
U045.10.0
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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### 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.


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


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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 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-305) 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-305) a été approuvé par Industrie Canada pour fonctionner avec le type d'antenne indiqué ci-dessous avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiqué. Il est strictement interdit d'utiliser avec cet appareil un type d'antenne ne figurant pas dans cette liste ou ayant un gain supérieur au gain maximum indiqué pour ce type.

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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
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Definitions

**Associate/Association**
Mode whereby SmaRT handhelds and base units are paired for operation (IDs exchanged). This mode is used to commission spare handhelds or base units.

**DSSS**
Direct Sequence Spread Spectrum; an advanced wireless communication technology resistant to intended or unintended jamming.

**Dissociation**
The process of decommissioning a handheld from a base unit ID memory — clears both handheld and base unit memory.

**Latch**
Command from the handheld remote to maintain an output state until specifically signalled again to change state.

**Line of Sight (aka Direct-Line-of-Sight)**
Term used to describe radio frequency (RF) communication where the pathway between the units is clear of physical obstacles such as walls, earth, and other obstructions.

**Momentary**
A switch or button capable of turning a base unit output to either an "on" or "off" state when an end-user presses the switch. The output returns to its original state when the button is released.

**SmaRT Base Unit**
Input/output (I/O) unit that the controlled machine is connected to. SmaRT base units communicate with each other and SmaRT handheld, console, pistol grip, and belt pack remote controllers.

**SmaRT Handheld Remote Control**
Portable unit that controls base unit activity using RF signals or through a hardwired umbilical connection.

**SmaRT Remote Control System**
SmaRT system consisting of one or more SmaRT base units and from one to eight SmaRT remote control units. The system operates in the 900 MHz or 2.4 GHz range and has inputs/outputs or data communications.

**TX/RX**
Transmit/Receive.

**Umbilical**
Hardwired connection between the handheld remote and base unit. When the umbilical is connected, handheld RF control is disabled, and all commands are sent over the umbilical connection to the base unit. This connection is detachable from the handheld remote and, when removed, the system, returns to RF control as long as the RF link has been previously established.
Note to the Manual User

✓ **Note:** The higher transmit power SmaRT pistol grips are available to operate at 900 MHz or 2.4 GHz using Direct Sequence Spread Spectrum (DSSS) wireless technology. To avoid repetition and possible confusion, high powered pistol grip remote control units are referred to as the “PG-xH14 remote” throughout this document, where “x” represents either 900 MHz for PG-9H14 or 2.4 GHz for PG-2H14.

The low-power version—which is only available in 2.4 GHz—is referred to as “PG-214.”

Related Documents

Engineered systems related Cervis, Inc. ESD documents—such as **WSMB-9999 Engineered System Document** as provided with that particular engineered system.

Installation or Troubleshooting Questions?

Contact Cervis, Inc. at (724) 741-9000 if you have any questions during installation or troubleshooting of a system, a handheld, or a base unit.
1.0 Safety Instructions

Caution! Carefully read these instructions to properly use the SmaRT PG-214 or PG-xH14, to keep it in safe working condition, and to reduce the risks of misuse.

Do not use the system in potentially explosive atmospheres.
Any use other than that specified in this manual is DANGEROUS.
Strict adherence to the following instructions is a MUST.

Note: To comply with United States Federal Communications Commission (FCC) radio frequency (RF) exposure compliance requirements, do not co-locate or operate this device and its antenna in conjunction with any other antenna or transmitter.

Caution! Certain adjustments may need to be made while the controlled machinery is active. All personnel must be at a safe distance from the machine during these adjustments to avoid risk of injury or accidental death.

