

Original Instructions

Installation, Operation & Maintenance Manual

ISOLOK MSA Sampler Point Samplers

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COMPANY WITH
QUALITY SYSTEM
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= ISO 9001 =

 SENTRY



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

Safety Information	4
General Safety Precautions	5
General Description	6
Installation	7
Selection of Installation Location	7
Sampler Installation	7
Controller Installation.....	8
Inspection.....	11
Operation	11
Initial Cleaning	11
Starting the Sampler.....	11
Maintenance	12
Daily Cleaning	12
Weekly Inspection	13
Complete Sampler Disassembly and Maintenance	13
Controller Maintenance.....	14
Standard Warranty	17
Customer Support	17
Appendix: Installation & Operation on a Milk Truck	18
Sampler and Controller Installation.....	18
Typical Operation Procedure	20

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 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.

CAUTION

Sampler may require a two-person lift. Please refer to the General Arrangement drawing for weight and dimensional information.

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® MSA sampler is designed for sampling sanitary products such as Grade A or industrial grade raw or processed milk. The ISOLOK MSA sampler can be used in a process line or on the wall of a vessel or reactor. It can also be installed on road tankers transporting liquid milk. See the Appendix of this manual for information specific to milk truck applications.

Other applications of this sampler include low volume chemical sampling or biofuel/hydrocarbon sampling.

The sampler is powered by compressed air and operated by an electrical cycle controller that provides adjustable, time-based sampling rates. The controller circuit has been designed to provide an adjustable time delay before the sampler begins operation. Delay before the first cycle adjustment range is approximately one-tenth of a second to 10 seconds. The objective is to allow product trapped in a hose or piping to pass the sampler before operation begins. During initial delay, the controller solenoid valve is energized, causing the sampler plunger to extend into the mounting tee, where it can be flushed by product flow.

The ATEX Temperature Class rating is dependent upon process fluid temperature. Reference the following chart:

TX	maximum temperature
T2	572°F (300°C)
T3	392°F (200°C)
T4	275°F (135°C)
T5	212°F (100°C)
T6	185°F (85°C)

ATEX Ratings:

Ex h IIB T6...T2 Gb

Ex h IIIC T83°C...T300°C Db

$-20^{\circ}\text{C} \leq T_a \leq +65^{\circ}\text{C}$

🔍 NOTE

The working pressure of the air cylinder is 120 psig with a max cycle rate of 240 cycles/min on a continuous duty cycle. Additionally, actuating gas needs to be a non-combustible neutral gas and the working temperature must be between -4°F to 149°F (-20°C to 65°C).

🔍 NOTE

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

The sampler is powered by compressed air and is typically operated by an electrical cycle control that provides an adjustable time or flow-based sampling rate. Other operating mediums are available.

The sampler normally connects to the sampler controller by two 16-foot lengths of flexible tubing. It mounts onto a 1-1/2 inch Tri-Clamp ferrule that is specially close-coupled to the line, usually by adding a specialized line-mounting adapter tee into the piping.

🔍 NOTE

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

Specifications

The ISOLOK MSA sampler takes 0.5 cc of sample per cycle. With the standard controller, it can be cycled at any rate between 180 samples per minute maximum and 2-1/2 samples per minute minimum. It meets sanitary construction standards and carries the 3-A symbol.

Sampler Controller

Housed in a stainless steel enclosure, the ISOLOK MSA sampler controller uses solid state timing to actuate a three-way solenoid valve that provides a compressed air pulse to operate the sampler. Services required to control the sampler are a source of compressed air at 50 psi minimum to 120 psi maximum, and a direct current electric supply, 12 VDC. Cycle rate [timing] adjustment is provided by the sampler controller dial.

Sample Collection Containers

Refer to your system application drawing for container mounting adapter or alternate sample collection methods provided on your specific equipment.

Bottles

Sample collection bottles in 4, 8 and 16 oz (125, 250 and 500 ml) capacities with 24 mm threads are available and screw directly onto the sampler body.

Bag Adapter or Vial Adapter

A typical ISOLOK MSA sampler includes a sample bag mounting adapter or a vial adapter. Either mounts onto the discharge port in the sampler body. The bag adapter holds wire-tie plastic sample bags, while the vial adapter mounts single-service plastic sample vials.

- **BAG ADAPTER.** Intended to be used with single service sanitary plastic bags that close with a built-in wire tie. Sizes up to about an 8 oz (250 ml) capacity can be supported by carefully folding the open bag mouth and wire around the small diameter below the drip shield. Larger capacity bags are available, but should be approached with caution, as the weight of larger samples could cause a bag to pull off of the adapter. Excessive twisting of the wire tie of a large bag also could distort the closure tie to the point where the bag could leak during later handling.
- **VIAL ADAPTERS.** Intended to be used with single-service sanitary plastic sample vials. For the greatest simplicity in setting the sampling rate for a given farm load, use the largest capacity vial that is practical.

