BARTEC

Process Analytics Solutions

Oil, Gas, Petrochemicals & Chemicals

Contents

BARTEC. Innovative measurement technologies and reliable industrial solutions for the process industries.

With over sixty years of experience through its Benke and Orb brands, BARTEC is a worldwide leader in the provision of fully engineered process analytical solutions for the oil, gas, petrochemical, chemical and other industries.

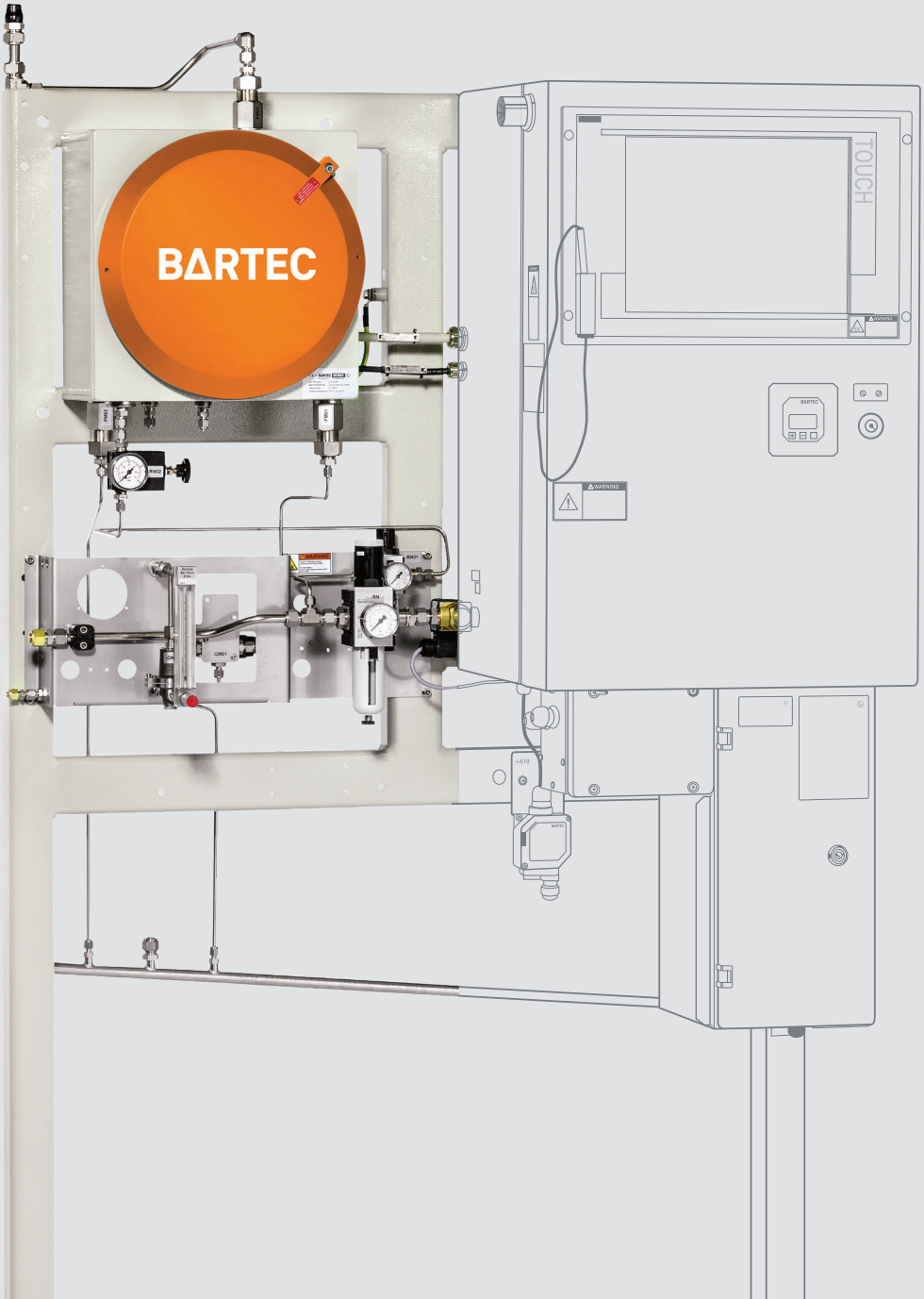
BARTEC Benke and BARTEC Orb between them offer a range of sophisticated, reliable and well established Physical property, Near Infrared and Moisture analyzers. All analyzers are available with the latest regional certification for use in safe or hazardous areas.

Analyzers may be supplied individually or as part of turn-key packages pre-installed into shelters or analyzer houses along with a range of BARTEC ancillary equipment such as sampling systems, heat tracing, air conditioning and chiller units, switch-gear and third party equipment.

Whatever process analytical challenge you face, in whatever difficult environment, BARTEC will strive to offer you an innovative, cost-effective and reliable solution backed up by worldwide engineering and service support.

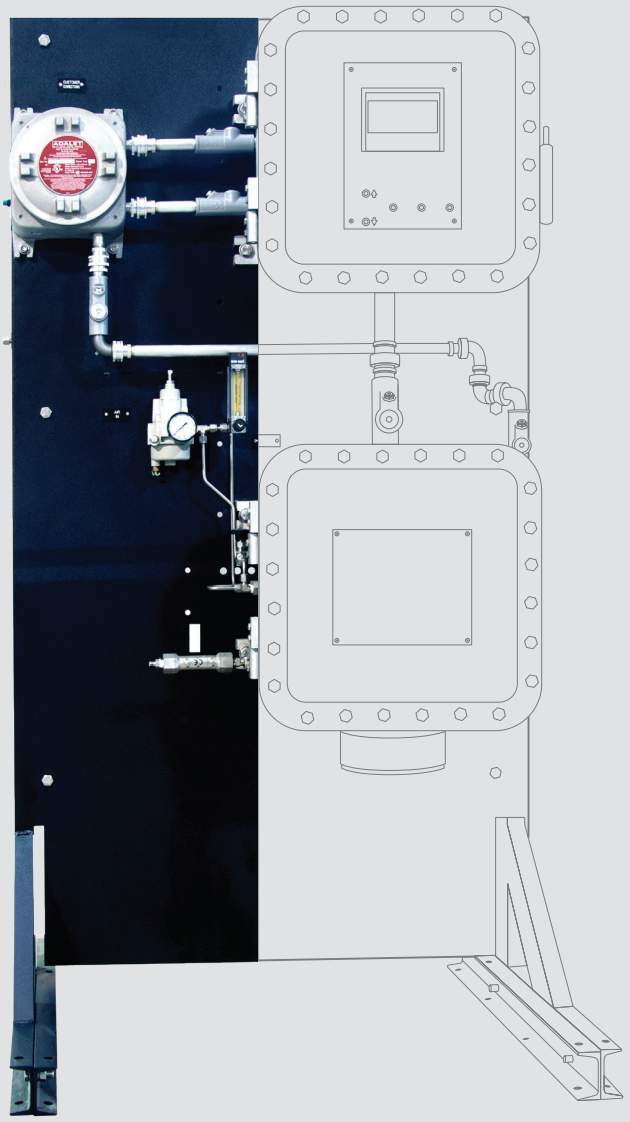
We look forward to listening to your process needs and adding value to your businesses. Allow us to introduce our Process Analytics Solutions!

ANALYZ



SY

ER



YSTEMS

BENKE Flash Point Process Analyzer FPA-4

The well established BENKE Flash Point Process Analyzer FPA-4 remains the best continuously measuring flash point analyzer for kerosene, diesel and other low sulphur refinery products. The improved concept offers an extended measuring range up to 180 °C (356 °F). The catalytic oxidation technique significantly reduces maintenance requirements by eliminating carbonization of the sample on the cell.

Benefit for your application

- Catalytic combustion technique
- Rapid continuous measuring
- Lag time < 30s
- No sample recovery required
- Measurement range of up to 180 °C

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	continuous measurement using catalytic combustion
Method	correlates with: ASTM D56, ASTM D93, DIN EN ISO 2719, DIN EN ISO 13736, IP 34, IP 170, DIN 51755
Measuring range	25 to 180 °C (77 to 356 °F)
Repeatability	≤ DIN EN/ASTM e.g. kerosene typ. 0.1 °C (approx. 0.2 °F)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	continuous
Product streams	2 x sample, 1 x validation (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	filtered 50 µm, free of suspended water, bubble-free, sulfur < 2000 ppm, free of heavy metals, free of phosphate (≤ 37 cSt at inlet temperature)
Consumption	approx. 2 to 3 l/h (at sample inlet)
Pressure at inlet	2 to 5 bar (29 to 72.5 psi)
Temperature at inlet	min. 15 K below expected FP temperature max. 80 °C, temperature change maximun 1K/min, For cooling with product: max +40 °C For using an inductive ring-type initiator (**"**min. contact**"**) on the flow meter: max. +60 °C
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.
– Coolant	depends on flash point temperature
Consumption	sample as coolant: 30 to 60 l/h or plant cooling water: 10 to 40 l/h
Temperature	5 to 40 °C (41 to 104 °F)
Pressure at inlet	2 to 5 bar (14.5 to 72.5 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	flash point temperature (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog inputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC/low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere
Weight and dimensions	
Weight	approx. 200 kg
Dimensions (W x H x D)	approx. 1140 x 2000 x 710 mm
Space requirements	right: 200 mm/left: 200 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

ORB Flash Point Analyzer Model P-500

The ORB Flash Point of mid-distillate products is one of the properties that must be maintained and controlled in order to produce and sell products to the market. The ORB P-500 is a state-of-the-art analyzer that implements the newest of electronics and detection principles for a low cost means of monitoring the Flash Point of a product during the refining process.

