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# **Sentry**

## **Remote Power Manager**

**Installation and Setup Manual**

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# Introduction

Server Technology, Inc. manufactures and distributes Sentry Power Management products for Power Distribution, Power Measurement and Power Control. The Sentry product line provides easy, practical and secure tools for power management and diagnostic support for remote internetworking sites. Users of the Sentry products eliminate unnecessary trips to remote locations and minimize the impact of locked-up internetworking devices on mission-critical networks. Network administrators can gracefully shutdown remote servers, reboot locked-up routers, and gain console access to equipment.

The Sentry Power Management Products include a wide variety of features and capabilities. Users may choose from a variety of product models with features that meet their needs. Sentry models are available in 115/230VAC and NEBS compliant 48VDC. Most models are rack mountable in a standard 19" rack using a 1U, 2U, or 3U rack mount enclosure depending on the model and features selected.

This manual describes all the features that are possible on all of the models of the Sentry Power Management Products. The actual features available on any specific product varies by the model. There is no one product that contains all of the possible features in all of the possible models.

Descriptions of the various types of connectors, switches, buttons, and LEDs that may be found on Sentry Products are included in this manual. This manual includes instructions for connecting power and data communications equipment. Specifications for the various connectors are included. Descriptions of the operation of the switches, buttons, fuses, and circuit breakers, along with meaning of the various status lights, are included as well.

This manual should be used by product installers to identify the particular features of the selected product model. The manual provides a guide for the installation, setup, and connection of a Sentry Power Management Product. Once the product is installed, the Sentry Operations Manual should be used to configure and operate the product. Model specific information, which includes a list of the features available on each model, can be found in a model specific specification sheet included with the shipped product, or from the Server Technology WEB site ([www.servertech.com](http://www.servertech.com)).

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## Power Features

This chapter describes the various features that are related to power on the various Sentry Power Management Products. These features include the various types of input power connectors, the various types of output power connectors, and the various types of fuses and circuit breakers that are used for power protection.

### Sentry Unit ON/OFF Switch

The Sentry Power Management Products all have a two position rocker switch that is the power switch for the Sentry internal controller board(s). This switch only controls the power to the Sentry controller boards that provide the processor and programming functions for operational features of the Sentry. This switch does NOT control the power to the Output Power connectors on the Sentry products. This is important to understand, because it is NOT sufficient to use this switch to disable output power connectors when attaching devices to a Sentry product. The following picture illustrates the power on/off switch. Please note that the switch may be mounted either horizontally or vertically.



**Sentry Unit ON/OFF Switch**

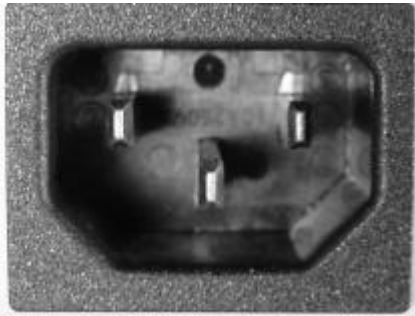
### Input Power Feed Connections

The Sentry Power Management Products all require external power to drive the internal controller boards that provide the management features for the products. The number and type of input power feed connections vary from model to model. The type of input power feed on the products varies between the 115/230VAC products and the -48VDC products. The following sections describe the various power feed input connections available depending on the voltage input capabilities of the Sentry product.

#### 115/230VAC Input Power Feed Connections

The Sentry Power Management Products that operate on AC power have one, two, four, or eight input power feed connections for supplying operational power to the product. If more than one input power feed connection is available, all connectors must be connected to power in order to take full advantage of the Sentry product. One of the connectors will be labeled “A” or “A1”. Power must be supplied to this connector in order to use your Sentry Product. If power is not supplied to all of the available input power feed connections, power will not be available at all of the output power feed connections.

The 115/230VAC products have two possible types of input feed connections. These are the IEC 320/C14 connector or the IEC 320/C20 connector. Both are three pronged male connectors as illustrated in the following picture.



**IEC 320/C14 Connector**



**IEC 320/C20 Connector**

The power input rating for the IEC 320/C14 connector is:

- For 115VAC products – 115V, 50/60 Hz, 15A
- For 230VAC products – 230V, 50/60 Hz, 6A

The IEC 320/C14 connectors are used to supply power to the Sentry internal power supply for operating the Sentry controller board, as well as to supply power to output power connectors (known as Intelligent Power Modules or IPMs). A more complete description of the Sentry IPMs is found later in this manual.

A single IEC 320/C14 input power connector may supply power to up to four (4) output power connectors. In this situation, the total amount of output power available to all four (4) of the output power connectors cannot exceed the total input power (i.e. 15 Amps for a 115 VAC product or 6 Amps for a 230 VAC product). When two IEC 320/C14 connectors are used on a Sentry product, the first connector supplies power to the first four output power connectors, and the second supplies power to the second four output connectors. Additionally, a Sentry model might also include eight IEC 320/C14 power input connectors that correspond with a one-to-one relationship to eight power outlet connectors.

The IEC 320/C20 connectors are used to supply power to internal IPMs. The power input rating for the IEC 320/C20 connector is:

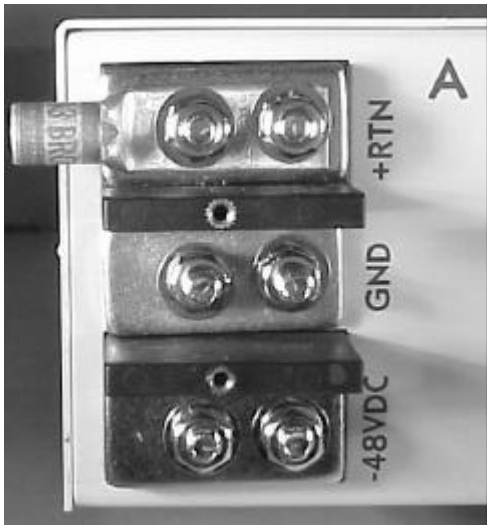
- For 115VAC products – 115V, 50/60 Hz, 20A
- For 230VAC products – 230V, 50/60 Hz, 16A

The IEC 320/C20 connectors are always used with a single output power connector so the power available at the output connector associated with the IEC 320/C20 connector is the same as input power. In this situation, the Sentry model features four IEC 320/C20 input/outlet connectors.

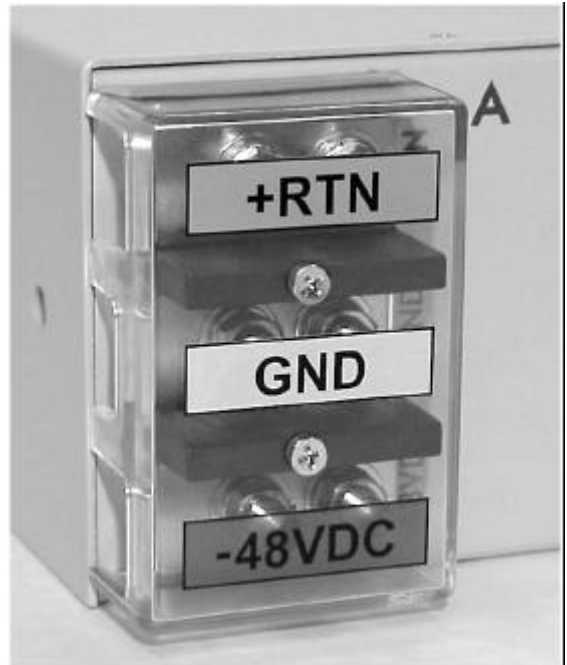
## -48VDC Input Power Feed Connections

The Sentry Power Management Products that operate on DC power have up to two input power feed connections. If there are two input connections, they are labeled “A” and “B”. Each input power feed connector consists of a terminal block with three positions. Each of the three positions is labeled as either -48VDC, GND or +RTN. The connection to these terminal block positions is made using two-hole compression lugs or insulated ring lugs.

