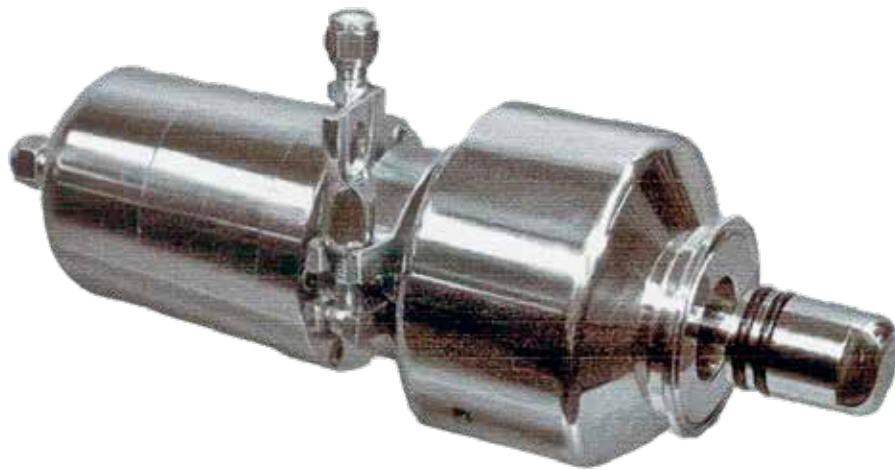


Original Instructions

# Installation, Operation & Maintenance Manual

## ISOLOK MSD Sampler Point Samplers

S-AS-IOM-00426-1 11-17





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.

# Table of Contents

<b>Safety Information</b> .....	<b>4</b>
<b>General Safety Precautions</b> .....	<b>5</b>
<b>General Description</b> .....	<b>6</b>
<b>Installation</b> .....	<b>6</b>
Selection of Installation Location .....	6
Line Adapter Mounting (if provided) .....	7
Sampler Mounting .....	7
Controller (if provided) .....	7
Service Connections .....	7
<b>Operation</b> .....	<b>8</b>
Sample Containers .....	8
Controller (if provided) .....	8
Venting .....	10
Sample Collection Containers .....	10
<b>Maintenance</b> .....	<b>10</b>
Sampler Cleaning .....	10
Sampler Removal .....	11
Plunger Seal Disassembly .....	11
Plunger Seal Reassembly .....	12
Piston Seal Disassembly .....	12
<b>Troubleshooting</b> .....	<b>13</b>
<b>Standard Warranty</b> .....	<b>14</b>
<b>Customer Support</b> .....	<b>14</b>

# 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.

### WARNING

Equipment rated TX. Equipment maximum surface temperature depends on operating conditions. Ensure maximum surface temperature shall stay below ignition temperature of dust or gas atmosphere where it is installed based on process conditions. Failure to comply could result in an explosion, causing serious injury or death to personnel and damage to equipment.

If the sampler is mounted directly to a non-electrically conductive surface, sampler shall be bonded to a grounding electrode. Failure to comply could result in sparking, which could lead to an explosion, causing harm to personnel and equipment.

If the sample container is removed from the sampler, do not insert any body part or other item into the sample discharge port. Crushing will occur.

### NOTICE

To ensure proper sampler operation, be sure the sampler is installed in a pipe large enough for the sampler plunger to extend without impacting the pipe. Failure to comply will result in equipment damage and poor sample quality.

# General Description

## 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.

The Sentry® ISOLOK® MSD automatic high viscosity sampler enables the collection of accurate samples of high viscosity materials. The ISOLOK MSD sampler delivers a fixed volume of sample with each cycle. The sampler mounts onto the process line using a 2 in tri-clamp ferrule mount held with a clamp and gasket.

Compressed air drives the sampler by forcing the plunger to reach into the process to capture a fixed volume of the material. The compressed air then acts on the opposite side of the piston to retract the plunger. Process line pressure assists in closing the sample annulus, forcing the material into the attached sample container. The operator is isolated from the process at all times by the sampler's seal design, and the sample captured in the container is locked out from external influences.

