Accord

Template Summary

AT CIP 1T1L C1 Summary R1.1.docx

Document: Accord Template Summary.

System: Food and Beverage: AT CIP 1T1L C1

Function: Clean In Position System with 1 CIP Tank

Revision: R01 20th May 2025

Introduction

Accord Template for CIP Set with 1 Tank and 1 Line

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 for a small CIP Set, to provide cleaning for Process Equipment in Dairy, Food, Beverage or Pharmaceutical type process plants.
The template maybe easily adapted for specific installations by renaming and modifying equipment and program items in Accord Designer.

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

Template Contents
The template AT CIP 1T1L C1 includes the following

Item	Name	Editor
Accord Model	AT CIP 1T1L C1 C R1.0.ctr	Designer
Accord HMI project	AT CIP 1T1L C1 HMI R1.0.zip	Designer
Summary	AT CIP 1T1L C1 Summary R1.0.pdf	
Simulator	AT CIP 1T1L C1 SimulatorProfile.csv	Excel
Model Development	AT CIP 1T1L C1 Model Development.pdf	

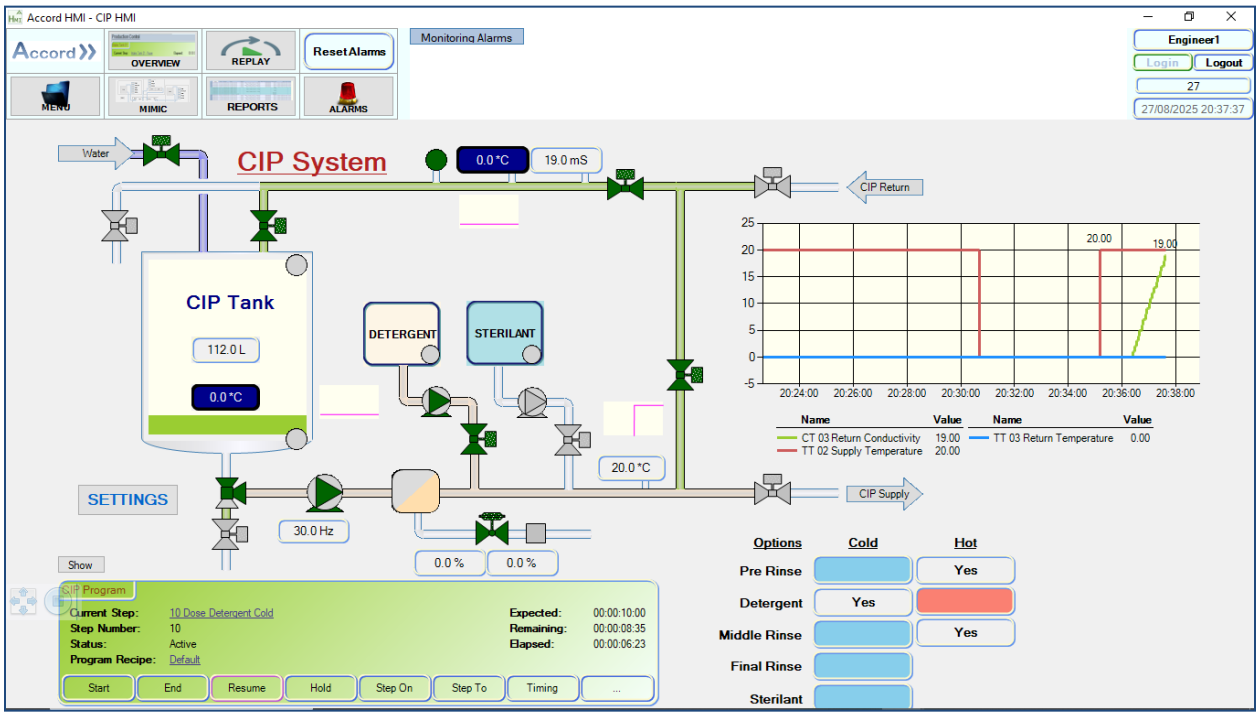
The items may have revision numbers, but the most of the filename will be as above.

Index

1. System Description

The system will provide

1. Automatic and Manual Operation of all devices and instruments.
2. Automatic Control of CIP Program, with selectable Steps, Decisions and Setpoints

