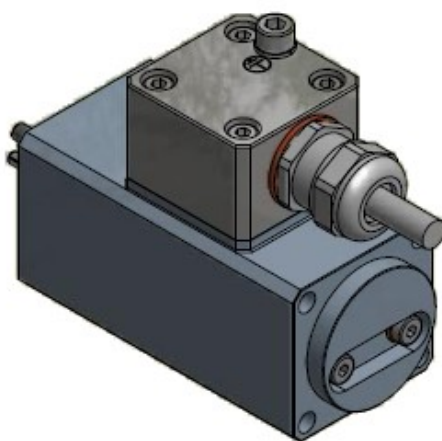


USER MANUAL

FOR HPRS

HIGH PERFORMANCE RANGE SENSOR



Ex d IIB T6 Gb
-40°C ≤ Tamb ≤ +70°C
24 VDC 62 mA IP67

EC TYPE CERTIFICATE: Presafe 14 ATEX 5124X
IECEX CERTIFICATE: IECEX PRE 14.0021X



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INNHOLD

1.	Introduction	4
2.	Key data	4
3.	ATEX, IECEx – Potentially Explosive Environment	4
4.	Quality assurance	5
5.	Description	5
5.1	Exterior dimensions	6
6.	Cable, Cablegland and earthing	8
7.	Marking	9
8.	Safe Use	10
9.	Installation	11
9.1	Wiring diagram	12
10.	Start-up and commissioning	12
11.	Maintenance Instructions	13
11.1	Periodic Maintenance	13
11.2	Storage	13
11.3	Waste disposal	13
12.	Notes	14

1. INTRODUCTION

HPRS is a electronic position sensor with high measuring accuracy approved for use in potentially explosive atmospheres, approved acc EN60079 (IECEX 60079). The unit is primarily to be used together with hydraulic proportional valves and is connected to the valve via an adaptor.

The unit consists of a coil section with integrated electronic, which detect position change of a movable core. This core is mechanically connected to spool of the proportional valve

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 in-depth knowledge of the contents of the User Manual and the following technical data sheets:

Doc. No	Title	Revision
1474197	HPRS – Technical manual	A1

2. KEY DATA

Type Approval:	Presafe 14 ATEX 5124X, C€ 2460 IECEX PRE 14.0021X
Identification:	II 2G Ex d IIB T6 Gb
Temperature range:	Ambient: -40 til +70°C (-40 to +158°F)
IP Class:	IP67
Max Current:	62 mA
External Fuse:	100 mA
Max Voltage:	24 VDC (SELV DC supply with max. 24VDC +20%)
Output signal:	4-20 mA

3. ATEX, IECEX – POTENTIALLY EXPLOSIVE ENVIRONMENT

HPRS has been approved according to the following EX Standards:

EN 60079-0:2012, EN 60079-1:2007

IECEX:

IEC 60079-0:2011, IEC 60079-1:2007

4. QUALITY ASSURANCE

Quality assurance of Servi Hydranor AS is fulfilled acc. the quality assurance system ISO 9001:2005. For production of equipment for use in explosive atmospheres the accredited certification body DNV Nemko Presafe, approval no 2460, perform periodic audits and certification acc directive 94/9EC

5. DESCRIPTION

HPRS can only be used for Hawe proportional valve PSL(F)/PSV(F), size 3,5 og 7

Sensor housing is connected to a valve adaptor fitted for the different valve sizes. The unit has molded in flying lead via an EX approved cable gland, fitted into a cable adaptor. The cable and/or gland **cannot** be dismantled from the unit. Cable adaptor and/or Valve adaptor **cannot** be dismantled from the Sensor housing. The Cable adaptor has a sign for earthing and external earthing must be connected here with the enclosed M5 screw. These screws must never be removed.

The unit can only be calibrated by authorized personnel in which are familiar with the unit. The adjustment screw are located on the inside of 2 pcs M4 screws. These screws must **never** be removed under operation.