Like all connections, Sentry ISOLOK samplers must be initially installed and periodically inspected to ensure all connectors, clamps and fasteners are firmly tightened. If screws or connectors are not properly secured, the sampler could leak or sustain damage.

CAUTION

Follow your plant safety procedures whenever maintenance or inspection is required on this sampler.

Do not weld, machine or otherwise modify the sampler or controller in any manner. Consult Sentry Equipment before considering any changes to the sampler.

Installation

Selection of Installation Location

Both the sampler and sampler controller are intended to be installed inside equipment cabinet(s). For milk truck applications, these cabinets are customarily part of milk pickup tankers. (See Appendix of this manual for installation on a milk truck.) Most sanitary standards require that these cabinet(s) be designed to protect pumps, valves and other

equipment from road dirt and damage, or in case of electric drive motors for pumps, from excessive exposure to cleaning sprays.

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 axis of the sampler body must be horizontal.

Sampler Installation

Install the sampler by using a line mounting tee that positions the sampler nose (front of body) close to the main sample flow stream. In this position, samples are taken directly from moving product. A short 1-1/2-inch ferrule clamp port on the side of the adapter tee (as recommended and/or furnished by Sentry Equipment Corp) provides the proper line mounting location for the sampler.

If a standard Sentry adapter tee cannot be used, a 1-1/2-inch tri-clamp style ferrule clamp port must be devised. The ferrule branch should be just long enough to accept the sampler mounting clamp without interference. The factory standard is 5/8-inch from the ferrule face to the outside of the line.

Refer to your system application drawing included with this manual and the following section in this manual to install the sampler controller in its most effective location.

1. The line where the sampler is to be located can be horizontal, vertical or at any angle. The location selected must mount the sampler body with its long axis horizontal and with sufficient clearance beneath the unit for ease of sample container mounting and exchange.
2. Disconnect the piping, insert the sampler mounting tee, and reconnect the piping to the tee. Attach the sampler to the short 1-1/2-inch tri-clamp ferrule port on the tee with the clamp and gasket.
3. Check to ensure the sampler body is horizontal. Loosen the tee and rotate it if required. Install the air line to the fitting on the sampler barrel. Use 36 inches of the length of 1/4-inch OD flexible polyurethane tubing provided.
4. Press the tube end over the barb fitting by hand. No external clamps are needed. Use no more than 36 inches of connecting airline; shorter if practical. Remember, the sampler must be removed from the piping for daily cleaning. Air lines longer than 36 inches may restrict the sampler's maximum cycle rate.
5. If a bag or vial adapter will be used, insert the o-ring seal into the sampler body port. It seats into a groove above the threads. Screw the adapter into the 24 mm threaded discharge port of the sampler. Turn in firmly, by hand. DO NOT USE TOOLS. Excess force could bind or gall stainless threads.

Controller Installation

Refer to your system application plus the controller group drawings included with this manual.

Select a location in an equipment cabinet, preferably a "dry" compartment area where using the sampler controller will be convenient for the operator, yet protected from direct exposure to cleaning solutions or wash water sprays.

NOTICE

Avoid positioning the sampler controller in any location where milk, water, cleaning solutions, tools, etc. could cause damage.

1. When checking locations, temporarily attach the L-shaped mounting bracket to the back of the controller, using the nuts provided.
2. Be sure the controller is far enough back inside the compartment to allow the door to close without hitting or rubbing against the controller.
3. Check to ensure the air line will reach the sampler location without interference with other equipment in the compartment. The sampler connection line is a 36-inch length of 1/4-inch OD flexible tubing. This air line length should be kept as short as possible to permit fastest cycle rates.

Mounting

CAUTION

Sampler may require a two-person lift. Please refer to the General Arrangement drawing for weight and dimensional information.

When the best location for the sampler controller has been determined, mark the position of the mounting bracket onto the surface. Remove the controller from the mounting bracket. Hold the bracket in position and mark the location of the four mounting holes onto the compartment wall.

Fastening

Drill four mounting holes to accept the fasteners you select to hold the bracket. Use all four holes and largest fasteners (screws, bolts, etc.) available to withstand the severe vibration usually encountered in this application.

Tanks with Bulkheads

Walls that seal a wet compartment from a dry area require special handling. The air supply line cannot be routed around a sealing bulkhead wall without the danger of pinching the tube or blocking the door.

Wall Penetrations

The following procedure is suggested whenever air tube must be routed through a wall between compartments. Since tank compartment designs vary, this is a general guide intended to be combined with your experience and local practices.

