



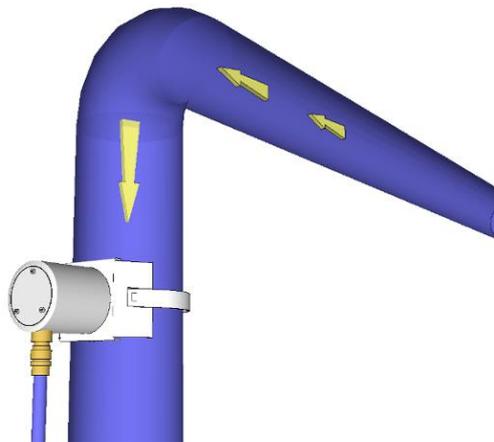
I-ART Sand Monitoring



SMS provides sand monitoring using best in class, field proven technology. After extensive testing of acoustic monitoring systems, we identified the instrumentation to give our clients the edge they require.

Acoustic System Overview

SMS supply single, dual, and quad sensor instrumentation system options. Custom configurations are available on request. SMS combination of unparalleled sand services field experience combined with our class leading acoustic detection system offers the best acoustic sand monitoring package on today's market.



Features

High Sensitivity

- Instantaneous response to sand production

Ideal Solution for HP/HT Applications

- Provides early identification of sand productions

Ease of Installation – Non-Intrusive

- Mounted externally on a pipework

Data Storage and Communication Standards

- Up to 9-90 days in flash memory
- Two wire RS485, Modbus RTU, baud rate configurable

Benefits

Increased Safety

- Early identification of sanding events allowing informed decisions to be made

Reduced Costs

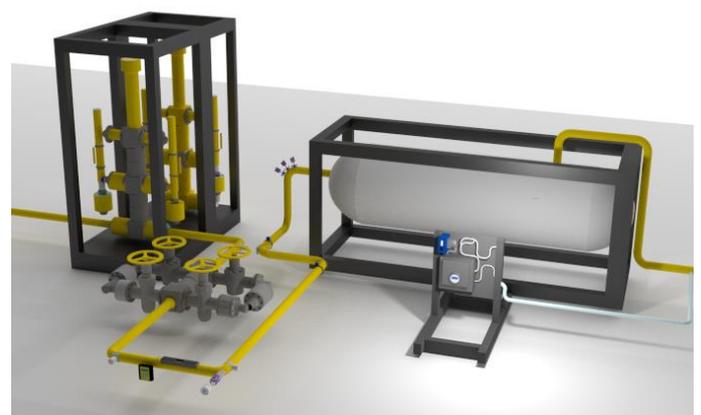
- Minimal maintenance required

Repeatable and Reliable

- Reliable method of tracking sand production

Remote Monitoring

- SMS engineers can monitor equipment remotely when required



Sense



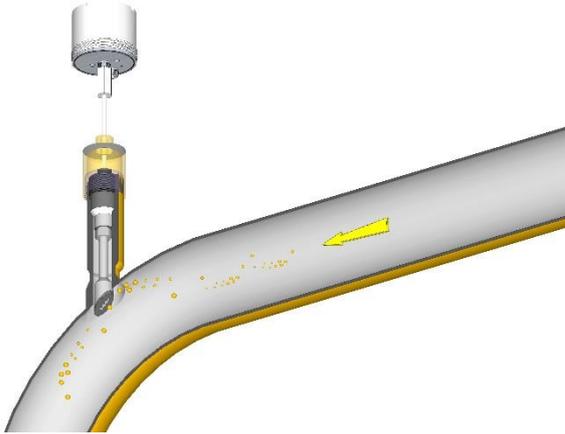
Understand



Perform

Intrusive System Overview

For Well Service applications SMS supply standard 4" spools c/w 3" 1502 hammer unions & access fitting rated to 414 Bar (6,000PSI). Spools can be custom fabricated to client specifications when required. For high pressure environments a 689 Bar (10,000PSI) rated intrusive probe can be supplied. Single, dual or triple acoustic sensor instrumentation can be integrated into the I-ART system.



Features

Flush Mount Intrusive

- Design is used to reduce wake frequency and flow turbulence issues

Smart Data Acquisition Instantaneous

- High sensitivity response to sand production and Logging metal loss every minute

Industry Standard – Data Communication

- Serial data linked based on industry standard Modbus protocol

Integrated Smart Data

- SMART software allows Integrated smart data interpretation

Benefits

Increased Safety

- Double isolation barrier design to eliminate risk of hydrocarbon leaks

Reduced Costs

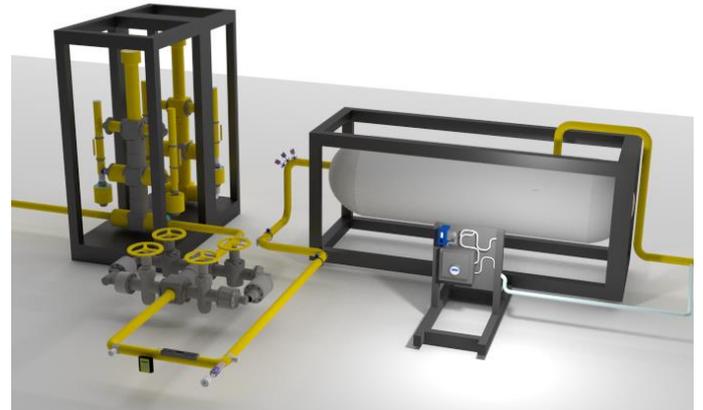
- Increased reliability while achieving cost saving considerably

