

### FEATURES

- ✓ Transmitter/receiver built into same unit
- ✓ Six user-selectable sensitivity levels
- ✓ 5m to 70m (use BEAMLRK beyond 70m) protection range
- ✓ Removable plug-in terminal blocks
- ✓ Digital display – no special tools required
- ✓ Built-in automatic gain control compensates for signal deterioration from dust buildup
- ✓ Optional remote test station
- ✓ Optional long-range kit (BEAMLRK) for applications in excess of 70m
- ✓ Optional multi-mount (BEAMMMK) providing ceiling or wall mount capability with increased angular adjustment



### PRODUCT DESCRIPTION

The FireSense SS-BEAM1224 is a conventional projected beam smoke sensor. It is uniquely suited for protecting open areas with high ceilings where other methods of smoke detection are difficult to install and maintain. Alignment is quickly accomplished via an optical sight and a 2-digit signal strength meter incorporated into the product.

Listed for operation from -30°C to 55°C, the SS-BEAM1224 can be used in open area applications to provide early warning in environments where temperature extremes exceed the capability of other types of smoke detection.

The SS-BEAM1224 consists of a transmitter/receiver unit at the head end and a reflector. When smoke enters the area between the unit and the reflector, it causes a reduction in the signal and when the smoke level reaches the predetermined threshold, an alarm is activated.

The SS-BEAM1224 has four standard sensitivity selections along with two Acclimate settings. When either of the two Acclimate settings are selected the detector will automatically adjust its sensitivity using advanced software algorithms to select the optimum sensitivity for the specific environment.

### CABLING REQUIREMENTS

#### SS-BEAM1224

- ✓ Requires 2 core for 24Vdc
- ✓ Requires 2 core for initiating alarm contact

**TECHNICAL SPECIFICATIONS**

Protection range	5m to 70m (70m to 100m long range kit)
Adjustment angle	± 10° horizontal and vertical
Sensitivity (Refer to Sensitivity Chart on page 6 of Installation Guide)	Level 1 – 25% total obscuration Level 2 – 30% Level 3 – 40% Level 4 – 50% Acclimate Level 1 – 30-50% Acclimate Level 2 – 40-50%
Alarm indicator	Local red LED and remote alarm
Trouble indicator	Local yellow LED and remote trouble
Normal indicator	Local flashing green LED
Temperature	-30°C to 55°C
Humidity	10% - 93% Relative humidity non-condensing
Voltage	10.2 to 32Vdc
Average standby current	17mA maximum
Alarm current	38.5mA maximum
Fault current	8.5mA maximum
Detector dimensions	254mm H x 191mm W x 84mm D
Reflector dimensions	5m to 70m 200mm x 230mm Over 70m 400mm x 460mm

**PRODUCT DESCRIPTION**
**Installation/Alignment**

The alignment is divided into four steps: coarse alignment, fine adjustment, final gain adjustment, and final verification. It is necessary for all four steps to be executed properly to ensure proper alignment of the product.

