mm

S115
Rugged Submersible Stand-Alone Linear Position Sensor

Position feedback for industrial and scientific applications

FEATURES

- 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

S115-17e

Our S115 is a heavy-duty version of the S114 sensor with a stronger 12.6mm 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, highaccuracy 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 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 0-5mm to 0-800mm 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, or dome end. 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 10 Bar.

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 ≤ ± 0.5% FSO @ 20°C - over 450 mm ≤ ± 0.1% FSO @ 20°C* available upon request.

*Sensors with calibrated travel from 10 mm up to 400 mm.

Temperature Coefficients	< ± 0.01%/°C Gain & < ± 0.01%FS/°C Offset
Frequency Response	> 10 kHz (-3dB) > 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 -20°C to +85°C buffered
Storage	-40°C to +125°C
Sealing	IP68 10 Bar
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

Drawings, in AutoCAD® dwg or dxf format, available on request.

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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.

PIPS®-based displacement transducers have the simplicity of a potentiometer with the life of an LVDT/RVDT.

PIPS® technology combines the best in fundamental inductive principles with advanced micro-electronic integrated circuit technology. A PIPS® sensor, based on simple inductive coils using '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.

PIPS® overcomes the drawbacks of LVDT technology – bulky coils, poor length-to-stroke ratio and the need for special magnetic materials. It requires no separate signal conditioning.

Our LIPS® range are linear sensors, while RIPS® are rotary units and TIPS® are for detecting tilt position. Ask us for a full technical explanation of PIPS® technology.

We also offer a range of ATEX-qualified intrinsically-safe sensors.

TABLE OF OPTIONS

CALIBRATED TRAVEL: Factory set to any length from 0-5mm to 0-800mm (e.g. 254mm)

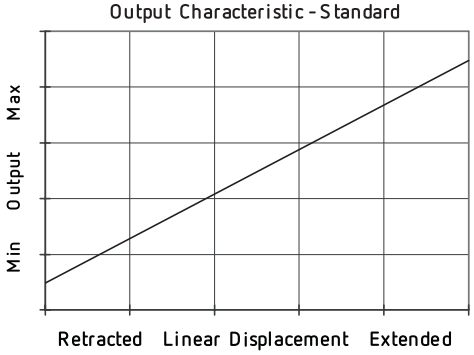
ELECTRICAL INTERFACE OPTIONS

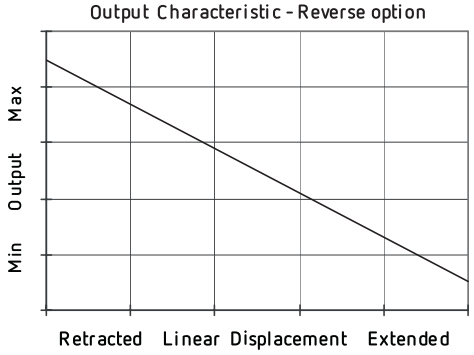
OUTPUT SIGNAL	SUPPLY INPUT	OUTPUT LOAD
Standard:		
0.5-4.5V dc ratiometric	+5V dc nom. ± 0.5V.	5kΩ min.
Buffered:		
0.5-4.5V dc	+24V dc nom. + 9-28V.	5kΩ min.
±5V dc	±15V dc nom. ± 9-28V.	5kΩ min.
0.5-9.5V dc	+24V dc nom. + 13-28V.	5kΩ min.
±10V dc	±15V dc nom. ± 13.5-28V.	5kΩ min.
Supply Current	10mA typical, 20mA maximum.	
4-20mA (2 wire)	+24V dc nom. + 18-28V.	300Ω @ 24V.
(3 wire sink)	+24V dc nom. + 13-28V.	950Ω @ 24V.
(3 wire source)	+24V dc nom. + 13-28V.	300Ω max.

CONNECTOR/CABLE OPTIONS
Cable with Pg 7 gland Axial or Radial, IP68 10 Bar
Cable length >50 cm – please specify length in cm

MOUNTING OPTIONS
M8 rod eye bearing (radial versions), Body Tube Clamp/s (axial or radial versions).

PUSH ROD OPTIONS – standard retained with M8x1.25 female thread, M8 rod eye bearing, Dome end, Sprung loaded (retraction or extension) or Free.





