Power Switch Module User Manual

Contents

Overview

The Power Switch Module (CE-MD-005-0000) extends MachineMotion 2's functionality with an integrated solid-state relay, which lets you switch various AC-powered devices on and off.

This plug-and-play module requires just three connections: one to the MachineMotion 2 controller, one to an AC power outlet, and one to the device to control.

Compatible modules, including the Power Switch Module (CE-MD-004-0000), can also be daisy chained one after the other, making it possible to connect up to eight modules per MachineMotion 2 controller.

Features

- Switch AC loads up to 15 A at 120 VAC or 10 A at 230 VAC.
- Support various loads with two types of output connectors: one NEMA 5-15R, and one, terminal block.
- Connect compatible modules via daisy chain.
- Configurable address.
- Plug-and-play to access from the Control Center, MachineLogic and Python API.

Included in the box

Part Number	Description	Quantity
CE-MD-005-0000	Power Switch module	1
CE-CA-022-5000	Control Device Extension Cable, 5m	1
CE-JP-001-0001	Module Termination Jumper	1
CE-CA-001-0001	IEC C13 Cable, CA/US, 120 V, 3m	1
CE-CA-001-0002	IEC C13 Cable, EU, 230 V, 2.5m	1
HW-FN-003-0018	M8 x 18-mm Screw	2
HW-FN-002-0001	M8 Drop-in Spring-Loaded T-Nut	2

WARNING: Important steps to avoid electric shock

The Power Switch Module operates at potentially life-threatening voltage levels. To prevent the risks of electric shock that could lead to serious injuries, follow the safety instructions below.

● When setting up the Power Switch Module connections, connect the input POWER cable to the AC power outlet last. Connecting to the power outlet should always be your final step.

● If you're not using the OUT2 port, make sure the detachable plug stays mated to the fixed module connector, to prevent an exposed lead with potential live power. This is important because the *OUT1* and *OUT2* ports act in parallel, meaning they are either both energized or both de-energized at the same time.

WARNING: Hot surface

The top aluminum enclosure of the Power Switch Module acts as a heatsink for the internal relay. The higher the current going through the module, the hotter the surface will become. Keep this in mind when driving large loads with the module. Maximum enclosure temperature rise from ambient is specified in the datasheet.

Choosing the appropriate output connector

The Power Switch Module has two parallel output connectors.

