



TI-P403-96
AB Issue 1

Model 556/TF56-N Turbidity Monitoring System

Description

The Turbidity Monitoring System consists of a TF56-N Turbidimeter and a 556 Converter designed to continuously monitor for oil and grease contamination in make-up water and condensate circulated back to the boiler feedwater system. It can also be used to monitor the supply from mains raw water, demineralisation and reverse osmosis water treatment plants.

The turbidimeter is a precise, dual channel, scattered light turbidity monitor that uses light in the visible range (VIS) and Near Infrared Range (NIR) from 400 to 1100 nm. A precisely defined constant light beam penetrates the fluid medium and the light scattered from any particles (trace suspended solids, undissolved liquids or gas bubbles) in the medium is detected by four hermetically sealed silicon photodiodes at an angle of 11°. Simultaneously the unscattered light is detected by a reference photodiode. This unique dual channel design compensates for colour and disturbances in the medium. The sensor can measure very low particle sizes and concentrations.

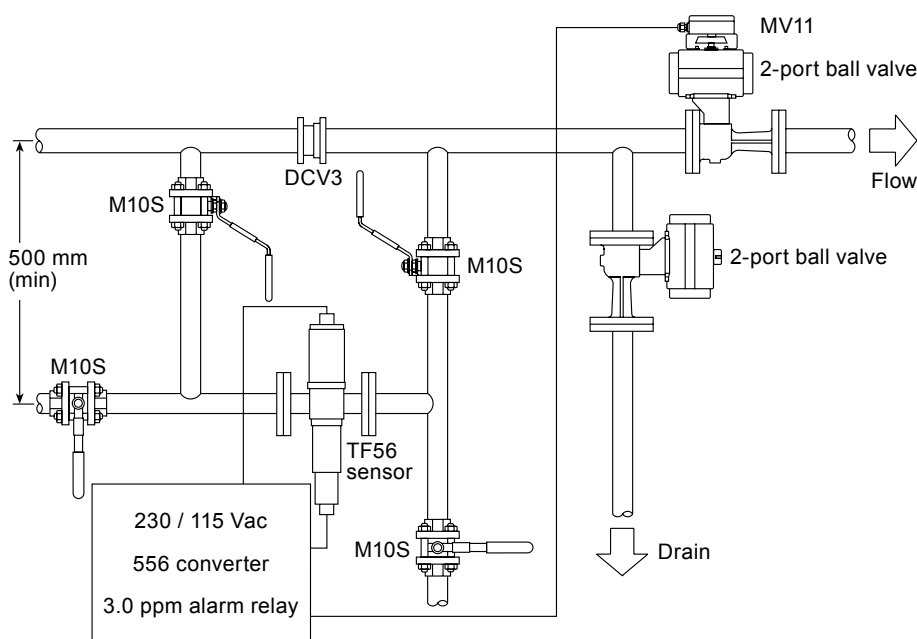
The converter has four fixed and one variable measuring range calibrated in ppm, providing continuous, real-time monitoring of a fluid medium's turbidity. A 3-digit LED indicator displays turbidity as a percentage of the selected measuring range. Two independent set points and a 0-20 mA or 4-20 mA output are provided by the converter for alarms and real-time remote display of turbidity monitoring. An additional failsafe relay output is built in for remote sensing of converter lamp or power failure.

Principle features:

- Real-time process monitoring.
- 2 independent alarm set points.
- Failsafe relay.
- 3-digit LED display.
- 0 - 20 or 4 - 20 mA output.
- Dual channel compensation design.
- Low maintenance.
- CIP / SIP compatible.
- Compact dimensions.
- Reliable, cost effective measurement.

Associated products:

- MS10 isolating ball valve.
- DCV3 check valve.
- Ball valve actuator (BVA).
- M21 two-port ball valve.
- MV solenoid valve for BVA.
- Three-port QL valve.



Recommended installation for the 556/TF56-N turbidity monitoring system

Requirements

Many countries ensure the protection and safe operation of boiler equipment, buildings and personnel through Legislation and Standards. For example shell boilers operated in the European Community must comply with requirements of the harmonised standard EN 12953 that specifies maximum contamination levels for boilers operated unsupervised for periods of 24 or 72 hours.

Function

To protect the boiler feedwater system from oil and grease contamination, the Turbidity Monitoring System has two independent alarm set points:

- **Alarm 1** can be set to divert and discharge contaminated water above 3.0 ppm to a blowdown vessel or directly to drain.
- **Alarm 2** can be set to shut down the boiler if contamination level rises above 5.0 ppm.

