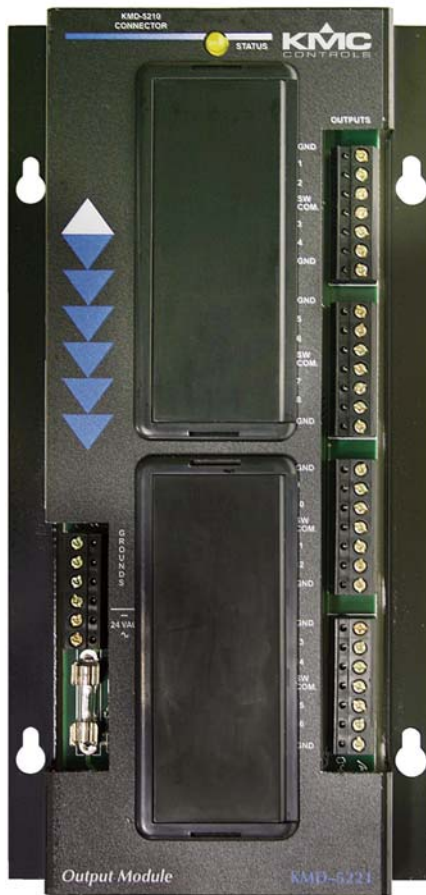




# Installation and Operation Guide



## KMD-5221 Output Module

*For use with KMD-5210 LAN Controller*

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# SECTION 1

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## Introduction

This section provides a brief introduction to the KMD-5221 Output Module. Review this material in its entirety before attempting to install or operate the module.

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The KMD-5221 Output Module is an auxiliary device for the KMD-5210 LAN Controller. The module processes control outputs from the LAN Controller and sends the outputs to the connected output devices.

KMD-5221 Output Modules feature the following:

- ◆ 16 universal outputs; software programmable as analog or digital
- ◆ 12-bit digital-to-analog conversion on all outputs
- ◆ Scalable from 16 to 128 outputs.
- ◆ Can control a wide range of devices with the addition of HPO-6700 series of output override boards.

## Specifications

KMD-5221 specifications are subject to change without notice.

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<b>Outputs</b>	16
<b>Key features</b>	Output short protection Universal outputs programmable as analog or binary objects Standard units of measure 12-bit digital-to-analog conversion
<b>Connectors</b>	Removable screw terminal blocks, wire size 14–22 AWG 16 conductor ribbon cable header for connection to a LAN Controller. Order ribbon cables separately.
<b>Output voltage</b>	0–10 volts DC analog 0 or 12 volts DC digital
<b>Output current</b>	50 mA per output maximum (or 800 mA total)
<b>Applied Voltage</b>	24 volts AC, continuous
<b>Protection</b>	
<hr/>	
<b>Weight</b>	16 ounces (454 grams)
<hr/>	
<b>Indicators</b>	Status LED flashes when card is accessed

