# MS-1
# MAGNETIC
# DOOR SWITCH KIT

**ITWatchDogs**

ID 01FA893B11000085

| Sound Level | 8 | 0:quiet - 99:loud |
| IO-1 | 99 | 0:0v - 99:5v |
| IO-2 | 99 | 0:0v - 99:5v |
| IO-3 | 99 | 0:0v - 99:5v |
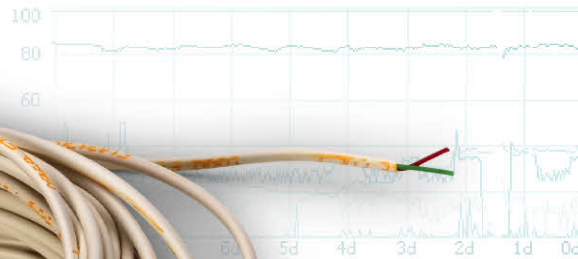
78.57 °F
66          20:still - 100:ru
Relative Humidity    38 %
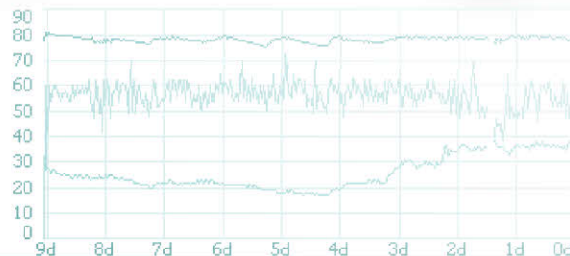
# installation & user guide