Benefit for your application

- High sulphur applications possible
- Spark ignition
- Rapid measuring cycle
- Ex-d technology
- IP 65 (rugged design)
- Measurement range of 25 – 125 °C
- ASTM compliant

Explosion protection

Ex protection marking	ATEX: Ex db IIB+H2 T6 Gb IECEx: Ex db IIB+H2 T6 Gb CSA/CUS Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	measurement/small stainless steel flash chamber, spark ignition
Method	compliant with: ASTM D56, ASTM D93
Measuring range	25 to 125 °C (77 to 257 °F)
Repeatability	± 1 °C or better
Reproducibility	≤ ASTM
Measuring cycle	measuring cycle typical 5 min or better
– Electrical data	
Nominal voltage	100 to 120 V AC 1 phase; 50/60 Hz 200 to 240 V AC 1 phase; 50/60 Hz
Maximum power consumption	less than 500 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	operation -18 up to 40 °C (0 to 104 °F)
Ambient humidity	less than 90 %
Sample	
Quality	filtered 10 µm, without water or moisture
Consumption	0.9 to 6 l/h
Pressure at inlet	1.4 to 10 bar (20 to 150 psi)
Temperature at inlet	min. 10 K below expected FP temperature ≤ 85 °C
Utilities	
– Instrument air Consumption	
Purge	60 l/h at 10 seconds per cycle
Operation	48 to 60 l/h continuous
Pressure at inlet	2.7 to 6.8 bar (40 to 100 psi)
Quality	clean dry, instrument air
– Coolant	None required

Signal outputs and inputs	
Analog outputs	Flash Point, sample temperature
Digital outputs	sample FP alarm, analyzer maintenance warning, analyzer fault alarm
Digital inputs	customer alarm, remote standby, stream switch, validation request
Electrical data of signal outputs and inputs	
Analog outputs	up to 3 to 4-20 mA self powered and isolated, 1 is standard
Analog inputs	optional
Digital outputs	up to 3 dry contacts programmable, alarm critical, come read, alarm warning
Digital inputs	up to 4 dry contact inputs
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic, no hot work permit required
Connections	
Sample inlet	1/4" FNPT
Sample outlet	1/4" FNPT
Vent/Drain	1/4" FNPT
Weight and dimensions	
Weight	approx. 228 kg (500 lbs)
Dimensions (W x H x D)	approx. 940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional, cell temperature
MODBUS interface	TCP/IP or Serial/RTU MODBUS output available

BENKE Freeze/Cloud Point Process Analyzer FRP-4/CPA-4

The BARTEC BENKE Freeze/Cloud Point Process Analyzer FRP-4/CPA-4 is a system for the fully automatic determination of the freezing point temperature of aviation fuels. The FRP-4/CPA-4 can be used for both determination of cloud point temperature and freezing point temperature of the sample.

Benefit for your application

- Determination of both cloud point and freezing point temperatures of sample
- Rugged design of measuring cell
- Easy and low maintenance approach
- Compliant with ASTM D2386, ASTM D2500, ASTM D1015
- Measuring range down to -80 °C

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	optical turbidity detection
Method	compliant with: ASTM D2386, ASTM D1015, DIN ISO 3013, ASTM D7153-05, ASTM D7154-05, ASTM D2500
Measuring range	down to -40 °C (-40 °F)* down to -70 °C (-94 °F)* optional: down to -80 °C (-112 °F)*
Repeatability	≤ DIN EN/ASTM e.g. kerosene typ. 0.2 °C at -50 °C (-58 °F)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 8 to 20 min depends on freezing point temperature cycle time 4 to 10 min depends on cloud point temperature*
Product streams	2 x sample, 1 x validation (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	filtered 50 µm, free of suspended water (≤ 37 cSt at inlet temperature)
Consumption	approx. 5 to 30 l/h
Pressure at inlet	2 to 3 bar (29 to 43.5 psi)
Temperature at inlet	5 to 15 °C (41 to 59 °F) min. 15 K above expected cloud point*
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	
Consumption*	60 to 100 l/h
Temperature	20 to 40 °C (68 to 104 °F)
Pressure at inlet	1 to 3 bar (15 to 44 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	freezing point temperature, cloud point temperature, (others on request)
Digital outputs	Alarm, Ready signal, see options
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog intputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere backpressure on request
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1140 x 1900 x 710 mm
Space requirements	right: 500 mm/left: 500 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

ORB Freeze Point Analyzer Model P-800LT, Low Temperature

Given today's highly competitive environment, oil refiners are demanding instrumentation that aids in the optimization of the refi ning process. Therefore, refineries require a reliable and accurate analysis system of the Freeze Point temperature to meet the required specifications. This analysis will allow the operators to optimize the refi ning process and therefore lower production costs while improving product quality.

Benefit for your application

- Determination of both cloud and freezing point temperatures of sample
- Automatic optical detection, absorbance or refl ectance
- Internal cryo cooler cools to -125 °C
- High pressure detection cell/no sample recovery required
- Dual optical system
- IP 65
- Measuring range down to -100 °C

Explosion protection

Ex protection marking	ATEX: Ex db IIB T6 Gb IECEX: Ex db IIB+H2 T6 Gb CSA/CUS Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	automatic optical detection, absorbance or reflectance
Method	correlates with: ASTM D2386
Measuring range	-100 to 25 °C (-148 to 77 °F)
Repeatability	0.25 °C
Reproducibility	≤ ASTM
Measuring cycle	typical is less than 15 min
Product streams	jet fuel is normal, kero
– Electrical data	IP 65
Nominal voltage	100 to 120 V AC 1 phase; 50/60 Hz 200 to 240 V AC 1 phase; 50/60 Hz
Maximum power consumption	600 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	0 to 30 °C (32 to 86 °F)
Ambient humidity	up to 90 %
Sample	
Quality	clean and filtered, less than 10 µm
Consumption	60 to 120 l/h; 2 bar (29 psi)
Pressure at inlet	2 to 24 bar (29 to 348 psi)
Temperature at inlet	15 to 85 °C (59 to 185 °F)
Utilities	
– Instrument air Consumption	If air cooled cyro then 25 CFM
Vortec Purge	12 l/h
Pressure at inlet	5 to 9 bar (80 to 120 psi)
Quality	plant air
– Coolant	None required
Consumption	if liquid cooled cyro then 240 l/h (air cooled/no coolant)
Temperature	10 to 55 °C (50 to 131 °F)
Pressure at inlet	1 to 20 bar (min 2 bar different)
Quality	clean and filtered
Signal outputs and inputs	
Analog outputs	Freeze Point
Digital outputs	F.P. alarm, analyzer fault, come read (programmable)
Digital inputs	customer alarm, remote standby, stream switch, validation (dry contact)
Electrical data of signal outputs and inputs	
Analog outputs	1 standard 4-20 mA self powered and isolated, 1 optional
Analog inputs	None required
Digital outputs	up to 3 dry contacts 250 V AC, 3 A
Digital inputs	up to 4 dry contact
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic, no hot work permit required
Connections	
Sample inlet	1/4" FNPT(37" x 71" x 30" in)
Sample outlet	1/4" FNPT
Weight and dimensions	
Weight	approx. 340 kg (750 lbs)
Dimensions (W x H x D)	approx. 940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional (Sig0, Sig90, cell temperature)
MODBUS	TCP IP/Serial RTU

ORB Cloud Point Analyzer Model P-820LT

Given today's highly competitive environment, oil refiners are demanding instrumentation that aids in the optimization of the refining process. Therefore, refineries require a reliable and accurate analysis system of the Cloud Point temperature to meet the required specifications. This analysis will allow the operators to optimize the refining process and therefore lower production costs while improving product quality.

