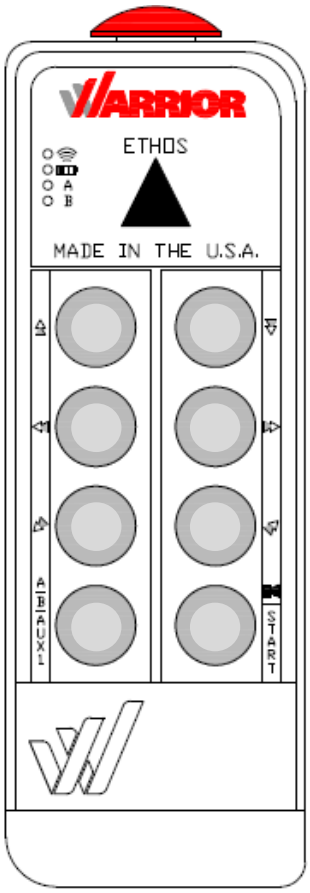
CERVIS

HHMS-9XW08 ETHOS (No Display)

Transmitter Manual

U129.1.0



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.**

Industry Canada Statement

This device complies with Canadian RSS-210.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html.

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

Le programme d'installation de cet équipement radio doit s'assurer que l'antenne est située ou fait telle qu'elle n'émet pas de champ RF dépassant les limites de Santé Canada pour la population générale ; consulter le Code de sécurité 6, disponible auprès de Santé Canada site Web https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html.

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 radio 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.

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 not 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 isotrope 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.

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*

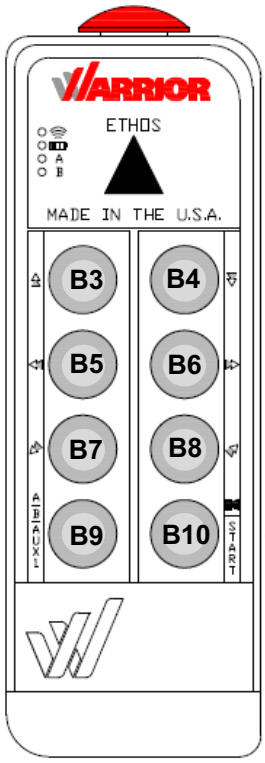
- ✓ ***Read and follow all instructions.***
- ✓ ***Failure to abide by Safety Precautions may cause equipment failure, loss of authority to operate the equipment, and personal injury.***
- ✓ ***Use and maintain proper wiring. Follow equipment manufacturer instructions. Improper, loose, and frayed wiring 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 HHMS-9XW08 Transmitter Introduction

The Warrior ETHOS model transmitter is an industrial transmitter that is designed to provide 3 motion 2 speed crane control with A/B select feature standard. It is specifically offered to work with the Warrior MU-X15, MU-6E, or MU-X9 receiver. The ETHOS model has eight dual redundant two step buttons for motion control.

The transmitter's vented enclosure is made of an impact resistant plastic, designed to meet an ingress protection rating of "IP65" according to International Electromechanical Commission (IEC) standard 60529. The unit has four diagnostic LEDs that indicate radio frequency (RF) transmit/receive, Battery status and A selection, and B selection.

Frequency Channel Hopping Direct Sequence Spread Spectrum (CH DSSS) wireless technology (at 900MHz @ 100mW) allows HHMS-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 receiver.



(HORN/START)

Stop Switch

Figure 1. Warrior HHMS-9XW08 LED and Button Descriptions

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

✓ ***IMPORTANT NOTE: This manual only references information for most standard systems. Refer to project drawings for system-specific information and configurations.***

Figure 2 is the label that is permanently attached to the unit's back side. This label describes warnings and precautions that must be followed when using the transmitter.

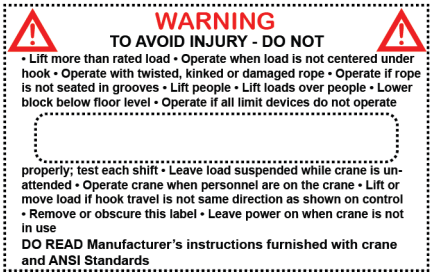


Figure 2. Warrior HHMS-9XW08 Transmitter Warnings and Precautions

2.0 HHMS-9XW08 Battery Installation

A rechargeable Lithium Polymer (LiPO) battery pack powers HHMS-9XW08 transmitters. When installed and fully charged, the battery supplies power to the transmitter for 80 continuous operating hours. When installing the battery, be sure that the metallic battery contacts properly align with those inside the unit.

