GCS
Global Control Solutions

Basyx PSC2
Programmable System Controller

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Warning (For your Safety)

All electrical connections must be in agreement with local codes, ordinances or the National Electric Code (NEC).

Do not install in areas that experience high levels of electrical interference, moisture or exposure to water.

BEFORE INSTALLING

Check contents for any sign of damage. If the PSC2 is damaged in any way, contact the dealer or seller immediately.

The Basyx PSC2 has mounting holes with standoffs for #8 screws, and may be installed in a NEMA type enclosure, equipment control section or other NEC approved enclosure.
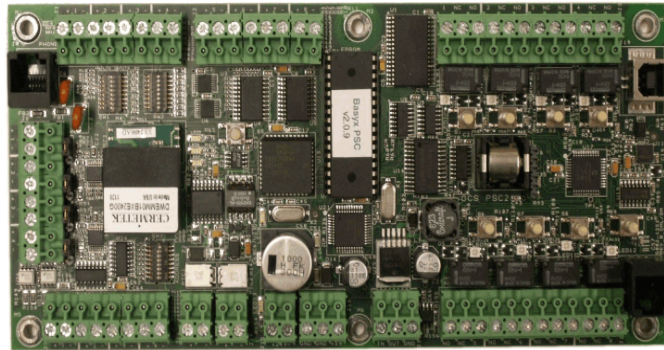
Figure 1:   Basyx PSC2 Universal Controller

The PSC2 controller is designed for use on new construction projects or retrofit of existing HVAC equipment or lighting systems. The PSC2 is ideal for control of air handlers, chillers, boilers and lighting control and is a stand-alone unit which contains all logic and algorithms for complete control of selected equipment.

Contact Global Control Solutions or your local dealer/distributor if unsure about the compatibility of any existing equipment or application.

NOTE: For descriptive purposes, all references to location of components on the board described herein are based on the board positioned as shown in Figure 1 and Figure 2.

PSC2 BOARD LAYOUT
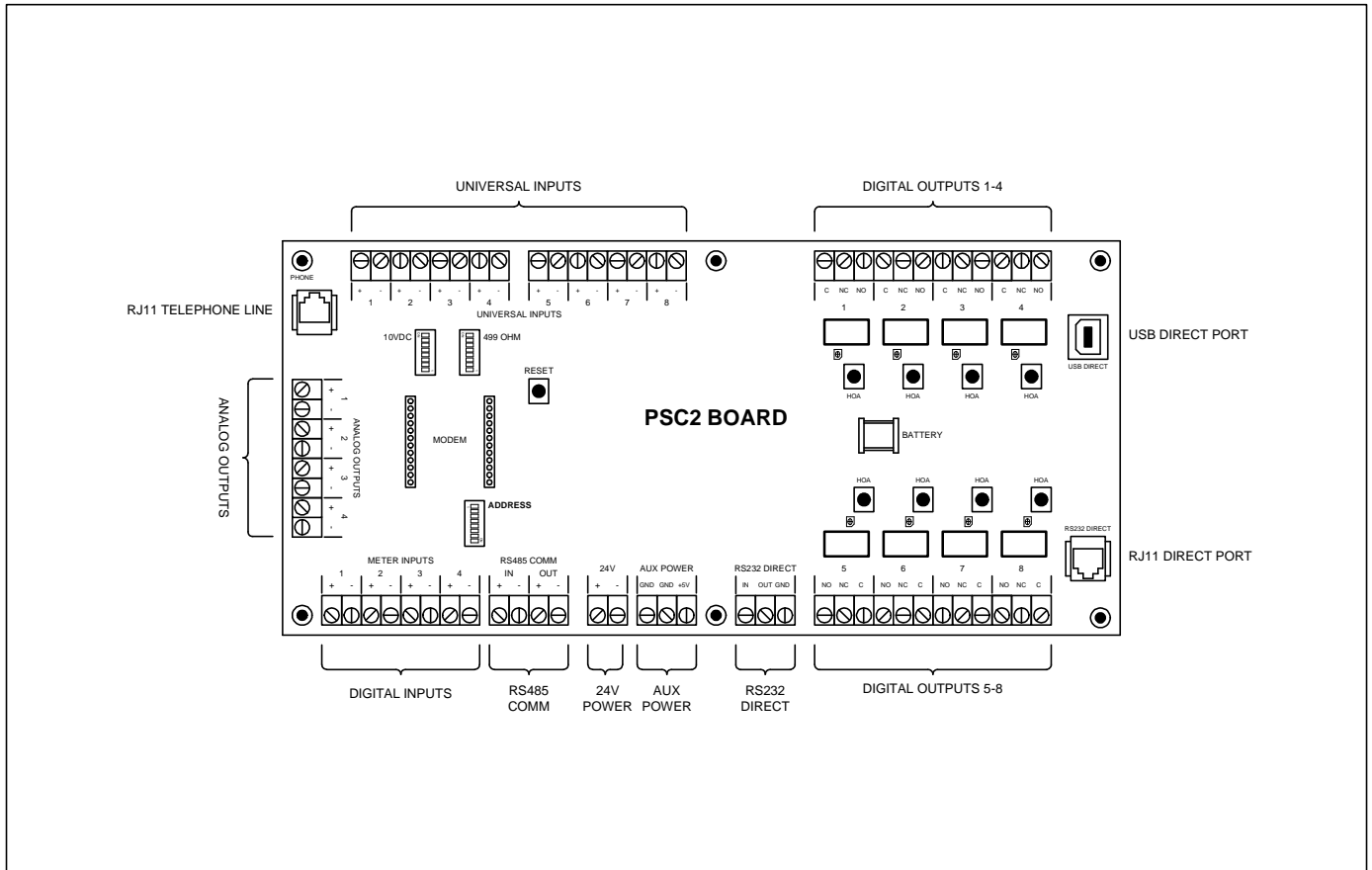
Figure 2: PSC2 Board Layout

The PSC2 controller contains eight (8) universal inputs, eight (8) digital outputs with SPDT relays and HOA buttons, four (4) digital/meter inputs and four (4) 0-10vdc or 4-20ma outputs.

An optional plug-on modem allows access from remote locations.

The board provides 5vdc 1 amp auxiliary power connection for the Basyx IPM Internet Module or other 5vdc device. DIP switches control the pull-up resistor circuit for low impedence voltage sensors, and provide a 499 ohm resistor for current sensors, eliminating the need to physically install parallel resistors across the inputs.

The board also has one (1) USB direct connect port, one (1) RJ11 direct connect port and one (1) RJ11 telephone line port when using the optional plug-on modem.

MOUNTING THE CONTROLLER

The PSC2 must be mounted in a relatively clean environment, free from major airborne dust and contaminants (moisture, oil, etc). Keep the PSC2 away from high voltage equipment that might disrupt communications and away from high vibration equipment. Do not mount the unit near any sources of electromagnetic interference (EMI) or flammable vapors.

Mount the PSC2 by inserting #8x3/4" self-tapping screw through the six (6) mounting holes in the board. Make sure that the screws are tightened sufficiently to hold the board, but do not over-tighten.

