

APPLICATION NOTE

Application note #	AN15-EN-142		
Date	30-10-2015	Revision	A
Subject	Using Trigger-Action to prioritize battery power over grid power		
Related product(s)	All Powersine Combi inverter/charger models		
No. of pages	10		

Description :

In a solar application containing an inverter/charger connected to a battery bank that is mainly being charged by a PV generator, one could require to operate on battery power as long as possible, before switching over to the metered AC-grid or an AC generator. This way, PV power will be maximally employed.

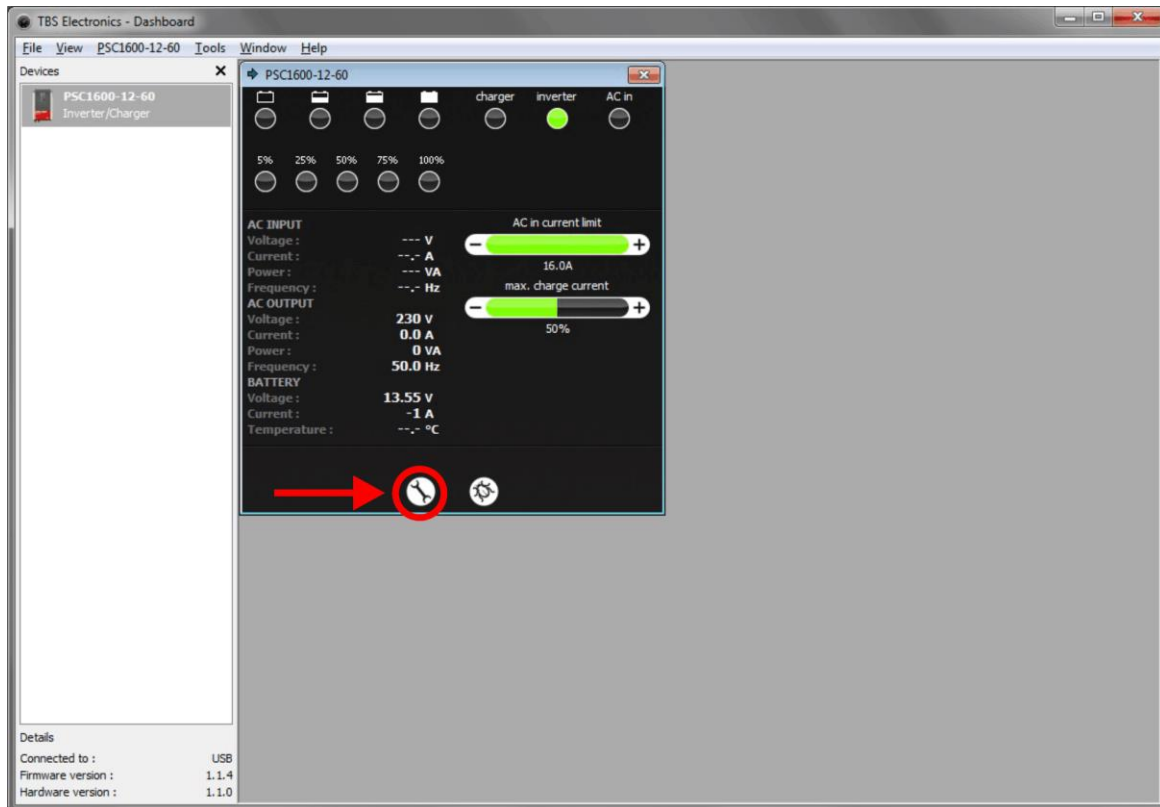
To set this up in the Powersine Combi, battery power must be prioritized over the available AC source connected to the AC input. This can be done by disabling the AC transfer switch as long as the battery voltage is above a certain level. Once this level is crossed due to the dropping battery SOC, the AC transfer switch will be enabled and the AC grid or generator will charge the battery, while maintaining the AC supply for the downstream AC loads connected to the inverter output. Once the battery voltage has climbed to a certain voltage again, the AC transfer switch will be disabled and the inverter runs on battery power again.

Additionally, during the AC transfer switch enable stage, the programmable alarm relay can also be activated. This allows a generator starter to be controlled by the Powersine Combi, in order to make sure that AC power is available to charge the battery in fully off-grid applications.