Benefit for your application

- Measuring range (-100 to 25 °C)
- Rapid measuring cycles of 8 minutes
- Internal Cryo chiller cools to -125 °C without an external cooling system
- No Sample Recovery System needed, can return directly to process
- Stream switching and validation option
- Correlates with ASTM D2500

Explosion protection

Ex protection marking	ATEX: Ex db IIB T6 Gb IECEX: Ex db IIB+H2 T6 Gb CSA/CUS Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	absorbance or reflectance
Method	correlates with: ASTM D2500
Measuring range	-100 to 25 °C (-148 to 77 °F)
Repeatability	0.25 °C
Reproducibility	correlates with: ASTM D2500
Measuring cycle	less than 15 min
Product streams	diesel, kerosene
– Electrical data	
Nominal voltage	100 to 120 V AC 1 phase; 50/60 Hz 200 to 240 V AC 1 phase; 50/60 Hz
Maximum power consumption	600 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	0 to 30 °C (32 to 86 °F)
Ambient humidity	up to 90 %
Sample	
Quality	clean and filtered, less than 10 µm
Consumption	60 to 120 l/h
Pressure at inlet	2 to 24 bar (29 to 348 psi)
Temperature at inlet	15 to 85 °C (59 to 185 °F)
Utilities	
– Instrument air Consumption	If air cooled cyro then 25 CFM
Vortec Purge	12 l/h
Pressure at inlet	5 to 9 bar (80 to 120 psi)
Quality	plant air
– Coolant	
Consumption	if liquid cooled cyro then 240 l/h (air cooled/no coolant)
Temperature	10 to 55 °C (50 to 131 °F)
Pressure at inlet	1 to 20 bar (min 2 bar different)
Quality	clean and filtered
Signal outputs and inputs	
Analog outputs	Cloud Point, cell temperature, optical signals
Digital outputs	Cloud Point alarm, analyzer fault, come read
Digital inputs	customer alarm, remote standby, stream switch, validation request
Electrical data of signal outputs and inputs	
Analog outputs	1 standard 4-20 mA self powered and isolated, 1 optional
Digital outputs	up to 3 dry contacts 250 V AC, 3 A
Digital inputs	up to 4 dry contact, (dry contact)
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic no hot work permit required
Connections	
Sample inlet	1/4" FNPT
Sample outlet	1/4" FNPT
Weight and dimensions	
Weight	approx. 340 kg (750 lbs)
Dimensions (W x H x D)	approx. 940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional (Sig0, Sig90, cell temperature)
MODBUS	TCP IP/Serial RTU

BENKE Pour Point Process Analyzer PPA-4

The BARTEC BENKE Pour Point Process Analyzer PPA-4 is a system for the fully automatic determination of the pour point of a variety of products. The PPA-4 is used by lube oil producers to optimize the production processes and the use of cold flow additives. It is also used by fuel oil producers to meet market demands. The PPA-4 is the only process analyzer that is compliant with the applicable norm using a tilting device.

Benefit for your application

- ASTM D97 compliant measurement based on tilting mechanism
- Low and high temperature applications
- Opacity independent measurement
- Compliant with ASTM D97, DIN ISO 3016, IP 15
- Easy and low maintenance approach
- Rugged design of measuring cell

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	Automatic tilting measuring cell
Method	compliant with: ASTM D97, DIN EN ISO 3016, IP 15 correlates with: ASTM D5949 Automatic Tilt Method similar to ASTM D5950
Measuring range	-30 to 33 °C (-22 to 91.4 °F)
Repeatability	≤ DIN EN/ASTM
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 15 to 90 min depends on pour point temperature
Product streams	1 x sample, 1 x validation (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 600 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	filtered 50 µm, free of suspended water (≤ 37 cSt at inlet temperature)
Consumption	approx. 20 to 40 l/h
Pressure at inlet	1 to 3 bar (14.5 to 43.5 psi)
Temperature at inlet	normal: 30 to 50 °C (86 to 133 °F) min. 20 K above pour point temperature
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 0.8 Nm³/h
Pressure at inlet	2 to 5 bar (29 to 72.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	controlled and supplied by chiller

Signal outputs and inputs	
Analog outputs	pour point temperature (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog intputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/8 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere, backpressure on request
Weight and dimensions	
Weight	approx. 420 kg
Dimensions (W x H x D)	approx. 1140 x 1900 x 710 mm
Space requirements	right: 500 mm/left: 500 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

ORB No Flow/Pour Point Analyzer Model P-840LT

Given today's highly competitive environment, oil refiners are demanding instrumentation that aids in the optimization of the refining process. Therefore, refineries require a reliable and accurate analysis system of the No Flow (Pour Point) temperature to meet the required specifications. This analysis will allow the operators to optimize the refining process and therefore lower production costs while improving product quality.

Benefit for your application

- Differential pressure sensing system
- Operating range -100 to 25 °C (-148 to 77 °F)
- Rapid analysis cycle of 10 to 45 minutes
- High pressure sample detection cell eliminates the need for atmospheric recovery
- Stream switching and validation
- Internal cryo cooler
- Compliant with ASTM D7346
- Correlates with ASTM D97

Explosion protection

Ex protection marking	ATEX: Ex db IIB T6 Gb IECEX: Ex db IIB+H2 T6 Gb CSA/CUS Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	differential pressure sensing system
Method	compliant with: ASTM D7346 correlates with: ASTM D97
Measuring range	-100 to 25 °C (-148 to 77 °F)
Repeatability	0.25 °C
Reproducibility	compliant with: ASTM D7346 correlates with: ASTM D97
Measuring cycle	less than 20 min typical
– Electrical data	
Nominal voltage	100 to 120 V AC, 1 phase; 50/60 Hz 200 to 240 V AC, 1 phase; 50/60 Hz
Maximum power consumption	600 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	0 to 30 °C (32 to 86 °F)
Ambient humidity	up to 90 %
Sample	
Quality	clean and filtered, no free water
Consumption	60 to 120 l/h
Pressure at inlet	min of 2 bar (29 psi), up to 15 bar (217 psi)
Temperature at inlet	-15 °C to 85 °C (5 to 185 °F)
Utilities	
– Instrument air Consumption	If air cooled cyro then 25 CFM
Vortec Purge	12 l/h
Pressure at inlet	24 bar (350 psi)
Quality	plant air
– Coolant	
Consumption	if liquid cooled cyro then 240 l/h (air cooled cyro unit/no coolant)
Temperature	10 to 55 °C (50 to 131 °F)
Pressure at inlet	1 to 20 bar (14 to 290 psi) (min 2 bar different)
Quality	clean and filtered

Signal outputs and inputs	
Analog outputs	Pour Point/No Flow Point, cell temperature, pressure signal
Digital outputs	come read, analyzer fault, Pour Point alarm, 3 A
Digital inputs	customer alarm, remote standby, stream switch, validation
Electrical data of signal outputs and inputs	
Analog outputs	1 standard 4-20 mA self powered and isolated, 1 optional
Digital outputs	up to 3 dry contacts 250 V AC, 3 A
Digital inputs	up to 4 dry contact, customer alarm, remote standby, stream switch, validation
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic, no hot work permit required
Connections	
Sample inlet	1/4" FNPT
Sample outlet	1/4" FNPT
Weight and dimensions	
Weight	approx. 340 kg (750 lbs)
Dimensions (W x H x D)	approx. 940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional (pressure, cell temperature)
MODBUS	TCP IP/Serial RTU

BENKE Vapor Pressure Process Analyzer RVP-4

The BARTEC BENKE Vapor Pressure Process Analyzer RVP-4 measures the vapor pressure of various petroleum products. Due to its design it can be used for gasoline applications as well as for high pressure applications on natural gas liquids. It is also a very good choice for applications for viscous samples such as crude oil without the necessity of implementing additional wash cycles. It is also possible to measure the vapor pressure at different temperatures e.g. True Vapor Pressure (TVP) for storage tank application.

