User Manual

PG-x14 Series Pistol Grip Remotes

Industrial wireless remote control solutions with customer service that is always within reach.

MADE IN PENNSYLVANIA SINCE 1972

CERVIS INC.

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:

- This device may not cause harmful interference and
- 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 Industry Canada 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.

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.

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.

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.

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:

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.

CONTENTS

DOCUMENT CONVENTIONS

NOTE

Notes pertaining to the use of the device, function, switch, system, etc. are used to alert the user to information that is useful, instructive, or informative.

CAUTION

Cautions are used to warn of serious consequences of actions or inactions that may result in injury, death, or serious damage to the equipment. It is critical for the user/operator to pay attention to a CAUTION.

RESOURCES

Resources provide links to additonal information and technical data available for download at CervisInc.com

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.
- Equipment changes or modifications 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 remote control and disconnect power from the base unit before attempting any maintenance. This will prevent accidental operation of the controlled machinery.
- Power can safely be disconnected from the remote by removing the source power (batteries) from the unit.
- Power can be removed from the base unit by disconnecting 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 allow liquid to enter the remote control or base unit enclosures. Do not use high-pressure equipment to clean the remote control or base unit.
- Disconnect the base unit before welding on the machine. Failure to disconnect the base unit may cause destruction of or damage to the base 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 handheld remotes. Activating high-power communication radios, for instance, in close proximity to handheld remotes can cause interference and "false" circuit activation.
- Do not key two-way radios while using the handheld remote.
- Abide by the recommendations in **Appendix A, Exposure to Radio Frequency Energy**.
- If the radio system is employed on a machine with a safety circuit (stop button, crash bar, etc.), you must ensure that the safety circuit is still completely functional after the radio system is wired into the control circuits of the machine.

1.0 SmaRT PG-xH12JS Series Pistol Grip Remotes

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.

2.0 SmaRT Pistol Grip Remote Control System

A standard SmaRT PG-x14 remote control system consists of a SmaRT pistol grip remote control unit and one or more SmaRT base units. The PG-x14 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.

3.0 PG-xH12JS 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.

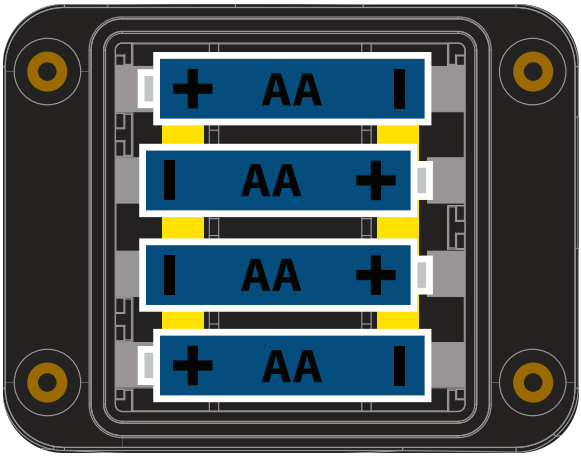
To replace or install batteries in the handheld:

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 over-tighten these screws, but make sure they are tight enough to ensure the gasket

Transmitter 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
- Various diagnostic information via LEDs and/or a display
- Comfortable weatherproof design
- Tether connection option
- Magnet-embedded handle (to attach to machine surfaces)
- Powered by four "AA" cell batteries (+3.0 VDC nominal)

provides a proper watertight seal.



4.0 Pistol Grip Tether Connection

The pistol grip tether connection is a 4-pin A-code or C-code 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. Radio communication is disabled whenever the unit is powered via cable and connected to the base unit. When the cable is attached, all control signals are transmitted via the cable. The example shown in Figure 4 uses a Cervis C6-12 C-Code style cable, but other cables and configurations are available. For detailed information on tether options, contact your Cervis, Inc. sales representative at: (724) 741-9000.

5.0 Operation

5.1 Activating the Unit

Activate the SmaRT PG-x14 Pistol Grip Remote by releasing the large red mushroom-style button up; and then activate a toggle switch. The unit will not transmit or receive messages before activating the toggle switch.

5.2 Deactivate the Unit

Deactivate the SmaRT PG-x14 Pistol Grip Remote by pushing the large red mushroom-style button IN or by allowing the unit to “time out.”

5.3 Proportional Control Trigger

The SmaRT PG-x14 spring-loaded trigger either controls a digital output, is an output enable, or a proportional output control.

5.4 Toggle Switches S1 through S7

Toggle switches S1 through S7 (see Figure 6 and Figure 7) 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.

6.0 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.

6.1 Associate PG-x14 to 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 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 S1 and S7.

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.

NOTE

PG-xH12JS Pistol Grip remotes are shipped from Cervis, Inc. with a set of four fresh type "AA" alkaline batteries separate from the pistol grip. These batteries must be installed prior to using the handheld remote.

CAUTION

Observe proper polarity when placing batteries into the cradle. Improper battery placement can cause excessive heat, battery explosion, injury to the operator, and damage to the remote.

NOTE

Cover screws must be tightened enough to compress the sealing gasket. Do not over-tighten the screws.

NOTE

All remote control system remotes and base units are associated before they are shipped from Cervis, Inc. If it becomes necessary to associate your system while in the field. Associate Mode allows this.

CAUTION

To prevent inadvertent movement of the machine, be sure to remove power from the base unit before attempting to enter Associate mode.

NOTE

In many systems, the toggle switch used to activate the pistol grip remote is S1, but the activation switch may be application-dependent – in which case you will have to refer to the ESM, ESD, or EASS document sent with the system.

6.2 Associate PG-x14-OLED Remote to 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. Pull up the MACHINE STOP button.
4. Simultaneously push and hold S1 and S7 in the UP position.

