



EmNet, LLC  
121 S. Niles Ave., Suite 22,  
South Bend, IN 46617  
574.855.1012  
www.emnet.net

DRAFT Updated Feb 2, 2021

CONFIDENTIAL – For Internal Use (Xylem and authorized partners only)  
Field Service Manual

# BLU-X Radar (Model B)

## Field Service Manual

### 1 Table of Contents

2 Legal Statements .....	2
2.1 FCC.....	2
2.2 Antenna care/ unauthorized modifications .....	3
2.3 Responsible Party .....	3
2.4 Manufacturer .....	3
3 Overview .....	4
3.1 Guideline .....	4
4 Technical Specifications.....	4
4.1 Model .....	4
4.2 Sampling Rate.....	4
4.3 Memory .....	4
4.4 Communication .....	4
4.5 Battery.....	4
4.6 Performance.....	4
5 Training and Qualifications.....	5
5.1 Requirements.....	5
6 Related Documents.....	5
7 Safety .....	5
7.1 Mitigating Risk when Servicing a Unit .....	5
7.2 Battery Requirements .....	5
8 Tools and Consumables .....	5

9	Site Installation.....	6
9.1	Site assessment.....	6
9.2	Support hardware installation.....	6
9.3	Radar mounting to support bar.....	7
9.4	Assembly installation.....	7
10	Configuration .....	7
10.1	Parameter Adjustment .....	7
11	Field Service.....	7
11.1	Inspection and removal of the tamper detection tag: .....	8
11.2	Visual inspection of the external surface of the radar enclosure: .....	9
11.3	Opening of the enclosure and inspection of the interior: .....	9
11.4	Inspection and replacement of the desiccant: .....	10
11.5	Inspection and Replacement of Batteries: .....	10
12	Troubleshooting.....	12
12.1	Identifying an issue .....	12
12.1.1	Hardware Issue .....	12
12.1.2	Configuration Issue .....	12
12.1.3	Connectivity Issue .....	12
12.2	Returning a device for service .....	13

## 2 Legal Statements

### 2.1 FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE: This device complies with part 15 of the FCC rules: Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired

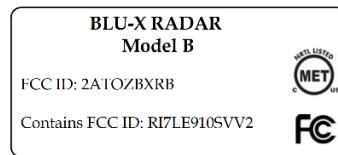
operation of the device. This device meets the FCC Radiofrequency Emission Guidelines and is certified with the FCC as:

FCC ID: 2ATOZBXRB

The FCC ID is located on the outside of the enclosure, closest to where the pulse generator and radiating antennas are located. The location of the label is as follows:



The label is as follows:



NOTE: This equipment may only be operated indoors. Operation outdoors is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

## 2.2 Antenna care/ unauthorized modifications

Use only the supplied integral radar antennas. Unauthorized antenna modifications or attachments could damage the unit and may violate FCC regulations. Only professional service personnel are authorized to open the enclosure.

## 2.3 Responsible Party

(North America)  
Emnet, LLC – a Xylem Brand  
121 S. Niles Avenue  
South Bend, IN 46617  
USA  
[www.emnet.net](http://www.emnet.net)

## 2.4 Manufacturer

(North America)  
CSI Electronics  
1942 S. Elizabeth Street  
Kokomo, IN 46902  
USA

### 3 Overview

#### 3.1 Guideline

This procedure and guide provides select instructions on how to service and install the BLU-X Radar device. For more detailed instructions, please reach out to your Xylem representative.

### 4 Technical Specifications

#### 4.1 Model

Device Name: BLU-X Radar

Model: B

#### 4.2 Sampling Rate

Rate 5 minutes (default), up to 1 hour

#### 4.3 Memory

Size 2048 Kbytes

Data capacity 1,048,576 values

Default recording time 2.5 years

#### 4.4 Communication

Connectivity Cellular LTE

Communication Frequency Real Time, Hourly, Daily, or Weekly

Antenna Integrated, optional external

#### 4.5 Battery

Type Factory installed 14V Primary lithium battery pack

Temperature tolerance -7C to 50C (-19F to 122F)

Refer to Safety section for information regarding battery replacement

#### 4.6 Performance

Range 49 feet (15 meters)

Span 33 feet (10 meters)

Accuracy<sup>1</sup> 0.05% of span

Deadband 1.5 ft (0.46 m)

### Specifications

Enclosure NEMA 4X/6P IP 66/68

Optional Class 1, Div 1

External dimensions 10" x 8" x 4" (250mm x 200mm x 100mm)

