

# Technical Information

## SRH76x Non-Contacting Rotary Sensor

- **Non-contacting, Hall-effect technology**
  - Long-life, high performance measurement, “Fit and Forget” for optimal cost of ownership
- **Fully Sealed Electronics**
  - Shaft is isolated from Electronics to ensure absolute integrity in any environment
- **Voltage, Current and PWM output options**
  - Customer selectable outputs for seamless integration with your control system
- **Zinc-aluminum alloy body with IP68 and IP69K sealing**
  - Rugged Design with engineered polymer bearings enabling 2kg side load capability, for reliable measurement in harsh environments
- **Single or Dual output configurations**
  - Industry leading dual die sensor technology offers dual redundancy to suit the needs of safety-rated systems (e.g. ISO11452, IEC61508)

With its non-contacting operation, mechanical and electrical protection, and output redundancy options, the SRH76x range of shaft-operated rotary position sensors offer designers the optimal combination of performance, safety and cost.

Developed and tested specifically for reliability in the harshest of environments, the SRH76x will run directly from 12 or 24Vdc battery systems, its internal circuitry providing transient protection to ISO7637 test pulse 1-5.

With a seal and bearing life in excess of 20 million operations, the sensor's shaft and magnet are



- **Electrical protection to ISO7637 and ISO11452**
  - Providing confidence in operation and reducing the need for replacement
- **MTTF'd >150 years**
  - Safety first for “peace of mind”

mounted in a blind cavity, ensuring a best in class IP67, IP68 and IP69K electronics sealing.

Standard features include;  $\pm 0.4\%$  linearity and 12-bit resolution, an industry standard M12 connector interface, M6 mounting holes, and a choice between voltage (0.5-4.5Vdc, 0.2-4.8Vdc or 0-10Vdc), current (4-20mA), or digital PWM (244, 500 or 1000Hz) outputs.

Our customer selectable working angle from 20° to 360° ensures optimised 12-bit resolution and full-scale output signal over the working angle for maximum output sensitivity.



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## CONFIGURATION & ORDERING CODES

SRH76x-XXX-XX-XX-X

Type	Angle	Supply	Output	Direction
SRH76x	XXX	XX	XX	X
1	XXX	V3	A1	3
2			A2	4
			A3	5
			A5	
			P1	
			P2	
			P3	

### TYPE

SRH76X-XXX-XX-XX-X

Code	Description
SRH761	Single channel
SRH762	Dual output, common supply

### ANGLE

SRH76x-XXX-XX-XX-X

Code	Description
XXX	20 to 360° in 1° increments e.g. 020, 095, 128, 360 etc.

### SUPPLY VOLTAGE

SRH76x-XXX-XX-XX-X

Code	Description
V3	13.5 to 30Vdc unregulated for 0-10V dc output option (A2) and 9-30Vdc unregulated for all other output options