This scheme can be realized by setting up a so-called Trigger-Action event. For this, the Powersine Combi should be connected to a PC running TBS Dashboard through a TBSLink to USB interface box. These items are available in the "TBSLink to USB Interface Kit (art.# 5092120)". Given below is the step by step procedure to implement this Trigger-Action.

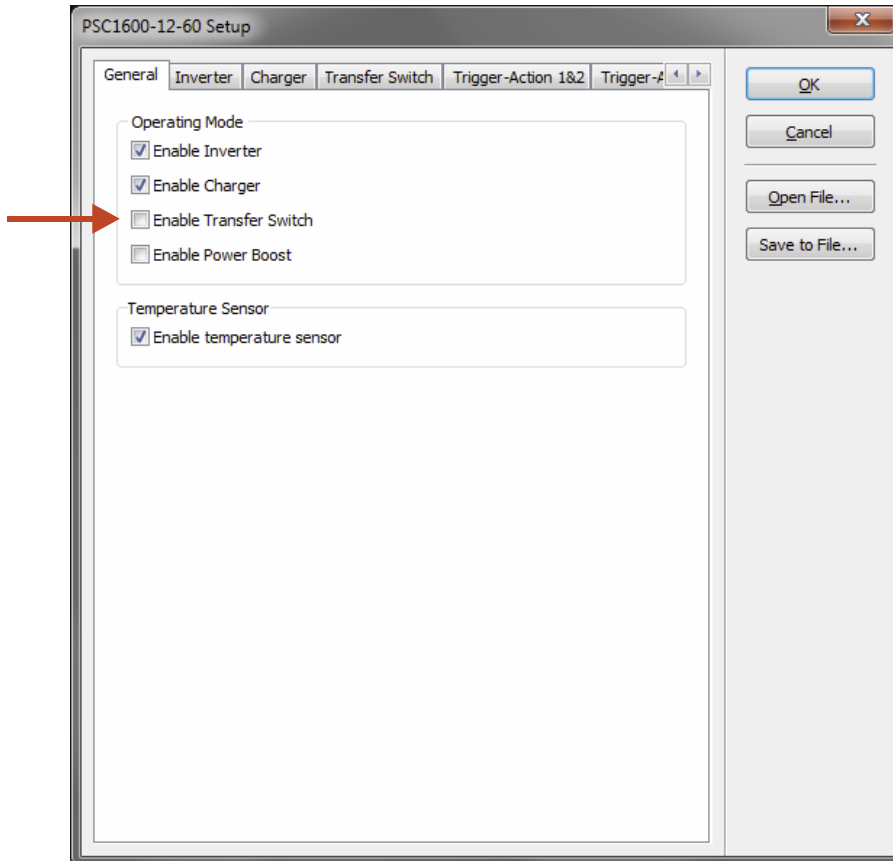
Step 1

For this example we have connected a Powersine Combi PSC1600-12-60 to a PC running TBS Dashboard. The image below shows the connected PSC1600-12-60 on the left, as well as the display/control panel on the right :



