



**NITTAN**

**ST-I-AS**  
**ANALOGUE - ADDRESSABLE**  
**IONISATION SMOKE SENSOR**  
**INSTRUCTION MANUAL**

No: **NISM/STIA/02**

DATE: **MARCH 2001**

PAGE: **1 of 7**

ISSUE: **02**

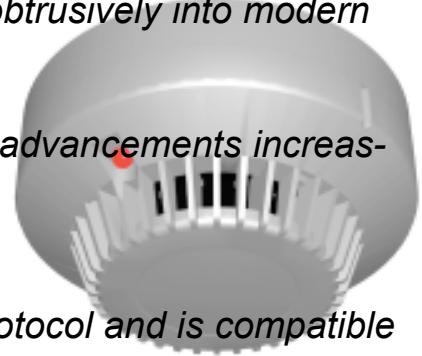
*From world leaders in* **SENSOR TECHNOLOGY**  
*comes* **SENSORTEC.....**



*The new **ST-I-AS** ionisation smoke sensor forms part of a brand new range of analogue addressable fire detectors from Nittan (UK) Ltd called **SENSORTEC-ANALOGUE**.*

*The **ST-I-AS** is a low cost, elegantly designed, low profile sensor which is aesthetically pleasing, thus enabling it to blend unobtrusively into modern working environments.*

*The **ST-I-AS** features the very latest technological advancements increasing reliability and performance.*



*The **ST-I-AS** is compatible with our existing 'AS' protocol and is compatible with leading panel manufacturers.*

**SENSORTEC-ANALOGUE.....**



**NITTAN (UK) LTD - BRINGING STYLE INTO FIRE DETECTION SYSTEMS**

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No: **NISM/STIA/02**DATE: **MARCH 2001**PAGE: **2 of 7**ISSUE: **02****CONTENTS:-**

<b>Section 1</b>	<b>- Introduction</b>	<b>- Page 1</b>
<b>Section 2</b>	<b>- Operation</b>	<b>- Page 2</b>
<b>Section 3</b>	<b>- Sensor Models</b>	<b>- Page 3</b>
<b>Section 4</b>	<b>- Base Models</b>	<b>- Page 3</b>
<b>Section 5</b>	<b>- Installation</b>	<b>- Page 3</b>
<b>Section 6</b>	<b>- Maintenance &amp; Cleaning</b>	<b>- Page 4</b>
<b>Section 7</b>	<b>- Specifications</b>	<b>- Page 5</b>
<b>Section 8</b>	<b>- Environmental Parameters:-</b>	<b>- Page 5</b>
	- Temperature	- Page 5
	- Humidity	- Page 5
<b>Section 9</b>	<b>- EMC</b>	<b>- Page 5</b>
<b>Section 10</b>	<b>- Address setting</b>	<b>- Page 6</b>
<b>Section 11</b>	<b>- Connections</b>	<b>- Page 7</b>
<b>Section 12</b>	<b>- Dimensions</b>	<b>- Page 7</b>

**Section 1 - INTRODUCTION**

The ST-I-AS is an attractively-styled, low cost, low profile ionisation smoke sensor for use with Nittan 'AS' protocol control panels. This sensor is virtually identical in function to our 2IC-AS/2IC-AS-2LR sensor and can therefore be used as a direct replacement.

The ST-I-AS analogue addressable ionisation sensor utilises the dual chamber, single source principle to provide optimum response to smoke. The Radioactive source is only 33.3 kBeq., (0.9 $\mu$ ci), Americium 241, therefore conforming to OECD recommendations. The sensor's design provides strong immunity to air velocities, contamination and RF interference.

The ST-I-AS has a chemically etched, stainless steel insect screen therefore reducing the ingress of insects and airborne contaminants.

The sensitivity of the ST-I-AS is easily confirmed in the field, using the TT3 or TT4\* electronic tester.

\* Available early 1998.

**ST-I-AS features:**

\* **Ionisation sensor, detecting visible and invisible particles of combustion**

\* **Low profile, stylish appearance**

\* **Supplied with protective dust cover, (remove during commissioning)**

\* **Low monitoring current**

\* **Integral red LED fire alarm indicator**

\* **Remote indicator output on standard model**

\* **Low activity radioisotope**

\* **Easy to disassemble and reassemble for cleaning**

\* **Compatible with STB-4 base & earlier RB-3/RB-6 Bases**

\* **Manufactured to meet the requirements of EN54 Part 7.**

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IONISATION SMOKE SENSOR  
INSTRUCTION MANUAL**

No: **NISM/STIA/02**DATE: **MARCH 2001**PAGE: **3 of 7**ISSUE: **02**

## **Section 2 - ST-I-AS OPERATION**

The ST-I-AS sensor consists of dual chambers ionised by a single radioactive source of 0.9  $\mu$ Ci Americium 241. A d.c. voltage is applied to two electrodes. The air between these two electrodes is ionised by the radioactive source so that ions in the airspace, both positive and negative, drift towards the appropriate electrode.

