

spirax sarco®

R1C Steam Trap Failure Monitor

The R1C steam trap failure monitor will monitor the performance of a single steam trap when used in conjunction with a Spiratec sensor chamber and sensor. It will indicate whether a trap is operating correctly, passing live steam or has failed closed by means of colored trap status lights on the unit. Analog and digital outputs allow it to be connected directly to BEMS/EMS to indicate steam trap status remotely.

SYSTEM COMPONENTS

To detect a steam trap that is leaking steam, a standard SS1 Spiratec sensor combined with a Spiratec sensor chamber is used. To detect a steam trap that is leaking steam or is waterlogged, a WLS1 Spiratec waterlogging sensor assembly combined with a Spiratec sensor chamber is used.

CONSTRUCTION MATERIALS

Body Cast malleable iron, black enamel finish.

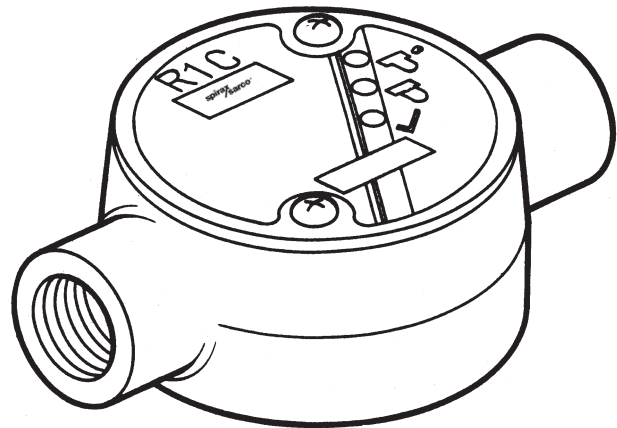
TECHNICAL DATA

Enclosure rating	IP65 (when fitted with correct cable glands)
Supply voltage:	Voltage required:
4-20 mA output not used	Separate 9-30 Vdc, <35 mA
4-20 mA output used	Separate 22-30 Vdc, <35 mA
R1C operation:	
Trap status:	Status lights:
Trap operating correctly	Red and orange lights OFF Green light FLASHING
Trap leaking steam	Red light ON Green light FLASHING
Trap blocked or waterlogged	Orange light ON Green light FLASHING
Trap cold but free of condensate (this is a common state during system start-up or when the system is shut down).	Red and orange lights ON Green light FLASHING

During normal operation, the green light flashes **ON** every second to show that electrical power is connected to the R1C and that it is operating correctly.

CONNECTIONS

The R1C enclosure is a circular conduit box with M20 threaded entry holes. To maintain resistance to moisture, use a suitable cable gland between the R1C and the Spiratec sensor (Type SS1 or WLS1). If the cable to the BEMS/EMS passes through a conduit, make sure that the threaded connection to the R1C is water-tight to maintain the IP65 enclosure rating. Details of electrical connection are supplied with the product.



INSTALLATION

The Spiratec sensor chamber is installed immediately upstream of the trap being monitored in a horizontal pipeline. Full details are given in the technical literature supplied with the products. The R1C should be installed within 30 ft. of the Spiratec sensor chamber. It is designed to form part of a conduit cable protection system but may be fixed to any convenient surface using bulkhead clamps.

STEAM LEAK DETECTION PERIOD

Internal switches in the R1C allow the steam leak detection period to be set at various intervals. This helps to prevent nuisance alarms which may be caused by intermittent interruptions in condensate flow under normal operating conditions.

CONDENSATE CONDUCTIVITY LEVELS

Internal switches in the R1C allow the condensate conductivity levels to be adjusted to accommodate local conditions. The purity of the steam is directly related to its conductivity. Therefore, the multiple settings cover a wide range of systems.

TRAP WATERLOGGING TEMPERATURE LEVELS

Internal switches in the R1C allow the waterlogging temperature levels to be set at one of seven pre-set temperatures. Because of relation between steam pressure and temperature, each steam trap can be monitored as closely as desired.

As supplied, the R1C comes factory set as follows:

Channel	Failure Detection	Notes
Leak detection period	22 minutes	The trap must leak steam for 22 minutes before the R1C signals a fault.
Leak detection	4.8µS	The conductivity of the condensate in the sensor chamber must be greater than 4.8 microsiemens for correct operation.
Waterlogging detection temperature	185°F	The condensate in the sensor chamber must cool below the R1C signals a waterlogging fault.

Local regulation may restrict the use of this product below the conditions quoted. Limiting conditions refer to standard connections only. In the interests of development and improvement of the product, we reserve the right to change the specification.

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OUTPUT SIGNALS FOR REMOTE INDICATION OF TRAP STATUS

Digital Outputs

PNP open collector output - use this output to connect the R1C to a BEMS/EMS whose digital inputs are pulled down to 0 volts. The pnp outputs act like switches connected to the R1C's power supply. During normal trap operation, the pnp outputs will switch ON and give out a voltage equal to the R1C's power supply minus 0.4 V. Their output resistance in this state is 220 ohms. If the trap fails, one of the pnp digital outputs will switch OFF.

NPN open collector outputs - use this output option to connect the R1C to a BEMS/EMS whose digital inputs are pulled up to a positive voltage. The npn outputs act like switches connected to 0 volts. During normal trap operation, the npn outputs will switch ON, giving out 0 volts with an output resistance of 220 ohms. If the trap fails, one of the npn digital outputs will switch OFF.

Trap Status	R1C Digital Outputs	
	Waterlogged	Steam Leak
Trap operating correctly	On	On
Trap leaking steam	On	Off
Trap blocked or waterlogged	Off	On
Trap cold, but free of condensate (or R1C failure)	Off	On

Analog Output:

An analog output is available as standard for use with BEMS/EMS's that operate on an analog input signal. Setting details are given below:

Maintenance

There are no user serviceable parts in the R1C.

How to Specify

- 1 - Spirax Sarco R1C steam trap failure monitor (pnp digital outputs), or
- 1 - Spirax Sarco R1C steam trap failure monitor (npn digital outputs)

Trap Status	Nominal Output Current from R1C	Recommended BEMS/EMS Alarm Threshold Settings
Trap operating correctly	20 mA	23.0 mA > setpoint > 17.5 mA
Trap leaking steam	15 mA	17.3 mA > setpoint > 12.5 mA
Trap blocked or waterlogged	10 mA	12.5 mA > setpoint > 7.5 mA
Trap cold, but free of condensate (or R1C failure)	4 mA	7.5 mA > setpoint > 0 mA

The current output from the R1C is derived from an internally powered loop and is capable of driving into an impedance of at least 550 ohms. In practice, this means that the maximum permissible distance between the R1C and the BEMS/EMS will be governed by the type of connecting cable used.

DIMENSIONS (NOMINAL) IN INCHES (mm)