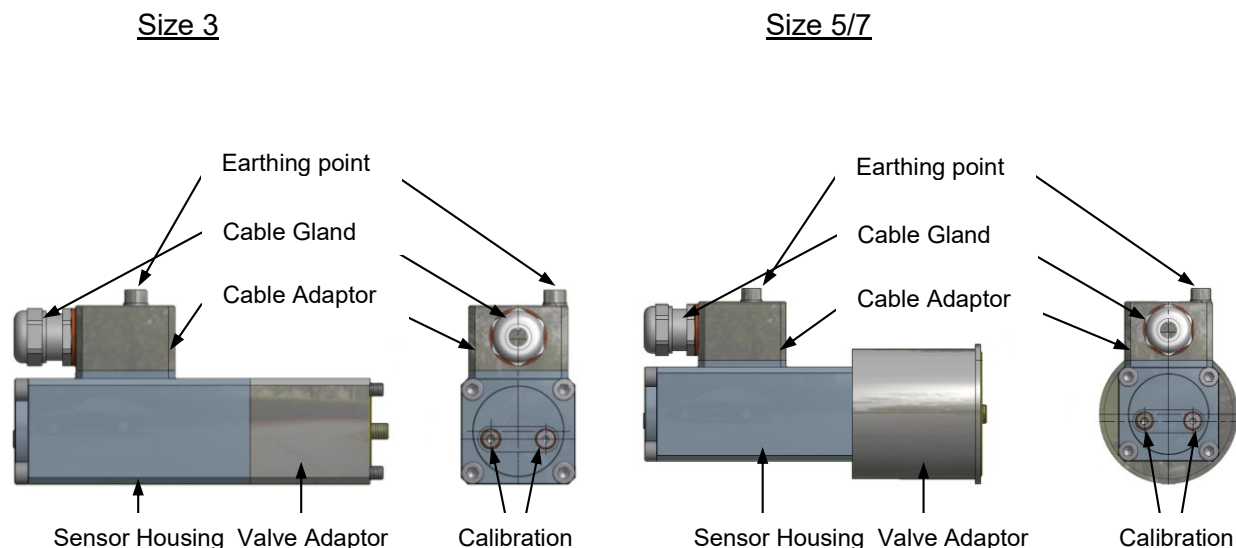
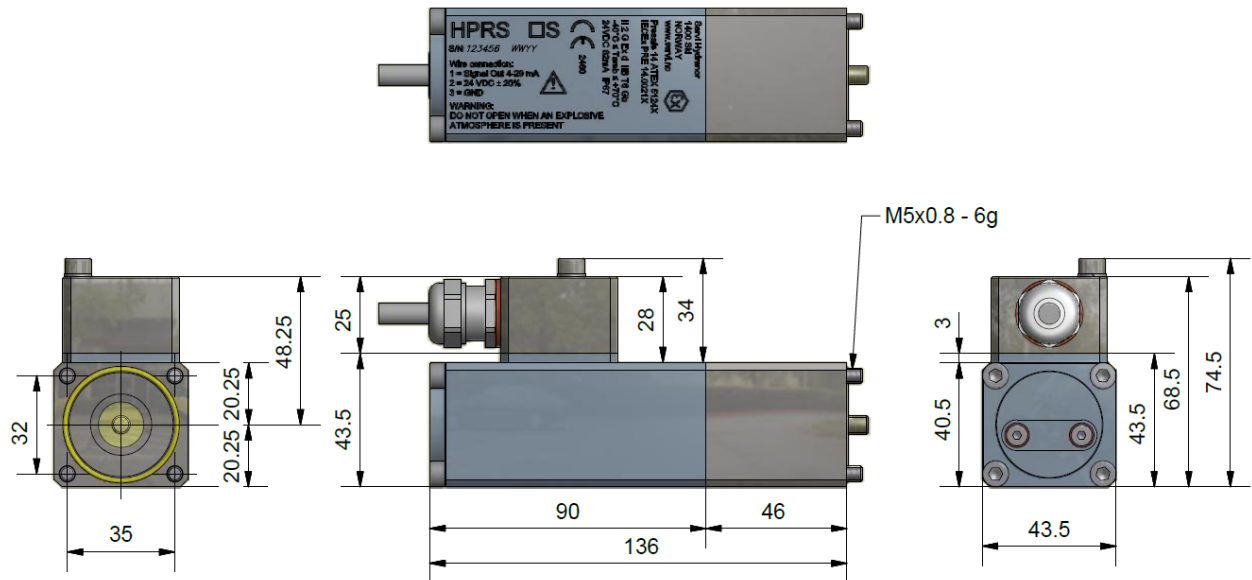