To install the battery pack in the transmitter body:

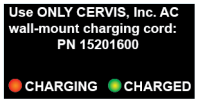
1. Pinch the clamps on each side of the battery in.
2. Slide the battery pack into the transmitter body until you hear a click.

✓ ***Note**: Make sure the battery contacts are positioned relative to the front right side of the transmitter.*

To charge the battery pack:

1. Pinch the clamps on each side of the battery in.
2. Slide the battery pack into the battery charger, as illustrated in Figure 3. (Make sure the battery contacts are oriented correctly with those inside the charger.)
3. Plug the charger into a nearby wall socket.

The LED on the plug indicates charging status.
(Solid Red = charging. Solid Green = charged.
Maximum charging time = Five hours from zero charge.)



4. When the battery has finished charging, unplug the charger from the wall socket, remove the battery from the charger base, and insert it into the transmitter.

Figure 3. HHMS-9XW08 Battery Installation

2.1 HHMS-9XW08 Battery Warning and Shutdown

The HHMS-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 once per second, indicating a LOW BATTERY (6.6V or less) situation is present. Recharge the battery pack within five hours of the first low battery warning. The LED continues to flash either until the battery pack is charged or until the voltage level drops to 6.1V, when Auto-Shutdown occurs.

✓ ***Note:*** *When the transmitter battery is low, the Horn/Light relay on the receiver will cycle on and off 4 times every minute.*

AUTO-SHUTDOWN

At 6.1V, the BATTERY LED lights solid for approximately 1.25 seconds before the transmitter automatically shuts down.

Recharge the battery pack before using the transmitter again.

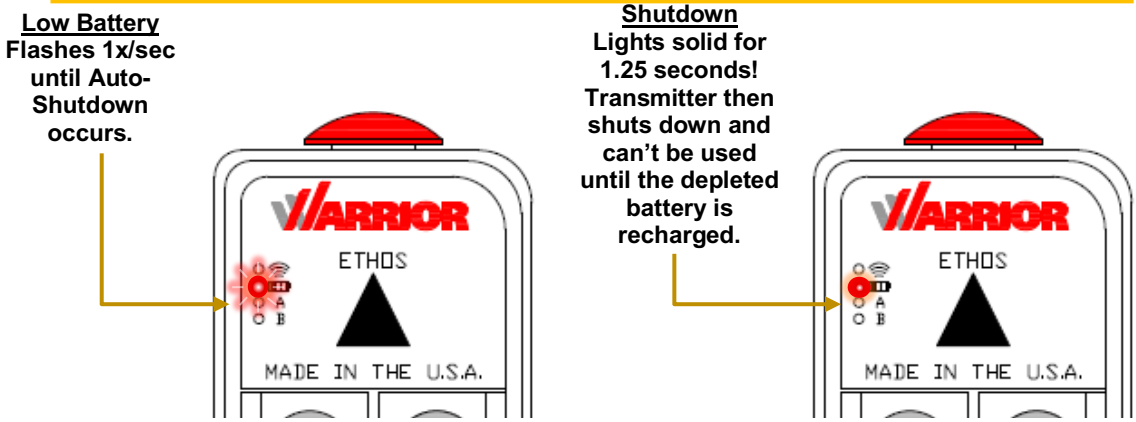
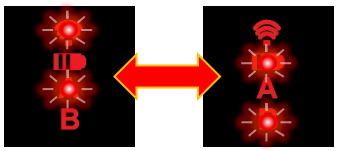


Figure 4. HHMS-9XW08 Remote Low Battery Warning and Auto-Shutdown

✓ ***Note****: The LED sequence indicated below will flash when a battery is inserted, and the STOP switch is already pulled up (cycle the STOP switch to reset):*



✓ ***Note****: All of the LEDs will flash briefly one time when a battery is inserted, and the STOP switch is already pushed down.*

3.0 System Startup

1. Pull the **STOP** switch up.

NOTE that LED B will light solid for 1.5 seconds indicating the time period allowed to enter Maintenance Mode.