The Basyx PSC2 may be mounted in any orientation, and mounting should be such that there is easy access to the wiring terminals.
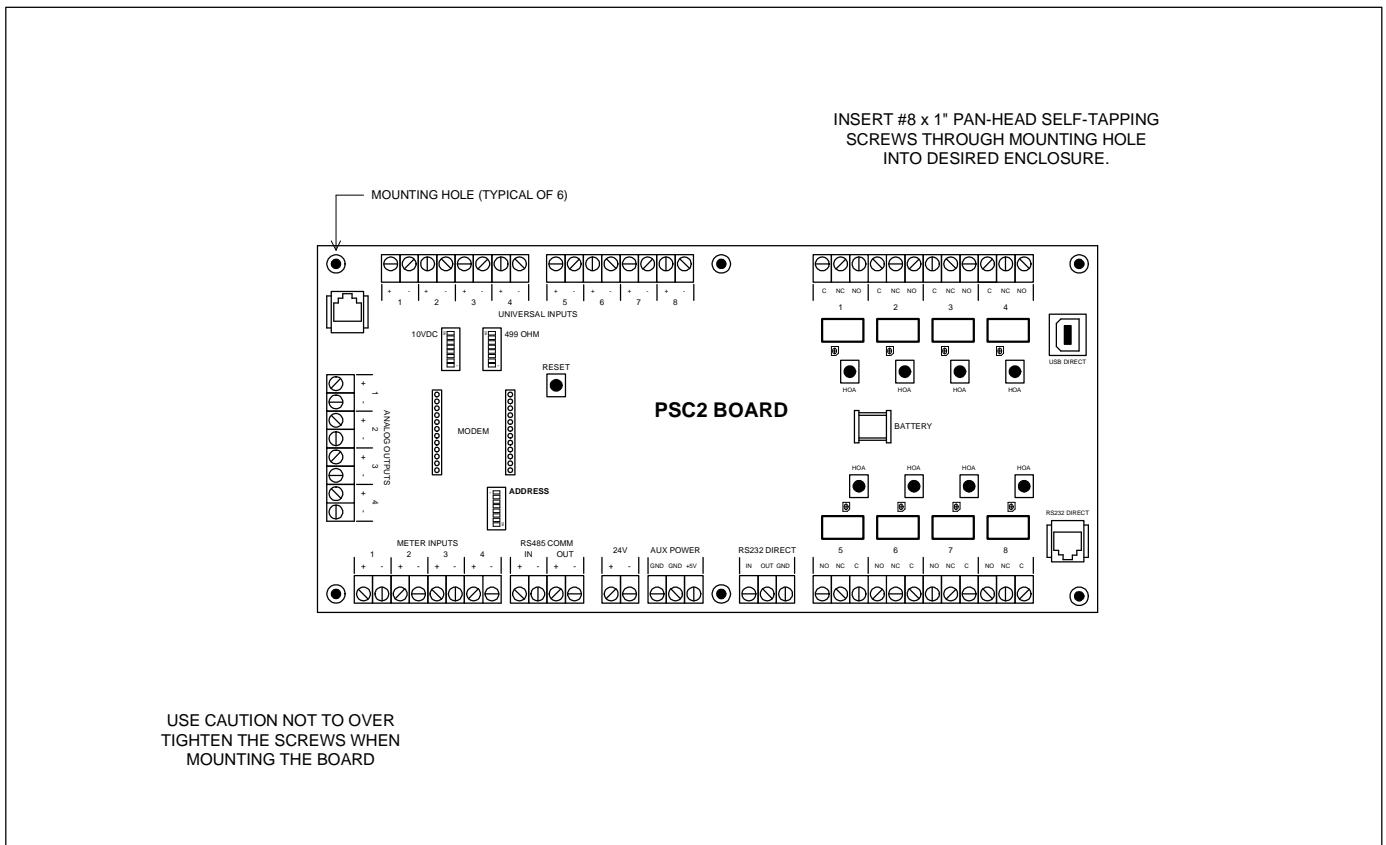

Figure 3: PSC2 Mounting

Figure 3 shows the mounting method for the PSC2 controller.

CONNECTING THE POWER

The PSC2 must be powered by a 24VAC Class 2 transformer or 24VDC power supply. To connect the power wiring to the PSC2 board, locate the terminals along the bottom edge of the board marked "+24V-" and connect to the power source. **Figure 4** illustrates the PSC2 showing the location of the 24V terminal Block.

NOTE: For 24 VAC power, use only power supplies with a Class 2 transformer rating. Multiple PSC2 controllers may be powered from a single transformer. Use 7VA for transformer sizing when designing power configurations.

Do not power with any voltage other than the 24VAC/VDC low voltage listed. Connect power to the PSC2 by connecting wires from the transformer or power supply to the 24V terminals + and -. The terminals are labeled on the board below the terminal strip. The red indicator LED left of the terminal strip will illuminate when the power is properly connected and turned on.

For connections to the PSC2, strip the wire back approximately 3/16" and insert into the terminal block. Back out the screw on the terminal block until the bare wire inserts fully, and turn the screw back down until there is firm tension on the wire. Make sure that the clamp secures the stripped portion of the wire, and that no insulation is under the clamp.
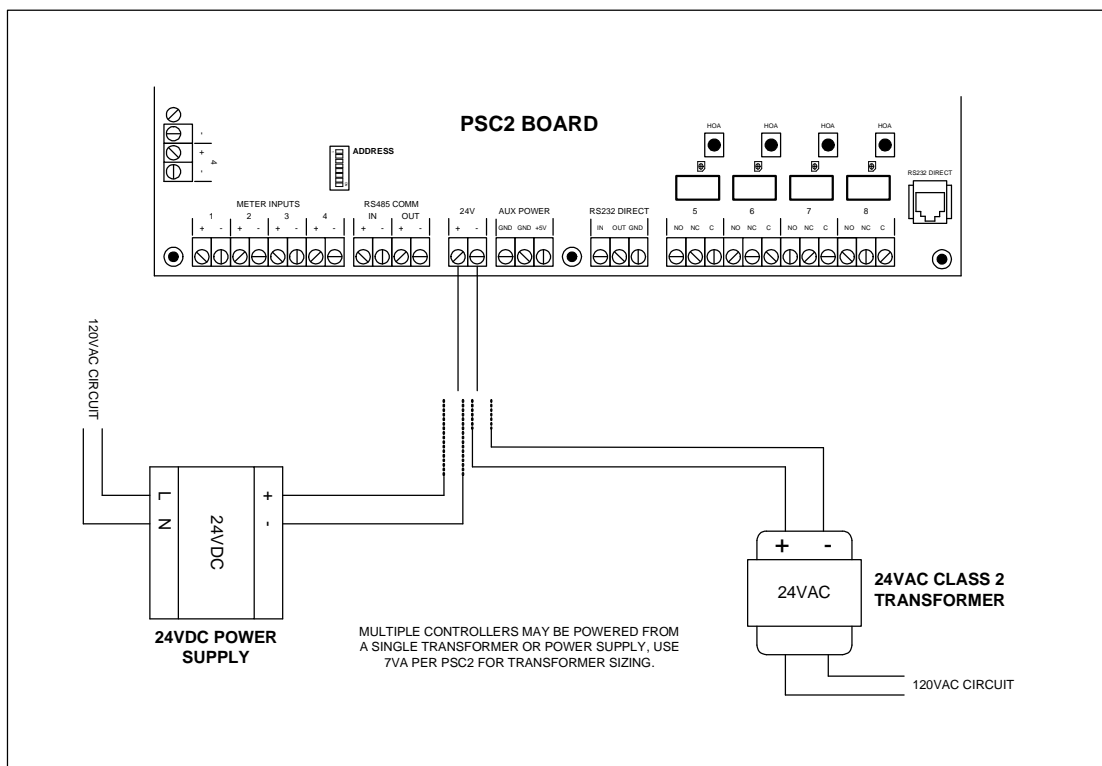

Figure 4: Basyx PSC2 Power Connections

COMMUNICATIONS BUS WIRING

The Basyx PSC2 can be used in a stand alone configuration or in an array utilizing hundreds of units. Multiple non-addressed channels or loops may be used for physical separation of channels (See **Figure 5**) in order to eliminate a continuous loop in a large or multi-story building. The BASYX system will support a total controller count of 256 PSC2, PSC or VAV controllers.

All communication wiring must be a 1 pair, shielded cable (See **Figures 5 & 6**). Use 18-22 AWG twisted pair, stranded, shielded, plenum rated cable for all communications wiring. When connecting a channel of controllers from an IPR repeater, connect communications in a daisy chain configuration.

Communication is via EIA RS-485 protocol. This requires that the system be wired according to the following methods and rules:

- Communications cable must be 1 twisted pair 18-22 AWG, stranded plenum rated.
- The total distance of any channel or loop must not exceed 4000 feet.
- The drain wire of the communication cable must **NOT** be connected to the PSC2 or VAV controller. Twist drain wires from the incoming and outgoing cables together to create single shield for the entire daisy chain, and connect to ground at one end only (suggest the IPR or first controller location).
- Each controller in the system must have a unique address, regardless of configuration of channel. Refer to the instructions in the next section for setting the Device Address (ADDR) dip switch.

Connect the communications wiring to the terminal blocks on the edge of the PSC2 controller marked + and - as shown in **Figure 6**.

