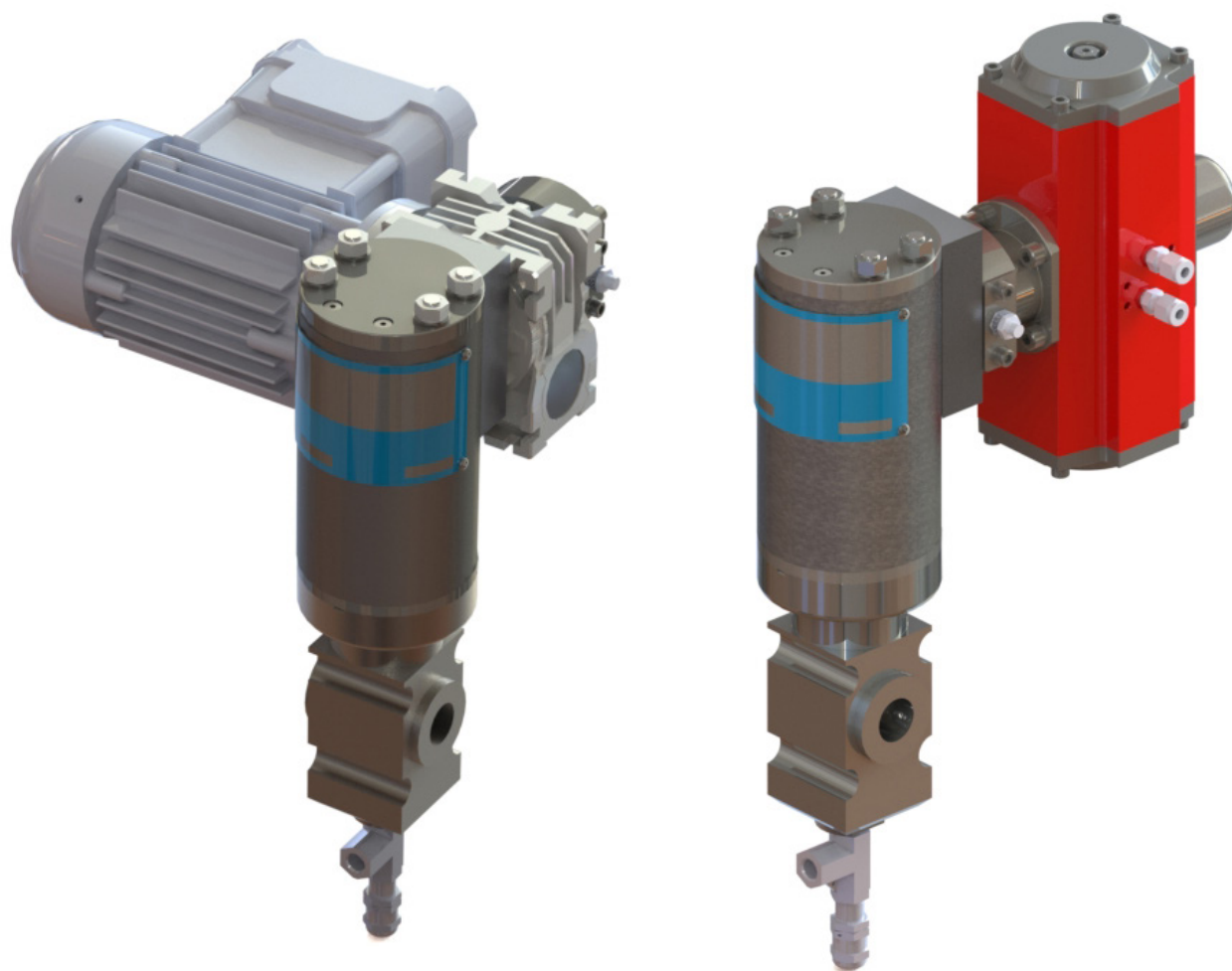


Original Instructions

Installation, Operation & Maintenance Manual

ISOLOK API-CA Sampler ISOLOK API-CE Sampler Point Samplers

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Do not install, maintain, or operate this equipment without reading, understanding, and following the appropriate Sentry Equipment Corp instructions. Otherwise, injury, damage, or both may result.

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Note

The information contained in this document is subject to change without notice.

