Charlotte County

SCADA Standards Manual

VTScada Application

REVISION HISTORY

Revision	Date	Comments
0	02/15/2022	Original Issue

Table of Contents

1 List of Abbreviations 5

2 General Introduction 6

3 High Performance Colors and Fonts 7

4 Tag Browser 8

5 Tags 12

5.1 Tag Types 13

5.2 Custom Tag Types 18

5.2.1 Pump Tag Type 19

5.2.2 Motor Tag Type 20

5.2.3 Valve Tag Type 21

5.2.4 Flowmeter Tag Type 22

5.2.5 Pressure Tag Type 23

5.2.6 Analytical Tag Type 24

5.2.7 Level Tag Type 25

5.2.8 Float Tag Type 26

5.2.9 MBR Tag Types 27

6 Alarms 29

7 Alarm Priorities 33

8 Widgets 35

8.1.1 Pump Widget 37

8.1.2 Pump Faceplate Widget 45

8.1.3 Motor Widget 53

8.1.4 Motor Faceplate Widget 61

8.1.5 Valve Widget 68

8.1.6 Valve Faceplate Widget 75

8.1.7 Flowmeter Widget 83
8.1.8 Flowmeter Faceplate Widget 89
8.1.9 Level Widget 96
8.1.10 Tank Widget 105
8.1.11 Level Faceplate Widget 113
8.1.12 Pressure Meter Widget 123
8.1.13 Analytic Widget 129
8.1.14 KPI Widgets 135
8.1.15 Alarm Status KPI Widget 136
8.1.16 Alarm Status On KPI Widget 138
8.1.17 Analog Setpoint KPI Widget 140
8.1.18 AnalogValExtAlm KPI Widget 142
8.1.19 AnalogValExtAlm_Small KPI Widget 144
8.1.20 MBR Widgets 146
9 Overview: Pages and Navigation 151
9.1.1 Plant Site Overview 152
9.1.2 Process Overview 153
9.1.3 Electrical System 154
9.1.4 Network 155
9.1.5 Flow Totals 156
9.1.6 Equipment Runtimes & Starts 157
10 Security 158
11 Redundancy and Automatic Failover 161
12 Custom Logo 162
13 Remote Notifications 163

1 List of Abbreviations

PLC ..... Programable Logic Controller

SCADA ..... Supervisory Control and Data Acquisition

MG ..... Million Gallon

RTU ..... Remote Terminal Unit

KPI ..... Key Performance Indicators

ISA ..... International Society of Automation

HMI ..... Human Machine Interface

2 General Introduction

This manual is intended to provide a standardized approach to Supervisory Control and Data Acquisition system (SCADA) implementation for Charlotte County. Standardizing the SCADA system will ensure consistency in design and operation through the county's water and wastewater reclamation facilities. The manual will define standards for the operator's interaction with the SCADA system such as screen layout and navigation, alarm Prioritization and handling, screen contents and functionality and visual screen elements (such as graphic symbols, colors, and fonts). Moreover, the manual will define standards for technical users on how to integrate within the SCADA system. Topics related to SCADA integration include defining tag types and structure, graphical components (widgets and symbols), and the relationship between the tag types and the widgets. Additionality, it will handle topics such as alarm configuration and handling, network layout of application servers, and SCADA backups and redundancy.

Charlotte County standards were developed based on the High-Performance HMI methodology. This methodology uses simple grayscale graphics to represent a system operating normally. Color begins to emerge as values approach tolerances or alarms are tripped. This approach allows operators to instantly see problems as they develop. All Charlotte County graphics and widgets were designed based on ISA 101, the standard for High Performance Graphics.

3 High Performance Colors and Fonts

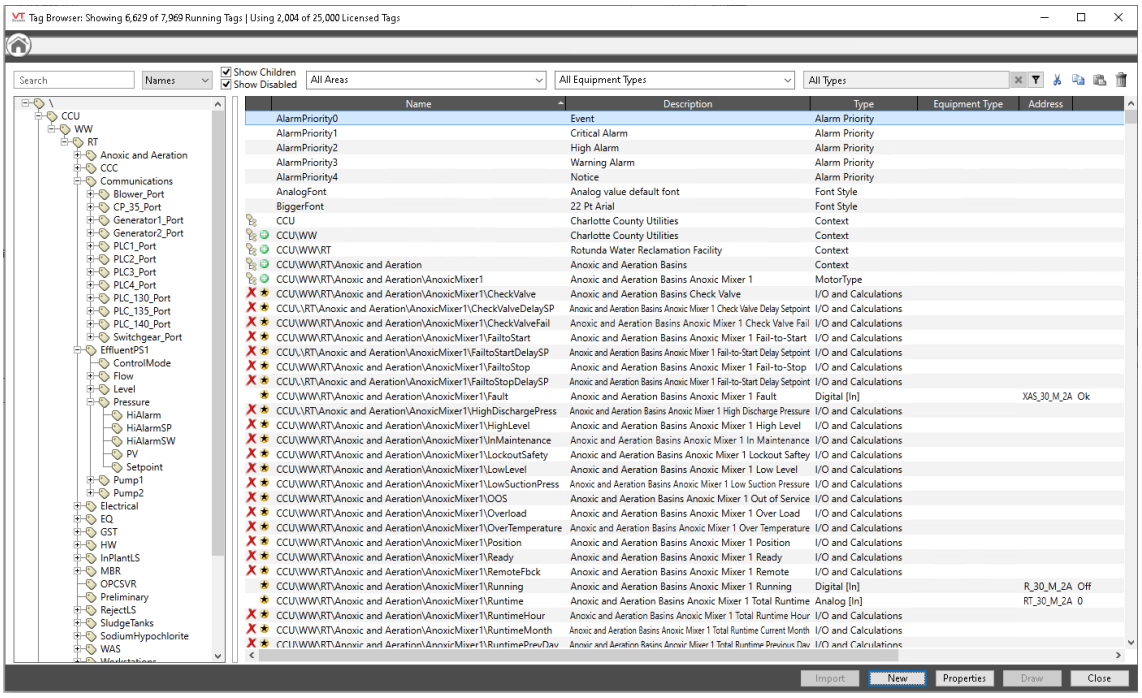
All Charlotte County standards that include symbols, widgets, fonts and pages were developed based on the ISA High Performance Graphics Standard. For example, when depicting the status of a pump or valve, instead of previous standards of using red and green for running or not running on a pump or open and closed on a valve, High-Performance HMI will use a gray status for a pump that is stopped and white for a pump that is running. This section will provide the color codes and font size that were used in developing the SCADA standards.

1- Equipment active status such as pump running, motor running, valve open, valve in travel, and tank fill will be indicated in white, color code <FFFFFFFF>.
2- Equipment not active status such pump stopped, motor stopped, and valve closed will be indicated in gray color, code <FF959595>.
3- Page background will be in a light gray color, code <FFD7D7D7>.
4- Process lines will be in a dark gray color, code <FF9B9B9B>.
5- Process line when overlapped with another process line will be in very light gray color, code <4EFFFFFF>.
6- Text display fields such as (Remote, Ready, Maintenance, etc.) will be in blue color, code <FF0000FF>. Font is Arial size 10 (CCU_AnalogValue10).
7- Text entry fields will be in green color, code <FF008000>. Font is Arial size 12 (CCU_AnalogValue12).
8- Equipment title text will be in dark gray, code <FF5A5A5A>. Font is Arial size is 12 (CCU_EquipmentTitleFont).
9- Rectangles for objects such as wells and open tanks will be transparent fill and outline will be in dark gray, code <FF5A5A5A>. Line thickness is 3 Pixels.
10- Alarms will be in red, orange, yellow and cyan based on the alarm priority. See alarms section for more details.

Note: CCU_AnalogValue10, CCU_AnalogValue12, and CCU_EquipmentTitleFont are fonts tags that were developed as part of the Charlotte County standards.

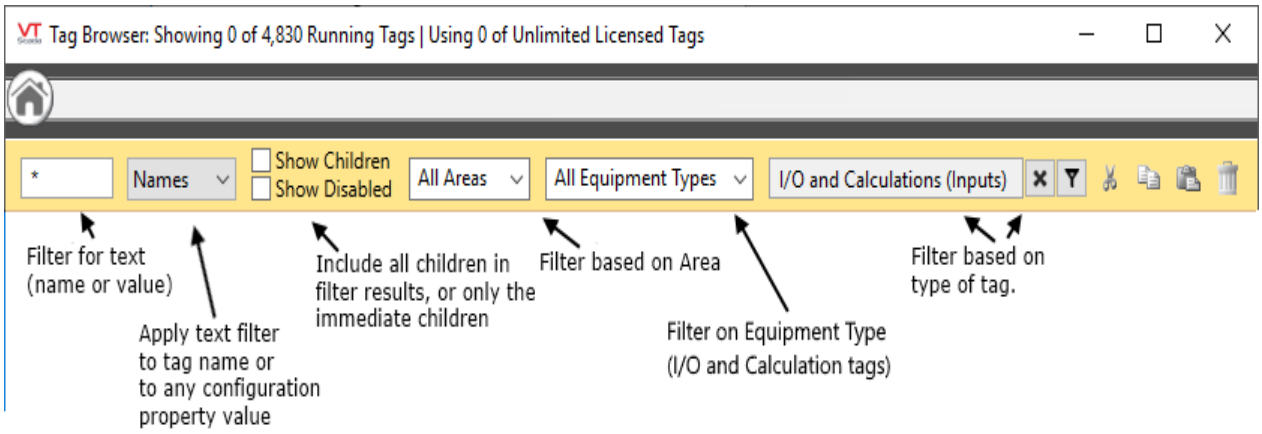
4 Tag Browser

The Tag Browser is the main environment for creating, modifying, and deleting tags. To access the Tag Browser page, login with a user account that has the appropriate privileges then click on the tag icon as shown in picture below:



In even the smallest application, the tag list will become long enough to require scrolling. For this reason, it is important to know how to filter the list so that you can find the tags you are interested in. The filters are shown in the next image. You may use any or all of these filters in combination.

If no tags match the filter parameters, or if you have used the address bar or tree window to browse to a tag that has no child tags, then the main browser window will read, "There are no tags that match the current selection."



Available filters

When a filter is in use, these controls are shown against an orange background.

Examples of how to filter the tag display:

Filter by location in the tag structure

When a parent tag is selected, the list shows only the child tags of that parent. If the option, Show Children is selected, all children and grandchildren are included. Otherwise, only the immediate children of the selected parent are shown.

Filter by name or other property

The text filter may be applied to names, or to any field within the tag's configuration.

By default, the search field displays an asterisk (*) indicating that all tags should be displayed. A search string can consist of the full name of the tag, or parts of the name, combined with the asterisk (*) wild card character. You can use the asterisk wild card to stand for any combination of characters.

The search field is not case sensitive. Entering "A*" is the same as entering "a*". For example:

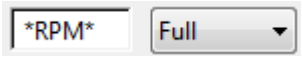
A* Return all tag names that contain an "A" as their first character (e.g. "AnalogFont" or "AlarmPriority0").

***A** Return all tag names that contain an "A" as their last character (e.g. "WellA" or "Soda").

A Return all tag names that contain one or more instances of the letter "A" (e.g. "AnalogFont" or "LabelFont").

A This is equivalent to *A*.

* Display all tags (assuming no other filter is in effect).

If you change the scope from "Name" to "Full" 

then the search will look at all text properties including description, engineering units, and more.

Show Children

Includes all children and grandchildren from the selected parent. Does not include tags in the Menus group unless you navigate to that group.

Show Disabled

Includes inactive tags. These are tags which start condition evaluates to false and tags that have been explicitly disabled. (Disabling a tag sets the start condition explicitly to FALSE.)

Filter by Area

The area property of your tags isn't shown in the Tag Browser, but you can still use it for a filter. Select one area at a time to view tags that were configured with the matching area property. In the following example, "Zone 2" has been selected in the Areas drop-down list, the Show Children option is selected, and the type filter is set to SupplyPump (a user-created type).

Filter by Equipment Type

I/O and Calculation tags can be assigned an equipment type. Select one type at a time to view tags that were configured with the matching property.

Filter by Type

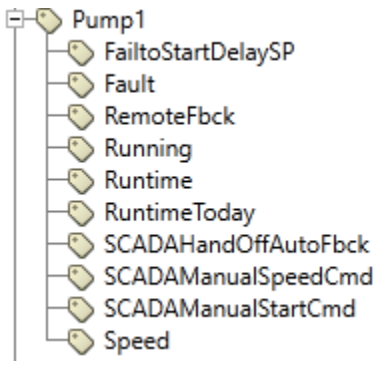
Select one type at a time to view only the tags of that type. This filter also affects the New Tag selection by pre-selecting the same type from the list. Use care if you create a tag of a type other than the one being filtered for - it will be created normally but won't be visible in the browser until you change or remove the type filter.

When you first run a VTScada application, the Types drop-down list is set to "All", indicating that all types of tag should be displayed. You may select a type or a tag group by which to filter the tag list.

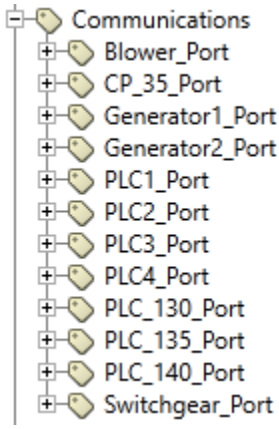
5 Tags

Tags are the software representation of the parts of a physical system. A tag might represent the status of a pump, the level of a tank, a control switch to open a valve, etc. Tags also represent the connections to your hardware, both physical (TCP/IP or Serial) and software (the choice of driver). Further, tags are used to hold certain configuration settings including fonts, default colors for widgets, alarm priority characteristics and more. All references to information within the SCADA system are based around the tag.

Example of pump tags:



Example of communications tags:

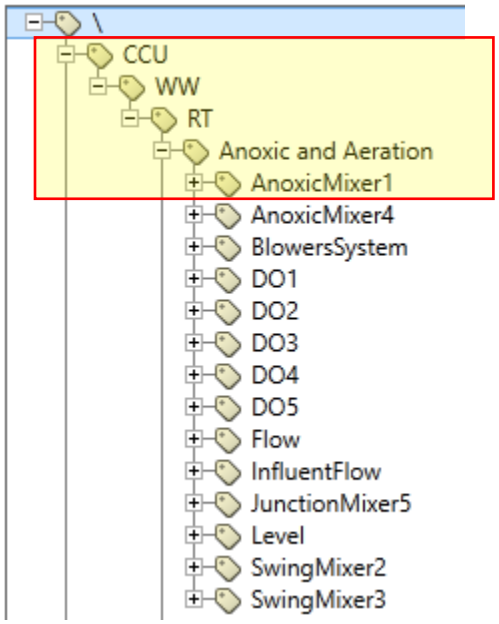


5.1 Tag Types

VTScada has various predefined tag types. These are known as standard tag types. Also, VTScada gives the ability to build completely new tag types, designed specifically for user's needs. These tags are known as custom tag types.

This document will only focus on the tag types that Charlotte County user will be using. The main standard tag types are:

1- **Context Tag:** Context tags are used as parents in a parent-child tag structure. They provide a generic and customizable template that you can use to define any natural grouping in your application.

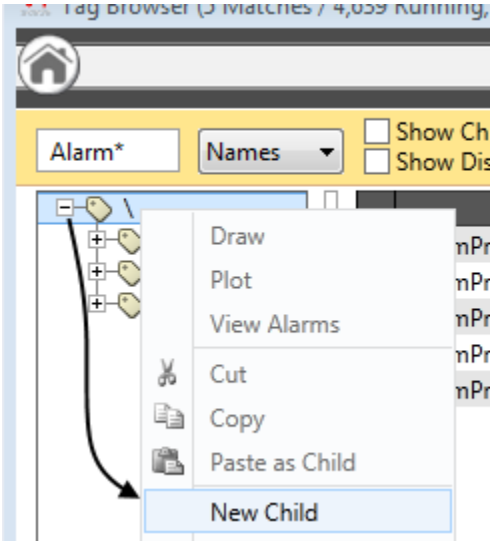


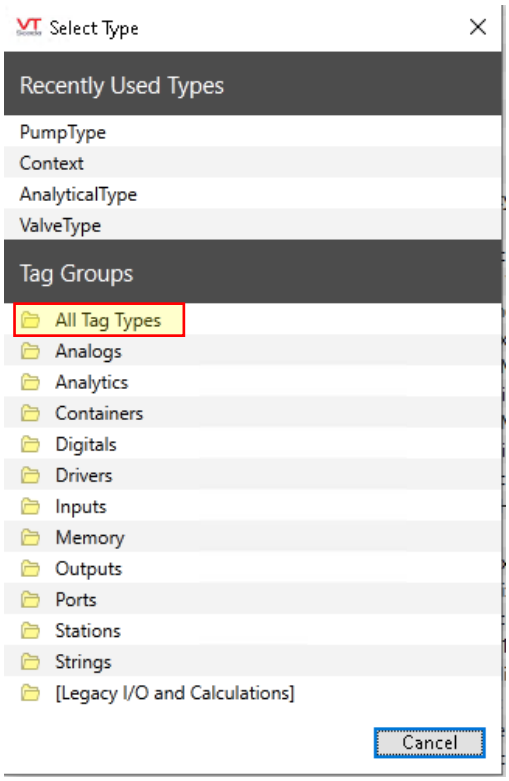
The picture above shows an example on how the tag structure is built for the Rotunda wastewater plant. **CCU**, **WW**, **RT**, and **Anoxic and Aeration** are all context tags that were used for grouping purposes only. In this example **Anoxic and Aeration** tag is the child of the **RT** tag, **RT** tag is the child of the **WW** tag, and **WW** is the child of the **CCU** tag. Similarly, we can say that the **CCU** tag is the parent of **WW** tag and so on.

2- **I/O and Calculations Tag:** It's advised by VTScada to use this tag type to create any IO tag. This tag type can be used to create: Analog Input, Analog Output, Digital Input, Digital Output, Analog Status, Analog Control, Digital Status, Digital Control, String I/O, Calculation and Memory Tags.

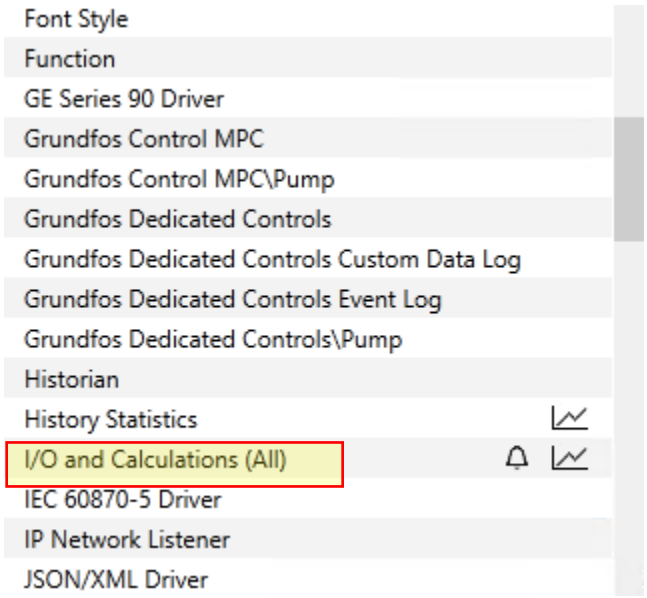
To create a new I/O and Calculations Tag:

1) Right click on the tag tree on the left pane of the Tag Browser window, then select **New Child**:

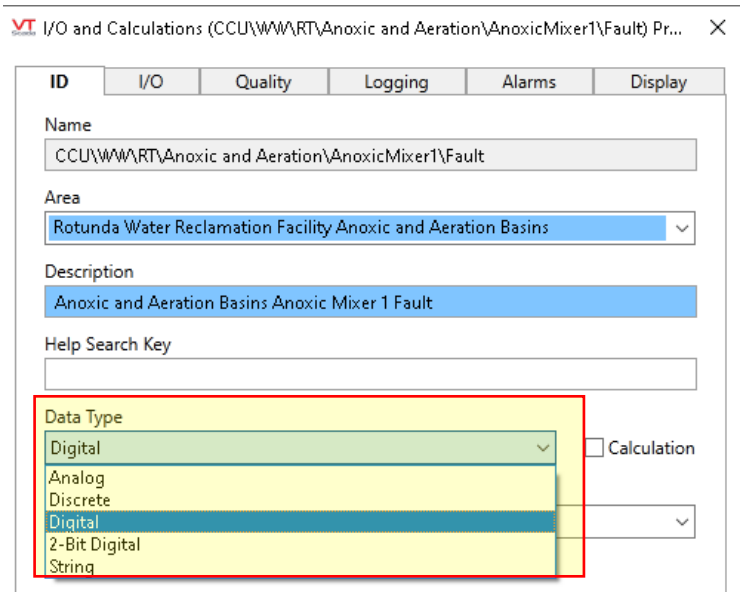




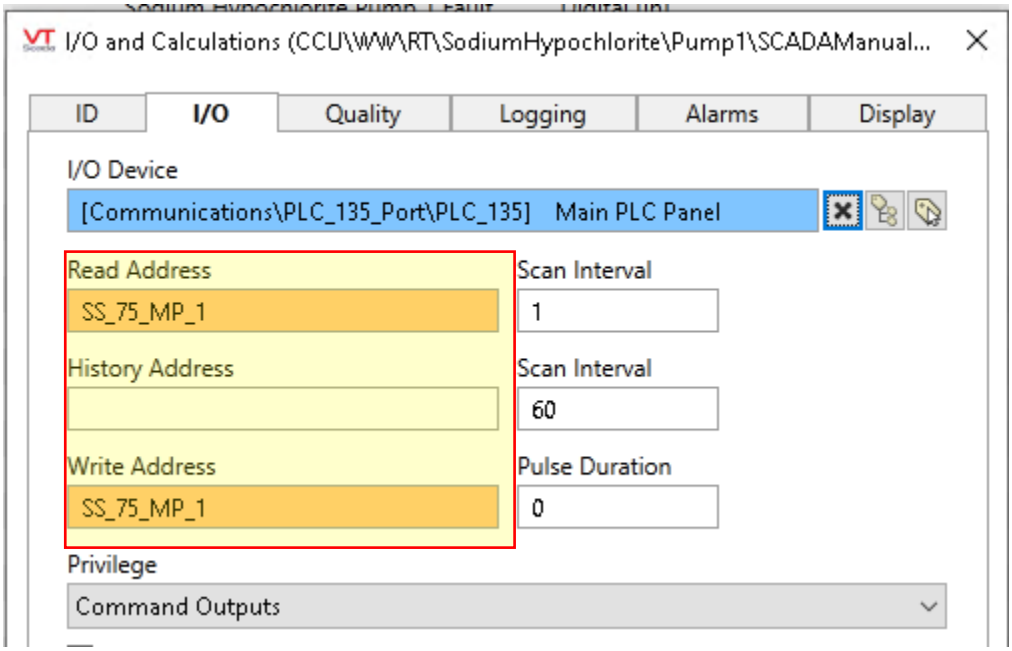
2) A new window will open that includes all the available tag types, click on **All Tag Types** then scroll down and search for **I/O and Calculations (All)** tag type then click on it:



3) Define a name for the new tag then select the desired data type for the tag:

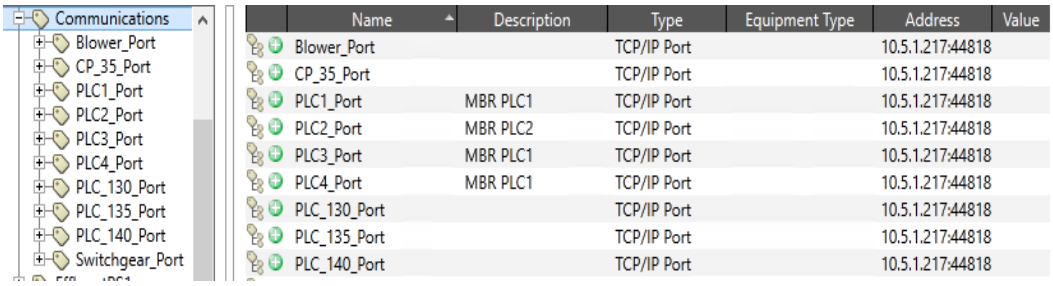


4) Click on the **I/O** tab to assign the PLC field address for the new tag. Assigning the PLC address under the **Read Address** field only will make the tag an input tag. To create the tag as an output tag, assign the PLC address to both the **Read Address** and **Write Address** fields:



5) Click **Ok** to save the changes.

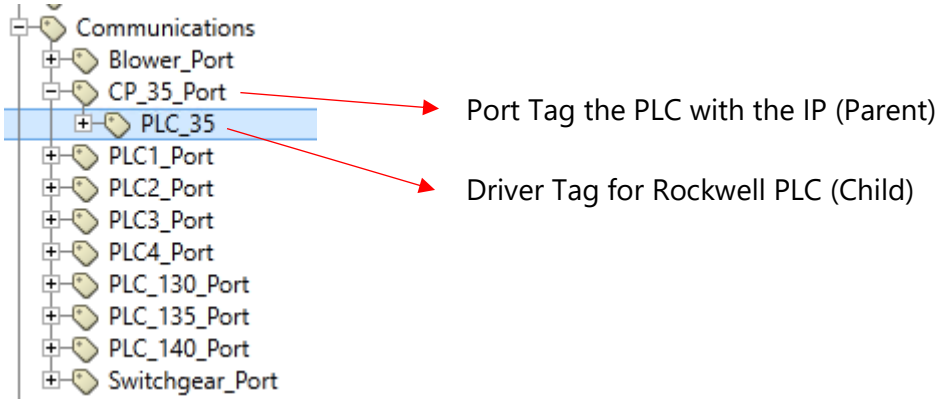
3- **Port Tags:** Port tags describe the path for communication between VTScada and the physical hardware. If the connection is made over an Ethernet network, you will need a TCP/IP or UDP/IP port, configured to use the correct IP address or DNS name, and the port number. Every port will represent a specific PLC with its unique IP address.



All ports tags are created under the "Communications" parent folder in the Tag Browser.

4- **Communication Driver Tags:** Drivers connect to ports and define the protocol used to communicate with the hardware. VTScada has more than 35 drivers. Each brand of PLC or RTU generally requires its own communication driver. **CIP/ENIP** driver is the main Ethernet/IP driver that will be used for all Rockwell Logix5000 PLCs. Another driver that will be used for Modbus devices is **Modbus Compatible Device**.

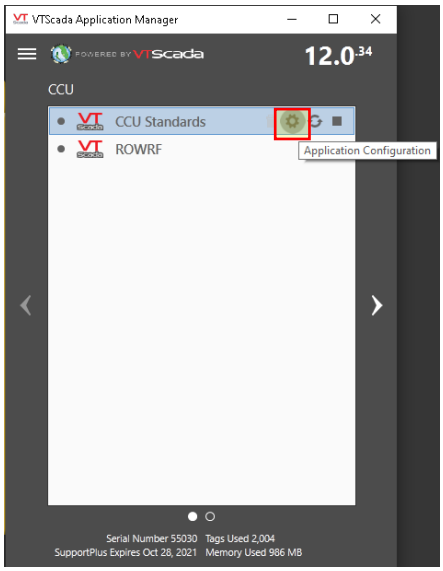
The driver tag must be created as a child under the PLC port tag.



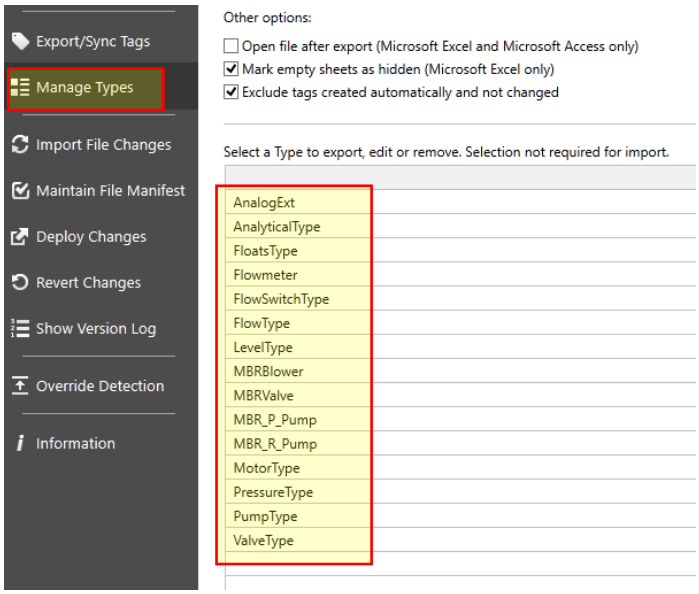
5.2 Custom Tag Types

Several custom tag types were developed as part of Charlotte County standards. Standardizing the tag types will ensure that all SCADA graphics are consistent, compatible, and easy to communicate throughout all the county plants. All tag types can be found under the **CCU Standards** application. To view all available tag types, follow these steps:

1- Open the VTScada Application Manager and click on **Application Configuration** for the **CCU Standards** application. In most cases the application manager is already running but it is minimized. A user with adequate privilege level must be logged in to access the **Application Configuration**.



2- From the left side panel, click on **Manage Types**. A list on the right side will open and show all the types that were created as part of the County standards.



5.2.1 Pump Tag Type

The pump tag type (**PumpType**) was designed to include typical control and status tags for a pump. A pump type could be Centrifugal, Submersible, Vertical, or Chemical Pump. **PumpType** includes the following tags:

1- Pump field status such as Remote, Off, Local, Out Of Service, Ready, Running, Speed, and Check Valve .

2- Pump SCADA status such as Hand/Off/Auto, Pump Position (Lead, Lag…), Manual, and Speed Feedback.

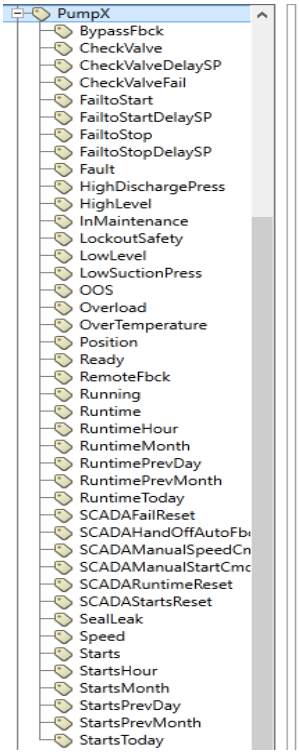
3- Pump SCADA commands such as Hand/Off/Auto, Manual Speed Setpoint, Manual Start/Stop, and Fail Reset.

4- Pump operational setpoints such as Fail to Start Setpoint, and Check Valve Delay Setpoint.

5- Pump runtime data such as Hour, Today, and Previous Day.

6- Pump start counters such as Hour, Today, and Previous Day.

7- Pump alarms such as Fail to Start, Fail to Stop, Seal Leak, Over Temperature, and Overload.



Name	Description
StartsToday	CCU Tag Templates PumpX Number of Starts Today
StartsPrevMonth	CCU Tag Templates PumpX Number of Starts Prevouis Month
StartsPrevDay	CCU Tag Templates PumpX Number of Starts Yesterday
StartsMonth	CCU Tag Templates PumpX Number of Starts Current Month
StartsHour	CCU Tag Templates PumpX Number of Starts Hour
Starts	CCU Tag Templates PumpX Number of Starts Cumulative
Speed	CCU Tag Templates PumpX Speed
SealLeak	CCU Tag Templates PumpX Seal Leak
SCADAStartsReset	CCU Tag Templates PumpX SCADA Starts Reset
SCADARuntimeReset	CCU Tag Templates PumpX SCADA Runtime Reset
SCADAManualStartCmd	CCU Tag Templates PumpX SCADA Manual Start Command
SCADAManualSpeedCmd	CCU Tag Templates PumpX SCADA Manual Pump Speed Command
SCADAHandOffAutoFbck	CCU Tag Templates PumpX SCADA HOA Feedback
SCADAFailReset	CCU Tag Templates PumpX SCADA Fail Reset
RuntimeToday	CCU Tag Templates PumpX Total Runtime Today
RuntimePrevMonth	CCU Tag Templates PumpX Total Runtime Prevouis Month
RuntimePrevDay	CCU Tag Templates PumpX Total Runtime Previous Day
RuntimeMonth	CCU Tag Templates PumpX Total Runtime Current Month
RuntimeHour	CCU Tag Templates PumpX Total Runtime Hour
Runtime	CCU Tag Templates PumpX Total Runtime
Running	CCU Tag Templates PumpX Running
RemoteFbck	CCU Tag Templates PumpX Remote
Ready	CCU Tag Templates PumpX Ready
Position	CCU Tag Templates PumpX Position
OverTemperature	CCU Tag Templates PumpX Over Temperature
Overload	CCU Tag Templates PumpX Over Load
OOS	CCU Tag Templates PumpX Out of Service
LowSuctionPress	CCU Tag Templates PumpX Low Suction Pressure
LowLevel	CCU Tag Templates PumpX Low Level
LockoutSafety	CCU Tag Templates PumpX Lockout Saftey
InMaintenance	CCU Tag Templates PumpX In Maintenance
HighLevel	CCU Tag Templates PumpX High Level
HighDischargePress	CCU Tag Templates PumpX High Discharge Pressure
Fault	CCU Tag Templates PumpX Fault
FailtoStopDelaySP	CCU Tag Templates PumpX Fail-to-Start Delay Setpoint
FailtoStop	CCU Tag Templates PumpX Fail-to-Stop
FailtoStartDelaySP	CCU Tag Templates PumpX Fail-to-Start Delay Setpoint

5.2.2 Motor Tag Type

The motor tag type (**MotorType**) was designed to include typical control and status tags for a valve. A motor could be an Auger, Agitator, Clarifier, Mixer, Bar Screen or a Blower. **MotorType** includes the following tags:

1- Motor field status such as Remote, Off, Local, OOS, Ready, Running, Speed, Check Valve, etc.

2- Motor SCADA status such as Hand/Off/Auto, motor Position (Lead, Lag…), Manual Speed, etc.

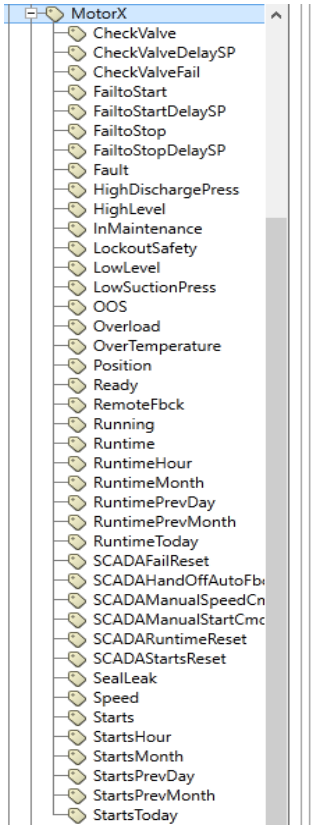
3- Motor SCADA commands such as Hand/Off/Auto, Manual Speed, Manual Start/Stop, Fail Reset, etc.

4- Motor setpoints such as Fail to Start Setpoint, Check Valve Delay Setpoint, etc.

5- Motor runtime such as Hour, Today, Previous Day, etc.

6- Motor number of Starts such as Hour, Today, Previous Day, etc.

7- Motor alarms such as Fail to Start, Fail to Stop, Seal Leak, Over Temperature, Overload, etc.



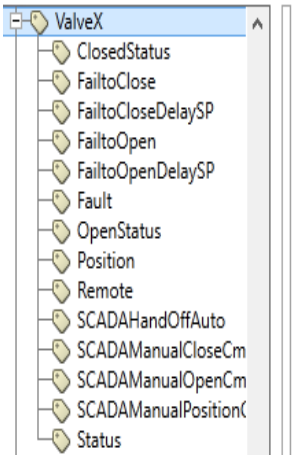
Name	Description
StartsToday	CCU Tag Templates MotorX Number of Starts Today
StartsPrevMonth	CCU Tag Templates MotorX Number of Starts Prevouis Month
StartsPrevDay	CCU Tag Templates MotorX Number of Starts Yesterday
StartsMonth	CCU Tag Templates MotorX Number of Starts Current Month
StartsHour	CCU Tag Templates MotorX Number of Starts Hour
Starts	CCU Tag Templates MotorX Number of Starts Cumulative
Speed	CCU Tag Templates MotorX Speed
SealLeak	CCU Tag Templates MotorX Seal Leak
SCADAStartsReset	CCU Tag Templates MotorX SCADA Starts Reset
SCADARuntimeReset	CCU Tag Templates MotorX SCADA Runtime Reset
SCADAManualStartCmd	CCU Tag Templates MotorX SCADA Manual Start Command
SCADAManualSpeedCmd	CCU Tag Templates MotorX SCADA Manual Pump Speed Command
SCADAHandOffAutoFbck	CCU Tag Templates MotorX SCADA HOA Feedback
SCADAFailReset	CCU Tag Templates MotorX SCADA Fail Reset
RuntimeToday	CCU Tag Templates MotorX Total Runtime Today
RuntimePrevMonth	CCU Tag Templates MotorX Total Runtime Prevouis Month
RuntimePrevDay	CCU Tag Templates MotorX Total Runtime Previous Day
RuntimeMonth	CCU Tag Templates MotorX Total Runtime Current Month
RuntimeHour	CCU Tag Templates MotorX Total Runtime Hour
Runtime	CCU Tag Templates MotorX Total Runtime
Running	CCU Tag Templates MotorX Running
RemoteFbck	CCU Tag Templates MotorX Remote
Ready	CCU Tag Templates MotorX Ready
Position	CCU Tag Templates MotorX Position
OverTemperature	CCU Tag Templates MotorX Over Temperature
Overload	CCU Tag Templates MotorX Over Load
OOS	CCU Tag Templates MotorX Out of Service
LowSuctionPress	CCU Tag Templates MotorX Low Suction Pressure
LowLevel	CCU Tag Templates MotorX Low Level
LockoutSafety	CCU Tag Templates MotorX Lockout Saftey
InMaintenance	CCU Tag Templates MotorX In Maintenance
HighLevel	CCU Tag Templates MotorX High Level
HighDischargePress	CCU Tag Templates MotorX High Discharge Pressure
Fault	CCU Tag Templates MotorX Fault
FailtoStopDelaySP	CCU Tag Templates MotorX Fail-to-Start Delay Setpoint
FailtoStop	CCU Tag Templates MotorX Fail-to-Stop

5.2.3 Valve Tag Type

The valve tag type (**ValveType**) was designed to include typical control and status tags for a valve. A valve could be Motorized Valve, open/close Valve, or Gate Valve.

ValveType includes the following tags:

1- Valve field status such as Remote, Local, Open, Closed, Traveling and Position Feedback.
2- Valve SCADA status such as Hand/Off/Auto, and Manual Position.
3- Valve SCADA commands such as Hand/Off/Auto, Manual Position, Manual Start/Stop, Fail Reset, etc.
4- Valve setpoints such as Fail to Open Delay Setpoint and Fail to Close Delay Setpoint.
5- Valve alarms such as Fail to Open, Fail to Close, and Valve Fault.



Name	Description
Status	CCU Tag Templates ValveX Status
SCADAManualPositionCmd	CCU Tag Templates ValveX SCADA Manual Valve Position Command
SCADAManualOpenCmd	CCU Tag Templates ValveX SCADA Manual Open Command
SCADAManualCloseCmd	CCU Tag Templates ValveX SCADA Manual Close Command
SCADAHandOffAuto	CCU Tag Templates ValveX SCADA Hand Off Auto
Remote	CCU Tag Templates ValveX Remote
Position	CCU Tag Templates ValveX Valve Position
OpenStatus	CCU Tag Templates ValveX Open Status
Fault	CCU Tag Templates ValveX Fault
FailtoOpenDelaySP	CCU Tag Templates ValveX Fail-to-Open Delay Setpoint
FailtoOpen	CCU Tag Templates ValveX Fail-to-Open
FailtoCloseDelaySP	CCU Tag Templates ValveX Fail-to-Close Delay Setpoint

5.2.4 Flowmeter Tag Type

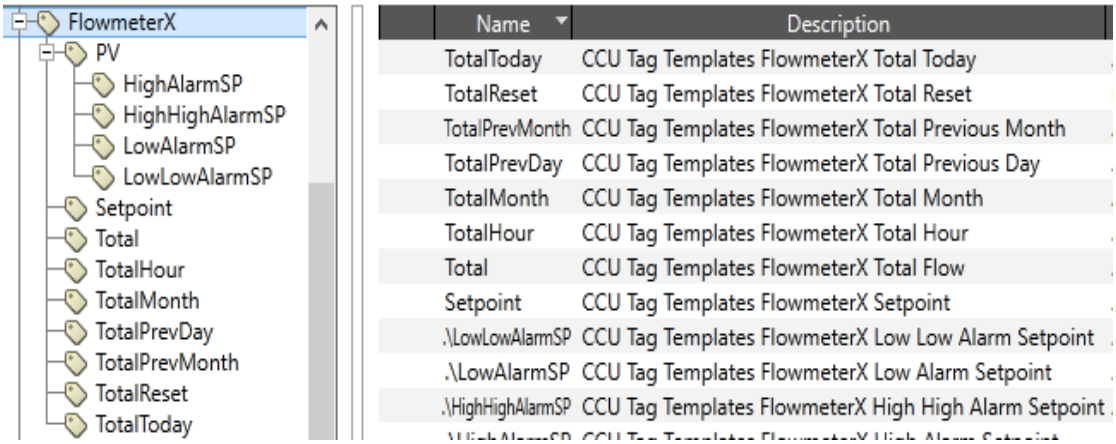
The flowmeter tag type (**Flowmeter**) was designed to include typical tags for any flowmeter. **Flowmeter** includes the following tags:

1- Flow current reading (process variable).

2- Flow totals such as Total Hour, Total Today, Total Previous Day, Total Month, etc.

3- Flow setpoints such as High Alarm Setpoint, High-High Alarm Setpoint, Low Alarm Setpoint, Low-Low Alarm Setpoint, and Setpoint.

4- Flow alarms such as High Alarm, High-High Alarm, Low Alarm, and Low-Low Alarm.



5.2.5 Pressure Tag Type

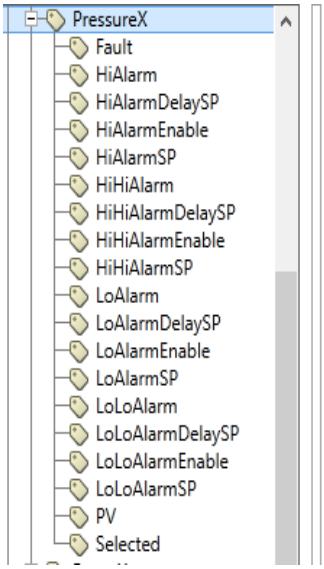
The Pressure tag type (**PressureType**) was designed to include all tags for any pressure meter. **PressureType** includes the following tags:

1- Pressure current reading (process variable)

2- Pressure setpoints such as High Alarm Setpoint, High-High Alarm Setpoint, Low Alarm setpoint, and Low-Low Alarm Setpoint.

3- Pressure alarms such as High Alarm, High-High Alarm, Low Alarm, Low-Low Alarm, and Fault Alarm.

4- Pressure alarms commands such as Low Alarm Enable, Low-Low Alarm Enable, High Alarm Enable, High-High Alarm Enable and Selected (Signal Selected).



Name	Description
Selected	CCU Tag Templates PressureX Signal Selected
PV	CCU Tag Templates PressureX Process Value
LoLoAlarmSP	CCU Tag Templates PressureX Low Low Alarm Setpoint
LoLoAlarmEnable	CCU Tag Templates PressureX Low Low Alarm Enable
LoLoAlarmDelaySP	CCU Tag Templates PressureX Low Low Alarm Delay Setpoint
LoLoAlarm	CCU Tag Templates PressureX Low Low Alarm
LoAlarmSP	CCU Tag Templates PressureX Low Alarm Setpoint
LoAlarmEnable	CCU Tag Templates PressureX Low Alarm Enable
LoAlarmDelaySP	CCU Tag Templates PressureX Low Alarm Delay Setpoint
LoAlarm	CCU Tag Templates PressureX Low Alarm
HiHiAlarmSP	CCU Tag Templates PressureX High High Alarm Setpoint
HiHiAlarmEnable	CCU Tag Templates PressureX High High Alarm Enable
HiHiAlarmDelaySP	CCU Tag Templates PressureX High High Alarm Delay Setpoint
HiHiAlarm	CCU Tag Templates PressureX High High Alarm
HiAlarmSP	CCU Tag Templates PressureX High Alarm Setpoint
HiAlarmEnable	CCU Tag Templates PressureX High Alarm Enable
HiAlarmDelaySP	CCU Tag Templates PressureX High Alarm Delay Setpoint

5.2.6 Analytical Tag Type

The analytical tag type (**AnalyticalType**) was designed to include all tags for any analytical meter. Analytical meters could include a Chlorine Residual Analyzer, Turbidity, Conductivity, pH, ORP or Temperature, etc.

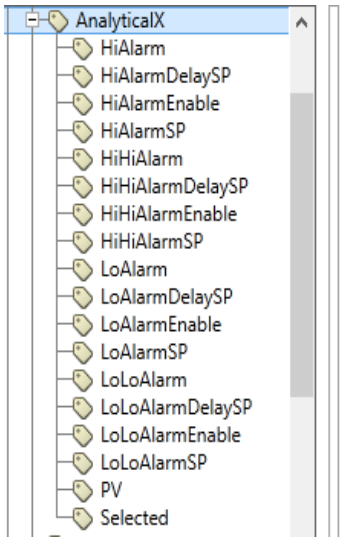
AnalyticalType will includes the following tags:

1- Analytical current reading (process variable).

2- Analytical setpoints such as High Alarm Setpoint, High-High Alarm Setpoint, Low Alarm Setpoint, and Low-Low Alarm Setpoint.

3- Analytical alarms such as High Alarm, High-High Alarm, Low Alarm, Low-Low Alarm, and Fault Alarm.

4- Analytical alarms commands such as Low Alarm Enable, Low-Low Alarm Enable, High Alarm Enable, High-High Alarm Enable and Selected (Signal Selected).



Name	Description
Selected	CCU Tag Templates AnalyticalX Signal Selected
PV	CCU Tag Templates AnalyticalX Process Value
LoLoAlarmSP	CCU Tag Templates AnalyticalX Low Low Alarm Setpoint
LoLoAlarmEnable	CCU Tag Templates AnalyticalX Low Low Alarm Enable
LoLoAlarmDelaySP	CCU Tag Templates AnalyticalX Low Low Alarm Delay Setpoint
LoLoAlarm	CCU Tag Templates AnalyticalX Low Low Alarm
LoAlarmSP	CCU Tag Templates AnalyticalX Low Alarm Setpoint
LoAlarmEnable	CCU Tag Templates AnalyticalX Low Alarm Enable
LoAlarmDelaySP	CCU Tag Templates AnalyticalX Low Alarm Delay Setpoint
LoAlarm	CCU Tag Templates AnalyticalX Low Alarm
HiHiAlarmSP	CCU Tag Templates AnalyticalX High High Alarm Setpoint
HiHiAlarmEnable	CCU Tag Templates AnalyticalX High High Alarm Enable
HiHiAlarmDelaySP	CCU Tag Templates AnalyticalX High High Alarm Delay Setpoint
HiHiAlarm	CCU Tag Templates AnalyticalX High High Alarm
HiAlarmSP	CCU Tag Templates AnalyticalX High Alarm Setpoint
HiAlarmEnable	CCU Tag Templates AnalyticalX High Alarm Enable

5.2.7 Level Tag Type

The level tag type (**LevelType**) was designed to include all tags for any Level meter

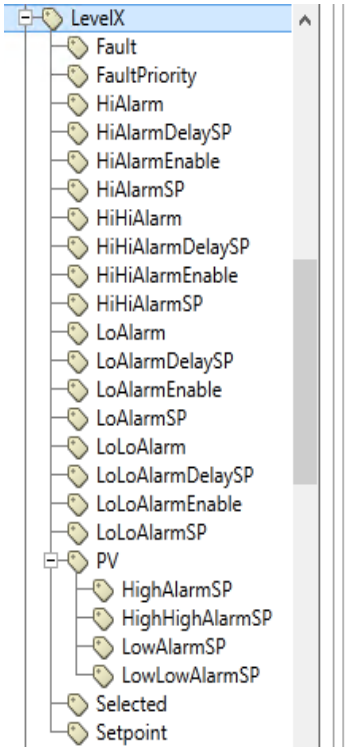
LevelType includes the following tags:

1- Level current reading (process variable).

