

N-CON

SENTRY

Compact Automatic
Composite Sampler

OPERATIONS MANUAL

TABLE OF CONTENTS

- DESCRIPTION..... 3**
 - TECHNICAL SPECIFICATIONS..... 3
 - STANDARD ACCESSORIES 3
 - OPTIONAL ACCESSORIES AND EXPANSION OPTIONS 4
- INSTALLATION 5**
 - UNPACKING..... 5
 - SETUP 5
 - INSTALLATION OF OPTIONAL ACCESSORIES 6
- TIMED SAMPLING OPERATION 7**
 - HOURS PER CYCLE SELECTION 7
 - SAMPLES PER HOUR SELECTION 7
 - SAMPLE VOLUME CALIBRATION 8
 - BEGINNING THE SAMPLE CYCLE 9
 - FINAL CHECK BEFORE LEAVING SAMPLING SITE 9
- FLOW PROPORTIONED OPERATION 11**
 - BEGINNING THE SAMPLE CYCLE 11
 - FINAL CHECK BEFORE LEAVING SAMPLING SITE 11
- MAINTENANCE AND LUBRICATION 13**
 - DAILY MAINTENANCE 13
 - PERIODIC MAINTENANCE 13
 - LUBRICATION..... 13
 - LONG-TERM STORAGE 13
 - POWER CONNECTIONS 14
- TROUBLESHOOTING..... 15**
 - SERVICE AND REPAIR PROCEDURES 16
 - REPLACE PUMP TUBE 16
 - REPLACE PUMP AND/OR MOTOR 16
 - CIRCUIT BOARD REPAIRS 18
 - SHIPMENT TO FACTORY 18
- SPARE PARTS LIST..... 19**
- LIMITED WARRANTY 20**

DESCRIPTION

The Sentry Sampling Module is a simple, reliable automatic water sampler.

The Sentry can collect samples either on a time-cycle basis or proportioned to flow, paced by a totalizer signal flowmeter. The volume of individual samples is set using a simple calibration.

Purge options include purge before, purge after, or purge both before and after sample collection.

Sentry operates on 120 VAC power or 12VDC external battery (with optional cable).



TECHNICAL SPECIFICATIONS

Dimensions	12" high, 9" wide, 8" deep
Weight	10 lbs. less accessories
Enclosure	NEMA 4X water and dust tight
Sample Volume	20-500 mL/sample
Inlet Velocity	1.5 foot/second at 3' head
Power Requirements	115 VAC, 60 HZ or 12V DC

STANDARD ACCESSORIES

- Sample delivery tube (reorder #12-058)
- One (1) spare pump tube (reorder #11-012)
- One (1) spare 5AMP 3AG fuse (reorder #06-033)
- AC power cable (reorder #15-504)
- Instruction Manual

OPTIONAL ACCESSORIES AND EXPANSION OPTIONS

Standard Sampler Inlet Assembly (Part #20-038)

Weighted inlet/screen to protect the sampler from collecting objects too large to pass through the pump. The weight is connected to the sampler by 20' of $\frac{1}{4}$ " vinyl tubing.

One-Gallon Plastic Sample Container (Part #19-001E)

One-Gallon Glass Sample Container (Part #19-080)

Auxiliary Battery Cable (Part #15-508)

5' cable to connect the sampler to an external, customer-furnished 12-volt battery. Any customer-furnished battery must provide a minimum of 5 AMP hours.

Dual AC/Proportional hookup cable. (Part# 15-510)

Grounded plug to AC power, 2-wire cable to contact-making flowmeter. An unpowered (dry) switch closure of at least 25 milliseconds is required.

Stainless Steel Mounting Feet (4) (Part # 01-658)

Mounting feet to secure the sampler to a wall, ice chest, or refrigerator.

Remote turn-off cable and float switch (Part# 20-058)

Cable to connect float switch cap to sampler to turn off when bottle is filled.

