PROFIBUS CABLE: Installation and testing of sensor connected double PROFIBUS cable. Look for the cable pairs one Red (wiring short) against Red (cable) and Green (wiring short) against Green (cable). And cable pair 2 is Connected: To: Red (wiring short) the Lilla (Cable) and Green (wiring short) the Orange (cable).

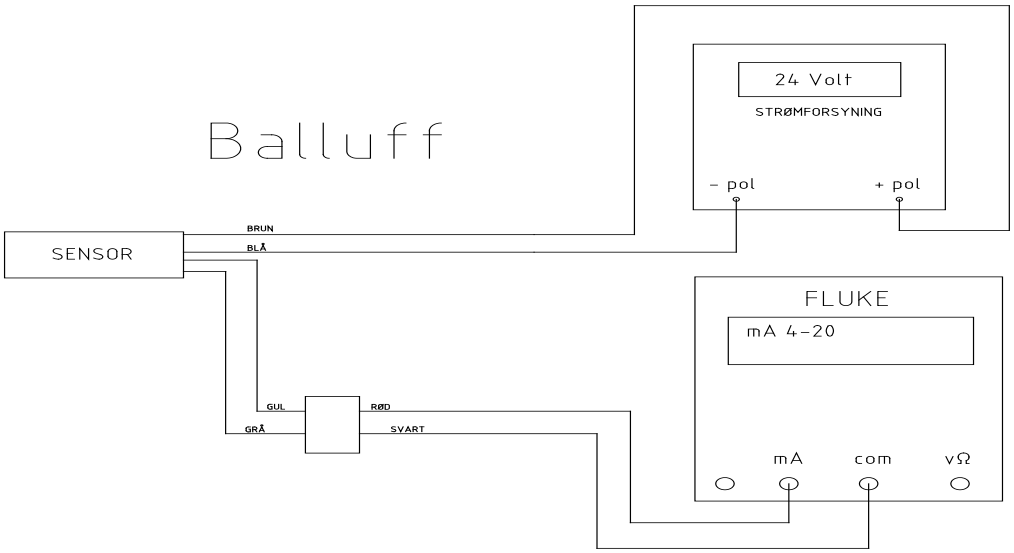
2 Temposonic Analog (4-20mA, 24V)

General precautions section. 1 will be discussed in each test of measuring rod / sensor. Sensor connects to the wiring diagram in this procedure Stroke cylinder divided into 0%, 25%, 50%, 75% and 100% and the length (in mm) of 0% for the various steps are listed in the test certificate. Values in "mA" are read and stored in the Fluke multi-instrument at all measuring points if cylinder runs out. When the cylinder runs out, the same values (mA) which was read by the various measuring points, and each value is read distance from 0% of (mm) and checked again against the calculated distances (mm). Information from the test is transferred electronically from Fluke measuring device to the PC and stored in accordance with section. 2.1.5.



3 Balluff analog (4-20mA, 24V)

General precautions section. 1 will be discussed in each test of measuring rod / sensor. Sensor connects to the wiring diagram in this procedure. Stroke cylinder divided into 0%, 25%, 50%, 75% and 100% and the length (in mm) of 0% for the various steps are listed in the test certificate. Values in "mA" are read and stored in the Fluke multi-instrument at all measuring points if cylinder runs out. When the cylinder runs out, the same values (mA) which was read by the various measuring points, and each value is read distance from 0% of (mm) and checked again against the calculated distances (mm). Information from the test is transferred electronically from Fluke measuring device to the PC and stored in accordance with section. 2.1.5



