



KONGSBERG

Instructor Manual

K-Spice® Generic Training Simulator



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TABLE OF CONTENTS

1	INTRODUCTION.....	4
2	STARTING THE INTERFACE	5
3	ACCESS CONTROL.....	5
4	INSTRUCTOR STATION DESIGN	6
4.1	LAYOUT	6
4.2	INSTRUCTOR TOOLBAR	6
4.3	INSTRUCTOR MENUS.....	7
4.3.1	<i>File.....</i>	7
4.3.2	<i>Control</i>	7
4.3.3	<i>View.....</i>	7
4.3.4	<i>Tools.....</i>	8
4.3.5	<i>Training.....</i>	8
4.3.6	<i>Help</i>	8
4.4	INSTRUCTOR GRAPHIC AREA.....	9
4.4.1	<i>Navigation.....</i>	9
4.4.2	<i>Hierarchy</i>	9
4.4.3	<i>Find Blocks</i>	9
5	INSTRUCTOR STATION FUNCTIONALITY	10
5.1	INITIAL CONDITIONS	10
5.1.1	<i>Saving Initial Conditions</i>	10
5.1.2	<i>Loading Initial Conditions.....</i>	10
5.1.3	<i>Deleting Initial Conditions</i>	10
5.1.4	<i>Protected Initial Conditions</i>	10
5.2	SNAPSHOTS.....	11
5.3	BLOCK FUNCTIONS	12
5.3.1	<i>Block Information</i>	12
5.3.2	<i>Field Actions</i>	12
5.3.3	<i>Malfunctions.....</i>	13
5.3.4	<i>Performance Curves.....</i>	14
5.3.5	<i>Browse Connections.....</i>	15
5.3.6	<i>Help</i>	15
5.4	GLOBAL VARIABLES	16
5.5	ACTIVE MALFUNCTIONS PANEL	16
5.6	MODEL MAP.....	17
5.7	RAMP MONITOR	18
5.8	BOUNDARY CONDITIONS	18
6	ASSESSMENT TOOL - NEPTUNE	19
6.1	AUTOMATIC EXERCISE SET-UP	19
6.2	TRAINEE PERFORMANCE EVALUATION.....	19



6.3	PRINT.....	20
6.4	EXERCISE LOG.....	20

1 Introduction

The objective of this document is to describe the functionality that is available for the Instructor when running an OTS training session.

Functionality provided on the Instructor Station includes:

- Access Control Levels
- Running, pausing and exiting the simulator
- Viewing, zooming, tracing through graphics
- Viewing equipment and stream process information
- Viewing trends and profiles
- Applying equipment malfunctions and remote actions
- Applying field actions to equipment
- Saving, opening and deleting operating conditions
- Saving, opening, replaying snapshots
- Applying user options such as snapshot period, default ramp time, etc.
- Training exercise set-up
- Trainee Evaluation

2 Starting the Interface

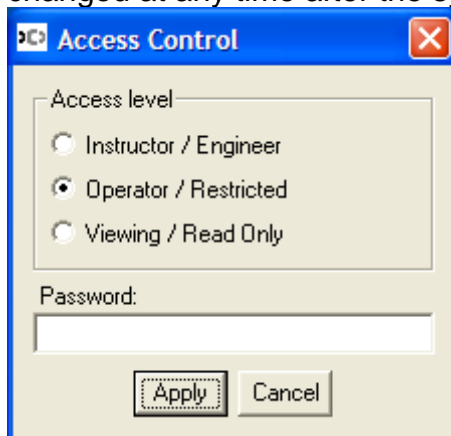
The instructor interface is started by double clicking on the K-Spice Instructor Icon on the desktop.



3 Access Control

The access to certain features in the OTS will be dependent on which level the user is logged on at.

The access control is activated when the system is loaded and the level can be changed at any time after the system is started.



The access levels are:

1. Engineer
2. Instructor (Instructor and Field Operator could be combined or separate)
3. View/Monitor Only

The access control log on is currently not implemented in K-Spice.

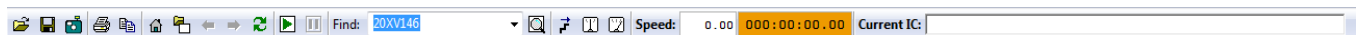
4 Instructor Station Design

4.1 Layout

The Instructor Station interface consists of the following areas:

- Toolbar
- Menu Bar
- Graphic Area
- Navigation Area
- Console Window
- Status Bar

