



# **Sensorsoft® Real-Time Contact and Voltage Sensor User's Manual**

**Models SS6420J and SS6420E**

**Manual P/N 071-0108 Rev 12 May 21, 2019**



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## About this Manual

This document contains information about using the Sensorsoft Contact & Voltage Sensor.

When other sections of this manual are referenced, *italics* are used.

The Sensorsoft Contact & Voltage Sensor can be referred to as a Sensorsoft device, SSD (Sensorsoft Soft Device) or by its model number SS6420 throughout this manual.

## Glossary of Acronyms

RWME – **Remote Watchman Enterprise** software for Windows

SCOM – **Serial Communications Tool** software for Linux and UNIX

SSDP – **Sensorsoft Device Protocol**

SSD – **SensorSoft Device**

AWG – **American Wire Gauge**

PoE – **Power Over Ethernet**

PSE – **Power Sourcing Equipment**

PD – **Powered Device**

## Overview

The SS6420J and SS6420E Sensorsoft Contact & Voltage Sensors are multi-functional devices based on the Sensorsoft Device Protocol (SSDP). They have the ability to simultaneously monitor 12 (dry) contact points, 3 voltage sources, and control two relays. They are suitable for requirements where the customer needs to be informed immediately (< 0.3 second) upon the (Boolean) state change of a contact closure or voltage level. Applications for this product include, but are not limited to the following:

- intrusion and security
- safety warning
- roadway vehicle detection
- building management systems

The SS6420 can power a variety of safety and intrusion (12 VDC) detectors through its terminal blocks and with the appropriate peripheral power adapter. Two built-in single-pole-double-throw (SPDT) relays can be used to control the ON/OFF state of small equipment or loads. This can include alarm sirens and lights.



Sensorsoft makes several SSDP-compliant software applications that permit you to read these devices, send alerts, record and (in some cases) graph data. These include:

- Sensorsoft Remote Watchman Enterprise (RWME) for Windows
- Sensorsoft Serial Communications Tool (SCOM) for Linux and UNIX

The Sensorsoft Contact & Voltage Sensors are available with two different communication interfaces; The SS6420J with an RS232 serial interface and the SS6420E with a 10/100 Ethernet interface. A secure version of the Ethernet interface is available, model SS6420E-SSH, which provides SSH encryption to keep its communications private over public networks.

As of firmware version 5.08, Sensorsoft Contact & Voltage Sensors also responds to Simple Text Commands when used with a text-based terminal or scripting language. Additionally, we've provided several means for customers to write software integrating these Sensorsoft devices into their systems. This is discussed further in the section, *Writing custom software programs for the SS6420*.

## SS6420J (v5.08) Specifications

### Electronic:

**Total Number of Monitored Inputs: 15**

(12 - contact inputs, ground referenced, numbered C1-C12)

(3 - opto-isolated voltage inputs, not ground referenced, numbered V1-V3)

**Total Number of Controlled Outputs: 2**

(2 - SPDT electromagnetic relay contacts (NO, NC, COM), numbered RL1 and RL2)

**Screw Terminal Connectors:** 8 connectors x 6 polls/connector (48 poles total), 3.50 mm pluggable screw-down connector, AWG 16-24, Molex P/N 39351-0006.

**Relay contact load rating (RL1 or RL2):** 1.5 Amp at 30 VDC

**Maximum relay contact operating voltage (RL1-RL2):** 30 VDC

**Maximum relay contact operating current (RL1-RL2):** 1.5 Amp

**Maximum relay contact switching capacity (RL1-RL2):** 62.5 VA, 33 W

**Detection Method - Contact Inputs (C1-C12):** Input transistor circuit detects external resistance between input and ground terminals. External resistances below 15K ohm produce a CLOSED condition/state. External resistances above 600K ohm produce an OPEN condition/state.

**Input Resistance of Opto-isolated Voltage Inputs (V1-V3):** 16K Ohm

**Detection Method - Opto-isolated Voltage Inputs (V1-V3):** Optical coupler detects voltage difference between V+ and V-. A voltage difference, on these terminals, below approximately 3 volts produces an OFF condition/state. A voltage difference, on these terminals, equal to or greater than approximately 3 volts produces an ON condition/state. The minimum recommended voltage input for an ON condition/state is dependent upon resistance of the voltage source.

**Minimum Detectable Input Duration:** 60 mS. This specification is not valid during a write to any variable in the SS6420's non-volatile memory.

**Maximum Time from State Change to Issue of Interrupt Packet:** 300 mS. This specification is not valid during a write to any variable in the SS6420's non-volatile memory.

**Maximum Applied Voltage on Opto-isolated Voltage Inputs (V1-V3):** 30 V

**Power source:** Port-powered (RTS and DTR, both asserted) or using an external AC-DC power adapter. To operate relay contacts, requires external power.

**Power supply current drain:** < 20 mA

**External Power Source Connector:** 2.1 mm jack

**External Power Source Requirements:** 6 VDC, 20 mA capability, center positive (input circuit is polarity protected). Recommended power adapter is P/N PA6106 or PA6206.

**Peripheral DC Power Source:** for external peripheral devices

**Peripheral Power Source Connector:** 2.5 mm jack

**Peripheral Power Source Requirements:** Center negative (input circuit is polarity protected). The input DC voltage will depend on the requirements of peripheral devices that the customer is powering. The maximum input voltage allowed is 30 VDC. The maximum current that can be conducted is 0.75 Amp after which the internal overload protection will trigger. The overload protection is provided by a self-healing poly-fuse. This power source is made available through 12 polls of the screw terminal connectors. The recommended power adapter for powering security detectors is P/N PA6420 or PA6212 (12 VDC, 1.2 A).

## Hardware/Software Interface:

**Communications Interface:** RS232C using TX,RX,RTS,DTR and GND. One device per serial port.

**Communications Settings:** 57600 bps, 8 bits, no parity and 1 stop bit

**Communications Connector:** 8 position modular jack, (accepts 8 position plug, RJ45)

**Maximum communications cable length:** 24 m (80 ft.) using recommended cable type. Low capacitance shielded cable or UTP is recommended

**Firmware Version:** 5.08

**Communications Protocols:** Sensorsoft Device Protocol (SSDP) Version 3.0 or Simple Text Command Interface (see *Writing custom software for the SS6420*)

**Communications Error Control:** (SSDP only) 16 bit CRC (cyclic redundancy checking) for detection of communication errors between the device and host.

**EEPROM:** 2 Kbytes. Stores user defined input description and Boolean state strings

**Number of Variables:** 87

**Maximum Length of Input Description String:** 32 characters

**Maximum Length of Boolean State String:** 8 characters

## Physical:

**Housing Dimensions:** 7.5" (19.0 mm) x 2.8" (7.1 mm) x 1.1" (2.8 mm)

**Housing Material:** injection molded ABS thermoplastic

**Housing Color:** Grey

**Operating Temperature Range:** 0 ° C to +60 ° C (32 ° F to +140 ° F)

**Operating Humidity Range:** 90% or less, non-condensing

## SS6420E (v5.08) Specifications

### Electronic:

**Total Number of Monitored Inputs: 15**

(12 - contact inputs, ground referenced, numbered C1-C12)

(3 - opto-isolated voltage inputs, not ground referenced, numbered V1-V3)

**Total Number of Controlled Outputs: 2**

(2 - SPDT electromagnetic relay contacts (NO, NC, COM), numbered RL1 and RL2)

**Screw Terminal Connectors:** 8 connectors x 6 polls/connector (48 poles total), 3.50 mm pluggable screw-down connector, AWG 16-24, Molex P/N 39351-0006.

