

# SMMI Menu: AI/AO Offset Adjustment



## Concept

There are many reasons that can cause differences in signal between AI channels. For example: wiring problem, noise levels, circuit temperature, etc. The difference between the expected and original values can be seen in the following chart:

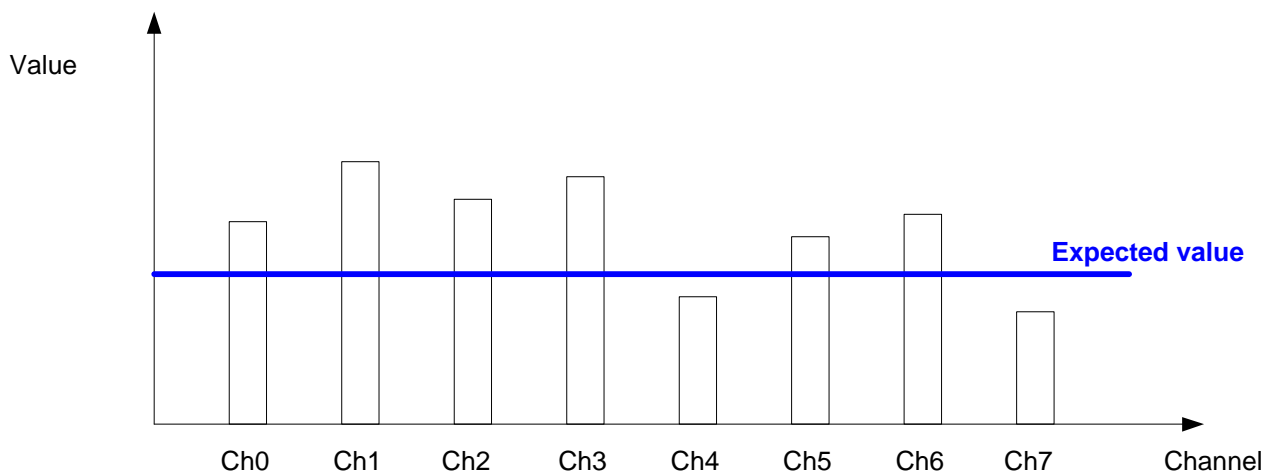


Figure 1: Original situation

Using the given expected value, the value difference can be calculated.

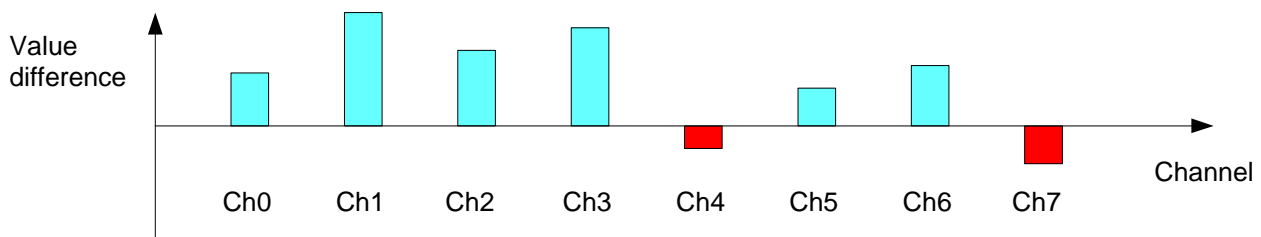


Figure 2: Difference value

The modbus firmware provides an offset function that enables the value difference to be eliminated allowing the value to become closer to the expected value.