1. Locating the hole between compartments: Determine the best place to pass the tube between compartments after you have decided on a location for both the sampler and sampler controller. Be sure the hole location avoids interference, pinch-points or wear on flexible line. Choose a hole location that provides the shortest practical distance between the sampler and controller. This should give maximum slack in the tube for later mounting and handling of the sampler.
2. Protecting and sealing tube: Each Sentry ISOLOK sampler includes two bulkhead grommets as standard. If additional grommets are required, contact Sentry Equipment Corp. Alternately, protective collars can be made on-site.
3. Single wall bulkhead: Drill a 3/8-inch (9.5 mm) diameter hole. Remove burrs and install a grommet in the hole. Feed the tube through the grommet to its approximate final location.
4. Double wall bulkhead: Drill two 3/8-inch (9.5 mm) diameter holes exactly opposite each other to form a passage through the wall. Remove or push aside any insulating material between the walls that might interfere with the grommets. Use a pair of grommets, one for each side of wall. Follow the same installation procedure as a single wall installation, provided above.

Electrical Power Connection

The sampler controller requires a 12 VDC (direct current) power supply. Maximum draw is less than 1 amp when the controller is operating.

1. **GROUNDING:** A separate ground wire is provided with each electrical power supply package.
 - a. AC package: Connect the GREEN ground wire from the negative terminal (3/16 in) on the back of the controller to the 3/16 in ground terminal of rectifier/transformer.
 - b. DC package: Connect the GREEN ground wire from the negative terminal (3/16 in) on the back of the controller to suitable chassis ground.
2. **STARTING AND STOPPING SAMPLER:** The sampler should operate only when product is flowing.
 - a. Systems using the AC power supply package to provide a direct current supply to the sampler controller automatically will start and stop with external signal.
3. Sampler systems intended to operate using a DC power supply can use the ON/OFF switch on the face of the sampler controller to manually turn the sampler on and off in conjunction with product flow.

NOTICE

Always disconnect the power lead from the rear of the sampler controller before removing the cover. Although voltages within cycle control are not dangerous, accidentally shorting exposed terminals to the box can cause serious damage to the equipment.

4. **ELECTRICAL OVERLOAD PROTECTION:** The sampler controller includes a current limiting device. This device automatically disconnects power to the controller in the event of an accidental overload or short circuit. Identified as "AutoFuse", this device opens the power circuit any time current draw exceeds 2 ampere (at 68°F).

DC Power Supply Package (standard)

This parts package is used with a 12 volt supply. Install this electrical supply using the following steps:

1. Attach insulated, stranded wire (No. 18 AWG or larger) to a non-switched terminal, such as a non-grounded battery terminal or equivalent.
2. Run wire lead to the 1/4 in spade-type terminal [+] on back of the cycle controller.

AC Power Supply Package (optional)

This parts package is used with 230 VAC supply and rectifies and transforms 230 VAC to 12 VDC (at 1/2 amp) to supply the sampler controller. Interlocking to 230 VAC electrical service also automates the "start-stop" sampling function.

Polarity

The 12VDC output from the AC power supply is positive. The controller is wired for operation on "hot" positive with negative to ground. If the sampler controller does not cycle when 230 VAC is ON to the power supply, check the ground continuity from the power supply base to the compartment wall. Also, check connections on the wire lead from the power supply to the sampler controller box.

Air Supply Connection

A source of compressed air is required at 50 psi (344 KPa) minimum, up to 120 psi (827 KPa) maximum. The air supply and piping selected should be capable of providing up to 1 cubic foot of air per minute of sampler operation. The air supply should be reasonably clean and free of water.

Air Supply Pressure

The sampler is designed to operate best at a regulated pressure of 40 psi (275 KPa). The regulator inside the controller has been factory set to provide 40 psi to the sampler and should not require field adjustment. However, if problems occur and are attributable to variation in the air pressure to the sampler, regulated pressure can be checked and readjusted as follows:

1. Remove the 1/8 in plug from the side of the regulator body. Install an accurate pressure gauge on this port.
2. With the air supply ON and sampler cycling every 2 seconds, the gauge should read 40 psi between cycles.
3. If the gauge does NOT read 40 psi, open the controller enclosure and readjust as follows:
 - a. Pull the adjusting knob upward to release the setting.
 - b. Turn the knob while the sampler is cycling until the gauge reads 40 psi between cycles. Clockwise [+] rotation increases, and counter-clockwise [-] rotation decreases the system pressure.
 - c. Push the adjusting knob downward to lock the pressure setting.
 - d. Turn the sampler controller OFF and disconnect the electrical power supply. Shut off the air supply. Remove the gauge, replace the plug and close the controller cover.

Inspection

After installation, the sampler periodically should be checked for proper operation and to ensure that any wear is detected so proper preventive maintenance can be performed. The Maintenance section of this manual describes recommended procedures for daily, weekly and other cleaning and maintenance.

Start-up Inspection

With electrical power and compressed air ON, set the dial pointer to approximately 40 percent of the maximum rate (in the 10 o'clock position). Remove the sampler from the line. Turn the controller switch to ON for a few seconds and observe sampler operations.

Each time the sampler cycles, the plunger will extend out of the body approximately 7/8 in" (22 mm), then withdraw. Each time the plunger moves in or out, you should hear a firm "click" as the piston bottoms at each end. The plunger dwells inside the sampler body between cycles.