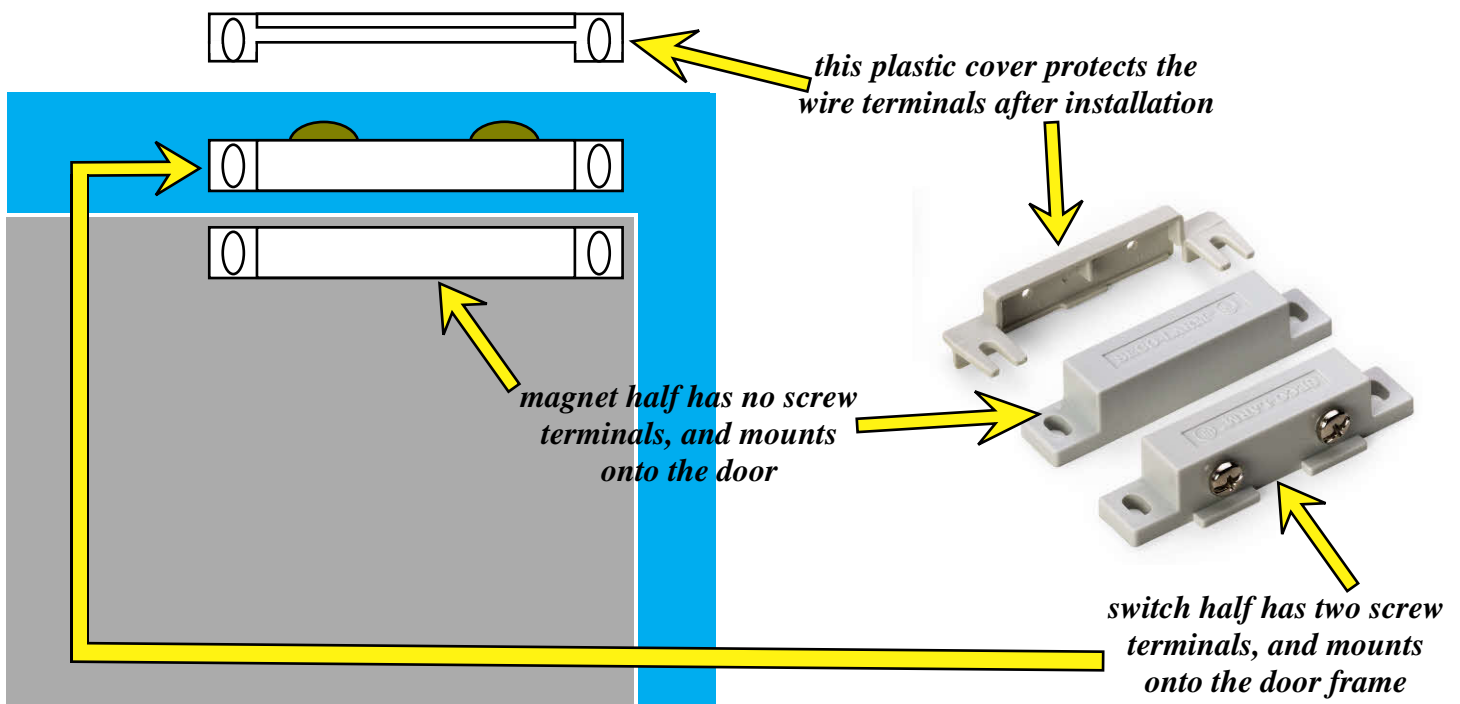# MS-1 *Magnetic Door Switch Kit*

The MS-1 Magnetic Door Switch Kit offers an economical way to keep an eye on the doors to your server-rack cabinets, or any other access doors or cabinets which should normally be remain closed.  A simple two-piece device consisting of a magnet and a switch, the MS-1 is a non-contact switch which can be mounted almost anywhere; the door or access panel is not required to make physical contact with the switch in order to trigger it.

The MS-1 Magnetic Door Switch 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 MS-1.  Models which do not provide connections for either analog or digital sensors, such as the MicroGoose, are not compatible with the MS-1.

If you need to monitor several doors at once, the MS-1 offers considerable flexibility, as multiple units can be connected in series to reduce the number of analog inputs or CCAT expansion devices  required.  And because it is a simple dry-contact switch sensor, no external power supply is required; the weak loop current automatically supplied by the WeatherGoose's analog inputs (or by the CCAT) is all that's required to operate the device, making it easy to install with a minimum of extra wiring per sensor.

As you can see in the following diagrams, installation of the MS-1 Magnetic Door Switch is fairly straightforward; simply mount the magnet half on the door or access panel to be monitored and mount the switch half on the door frame, positioned so that the two pieces will be within ½in. of each other when the door is closed.  Note that the two halves look very similar; however, you can tell which half is which simply by looking for the presence of two philips-head screw terminals on the switch half, as shown below.  A plastic cover, provided with the MS-1 kit, protects the wire terminals from tampering or accidental shorts after installation.

Note: because the door switch is operated by a magnet, it may not function properly when mounted directly to a metal door and/or door frame.  If you experience unreliable operation with the MS-1 mounted to this type of door, try mounting it with ½ inch-thick pieces of a non-magnetic material, such as wood or plastic, between the switch components and the metal door & frame.
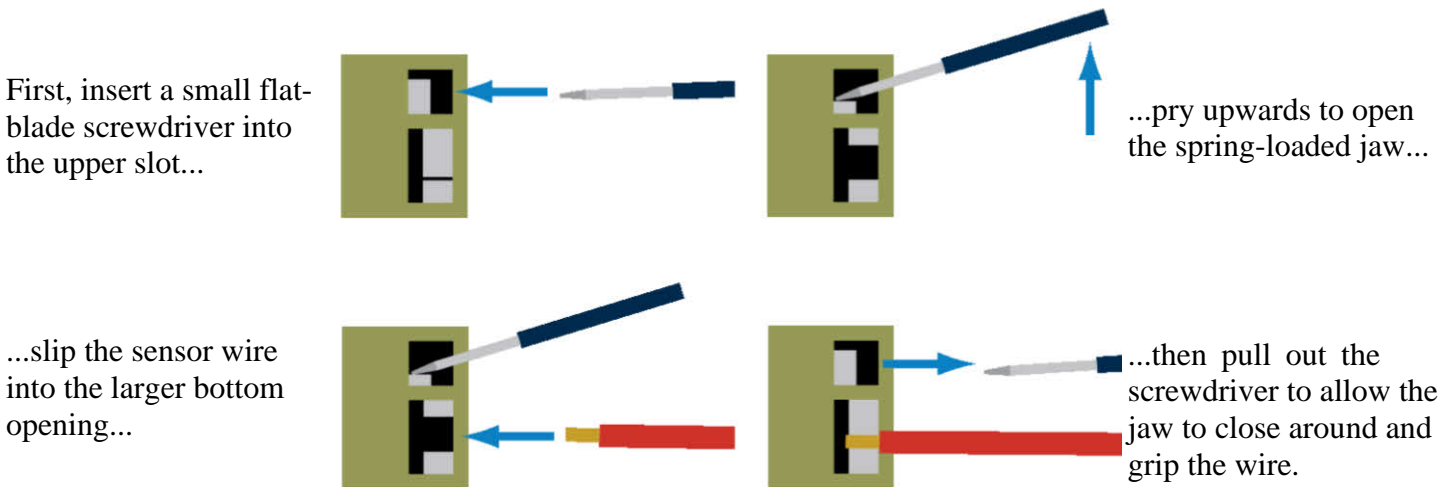
*this plastic cover protects the wire terminals after installation*