2- Level setpoints such as High Alarm Setpoint, High-High Alarm Setpoint, Low Alarm Setpoint, Low-Low Alarm Setpoint, and Setpoint

3- Level alarms such as High Alarm, High-High Alarm, Low Alarm, Low-Low Alarm, and Fault Alarm.

4- Level alarms commands such as Low Alarm Enable, Low-Low Alarm Enable, High Alarm Enable, High-High Alarm Enable, and Selected (Signal Selected).



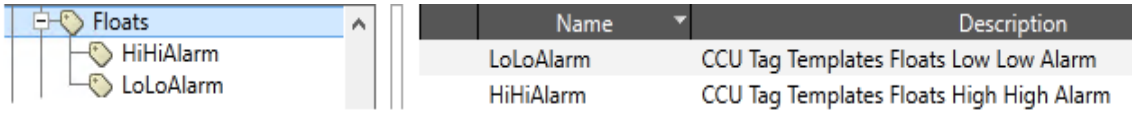
Name	Description
Setpoint	CCU Tag Templates LevelX Setpoint
Selected	CCU Tag Templates LevelX Signal Selected
PV\LowLowAlarmSP	CCU Tag Templates LevelX Low Low Alarm Setpoint
PV\LowAlarmSP	CCU Tag Templates LevelX Low Alarm Setpoint
.\HighHighAlarmSP	CCU Tag Templates LevelX High High Alarm Setpoint
PV\HighAlarmSP	CCU Tag Templates LevelX High Alarm Setpoint
PV	CCU Tag Templates LevelX Process Value
LoLoAlarmSP	CCU Tag Templates LevelX Low Low Alarm Setpoint
LoLoAlarmEnable	CCU Tag Templates LevelX Low Low Alarm Enable
LoLoAlarmDelaySP	CCU Tag Templates LevelX Low Low Alarm Delay Setpoint
LoLoAlarm	CCU Tag Templates LevelX Low Low Alarm
LoAlarmSP	CCU Tag Templates LevelX Low Alarm Setpoint
LoAlarmEnable	CCU Tag Templates LevelX Low Alarm Enable
LoAlarmDelaySP	CCU Tag Templates LevelX Low Alarm Delay Setpoint
LoAlarm	CCU Tag Templates LevelX Low Alarm
HiHiAlarmSP	CCU Tag Templates LevelX High High Alarm Setpoint
HiHiAlarmEnable	CCU Tag Templates LevelX High High Alarm Enable
HiHiAlarmDelaySP	CCU Tag Templates LevelX High High Alarm Delay Setpoint
HiHiAlarm	CCU Tag Templates LevelX High High Alarm
HiAlarmSP	CCU Tag Templates LevelX High Alarm Setpoint
HiAlarmEnable	CCU Tag Templates LevelX High Alarm Enable
HiAlarmDelaySP	CCU Tag Templates LevelX High Alarm Delay Setpoint

5.2.8 Float Tag Type

The float tag type (**FloatsType**) was designed to monitor the float switches.

FloatsType include two tags:

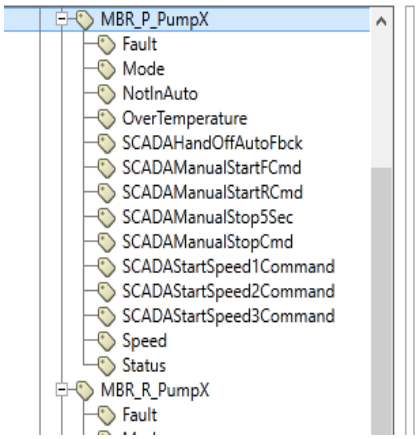
1) Low-Low Level Alarm.
2) High-High Level Alarm.



5.2.9 MBR Tag Types

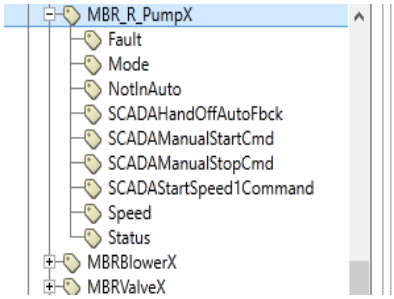
MBR tag types were designed specifically for the Rotunda reclamation facility and can be used for future MBR systems in this or other plants. The tag types are:

1- MBR Permeate Pump (**MBR_P_Pump**): This type will include common pump status tags such as Pump Speed and Pump Running. Additionally, it will include specific tags such as Forward Start, Reverse Start, Stop, Stop 5 seconds, Manual Speed 1, Manual Speed 2, and Manual Speed 3.



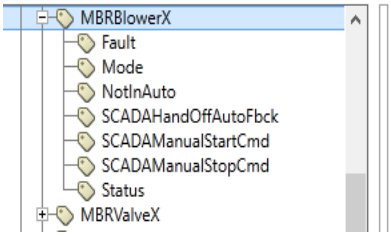
Name	Description	Type
Status	CCU Tag Templates Permeate Pump SCADA HOA Fee	Analog [Mem]
Speed	CCU Tag Templates Permeate Pump Speed	Analog [Mem]
SCADAStartSpeed3Command	CCU Tag Templates Permeate Pump SCADA Start Spe	Analog [Mem]
SCADAStartSpeed2Command	CCU Tag Templates Permeate Pump SCADA Start Spe	Analog [Mem]
SCADAStartSpeed1Command	CCU Tag Templates Permeate Pump SCADA Start Spe	Analog [Mem]
SCADAManualStopCmd	CCU Tag Templates Permeate Pump SCADA Manual S	Digital [Mem]
SCADAManualStop5Sec	CCU Tag Templates Permeate Pump SCADA Manual S	Digital [Mem]
SCADAManualStartRCmd	CCU Tag Templates Permeate Pump SCADA Manual S	Digital [Mem]
SCADAManualStartFCmd	CCU Tag Templates Permeate Pump SCADA Manual S	Digital [Mem]
SCADAHandOffAutoFbck	CCU Tag Templates Permeate Pump SCADA HOA Fee	Digital [Mem]
OverTemperature	CCU Tag Templates Permeate Pump Over Temperatur	Digital [Mem]
NotInAuto	CCU Tag Templates Permeate Pump Not in Auto at M	Digital [Mem]
Mode	CCU Tag Templates Permeate Pump SCADA HOA Fee	Analog [Mem]
Fault	CCU Tag Templates Permeate Pump Fault	Digital [Mem]

2- MBR Recirculation Pump (**MBR_R_Pump**): This type will include some of the pump tags comparing to the original **PumpType**. Additionally, it includes a new tag called Mode which is specific for the MBR Pump.



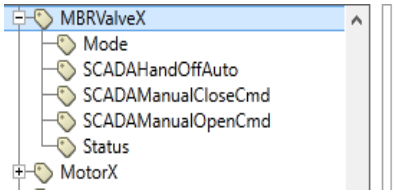
Name	Description	Type
Status	CCU Tag Templates Recirculation / RAS Pump SCADA	Analog [Mem]
Speed	CCU Tag Templates Recirculation / RAS Pump Speed	Analog [Mem]
SCADAStartSpeed1Command	CCU Tag Templates Recirculation / RAS Pump SCADA	Analog [Mem]
SCADAManualStopCmd	CCU Tag Templates Recirculation / RAS Pump SCADA	Digital [Mem]
SCADAManualStartCmd	CCU Tag Templates Recirculation / RAS Pump SCADA	Digital [Mem]
SCADAHandOffAutoFbck	CCU Tag Templates Recirculation / RAS Pump SCADA	Digital [Mem]
NotInAuto	CCU Tag Templates Recirculation / RAS Pump Not in.	Digital [Mem]
Mode	CCU Tag Templates Recirculation / RAS Pump SCADA	Analog [Mem]
Fault	CCU Tag Templates Recirculation / RAS Pump Fault	Digital [Mem]

3- MBR Blower (**MBRBlower**): This type will include some of the motor tags comparing to the original Motor Type. Additionally, it includes a new tag called Mode which is specific for the MBR blowers.



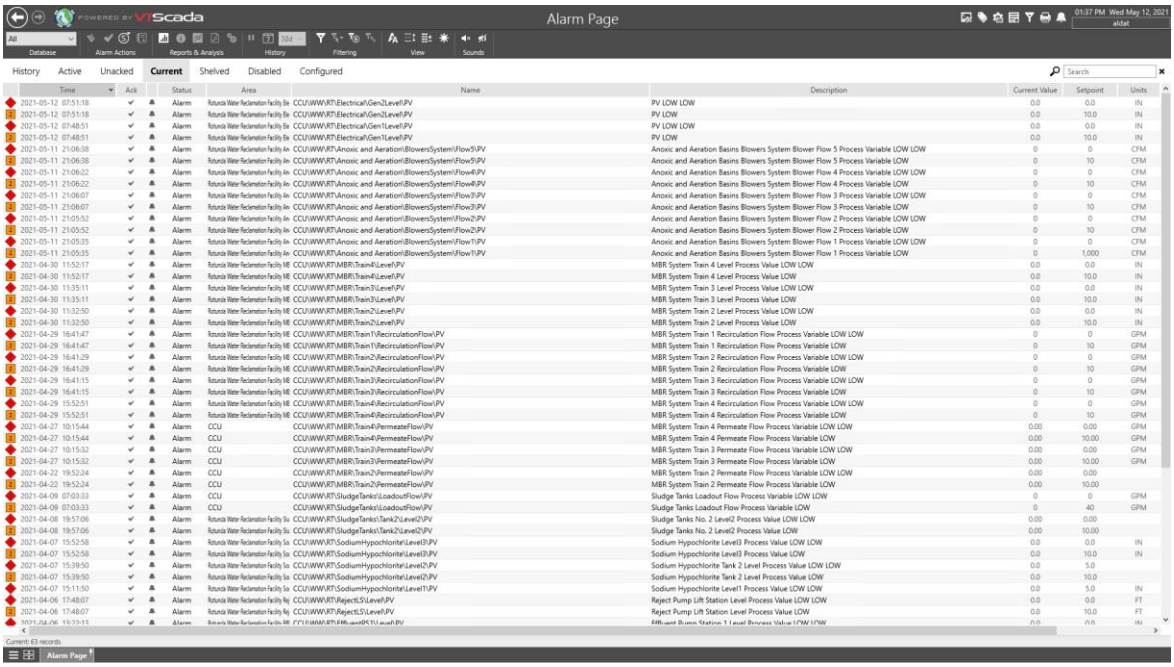
Name	Description	Type
Status		Analog [Mem]
SCADAManualStopCmd		Digital [Mem]
SCADAManualStartCmd		Digital [Mem]
SCADAHandOffAutoFbck		Digital [Mem]
NotInAuto		Digital [Mem]
Mode		Analog [Mem]
Fault		Digital [Mem]

4- MBR Valve (**MBRValve**): This type will include some of the valve tags comparing to the original **ValveType**. Additionally, it includes a new tag called Mode which is specific for the MBR valves.



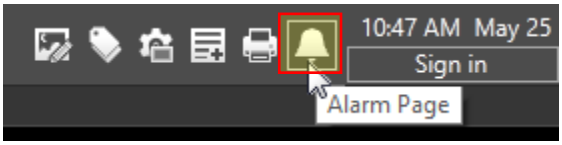
Name	Description	Type
Status		Analog [Mem]
SCADAManualOpenCmd		Digital [Mem]
SCADAManualCloseCmd		Digital [Mem]
SCADAHandOffAuto		Digital [Mem]
Mode		Analog [Mem]

6 Alarms

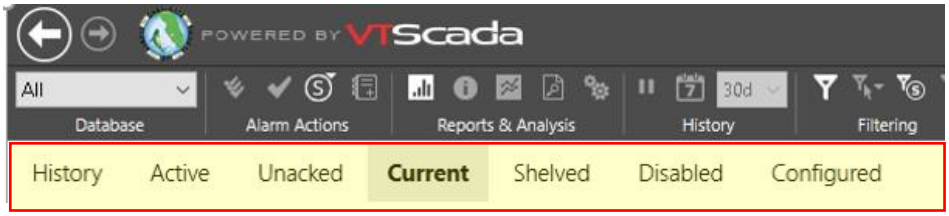


Every VTScada application has an **Alarm** page where an operator can view, manage, and acknowledge alarms. What operators can do on that page depends on the security privileges granted to their account.

Open the **Alarm** page by clicking the alarm icon at the top of the screen, or through the menu system.



The **Alarm** page is set to show the **Current** alarms tab by default. Other alarm tabs are available such as **History**, **Active**, **Unacked**, **Shelved**, **Disabled** and **Configured**. Click on the desired tab to access the tab section. See below:



Active alarm list

Active alarms are those for which the condition that caused them to trigger still exists, whether the alarm has been acknowledged or not.

Unacknowledged alarm list

The unacknowledged alarm list displays all alarms that have not yet been acknowledged, whether the condition that caused the alarm to trigger still exists or not.

Current alarm list

Any alarm that qualifies as either Active or Unacknowledged will be included in the list of Current alarms.

Shelved alarm list

Shows all alarms that have been marked as shelved.

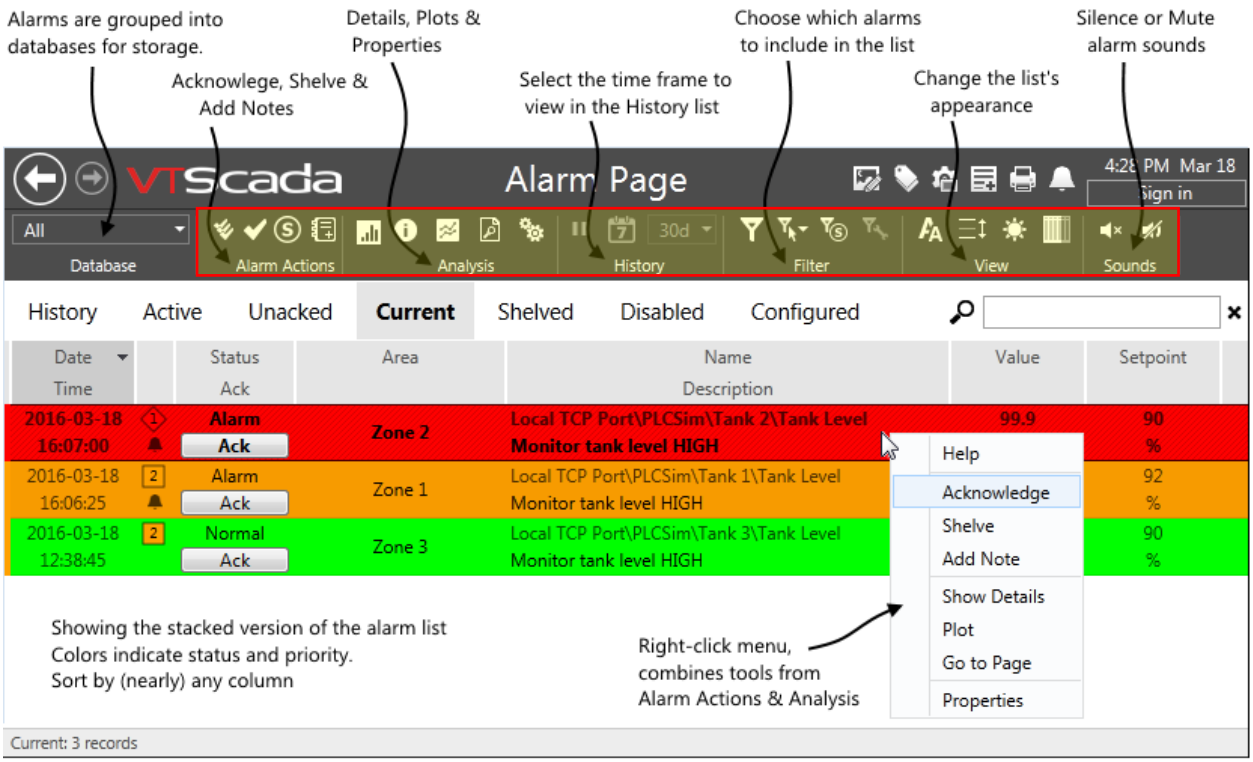
Disabled alarm list

Shows all configured alarms in the application that are marked as disabled

Configured alarm list

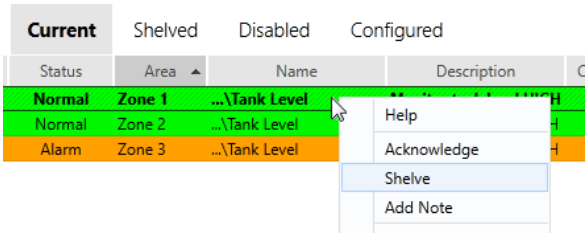
Simply, the list of all configured alarms in the application, including shelved and disabled alarms. This list will not tell you whether any particular alarm is active or unacknowledged.

Several actions can be applied to the alarms page by using the alarm page ribbon, see below:

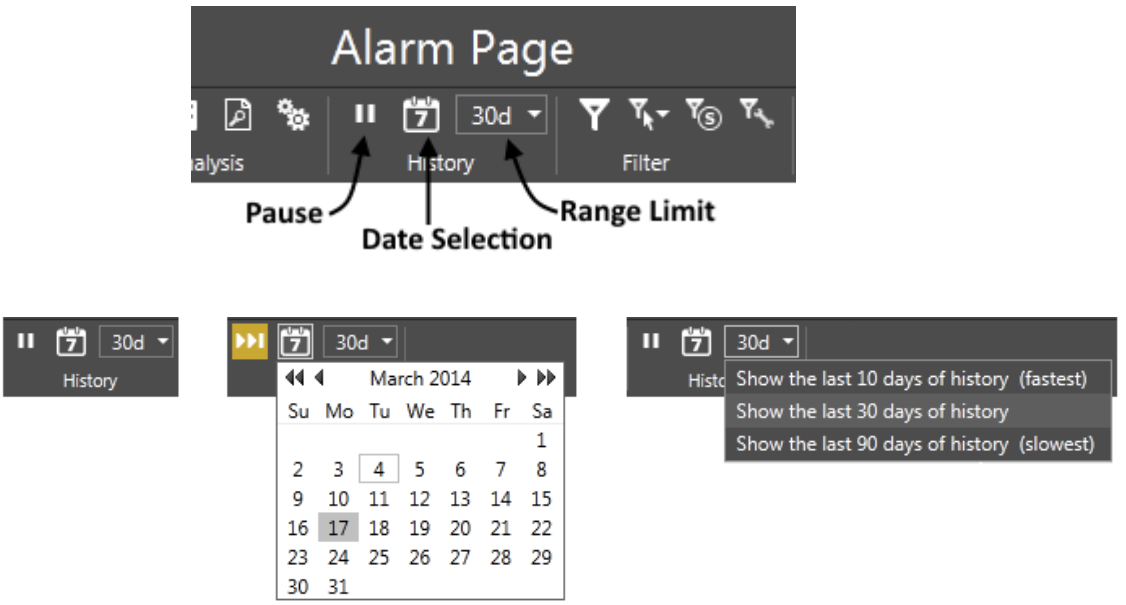


Alarms can be acknowledged using the buttons in the Alarm Actions section of the ribbon, but in most cases, it will be easier to use the button provided within the list for each alarm.

Shelving an alarm is one step short of disabling the alarm. Shelving should be used to deal with so-called 'nuisance' alarms such as those that result from expected maintenance operations rather than those that signal a dangerous situation. To shelve an alarm, right click on the alarm and select shelve then specify how long that alarm will be shelved for. See below:



The Alarm History section can be used to view historical alarms by using the date selection and range limit. The date selection will provide a calendar control that allows a specific date to be selected. The range limit will select how many days of data from that point are presented with a maximum of 90 days. This maximum is set to limit the amount of time required to refresh the list.



7 Alarm Priorities

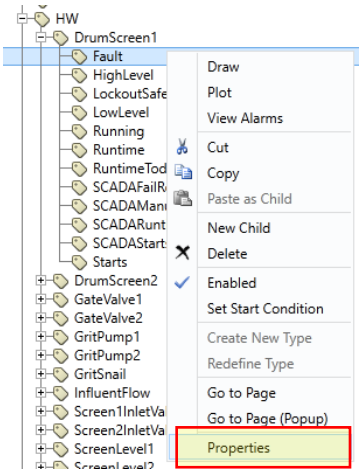
All alarms should be investigated and addressed by facility staff. However, some alarms are considered more critical than others and require a higher level of response. There are five alarm priorities in VTScada: Critical, High, Warning, Notice and Event. Each priority type will have a unique shape, color, and number associated with it. Note: All alarms configured as Critical (Priority 1) and High (Priority 2), will also send an alarm notification. To prevent an alarm from sending a notification requires a configuration as Priority 0, 3 or 4.

Name	Descriptor	Priority #	Color	Symbol	Tone 1 Freq	Tone 2 Freq	Tone Cycles
AlarmPriority0	Event	0	White	none	0 Hz	0 Hz	0
AlarmPriority1	Critical	1	Red	1	2000 Hz	1000 Hz	unlimited
AlarmPriority2	High	2	Orange	2	1800 Hz	1000 Hz	unlimited
AlarmPriority3	Warning	3	Yellow	3	1600 Hz	1000 Hz	unlimited
AlarmPriority4	Notice	4	Cyan	4	1400 Hz	1000 Hz	0

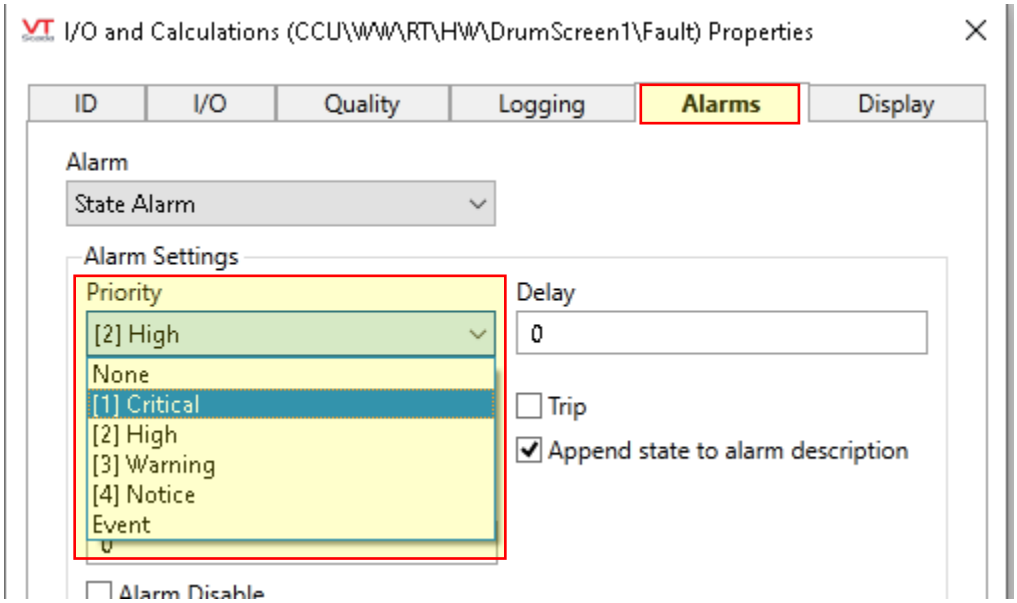
To assign an alarm priority for a specific tag, follow the instructions below:

1- Login to VTScada with the proper privilege level then access Tag Browser from the top right corner:

2- Right click on the desired tag then click on **Properties**:

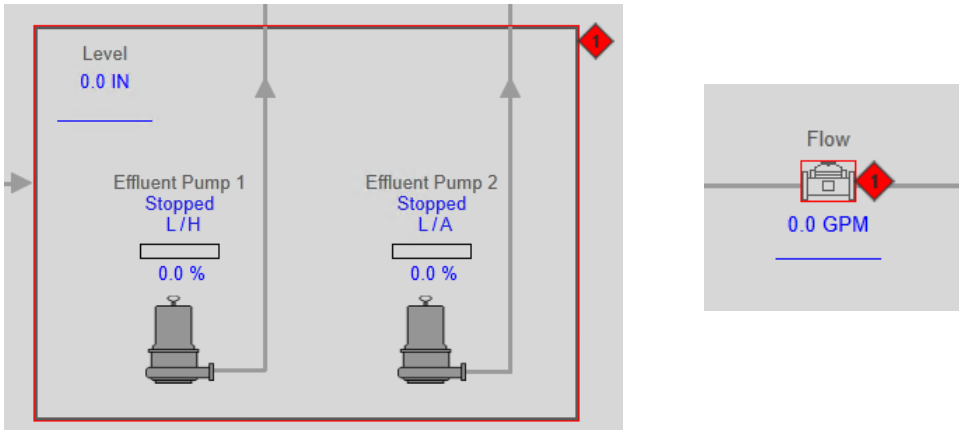


3- Click on the **Alarms** tab then under **Alarm Settings** choose the desired priority for the alarm:



4- Click **Ok** to save the changes.

All configured alarms will show on the Alarm page. Alarms can also be integrated within the application widgets, which will be indicated around the area for that widget. See below:



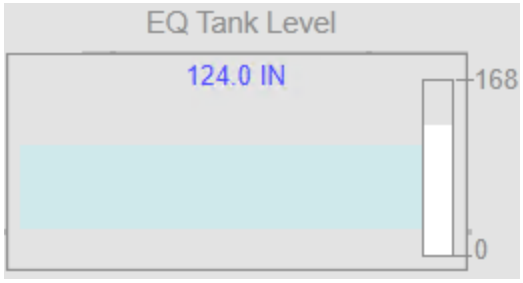
8 Widgets

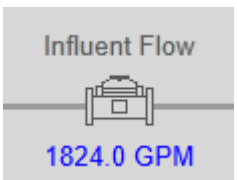
A widget is used to display the value of a tag to an operator, or to allow operator control over a tag. VTScada comes with a prebuilt widget library which include color indicators, gauges, buttons, bars, switches, animations, text, meters, and more. Also, VTScada gives the developer the ability to build custom widgets that suits the user needs.

Several custom widgets were developed as part of the Charlotte County standards. Standardizing the widgets will ensure that all SCADA graphics and widgets are consistent, compatible, and equal throughout all the county plants. The custom widgets were specifically designed to work together with the custom tag types that were introduced in the previous section.

VTScada prebuilt widgets example:

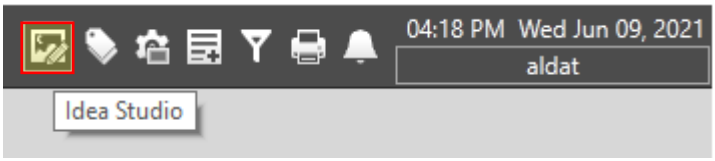
Charlotte County custom high performance widgets example:

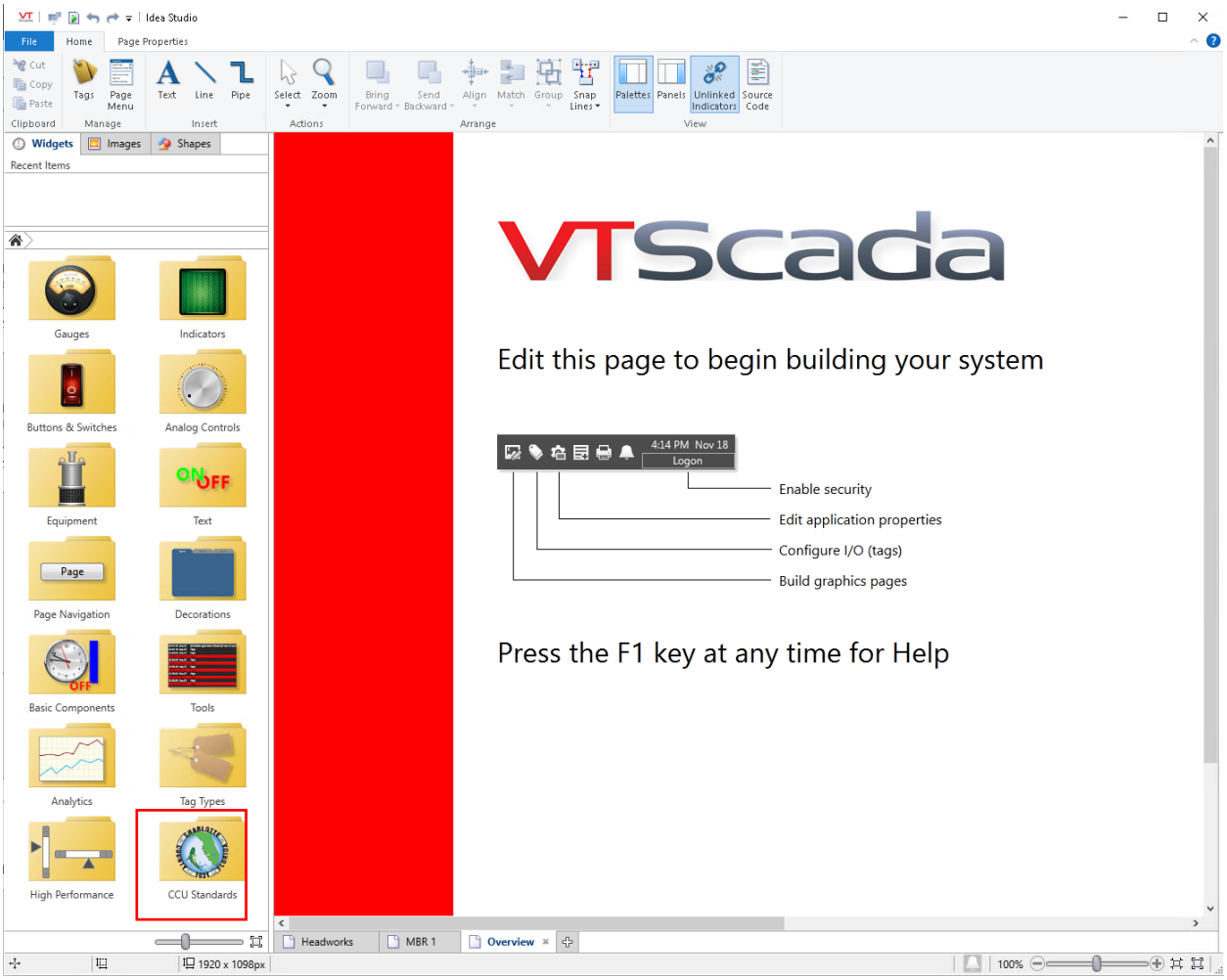




Accessing the widgets library requires a privileged user to be logged into the Idea Studio. Idea Studio is the design environment for the application's pages, symbols, and widgets.

To access the widget library, Login to VTScada with a privileged user account then access Idea Studio from the top right corner of the screen:



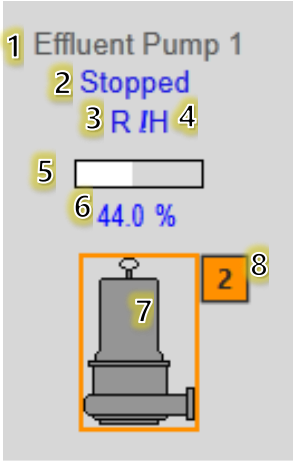


All Charlotte County widgets are located inside the **CCU Standards** folder.

8.1.1 Pump Widget

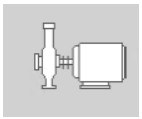
The pump widget (**PumpWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the pump type tag **PumpType**.

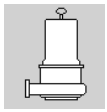
PumpWidget:

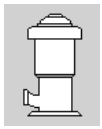


1- Pump Name
2- Pump Running/ Stopped status
3- Field Remote/Off/Local status
4- SCADA Hand/Off/Auto status
5- Pump speed feedback bar indication
6- Pump speed feedback value
7- Pump running indication. Gray for stopped, white for running
8- Pump alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

There are four pump types:

1- Centrifugal: 

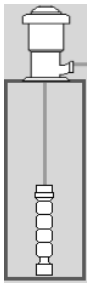
2- Submersible: 

3- Vertical: 

4- Chemical

Changing the pump type can be done by navigating to the pump tag properties inside Tag Browser.

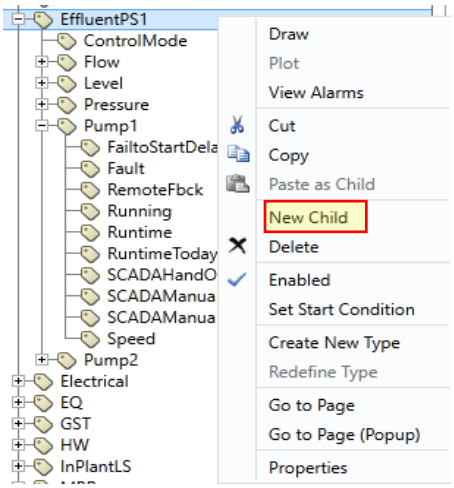
Note: If the pump type is vertical, another widget called **VpumpShaftWidget** should be used as a shaft to the vertical pump. The shaft widget will animate its color based on the pump running tag.



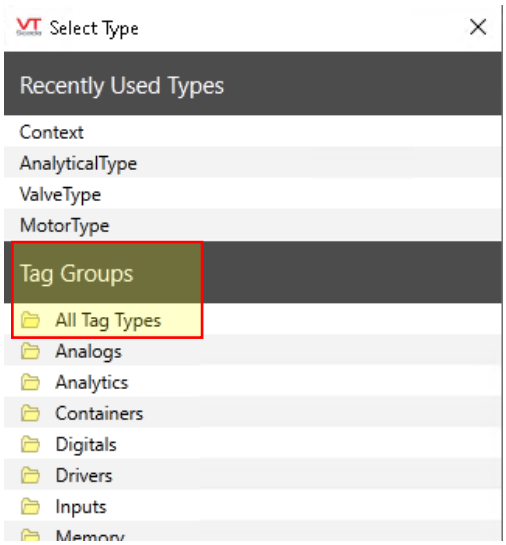
PumpWidget is linked to tag type called **PumpType**. To add a new pump:

1- Login to VTScada with the proper privilege then access the Tag Browser from the top right corner:

2- Right click on the specified area where the pump will be added, then select **New Child**:

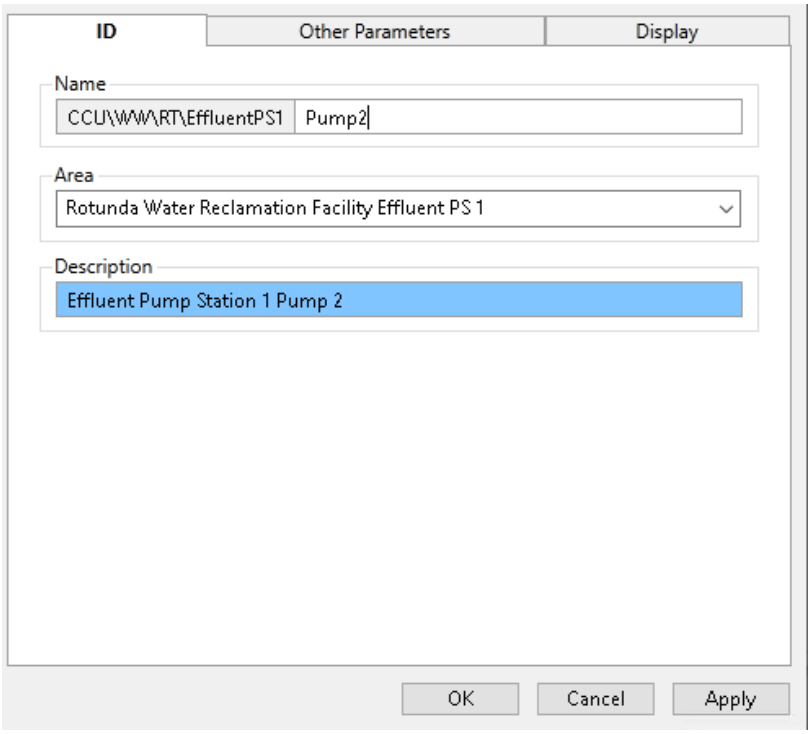


3- From **Tag Groups**, click on **All Tag Types**:



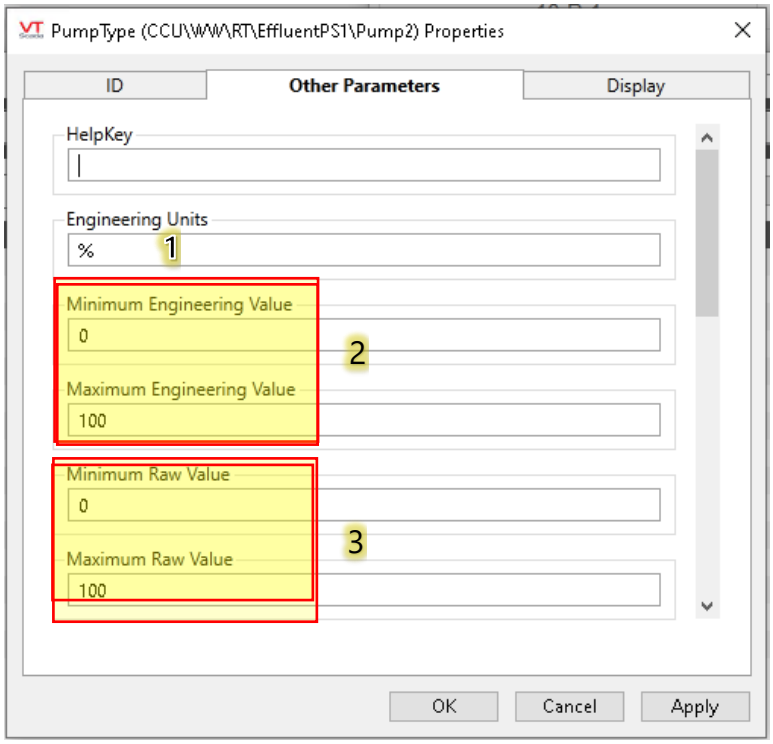
4- Search and select **PumpType**:

5- Under the **ID** tab, type in the pump name. Notice that the area field will inherit the area name from the previous parent.

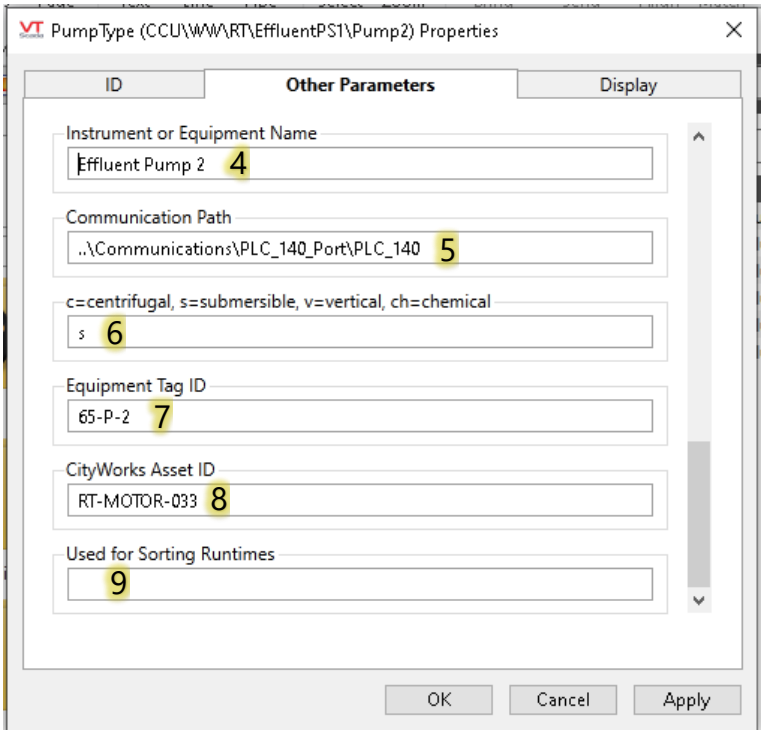


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the pump inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter pump name here "). Click **Ok** next. Notice that the **Description** field will be highlighted in blue as shown in the figure above which indicates that some expression was used in this field.

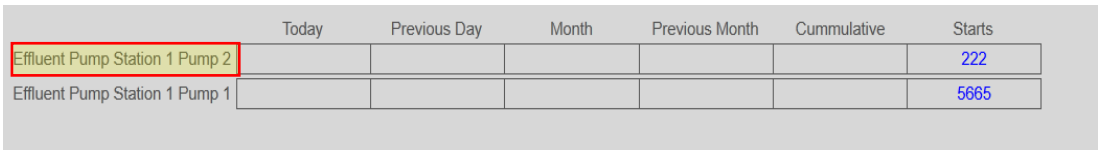
6- Click on the **Other Parameters** tab and fill in the following fields:



1) Pump speed unit
2) Maximum and Minimum engineering speed values. These fields will scale the PLC values to be represented in a desired range in SCADA.
3) Maximum and Minimum raw speed values for the pump that coming from the PLC. These values should match the PLC raw value scaling.

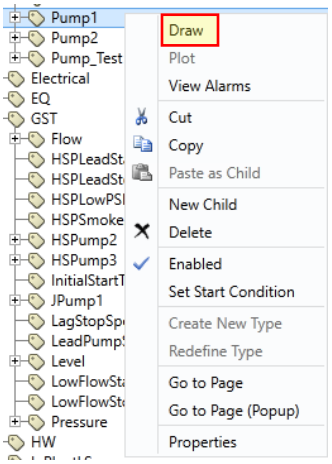


4) Pump name which will show on the top of the pump symbol in runtime.
5) The communication path is for specifying the path of the PLC for the pump.
6) Pump type which will determine the type of the pump. The pump symbol will change according to the entered letter in this field. Enter "**c**" for **c**entrifugal pump, "**s**" for **s**ubmersible, "**v**" for **v**ertical, "**ch**" for **ch**emical. Letters must be lower case.
7) The Tag ID is for specifying the equipment P&ID or other identifying number. This number will show on the pump faceplate in runtime.
8) This field is for the Cityworks Asset ID. This ID will show on the pump faceplate under the configuration tab in runtime.
9) This field is used for sorting the equipment runtime on the **Equipment Runtimes & Starts** page. For example, if the user enters number "1" in this field, the equipment will be the first row of the equipment's runtime list.

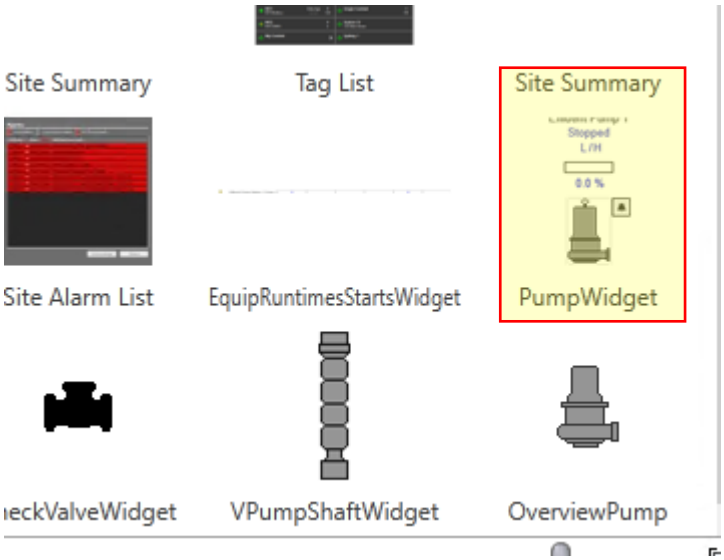


To draw a pump in runtime:

1- Go to Tag Browser and right click on any pump tag then click **Draw**:



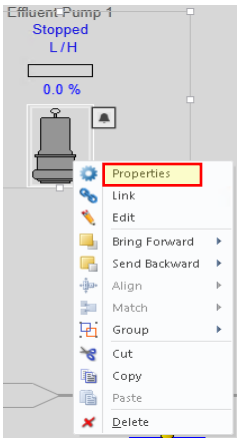
2- A new window will open that shows all widgets that are related to the pump. Find and click on a widget called **PumpWidget**:



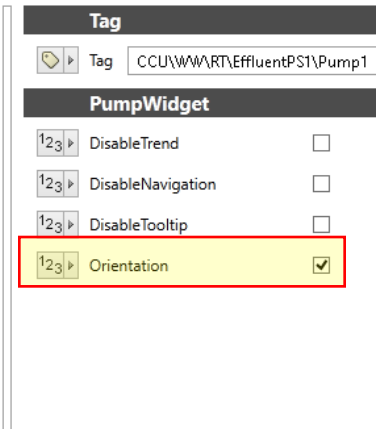
Note: there may be other variances of the pump widget for each plant. Some are also associated with the lockout function (widget with "_LO" described in the faceplate section.

3- Place the pump widget on the desired page inside the Idea Studio environment.

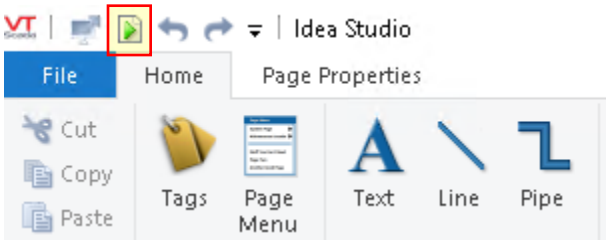
Right click on the pump widget and click on **Properties**:



4- The pump symbol will be oriented towards the right by default. To switch it to the left side, check the **Orientation** box and click **Ok**:



5- Place the pump widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime



8.1.2 Pump Faceplate Widget

The pump faceplate widget (**FP_Pump**) was designed as a separate widget from the pump widget. However, the faceplate is linked directly to the pump widget. The user can access the faceplate by clicking on the **PumpWidget** in runtime.