4.2 Instructor Toolbar



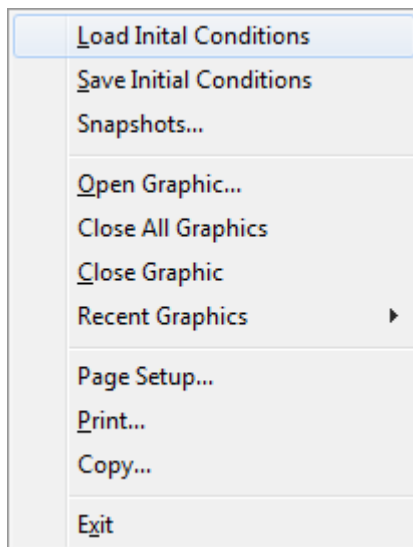
The Instructor Toolbar consists of the following functions:

- Load Initial Condition
- Save Initial Condition
- Open Snapshots Overview
- Print Graphic Area
- Copy Graphic Area to Clipboard
- Open Overview / Home Graphic
- Open Graphic
- Previous Graphic
- Next Graphic
- Refresh Graphic
- Run
- Pause
- Step
- Run at Real Time

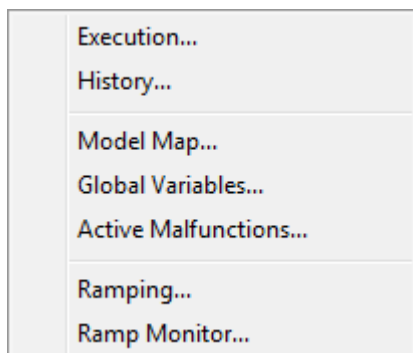
- Run at Max Speed
- Simulation Speed
- Simulation Time
- Current Initial Condition

4.3 Instructor Menus

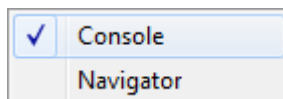
4.3.1 File



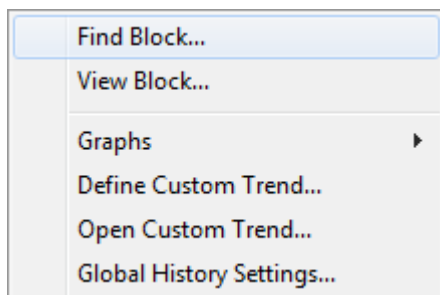
4.3.2 Control



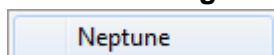
4.3.3 View



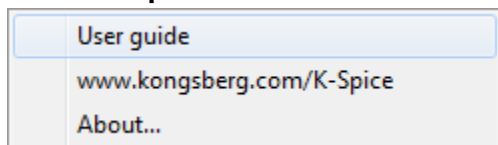
4.3.4 Tools



4.3.5 Training



4.3.6 Help



4.4 Instructor Graphic Area

These will be same graphics as built for the engineering model. Tabbed functionality for multiple graphics display is available on Instructor Station similar to engineering HMI.

Access to various block panels will be by right Clicking on any block or stream. Right-clicking will give a menu with the available options for that block (Plant, Field, Malfunction, Trend, Map etc) and on selecting any of the menu options, a new panel will appear.

All the panel/windows have an option to pin them. The first face plate panel will automatically close if a second face plate panel is requested to be opened, unless the first one has been pinned by the user. A user configurable maximum number of panels to be pinned will be available in engineering login access.

4.4.1 Navigation

Previous, Next, Home and Refresh graphic buttons are available in the toolbar.

It is possible to navigate within the process from graphic to graphic by using the Graphic Connectors.

The process graphics are available through a tree structure in the left hand side navigation window.

It is possible to navigate the tree structure hierarchy using the arrows at the top, bottom, left and right side graphic area, the arrows will only appear when the cursor is at the edge of the graphic and a valid graphic exists in that direction.

4.4.2 Hierarchy

The Instructor Station graphics have an Overview drawing at the top level and System drawings at the lower level:

- Overview - The top level is an overview of the process and will be the graphic which will be opened on the Instructor Station HMI on the start-up of Simulator.
- System – The lower level graphics are drawn up based on P&IDs with all process and control equipment modelled included in the graphics. P&IDs used in the system drawings are referenced in the title block with hyperlinks to the original P&ID's in PDF format for reference.

4.4.3 Find Blocks

A find block function is available (also through Ctrl-F) to find any blocks in model and this allows the user to navigate to the graphic on which this block is located. The use of wild cards is available for this function.

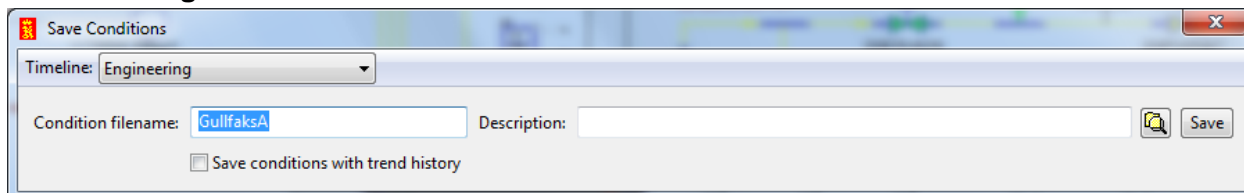
For a multi-kernel system, it is possible to find blocks in any kernel in the active project and not just the currently active application.