*magnet half has no screw terminals, and mounts onto the door*

*switch half has two screw terminals, and mounts onto the door frame*

# *Using the MS-1 via a direct connection*
# *to the WeatherGoose's built-in Analog Inputs:*

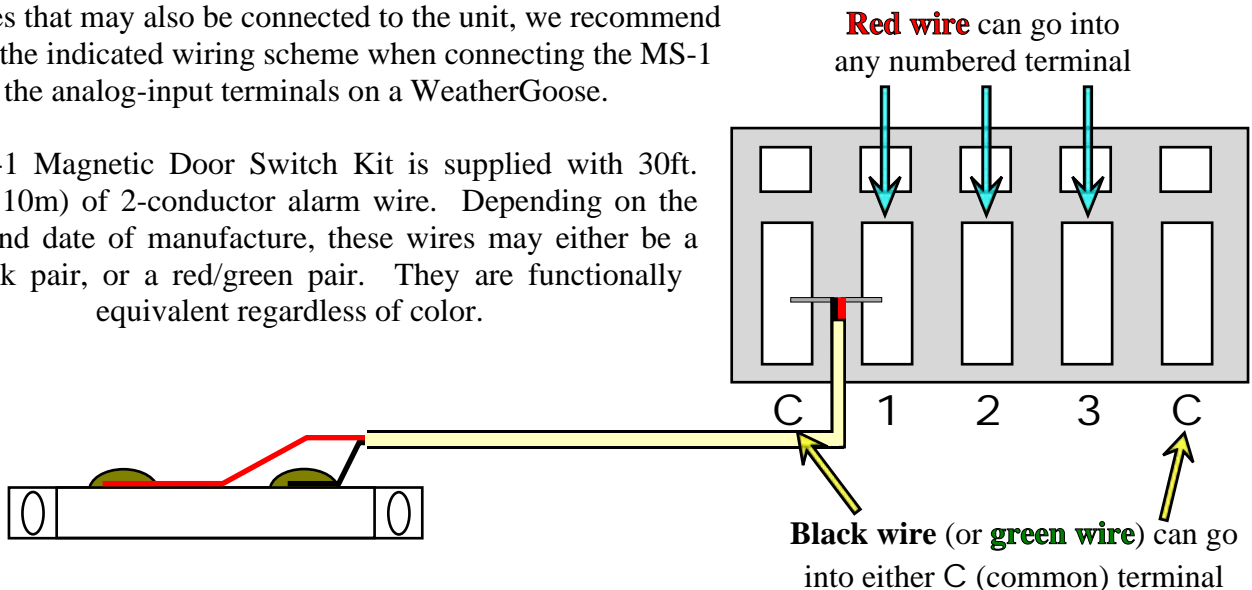Ÿ Connecting the MS-1 to the Analog-Input terminals:

The following diagrams demonstrate how to connect your MS-1 Magnetic Door Switch 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 on the WeatherGoose, and the screw terminals on the switch, are <u>not</u> of an insulation-piercing type; therefore, the wire ends must be stripped at least ½" prior to connection.

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...