- Only use the OUT1 port with a standard NEMA 5-15P connector, and if the load operates at a max voltage of 125 VAC with a max current of 15 A.
  - The *OUT1* port is a standard NEMA 5-15R connector, compatible with 120 VAC devices for North America and capable of delivering up to 15 A.
- Use the OUT2 port with any other connector (not NEMA 5-15P), and/or if the load has an operating voltage higher than 125 VAC.
  - The *OUT2* port is a two-part terminal block connector mating. The male connector is a fixed part (jack) of the module, whereas the female connector is detachable (plug) and provides three screw connections for flying leads (live, neutral, and earth).
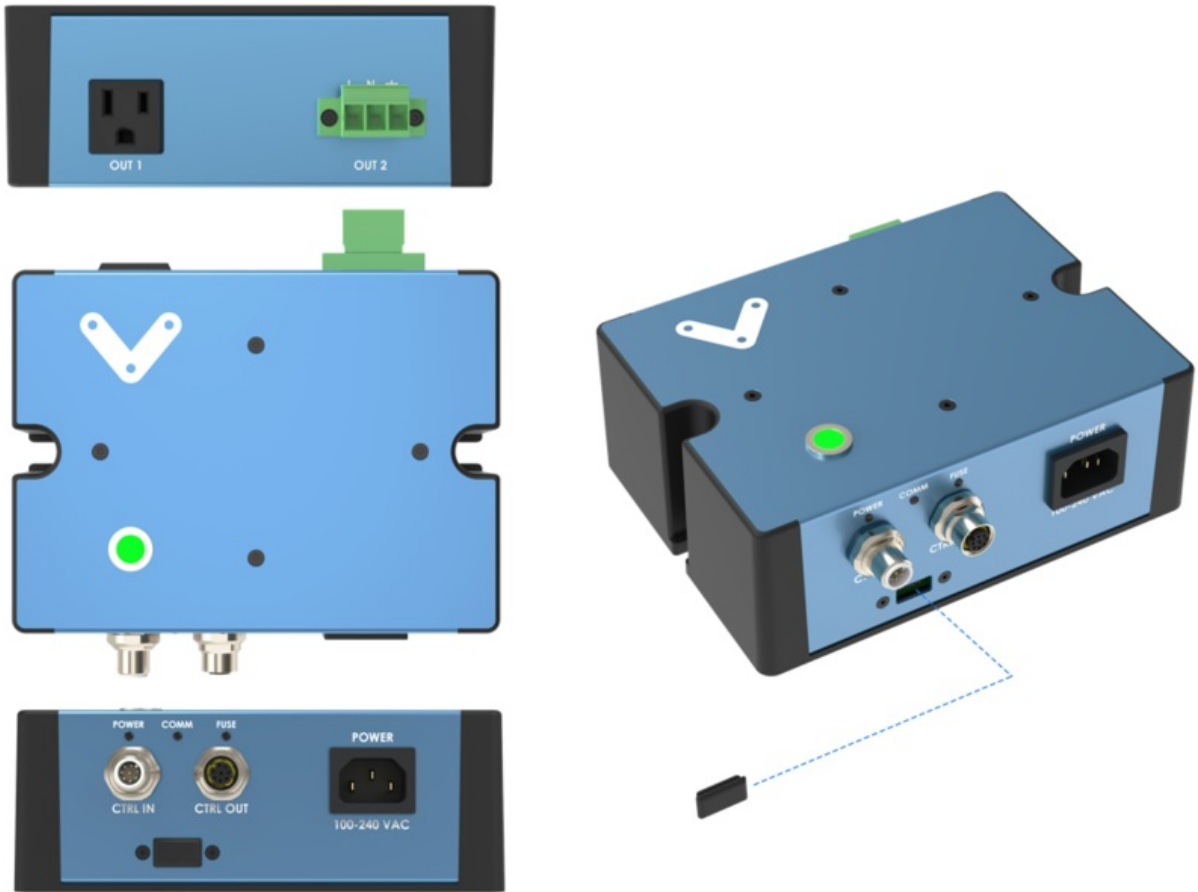
Physical Interface

Figure 1: Power Switch Physical interface.

LED status indicators

| Name	LED Color	Indicates (when ON)
SWITCH STATUS	Green	Power switch closed (active)
POWER	White	24 VDC supplied to module
COMM	Yellow and Blue	RS-485 communication functional
FUSE	Red	Module internal fuse tripped

Applications

Connecting to MachineMotion 2 (direct connection)

To connect the Power Switch Module directly to a MachineMotion 2 controller (see Figure 2):

1. Set the Power Switch Module address, as explained in the *Address configuration switches* section.
2. Using the Control Device Extension Cable (CE-CA-022-5000):
   1. Connect the male end to any *CONTROL* port on the MachineMotion 2 controller.
   2. Connect the female end to the *CTRL IN* port on the Power Switch Module.
3. Connect the Module Termination Jumper (CE-JP-001-0001), to the *CTRL OUT* port on the Power Switch Module.
4. Connect the AC-powered device to be controlled to one of the Power Switch Module output ports; either *OUT1* (US/Canada, NEMA 5-15R) or *OUT2* (Terminal Block with Screw Connections).
5. Using an appropriate IEC C13 cable (CE-CA-001-0001, CE-CA-001-0002, or other):
   1. Connect the female end to the *POWER* port on the Power Switch Module.
   2. Connect the male end to an AC power outlet.

