Alarms for the Cisco ISA 3000

This chapter gives an overview of the alarm system in the ISA 3000, and also describes how to configure and monitor alarms.

- About Alarms, on page 1
- Defaults for Alarms, on page 3
- Configure Alarms, on page 3
- Monitoring Alarms, on page 6
- History for Alarms, on page 8

About Alarms

You can configure the ISA 3000 to issue alarms for a variety of conditions. If any conditions do not match the configured settings, the system triggers an alarm, which is reported by way of LEDs, syslog messages, SNMP traps, and through external devices connected to the alarm output interface. By default, triggered alarms issue syslog messages only.

You can configure the alarm system to monitor the following:

- Power supply.
- Primary and secondary temperature sensors.
- Alarm input interfaces.

The ISA 3000 has internal sensors plus two alarm input interfaces and one alarm output interface. You can connect external sensors, such as door sensors, to the alarm inputs. You can connect external alarm devices, such as buzzers or lights, to the alarm output interface.

The alarm output interface is a relay mechanism. Depending on the alarm conditions, the relay is either energized or de-energized. When it is energized, any device connected to the interface is activated. A de-energized relay results in the inactive state of any connected devices. The relay remains in an energized state as long as alarms are triggered.

For information about connecting external sensors and the alarm relay, see Cisco ISA 3000 Industrial Security Appliance Hardware Installation Guide.
### Alarm Input Interfaces

You can connect the alarm input interfaces (or contacts) to external sensors, such as one that detects if a door is open.

Each alarm input interface has a corresponding LED. These LEDs convey the alarm status of each alarm input. You can configure the trigger and severity for each alarm input. In addition to the LED, you can configure the contact to trigger the output relay (to activate an external alarm), to send syslog messages, and to send SNMP traps.

The following table explains the statuses of the LEDs in response to alarm conditions for the alarm inputs. It also explains the behavior for the output relay, syslog messages, and SNMP traps, if you enable these responses to the alarm input.

<table>
<thead>
<tr>
<th>Alarm Status</th>
<th>LED</th>
<th>Output Relay</th>
<th>Syslog</th>
<th>SNMP Trap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm not configured</td>
<td>Off</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>No alarms triggered</td>
<td>Solid green</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Alarm activated</td>
<td>Minor alarm—solid red</td>
<td>Relay energized</td>
<td>Syslog generated</td>
<td>SNMP trap sent</td>
</tr>
<tr>
<td></td>
<td>Major alarm—flashing red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm end</td>
<td>Solid green</td>
<td>Relay de-energized</td>
<td>Syslog generated</td>
<td>---</td>
</tr>
</tbody>
</table>

### Alarm Output Interface

You can connect an external alarm, such as a buzzer or light, to the alarm output interface.

The alarm output interface functions as a relay and also has a corresponding LED, which conveys the alarm status of an external sensor connected to the input interface, and internal sensors such as the dual power supply and temperature sensors. You configure which alarms should activate the output relay, if any.

The following table explains the statuses of the LEDs and output relay in response to alarm conditions. It also explains the behavior for syslog messages, and SNMP traps, if you enable these responses to the alarm.

<table>
<thead>
<tr>
<th>Alarm Status</th>
<th>LED</th>
<th>Output Relay</th>
<th>Syslog</th>
<th>SNMP Trap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm not configured</td>
<td>Off</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>No alarms triggered</td>
<td>Solid green</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Alarm activated</td>
<td>Solid red</td>
<td>Relay energized</td>
<td>Syslog generated</td>
<td>SNMP trap sent</td>
</tr>
<tr>
<td>Alarm end</td>
<td>Solid green</td>
<td>Relay de-energized</td>
<td>Syslog generated</td>
<td>---</td>
</tr>
</tbody>
</table>
Defaults for Alarms

The following table specifies the defaults for alarm input interfaces (contacts), redundant power supply, and temperature.

<table>
<thead>
<tr>
<th>Alarm Contact 1</th>
<th>Alarm</th>
<th>Trigger</th>
<th>Severity</th>
<th>SNMP Trap</th>
<th>Output Relay</th>
<th>Syslog Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Closed State</td>
<td>Minor</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Enabled</td>
<td></td>
</tr>
<tr>
<td>Alarm Contact 2</td>
<td>Enabled</td>
<td>Closed State</td>
<td>Minor</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Redundant Power Supply (when enabled)</td>
<td>Enabled</td>
<td>—</td>
<td>—</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Temperature</td>
<td>Enabled for the primary temperature alarm (default values of 92°C and -40°C for the high and low thresholds respectively)</td>
<td>—</td>
<td>—</td>
<td>Enabled for primary temperature alarm</td>
<td>Enabled for primary temperature alarm</td>
<td>Enabled for primary temperature alarm</td>
</tr>
</tbody>
</table>

Configure Alarms

To configure alarms for the ISA 3000, perform the following steps.

