

# BEEPER

END-OF-STROKE SENSOR FOR WELDED HYDRAULIC CYLINDERS



## BEEPER: WHAT IT IS?

**Beeper** is an end-of-stroke sensor which mechanically detects the extreme positions of the piston of a welded hydraulic cylinder, transducing them into a single or dual electrical signal.

It is screwed into the special ports, welded to the ends of the cylinder tube, immersed and pressurized by the mineral fluid that feeds it.

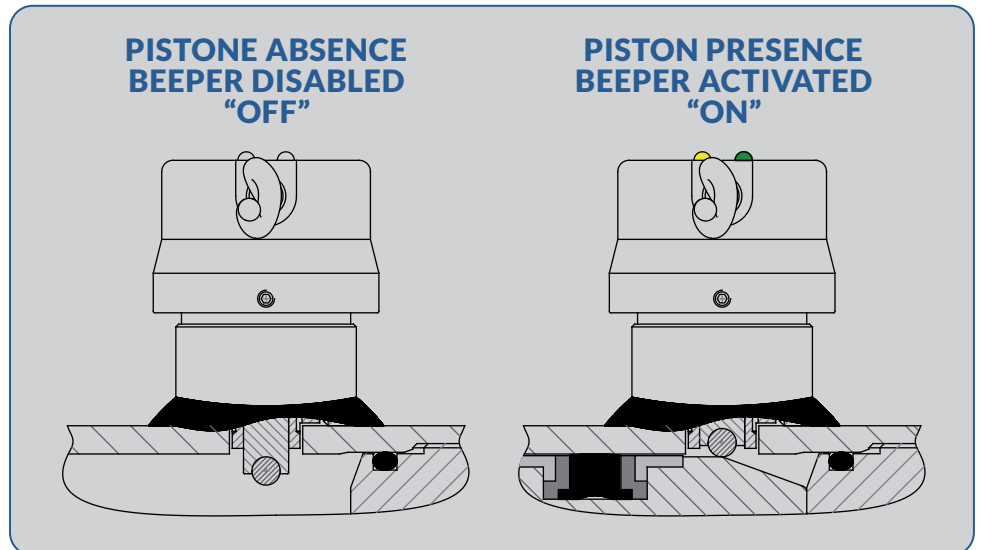
Beeper is essentially an amagnetic cap inside which is inserted a probe with a spherical end on the lower side, and a permanent magnet and a spring on the upper side.

Externally, above this cap, is positioned the magnetic sensor, single or dual.

## HOW DOES IT WORK?

In the absence of the hydraulic cylinder piston, the spherical probe protrudes, pushed by the spring pre-compression; the hydraulic pressure does not affect its position as it completely envelops it, and the magnetic sensor is in the OFF state.

The presence of the piston, on the other hand, causes the radial retraction of the probe, so that the permanent magnet incorporated in it approaches the external sensor, modifying its state from OFF to ON.



## HOW DOES IT APPLY?

To apply Beeper on a hydraulic cylinder, you have to drill the tube at the established coordinates, weld the threaded port (provided by us) and then screw the amagnetic cap in place.

Depending on the type of cap, you can apply respectively the cover containing the various types of magnetic sensors: Reed or single Hall Effect (on hexagonal cap) or the Hall Effect dual versions with status led (on round cap).

## APPLICATION ADVANTAGES

- 1) overall dimensions reduced to a minimum;
- 2) **TOTAL ABSENCE OF STATIC AND DYNAMIC SEALS** inside, which determines a high durability and reliability of the product;
- 3) the piston of the hydraulic cylinder can be made of C40 / C45 steel (or better) without any surface heat treatment, as the pressing force of the probe is +/- 1kg, constant throughout the range of pressures allowed by the product;
- 4) the port that receives Beeper is radiated on the lower side according to the external diameter of the cylinder tube, to allow an easier, contained and less deforming welding;
- 5) possibility of use with high working pressures up to 420 bar;
- 6) product version resistant to corrosion, water, mud, ice, salt, and for marine applications;
- 7) product version for high temperatures and with a high protection degree (IP68);
- 8) physical interchangeability with similar products already on the market.

## PRODUCT VERSIONS

**Beeper ONE** is characterized by the hexagonal shape of the base cap and allows to mount hexagonal or rectangular magnetic sensors, or various types of optional covers, prepared for housing single or double sensors (see pages 3.00-3.10-3.20).

**Beeper DUO** is characterized instead by the round shape of its base cap, and allows to mount two types of covers that are also round and interchangeable: the DE (electronic dual) and DEP (dual electronic power) cover, both with double status led (see pages 4.00-4.10).

