VACUUM SOLUTIONS

Instruction manual

Busch Monitoring System 2.0

Busch Manufacturing Korea, Ltd.
189-51, Soicheon-ro, Majang-myun
Icheon-si, Gyunggi-do, 467-813
Republic of Korea

0870731454/-_en / Original instructions / Modifications reserved

05/05/2020

The Busch Monitoring System User's Guide packaged along with the Busch Monitoring System application, includes all the information for the effective usage of system. This consolidated guide provides you enhanced documentation usability and quick navigation to relevant information through its well designed Table of Content and Index.

Change Description	Section mber Changed	Version No.	Date of Revision	Revised By	Approving Authority
Base line	All	1.0	03/ May/ 2019	Dae Young Lee	Dae Young Lee

Contents

1. Introduction to Busch Monitoring System

The Busch Semiconductor Vacuum Group Central Monitoring System is a fully integrated and computerized system that allows the owner to monitor all operating characteristics of up to 1000 Busch Cobra systems at one time. This can be accomplished through the use of a single computer system allowing for all information to be real time monitored and viewed from one location. This becomes extremely beneficial where a large number of pumps are installed, and the location is such that having to go to each installed location to view operation parameters is both time consuming and somewhat unpractical.
The use of a central monitoring system can allow a single operator to display, print, monitor for alerts, and historically store graph, all from a single computer system. This provides maximum informational benefits with minimal personnel time and cost. In common practice, a large installation base within a facility will operate their systems, while trying to manually monitor every system for warnings and alarms and, logically, does not yield the desired results. Modern pumping systems have highly sophisticated electronics on board to monitor and alert all of its operating functions. When an alert condition occurs, local alarming is displayed along with O.E.M designed tool interface warning. In many cases, the O.E.M. tool interfaces are not adequate to display all of the pumping systems parameters, and therefore many alerts go unnoticed until system failure occurs.

Along with this, many facilities design in ‘’Preventative Maintenance’’ programs and logging procedures based upon the trend values of the pumping systems parameters. This is accomplished through time consuming, manual informational logging with personnel having to visit each installation site and write down the systems information.
With many existing facilities having hundreds of systems, this is very costly and arduous. And therefore, often times not done correctly to yield maximum benefits.

The use of the Busch Monitoring system and its options can provide all the information of every pump in operation through the use of an Ethernet high speed computerized network system. It is fully automatic in its operation and will provide all the ability to view a single pump with all of it is individual parameters displayed at one time, or the overall system’s alert status.

The functional capability of the system provides complete command and control as well as monitoring and data storage. Any and all programming and operational control can be established through the Central Monitoring system. This provides the ability to view and control from any user desk computer if so configured. All of these high-level functions can be password protected so that security of operation is always maintained while give system users ultimate convenience of operation.

1.1 About Busch Monitoring System

The Busch Monitoring System is a SCADA based application for monitoring vacuum pumps or other devices allowing a network connection (LAN).

The unique features of Busch Monitoring System are:

- Enterprise level high speed vacuum pump monitoring ability
- SCADA based application
- Can monitor about 1000 pumps connected to one main server
- Support for Modbus TCP protocol-based communication with pumps
- Pumps can be configured rapidly using Pump Configuration Templates
- Efficient data storage and support for storing up to 1000 pumps every second data up to 6 months

  (Increasing the storage period depends on the PC's capacity.)
- User authentication and authorization for accessing BMS 2.0 console and functionalities
- Complete control on all the pumps data acquisition through BMS 2.0 console
- Monitoring support for about 10 concurrent users (Optional & by WEB)
- Excel reporting of Totaled Consumption data, Events list, etc...
- Parameter's drift detector
- E-mail, and SMS support for alert escalations

  (SMS: Need to have customer own server & machine)
- Monitoring ability of
- other devices through external database device configuration

1.2 Specification of BMS 2.0

It needs to be understood that the design and set-up of all network systems is somewhat customized to the specific installation site. This is due to the fact that this Central Monitoring System is constructed the same as a full office computer network system. A central server system is used, or multiple servers if needed, along with RJ45 connection cables and workgroup switches to facilitate the data communications. Therefore, just as in office networks, each installation is designed around the needs of the user and the facilities locations. In the most typical case, thought must be given to the length of cable runs from the central server to the pumping systems. The most common design is to have switches located at each grouping of pumping systems. From this switch, a number of pumps are connected via RJ 45 connector cables.
The BMS 2.0 is software only by default, so the installation must take place on the customer side for the hardware installation.

In some cases, it may even be desirable to use multiple servers, which are then connected to a main server to allow for optimised design. This is certainly possible and would simply be a matter of desired design criteria.
That is why the first step to setting up a system is to have a facility audit accomplished with the Busch Semiconductor Networking specialists to allow for a design to be completed. Once the design is done then the system can be installed, generally without system interruption.

Basic Components Necessary:

- Busch Cobra Series Vacuum pump with available Modbus TCP.
- Central Server Computer for BMS 2.0 installation
- Busch Monitoring System 2.0 software
- Design designated switches ports
- Cabling with RJ45 connectivity, category 6
- License key (Dongle) for BMS 2.0

H/W Specification
This section lists the pre-requisites for installation of BMS 2.0.
(Installation Recommended Specifications)

- Install .Net framework 64 bit or 32 bits as per the machine configuration.
- Window 7
- Processor: Over Intel Core i5.
- HDD: over 1 TB
- Memory: Over 16GB RAM
- Extended VGA with 1680 x 1050 pixels.
- Network connection: 100 MBit/s

1.3 Configuration of BMS 2.0

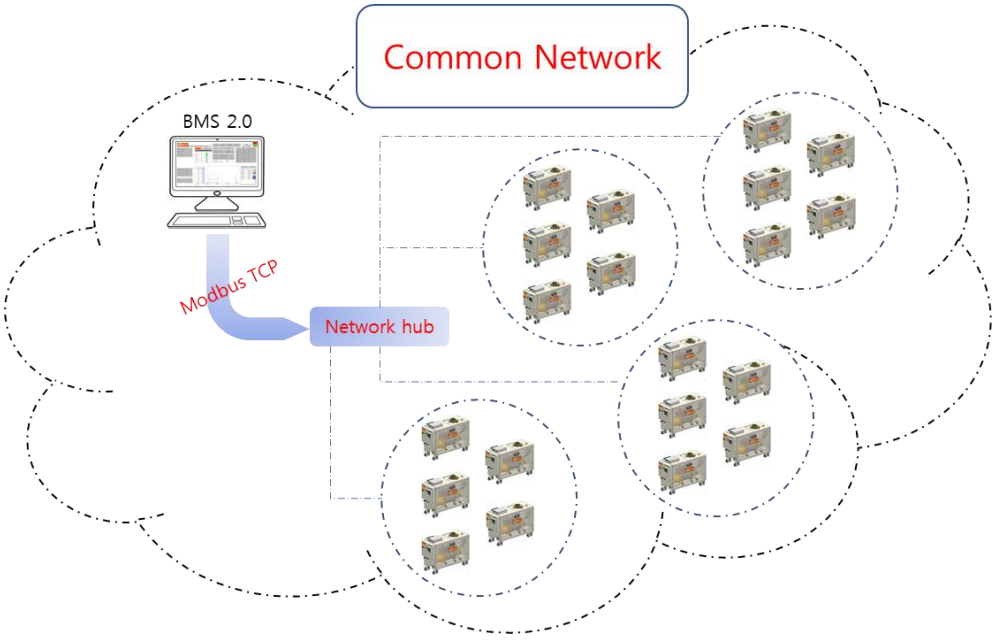


Fig 1. Network configuration

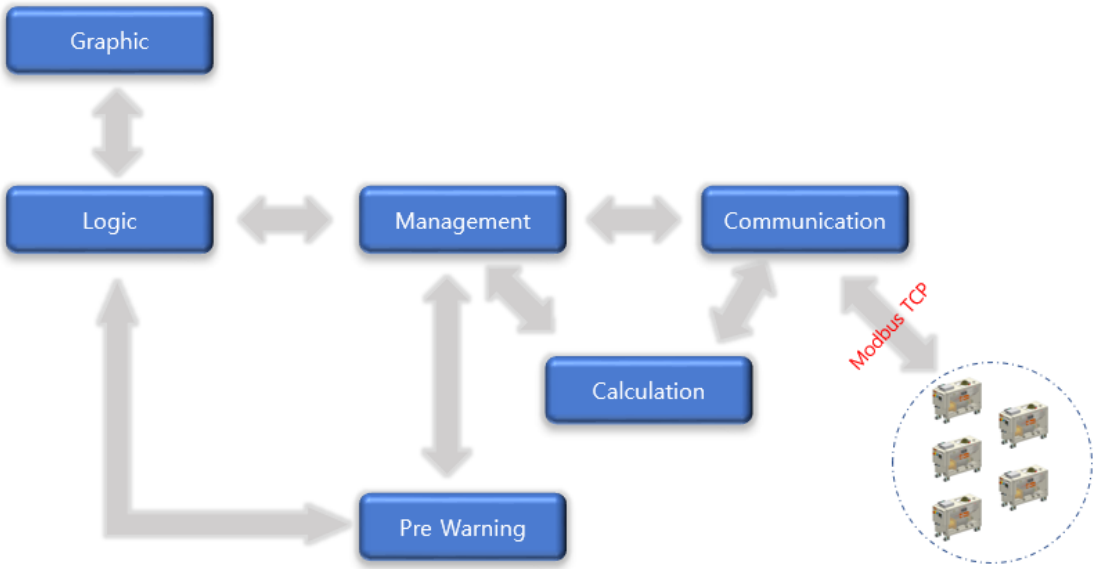


Fig 2. Software configuration

2. Installation

2.1 Install software platform (Zenon) of BMS 2.0 on window

Although external installation is not necessary because the hardware is provided by the supplier by default, the installation process of the platform is required for its own use or maintenance.

If you are installing the hardware for yourself, please follow the specifications described in 1.2.

Before installing platform of BMS 2.0.

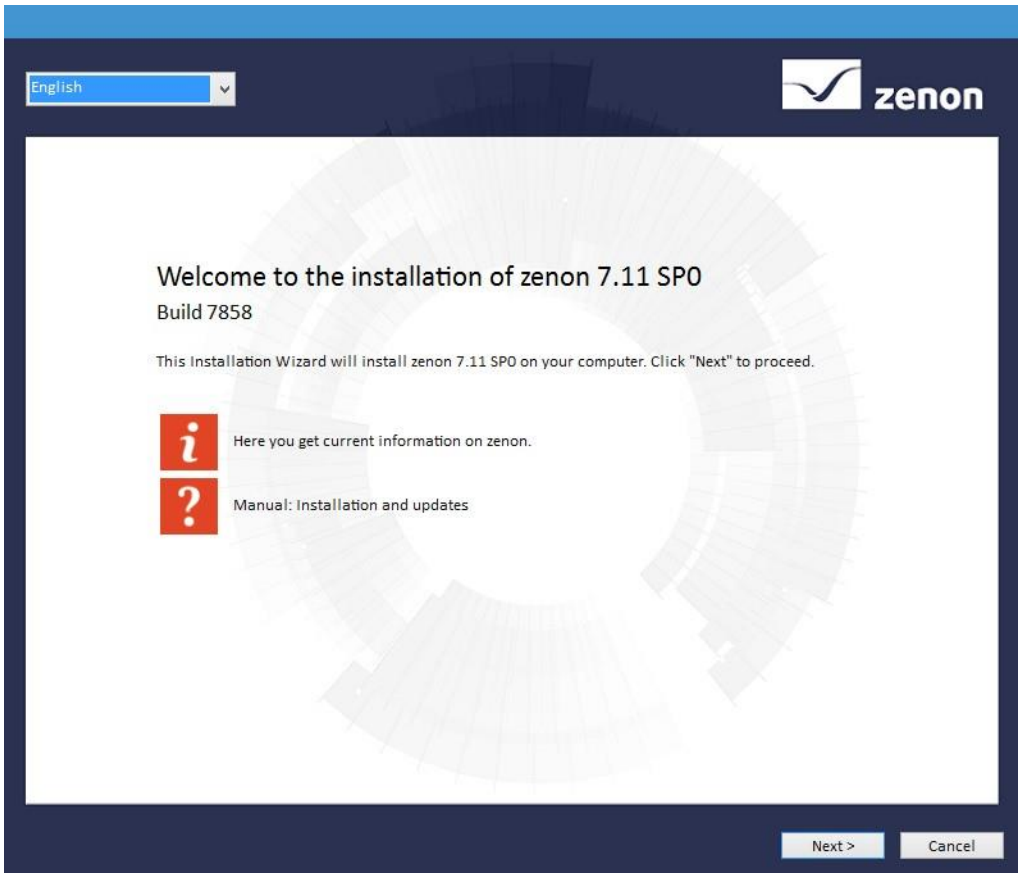
- All current operating system updates must be installed.
- There must not be a restart pending.