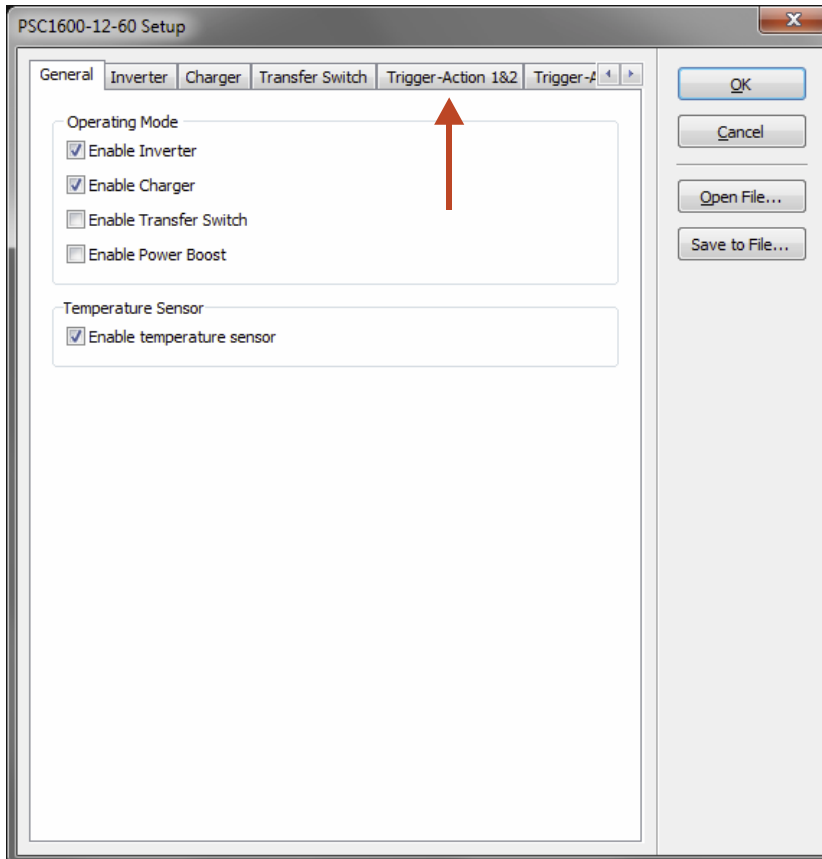
Step 2

Now that the setup window is opened, we first need to disable the AC Transfer switch by unchecking the 'Enable Transfer Switch' box below by the red arrow :



Step 3

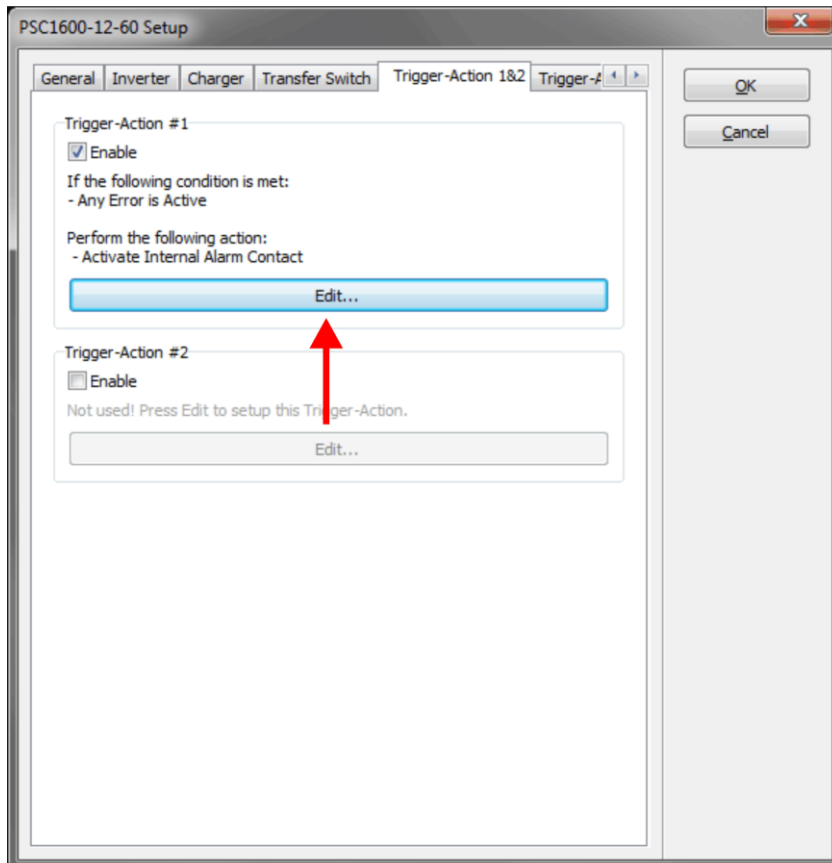
Now we need to select the tab “Trigger-Action 1&2” as indicated below by the red arrow :



