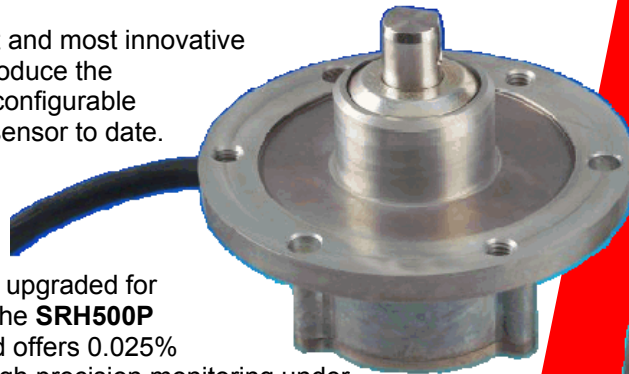


Penny + Giles uses the latest and most innovative mechatronics disciplines to produce the **SRH500P** - it's most rugged, configurable contactless Hall effect rotary sensor to date.

This hugely robust new sensor, designed for use in harsh environments, sits within the all new SRH series, upgraded for more extreme performance. The **SRH500P** features a 12bit processor and offers 0.025% measurement resolution for high precision monitoring under conditions of extreme temperature, humidity, vibration, shock and immersion.

Where the most accurate measurement is demanded for steering, suspension and position sensing, **SRH500P** is the solution, particularly 'on-vehicle' for municipal, agricultural and construction applications.

- **Single (SRH501P)/dual (SRH502P) redundant analogue or digital (PWM) outputs**
- **Total sensor measurement range from 20° up to 360°**
- **12 bit resolution over selected measuring range**
- **Low, low noise level (1mV rms) on output signal**
- **Environmental protection to IP69K**
- **Operating temperature range -40° to +140° C**
- **Enhanced OEM measurement options – non-linear and switched outputs, clamp voltage levels**



SRH500P

CONTACTLESS ROTARY SENSOR

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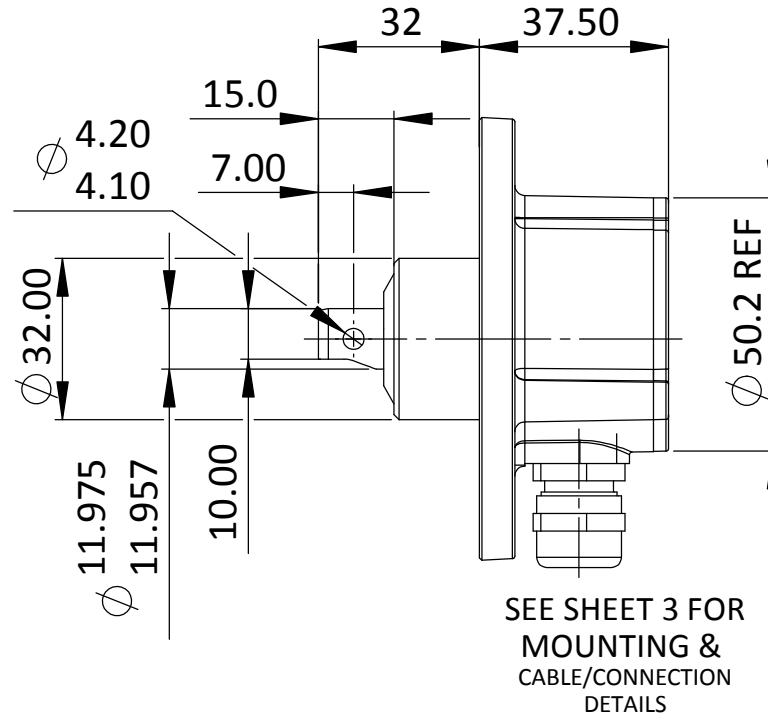
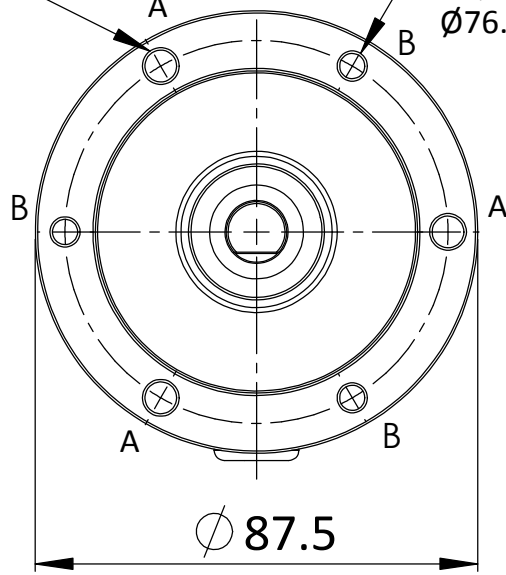
www.penny-giles.de