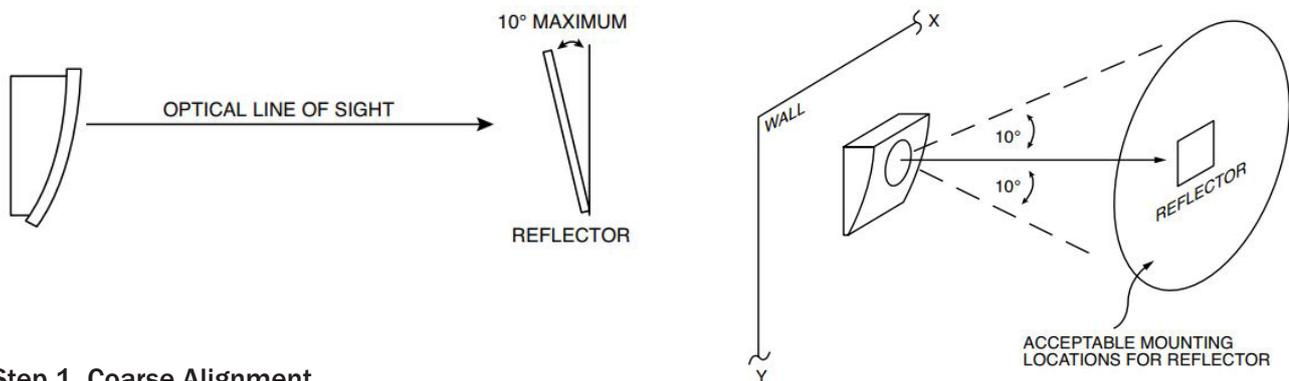
**Pre-Alignment Checklist**

- ✓ Ensure that both the detector and reflector are mounted securely to stable surfaces
- ✓ Ensure that all wiring is correct
- ✓ Ensure that terminal blocks are fully seated into their receptacles on the detector
- ✓ Complete any wiring dressing to minimize movement to the detector once the alignment procedure is completed
- ✓ Ensure that the appropriate number of reflectors are used for the installed distance. Distances between 70 - 100m require additional reflectors (4 total). The BEAMLRK accessory should be used in these cases.
- ✓ Ensure that the line of sight between the detector and reflector is clear and that reflective objects are not too near.

- ✓ Ensure that both the detector and reflector are mounted within their operational parameters for off axis angles (see below)
- ✓ Disable the zone or system to prevent unwanted alarms before applying power
- ✓ Ensure power to the detector is "ON"

You are now ready to begin the alignment procedure.

#### Reflector Mounting Guidelines



#### Step 1. Coarse Alignment

Refer to Figures 2 and 3 for this step.

1. Ensure that both of the optics lock-down screws are loosened so that the optics will move freely.
2. Looking through the alignment mirror, at both the alignment sight and reflector simultaneously, locate the position of the reflector in the optical sight. This step will require some practice. It is necessary to train your eyes to shift focus between the reflector and the mirror in order to locate the reflector. If the distance between the reflector and the detector is large it is helpful to place a brightly coloured object on the wall near the reflector to aid in seeing the reflector in the alignment mirror.
3. Once the reflector has been located, begin to adjust both the horizontal and vertical alignment knobs so that the reflector becomes centred in the alignment mirror. Take care in this step. If the optics are incorrectly aligned in this step, it will not be possible to proceed with the fine adjustment step.

Figure 1: Switch Locations

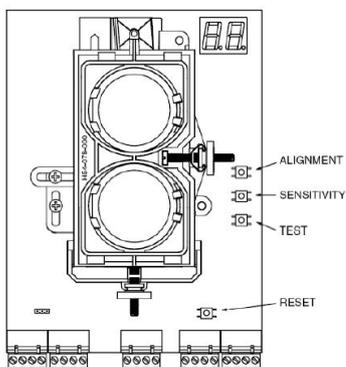


Figure 2: Alignment Adjustment Locations

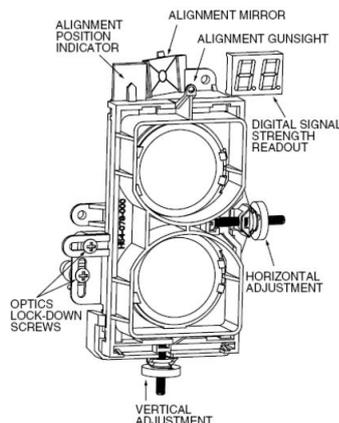
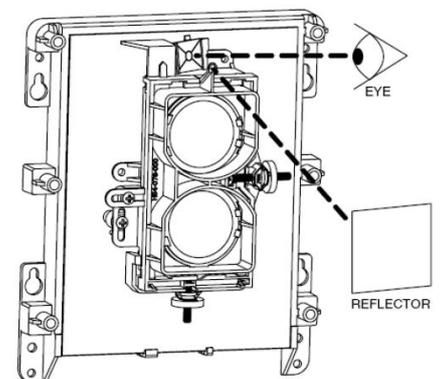


Figure 3: Coarse Alignment Procedure



## Step 2. Fine Adjustment

Refer to Figures 1-3 for this step.

