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Trip Counter with Pulse Metered Value

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SIPROTEC 5 Application

Trip counter with Pulse Metered Value

APN-054, Edition 1

Content

1 Trip counter with Pulse Metered Value

1.1 Introduction

The standard circuit breaker counter indicates all the operations, trip and close, per phase. This counter can be set via the device front. Additional information on circuit breaker can be obtained by implementation of the CB wear monitoring.

If a specific counter that indicates only the trip count of the CB is required this can be implemented with a user defined Pulse Metered Value. This application note will show how this can be done.

1.2 Apply the counters in the Routing Matrix

For a single pole tripping CB a counter per phase is required. For 3-pole tripping applications the description below can be simplified by using only one counter.

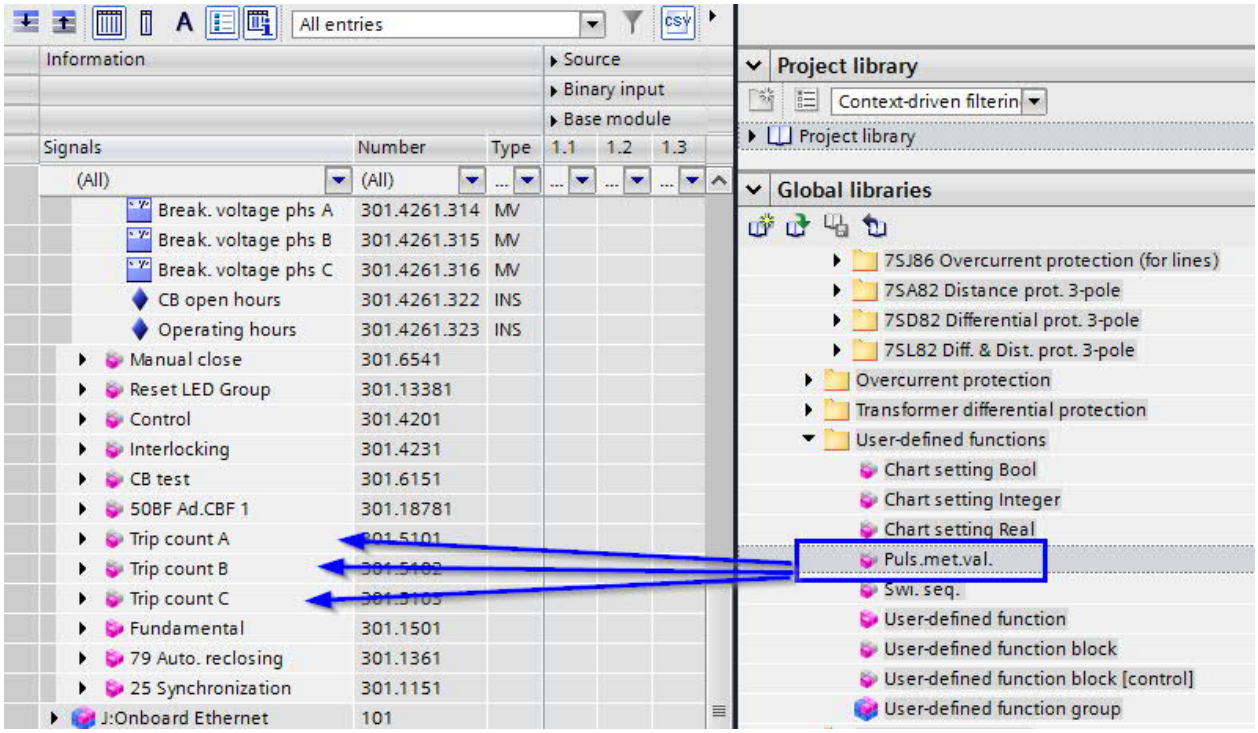


Figure 1: Apply Pulse Metered Value from Library

Drag and drop from the Project Library 3 Pulse Metered Values (1 for 3 pole CB) and rename the counters as shown (or as preferred). The count value will be displayed as metered value; an example display is shown later.

