

Original Instructions

# Installation, Operation & Maintenance Manual

## Sentry D2 Sampler Strip Samplers

S-SP-IOM-00285-4 11-17



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

 **SENTRY**

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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.

### **CAUTION**

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

### **WARNING**

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

**Moving parts!** This equipment may contain moving parts. All drive guards and doors must be secured in place when this machine is being operated.

## General Description

The Sentry® D2 automatic strip sampler obtains samples of free-flowing materials in gravity flow pipes, spouts or hoppers. The sample tube has a slot opening across the inner diameter of the pipe, spout or hopper.

When signaled from the sampler controller, a solenoid-operated four-way valve activates a pneumatic actuator that rotates a slotted sample tube through the product flow to catch a cross-sectional sample. Simultaneously, a motor-driven auger conveys the sample to a collection container.

Close tolerance between the sample tube and auger assures self-cleaning of the sampler. The auger rotates at 90 RPM, and since it rotates at a slow speed, product characteristics are not changed significantly by the sampler. Sample frequency can be changed at the sampler controller.

### WARNING

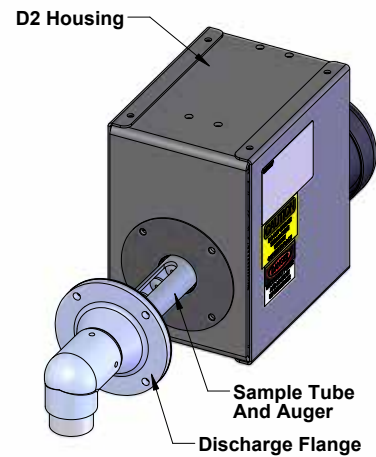
Read these instructions completely before proceeding to assemble, install or operate this machine. This machine should be installed, operated and serviced by qualified individuals. All drive guards and doors must be secured in place when this machine is being operated. Follow proper local, state and federal regulations for proper installation and operational requirements..

# Installation

## ⚠ CAUTION

Sampler must be supported in two planes to protect personnel and assets, and prevent bending of the sample tube and property damage.

1. Choose a location for the sampler. Product should be evenly dispersed in the material line. Make sure that the mounting location is six to eight feet beyond all elbows or line irregularities.
2. The D2 automatic strip sampler has a variety of installation configurations. Check the figures for the one that suits your location. Make sure the sample tube is centered in the line so it can revolve freely. When installed, the slot in the sample tube must face approximately the six-o'clock position when it is viewed from the discharge end.
3. If the sampler is premounted at the factory:
  - a. Remove a section of the line equal to the length of line in which the sampler is mounted.
  - b. If the sampler is mounted with an adapter to existing piping, refer to the mounting details on your customer drawing.
  - c. For further details, reference the drawing included with this manual.

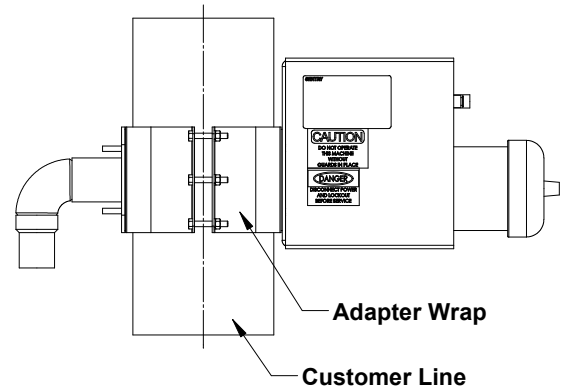


## ➡ NOTE

If the wall of the spout or chute is 12 gauge or heavier, bolts, nuts, and lock washers can be used to mount the sampler. Otherwise, regular flathead bolts with nuts and lock washers on the outside should be used, so as not to interfere with material flow. Any time the sampler is to be mounted to a line that is 14 gauge or lighter, reinforce the line with heavier gauge metal before bolting it directly to the line. If the line cannot be reinforced, then support the sampler housing with a bracket.