Step 4

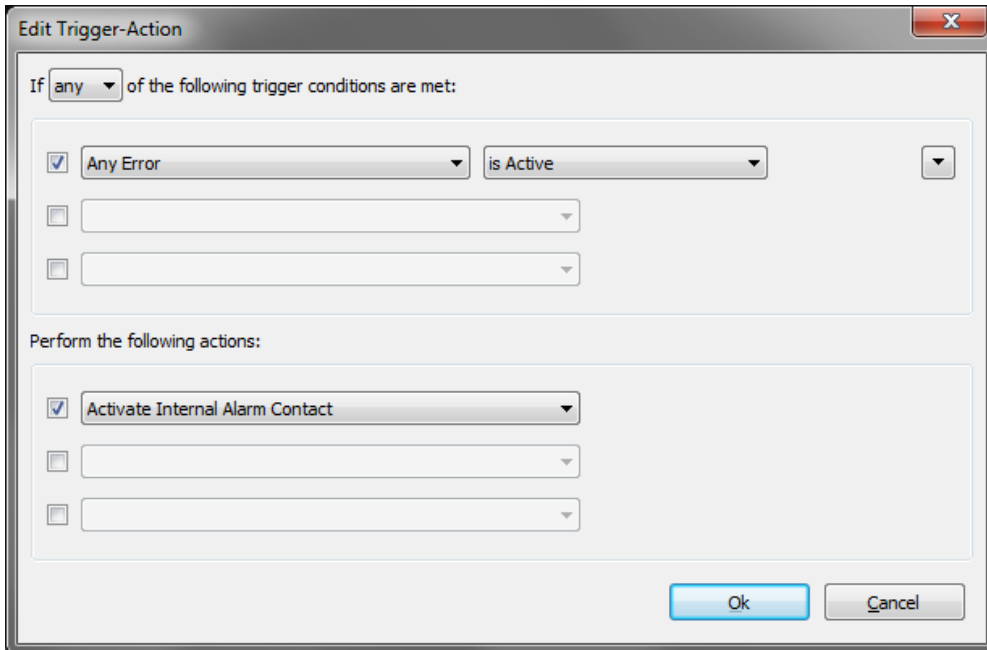
With the “Trigger-Action 1&2” tab opened, you can see below that “Trigger-Action #1” is already set by the factory in order to trigger the internal alarm relay once any error is active.

We are going to overwrite this Trigger-Action with the one explained in this application note. So we need to press the long ‘Edit’ button as indicated by the arrow below :



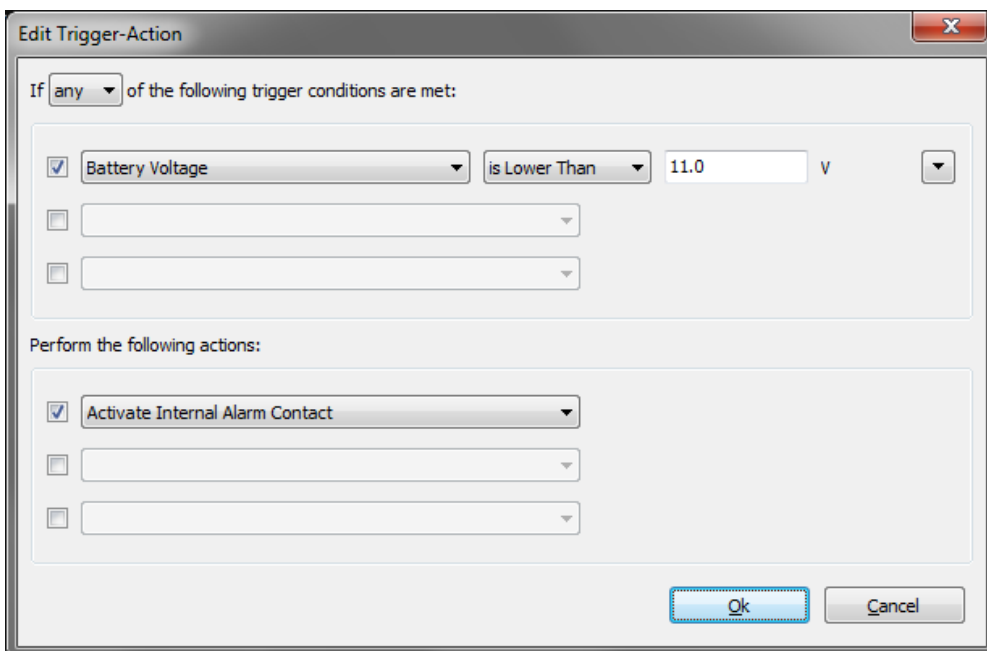
Step 5

The following edit window will appear, containing the default Trigger-Action values :