Diversion of contaminated supplies may be achieved with two 2-port ball valves with a ¼ turn actuator or a 3-port actuated valve.

Spare parts

For available spares and options please contact your local Spirax Sarco representative.

Technical data

TF56-N Turbidimeter

Material	Sensor body stainless steel 316 Ti, 1.4571
Line size	DN25
Process connection	DIN flange (EN 1092).
Gaskets	Viton seals
Windows	Sapphire
Optical path length	40 mm
Process pressure	10 bar
Continuous process temperature	0°C to +100°C (+32°F to 212°F)
Peak process temperature	+120°C (+248°F) for maximum duration of 15 minutes/day.
Ambient temperature	0°C to +40°C (+32°F to 104°F)
Air purge	Connections available as standard.
Light source	Incandescent tungsten lamp: 5.0 Vdc, 775 mA (typical life span 3 to 5 years).
Wave lengths	400 nm – 1100 nm
Detector	Silicon photodiodes hermetically sealed.
Calibration	Basic calibration in ppm (DE), FTU, EBC
Measuring range	Any measuring range between - 0 – 25 to 500 ppm (DE) - 0 – 10 to 200 FTU - 0 – 2.5 to 50 EBC
Resolution	< ± 0.5% of respective measuring range
Repeatability	< ± 1% of respective measuring range
Linearity	Specific to application, < ± 2% with standard solution
Protection	All optical parts protected according to IP65
Cable length	5.0 m (16 ft)
VA-plug-protection	special ultra-shielded cable sets.
Certificates	ISO 9001:2000, PED, CE, HPO

Turbidimeter options

Flange specification	- ASME flange Class 150.
High temperature Turbidimeter: TF56-HT	- Continuous: -20°C to +190°C (-4°F to +374°F) - Peak: -20 to +210°C (-4°F to +410°F) for maximum duration of 15 minutes/day.
Process connection	- ASME: 1"

556 Converter

Enclosure material	Aluminium
Mounting plate	W19 mounting assembly: For 482.6 mm (19") rack mounting (front IP40, rear IP20), 3HE / 21TE
Dimensions	106 x 116 x 190 mm deep (4.18" x 4.57" x 7.49" deep)
Weight	2.0 kg
Display	1 digital display, 3-digits, LED, height 7 mm - 1 LED: power on (red) - 1 LED: Zero (green) - 5 LED: Range (yellow) - 2 LED: Alarms 1 (red) and Alarm 2 (red) - 1 LED: Lamp or system failure (red)
Measuring range	Factory set: 0 – 25 ppm, 0 – 50 ppm, 0 – 100 ppm, 0 – 250 ppm, 0 – 500 ppm, Variable range: 0 – 25...500 ppm
Resolution	< ± 0.5% of respective measuring range.
Repeatability	< ± 1% of respective measuring range
Linearity:	Specific to application, < ± 2% with standard solution
Response time	1 second
Power supply	Selectable 115 / 230 Vac at 50/60 Hz
Power consumption	30 VA
Cable length	5.0 m (16 ft)
mA output	0 – 20 or 4 – 20 mA (load: 0 – 500 Ohm) galvanically isolated (> 500 Vdc)
Alarm output	2 independent adjustable SPDT relays.
Failsafe	1 SPDT relay to alarm in case of lamp or system failure (active)
Ambient temperature	In operation 0°C to +50°C (+32°F to +122°F) Storage temperature: -20°C to +70°C (-4°F to +158°F)
Requirements	EN 61010-1 / 202-08 / class 1
Certificates	ISO 9001:2000, GS, CE

