MARWAY
POWER SOLUTIONS

Optima Technical Note:
Custom EPO Wiring Schemes

Custom Field Wiring of Marway's PDU EPO Connectors with Optima Standard and Custom PDUs when Not Using one of Marway's Commander UCP Panels

Sep 2026 • r3

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Introduction

This document describes how the Remote Panel Control System (a.k.a EPO system) in Marway Optima power distribution units (PDU) can be wired using buttons provided by the end user.

The remote panel connector (a.k.a. EPO connector) has been designed primarily to interface with Marway's Commander UCP Remote Control Panels. There are two models that provide the option to utilize either a simple two-button solution, or a full-featured solution with On, Off, Reset, EPO, audio alarm, and more.

However, for those preferring to create their own circuits, or needing to adapt to existing circuits, the PDU wiring for the remote panel connector is designed for external dry contact interfaces. This allows for customized external wiring. This document addresses using only buttons to fulfill the remote On/Off and EPO functionality. More complex circuits can offer additional features emulating the full features available on the Commander, but that's beyond the scope of this document.

The remote panel control system evolved to allow for a variety of configurations regarding normally open vs. normally closed, and maintained vs. momentary signals. While this document explains multiple configurations, some of these configurations come from legacy requirements. Not all combinations are ideal for Marway's modern installations.

Applicable Models

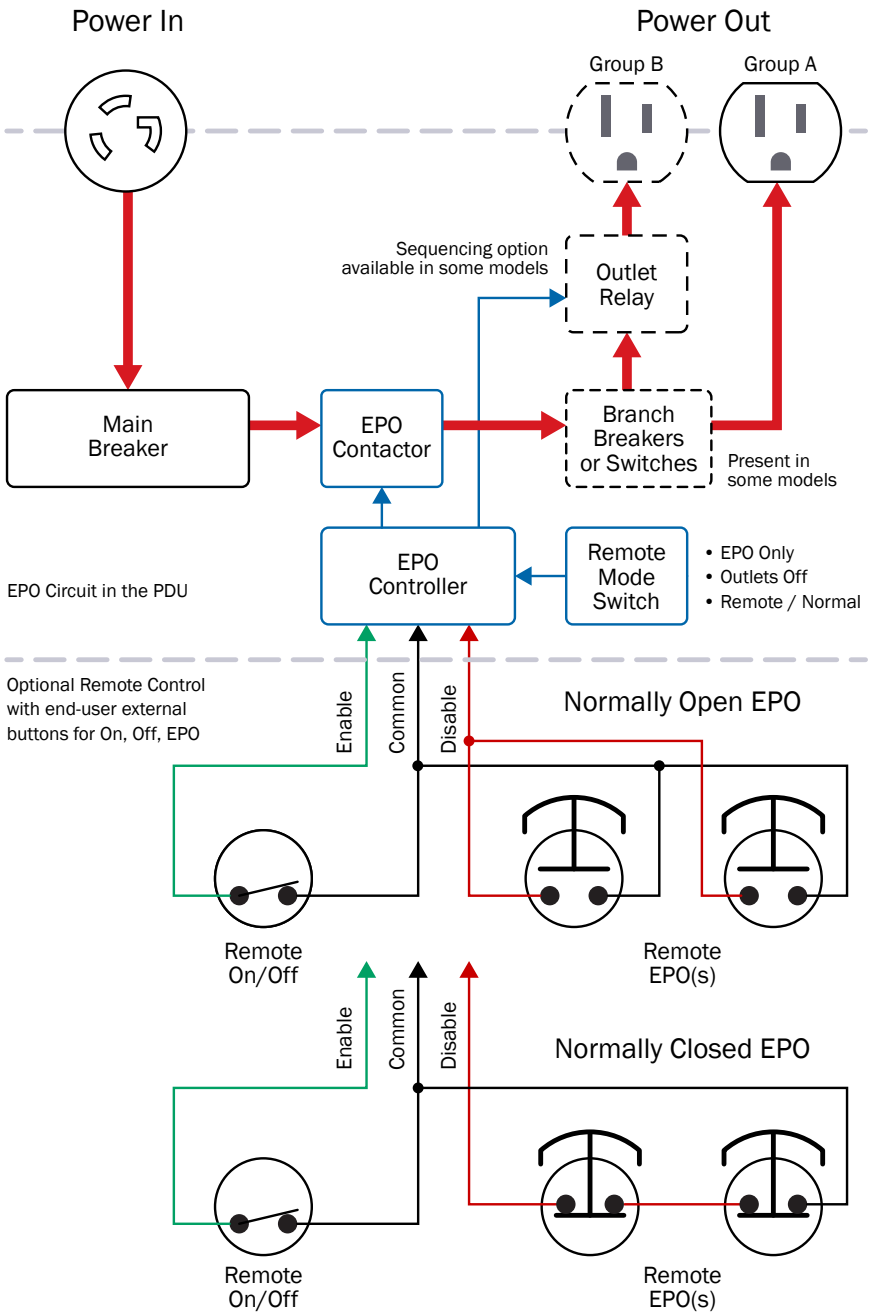
Marway has a wide variety of models which share the Optima™ product brand. These models can be categorized into two groups:

- Standard models, which are pre-designed and listed in Marway's Standard Products Catalog (these will have part numbers beginning with MPD 520, 532, 533).
- Custom models, which are either modified versions of standard models, or completely unique designs for specific customers. Model numbers start with MPD, but then have a variety of possible numbers.