**Relay contact load rating (RL1 or RL2):** 1.5 Amp at 30 VDC

**Maximum relay contact operating voltage (RL1-RL2):** 30 VDC

**Maximum relay contact operating current (RL1-RL2):** 1.5 Amp

**Maximum relay contact switching capacity (RL1-RL2):** 62.5 VA, 33 W

**Detection Method - Contact Inputs (C1-C12):** Input transistor circuit detects external resistance between input and ground terminals. External resistances below 15K ohm produce a CLOSED condition/state. External resistances above 600K ohm produce an OPEN condition/state.

**Input Resistance of Opto-isolated Voltage Inputs (V1-V3):** 16K Ohm

**Detection Method - Opto-isolated Voltage Inputs (V1-V3):** Optical coupler detects voltage difference between V+ and V-. A voltage difference, on these terminals, below approximately 3 volts produces an OFF condition/state. A voltage difference, on these terminals, equal to or greater than approximately 3 volts produces an ON condition/state. The minimum recommended voltage input for an ON condition/state is dependent upon resistance of the voltage source.

**Minimum Detectable Input Duration:** 60 mS. This specification is not valid during a write to any variable in the SS6420's non-volatile memory.

**Maximum Time from State Change to Issue of Interrupt Packet:** 300 mS. This specification is not valid during a write to any variable in the SS6420's non-volatile memory.

**Maximum Applied Voltage on Opto-isolated Voltage Inputs (V1-V3):** 30 V

**Power source:** External AC-DC power adapter

**Power supply current drain:** < 300 mA

**External Power Source Connector:** 2.1 mm jack

**External Power Source Requirements:** 6 VDC, 300 mA capability (input circuit is polarity protected). Recommended power adapter is P/N PA6106 or PA6206.

**Peripheral DC Power Source:** for external peripheral devices

**Peripheral Power Source Connector:** 2.5 mm jack

**Peripheral Power Source Requirements:** Center negative (input circuit is polarity protected). The input DC voltage will depend on the requirements of peripheral devices that the customer is powering. The maximum input voltage allowed is 30 VDC. The maximum current that can be conducted is 0.75 Amp after which the internal overload protection will trigger. The overload protection is provided by a self-healing poly-fuse. This power source is made available through 12 polls of the screw terminal connectors. The recommended power adapter for powering security detectors is P/N PA6420 or PA6212 (12 VDC, 1.2 A).



**Hardware/Software Interface:**

**Communications Interface:** 10/100 Base-T Ethernet

**Communications Connector:** 8 position modular jack, (accepts 8 position plug, RJ45)

**Maximum communications cable length:** 100 m (328 ft.) using appropriate UTP cable.

**Transport Layer Communications Protocol:** TCP

**IP Address:** defined by customer (can be dynamic via DHCP or static, default is DHCP)

**TCP Port Number:** defined by customer (default is 3001)

**Firmware Version:** 5.08

**Application Layer Communications Protocols:** Sensorsoft Device Protocol (SSDP) Version 3.0 or Simple Text Command Interface (see *Writing custom software for the SS6420*)

**Communications Error Control:** (SSDP only) 16 bit CRC (cyclic redundancy checking) for detection of communication errors between the device and host.

**Number of Variables:** 87

**EEPROM:** 2 Kbytes. Stores user defined input description and Boolean state strings

**Maximum Length of Input Description String:** 32 characters

**Maximum Length of Boolean State String:** 8 characters

**Physical:**

**Housing Dimensions:** 7.5" (19.0 mm) x 2.8" (7.1 mm) x 1.1" (2.8 mm)

**Housing Material:** injection molded ABS thermoplastic

**Housing Color:** Grey

**Operating Temperature Range:** 0 ° C to +60 ° C (32 ° F to +140 ° F)

**Operating Humidity Range:** 90% or less, non-condensing

## Installing and operating the SS6420

Use the following sequence to install and operate your SS6420:

- Choosing a location for mounting
- Connecting the SS6420 inputs to what you want to monitor
- Connecting the SS6420 to the equipment or load you want to control
- Connecting the SS6420J to a serial port
- Connecting the SS6420E to an Ethernet port
- Powering the SS6420
- Configure the IP Settings of the SS6420E
- Supplying power to peripheral devices
- Starting the application software. Please refer to the specific software manual that applies to your installation.

### Choosing a location for mounting

The best location for mounting the SS6420 is in a closet or rack that is centralized to all the wiring end points. The SS6420 enclosure provides four holes for screw mounting to a wall, board or rack.

The following points should be adhered to during mounting:

- Allow enough space near the SS6420 terminal blocks for a technician to install, remove and harness the wiring and cabling
- Since the SS6420 is not weatherproof or waterproof it is important to keep its housing out of contact with direct sunlight, UV exposure and water.
- Protect the SS6420 from high traffic areas that could wear or damage its housing, cabling or wiring.
- If the SS6420 is connected to higher voltage **equipments or loads greater than 24 volts**, be sure to protect its terminals from unauthorized individuals to prevent electrical shock hazard. **It would be necessary in this situation to place the SS6420 in a protective panel or cabinet. Consult an electrician or electrical engineer when dealing with such situations.**
- Never allow the SS6420's housing to come into contact with harsh chemicals or cleaning agents. If it needs to be cleaned, do so with a damp cloth or vacuum cleaner. During such a cleaning, take the necessary precautions to de-energize the equipment that the SS6420 is monitoring or controlling.

### Connecting the SS6420J to a serial port

Use the appropriate C200X cable to connect the SS6420J to your computer or device server. Please refer to the Sensorsoft price list for available types of cables.

If you intend to make your own serial communication cable for the SS6420J, please refer to *Making serial communication cables for SS6420J*.

If you are connecting this Sensorsoft device to a device/console server, please be sure to configure its port as follows:

- 57600 bps, 8 bits, no parity, 1 stop bit
- Turn off autobaud
- Flow control set to none
- Non-telnet binary (raw) transfer mode, do not strip NULL bytes
- Assert RTS and DTR always to power the SS6420J

If using a device/console server, refer to its documentation for more details on the above. Sensorsoft sells suitable device servers that are preconfigured for use in this application:

<https://www.sensorsoft.com/products.html#exactline13>

Note the physical port number where you plugged the cable into your computer or device/console server. If the Sensorsoft device is being plugged into a Windows based computer that has only one COM port, the port number is usually COM1. If you are using a USB to serial adapter, you need to refer to the operating system's serial port (COM) listing. In Microsoft Windows, this is usually "Device Manager->Ports (COM&LPT)." In Linux or UNIX, refer to the /dev/tty directory.

## Connecting the SS6420E to an Ethernet port

Use a straight through patch cord (RJ45 to RJ45) to connect the SS6420E to an Ethernet hub or switch. Sensorsoft offers cable P/N C2006 (10 ft, 3 m) for use in this application. We can also manufacture longer patch cables if required.

