

**ALERT SAFETY PRODUCTS**

Forklift Warning Systems

**Improving Safety With Technology**



**With Hercules 2S Microwave Sensors**

## **User's Manual**

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- **Installation & Operation (Page 2 & 3)**
- **Microwave Sensor Setup (Page 4)**
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**ALERT Safety Products Inc.**  
11435A Williamson Road  
Cincinnati, OH 45241  
513-791-4790  
[ALERTSafetyProducts.com](http://ALERTSafetyProducts.com)

2S Rev 1b

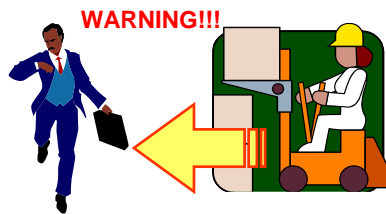
# Bi-Directional Worker ALERT

ALERT Safety Products 513-791-4790

## Introduction

The Bi-Directional Worker ALERT is activated when a vehicle travels towards either microwave sensor. The BDWA has separate output for each sensor to indicate the direction that the vehicle is coming from. It will not activate on vehicles traveling away from the sensor.

Bi-Directional Worker ALERT is a warning device that alerts workers at blind corners or intersections of an approaching forklift.



### How It Works

The Bi-Directional Worker Alert (BDWA) has 2 Hercules 2S microwave sensors that detect vehicles and pedestrians as they travel towards the sensors. The BDWA can be used to activate our directional CAUTION sign or other device to warn traffic that is also approaching the intersection. Once the forklift, pedestrian or other vehicle travels out of the sensor field the BDWA will timeout and turn the warning off. The BDWA Hercules 2S sensors have independent outputs for vehicles and pedestrians so the pedestrian field can be made smaller than the vehicle field if pedestrian detection is enabled. The sensors will not activate on pedestrians or vehicles traveling away from the sensors.

### Bi-Directional Worker Alert Components

The Bi-Directional Worker Alert System consists of a BDWA control box, 2 Hercules 2S microwave sensors with a remote control and an AC adapter. The low voltage (16VAC) Class II plug-in AC adapter needs to be installed within 100' of the BDWA control box with user supplied 2 conductor 18 gauge wire.



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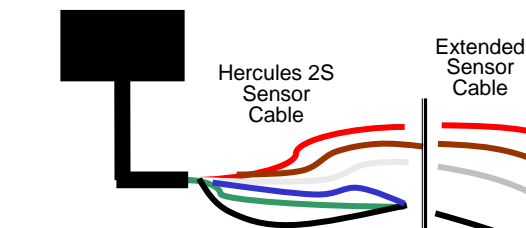
## Installation & Operation

Bi-Directional Worker ALERT has been carefully designed so that the user can install it with common tools. Just follow these steps.

### Extending the 2S Sensor Cable

If the microwave sensors can not be located within 20' of the BDWA control box you can splice up to 100' of additional cable on the sensors. Connect the sensors to the "Sensor Terminal" in the BDWA as shown below. We recommend using 22 gauge multi-conductor control cable such as Belden #8443 or similar cable. You can remove the back panel from the sensor and wire a longer cable directly to the sensor terminals as shown below or splice to the existing sensor cable.

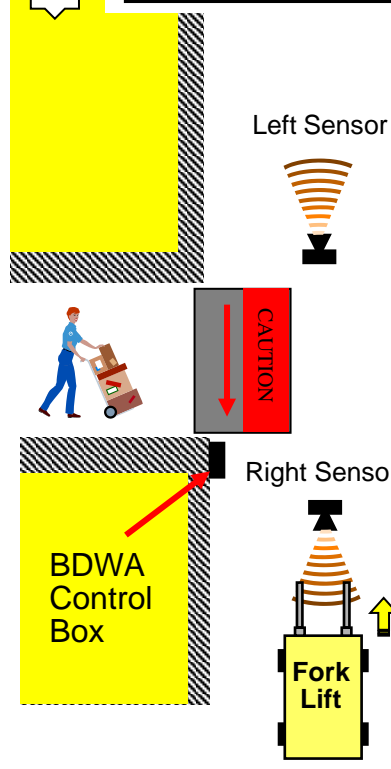
Multiple "Auxiliary" sensors can be wired to the sensor input terminals in the BDWA as shown below.



Sensor Cable & Ter #	BDWA Terminal
+12V Red (2)	+12V
Output 1 White (3)	Lt or Rt
Output 1 Gnd Green (5)	Gnd
Output 2 Brown (6)	Lt or Rt
Output 2 Gnd Blue (7)	Gnd
Ground Black (1)	Gnd

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### Mount the BDWA Components



Mount the sensors at a height of 8' to 23' close to the middle of the aisle pointing towards the approaching traffic. Set the angle of the sensor at 60 degrees for a detection field of 25' to 45' from the sensor. The sensor is adjustable in 15 degree increments from 0 degrees to 90 degrees. 0 degrees is pointing directly at the ground.

