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FXM HP UPS EDUCATION SERIES

FXM-HP **RUGGED UPS MODULE DRY CONTACT RELAYS**







DRY CONTACT RELAYS

Dry Contact relays are used for a variety of functions. They could be used for sending an alarm back to central hub/NOC when the UPS is in backup, bringing the traffic signal cabinet to flash when the batteries are low, and many other uses. The FXM UPS comes with 5 programmable dry contact relays. They are pre-programmed with default settings as shown below. Each Relay is rated for 1A/250VAC and is SPDT (Single Pole Double Throw) which means that you have a center contact which can make contact with either the NC (Normally Closed) or the NO (Normally Open) contact. When the relay is de-energized (not triggered), the center contact is making contact with the NC contact. Most wiring scenarios use the center contact and the NO contact which completes a circuit when the relay is energized due to the programmed event occurring. Terminal blocks are removable and accept 16 to 22AWG wire.



The sixth set of contacts, C6, is used to power a DC cabinet fan. The programming of C6 cannot be changed by the user and is set at the factory. We provide DC fans in our cabinet because they are more efficient, generally quiet and easier to wire and control.



One possible wiring scenario as shown previously. This scenario uses C1, C2, and C5 to provide controller alarm inputs. Further, C3 is wired to bring the signal cabinet to flash operation when the programmed "Low Battery" threshold is reached while in backup. Relays C1, C2, C3, and C5 in this example use the controller logic ground as the center contact.

PROGRAMMING DRY CONTACT RELAYS

The dry contact relays are programmable through the web browser and the touchscreen LCD. This document shows the method through using a web browser. To program with the LCD, use the menu icon to navigate similarly to what is shown here.

WEB BROWSER

To view the current relay settings, browse to System/Status and scroll down to Relays. The relays are shown in order C1-C6. The second column shows the current state of the relay, whether it is energized (triggered) and which contact is closed. The Count column shows how many items are programmed to trigger the relay. The Actions column allows you to test the relay. Clicking the arrow in the last column allows you to edit some of the settings.

Relays					
Name 💠	Value	\$	Count	\$ Actions	
On Battery (Output Relay C1)	Normal	Not Energized (N.C. contacts closed)	1	🖒 Test Relay	
Low Battery + No Line 1 (Output Relay C2)	Normal	Not Energized (N.C. contacts closed)	1	🖞 Test Relay	\square
Low Battery + No Line 2 (Output Relay C3)	Normal	, Not Energized (N.C. contacts closed)	1	🖞 Test Relay	
Timing Relay 1 (Output Relay C4)	Normal	, Not Energized (N.C. contacts closed)	1	🖞 Test Relay	
Controller Alarm (Output Relay C5)	Normal	, Not Energized (N.C. contacts closed)	3	🖞 Test Relay	
External VDC (Output Relay C6)	Not Ava	ilable, Configured for Fan	0	👌 Test Relay	\square





CHANGING THE DURATION OF A TIMER RELAY

The default duration for the timer relays is 120 minutes. If you would like to change this value navigate to the Load Shedding Relays page as shown below. Select and edit the "Relay Activation Delay" of Timer 1 to the desired time. Be sure to also "Enable" the relay.

🔺 / System / F	FXM-HP 1	20V-48V/854 / System Functions /	Load Sheddin	g Relays / Timer 1 (Loa	d Shedding	Relay/881)		
Status				Configuration				
Name ≑	Value	\$	Actions	- Remove				
State	Inactive		0	Name 🚖	Value 🏛		Actions	
Relay Status	Normal,	Not Energized (N.C. contacts closed)	0	Name	Timer 1		Actions	
Trigger Source Status	False		0	Description				
Delay Remaining	m		0	Relay Enable	Enabled			
Time Period 1			0	Relay	FXM ADIO:	Timer 1 (Output Relay C4)		
Time Period 2			0	Relay Trigger Source	FXM-HP 12	20V-48V/854: AC Power Outage Status		
				Relay Activation Delay	120 m			Ø
				Time Period 1			🎢 Configure	Ø
				Time Period 2			🎢 Configure	

CHANGING THE TRIGGER OF A RELAY

Let's say we've decided to change what relay C3 is driven by and its name. Navigate to the below page by going to System/FXM-HP/Status and then scroll to Relays. Select the arrow on relay C3. Let's program it to be triggered by "Battery Runtime Low." Change the name of the relay by clicking. Type "Battery Runtime Low" and save. Next, click on the "Is Driven By" arrow.

Low Battery + No Line 2 (Output Relay C3)			Is Driven By	
Name 🗘	Value 🗘	Actions	Name \$	Actions
Low Battery + No Line 2 (Output Relay C3)	Normal, Not Energized (N.C. contacts closed)	0	FXM-HP 120V-48V/854: Low Battery and No Line 2	
Low Battery + No Line 2 (Output Relay C3) Name	Low Battery + No Line 2	Ø		
Low Battery + No Line 2 (Output Relay C3) Normal Position	Not Energized (N.C. contacts closed)	Ø		
Low Battery + No Line 2 (Output Relay C3) Test Status	Test Allowed	0		
Low Battery + No Line 2 (Output Relay C3) Comms Lost Action	No Action	Ø		



