Accord

Template Summary

AT Heating Plant C2 Summary R1.0.docx

Document: Accord Template Summary.

System: Food and Beverage: AT Heating Plant C2

Function: Small Food Plant Product Heating

Revision: R01 15th Sept 2025

Introduction

Accord Template for a product heating system, e.g. in a small Food Plant.

This document is to assist engineering personnel with installation and usage of an Accord Template; using the Accord RunTime Library. The user should be familiar with Accord system. Accord User Guides provide more information on modules and setup.

This Accord Template is for a Small Food plant to take in Product in an Intake (Reception) tank and heat it using a Heat Exchanger and transfer to Holding Tank. The product could be a sauce for example.

The template maybe easily adapted for specific installations by renaming and modifying equipment and program items in Accord Designer for Model and HMI.

The System differs from C1 in that the Heating program starts, controls, and ends the Tank programs. The Heating program is a Master Program and the Tank programs control only their Units and equipment.

Template Contents

The template AT Heating Plant C1 includes the following

Item	Name	Editor
Accord Model	AT Heating Plant C2 C.ctr	Designer
Accord HMI project	AT Heating Plant C2 HMI.zip	Designer
Summary	AT Heating Plant C2 Summary.pdf	
Simulator	AT Heating Plant C2 SimulatorProfile.csv	Excel

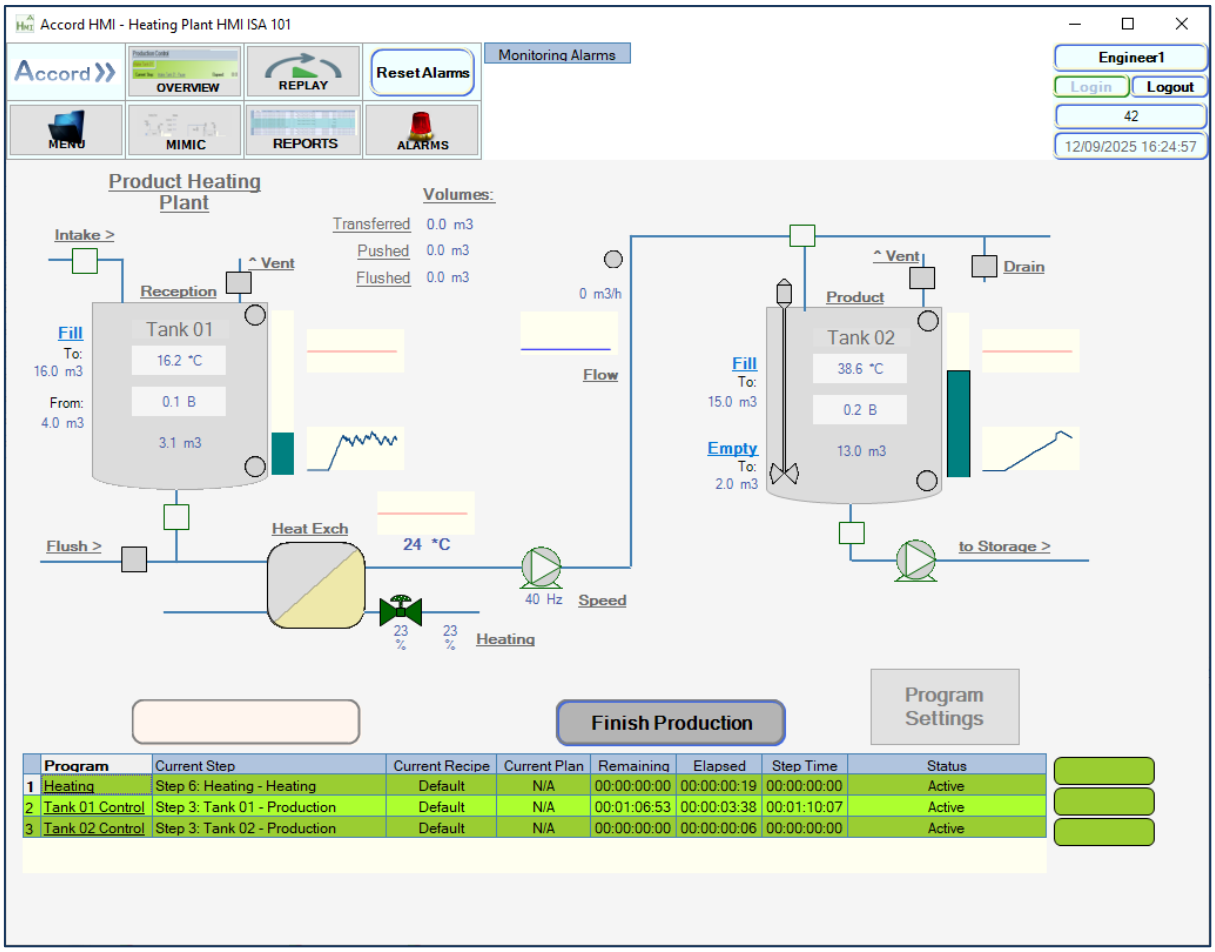
The items may have revision numbers, but the most of the filename will be as above.

Index

1. System Description

The system will provide

1. Automatic and Manual Operation of all devices and instruments.
2. Automatic program for control of Reception Tank 01, with Setpoints.
3. Automatic program for Transfer to Tank 2 with Heating, and emptying Tank 02.
4. Automatic program for control of Product Tank 02, with Setpoints.



Mimic of the Heating Plant

There is full automatic operation, including the ability to change step on or steps at any time. The program will run according to selections, using the setpoints chosen, automatically stop on critical alarms and resume on Alarms reset and resume commands.
The system may be easily customised; it is easy to modify, add or delete a tank, program or step and also to change any Step Time or Setpoint.
Step Order may be changed in Designer
Setpoint Values may also be changed in Designer or HMI or Recipe Manager.
Decision States may also be changed in Designer or HMI or Recipe Manager.

2. Process Summary

2.1 List of Programs

Common:

There are checks for High Temperature Alarms at both Tanks. These checks will be active at all times.

Production:

Tank 01:

The product is fed into the Tank 01 through Inlet valve. The Tank level is maintained between Fill Enable and Filled Level Setpoints by switching in Filling and Production Steps. There is an activation of a Vent Valve at a High Pressure.