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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.

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

The Sentry® ISOLOK® API-CA and ISOLOK API-CE samplers are suitable for sampling a variety of liquids, especially hydrocarbon liquids such as crude oil and oil/water mixtures. Ideal for use in energized mixing and blending applications. The wetted materials are 316 stainless steel (standard) or Super Duplex (or equivalent) which have higher tensile strengths, toughness, and greater corrosion resistance, particularly relating to enhanced pitting and crevice corrosion resistance.

The ISOLOK API-CA and ISOLOK API-CE samplers take advantage of all the benefits of bypass or fast loop sampling systems. The pneumatically (ISOLOK API-CA) or electrically (ISOLOK API-CE) actuated sampler optimizes the accuracy and repeatability of hydrocarbon fluid samples. Based on scotch yoke and lost motion principles, the sampler eliminates the problems of and accessories required in conventional air-actuated samplers.

The ISOLOK API-CA and ISOLOK API-CE samplers use a flow through, bottom discharge design which eliminates oil and water separation. The electric motor or pneumatic actuator operates a scotch yoke mechanism which actuates the capture tube. During its movement the capture tube creates the fixed volume. The sampler's design includes a unique non-return valve and defined actuation speed to provide a repeatable, representative sample. Sampling frequency is changed based on flow.

Product Specifications

Wetted materials:	316 stainless steel, standard (2507 Super Duplex or equivalent, optional)
Optional coating on wetted parts:	DLC (diamond-like carbon) with silicone carbide via DCD (dynamic compound deposition); 1–5 microns thick; 1500–3000 HV
Flanges:	1" Class 300/600 RF
Process pressure:	1500 psi at 100°F (103 bar at 38°C)
Viscosity range:	0.5–8000 cSt
Seal temperature:	-4°F to 500°F (-20°C to 260°C)
Sample size (nominal):	1 cc per grab
Grab size repeatability:	± 2%
Maximum sampling rate:	20 grabs/min
Utilities required:	API-CA: 58–145 psi (4–10 bar) compressed air; 0.04 ft ³ per grab at 60 psi (1133 cc at 4.1 bar) API-CE: 3 Phase, 230 V; 50 Hz; 0.12 kW; 1.07 A
Hazardous classification:	API-CA: CE Ex h IIB T5... T2 Gb -20°C ≤ Ta ≤ 70°C API-CE: CE Ex h IIB T4... T2 Gb -20°C ≤ Ta ≤ 55°C

- Relief valve at sampler discharge set 44–73 psi (3–5 bar) over line pressure.
- Sampler discharges to sample receiver (sold separately).
- Meets API 8.2, ISO 3171, ANSI 4177 sampling standards.

The maximum rated temperature of the ISOLOK API-Cx sampler is defined by the 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)

Installation

Receiving

- Examine the crate and all contents for any shipping damage immediately after receipt.
- Take pictures of any suspected damage.
- Report damages to the delivery company at once. This is the responsibility of the consignee.

NOTE:

To ensure full accuracy and repeatability, the standards listed in this section should be used to create the entire sampling system.

Selecting Sampler Location

The mounting location of the sampler is extremely important for the most accurate sampling results.

The ISOLOK API-CA or ISOLOK API-CE sampler is located within a sampling loop that includes a pump to circulate sample through the loop, and a probe and quill that remove and re-insert sample into the main pipeline. The location of this loop should be determined using the following sampling specifications:

- API 8.2/ASTM D4177, sections 6 and 10
- ISO3171 section 8.2

Mounting the Sampler

The ISOLOK API-CA and ISOLOK API-CE samplers use 1" ANSI 300# or 600# flanges. See the General Arrangement drawing for flange locations and face distances.

CAUTION

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

Pneumatic Actuator Setup (API-CA only)

For most installations, the sampler requires compressed air at normal flow capacity of 0.8 standard cubic feet per minute (SCFM) at normal regulated pressure between 58 psig (4 barg) and 145 psig (10 barg). At 60 psig (4.1 barg) air consumption is approximately 0.04 SCF per sampler cycle.

Air lines:

- Use 1/4" air lines, making sure each line is as short as possible to minimize delay between solenoid and sampler.
- Connect port 2 on the air actuator to the normally open port on the air solenoid.
- Connect port 4 on the air actuator to the normally closed port on the air solenoid.