## Powering the SS6420

The **SS6420J** can be powered from the serial port if you do not intend to use the built-in relays. If you need to use the relay contacts, or if the serial port is not providing sufficient power to the SS6420J, it would then be necessary to power the SS6420J from a power adapter that plugs into its 6 VDC power connector. Use only Sensorsoft Power Adapter P/N PA6106 or PA6206.

The **SS6420E** must always be powered from a power adapter that plugs into its 6 VDC power connector. Use only Sensorsoft Power Adapter P/N PA6106 or PA6206. Alternatively, Sensorsoft offers a PoE adapter, P/N SS1017, so that the SS6420E (PD) can be powered from a PoE (PSE) capable switch.



**WARNING:** We highly advise that you plug the mains AC end of the PA6106/PA6206 power adapter into a UPS (Uninterruptible Power Supply) so that the SS6420 will continue to operate in the event of a power failure.

## Configure the IP Settings of the SS6420E

### Method 1 – Using DHCP (default):

By default the SS6420E is setup in the factory to use DHCP to acquire an IP address. If you do not have a DHCP server on your network use method 2 described below, to assign a static IP address. To determine what IP address the SS6420E acquired via DHCP, please contact your network administrator or use the software in Method 2 to perform a search.

### Method 2 – Using Windows software:

To use Windows software to find or assign an IP address for your SS6420E you must follow the steps below:

1. Download and install the following software on a networked Windows computer:

For Windows XP

<https://www.sensorsoft.com/download/device-installer-4.3.0.9-setup.exe>

For Windows 7/8/10/2008/2012

<https://www.sensorsoft.com/download/device-installer-v4407-setup.zip>

2. After installation, run the Device Installer software from the Windows start menu.
3. Power the SS6420E using the supplied power adapter (P/N PA6106 or PA6206) and connect it to your network using an Ethernet patch cable (P/N C2006-10).
4. Click the “Search” button on the software’s menu bar.
5. After a couple of seconds an item should appear, labeled XPort-0x (x = 3, 4 or 5). If several items appear, select the item that has your MAC address (printed on the SS6420E enclosure).
6. If the selected item is in a red colour, click the “Assign IP” button to assign a static IP address and follow the on-screen wizard instructions. If the selected item is in a black colour, it has already obtained an IP address using DHCP.
7. If using DHCP, telnet to port 9999 and use Server menu (0) to assign the device name that will be reflected in DNS.

### Method 3 – Using the ARP and Telnet command on a Windows/LINUX/UNIX computer:

For this method to work you must be logged in as the administrator or root on your computer. The format of the MAC address below will vary depending on your operating system, please refer to the arp command help on your computer. The MAC address for this Sensorsoft device is printed on its enclosure. Power the SS6420E using the supplied AC-DC power adapter (P/N PA6106 or PA6206) and connect it to your network using an Ethernet patch cable (P/N C2006-10). Follow the command procedure below to assign the IP address:

```
> arp -s ip_address MAC_address
> telnet ip_address 1 (this command should fail)
> telnet ip_address 9999
Press the <Enter> key immediately
```

Type 0 to configure the IP settings

Type 9 to save these settings permanently

## Connecting to the SS6420 terminal blocks

The SS6420 is supplied with plug-in terminal blocks that have screw terminals. This design permits you to remove the plug-in blocks should you want to replace or swap-out the SS6420 unit for repair or maintenance. To attach or remove a wire from the terminal block you will need a straight blade screw driver with a tip that is 0.1 inch (2.5 mm) wide or smaller. This is the procedure for attaching a wire to the terminal block:

1. Remove the power from the SS6420 unit
2. Use the flat blade screw driver, specified above, to fully loosen a terminal block screw
3. Strip approximately 0.25 inch (6 mm) of insulation from a solid core wire with an AWG size of 16-24
4. Insert this stripped wire into the terminal block contact opening
5. Use the same screw driver to tighten the screw until the wire cannot be removed

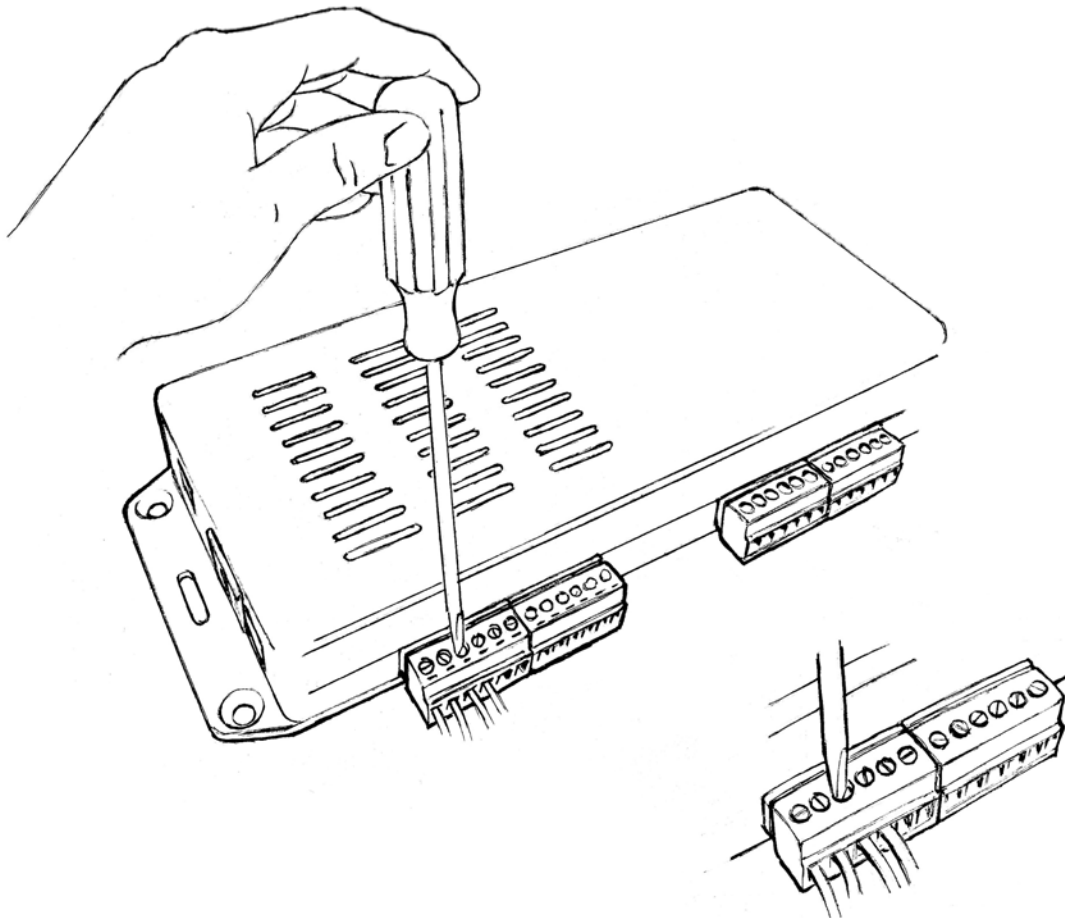


Figure 1: Shows how a flat blade screw driver can be used to fasten or remove wires from the SS6420 terminal blocks.