5 Instructor Station Functionality

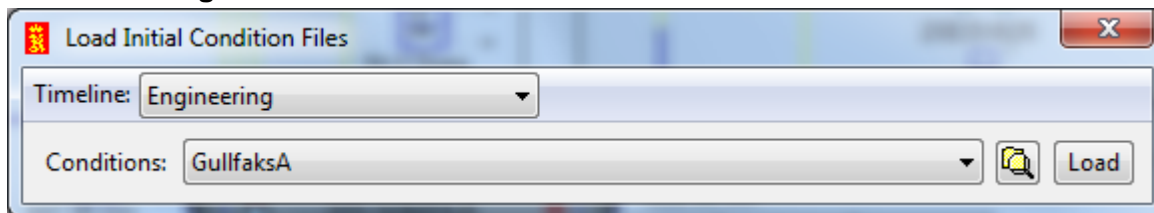
5.1 Initial Conditions

Initial conditions can be Saved and Loaded from the File menu or the toolbar. The Delete function is available in the Navigator.

5.1.1 Saving Initial Conditions



5.1.2 Loading Initial Conditions



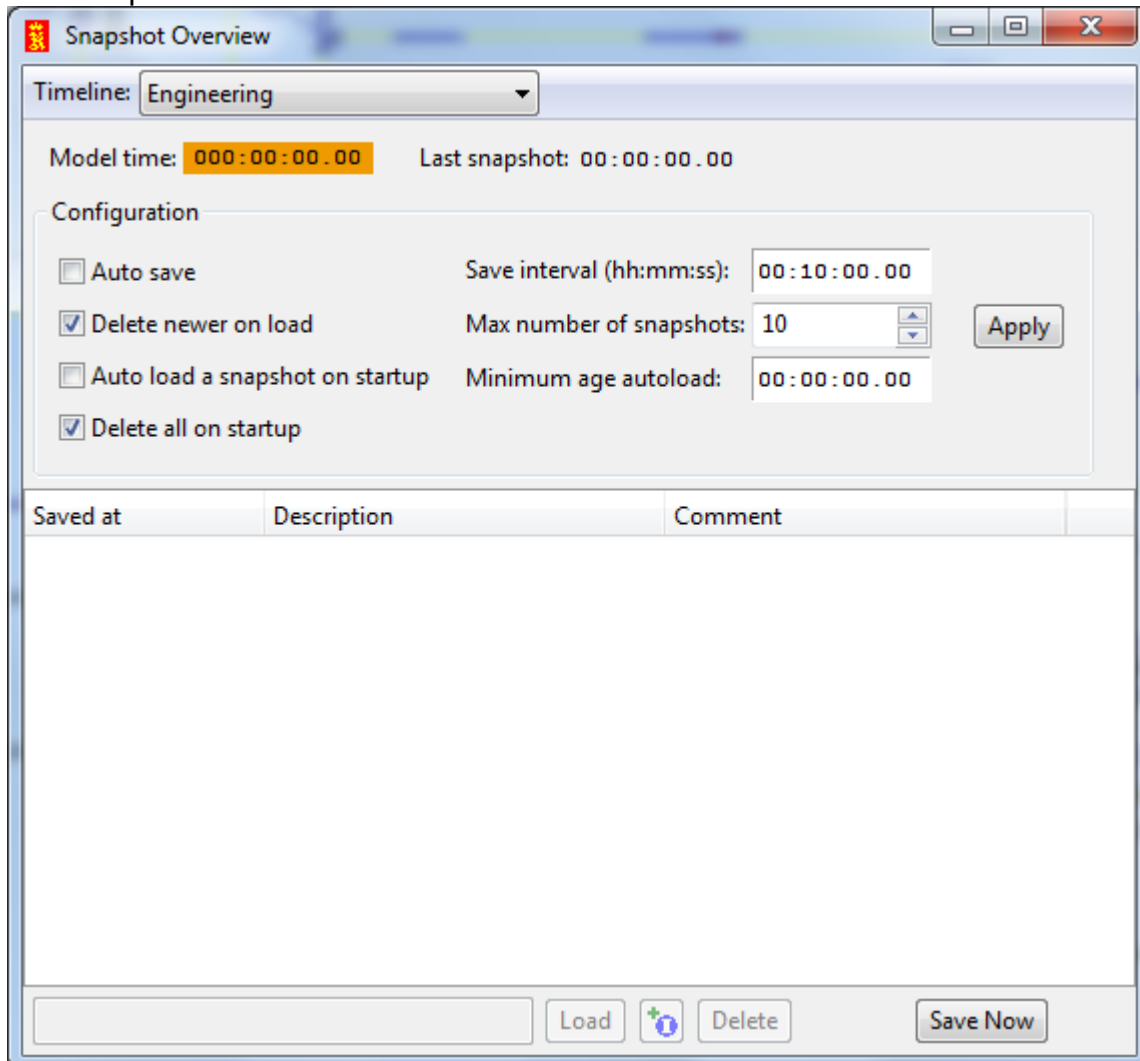
5.1.3 Deleting Initial Conditions

5.1.4 Protected Initial Conditions

With K-Spice it is possible to protect Initial Conditions so that they cannot be deleted from the Instructor Interface.

5.2 Snapshots

The Snapshot overview can be accessed from the File menu or the toolbar.



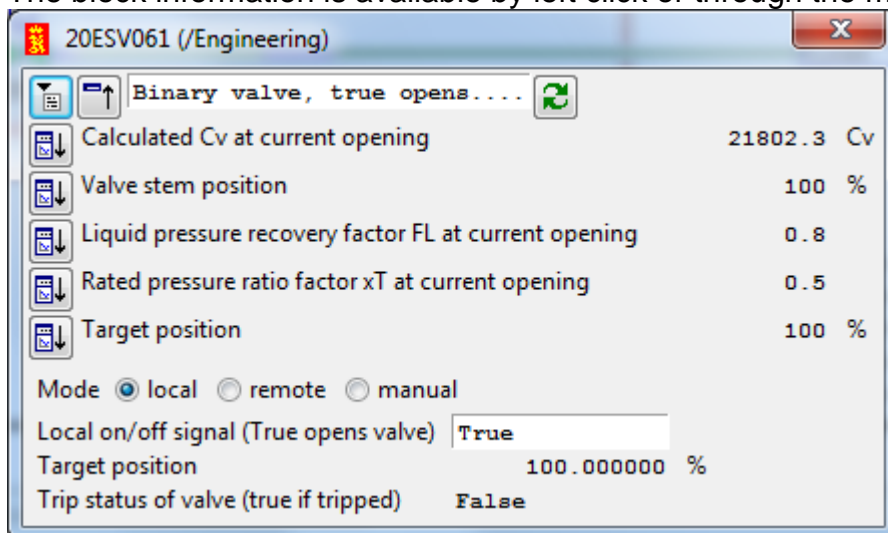
The following options are available for the Snapshots:

- Auto Save – Enable and disable automatic snapshots
