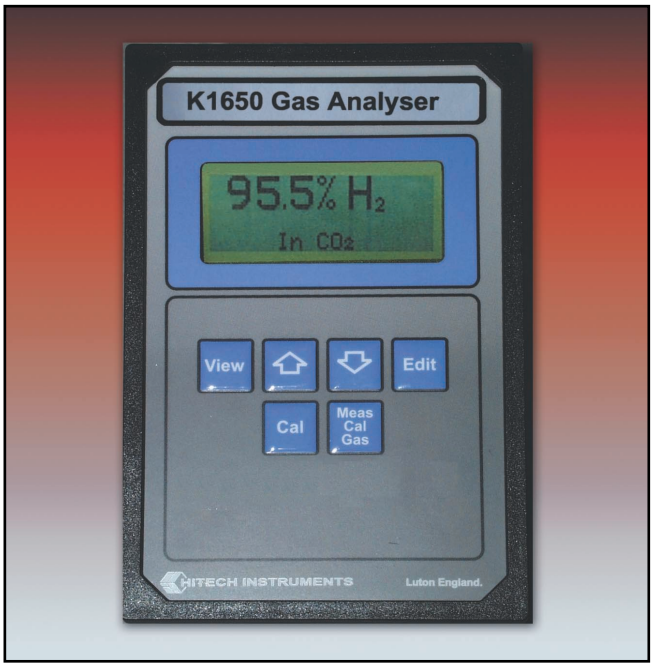
K1650 alternator purge gas monitor

Features

- **Certified for hazardous area use**
- **Compact self-contained unit with remote sensor**
- **Low cost and easy to install**
- **Simple, low cost maintenance**
- **User-friendly interface**



Application

Modern turbogenerators, as used in power stations, produce a great deal of heat which must be dissipated. The preferred coolant is hydrogen gas which has a cooling capacity of around seven times that of ambient air. It is essential that the hydrogen remains uncontaminated by air leakage or a potentially explosive gas mixture can result. Air in-leakage also increases the viscosity of the hydrogen and therefore its friction with the rotor, increasing the losses within the system.

Before either filling with hydrogen or re-filling with air, it is necessary to use an inert intermediary gas to avoid creating a flammable mixture. Carbon Dioxide (CO_2) is the gas most commonly used for this. Thus, for filling the turbogenerator, air is first purged from the system with CO_2 and then the CO_2 is purged out with hydrogen.

The Alternator Purge Gas Monitor measures all stages of the hydrogen filling and air re-filling processes as well as the hydrogen purity during normal operation.

Principle of Operation

The Alternator Purge Gas Monitor uses the proven katharometer sensor used in the Hitech K1550 analyser range.

In construction the katharometer comprises two chambers, each with an identical thermal conductivity sensor. One chamber is sealed and is filled with a reference gas and the other receives the sample gas. The difference in thermal conductivity of the reference and sample gases is translated into a concentration figure by the microprocessor circuitry within the electronics unit.

The inherent stability of this system and, its almost perfect temperature compensation, make the instrument one of the most accurate available.

System Description

The display/controller unit and the remote sensor assembly are shown overleaf.

Designed to be fitted into the turbo-generator cubicle, the display module plate mounts the control electronics and the intrinsically safe barriers. Depending on the scale selected from the keypad, the display will show one of the three following measured values.

0 to 100% CO_2 in Air
0 to 100% H_2 in CO_2
90 to 100% H_2 in Air

Four user programmable alarm relay outputs are provided and their status is displayed on LED's on the front of the module.

The remote sensor assembly consists of a katharometer supplied in a wall mounting, IP65 enclosure complete with flowmeter and sample flow control valve. The sensor is certified to European standards for use in Group IIB + H_2 gases, and the zener barrier interface, incorporated in the display/controller unit, allows 'live-working' on the sensor unit.

SPECIFICATION

Display
Dot matrix LCD registering 4 lines of alphanumeric characters

Ranges
0 to 100% CO_2 in Air (Resolution 0.5%)
0 to 100% H_2 in CO_2 (Resolution 0.1%)
90 to 100% H_2 in Air (Resolution 0.1%)

Stability
Better than 1% fsd/month

Accuracy
±1% fsd typicaly

Sample flow
Between 100 to 300 ml/min for optimum performance

Sample temp.
-10°C to +55°C (non-condensing)

Sample pressure
Set by vent pressure which must be nominally atmospheric

Speed of response (typical)
T_{90} = 5secs.