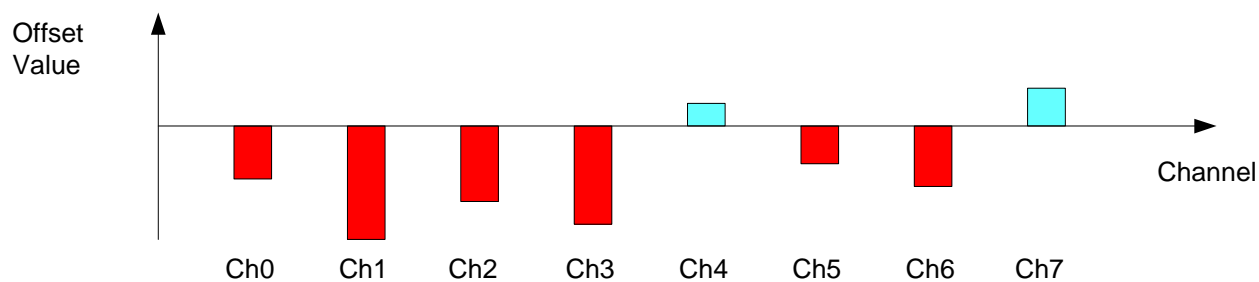


Figure 3: Offset value

# SMMI Menu Operation

## Accessing the SMMI Menu

The LEDs normally show the system information, but pressing **Mode** and **Set** for more than 1.5 seconds will allow access to the SMMI menu. The LED menu has 3 levels. By following the menu tree map, the cursor position in the menu can be changed.

## Tree of the SMMI menu

The menu is designed to allow the users to set an offset value in order to cancel the differences in signal value described previously. You can give an expected value to set each channel of every slot or each channel of one slot.

Following is the tree of the menu.

