



Model NDG-431 Density Gauge

The Density Sensor Set

The Density Sensor set comprises:

- Source holder with fitted gamma source
- Gamma detector in housing
- Pipe clamp assembly
- UNIPRO^M Transmitter/Indicator

Source Holder Assembly

The source holder is a lead filled, steel fabrication designed to exceed the requirements of the South African Department of Health / Directorate Radiation Control. The isotope standardly used is Caesium¹³⁷, which provides a good balance between measurement precision, longevity and cost. Other isotopes may be required for special applications.

Depending on the source holder model, the shutter mechanism may be either a *Slide* type or *Rotary* type. The standard shutter mechanism is a two position device – “ON (Measure)” & “OFF” (Closed). Alternative (optional) source holder models can be provided which feature

either **three-** or **four-position** shutter mechanisms. These additional shutter positions provide **Calibration References** for simplified calibration/ maintenance checks.

A single calibration point alone cannot reliably define the system calibration. At least two points are required. Our unique **four-position** shutter assembly provides for both a **Zero** reference and an on-scale **Span** calibration reference. Servo actuation of the source shutter is also possible to allow automated calibration checking.

I-Tag®

The source holder may be equipped with our optional electronic Isotope Tag (I-Tag®) which removes the problems encountered in traditional stamped stainless steel tags which could become illegible or lost. The I-Tag® allows for a far safer & more reliable system of reading Radio Nuclide & Source Holder information.



Gamma Detector Assembly (Model DSA-1)

The detector housing bolts to the Pipe Clamp.
An **optional safety shield** is available, to significantly reduce through radiation. The detector is scintillation type.

Features of this detector are:

- Factory sealed detector (No access required) - Termination via external junction box
- Greater sensitivity
- Lower isotope activity.
- Lower radiation levels – greater margins of safety.
- Auto (electronic) shut down under empty pipe conditions (to protect the detector from over radiation damage).
- High noise immunity, RS-485 type output.

Pipe Clamp Assembly

The pipe clamp bolts around the process pipe and provides attachment points for the Density Detector Assembly and Source Holder. The clamps and the mounting bolts are from stainless steel.

UNIPROM^M

The UNIPROM^M transmitter provides all the outputs. The UNIPROM^M may be located at any convenient location for termination/indication, and may be up to 300m from the Detector.

Standardly the UNIPROM^M is supplied "Blind" using the PTU for Calibration/Maintenance. Optionally UNIPROM^M may be equipped with a local keypad & display.

Specifications - NDG-431

Detector Type	High Sensitivity Scintillation Type
Detector Enclosure	Polycarbonate to IP66 protection (Others optional)
Display (Optional)	Graphic type OLED
Transmitter/Indicator	UNIPROM ^M
Outputs	On-board Solid state digital output (24VDC/AC) Volt free change over contact (relay) - 24VDC Optional Plugin Up to two of any SIM modules (the SIM modules currently include 4-20mA Output, 4-20mA Input, Digital Input (volt free or 24 VDC) or Digital Output (relay rated 24 VDC at 1 Amp).
Field Bus support	ControlNet TM , DeviceNet TM , EtherNet/IP TM , Modbus TM TCP/IP, Modbus TM RTU, Profibus TM DP, PROFINET TM IO
Power Supply	Requires transient free, Instrumentation Quality power, either: 90-250 VAC, 50/60Hz at 100VA or; 24V DC at 20 VA (optional).
Operating Temp	UNIPROM ^M : -20° C - +50° C Density Sensor (DSA-1): -10° C - +45° C
Mass	Subject to Isotope activity and source holder model

Upgrade from NDG-421 systems

NDG-421 systems may be upgraded to the NDG-431 system by the addition of:

- DSA-1 Detector in polycarbonate housing.
- Mounting bracket to locate the DSA-1 to the pipe clamp.
- UNIPROM^M transmitter/Indicator (with appropriate I/O).