PG-212JS and PG-912JS

Pistol Grip Handheld Remote User Manual

U070.2-SmaRT_PG-x12JS_HHR

FCC Statements

15.19 – Two Part Warning

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

(1) This device may not cause harmful interference and

(2) This device must accept any interference received, including interference that may cause undesired operation.

15.21 – Unauthorized Modification

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

15.105(b) – Note:

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

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

Industry Canada Statement

This device complies with Canadian RSS-210.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc-ca/rpb.

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.

Cervis, Inc.

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The following only applies to PG-212JS handheld remotes.

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

This product may contain material that may be hazardous to human health and the environment. In compliance with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE):

- ✓ Do not dispose of the product as unsorted municipal waste.
- ✓ This product should be recycled in accordance with local regulations. Contact local authorities for detailed information.
- ✓ This product may be returnable to the distributor for recycling. Contact your distributor for details.

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Cervis Inc. Safety Precautions

- ✓ ***Read and follow all instructions.***
- ✓ ***Failure to abide by Safety Precautions may 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.***
- ✓ ***Owner/operators of the equipment must abide by all applicable Federal, State, and Local laws concerning installation and operation of the equipment. Failure to comply could result in penalties and could void user authority to operate the equipment.***
- ✓ ***Make sure that the machinery and surrounding area is clear before operating. Do not activate the remote control system until certain that it is safe to do so.***
- ✓ ***Turn off the handheld remote and remove power from base units before attempting any maintenance. This will prevent accidental operation of the controlled machinery.***
- ✓ ***Power can be removed from the base units by detaching the 12-pin cables from the base unit wiring harness 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 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 result in destruction of or damage to the unit.***
- ✓ ***Operate and store units only within the specified operation and storage temperatures defined in the specifications of this document.***

1.0 SmaRT PG-212JS and PG-912JS Handheld Remote

✓***Note:*** *Frequency of operation for a SmaRT handheld remote will be in the 2.4GHz or 900MHz range. The first number in the name of the system or device indicates the frequency of operation. For instance, a SmaRT pistol grip handheld remote will either be PG-212JS or PG-912JS, where a 2 indicates 2.4GHz and 9 indicates 900MHz frequency of operation. As such, reference to the, handheld remote, base unit, or system in this manual may use x rather than a 2 or 9 in the name to indicate the frequency of operation.*

The SmaRT PG-x12JS is designed for traditional and non-traditional mobile applications. Capable of activating and deactivating the input/outputs of SmaRT base units, the ergonomic layout of the handheld remote provides for comfortable remote operation of the SmaRT system.

Using direct sequence spread spectrum (DSSS) wireless technology at system-dependent 2.4GHz or 900MHz frequency range to communicate, the SmaRT PG-x12JS handheld remote provides a robust link with a base unit in congested radio environments. The handheld remote allows seamless association to a SmaRT base unit without the need to open the case of either unit. The rugged weatherproof handheld enclosure allows the unit to operate worry free in harsh weather conditions.

Figure 1. SmaRT PG-x12JS Handheld Remote Control Unit Example

1.1 Handheld Features

- Direct sequence spread spectrum technology (DSSS) at 2.4GHz or 900MHz
- Direct-line-of-sight operation
- Three toggle multiple function control
- Two dual or single axis joystick controls
- Spring return trigger for digital or proportional control
- Oversized Machine Stop
- Custom control programming available
- Controls a full line of SmaRT base units
- Optional umbilical CAN Bus operation
- Four status and diagnostic LED indicators
- Low voltage warning LED indication
- Critical low voltage auto-shutdown
- Variable inactivity time-out
- Rugged high-impact polymer/polycarbonate/aluminum enclosure
- Weatherproof design
- Magnets integrated into the handle for convenient attachment to ferrous metal surfaces helps avoid misplacing the handheld remote (see Figure 4)
- Operates at 1.6 – 3.2VDC (four AA batteries) with nominal battery life of 100 hours

1.2 Standard Switch and Joystick Identification

The standard PG-x12JS has three toggle switches, two single or dual-axis joysticks, a machine stop button, and a spring-return trigger. Units configured for CAN Bus communications have an umbilical port at the base of the handheld remote handle as shown in Figure 3.