CAUTION: All communication wiring must be connected such that the plus (+) terminal is wired to a plus terminal and the minus terminal (-) is wired to a minus terminal. Do not install communications cables near power cables or in power conduits. Isolate all communications wiring from large motors, fluorescent lighting fixtures or other sources of high intensity electromagnetic interference (EMI).
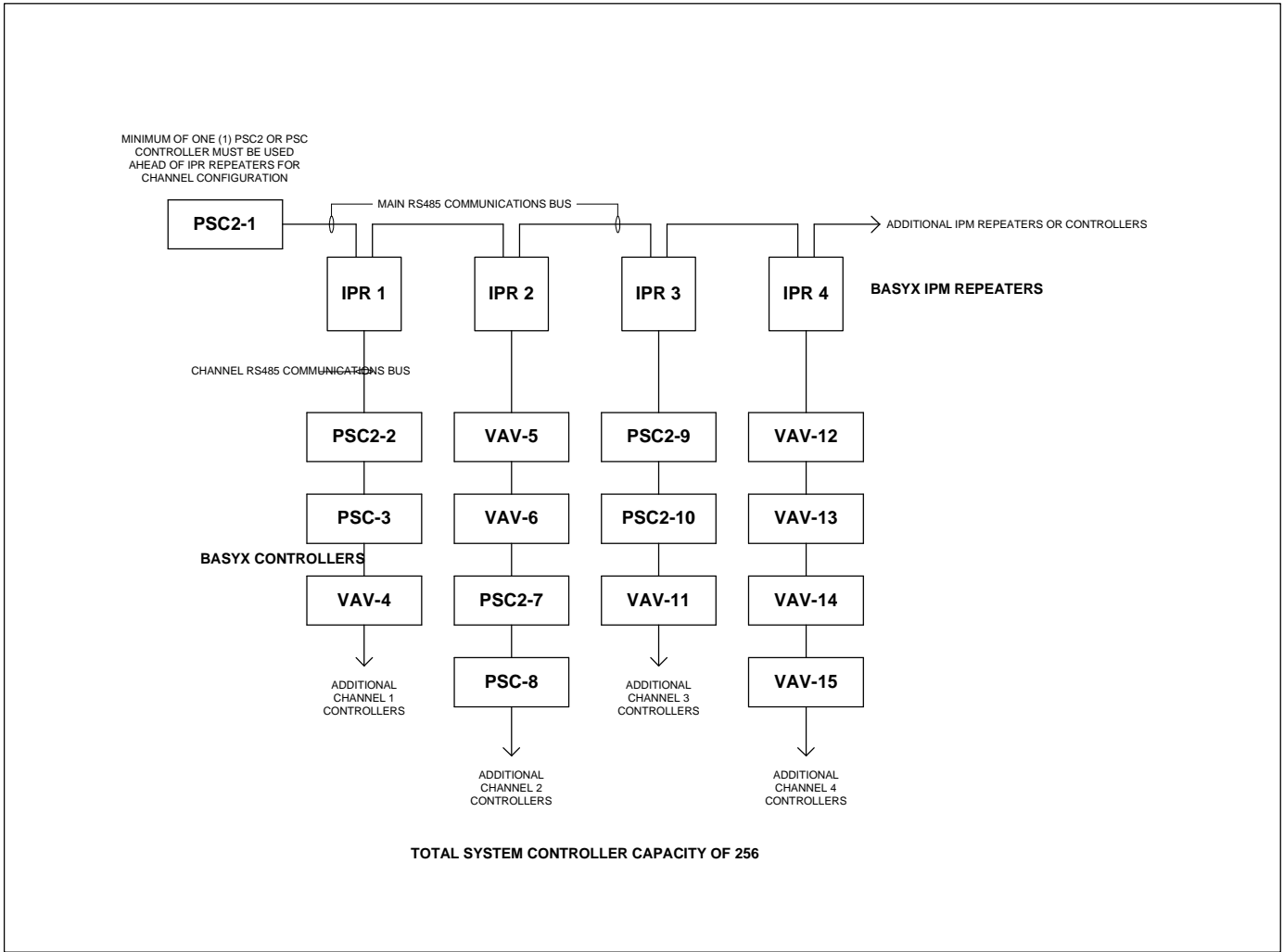

Figure 5: Basyx Typical Communications Loop Configuration

As shown, communications loops may contain any mixture of Basyx controllers. Each controller must have a unique address setting for proper operation.

A single loop containing a minimum of one (1) PSC2 or PSC and up to 31 additional PSC2, PSC or VAV controllers may be used.
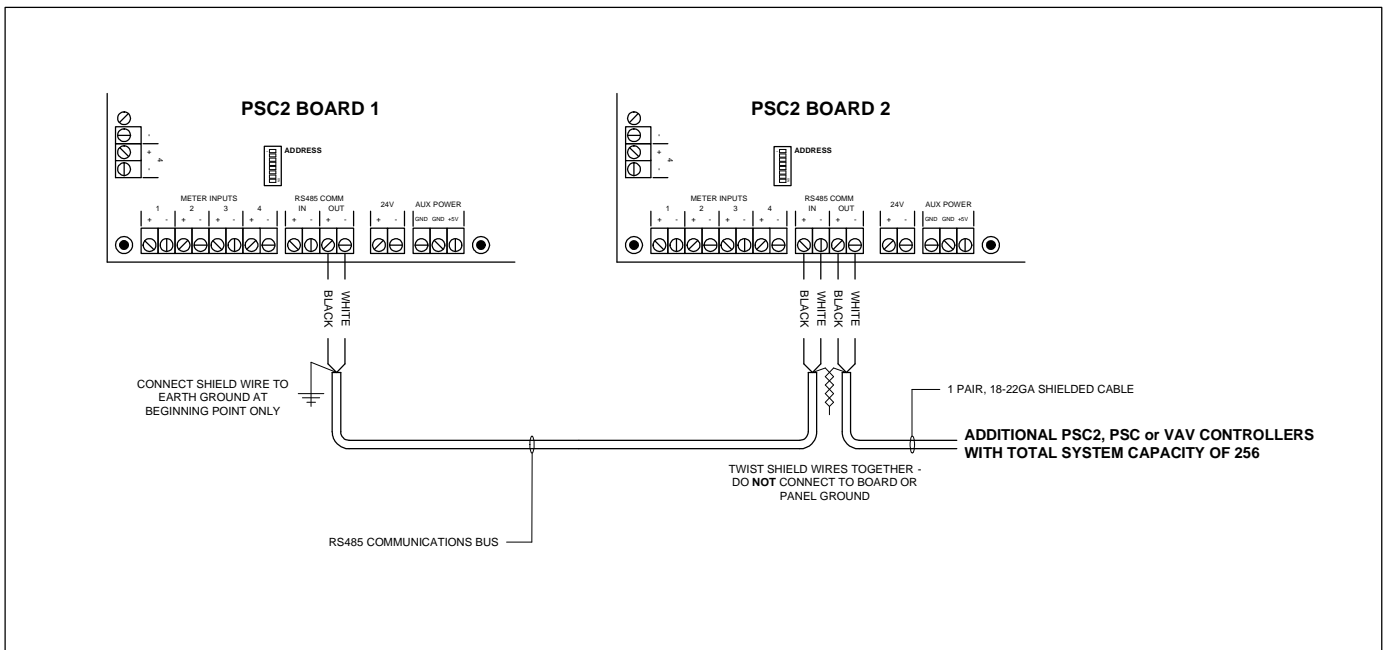
Figure 6: Typical PSC2 Communications Connection Details

SETTING THE DEVICE ADDRESS

If the PSC2 is used as a stand alone controller make sure that the address is set to #1.

If more than one PSC2 is used each device must have a different address for proper communication. The address switch is located above and to the left of the RS485 terminal strips, below the modem socket. Refer to **Appendix 1** for setting the device address to a number between 1 and 256. The communication address for each device must be unique.

NOTE: Do not skip addresses in a daisy chain; begin at 1 and count up. The boards do not have to be in consecutive order, however all addresses must be included.

To set the address, refer to appendix 1 and push any of the eight (8) switches required RIGHT (towards center of the board) to set to ON.

CONNECTING THE UNIVERSAL INPUTS

The Basyx PSC2 provides eight (8) universal inputs which may be used for thermistors, resistance, 0-10VDC, 4-20MA or digital contact closures. Typical applications include temperature, humidity, pressure and other analog or digital devices.

All input cables should be 18 AWG, and must consist of stranded, twisted pairs (as required), shielded type with less than 20 pF capacitance per foot.

NOTE: Connect all sensor cable drain wires to earth ground.

CAUTION: Do not run sensor wires near power cables or in power conduits. Isolate all sensor wires from large contactors or motors, fluorescent light fixtures and other sources of high intensity electromagnetic interference (EMI).

SETTING THE INPUT DIP SWITCHES

The PSC2 contains two eight (8) position DIP switches below the universal input 1-4 terminal strip.