Benefit for your application

- ASTM compliant cylinder piston design with 4:1 expansion (ASTM D5191)
- Wide range of applications (fuel, crude oil, LPG)
- For high viscous samples without additional wash cycles (e.g. crude)
- No maintenance approach; rugged design of measuring cell
- Wide range of inlet temperatures
- Measurement at different temperatures for e.g. tank storage
- Sample recovery not necessarily required

Explosion protection

Marking	ATEX: II 2 G Ex h IIC T4 Gb NEC 500: Class I, Div. 2, Groups B, C, D, T4 NEC 505: Class I, Zone 1, TR CU Certification available

Technical data

Technology	expansion with piston
Method	**compliant:** ASTM D5191, DIN EN 13016-1 **correlates:** ASTM D4953*, ASTM D323, ASTM D5482, ASTM D6377 (Crude Oil), ASTM D1267, ASTM D6897
Measuring range	fuel up to 1.6 bar (23 psi) LPG up to 16 bar (232 psi)
Repeatability	≤ DIN EN/ASTM fuel typ. 1.5 mbar (0.02 psi) LPG typ. 50 mbar (0.73 psi)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 7 min typically, depends on sample composition
Product streams	2 x sample, 1 x validation (additional hardware required)
Measuring temperature	7.8 °C (100 °F), up to 60 °C (140 °F) optional
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
– Protection class	P 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, storage 5 to 85 % relative humidity, – both are non-corrosive
Sample	
Quality	filtered 10 µm, moisture content max. 500 ppm, ≤ 200 cSt at inlet temperature
Properties	pour point 15 K below measuring temperature or cloud point temperature, for crude oil applications WAT needed
Consumption	approx. 2 to 10 l/h (depends on product) approx. 30 l/h for re-cooling of peltier device (not required if suitable coolant is available)
Pressure at inlet	min. 2 bar (29 psi) above measuring range standard: up to 8 bar (116 psi) optional: up to 18 bar (261 psi)
Temperature at inlet	Standard: T_M**< 45°C: T_M**-40 K< T_{INLET} ***< max. 45°C(113°F) Optional: T_M**> 45°C: T_M**-30 K< T_{INLET} ***< T_M**+5K variation of temperature should not exceed 0.2 K/min
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	controlled and supplied by chiller
Consumption	sample as coolant: 20 to 40 l/h or plant cooling water: 10 to 30 l/h for re-cooling of peltier device
Temperature	5 to 50 °C (41 to 122 °F), variation of coolant should not exceed 1.0 K/min
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	vapor pressure (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog intputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC/low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere backpressure on request
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1191 x 1930 x 710 mm
Space requirements	right: 150 mm/left: 100 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

ORB Reid Vapor Pressure Analyzer Model P-700

With the introduction of the Clean Air Act and its amendments in 1990 by the Environmental Protection Agency under Title II Emission Standards for Moving Sources, Part A – Motor Vehicle Emission and Fuel Standards, Section 211 Regulation of Fuels – (h) Reid Vapor Pressure Requirements, it has become unlawful to sell, offer for sale, dispense, supply, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi) during the high ozone season (as defined by the Administrator).

Therefore, refineries, pipeline terminals and blending stations require a reliable and accurate analysis system of Reid Vapor Pressure to comply with this regulation. In addition, the very same analysis system will allow the operator to run the blending process in an optimized range, lowering production cost and improving product quality.

Benefit for your application

- Digitally controlled syringe sample handling system
- Micro samples 0.5 ml/cycle
- Sample temperature of up to 75 °C
- Stream switching possible
- IP 65
- Less than 5 min cycle times

Explosion protection

Ex protection marking	ATEX: Ex db IIB+H2 T6 Gb IECEX: Ex db IIB+H2 T6 Gb CSA/CUS: Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	uses a digitally controlled syringe sample handling system; micro sample 0.5 ml
Method	correlates with: ASTM D323, ASTM D4953, ASTM D5482, ASTM D5191, ASTM D6377
Measuring range	0 to 2.4 bar (0 to 35 psi)
Repeatability	3.4 mbar (0.05 psi)
Reproducibility	≤ ASTM
Measuring cycle	Less than 5 min
– Electrical data	
Nominal voltage	100 to 120 V AC, 1 phase; 50/60 Hz 200 to 240 V AC, 1 phase; 50/60 Hz
Maximum power consumption	less than 500 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	operation -20 up to 40 °C (-4 to 104 °F)
Ambient humidity	up to 90 %
Sample	
Quality	clean dry, filtered less than 10 µm, no free water
Properties	
Consumption	1.2 to 6 l/h
Pressure at inlet	1 to 3.8 bar (55 psi)
Temperature at inlet	2 to 75 °C (35 to 167 °F)
Viscosity	max. 15 cST
Utilities	
– Instrument air Consumption	
Cell Purge	30 l/h
Pressure at inlet	1 bar to 8 bar (14 to 116 psi)
Quality	clean dry, oil and particulate free, instrument air
– Coolant	None required

Signal outputs and inputs	
Analog outputs	RVP values, analyzer system/ maintenance warning, RVP1, RVP2, TVP (with option) cell temperature, 2 outputs standard analysis measurement indication
Digital outputs	RVP value alarm, analyzer maintenance warning, analyzer fault alarm, come read, in validation, analyzer warning (plus your listed), 3 dry contacts programmable
Digital inputs	customer alarm, remote standby, stream switch, validation (dry contact)
Electrical data of signal outputs and inputs	
Analog outputs	3 x 4 to 20 mA, self powered and isolated
Digital outputs	250 V AC, max. 3A, 3 dry contacts
Digital inputs	dry contact
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic, no hot work permit required
Connections	
Sample inlet	1/4" FNPT
Sample outlet	1/4" FNPT
Vent/Drain	1/4" FNPT
Weight and dimensions	
Weight	approx. 228 kg (500 lbs)
Dimensions (W x H x D)	approx. 940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional, cell pressure, validation result, cell temperature, additional on request
MODBUS	TCP/IP or Serial/RTU MODBUS output available

BENKE Viscosity Process Analyzer VISC-4

The BARTEC BENKE Viscosity Process Analyzer VISC-4 continuously measures the kinematic viscosity of a product via the capillary method.

Due to the outstanding performance and sample temperature stability of ± 0.02 K the VISC-4 is a very good choice for highly accurate viscosity measurements e.g. lube oil production and fuel oil blending. This high level of accuracy results in cost reduction while improving product quality. The VISC-4 is suitable to handle samples with a viscosity of up to 1000 cSt at measurement temperatures of up to 100 °C.

Benefit for your application

- The only ASTM D445 compliant capillary type viscometer
- Kinematic viscosity directly and continuously measured
- Integral measurement of density
- Calculation of dynamic viscosity
- Unparalleled temperature stability of ± 0.02K
- Hagenbach correction not necessary
- No maintenance approach
- Recovery system not necessarily required

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 or T3 Gb X IECEx: Ex h IIC T4 or T3 Gb X NEC 500: Class I, Div. 2, Groups B, C, D, T4 or T3 NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	continuously analyzing kinematic viscosity, capillary-type temperature stability ± 0,02K
Method	compliant with: ASTM D445, DIN EN ISO 3104, IP 71
Measuring range and temperatures	L T_M*: 20 to 60°C (68 to 140°F) M T_M*: 40 to 60°C (106 to 140°F) H T_M*: 50 to 100°C (122 to 212°F) t viscosity 0.7 to 30 cSt v viscosity 10 to 500 cSt/200 to 1000 cSt
Repeatability	≤ DIN EN/ASTM formulated oils typ. 0.03 cSt at 100 °C (212 °F)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	continuous
Product streams	2 x sample, 1 x validation (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	t filtered 10 µm, bubble-free v filtered 50 µm, bubble-free max. viscosity = end of measuring range (technical clarification required) (sample as coolant ≤ 10 cSt)
Consumption	3.8 to 10 l/h (depends on variant)
Pressure at inlet	3 to 14 bar (43.5 to 203 psi)
Temperature at inlet	for L + M Versions: T_M*-35 K<T_{INLET}**< T_M*+5 K for H Versions: T_M*-40 K<T_{INLET}**< T_M*-5 K depends on application
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	3 to 7 bar (43.5 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	
Consumption	sample as coolant: 20 to 40 l/h or plant cooling water: 20 to 40 l/h for re-cooling of peltier device
Temperature	5 to 50 °C (41 to 122°F)
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	kinematic viscosity (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog input	4 to 24 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC/low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere, backpressure on request
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1190 x 1930 x 710 mm
Space requirements	right: 150 mm/left: 100 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

Technical data subject to change without notice. – *T_M = Measuring Temperature / ** T_{INLET}= Sample Inlet Temperature

BENKE Viscosity Index Process Analyzer VI-4

The BARTEC BENKE Viscosity Index Process Analyzer VI-4 consists of two viscosity process analyzer units. One analyzer unit measures the kinematic viscosity at a temperature of 40 °C and the other at a temperature of typically 100 °C. These two values are used to calculate the VI according to ASTM D2270.

Due to the outstanding performance and sample temperature stability of ± 0.02 K the VI-4 is a very good choice for highly accurate viscosity index measurements e.g. lube oil production and fuel oil blending. This high level of accuracy results in cost reduction while improving product quality. The VI-4 is suitable to handle samples with a viscosity of up to 800 cSt at measurement temperatures of up to 100 °C.

