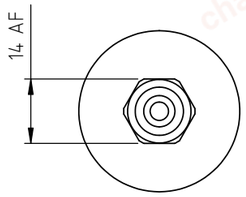
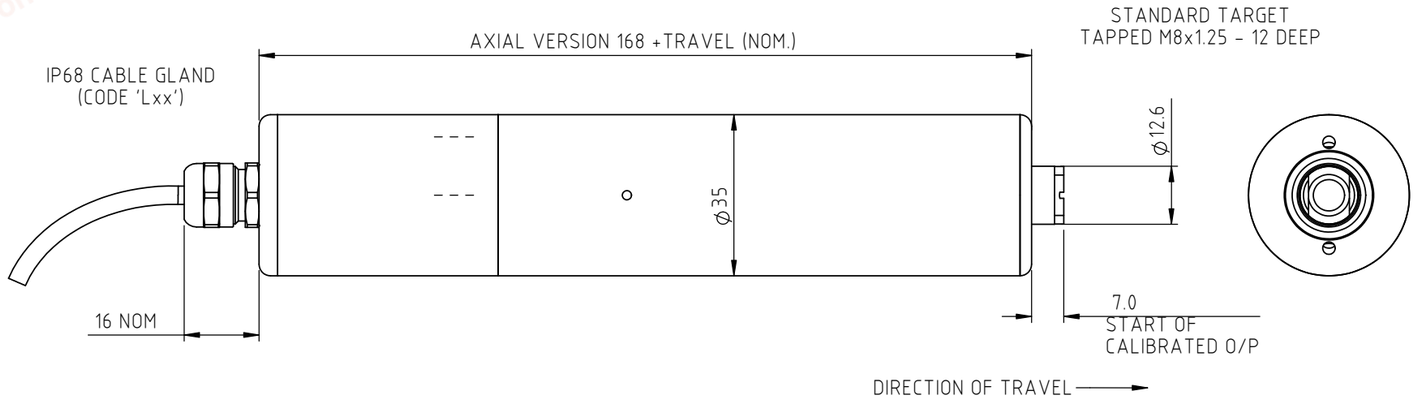
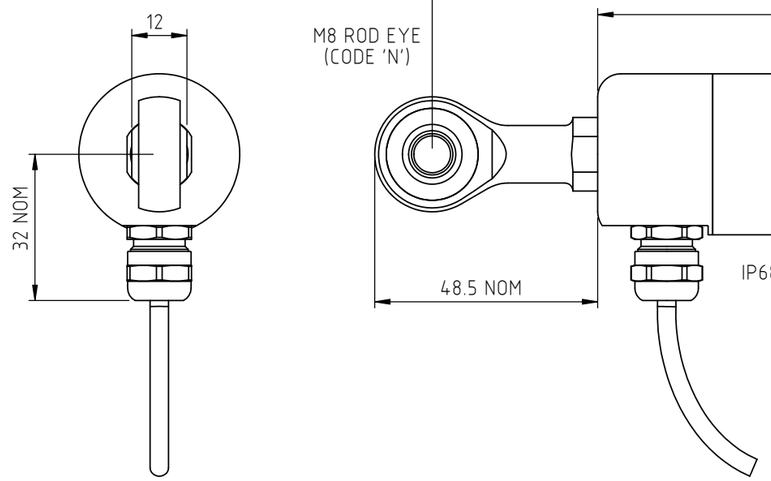
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NOTE. ROD-EYE ORIENTATION NOT GUARANTEED







ELECTRICAL OPTIONS/ SPECIFICATIONS

| OUTPUT | SUPPLY (NOM) |
|---|---|
| 'A' 0.5 - 4.5V RATIOMETRIC | 5V |
| 'B' ±5V | ±15V |
| 'C' 0.5 - 9.5V | 24V |
| 'D' ±10V | ±15V |
| 'G' 0.5 - 4.5V | 24V |
| SUPPLY CURRENT 12MA TYP. 20MA MAX. | |
| 'E' 4 TO 20MA 2-WIRE | 24V (18V MIN.) |
| 'F' 4 TO 20MA SINK† | 24V |
| 'H' 4 TO 20MA SOURCE‡ | 24V |