The switches are numbered 1-8 bottom to top, and correspond to the input used i.e. switch 1 = input 1, switch 2 = input 2 etc. **Figure 7** illustrates the location of the universal input DIP switches.
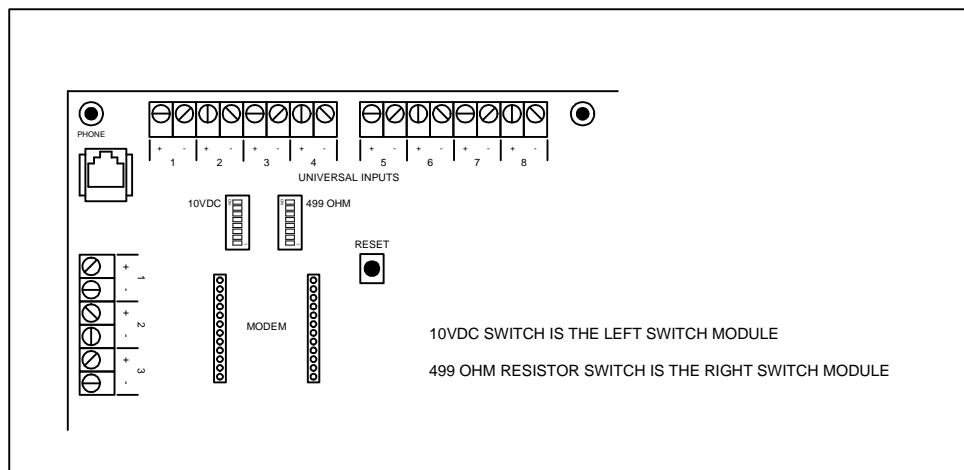
Figure 7:   Universal Input DIP Switches

The 0-10VDC set of switches (left switch module) sets the status of the 0-10vdc excitation voltage for the input. The switch is factory set to ON, and will normally remain ON for most input devices. If using a self-generating 0-10vdc device which does not require excitation voltage, slide the switch right (OFF) to disengage the reference voltage. **Figure 8** illustrates the operation of the 0-10VDC universal input DIP switches.

TO DISABLE THE 10VDC EXCITATION VOLTAGE, PUSH THE SWITCH RIGHT (OFF). THIS APPLIES TO SELF-GENERATING VOLTAGE INPUT DEVICES ONLY.
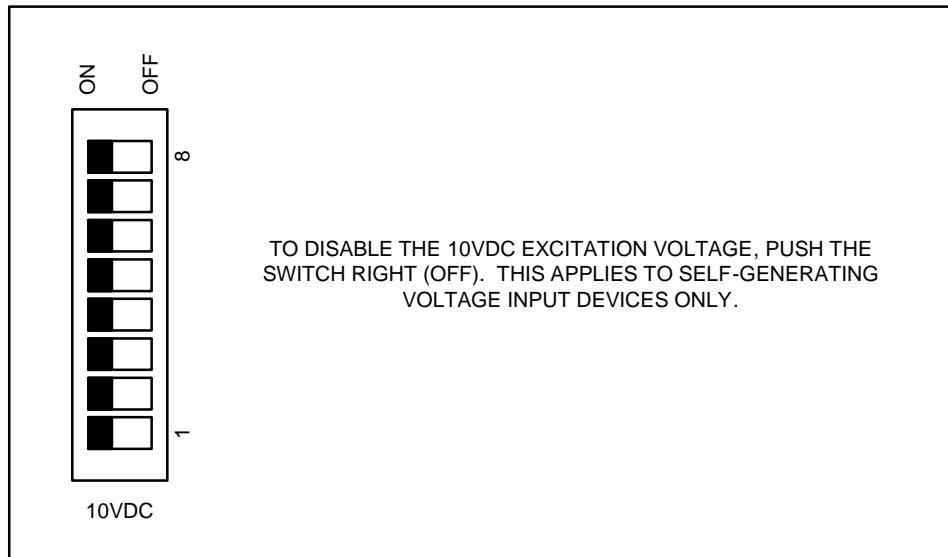
Figure 8: Universal Input 0-10VDC Dip Switch Operation

The 499 OHM set of switches (right switch module) inserts a 499 ohm resistor across a corresponding input, and is used with a 4-20ma sensor only. This switch eliminates the need to physically install a resistor across the input terminals. Slide switch right (ON) to install this resistor. **Figure 9** shows the settings for the 499 OHM switches.

TO INSERT THE 499 OHM RESISTOR INTO THE CIRCUIT, PUSH THE DIP SWITCH LEFT (ON). THIS APPLIES TO 4-20mA INPUTS ONLY, OTHERWISE LEAVE SWITCH OFF.

Figure 9: Universal Input 499 OHM Dip Switch Operation

CONNECTING A TEMPERATURE SENSOR (THERMISTOR)

Temperature sensors are typically type II thermistors, and are available from a variety of suppliers. Make sure that type II sensors are used to insure proper temperature monitoring and control.

Thermistors are not polarity sensitive, and cannot be connected backwards. It is recommended that any color coding pertaining to the + and - connections on the board be consistent within the system. The 0-10VDC DIP switch as outlined above must be set to **ON**, and the 499 OHM switch must be be set to **OFF**.

Figure 10 indicates a typical thermistor connection, and shows a duct temperature sensor installation.
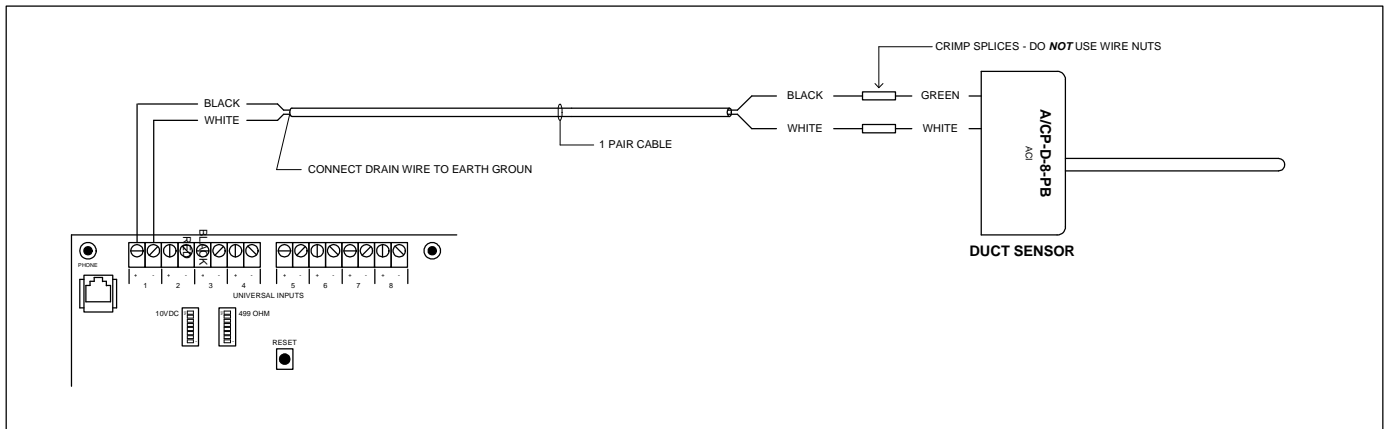
Figure 10: Typical Thermistor (Temperature) Connection

CONNECTING A VOLTAGE SENSOR

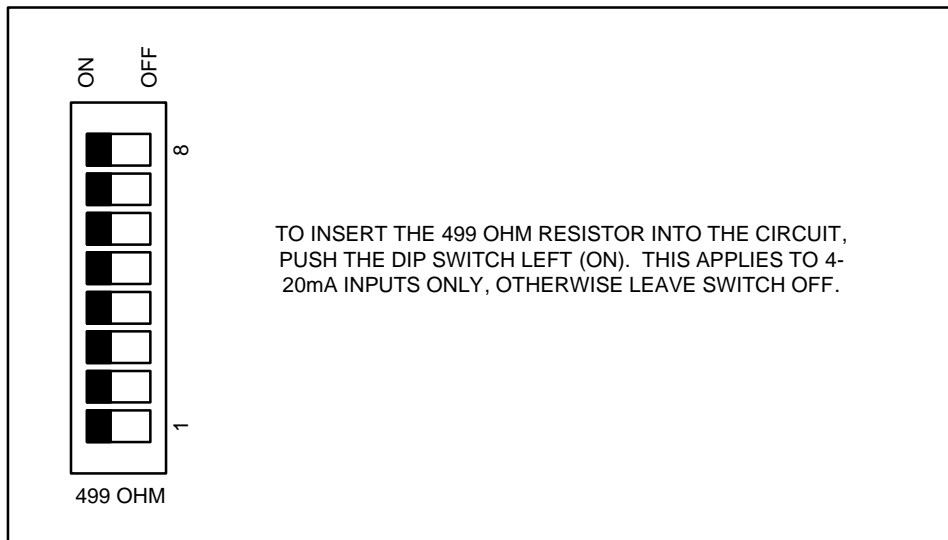The PSC2 can accept any 0-10VDC or 0-5VDC sensor input, and typical applications include humidity, pressure or other analog type sensors. The sensor is powered by an external 24VDC power supply, and the 0-10VDC DIP switch as outlined above will set to **ON**, and the 499 OHM switch will be set to **OFF**.