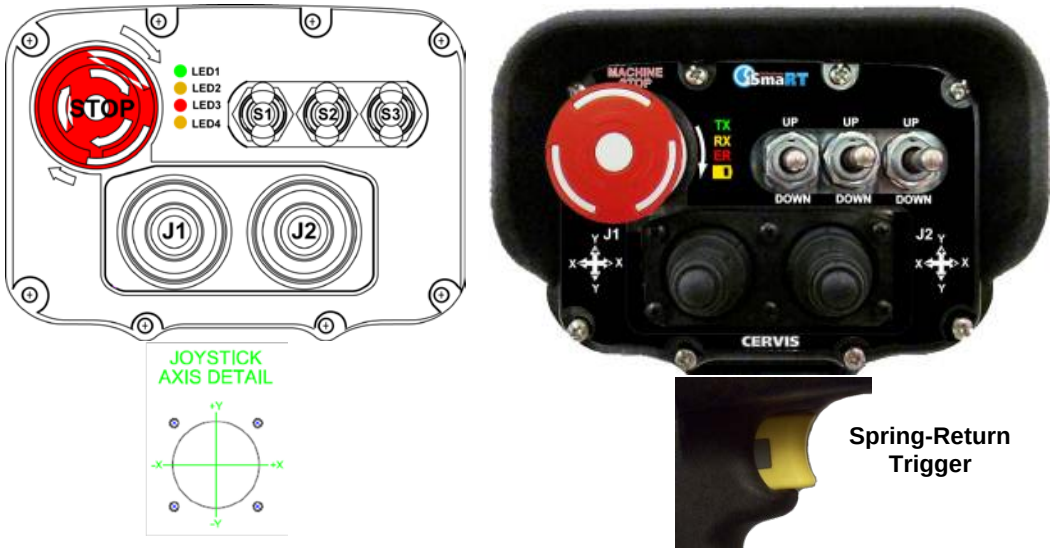
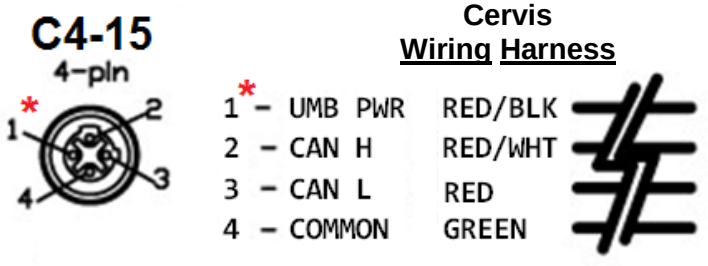


Figure 2. Top Plate Switch and Joystick Layout

1.3 Optional Umbilical CANbus Connector

The PG-x12JS option affords the opportunity to connect to the base unit using an umbilical cable as a backup. The keyed CANbus connector is located at the base of the handheld remote handle. When not in use, the connector is protected by an aluminum cap that is attached to the handle by a chain to keep it from being misplaced when removed for use as illustrated in Figure 3 below. Cervis offers a selection of umbilical wiring harnesses fit for use with the PG-x12JS handheld remote. For details, please contact your Cervis representative.

PG-212JS Optional Keyed Umbilical Connector
(base of the handheld remote handle)



***CAUTION**

Umbilical Power is +5VDC derived from the base unit to which it is connected. Do not connect to 12 or 24V battery power or any power source other than the base connector UMB PWR to C4-15 Pin-1.

Figure 3. Umbilical Connector and CANbus Wiring

1.4 Standard Remote Switches

Table 1. Standard Remote Switches

Switch/Button	Function	Description	Default
S1 UP	Output control	3 position momentary or latch	Center (no command)
S1 DOWN	Output control		
S2 UP	Output control	3 position momentary or latch	Center (no command)
S2 DOWN	Output control		
S3UP	Output control	3 position momentary or latch	Center (no command)
S3 DOWN	Output control		
PB1 Down	Machine stop Handheld disabled	2-position maintained Spring-loaded mushroom style CW twist to release (enable) Depress to stop (disable)	Down (unit off)
PB1 Up	Handheld enabled		
J1 +Y	Proportional output control	Dual axis open gated joystick	Center (no command)
J1 -Y	Proportional output control		
J1 +X	Proportional output control	Dual axis open gated joystick	Center (no command)
J1 -X	Proportional output control		
J2 +Y	Proportional output control	Dual axis open gated joystick	Center (no command)
J2 -Y	Proportional output control		
J2 +X	Proportional output control	Dual axis open gated joystick	Center (no command)
J2 -X	Proportional output control		
Trigger	Joystick enable Switch enable Proportion control	Spring-loaded return to full extension	Extended (no command)

1.5 Remote LEDs

The standard PG-x12JS handheld remote has four LEDs that are used to relay operating status and for troubleshooting when needed.

