SA-1
SMOKE ALARM

ITWatchDogs

installation & user guide

SA-1 *Smoke Alarm*

A smoke alarm is an excellent safety device – and with the IT Watchdogs' SA-1, not only will you have the usual audible alarm signal if something in your installation begins to smoke, but your WeatherGoose monitoring system will be able to notify you via e-mail or SNMP as well, just like any other monitored sensor! This makes the SA-1 an especially valuable add-on for monitoring remote installations which might not have anyone around to hear the siren.

Plus, since the Kidde smoke alarms the SA-1 is based around are capable of being connected to other smoke alarms as a group, such that if one senses smoke, they all sound off (a very important feature for large commercial buildings where a single alarm wouldn't be loud enough to be heard throughout the facility), an SA-1 can be wired up alongside other compatible Kidde smoke alarms such that any smoke alarm in your facility can trip the alarm threshold on the WeatherGoose unit and send an alert. (In fact, it is exactly this remote "daisy-chaining" function which the SA-1 taps into in order to provide a signal to the WeatherGoose; the actual Kidde smoke alarm device is not modified by IT Watchdogs in any way.)

The SA-1 is directly compatible with any WeatherGoose (series I or series II) monitoring unit which has analog-sensor inputs; such models include the WeatherGoose, SuperGoose, and the MiniGoose/XP. Models which do not have built-in analog inputs, such as the MiniGoose, will require the use of an appropriately-programmed CCAT analog-to-digital converter to use an SA-1. Models which do not provide connections for either analog or digital sensors, such as the MicroGoose, are not compatible with the SA-1 Smoke Alarm.

A typical example of the SA-1 Smoke Alarm is shown below. Note that because the SA-1 is based around a standard off-the-shelf Kidde smoke alarm, your particular unit may have some cosmetic differences from the one shown below. Its functionality, however, will be the same.
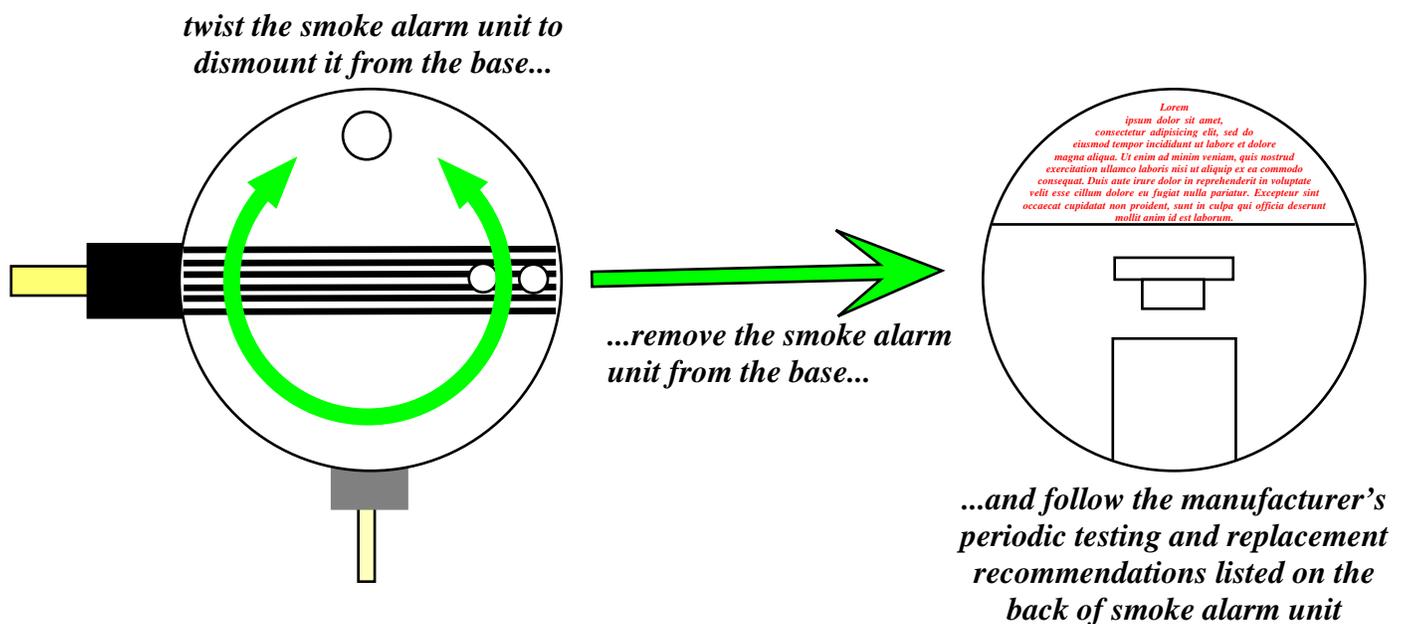
The SA-1 is powered both by a 120VAC wall plug, and by a 9V backup battery which keeps the unit alive and functioning in the event of a line-power failure. This means that as long as your WeatherGoose and its associated network & internet gateways are also kept alive via a UPS or auxiliary generator during a power failure, then you will still receive e-mails and/or SNMP trap events if smoke should be detected.