INSTALLATION

UNPACKING

Retain original carton for storage or shipment of the sampler. This carton contains:

- Sampler
- Grounded AC cable
- Instruction Manual
- Spare parts kit (1 pump tube and 1 5 AMP fuse)
- Sample delivery tube (3' Ft)

Optional accessories (may be shipped in a separate carton)

- Inlet assembly (if ordered)
- Sample bottles (if ordered)

SETUP

SAMPLER LOCATION

The sampler should be located in the shade or otherwise protected from direct sunlight or excessive heat. Sampler may be fastened to a wall with wall-mounting feet or suspended in a manhole with hooks or rope through the mounting feet.

The sampler installation must allow the pump tube to enter and exit without kinking or excessive bending which will impede flow.

The sampler should be located as close to the sample source as practical. The inlet lift limit is 20 feet.

NOTE: DO NOT use the sampler in an atmosphere where there is a risk of explosion.

INLET LINE INSTALLATION

Connect push-on fitting on end of inlet line to inlet fitting on pump tube. Inlet line should be as straight and short as possible to prevent retention of previous sample when purging. Cut the tubing, if necessary, to avoid loops or coils in the inlet line.

Install an inlet weight (PN: 12-104) or inlet screen (PN: 12-525 as necessary to avoid solids clogging the inlet line.

NOTE: Inlet tubing must be $\frac{1}{4}$ " ID and a maximum of 20 feet in length for proper operation. Keep the inlet tube as short as practical.

SAMPLE DELIVERY TUBE ATTACHMENT

Attach the push-on fitting to the delivery side of the pump (see label on side of case). Insert the other end into sample container. Make sure tube is secured so it will not fall out and does not extend so far into the sample container that it removes collected sample during the purge cycle.

POWER CABLE ATTACHMENT

Attach power cable to the nine-pin fitting on the left side of the case. Screw on firmly. Connect to any convenient source of 115 volt, 60 HZ power.

INSTALLATION OF OPTIONAL ACCESSORIES

External Battery Cable (PN: 15-508)

User supplied battery

Connect the fitting on the external battery cable to the 9-pin connector on the left side of the sampler case. Attach the clips at the other end of the cable to any 12-volt battery. The black wire is negative (-), and the white wire is positive (+). The sampler will NOT operate on reversed polarity.

AC/Proportional Hookup Cable (PN: 15-510)

User supplied flow meter

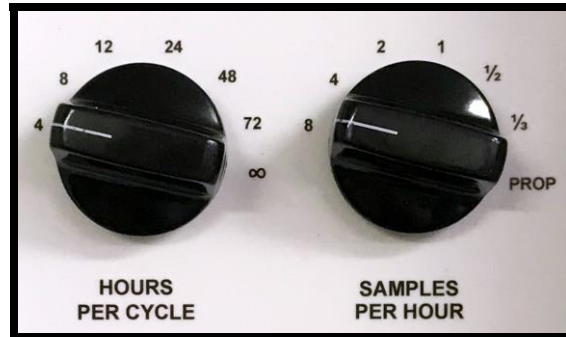
This cable replaces the standard AC cable that is supplied with the Sentry.

Connect the fitting on the proportional/AC hookup cable to the 9-pin connector on the left side of the sampler case. Connect the grounded AC plug to a power source. Connect the spade terminals on the 2-wire portion of the cable to the normally open contacts of the flowmeter sampling switch or recorder.

NOTE: This must be an UNPOWERED CONTACT. Connecting the sampler to a powered contact will damage the unit's control circuit!

SAMPLER MUST BE CALIBRATED BEFORE FIRST USE

TIMED SAMPLING OPERATION



HOURS PER CYCLE SELECTION

The sampler will automatically stop at the end of the specified CYCLE. **Hours Per Cycle** can be set to 4, 8, 12, 24, 48, 72 hours. Select an appropriately sized sample container based on the length of sample cycle (time between pickup) and samples per hour. Select ∞ for no automatic shut off (continuous operation).

If cycle has been completed and sampler has turned off automatically, fill cycle may be restarted without opening the cover by pushing the green RESET button on the left side.

