



SmaRT 904
Handheld Remote

User Manual

DN: U010.3-SmaRT904_HH-R

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FCC Statements

15.19 – Two Part Warning

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference and**
- (2) This device must accept any interference received, including interference that may cause undesired operation.**

15.21 – Unauthorized Modification

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

15.105(b) – Note:

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

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

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Notes/Definitions

Association

SmaRT configuration method using a series of specific remote unit button presses to establish a communication link between a SmaRT Handheld and a SmaRT Base Unit.

DSSS

Direct sequence spread spectrum; an advance wireless communication technology.

Disassociation

Dissolution of all established communication links between handhelds and a base unit.

FET

Field effect transistor: Type of transistor that relies on an electric field to control the conductivity of the device.

IP65

IEC (International Electrotechnical Commission) rating that classifies the level of protection provided by an enclosure.

IP (international protection)

6 (dust tight)

5 (water jetted from any direction on the enclosure shall have no harmful effects)

PTO

Push to Operate: Command broadcast only while a button is depressed. The command ends when the button is released.

PTO-904

Remote handheld unit that can typically control a four output base unit.

SmaRT 90N Remote Control System

SmaRT system consisting of one SmaRT Base Unit and from one to eight SmaRT remote control units. The system operates in the 900MHz range and has N (some defined) number of outputs.

For instance, a SmaRT 904 Remote Control System operates in the 900MHz range, and a maximum of four outputs can be controlled by the remote.

Line of Sight (aka Direct-Line-of-Sight)

Type of communication between transceivers, or a transmitter and a receiver, where the pathway between the two units must be clear of obstacles.

TX/RX

Transmit/Receive

1.0 SmaRT 904 Handheld Remote

The SmaRT 904 Handheld Remote is a 4-button PTO (push-to-operate) wireless handheld transmitter used to communicate with and control a SmaRT Base Unit.



Figure 1. SmaRT PTO-904 Handheld Remote and Base Unit

The SmaRT PTO-904 Handheld Remote features a 300ft. handheld-to-base unit communication range providing four function press-to-operate (PTO) control. The handheld can communicate to a variety of SmaRT Base Units and is used to control up to four assigned output functions using direct sequence spread spectrum (DSSS) wireless technology at 900MHz. It provides a robust link with a base unit in congested radio environments. SmaRT handheld units feature seamless association to a SmaRT Base Unit without the need to open either the handheld or base unit case.

The handheld enclosure is constructed of rugged high-impact polymer with a polycarbonate face plate securely sealed and attached by eight screws. It is further protected by a removable rubber bumper that covers the back and sides of the unit extending beyond the recessed faceplate. The convenient lanyard attaches to the unit through a recess on the bottom of the rubber bumper.

The handheld is powered by three size AAA batteries. Three status/diagnostic LEDs are visible on the handheld faceplate as shown in Figure 2 below.