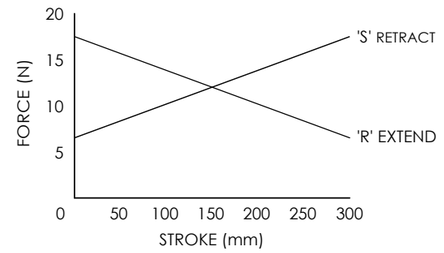
† OUTPUT COMPLIANCE 5-28V
‡ DRIVE 300Ω MAXIMUM TO 0V

| CONNECTIONS: | CABLE | |
|---|---|---|
| | 3-CORE | 4-CORE |
| +VE | RED | RED |
| 0V | BLACK | GREEN |
| -VE | - | YELLOW |
| OUTPUT | WHITE | BLUE |
| BODY | SCREEN | SCREEN |

CABLE; 0.2mm², O/A SCREEN, PUR JACKET. O/D; 3-CORE: Ø4mm, 4-CORE: Ø4.6mm,
SUPPLIED WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 'L50'
CONNECTORS; MAXIMUM CONDUCTOR CROSS SECTION 0.75mm²

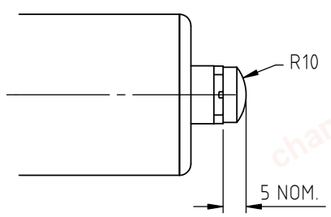
RANGE OF DISPLACEMENT FROM 0-5mm TO 0-800mm e.g.76,
IN INCREMENTS OF 1mm
BODY MATERIAL:- STAINLESS STEEL 316.

FURTHER OPTIONS:
SINGLE PAIR OF BODY CLAMPS 'P'
TWO PAIRS OF BODY CLAMPS 'P2'
SPRING RETURN PUSH-ROD, TRAVEL ≤300mm
RETURN TO EXTENDED POSITION (CODE 'R')
RETURN TO RETRACTED POSITION (CODE 'S')
PUSH-ROD FREE (CODE 'V') - NOT AVAILABLE WITH SPRUNG OPTIONS.

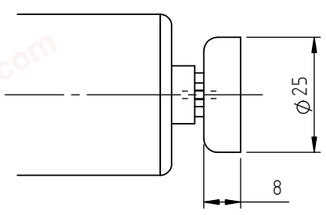



SPRING FORCE vs STROKE
(CODE 'R' OR 'S')

DOME END (CODE 'T')
NOTE: WITH CODE 'R'




MAGNETIC TIP
(CODE 'WA')




MAXIMUM WORKING DEPTH: 100m (328 ft).
WHERE THE FREE END OF THE CABLE IS TO BE TERMINATED IN A SUBMERGED POSITION, ADEQUATE SEALING MUST BE PROVIDED TO PROTECT CONNECTIONS.

DRAWINGS NOT TO BE CHANGED WITHOUT REFERENCE TO THE CHANGE PROCEDURE.
CHANGES TO PARTS USED IN INTRINSICALLY SAFE PRODUCT MUST BE APPROVED BY THE AUTHORISED PERSON.
*THIS IS AN UNCONTROLLED PRINT AND WILL NOT BE UPDATED.*

| REV | CHANGE HISTORY | DR'WN | DATE | CHK'D |
|---|---|---|---|---|
| F | RAN1311 - MAGNETIC TIP OPTION 'WA' ADDED | ASC | 02/06/2023 | ASC |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

THE PUSH-ROD RETRACTS 4mm NOM. BACK FROM THE START OF CALIBRATED TRAVEL.
THE PUSH-ROD EXTENDS 8mm NOM. BEYOND THE END OF CALIBRATED TRAVEL.
SPRUNG OPTIONS:- CODE 'R': 1mm, CODE 'S': 2mm.
CODE 'V': PUSH-ROD NOT RETAINED.