This document applies to all Marway Optima PDU products which do not include the RCM networked control system. There is a separate document for models which have the RCM control system.

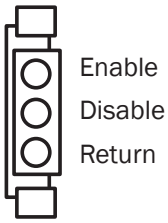
Block Diagram

Use this diagram as a companion for the descriptions on the following pages. The upper section is the PDU's main power control elements. Below that are two wiring examples of buttons which can be wired to the EPO connector. There are several EPO configuration options and wiring options. As the document progresses, alternative wiring schemes will be shown to match specific EPO configurations. (Note that the remote mode switch has used varying labels over the years, but the functions of the up/middle/down positions have remained the same.)



The Remote/EPO Connector

Every PDU with the remote panel system has at least one connector with three pins, usually mounted vertically. The three pins are labeled `Enable` (top), `Disable` (center), and `Return` or `Common` (bottom). The connector provides On/Off and EPO control, but it is often referred to simply as the **EPO Connector**.



One vs. Multiple Connectors

Some units, particularly the 1U models, have only one of these connectors. Many models will have multiple connectors with some on the back panel, and/or some on the front panel. Whenever there is more than one connector, they are all wired in parallel (all `Enable` pins connected, etc.).

An external On/Off and EPO circuit would be wired to just one connector (even if there are multiple EPO buttons). The additional connectors are intended to daisy chain out to additional PDUs so they can all be controlled from the same circuit It doesn't matter which PDU the remote panel buttons are wired to. All PDUs will get the signals.

Before wiring the **EPO Connector**, be sure to know the EPO Controller configuration.

Enable Pin

The `Enable` pin is essentially the On/Off control for the **EPO Contactor**. The **EPO Controller** of the PDU primarily uses the `Enable` state to switch the **EPO Contactor** `On` and `Off`, enabling power to be applied to the outlets (assuming there is not an active EPO condition).

The `Enable` input can be configured to require a maintained signal, or a momentary signal. However, unless there's a specific reason (usually legacy compatibility), we don't recommend using a momentary `Enable` signal for most systems. Reasons for that are discussed below.

Maintained Enable

With a maintained signal, the contacts between `Enable` and `Return` must be maintained `closed` in order to keep the **EPO Contactor** switched **On**. With a rocker, toggle, or similar SPST maintained switch, this creates a single On/Off master outlet control switch from a remote location.

A triggered EPO condition will ignore the state of the `Enable` signal even if it is `On` to ensure the **EPO Contactor** is `Off`.

Momentary Enable

With a momentary signal, the contacts between `Enable` and `Return` do not have to be maintained in order to keep the **EPO Contactor** switched **On**. A momentary button can be used to briefly create a closed circuit, that otherwise is normally open.

However, a momentary Enable button provides only an On signal. It cannot generate an Off signal. The Disable button (which is usually the EPO button) has to be used to switch the **EPO Contactor** Off.

Both OSHA and NFPA have rules declaring that the EPO button must be distinct from the Off button, and that the EPO button is not to be used for day-to-day Off operation. This can be compensated for by adding a second (non-mushroom) button on the Disable line with the EPO button to perform the Off function. This solution works well enough for Off control, but in combination with some Disable configurations, the momentary Enable creates problems when clearing an EPO event.

With the combination of downsides and side effects with a momentary signal, we suggest that when using only a button (without additional relay logic) to interface to the Enable signal, that it be a maintained type of button.

Disable Pin

The Disable pin is activated to create an active EPO condition which switches the **EPO Contactor** Off denying power to all outlets (or most outlets in some PDU designs). When Disable is activated, Enable is overridden (essentially ignored).

Normally Open vs. Closed

The Disable input can be configured for normally open or normally closed operation.

Normally Open means the connection between Disable and Return pins are an open circuit (the two are normally not connected). To trigger an active EPO state, the two pins are connected (via button or relay contacts).

Normally Closed means the connection between Disable and Return pins are a closed circuit (the two are normally connected). To trigger an active EPO state, the two pins are disconnected (by a button or relay contacts). This option is considered a fail safe design in that any accidental severing of the wire (e.g. loose connection) will cause an active EPO state, and is the preferred option for modern installations.

Maintained vs. Momentary

The Disable input can be configured to require a maintained signal, or a momentary signal.

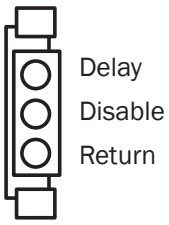
With a maintained signal, the contacts between Disable and Return must be maintained (whether open or closed) in order to keep an active EPO state engaged.

With a momentary signal, the normal state (open or closed) has to be changed for only a brief moment to trigger the EPO state and keep it engaged. If configured this way, the **EPO controller** needs an explicit Reset signal to clear the EPO condition. This is done by activating then deactivating the Enable input. The momentary Disable option has a small advantage in that it does not rely on a sustained signal to keep the EPO state engaged, and therefore is more resilient in conditions where the EPO button may bounce or the wiring is compromised.

Return (a.k.a Common)

Both the Enable and Disable inputs are to be wired back to the Return pin. The external wiring to activate or deactivate the inputs are to run through dry contacts, whether they're switches or relay contacts.