### OUTPUT

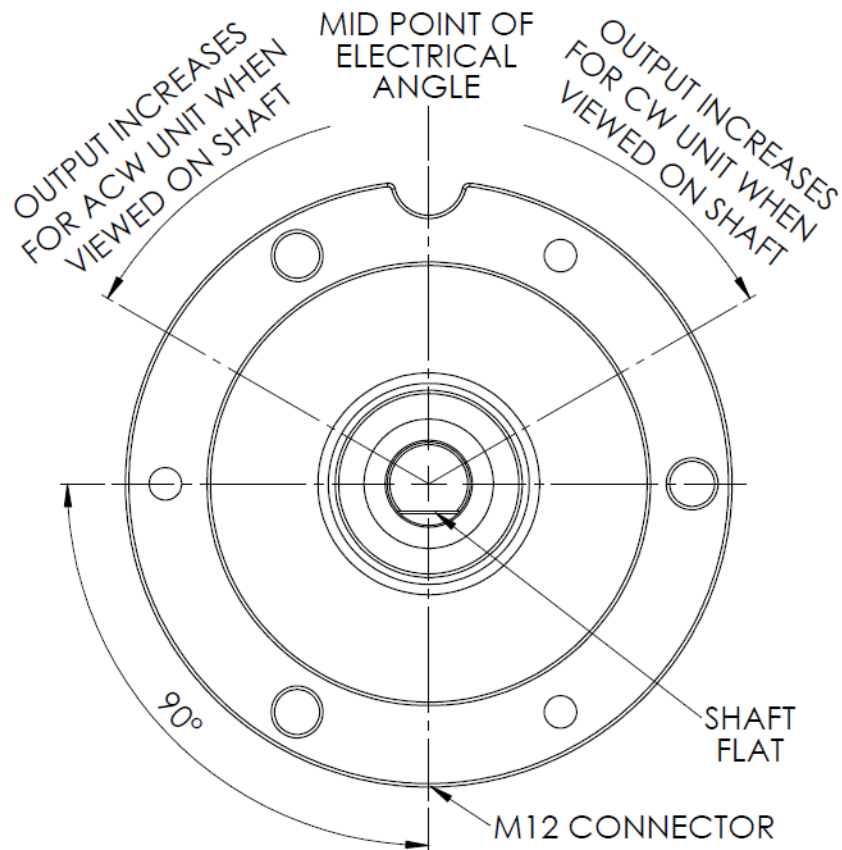
SRH76x-XXX-XX-XX-X

Code	Description
A1	0.5-4.5Vdc
A2	0-10Vdc – requires a 13.5 to 30V dc unregulated supply voltage
A3	4-20mA
A5	0.2-4.8Vdc
P1	244Hz digital PWM
P2	500Hz digital PWM
P3	1000Hz digital PWM

### DIRECTION

SRH76x-XXX-XX-XX-X

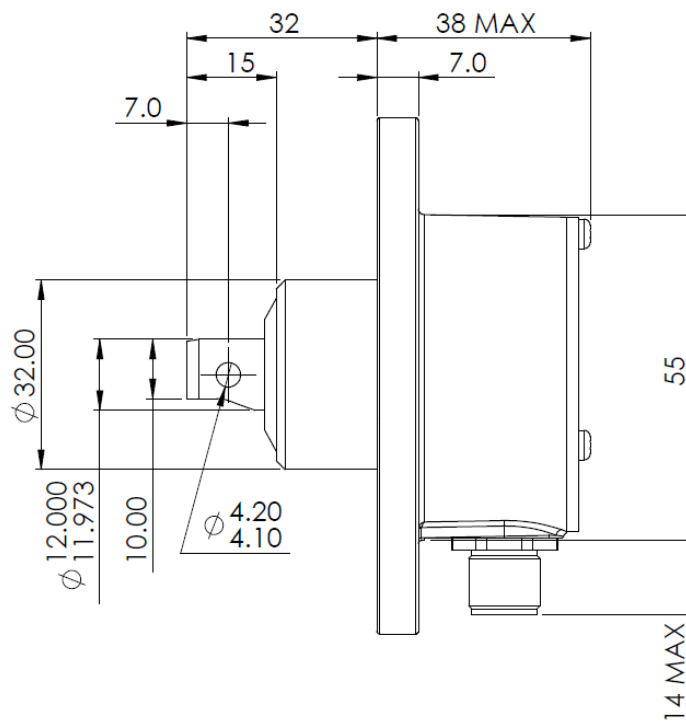
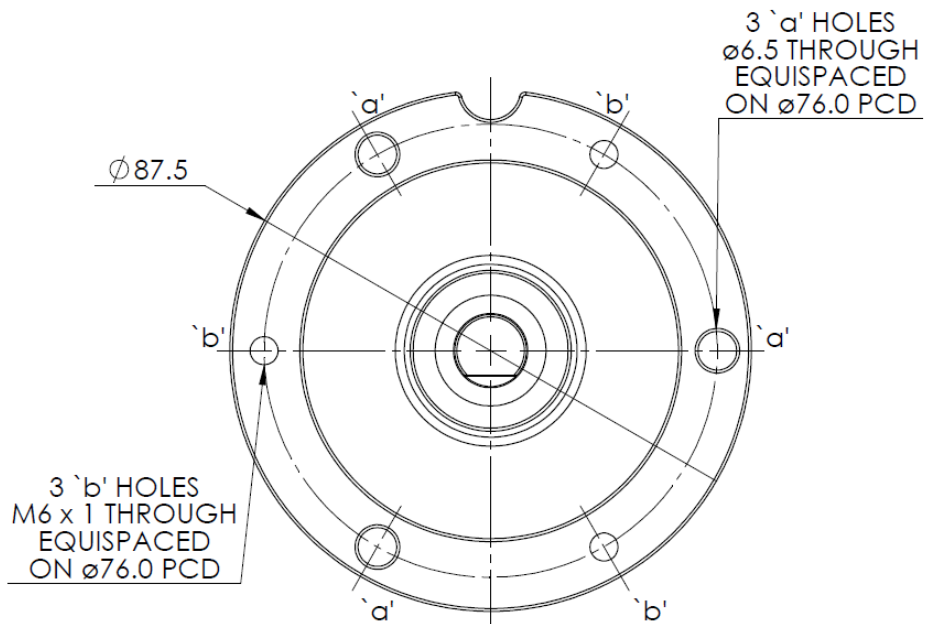
Code	Description
3	Both clockwise
4	Both anticlockwise
5	Channel 1 clockwise, channel 2 anticlockwise