Positek

| APPROVED BY | REV | | X ±0.4<br>X.X ±0.2<br>X.XX ±0.1<br>DIMS mm |
|---|---|---|---|
| RDM | F | | |

DESCRIPTION
S115 RUGGED SUBMERSIBLE STAND ALONE LINEAR POSITION SENSOR

| SCALE | DRAWING NUMBER |
|---|---|
| 3:4 | S115-11 |
| A3 | SHEET 1 OF 1 |

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# S115 RUGGED SUBMERSIBLE STAND-ALONE LINEAR POSITION SENSOR

## Position feedback for industrial and scientific applications

- **Non-contacting inductive technology to eliminate wear**
- **Travel set to customer's requirement**
- **Compact and self-contained**
- **High durability and reliability**
- **High accuracy and stability**
- **Sealing to IP68 10bar/IP69K**



As a leading designer and manufacturer of linear, rotary, tilt and intrinsically safe position sensors, Positek® has the expertise to supply a sensor to suit a wide variety of applications.
Our S115 is a heavy-duty version of the S114 sensor with a stronger 12.6 mm push rod, recommended for applications where vibration is an issue or there is a need for longer travel sensors which are to be mounted horizontally between rod eyes. It remains an affordable, durable, high-accuracy position sensor designed for applications where the sensor would be completely submerged during normal operation.
The unit is highly compact and space-efficient, being responsive along almost its entire length.
Like all Positek® sensors, the S115 provides a linear output proportional to travel. Each sensor is supplied with the output calibrated to the travel required by the customer, any stroke from 5mm to 800 mm and with full EMC protection built in.
The sensor is very robust, the body and push rod being made of 316 stainless steel for long service life and environmental resistance.
Overall performance, repeatability and stability are outstanding over a wide temperature range.
The sensor is easy to install with mounting options including stainless steel M8 rod eye bearings and body clamps. The push rod can be supplied free or captive with female M8 thread, an M8 rod eye, dome end or magnetic tip. M12 and 1/2" rod eye option available. Captive push rods can be sprung loaded, in either direction, on sensors up to 300mm of travel. The S115 also offers a selection of mechanical and electrical options, environmental sealing is to IP68 10bar/IP69K.

### SPECIFICATION

| | |
|---|---|
| **Dimensions** | |
| Body diameter | 35 mm |
| Body length (Axial version) | calibrated travel + 168 mm |
| Body length (Radial version) | calibrated travel + 189 mm |
| Push rod extension | calibrated travel + 7 mm, OD 12.6 mm |
| *For full mechanical details see drawing S115-11* | |
| **Independent Linearity** | ≤ ± 0.25% FSO @ 20°C - up to 450 mm<br>≤ ± 0.5% FSO @ 20°C - over 450 mm |
| **Temperature Coefficients** | < ± 0.01%/°C Gain &<br>< ± 0.01%FS/°C Offset |
| **Frequency Response** | > 10 kHz (-3dB)<br>> 300 Hz (-3dB) 2 wire 4 to 20 mA |
| **Resolution** | Infinite |
| **Noise** | < 0.02% FSO |
| **Environmental Temperature Limits** (Non Icing) | |
| Operating | -40°C to +125°C standard<br>-20°C to +85°C buffered |
| Storage | -40°C to +125°C |
| **Sealing** | IP68 10bar/IP69K |
| **EMC Performance** | EN 61000-6-2, EN 61000-6-3 |
| **Vibration** | IEC 68-2-6: 10 g |
| **Shock** | IEC 68-2-29: 40 g |
| **MTBF** | 350,000 hrs 40°C Gf |
| **Drawing List** | |
| S115-11 | Sensor Outline |

*3D models, step or .igs format, available on request.*

**Do you need a position sensor made to order to suit a particular installation requirement or specification? We'll be happy to modify any of our designs to suit your needs - please contact us with your requirements.**

*For further information please contact:*
www.positek.com sales@positek.com
Tel: +44(0)1242 820027 fax: +44(0)1242 820615
Positek, Andoversford Industrial Estate, Cheltenham GL54 4LB. U.K.