CAUTION: the SA-1 is <u>not</u> designed for worldwide-voltage operation, and is not compatible with 208VAC or 240VAC line voltages!

The Kidde smoke alarms that the SA-1 is designed around are only rated and sold for use in North America, and are only designed to function on standard 120VAC/60Hz line voltages. Attempting to operate the SA-1 from higher voltages, and/or from 50Hz line frequencies, may permanently damage or destroy the smoke-alarm unit.

As with any smoke alarm device, IT Watchdogs strongly recommends that you make a note of when the SA-1 was first installed, test it at regular intervals, and replace it on the schedule recommended by the smoke alarm's manufacturer. The manufacturer's recommended testing and replacement schedules can be found on the body of the smoke alarm itself; simply twist the smoke alarm to unlock it from the mounting base (an arrow molded into the plastic body will show the correct direction), then look at the manufacturer's labeling on the back of the unit.

twist the smoke alarm unit to dismount it from the base...

...remove the smoke alarm unit from the base...

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

...and follow the manufacturer's periodic testing and replacement recommendations listed on the back of smoke alarm unit

This same procedure can be used to access the battery compartment to install or change the 9V backup battery, if yours is one with the battery compartment located on the back of the unit. (The location of the battery compartment may vary depending on smoke alarm model.) Be certain to follow all manufacturer's recommendations as to how to open the battery compartment, and how often the battery should be changed.
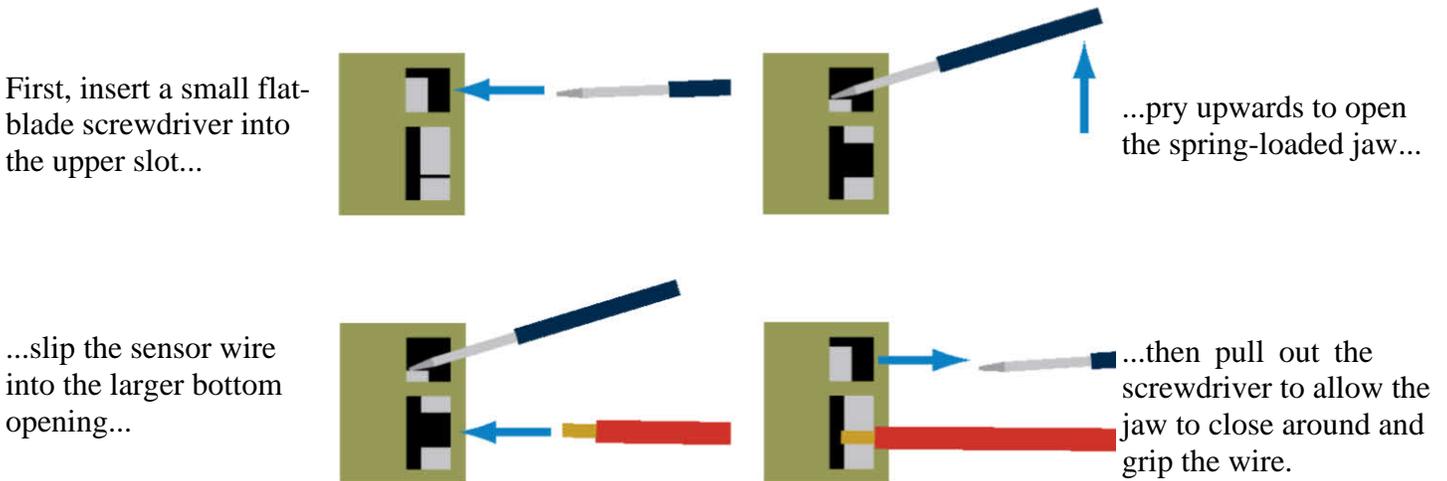
Using the SA-1 via a direct connection
to the WeatherGoose's built-in Analog Inputs:

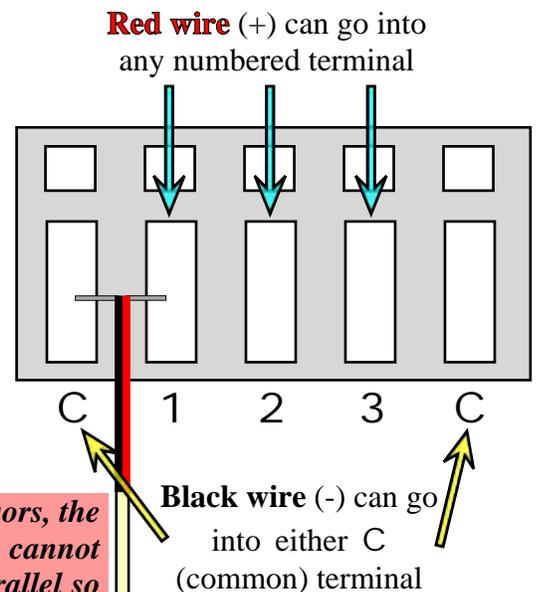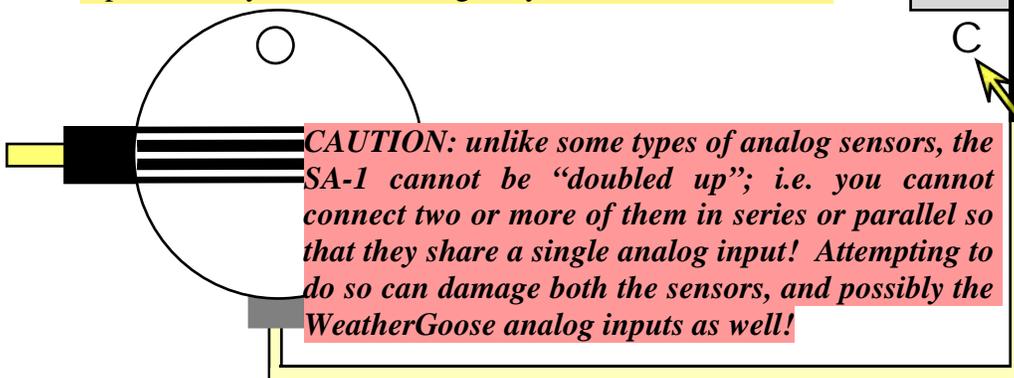Ÿ Connecting the SA-1 to the Analog-Input terminals:

The following diagrams demonstrate how to connect your SA-1 Smoke Alarm directly to the spring-loaded analog-input terminals used on most of the standard series-I and series-II WeatherGoose product lines. (Note that specialized models, such as the PowerGoose and RelayGoose, use different styles of terminal blocks; while the connections will be the same electrically, the mechanical nature of the connector will be different than the one shown here. If necessary, refer to the manuals for those specific models for further details on how to connect analog sensor devices.) Each terminal consists of two openings; a larger, square opening at the bottom, where the wire will be inserted, and a smaller, narrower opening above which is used to open the spring-loaded jaws inside the terminal block so the wire can be inserted.