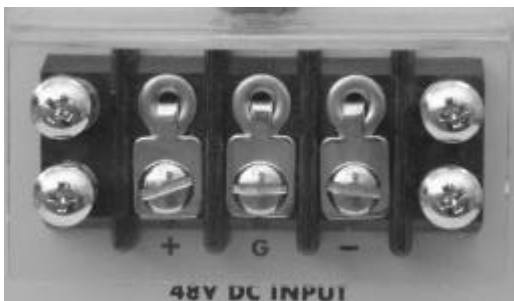
Each Input Power Input Feed is protected by a removable plastic cover. The cover must be removed to attach the power input compression lugs to the input terminal blocks.



**Input Power Feed Assembly (Without Cover) with a Compression Lug on the +RTN**



**Input Power Feed Assembly With Cover**



**Screw Type Input Power Feed Assembly With Cover**

The input power feed assemblies on Sentry 48VDC products can have one of three possible power specifications. Sentry products with 1/4" studs on the terminal block connectors have a capacity of 100 Amps, while products with 5/16" studs on the terminal block connectors have a capacity of 200 Amps.

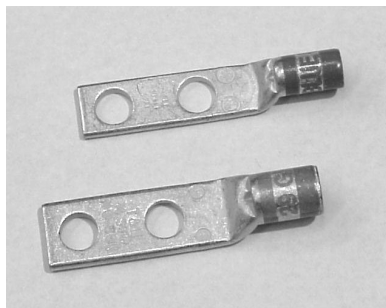


Sentry products that use the terminal block connectors with #8 screws have a capacity of 20 Amps. These input power connectors are on products that do not provide power for internal IPMs.

As the illustrations show, the terminal positions are clearly labeled on the enclosure unit next to each position. The high amperage connectors also have labels on the removable plastic covers over the entire terminal block.

**WARNING: BACKWARD POLARITY WILL DAMAGE THE SENTRY UNIT!! Verify proper polarity with a voltmeter before connecting the power source.**

The power input connections are made using two-hole Compression Lugs for the high power connectors. Connections for the low power (i.e. 20 Amp) connectors are the same as those used on the output power connectors described later in this manual. The charts below were obtained from the Year 1999-2000 Grainger Catalogue #390 ([www.grainger.com](http://www.grainger.com)) and show a type of copper lug that are acceptable.



<b>Power Input Connectors</b>				
Color Keyed Compression Connectors				
Two Hole Copper Lugs				
Cable Size	Stud Size	Color Code	Thomas & Betts #	Grainger Stock #
AWG				
#6 str.	1/4 "	Blue	54205	3LL91
#4 str.	1/4 "	Gray	54206	3LL92
#2 str.	1/4 "	Brown	54207	3LL93
#1 str.	1/4 "	Green	54208	3LL94
#1/0 str.	5/16"	Pink	54253	3LM04

When connecting power to the input power feed assemblies it is important to attach a grounding cable. The center studs labeled GND accept a copper grounding lug. The grounding lug should be attached to a bare copper wire one size larger than the input cable. Use the chart above to select the correct grounding lug.

**WARNING: Upon connecting the power source to the Power Input Terminal Block, the Sentry will provide power to any Power Output connectors that have not been disabled by either removing an associated fuse or opening an associated circuit breaker for the Power Output connector. All Power Output connectors should be disabled via an associated fuse or circuit breaker prior to connecting the power input cables.**

Each of the input power connectors can supply power to up to multiple output power connections. The total amount of power available to all of the output power connections associated with a single input power connector cannot exceed the total input power (i.e. 100 Amps or 200 Amps depending on the input connector).

Once the appropriate connections have been made to the input power terminal blocks, reinstall the Input Power Feed protective covers.

## Output Power Connections

Sentry Remote Power Management products provide output power connectors for connecting electrical equipment that will be managed by the Sentry. Depending on the specific Sentry product, these output connectors are provided by various types of Intelligent Power Modules (IPMs). These IPMs contain the relays and circuitry required to allow the Sentry the ability to perform the various management functions (i.e. turn power on, turn power off, monitor power load, etc.). IPMs may be installed as an integral part of a Sentry product enclosure (internal IPMs) or provided as an external unit that is connected to a Sentry product enclosure via a connecting cable (external IPMs). A separate section of this manual describes the IPMs in more detail. This section describes the various type of output power connections that are available. The output power connections described in this section apply to both the internal and external IPMs.

The number and type of output power connections vary from model to model. The type of output power connectors on the products varies depending on whether the connector is supplying 115/230VAC power or -48VDC power. The output power connectors supply power to the attached devices, and can be individually turned on and off. Each output power connector has an individual load limit. When the output power connectors are provided by internal IPMs, multiple output power connectors are powered by a single input power feed connector. The combined output of all of the internal IPMs powered by a single input power feed connector cannot exceed the total power provided by the input power connector. To illustrate this concept, consider a Sentry product that has a 15 Amp input power feed that supplies power to 4 output power connectors. Although each output power connector can supply 10 Amps of power to an attached device, all 4 output power connectors can only supply a total of 15 Amps of power to all devices attached on all 4 output power connectors. Installers must be aware of this, and ensure the attached devices on internal IPMs do not exceed the total power available. Because external IPMs are not powered by the input power feed connections, this restriction does not apply to external IPMs.

The following sections describe the various output power connectors available depending on the voltage supplied by the output power connector.

## 115/230VAC Output Power Connectors

There are two types of Output Power Connectors that supply AC power that is controlled by Sentry IPMs. These are the IEC 320/C13 connector or the IEC 320/C19 connector. These connectors are the three pronged female equivalents to the AC input power connectors described earlier in this manual. The connectors may have retaining clips attached (as illustrated in the IEC 320/C13 picture that follows). The retaining clips are to secure the power cable connection to the connector. The following pictures illustrate the IEC 320/C13 and the IEC 320/C19.



**IEC 320/C13 Connector**



**IEC 320/C19 Connector**

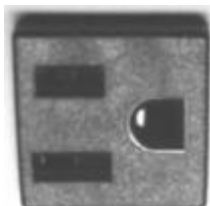
The power rating for the IEC 320/C13 connector is:

- For 115VAC products – 115V, 50/60 Hz, 15A
- For 230VAC products – 230V, 50/60 Hz, 6A

The power rating for the IEC 320/C19 connector is:

- For 115VAC products – 115V, 50/60 Hz, 20A
- For 230VAC products – 230V, 50/60 Hz, 16A

In addition to the AC power outputs that are controlled by Sentry IPMs, some Sentry products provide NEMA 5-15 female power outputs. These power outputs are not controlled by the Sentry and are provided to allow users the ability to directly attach AC devices to Sentry products. The following picture shows a NEMA 5-15 AC power output connector.



**NEMA 5-15 Power Output**

## -48VDC Output Power Connections

The Sentry Power Management Products that provide DC output power have one of five types of output power connectors.