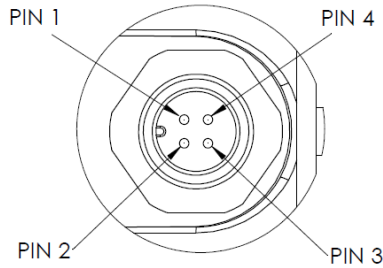
## INSTALLATION

## MECHANICAL



## ELECTRICAL CONNECTIONS

### M12 Connector

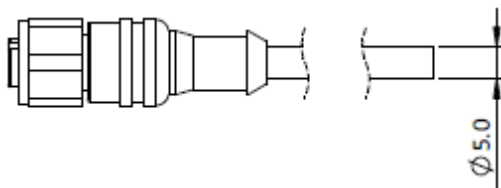


Pin	Function (Single output)	Function (Dual output)	Mating connector cable color
1	SRH761: Vsupply	SRH762: Vsupply	BROWN
2	SRH761: Not used	SRH762: Output 2	WHITE
3	SRH761: GND (0V)	SRH762: GND (0V)	BLUE
4	SRH761: Output	SRH762: Output 1	BLACK

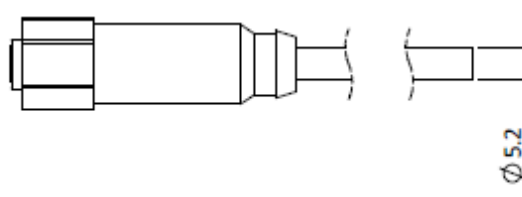
### Recommended Mating Connectors

Description	Manufacturer reference number
3 wire, 2 meter long, IP68	Hirschmann No. 934-401-203 2m
4 wire, 2 meter long, IP68	Hirschmann No. 934-551-009 2m
3 wire, 5 meter long, IP68	Hirschmann No. 934-401-202 5m
4 wire, 5 meter long, IP68	Hirschmann No. 934-551-010 5m
3 wire, 10 meter long, IP68	Lumberg PRST 4-07/10m
4 wire, 10 meter long, IP68	Hirschmann No. 934-551-035 10m
4 wire, 1.5 meter long, IP69K	Murr No.7044-12221-336-0150 1.5m
4 wire, 5 meter long, IP69K	Murr No.7044-12221-336-0500 5m
4 wire, 10 meter long, IP69K	Murr No.7044-12221-336-1000 10m

