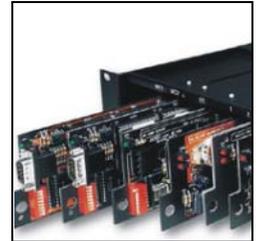




instruction manual

PCS and PCS2

Power Current Sensors



Control System Accessories

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Product Information

The Power Current Sensors (PCS) and Dual Power Current Sensors (PCS2) provide power current status for AMX equipment. Examples of such equipment are video projectors, monitors, audio receivers, and VCRs. The PCS and PCS2 detect the AC current drawn by the equipment plugged into its AC receptacle. You can adjust either the PCS or PCS2 to detect full on, full off, and standby power levels.

Specifications

The following tables list specifications for the PCS and PCS2.

PCS Specifications	
Dimensions	3.13" x 2.23" x 2.5" (79.5 mm x 56.6 mm x 63.5 mm)
Weight	4 oz. (114 g)
Enclosure	Plastic black matte finish
Power Requirement	12 VDC @ 20 mA minimum
Connectors	4-pin captive screw connector 3-prong, grounded, 120 VAC receptacle
Indicators	<ul style="list-style-type: none"> • Standby LED • On LED
Load Sensitivity	15 A 1800 W maximum (15 A @ 120 VAC maximum) 30 mA minimum

PCS2 Specifications	
Dimensions	1.51" x 5.55" x 5.45" (38.4 mm x 141.10 mm x 138.4 mm)
Weight	1 lb. 10.8 oz. (816 g)
Enclosure	Metal black matte finish
Power Requirement	120 VAC @ 250 mA minimum
Connectors	6-pin captive screw connector 3-prong, grounded, 120 VAC receptacle
Dry Closure Relay Outputs	0.5 A @ 120 VAC or 1 A @ 28 VDC
Indicators	<ul style="list-style-type: none"> • 2 Standby LEDs • 2 On LEDs • Power LED
Load Sensitivity	10 A 1200 W maximum (combined fuses) 20 mA 2.4 W minimum 120 W maximum

Installation

The PCS requires +12 VDC (+11 VDC to +17 VDC @ 20 mA minimum) for operation; the PCS2 is simply plugged into a 120 VAC three-hole wall outlet to obtain power.

PCS and PCS2 Installation

1. Provide +12 VDC power from the Central Controller or external power supply, and connect it to the port on the PCS. Refer to the *Wiring Guidelines* section on page 3 for more information.
2. Connect the STBY and ON outputs to the appropriate system inputs. Refer to the *Wiring Guidelines* section on page 3 for more detailed information.
3. Plug the unit into the PCS AC receptacle. The term *unit* refers to the piece of equipment the PCS or PCS2 is sensing for power status.
4. Plug the PCS into an AC outlet.

Rack mounting the PCS2

To rack mount the PCS2 using the optional AC-RK Accessory Rack Kit:

1. Remove any connected power and communication connectors from the rear panel.
2. Remove the two screws on the front panel of the PCS2.
3. Remove the front panel and the space bracket behind the panel.
4. Remove the rubber feet on the bottom of the unit, if necessary. Insert a scissors blade or other sharp object into the side of one of the rubber feet and pull it off. Do the same to remove the other three rubber feet.
5. Place the unit in the appropriate opening in the AC-RK.
6. Place the front panel of the PCS2 on the front of the rack over the unit and secure the front panel using the two screws removed in step 2.

Wiring Guidelines

The Wiring Specifications table lists wire sizes and the maximum lengths allowable between the PCS/PCS2 and the Central Controller. The maximum wiring lengths are based on a minimum of 13.5 volts available at the power supply output. The PCS/PCS2 requires a local +12 VDC power to operate properly. The maximum wiring distance between the power supply and PCS/PCS2 units are determined by power consumption, supplied voltage, and the wire gauge used for the cable.

To reduce the possible effects of ground loop noise in the video, use a single-source power supply mounted within distances specified in the following table.

Wiring Specifications	
Wire Size	Maximum Wiring Length
18 AWG	29.34 feet (8.94 meters)
20 AWG	18.56 feet (5.66 meters)
22 AWG	11.57 feet (3.53 meters)
24 AWG	7.30 feet (2.23 meters)



Do not connect power to the PCS/PCS2 until the wiring is complete.