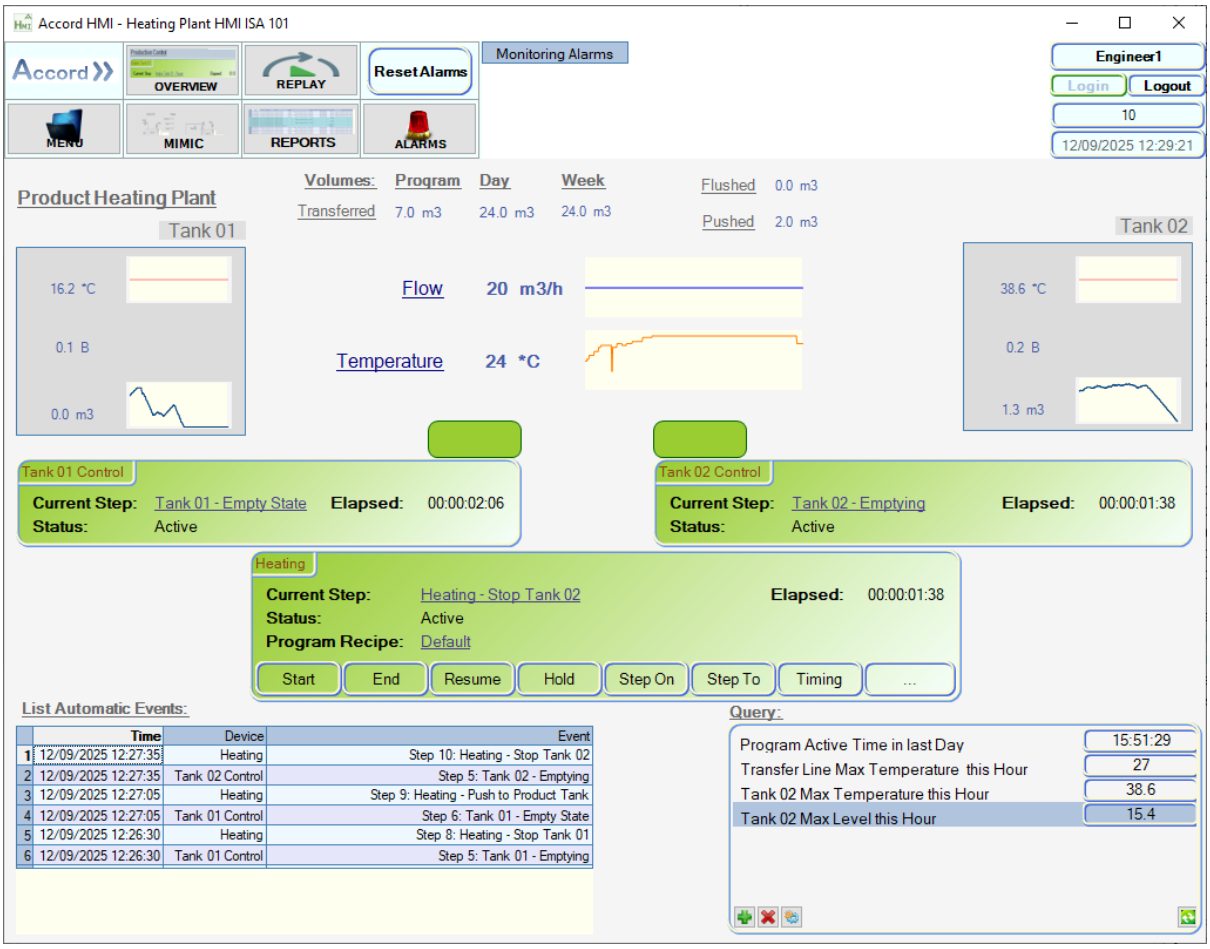
Heating:

Product is transferred from Tank 01 to Tank 02, and levels are maintained in both tanks. Transfer and Heating are always enabled.

The heating is controlled by a PID Loop. There are Push Steps to a drain at Tank 02 and Flush steps at Start and End. The times of the Flush steps and the volumes for the Push steps are changeable as Step Times, and Setpoints. The Heating Target temperature is a setpoint also. All programs are configurable for Recipes and the program faceplates allow for Recipe Selection.

Tank 02:

The product is fed into the Tank 02 through Inlet valve and Emptied out by Outlet Valve, and pumped away to other external target. The Tank level is maintained at Filled Level Setpoint. There is an activation of a Vent Valve at a High Pressure.



Overview of the Heating Plant

2.2 Process Steps

Program	Step	Description
Heating	Startup	
Heating	Initial Alarm Check	Check Sub Program Alarms
Heating	Initial Flush	Flush Line before Transfer
Heating	Wait for Tank 01	Wait for Tank 01 to Fill
Heating	Push to Drain	Push Flush Water to Drain
Heating	Heating	Product Heating and Transfer
Heating	Pause	Pause due to Levels
Heating	Stop Tank 01	End the Reception Tank Program
Heating	Push to Product Tank	Push Product to Tank with Water
Heating	Stop Tank 02	End the Product Tank Program
Heating	Final Flush	Flush Line
Tank 01 Control	Startup	Initial Alarm Check
Tank 01 Control	Filling	Initial Filling. Heating Program starts this Step
Tank 01 Control	Production	Level Control in Tank during Production
Tank 01 Control	Pause	Pause due to Level and Transfer Program
Tank 01 Control	Emptying	Tank is Emptying after Production
Tank 01 Control	Empty State	Tank is Emptied after Production
Tank 02 Control	Startup	Initial Alarm Check
Tank 02 Control	Filling	Initial Filling
Tank 02 Control	Production	Filling into Tank 02 after Product Heating
Tank 02 Control	Pause Filling	Pause due to Level and Transfer Program
Tank 02 Control	Emptying	Tank is Emptying after Production
Tank 02 Control	Empty State	Tank is Emptied after Production

2.3 Process Setpoints

Program	Setpoint	Description
Heating	Heating VSD Speed SP	Pump Speed for Fast Transfer
Heating	Line Push Volume SP	Volume of the line for Pushouts
Heating	Heating Temperature SP	Temperature SP for Heating during Transfer
Tank 01 Control	Fill Enable Level SP	Tank Refill Level
Tank 01 Control	Filled Level SP	Tank Filled Level
Tank 01 Control	High Alarm Pressure SP	High Alarm Pressure
Tank 01 Control	Vent Pressure SP	High Alarm Pressure to Open Vent Valve
Tank 01 Control	High Alarm Temperature	Temperature for High Alarm
Tank 01 Control	End Level SP	Empty Level for Pushouts
Tank 02 Control	Filled Level SP	Tank Filled Level
Tank 02 Control	High Alarm Pressure SP	Tank High Pressure reached
Tank 02 Control	Vent Pressure SP	High Alarm Pressure to Open Vent Valve
Tank 02 Control	Agitator Enable Level SP	Level at which the Agitator is Enabled
Tank 02 Control	High Alarm Temperature SP	Temperature for High Alarm
Tank 02 Control	Empty Level SP	Level at which Emptying pauses

3. Installation

This Template acts as a working system and a good template for similar systems. Systems may differ in many ways; Item naming, Nr of items, Nr of Tanks, Nr of crystallisation stages, etc. The following are brief guides to help customisation.

