



FDDWorX

Creating Rules for Fault Detection and Diagnostics



APPLICATION NOTE

August 2014

Description: Guide to creating rules in FDDWorX that continuously monitor equipment for faults.

General Requirement: Knowledge of desired rules to detect a fault condition in equipment.

Introduction

FDDWorX is a component of the GENESIS64 Suite that allows users to create rules, both simple and complex, to detect conditions in a system of equipment that are deemed to be out of the ordinary operating boundaries, called faults. These rules can consist of a combination of logical structures, mathematical formulas and time based evaluations. With the use of FDDWorX, the system of equipment is continuously monitored and any faults detected are presented to the user to be acted upon. It is expected that users would then act upon these faults to bring the system back into normal operating conditions.

Accessing the FDDWorX interface

For the purpose of this application note, we will be adding a Variable Air Volume (VAV) unit to the AssetWorX asset structure.

1. Open Workbench-SL from start menu
2. Select the AssetWorX provider and Expand the active database → Assets
3. Create a new asset by right clicking on the desired asset level and choosing 'Add Equipment'.
4. Name the new equipment 'VAV 101'
5. Click on the '+' tab button below the equipment name
6. From the drop down menu, select FDDWorX. This adds the FDDWorX functionality to this equipment
7. Click Apply to confirm this addition

Adding a fault

For the purpose of this application note, we will add an Underheating Fault to the VAV we added above.

1. In the FDDWorX interface, click on Add Fault to add a new fault to the fault list.
2. Name this fault 'Underheating Fault'
3. We now have to create a rule that will monitor various data points of this equipment to determine if an underheating fault has occurred.
4. A rule is built using the various expression functions available. All available functions can be found by clicking on the buttons to the right of the rule editor.

5. For the purpose of this application note, we will create the underheating fault rule by typing in the rule as follows below:

```
IF (<<Heat>>==1)
THEN (IF <<DAT>> <= <<RoomTemp>> + 5 THEN 1 ELSE 0)
ELSE 0
```

6. Notice that elements in the rule that are wrapped with '<<...>>' show up in the parameters list below the rule. This parameter support allows the rule to be created in a generic way and be saved in the rule library. Rules from the rule library can then be reused for multiple similar equipment, with each equipment binding its unique value to each parameter.
7. Before we bind a unique value to each parameter, we need to save the rule into the library first. To do so, click on 'Save Rule As' from the row of buttons below the parameter list.
8. In the dialog box that pops up, select 'FacilityAnalytiX'.
9. In the 'Folder Path' field, replace 'FacilityAnalytiX' with 'VAV Fault Rules' and click 'Create New Folder' to create the folder.
10. In the refreshed folder list, select 'VAV Fault Rules'.
11. In the 'New Expression Name' field, type in 'Underheating Fault Rule', as shown in Figure 1.

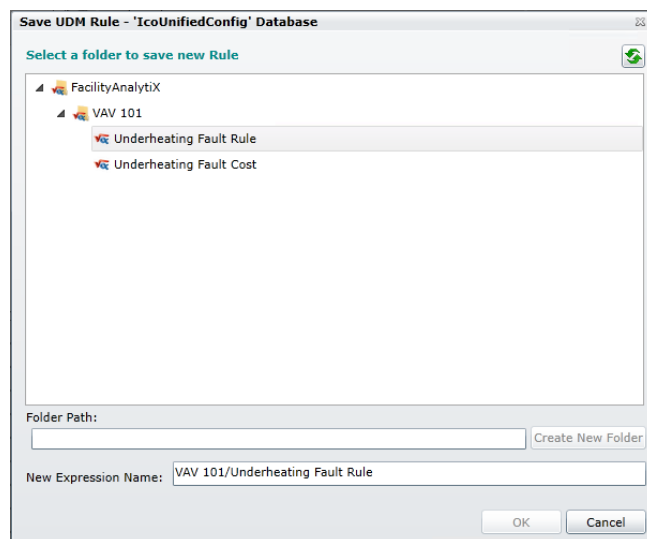


Figure 1 - Saving Fault Rule

12. Click OK to save the rule.
13. Now we need to bind each parameter with the address of the corresponding data point.
14. To bind a value, double click in the 'Bound to Value' field of the parameter and click on the '...' button to the right.
15. This brings up the data browser that lets you browse to the appropriate point and bind the point address as the value for the parameter.



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16. For each parameter in our fault, bind it to the appropriate point address if available or to a simulation point.
17. Once all the parameters are bounded, click on Apply to complete the creation of the Underheating Fault.
18. Now, you can test the FDDWorX rule in GraphWorX by generating the fault. You can do that by triggering the data point and showing the fault in AlarmWorX Viewer.

NOTE: When you saved FDD rule it automatically created an UDM Expression and an alarm in AlarmWorX Server.