TT191104 – FUP - Sequencing Module for 2 Devices

Note	This Support Knowledge Base article KB is the result of a support request.
	It is not part of the official documentation of DEOS AG and does not claim to be complete.
	The article is intended to support the solution of a similar problem.
	If you have any questions, comments or additions, please contact DEOS AG Support.

Title	FUP - Sequencing Module for 2 Devices (TT191104)

Object	FUP

Reference version	2

Date	11.2019

Author	EK

Goal	To perform sequencing control of 2 equipment (e.g. pumps)

Content:

TT191104 – FUP - Sequencing Module for 2 Devices

1. To perform sequencing control of 2 equipment (e.g. pumps), we can simply use the "PU_SW" module in FUP, which provide automatic switching of pumps based on different criteria
2. First create a new FUP page call "seq2.f" and add the below logic. Please make sure the Display "D03" is set to "Read and Write"
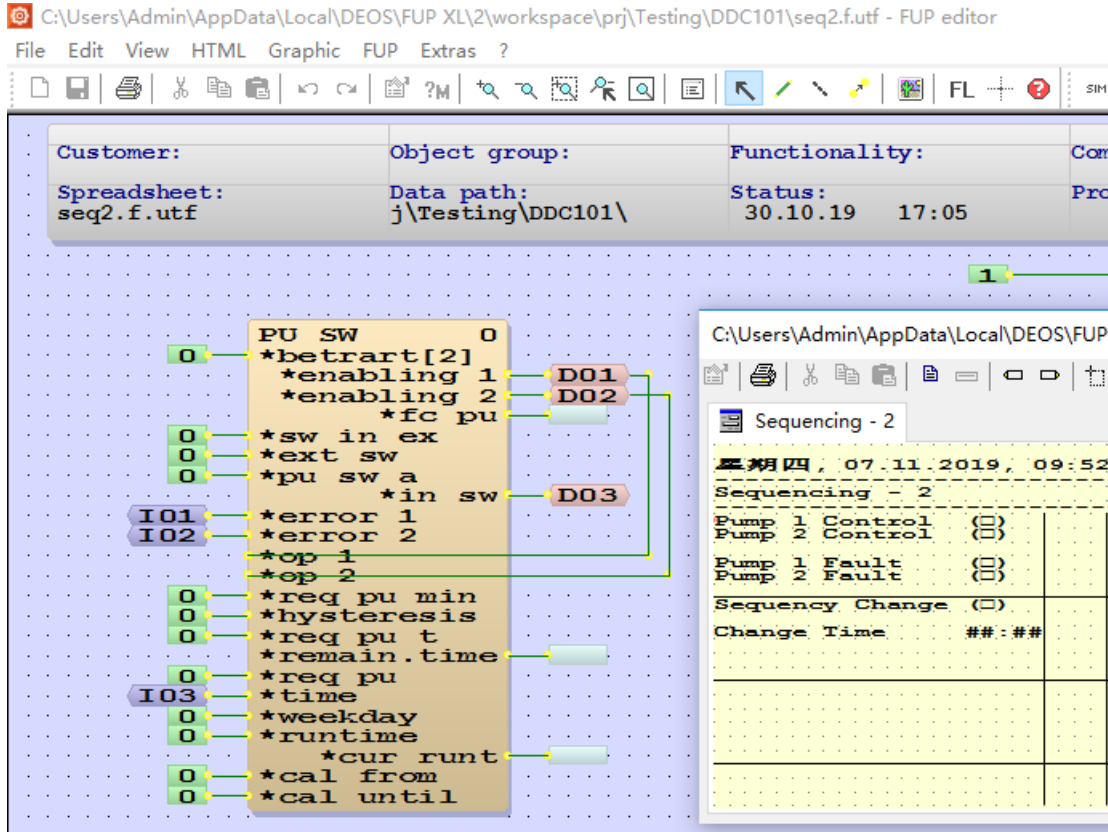
3. This program control 2 pumps in sequence. You can try it by simulation
   a. First, pump 1 will start to run
   b. If fault is detected, then it will be stopped, and pump 2 will start to run
   c. Pump 2 will remain on, even if pump 1 fault is cleared
   d. Everyday at time set in "I03", the pump will change sequence, so the running pump will turn off, and the other pump will start to run
   e. You can also manually change the sequence, by setting "D03" to 1
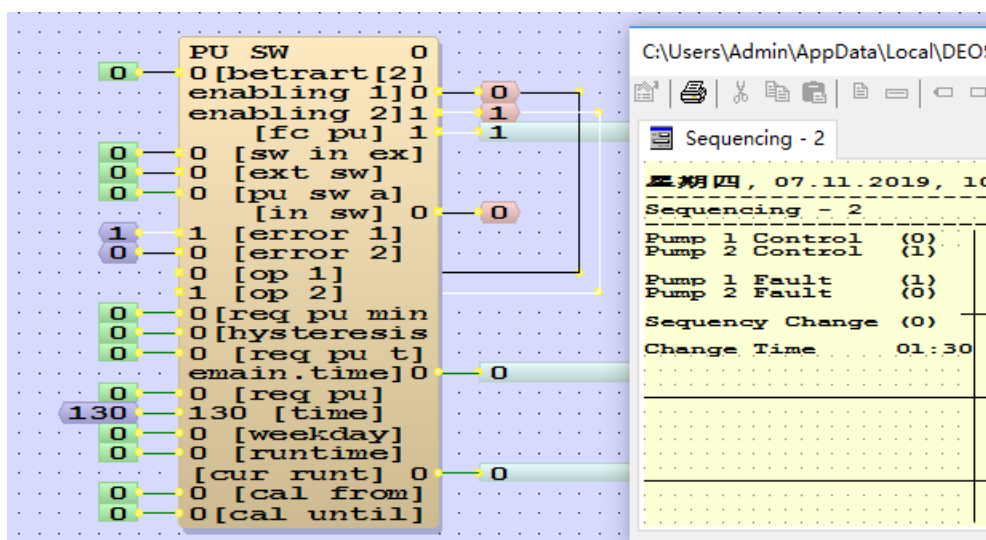
4. You can find the help text of the module for detail explanation of the functions
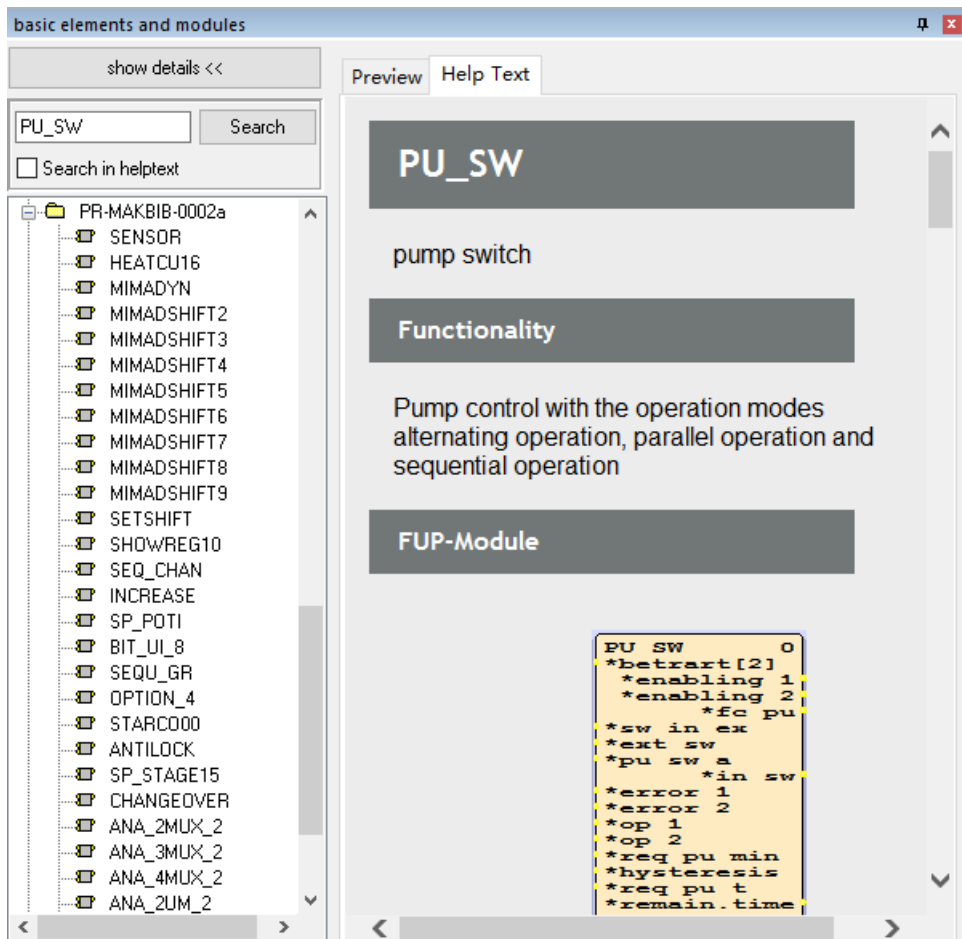

