MCB-9XL Transmitters

U106.3.0
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 RSS-210 of Industry Canada.
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-radiation-exposure-guidelines-environmental-workplace-health-health-canada.html

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

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.

Industry Canada 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 (EIRP) 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 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 : Cet 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.
User Manual

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Cervis, Inc. Safety Precautions

✓ Read and follow all instructions.

✓ Failure to abide by Safety Precautions may result in 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 transmitter control system until certain that it is safe to do so.

✓ Turn off the mini console box transmitter and remove power from the machine unit 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 mini console box or machine unit enclosures. Do not use high-pressure equipment to clean the mini console box transmitter or machine unit. Liquid will damage the interior circuitry.

✓ Disconnect the radio machine unit before welding on the machine. Failure to disconnect the machine unit may result in destruction of or damage to the machine unit.

✓ 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 mini console box transmitters. Activating high-power communication radios, for instance, in close proximity to mini console box transmitters can cause interference and “false” circuit activation.

✓ Do not key two-way radios while using the mini console box transmitter.
1.0 Warrior MCB-9XL Transmitter (MCB-9XL)

The Warrior MCB-9XL transmitter is a compact remote control unit that interfaces with Warrior machine unit (MU) receivers. The MCB-9XL is available as either a three-joystick- or four-joystick transmitter, both powered by four type “AA” cell batteries. Each version includes two toggle switches, a push-pull Single-Pole/Single-Throw (SPST) Professional STOP switch, and a green multi-purpose pushbutton. Both MCB-9XL designs have four red diagnostic/status Light-Emitting Diodes (LEDs) that indicate wireless link (or radio frequency, “RF”) activity, Battery (“Bat.”) condition, trolley/hoist “A” selection, and trolley/hoist “B” selection. The rugged MCB-9XL enclosure is made of glass-filled nylon designed to meet an IP55 ingress protection rating, as defined by IEC 60529.

Using line-of-sight Direct Sequence Spread Spectrum (DSSS) technology, the mini console box’s (MCB’s) transmission power permits a generous control distance in crowded radio environments. The rugged enclosure and water-resistant switches and joysticks ensure reliable operation in harsh weather environments – operating in temperatures as low as -4°F (-20°C) to a maximum of 158°F (70°C). Warrior MCBs transmit RF signals via an internal antenna, while status is conveyed to the user via the four LEDs.

MCB-9XL transmitter functions can be configured by manipulating the MU receiver DIP Switch (S01) mode settings.

Figure 1. Warrior MCB-9XL Three- and Four-Joystick Transmitters

Warrior MU-9X15 Features

- Three or Four 2-Step, Single-Axis Joysticks
- Two Toggle Switches and an Activate Pushbutton
- 900MHz @ 100mW Operation
- Push/Pull Professional Stop Switch
- Four System Status/Diagnostics LEDs
Warrior MCB-9XL Transmitters

- Operates Using Four “AA” Cell Batteries
- Mounting by Custom Shoulder Harness
2.0 Warrior MCB-9XL Layout

2.1 Standard Joysticks, Toggle Switches, and Pushbuttons

Table 1 lists the standard MCB-9XL switches.

**Table 1. MCB-9XL Standard Switches**

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
<th>Type</th>
<th>Switch Type/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JS1 through JS4</td>
<td>Trolley/Hoist Motion Control</td>
<td>Analog Joystick</td>
<td>Single-axis, Two-step</td>
</tr>
<tr>
<td>S01</td>
<td>A/B Select</td>
<td>Toggle</td>
<td>Three-Position Maintained</td>
</tr>
<tr>
<td>S07</td>
<td>Aux/Select/Next</td>
<td>Toggle</td>
<td>Three-Position Momentary</td>
</tr>
<tr>
<td>S09</td>
<td>Horn/Start/ON</td>
<td>Pushbutton</td>
<td>Green, SPST</td>
</tr>
<tr>
<td>STOP</td>
<td>STOP</td>
<td>2-Position Maintained</td>
<td>Pull up to ENABLE; Push down to STOP</td>
</tr>
</tbody>
</table>

2.2 LEDs

Table 2 lists the MCB-9XL LEDs. Table 3 lists advanced LED diagnostic functions.

