ShapeAccelArray (SAAX) Model 001

SAAX is a ShapeArray with 1000 mm long segments, designed for use where cost reduction is important.

The waterproof construction includes robust joints of hydraulic hose connecting stainless steel tubes. Plated steel fittings are used. SAAX is for use where curvatures are modest and/or casing is large enough to prevent bending of the longer segments. Spatial detail will of course be more limited than with shorter segments. Applications include settlement, rail line, and pipeline monitoring (contact Measurand for installation details). SAAX has the same internal sensing and electronics as Model 3 SAAF or SAAScan.

Related products: SAA Field Power Unit

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SPECIFICATIONS

PHYSICAL PROPERTIES	
Segment Length	1000 mm joint centre to joint centre
Length of Far Tip Eyebolt	32 mm
Length of Unsensorized Near Cable End (See Diagram Below)	Standard 1.7 m (includes: 260 mm Cable Terminator Segment and 1500 mm PEX, less 60 mm overlap)
Length of Communication Cable	Standard 15 m, (13.5 m extending past the PEX tubing)
Maximum Diameter	23 mm
Maximum Standard Sensorized Length[1]	100 m
Maximum Custom Sensorized Length[1]	Over 100 m6 (Contact Measurand for details)
Weight	1.0 kg/m
Operating Temperature	-40°C to 60°C
Waterproof to[2]	2000 kPa (200 m Water)
Maximum Tensile Resistance	550 kgf
Maximum Joint Bend Angles	70°
Power Requirements	12 VDC at 4.2 mA/segment
ELASTIC TWIST TOLERANCE	
Maximum Torque for Elastic Return[3]	2.0 N-m per joint
Twist Tolerance[3]	0.5° per joint
Accuracy of Return for Elastic Twist[3]	±0.01° per joint
DYNAMIC ACCELERATION MEASUREMENTS	
Range	± 1.7 G
3dB Bandwidth	50 Hz
Noise Floor of MEMS	110 μG/Hz0.5
Data Rate	SAA232: 38.4 kbps to 230.4 kbps

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STATIC SHAPE MEASUREMENTS	
Angular Range of Mems Sensors	± 360° (software selection required for 2D/3D modes)
Range of 2D Mode (Horizontal)	± 60° with respect to horizontal
Range of 2D Mode (Mixed H/V)	± 180° with respect to horizontal
Accuracy of Deformation Relative to Starting Shape[4,5,6]	± 1.5 mm for 32 m SAAX
Accuracy of Absolute Shape[3,4,5,6]	± 10 mm for 32 m SAAX
Resolution[5,6,7]	± 0.5 mm for 32 m SAAX
Azimuth Error in Joints	< ±0.01°
Long-Term Reliability MTBF[8]	38 years for 32 m SAAX

NOTES

[1] Caution: Long SAAX1000s (>50 m) are heavy. Future installations will require use of winches and support cables.2 Long term measurement value based on field measurements of vertical arrays > 1 year of operation.

[2] Use in salt water or other difficult water chemistries is recommended only inside a watertight casing, as galvanic corrosion will occur due to the plated steel hydraulic hose fittings. Contact Measurand for advice.

[3] Measured at 20°C, with X mark facing a consistent direction.

[4] Long term measurement value based on field measurements of vertical arrays > 1 year of operation.

[5] Value based on averaging 1000 frames per reading.

[7] Short-term measurement ≤ 24 h.

[8] Conservatively based on longevity data for electronic components used in ShapeArray, a) assuming total system failure if any single component fails, b) system powered on 100% of the time, c) ambient 6 deg C, d) internal temperature rise of 8 deg C above ambient due to 100% powered-on duty, and e) a benign ambient environment typical of geotechnical instrumentation. MTBF will increase for more typical duty cycles (not powered on 100% of the time). At higher temperatures, MTBF will decrease (e.g. by ~half at 52 deg C). MTBF is based on "MIL- HDBK-217F Notice 2" performed by, ALD/SoHaR.