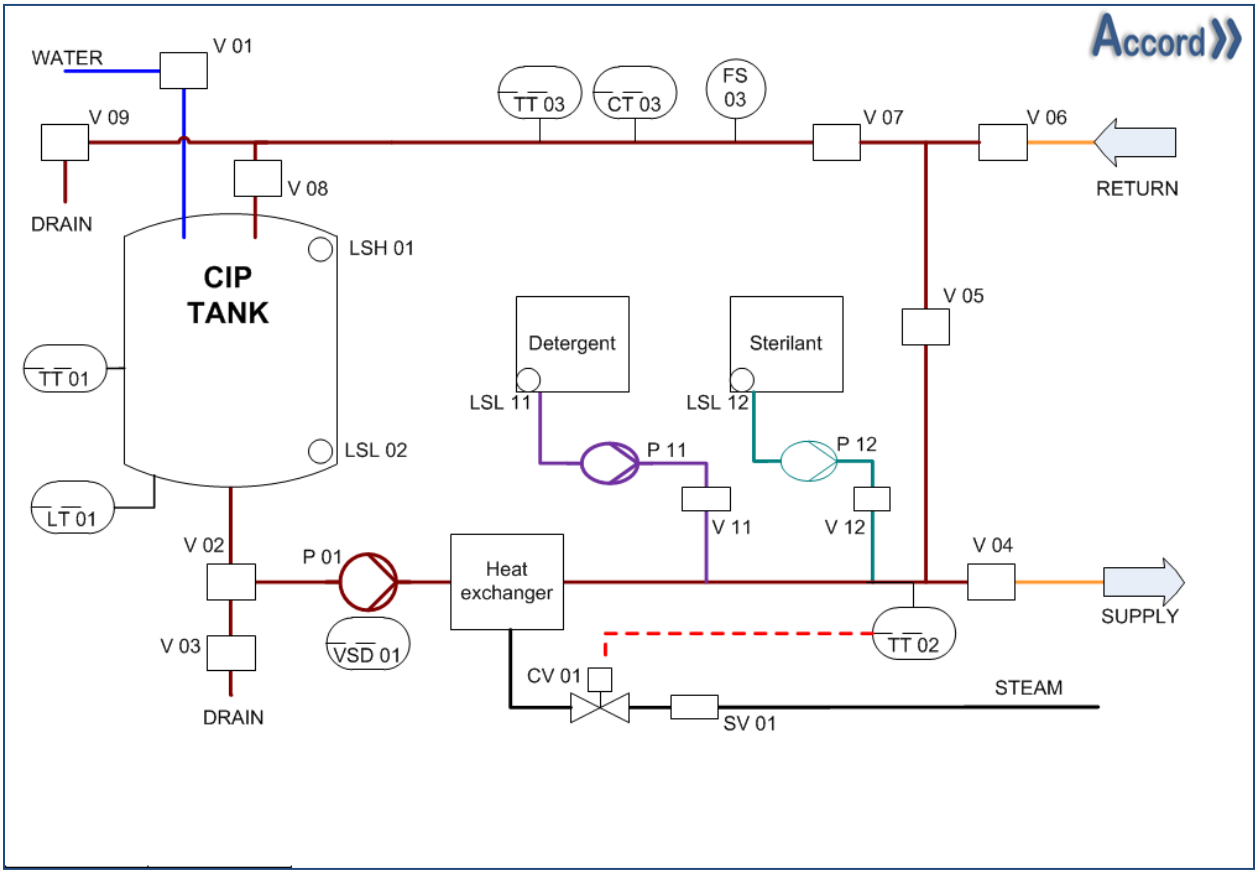


The system provides CIP for target (plant/production) system. There is full automatic operation, including the ability to change to any step in the Program at any time. The program will run according to selections and using the setpoints chosen and will automatically stop on critical alarms and resume on Alarms reset and resume commands..

The system may be easily customised; It is easy to add or delete a device or tank, program, step and also to change any Step Time or Temperature Setpoint for any step in the system.
Step Order may be changed in Designer or Recipe Manager
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 P&ID



2.2 Program

There is one automatic program – the CIP Program with selections.
The required CIP routine of Rinse, Detergent and Sterilant is selected by Operator making selection Decisions on HMI.

The available selection Decisions are

Cold Detergent Wash	A Cold Detergent Wash is Selected
Cold Final Rinse	A Cold Final Rinse is Selected
Cold Middle Rinse	A Cold Middle Rinse is Selected
Cold PreRinse	A Cold Initial Rinse is Selected
Hot Detergent Wash	A Hot Detergent Wash is Selected
Hot Middle Rinse	A Hot Middle Rinse is Selected
Hot PreRinse	A Hot Initial Rinse is Selected
Sterilant Wash	A Sterilant Wash is Selected

2.3 Process Steps

There are 43 Steps configured in the Program and Steps are run according to Decisions.

1 Fill CIP Tank for Cold PreRinse
2 Cold PreRinse
3 Drain CIP Tank after PreRinse
4 Fill CIP Tank for Hot PreRinse
6 Hot PreRinse
5 Circulate to Heat Tank for Hot PreRinse
7 Drain Tank after Hot PreRinse
8 Fill CIP Tank for Cold Detergent Wash
9 Dose Detergent Cold
10 Cold Detergent Wash Circulate Tank
11 Cold Detergent Wash Check Strength
12 Push with Cold Detergent to Drain
13 Achieve Cold Detergent at CIP return
14 Cold Detergent Wash
15 Push Cold Detergent to Drain
16 Drain CIP Tank after Cold Detergent Wash
17 Fill CIP Tank for Hot Detergent Wash
18 Dose Detergent Hot
19 Hot Detergent Wash Circulate Tank
20 Hot Detergent Wash Check Strength
21 Push with Hot Detergent to Drain
22 Achieve Hot Detergent at CIP return
23 Hot Detergent Wash
24 Push Hot Detergent to Drain
25 Drain CIP Tank after Hot Detergent Wash
26 Fill CIP Tank for Cold Middle Rinse
27 Cold Middle Rinse
28 Drain CIP Tank after Cold Middle Rinse
29 Fill CIP Tank for Hot Middle Rinse
30 Heat Tank for Hot Middle Rinse
31 Hot Middle Rinse
32 Drain CIP Tank after Hot Middle Rinse
33 Fill CIP Tank for Sterilant Wash
34 Dose Sterilant
35 Push with Sterilant to Drain
36 Sterilant Wash

37 Drain CIP Tank after Sterilant Wash
38 Fill CIP Tank for Cold Final Rinse
39 Cold Final Rinse
40 Drain CIP Tank after Final Rinse
41 Fill CIP Tank to Flush CIP System
42 Flush System
43 Drain CIP Tank after Flush System

See also AT CIP 1T1L C1 Model Development.pdf for description of Model and configuration.