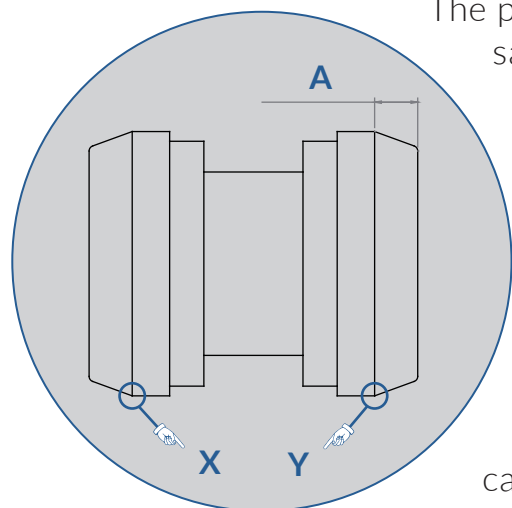
Both models have a version for medium working pressures (160/210 bar) and one for high pressures (350/420 bar), identifiable by the different metric thread of the base cap: in the first case M18x1.5 and in the second M22x1.5.

MECHANICAL AND HYDRAULIC FEATURES	BEEPER 18 (medium pressure)	BEEPER 22 (high pressure)
Base cap thread	M18x1.5	M22x1.5
Linear mechanical stroke of the spherical probe	3mm	5mm
Stroke required for electrical switching	~2mm	~3mm
Tightening torque	40Nm	60Nm
Operating pressure	160bar	350bar
Peak pressure	210bar	420bar
Spring precompression strenght	~1.3kg	~1kg
Hydraulic piston material	C40/C45 steel (or better)	C40/C45 steel (or better)
Pistone external diameter	Cylinder bore - 1mm*	Cylinder bore - 1mm*
Piston lateral smoothing (A)	8mm x 20°	15mm x 20°
Hole diameter on cylinder tube	Ø9mm	Ø13mm
Compatible mineral oil	HM/HV - ISO 6074	HM/HV - ISO 6074
Viscosity field of the fluid (cSt)	2.8-380	2.8-380
Filtering required	25µm (19/15-ISO 4466)	25µm (19/15-ISO 4466)

\* valid data for bores up to Ø100mm.

## GENERAL APPLICATION

On the cylinder tube a hole must be made, properly cleaned, in the most congenial angular position, but linearly at the precise point where is the origin of the smoothing piston is located (point **X** with piston at the start of the stroke, point **Y** with piston at the end of the stroke).

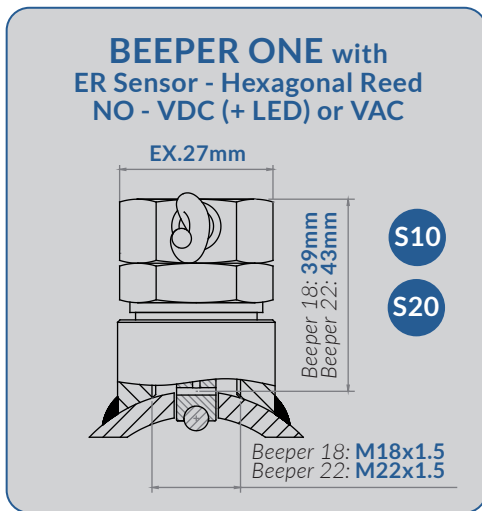
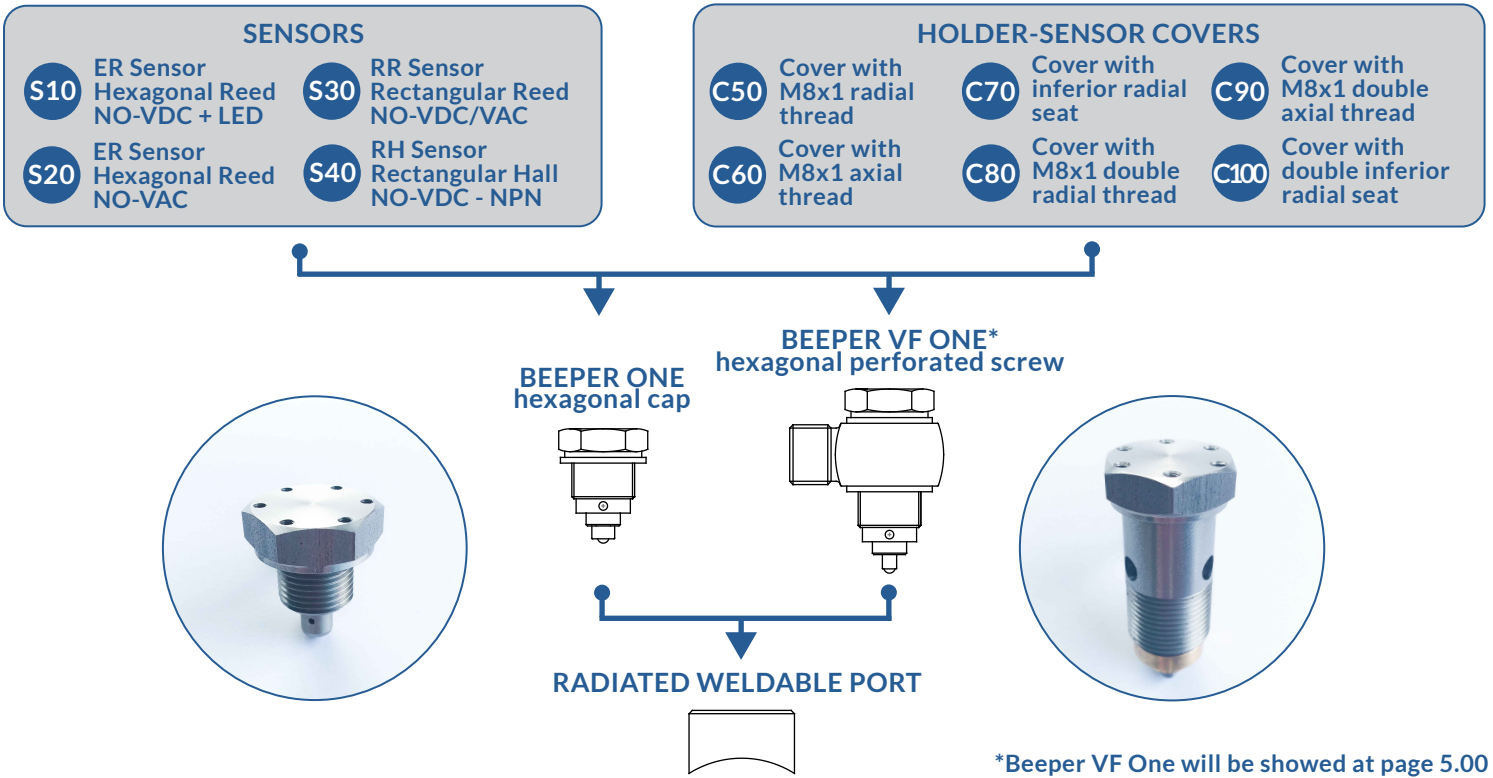