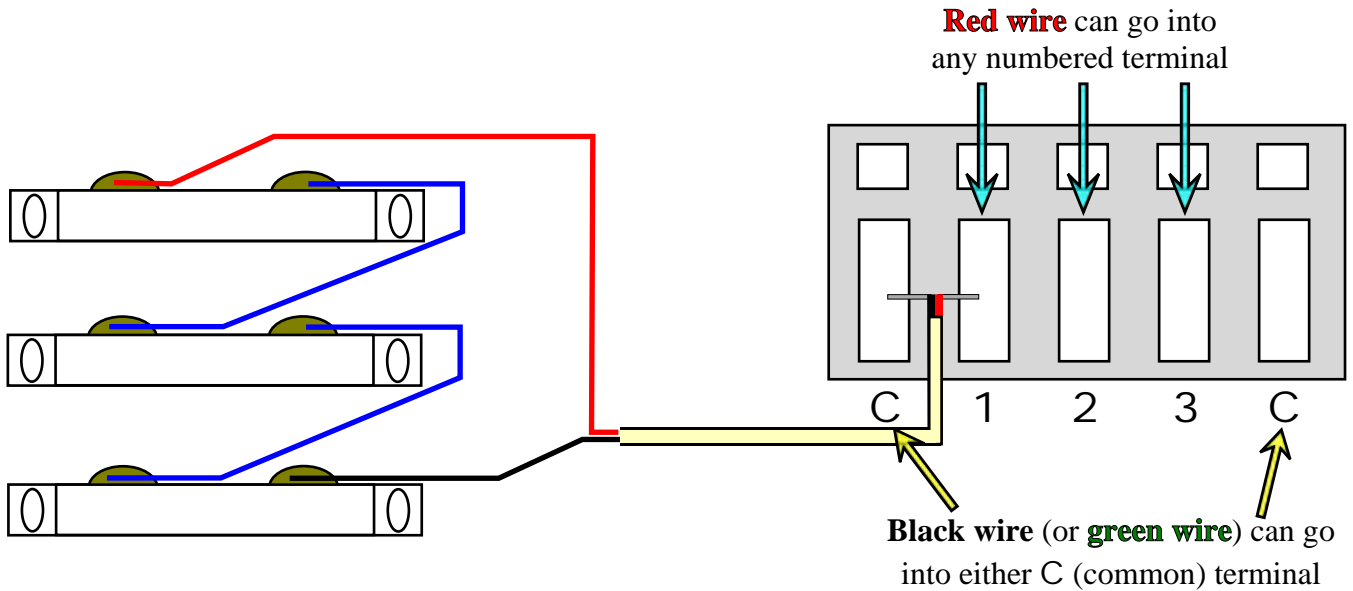...then pull out the screwdriver to allow the jaw to close around and grip the wire.

Since the MS-1 is a dry-contact device, it doesn't have a specific polarity – however, to maintain consistency with other analog sensor types that may also be connected to the unit, we recommend following the indicated wiring scheme when connecting the MS-1 to the analog-input terminals on a WeatherGoose.

The MS-1 Magnetic Door Switch Kit is supplied with 30ft. (approx. 10m) of 2-conductor alarm wire. Depending on the vendor and date of manufacture, these wires may either be a red/black pair, or a red/green pair. They are functionally equivalent regardless of color.

**Red wire** can go into any numbered terminal

C    1    2    3    C

**Black wire** (or **green wire**) can go into either C (common) terminal

Unlike some types of analog sensors, two or more MS-1's can be connected in series so that they share a single analog input, as shown below. Note that in such a configuration, you will not be able to determine exactly which door has been opened; you will only know that one or more of the doors in the group sharing that particular input are open. Depending on your installation, though, it might not be necessary for your alerts to be that specific about the location; if you have a single rack cabinet with both front and rear access doors, for example, it's probably sufficient just to know that a door on the rack is sitting open. If so, wiring multiple MS-1's in series can be a convenient and inexpensive way to monitor several doors without having to use up all of your analog inputs.

There is no fixed limit to the number of MS-1's that can be wired in series to share a single analog input.

Red wire can go into
any numbered terminal

C   1   2   3   C

Black wire (or green wire) can go
into either C (common) terminal

Ÿ Sensor operation and behavior:

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

In this screenshot, the door is currently closed, so the magnet is holding the switch closed – so, why does the reading show "**0**"?  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 a closed MS-1 is a closed circuit, connecting the "C" and analog-input terminals together, the input is pulled down to ground (or 0V) potential and, and since the WeatherGoose displays the Analog Inputs' 0 ~ 5Vdc input range as a proportional value from 0 ~ 99, a closed contact pair reads as "**0**".

Conversely, when the door opens far enough that the magnet can no longer hold the switch closed (about ½ ~ 1 inch), the contacts open and the reading rises to "**99**".  This is due to the presence of a weak pull-up resistor inside the WeatherGoose unit, which provides a small loop current for dry-contact switches; thanks to this pull-up resistor, an open circuit will tend to float up to +5V, which is displayed by the WeatherGoose as "**99**".  (This, incidentally, is why Analog Inputs with nothing connected to them also display a default reading of "**99**".)