Table 2. Handheld Remote LEDs

LED	Color	Indication	Meaning
TX	Green	Blinking Solid	Transmitting, no switch active Transmitting, switch active
RX	Amber	Blinking Solid	Receiving, no output of interest active Receiving, output of interest active
ER	Red	Lit	Indicates error with belt pack remote Indicates that the system is not enabled
	Amber	Lit	Low battery indication

Although the LEDs are shown in Table 2 and in the previous illustrations in color on the faceplate label, the colored LEDs are protected by the faceplate and label. The areas of the label covering the LEDs are transparent allowing the LEDs when lit to be observed and used for status and system troubleshooting.

2.0 PG-x12JS Pistol Grip Battery Installation

✓***Note:*** *PG-x12JS Pistol Grip remotes are shipped from Cervis 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.*

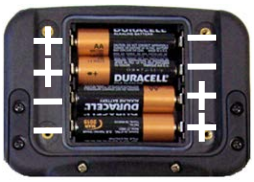
This SmaRT handheld unit is powered by four size AA alkaline batteries. The battery compartment – located on the back of the pistol grip as shown in Figure 4 – is sealed with a cover attached to the unit by four Phillips screws sufficiently tightened to compress an O-ring to seal out moisture. The battery compartment is accessed by loosening the screws enough, which remain attached to the cover, and removing the cover. 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:

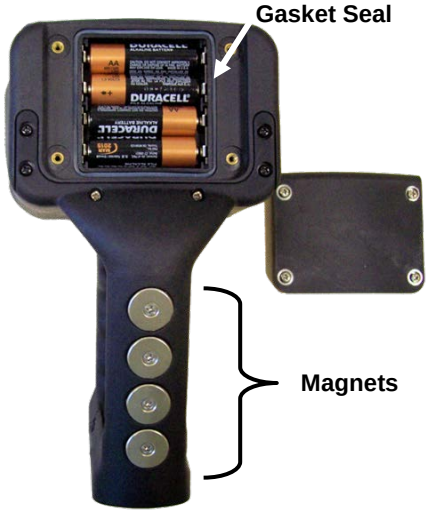
1. Loosen the four Phillips battery compartment cover screws on the rear of the remote and lift the cover from the handheld.
2. Install (or replace with) four (4) fresh size AA batteries. Determine which type of battery enclosure is used. Observe the proper polarity by positioning the batteries as shown in Figure 4.
3. Replace the compartment cover and tighten the four Phillips screws. These screws should not be over-tightened, *but they must be tight enough to assure the gasket provides a proper seal.*

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

Type 1 Battery Enclosure
(prior to March 2013)



Each pistol grip battery compartment contains labeled battery polarity.
(Not shown here. Labels are beneath the batteries.)



Type 2 Battery Enclosure
(circa March 2013)

Figure 4. Pistol Grip Battery Installation

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

3.0 PG-x12JS Pistol Grip Associate Mode

✓***Note:*** *All remote control system remotes and base units are associated—communication links are established—before they are shipped from Cervis. It is not normally necessary to associate your system when it arrives. But, there are circumstances when it may become necessary to establish the communications link between remote and base unit while in the field. Associate Mode allows this.*

The Associate mode is used to establish the communication link between the pistol grip remote and the base unit. There must be a clear line of site between the handheld and the base unit, and both units must initially be powered down (OFF) to begin the associate procedure. The pistol grip remote is turned OFF by pushing in the oversized mushroom STOP button. The base unit is safely powered down by removing the power source from the unit.

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

Associate PG-x12JS Remote to Base Unit (See Figure 5)

1. Stand near to the base unit with the pistol-grip remote **OFF** and **power removed** from the base unit (disconnect P1 and P2 or turn the source power OFF).
2. Release the **STOP** button on the handheld by twisting it **clockwise**.
3. Push and hold **SW1 DOWN** and then immediately push and hold **SW2 UP**. All four LEDs light solid.
4. Observe the LEDs. When RX goes OFF, power up the base unit. When the RX LED blinks, release **SW1** and **SW2**.

A successful Association is indicated when LEDs TX and RX are rapidly blinking while the Battery and Error LEDs are unlit.