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+49 (0) 841 61000
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info@penny-giles.de

METRIC
IF IN DOUBT ASK

3 HOLES Ø6.5 THRU
EQUI-SPACED ON A
Ø76.0 PCD

3 HOLES M6x1 THRU
EQUI-SPACED ON A
Ø76.0 PCD



MID POINT OF
ELECTRICAL ANGLE

OUTPUT INCREASES
FOR ACW UNIT WHEN
VIEWED ON SHAFT

OUTPUT INCREASES
FOR CW UNIT WHEN
VIEWED ON SHAFT

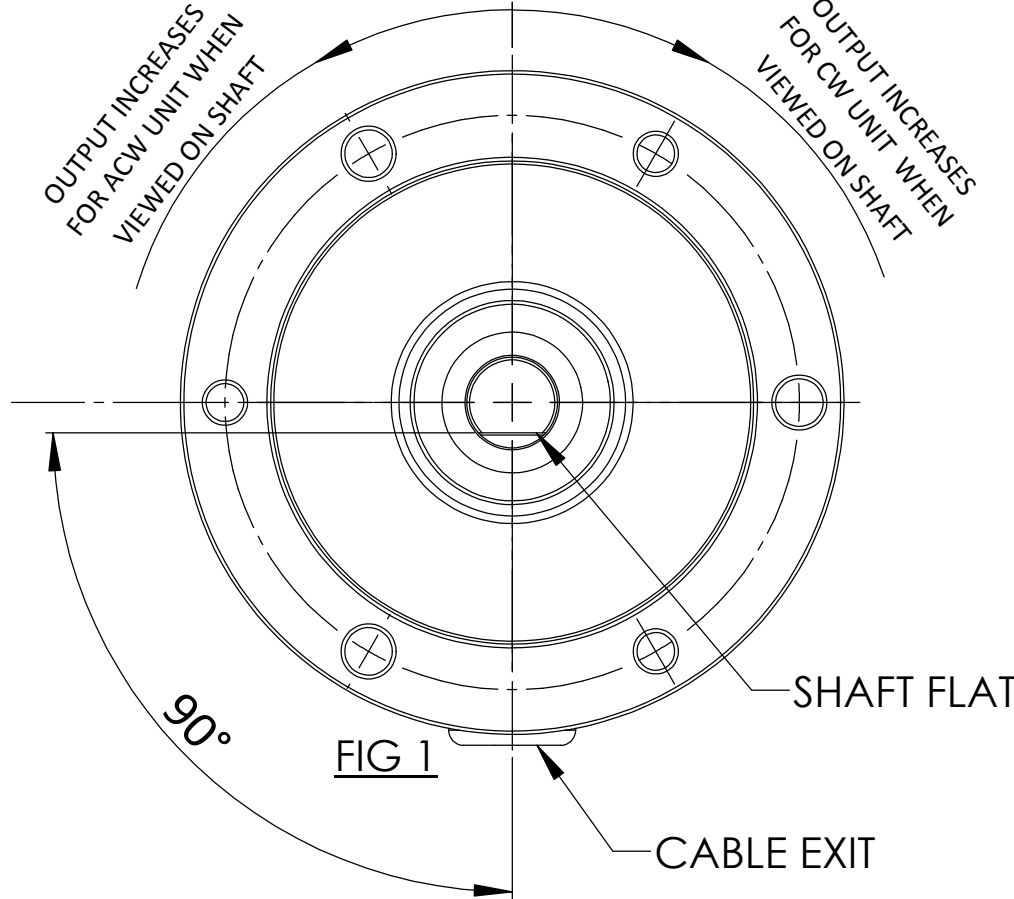
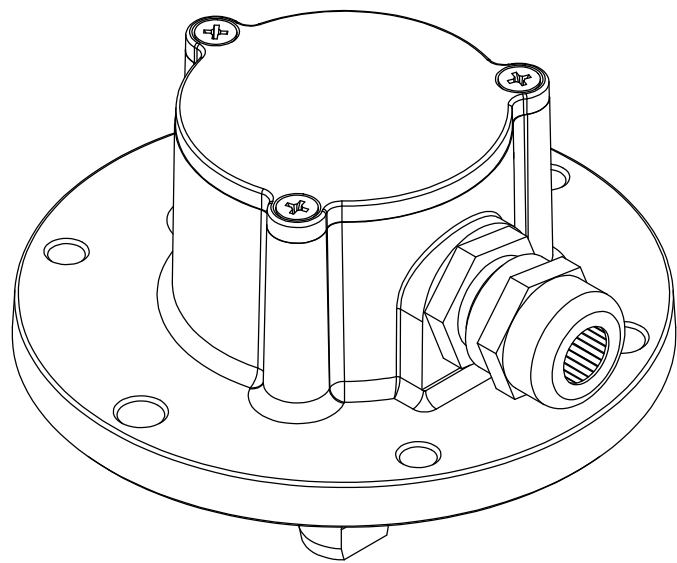