Note that if you have multiple MS-1's wired in series to a single analog input, if any one of the switches opens and breaks the circuit, the reading will switch from "**0**" to "**99**", but you will not be able to tell which one it is just by looking at the reading on the WeatherGoose's web page.
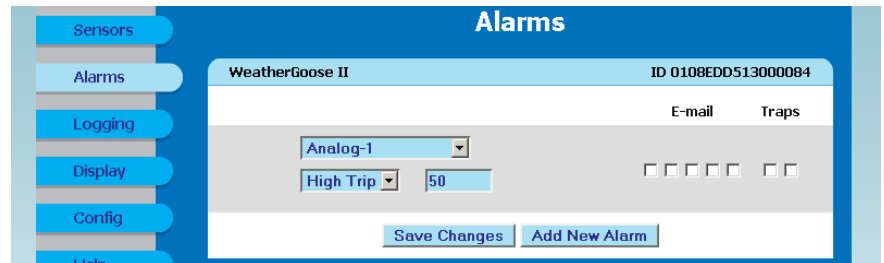
4
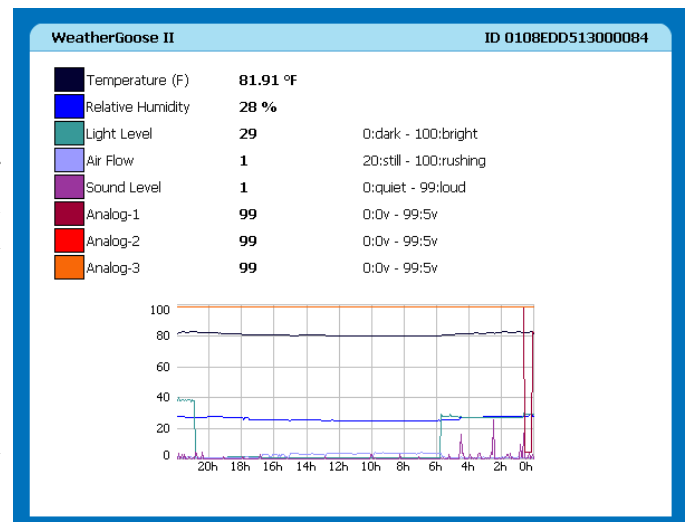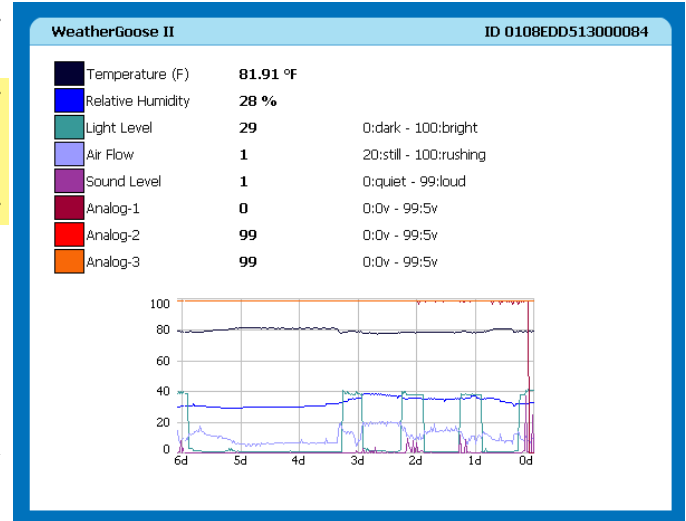
Ÿ Alarm-threshold settings when connected directly to an Analog Input:

**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 MS-1 is connected (Analog-1 in this example), set *trips if:* to **Below** and threshold to **50**; then, select 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*. The alarm will trip when the switch contacts open, allowing the reading to rise from "**0**" to "**99**", and clear when the switch contacts close and the reading returns to "**0**".

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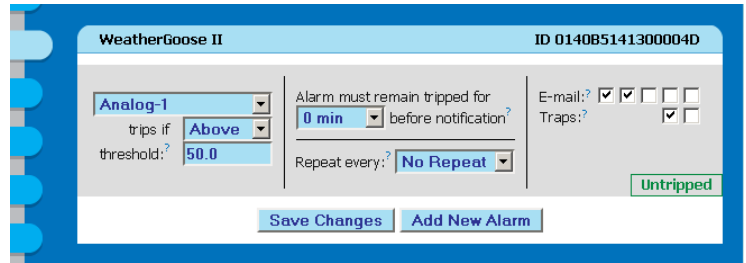
    **If you are using a Series-II unit with a firmware revision prior to v3.4.x**, your alarm-settings block will look like this. Alarm-threshold settings are calculated and programmed the same way as above; the only difference (aside from the lack of trigger-delay and alarm-repeat intervals, which were 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.

