

# Sonic Reservoir Sensor

## SR-13 series

### Instruction Manual

Ver.1



#### Introduction

Thank you for purchasing the FLOM SR-13 Sonic Reservoir Sensor. Before using this device, please carefully read and understand the Safety Notes below. Note that the warranty for this device is void if the device has been used or handled contrary to the instructions contained in this manual. Please keep this manual in a safe place easily accessible to the actual operators of the unit.

#### Safety Notes



This instruction manual uses the safety mark to indicate important safety information when operating the device. The Safety Notes are divided into 3 categories in descending order

of hazard: 1) Danger, 2) Warning, and 3) Caution, as described below. Follow the Safety Notes at all times to ensure safety for device and the operator.

Danger	A "Danger" Mark indicates the imminent and acute possibility of injury or death, if the situation or action described is not avoided.
Warning	A "Warning" Mark indicates the possibility of injury or death if the situation or action described is not avoided.
Caution	A "Caution" Mark indicates the possibility of moderate or light injury, or physical damage, if the situation or action described is not avoided.



The points below are all WARNINGS. Avoid these actions and situations at all times.

- Never wet the panel or cover of the unit with water or solvents, organic or otherwise. If solvent is inadvertently spilled on it, unplug the unit and clean immediately. Do not operate the unit until it is completely dry. A wet unit is a hazard for fire, short circuits, electric shock and unit damage. If you suspect a large volume of solvent has leaked into the unit interior, contact your vendor for advice.
- Never allow stainless steel tubing or metal fragments of any kind to enter the unit through the cover vents. This could cause short circuits, electrical shock, damage or injury.
- Do not attempt to repair or dismantle the unit if you suspect a technical problem, nor attempt to convert or upgrade it yourself. Doing so could cause fire, electrical shock, or injury.



The points below are CAUTIONS. Be sure to follow them to ensure safe operation of the unit.

- Do not run this unit on an electric power system outside the standard AC 100V-240V (50/60 Hz) range. Doing so could result in fire, electrical shock or damage.
- If a malfunction occurs, stop operation immediately. Contact FLOM, providing a clear description of the problem. Using the unit after malfunction could cause fire, electrical shock, or injury.

- Treat the electric power cord carefully: do not excessively bend, treat, tuck into small spaces, wrap up, bind up, or place under heavy objects. Doing so could result in fire, overheating, and electrical shock.



The points below are DANGERS. Heed the following without fail under all circumstances.

- This device is not rated explosion-proof. Never use in an environment with an explosion hazard. Doing so will result in a high risk of death, injury and/or fire hazard.
- This unit features a light, compact design, but do not place in a location above head level or where the unit could easily fall. Doing so could result in death, injury, or damage to the unit.



The following locations are not suitable for installation or storage of this unit. Placement in any of these locations may result in short circuits or damage to the unit.

- Do not use or store the unit out-of-doors.
- Do not use or store the unit near a source of corrosive gas.
- Strong electromagnetic waves can cause malfunctioning in nearby CPUs, so do not use the unit near high-frequency equipment.
- Do not place the unit in vibrating or unstable locations.
- Do not place in direct sunlight or near sources of high heat.
- Do not use or store in places with high humidity.
- One important condition is to always use and store the unit at room temperature (indoors). Avoid use or storage under extremes of temperature. (Appropriate ambient temperature range: between 4° – 45° C in areas without water condensation.)
- Do not attempt to connect the probe connector to anything other than the supplied probe cable. Doing so could damage the connector.

#### Standard Accessories

When opening the unit packaging, please check that all the following accessories are included.

