HOCHIKI
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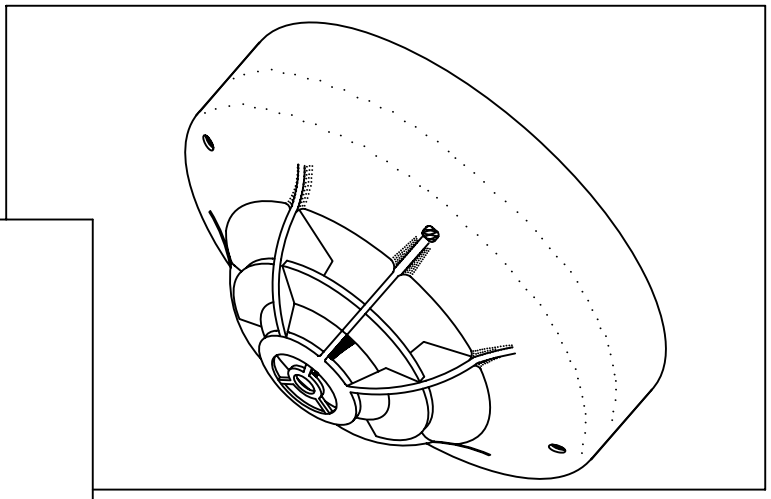
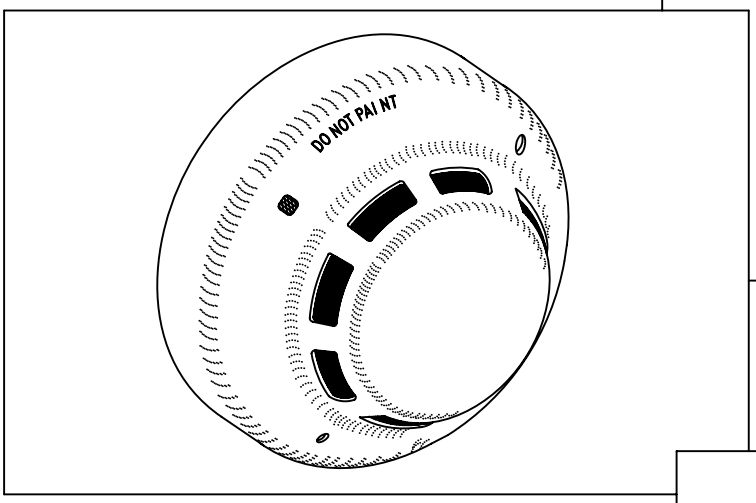
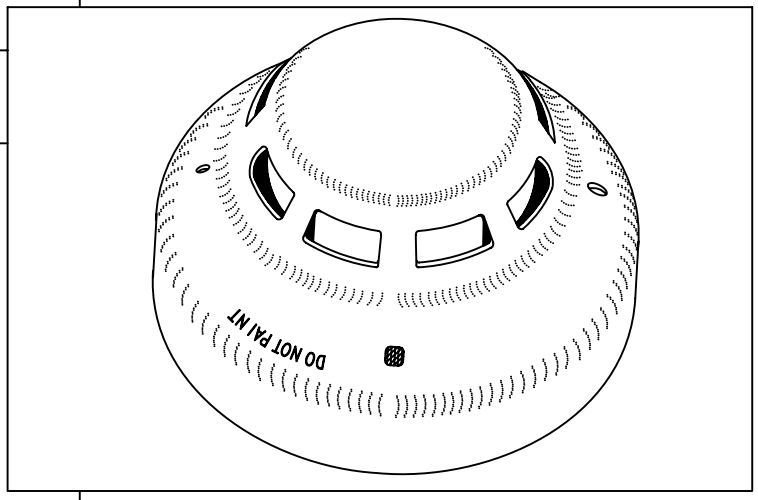
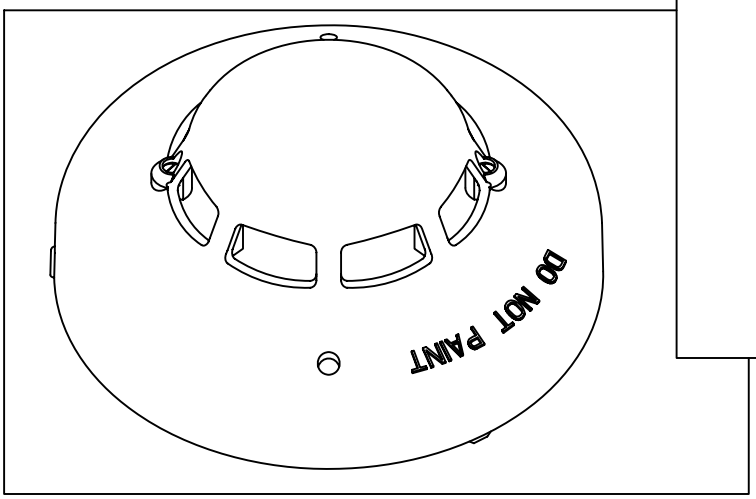
Technical Bulletin HA-96 Analog









MARCH 2008

Introduction

Hochiki America Corporation provides its customers with reliable, high quality fire detection equipment utilizing the latest technology available.

Analog Sensors

Our new sensors are dramatically small in size like their predecessors the Hochiki America low profile conventional smoke detectors. Yet they maintain the dependability Hochiki customers have come to rely on. This bulletin documents all the NS Analog Sensors (ALG-EA, ALG-V ALK-V/-V2/-D, AIE-EA, and ATG-EA).