Figure 11 illustrates a voltage sensor powered by an external source, and shows a typical duct pressure differential sensor.

NOTE: Voltage sensors normally require 3 wires for proper connection. The specific manufacturers labeling may vary from that shown on the typical drawings. It is imperative that the power and signal wires be connected properly, or serious damage to the PSC2 board may occur. Refer to your device installation instructions for exact wiring and termination labeling.

Figure 11: Voltage Input Wiring Using External Power Source

CONNECTING A CURRENT SENSOR

The PSC2 can accept any 4-20mA sensor input, and typical applications include humidity, pressure or other analog type sensors. The sensor is powered by an external 24VDC power supply and the 0-10VDC DIP switch as outlined above must be set to **ON**, and the 499 OHM switch must be be set to **ON**.

Figure 12 illustrates a current sensor powered by an external source, and shows a typical room humidity sensor.

NOTE: Current sensors typically require 2 wires for proper connection. The specific manufacturers labeling may vary from that shown on the typical drawings. It is important that the power and signal wires be connected properly, or serious damage to the PSC2 controller may occur. Refer to your sensor installation instructions for exact wiring and termination labeling.
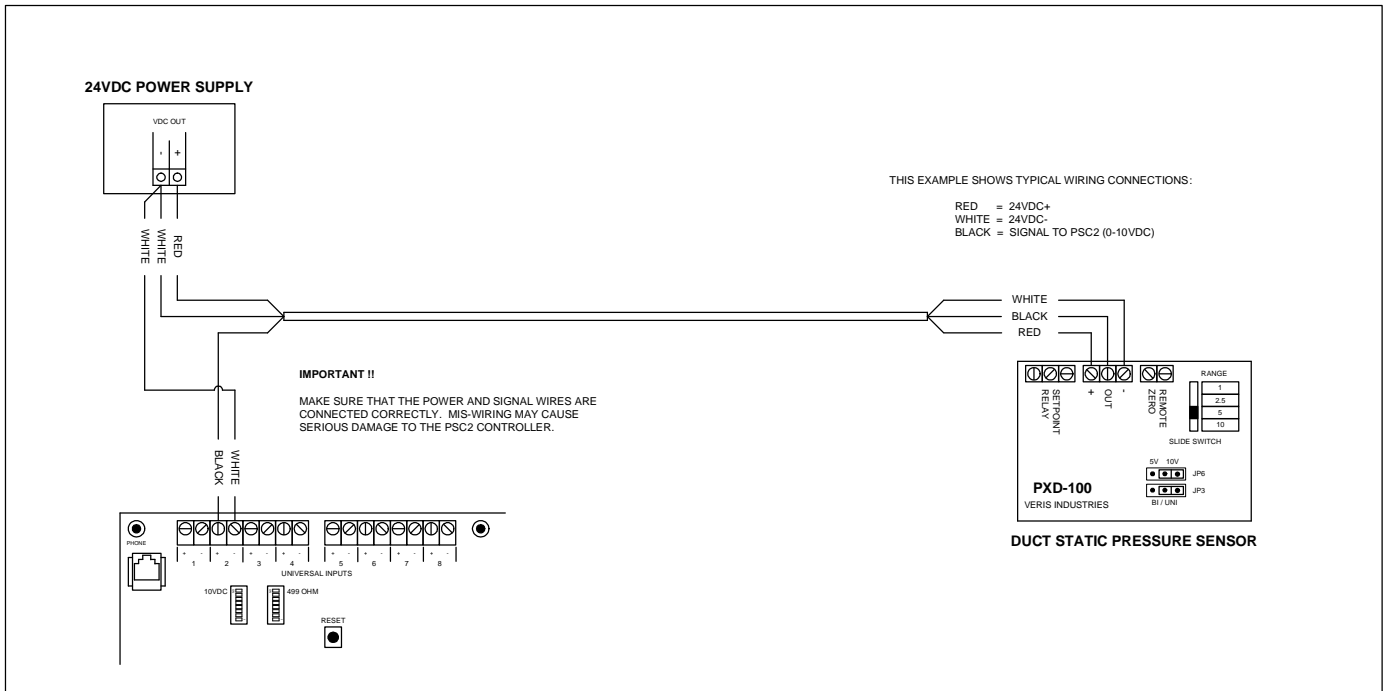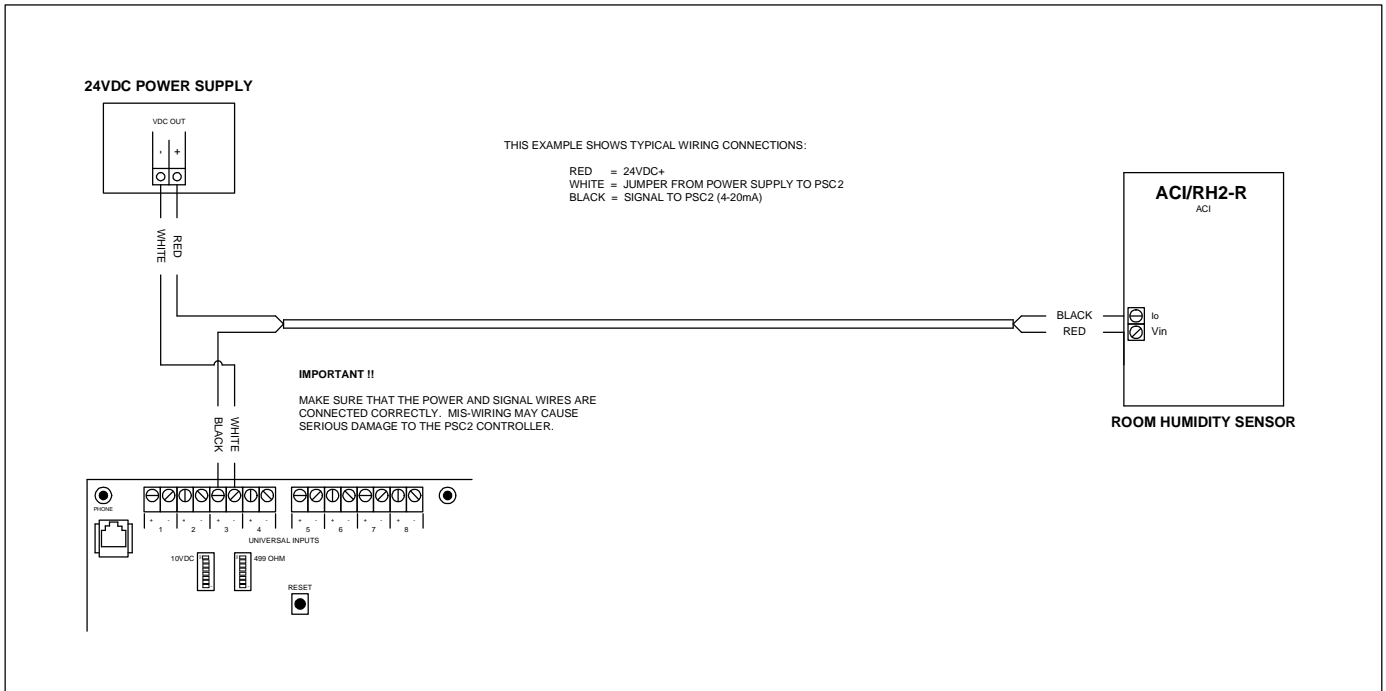

Figure 12: Current Input Wiring Using External Power Source

CONNECTING A DIGITAL DEVICE

Digital inputs connected to the universal inputs are 2 position status points only, and will not accumulate closures or pulse counts. If using an electric or flow type pulse meter, use the METER input connections as described in the next section.

Digital inputs are used for binary indication (on/off) of a toggle switch, pressure differential switch, current switch, flow switch or other 2 position contact closure. Make sure that the contact is a dry closure, and that no external voltage is applied through this circuit. Digital inputs are not polarity sensitive, and can not be connected backwards. It is recommended that any color coding pertaining to the + and - connections on the board are consistent within the system. The 0-10VDC DIP switch as outlined above must be set to **ON**, and the 499 OHM switch must be set to **OFF**.

CONNECTING THE METER INPUTS

The Basyx PSC2 provides four (4) meter inputs which may be used for electric, flow or other pulse generating digital devices used for consumption monitoring. These inputs are also ideal for connection of override switches or momentary contact pushbuttons. These inputs are also used for current switches, flow switches and other status type indication.

All input cables should be 18 AWG, and must consist of stranded, twisted pairs (as required), shielded type with less than 20 pF capacitance per foot.

NOTE: Connect all the input cable drain wires to earth ground.