The ion drift constitutes an electric current whose magnitude is dependant on the freedom of mobility of the ions. Any combustion products entering the air space will collide with and adhere to the ionised molecules, thus impeding their drift and increasing the neutralisation of ions.

This impeding drift and increased neutralisation of ions is converted from analogue data to digital data and communicated back to the control equipment. If a sensor's analogue output falls below or rises above a certain predetermined level, a fault, pre-alarm or fire alarm is generated.

## **Section 3 - SENSOR MODELS**

The ST-I-AS ionisation smoke sensor is supplied, as standard, with three terminals.

The ST-I-AS has the facility to activate a remote LED indicator or auxiliary function, as standard.

The terminals on the ST-I-AS sensor head are configured as follows:-

Terminal 3 = -VE 3 mA aux output

Terminal 1 = Sig + (+VE) positive in/out

Terminal 6 = S- (-VE) negative in/out

## **Section 4 - BASE MODELS**

i) **STB-4 Base:** having 4 terminals, for standard use with ST-P-AS sensor including the auxiliary output function.

## **Section 5 - INSTALLATION**

In normal use, the ST-I-AS sensor will be installed at ceiling level. Pass the field wiring through the cable hole in the centre and from the rear of the base. Offer up and affix the base to the ceiling or conduit fitting with screws via the base mounting holes. Consider visibility and orientation of the sensor's integral alarm LED indicator when mounting the base. Connect field wiring to the base terminals, as detailed on page 6, making sure that wiring will not obstruct fitting of the detector head. Fit the sensor head by inserting it into base and turning clockwise until the notch in the detector rim aligns with the base locking screw.

Fit the plastic dust cover supplied over the detector to keep out dust etc, until the system is commissioned.

If the dust cover is not fitted and the environment is slightly dusty, such as when building work is carried out, then false alarms may occur after commissioning unless cleaning of the detector is undertaken. At commissioning, the dust cover should be removed and discarded.

**NOTE: THE PLASTIC DUST COVER MUST BE REMOVED FROM THE SENSOR IN ORDER FOR THE DETECTOR TO FUNCTION CORRECTLY.**

## **Section 6 - MAINTENANCE AND CLEANING**

### **Maintenance:**

The ST-I-AS sensor is a high quality product engineered for reliability. In order to obtain optimum performance, periodic maintenance is required as a dirty sensor is more likely to cause a false alarm.

### **Servicing:**

Servicing of the system should be carried out in accordance with the requirements of BS 5839 Part 1, Fire Detection and Alarm Systems for Buildings: Code of Practice for System Design, Installation and Servicing.

The maintenance procedures described below should be conducted with the following frequency:

**One month after installation:-** Routine Inspection  
and every 3 months  
after.

**Every 6 months:-** Operational Test

**Every 12 months:-** Functional Test and  
Clean.

All above frequencies of maintenance are dependent on ambient conditions.

### **Routine Inspection**

i) Ensure the sensor head is secure and undamaged.

ii) Check that the smoke entry apertures are in no way obstructed.

iii) Ensure the surface of the sensor's outer cover is clean. If there are deposits due to the presence of oil vapour, dust etc, then the sensor should be cleaned in accordance with the cleaning instructions detailed later in this manual. It may be advisable to ensure that such cleaning is conducted regularly in the future.

iv) Ensure no equipment which may generate combustion products or fine airborne particles, has been installed in the vicinity of the sensor since the last routine inspection. If such equipment has been installed, then you should notify the Fire Safety Officer or other competent authority and that its presence may cause false alarms.