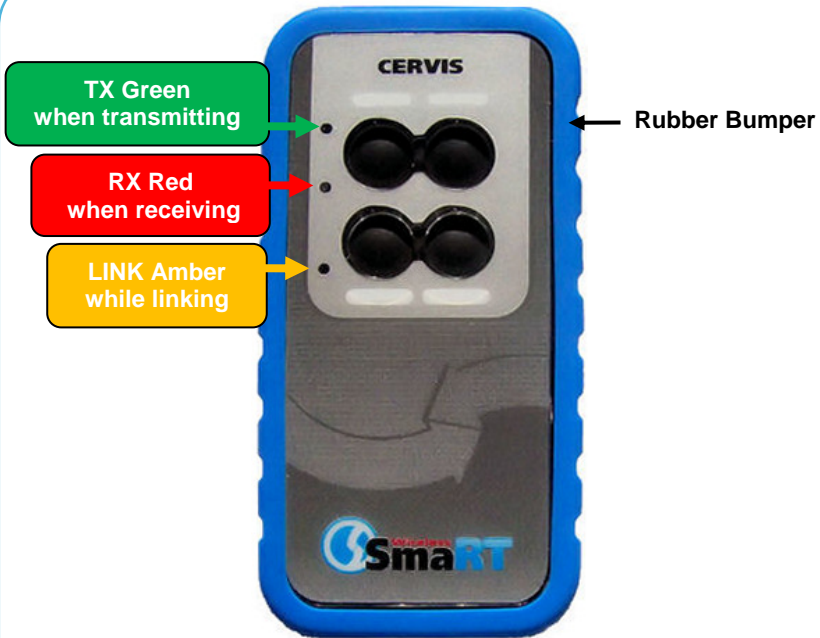


Figure 2. PTO-904

1.1 Features

- Compact weatherproof design
- Four function Push-To-Operate (PTO) buttons
- Internal antenna
- 300ft. (100m) range
- License free frequency, 900MHz Direct Sequence Spread Spectrum Technology (DSSS)
- Power saving auto-shutdown after 5 sec. of inactivity
- Rugged high-impact polymer enclosure with removable rubber bumper
- Convenient lanyard attaches to the unit through the bumper
- Three diagnostic LEDs
- Operating temperature: -20°C to +55°C (-4°F to 131°F)
- Storage temperature: -40°C to +55°C (-40°F to 131°F)
- Powered by three AAA Batteries (+3.6VDC to 4.5VDC)


1.2 Handheld ↔ Base Unit Communication

A standard SmaRT System comes with one Handheld Remote and one SmaRT Base Unit. Each base unit is capable of communicating with up to eight Handheld Remotes. Each handheld must first establish a communications link with the base unit before the base unit will recognize the handheld unit. This process is called Association.

1.2.1 Handheld ↔ Base Unit Association

Handheld ↔ Base Unit Association is established using the following steps:

1. Remove power from the base unit.
2. Stand near the base unit in line of sight with the handheld in your hand.
3. Simultaneously press and hold the Association and Disassociation buttons (see Figure 3). The TX LED lights steady green.
4. Continue to hold both buttons for the five seconds it takes for the LINK LED to begin flashing amber.
5. When the LINK LED flashes amber, release the two buttons. The RX LED flashes red allowing two (2) seconds for you to make the next button press.

 **Note:** *If the next button press is not performed within the two second interval that RX flashes red, the Association procedure is aborted and must be started anew to establish the communication link.*

6. Press and hold the Association button (see Figure 3 below). The RX LED extinguishes, the TX LED lights steady green, and the LINK LED lights steady amber.
7. Apply power to the base unit while continuing to hold the Association button.

The base unit and handheld begin to establish a communication link while the Association button is held. Once the process is complete, the amber LINK LED extinguishes, the RX LED begins flashing red, and the TX LED lights steady green and remains so until the Association button is released.

8. Release the Association button.

The RX LED extinguishes, the TX LED flashes green for a brief time and then it too goes out. The SmaRT 904 System is ready for use with that particular handheld remote.