Delay Connector



Some systems will have a modified version of the **EPO Connector** which has a Delay pin in place of the Enable pin. If present, this connector is always in addition to the standard **EPO Connector**. This connector is designed to daisy chain directly to another PDU. It is not designed for external button connections.

Consider a set of three PDUs connected together through the **EPO Connectors**, One PDU, we'll call the primary PDU, has the On/Off and EPO buttons wired to it. When the On/Off button of the primary PDU triggers the Enable pin, all other Enable pins on other connectors are triggered at the same time. All PDUs will switch their **EPO Contactors** on at the same time, and thus applying power to outlets at the same time across all PDUs.

There may be a reason, perhaps inrush control, to stagger the switching on of each subsequent PDU in the daisy chain. The **Delay Connector** is essentially the same as the **EPO Connector** except the activation of the Delay pin is delayed by the **EPO Controller** for some number of seconds. The delay is preconfigured at the factory—two seconds is typical for standard PDUs, up to 16 is possible for custom PDUs. By daisy chaining a second PDU with the **Delay Connector**, the second PDU is powered a few seconds after the primary PDU. A third PDU could used the standard **EPO Connector** or the `Delay Connector` depending on the need for a delay or not.

Electrical Ratings

The **EPO Connector** pins have a 5 Vdc potential, are wired directly to TTL logic, and therefore have no load capacity. They cannot be used to drive lamps or relays.

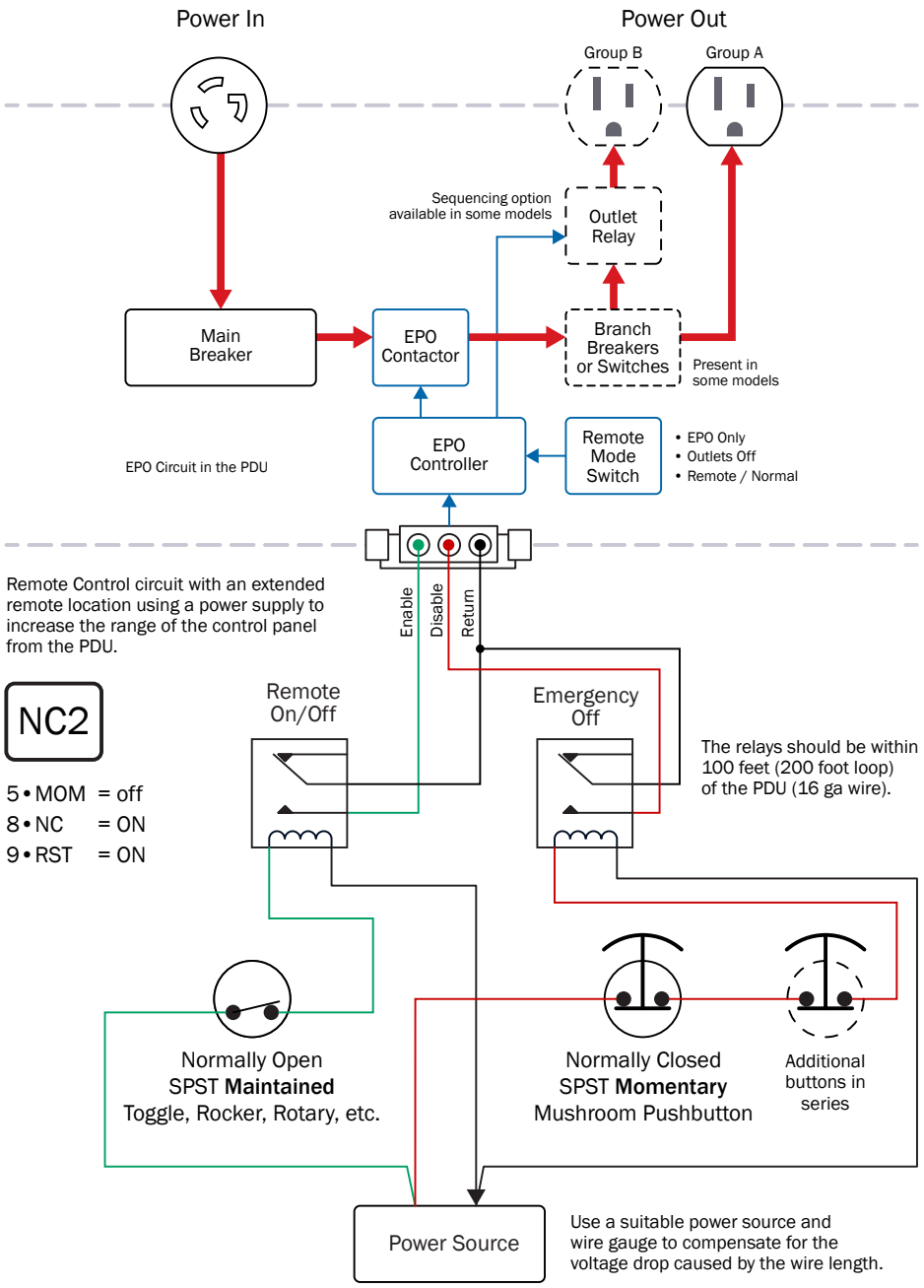
We recommend that wiring loop should have no more than a total of 200 feet between the Enable and Return pins, and separately between the Disable and Return pins. This allows for a remote panel approximately 100 feet away from the PDU. For these long distances, 16g wire should be used.