The maximum rated temperature of the ISOLOK MSD sampler is defined by the plunger seals. The plunger seals are selected based on material compatibility and temperature of the process being sampled. Reference the following chart:

TX	plunger seal material	maximum temperature
T2	Perfluorinated elastomer (FFKM)	550°F (288°C)
T3	Filled PTFE	500°F (260°C)
	Fluoroelastomer (FKM)	400°F (204°C)
T4	ECTFE	325°F (163°C)
T5	Ethylene propylene	250°F (121°C)
	95 Duro polyurethane	230°F (110°C)
	Nitrile	225°F (107°C)
	75 Duro polyurethane	212°F (100°C)
T6	UHMW PE	200°F (93°C)

## NOTE

Figures in this manual may differ from actual purchased equipment. Please refer to the drawings in the appendices of this document.

# Installation

## Selection of Installation Location

Select a location to install the sampler where the material in the process stream is well mixed. Location of the sampler and controller is very important for accurate sampling results. They should be as close together as practical, within sight of each other, and protected from weather, traffic damage and normal work activities in the area.

When selecting a sampler location, ensure the sample collection container will clear vertical lines (or other obstructions) when mounted onto the sampler. The sampler can be used on a pipe or tank running horizontally, vertically or at an angle, but the preferred position is with the axis of the sampler horizontal.

## Line Adapter Mounting (if provided)

1. Reference the accompanying drawing to determine which line adapter had been provided.
  - a. SADDLE SHAPE line adapters are machine cut to fit the OD of sampler diameter process pipes.
  - b. PLUG SHAPE line adapters are installed through the wall of larger diameter pipes or sides of tanks.
2. After selecting a location and verifying the sampler orientation, cut a hole in the process line (or tank) according to the shape of the line adapter. Exact size to cut is shown on the accompanying drawings
3. Protect bore and face of adapter from weld spatter.
4. Tack weld adapter in position. Again, check orientation and position before continuing to weld.

### NOTICE

Use industry code procedures to protect adapter from distortion. Major distortion cannot be corrected and will prevent installation of sampler.

## Sampler Mounting

1. ISOLOK samplers are designed to mount to a line adapter that is welded or otherwise attached to a process line.
2. PLUNGER CLEARANCE. Ensure that adequate clear space exists ahead of nose of sampler to allow for full plunger movement.
3. Check orientation of sampler and line mounting adapter, and ensure that axis of sampler is mounted as shown on the accompanying general arrangement drawing.

## Controller (if provided)

1. Make connections as shown on the accompanying drawings.

## Service Connections

1. Make air line connections as shown on the accompanying drawings.
2. For most installations, the sampler requires compressed air at normal flow capacity of 2 standard cubic feet per minute (SCFM) at normal regulated pressures between 30 psig (2.1 barg) and 80 psig (5.5 barg).
3. At 80 psig (5.5 barg), air consumption is approximately 0.06 SCF per sampler cycle for 2-3/4-inch cylinders.
4. AIR LINES. Connect two air outlet ports on controller to sampler air fittings P5 on head and P6 on rear of cylinder using 1/4 in OD air lines. Use no more line than is necessary.
5. An adjustable restrictor (flow-control valve) should be used to control exhaust air flow from the air cylinder. Consult Sentry Equipment Corp if not furnished as part of the operating controller system.
6. Connect lines so that sampler dwells in retracted position while in between cycles or when off.
7. Check for proper connection of air lines by extending the sampler plunger using the "HAND" or "GRAB" option of the controller.

# Operation

## DANGER

**Dangerous gas!** The gases being emitted from the bottle vent may be hazardous and toxic upon exposure. The vent line should be directed to a charcoal canister, flare or other sub atmospheric region for collection and treatment of sample vapors.

## Sample Containers

1. Sample collection containers always should be clean and completely dry before being used. Containers (bottles) of polypropylene most often are utilized.
2. **SCREW MOUNT CONTAINERS.** The standard sampler body is provided with a 70 mm, 4 tpi threaded discharge port for direct mounting of the sample collection bottle.
3. **SEPARATE CONTAINERS.** Suitable piping connections for metal or plastic components can be arranged to conduct sample portions to a separate container. Whenever such piping is installed, avoid long runs with multiple fittings, joints or other areas where solids or crystals could build up and block flow.

## NOTE

**IMPORTANT.** Select sample container size that will not be filled completely even during longest sampling times. Use care when setting a cycle rate that may nearly fill a container.

## WARNING

Always ensure control is OFF before mounting or exchanging sample containers.

## Controller (if provided)

ISOLOK samplers require an operating controller which determines the time interval between cycles, speed of the plunger and dwell in product stream. Filtered, compressed air or gas is provided from controller to sampler air cylinder for operation.