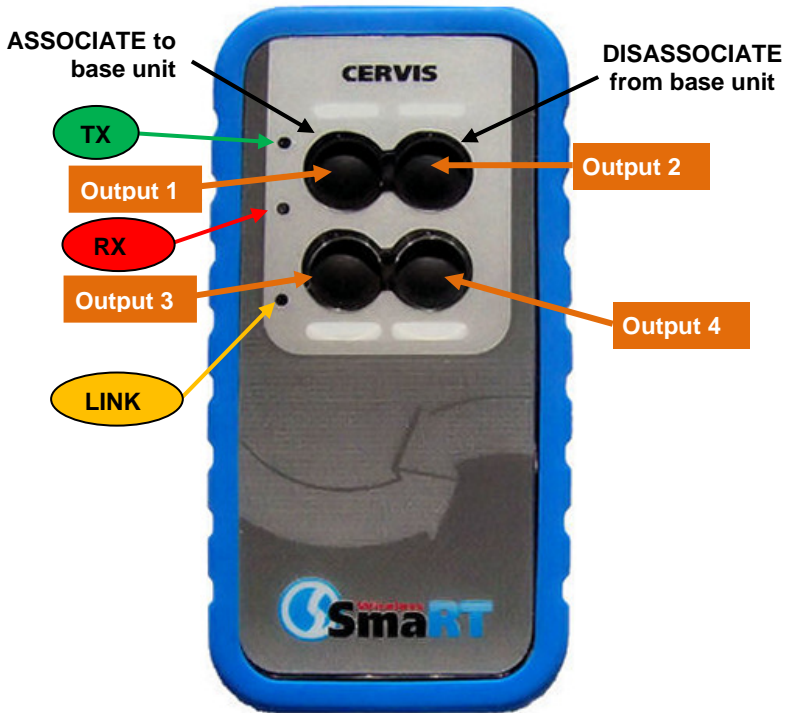


Figure 3. Handheld PTO Buttons

1.2.2 Handheld ↔ Base Unit Disassociation

In some circumstances it may become necessary to break the communication link, or disassociate a handheld and a base unit. The Disassociation procedure is almost identical to the Association procedure, except the Disassociation button is used and held throughout the process instead of the Association button.

CAUTION



Using the following steps will break all previously established handheld remote links. It will be necessary to perform the Association Procedure (1.2.1 above) using each handheld to re-establish communication links with a base unit.

1. Remove power from the base unit.
2. Stand near the base unit in line of sight with the handheld in your hand.
3. Press and hold both the Association and Disassociation buttons (see Figure 3). TX lights steady green.
4. Continue to hold both buttons for the five seconds it takes for the LINK LED to begin flashing amber.
5. When LINK flashes amber, release both buttons. The RX button flashes red allowing two (2) seconds for you to make the next button press.

✓ **Note:** *If the next button press is not performed within the two second interval that RX flashes red, the procedure is aborted and must be started anew to break the link.*

6. Press and hold the Disassociation button. (See Figure 3 above.) The RX extinguishes, the TX lights steady green, and the LINK LED lights steady amber.
7. Apply power to the base unit while continuing to hold the Disassociate button.

The base unit and all previously linked handhelds begin to Disassociate communications links. Once the Disassociation is complete, the amber LINK led extinguishes, the RX begins flashing red, and the TX lights steady green and remains so until the button is released.

8. Release the Disassociate button. The RX LED extinguishes, the TX LED flashes green for a brief time and then it too extinguishes.

The Smart base unit will not communicate with any handheld remote units. A handheld remote must use the Association Procedure (1.2.1) to re-establish a communication link with the base unit.

2.0 Battery Installation or Change

The SmaRT handheld unit is powered by three size AAA batteries. 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. Remove the four small Phillips screws from the Battery Compartment cover and lift the cover from the handheld.
2. If installing batteries in an empty battery compartment, install three fresh size AAA batteries. Be sure to position the batteries as shown in Figure 4 below.

If replacing expired batteries, remove the old batteries and install three fresh size AAA batteries. Be sure to position the batteries as shown in Figure 4 below.

3. Replace the compartment cover and tighten the four Phillips screws. These screws should not be over-tightened, but they should be tight enough to assure the gasket provides a proper seal.

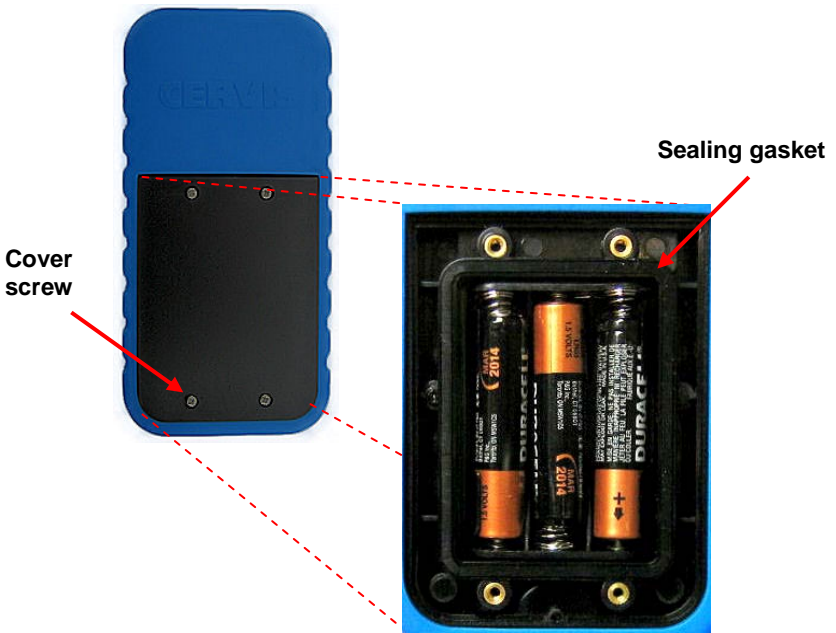


Figure 4. Handheld Battery Installation

✓ **Note:** Cover screws must be tightened enough to assure the sealing gasket is compressed. Do not over-tighten the screws.