During the installation platform of BMS 2.0, Multiple Network Protocol Driver (cdprotdrv.sys) is installed. To start the driver, the operating system must be restarted after installation.
And platform works with an SQL database. This is also installed when platform is installed.
Software required for dongle protection (Wibu-Key or CodeMeter) is automatically installed and updated when platform is installed.

And because the management of these serial numbers is managed inside the BMS 2.0, if you use a license that is not managed by the supplier, the BMS 2.0 will not function normally.

Windows administrator rights are required for installation.
Standard Windows user rights are required for ongoing operation. The user account control (UAC) can be activated at the highest security level.

zenon will automatically start its installation routine and guide you through the whole installation process when the zenon installation medium is connected. Alternatively, it is possible to start the installation by executing **start.exe** in the root directory of your zenon installation medium.



1. You can see the version to be installed including the build number on the start screen.
2. Select the desired language for the installation from the drop-down list at the top left.
3. You can receive information on zenon with:
   - Click on button **i:** Opens the Flash player with information on the current zenon version.
   - Click on button **?** Opens the zenon help for installation as a PDF.

Attention: This page cannot be shown again later. If you need information on the current version or need the manual for installation, open it now.

4. Clicking on the **Next** button opens the window with the license conditions.
5. Confirm the license conditions by activating the corresponding checkbox. You can also print the

license conditions out by clicking on the **Print** button.

6. Clicking on the **Next** button opens the window to select the desired product.

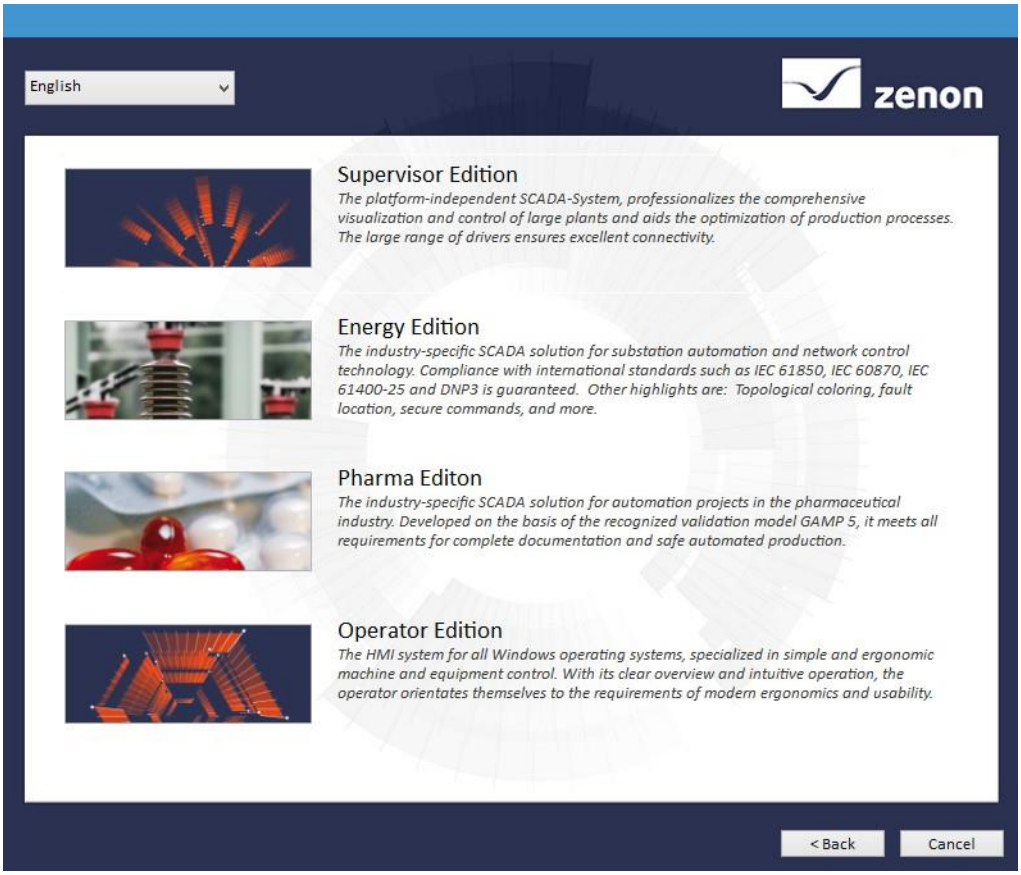
7. Select the desired product. It is only possible to select products that have not already been installed. If you want to reinstall something, you must first uninstall it using the control panel.

- Editor: Installs the zenon Editor and zenon Runtime. Other components required for the Editor are also installed together automatically.
- Runtime: Installs the zenon Runtime only.
- Web Server: Installs zenon Web Server and the respective current zenon Web Clients.

8. By clicking on the desired product, you open the window to select the edition.

9. Select the licensed version:
   - zenon Supervisor Edition (BMS 2.0 use this)

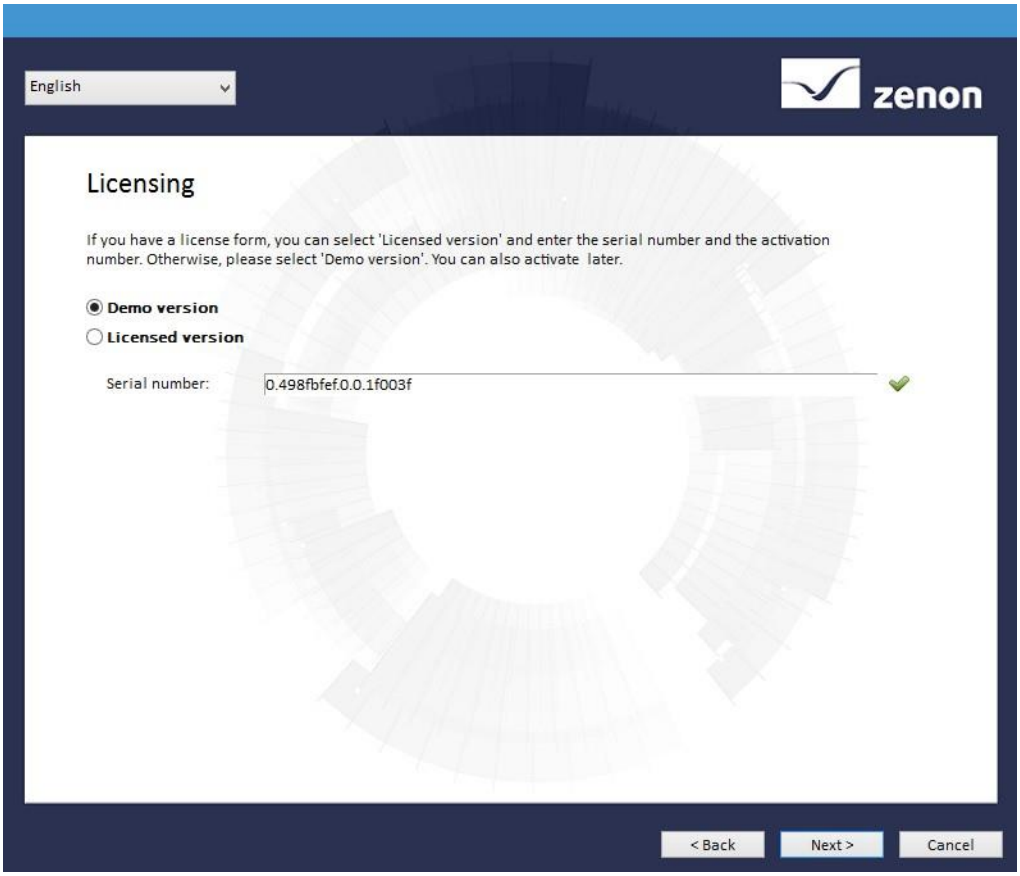
- zenon Operator Edition



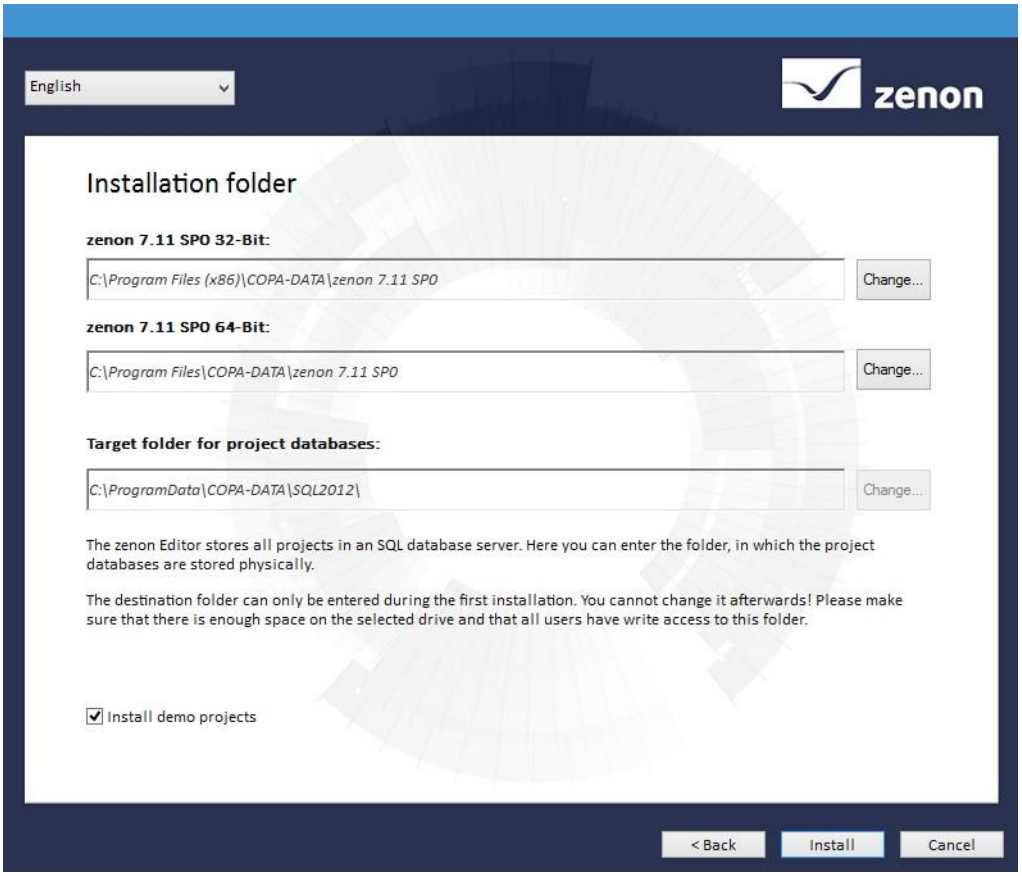
10. Click on the desired edition to open the window to select the type of installation:
    - **Install now**: Starts the installation of the selected edition.
      The computer may be restarted automatically during installation. Follow the instructions of the wizard
    - **Userdefined**: Opens other windows for individual installation.
      You can enter an existing serial number here and change the installation path.