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IONISATION SMOKE SENSOR  
INSTRUCTION MANUAL**

No: **NISM/STIA/02**

DATE: **MARCH 2001**

PAGE: **4 of 7**

ISSUE: **02**

**Operational Test**

The purpose of the Operational Test is to confirm the sensors's correct operation in response to a smoke condition.

i) Take any necessary precautions at the control panel to limit the sounding of the alarm sounders/bells and any fire service summoning device.

ii) Introduce a discrete amount of smoke into the sensor head, using NID-T2 Smoke Test Head or equivalent. Check that the sensor gives an alarm condition within 15 seconds. Check that the red LED indicator on the ST-I-AS sensor illuminates and any remote indicator LED that may be fitted also illuminates.

iii) After the sensor has given the alarm condition, reset the sensor from the control panel. It may be necessary to allow a short time to elapse before resetting the sensor, to allow any residual smoke from the test, to disperse.

iv) Before proceeding to the next sensor, ensure that the sensor just tested, does not re-operate due to the presence of residual smoke.

**Functional Tests:-**

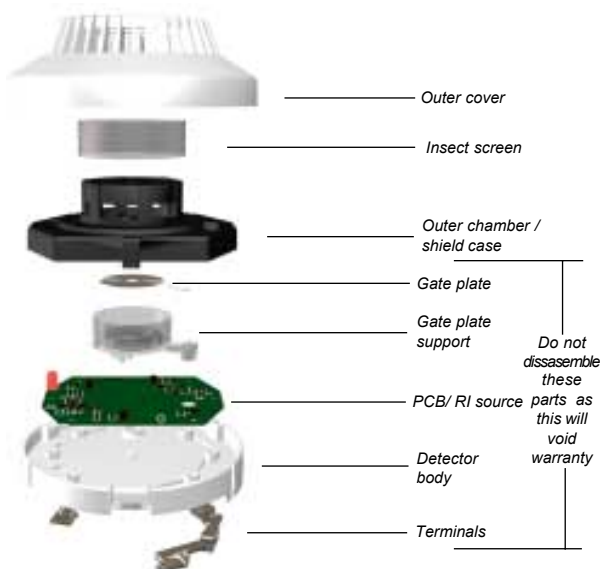
The ST-I-AS may be tested on the TT3 or TT4\* transmission tester, please refer to the instruction manual for the testers as follows:-

TT3 = NISM/TT3/01 April 1993

TT4 = \*Available early 1998

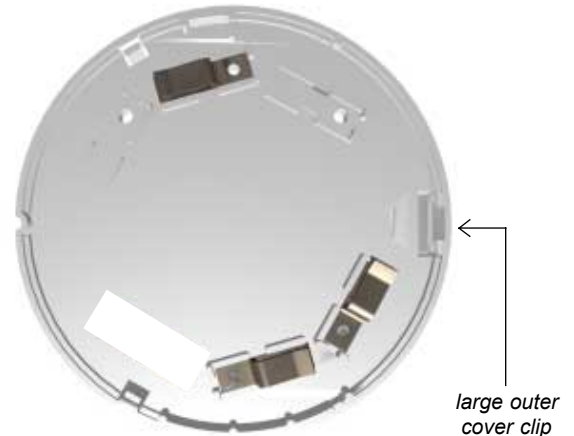
**Cleaning**

Figure 1:- 'Exploded' View of ST-I-AS Sensor Assembly:-



i) Carefully remove the outer cover of the detector by gently releasing the larger outer cover clip, (see figure 2 below), with a small screwdriver, this clip is visible from the rear of the ST-I-AS sensor. It is not necessary to use any excessive force. Once released gently release the two smaller clips with the aid of a finger

Figure 2:- Rear view of ST-I-AS Sensor.



ii) Remove the chemically-etched insect screen.

iii) Remove the screw holding the outer plastic chamber shield case to the detector body. Remove the plastic outer chamber shield case by gently releasing the clip on the opposite side to the retaining screw.

**DO NOT DISMANTLE ANY FURTHER**

iv) Examine the gate plate and the surface of the R.I. source through the round aperture of the gate plate. If the foil is very dirty or corroded, return the complete detector to Nittan for service. The R.I. source should not be touched with the finger or any instrument. This handling should be carried by a Professional Engineer/ Competent Person in a clean environment.

v) If the parts of the sensor are still serviceable, proceed to clean the outer chamber/shield case and plastic outer cover using both a clean dry brush for dry dust and dirt and a lint-free cloth moistened with alcohol for sticky deposits.

vi) Reassemble the sensor in the reverse order. Refit the plastic outer cover, aligning the LED indicator aperture with the LED indicator. Check alignment of the outer cover prior to fully pushing home in order to avoid



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IONISATION SMOKE SENSOR  
INSTRUCTION MANUAL**

No: **NISM/STIA/02**

DATE: **MARCH 2001**

PAGE: **5 of 7**

ISSUE: **02**

distortion of the insect screen.

