



Onsite testing and performance monitoring

Censeo is a comprehensive roto-dynamic performance and condition monitoring platform. It has been developed using our patented thermodynamic technique, using head, differential temperature and power, and is the latest version of our Yatesmeter range. It can also operate using the conventional technique based on head, flow and power.

It can be used to monitor the performance of the three key types of roto-dynamic machine (pumps, hydro-turbines and blowers). It measures the performance of centrifugal and positive-displacement units. It also measures flow accurately, even if the pumping system does not have sufficient straight lengths of pipework for conventional flow metering techniques. It accurately measures pump and system performance parameters, helping to improve the energy efficiency of pumping systems and to reduce their carbon footprint. It can also be used to monitor the hydraulic performance of a wide range of rotating machines in industrial applications, manufacturing plants and power stations.

The provision of analogue inputs and outputs allows Censeo to be used as a fully integrated condition monitoring system. It can be readily integrated into a SCADA system, providing detailed pump performance and condition monitoring data for optimal operation.

Built-in relays provide secondary protection for the pumping system and can be set to generate an alarm or trip a circuit, using data from up to eight of the measured parameters.

Application

- Pump performance testing and monitoring for low-temperature fluids
- Flow metering in pumped systems
- Verification and bench marking of pumping station performance
- Condition monitoring (vibration, temperature and level)
- Secondary protection (for pump and associated motor)

Benefits

- Reduced energy costs through improved plant and system efficiency
- Helps to identify the optimum time to repair or replace pumps
- Increased reliability through condition monitoring
- Minimised repair and replacement costs through early detection of mechanical and hydraulic faults
- Low installation and set up costs



Features

- Accurate measurement
- Compact and modular design for panel or surface mounting
- Graphical display, with four navigation keys
- Logging of hydraulic and electrical parameters
- Field-configurable analogue inputs and outputs
- Alarms for various pump parameters
- Large built-in memory (up to 40 days for 15 parameters, at 15-minute intervals)
- RS-485 port for integration with SCADA/PLC/Telemetry systems via Modbus RTU protocol
- Integration into PROFIBUS systems

Technical specifications - Temperature transducer

Environmental media	Fluids compatible with stainless steel. pH neutral +/- 2, no solids greater than 10mm.
Transduction principle	Integrated semiconductor electronics
Common mode voltage	Typically + 5 volts with respect to the -Ve supply at 10 volts excitation
Temperature range*	0 to 40°C
accuracy (probe set)	±0.0020°C
Material	316 high grade stainless steel
Cable length	10m standard
Probe length	MD & SD : 300 , 450 & 620 mm
SD probe	Diameter = 9.51mm
MD probe	Diameter =12.01mm

* Higher range can be offered



These temperature transducers are high-precision devices for use in conjunction with Censeo meters. Temperature transducers are inserted into both the suction and delivery pipeline through a gate valve or thermowell. The gate valve and compression fitting are firmly tightened to prevent fluid leaking into the atmosphere. Suction and discharge temperature is measured in order to obtain a precision differential temperature (ΔT , mK) rise across the pump. The probes have an operating temperature range of 0°C - 40°C.

Technical specifications - Pressure transducer

Process connection	G 1/4 A (according to DIN EN ISO 1179-2)
Measuring range	0...300 bar
Type of pressure	Relative pressure
Operating voltage [V]	8.5...36 DC
Insulation resistance [M]	>100(500 V DC)
Protection class	III
Reverse polarity protection	Yes
Output	Analogue output
Output function	4...20 mA analogue
Max load	($U_b - 8.5 V$)/21.5 mA; 720 at $U_b = 24 V$
Accuracy/deviations	< ± 0.5 (in % of the span)
Materials (wetted parts)	1.4542 (17-4 PH/630)
Housing materials	1.4542 (17-4 PH/630); stainless steel (316L/1.4404); PEI
Cable length	10m Standard

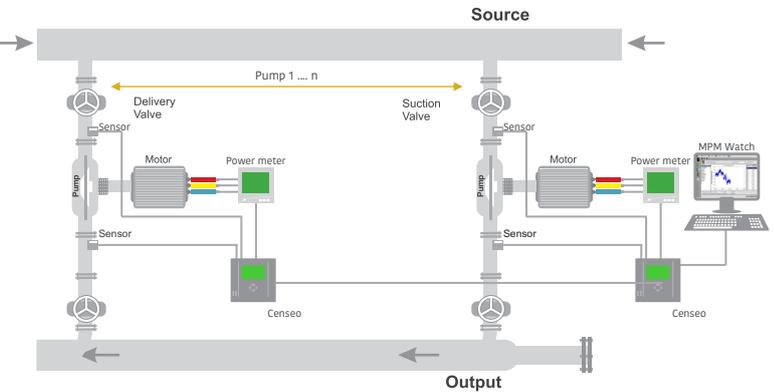


These pressure transducers are used to take pressure measurements from suction and discharge points. Each Censeo meter is designed to connect two pressure transducers to sample pressure readings on the suction and delivery side of the pump. These customised pressure transducers offer best-in-class performance for the measurement of thermodynamic pump performance applications and are calibrated to meet the accuracy requirements of the entire test setup. They are calibrated at an NABL certified laboratory.