This length limit is based on voltage drop and EMI considerations. Long wire lengths can behave like an antenna creating false positive signals on the 5 Vdc circuit. Our experience is that up to 100 feet has worked well for thousands of installations over many years.

The Enable, Disable, Delay, and Return pins are wired directly to 5 Vdc TTL logic. They must be connected to dry contacts only. There is no capacity to drive lamps or relay coils.

For longer distances, or if the remote wiring will be routed through an electrically noisy environment, it may be necessary to create an externally powered loop through the buttons to control relays through which the PDU's native Enable and Disable signal can be routed. A higher voltage source would be more robust against voltage drop and EMI with longer wire loops.

The diagram below is an example of one of the EPO configurations (NC2) modified as described above. The size of the wire will be based on the length of the loop, and the tolerance for voltage drop. The voltage drop should not exceed the difference between the nominal voltage and the minimum voltage the relay coils require. For example, a 24 volt coil relay might have a specification for a minimum of 18 volts (a difference of 6 volts). Therefore, the voltage drop across the wire loop should probably be no more than 4 volts to allow for some headroom. Use a voltage drop table or calculator to estimate the drop across a particular wire type and gauge for a given length of wire. The exact voltages and details will depend on the end user's safety requirements, and other standards applicable to the application.



The Remote/EPO Mode Switch

Every PDU with the remote panel system has a **Remote Mode** switch. The switch is usually a shrouded mini toggle with three positions. The labeling of the switch, and the three positions have changed over time, but the three positions themselves always do the same thing.

When there is a remote panel connected to the PDU:

- `Remote` (down position) is the normal operating mode. Outlets are subject to the remote panel On/Off/EPO controls.
- `Off` (center position) causes the **EPO Contactor** to disengage power from outlets. Note that some PDUs have outlets not affected by this. The PDU will ignore the On/Off/EPO commands of the remote panel. Therefore, `Off` disconnects power to the controlled outlets even if the main breaker is `On`.

- `Local/On` (up position) causes the PDU to ignore the On/Off controls (the `Enable` signal) of the remote panel. The EPO (`Disable`) signal is still allowed.

When there is not a remote control panel connected:

- `Local/On` (up position) is the normal operating mode. Effectively, this is a Local Control mode.
- `Off` (center position) causes the **EPO Contactor** to disengage power from outlets. Note that some PDUs have outlets not affected by this. The PDU will ignore the On/Off/EPO commands of the remote panel. Therefore, `Off` disconnects power to the controlled outlets even if the main breaker is switched `On`.
- `Remote` (down position) will behave like `Off`. (With no remote control panel connected, this label may be a bit of a misnomer as this would not be the normal position.)

Note that it is possible to use this switch to do an EPO `Reset`. Toggle the switch to the `Off` (center) position for second or two, then back to the desired mode (usually the up position).

EPO Controller Configuration

The **EPO Controller** can be configured for a variety of switching arrangements and a few other options. However, these configurations are set at the factory, and are generally not changeable as the PDU is a sealed system, and opening it voids the warranty.

Still, in order to wire the PDU's remote panel On/Off and EPO circuits correctly, the EPO Controller configuration must be known. Contact Marway for model documentation if needed.

Standard Optima 5 Series

For the standard Optima 5 Series (520, 532, 533), the last three digits of the model number are used to indicate the EPO configuration — if the EPO Controller is included in the model. Check Marway's Standard Products Catalog for model numbers which include the remote panel / EPO capability.

- –000 = NO EPO (maintained enable, normally open EPO, no reset required)
- –001 = NC EPO (maintained enable, normally closed EPO, no reset required)
- –002 = LT EPO (momentary enable, normally closed EPO, no reset required)

Custom PDUs

For custom PDUs, the original specs and/or design discussions would have established the EPO related options. If the original documentation is not available, Marway can always reference it's internal documents based on the model number.

DIP Switch Reference

While these generally should not be changed in the field, the following configuration switches may come up in conversations when planning for new EPO requirements.

