



Circuit Sentry™ Flo-Setter II Balance & Commissioning Valves with NPT Connections

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1 Introduction and Safety

1.1 Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

NOTICE:

Save this manual for future reference, and keep it readily available at the location of the unit.

1.2 Safety



WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
- Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.
- Do not change the service application without the approval of an authorized Xylem representative.



CAUTION:

You must observe the instructions contained in this manual. Failure to do so could result in physical injury, damage, or delays.


1.2.1 Safety message levels




About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product
- Product malfunction

Definitions

| Safety message level | Indication |
|--|---|
|  DANGER: | A hazardous situation which, if not avoided, will result in death or serious injury |

| Safety message level | Indication |
|---|--|
|  WARNING: | A hazardous situation which, if not avoided, could result in death or serious injury |
|  CAUTION: | A hazardous situation which, if not avoided, could result in minor or moderate injury |
|  Electrical Hazard: | The possibility of electrical risks if instructions are not followed in a proper manner |
| NOTICE: | <ul style="list-style-type: none"> • A potential situation which, if not avoided, could result in undesirable conditions • A practice not related to personal injury |

Precautions before work

Observe these safety precautions before you work with the product or are in connection with the product:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.
- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition and is properly rated for the load to be lifted.
- Use a lifting harness and safety line, as required.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you install or service the valve.
- Check the explosion risk before you weld or use electric hand tools.

Wash the skin and eyes

Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

| Condition | Action |
|---------------------------------------|--|
| Chemicals or hazardous fluids in eyes | <ol style="list-style-type: none"> 1. Hold your eyelids apart forcibly with your fingers. 2. Rinse the eyes with eyewash or running water for at least 15 minutes. 3. Seek medical attention. |
| Chemicals or hazardous fluids on skin | <ol style="list-style-type: none"> 1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least 1 minute. 3. Seek medical attention, if necessary. |

1.3 Protecting the environment

Emissions and waste disposal

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

Exceptional sites



CAUTION: Radiation Hazard

Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

Recycling guidelines

Always follow local laws and regulations regarding recycling.

2 Transportation and Storage

2.1 Inspect the delivery

2.1.1 Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.
If the product has been picked up at a distributor, make a claim directly to the distributor.

2.1.2 Inspect the unit

1. Remove packing materials from the product.
Dispose of all packing materials in accordance with local regulations.
2. Inspect the product to determine if any parts have been damaged or are missing.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.
For your personal safety, be careful when you handle nails and straps.
4. Contact the local sales representative if there is any issue.

3 Product Description

3.1 General description

The Circuit Sentry Flo-Setter II Balance & Commissioning Valves are precision engineered valves used in closed heating and cooling systems for the distribution of flow in various sections of the system



WARNING:

California Proposition 65 warning! This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

NOTICE:

This product is not intended for potable water applications.

NOTICE:

This product is not intended for use in open systems. An open system is one that is exposed to atmospheric pressure at any point, such as a cooling tower system.

The dynamic balancing and commissioning valve ensures easy and reliable balancing of the system, regardless of any fluctuations in the differential pressure of the system.

The Circuit Sentry Flo-Setter II limits the maximum flow in the system and can be used in both variable and constant flow systems.

The clear GPM flow rate scale on the lockable handle ensures that flow setting is simple and user friendly while the integral P/T ports allow verification of pressure.

3.2 Operational limits

| Valve | Maximum Limitations | |
|------------------------------|-------------------------------|--------------------------------|
| | Temperature °F (°C) | Maximum Working Pressure (kPA) |
| Circuit Sentry Flo-Setter II | 14°F (-10°C) to 250°F (120°C) | 360 PSI (2500 kPA) |

4 Installation

4.1 Installation precautions



WARNING:

Installation and maintenance must be performed by a qualified professional.