- Delete all on startup – Delete all the snapshots when starting the model.
- Save Interval – The time between automatic snapshots
- Max Number of Snapshots –The maximum number of snapshots in the buffer

5.3 Block Functions

5.3.1 Block Information

The block panel displays process information, for example temperature, flow, level etc., for the equipment item, as well as basic design data such as actuator direction. The block information is available by left click or through the menu on right click.

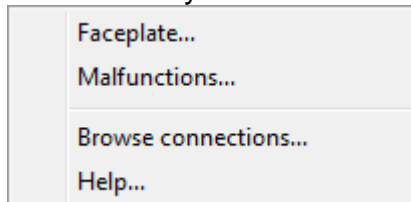


5.3.2 Field Actions

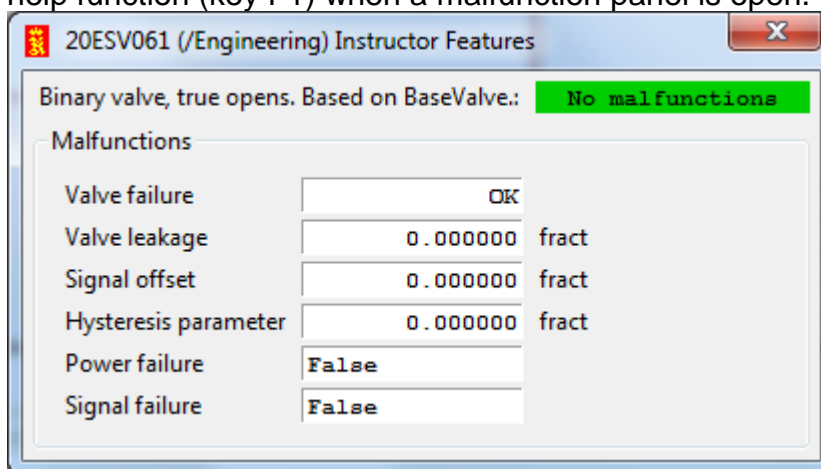
Field Operations are available on the menu by right click of the mouse for those blocks that have any field operations. This will allow the instructor to perform field actions such as opening or closing a manual valve.

