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MOP for Shunt Mux Negative Current Values

Objective

This procedure will outline the process for correcting the negative amperage reading on the shunt mux by creating an equation to convert the negative value to zero. This will enable the controller to display the correct readings.

Affected System PN:

Part #: 0910025-001, 0910027-001, 0910029-001, 0913022-001. Also can affect power plants if used with the Bolt-In Breaker Panels 0250002-xxx connected with shunt mux 018-568-20-xxx

Tools/Information Required

- Laptop
- Cross-over ethernet (RJ45) cable
- Voltmeter with DC mV range
- System schematics



In this set up, system has 2 shunts mux, 3 X distribution panel with 16 shunts each rated 300A /50mV

Issue:

The problem occurs when there is a shunt mux connected to a load but the breaker for that load is turned off (That shunt mux effectively sits at ground level while the other shunt mux's are at -48V). The problem goes away when all circuit breakers are turned on, or the load is disconnected from the breaker that is turned off.

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Preparations before commencing with the procedures

- 1) Confirm there are no controller alarms present; all alarms should be cleared before proceeding with this MOP, unless alarms are directly related to the issue.
- 2) Confirm all parts and tools required are available.

To get this issue resolved, we will be dividing the procedure into 4 steps.

For purposes of this MOP, system p/n 0913022-001 is used as a reference. Always refer to the system's wiring diagram to group the breaker panel shunt mux channel correctly.

Procedure:

1. Following the procedures in the 'MOP CXC Ethernet Connection', log onto the controller.

2. Go to Signals> ADIO Device Configuration

mux name.

CXC Supervisory, Burnaby, B.C.	_			Cordex CXC v2.05	<u>ات</u>
Language Logout					
Normal Alarm Cut Off	Submit Changes Dis	scard Changes	Battery Vo Load Cu	litage 53.97V Irrent -31.5A	
System Controller Con	verters Rectifiers Batteries View Live Status Configure S	Alarms Signals Controls Signals Configure Data Loggi	Communications Hardw ing ADIO Device Configuration	are Logs and Files Supervisor	
	Signals > ADIO Dev	vice Configuration			*
	ADIO Device Configura	ation			
	Device Name	Serial Number	Version Number		
	Shunt Mux #1				
	Shunt Mux #2	391	1.10		
	Modify Name	Configure Alarms	Calibrate		
From here This button will	you can see the num	nber of shunt mu Clickirg the 3	x(s) present in th buttons below w	e system, their SN and vill give you options to c	versi do th
give you an option					_
to modify your		This	is to set the Hi a	nd Low limit for the	
shunts & shunt		aları	ms in each shunt	Sten # 1 is to focus on	
		ului i			

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ADIO Device Configuration - Windows Internet Explorer							
http://192.168.168.10/adio_alarmconfig.htm?40							
Device N	ame						<u>^</u>
		Shunt M	ux #2				
High and	Low Limits						
Enable	Channel Name	Low Limit			High Limi	it	
V	AMPS01	-9999	A		480	A	
	AMPS02	-9999	А		480	A	
	AMPS03	-9999	A		480	A	
V	AMPS04	-9999	A		480	A	
	AMPS05	-100	А		100	A	
	AMPS06	-100	A		100	A	-
	AMPS07	-100	А		100	A	-
V	AMPS08	-100	A		100	A	
	AMPS09	-100	A		100	A	
	AMPS10	-100	A		100	A	
	AMPS11	-100	A		100	A	
	AMPS12	-100	A		100	A	
	AMPS13	-100	A		100	A	
	AMPS14	-100	A		100	A	
	AMPS15	-100	A		100	A	
	AMPS16	-100	A		100	A	
Average	Voltage Deviation 0	v					
						Back	Apply Changes

Step # 1:

Setting the low limit equal to -9999 in the shunt alarms.

- Click on <u>Configure</u> <u>alarms</u> button, expect the popup to come out.
- 2. Change all the low limit values to –9999
- 3. Click on <u>Apply</u> <u>changes</u> in the bottom right.

Apply Changes

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Because there are a limited number of load current signal readings, and more shunts to read, we will be using the customs signals for us to create an equation that can read all the amperage values. We are going to make a signal equation that will fit to the limited number of characters allowed for each signal.

The number of custom signals to be use will be based on the number of shunts on the distribution panel. For the demonstration purposes, we will be using 3 distribution/breaker panels and 2 shunt mux. Number of shunt mux will be based on the number of shunts.

Submit Signal Text Changes



Step#3

panel

Configure custom

signals by creating

the signal equation

1. Click on SIGNALS

Menu. Then click on

Configure Signals as

2. Click on Custom

Signals and look for

the Signal list which

#2 like the Total

Current-Bkr Pnl #1

you renamed on Step

shown in the picture.

for each distribution

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Since we do have 3 distributions / breaker panels, we need to create a signal equation for each but this EQUATION will be applied to any system that has the multiple shunts. Most of the time, each breaker panel has 12 shunt positions but sometimes it may vary, and each shunt mux has 16 positions. We need to shorten the equations. Instead of getting the summation of the 16 shunts, we will group them into 4 shunts as shown below.