2.4 Process Setpoints

Name	Min	Max	Default	Eng. Unit	Allow Change when Active
CIP Tank Operating Level	0	800	600	Litre	Yes
Low Return Conductivity Alarm SP	30	50	40	Deg C	Yes
Low Return Temperature Alarm SP	40	60	50	Deg C	Yes
Low Supply Temperature Alarm SP	40	60	50	Deg C	Yes
Return Check Delay Time	60	180	120	secs	Yes
Return Conductivity Push-Out SP	0	10	2	mS	Yes
Return Conductivity Target SP	30	50	40	mS	Yes
Return Temperature Push-Out SP	0	30	20	Deg C	Yes
Return Temperature Target SP	60	80	70	Deg C	Yes
Supply Alarm Check Delay Time	15	60	30	Secs	Yes
Supply Temperature Target SP	60	80	72	Deg C	Yes
VSD 01 Loop Speed Setpoint	10	50	30	Hz	Yes
VSD 01 Wash Speed Setpoint	10	50	40	Hz	Yes

3. Initial Setup

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 program, 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

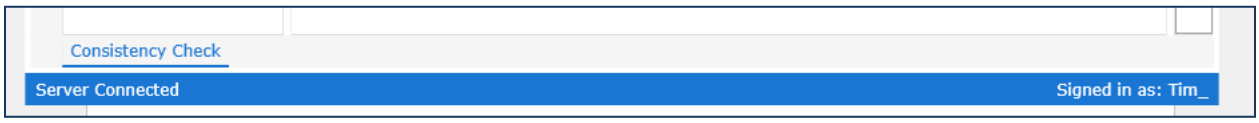
The template is meant for understanding Accord, using the Emulator, but it could be transferred to a PLC, and in that case the following are required

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)

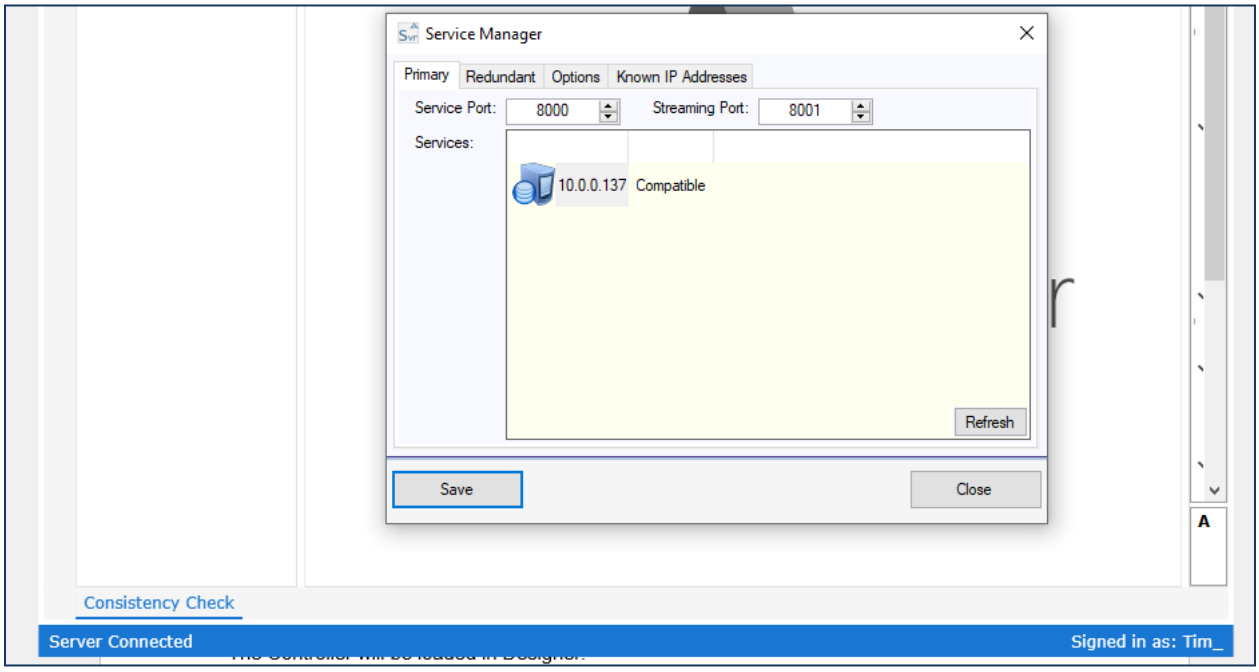
The aspects of the template can be expanded and the following can be used
Accord Recipe
Accord Plan
Accord Reports
MS Word, Excel

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.