Weight 5 lbs 8 oz (2.5 kg)

---

<sup>1</sup> Based upon average measurements using a metal plate reflector of area 230 mm<sup>2</sup>

## 5 Training and Qualifications

### 5.1 Requirements

The skills required to complete this work are:

- Knowledge of electrical wiring and safety
- Minor hardware installation (bolts and nuts)

## 6 Related Documents

Reference Letter	Part Number	Description
Ref.A	Battery_cable_illustrated_drawing.pdf	Diagram for battery cable connector
Ref.B	Chasqui_radar_connection_illustrated_drawing.pdf	Diagram for Telecom Board radar connector

## 7 Safety

There are some potential hazards which could damage equipment or cause risk of injury.

- Static discharge to electronic equipment
- Battery discharge and fire
- Pinching
- Working near a confined space

### 7.1 Mitigating Risk when Servicing a Unit

Please review the following before attempting to service a unit

- Inspect outside of enclosure for damage before attempting service. If the unit appears physically damaged in any way, do not redeploy unit. Disconnect the battery if it is safe to do so and contact your Xylem Representative to arrange for safe disposal.
- Do not service the device while the radar is operating.
- When servicing in the field, remove the radar from the manhole and move to a safe and dry location before opening the enclosure.
- Disconnect the battery from the electronic circuitry whenever the enclosure is opened.
- Please read the remainder of this document and adhere to all requirements listed herein.

### 7.2 Battery Requirements

Caution – The battery used in this device may present a risk of fire or chemical burn if mistreated. Do not disassemble, heat above 100C, or incinerate. Replace battery with Vitzrocell SB-D024S+CON only. Use of another battery may present a risk of fire or explosion. Caution – DO NOT attempt to charge the batteries. The batteries are primary cells and should not be charged. Doing so risks potential fire or explosion.

## 8 Tools and Consumables

No special tools are required to service the radar.

The installer will be required to replace the tamper detection tag (consumable item) when servicing the unit. The tags are supplied with the support bar installation kit and the support

bar service kit. Please refer to the support bar documentation for more information on installation and mounting of the support bar.

## 9 Site Installation

Site installation starts with performing a site assessment, followed by installation of the support hardware and then mounting the radar to the support bar before proceeding to install the assembly into the manhole.

### 9.1 Site assessment

No.	Description	Illustration
	Monitoring site should have clear view of water surface.	

### 9.2 Support hardware installation

Please refer to the support bar documentation (provided separately) for more information on installation of the support brackets.

### 9.3 Radar mounting to support bar

No.	Description	Illustration
	Connect the radar support clamps to the support bar and mount the bar onto the bracket.	

### 9.4 Assembly installation

Please refer to the support bar documentation (provided separately) for more information on installation of the support bar in the manhole and attachment to the support brackets.

## 10 Configuration

### 10.1 Parameter Adjustment

There are a number of parameters that are used to configure the radar for different site conditions. These are changed by editing parameters. At the time of writing, the parameters that the installer will need to update are:

- (1.0 to 30.0) Total manhole height (in meters).
- (0.0 to 20.0) This is the distance (in meters) from the manhole rim to the lid of the enclosure when installed.

## 11 Field Service

Important note: The BLU-X Radar has been designed as a single device. While there are multiple components within the radar, the components are associated with the serial number of the unit and they are not intended to be field serviceable. If a BLU-X Radar device is not performing as expected, please request authorization to return the device for replacement.

Normally maintenance of the unit involves the following few steps:

1. Removal of the radar and support bar assembly from the sewer
2. Inspection and removal of the tamper detection tag
3. Visual inspection of the external surface of the radar enclosure
4. Opening of the enclosure and inspection of the interior
5. Inspection and replacement of desiccant
6. Inspection and replacement of batteries

Step 1 above should be completed according to support bar service documentation. Steps 2-6 are addressed below.

#### **11.1 Inspection and removal of the tamper detection tag:**

No.	Description	Illustration
	Check to make sure the tamper detection tag is intact. If the tag is broken then please record and report the issue and use extreme caution when servicing the unit, as it may have been tampered with; only authorized users are allowed to open the unit.	
	Remove tamper detection tag by snipping it	

**11.2 Visual inspection of the external surface of the radar enclosure:**

No.	Description	Illustration
	Inspect the exterior of the radar enclosure to identify any cracks or significant dents to the base or lid of the enclosure as well as the clasp and hinge. If the unit appears to have been damaged please request a replacement unit.	