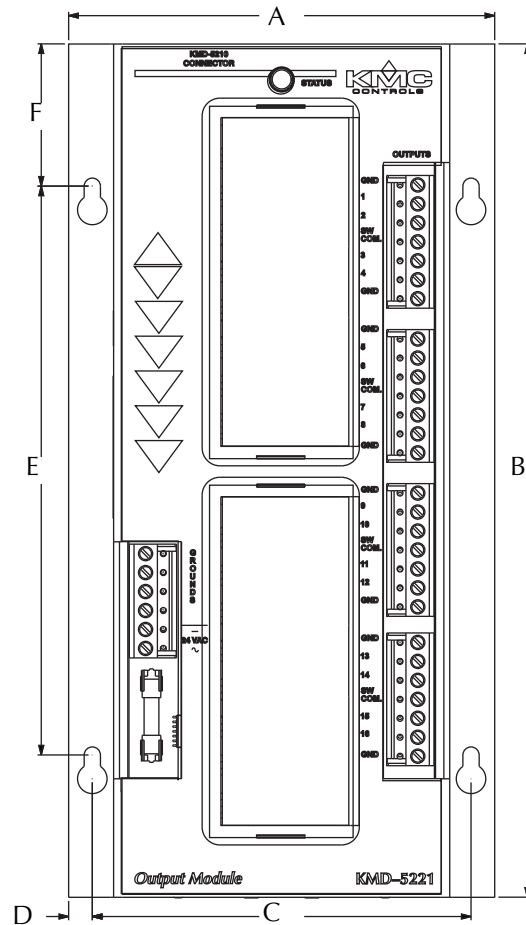
**Ambient Limits**

**Operating** 0 to 120°F (-18 to 49°C)  
**Shipping** -40 to 140°F (-40 to 60°C)  
**Humidity** 0-95% RH, non-condensing

**Regulatory**

UL 916 Energy Management Equipment listed  
 CE compliant  
 FCC Class B, Part 15, Subpart B  
 SASO PCP Registration KSA R-103263

**Dimensions**



**Table 1-1 Dimensions**

A	B	C	D	E	F	Height (not shown)
4.50 in.	9.00 in.	4.00 in.	0.25 in.	6.00 in.	1.50 in.	0.98 in.
114 mm	229 mm	102 mm	6 mm	152 mm	38 mm	25 mm

## Accessories

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### Ribbon cables

KMD-5660	6 inch (15 cm) ribbon cable
KMD-5668	9 inch (23 cm) ribbon cable
KMD-5661	14 inch (36 cm) ribbon cable
KMD-5662	19 inch (48 cm) ribbon cable
KMD-5663	24 inch (61 cm) ribbon cable

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### Output override boards

HPO-6701	Triac output
HPO-6702	Short protected analog output
HPO-6703	Relay, normally open contacts
HPO-6704	4–20mA current loop
HPO-6705	Relay, normally closed contacts
HPO-6802	Output board cover with labels. Required to secure HPO-6700 series output boards.

---

### Power transformer

XEE-6111-100	Single-hub, 120 volt AC input, 24 volt, 96 VA output power transformer
XEE-6112-100	Dual-hub, 120 volt AC input, 24 volt, 96 VA output power transformer.
XEE-6311-100	Dual-hub, 120/240/277/480 volt AC input, 24 volt, 96 VA output power transformer

## Safety considerations

KMC Controls assumes the responsibility for providing you a safe product and safety guidelines during its use. Safety means protection to all individuals who install, operate, and service the equipment as well as protection of the equipment itself. To promote safety, we use hazard alert labeling in this manual. Follow the associated guidelines to avoid hazards.



### **Danger**

Danger represents the most severe hazard alert. Bodily harm or death will occur if danger guidelines are not followed.



### **Warning**

Warning represents hazards that could result in severe injury or death.



### **Caution**

Caution indicates potential personal injury or equipment or property damage if instructions are not followed.



### **Note**

Notes provide additional information that is important.



### **Detail**

Provides programming tips and shortcuts that may save time.



# SECTION 2

## Installation

This section provides important instructions and guidelines for installing the KMD-5221 Output Module. Carefully review this information before installing a KMD-5221 module.

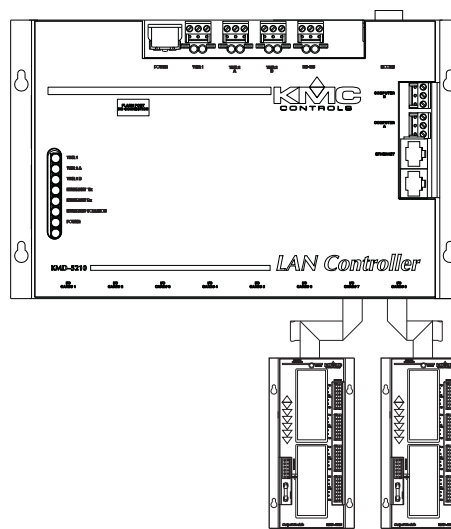
### Mounting

Mount KMD-5221 output modules and the KMD-5210 to which they are connected inside of a metal enclosure. KMC Controls recommends using a UL-approved Enclosed Energy Management Equipment Panel such as a KMC model HCO-1034, HCO-1035 or HCO-1036. Use the two mounting holes on each side of the module to fasten it securely to a flat surface with #6 or #8 hardware. See [Dimensions on page 6](#) for mounting hole locations and dimensions. To maintain RF emissions specifications, use either shielded connecting cables or enclose all cables in conduit.