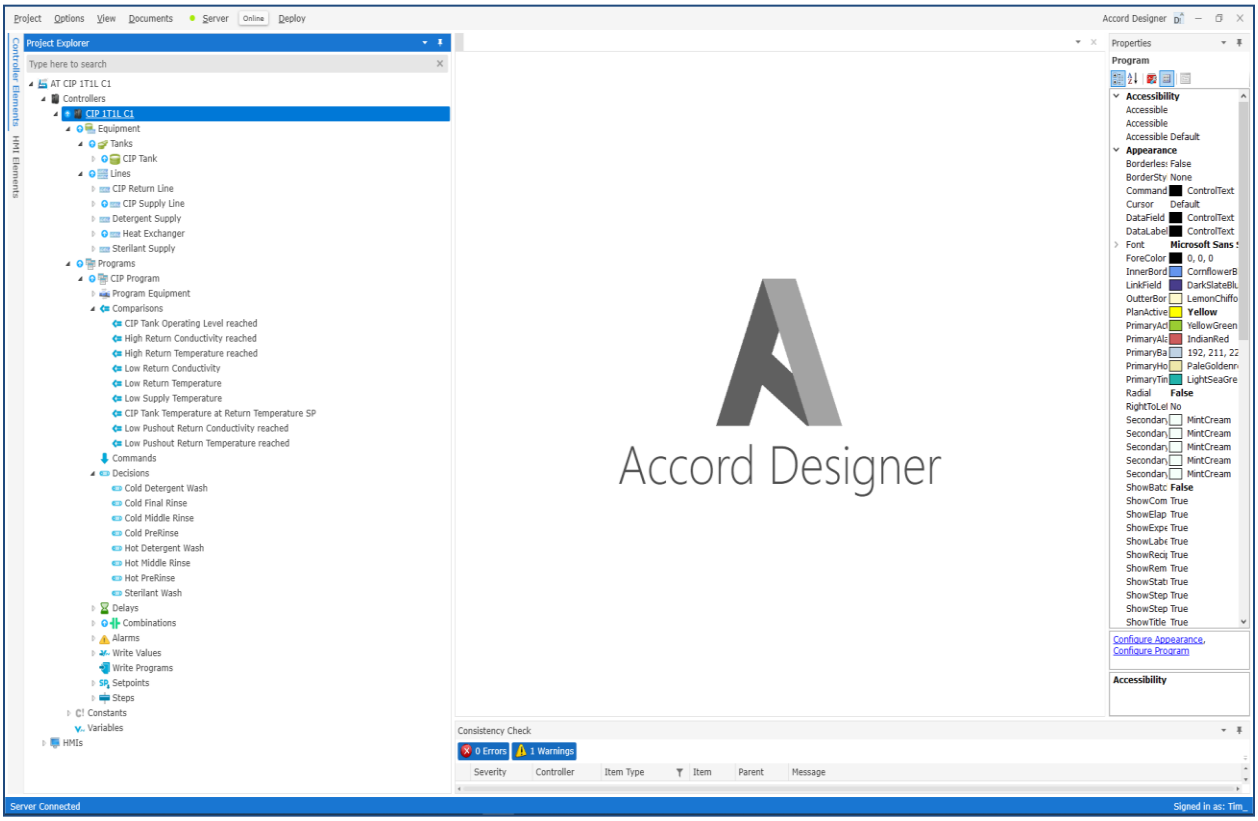
Click on Refresh if necessary to find the IP of the PC hosting Accord Server. When the required IP appears then double-click to select it.

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 CIP 1T1L C1 C R1.0.ctr file and confirm by Open.
The Controller will be loaded in Designer.

Screen showing loaded Controller which may be modified.

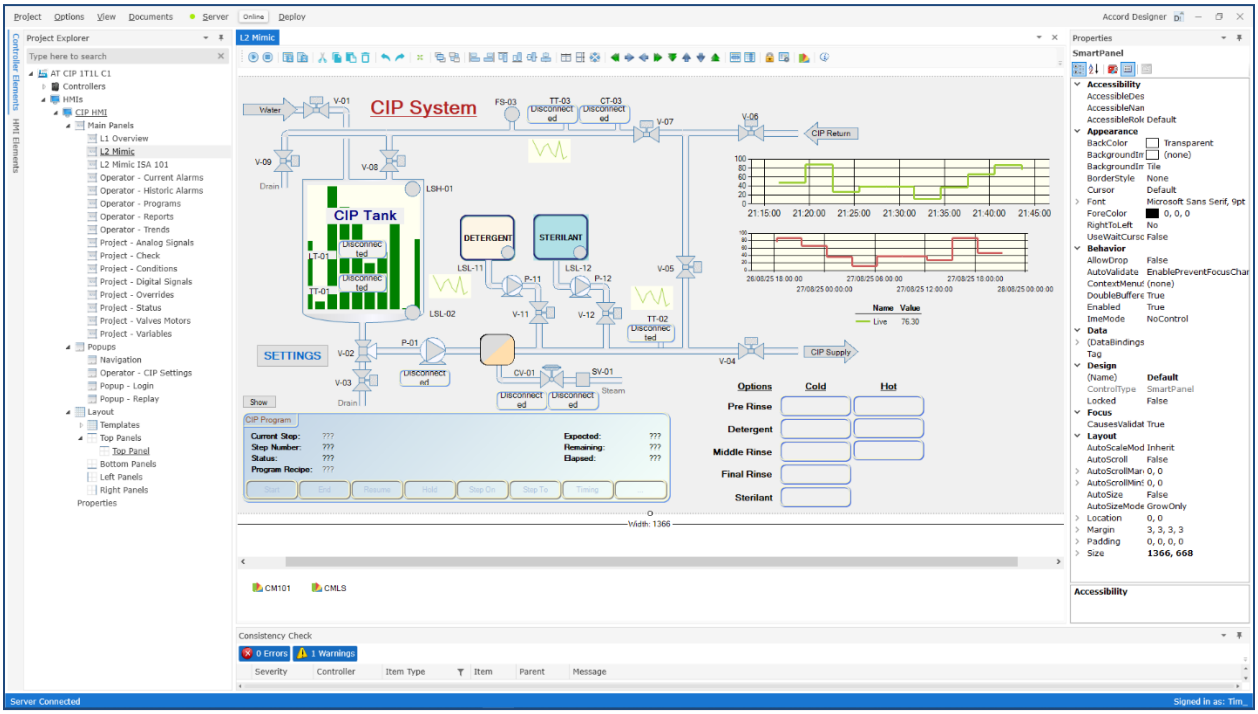


3.4 Restoration of HMI in controller

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 CIP 1T1L 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