In this step you will be fine-tuning the optics to the reflector. To provide feedback of the signal level coming from the reflector the dual digital display readout will be used. Due to the large distance range that the detector can operate over it is necessary that the detector operate with many different settings of “electronic amplifier gain”. The detector is capable of determining the appropriate gain setting and then setting it itself via on-board processing algorithms. There are no external gain settings on the detector that must be set by the operator. Periodically throughout the fine adjustment step the detector will need to re-adjust its “electronic amplifier gain” setting. When this occurs it will be indicated by the dual digital readout as “- -”. When this occurs, cease any further adjustment until the display again reads a number value.

1. Ensure that neither you nor any other objects are in the line of sight between the detector and the reflector.
2. Depress the Alignment switch once. Both the digital display and the yellow LED should turn on indicating that alignment mode has been entered. The display should begin reading “- -” signifying an electronic gain adjustment. After a few moments the display will indicate a numeric value near 20. If the display reads “Lo” then the detector is not receiving enough light from the reflector. Go back and repeat the coarse alignment step and verify that the proper number of reflectors is used for the installed distance.

**Note:** The display will continue to read “Lo” until the detector receives enough light from the reflector to continue with the fine adjustment step.

**Note:** In alignment mode (indicated by the yellow LED and the numeric display) the sensitivity select and test switches are disabled.

3. With the display reading a numeric value, begin adjusting the horizontal and vertical alignment knobs one at a time in the direction that increases the numeric signal level on the display. Continue adjusting each axis one at a time going back and forth between them until a peak value is indicated. If a value of 90 is achieved, the detector will re-adjust the electronic gain once again. This will be indicated by a “- -” reading on the display. When this happens halt any further adjustment until the display again reads a numeric value. This process may occur more than once during the fine adjustment step.

**Note:** Each time the display reads a value of 90 or greater the detector will reduce the electronic gain. Each time the display reads a value of 10 or less the detector will increase the electronic gain.

4. Once satisfied that it is not possible to achieve a higher reading on the display, depress the alignment switch to complete the fine adjustment step. The digital display readout will turn “OFF” and the yellow LED will remain “ON”.

**Note:** It may not be possible to achieve a value near 90 on the display during the last adjustment iteration. The final value of the display will not likely be near 90. This is normal. It is due to the detector reducing its electronic gain each time a value of 90 is achieved. When this occurs the detector resumes with less electronic gain than previously when 90 was achieved. Less gain makes it more difficult to achieve higher values. Final values anywhere between 20 and 90 are acceptable if no further increase can be achieved.

**Note:** The alignment procedure is not complete yet. At this time it is possible to set the sensitivity of the detector using the sensitivity switch and digital display. See the Sensitivity Selection section of this manual for further details.

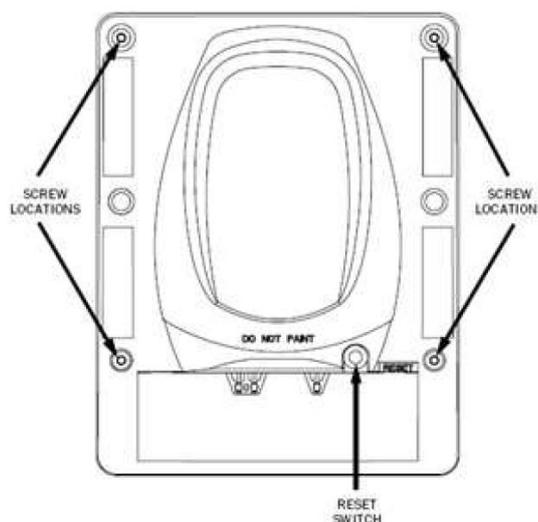
### Step 3. Final Gain Adjustment

In this step, the detector will electronically adjust its internal gain one final time. It is necessary to complete this step with the outer housing installed since the housing will change the amount of light received from the reflector.