Connecting compatible modules (daisy chain)
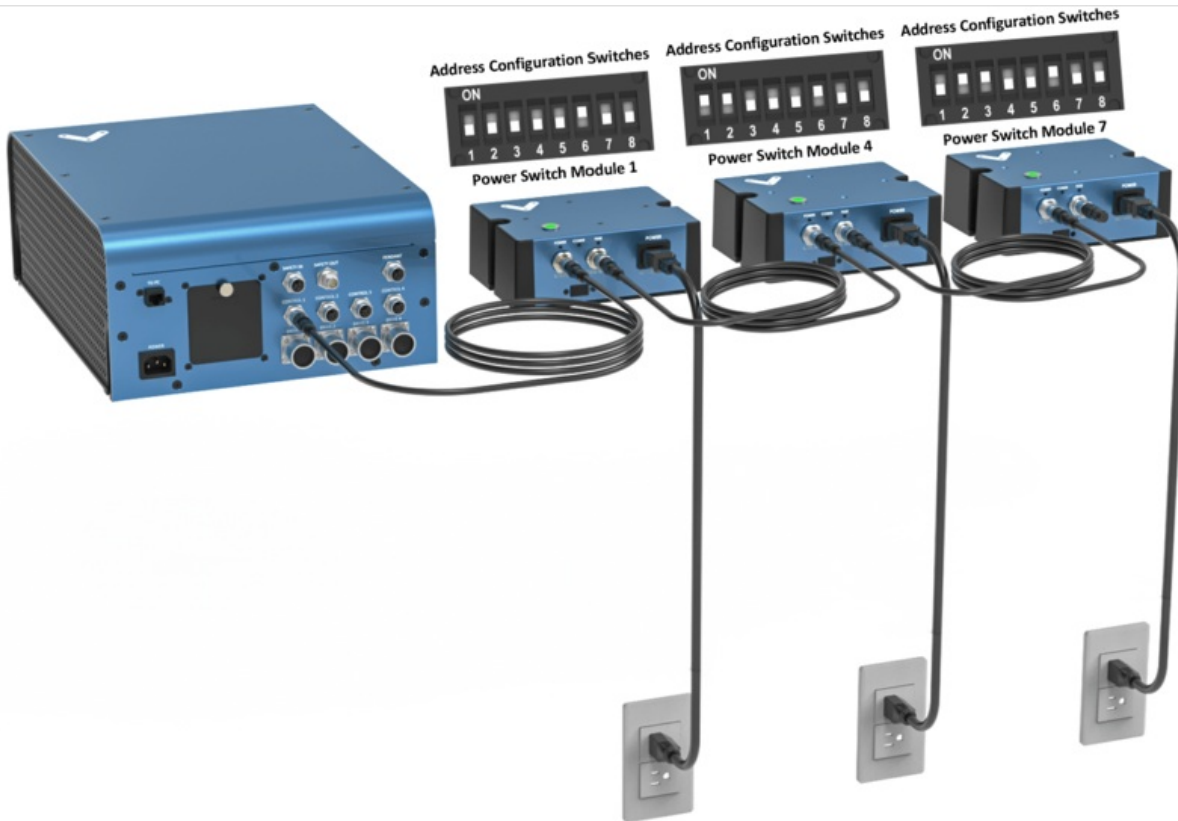
Compatible modules, including the Power Switch Module, can also be daisy chained to a single *CONTROL* port on the MachineMotion 2 controller (see Figure 2). Across all four *CONTROL* ports, the controller supports up to eight modules at the same time, provided they all have distinct addresses (see *Address configuration switches*).

To connect several modules in a daisy chain:

1. Set a distinct address for every module of the daisy chain, as explained in the *Address configuration switches* section.
2. Using a Control Device Extension Cable (CE-CA-022-5000):
    1. Connect the male end to any *CONTROL* port on MachineMotion 2.
    2. Connect the female end to the *CTRL IN* port on the first module in the daisy chain.
3. For every additional module to be connected, repeat this step using an additional Control Device Extension Cable:
    1. Connect the male end to the *CTRL OUT* port on the previous module in the daisy chain.
    2. Connect the female end to the *CTRL IN* port on the current module in the daisy chain.
4. Connect the Module Termination Jumper (CE-JP-001-0001) to the *CTRL OUT* port on the last module in the daisy chain.

