Fan Controller
User Guide

Description: The Fan Controller helps keep your equipment cool while providing power and noise reduction through manipulation of the power waveform supplied to the unit's output receptacles. Auto-sensing 90-250V redundant power inputs with auto-failover provide stable power to your fans in the event of a power loss to one circuit. Included is one internal temperature sensor, with up to four optional external temperature sensors allowing precise monitoring of multiple cabinets, servers and other hotspots in your server room. Web pages, including graphs, are generated from the unit. No software other than a web browser is required. A temperature setting on the front of the unit provides control of the unit when a LAN cable is not plugged in or is not linked properly. All temperature and fan speed data is also presented on the Fan Controller's front-mounted LCD screen. Additionally 5 status LEDs are located on the front of the unit. Fan Controller's 1U form factor and recessed mounting brackets allow for easy mounting in existing or new cabinets.

Specifications (See Unit Label for Ratings):

Networking:	HTTP, HTTPS (SSL/TLS), SMTP, POP3, ICMP, DHCP, TCP/IP, NTP, FTP.
Data Formats:	HTML, SNMP, CSV/Plain Text, Telnet, WAP, PDA formatted HTML, XML.
EMC Verification:	Class A digital device. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. **Warning:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
Receptacle Ratings:	IEC-320 C13 125/250 Volt, 15 Amp

Installation Guidelines:

- While the Fan Controller is designed to help maintain temperatures and reduce power consumption and noise, the ambient temperature in the cabinet/room should not be above 25°C.
- Follow nameplate ratings when connecting equipment to the outlets on the rear of the unit. Take into consideration the effect that overloading of the circuits might have on overcurrent protection and supply wiring. **Note:** the Fan Controller is rated for **800 Watts total output** split evenly across the three outlets on the rear of the unit.
- **Warning**: Due to the way power is being modulated, **only fans** should be connected to the output receptacles on the rear of the unit. No other devices should be attached as they may be permanently damaged by the power waveform being generated by the Fan Controller.

Installation:

1. Using appropriate hardware, mount Fan Controller in rack or cabinet.
2. Plug Fan Controller into an appropriately rated and protected branch circuit receptacle.
3. Connect Fan Controller to network using Ethernet connection.
4. Connect any External Sensors (Optional) to the rear of the Fan Controller.
5. Attach fans to the outlets on the rear of the Fan Controller. **Note:** each outlet is rated for 267 Watts.
6. Connect to the unit's web page, see "Setting an IP Address" below.

Note: Source power must be phase synchronized.

Service and Maintenance:

No service or maintenance is required. **Do not attempt to open, warranty will be void**. No user serviceable parts inside.

Setting an IP Address

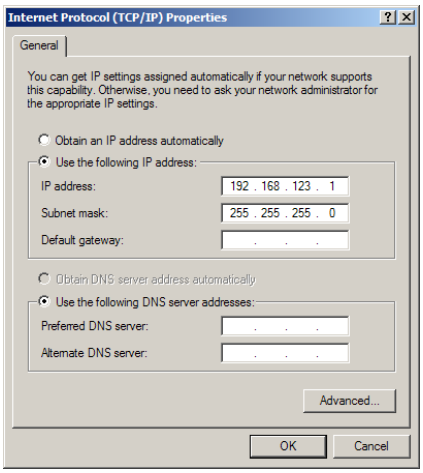
The Fan Controller has a permanent IP address for initial setup and access to the unit if you forget the address you assign to it. The Configuration page allows you to assign the network properties or use DHCP to connect to your network. Access to the unit requires the IP address to be known, so use of a Static IP or reserved DHCP is recommended. The permanent address is shown on the front of the unit.