Multipump monitoring solution (with MPM watch)

Censeo along with MPM watch software, provides a thermodynamic pump monitoring solution designed for use in an industrial environment. The system provides real-time data about individual pumps and an entire pump house with relevant dashboards, including monitoring the hydraulic performance of each individual pump. This enables the user to determine the hydraulic condition, pump efficiency and effectiveness for each pump, as part of the overall pumping system and to make a similar assessment about an entire pump house.



System Components

Censeo Meter

A pair of temperature transducers

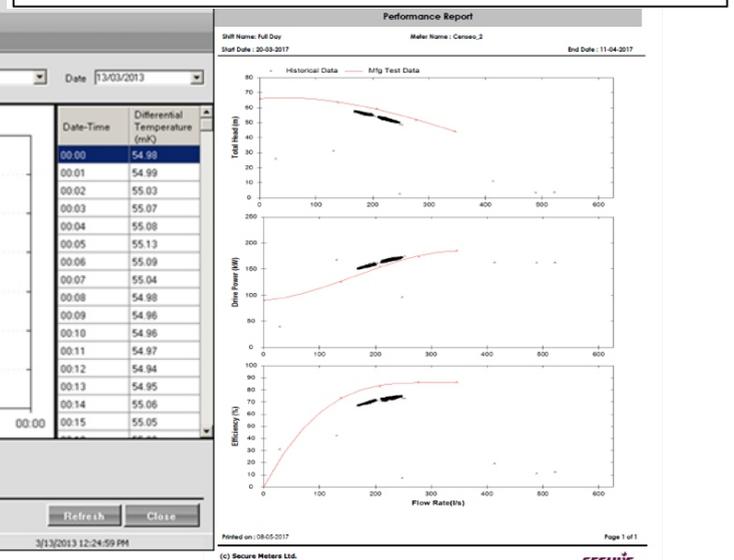
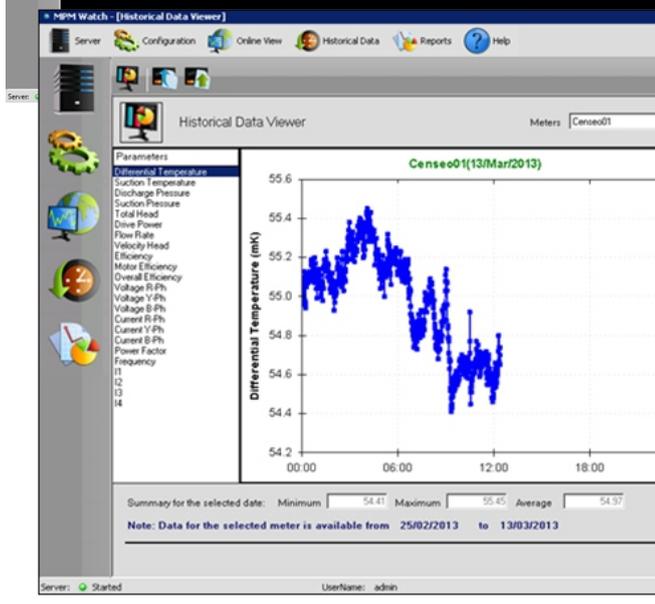
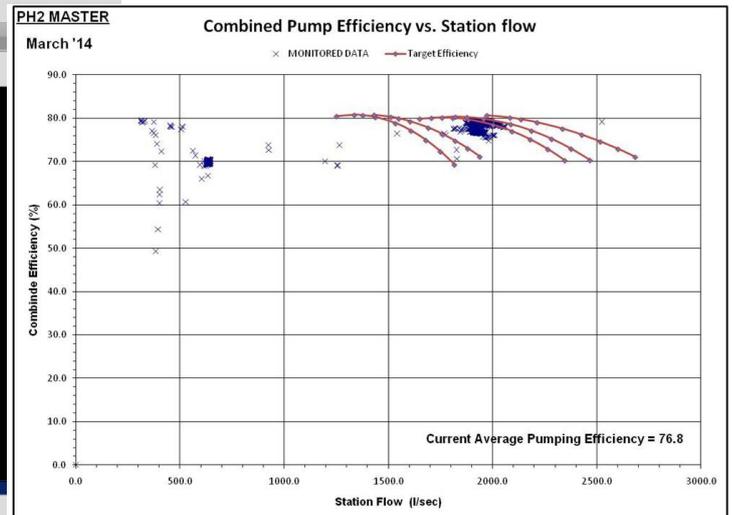
A pair of pressure transducers