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    **If you are using a Series-I unit**, the alarm settings are somewhat different. Find the sensor block on the *Alarms* page for the Goose unit's internal sensors, then set the *Low Trip* threshold to **-10** and the *High Trip* threshold to **50**, as shown here, for the input which the MS-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.) The alarm will trip when the switch contacts open, allowing the reading to rise from "**0**" to "**99**", and clear when the switch contacts close and the reading returns to "**0**". Since the Analog input cannot go below 0, this will effectively disable the Low Trip event, which is not needed in this application.

# Using the MS-1 via a CCAT-DOOR
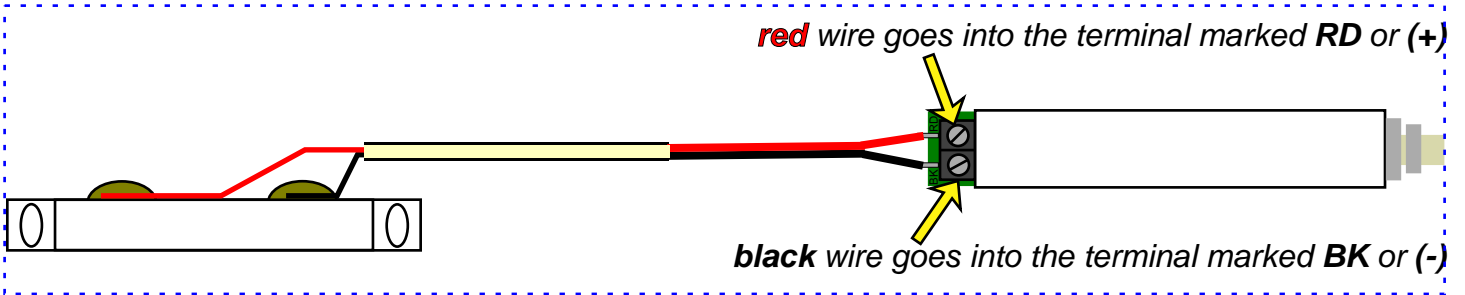## analog-to-digital bus interface module:

Ϋ Connecting the MS-1 to the CCAT-DOOR:

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 MS-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 MS-1 in combination with a CCAT-DOOR interface module.
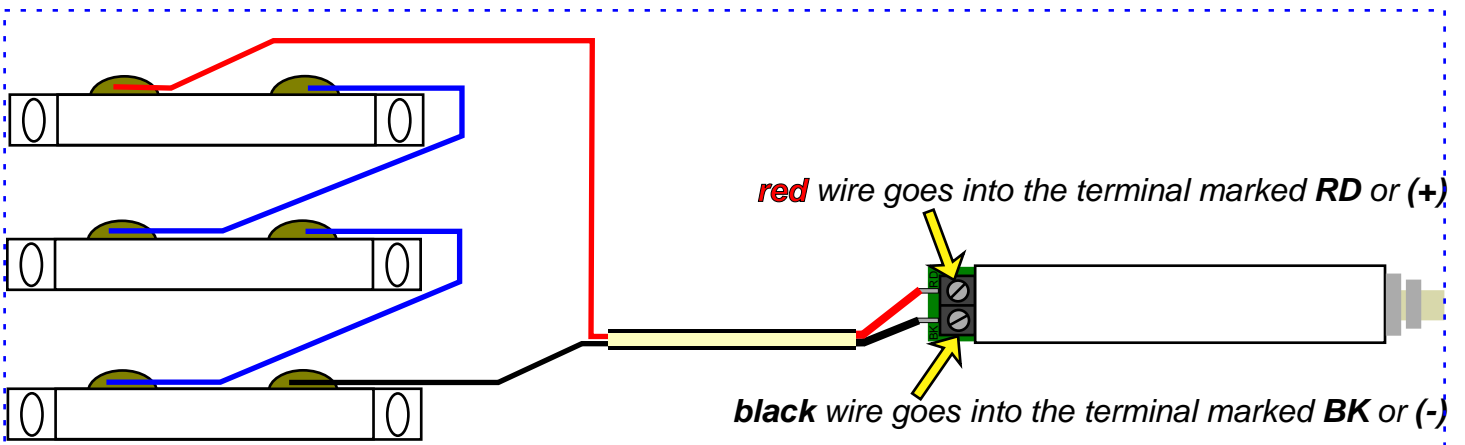
(Note: the CCAT has been manufactured in a couple of different physical variations over the lifetime of the product. If your CCAT does not seem to match the appearance of the one shown below, you may have an earlier model, and may wish to consult the CCAT User Guide to insure the correct hookups.)