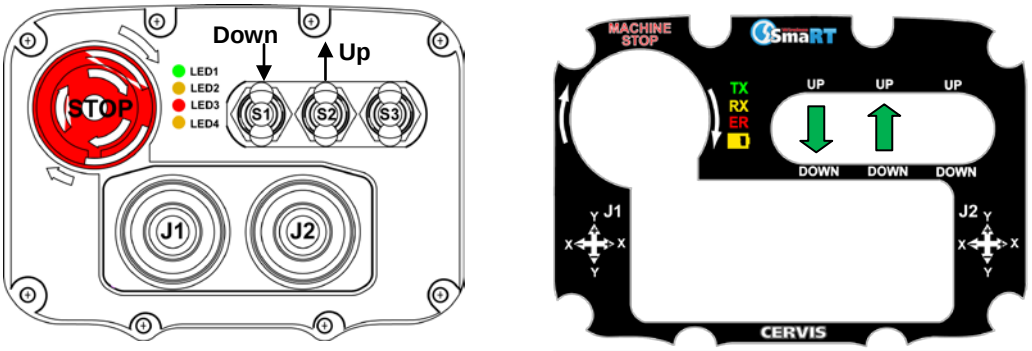


Figure 5. Switch Actuation for Associate Mode

4.0 PG-x12JS Pistol Grip Operation

The PG-x12JS pistol grip remote control is ready to operation when the batteries are installed and the unit is Associated to the base unit.

4.1 To Start And Stop The Unit

1. Twist the Machine Stop button clockwise. The spring loaded button snaps into the UP position thus powering and enabling the handheld remote for use.
2. Activate any toggle switch. Initial activation of the chosen switch *will not* engage operation of its mated base unit output. Activation of any output controlling switch thereafter – once the handheld is enabled – w*ill control* the switch output.
3. Push the large red Machine Stop button down to stop operation of the base unit outputs and disable the handheld remote.

4.2 Toggle Switch Operation

Toggle switches S1, S2, and S3 are three position toggles with the center position as neutral (inactive). Up (+) and Down (–) positions command output control.

4.3 Joystick and Trigger Operation

Typical joystick operation is proportional control for the X axis and Y axis activation. The Minimum and Maximum are independently set for each of the two axes (see Heading 4.0).

The trigger must be fully engaged before the joystick will respond to position commands. That is, the joystick will remain inactive until the PG-x21JS trigger is fully depressed and will only remain active while the trigger is depressed. Release of the trigger while the joystick is positioned stops the output command.

If the trigger is depressed when the joystick has been positioned to any position except center (neutral, no command), the output will not respond as no signal is sent until the joystick is centered and then the trigger is first fully engaged (depressed).

5.0 PG-x12JS Joystick Min and Max Adjustment

Adjust Mode is entered by holding S1 and S3 down for ≈five seconds while the controller is on (initial release of the STOP button and then activation of any function switch).

When adjusting the Maximum note that the output will ramp immediately to the current maximum value when the TRIGGER and JOYSTICK is operated. There is no control by the joystick other than to initiate the output signal at the current maximum value. It should be expected that it may jump or accelerate to maximum speed very quickly depending on the ramp rate we select.

The Joystick adjust mode allows individual adjustment of Minimum and Maximum of the joystick. The Adjust Mode variable is indicated by the following particular BATT and ERR LED patterns:

X Axis MIN	**Blink…Pause…Blink…Pause…etc.**
Y Axis MIN	**Blink …Blink…Pause…Blink…Blink…Pause…etc.**
X Axis MAX	**Blink…Blink…Blink…Pause…Blink…Blink…Blink…Pause…etc.**
Y Axis MAX	**Blink…Blink…Blink…Blink…Pause…Blink…Blink…Blink…Blink…Pause…etc.**

- All adjustments are made while the Joystick is in the Positive (UP or Right) position. Reverse values are automatic, negative mirrors of positive settings.
- The STOP switch exits the adjust mode after storing (S2 UP).
- After adjustment, the full travel of the joystick will take the system from minimum to maximum speed and distribute the full resolution of the joystick over this range.
- The adjust mode can be aborted by operation of the STOP switch. This also shuts off the handheld.

5.1 Minimum Command Adjust

✓***Note:*** *It is important in Step 3 below NOT to operate the Joystick*

1. Release the Machine Stop button by twisting it clockwise.
2. Active the handheld by moving any function switch (S1, S2, or S3).
3. Hold down **S1** (**S1-**) and **S3** (**S3+**) switches simultaneously for five (5) seconds. The system will enter the adjust mode at the end of the five seconds indicated when both the **BATT** and **ERR LEDs** flash in unison.
4. Release S1 and S3. Battery LED continues to flash. This indicates that you are now in Adjust Mode, default Deadband Adjust. The unit will remain in Adjust Mode for 10 seconds of ***inactivity***. If there is no switch or joystick activity within the 10 second window of opportunity, the unit returns to normal operating mode.
5. Move Joystick 1 –X Axis to it maximum position (left).
6. While holding the joystick in its max position, adjust the Deadband using S3. Each toggle UP of S3 increases the value. Each toggle DOWN of S3 decreases the value. Each switch action results in one blink of the Error LED. The value will ramp if S3 is held in position (UP or DOWN) during which time the Error LED will blink per value change.
7. Push S2 UP. The BATT LED will flash once indicating the value change is stored.
8. Repeat Steps 5 through 7 for each joystick position.