There are 5 tabs for **FP_Pump**:

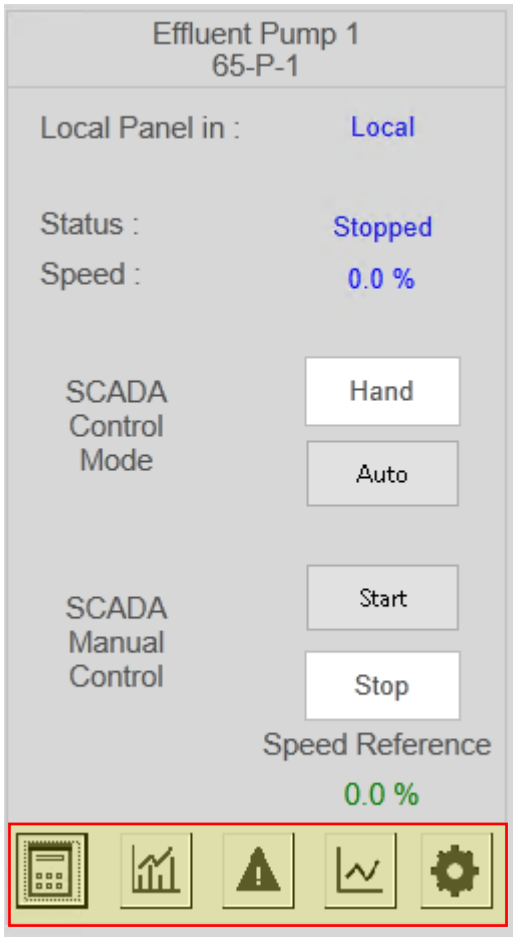
1- Main tab

2- Statistics tab

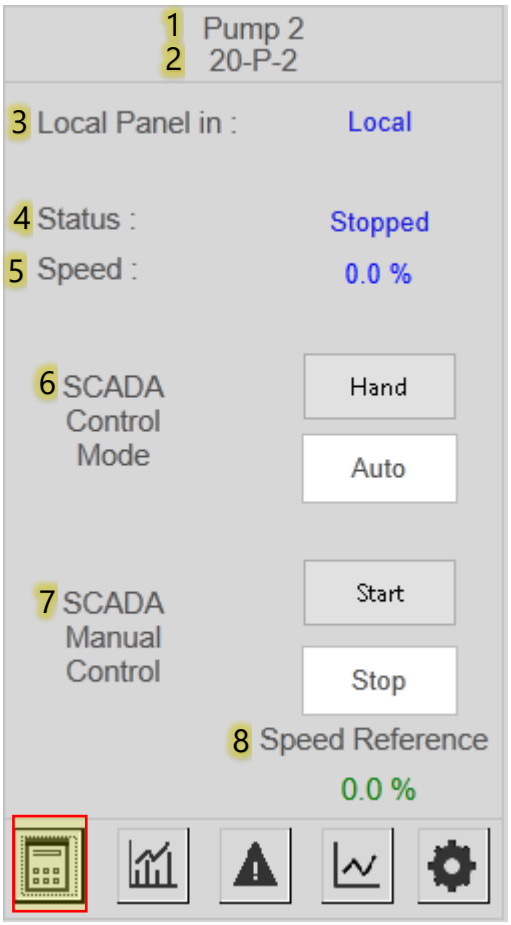
3- Alarms tab

4- Trend tab

5- Configuration tab

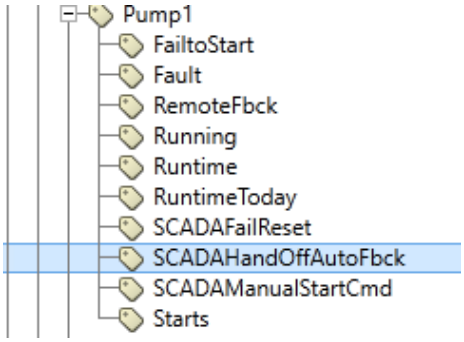


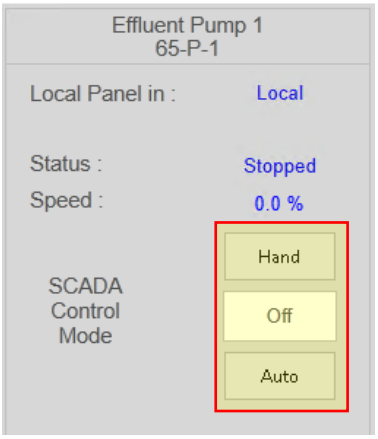
Main tab:



1- Pump Name
2- Pump P&ID or identifying number
3- Field Status (Remote, Local, Off)
4- Pump Status (Running, Stopped)
5- Pump Speed Feedback
6- SCADA Control Mode. This mode can be shown in two ways depending on the pump functionality. This mode could be either Hand/Off/Auto or Hand/Auto as shown in the picture above. If the assigned tag type for **SCADAHandOffAutoFbck** tag is digital then the mode will be Hand/Auto. If

the tag type is analog, then the mode will be Hand/Off/Auto. The example below indicates how the analog mode will look like:

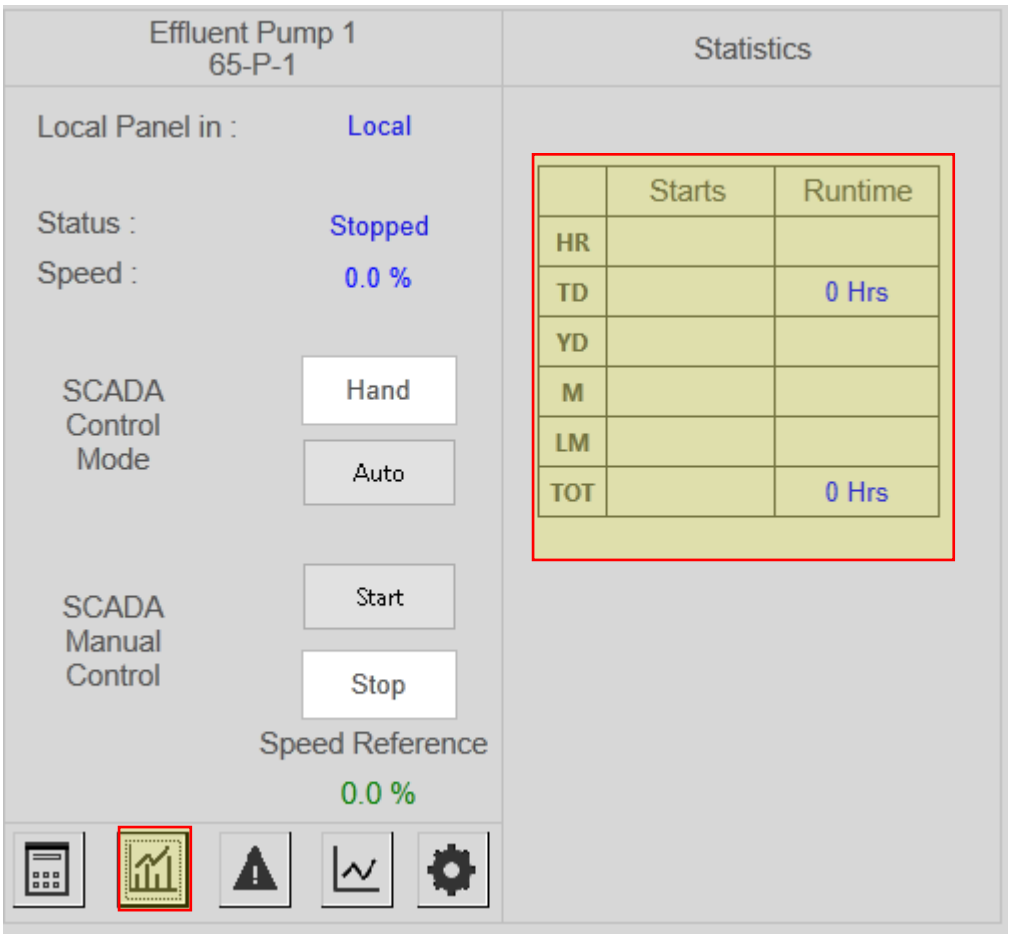




7- SCADA Start/Stop Manual Control. This mode will start and stop the pump when SCADA Control Mode is in Hand. This mode will be available only when the tag **SCADAHandOffAutoFbck** is set to be a digital type.

8- Manual pump speed command.

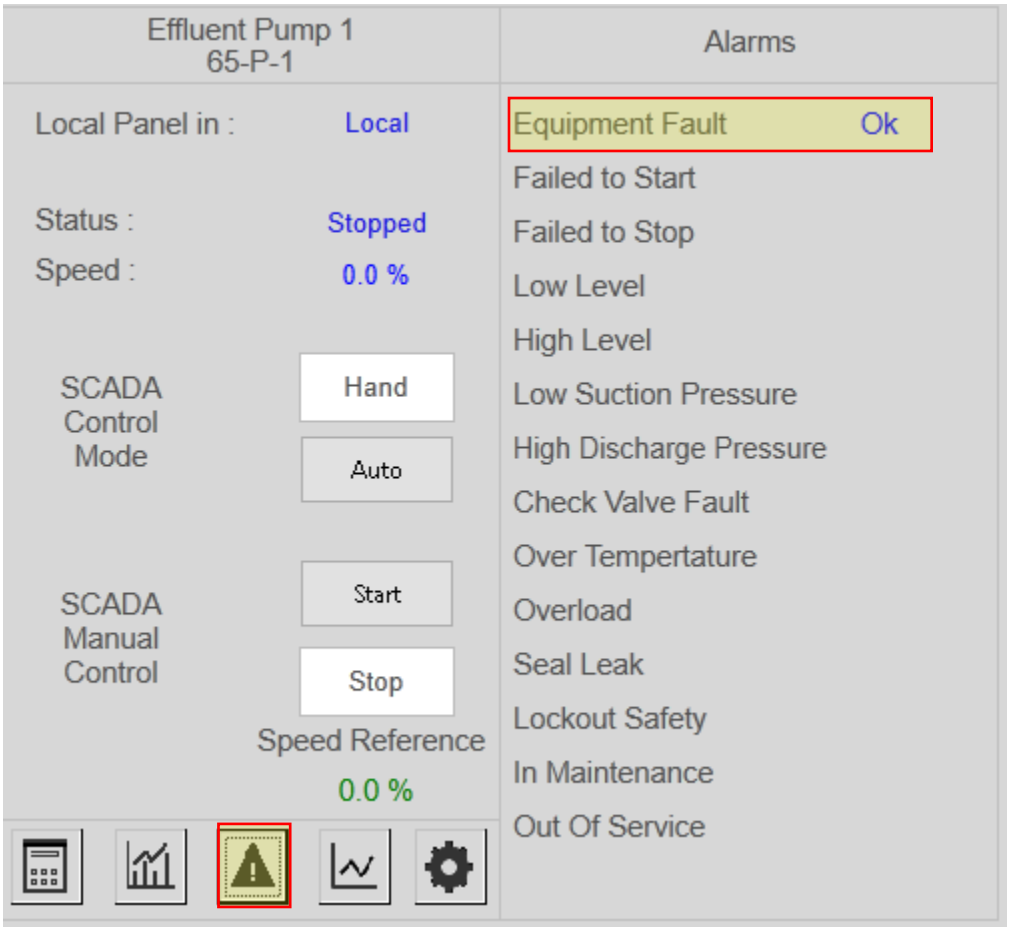
Statistics tab:



The Statistic tab will show the pump number of **Starts** and the pump **Runtime** data. The data could be Hourly (**HR**), Today (**TD**), Yesterday (**YD**), Monthly (**M**), Last month (**LM**), or Total accumulated (**TOT**). The availability of the data depends on the tag availability in the PLC. If the data is available, the numeric data will show in blue.

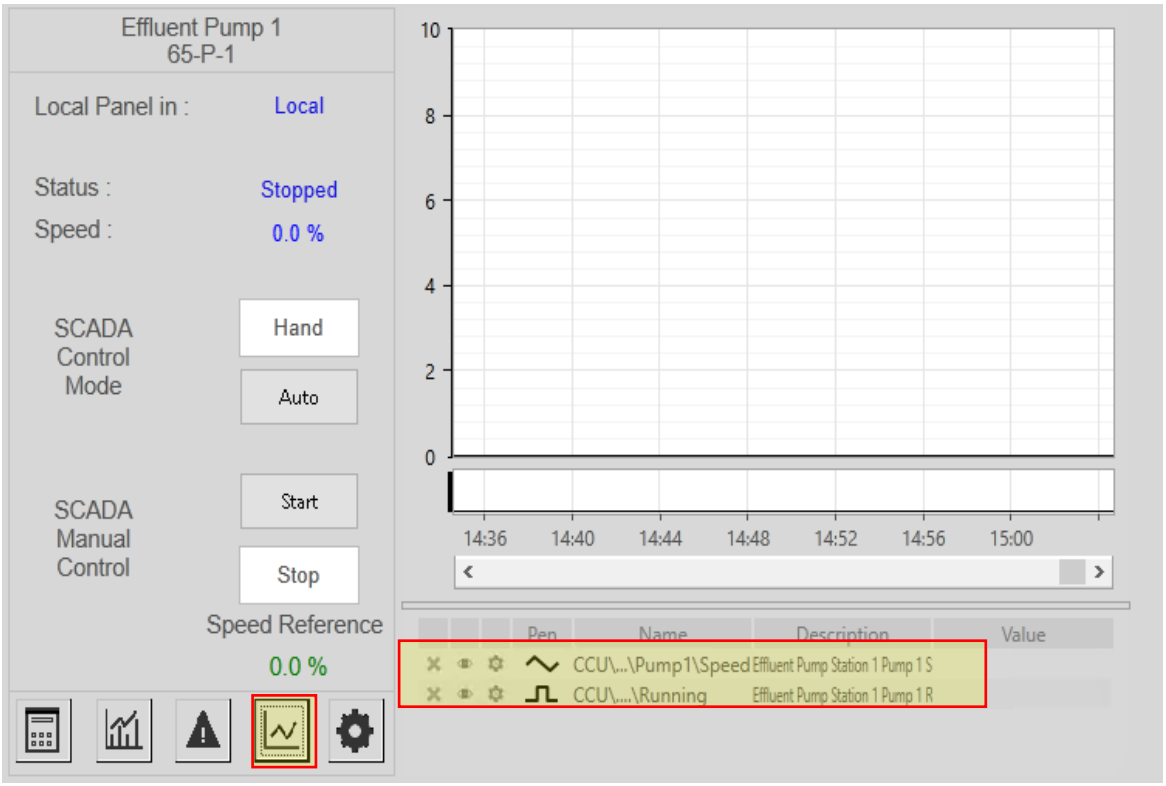
Note: If the field tag is not available in in the PLC then the SCADA tag should be disabled in Tag Browser.

Alarm's tab:



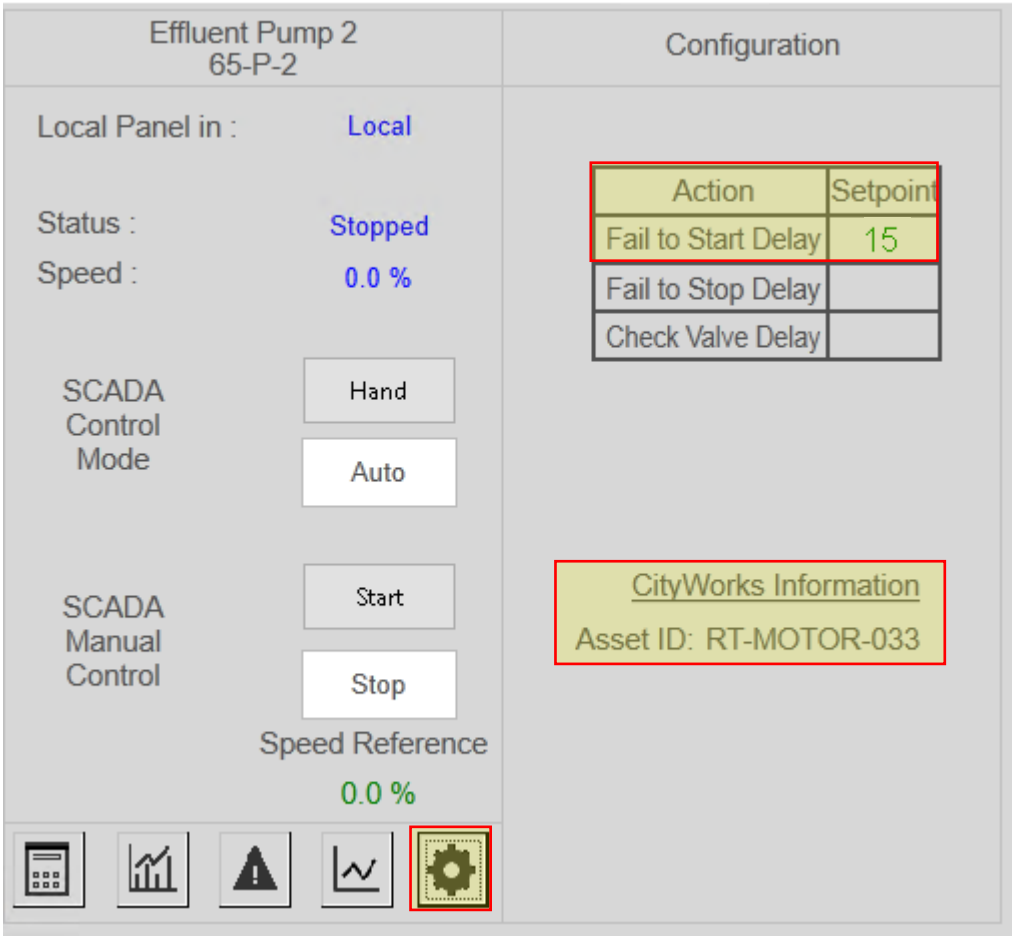
The Alarm tab will show the available alarms for the pump. An alarm will be available on SCADA if it is available in the PLC and enabled in the Tag Browser. The alarm will either indicate OK or Alarm in blue text next to the alarm description as shown in the above picture.

Trend tab:



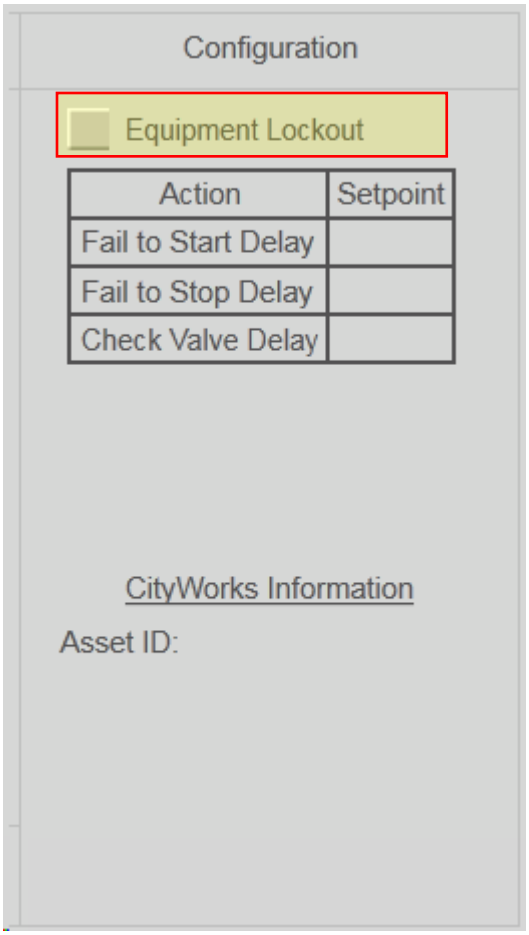
The trend tab will show the historical data for the pump. Pump speed and pump running were assigned to be trended as part of the faceplate.

Configuration tab:



The configuration tab will show the available setpoints for the pump. If the tag is available in the PLC and enabled in Tag Browser for a specific setpoint then numeric entry will show in green. Also, the configuration tab will show the assigned CityWorks Asset ID number.

Configuration tab with Lockout:

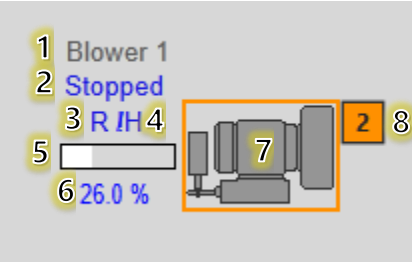


There is an additional faceplate the has the Equipment Lockout function (FP_Pump_EP_LO). This function will put the equipment out of service and will show an alarm notice (priority 4 with cyan color).

8.1.3 Motor Widget

The Motor widget (**MotorWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in motor type tag **MotorType**.

MotorWidget:



1- Motor Name
2- Motor Running/ Stopped status
3- Field Remote/Off/Local status
4- SCADA Hand/Off/Auto status
5- Motor speed feedback bar indication
6- Motor speed feedback value
7- Motor running indication. Gray for Stopped, White for Running
8- Motor alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

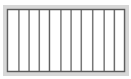
There are 6 motor types:

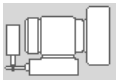
1- Auger:

2- Agitator:

3- Clarifier

4- Mixer

5- Bar Screen: 

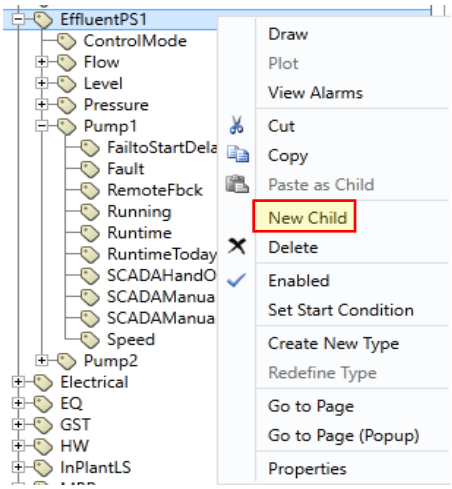
6- Blower 

Changing the motor type can be done by navigating to the motor tag properties inside the Tag Browser.

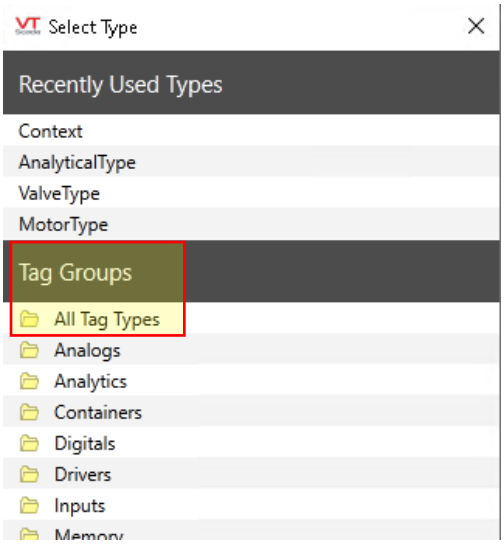
MotorWidget is attached to a tag type called **MotorType**. To add a new motor:

1- Login to VTScada with the proper privilege then access Tag Browser from the top right corner:

2- Right click on the specified area where the motor will be added, then select **New Child**:

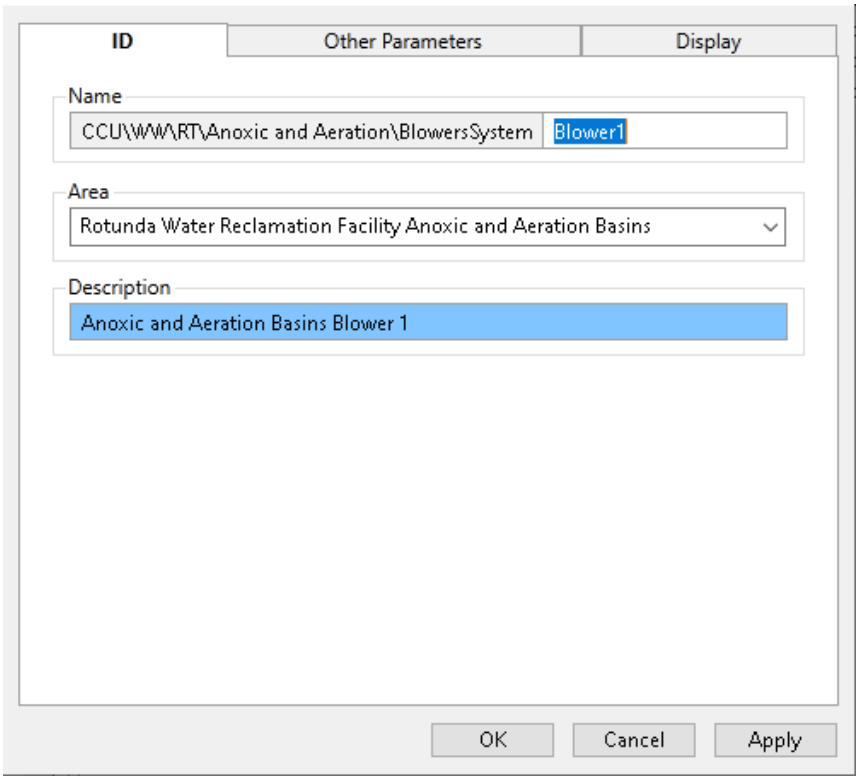


3- From **Tag Groups**, click on **All Tag Types**:



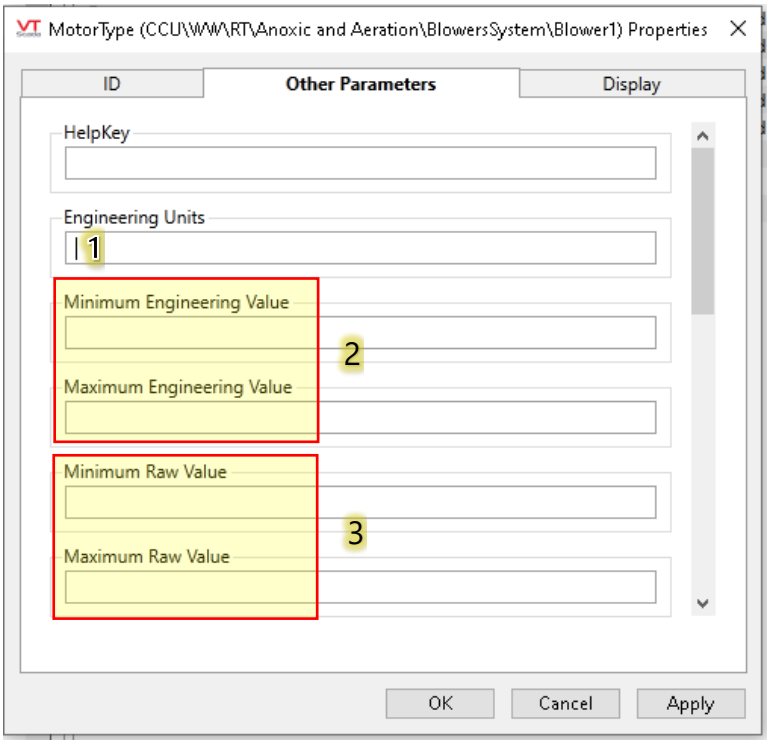
4- Search and select **MotorType**:

5- Under the **ID** tab, type in the motor name. Notice that the **Area** field will inherit the area name from the previous parent.

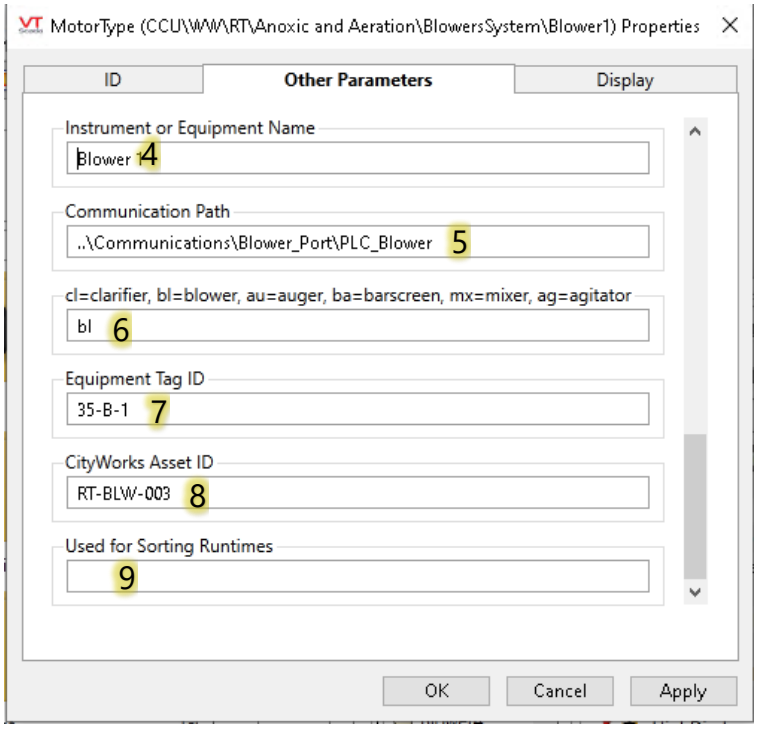


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the motor inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter motor name here "). Click **Ok** next. Notice that the **Description** field will be highlighted in blue as shown in the figure above which indicates that some expression was used in that field.

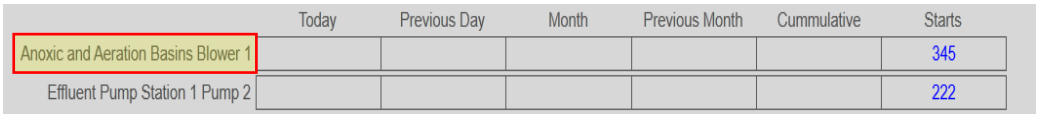
6- Click on the **Other Parameters** tab and fill in the following fields:



1) Motor speed unit
2) Maximum and Minimum engineering speed values. These fields will scale the PLC values to be represented in a desired range in SCADA.
3) Maximum and Minimum raw speed values for the motor that coming from the PLC. These values should match the PLC raw value scaling.

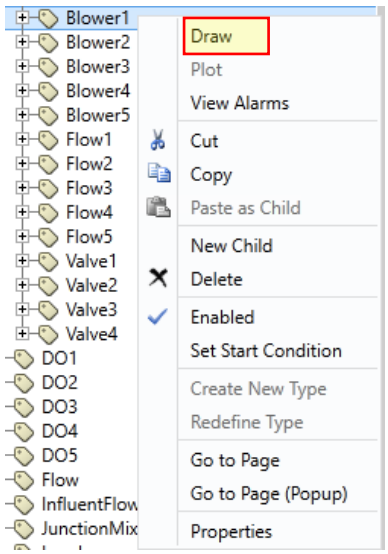


4) Motor name which will show on the top of the motor symbol in runtime.
5) The communication path is for specifying the path of the PLC for the motor.
6) Motor type which will determine the type of the motor. The motor symbol will change according to the entered letter in this field. Enter "**cl**" for **cl**arifier, "**bl**" for **bl**ower, "**au**" for **au**ger, "**ba**" for **ba**rscreen, "**mx**" for **mi**xer, "**ag**" for **ag**itator. Letters must be lower case.
7) The Tag ID is for specifying the motor P&ID or identifying number. This number will show on the motor faceplate in runtime.
8) This field is for the Cityworks Asset ID. This ID will show on the motor faceplate under the configuration tab in runtime.
9) This field is used for sorting the equipment runtime on the **Equipment Runtimes & Starts page**. For example, if the user enters number "1" in this field, the equipment will be the first row of the equipment list.



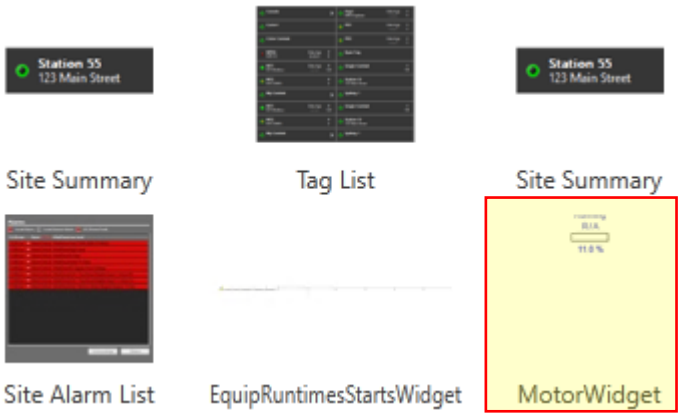
To draw a motor in runtime:

1- Go to Tag Browser and right click on any motor then click **Draw**:



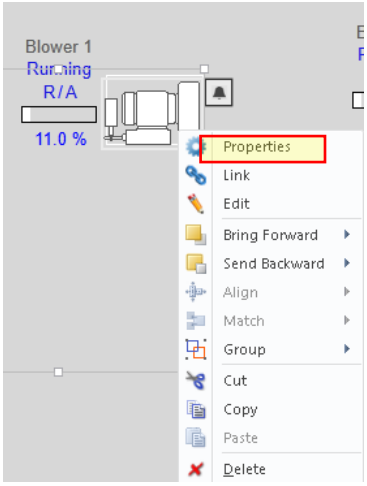
2- A new window will open that shows all widgets that are related to the motor.

Find and click on a widget called **MotorWidget**:

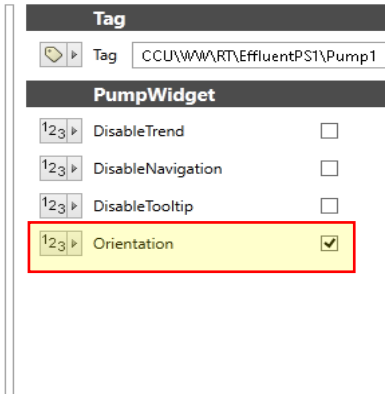


Note: there may be other variances of the motor widget for each plant. Some are also associated with the lockout function described in the faceplate section.

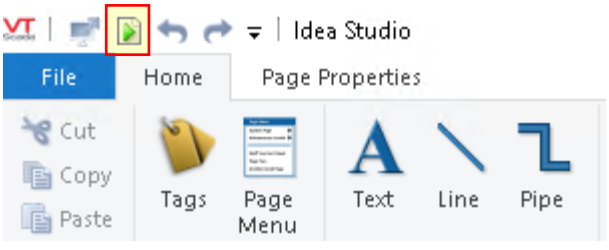
3- Place the motor widget on the desired page inside the Idea Studio environment. Right click on the motor widget and click on **Properties**:

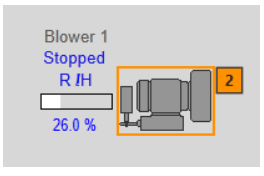


4- The motor symbol will be oriented towards the right by default. To switch it to the left side, check the **Orientation** box then click **Ok**:



5- Place the motor widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime





Note: there may be other variances of the motor widget for each plant. Some are also associated with the lockout function (widget with "_LO" described in the faceplate section.

8.1.4 Motor Faceplate Widget

The motor faceplate widget (**FP_Motor**) was designed as a separate widget from the motor widget. However, the faceplate is linked directly to motor widget. The user can access the faceplate by clicking on the **MotorWidget** in runtime.

There are 5 tabs for **FP_Motor**:

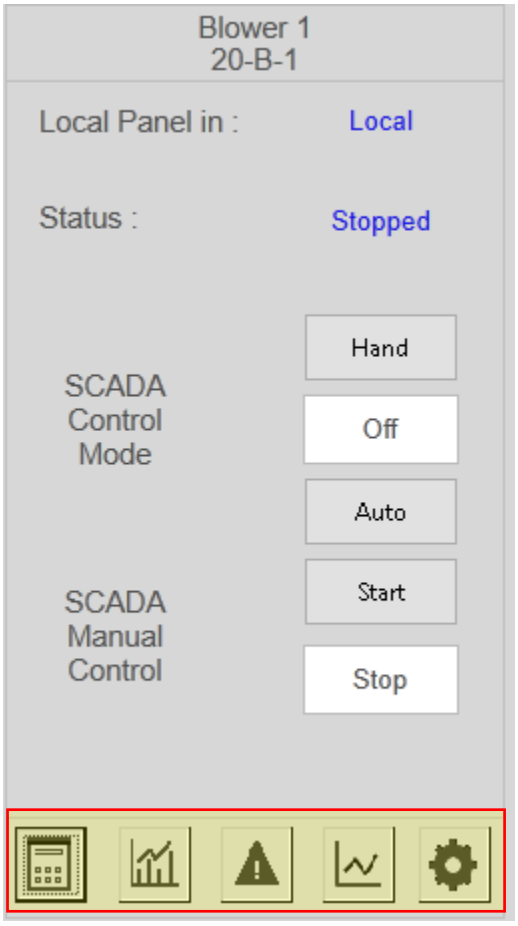
1- Main tab

2- Statistics tab

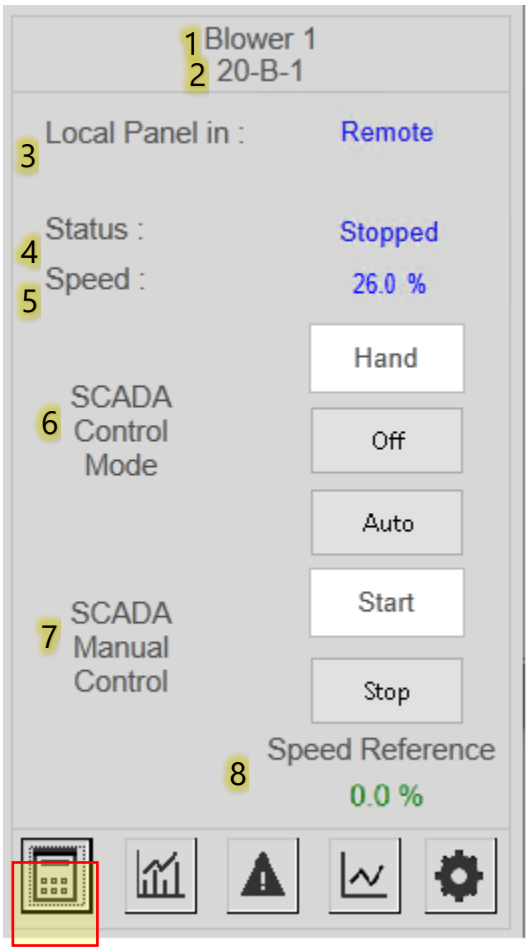
3- Alarms tab

4- Trend tab

5- Configuration tab

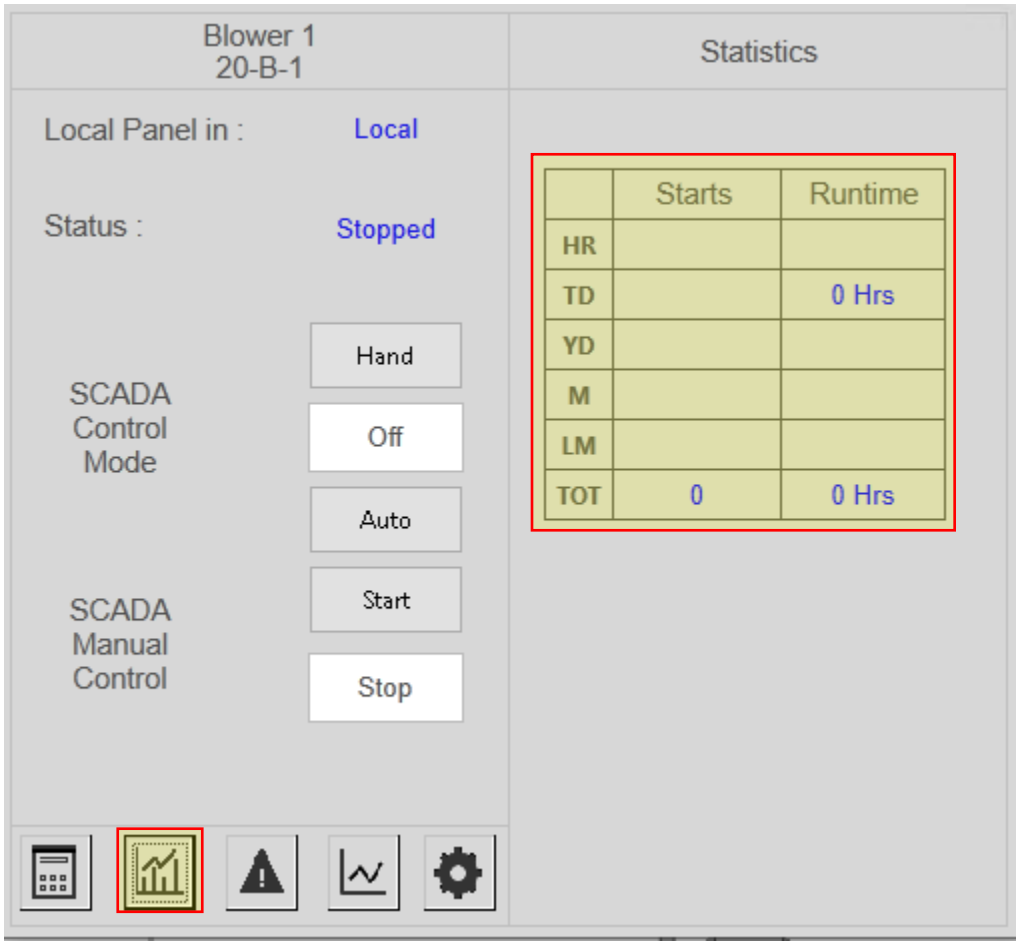


Main tab:



1- Motor Name
2- Motor P&ID or identifying number
3- Field Status (Remote, Local, Off)
4- Motor Status (Running, Stopped)
5- Motor Speed Feedback
6- SCADA Control Mode can be shown in two ways depending on the motor functionality. This mode could be either Hand/Auto as shown in the picture above, or Hand/Off/Auto. See pump faceplate section for more details.
7- SCADA Start/Stop Manual Control. This mode will start and stop the pump when SCADA Control Mode is in Hand.
8- Manual motor speed command.

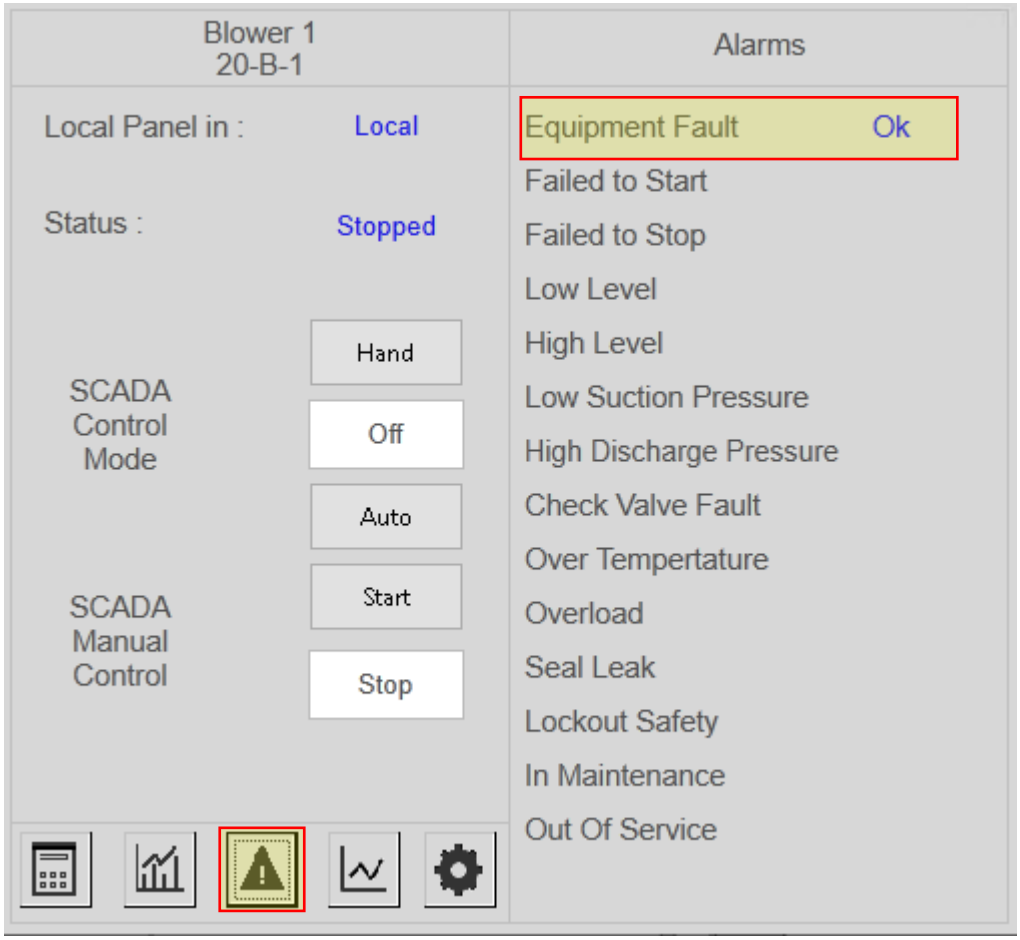
Statistics tab:



The Statistic tab will show the motor number of **Starts** and the motor **Runtime** data. The data could be Hourly (**HR**), Today (**TD**), Yesterday (**YD**), Monthly (**M**), Last month (**LM**), or Total accumulated (**TOT**). The availability of the data depends on the tag availability in the PLC. If the data is available, the numeric data will show in blue.

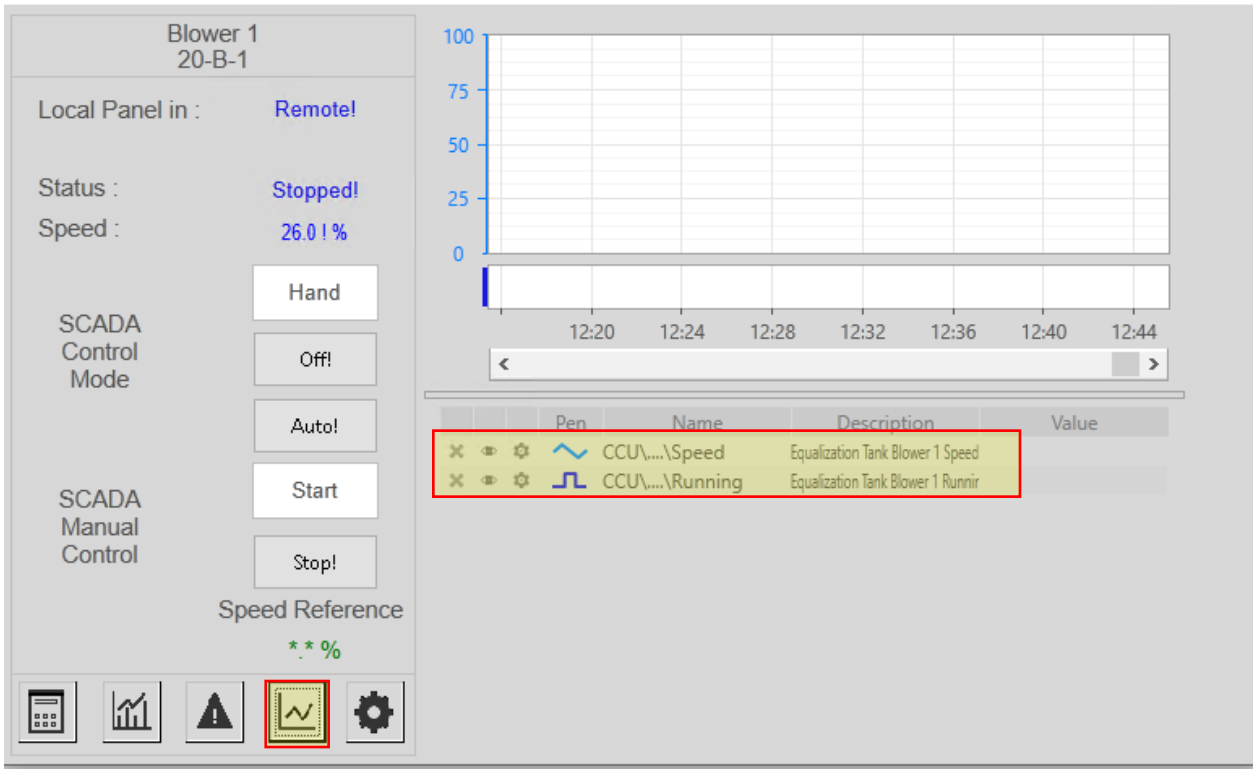
Note: If the field tag is not available in in the PLC then the SCADA tag should be disabled in the Tag Browser.

Alarm's tab:



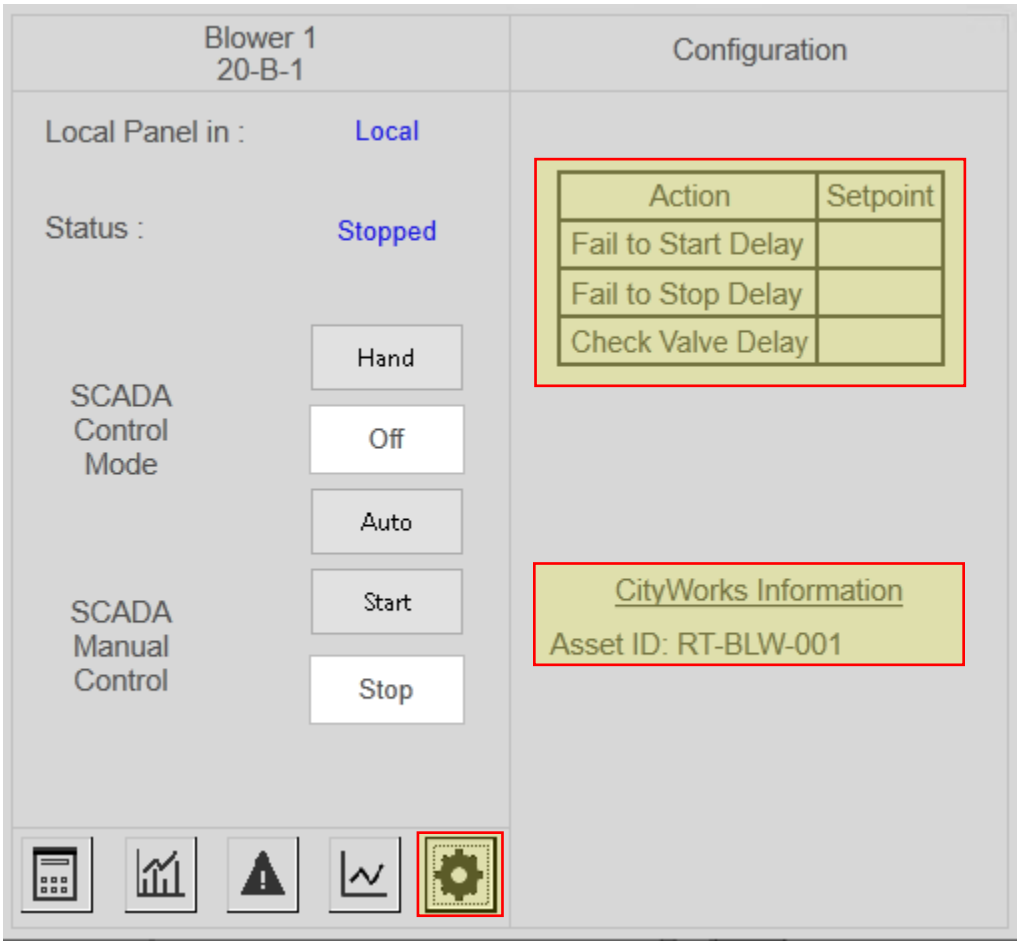
The Alarm tab will show the available alarms for the motor. An alarm will be available on SCADA if its available in the PLC and enabled in Tag Browser. The alarm will either indicate OK or Alarm in blue text next to the alarm description as shown in the above picture.

Trend tab:



The trend tab will show the historical data for the motor. Motor speed and motor running were assigned to be trended as part of the faceplate.