Please remember that changes made to the Model in Accord Designer will be also in Designer documents and in PLC or Emulator after import and download. Changes will also be automatically available in Accord Recipe, Plan and Reports.

Accord needs to be installed on a Windows 10 or 11 PC

3.1 PC Software

The following software is needed.
MS SQL Server 2014 or later, preferably with Management Studio, and .Net 4.8 enabled on PC.
Accord Designer
Accord Server
Accord HMI

The template is meant for understanding Accord, using the Emulator, but it could be transferred to a PLC, and in that case the following are required

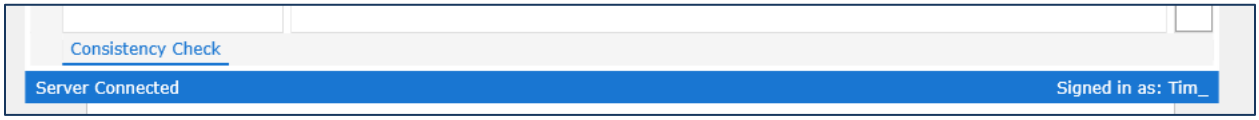
PLC: Siemens or other that Accord PLC Library is available for.
Network: using Ethernet.
PLC Editor: (Siemens TIA or equivalent)
OPC Server (Kepware or equivalent)

The aspects of the template can be expanded and the following can be used
Accord Recipe
Accord Plan
Accord Reports
MS Word, Excel

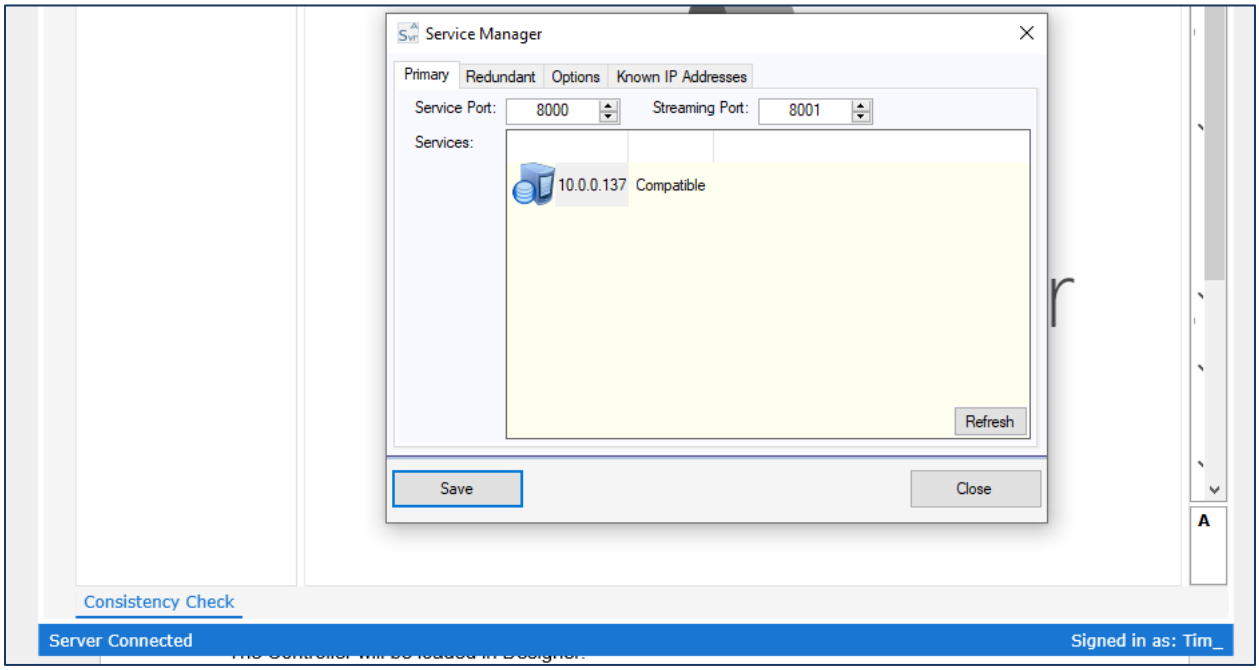
The following steps for restoration of Model (Controller) and HMI may not be necessary if the template is being shipped as part of Accord Installer.

3.2 Initial Start of Designer

Start Accord Server and Accord Designer and connect Designer and login to begin loading and editing.



Click on Server area to access the Server search panel.

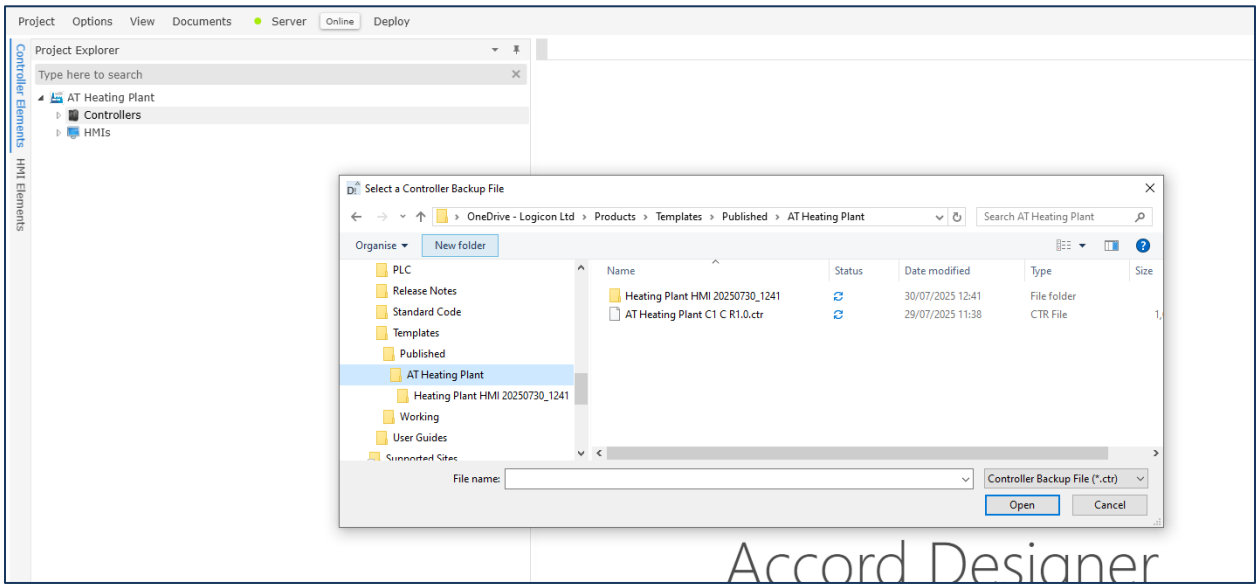


Click on Refresh if necessary to find the IP of the PC hosting Accord Server. When the required IP appears then double-click to select it.