NOTE: A float switch or large sample container highly recommended for continuous operation.

SAMPLES PER HOUR SELECTION

The sampler can be set to collect 8, 4, 2, or 1 sample(s) per hour, 1 sample every 2 hours (1/2 on the Samples per Hour switch), 1 sample every 3 hours (1/3 on the Samples per Hour switch), or in proportion to flow (PROP on the Samples per Hour switch). To

The number of samples to be collected per hour is set on the Samples per Hour switch. To collect a two-gallon composite in 24 hours, set the volume to the size indicated below for your sampling frequency.

SAMPLE VOLUME CALIBRATION

The calibration process enables the user to set the individual sample volume. Unit must be recalibrated if the inlet tube length is changed, viscosity of sample changes significantly or change from AC to DC operation.

Individual sample volume is adjustable from 20 mL. A 2-gallon container is recommended.

NOTE: Sampler must be calibrated before FIRST USE. Calibration must be completed with the correct inlet tube length. Determine the installation location and length of inlet tubing prior to calibration for accurate sample size.

- 1) Determine the required number of samples per hour AND volume per sample following the chart below.

Samples per Hour switch setting	Volume of each sample needed to fill a two-gallon container in 24 hours:
8 = 8 samples per hour	@ 30 mL
4 = 4 samples per hour	@ 60 mL
2 = 2 samples per hour	@ 120 mL
1 = 1 sample per hour	@ 240 mL
1/2 = 1 sample every 2 hours	@ 480 mL
1/3 = 1 sample every 3 hours	@ 960 mL
PROP = when paced by flowmeter	Based on expected flow

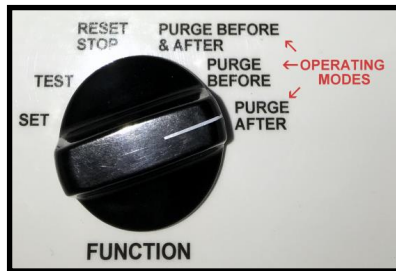
- 2) Remove the sample delivery tube from the sample container and insert it into a suitable graduated container to measure sample volume. Inlet tube must be located in the sample stream or fresh water.
- 3) Make sure that the sampler is connected properly to line or battery power and set the power switch to the AC or DC position, as appropriate.
- 4) Set the FUNCTION switch to the **TEST** position.
- 5) The pump will reverse to purge and then collect a sample into the graduated container.
- 6) When the desired sample volume has been collected, turn the FUNCTION selector switch to **SET**.
- 7) Turn the FUNCTION selector to the **RESET STOP** position to complete the calibration.

Repeat steps 4-7 as needed until the desired volume is established.



BEGINNING THE SAMPLE CYCLE

1. With the FUNCTION switch in the **RESET STOP** position, place the sample delivery tube in sample container. Tube should not extend below fill level desired or it may remove sample during purge cycle.
2. Select the desired **Hours Per Cycle** and **Samples Per Hour** (see above). It is not necessary to calibrate the sampler unless operational environment has changed.
3. Set FUNCTION switch to the desired purge cycle.



The pump will run for the sample volume time plus 10 seconds to clear the tube of previous sample.

The sampler will immediately go through its first sample collection. This allows you to verify proper operation and check sample size.

NOTE: Purging Before & After will shorten the life of the pump tube.

FINAL CHECK BEFORE LEAVING SAMPLING SITE

- Is inlet line weighted or secured so it will remain in sample stream? Inlet should not lie in sewer invert or bed load where it will pick up excess solids.
- Is sample delivery tube in sampler container so that it cannot fall out and so that is above the anticipated fill line?
- Was the Function switch turned to **RESET STOP** position before it was set for the required operating mode? Sampler must be reset to start timing of fill cycle. The external RESET button will also reset for the next sample cycle.
- Is the **Hours Per Cycle** switch set to required automatic turnoff time?

FLOW PROPORTIONED OPERATION

To collect samples in proportion to flow, the Sentry must be connected to a flow meter using an AC/Proportional Hookup Cable (PN: 15-510). The flow meter must provide an unpowered signal to the sampler.