The port that receives Beeper is radiated on the lower side with the same radius as the cylinder tube to guarantee an easier and more contained welding; the port must be welded perfectly perpendicular to the tube and concentric with the hole above mentioned.

Then, after inserting the appropriate copper or bonded washer, and applying to its thread some medium strength resistance threadlocker, Beeper is ready to be screwed into the port with the tightening torque above recommended. Finally, must be inserted the chosen sensor (or sensor-holder cover) which can be angularly oriented according to the application needs.

# BEEPER ONE

Below, a graphical diagram to present **Beeper One** enhancing its modularity.



**ELECTRICAL FEATURES**  
ER SENSOR  
REED CONTACT NO  
VDC + LED VERSION

**S10**

Supply: 10-30V  
Switching current: 0,5A max  
Switching power: 10W max  
Repeatability: ±0,1mm  
Status led: present  
Contact resistance: 150mW max  
Protection degree: IP67  
Standard wiring: bipolar cable L=2mt  
Operating temperature: -25C°+105C°

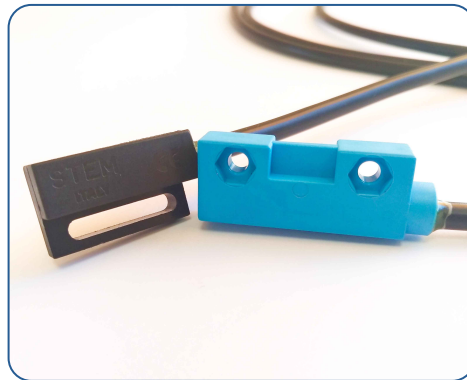
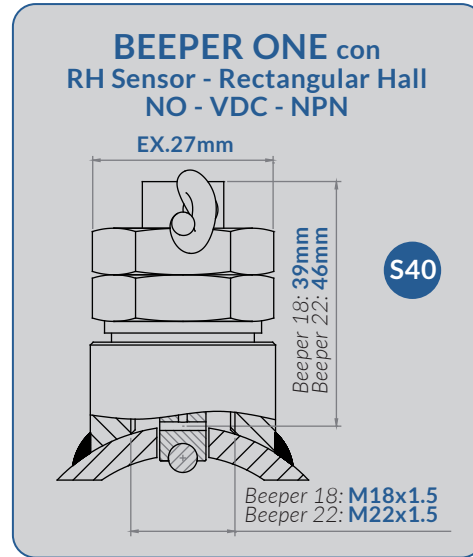
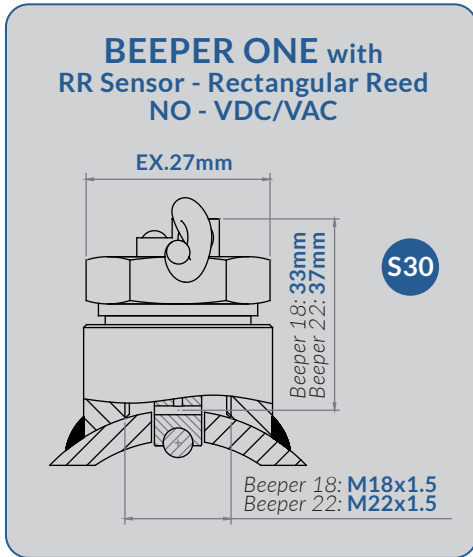
**ELECTRICAL FEATURES**  
ER SENSOR  
REED CONTACT NO  
VAC VERSION