CAUTION: Do not run meter input wires near power cables or in power conduits. Isolate all input wires from large contactors or motors, fluorescent light fixtures and other sources of high intensity electromagnetic interference (EMI).

Make sure that the contact is a dry closure, and that no external voltage is applied through this circuit. Digital inputs are not polarity sensitive, and cannot be connected backwards. It is recommended that any color coding pertaining to the + and - connections on the board be consistent within the system.

Figure 13 illustrates the meter input wiring, and shows a typical flow transmitter for monitoring liquid flow.
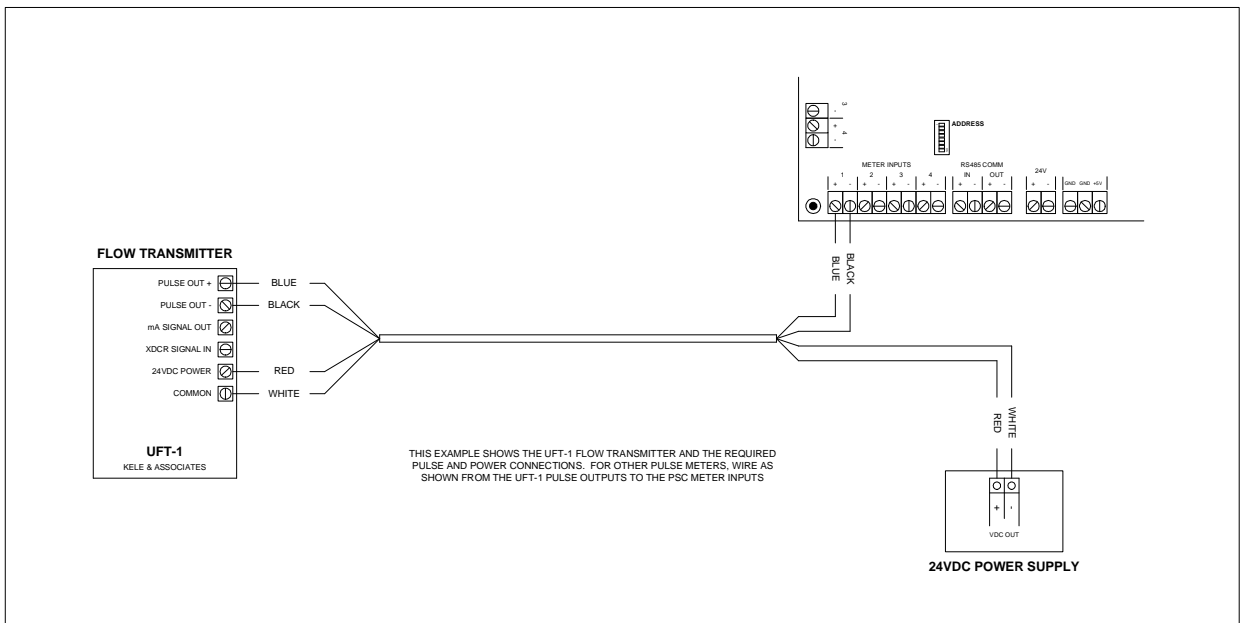
Figure 13:   Typical Meter Input Wiring Detail

CONNECTING THE DIGITAL OUTPUTS

The Basyx PSC2 contains eight (8) digital outputs for binary (on/off) control of HVAC, lighting or other system equipment. Each output is a form C SPDT contact closure through an on-board pilot duty relay. Each output is controlled through a hand-off-auto pushbutton for local override of any system output point.

All input cables should be 18 AWG, and must consist of stranded, twisted pairs (as required), shielded type with less than 20 pF capacitance per foot.

CAUTION: Relay outputs on the PSC2 board are designed for pilot duty only. Do not attempt to switch line voltage through these contacts, as serious damage to the board or connected system may occur. Switch low voltage 24VAC/VDC circuits only.

NOTE: Connect all input cable drain wires to earth ground. Do not run meter input wires near power cables or in power conduits. Isolate all input wires from large contactors or motors, fluorescent light fixtures and other sources of high intensity electromagnetic interference (EMI).

Figure 14 shows connection of a field relay powered from an exterior transformer.
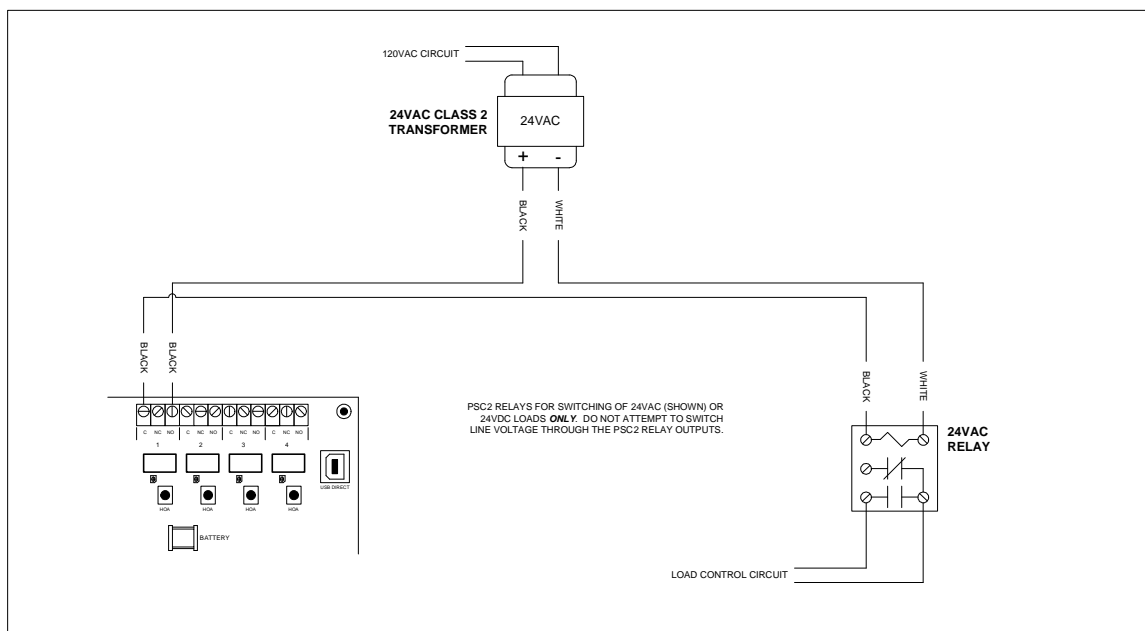
Figure 14:   Typical Output Wiring with Relay Control

Figure 15 shows typical rooftop unit connections.
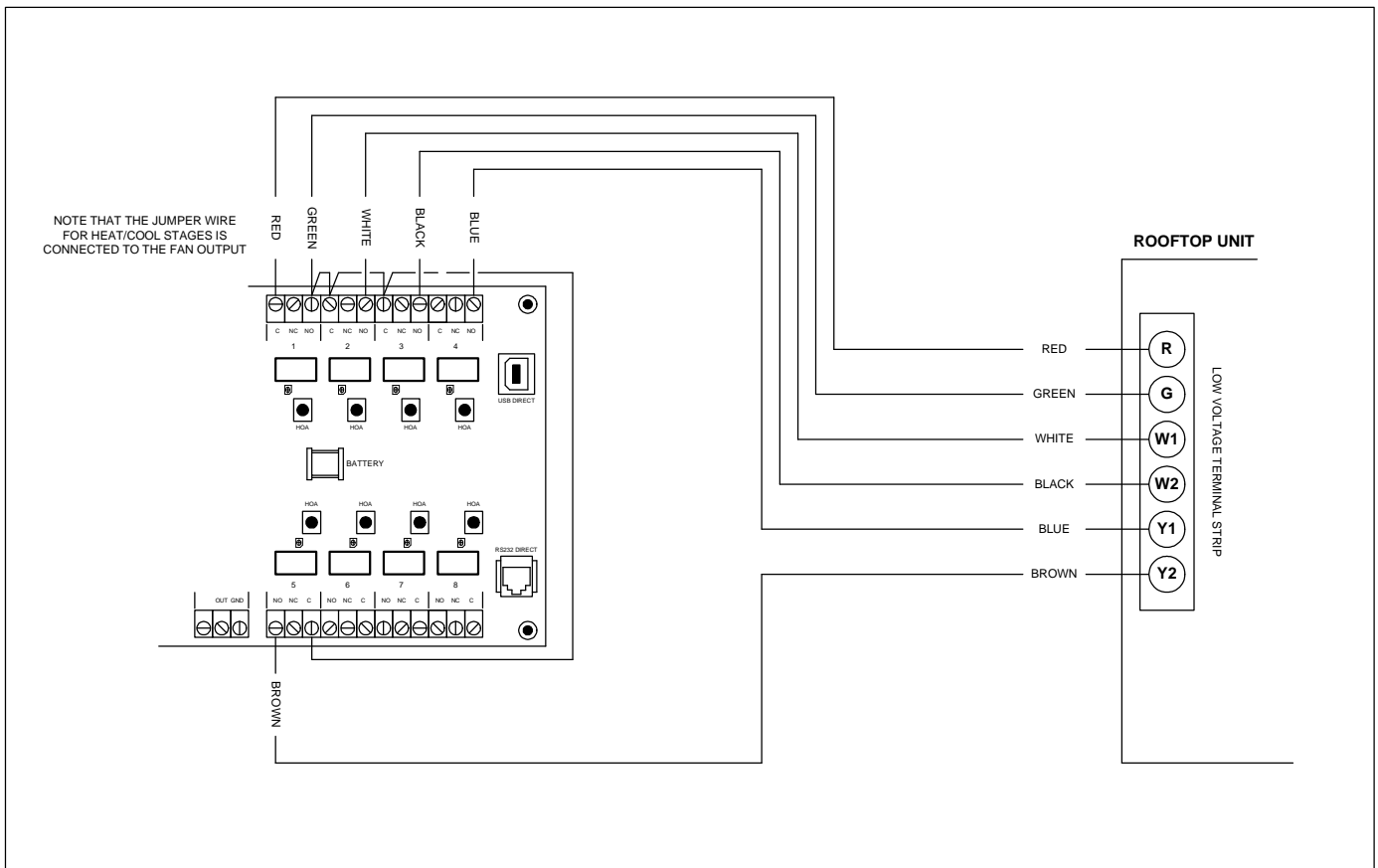
Figure 15: Typical Rooftop Unit Output Wiring