    You select **user-defined** during installation, the window to enter the serial number is opened:

    Enter the serial number and activation number provided from KRM.



Clicking on the **Next** button opens the window to amend the installation folder



If necessary, define you individual folder for the 32-bit version and the 64-bit version of the program.

Define the target folder for the project database.

Note: This folder cannot be changed afterwards. The save location selected here must have sufficient memory space. All users need write authorization.

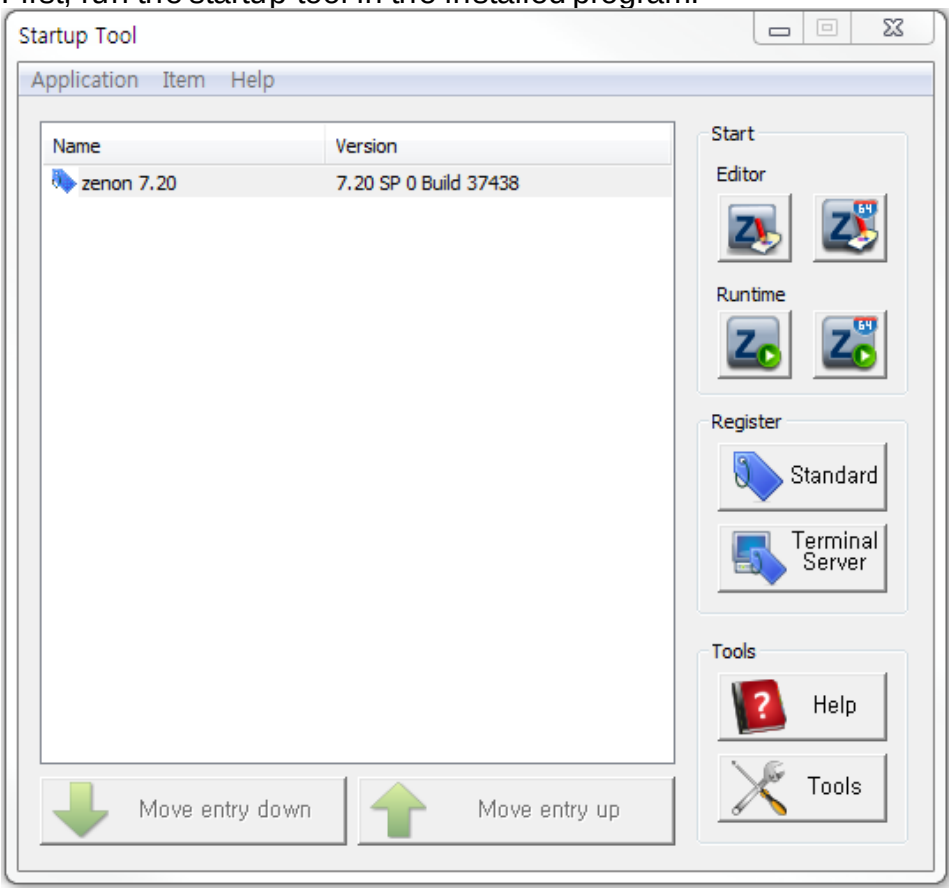
If you would also like to install the demo project, activate the corresponding checkbox.
The demo project provides examples of possible usage scenarios in different industries. You can find details in the section Encryption zenon Demo-Project.

Click on the **Install** button. Installation of the selected edition is started.
The computer may be restarted automatically during installation. Follow the instructions of the wizard

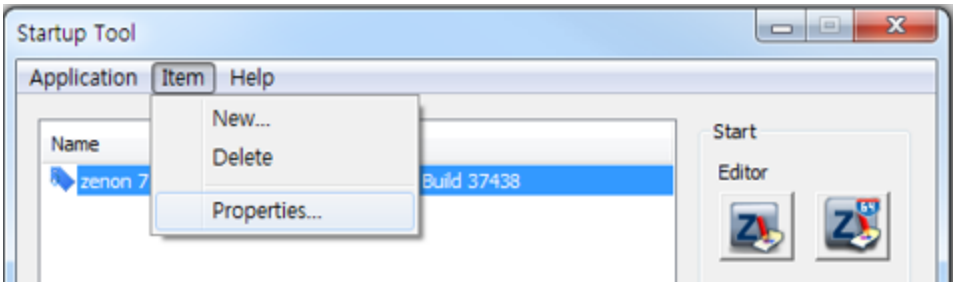
2.2 Update & Back up BMS 2.0

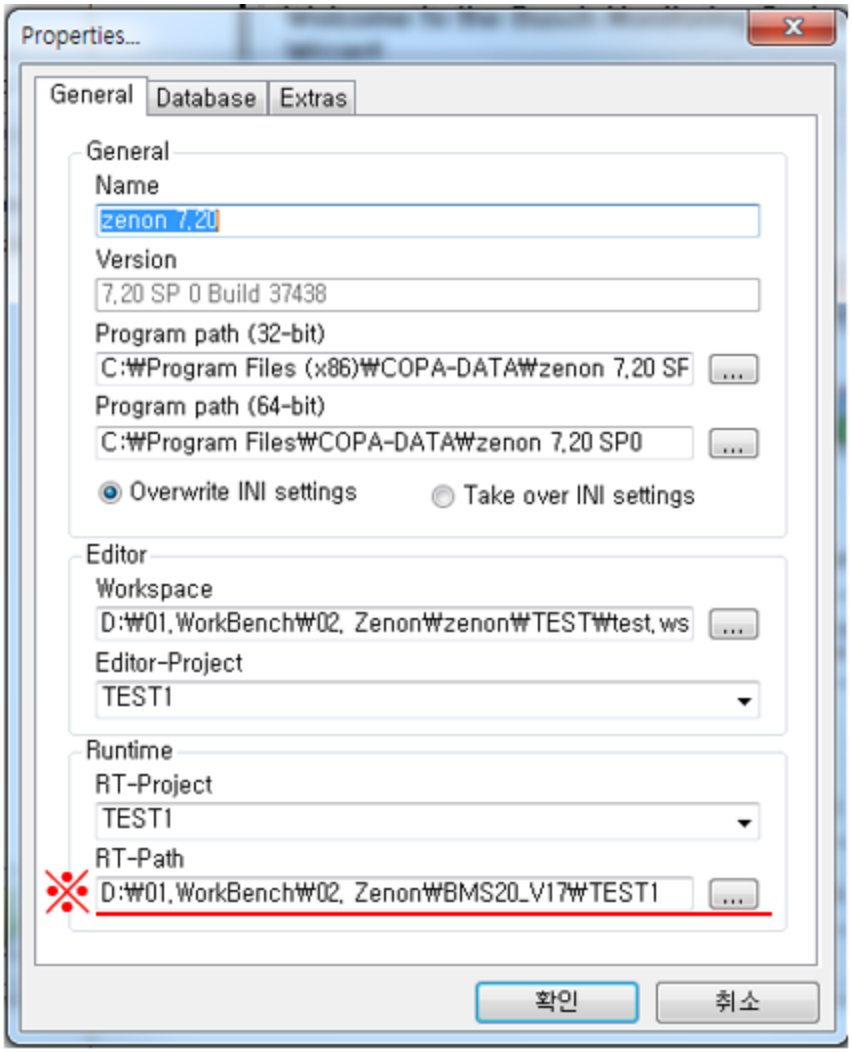
Once the platform is installed, must set up a folder of BMS 2.0 to run.

First, run the startup tool in the installed program.



Select “Item -> Properties”



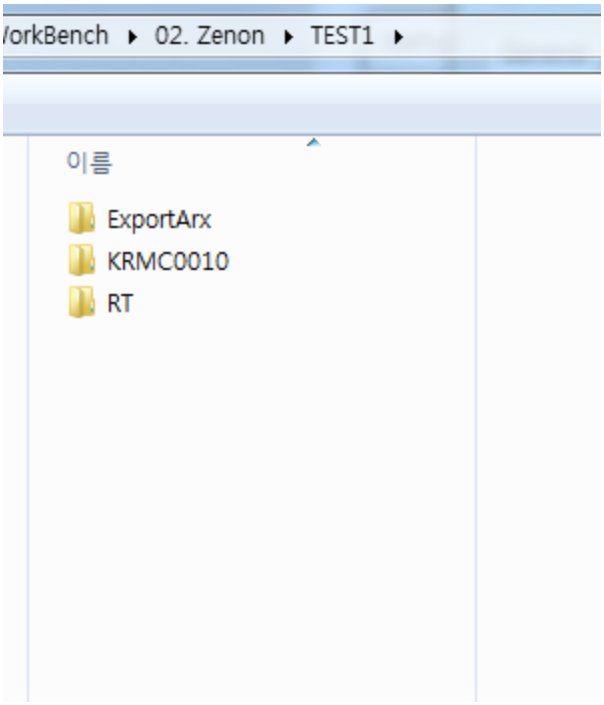


Enter the path with an ※ sign to run BMS 2.0.

Create logdata and program at the corresponding path. Set the save location well.

It is recommended to set path to drive where the operating system is installed.

If you use the hardware provided with BMS 2.0, you will see a folder already named RT in that folder, and if you do not have, you will unzip RT.zip file provided from Busch.



The BMS 2.0 program can be backed up by compressing the entire RT folder already performed. However, you cannot analyze source code because it is an executable file.
The BMS 2.0 version up or update will then be offered under title RT.zip in Busch and will only be updated by overwrite to RT folder.
Note that BMS 2.0 only operates on the license key provided by Busch, so keep in mind.

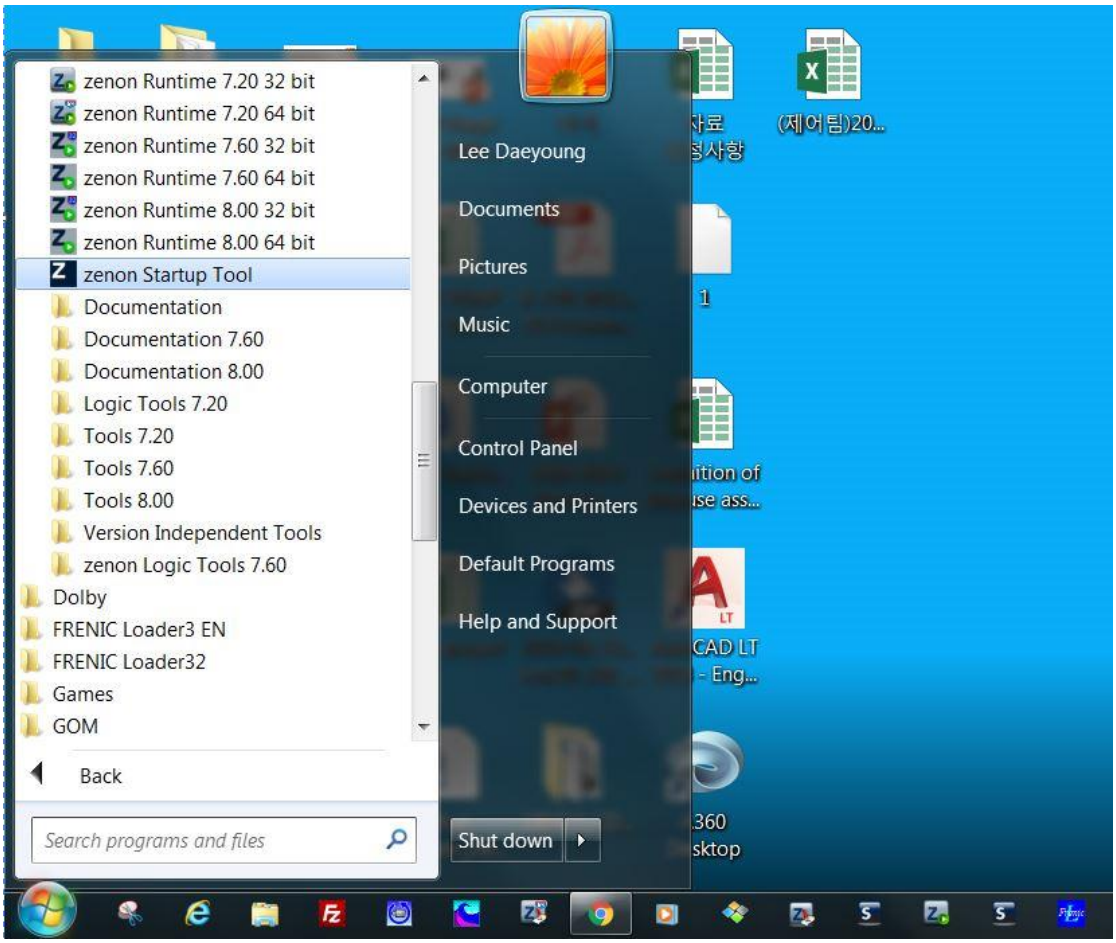
3. Operation application

The Busch Semiconductor Vacuum Group Central Monitoring System is a fully integrated and computerized system that allows the owner to monitor all operating characteristics of up to 1000 Busch Cobra systems at one time. This can be accomplished through the use of a single computer system allowing for all information to be real time monitored and viewed from one location. This becomes extremely beneficial where a large number of pumps are installed, and the location is such that having to go to each installed location to view operation parameters is both time consuming and somewhat unpractical.