Sample connections:
Captive seal compression fittings suitable for 0.25inch (or 6mm) outside diameter tube.

Output (signal)
4 to 20mA, proportional to the selected range.
Maximum load 600Ω

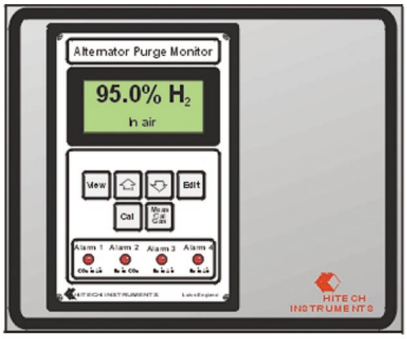
Alarms
Four user configurable alarms programmable for level, function and hysteresis are provided as follows:
1 alarm for CO_2 in Air
1 alarm for CO_2 in H_2
2 alarms for H_2 purity

Outputs are volt-free changeover relay outputs contacts rated at 48Vac or dc, 0.5A

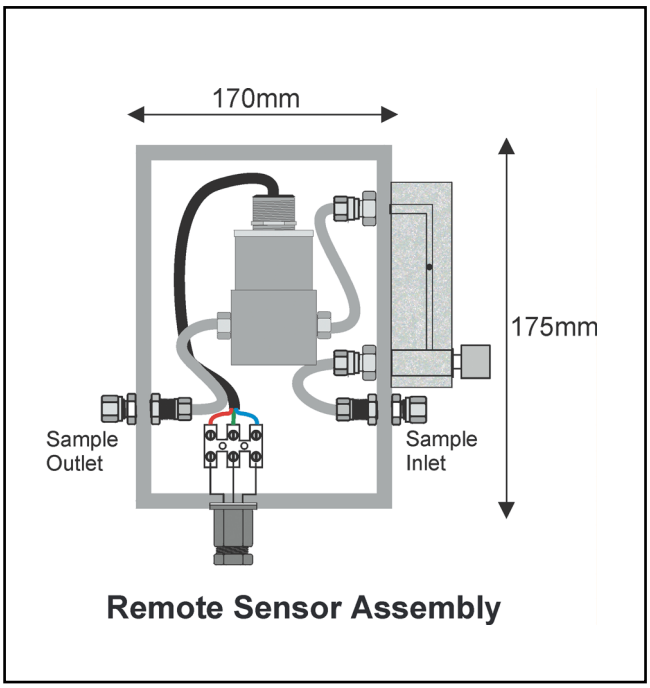
Ambient temp
-5°C to +40°C

Power supply
110/120V or 220/240Vac, 50/60Hz
power consumption, 12VA

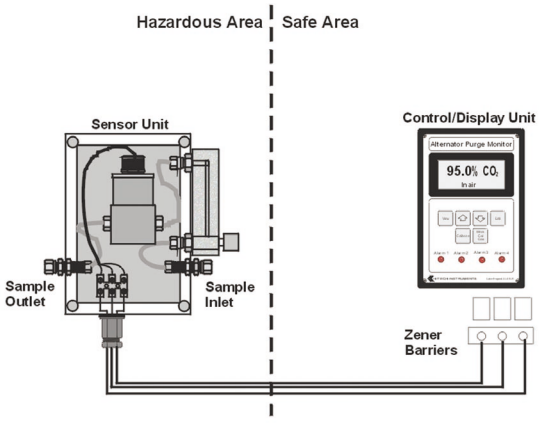
Mounting
Electronics unit: Control/Display unit: panel mounting by four corner screws.
Remote sensor unit: wall/bulkhead



Controller/Display Unit



Remote Sensor Assembly



Electrical Interconnection Diagram

In keeping with a policy of continuous development, Hitech Instruments Ltd reserves the right to change any part of this specification without notice

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HITECH INSTRUMENTS LIMITED

3/02 Printed in the EU