1. Tighten the optics lock down screws so the optics are secure.
2. Install the outer housing of the detector. The housing is installed by tightening four screws, one in each corner of the housing. The screws are captivated in the plastic of the housing and cannot fall out during assembly.

**Note:** The housing contains a gasket seal that protects the detector circuitry from corrosion and moisture sources. To ensure that the gasket seal performs correctly it is necessary to fully tighten all four of the screws that hold the outer housing in place.

3. Remove the protective film from the front surface of the outer housing.
4. To initiate the final electronic gain adjustment, the reset switch must be depressed. Once depressed the yellow LED will begin to blink. This indicates that the detector is adjusting the electronic gain setting. Once complete, the yellow LED will stop blinking and the green LED will begin blinking. This indicates that the gain adjustment was successful.



**Note:** Use caution not to block the line of sight between the detector and reflector in this step.

5. Install the outer aesthetic ring by snapping it onto the outer housing.

**Note:** If the outer aesthetic ring has been painted ensure that the paint is completely dry before proceeding with this step.

### Step 4. Final Verification

This step is required to ensure the detector has been setup correctly and will detect smoke at the proper sensitivity level.

1. With the detector functioning (indicated by the green LED blinking), completely block the reflector with an opaque material. (Due to the high optical efficiency of the reflector, the selection of the opaque material used to block the reflector is not critical. Acceptable materials include, but aren't limited to, this manual or the cardboard packaging inserts.) The detector should enter the trouble condition (indicated by the fault relay and the yellow LED (see Appendix I). If the detector does not enter the trouble condition there is a problem with the installation refer to the troubleshooting section in Appendix I for further assistance.
2. Complete a sensitivity test of the detector. Refer to the Sensitivity Testing section of this manual for the appropriate procedure.
3. If the orange sticky paper was used to aid in the location of the reflector in the alignment mirror it should be removed now. It is no longer necessary. Congratulations. You have completed the final installation and alignment procedure.

**Sensitivity Selection**

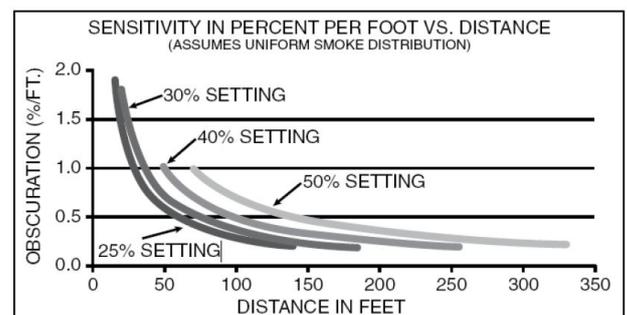
The detector has six sensitivity selections. Each of these selections is only acceptable over a specific distance separation between the detector and the reflector per UL268. The chart below is used to determine which selections are acceptable for your installed distance. The sensitivity of the detector can be set only when the housing is removed and the detector is not in the fine adjustment step of the alignment mode, indicated by the illumination of the dual digital display. To set the sensitivity depress the sensitivity button one time (see Figure 1). Once the switch is pressed the digital display will illuminate and read the current sensitivity setting in percent obscuration. To change the sensitivity continue to depress the sensitivity switch until the desired setting is achieved. The digital display will turn off automatically if no further switch presses occur.

In addition to the four standard sensitivity selections the detector has two Acclimate settings. When either of these settings is chosen the detector will automatically adjust its sensitivity using advanced software algorithms to select the optimum sensitivity for the environment. The sensitivity will be continuously adjusted within the ranges specified in the chart below.