APPLICATION NOTE

		/ System / FXM-HP 120V-48V/854 / Configu	re Syster	n /	Low Battery and No Line 2	
	Low Ba	attery and No Line 2				
	🖒 Test A	Alarm				
	Name	÷	Value	\$		Actions
	Low Batt	tery and No Line 2	Inactive			1
	Low Batt	tery and No Line 2 Time of Activation				1
	Low Batt	tery and No Line 2 Time of Acknowledgement				1
	Low Batt	tery and No Line 2 Alarm Processing	Enabled	ł		Ø
	Low Batt	tery and No Line 2 Priority	Major		2	
	Low Batt	tery and No Line 2 Parameter 1				
	Low Batt	tery and No Line 2 Custom Name (Parameter 2)				
	Low Batt	tery and No Line 2 Relay	FXM AD	oio	Low Battery + No Line 2 (Output Relay C3)	
	ow Ba	ttery and No Line 2 Relay		e	d	1
F	FXM-HP	120V-48V/854	>			

The page above appears. Click the pencil/edit to remove relay C3 from this alarm above. Select "—" and then "Save." This removes C3 from being triggered by this alarm.

Next, we will setup C3 to be triggered by the new alarm.





ADDING A RELAY TO AN ALARM

Now that C3 has no trigger we will set it up for another. Navigating to the Alarms/All Alarm Settings page will show all the possible alarms it could be set to. In this example we are programming it to be triggered by "Battery Runtime Low." The easy way to find this is by simply typing "runtime" in the search bar at the top of the page and selecting "Go to View." Then select "Battery Runtime Low Relay" and select relay C3 as shown below and save. The relay is now programmed.

Battery Runtime Low				
🖕 Test Alarm				
Search	Aa	"abc"		
Name ≑		Ţ	Value 💠	Actions
Battery Runtime Low			Inactive	0
Battery Runtime Low Time	of Activation			0
Battery Runtime Low Time	of Acknowled	Igement		0
Battery Runtime Low Alarm	Processing		Enabled	
Battery Runtime Low Priorit	у		Minor	
Battery Runtime Low Paran	neter 1			
Battery Runtime Low Custo	m Name (Pa	rameter 2)	
Battery Runtime Low Relay				Ø
Battery Runtime Low Limit			60.0 m	
Battery Runtime Low Hyste	resis		5.0 m	
« < 1 2 >	Battery Runt	ime Low F	Relay	
	> FXM-HP 120	-48V/854 🕻	FXM ADIO 🕻 Bat	tery Runtime L
		9\ <i>11</i> 95 <i>4</i>		FXM.
	1200-4	o v70J4		



NOTE

- A relay can have more than one trigger and the "Count" shows how many triggers are driving that relay
- Timer and TOD (Time of Day) relay settings can be found on the "Load Shedding Relays" page

PROGRAMMING RELAYS FOR TIME OF DAY

This feature allows the ability to exclude a timer or low battery relay operation if the current time falls within the TOD window. This can be useful if you don't want to bring the intersection to flash during rush hour if the UPS timer has expired or the battery has hit the low battery threshold.

- Timer Relay & TOD Adjust scheduled time periods in Scheduler and select the schedule in the Timer (Load Shedding) relay section as shown below
- Low Battery + No Line & TOD Adjust scheduled time periods in Scheduler. You will also need to change the way the desired relay is programmed, add a Custom Data equation, and add a Change Relay Action. See "FXM-HP UPS Custom Data & User Alarms" application note as this process is covered in detail there.

SCHEDULER

Navigate to Controller/Advanced Functions/Scheduler. Look at the scheduled time periods and adjust the times and days of week as necessary for your TOD windows.





LOAD SHEDDING RELAYS

Navigate to System/FXM-HP/System Functions/Load Shedding Relays page. Select Timer 1. Click and edit as needed:

- Relay Enable Verify the relay is enabled
- Relay Verify that it is Output Relay C4
- Relay Activation Delay Set the amount of time until the relay energizes after the UPS is in inverter mode. The timer counts down when UPS is in inverter mode and the relay energizes when the timer hits 0.
- Time Periods Use the default ones or choose yours if you created others. By default, there are no time periods selected.

A / System /	FXM-HP 120V-48V/854 / System Functions / L	.oad Shedding
Status		
Name \$	Value 🗘	Actions
State	Inactive	C
Relay Status	Normal, Not Energized (N.C. contacts closed)	0
Trigger Source Status	False	0
Delay Remaining	m	0
Time Period 1	6:00 AM - 9:00 AM	U
Time Period 2	4:00 PM - 7:00 PM	U





LOW BATTERY VS. LOW BATTERY + NO LINE

The Low Battery setting will trigger the relay when the battery capacity reaches the "Low Battery Threshold" set in System/FXM-HP/Configure System/System Properties. The default threshold is at 40%. The low battery relay is a way to take your signal cabinet to flash to extend overall run time of the system while in inverter mode.

Low Battery relay will stay energized even after utility is restored, until the battery voltage exceeds the threshold setting while charging. This means that if you have your traffic signal wired for Flash using this programming that your intersection will stay in Flash after utility returns until the battery voltage gets above this threshold. To prevent this, we have defaulted C2 & C3 for "Low Battery + No Line" setting which will have the signal come out of Flash as soon as utility is restored.

For assistance, contact Alpha Technical Support:

Toll Free North America: 1.888.462.7487 International: +1.604.436.5547 Monday - Friday, 7:00 AM - 5:00 PM PST for regular inquires 24/7 for emergency support <u>Click here to report a problem</u>



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