### **Screw Type Output Power Terminal Block**

Two of the output connectors are screw type terminal block pairs, with one screw for the negative connection, and one screw for the positive connection. The following picture illustrates this type of output power connector.



**Screw Type Output Power Terminal Block**

One of the screw type output power terminal block pair uses #8 screws. This type of output power terminal block provides up to 20 Amps of output power. The second screw type output power terminal block pair uses #10 screws and provides up to 35 Amps of output power. Power output connections from the screw type output power terminal pair to an internetworking device are made by connecting power output ring compression lugs to the (+/-) terminals. The entire Power Output Terminal Block (which may include several terminal block pairs) is protected by a removable plastic cover. The cover must be removed to attach the power output ring compression lugs.

The charts below were obtained from the Year 1999-2000 Grainger Catalogue #390 ([www.grainger.com](http://www.grainger.com)) and show a type of ring lugs that are acceptable.

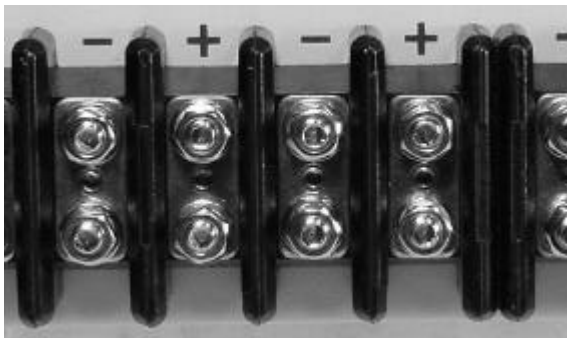
<b>Power Output Connectors</b>				
Closed End - Nylon Insulated				
Cable Size	Stud Size	Color Code	Thomas & Bett #	Grainger Stock #
AWG				
#22-16	6	Red	RA18-8	3KG16
#22-16	10	Red	RA18-10	3KF97
#18-14	6	Blue	RB14-8	3KG42
#18-14	10	Blue	RB14-10	3KG24
#12-10	10	Yellow	RC10-10	3KG51

Note: Many types of #8 and #10 terminals may be acceptable for a particular application. The chart above gives a listing of just one type that is acceptable for connection to the Sentry power outputs. Please refer to the Grainger Catalogue or manufacturers specifications for information on other terminal types and for determining the suitability for a particular application.

## Dual Stud Assembly Type Output Power Terminal Block

Sentry Power Management products that provide 50 Amp DC output power use dual stud assembly type output power terminal pairs to provide this power. As with the screw type connectors, each connection pair consists of a negative and a positive connector and the entire terminal block is protected by a removable plastic cover. This cover must be removed to attach the compression lugs that are used to connect devices to the output power connectors. The type of compression lugs used for this type of connector are described earlier in this manual in the power input section.

The following picture illustrates the dual stud assembly type output power terminal connector.



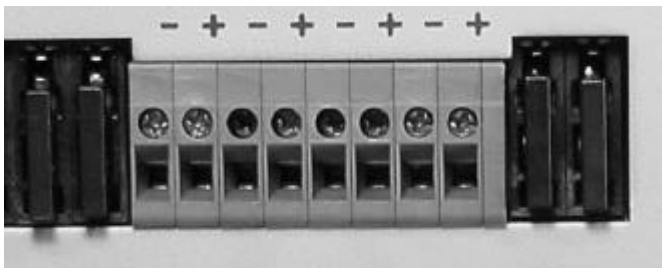
**Dual Stud Assembly Output Power Connectors**

## Screw Down Output Power Block

The last type of DC Power output connectors available with the Sentry products is the Low Amp screw down terminal pair. These connectors are connected to external devices using a screw-down connector on a stripped wire.

Warning: No two power output pairs may be connected together. Each load device must be isolated from all other load devices.

The following picture illustrates the screw down type output connector.



**Screw Down Output Power Connectors**

## Output Power Protection (Circuit Breakers and Fuses)

All Sentry Power Management products provide output power protection for all output connectors. On the AC output connectors, the circuit breakers and fuses are designed to be protection devices only. The circuit breakers will pop when the protection limit is exceeded, but they are not designed to be pulled by the user in order to disable the connector. Some AC connectors are protected by internal fuses that are strictly protection devices and are not designed to be customer replaceable.

The following sections describe the different types of power protection devices available with the Sentry Power Management products.

### Circuit Breakers

There are three types of circuit breakers used in the various Sentry products. Sentry product power outputs that are protected by circuit breakers have the associated circuit breaker located adjacent to the power output connector. All provide protection by opening (breaking) the power connection when the power load is exceeded.

#### **Pop-Out Push-to-Reset Breaker**

This type of circuit breaker is found on the AC power output devices. Specifically, this type of circuit breaker is used to protect power output provided by the IEC 320/C19 connectors, and this Amp value for this circuit breaker is typically 20 Amps. This type of circuit breaker is not designed to be tripped manually. However, this type of circuit breaker is designed to be reset when tripped by pushing the button that pops when the breaker trips. The following illustration depicts a 20 Amp pop out push to reset circuit breaker.



**Pop Out Push to Reset Breaker**

#### **Pull-to-Break Push-to-Reset Breaker**

These circuit breakers are the Pull-to-Break, Push-to-Reset type. These circuit breakers are thermal circuit breakers and they are used to protect DC power output on Sentry products. These circuit breakers can be used as a local on/off switch – they can be pulled out to turn off power to the individual output, or pushed in to turn on power to the individual output. The following illustration depicts a 40 Amp Pull-to-Break, Push-to-Reset Circuit Breaker.



**Pull-to-Break Push-to-Reset Breaker**

## Latch-Type Breaker

These circuit breakers are the large switch or latch type of breaker. These circuit breakers are thermal circuit breakers and they are used to protect high power DC power output on Sentry products. These circuit breakers can be used as a local on/off switch. The latch may be manually moved to the open position and returned to the closed position to turn power off and on to an individual power output. The following illustration depicts a Latch-Type Circuit Breaker.



**Latch-Type Circuit Breaker**

## Fuses

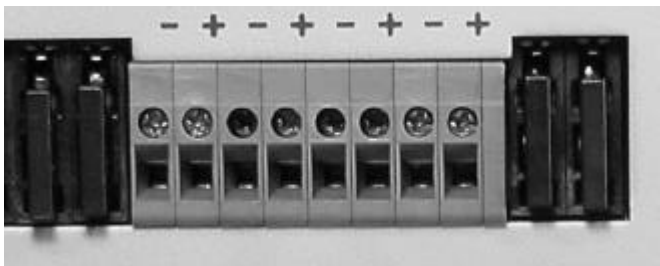
All Sentry AC power outputs that are not protected by a circuit breaker are protected by fuses. The fuses that protect the AC power outputs are designed to be for protection only. They are not designed to be replaced by users.

For Sentry products that provide DC power outputs that are not protected by circuit breakers, there are two types of fuses used to provide power output protection. The type of fuse used by the Sentry product power output depends on the amount of power provided at the power output.

## Fused Power Output Protection - .5 to 15 Amp

Sentry power outputs that provide Low-Amp power (i.e. .5 to 15 Amps) use GMT fuses for power protection. On the Low-Amp output block, the GMT fuse can be removed to turn-off power to each terminal block output pair. **Pull the fuse prior to inserting the stripped wire into the screw-down terminal block.** Then reinsert the fuse to restore power the terminal block.

