



# Wireless Emergency Stop

## Rugged Handheld Emergency Stop with SafetySense Wireless



HRI's Wireless Emergency Stop is a handheld remote emergency stop designed from the ground up to enable the safe operation of remote and automated systems. It provides a rugged, ergonomic, and easy to understand system with a flexible receiver that both implement HRI's proprietary SafetySense™ technology to ensure both consistent and reliable control.

### 1. Applications

- Emergency stop of remote, tele-operated, semi- or fully autonomous robotic systems where safety and usability are critical.
- Control of fixed or mobile industrial systems requiring and reliable wireless emergency stop capabilities.

### 2. Key Features (Wireless Emergency Stop – WES)

- SafetySense™ Secure wireless communications with AES128 encryption and range of 1000+ ft
  - Frequency bands include 900 MHz, 2.4 GHz (other bands available)
  - AES256 encryption available upon request
- Guaranteed low latency emergency stop response (300ms default, adjustable up to 5s)
- 1000+ unique system addresses
- 12 hour battery life for continuous use
- Flexible USB charging interface
- RP-SMA antenna connector (antenna included)
- IP65 rated enclosure
- Designed to meet MIL-STD-810 for ruggedness
- -20°C to 60°C operation
- Belt clip and lanyard options available

### 3. SafetySense™ Technology

SafetySense™ Technology consists of major system-level technologies that work together to provide the integrator the ability to design systems with consistent and reliable remote operations.

While the system is constantly monitoring its health, the remote also provides the operator with the ability to intervene. The Wireless Emergency Stop maintains constant, two-way communications with its paired receiver to guarantee that the emergency stop function is active if the button is pressed or communications are ever lost. This is critical for the safety of people and property in dangerous environments and sets SafetySense enabled devices apart from their peers.

#### 4. Specifications (Wireless Emergency Stop - WES)

The Wireless Emergency Stop (WES) is a highly ruggedized wireless remote emergency stop device. It implements HRI's SafetySense™ system to provide reliable control of dangerous systems.

##### 4.1. Specifications

Parameter	Minimum	Typical	Maximum	Unit
Operating Temperature	-20		+60	°C
Charging Voltage	4.5	5	5.5	V
Charging Current			1.5	A
Battery Life		12		Hours
Ingress Protection	IP65			
Ruggedness	Designed to meet MIL-STD-810			
Weight		310		g
Radio Connector		RP-SMA		
Charging/Programming Connector		Sealed Mini USB with dust plug		
RF Transmit Power <sup>1</sup> (900MHz)			140	mW
RF Transmit Power <sup>1</sup> (2.4GHz)			100	mW
RF Receive Sensitivity	-101			dBm
RF Spread Spectrum		FHSS		
Data Security <sup>2</sup>		AES 128		optional

**Table 1 - Safe Remote Control Specifications**

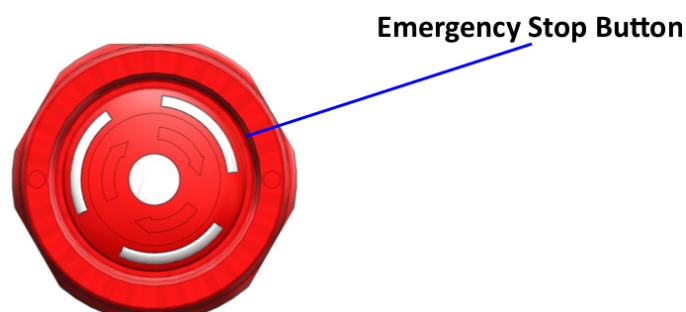
Notes:

1 – Transmit power limited by regulatory requirements. Higher powers available for specific use. Please enquire for details.

2 – Export controls may apply.

##### 4.2. Control Layout

The WES have a very simple control layout. The top the WES is dominated by a twist to unlock emergency stop button.



**Figure 1 - WES-001 Top View**

Red Emergency Stop LED Behavior	Description	Emergency Stop State
Solid Red	Emergency Stop button pressed Searching for network	Stopped
Red Blink Once Every Second	Connected with low signal strength	Operating
Red Blink Once Every Three Seconds	Connected with high signal strength	Operating
Fast Red Blink	Error connecting to system or in bootloader mode (if turned on with estop button in)	Stopped
Off	Powered off	Stopped

Table 2 - Emergency Stop LED Behavior

The bottom of the WES contains the mini-USB plug for charging and configuration, an RP-SMA antenna connector, and the power button.

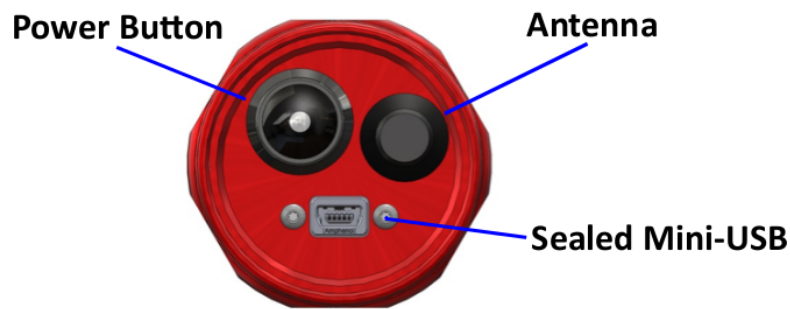


Figure 2 - WES-001 Bottom View

Green Power Button LED Behavior	Description
Solid Green	USB plugged in: Battery fully charged
Slow Green Blink	USB plugged in: Battery charging USB Unplugged: Battery below 20% charge
Fast Green Blink	USB Unplugged: Battery below 10% charge or in bootloader mode (if turned on with estop button in)
Off	Red Estop LED Off: WES off Red Estop LED On Solid or Blinking: WES searching for network

Table 3 – Power Button LED Behavior

#### 4.3. Bootloader Mode

The WES supports firmware upgrades in the field. In order to support this feature, the WES can be placed into bootloader mode. In this mode the wireless link is not active, so it will not connect to the receiver (VSC). This mode is entered whenever the WES is powered on with the Emergency Stop button depressed. Contact HRI for more details and requirements for firmware upgrades.