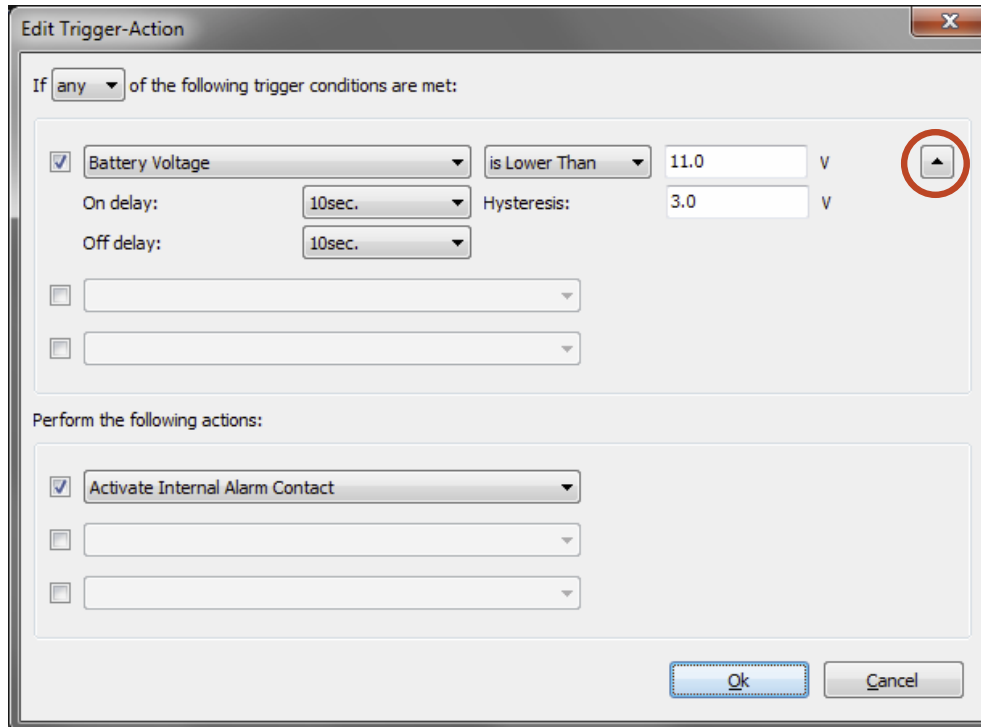
We will start by changing the Trigger conditions first. The trigger conditions in this example are : *Disable the AC transfer switch when the battery voltage is between 11.0V and 14.0V. Additionally, turn on the alarm relay when the AC transfer switch is enabled in order to start a generator when applicable.*

First the "Battery Voltage" Trigger condition must be entered :



Step 6

Next, by pressing the rectangular up/down arrow button as indicated by the red circle below, we can enter the additional Trigger conditions :