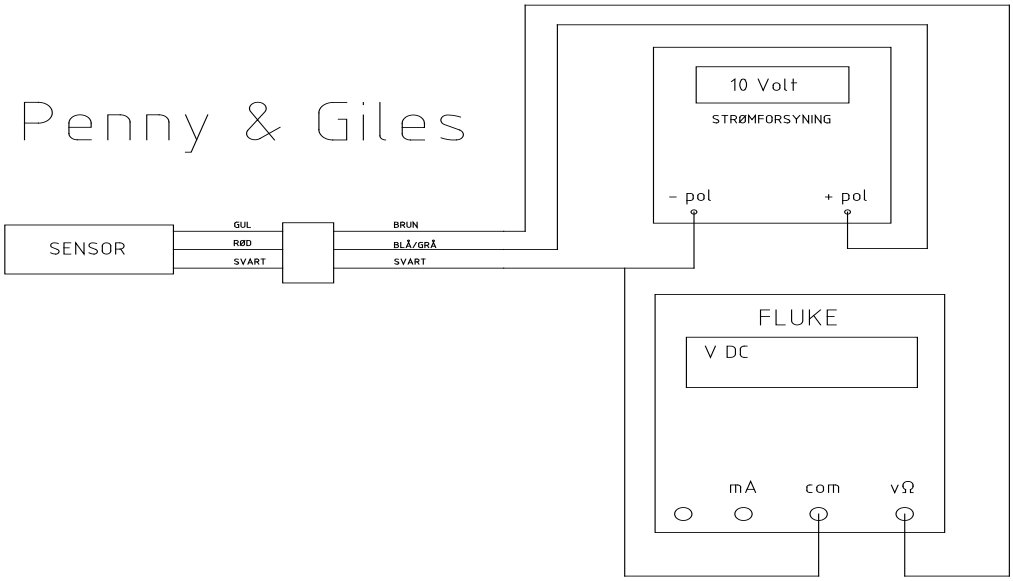
Penny & Giles (1-10V)

General precautions section. 1 will be discussed in each test of measuring rod / sensor.

Sensor connects to the wiring diagram, in this procedure.

Stroke cylinder divided into 0%, 25%, 50%, 75% and 100% and the length (in mm) of 0% for the various steps are listed in the test certificate. Values in "V" are read and stored in the Fluke multi-instrument at all measuring points if cylinder runs out. When the cylinder runs out, the same values (V) which was read by the various measuring points, and each value is read distance from 0% of (mm) and checked again against the calculated distances (mm).

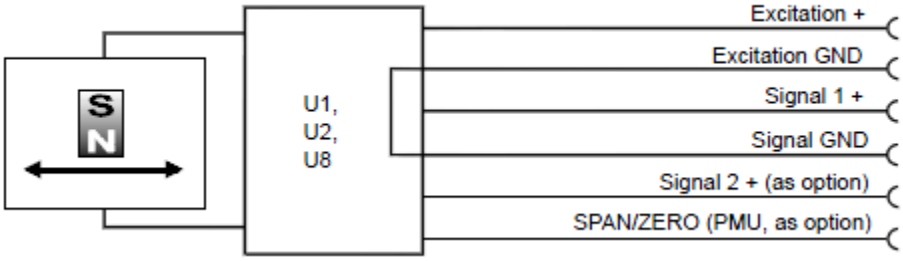
Information from the test is transferred electronically from Fluke measuring device to the PC and stored in accordance with section. 2.1.5.



ASM Sensor

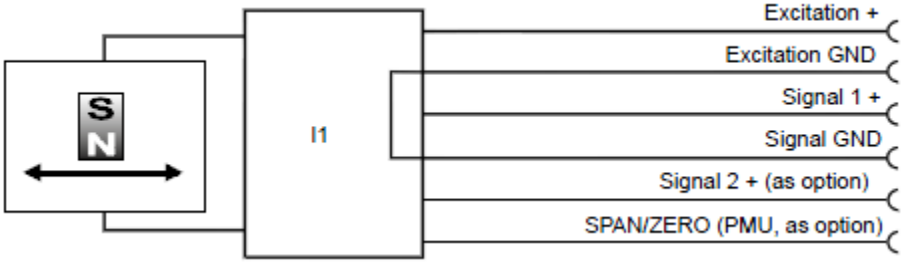
U1, U2, U8 Voltage output	Excitation voltage	**U1**: 18 ... 36 V DC; **U2**: 18 ... 36 V DC; **U8**: 10 ... 36 V
	Excitation current	Typ. 35 mA, 80 mA max.
	Output voltage	**U1**: 0 ... 10 V DC; **U2**: 0.5 ... 10 V DC; **U8**: 0.5 ... 4.5 V DC
	Output current	2 mA max.
	Output load	> 5 kΩ
	Resolution	16 bit f.s., min. 10 µm
	Stability (temperature)	±50 x 10^{-6} / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV_{RMS}
	Operating temperature	-40 ... +85 °C
	EMC	EN 61326-1:2013