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NOTES

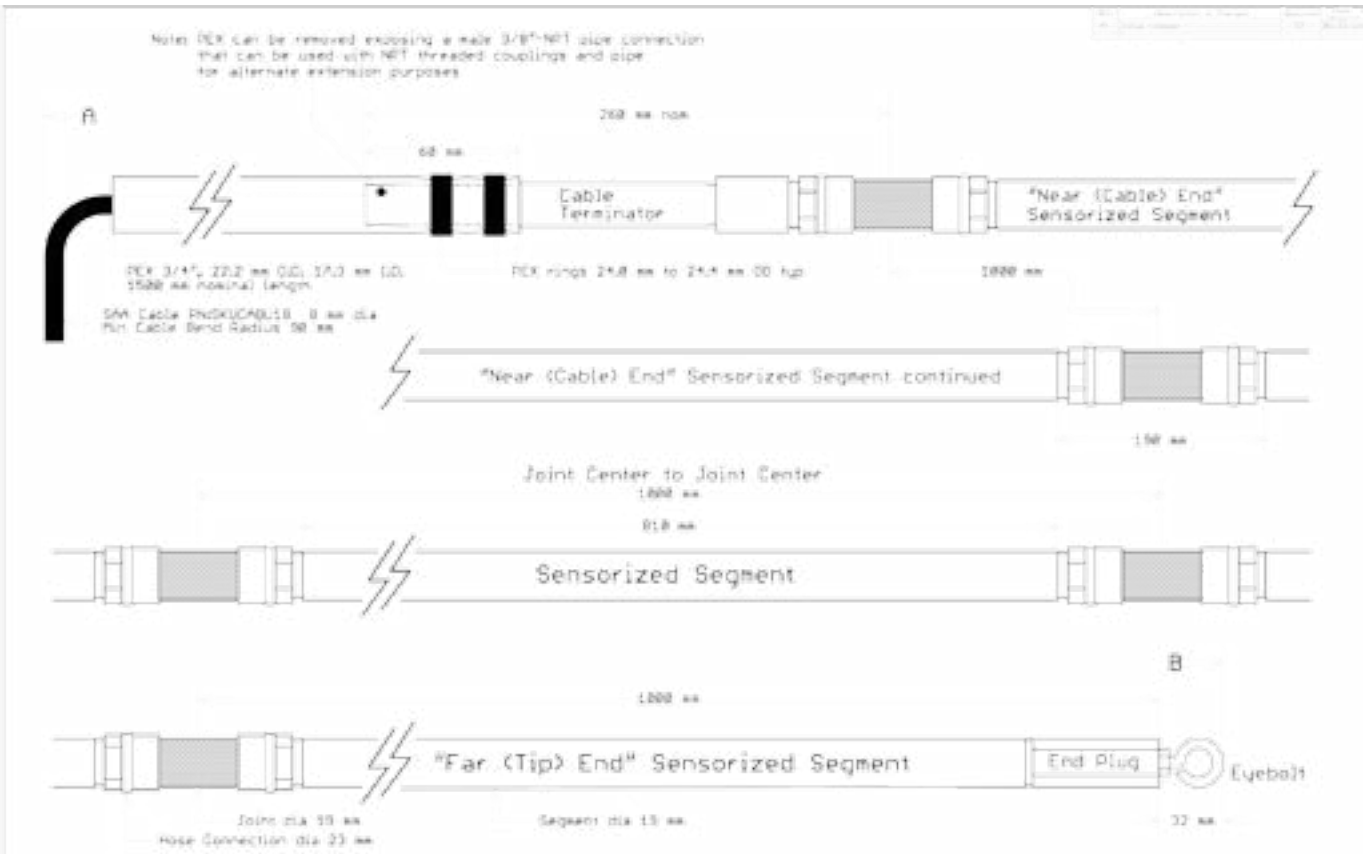
Minimum Capped ShapeArray Length (A to B) = Min Cable Bend Radius + Unsensorized Length + Sensorized Length + Eyebolt

Standard Unsensorized Length = 8.2 m

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

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

Standard tolerance on measurements +/- 2 mm unless stated



Note: HMA Geotechnical is continually improving its products and processes, information contained within this brochure is subject to change without notice

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