A complete plunger stroke occurs in about 1/5 (0.2) second. If plunger seals are dry, a sluggish or incomplete stroke may occur. See the Maintenance section of this manual for service information

Operation

Initial Cleaning

1. Remove the sampler body.
2. Using approved sanitary methods, clean the parts that have contact with product (i.e., plunger rod, front face, interior and discharge ports of the sampler body).
3. Wipe a very thin film of approved dairy lube (white grease, CIP lube or Vaseline) on the four plunger O-ring seals, plus the rod and piston O-rings.

4. Reassemble the sampler and clamp-mount onto the piping tee.

Starting the Sampler

NOTE

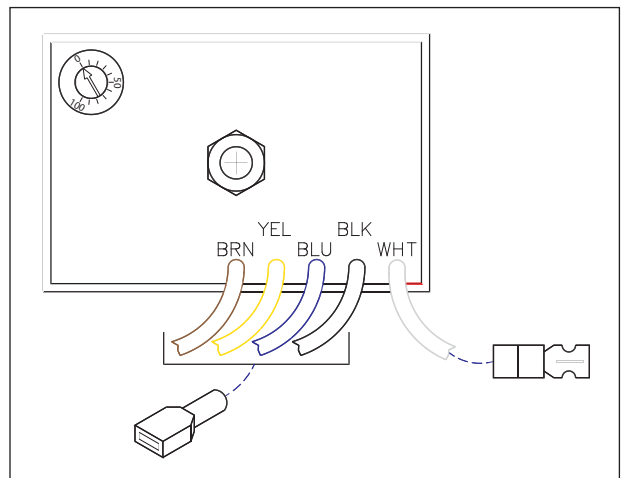
Delayed start is designed to avoid sampling product which may be trapped in a transfer hose or other piping at the conclusion of pumping a load. Delay before the first sample should be adjusted to the minimum time needed to clear the hose of standing product and ensure that product at the sampler is from load being pumped, not carryover from a previous producer.

Delay time adjustment is made by changing the setting on the delay potentiometer located in the upper left-hand corner of the timing module.

CAUTION

Turn off power to the sampler controller before opening the enclosure or making internal adjustments.

1. With the power OFF and the controller enclosure open, locate the delay potentiometer on the timer module. The dial is calibrated in percentages [%] of 0-100. Adjust by turning the knob with a screwdriver in the slot provided.
2. Start delay adjustment (0.1 - 10 seconds).
3. Turn clockwise to increase, counterclockwise to decrease delay.
4. Start delay is a single turn potentiometer. It will not turn more than a nominal 270°. Adjustment is 1/10 second minimum to 10 seconds maximum.
5. When the sampler controller is operated through a DELAY-SAMPLE OFF sequence, allow approximately 10 seconds for the delay timer to reset before starting the next sampling operation.
6. After adjusting the delay time, replace the controller cover securely onto the box.



Maintenance

Refer to your specific group drawing that is included with this manual.

The ISOLOK MSA sampler should be cleaned and checked at daily and weekly intervals for proper operation and to ensure any wear is detected so preventive maintenance can be performed.

NOTICE

Never use pipe wrenches, vise-grip pliers or other marking or abrasive tools on your sampler.

Daily Cleaning

Clean the sampler by removing the unit from the line tee, partially disassemble it, and manually clean it. Typical steps for cleaning the sampler include:

1. Unclamp and remove the sampler from its mounting tee. Remove the gasket.
2. Remove any sample container adapter, including the O-ring seal within the body port.
3. Disconnect the clamp between the sampler body and barrel. The spring will force the plunger and barrel away from the body.
4. Pull the plunger and spring out of the barrel. Leave the barrel connected to the air line tubing.
5. Remove four plunger seal O-rings from the grooves in the plunger by squeezing the O-ring diameter between the thumb and finger and rolling the rings out of their grooves. Two front plunger seal O-rings should be rolled forward, off the plunger. Two back seals can be rolled into the sample collecting ring on the plunger for convenience during cleaning. Remove the rear rod seal O-ring and piston seal O-ring from the plunger.
6. Spray or brush clean/sanitize the body, plunger, spring, all seals and gasket, as well as any port adapter and its seal, in approved sanitary procedure.
7. Replace the rod seal and piston O-ring into their grooves. Roll the O-ring plunger seal rings into the grooves on the plunger. Wipe a light film of approved dairy lubricant onto all six O-ring seals. Add a light film of lubricant on the inside of the air cylinder barrel.
8. Assemble the spring on the plunger and insert the plunger into the sampler body.
9. Slip the barrel over the plunger piston. Press the barrel against the sampler body to compress the spring. Install the clamp. Replace any port adapter, including the O-ring seal.
10. Replace the line tee gasket and install the sampler and clamp in place. The sampler body should be horizontal, with the sample discharge port pointing down.

Weekly Inspection

With the sampler removed from the line, turn the compressed air and sampler controller power on. Between cycles, the plunger dwells retracted. When a cycle is initiated, the sampler plunger should extend 7/8 in (22mm) from the sampler body and then retract inside the body. If the seals are completely dry, a sluggish or incomplete stroke may occur.