CAUTION:

- The valve can be damaged if improper sweating (soldering) is used with the union connection. Before sweating the union connection to the valve, remove the union nut and O-ring from the valve body, then sweat the union tailpiece with union nut into place.
 - Make sure that all connecting pipe work is water tight.
-

NOTICE:

- The valve body may be damaged if you overtighten when using PTFE pipe compound or PTFE tape on pipe threads.
 - Avoid damaging the valve operating mechanism by using too much joint compound. Apply compound sparingly to male threads only.
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Safety rules

- Service should not be performed on any valve in an active hydronic loop.
- Before attempting to make any required adjustments, properly isolate and drain the branch loops or system that require service and allow the valves to reach a safe handling temperature and zero pressure condition.
- Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards.
- Use proper tools and lifting equipment when installing or servicing the valve. Be sure it is properly supported at all times.
- Failure to follow these instructions could result in personal injury, death, and property damage.

4.2 Installation guidelines

- The valves are uni-directional and can be installed in most attitudes. The preferred installation is to mount the valve in the return piping where temperatures are lower and where the sealing gland is less affected by strain.
 - Installation of strainers and isolation valves is recommended.
 - Valves can be used with up to 50% ethylene or propylene glycol mixtures.
 - Be sure to install the valve with the arrow pointing in the direction of flow.
 - There must be a minimum of 4 in (100 mm) access space surrounding the valve.
-

NOTICE:

- The hydronic system must be properly vented to remove all entrained air. Liquid media containing debris or other particulates should be filtered to avoid damage to or obstruction of the valve, which could cause it to malfunction.
 - Due to the different types of material used, Bell & Gossett Circuit Sentry Flo-Setter II Balance & Commissioning Valves and accessories must be disassembled prior to disposal. Special handling of certain valve components may be required by law or may be sensible from an ecological point of view.
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4.3 Install NPT connection

1. Apply pipe compound conservatively to male connecting fittings only.

NOTICE:

- Do not overtighten when using PTFE impregnated pipe compound or PTFE tape on pipe threads. Doing so may damage the valve body.
 - Pipe compound should not be used in combination with PTFE thread sealing tape. Using both together can cause leakage and damage the valve or fitting.
-

2. Check connections for leaks.

4.4 Pipe hanging installations

Be aware of water weight in the valve and connected piping when installing your system.

NOTICE:

Never use the valve as a form of piping support. Support the valves and piping according to the local building code. Failure to follow these instructions may result in property damage.

5 Operation

5.1 Recommended operating procedures

Pre-set flow balancing

1. Select the appropriate size valve, normally line size, for the required flow rate.
 - The ideal valve selection should operate at about 80% of the maximum flow, enabling them to deliver spare capacity, if required.
2. Set the flow rate of the valve with the presetting scale in the valve handle in accordance with the desired flow rate.
3. Once the valve has been set to the desired flow rate, the knob can be locked in position. Remove the logo cap and tighten with a 2 mm hexagonal key. From this locked position, the valve can be fully closed for isolation purposes and re-opened back to the required set point.

Commission a system



WARNING:

- Burn hazard. Water temperatures higher than 100°F (38°C) can be dangerous. Take all necessary precautions to prevent water or steam leakage.
 - Hot water leakage can occur from readout valves during probe insertion and during hookup of readout kit. Follow the safety instructions supplied with readout probes and readout kits.
 - Installation and maintenance must be performed by a qualified professional.
-



CAUTION:

Avoid pipe strain. This can cause breakage and water loss over time.

1. Ensure that the valve is fully open.
2. Using Bell & Gossett Model RP250-B Readout Probes, attach a Bell & Gossett differential pressure readout kit to the readout valves on the desired valve.
3. Measure the pressure differential across the readout valves (P/T ports) in the valve body. Confirm that the value obtained is greater than the minimum value indicated in the valve submittal. If it is not, then investigate the causes and if necessary, report to the designer.
4. Adjust the pre-setting dial for the specified design flow rate. Lock the dial in position and record the setting.
5. Repeat the process for all of the Flo-Setter II valves on the branch.
6. Measure the flow rate indicated at the flow measurement device on the branch. Confirm that the value recorded is equal to the sum of the flows set at downstream Flo-Setter II valves. If this is not the case investigate the causes and, if necessary, report to the designer. If a flow measurement device is not present on the branch, measure the differential pressure across the valve and verify the minimum differential pressure listed in the submittal required to achieve the desired flow rate.
7. Repeat this procedure until all Flo-Setter II valves in the system have been set and their summated flows checked against upstream flow measurement devices or differential pressure verification.
8. Measure the differential pressure across the Flo-Setter II valve on the system index terminal (usually the most remote terminal from the pump). Adjust the pump speed until the pressure differential across this valve is equal to the minimum value indicated in the product submittal.