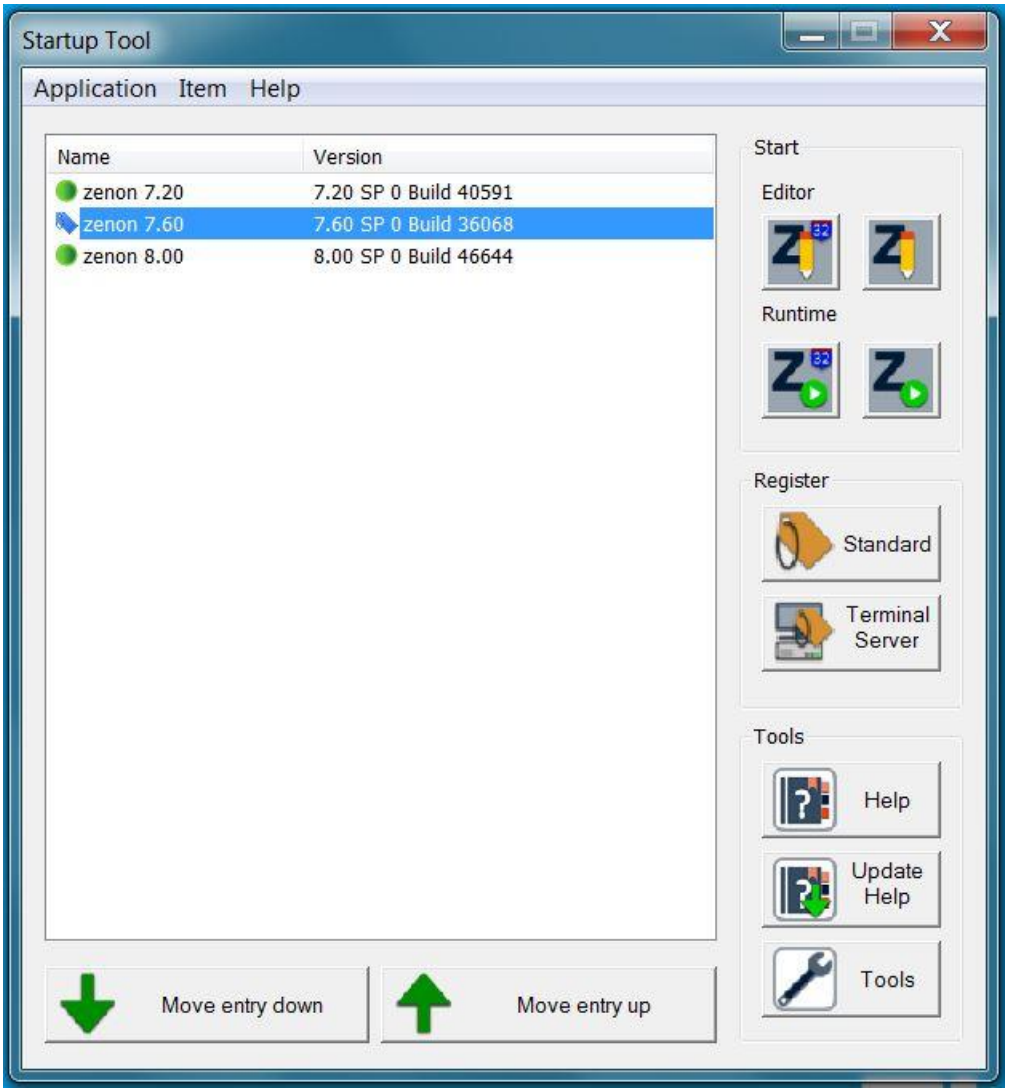
3.1 Common Menu

3.1.1 Start BMS 2.0

Before running the Bush Monitoring Program, the Firmware Installation and License must be enabled.



First, run the Zenon Startup Tool.
The icon is located on the start menu of window.



If you look at the menu, there show a lot of versions, preferably the latest version.
The corresponding version refers to firmware version, and on versions lower than the editor version, the Busch Monitoring Software does not operate normally.

This screen lets you specify folder in which program runs and folder in storage data.

3.1.2 Network Information

Before running the Bush Monitoring Program, the Firmware Installation and License must be enabled.

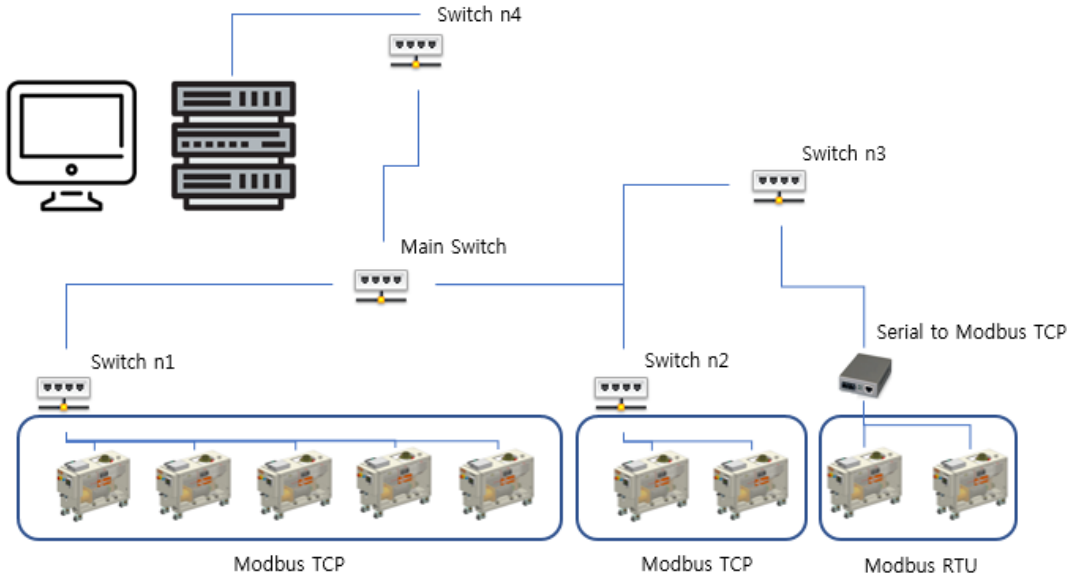
It needs to be understood that the design and set-up of all network systems is some what customized to the specific installation site. This is due to the fact that this Central Monitoring System is constructed the same as a full office computer network system.

A central server system is used, or multiple servers if needed, along with RJ45 connection cables and workgroup switches to facilitate the data communications.
(Note: For Multiple Server, consultation with Busch is required.)

Therefore, just as in office networks, each installation is designed around the needs of the user and the facilities locations. In the most typical case, thought must be given to the length of cable runs from the central server to the pumping systems.

The most common design is to have switches located at each grouping of pumping systems. From this switch, a number of pumps are connected via RJ 45 connector cables. A “main switch” connect the “group switches” to the server. From the “main switch” there is a single RJ45 cable, up to 90 m in length to the server computer. A design that used this approach is displayed in figure below, which we will refer to as point of us switch ports.

In case of serial communication, convert to using Modbus TCP converter as shown below.
(* Recommended use of Device server type.)



As mentioned earlier, the individual connections should all be on the same network and be able to communicate.
* This part must be discussed with Customer's IT manager.

Basic Components Necessary:

- Busch Cobra Series Vacuum pump
- Ethernet module installed
- Central Server Computer
- Design designated switches ports
- Cabling with RJ45 connectivity, at least category 6 or 5E.

3.1.3 Authority of BMS 2.0

The Busch Monitoring System can set permissions individually.
By default, permissions are set to three things: Guest, Operator, and Administrator.

The guest can only be monitored pump status.
The configuration of pump is authorized by the Operator and Administrator.
The settings of Busch Monitoring System are only granted to Administrator.
Password will be provided with a password of the default value unless you have a request in relation to Password.
All permissions can be increased to 10 user, and history of Log in users will be recorded in the event history.

- If you want to increase your user rights, should contact us before purchasing or receive product.

3.1.4 Pump Connection

Once the network design is completed for the pumping systems to the main server computer, it then needs to be decided how the main server is to be connected to other computer nodes in the system.
This would be decided by what precisely the user would want as far as the number of pump that they would want to be able to view the pump information simultaneously.
There are many ways of configuring this system and it is simply up to the user's desires as to how it is completed.
Because system would also be the most ideal system for convenience and speed, for it sis only limitations will be the speed of the main network system.
It may pose an additional load to the existing network that should also be considered.
In other words, the higher the quantity of the monitoring pump, the higher H/W specification will be required.

3.1.5 Navy Button of Top

The top Menu of the Busch Monitoring System is configured as above.

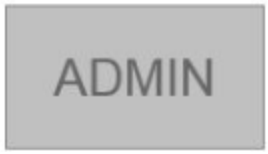
Indicates the name of the company and program that provides Busch Monitoring System.

This button always returns to the first screen.

When you want to see historical data for the pump, click the button.

When checking the alarm history for an individual pump, go to the corresponding page.

If want to check all history, including alarm history, go to the page.

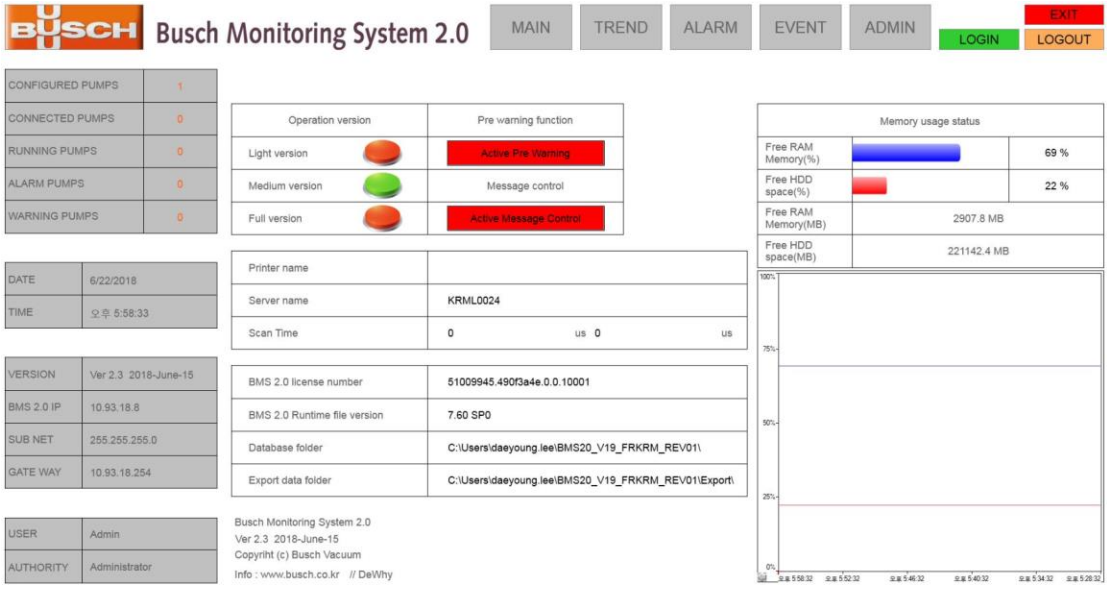


To check the Pump connection quantity limit, Prewarning settings, E-mail service, Version information, go to the corresponding page. The page requires administrator authority.