Note that the jumper wire connecting all of the output commons initiates at the Fan output. This is highly recommended and insures that compressors and heat will not operate if the fan is disabled, either by the PSC2 or the manual HOA button.

OPERATING THE HAND-OFF-AUTO (HOA) BUTTONS

The Basyx PSC2 contains eight (8) hand-off-auto pushbuttons for local override of the individual outputs, which are located to the inside of the output relays. Pressing the button will sequentially set the output as follows:

Manual ON   This will energize the relay and turn the output ON, and is indicated by a YELLOW led.

Manual OFF   This will de-energize the relay and turn the output OFF, and is indicated by a RED led.

Automatic   This places the outputs in the automatic mode, which is under control of the computer programming. Indication will be a GREEN led when ON, and OFF LED when OFF.

CONNECTING ANALOG OUTPUTS

The PSC2 provides four (4) analog outputs for control of modulating devices such as dampers, valves, variable speed drives and other items using a modulating input signal. Each output has individual jumpers for selection of 0-10VDC or 4-20MA output signals.

The examples shown indicate typical wiring. Consult your specific device manufacturer's instructions for exact wiring and interface requirements. Contact GCS if unsure about the compatibility of any selected device.

CONNECTING ANALOG DEVICE

Figure 16 illustrates connection of a standard damper or valve actuator to the PSC2 controller. This application shows a 0-10VDC input actuator and requires that the actuator be powered from the SAME transformer which is powering the PSC2 controller. When connecting the actuator, make sure to maintain the + (LINE) and - (COMMON) connections within the system.

DANGER: The PSC2 analog output is designed for use with an actuator using half-wave power. Serious damage can occur to the board if connected to a full-wave device. If unsure about your selected actuator, call Global Control Solutions technical support.
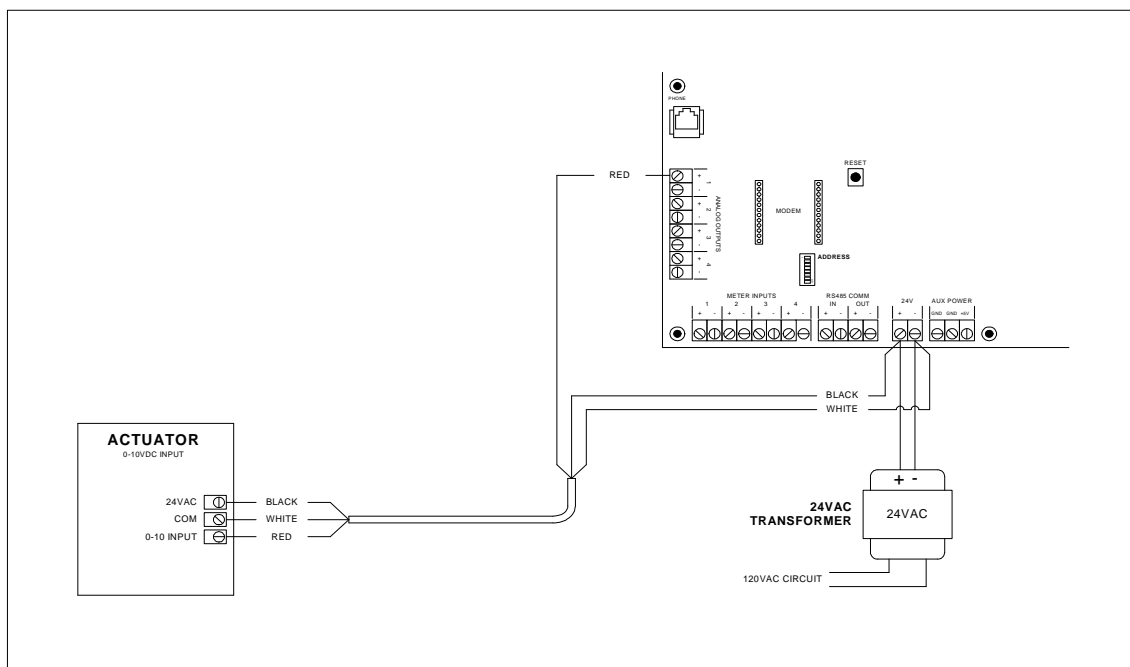
Figure 16: Typical Actuator Wiring with Common Transformer

INSTALLING THE BASYX M24 MODEM

The Basyx M24 modem must be installed with the power turned off to the PSC2 controller. Failure to do so will void the product warranty, and may result in serious damage to the controller and modem.

The M24 modem inserts into the socket on the left portion of the board, above the digital input terminal strip marked "MODEM".

IMPORTANT: The Basyx M24 modem must be installed on the PSC2 board address 1 for proper operation. Global communications features originate in board 1and communications errors may be incurred if not connected to board 1.

Figure 17 shows the installation of the Basyx M24 modem.
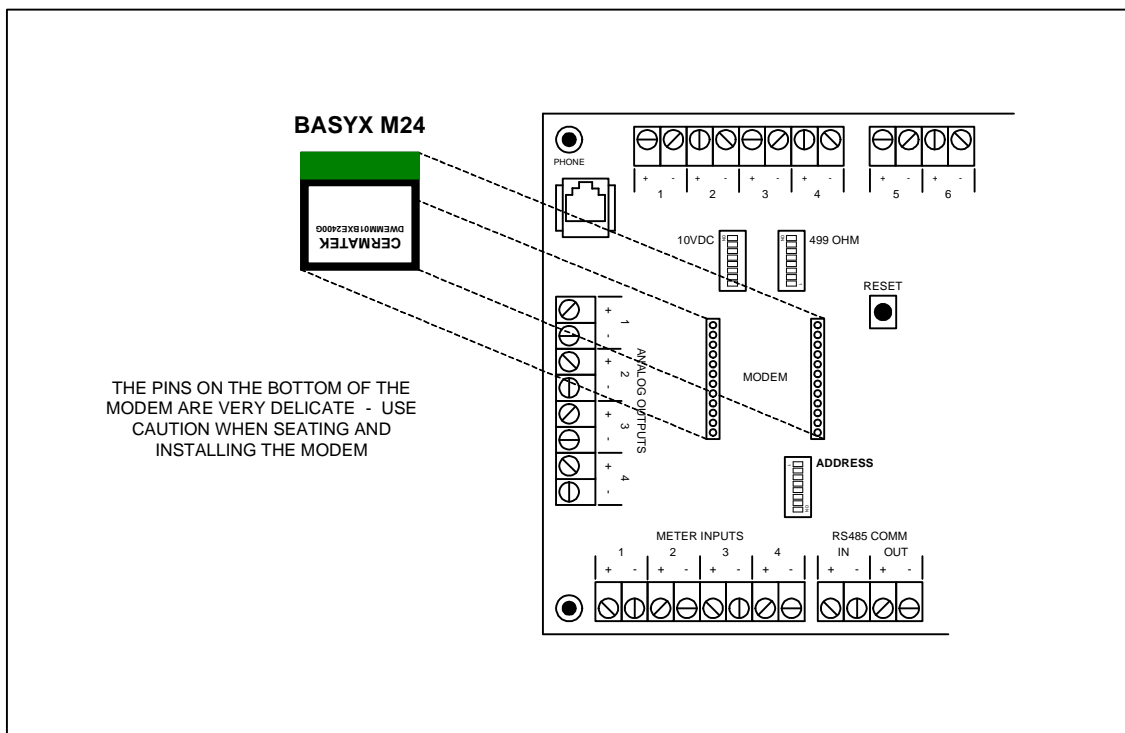
Figure 17: Modem Installation

The green portion of the PC board is towards the top (universal input switches) when properly installed. Make sure that all pins are seated accurately in the socket, and gently press on the modem until it snaps in place. After installation, verify that no pins have bent or are not securely in the sockets.

