Analytical Technology & Control Limited

ATAC Hone 'Distillar' Model 4102 Distillation Analyser

MEASURES THE DISTILLATION POINTS OF PETROLEUM PRODUCTS

The microprocessor controlled Model 4102 Distillar is a completely automatic process stream analyser for the measurement of any distillation point or points which can be determined by the laboratory method. The analysis is performed on-line in correlation with ASTM D86 / IP123.

TYPICAL APPLICATIONS

- Product blending
- Middle distillate monitoring

PRINCIPLE OF OPERATION

The analyser, in general, copies the standard laboratory test, ASTM D86 / IP123. The close similarity between the analyser operation and the laboratory test ensures an excellent agreement at all points for all products. A typical analysis is described below.

Fresh sample is flushed through the analyser to cool all wetted parts to at least 20°C below the IBP of the product being analysed. The burette is allowed to fill with sample then settle at a volume of 100ml.

The 100ml sample is drained into the pre-cooled flask. The flask is heated electrically until the analysis is complete.

During the heating period, the power to the flask heater is controlled to ensure optimum rate of recovery, as defined by ASTM, for the product sampled. The vapour travels up the neck of the flask and flows into a water cooled condenser. The vapour temperature is measured in the neck of the flask by a temperature sensor.

The distillate, after passing through the water cooled condenser, is collected in a receiver. Percentage recovered is measured by means of an optical detector. The recovery level and vapour temperature are monitored and compared with pre-set analysis points.

The test cycle will end when all the nominated analysis points have been found. Results are output on to the 4-20mA process signals.

DESCRIPTION

The Distillar is certified to ATEX standards and provides extensive facilities for user configuration via the RS232 input and remote standard PC/AT.

The analyser comprises three close coupled cabinets. The top left enclosure houses the pneumatic valves for the inlet burette and flask, as well as the burette itself. The right hand unit contains all the electrical and electronic components. The main cabinet contains the flask box, condenser, receiver, remaining pneumatic valves and purge controller.
The purge controller ensures protection type "p" requirements are met within the flask and electronics box. The electronic and pneumatic components enable complete automatic and safe operation within a hazardous area, (Zone 1).

ONE OF THE ATAC RANGE OF PROCESS ANALYSERS

Measurement outputs
The Hone Distillar is capable of determining the following properties of the sample being analysed:-

- initial boiling point (IBP)
- final boiling point (FBP)
- recovery point
- distillation point
- end point
- total recovery
- continuous recovery
- continuous temperature

Up to seven 4-20mA process signal outputs can be provided. Any combination of the properties listed may be specified.

Programmable Parameters.
It is possible to change the analyser parameters remotely by means of a serial RS232 link. The changeable parameters are:-

- heating levels
- specification - properties measured
- transmitter ranges
- offsets on results
- the burette filling time
- the flask temperature at which flushing ceases
- alarm temperatures for :-
  - flask over temperature
  - high sample temperature
  - low sample temperature
  - high coolant temperature
  - low coolant temperature
- alarm time out periods for:-
  - cycle time
  - flush time
  - IBP time
- continuous burette flush option ON/OFF

Status indication
At all times, the Distillar informs the operator of the analyser status via an in-built 28 digit alphanumeric display.

Status outputs
The following status outputs are available in the form of voltage free contacts for connection to intrinsically safe circuits :-

- *Ready*

This contact is closed when the outputs are valid. The contact will open for two seconds while the outputs are updated.

- *Heating*

This contact is closed when the analyser is in the heat mode. Stream switching may take place while this contact is made.

- *Hold acknowledge*

This normally open contact will close to indicate that the analyser has reached the hold state in response to the external hold contacts being closed. The analyser will remain in the hold state while the external hold contacts remain closed. This feature allows external equipment to synchronise the analyser while stream switching etc. is taking place.

- *Warning*

This contact will open to indicate the existence of a non fatal error.

- *Alarm*

This contact will open to indicate the existence of a fatal error requiring manual intervention.

External controls
Inputs are provided to accept the following external inputs in the form of voltage free intrinsically safe contacts :-

- *External standby*

This external voltage free contact input will, when closed, immediately stop the analysis, clear all the stored values, the error state and place the analyser in the Standby mode.

- *External hold*

This external voltage free contact input will, when closed, cause the analyser to enter the Hold state when the current analysis cycle is completed.

- *Alarm 1*

This local external voltage free contact will, when closed, cause the analyser to enter the error state immediately. An example of the use of this facility might be an over temperature switch on the sample conditioning system.

- *Alarm 2*

This local external voltage free contact input will cause the Warning contacts to open. This facility might be used to indicate to the plant control system that the analyser's signals may not be valid due to conditions outside the analyser's control, i.e. calibration sample.

Local alarms are Reed relays, rated 0.25A @ 24Vdc max, 3VA max

SPECIFICATION

Analyser performance

Range	0-390°C
Span	50-390°C
Repeatability	equal to or better than the repeatability as defined by the laboratory test for any particular operating point.
Reproducibility	within the reproducibility limits as defined by the laboratory test for any particular operating point.
Cycle time	10-30 minutes typical

Output signal

Range	0-400°C max. 4-20 mA fully isolated
Load impedance	self powered 350 Ω max.
Span	50°C or 10% recovery min

Sample conditions required at inlet

Pressure	0.5 to 1 bar g
Temperature	20°C below expected IBP of the product being analysed, 45°C max.
Flow	20 to 30 litres / hour free of water and entrained solids.

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

Sample disposal
The analyser sample outlet must be connected to a system which is at atmospheric pressure. Sample recovery systems can be supplied.

Analyser vent
The analyser must be vented to atmosphere.

Utility requirements

Power supply

Voltage	110/120 or 220/240 Vac ±10%
Frequency	50 or 60 Hz
Consumption	600 VA max.

Instrument air supply

Pressure	3-7 bar g (dry)
Consumption	50 litres / hour

Cooling water

Temperature	at least 20°C below the initial boiling point of the product being analysed.
Pressure	< 7 bar g
Consumption	26 litres / hour

Local display
A 28 digit alphanumeric LED display provides signal and diagnostic information. Standard display is in the English language.

Standard connections

Sample in	¼" API (female)
Drain and vent	½" API (female)
Cooling water	¼" API (female)
Air	¼" API (female)
Power and signals	ISO 20

Explosion protection
The analyser is ATEX certified
Ex II 2G EEx p [ia] IIC T3
for use in zone 1 hazardous areas.
Certificate no. DEMKO 03 ATEX 134900

Environmental protection
Whilst the analyser is weatherproof to IP55 and will operate in ambient temperatures within the range +5°C to +35°C, use of a weatherproof shelter is strongly recommended.

Dimensions and weight

Height 2200 mm	Width 900 mm
Depth 600 mm	Weight160 kg

Options

- multi-stream applications
- voltage free contacts for alarms
- remote control

4102 Apr 2007

For further information contact :-

ATAC
e-mail: atac@atacuk.com
web: www.atacuk.com

Sales Office
ATAC House, The Green,
Warlingham, Surrey,
CR6 9NA, England.
Tel: +44 (0)1883 626583
Fax: +44 (0)1883 625430

Manufacturing Site
Broadway, Market Lavington,
Devizes, Wiltshire,
SN10 5RQ, England.
Tel: +44 (0)1380 818411
Fax: +44 (0)1380 812733