All four LEDs illuminate for approximately 2 seconds, then the RX, ERR, and BATT LEDs go out, the TX LED begins to blink, and the display reads “Apply Power to Receiver”.

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

The Handheld and Base Unit are Associated when the display reads “Link Successful” and the TX and RX LEDs continuously flash. If association was not successful, the display will read “Link Not Successful” and only the TX LED will begin flashing.

Figure 9. Associate PG-x14-OLED Remote to Base Unit

6.3 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 continuouesly 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.

6.4 Dissociate PG-x14-OLED 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. Pull up the MACHINE STOP button.
4. Simultaneously push and hold S1 in the UP position and S7 in the DOWN position.

All four LEDs illuminate for approximately 2 seconds, then the RX, ERR, and BATT LEDs go out, the TX LED begins to blink, and the display reads “Apply Power to Receiver”.

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

Handheld and base unit are Dissociated when the display reads “Unlink Successful” and only the TX LED flashes. An inactive RX LED while the base unit is powered on affirms that the communication link between the handheld and base unit is broken.

8.0 Proportional Output MIN and MAX Adjustments

8.1 MIN and MAX Adjustment Fundamentals

- 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

PG-X14 SERIES

900MHz @ 10mW / 2.4GHz @ 100mW

SmaRT PISTOL GRIP REMOTE

Channel-Hopping DSSS ■ FCC & Industry Canada License-Free ■ Internal Antenna

POWER

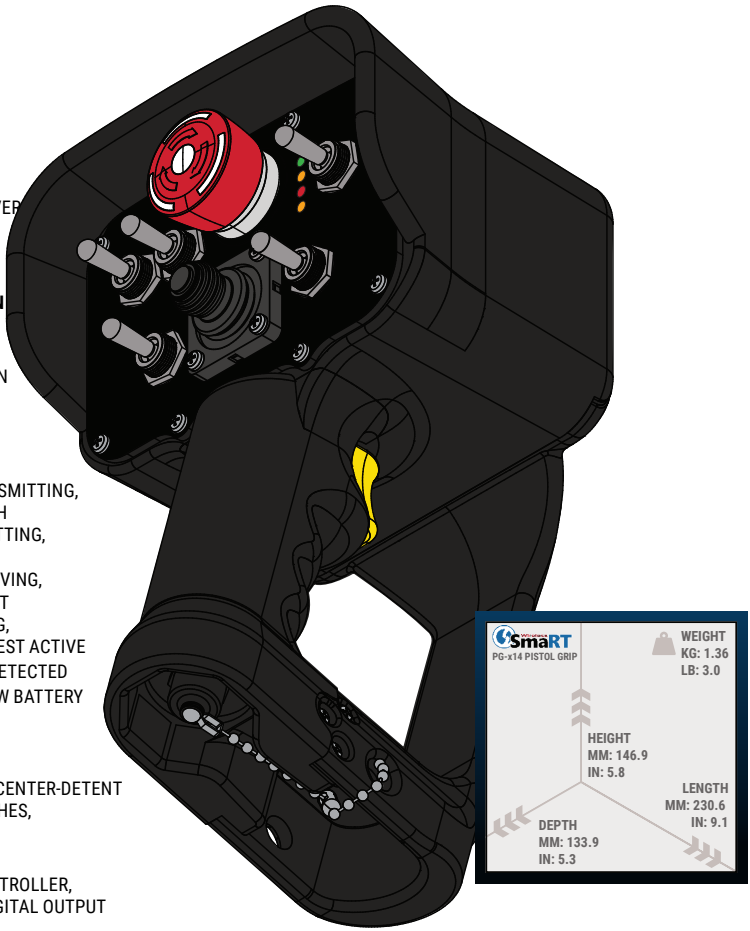
OPERATING VOLTAGE
+1.6 – +3.2 VDC

BATTERIES
FOUR AA ALKALINE

BATTERY LIFE
PG-X14: >100 HRS
PG-X14 OLED, SCREEN SAVER >70 HRS
PG-X14 OLED, SCREEN ALWAYS ON: >40 HRS

LOW BATTERY SHUTDOWN
1.6 VDC AND BELOW

AUTO-SHUTDOWN
FOUR MINUTES OF BUTTON INACTIVITY (STANDARD)



LED INDICATORS

- **TX** – FLASHING – TRANSMITTING, NO ACTIVE SWITCH
  SOLID – TRANSMITTING, ACTIVE SWITCH
- **RX** – FLASHING – RECEIVING, NO ACTIVE OUTPUT
  SOLID – RECEIVING, OUTPUT OF INTEREST ACTIVE
- **ERR** – SOLID – ERROR DETECTED
- **BATT** – FLASHING – LOW BATTERY

CONTROLS

TOGGLES
SEVEN; THREE POSITION, CENTER-DETENT PUSH-TO-OPERATE SWITCHES, MOMENTARY OR LATCH

TRIGGER
ONE; PROPORTIONAL CONTROLLER, FUNCTION ENABLE, OR DIGITAL OUTPUT

M-STOP
ONE; ONE MUSHROOM-STYLE, SPRING-LOADED TWO-POSITION

ENVIRONMENT

OPERATING TEMPERATURE
-4°F TO 131°F (-20°C TO 55°C)

STORAGE TEMPERATURE
-40°F TO 131°F (-40°C TO 55°C)

HUMIDITY
0 TO 100%

Appendix A: Exposure to Radio Frequency Energy

SmaRT handheld remote units contain radio transceivers. When active, a handheld remote sends out radio frequency (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 Locations

Appendix C: EU Declaration of Conformity

NOTE

The pistol grip unit agency ID label position is identical for all pistol grip remote units, including both 900 MHz and 2.4 GHz units.

RESOURCES

A complete glossary of terms and definitions can be found at CervisInc.com/definitions, or simply scan the code below.