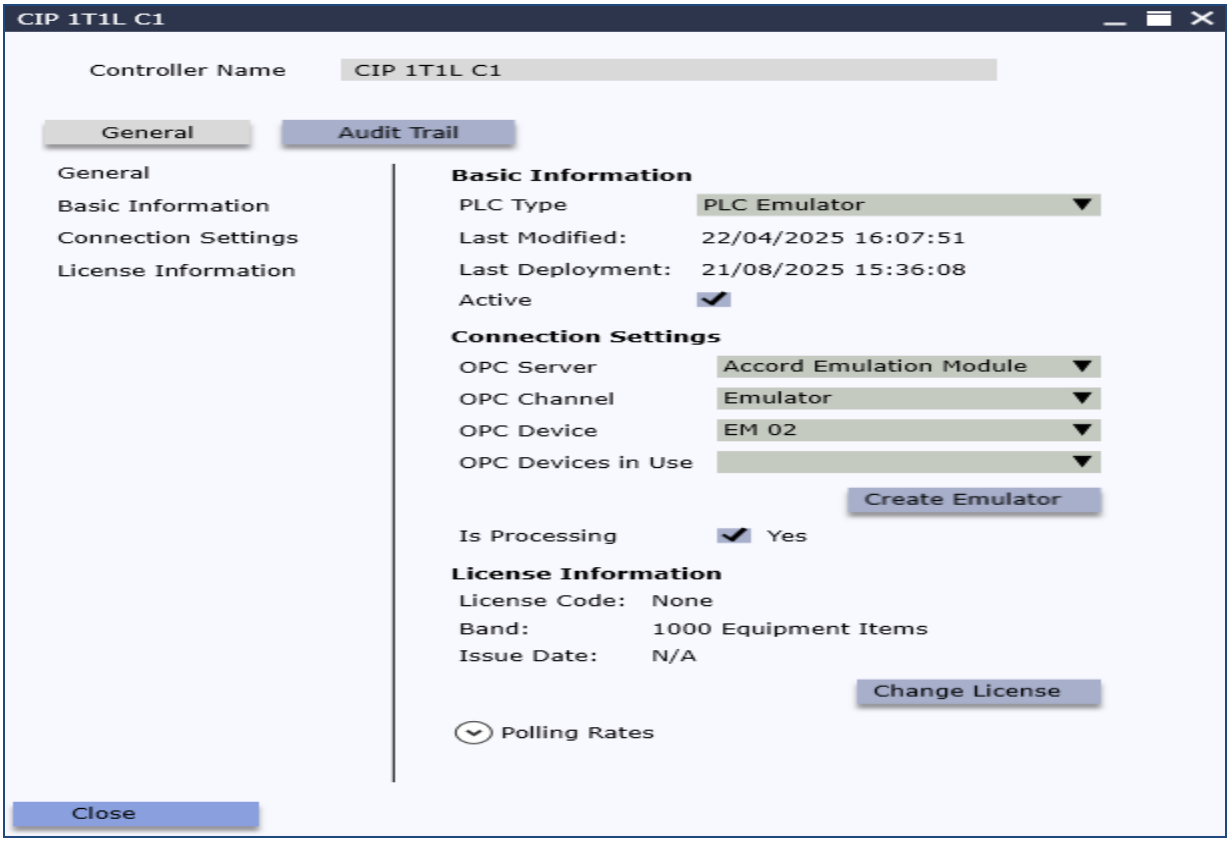
The following is for initial information, there is more information in the Designer Manual.

4.1 Controller Properties and Deployment.

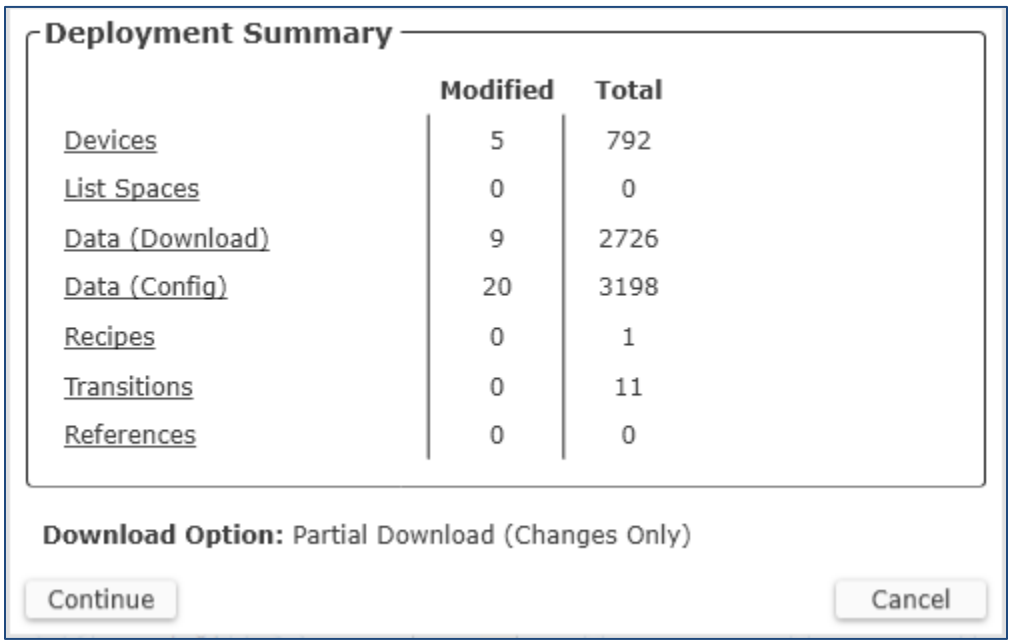
The Controller needs to be deployed to the Emulator, (or PLC) initially and after changes.

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.



