

Topic: Global Water Budget adjustment upon tank level
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Date: 2024.08.12
To: OEM Partners
Purpose: Demonstrate how to use the logic engine to adjust the global water budget based on measured tank level.

Level input:

The sensor decoder setup has an expression to convert the input signal to a level. The setup of the IO configuration is explained at the end of the document.

Water budget adjustment:

The system is based upon one program being the daily trigger to adjust the global water budget for the controller. All programs are assumed to be defined such that they jointly use all the available water in the tank when it is full. If the tank is less than full when the trigger program starts, then the global water budget is adjusted accordingly, and all programs will get proportionally less water. The trigger program should be the first to run in the daily water cycle. The logic only adjusts the global water budget if the trigger program start automatically (see note below on the block).

Variables:

ID	Description	State	Type	Source ID	Source sub ID	Value
 1	Top level (m3)	Ok	Local	0	0	7000
 2	Bottom level (m3)	Ok	Local	0	0	1000
 3	Actual level	Ok	IO value	679088867	1	6468
 4	Actual Available Water (m3)	Ok	Local	0	0	5468
 5	Trigger program ID	Ok	We program state	1	0	3
 6	Global Water Budget	Ok	Local	0	0	91

Variable #1 is the top level of the tank. Should the level meter measure above then the global water budget will be set to 100.

Variable #2 is the lowest level of the tank you wish to use. Should the level meter measure below then the global water budget is set to 1 (0 is not allowed).

Variable #3 is the level meter input.

Variable #4 is the actual available water for irrigation.

Variable #5 is program ID for the trigger program. In this example it is program 1.

Variable #6 is the calculated global water budget.

The two level indicators are made with variables for easy modifications on the variable page or via the API. Using the API:

```
PATCH /le/var/1/value=7000
{"result":"ok"}
PATCH /le/var/2/value=1000
{"result":"ok"}
```

Block:



- ▼ if: (\$5 == 2)
 - set: \$4 = \$3 - \$2
 - set: \$6 = (100 * \$4) / (\$1 - \$2)
- ▼ if: \$6 > 100 # Level is above max
 - set: \$6 = 100
- ▼ if: \$6 < 1 # Level is below min
 - set: \$6 = 1
 - log info: Set GWB = \$6%
 - action: PATCH /we/engine/waterBudget=\$6
- ▼ while: \$5 > 1 # Wait until trigger program stops
 - sleep: 1



The first “if” statement checks if the trigger program is running in auto. If manual run shall be included the “if” logic should be: (\$5 == 2) || (\$5 == 3).
The global water budget is calculated and checked for limits.
Last “while” block awaits the trigger program to finish.

Sensor decoder setup:**IO configuration:**

Protocol	mk3	
Type	input	
Description	Tank level	
Expression to modify interrupt value stored in object	$10000 * (x - 4000) / 16000$	
x gets replaced by value		
Secondary expression, usage depends on context		
x gets replaced by value		
Reset io value to 0 after X seconds without interrupt, 0 = indefinitely		
0		

GENERAL	INTERRUPTS	TIMINGS
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Input power source	12V	
Input type	4-20mA	
Sensor operation mode	Continuous mode, constant on	
Current control	400	20 mA
Analog processing	0-20 mA, value in uA, steps of 50	
Analog high measure level	20000	uA
Analog low measure level	0	uA
# samples for analog input value	10	

The expression converts the 4000-20000uA to 0-10000.

The Input power source of 12V might differ depending on the actual sensor.

GENERAL	INTERRUPTS	TIMINGS
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Interrupt rate limit (min. time between interrupts)	5	s
Minimum value change (since last interrupt) for interrupt to be sent	0	

The setting above will update the value every 5 seconds regardless of there is any change. A minimum uA change could be defined to avoid too many interrupts on the 2-wire if the sensor fluctuates.

Send interrupt for selected values

- ☒ Measurement Value
- ☐ Measurement Minimum Value
- ☐ Measurement Maximum Value
- ☐ Digital count
- ☐ Milliseconds since last digital input
- ☐ Attention

This setup ensures the sensor decoder sends interrupt when the reading changes.