Lubrication

Cleaning normally will remove all lubrication. Wipe a thin film of approved dairy lubricant, such as white grease, CIP lube or Vaseline, onto all seals. Continued short stroke, incomplete cycling or sluggish extension may indicate dirt or liquid in the barrel, leaks in the air line, or damage to metal parts.

Plunger Seals

Inspect the O-ring seals on the plunger. Replace any that are scuffed, scored or with flats worn on OD. Carefully insert the plunger through the bore of the body. Seals should move through smoothly, but with light resistance. Little or no resistance indicates the rings are not properly sealing and should be replaced. The bore of the body where the seals ride also should be smooth and free of nicks and scratches.

Complete Sampler Disassembly and Maintenance

A complete disassembly, inspection and cleaning of the ISOLOK MSA sampler should be performed as required. Work on a clean, well-lighted bench area with a copy of the sampler group assembly drawing for reference.

Disassembly

Disassemble as for cleaning. Remove any sample container adapter, including the O-ring seal within the body port. Remove all six O-ring seals and inspect for wear, flat spots or cuts and tears. Replace if required.

1. Test the four plunger seals and rod seal by carefully inserting the plunger through the rear of the body. You should feel resistance.
2. Carefully remove the O-rings, examining for flats, cuts or other signs of wear. Clean the seal recesses.
3. Inspect the O-ring piston seal. If the seal is deformed, scored or has flats worn on the outside diameter, replace it.
4. Inspect the bore of the air cylinder barrel for scoring or wear. Wipe it clean using an approved solvent, if necessary. Light score marks can be polished using fine crocus cloth. Be careful not to remove excess metal anywhere. Heavy score marks that do not easily polish out will render the barrel inoperable, and the barrel should be replaced.
5. Insert the piston, with the lubricated O-ring seal in place, into the sampler barrel. Hold the piston square. It should fit airtight. Check by holding your finger over the air fitting port on the barrel while moving the piston back and forth. A leaking piston seal should be replaced.

Resassembly

1. Reassemble the four plunger seals, rod seal and piston seal O-rings onto the plunger.
2. Apply a thin film of the approved dairy lubricant to all six seals. Assemble the spring onto the plunger and insert it into the sampler body.
3. Lightly lubricate the inside of the sampler barrel. Slip the barrel over the piston and compress against the body. Cycle testing at this point is recommended to ensure proper operation.
4. Replace any bottle or bag adapter after inserting the O-ring seal at the base of the threads in the sampler body. Cycle testing at this point is recommended to ensure proper operation.

Controller Maintenance

Cleaning

DO NOT subject the sampler controller to direct contact with cleaning solutions or detergents. DO NOT hose it down or otherwise steam or spray clean water on the controller. Repeated contact with water and/or caustic cleaners may cause a malfunction. CLEAN GENTLY.

Visual Check – Daily

1. Check for water in the filter bowl.
2. With the air pressure on, push the spring valve on the bottom of the bowl to blow out any accumulated moisture.

Visual Check – Weekly

1. Check air lines for wear, cracks or leakage.
2. Check mounting bolts and fasteners to ensure they are tight.
3. Check the controller dial knob and air filter-regulator-solenoid assembly to ensure they are tight.
4. Check rubber “boot” on the ON/OFF switch. Replace if it is worn or torn.
5. With the air pressure OFF, unscrew the air filter bowl and remove any accumulated debris.

Component Replacement

WARNING

Disconnect electrical power supply before opening or working inside the sampler controller enclosure.

Timing Components

The timer is a solid state module and non-repairable. If the controller fails to function, first determine if the problem is electrical. If electrical, check for power supply ON, and for continuity through ON/OFF switch.

Cycle Timer

If the sampler controller fails to function at any setting of load dial, the timer probably needs to be replaced. Replacement timers are available from Sentry Equipment Corp. Follow the controller circuit diagram to properly connect a replacement timer.

NOTICE

A 1/4-inch nut is used to hold the timer in place against a rubber base sheet. The nut is self-locking and should be tightened only until the timer is secure. DO NOT OVERTIGHTEN as this could cause the timer case to crack and allow damaging moisture inside.

Any time connections are removed from the timing module for any reason, always refer to the circuit diagram when reconnecting wires to timer terminals.

Controller Sample Rate Potentiometer

The controller sample rate potentiometer is a round component with brown wire leads on two of three lugs. If controller operation becomes erratic (e.g., cycles at some load size dial settings but not at others, or different sampling rates at the same setting), the potentiometer is the probable cause. It is not repairable and must be replaced. Replacement parts are available from Sentry Equipment Corp.