Note that the terminal jaws are not of an insulation-piercing type, and the wire ends must be stripped at least ½" prior to insertion.

First, insert a small flat-blade screwdriver into the upper slot...

...pry upwards to open the spring-loaded jaw...

...slip the sensor wire into the larger bottom opening...

...then pull out the screwdriver to allow the jaw to close around and grip the wire.

Red wire (+) can go into any numbered terminal

This diagram shows the correct polarity to connect an SA-1 to the analog-input terminals on a WeatherGoose.

Note that this applies to all models of the WeatherGoose family, regardless of series or model; the SA-1 must be connected with the correct polarity, or the unit will not function and the Goose's input circuitry could be damaged by incorrect connections!

C   1   2   3   C

Black wire (-) can go into either C (common) terminal

CAUTION: unlike some types of analog sensors, the SA-1 cannot be "doubled up"; i.e. you cannot connect two or more of them in series or parallel so that they share a single analog input! Attempting to do so can damage both the sensors, and possibly the WeatherGoose analog inputs as well!

Ÿ Sensor operation and behavior:

Once you've successfully connected the SA1 to your WeatherGoose, the internal-sensors display block of the *Sensors* page will look something like this: (NOTE: for purposes of this example, the SA-1 has been connected to Analog Input #1 of a WeatherGoose-II with v3.3 firmware; the use and operation of the SA-1 will be similar for other models, but the on-screen displays may differ somewhat.)

In this screenshot, the SA-1 is currently dormant; no smoke has been detected, so the alarm is quiet and there is no signal to the WeatherGoose...

So, if the alarm is inactive, why does the reading show "**99**", instead of "**0**" as you might normally assume? This is just a consequence of the way the internal Analog Inputs are designed to accommodate both dry-contact devices such as switches, relays, etc., and voltage-signal devices such as current transformers. Since the SA-1 presents itself as a dry-contact type of device, the analog input reads "**99**", because its contacts are currently in the "open" state and, due to the presence of a weak pull-up resistor which supplies loop current for dry-contacts connected to the Analog Input terminals, an "open" terminal will tend to float up to +5V – and since the WeatherGoose displays the Analog Inputs' 0~5VDC input range as a proportional value from 0~99, an open contact pair reads as "**99**".
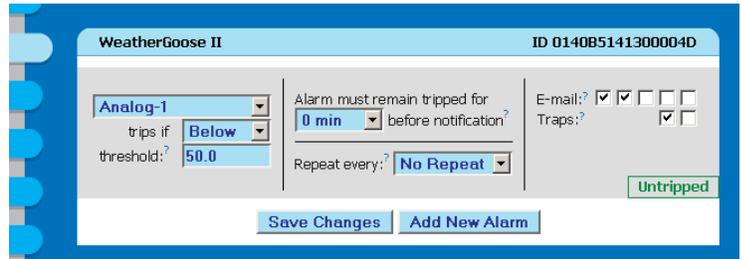