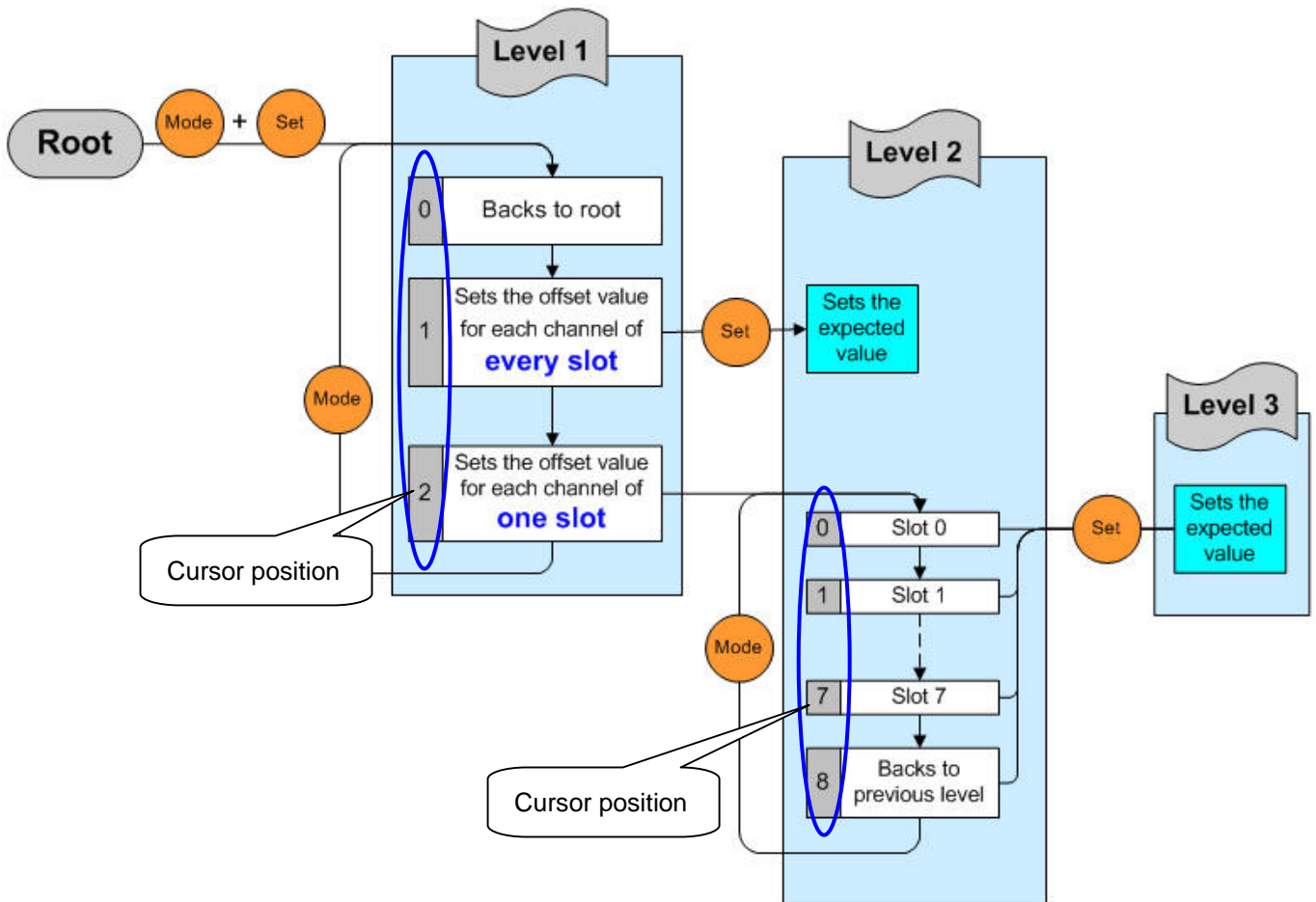


Figure 4: Tree of the SMMI menu

## Changing position in the SMMI menu

The LED displays the current cursor position. There are three levels in the menu, thus there are three digits to indicate the status of the three levels. The point indicates the current level. When enter the SMMI menu, the initial status is at level1 and the cursor position is at position 1 (sets offset value for every slot).

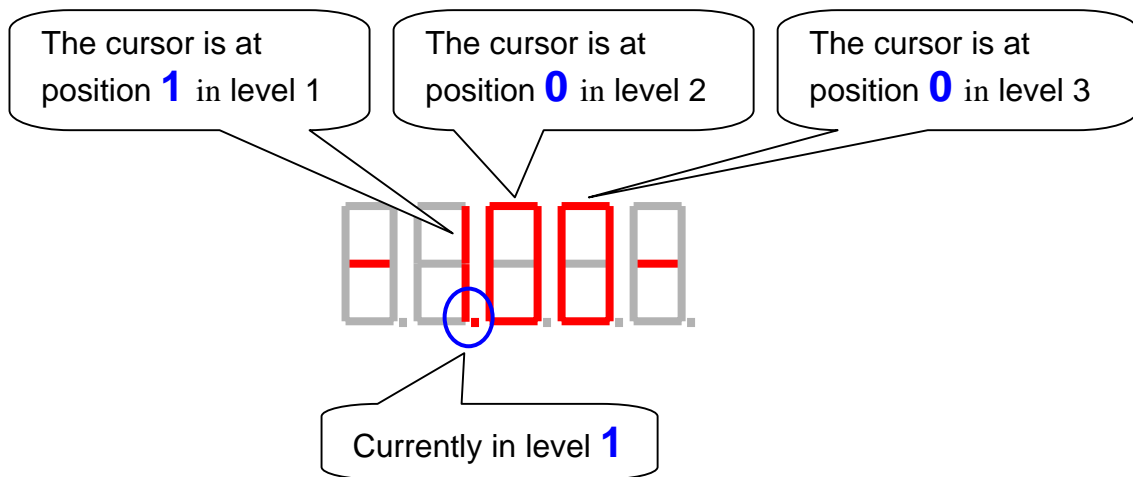


Figure 5: Position in the SMMI menu

Only “**Mode**” and “**Set**” buttons are available in the situation. Pressing the “**Mode**” button, you can move the cursor position in same level. Pressing the “**Set**” button, the position will be changed to another level to execute the action that the user selected. Following two figures illustrate what the LED displays to indicate current position in the menu.