**Table 2. MCB-9XL LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Icon</th>
<th>Function</th>
<th>Action</th>
</tr>
</thead>
</table>
| L1  | 📺  | Transmit indication (radio frequency or “RF”) | Flashes when message is sent  
     |      |                                   | Solid with switch motion            |
| L2  | 📺  | Low Battery indication (“Bat.”)    | Slow Blinks when <2.2V               |
| L3  | 📺  | A Selection                        | Lights when A trolley/hoist is selected |
| L4  | 📺  | B Selection                        | Lights when B trolley/hoist is selected |

**Table 3. MCB-9XL Advanced LED Diagnostics**

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Indication</th>
<th>Diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>RF Solid</td>
<td>Transmitting, looking for receiver.</td>
</tr>
<tr>
<td>RF</td>
<td>RF Blinking</td>
<td>Transmitting to and receiving from the mounted receiver.</td>
</tr>
<tr>
<td>Bat</td>
<td>RF/A ↔ Bat/B</td>
<td>M-Stop Check: Cycle M-Stop, Blinks back-and-forth.</td>
</tr>
<tr>
<td>LEDs</td>
<td>Indication</td>
<td>Diagnostic</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RF/Bat ↔ A/B</td>
<td>Stuck switch: Check switches/proportional not neutral.</td>
<td></td>
</tr>
<tr>
<td>RF→Bat→A→B→RF→Bat</td>
<td>Scrolling: Tilt Mode active.</td>
<td></td>
</tr>
<tr>
<td>B→A→Bat→RF→B</td>
<td>Scrolling: Signifies Maintenance Mode</td>
<td></td>
</tr>
<tr>
<td>Bat</td>
<td>Blinking: Batteries low, replace with fresh batteries soon.</td>
<td></td>
</tr>
<tr>
<td>RF/BAT/A/B</td>
<td>Shutting Off: Unit is shutting down: Inactivity timeout M-Stop engaged Keyswitch moved to OFF Unit wake-up without switch S12</td>
<td></td>
</tr>
<tr>
<td>Bat</td>
<td>Shutting Off: Batteries below operating level; unit shutting down; replace batteries with fresh set.</td>
<td></td>
</tr>
</tbody>
</table>

2.3 Neck/Shoulder Harness

The 1¾” wide neck/shoulder harness lets you conveniently and comfortably strap the MCB-9XL around your neck or shoulder for easy access and operation. Adjustable to lengths up to 60 inches (~1.5m), the harness conforms to most body lengths; and its rugged, heavy-duty construction and quick-release fasteners keep a single MCB-9XL securely against your body. Plus, its polypropylene webbing resists wear, and its bright orange color gives it high visibility against even the lightest colored garments.
2.3.1 Adjusting the Harness

Before you attach the harness to your MCB-9XL, adjust the blue strap to the most comfortable operating length for your individual body type.

The harness’ left strap features a 6” (152mm) long quick release hook-and-loop Nylon rip cord.

Connect the two parts of the rip cord together, and press down to secure the connection.

2.3.2 Attaching the Harness to the MCB-9XL

Both ends of the high-visibility orange straps feature a pair of heavy-duty metal button snaps at the ends.
To attach the harness to your MCB-9XL, locate the two T-shaped harness clips on the front of your MCB.

Thread the high visibility orange straps through the harness mounts—snap side up—past the first two (female) snaps.
Fold the strap over onto itself, and fasten the female snaps to their male counterparts.