## Connecting and monitoring dry-contacts

The SS6420 has twelve (12) input contact terminals respectively labeled **C1** through to **C12**. This allows you to monitor 12 ground referenced dry contact sources. To connect a contact source to the SS6420, do the following:

1. Connect the supplied screw terminal plugs to the SS6420 if you have not already done so.
2. Extend a pair of wires from the contact source to the SS6420
3. Connect one of the wires to a contact terminal (C1...C12) on the SS6420. Refer to the section *Connecting to the SS6420 terminal blocks* to fastening this wire.
4. Connect the other wire to a ground terminal on the SS6420. The SS6420 has 12 ground terminals all labeled **Gnd**. You can use any of the ground terminals since they are all common. However, it is recommended that you use one closest to the contact terminal, so as to keep the wire pair connected near each other.

### Internal circuit diagram of contact inputs

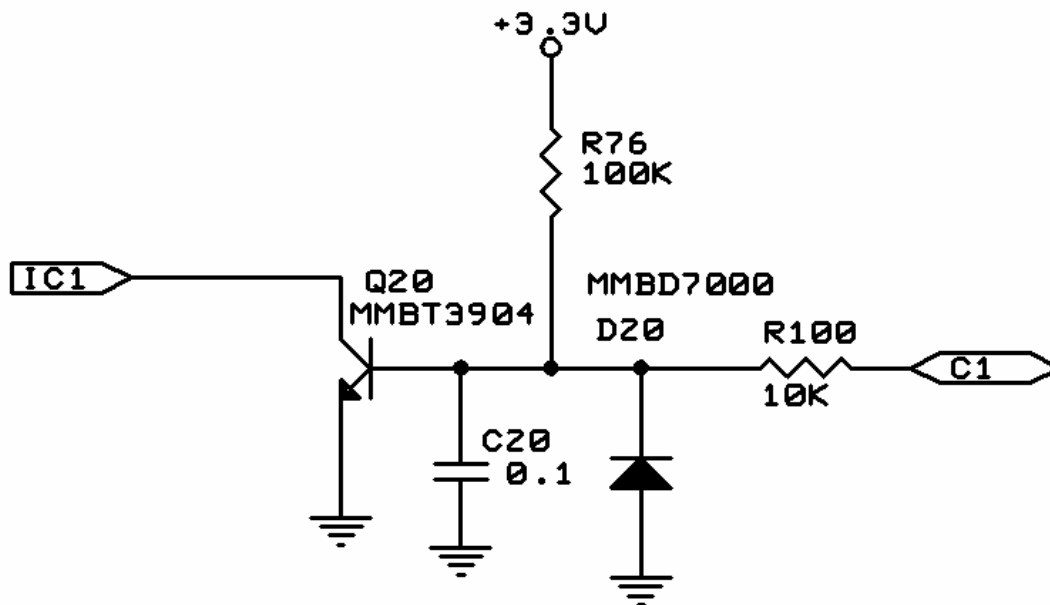


Figure 2: The above schematic diagram shows the SS6420 internal circuitry for the C1 contact input. Inputs C1 through C12 have identical circuitry.

## Connecting and monitoring voltages

The SS6420 has three (3) pairs of voltage input terminals: **V1+/V1-**, **V2+/V2-**, and **V3+/V3-**. This allows you to monitor three separate DC voltage sources. These inputs cannot be used to measure the voltage, they can only determine the Boolean presence of a voltage (ON, OFF). To connect a voltage source to the SS6420, do the following:

1. Connect the supplied screw terminal plugs to the SS6420 if you have not already done so.
2. Be carefully not to exceed the maximum voltage input of the SS6420. See the SS6420 Specifications for more information.
3. Extend a pair of wires from the voltage source to the SS6420
4. Connect the wire with the positive voltage into one of the V+ terminals on the SS6420. Refer to the section *Connecting to the SS6420 terminal blocks* to fastening this wire.
5. Connect the other wire into the corresponding V- terminal on the SS6420.

### Internal circuit diagram of voltage inputs

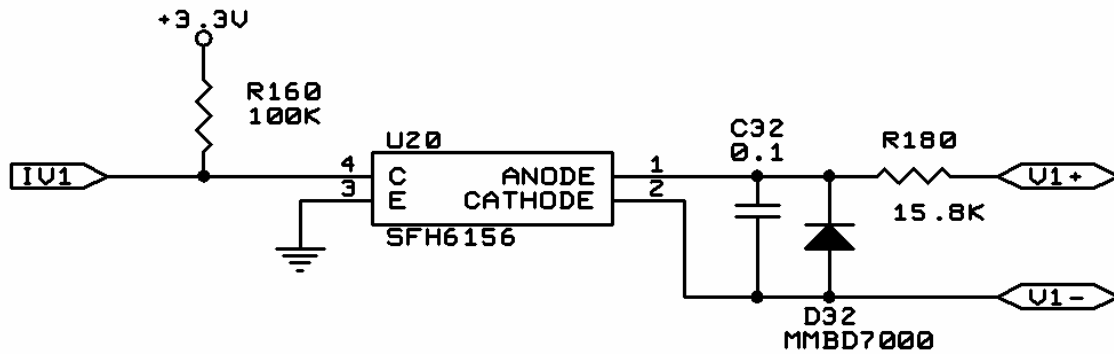


Figure 3: The above schematic diagram shows the SS6420 internal circuitry for the V1 voltage input. Inputs V1 through V3 have identical circuitry. The opto-coupler provides optical isolation to protect the SS6420 from any electrical noise and spikes that may occur on the V+/V- terminals.



## Controlling loads or equipments using relays on SS6420

The typical way to control things using a relay is by a series connection that interrupts the power or continuity to the equipment or load. The SS6420 has two single pole double throw (SPDT) relays.

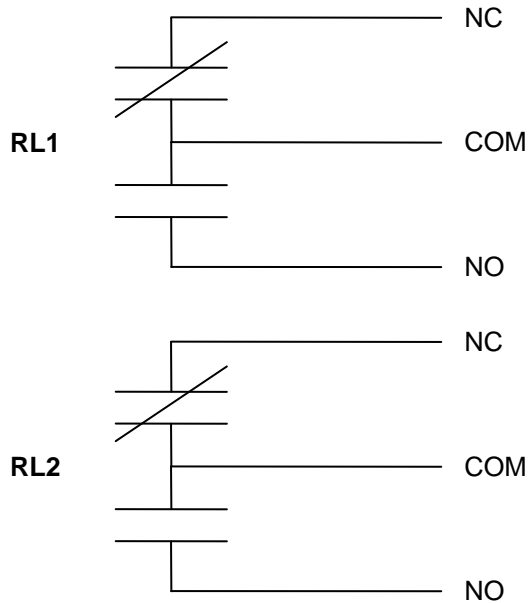


Figure 4: Schematic diagram of relay contacts in the SS6420. It shows normally closed (slash through contact) and normally open contacts when the relays are not energized (OFF).

Connect your load (or equipment) as follows:

1. **De-energize the load from any live power source before wiring to the relay.**
2. Connect the supplied screw terminal plugs to the SS6420 if you have not already done so.
3. Slip one of the controlling wires from the load into either the NC or NO terminal position. Refer to the section *Connecting to the SS6420 terminal blocks* to fastening this wire.
4. Slip the other controlling wire from the load into the COM terminal position. Refer to the section *Connecting to the SS6420 terminal blocks* to fastening this wire.
5. Energize the load power supply and test by operating the relay with a software command.