Preparing captive wires

You will need a wire stripper and flat-blade screwdriver to prepare and connect the captive wires.



Never pre-tin wires for compression-type connections.

1. Strip 0.25 inch (6.35 mm) of insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section.
3. Turn the flat-head screws clockwise to secure the wire in the connector. Do not over-torque the screws; doing so can bend the seating pin and damage the connector.

PCS to AXC-INP8

Connect the PCS output ports to the AXC-INP8 input ports as shown in FIG. 1; follow the illustration for input 1 through input 8. Set the jumpers of the associated inputs on the AXC-INP8 (refer to the *AXC-INP8 Switch/Opto Voltage Input Card* instruction manual) to Switch mode. All Switch mode inputs and the CardFrame share common GND.

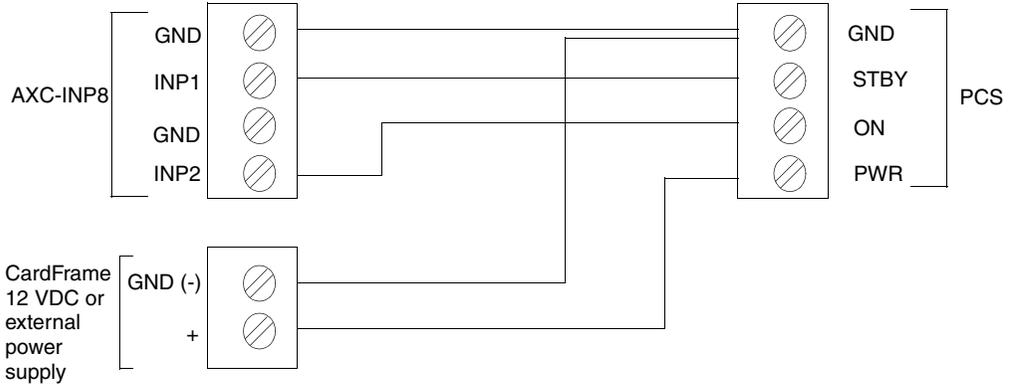


FIG. 1 PCS to AXC-INP8



If using a power supply that is independent of the CardFrame, an optional GND wire is necessary.

PCS2 to AXC-INP8

Connect the PCS2 output ports to the AXC-INP8 input ports, as illustrated in FIG. 2. Follow the illustration for Input 1 through Input 8. Set the jumpers of the associated inputs on the AXC-INP8 to Switch mode. All Switch mode inputs and the Card-Frame share common GND.

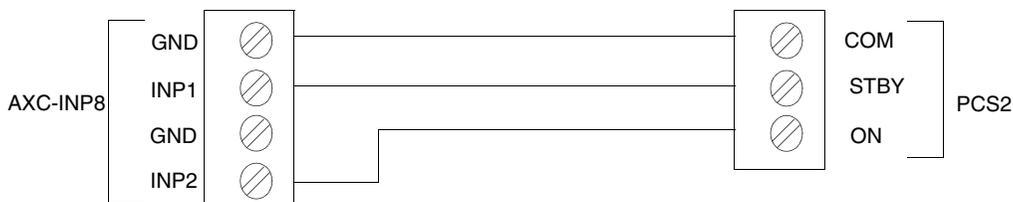


FIG. 2 PCS2 to AXC-INP8

PCS to Axcent, Axcent², or Axcent³

Connect the PCS output and power ports to the Axcent, Axcent², or Axcent³ input/output (I/O) ports, as illustrated in FIG. 3. Provide 12 VDC power from the Panja system power supply or an external power supply.