Photoelectric Smoke Sensor

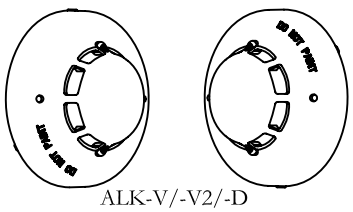
Features

- The ALG-EA/-V, ALK-V, ALK-V2 and ALK-D photoelectric smoke chamber that can detect smoldering or fast-flaming fires.
- The combination of a high signal-to-noise ratio and sensitivity stability make this sensor effective in a wide range of environmental conditions.
- User programmable alarm thresholds.
- A reliable and fully digital transmission method, which is highly immune to noise.
- The control panel is able to verify the status of any device. Whether the device is dirty or approaching an alarm condition, it can make this determination routinely.
- It is possible to assign a priority to any device that is deemed necessary by the nature of the systems design.
- There is an interrupt sequence, which can assign priority to fire and other similar signals.

ALG-EA/-V

ALG-EA/-V Specifications

Light Source	GaAlAs Infrared Emitting Diode
Voltage Operating Range	24.0 ~ 40.7 VDC
Average Current Consumption	41.0 VDC MAXIMUM
Normal Mode (S-SC)	390 µA Typical
	540 µA Maximum
Low Power Mode (S-SC)	120 µA @ 0.75s
	110 µA @ 1.50s
When Called (S-SC)	2mA (momentary)
Alarm mode (S-SC)	8mA
Remote LED (during alarm)	8mA
Device Type Code	88 Hex
Operating Temperature	-10°~ 50°C
Storage Temperature	-20°~ 60°C
S-SC Protocol	
Half duplex, asynchronous communication	
Speed: 1200 bps	
1 stop bit, 1 parity bit	
Error check: Check-sum, even parity check	
TX protocol control: polling, selecting, interrupt	
TX code: 8 bit binary data	
S-SC line resistance	50 Ohm MAX. (14~18 AWG. wiring)
Dimensions	3-15/16"D X 1-1/2"H
Weight	3.4 oz. (with YBN-NSA-4 base 5.1 oz.)
Test Feature	See control panel operating manual
Environment	Indoor Use Only
Address setting method	EEPROM (refer to control panel
(1 - 127 addresses)	operating manual for address setting procedure or utilize Hochiki TCH-B100 - See Page 9)
Base Requirement	HSB-NSA-6, YBN-NSA-4 or ASB



ALK-V/-V2/-D

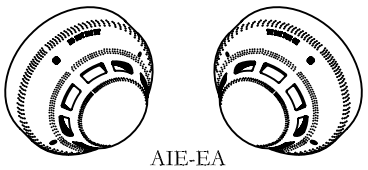
ALK-V/-V2/-D Specifications

Light Source	GaAlAs Infrared Emitting Diode
Voltage Operating Range	22.9 ~ 39.5 VDC
Average Current Consumption	39.5 VDC MAXIMUM
Normal Mode (S-SC)	390 µA Typical
	800 µA Maximum
Low Power Mode (S-SC)	120 µA @ 0.75s
	110 µA @ 1.50s
When Called (S-SC)	2mA (momentary)
Alarm mode (S-SC)	8mA
Remote LED (during alarm)	8mA
Device Type Code	88 Hex
Operating Temperature	-10°~ 50°C
Storage Temperature	-20°~ 60°C
S-SC Protocol	
Half duplex, asynchronous communication	
Speed: 1200 bps	
1 stop bit, 1 parity bit	
Error check: Check-sum, even parity check	
TX protocol control: polling, selecting, interrupt	
TX code: 8 bit binary data	
S-SC line resistance	50 Ohm MAX. (14~18 AWG. wiring)
Dimensions	3-15/16"D X 1-1/2"H
Weight	3.4 oz. (with YBN-NSA-4 base 5.1 oz.)
Test Feature	See control panel operating manual
Environment	Indoor Use Only
Address setting method	EEPROM (refer to control panel operating manual for
(1 - 255 addresses)	address setting procedure or utilize Hochiki TCH-B100 - See Page 8)
Base Requirement	HSB-NSA-6, or YBN-NSA-4

Ionization Smoke Sensor

Features

- The AIE-EA ionization smoke sensor has a computer-designed smoke chamber that can detect smoldering or fast-flaming fires.
- The combination of a high signal-to-noise ratio and sensitivity stability make this sensor effective in a wide range of environmental conditions.
- User programmable alarm thresholds.
- A reliable and fully digital transmission method, which is highly immune to noise.
- The control panel is able to verify the status of any device. Whether the device is dirty or approaching an alarm condition. It can make this determination routinely.
- It is possible to assign a priority to any device that is deemed necessary by the nature of the systems design.
- There is an interrupt sequence, which can assign priority to fire and other similar signals.



AIE-EA

AIE-EA Specifications

Radioactive Source	Americium 241 (0.98 µCi)
Voltage Operating Range	24.0 ~ 40.7 VDC
Average Current Consumption	41.0 VDC MAXIMUM
Normal Mode (S-SC)	350 µA Typical
	460 µA Maximum
Low Power Mode (S-SC)	140 µA @ 0.75s
	100 µA @ 1.50s
When Called (S-SC)	2mA (momentary)
Alarm mode (S-SC)	8mA
Remote LED (during alarm)	8mA
Device Type Code	A8 Hex
Operating Temperature	-10°~ 50°C
Storage Temperature	-20°~ 60°C
S-SC Protocol	
Half duplex, asynchronous communication	
Speed: 1200 bps	
1 stop bit, 1 parity bit	
Error check: Check-sum, even parity check	
TX protocol control: polling, selecting, interrupt	
TX code: 8 bit binary data	
S-SC line resistance	50 Ohm MAX. (14~18 AWG. wiring)
Dimensions	3-15/16"D X 1-1/2"H
Weight	4.2 oz. (with YBN-NSA-4 base 5.9 oz.)
Test Feature	See control panel operating manual
Environment	Indoor Use Only
Address setting method	EEPROM (refer to control panel operating manual
(1 - 127 addresses)	for address setting procedure or utilize Hochiki TCH-B100 - See Page 8)
Base Requirement	HSB-NSA-6, YBN-NSA-4 or ASB