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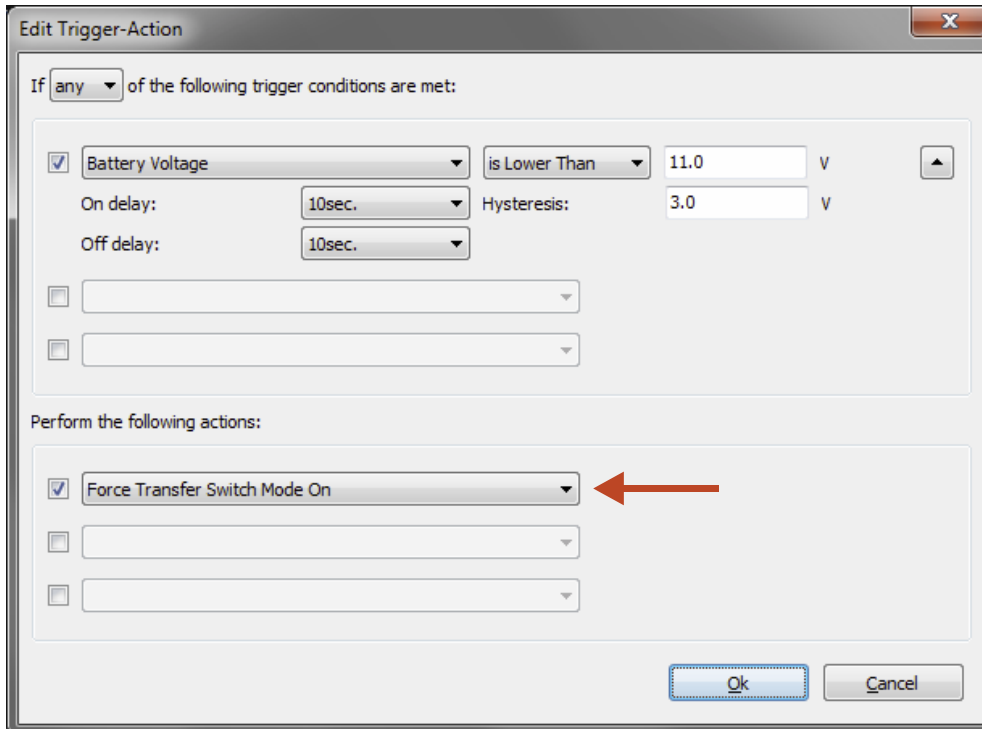
As you can see, we have set the 'On delay' to '10sec.', which means that the Trigger will be considered active once the battery voltage is lower than 11.0V for 10 seconds.

The 'Hysteresis' is set to '3.0V', which means that for the Trigger to de-activate again, the battery voltage must be increased to at least $11.0V + 3.0V = 14.0V$.

And finally, we have set 'Off delay' to '10sec.', which means that the Trigger will at least be active for 10 seconds, even if the battery voltage is already higher than 14.0V.

Step 7

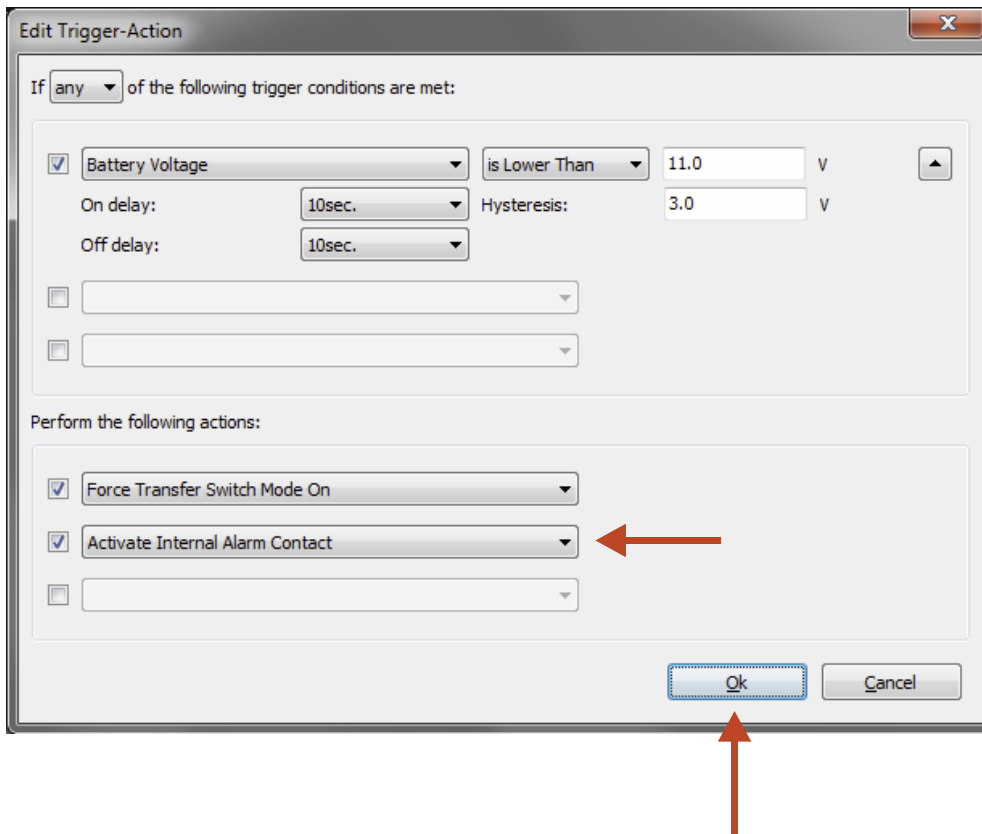
Next we need to decide what kind of Action needs to be linked to the activated Trigger. The Action type can be selected from the drop down list as indicated below by the red arrow :



As you can see, we have selected 'Force Transfer Switch Mode On' to enable the AC transfer switch while the battery voltage is between 11.0V and 14.0V.