Operation can be manual-pneumatic, electric-pneumatic, all-pneumatic, etc. A few are described:

- Manual-Pneumatic Control includes a filter, regulator, gauge, and lever operated four-way air valve with speed controls and mounting bracket. The lever is depressed to extend the plunger and held approximately two seconds. The lever release retracts the plunger. A stainless steel enclosure with locking provision is optional.
- Electric-Pneumatic Control includes an electric power supply for the timer and solenoid operation with separate pneumatics. Time-based units include EXTEND-RETRACT adjustable plug-in timers to control time intervals and optional special time delay functions. Flow proportional or remote contact controls operate from the user's flow meter or pulse generating device and usually include an adjustable counter. NEMA 4 or NEMA 7 enclosure models are available.
- All-Pneumatic Control is suitable for explosion hazard-rated areas where compressed air is available for sampler operation or for areas where electric power supply is not available.

## General Specifications

In most cases, an automatic electric sampler cycle controller requires an 115VAC power supply. IN ALL CASES controls require a suitable ground and means to disconnect the electrical supply.

Where connecting a contact closure or pulse input from the flow meter to the controller, using shielded cable is recommended if the run is more than 10 feet or if the conduit contains leads of higher voltage.



The controller location should be within sight of the sampler and require connecting air lines to the sampler of no more than 30 feet.

Connect a compressed air supply line to the sampler operating controller of nominal flow capacity in the range of 2 SCFM at 80 psig (5.5 barg) to 120 psig (8.3 barg). Dry, oil-free air gives best operation with minimum maintenance. Adequate use of air filters is recommended. Minimum pressure setting of 30 psig (2.1 barg) is required. The maximum pressure setting should be less than the incoming air supply to ensure steady, regulated pressure on the sampler.

## Automatic Cycle Rate

Select a cycle rate on an adjustable delay timer that will provide an adequate sample composite for the container in use. DO NOT overfill the container. Sample delivery is charted for samplers with 14 cc liquid volumetric displacement per cycle. A partial chart is shown on the following page. Cycle rate is a combination of the time needed to fully extend the plunger into the product line, then completely retract and discharge the sample collected.

**NOTE**  
**The plunger should remain extended into the process flow for the shortest amount of time possible.**

To convert cubic centimeters to fluid ounces, multiply by .0338. There are approximately 30cc (29.5735) to one fluid ounce, 128 fluid ounces to one U.S. gallon.

$$*CYCLE TIME = \frac{CC \text{ PER CYCLE} \times \text{TOTAL SAMPLING TIME (SEC)}}{\text{TOTAL SAMPLE (CC)}}$$

$$* CYCLE TIME (SEC) = \text{EXTEND TIME} + \text{RETRACT TIME}$$

Specialized controls are available on request to suit various requirements.

total sample (cc) at 14 cc per cycle						
	total sampling time					
cycle time*	5 min	10 min	30 min	1 hr	8 hr	24 hr
5 sec	840	1680	5040	10080	80640	241920
10 sec	420	840	2520	5040	40320	120960
15 sec	280	560	1680	3360	26880	80640
20 sec	210	420	1260	2520	20160	60480
30 sec	140	280	840	1680	13440	40320
60 sec	70	140	420	840	6720	20160
120 sec	28	70	210	420	3360	10080
300 sec	14	28	84	168	1344	4032
480 sec	--	14	42	98	840	2520
600 sec.	--	14	42	84	672	2016

The sampler design precludes marking each component of the sampler with a part or serial number. We recommend the user uniquely identify each sampler and controller. Equipment identification becomes invaluable when operating more than one sampling instrument serviced through a central maintenance facility. Identification tags can be provided from Sentry Equipment in laminated plastic or metal to be attached to the sampler or controller. Price of the tags is available upon request.

Sampling should be performed only when the product is moving. Sampling from stagnant (stationary) product can bias the sample. Starting and stopping the sampling system can be done manually or by interlocking to a pump or valve. Special controls are available for use with flow meters or for remote computer operation.

## CAUTION

Product collected with each sampler plunger cycle drains from the discharge port (P1) of the sampler into the container. However, there is always some clingage to wetted parts. Those collecting samples should be instructed in proper techniques and care when handling containers. If required, users should wear protective equipment such as gloves, masks or other clothing at all times when operating sampling equipment where exposure to the sampled product could be hazardous.

## Venting

Samplers used on pressurized lines – where expansion of entrained gas, air, steam or fumes could cause a pressure rise in the sample bottle – require adequate venting.