Procedure

**Step 1** Configure severity for one or all alarm contacts.

```
alarm contact {contact_number | all} severity {major | minor | none}
```

Example:

ciscoasa(config)# alarm contact 1 severity major

Enter a contact number (1 or 2) or enter all to configure all alarms. Enter major, minor or none as the severity. The default is minor.

**Step 2** Configure triggers for one or all alarm contacts.

```
alarm contact {contact_number | all} trigger {closed | open}
```

Example:

ciscoasa(config)# alarm contact 1 trigger closed

Enter a contact number (1 or 2) or enter all to configure all alarms. Enter closed or open as the trigger. The default is closed.
Specifying **open** will trigger an alarm when a contact which is normally closed (normal electrical connectivity), is open, or when current stops flowing.

Specifying **closed** will trigger an alarm when the contact which is normally open (no electrical connectivity), is closed, or when current starts flowing.

For example, if a door sensor is connected to an alarm input, its normally open state has no electrical current flowing through the contacts. If the door is opened, electrical current flows through the contacts, activating the alarm.

**Example:**
ciscoasa(config)# alarm contact 1 trigger open

Enter a contact number (1 or 2) or enter **all** to configure all alarms. Enter **open** or **closed** to specify the trigger. The default is closed.

**Step 3**
Enable relay, system logger and SNMP traps for alarm contacts.

When the relay is enabled, and an alarm condition arises, the relay is energized and the device attached to the relay is activated. When the relay is energized, the alarm out LED glows solid red.

- Enable relay for the input alarm.

```
alarm facility input-alarm contact_number relay
```

**Example:**
ciscoasa(config)# alarm facility input-alarm 1 relay

Enter a contact number (1 or 2). By default, relay for alarm inputs is disabled.

- Enable system logger.

```
alarm facility input-alarm contact_number syslog
```

**Example:**
ciscoasa(config)# alarm facility input-alarm 1 syslog

Enter a contact number (1 or 2).

- Enable SNMP traps.

```
alarm facility input-alarm contact_number notifies
```

**Example:**
ciscoasa(config)# alarm facility input-alarm 1 notifies

Enter a contact number (1 or 2).

**Step 4**
(Optional) Specify a description for input alarm contacts.

```
alarm contact contact_number | description string
```

**Example:**
ciscoasa(config)# alarm contact 1 description Door_Open

The contact_number specifies the alarm contact for which the description is configured. The description may be up to 80 alphanumeric characters long and will be included in syslog messages.

To set the default description to the corresponding contact number use the **no alarm contact contact_number description** command.
Step 5 Configure power supply alarms.

Note Redundant power supply has to be enabled for the power supply alarms to work.

See the following commands for configuring power supply alarms:

- **power-supply dual**
  This command enables dual power supply.

- **alarm facility power-supply rps disable**
  This command disables the power supply alarm. In its default state, this alarm is disabled. If the alarm is enabled, use this command to disable it.

- **alarm facility power-supply rps notifies**
  This command sends power supply alarm traps to an SNMP server.

- **alarm facility power-supply rps relay**
  This command associates the power supply alarm to the relay.

- **alarm facility power-supply rps syslog**
  This command sends power supply alarm traps to a syslog server.

Step 6 Configure temperature thresholds.

```
alarm facility temperature {primary | secondary} {high | low} threshold
```

Example:

```
ciscoasa(config)# alarm facility temperature primary high 90
```

For the primary temperature alarm, valid threshold values range from –40°C to 92°C. For the secondary temperature alarm, valid threshold values range from –35°C to 85°C. If a temperature threshold is configured for the secondary alarm, only the secondary alarm will be enabled.

Use the **no** form of each command to disable or revert to default values. Using the **no** form of the commands for the primary alarm will not disable the alarm and will revert to the default values of 92°C for the high threshold, and –40°C for the low threshold. Using the **no** form of the command for the secondary alarm will disable it.

Step 7 Enable SNMP traps, relay and system logger for temperature alarms.