Heat Sensor

Features

- The ATG-EA heat sensor is a computer-designed heat sensing device that can accurately detect fast-flaming fires.
- The combination of a high signal-to-noise ratio and sensitivity stability make this sensor effective in a wide range of environmental conditions.
- User programmable alarm thresholds.
- A reliable and fully digital transmission method, which is highly immune to noise.
- The control panel is able to verify the status of any device. Such as whether or not the device is approaching an alarm condition. The control panel can make this determination routinely.
- It is possible to assign a priority to any device that is deemed necessary by the nature of the systems design.
- There is an interrupt sequence, which can assign priority to fire and other similar signals.

ATG-EA

ATG-EA Specifications

Heat Sensing Element	Thermistor
Voltage Operating Range	24.0 ~ 40.7 VDC
Average Current Consumption	41.0 VDC MAXIMUM
Normal Mode (S-SC)	350 µA Typical
	500 µA Maximum
Low Power Mode (S-SC)	110 µA @ 0.75s
	100 µA @ 1.50s
When Called (S-SC)	2mA (momentary)
Alarm mode (S-SC)	8mA
Remote LED (during alarm)	8mA
Device Type Code	98 Hex
Operating Temperature	-10°~ 50°C
Storage Temperature	-20°~ 60°C
S-SC Protocol	
Half duplex, asynchronous communication	
Speed: 1200 bps	
1 stop bit, 1 parity bit	
Error check: Check-sum, even parity check	
TX protocol control: polling, selecting, interrupt	
TX code: 8 bit binary data	
S-SC line resistance	50 Ohm MAX. (14~18 AWG. wiring)
Dimensions	3-15/16"D X 1-9/16"H
Weight	3.2 oz. (with YBN-NSA-4 base 4.9 oz.)
Test Feature	See control panel operating manual
Environment	Indoor Use Only
Address setting method	EEPROM (refer to control panel
(1 - 127 addresses)	operating manual for address setting procedure or utilize Hochiki TCH-B100 - See Page 8)
Base Requirement	HSB-NSA-6, YBN-NSA-4 or ASB

Proper placement of sensors

This section explains how to determine the number of sensors you need, and where to place them.

By following the guidelines listed in NFPA 72, base the number and location of sensors on an engineering survey of the area to be protected.

Factors to consider

- Contents to be protected.
- Type of construction and use of structure.
- Human occupancy.
- Burning characteristics of contents
- Space involved.
- Height of ceilings.
- Surface condition of ceilings.
- Total area.
- Air movement--stratification.
- Vent locations--velocities and dilution.
- Deflections and obstructions.

Location Sensors

One smoke sensor covers 450 to 900 square feet.

One heat sensor covers up to 2500 square feet.

Consider local conditions and codes along with engineering evaluations to determine the proper spacing and specifications.

Warning: HEAT SENSORS ARE NOT LIFE SAFETY DEVICES. WHERE LIFE SAFETY IS A FACTOR SMOKE SENSORS ARE RECOMMENDED.

Examples

You may use 30-foot spacing on smooth ceilings for smoke sensors.

You may use 50-foot spacing on smooth ceilings for heat sensors.

Beams other obstructions extending more that 18" below the ceiling reduce the effective range of the sensors. Such obstructions should designate a new separation point, and be considered a border for a new section.

Beams or other obstructions extending more that 8" but less than 18" require reduced spacing at the perpendicular of the obstructions.

NOTE: FOR INFORMATION ON DIFFERING STYLES OF CONSTRUCTION CONSULT THE NFPA HANDBOOK, SECTION 72.

Warning: DO NOT INSTALL HOCHIKI SMOKE SENSORS IN THE FOLLOWING AREAS:

- Where temperatures are likely to exceed 100°F or fall below 32°F.
- Closer than 4 inches to any side wall.
- Where forced ventilation can dilute the smoke from a fire
- In known areas of combustion such as kitchens or furnace rooms.

Testing

Smoke Sensors

Remember, for a smoke sensor to operate efficiently, combustion products must enter the outer chamber. Air flow, stratification, velocity, stagnation, and migration all affect the efficiency and accuracy of the sensor.

You may use an air flow meter to determine the movement of air within a structure.

Field testing equipment is available from Hochiki for testing the function of the sensors. See the Hochiki Tester section in this bulletin and the control panel operation manual for more information.

Maintenance

Consult local codes and ordinances.

Hochiki recommends biannual confirmation of functional operation and external appearance.