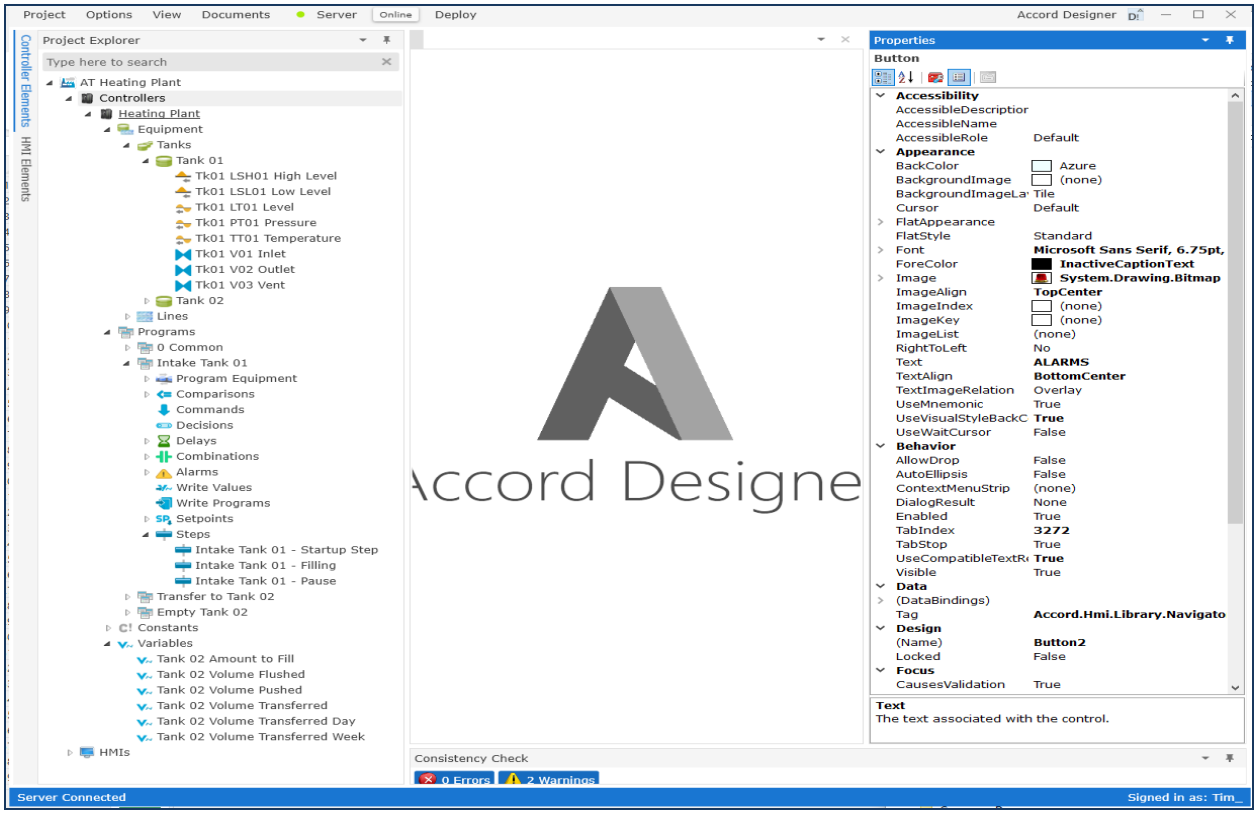
A login popup will then appear. Engineer1 and password Engineer is available for initial use. The name or password may be changed in Server or Designer later.

3.3 Restoration of Controller in Designer

When Designer is open, then select Restore in Controllers section and browse to and select the AT Heating Plant C2 C R1.0.ctr file (or similar if R Nr has changed) and confirm by Open.
The Controller will be loaded in Designer.



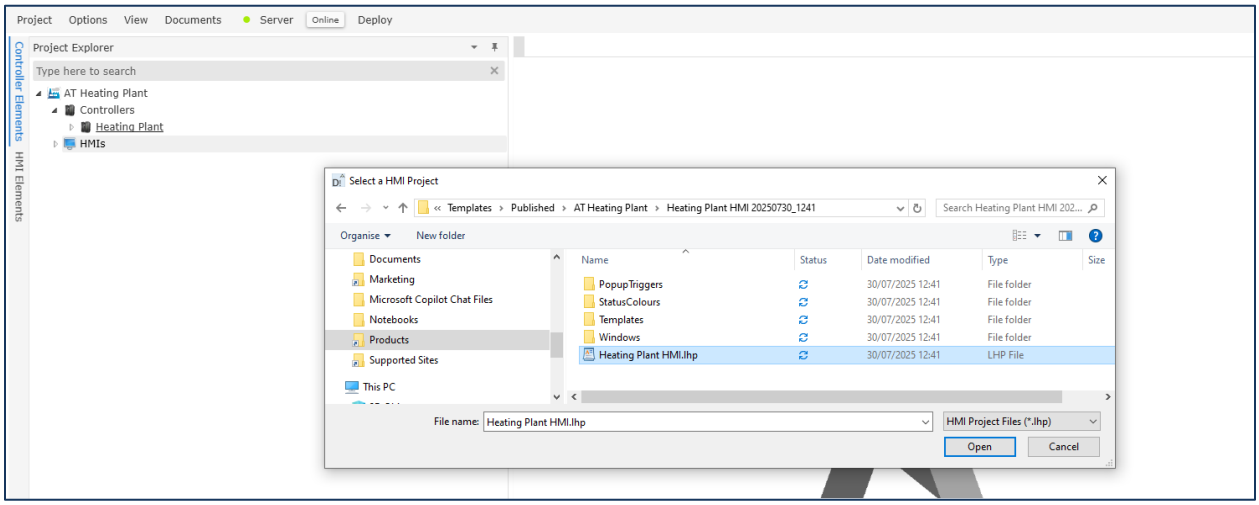
Screen showing loaded Controller which may be modified.