For Breaker Panel 1: we have 8 shunts only

From (OLD) :{Shunt Mux #1:AMPS01}+{Shunt Mux #1:AMPS02}+{Shunt Mux #1:AMPS03}+ dp to 8

NEW: [Bkr Pnl #1 Shunt 1-4]+[Bkr Pnl #1 Shunt 5-8]

🖉 Equation Editor - Windows Interr	net Exp	lore	r						
http://10.10.10.201/equation_editor	.htm								
Operators + - * / &	! =	<	>	()	Constants	True	False	Function
[Bkr Pnl #1 Shunt 1-4]+[Bkr Pnl	#1 Shu	int 5	-8]						
Operand									
Controller Signals	Total	Curr	ent	- Bk	r Pn	l #1			
Analog Input	Total Current - Bkr Pnl #2								
Digital Input Rectifier Signals	Total	Curr	ent	Bk	r Pn	l #3			
Custom Signals	Bkr Pr	nl #1	L Shu	unt	1-4				
Rectifier Alarms	Bkr Pr	nl #1	L Shu	Int	5-8				

3. Click on the Customize button, the equation editor pop-up will appear

4. On the Equation Editor screen, delete the old equation at the top and create a new equation following or using the new customized signal depending on the number of shunts.

5. Continue on creating the equation until the last breaker panel.

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Equation Editor - Windows Internet Explorer http://10.10.10.201/equation_editor.htm Operators + - * / & | ! = < > () Constants True False Fun is abs [Bkr Pnl #2 Shunt 1-4]+[Bkr Pnl #2 Shunt 5-8]+[Bkr Pnl #2 Shunt 9-12] Analog Input Total Current - Bkr Pnl #2 Digital Input Total Current - Bkr Pnl #3 **Rectifier Signals** Bkr Pnl #1 Shunt 1-4 Bkr Pnl #1 Shunt 5-8 Rectifier Alarms Digital Alarms Bkr Pnl #2 Shunt 1-4 Voltage Alarms Bkr Pnl #2 Shunt 5-8 Current Alarms Bkr Pnl #2 Shunt 9-12

For Breaker Panels 2. We have 12 shunts

You can use the same equation, just add shunt numbers if necessary

[Bkr Pnl #2 Shunt 1-4]+[Bkr Pnl #2 Shunt 5-8]+ [Bkr Pnl #2 Shunt 9-12]

For Breaker Panels 3: we have 12 shunts Bkr Pnl #3 Shunt 1-4]+[Bkr Pnl #3 Shunt 5-8]+ [Bkr Pnl #3 Shunt 9-12]

Setting Name	Controller Value	New Value	
Signal Equation		-	
Signal Equation			
Total Current - Bkr Pnl #1	[Shunt Mux #1:AMPS01]+[Shunt Mux #1:AMPS02]+ [Shunt Mux #1:AMPS03]+[Shunt Mux #1:AMPS04]+ [Shunt Mux #1:AMPS05]+[Shunt Mux #1:AMPS06]+ [Shunt Mux #1:AMPS07]+[Shunt Mux #1:AMPS08]+ [Shunt Mux #1:AMPS09]+[Shunt Mux #1:AMPS10]+ [Shunt Mux #1:AMPS11]+[Shunt Mux #1:AMPS12]	[Bkr Pnl #1 Shunt 1-4] +[Bkr Pnl #1 Shunt 5- 8]	
✓ Total Current - Bkr Pnl #2	[Shunt Mux #1:AMPS13]+[Shunt Mux #1:AMPS14]+ [Shunt Mux #1:AMPS15]+[Shunt Mux #1:AMPS16]+ [Shunt Mux #2:AMPS01]+[Shunt Mux #2:AMPS02]+	[Bkr Pnl #2 Shunt 1-4] +[Bkr Pnl #2 Shunt 5- 8]+[Bkr Pnl #2 Shunt 9-12]	

6. Click Accept button on the lower right to accept the equation that you made.

Accept



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After setting equations for each distribution panel and by dividing the shunts by 4, we need to create an equation for each grouping using the logical equation that will give zero amp value to all negative readings.