IP Address: 192.168.123.123
Net Mask: 255.255.255.0
Gateway: 192.168.123.1

First time setup:

1. Connect your Fan Controller to your computer using a crossover cable or a hub.
2. On your computer, go to "Start > Settings > Control Panel > Network and Dial Up Connections"
3. Right Click on "Local Area Connection" and select "Properties"
4. Select the option to "Use the following IP address" and enter:
   IP address: 192.168.123.1
   Subnet mask: 255.255.255.0
   Default gateway: "Not Needed"
5. Click "OK" twice
6. You can now access the unit using your web browser at the permanent IP address, http://192.168.123.123

Typical Network Card Settings for PC or Laptop to connect to backup IP address. Note that a Default Gateway is not needed nor recommended.



Sensors

The internal temperature sensor is measured every 5 seconds. External temperature sensors are measured at approximately the same rate, depending on how many (1-4) are connected. Sensor data collected by Fan Controller gives useful trend analysis data, allowing users to view changes in data value over time. Analysis of the change in value of the data can lead the user to useful conclusions about what is happening in the monitored environment.

Set Point Temp – Displays the desired temperature, set by the user either via the unit's Control page or via the dial on the front of the Fan Controller.

Internal Temp – Measures temperature inside the unit and can be displayed in °C or °F.

Temp 1 – Measures temperature outside the unit in °C or °F. This will read 0°C or 32°F until an external temperature sensor is connected.

Temp 2 – Measures temperature outside the unit in °C or °F. This will read 0°C or 32°F until 2 external temperature sensors are connected.

Temp 3 – Measures temperature outside the unit in °C or °F. This will read 0°C or 32°F until 3 external temperature sensors are connected.

Temp 4 – Measures temperature outside the unit in °C or °F. This will read 0°C or 32°F until 4 external temperature sensors are connected.

Fan Speed – Percent, from 30-100 of maximum power being outputted to the outlets on the rear of the Fan Controller.

Temperature Offset

The internal temperature sensor is pre-calibrated at the factory and the values being reported are accurate. However, due to low airflow and normal board heating, the temperature sensor may read a few degrees higher than any external sensors that are attached. To counteract this an offset of up to -7 °C or °F depending on the current operating mode, is configurable on the Display page.

Connecting Optional RJ Remote Sensors

Plug and Play Remote Sensors may be attached to the unit. Each sensor has a unique address and is automatically discovered and added to the webpage. **Note:** the display order of the sensors on the web page is determined by the internal ID of each sensor, a customizable friendly name is available for each on the Display page. The Fan Controller will only recognize RT (Temperature) sensors. The Fan Controller uses the highest temperature reading available* when adjusting fan speed.

*When an external sensor is attached, the internal sensor is ignored in fan speed calculations.

Optional RJ Remote Sensors

RT-12 Temperature – 12' Cord
RT-20 Temperature – 20' Cord

Custom lengths available upon request at 800-432-3219 or products@geistmfg.com.

Initial Set Point Configuration

After configuring an IP address and attaching fans and any external sensors, power up the Fan Controller and allow about a minute for the device to boot up. Go to the unit's Control page and select a control mode. **Manual Set Point** tells the unit to use the set point entered via the dial on the front of the unit when making fan speed calculations. **Web Set Point** tells the unit to use the set point entered in the box below when making fan speed calculations. **Fans Always On** tells the unit to ignore both set points and keep the fans at 100% at all times.

In order to set a temperature in Manual Set Point mode, use a small screw driver to turn the dial on the front panel to the desired temperature. Turning the dial to the left will increase the set point and decrease fan speed. Turning to the right does the opposite. - After setting the desired set point, press and hold the **Alarm Silence/Set Point Change** button on the front of the unit until the LCD screen indicates "Local Mode" and changes to display the set point. DO NOT hold the button longer than necessary or apply excess force to the button as it could lead to damage to the button, requiring factory servicing.

General Operation

Once the desired mode of operation and set point have been set, the unit will operate without any interaction with the user. Status information can be viewed on the front panel LCD/LEDs and via the unit's web page.