It is recommended to also change the name “Counter” to a more specific designation:

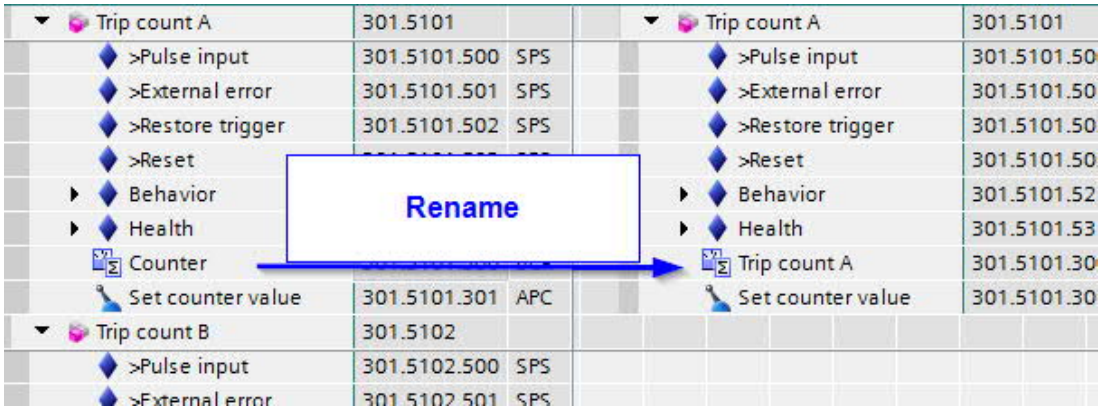


Figure 2: Rename the "Counter" indication

1.3 CFC Logic to increment counter

The diagram below shows the logic applied to increment the counter. The trip per phase is combined with the 3 pole trip via OR-gate; the output is routed to a rising edge detection which increments the counter by means of the ">Pulse input".

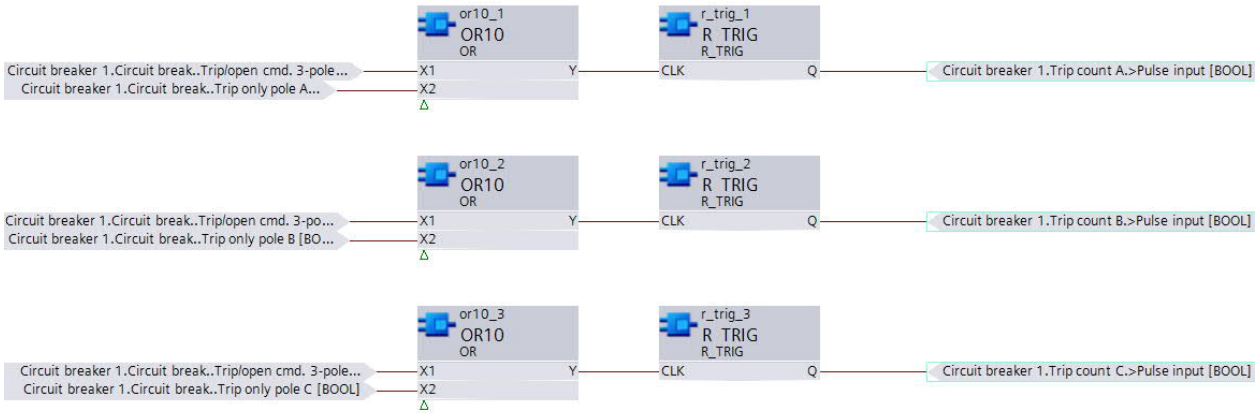


Figure 3: CFC Logic for single pole tripping circuit breaker

1.4 Reading and changing the Trip Counter

The counter values will by default be available as metered values in the circuit breaker:

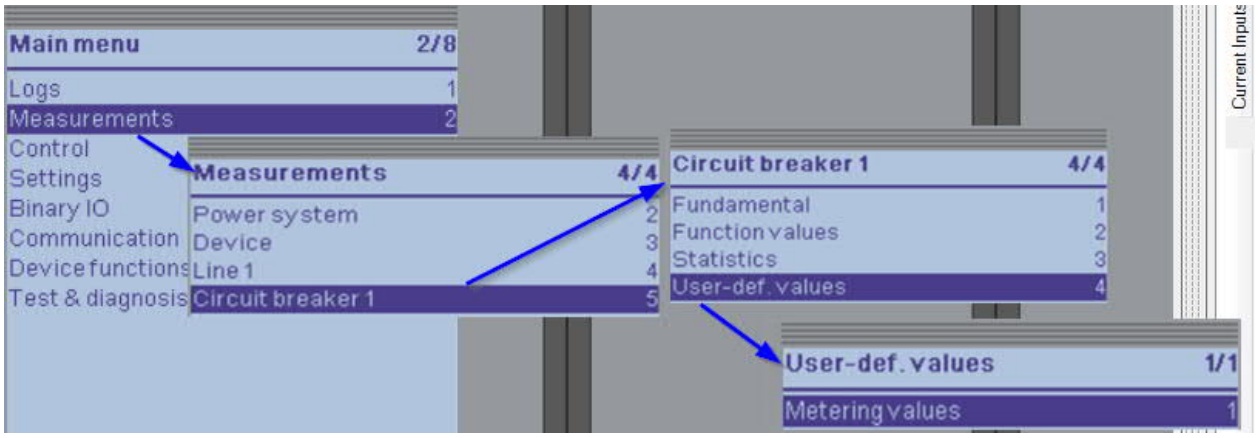


Figure 4: From Main Menu to Circuit Breaker User Defined Metered Values.

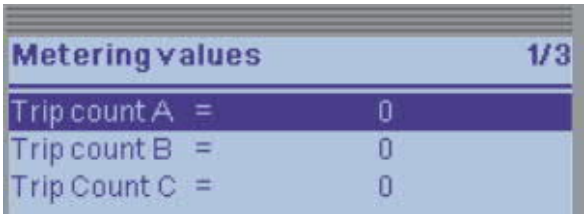


Figure 5: Displayed Trip Count (Counter was renamed: Figure 2)

Once a trip (or more) has been executed the trip counter is updated:

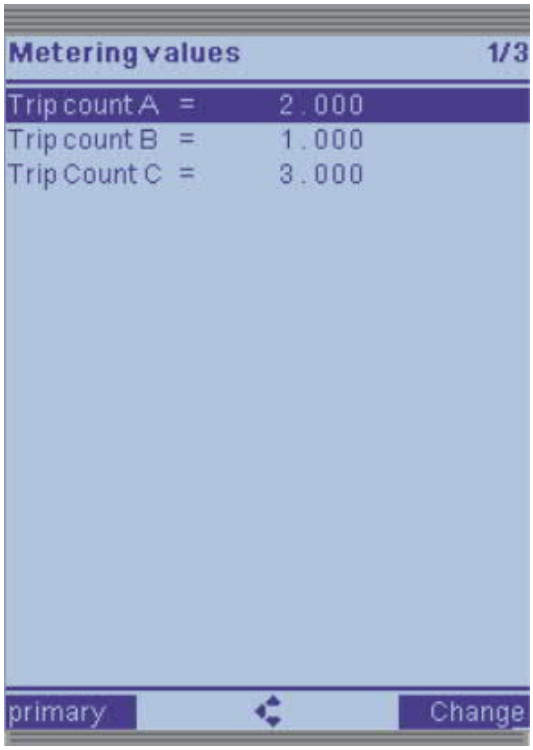


Figure 6: Counter indication after some operations.

If testing or maintenance will affect the trip count indication, the count values should be noted prior to the testing. When the testing is completed the correct values can be entered for each phase using the "Change" option in Figure 6. Note this is password protected (default Password is 222222).