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 you are certain that it is safe to do so.
✓ Turn off the handheld remote and remove power from the base unit before attempting any maintenance. This will prevent accidental operation of the controlled machinery.
✓ Remove power from the Base Unit either by detaching the harness wiring cables from the base unit connectors or by removing the source power from the circuit.
✓ 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 intentionally allow liquid to enter the handheld or base unit enclosures. Do not use high-pressure equipment to clean the handheld remote or base unit.
✓ Disconnect the radio base unit before welding on the machine. Failure to disconnect the base unit may destroy or damage the base unit.
✓ Keep high-energy radio frequency (RF) devices away from handheld remotes. Activating high-power communication radios, for instance, close to the handheld remotes can cause interference and “false” circuit activation.
✓ Operate and store units only within the specified operation and storage temperatures defined in this document.
✓ Do not key two-way radios when the handheld remote is active.
Caution!

Outputs under sole control of momentary switches—push-to-operate (PTO), for instance—should only change state when the appropriate handheld remote button or switch is pressed or positioned; and then only for the duration of time that particular output button is pressed or switch is positioned. Investigate any unexpected motion that occurs when pressing the handheld remote output controls.

Immediately stop operating if a jerky motion occurs while constantly pressing an output switch. Check the base unit diagnostic LEDs for any indication of a problem. Diagnostic descriptions are found in the manual of the particular SmaRT base unit in use.

Be aware that even if the handheld and base unit diagnostic LEDs do not indicate a problem, one may be present and further troubleshooting steps may be needed.

If a problem is found, do not operate the SmaRT System until the problem is resolved.
2.0 SmaRT PG-214 and PG-xH14 Pistol Grips

✓ Note: The “x” in PG-xH14 represents either 900 MHz for PG-9H14, or 2.4 GHz for PG-2H14.

The SmaRT™ pistol grip remotes are designed for both traditional and non-traditional mobile applications. The SmaRT pistol grips can activate digital and trigger-controlled proportional pulse-width-modulation (PWM) SmaRT base unit outputs. They permit single-handed operation in a comfortable ergonomic layout. Using direct sequence spread spectrum (DSSS) wireless technology at 900 MHz or 2.4 GHz, SmaRT pistol grip remotes provide a robust link with a receiver in congested radio environments. The remotes feature seamless association with SmaRT base units without the need to open the case of either unit. The rugged weatherproof pistol grip enclosure allows the unit to operate worry free in harsh weather conditions.

Figure 1. SmaRT PG-214 and PG-xH14 Pistol Grip Remote

Two RF Power Levels Available
Two radio frequency (RF) operation power levels are available – low-power and higher-power:

- The low-power PG-214 pistol grip remote operates in the 2.4 GHz range @ 2 mW.
- Higher transmit power pistol grip remotes have an “H” designation indicating that they operate at high power. PG-9H14 units operate in the 900MHz range @ 10 mW; and PG-2H14 units operate in the 2.4 GHz range @ 100 mW.

Features
- Direct Spread Spectrum Technology (DSSS)
- Controls a variety of SmaRT base units
- Controls accessible while wearing gloves
- Oversized Machine Stop button
- Seven three-position, bi-direction toggle switches (standard)
- Trigger as a digital output enable, a digital output, or as a proportional output control
- Four status/diagnostic LEDs
- Comfortable weatherproof design
- Umbilical connection option
- Magnet-embedded handle (to attach to machine surfaces)
- Powered by four “AA” cell batteries (+3.0 VDC nominal)
3.0 SmaRT Pistol Grip Remote Control System

A standard SmaRT PG-214 or PG-xH14 remote control system consists of a SmaRT pistol grip remote control unit and one or more SmaRT base units. The PG-214 or PG-xH14 can communicate with SmaRT base units in congested radio environments using Direct Sequence Spread Spectrum (DSSS) wireless technology at 900 MHz or 2.4 GHz.

The communication link between the pistol grip remote control and the base unit is established at the factory using a process known as “Association.” Situations may arise in the field where it becomes necessary to reestablish the system RF link. The flexible wireless system can be seamlessly associated in the field by a series of switch operations (detailed in Section 7.0) without the need to open the enclosures of either the handheld or base unit.

SmaRT base units come in a variety of standard configurations for 900 MHz or 2.4 GHz operation, among which are the base units shown in Figure 2. SmaRT handhelds and base units can be standard or custom configured by Cervis Engineering.

