



Facility AnalytiX Fault Library



APPLICATION NOTE

October 2015

Description: Provide information and guidance on the proper usage of the Fault Library.

General Requirement: GENESIS64 and FDDWorX or Facility AnalytiX knowledge. Knowledge about industry specific equipment's would be beneficial in understanding and creation of fault rules.

Introduction

Facility AnalytiX is a predictive building automation solution that uses an advanced Fault Detection and Diagnostics Engine. It incorporates algorithms that weigh the probability of faults and advises management, operators and maintenance personnel of actions to prevent equipment failures.

In order to make use of the power of Facility AnalytiX, one would need to define a list of equipment faults they expect to see and create corresponding fault rules to trigger them in the correct scenarios. The creation of Fault rules is a critical step towards building a smart system with low equipment downtime and high cost savings.

The implementer would need to have a good grasp on the working of the specific equipment and create the fault rules accordingly.

ICONICS realizes the importance of this step; thus, in version 10.90, included as part of the Facility AnalytiX installation is a library of preconfigured fault rules categorized by the different industries and equipment types. The faults and their corresponding rules are compiled from several of our customers and are the most widely used indicators for the different equipment types.

The library of preconfigured Fault Rules is meant to be used as a stepping stone for tweaking and creating further rules for the different equipment types.

NOTE: Facility AnalytiX software solution is powered by ICONICS' FDDWorX engine. However, this library is not part of FDDWorX engine. You need to obtain Facility AnalytiX solution in order to get it.

Let's now take a look at where and how the Fault library can be accessed.

Accessing and Viewing the Fault Library

Everything related to Facility AnalytiX would need to be accessed through Workbench SL or Workbench Desktop.

While the fault settings and the fault diagnostic model is created within the FDDWorX Provider, the creation of faults and their rules is done within the AssetWorX provider.

For more information on AssetWorX, please refer to the Application Note *AssetWorX – Quick Start*.

For more information on FDDWorX, please refer to the Application Notes, *FDDWorX – Quick Start*

The Fault Library can be found under the AssetWorX provider under the Equipment Classes.

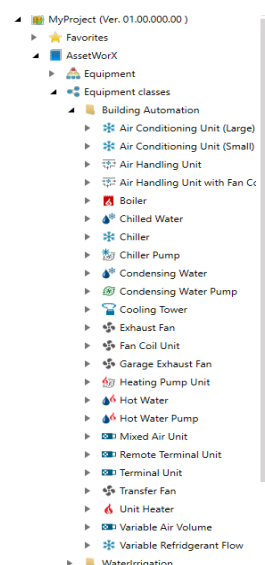


Figure 1 - Fault Library Specific to Building Automation

Each of the assets within the Fault Library is an equipment class which can then be easily instantiated into the AssetWorX project.

For more information on equipment classes, please refer to the Application Note *AssetWorX – Equipment Classes*.

In order to view the faults and their rules,

1. Click on one of the equipment class such as Chiller.
2. Click on its *FDDWorX* tab to load the configuration of the Fault rules. There will be a list of pre-configured Faults that correspond to the selected Equipment Type under the Fault Definitions tab



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Fault Name	Enabled	Severity
Failed Closed Isolation Valve Fault	1	500
High Approach Temperature Fault	1	500
Leaking Isolation Valve Fault	1	500
Low Chilled Water Temp Setpoint Fault	1	500
Low Delta T Fault	1	500
Poor Operating Efficiency Fault	1	500

Figure 2 - List of Preconfigured Faults for an Equipment Class

In order to view the Fault Rules associated with each of these Faults,

1. Click on the + button in front of each Fault
2. A window would expand with tabs for Description, General, Fault Rule and a few others.
3. Click on the Fault Rule tab to bring up the rule associated with the selected fault.

Description	General	Fault Rule	Fault Cost	Related Values
Boolean Expression: $((\text{IF } (\ll\text{Differential_Pressure}\gg > 5 \text{ \&\& } \ll\text{Chilled_Water_Isolation_Valve}\gg == 1 \text{ \&\& } \ll\text{Flow}\gg < 10 * \ll\text{Design_Flow}\gg) \text{ THEN } 1 \text{ ELSE } 0) * 100 * 15.00"$ Chilled_Water_Isolation_Valve: @@wellChilled_Water_Isolation_Valve Design_Flow: @@wellDesign_Flow Differential_Pressure: @@wellDifferential_Pressure Flow: @@wellFlow				

Figure 3 - Fault Rules for Selected Fault

The Parameters section automatically populates the list of parameters that are required for the defined fault rule.

The Fault Rules defined within the Fault Library consist of several parameters to accommodate the different types of inputs for different project requirements.

For more information on creating Faults, please refer to the Application Note *FDDWorX – Creating Rules for Fault Detection and Diagnostics*.

The predefined Fault Rules are based on the general equipment type setup and would need to be verified and tweaked to meet the equipment at the different sites.

Instantiation from the Fault Library

Once the Fault Rules within the Fault Library have been tweaked as per the project requirements, you can instantiate these classes into the Asset Tree. You can follow the steps below.

1. Right click on the asset within the Asset Tree
2. Select *Add Equipment from library...* to open a window with all the folders and classes within the Fault Library available for instantiation on the selected asset level.

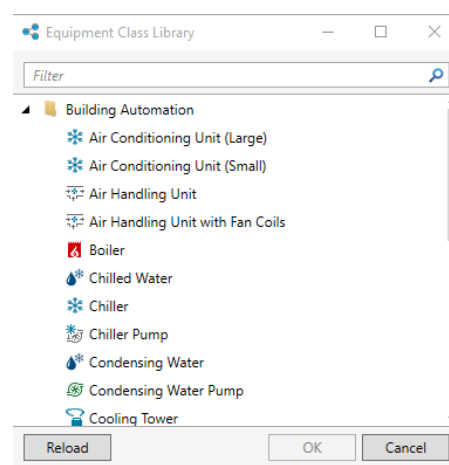


Figure 4 - Select Equipment Type to Instantiate

3. Select the equipment type you would like instantiate and click on OK.
4. Enter the inputs for the Parameters and click on OK
5. The equipment type from the Fault Library then gets instantiated and can be used just like any other asset.

You can create your own equipment classes within the Fault Library and instantiate them within the Asset Tree.