✔️ **Note:** You’ll know the snaps are secured when you hear a clicking sound.
When you have the harness securely together, hang it around your neck—or drape it over your shoulder—and begin operating your MCB-9XL.
3.0 MCB-9XL Battery Installation

Four “AA” cell batteries power the MCB-9XL mini console box units. 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 MCB:

1. Loosen the four Phillips battery compartment cover screws on the rear of the transmitter, and lift the cover from the MCB.
2. Install (or replace with) four fresh size “AA” batteries. Observe proper polarity by positioning the batteries as illustrated in Figure 2.
3. Replace the compartment cover, and tighten the four Phillips screws. Do not over-tighten these screws, but make sure they are tight enough to properly seal the gasket.

![Battery Cradle Polarity Labels]

Figure 2. MCB-9XL Battery Installation

Caution! Be sure to observe proper polarity when placing batteries in the MCB-9XL battery compartment.

3.1 Low Battery and Auto Shutdown

Low Battery Warning

The MCB-9XL Low Battery Warning is factory set to activate when the power voltage reaches 2.2V. At this time, the Bat LED begins blinking once per second until the voltage reaches the 2.0V Auto-Shutdown voltage. Cervis, Inc. recommends replacing the batteries as soon as possible once the Bat LED begins flashing. Replacement batteries must be four new size “AA” alkaline batteries, and all four batteries must be made by the same manufacturer.

Note: If the transmitter is linked to a receiver, the receiver horn blows four times per minute when under Low Battery condition.

Caution! Do not mix battery manufacturers when replacing the MCB-9XL batteries. Batteries must be fresh and all from the same manufacturer.

Auto-Shutdown

Auto-shutdown occurs when the power voltage drops to 2.0V. The MCB-9XL shuts down when 2.0V is reached. It will not activate until the used batteries are removed, and a fresh set of four “AA” batteries is installed. (Follow the directions in Section 0.)
4.0 Warrior MCB-9XL Operation

4.1 MCB-9XL System Startup

![Image of Warrior MCB-9XL components]

**Figure 3. MCB-9XL Turn ON/OFF**

For the following procedure, assume that power is applied to the Warrior receiver. Stand close to the MU receiver when starting up the MCB.

1. Confirm that the **STOP** switch is pressed down (**OFF**).
2. Turn on the MCB by pressing and releasing the green **Horn/Start** pushbutton (**S09**). The **RF/A Selection** and **Bat/B Selection** LEDs should begin cycling.

   ![Image showing LED cycling]

3. **Within one second**, pull up the **STOP** switch.
4. Wait until the LEDs cycle and then the **RF** LED begins flashing.
5. Press the green **Horn/Start** pushbutton (**S09**). The MU receiver relay sounds the attached horn (or lights the light), and the Main Line Contactor (MLC) relays energize in the receiver.

The MCB-9XL is ready for crane operation.
Turn Off the Transmitter

Following are methods of turning off or disabling the MCB.

- Push the STOP switch down. This immediately shuts down the MCB-9XL and all machine unit outputs.
- Allow the unit inactivity timer to "time out." In this case, shutdown occurs after four minutes of transmitter controls inactivity.

4.2 Associating an MCB-9XL with a Receiver

Warrior system transmitters are linked (or "associated") to the receiver before the system is shipped, and the association process is locked by S01 DIP Switch 8 in the receiver being 0 (OFF). The receiver will only communicate with the transmitter it is associated with. When necessary, other Warrior transmitters can be associated to the receiver as additional spares or to replace damaged transmitters, but the receiver association ability must first be unlocked.

Two Methods to Unlock Association

Method 1: Manually change the position of DIP Switch 8 in the receiver. To unlock association, change S01 DIP Switch 8 from its default position (0 – OFF) to (1 – ON). Unlocking with the DIP switch will unlock association until DIP Switch 8 is changed back to the 0 (OFF) or LOCKED position.

Method 2: Virtually unlock the receiver via the following steps. (There is no need to physically change S01 DIP Switch 8.):

1. Make sure the MCB-9XL and MU are associated and communicating, but the MLC should not be pulled-in.
2. Confirm that the STOP switch is pulled UP.
3. Press and hold the MCB Select/Next switch (S07) down (Figure 4).
4. Press the STOP button.