5.3.3 Malfunctions

Malfunctions are available on the menu by right click of the mouse for those blocks that have any malfunctions.

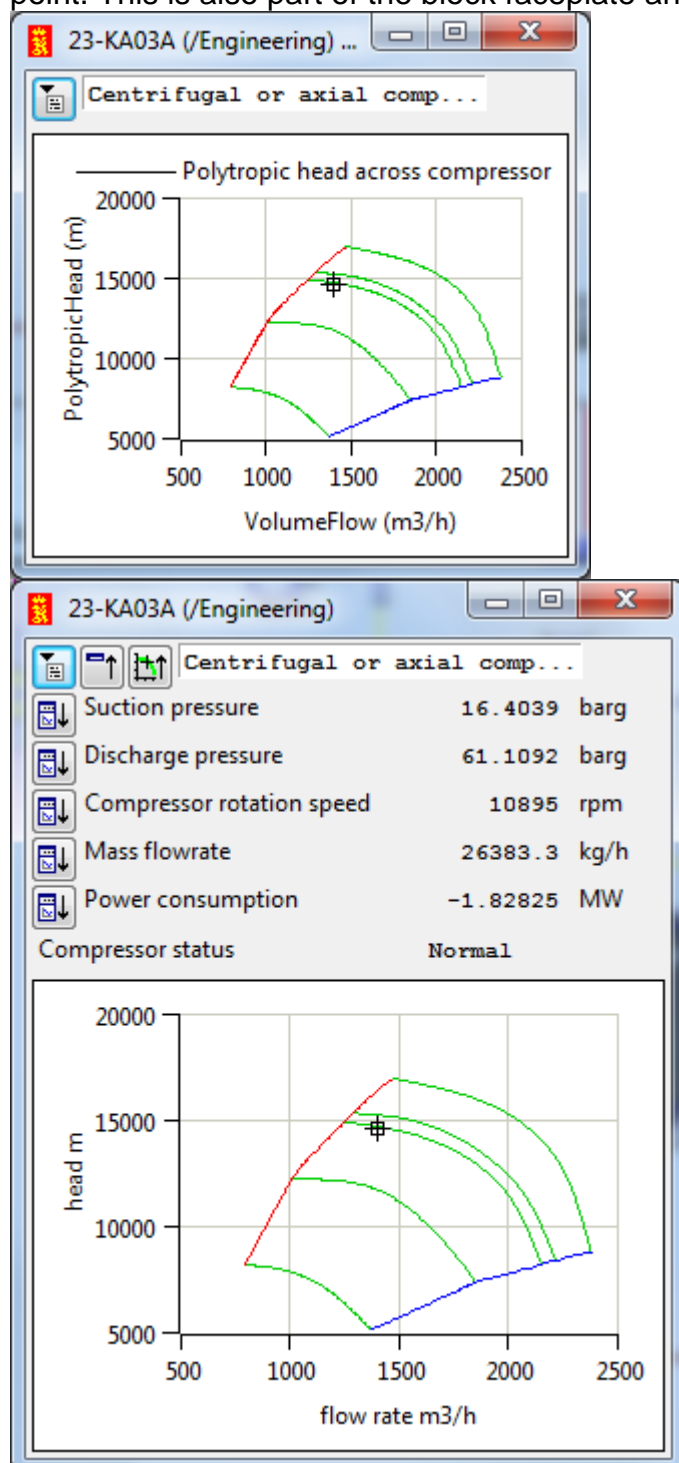


Help will be available for the malfunctions and be available using standard windows help function (key F1) when a malfunction panel is open.