CAUTION



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

3.0 Using the SmaRT PTO-904 Handheld Remote

The front panel of the SmaRT PTO-904 Handheld Remote has four (4) push-to-operate buttons and three (3) diagnostic LEDs. PTO buttons 1 and 2 have dual functions as described in Figure 5.

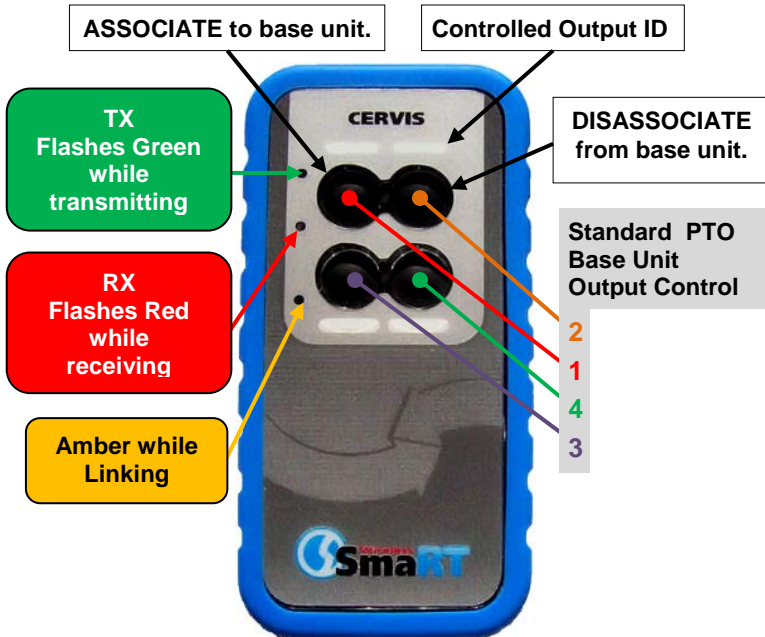


Figure 5. PTO-904 Front Panel

4.0 Handheld Operation

1. Communication between the handheld and base unit must be established using the Association Procedure (1.2.1).
2. You must be line of sight of the base unit while holding the handheld, within 300 ft. (100m) of the unit.
3. Each button is Push-To-Operate (PTO). Each is dedicated to its assigned (or hardwired) output driven by the base unit. The output is only controlled when the appropriate button is pressed and held.

5.0 Specifications

Item	Description	
Power	V_{in}	+3.6V to +4.5V
	Batteries	Three (3) AAA
	Auto-shutdown	5 Sec. of button inactivity
Environment	T_{Operating}	-20°C to 55°C (-4°F to 131°F)
	T_{Storage}	-40°C to 55°C (-40°F to 131°F)
	Humidity	0 to 100%
Radio	Frequency	906-924MHz
	RF_{power}	1mW
	License	License free
	Modulation	DSSS
	Antenna	Internal
Enclosure	Dimensions	mm: 136.38 x 68.96 x 28.42 Inches: 5.37 x 2.68 x 0.92
	Total Weight	200 gr./7.2 oz. (with lanyard)
	Durability	High Impact Polymer case Polycarbonate faceplate Impact absorbing bumper
Indicators	Green	Transmit
	Red	Receive
	Amber	Link
Control Functions	Four	Pushbuttons
	Style	Push-to-operate
	Button Life	5-million operations (typical)


6.0 Spare Parts List

Item	Part Number
Protective Rubber Bumper	RB-1001
Lanyard	LY-1002
Battery Cover with 4 Screws	BC-1003
AAA 1.5V Alkaline Batteries (pk. 3)	AB-1004



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