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INTRINSICALLY SAFE - GAS/VAPOUR ATMOSPHERES

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

a **Displacement** (mm)		Value
Displacement in mm	e.g. 0 - 254 mm	254

b **Output**		
Supply V dc V_s (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

c **Connections** Cable* or Connector		Code
Cable Gland - Radial	IP67 Pg7	Ixx
Cable Gland - Axial	IP67 Pg7	Lxx

*Supplied with 50 cm as standard, specify required cable length specified in cm. e.g. L2000 specifies cable gland with 20 metres of cable. Nb: restricted cable pull strength.

d **Body Fittings**		Code
None - default		blank
M8 Rod-eye Bearing	Radial body style only	N
Body Clamps - 1 pair		P
Body Clamps - 2 pairs		P2

e **Sprung Push Rod**		Code
None - default		blank
Spring Extend	Up to 300mm displacement. Captive push rod only.	R
Spring Retract		S

f **Push Rod Fittings**		Code
None - default	Female Thread M8x1.25x12 deep	blank
Dome end	Required for option 'R'	T
M8 Rod-eye Bearing		U

g Push Rod Options		Code
Captive - default	Push rod is retained	blank
Non-captive	Push rod can depart body	V

h **Z-code**	Code
≤± 0.1% @20°C Independent Linearity displacement between 10mm & 400mm only!	Z650

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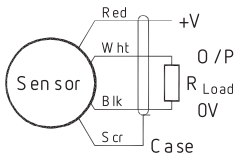
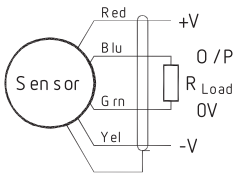
INSTALLATION INFORMATION

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

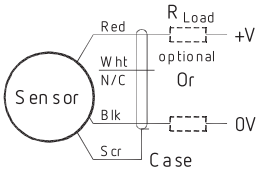
'A', 'C', 'G' & 'H'



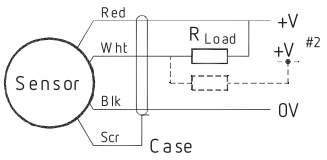
'B' & 'D'



'E'



'F'

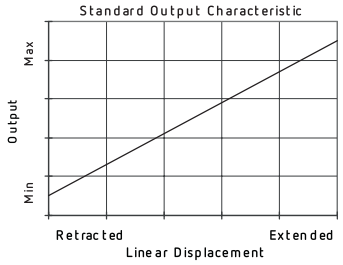


$V^{\#2}$ = +5 - +28V

Mechanical Mounting: Depending on options; Body can be mounted by M8 rod eye or by clamping the sensor body - body clamps are available, if not already ordered. Target by M8x1.25 female thread or M8 rod eye. 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 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.

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ALTHEN SENSORS & CONTROLS

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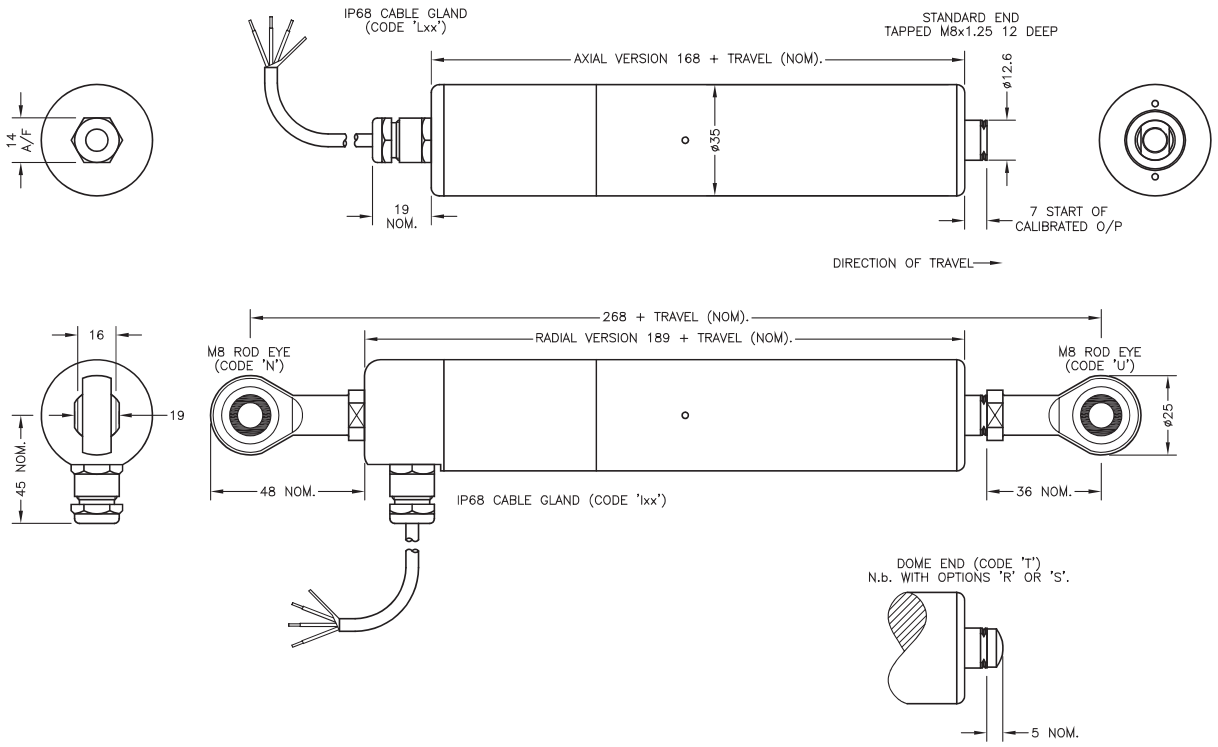
N.b. ROD–EYE ORIENTATION NOT GUARANTEED.