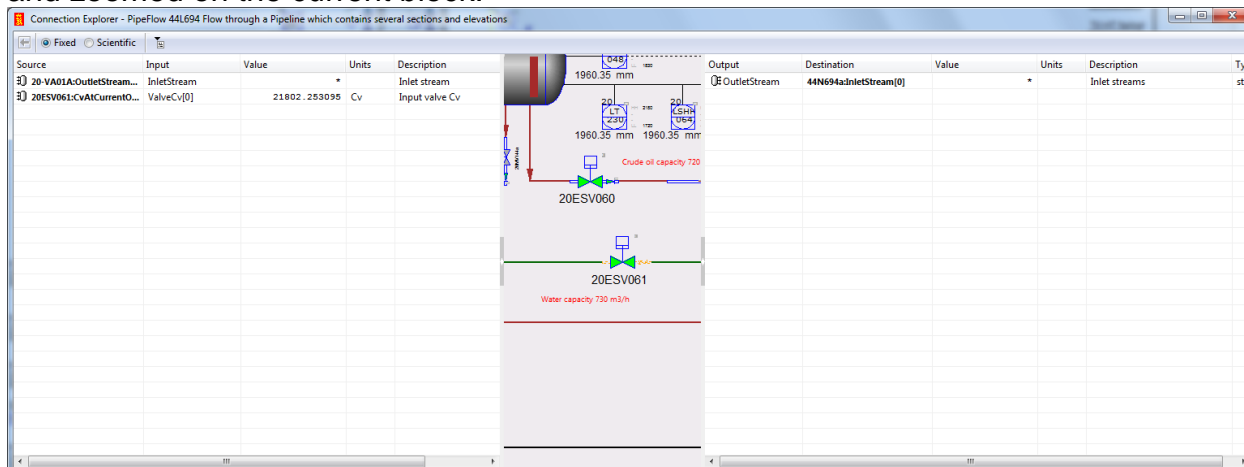
5.3.4 Performance Curves

For equipment like Pumps, compressors, vacuum pump etc for which a performance curve is available, a curve is available showing the history and current operating point. This is also part of the block faceplate and can be toggled on and off.



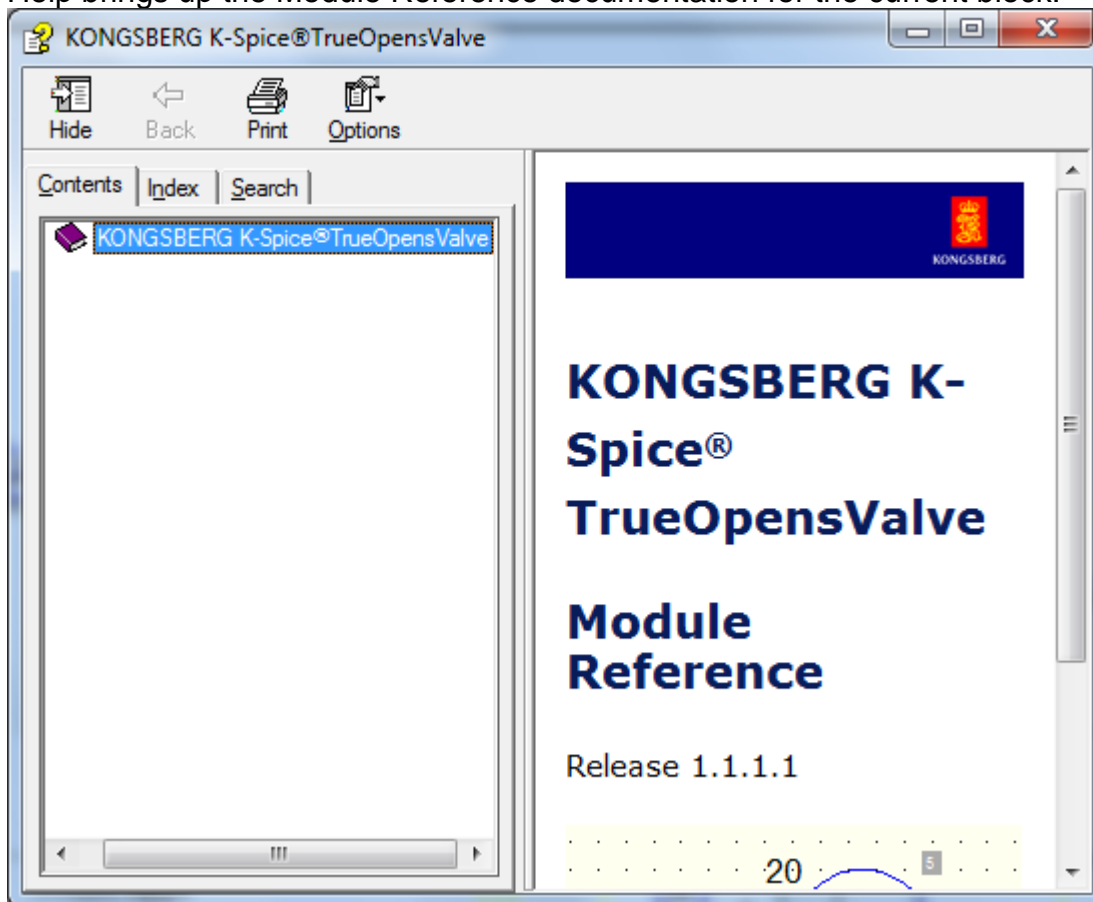
5.3.5 Browse Connections

Browse connections allow navigation from block to block through the input and output connections. The panel shows the current values where applicable and has a section displaying the graphic containing the current block, which is also centered and zoomed on the current block.



5.3.6 Help

Help brings up the Module Reference documentation for the current block.