FIG 1 IS MID ELECTRICAL ANGLE WHEN SHAFT FLAT IS FACING TOWARDS AND PERPENDICULAR TO THE CABLE EXIT. (AS SHOWN)

ISS	DATE	DRAWN	ECR No.	CHK	APP
5	17/02/09	DR	10517/16	M.Bentley	M.Bentley

Single Channel Order Code

SRH501P /--- /- /- /-

- Angle** - ←
- Output** - ←
- A = Analogue
P = PWM
- Direction Code** - ←
1. = Clockwise
2. = Anticlockwise
- Cable Code** - ←
- A = No Cable
B01 = P&G Cable (1m) (IP69K)
B05 = P&G Cable (5m) (IP69K)
B10 = P&G Cable (10m) (IP69K)
C = Hirschmann M12 Fitted to Body (IP67 & IP69K Only in locked position with mating connector. See sheet 3)

Dual Channel Order Code

SRH502P /--- /--- /- /- /-

- Angle CH1** ←
- Angle CH2** ←
- Output** - ←
- A = Analogue
P = PWM
- Direction Code** - ←
3. = Both Clockwise
4. = Both Anticlockwise
5. = CH1 Clockwise, CH2 Anticlockwise
- Cable Code** - ←
- A = No Cable
B01 = P&G Cable (1m) (IP69K)
B05 = P&G Cable (5m) (IP69K)
B10 = P&G Cable (10m) (IP69K)
C = Hirschmann M12 Fitted to Body (IP67 & IP69K Only in locked position with mating connector. See sheet 3)

OEM OPTIONS

- NON LINEAR LAW
- SWITCH OUTPUTS
- CLAMP VOLTAGES
- MIXED PWM/ANALOGUE OUTPUTS
- ALTERNATIVE PWM FREQ
- DIFFERENT OUTPUT PHASING CH1 AND CH2

SCALE 1:1 UNLESS STATED	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No SRH500	MATERIAL BODY - LM6 ALLOY SHAFT - 316 SS	TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301 SURFACE TEXTURE VALUES IN MICROMETRES (µm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6 ALL SCREW THREADS TO BS3643 PT.2: EXTERNAL CLASS: 6g INTERNAL CLASS: 6H	TITLE SEALED DUAL ROTARY HALL SENSOR		A3			
THIRD ANGLE PROJECTION TO BS 8888	MASS (g)	VOL. (mm ³)	FINISH BODY - ALOCHROM 407/47	<table border="0"> <tr> <td>ANGULAR ± 1°</td> <td>LINEAR 0, mm 0,0 mm 0,00mm 0,000mm</td> <td>(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm</td> <td>BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm</td> </tr> </table> <p>UNLESS OTHERWISE STATED</p>	ANGULAR ± 1°			LINEAR 0, mm 0,0 mm 0,00mm 0,000mm	(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm	BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm
ANGULAR ± 1°	LINEAR 0, mm 0,0 mm 0,00mm 0,000mm	(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm	BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm							

**METRIC
IF IN DOUBT ASK**

SRH501P (Single Channel) & SRH502P (Dual Channel) PERFORMANCE SPECIFICATION

ISS	DATE	DRAWN	ECR No.	CHK	APP
5	17/02/09	DR	10517/16	M.Bentley	M.Bentley

ELECTRICAL DATA
 Measurement range 20° to 360° in 1° increments
 Supply voltage 9-30Vdc unregulated **and** 5Vdc±0.5Vdc regulated
 Supply current ≤25mA
 Supply reverse polarity protection Yes
 Output short circuit protection to GND Yes
 Output short circuit protection to supply In 5V Regulated Mode Only
 Power On Settlement <1s
 Resolution 12 bit (0.025% of measurement range)
 Output Range ±1% of range in 5V Regulated Supply Mode
 Tolerance ±1% of range ±3% of output Unregulated 9 To 30V Supply Mode
 Non-linearity ≤0.4% of range
 Temperature coefficient <±50ppm/°C
 Over Voltage Protection Up to 40V (-40 to +60 °C)