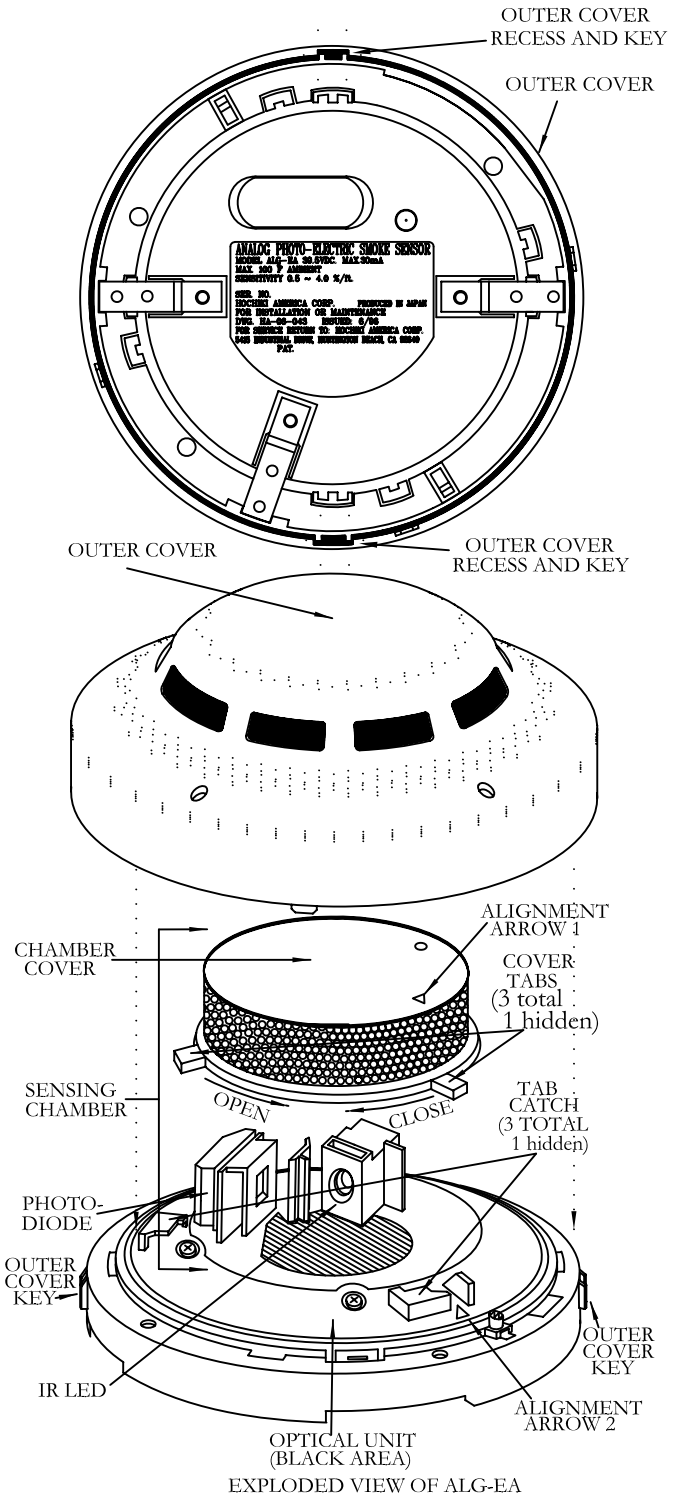
You can obtain field testing equipment from Hochiki. See the Hochiki Tester section in this bulletin for more information.

Heat Sensors

There are two basic test methods that can be used to determine proper operation of the ATG-EA.

1. Testing can be accomplished by use of the built in test feature. For proper operation refer to the control panel operation manual.
2. Functional testing can be accomplished by using the Solo 461 heat sensor tester. See testers section.

BOTTOM VIEW OF ALG-EA



EXPLODED VIEW OF ALG-EA

Manual cleaning procedures

Cleaning the photoelectric sensor

This section explains how to clean the ALG-EA/-V/ALK-V/-V2/-D sensors. Use the diagram to identify the sensor's parts.

Tools

You will need:

- Hochiki America's NSRT-A100 Cover Removal Tool
- A small soft bristled artist's paint brush
- Denatured alcohol
- Clean dry compressed air

NOTE: Use only lint-free materials when cleaning the chambers of the photoelectric smoke detector. Use of fibrous materials may result in false alarms.

Remove and disassemble the sensor

Follow the steps in this section to prepare the sensor for cleaning:

1. Remove the sensor from its base.
2. Disassemble sensor by following the NSRT-A100 instructions found on page 5 of this document.

Clean the sensor

Follow the steps in this section to clean the sensor.

CAUTION: Do not attempt to remove the insect screen.

1. Remove the Outer Cover of the sensor as specified on page 5 and set aside.
2. Place the sensor in the palm of your left hand and grasp the Chamber Cover with your right hand. Twist the Chamber Cover counter clockwise until the Cover Tabs clear the Tab Catches. Lift and separate the Chamber Cover from the Optical Unit.
3. Swab the Optical Unit with denatured alcohol using a small soft bristled brush.
4. Use dry clean compressed air to dry the optical unit and to remove any remaining particles.
5. Clean the Chamber Cover and Outer Cover in the same manner.

Reassemble the sensor.

Follow the steps in this section to reassemble the sensor.

1. Locate the Alignment Arrows on both the Chamber Cover and the Optical Unit.
2. Set the Chamber Cover onto the Optical Unit while making sure that Alignment Arrow 1 and Alignment Arrow 2 are aligned with one another.
3. Holding the sensor in your left hand and grasping the Chamber Cover with your right hand, rotate the Chamber Cover clockwise until the Cover Tabs snap into the Tab Catches.
4. Place the Outer Cover of the sensor nose down on a flat surface.
5. Align the Outer Cover Keys with the Recess in the Outer Cover (two orientations are possible, only one will fit properly).
6. With the Outer Cover Keys aligned with the Cover Recessed, press down firmly on the back of the sensor. The sensor will snap into the Outer Cover. The sensor is now ready to be returned to the base from which it was removed.
7. The sensor should be re-tested by following the test procedure found in the control panel literature.

NOTE: If after testing, the sensor is not working within the prescribed range then return it to the manufacturer for servicing.

AIE Cleaning Instructions

This section explains how to clean the AIE-EA sensor. Use the diagram to identify the sensor's part.