### IP68 connectors



### IP69K connectors





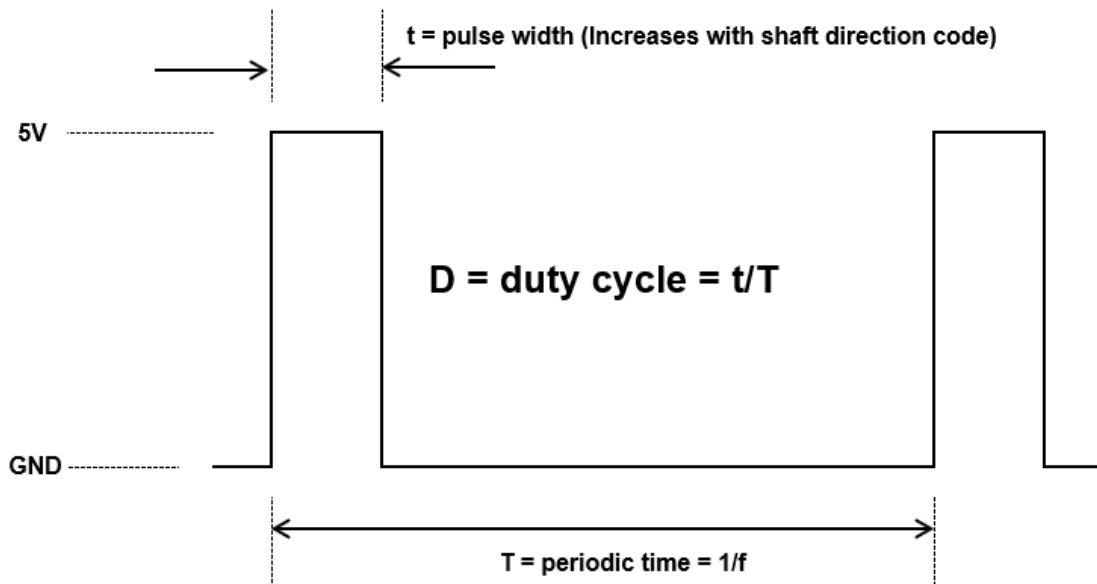
## SPECIFICATIONS

### ELECTRICAL

MEASUREMENT RANGE	As per configuration code, minimum 0-20°, maximum 0-360° in 1° increments
SUPPLY VOLTAGE	13.5-30Vdc unregulated for A2 option, 9-30Vdc unregulated for all other options
SUPPLY CURRENT (SINGLE OR DUAL OUTPUT)	≤30mA (+ output current for each 4-20mA output)
SUPPLY REVERSE POLARITY PROTECTION	Yes
SHORT-CIRCUIT PROTECTION	
OUTPUT TO GND	Indefinite (30mA maximum per channel)
OUTPUT TO SUPPLY	Indefinite (30mA maximum per channel)
OVER-VOLTAGE PROTECTION	Up to 40Vdc at ambient temperature
POWER-ON SETTLEMENT	≤1s
RESOLUTION	≤0.025% of measurement range (12-bit)
TEMPERATURE COEFFICIENT	<±100 ppm/°C (A1, A2, A5, P1, P2 and P3) <±200 ppm/°C (A3 option only)
LINEARITY	≤±0.4%

### PWM OUTPUTS (PX)

PWM FREQUENCY	P1: 244Hz ±20% over temperature range P2: 500Hz ±20% over temperature range P3: 1000Hz ±20% over temperature range
PWM LEVELS (9-30Vdc SUPPLY)	0V and 5V ±3% nominal
DUTY CYCLE	10% – 90% over measurement range
MONOTONIC RANGE	5% and 95% nominal
RISE/FALL TIME	20µs
LOAD RESISTANCE	10kΩ min. resistive to GND
PWM OUTPUT CHARACTERISTICS	

