

Original Instructions

Installation, Operation & Maintenance Manual

Sentry VREL Control Valve Pressure Conditioning

S-SW-IOM-00277-15 1-17



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



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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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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.

Overview

The Sentry® VREL® Control Valve is a valve specifically designed for high-pressure liquid sampling. Typical applications are for the pressure reduction and flow control of samples greater than 500 psig (34.5 bar).

The adjustable rod-in-tube design allows for variable pressure drop and flow control of high-pressure liquid samples. The VREL valve is also cleanable in place.

The VREL valve is an adjustable rod-in-tube pressure reducing device. The pressure of the incoming sample is reduced as the liquid is forced to travel through the narrow gap between the tapered rod and the rod opening. Because the reduction in pressure is done over the entire length of the rod, localized wear is held to a minimum. The result is a very long service life compared with devices in which the pressure drop is taken over a very short distance (fixed orifice, pressure regulator, etc.). Other devices erode frequently causing friction loss and down time.

With a VREL valve, the flow or pressure drop can be changed while the sample is flowing by adjusting the position of the rods. Turning the handle moves the rods in or out on the lead screw. If sample flow is blocked, the rods can be fully retracted to allow sample pressure to flush the dirt through. The sample line never needs to be shut off or the VREL valve disassembled to accomplish this. This is very important as the operator tries to get critical samples while boiler pressure is rising or falling during startup or shutdown.

Installation

WARNING

To ensure the protection provided by this equipment is not impaired, this equipment must not be installed or used in any manner other than that which is specified in this manual.

NOTICE

Ensure that the VREL valve is installed such that it will not be subject to steam or water sample temperatures greater than 300°F. Damage to the VREL valve or downstream equipment may occur.

The physical dimensions of the VREL valve are shown on the drawing in Figure 4. The VREL valve can be mounted in any position. The cutouts for panel mounting are shown in Figure 4. The locating pin ensures correct orientation to connecting tubing. As an alternative, a U-bolt can be used to hold the body to a panel face or post.

Installing the VREL valve in a Panel

WARNING

Isolate the sample line and make sure that it cannot be opened during installation of the VREL valve. Failure to isolate the sample line could expose personnel to high pressure and/or hot materials.

1. Drill holes in panel per Panel Cutout diagram in Figure 4.
2. Remove valve handle assembly by unscrewing head nut and pulling assembly out of body.
3. Remove panel lock nut.
4. Insert body assembly from rear of panel using locating pin to position body.

NOTE

Do not rely on the locating pin to hold the barrel assembly while tightening the head nut.

5. Install panel locknut. Pull up snug.
6. Insert rods into barrel. Be sure keyway on rod assembly lines up with key inside barrel. Tighten head nut finger tight.
7. From the backside of the panel, use a wrench on the body nut to hold the body while further tightening the head nut. It may require considerable torque to get a tight seal on the metal-to-metal sealing surface inside the head nut.
8. The head nut must be fully tightened before the packing nut can be tightened or loosened. Tighten packing nut with 15-20 ft-lb (20.3-27.1 Nm) of torque.

Connecting Sample Tubing

WARNING

Isolate the sample line and make sure that it cannot be opened during installation of the VREL valve. Failure to isolate the sample line could expose personnel to high pressure and/or hot materials.

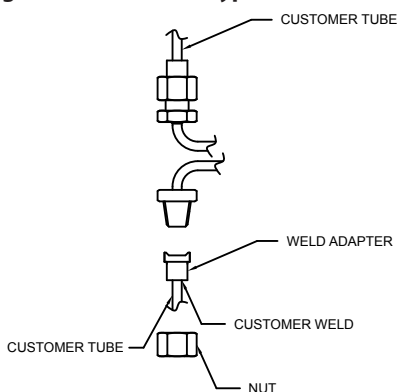
Three types of tube end configurations are available:

- Type 1: Plain end – 1/4" tubes with no connections for use with customer supplied compression fittings.
- Type 2: Socket weld – socket weld fittings for customer's 1/4", 3/8" or 1/2" tubing.
- Type 3: 37° Fitting - 37° metal to metal fitting for customer's 1/4" or 3/8" tubing.

A VREL valve with Type 1 or Type 3 connectors can be easily disassembled. Type 2 connectors must be cut out.

For Type 2 and Type 3 connections, the customer must weld the system tubes either to the socket weld fittings (Type 2), or to the loose weld adapter (Type 3). In the case of Type 3 connections, be sure to slide the nut onto the tube before welding the adapter. See Figure 1.

Figure 1. Connection Type 3 – 37° Fittings



Operation

⚠ WARNING

During operation, the VREL valve may become hot. Do not touch. Use care not to touch adjacent hot sample lines.

⚠ CAUTION

When starting up a sample line that includes a VREL valve, always be sure that the rods are fully inserted before opening the sample isolation valve (turn handle clockwise to insert rods). The VREL valve is not a positive shut-off device. Even when fully closed, approximately 150 cc/min sample flow through the VREL valve is possible. When the rods are fully inserted, the yoke bottoms in the barrel. When the rods are fully retracted, the yoke is stopped by the seal.