## Supplying power to peripheral devices

The SS6420 has twelve (12) peripheral power terminals labeled P+. These terminals can be used to supply power to external devices that are being monitored or controlled by the SS6420. Such devices can include:

- motion, glass-break, CO and smoke detectors
- solenoids
- signal lamps
- audio sirens and beacons

The P+ voltage output is DC (Direct Current), and therefore they cannot power AC devices. Each P+ terminal draws current from the peripheral power source jack. This jack is labeled Peripheral Power (P+), and must be connected to an AC/DC power adaptor to power the P+ terminals. The recommended peripheral power adaptor is Sensorsoft P/N PA6420 or PA6212. This Sensorsoft power adapter works best for most security/safety detectors, solenoids and audio alarms that are 12 VDC powered. If you prefer to use your own power supply or adapter, you must ensure that you meet the requirements (see the *Specifications* section). The voltage level on the P+ terminals is always 0.5 Vdc lower than the voltage level of the peripheral power adaptor due to an internal polarity protection diode.

When powering peripheral devices from the P+ terminals, it is important to remember that **the total current collectively drawn by all the peripheral devices being powered must not exceed 0.75 Amp**. Otherwise, a poly-fuse will activate inside the SS6420 and the voltage on the P+ terminal will drop far below its normal level. Check the current requirement of each peripheral device that will be attached to the P+ terminals. To determine the total current drawn by all the peripheral devices being powered, simply add up the current requirements of all the devices.

To power a peripheral device from a P+ terminal, do the following:

1. Disconnect the peripheral power adaptor from the peripheral power jack.
2. Connect the supplied screw terminal plugs to the SS6420 if you have not already done so.
3. Using a pair of wires, extend the peripheral device's power and ground terminals to the SS6420.
4. Connect the peripheral device's power terminal to any of the P+ terminals on the SS6420. Refer to the section *Connecting to the SS6420 terminal blocks* to fastening this wire.
5. Connect the peripheral device's ground terminal to one of the Gnd terminals on the SS6420.
6. Reconnect the peripheral power adaptor to the peripheral power jack.

## Contact Input Application Examples

### Connecting a Motion Detector

#### Motion Detector with the Sensorsoft Quick-Connect feature

If your motion detector was purchased from Sensorsoft, and it came with the quick-connect option, then the connection procedure is greatly simplified by using a C6420 cable. To make the connection, do the following:

1. Connect the PA6420 or PA6212 power adapter to the SS6420's Peripheral Power jack.
2. Plug the white 4-pin connector of the C6420 extension cable into the compatible connector on the motion detector.
3. Plug the other end (6-position terminal block) into a vacant group of contact terminals (e.g. C1 Gnd P+ C2 Gnd P+) on the SS6420. The lower index contact (e.g. C1) will be used to detect motion. The higher index contact (e.g. C2) will be used to detect tampering.

The Sensorsoft supplied motion detectors have a normally-closed tamper switch that is wired separately from the motion contact. If monitored, this can indicate if the detector's enclosure has been opened and that someone has made an attempt to disable or cut wires in the detector. This tamper switch can also be used to detect severed wires or accidental removal from the SS6420 terminals. By using the Sensorsoft Quick-Connect feature, the SS6420 will detect when the motion detector has lost power, is being tampered with (i.e. enclosure is open), or has been disconnected. When the motion detector has lost power, the motion contact will report an OPEN state. When the motion detector is being tampered with, the tamper contact will report an OPEN state. When the motion detector is disconnected, BOTH the motion contact and the tamper contact will report an OPEN state.

#### Motion Detector without the Sensorsoft Quick-Connect feature

To use a third party motion detector with the SS6420, your motion detector needs to have a relay contact output, and you need to supply your own 4 wire security cable. The SS6420 does not support wireless, addressable or 2-wire and 4-wire protocol motion detectors. To make the connection, do the following:

1. Ensure the AC adaptor connected to the SS6420's Peripheral Power jack has adequate voltage to power the motion detector. The recommended power adaptor is the PA6420 or PA6212 (12 VDC 1.25 A), which can be purchased from Sensorsoft.
2. Open the motion detector's enclosure to expose the screw terminals within.
3. Connect the N.C. terminal of the motion detector to an unused contact terminal (C1 – C12) on the SS6420.
4. Connect the Common (COM) terminal of the motion detector to a ground terminal (Gnd) on the SS6420.
5. If your motion detector has tamper output (T1, T2), then connect one of the tamper terminals to an unused contact terminal (C1 – C12) on the SS6420. Connect the other tamper terminal to the ground terminal (Gnd) on the SS6420.
6. Connect the power terminal (+12V) of the motion detector to a P+ terminal on the SS6420.

7. Connect the GND terminal of the motion detector to a ground terminal (Gnd) on the SS6420.

## Connecting a Glass-break Detector

### Glass-break Detector with the Sensorsoft Quick-Connect feature

If your glass-break detector was purchased from Sensorsoft, and it came with the quick-connect option, then the connection procedure is greatly simplified by using a C6420 cable. To make the connection, do the following:

1. Connect the PA6420 or PA6212 power adapter to the SS6420's Peripheral Power jack.
2. Plug the white 4-pin connector of the C6420 extension cable into the compatible connector on the glass-break detector.
3. Plug the other end (6-position terminal block) into a vacant group of contact terminals (e.g. C1 Gnd P+ C2 Gnd P+) on the SS6420. The lower index contact (e.g. C1) will be used to detect glass-break. The higher index contact (e.g. C2) will be used to detect tamper.

The Sensorsoft glass-break detectors have a normally-closed tamper switch that is wired separately from the alarm contact. If monitored, this can indicate if the detector's enclosure has been opened and that someone has made an attempt to disable or cut wires in the detector. This tamper switch can also be used to detect severed wires or accidental removal from the SS6420 terminals. By using the Sensorsoft Quick-Connect feature, the SS6420 will detect when the glass-break detector has lost power, is being tampered with (i.e. enclosure is open), or has been disconnected. When the glass-break detector has lost power, the glass-break contact will report an OPEN state. When the glass-break detector is being tampered with, the tamper contact will report an OPEN state. When the glass-break detector is disconnected, BOTH the glass-break contact and the tamper contact will report an OPEN state.

### Glass-break Detector without the Sensorsoft Quick-Connect feature

To use a third party glass-break detector with the SS6420, your glass-break detector needs to have a relay contact output, and you need to supply your own 4 wire cable. The SS6420 does not support wireless, addressable or 2-wire and 4-wire protocol glass-break detectors. To make the connection, do the following:

1. Ensure the AC adaptor connected to the SS6420's Peripheral Power jack has adequate voltage to power the glass break detector. The recommended power adaptor is the PA6420 or PA6212, which can be purchased from Sensorsoft.
2. Open the glass-break detector's enclosure to expose the screw terminals within.
3. Connect the N.C. terminal of the glass-break detector to an unused contact terminal (C1 – C12) on the SS6420.
4. Connect the common (COM) terminal of the glass-break detector to a ground terminal (Gnd) on the SS6420.
5. If your glass-break detector has tamper outputs (TAMP), then connect one of the tamper terminals to an unused contact terminal (C1 – C12) on the SS6420. Connect the other tamper terminal to the ground terminal (Gnd) on the SS6420.
6. Connect the power terminal (+12V) of the glass-break detector to a P+ terminal on the SS6420.