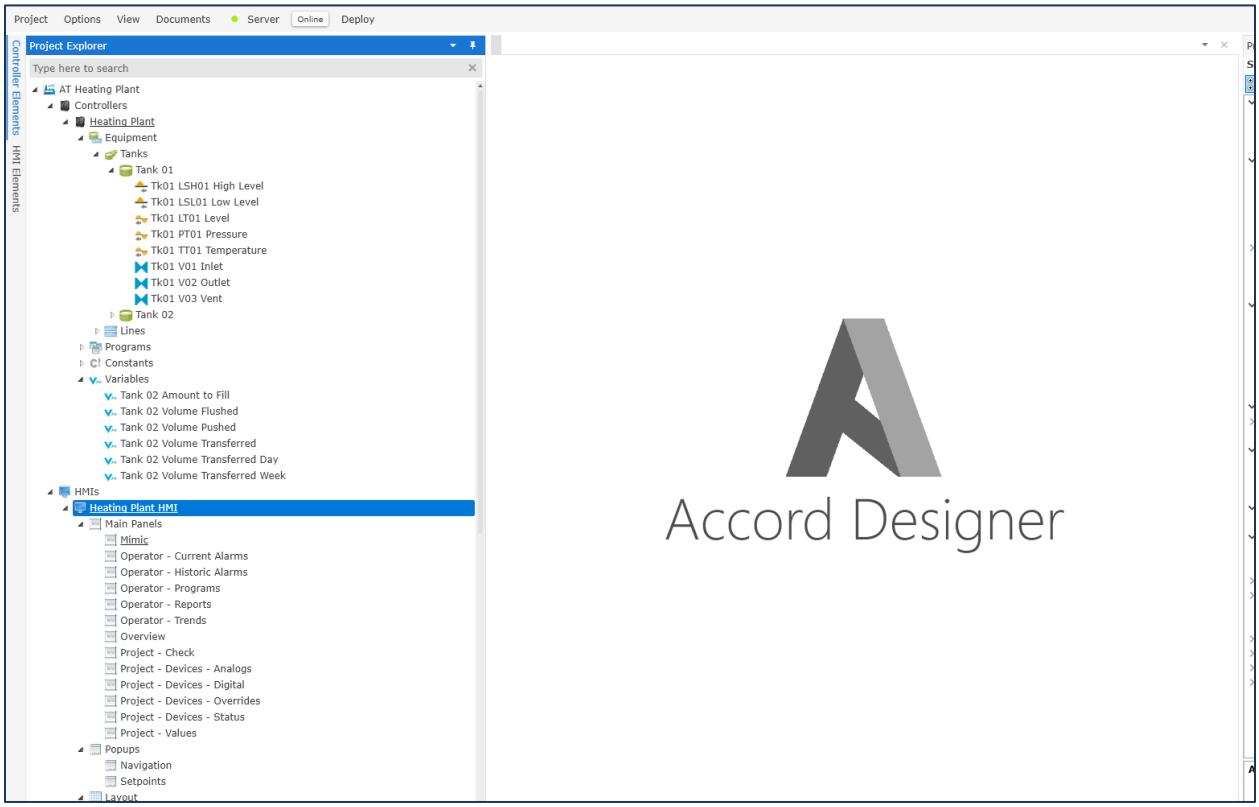
3.4 Restoration of HMI in controller

The HMI may be received as a zipped file and needs to be extracted to a folder.

Select Restore in HMI section in Designer and browse to and select the AT Heating Plant HMI folder and select the .lhp file and confirm by Open.
The HMI will be loaded in Designer.



Screen showing loaded HMI which may be modified.



4. Using the Controller and HMI

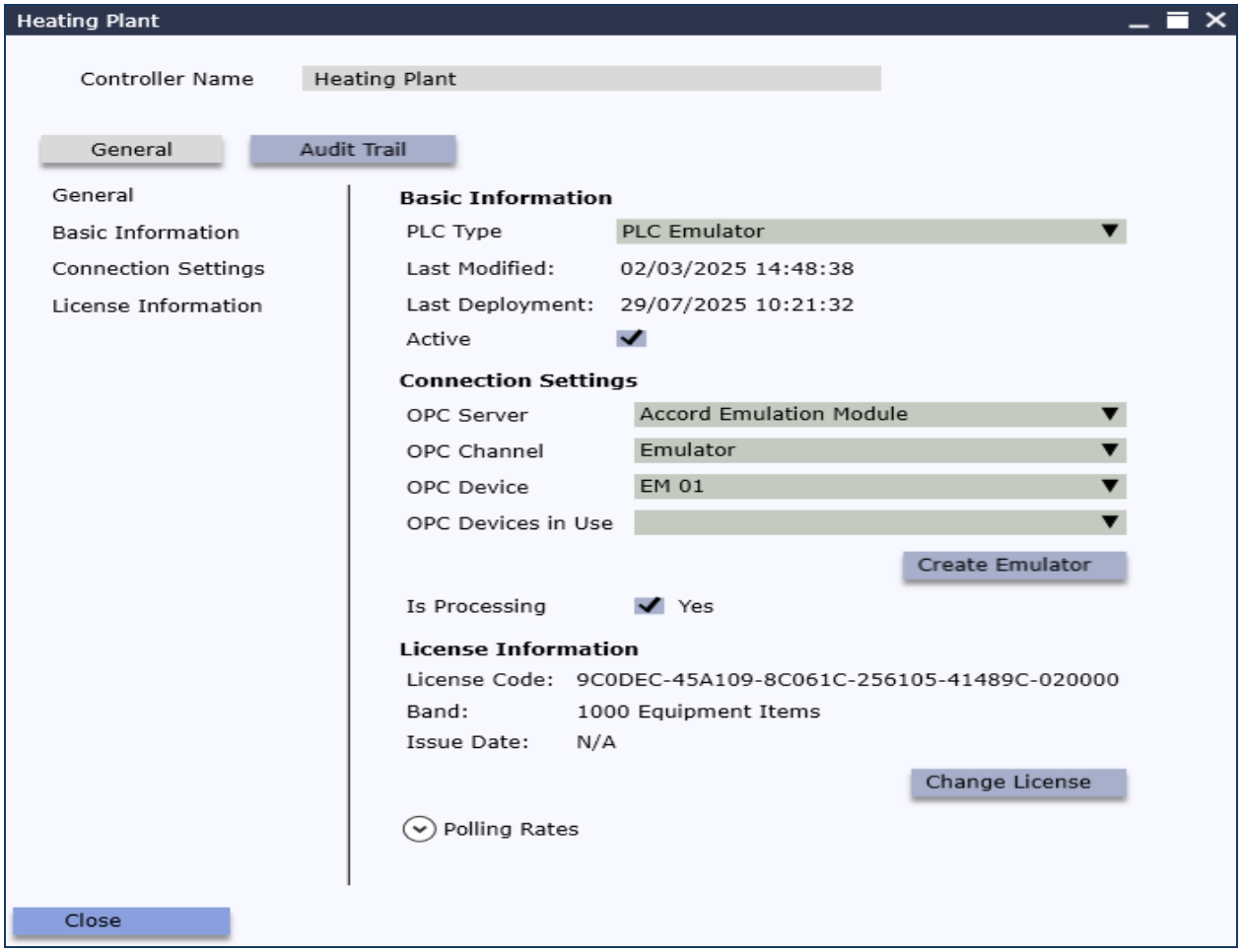
The following is for initial information, there is more information in the Designer Manual.