Benefit for your application

- Continuously analyzing kinematic viscosities at different measuring temperatures, capillary type
- Only ASTM D2270 compliant viscosity index analyzer
- Integral calculation of viscosity index
- Integral measurement of density
- Unparalleled temperature stability of ± 0.02 K
- Hagenbach correction not necessary
- No maintenance approach
- Sample recovery not necessarily required

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 or T3 Gb X IECEx: Ex h IIC T4 or T3 Gb X NEC 500: Class I, Div. 2, Groups B, C, D, T4 or T3 NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	continuously analyzing kinematic viscosities at 40 °C and 100 °C, capillary-type
Method	compliant with: ASTM D445, ASTM D2270, ASTM D341, DIN EN ISO 3104, IP 71
Measuring range and temperatures	viscosity index 80 to 120 (other temperatures on request) L T_M*: 20 to 60°C (68 to 140°F) M T_M*: 40 to 60°C (106 to 140°F) H T_M*: 50 to 100°C (122 to 212°F) t viscosity 0.7 to 30 cSt v viscosity 10 to 500 cSt/200 to 1000 cSt
Measuring cycle	continuous
Product streams	2 x sample, 1 x validation (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 1000 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	t filtered 10 µm, bubble-free v filtered 50 µm, bubble-free max. viscosity 800 cSt at the lowest temperature (technical clarification required) (sample as coolant ≤ 10 cSt)
Consumption	3.8 to 10 l/h (depends on variant)
Pressure at inlet	3 to 14 bar (43.5 to 203 psi)
Temperature at inlet	50 to 60 °C; changes ≤ 0,1 K/min
Utilities	
– Instrument air Consumption	
Purge	11 Nm³/h while purging (~16 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	3 to 7 bar (43.5 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	
Consumption	sample as coolant: 20 to 40 l/h or plant cooling water: 20 to 40 l/h for re-cooling of peltier device
Temperature	5 to 50 °C (41 to 122°F)
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	viscosity index others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog intputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixe
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere, backpressure on request
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1190 x 1930 x 710 mm
Space requirements	right: 150 mm/left: 100 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

BENKE Cold Filter Plugging Point Process Analyzer CFPP-4

The BARTEC BENKE Cold Filter Plugging Point Process Analyzer CFPP-4 is a system for the fully automatic determination of the cold filter plugging point of diesel and domestic fuels. The CFPP-4 allows diesel fuel producers to optimize the use of cold flow additives that allows spreading the usage of winter grade diesel at temperatures below the cloud point. Besides the step-cooling procedure the CFPP-4 also offers linear sample cooling.

Benefit for your application

- The only ASTM compliant CFPP progress analyzer
- Identical test mesh filter as used in the laboratory
- Stepped and linear cooling

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	plugging sieve
Method	compliant with: ASTM D6371, DIN EN 116, DIN EN 16329, IP 309
Measuring range	-35 to 15 °C (-31 to 59 °F)
Repeatability	≤ DIN EN/ASTM
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous 25 to 90 min depends on CFPP temperature
Product streams	2 x sample, 1 x validation (additional hardware required))
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; chiller: 400 V AC ± 10 %, 3 phases; 50 Hz other ratings on request
Maximum power consumption	approx. 700 W chiller: approx. 1200 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 35 °C (41 to 95 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	filtered 10 µm, moisture content max. 550 ppm (≤ 37 cSt at inlet temperature)
Consumption	20 to 40 l/h
Pressure at inlet	1 to 4 bar (14.5 to 58 psi)
Temperature at inlet	≥ 15 °C (59 °F)
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 2.3 Nm³/h
Pressure at inlet	3 to 7 bar (43.5 to 101.5 psi)
Quality	dew point ≤ -40°C (-40°F) humidity class 2 or better acc. to ISO 8573.1
– Coolant	FKS-KWS with „Temper -55" integrated

Signal outputs and inputs	
Analog outputs	Cold Filter Plugging Point (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog intputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere
Weight and dimensions	
Weight	approx. 400 kg
Dimensions (W x H x D)	approx. 1140 x 2030 x 710 mm
Space requirements	right: 500 mm/left: 500 mm
Optional interfaces	
Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

BENKE Distillation Process Analyzer DPA-4

The BARTEC BENKE Distillation Process Analyzer DPA-4 is the only distillation analyzer that is compliant with the master norm ASTM D86. Apart from measurement cycles fully compliant with the norm, the DPA-4 can be operated in the so called Rapid Analizer Mode (RAM) in which the cycle time can be reduced to approx. 60%. It therefore serves to enhance automatic control of blending processes.

The DPA-4 offers to run the distillation process below atmospheric pressure which prevents samples that are sensitive to temperature (e.g. palm oils) from degradation. It also allows extending the measurement range to higher boiling points.

Benefit for your application

- The only ASTM D86 compliant design with flask – condenser – receiver
- Capability to reduce cycle time by Rapid Analysis Mode (RAM)
- Complete boiling curve can be measured from IBP to FBP
- Suitable for operation at pressure below atmospheric pressure
- De-coking feature

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	batch distillation
Method	SAM compliant with: ASTM D86, DIN EN ISO 3405, IP 123 Correlates with: ASTM D4814 (calculation of TV/L) ASTM D4737 (Calculated Cetane Index) RAM correlates with: ASTM D86, DIN EN ISO 3405, IP 123
Measuring range	20 to 420 °C (68 to 788 °F) output of any temperature/distillate amount via Modbus
Repeatability	≤ DIN EN/ASTM e.g. gasoline typ. T@ 50% rec. 1 °C
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	typical time for gasoline/diesel in SAM (in min) IBP: approx. 24/29 50 % recovered: approx. 36/41 FBP: approx. 45/50 cycle time will be reduced by approx. 40 % in RAM
Product streams	up to 3 x sample, 1 validation sample each (additional hardware required)
– Electrical data	
Nominal voltage	230 V AC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 600 W
– Protection class	IP 54 (NEMA 13)
– Ambient conditions	
Ambient temperature	operation 5 to 40 °C (41 to 104 °F) storage 0 to 60 °C (32 to 140 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive
Sample	
Quality	filtered 50 µm, bubble-free (≤ 37 cSt at inlet temperature)
Consumption	approx. 10 to 40 l/h (≥ 10 cSt: max. 15 l/h)
Pressure at inlet	1.5 to 2 bar (21.8 to 29 psi)
Temperature at inlet	depends on application, max. 55 °C (131 °F)
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
– Coolant	
Consumption	max. 60 l/h
Temperature	-10 to 55 °C (14 to 131 °F)
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm
Signal outputs and inputs	
Analog outputs	temperature at specific distillation batch
Digital outputs	Alarm, Ready/Valid
Digital inputs	Stream Selection, Validation Request, Reset
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Analog inputs	4 to 20 mA; 160 Ω
Digital outputs	24 V DC; max. 0.5 A
Digital inputs	high: 15 to 28 V DC low: 0 to 4 V DC
Auxiliary power supply output	24 V DC; max. 0.8 A
Control unit	
Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS
User interfaces	
Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere backpressure on request
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1140 x 1900 x 710 mm
Space requirements	right: 150 mm/left: 100 mm
Optional interfaces	
Analog outputs	on request
Analog inputs	density
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

BENKE Rapid Distillation Process Analyzer rapiDist-4

The BARTEC BENKE rapiDist-4 Analyzer is designed for fast process control of atmospheric distillation columns, blending processes as for all types of middle distillates, feedstock for petrochemical processes (naphtha), jet fuels, fuel oils, diesel fuels, similar petroleum products and liquid hydrocarbons. No matter if refinery or remote terminal sites for blending, the rapiDist-4 provides results correlating to ASTM D86 in the shortest time possible for physical property measurement. Changes in sample recipes or matrix will be visible and allow for optimizing the profit within cycle.

Benefit for your application

- Measurement from IBP to FBP possible
- Measuring points can be freely selected by software
- Cycle time 10 – 15 min depending on matrix
- Automated de-coking
- Integrated failure diagnosis and self monitoring