1. Connect the dual Hookup Cable to the 9-pin connector on the side of the sampler case.
2. Connect the spade terminals to the flow recorder actuator switch.
3. Adjust flow meter contact rate to provide approximately 2/3 of container capacity under typical flow conditions.
4. Set the Samples per Hour switch to PROP.(proportional).

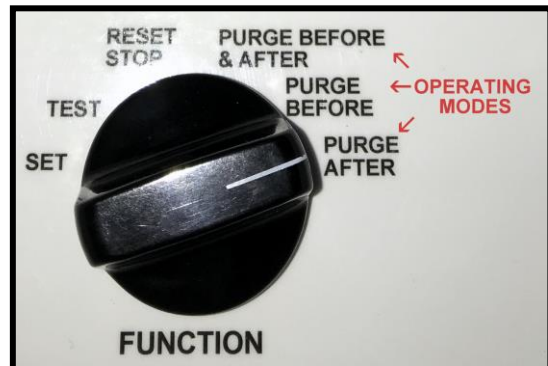
BEGINNING THE SAMPLE CYCLE

1. Place the sample delivery tube in sample container. Tube should not extend below fill level desired or it may remove sample during purge cycle.
2. Select the desired **Hours Per Cycle** and **Samples Per Hour** (see above). It is not necessary to calibrate the sampler unless operational environment has changed.
3. Set **Function** switch to the desired PURGE mode.

The pump will run for the sample volume time plus 10 seconds to clear the tube of previous sample.

The sampler will immediately go through its first sample collection. This allows you to verify proper operation and check sample size.

NOTE: Purging Before & After will shorten the life of the pump tube.



FINAL CHECK BEFORE LEAVING SAMPLING SITE

- Is inlet line weighted or secured so it will remain in sample stream? Inlet should not lie in sewer invert or bed load where it will pick up excess solids.
- Is sample delivery tube in sampler container so that it cannot fall out and so that is above the anticipated fill line?
- Was the Function switch turned to **RESET STOP** position before it was set for the required operating mode? Sampler must be reset to start timing of fill cycle. The external RESET button will also reset for the next sample cycle.
- Is the **Hours Per Cycle** switch set to required automatic turnoff time?

MAINTENANCE AND LUBRICATION

DAILY MAINTENANCE

Maintenance Task	Action Required
Clean sample containers	Wash with hot water and detergent. Rinse well.
Inspect inlet line and screen	Clear of rags and debris. Make sure the inlet line is in the liquid to be sampled.
Check pump tube	If no suction, replace with spare and order replacements. DO NOT USE OTHER TYPES OF TUBING as this can damage both the motor and circuit board.
Check battery (if used)	Recharge battery if below 10.5 VDC

PERIODIC MAINTENANCE

Maintenance Task	Action Required
Check pump tube for wear	Always replace worn pump tubes as a split will leak and cause damage to the pump head
Clean outside of case	Wipe with a rag or paper towel and spray cleaner such as Fantastik®.
Check electrical cable for breaks, wear, or exposed wire.	Replace or repair.
Check for wear on drive belt	Replace if necessary
Clean inlet line	Wash with hot water and detergent. Rinse well. Replace if necessary.

LUBRICATION

This equipment **MUST NOT** be lubricated. Oiling or greasing the pump will cause slipping or gumming of the pump tube, which will prevent suction from lifting a sample.

LONG-TERM STORAGE

If the sampler is to be stored for 2 weeks or longer:

- Remove pump tube from pump to keep it from becoming “set” or stuck together so that it will not create a suction problem when it is used again.
- Clean sampler and sample container
- Clean and drain all tubing
- Leave cap off sample container

POWER CONNECTIONS

External Power Sources

A single 9-pin connector on the left side of the case is used for all external power connections. A 5 AMP fuse protects against shorts in the AC circuit.



