Sentry

WIRELESS
LIQUID LEVEL ALARM
MODEL 110

OPERATING MANUAL

Aquatic Sentry
CONTROLS

www.aquaticsentry.com

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Printed in Canada

Rev 2.2 December 2020
Serial #DW110-01000 and up

1. SAFETY PRECAUTIONS

The potential for electrical shock exists whenever water is present near conductive electrical equipment. Check for sources of electricity from other nearby devices before working on this equipment. There is no possibility of serious shock from the energy levels used by this alarm. The low voltage DC and transformer isolation provide safety when handling or opening the enclosures or the probe. Best practice, however, is to disconnect power when working on this equipment.

2. APPLICATION

The Sentry liquid level alarm continuously monitors a water level, rising (high level) or falling (low level), that may cause an alarm condition. Application examples are pump chambers, cisterns, holding tanks, sumps, floor drains, irrigation channels or truck tanks. The alarm also performs self-diagnostics, continuously testing that all components are operating correctly. The battery powered outdoor probe communicates with the indoor alarm display up to 90 m (300 feet) range. The indoor alarm display will flash an LED and sound an audible alarm. Audio can be muted with the pushbutton. When the alarm condition is corrected the audio will reset.

- Green indicates power on and monitoring
- Red flashing and audio pulsing indicates an alarm condition
- Yellow or blue indicates an error in the wireless communication or in the probe circuit
- Audio chirp warns of low batteries in the outdoor transmitter

See FIG 7 and section 4.1.

2.1 HIGH Liquid Level Alarm

HIGH LEVEL alarm condition occurs when the liquid level rises to partially cover the pins on the bottom of the probe. An example of rising water causing an alarm condition is a septic tank.

2.2 LOW Liquid Level Alarm

LOW LEVEL alarm condition occurs when the liquid level falls below the middle of the pins of the probe. An example of falling water level causing an alarm condition is a cistern that requires filling.

2.3 Optional Relay Output

The relay output may be utilized to switch on remote alarms, input to security systems, auto dialers, WiFi transmitters or control applications. See FIG 5 and FIG 6. Set the relay operation to Normally Open or Normally Closed with the jumper shown in FIG 6.

3. INSTALLATION

3.1 Mount Indoor Alarm Display

Mount the Sentry indoor alarm display at a convenient viewing location. Select an eye level location that is frequented, near a 120VAC receptacle. Power to the receptacle should be supplied from a circuit separate from any pump that is being monitored by this alarm. Install two supplied screws, 3" apart vertically and projecting ¼" from the wall, to mount the display. Install the AC adapter and plug into the alarm display. The LED will be steady yellow with a continuous audio, indicating no wireless communication. The supplied labels may be used to identify the indoor alarm display's function, ie HIGH LEVEL in the SUMP. Radio transmission is improved by mounting away from sheet metal or electrical wiring. Clear line of sight is the best situation.

3.1.1 Installer Code and/or Radio Frequency

If an installation requires multiple alarms, or if interference with other radio devices occurs, change the installer code and / or the frequency program. See section 4.3.

3.2 Mount the Outdoor Transmitter

Mount the Sentry outdoor transmitter near the water source to be monitored. Fasten the weatherproof NEMA 6P enclosure to a post or a riser pipe above grade using screws supplied. Radio

transmission is improved by mounting the transmitter higher off grade. For access to disconnect probe wire see 4.2

3.2.1 Setting HIGH or LOW level function

The jumper position inside the outdoor transmitter determines the HIGH LEVEL or LOW LEVEL function to suit your application. See FIG 3. Using needle nosed pliers, install the jumper, shorting the two terminals for a HIGH LEVEL function. For a LOW LEVEL function the jumper is installed on one terminal.

3.2.2 Setting up Installer code or Radio Frequency

If an installation requires multiple alarms, or if interference with other radio devices occurs, change the installer code and / or the frequency program. See section 4.3.

3.2.3 Install Batteries

Install the four AA cell batteries supplied.

3.3 Suspend the Probe

Suspend the probe at the depth the alarm is required. The probe's alarm point occurs when the pins are immersed 3/8" in water

3.4 Test the alarm

3.4.1 HIGH Alarm

For a HIGH ALARM the LED will be green and on steady with the probe out of the liquid. When the probe is lowered into the liquid, the LED will turn flashing red and the audible alarm will pulse. Silence the audible

alarm. Raise the probe out of the liquid to stop the red LED flashing and to reset the audible alarm. Repeat this sequence to prove operation. For any other conditions see the State Table in section 4.1.

