Censeo

Pump efficiency testing instrument

Accurate onsite efficiency testing

Remote data collection & reporting

Ease of installation

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

SECURE energy together

Censeo

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.

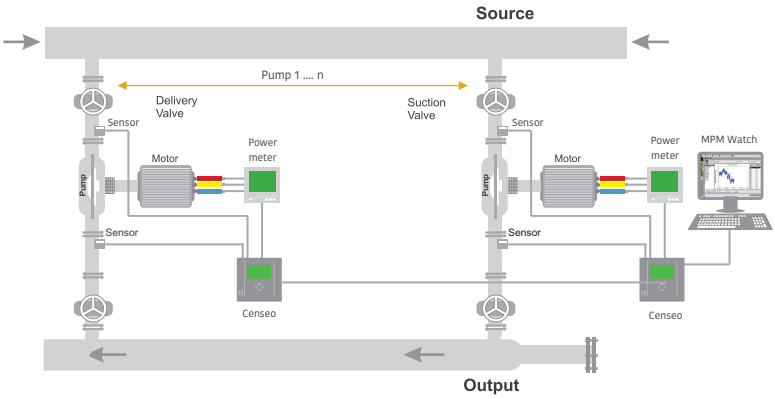
Technical specifications - Pressure transducer

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	(Ub - 8.5 V)/21.5 mA; 720 at Ub = 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

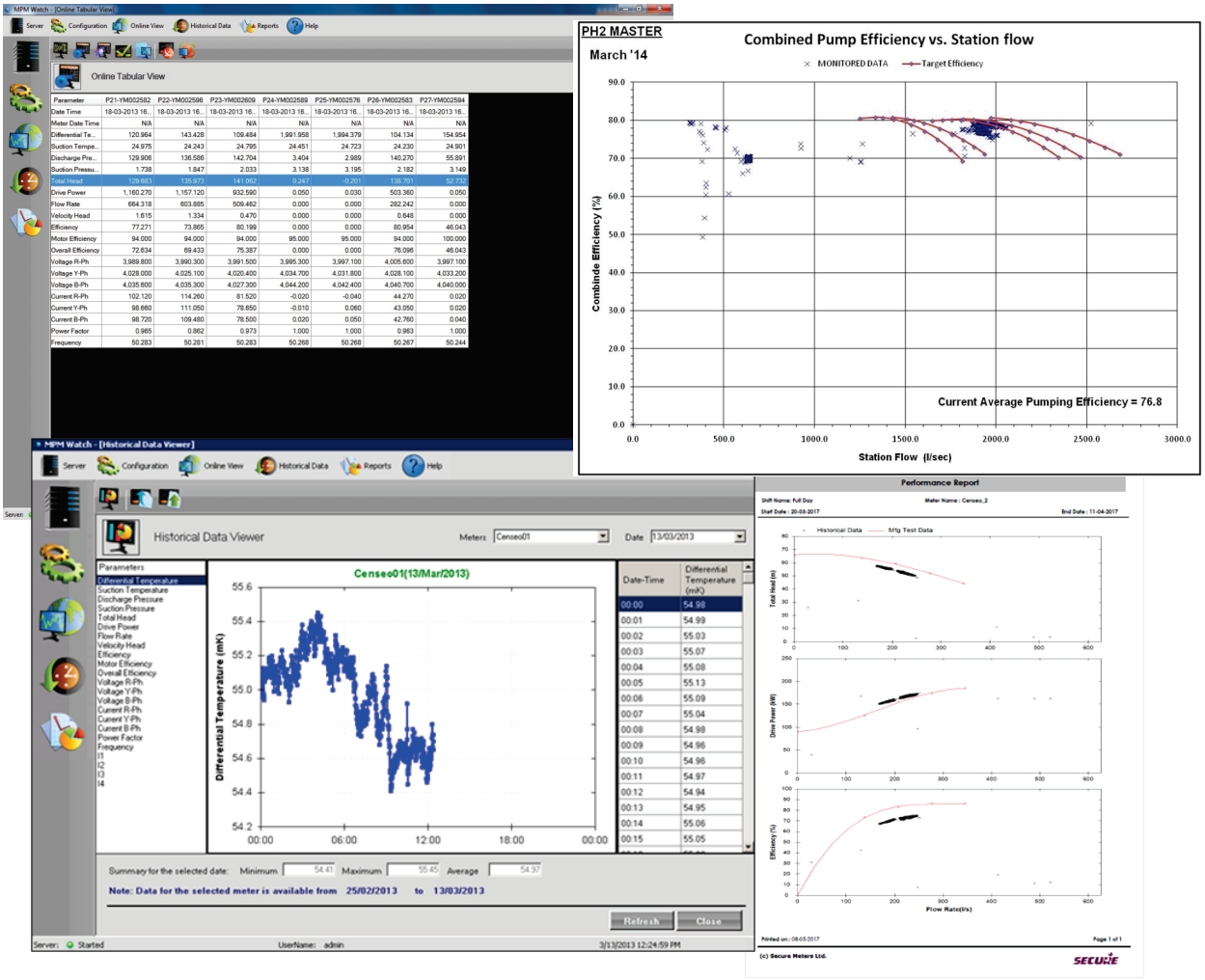
A pair of temperature transducers

A pair of pressure transducers

Elite 440 power meter

Configuration software PT9

Monitoring software MPM watch



Censeo

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

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