4. To install the sampler on a horizontal plane in a square to rectangular chute:

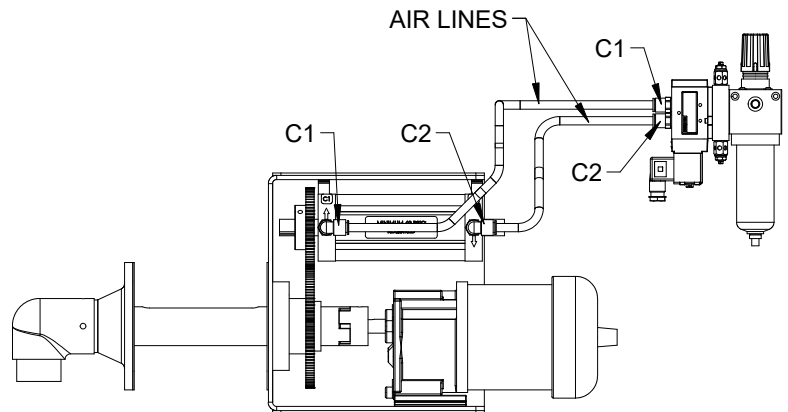
- a. From a reference point up or down on both sides of the line, locate the center point where the sampler is to be mounted.
- b. Cut a 2-inch diameter hole in both sides of the line.
- c. Using the bolt pattern from the drawings accompanying this manual or the gasket as a guide, mark and drill bolt holes on each side.
- d. Mount and secure the sampler on the housing end.
- e. Visually check the alignment of the sample tube from the discharge end.
- f. Slide the discharge casting on and secure in position. Discharge casting should slide on easily; if not, adjust the tube and housing accordingly.
- g. Secure the discharge elbow on the end of the discharge casting.



5. To install the sampler in a round line with adapters:

- a. From a reference point up or down on both sides of the line, locate the center point where the sampler is to be mounted.
- b. Cut a 2-inch diameter hole in both sides of the line.
- c. Mount the sampler adapters to each side of the line, making sure they are directly across from each other.

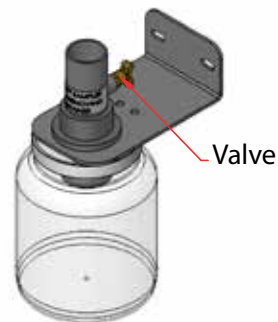
- d. Mount and secure the sampler on the housing end.
  - e. Visually check the alignment of the sample tube from the discharge end.
  - f. Slide the discharge casting on and secure in position. The discharge casting should slide on easily; if not, adjust adapters accordingly.
  - g. Secure the discharge elbow on the end of the discharge casting.
6. To install the sampler in a bin with adapters:
    - a. From a reference point up or down on both sides of the bin, locate the center point where the sampler is to be mounted.
    - b. Cut a hole in both sides of the bin (see the drawings accompanying this manual for size).
    - c. Using the adapter plate as a guide, mark and drill bolt holes on each side.
    - d. Mount and secure the sampler on the housing end.
    - e. If accessible, use a level to check alignment of the sample tube or visually check it from the discharge end.
    - f. Slide the discharge casting on and secure in position. The discharge casting should slide on easily; if not, the adapters may need shims to correct the problem.
    - g. When the sampler is correctly in position, secure the discharge elbow on the end of the discharge casting.
  7. Mount the sample bottle assembly in any convenient location below the sampler. Best results are obtained when, in the sampling position, the discharge of the sampler is in direct line with the intake of the sample bottle.
  8. Connect a flexible hose from the sample discharge to the sample collection container. In certain applications, rigid metal tubing can be used following a short length of hose attached to the discharge.
  9. Mount the filter-regulator and the solenoid valve. The bowl should be in a vertical position as close as possible to the sampler. Air pressure of 60 to 80 psi ( bar) normally is recommended. The regulator and the restrictors are preset at the factory. Air usage is 17 cubic inches per stroke. CFM depends on how often the sampler is actuated.
  10. Connect the lines from the solenoid valve marked C1 and C2 to the corresponding C1 and C2 marks on the air cylinders with 3/8-inch OD poly tube.
  11. Connect a clean air supply to the inlet of the filter-regulator. Oil and moisture filters should be used before the filter-regulator, if necessary. If an air lubricant is added to the system, it should be placed immediately after the filter-regulator. Air lines should not be so long that sharp bends or kinks develop in the lines. If an air purge is supplied, connect a purge gas source to the solenoid valve mounted on the sampler purge connection.
  12. Connect motor leads to the sampler controller or PLC per the motor wiring diagram supplied with this manual.



