HH2S-9XW08 Transmitter Manual

U110.1.3

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**FCC Statements**

15.19 – Two Part Warning

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.

15.21 – Unauthorized Modification

NOTICE: The manufacturer is not responsible for any unauthorized modifications to this equipment made by the user. Such modifications could void the user’s authority to operate the equipment.

15.105(b) – Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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**Industry Canada Statement**

This device complies with Canadian RSS-210.


Le présent appareil est conforme à la norme CNR-210 d'Industrie Canada.


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**Industry Canada Statement**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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**IC Unlicensed Devices EIRP Statements for Removable Antennas**

Part 1: Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (E.I.R.P.) is no more than that necessary for successful communication.

Partie 1 : Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotope rayonnée équivalente (P.I.R.E.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Part 2: This radio transmitter (LOBSRF-310) has been approved by Industry Canada to operate with the antenna type listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Partie 2 : Le présent émetteur radio (LOBSRF-310) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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**RoHS Compliance Statement**

Cervis, Inc. complies with the requirements of Restriction of Hazardous Substances (RoHS/WEEE) Specification based on in-house practice and declaration of compliance from our vendors. For additional information concerning RoHS compliance, please contact Cervis, Inc. at:

CERVIS, Inc.
170 Thorn Hill Road • Warrendale, PA 15086
Phone: 724.741.9000 • Fax: 724.741.9001

This product may contain material that may be hazardous to human health and the environment. In compliance with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE):

- Do not dispose of the product as unsorted municipal waste.
- This product should be recycled in accordance with local regulations. Contact local authorities for detailed information.
- This product may be returnable to the distributor for recycling. Contact your distributor for details.
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Cervis, Inc. Safety Precautions

✓ Read and follow all instructions.

✓ Failure to abide by Safety Precautions may cause equipment failure, loss of authority to operate the equipment, and personal injury.

✓ Use and maintain proper wiring. Follow equipment manufacturer instructions. Improper, loose, and frayed wiring can cause system failure, equipment damage, and intermittent operation.

✓ Changes or modifications made to equipment not expressly approved by the manufacturer will void the warranty.

✓ Equipment owner/operators must abide by all applicable Federal, State, and Local laws concerning equipment installation and operation. Failure to comply could result in penalties and could void user authority to operate the equipment.

✓ Make sure that the machinery and surrounding area is clear before operating. Do not activate the remote control system until certain that it is safe to do so.

✓ Turn off the transmitter and disconnect power from the receiver before attempting any maintenance. This will prevent accidental operation of the controlled machinery.

✓ Use a damp cloth to keep units clean. Remove mud, concrete, dirt, etc. after use to prevent obstructing or clogging the buttons, levers, wiring, and switches.

✓ Do not allow liquid to enter the transmitter or receiver enclosures. Do not use high pressure equipment to clean the transmitter or receiver.

✓ Disconnect the receiver before welding on the machine. Failure to disconnect the receiver may cause destruction of or damage to the receiver.

✓ Operate and store units only within the specified operation and storage temperatures defined in this document’s specifications.

✓ Keep high-energy radio frequency (RF) devices away from transmitters. For instance, activating high-power communication radios close to transmitters can cause interference and “false” circuit activation.

✓ Do not key two-way radios while using the transmitter.
1.0 Warrior HH2S-9XW08 Transmitter

The Warrior HH2S-9XW08 transmitter is a compact transmitter that interfaces with Warrior 22 MU-X9 and other Warrior receivers. The HH2S-9XW08 has eight 2-step actuators. Its enclosure is made of rugged polycarbonate, designed to meet an ingress protection rating of “IP55” according to International Electrotechnical Commission (IEC) standard 60529. The unit has four diagnostic LEDs that indicate Radio Frequency (RF) transmit/receive, Battery status, A selection, and B selection. Direct Sequence Spread Spectrum (DSSS) wireless technology (at 900MHz) allows HH2S-9XW08 transmitters to create a robust link with Warrior receivers in congested radio environments. These transmitters feature seamless association to receivers without having to open a machine-mounted MU-X9 receiver.

Handheld remote applications include overhead crane control, such as two-motion/two-speed, where it can include A/B transfer. The transmitter deactivates immediately following a high g-force event. Auto-Shutdown is also available through an inactivity timer. Both features are configurable.

![Indicator LEDs (Red when active)](image)

**Note:** Refer to the manual for the receiver being used or specific project documentation for details on relay operation.

Figure 2 is the label that is permanently attached to the battery compartment cover. This label describes warnings and precautions that must be followed when using the transmitter.
1.1 HH2S-9XW08 LEDs

The HH2S-9XW08 has four red light-emitting diodes (LEDs) that indicate transmitter status and are also used for troubleshooting. Table 1 describes each LED.