2. Observe rapid blinking of the RF signal LED and then Press the **HORN/START** button, B10, to energize the receiver MLC relays. Normal crane operation may begin.

✓ ***Note:*** *If the RF signal LED is on solid when the STOP switch is pulled up, the handheld may not be associated to a receiver or the receiver it is associated to may not have power.*

3.1 System Shutdown

Push the **STOP** switch down.

The transmitter will shut down. The receiver will retain power but all receiver relay outputs will return to their inactive state.

4.0 HHMS-9XW08 LEDs

The HHMS-9XW08 has four red light-emitting diodes (LEDs) that indicate transmitter status and are also used for troubleshooting.

Table 1. HHMS-9XW08 LEDs

LED	Indication	Meaning
Radio Frequency (RF)	**Lit Solid** **Flashing**	Transmitter searching for receiver or a button is being pressed Transmitting and receiving messages
Battery	**Off** **Flashing** **1.25s Solid**	Battery strength normal Low Battery (≤6.6V) Start of Auto Shutdown (≤6.1V)
Selection	**Off (unlit)** **On (lit solid)**	A not selected Trolley/Hoist A selected or Receiver A selected (tandem systems)
Selection	**Off (unlit)** **On (lit solid)**	B not selected Trolley/Hoist B selected or Receiver B selected (tandem systems)

LEFT ROW

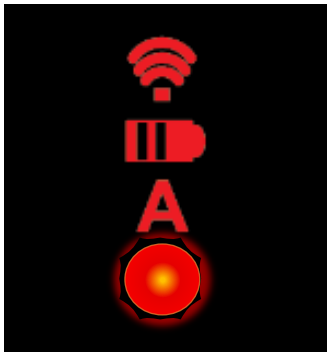
5.0 Maintenance Mode

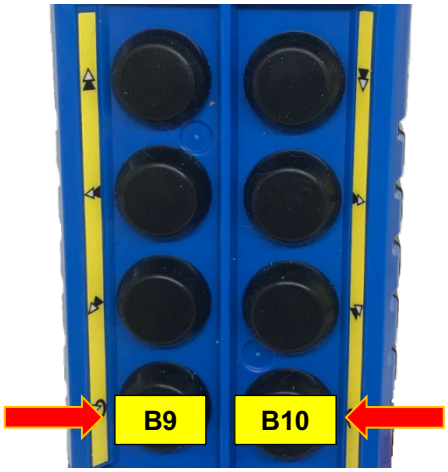
Entering Maintenance Mode provides access to additional system features such as:

- Association (Section 5.1)
- Clear Receiver IDs (Section 5.2)

To enter Maintenance Mode:

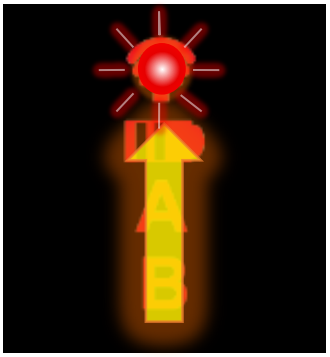
1. Follow start-up procedure steps (see Section 3.0).
2. When LED B lights solid, immediately press and release buttons B9 and B10:





✓ ***Note**: If the B LED goes out before you press the buttons, restart the process from Step 1.*

3. The LEDs begin to scroll, indicating that the transmitter is in *Maintenance Mode*.



5.1 Associate a Transmitter with a Receiver

Warrior HHMS-9XW08 transmitters are associated with their respective system receivers at the factory before the system is shipped. A receiver will only communicate with the transmitters it is associated with. Other Warrior HHMS-9XW08 transmitters can be associated with the receiver when necessary, either as additional spares or to replace damaged transmitters. Find specific Warrior receiver details in the following receiver manuals:

