

# SIGMA 900 MAX All Weather Refrigerated Sampler

## Sigma All Weather Refrigerated Liquid Sampler Overview

### Unsurpassed Corrosion Resistance

With American Sigma's All Weather Refrigerated Sampler, spending time and money to maintain your sampler is a thing of the past. We designed this unit to last longer than any other sampler available. First, we put the compressor on top to avoid hydrogen sulfide and other corrosive heavier-than-air gases, which attack conventional refrigerated samplers with floor-level compressors. Then, we equipped the sampler with a tough, chemically resistant coating to better protect

refrigeration lines against moisture and corrosive gases.

Finally, we used stainless steel hardware, sealed electrical connections and weather resistant cables to complete its corrosion-resistant design.

### Mother Nature Meets Her Match

Customers quickly learn that the name All Weather is no exaggeration. This sampler is designed to operate anywhere - indoors or out - without a secondary enclosure. Completely self-contained, the All Weather is rated for operation in temperatures from -40° to 120°F. The cabinet is resin transfer-molded fiberglass with rounded, moisture-shedding, UV-resistant surfaces. Its sidewall ventilation system allows positioning against a wall, and its sturdy locks prevent tampering. A level adjustment and stainless steel anchoring rails ensure proper, secure installation.

### The Advantages of the All Weather

- All fiberglass construction provides superior corrosion and UV resistance.
- NEMA 4X,6 controller seals out moisture and corrosive gases.
- High integrity temperature control system automatically adjusts to ensure 4°C samples in ambient environments from -40° to 120°F (-40° to 50°C).
- Mechanical door latch with compressible gasket ensures positive seal, even with wide temperature fluctuations.
- Lip overhangs door seal, preventing precipitation from entering sample containers.

## Sigma All Weather Refrigerated Liquid Sampler Specifications

### 900 Series All Weather Refrigerated Liquid Sampler General Specifications

#### Dimensions:

- **Width** 28" (71 cm),
- **Depth** 28" (71 cm),
- **Height** 49" (125 cm),
- **Weight** 175 lbs. (79 kg).

#### Cabinet:

- Fiberglass reinforced plastic with beige UV inhibited polymer laminate.

#### Sample Pump:

- High speed peristaltic, dual roller, with 3/8" ID by 5/8 " OD Dow Corning Silastic Rx50 medical grade silicone rubber pump tube.

**Pump Body:**

- Impact/corrosion resistant, glass reinforced Delrin\*.

**Vertical Lift:**

- 27 ft. maximum (note: Remote Pump Option recommended for lifts from 22 to 35 feet).

**Sample Transport Velocity:**

- 2 ft./sec. minimum, at 15 ft. vertical lift in a 3/8" ID intake tube.

**Pump Flow Rate:**

- 60 ml/sec at 3 ft. vertical lift in a 3/8" ID intake line.

**Liquid Sensor:**

- Single sensor, non-wetted, non-contact.

**Sample Volume:**

- Programmed in milliliters, in one ml increments from 10 to 9,999 ml.

**Sample Volume Repeatability:**

- $\pm 5\%$  typical.

**Sample Bottle Capacity:**

- (24) 1 liter polyethylene and/or 350 ml glass bottles.
- (8) 2.3 liter polyethylene and/or 1.9 liter glass bottles.
- (4) 3 gallon polyethylene and/or 2- 1/2 gallon glass bottles.
- (2) 3 gallon polyethylene and/or 2-1/2 gallon glass bottles,
- (1) 5-1/2 gallon polyethylene or 6 gallon polyethylene bottle.

**Sampling Modes:**

- Multiple Bottle Time, Multiple Bottle Flow, Composite Time, Composite Flow, Flow with Time Override, Variable Interval, Start/Stop, and Level Actuation.

**Interval Between Samples:**

- Selectable in single increments from 1 to 9,999 flow pulses (momentary contact closure 25 msec. or 5-12 VDC pulse;
- 4-20 mA interface optional), or 1 to 9,999 minutes in one minute increments.

**Multiplex:****Multiple Bottle Mode:**

- Programming allows multiple samples per bottle and/or multiple bottles per sample

collection.

**Intake Purge:**

- Air purged automatically before and after each sample;
- duration automatically compensated for varying intake line lengths.

**Pump/Controller Housing:**

- High impact injection molded ABS; submersible, watertight, dust tight, corrosion & ice resistant; NEMA 4X, 6.