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,



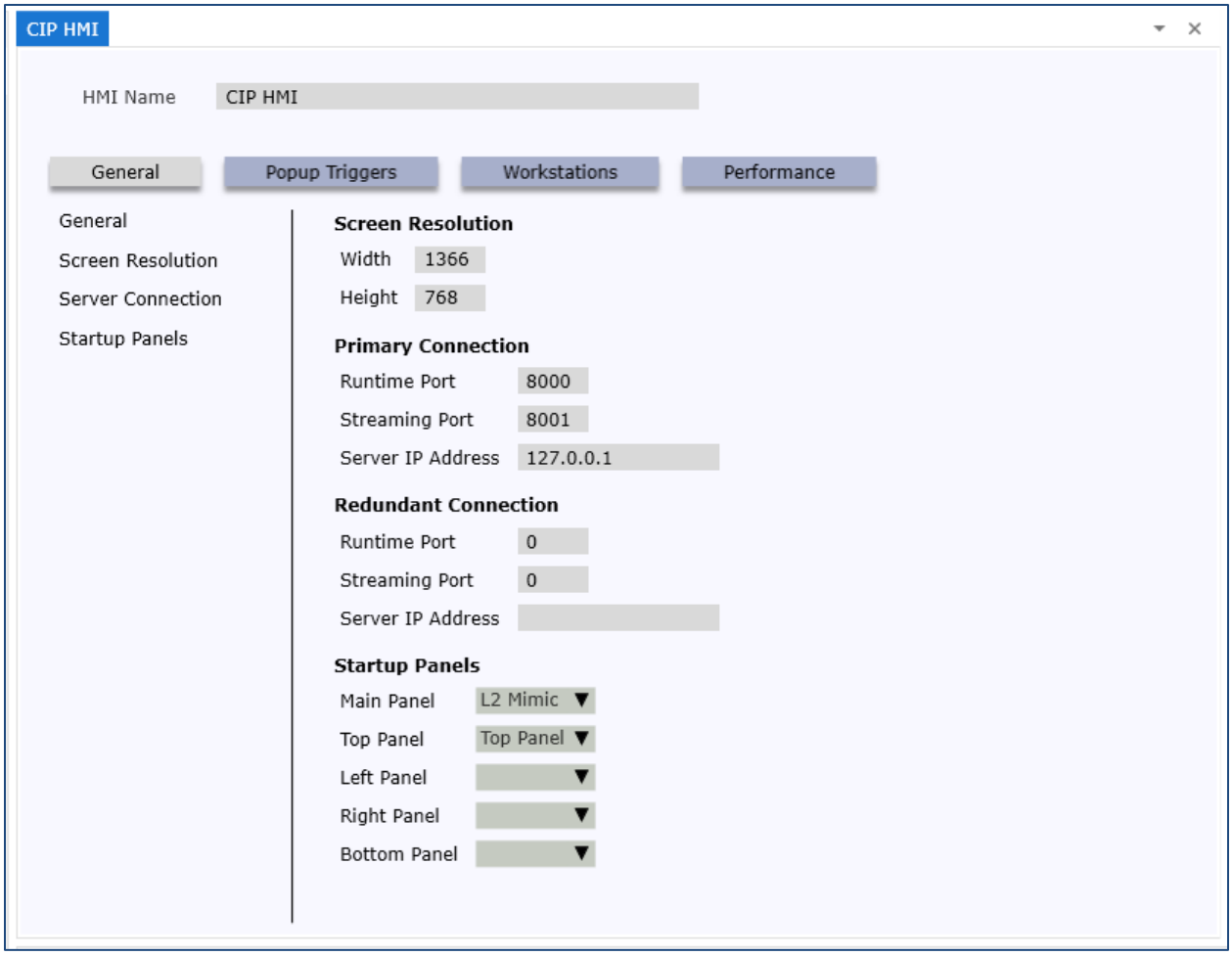
Clicking on the underlined links brings up more information if needed.
Space may be reserved for spare items to be added using Partial Downloads.

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.

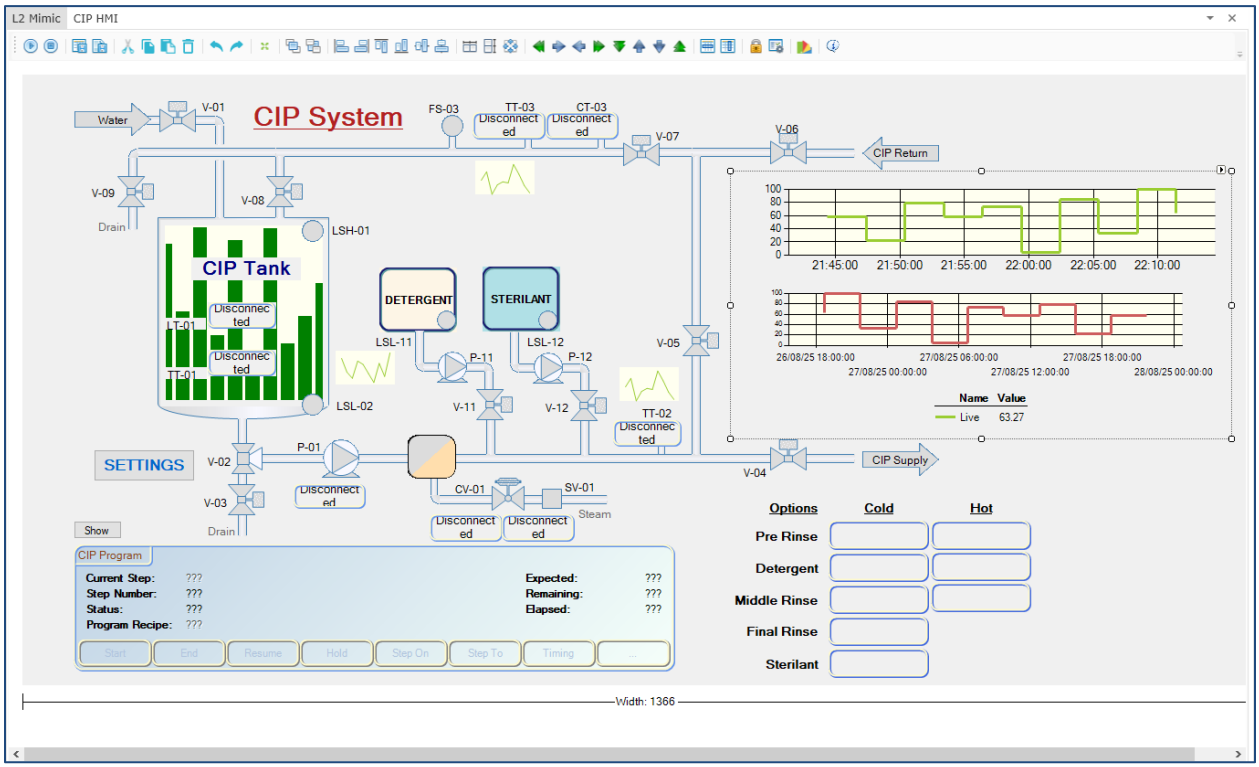
4.2 HMI Properties and Deployment.