Signal diagram

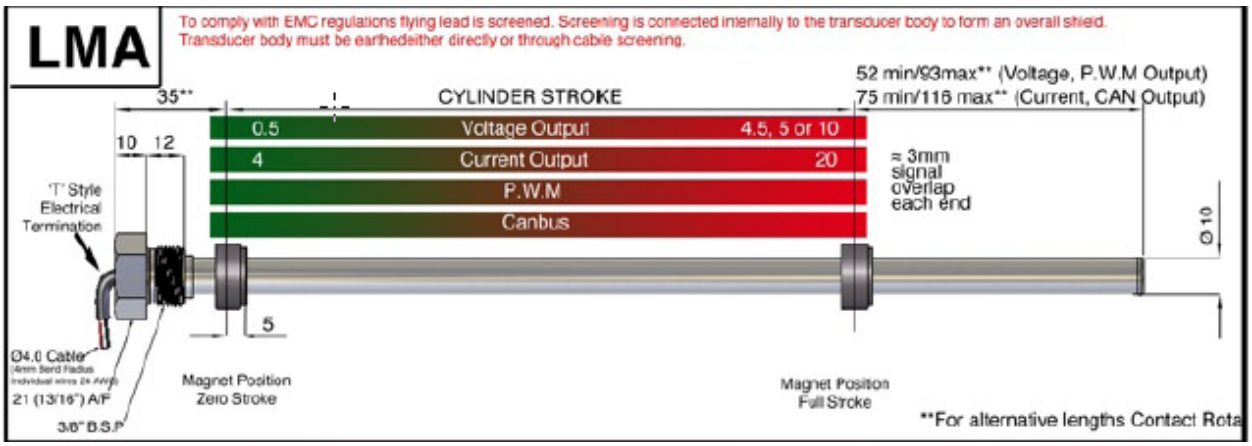


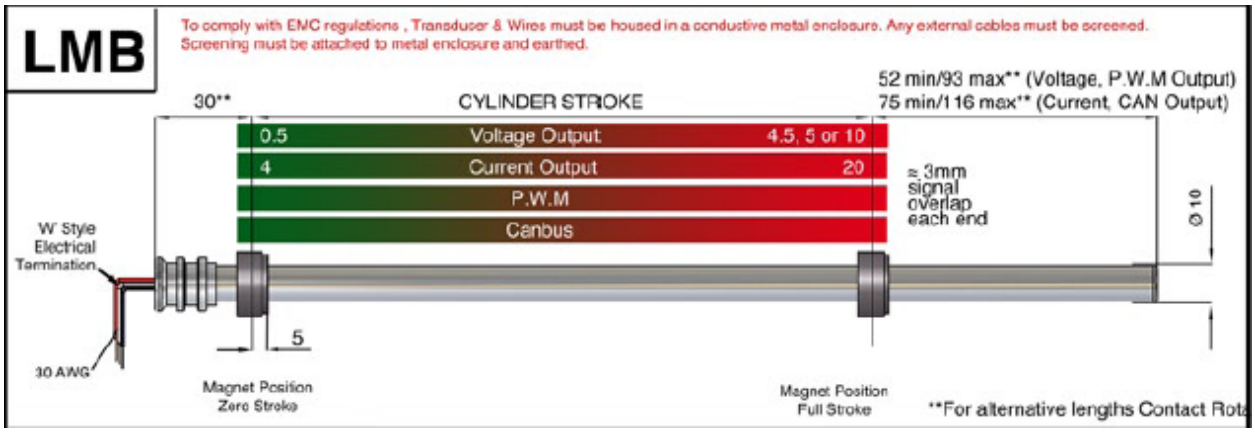
I1 Current output (3 wire)	Excitation voltage	18 ... 36 V DC (10 ... 36 V for R_L≤250Ω)
	Excitation current	Typ. 60 mA, 80 mA max.
	Load resistor	350 Ω max.
	Output current	4 ... 20 mA, 30 mA max (at failure)
	Resolution	16 bit f.s., min. 10 µm
	Stability (temperature)	±50 x 10^{-6} / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV_{RMS}
	Operating temperature	-40 ... +85 °C
	EMC	EN 61326-1:2013