The following illustration shows a Low-Amp power output block with the associated GMT fuses located to the left and right of the power output block. The two GMT fuses to the left of the power output block protect the first two power output pairs, and the two GMT fuses to the right of the power output block protect the second two power output pairs. The second illustration shows a side view of a GMT fuse that has been removed from its receptacle.



**Power Output Block With Associated GMT Fuses**



**GMT Fuse**

The GMT fuses have the following features:

- Fast acting fuse
- Positive visual indication of a blown fuse
- Fuses are easily replaced without special tools
- Protective splatter cap fuse safety cover
- Available in current protection ratings from .5 to 15 Amps

It is the user's responsibility to select the correct Fuse Value to protect their network equipment units. **Fuses are not supplied with Sentry Power Management products.**

Following is a table showing a few of the GMT Fuse Values:

Amps	Color	Comment
1	Gray	
2	Orange	
3	Blue	
5	Green	
7 ½	Blk-white	
10	Red-white	
12	Yellow-green	
15	Red-blue	

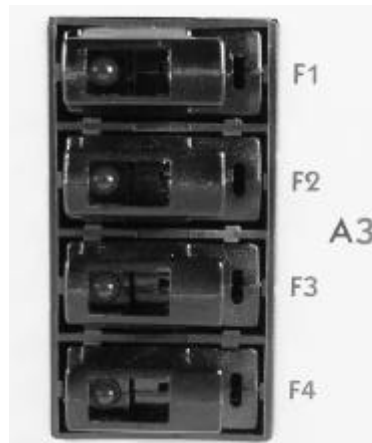
## Fused Power Output Protection – High-Amp

Sentry power outputs that provide High-Amp power use interchangeable TPA fuses for power protection. On the High-Amp output block, the interchangeable TPA fuse can be removed to turn-off power to each terminal block output pair. **Remove the TPA fuses prior to attaching the compression lugs to the output blocks.** The TPA fuse that protects a High-Amp power output may be located on the opposite panel of the Sentry product enclosure.

The following illustration shows a TPA fuse receptacle and a TPA fuse in front of the TPA fuse block on a Sentry product, and a close up view of the TPA fuse block with 4 TPA fuse receptacles installed.



**TPA Fuse and Receptacle**



**TPA Fuse Block**



TPA fuses have the following properties:

- TPA fuses accommodate a range of different Amps and are fast and easy to replace
- Fast acting fuse
- Positive visual indication of a blown fuse
- Fuse orientation feature
- Safe, secure enclosed fuse insertion module
- Available in current protection ratings from 5 to 50 Amps

It is the user's responsibility to select the correct Fuse Value to protect their network equipment units. Fuses are not supplied with the Sentry Power Management products.

Following is a table showing a few of the TPA Fuse Values:

Amps	Comment
3	
5	
10	
15	
20	
25	
30	
40	
50	

## DC Power Output Connection Procedure

Use the following steps to connect the power cords of the -48VDC devices to the power output terminal block pairs on Sentry products:

- Shutdown, if necessary, and turn off the -48VDC device.
- Unplug the device's power connections from their current power source connection.
- Convert, if necessary, the power source ends of the device's power cables to the appropriate connectors for the power output terminal being used.
- Choose a positive/negative power output pair connection on the Sentry product. Turn off power to the connection by either tripping the circuit breaker or removing the fuse that protects the sentry power output connector.
- Connect the positive and negative power cable ends to the positive/negative power output connector on the Sentry product.

**CAUTION: Observe the proper polarity for your devices. Make sure to wire the connections appropriately – negative-to-negative and positive-to-positive. The Sentry DC power output connections are clearly labeled.**

- Place the device's power switch into the ON position.
- Restore power to the Sentry power output connector by either resetting the circuit breaker or reinserting the fuse.

After these steps, the device will be turned on and off when the Power Output terminal block pair is turned on and off. Attach more devices following the same procedure.

## Sentry Intelligent Power Modules (IPMs)

Sentry Remote Power Management products perform the various management functions (i.e. turn power on, turn power off, monitor power load, etc.) by communicating from internal processors to Intelligent Power Modules (IPMs). The IPMs have the circuitry, relays and intelligent processors necessary to control the power output connector provided by the IPM, as well as to monitor various power related activities (i.e. Load Sense, On/Off Sense, etc.). The capabilities of the IPMs varies depending on the model of Sentry product. All IPMs have the ability to turn power on and off at the power output connector, but not all IPMs have the other power monitoring capabilities.

IPMs may be installed as an integral part of a Sentry product enclosure (internal IPMs) or provided as an external unit that is connected to a Sentry product enclosure via a connecting cable (external IPMs). This section describes the various types of external IPMs that are available with Sentry products. The capabilities of a Sentry IPM in terms of control and monitoring features may vary between internal and external IPMs. External IPMs always have a single input power source connected to a single output power connector. Internal IPMs may share a single input power source among multiple power output connectors (see the section on output power connections earlier in this manual). Type of power input and output connectors and their associated specifications are described earlier in this manual.

### External IPMs

There are three types of external IPMs available with Sentry products. The external IPMs have an in-line design. This means that a power input connector (such as an IEC 320/C20 or a –48VDC input power terminal) is provided on one end of the IPM and a power output connector (such as an IEC 320/C19 or a –48VDC output power terminal) is provided on the opposite end of the IPM. The external IPM is placed in-line on the power connection between the power source and the device to be powered. The Sentry is able to control the IPM via a telephone type cable connection between the Sentry unit and the external IPM. All external IPMs have a modular telephone type connector to allow the cable connection between the Sentry Unit and the external IPM. The cable connection between the Sentry unit and the external IPM is made using a standard 4-wire modular telephone type cable. The modular ends of these cables must be made so the connections are crossed. These cables are supplied by Server Technology, although customers can build their own custom length cables. All external IPMs have status light LED (status LEDs and their meaning are described later in this manual). All external IPMs provide power protection either by an internal fuse (which is not accessible by the user) or by a circuit breaker. The type of circuit breaker varies based on the type of power supported by the external IPM. For descriptions of the power connections and power protection on the external IPMs, refer to the appropriate sections of this manual.

The following pictures show the three types of external IPMs that are available.



The modular connector that connects the external IPM to the Sentry unit is visible on two of the external IPMs pictured above. On the third, it is located on the side of the IPM that is not visible.

### Sentry Unit External IPM Connections – IPM Connection Ports (BLACK)

Some Sentry Power Management Products are equipped with external IPM Connection Ports. These ports are used to connect the Sentry products to external IPM's via a telephone type modular cable to turn power on or off. These external IPM Connection ports are color coded black on all Sentry products. A cable connection between the Sentry unit and the external IPM allows the Sentry Product to control the external IPM and to monitor the status of the external IPM. All external IPMs have the ability to turn power on and off. Additional features (such as Load Sense and On Sense capabilities) are dependent on the specific model of IPM and Sentry product. The IPM Connection Ports on the Sentry products are modular RJ12 (6-wire) telephone type connectors and are distinguished from other Sentry product RJ12 ports by the black color. The number of IPM Connection Ports available depends on the specific Sentry product and model. IPM Connection Ports are installed in groups of 4 ports.