FIGURE 1

5.1 EXTERIOR DIMENSIONS

Sensor Housing with Valve adaptor size 3

Horizontal Cable adaptor



Vertical Cable Adaptor

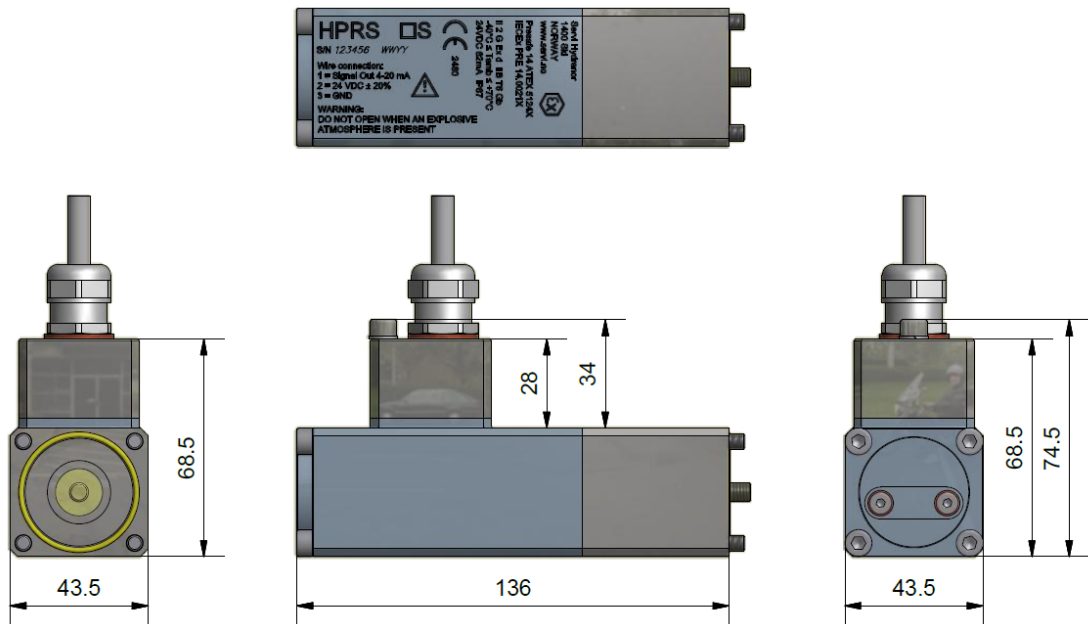
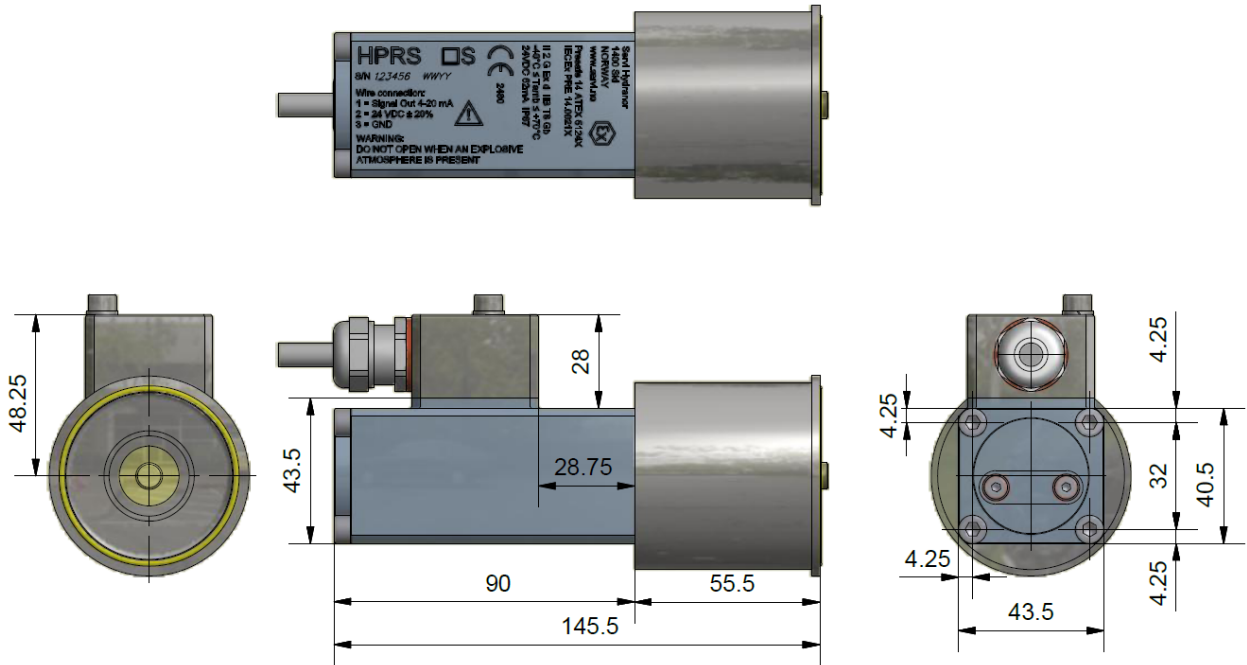