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.

All Devices may be logged. Logging is set up in the Settings Tab.
Select Historian and then select Devices to be logged and in the case of Values select the log deadband, which is the change required to generate a new entry. Deadband values should be large enough to not cause excessive logging to PC hard-drive. Types of devices for logging are in the Groups drop down list and all the devices of a type will be presented when the Group is selected.

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

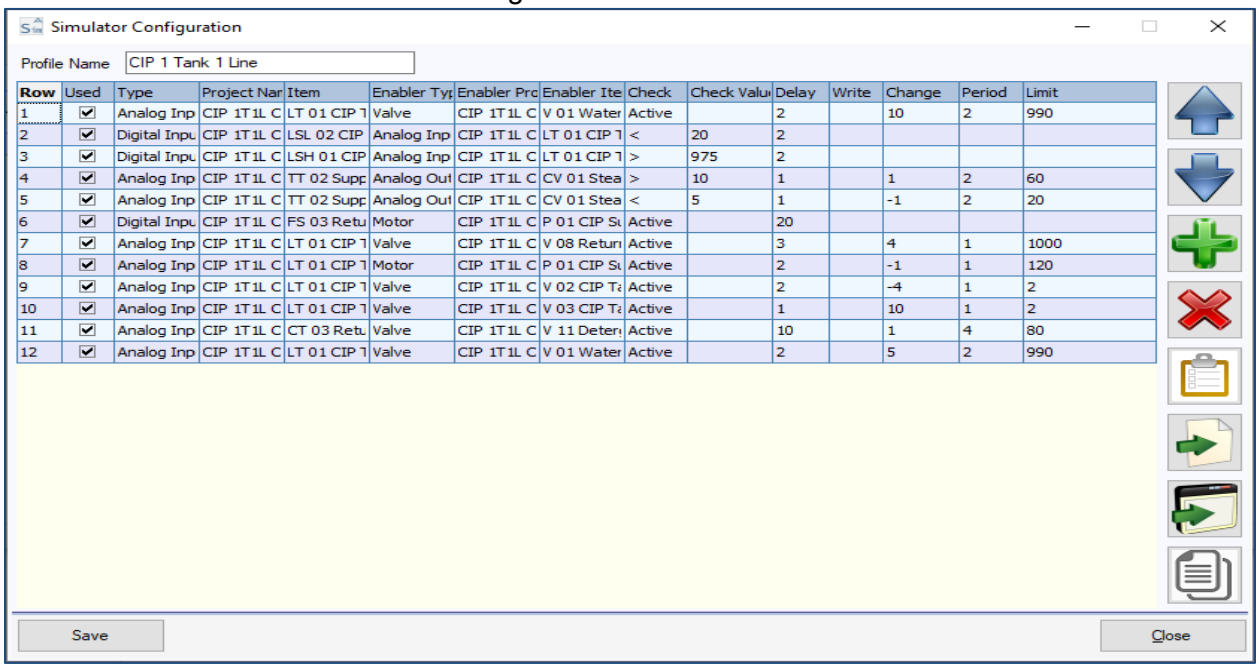
An Item can be removed or deleted using Right-ckick and Delete. An item which is removed from the controller must also be removed from the Screens. If an item was being logged, but is removed from the model then the logging of values will be stopped, but values will be retrained.