**S20**

Supply: 150V max  
Switching current: 0,5A max  
Switching power: 10W/VA  
Repeatability: ±0,1mm  
Status led: absent  
Contact resistance: 150mW max  
Protection degree: IP67  
Standard wiring: bipolar cable L=2mt  
Operating temperature: -25C°+105C°



# BEEPER ONE



RECTANGULAR SENSORS  
APPLICABLE ON BEEPER ONE



**ELECTRICAL FEATURES**  
RR SENSOR  
REED CONTACT NO  
VDC/VAC VERSION

**S30**

Supply: V200DC - V140AC

Switching current: 1A

Switching power: 15V

Repeatability:  $\pm 0,1\text{mm}$

Status led: absent

Protection degree: IP67

Standard wiring: bipolar cable  $\varnothing 4,8\text{mm}$ , L=2mt

Operating temperature:  $-25\text{C}^{\circ}+105\text{C}^{\circ}$

**ELECTRICAL FEATURES**  
RH SENSOR  
HALL EFFECT  
NO - VDC - NPN

**S40**

Supply: 5-26 VDC

Dissipated power: 300mW

Maximum absorption without load: 10mA

Output current: 100mA

Protection against polarity reversal

Repeatability precision: 0,1mm

Status led: assente

Protection degree: IP67

Standard wiring: tripolar cable  $\varnothing 4,4\text{mm}$ , L=2mt

Operating temperature:  $-30\text{C}^{\circ}+85\text{C}^{\circ}$

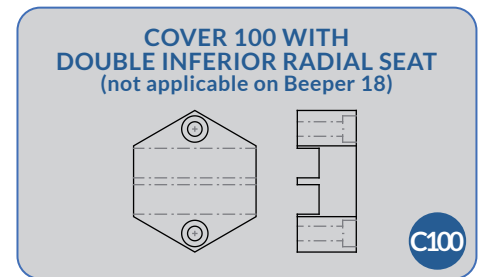
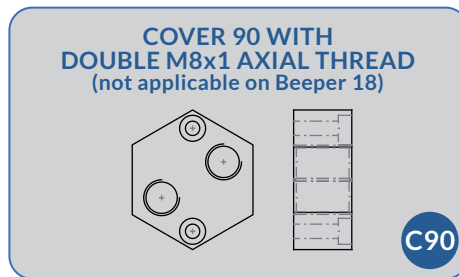
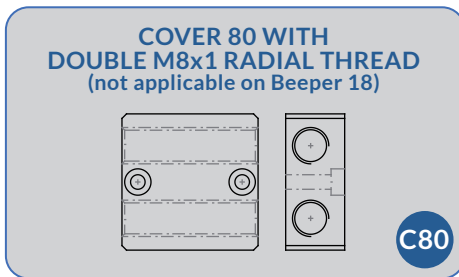
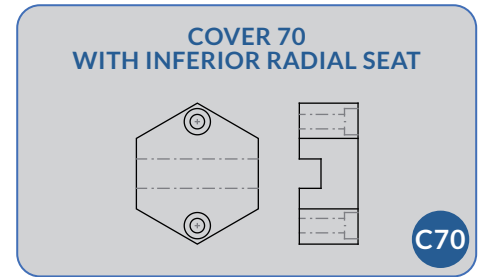
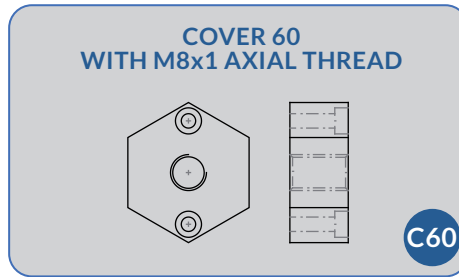
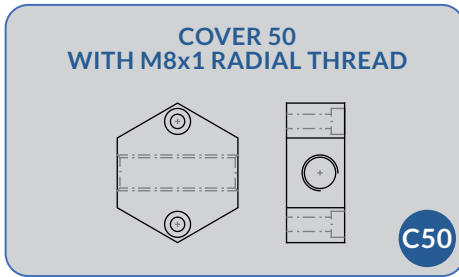
# BEEPER ONE

Beeper One's amagnetic base cap can also receive six interchangeable covers for mounting one or two magnetic sensors; these sensors can be Reed or Hall Effect type, M8x1 threaded or rectangular for insertion in the quarry.

