

ShapeArray SAAScan

Description

Designed to be used, moved, and re-used as quickly as possible, SAAScan is ideal for applications where borehole shape must be measured repeatedly—jet grouting and borehole drilling, for example. SAAScan’s robust and durable construction combines twist-resistant joints and thick-walled stainless steel segments. The construction contains a compact array of MEMS gravity sensors.

SAAScan saves time and money. It is a reel-based system enabling the measurement of hundreds of holes. A unique extension hose and cable terminator allows SAAScan to remain anchored on the reel while the rest of the array length is installed to collect accurate real-time data.

SAAScan’s segment length is 500 mm. SAAScan can be manufactured to a standard length of up to 50 m. Contact Measurand to inquire about custom lengths. All ShapeArrays™ are manufactured in an ISO 9001 certified facility.

PHYSICAL PROPERTIES

ITEM	SPECIFICATION
SEGMENT LENGTH	500 mm joint centre to joint centre
STANDARD LENGTH OF SAASCAN	Up to 50 m
CUSTOM LENGTH OF SAASCAN	Over standard length, contact Measurand for details*
LENGTH OF FAR TIP EYEBOLT	32 mm
LENGTH OF UNSENSORIZED NEAR CABLE END SEGMENT	Standard 8.2 m (includes: 330 mm Cable Terminator Segment and 7.9 m Hydraulic Hose)
LENGTH OF COMMUNICATION CABLE	Standard 15 m, (extending past the extension hose and cable terminator)
MAXIMUM DIAMETER	23 MM
WEIGHT	1.0 kg/m
OPERATING TEMPERATURE	-40°C to 60°C
WATERPROOF TO	2000 kPa (200 m Water)
MAXIMUM TENSILE RESISTANCE	550 kgf
MAXIMUM JOINT BEND ANGLES	70°
POWER REQUIREMENTS	12 VDC at 1.8 mA/segment

ELASTIC TWIST TOLERANCE

ITEM	SPECIFICATION
MAXIMUM TORQUE FOR ELASTIC RETURN ¹	2.0 N-m per joint
TWIST TOLERANCE ¹	0.5° per joint
ACCURACY OF RETURN FOR ELASTIC TWIST ¹	±0.01° per joint

STATIC SHAPE MEASUREMENTS

ITEM	SPECIFICATION
ANGULAR RANGE OF MEMS SENSORS	$\pm 360^\circ$ (software selection required for 2D/3D modes)
RANGE OF 3D MODE (VERTICAL)	$\pm 60^\circ$ with respect to vertical (SAAScanner alert at $\pm 70^\circ$ w.r.t. vertical)
RANGE OF 2D MODE (HORIZONTAL)	$\pm 60^\circ$ with respect to horizontal
RANGE OF 2D MODE (MIXED H/V)	$\pm 180^\circ$ with respect to horizontal
ACCURACY OF ABSOLUTE SHAPE ^{1,2,4,5}	± 10 mm for 30 m SAAScanner
RESOLUTION	0.00067° (0.012 mm/m)
ACCURACY OF TILT/SEGMENT WITHIN 20° OF VERTICAL ^{2,4,5}	± 0.0005 rad = 0.029°
SYSTEM PRECISION ^{3,4,5}	± 0.5 mm for 30 m SAAScanner
SEGMENT PRECISION ⁶	$\pm 0.0005^\circ$ (0.01 mm/m) (68% confidence interval) $\pm 0.0050^\circ$ (0.09 mm/m) (99.7% confidence interval)
SENSOR 24H STABILITY ⁷	± 0.01 mm/m (68% confidence interval) ± 0.03 mm/m (99% confidence interval)
AZIMUTH ERROR IN JOINTS	$< \pm 0.01^\circ$

¹ Measured at 20°C , with X-Mark facing a consistent direction. ² Long term measurement value based on field measurements of vertical arrays > 1 year of operation. ³ Short-term measurement ≈ 24 h. ⁴ Value based on Average in Array (AIA) setting of 1000 samples. ⁵ Specification is for 3D mode within $\pm 15^\circ$ of vertical. Vertical accuracy degrades with angular deviation from the vertical. ⁶ Sample size for segment precision is 540,000 readings. Data was collected for 3 different positions within $\pm 10^\circ$ of the X, Y, and Z axes. Figures provided fall within 99.7% confidence interval (3-sigma value). ⁷ 24 h stability is the maximum change in the sensor readings in a 24 h period for an instrument installed in repeatability conditions. Sample size is 7,200 samples for each 24 h period reviewed. * Caution: Long SAAScanners are heavy and winches would be involved in installing them.

SPECIFICATIONS