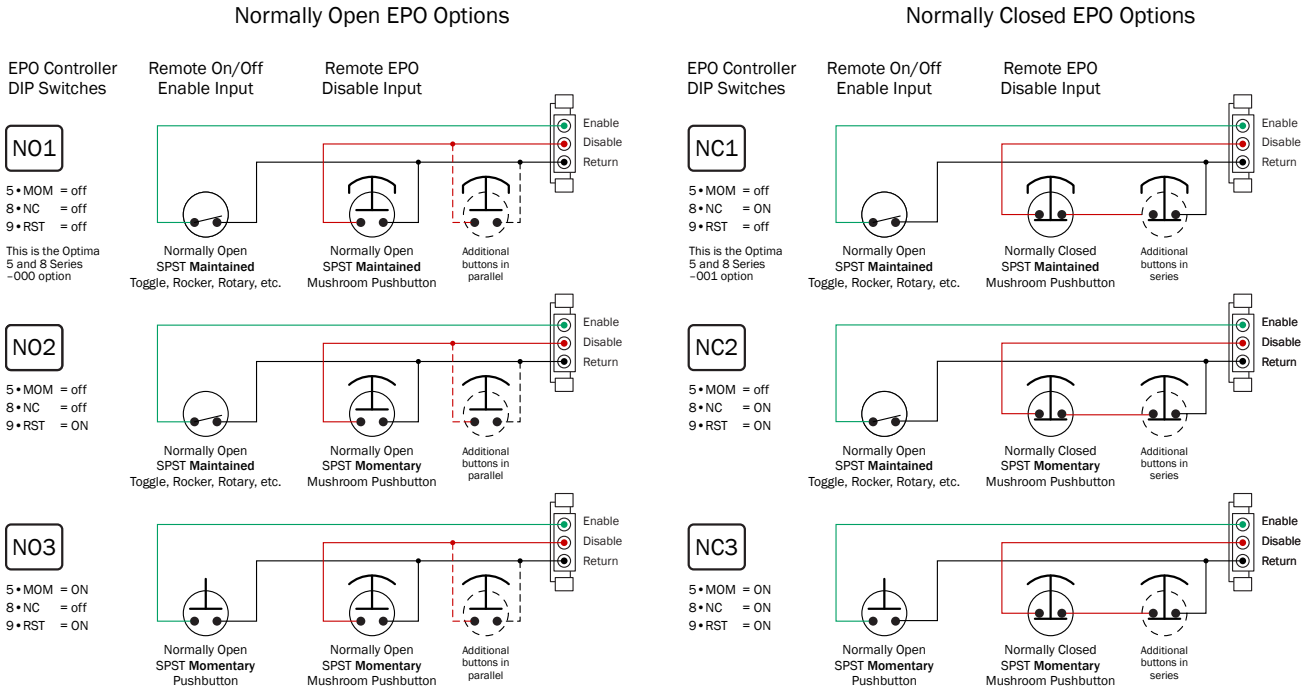
ON Purpose	Switch #	OFF Purpose
Output 2 Delay 1 Second	1 – 1SEC *	Combine the delays
Output 2 Delay 2 Seconds	2 – 2SEC *	switches for longer delays.
Output 2 Delay 4 Seconds	3 – 4SEC *	
Output 2 Delay 8 Seconds	4 – 8SEC *	
Momentary Start (Enable)	5 – MOM	Maintained Start (Enable)
Delay Output 1 at Start	6 – DLY1 *	No Start Delay
Output 1 and 2 Operate Together	7 – DLY2 *	Output 2 Delays After Outlet 1
Disable is Normally Closed	8 – NC	Disable is Normally Open
Reset Required	9 – RST	No Reset Required
Always in Remote Mode	10 – MOD	Normal Operating Toggle Switch

* The delay features are used for models which have the Delay Connector.

On/Off and EPO Button Configurations

The following chart shows the On/Off and EPO button configurations, and the EPO Controller DIP settings that correlate to the button types. In all cases, if there are to be multiple EPO buttons, the same button type is wired on the Disable circuit (N.O. buttons in parallel, and N.C. button in series). Note that if there are to be additional shutoff interlocks (typically SPST N.C.), the best option is to use a normally closed EPO circuit, and wire the interlocks in series with the EPO buttons.

As discussed in sections above, not all of these configurations are equally suited to modern safety guidelines. For installations using only buttons to engage the Enable and Disable control signals, our recommendation is to use either the NC2, NC1, NO2, or NO1 options shown below.



Note that the NO1, NC2, etc. designations are not related to PDU part numbers. They're designations used only for this documentation.

On/Off/EPO Configuration Reference

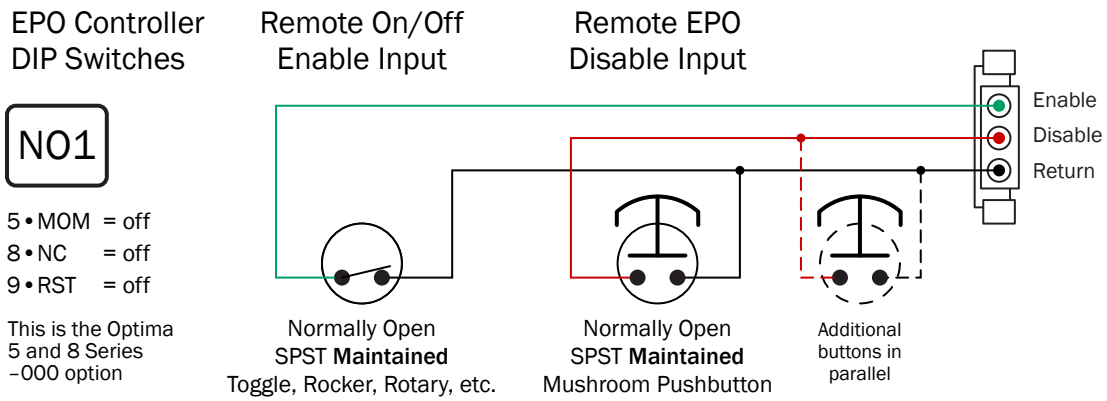
The above sections review the various hardware elements relevant to an external remote control panel and the EPO Connector interfaces. The following sections examine the various settings, button types, wiring, and operation of the possible configurations which have On, Off, and EPO buttons.

As discussed in sections above, not all of these configurations are equally suited to modern safety guidelines. For installations using only buttons to engage the Enable and Disable control signals, our recommendation is to use either the NC2, NC1, NO2, or NO1 options shown below.

NO1 • Maintained On/Off, Maintained EPO N.O.