Mount the control box at a convenient location close to the sensors. The sensor cables are 16' long.

Mount the warning device at the place where workers need to be alerted of the approaching vehicle.

The AC adapter plugs into a standard 120VAC outlet and should be located within 100' of the BDWA control box.

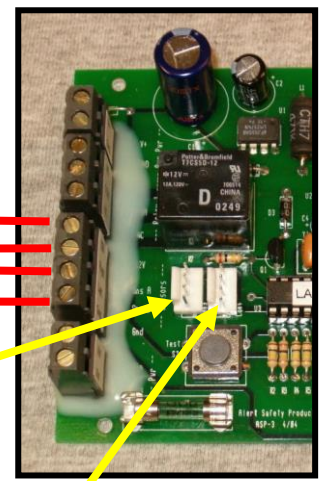
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### Connect the Sensors

The microwave sensor plugs into the BDWA control board as shown below.



Left Sensor housing plugs in here.



Right Sensor housing plugs in here.

Sensor Outputs #1 and #2 are wired together on each 2S sensor (pedestrian & vehicle fields).

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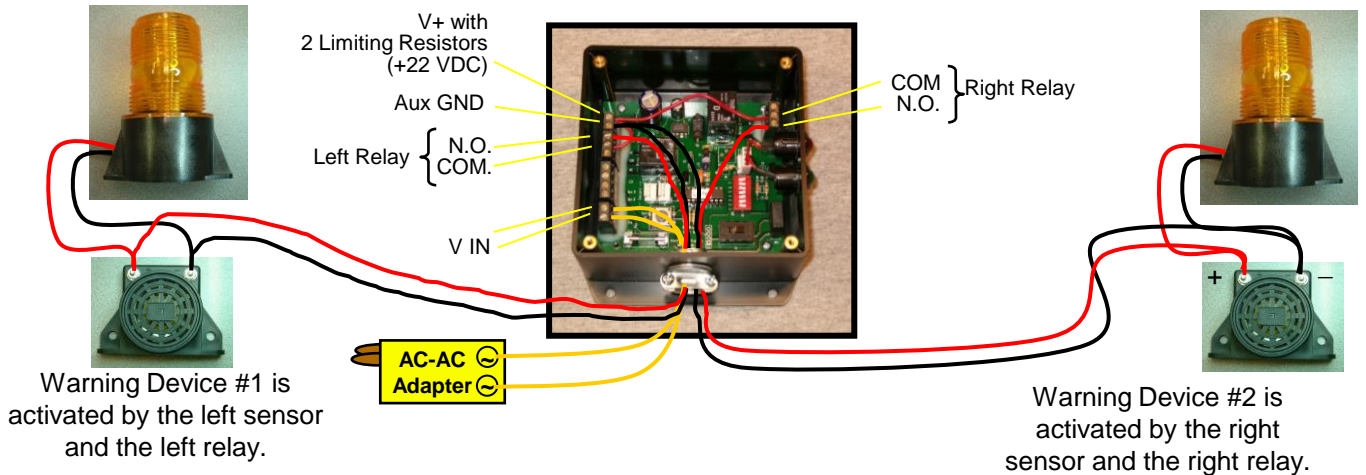
## Installation & Operation

Use 2 conductor 18 gauge cable for the AC Adapter and 22 gauge cable for the warning devices.

The sensors should be mounted so they are pointing directly towards the approaching traffic. If they need to be swiveled they can be mounted on a 4" angle bracket using the center hole in the sensor bracket. This is shown on page 3 "optional ceiling mounting" in the Bircher 2S sensor manual.

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### Connect the Bi-Directional Worker ALERT Components



- Connect the power terminals (~ and ~) on the AC adapter to the V IN power terminals in the base unit.
- Connect the Warning Devices (-) to the auxiliary power GND terminal.
- Connect Warning Device #1 (+) to Relay #1 N.O. terminal.
- Connect Warning Device #2 (+) to Relay #2 N.O. terminal.

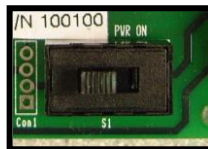
**Note:** The AC Adapter and limiting resistors may be used to power only our warning devices. Do not power user-supplied devices with these. See page 7, Externally Powered Alarms.

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### Turn the Base Unit ON

Plug the AC adapter into a 120VAC outlet and turn the power switch to the ON position. The Green Power LED will be on when the BDWA is turned on.

