Original Instructions

Installation, Operation & Maintenance Manual

Sentry ROM-11 EPC Controller

Sampler Controllers

S-AS-IOM-00298-1 11-17

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= 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.

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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.**

General Description

The Sentry® ROM-11 EPC controller is used to control an ISOLOK® sampler powered by a double-acting air cylinder.

The ROM-11 EPC controller provides a switch to manually start and stop Composite Cycle Time. No cycle timing functions are provided.

Sampler operation is controlled by a timed remote contact closure to initiate each sampler extend/retract cycle. See drawing attached to this manual for connections required.

NEMA 4X stainless steel enclosure standard; others optional.

⚠ 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

1. LOCATION. Mount control in an accessible location firmly against a flat vertical surface. Control should be positioned where protected from corrosive, abrasive, or other harmful materials, severe weather conditions or physical damage. Control location should be within sight of sampler and preferably require connecting air lines of no more than 30 feet each.
2. ELECTRIC POWER SUPPLY. Control requires 12 volt, 0.5 amp, AC electrical input. A separate means of disconnecting electric power supply should be provided.

   PROVIDE A SUITABLE GROUND CONNECTION TO CONTROL. Bonding between conduit connections is not automatic and must be provided as a part of the installation.

   a. CAUTION: Connect incoming power to terminal 2 (neutral) and terminal 1 (pos) only. Connect earth ground to terminal marked "G."

   b. Install in accordance with local code specifications. Be sure to properly seal incoming leads through 1/2" conduit opening provided in bottom of enclosure.
3. REMOTE CONTACT. Contact closure must be "dry" (electrically isolated) contact or switch closure capable of switching 120 VDC with a load of 0.5 amps. Connect remote contact input to terminals marked 3 and 4.
4. INLET AIR SUPPLY. Control requires a compressed air line with suitable connection to a 1/4" NPT female thread on control pressure regulator. Nominal flow capacity of 2 standard cubic feet per minute (SCFM) at normal shop pressures in range of 60 to 120 psi is suitable. Dry, oil-free air gives best operation and minimum maintenance.

   a. An air shut-off valve or other means of disconnecting air supply before it enters control is recommended to permit periodic inspection or maintenance.

   b. Rated operating conditions for filter/regulator polycarbonate bowl are 150 PSIG maximum inlet pressure; 0°-125°F.
5. CONTROL VALVE CONNECTION TO SAMPLER. Four-way air valve underneath control requires air lines connecting it to sampler cylinder.

   a. Front port [2] of solenoid air valve is connected to rear port [P6] of sampler cylinder using 5/16 OD tubing. Rear port [1] of air valve is connected to front port [P5] of sampler cylinder using 1/4 OD tubing.

   b. These lines and fittings are usually different sizes to insure that proper connections are made to cause sampler plunger to dwell retracted between cycles, when control selector valve is in OFF position and during an interruption of electric power to control.

c. Fittings on front port [2] of control air valve and rear port [P6] of sampler cylinder which connect together are also coded with a black O-ring.

d. Where both sampler air fittings use 1/4 OD tubing, a 1/4OD-5/16OD tube adapter fitting is supplied. Use this fitting in solenoid air valve port [2]..

Operation

1. GENERAL. Control operation requires local access to 2-position rotary selector switch on door of enclosure. Switch is marked OFF-ON.

2. OFF SWITCH POSITION. In this mode, control is in a "standby" condition. Circuitry inside box is live but no operating functions are active. Single solenoid spring offset air valve is de-energized and air pressure is present at rear port [1] of valve holding sampler plunger retracted.

3. ON SWITCH POSITION. Turning switch to this position allows cycling of sampler.

a. While control is ON, cycling can continue at a rate set by remote contact closure interval. Turning switch to OFF will immediately return to "standby" with sampler plunger retracted.

b. One sampler cycle is made each time a contact closure is made. Closure duration must be approximately 5 seconds; see Section 4.4-Cycle Rate Timing.

c. Turning switch to OFF will immediately return system to "standby" with sampler plunger retracted.

