LPG Quality monitor

MONITORS FOR UNACCEPTABLE LEVELS OF SULPHUR IN LPG

The model 4600 LPG quality monitor is a completely automatic process stream monitor for use as an alarm when there is an unacceptable level of sulphur in a finished product line

Based on the ASTM D 1838-89

"Standard Test Method for Copper strip corrosion by Liquefied Petroleum Gases"

TYPICAL APPLICATION

- The monitoring of finished LPG prior to storage

PRINCIPLE OF OPERATION

The operation of the monitor is based on the fact that the rate of change of reflectivity of a polished copper token, measured at the optical wavelength of a red Light Emitting Diode (LED), can be correlated to the surface condition of a copper token.

For this correlation to apply and for practical monitoring the following conditions are met within the LPG Quality monitor

- Temperature controlled Optical Amplifiers
- Temperature controlled 'Control' cabinet
- Sample stream dilution (Increases token life)

DESCRIPTION

The LPG Quality monitor comprises two independent, close coupled cabinets, suitable for either wall mounting or mounted on a free standing frame.

The lower cabinet houses the dual optical sensors and the sample handling system, the upper cabinet houses the power distribution and electrical control circuits.

Sample handling

Sample entering the monitor is split, into two lines. One line passes through a scrubber to remove the entire sulphur content. It is then used to dilute the sample in the second line at an adjustable ratio which is set to optimise the copper token life of 2 to 3 months. Where the background level of sulphur is low, it may not be necessary to use the dilution option.

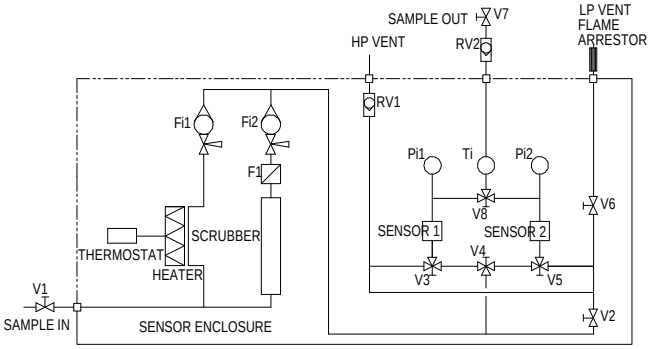
The diluted sample flows through one of the sample sensors and exits the monitor for return to the process or to the vent system according to the process application requirements.

Control Unit

The control enclosure houses the electrical power distribution, circuit protection, DC power supply, indicating displays, optical signal amplifiers and signal isolators plus the temperature-controlled optical amplifiers. A fully certified CENLEC air purged control system is incorporated within the enclosure allowing the LPG Quality monitor to be suitable for safe operation in a Zone 1,IIC T4 area.

Sensor Units

The sensor units comprise a main body, a token holder assembly and a fibre optic splitter. The design is such that sample flows directly over the copper token, passing between the fibre optic splitter window and token. The token holder assembly comprises the holder body, a stainless spring and ball to retain the copper token. The splitter comprises a central fibre optic bundle which projects transmitted light onto the copper token, and six surrounding bundles of fibres which receive light reflected by the token. A sapphire pressure window isolates the fibre bundles from the sample



ONE OF THE ATAC RANGE OF PROCESS ANALYSERS

Fibre Optic Amplifiers
Fibre optic amplifiers are mounted on a temperature stabilised block within an insulated jacket to minimise signal changes effected by ambient temperature variations.

Each amplifier device has a red LED light source to illuminate the surface of the token and a detector to sense the reflected light, the output of which is used to drive the 4-20 mA analyser output signal. The amplifiers are also fitted with adjustable alarm trips which are used to drive local 'Exhausted Token' alarm indicator lamps on the control unit panel.

In use, the amplifier outputs are set to near 20mA on installation of a clean token. The signal then drops towards 4 mA as reaction with sulphur species in the sample progressively tarnish the token surface causing a corresponding drop-off in reflected light.

SPECIFICATION

Sensitivity Range
Minimum Sulphur content 2 ppm

Performance
Life of token typically 3 months.

Output signal
4 - 20 mA fully isolated.
Load impedance 700 ohms maximum connected load.

Alarms
Local 'exhausted token' alarm (LED)

Sample conditions required at inlet

Pressure	Minimum	10 psig (0.7 barg)
	Maximum	725psig (50barg)
Temperature	Minimum	0°C
	Maximum	50°C
Flow	2 litres/hr	

Sample conditioning
The analyser will accept samples having the inlet conditions above. Complete systems can be supplied to condition sample as required at the analyser inlet.

Sample disposal
Sample can either be returned to the high pressure process line or routed to flare.

Analyser vent
The analyser must be vented to atmospheric pressure vent or flare line.

Utility requirements
Power supply

Voltage	110 / 120V or 220 / 240V AC Voltage to be ± 10% of specified voltage.
Frequency	50 or 60 Hz
Consumption	650 VA max.

Local display
Twin LCD calibrated 0 - 100%.

Standard connections

Sample in	¼" NPTF
Sample out	½" NPTF
Vent High pressure	¼" API (female)
Vent Low Presure	½" NPTF

Power and signals
Power connection - M25 through gland entry.

Explosion protection
The LPG Monitor CENELEC certification is achieved through protection by a certified Telektron pneumatically operated purge controller.
EExpIICT4. Zone 1 hazardous areas.
Certificate no. KEMA Ex-95.D.4549 X.

Environmental protection
Whilst the Monitor is designed to operate satisfactorily when exposed to normal ambient temperatures within the within the range +5°C to +35°C a weatherproof shelter is strongly recommended. To protect the Monitor from rain, snow, exposure to extreme wind and direct heat from the sun.

Dimensions and weight

Wall Mounted	
Height	1290 mm
Width	700 mm
Depth	290 mm
Weight	75 Kg

Floor Mounted	
Height	2000 mm
Width	700 mm
Depth	330 mm
Weight	100 Kg

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