

# DSIC

## Digital Servo Inclinometer Single & Dual Axis

### Features

- resolution 0.001°
- total accuracy 0.08° over -20°C to +70°C
- mechanical shock 1,000g 0.5ms half sine
- industry-standard RS485 output
- 19-bit analog to digital conversion
- 9 to 18 or 18 to 36 Vdc unregulated supply options
- closed loop servo inclinometer sensing element
- dynamic filtering, allowing fast response with high vibration rejection
- built-in temperature sensing and active compensation
- user-configurable output bandwidth
- wide range of bus speeds supported
- non-volatile configuration memory



### DSIC

The DSIC utilizes a servo-inclinometer element to sense inclination to a very high accuracy with almost zero hysteresis. Internal temperature and linearity compensation is programmed into the DSI during calibration. This ensures that the output is never outside a 0.08° error margin from true input angle, at any temperature and any angle within its compensated range.

### Frequency Response

#### Analog Filter

A low pass filter with a -3dB cut-off frequency at 20Hz ensures a -40dB/decade attenuation. The DSI additionally includes a programmable lowpass dynamic filter to remove unwanted noise and vibration from the inclination input.

#### Measurement Update Rate

The internal sampling rate is 4.8kHz. These samples are block averaged to produce the required measurement update rate. By reducing the update rate, any signal noise can also be significantly reduced. The default measurement update rate is 10Hz, but may be configured by the user to suit the application.

#### Dynamic Filter

A common problem associated with lowpass filters for signal conditioning is the filter's effect on the step response. Because lowering the cutoff frequency slows the step response, the system may fail to recognize significant changes within a reasonable amount of time. The dynamic filter of the DSI accommodates lower cutoff frequencies for vibration rejection, without sacrificing the step-response time.

A window comparator monitors the difference between the filter's input and output. When the difference exceeds a pre-set threshold, the filter increases its slew rate by setting the filter's output equal to its input. The default setting of this threshold is 0.1% of full range output, but this can be configured or removed by the user to suit the application.

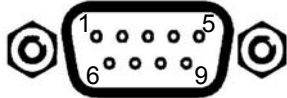
Within this threshold, the output is passed through a digital lowpass recursive filter to remove noise and low-level vibration. The -3dB frequency is determined by the measurement update rate divided by the number of steps of recursion. The default setting for this filter is 0.5Hz, but may be configured or removed by the user to suit the application.

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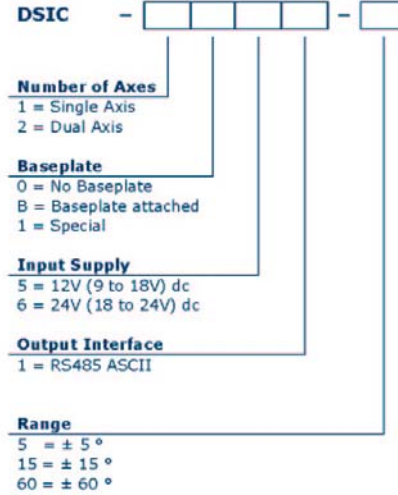
## Electrical Connections

Connection to the DSI is via a 9-way D-type male connector, sealed to IP65.



PIN	RS485
1	+supply
2	-supply
3	DATA+
4	DATA-
5	DATA GND
6	N/C
7	N/C
8	N/C
9	N/C

## Part Numbering



## Specifications

Performance		
Angular range		±5°, ±15°, ±60°
Resolution		0.001°
Accuracy		0.08° Note 1
Cross-axis sensitivity		0.2% of equivalent sensitive axis output
Repeatability		0.008° Note 2
Response		20Hz maximum
Environmental		
Temperature range :	compensated	-20°C to +70°C
	operable	-40°C to +80°C
Mechanical shock survival		1,000g 0.5ms half sine
Sealing		IP65
EMC		
Emmissions		EN 55022: 2006
Immunity		EN 61000-4-3: 2002
		EN 61000-4-4: 2004
		EN 61000-4-8: 1994
		EN 61000-4-2: 1996
Output		
Representation		sine of angle
Measurement update rate		1, 2, 5, 10, 20, 50, 60, or 100 readings per second
Communication	RS485	ASCII
Bus speeds	RS485	2400, 4800, 9600, 19k2, 38k4, 57k6, 76k8, 115k2, or 230k4 bits per second
Electrical		
Supply voltage		9 to 18 or 18 to 36 Volts
Power		950 mW (max.)
Physical		
Dimensions (L×W×H)		65 × 65 × 45 mm
Weight		400 g (nom.)

Notes	
1	This is the absolute error of the DSI combining linearity, calibration uncertainties, and all thermal offset and sensitivity errors over the compensated temperature and measurement ranges.
2	Maximum deviation over 50 calibrations at constant ambient temperature.