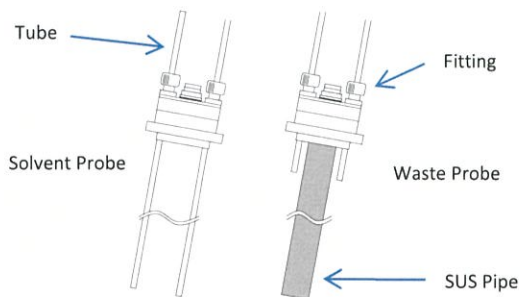
P/N	Description	Number	Notes
	Power Cord	1	AC100V
	3-Prong Connector	1	AC100V
SPU-16A-108	AC Adapter	1	DC Plug Inlet C14
#9711	1/8 Flat Seal Fitting	2	
#9701	φ3 Flat Seal Ferrule	2	

Note: using after-market parts not approved by FLOM may void the warranty.

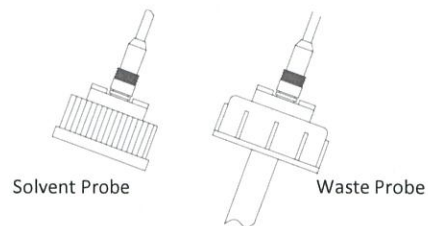
#### Solvent/Waste Probe and Bottles

Please check that the following accessories are included when you purchase the SR-13 with the probe and bottle.

P/N	Description	Number	Notes
FD007-501	SR-13 Solvent Probe	1	
FD007-502	SR-13 Waste Probe	1	with pipe
FF007-01	SR-13 Probe Cable	1	1m
FP007-506	SR-13 Solvent Bottle Cap	1	
FP007-512	SR-13 Waste Bottle Cap	1	
MT-004782	SR-13 Solvent Bottle	1	1000mL
FP007-511	SR-13 Waste Bottle	1	20L



Note: When you use a suction filter, suction will stop once the liquid level falls below the tube joint.



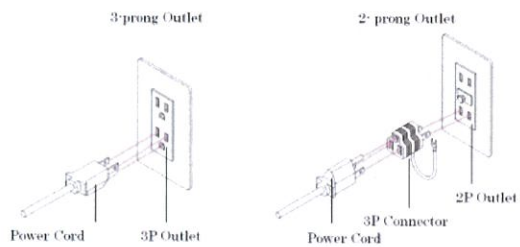
Connect the probe cable to any of the channels on the Sonic Reservoir Sensor main unit. Both the solvent probe and the waste probe are automatically activated when powered on.



**Warning**

When plugging into a power outlet, always hold the cord by the plug head. Do not touch the cord with wet hands to avoid electric shock.

The cord provided is a 3-pronged triplex cable. If connecting to a 2-pronged outlet, always use a 3-pronged adapter unit in between. Always ground the



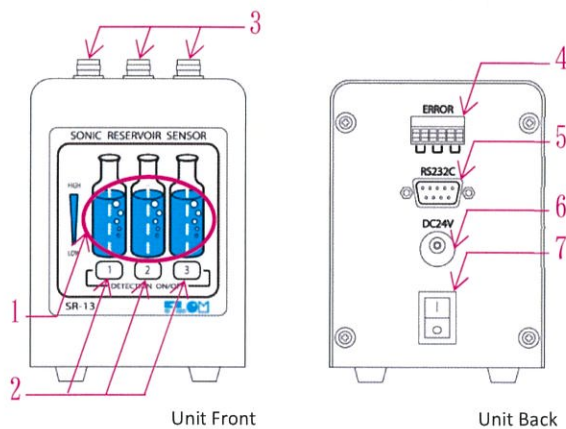
unit as shown in the illustration below.



**Caution**

If the probe and the channel are not properly connected, an error warning will be output from one of the other channels.