✓ Note: Once Virtual Unlock is performed, the next transmitter to be associated has a five-minute window-of-opportunity to associate.

Once the new (or different) transmitter is associated to that receiver, the receiver then locks.

![Figure 4. Method 2 Virtual Unlock Switch S07—Push and Hold Down](image)

4.2.1 Associating an MCB-9XL Using the DIP Switch Unlock Method.

This process unlocks receiver association, allowing the user to associate transmitters to the receiver until the DIP switch is set back to the locked position.

1. Set the receiver S01 DIP Switch 8 UP (ON).
2. If the receiver is **OFF**, the Horn/Light relay momentarily activates when it is powered. If the receiver is **ON**, the Horn/Light relay activates when DIP Switch 8 is moved.

3. Go to subsection 4.2.2.

**Caution!** Cervis, Inc. does not recommend leaving receivers in an unlocked state. Move DIP Switch 8 to the “0” (OFF) position once association is complete.

### 4.2.2 Associate an MCB-9XL to a Receiver

This process is required when either the MCB memory slot is empty or the user wishes to associate to a different receiver.

**Note:** During this process, a receiver already in use with another MCB cannot be associated.

1. Confirm that the **STOP** switch is pressed **DOWN**.

2. Turn on the MCB by pressing and releasing the green **Horn/Start** pushbutton (**S09**) on the left side.

3. **Within two seconds**, pull the **STOP** switch **UP** (OFF to ON).

4. **Within one second**, while the **B Select** LED is active:

   Press and hold the **Select/Next** switch (**S07**) **DOWN**,

   Then press the green **Horn/Start** pushbutton (**S09**), and release both controls simultaneously.
MCB LEDs begin cycling from bottom to top, indicating that the MCB is in **Maintenance Mode**.

![MCB LEDs cycling](image)

**Note:** If you take too long to perform the next step, restart the process from Step 1.

5. Press and hold the **Select/Next switch (S07) UP:**

![Select/Next switch](image)

Then press/hold the green **Horn/Start pushbutton (S09)** for approximately 5 seconds.

Release both switches when LED **A Select** starts blinking.

6. The **RF and B Selection** LEDs light steadily, indicating that the MCB is attempting to locate all available Warrior receivers that the transmitter can link to.

![RF and B Selection LEDs](image)
7. Once the MCB has completed its search—and one or more receivers have been found—the RF and A Selection LEDs light steadily.

![RF and A Selection LEDs](image)

**Note:** If no receivers are available, the MCB will stay in scan mode either until it times out or is turned off.

8. A detected receiver’s Association LED indicator starts blinking, and the Horn/Light relay sounds the horn (or lights the light) it is connected to. To select this receiver, flip the Select/Next switch (S07) UP.

![Select/Next switch](image)

The RF LED starts blinking rapidly, indicating that communication is established. The receiver identity (ID) is now stored in the MCB memory slot.

![RF LED blinking rapidly](image)

9. If the found receiver unit is NOT the receiver desired, press the Select/Next switch (S07) DOWN to scroll through the detected receivers until the desired receiver is found.

![Scrolling through detected receivers](image)

(The receiver indicates its selection by blinking its Association LED and pulsing the Horn/Light relay, sounding the horn or flashing the light.) Flip the Select/Next switch (S07) UP to select the receiver.

![Select/Next switch UP](image)
The RF LED starts blinking rapidly, indicating communication is established. The selected receiver ID is stored in the MCB memory slot.

10. Press the green Horn/Start pushbutton (S09) to pull in the MLC relay.

The MCB is now linked to the chosen receiver, and the crane is ready for control.

Notes:

- Associate each MCB transmitter one-at-a-time. Once associated, the transmitter will only work with that receiver until its ID is cleared.
- Transmitters work on a first-come/first-serve basis, meaning only one transmitter can ever be paired to a chosen receiver at a time.
- If you purchase a spare transmitter, you will have to associate it using the association process described above.
- Transmitters for each newly purchased system are associated at Cervis, Inc. before shipping.