![Figure 2. SmaRT PG-214 and PG-xH14 Pistol Grip Remote and Base Unit Examples](image)
4.0 SmART Pistol Grip Battery Installation

Four size AA cell batteries power the SmART pistol grip handheld unit. 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 handheld:

1. Loosen the four Phillips battery compartment cover screws on the rear of the remote and lift the cover from the handheld.
2. Install (or replace with) four fresh size AA cell batteries. Observe proper polarity by positioning the batteries as shown in Figure 3.
3. Replace the compartment cover and tighten the four Phillips screws. Do not overtighten these screws, but make sure they are tight enough to ensure the gasket provides a proper watertight seal.

Caution! Be sure to observe proper polarity when placing batteries in the handheld battery compartment.

Figure 3. SmART Pistol Grip Battery Installation

✓ Note: Tighten cover screws enough to compress the sealing gasket. Do not over-tighten the screws.
5.0 Pistol Grip Umbilical Connection

The pistol grip umbilical connection is a 4-pin Turck-style connection that is keyed to prevent connector pin misalignment. A cap is attached to the handheld remote with a sturdy chain to prevent loss while it is unscrewed from the connector. When not in use, the operator should cap the connector. The RF is disabled whenever the umbilical is attached to the handheld remote and the target base unit. When the umbilical is attached, all control signals are transmitted via the umbilical cable. The example shown in Figure 4 uses a Cervis C6-12 cable, but other cables and configurations are available. For detailed information on umbilical options, contact your Cervis, Inc. sales representative at: (724) 741-9000.

✓ **Note:** Any similarly configured handheld remote can operate a base unit in umbilical mode. But, when the umbilical is removed, the handheld and base unit will not communicate unless the units have been associated— that is, the RF link is established.

✓ **Note:** Keyways may be positioned other than as shown. Pins are always positioned relative to the Keyway positions.

![Figure 4. Pistol Grip Umbilical Connection](image-url)
6.0 Operation

6.1 Turn ON the Unit

Power ON the SmaRT PG-xH14 Pistol Grip Remote by twisting the large red mushroom-style button clockwise until it springs UP; and then activate a toggle switch. The unit will not transmit or receive messages before activating the toggle switch.

✓ Note: Power to the handheld is available when you twist the mushroom-style Machine Stop button clockwise until it springs UP, but the transceiver is not yet enabled. The unit does not transmit or receive until it is enabled.

Enable the standard pistol grip transceiver by operating any of the toggle switches (either UP or DOWN) following Stop button release. (A specific switch can be configured as an “ON” switch on non-standard/custom pistol grip remotes.) Initial toggle switch operation following handheld power-up does not send a command to the base unit.

✓ Note: If a switch is held before the Stop button is released (enable the remote), the red ERR LED begins to flash. The handheld will not operate until the condition is remedied.

6.2 Turn OFF the Unit

Turn the SmaRT PG-xH14 Pistol Grip Remote OFF by pushing the large red mushroom-style button IN or by allowing the unit to “time out.”

Caution! A stuck switch is indicated if the remote’s Stop button is depressed and the red ERR LED lights solid and remains lit. Check all switches before use. If the LED remains lit, the remote needs to be serviced before it can be safely used. Contact Cervis, Inc. Support at (724) 741-9000.

6.3 Proportional Control Trigger

The SmaRT PG-xH14 spring-loaded trigger either controls a digital output, is an output enable or a proportional output control.

6.4 Toggle Switches S1 through S7

Toggle switches S1 through S7 (see Figure 6) are three-position, return-to-center, Up or Down with a return-to-center detent. These switches are used for digital control and for various setup and adjustment functions described later in this manual.
Figure 5. Button, Switch, and Trigger Operation

Connect for optional umbilical cord is in the base of the grip and recessed for protection.

Spring-loaded Trigger either controls a digital output, is a function enable or proportional output control.