Address configuration switches

Each module has an address with two components: device ID and device type. Both device ID and device type are set by changing the state of the address configuration switches, which are located at the front of the Power Switch Module under a removable rubber cap.

Switches 1 to 4 define the module device ID and allow the MachineMotion 2 controller to know which module it is communicating with. Every module connected to the same controller should have **a distinct device ID, regardless of its device type**

Switches 5 to 8 define the module device type and their positions should remain identical for all modules of the same type.
The table below lists every valid address for the Power Switch Module. An individual switch is considered ON when the selector is slid up and OFF when the selector is slid down.

Switches								Module Address
Device ID				Device Type				
1	2	3	4	5	6	7	8	
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	Power Switch Module 1
ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	Power Switch Module 2
OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	Power Switch Module 3
ON	ON	OFF	OFF	OFF	ON	OFF	OFF	Power Switch Module 4
OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	Power Switch Module 5
ON	OFF	ON	OFF	OFF	ON	OFF	OFF	Power Switch Module 6
OFF	ON	ON	OFF	OFF	ON	OFF	OFF	Power Switch Module 7
ON	ON	ON	OFF	OFF	ON	OFF	OFF	Power Switch Module 8

Table 1: Address configurations.

Connecting a device to the *OUT2* port

The *OUT2* port is a two part terminal block connector mating that can be used to control any AC-powered device within the Power Switch Module specifications (see Datasheet).

To connect a device to the *OUT2* port:

1. Make sure the device has two wires (black and white) or three wires (black, white, and yellow/green).
2. Strip 7 mm of insulation off the device's wires.
3. Use the markings on the Power Switch Module to identify the live (*L*), neutral (*N*) and ground (⏚) terminals.
4. Remove the plug from the *OUT2* port.
5. Insert and screw the black wire into the OUT2 plug *L* (live) terminal.
6. Insert and screw the white wire into the OUT2 plug *N* (neutral) terminal.
7. If available, insert and screw the yellow/green wire into the OUT2 plug ⏚ (ground) terminal.
8. Re-insert the plug from step 4 in the *OUT2* port.

Configuring the Power-Switch Module in Control Center

If you would like to configure your power-switch module and utilize MachineLogic to program your power-switch, follow the steps below:

1. Open the Control Center on a PC (by entering 192.168.7.2 in the Google Chrome URL) or use the MachineMotion 2 Pendant.
2. Go to the **Configuration** tab and click **Add Output**.
3. Fill out the following fields:
   - **Name**: Give your push-button a friendly name, which will be used to call the push button module in MachineLogic
   - **Module Type**: In the drop-down menu, select **Power Switch**
   - **Device**: Represents the device ID of your module. The device number is configured on the physical module using dip-switches, therefore, ensure the device ID configured in this dropdown matches the dip switches configured on the physical device.

Figure 4: Power-switch configuration

1. To test the configured push-buttons, go to the **Manual Control** tab and navigate to the **Digital Inputs/Outputs** at the bottom left of the screen.
2. Under **Outputs**, you should see your configured power-switch modules:

Figure 5: Power-switch manual control

You could test the configured power-switch module by clicking the toggle**OFF/ON** to check if the device connected to the power-switch toggles on and off.

Programming the Power-Switch Module with MachineLogic

To program your power-switch in MachineLogic, ensure you have completed the steps in Configuring the Power-Switch Module in Control Center.

1. Go to the **MachineLogic** tab.
2. Click **Add command** › **Add Outputs**:
   - Under **Output**, select the **Power Switch** from the drop-down menu. Select the friendly name of your power switch under **Output Name** and select if you would like to turn your power-switch **On** or **Off**

Using the Power-Switch Module with the Python API

See Python API reference here