



SAASCAN

Model 004

ShapeArray™ is patented technology.

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.

The SAAScan can be used in vertical or horizontal installations. It can be used to measure 3D shape within 60° of vertical as x, y, z displacements and tilt angles. Near horizontal shapes are measured as 2D projections in a vertical plane. The x, y, and z tilts due to gravity are measured in each segment. As with all ShapeArray models, the temperature is measured in each segment. An unsensorized section is attached at the top of the SAAScan and includes a cable terminator and extension hose. The cable terminator is meant to remain attached to the reel in order to help with determining the azimuth of the instrument, and to help properly align the SAAScan during reeling and unreeling without applying lateral force.

All ShapeArray instruments are manufactured in a high-capacity ISO 9001:2015 certified facility.

SPECIFICATIONS



PHYSICAL PROPERTIES

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

SPECIFICATIONS



ELASTIC TWIST TOLERANCE

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

ANGULAR RANGE OF MEMS SENSORS	± 360° (software selection required for 2D/3D modes)
RANGE OF 3D MODE (VERTICAL)	± 60° with respect to vertical (SAAScanner alert at ±70° w.r.t. vertical)
RANGE OF 2D MODE (HORIZONTAL)	± 60° with respect to horizontal
RANGE OF 2D MODE (MIXED H/V)	± 180° with respect to horizontal
ACCURACY OF ABSOLUTE SHAPE ^{1,2,4,5}	± 10 mm for 30 m SAAScan
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 SAAScan
SEGMENT PRECISION ⁶	± 0.0005° (0.01 mm/m) (68% confidence interval) ± 0.0050° (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	< ±0.01°

NOTES



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 \leq 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 SAAScans are heavy and winches would be involved in installing them.

PATENT INFORMATION

ShapeArray is patented technology.

Measurand's patents include, but are not limited to:

Shape-Acceleration Measurement Device and Method, Canadian Patent 2,472,421 & 2,747,236

Shape-Acceleration Measurement Device and Apparatus, US Patent 7,296,363

Cyclical Sensor Array, Canadian Application 2,815,199 & 2,911,178

Bipartite Sensor Array, Canadian Application 2,815,195 & 2,911,175

ShapeArray patents include coverage in: United States, Canada, France, United Kingdom, Italy, Japan and Germany.

Installation patents include coverage in United States, Canada, France, United Kingdom, Italy, Germany, China, Hong Kong, and Korea.

Patent families are sufficiently broad to capture most or all usage of ShapeArray in longer lists of countries.

NOTES



Minimum Capped SAA Length (A to B) = Min Cable Bend Radius + Unsensorized Length + Sensorized Length + Eyebolt

Standard Unsensitized Length = 8.2 m

Sensitized Length = "Near (Cable) End" Sensorized Segment through "Far (Tip) End" Sensorized Segment

PVC conduit End Cap and Install Kit Top Stack require additional depth

Sensitized length tolerance within 1% of total length.