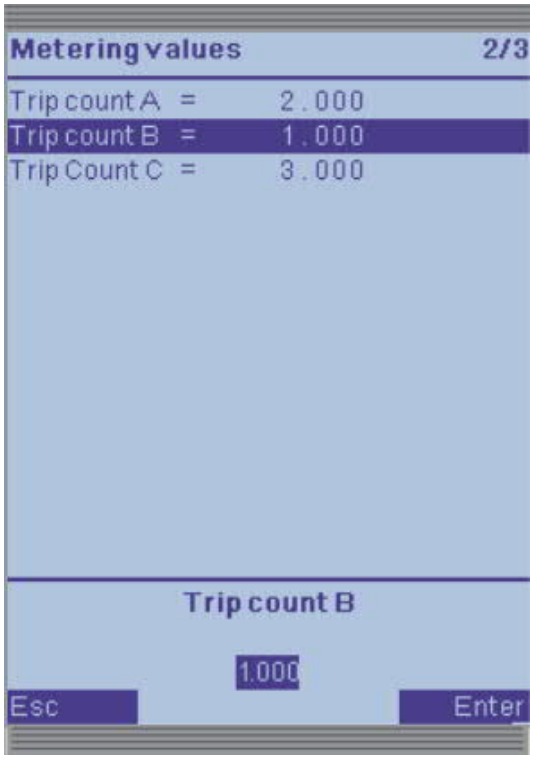


Figure 7: Changing the trip counter values.

1.5 Dedicated display and other options

A dedicated display page can be implemented for the trip counters. In the diagram below the operate counters are also included.

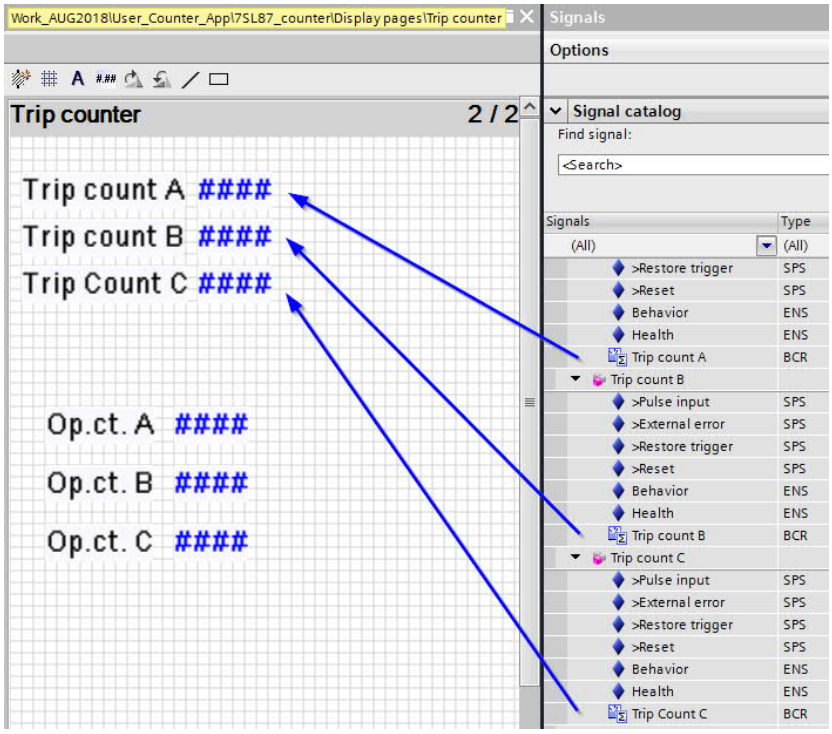
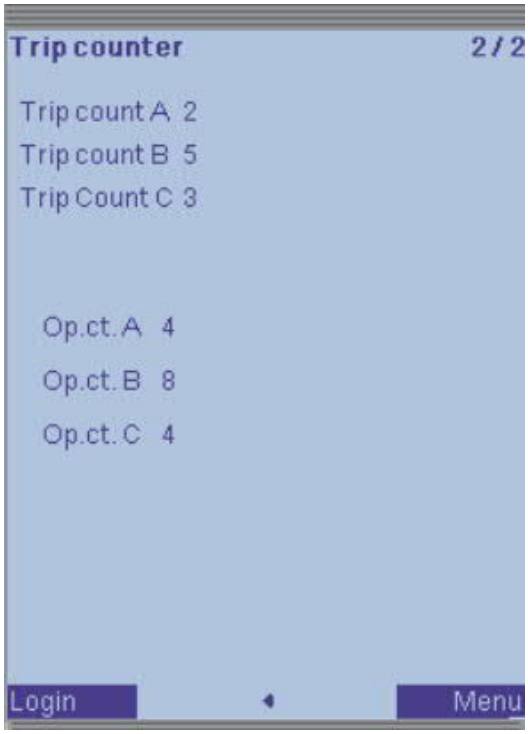


