

# TPS280DP DUAL OUTPUT

contactless throttle position/rotary sensor



## PERFORMANCE

### ELECTRICAL

<b>Measurement range</b>	°	20 to 360 in 1° increments
<b>Supply voltage</b>	Vdc	9 to 30 (unregulated) and 5 ±0.5 (regulated)
<b>Over voltage protection</b>	Vdc	Up to 40 (-40 to +60°C)
<b>Maximum supply current</b>	mA	<25
<b>Reverse polarity protection</b>		Yes
<b>Short circuit protection</b>		
<b>Output to GND</b>		Yes
<b>Output to supply</b>		In 5V regulated mode only
<b>Power-on settlement time</b>	S	<1
<b>Resolution</b>	%	0.025 of measurement range (12 bit)
<b>Non-linearity*</b>	%	< ±0.4
<b>Temperature coefficient</b>	ppm/°C	< ±30 in 5V supply mode; < ±90 in 9-30V supply mode

\*Non-linearity is measured using the Least-Squares method on a computerised calibration system

### Analog Output (order code A1, A4) - see graph on page 31

<b>Voltage output range</b>		
<b>9-30V supply</b>	Vdc	Absolute voltage, 0.5 to 4.5 (A1) or 0.1 to 4.9 (A4) over measurement range (±3%)
<b>5V supply</b>	Vdc	Ratiometric output voltage - 10 to 90% (A1) or 2 to 98% (A4) of Vs over measurement range (±1%)
<b>Monotonic range</b>	Vdc	0.25 (5%) and 4.75 (95%) nominal (A1)
	Vdc	0.05 (1%) and 4.95 (99%) nominal (A4)
<b>Load resistance</b>	Ω	10k minimum (resistive to GND)
<b>Output noise</b>	mVrms	<1
<b>Input/output delay</b>	mS	<2

### PWM Output (order code Pn) - see output characteristics on page 31

<b>PWM frequency</b>	Hz	244 (P1); 500 (P2); or 1000 (P3) ±20% over temperature range
<b>PWM levels</b>	Vdc	0 and 5 nominal (±3%)
<b>9-30V supply</b>	Vdc	0 and Vs (±1%)
<b>5V supply</b>	Vdc	0 and Vs (±1%)
<b>Duty cycle</b>	%	10 to 90 over measurement range
<b>Monotonic range</b>	%	5 and 95 nominal
<b>Load resistance</b>	Ω	10k minimum (resistive to GND)
<b>Rise/fall time</b>	µS	<15

### MECHANICAL

<b>Mechanical angle</b>	°	360, continuous
<b>Operating torque</b>	g-cm	10
<b>Maximum rotational speed</b>	°/sec	3600
<b>Weight</b>	g	<30
<b>Mounting</b>		Use 2 x M4 socket head cap screws and M4 washer - maximum tightening torque 2Nm
<b>Phasing</b>		When shaft drive detail is aligned as shown in Electrical Angle Diagram (page 21), output is at mid travel. The sensor housing allows for ±10° adjustment via the mounting flange slots.

# TPS280DP

## ENVIRONMENTAL

<b>Protection class</b>		IP68 (to 2m depth for 1 hour) and IP69K
<b>Life</b>		60 million operations (30 x 10 <sup>6</sup> cycles) of ±75°; Sensing element life is essentially infinite (contactless)
<b>Dither life</b>		Contactless - no degradation due to shaft dither
<b>Operational temperature<sup>†</sup></b>	°C	-40 to +140 (5V supply) and +170°C for 72 hours -40 to +135.7 (9V supply option) Derate upper temperature limit by 1.7°C for every 1V increase in supply: e.g. -40 to +100 @30V
<b>Storage temperature</b>	°C	-55 to +140
<b>Vibration</b>		BS EN 60068-2-64:1995 Sec 8.4 (31.4gn rms) 20 to 2000Hz Random
<b>Shock</b>		3m drop onto concrete and 2500g
<b>EMC Immunity level</b>		BS EN 61000-4-3:1999, to 100V/m, 80MHz to 1GHz and 1.4GHz to 2.7GHz (2004/108/EC)

<sup>†</sup> See Maximum Operating Temperature – Derating graph on page 30.  
If the maximum operating temperature is exceeded, the voltage regulator will shut down to protect the device from overheating

## OPTIONS

<b>Measurement range (angle)</b>		Select from 20° to 360° in 1° increments (factory programmed) for each output channel
<b>Output</b>		Analog voltage (An) or PWM (Pn)
<b>Output direction</b>		Both clockwise, both anticlockwise or one CW, one ACW
<b>Cable length</b>	m	0.2 or 0.5
<b>Connector</b>		Not fitted (C0) or Mini Sure Seal MSS4R fitted (C1)
<b>OEM options</b>		Outputs can be programmed to provide: non linear laws; switch outputs; clamp voltages; different output phasing CH1/CH2; faster input/output delay; extended analog range; and output mapping for potentiometer replacements.