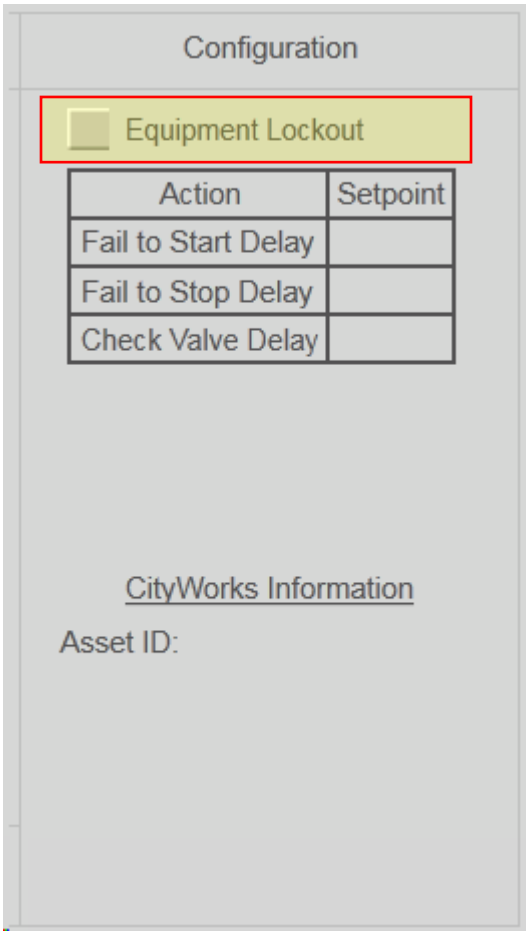
Configuration tab:



The configuration tab will show the available setpoints for the motor. If the tag is available in the PLC and enabled in Tag Browser for a specific setpoint then the numeric entry will show in green. In this specific example, there is no setpoint available.

The configuration tab will also show the assigned CityWorks Asset ID number.

Configuration tab with Lockout:

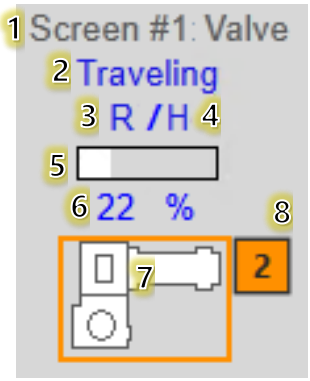


There is an additional faceplate the has the Equipment Lockout function (FP_Motor_EP_LO). This function will put the equipment out of service and will show an alarm notice (priority 4 with cyan color).

8.1.5 Valve Widget

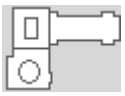
The Valve widget (**ValveWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the valve tag type **ValveType**.

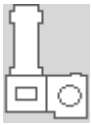
ValveWidget:



1- Valve Name
2- Valve Open/Closed/Traveling status
3- Field Remote/Off/Local status
4- SCADA Hand/Off/Auto status
5- Valve position bar indication
6- Valve position feedback value
7- Valve status color indication. Gray for closed, white for open or traveling.
8- Valve alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

There are three valve types:

1- Horizontal: 

2- Vertical: 

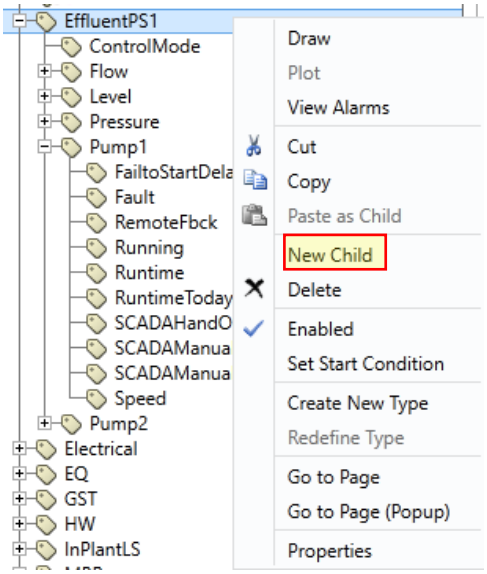
3- Gate:

Changing the valve type can be done by navigating to the valve tag properties inside Tag Browser.

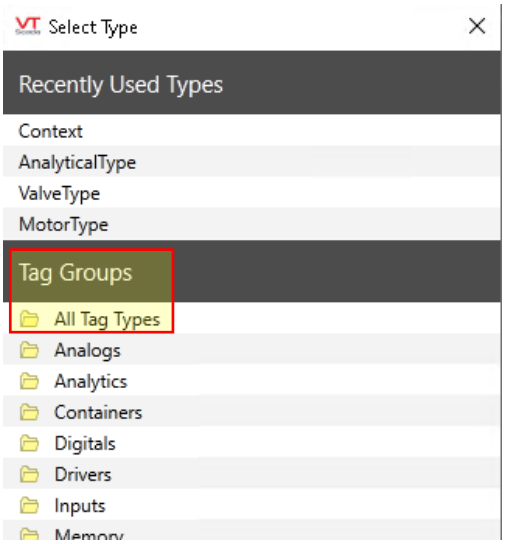
ValveWidget is attached to a tag type called **ValveType**. To add a new valve:

1- Login to VTScada with the proper privilege then access the Tag Browser from the top right corner:

2- Right click on the specified area where the valve will be added, then select **New Child**:

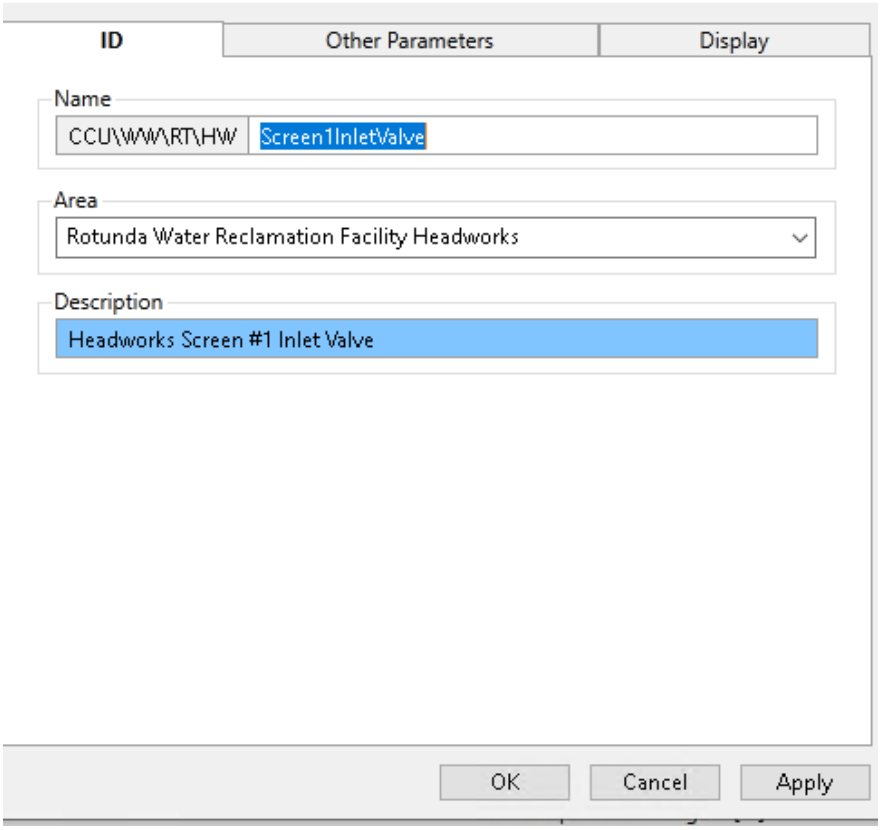


3- From **Tag Groups**, click on **All Tag Types**:



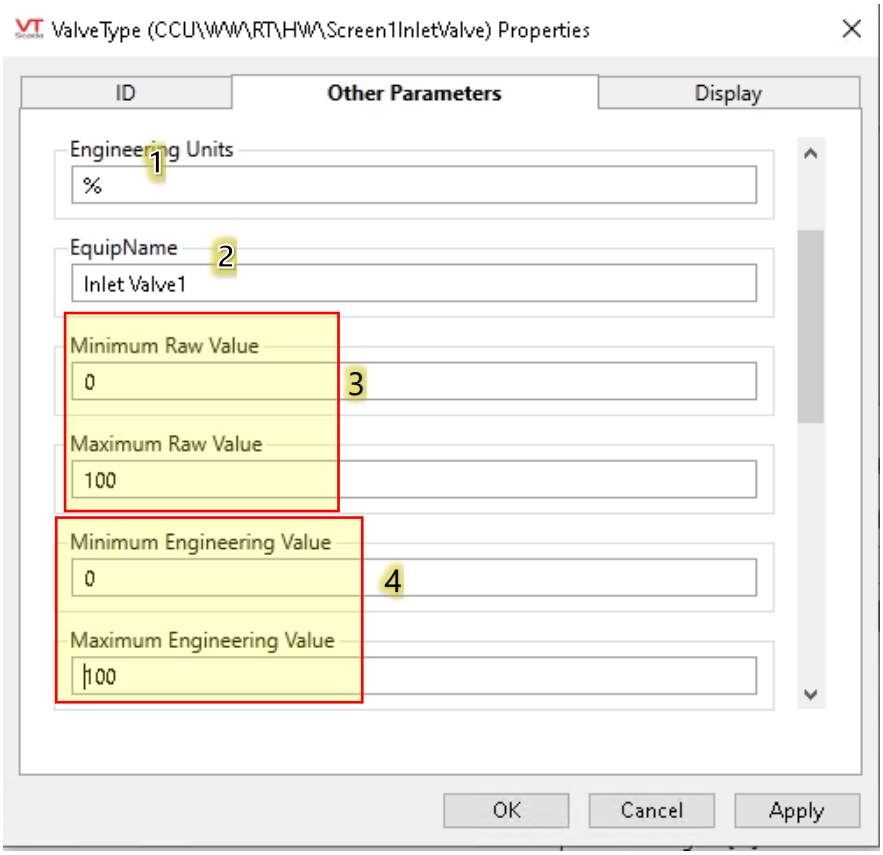
4- Search and select **ValveType**:

5- Under the **ID** tab, type in the valve name. Notice that the **Area** field will inherit the area name from the previous parent.

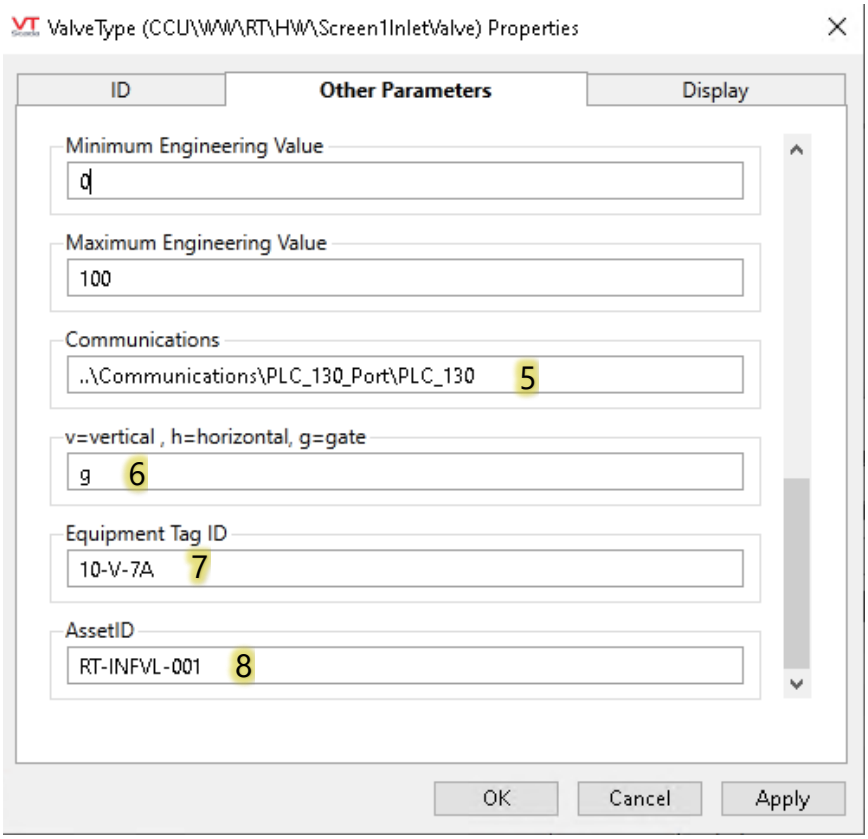


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the valve inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter valve name here ") andclick **Ok**. Notice that the **Description** field will be highlighted in blue as shown in the figure above which indicates that some expression was used in this field.

6- Click on Other Parameters tab and fill in the following fields:



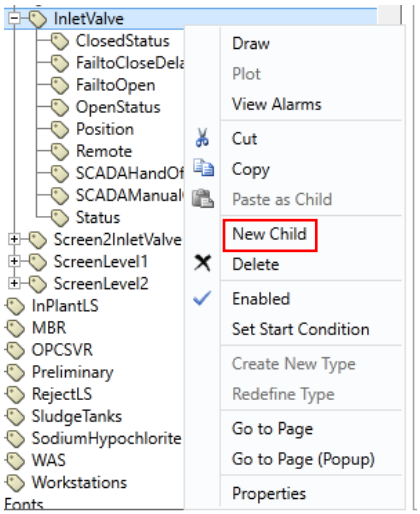
1) Valve position unit
2) Valve name which will show on the top of the valve symbol in runtime.
3) Maximum and Minimum engineering position values. These fields will scale the PLC values to be represented in a desired range in SCADA.
4) Maximum and Minimum raw PLC position values for the valve that are obtained from the PLC.



5) The communication path is for specifying the path of the PLC for the valve.
6) Valve type field which will determine the type of the valve. The valve symbol will change according to the entered letter in this field. Enter "**v**" for **v**ertical, "**h**" for **h**orizontal, and "**g**" for **g**ate valve. Letters must be lower case.
7) The Tag ID is for specifying the valve P&ID or identifying number. This number will show on the valve faceplate in runtime.
8) This field is for the Cityworks Asset ID. This ID will show on the pump faceplate under the configuration tab in runtime.

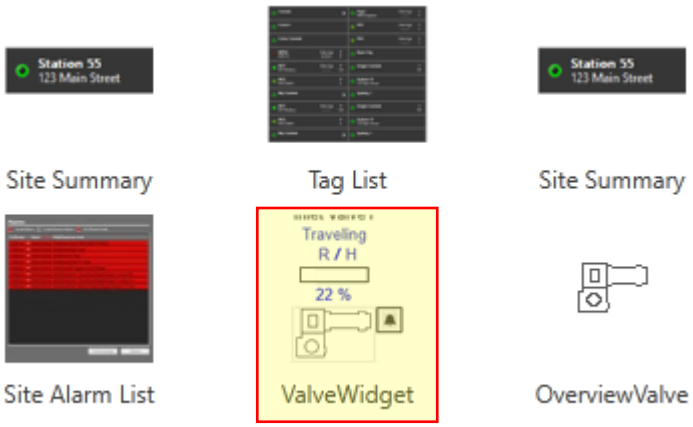
To add a valve to runtime:

1- Go to Tag Browser and right click on the new valve then click **Draw**:



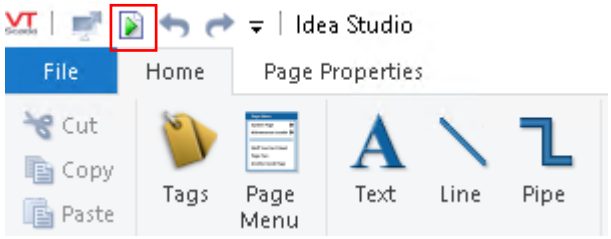
2- A new window will open that shows all widgets that are related to the valve type.

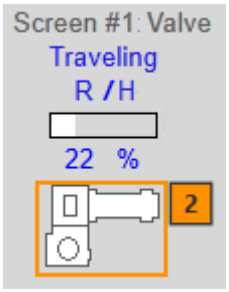
Find and click on a widget called **ValveWidget**:



Note: there may be other variances of the valve widget for each plant. Some are also associated with the lockout function described in the faceplate section.

3- Place the valve widget on the desired page inside Idea Studio environment. Then from top left corner switch to runtime





8.1.6 Valve Faceplate Widget

The valve faceplate widget (**FP_valve**) was designed as a separate widget from the valve widget, however, the faceplate is linked directly to valve widget. The user can access the faceplate by clicking on the **ValveWidget** in runtime.

There are 5 tabs for **FP_valve**:

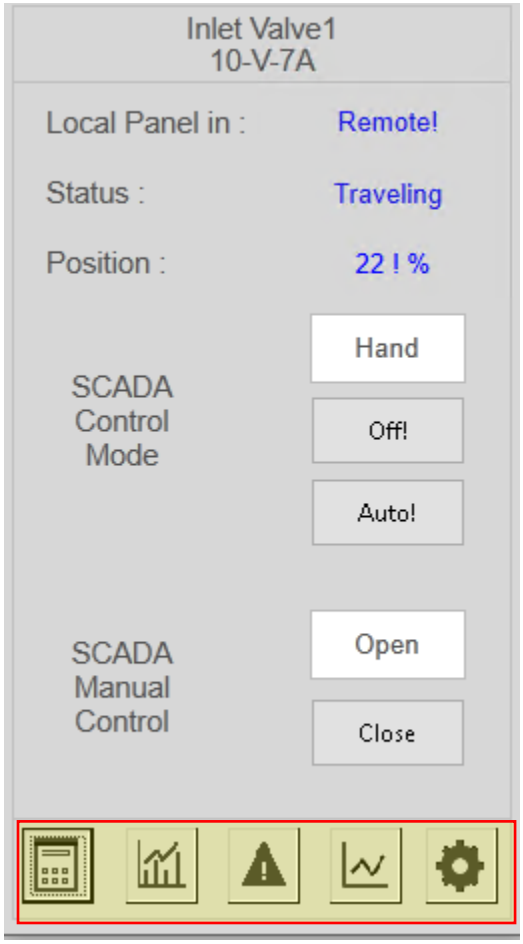
1- Main tab

2- Statistics tab

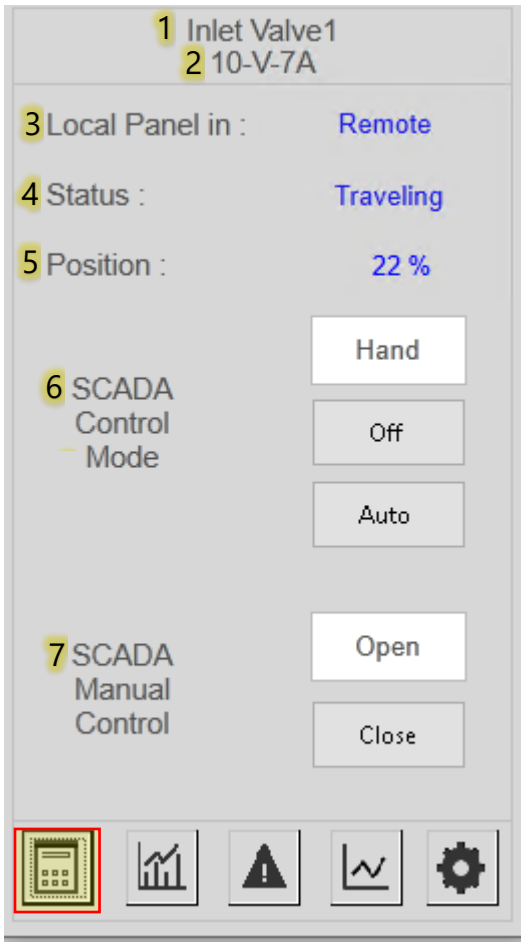
3- Alarms tab

4- Trend tab

5- Configuration tab

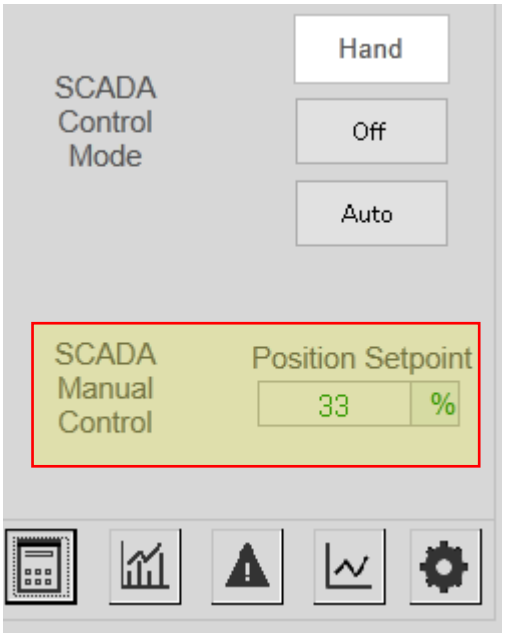


Main tab:



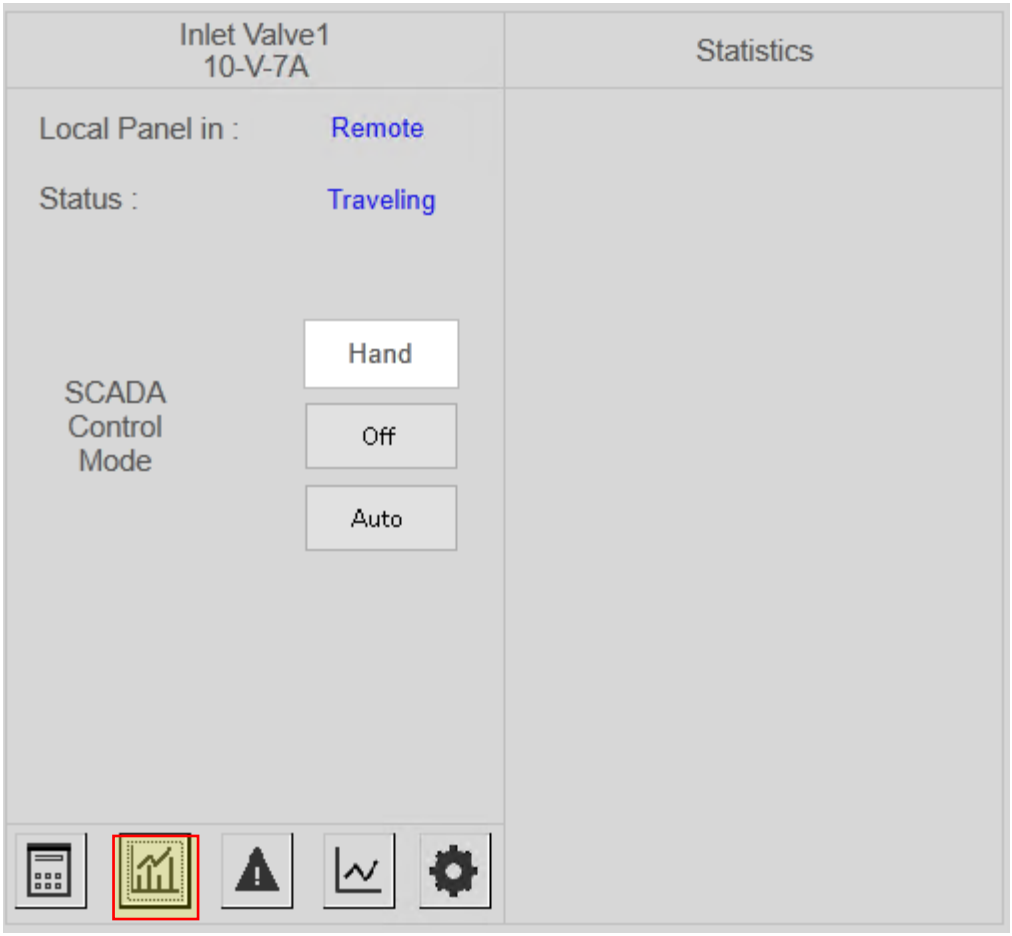
1- Valve Name
2- Valve P&ID or identifying number
3- Field Status (Remote, Local, Off)
4- Valve Status (Open, Closed, Traveling)
5- Valve feedback position. If the valve doesn't have position feedback, the field will be hidden.
6- SCADA Control Mode (Hand/Off/Auto)

7- SCADA Open/Close Manual Control. This mode will open or close the valve when SCADA Control Mode is in Hand. If the valve has a manual position control available in the PLC, a manual position command will be available for this mode instead of Open/Close. See below:



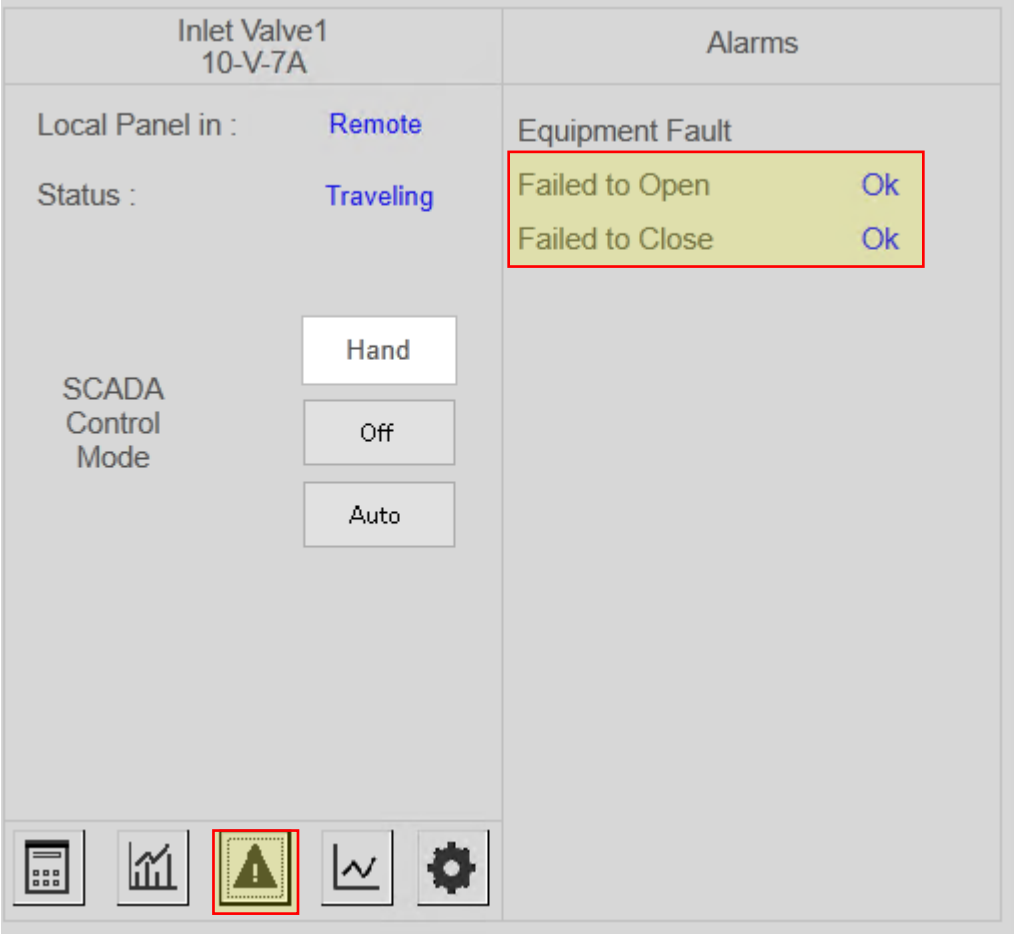
To enable/disable the manual position command go to Tag Browser and disable/enable a tag called **SCADAManualPositionCmd**.

Statistics tab:



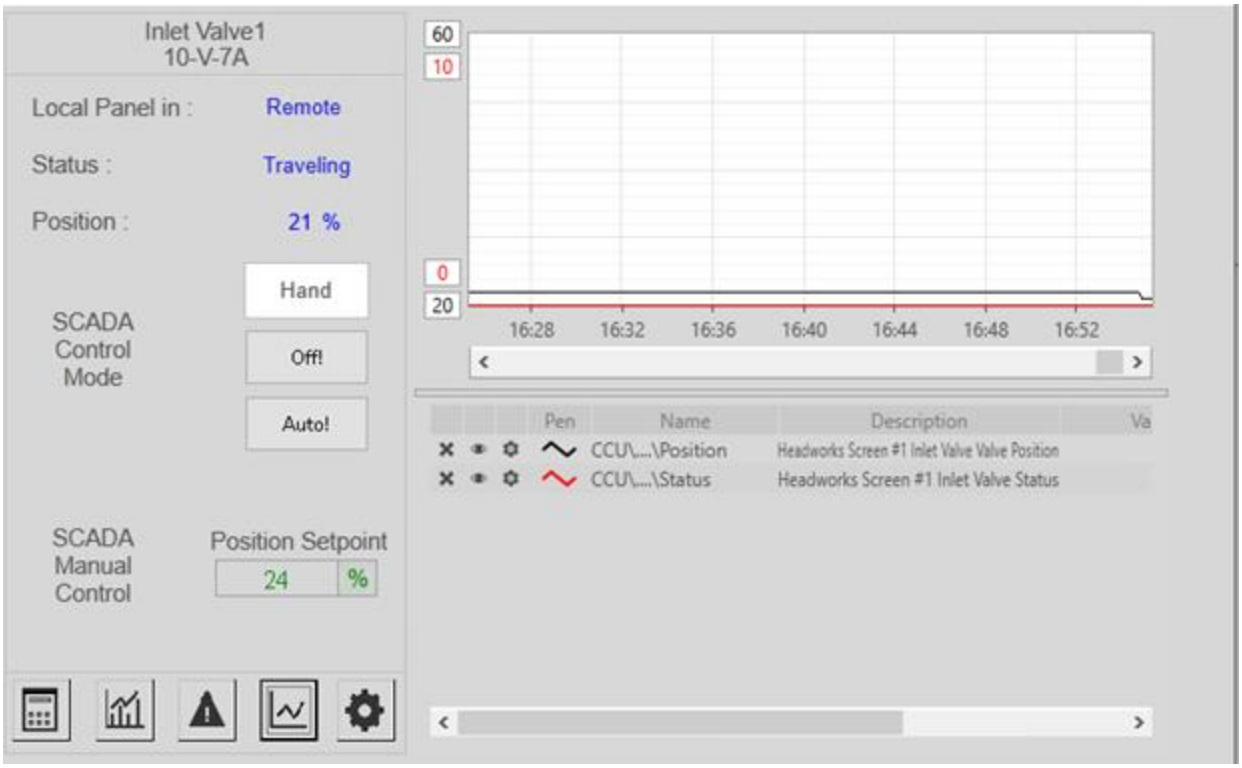
There is no functionality for the statistics tab at this time, but it is available for future use if needed.

Alarm's tab:



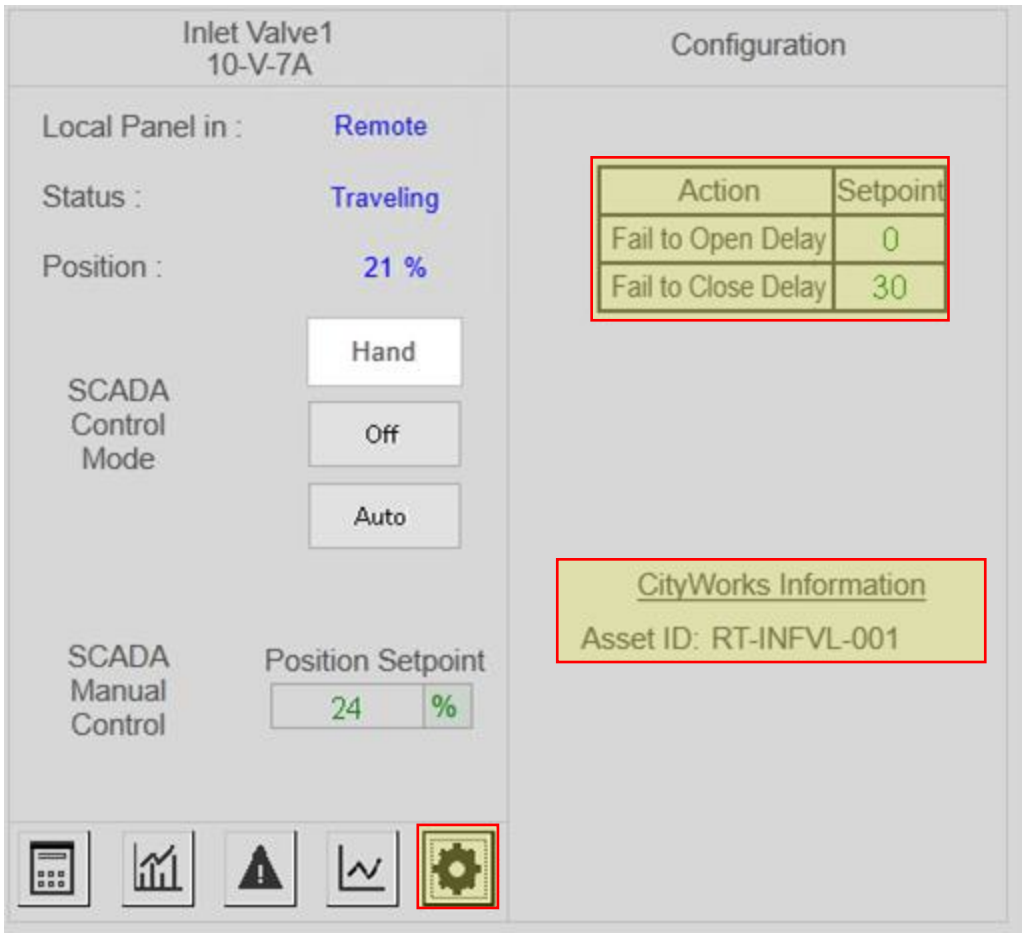
The Alarm tab will show the valve's available alarms. The alarm will be available if its available in the PLC and enabled in Tag Browser. The alarm will either indicate OK or Alarm in blue text next to the alarm description as shown in the above picture.

Trend tab:



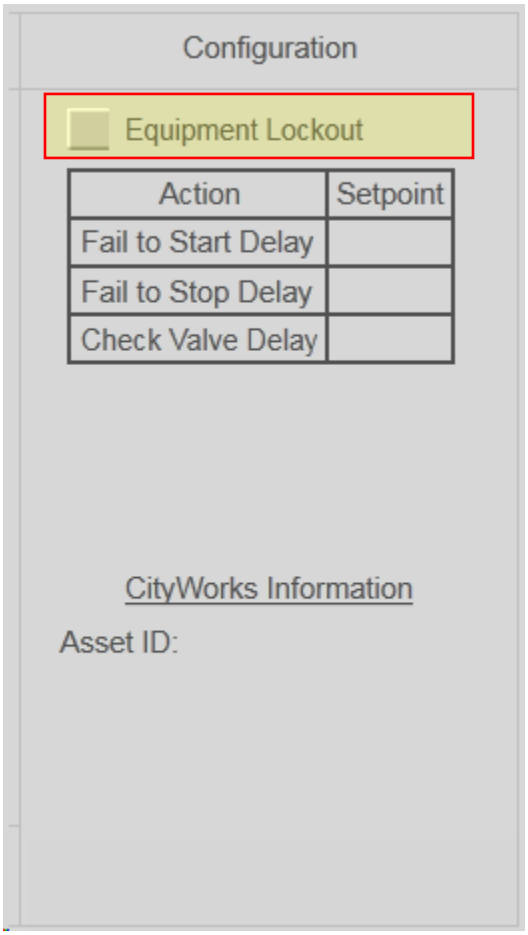
The trend tab will show the historical data for the valve status and valve position. If the valve doesn't have a position feedback, the position trend will not be available.

Configuration tab:



The configuration tab will show the available setpoints for the valve. If the tag is available in the PLC and enabled in Tag Browser for a specific setpoint then numeric data will show in green. Also, the configuration tab will show the assigned CityWorks Asset ID number.

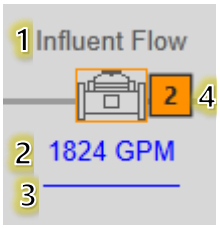
Configuration tab with Lockout:



There is an additional faceplate the has the Equipment Lockout function (FP_Valve_EP_LO). This function will put the equipment out of service and will show an alarm notice (priority 4 with cyan color).

8.1.7 Flowmeter Widget

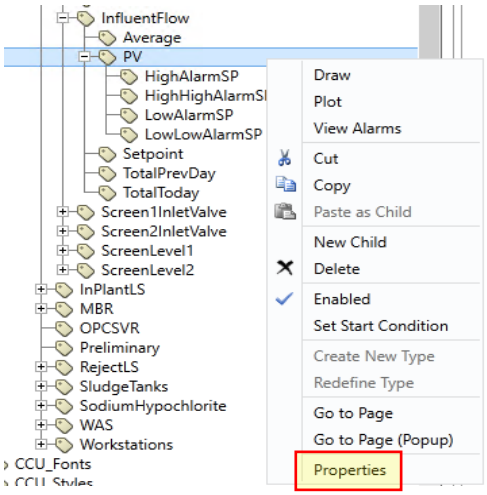
The Flowmeter widget (**FlowmeterWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the flowmeter tag type **Flowmeter**.



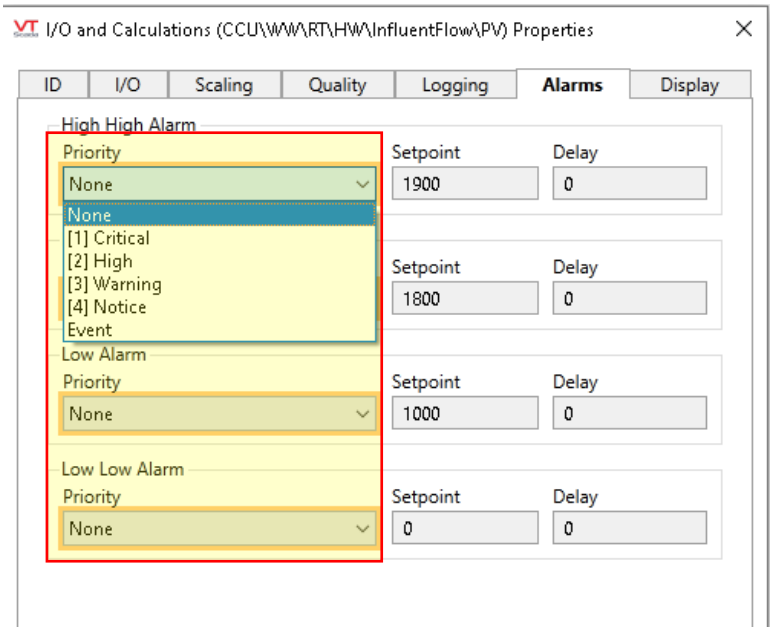
1- Flowmeter Name
2- Flow current value (process variable)
3- Flow spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.
4- Flowmeter Alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

To enable or disable the flow alarms:

1- Go to the flowmeter tag in Tag Browser.
2- Right click on a child tag of the flowmeter tag called **PV** (Process Variable) and choose **Properties**.



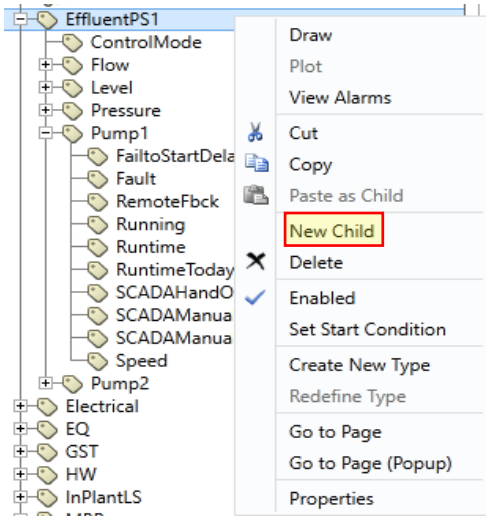
3- Click on the **Alarms** tab then enable or disable the alarms as desired. To disable an alarm, select None. To enable and alarm select the desired priority. See below:



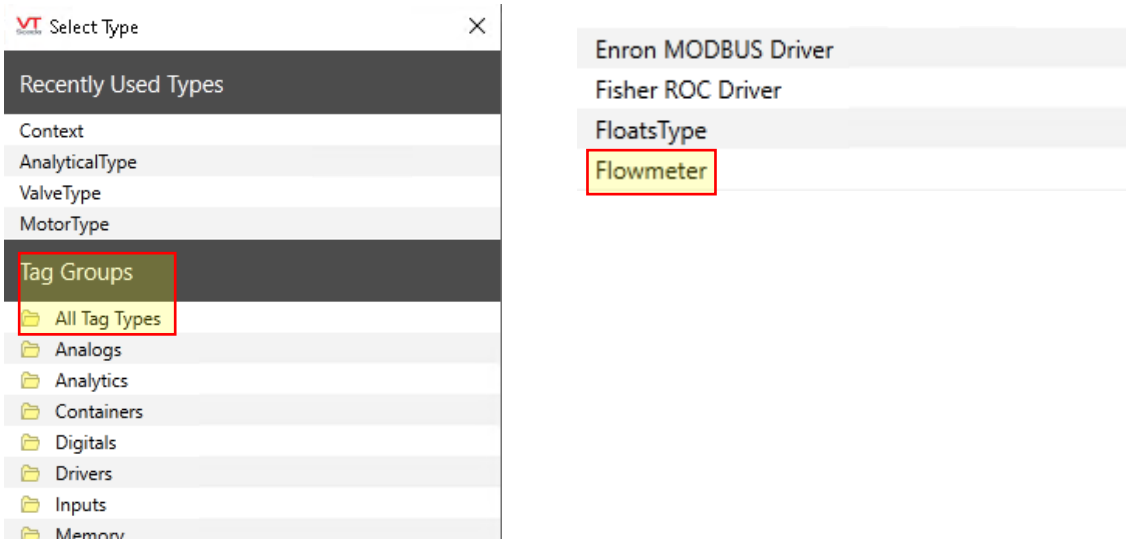
FlowmeterWidget is attached to a tag type called **Flowmeter**. To add a new flowmeter, follow the instructions in this section:

1- Login to VTScada with the proper privilege then access the Tag Browser from the top right corner:

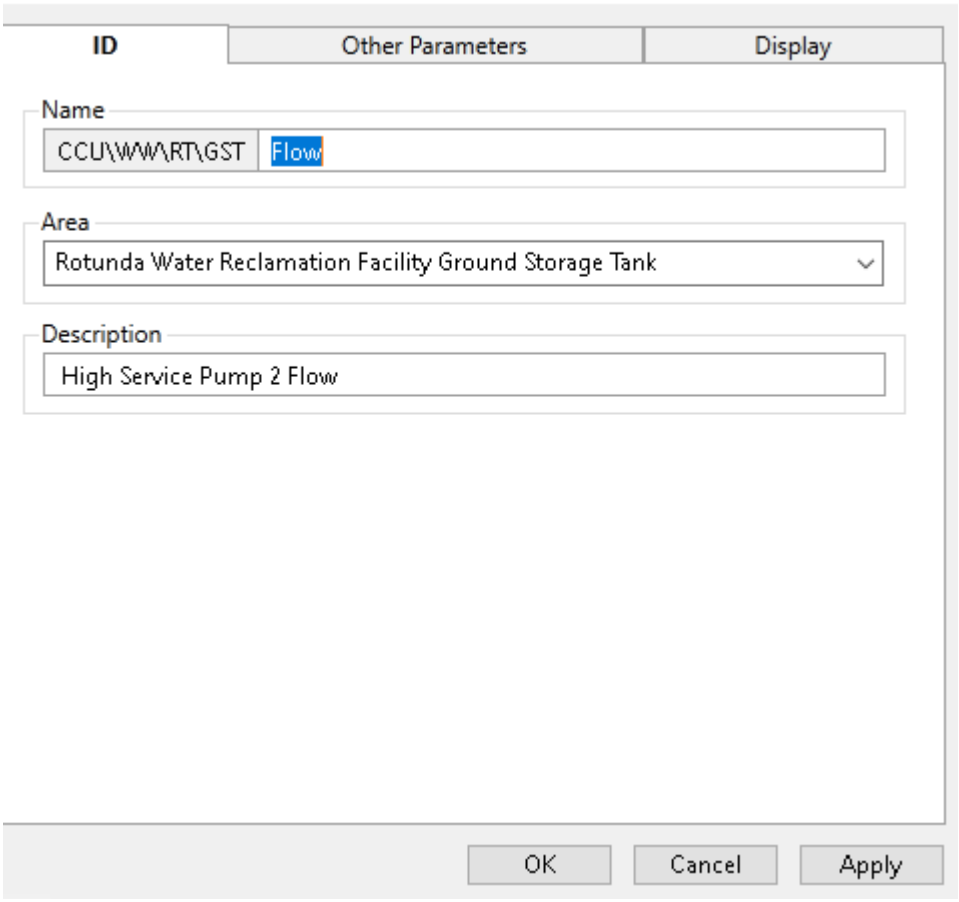
2- Right click on the specified area where the flowmeter will be added, then select **New Child**:



3- From **Tag Groups**, click on **All Tag Types**, the click on **Flowmeter**:

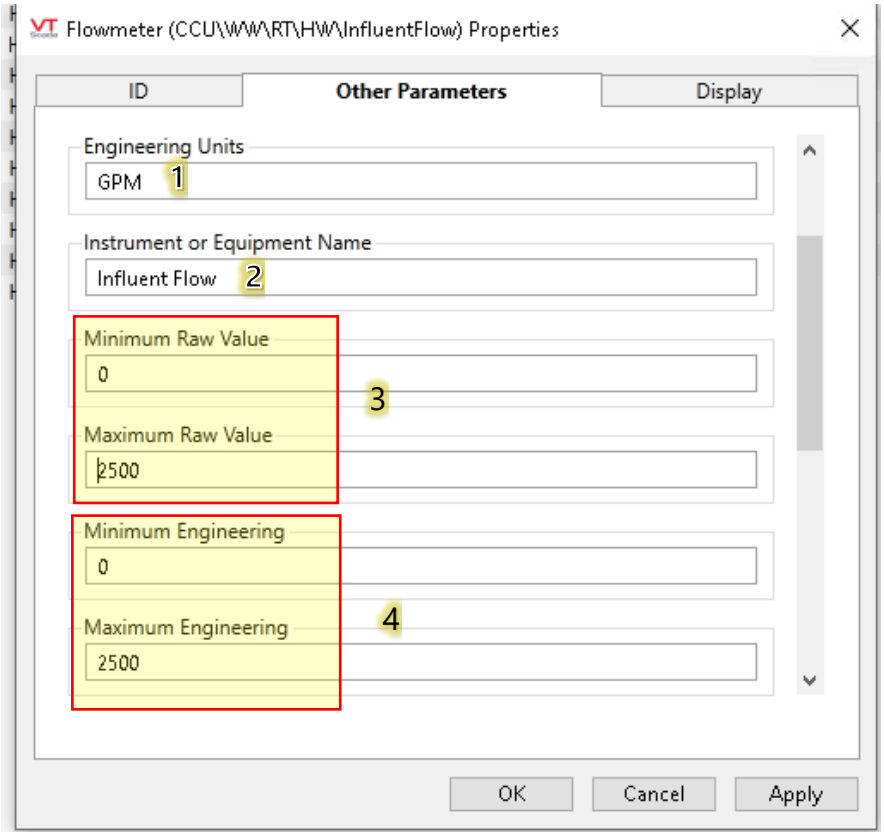


4- Under the **ID** tab, type in the flowmeter name. Notice that the **Area** field will inherit the area name from the previous parent.

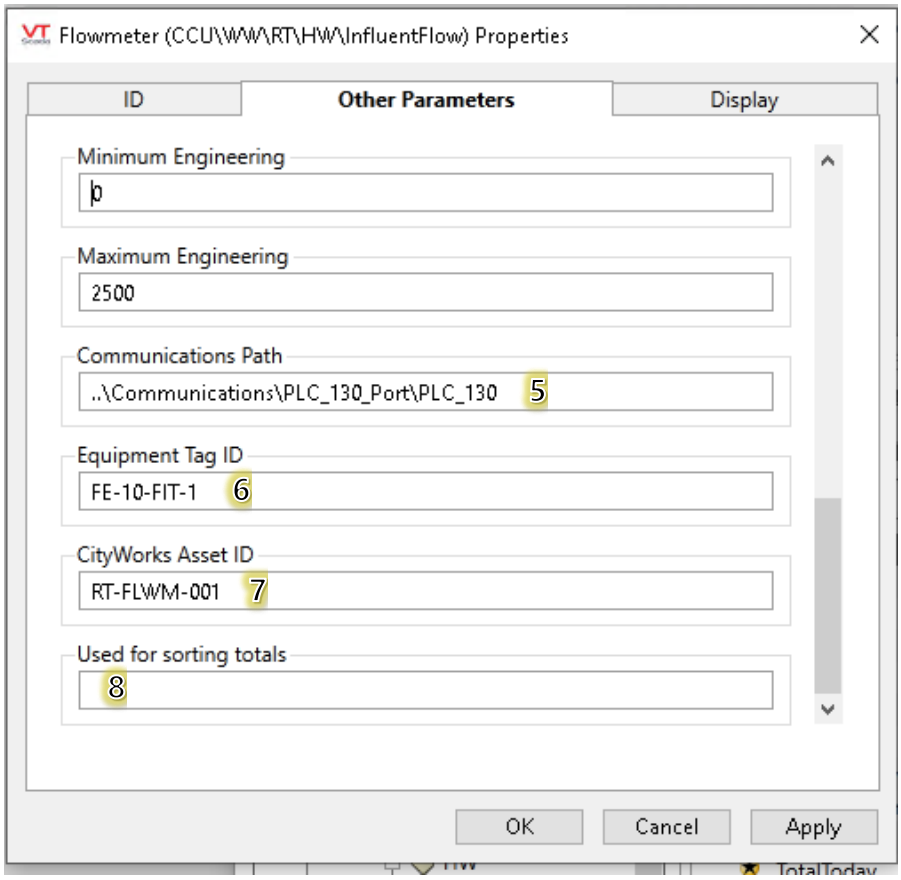


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the flowmeter inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter flowmeter name here ") and select **Ok**.