The following chart lists the pin assignments for all external power options:

Line Power 115 –220 VAC	3-wire grounded cable pin 1 = line pin 2 = neutral pin 3 = ground	AC power connection
12 VDC	2-wire cable pin 5 = negative (black) pin 6 = positive (white)	12 VDC battery connection
Flowmeter/AC	3-wire grounded as above plus 2-wire cable pins 8 & 9 (10')	AC power to flowmeter Unpowered input
Remote Turnoff	2-wire A/N	Option for remote turnoff

NOTE: The sampler will not operate if 12 VDC source has reversed polarity.

□

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CHECK	REQUIRED ACTION
Sampler totally inoperative:	<ul style="list-style-type: none"> A. No power B. Switch to DC/AC C. DC polarity reversed D. Blown Fuse E. Board or motor disconnected F. Motor failure G. Broken internal wire H. Defective circuit board 	<ul style="list-style-type: none"> A. Power source B. Power switch C. Battery connections D. Short circuit E. MOLEX internal plugs F. If motor will run on 12VDC directly G. Internal wiring for breaks or loose solder joints H. Return for repair 	<ul style="list-style-type: none"> A. Reconnect/turn on B. Set to correct source C. A= + (white)/B = - (black) D. Correct E. Reconnect F. If not, replace motor G. Reconnect/resolder H. Repair or replace
Motor runs but pump does not	<ul style="list-style-type: none"> A. Loose wire or broken pulley B. Broken or slipping belt 	<ul style="list-style-type: none"> A. Pulleys & set screws B. Adjust/replace belt 	<ul style="list-style-type: none"> A/B. Tighten or replace
Pump runs but does not collect sample	<ul style="list-style-type: none"> A. Inlet out of water B. Pump runs “wrong way” C. Pump tube worn/split D. Loose tube connector E. Obstruction/cut in inlet 	<ul style="list-style-type: none"> A. Position of inlet B. Inlet & delivery line may be reversed. Motor leads may be reversed C. Tube for wear or cracks D. Inlet connectors E. Inlet line & screen 	<ul style="list-style-type: none"> A. Make sure inlet stays in water B. Reverse connections C. Replace tube D. Clean/reconnect E. Clean/replace
Erratic sample volume	<ul style="list-style-type: none"> A. Incomplete purging B. Timing of pump delivery C. Changing liquid level of source 	<ul style="list-style-type: none"> A. Loops in inlet trapping liquid B. Check delivery timing & volume for repeatability C. End of inlet 	<ul style="list-style-type: none"> A. Straighten inlet/reduce length B. Try a larger sample volume - sample may be too small for minimum pump time C. Make sure inlet is always in liquid

SERVICE AND REPAIR PROCEDURES

REPLACE PUMP TUBE

1. Disconnect sampler from power source.
2. Remove two (2) knurled head screws from pump head.
3. Remove pump head by pulling straight back and remove old tubing.
4. Stretch new pump tube several times before forming a loop.

BE SURE SMALL TEFLON THRUST WASHER IS ON SHAFT OR PUMP WILL BIND AND CAUSE JAMMING

5. Pull loop over roller cage and press tubing down into slot formed between rollers and pump housing. Never use a sharp tool to press tube in place.
6. Replace pump head and replace knurled head screws. Use the tubing clamp provided to prevent the pump tube from riding up into the pump housing.
7. Reconnect suction side of tubing to the connector on inlet line.
8. Insert delivery end of tube into bottle cap. Trim off any excess if tube kinks or extends below float.

REPLACE PUMP AND/OR MOTOR

1. OPEN CASE AND REMOVE PROGRAMMER PANEL
2. Disconnect sampler from power source.
3. Loosen the four screws in corners of cover on front of unit.
4. Remove top and set alongside base. Internal electrical connection harness may be disconnected if required by service procedure.
5. Reverse steps to replace.