Figure 6. SmaRT PG-214 and PG-xH14 Switch and LED Layout

6.5 Standard LED Indications

<table>
<thead>
<tr>
<th>LED</th>
<th>Action</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX Transmit – Green LED 1</td>
<td>Steady lit</td>
<td>Switch active</td>
</tr>
<tr>
<td></td>
<td>Blink</td>
<td>Transmitting</td>
</tr>
<tr>
<td>RX Receive – Amber LED 2</td>
<td>Blink</td>
<td>Receiving</td>
</tr>
<tr>
<td>ERR Error – Red LED 3</td>
<td>Steady lit when Stop is pushed in or released</td>
<td>Stuck switch, contact Cervis, Inc. Support</td>
</tr>
<tr>
<td></td>
<td>Flashing while Stop is released (unit turned on)</td>
<td>Switch conflict; switch is being held by the user</td>
</tr>
<tr>
<td>BATT Battery – Amber LED 4</td>
<td>Cycle on/off</td>
<td>Change batteries</td>
</tr>
</tbody>
</table>
7.0 Associate and Dissociate Radio (RF) Link

Cervis, Inc. establishes the RF link between a system handheld and base unit before shipping the system. In some circumstances after the system is received, it may be necessary to re-establish or to remove the communications link – for the purpose of troubleshooting, for instance. The pistol grip remote establishes or removes the radio link between the handheld remote and the base unit when necessary via the Association procedure. The Dissociation procedure removes the radio link between the pistol grip remote and the base unit.

To associate or dissociate, a clear line of sight must be between the handheld remote and the base unit, and both units must be OFF (powered down). Immediately turn off the pistol grip remote by pushing in the oversized red mushroom STOP button, which removes power from the unit. The pistol grip also turns off if the auto-shutdown time limit is exceeded. Standard auto-shutdown time is four minutes of switch or button inactivity. Safely power down a SmarT base unit by removing the power source from the unit.

**Note:** If an umbilical cable is attached, remove it before establishing the RF link using the Associate procedure, or before using the Dissociate procedure to break the link.

**Caution!** To prevent inadvertent movement of the controlled machine, be sure to remove power from the Base Unit before attempting to enter Associate Mode.

7.1 Associate PG-xH14 to Base Unit

![Figure 7. Associate Mode Switches](image)

1. Remove power from the base unit, and shut down the PG.
2. Stand near the base unit (in line of sight).
3. Twist the MACHINE STOP button clockwise to its UP position.
4. Hold switch S7 in the ASSOCIATE (UP) position.
5. Hold switch S1 in the UP position. This activates the handheld remote.

All four LEDs flash once, and then the TX (transmit) LED lights steady, and the RX, Error, and Battery LEDs go out.

6. Continue to hold switches S1 and S7.
7. **Power Up** the base unit.
8. Release switches S7 and S1.
Handheld and base unit are Associated when the TX and RX LEDs continue to flash (flicker) while the handheld is on, indicating communication is established. If Association is not successful, restart the process from Step 1.

7.2 Dissociate PG-xH14 Remote from a Base Unit

1. Remove power from the base unit, and shut down the PG.
2. Stand near the base unit (in line of sight).
3. Twist the MACHINE STOP button clockwise to the UP position.
4. Hold switch S7 in the DISSOC. (DOWN) position.
5. Hold switch S1 in the UP position. This activates the handheld remote.

All four LEDs flash once and then the TX (transmit) LED continuously flashes (flickers), the RX LED goes out, and the Error and Battery LEDs light steady.

6. Continue to hold switches S1 and S7.
7. Power Up the base unit.
8. Release switches S7 and S1.

Handheld and base unit are Dissociated when the Error, Battery, and RX LEDs go out, while the TX LED continues to flash (flicker) when the switches are released. An inactive RX LED while the base unit is powered affirms that the communication link between the handheld and base unit is broken.

Figure 8. Dissociate PG-xH14 Remote from Base Unit
8.0 Proportional Output MIN and MAX Adjustments

8.1 MIN and MAX Adjustment Fundamentals

Caution! Keep in mind at all times that you are going to control a moving piece of machinery. You must strictly adhere to the safety instructions described in Section 1.0, Safety Instructions.