7. Connect the GND terminal of the glass-break detector to a ground terminal (Gnd) on the SS6420.

## Connecting a Carbon Monoxide (CO) Detector

### Carbon Monoxide Detector with the Sensorsoft Quick-Connect feature

If your carbon monoxide detector was purchased from Sensorsoft, and it came with the quick-connect option, then the connection procedure is greatly simplified by using a C6420 cable. To make the connection, do the following:

1. Connect the PA6420 or PA6212 power adapter to the SS6420's Peripheral Power jack.
2. Plug the white 4-pin connector of the C6420 extension cable into the compatible connector on the carbon monoxide detector.
3. Plug the other end (6-position terminal block) into a vacant group of contact terminals (e.g. C1 Gnd P+ C2 Gnd P+) on the SS6420. The lower index contact (e.g. C1) will be used to detect carbon monoxide. The higher index contact (e.g. C2) will be used to detect disconnection.

By using the Sensorsoft Quick-Connect feature, the carbon monoxide detector can indicate when it has been physically disconnected from the SS6420. This type of disconnect sensing is useful for detecting severed wires or accidental removal from the SS6420 terminals. When the detector is disconnected, the disconnect contact will report an OPEN state.

### Carbon Monoxide Detector without the Sensorsoft Quick-Connect feature

To use a third party carbon monoxide detector with the SS6420, your carbon monoxide detector needs to have a relay contact output, and you need to supply your own 4 wire cable. The SS6420 does not support wireless, addressable or 2-wire and 4-wire protocol carbon monoxide detectors. To make the connection, do the following:

1. Ensure the AC adaptor connected to the SS6420's Peripheral Power jack has adequate voltage to power the carbon monoxide detector. The recommended power adaptor is the PA6420 or PA6212, which can be purchased from Sensorsoft.
2. Open the carbon monoxide detector's enclosure to expose the terminals within.
3. Connect the N.C. terminal of the carbon monoxide detector to an unused contact terminal (C1 – C12) on the SS6420.
4. Connect the common (COM) terminal of the carbon monoxide detector to a ground terminal (Gnd) on the SS6420.
5. Connect the power terminal (+12V) of the carbon monoxide detector to a P+ terminal on the SS6420.
6. Connect the GND terminal of the carbon monoxide detector to a ground terminal (Gnd) on the SS6420.

## Connecting a Smoke Detector

### Smoke Detector with the Sensorsoft Quick-Connect feature

If your smoke detector was purchased from Sensorsoft, and it came with the quick-connect option, then the connection procedure is greatly simplified by using a C6420 cable. To make the connection, do the following:

1. Connect the PA6420 or PA6212 power adapter to the SS6420's Peripheral Power jack.
2. Plug the white 4-pin connector of the C6420 extension cable into the compatible connector on the smoke detector.
3. Plug the other end (6-position terminal block) into a vacant group of contact terminals (e.g. C1 Gnd P+ C2 Gnd P+) on the SS6420. The lower index contact (e.g. C1) will be used to detect smoke. The higher index contact (e.g. C2) will be used to detect disconnection.

By using the Sensorsoft Quick-Connect feature, the smoke detector can indicate when it has been physically disconnected from the SS6420. This type of disconnect sensing is useful for detecting severed wires or accidental removal from the SS6420 terminals. When the detector is disconnected, the disconnect contact will report an OPEN state.

### **Resetting the alarm state for a Sensorsoft supplied smoke detector**

If your smoke detector goes into alarm state (i.e. detected smoke), it will stay in the alarm state until it has been reset. This is performed by temporarily removing power from the smoke detector in one of the following ways:

- Remove the smoke detector head from its base temporarily
- Temporarily disconnect the C6420 cable from the SS6420. Please take extra precaution to ensure that you only disconnect the C6420 cable connected to the smoke detector in alarm state.
- If the above points do not reset the detector unplug the peripheral power adapter for a few (5) seconds.

### **Smoke Detector without the Sensorsoft Quick-Connect feature**

To use a third party smoke detector with the SS6420, your smoke detector needs to have a relay contact output, and you need to supply your own 4 wire cable. The SS6420 does not support wireless, addressable or 2-wire and 4-wire protocol smoke detectors. To make the connection, do the following:

1. Ensure the AC adaptor connected to the SS6420's Peripheral Power jack has adequate voltage to power the carbon monoxide detector. The recommended power adaptor is the PA6420 or PA6212, which can be purchased from Sensorsoft.
2. Open the smoke detector's enclosure to expose the screw terminals within.
3. Connect the N.C. terminal of the smoke detector to an unused contact terminal (C1 – C12) on the SS6420.
4. Connect the common (COM) terminal of the smoke detector to a ground terminal (Gnd) on the SS6420.
5. Connect the power terminal (+IN) of the smoke detector to a P+ terminal on the SS6420.
6. Connect the GND terminal of the smoke detector to a ground terminal (Gnd) on the SS6420.

## Connecting a Door Contact

### Door Contact with the Sensorsoft Quick-Connect feature

If your door contact was purchased from Sensorsoft, and it came with the quick-connect option, then the connection procedure is greatly simplified by using a C6420 cable. To make the connection, do the following:

1. Plug the white 4-pin connector of the C6420 extension cable into the compatible connector on the door contact.
2. Plug the other end (6-position terminal block) into a vacant group of contact terminals (e.g. C1 Gnd P+ C2 Gnd P+) on the SS6420. The lower index contact (e.g. C1) will be used to detect the position of the door (OPEN or CLOSED) and changes in state. The higher index contact (e.g. C2) will be used to detect disconnection.

By using the Sensorsoft Quick-Connect feature, the door contact can indicate when it has been physically disconnected from the SS6420. This type of disconnect sensing is useful for detecting severed wires or accidental removal from the SS6420 terminals. When disconnected, the disconnect contact will report an OPEN state.

### Door Contact without the Sensorsoft Quick-Connect feature

To use a third party door contact with the SS6420, you need to supply your own wiring. To make the connection, do the following:

1. Connect one terminal of the door contact to an unused contact terminal (C1 – C12) on the SS6420.
2. Connect the other terminal of the door contact to a ground terminal on the SS6420.