LOGIN : Log in information is required to use the Busch Monitoring System. Press button to activate it.
LOGOUT: Press this button to logout from the currently set authority level.
EXIT : If want to shut down the Busch Monitoring System normally, press this button.

3.2 Admin Page

The screen can be moved to that screen by "ADMIN" button and requires administrator authority.



3.2.1 Selection Operation Version

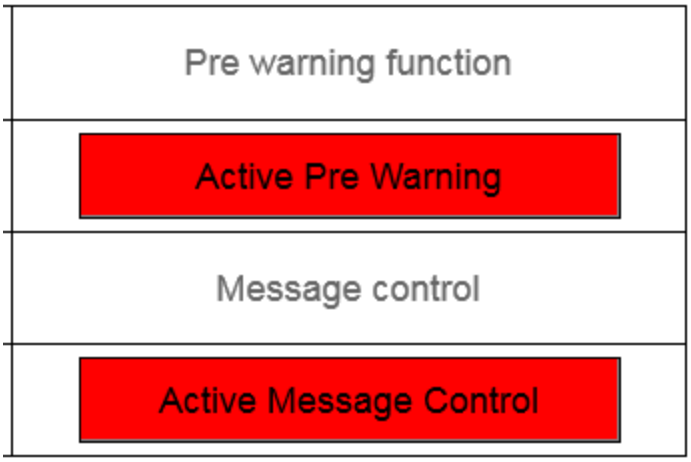
Light Version : Default value for shipment.
A total of 80 connections are available.

Medium Version : A total of 400 connections are available.

Full Version : A total of 1000 connections are available.

Select version to match number of pumps to be connected on H/W specification.

3.2.2 PRE-Warning



The feature is disabled by default.
"Pre warning" can be activated at the user's choice, but "Message control" must be conducted after consultation with the developer.
(According to the Server and Account settings to which you want to send Message.)

- Pre-Warning
  The pump is not an interlock of its own pump and is set by the user to determine the propensity of the pump.
  These settings are displayed on the Detail screen. Not visible in the disabled state of deactivation.
  Error message by this function is not an interlock function, it is just a function to inform the user for pre check before fail pump.
  There are no reference for individual levels and should be entered according to the user's experience and choice.

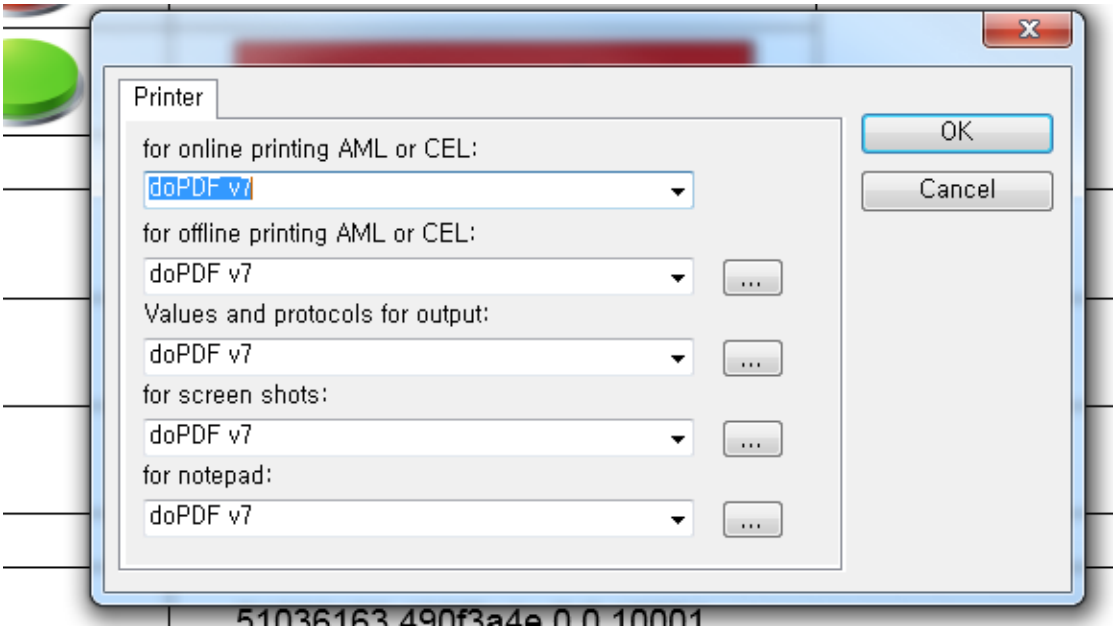
PARAMETERS	DP1	DP2	DP3	DP4	MB	UNIT
DP CURRENT	0.0	0.0	0.0	0.0		A
MB CURRENT					0.0	A
TEMPERATURE	0.0	0.0	0.0	0.0	0.0	ºC
DP OVER PR.	0	0	0	0		mbar
DP H2O FLOW	0.0	0.0	0.0	0.0		LPM
DP N2 FLOW	0.0	0.0	0.0	0.0		LPM
DP FREQUENCY	0.0	0.0	0.0	0.0		HZ
MB FREQUENCY					0.0	HZ

SET PRE-WARNING			
0.0	A	0.0	Sec
0.0	A	0.0	Sec
0.0	ºC	0.0	Sec
0.0	LPM	0.0	Sec
0.0	LPM	0.0	Sec

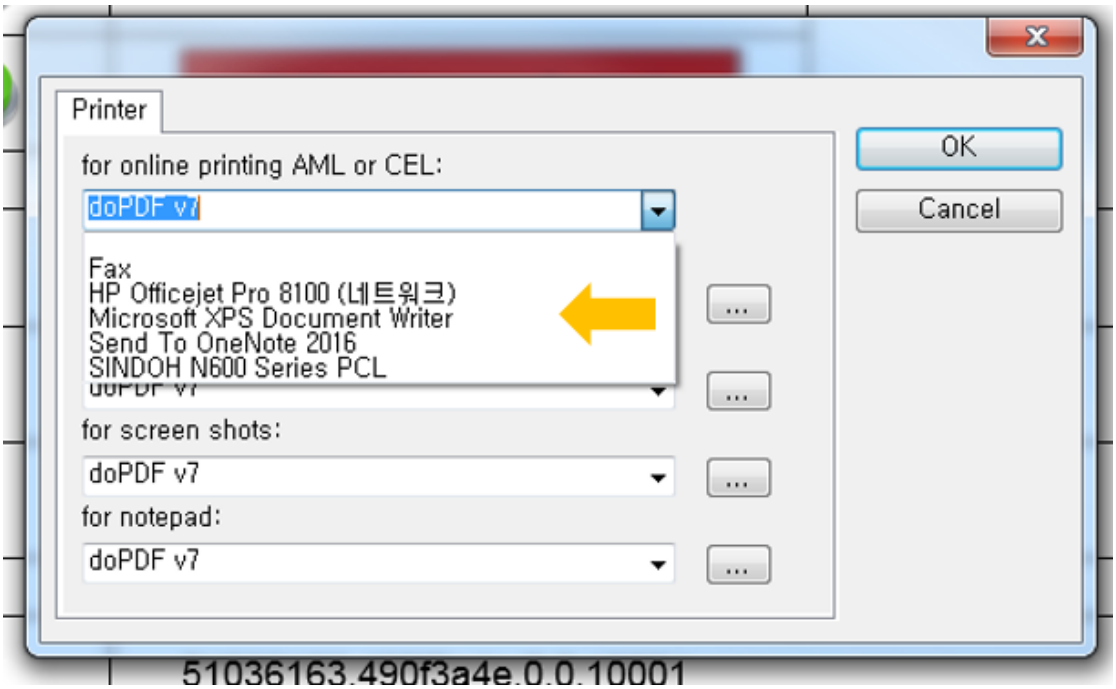
3.2.3 Printer Setting

Printer name	doPDF v7
Server name	KRMC0010
Scan Time	0 us 0 us

Click on the printer name shown in the image above, and you'll see a screen where you can set up the printer.



If have a printer installed and want to print through it, you can choose it.



3.2.4 Information of License

BMS 2.0 license number	51036163.490f3a4e.0.0.10001
BMS 2.0 Runtime file version	7.60 SP0
Database folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\
Export data folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\Export\

Displayed the license information that is currently in use.
The Busch Monitoring system does not start normally for a license that is not purchased through Busch. And technical support is not available.

3.2.5 Information of Database Folder

BMS 2.0 license number	51036163.490f3a4e.0.0.10001
BMS 2.0 Runtime file version	7.60 SP0
Database folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\
Export data folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\Export\

Displays the Data Base Folder for Busch Monitoring System and the folder path for output.

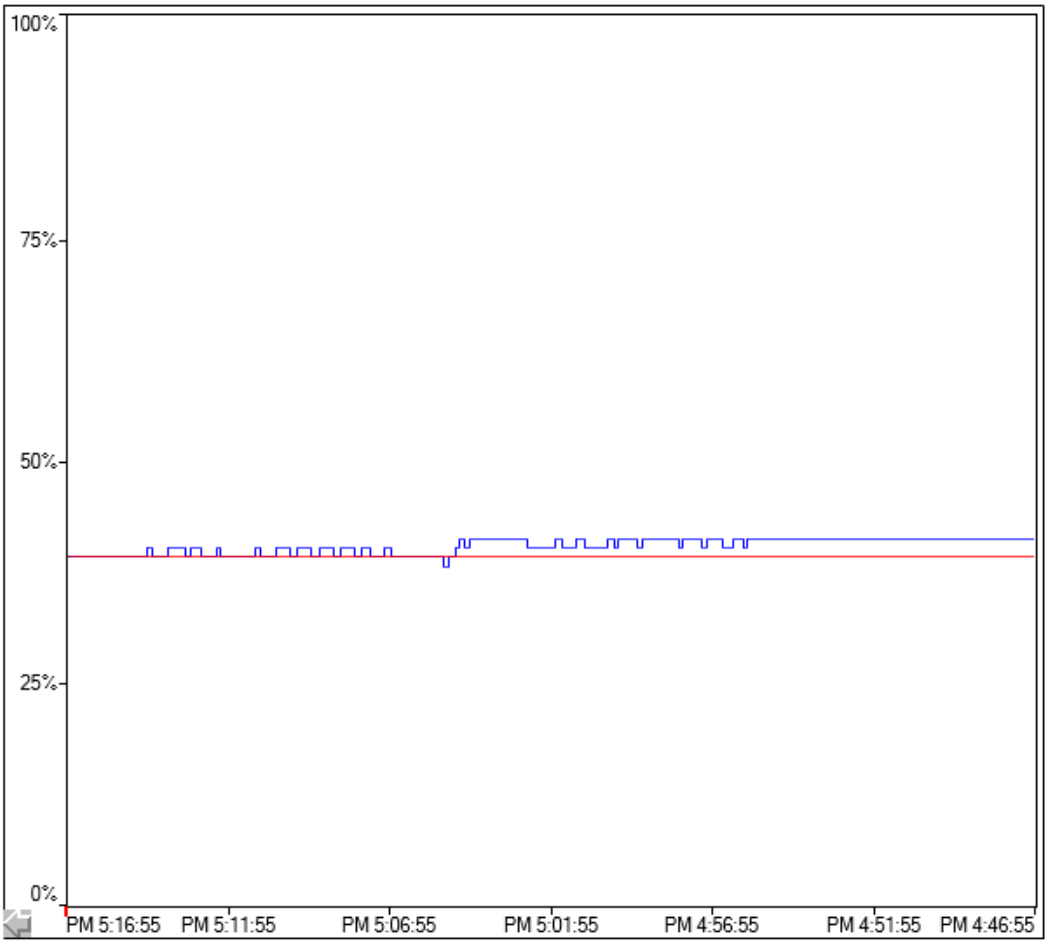
3.2.6 Information of Runtime Version

BMS 2.0 license number	51036163.490f3a4e.0.0.10001
BMS 2.0 Runtime file version	7.60 SP0
Database folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\
Export data folder	C:\Users\daeyoung.lee\BMS20_V19_FRKRM_REV01\Export\

The Firmware version is displayed on this page, and the software created in the higher firmware version may not function properly in the lower version.
The Busch Monitoring System developed from V7.20.