Internal Power Switch



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## 2S Microwave Sensor Setup

The microwave 2S sensors settings can be read and changed from the floor using a remote control. A detailed description of the sensor settings and programming is in the Hercules 2S sensor manual from Bircher that is included with the system. Other than checking and possibly changing the setting for the sensor mounting height, all other sensor presets should work for most applications.

### 2S Sensor Configuration Mode

The Sensor will time out of the configuration mode 30 minutes after it was last powered on or accessed. If the configuration mode has timed out it can be entered by powering the sensor off and back on or by using the following commands:

- 1) Press the start key G, one of the keys 1-4 will light up.
- 2) Press D then 9, D and 2 light up.
- 3) Enter the four digit code 1234
- 4) Press D, D and 2 should light up, the configuration mode is now activated.

Any other remote control commands can now be accessed for 30 minutes.  
The G key only needs to be pressed 1x as long as the remote remains powered on.

### Programming the Mounting Height

The sensor should be programmed with the correct mounting height. The default setting from the factory is from 10' to 13' measured from the floor to the sensor. If this is not the correct mounting height for the sensor follow these steps to program the correct mounting height for the sensor.

- 1) Make sure the sensor is in the configuration mode as described above.
- 2) Press G then A followed by the desired height setting:
  - 1 for a sensor height of 6' 6" to 8'
  - 2 for a sensor height of 8' 1" to 10'
  - 3 for a sensor height of 10' 1" to 13' default
  - 4 for a sensor height of 13' 1" to 16' 6"
  - 5 for a sensor height of 16' 7" to 19' 5"
  - 6 for a sensor height of 19' 6" to 23'

- 3) To read the sensor height setting press G then A.  
The sensor height setting of 1 thru 6 will be displayed on the remote.

The other sensor commands can be programmed and read in a similar fashion as described in the Hercules 2S manual.

### Mounting Angle & Field Size

The mounting angle of the sensor is adjustable and can be changed to adjust the field size. Setting it at 60 degrees will provide a detection field that covers 25' to 45' from the sensor and is approximately 12' wide. This is with a mounting height of 14' and the field dimension set at 4. The field size can be adjusted by changing the angle and field dimension setting of the sensor. A mounting angle of 0 degrees is pointing directly at the floor.

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## 2S Microwave Sensor Defaults

The microwave sensors come with the following default settings which should work for most applications. Refer to the included Hercules 2S sensor manual for additional sensor specifications and settings. A small green LED on the sensor will come on (output #1) when vehicles are detected. The default setting for output #2 (small red LED on sensor) is off, this can be changed using the remote control.

### Sensor Default Settings - Hercules 2S

Following are the default settings and commands for the microwave sensors:

Access Code:	1234 (code saved)	D,9,(2)
Mounting Height:	1-6 (10.to 13')	A,(3)
Field Size:	1-5 (large)	D,(4) output #1
	(small)	E,(2) output #2
Relay Hold Interval:	1-9 (2.0S delay)	F,1,(4) output #1
	1-9 (output off)	F,2,(9) output #2
Output Configuration:	1-9 (Vehicles, Forwards)	B,(1) output #1
	1-9 (People & Vehicles Fwds)	C,(7) output #2
Output Logic:	1,2 (Normally Open)	F,3,(1) output #1
	1,2 (Normally Open)	F,4,(1) output #2
Cross-Traffic Optimization:	1-4 (High)	F,5,(4)
Wide Field:	off	use internal programming buttons
Slow Motion Detection:	1,2 (Off)	F,7,(1)
Interference Filter:	1,2 (Off)	F,6,(1)

Values in ( ) are read back when command is entered

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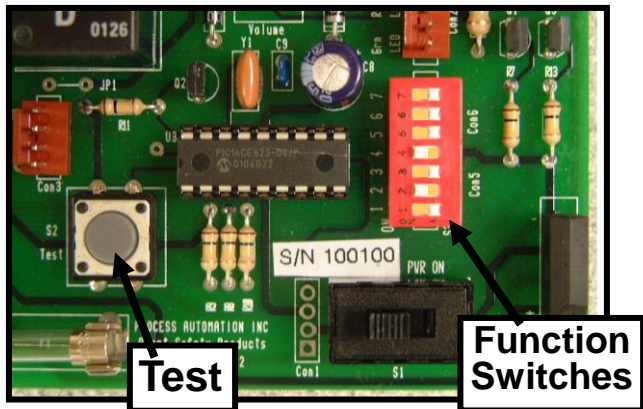
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## Control Unit Settings

The BDWA control box has a programmable warning duration that is added to the sensor relay hold interval. This delay will begin after the sensor relay hold time has timed out.