Table 1. HHS2-9XW08 Advanced LED Diagnostics

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Indication</th>
<th>Diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="RF" /></td>
<td><img src="image" alt="Solid LED" /></td>
<td>Solid: Transmitting, looking for receiver.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Flashing LED" /></td>
<td>Flashing: Transmitting to and receiving from the mounted receiver.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Alternating LED" /></td>
<td>Alternating: Stop Check: Cycle Stop Switch, Blinks back-and-forth.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Stuck Switch LED" /></td>
<td>Alternating: Stuck Switch: Check switches/proportional not neutral.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Scrolling LED" /></td>
<td>Scrolling: Signifies Maintenance Mode</td>
</tr>
</tbody>
</table>

Figure 2. Warrior HH2S-9XW08 Transmitter Warnings and Precautions
1.2 HH2S-9XW08 Battery Installation

Two “AAA” cell batteries power HH2S-9XW08 transmitters. When installing batteries, be sure to observe proper polarity—as marked on the inside of the compartment—to avoid damaging the unit. To replace or install batteries in the transmitter:

1. Loosen the four small Phillips screws from the Battery Compartment cover, and lift the cover from the transmitter. The screws remain attached to the cover.
2. If installing batteries in an empty battery compartment, install two fresh size “AAA” cell batteries. Be sure to position the batteries as shown in Figure 3.
3. If replacing expired batteries, remove the old batteries, and install two fresh size “AAA” cell batteries. (Discard the used batteries according to local regulations.) Be sure to position the batteries as shown in Figure 3.
4. Replace the compartment cover and tighten the four Phillips screws. Do not overtighten these screws, but make sure they are tight enough to properly seal the gasket.

**Note:** Discard expired batteries according to local regulations.
Caution!
Be sure to observe proper polarity when placing batteries in the transmitter battery compartment.
1.3 HH2S-9XW08 Battery Warning and Shutdown

The HH2S-9XW08 will alert you if the remaining battery life is getting low or is too low for normal operation.

LOW BATTERY
The BATTERY LED flashes at the same rate as the RF LED, indicating a LOW BATTERY (2.2V or less) situation is present. Replace with two fresh “AAA” cell batteries as soon as possible. The LED continues to flash either until the batteries are changed or until the voltage level drops to 2.0V, where Auto-Shutdown occurs.

✓ Note: The receiver LED will quickly flash three times, once per minute when transmitter low battery is indicated.

AUTO-SHUTDOWN
At 2.0V, the BATTERY LED lights solid for approximately 1.25 seconds before the transmitter automatically shuts down.
Two fresh “AAA” cell batteries must be installed before the transmitter can be used again.

1.4 System Startup

For the following directions, assume that power is applied to the Warrior 22 MU-X9 receiver.

1. Press and release the transmitter STOP button.
2. Wait while the LEDs cycle, and then the RF LED begins to flash.
3. Press and release the Horn/Start button. This energizes the Main Line Contact (MLC) relays in the receiver.

The transmitter is ready for normal functional operation.
2.0 Associate a Transmitter with a Receiver

Warrior HH2S-9XW08 transmitters are associated with their respective system receiver(s) at the factory before the system is shipped. A receiver will only communicate with the transmitter(s) it is associated with. Other Warrior HH2S-9XW08 transmitters can be associated to the receiver when necessary, either as additional spares or to replace damaged transmitters. Specific Warrior receiver details can be found in that receiver’s manual.

2.1 Associate an HH2S-9XW08 to a Warrior 22 MU-X9 Receiver

This process is required when the HH2S-9XW08 transmitter memory slot is either empty or the user wishes to associate to a different receiver.

**Note:** During this process, a receiver that is in use with another transmitter cannot be associated.

1. Activate MU-X9 receiver power. (If power is already on, shut it off. Then, turn it back on again.) This opens a two-minute window of opportunity in which the transmitter can associate.

2. Turn on the transmitter by pressing and releasing the STOP button.

3. Within one second, while the B Select LED is active, simultaneously press and release buttons A/B-AUX 1 and AUX 2.

4. Simultaneously press and hold the HOIST UP and HOIST DOWN buttons for approximately five seconds.

5. Release the buttons when LED A starts to blink.

6. The RF and B Selection LEDs will become active, indicating the transmitter is attempting to locate all available Warrior receivers.

7. Once the transmitter has completed its search—and one or more receivers have been found—the RF and A Selection LEDs become active.

If there are no receivers available, the transmitter will stay in scan mode until the transmitter either times out or is turned off.

8. The Associate LED indicator on the detected receiver will start blinking, and the Horn/Light relay sounds the horn. To select this receiver, press button AUX 2 (Button 8). The RF LED will start blinking rapidly, indicating communication is established. The receiver’s identity (ID) is now stored in the transmitter memory slot.

9. If the found receiver unit is NOT the receiver desired, press the A/B-AUX 1 button to scroll through all detected receivers until the desired receiver is found (blinking its Associate LED indicator and sounding the horn). Press button AUX 2 to select the receiver. The RF LED will start blinking rapidly, indicating that communication is established. The selected receiver is stored in the transmitter memory slot.