### Planning for output modules

To connect output devices to a KMD-5210 controller, use one or more KMD-5221 output modules. The KMD-5210 controller includes eight universal I/O ports for up to eight KMD-5221 output modules, eight KMD-5220 input modules, or any combination of up to eight modules.

Each module connects to the controller using a flat ribbon cable. Connect the first KMD-5221 output module to connector *I/O Card 8*; continue adding output modules from the right connection, *I/O Card 8* to left, *I/O Card 1*.



**Illustration 2-1** Output module connections

## Installing the module

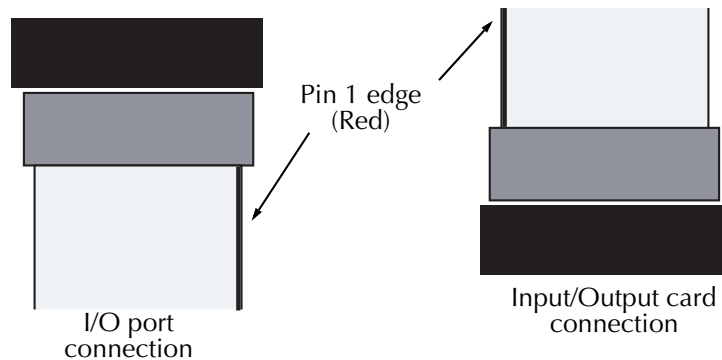
To install the module, do the following:

1. Position and mount the modules near the KMD-5210 to which it will connect. Connect output modules starting at position *I/O Card #8*.
2. Connect the ribbon cable to the KMD-5210 LAN Controller. Estimate the required cable length and select from one of the cables from KMC Controls. See [Ribbon cables on page 7](#) in the Accessories section.



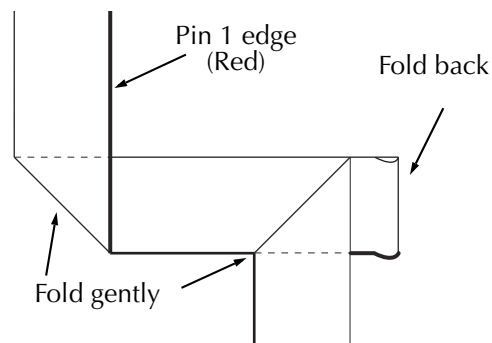
### Note

Observe the orientation of the cable header. If the pin 1 edge is reversed, the controller will not communicate with the module.



**Illustration 2-2 Ribbon cable orientation**

3. Connect the other end of the ribbon cable to the input module. You may find it necessary to fold the cable to properly route it to the module. To accommodate turns, fold the cable gently to change direction. To make a fold, overlay the cable at a right angle and press gently until the cable holds the fold as shown in Illustration 2-3.



**Illustration 2-3 Ribbon cable fold**



### Caution

Do not crimp the cable in a tight fold. This may result in separation of cable strands and result in unreliable operation of the module.

4. Connect input devices to the modules.

## Connecting output devices

All 16 outputs are universal and can be configured by software to operate either analog or digital devices. The outputs are grouped in four banks. Connect the device under control between the output terminal and one of the GND (ground) terminals on the same bank. For polarity sensitive loads, connect the positive terminal of the load (+) to the output terminal and the negative terminal (-) of the load to one of the GND (ground) terminals on the same bank

Each output module can drive up to 16 outputs providing up to 50 mA at 12 VDC to each output. The module is limited to a maximum output to all devices of 800 mA. See the following topic, [Installing override boards on page 11](#) to select an install an override board for devices that cannot be controlled from the universal outputs.

## Installing override boards

For large relays or devices that cannot be powered directly from a standard output, install an output override board. Override boards provide the following features:

- ◆ A wide choice of output signals.
- ◆ A slide switch for automatic or manual control.
- ◆ An LED for assessment of the output state.