Here, the smoke alarm has detected smoke in the air (or someone has held down the test button), and the SA-1's contacts have closed. Note that the reading hasn't quite gone all the way to "**0**", but that's not unusual; depending on the length of the wire between the WeatherGoose and the SA-1, there may be a few ohms of resistance in the wire that keep the input from getting all the way down to 0VDC. (Oxidization on the wire terminals can also cause this, which is why it is important to ensure that the wires are cleanly stripped and that the WeatherGoose unit is not mounted in an area which is exposed to excessive humidity or airborne chemical contaminants. Since the SA-1 is simply a "Yes/No"-type of sensor, though, a slight variation in readings doesn't matter – effectively, any reading >50 can be considered "inactive", and anything <50 can be read as "alarm."
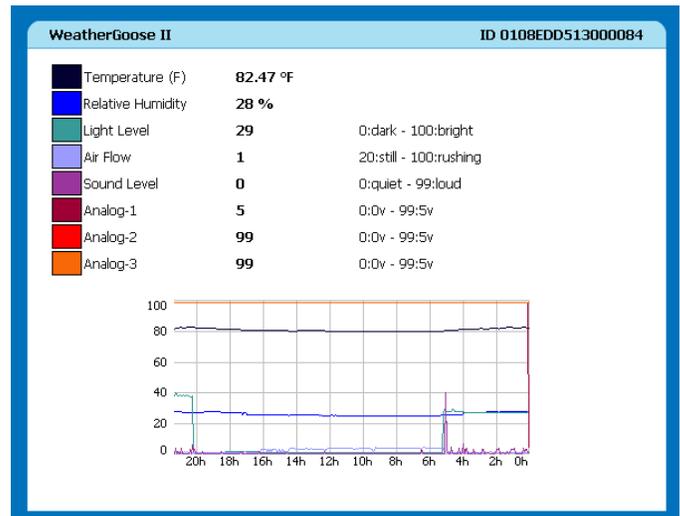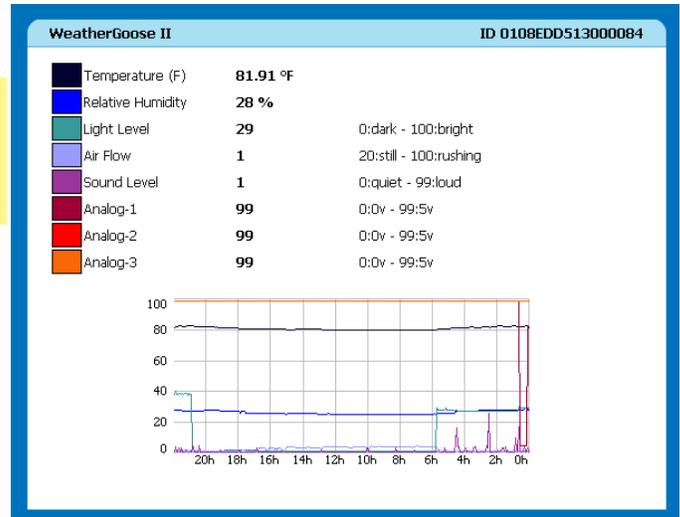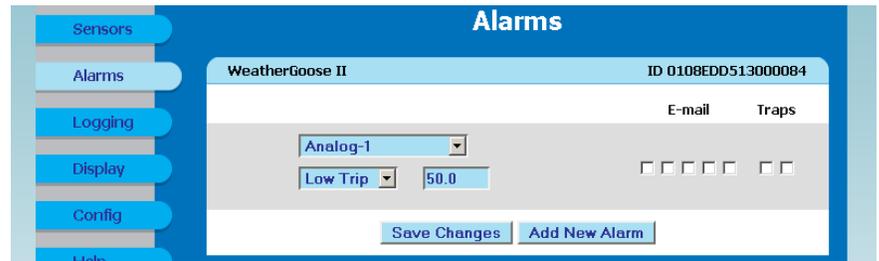
Ÿ Alarm-threshold settings when connected directly to an Analog Input:

If you are using a Series-II unit:

To set an alarm threshold to notify you when a door is opened, simply go to the ***Alarms*** page, click the *Add New Alarm* button under the Goose's internal-sensors block, Analog Input to which the RCP2-100 is connected (Analog-1 in this example), set *trips if:* to `Below` and threshold to `50`; then, set the checkboxes for the alarm actions you wish this alarm threshold to trigger, along with a trigger delay or alarm-repeat interval if desired, and click *Save Changes*.