Figure 6. Associate Step 2 and Step 3

Transmitter LEDs will begin cycling, indicating the transmitter is in maintenance mode.

6
3.0 HH2S-9XW08 Transmitter Factory Reset (Memory Clear)

Follow these steps to perform a factory reset on the transmitter. Once this process is complete, the transmitter memory slot is cleared, and it will not communicate with any receivers until a target receiver is associated.

✔ Note: Spare transmitters shipped from the factory will have cleared memory upon arrival.

1. Turn on the transmitter by pressing and releasing the STOP button.
2. Within one second of activating the transmitter—while only the B LED is active—simultaneously press and release the A/B-AUX 1 and AUX 2 buttons. The LEDs will start scrolling, indicating maintenance mode.
3. Simultaneously press and hold the A/B-AUX 1 and AUX 2 buttons.
4. Press and release the STOP button.
5. The transmitter will turn off, indicating the factory reset was successful.

A transmitter that has been cleared will power up and immediately shut down, indicating that it has no receiver in its memory.

Figure 7. HH2S-9XW08 Button Layout
## 4.0 HH2S-9XW08 Transmitter Specifications

### Table 2. HH2S-9XW08 Transmitter Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td></td>
</tr>
<tr>
<td>$V_{in}$ Source</td>
<td>+2.0V to +3.0V</td>
</tr>
<tr>
<td><strong>Low Battery Warning</strong></td>
<td>Two “AAA” cell batteries</td>
</tr>
<tr>
<td><strong>Low Battery Shutdown</strong></td>
<td>2.2V – batteries should be immediately replaced</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Operating Temp</strong></td>
<td>-4°F to 131°F (-20°C to 55°C)</td>
</tr>
<tr>
<td><strong>Storage Temp</strong></td>
<td>-4°F to 185°F (-20°C to 85°C)</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>0–95% non-condensing</td>
</tr>
<tr>
<td><strong>Radio</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>904–926 MHz @ 100mW</td>
</tr>
<tr>
<td><strong>License</strong></td>
<td>No license required</td>
</tr>
<tr>
<td><strong>Modulation</strong></td>
<td>DSSS</td>
</tr>
<tr>
<td><strong>Antenna</strong></td>
<td>Internal</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>136.38mm x 68.96mm x 28.42mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>5.37” x 2.68” x 0.92”</td>
</tr>
<tr>
<td><strong>Durability</strong></td>
<td>7.2 oz. / 200g (With lanyard or belt clip)</td>
</tr>
<tr>
<td></td>
<td>High Impact Polymer case</td>
</tr>
<tr>
<td></td>
<td>Polycarbonate faceplate</td>
</tr>
<tr>
<td></td>
<td>Impact absorbing bumper</td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td>(See Table 1)</td>
</tr>
<tr>
<td><strong>Radio Frequency</strong></td>
<td>Indicates wireless communications (transmit/receive)</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>Indicates battery status</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Indicates Crane A selected when lit</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Indicates Crane B selected when lit</td>
</tr>
<tr>
<td><strong>Buttons</strong></td>
<td>Eight</td>
</tr>
<tr>
<td></td>
<td>Two-step pushbuttons</td>
</tr>
</tbody>
</table>
Appendix A: Exposure to Radio Frequency Energy

Warrior transmitters and machine units contain radio transceivers. When active, a transmitter sends out radio frequency (RF) energy through its internal antenna. The Warrior transmitter complies with limits set by the United States Federal Communications Commission (FCC) for operating distance from human tissue.

Appendix B: RF Exposure Considerations

The radio module may be used in a variety of host applications falling into two general categories:

1. **Mobile** applications: Any operating locations where the transmitting equipment is not on a human body. In mobile applications, the host application is typically fixed to mobile equipment, with either an internal or external antenna.

2. **Portable** applications: Any operating locations where the transmitting equipment is located on the hand, arm, or other part of the human body. In portable applications, the equipment is either held in the hands of an operator or affixed to either a belt or harness on the torso.

Equipment containing the radio module was evaluated for RF exposure hazards by two approaches:

1. Maximum Permissible Exposure (MPE) for mobile applications.
2. Specific Absorption Rate (SAR) for portable applications.

Required separation distances are measured from the actual location of the radiating part of the antenna. An antenna may be inside the host application, affixed to the host application enclosure, or at the end of an optional extension coaxial cable.

**Mobile Applications**

Equipment must be located at least 20cm away from areas likely to be occupied by an unaware person.

**Transmitter Applications**

All operators of transmitter equipment with any type of antenna require proper equipment operation training, and such training must include RF exposure safety instructions. They are then considered to be “aware” persons once training is completed.

If the portable operating position is on the hand or arm, a 5mm separation is required between the radiating part of the antenna and nearby human tissue.

**Required Training**

All installers and operators of host applications that include an SRF310 FT module must be trained to use proper RF safety precautions as presented in this Appendix.