# Operation

## Sample Bottle Assembly

The valve on the sample bottle assembly is used to release pressure in the container (see figure, right). The valve may be opened a one quarter turn to allow pressure to bleed slowly between sampling cycles. The valve must be closed when sampling on a vacuum line.

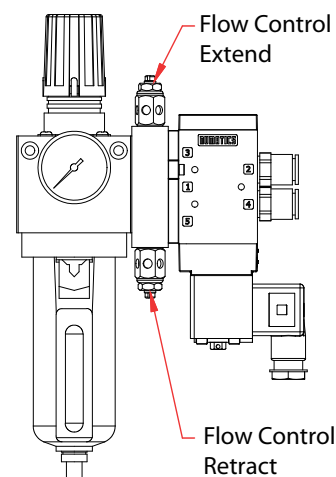
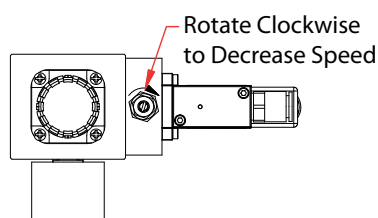


### **⚠ WARNING**

Open the valve on the sample bottle assembly to release the container pressure before removing the container. DO NOT open the valve by more than a quarter turn during sampling. Fine material may escape, biasing the sample and possibly causing personal injury.

## Sample Probe Speed

The speed with which the sample probe extends and retracts can be increased or decreased by turning the flow controls on the four-way valve (see figure, below right). Each screw regulates the air exhausting from the cylinder. Turn the screw clockwise to decrease cylinder speed. When shipped from the factory, the advancing and retracting speeds are equal.



### **⇒ NOTE**

If you make an adjustment to the four-way valve, you may need to adjust the timers in the controller.

# Maintenance

## Filter Regulator

1. Drain the filter/regulator at least once a week by turning the thumb screw on the bottom of the bowl. Draining frequency depends upon the quality of the air supply and may be required daily.

### **⇒ NOTE**

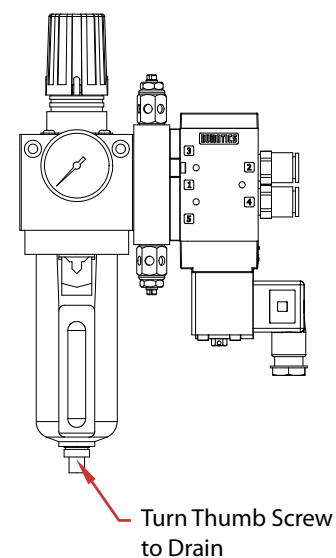
If an air lubricant is added to the system, it should be placed immediately after the filter regulator.

2. Excessive pressure drops or a visible coating on the filter element indicate cleaning of the filter regulator is necessary.
  - a. Shut off the air supply and remove the bowl.
  - b. Unscrew the lower gasket, allowing the filter element to fall out.
  - c. Wash the filter element with denatured alcohol.

### **NOTICE**

Use an alkaline solution (soapy water) and not a solvent for cleaning the polycarbonate bowl