3.4.2 LOW Alarm

For a LOW ALARM the LED should be green and on steady with the probe in the liquid. When the probe is raised above the water, the LED will turn flashing red and the audible alarm will pulse. Silence the audible alarm. When the probe is lowered into the liquid the LED will turn steady green indicating alarm is monitoring. Repeat this sequence to prove the operation. For any other conditions see the State Table in section 4.1.

FIG 1
Indoor Alarm Display Interior

FIG 2
Outdoor Transmitter Enclosure Cover Interior

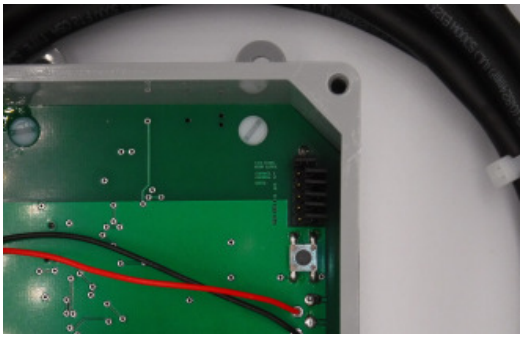

FIG 3
Outdoor Transmitter Enclosure Interior Close-up

FIG 4
Outdoor Transmitter Batteries Installed

FIG 5
Optional Relay Output

FIG 6
Indoor Alarm Display
Setting relay to Normally Open or Normally Closed

FIG 7
Indoor Alarm Display Rear Cover Operating Instructions

4. OPERATION and TROUBLESHOOTING

4.1 State Table and Troubleshooting - Indoor Alarm Display

LED	AUDIO	HIGH LEVEL (i.e. Septic tank)	LOW LEVEL (i.e. Cistern)	CORRECTIVE ACTION
OFF	OFF	No Power		Check breaker Check Transformer Check plug into display
GREEN STEADY	OFF	PROBE DRY	PROBE WET	OK
RED FLASHING	PULSING	ALARM - PROBE WET	ALARM - PROBE DRY	OK
RED FLASHING	MUTED	ALARM - PROBE WET	ALARM - PROBE DRY	OK
RED STEADY	OFF	DISPLAY GOING INTO PROGRAMMING MODE		See 4.3.1
YELLOW FLASHING	PULSING	MANUAL TEST		OK
YELLOW STEADY	CONTINUOUS	NO WIRELESS SIGNAL		Replace batteries (See 5.1) Check for radio interference Change radio frequency Transmitter out of range
GREEN / YELLOW FLASHING OR BLUE	CONTINUOUS	PROBE ERROR		Replace probe
RED STEADY	CONTINUOUS	PROBE OR ELECTRONICS SHORTING		Check polarity of probe conductors Check the probe wire for damage Check outdoor transmitter interior for moisture Replace probe
RED / YELLOW FLASHING	CONTINUOUS	LOW VOLTAGE OR PROBE DISCONNECTED		Check battery polarity Connect probe wires (See FIG 4) Check probe wire for damage; make a waterproof repair
As it was	CHIRP	LOW BATTERY		Replace batteries (See 5.1)

4.2 Probe Assembly

To access the probe wire terminal block, tilt and lift out the electronic board. See FIG 4. Tilt the board by pressing down on the lower right corner, at the serial number.

4.3 Changing Installer Code or Radio Frequency

If an installation requires multiple alarms change the programmed installer code of both the indoor display and the outdoor transmitter. If there is interference with the wireless signal change the frequency. There are 16 installer code combinations and 12 frequencies for a total of 192 combinations.

The installer code factory preset is all jumpers installed non-shorting. Set an installer code unique to your installation by installing one or more jumpers shorting the pins and then go into programming mode.

The frequency factory preset is frequency 3.
Select channel 1 or 2 by installing the jumper off one pin for

Factory preset

Channel #	1	2	1	2	1	2	1	2	1	2	1	2
Flashes	1		2		3		4		5		6	
Frequency	1	2	3	4	5	6	7	8	9	10	11	12

channel 1 or shorting the pins for channel 2. Flash the LED once or up to 6 times to select a frequency.

4.3.1 Program the Indoor Display

- Disconnect power from the indoor alarm display.
- Open the back cover of the display and move the jumpers for the code and the channel. See FIG 1. Replace the cover.
- Hold the Silence button down while connecting power. The LED will turn on bright red indicating that programming mode is entered. Release the button and the LED will go out.
- Within 5 seconds, press the button down until the LED turns on bright red. Perform this 1 to 6 times to select the number of Flashes.
- Wait for 5 seconds, and the LED will flash back what has been programmed.After another 5 second delay it will flash once or twice confirming the channel setting. The display will then go into normal operation.