3.2.7 Information of Server Status

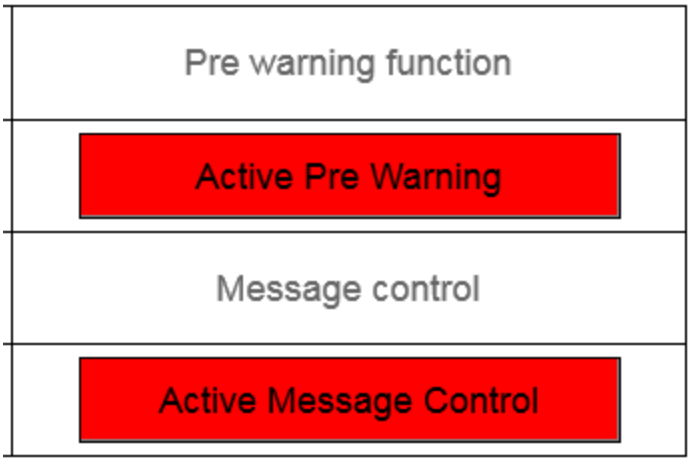
Memory usage status		
Free RAM Memory(%)		39 %
Free HDD space(%)		39 %
Free RAM Memory(MB)	6613.5 MB	
Free HDD space(MB)	96572.3 MB	



Displays the current memory state of PC of Busch Monitoring System and the state of HDD capacity.
If the memory is not in good condition, we recommend improving the H/W specification.

3.2.8 Message Control

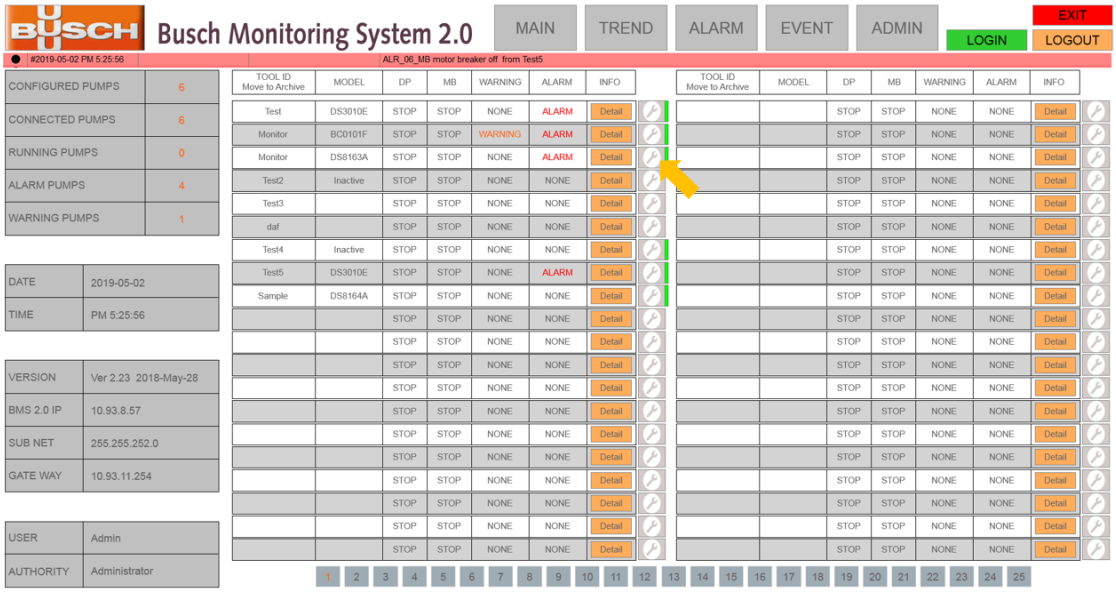
When activating the function, consultation with the developer is required.
The System requires an account and a Message Recipient setting.
If enabled without this setting, to be occur nothing.
This setting can be set up in its own Firmware, so you must consult with the developer and also consult with the IT manager where it will be installed.



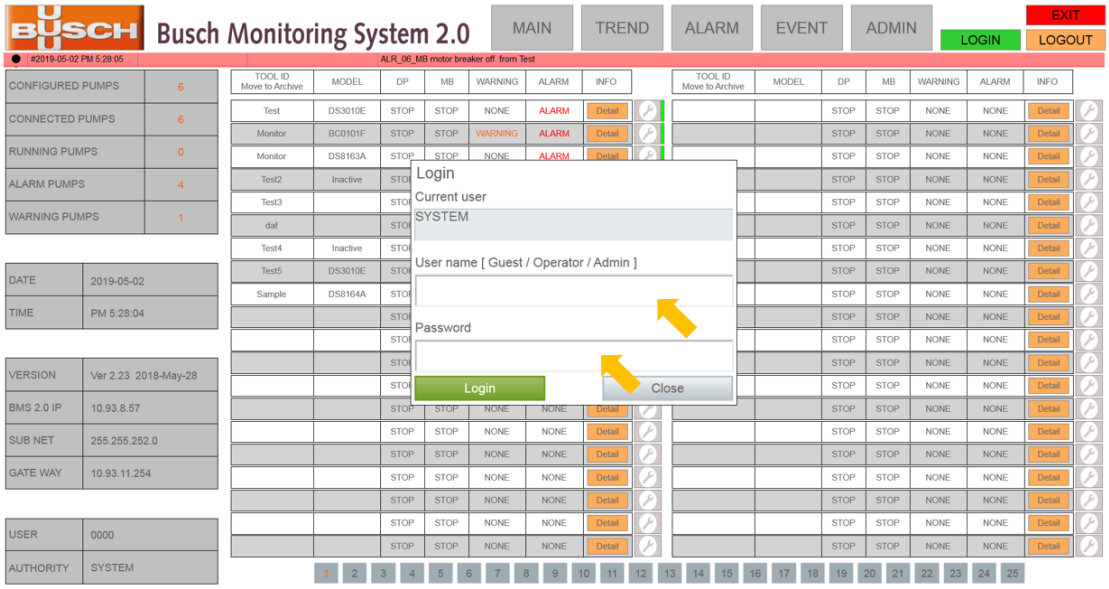
3.3 Main Page

3.3.1 Pump Setting

Permission is required to set up the pump configuration.

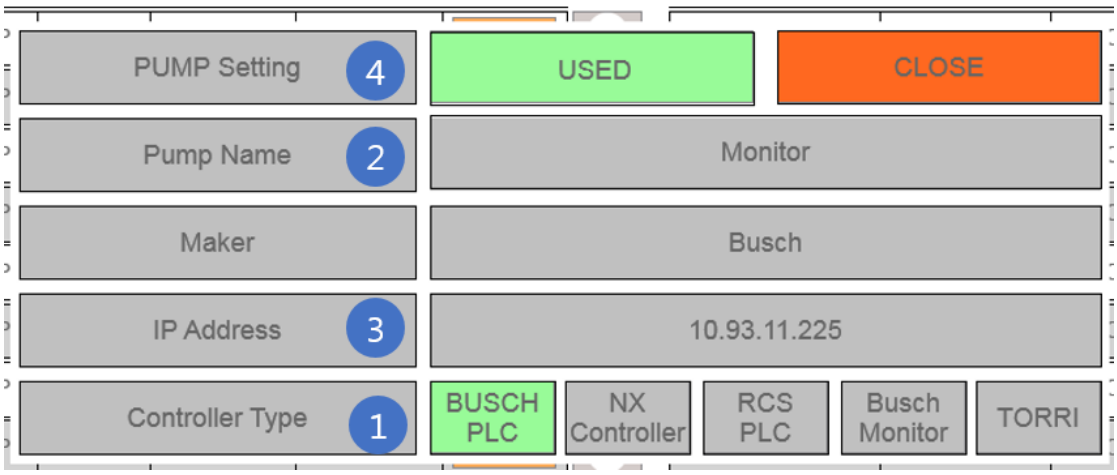


Press the button displayed on the screen to set the pump configuration.



If you press the button while you are not logged in, a Log in pop-up window will appear. The Login function is one time at that time.

Set pump configuration after logging in to an authorized user.



When the pump configuration setup window appears, set the pump configuration in order.

1 Controller selection button by user.

Busch PLC: Currently used
NX Controller: Currently used
RCS PLC: Currently used
Busch Monitor: Only for BC 0101 F pump..
Torri: Only for BD Series pump.

2 Input Tool ID by user.

This is the place to enter the name of the equipment that the customer has given to manage.

3 Input Target IP address by user.

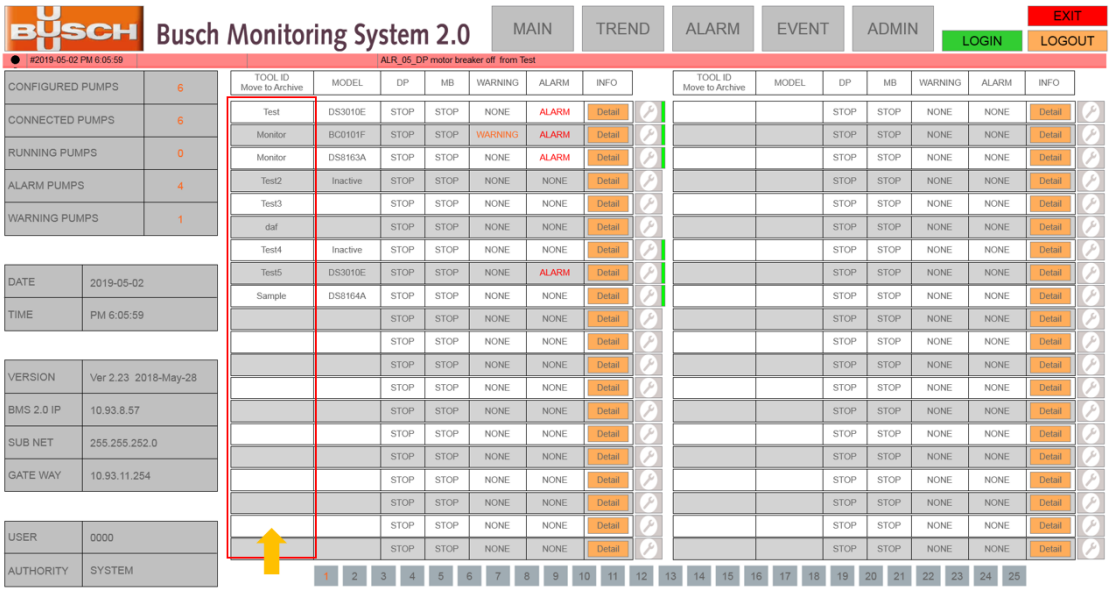
This is where you enter the IP address of the pump to which you want to connect.