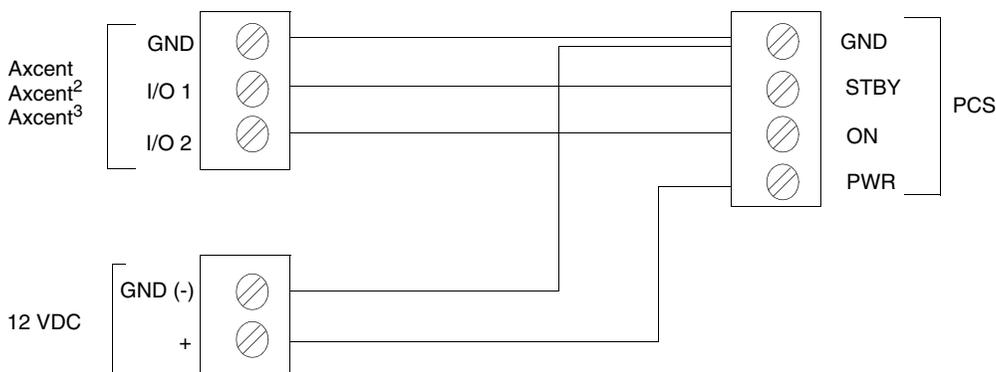


FIG. 3 PCS to Axcent, Axcent2, or Axcent3

PCS2 to Axcent, Axcent², or Axcent³

Connect the PCS2 output and power ports to the Axcent, Axcent², or Axcent³ input/output (I/O) ports, as illustrated in FIG. 4.

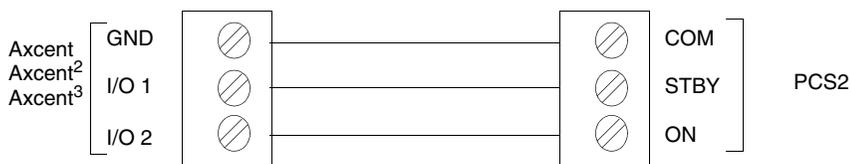


FIG. 4 PCS to Axcent, Axcent2, or Axcent3

PCS to Television Controllers

FIG. 5 illustrates the connections required for the PCS to television controllers.

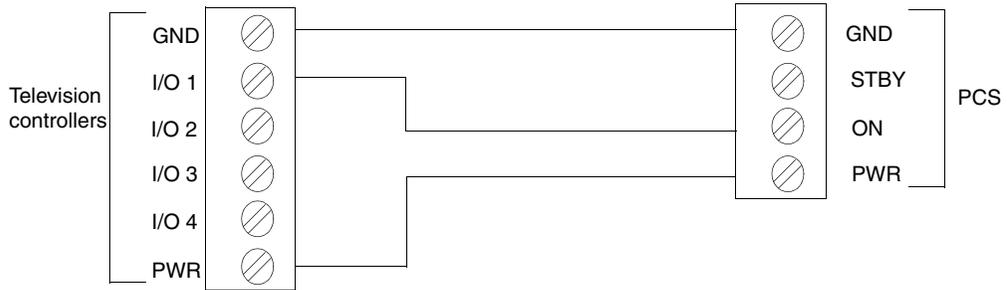


FIG. 5 PCS to television controllers

PCS2 to Television Controllers

FIG. 6 illustrates the connections between the PCS2 to television controllers.

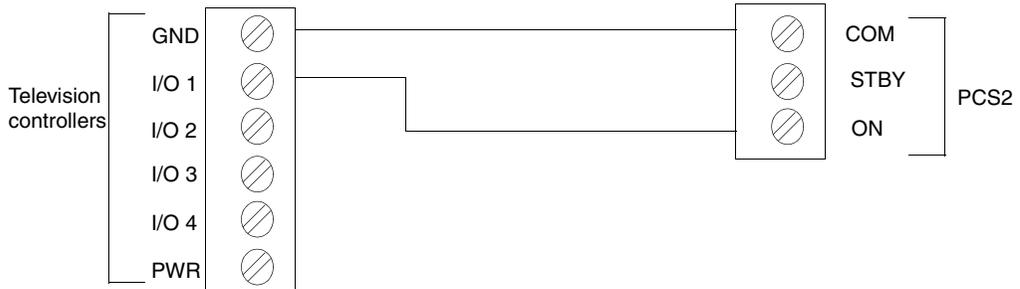


FIG. 6 PCS2 to television controllers

Calibration

The PCS and PCS2 work by setting a threshold. The STANDBY threshold is set between the current draw of the OFF state and that of the STANDBY state. The ON threshold is then set between the current draw of the STANDBY state and the ON state.

The PCS2 contains two major circuits, each independent of each other. Each of these major circuits contains two sub-circuits, the ON and STANDBY circuits. The following paragraphs will address the sub-circuits for each major circuit of the PCS2.