As we saw with the direct analog inputs in the previous section, the MS-1 does not have a specific polarity, so the wiring is not critical; nonetheless, we suggest following the indicated wiring scheme for consistency with other sensor types. The wires will need to be stripped, as the terminals are not of an insulation-piercing type – however, the ends which connect to the CCAT 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 (-)*

Unlike some types of analog sensors, two or more MS-1's can be connected in series so that they share a single CCAT, as shown below. Note that in such a configuration, you will not be able to determine exactly which door has been opened; you will only know that one or more of the doors in the group sharing that particular input are open. Depending on your installation, though, it might not be necessary for your alerts to be that specific about the location; if you have a single rack cabinet with both front and rear access doors, for example, it's probably sufficient just to know that a door on the rack is sitting open. If so, wiring multiple MS-1's in series can be a convenient and inexpensive way to monitor several doors without the additional complexity and expense of a large number of CCAT devices to give each MS-1 its own connection to the WeatherGoose.

There is no fixed limit to the number of MS-1's that can be wired in series to share a single CCAT input.

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

*black wire goes into the terminal marked BK or (-)*

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Ϋ Sensor operation & behavior when connected via a CCAT-DOOR:

Once you've connected the CCAT-DOOR to the monitoring unit, a new sensor block will appear, initially titled "Door 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 "Door 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.)

In this first screenshot, the In this screenshot, the door is currently closed, so the magnet is holding the switch contacts closed.  Note that unlike when the device was connected to one of the internal analog inputs, the sensor block actually displays the door's state as "**Closed**", instead of a numeric reading of "**1**"; this is because the WeatherGoose "knows" that this device is supposed to be a door switch, thanks to the programmed CCAT, and so it is able to scale and interpet a closed or open circuit into a "friendlier", more human-readable form.
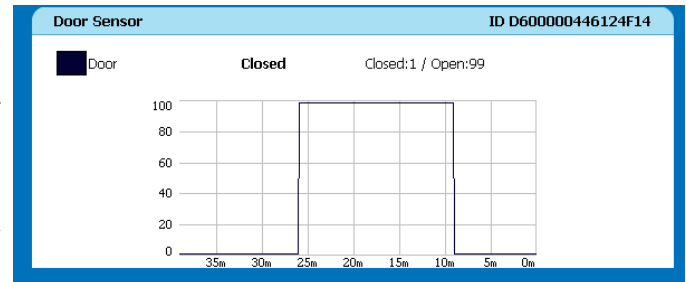


Conversely, when the door opens far enough that the magnet can no longer hold the switch closed (about ½ ~ 1 inch), the contacts open and break the circuit.  Again, notice how the WeatherGoose display's the door sensor's status as "**Open**", instead of a numeric reading of "**99**".
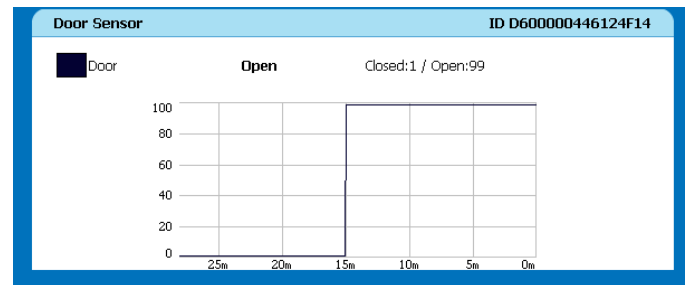


Note that if you have multiple MS-1's wired in series to a CCAT-DOOR, if any one of the switches opens and breaks the circuit, the reading will switch from "**Closed**" to "**Open**", but you will not be able to tell which one it is just by looking at the reading on the WeatherGoose's web page.