4.1 Controller Properties and Deployment.

The Controller needs to be deployed to the Emulator, (or PLC) initially and after changes.

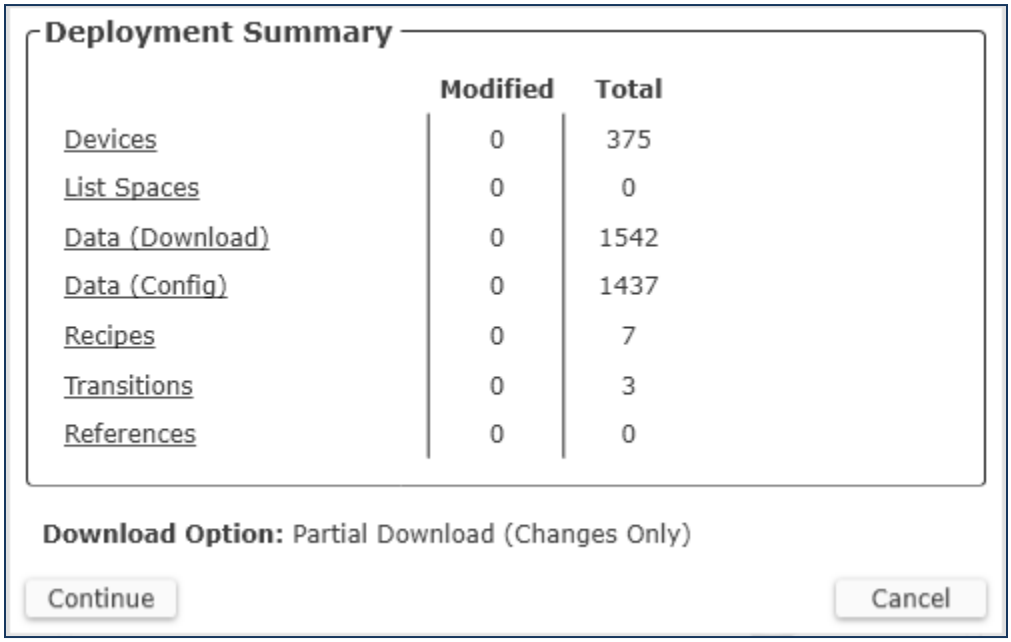
The screen shows the initial set-up, for an Emulator. The Emulator will have to be set up in Server, and selected, if not already set up. See Server / Settings / Emulator

If the Controller process model information is to be downloaded to a PLC, then the Accord PLC Library must be copied into the PLC project and an OPC profile must be setup for communication. Obtain the PLC Library and instructions from vendors. The PLC type would be selected in the dropdown, and the PLC can be selected from an OPC profile, which can be automatically read in by Accord.



Setup for Emulator. Names are Generic and similar may be used / selected.

Deployment to a PLC, or Emulator, is carried out by Right-clicking and selecting Deploy or Partial Download. A consistency check is performed and advised before the deployment and the summary for changes is presented,



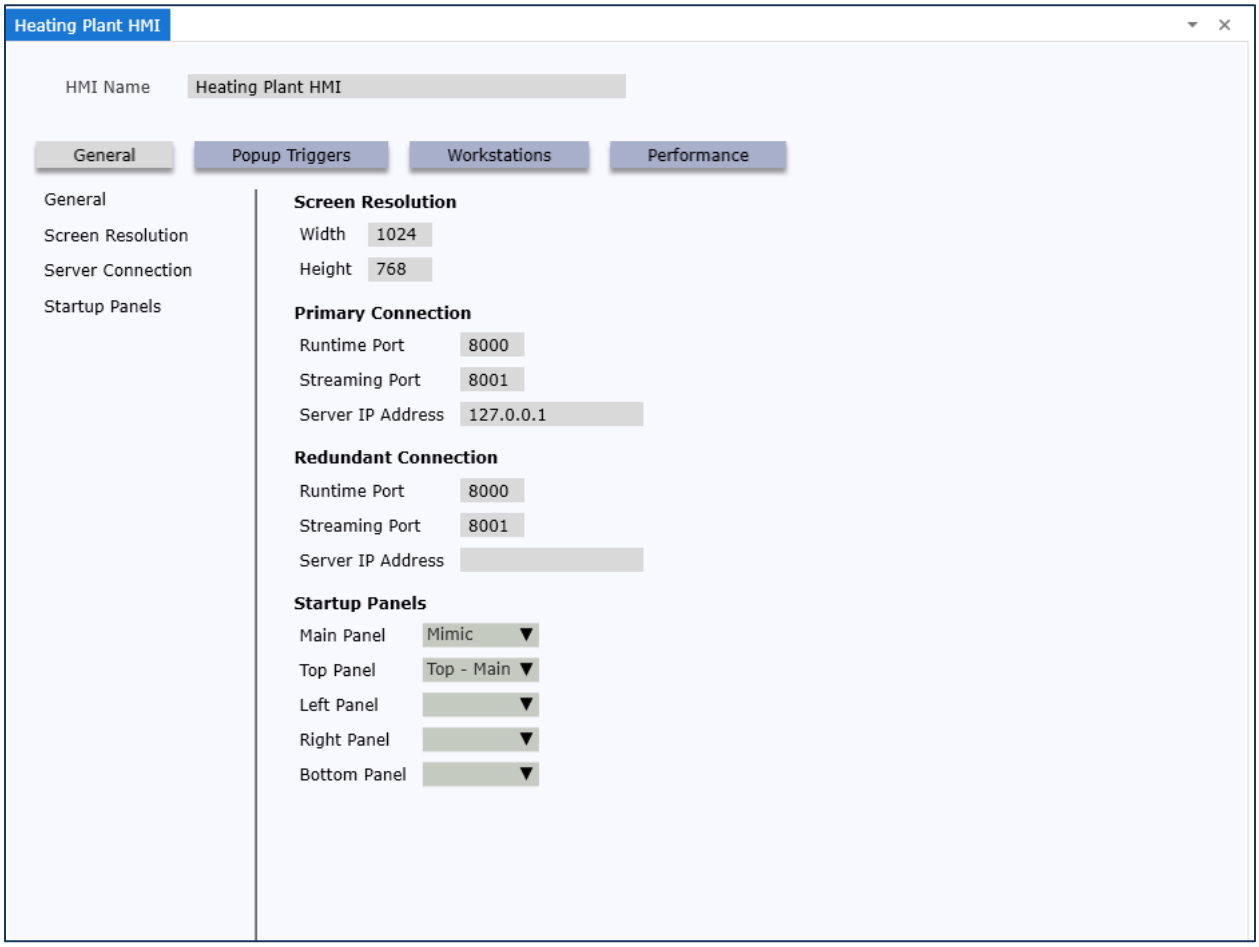
Clicking on the underlined links brings up more information if needed.
Space may be reserved for spare items to be added using Partial Downloads.