PCS

The state status for the PCS is:

- STANDBY senses when the current is at or below standby threshold. The LED lights and relay switch output is closed when below ON.
- ON senses when current is at or above ON threshold. The LED lights and relay switch output is closed when above ON.
- The circuit (both the ON and STANDBY) can differentiate between 20 mA and 1 A. Anything above 1 A is sensed as 1 A, regardless if it is 2 A, 6 A, or 10 A.

PCS2

The PCS2 has an inline 10 A fuse for protection. This will allow one, or both major circuits to draw a maximum of 10 A (1,200 W) total.

The state status for each of the major circuits of the PCS2 is:

- STANDBY is lit when the sensed current level is above STANDBY threshold.
- STANDBY remains lit (regardless of its setting) when the ON LED lights.
- ON is lit when current is above the ON threshold.
- The circuit (both the ON and STANDBY) can differentiate between 20 mA and 1 A. Anything above 1 A is sensed as 1 A, regardless if it is 2 A, 6 A, or 10 A.
- It is not logical for ON to light before STANDBY. As a result, the circuit is de-signed so that if the ON is lit, the STANDBY will also be lit, regardless of its setting.

When extreme accuracy is required for calibration, it is best to plug the PCS or PCS2 into a wall outlet at least 15 minutes before calibration to allow the circuitry to warm up. Calibration of the PCS and PCS2 must be accomplished prior to use. Calibration of the PCS and PCS2 is accomplished as follows:

PCS Calibration

In the PCS, the ON state is dependent of the STANDBY mode but the STANDBY mode is not dependent on the ON mode. They work together to provide a final level, where the Standby power level provides a base and the ON level is an increment to that level. FIG. 7 illustrates the relationship that the STANDBY and ON power levels have with each other in determining the final power level.

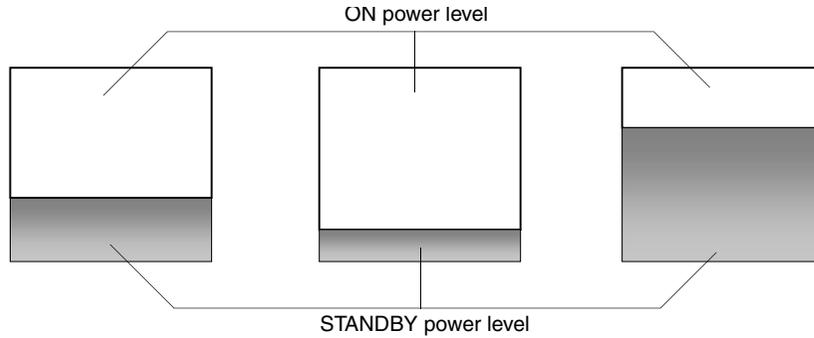


FIG. 7 Standby and On level relationship

If the unit has both STANDBY and ON states, follow these steps:



If the unit only has an ON state, or if the PCS is sensing the ON state, perform step 1. If you are using only the STANDBY mode, focus on steps 3 and 4.

1. Turn the STANDBY and ON potentiometers (POTs) clockwise until they stop.
2. Plug the PCS into an outlet and plug the unit (the device you are monitoring) into the PCS. This power provides the unit with power. There are three power conditions that most units exhibit: ON, Standby, and OFF.
3. Plug an cable from the PCS to a Central Controller to provide power to the PCS unit.
4. Set the unit to the desired STANDBY power mode. This is obtained by plugging the device into an electrical port and not turning the power switch/button ON.
5. Turn the STANDBY POT counterclockwise until the status LED turns off. Then, turn it slowly clockwise until the LED turns on.
6. Set the unit (device being monitored) to the ON state.
7. If the STANDBY LED stays on, turn the ON POT counterclockwise until:
 - The ON LED turns on.
 - The STANDBY LED turns off.
8. Set the unit to the Standby mode.
9. If the ON LED stays on, turn the STANDBY POT counterclockwise until:
 - The ON LED turns off.
 - The STANDBY LED turns on.
10. Repeat steps 5 through 9 to calibrate the PCS.