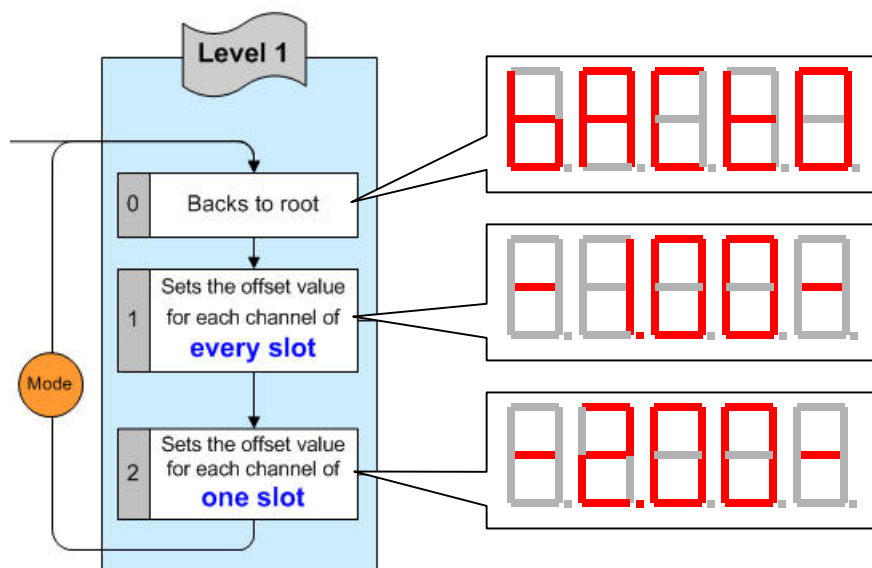


Figure 6: Function in the SMMI menu level1

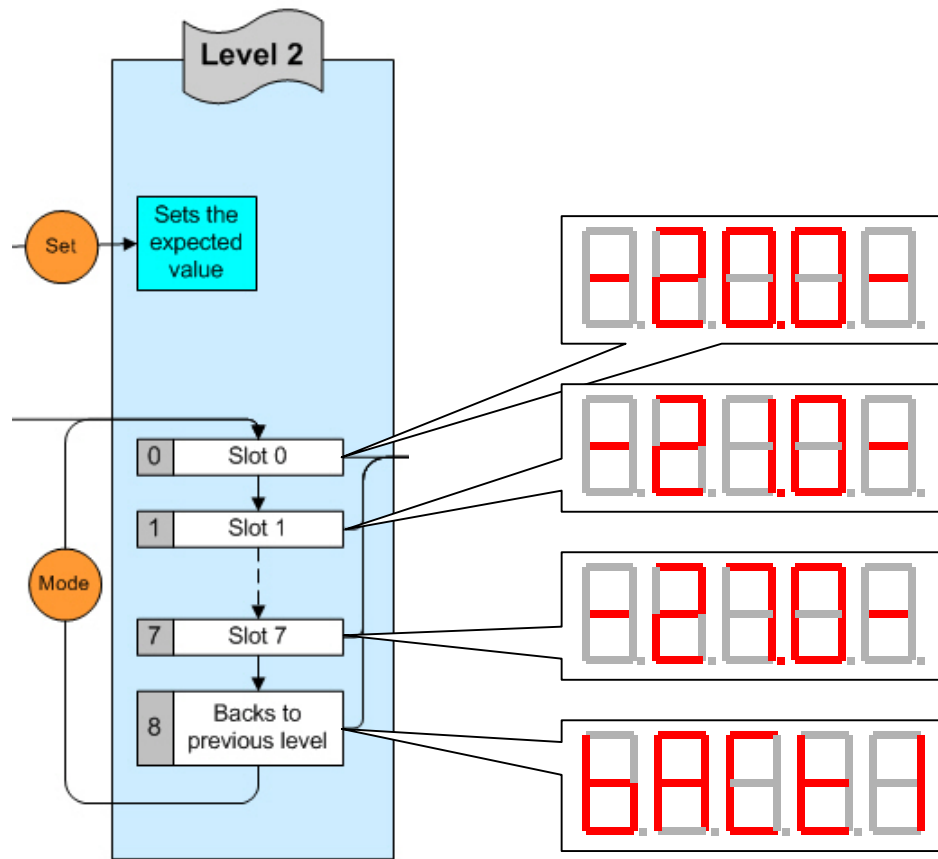


Figure 7: Function in the SMMI menu level2

## Sets expected value

When enter the “Sets expected value” subroutine, the LED shows the current value.

### For every slot

In “Sets the offset value for each channel of very slot” mode, the shown value is Ch0 of the first found analog input module.

### For one slot

In “Sets the offset value for each channel of one slot” mode, the shown value is Ch0 of the slot that user select. Following figure means user select Slot 7.