4.3.2 Program the outdoor transmitter

- Disconnect the power from the outdoor transmitter by removing a battery. Discharge the capacitance by using a short length of wire to short out the red and black wires of the battery holder.
- Move the installer code and channel jumpers to your selected position. See FIG 3.
- Hold down the push-button switch while installing the last battery. The LED will turn on bright red indicating that programming mode is entered. Release the push-button and the LED will go out.
- Within 5 seconds, press the button down until the LED turns on bright red. Perform this 1 to 6 times to select the number of Flashes.
- Wait for 5 seconds, and the LED will flash back what has been programmed.After another 5 second delay it will flash once or twice confirming the channel setting. The transmitter will then go into normal operation.

4.4 Wireless Transmission Timing

The wireless transmissions are timed to optimize battery life. The indoor alarm display will respond within 3 seconds to a change in alarm state after wireless communications have been established. The indoor alarm display receives an update from the outdoor transmitter every 3.5 minutes. It will take 10 minutes for the indoor alarm display to indicate that no wireless signal has been received (yellow steady) after the battery has been removed.

5. MAINTENANCE

5.1 Battery Change

Four AA cell long life alkaline batteries power the outdoor transmitter. See FIG 4. Follow the diagrams on the battery holder for correct battery installation; positive and negative battery ends installed as shown on the battery holder. Replacement batteries must be new, fresh and replaced as a set of four.

6. SPECIFICATIONS

6.1 Indoor Alarm Display

Power Supply	120VAC, 60 Hz input, 12VDC 5W output, UL listed, CSA certified, indoor unit, power consumption typically .05 watts, 0.9 watts maximum during alarm condition
Enclosure	flame retardant ABS
	High level, Low level function selectable
LED	tricolor
Audible alarm	solid state transducer, 80db @ 10cm
Transceiver	ISM 2.4GHz, 12 channels available, -40°C to 85°C rated, IC and FCC 15 approved

6.2 Outdoor Transmitter

Power	four AA batteries, battery life 3 years under normal operation
Enclosure	PVC NEMA 6P
	High level, Low level function selectable
Transceiver	ISM 2.4GHz, 12 channels available, -40°C to 85°C rated, IC and FCC 15 approved
Probe	digital RF proximity, stainless steel, type 304 or 316, 22mm diameter x 100mm long, cable - 2 conductor, 18 Ga, SJOOW jacket, 5m (16 feet) or 10m (32 feet)
Optional relay output	dry contacts normally open, 2A @ 30 VAC or VDC

6.3 IC and FCC 15 Approval

Contains Model XBEE3-PRO Radio, IC:1846A-XBS2C
Contains FCC ID: MCQ-XBEE3-PRO
The enclosed device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

7. WARRANTY

Aquatic Sentry Controls Inc. warrants that this product is free from defects in materials and workmanship under normal use and service for a period of three years from the date of purchase by the initial owner. Aquatic Sentry shall be responsible only for actual loss or damage suffered and then only to the extent of Aquatic Sentry's invoiced price. Within the warranty period we shall repair, refurbish or replace, at our option, such products or components, which are returned to us with shipping charges prepaid, and which are determined by us to be defective. This warranty will not apply to any product or part thereof which has been subject to misuse, negligence, or accident; or misapplied; or modified; or repaired by unauthorized persons; or improperly installed. The provisions of the above warranty are our sole obligation and exclude all other remedies or warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to the customer, or to any person, for injury to person, damage to, or loss of property or value caused by any product, regardless of whether the defect is warrantable or whether the product has been subjected to misuse, negligence, accident; or modified or repaired by unauthorized persons; or improperly installed.

Under no circumstances shall the company be liable for any incidental, consequential or special damages, loss or expenses arising from the use of this product, or in connection with the use of, or inability to use, our product for any other purpose whatsoever.

Aquatic Sentry products or parts thereof assumed to be defective by the purchaser within the stipulated warranty period should be returned to the seller or local distributor for evaluation and service. If deemed necessary, the seller or distributor shall contact Aquatic Sentry Controls Inc. for a Returned Materials Authorization and then return the item for direct factory evaluation, service or replacement. No material may be returned to Aquatic Sentry Controls Inc. without proper factory authorization.

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