Once the pneumatic actuator is connected, make sure the crankshaft eccentric is at the top of its stroke while the solenoid is in the non-powered state. If the eccentric is at the bottom of the stroke, switch the air lines on the actuator. That is, connect port 4 on the air actuator to the normally open port on the air solenoid, and connect port 2 on the air actuator to the normally closed port on the air solenoid.

Motor Setup (API-CE only)

NOTE

Wiring connections/conduit runs must be installed using Zone 1 hazardous area wiring methods per local code.

The motor selected for your specific application is ATEX certified.

1. Connect the motor to an appropriate controller (such as the Sentry COS Controller). The motor cable entry is an M25 cable gland.
2. A shielded cable (Belden 29550C or equivalent) must be used for the connection to the motor, and it must be tied to ground on the VFD and motor. Wiring requirements must be suitable to meet motor specifications.
3. An appropriate disconnect shall be addressed by the controller in the end product installation.
4. Connect the sampler to an approved/certified motor drive with the appropriate electrical ratings. The motor drive shall have both overcurrent and overtemperature protection equivalent to or better than the one in the COS Controller.
5. The power supply cord shall be housed within an approved/certified conduit. There shall be approved/certified bushing or a strain relief on the controller side to prevent wear on the power supply cord.
6. To satisfy applicable wiring codes, connect the equipment using the earth grounds provided on the motor to a properly installed grounding rod.

Ventilation

Make sure the area round the motor fan and motor body is clear for cooling.

Proximity Switch

- Connect the proximity switch to the controller.
- The proximity switch is an intrinsically safe device and needs to be run through an I.S. barrier per applicable codes.

Relief Valve

- Set the supplied relief valve to open at 44–73 psi (3–5 bar) above operating line pressure.
- Attach a flexible hose to the relief valve discharge with a male ¼" NPT fitting.

Sample Receiver

The sample receiver must be the lowest point in the system to facilitate proper sampling and sample flow of viscous fluids.

- Attach flexible hose from the sampler to the sample receiver(s).
- To minimize trapped volume (i.e., "dead" sample), keep hose runs short.
- Lines should slope downward at least 15 degrees to avoid water entrapment.
- Use heat tracing in cold environments or at high viscosities to prevent line blockage.

Operation

- Before operating the sampler, make sure that it is installed in accordance with the installation instructions provided in this manual, and that it is connected to an appropriate sample receiver.
- The sampler is controlled via a VFD motor drive (API-CE) or a 4 way pneumatic solenoid valve (API-CA).
- The sampler operates using compressed gas (API-CA) or 3 phase power from the VFD motor drive (API-CE).

To ensure a representative sample, active pipeline conditioning must take place upstream of the sampler.

Maintenance

When completing maintenance, remove the sampler from the sample loop and move it to a clean area.

WARNING

Wear appropriate personal protective equipment and exercise care to minimize contamination by any residual sample or liquid. Liquids sampled by this equipment may be carcinogenic or highly hazardous.

Relieve all pressure to components before removing the sampler from the sample loop.

NOTICE

Use soft vise jaws to hold components to avoid damaging seals or sealing surfaces. Damage may cause seal failure, resulting in inadequate sample volume, process leakage into the sampler body, or failure to take sample.

Use the recommended tools and properly sized seals to ensure sampler performance.

NOTE

Parts are referenced by part number, then drawing reference letter, which can be found at the bottom of the included drawings.

Tools and Lubricants

- Soft vise jaws to hold components.
- M30 or adjustable wrench.
- Pick or small screwdriver.
- M5 allen wrench.
- Belt wrench.
- Cooper grease (such as Loctite C5-A) for all threads (unless otherwise noted).
- PTFE based grease (such as DuPont™ Krytox® GPL 205) for all O-rings, seals, and sealing surfaces.
- Molybdenum disulphide paste (such as Rocol 10046) for bearing surface of the lower scotch yoke support plate (10-B).