REMOVE AND REPLACE PUMP DRIVE MOTOR

1. Remove pump drive assembly by loosening nuts securing motor clamp to base.
2. Disconnect connector from connector on circuit board (Orange & blue wires).
3. Remove pulley from motor shaft by loosening set screw
4. Mount new motor in clamp. Tighten screws lightly so motor can be turned.
5. Replace pulley and tighten set screw.
6. Replace belt over pump pulley and rotate motor in clamp until belt is tightened. Belt should be loose enough for a quarter turn at midsection. Adjust as necessary so that pulleys and belt are aligned.
7. Tightened bolts on clamp securely.
8. Reconnect orange & blue wire connector .

REMOVE AND REPLACE PUMP HEAD

1. Loosen pump drive assembly.
2. Remove two (2) knurled screws from pump head and pull head off.
3. Remove pump tubing.
4. Remove two screws holding the pump base to side of case and backing plate.
5. Loosen pulley on pump shaft with Allen key and remove.
6. Reverse procedure to reassemble
7. Be sure lock washers are used under the retaining nuts and that the nuts are tightened securely.

CIRCUIT BOARD REPAIRS

SHIPMENT TO FACTORY FOR REPAIR

If you must return your Sentry for repair, please follow the following shipping guidelines:

Contact the factory (1-800-932-6266) for an RMA number.

Clean and decontaminate the sampler. Indicate in writing if the unit has been used to sample toxicants so that we may provide protection for our employees.

Pack the entire unit. Be sure to include the power cable.

Do not send only the part of the sampler you believe is not working properly.

Do not send inlet lines or sample containers. These needlessly add to the shipping weight of the sampler.

Be sure to include a note giving a clear description of the problem, your name and telephone number, a return shipping address and billing address, if different.

Always over-pack the Sentry for shipping. Simply placing an address sticker over the case is not acceptable and almost always results in further damage to the unit. Units received without over-packing will be refused by our receiving department. The Sentry is extremely rugged, but damage will occur if it is not properly packed.

SPARE PARTS LIST

PART #	DESCRIPTION
06-033	5 AMP Fuse, 3 AG Standard
08-005	Belt 100
11-012PK	Pump Tube, 7015, 12" (Pack of 4)
11-015	Pump, 7015, long shaft, ball bearings
12-003	Tubing Connector, pair
12-094	Inlet Weight, stainless
15-504	Cable, AC Grounded, AMP
15-508	Cable, DC, with battery clips
15-510	Cable, AC/Proportional Hookup
19-002	Bottle, One Gallon HDPE with cap
19-080	Bottle, Two Liter, glass, with cap
19-003	Bottle, Two Gallon rectangular HDPE with cap
07-017	Motor
20-038	Inlet Assembly, 20' Vinyl with SS inlet weight
20-066	Turn-off Cap Assembly (Check cap size)

PLEASE CONTACT N-CON
FOR CURRENT PRICING & AVAILABILITY.
(800) 932-6266 (706) 389-9600

LIMITED WARRANTY

WHAT IS COVERED

N-CON Systems, Co. Inc. warrants that the product you have purchased will be free of defects in materials and workmanship.

FOR HOW LONG

This warranty covers all defects that you bring to the attention of N-CON Systems within ONE YEAR FROM DATE OF PURCHASE.

WHAT N-CON SYSTEMS WILL DO

If your N-CON product is defective we will repair or replace it and will ship it back (UPS Ground) to you free of charge. If UPS Blue or RED air is required, you will be charged the difference between air service and ground service to the same destination.

HOW TO GET SERVICE

Please call 1-800-932-6266 to OBTAIN RETURN AUTHORIZATION. You must return your N-CON product within one year of the date of purchase, shipping prepaid, to our factory at this address:

N-CON Systems Company, Inc.
Warranty Repair Service
130 Old Edwards Road
Arnoldsville, GA 30619

In any correspondence with us, or if you send part, but not all the product, please include both Model and Serial # of the product.

WHAT THIS WARRANTY DOES NOT COVER

Your rights and remedies are specifically limited to those set forth in this warranty. N-CON Systems disclaims any and all implied warranties including those of mercantability or fitness for a specific purpose. N-CON Systems shall not be liable for any special, incidental, or consequential damages. In no event shall N-CON Systems liability to you exceed the purchase of your N-CON product.