OUTPUT (Fig 2)
 Options Ratiometric Analogue, PWM or Absolute Analogue
 Direction Factory programmed to increase or decrease with CW shaft rotation

ANALOGUE OUTPUT OPTION
 Voltage output range (9-30V supply) Absolute voltage from 0.5V to 4.5V over measurement range
 Voltage output range (5V supply) Ratiometric output voltage from 10% to 90% of Vsupply over measurement range
 Monotonic Range 0.25V (5%) and 4.75V (95%) nominal
 Load resistance 10kΩ minimum (resistive to GND)
 Step response time 4ms typical
 Output noise ≤1 mVrms
 Frequency response 40Hz (-3dB) nominal

PWM OUTPUT OPTION
 PWM frequency 244Hz ±20% over temperature range
 PWM Levels (9-30V supply) 0V and 5V nominal
 PWM Levels (5V supply) 0V and Vsupply
 Duty cycle 10% to 90% over measurement range
 Monotonic Range 5% and 95% nominal
 Load resistance 10kΩ minimum (resistive to GND)
 Rise/fall time <20µs

MECHANICAL DATA
 Weight 265gm without cable
 Mounting Tapped 3 x M6 screws, Through Holes 3 x M6 or ¼ UNC
 Cable SRH501P 3 Core or SRH502P 4 Core Cable
 Phasing Sensor is at Mid Electrical Angle when shaft flat is facing towards and perpendicular to the cable exit ±5°

ENVIRONMENTAL
 Operational temperature range (5V version) -40 to 140 °C
 Operational temperature range (8-30V version) -40 to 135.2°C with Vsupply = 9Vdc
 Derate upper temperature limit by 1.7°C for each 1V increase in Vsupply e.g. -40 to 100 °C with Vsupply = 30Vdc (see Note 2 below)
 Sealing IP67 with Cable code C (IP69K Only in locked position with its proper counterpart) IP69K with Cable code B
 Note 2: Excessive temperature will cause the internal voltage regulator to shut down to protect the circuit from damage through overheating.

TESTED TO:
 Storage temperature -55 to 140 °C
 Vibration BS EN 60068-2-64; 1995 Sec 8.4 (14gn rms) 20 to 2000Hz Random
 Shock 3m drop onto concrete.
 EMC Complies to Directive 2004/108/EC
 Electromagnetic interference BS EN 61000-4-3(1999) to 100V/M, 80Mhz to 1Ghz and 1.4Ghz to 2.7Ghz
 Side Load 2Kg Mounted on sensor shaft Tested 3 million cycles
 Life 20x10⁶ operations, tested over 150° sweeps
 Salt Spray BS EN 60068-2-52; 1996 Test Kb Severity 2 (48hrs)
 Humidity BS EN 60068-2-30; 2005 Severity Db (55 °C, 93%RH)