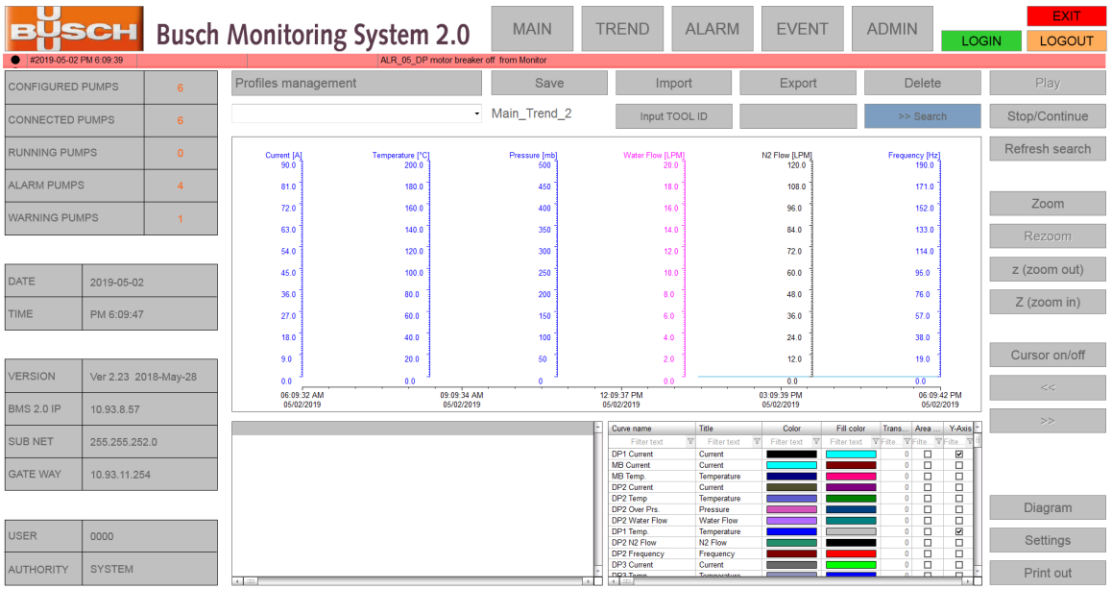
4 Activate connection by user.

This button activates the connection with a set configuration.
If no value is entered from 1 to 3, activation is disabled.

3.3.2 Tool ID (Move to archive)

You can search for historical data of the pump by using the Trend button, but if you click on the tool ID that you want to view on the main screen, you can go directly to the page and call up old data.





3.3.3 General Information

The main page displays basic information. Configured pump quantity, quantity of pump with alarm, configured but disconnected pump, IP information, etc.

Based on this information, you can see the basic status of Monitoring System.

CONFIGURED PUMPS	6
CONNECTED PUMPS	6
RUNNING PUMPS	0
ALARM PUMPS	4
WARNING PUMPS	1

Configured Pumps: amount of pumps configured for connection.
Connected Pumps: Amount of pump to which communication is connected.
Running Pumps: Amount of pump in operation.
Alarm Pumps: The quantity of the pump on which the alarm was triggered.
Warning Pumps: The quantity of the pump on which the warning was triggered.

DATE	2019-05-02
TIME	PM 6:18:03

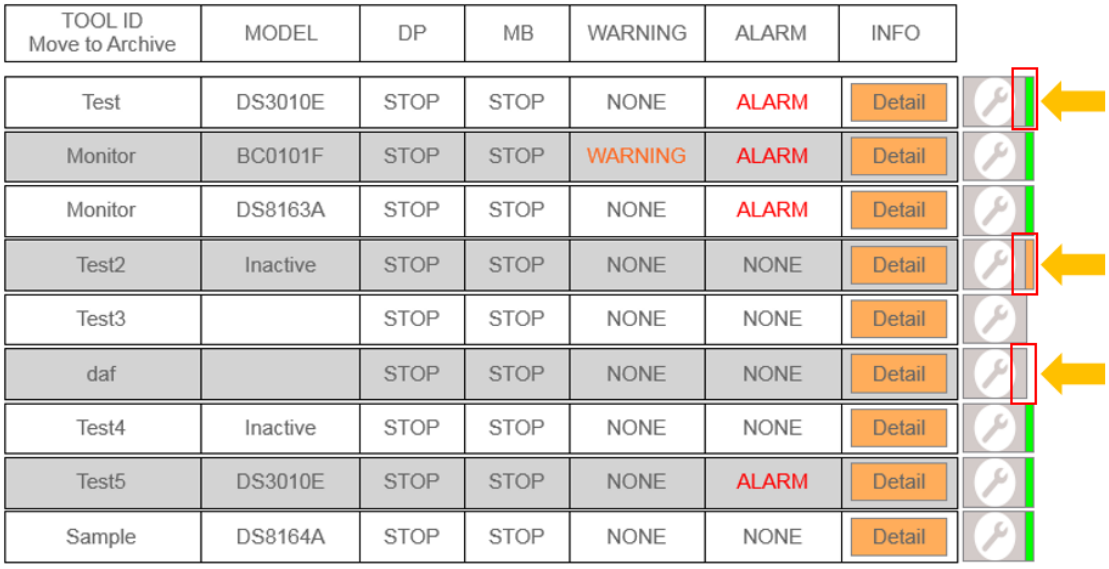
Shows the current date and time.

VERSION	Ver 2.23 2018-May-28
BMS 2.0 IP	10.93.8.57
SUB NET	255.255.252.0
GATE WAY	10.93.11.254

Displays the Busch Monitoring System's network settings information and Version.

USER	0000
AUTHORITY	SYSTEM

Displays the authority level of the current user.



TOOL ID Move to Archive	MODEL	DP	MB	WARNING	ALARM	INFO
Test	DS3010E	STOP	STOP	NONE	ALARM	Detail
Monitor	BC0101F	STOP	STOP	WARNING	ALARM	Detail
Monitor	DS8163A	STOP	STOP	NONE	ALARM	Detail
Test2	Inactive	STOP	STOP	NONE	NONE	Detail
Test3		STOP	STOP	NONE	NONE	Detail
daf		STOP	STOP	NONE	NONE	Detail
Test4	Inactive	STOP	STOP	NONE	NONE	Detail
Test5	DS3010E	STOP	STOP	NONE	ALARM	Detail
Sample	DS8164A	STOP	STOP	NONE	NONE	Detail

If it is not configured, the lamp will not be displayed.

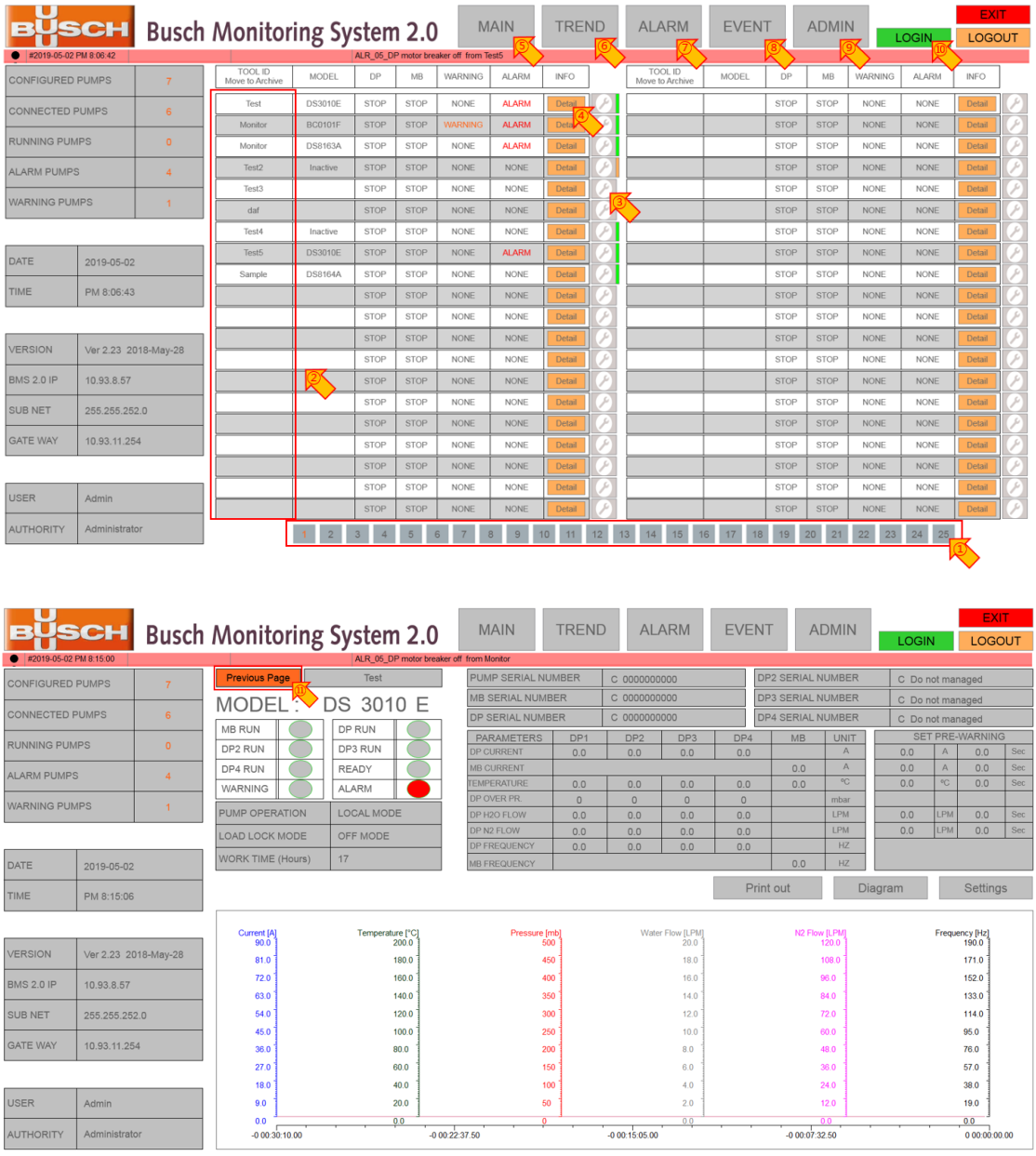
If orange lamp is displayed, it means that there is no communication even though it has been configured.

Check the configuration and communication lines.

If green lamp is displayed, it is normally communicating between monitoring system and pump.

3.3.4 Page Moving

There are 11 buttons to switch between screens on Busch Monitoring System.