Make sure that the three securing clips of the outer cover are properly aligned and seated. 'Snap fit' the plastic outer cover to the ST-I-AS body, taking care not to compress the insect screen.

**Ultrasonic Cleaning**

This method may be used to good effect for the removal of contamination from the outer cover, plastic outer chamber, and chemically etched insect screen, only, after they have been dismantled from the detector. However, care must be taken in selection of the solvent to avoid damage to the plastic and insect screen. The solvent supplier should be consulted as to its suitability. **Under no circumstances should the fully assembled detector be cleaned without disassembly as this may cause damage to the special treatment applied to specific components within the detector.**

**Disposal of the ST-I-AS Sensor**

If the need arises for the disposal of the ST-I-AS ionisation sensor, it should be returned to NITTAN (UK) Ltd for safe and correct disposal.

**Section 7 - SPECIFICATION**

<b>Model Reference:</b>	-	<b>ST-I-AS</b>
<b>Detector Type:</b>		Ionisation smoke sensor
<b>Computer Reference:</b>	-	81000
<b>Sensor Type:</b>		Ionisation smoke sensor
<b>Operating Current:</b>	-	200µamps fire alarm (LED on) 3.2mA
<b>Sensitivity:</b>	-	BS5445/EN54 Part 7
<b>Mass:</b>	-	108g (excluding base)
<b>Charging Time:</b>	-	20 seconds
<b>Ambient Temperature Range:</b>	-	-10 Deg.C to +50 Deg.C

**Section 8 - ENVIRONMENTAL PARAMETERS**

**Temperature Considerations:**

Over the range -10 deg. C. to +50 deg. C., the alarm voltage will not change from its nominal value by more than +/- 0.5 volts.

**Humidity:**

Alarm voltage will not change by more than 0.5V d.c. from its nominal value in Relative Humidity of up to 90%. (measured at 50 deg. C. - non condensing).

**Section 9 - EMC**

**Installation**

The installation shall be in accordance with the regulations either of the approval body for an approved system, or otherwise, to the national code of practice/regulations for the installation of the fire alarm system, e.g. BS 5839 part 1.

**Electromagnetic Compatibility (EMC)**

On a site where there is an unusually high level of potential electrical interference, e.g. where heavy currents are being switched or where high levels of R.F. are prevalent, care then must be taken in the type and routing of cables. Particular care should be given to the separation of zone wiring from the cable carrying the interference.



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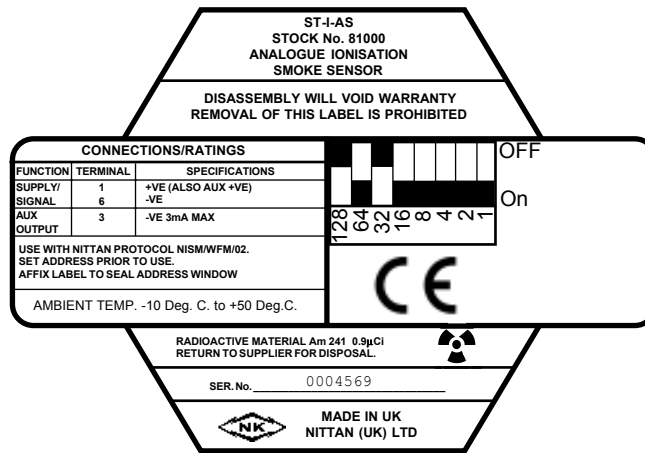
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**INSTRUCTION MANUAL**

No: <b>NISM/STIA/02</b>	
DATE: <b>MARCH 2001</b>	
PAGE: <b>6 of 7</b>	ISSUE: <b>02</b>

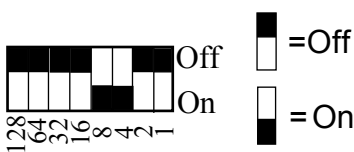
**Section 10 - ADDRESS SETTING:-**

**NITTAN DIL SWITCH SETTINGS FOR SENSORTEC MODEL TYPES: 5000/ION, ST-P-AS, 5000/OP and ST-H-AS, 5000/TEMP.**

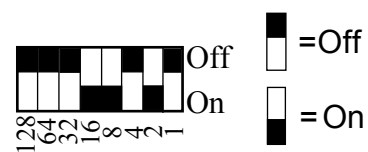
**WARNING: Connect only to NITTAN (UK) LTD suitable and compatible analogue-addressable control panels. If in doubt, check with control panel manufacturer.**



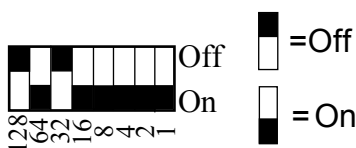
*Rear of ST-I-AS Sensor and Address Switch Setting (DIL Switch)*



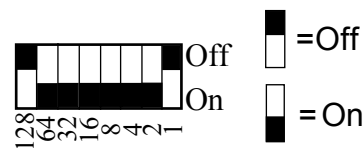
Above switch setting set to address 12.