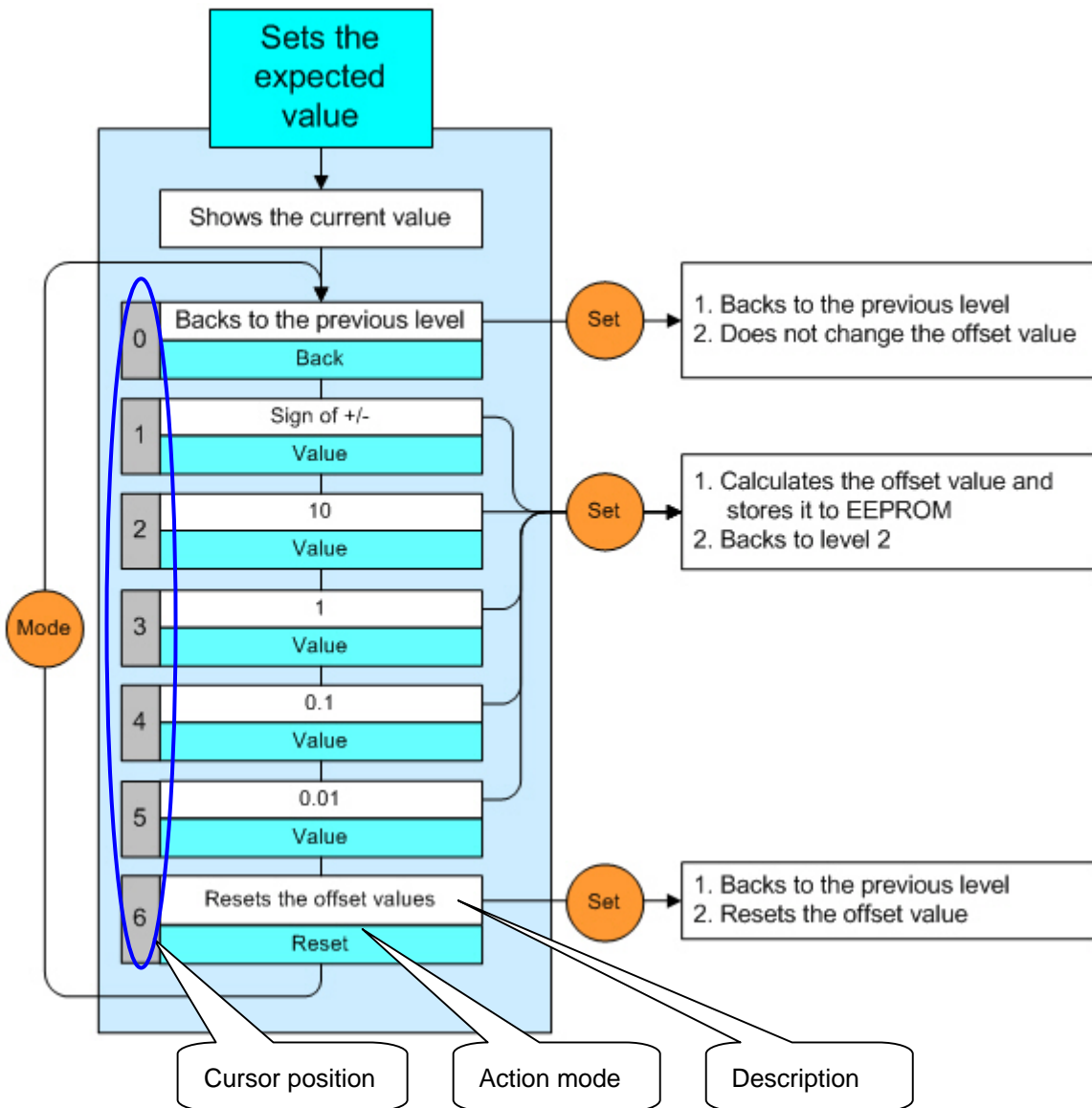
