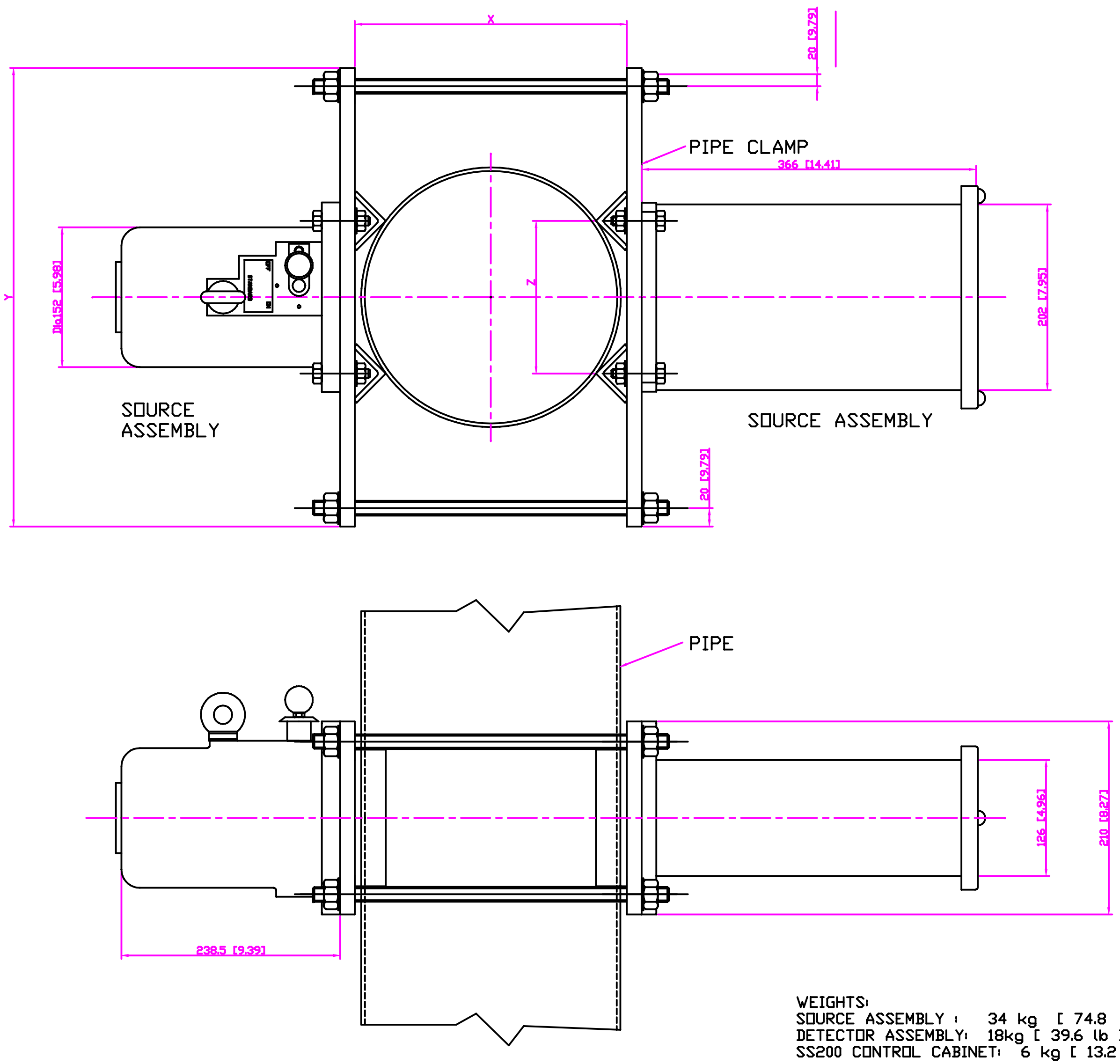
DENSITY GAUGE Model SS200

Nucleonic Density Measurement of Slurries, Sewerage Sludge And Liquids

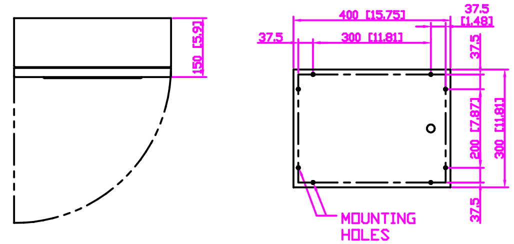
- Fully digital operation
- Automatic gain stabilisation
- Low source activity
- Scintillation detector
- Rugged construction
- IP67
- Repeatability 0.0001 SG

SIStec

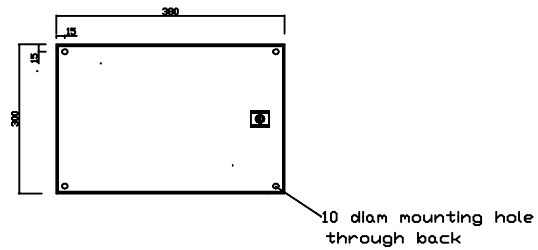
RevNo	Revision note	Date	Signature	Checked