5. There are 4 ways to switch the pump automatically.

pu_sw_a	auto. pump switch mode (0 = daily, 1 =weekly, 2 = runtime dependent , 3 = calendar dependent , 4 = switch only by hand in_sw

6. You can also develop your own switching logic and set "sw_in_ex" to 1 to use it

sw_in_ex	switching (0 = internal, 1 = external)
ext_sw	external switch request (0 = pump 1, 1 = pump 2)

7. Now we change the program a little bit, so that you can change the switching method online
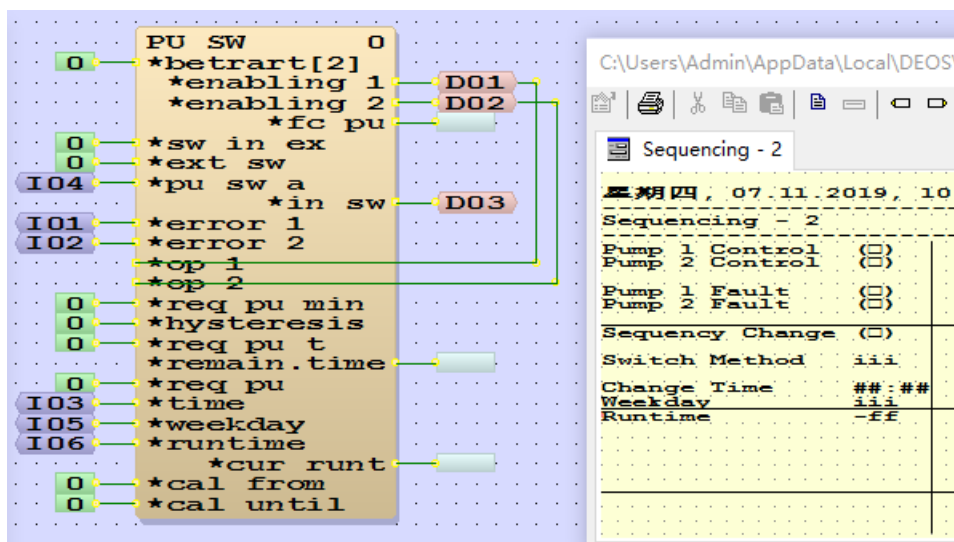
8. Try in simulation. Set "Switching Method" to 1, and set "Weekday" to 1, such that the pump will change weekly on Monday at 1:30am. To test it, you can set the simulation date/time in the simulation window on the "Time" tab

9. Now set the "Switching Method" to 2, and set "Runtime" to 1. The pump will then be switched based on runtime of the pump. In this example, it will be switched after running for 1 hour. To test it, you can set the "Clock Speed" to "1 second = 60 seconds" so that the clock will run much faster

10. Set "Switching Method" to 4, and it will be switched at the specific dates at midnight

cal_from	change from specified calendar date (DATE-input)
cal_until	change until specified calendar date (DATE-input)

11. This module can also be used to turn on 1 or 2 pumps automatically based on the loading (e.g. different pressure). To use it, set "opmod" to 2. The operation is basically the same as before. Please refer to the following in details and try it in simulation

sequential operations

IF **opmod** is set on 2 then the is sequentiel operation active. The master pump and the error switch in the sequential operation is set like described at alternating operation.
The enabling of the second pump will be activated as a result if the set request at the input **req_pu** is at least for the time **req_fu_t** above the set value of **req_pu_min**. The enabling of the second pump will be deactivated if the request at the input **req_pu** is below the result of **req_pu_min** plus **hysteresis**. **Therefore a negative hysteresis has to be set!**

req_pu_min	Minimal pumps request for enabling the next pump.
hysteresis	Hysteresis for the minimal pump request.
req_pu_t	Minimal pumps request has to wait for at least the set time (in Seconds).
remain.time	remaining time minimal pump request (in seconds)
req_pu	request pumps

12. We have some macros for 2-pumps application like this (e.g. ex_pu_2v.f$x)