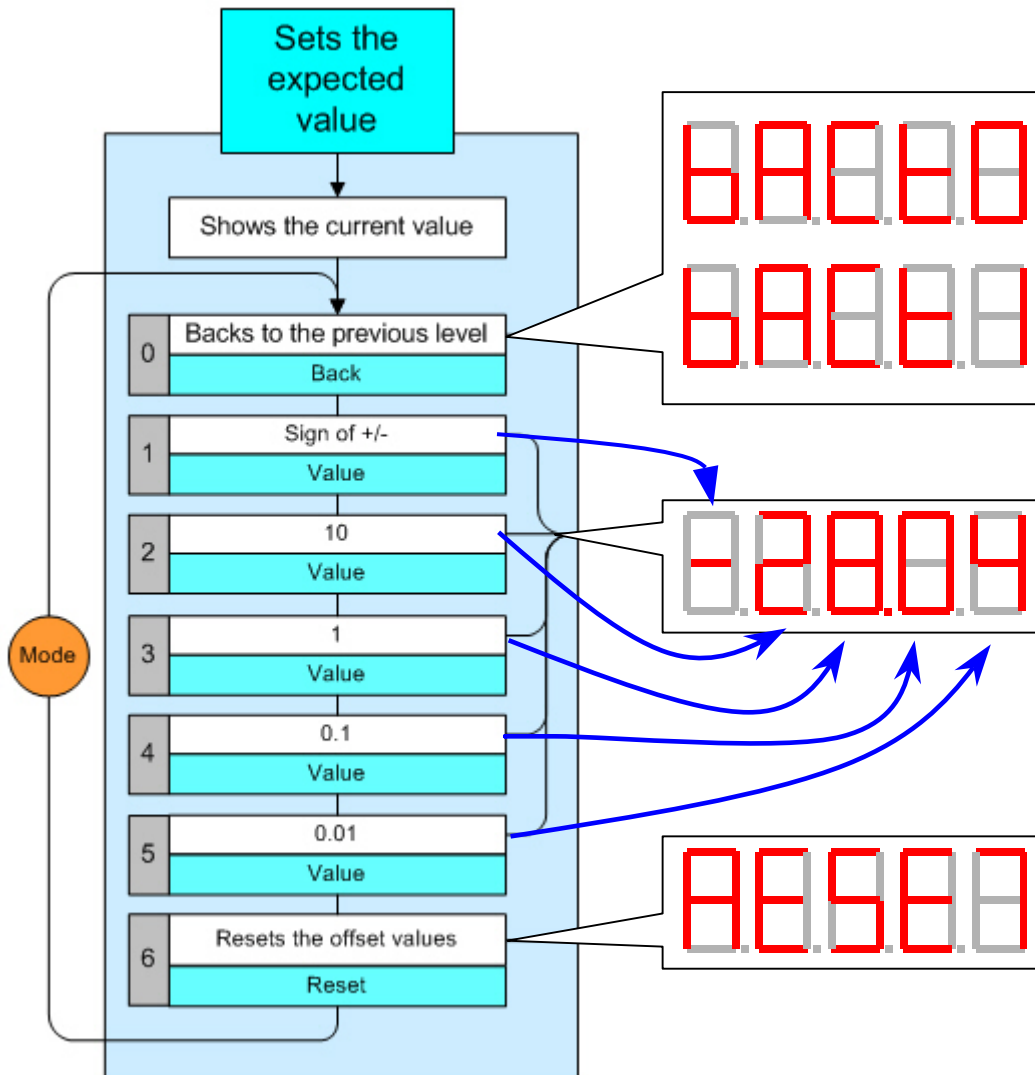