Tool

You will need:

- Hochiki America's NSRT-A100 Cover Removal Tool
- Soap solution (1 teaspoon of Lemon Joy to 1 gallon clean water)
- Soap bristled brush
- Clean dry compressed air
- Distilled water
- Vacuum

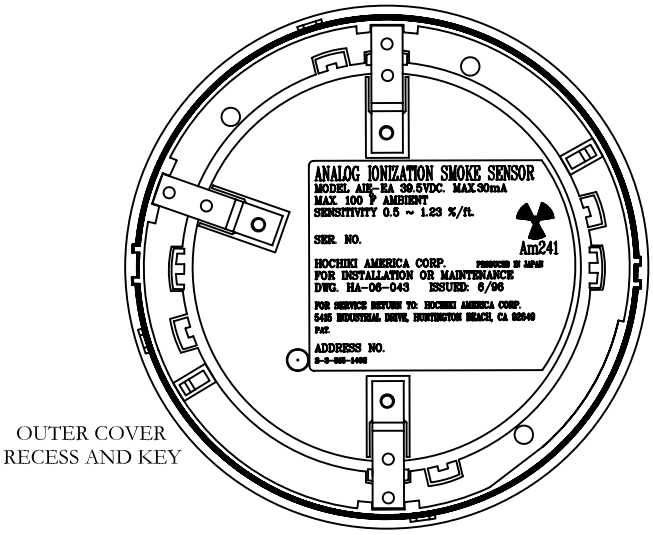
Remove and disassemble the sensor

Follow the steps in this section to prepare the sensor for cleaning:

1. Remove the sensor from its base.
2. Disassemble sensor by following the NSRT-A100 instructions found on page 5 of this document.

CAUTION: Only the Outer Cover may be cleaned with a soap solution. Never attempt to clean any other part of the sensor with a soap solution. This may render the sensor inoperable.

DO NOT ATTEMPT TO REMOVE THE INSECT SCREEN !!!.

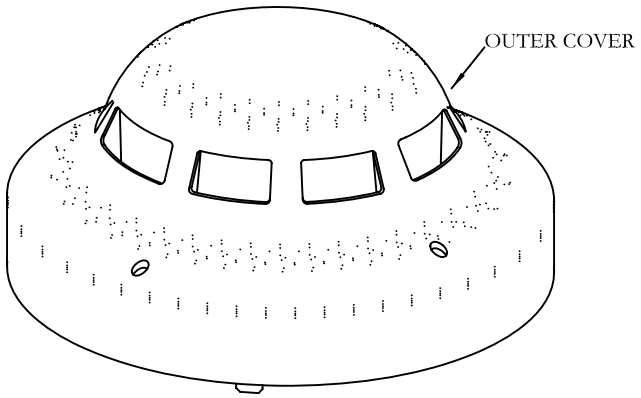


BOTTOM VIEW OF AIE-EA

Clean the sensor

Follow the steps in this section to clean the sensor.

1. Remove the Outer Cover of the sensor as specified on page 5 and set aside.
2. Vacuum the Outer Chamber and Insect Screen to remove any foreign matter from the sensor.
3. Submerse the Outer Cover in the soap solution and scrub with the brush to remove any foreign matter from the Outer Cover.
4. Rinse the Outer Cover in distilled water and blow it dry with clean compressed air.

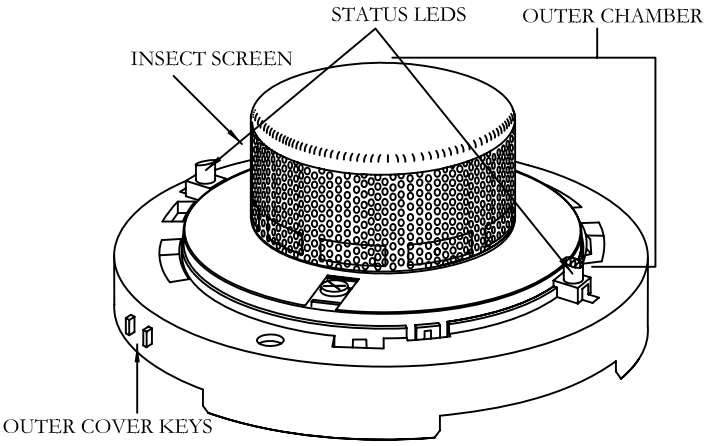


Reassemble the sensor

Follow the steps in this section to reassemble the sensor:

1. Place the Outer Cover of the sensor nose down on a flat surface.
2. Align the Outer Cover Keys with the Recessed in the Outer Cover (Two orientations are possible, only one will fit properly).
3. With the Outer Cover Keys aligned with the Outer Cover Recessed, press down firmly on the back of the sensor. The sensor will snap into the Outer Cover. The sensor is now ready to be returned to the base from which it was removed.
4. The sensor should be re-tested by following the test procedure found in the control panel literature.

NOTE: If after testing, the sensor is not working within the prescribed range, then return it to the manufacturer for servicing.



EXPLODED VIEW OF AIE-EA

Sensor Cover Removal Instructions

This section explains how to remove the outer cover from the AIE-EA or the ALG-EA, ALG-V by using the NSRT-A100.

