TS-91V1 & TS-91V5

ASC MEMS Capacitive Tilt Sensors (Uniaxial)

- *Uniaxial / Biaxial*
- *4 / 8 Wire System*
- *Anodised Aluminium Housing*
- *Stainless Steel Housing*
- *Protection Class IP67 / IP68*
- *Made in Germany*

ASC TS-91V1-090 (Uniaxial)

ASC TS-92V5-090 (Biaxial)

Features

- *Range: ±15°, ±90°*
- *DC Response*
- *High Resolution*
- *Low Temperature Coefficient of Bias*
- *Excellent Long-Term Bias Stability*
- *Wide Temperature Range*
- *High Shock Limit*

Options

- *Customised Cable Length*
- *Customised Connector*
- *4-20mA Current Output*

Applications

- *Crane Safety Systems*
- *Building Construction Machines*
- *Solar Array Tracking Systems*
- *Ship's Navigation Posture Measurement*
- *Flap Bridge Monitoring*
- *Track Alignment & Maintenance*
- *Wheel Alignment*
- *Truck Chassis Levelling*
- *Machine Tool Angle Positioning*

Tilt Sensors

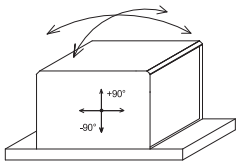
MEMS capacitive accelerometers measure both static and dynamic accelerations. Tilt is a static measurement where earth's gravity is the acceleration being measured. The change in degrees of tilt corresponds to a change in acceleration due to a changing component of gravity that acts on the accelerometer. Low-g accelerometers with high sensitivity result in the highest degree of resolution of a tilt measurement. For a tilt from -90° to +90°, the ASC MEMS capacitive accelerometer experiences acceleration from -1g to +1g. The analog output from the tilt sensor (V_{out}) can be converted to the degree of tilt (Ø) using the following equation:

$$Ø = \arcsin((V_{out} - Offset) / Sensitivity)$$

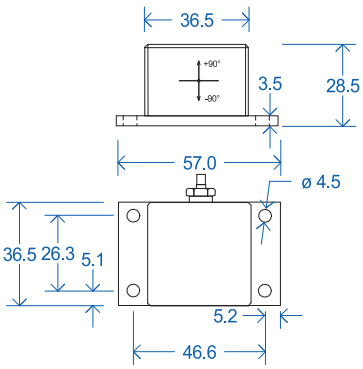
ASC's tilt sensors yield a nominal full scale output of ±2V for an acceleration of ±1g, which corresponds to a tilt of ±90°. The nominal bias or offset (output at 0g or 0°) is < ±10mV (< ±0.29°) and the output swing is from -2V to +2V with a linear response in the range < ±15°.

Description

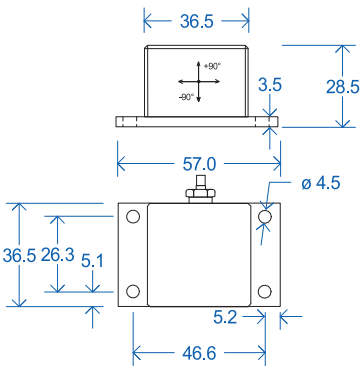
ASC's tilt sensors TS-9XVY, feature an analog voltage output and are available in two versions, uniaxial and biaxial. Biaxial tilt sensors contain two independent MEMS sensors oriented at 90° to each other to allow perpendicular tilt measurement. ASC's tilt sensors feature either a light-weight anodized aluminium housing, which provides case isolation against ground loops or a robust stainless steel housing, which has an IP68 rating. The sensor sensitivity and bias is extremely stable over a wide temperature range from -40°C to +120°C. The sensors can be powered using a 6-36 VDC supply, where the output is independent of the supply. ASC's tilt sensors can withstand shocks as 5000g and feature an aluminium housing (78g) or stainless steel housing (192g) with an integral cable. The sensors can be configured with a 4-20 mA current output as an option, by a temperature range from -20 to +70°C.



Uniaxial (TS-91VY)



Biaxial (92VY)



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TS-91V1 & TS-91V5

ASC MEMS Capacitive Tilt Sensors (Uniaxial)

ASC TILT SENSOR:	UNIAXIAL TS-91V1 (ALUMINIUM) TS-91V5 (STAINLESS STEEL)	BIAXIAL TS-92V1 (ALUMINIUM) TS-92V5 (STAINLESS STEEL)

DYNAMIC		
Angular range	°	±15;±90
Acceleration range	g	±1
Resolution	°	0.005
Non-linearity	%	1
Shock limit	gpk	Operational: 5000 (0.1 ms; half-sine)
Recovery time	ms	1