FIGURE 2

Sensor Housing with Valveadaptor size 5/7

Horizontal Cable adaptor



Vertical Cable Adaptor

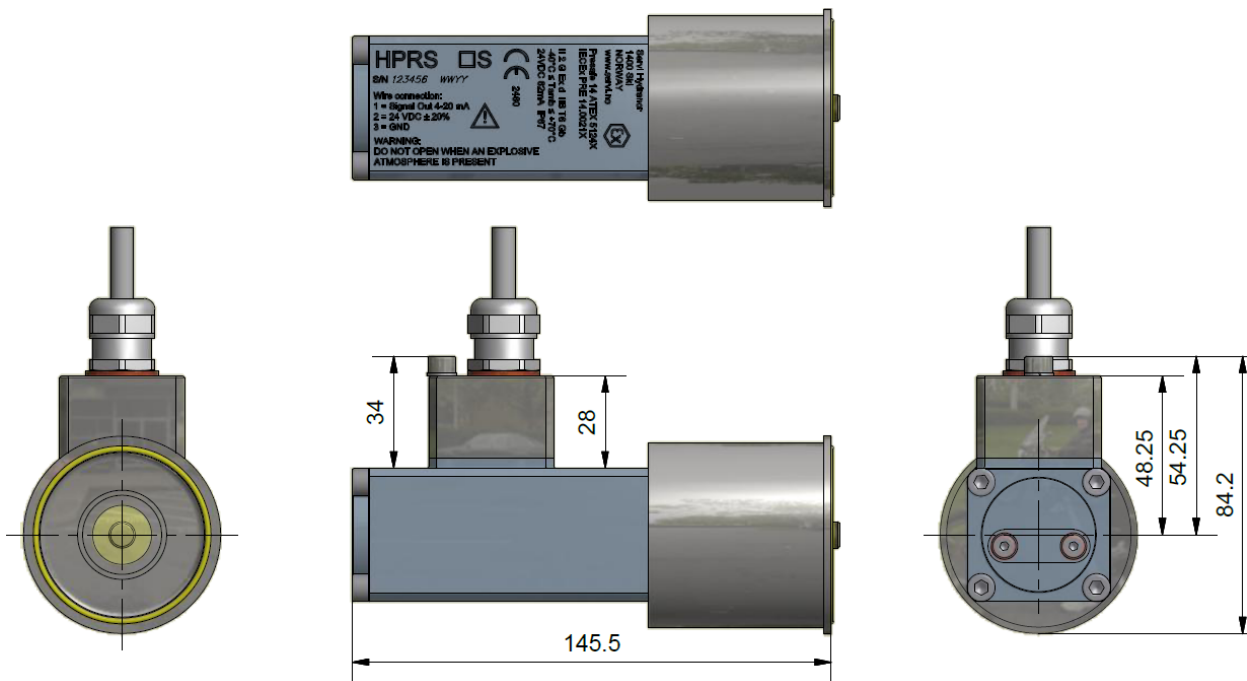


FIGURE 3

6. CABLE, CABLE GLAND AND EARTHING

The unit is delivered with molded cable, with or without shielding. The cables must have a allowed operational temperature of min + 74 °C. Following cables are delivered:

Manufacturer	Manufacturer description	Dimension	Temperature range	Color
Lapp Group	Petro FD 865 CP 1)	4G x 0,5 mm ²	-50 °C - +80 °C flexible use -60 °C - +90 °C stationary use	Black
Lapp Group	Ölflex Robust FD 2)	4G x 0,5 mm ²	-40 °C - +105 °C flexible use -50 °C - +110 °C stationary use	Black

1) Shielded cable 2) Non shielded Cable

Other cables with same or better quality which are in accordance with the listed norms and standards may also be delivered on request

The connected cable has conductor for earthing with color yellow/green. The earthing conductor is internally connected in the cable adaptor.