### Part Names and Functions

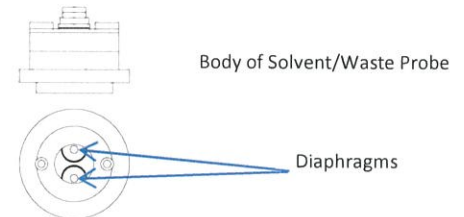


No.	Name	Function
1	Level Status LED Display	Indicates Channel Level and Status
2	Channel Selector Buttons	ON/OFF Switch for Each Channel
3	Channel Probe Connectors	Connects to Solvent/Waste Probes
4	Error Output Connector	Error Output for Each Channel
5	RS232C Terminal	Connects to Host (Option)
6	DC Power Inlet	DC +24V (standard IEC-320-C14)
7	Power Switch	Rocker Switch (DPST type)

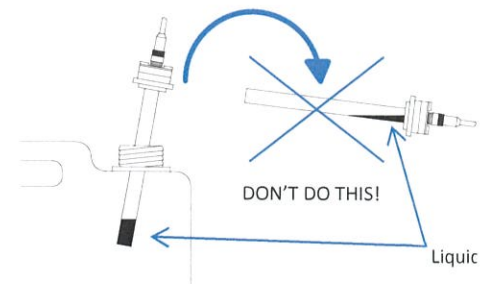
### Installation

- Following the instructions outlined in the Safety Notes above, place the unit in an appropriate location.
- Plug the AC adapter power cord provided into the DC inlet in the back of the unit.
- When using the solvent probe, screw the GL45 size cap on to a 1 liter bottle. When using the waste probe, screw the specialty bottle cap on to the waste bottle.

- If the inside of the probe gets wet, a malfunction will occur. If the diaphragms shown in the diagram below get wet, expose to normal temperature ambient air until the inside is fully dry before using again. If you need to wipe it, use a very cloth that won't get pushed inside the holes of the diaphragms.



- When the waste probe is removed from the waste bottle, a small volume of liquid remains within the pipe. If the probe is turned horizontal as it is removed, this will cause the liquid to flow down the pipe and wet the inside of the probe. Always remove the waste probe vertically from the bottle, holding for several seconds in the upright position until you are sure that all liquid has drained from the pipe. At that point the probe can be laid down horizontally. Doing so helps prevent diaphragm malfunction.



## Operation

■ When the unit is powered on, channels which are already connected will also turn on.

You can also turn individual channels on and off at will by pressing the numbered buttons below the display.

Note: if a channel is connected but turned off, you will still be able to detect the sound of sonic measurements being made.

■ Connected probes turn ON automatically on power up. You can also turn each channel, 1, 2, and 3, ON or OFF with the numbered key on the front panel.

Note that even when a channel is turned OFF, during measurement you may hear the sound from the channel. Each probe-connected channel will start taking measurements on power up. During this start-up period, the channel taking measurements will show 2 blinking LED lights as shown here.



Once initial measurements have finished, current measured levels will be displayed. The next section explains how levels are indicated using the LED displays.

Note: When measuring chloroform levels, occasionally the density of the chloroform may cause erroneous readings. If the errors become unacceptably large, you can input an adjustment factor to correct the error. For details, see section "Inputting Chloroform Adjustment Factor".

Solvent Bottle Level Display (1L Solvent Levels)				
over 75%	under 75%	under 50%	under 25%	under 10%
Green LED ×4	Green LED ×3	Green LED ×2	Orange LED ×1	Red LED×1
Steady Light				Blinking
No Buzzer			Buzz Twice	Steady Buzz
No Error				Error Output

Waste Bottle Level Display (Until Bottle Full)				
over 7.5cm	over 4.5cm	over 1.5cm	under 1.5cm	0cm
Green LED×1	Green LED×2	Green LED×3	Orange LED×4	Red LED×4
Steady Light				Blinking
No Buzzer			Buzz Twice	Steady Buzz
No Error				Error Output

## Other Parameter Settings

■ Press and hold the [1] key as you turn the unit on to enter the Parameter Settings Mode. Press the [3] key to cycle through the parameters, and press the [1] key to change parameter settings and values. Press the [2] key to return to the previous parameter setting or value. Press the [3] key to save the currently selected parameter or value, and the mode will advance to the next parameter. When finished setting parameters, press the [3] key to confirm the change, and turn unit off and on once, to return to Normal

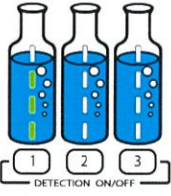
Common Display Indicators for Both Solvent and Waste		
Sensor Max Value Too Small	Sensor Min Value Too Large	Can't Identify Probe
Orange LED×4	Orange LED×2	Orange LED×3
Blinking		
Steady Buzz		
Error Output		

Mode.