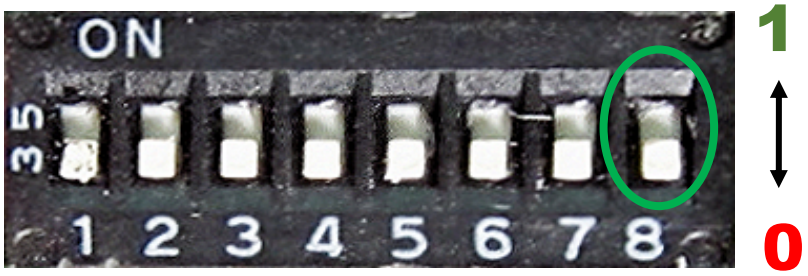
U104.x.x Warrior MU-X15 Receiver Manual

U107.x.x Warrior MU-6E Receiver Manual

U108.x.x Warrior MU-X9 Receiver Manual

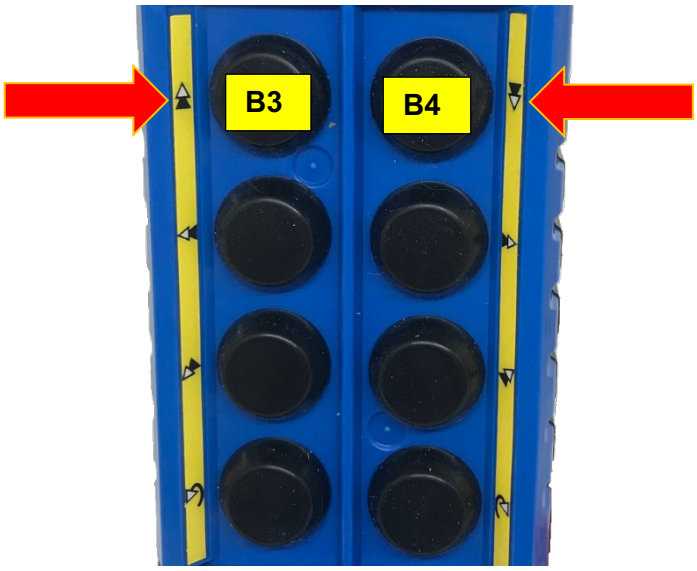
The system and any spare transmitters sold with the system will be associated with the radio receiver for first-come/first-serve operation before being shipped from Cervis, Inc. However, for any newly added or repaired transmitters, follow these steps to associate a transmitter with the receiver (if it is not communicating with the receiver):

✓ ***Note**: Before attempting association, make sure that receiver DIP Switch #8 in the target receiver is set to the ON (1) position.*

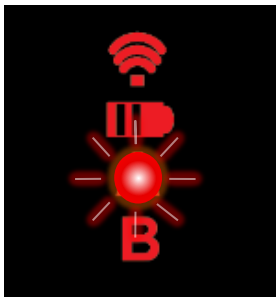


To Associate the HHMS-9XW08 to a Warrior Receiver:

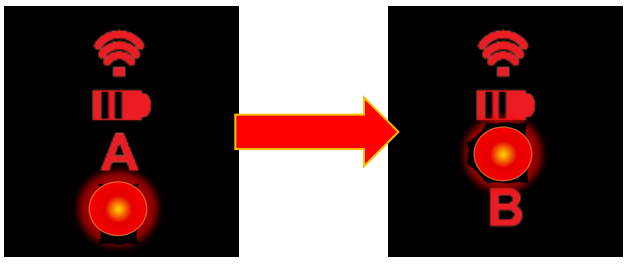
1. Turn the transmitter on. (See Section 3.0)
2. Enter *Maintenance Mode* as described in Section 5.0 above.
3. To enter *Association Mode*, press and hold buttons **B3** and **B4** for **five seconds**.



4. When LED A begins blinking; release buttons **B3** and **B4**.



The transmitter is now in *Association Mode*. It now begins scanning for nearby radio receivers to associate with. LED B will be on solid (1-2 seconds) while the transmitter searches for all available Warrior receivers. When the transmitter has built a table of available receivers, LED B will go out and LED A will turn on solid when the operator can scroll through and select the target receiver.



