Original Instructions

Installation, Operation & Maintenance Manual

Waters Equipment W9150/W9250 Series
Sample Coolers

W-SW-IOM-00044-1 8-16

sentry-equip.com

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COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV GL = ISO 9001 =

SENTRY

Standard Warranty

Sentry Equipment Corp ("Seller") warrants products manufactured by it and supplied hereunder ("Products") to be free from defects in workmanship and, to the extent materials are selected by Seller, to be free from defects in materials, in each case for a period as defined in the table below:

Brand	Product Line	Warranty Period
Sentry®	▪ Steam & Water Sampling Products and Systems ▪ Solid & Powder Sampling Products and Systems ▪ Gas Sampling Products and Systems ▪ Liquid & Slurry Sampling Products and Systems ▪ Pipeline Integrity Products	Eighteen months from date of shipment or twelve months from startup (whichever occurs first)
Waters Equipment	Steam & Water Sampling Products and Systems	Twelve months from date of shipment

To view the full warranty, go to www.sentry-equip.com/warranty.

Do not install, maintain, or operate this equipment without reading, understanding, and following the appropriate Sentry Equipment Corp instructions. Otherwise, injury, damage, or both may result.

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Limit of Liability

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Note

The information contained in this document is subject to change without notice.

Safety Information

Please read the entire manual before attempting to unpack, set up, or operate this product. Pay careful attention to all Warnings, Cautions, and Notes. Failure to do so could result in serious personal injury and/or equipment damage.

Use of Hazard Information

If multiple hazards exist, the signal word corresponding to the greatest hazard shall be used.

Definitions

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

➲ NOTE

Information that requires special emphasis.

➲ TIP

Alternate techniques or clarifying information.

SHALL: This word is understood to be mandatory.

SHOULD: This word is understood to be advisory.

General Safety Precautions

Product Selection, Installation, and Use

⚠ WARNING

Improper selection, installation, or use can cause personal injury or property damage. It is solely the responsibility of users, through their own analysis and testing, to select products suitable for their specific application requirements, ensure they are properly maintained, and limit their use to their intended purpose.

Follow proper local, state, and federal regulations for proper installation and operational requirements.

Always use caution and common sense when working with any chemical. Read the product label and Material Safety Data Sheets (MSDS) carefully and follow the instructions exactly.

Potential Equipment Hazards

⚠ WARNING

Hot surfaces! This equipment may have very hot surfaces. If an operator contacts a hot surface, injury may occur. Use protective clothing to prevent injury. If other equipment comes in contact with a hot surface, damage to the equipment may occur. Ensure the area around this equipment is kept clear to prevent this damage from occurring.

High pressures! This equipment may contain fluids at very high pressures. Prior to installing, removing, or maintaining this equipment, ensure that the equipment is isolated from all connecting piping, the equipment is depressurized, the contents have been drained, and the equipment is cool.

Freezing Temperatures! This equipment may have very cold surfaces. If an operator contacts a cold surface, injury may occur. Use protective clothing to prevent injury. If other equipment comes in contact with a cold surface, damage to the equipment may occur. Ensure the area around this equipment is kept clear to prevent this damage from occurring.

NOTICE

Freezing of fluids in tube can lead to rupture of the tube wall and coil failures. Take precautions to avoid freezing, such as draining the equipment when out of service or installing the equipment in an environment protected from temperatures below the freezing point of the fluids used.

Installation

1. Support the Waters Equipment W9150/W9250 Series sample cooler by its bracket or by water lines only.
2. Provide a globe valve (not gate) in the **COOLING WATER OUTLET LINE** for throttling purposes. (3/8" for Model W9000, ½" for Model W9100 series; ¾" for Model W9200 series)
3. If it's desired to isolate the cooler, provide a ¾" gate or ball valve (not globe) in the **COOLING WATER INLET** line.
4. For shell side pressure relief, install a combination temperature/pressure relief valve in the **COOLING WATER INLET** line.
5. Mount the cooler vertically.
6. Make connections to the cooling water connection and sample fluid studs by means of welding or with fittings, as appropriate.