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

THE PUSH–ROD RETRACTS A FURTHER 4mm NOM. FROM START OF CALIBRATED TRAVEL. STANDARD VERSIONS THE PUSH–ROD EXTENDS A FURTHER 8mm NOM. FROM END OF CALIBRATED TRAVEL, FOR SPRUNG VERSIONS: 'R': 1mm, 'S': 2mm. 'V' CODED PUSH–ROD WILL DEPART SENSOR BODY.

A	FIRST ISSUE ~ RAN1044	PDM
B	RANGE WAS 50-600mm RAN1056	RDS
C	OPTION 'S' ADDED ~ RAN1108	PDM
D	RANGE NOTE AMENDED ~ RAN1200	PDM

CE

ELECTRICAL OPTIONS/ SPECIFICATIONS

OUTPUT OPTION	OUTPUT	SUPPLY	
A	0.5 TO 4.5V RATIOMETRIC	5V	STANDARD
B	±5V	±15V	BUFFERED
C	0.5 TO 9.5V	24V	BUFFERED
D	±10V	±15V	BUFFERED
G	0.5 TO 4.5V	24V	BUFFERED
	SUPPLY CURRENT 12mA TYP. 20mA MAX.		BUFFERED
E	4 TO 20mA 2–WIRE	24V	BUFFERED
F	4 TO 20mA 3–WIRE SINK	24V	BUFFERED
H	4 TO 20mA 3–WIRE SOURCE	24V	BUFFERED

SINK VERSION OUTPUT COMPLIANCE 5–28V
SOURCE VERSION DRIVE 300Ω MAX TO 0V

CABLE: 0.2mm², O/A SCREEN, PUR JACKET – SUPPLIED WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 'L50'
3–CORE: JACKET ø4mm
4–CORE: JACKET ø4.6mm
CONNECTIONS;

3 CORE	4 CORE	
RED	RED	+Ve
BLACK	GREEN	0V
	YELLOW	–Ve – OPTIONS: B OR D
WHITE	BLUE	OUTPUT
SCREEN	SCREEN	BODY – OPTIONS: A, C, E–H

RANGE OF DISPLACEMENT FROM 0–5mm TO 0–800mm e.g.76, IN INCREMENTS OF 1mm.

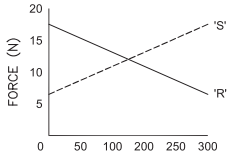
BODY MATERIAL: STAINLESS STEEL 316.

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 v STROKE
(CODE 'R' OR 'S')

A	16/10/15		CHECKED BY	X ±0.4
B	09/11/15		RDS	X.X ±0.2
C	14/09/16			X.XX ±0.1
D	06/09/17			DIMS mm
		DESCRIPTION		
		S115 RUGGED SUBMERSIBLE STAND-ALONE LINEAR POSITION SENSOR		
SCALE 12.5mm		DRAWING NUMBER S115-11		REV D
				SHEET 1 OF 1

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