To replace:

1. Unplug the two brown wire leads from insulated terminals on the timer module.
2. Release the two set screws in the black knob and remove the knob.
3. Remove the rubber seal hex nut on the potentiometer shaft and on the ON/OFF switch toggle, both from outside of the controller.
4. Inside the controller, remove the subplate holding switch, autofuse and potentiometer.
5. Remove the hex nut and lockwasher holding the potentiometer to the subplate. Remove the potentiometer.
6. Insert the replacement potentiometer shaft through the subplate. Rotate until the tang enters the slot on the subplate. Attach it with the lockwasher and hex nut.
7. Reassemble the subplate through the holes in the controller cover. Install the rubber seal hex nuts on the potentiometer and switch.
8. Reconnect the potentiometer lead wire terminals to yellow and brown insulated timer leads.
9. Reassemble the controller cover into box.

Setting and Checking the Replacement Potentiometer

1. Rotate the bare potentiometer shaft to its maximum counterclockwise position. Slip the black knob onto the shaft. Line up the pointer with the end of the sample frequency scale on the [+] side. Tighten the two set screws on the knob.
2. Rotate the knob from minimum to maximum setting to make sure it moves smoothly.

On/Off Switch

If switch becomes undependable or fails completely, it must be replaced. Replacement switches, complete with all necessary wire leads and terminals, are available from Sentry Equipment Corp.

1. Disconnect all power to the sampler controller. Remove the rubber seal hex nut from the toggle on the outside of the controller. Release two set screws on the controller knob and remove the knob. Remove the rubber seal nut on the potentiometer shaft.
2. Open the sampler controller. Remove the subplate holding switch, autofuse and potentiometer. Remove the hex nut holding the switch to the subplate.
3. Disconnect the two switch leads from the spade terminals. Remove the switch.
4. Insert the replacement switch and reassemble in reverse order.

Pneumatic Components

Replace either the air pressure regulator or the solenoid air valve using the following steps:

1. Disconnect the air line tubing to the sampler. Disconnect the incoming compressed air supply line. Open the sampler controller enclosure. Disconnect the wire leads between the cover and box. Completely remove the cover to a safe, clean area.
2. Lift the clear plastic vent tube into the sampler controller box. Using a 1/2-inch open end wrench, unscrew the hex nut at the top of the valve coil. (Note that the tubing will contact the back wall, but by folding it over, the nut can be removed). This will release the valve coil from the valve body.
3. Remove the large aluminum locking ring that holds the air regulator in place. Carefully loosen it with pliers. The regulator and lower valve body can be removed from the bottom of the enclosure. Further disassembly now can be done as required.
4. Remove the DC solenoid coil by disconnecting the two spade terminal lead wires and pressing the coil up out of the grommet. The coil may be tested with an ohmmeter. A good coil will have about 20 ohms resistance. A much higher resistance indicates an open or burned-out coil, while a much lower resistance indicates a shorted coil.
5. Replace the malfunctioning component and reassemble in reverse order of above steps. Refer to the circuit diagram for reconnection of solenoid lead wires. Refer to the air pressure regulator adjustment section of this manual for adjustment of the air pressure regulator.

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.

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.

Appendix: Installation & Operation on a Milk Truck

Sampler and Controller Installation

Please see the “Installation” section of this manual for general installation and sampler controller installation instructions.

When selecting a location on a milk truck, a typical location is on the ceiling or side wall of the motor compartment, as close to the sampler location as possible. Otherwise, follow the general controller installation instructions.

Electrical Power Connection

Please see page 10 of this manual for general electrical power connection. The following is specific to power connection on a milk truck.

This parts package is used with a 12 volt power supply. Install this electrical supply using the following steps:

1. Attach insulated, stranded wire (No. 18 AWG or larger) to a non-switched terminal, such as a non-grounded battery terminal or equivalent.
2. Run wire lead to the 1/4 in spade-type terminal [+] on back of the cycle controller. Route wire along chassis to give it protection from accidental damage.
3. Semi-trailer units will require a disconnect between the tractor and trailer. If the existing disconnect has an unused pin, run the power lead through this pin. Alternately, if two pins are used for similar circuits (e.g., left clearance lights on one pin, right side on another), consider combining both into one connection and using the remaining pin for the sampler power lead.

AC Power Supply Package

This parts package is used with 230 VAC supply and rectifies and transforms 230 VAC to 12 VDC (at 1/2 amp) to supply the sampler controller. Interlocking to 230 VAC electrical service also automates the “start-stop” sampling function.

WARNING

Disconnect any 230 volt power supply from the truck before making any electrical connections.

Install the AC electrical supply using the following steps:

1. Locate the power supply in an equipment cabinet convenient to both the sampler controller and pump motor reversing switch. The power connection is a 36-inch length of flexible SJO cord, complete with metallic fitting and conduit lock-nut.
2. Mount the power supply using two brackets attached, or remove the cover to locate mounting holes within the enclosure using your drawing as a template. Drill holes to accept fasteners selected and secure the power supply enclosure.
3. Examine the motor conduit box or motor drum switch. The power cord fitting is mounted through a 1/2-inch conduit knock-out. If none can be found, a 7/8-inch diameter hole can be drilled or punched through the conduit box or drum switch cover, whichever allows a clean mounting of the power supply connector without becoming an obstruction.
4. Insert the wires and cord connector through the hole and place a conduit nut on the fitting, locking firmly. PROVIDE A SUITABLE GROUND CONNECTION TO POWER SUPPLY. Check ground continuity after mounting.