Sensitivity Setting	Percent Obscuration	Display Reading	Acceptable Distance Between Detector & Reflector (Feet)	Acceptable Distance Between Detector & Reflector (Meters)
Level 1	25	25	16.4 - 120	5.0 - 36.6
Level 2	30	30	25 - 150	7.6 - 45.7
Level 3	40	40	60 - 220	18.3 - 67
Level 4	50	50	80 - 328	24.4 - 100
Acclimate Level 1	30-50	A1	80 - 150	24.4 - 45.7
Acclimate Level 2	40-50	A2	80 - 220	24.4 - 67

**Sensitivity**

Total obscuration can be converted to percent per foot, assuming uniform smoke density for the entire length of the beam. The chart on the right converts total obscuration to percent per foot for all acceptable sensitivity settings.



**Sensitivity Testing**

Detectors must be tested after installation and following periodic maintenance. The sensitivity of the BEAM1224/ BEAM1224S may be tested with a calibrated Test Filter (Reflector Test Card) or the local test switch on the transmitter/receiver unit.

**Note:** Before testing, notify the proper authorities that the smoke detector system is undergoing maintenance, and therefore the system will be temporarily out of service. Disable the zone or system undergoing maintenance to prevent unwanted alarms.

**Note:** Before testing the detector, check for the presence of the flashing green LED at the receiver, making sure not to disturb or block the beam. If it does not flash and the detector is not in trouble or alarm, power has been lost to the detector (check the wiring).

**APPENDIX I. OPERATION MODES AND TROUBLESHOOTING GUIDE**

Modes	Red	Yellow	Green	Dual Digital Display Readout	Initiating Means	Alarm Controls		Fault Contacts	Comments & Troubleshooting Tips
						Alarm	Remote		
Normal	Off	Off	Blink	Off	Successful completion of initialisation or detector reset	Open Open	Off	Close	
Alignment	Off	On	Off	On, Relative amount of signal 0-99, or - - if automatic gain resetting, or Lo if signal is too low	Alignment switch	Close	Off	Open	
Alarm	On	Off	Off	Off	Smoke, test filter, RTS451/KEY or RTS151/KEY	Open	On	Close	
Trouble-Drift Comp Elevated Signal	Off	3 Quick Blinks	Blink	Off	Long term drift reference out of range	Open	Off	Open	- Sunlight into detector or reflector - Re-align detector
Trouble-Drift Comp Reduced Signal	Off	2 Quick Blinks	Blink	Off	Long term drift reference out of range	Open	Off	Open	Clean detector and reflector
Trouble-Signal Over Range	Off	2 Quick Blinks	Blink	Off	Increase of reflected signal	Open	Off	Open	Inspect line of sight between detector and reflector for reflective objects in the pathway
Trouble-Beam Blockage Response	Off	4 Quick Blinks	Off	Off	Beam blockage	Open	Off	Open	- Remove blockage - Faulty unit
Initialisation-Power On	Off	Blink Until Complete	Blink	Off	Apply power from discharged state	Open	Off	Close	
Initialisation-Alignment Exit	Off	Blink Until Complete	Blink	Off	Depressing RESET switch after alignment	Open	Off	Close	
Local Test (BEAM1224S) Pass Result	On	Blinking the amount of drift used	Off	Off	RTS451/KEY or RTS151/KEY	Close	On	Close	Detector remains in alarm until reset or time-out
Local Test (BEAM1224S) Fail Result	Off	On until reset or time-out	Blink	Off	RTS451/KEY or RTS151/KEY	Open	Off	Open	Detector remains in fault until reset or time-out
Local Test (BEAM1224) Fail Result	Off	Per fault mode	Blink	Off	RTS451/KEY or RTS151/KEY	Open	Off	Open	If local test fails will already be in fault
Local Test (BEAM1224) Pass Result	On	Blinking the amount of drift used	Off	Off	RTS451/KEY or RTS151/KEY	Open	On	Close	

Blinks output by yellow LED and Remote Trouble Output once the device has passed a local remote test (*tables to the right*):

Percent the detector has drifted	Number of blinks output
<10%	None
<20%	1
<30%	2
<40%	3
<50%	4

Percent the detector has drifted	Number of blinks output
<60%	5
<70%	6
<80%	7
<90%	8
<100%	9