Figure 8: Create Display page with trip counters

In the display this appears as follows:



If the trip counter is required in fault logs etc. the count value must be converted:

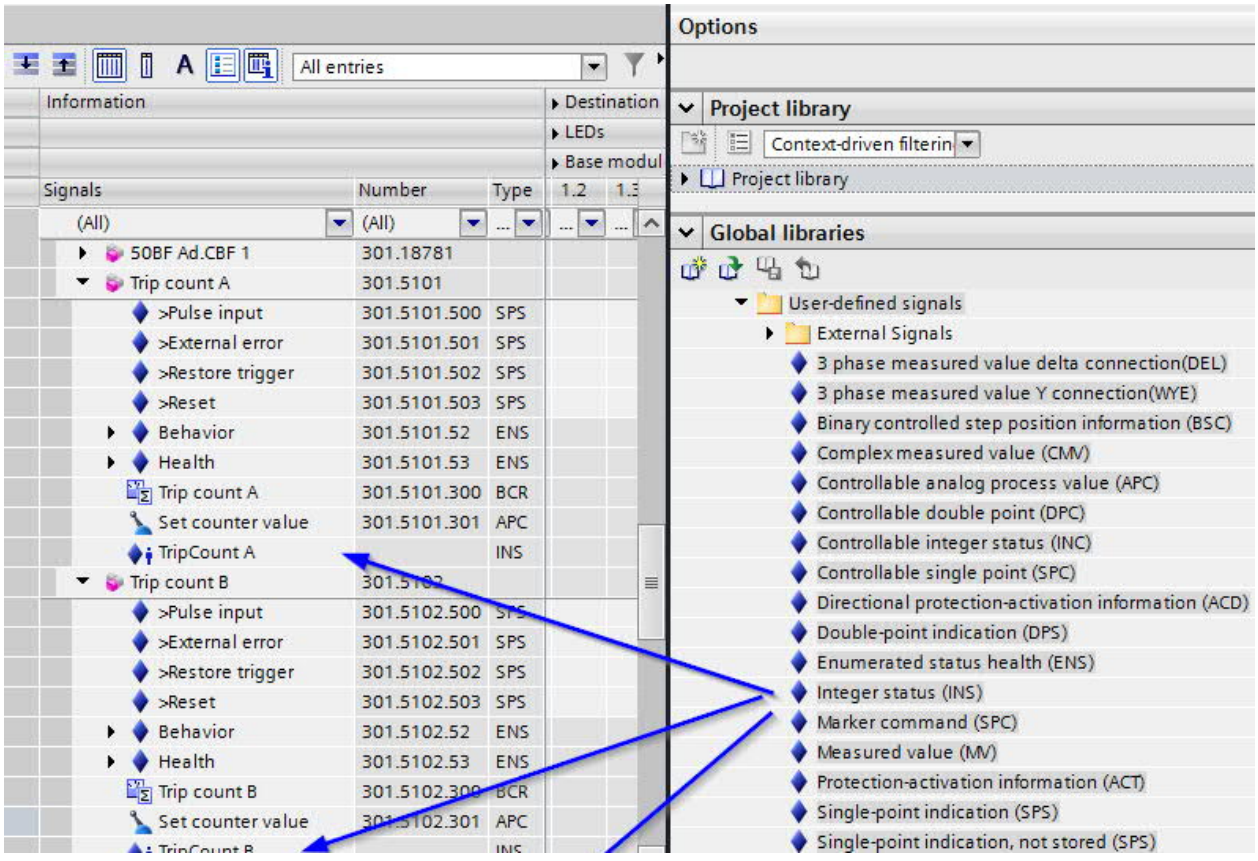


Figure 9: Add an "Integer Status" to each Pulse Counter and rename.