OPERATION

The red indicator light left of the 24V terminal block illuminates solid when the power is on. When the unit is operating properly, the CPU light above and to the left of the large capacitor will blink intermittently to indicate proper CPU operation.

BASIC TROUBLESHOOTING

If the PSC2 does not operate properly, perform the necessary troubleshooting as described below.

SYMPTOM	ACTION
Failure to communicate:	Check that the power is on and that the red indicator light is on. If it is on, measure voltage at the 24V power terminals of the PSC2 to ensure that the unit is getting 24V (-10% / +5%). Check the continuity and connection of the communication wires. Check that the device address is correctly set.
Faulty Communication:	Check that all communication cables are connected as required, with drain wires connected to a solid earth ground. Check that all communication cable wires are connected "+" terminal to"+" terminal and "-" terminal to "-" terminal. Check for continuity on all communication signal lines. Isolate sensor wiring from large contactors, fluorescent light fixtures, and other sources of high-intensity electromagnetic interference (EMI).
Digital outputs not responding:	Disconnect the device wiring and check for continuity at the between common (C) and normally open (NO) terminals based on output position. Check to see that exterior voltage source is present if used to switch pilot relays.
Analog or digital inputs are jumpy:	Isolate sensor wiring from large contactors, motors, fluorescent light fixtures, and other sources of high-intensity electromagnetic interference (EMI).

SPECIFICATIONS

Communications Bus:	EIA RS-485 at 57.6K baud on 1 Pair, 18AWG shielded, plenum rated cable	

Power Requirements:	Voltage:	24VAC/24VDC (-10% / 5%), 50/60/Hz
	Current:	3.2VA

Power Outputs: 5VDC, 1A auxiliary power source

Universal Inputs:	(8) Universal inputs	Thermistor 10,000 ohm type II material
		0-10vdc >/= 100 ohm input impedance
		0-20ma </= 500 ohm input impedance
		Resistance 0-10,000 ohms
		Dry contact >/= 50ms timing

Digital Inputs:	(4) Meter inputs	Dry contact >/= 50ms timing or maintained
Digital Outputs:	(8) Dry contacts	SPDT pilot duty rated 1 amp at 24VAC/24VDC
Analog Outputs:	(4) 0-10VDC or 4-20MA	>/= 1K ohm drive impedance, jumper selectable

Ports: RS-485 communications bus, optically isolated and fused
          RS-232 USB direct connect port, 19.2K baud
          RS-232 direct connect port, 19.2K baud
          RS-232 modem socket

Environmental Limits:	Temperature:	32°F to 125°F.
	Humidity (non-condensing):	95%

Enclosure/Mounting: (6) Mounting holes with stand-offs for mounting with #8 screws

UL Listing: ANSI/UL 916

Dimensions: 8.5"W x 4.0"H x 1.0"D

Shipping Weight: Approximately 0.75 lbs.

ABOUT THE BASYX PRODUCT LINE

The PSC2 is one product in a line of Basyx control products. The TriComm interface software package is a Windows based human interface used with the Basyx automation and control system. Tricomm will operate on any personal computer with the Windows 98 or later operating system.

The program provides a simple interface through direct connect, modem or internet to setup, operate and modify the operating parameters of the Basyx system, using easy to understand point-and-click commands. The drop-down system menus allow access to all system functions, and requires minimal computer experience for normal daily interaction with the system.

The Basyx system is designed specifically to meet today's building automation, facility and energy management needs. Global Control Solutions develops and provides application support for control systems around then world. The company has a continuing commitment to research and development in order to provide new and improved products to the building automation market.

For more information contact:

> Global Control Solutions
> 1125 Corporation Parkway
> Suite 171
> Raleigh, NC   27610
>
>   Telephone: (919) 785-2855
>
>   E-mail: sales@globalcontrolsolutions.net
>   Website: www.globalcontrolsolutions.net

The technical contents of this document, while accurate as of publication, are subject to change without notice.
No responsibility is assumed for its use.

APPENDIX 1 - BASYX ADDRESS SWITCH SETTINGS

ADDRESSES 1-32

ADDRESS	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
1	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	OFF
3	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	OFF
5	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF	OFF
6	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF
7	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	OFF
9	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF	OFF
10	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF
11	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF
12	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF
13	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF
14	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF
15	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	OFF
17	**ON**	OFF	OFF	OFF	**ON**	OFF	OFF	OFF
18	OFF	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF
19	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF
20	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF
21	**ON**	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF
22	OFF	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF
23	**ON**	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF
24	OFF	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF
25	**ON**	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF
26	OFF	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF
27	**ON**	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF
28	OFF	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF
29	**ON**	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF
30	OFF	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF
31	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF
32	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	OFF

ADDRESSES 33-64:

ADDRESS	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
33	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
34	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
35	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
36	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
37	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
38	OFF	ON	ON	OFF	OFF	ON	OFF	OFF
39	ON	ON	ON	OFF	OFF	ON	OFF	OFF
40	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF
41	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
42	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
43	ON	ON	OFF	ON	OFF	ON	OFF	OFF
44	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
45	ON	OFF	ON	ON	OFF	ON	OFF	OFF
46	OFF	ON	ON	ON	OFF	ON	OFF	OFF
47	ON	ON	ON	ON	OFF	ON	OFF	OFF
48	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
49	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
50	OFF	ON	OFF	OFF	ON	ON	OFF	OFF
51	ON	ON	OFF	OFF	ON	ON	OFF	OFF
52	OFF	OFF	ON	OFF	ON	ON	OFF	OFF
53	ON	OFF	ON	OFF	ON	ON	OFF	OFF
54	OFF	ON	ON	OFF	ON	ON	OFF	OFF
55	ON	ON	ON	OFF	ON	ON	OFF	OFF
56	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
57	ON	OFF	OFF	ON	ON	ON	OFF	OFF
58	OFF	ON	OFF	ON	ON	ON	OFF	OFF
59	ON	ON	OFF	ON	ON	ON	OFF	OFF
60	OFF	OFF	ON	ON	ON	ON	OFF	OFF
61	ON	OFF	ON	ON	ON	ON	OFF	OFF
62	OFF	ON	ON	ON	ON	ON	OFF	OFF
63	ON	ON	ON	ON	ON	ON	OFF	OFF
64	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF

APPENDIX 2 - RECOMMENDED CABLE

This document lists the recommended cable types and part numbers for the various connections to the Basyx building automation and control system hardware.   GCS recommends the New Generation product line from Belden Wire & Cable, and suggests that any substitutions meet or exceed the technical specifications of those cables listed.

Communications Cable

| Belden 6300FE | 1 twisted, shielded pair 18 AWG, Plenum rated | Communications |
| Belden 6541FE | 2 twisted pairs w/overall shield 22 AWG, Plenum rated | Communications |

Sensor & Output Cable

Belden 6300FE	1 twisted pair w/overall shield 18 AWG, Plenum rated	Sensors & Outputs
Belden 6342FE	3 twisted pairs w/overall shield 18 AWG, Plenum rated	Sensors & Outputs
Belden 6343FE	4 twisted pairs w/overall shield 18 AWG, Plenum rated	Sensors & Outputs
Belden 6345FE	6 twisted pairs w/overall shield 18 AWG, Plenum rated	Sensors & Outputs
Belden 6347FE	9 twisted pairs w/overall shield 18 AWG, Plenum rated	Sensors & Outputs

Specialty Cable

| Belden 6541FE | 2 twisted pairs w/overall shield 22 AWG, Plenum rated | Room Sensor RJ11 Jack |
| Belden 6542FE | 3 twisted pairs w/overall shield 22 AWG, Plenum rated | Room Sensor R / RS / RO / RSO |

Multi-paired cable should be used for ALL connections to the Basyx system, multi-conductor cable should be avoided due to capacitance issues. ALL cables should be shielded type, and drain wires should be connected to solid earth ground.