



ASC TS-91V1, TS-91V5 (UNIAXIAL)

ASC MEMS Capacitive Tilt Sensors

SPECIFICATIONS

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

FEATURES

- Range: $\pm 15^\circ$, $\pm 90^\circ$
- 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



ASC TS-91V1-090 (Uniaxial)



ASC TS-92V5-090 (Biaxial)



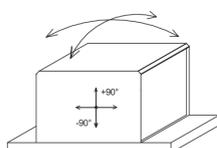
TILT SENSORS

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 $+90^\circ$, 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 (θ) using the following equation: $\theta = \arcsin((V_{out} - \text{Offset}) / \text{Sensitivity})$

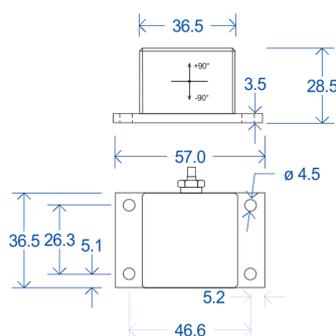
ASC's tilt sensors yield a nominal full scale output of $\pm 2V$ for an acceleration of $\pm 1g$, which corresponds to a tilt of $\pm 90^\circ$. The nominal bias or offset (output at $0g$ or 0°) is $< \pm 10mV$ ($< \pm 0.29^\circ$) and the output swing is from $-2V$ to $+2V$ with a linear response in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

DESCRIPTION

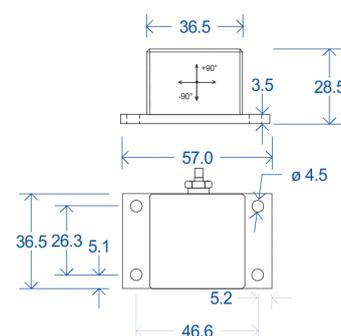
ASC's tilt sensors TS-9XVY, feature an analog voltage output and are available in two versions, uniaxial and biaxial. Biaxial tilt sensors contain two independent MEMS sensors oriented at 90° to each other to allow perpendicular tilt measurement. ASC's tilt sensors feature either a light-weight anodized 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 $-40^\circ C$ to $+120^\circ C$. 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 $+70^\circ C$.



Uniaxial (TS-91VY)



Biaxial (92VY)





TYPICAL SPECIFICATIONS

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

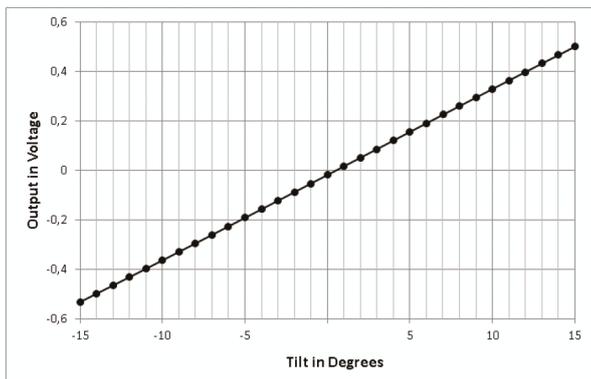


CALIBRATION

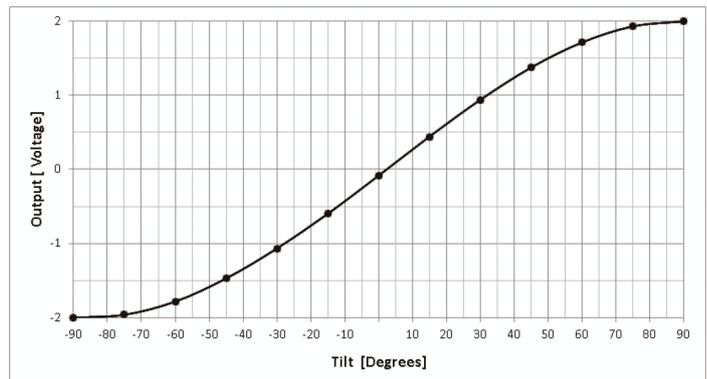
The tilt sensor can be delivered with or without factory calibrations.

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