Should the network connection become unavailable while operating in **Web Set Point** mode, the unit will continue to use the **Web Set Point** until the **Alarm Silence/Set Point Change** button is pressed. At this point, it will switch to **Manual Set Point** mode until the network connection becomes available again.

Front Panel LEDs

The Fan Controller has 5 front-mounted LEDs that provide at-a-glance status information. From left to right, the LEDs are:

Speed (orange): Indicates that the attached fans are automatically being run at a speed between 30-100%.
Fan Manually Off (orange): Indicates that the fans have been turned off manually.
Remote Control (orange): Indicates that the Web Set Point is active.
Fan Full On (orange): Indicates that the fans are running at 100%. The LED will light under these conditions:

- Web Set Point mode
  - A measured temperature is greater than the set temperature.
- Manual Set Point mode
  - Dial on the front of the unit is set to Manual Full On.
  - A measured temperature is greater than the set temperature.
- Fans Always On
  - Fans will always be on.

Over Temp (red): Indicates that one or more of the attached/internal sensors are currently reading higher than the active set point.

Auto-Sensing Input Power

The FC has dual power inputs to auto-switch over in the event of power loss on one feed. The first input to receive power will remain the primary feed for the unit until that feed drops. Upon power loss to the primary feed, the unit will stop for ½ second, switch feeds and turn fans to 100% for 1 second. The fans and unit will then return to normal operation and the new feed is now considered the primary feed. **Warning: Source power must be Phase Synchronized, high voltage potential may result in relay failure when sources are not Phase Synchronized.**

Graphing the Sensor Data

All data collected by the Fan Controller can be graphed. The Log page allows the user to select graphed content and sampling rate. The amount of data and sample rate determine the graph time span. This period is calculated and displayed on the Log page. When

on board memory fills up, old data will start to delete making room for the new data. All settings are stored in case of a power loss or reboot. A sample rate of 30 seconds or longer is recommended to allow the unit to gather all sensor data before graphing. Sampling rates of 60 to 120 seconds should provide ample resolution.

Setting Alarms

For all data collected by the Fan Controller, the user can set high and low limits. When these limits are exceeded the user has the option of sending an email, SNMP trap, activate the audible alarm, or any combination of the three. The SNMP traps can be sent to 4 IP addresses entered on the Configuration page. Some analysis of each unit is recommended before setting alarm limits. Once each unit has been operating in the environment under normal, steady state conditions for several hours, alarm set points may be chosen. By allowing the unit to come to steady state before setting alarm set-points, the user may make more informed decisions about the normal variation in conditions, and choose alarm set points that will inform when conditions are truly changing without triggering numerous false alarms. Besides using historical graphs to make alarm set-point decisions, the user may wish to download raw log data from the logs page to see specific historical data records and use this data to help set useful alarm set-points. **Note:** Changes in settings are processed less frequently and depending on the number of attached devices may take several minutes to respond. Rapidly resetting alarm values may not provide desired results. Allow up to 2 minutes after making a setting change before modifying.

Optional IP-Enabled Web Camera

The unit has been designed to allow up to 4 IP Network Cameras to interface with the webpage. To enable this feature the camera must be set to allow anonymous access. The unit Configuration page allows you to add the IP address of the camera and specify the model. This live image will appear on the Sensors page and will update with the webpage. Clicking on the picture itself will take you to the IP address of the camera. Each device currently supports up to 4 cameras simultaneously.

Supported Cameras: Axis 205/206, D-Link DCS-900, D-Link DCS-950/G, D-Link DCS-5300/G

Other Formats

- PDA Displays data in a small screen format for a PDA.
- WAP Wireless Application Protocol, displays text values for wireless clients such as mobile phones and some PDAs.
- XML Extensible Markup Language, displays values in XML format.
- MIB Management Information Base, downloads the MIB to be used for SNMP applications.

Accounts, Passwords and Security

The unit is accessible via a standard, unencrypted HTTP connection as well as an encrypted HTTPS (SSL) connection. The user may opt to enable access via HTTP, HTTPS, or both HTTP and HTTPS. It is not possible to disable the web interface completely.