The strobe light of the first receiver that the transmitter has found will begin to flash. (MU-6E model receivers will flash a green LED)

5. **To select and confirm this receiver**, press button B10.
   OR
   To select a different receiver, press button B9 to move to the next receiver,
   OR
   To continue to search for the target receiver, repeatedly press button B9 to access all receivers found by the transmitter.
6. Press button B10 to select and confirm the target receiver. The RF signal LED will begin flashing rapidly to confirm RF link with target receiver.
7. Press button B10 again to energize the crane by pulling in the receiver's MLC and beginning normal operation.

For TANDEM systems, the association process is the same as noted above. Following association of the transmitter to the first receiver (RX A), tandem software will automatically search for the second receiver (RX B).

Association to RX B will occur in the same manner as RX A. (Refer to Steps 5-7 above)

Press button B10 to select and confirm the target RX B receiver. The RF signal LED will begin flashing rapidly to confirm RF link with target receiver.

Press button B10 again to energize the crane by pulling in the receiver's MLC and begin normal operation.

✓ ***Note:*** *Both receivers must be associated in a Tandem system for the system to operate.*

✓ ***Note:*** *For additional diagnostic information, observe the receiver LEDs as noted:*

LED A: flashing strobe once per second during communication
LED B: slow flash indicating normal Health
LED C: fast flashing TX indicator
LED D: fast flashing RX indicator

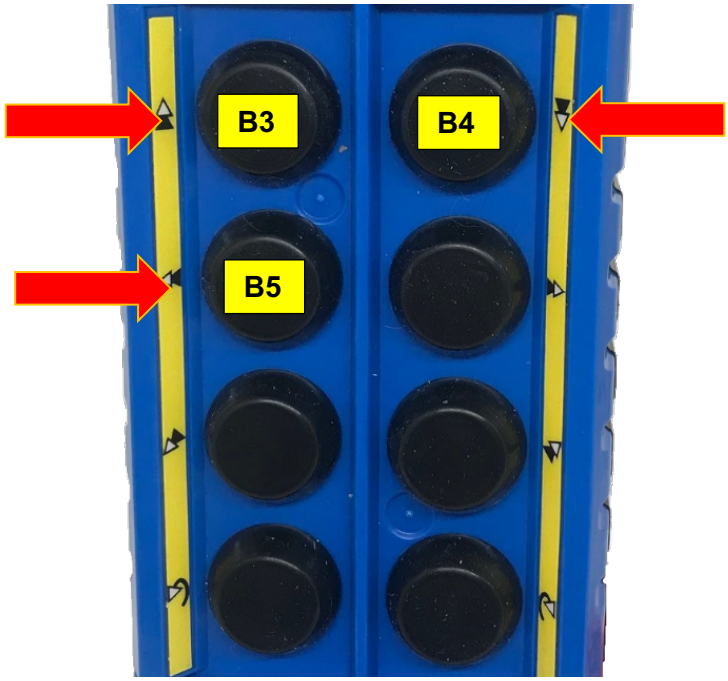
✓ ***Note:*** *If unsure of any activity, the STOP switch may be pressed at any time to exit a process or operation.*

5.2 Clearing HHMS-9XW08 Stored Receiver ID (Factory Reset)

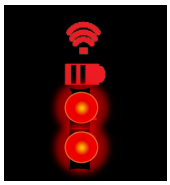
The HHMS-9XW08 transmitter stores its associated receiver ID in its internal memory. During instances of severe interference—or perhaps when troubleshooting—it may become necessary to break the established communications link between the transmitter and the system receiver. This is called “clearing the stored ID” or “Factory Reset.”

To Clear the Stored Receiver ID (Factory Reset):

1. Turn the transmitter on. (See Section 3.0).
2. Enter *Maintenance Mode* as described in Section 5.0 above.
3. To reset the transmitter, simultaneously press buttons **B3 and B4** and then also press button **B5**.