On some models, Sentry IPM Connection ports have an optional Shutdown feature. On Sentry products with the Shutdown feature included, the IPM Connection ports have the ability to signal an associated device when an external IPM is being set to power off. For additional information on how this feature is configured and used, refer to the Sentry Operations manual. IPM Connection Ports that have the Shutdown feature use a color-keyed Y-cable to connect to an external IPM, and also to a serial port on a Windows NT machine to support Shut Down notification. The IPM Connection Ports with the Shutdown feature are identical to the IPM Connection Ports without the feature (i.e. color coded black RJ12 connectors, installed in groups of 4). All IPM Connection Ports can control external IPMs via a direct cable connection between the IPM Connection Port and the external IPM. IPM Connection Ports with the Shutdown feature use the color coded Y-cable to provide the Shutdown signaling to the external device.

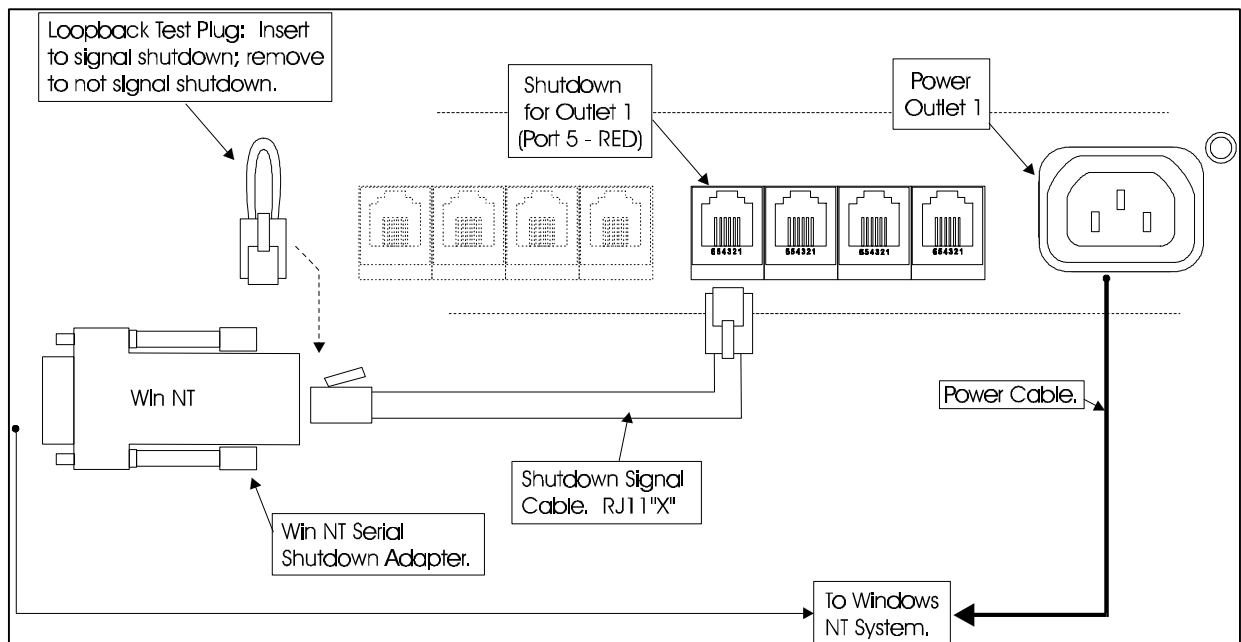
Each Y-Cable serves two purposes – one, to signal an IPM to turn power on and off; and two, to signal an operating system shut down. Because it is very important that the correct ends of the Y-Cable go to the IPM and to the Shutdown adapter, the Y-cable is color-keyed. The black end attaches to a Sentry product black IPM Shutdown Port. It then splits to a red end and a blue end. The blue end connects into the side of an external IPM, while the red end connects to a serial port Shutdown adapter which is attached to a serial port on a Windows NT system.

The red end of the Y-Cable operates exactly like the “Normally Open Line Fail Signal” and/or the “Normally Open Low Battery Signal” on many popular UPSs (Uninterruptible Power Supplies). Its pins (2 and 5 in the RJ-plug) map directly to IPM Shutdown Port RJ-receptacle pins 1 and 6, which are the pins used specifically for shut down notification. Pin 1 is an open collector output of a transistor, and pin 6 is a common ground. Pins 1 and 6 are in an open state when not signaling a shutdown, and are in a closed state when signaling a shutdown. This design allows a shutdown port to be used with a variety of operating systems and UPS monitoring software. An RJ11 loop back plug is also included for testing. For details on configuring a Windows NT system for automatic shutdown refer to the Sentry Operations Manual.

## Sentry Unit Associated Shutdown Ports (Red)

A popular option of the Sentry 115/230 VAC models is the Sentry Shutdown feature associated with each of the internal IPMS. A separate red color-coded RJ12 Telco connector is supplied on the Sentry unit to allow a shutdown signal to be sent to a Windows NT UPS Service (or other operating system shutdown software) when power is being turned off on an internal IPM. The associated shutdown ports are color coded red to distinguish them from other modular RJ12 Telco connectors on the Sentry unit. The associated Shutdown ports provide the same function as the Y-cable with an external IPM. The red associated shutdown ports correspond on a one to one basis with the internal IPM power output connectors. The first associated shutdown port corresponds to the first internal IPM power output connector, the second to the second, and so on. Each associated shutdown port uses a separate RJ11 “X” cable and a head-shell-type “Win NT” adapter to connect to a serial port on a Windows NT system. Shutdown software and head-shell adapters are available for other operating systems.

The following diagram illustrates an appropriate Shutdown signal connection for systems that are powered by internal IPM power outputs.



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## Data Features

This chapter describes the various data features that are available with the Sentry Power Management products. Data features allow remote access to the Sentry Power Management product for controlling and monitoring devices being managed by the Sentry product. In addition, the data features allow users to pass through the Sentry product to connect to other devices that are also connected to the Sentry product. This section of the manual describes the various data connections that can be installed on Sentry products.

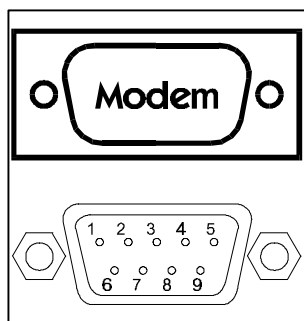
### RS-232 Input and Output Ports

Sentry Power Management product are equipped with RS-232 serial ports that can be used to connect external devices to the Sentry unit. The number and type of RS-232 ports available varies by Sentry product. This section describes the types of RS-232 serial ports that are available. Refer to the model specific data sheet (or look on your unit) to determine which ports are available on your specific product.

#### Modem Port

Sentry Power Management products are equipped with a male 9-pin RS-232C DTE serial port. This port is labeled as “Modem”. This connector is typically used to connect to an external modem, but may also be used to connect to any RS-232C device. A 9-pin female to 25-pin male cable is included for connecting an external modem to the Modem port. The following figure describes the pin outs for the Modem port:

Pin	Signal Name	I/O
1	Data Carrier Detect (DCD)	I
2	Receive Data (RD)	I
3	Transmit Data (TD)	O
4	Data Terminal Ready (DTR)	O
5	Signal Ground	N/A
6	Data Set Ready (DSR)	I
7	Request To Send (RTS)	O
8	Clear To Send (CTS)	I



**Modem Port Pin Outs**

*Note:* To connect to a PC's serial port, a null-modem adapter and a female-to-female gender changer are needed with the included modem cable. Also, when a modem is not connected, the modem initialization strings should be disabled (see the “SET MODEM” command in the Sentry Operations Manual).