Adjustment

1. GENERAL. This cycle control can be used with a wide range of sampler cylinder sizes, combinations of cylinders, different lengths of air lines, different product line pressures and different viscosity products. Each of these factors will affect sampler operation.

a. Three basic control adjustments are available: OPERATING AIR PRESSURE, EXHAUST AIR FLOW, and CONTROL RATE TIMING. Proper use of these adjustments is important to an effective system installation.

2. OPERATING AIR PRESSURE. An adjustable pressure regulator, filter, and gage are provided. Pressure is controlled by adjusting knob inside control enclosure. Clockwise [+] rotation increases, and counter-clockwise [-] decreases system pressure. (Push, adjusting knob downward to lock pressure setting. To release, pull upward). Regulated pressure is indicated on gage.

a. Pressure should be adjusted high enough to operate sampler smoothly against maximum product line pressure. Excessive pressure may cause problems if foreign objects get caught on sampler plunger.

b. As a starting point, set the regulated pressure at slightly more than is necessary to move the sampler plunger into the fluid stream in a quick, positive move but without impact of the cylinder and piston.

c. As a general rule, a pressure setting of 30 PSI can be considered minimum, and the maximum should be less than the incoming air supply to insure a steady, regulated pressure on the sampler.

d. An increase in pressure needed to operate a sampler that has been operating smoothly at a lower pressure may indicate bent or misaligned sampler parts and should be investigated.

e. Movement of a sampler plunger when installed in a product line and out of sight can be gaged by listening or feeling air exhaust from port of four-way valve. Normally when cylinder is in motion, air is exhausting; when cylinder stops, air shortly stops exhausting. Exhaust flow should be smooth and constant.

3. EXHAUST AIR FLOW. Control is normally shipped with a fixed (.040") exhaust restrictor plug screwed into exhaust port of four-way valve. This has been found appropriate for most applications. Removing restrictor plug will roughly double travel speed of sampler plunger in most cases. For 3-1/4" dia. cylinders (typically used on Series SAB Samplers) restrictor plug is eliminated. An adjustable restrictor is available if required.

Slow, smooth motion tends to increase life of sampler parts. High viscosity products using samplers with

pressurized sample ejection may cause foaming or damage to sample if operated too fast.

4. CYCLE RATE TIMING. Effective sampling requires that sampler plunger extends into product line fully and dwells extended for a short period of time. This extended dwell period allows flowing product to flush sample annulus of any residue from previous sample. Similarly, sampler plunger should fully retract and dwell for at least a short period to allow sample discharge to clear.

Actual "extend time" and "retract time" usually require only a few seconds. Since most applications do not require samples to be withdrawn that rapidly, it is advantageous to TUNE cycle for slow, smooth operation.

Two adjustable timer functions are required to independently set CYCLE EXTEND TIME and CYCLE RETRACT TIME.

a. CYCLE EXTEND TIME is defined as time air pressure is applied to sampler to cause plunger to move in direction of extending.

b. CYCLE RETRACT TIME is time air pressure is applied to cause plunger to move in direction of retracting.

c. UNIT CYCLE TIME is total of CYCLE EXTEND TIME and CYCLE RETRACT TIME. A UNIT CYCLE withdraws a SAMPLE UNIT VOLUME in a UNIT CYCLE TIME interval.

d. COMPOSITE CYCLE TIME is total time system is operating to produce a SAMPLE COMPOSITE VOLUME composed of individual SAMPLE UNIT VOLUMES.

e. It is normal procedure to set CYCLE EXTEND TIME to shortest practical time and set CYCLE RETRACT TIME to a longer time sufficient to achieve overall sampling objectives. This allows plunger to dwell retracted out of product flow, minimizing turbulence in product and protecting plunger seals.

f. If a SAMPLE COMPOSITE VOLUME is to be representative of flowing product, a SAMPLE RATIO must be chosen to sample frequently enough to detect product changes.