Elite 440 power meter

Configuration software PT9

Monitoring software MPM watch

Parameter	P21-YM002582	P22-YM002596	P23-YM002809	P24-YM002589	P25-YM002576	P26-YM002583	P27-YM002594
Date Time	18-03-2013 16:16	18-03-2013 16:16	18-03-2013 16:16	18-03-2013 16:16	18-03-2013 16:16	18-03-2013 16:16	18-03-2013 16:16
Meter Date Time	N/A						
Differential Te...	120.964	143.428	109.484	1.991.958	1.994.379	104.134	154.954
Suction Tempe...	24.975	24.243	24.795	24.451	24.723	24.230	24.907
Discharge Pre...	129.908	136.586	142.704	3.404	2.989	140.270	55.897
Suction Press...	1.728	1.847	2.023	3.138	3.195	2.182	3.149
Total Head	109.963	133.973	141.982	0.247	-0.201	136.931	50.723
Drive Power	1.160.270	1.157.120	932.590	0.050	0.030	503.360	0.050
Flow Rate	664.318	603.885	509.462	0.000	0.000	282.242	0.000
Velocity Head	1.615	1.334	0.470	0.000	0.000	0.648	0.000
Efficiency	77.271	73.965	80.169	0.000	0.000	40.954	46.943
Motor Efficiency	84.000	84.000	84.000	95.000	95.000	84.000	100.000
Overall Efficiency	72.634	69.433	75.387	0.000	0.000	76.096	46.943
Voltage R-Ph	3.989.800	3.990.300	3.991.500	3.995.300	3.997.100	4.005.600	3.997.100
Voltage Y-Ph	4.028.000	4.025.100	4.020.400	4.034.700	4.031.800	4.028.100	4.033.200
Voltage B-Ph	4.035.600	4.035.300	4.027.300	4.044.200	4.042.400	4.040.700	4.040.000
Current R-Ph	102.120	114.260	81.520	-0.020	-0.040	44.270	0.020
Current Y-Ph	88.660	111.050	78.650	-0.010	0.060	43.050	0.020
Current B-Ph	88.720	109.480	78.500	0.020	0.050	42.760	0.040
Power Factor	0.965	0.862	0.973	1.000	1.000	0.963	1.000
Frequency	50.283	50.281	50.283	50.268	50.268	50.267	50.244





Technical specifications

Electrical

Auxiliary supply	110-230 V AC/DC
Internal relays	2 nos. contact rating 230 V AC, 2 A

Compliance

Standard	ISO 5198, ISO 4185, IEC61326-1, CISPR22, EN 61010-1:2001
----------	--

Mechanical

Dimensions (W X H X D)	144 x 144 x 172 mm
Weight	1.2 kg (approx.)
Mounting type	Panel or wall mounting
Material	Fire-retardant polycarbonate

Environmental

Ambient temperature	-10 °C to +60 °C
Ingress protection	IP 54
Humidity	95% non-condensing

Features

Pump parameters	Pump efficiency, system efficiency, head and flow
Electrical parameters	Drive power, voltage, current and frequency
Display	128 x 80 pixel graphical LCD, 81 x 53 mm, with green backlight
Data logging	Up to 40 days for 15 parameters, with 15-minute integration period

Communication

Censeo configuration	RS-232 communication through PACT port
Connectivity to PC/SCADA	Single pump: RS-232 communication through PACT port, using Pump Test 9 software Multiple pumps: Two-wire RS-485 communication with PC running MPM-Watch software

Temperature & pressure sensor inputs

Pressure sensors	Two-wire analogue 4-20 mA
Temperature sensors	Two-wire analogue probe
Power meter input	Two-wire RS-485 Modbus
Maximum pressure supported	300 bar for pump & turbine, 20 bar for blower

Analog inputs & outputs

Analog inputs	1-5 V/4-20 mA (level and vibrations transducer can be provided)
Analog outputs	1-5 V/4-20 mA

Software tools

Pump configuration and testing	Pump Test 9
Online pump monitoring	MPM Watch

Australia

sales_australia@securemeters.com
www.securemeters.com/au

Dubai

sales_middleeast@securemeters.com
www.securemeters.com/me

Europe

sales_europe@securemeters.com
www.securemeters.com/eu

India, SE Asia, Africa

sales_india@securemeters.com
www.securemeters.com/in

UK

sales_uk@securemeters.com
www.securemeters.com/uk