**The above mentioned covers can also accept ATEX magnetic sensors certified according to the areas and categories of use.**

For this series of covers the magnetic sensors must be ordered separately, depending on the application requirements.

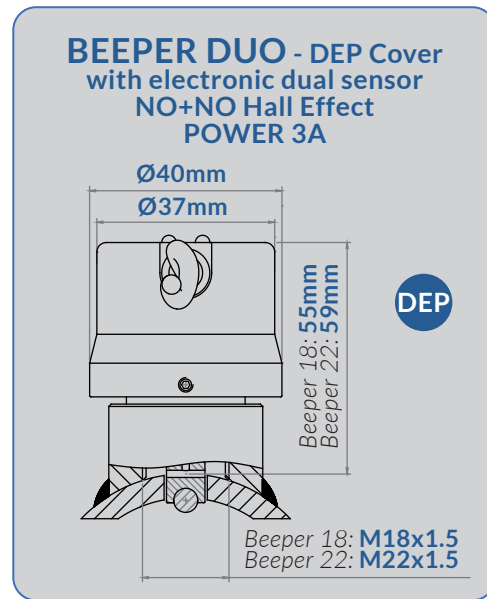
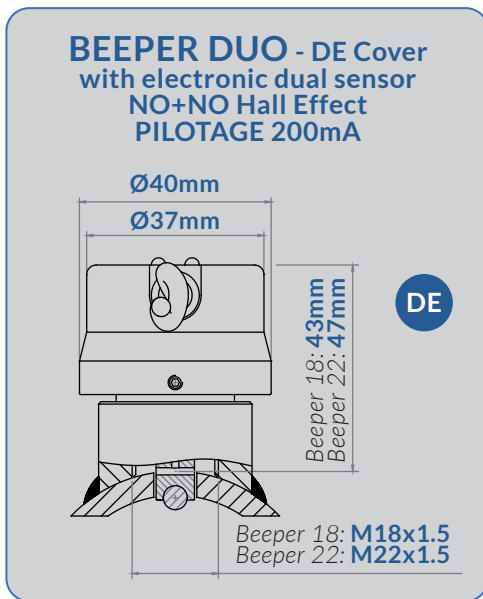
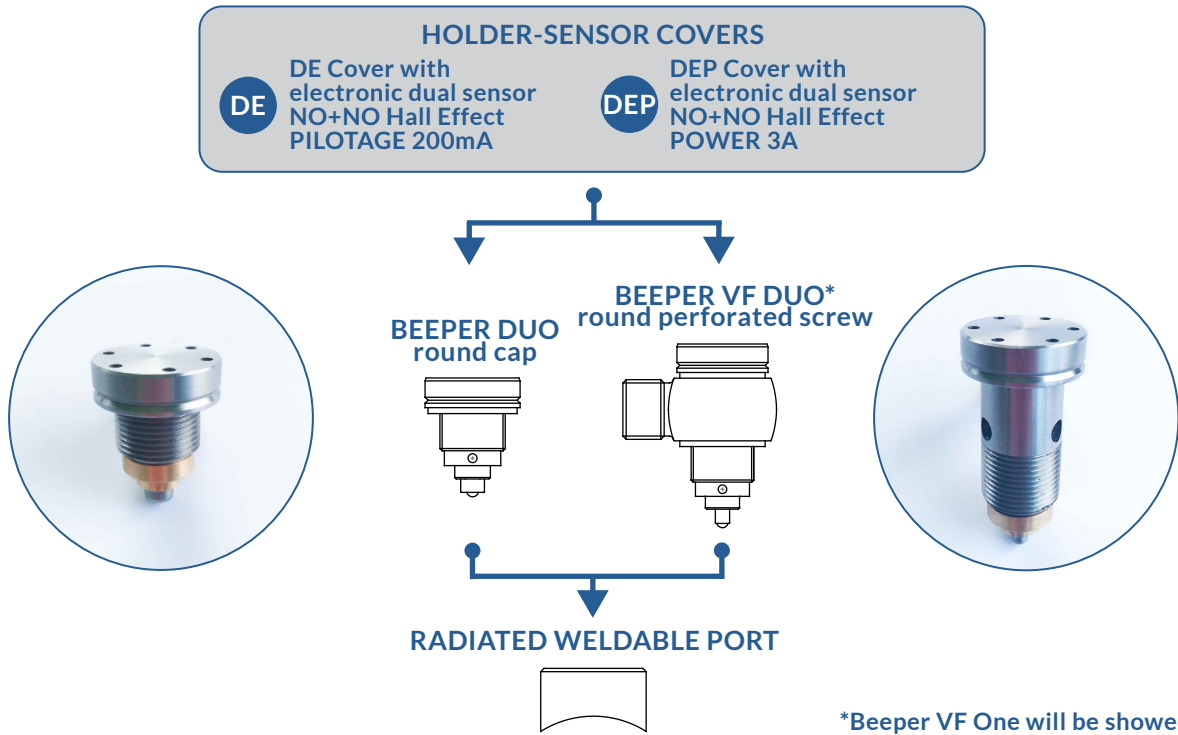
Technical documentation on request.