FIG 2

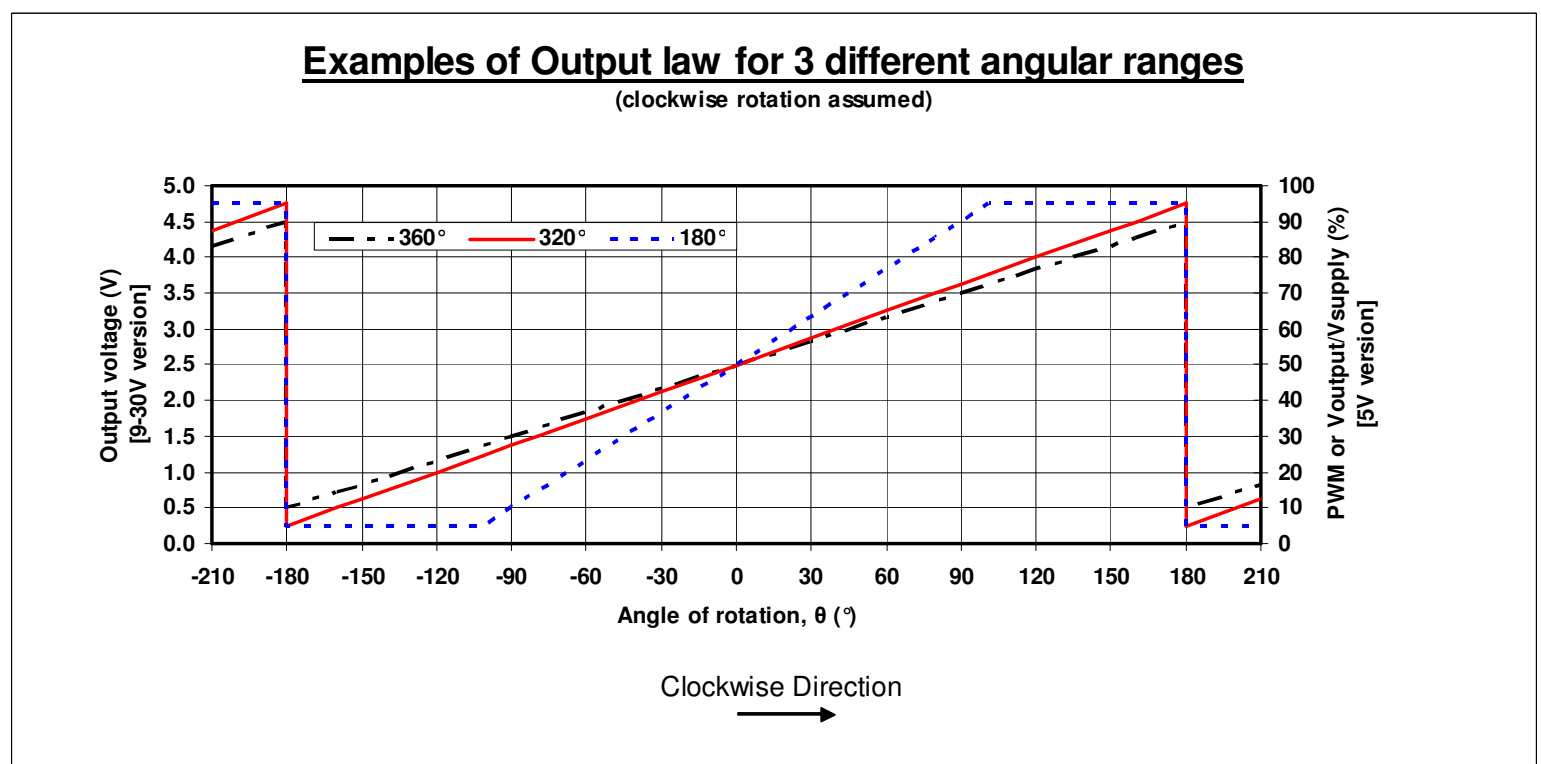


FIG 3 MAX OPERATING TEMPERATURE DERATING

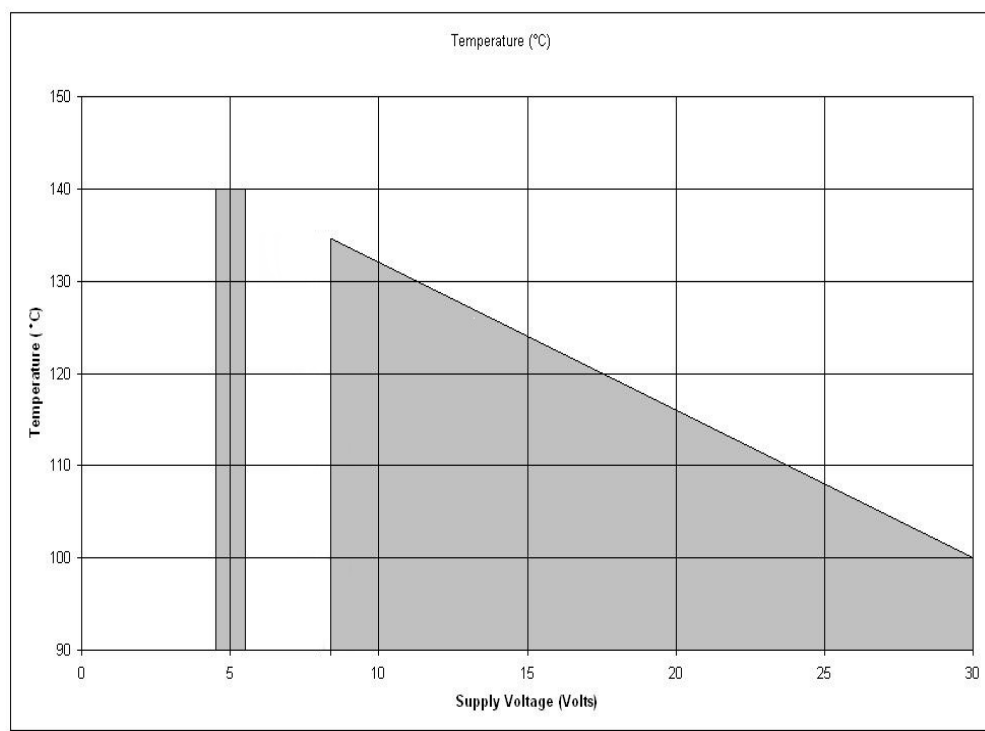
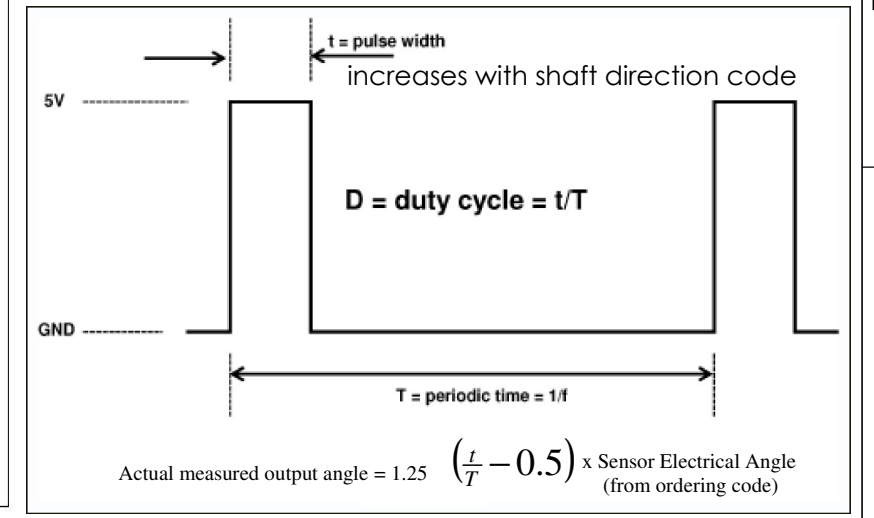


FIG 4 PWM OUTPUT CHARACTERISTICS



SCALE 1:1 UNLESS STATED	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No SRH500	MATERIAL	TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301 SURFACE TEXTURE VALUES IN MICROMETRES (µm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6/√ ALL SCREW THREADS TO BS3643 PT.2: EXTERNAL CLASS: 6g INTERNAL CLASS: 6H	TITLE SEALED DUAL ROTARY HALL SENSOR	PENNY + GILES	A3				
THIRD ANGLE PROJECTION TO BS 8888	MASS (g)	VOL. (mm ³)	REF.	FINISH	ANGULAR ± 1°	LINEAR 0, mm 0,0 mm 0,00mm 0,000mm	(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm	BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm	UNLESS OTHERWISE STATED	PART NUMBER: SRH501/2P	SHT 2 OF 3 SHTS

METRIC
IF IN DOUBT ASK

MOUNTING, CONNECTION & CABLE OPTIONS

M12 CONNECTOR (CABLE CODE C)

(IP67 & IP69K Only in locked position with its proper counterpart)

ISS	DATE	DRAWN	ECR No.	CHK	APP
5	17/02/09	DR	10517/16	M.Bentley	M.Bentley

M12 MATING CONNECTORS FOR OPTION C

(ORDER SEPARATELY)

MATING CONNECTOR IP68

2 metre long No X61-169-102
(Hirshmann No. 934-401-203 2m)

5 metre long No X61-169-105
(Hirshmann No. 934-401-202 5m)