1. Venting may be provided by a port in the bottle adapter or body top port of the sampling instrument. Ensure any potentially hazardous fumes or product are conducted to a safe area. Periodically check to ensure the vents are open and unclogged.
2. Vent or drain ports always should be located to avoid accidental exposure of an operator to hazardous or hot material. Where evaporation or vapor loss through a vent is undesirable, the vent should be equipped with a proper control.
3. Contact Sentry Equipment Corp for clarification of any questions on venting of the sampler system.

## Sample Collection Containers

### WARNING

Always ensure controller is OFF before mounting or exchanging sample containers.

The sampler has been provided with one of a variety of sample collection container connections. See the accompanying drawing to identify which has been provided.

1. Sample collection containers always should be clean and completely dry before being used. Containers (bottles) of polypropylene are often used.
2. SCREW MOUNT CONTAINERS. These adapters have a suitable threaded port and mount onto a discharge port.

## Maintenance

### WARNING

Sampler must not be disassembled or removed from line until line is free of product, is at atmospheric pressure, all components are at safe temperature, and all services have been shut off.

## Sampler Cleaning

1. Operating an accurate and valid sampling installation is critically dependent on effective cleaning procedures. ISOLOK samplers incorporate materials, finishes and design to allow effective cleaning of seals, ports, vents and interior body cavities.
2. Whenever a sampler is cleaned, it should be lubricated and inspected for wear and damage that can affect its continued successful operation. The sampler periodically should be checked for proper operation and to ensure that any wear is detected for preventive maintenance.
3. On continuous duty installations, the sampler should be checked once a day for proper operation. On all installations, a definite schedule of inspection should be established to ensure safe and accurate sampling

operation. ISOLOK samplers initially must be installed and periodically inspected to ensure all connections, clamps and fasteners are firmly tightened. Failure to keep screws or connections properly secured could result in leakage or damage.

4. Do not weld, machine or otherwise modify the sampler or control in any manner. Consult Sentry Equipment Corp before undertaking any changes. Follow your plant safety procedures whenever maintenance or inspection is required on this equipment.
5. We recommend that service records be maintained on sampling equipment. Data should include:
  - a. Sampler: Record date of installation, date of seal replacement, which seals were replaced and the condition of used seals, and the reason they were replaced. Accurate records will assist in determining seal life or if abnormal operating conditions exist. Contact Sentry Equipment Corp if unusual wear or chemical attack to the seals or the metal parts of the sampler occurs.
  - b. Controller: Record the date of installation, the date of timer or air valve replacement, items replaced and the condition of used parts. Indicate the reason they were replaced. Frequent replacement of timers may indicate an issue with the controller operating environment. Impurities in the air supply source may cause premature failure of pneumatic components.

## Sampler Removal

### WARNING

Sampler must not be disassembled or removed from line until line is free of product, is at atmospheric pressure, all components are at safe temperature, and all services have been shut off.

Refer to the included general arrangement and assembly drawings for removal information. All service to the sampler should be performed with it removed from the process line.

## Plunger Seal Disassembly

### WARNING

Sampler must not be disassembled or removed from line until line is free of product, is at atmospheric pressure, all components are at safe temperature, and all services have been shut off.

If preliminary inspection of the sampler plunger or persistent leakage indicates replacement of the plunger seals or o-rings, remove the complete sampler from the line adapter and proceed as follows.

1. Carefully apply compressed air to the rear cylinder port, fully extending the plunger. The plunger seals now can be accessed for inspection without further disassembly.
2. Remove the clamp at the rear of the body or unbolt the air cylinder from the body and withdraw the cylinder and plunger from the body.

### CAUTION

Decompression of seals may occur as the plunger is removed. Protect personnel from exposure to sample material trapped between plunger seals.

3. Unscrew the plunger from the piston rod using the wrench flats provided. Metal parts slide off the spindle. Observe the position of the parts as removed and set aside carefully, taking care not to lose any small parts.
4. If any seal is worn flat on the outside diameter, torn, scored or experiencing chemical degradation, remove the seals from the carriers and sleeve.

## NOTICE

Do not nick or scratch seal seats.

5. Check to ensure the spindle has not been bent and all parts are smooth and free of score marks. Scored or damaged parts should be repaired or replaced.

## Plunger Seal Reassembly

Reassembly is done in reverse order of disassembly procedure. Always work with the sampler group drawing as a guide. The following techniques will be helpful in reassembling seals and components of plunger module.