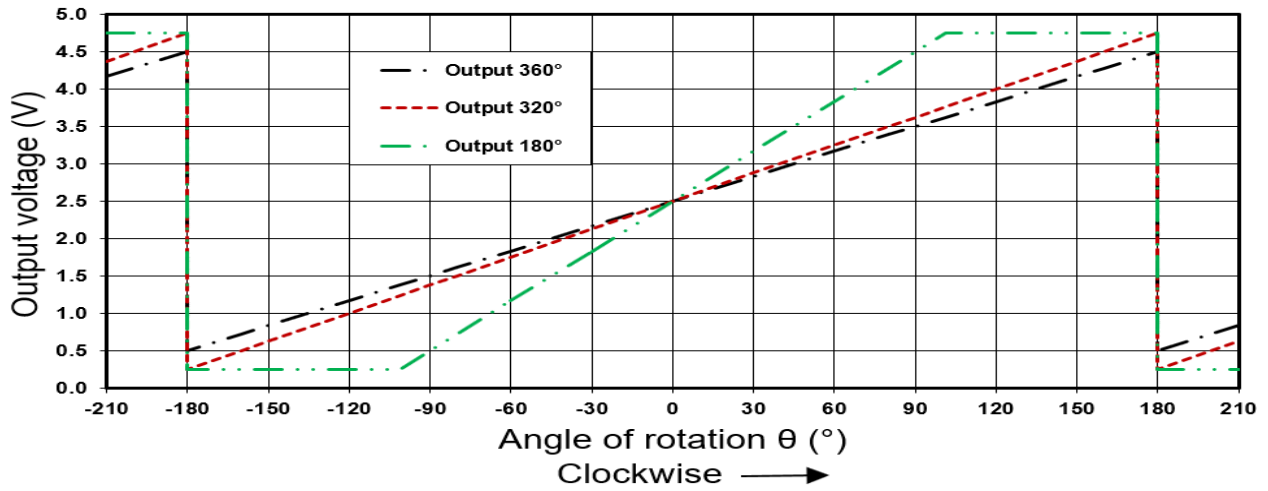


**Actual Measured Output Angle = 1.25 x (D-0.5) x Sensor electrical angle (from ordering code)**



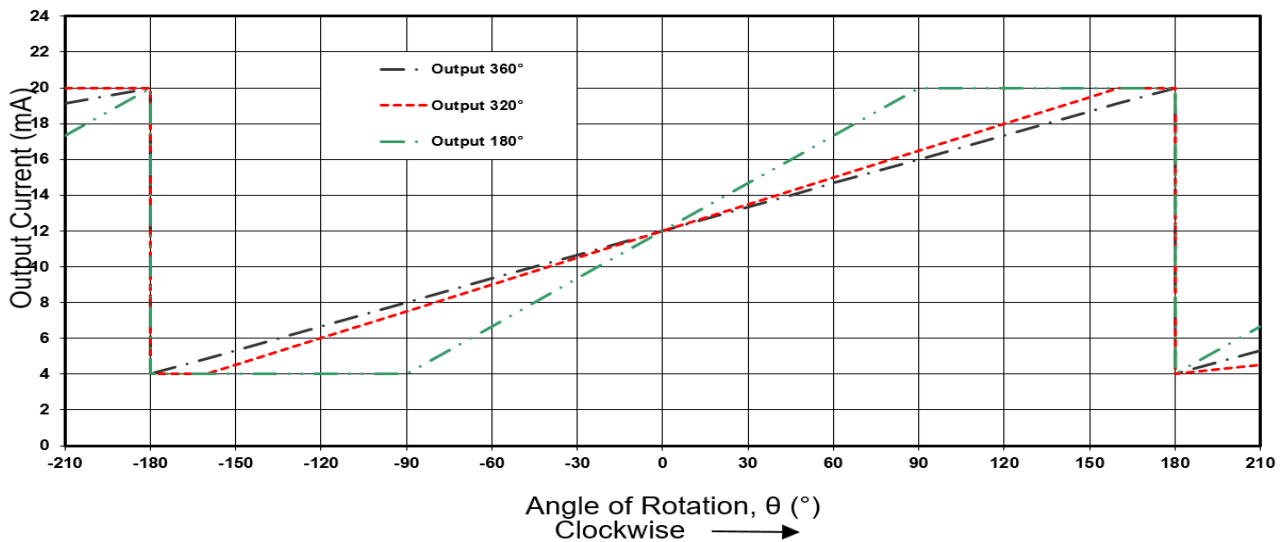
### VOLTAGE OUTPUTS

OUTPUT RANGE	A1 – Absolute voltage 0.5V-4.5V dc ( $\pm 3\%$ ) over measurement range A2 – Voltage 0.2V-9.8V dc ( $\pm 0.1V$ ) A5 – Absolute voltage 0.2V-4.8V dc ( $\pm 3\%$ ) over measurement range
MONOTONIC RANGE	A1 – 0.25V – 4.75V nominal A5 – 0.10V – 4.90V nominal
LOAD RESISTANCE	10k $\Omega$ min. resistive to GND
OUTPUT NOISE	<1mV rms
INPUT/OUTPUT DELAY	<3.5ms
EXAMPLE OF OUTPUT LAW	A1 with clockwise output configuration assumed



### CURRENT OUTPUTS

OUTPUT RANGE	A3 - Absolute current from 4mA to 20mA over measurement range ( $\pm 2\%$ span)
LOAD RESISTANCE	400 $\Omega$ max. resistive to GND
OUTPUT NOISE	<10 $\mu$ A rms
INPUT/OUTPUT DELAY	<3.5ms
EXAMPLE OF OUTPUT LAW	A3 with clockwise output configuration assumed





**MECHANICAL**

MECHANICAL ANGLE	360° continuous
MAXIMUM OPERATING SPEED	3600°/s
LIFE	>20 million operations of 150° sweep
SHAFT SIDE LOAD (DYNAMIC)	2kg mounted on sensor shaft – tested to 3 million operations of 150° sweep
WEIGHT	600g maximum
MOUNTING	Three tapped holes (M6 x 1 screws) or three through holes (to clear M6 or x ¼ UNC screws) with tightening Torque 10Nm Maximum

**EMC DATA**

RF IMMUNITY	ISO 11452-2: 2004, 100V/m, 80-3000MHz frequency range, 80%AM, 1kHz sine
MAGNETIC FIELD IMMUNITY	ISO 11452-8: 2015