Explosion protection

Marking	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	distillation
Method	correlates with: ASTM D86, DIN EN ISO 3405, IP 123
Measuring range	+20 °C to +400 °C (+68 °F to +752 °F)
Repeatability	≤ DIN EN/ASTM D86
Reproducibility	≤ DIN EN/ASTM D86
Measuring cycle	discontinuous, cycle time approx. 10 min for diesel cycle time approx. 15 min for gasoline
Product streams	2 x sample, 1 x validation
– Electrical data	
Nominal voltage	230 VAC ± 10 %, 1 phase; 50 Hz/60 Hz or 110 VAC +/- 10 %, 1 phase; 50 Hz/60 Hz with FKS 1,4-KWS 400 VAC +/- 10 %; 3 phase; 50 Hz/60 Hz other ratings on request
Maximum power consumption	approx. 700 W (analyzer only) incl. chiller for liquids: approx. 1600 W
– Protection class	IP 54
– Ambient conditions	
Ambient temperature	operation +5 °C to +40 °C (+41 °F to +104 °F) storage -20 °C to +60 °C (-4 °F to +140 °F)
Ambient humidity	operation: 5 to 80 % , relative humidity at +25 °C, non- corrosive storage: 5 to 80 %, relative humidity at +25 °C, non- corrosive
Sample	
Quality	filtered 50 µm, no suspended water, bubble-free
Consumption	20 to 40 l/h
Pressure at inlet	1 to 3 bar (14.5 to 43 psi)
Temperature at inlet	max. +50 °C (+122 °F)
Temperature change	max. 1K/min.
Viscosity	max. 37 cSt at inlet temperature
Utilities	
– Instrument air Consumption	
Purge	8 Nm³/h while purging Ex p (12 mins) approx. 1 Nm³/h (normal operation) approx. 1.5 Nm³/h at 6 bar, optional nitrogen generator is used approx. 0.1 Nm³/h for purging Ex d (for gasoline application)
Pressure at inlet	5 to 7 bar (72 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO8573.1
– Coolant	Plant water or integrated FKS 1.4 KWS
Consumption	use of plant water: 20 to 40 l/h
Pressure at inlet	plant water: 1 to 3 bar
Temperature	plant water: -5 °C to +40 °C; ± 0.5 K
Quality	filtered 50 µm, pH 6 to 8
Electrical data of signal outputs and inputs	
Analog outputs	max. 8 outputs 4 to 20 mA, (max. resistance 1000 Ω), active isolated on request
Analog inputs	4 to 20 mA, 160 Ω
Digital outputs	DC 24 V; max. 0.5 A; sum alarm Ready/Come-Read, Power identification Validation identification, Analysis Cycle Active
Digital inputs (max. 3 configurable inputs)	high: DC 15 to 28 V; low: DC 0 to 4 V Reset, Inhibit, Stream request, Validation request, Decoking request, Automatic stream switching, Electrical data of signal outputs and inputs
Control unit	
Central control unit	Industrial PC
Operating system	Windows 7
Control software	PACS
HMI	TFT display (multi-touch)
User interfaces	
Display	TFT display with touch function, 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function
Connections	
Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere
Weight and dimensions	
Dimensions (W x H x D)	approx. 1150 x 1900 x 710 mm
Weight	approx. 300 kg approx. 450 kg (incl. FKS 1.4-KWS)
Space requirements	right: 500 mm/left: 500 mm
Optional interfaces	
MODBUS interface	MODBUS RTU/TCP (RS485, RS422, VDSL/FO (IS) MODBUS/TCP via FOC is
Remote access	remote software with modem, ISDN, Ethernet via VDSL modem FO (FS)

ORB Salt In Crude Analyzer Model P-600

In certain areas of the world, crude oils with high level of salts exist. This crude oil must still be transported and refined and the high levels of salt pose problems if left untreated. De-Salting technology is well established but to be utilized effectively the need for quick and accurate measurements of the level of salt concentration is necessary. The immediate response of an on-line analyzer allows the operator to use De-Salters as efficiently as possible.

Benefit for your application

- Variable measurement ranges of up to 0 – 400 PTB (0-1000 mg/L)
- Rapid analysis cycle of 6 minutes
- Superior repeatability of 2 % of scale
- Repeatability better than 99 % uptime
- Micro sample analysis reduces solvent consumption
- Precise bi-directional cell temperature control
- Incorporated rinse/flush system
- Correlates with ASTM D3230

Explosion protection

Marking	ATEX: Ex db IIB+H2 T6 Gb IECEX: Ex db IIB+H2 T6 Gb CSA/CUS Class I Div 1 Group B, C + D CE 0518

Technical data

Technology	chemical mixing, electrometric
Method	correlates with: ASTM D3230
Measuring range	0 to 400 PTB (0 to 1000 mg/L)
Repeatability	2 % of scale
Reproducibility	± 1 % of scale
Measuring cycle	6 min typical
Measuring temperature	programmable, typical 50 °C (122 °F)
– Electrical data	
Nominal voltage	110 or 220 V AC, 1 phase; 50/60 Hz
Maximum power consumption	600 W
– Protection class	IP 65
– Ambient conditions	
Ambient temperature	operation -20 to 40 °C (-4 to 104 °F)
Ambient humidity	up to 90 %
Sample	
Quality	filtered 100 µm, without water
Consumption	3.0 to 6.0 l/h
Pressure at inlet	2 to 10 bar (29 to 145 psi)
Temperature at inlet	10 to 60 °C (50 to 140 °F)
Utilities	
– Instrument air Consumption	less than 60 l/h
Pressure at inlet	4 to 8 bar (58 to 116 psi)
Quality	clean dry, instrument air
– Coolant	Not required

Signal outputs and inputs	
Analog outputs	1 standard, 1 optional
Digital outputs	3 dry contacts programmable
Digital inputs	up to 4 dry contact inputs, (customer alarm, remote standby, stream switch, validation request)
Electrical data of signal outputs and inputs	
Analog outputs	up to 3 to 4-20 mA self powered and isolated, 1 is standard
Analog intputs	None required
Digital outputs	up to 3 dry contacts programmable, alarm critical, come read, alarm warning
Digital inputs	up to 4 dry contact inputs, (customer alarm, remote standby, stream switch, validation request)
User interfaces	
Display	7" color graphics
Keyboard	5 button magnetic, no hot work permit required
Connections	
Sample inlet	1/4" FNPT
Sample outlet	1/4" FNPT
Vent/Drain	1/4" FNPT
Weight and dimensions	
Weight	340 kg (750 lbs)
Dimensions (W x H x D)	940 x 1803 x 762 mm (37" x 71" x 30" in)
Optional interfaces	
Analog outputs	optional, conductivity, cell temperature
MODBUS interface	TCP/FP or Serial/RTU MODBUS output available

BENKE Near Infrared Process Analyzer NIR 4.1/4.2

The very innovative BENKE Near Infrared Process Analyzer 4.1/4.2 can be used for applications such as Naphtha Steam Cracking Optimization, Gasoline Blending and Diesel blending, Catalytic Reforming Optimization and Terminal Pipeline Blending Monitoring. The NIR can be operated in Ex (NIR-4.2) or non-Ex (NIR-4.1) zones.

Benefit for your application

- Real-time analysis of liquid naphtha feed to steam-cracking units
- Ability to keep control on the reformate cracker
- Yield optimization of high-quality reformate
- Real time blending operations
- Reduction of giveaways during gasoline and gasoil blending
- Cost effective multichannel analysis
- Ability to simultaneously monitor multiple properties

Explosion protection

Marking	NIR 4.2 (Ex) ATEX: II 2 G Ex h IIC T4 Gb NEC 500/NEC 505: on request TR CU: on request NIR 4.1 (general purpose)

Technical data

Device type	NIR-4.2 (operation in potentially explosive atmospheres)
Method	NIR spectroscopy
Measuring range	1,000 to 2,200 nm
Measuring cycle	Cyclical
Sample volume of NIR measuring cell	≤10 ml
– Electrical data	
Rated voltage	230 VAC ± 10 % 1 phase, 50 Hz (others upon request)
Rated current	See data sheet/type plate
Power rating	Typically 275 W max. 450 W
Pre-fuse	20 A
– Protection class	Europe (IEC 60529): IP 54 (splash water protected)
– Ambient conditions	
Ambient temperature	Operation 5 to 40 °C (41 to 104 °F) Storage -20 to 60 °C (-4 to 140 °F)
Ambient humidity (operation and storage)	5 to 80 % relative at 25 °C (77°F), non-corrosive
Emissions	Noise ≤ 70 dB(A)
Sample	
Quality	filtered 5 µm, without suspended water, bubble-free
Consumption	approx. 20 l/h
Pressure at inlet	min. 1 bar (14.5 psi) above the pressure at the outlet of the measuring cell max. 10 bar (145 psi)
Temperature at inlet	20 to 30 °C (68 to 86 °F)
Utilities	
– Instrument air Consumption	
Purge	approx. 6.4 Nm^3 920 l/h leakage rate
Pressure at inlet	5 to 7 bar (73 to 116 psi)
Quality	Class 2 in line with ISO 8573-1 or higher
Purging of measuring cell (optional)	see operating manual for process flow measuring cell
– Coolant	
Consumption	250 l/h
Temperature	≤ 20 °C (≤ 68 °F)
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm, pH value 6 to 8
Electrical data of signal outputs and inputs	
Analog outputs	
Signal	4 to 20 mA (max. 8)
Apparent ohmic resistance, maximum	1000 Ω
Reference potential	0 V/ground
Anolog inputs	
Signal	4 to 20 mA
Apparent ohmic resistance, maximum	160 Ω
Reference potential	0 V/ground
Digital outputs	
Voltage	24 VDC
Current	0.5 A
Total signal currents, max.	0.8 A
Reference potential	0 V/ground
Voltage	High 15 to 28 VDC Low 0 to 4 VDC
Digital inputs	
Voltage	High 15 to 28 VDC Low 0 to 4 VDC
Reference potential	0 V/ground
Auxiliary voltage	
Voltage	24 VDC
Current, max.	3.75 A
Weight and dimensions	
Weight	approx. 350 kg without options
Dimensions (W x H x D)	Ex d housing: approx. 860 x 1,890 x 830 mm (W x H x D) NIR measuring cell: approx. 150 x 100 x 120 mm (L x W x H)
Space requirements	approx. 0.5 m space on the left and right (chiller)

BENKE Hygrophil F 5673

HYGROPHIL F 5673 is a high-quality, multi-channel fiber optic hygrometer for measuring the moisture and trace humidity in gases and liquids. The extremely robust temperature-compensated moisture sensor was developed especially for natural gas applications and is now applied for a large number of different applications.