### Additional Warning Duration

An additional warning duration in the BDWA control box can be adjusted from 2 seconds to 32 seconds. Use a small screwdriver to flip the switches. You can try your settings by pressing the Test switch. The default setting for this from the factory is 2S



### Microwave Sensor & System Testing

The microwave sensors can be manually activated by entering the command F,1,8. The small green LED on the sensor will come on and the BDWA and warning devices will turn on. Enter the command F,1,4 to turn the sensor off and set the hold time to 2S.

To test system with pedestrian traffic enter the command F,2,8. The red LED on the sensor and the BDWA and warning devices will turn on as you walk towards the sensor and are in the small pedestrian detection field. Enter the command F,2,9 to turn the sensor output #2 off (default setting).

Press and hold the "G" button on the remote for 2 seconds to turn on the remote

Function Switches							Duration Seconds
1	2	3	4	5	6	7	
				*	**	---	2
On				*	**	---	4
	On			*	**	---	6
On	On			*	**	---	8
		On		*	**	---	10
On		On		*	**	---	12
	On	On		*	**	---	14
On	On	On		*	**	---	16
			On	*	**	---	18
On			On	*	**	---	20
	On		On	*	**	---	22
On	On		On	*	**	---	24
		On	On	*	**	---	26
On		On	On	*	**	---	28
	On	On	On	*	**	---	30
On	On	On	On	*	**	---	32

#### Legend:

Blank = Off  
 SW 5(\*):  
 Not Used  
 SW 6(\*\*)  
 Not Used  
 SW 7 (---)  
 Not Used

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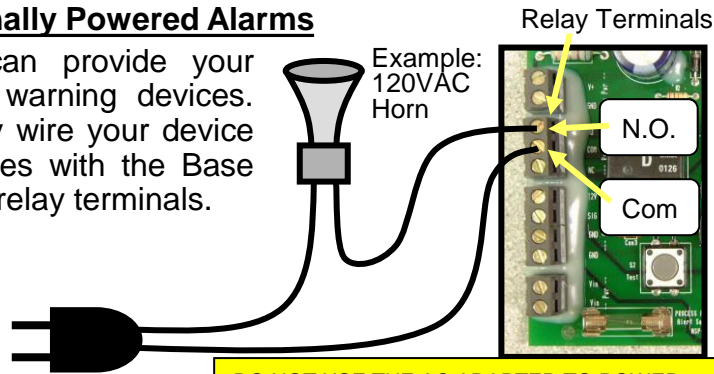
## Specifications

### Special Message

While we cannot anticipate all of the conditions you may encounter, we hope that we have given you enough information that your inventive spirit will take over to solve those really challenging cases. On the other hand, our consulting services are always available to create custom solutions for unique problem areas.

### Externally Powered Alarms

You can provide your own warning devices. Simply wire your device in series with the Base Unit's relay terminals.



DO NOT USE THE AC ADAPTER TO POWER USER-SUPPLIED WARNING DEVICES. REMOVE THE LIMITING RESISTOR (V+ to COM) SUPPLIED WITH THE UNIT AND WIRE YOUR EXTERNAL DEVICES AS SHOWN ABOVE.

### Specifications

- Sensor:
  - Max Range: 55'  
w/appx field width of 12' at 35'
  - Mounting angle: 15 to 90 degrees  
adjustable in 15 degree increments
  - See sensor manual for other sensor specifications
- Power Requirements
  - 120 VAC Standard Wall Outlet
  - Plug-in Class II AC Adapter provides 16 VAC 40W
  - V+ Accessory Power 24VDC at 1.5 amps max
  - Fuse: 5.1 Amp, slow-blow, 5x20 mm
- Mounting:
  - BDWA control box - 4 mounting holes
- BDWA Control Box User Adjustments:
  - Timeout Warning Duration
    - 2S to 32S in 2 second steps.

Bi-Directional Worker Alert is intended to enhance safety, not to relieve the user's responsibility to comply with OSHA and other safety requirements. The user is responsible for maintaining and testing all ALERT Safety components. See the "Terms and Conditions of Sale" for specific warranty and other information.



# Important Notice!!!

The use of this system or any other warning device does not insure that all drivers and pedestrians can or will observe or react to a warning signal. Never take the right-of-way for granted, it is your responsibility to be sure you can proceed safely. The effectiveness of this warning system is highly dependent upon correct mounting, wiring and installation. Vehicle operators and plant personnel should insure daily that all features of the system are operating correctly.

Alert Safety Products are intended to enhance safety, not to relieve the user's responsibility to comply with OSHA or other safety requirements. The user is responsible for maintaining, testing and cleaning all Alert Safety components including photo sensors and reflectors. Alert Safety Products, Inc assumes no liability for any loss resulting from the use of this warning system. See the "Terms and Conditions of Sale" for specific warranty and other information.



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