## Writing custom software for the SS6420

Due to the complex nature of the real-time Sensorsoft Device Protocol (SSDP) in the SS6420 we do not publish the raw commands or algorithm for use by programmers. Sensorsoft provides two methods for allowing your custom software to communicate and work with the SS6420 in real-time as shown here:

### Sensorsoft Device Monitoring .NET Component for Windows

This method involves use of the Sensorsoft Device Monitoring.NET Component for creating software on Windows based systems. It provides a high level Windows .NET based API that implements the Sensorsoft Device Protocol and real-time capability of the SS6420. You can download and learn more about this free software at:

<https://www.sensorsoft.com/developers.html>

### Simple Text Command Interface

The simple text command interface can be used interactively with a terminal program (telnet, hyper-terminal, Teraterm, putty, etc.) or by user written programs and scripts. These commands make it possible to read and control the SS6420 in many systems including Linux, UNIX and embedded applications. This interface supports the real-time capability of the SS6420. The following single letter (lower case) commands should be ended with a carriage return and or line feed character:

```
r      read state of all variables
m      read model number
v      read firmware version
i      enable interrupts
d      disable interrupts
c      clear pending interrupts
s      show state of interrupt flag (enabled/disabled)
x      control relays
```

When you enable interrupts with the "i" command and if after that any inputs change state it will immediately send you the changes that occurred. The SS6420 will then automatically disable interrupts until you re-enable them again with the "i" command. The following shows a sample of the interrupt message output format:

```
<IRQ-BEGIN>C1=0,C4=1<IRQ-END>
```



## SSDP Variable List for the SS6420

The following chart provides a detailed description of each variable inside the SS6420 if using the SSDP. This chart is not applicable to the simple text commands interface;

Variable Number	Variable Name	R/W Capability	Notes
1	CONTACT(C01)	Read Only	Reports Boolean state string
2	CONTACT(C01)_SETTINGS	R/W	Can be ignored
3	CONTACT(C01)_DESCRIPTION	R/W	User defined name
4	CONTACT(C01)_ZEROSTATE	R/W	User defined state string
5	CONTACT(C01)_ONESTATE	R/W	User defined state string
6	CONTACT(C02)	Read Only	Reports Boolean state string
7	CONTACT(C02)_SETTINGS	R/W	Can be ignored
8	CONTACT(C02)_DESCRIPTION	R/W	User defined name
9	CONTACT(C02)_ZEROSTATE	R/W	User defined state string
10	CONTACT(C02)_ONESTATE	R/W	User defined state string
11	CONTACT(C03)	Read Only	Reports Boolean state string
12	CONTACT(C03)_SETTINGS	R/W	Can be ignored
13	CONTACT(C03)_DESCRIPTION	R/W	User defined name
14	CONTACT(C03)_ZEROSTATE	R/W	User defined state string
15	CONTACT(C03)_ONESTATE	R/W	User defined state string
16	CONTACT(C04)	Read Only	Reports Boolean state string
17	CONTACT(C04)_SETTINGS	R/W	Can be ignored
18	CONTACT(C04)_DESCRIPTION	R/W	User defined name
19	CONTACT(C04)_ZEROSTATE	R/W	User defined state string
20	CONTACT(C04)_ONESTATE	R/W	User defined state string
21	CONTACT(C05)	Read Only	Reports Boolean state string
22	CONTACT(C05)_SETTINGS	R/W	Can be ignored
23	CONTACT(C05)_DESCRIPTION	R/W	User defined name
24	CONTACT(C05)_ZEROSTATE	R/W	User defined state string
25	CONTACT(C05)_ONESTATE	R/W	User defined state string
26	CONTACT(C06)	Read Only	Reports Boolean state string
27	CONTACT(C06)_SETTINGS	R/W	Can be ignored
28	CONTACT(C06)_DESCRIPTION	R/W	User defined name
29	CONTACT(C06)_ZEROSTATE	R/W	User defined state string
30	CONTACT(C06)_ONESTATE	R/W	User defined state string
31	CONTACT(C07)	Read Only	Reports Boolean state string
32	CONTACT(C07)_SETTINGS	R/W	Can be ignored
33	CONTACT(C07)_DESCRIPTION	R/W	User defined name
34	CONTACT(C07)_ZEROSTATE	R/W	User defined state string
35	CONTACT(C07)_ONESTATE	R/W	User defined state string
36	CONTACT(C08)	Read Only	Reports Boolean state string
37	CONTACT(C08)_SETTINGS	R/W	Can be ignored
38	CONTACT(C08)_DESCRIPTION	R/W	User defined name
39	CONTACT(C08)_ZEROSTATE	R/W	User defined state string
40	CONTACT(C08)_ONESTATE	R/W	User defined state string
41	CONTACT(C09)	Read Only	Reports Boolean state string
42	CONTACT(C09)_SETTINGS	R/W	Can be ignored
43	CONTACT(C09)_DESCRIPTION	R/W	User defined name
44	CONTACT(C09)_ZEROSTATE	R/W	User defined state string

45	CONTACT(C09)_ONESTATE	R/W	User defined state string
46	CONTACT(C10)	Read Only	Reports Boolean state string
47	CONTACT(C10)_SETTINGS	R/W	Can be ignored
48	CONTACT(C10)_DESCRIPTION	R/W	User defined name
49	CONTACT(C10)_ZEROSTATE	R/W	User defined state string
50	CONTACT(C10)_ONESTATE	R/W	User defined state string
51	CONTACT(C11)	Read Only	Reports Boolean state string
52	CONTACT(C11)_SETTINGS	R/W	Can be ignored
53	CONTACT(C11)_DESCRIPTION	R/W	User defined name
54	CONTACT(C11)_ZEROSTATE	R/W	User defined state string
55	CONTACT(C11)_ONESTATE	R/W	User defined state string
56	CONTACT(C12)	Read Only	Reports Boolean state string
57	CONTACT(C12)_SETTINGS	R/W	Can be ignored
58	CONTACT(C12)_DESCRIPTION	R/W	User defined name
59	CONTACT(C12)_ZEROSTATE	R/W	User defined state string
60	CONTACT(C12)_ONESTATE	R/W	User defined state string
61	VOLTAGE(V01)	Read Only	Reports Boolean state string
62	VOLTAGE(V01)_SETTINGS	R/W	Can be ignored
63	VOLTAGE(V01)_DESCRIPTION	R/W	User defined name
64	VOLTAGE(V01)_ZEROSTATE	R/W	User defined state string
65	VOLTAGE(V01)_ONESTATE	R/W	User defined state string
66	VOLTAGE(V02)	Read Only	Reports Boolean state string
67	VOLTAGE(V02)_SETTINGS	R/W	Can be ignored
68	VOLTAGE(V02)_DESCRIPTION	R/W	User defined name
69	VOLTAGE(V02)_ZEROSTATE	R/W	User defined state string
70	VOLTAGE(V02)_ONESTATE	R/W	User defined state string
71	VOLTAGE(V03)	Read Only	Reports Boolean state string
72	VOLTAGE(V03)_SETTINGS	R/W	Can be ignored
73	VOLTAGE(V03)_DESCRIPTION	R/W	User defined name
74	VOLTAGE(V03)_ZEROSTATE	R/W	User defined state string
75	VOLTAGE(V03)_ONESTATE	R/W	User defined state string
76	PERIPHERAL_POWER	Read Only	PWR_OK or PWR_FAIL
77	RELAY(RL01)	R/W	Boolean state string
78	RELAY (RL01)_DESCRIPTION	R/W	User defined name
79	RELAY (RL01)_ZEROSTATE	R/W	User defined state string
80	RELAY (RL01)_ONESTATE	R/W	User defined state string
81	RELAY(RL02)	R/W	Boolean state string
82	RELAY (RL02)_DESCRIPTION	R/W	User defined name
83	RELAY (RL02)_ZEROSTATE	R/W	User defined state string
84	RELAY (RL02)_ONESTATE	R/W	User defined state string
85	COM_INTERFACES	Read Only	RS232 or ETHERNET
86	POWER_METHODS	Read Only	Port or external power
87	HASH_ID	R/W	A random number

## Making serial communication cables for SS6420J

In some applications it's not possible to use pre-assembled cables. When installing the Sensorsoft device at a remote location it may be necessary to run cables through walls, ceilings or conduits where connectors would get jammed. In this situation it makes sense to terminate the cables on-site using hand crimp tools. The following details will assist you in this process.