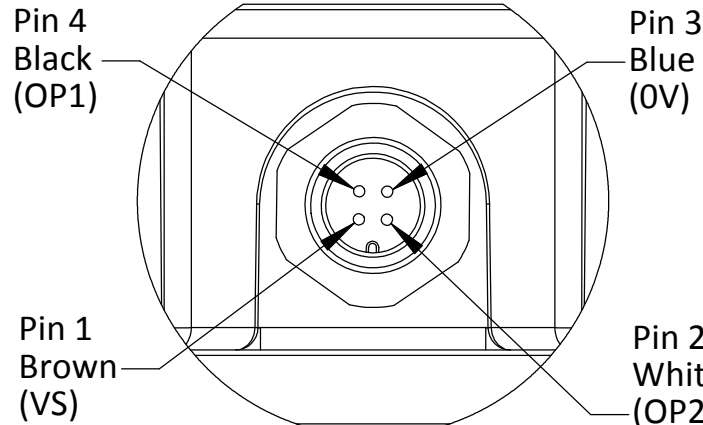
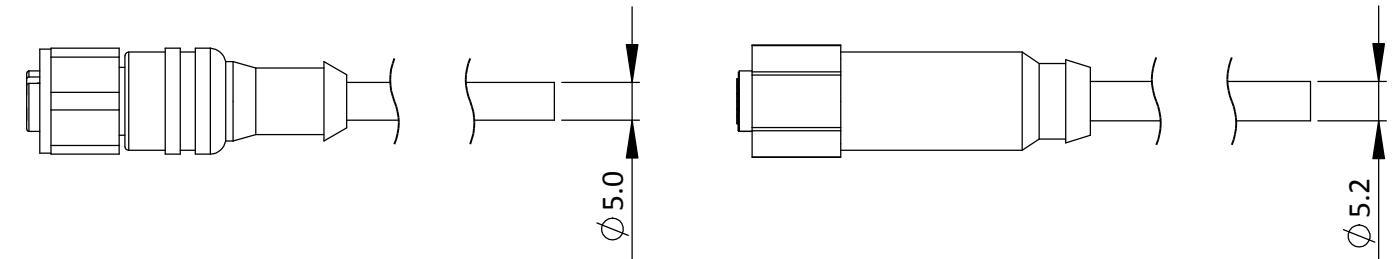
10 metre long No X61-226-002
(Lumberg PRST 4-07/10M)

MATING STEEL CONNECTOR IP69K

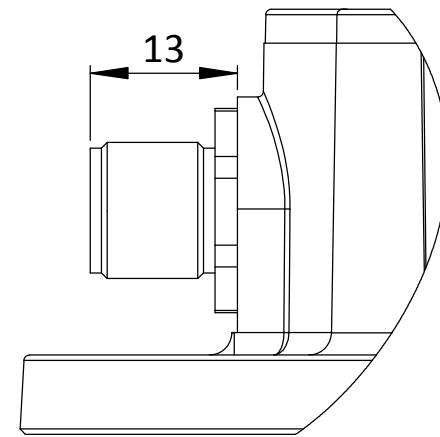
1.5 metre long No X61-222-001
(Murr No.7044-12221-336-0150 1.5m)

5 metre long No X61-222-003
(Murr No.7044-12221-336-0500 5m)

10 metre long No X61-222-005
(Murr No.7044-12221-336-1000 10m)

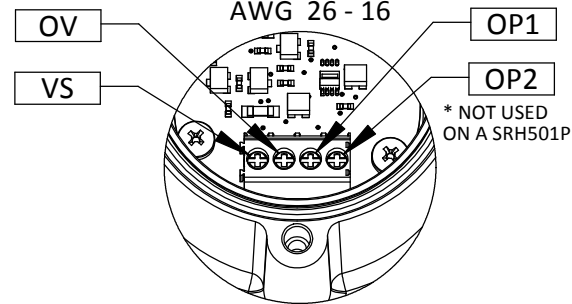


Pin 2 White (OP2)
* NOT USED ON A SRH501P



CONNECTION DETAILS

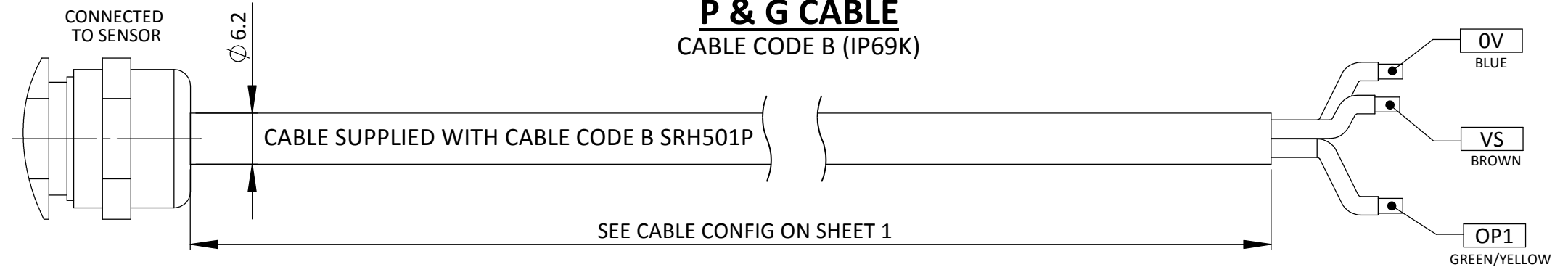
CONNECTOR CAPACITY
SOLID 0.14 - 1.5mm²
STANDARD 0.14 - 1.5mm²
AWG 26 - 16