**N.B.** The whole range of sensors and covers applicable on Beeper One (pages 3.00, 3.10 and 3.20) can be 60° in 60° angularly oriented.

# BEEPER DUO

Below, a graphical diagram to present **Beeper Duo** enhancing its modularity.



**COVERS, SENSORS AND WIRINGS  
APPLICABLE ON BEEPER DUO**



N.B. On request, the AISI 316 stainless steel versions.

## ELECTRICAL FEATURES BEEPER DUO - DE COVER

DE

Supply: 10-30VDC

Single integrated with NO+NO Hall Effect dual sensor

Double status led (1 green - 2 yellow)

Electronic NPN - OPEN DRAIN

Protection against polarity reversal

Protection against overvoltage up to 60VDC

Maximum absorption: 30mA

Current conveyed for each channel: 200mA

Temperature limits: -25°C+100°C°

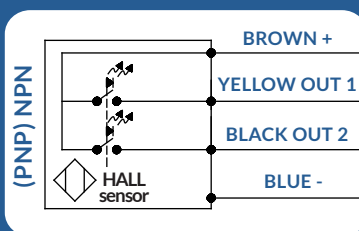
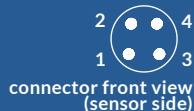
Protection degree: IP67

Standard wiring: quadripolar cable L=2mt

Wiring option: connector M8 - 4 pin

### CABLE ASSIGNMENT

- 1 - BROWN +
- 2 - BLUE -
- 3 - YELLOW OUT 1
- 4 - BLACK OUT 2



## ELECTRICAL FEATURES BEEPER DUO - DEP COVER

DEP

Supply: 10-30VDC

Single integrated with NO+NO Hall Effect dual sensor

Double status led (1 green - 2 yellow)

Electronic PNP - NPN

Protection against polarity reversal

Protection against overvoltage up to 60VDC

Maximum absorption: 30mA

Current conveyed for each channel: 3A

Temperature limits: -25°C+100°C°

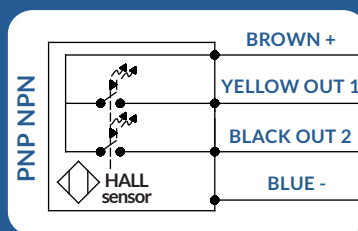
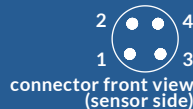
Protection degree: IP67

Standard wiring: quadripolar cable L=2mt

Wiring option: connector M8 - 4 pin

### CABLE ASSIGNMENT

- 1 - BROWN+
- 2 - BLUE -
- 3 - YELLOW OUT 1
- 4 - BLACK OUT 2



**N.B.** DE and DEP covers applicable on Beeper Duo (pages 4.00 and 4.10) can be 360° angularly oriented.



# BEEPER VF

In this product version, the Beeper mechanism is closed inside a special perforated screw; this, inserted in the banjo fitting and screwed onto the port we provide, allows in a single solution to hydraulically feed the cylinder and detect the extreme positions of its piston.

Also **Beeper VF** is free of static and dynamic seals inside, so it is particularly suitable for installation in the sealed sections between the block valves and the hydraulic cylinder chambers.