**Control Panel:**

- 18 key membrane switch keypad; 24 character alphanumeric liquid crystal display.

**Internal Clock:**

- Indicates real time and date; 0.007% time base accuracy.

**Diagnostics:**

- Tests RAM, ROM, pump, and distributor.

**Program Delay:**

- Sampler start at time of day, or delay in minutes is user programmable.

**Manual Sample:**

- Initiates a sample collection independent of program in progress.

**Intake Rinse:**

- Intake line automatically rinsed with source liquid prior to each sample, from 0 to 3 rinses.

**Intake Fault:**

- Sample collection cycle automatically repeated from 0 to 3 times if sample not obtained on initial attempt.

**Multiple Programs:**

- Stores up to five sampling programs.

**Cascade:**

- Allows using two samplers in combination where the first sampler at the completion of the program initiates the second.

**Data Logging:**

- Records program start time and date, stores up to 400 sample collection times/dates, all program entries, operational status including number of minutes or pulses to next sample, bottle number, number of samples collected, number remaining, sample volume collected, volume remaining and sampler identification number.

**Serial Interface:**

- RS232 compatible; allows on-site collection of stored data.

**Status Output:**

- Alerts operator to low main battery, low memory power, plugged intake, jammed distributor arm, sample collected, and purge failure

**Automatic Shutdown:**

**Multiple Bottle Mode:**

- After complete revolution of distributor arm (unless Continuous Mode selected). Composite Mode: After preset number of samples have been delivered to composite container, from 1-999 samples, or upon full container.

**Program Lock:**

- Access code protection precludes tampering.

**Intake Tubing:**

- 1/4" and 3/8" ID vinyl or 3/8" ID Teflon\* lined polyethylene with protective outer cover.

**Intake Strainers:**

- Choice of Teflon\* and 316 stainless construction, and all 316 stainless steel in standard size and low profile for shallow depth applications.

**Power Requirements:**

- 115 VAC, 60 Hz (230 and 100 VAC optional);
- Compressor Running Amperage 1.5-2.0 A.
- Locked rotor current 12 Amps.

**AC Power Backup:**

- (Pump/Controller Only):
- Rechargeable 6 Amp-hour gel lead acid battery takes over automatically with AC line power failure. Integral trickle charger maintains battery at full charge (factory installed option).

**Internal Battery:**

- 5 year lithium battery maintains program settings and real time clock.

**Overload Protection:**

- Controller: 5 amp DC line fuse.

**Compressor:**

- Thermal overload relay, opens at 230°F (110°C).

**Thermal System:**

- Top mounted compressor/condenser with fan forced air cooled condenser;
- 3-sided wrap-around evaporator plate; 2" rigid foam insulation;
- microprocessor controlled thermostat maintains sample liquid at 4°C ( $\pm 1^\circ\text{C}$ );
- frost free; non-CFC R134A refrigerant; compression gasket door seal;
- refrigeration components and plumbing are corrosion protected with conformal coating. Refrigerant is R134A non CFC.

**Temperature Range:**

- -20°F to 122°F (-29°C to +50°C);
- With optional controller compartment heater, -40°F to 122°F (-40°C to +50°C)

**Recovery Time:**

- With door open one minute in 75° F (24°C) ambient and 4° C sample temperature, 5 minutes.

**Pull Down Time:**

- From 75° F (24° C) to 39° F (4° C), 15 minutes.

**Note:** Specifications are subject to change without notice.

## Sigma 900 MAX Controller Specifications

### 900 MAX Controller Specifications

**Diagnostics:**

- Tests keypad,
- display,
- ROM,
- pump,
- distributor.

**Program Delay:**

- (1) 1-9,999 minutes or flow pulses in one unit increment
- (2) programmable start time/day,
- (3) programmable time/day/week.

**Sampling Modes:**

- Multiple Bottle Time,
- Multiple Bottle Flow,
- Composite Multiple Bottle Time,
- Composite Multiple Bottle Flow,
- Composite Time,
- Composite Flow,
- Constant Time / Variable Volume,
- Constant Volume / Variable Time,
- Flow with Time Override,
- Variable Interval,
- Start/Stop,
- Level Actuation.