CONDUCTED IMMUNITY	ISO 11452-4: 2005, 100mA, 10kHz-400MHz frequency range, 80%AM, 1kHz sine
ELECTROSTATIC DISCHARGE	ISO 10605: 2008 + A1: 2014, ±8kV contact, ±15kV air discharge
RADIATED EMISSIONS	EN55011: 2016 / CISPR 25
TRANSIENT PROTECTION	ISO 7637-2, pulses 1-5

**ENVIRONMENTAL AND LEGISLATIVE**

OPERATING TEMPERATURE RANGE	-40°C to +85°C
STORAGE TEMPERATURE RANGE	-50°C to +85°C
HUMIDITY	EN 60068-2-30 severity Db (55°C, 93%RH)
WATER AND DUST INGRESS	IP69K, IP68, IP67 with appropriate mating connector fitted
SALT SPRAY	EN 60068-2-52 test Kb severity 2 (72h)
VIBRATION (RANDOM)	BS EN 60068-2-64; 1995 - 14gn rms, 20-2000Hz
DROP/IMPACT SHOCK	2500g impact
MTTF'd	>150 years

**IMPORTANT INFORMATION**

Whilst Curtiss-Wright Industrial Group - Penny & Giles has designed this sensor to meet a range of applications it is the responsibility of the customer to ensure it meets their specific requirement.

Penny & Giles Controls Ltd makes no warranty or representation in respect of product fitness or suitability for any particular design application, environment, or otherwise, except as may subsequently be agreed in contract for the sale and purchase of products. Customers should therefore satisfy themselves of the actual performance requirements and subsequently the product's suitability for any particular design application and the environment in which the product is to be used.

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