Above switch setting set to address 26.



Above switch setting set to address 95.



Above switch setting set to address 126.

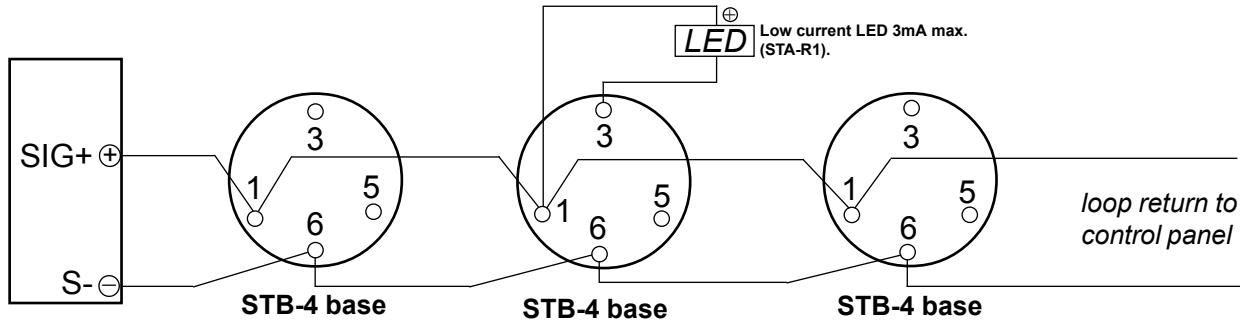


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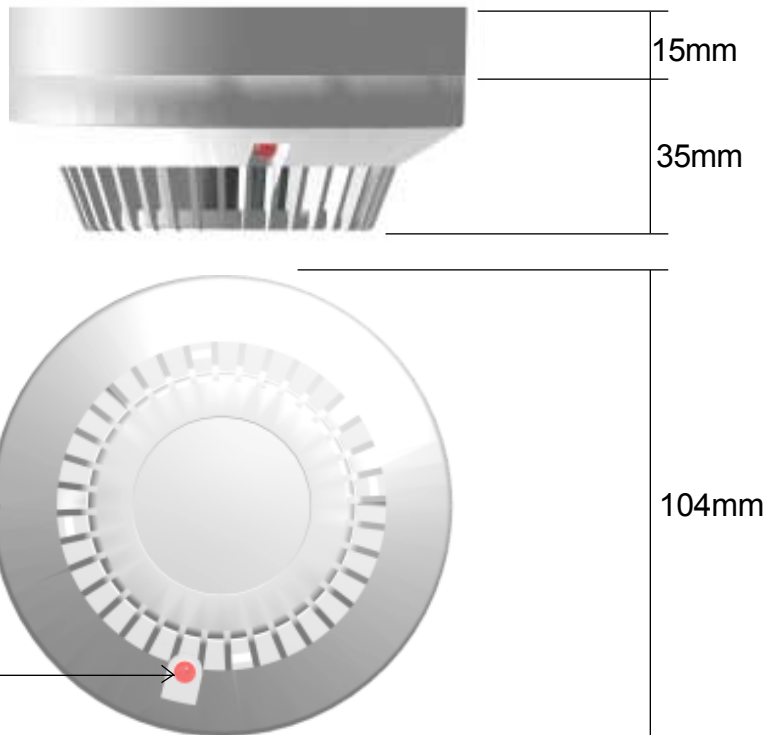
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No: <b>NISM/STIA/02</b>	
DATE: <b>MARCH 2001</b>	
PAGE: <b>7 of 7</b>	ISSUE: <b>02</b>

**Section 11 - CONNECTIONS (Also suitable for ST-P-AS and ST-H-AS Sensors)**



**Section 12 - DIMENSIONS**



**NOTE:**  
**Red LED:** denotes  
ionisation sensor.  
**Clear LED:** denotes  
Photoelectric smoke  
sensor.

**NITTAN (UK) LTD**



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comes **SENSORTEC.....***

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LPCB REF: 041c/10



Quality System Certificate No. 041  
Assessed to BS EN ISO 9002

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