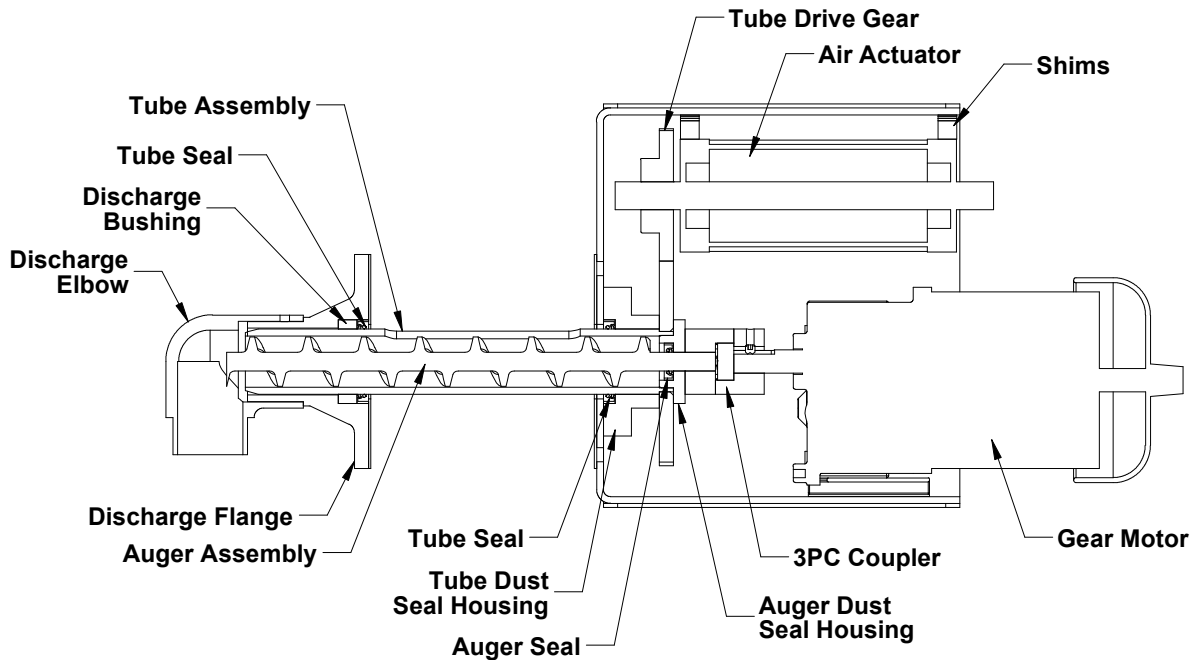
- d. Clean the polycarbonate bowl with soapy water.
- e. Reassemble the regulator and turn on the air supply.



3. Wash and blow out restrictors once a month or more frequently if necessary.
4. Replaceable items for the filter-regulator are the filter, bowl and gauge.

## Seals

There are three (3) dust seals on a standard Sentry D2 sampler, two (2) tube seals, one on the housing side of the sampler and one on the discharge side, and one (1) auger seal. Inspect and replace as needed.



## Frequency

Because the Sentry D2 sampler can be used with a wide variety of products and installations, there are no definite guidelines on how often maintenance should be performed. Maintain the sampler very closely for the first three to four months from initial installation and document wear vs. usage. Using this information, determine a maintenance program that fits your specific environment.

## Seal Replacement

If the seals become worn, you must remove and replace them.

1. Discharge side, tube seal
  - a. Remove the discharge flange from the chute.
  - b. Remove the seal from the discharge housing.
  - c. Install the new seal.
  - d. Install the discharge flange back onto the chute.
2. Housing side, tube and auger seals
  - a. Remove the sampler from the chute.
  - b. Disassemble the gearmotor, coupler and spider from the housing.
  - c. Remove the tube and auger; note the direction of the tube aperture and mark a line on the gears if needed.
  - d. Disassemble the tube dust seal from the housing.



- e. Remove the auger dust seal housing from the auger shaft.
- f. Remove the seals from the tube and auger dust seal housings.
- g. Install new seals.
- h. Reassemble the tube and auger dust seal housings.
- i. Install the tube and auger, making sure the aperture is facing the same direction as it was when it was removed.
- j. Reassemble the gearmotor, coupler and spider.
- k. Install the sampler back onto the chute.

## Troubleshooting

The following information is a synopsis of the problems you may encounter prior to troubleshooting your equipment. Divide the unit into three sections and try solving the problem before you continue on.

### Potential Problems

#### Electrical

- Controller
- Connections
- Circuit breaker
- Solenoid
- Motor

#### Pneumatic

- Air pressure
- Filter-regulator
- Restrictors
- Four-way valves
- Actuator
- Air lines