5- Click on Other **Parameters** tab and fill in the following fields:



1) Flowmeter unit
2) Flowmeter name which will show on the top of the meter symbol in runtime.
3) Maximum and Minimum engineering values for the flow. These fields will scale the PLC values to be represented in a desired range in SCADA.
4) Maximum and Minimum raw values for the flowmeter that comefrom the PLC. These values should match the PLC raw value scaling.

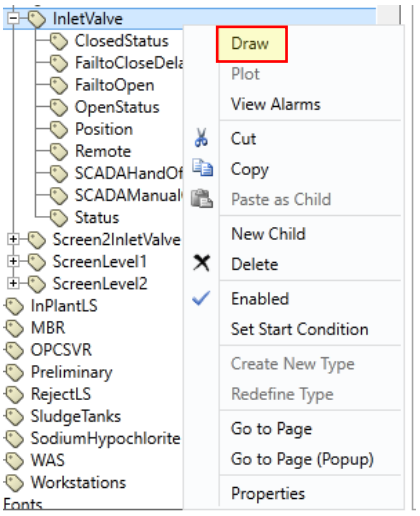


5) The communication path is for specifying the path of the PLC for the flowmeter.
6) The Tag ID is for specifying the flowmeter P&ID or identifying number. This number will show on the flowmeter faceplate in runtime.
7) This field is for the Cityworks Asset ID. This ID will show on flowmeter faceplate under the configuration tab in runtime.
8) This field is used for sorting the flow totals on the **Flow Totals** page. For example, if the user enters number "1" in this field, the flowmeter will be the first row of the flow totals list.

	Today	Previous Day	Month	Previous Month	Cummulative
Headworks Influent Flow	213				
Effluent Pump Station 1 Flow		5656			

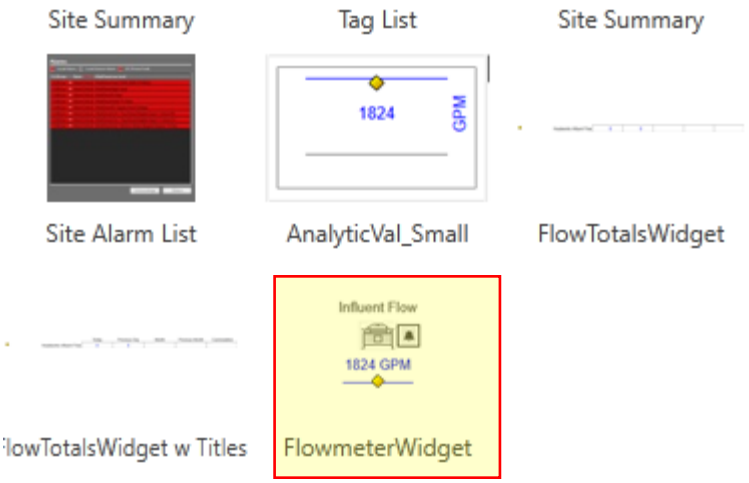
To draw a flowmeter in runtime:

1- Go to Tag Browser and right click on any flowmeter tag then click **Draw**:



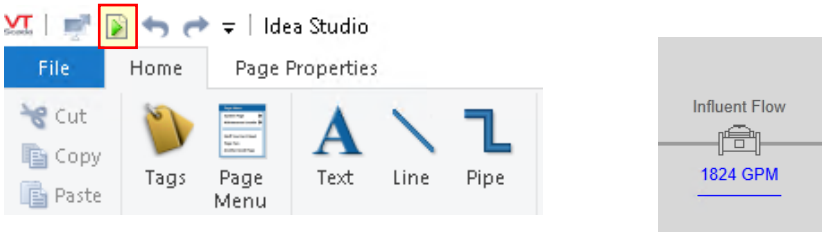
2- A new window will open that shows all widgets that are related to the Flowmeter.

Find and click on a widget called **FlowmeterWidget**:



3- Place the flowmeter widget on the desired page inside Idea Studio environment.

From the top left corner, switch to runtime



8.1.8 Flowmeter Faceplate Widget

The Flowmeter faceplate widget (**FP_Flowmeter**) was designed as a separate widget from the Flowmeter widget. However, the faceplate is linked directly to flowmeter widget. The user can access the faceplate by clicking on the **FlowmeterWidget** in runtime.

There are 5 tabs for **FP_Flowmeter:**

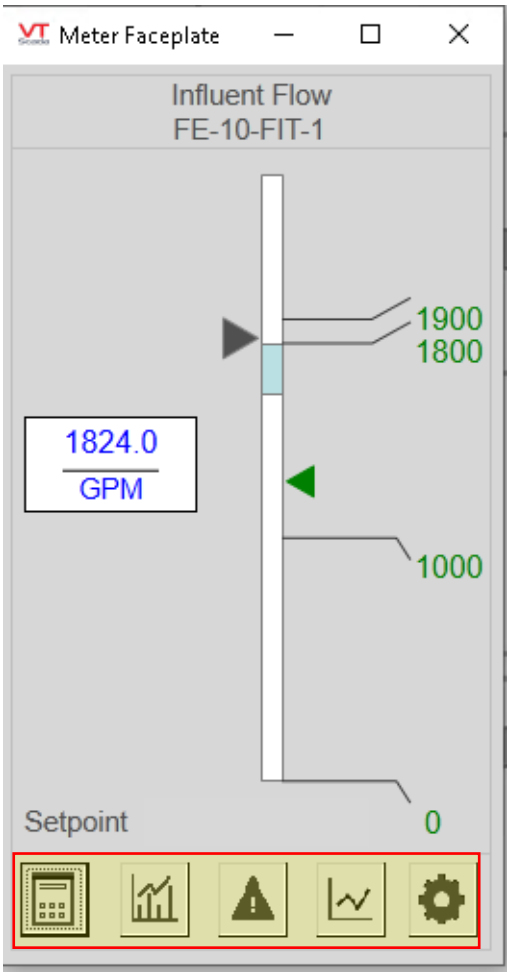
1- Main tab

2- Statistics tab

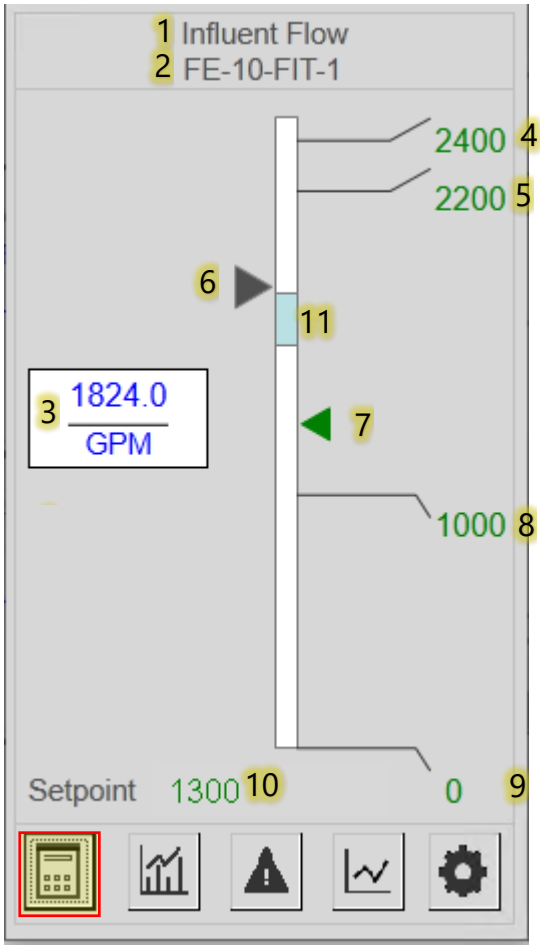
3- Alarms tab

4- Trend tab

5- Configuration tab

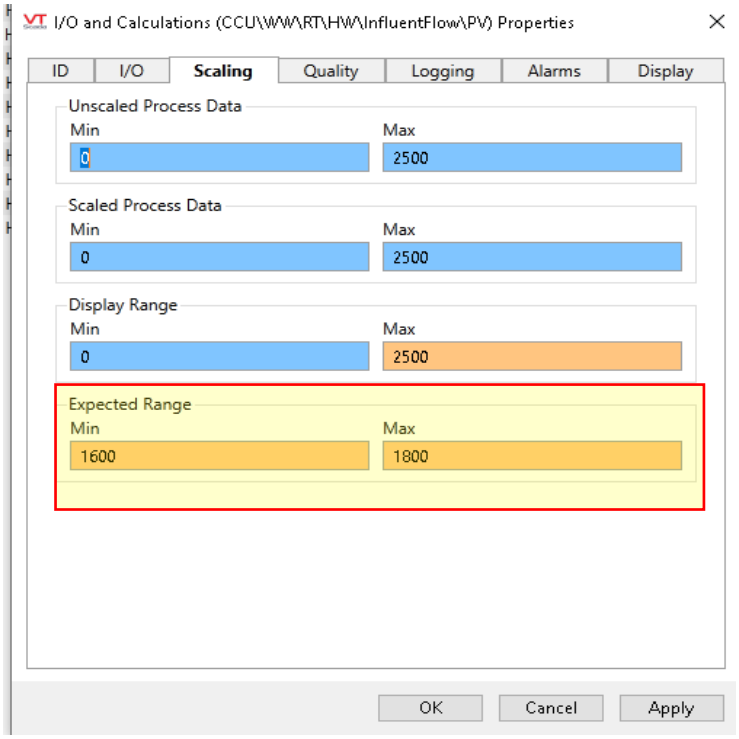


Main tab:

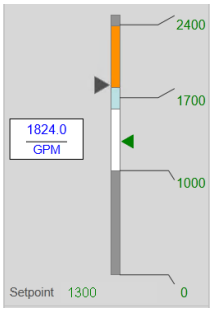


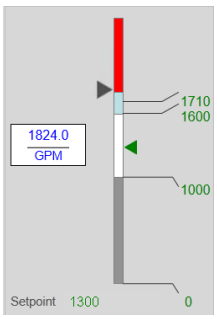
1- Flowmeter Name
2- Flowmeter P&ID or identifying number
3- Flow current value (Process Variable)
4- High-High flow setpoint indicator
5- High flow setpoint indicator
6- Current flow value indicator
7- Desired setpoint indicator
8- Low setpoint indicator
9- Low-Low setpoint indicator
10- Desired setpoint entry value

11- The blue area represents the expected range that the flow should operate in. To change the expected range go to Tag Browser and right click on the tag called PV and choose **Properties**. Navigate to the scaling tab and change the range. See below:

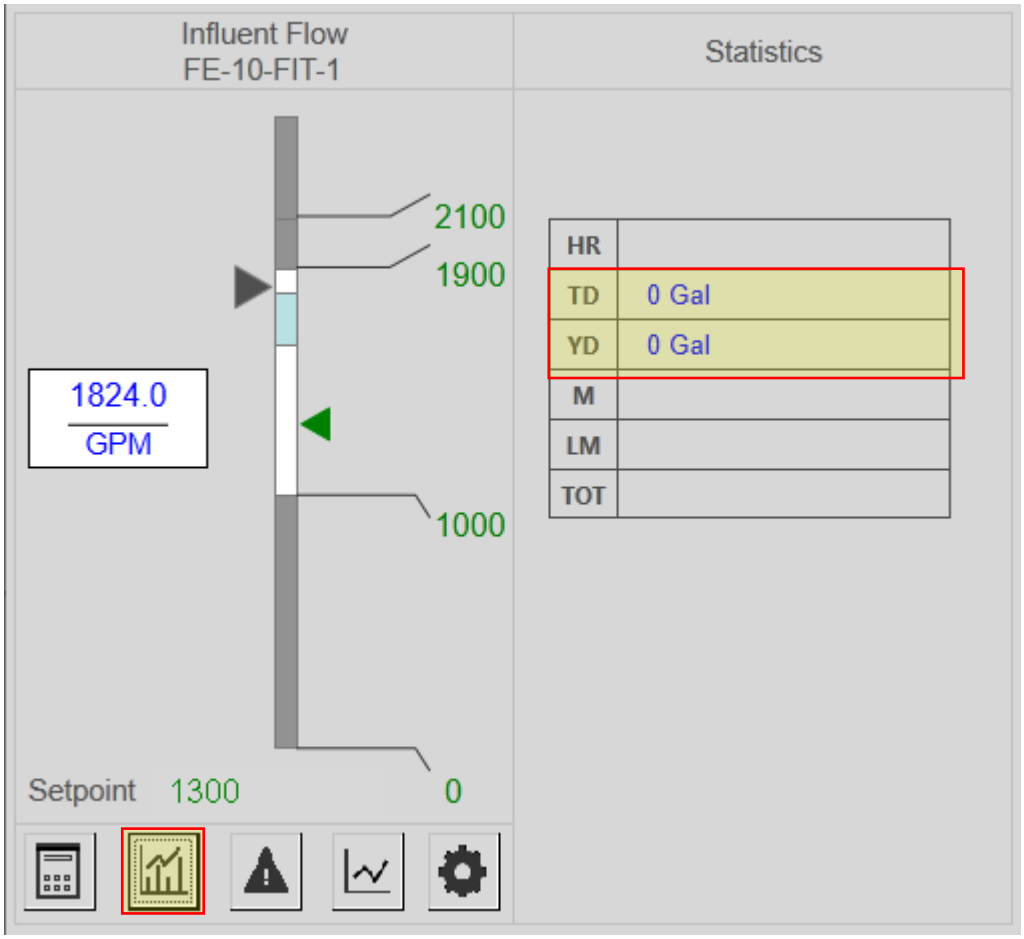


Flow meter faceplate alarm event: If the current value is above the high alarm setpoint (or below the low alarm setpoint), the indication bar will change the color to indicate that there is an alarm. The color of the bar will change based on the priority of the alarm. Below is an example of two different alarms. When the current value is higher than the high setpoint, the color changed to orange. When the current value is higher than the high-high setpoint, the color changed to red.





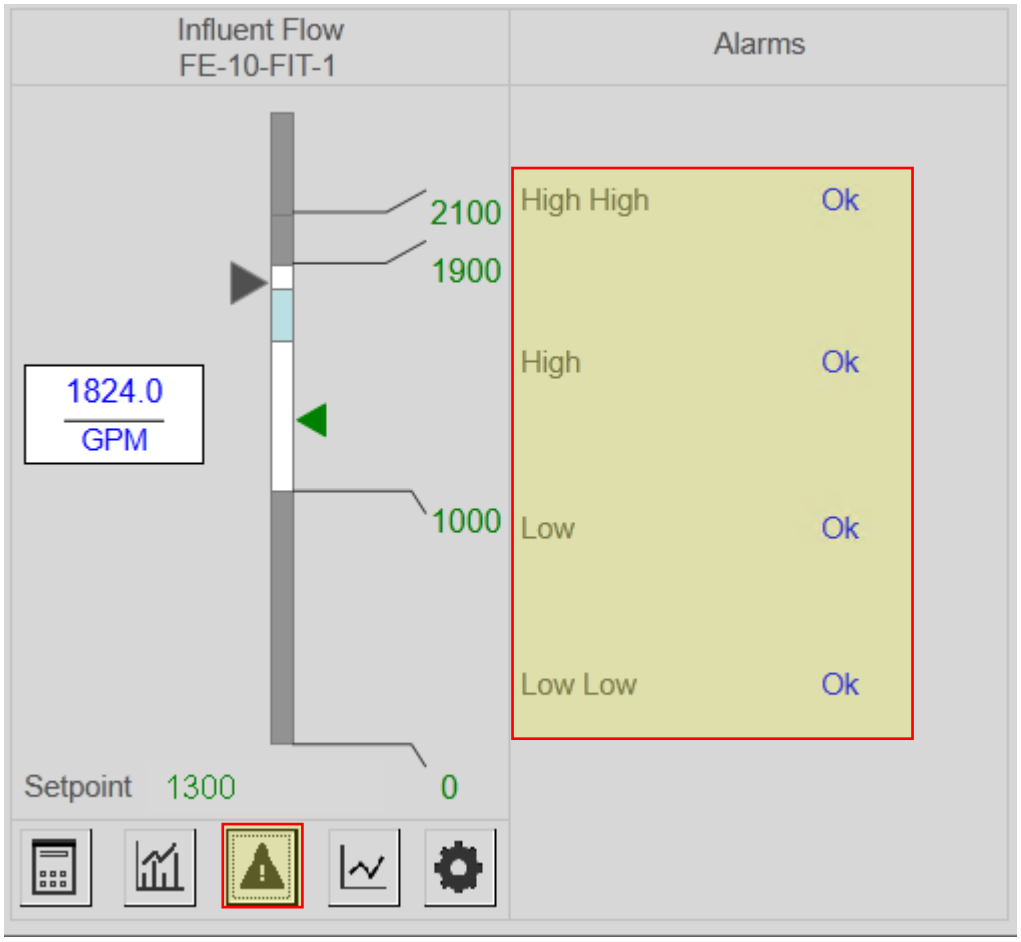
Statistics tab:



The Statistic tab will show the flowmeter **Totals** data. The data could be Hourly (**HR**), Today (**TD**), Yesterday (**YD**), Monthly (**M**), Last month (**LM**), or Total accumulated (**TOT**). The availability of the data depends on the tag availability in the PLC. If the data is available, the numeric data will show in blue.

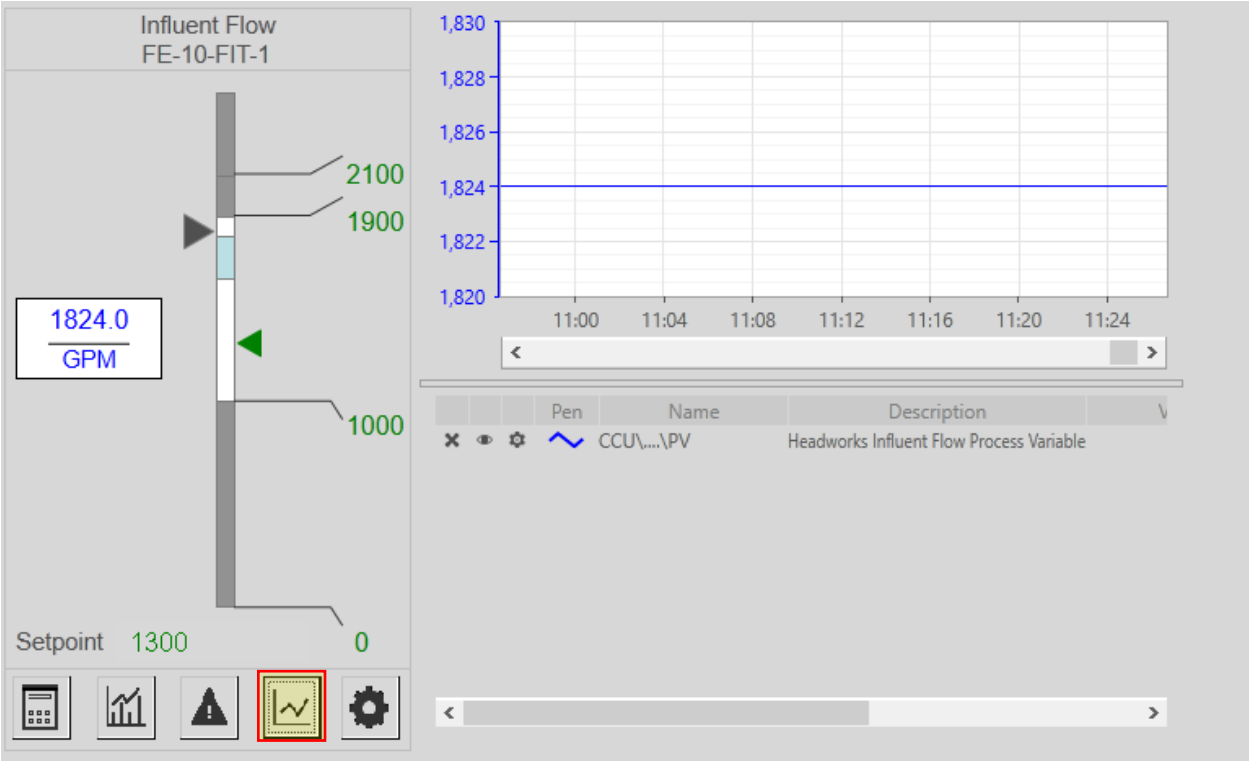
Note: If the field tag is not available in the PLC, the SCADA tag should be disabled in Tag Browser.

Alarm's tab:



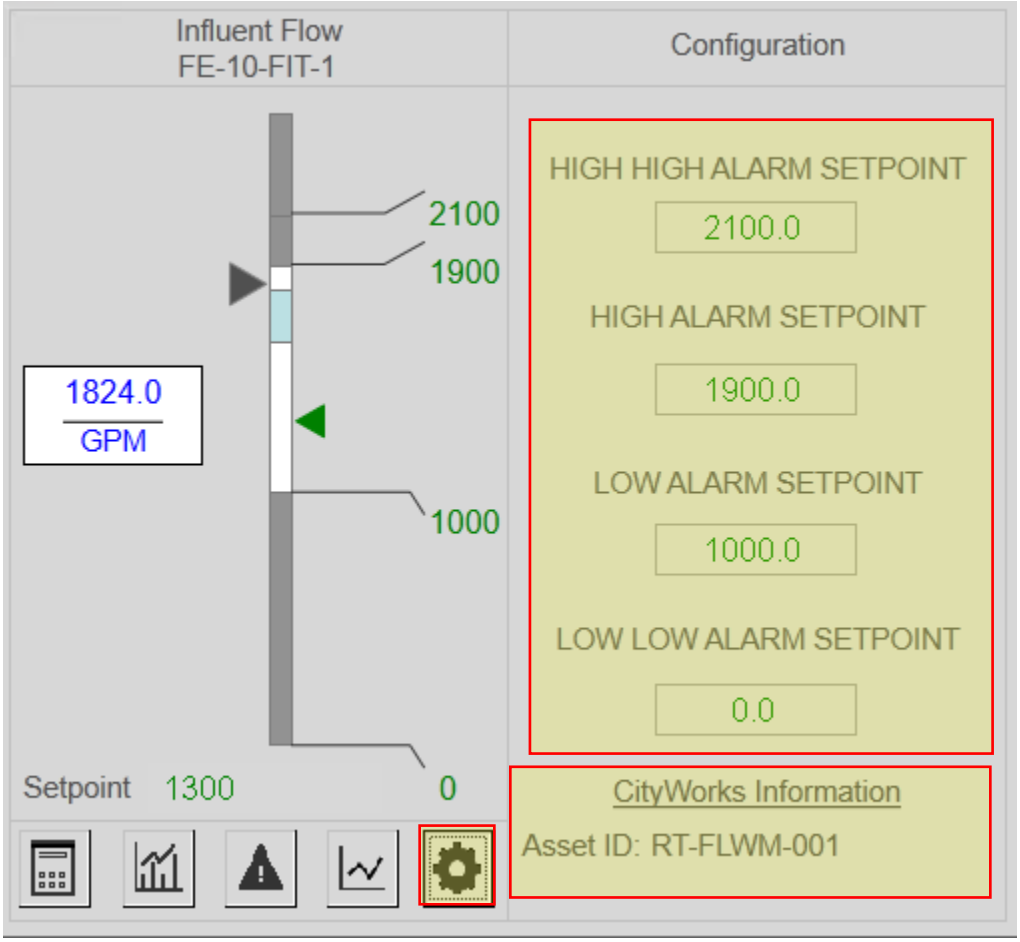
The Alarm tab will show the flowmeter's available alarms. The alarm will be available on SCADA if its available in the PLC and enabled in Tag Browser. The alarm will either indicate OK or Alarm in blue text next to the alarm description as shown in the above picture.

Trend tab:



The trend tab will show the historical data for the flowmeter current value (PV). PV stands for process variable.

Configuration tab:

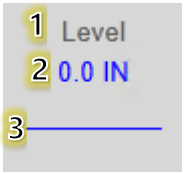


The configuration tab will show the available setpoints for the flowmeter. If the tag is available in the PLC and enabled in Tag Browser for a specific setpoint, the numeric entry will show in green.

The configuration tab will also show the assigned CityWorks Asset ID number.

8.1.9 Level Widget

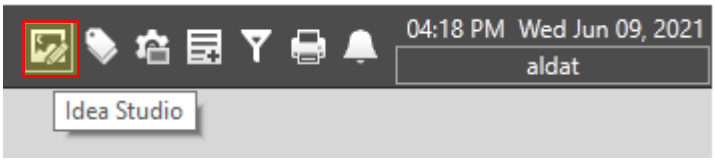
The Level widget (**LevelWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the level tag type **LevelType**.



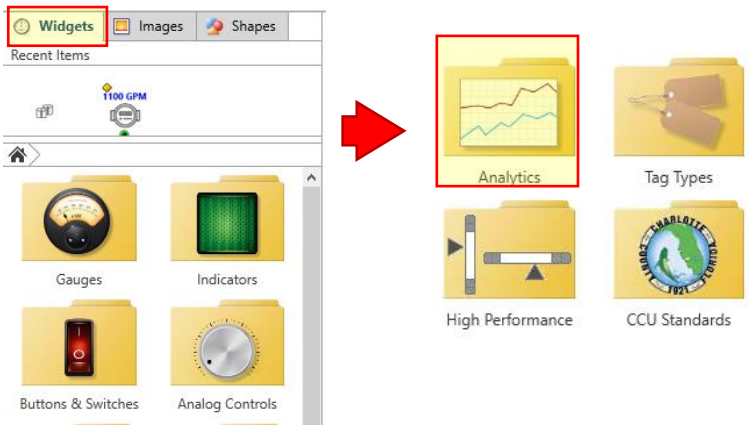
1- Level Name
2- Level current value (process variable)
3- Level spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.

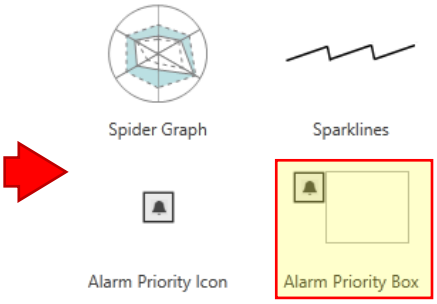
Unlike other widgets, the level widget will not have an alarm box around the widget. However, the alarm box maybe placed around the process area where the level is. Below is an example on how to place the alarm box around an effluent pump station wet well:

1) Login to VTScada with the proper privilege and access Idea Studio from the top right corner:

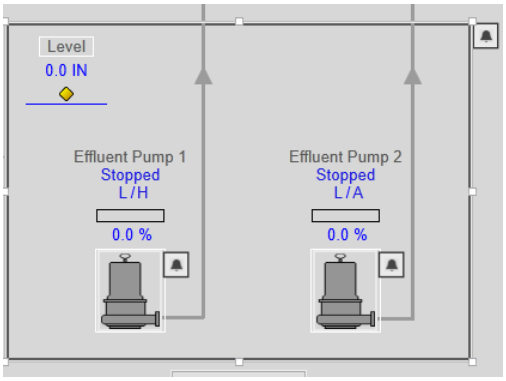


2) From the left panel click on the Widgets tab, then click on the **High Performance** folder and select the **Alarm Priority Box** widget:

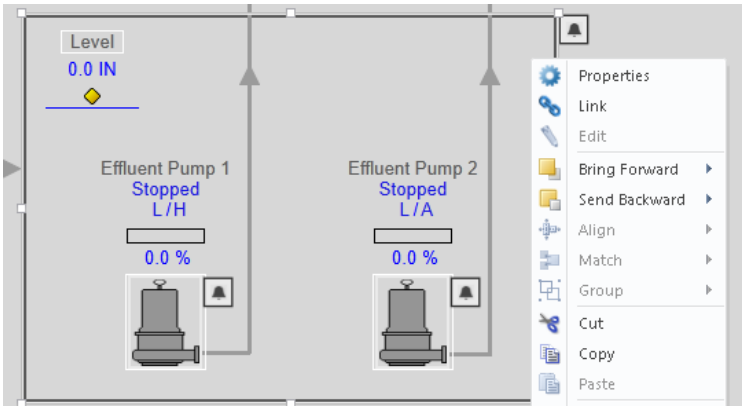




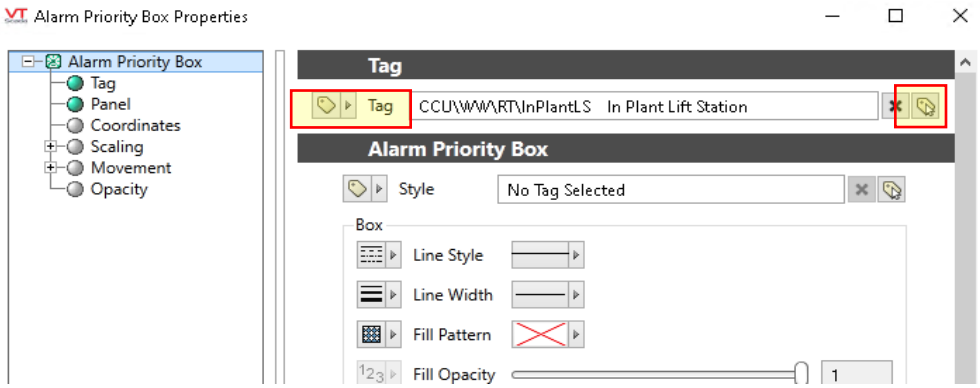
3) Place the box around the well as shown below:



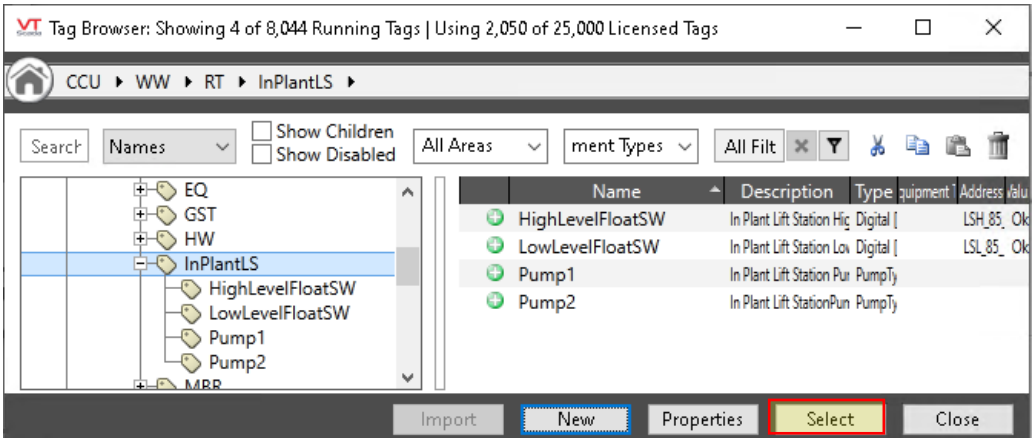
4) Right click on the alarm box and select **Properties**:



5) Under the Tag field, click on the small tag icon:

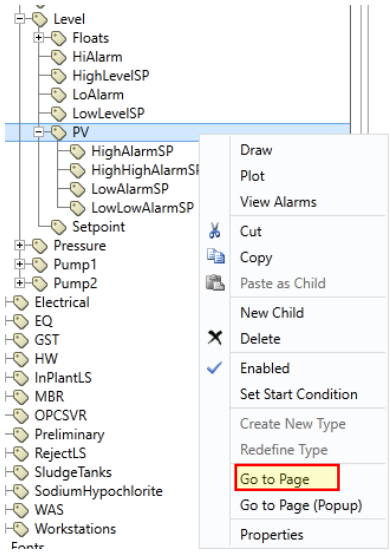


6) Select the tag or the area that includes the desired alarms then click on **Select** then **Ok**:

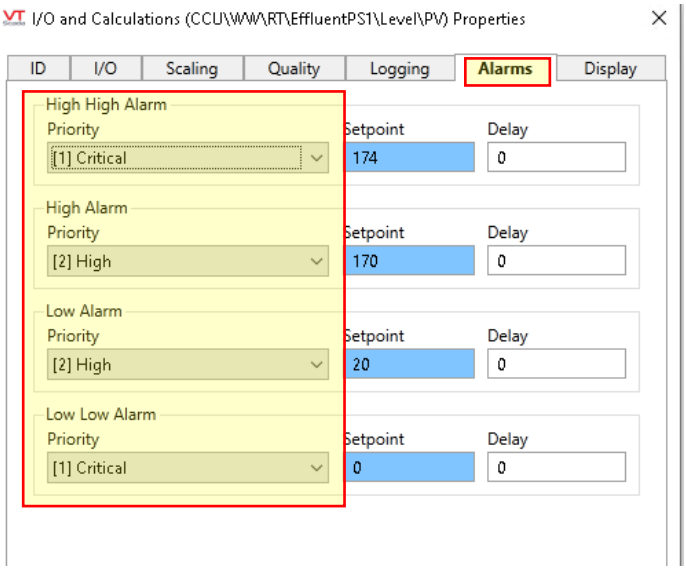


To enable or disable the level alarms:

1- Go to the level tag in the Tag Browser window and right click on a child tag of the level called PV (Process Variable) and click **Properties**:



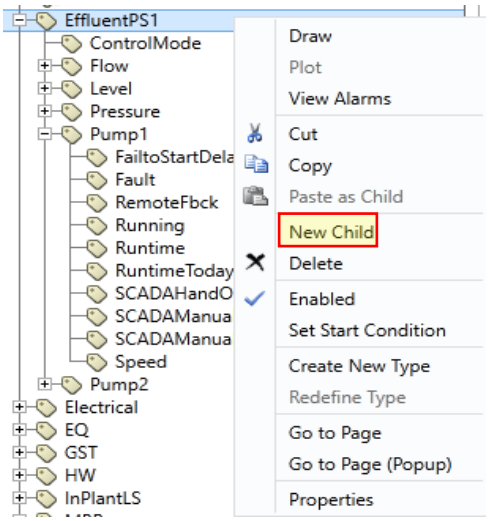
2- Click on the Alarms tab to enable or disable the alarms as desired. To disable an alarm, select None. To enable an alarm, select the desired priority level.



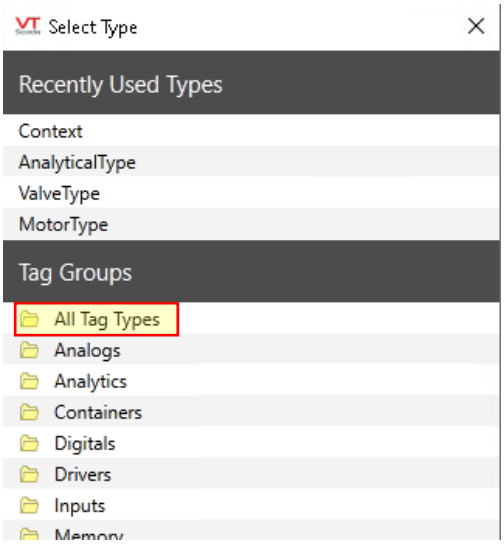
LevelWidget is attached to a tag type called **LevelType**. To add a new level:

1- Login to VTScada with the proper privilege then access the Tag Browser from the top right corner:

2- Right click on the specified area where the level will be added, then select **New Child**:

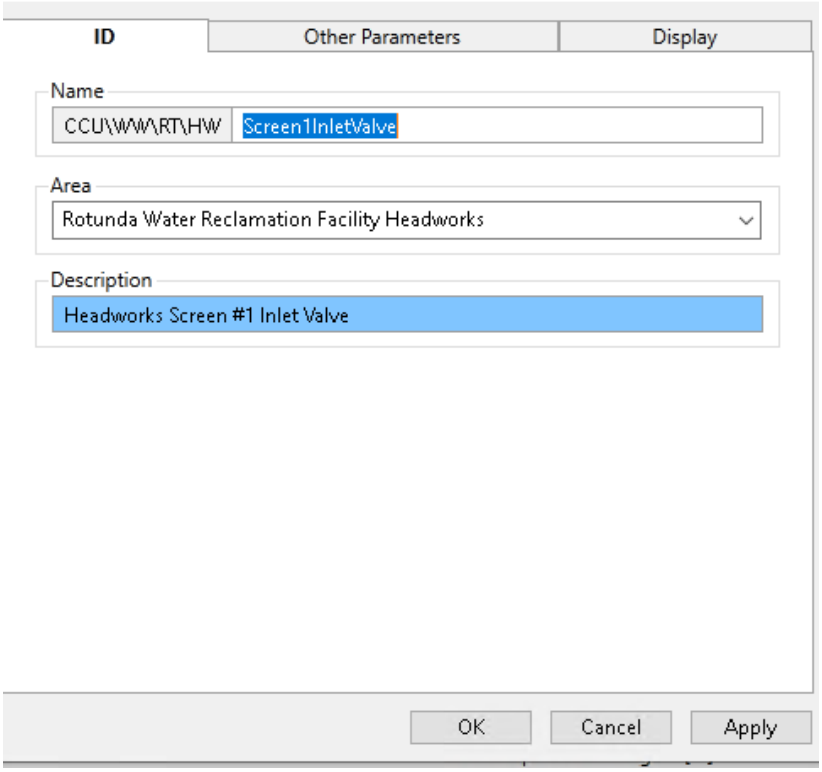


3- From **Tag Groups**, click on **All Tag Types**:



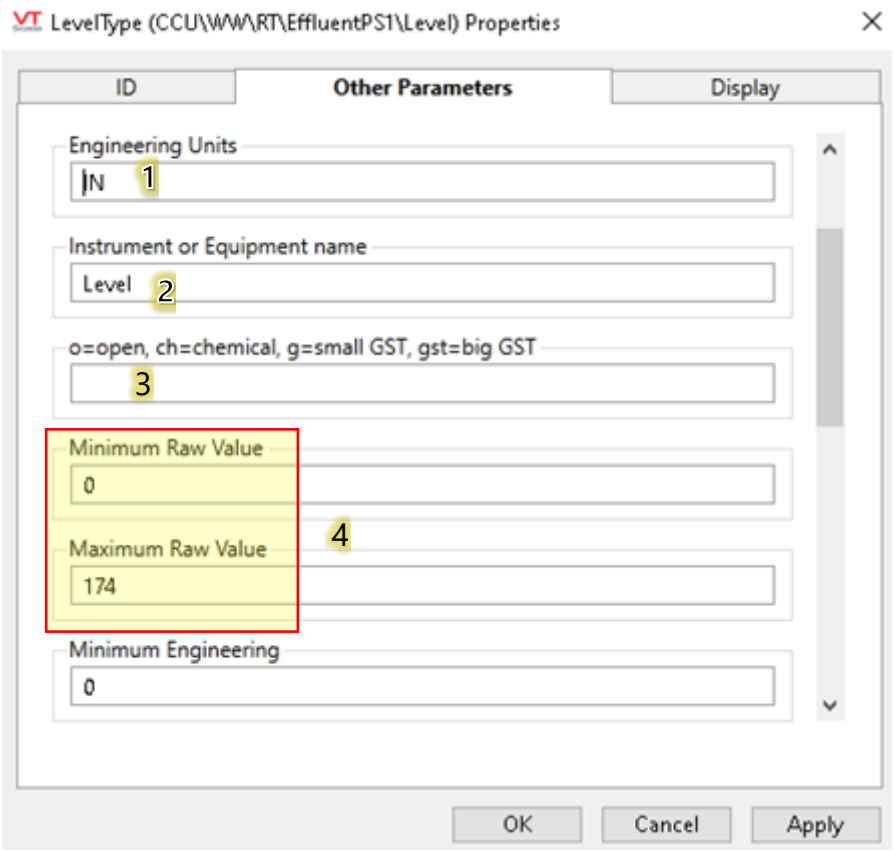
4- Search and select **LevelType**:

5- Under the **ID** tab, type in the level name. Notice that the **Area** field will inherit the area name from the previous parent.

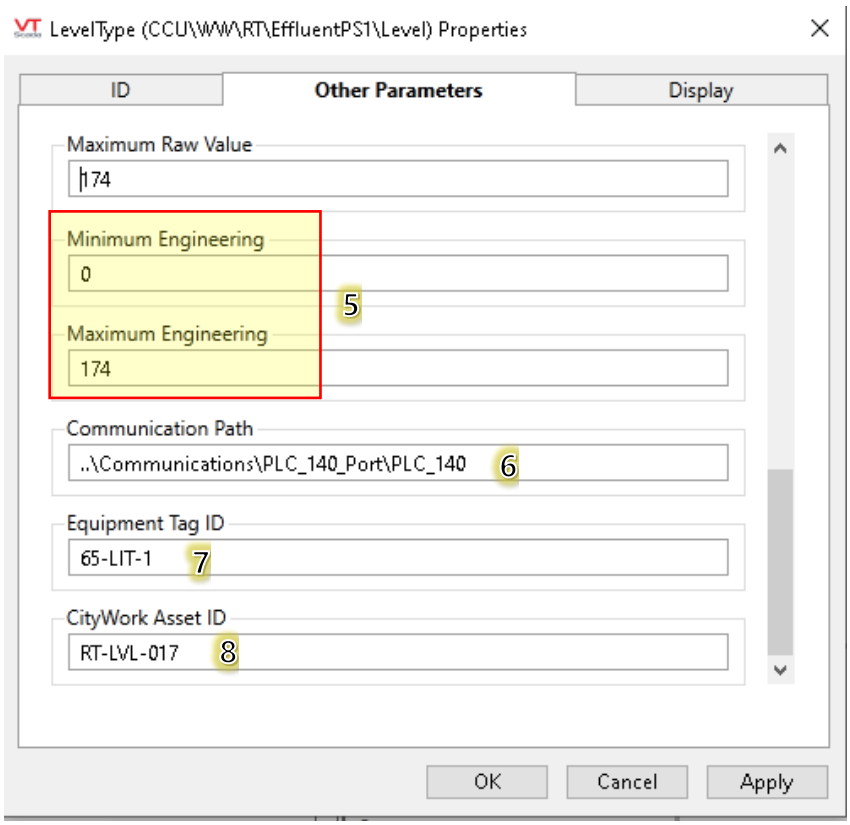


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the level inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter level name here "). "). Click **Ok** next. Notice that the **Description** field will be highlighted in blue as shown in the figure above which indicates that some expression was used in this field.

6- Click on the **Other Parameters** tab and fill in the following fields:



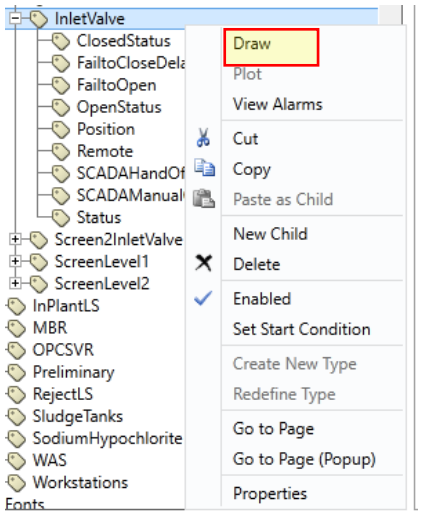
1) Level units
2) Level name which will show in runtime.
3) This field is for the tank widget (**TankWidget**) that will be discussed as part ofthe tank widget section. The user can leave this field empty.
4) Maximum and Minimum engineering values for the level. These fields will scale the PLC values to be represented in a desired range in SCADA.



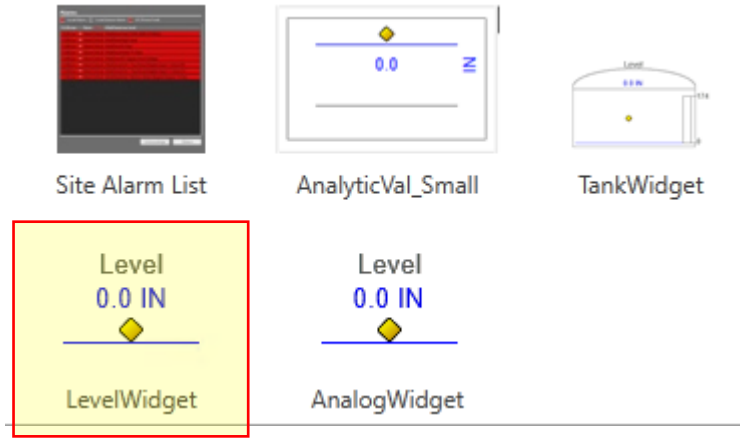
5) Maximum and Minimum raw values for the level that come from the PLC. These values should match the PLC raw value scaling.
6) The communication path is for specifying the path of the PLC for the level.
7) The Tag ID is for specifying the level P&ID or identifying number according to the record drawings. This number will show on the level faceplate in runtime.
8) This field is for the Cityworks Asset ID. This ID will show on the level faceplate under the configuration tab in runtime.

To draw a level in runtime:

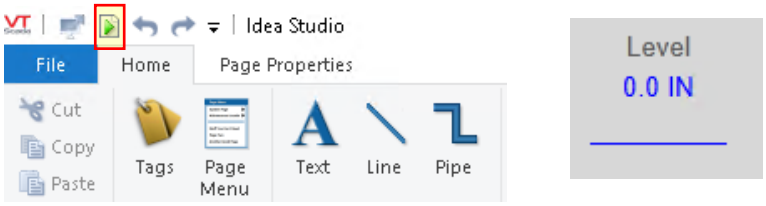
1- Go to Tag Browser and right click on any level then click **Draw**:



2- A new window will open that shows all widgets that are related to the level type. Find and click on a widget called **LevelWidget**:



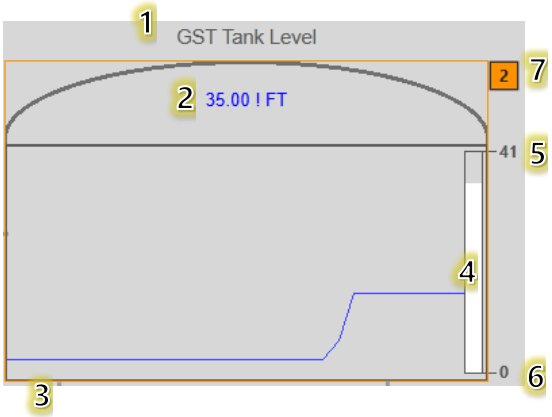
3- Place the level widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime



8.1.10 Tank Widget

The Tank widget (TankWidget) is a custom widget that allows the user to control and monitor all the tags that were defined in the level tag type (LevelType). The tank widget is very similar to the level widget. The only difference is the Tank widget has tank symbols added to it.

.



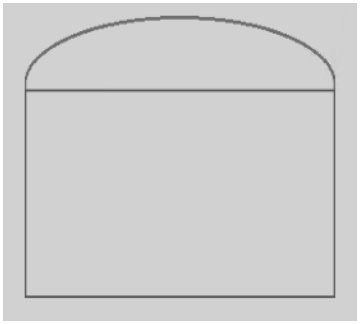
1- Level Name
2- Level current value (process variable)
3- Level spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.
4- Level bar indication
5- Maximum engineering unit for the level
6- Minimum engineering unit for the level
7- Tank Alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

Unlike the **LevelWidget**, the **TankWidget** alarm box is part of the widget.