Tool

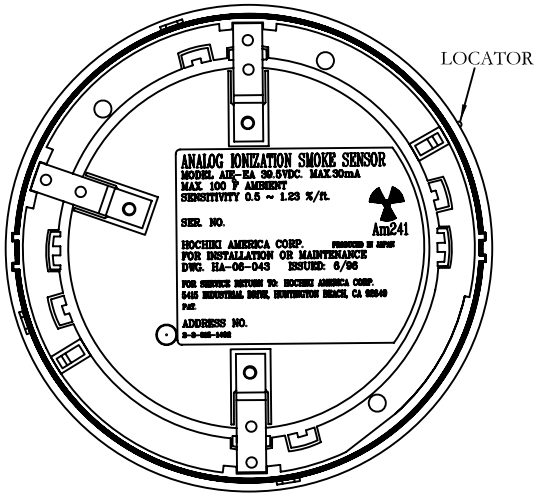
You will need:

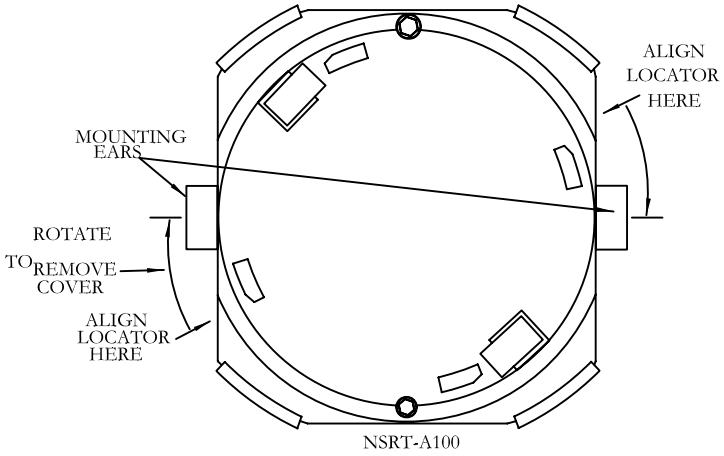
- Hochiki America's NSRT-A100 tool

Remove and disassemble the sensor

Follow the steps in this section for removal of the sensor cover:

1. Place the sensor to be disassembled on the NSRT-A100 tool making sure that the Locator on the sensor is aligned as shown on the diagram.
2. Using your thumb and index finger rotate the sensor back and forth until it drops into place on the NSRT-A100.
3. Grasp the sensor firmly and rotate the sensor clockwise (approximately 30 deg.) until the Locator on the sensor lines up with the Mounting Ears of the NSRT-A100. The contact blades on the sensor will engage on the NSRT-A100 and will prevent further rotation.
4. The sensor cover is now disengaged from the sensor body and can be removed by pulling the sensor cover away from the NSRT-A100.
5. After the cover has been removed, refer to the sensor cleaning instructions to clean and reassemble the sensor.





ALK-V/-V2/-D Cover Removal Instructions

This section explains how to remove the outer cover from the ALK-V/-V2/-D by using the CRT (COVER REMOVAL TOOL).

Tool

You will need:

- Hochiki America's CRT Cover Removal Tool

Remove and disassemble the sensor

Follow the steps in this section for removal of the sensor cover:

1. Place the sensor to be disassembled on the CRT tool.
2. Using your thumb and index finger rotate the sensor back and forth until it drops into place on the CRT.
3. Grasp the sensor firmly and rotate the CRT clockwise (approximately 30 deg.) The contact blades on the sensor will engage on the CRT and will prevent further rotation.
4. The sensor cover is now disengaged from the sensor body and can be removed by pulling the sensor cover away from the CRT.
5. After the cover has been removed, refer to the sensor cleaning instructions to clean and reassemble the sensor.