PCS2 Calibration

When extreme accuracy is required for calibration, allow the PCS2 to warm up for a minimum of 15 minutes before calibration. The following procedures are used for both circuit 1 and circuit 2. Calibrate each circuit independently.

If the device only has an ON state, either STANDBY or ON can be used in the following steps.

1. Plug the PCS2 into a power source.
2. Connect the device.
3. Turn both POTS all the way counter clockwise. At a maximum, this is 20 full turns. The stop (end) can be detected by a subtle clicking sound and feel.
4. Set the device to the STANDBY power mode and wait 2-seconds. STANDBY power mode is obtained by plugging the unit into an electrical port and *not* turning the power switch ON.
5. Turn the PCS2 STANDBY POT clockwise until the STANDBY LED lights.
6. Slowly turn the POT counterclockwise until the LED goes out. Then, very slowly turn the POT clockwise until the LED lights. The "turn-on-threshold" has just been determined. It is best not to set precisely on this threshold, so turn the POT a fraction more clockwise. This fractional extra turn can be a bit larger for higher power devices and may be almost negligible for very low power devices.
7. Turn the devices off and wait 2 seconds.



Because of hysteresis (the analog circuit components time for changing states) the turn-on and turn-off thresholds will not be exactly the same.

8. If the LED is still on, repeat steps 6 through 8 until the LED is not on when the device is turned off.
9. Perform steps 1 through 8 for the ON circuit level.
10. Repeat steps 1 through 9 for the second PCS2 circuit's STANDBY and ON circuit levels.

Operation and Programming

PCS Operation

When properly calibrated, the PCS senses current levels from sources that have one or two levels of power consumption. The STANDBY LED is on when the following occurs:

- The PCS is sensing the lower level of current (as low as 30 mA, or 4W at 120 VAC).
- The STANDBY output is low.

The STANDBY and ON outputs are mutually exclusive. You can adjust the PCS to sense differences in STANDBY and ON current level as low as 30 mA. The ON LED is on when the PCS senses the higher operating level of current (up to 15A). If the source is completely off, neither LED is ON.

PCS2 Operation

When properly calibrated, the PCS2 senses current levels from connected sources that have one or two levels of power consumption. The PCS2 STANDBY LED is ON when the following occurs:

- STANDBY is lit when the sensed current level is above STANDBY threshold.
- STANDBY remains lit (regardless of its setting) when the ON LED lights.
- STANDBY threshold cannot be set less sensitive than ON threshold.

This requires that the STANDBY circuitry be calibrated for levels between 20 mA and 1 A in order to differentiate when a connected unit is in a STANDBY or ON mode.

- ON is lit when current is above the ON threshold.
- The circuit (both the ON and STANDBY) can differentiate between 20 mA and 1 A. Anything above 1 A is sensed as 1 A, regardless if it is 2 A, 6 A, or 10 A (LED ON = output switch closed).
- It is not logical for ON to light before STANDBY. As a result, the circuit is designed so that if ON lights, the STANDBY will light, regardless of its setting.

PCS2 considerations

When connecting a unit/system to the PCS2, be aware that a one or two second PCS2 circuitry stabilization consideration must be accounted for.

During transitions between states, the PCS2 may take 1 to 2 seconds to stabilize and its initial output indication may be incorrect. Failure to account for this possible delay may cause the Axxess or Axxent² system to repeatedly cycle power on the unit being sensed.

Programming

When properly calibrated, the PCS and PCS2 sense current levels from sources that have one or two levels of power consumption.

PCS Programming

When programming actions based on the state of the PCS, include the following:

- A one- or two-second delay.
- Verification of status changes.

During transitions between states, the PCS may take 1 to 2 seconds to stabilize and its output indication may be incorrect. Failure to observe this delay may cause the Axxcess, Axcent², or Axcent³ system to repeatedly cycle power on the unit being sensed.

PCS2 Programming

When connecting a unit/system to the PCS2, be aware that a 1 or 2 second PCS2 circuitry stabilization consideration must be accounted for.

During transitions between states, the PCS2 may take 1 to 2 seconds to stabilize and its initial output indication may be incorrect. Failure to account for this possible de-lay may cause the Axxcess, Axcent², or Axcent³ system to repeatedly cycle power on the unit being sensed.



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