The deploy is then completed by pressing Continue.

See Designer and Server Manuals for setting up or changing Logging, User Security, Start-Up Module selection, or other aspects of setting up the Server side.

4.2 HMI Properties and Deployment.

The HMI is composed of screens, and objects on the screens.
The initial properties above include the application resolution and the IP Address of the Server that will provide information for the HMI during Runtime. The HMI acts as a client only at all times.



Other common settings may also be configured here.

The Template HMI contains initial screens for a Mimic, an Overview dashboard and list screens for Alarms, and Device States.

Mimic Screen, showing Tanks, and controls for devices and Programs and Recent Events.
The HMI may be emulated by pressing the Play button the top left hand corner. There are also buttons for alignment and other design aspects and changes may be saved using Save or Save All.
All changes are stored in the Database and available immediately for Runtime client applications.
See the HMI Runtime manual for starting a client application.

4.3 Customisation

Items in the Controller process model may be easily renamed or changed and the Cross Reference and Consistency Checks will help ensure secure modifications.
Accord is an integrated environment so all changes to Model are available in HMI, Recipe, Reports, as appropriate. Depending on the change, an item may need to be re-assigned using Project Explorer in Accord HMI.

Data should be uploaded from PLC to Designer Model, using the Sync Function, before modifications.

Controllers and HMI's can be copied within the project or copied between projects.

4.3.1 Adding an Equipment Item

Equipment Items are: Valve, Motor, Digital In, Digital Out Signal, Instrument or Drive

1. In the controller:

Drag in the appropriate icon into the unit
Or
Copy an existing item, using right-click copy and paste
Or
Right-click on the Unit and use Add Valve, etc.…

Configure the item and give the new item an appropriate I/O address. Use the I/O Table from the top menu to see all the existing I/O and to modify for the new item if required. Remember that this table can be copied to excel, modified and copied back, if required.

When an Analog Output; a Drive or Control Valve, that has a PID Loop controller, is copied then PID Loop Controller is also copied automatically. The Process Variable for the PID Loop will have to be changed or confirmed.

2. In the HMI:

The new device will be available for placing on screen as required. The quickest way is to copy an existing device and select the new device name using the built-in HMI Explorer.

4.3.2 Adding a Program Item

Program Items are: Program, Step, Setpoint, Alarm, Comparison, Decision, Delay, Combination, Write,

1. In the controller:

Drag in the appropriate icon into the unit
Or
Copy an existing item, using right-click copy and paste
Or
Right-click on the container and use Add Write, etc.…

Configure the item and add to / enable in Steps etc. as required.

2. In the HMI:

The new item will be available for placing on screen if appropriate . The quickest way is to copy an existing device and select the new device name using the built-in HMI Explorer.

4.3.3 Renaming an Item

Item objects are based in the Controller, so must be renamed there. Renaming can be done by right-clicking on the item and selecting Rename. The new name must not be used already. The new name will be used in all lists and references.

Items must be reselected, or renamed using properties in the HMI also. The Replace Text function can be used for this.

If the values or states of the object were logged in Server, then those records are retained under the original item name in case they are required in Reports. New values will be logged under the new name.

4.3.4 Removing or Deleting an Item

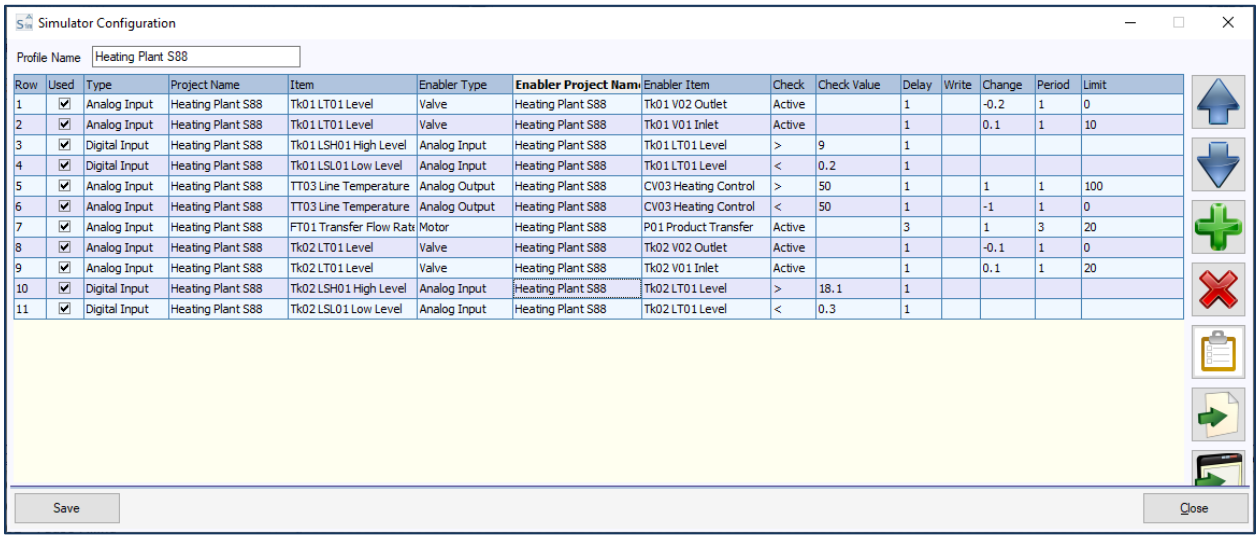
An Item can be removed or deleted using Right-ckick and Delete. An item which is removed from the controller must also be removed from the Screens. If an item was being logged, but is removed from the model then the logging of values will be stopped, but values will be retrained.

4.3.5 Changing Interlocks or Activations

Interlocks or Activations can be changed by selecting the requried aspect within the Proerties of the object. This applies to Digital Devices and Outputs.