Figure 8: Tree of “Sets the expected value” block

When enter the procedure of “Sets the expected value”, the LED shows the current value. Figure9 illustrates what the LED displays for setting the expected value



# Application sample

Hardware:

Digital Module Mapping				Analog Module Mapping				Summary			
Slot	Module	DI (1xxxx) address	Points	DO (0xxxx) addr...	Points	AI (3xxxx) address	Points	AO (4xxxx) addr...	Points		
0	I-87018	-	-	-	-	00 [00]	8	-	-		
1	I-87013	-	-	-	-	08 [08]	4	-	-		
2	I-8040	00 [00]	32	-	-	-	-	-	-		
3	I-8041	-	-	00 [00]	32	-	-	-	-		

Firmware: MBT8\_120.exe

Before using the AI offset adjustment:

The max. difference of signals of 87018 is Ch7 – Ch0 = 30.952 – 29.6532 = **1.2988**

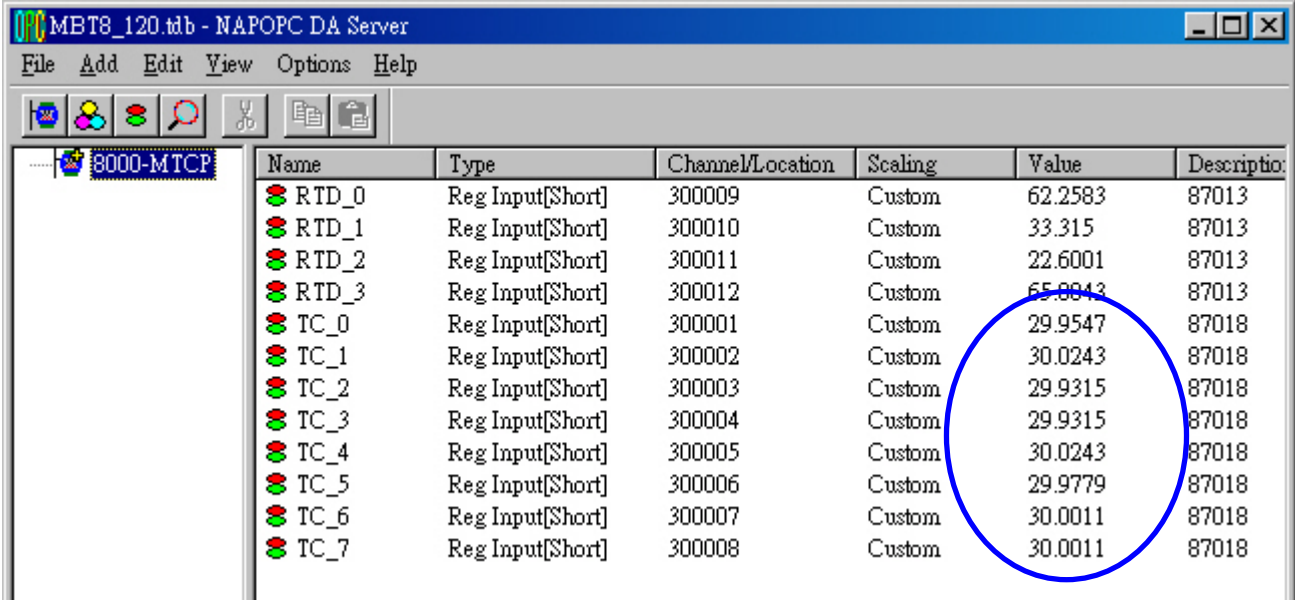
Name	Type	Channel/Location	Scaling	Value	Description
RTD_0	Reg Input[Short]	300009	Custom	62.1607	87013
RTD_1	Reg Input[Short]	300010	Custom	33.4615	87013
RTD_2	Reg Input[Short]	300011	Custom	22.4811	87013
RTD_3	Reg Input[Short]	300012	Custom	65.1301	87013
TC_0	Reg Input[Short]	300001	Custom	29.6532	87018
TC_1	Reg Input[Short]	300002	Custom	29.7227	87018
TC_2	Reg Input[Short]	300003	Custom	29.8155	87018
TC_3	Reg Input[Short]	300004	Custom	30.117	87018
TC_4	Reg Input[Short]	300005	Custom	30.2562	87018
TC_5	Reg Input[Short]	300006	Custom	30.349	87018
TC_6	Reg Input[Short]	300007	Custom	30.5113	87018
TC_7	Reg Input[Short]	300008	Custom	30.952	87018



### Test 1 (adjusts one slot)

After using the AI offset adjustment (adjusts each channel of slot 0 to 30.0 degree C)