Step 8

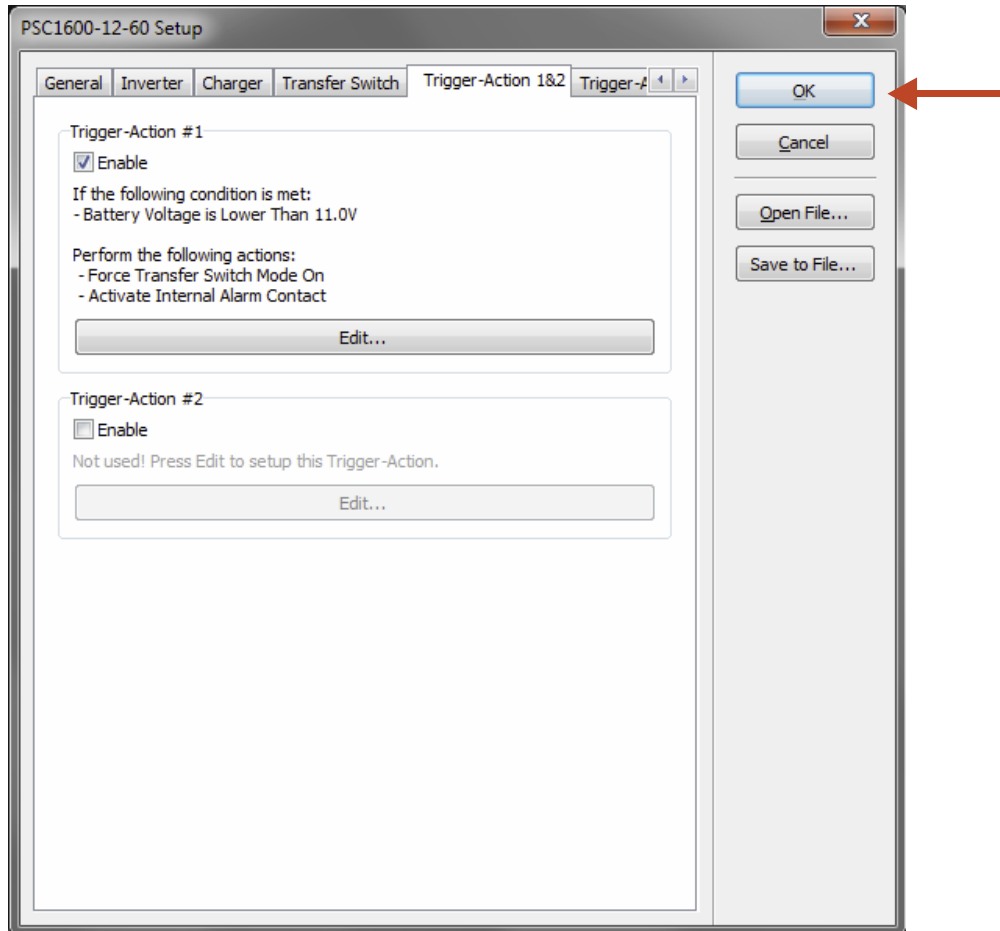
Since we also wish to activate the alarm relay in order to start a generator (for application that do not have an fixed AC grid available), we will enter a second 'Action' as indicated by the arrow :



Now you need to press 'Ok' as indicated by the red arrow in the above image.

Step 9

After the Trigger-Action settings have been made and confirmed, you will jump back to the Setup window which indicates an updated summary of 'Trigger-Action #1' :



Once the 'Ok' button (see red arrow) is pressed, Dashboard will transfer all updated data to the Combi and everything should work as desired.

Since there are too many generator- or generator starter products on the market, it is up to the user to check how to interface the internal alarm relay contact to the generator start circuit.

- End of document -