5. Simulator

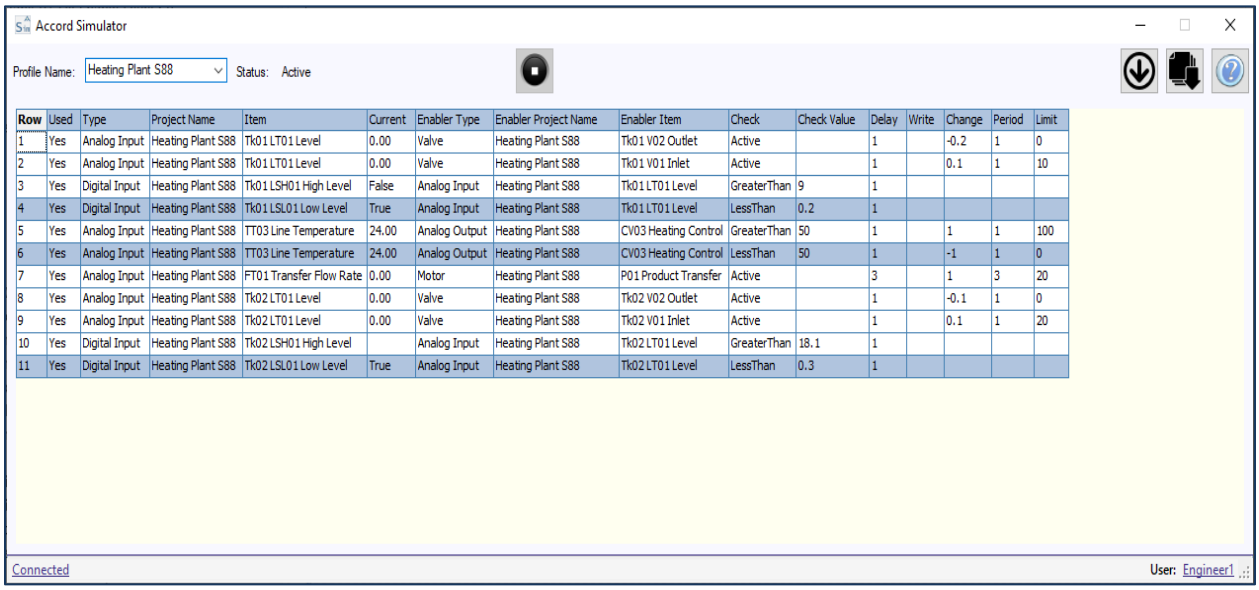
The small plant can be used in Emulator and with the Simulator. The Simulator will modify Analog Transmitter values and Digital Input results, to allow the operation of the plant to be tested. The Simulator can be accessed within Designer as of Release 4.10.



Row	Used	Type	Project Name	Item	Enabler Type	Enabler Project Nam	Enabler Item	Check	Check Value	Delay	Write	Change	Period	Limit
1	☑	Analog Input	Heating Plant S88	Tk01 LT01 Level	Valve	Heating Plant S88	Tk01 V02 Outlet	Active		1		-0.2	1	0
2	☑	Analog Input	Heating Plant S88	Tk01 LT01 Level	Valve	Heating Plant S88	Tk01 V01 Inlet	Active		1		0.1	1	10
3	☑	Digital Input	Heating Plant S88	Tk01 LSH01 High Level	Analog Input	Heating Plant S88	Tk01 LT01 Level	>	9	1				
4	☑	Digital Input	Heating Plant S88	Tk01 LSL01 Low Level	Analog Input	Heating Plant S88	Tk01 LT01 Level	<	0.2	1				
5	☑	Analog Input	Heating Plant S88	TT03 Line Temperature	Analog Output	Heating Plant S88	CV03 Heating Control	>	50	1		1	1	100
6	☑	Analog Input	Heating Plant S88	TT03 Line Temperature	Analog Output	Heating Plant S88	CV03 Heating Control	<	50	1		-1	1	0
7	☑	Analog Input	Heating Plant S88	FT01 Transfer Flow Rat	Motor	Heating Plant S88	P01 Product Transfer	Active		3		1	3	20
8	☑	Analog Input	Heating Plant S88	Tk02 LT01 Level	Valve	Heating Plant S88	Tk02 V02 Outlet	Active		1		-0.1	1	0
9	☑	Analog Input	Heating Plant S88	Tk02 LT01 Level	Valve	Heating Plant S88	Tk02 V01 Inlet	Active		1		0.1	1	20
10	☑	Digital Input	Heating Plant S88	Tk02 LSH01 High Level	Analog Input	Heating Plant S88	Tk02 LT01 Level	>	18.1	1				
11	☑	Digital Input	Heating Plant S88	Tk02 LSL01 Low Level	Analog Input	Heating Plant S88	Tk02 LT01 Level	<	0.3	1				

Rows may be edited using the Edit button. They may be reordered or removed and new rows may be added. The Profile may be exported and modified in Excel and imported using the arrow buttons.

The Play and Stop buttons provide for the profile to be made Active and Stopped. Rows whose enablers are true are shown in blue when the profile is Active.



Row	Used	Type	Project Name	Item	Current	Enabler Type	Enabler Project Name	Enabler Item	Check	Check Value	Delay	Write	Change	Period	Limit
1	Yes	Analog Input	Heating Plant S88	Tk01 LT01 Level	0.00	Valve	Heating Plant S88	Tk01 V02 Outlet	Active		1		-0.2	1	0
2	Yes	Analog Input	Heating Plant S88	Tk01 LT01 Level	0.00	Valve	Heating Plant S88	Tk01 V01 Inlet	Active		1		0.1	1	10
3	Yes	Digital Input	Heating Plant S88	Tk01 LSH01 High Level	False	Analog Input	Heating Plant S88	Tk01 LT01 Level	GreaterThan	9	1				
4	Yes	Digital Input	Heating Plant S88	Tk01 LSL01 Low Level	True	Analog Input	Heating Plant S88	Tk01 LT01 Level	LessThan	0.2	1				
5	Yes	Analog Input	Heating Plant S88	TT03 Line Temperature	24.00	Analog Output	Heating Plant S88	CV03 Heating Control	GreaterThan	50	1		1	1	100
6	Yes	Analog Input	Heating Plant S88	TT03 Line Temperature	24.00	Analog Output	Heating Plant S88	CV03 Heating Control	LessThan	50	1		-1	1	0
7	Yes	Analog Input	Heating Plant S88	FT01 Transfer Flow Rate	0.00	Motor	Heating Plant S88	P01 Product Transfer	Active		3		1	3	20
8	Yes	Analog Input	Heating Plant S88	Tk02 LT01 Level	0.00	Valve	Heating Plant S88	Tk02 V02 Outlet	Active		1		-0.1	1	0
9	Yes	Analog Input	Heating Plant S88	Tk02 LT01 Level	0.00	Valve	Heating Plant S88	Tk02 V01 Inlet	Active		1		0.1	1	20
10	Yes	Digital Input	Heating Plant S88	Tk02 LSH01 High Level		Analog Input	Heating Plant S88	Tk02 LT01 Level	GreaterThan	18.1	1				
11	Yes	Digital Input	Heating Plant S88	Tk02 LSL01 Low Level	True	Analog Input	Heating Plant S88	Tk02 LT01 Level	LessThan	0.3	1				