#### Mechanical

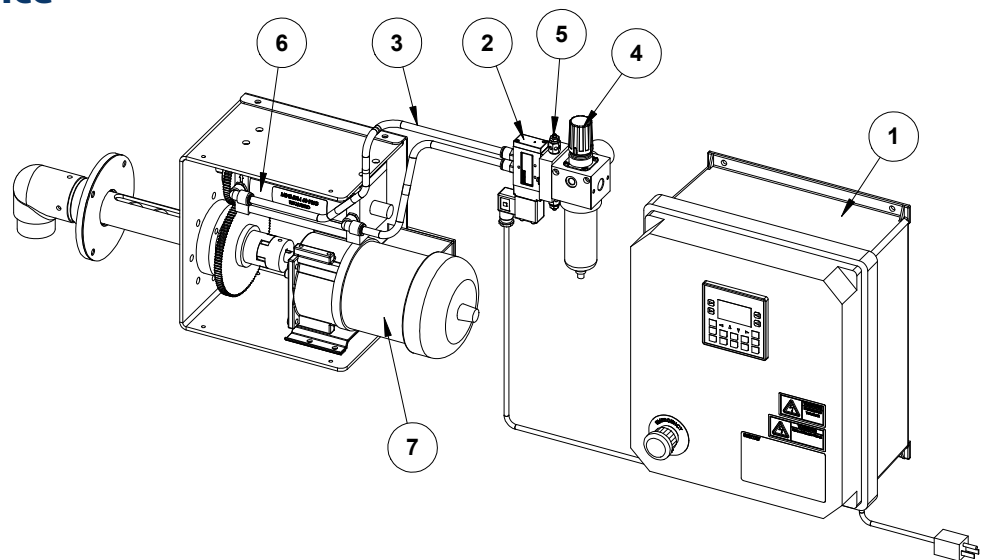
- Alignment (binding of tube/auger)
- Motor coupler
- Loose set screws
- Broken or worn teeth on gears

### **⚠ WARNING**

Disconnect main power to controller before attempting any adjustments or disassembly.

### Troubleshooting Sequence

1. Controller
2. Connections
3. Tubing kinks
4. Air pressure
5. Restrictors
6. Actuator
7. Gearmotor
8. Alignment



#### Electrical

1. See controller manual.

#### Pneumatic

- 2., 3., 4., 5. Check air lines for kinks, breaks, etc. Air pressure to the filter/regulator should be 60-80 psi. If higher air pressure is required to activate the cylinder, then there is a possibility that the probe is bound or the four-way valve needs cleaning. Look at the air restrictors and make sure they are open and not clogged.

6. If the probe slows up or stops when rotating, the air cylinder seals may need replacing. If the main seal is worn, you may be able to hear air escaping around it.

## Mechanical

### CAUTION

**Pinch hazard! Keep clothing and body parts away from the auger while the discharge flange is removed.**

7. Check connections to the motor and sampler controller to ensure that the auger is rotating in the correct direction. Remove the discharge flange and observe the direction of the auger. Correct the wiring as necessary. In addition, check to see if any sample material is packed or stuck in the outlet due to an obstruction. Run the sampler without discharge to check for the cause of any obstruction. Set up a regular cleaning schedule for the sampler based on sampled material properties. Reinstall the discharge flange.

If there are frequent motor trips, disassemble the sample tube and auger assembly to check for binding caused by wet or packed sample, incorrect tolerance between the sample tube and auger, bent sample tube, or other issues. If the sampler is clogged with sampled material, set up a regular cleaning schedule for the sampler based on sampled material properties.

### NOTE

**If the sampled material is not dry and free flowing, the sampler motor will overload and trip. Consult Sentry Equipment for proper sampler application.**

If the auger does not rotate, check alignment of the sample tube or gearmotor. Make sure the sample tube is not striking the walls of the material line. If the gearmotor runs but auger still does not rotate, check for loose set screws on the coupler or in the gears for adjustment or wear. Check for dirty restrictors or readjust the restrictors to retract within the two-second limit. Pressure drop may also cause the gears to strip. Check filter-regulator for correct psi.

8. If the sampler properly runs mechanically, but still does not function correctly, then remove it from the line. Check for obstructions in the tube. Reassemble and check for operation. If any other problems arise, please contact Sentry Equipment.

# 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:

Product Line	Product Category	Warranty Period
Sentry®	1. Automatic Sampling 2. Corrosion Monitoring 3. Manual Sampling 4. Sample Conditioning 5. Sampling & Analysis Systems 6. Replacement Parts (without expiration dates)	Eighteen months from date of shipment or twelve months from startup, whichever occurs first
Waters Equipment	1. Sampling & Analysis Systems 2. Replacement Parts (without expiration dates)	Twelve months from date of shipment

To view the full warranty, go to [www.sentry-equip.com/warranty](http://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.

To learn more, go to [www.sentry-equip.com/support](http://www.sentry-equip.com/support).

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