Real-Time Erosion Measurement

- Informs Real-Time decision making, risk assessment allowing increased reliability and safe operations

Remote Monitoring

- Save on manpower and offshore bed space



Specifications – Acoustic Sand Monitoring

Functional Characteristics

Particle detection limit.....	15-25µm varies with flow regime, velocity, viscosity etc
Output.....	grams/second (g/s)
Pipe Dimension.....	≥2"
Uncertainty.....	Down to +/- 5%, depending on flow regimes and calibration level. Can be configured as a sand indicator, indicating whether there is no sand, some sand or excessive sand production or fully calibrated for accurate sand rate
Flow Velocity.....	Min. 1m/s for most flow regimes

Detector Unit

Power Consumption.....	Max. 0.6W
Supply Voltage.....	11-18VDC (supplied with 24VDC via safety barrier)
Ex Classification.....	EEx ia IIB T5
Location.....	Hazardous area, Zone 0, 1 or 2
ATEX Certification.....	NEMKO 02 ATEX 110
CSA US Ex. Certification.....	Certificate of Conformance 1299771
Pipe Surface Temp. Range.....	-40°C to + 290°C (with high temperature housing)
Ambient Temp. Range.....	-40°C to + 80°C
Weight.....	3.0kg
Dimensions.....	88mm x 100mm
Ingress Protection.....	IP67
Installation.....	Banded onto pipe
Material.....	Stainless Steel 316
Communication.....	Proprietary serial SW protocol overlaid on power cable
Power Consumption.....	Max. 0.6W

Field Cables

Cable Type.....	Screened twisted pair ≥ 0.75 mm ² (power & data on single pair)
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Portable Interface Unit

Installation.....	CIU / PSU / Safety barrier supplied in complete Portable Interface Unit with field cable connections terminated with Harting connectors and an RS 232 serial interface provided for laptop communication
Voltage.....	Input 110 VAC – 240VAC Output 11-18 VDC (supplied with 24VDC via safety barrier)
Weight.....	5 kg
Power Consumption.....	2W
Supply Voltage.....	24VDC +/- 5%
Process Bus (COM 2).....	Two wire RS485, Modbus RTU, baud rate configurable, continuous, real time data transmission
Process Bus (COM 1).....	Two wire RS485, or 3 wire RS232, Modbus RTU, baud rate configurable
Data Storage.....	Both data and configuration parameters are stored in Flash memory. No loss of data due to power loss. Data can be stored for up to 90 days with 10 second averaging. Data is uploaded via Modbus link
Location.....	Safe area (within Portable System CIU housing)

Safety Barriers

Type.....	MTL 7087+
Ex classification.....	EEx ia IIC T6
Ex Certification.....	BAS No. Ex 95C2261
Location.....	Safe area (within Portable Interface Unit)

Specifications – Intrusive Sand Monitoring System

Functional Characteristics

Output: Metal Loss: m, mm, mils

Erosion Rate:m/yr, mm/yr, mils/yr

Sand Probe

Model:..... S4700 Angle Head (Standard*)

Classification:NACE standard MR0175

Installation: Installed in flow line / spool assembly through access fitting

Probe Material: 316L Stainless steel body c/w PPS (Polyphenylene Sulphide) potting compound

Probe Element: F20 Hasteloy element (254m / 20 mil thickness) (Standard*)

Max. Temp Rating:260C / 500F

Max. Pressure Rating: 689Bar / 10000PSI (for high pressure version) *Probe options on client request

Transmitter Unit

Transmitter:..... Model ST-9485A

Voltage:24 VDC

Current Consumption: 17mA @ 24 VDC

Ex Classification: EEx d IIC T6

Location: Hazardous Area, Zone 1 or 2

ATEX Classification: DEMKO 03 ATEX 0215219

Ambient Temp. Range: -40C to +70C (-40F to 158F)

Weight: 1.6kg (3.5lbs)

Dimensions: 115mm (4.5") Diameter X 108mm (4.25") High

Ingress Protection: IP 66

Installation: Direct to probe through connector assembly

Resolution: 18 Bit/256 times higher than standard ER probes

Field Cables

Cable Type: Individually screened two pair cable 16 – 22 SWG wire dependent on cable length

Portable Interface Unit

IIU 19" rack assembly c/w Intelligent Interface Unit – embedded pc, power supply, repeaters and converters for two channel multi-drop acquisition. Provides data and configuration parameter storage and back up. Data can be uploaded via LAN, USB, serial and modem connections. Each channel is capable of monitoring up to thirty-two (32) locations simultaneously through proprietary software. Two channels for system redundancy

MK9300 Armour case data acquisition system for rugged applications. MK 9300 system c/w power, repeaters and converters for two channel multi-drop acquisition. Supplied laptop runs proprietary software for real time erosion monitoring. Two channels for system redundancy

Voltage: Input 110 VAC – 240VAC Output 24 VDC

Weight: IIU 12kg, MK9300 15kg, IIU 48cm (19") x 46cm (18") x 18cm (7") MK9300 49cm (19.5") x 39cm (15.5") x 19 cm (7.5")

Dimensions: RS 485 two wire, 2400 Baud Rate, 8 data bits, 1 stop bit, no parity

Communication: Proprietary serial communication protocol based on Modbus RTU and OPC Server/Client

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