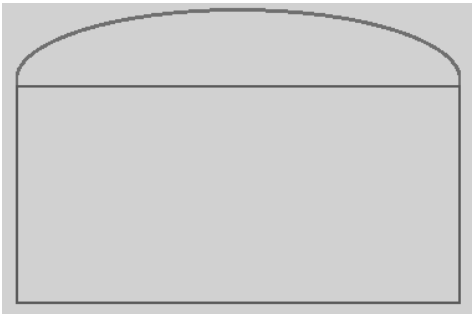
There are four tank types:

1- Open Tank:

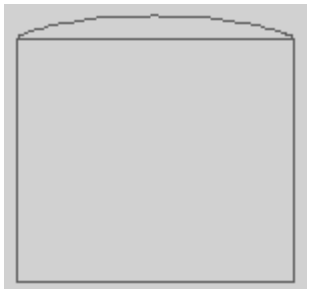
2- Small GST:



3- Large GST:

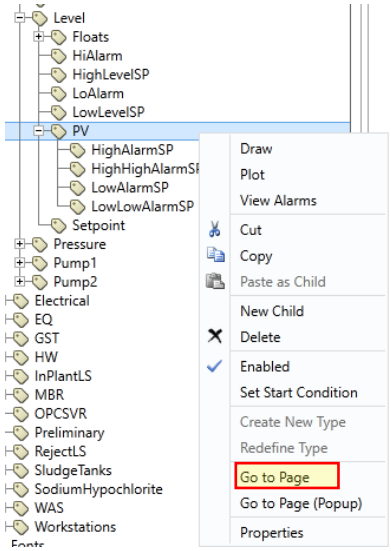


4- Chemical:

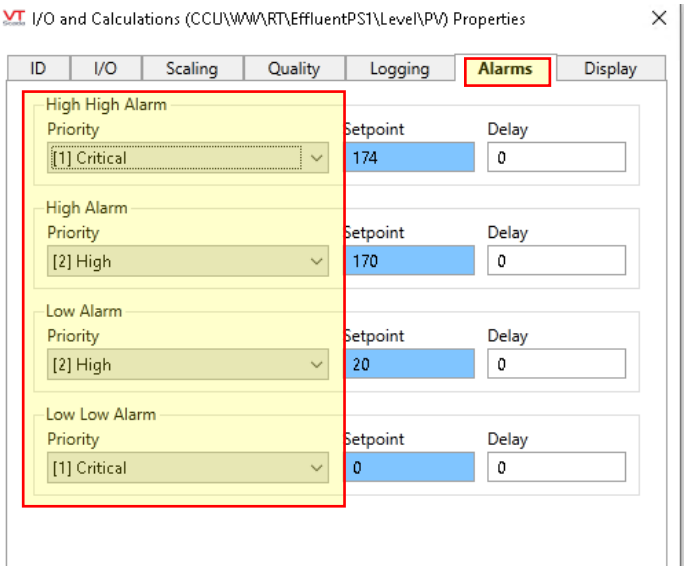


To enable or disable the level alarms:

1- Go to the level tag in Tag Browser window and right click on a child tag of the level called PV (Process Variable) and click **Properties**:



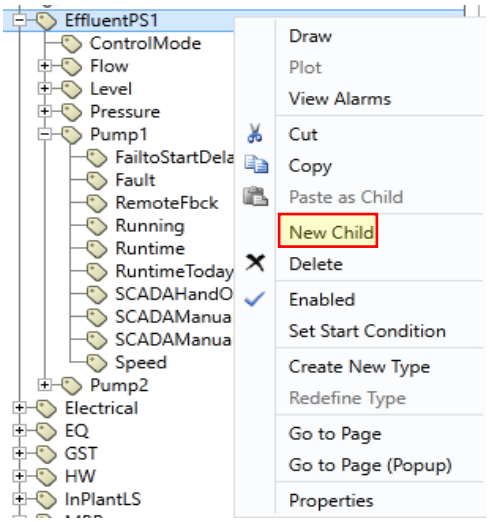
2- Click on the Alarms tab and enable or disable the alarms as desired. To disable an alarm, select None. To enable an alarm select the desired priority.



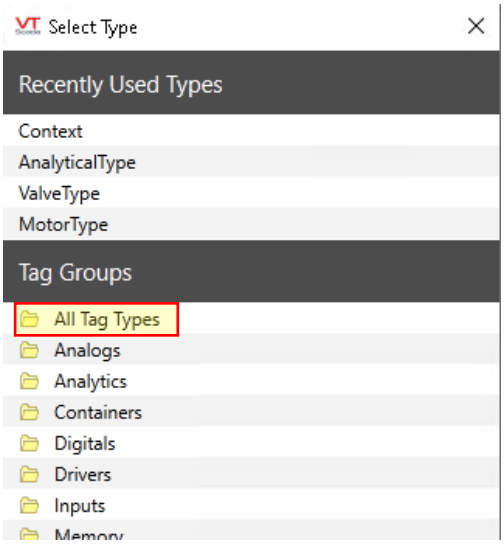
TankWidget is attached to a tag type called **LevelType**. To add a new level:

1- Login to VTScada with the proper privilege then access the Tag Browser from the top right corner:

2- Right click on the specified area where the level will be added, then select **New Child**:

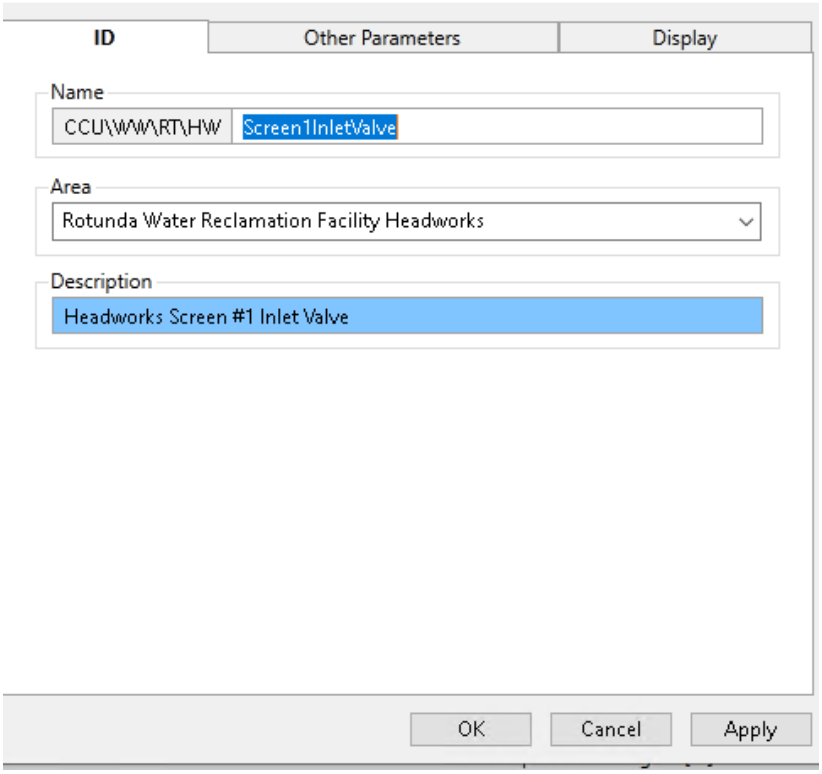


3- From **Tag Groups**, click on **All Tag Types**:



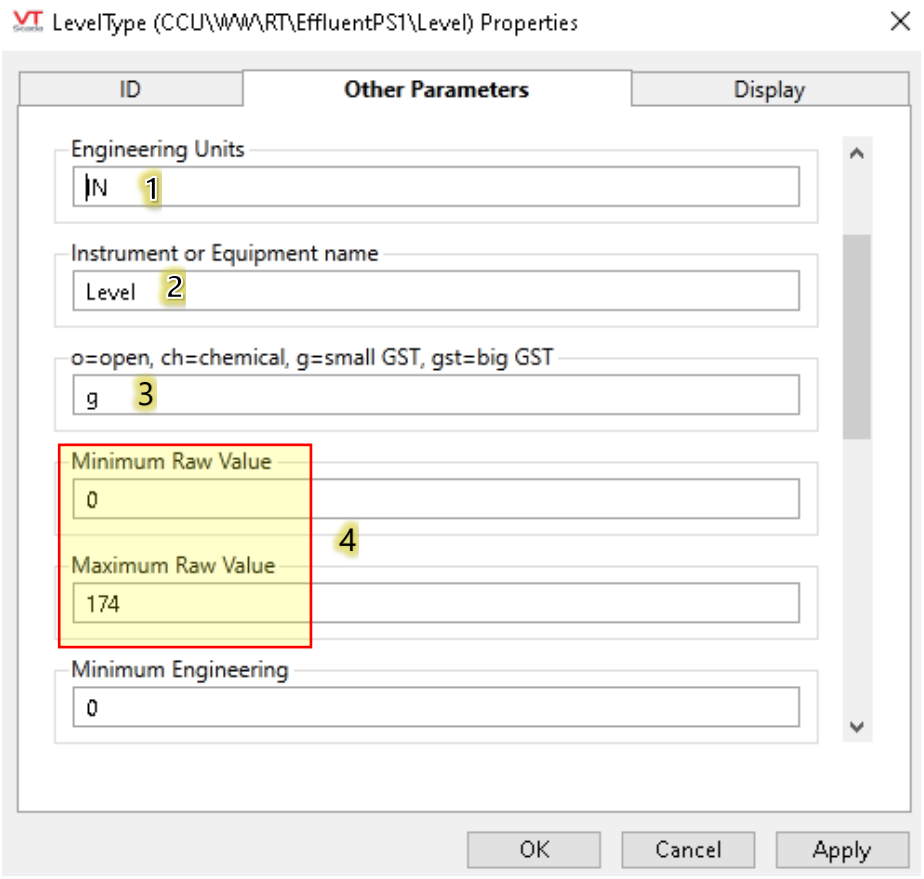
4- Search and select **LevelType**:

5- Under the **ID** tab, type in the level name. Notice that the **Area** field will inherit the area name from the previous parent.

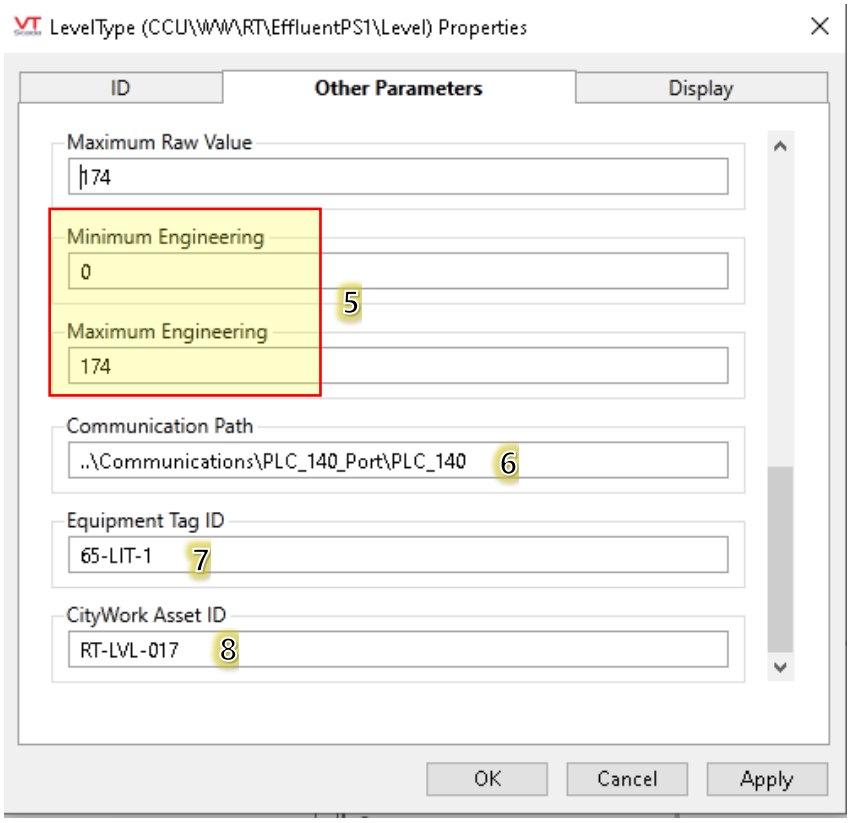


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the tank inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter tank name here "). ") and select **Ok**. Notice that the **Description** field will be highlighted in blue as shown in the figure above, which indicates that some expression was used in this field.

6- Click on **Other Parameters** tab and fill in the following fields:



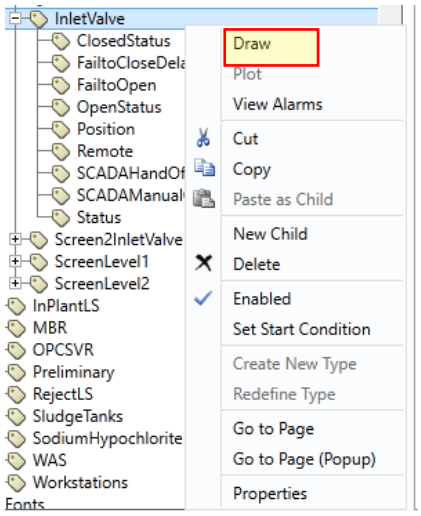
1) Level unit
2) Level name which will show in runtime.
3) This Field will determine which type is the tank. The tank symbol will change according to entered letter in this field. Enter "**o**" for an open tank, "**ch**" for chemical tank, "**g**" for small ground storage tank, and "**gst**" for large ground storage tank. Letters must be lower case.
4) Maximum and Minimum engineering values for the level. These fields will scale the PLC values to be represented in a desired range in SCADA.



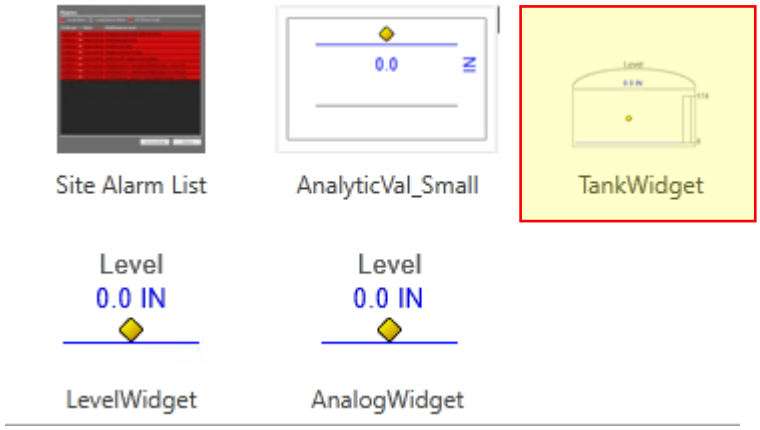
5) Maximum and Minimum raw values for the level that comes from the PLC. These values should match the PLC raw value scaling.
6) The communication path is for specifying the path of the PLC for the level.
7) The Tag ID is for specifying the level P&ID or identifying number. This number will show on the level faceplate in runtime.
8) This field is for the Cityworks Asset ID. This ID will show on the level faceplate under the configuration tab in runtime.

To draw a tank in runtime:

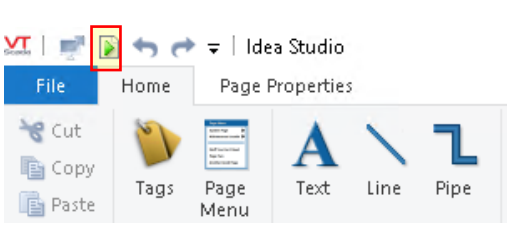
1- Go to Tag Browser and right click on any level tag then click **Draw**:

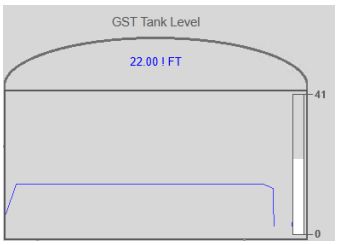


2- A new window will open that shows all widgets that are related to the level type. Find and click on a widget called **TankWidget**:



3- Place the tank widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime

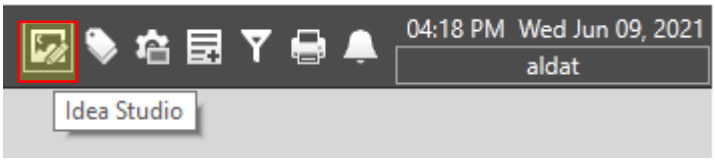




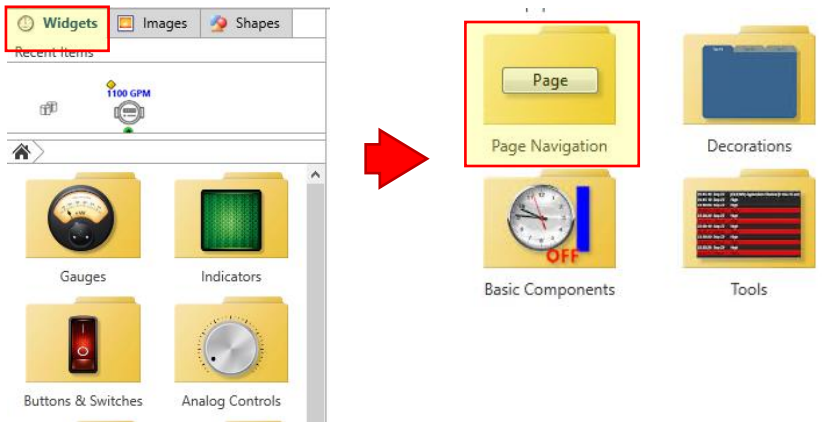
8.1.11 Level Faceplate Widget

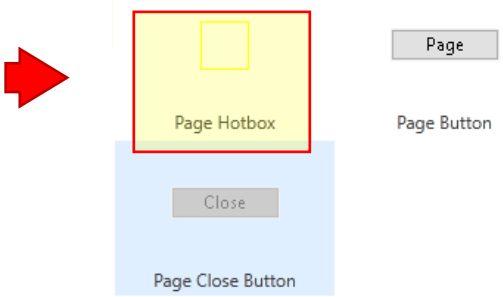
The level faceplate widget (**FP_Level**) was designed as a separate widget to work with both the **LevelWidget** and the **TankWidget**. The faceplate is linked directly to the **Tankwidget**. However, it has to be manually attached to the **Levelwidget** when needed. To add the level faceplate to the LevelWidget follow these steps:

1- Login with The proper privilege level to the Idea Studio environment.

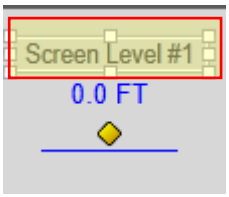


2- From the left panel, click on the **Widgets** tab, click on the **Page Navigation** folder and select the **Page Hotbox** widget:

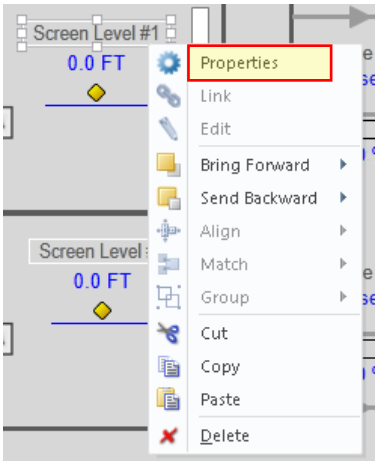




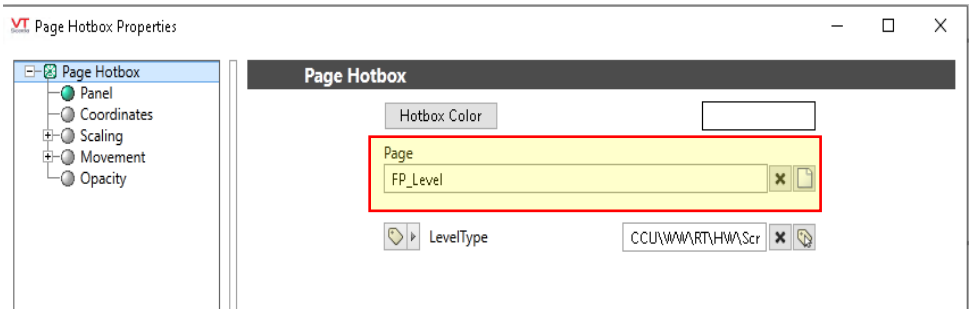
3- Place the box around the level title as shown below:



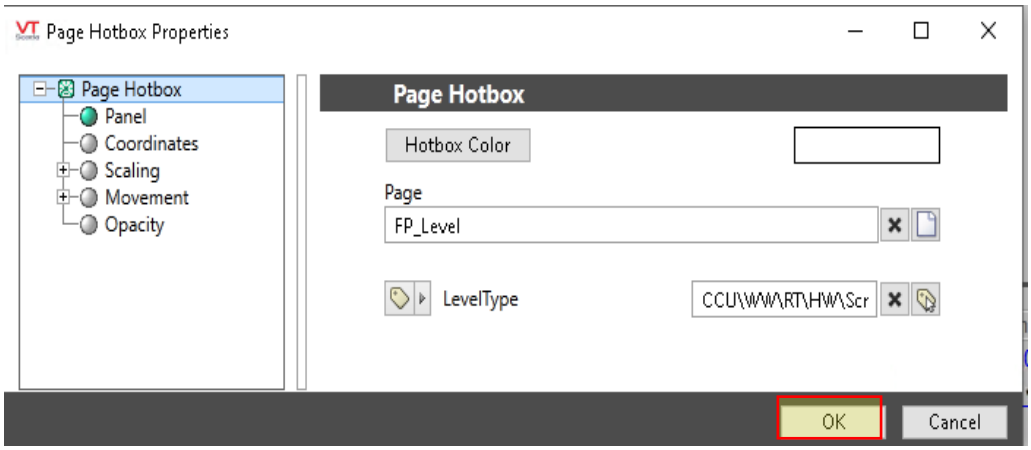
4- Right click on the alarm box and click on **Properties**.



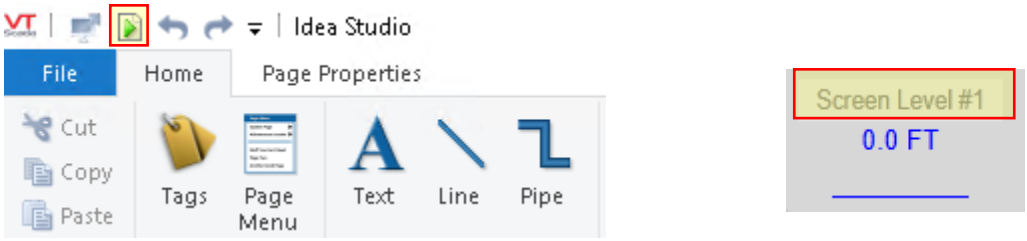
5- Click on the **Page** field and find a page called **FP_Level** (or type in FP_Level) as shown below:



6- Click **Ok** to finish configuring the faceplate link.



7- To open the faceplate, return to runtime and click on the level title text as shown below:



There are 5 tabs for **FP_Level**:

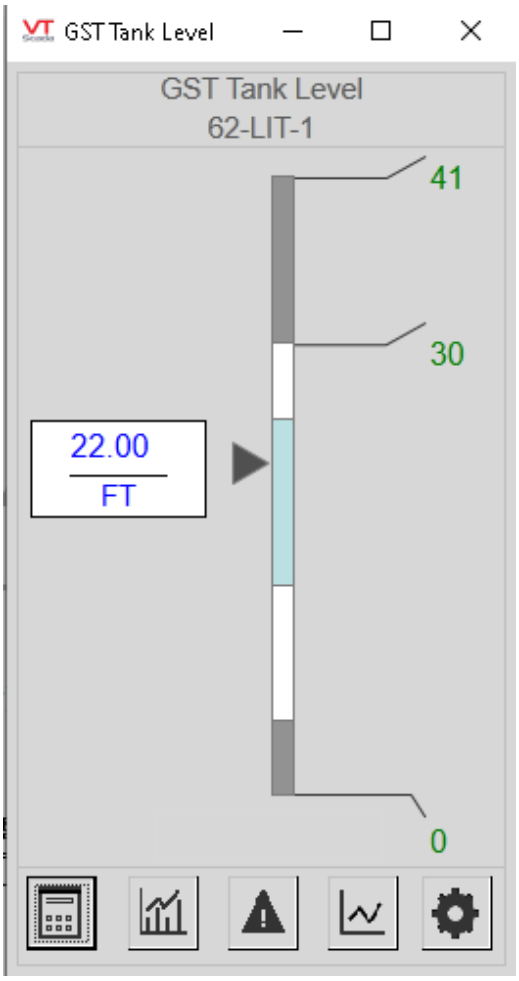
1- Main tab

2- Statistics tab

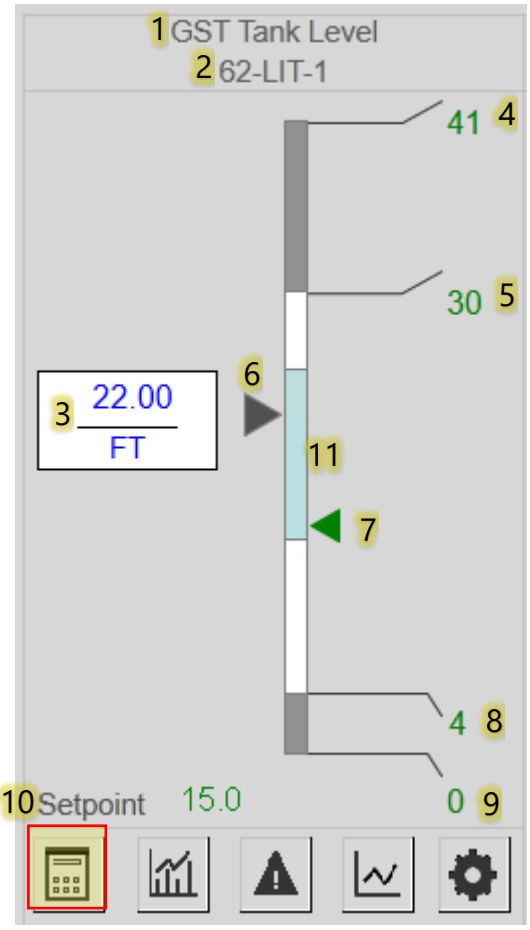
3- Alarms tab

4- Trend tab

5- Configuration tab

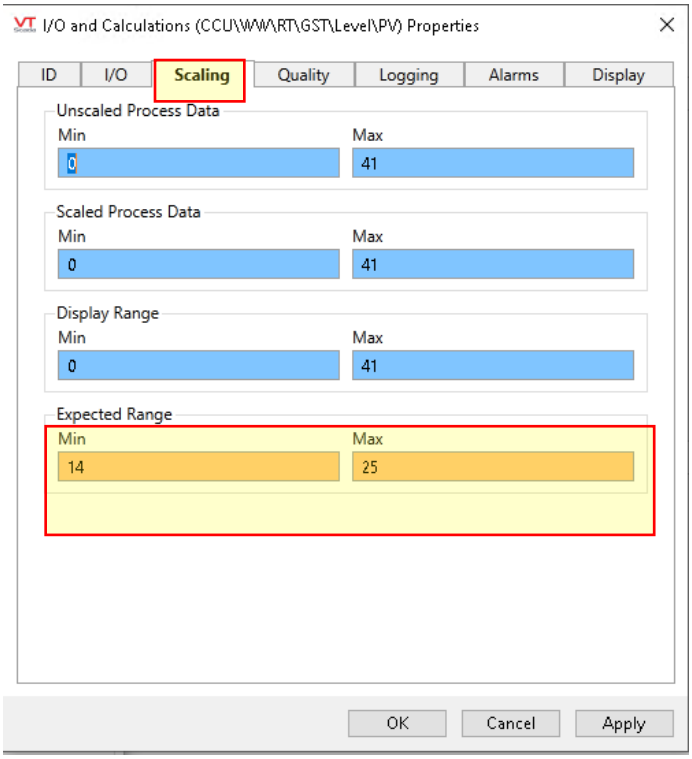


Main tab:

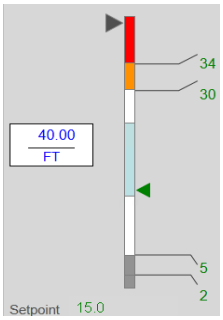


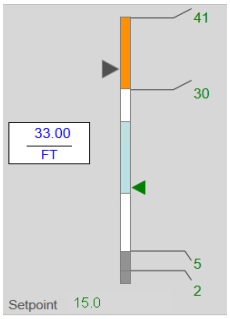
1- Level Name
2- Level P&ID or identifying number
3- Level current value (Process Variable)
4- High-High level setpoint indicator
5- High level setpoint indicator
6- Current level value indicator
7- Desired setpoint indicator
8- Low setpoint indicator
9- Low-Low setpoint indicator
10- Desired setpoint entry value

11- The blue area represents the expected range that the level should operate in. To change the expected range go to the Tag Browser and right click on the tag called PV and choose **Properties**. Navigate to the scaling tab and change the range. See below:

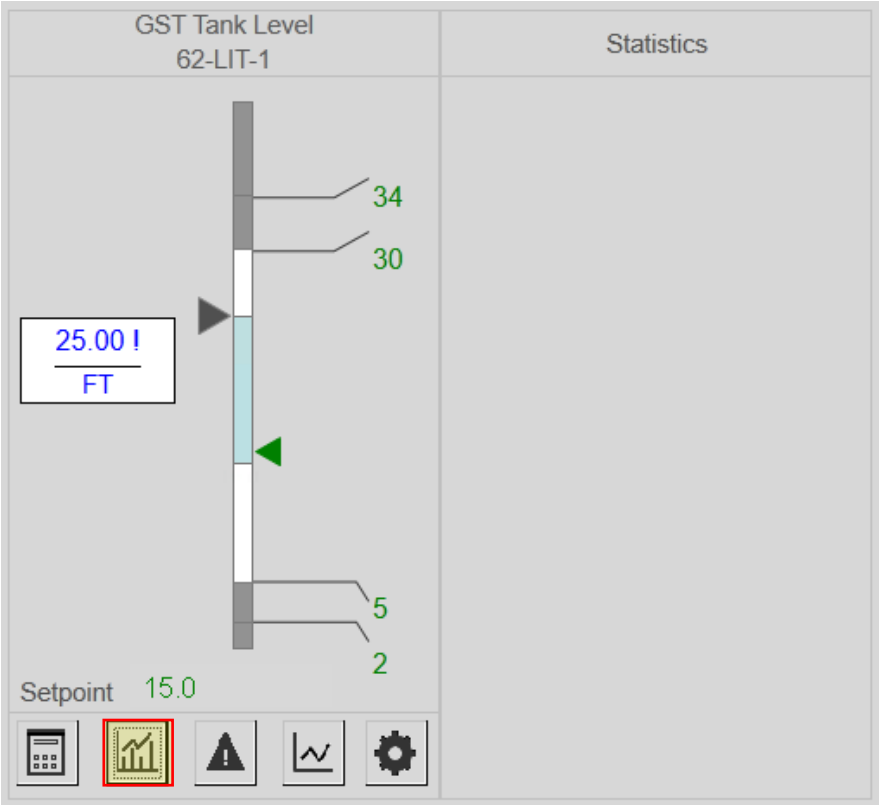


Level faceplate alarm event: If the current value is above the high alarm setpoint (or below the low alarm setpoint), the indication bar will change the color to indicate that there is an alarm. The color of the bar will change based on the priority of the alarm. Below is an example of two different alarm priority configuration. When the current value is higher than the high setpoint then the color changes to orange. When the current value is higher than the high-high setpoint the color changes to red.



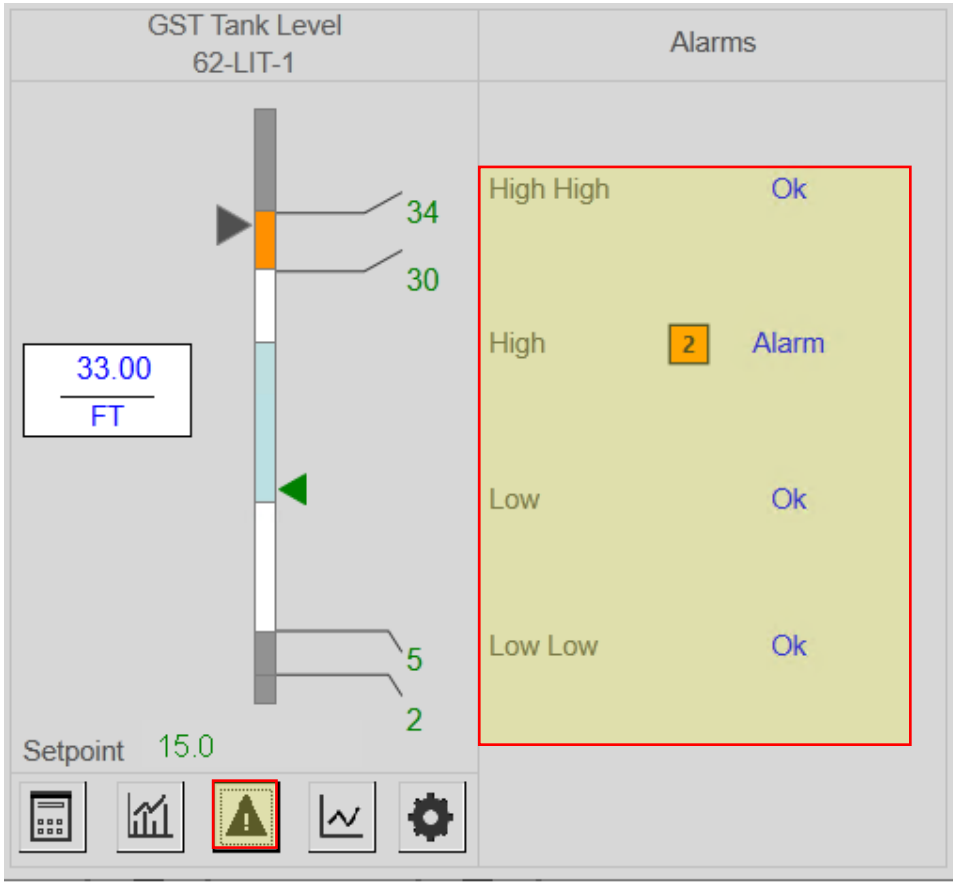


Statistics tab:



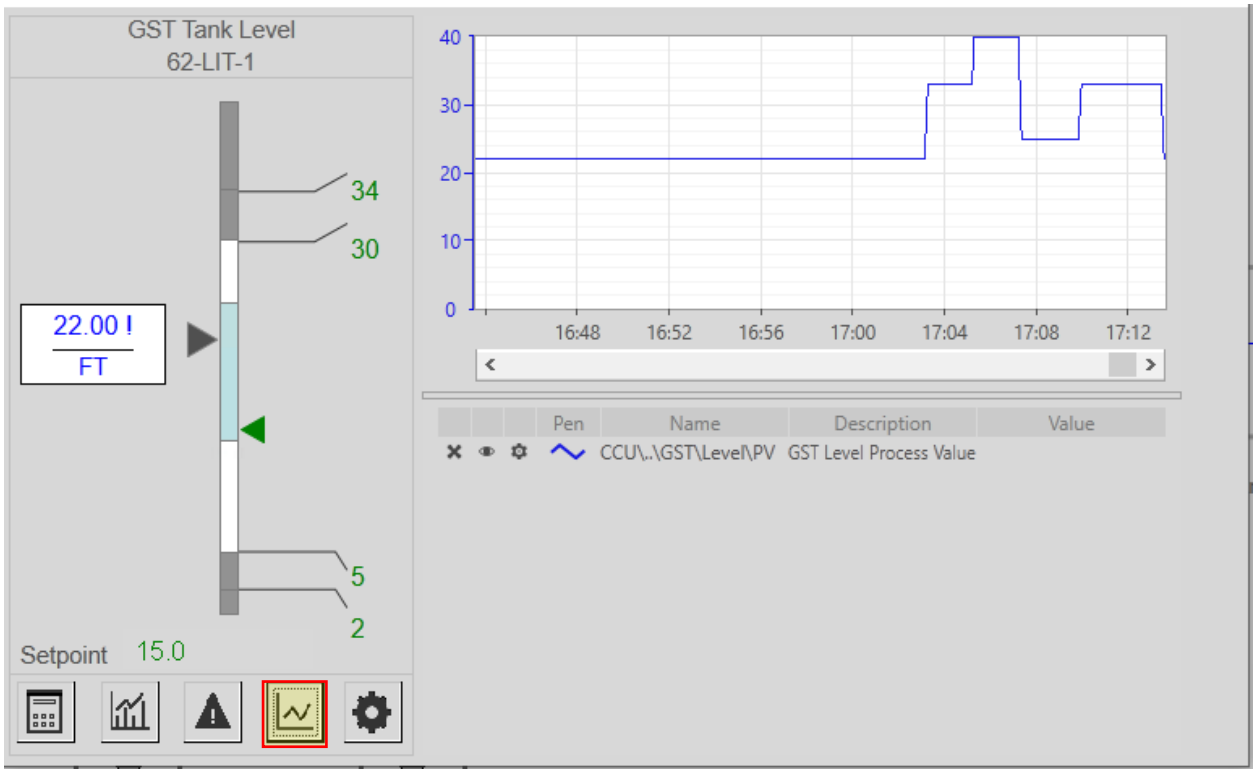
There is no functionality for the statistics tab at this time, but it is available for future use if needed.

Alarm tab:



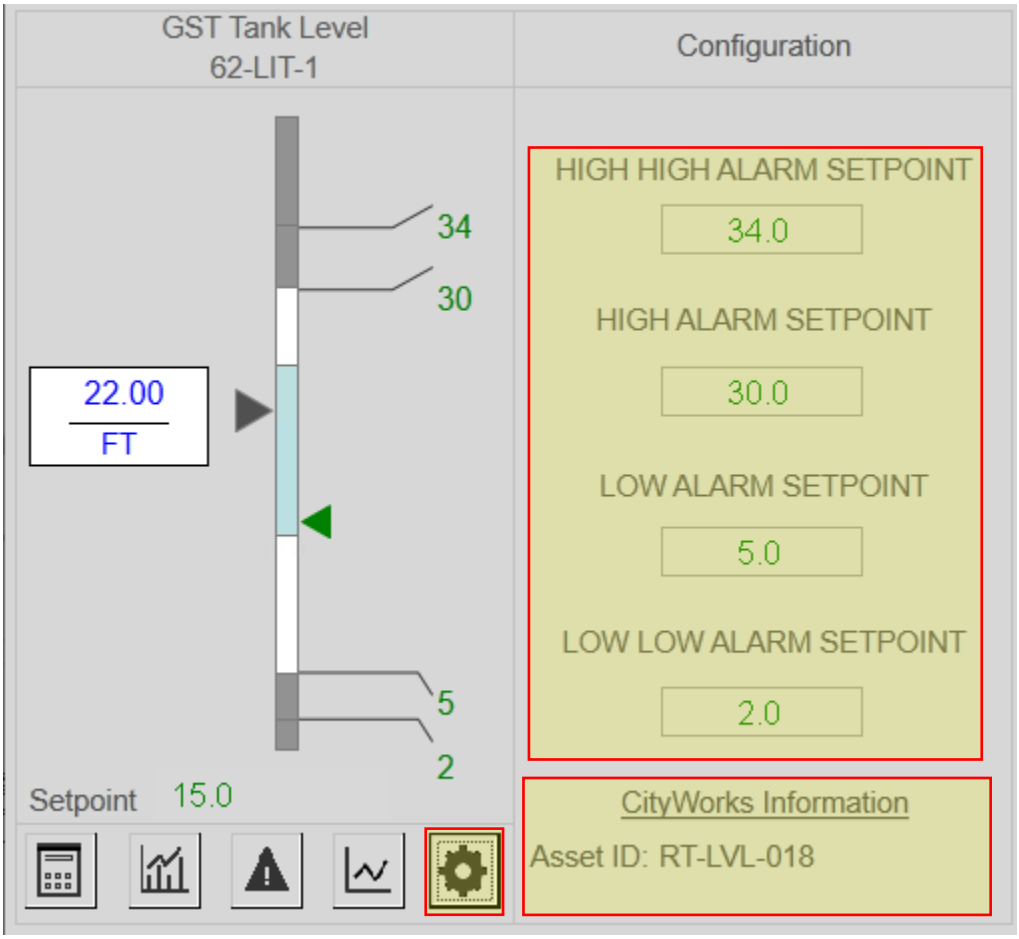
The Alarm tab will show the level's available alarms. The alarm will be available if it is available in the PLC and enabled in the Tag Browser. If the alarm tag exists, it will show either OK or Alarm in blue next to the alarm description, as shown in the above picture. If the tag doesn't exist, the blue text will be hidden. In the case of an alarm, a number will show next to alarm to represent the priority of the alarm.

Trend tab:



The trend tab will show the historical data for the level current value (PV). PV stands for process variable.

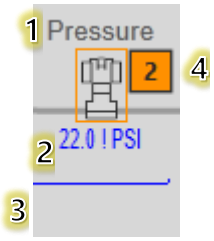
Configuration tab:



The configuration tab will show the available setpoints for the level. If the tag is available in the PLC and enabled in Tag Browser for a specific setpoint, it will show in green. The configuration tab will also show the assigned CityWorks Asset ID number.

8.1.12 Pressure Meter Widget

The Pressure meter widget (**PressuremeterWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the pressure tag type **PressureType**.

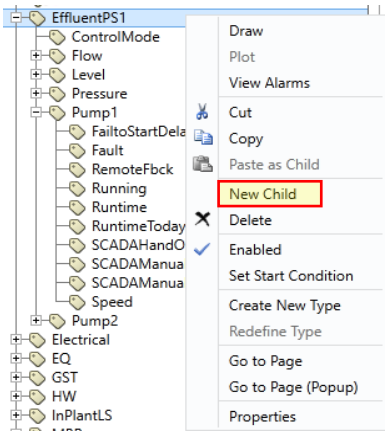


1- Pressure meter name
2- Pressure current value (process variable)
3- Pressure spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.
4- Pressure Alarm indication. The severity of the alarm is represented by a number.

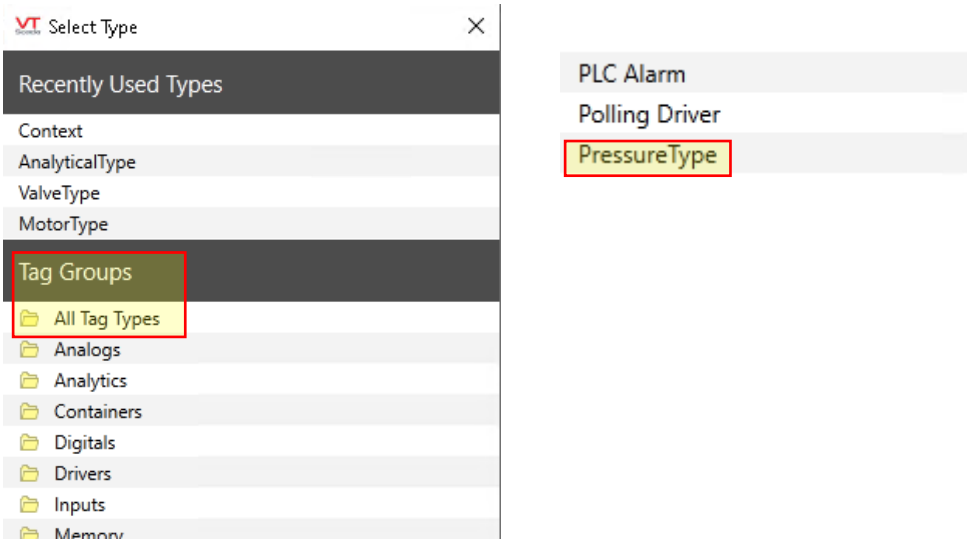
PressuremeterWidget is attached to a tag type called **PressureType**. To add a new pressure meter:

1. Login to VTScada with the proper privilege and access the Tag Browser from the top right corner:

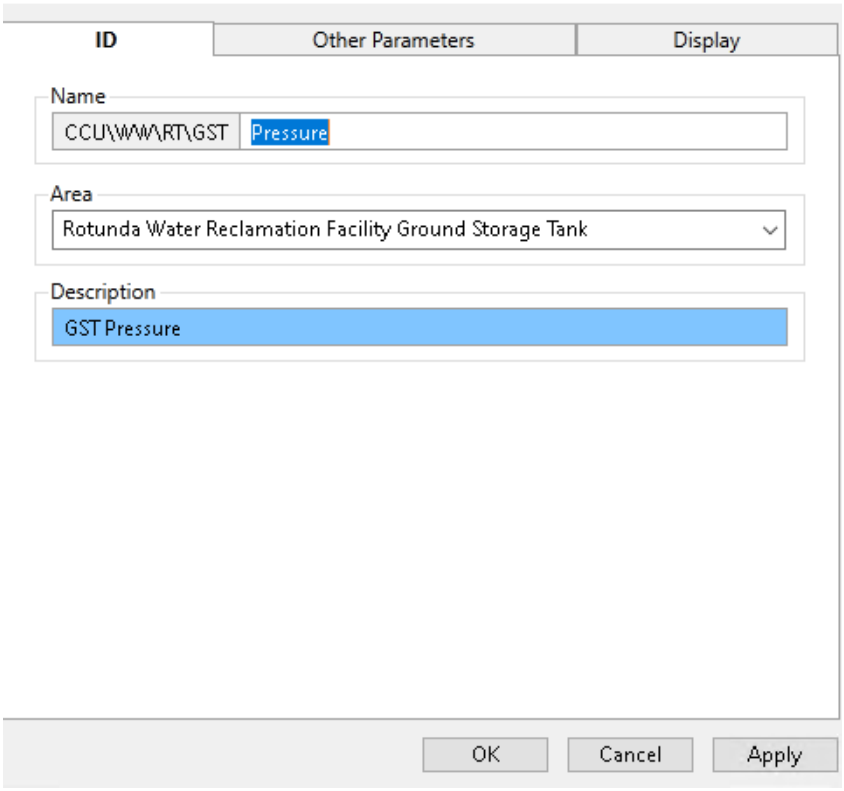
2. Right click on the specified area where the pressure meter will be added, then select **New Child**:



3. From **Tag Groups**, click on **All Tag Types**, the click on **PressureType**:

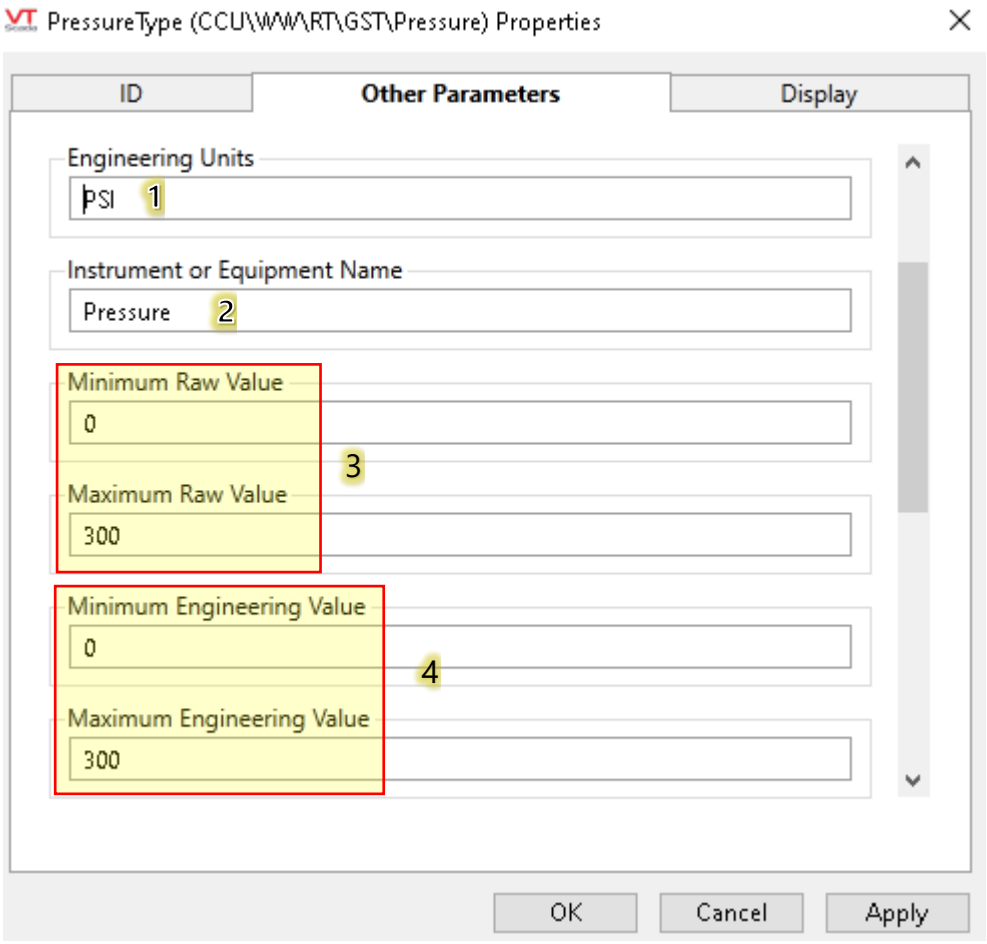


4. Under the ID tab, type in the pressure name. Notice that the Area field will inherit the area name from the previous parent.