**11.3 Opening of the enclosure and inspection of the interior:**

No.	Description	Illustration
	Orient the radar with the lid facing up and lift the integrated clasp to the side until the lid releases. Proceed to gently open the lid from the base of the unit	
	Inspect the interior of the unit for evidence of water damage such as pooling water, evidence of water stains, moisture in the interior, or other signs of enclosure failure.	

**11.4 Inspection and replacement of the desiccant:**

No.	Description	Illustration
	The desiccant is located in the compartment opposite of the battery connectors. Remove the old desiccant packs and inspect the color indicator on the packs to determine if the desiccant was consumed. Please estimate and record how much the desiccant was consumed.	
	Replace with new packs of the same type.	

**11.5 Inspection and Replacement of Batteries:**

Battery removal is described as follows:

No.	Description	Illustration
	Note: Please review the safety section in this document before attempting to replace batteries	
	If you have not already done so, please disconnect the battery from the telemetry board by separating the male and female battery connectors. Use caution when separating the connectors.	

	<p>Rotate the hinged telemetry assembly up to access the battery compartment. Take care to avoid contact with wires and electronics. Make sure to use all necessary safety equipment when accessing batteries.</p>	
	<p>Inspect battery packs and battery cables for signs of damage such as corrosion, bloating, or discoloration. If any pack or cable appears to be damaged, do not attempt to service the unit. Please place the unit in a safe location, away from people and potentially flammable items then contact your Xylem representative. If you cannot reach your representative and/or if you have identified a dangerous safety issue, please contact your local authority.</p>	
	<p>If battery packs and cables appear to be in good condition, remove battery packs and safely discard, following all legal requirements.</p> <p><b>Note: Dispose of used battery promptly. Keep away from children. Do not disassemble and do not dispose of in fire. Do not attempt to charge battery.</b></p>	

Battery installation is described as follows:

No.	Description	Illustration
	<p>If not already done, please follow instructions to remove old batteries. Enclosure should be opened and the hinged telemetry assembly should be up and out of the way to expose the battery compartment</p>	
	<p>Obtain three Vitzrocell SB-D024S+CON battery packs. This battery pack has been authorized for use in this application and no substitutions are allowed. Please refer to the battery requirements within the safety section of this document before proceeding. Please reach out to your Xylem Representative before continuing if you have questions.</p>	

	<p>Inspect the battery packs to make sure that there are no signs of non-uniformity. Place three (3) battery packs upside-down into the battery compartments as shown, being careful to thread the wiring through the cable management channels. The indication that the battery pack is upside-down is that the cables for the pack will exit the pack at the bottom of the enclosure, not the top.</p>	
	<p>Connect the battery packs in parallel using the integrated battery connectors. Pack all but one of the cables into the battery cable management chamber. The remaining cable will be connected to the telemetry board when the unit is powered on.</p>	

## 12 Troubleshooting

### 12.1 Identifying an issue

#### 12.1.1 Hardware Issue

Most issues are easily identified as hardware issues, such as:

- Low voltage Battery packs – as indicated by values on the Blu-X portal
- Moisture in the enclosure - evident without opening the enclosure by looking through the optically transparent lid. If the enclosure is opened, look for pools, droplets on surfaces, and corrosion of metal surfaces and connectors.
- Damage to enclosure – as indicated by cracks in the enclosure, missing pieces of the enclosure
- Damage to internal components – as indicated by loose or broken pieces in the enclosure, etc.
- Cable connectivity issues – as indicated by frayed cables or loose or disconnected cables.

If you identify a hardware issue, please return the device for service.

#### 12.1.2 Configuration Issue

If the BLU-X Radar is reporting an incorrect water level, please double check the configuration settings for the correct manhole height and radar offset values.

#### 12.1.3 Connectivity Issue

When deploying a new BLU-X Radar, if you find that data from the BLU-X Radar are not visible on the BLU-X Portal and there are no signs of physical damage, then it is possible that there is a wireless connectivity issue. The units have been preconfigured for wireless connectivity and communication with the BLU-X platform. Please reach out to your field

service manager with the serial number of the radar in question in order to receive further support.

### **12.2 Returning a device for service**

If there is an issue which cannot be resolved or if the service technician has identified a hardware issue, please disconnect the batteries if it is safe to do so. Please request authorization to return the unit for replacement. You will receive instructions to safely prepare and return the unit.