### Modem Configuration

In almost all cases, no modem configuration steps are necessary for a modem to operate properly with a Sentry product – just hook it up, plug it in, and turn it on: the Sentry product will initialize the modem as needed.

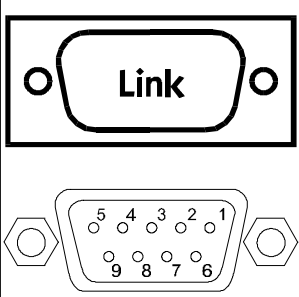
The Sentry products have some simple requirements of a modem attached to the Modem port. They are:

- That the modem does not echo data sent to it.
- That the modem does not send result codes.
- That the modem automatically answer an incoming call.
- That the modem communicates to the Sentry product at one of the data rates supported by the Sentry product. They are **38400**, **19200**, **9600**, **4800**, **2400**, **1200**, and **300** bits per second (BPS).
- That the modem connections uses 8 data bits, 1 stop bit and no parity.

For further information on communicating with the Sentry product through the modem, please refer to the section in the Sentry Operations Manual on modem configuration.

## Link Port

Some Sentry products come with a female 9-pin RS-232C DCE serial port labeled as “Link”. This connector is typically used to connect to another Sentry product in a chain of Sentry products, but may also be used to connect to any RS-232C device that a user wants to communicate to through the Sentry. Because the Link port is a standard female 9-pin RS-232C DCE serial port, and also because of the variety of devices that might be connected, a cable is not included. The following figure describes the pin outs for the Link port.

	Pin	Signal Name	I/O
	1	Data Carrier Detect (DCD)	O
	2	Receive Data (RD)	O
	3	Transmit Data (TD)	I
	4	Data Terminal Ready (DTR)	I
	5	Signal Ground	N/A
	6	Data Set Ready (DSR)	O
	7	Request To Send (RTS)	I
	8	Clear To Send (CTS)	O
	9		

**Link Port Pin Outs (Same as Console Port)**

## Chaining Sentry Products

Using the Link port, multiple Sentry products can be chained together. The number of Sentry products that can be connected in a chain varies with the specific Sentry product model. A 9-pin male to 9-pin female straight-through cable is used for chaining Sentry products. This chaining cable connects from the previous unit’s Link port to the next unit’s Modem port. *Note:* Sentry products should be linked together before turning them on.

## Communication Pass-Through

The Link port of a Sentry product, or the last Link port in a chain of Sentry products, can be used to connect to a serial device. With this option, a user can communicate to the connected serial device through the Sentry product by using the “CONNECT” command at the Sentry command prompt (see the Sentry Operations Manual for details on the “CONNECT” command). A connection through this port supports both DTR/DSR and RTS/CTS handshaking. Note that communications pass through to other serial devices is also available on some Sentry products via additional pass through ports. These pass through ports are described later in this manual.

### Console Port

Some Sentry products come with an additional female 9-pin RS-232C DCE serial port labeled as “Console”. This female 9-pin DCE serial port functions as a console access port to the Sentry. The Sentry product can be accessed and controlled through this port. The pin outs for this port match the pin outs given for the “Link” port described earlier. A straight through DB9 Female to DB9 Male cable is provided to connect this port to a 9-pin DTE device, such as a PC’s serial port. *Note:* The Console port is available only on the lead unit [head unit, *first* unit] of any single chain of multiple Sentry products.

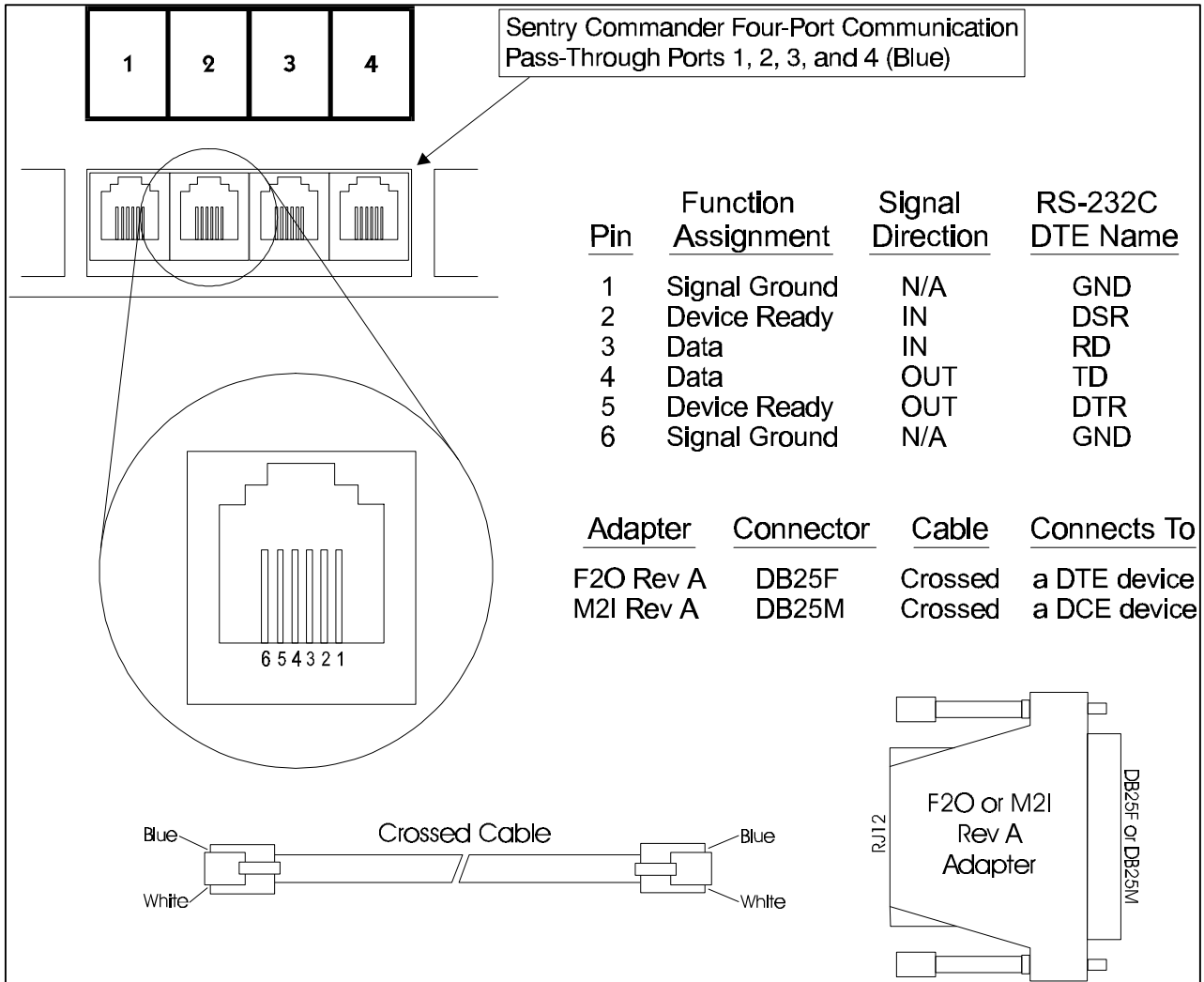
### Communication Pass-Through Ports (Blue)

Some Sentry products have communication pass-through ports. With this option, a user can attach serial devices to the Sentry product and then communicate to any of the connected serial devices through the Sentry product by using the “CONNECT” command at the Sentry command prompt (see the Sentry Operations Manual).

