CAMERON
A Schlumberger Company

CALDON LEFM 2010FE

Cooling water flow and temperature meter

APPLICATIONS

Measurement of cooling water flow and temperature for pump efficiency and protection

ADVANTAGES

- Flow rate accuracy up to ± 1% and temperature within ± 2 degF [± 1.1 degC]
- Online, continuous self-checking that ensures high reliability
- Qualification for nuclear safety

Cameron CALDON LEFM 2010FE* cooling water flow and temperature meter provides accurate and reliable measurement of flow and temperature in cooling water pipes and channels. This ability enables determining the efficiency and protection of circulating water pumps as well as documenting compliance with environmental restrictions on water usage and thermal loading of receiving waters.

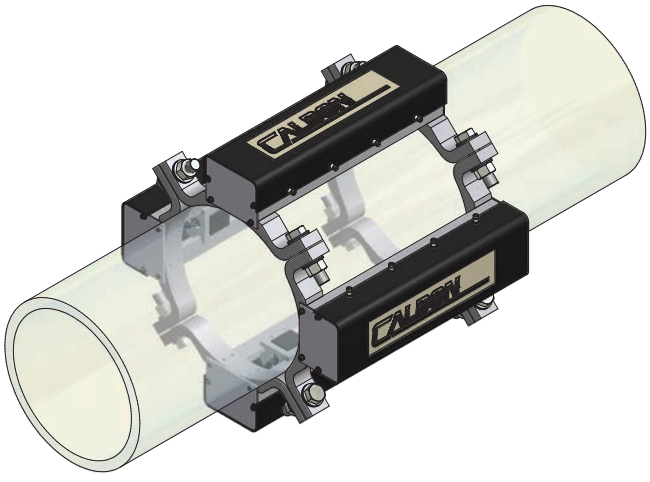
The CALDON LEFM 2010FE cooling water flow and temperature meter helps improve cooling water system efficiency and pump integrity.

CALDON LEFM 2010FE meters are

- qualified for nuclear safety under French RCC-E Standard (qualification documentation available upon request)
- designed for continuous operation during and after a seismic event
- accurate for freshwater and saltwater flows
- nonintrusive and easily installed on existing pipe
- suitable for monitoring of rubber-lined and unlined pipes.

Transit-time ultrasonic meters operate by measuring the difference in transit times of acoustic pulses traveling between acoustic transducers installed at an angle with respect to the axis of the pipe. The difference in transit times as the pulses travel with and against the flow is proportional to the fluid velocity along that path. The axial fluid velocity, the cross-sectional area of the pipe, and the meter velocity profile constant are used to calculate volumetric flow through the pipe. Cameron flow data from hydraulic calibrations of hundreds of externally mounted and chordal systems enables us to provide externally mounted flowmeters with uncertainties as low as ± 1% of flow. The meters also output temperature to within ± 2 degF.

The CALDON LEFM 2010FE meter provides multiple analog (4–20 mA) and pulse outputs as well as Modbus® RS-485 serial communications for data acquisition and interface to plant equipment.



The CALDON LEFM 2010FE meter provides accuracy up to ± 1% of flow.

CALDON LEFM 2010FE

System Accuracy	
Volumetric flow, %	±1 of maximum rate
Temperature, degF [degC]	±2.0 [±1.1]
Transmitter	
Storage temperature, degF [degC]	–70 to 185 [–57 to 85]
Operating ambient temperature, degF [degC]	–40 to 140 [–40 to 60]
Storage and operating humidity, %	0–95 (noncondensing)
Outputs	Up to two 0–5 V or 0–12 V pulse output (linear with flow)
	Up to two 4–20 mA outputs
	Two Modbus RS-485 outputs
Environmental	IP65, corrosion resistant
Nominal voltage, VAC	120 (one phase, 50/60 Hz)
	230 (one phase, 50/60 Hz)
Steady-state voltage range, %	±10 nominal
Transit voltage range, %	–20 to 20 for less than 10 ms
Power surges, V	1,200 max. for less than 50 uS and less than 10 joules
Pipe Mounted Hardware/Transducers	
Process temperature, degF [degC]	32 to 239 [0 to 115]
Transducer frequency, MHz	1.0 nominal
Frequency range, %	±10 nominal
Environmental	IP66 corrosion resistant
Cable	
Nominal outside diameter, in [mm]	0.235 [5.97]
Weight, lbm [kg]	41 [18.6] per 1,000 ft [304.8 m]
Cable length, ft [m]	50 [15]
Conductors	Twisted, shielded 24 American wire gauge (AWG) tinned copper
Characteristic impedance, ohm	78 at 1 MHz
Continuous working voltage, V	750 rms

Qualified for nuclear safety

- RCC-E (2005)
- C3 Safety Classification
- K3 Seismic—operable during and after an earthquake

Services

Cameron offers the following services with every CALDON LEFM 2010FE meter:

- onsite installation of fixtures and transducers
- system commissioning
- customer training
- field testing.

cameron.slb.com/measurement

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