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# S115 RUGGED SUBMERSIBLE STAND-ALONE LINEAR POSITION SENSOR

## Position feedback for industrial and scientific applications

## How Positek's technology eliminates wear for longer life

Positek's Inductive technology is a major advance in displacement sensor design. Our displacement transducers have the simplicity of a potentiometer with the life of an LVDT/RVDT.
Our technology combines the best in fundamental inductive principles with advanced micro-electronic integrated circuit technology. A Positek sensor, based on simple inductive coils using Positek's ASIC control technology, directly measures absolute position giving a DC analogue output signal. Because there is no contact between moving electrical components, reliability is high and wear is eliminated for an exceptionally long life.
It also overcomes the drawbacks of LVDT technology – bulky coils, poor length-to-stroke ratio and the need for special magnetic materials, no requirement for separate signal conditioning.
We also offer a range of ATEX-qualified intrinsically-safe sensors.

| S115 . | a | b | c | d | e | f | g | h | j |
|---|---|---|---|---|---|---|---|---|---|
| | Displacement | Output | Connections | Option | Option | Option | Option | Option | Z-code |

| a **Displacement** | **Value** |
|---|---|
| Factory set to any length from 0-5 mm to 0-800 mm (e.g. 0-254 mm) | **254** |

b **Output**

| **Supply** $V_{dc}$ (tolerance) | **Output** | **Code** |
|---|---|---|
| +5V (4.5 - 5.5V) | 0.5 - 4.5V (ratiometric with supply) | **A** |
| ±15V nom. (±9 - 28V) | ±5V | **B** |
| +24V nom. (13 - 28V) | 0.5 - 9.5V | **C** |
| ±15V nom. (±13.5 - 28V) | ±10V | **D** |
| +24V nom. (18 - 28V) | 4 - 20mA 2 wire | **E** |
| +24V nom. (13 - 28V) | 4 - 20mA 3 wire Sink | **F** |
| +24V nom. (9 - 28V) | 0.5 - 4.5V | **G** |
| +24V nom. (13 - 28V) | 4 - 20mA 3 wire Source | **H** |

Supply Current: 'A' 10mA nominal, 12mA max. 'B', 'D' & 'G' 12mA nominal, 15mA max. 'E' 26mA max. 'F' & 'H' 32mA nominal, 35mA max.

| c **Connections** | **Code** |
|---|---|
| Cable gland radial IP68 10bar/IP69K Pg7 | **Ixx** |
| Cable gland axial IP68 10bar/IP69K Pg7 | **Lxx** |

Specify required cable length **'xx'** in cm. e.g. L2000 specifies axial cable gland with 20 m of cable, 50 cm supplied as standard.

| d **Body Fittings** | **Code** |
|---|---|
| None default | blank |
| M8 Rod-eye bearing radial version only | **N** |

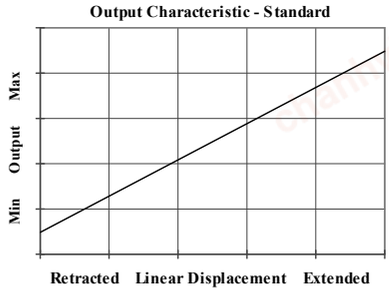
| e **Body Clamps** | **Code** |
|---|---|
| Body Clamps 1 pair | **P** |
| Body Clamps 2 pairs | **P2** |

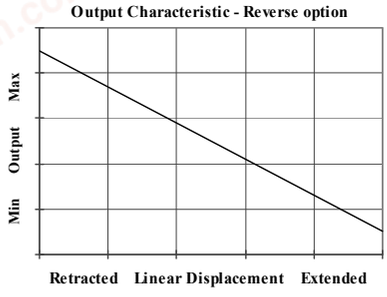
| f **Sprung Push Rod** | | **Code** |
|---|---|---|
| Not sprung default | | blank |
| Spring extend | 300 mm maximum displacement and captive push rod only. | **R** |
| Spring retract | | **S** |

| g **Push Rod Fittings** | **Code** |
|---|---|
| Female thread M8x1.25x12 deep default | blank |
| Dome end with spring extend option 'R' | **T** |
| M8 Rod-eye Bearing | **U** |
| Magnetic Tip | **WA** |

| h **Push Rod** | **Code** |
|---|---|
| Captive push rod retained default | blank |
| Non-captive push rod can depart body | **V** |

| j **Z-code (optional)** | **Code** |
|---|---|
| Tighter Independent Linearity; ≤± xx% FSO @20°C<br>≤± 0.1% 0 - 10 mm min. to 0 - 450 mm<br>≤± 0.25% 0 - 451 mm to 0 - 600 mm<br>≤± 0.5% 0 - 601 mm to 0- 800 mm max. | **Z650** |
| ½" Rod eyes with options 'N' and/or 'U' | **Z825** |
| M12 Rod eyes with options 'N' and/or 'U' | **Z826** |