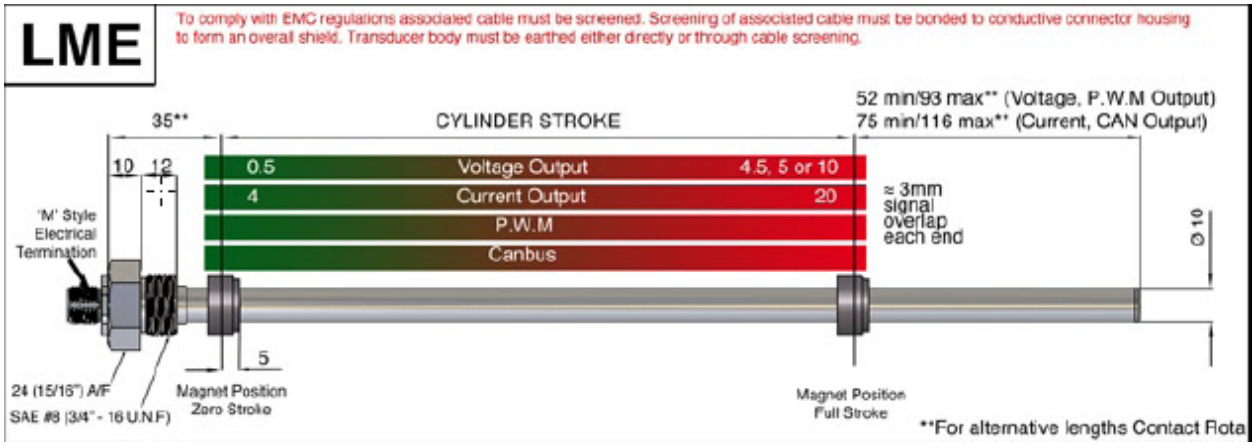
Signal diagram

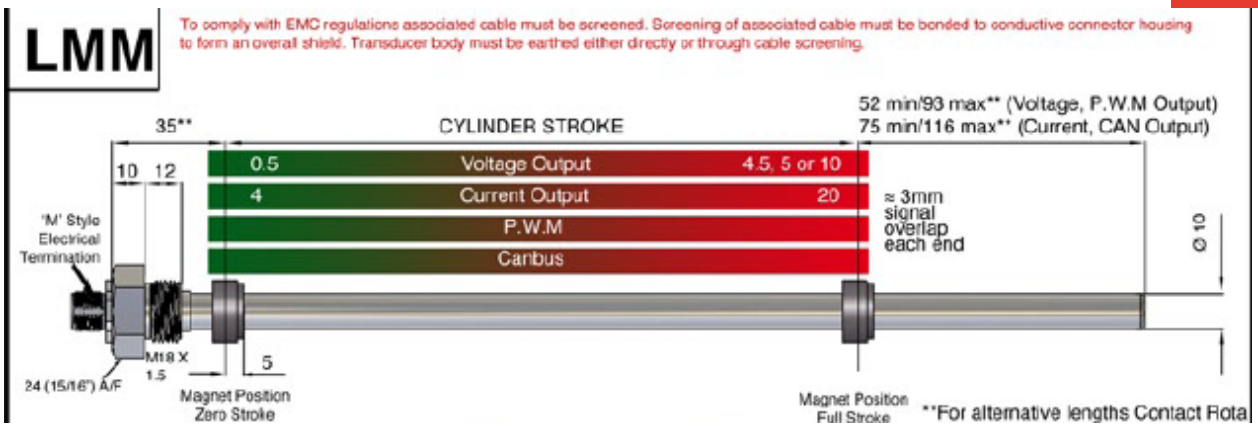


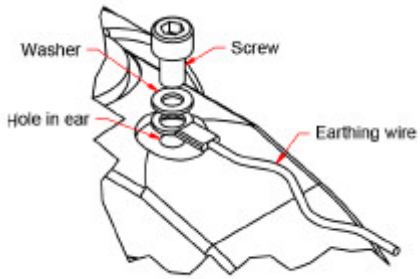
ROTA –LMA/LMB/LME/LMM











Grounding,
Screw M6 and Lock washer (Nord-Lock) tightening torque 6 Nm.

TERMS OF USE

1. Indication of any special hazard arising from the use of the equipment (when necessary).

No special hazard occurring from the use of equipment.

2. Training instructions

No special training required for the users.

3. Details which allow a decision to be made as to whether equipment can be used safely in the intended area under the expected operated conditions.