Install the output override cards in the area under the plastic cover next to the output terminals. The following output cards are available from KMC Controls.

**Table 2-1 Output override boards**

Card model number	Output type
HPO-6701	Triac
HPO-6702	0–10 volts DC analog
HPO-6703	Normally open contact
HPO-6704	4–20 milliamperes current loop
HPO-6705	Normally closed contact

### Grounds and switched commons

When using an output override card, use the *SW.COM.* terminal instead of the GND (ground) terminal as signal common. Always use the *SW.COM.* terminal in the same output bank as the output terminal.

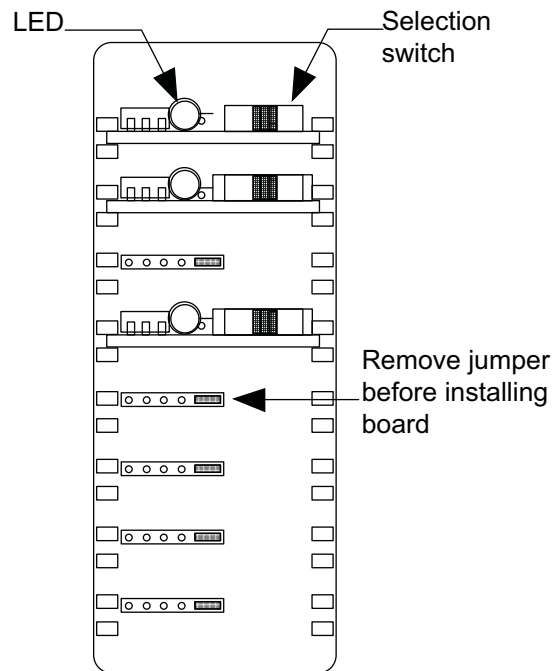
### Controlling devices from the power source

If you configure the outputs so that you use the same power source with relays in the first and second banks, you must jumper the switched common for each bank.



#### Note

If the transformer used to power the board is also used as the switched common, the board will no longer be optically isolated from the switched device.