#### **Temperature Range:**

- **General use:** 32° to 120°F, (0° to 49°C)
- **Liquid Crystal Display: Operating :** -14° to 158°F, (-10° to 70°C),
- **Storage:** -40°F to 176°F, (-40° to 80°C).

#### **Serial Interface:**

- **RS-232;** up to 19,200 baud; allows on-site collection of stored data.

#### **Internal Battery:**

- Two C-cell alkaline batteries; maintains program logic and real time clock for five years. Internal battery draws less than 40 micro amps.

#### **User Interface:**

- 21 key membrane switch keypad with 4 multiple function soft keys; 8 line x 40 character alphanumeric, liquid crystal graphics display.
- Self prompting/menu driven program.

#### **Data Logging:**

- Records program start time and date, stores up to 400 sample collection times/dates, all program entries, operational status including number of minutes or pulses to next sample, bottle number, number of samples collected, number remaining, sample volume collected, volume remaining, sample identification number, and all logged data (i.e., level, flow velocity, rainfall, stream temperature, pH or ORP, and any logged (external inputs).

#### **Set Point Sample Trigger:**

- When equipped with data logging options (i.e., level, flow velocity, rainfall, stream temperature, pH or ORP, and any logged external inputs)
- Mode 1 - Sampling can be triggered upon an upset condition when field selectable limits are exceeded.
- Mode 2 - Concurrent with normal sampling routine, sample liquid is deposited in designated "Trouble Bottle(s)."

#### **Automatic Shutdown:**

- **Multiple Bottle Mode:** After complete revolution of distributor arm (unless Continuous

Mode selected).

- **Composite Mode:** After preset number of samples have been delivered to composite container, from 1-999 samples, or upon full container.

#### Flash Memory:

- **Via RS-232;** permits embedded software upgrades in the field.

#### 900 Sampler Series - General Specifications

- **Pump Body:** High impact, corrosion resistant, glass reinforced Delrin®.
- **Sample Pump:** High speed peristaltic, dual roller, with 3/8" (.95 cm) ID by 5/8" (1.6 cm) OD pump tube.
- **Vertical Lift:** 27' (8.2 m) maximum (note: Remote Pump Option recommended for lifts from 22' (6.7 m) to 35' (10.7 m).
- **Internal Clock:** Indicates real time and date, 0.007% time base accuracy.
- **Liquid Sensor:** Single sensor, non-contact, ultrasonic.
- **Sample Transport Velocity:** 2'/sec. (.6 m/sec.) minimum at 15' (4.6 m) vertical lift in a 3/8" (.95 cm) ID intake tube.
- **Pump Flow Rate:** 60 ml/sec at 3' vertical lift in a 3/8" (.95 cm) ID intake tube.
- **Sample Volume Repeatability:** ±5% typical.
- **Status Output:** Low battery, low memory power, plugged intake, jammed distributor arm, sample collected, and purge failure.
- **Sample Volume:** Programmed in milliliters, in one ml increments from 10 to 9,999 ml.
- **Intake Strainers:** Teflon® and 316 stainless construction. All 316 stainless steel in standard size and low profile for shallow depth applications.
- **Intake Purge:** Air purged automatically before and after each sample; duration automatically compensated for varying intake line lengths.
- **Intake Rinse:** Intake line automatically rinsed with source liquid prior to each sample, from 1 to 3 rinses.
- **Intake Tubing:** 3/8" ID vinyl, 1/4" ID vinyl, 3/8" ID Teflon/polyethylene.
- **Intake Fault:** Sample collection cycle automatically repeated from 1 to 3 times if sample not obtained on initial attempt.
- **Cascade:** Allows using two samplers in combination where the first sampler at the completion of the program initiates the second.
- **Program Languages:** Czech, Danish, Dutch, English, French, German, Italian, Spanish, and Swedish.
- **Manual Sample:** Initiates a sample collection independent of program in progress.  
Automatic Shutdown:
- **Multiple Bottle Mode:** After complete revolution of distributor arm (unless Continuous Mode selected).
- **Composite Mode:** After preset number of samples has been delivered, from 1-999 samples, or upon full container.
- **Interval Between Samples:** Selectable in single increments from 1 to 9,999 flow pulses (momentary contact closure 25 msec. or 5-12 VDC pulse; 4-20 mA interface optional), or 1 to 9,999 minutes in one minute increments.
- **Program Lock:** Access code protection precludes tampering.
- **Multiple Programs:** Stores up to five sampling programs.