See the following commands for enabling relay, SNMP traps, and syslogs for temperature alarms:

- **alarm facility temperature {primary | secondary} notifies**
  This command sends primary or secondary temperature alarm traps to an SNMP server.

- **alarm facility temperature {primary | secondary} relay**
  This command associates the primary or secondary temperature alarm to the relay.

- **alarm facility temperature {primary | secondary} syslog**
  This command sends primary or secondary temperature alarm traps to a syslog server.
Use the no form of each command to disable relay, SNMP traps and syslogs.

Monitoring Alarms

See the following commands to monitor alarms:

**Procedure**

- **show alarm settings**
  
  This command displays all global alarm settings.

  ```
ciscoasa> show alarm settings
  Power Supply
  Alarm Disabled
  Relay Disabled
  Notifies Disabled
  Syslog Disabled
  Temperature-Primary
  Alarm Enabled
  Thresholds MAX: 92C MIN: -40C
  Relay Enabled
  Notifies Enabled
  Syslog Enabled
  Temperature-Secondary
  Alarm Disabled
  Threshold
  Relay Disabled
  Notifies Disabled
  Syslog Disabled
  Input-Alarm 1
  Alarm Enabled
  Relay Disabled
  Notifies Disabled
  Syslog Enabled
  Input-Alarm 2
  Alarm Enabled
  Relay Disabled
  Notifies Disabled
  Syslog Enabled
  ```

- **show environment alarm-contact**
  
  This command displays all external alarm settings.

  ```
ciscoasa> show environment alarm-contact
  ALARM CONTACT 1
  Status: not asserted
  Description: external alarm contact 1
  Severity: minor
  Trigger: closed
  ALARM CONTACT 2
  Status: not asserted
  Description: external alarm contact 2
  Severity: minor
  Trigger: closed
  ```

- **show facility-alarm status [info | major | minor]**
This command displays all alarms based on severity specified.

The output displays the following information:

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Device from which the alarm was triggered. This is usually the hostname configured on the device.</td>
</tr>
<tr>
<td>Severity</td>
<td>Major or minor</td>
</tr>
<tr>
<td>Description</td>
<td>Type of alarm triggered. For example, temperature, external contact, redundant power supply etc.</td>
</tr>
<tr>
<td>Relay</td>
<td>Energized or de-energized</td>
</tr>
<tr>
<td>Time</td>
<td>Timestamp of the triggered alarm</td>
</tr>
</tbody>
</table>

```
ciscoasa> show facility-alarm status info
Source Severity Description Relay
Time
ciscoasa minor external alarm contact 1 triggered Energized 06:56:50
UTC Mon Sep 22 2014
ciscoasa minor Temp below Secondary Threshold De-energized 06:56:49
UTC Mon Sep 22 2014
ciscoasa major Redundant pwr missing or failed De-energized 07:00:19
UTC Mon Sep 22 2014
ciscoasa major Redundant pwr missing or failed De-energized 07:00:19
UTC Mon Sep 22 2014
```

- show facility-alarm relay

This command displays all relays in energized state.

```
ciscoasa> show facility-alarm relay
Source Severity Description Relay
Time
ciscoasa minor external alarm contact 1 triggered Energized 06:56:50
UTC Mon Sep 22 2014
```
## History for Alarms

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Platform Releases</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm ports support for the ISA 3000</td>
<td>9.7(1)</td>
<td>The ISA 3000 now supports two alarm input pins and one alarm out pin, with LEDs to convey alarms’ statuses. External sensors can be connected to the alarm inputs. An external hardware relay can be connected to the alarm out pin. You can configure descriptions of external alarms. You can also specify the severity and trigger, for external and internal alarms. All alarms can be configured for relay, monitoring and logging. We introduced the following commands: alarm contact description, alarm contact severity, alarm contact trigger, alarm facility input-alarm, alarm facility power-supply rps, alarm facility temperature, alarm facility temperature high, alarm facility temperature low, clear configure alarm, clear facility-alarm output, show alarm settings, show environment alarm-contact. We introduced the following screens: Configuration &gt; Device Management &gt; Alarm Port &gt; Alarm Contact Configuration &gt; Device Management &gt; Alarm Port &gt; Redundant Power Supply Configuration &gt; Device Management &gt; Alarm Port &gt; Temperature Monitoring &gt; Properties &gt; Alarm &gt; Alarm Settings Monitoring &gt; Properties &gt; Alarm &gt; Alarm Contact Monitoring &gt; Properties &gt; Alarm &gt; Facility Alarm Status</td>
</tr>
</tbody>
</table>