ELECTRICAL		
Excitation voltage	V DC	+6 to +36
Current consumption (per axis)	mA	2
Offset (Bias at 0°)	°	<±0.3
Isolation		Case Isolated
Spectral noise	°/√Hz	0.001

ENVIRONMENTAL			
Temperature coefficient of sensitivity	%/°C	0.03	
Temperature coefficient of bias	°/°C	0.02	
Long-term bias stability (one year)	°	0.1	
Operating temperature (Voltage)	°C	-40 to +120	
Storage temperature (Voltage)	°C	-40 to +125	
Protection Class		TS-91V1 & TS-92V1: IP67	TS-91V5 & TS-92V5: IP68

PHYSICAL		
Sensing element		MEMS Capacitive
Case material		Anodised Aluminium Stainless Steel
Connector		Cable gland
Mounting		Adhesive/Screw holes
Weight (excl. cable)	gram	TS-91V1 & TS-92V1 (Aluminium Housing): 78 TS-91V5 & TS-92V5 (Stainless Steel Housing): 192
Integral cable		12-wire high-temperature PUR cable (AWG 30) Outer diameter: 4.2 mm ±0.3 mm ; #14077
		12-wire FEP cable (AWG 30) Outer diameter: 3.6 mm ±0.15 mm; #15344

Note: All values are typical at +25°C, unless otherwise specified

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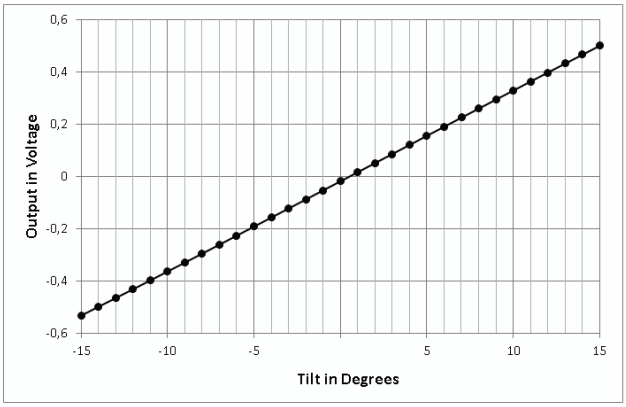
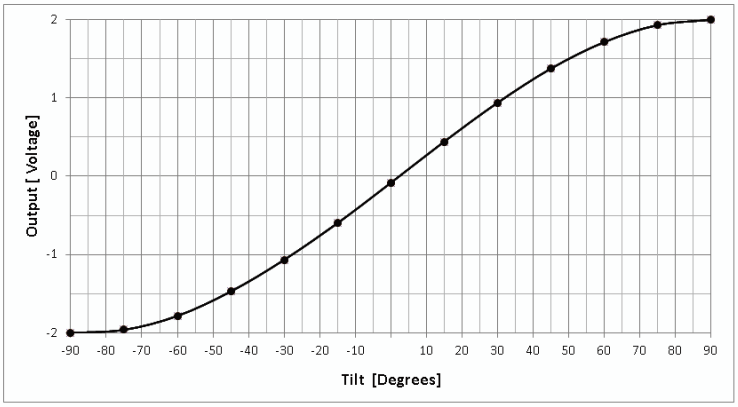
CALIBRATION

The tilt sensor can be delivered with or without factory calibrations.
A calibration certificate from a DAkkS certified (Deutsche Akkreditierungsstelle, DAkkS, to DIN EN ISO/IEC 17025) can also be provided upon request.

ASC TS 91V1-015 Typical Response



ASC TS 91V1-090 Typical Response



CABLE CODE / PIN CONFIGURATION

		X-Axis	*Y-Axis*
Uniaxial, 4-wire			*Red: Supply +*
			Black: Supply - (GND)
			Green: Signal +
			White: Signal -
Biaxial, 8-wire		*Red: Supply +*	*Red/Violet: Supply +*
		Black: Supply -	*Black/Violet: Supply - (GND)*
		Green: Signal +	*Green/Violet: Signal +*
		White: Signal -	*White/Violet: Signal -*

ORDERING INFORMATION

ASC TS	9XV	Y	090	6A	5V
ASC Tilt Sensor	X: 1 (uniaxial)	Y: 1 (aluminium); IP67	Range:90	6m cable	5V power
	X: 2 (biaxial)	Y: 5 (stainless steel); IP68	Range:15	open-ended	supply 5 VDC
	V: Voltage Output			(standard)	(option)
	C: Current				

Example: ASC TS-91V5-090-6A

QUALITY

1) ASC is ISO 9001:2015 certified

2) The Deutsche Akkreditierungsstelle GmbH (DAkkS) has awarded to our calibration laboratory the DIN EN ISO/IEC 17025:2005 accreditation for calibrations and has confirmed our competence to perform calibrations in the field of mechanical acceleration measurements.