5.4 Global Variables

The Instructor has access to change the global variables of the process. The Global Variables panel can be categorized with a tab for each category.

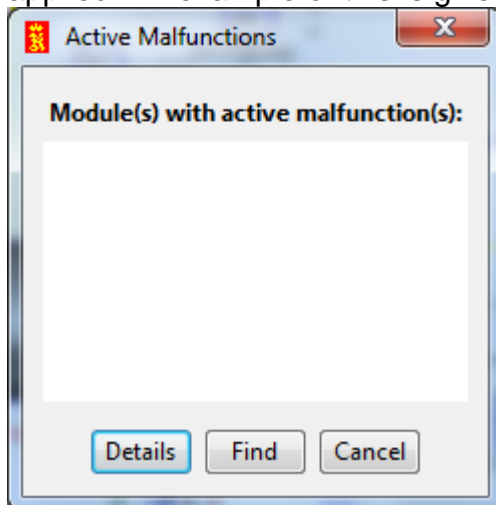
Some examples of the Global Variables are:

- Ambient temperature
- Sea water temperature
- Utility Air Failure
- General Power Failure
- Gas export pipeline pressure and temperature

Options which require a number should have a ramp time associated with them that the Instructor can set. Boolean type options should be provided as an on / off tick box.

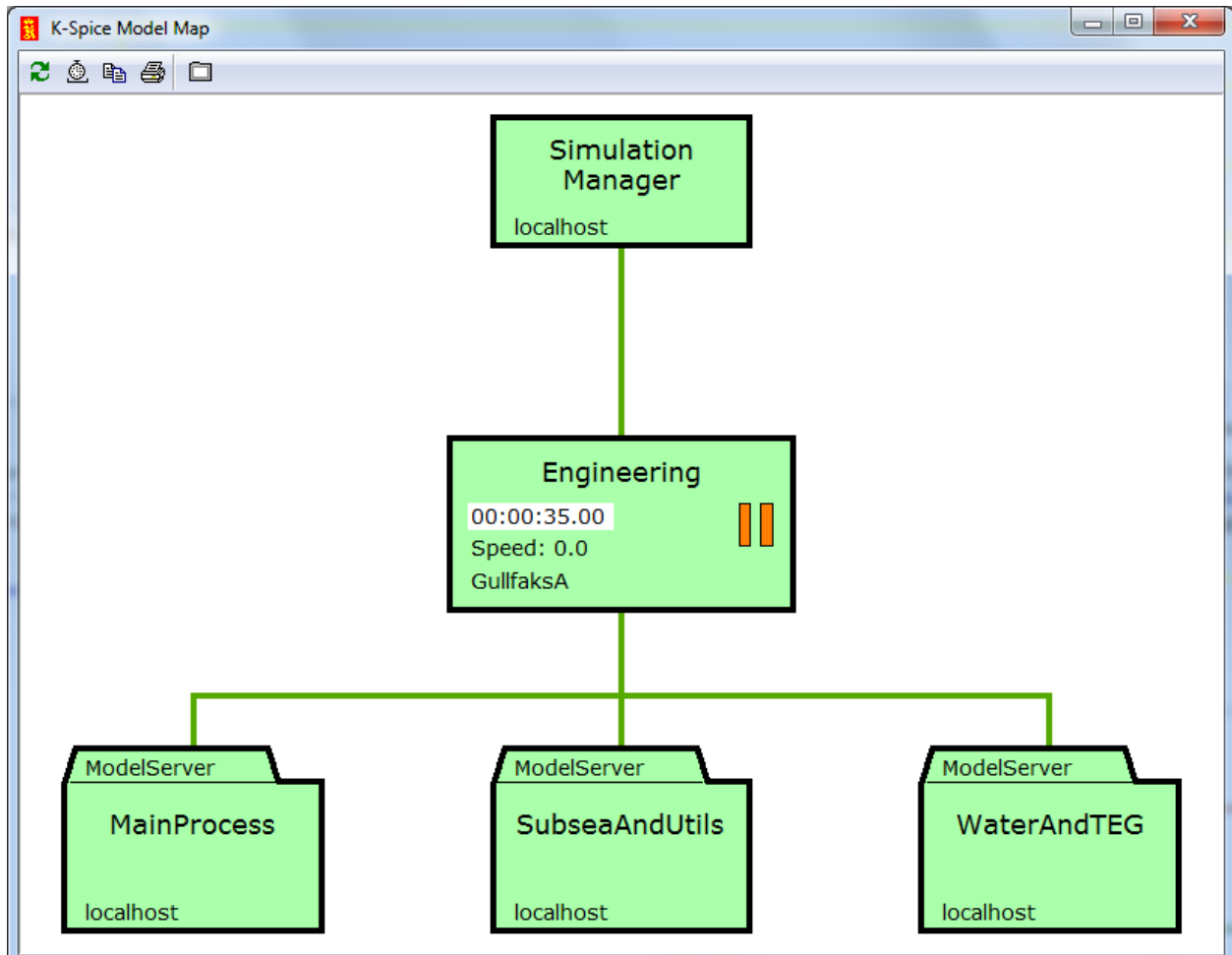
5.5 Active Malfunctions Panel

The Active Malfunctions panel displays any equipment items that have a malfunction applied. An example of this is given below.