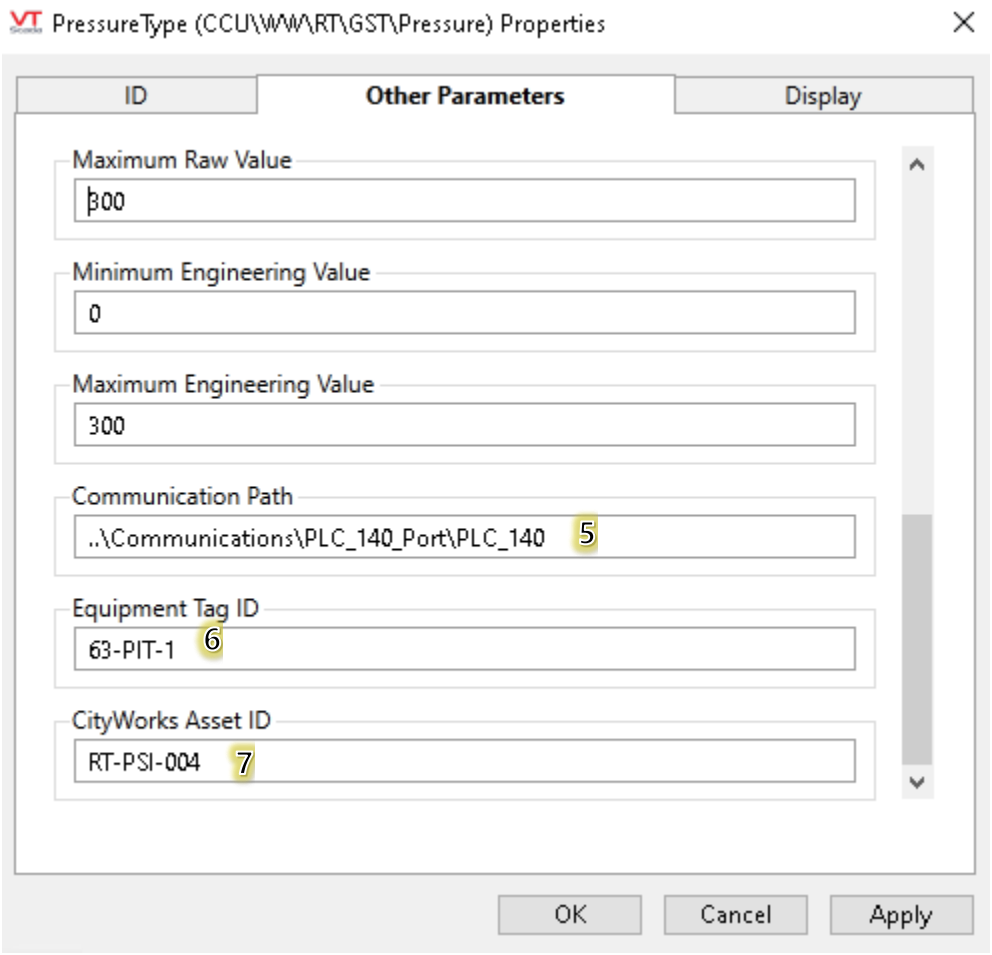


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the pressure meter inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter valve name here ") andclick **Ok**. Notice that the **Description** field will be highlighted in blue as shown in the figure above, which indicates that some expression was used in this field.

5. Click on the Other Parameters tab and fill in the following fields:



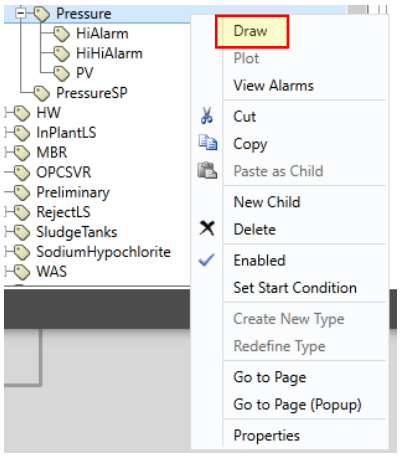
1) Pressure meter unit
2) Pressure meter name which will show on the top of the meter symbol in runtime.
3) Maximum and Minimum engineering values for the pressure. These fields will scale the PLC values to be represented in a desired range in SCADA.
4) Maximum and Minimum raw values for the pressure that come from the PLC.



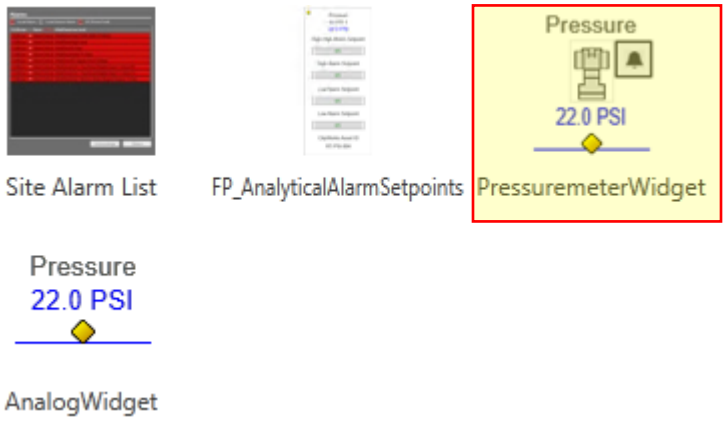
5) The communication path is for specifying the path of the PLC for the Pressure meter.
6) The Tag ID is for specifying the Pressure meter P&ID or identifying number. This number will show on the Pressure meter faceplate in runtime.
7) This field is for the Cityworks Asset ID. This ID will show on the pump faceplate under the configuration tab in runtime.

To add a pressure meter to runtime:

1- Go to Tag Browser and right click on the new pressure then click **Draw**:



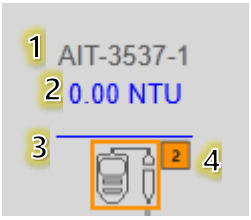
2- A new window will open that shows all widgets that are related to the pressure type. Find and click on a widget called **PressuremeterWidget**:



3- Place the pressure meter widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime

8.1.13 Analytic Widget

The Analytic widget (**AnalyticWidget**) is a custom widget that allows the user to control and monitor all the tags that were defined in the Analytical tag type (**AnalyticalType**).

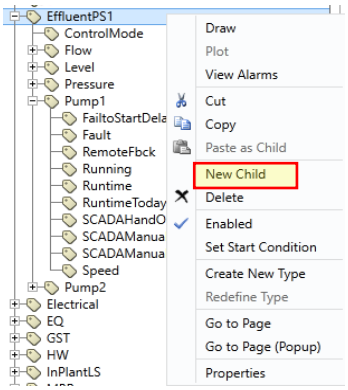


1- Analytic meter name
2- Analytic current value (process variable)
3- Analytic spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.
4- Analytic Alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

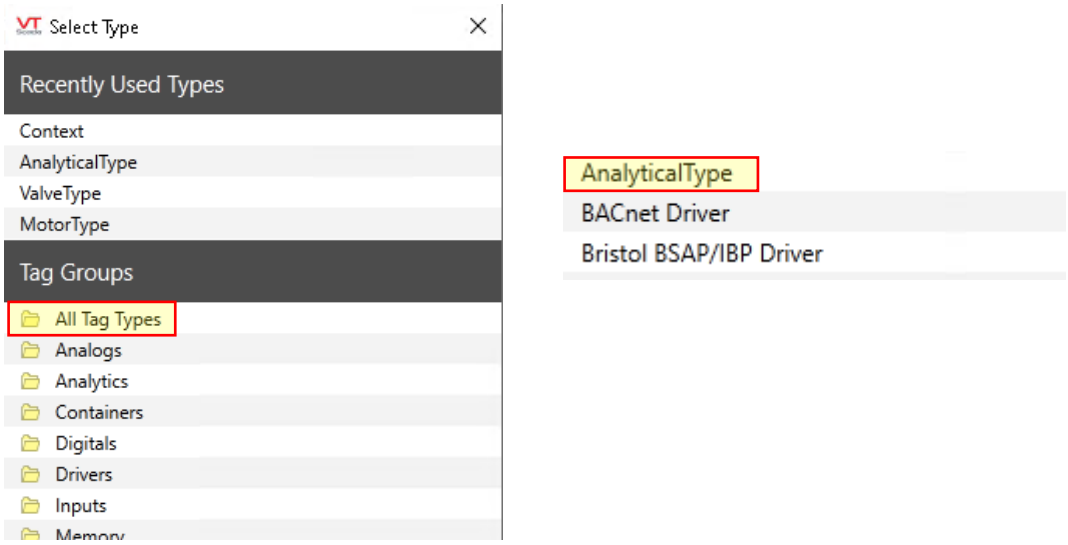
The AnalyticWidget is attached to a tag type called **AnalyticalType**. To add a new analytic meter:

1- Login to VTScada with the proper privilege and access the Tag Browser from the top right corner:

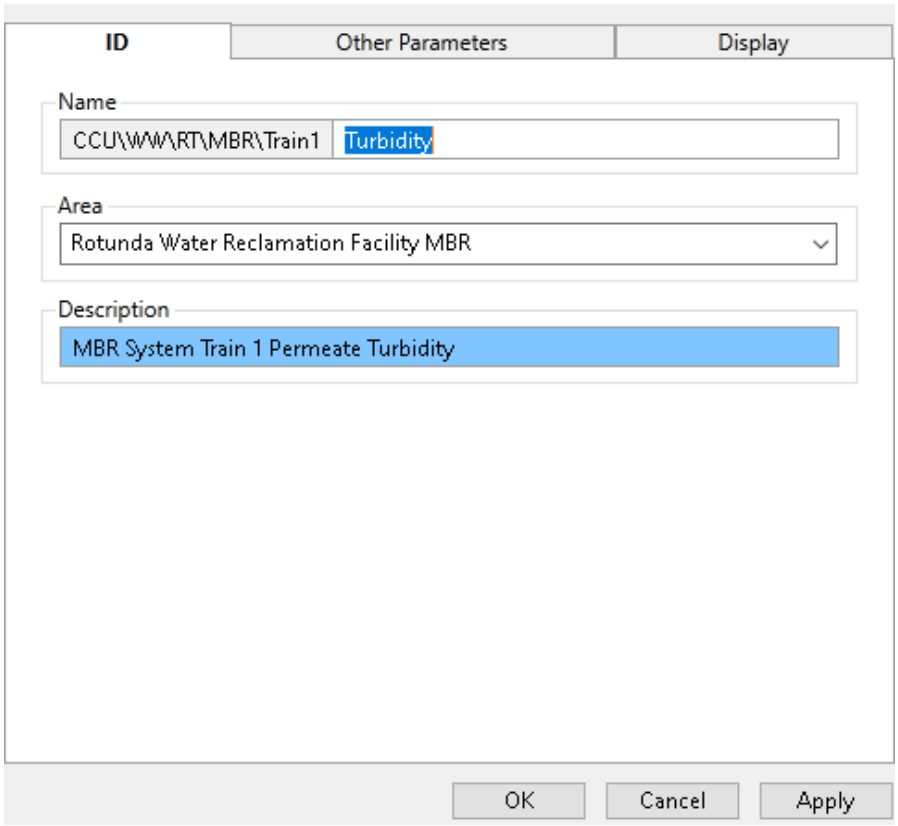
2- Right click on the specified area where the Analytical meter will be added, then select **New Child**:



3- From Tag Groups, click on **All Tag Types**, then click on **AnalyticalType**:

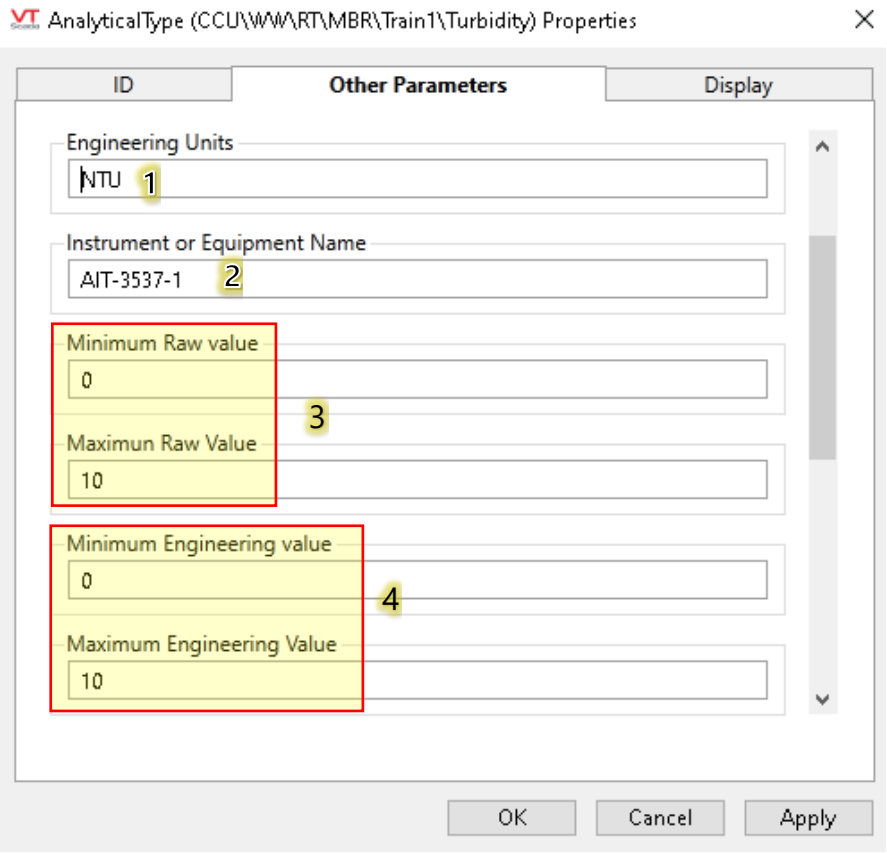


4- Under the **ID** tab, type in the analytical meter name. Notice that the Area field will inherit the area name from the previous parent.

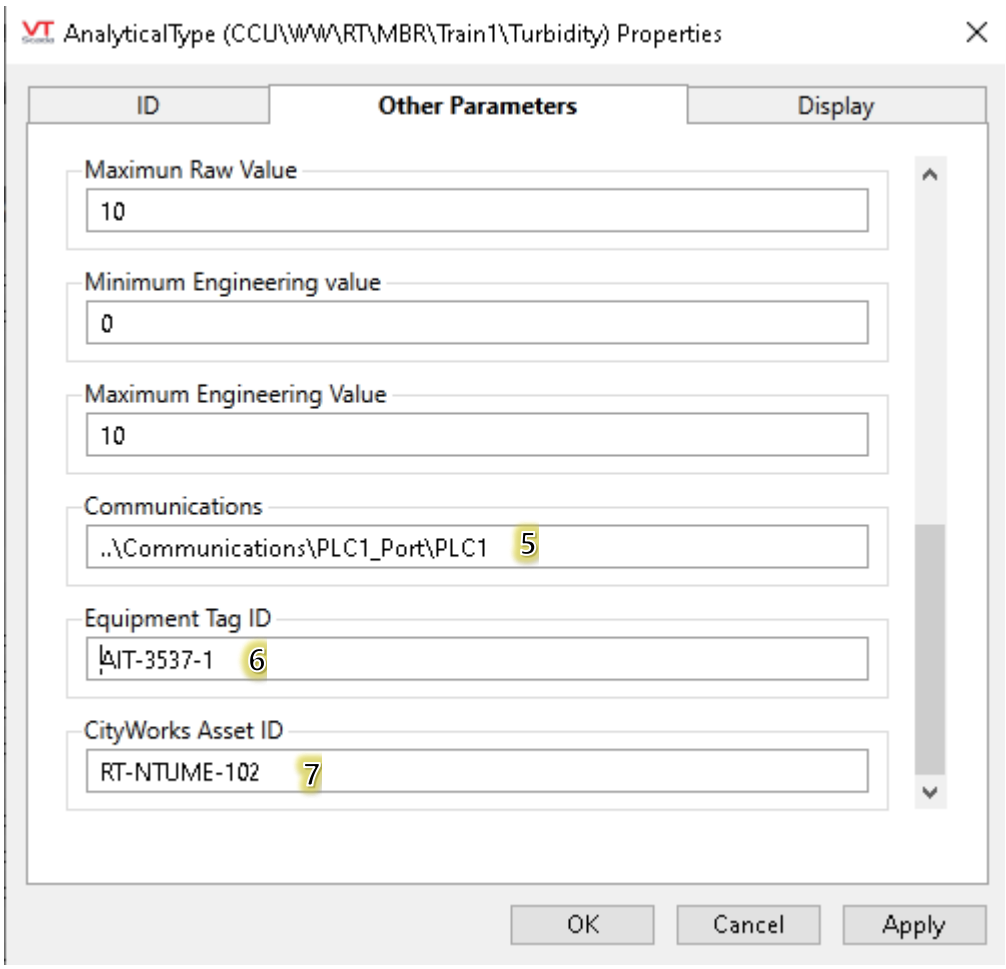


Right click on the **Description** field and select **Add Parameter Expression**. Type in the following expression to make the analytic meter inherit its description from its parent: Concat(GetPhrase(..\Description), " Enter valve name here ") and click **Ok**. Notice that the **Description** field will be highlighted in blue as shown in the figure above which indicates that some expression was used in this field.

5- Click on Other Parameters tab and fill in the following fields:



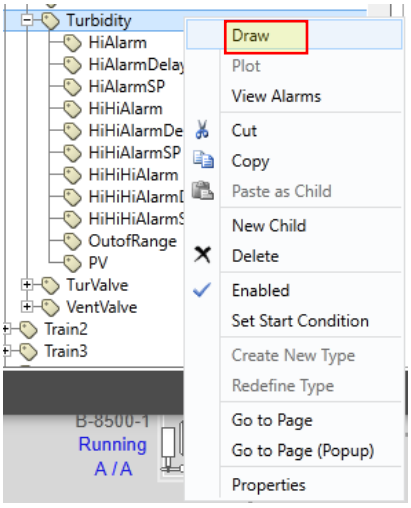
1) Analytical meter unit
2) Analytical meter name which will show on the top of the meter symbol in runtime.
3) Maximum and Minimum engineering values or the analytic meter. These fields will scale the PLC values to be represented in a desired range in SCADA.
4) Maximum and Minimum raw values for the analytical meter that come from the PLC.



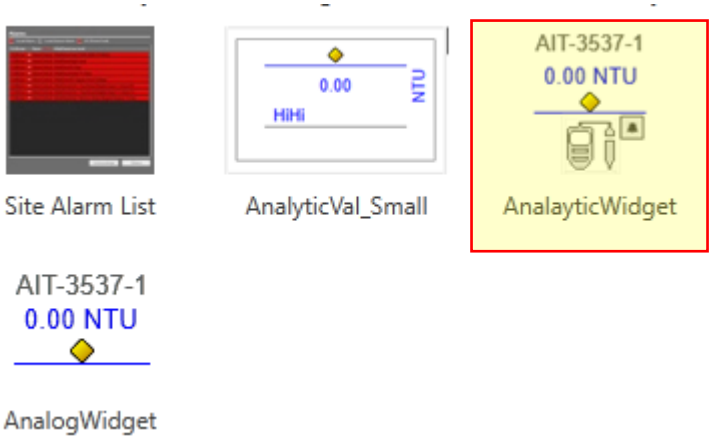
5) The communication path is for specifying the path of the PLC for the analytic meter.
6) The Tag ID is for specifying the analytic meter P&ID identifying number. This number will show on the analytic meter faceplate in runtime.
7) This field is to enter the Cityworks Asset ID. This ID will show on analytic meter faceplate under the configuration tab in runtime.

To add an analytic meter to runtime:

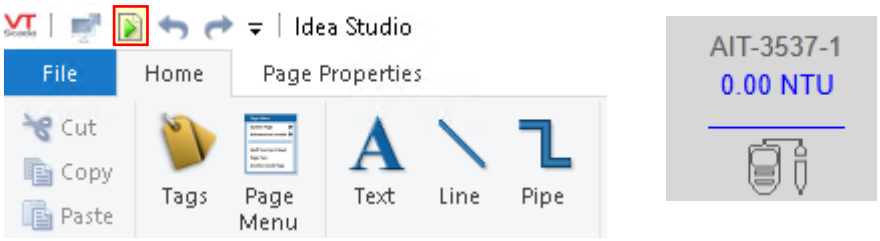
1- Go to Tag Browser and right click on the new analytic meter then click Draw:



2- A new window will open that shows all widgets that are related to the analytic type. Find and click on a widget called AnalyticWidget:

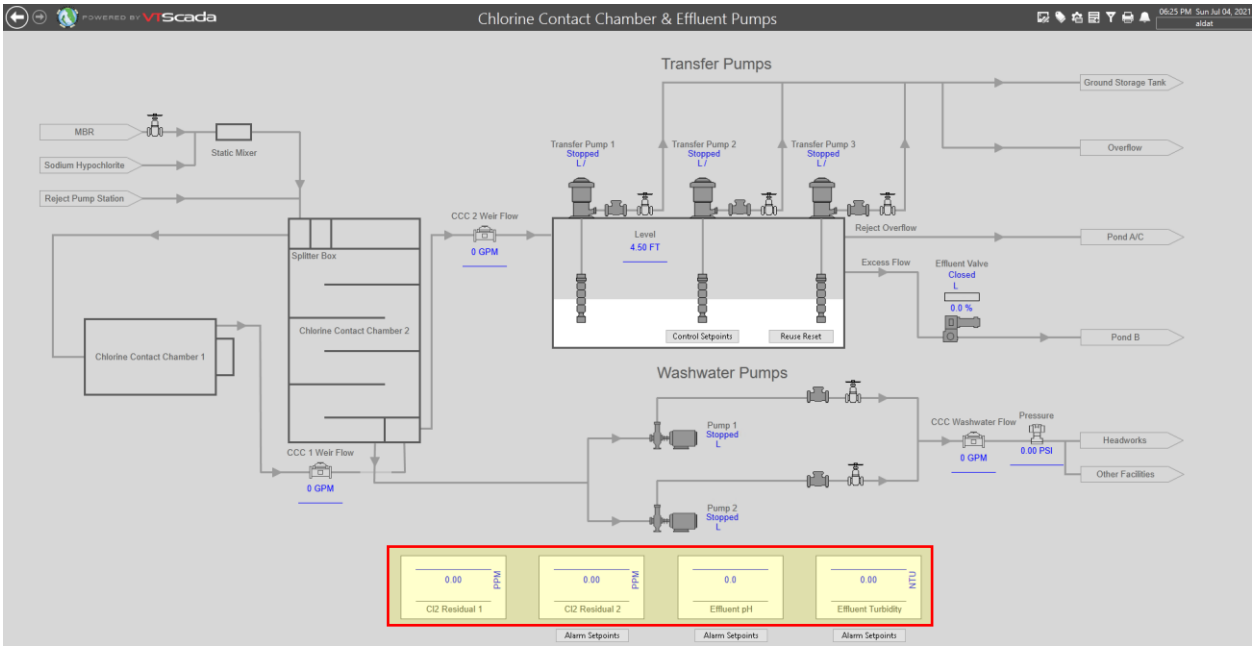


3- Place the analytical meter widget on the desired page inside the Idea Studio environment. Then from top left corner switch to runtime



8.1.14 KPI Widgets

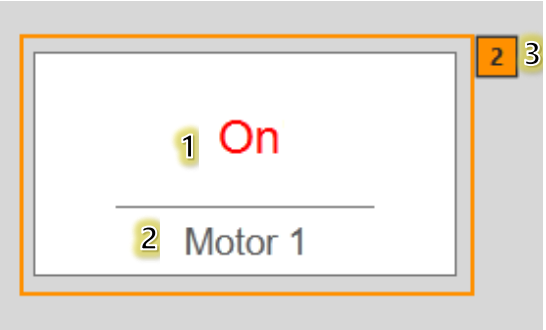
KPI stands for **K**ey **P**erformance **I**ndicators. KPI widgets are special widgets that were designed to provide quantifiable measures and alarm indications to track the performance of a process over time. KPI's are always placed at the bottom of the page for any process. See the example below:



There are various types of KPI widgets that were designed as part of the County standards such as the **Alarm Status** widget, the **AnalogValExtAlm** widget and the **AnalyticVal**_Small widget. KPI widgets can be found under Widgets>CCU Standards>Displays.

8.1.15 Alarm Status KPI Widget

The **Alarm Status** widget is a custom widget that allows the user to monitor digital alarms. This KPI can be used with any I/O and Calculations tag that is configured as digital.



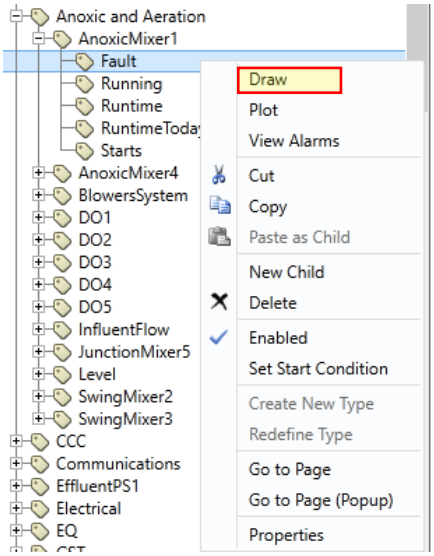
1- Alarm (On/Off) status indication.

2- Alarm description.

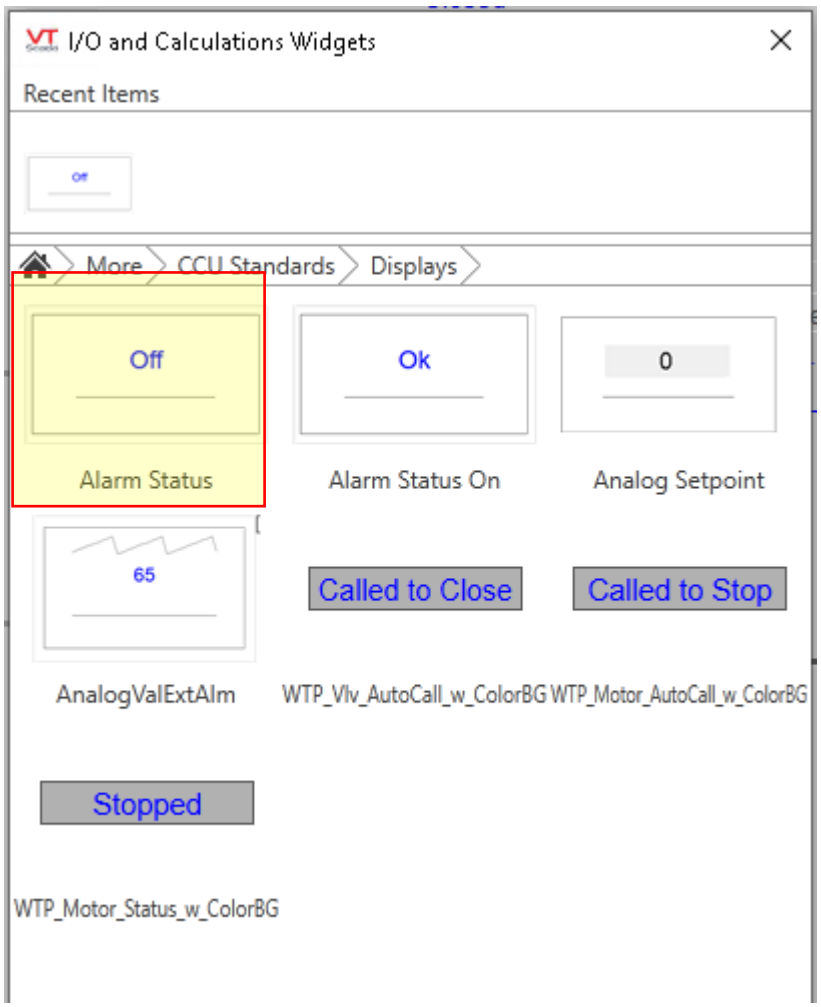
3- KPI Alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

To add an Alarm Status widget to runtime:

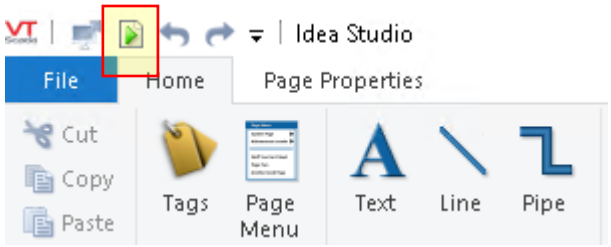
1- Go to Tag Browser and right click on any digital tag (I/O and Calculation tag) then click **Draw**:

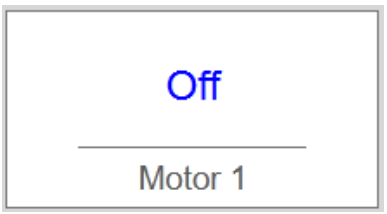


2- A new window will open that will show the available I/O and Calculations widgets. Select **Alarm Status** widget:



3- Place the **Alarm Status** KPI on the desired page inside the Idea Studio **environment**. From the top left corner, switch to runtime





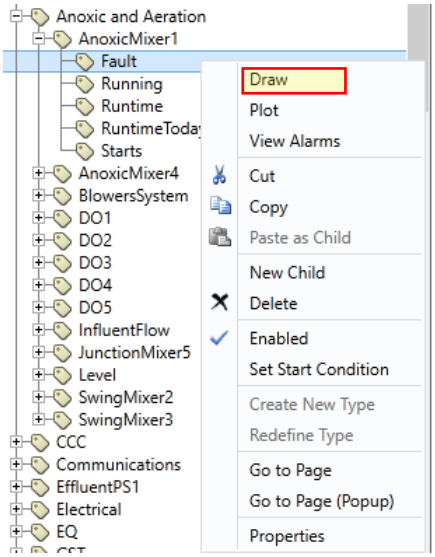
8.1.16 Alarm Status On KPI Widget

The **Alarm Status On** widget is a custom widget that allows the user to monitor digital alarms. This KPI can be used with any I/O and Calculations tag that is configured as digital. It is very similar to the **Alarm Status** widget, the only difference is that it will show Ok/Alarm status instead of On/Off status.

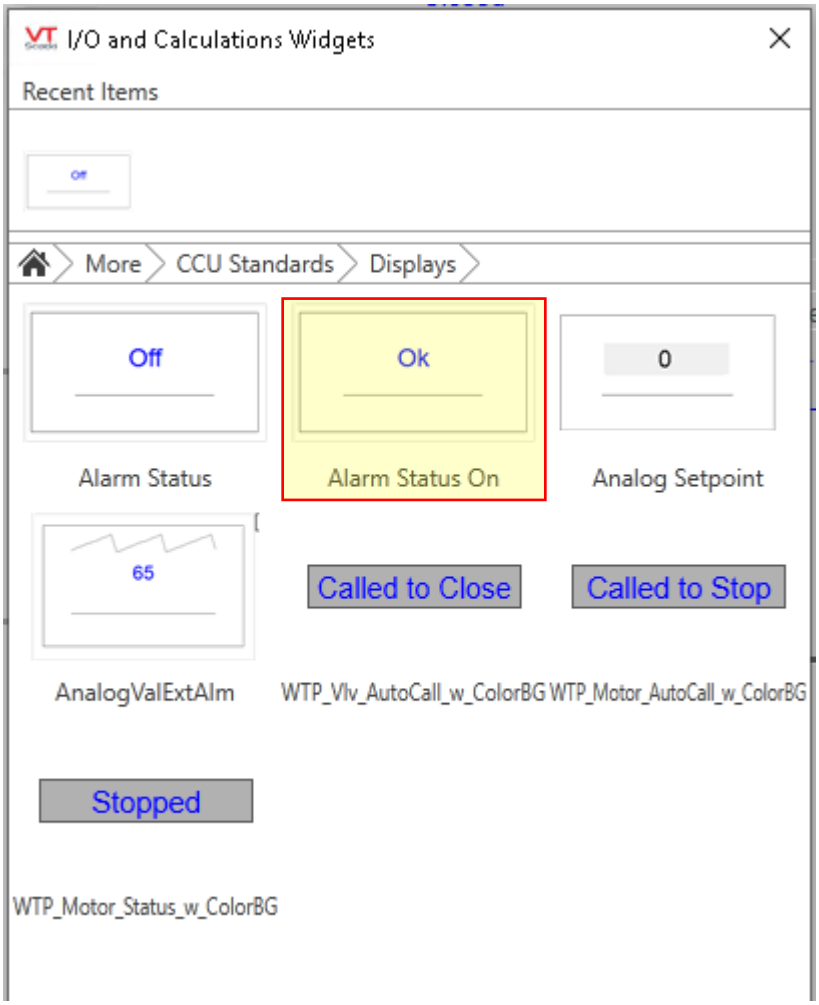
1- Alarm (Alarm/Ok) status indication.
2- Alarm description.
3- KPI Alarm indication. The color and the number of the alarm box will change based on the configuration of the triggered alarm

To add the **Alarm Status On** widget to runtime:

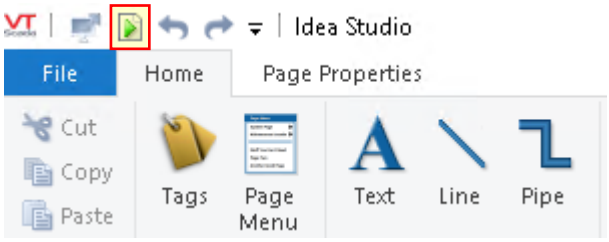
1- Go to Tag Browser and right click on digital tag (I/O and Calculation tag) then click **Draw**:

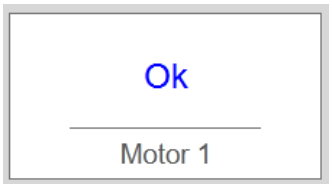


2- A new window will open that will show the available I/O and Calculations Widgets. Select **Alarm Status On** widget:



3- Place the **Alarm Status On** widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime





8.1.17 Analog Setpoint KPI Widget

The **Analog Setpoint** widget is a custom widget that allows the user to read/write to a setpoint. This KPI can be used with any I/O and Calculations tag that is configured as analog.

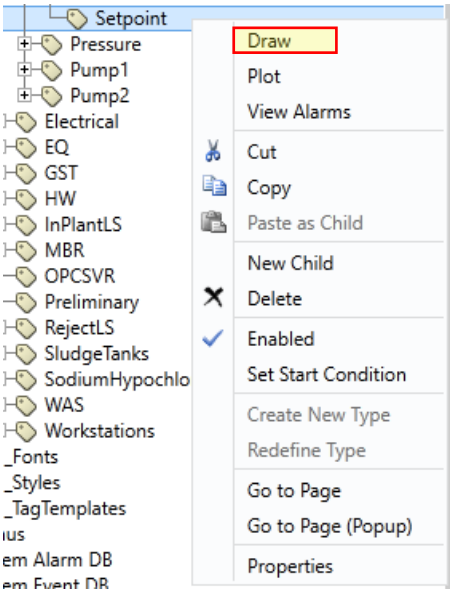
1- Setpoint read/write.

2- Setpoint description.

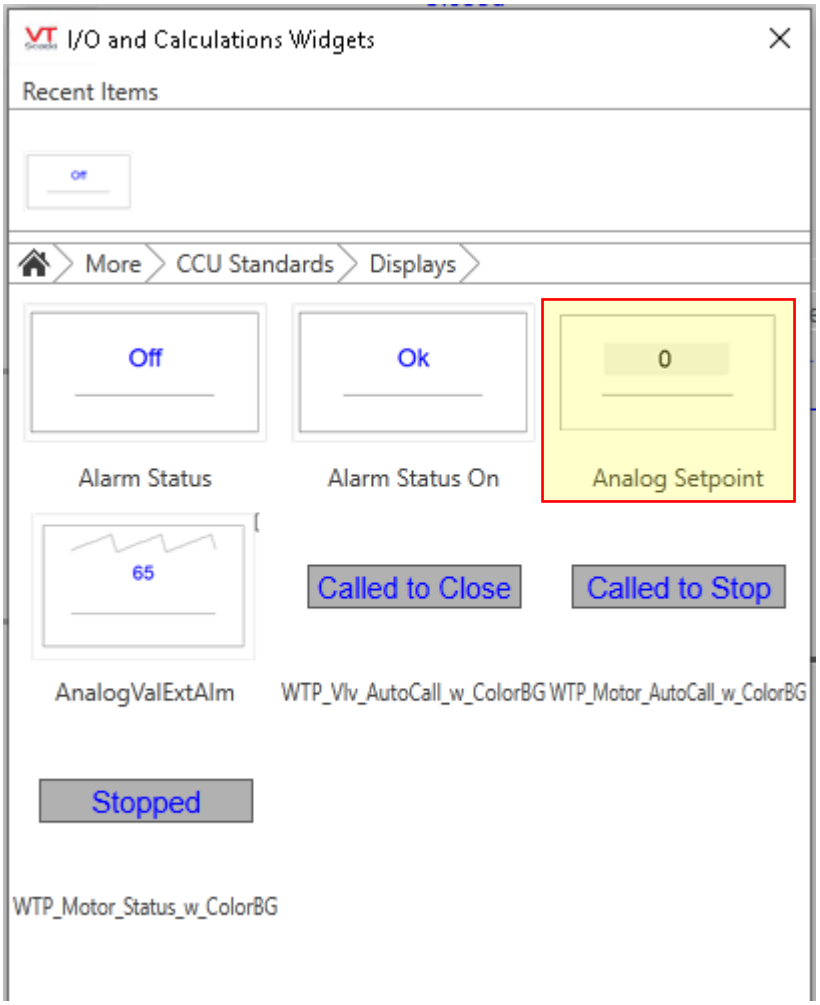
3- Setpoint unit.

To add the Analog Setpoint widget to runtime:

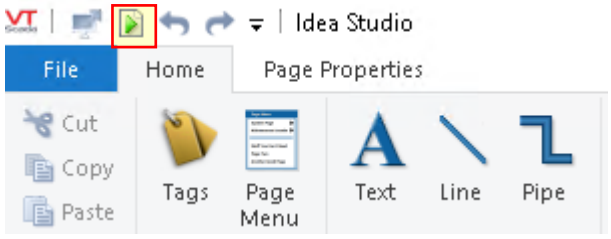
1- Go to Tag Browser and right click on analog tag (I/O and Calculation tag) and click Draw:

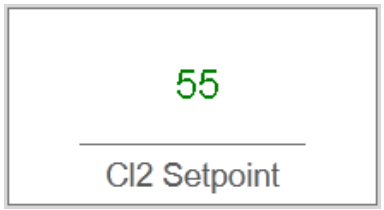


2- A new window will open that will show the available I/O and Calculations Widgets. Select **Analog Setpoint** widget:



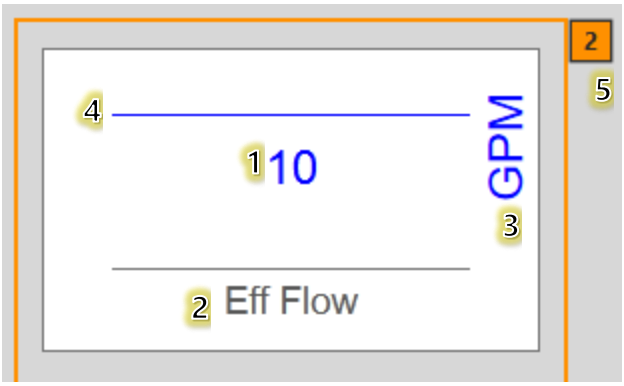
3- Place the **Analog Setpoint** widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime





8.1.18 AnalogValExtAlm KPI Widget

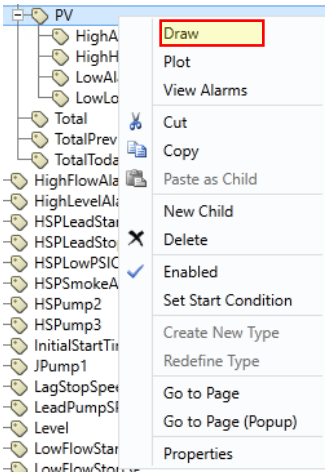
The Analog Value with External Alarm KPI Widget (**AnalogValExtAlm**) is a custom widget that allows the user to monitor any analog value. This KPI can be used with any I/O and Calculations tag that is configured as analog. It can also be used with the tag type **AnalogExt**.



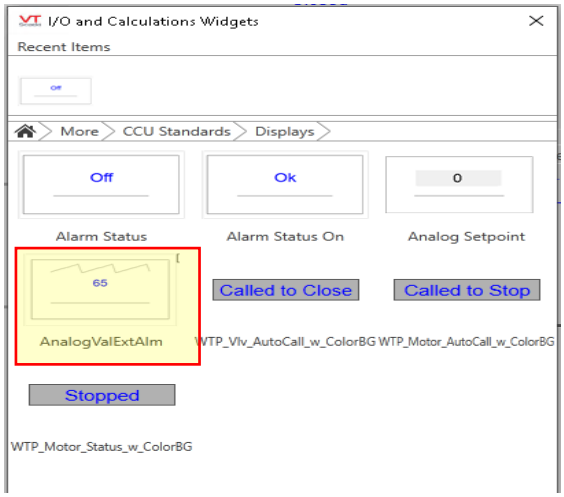
1- Analog current value (process variable)
2- Analog value name
3- Analog unit
4- Analog current value spark line. This line is a trend line that allows the operator to see at a glance the data in the last 60 minutes.
5- Analog value alarm indication for external alarms that come from the PLC. The color and the number of the alarm box will change based on the configuration of the triggered alarm.

To add the **AnalogValExtAlm** widget to runtime:

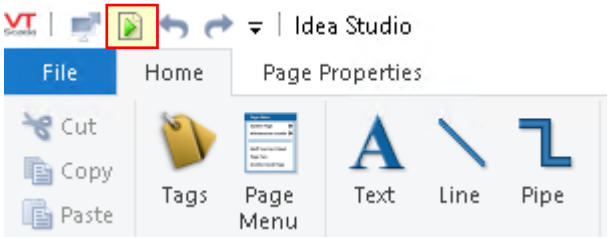
1- Go to Tag Browser and right click on the desired analog tag then click **Draw**:

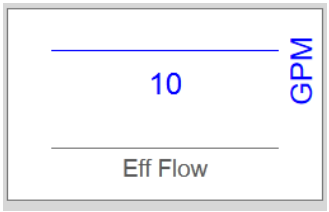


2- A new window will open that will show the available Widgets. Select the **AnalogValExtAlm** widget:



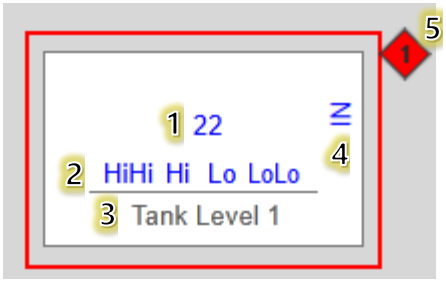
3- Place the **AnalogValExtAlm** widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime





8.1.19 AnalogValExtAlm_Small KPI Widget

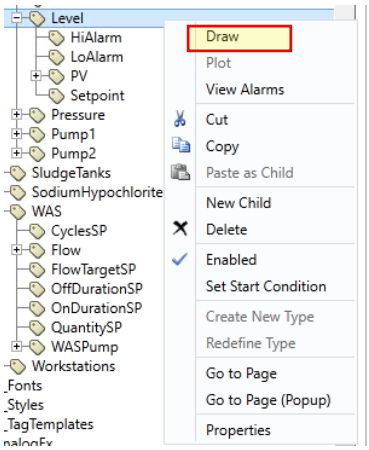
The Analog Value with External Alarm Small KPI Widget (**AnalogValExtAlm_Small**) is a custom widget that allows the user to monitor analog tags that were defined as AnalogExt type. This version of the KPI is smaller than the previous one. This KPI doesn't have a spark line for the analog value. It also has a text indication for the digital alarms that are related to the analog value.



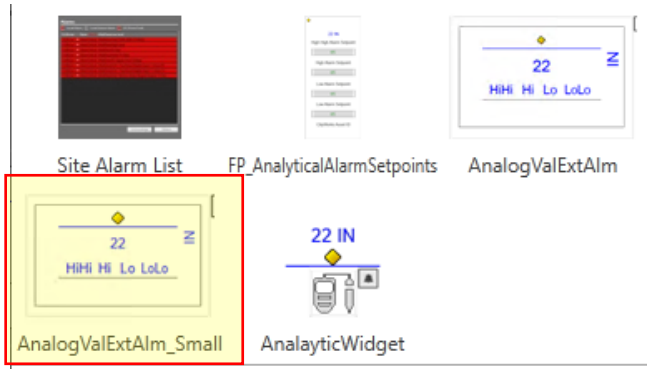
1- Analog current value (process variable)
2- Text indication for the digital alarms that are related to the analog value. The text will appear in the alarm event and it will be hidden in the absence of the alarm.
3- Analog value name
4- Analog unit
5- Analog value alarm indication for external alarms that come from the PLC. The severity of the alarm is represented by a number.

To add the **AnalogValExtAlm_Small** widget to runtime:

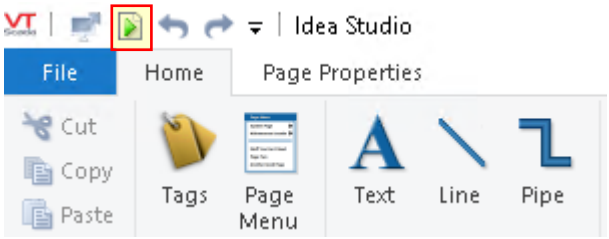
1- Go to Tag Browser and right click on any **AnalogExt** type tag then click **Draw**:



2- A new window will open that will show the available Widgets. Select **AnalogValExtAlm_Small** widget:



3- Place the **AnalogValExtAlm_Small** widget on the desired page inside the Idea Studio environment. From the top left corner, switch to runtime

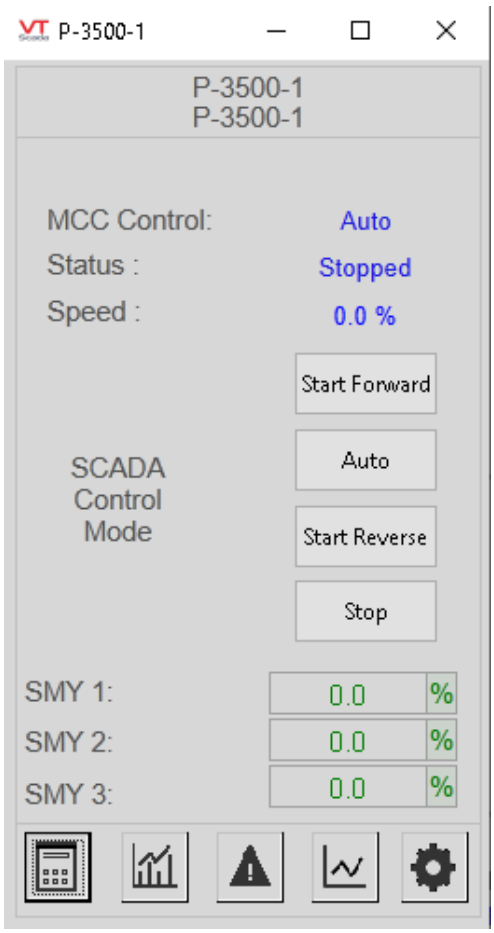


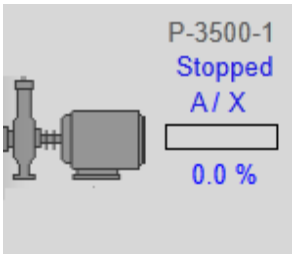
8.1.20 MBR Widgets

MBR widgets were created specifically for the Rotunda Water Reclamation Facility but can be used for future MBR systems in other facilities. The widgets are:

1- MBR Permeate Pump widget (**MBR_P_PumpWidget**): This widget is similar to the standard pump widget, but it has other functionality that is specific to the MBR permeate pump such as: Forward Start, Reverse Start, Stop, Stop 5 seconds, Manual Speed 1, Manual Speed 2, and Manual Speed 3.