Annual Maintenance

The ISOLOK API-CA and ISOLOK API-CE samplers are designed to function for 12 months or 1,000,000 cycles between service intervals, whichever occurs first. In addition, the two (2) bearings need to be replaced every 10 years or 10,000,000 cycles. However, experience will determine the optimal service interval, since extreme sampling conditions, such as those listed below, may shorten this time frame:

- highly abrasive or corrosive process stream
- high viscosities and temperatures
- mixing of different type of crudes

NOTE:

Before reassembly, clean and degrease all sealing surfaces using method indicated in ASTM A380-06 section 4.

Replace Anvil/Discharge Plug Seals

NOTE:

References in parentheses refer to the parts list drawing included in this manual.

1. Remove any tubing connected to the discharge of the relief valve (16-B).
2. Unscrew the bottom discharge plug seal cartridge (15-B) from the body of the sampler with an M30 or adjustable wrench.
3. Obtain a discharge plug seal cartridge (15-B) and apply lubricant to all seals. Apply anti-seize thread lubricant to the outer threads.
4. Install the discharge plug seal cartridge (15-B) into the chamber body (1-B) and tighten until the bottom of the flats are flush with the sampler body.

Replace Piston Seal/Piston Wear Ring

1. Loosen and remove all four M10 nuts/washers (10-A) on the top of the sampler, and then remove the sampler housing cap (6-A).

2. Using an M5 wrench, loosen and remove the two M6 bolts (5-A) connecting the upper (4-A) and lower (10-B) scotch yoke support plates.
3. Carefully remove the two scotch yoke spacers (3-A) and store them.
4. Lift the drive assembly (2-A) up and away from the chamber body (1-B) and seal plate (3-B).
5. Remove the remaining scotch yoke assembly from the chamber body (1-B) and seal plate (3-B).
6. Using a belt wrench, loosen and remove the capture tube (4-B) from its carrier.
7. Using an M5 allen wrench, loosen and remove the plunger assembly (5-B).
8. Inspect the capture tube (4-B) for signs of excessive wear, and thoroughly remove any debris.
9. Obtain a new plunger assembly (5-B) and grease all seals and wear rings.
10. Apply Loctite 222 to the threads of the plunger rod assembly (5-B), then install into the piston carrier (6-B) and torque per notes on drawing.

NOTE:

To complete annual maintenance, skip the reassembly steps below and continue with Cartridge Seal Replacement.

11. Install the scotch yoke assembly, with the piston return spring (13-B) and carrier (9-B), into the clamp plate (3-B) and chamber body (1-B).
12. Place the drive assembly (2-A) over the chamber body (1-B) and reinstall.
13. Ensure that the face of the scotch yoke cam bearing (2A-A) is parallel to the face of the lower scotch yoke support plate (10-B) that has the linear guide (11-B).
14. Put the scotch yoke spacers (3-A) back in place, apply Loctite 222 to the threads of the two M6 bolts (5-A), and install and torque per notes on drawing.
15. Reinstall the sampler housing cap (6-A) and the M10 nuts (10-A) and washers (9-A); torque the nuts per notes on drawing.

Cartridge Seal Replacement

1. If the sampler is not already disassembled, follow steps 1–5 of “Replace Piston Seal/Piston Wear Ring” section before continuing.
2. Using a screwdriver, find the detent on the chamber body (1-B), and separate the body from the clamp plate (3-B).
3. Using a small screwdriver and provided reliefs, carefully remove the seal cartridge (2-B) from the chamber body (1-B). Discard used seal cartridge.
4. Lube new seal cartridge (2-B) and install in the chamber body (1-B). Make sure that the inner wear ring and seal surfaces within the cartridge are lubricated for re-assembly.
5. Install the clamp plate (3-B) into the chamber body (1-B).
6. Install the scotch yoke assembly, with the piston return spring (13-B) and carrier, onto the seal plate (3-B) and chamber body (1-B).
7. Place the drive assembly (2-A) over the chamber body (1-B) and reinstall.
8. Ensure that the face of the scotch yoke cam bearing (2A-A) is parallel to the face of the lower scotch yoke support plate (10-B) that has the linear guide (11-B).
9. Put the scotch yoke spacers (3-A) back in place, apply Loctite 222 to the threads of the two M6 bolts (5-A), and install and torque per notes on drawing.
10. Reinstall the sampler housing cap (6-A) and the M10 nuts (10-A) and washers (9-A); torque the nuts per notes on drawing.

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.

Serving customers
in more than 50 countries
across six continents worldwide.



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