1. Wipe and clean seal seats of metal parts. Always replace the plunger seals as a complete set.
2. Wipe seals with a light film of process compatible lubricant as an aid in assembly, if required.

## NOTICE

Do not use petroleum-based grease, oil or similar hydrocarbon lubricants on the EPDM plunger seals; they will swell the rubber material.

3. Seals will stretch more easily if they are warmed on a hot plate or in hot water. Also, lubricate seals before stretching them over the plunger. (Use the optional seal loading tool for ease of seal assembly. Contact Sentry Equipment Corp for more information.)
4. Screw the plunger assembly carefully into the piston rod by hand. Using the wrench flats provided, torque the spindle to torque value provided on the accompanying drawing. Check the concentricity of the assembled plunger module to ensure it is straight.
5. When the plunger module is assembled with seals, reinstall the cylinder and plunger into the body module and clamp securely.

## Piston Seal Disassembly

### WARNING

Sampler must not be disassembled or removed from the line until the line is free of product, is at atmospheric pressure, all components are at safe temperature, and all services have been shut off.

1. Remove the clamp at the rear of the sampler body or unbolt the air cylinder from the body.
2. Inspect the bore of the barrel for scoring or wear. Wipe out with a dry, non-abrasive cloth.

## NOTICE

Do not use solvents. A heavily scored barrel should be replaced.

3. Inspect and replace the piston seals and rod seals if needed.
4. Reassemble the plunger to the piston rod and torque per assembly drawings.
5. Reassemble the barrel to the head. Ensure the o-ring seal is in place and tighten the screws securely.

# Troubleshooting

symptom	possible problem(s)	remedy
Sampler leaks product or air out of bottom ports	<ul style="list-style-type: none"> <li>▪ Worn seals</li> <li>▪ Incorrect installation</li> <li>▪ Other worn parts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Thorough inspection is required</li> <li>▪ Replace worn seals</li> <li>▪ Check any recently replaced seals against drawings for correct installation</li> <li>▪ Replace other worn sampler parts: Body, head, barrel or plunger</li> </ul>
Sampler leaks product at pipe connection	<ul style="list-style-type: none"> <li>▪ Installation misaligned</li> <li>▪ Fastener, clamp/gasket or seals issue</li> </ul>	<ul style="list-style-type: none"> <li>▪ Check installation for misalignment</li> <li>▪ If the installation is threaded, replace locknut fastener and add commercial grade Teflon tape when reinstalling</li> <li>▪ If the installation is tri-clamp or instrument hub, check the clamp/gasket (TC) or o-rings/fasteners (IH) attaching the sampler to the line adapter</li> <li>▪ Replace seals if they are damaged or show signs of chemical attack</li> </ul>
Sample discharge is decreasing	<ul style="list-style-type: none"> <li>▪ Buildup in sample spool cavity or sampler nose</li> </ul>	<ul style="list-style-type: none"> <li>▪ Check sample spool cavity for buildup; if present, add flush or air eject provision to sampler body</li> <li>▪ Check sampler nose for buildup; if present on nose or pipe wall interior, remove the body from the line frequently and clean it using plant procedures</li> </ul>
Sampler will not operate	<ul style="list-style-type: none"> <li>▪ Issues with power source and/or air connections</li> </ul>	<ul style="list-style-type: none"> <li>▪ Check power source and air connections; connect as required</li> <li>▪ Check air lines for proper connection, as plunger must dwell retracted; air lines connected backwards will cause sampler to dwell (pause) extended into the process line</li> <li>▪ Check for air bind; depending on the density of the product sampled, this sometimes can be resolved by opening a top port on the sampler</li> <li>▪ Check sampler operating air pressure and process line pressures; operating air pressure must be sufficient to move the plunger against process pressure. Issue may be resolved by increasing or decreasing air to sampler or relocating sampler.</li> </ul>
Controller does not operate	<ul style="list-style-type: none"> <li>▪ Issues with pneumatic and/or electric power source</li> </ul>	<ul style="list-style-type: none"> <li>▪ Verify correct 115V or other specified power to controller</li> <li>▪ If using a remote contact unit, check the output signal to the controller from the flow meter; check purchase records, and if an incorrect output signal was specified, contact Sentry Equipment</li> <li>▪ Secure a qualified technician to run a complete operating check of timing circuits, remote contact inputs and/or counter inputs that sequence the electric or pneumatic power valve</li> </ul>

# 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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