STEEL CONTROL CABINET



316 S\STEEL CONTROL CABINET



Note: Use Rittall 1004316 enclosure 316 st./steel seal to IP66

WEIGHTS:
SOURCE ASSEMBLY : 34 kg [74.8 lb]
DETECTOR ASSEMBLY: 18kg [39.6 lb]
SS200 CONTROL CABINET: 6 kg [13.2 lb]

MOUNTING DIMENSIONS			
PIPE DIAMETER	X	Y	Z
50 TO 230	67 TO 285	290	70
[1.97] TO [9.05]	[2.64] TO [11.22]	[11.42]	[2.75]
230 TO 425	234 TO 465	510	165
[9.06] TO [16.73]	[9.21] TO [18.31]	[20.08]	[6.50]
425 TO 625	437 TO 657	710	225
[16.73] TO [24.61]	[17.20] TO [25.87]	[27.95]	[8.86]
625 TO 825	633 TO 853	910	275
[24.61] TO [32.48]	[24.61] TO [32.48]	[35.83]	[10.83]

NOTE: DIMENSIONS IN BRACKETS ARE INCHES.

DO NOT SCALE THIS DRAWING. WORK TO DIMENSIONS SHOWN.
ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED

3 rd Angle

Tolerance: unless otherwise specified
Whole Number: +/- 0.5 mm
Decimal: +/- 0.05 mm

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Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
Drawn by G-KESSELL		Checked by M-Marsh	Approved by - date LE_28/11/04	Job NO XXX	Date 25/10/04	Scale NTS

GENERAL__ARRANGEMENT

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WHY THE SS200 HAS THE HIGHEST STABILITY

For the highest achievable stability, four main areas need to be addressed.

1. **Narrow Beam Geometry**
2. **Decay compensation**
3. **Dead Time correction**
4. **Gain Stabilisation**

NARROW BEAM GEOMETRY

A collimated 8mm narrow beam together with a collimated NaI crystal ensures that errors due to Compton Scattering through the pipe and slurry do not arrive indirectly at the detector crystal.

DECAY COMPENSATION

Decay compensation is the system built into the gauge to allow for the decay of the radioactive source. Each day the time elapsed between the last calibration and today's date is used to calculate a correction factor.

DEADTIME CORRECTION

Assume a count rate of 10,000 ie the number of gamma ray pulses being detected is 10,000 per second. These gamma rays are emitted by the radio-isotope in a random manner. Some pulses will arrive close together whilst others will arrive further apart.

In order to achieve accuracy, the count rate period selected must be as high as possible for the accumulation of counts in the required period of time. The electronics used in nuclear density gauges has a finite response time when analysing each pulse as it arrives. When the pulses arrive close together some are not analysed because earlier pulses are still being analysed. The time during which the electronics is unable to analyse pulses is called the deadtime.

For a nucleonic density gauge to be accurate the software has to add in the missing counts causes by the deadtime in the system. This is generally by using a well known statistical correction formula. However, what is not generally understood and allowed for in nucleonic density gauges is the fact that for the formula to work properly over the complete temperature range of the instrument, the deadtime must be extremely tightly controlled.

The SIStec Model SS200 eliminates this source of error by maintaining the deadtime very precisely over the temperature range of the instrument, in fact to a precision of +/- 10 nanoseconds.

GAIN STABILISATION

The SS200 employs a sophisticated control technique which monitors the count rate and compares it to a statistical model of the radiation and automatically adjusts the gain of the detector system accordingly, in effect an automatic gain control

SPECIFICATIONS

Principle Components

Source Holder	IP65 Lead filled sealed ductile steel or 316 Stainless Steel Shielding meets or exceeds internationally accepted safety standards Rotary shutter with standardising absorber incorporated
Radioisotope	Double encapsulated Cs 137 or Co 60
Detector Housing	IP67 Rugged steel enclosure or 316 Stainless Steel Connects to Control Unit with instrumentation cable
Scintillation Detector	Sodium Iodide with integral photo-multiplier
Control Unit	IP 66 316 Stainless Steel housing Switch mode power supply 88 to 264 Vac or 24Vdc 30watts No loss of data with power off Decay clock continues with power off Data transmitted by RS422 link May be up to 1000 metres from detector module Isolated 4-20ma current output loops (1.5KV) Comms options: Modbus RTU, Profibus DP Device Net, Hart Protocol, Foundation Fieldbus

Operation

Temperature Drift	± 0.000006 SG units per degree Celsius
Repeatability	± 0.0001 SG units typical ± 0.0002 SG units maximum
Operating Temperature	0 to 60 ° C
Vibration	2g at 100 Hz
Humidity	5-95 % RH, non condensing
Inputs	4-20ma from volume flow gauge or temperature sensor
Outputs	Two 4-20ma current loops for SG, per cent solids, mass flow or temperature corrected SG. Mass flow integrator with potential free make contacts one pulse per tonne
Mass (Kg)	Source Holder - 40 Kg Detector Unit - 20 Kg Control Unit - 6 Kg

Manufactured by
Specialised Industrial Systems
Perth, Western Australia

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