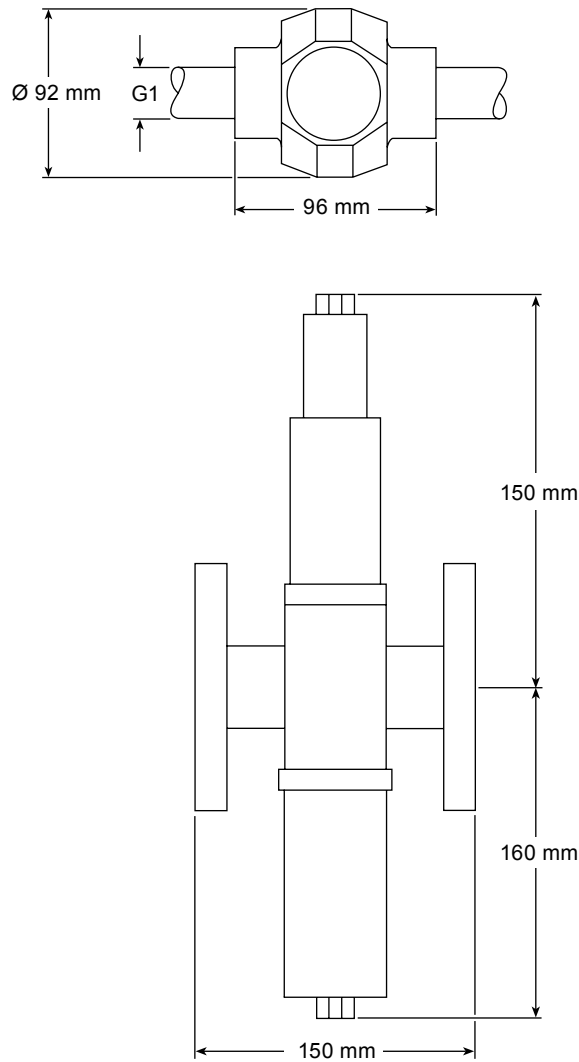
Converter options

Power supply	24 Vac/dc at 50/60 Hz
Housing	- B19-21 Housing: ABS plastic IP66 (1 converter) - B19-42 Housing: ABS plastic IP66 (2 converters) S19-42 Housing: Stainless steel, IP65 (2 converters)
Cable lengths	Metric: 10, 20, 35, 50, up to maximum of 250 m Imperial: 33, 66, 115, 164 ft, up to a maximum of 820 ft
Alternative cable connectors	Rigid stainless steel connector.

Dimensions/weights (approximate) in mm and kg

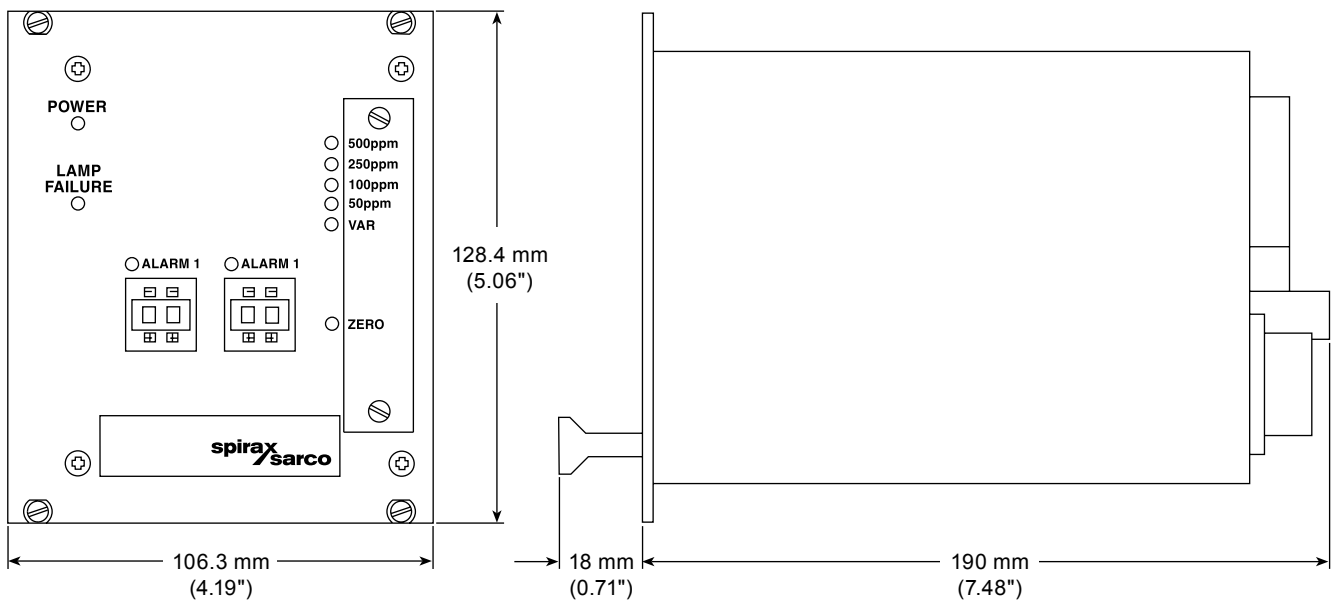
TF56-N Turbidimeter

Weight: 4.0 kg (8.8 lbs)