Electric cables must meet all applicable regulatory requirements of the countries in which the unit is used.

Warning! It is not possible to dismantle or change the cable after the unit is manufactured

The unit is approved for use with following Cable Glands.

Manufacturer	Manufacturer description	EX Certificates	Temperature range
Eaton Cooper Capri S.A.S	ADE 1F2, Type 4 M16 1)	INERIS 12ATEX 0032X IECEX INE 12.0025X	-60 °C - +140 °C
Eaton Cooper Capri S.A.S	ADE 1F2, Type 5 M16 1)	INERIS 12ATEX 0032X IECEX INE 12.0025X	-60 °C - +140 °C
Eaton Cooper Capri S.A.S	ADE 4F, Type 5 M16 2)	INERIS 12ATEX 0032X IECEX INE 12.0025X	-60 °C - + 140 °C
Eaton Cooper Capri S.A.S	ADE 4F, Type 6 M16 2)	INERIS 12ATEX 0032X IECEX INE 12.0025X	-60 °C - + 140 °C

1) Shield cannot be connected inside the gland ("open end") 2) Shield may be connected inside the gland

Warning! It is not possible to dismantle or change the Cable Gland after the unit is manufactured

Connection of external earthing must be made with the exterior earthing point of the unit (see figure 1, page 5). If replacement of the screw for the earthing point is needed, only dim M5 x 10 and locking washer in minimum quality A4-70 (AISI 316) must be used. The locking washer is required for keeping the EX certification. The unit must be earthed with a conductor of minimum size 4 mm², use suitable cable shoe.

7. MARKING

The unit has engraved marking. The marking must not be painted over or in any other way removed.

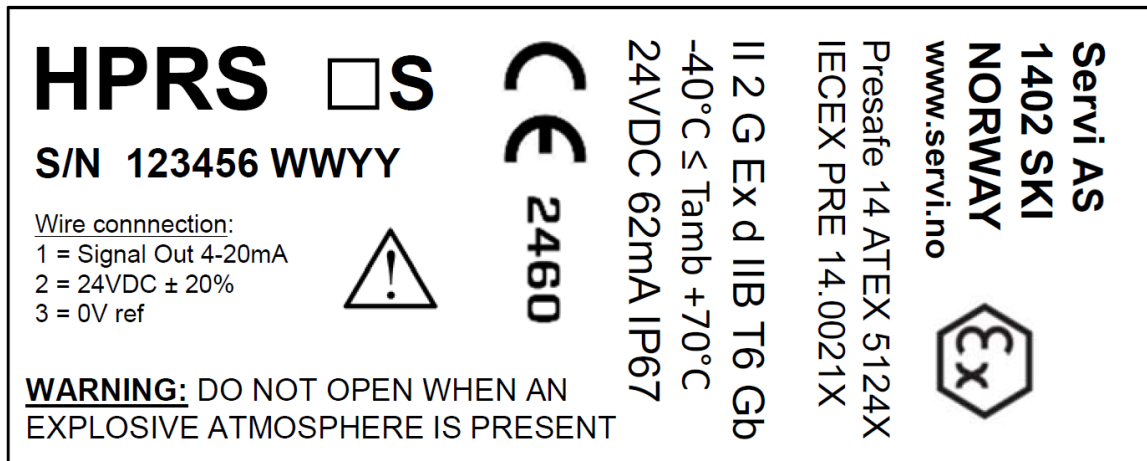


FIGURE 4

The unit can be delivered in following versions:

Modelcode	Shielded cable	Marking
HPRS-**	No	HPRS □S
HPRS-**-S	yes	HPRS ☒S

** = length of the cable (meters).

Specific conditions of use - "X":

Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer.