### List of Parameters

1. Buzzer Alarm Style When Either Empty or Full	
Channel 1: LED X 1	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> When either empty or full, the alarm will sound continuously. (Default)
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> When either empty or full, the alarm will sound 10 times, then stop.

Setting Error High or Low	
Channel 1: LED X 2	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> When either empty or full, ERROR output level is Low. (Default)
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> When either empty or full, ERROR output level is High.

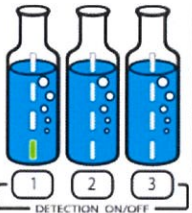
3. All Channel/Single Channel Error Output	
Channel 1: LED X 3	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0 When either empty or full, ERROR output only by channel in which ERROR occurred. (Default)
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1 When either empty or full, all channels linked, ERROR on any channel output by all channels.

### Inputting Chloroform Adjustment Factor

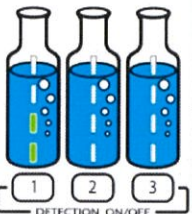
■ This adjustment factor is only to be used when measuring chloroform levels. If an adjustment factor is not necessary, refer to "Resetting Parameters to Default" below to return the unit to its original factory settings.

■ Press the [1] and [3] keys together as you turn the unit on to enter the Chloroform Adjustment Factor Mode. Press the [1] key to change parameter value as shown below. Press the [2] key to return to the previous parameter setting. Press the [3] key to save the currently selected parameter or value, and automatically advance to the next channel. When finished setting parameters, press the [3] key to confirm the change, and turn unit off and on once, to return to Normal Mode.

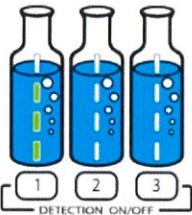
#### Setting The Adjustment Factor for Channel 1

CH1 : LED X 1	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0 Adjustment Factor 0 (Default)
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1 Adjustment Factor 10%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 2 Adjustment Factor 20%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 3 Adjustment Factor 30%

#### Setting The Adjustment Factor for Channel 2

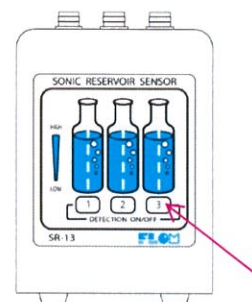
CH1 : LED X 2	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0 Adjustment Factor 0 (Default)
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1 Adjustment Factor 10%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 2 Adjustment Factor 20%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 3 Adjustment Factor 30%

#### Setting The Adjustment Factor for Channel 3

CH1 : LED X 3	Selection of Parameter Setting
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 0 Adjustment Factor 0 (Default)
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 1 Adjustment Factor 10%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 2 Adjustment Factor 20%
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CH3 : LED X 3 Adjustment Factor 30%

### Resetting Parameters to Default

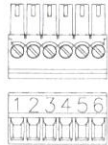
■ Press and hold the [3] key as you turn the unit on to reset all parameters to their original factory defaults. You can use this when you wish to use the default parameters, or when you've made a mistake with the parameters and wish to start over.



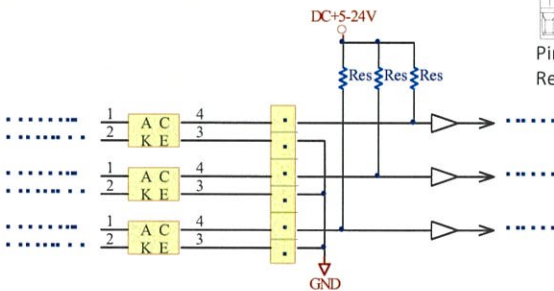
## Remote Control

You can query the error status of each channel through the remote terminal located on the rear panel. The terminal is a 6-pin connector.