Benefit for your application

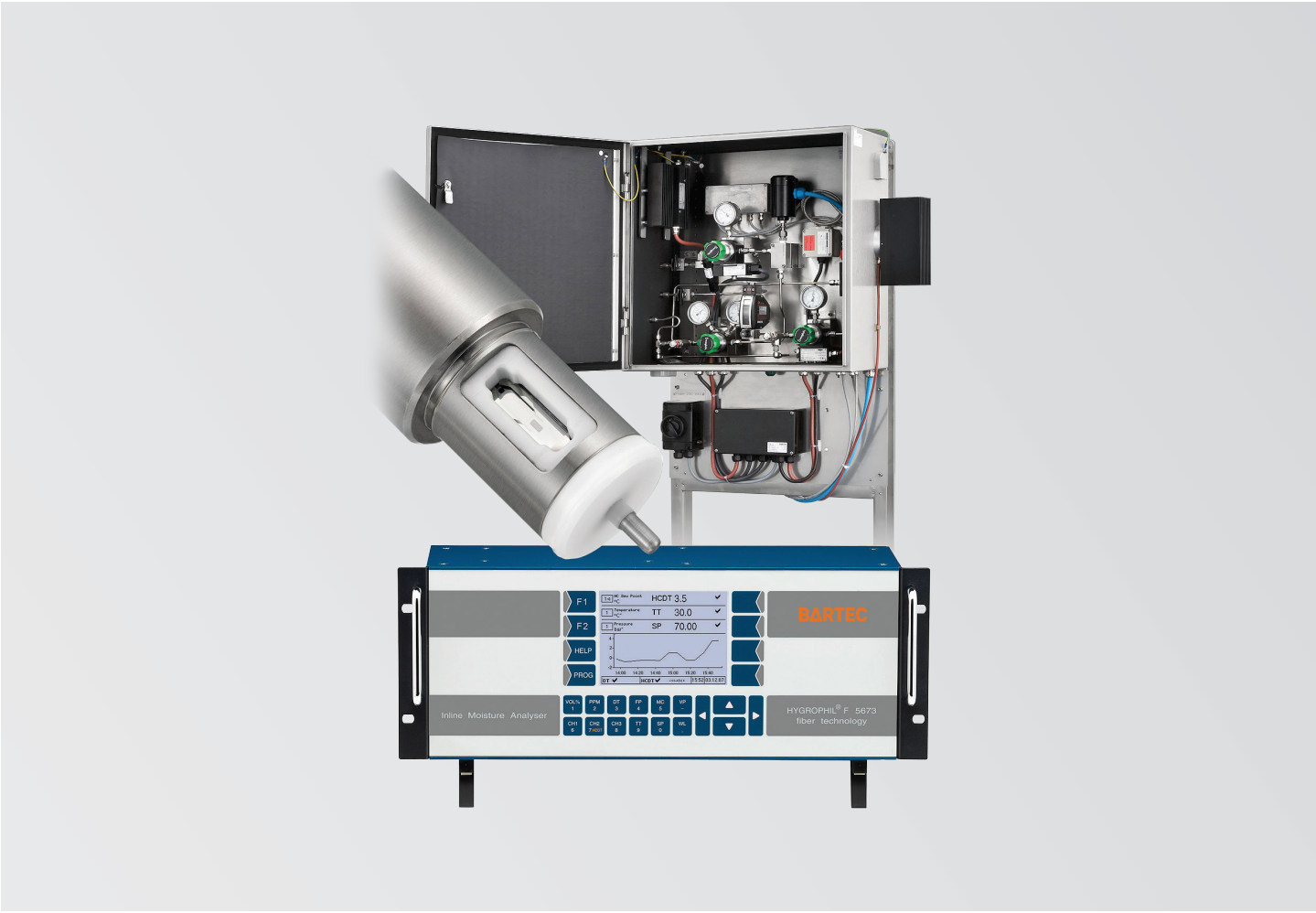
- Low-maintenance and long-term stable
- Measurement in gases and liquids
- Multi-channel up to three sensors
- In-line measurement with retraction tool

Explosion protection

Marking ATEX	for Hygrophil F 5673-xx Ex II (1) G [Ex ia] IIC Certificate no. PTB 04 ATEX 2076
	for Humidity Sensor L166x Ex II 1/2 G Ex ia IIC T6 Ga/Gb Certificate no. PTB 04 ATEX 2075
	for Hygrophil F in flameproof enclosure Ex II 2 G Ex db IIB T4 Certificate no. TÜV 12 ATEX 091302X
Marking IECEx	Certificate no. IECEx CSA 14.0006X
	for Hygrophil F 5673-xx Ex nA [ia Ga] IIC T4
	for Humidity Sensor L166x Ex ia IIC T6 Ga/Gb
Marking CSA	Certificate no. 1826252
	for Hygrophil F 5673-xx Class I, Division 2, Groups A, B, C and D Class I, Zone 2, Group IIC
	for Humidity Sensor L166x Class I, Division 1, Groups A, B, C and D Class I, Zone 0, Group IIC
Marking CRN	Registration no. 0F10620.2
	for Humidity Sensor L166x ISA 12.27.01-2003
Marking EAC	Certificate no. TRCU C-DE.08.B.01952
	for Hygrophil F 5673-xx (Ga) [Ex ia] IIC
	for Humidity Sensor L166x Ga/Gb Ex ia IIC T6 to T3

Technical data

Principle	fiber optic Fabry-Pérot-Interferometer
Factory calibration	based on application
Evaluation unit HYGROPHIL® F 5673	
Indication	DT, FP, PPMv/PPMw, Vol %, VP, MC, TT, SP, WL
Sampling rate	20 seconds per channel
Channels	up to 3
Power supply	DC 10 to 36 V (max. 60 W) AC 100 to 240 V (max. 110 VA)
Inputs per channel	1 x Fiber optical connection (ST) 1 x Calibration data plug (DE-9 connector) 1 x Pt100 temperature input (Ex ia, galvanically isolated) 1 x Pressure sensor (4 to 20 mA, Ex ia, galvanically isolated)
Analog outputs	3 x current output (4 to 20 mA, galvanically isolated)
Interfaces	Ethernet, Modbus (TCP/RTU), PROFIBUS DB (slave), USB
Working temperature	0 °C to 50 °C, 32 °F to 122 °F
Certifi cates	ATEX, IECEx, CSA, EAC (TRCU)
Dimensions (W x H x D)	483 mm x 192 mm x 212 mm, 19-inch-rack mounting
Weight	approx. 8.5 kg
Moisture Sensor L166x	
Measurement range	-80 °C to 20 °C, -112 °F to 68 °F (dew point)
Accuracy	±1 K (dew point)
Working temperature	-30 °C to 60 °C, -22 °F to 140 °F
Working pressure	10 MPa (1450 psi), 20 MPa (2900 psi) with test certificate
Integrated Pt100	DIN IEC 751, 4 wire
Degree of protection	IP 65
Certificates	ATEX, IECEx, CSA, CRN, EAC (TRCU)
Wetted materials	Stainless steel 1.4571 or Alloy C-276 2.4819 sensor shaft, FFKM (Perlast® G90LT) sealing, Optical multi-layer
Sensor head	POM
Sensor length	36 mm, 100 mm, 225 mm other lengths on request
Fibre optic cable 1631-11x	
Combined cable	2 fibre optics and 6 Cu wires
max. length	800 m (875 yards)
– Working temperature	
standard	-30 °C to 70 °C, -22 °F to 158 °F
extended	-55 °C to 70 °C, -67 °F to 158 °F



BENKE Hygrophil HCDT

Hygrophil HCDT combines the established water dew-point measurement and the hydrocarbon dewpoint sensor to detect the moisture content, the temperature and the hydrocarbon dewpoint of the measured medium. The HCDT sensor type 1510-11 works according to the dewpoint mirror principle, based on the new method of total internal reflection. The technical design of the sample conditioning system is following the technical code of the DVGW (German technical and scientifitc association for gas and water) G488 (A) and is in compliance with sound engineering practice according to PED 2014/68/EG article 4, section 3.