Equipment intended for use in hazardous zones 1 and 2, (EPL: Gb).
Measuring sides of the sensors must be mounted in safe area.

4. Special conditions of use (required from the manufacturer).

1. The housing type “Area1” can vary in length up to 2 meters and diameter up to 320 mm. The length / diameter ratio must always be less than 6.25. The type “Area2” can vary in length up to 170 mm inside length. The wall thickness must be at least 5 mm Area1 types, and 8 mm for Area2 types. The depth of engagement of the gland threads must be ≥ 8mm.

2. The protection depends on that the measuring side of the sensors in “Area1”, “Area2” and “Area3” are mounted in a safe zone, i.e., in oil or other fluid as intended.

3. Only appropriate (ATEX&IECEx) certified cable glands shall be used in cable entries.

4. Any service and repairs not performed by Servi AS-Rissa within the warranty time, will void the product warranty.

5. Any service and repairs must be according to NEK IEC 60079-19:2019 and only OEM parts must be used.

6. To maintain the Ex-certification after any service or repairs, the product must be controlled according to the regulations by authorized personnel and meet the requirements in IEC 60079-0:2017 and IEC 60079-1:2014-06 and all repairs must be documented.

7. The free end of the permanently connected cable shall be protected by type of protection listed in clause 1 of 60079-0.

8. Hydraulic oil or fluid used maximum allowed temperature is up -20°C to +60°C.

9. The name plate must not be removed or painted over.

5. Essential characteristics of tools which may be fitted to the equipment.

No special tools required.

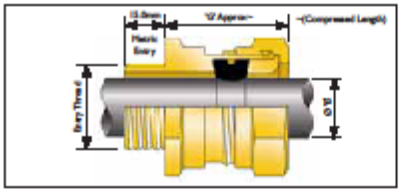
SPECIFIC CONDITIONS FOR SAFE USE ("X") MARK

1. Repairs of the "Area 2" flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repairs must not be made based on values specified in table 2 of EN/IEC 60079-1.
2. The cable and cable gland are suitable only for fixed applications and the cable must be effectively clamped and cleated to prevent pulling and twisting.
3. Parts are fixed together by means of special fasteners (fastening screws), minimum yield strength is 630 N/mm2.

Routine tests:

Every enclosure of type "Area1" must be routine pressure tested with at least 11.3 bar according to clause 16 of EN 60079-1:2007.

Enclosures of type "Area2" and "Area3" must be routine pressure tested with at least 10.1 bar according to clause 16 of EN 60079-1:2007 if welded joint has been used.



Cable Gland Type 501/421

ATEX

Flameproof and Increased Safety

CABLE GLAND SELECTION TABLE

Size Ref.	Entry Thread Size		Cable Acceptance Details				'G'	Hexagon Dimensions	
			Outer Sheath 'B'						
			Standard Seal		Alternative Seal (S)				
	Metric	NPT* Std./ Option	Min.	Max.	Min.	Max.		Across Flats	Across Corners
2K	M16	-	3.0	8.0	-	-	27	19.0	21.2
Os	M20[2]	½"	3.0	8.0	-	-	32.8	24.0	27.7
O	M20[2]	½"	7.5	11.9	-	-	32.8	24.0	27.7
A	M20	¾"/½"	11.0	14.3	8.5	13.4	32.8	30.0	34.6
B	M25	1"/¾"	13.0	20.2	9.5	15.4	33.8	36.0	41.6
C	M32	1¼"/1"	19.0	26.5	15.5	21.2	35.2	46.0	53.1
C2	M40	1½"/1¼"	25.0	32.5	22.0	28.0	36.5	55.0	63.5
D	M50	2"/1½"	31.5	44.4/42.3[1]	27.5	34.8	47.9	65.0	75.1
E	M63	2½"/2"	42.5	56.3/54.3[1]	39.0	46.5	46.2	80.0	92.4
F	M75	3"/2½"	54.5	68.2/65.3[1]	48.5	58.3	48	95.0	109.6
G	M80	3½"	67.0	73.0	-	-	41	106.4	123.0
H	M90	3½"	67.0	77.6	-	-	41	115.0	132.8
J	M100	4"	75.0	91.6	-	-	41	127.0	146.7

[1] Smaller value is applicable when selecting reduced NPT entry option.
[2] Sizes Os and O are available with an M16 thread size. For O size with M16 thread, the maximum cable outer sheath diameter is 10.9mm.

