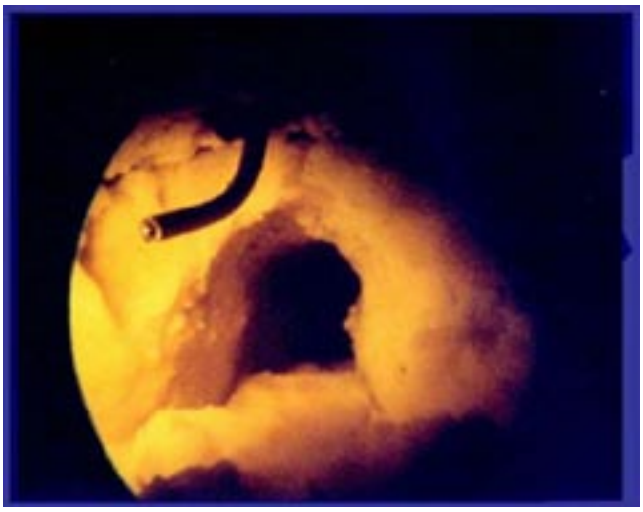
AGAR CORPORATION

Process Measurement & Control

Hydrate Detection HD-102



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HD 102 Provisional Specification Data Sheet
- Hydrate Detector

Principle of Operation:
Measurement of the water cut and hydrate presence is performed by measuring the complex permittivity properties of the flow stream using the multiple high frequency method. This method will compensate for the effected of changing hydrocarbon composition and water salinity while providing two unique outputs, one for water cut, the second for hydrate concentration.

Configuration:
The sensor is an insertable sensor with a seal housing for installation and retraction while the pipeline is in service and under pressure for flow lines 6" and larger. An insertion tool is available for insertion into high pressure lines. The sensor also has a blow-out preventer to ensure that the sensor is not removed from the seal housing without the isolation valve being closed.

Typical Applications:
Pipeline BS&W measurement and hydrate detection for pipelines. Hydrate presence can impair fluid flow and require regular pigging. Low Dosage Hydrate Inhibitor or Methanol injection is used to impair hydrate formation. By detecting presence of hydrate, LDHI or methanol injection can be optimized.

Measurement Capabilities & Accuracy:

Model	Water Range	Water Absolute Accuracy
HD-102	0 to 5%	±0.05%
	0 to 10%	±0.1%
	0 to 20%	±0.2%
	0 to 100%	±2.0%
Hydrate Repeatibility:		±1.0%

Approximate Dimension:
Electrical enclosure: Diameter: 6", Length 12"
Probe: 1.25" diameter shaft, 1.8" diameter sensor.
The active length of the probe is 6" or 12" to match the diameter of the pipe.
The over all length of the probe is determined by the pipe diameter, nozzle, and valve size, with standard lengths

Pipeline Sizes: 6" and Larger
Process connection minimum 2" Full port ball or gate valve, 2" schedule 80 or larger ID nozzle.

Flange Rating: 150#, 300#, 600#, 900#, 1500# Consult factory for others

Maximum Pressure: 5000PSI

Insertion Tool: Recommended for HD-102 when operating pressure is over 60PSI and flange rating is 600# or less.

Data Output / Input:

Standard:

- Analog Output: Two analog 4-20 mA for water cut and hydrate or flow (with flow meter input).
  4-20 mA output is powered by external power or internal
- Input Data: Flow; 1 pulse or frequency (0-5 to 0-30 V <2KHz) or 1 analog (4-20 mA)
- User Communication: Hart protocol or Modicon Modbus protocol via RS232, RS422 or RS485
- Update time: 1.0 sec.
- Net Oil, Net Water, Total Flow, Flow Rates accessible via Modbus and display are calculated when flow rate input is provided
- Display with four lines: % Water, Temperature, Total Oil, Total Water or Flow rates configurable

Options:Pulse or Relay: 3- SPST relay isolated output (30V - 0.5a) – Selectable for totalizer or alarm

Configuration:

Configuration can be done Local Buttons, via HART, Modbus, and OWMWin software.