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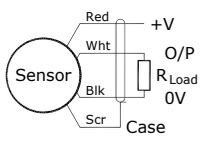
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# Installation Information

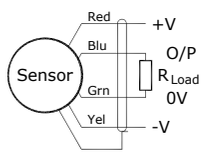
## S115 RUGGED SUBMERSIBLE STAND-ALONE LINEAR POSITION SENSOR

| Output Option | Output Description: | Supply Voltage: $V_s$ (tolerance) | Load resistance: (include leads for 4 to 20mA O/Ps) |
|---|---|---|---|
| **A** | 0.5 - 4.5V (ratiometric with supply) | +5V (4.5 - 5.5V) | ≥ 5kΩ |
| **B** | ±5V | ±15V nom. (±9 - 28V) | ≥ 5kΩ |
| **C** | 0.5 - 9.5V | +24V nom. (13 - 28V) | ≥ 5kΩ |
| **D** | ±10V | ±15V nom. (±13.5 - 28V) | ≥ 5kΩ |
| **E** | 4 - 20mA 2 wire Current Loop | +24V nom. (18 - 28V) | ≈ 0 - 300Ω max. @24V ~ 1.2 to 6V across 300Ω {$R_L$ max. = ($V_s$ - 18) / $20^{-3}$} |
| **F** | 4 - 20mA 3 wire Sink | +24V nom. (13 - 28V) | ≈ 0 - 950Ω max. @24V ~ 3.8 to 19V across 950Ω {$R_L$ max. = ($V_s$ - 5) / $20^{-3}$} |
| **G** | 0.5 - 4.5V | +24V nom. (9 - 28V) | ≥ 5kΩ |
| **H** | 4 - 20mA 3 wire Source | +24V nom. (13 - 28V) | ≈ 0 - 300Ω max. ~ 1.2 to 6V across 300Ω |

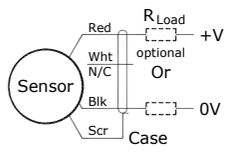
'A', 'C', 'G' & 'H'



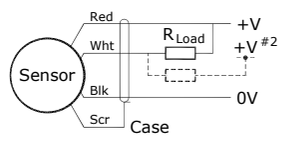

'B' & 'D'




'E'




'F'

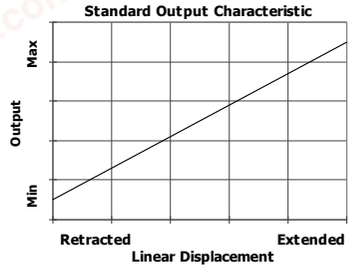



$V^{\#2}$ = +5 - +28V

**Mechanical Mounting:** Depending on options; Body can be mounted by rod eye or by clamping the sensor body - body clamps are available, if not already ordered. Target by M8x1.25 female thread, rod eye or magnetic tip. It is assumed that the sensor and target mounting points share a common earth.

Where the free end of the cable is to be terminated in a submerged position, adequate sealing must be provided to protect connections.

**Output Characteristic:** Target is extended 7 mm from end of body at start of normal travel. The output increases as the target extends from the sensor body, the calibrated stroke is between 5 mm and 800 mm.




**Incorrect Connection Protection levels:-**

A **Not protected** – the sensor is **not** protected against either reverse polarity or over-voltage. The risk of damage should be minimal where the supply current is limited to less than 50mA.

B & D Supply leads diode protected. Output must not be taken outside ± 12V.

C & G Supply leads diode protected. Output must not be taken outside 0 to 12V.

E, F & H Protected against any misconnection within the rated voltage.

*For further information please contact:*
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