Continue to hold all 3 buttons while the transmitter resets the receiver ID. LEDs **A** and **B** illuminate steadily when the reset is complete:



4. Release the **buttons** and then press button B5 or the STOP button to turn off the transmitter.

Notes:

- *When a transmitter is not associated with a receiver, the transmitter will illuminate all the LEDs and then power down shortly after it is turned on.*
- *The receiver does not need to be on when clearing a receiver ID from the transmitter.*

6.0 HHMS-9XW08 Tandem Operation

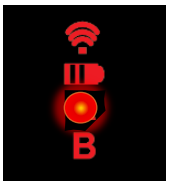
Notes:

- *A TANDEM HHMS-9XW08 Ethos Transmitter can be recognized by the green triangle on the front label.*
- *Tandem operation is an optional feature and is only included with systems that are ordered this way.*

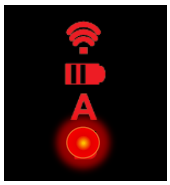
Tandem operation allows the associated transmitter(s) to control RX A, RX B, or BOTH.

1. Following Association, turn on the transmitter. Observe that LED A is blinking, indicating Receiver Select Mode. NOTE that all receiver outputs are disabled at this time.
2. To select RX A only, push button B10 to confirm selection.
3. To select RX B only, push button B9. Observe that LED B is blinking. Push button B10 to confirm selection.
4. To select RX A and RX B, press button B9 so that LED A and LED B are blinking. Push button B10 to confirm selection.

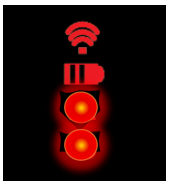
RX A is selected



RX B is selected



Both selected



Following receiver selection confirmation, the target receiver(s) MLC relay(s) will be energized. NOTE that all receiver outputs are enabled at this time.

Be sure to observe crane/machine to ensure that the target receiver(s) have been selected.

✓*Note: The system is First come, First serve. If a second transmitter is turned on, and the first transmitter is turned off, the system will return to Receiver Select Mode, and the receiver(s) must be selected again as indicated in Steps 1-4 above.*

6.1 HHMS-9XW08 Tandem Operation Receiver Select Mode

To change the target receiver(s) during tandem operation, press button B9 and return to the process as indicated in Steps 1-4 above.

✓***Notes:***

- *Receiver outputs are disabled during Receiver Select Mode.*
- *For tandem systems, pressing button B9 at any point will initiate Receiver Select Mode. Button B9 is also used to select RX A, RX B or both.*
- *Observe blinking LEDs (A and B) to determine Receiver selection.*
- *Pressing button B10 will confirm receiver(s) selection.*
- *Observe solid LEDs (A and B) to confirm Receiver selection.*

7.0 HHMS-9XW08 Accessories

	PART #
Battery	15201306
Battery charger	15201501
Battery charger power supply	15201600
Battery charger kit (includes battery, charger and power supply)	15201500
HHMS Top Label (standard)	15205421
HHMS Top Label (tandem)	15205423
HHMS Rail Labels (standard)	15205422
Carrying Strap	2101004
Boot	15205135
Strap Kit (Includes carrying strap and boot)	15205398

8.0 HHMS-9XW08 Transmitter Specifications

Table 2. HHMS-9XW08 Transmitter Specifications

Item	Description	
Power	**V_{in}**	+6V to +8.4V
	Source	Rechargeable Lithium Ion Battery Pack
	Low Battery Warning	6.6V – batteries should be immediately replaced
	Low Battery Shutdown	6.1V – batteries must be replaced to operate
Environment	**Operating Temp**	-4°F to 140°F (-20°C to 60°C)
	Storage Temp	-22°F to 158°F (-20°C to 70°C)
	Humidity	0–95% non-condensing
Radio	**Frequency**	904–926 MHz @ 100mW
	License	No license required
	Modulation	DSSS
	Antenna	Internal
Enclosure	**Dimensions**	76.2mm x 220.98mm x 42.67mm 3.0" x 8.7" x 1.68"
	Weight	1.43 lb. / 650g
	Durability	High Impact Polymer case Polycarbonate faceplate
Indicators	**Radio Frequency**	Indicates wireless communications (transmit/receive)
	Battery	Indicates battery status
	A	Indicates Crane A selected when lit (or Receiver A for tandem systems)
	B	Indicates Crane B selected when lit (or Receiver B for tandem systems)
Buttons	**Eight**	Two-Step actuators

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. Warrior transmitters and receivers comply 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.

Appendix C: Agency Identification Label Locations

Figure 5. Agency Identification Label Locations