4.3 Adjusting MCB-9XL Inactivity Timeout

The Warrior MCB-9XL ships from the factory configured with a standard four-minute inactivity timeout. To adjust the timeout interval length—from one minute to infinity (or no timeout)—in the field, follow these steps.

1. Confirm that the STOP switch is pressed DOWN.

2. Press and release the green Horn/Start pushbutton (S09) to turn on the MCB.

The B Selection LED lights steadily.
3. Pull the **STOP** switch up to the **ON** position.

4. **Within one second** of activating the MCB, while the **B Selection** LED is active:

   Press the **Select/Next** switch (**S07**) **DOWN**.

   Then press the green **Horn/Start** pushbutton (**S09**).

   MCB LEDs begin cycling from bottom to top, indicating that the MCB is in **Maintenance Mode**.

   ✓ **Note**: If you take too long to perform the next step, restart the process from Step 1.

5. Press and hold the **A/B Select** switch (**S01**) for five seconds.
The LEDs stop scrolling. Then, the **A Selection** LED lights solid, and the other LEDs go out.

This indicates that the timeout is set to four minutes (standard factory configuration).

6. To increase the timeout, flip the **Select/Next** switch (S07) **UP** and release it.

7. To decrease the timeout, flip the **Select/Next** switch (S07) **DOWN** and release it.

8. When the **RF** LED is lit solid, it indicates that a time of one minute will be added. When the **Bat** LED is lit solid = two minutes; **A Selection** LED = four minutes; **B Selection** LED = eight minutes.

   ✓ **Note:** This is a binary representation. So, if the **RF** and **A Selection** LEDs are lit solid—and the others are unlit—you have a five-minute timeout.

9. When the **RF** LED is blinking, the timeout = 20 minutes. When the **Bat** LED is blinking = 30 minutes; **A Selection** LED blinking = 45 minutes; **B Selection** LED blinking = 60 minutes; and all four LEDs blinking = infinite timeout.

10. Once you have chosen your desired timeout, press and release the green **Horn/Start** pushbutton (S09) to return to **Maintenance Mode**.

11. Press the green **Horn/Start** pushbutton (S09) again to return to operational mode.
4.4 Tilt Fault Mode

The MCB-9XL has an internal accelerometer that detects when the unit is in an angled position (up to 60° from level). If the MCB is tilted at 60° or greater for four seconds, the receiver Horn Relay energizes. If the unit remains in the tilted position for five seconds, the Horn Relay energizes again, and all motion commands stop.

To exit tilt fault mode, return the MCB to level and reset all controls to their neutral state. Remote machine control will become available again.

Cervis, Inc. ships all MCB transmitters with tilt fault mode enabled, as a safety feature. And while you can briefly maintain equipment motion control during the first three seconds of the warning period, you should return the transmitter to a level position before it expires.

However, if it is necessary to operate the MCB transmitter in an angled position for prolonged periods, you can disable the factory-set tilt fault mode as follows:

To Enable/Disable Tilt Fault Mode

1. Confirm that the STOP switch is pressed DOWN.

2. Press and release the green Horn/Start pushbutton (S09) to wake the MCB.

3. Pull the STOP switch up to the ON position.

Note: Perform Step 3 within two seconds; otherwise, you must go back to Step 1.

4. The B Selection LED lights steadily for about 1.5 seconds after pushing the green Horn/Start pushbutton (S09).

5. Within one second of activating the MCB, while the B Selection LED is active:
Press the **Select/Next** switch (S07) **DOWN**.

Then, press the green **Horn/Start** pushbutton (S09).

MCB LEDs begin cycling from bottom to top, indicating that the MCB is in **Maintenance Mode**.

6. Tilt the MCB 60° or more.

7. After three seconds, the LEDs will flash in one of the following patterns:
   a. **RF→BAT→A→B** – sequence repeats (**Tilt Fault Mode** enabled)
8. Press and release the green **Horn/Start** pushbutton (S09) to alternate between patterns 6a and 6b.