Repairs must not be made on the basis of values **specified in tables 1 and 2 of EN/IEC 60079-1**.

8. SAFE USE

HPRS can only be used for Hawe proportional valve type PSL(F)/PSV(F), size 3,5 og 7.

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.

Sensor Housing, Cable Adaptor with Gland and Cable is molded together and cannot be opened. Sensor Housing is fixed to the Valve Adaptor with a locking o-ring and 4 screws and dismantling requires special tool

Do not dismantle the unit from the valve when used in explosive atmosphere. The unit has Ingress Protection IP 67, but this is only valid if the unit is correctly installed



This equipment shall be installed so that the flanged joint are not within 10 mm of a solid object that is not part of this equipment.

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.



The unit shall only be calibrated by personnel who is familiar with this equipment and trained to do so. The adjustments screws are located underneath 2 pcs M4 screws. **These screws must NOT be removed when used in explosive atmosphere.**

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.**

The unit must under no circumstance be opened or dismantled in a potentially explosive atmosphere. A so-called «hot permit» or similar must be issued at the operator's own risk and responsibility.

The safety instructions given in the Technical Manual (adjustment manual) for the control board must be followed at all times.

The unit has the following materials/surface treatment:

Component	Material quality	Surfcae treatment
Sensor Housing and Cable adaptor	AISI 316 L	None
Valve Adaptor	EN 10027-2-1.0338	Gasnitration, Corridur or similar color black
Cable Gland	Brass	Nickel plated

9. INSTALLATION

In order to avoid personal injury or damage to equipment and property, the installation must comply with NS-EN 60079-0 (ISO 60079-0) in addition to the requirements set out in this manual.

The unit must be mounted in such a way that it is protected against external heat sources which can make the surrounding temperature exceed the permissible temperature. In particular, heat sources emitting radial heat (e.g. direct sunlight) must be taken into consideration.

Do not install the unit so that it carries more weight than its own. Cables must be fastened using suitable equipment (cable ducts etc.).

The supply voltage must be SELV DC with a maximum outlet voltage of 24 VDC +20%.

The Voltage supply must be secured with a 200 mA fuse

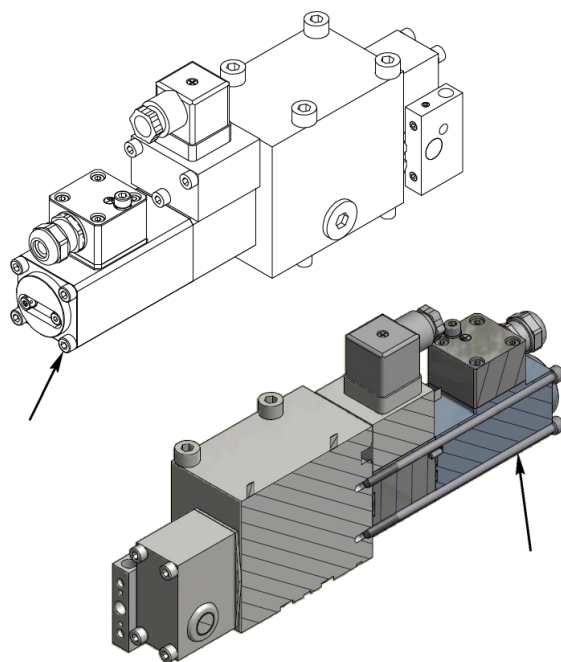


FIGURE 5 – ASSEMBLY EXAMPLE OF HAWE SLF 3

When using the unit for valve size 3, the assembly screws (see below table) for fastening the Sensor Housing to the Valve Adaptor the same screws as for fastening the complete unit to the valve, se fig. 5 complete

Other types of fastening screws is not allowed

Valve size	Dimension	Quality	Qty	Torgue
3	M5 x 136	70-A4	4	6 Nm

For valve size 5 and 7 the original screws delivered with the valve can be used for fastening the unit to the valve.