If you are using a Series-II unit with a firmware revision prior to v3.4.x, your alarm-settings block will look like this. Alarm-threshold settings are calculated and programmed the same way as above; the only difference (aside from the lack of trigger-delay and alarm-repeat intervals, which were introduced in v3.4) is that the alarm types are named `High Trip` and `Low Trip` instead of `Above` and `Below`, respectively. `High Trip` alarms are tripped when the reading goes higher than the set threshold, while `Low Trip` alarms are tripped when the reading goes below the threshold.

If you are using a Series-I unit:

The alarm thresholds are the same as for series-II, but the method of setting them is somewhat different. Find the sensor block on the ***Alarms*** page for the Goose unit's internal sensors, then set the *Low Trip* threshold to `50` and the *High Trip* threshold to `110`, as shown here, for the input which the SA-1 is connected to, then set the *Alarm State* to the action you wish to take place when the trip threshold(s) are exceeded and click *Save Changes*. (The input being used is highlighted here for example purposes.) Since the Analog input cannot go higher than 99, this will effectively disable the High Trip event, which is not needed in this application.

Using the SA-1 via a CCAT-SMOKE
analog-to-digital bus interface module:

Ÿ Connecting the SA-1 to the CCAT-SMOKE:

If you are using an ITWatchdogs monitoring device which does not have built-in analog inputs, such as the MiniGoose-II, or if you have already used up all of your analog inputs on other sensors, then you will need to attach the SA-1 via an appropriately-programmed CCAT analog-to-digital bus interface module, available from IT Watchdogs. The following diagrams show how to hook up and use an SA-1 in combination with a CCAT-SMOKE interface module.

(Note: the CCAT has been manufactured in a couple of different physical variations over the lifetime of the product. If your CCAT does not seem to match the appearance of the one shown below, you may have an earlier model, and may wish to consult the CCAT User Guide to insure the correct hookups.)

Note that the same cautions apply to using the CCAT as to the internal Analog Inputs; i.e. correct polarity must be observed when connecting the SA-1, and multiple units may not be connected in series or parallel to share a single CCAT connection! Again, the wires will need to be stripped, as the terminals are not of an insulation-piercing type. However, they do not need to be stripped back as far as they do for the Analog Input block; a ¼-inch of exposed wire will generally be sufficient for the style of terminals used on the CCAT.