5. The sampler controller may be wired to operate the sampler whenever the pump is running, or to cycle the sampler only when the pump is running in the loading direction. Where the truck pump is used to unload milk or to discharge cleaning solution, it may be useful to operate the sampler whenever the pump is running. The ISOLOK MSA sampler can be used to sample an entire truck load, and the sampler will be partially sanitized during cleaning solution discharge.
6. BIDIRECTIONAL OPERATION is accomplished by splicing two wires (black/white) from the power supply directly across the motor leads (i.e., in parallel with motor leads T1 and T4).
7. SINGLE DIRECTION OPERATION (loading only) is obtained by wiring two leads (black/white) from the power supply to one of the following motor lead combinations:
MOTOR CLOCKWISE ROTATION - Connect to T4 and T5 (or) to T4 and T8
MOTOR CCW ROTATION - Connect to T4 and T5 (or) T1 and T8.
8. Make certain that all connections are secure and that splices are properly insulated. Close the drum switch and motor junction box before connecting the power.
9. Connect the 12VDC output of the AC power supply to the sampler controller using wire with female push-on connectors on both ends. Plug one end into the 1/4-inch spade receptacle located on the power supply and the other end into the identical receptacle in the back of the sampler controller. Check for ground continuity between the power supply module and sampler controller box. Route the wire to protect it from damage or vibration.

NOTE

Within the motor junction box, either T5 or T8 normally will be connected to T2 and T3. Select a combination of motor leads so that the sampler is NOT wired into this connection.

Polarity

The 12VDC output from the AC power supply is positive. The controller is wired for operation on “hot” positive with negative to ground. If the sampler controller does not cycle when 230 VAC is ON to the power supply, check the ground continuity from the power supply base to the compartment wall. Also, check connections on the wire lead from the power supply to the sampler controller box.

Air Supply Connection

A source of compressed air is required at 50 psi (344 KPa) minimum, up to 120 psi (827 KPa) maximum. The air supply and piping selected should be capable of providing up to 1 cubic foot of air per minute of sampler operation. The air supply should be reasonably clean and free of water.

NOTE

Route air line inside dry compartment away from interference with belts, pulleys or other equipment that could cause damage. Always use flexible tubing inside the dry compartment to isolate the sampler controller from the weight and vibration of hard metal piping.

This air supply can be obtained from one of two alternate sources:

1. TRUCKS WITH AIR BRAKE SYSTEMS: The small amount of air needed for sampler operation usually can be taken from the air reservoir of the vehicle. If an air supply package has been selected with the sampler system, it includes air tubing and commonly needed fittings. Alternately, tubing and fittings can be obtained locally.
 - a. Examine the air brake reservoir tank(s) and locate a connection point near the top of the tank, high enough to prevent accumulated moisture or water from flowing into the supply line.

- b. Use appropriate fittings to attach a 1/4-inch supply line to the tank. Install an air shut-off valve on the tank or at a location convenient to the driver to permit the air supply to be easily turned off for safety purposes or as other conditions require.
 - c. An automatic shut-off valve also is recommended in the air line near the tank. This valve acts as a circuit breaker, automatically shutting off air flow if the supply line is accidentally broken between the valve and the sampler. Government regulations or plant safety codes often require this valve. Select a valve with sufficient flow capacity to operate the sampler at its maximum cycle rate.
 - d. Use a 1/4-inch bulkhead fitting, provided with the sampler package, to penetrate a dry compartment wall. Drill a 3/8-inch hole through the wall, insert the bulkhead fitting and tighten securely with locking nuts.
 - e. Run a 1/4-inch OD tube from the shut-off valve to the bulkhead fitting connection on the outside of the dry compartment. Use 1/4-inch OD copper or other approved metal tubing. Support and protect the tubing along the truck chassis to prevent damage from road conditions or vibration. Tighten all connections securely.
 - f. Inside the dry compartment, run 1/4-inch OD flexible plastic tubing, provided with sampler package, from interior bulkhead fitting to the 1/4-inch tube fitting on the left side of the sampler controller (regulator input). Tighten compression fittings securely.
2. TRUCKS WITHOUT AIR SUPPLY: Where trucks use hydraulic brakes, or other conditions prevent connecting to an on-board air supply, a small air receiver tank can be installed to operate the sampler. An appropriate tank size is 6 to 12 gallon capacity, and it should be code rated (U.S. Dept. of Transportation or equal) for service to at least 120 psi (827 KPa). Tanks can be obtained locally from firms that build or repair truck air brake systems, or an air tank package is available from Sentry Equipment Corp. A typical supplier is Bendix/Westinghouse.