CRT

Testers

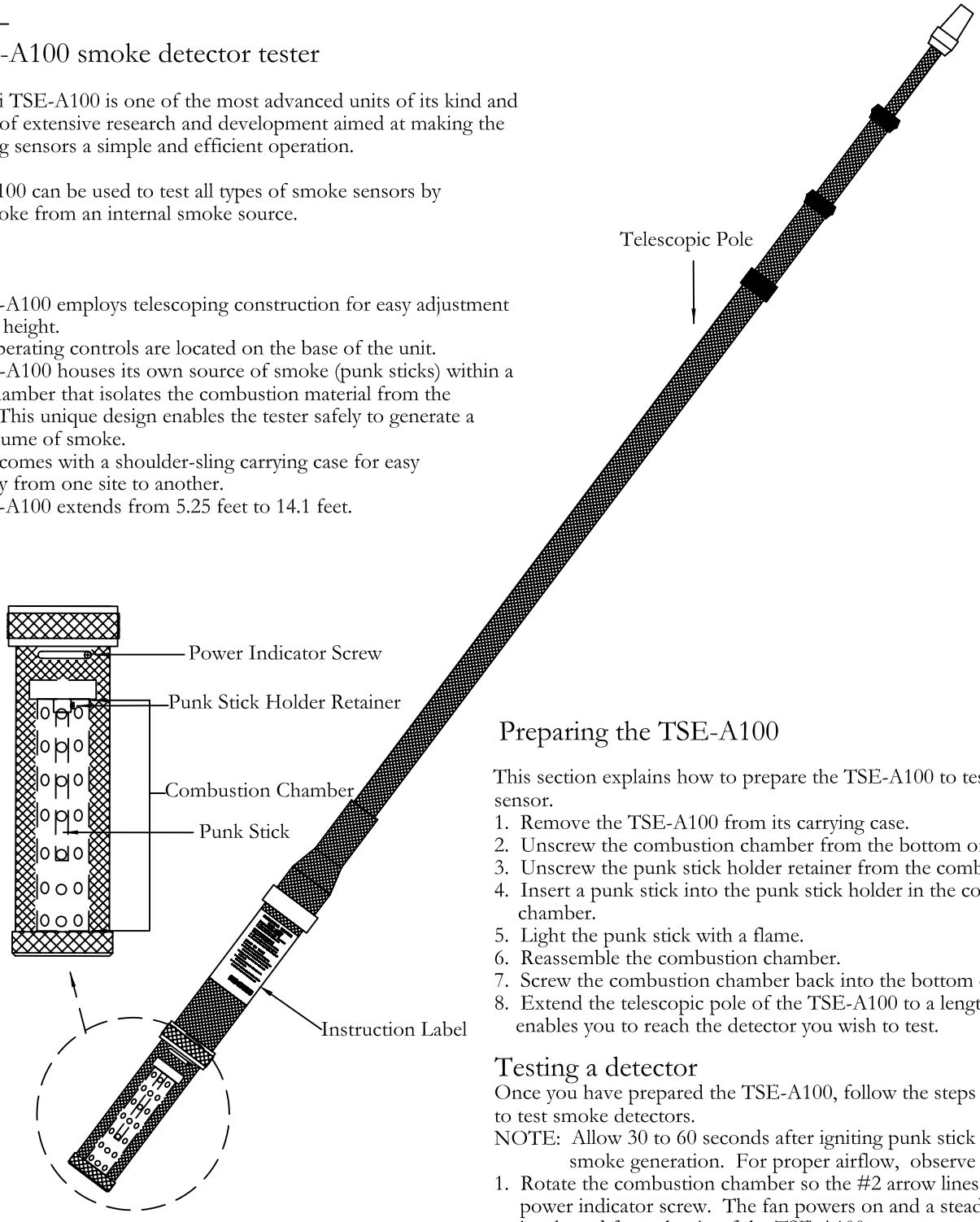
The TSE-A100 smoke detector tester

The Hochiki TSE-A100 is one of the most advanced units of its kind and is the result of extensive research and development aimed at making the job of testing sensors a simple and efficient operation.

The TSE-A100 can be used to test all types of smoke sensors by applying smoke from an internal smoke source.

Features

- The TSE-A100 employs telescoping construction for easy adjustment to ceiling height.
- Simple operating controls are located on the base of the unit.
- The TSE-A100 houses its own source of smoke (punk sticks) within a special chamber that isolates the combustion material from the outside. This unique design enables the tester safely to generate a stable volume of smoke.
- The unit comes with a shoulder-sling carrying case for easy portability from one site to another.
- The TSE-A100 extends from 5.25 feet to 14.1 feet.



TSE-A100 specifications

Rated Voltage	3 VDC
Battery	D size (2)
Combustion material	Punk stick (7mm diameter, 150mm long)
Weight	5 pounds
Maximum length	14.1 feet

Preparing the TSE-A100

This section explains how to prepare the TSE-A100 to test smoke sensor.

1. Remove the TSE-A100 from its carrying case.
2. Unscrew the combustion chamber from the bottom of the TSE-A100
3. Unscrew the punk stick holder retainer from the combustion chamber.
4. Insert a punk stick into the punk stick holder in the combustion chamber.
5. Light the punk stick with a flame.
6. Reassemble the combustion chamber.
7. Screw the combustion chamber back into the bottom of the TSE-A100
8. Extend the telescopic pole of the TSE-A100 to a length which enables you to reach the detector you wish to test.

Testing a detector

Once you have prepared the TSE-A100, follow the steps in this section to test smoke detectors.

NOTE: Allow 30 to 60 seconds after igniting punk stick for sufficient smoke generation. For proper airflow, observe battery polarity.

1. Rotate the combustion chamber so the #2 arrow lines up with the power indicator screw. The fan powers on and a steady flow of smoke is released from the tip of the TSE-A100.
2. Raise the extended tip of the TSE-A100 to within 6-8" of the sensor. The sensor should alarm.

Storing the TSE-A100

This section explains how to store the TSE-A100 after use.

1. Rotate the combustion chamber to the #1 position to turn the power off.
2. Compress the telescopic pole to its shortest length.
3. Replace the TSE-A100 in its carrying case.
4. Store in a cool, dry place.
5. For extended storage, remove the batteries.

The SOLO Heat Sensor Tester

The SOLO 461 provides a solution for testing heat detectors that is second to none. Its patented design is convenience itself, while offering the fastest functional test possible in the safest and most controlled way.

Features

- Heat is directed straight at the detector sensor.
- Sets 95% of all heat detector types into alarm within seconds.
- Tests detectors up to 30ft with SOLO universal access poles.
- No cords - power from Battery Baton is delivered to unit via the frame.
- Uses same Battery Batons and charger as previous model - no need to buy new ones.
- Infra-red beam is broken by detector to activate heat generation.
- Microprocessor control maintains constant heat and airflow with variations in battery voltage.
- Goes into standby after 120 secs of use for protection.
- Switches off completely after 5 minutes in standby for further protection.
- Supplied with 2 Battery Batons and fast charger (operates from 110 / 120V, AC supply or 12V DC car battery).

Top View of SOLO 461 Head

ATG-EA

View of SOLO 461 in relationship to sensor

Specifications Tester and Pole

Suitable detector types:	Spot type, Rate of Rise, Fixed Temperature and Combination up to 194ºF
Maximum detector size:	Any - so long as the sensing element can be targeted by the heat source
Number of test:	Typically 50 tests of 30 secs duration per Battery BatonTMLimitless, if using one Battery Baton™while charging another
Maximum height:	Up to 10ft using SOLO 461 alone. Up to 30ft using SOLO extension poles
Approvals:	CE Mark UL listed (charger)
Safety Features:	Battery over-current cut-out Element safety cut out after 120 secondsAuto power off after 5 mins
Operating features:	Color coded LED user feedbackAutomatic infrared sensing of detector Multi position head 1 hour recharge time for Battery Baton™(car - 12V DC or 110 / 120V AC)
Environment:	Operating temperature 40ºF to 115ºF Storage Temperature 15ºF to 120ºF Humidity: 0-85% RH non-condensing