This option is functionally equivalent to Marway's Commander UCP 4900 panel. It's the simplest design, but one could argue that NC1 or NC2 are better in that they offer a fail-safe design. The key disadvantage is that if the Enable button is still On when the EPO button (Disable) is released, then power is restored to the outlets immediately (a procedure where On/Off is switched off before releasing the EPO button will prevent automatic power restoration). This configuration is the default Normally Open option in standard Optima 5 models (–000) for reasons of compatibility with legacy installations.

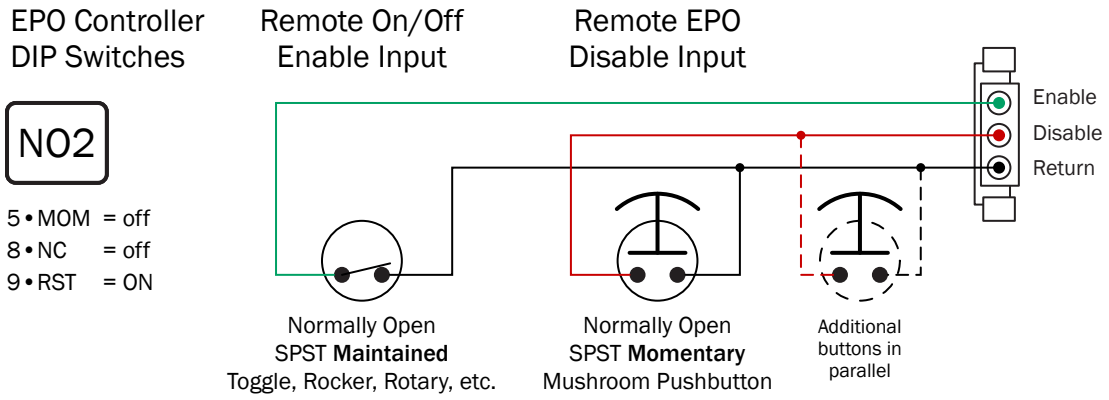
Prevent outlet power ("Off")	Trigger an active EPO (cut outlet power)
Ensure Disable is open Ensure Enable is open	Ensure Disable is closed The Enable state does not matter
Enable outlet power ("On")	Clear/Reset an EPO
Ensure Disable is open Ensure Enable is closed	Ensure Disable is open Outlets will be on if Enable is closed



NO2 • Maintained On/Off, Momentary EPO N.O.

This option has an advantage over NO1 in that after the EPO button (Disable) is pressed, it requires the Enable button be switched `Off` to `Reset` the EPO condition. Then, power is available to the outlets only when the button is switched back `On`.

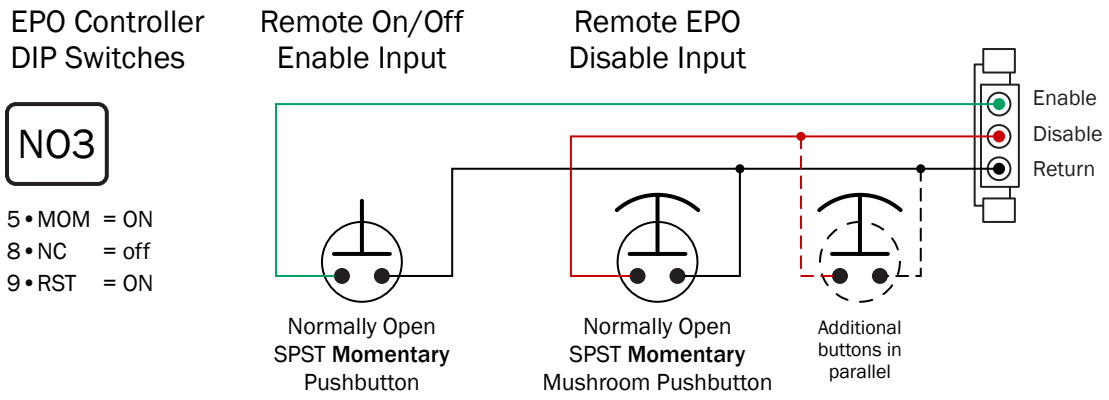
Prevent outlet power ("Off")	Trigger an active EPO (cut outlet power)
Ensure Disable is `open` Ensure Enable is `open`	Ensure Disable is `closed` at least briefly The Enable state does not matter
Enable outlet power ("On")	Clear/Reset an EPO
Ensure Disable is `open` Ensure Enable is `closed`	Ensure Disable is `open` Ensure Enable is `open` after Disable is `open`



NO3 • Momentary On/Off, Momentary EPO N.O.

Using a momentary Enable signal does not provide a built-in `Off` capability. In a simple two-button circuit, the EPO button has to be used as an `Off` button. Adding a second, non-mushroom N.O. button in parallel as a dedicated Off button can solve that. Therefore, using a momentary Enable button may require using a three-button circuit depending on the safety standards of the installation. A downside to even the three-button circuit is that there is no separate EPO `Reset` action. Clearing the EPO trigger state is synonymous with starting power to the outlets by pressing the Enable button.