The number of communication pass-through ports installed depends on the specific Sentry product. However, communications pass-through ports are always installed in groups of four ports. The ports can be distinguished by the color coding of the ports. The communication pass-through ports are provided by modular RJ12 (6-wire) telephone type connectors. The communication pass-through port connectors are color coded blue. The color coding of the communications pass-through ports is important because the RJ12 telephone-type connectors that the communication pass-through ports use are also used for other features on the Sentry product products. Communication pass-through ports are associated with IPMs for configuration and access purposes. The first blue communications pass-through port on the upper left position on a Sentry is associated with the first IPM on that Sentry product. This association allows the communication pass through port to be addressed in Sentry commands by the same name as the Sentry IPM. There are commands available for administrators to assign different names to the communication pass-through ports. More information on assigning names to communication pass through ports, and on connecting to devices attached to these ports, can be found in the Sentry Operations Manual. Included with the communication pass-through ports are the appropriate cable and D shell adapters to use for connection to a male DTE or a female DCE RS-232C device. Four crossed 6-wire Telco cables, two F2O Rev A adapters, and two M2I Rev A adapters are included to make these connections.

The following figure describes the pin outs for these ports, along with the appropriate cable and adapter to use for connecting to a male DTE or a female DCE RS-232C device.

*Note:* Because these ports only have 6 wires, connections through these ports only support DTR/DSR handshaking, not RTS/CTS handshaking. RTS is looped back to CTS to avoid no communication with devices that perform RTS/CTS handshaking. If needed, contact Server Technology for the pin outs of these, or any, adapters.

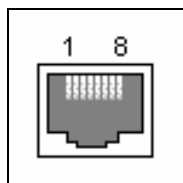


*Note:* The serial port configuration of all devices attached to pass-through ports must be configured for one of the supported data rates (38400, 19200, 9600, 4800, 2400, 1200, and 300 BPS), along with no parity, 8 data bits, and one stop bit. In particular, for accessing the Sentry product and attached pass-through devices by modem, the data rate of the devices must match the Sentry product's modem initialization data rate, as shown by the "SHOW MODEM" command (refer to the Sentry Operations Manual for details).



## 10Base-T Ethernet Port

Some Sentry products can be equipped with an optional network access device (NAD). On these models, a 10Base-T Ethernet port is present. This port connects the Sentry product to your Ethernet network hub. Any unit equipped with this network option must be used as the head-of-the-chain unit. The 10Base-T connector is an 8 wire RJ45 telephone type connector as illustrated below.



**RJ45 10Base-T Connector**

Before the Sentry can be accessed over a network, the network access device must first be configured with an IP Address, Subnet Mask, and Default Gateway. The Sentry Operations Manual contains detailed instructions for configuring the network access device to allow network access to your Sentry product.

The network access device of the Sentry product is a custom OEM version of the MSS Micro Serial Server manufactured by Lantronix. This device is enclosed within the Sentry product and provides the Telnet-to-asynchronous functionality that allows the Sentry product to be accessed over a TCP/IP Ethernet network.

The Lantronix MSS is a feature-rich product – it provides the basic functionality of a Telnet-to-asynchronous session, as well as other network related features such as SNMP support. To learn more about the Lantronix MSS, a complete manual and support files are available on-line at Lantronix's WWW page: <http://www.lantronix.com>

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# Manual Controls and LED Status Indicators

This chapter describes the various push button controls and status LED indicators that can be found on Sentry Power Management Products. The availability of these controls and indicators varies from product to product. When these controls and indicators are present, they provide users the ability to manually control some Sentry operations, and to visually determine certain status conditions. Normally the Sentry products are controlled via a terminal connected to a data connection on the Sentry product. There is a complete user interface for controlling the Sentry and viewing the status via the terminal interface. The terminal interface is described in the Sentry Operations Manual.

## Push Button Controls

Some Sentry products are equipped with optional push button controls for the IPMs. Other Sentry products are equipped with a single reset button. A Sentry product can be equipped with either IPM push button controls or a reset button, but not both. If a Sentry product has IPM push button controls, the push button control that is associated with the first IPM on the Sentry product also serves as the reset button. The following sections describe the operation of the reset button and the IPM push button controls.

### Reset Button

The Reset Button (either the button labeled A1 if IPM push buttons are installed or the button labeled Reset) is used to clear configuration information that is stored in non-volatile RAM. This configuration information includes usernames, passwords, and other customer created configuration information. For more information on the type of information, and the commands used to configure Sentry products, refer to the Sentry Operations Manual. The non-volatile RAM that stores all the configurable Sentry Commander options can be reset to factory defaults. This clears all configurable options to defaults, including passwords, device name, and network settings.

Resetting to factory defaults can be done in two ways – by an administrative-level command at the Sentry prompt (as described in the Sentry Operations Manual), or by a Reset button press during power up. This second method is necessary if the passwords are forgotten.

The button press during power up reset must be done on the first Sentry product at the beginning of a chain. The reset is performed by pressing and holding down the Reset button while turning on power with the On/Off toggle switch. Continue to hold down the Reset button for ten after turning on the power, then let go.

This will only reset the first power controller board in the Sentry product at the beginning of a chain. The rest of the chain should then be reset by logging in with the default administrative-level username/password, and then issuing the administrative reset command as described in the Sentry Operations Manual.

## IPM Push Button Controls

On some Sentry products IPM Push Button Controls are provided. These push button controls correspond on a one-to-one basis with the IPMs provided by the Sentry product. These push button controls are used to turn power on and off at the associated IPM power output. The behavior of the IPM Push Button Controls depends on the length of time the button is pushed and on the type of IPM being controlled.

When a user presses an IPM Push Button Control, the length of time that the button press is held affects the operation performed by the IPM Push Button Control. If the user presses the button for less than two seconds, the Sentry recognizes the button press as a Short Press (SP). If the user presses the button and holds it for more than two seconds, the Sentry recognizes the button press as a Long Press (LP).

As described earlier in this manual, there are two operational varieties of Sentry IPMs; Shutdown capable IPMs and Non-Shutdown capable IPMs. The behavior of the IPM Push Button Controls for each of these is described in the next two sections. For more information on the shutdown feature refer, to the Sentry Operations Manual.

### **Non-Shutdown IPM Push Button Control Behavior**

A non-shutdown IPM may be in one of four possible states at any time. The following discussion describes the behavior of the IPM Push Button Control for each of the four possible IPM states.

1. On State – the IPM is on (i.e. providing power at the power output).
  - A short button push in this state causes the associated IPM to go to the Off State.
  - A long button push in this state causes the associated IPM to go to the Locked On State.
2. Off State – the IPM is off (i.e. not providing power at the power output).
  - A short button push in this state causes the associated IPM to go to the On State.
  - A long button push in this state causes the associated IPM to go to the Locked Off State.
3. Locked On State – the IPM is locked on (i.e. the IPM cannot be controlled from the Sentry user interface commands – only a manual push button control can change the state of the IPM).
  - A short button push in this state has no effect.
  - A long button push in this state causes the associated IPM to go to the On State (i.e. unlocked and On).
4. Locked Off State – the IPM is locked off (i.e. the IPM cannot be controlled from the Sentry user interface commands – only a manual push button control can change the state of the IPM).
  - A short button push in this state has no effect.
  - A long button push in this state causes the associated IPM to go to the Off State (i.e. unlocked and Off).