9. Once you’ve selected the desired mode, return the MCB to its normal operating position.

10. Press the green **Horn/Start** pushbutton (S09) again to set the desired mode.
# 5.0 Warrior MCB-9XL Specifications

## Table 4. Warrior MCB-9XL Receiver Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td><strong>Operating Voltage</strong> 2.1VDC to 3.0VDC</td>
</tr>
<tr>
<td></td>
<td><strong>Batteries</strong> Four &quot;AA&quot; Alkaline</td>
</tr>
<tr>
<td></td>
<td><strong>Low V Warning</strong> 2.2VDC</td>
</tr>
<tr>
<td></td>
<td><strong>Auto-Shutdown</strong> 2.0VDC</td>
</tr>
<tr>
<td></td>
<td><strong>Inactivity Shutdown</strong> Four Minutes</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td><strong>Operating Temp</strong> -40°F to 158°F (-40°C to 70°C)</td>
</tr>
<tr>
<td></td>
<td><strong>Storage Temp</strong> -40°F to 131°F (-40°C to 55°C)</td>
</tr>
<tr>
<td></td>
<td><strong>Humidity</strong> 0–95% non-condensing</td>
</tr>
<tr>
<td><strong>Radio</strong></td>
<td><strong>Frequency</strong> 904–926 MHz @ 100mW</td>
</tr>
<tr>
<td></td>
<td><strong>License</strong> No license required</td>
</tr>
<tr>
<td></td>
<td><strong>Modulation</strong> DSSS, channel hopping</td>
</tr>
<tr>
<td></td>
<td><strong>Antenna</strong> Internal</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td><strong>Dimensions</strong> Inches: 7.09 x 4.15 x 4.61 mm: 180.03 x 105.44 x 117.04</td>
</tr>
<tr>
<td></td>
<td><strong>Material</strong> Glass-filled nylon</td>
</tr>
<tr>
<td></td>
<td><strong>Weight</strong> ~2.5 lbs. (~1.13kg)</td>
</tr>
<tr>
<td></td>
<td><strong>Durability</strong> IP55</td>
</tr>
<tr>
<td></td>
<td><strong>Hardware</strong> Stainless steel</td>
</tr>
<tr>
<td><strong>Control Switches</strong></td>
<td><strong>Joysticks</strong> Three or Four (Model-dependent) 2-step Single Axis (digital)</td>
</tr>
<tr>
<td></td>
<td><strong>Toggles</strong> Three-position momentary or maintained</td>
</tr>
<tr>
<td></td>
<td><strong>Stop</strong> Professional pull-up/push-down</td>
</tr>
<tr>
<td></td>
<td><strong>Pushbutton</strong> Activation button (green)</td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td><strong>RF</strong> Indicates wireless communication and switch motion</td>
</tr>
<tr>
<td></td>
<td><strong>Battery</strong> Indicates low battery voltage</td>
</tr>
<tr>
<td></td>
<td><strong>A Selection</strong> Indicates trolley/hoist A selection</td>
</tr>
<tr>
<td></td>
<td><strong>B Selection</strong> Indicates trolley/hoist B selection</td>
</tr>
</tbody>
</table>
Appendix A: Exposure to Radio Frequency Energy

Warrior MCB transmitter and receiver units contain radio transceivers. When active, an MCB transmitter sends out radio frequency (RF) energy through its internal antenna. The Warrior MCB 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 that fall into two general categories:

1. **Mobile** applications: Any operating locations 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: Applications where the transmitting equipment is located on the hand, arm, or other part of the human body. In portable applications, the equipment is typically held in the hand 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.

**Handheld Applications**

All operators of MCB equipment with any type of antenna require proper equipment operation training, and such training must include RF exposure safety instructions. Once training is completed, they are considered "aware persons."

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 radio frequency transceiver (RT) module must be trained to use proper RF safety precautions as presented in this appendix.
Appendix C: Agency Label

Figure 5. Warrior MCB-9XL Agency Label