Benefit for your application

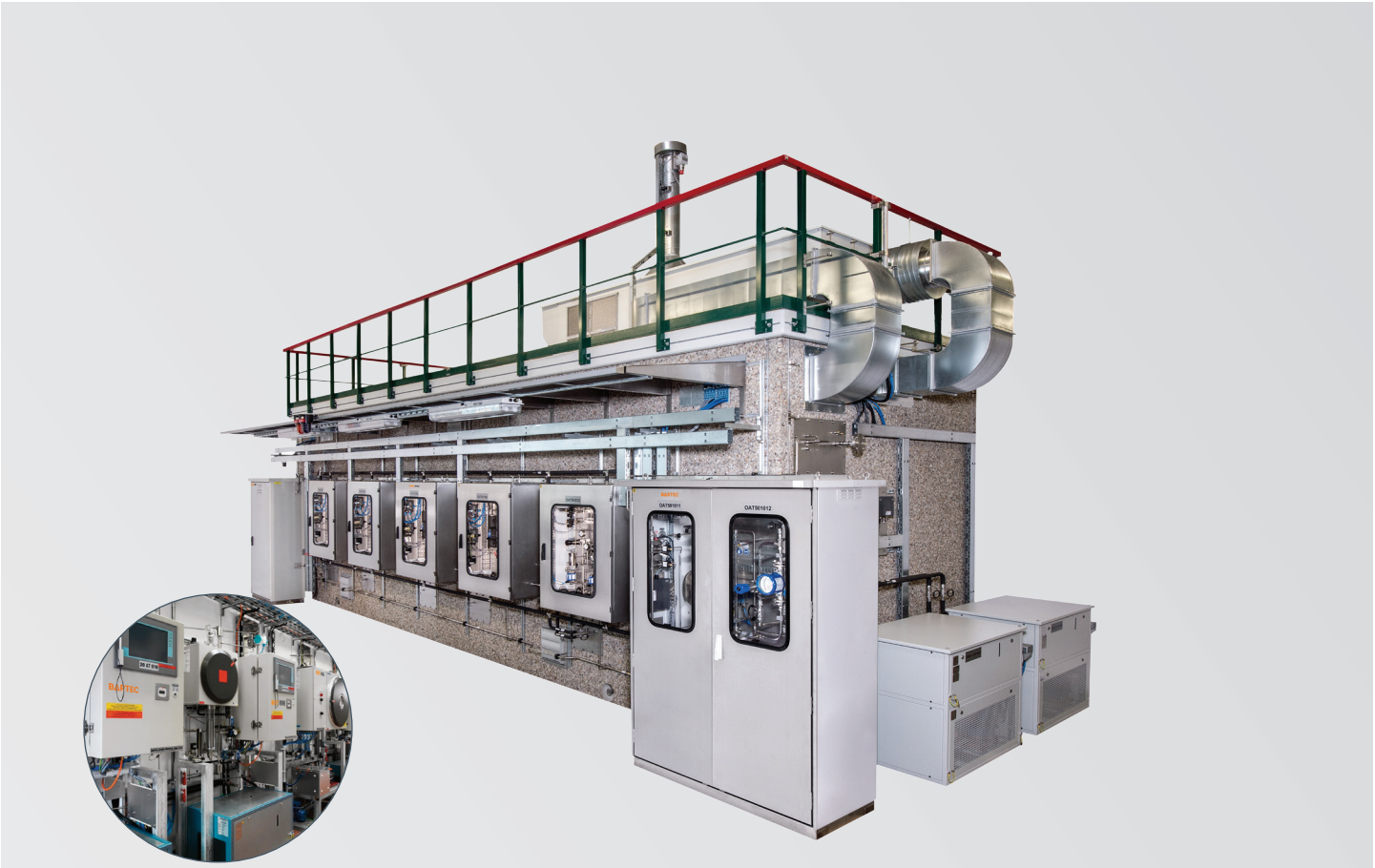
- High measuring certainty including precision, reproducibility and low hysteresis
- Long-term stability of sensors
- Measurement of HCDT at the cricondentherm point (pressure reduction
- Measurement of DT on high pressure side (pressure dewpoint!)

Explosion protection

Marking ATEX	ATEX: II 2G Ex h IIC T4 Gb X IECEx: Ex h IIC T4 Gb X NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1 TR CU certification available

Technical data

Technology	Combined methods Moisture: Fiber optic Fabry-Pérot-Interferometer HCDT: Chilled Mirror
Measuring range	HCDT: -22 °C to +8 °C other ranges on request
Calibration/Validation	Validation at third party laboratory Calibration of PHLC (e.g. 5 mg/m³) on request
Precision	±1 K (HCDT)
Measuring cycle	continous sample flow approx. 6 measurements per hour
Degree of protection	IP 54
Electrical data	
Nominal voltage	AC 230 V ± 10% 1Ph.; 50/60 Hz (approx. 4 A) (approx. 11 A with trace heated sample line)
Working temperature	5 °C to 40 °C
Intel pressure	max. 100 bar(g)
Connections	
Tube fittings	6 mm/12 mm (other connection on request)
Weight and dimensions	
Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1140 x 1900 x 710 mm



BARTEC BENKE Analyzer Shelter (inside)

BENKE Systems

BARTEC BENKE customizes fast loop systems, sample conditioning systems as well as validation systems, recovery tanks and analyzer shelters – based on professional experience for six decades BARTEC BENKE is in the situation to tailor-made design, engineering, procurement and building of complete systems, and protects people and the environment by the safety of components, systems and plants.

BARTEC BENKE's chillers, compact air conditioning units and customized air conditioning units round the portfolio and secure reliable measurement results even in challenging climate zones.

The combined strength of all components with BARTEC BENKE's competence along will assure optimal performance of supplied systems.

BARTEC ORB Analyzer Shelter

ORB Systems

The Orb Analyzer Shelter combines highly reliable, field-proven online analyzers with an extremely durable, solidly constructed shelter system. Our turnkey solution allows for monitoring physical properties prior to and during transport. This precision-engineered system arrives fully equipped with the required analytical instrumentation as well as personnel protection, climate control, and sample recovery systems.

The Orb Sampling Systems are designed and built to the customer's specification, providing uninterrupted operation and consistent sample handling to and from the physical properties analyzer

Contact data

Below you will find the contacts for our key markets. For any questions you might have on BARTEC process analytics solutions please contact us.

Company	Address	Contact details
BARTEC BENKE GmbH	Borsigstraße 10 D-21465 Reinbek/Hamburg Germany	**Telefon** +49 40 72703 400 **Fax** +49 40 72703 363 sales@bartec-benke.de www.bartec-benke.de
OOO "BARTEC Rus"	5A, bld. 1 Volkovskoe Shosse Volkvovsky Business Center, office 401 141006, Mytischi, Moscow Region Russia	**Telefon** +7 495 24905 42 mail@bartec-russia.ru www.bartec-russia.ru
BARTEC Electric (Shanghai) Co., Ltd.	New Building 7 No. 188 Xinjun Ring Road Caohejing Pujiang Hi-tech Park (Pudong Area), Minhang District 201114 Shanghai China	**Telefon** +86 21 346372 88 **Fax** +86 21 346372 82 info@bartec.com.cn www.bartec.com.cn
BARTEC Pte. Ltd.	63 Hillview Ave #07-20/21 Lam Soon Building SGP-669569 Singapore	**Telefon** +65 6762 5030 **Fax** +65 6762 5031 info@bartecasia.com www.bartecasia.com
BARTEC US Corp.	650 Century Plaza Drive Suite D120 Houston, TX 77073 USA	**Telefon** +1 281 214 8542 **Fax** +1 281 214 8547 sales@bartec.us www.bartec.us
BARTEC LATAM	Calle 106 No. 54 – 78 Oficina 402, Torre Empresarial Baikal Bogotá D.C. South America	**Telefon** +57 1 7035146 **Telefon** +57 1 4672805 info@bartec.com.co www.bartec.com.co
BARTEC Middle East FZE	RA-08 , HB-01 Jebel Ali Free Zone P.O. Box 17830 UAE - Dubai	**Telefon** +971 4 8876 162 **Fax** +971 4 8876 182 daniel.eichert@bartec.de www.bartec-group.com
BARTEC Vertrieb Deutschland GmbH	Max-Eyth-Straße 16 97980 BAD MERGENTHEIM Germany	**Telefon** +49 79315 97 0 **Fax** +49 79315 97 119 bartec-vd@bartec.de www.bartec.de

BARTEC

Business Unit
Technology Systems

BARTEC BENKE GmbH
Borsigstraße 10
D-21465 Reinbek/Hamburg
Deutschland

Tel.: +49 40 72703-400
sales@bartec-benke.de
www.bartec-benke.de

bartec.com

UK-D-BBS27042016-05/2019-BARTEC-400787