Configure Signals				
Signal Categories	Signal List			
Controller Signals	Bkr Pnl #1 Shunt 1-4			
Analog Input	Bkr Pnl #1 Shunt 5-8			
Custom Signals	Bkr Pnl #2 Shunt 1-4			
Timers	Bkr Pnl #2 Shunt 5-8			
Counters	Bkr Pnl #2 Shunt 9-12			
Shunt Mux #1 Shunt Mux #2	Bkr Pnl #3 Shunt 1-4			
	Bkr Pnl #3 Shunt 5-8			
	Bkr Pnl #3 Shunt 9-12			

Equation Editor - Windows Internet Explorer http://10.10.10.201/equation_editor.htm

Operators + - * / & | ! = < > () Constants True False Functions abs() sqrt()

([Shunt Mux #1:AMPS01]*([Shunt Mux #1:AMPS01]>0))+([Shunt Mux #1:AMPS02]*([Shunt Mux #1:AMPS02]>0))+([Shunt Mux #1:AMPS03]*([Shunt Mux #1:AMPS03]*([Shunt Mux #1:AMPS04]>0))

Operand			
Controller Signals	Load Voltage	53.95V	-
Analog Input	Load Current	0.0A	
Digital Input	Battery Voltage	53.95V	
Custom Signals	Battery Current		
Rectifier Alarms	AC Mains	(<u></u>)	
Digital Alarms	Battery Temperature		
Voltage Alarms Current Alarms	Battery Runtime	(<u>)</u> ()	
	Battery Capacity	100.0%	
Battery Alarms	Battery DOD	2 <u>000</u> 0	
Miscellaneous Alarms	Converter Load Current		
A dia A breac			



Step#4

Configure <u>Custom</u> <u>Signals</u> by creating an equation signal to eliminate negative Amps readings.

1. Click on <u>Signals Menu</u>. Then click on <u>Configure</u> <u>Signals</u> as shown in the picture.

2. Click on <u>Custom</u> <u>Signals</u> and select the Signal List on which you are to edit. This time it is the shunt groupings. To begin, Bkr Pnl #1 Shunt 1-4.

3. Click on the

- 🗆 🗙

Customize button, the equation editor pop-up will appear

4. On the Equation Editor screen, we will use the logical equation. You will use the same logic for all the shunt groupings. Continue on creating the equation until the last grouping using the shunt mux signals.

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EQUATION for the sub divided custom signal breaker panels will have the following format. Example for Breaker Panel 1's "Bkr Pnl #1 Shunt 1-4 " and "Bkr Pnl #1 Shunt 5-8"

Bkr Pnl #1 Shunt 1-4

([Shunt Mux #1:AMPS01]*([Shunt Mux #1:AMPS01]>0))+([Shunt Mux #1:AMPS02]*([Shunt Mux #1:AMPS02]>0))+([Shunt Mux #1:AMPS03]*([Shunt Mux #1:AMPS03]>0))+([Shunt Mux #1:AMPS04]>0))

Bkr Pnl #1 Shunt 5-8

([Shunt Mux #1:AMPS05]*([Shunt Mux #1:AMPS05]>0))+([Shunt Mux #1:AMPS06]*([Shunt Mux #1:AMPS06]>0))+([Shunt Mux #1:AMPS07]*([Shunt Mux #1:AMPS08]>0))+([Shunt Mux #1:AMPS08]*([Shunt Mux #1:AMPS08]>0))



This equation will correct the negative of shunts readings and have it equal to zero. All groupings will have the same logic equations, from the first breaker panel to the very last. Repeat the same equation logic for other breaker panel custom signals. Make sure the right shunt mux and channel are used.



5. Click Accept button on the lower right of the equation editor window to accept the equation that you made.

6. Click

Submit Changes

button to submit all the changes and confirm; expect the pop-up to come up and verify all the equations and then

click the Accept outton on the compare settings window once all have been reviewed and confirmed.

Accept



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After setting the equations, please check the Signals > View Live Status. You will notice that shunts are reading negative values.

But because of the logical equation, it will now show on the next screen shot, the positive values of all the customize signals

From there, you can create your <u>Total Load</u> <u>Current</u> using the sum of all your breaker panel readings.

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iguage Logout						
Normal	rm Cut Off	anges Discard Changes	Battery Voltage 53.95V Load Current 9.2A			
System Contr	oller Converters Rectifiers View Live State	Batteries Alarms <mark>Signals</mark> Controls S Configure Signals Configure Data Loggin	Communications Hardware Logs and Files Supervisor ng ADIO Device Configuration			
	Signals > View	Live Status				
	Signal List	Signal List				
	Signal Categories	Signals Name	Value			
	Controller Signals	Load Voltage	53.95V			
	Analog Input	Load Current	9.2A			
	Digital Input Rectifier Signals Custom Signals	Battery Voltage	53.95V			
		Battery Current				
		AC Mains				
Converter Signals Timers Counters Shunt Mux #1 Shunt Mux #2	Timere	Battery Temperature				
	Counters	Battery Runtime				
	Shunt Mux #1	Battery Capacity	100.0%			
	Shunt Mux #2	Battery DOD				
	Converter Load Current	-				

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Total Load Current = Total Current Bkr Pnl #1+Total Current Bkr Pnl #2+Total Current Bkr Pnl #3c

Note: Setting the Total Load Current as shown in this procedure is only needed if the power plant does not have a main shunt installed.

For additional assistance or if you have any questions regarding this procedure, please contact Alpha Technical Support at 1-888-462-7487 or <u>www.alpha.ca/report-a-problem.</u>

Sincerely, Charlie Manson Technical Support Manager charlie.manson@alpha.ca

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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> #0470169-00 Rev A (08/2014)

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