### **Shutdown IPM Push Button Control Behavior**

An IPM with the shutdown feature may be in one of five possible states at any time. The following discussion describes the behavior of the IPM Push Button Control for each of the five possible states of a Shutdown IPM.

1. On State – the IPM is on (i.e. providing power at the power output).
  - A short button push in this state causes the associated IPM to go to the Off State.
  - A long button push in this state causes the associated IPM to go to the Locked On State.
2. Shutdown State – the IPM is transitioning from On State to Off State (i.e. providing power at the power output during the shutdown delay time).
  - A short button push in this state causes the associated IPM to go immediately to the Off State (i.e. the shutdown delay time is ended).
  - A long button push in this state causes the associated IPM to go to the On State (i.e. this is an escape from shutdown – the IPM does not go to the Locked On State, only to the On State).
3. Off State – the IPM is off (i.e. not providing power at the power output).
  - A short button push in this state causes the associated IPM to go to the On State.
  - A long button push in this state causes the associated IPM to go to the Locked Off State.
4. Locked On State – the IPM is locked on (i.e. the IPM cannot be controlled from the Sentry user interface commands – only a manual push button control can change the state of the IPM).
  - A short button push in this state has no effect.
  - A long button push in this state causes the associated IPM to go to the On State (i.e. unlocked and On).
5. Locked Off State – the IPM is locked off (i.e. the IPM cannot be controlled from the Sentry user interface commands – only a manual push button control can change the state of the IPM).
  - A short button push in this state has no effect.
  - A long button push in this state causes the associated IPM to go to the Off State (i.e. unlocked and Off).

## LED Status Indicators

The various Sentry products provide LEDs to give users an indication of the current status of the Sentry product. The Sentry LEDs are associated with the main operational power to the Sentry product, with the IPM Push Button Controls (if installed), and with the Sentry IPMs. The following sections describes the operation of the Sentry LEDs.

### Sentry Unit Power On/Off and Status LEDs

A Sentry product may have a single LED located in close proximity to the Sentry Unit main power switch (described earlier in this manual). If the LED is not labeled as Status, it is simply a power on/off indicator and it is either on when the power switch is in the On position or off when the power switch is in the Off position.

If the Sentry product has one or more LEDs that are labeled Status, these LEDs provide more information via flash pattern of the LEDs. If IPM Push Button Controls are installed on a Sentry product, there may be one Status LED for each group of four IPM Push Button Controls. In this case the Status LED applies to the Sentry controller board that is controlling the IPMs associated with the group of four IPM Push Button Controls adjacent to the Status LED. If there is a single Status LED, it applies to entire Sentry unit.

LEDs that are labeled Status (i.e. Status LEDs) display one of the following light patterns (any other light pattern is an error condition).

1. LED is flashing bright/dim – this is the normal condition and indicates the system is in a normal state and is idle.
2. LED is flashing on and off – this is the normal active condition and indicates there is an operation in progress (i.e. an operator is accessing the Sentry, and SNMP request is in progress, etc.).
3. LED is off – this indicates there is no power (i.e. the Sentry is turned off or the power to the Sentry has been removed).

## IPM Push Button Control LEDs

If IPM Push Button Controls are installed on a Sentry Product, the buttons can have LEDs located adjacent to the push buttons. These LEDs indicate the current state of the push button controls by displaying one of the following light patterns (any other light pattern is an error condition).

1. LED is on solid – this indicates the control of the associated IPM is set to On.
2. LED is off – this indicates the control of the associated IPM is set to Off.
3. LED is flashing bright/dim – this indicates the associated IPM is set to On and is currently in Shutdown time delay before the IPM will be set to Off (only on shutdown capable IPMs).
4. LED is flashing with a pattern of Off for approximately 2 seconds then on briefly then Off for approximately 2 seconds then on briefly – this flashing pattern indicates the IPM is in a Reboot operation. The IPM is set to Off and will remain Off until the flashing pattern stops and the LED return to solid on (refer to the Sentry Operations Manual for more information on the Reboot operation).
5. LED is on and at approximately 4 second intervals the LED flashes Off twice – this indicates the IPM is set to the Locked On State (described earlier in the IPM Push Button Control section of this manual).
6. LED is off and at approximately 4 second intervals the LED flashes On twice – this indicates the IPM is set to the Locked Off State (described earlier in the IPM Push Button Control section of this manual).
7. LED is flashing rapidly bright/dim – this flashing pattern occurs when the associated IPM Push Button Control has been pressed long enough to be recognized as a Long Button Push rather than a Short Button Push (refer to the IPM Push Button Control section of this manual for more information on these two types of button operations).

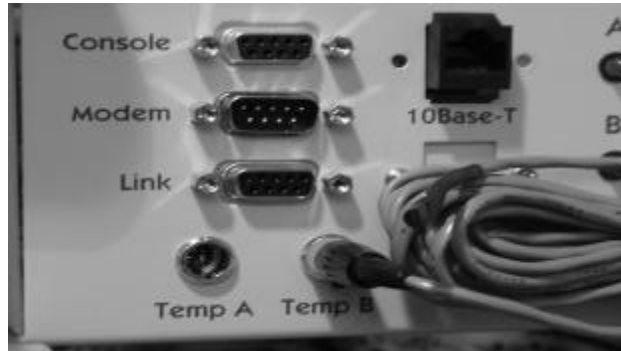
## IPM LEDs

Individual Sentry IPMs may have LEDs associated with them. These LEDs are either located in close proximity to the IPM for which they provide status (the LED for an external IPM is located on the external IPM) or the LED will have a label with correlates the LED to the associated IPM. IPM LEDs display the current status of the power output of the associated IPM. The IPM LED is on solid when the power is on and off when the power is off.

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## Temperature Probes

Some Sentry products have external temperature probes installed. There can be up to two temperature probes installed on each Sentry enclosure in a chain of Sentry products. The temperature probe is provided by one or two connectors located on the Sentry cabinet. A temperature probe cable is attached to the connector on the Sentry product and then located as desired for monitoring the temperature. The following illustration shows a Sentry cabinet with two temperature probe connections. One of the connections has the associated temperature probe cable attached.



**Temperature Probes and Associated cable**

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## Appendix - Support and Warranty

### Support

Server Technology, Inc. provides free product support between 8:30AM and 5:00 PM Pacific Time, Monday-Friday at the following Reno, Nevada, USA phone number:

**(775) 284-2000**

Server Technology, Inc. also has an e-mail address for support issues:

**support@servertech.com**

### Warranty

Server Technology, Inc. extends a one-year limited warranty, from the date of purchase.

This warranty covers defects in material and workmanship for the Sentry Remote Power Manager under normal use and service, and any failure to perform substantially in accordance with this User's Manual.

This warranty does not cover any failure, which results from accident, abuse, misapplication or alternation. Incidental and consequential damages are not covered by this warranty and are not the responsibility of Server Technology, Inc.

For warranty issues, contact the Product Support Department at the number listed above. All repair and return shipments must be approved by Server Technology and must be accompanied by an RMA (return merchandise authorization) number and dated proof of purchase.

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## Notes









# Server Technology, Inc.

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