- Must make sure that the area around the controlled machine is safe to operate before performing dynamic MIN and MAX adjustments.
- Power the base unit for dynamic adjustment.
- Ensure that the base unit LEDs and display are close enough to be easily read.
- Adjust Mode timeout defaults to a ten-second window of opportunity, where the unit returns to normal operating mode if none of the switches are operated within the ten-second window. The timer resets to ten seconds each time a switch or the trigger is operated while in Adjust Mode.
- Exit Adjust Mode either by:
  - Pressing the STOP button
  - Waiting for 20 seconds without operating any of the function switches on the unit
  - Releasing the function switch used to enter trigger adjustment

8.2 MIN and MAX Adjustment Procedure for BU-xH18XF, BU-xH20XF, and BU-9H8D

✓ Note: The “x” in a base unit name represents either a 9 or a 2. A “9” indicates that the base unit radio is 900 MHz. A “2” indicates that the radio is 2.4 GHz.

1. Turn the controller on by twisting the red STOP button clockwise until the button releases (pops UP).
2. Move switch S1 DOWN (STOP) and allow it to return to center.
3. Enter Adjust Mode by first holding switch S7 DOWN. Then, while still holding switch S7, hold switch S1 DOWN for four seconds. Adjust Mode is indicated when the bottom three base unit LEDs (6, 7, and 8) begin flashing.

   To enter Adjust Mode, hold handheld switch S7 and then S1 DOWN until base unit LEDs 6, 7, and 8 begin to flash.

   Figure 9. Enter Adjust Mode for Min/Max Adjustments

4. Release switches S7 and S1.
5. Operate any of the function toggles either UP or DOWN and hold it in position. Continue to hold the function switch throughout the entire Adjustment procedure. The base unit LED 8 lights solid indicating MIN Adjust Mode. LEDs 6 and 7 go out (extinguish).

6. While observing the machine being controlled, slowly press the pistol grip trigger (proportional control) to the point where the machine just begins to move.

7. When the desired result is achieved, move switch S7 DOWN to the STORE position. The MIN value is stored. Base unit LED 7 activates.

8. Release all switches including the trigger. The base unit LED 8 goes out, and LED 6 lights solid indicating MAX Adjust Mode.

9. Engage and hold a function switch. Operate the trigger while observing the machine being controlled.

10. When the desired MAX value is achieved, move switch S7 DOWN to the STORE position. The MAX value is stored. Base unit LED 8 activates.

11. Release all switches, including the trigger. The system returns to MIN Adjust Mode.

✓ Note: Activating switch S7 down toggles between MIN and MAX while in Adjust Mode.

Exit Adjustment Mode either by:

- Releasing all switches—including the trigger—and waiting for the handheld to timeout.
- Pressing the red STOP button, which powers down the handheld remote.
# Specifications