## AVAILABILITY

All standard configurations can be supplied rapidly from the factory – check with your local supplier for more details

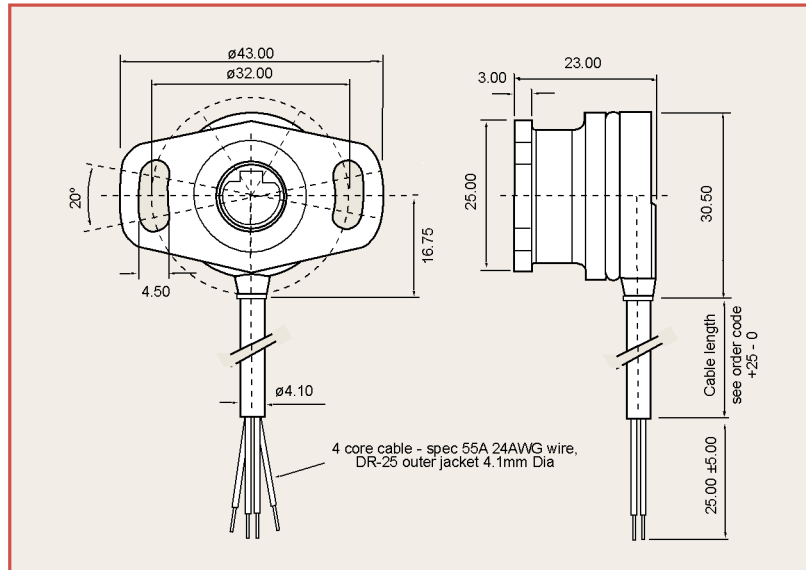
## ORDERING CODES

		<b>TPS280DP/...../...../...../...../...../.....</b>
Measurement range	CH1 = angle in °	_____
Measurement range	CH2 = angle in °	_____
Output	A1 = Analog 0.5-4.5Vdc A4 = Analog 0.1-4.9Vdc P1 = PWM, 244 Hz P2 = PWM, 500 Hz P3 = PWM, 1000 Hz	_____
Direction	3 = Both clockwise 4 = Both anticlockwise 5 = CH1 CW; CH2 ACW	_____
Cable length	P2 = 0.2m P5 = 0.5m	_____
Connector	C0 = No connector C1 = Mini Sure Seal MSS4R	_____

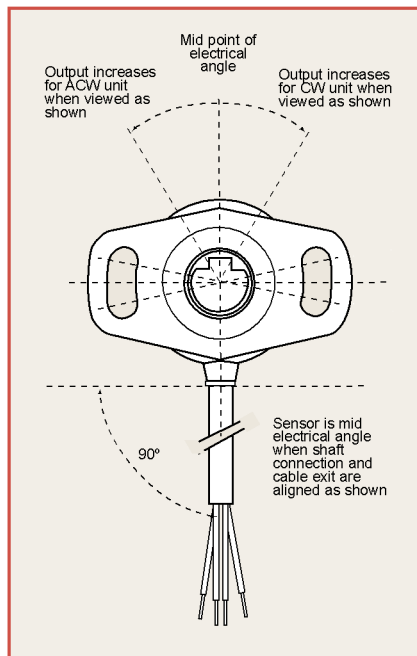
**Accessories** (order all items separately)  
Mating connector – X61-227-002 Mini Sure Seal MSS4P  
X61-227-201 PIN contact (2off required)  
X61-227-202 SOCKET contact (2off required)

## DIMENSIONS

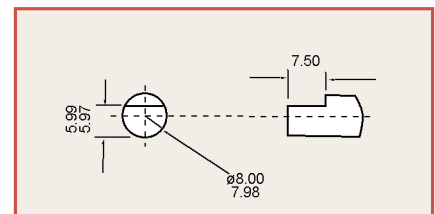
Note: drawings not to scale



## ELECTRICAL ANGLE



## RECOMMENDED MATING DRIVE



## ELECTRICAL CONNECTIONS

**Option C0** - 200 or 500mm of 4-core cable: FDR-25 sheathed, with 55A spec (24AWG) cores

**Option C1** - Mini sure seal MSS4R fitted to cable

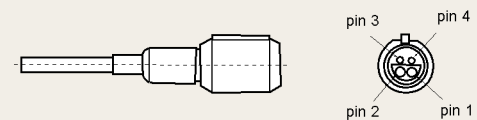
### Cable colour Description

Red	+V Supply
Black	0V Supply GND
Yellow	CH1 Output
White	CH2 Output

Output increases with CW or ACW rotation viewed on shaft drive - depending on selected order code

### C1 Connector option

Pin 1 = V+ Supply	Pin 3 = CH1 Output
Pin 2 = 0V Supply GND	Pin 4 = CH2 Output



When connecting the sensor, care should be taken with the correct connections. The sensor is provided with reverse polarity protection and short circuit protection between outputs (Yellow & White) to GND (Black), **but if the outputs (Yellow & White) are connected to the supply this will result in device failure.**