General Information

2K - F size metric entry threads are 1.5mm pitch as standard.
For G size glands and above, a 2mm pitch is supplied as standard.
(1.5mm pitch with 15mm length of thread can be supplied) please specify when ordering.
Thread length is 15mm for sizes 2K to F and 20mm for sizes G to J.
All dimensions in millimetres (except* where dimensions are in inches).
Assembly instruction data sheet No. A.I. 307.

Accessories including locknuts, sealing washers, serrated washers, earth tags, shrouds, adaptors and reducers available. See pages 53 - 57.

Materials & Finishes

The 501/421 cable gland is manufactured in brass (standard), nickel plated brass, 316 stainless steel or aluminium.
Brass NPT entries are nickel plated as standard.

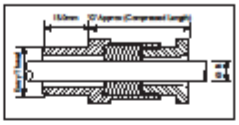
Cable Gland Ordering Examples

Cable Gland Type/Size/Thread

e.g. 501/421/C/M32
501/421/C/1½" NPT

Cable Gland with Alternative Seal (S)

e.g. 501/421/C/M32/S
501/421/C/1½" NPT/S



2K Size Cable Gland Design

Application

- Outdoor or Indoor use.
- For use with non-armoured elastomer and plastic insulated cables.
- See technical section of the catalogue for installation rules and regulations.

Features

- Provides a cable retention seal onto the cables outer sheath.
- When used in increased safety applications, this cable gland may be used with braided cable where the braid and the cables outer sheath pass into the enclosure.
  The braid must be suitably terminated inside the enclosure.

Technical Data

- Flameproof Exd and Increased Safety Exe. Ex II 2 GD
- Baseefa 06ATEX0056X.
- IECEx BAS06.0013X.
- Suitable for use in Zone 1, Zone 2, Zone 21 and Zone 22.
- Suitable for use in Gas Groups IIA, IIB and IIC.
- Construction and test standards EN 50014, EN 50018, EN 50019 and EN 50281-1-1.
  IEC 60079-0, IEC 60079-1 and IEC 60079-7.
- IP66, IP67 and IP68 (30 metres for 7 days) ingress protection to IEC 60529, EN 60529 and NEMA 4X.
- DTS01 deluge protection certified by ITS. Additional deluge protection seal also available.
- Operating temperature range -60°C to +100°C as standard.
- Alternative Certification Options Available.
  - Exd IIC/Exe II.
  - CQPBL BR-Exd IIC/Exe II.
  - GOST R-Exd IICU/Exe IIU.
  - Approved for use in Kazakhstan.
  - AUS-Exd IIC/Exe II.
  - Marine Approval.

501/421 Cable Gland

Connection Solutions
www.ehawke.com

HAWKE International

HWK69 June '07

SAFE USE

If an error occurs that is not described in this manual or the Technical Manual, immediately take the unit out of operation, and contact the manufacturer/distributor.
Do not open /dismount the cover in a potentially explosive atmosphere. The unit is constructed in compliance with Protection Class IP67, but this only applies if the lid is correctly installed.

All work performed on the unit, such as installation, maintenance, replacements or similar, shall be performed by personnel with the required training and qualifications according to applicable regulations in the country of use. The personnel must also have sufficient knowledge of the unit, to ensure that no errors occur due to faulty mounting, connection, adjustment, or similar.

Changing the parameters of the unit during operation shall only occur if the operator carrying out the modification has the necessary training, to ensure correct functioning of the unit. The operator shall also ensure that the change in parameters does not cause unwanted movement of the machine on which the unit is installed, resulting in personal injuries or damage to property. See separate manual for bus communication and parameter adjustment**. Note especially that all changes in parameters will have immediate effect, also during operation**.

PERIODIC MAINTENANCE

There are no special requirements for the periodic maintenance of this unit. But if the device has been subjected to errors or other external defects influences that can shorten its life, it is necessary to assess the risk of injuries and, if necessary, develop a plan for periodic inspection. Pay special attention to the dangers that can harm EX protection device. If in doubt, consult with Atex cylinder Servi AS-Rissa distributor.

NOTES

SERVI GROUP™

SERVI AS-RISSA

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