

Leakage Monitoring of Cooling Systems for Arc Furnaces, Reactors and Continuous Casting Machines

Metals

Instrumentation Solutions



- Leakage monitoring with on site evaluation unit
- Quick recognition of leaks
- Improvement of plant safety
- High cost saving potential

1 The Problem

In many industrial applications cold water is used for cooling, for example, arc furnaces, reactors and continuous casting machines. Usually, two flowmeters are provided for flow measurement, one in the supply and one in the return line. In a worst case scenario, a leak in the cold water cooling systems might damage the cladding, so that water can ingress into the hot steel melt and cause an explosion. Damage costs of several millions would be the consequence.

Moreover, the system is not cooled evenly in some zones, which may also result in plant problems.

2 The Solution

By using the flow computer unit FCU200 W (SensyCal W) in conjunction with the electromagnetic flowmeters and two additional temperature sensors, which are selected as pair, the mass flows in the supply and return lines can be measured and compared to each other.

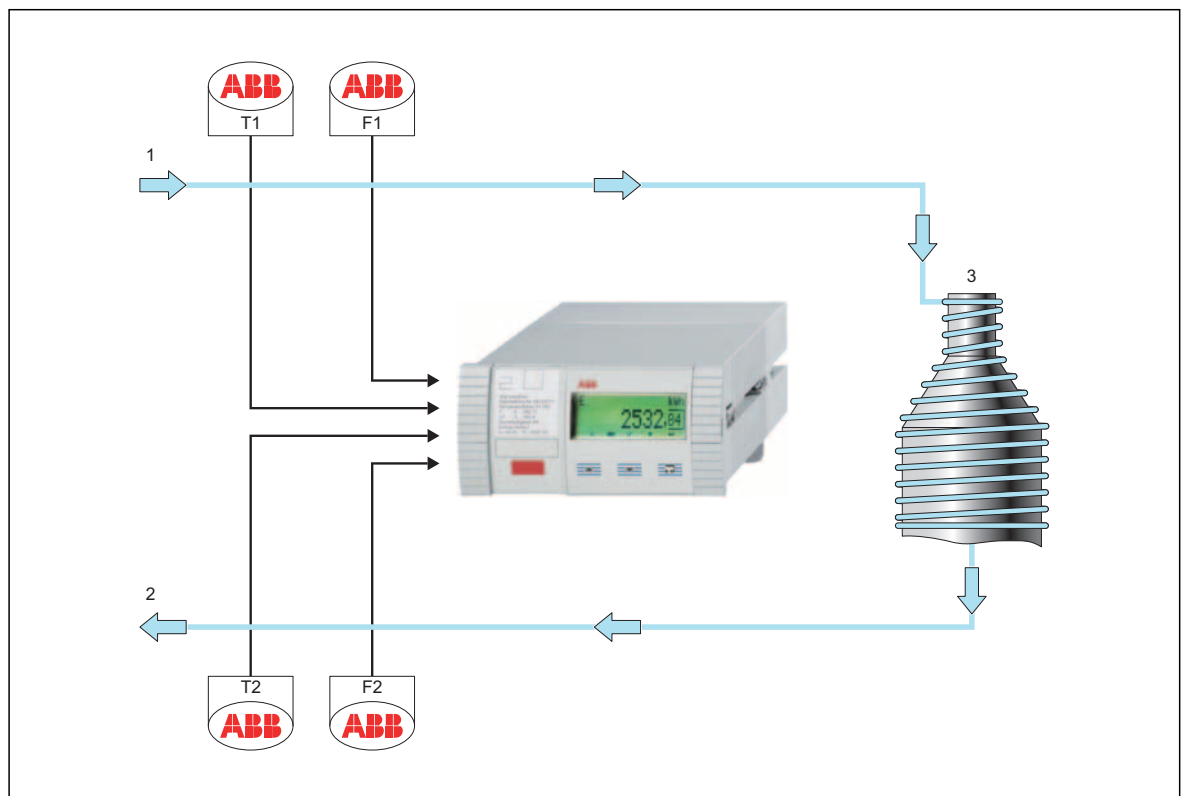


Fig. 2-1: Leakage monitoring system

- 1 Cooling water supply line
- 2 Cooling water return line
- 3 Consumer (arc furnace)

As the mass flows must be identical in both lines, irrespective of the different temperatures, even small deviations are recognized as leaks, and the alarm output is activated accordingly.



Fig. 2-1: E. g.: Electromagnetic Flowmeter in the cooling water supply and return lines including temperature measurements



Fig. 2-2: E. g.: Flow Computer Unit FCU200-W as a field instrument mounted on a Z rail in the switch cabinet (right picture) and as a panel-mounting variant installed in the cabinet door (left picture)

3 Customer Benefit

Due to the early recognition, even very small leaks are already discovered.

The pumps can be switched off immediately in this case, so that the damage in the cladding area of the arc furnace is minimized. As a result, damage costs of several millions can be avoided.

4 Features of the Components Utilized




Tags		Instrumentation
		<p>Flow Computer Unit FCU200-W (SensyCal W)</p> <ul style="list-style-type: none"> • Control room or field mounting on Z rails • Pre-alarm for minor leaks • Main alarm for leaks • Leakage detection already at 0.5 % of reference value • All parameters locally available due to built-in display • MODBUS communication for online monitoring
<p>F1, F2</p>		<p>Electromagnetic Flowmeter e. g. ProcessMaster FEP or FEX4000 in remote mount design or integral mount design</p> <ul style="list-style-type: none"> • Intuitively operable • High measuring accuracy • Wide range of sizes
<p>T1, T2</p>		<p>Temperature Sensor, e. g. SensyTemp TSP121</p> <ul style="list-style-type: none"> • With Pt100 resistance thermometer, 4-wire connection • Class A without integral transmitter • With thermowell (e. g.: 12 x 2.5 mm) • selected in pairs (with any change both must be replaced)

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