## Table 2. SmarRT PG-xH14 Pistol Grip Remote Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td><strong>Vin</strong> +1.6V to +3.2 VDC</td>
</tr>
<tr>
<td></td>
<td>Batteries Four AA cell</td>
</tr>
<tr>
<td></td>
<td>Battery Life 100 hours</td>
</tr>
<tr>
<td></td>
<td>Low V Shutdown 1.6 VDC</td>
</tr>
<tr>
<td></td>
<td>Auto-shutdown Four min. of button inactivity (standard)</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Operating Temp –20° C to 55° C (-4° F to 131° F)</td>
</tr>
<tr>
<td></td>
<td>Storage Temp –40° C to 55° C (-40° F to 131° F)</td>
</tr>
<tr>
<td></td>
<td>Humidity 0 to 100%</td>
</tr>
<tr>
<td><strong>Radio</strong></td>
<td>Frequency 906–924 MHz @ 10 mW</td>
</tr>
<tr>
<td></td>
<td>2405–2480 MHz @ 100 mW (high power)</td>
</tr>
<tr>
<td></td>
<td>2405–2480 MHz @ 2 mW (low power)</td>
</tr>
<tr>
<td></td>
<td>License None required</td>
</tr>
<tr>
<td></td>
<td>Modulation DSSS</td>
</tr>
<tr>
<td></td>
<td>Antenna Internal</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>Dimensions mm: 230.6 x 133.9 x 146.9; inch: 9.1 x 5.3 x 5.8</td>
</tr>
<tr>
<td></td>
<td>Total Weight 1.36 kg; 3 lbs</td>
</tr>
<tr>
<td></td>
<td>Durability High Impact Polymer case</td>
</tr>
<tr>
<td></td>
<td>Faceplate Aluminum or Polycarbonate</td>
</tr>
<tr>
<td><strong>Indicators (4 LED)</strong></td>
<td>TX (green) Blinking – transmitting, no switch active</td>
</tr>
<tr>
<td></td>
<td>Solid – transmitting, switch active</td>
</tr>
<tr>
<td></td>
<td>RX (amber) Blinking – receiving, no output of interest active</td>
</tr>
<tr>
<td></td>
<td>Solid – receiving, output of interest active</td>
</tr>
<tr>
<td></td>
<td>Error (red) Indicates error with handheld remote</td>
</tr>
<tr>
<td></td>
<td>Battery (amber) Low battery indication</td>
</tr>
<tr>
<td><strong>Control Switches</strong></td>
<td>Toggle 7 Three-position, return-to-center, push-to-operate or latch</td>
</tr>
<tr>
<td></td>
<td>Trigger Proportional controller, function enable, or digital output</td>
</tr>
<tr>
<td></td>
<td>M-Stop One mushroom-style, spring-loaded two-position</td>
</tr>
</tbody>
</table>
Appendix A: Exposure to Radio Frequency Energy

SmaRT handheld remote units contain radio transceivers. When active, a handheld remote sends out RF energy through its internal antenna. The SmaRT handheld remote complies with limits set by the FCC for operating distance from human tissue.

Appendix B: Agency Identification Label Location

![Agency ID Label Location]

✓ **Note:** The pistol grip agency ID label position is identical for all pistol grip remote units, including all 900 MHz and 2.4 GHz units.

*Figure 10. Agency Identification Label Location*
Appendix C: Declaration of Conformity

 Declaration of Conformity

Manufacturer: Structured Mining Systems, Inc.
(d.b.a. Cervis, Inc.)
170 Thorn Hill Road
Warrendale, PA 15086 USA
Telephone No. (724) 741-9000

Date: February 14, 2018

This declaration of conformity is issued under the sole responsibility of the manufacturer. The
undersigned hereby declares, on behalf of Structured Mining Systems, Inc. (d.b.a. Cervis, Inc.) of
Warrendale, Pennsylvania, that the below referenced list of industrial (ISM) radio equipment products,
to which this declaration relates, is in conformity with the provision of the following European Union
harmonization legislation:

Council Recommendation 1999/519/EC (Human Exposure to Electromagnetic Fields)

Relevant Harmonized Standards or Other Technical Specifications:

ETSI EN 300 328 v1.7.1:2006
IEC 60650-1 Ed 2.2; 2013-05-28
ETSI EN 301 489-1 v1.9.2:2011

BS EN 62311:2008
BS EN 62209-2:2010

The technical documentation is maintained at the corporate headquarters of Structured Mining
Systems, Inc. (d.b.a. Cervis, Inc.), 170 Thorn Hill Road, Warrendale, PA.

Products: (see other sections/areas of the product user manual for product images, accessories,
components, and software, which allow the radio equipment to operate as intended)

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PART NUMBER</th>
<th>BATCH OR SERIAL NUMBER RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG-2H10JS</td>
<td>07128570</td>
<td></td>
</tr>
<tr>
<td>PG-2H10JS-UMB</td>
<td>07128571</td>
<td></td>
</tr>
<tr>
<td>PG-2H12JS</td>
<td>07129570</td>
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<td>PG-2H12JS-UMB</td>
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<td>PG-2H14-DIS</td>
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</tr>
<tr>
<td>PG-2H14-DIS-UMB</td>
<td>07125573</td>
<td></td>
</tr>
</tbody>
</table>

Anthony M. Di Tommaso
Director of Product Development, Quality, & Finance

February 14, 2018

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