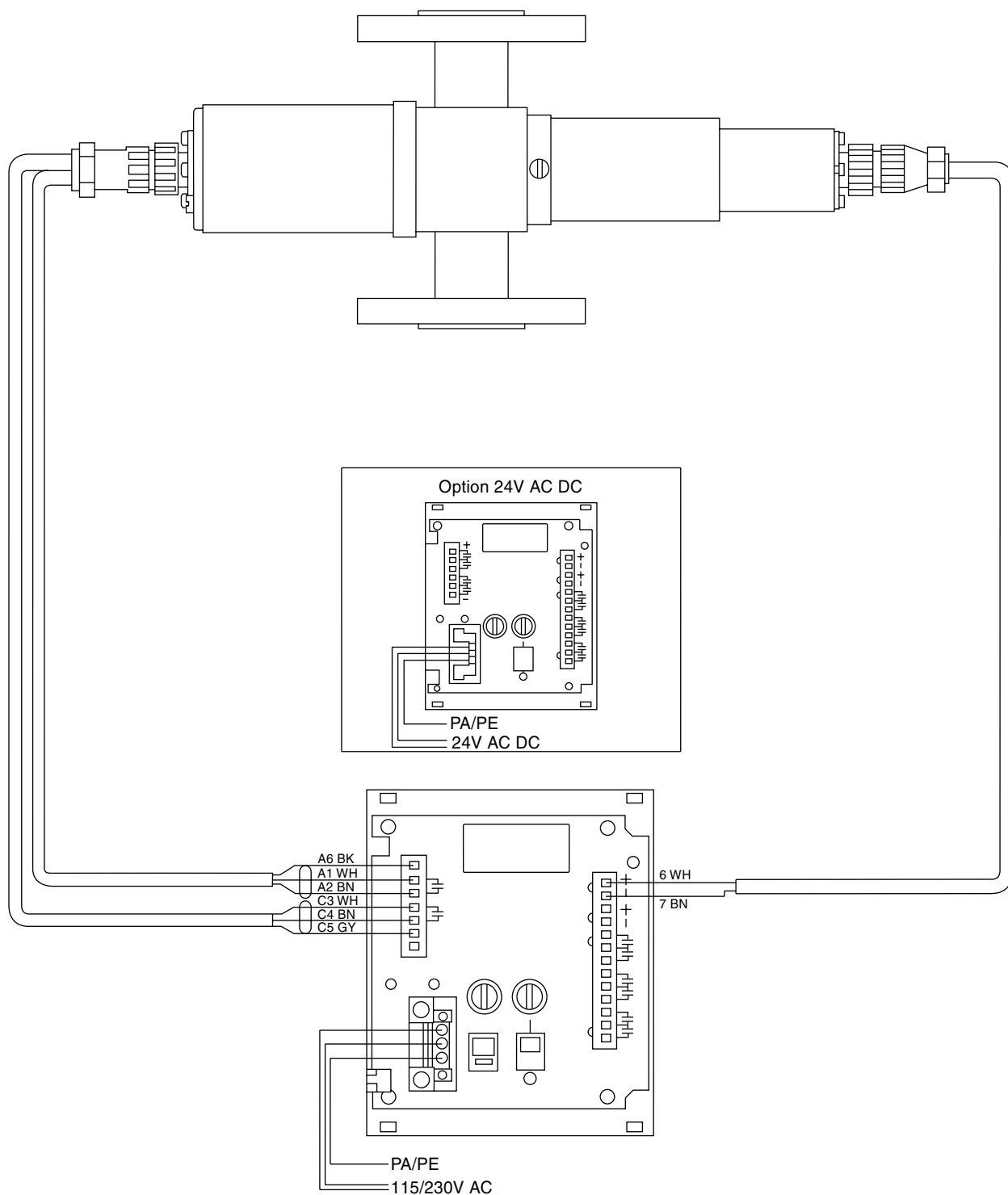
556 Converter

Weight: 2.0 kg (4.4 lbs)



Safety information, installation and maintenance

Warning: This document does not contain sufficient information to install the system safely. The system operates at a potentially fatal mains voltage. Before attempting to install the system read the Instruction Manual supplied with the equipment.



How to specify

Spirax Sarco dual-channel scatter light turbidity monitoring system.

How to order example

1 off Spirax Sarco Model 556/TF56-N turbidity monitoring system.