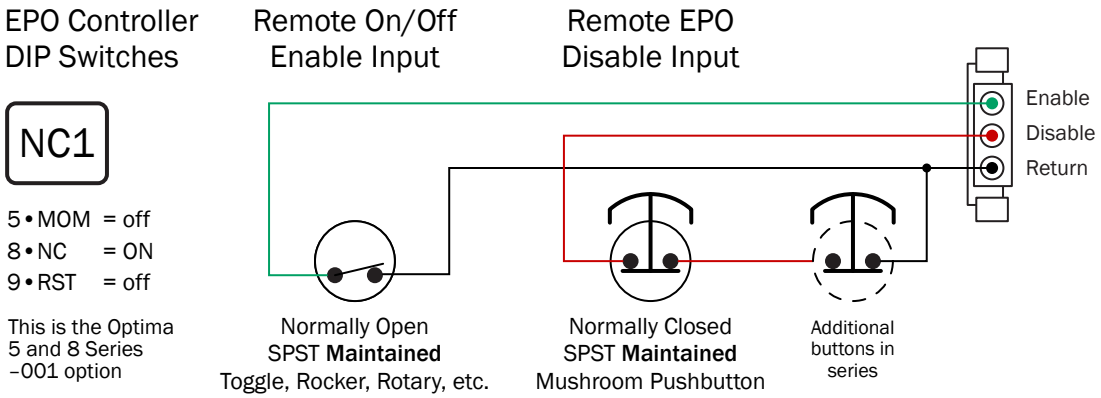
Prevent outlet power (“Off”)	Trigger an active EPO (cut outlet power)
Ensure Disable is `open` Ensure Enable is `open`	Ensure Disable is `closed` The Enable state should already be open
Enable outlet power (“On”)	Clear/Reset an EPO
Ensure Disable is `open` Ensure Enable is `closed` briefly	Ensure Disable is `open` Briefly `closing` Enable both resets and enables power



NC1 • Maintained On/Off, Maintained EPO N.C.

This is one of the two (along with NC2) most ideal configurations. It's a simple design, but one could argue that NC2 is better in that it requires a Reset prior to power being restored to the outlets. The key disadvantage of NC1 is that if the Enable button is still On when the EPO button (Disable) is released, then power is restored to the outlets immediately (a procedure where On/Off is switched off before releasing the EPO button will prevent automatic power restoration). This configuration is the default Normally Closed option in standard Optima 5 models (–001) for reasons of compatibility with legacy installations.

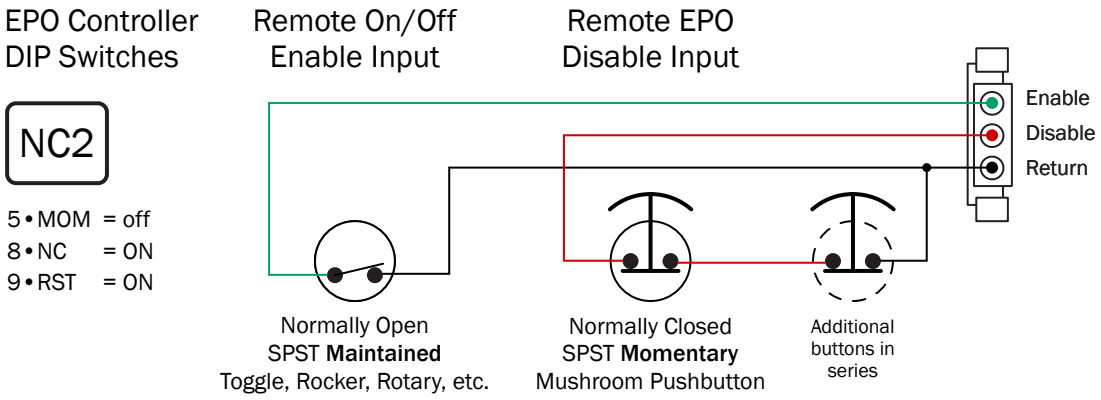
Prevent outlet power ("Off")	Trigger an active EPO (cut outlet power)
Ensure Disable is closed Ensure Enable is open	Ensure Disable is open briefly The Enable state does not matter
Enable outlet power ("On")	Clear/Reset an EPO
Ensure Disable is closed Ensure Enable is closed	Ensure Disable is closed Outlets will be on if Enable is closed



NC2 • Maintained On/Off, Momentary EPO N.C.

This is the the most ideal simple, two-button configuration. It has an advantage over NC1 in that after the EPO button (Disable) is pressed, it requires the Enable button be switched `Off`, to `Reset` the EPO condition. Then, power is available to the outlets only when the button is switched back `On`.

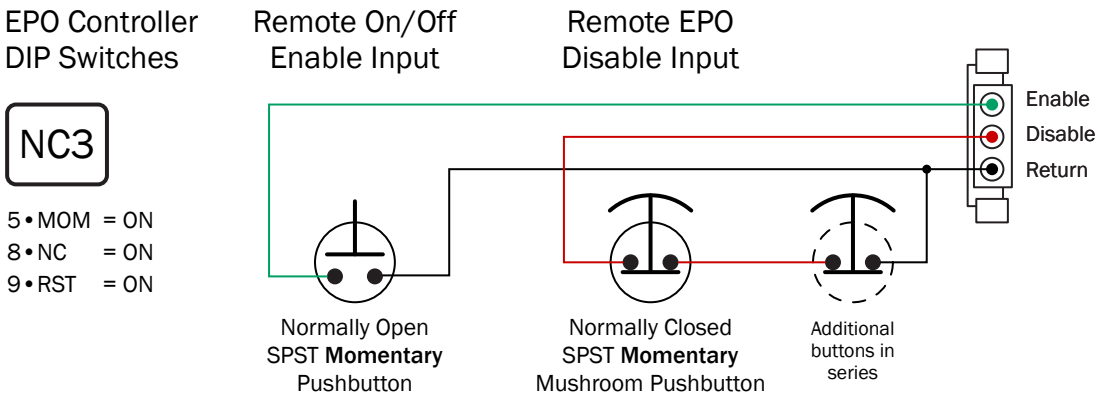
Prevent outlet power (“Off”)	Trigger an active EPO (cut outlet power)
Ensure Disable is `closed` Ensure Enable is `open`	Ensure Disable is `open` briefly The Enable state does not matter
Enable outlet power (“On”)	Clear/Reset an EPO
Ensure Disable is `closed` Ensure Enable is `closed`	Ensure Disable is `closed` Ensure Enable is `opened` after Disable is `closed`