Start-up and Operation

1. Open fully all cooling water lines. Verify that minimum specified cooling water flow is occurring. If cooling water is untreated, its temperature rise should not exceed 40°F, so as to minimize scaling.
2. When necessary, throttle cooling water flow by partially closing the globe valve on the **COOLING WATER OUTLET** line. Any valve on the **COOLING WATER INLET** must always be full open.
3. When possible and practical, shut off the sample fluid when not taking a sample so as to minimize scaling. This action is not necessary if the cooling water is from a treated, closed loop supply.

Disassembly and Reassembly

1. For heavily scaled coolers, disassembly is easier by first dissolving the scale. Remove scale by circulating an oxalic acid cleaning solution through the cooling water side.
2. Reuse original gaskets if not too old or if not overly compressed. After reassembly, pressurize shell and visually inspect for water leaks. Replace those gaskets that show visible leaks. Keep spare shell gaskets on hand for this need.

Model	Gasket
W9150, W9155	WA170592
W9250, W9255, W9260, W9265	WA170593

3. During reassembly, retorque nuts as follows:

Model	Ft-Lbs Torque
W9150, W9155	15-20
W9250, W9255, W9260, W9265	20-25

⚠ CAUTION

VIBRATION is the typical cause of Sample Cooler failure.

VIBRATION is caused by two (2) conditions:

A. CAVITATION RESULTS whenever localized boiling occurs on the outside surface of the hot heat transfer coil. Steam bubbles form on the shell side of the hot coil surface and are swept into the main stream of the cooling water, where they immediately condense and collapse. The collapsing bubbles generate severe shock waves (i.e. vibrations) which can fatigue and ultimately fracture the heat transfer coil.

CAVITATION IS CAUSED BY: (a) the cooling water **FLOW RATE IS TOO LOW**, such that the water is **OVERHEATED** to its boiling point, and/or (b) the cooling water **OPERATING PRESSURE IS TOO LOW**, such that the cooling water can BOIL at too low a temperature.

CAVITATION CAN BE PREVENTED if (a) the cooling water and sample flows are kept at the design conditions specified in WATERS literature, and (b) the cooling water pressure is kept as high as possible (50 psig minimum recommended). To avoid reducing the cooling water pressure in the shell side, do any throttling at the cooling water **OUTLET**, *never* at the **INLET**.

B. EXCESSIVE COOLING WATER VELOCITY will vibrate the heat transfer coil, which can fatigue and ultimately fracture the coil. To prevent coil failure, keep the cooling water flow at the design conditions specified in WATERS literature. **REMEMBER:** Throttling must be done at the cooling water **OUTLET**.

IF YOU HEAR VIBRATION OR RATTLING NOISES from the cooler, take corrective action **IMMEDIATELY** to:

- Eliminate vibration from cavitation by adjusting cooler so that:
  - **a.** Cooling water inlet valve is fully open.
  - **b.** Cooling water flow is per design condition.
  - **c.** Cooling water shell side pressure is as high as possible.
  - **d.** Sample flow is reduced if necessary.
- Eliminate vibration from excessive velocity by throttling cooling water flow to design conditions. Always throttle at the cooling water outlet.

Customer Support

With proven sampling expertise since 1924, Sentry products and services provide business operations the critical insights to optimize process control and product quality. We deliver true representative sampling and analysis techniques to customers around the globe, empowering them to accurately monitor and measure processes for improved production efficiency, output, and safety. Standing behind our commitments, we are determined to tackle any application, anywhere.

We know that running an efficient operation isn't easy. It requires thorough, careful analysis of controlled, real-time data achieved through reliable, accurate, and repeatable process monitoring and measuring. By effectively conditioning, sampling, and measuring gas, liquid, slurry, powder, solids, steam, or water within their production environments, our customers obtain the critical insights they need to control and optimize their processes.

Yet, controlling your processes also means reliable customer support throughout the life cycle of your equipment.

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