CABLE GLAND WILL SUIT CABLE BETWEEN Ø4-8mm

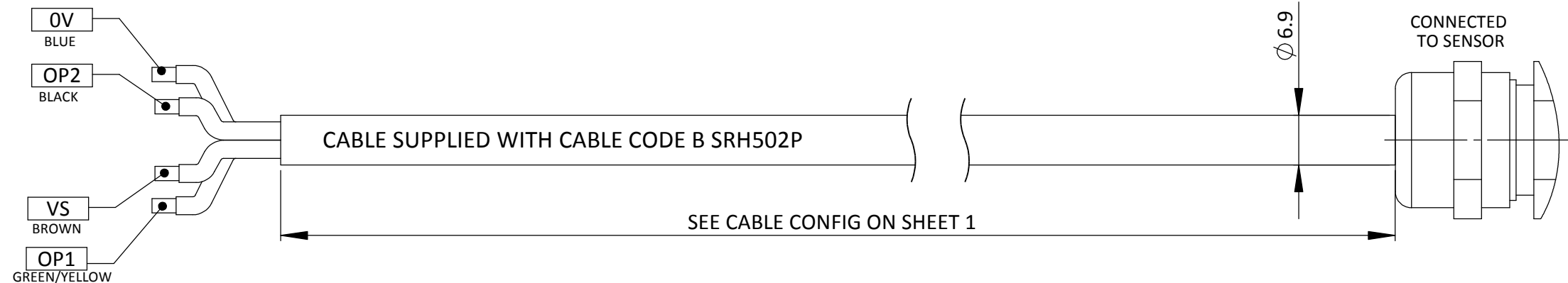
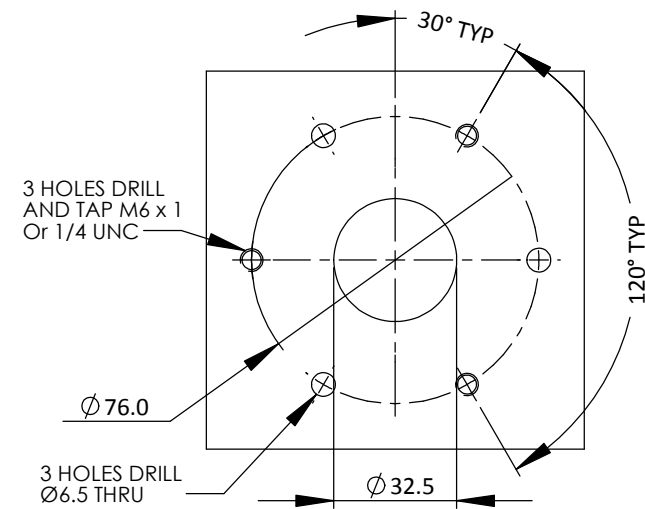
P & G CABLE

CABLE CODE B (IP69K)



SEE CABLE CONFIG ON SHEET 1

SENSOR MTG DETAILS

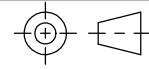


SEE CABLE CONFIG ON SHEET 1

SCALE

1.5:1

UNLESS STATED



THIRD ANGLE PROJECTION TO BS 8888

IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.

MASS (g)

VOL. (mm³)

D No

SRH500

FIRST USED ON

REF.

MATERIAL

FINISH

TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301
SURFACE TEXTURE VALUES IN MICROMETRES (µm)
TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6/√
ALL SCREW THREADS TO BS3643 PT.2:
EXTERNAL CLASS: 6g INTERNAL CLASS: 6H

ANGULAR	LINEAR	(MACHINING)	BREAK EDGE
+ 1°	0, mm	+/- 0.5 mm	0.05 - 0.15mm
	0,0 mm	+/- 0.2 mm	FILLET RADS
	0,00mm	+/- 0.1mm	0.1 - 0.3mm
	0,000mm	+/- 0.01mm	

UNLESS OTHERWISE STATED

TITLE

SEALED DUAL
ROTARY HALL SENSOR

PENNY + GILES

PART NUMBER:

SRH501/2P

A3

SHT 3
OF
3 SHTS