9.1 WIRING DIAGRAM

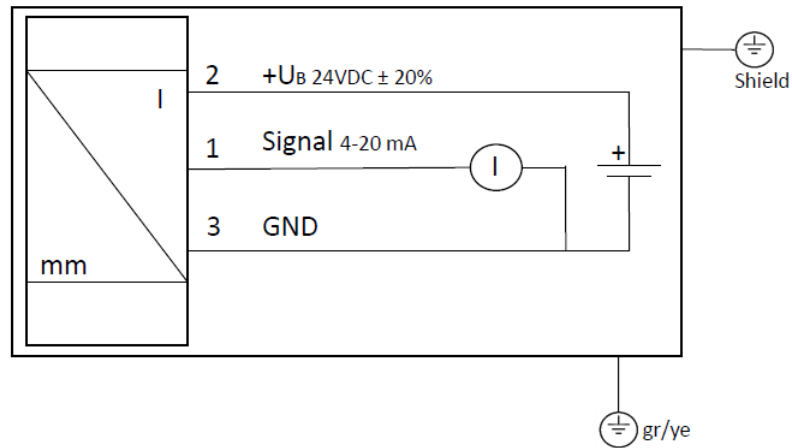


FIGURE 6, ELECTRIC DIAGRAM WITH AND WITHOUT SHIELDED CABLE

10. START-UP AND COMMISSIONING

Starting the unit for the first time after maintenance or new installations, must be done with caution, so that it is possible to stop quickly if errors should occur, in order to avoid personal injury or damage to equipment or property.

Before the unit is put into operation, the parameters in the control board software must be adjusted. If the unit is connected to a valve, it should be started before the hydraulic system is started.

The unit has two adjustment screws (potentiometers), one for offset (zero-point adjustment) and one for gain adjustment, see fig 7

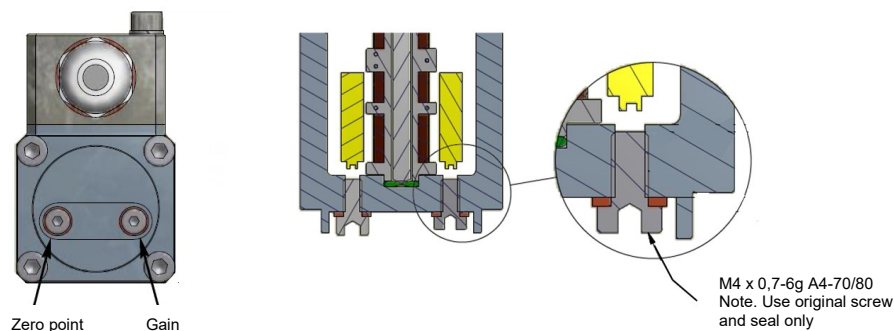


FIGURE 7

NOTE: When the unit is being delivered already mounted on a valve the calibration is already made

Pay special attention if the valve is used in a regulated (closed) loop that required adaptations and adjustments is made to avoid unexpected movement of the valve.

When the valve is activated for the first time, the controller card must be set to “Open-loop”. Make then a control that the polarity of the control loop is correct before enabling “Closed-loop” operation. The same sequence must be done if the unit has been exchanged on the valve or it has been made a maintenance of the system

11. MAINTENANCE INSTRUCTIONS

The unit must not be covered with anything that may insulate its surface. The unit may be cleaned gently with a high-pressure hose using tempered water.

If the unit shows signs of heavy corrosion, mechanical damage or other problems, remove from operation immediately and contact the distributor.

If the moulding inside the unit has been damaged, the unit must be taken out of operation.

If the gasket on the cover is damaged, the whole cover must be replaced. Use only the original screws included in the delivery. The cover may only be replaced by qualified personnel. Also check the surface of the gasket in the main housing for damage/corrosion.

Repair of the unit must be performed by authorised personnel or distributor representatives, and only as and when approved by the manufacturer.

11.1 PERIODIC MAINTENANCE

There are no specific requirements for periodic maintenance of this unit. However, if the unit has been exposed to a corrosive environment, powerful vibrations or other external influences which may shorten its lifespan, it is necessary to assess the risk of damage and, if required, develop a plan for periodic inspection. Pay particular attention to the risks which may damage the unit's EX protection. In case of doubt, contact your HPRS distributor.

11.2 STORAGE

For long-term storage (more than 24 months), the unit should be placed in an antistatic bag in a tempered room (+5 to +25°C). Recommended humidity is 20 – 50% RH.

Storage for less than 24 months requires no special measures.

11.3 WASTE DISPOSAL

The unit shall be handled as EE waste.



POWER AND MOTION CONTROL

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