Relevant Weights and Dimensions

	Weight	Dimensions
Solo 460:	21oz	Inside diameter 4in approx
Solo 720:	18oz	Diameter 1.15in, Length 19.3in
Solo 724:	2lb 10oz	3in (w) X 5.3in (l) X 2.6in(h)

Testing a heat sensor

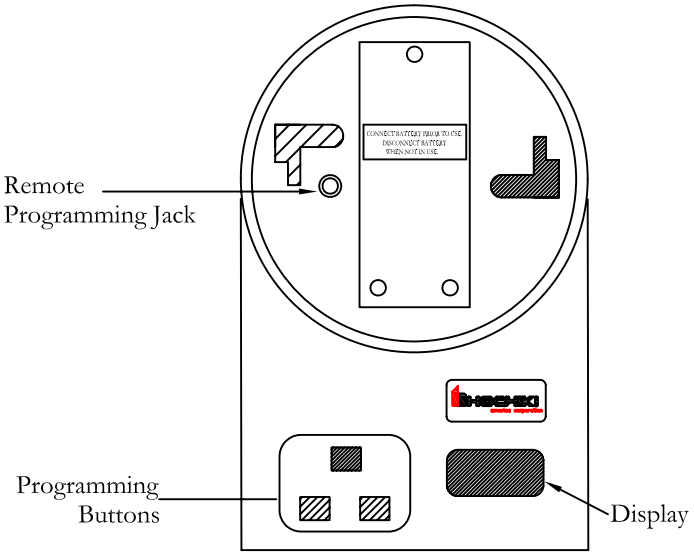
This section explains how to use the SOLO 461 to test smoke sensors.

WARNING:
DO NOT USE THIS DEVICE ON NON-RESTORABLE HEAT SENSORS OR DETECTORS!!!!

1. Connect 12Volt plug from the SOLO 461 into the battery pack.
2. Raise the extended head of the SOLO 461 up to the the sensor, and slip the head over the sensor.
3. Rotate the SOLO 461 until it is snug over the device.
4. Slide the power switch located at the bottom of the pole to the on position. The sensor should alarm between 5 and 15 seconds.
5. Once the sensor has alarmed remove the SOLO 461 and slide the power switch to the off position.
6. Testing is now complete for that sensor.
7. For added details refer to operation manual.

TCH-B100-NS Programmer operating instruction

TCH-B100-NS is a hand held programmer. It is designed for use with the following products: ALG-V/ALG-EA, ALK-V, ALK-V2, ALK-D AIE-EA, ATG-EA, FRCME-S, FRCME-P, FRCME-4, SOM, R2M and RM.



Features

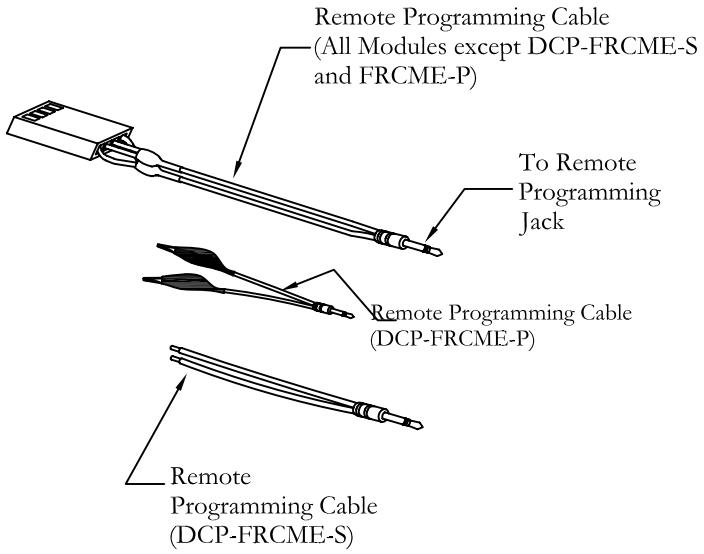
- The TCH-B100-NS is a compact unit and easy to use.
- The TCH-B100-NS provides address setting and reading.
- Has the diagnostic ability to display the analog value.
- Use 9V battery
- Automatically increments the address ready to set the address of the next sensor.
- Automatically switches the power off after use

Programming Buttons

Left Gray Button:	Power on. Automatically reads the address of a sensor. Subsequent operations will advance the device address by ten.
Right Gray Button:	Power off. Advances the device address by one.
Red Button:	Stores the displayed address to the device and is used to read sensor analog levels.

Address Setting

1. Install sensor onto programmer, ensuring that sensor protrusion aligns with programmer grooves.
2. Press the left gray button to switch programmed on. A battery check message will appear followed by the devices address (un-programmed sensors will read address 127).
3. Set the required address by incrementing the left and right gray buttons (the display will show three red flashing dots if the address being programmed is different from the device's current address).
4. When the desired address is present press the red button to store that address. The three red dots on the display will no longer be present.



Reading Analog Value:

NOTE: For Ion Sensor, do not read analog value for 30 seconds (stabilization period).

1. Install the sensor and power up programmer as previously described.
2. Press the red button. An "A" will appear on the display followed by the analog value. This value will be continuously updated for three minutes or until the unit is turned off.

Display Message:

bAt - On upon power up (battery check). Also on when battery is low. Low battery good for up to 3,000 address setting operation.
E0 - Attempting to set an address beyond 127.
E1 - Attempting to program an address with no device connected.
E2 - Can not find device after power up.
E3 - Invalid sensor response
E4 - Can not find the device program.
E5 - Device read error.
E6 - Fail during Analog value reading.