SAMPLE COMPOSITE VOLUME is therefore determined by:

A) SAMPLE UNIT VOLUME: Determined by sampler.

B) COMPOSITE CYCLE TIME: Determined manually by operator starting and stopping control or by auxiliary start-stop means.

C) UNIT CYCLE TIME: Sample ratio, converted to time per cycle, determines how often sampler cycles.

5. FORMULA RELATIONSHIP.

$$\frac{\text{Sample Composite Volume (cc)}}{\text{Sample Unit Volume (cc)}} = \frac{\text{Composite Cycle Time (sec)}}{\text{Unit Cycle Time (sec)}}$$

$$\text{UCT (sec)} = \frac{\text{SUV (cc)} \times \text{CCT (sec)}}{\text{SCV (cc)}}$$

UCT (sec) = CYCLE EXTEND TIME(sec) + CYCLE RETRACT TIME (sec)

EX: Determine UNIT CYCLE TIME (UCT).

Given: SUV = 8 cc
CCT = 8 hours = 28800 sec
SCV = 1/2 gal = 1920 cc

$$\text{UCT (sec)} = \frac{8\text{(cc)} \times 28800\text{(sec)}}{1920\text{(cc)}} = 120 \text{ sec}$$

Assume CYCLE EXTEND TIME = 4 sec

Therefore CYCLE RETRACT TIME = 120 (sec) - 4 (sec) = 116 sec

6. EXTEND TIME. Set to allow enough time for sampler plunger to be fully extended into product line and dwell long enough for annulus to be filled with fluid. Two to five seconds EXTEND time is usually sufficient. Excessive dwell will increase wear of sampler plunger and seals.
7. RETRACT TIME. Set to control frequency of sampler operation.

Maintenance

1. GENERAL. Normal control maintenance should require draining water from primary filter bowl and replacing dirty or clogged filter element. If control fails to function, check fuse on panel inside enclosure. If problem is not evident, it is recommended that a qualified technician be called to service it.

⚠ CAUTION

Always disconnect both air and electrical power before opening control enclosure for inspection or maintenance of control or sampler.

2. FILTER/REGULATOR. With relieving type filter/regulator, outlet pressure can be reduced even though the system is dead-ended. Turning adjusting knob counter-clockwise opens relief passage allowing air to escape to atmosphere.
3. FILTER. Drain filter as frequently as necessary to keep liquid level in bowl below the element mounting stud. If liquid level rises above the stud, liquid will be carried into air lines.
   a. Replace filter element when plugged or dirty. Shut off inlet pressure. Turn adjusting knob counter-clockwise until it stops, reducing pressure to zero. Remove bowl and unscrew mounting stud to replace filter element.
   b. Clean plastic bowl using warm water only.

⚠ WARNING

The polycarbonate plastic bowls used on these filter/regulators can be damaged and possibly burst if exposed to such substances as certain solvents, strong alkalies, compressor oils containing ester-based additives, or synthetic oils. Fumes of these substances in contact with the polycarbonate bowl, externally or internally, can also result in damage. Clean with warm water only.

   c. If plastic bowl shows signs of cracking, cloudiness or other signs of deterioration, replace with metal bowl. Consult factory for replacement parts.
   d. Lubricate O-ring seal before reassembly. Tighten element stud and/or bowl to 5-10 inch-pounds.
4. REGULATOR. On detection of air leaks, pressure fluctuation, or "creep," regulator can be disassembled for cleaning.
   a. Shut off inlet pressure. Turn adjusting knob counter-clockwise until it stops, reducing pressure to zero. Remove entire air control assembly by unscrewing panel nut from bonnet.
   b. Unscrew plastic bonnet from regulator and carefully remove parts. Observe arrangement of components for future reassembly.
   c. Clean parts with warm water and soap. Dry parts and blow out internal passage in body using clean dry compressed air.
   d. Inspect parts carefully and reassemble. Tighten plastic bonnet to 50-60 inch-pounds. Replace air control assembly and tighten panel nut securely.

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.

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