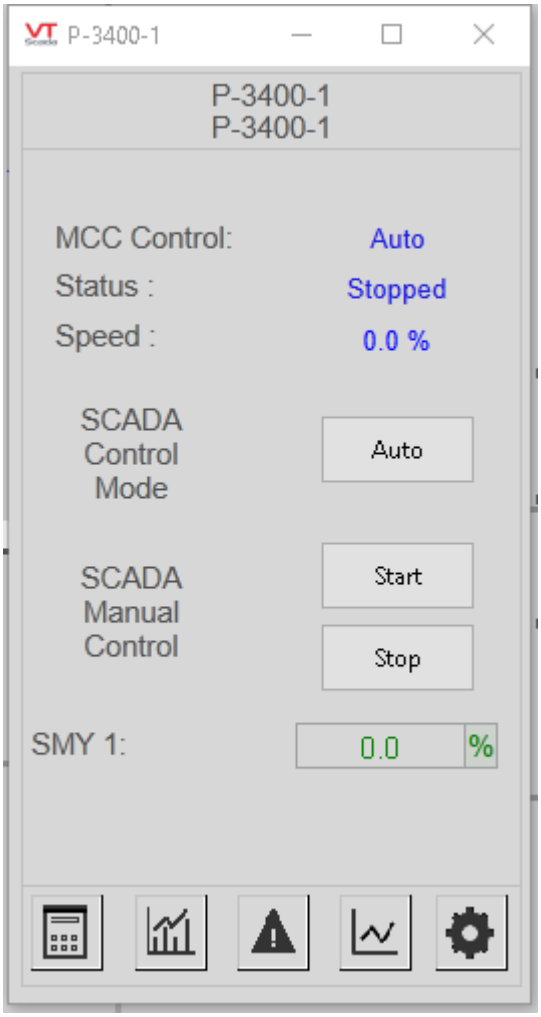
The **MBR_P_PumpWidget** is linked to a faceplate called **FP_MBR_P_Pump**. Clicking on the pump widget will open the faceplate in runtime.

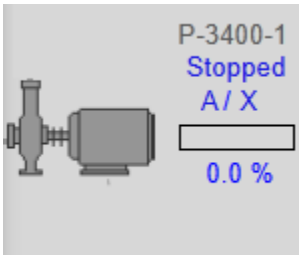




2- The MBR Recirculation Pump widget (**MBR_R_PumpWidget**): This widget is similar to the standard pump widget, but it has other functionality that is specific to the MBR recirculation pump such as Manual Speed 1.

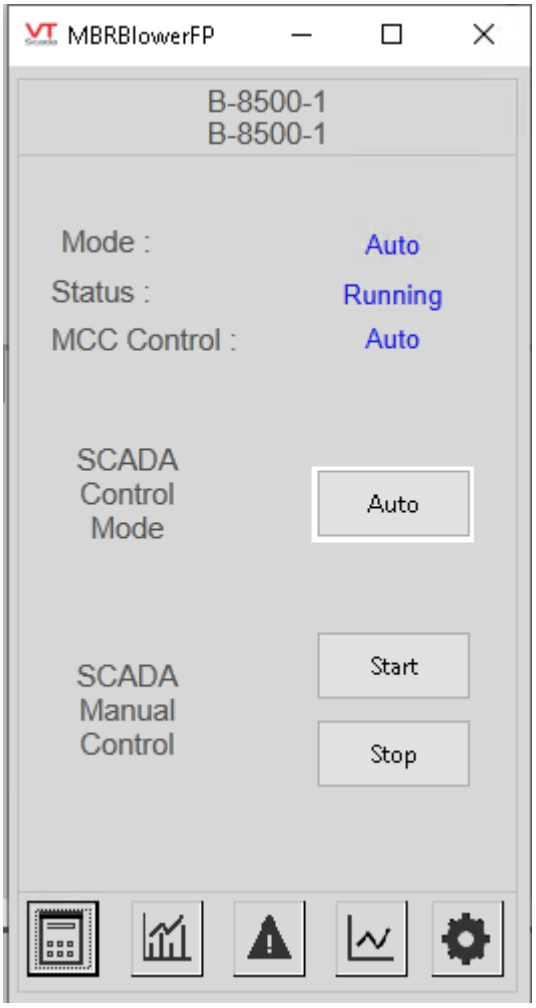
The **MBR_R_PumpWidget** is linked to a faceplate called **FP_MBR_R_Pump**. Clicking on the pump widget will open the faceplate in runtime.



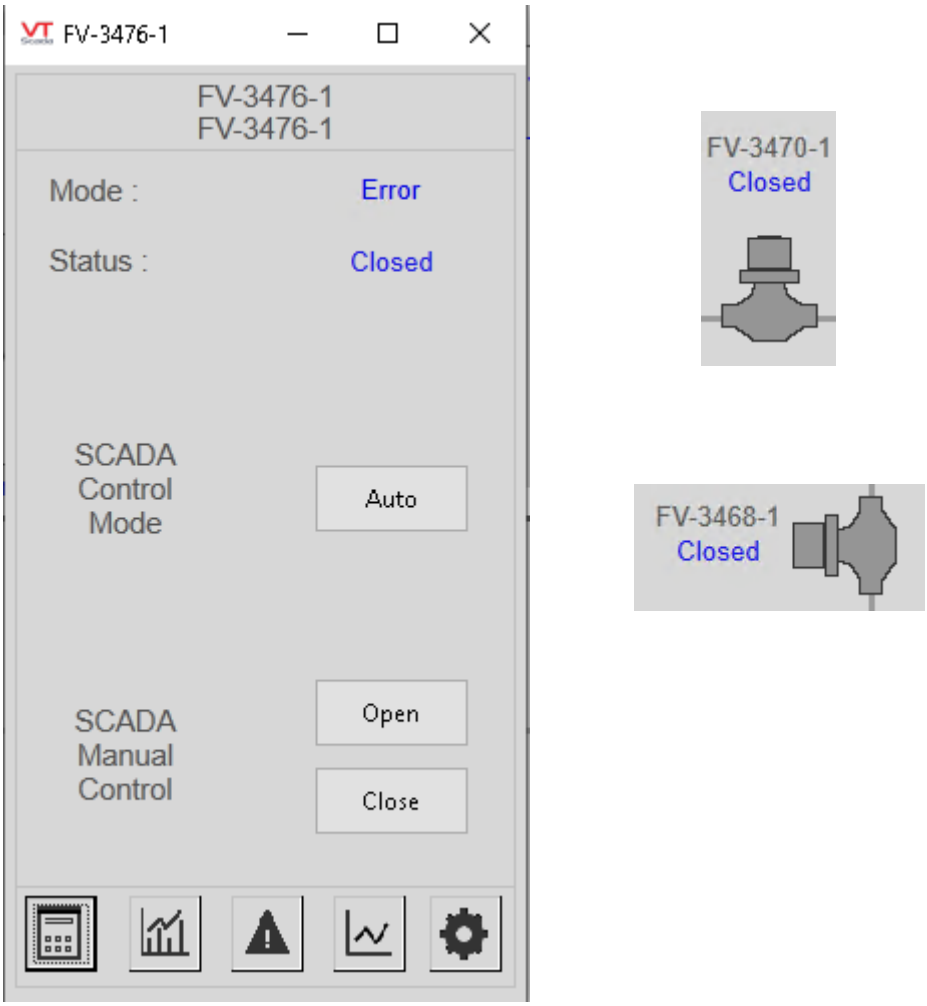


3- MBR Blower widget (**MBRBlowerWidget**): This widget is similar to the standard motor widget, but it has other functionality that is specific to the MBR.

The **MBRBlowerWidget** is linked to a faceplate called **MBRBlowerFP**. Clicking on the blower widget will open the faceplate in runtime.

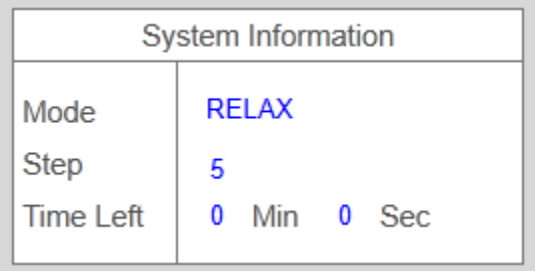


4- MBR Valve widget (**MBRValveWidget**): This widget is similar to the standard valve widget, but it has other functionality that is specific to the MBR. The **MBRValveWidget** is linked to a faceplate called **FP_MBRValve**. Clicking on the valve widget will open the faceplate in runtime.



To change the orientation of the valve, browse to the valve properties in the Tag Browser window. Type in "**v**" for **v**ertical and "**h**" for horizontal.

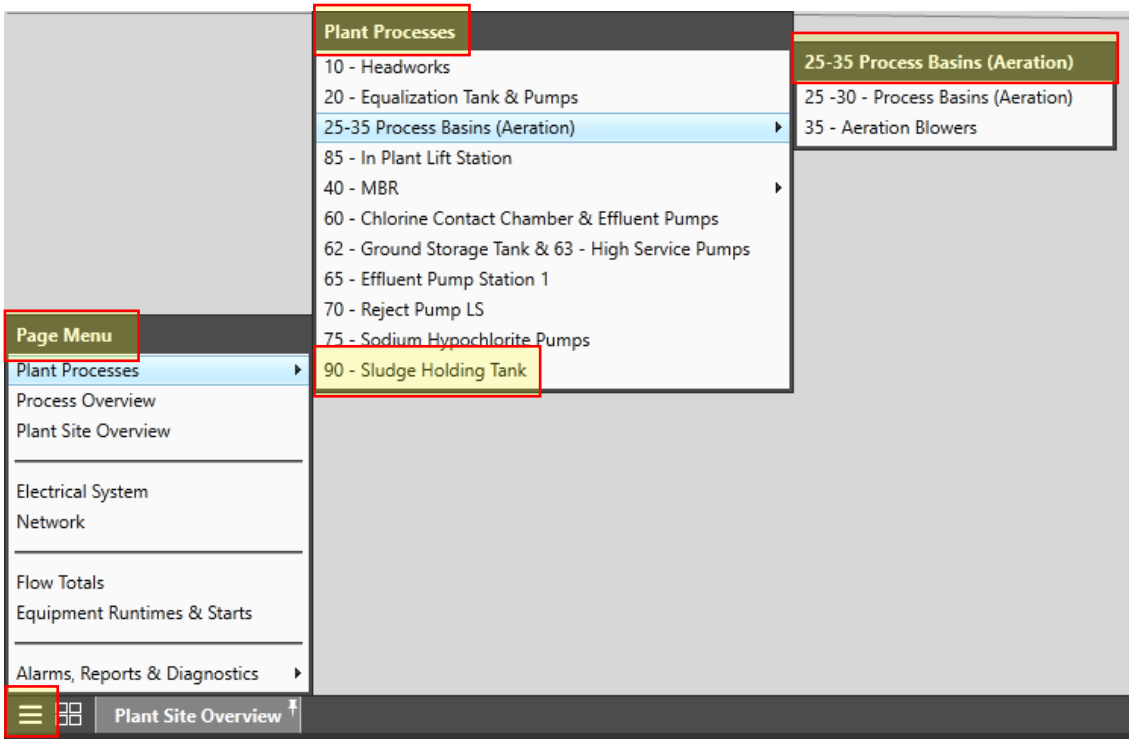
MBR Display widget (**MBRDisplay**): The **MBRDisplay** widget is a KPI widget that is specific for the MBR process.



9 Overview: Pages and Navigation

Understanding the methods of navigation in VTScada is an important component of using the SCADA system. Each process has a dedicated page that allows the operator to control and monitor that process. Most of the pages are designed by the developer. However, some pages are integrated by default in VTScada such as Alarms, Reports, and historical data viewer.

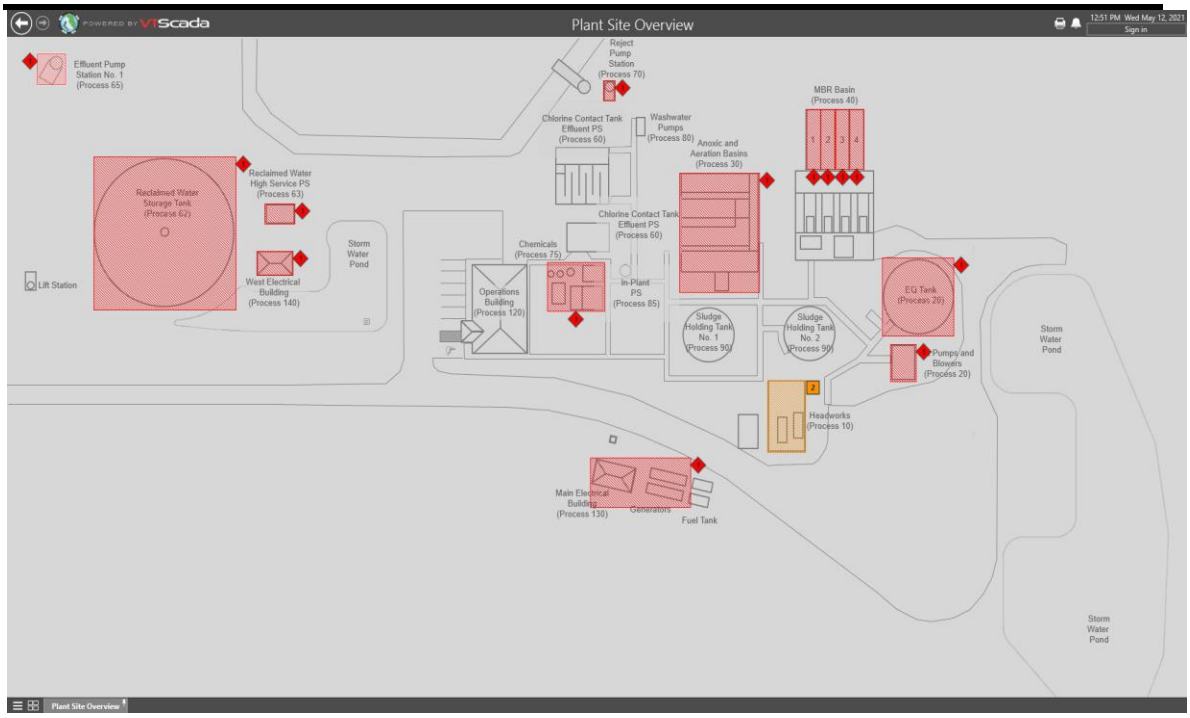
To access page navigation, click on menu list button at the bottom left corner of the VTScada application's screen:



As part of Charlotte County standards, the main pages such as Plant Site Overview and Process Overview will be on a main list called **Page Menu**. The plant process pages will be on another sub list called **Plant Processes**. If one of the processes has more than one page, they will be put together on a second sub menu such as **Process Basins** and **MBR,** as shown in the above picture.

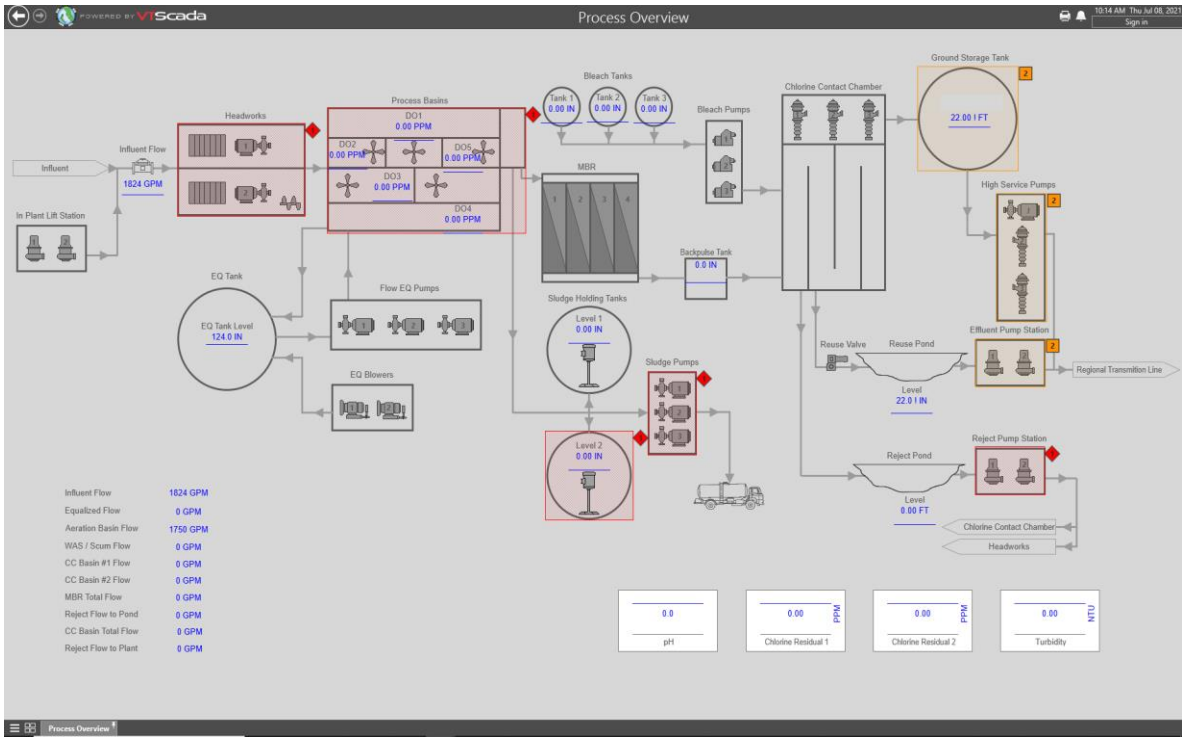
All the plant processes will start with a number that corresponds to the P&ID number for that process. For example: **90 – Sludge Holding Tank**.

9.1.1 Plant Site Overview



A **Plant Site Overview** page will show the plant processes based on the site map. Clicking on any process area will open the page for that specific process. Each process area will be highlighted in a predefined alarm color if there is an alarm in that specific process area. The color of the alarmed area depends on the alarm priority. Alarms and alarms priority are the only indications available on this page. Alarm's priority will be discussed in later sections. Right clicking on the alarm box will allow a user to view the alarms in that area via a popup window.

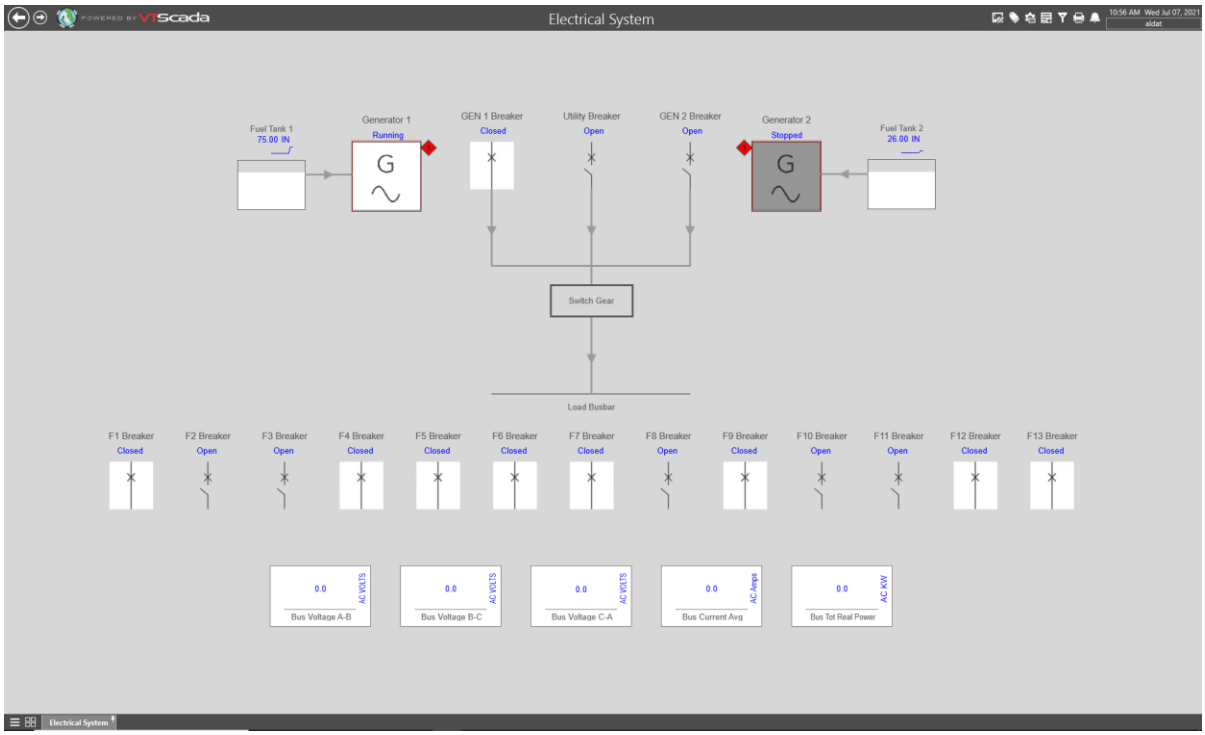
9.1.2 Process Overview



A **Process Overview** page will show the plant processes based on the Process and Instrumentation Diagram (P&ID) or flow path through the plant. The **Process Overview** page will provide an overall status for the plant. It will provide data such as pumps status, valves status, analog instruments values (Flow, Level, Cl2 Residual, etc...), statistical charts, area alarms, and alarms priority.

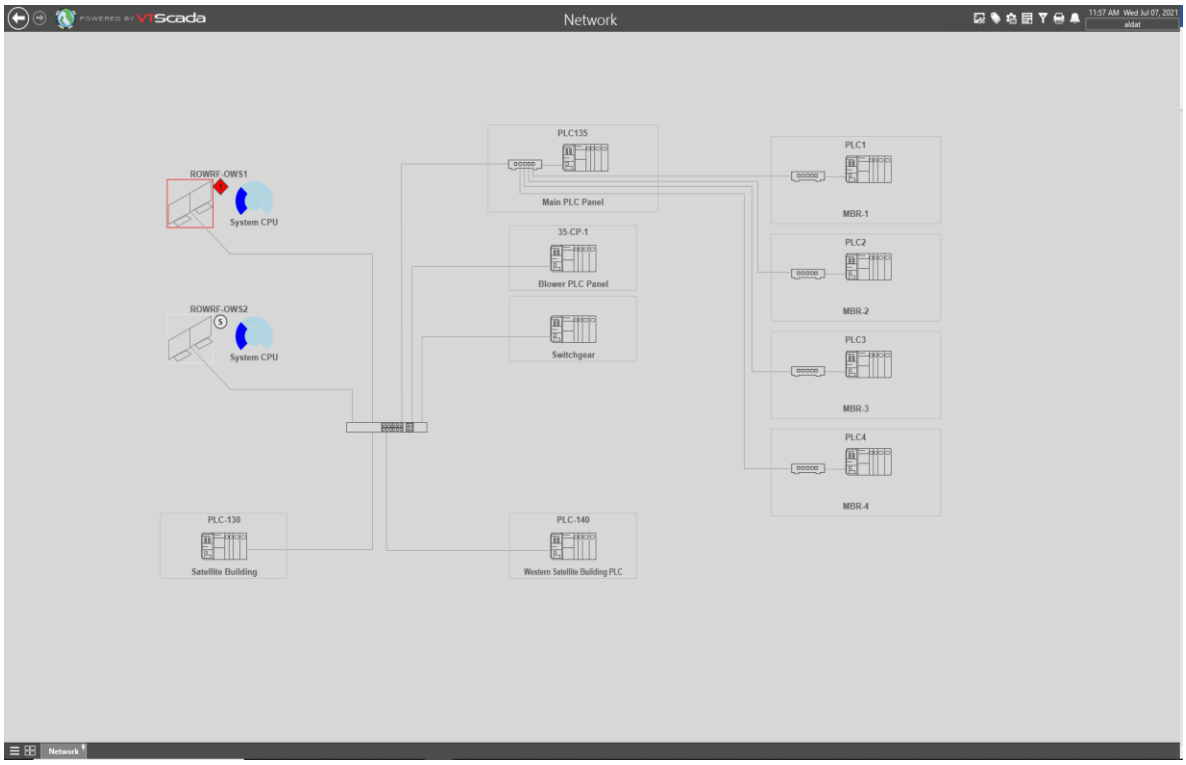
Clicking on any process area will open the page for that specific process. Each process area will be highlighted in a predefined alarm color when there is an alarm event in that specific area. The color of the alarmed area depends on the alarm priority.

9.1.3 Electrical System



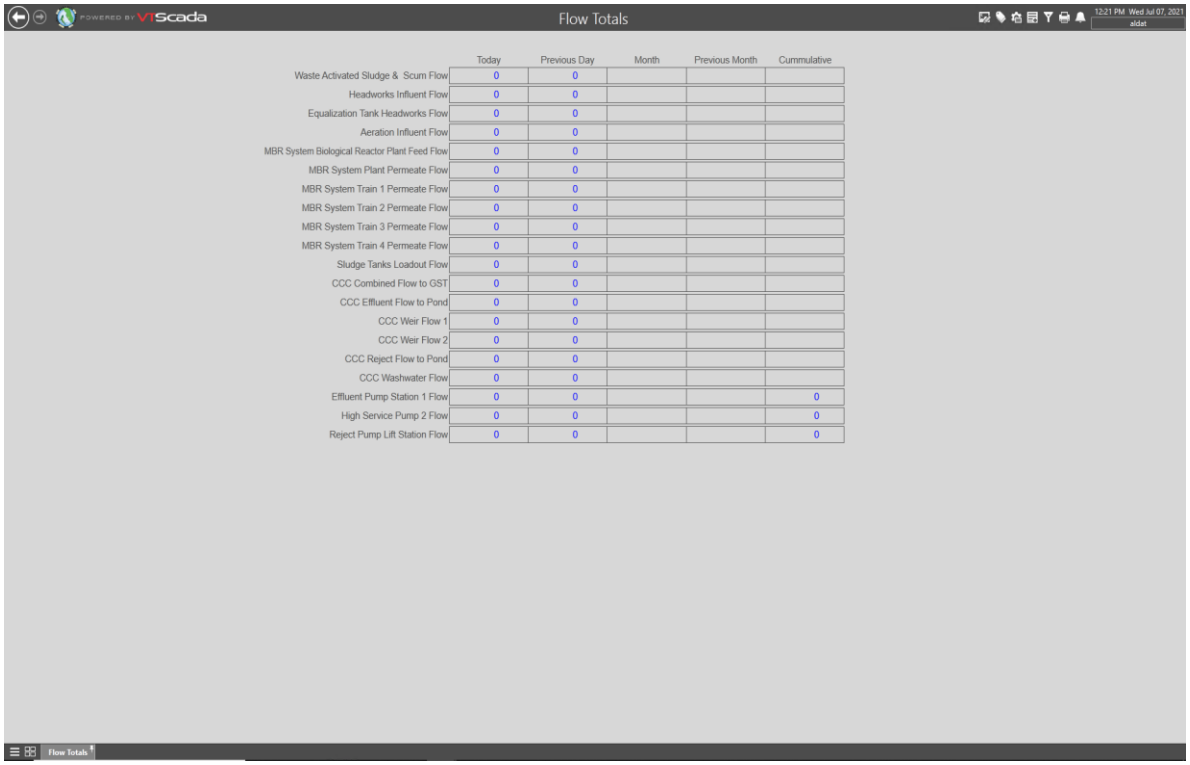
The **Electrical System page** shows the plant electrical system in a simplified configuration using a single line diagram. Main components such as generators, fuel tanks, and breakers are indicated by a customized widgets that will indicate the status of each component. The overall diagram provides information on how the components connect and how the power flows through the system. The page also includes **Key Performance Indicators** (KPI) that will show numeric data about the electrical system such as voltage, current, and real power, depending on availability.

9.1.4 Network



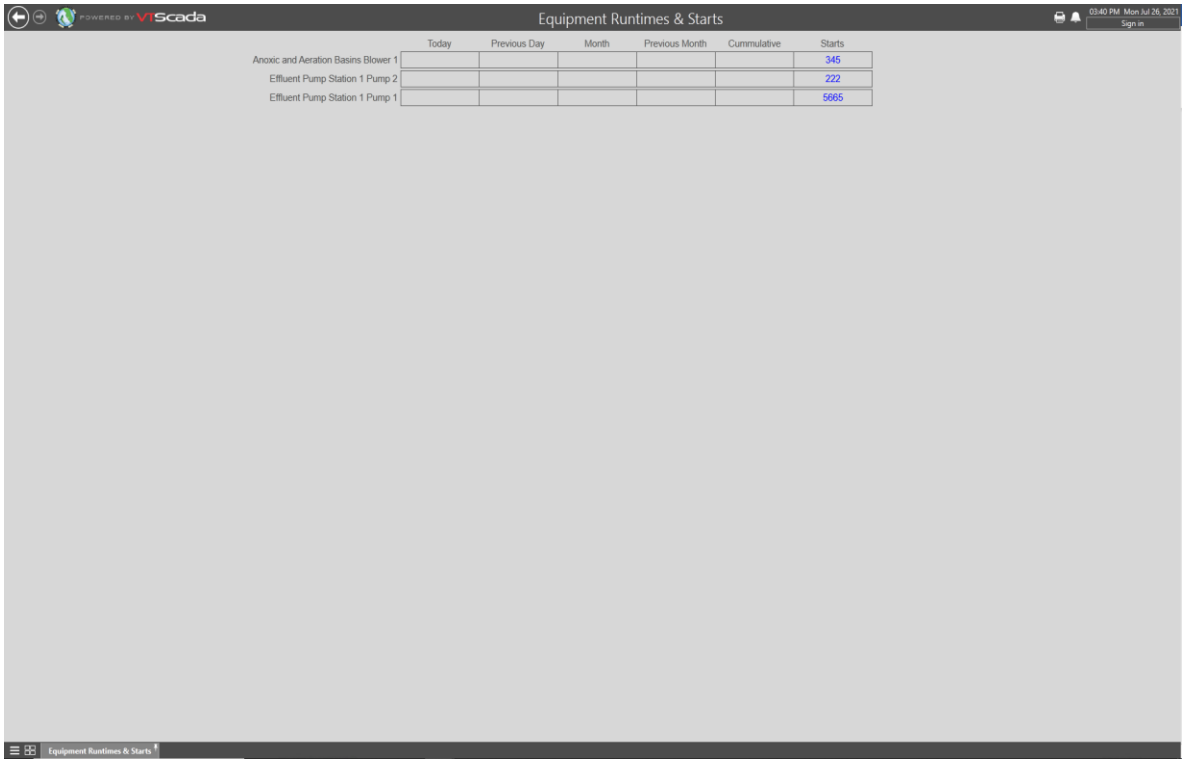
The **Network** page shows the overall plant SCADA communications network and shows how the SCADA servers are connected with the field devices (PLCs). Main components such as SCADA servers, switches, and Programable Logic Controllers (PLCs) are represented by customized widgets that shows that status of each component. The SCADA server widget will indicate the server's total processor usage and it will alarm in the event of a communication loss. The PLC widget will also alarm in the event of communication loss.

9.1.5 Flow Totals



The **Flow Totals** page indicates the plant overall flow totals. If the user creates a new flow tag, the flow totals for the new tag will be automatically added to this page as part of the flow total widget **FlowTotalsWidget** functionality. There are five total columns available: Today, Previous Day, Month, Previous Month, and Cumulative. The flow total tag will only show in the list if its available in the PLC. Determining the top bottom order of the totals, depends on a unique number get assigned to each total tag.

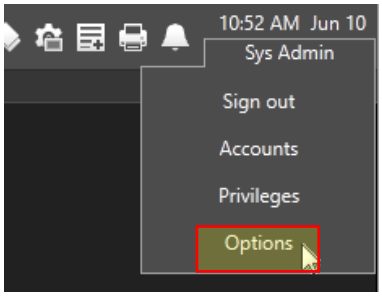
9.1.6 Equipment Runtimes & Starts

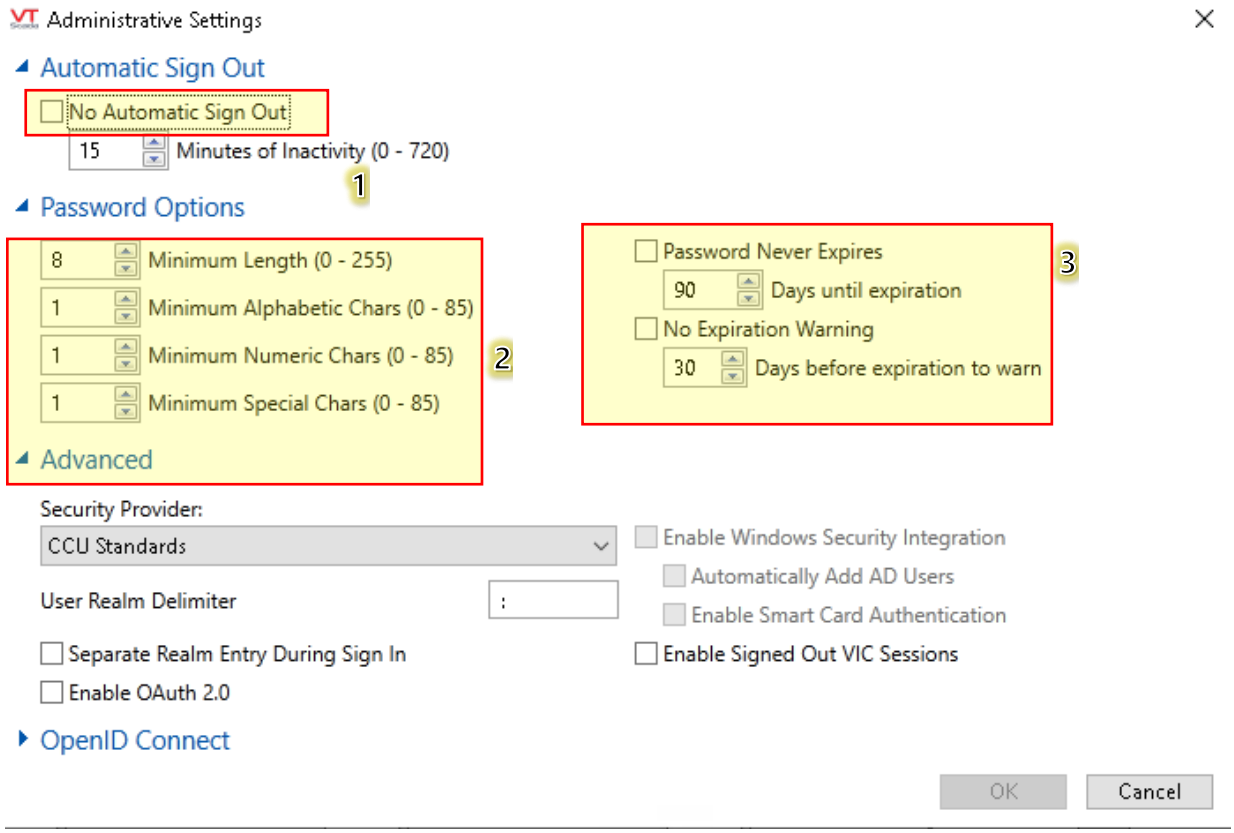


The **Equipment Runtimes & Starts** page shows the total runtime and total number of starts for motors and pumps. If the user creates a new pump tag, the new pump total runtime and starts will be automatically added to this page as part of the equipment runtime and starts widget **EquipRuntimesStartsWidget** functionality. There are six totals columns available: Today, Previous Day, Month, Previous Month, Cumulative, and Starts. The equipment runtime will only show in the list if its available in the PLC. Determining the top bottom order of the totals, depends on a unique number get assigned to each equipment tag.

10 Security

As part of Charlotte County standards, the accounts security was set with some complexity to make the application more secure. The setting in the Administrative Options dialog will apply to all users. Accounts that possess the Administrator privilege can control options such as minimum password length, automatic log-off time and more. These controls can be found under the **Administrative Settings** dialog, which opens in response to "**Options**".





1- VTScada is configured to sign users out when the application is left idle for a defined period of time. As part of the County standards, the application will sign users out after being idle for 15 minutes. The valid range is from 0 (no automatic sign out) to 720 minutes (12 hours).

2- The four spin boxes define the required strength of passwords. Password strength is a measure of how difficult it is to guess the word. In general, words from a dictionary are easily guessed by a hacker. Words that include a mix of letters, numbers and symbols are more difficult. The longer the password, the more difficult it is to hack.

Minimum Length - Sets the overall minimum number of characters. It ranges from 0 characters (no restriction) to 255 characters.

Minimum Alphabetic Characters - Sets how many letters must be included in the password.

Minimum Numeric Characters - Set to a number greater than 0 if you want to require passwords to contain numbers.

Minimum Special Characters - Set to a value greater than 0 if you want to require passwords that contain symbols such as @#$%, etc

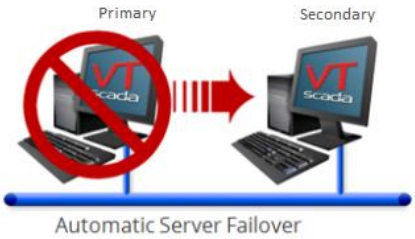
As part of the County standards, the minimum length for passwords was set to 8. The password must include a minimum of one alphabetic character, minimum of one numeric character, and a minimum of one special character.

3- The two boxes will determine how often the user must change the password. As part of the County standards, the user is required to change the password every 90 days. The user will be warned about changing the password 30 days before the password expires.

One workstation at each facility is provided with an RFID card reader. All workstations can be configured to have one and provides a second convenient option for users to login using an electronic ID card. The unit used initially was a Wave ID model RDR-6081AK0 and it acts as a serial port. Note, ASCII card readers do not work with VTScada. Also, newer models may become available but only use the ones that emulate the serial port.

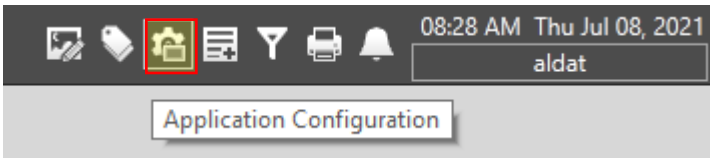
11 Redundancy and Automatic Failover

VTScada supports unlimited synchronized servers with automatic failover. Each server maintains a complete copy of the application tags, security settings, displays, scripts, networked variables and configuration history. Each plant in the County will have a primary and a secondary server. If the primary server fails, the secondary server will become the primary server, managing the communications, alarm system and historical data collection. This means no information or functionality is lost if the primary server fails.

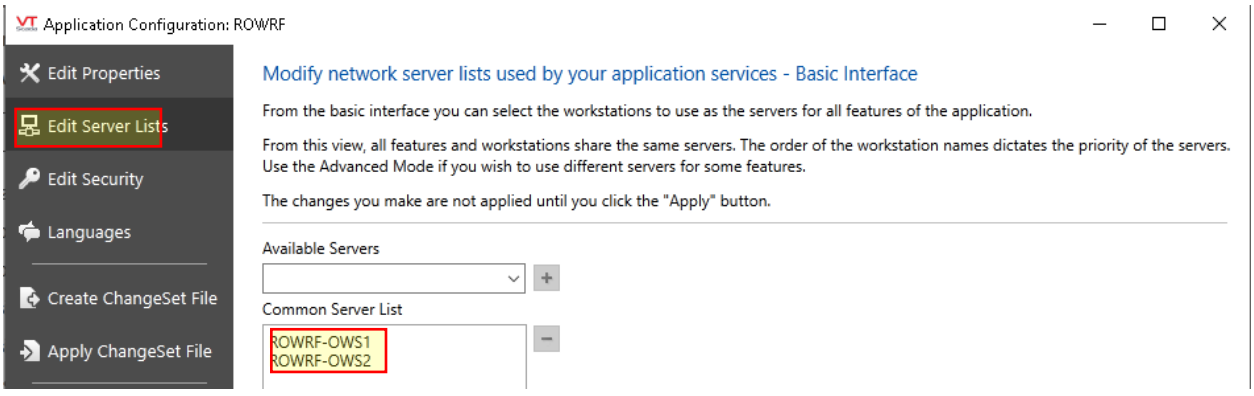


To access the available server list:

1- Login to VTScada with high privileged user and click on the **Application Configuration** icon from the top right corner:



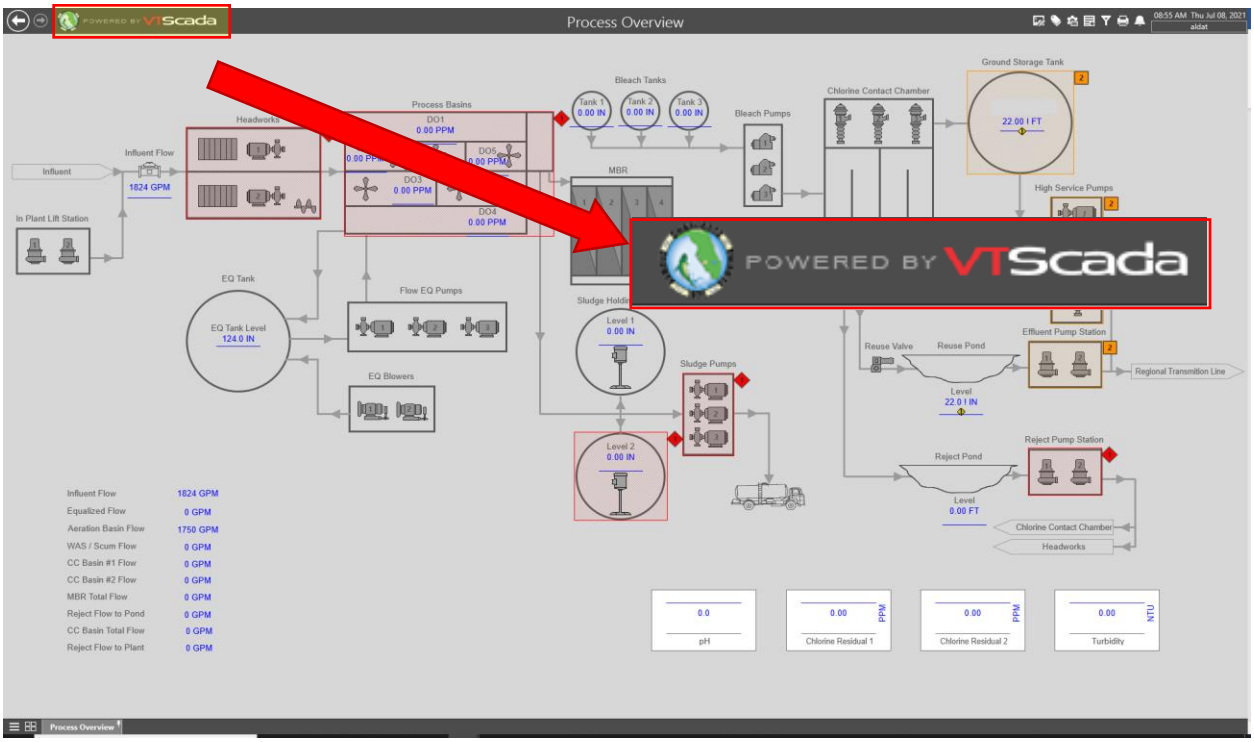
2- From the left side panel, click on Edit Server Lists:



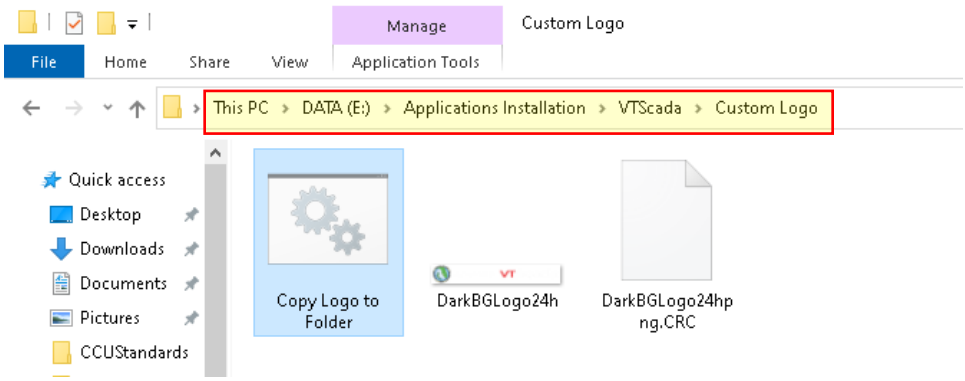
Note: XL reporter software and the alarm notification server are not redundant. They are only installed on the primary server (OWS1).

12 Custom Logo

VTScada allows the user to add a custom logo to its SCADA application. As part of Charlotte County standards, the County logo will show on the top left side of the SCADA application.

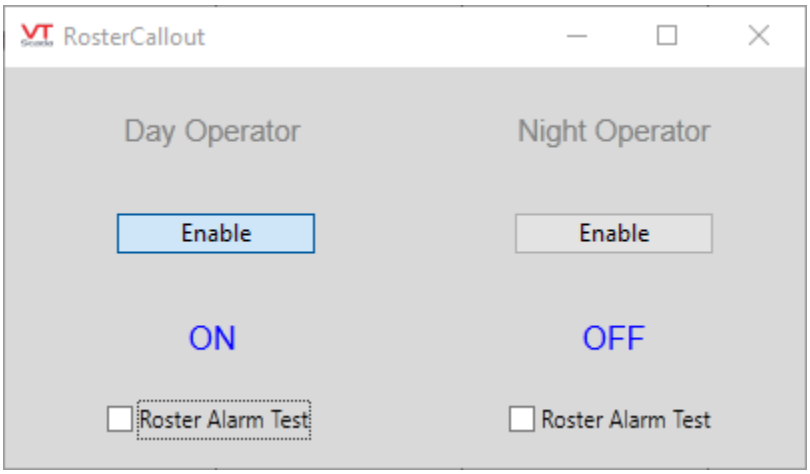


Updating VTScada software to a newer version will overwrite the custom logo with the default VTScada logo. A batch file called “Copy Logo to Folder” was created under VTScada directory “E:\Applications Installation\VTScada\Custom Logo” to solve this problem. Double clicking the batch file will change the custom logo in the application back to the Charlotte County logo. This step must be done with the application stopped.

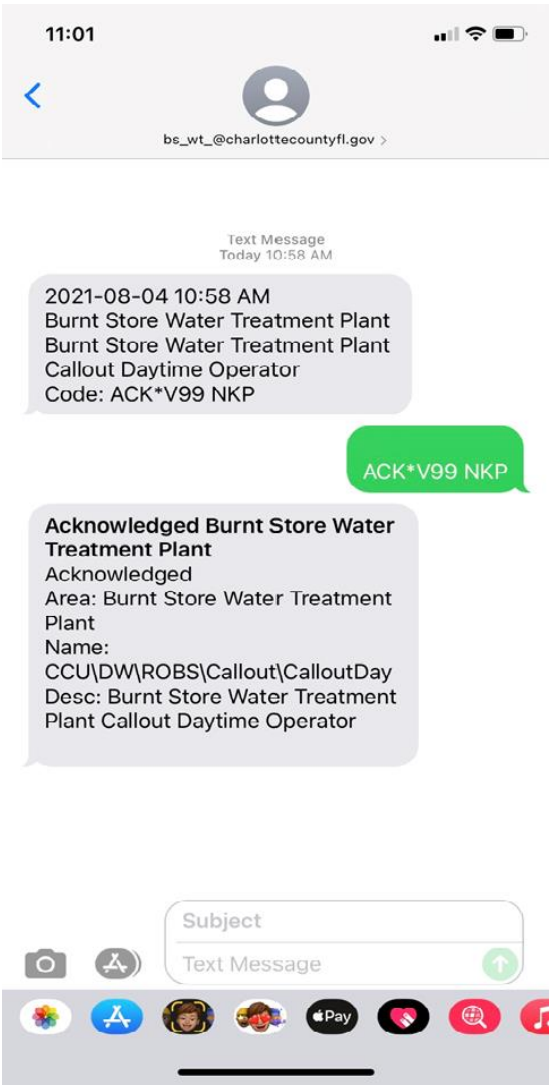


13 Remote Notifications

Each VTScada application is setup to use texting as the method for remote alarm notifications. During the day, the roster is set to text the Operator's phone, at night the texts will go to the Chief Operator's or Night Operator's phone. This can also be changed by manually selecting the opposite on the roster page.



When a text is received on the phone, the person receiving the text should reply to the text with the acknowledgement code. The green part of the text below is acknowledgement code sent to VTScada and the text below is the system notifying the alarm has been acknowledged. Note this action only acknowledges the alarm and does not change any operating parameters or correct the alarm issue.


11:01
bs_wt_@charlottecountyfl.gov
Text Message
Today 10:58 AM
2021-08-04 10:58 AM
Burnt Store Water Treatment Plant
Burnt Store Water Treatment Plant
Callout Daytime Operator
Code: ACK*V99 NKP
ACK*V99 NKP
Acknowledged Burnt Store Water Treatment Plant
Acknowledged
Area: Burnt Store Water Treatment Plant
Name: CCU\DW\ROBS\Callout\CalloutDay
Desc: Burnt Store Water Treatment Plant Callout Daytime Operator
Subject
Text Message