A typical 7-1/2 gallon air reservoir (part of the air tank package), charged to 120 psi, will provide approximately 2000 sampler cycles before recharging. At 0.5 cc of sample per cycle, this equals one liter of sample, or approximately 25 samples of 40cc quantity each.

INSTALLATION:

- a. Determine an appropriate location on the truck for the air reservoir. It should be protected from road damage, but accessible for recharging with compressed air.
- b. Ensure that the air tank is equipped with a water blow-off valve at its lowest point. Also supply an air inlet (tire-valve fitting or equal). Both are provided with the Sentry air tank package.
- c. Pipe the air outlet from the top or end of the tank with fittings to attach a 1/4-inch OD supply line. A shut-off valve in the supply line is recommended. Complete the installation in same manner as outlined for trucks with air brake systems.

Typical Operation Procedure

Following is a typical milk pickup sequence using the ISOLOK MSA sampler. Steps not covered should be carried out in accordance with standard methods as prescribed by local, state or other health regulatory agencies.

1. The ON-OFF switch remains "on" continuously when the AC power supply package is installed. Starting and stopping the sampler usually is controlled by switching the power to the pump motor on or off. Use the ON-OFF switch to start and stop sampler operation when power for the sampler controller comes directly a truck electrical system (DC power supply package or equivalent installation). Turn the switch off when sampler operation is not desired.
2. Ensure the compressed air supply is ON.
3. Attach the sample container (bottle, bag or vial) to the sampler.

4. Take the transfer hose and sanitizing equipment into the milk room. (If the agitator is on, turn it off. Check appearance, temperature, and odor of the milk.)
5. Connect the transfer hose and power cord.
6. After milk stops moving in the tank, read and record the volume.
7. Start the milk pump. Where the sampler controller is interlocked to an electric pump motor, sampler operation will start and stop with the pump. If not interlocked, it is important that the sampler be started and stopped simultaneously with pump operation (sample only during milk flow).
8. After the tank is empty and the hose is practically empty, shut off the pump and sampler. Disconnect and cap hose; return the hose to the truck.
9. Remove the sample container, cap or closed container and place in an ice chest or approved carrier.
10. Rinse the milk tank and hose valve port.

Sampling Tips

1. Some users instruct the operator to start the farm bulk tank agitator after reading the volume (before pump-out begins), and to allow the agitator to run until the tank is drained. The objective is to provide some milk movement, as well as to reduce cream clingage in the tank on severely stratified loads. There is no reported difference in sample validity between agitated and unagitated tanks when the sampler is properly used. Agitation during pumping is naturally limited by tank design.
2. DO NOT use a control dial setting that produces less than 1 U.S. ounce (30 cc or 60 sampler cycles). A biased sample could result.
3. Select a sample container size that will not be filled completely, even on longest sampling times. Use care in setting the control dial to a cycle rate that does not completely fill a container. When the container fills completely, final sampler cycles simply “exchange” portions of milk from the line into the sampler and back into the line. Overfull containers cannot be properly agitated before opening in a laboratory. This could cause a biased sample.
4. Some users instruct the operator to install a sample container for the next producer load as the last step before closing the compartment doors. This can protect the discharge end of the port adapter from dust or other contamination.
5. Inspect, clean and lubricate the sampler daily.
6. Before the sampler controller is turned on, or whenever samples are to be taken, make sure the sample collection bottles or containers are mounted and personnel are clear of any hazard.
7. Keep the sampler controller box cover tightly closed at all times, except for maintenance or inspection, to protect electrical equipment.

Sample Composite

Total volume of a composite sample is determined primarily by three factors with the following relationship:

$$\text{Sample volume} = \text{sampler size} \times \text{cycle rate} \times \text{sampling time}$$

1. Sampler size: On the ISOLOK MSA sampler, this volume is 0.5 cubic centimeters. Each extend-retract stroke of the plunger withdraws 1/2 cc of product from the line and allows it to flow into a sample container. If there is no product in front of the plunger, no sample is taken.

2. Cycle rate: The number of sampler cycles per minute is set by adjusting the dial on the sampler controller. Turning the black controller knob adjusts a timer that determines the cycle rate.
3. Sampling time: This is generally “pumping time.” Keep in mind that sample portions are collected only when product actually is in front of the sampler.

Pump Flow Factors

While a truck pump is rated at units of flow per time interval (gallons per minute, liters per minute, etc.), actual delivery will be influenced by many factors, some of which are:

- Speed of pump drive and pump condition
- Type of valve on farm tank
- Suction hose size and condition
- Head pressure, suction and discharge

Since some of these “flow factors” are beyond the scope of the sampling system itself, an operator may require a few days of using the system to become familiar with its characteristics and how it operates on individual producer farm tanks.

NOTE

To take more sample, increase the sample frequency by turning the sampler controller dial counterclockwise, towards “+”. To take less sample, decrease the sample frequency by turning the sampler controller dial clockwise, towards “-”.

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