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

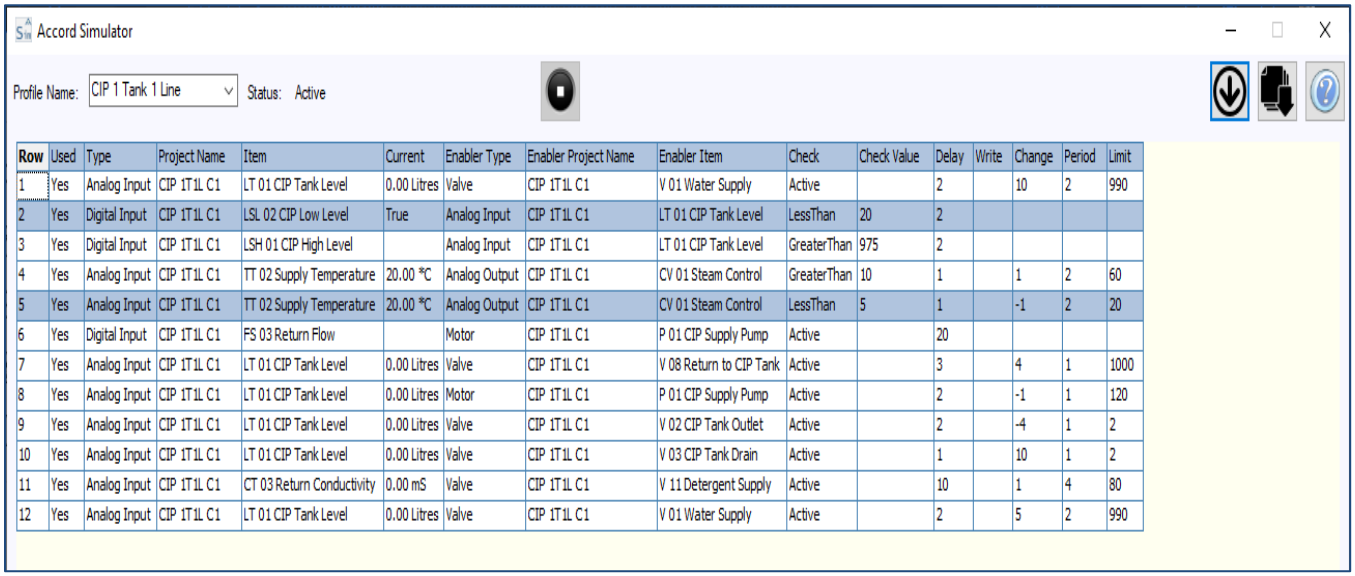
The small plant can be used in Emulator and with the Simulator. The Simulator will modify Analog Transmitter values and Digital Input results, to allow the operation of the plant to be tested. The Simulator can be accessed within Designer as of Accord Release 4.1.



Row	Used	Type	Project Nar	Item	Enabler Ty	Enabler Pro	Enabler Ite	Check	Check Valu	Delay	Write	Change	Period	Limit
1	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Valve	CIP 1T1L C	V 01 Water	Active		2		10	2	990
2	☑	Digital Inpu	CIP 1T1L C	LSL 02 CIP	Analog Inp	CIP 1T1L C	LT 01 CIP T	<	20	2				
3	☑	Digital Inpu	CIP 1T1L C	LSH 01 CIP	Analog Inp	CIP 1T1L C	LT 01 CIP T	>	975	2				
4	☑	Analog Inp	CIP 1T1L C	TT 02 Supp	Analog Out	CIP 1T1L C	CV 01 Stea	>	10	1		1	2	60
5	☑	Analog Inp	CIP 1T1L C	TT 02 Supp	Analog Out	CIP 1T1L C	CV 01 Stea	<	5	1		-1	2	20
6	☑	Digital Inpu	CIP 1T1L C	FS 03 Retu	Motor	CIP 1T1L C	P 01 CIP Su	Active		20				
7	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Valve	CIP 1T1L C	V 08 Return	Active		3		4	1	1000
8	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Motor	CIP 1T1L C	P 01 CIP Su	Active		2		-1	1	120
9	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Valve	CIP 1T1L C	V 02 CIP Ta	Active		2		-4	1	2
10	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Valve	CIP 1T1L C	V 03 CIP Ta	Active		1		10	1	2
11	☑	Analog Inp	CIP 1T1L C	CT 03 Retu	Valve	CIP 1T1L C	V 11 Deter	Active		10		1	4	80
12	☑	Analog Inp	CIP 1T1L C	LT 01 CIP T	Valve	CIP 1T1L C	V 01 Water	Active		2		5	2	990

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	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Valve	CIP 1T1L C1	V 01 Water Supply	Active		2		10	2	990
2	Yes	Digital Input	CIP 1T1L C1	LSL 02 CIP Low Level	True	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	LessThan	20	2				
3	Yes	Digital Input	CIP 1T1L C1	LSH 01 CIP High Level		Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	GreaterThan	975	2				
4	Yes	Analog Input	CIP 1T1L C1	TT 02 Supply Temperature	20.00 °C	Analog Output	CIP 1T1L C1	CV 01 Steam Control	GreaterThan	10	1		1	2	60
5	Yes	Analog Input	CIP 1T1L C1	TT 02 Supply Temperature	20.00 °C	Analog Output	CIP 1T1L C1	CV 01 Steam Control	LessThan	5	1		-1	2	20
6	Yes	Digital Input	CIP 1T1L C1	FS 03 Return Flow		Motor	CIP 1T1L C1	P 01 CIP Supply Pump	Active		20				
7	Yes	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Valve	CIP 1T1L C1	V 08 Return to CIP Tank	Active		3		4	1	1000
8	Yes	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Motor	CIP 1T1L C1	P 01 CIP Supply Pump	Active		2		-1	1	120
9	Yes	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Valve	CIP 1T1L C1	V 02 CIP Tank Outlet	Active		2		-4	1	2
10	Yes	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Valve	CIP 1T1L C1	V 03 CIP Tank Drain	Active		1		10	1	2
11	Yes	Analog Input	CIP 1T1L C1	CT 03 Return Conductivity	0.00 mS	Valve	CIP 1T1L C1	V 11 Detergent Supply	Active		10		1	4	80
12	Yes	Analog Input	CIP 1T1L C1	LT 01 CIP Tank Level	0.00 Litres	Valve	CIP 1T1L C1	V 01 Water Supply	Active		2		5	2	990