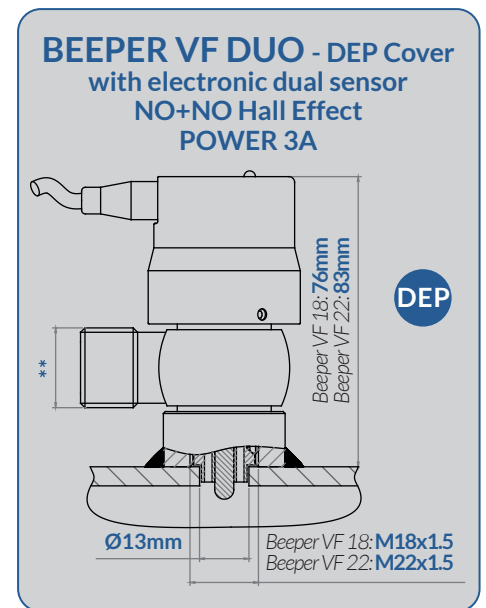
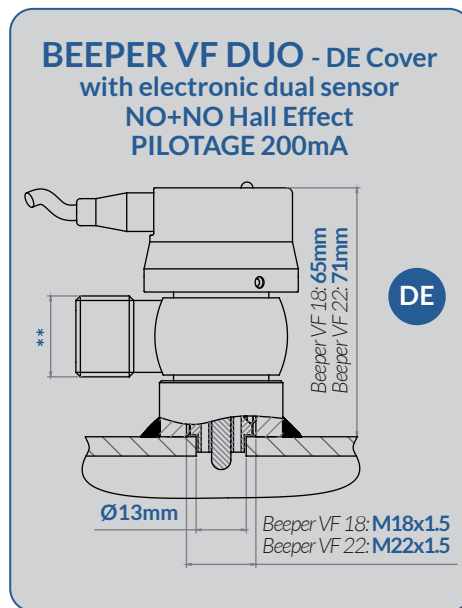
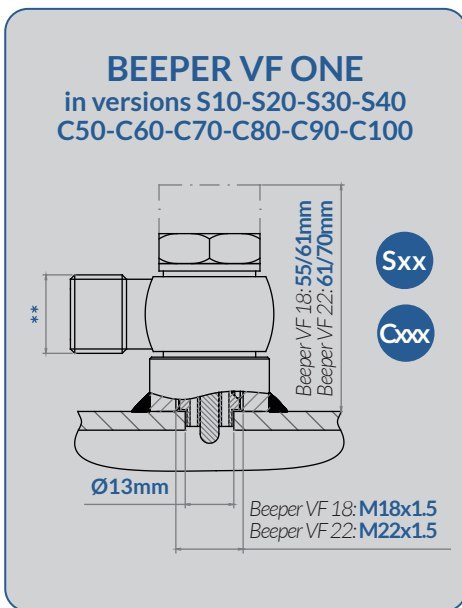
To complete the mechanical, oleodynamic and electrical characteristics already mentioned on page 2.00, the following are added.

MECHANICAL AND HYDRAULIC FEATURES	BEEPER VF 18	BEEPER VF 22
Useful section for fluid passage	40mm <sup>2</sup>	44mm <sup>2</sup>
ΔP with flow 20lt/min - ISO VG46 - 40°C*	~4bar	~3bar
ΔP with flow 40lt/min - ISO VG46 - 40°C*	~6bar	~4bar

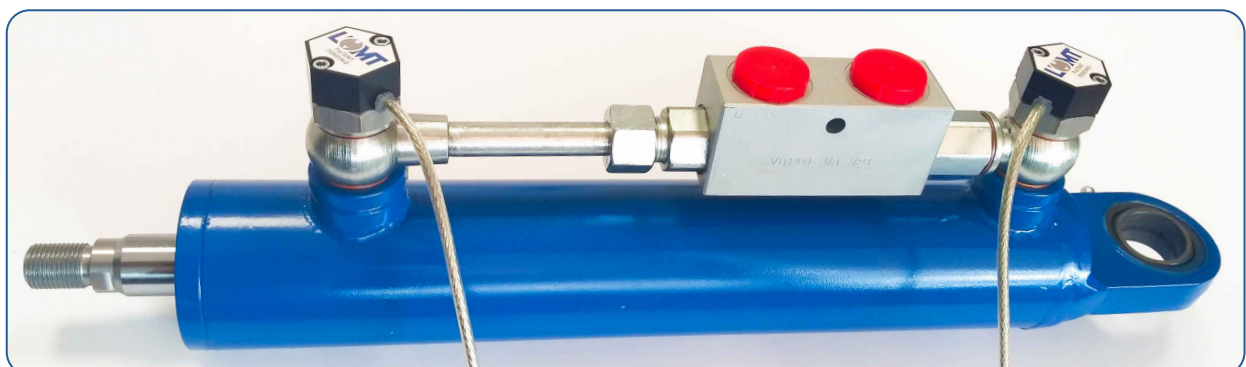
\*\* The above mentioned ΔP detection is performed by feeding Beeper VF in the two directions of flow, not connected to the cylinder. In the specific application, the actual flow rate induced by the ratio between the cylinder areas must be considered.

\*\* Banjo fittings, in various versions, must be ordered separately.

**N.B.** On request, available Beeper VF2 for mounting two overlapping banjo fittings.



## BEEPER VF TYPICAL APPLICATION



Following, the **CODING** to order the various Beeper models.