Data Storage:

Process (calculated) data can be stored on 1 minute intervals for 10 days and diagnostic (raw signal) data can be stored for 2 days with 1 minute intervals.
Options: Consult factory for additional memory requirements

Process Conditions:

Ambient Temperature: 0°F to 140°F (-15°C to 60°C), Optional -40° to 140°F (-40°C to 60°C with Insulation)
Process Temperature: Standard Model 32°F to 212°F (0°C-100°C), Optional Max. Temp 450°F (232°C),
Consult Factory for higher temperature
Wetted Parts: 316L Stainless Steel; Ceramic, Peek, Viton
Options: Metallic Parts - Duplex, Monel, Hastelloy C
Elastomers - Teflon, PDMA
Other materials – Consult Factory

Vibration: 5g at 500 Hz

Power Supply:

Standard: 12 to 36 VDC +/-15% Isolated, Optional: 110 to 220 VAC, others available upon request
Power Requirements: Less then 6 Watts
Optional: Solar Powered and Battery Back Up

Hazardous Area Classification:

UL/C-UL - Class 1, Division 1, Groups C & D, T6 - Pending
ATEX - EEx ia IIC T6 - Pending

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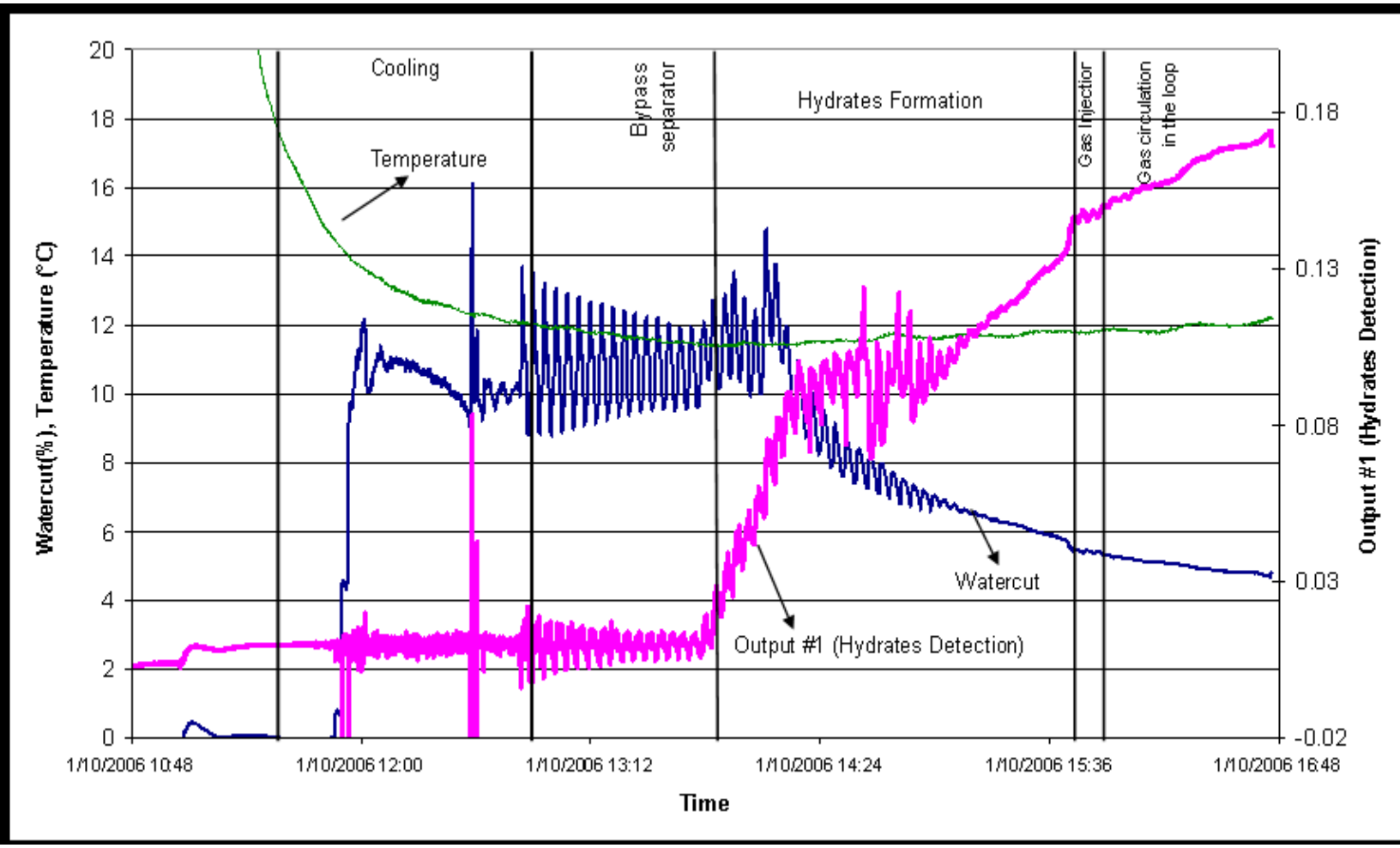

Flow data showing hydrate formation. As temperature drops the HD-102 shows higher Hydrate volume and lower water concentration.

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