Special note for series-I WeatherGoose users:

Series-I models will not display the "open" or "closed" labels described above; instead, they will simply display the same numeric values as described in the previous section on analog inputs, as shown here.
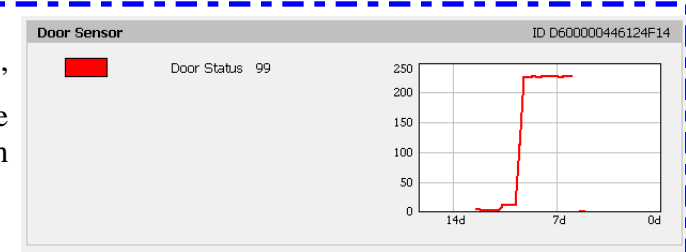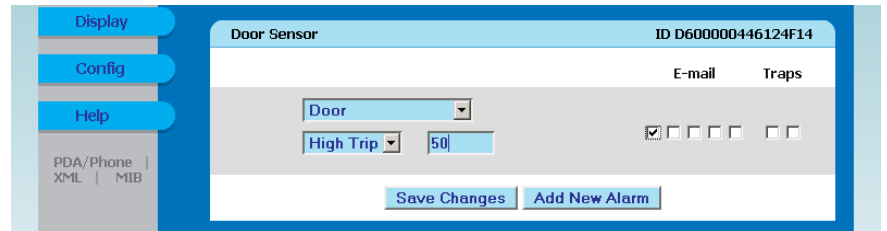
Ÿ Alarm-threshold settings when connected via a CCAT-DOOR:

When you go to the *Alarms* page, you'll find that a new parameter block has been added there as well, also titled "Door Sensor." To set an alarm threshold to notify you when the door is opened, simply go to the *Alarms* page, find the sensor block for the newly-connected CCAT-DOOR, simply scroll down to this new parameter block, click the *Add New Alarm* button, set *trips if:* to **Below** and the threshold to **50**; then, select the alarm actions you wish this threshold to trigger, along with a trigger delay or alarm-repeat interval if desired, and click *Save Changes*.
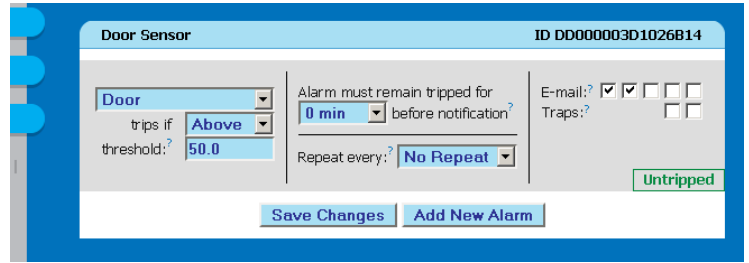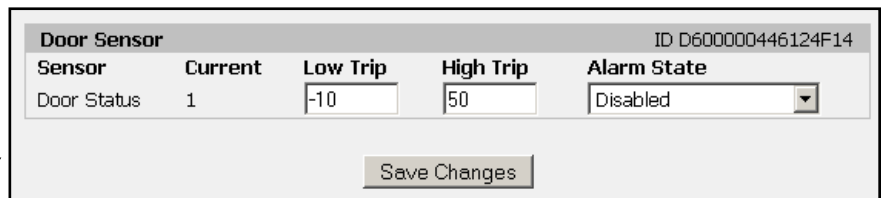
Keep in mind when setting your thresholds that even though the WeatherGoose conveniently displays the status as "**Open**" or "**Closed**" for you on the *Sensors* page, the alarms system still deals in numeric values, and those values are the same as for a direct analog-input connection, i.e. a closed door switch will read "**0**", while an open door switch reads "**99**".

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**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 settings are 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.

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**If you are using a Series-I unit**, the alarm settings are somewhat different. Find the sensor block on the *Alarms* page for the newly-connected CCAT-DOOR, then set the *High Trip* threshold to **50** and the *Low Trip* threshold to **-10**, 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 cannot go below 0, this will effectively disable the Low Trip event, which is not needed in this application.

Keep in mind when setting your thresholds that even though the WeatherGoose conveniently displays the status as "**Open**" or "**Closed**" for you on the *Sensors* page, the alarms system still deals in numeric values, and those values are the same as for a direct analog-input connection, i.e. a closed door switch will read "**0**", while an open door switch reads "**99**".