	BEEPER ONE 18	BEEPER DUO 18	BEEPER ONE 18	BEEPER VF DUO 18	BEEPER ONE 22	BEEPER DUO 22	BEEPER VF ONE 22	BEEPER VF DUO 22
CODING OF THE AMAGNETIC BASE CAP	B1-18	B2-18	BVF1-18	BVF2-18	B1-22	B2-22	BVF1-22	BVF2-22
FOR CYLINDERS WITH TUBE THICKNESS 5mm*	1	1	1	1	1	1	1	1
FOR CYLINDERS WITH TUBE THICKNESS 6mm	---	---	---	---	2	2	2	2
FOR CYLINDERS WITH TUBE THICKNESS 7.5mm	---	---	---	---	3	3	3	3
FOR CYLINDERS WITH TUBE THICKNESS 10mm	---	---	---	---	4	4	4	4
FOR CYLINDERS WITH TUBE THICKNESS 12.5mm	---	---	---	---	5	5	5	5
FOR CYLINDERS WITH TUBE THICKNESS 15mm	---	---	---	---	6	6	6	6
ER SENSOR - HEXAGONAL REED VDC - NO + LED	S10	---	S10	---	S10	---	S10	---
ER SENSOR - HEXAGONAL REED VAC - NO	S20	---	S20	---	S20	---	S20	---
RR SENSOR - RECTANGULAR REED VDC/VAC - NO	S30	---	S30	---	S30	---	S30	---
RH SENSOR - RECTANGULAR HALL VDC - NO - NPN	S40	---	S40	---	S40	---	S40	---
COVER WITH M8x1 RADIAL THREAD**	C50	---	C50	---	C50	---	C50	---
COVER WITH M8x1 AXIAL THREAD**	C60	---	C60	---	C60	---	C60	---
COVER WITH INFERIOR RADIAL SEAT**	C70	---	C70	---	C70	---	C70	---
COVER WITH DOUBLE M8x1 RADIAL THREAD**	---	---	---	---	C80	---	C80	---
COVER WITH DOUBLE M8x1 AXIAL THREAD**	---	---	---	---	C90	---	C90	---
COVER WITH DOUBLE INFERIOR RADIAL SEAT**	---	---	---	---	C100	---	C100	---
DUAL ELECTRONIC (NO+NO)	---	DE	---	DE	---	DE	---	DE
DUAL ELECTRONIC POWER (NO+NO)	---	DEP	---	DEP	---	DEP	---	DEP
NPN OPEN DRAIN (std for DE versions)	---	A	---	A	---	A	---	A
PNP	---	B	---	B	---	B	---	B
CABLE L=2MT (std)	X	X	X	X	X	X	X	X
CIRCULAR CONNECTOR M8-4PIN***	---	Y	---	Y	---	Y	---	Y

\* for applications on compact cylinders, contact our technical department.

\*\* if the 6 covers (C50-C60-C70-C80-C90-C100) are chosen, the relative Reed or Hall Effect sensors must be ordered separately.

\*\*\* With the wording Y is understood INCLUDING the supply of a swiveling M8x1 straight connector with molded cable L = 2mt.

## CODING EXAMPLES

B1 - 181 - S10 - X

B1 - 222 - S40 - X

BVF1 - 181 - C60 - X

B2 - 181 - DE - A - X

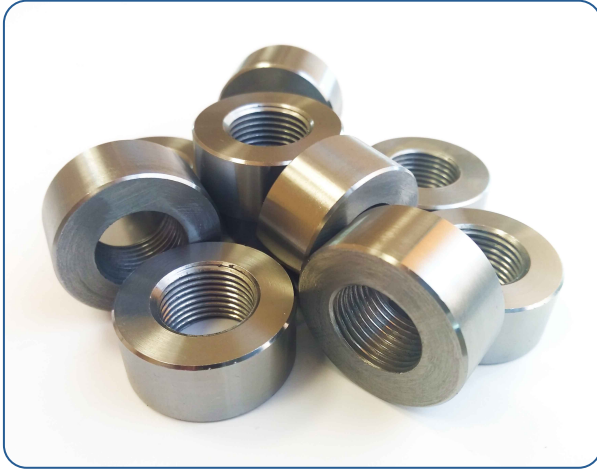
B2 - 223 - DEP - B - Y

BVF2 - 225 - DEP - A - X

## ACCESSORIES AND MISCELLANEOUS ITEMS

Below, a list of accessories and other items excluded from the coding shown on page 6.00, which must be ordered separately from Beeper.

**B18-B22**  
M18x1.5 OR M22x1.5 FLAT PORTS  
FOR WELDING ON END PLUGS



coding example: **B22-R30**  
M18X1.5 OR M22X1.5 RADIATED PORTS  
FOR WELDING ON THE CYLINDER TUBE



**A18-A22**  
ACCESSORY FOR POSITIONING AND  
WELDING OF THE RADIATED PORTS



**CHDUO**  
TIGHTENING KEY  
FOR BEEPER DUO



**BANJO FITTINGS**  
FOR MOUNTING ON BEEPER VF



**N.B.** L'Oleomeccatronica reserves the right to modify without notice the technical features and dimensions of Beeper communicated in this catalog.

For special applications, contact our technical department.



**L'Oleomeccatronica s.r.l.s.**

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