#### 4.4. Mechanical



Figure 3 - WES Mechanical Drawing

## 5. Installation

### 5.1. WES Wireless Integration

The WES is designed to be paired with any of HRI's Vehicle Safety Controllers (VSC). The VSC receiver provides dual enable outputs that are designed to be used to control any system that needs to be stopped remotely. It also has USB, serial, or CAN interfaces that can be used to integrate the system with other intelligent control systems to get status or configure the emergency stop system. An example of this type of integration is shown below.

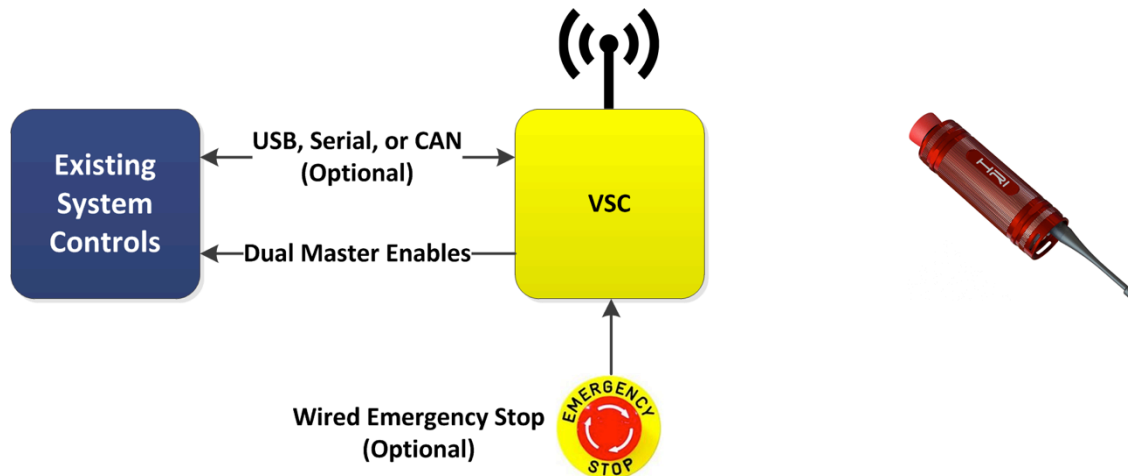


Figure 4 - Simple Receiver Integration

Detailed information on integration interfaces can be found in the system user manual and receiver data sheet.

**Ordering Information**

Part Number	Description
WES-001-(F)	Wireless Safe Remote Control and USB charging cable (F) = Radio Selection 900 : 900MHz FHSS 240 : 2.4GHz FHSS ** Inquire about other frequency bands and power settings  <b>Other colors available. Contact for details</b>

Table 4 - WES Orderable Part Numbers

## 6. Limited Warranty

All products sold by Humanistic Robotics, Inc are subject to the warranty provisions of the Humanistic Robotics Order Confirmation terms and conditions and are warranted against defects in material and workmanship for a period of one (1) year from the date of shipment. If you believe any Humanistic Robotics, Inc product you have purchased has a defect in material or workmanship or has failed during normal use within the warranty period, please contact Humanistic Robotics, Inc for assistance. If product repair or replacement is necessary, the Customer will be solely responsible for all shipping charges, freight, insurance and proper packaging to prevent breakage in transit, whether or not the product is covered by this warranty.

This warranty does not apply to defects resulting from any Customer actions, such as mishandling, improper interfacing, operation outside of design limits, misapplication, improper repair, or unauthorized modification. No other warranties are expressed or implied. Humanistic Robotics, Inc specifically disclaims any implied warranties of merchantability or fitness for a specific purpose and all warranties arising from course of dealing and/or trade usage. Humanistic Robotics, Inc.'s liability shall be limited to the actual purchase price of any defective unit or units of equipment to which a claim is made, and shall in no event include the Customer's manufacturing costs, lost profits or goodwill, or any other direct, indirect, special, incidental, consequential or punitive damages whether based on contract, tort or other legal theory. Humanistic Robotics, Inc shall not be liable for normal manufacturing defects or customary variances from specifications.

Products sold by Humanistic Robotics, Inc are not designed, intended or authorized for use in applications intended to sustain or support life, in any nuclear facilities or any other application where the failure of the product could create a situation where catastrophic property damage, personal injury or death may occur. In the event that the Customer purchases or uses any Humanistic Robotics, Inc products for any such unintended or unauthorized application, the Customer shall indemnify and hold harmless Humanistic Robotics, Inc and its officers, directors, employees, agents, affiliates, successors and assigns against all claims, costs, damages and expenses (including reasonable attorneys' and expert witness' fees) arising out of or in connection with, directly or indirectly, any claim for property damage, personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Humanistic Robotics, Inc was negligent regarding the design or manufacture of the subject product.

**7. Revision History**

Version	Date	Changes
-01	8/28/14	Initial Release
-02	1/7/14	Updated LED states with bootloader information

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