5.6 Model Map

The Model Map gives a description of each of the system components being connected as part of the OTS and the connecting lines gives the status of the data transfer links.



The following color coding is used:

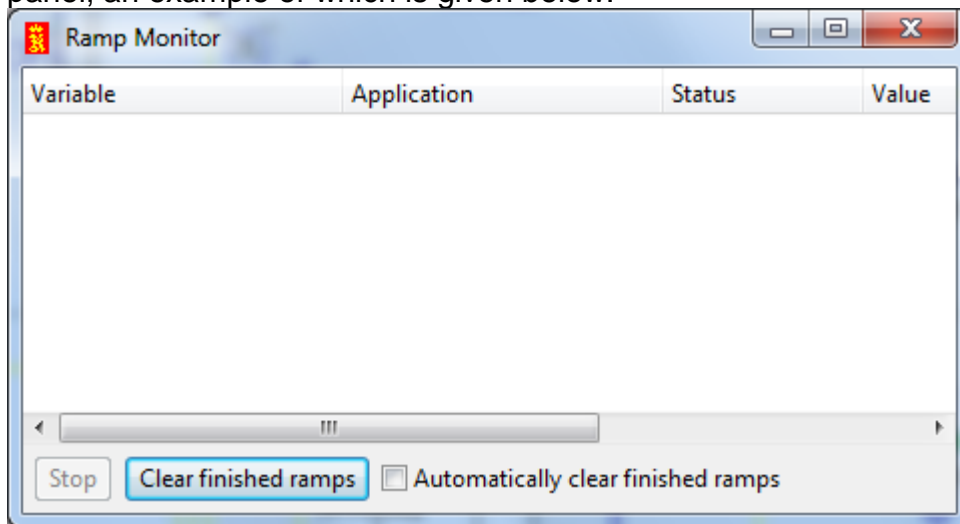
- Green – OK
- Yellow – Warning or Initialization
- Red – Error

The yellow and red will include a brief error message stating the problem.

5.7 Ramp Monitor

Where actions have been applied by ramping a variable the Ramp Monitor is available to display the state of any current ramps.

Ramps can be paused, continued or stopped using the buttons provided on the panel, an example of which is given below:



5.8 Boundary Conditions

Right-clicking using the mouse on a Boundary block should give a panel where Boundary Conditions variable could be altered like Boundary Pressure, Temperature, and Composition etc.

6 Assessment Tool - Neptune

6.1 Automatic Exercise Set-up

One of the options on the Instructor Station is to start the Neptune Instructor Tool. Neptune allows the instructor to create and save exercises. Multiple scenarios can be created in each exercise. Triggers can be inserted in Scenarios. These triggers can then be used to evaluate and score a Student's performance.

The exercises can be saved and accessed later when required by the Instructor.

Engineering units used are project defaults.

Exercise setup is based on wizards:

1. Give a title, objective and owner
2. Define the initial Condition to use (if any)
3. Define Scenarios to run
4. Define Evaluations to run
5. Save

Detailed information on using Neptune can be found in the Neptune Instructor System Guidance Manual which is an online program that accompanies the Neptune installation.

6.2 Trainee Performance Evaluation

The Instructor Station also includes access to a trainee performance evaluation tool, where it is possible to monitor, review and evaluate the performance of an operator.

The process of scoring for an Assessment can be configured in the following ways:

- Discreet
 - Positive – Add a set amount of points to the Operator's score.
 - Negative – Subtract a set amount of points to the Operator's score.
- Integrating
 - Increasing – Add points to the Operator's score over time up to a maximum.
 - Decreasing – Subtract points from the Operator's score over time up to a minimum.

6.3 Print

An instructor can print a report of an exercise for each student. Report can contain the following items:

- Instructor Name
- Student Name
- Date
- Time
- Exercise Name
- Exercise Scenario
- Instructor Actions
- Operator Actions
- Trainee Performance Record

6.4 Exercise Log

Following items can be logged on Instructor Station for each session:

- Instructor Name
- Student Name
- Date
- Time
- Exercise Name
- Exercise Scenario
- Instructor Actions
- Operator Actions
- Trainee Performance Record