The integer status is taken from the pulse counter value via the following CFC:

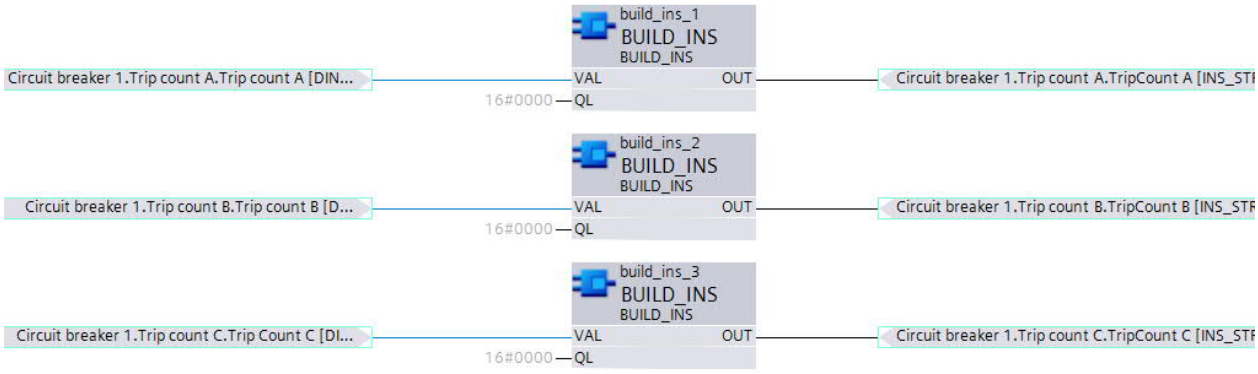


Figure 10: Use “Build_INS” to convert the counter value to a structured integer.This INS can now be included in Fault Log etc.:

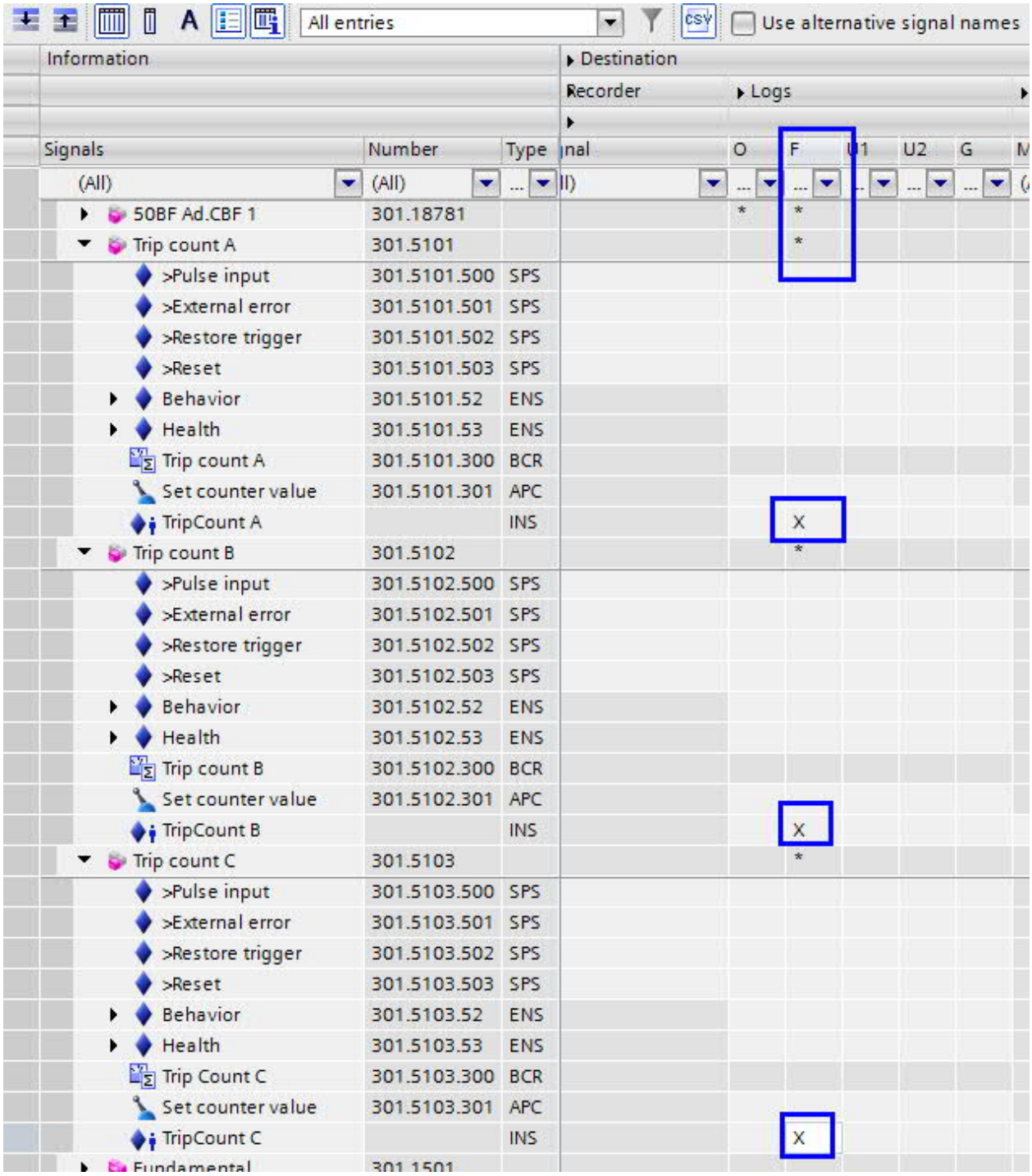


Figure 11: Routing the counter value to the fault log:

Read log entries | Delete | Show values as: primary

Time stamp	Relative time	Fault nu	Entry nu	Functions structure	Name	Value	Quality
		(...	(A...	(All)	(All)	(All)	(All)
15.01.2019 12:01:47.154	00:00:00:00.145		33	Circuit breaker 1:Circuit break.	Break. current 3I0/IN	10000 A	good (process)
15.01.2019 12:01:47.166	00:00:00:00.157		34	Circuit breaker 1:Circuit break.	Definitive trip	on	good (process)
15.01.2019 12:01:47.178	00:00:00:00.169		35	Line 1:67N GFP gnd.sys.1:Definite-T 1	Pickup	phs A gnd forward	good (process)
15.01.2019 12:01:47.186	00:00:00:00.177		36	Circuit breaker 1:79 Auto. reclosing:General	3-pole operate by 79	off	good (process)
15.01.2019 12:01:47.306	00:00:00:00.297		37	Line 1:21 RM Distance 1:Z 1B	Operate	phs A	good (process)
15.01.2019 12:01:47.606	00:00:00:00.597		38	Line 1:21 RM Distance 1:Z 3	Operate	phs A phs B phs C	good (process)
15.01.2019 12:01:47.636	00:00:00:00.627		39	Circuit breaker 1:79 Auto. reclosing:General	Blk.by strtsig.superv.	off	good (process)
15.01.2019 12:01:47.666	00:00:00:00.657		40	Circuit breaker 1:Circuit break.	Definitive trip	off	good (process)
15.01.2019 12:01:47.676	00:00:00:00.667		41	Circuit breaker 1:Trip count A	TripCount A	3	good (process)
15.01.2019 12:01:47.676	00:00:00:00.667		42	Circuit breaker 1:Trip count B	TripCount B	6	good (process)
15.01.2019 12:01:47.676	00:00:00:00.667		43	Circuit breaker 1:Trip count C	TripCount C	4	good (process)
15.01.2019 12:01:47.906	00:00:00:00.897		44	Line 1:21 RM Distance 1:Z 4	Operate	phs A phs B phs C	good (process)
15.01.2019 12:01:53.377	00:00:00:06.368		45	Circuit breaker 1:50BF Ad.CBF 1	Pickup	off	good (process)
15.01.2019 12:01:53.377	00:00:00:06.368		46	Circuit breaker 1:50BF Ad.CBF 1	Trip T2	off	good (process)
15.01.2019 12:01:53.377	00:00:00:06.368		47	Circuit breaker 1:50BF Ad.CBF 1	CB failure pole	off	good (process)

Figure 12: Fault Log with Trip Counter Indication.

1.6 Summary

When user defined operational counters are required with must have similar features as provided by the standard circuit breaker operation counters, the user defined pulse metered values can be applied.

This application note shows all the required steps, by means of a practical example with per phase trip counter, for a circuit breaker with single pole tripping.

A method for including the trip counter in the fault log is also shown.

The process for resetting the trip counter to a specific starting value after testing/maintenance is described.

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