When the desired Deadband adjustments are made and saved, you can choose to go directly to Maximum Command Adjust while still in Adjust Mode by holding S1 DOWN and S3 UP, or you can exit Adjust Mode.

5.2 Maximum Command Adjust

Maximum command is a point at the upper end in that any electrical signals above this amount result in no additional hydraulic response. Any joystick stroke which varies the system output above the maximum command point is also effectively “wasted”.

Each joystick position (+X Axis, –X Axis, +Y Axis, and –Y Axis) for both J1 and J2 is individually adjusted and the value saved in the same manner.

1. Pull up the Machine Stop button.
2. Activate the handheld remote by activating any function switch.
3. Enter Adjust Mode by holding S1 and S3 until the Battery LED begins to flash.
4. Release S1 and S3. Battery LED continues to flash. This indicates that you are now in Adjust Mode, default Deadband Adjust. The unit will remain in Adjust Mode for 10 seconds of ***inactivity***. If there is no switch or joystick activity within the 10 second window of opportunity, the unit returns to normal operating mode.
5. Hold S1 DOWN and S3 UP and release. The BATT LED will light STEADY indicating you are now in Max Command Adjust Mode.
6. Move Joystick 1 –X Axis to it maximum position (left).
7. While holding the joystick in its max position, adjust the Max Command using S3. Each toggle UP of S3 increases the value. Each toggle DOWN of S3 decreases the value. Each switch action results in one blink of the Error LED. The value will ramp if S3 is held in position (UP or DOWN) during which time the Error LED will blink per value change.
8. Push S2 UP. The BATT LED will flash once indicating the value change is stored.
9. Repeat Steps 5 through 7 for each joystick position.

When the desired Max Command adjustments are made and saved, you can choose to go directly to Deadband Adjust while still in Adjust Mode by holding S1 and S3 DOWN, or you can exit Adjust Mode.

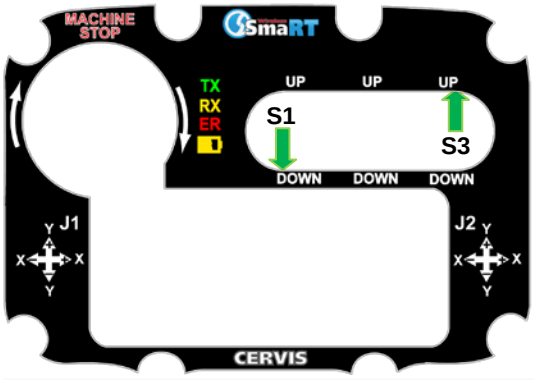


Figure 6. Enter Adjust Mode

6.0 SmaRT Remote Control Specifications

Table 3. PG-212JS and PG-912JS Pistol-Grip Specifications

Item	Description	
Power	**V_{in}**	+1.6V to +3.2VDC
	Batteries	Four (4) AA
	Battery Life	100 hours (nominal)
	Low V Shutdown	1.6VDC
	Auto-shutdown	variable
Environment	**Operating Temp**	-20°C to 55°C (-4°F to 131°F)
	Storage Temp	-40°C to 55°C (-40°F to 131°F)
	Humidity	0 to 100%
Radio	**Frequency**	2405-2480MHz (PG-212JS) 906-924MHz (PG-912JS)
	RF Signal	4.3mW (PG-212JS) 1mW (PG-912JS)
	License	License free
	Modulation	DSSS
	Antenna	Internal
Enclosure	**Dimensions**	mm: 230.6x133.9x146.9 inch: 9.1 x 5.3 x 5.8
	Total Weight	≈3lbs ≈1.36kg
	Durability	High Impact Polymer case
	Faceplate	Aluminum or Polycarbonate
Indicators (4)	**LEDs**	
	TX	Blinking – transmitting, no switch active
		Solid – transmitting, switch active
	RX	Blinking – receiving, no output of interest active
		Solid – receiving, output of interest active
	ERR	Indicates error with handheld remote
	BATT	Low battery indication
Control Switches	**Toggle**	Three 3-position, center-detent push-to-operate toggle switches; momentary or latch
	Trigger	Joystick Enable or digital control
	Joysticks	Two single or dual-axis; 0-255 bit count signal out
	Mushroom	Oversized pushbutton

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