*Illustration 2-4 Override board placement details*



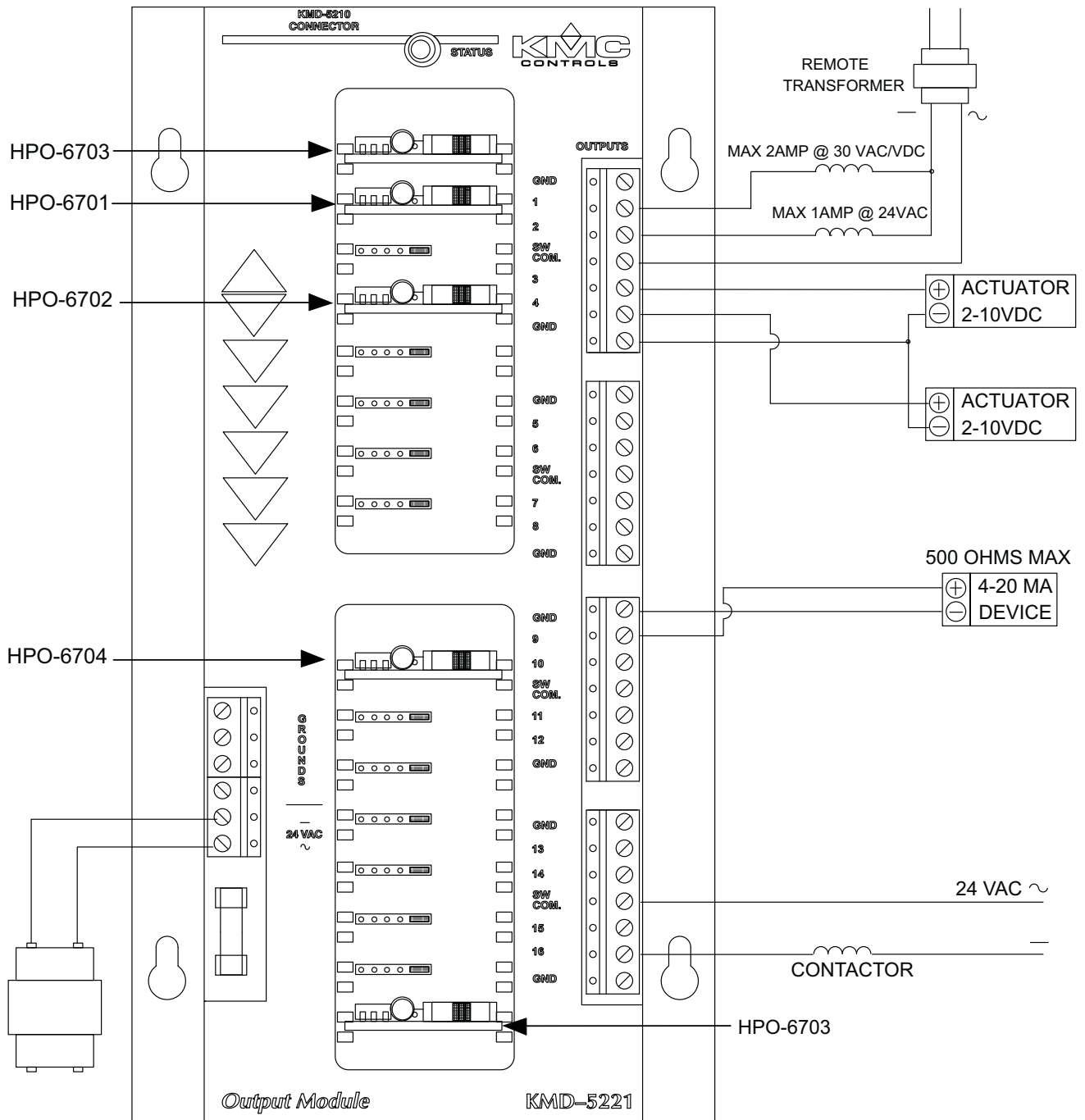
#### Caution

Do not connect active 24 volt AC circuits to the output terminals unless the associated jumper is first removed. Doing so will result in damage to the output module.

To install an HPO-6700 series override board do the following:

1. Remove the appropriate cover from the module. The upper cover is for outputs 1-8; the lower for outputs 9-16.
2. Remove the jumper from the mounting header.
3. Press the override board onto the header pins. The "Hand-Off-Auto" selection switch is always positioned toward the output connections. (Refer to Illustration 5.)
4. If required, set the selection switch on the Override Board.
5. When all Override Boards are installed, place an Override Cover on the module.

6. Connect output devices to the module.
7. Connect required power to the input module. Illustration 2-5 gives an example of a typical output module configuration.



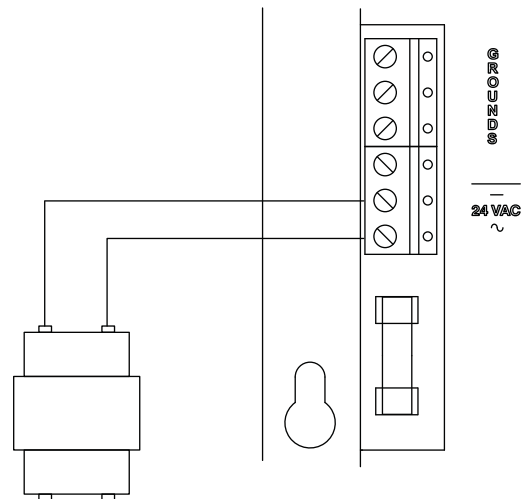
**Illustration 2-5 Typical output board configuration**

## Connecting power

When all outputs are configured and connected, connect a power supply that is properly rated to match the requirements of the KMD-5221. The KMD-5221 module requires an external, 24 volt, AC power source. Use the following guidelines when choosing and wiring transformers.

- ◆ Use a KMC Controls Class-2 transformer of the appropriate size to supply power to the module.
- ◆ Do not run 24 volt, AC power from within an enclosure to external controllers.

Connect the 24 volt AC power supply to the power terminal block on the lower left side of the module near the Grounds block. Connect the ground side of the transformer to the ground terminal (–) and the AC phase to the phase ~ terminal. Power is applied to the module when the transformer is powered.