NOTICE

Do not try to turn the handle by using extra force. The threads will be damaged.

After opening the isolation valve fully, adjust the setting of the VREL valve until the desired flow is established. Turning the handle clockwise will decrease flow; turning counterclockwise will increase flow.

Clean in place

⚠ WARNING

Isolate the sample flow before cleaning the VREL valve. When performing this cleaning operation, the sample pressure is not being reduced by the VREL valve. Failure to isolate the sample flow could result in serious injury and/or cause damage to pressure-sensitive equipment downstream from the VREL valve.

Since corrosion products, scale, and other foreign matter may be present in sample lines, plugging of the VREL valve is possible. To clean, fully retract the rods by turning the handle in a counter-clockwise direction. Allow the obstruction to clear. Readjust the setting of the VREL valve until desired flow is established.

Service

⚠ WARNING

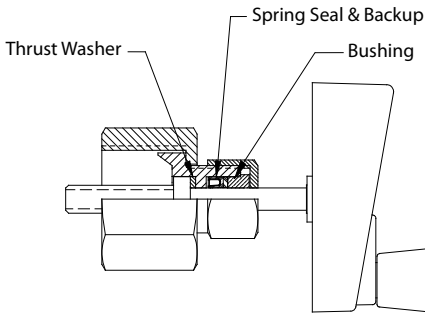
Before servicing, ensure that the sample line is isolated and cannot be opened during this service. This is necessary to prevent exposure to high pressure and/or hot materials. Allow the VREL valve to cool to a comfortable touch prior to commencing service.

No normal maintenance is required. Replacement parts available are listed below.

Replacement Parts

Part Number	Item
6-02302C	VREL Valve Seal Kit (Figure 2) (includes thrust washer, spring seal & backup washer)
6-02302E	Valve Handle & Rod Assembly (Figure 3) – includes both 6-02302A and 6-02303A
6-02302A	Valve Handle Assembly Only (Figure 3)
6-02303A	Tapered Rod & Nut Assembly Only (Figure 3)
6-04605A	VREL Swivel Handle

Figure 2. 6-02302C – VREL Seal Kit



Ratings

Wetted materials: 316 Stainless Steel
Weight: 4 lbs
Pressure: 5000 psig at 300°F
(345 barg at 149°C)

Figure 3. 6-02302E – Valve Handle & Rod Assembly

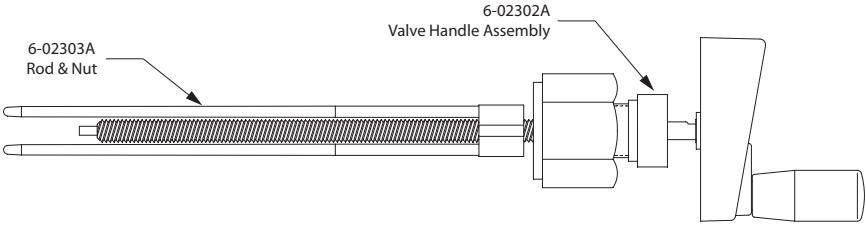
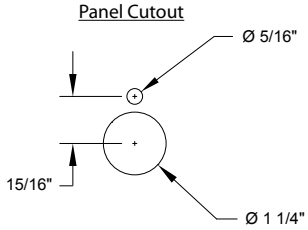
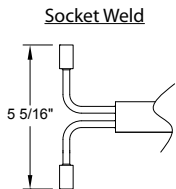
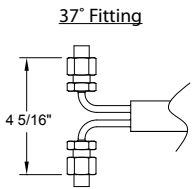
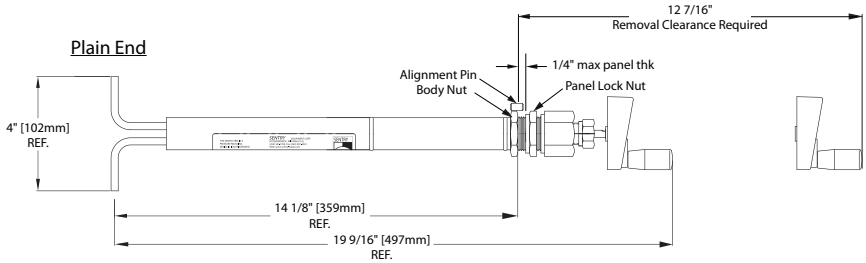


Figure 4. VREL



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®	<ul style="list-style-type: none">▪ 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.

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.

- Customer Service—General information, warranty claims, order management.
- Installation Service—For systems that require specialized expertise upon installation.
- Technical Support—Troubleshooting, training, and technical manuals.
- Field Service & Retrofits—When a problem needs immediate attention.
- Replacements Parts & Consumables—Order your replacement parts and consumables.
- Sentry ProShield Services—Select from four ProShield Guardian service plans providing different levels of support to protect your large system investments with regularly scheduled maintenance.

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