**NOTE** – The **SS6420J** (J-suffix) Sensorsoft Device has an RJ45 jack connector. It accepts a plug-in serial cable.

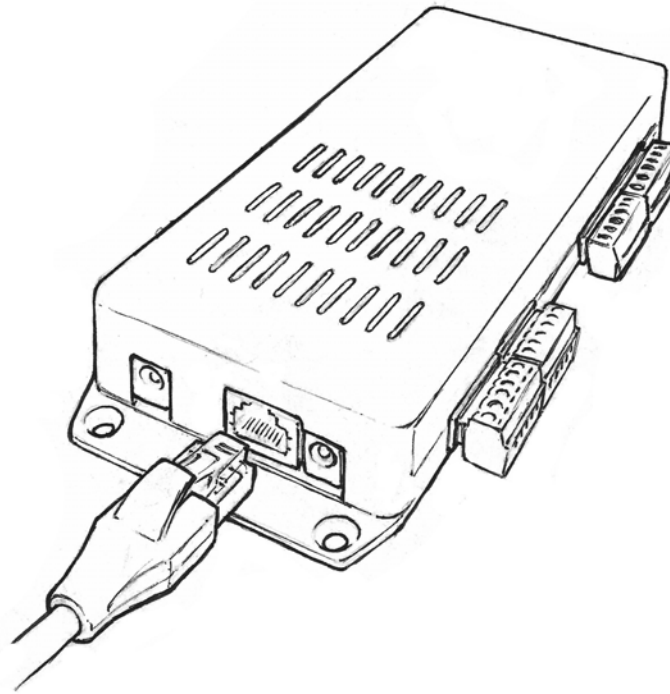


Figure 5: Illustrates a SS6420J (J-suffix) Sensorsoft device that accepts a serial cable with RJ-45 plug.



**IMPORTANT** - A properly made cable will allow your **SS6420J** Sensorsoft device to operate reliably over cable lengths up to 24 m (80 ft) using SSDP-compliant software.

You may connect the Sensorsoft device to the port with as little as three wires (RX, TX and GND), using inexpensive unshielded telephone wire. However, the host may need to set the number of retries high in order to overcome the effect of occasional noise/interference and would require the use of an external power supply (PA6106 or PA6206) at the Sensorsoft device.

The Sensorsoft device modular-jack connector uses the same UTP wire map as 10-BASE-T. It is therefore possible to use this type of cabling system for Sensorsoft devices.

**PIN-OUT OF THE MODULAR 8 POSITION JACK/PLUG ON A SENSORSOFT DEVICE**

Note: Terminal No. 1 is the terminal to the extreme left as you face the cable opening, latch tab down.

Terminal	Function	UTP wire color
1	Receive Data	white-green
2	Ground	green
3	Transmit Data	white-orange
4	Power +V	blue
5	Ground	white-blue
6	Ground	orange
7	Power +V	white-brown
8	Ground	brown

The following are specialized tools and parts needed to make good quality cables:

**Hand Tools:**

- Tyco Crimping Tool P/N 1-231652-0 or 2-231652-1, for modular plugs
- Tyco 8 position modular die set P/N 853400-1
- Tyco Crimping Tool P/N 90312-1 or 90302-1, for subminiature D pin or socket contacts
- Tyco PROCRIMPER P/N 58448-2, for subminiature D pin or socket contacts
- Tyco Insertion/Extraction Tool P/N 91285-1, for subminiature D connector contacts

**Materials:**

- CP Technologies CAT5E UTP stranded, P/N E-207-4P-C5-LGY, 1000 ft, light gray, RoHS (4 pair, 8-#24 AWG wires, category 4 or better, 75 C)
- Tyco 8 position modular plug for round stranded wire cables, P/N 5-554169-3 (CAT4)
- Tyco 8 position modular plug for round stranded wire cables, P/N 5-557961-3 (CAT5)
- Tyco DB-9 receptacle subminiature D connector (crimp-snap-in), P/N 205203-1 or -3
- Tyco DB-25 receptacle subminiature D connector (crimp-snap-in), P/N 205207-1 or 207463-1
- Tyco socket crimp contact for subminiature D connectors, P/N 1-66504-0
- Tyco pin crimp contact for subminiature D connectors, P/N 1-66506-0

### Sensorsoft Cable P/N C2000 DB9M Serial Port to Sensorsoft Device (SSD)

Serial Port - DB-9F			SSD - RJ45 plug	
3	TX	white-green	RX	1
2	RX	white-orange	TX	3
4	DTR	white-brown	POWER +V	7
7	RTS	blue	POWER +V	4
5	SIGNAL GND	green	GND	2

Figure 4: The C2000 cable is used to connect a J-suffix Sensorsoft device to most computers or devices that have a DB-9M serial port. The DB-9F end of the cable plugs into a DB-9M serial port. The RJ-45 end of cable plugs into the SSD. M indicates male/pin type connector. F indicates female/socket type connector.

### Sensorsoft Cable P/N C2012A DB25F DCE Serial Port to Sensorsoft Device (SSD)

DCE Port - DB25-M			SSD - RJ45 plug	
3	TX	white-green	RX	1
2	RX	white-orange	TX	3
6	DSR	white-brown	POWER +V	7
7	SIGNAL GND	green	GND	2

Figure 5: The C2012A cable is used to connect a J-suffix Sensorsoft device to multi-port serial cards or device servers (UDS1100, EDS1100) which have a DB-25F connector with DCE pin-out. The DB-25M end of the cable plugs into a DB-25F serial port. The RJ-45 end of cable plugs into the SSD. M indicates male/pin type connector. F indicates female/socket type connector.

## Getting Help

### Limited Warranty

Sensorsoft Corporation warrants Sensorsoft products to be free from manufacturing defects for a period of two years. This includes parts and labor. All shipping and brokerage fees are your responsibility when returning a Sensorsoft product for warranty claims. The following will void the warranty:

- signs of water or chemical damage
- cracks to the housing
- lightning or electrical storm damage
- signs of tampering or reverse engineering

### Technical Support

In the unlikely event you should have problems installing or using your Sensorsoft product and the previous sections of this manual have failed to provide a solution, we offer technical support to help you overcome your difficulties (see web site address below). Sensorsoft Corporation **does not** provide free support to those wishing to write their own software, although this is available on a charge-per-incident basis. Please contact our sales department for current rates.

**World Wide Web:**     <https://www.sensorsoft.com>

### 30 Day Money Back Guarantee

If for any reason you want to return a Sensorsoft product for a refund, you can do so within 30 days (calendar days) of your purchase. The refund does not include shipping or brokerage fees you may have incurred. Some exceptions may apply.

### Returns

If returning a product or item, please observe the following guidelines:

- Contact Sensorsoft for an RMA number (Return Material Authorization).
- Provide an explanation or reason for returning the product.
- Return shipments that bear no RMA number (on the outside of the package) or are not prepaid for shipping/clearing charges, will be refused.