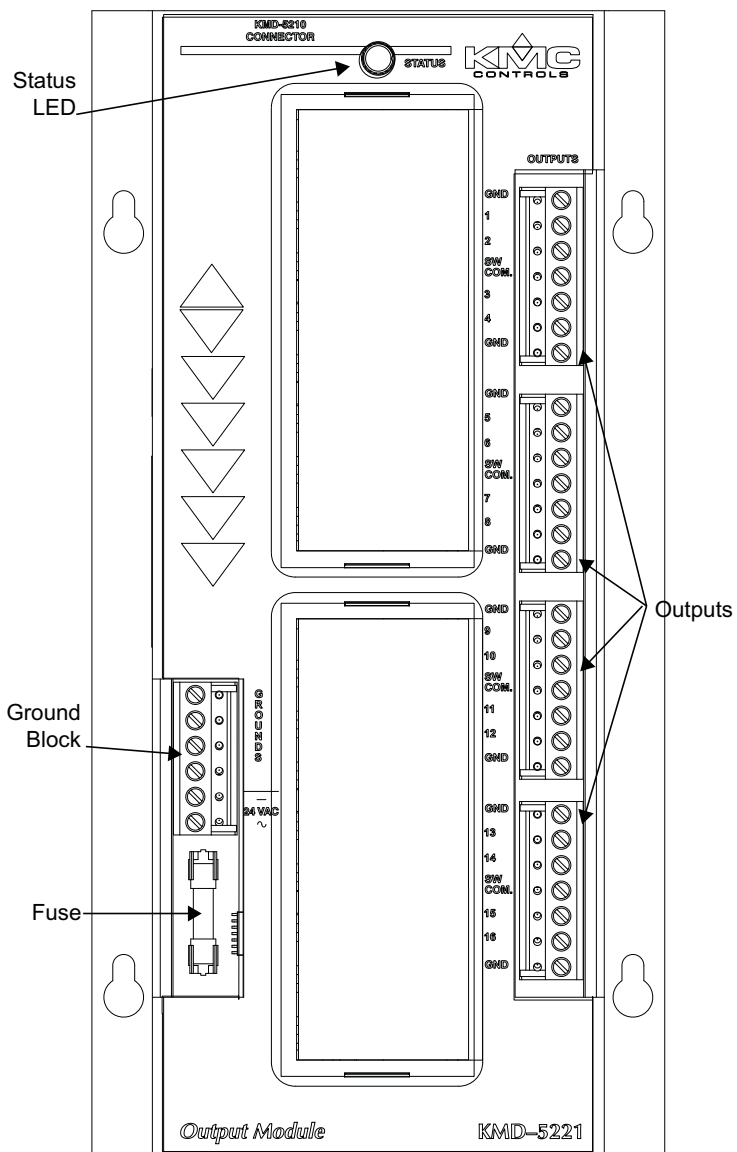
**Illustration 2-6 Power connections**

# SECTION 3

## Operation

This section provides general operating instructions for your KMD-5221 output module. Carefully review this information before operating the module.

Once the output module is wired and powered is applied, operation is automatic.



**Illustration 3-1 KMD-5221 Output Module components**

## Status LED

The status LED at the top of the module will illuminate when the module is communicating with the LAN controller too which it is connected. Under normal operation the LED blinks at a regular rate. The LED glows steady until the LAN controller to which it is connected is programmed with HCM *and* at least one output is configured with WinControl XL Plus or TotalControl.

## Power On/Off

The output module does not use an On/Off switch or a power jumper. After the module is connected to a LAN controller and the LAN controller is powered, the module is also powered.

## Maintenance

The KMD-5221 does not require routine maintenance. If cleaning is required, wipe with a soft, damp cloth and mild soap.

## Replacing the fuse

If a fuse opens, investigate the cause, and then replace the fuse. To replace the fuse:

1. Remove the power connection to the module.
2. Carefully pull out the open fuse from the fuse holder.
3. Carefully snap an identical 1.6 ampere, fast-acting, fuse into the fuse holder.
4. Reconnect the power.