9. Determine the pressure differential at the sensor location. Set the pump speed to control such that the value indicated at the sensor is maintained constant under all conditions.
 10. Measure and record the total flow rate, pressure differential and energy consumption at the pump.
-

NOTICE:

The Flo-Setter II valve should be fully open when flushing or pressure testing the hydronic system. Strong pressure impacts, or water hammer, can damage closed Flo-Setter II valves.

6 Maintenance

6.1 Precautions



WARNING:

- All procedures must be performed by qualified personnel.
 - When the process fluid is hazardous, thermal (hot or cold), or corrosive, take extra precautions. Employ the appropriate safety devices and be prepared to control a process media leak.
 - Always wear protective clothing and equipment to safeguard the eyes, face, hands, skin, and lungs from the particular fluid in the line.
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6.2 Valve inspection

Periodically inspect the valve for signs of leakage or corrosion.



WARNING:

Risk for property damage, serious personal injury or death. You must replace the valve if corrosion or leakage is found.

6.3 Reseal the valve

The P/T readout ports and drain plugs come pre-assembled with a leading industrial thread sealant, Loctite, and are tightened to appropriate levels. Any field adjustment of factory installed components breaks the original thread seal and could cause leakage. This adjustment necessitates the removal, cleaning, and resealing of those parts per the following instructions.

1. Remove the desired component from the valve.
2. Clean off all of the old thread sealant using a wire brush and gentle abrasion if necessary.

If the component or valve appears to have been damaged, replace it.

3. Starting with the second thread of the NPT male valve component, apply a 360° bead of Loctite 567 thread sealant/lubricant as shown. Follow Loctite handling precautions as noted on the product label.



4. If Loctite is not available, it is recommended that you use RectorSeal No. 5 pipe thread sealant for all non-glycol based applications, or any PTFE thread sealing tape. Be sure to follow the manufacturer-specific handling precaution and application instructions as noted on the product label.
5. Thread component into the valve until it is finger tight.
6. Apply torque to the following specification:

| Size | Type | Torque, ft-lbs | Torque, Nm |
|------|------------------|-------------------------------|----------------------|
| 1/4" | P/T Readout Port | 9.0 ft-lbs. + 3.0 ft-lbs. / 0 | 12.2 Nm + 4.1 Nm / 0 |

NOTICE:

- The use of thread sealants and lubricants on threads also provides lubricity. Over-application of torque can damage the valve port or component.
 - Thread sealant should not be used in combination with PTFE thread sealing tape. Using both together can cause leakage and damage the valve or fitting.
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7. Properly assembled valve components will immediately seal to moderate pressure (6 bar [100 PSI] or less). For maximum pressure resistance, allow the Loctite 567¹ or RectorSeal No. 5² thread sealant to cure for 24 hours. PTFE tape typically does not require curing to achieve maximum pressure resistance.

6.4 Attach insulation

To maximize energy savings, attach insulation to the valve after the system has been balanced. Tape or other acceptable means can be used to secure the insulation to the valve. The insulation must not cover the valve handle.

¹ Loctite and Loctite 567 are registered trademarks of Henkel Ag & Co.

² RectorSeal No.5 is a registered trademark of RectorSeal Corporation.

7 Product warranty

Commercial warranty

Warranty. For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of one (1) year from the date of installation or eighteen (18) months from the date of shipment (which date of shipment shall not be greater than thirty (30) days after receipt of notice that the goods are ready to ship), whichever shall occur first, unless a longer period is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO THE GOODS PROVIDED HEREUNDER, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. EXCEPT AS OTHERWISE REQUIRED BY LAW, BUYER'S EXCLUSIVE REMEDY AND SELLER'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES ARE LIMITED TO REPAIRING OR REPLACING THE PRODUCT AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE BUYER FOR THE DEFECTIVE PRODUCT. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.

Limited consumer warranty

Warranty. For goods sold for personal, family or household purposes, Seller warrants the goods purchased hereunder (with the exception of membranes, seals, gaskets, elastomer