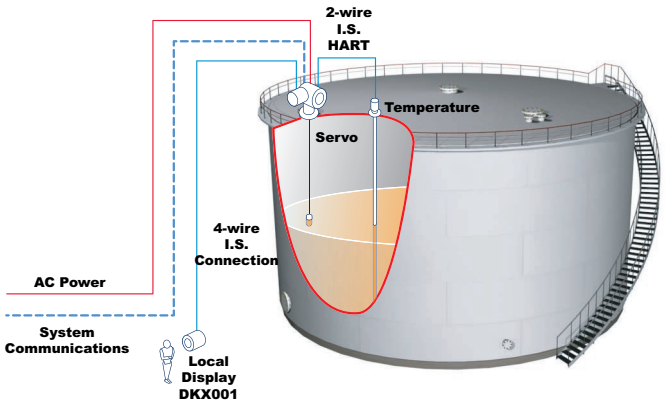
NMS81 Proservo Tank Gauge

Intelligent servo tank gauge with high accuracy liquid level measurement in storage and process applications for tank inventory management, inventory control, custody transfer, loss control, total cost saving, and safe operation.

Highlights

- Interfaces to FuelsManager via the 8810 Remote Terminal Unit
- Measures liquid to an accuracy of +/- 0.4 mm (0.016 in)
- Measures two interface levels and density of up to three liquid phases
- Profiling of liquid density of up to 50 points throughout the tank (tank profile) and upper layer (I/F profile)
- Wetted parts are completely separated from the electronic circuit
- Tank top mounting with ASME 3"/4"/6"/8" 150lb or 300lb flange, or DN80 PN10 or D80 PN25 flange
- Wide range of output signals, including Sakura V1, RS-485 (MODBUS), and HART protocol
- FM, ATEX, IEC Ex, and NEPSI approved for use in hazardous areas
- OIML, NMi, and PTB approved for custody transfer applications
- SIL2 certified (Min, Max, Continuous level)
- Material and pressure rating of the wetted parts can be selected
- Suitable for atmospheric and high pressure applications up to 362 psi (25 bar/2.5 MPa)



Example Tank Gauging System

Application

The NMS81 Proservo is an intelligent tank gauge for high accuracy liquid level measurement employing the latest microprocessor technology. In addition to level measurement, the NMS81 Servo can determine the interfaces between three liquids, specific gravity of these liquids, and tank bottom. To enable accurate volume calculation, the NMS81 Servo will accept an input from either an average temperature probe 453x ATC series of temperature devices (via twisted pair cables, HART protocol) or via spot temperature element (via 3-wire Pt. 100 RTD signal). Once installed, all calibration and operating functions can be made via both:

- Local display; operation via the local display is possible without opening the device
- Configuration software (e.g., DeviceCare) connected via HART and the service port (CDI)

Tank side monitoring and operation can be performed by the remote display and operating module DKX001.

Measuring Principle

The NMS81 Proservo Tank Gauge operates on the principle of displacement measurement. A small displacer on a measuring wire is unwound from a drum and accurately positioned in the liquid medium using a servo motor. The weight of the displacer is precisely balanced against a magnetic coupling. As the level rises and falls the position of the displacer is automatically adjusted by the motor.

Technical Specifications

Physical

Net weight	30kg (66.1 lb)
Enclosure Materials	• Electrical compartment: aluminium • Drum chamber: 316/316L • Rated IP66/68, NEMA Type 4x/6P enclosure
Flange Type	ASME or DIN. Refer to order code for full selection
Wire Material	• 28 m (93.33 ft), 36 m (120 ft), 47 m (154.2 ft), and 55 m (180.5 ft): 316L • 16 m (53.33 ft): PFA > 316L • 22 m (73.33 ft): AlloyC276
Wire Protection	PTFE coated St/St 316L, 0.4mm (max 16m)
Displacer Diameter	30...50mm (dependent on application), optional 70...110mm
Displacer Material	Stainless steel 316L, AlloyC, or PTFE
Pressure Rating	Suitable for atmospheric and high pressure applications up to 25 bar/2.5 MPa/362 psi
Cable Entry	NPT, Metric, BSP (G) class threads

Power

Power Requirements	High voltage type: 85 to 264 VAC, 50/ 60 Hz, 28.8 VA Low voltage type: 52 to 75 VAC, 50/60 Hz, 21.6 VA 19 to 64 VDC, 13.4 W
Safe Electrical Isolation	Bus inputs are electrically isolated from the other electronics

Environmental

Operating (Liquid) Temperature	-200 to +200°C (-328 to 392°F)
Ambient Temperature	• Device: -40 to +60°C (-40 to +140°F) • Display Module: -20 to +70°C (-4 to +158°F)
Approvals	FM, ATEX, IEC Ex, or NEPSI

Display/Programming

Display (LCD)	Four line, white background lighting, switches to red for device errors Language selection: English, German, Japanese
Programming	• Local display; operation via the local display is possible without opening the device • Configuration software (e.g. DeviceCare); connected via: – HART – Service port (CDI) with optional Commubox FXA291

Intelligent Functions

- Wire Compensation - Compensation of wire expansion due to temperature and wire weight
- Displacer Compensation - Automatic compensation of displacer weight
- Tank Roof Compensation - for depression and distortion
- The device has a sealable locking switch according to the Weight & Measure requirements. This switch locks all software parameters related to the measurement. The switching status is indicated on the display and via the communication protocol.

Performance

Standard Range	28m with 316L measuring wire
Optional Range	• 28 m (93.33 ft), 36 m (120 ft), 47 m (154.2 ft), and 55 m (180.5 ft): 316L • 16 m (53.33 ft): PFA > 316L • 22 m (73.33 ft): AlloyC276
Level Accuracy	+/-0.4 mm for (+/- 0.015 in) (Under reference condition, according to OIML R85)
Interface Level	+/-2 mm (+/-0.08) (Difference of product densities 0.100 g/cm^3 (6.25lb/ft3))
Spot & Profile Density	+/-0.003 g/cm^3 (Under reference condition, according to OIML R85)
Medium Density	0.430 to 2.000 g/cm^3 (27 to 125 lb/ft3)
Medium Density Difference	0.1 g/cm^3 (6.24 lb/ft3)
Viscosity	0 to 5 000 mPa s

Inputs and Outputs

Primary Outputs	• MODBUS RS485 • V1 • 4-20mA HART Ex d/XP, RTD input • + 4-20mA HART Ex i/IS, RTD input
Secondary I/O Analog	• 1 x "Ex d/XP 4-20mA HART + RTD input" • 2 x "Ex d/XP 4-20mA HART + RTD input" • 1 x "Ex i/IS 4-20mA HART+ RTD input" • 2 x "Ex i/IS 4-20mA HART+ RTD input" • 1 x "Ex i/IS 4-20mA HART + RTD input" • 1 x "Ex d/XP 4-20mA HART + RTD input" • None
Secondary I/O Exd	• 1 x "2x relay + 2x discrete I/O" • 2 x "2x relay + 2x discrete I/O" • 3 x "2x relay + 2x discrete I/O" • 1x "MODBUS RS485" • 1x "MODBUS RS485", 1 x "2x relay + 2x discrete I/O" • 1x "MODBUS RS485", 2 x "2x relay + 2x discrete I/O" • None
HART Ex ia/IS Active Input	The HART Ex ia/IS active input is available by default. It needs not to be chosen explicitly when ordering a device.

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