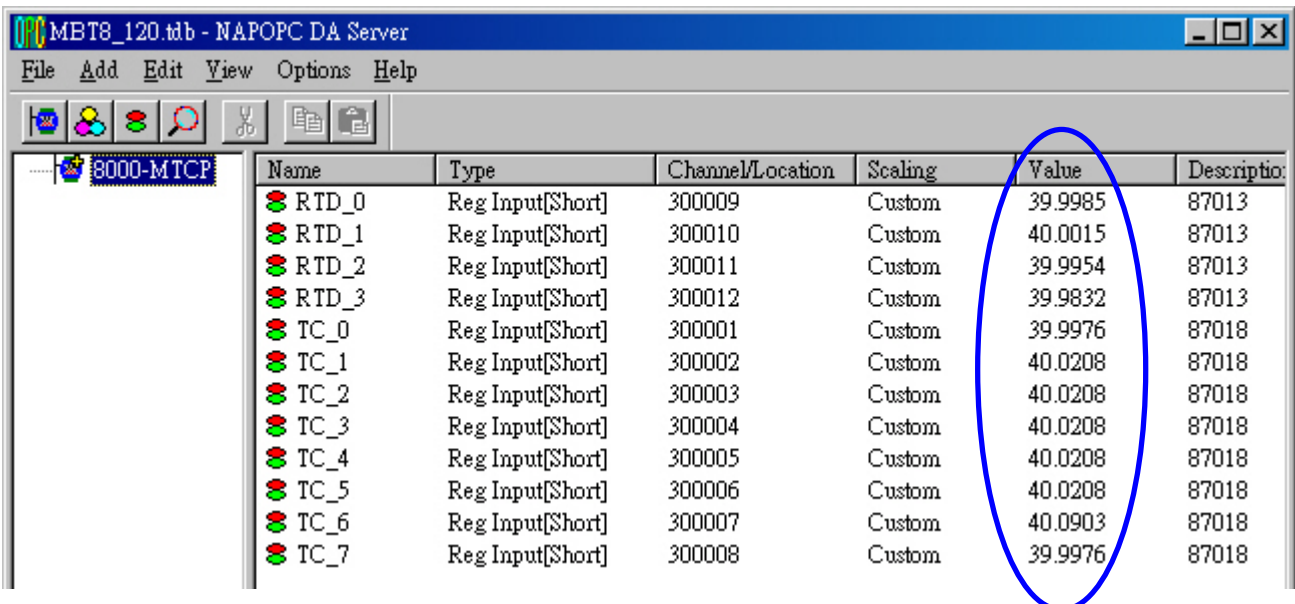
The max. difference of signals of 87018 becomes  $Ch4 - Ch3 = 30.0243 - 29.9315 = 0.0928$



Name	Type	Channel/Location	Scaling	Value	Description
RTD_0	Reg Input[Short]	300009	Custom	62.2583	87013
RTD_1	Reg Input[Short]	300010	Custom	33.315	87013
RTD_2	Reg Input[Short]	300011	Custom	22.6001	87013
RTD_3	Reg Input[Short]	300012	Custom	65.8843	87013
TC_0	Reg Input[Short]	300001	Custom	29.9547	87018
TC_1	Reg Input[Short]	300002	Custom	30.0243	87018
TC_2	Reg Input[Short]	300003	Custom	29.9315	87018
TC_3	Reg Input[Short]	300004	Custom	29.9315	87018
TC_4	Reg Input[Short]	300005	Custom	30.0243	87018
TC_5	Reg Input[Short]	300006	Custom	29.9779	87018
TC_6	Reg Input[Short]	300007	Custom	30.0011	87018
TC_7	Reg Input[Short]	300008	Custom	30.0011	87018

### Test 2 (adjusts all AI slot)

After using the AI offset adjustment (adjusts each channel of all slots to 40.0 degree C), every AI values becomes **40 +/- 0.0208** degree C



Name	Type	Channel/Location	Scaling	Value	Description
RTD_0	Reg Input[Short]	300009	Custom	39.9985	87013
RTD_1	Reg Input[Short]	300010	Custom	40.0015	87013
RTD_2	Reg Input[Short]	300011	Custom	39.9954	87013
RTD_3	Reg Input[Short]	300012	Custom	39.9832	87013
TC_0	Reg Input[Short]	300001	Custom	39.9976	87018
TC_1	Reg Input[Short]	300002	Custom	40.0208	87018
TC_2	Reg Input[Short]	300003	Custom	40.0208	87018
TC_3	Reg Input[Short]	300004	Custom	40.0208	87018
TC_4	Reg Input[Short]	300005	Custom	40.0208	87018
TC_5	Reg Input[Short]	300006	Custom	40.0208	87018
TC_6	Reg Input[Short]	300007	Custom	40.0903	87018
TC_7	Reg Input[Short]	300008	Custom	39.9976	87018