The unit has a View-Only account, a Control Access account, and an Administrator account. When activated the Administrator account limits access to any web pages with configuration settings. When left blank no username or password is required to adjust the configuration. When activated, the View-Only account requires a username and password to view sensor data. The Control Access account allows access to the Control page, allowing configuration of attached switch-able power distribution units. The Administrator account must be password protected to activate the View-Only and Control Access accounts. The user may choose any name for the Administrator, Control Access, and View-Only accounts consisting of alphanumeric characters, spaces, and underscores, except for "**root**" and "**admin**". These account names are disabled for security reasons and cannot be re-enabled. **WARNING: Record your password. Loss of password will require the unit serial number and contact of customer service to be recovered.**

Setting Time and Date

The unit comes preconfigured with the IP addresses of two military NTP servers and set to the Central Time Zone (-500 GMT). Should a local time server be preferred, enter its IP address into the box and click the "Save Changes" button. Should the user need to revert back to the military time servers, simply clearing the time server addresses and clicking "Save Changes" will set the time servers back to the defaults. The unit attempts to contact the timeservers while booting up. If a timeserver is unavailable, all log time stamps will present time as the number of seconds since the unit was powered up. **Note:** that the time and date are not adjusted for daylight savings time. Setting the time zone offset forward and backward an hour will cause a gap or overwriting of logs, respectively.

Telnet

When using Telnet to connect to the unit, the Administrator username and password from the Configuration page will be required. If the Administrator user is not configured, the Telnet server will be enabled, but logins will be impossible. The Telnet server can be disabled on the Configuration page. Available Telnet commands can be found by using the command "help".
The following are some commonly used Telnet commands:
Airflowset – Resets the internal airflow sensor such that the current flow is measured as '20'.

Exit – Terminates the Telnet connection.
Reboot – Reboots the controller board remotely. Power distribution is not affected.
Report – Displays a report of all connected sensors and their current values.
Time – Displays the current date and time according to the unit if the unit has contacted an NTP server.
Systeminfo – Displays general information about the unit, including: Unit type, Software version and MAC address.

SNMP

The unit is accessible via SNMP and can be configured to send out SNMP traps to a maximum of 4 IP addresses when alarm conditions are met. The community string defaults to "public," but is user-customizable on the Configuration page. The MIB is downloadable via a link at the top of the web interface. The MIB is walk-able via any SNMP browser, but will have to be imported before doing so. The SNMP service can be disabled via the Configuration page. A test SNMP trap can be sent from the Configuration page.

E-Mail

The unit is capable of sending e-mail to a maximum of 5 e-mail addresses when alarm conditions are met. E-mail settings are on the Configuration page. An SMTP server, a "From" address and a "To" address are required to send email alerts. Some e-mail servers are password protected and will require a POP server, username and password for validation. In most cases, the username does not have to match the "From" address, but does need to be a valid user on the POP server. Microsoft Exchange servers will have to be set to allow SMTP relay from the IP address of the unit. A local network administrator will have to change this setting. A test email can be sent from the Configuration page.

Daily Affirmation

Daily Affirmation allows the users to choose a frequency with which the unit will forward a full status report to their e-mail. This status report can come hourly, every 2, 4, 8, or 12 hours, or once daily (24 hours). This feature allows you to know that everything is still running, and gives you an update on all attached devices as well. Set-up of this feature is on the Configuration page under "Status Reports".

Owner Contact Information

Owner contact information can be entered on the Configuration page and will display at the bottom of the web interface.

Optional Console Integration

In addition to its own web interface, Console Software is available. Console Software allows convenient, one screen monitoring of multiple units via simple web-based interface, streamlined firmware updating and consolidation of alarm settings.

Firmware Upgrades and Additional Information

New firmware upgrades and additional information is available at http://www.geistmfg.com/GeistUS/Docs/downloads.htm.