red wire goes into the terminal marked **RD** or **(+)**

black wire goes into the terminal marked **BK** or **(-)**
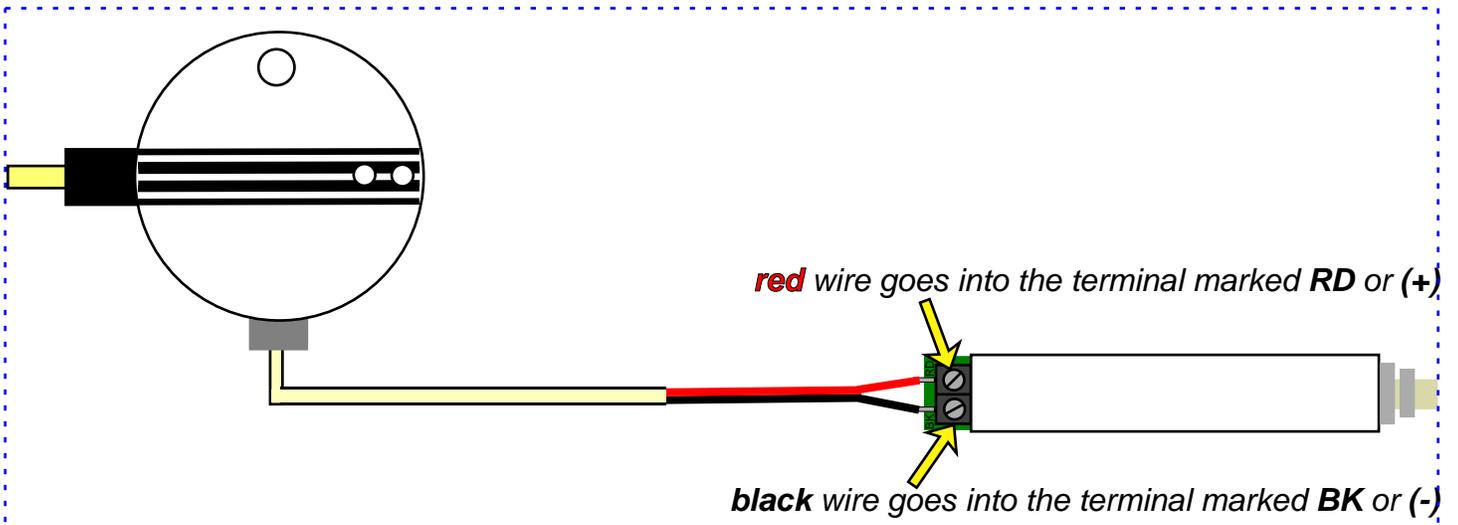
Ÿ Sensor operation & behavior when connected via a CCAT-SMOKE:

Once you've connected the CCAT-SMOKE to the monitoring unit, a new sensor block will appear, initially titled "Smoke Sensor." (This name can, of course, be changed from the **_Display_** page to something more specific to your installation.) If your CCAT does <u>not</u> initially display as "Smoke Sensor", do not proceed further, as your CCAT is not correctly programmed for this sensor and will not display its status properly! (In this event, contact IT Watchdogs technical support for assistance.)

This screenshot shows an inactive smoke alarm, so the WeatherGoose displays the SA-1's status as "Clear." The actual numeric value being graphed is "99" – this is because the CCAT's A/D converter behaves essentially the same way as the built-in Analog Inputs on the WeatherGoose; i.e. an open dry-contact input tends to "float" to 5VDC due to an internal pull-up resistor, and 5V is interpreted and displayed as "99".   However, since the CCAT and WeatherGoose "know" that the connected device is supposed to be an SA-1 smoke alarm, it is able to interpret the number and present a more user-friendly display.


Now, let's see what happens when we activate the smoke alarm. The numeric reading drops down towards 0, and the SA-1's status is indicated as "Smoky." (If you are conducting a test of the SA-1, you will probably want to hit "refresh" on your browser a few seconds after the alarm begins to sound, rather that wait for the automatic 1-minute page refresh.)
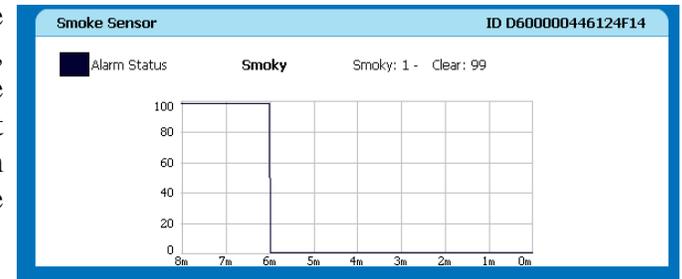
Special note for series-I WeatherGoose users:

Series-I models will not display the "smoky" or "clear" labels described above; instead, they will simply display the same numeric values as described in the previous section on analog inputs, as shown here.
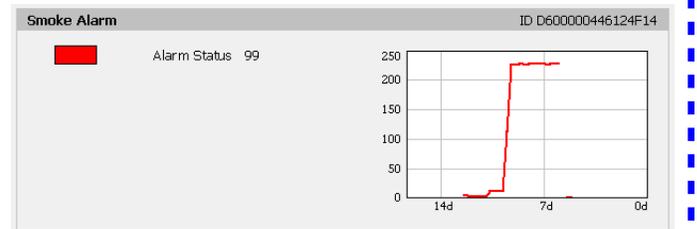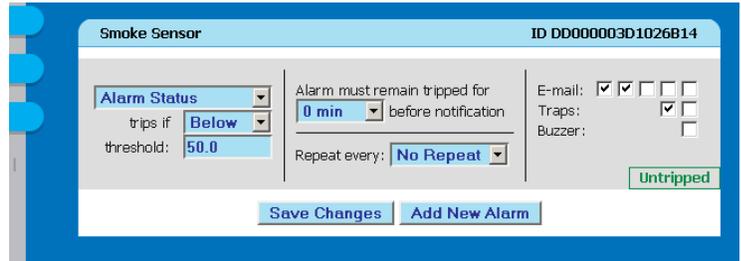

NOTE: THERE IS A BUG IN SOME OLDER SERIES-II FIRMWARE VERSIONS WHICH CAUSES THE UNIT TO DISPLAY THE STATUS INCORRECTLY; i.e. the "Smoky" and "Clear" states are reversed! This does <u>not</u> affect the device's actual operation or the ability to set alarm thresholds; it is merely a cosmetic issue with the "friendly" naming of the actual numeric values from the CCAT-SMOKE. However, it can be confusing, so if you find that your device is displaying the SA-1's status opposite of what it should be, IT Watchdogs highly recommends updating your unit to the latest firmware revision at the soonest opportunity.
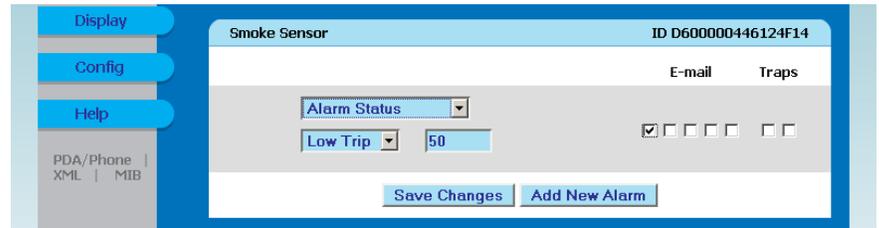
Ÿ Alarm-threshold settings when connected via a CCAT-SMOKE:

If you are using a Series-II unit:

When you go to the ***Alarms*** page, you'll find that a new parameter block has been added there as well, also titled "Smoke Sensor." To set an alarm threshold to notify you when the SA-1 detects smoke and sounds the alert, simply scroll down to this new parameter block, click the *Add New Alarm* button, set *trips if:* to `Below` and threshold to `50`; then, set the checkboxes for the alarm actions you wish this alarm threshold to trigger, along with a trigger delay or alarm-repeat interval if desired, and click *Save Changes*.

If you are using a Series-II unit with a firmware revision prior to v3.4.x, your alarm-settings block will look like this. Alarm-threshold settings are calculated and programmed the same way as above; the only difference (aside from the lack of trigger-delay and alarm-repeat intervals, which were introduced in v3.4) is that the alarm types are named `High Trip` and `Low Trip` instead of `Above` and `Below`, respectively. `High Trip` alarms are tripped when the reading goes higher than the set threshold, while `Low Trip` alarms are tripped when the reading goes below the threshold.

If you are using a Series-I unit:

The alarm thresholds are the same as for series-II, but the method of setting them is somewhat different. Find the sensor block on the ***Alarms*** page for newly-connected CCAT-SMOKE, then set the *Low Trip* threshold to `50` and the *High Trip* threshold to `110`, as shown here, then set the *Alarm State* to the action you wish to take place when the trip threshold(s) are exceeded and click *Save Changes*. Since the reading on a CCAT analog-to-digital input channel cannot go higher than 99, this will effectively disable the High Trip event, which is not needed in this application.