Cable: AWG28-16  
Suggested Wire Stripping: 7mm



Pin Order on Remote Terminal



Signal	Pins	Description
Channel 1, Error	1 C	Outputs Pump Error Info. Please apply DC5-24V to photocopler, adjust resistor value "Res" to produce max current 10mA.
	2 E	Photocopler OFF Normal Photocopler ON Error, Stopped
Channel 2, Error	3 C	Outputs Pump Error Info. Please apply DC5-24V to photocopler, adjust resistor value "Res" to produce max current 10mA.
	4 E	Photocopler OFF Normal Photocopler ON Error, Stopped
Channel 3, Error	5 C	Outputs Pump Error Info. Please apply DC5-24V to photocopler, adjust resistor value "Res" to produce max current 10mA.
	6 E	Photocopler OFF Normal Photocopler ON Error, Stopped

C = Collector E = Emitter

## Troubleshooting

The LED display will indicate when an error has occurred on the SONIC RESERVOIR SENSOR unit. Determine the error type, and use the charts below to determine the proper measures to take. Press the ON/OFF button of the channel displaying the error to clear the display.

### ERROR Output Conditions (same for all channels)

- under 10% liquid remaining
- 1.5cm or less until full
- Full
- Sensor Malfunction / Largest Value is Too Small
- Sensor Malfunction / Smallest is Too Large

### Troubleshooting Conditions Not Shown on Error Display

#### No Power

- Check main power (rocker switch, outlet, socket connection)
- Check that voltage is in correct range, AC100 ~ 240V.

#### Abnormal Odor

- **Immediately** turn off unit and contact vendor.

## Optional Parts

P/N	Name	Notes
FQ007-06	RS-232C Circuit Board	
FF007-01	Probe Cable	5M
FF007-02	Probe Cable	1M
FD007-501	Solvent Probe	
FD007-502	Waste Probe	with pipe
MT-004782	Solvent Bottle	1000mL
FP007-506	Solvent Bottle Cap	GL45
FP007-511	Waste Bottle	20L
FP007-512	Waste Bottle Cap	
#9711	1/8 Flat Seal Fitting	
#9701	φ3 Flat Seal Ferrule	

Contact FLOM or your vendor for pricing on these parts.

## Specifications

Model	SR-13
Measuring Range	Solvent: designated bottle 10ml~1000ml Waste: from probe end, 75mm
Measuring Method	Sonic Wave Reflection
Wetted Material	SUS316 (Waste Probe)
Remote Output	Error (OUT)
Serial Comm	RS232C (Option)
Power	DC+24V, from AC Adapter provided Adapter AC Input:100-240V 0.62A
Dimensions	(W)86 × (H)115 × (D)80 mm (excepting protrusions)
Weight	about 700g

## Warranty

FLOM Corporation guarantees the performance of this product for one (1) year. FLOM Corporation will assume responsibility for covering the costs of repair and/or replacement for any defect in, or damage to, the unit, occurring within this period, when such defect or damage can be shown to be the responsibility of FLOM. However, FLOM Corporation will assume no responsibility for defects or damage due to, or substantially similar to, the following circumstances or conditions:

- operating the unit in violation of the Safety Notes given in the Instruction Manual;
- errors in handling and operation;
- repairs or reconditioning not done by FLOM;
- earthquakes, fire, catastrophes or other acts of God;
- all defects or damage resulting from causes not inherent in the unit;
- high temperature, high humidity, extremely low temperature, corrosive gas, constant high vibration and other factors produced by extreme environments;
- replacement of consumables and similar parts.

Model: SR-13  
Serial Number: \_\_\_\_\_  
Purchase Date: \_\_\_\_\_  
Dealer: \_\_\_\_\_

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