NC3 • Momentary On/Off, Momentary EPO N.C.

Using a momentary Enable signal does not provide a built-in `Off` capability. In a simple two-button circuit, the EPO button has to be used as an `Off` button. Adding a second, non-mushroom N.C. button in series as a dedicated Off button can solve that. Therefore, using a momentary Enable button may require using a three-button circuit depending on the safety standards of the installation. A downside to even the three-button circuit is that there is no separate EPO `Reset` action. Clearing the EPO trigger state is synonymous with starting power to the outlets by pressing the Enable button.

Prevent outlet power (“Off”)	Trigger an active EPO (cut outlet power)
Ensure Disable is `closed` Ensure Enable is `open`	Ensure Disable is `open` briefly The Enable state should already be open
Enable outlet power (“On”)	Clear/Reset an EPO
Ensure Disable is `closed` Ensure Enable is `closed` briefly	Ensure Disable is `closed` Briefly `closing` Enable both resets and enables power

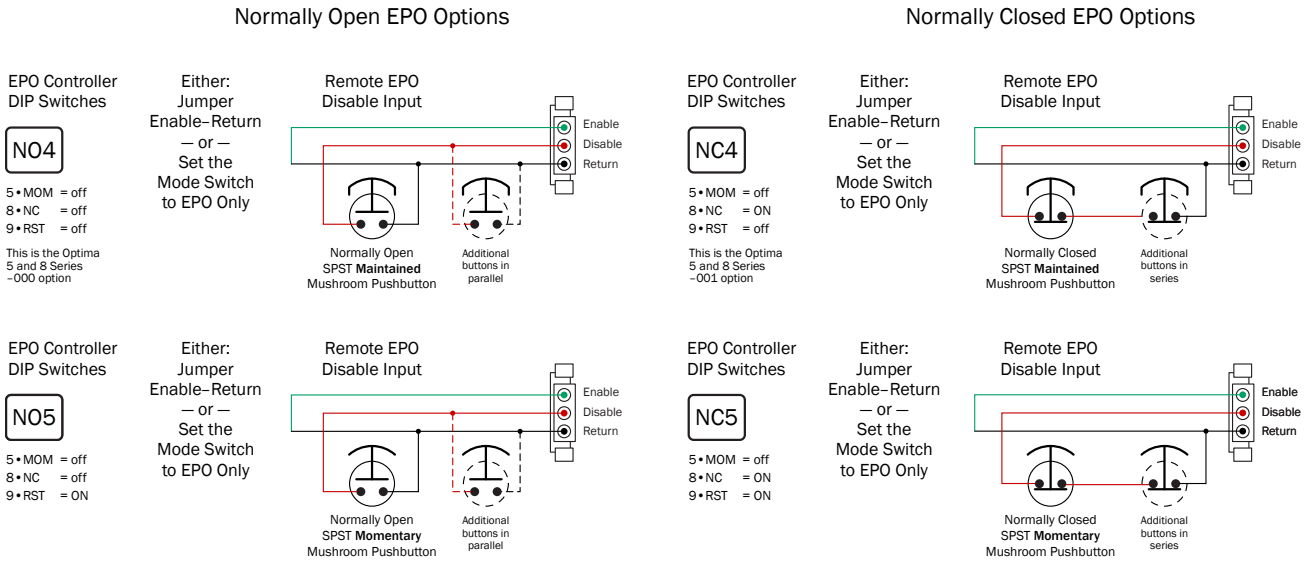


EPO Only Configuration Reference

For installations where a full On/Off/EPO control panel is not desired, it is possible to configure the PDU and EPO Connector for EPO only input.

We see this type of circuit used where the PDU and all outlets are always powered, or where the outlet control is managed directly from PDU's own control panel, but where EPO buttons at various locations are desired for safety.

Overall, there are four configurations. They mirror the settings and operation of NO1, NO2, NC1, NC2 except that there is a permanently shorted `Enable` signal (either from an **EPO Connector** jumper, or from setting the **Mode Switch** to `EPO Only`.



Change Log

R3 — Sep 18, 2026 — gw

- Added EPO Only configuration discussions.
- Added example schematic for using an external power source to increase the remote panel distance beyond what the EPO connector can support directly.

R2 — Sep 16, 2026 — gw

- Added Mode Switch discussion.
- Updated some of the configuration descriptions.

R1 — Sep 4, 2026 — gw

- Original release.