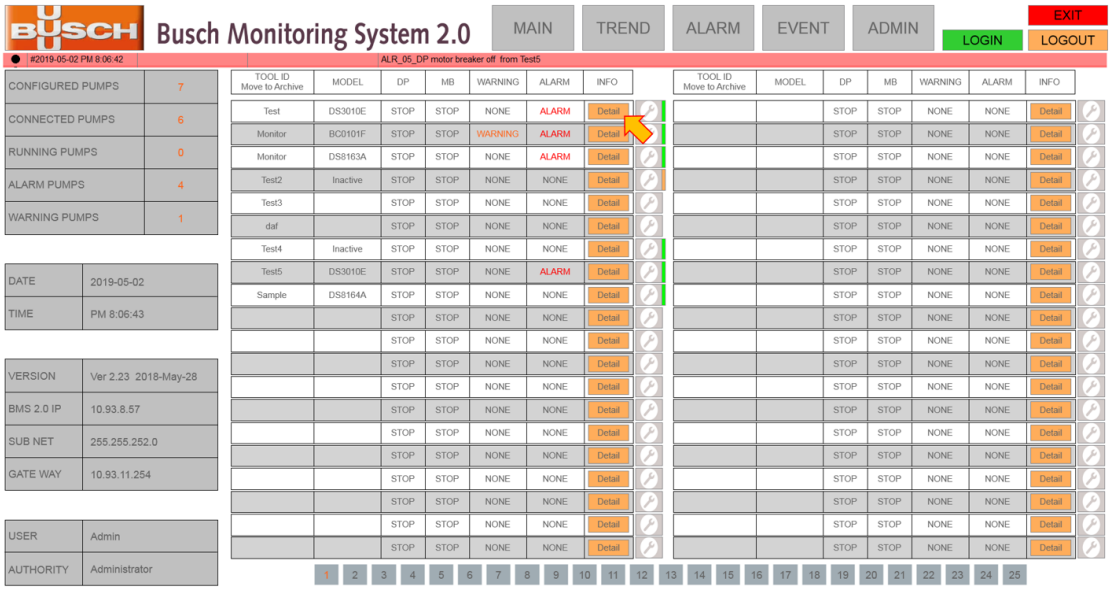


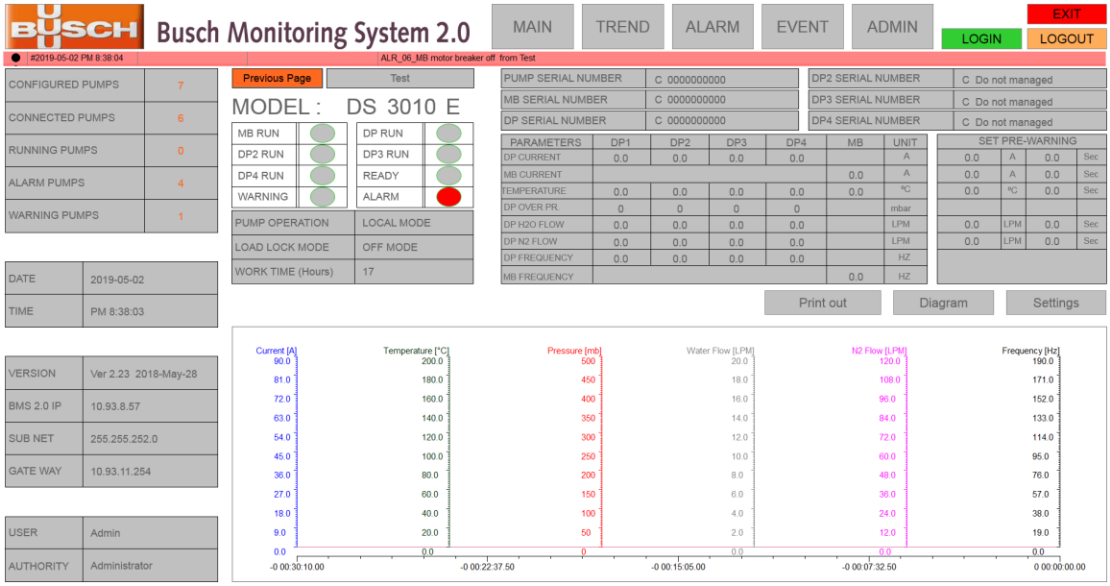
①: 40 Pumps can be configured on a page, which consists of 25 pages in total.
②: Button that can be moved to Archive Data for individual pumps.
③: Switch to screen button for setting pump configuration.
④: Screen switch button for more information on individual pumps.
⑤: Switch to home screen button.
⑥: Switch to Archive data screen button.
⑦: Switch to Alarm History screen button.
⑧: Switch to Event History screen button.
⑨: Switch to Administrator screen button.
⑩: Login screen switch button

⑪: Return to last screen button.

3.4 Detail Screen Page

Details of individual pumps can be viewed through the "Detail" button on the main screen.





3.4.1 Display Serial Number of Pump

If the controller of the pump has serial number information, the information can be viewed on that screen.

PUMP SERIAL NUMBER	C 0000000000	DP2 SERIAL NUMBER	C Do not managed
MB SERIAL NUMBER	C 0000000000	DP3 SERIAL NUMBER	C Do not managed
DP SERIAL NUMBER	C 0000000000	DP4 SERIAL NUMBER	C Do not managed

Shows serial information for the System and information for each Module.

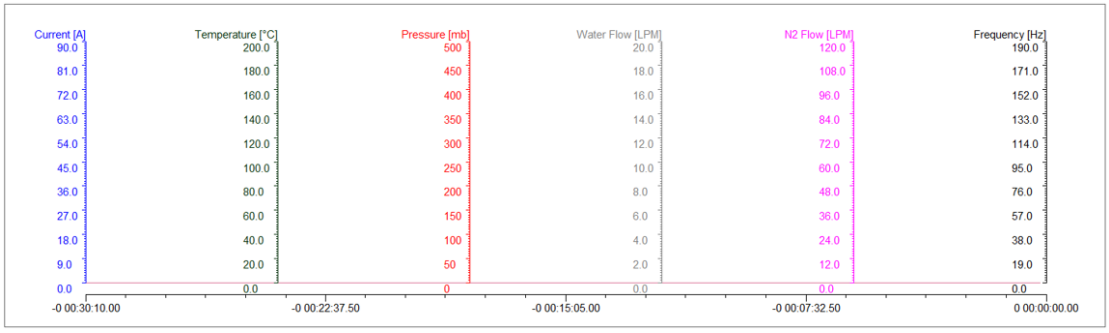
- If there is no information, it will be labelled "Do not managed".
- Only the pump model with up to four DP is managed.

3.4.2 Display Actual Data

Real time data is displayed on the screen. And the data is marked with Trend Graph. (Default 30 min).

PARAMETERS	DP1	DP2	DP3	DP4	MB	UNIT
DP CURRENT	0.0	0.0	0.0	0.0		A
MB CURRENT					0.0	A
TEMPERATURE	0.0	0.0	0.0	0.0	0.0	°C
DP OVER PR.	0	0	0	0		mbar
DP H2O FLOW	0.0	0.0	0.0	0.0		LPM
DP N2 FLOW	0.0	0.0	0.0	0.0		LPM
DP FREQUENCY	0.0	0.0	0.0	0.0		HZ
MB FREQUENCY					0.0	HZ

SET PRE-WARNING			
0.0	A	0.0	Sec
0.0	A	0.0	Sec
0.0	°C	0.0	Sec
0.0	LPM	0.0	Sec
0.0	LPM	0.0	Sec



The Y-Scale of the Trend Graph is set to the Max value.

You can change the graphing setting through the Diagram button.
The changed setting value will revert to the default value when it is off the screen.
If want to capture the screen you are viewing, or save it as a pdf file, press the Print out Button.
The saved files will be stored in the “Export folder”.
(See Admin page for pathways.)

3.4.3 Display Pre-Warning

For old pumps, the data tend to vary. In particular, too old pump data is different compared to the new pump after many overhauls.

Enter the reference information level and delay time based on propensity before the pump is down.
Pre warning occurs when the actual data matches the information entered.
This information is not an actual pump down, so please go to the actual pump to conduct a pre-check.
The feature must be enabled on the Admin page for it to work.
If do not want this feature, leave it deactivated.

The feature does not support Frequency and Over pressure.

PARAMETERS	DP1	DP2	DP3	DP4	MB	UNIT
DP CURRENT	0.0	0.0	0.0	0.0		A
MB CURRENT					0.0	A
TEMPERATURE	0.0	0.0	0.0	0.0	0.0	ºC
DP OVER PR.	0	0	0	0		mbar
DP H2O FLOW	0.0	0.0	0.0	0.0		LPM
DP N2 FLOW	0.0	0.0	0.0	0.0		LPM
DP FREQUENCY	0.0	0.0	0.0	0.0		HZ
MB FREQUENCY					0.0	HZ

SET PRE-WARNING			
0.0	A	0.0	Sec
0.0	A	0.0	Sec
0.0	ºC	0.0	Sec
0.0	LPM	0.0	Sec
0.0	LPM	0.0	Sec

3.4.4 Display Work Time & Operation Mode

For old pumps, the data tend to vary. In particular, too old pump data is different compared to the new pump after many overhaul.

PUMP OPERATION	LOCAL MODE
LOAD LOCK MODE	OFF MODE
WORK TIME (Hours)	17

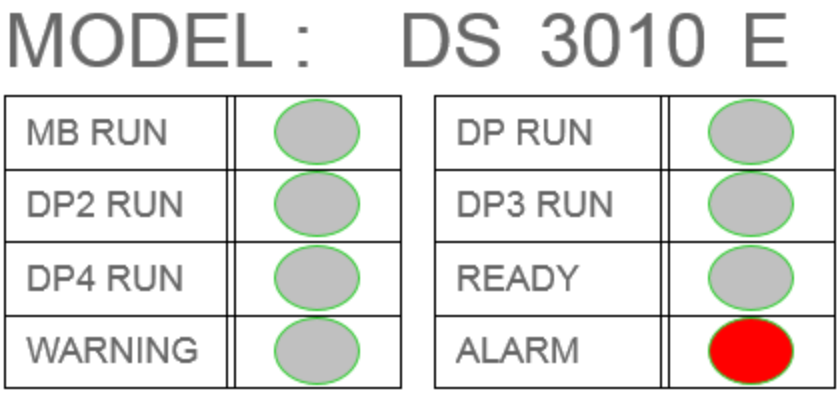
Receive data from the pump to display the total start up time and operation mode of the pump.

Pump Operation: LOCAL / REMOTE / NETWORK
- LOCAL: Pump operated by local Handy pad
- REMOTE: Pump operated through Toll interface connector by DIO.
- NETWORK: Pump operated from network data of customer.

LOAD LOCK MODE: OFF / AUTO / EXTERN
- OFF: The pump is driven at full speed continuously.
- AUTO: Driven variable speed according to the internal reference value of controller.
- NETWORK: The pump is driven by customer signal

3.4.5 Display Pump Status

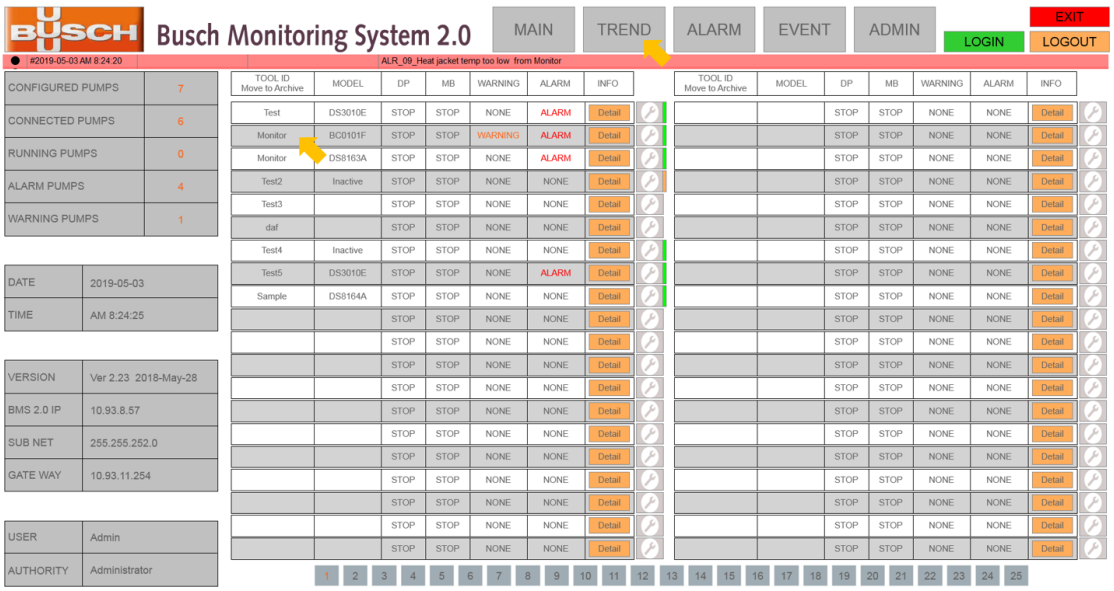
The pump model is displayed based on the data sent from the controller.



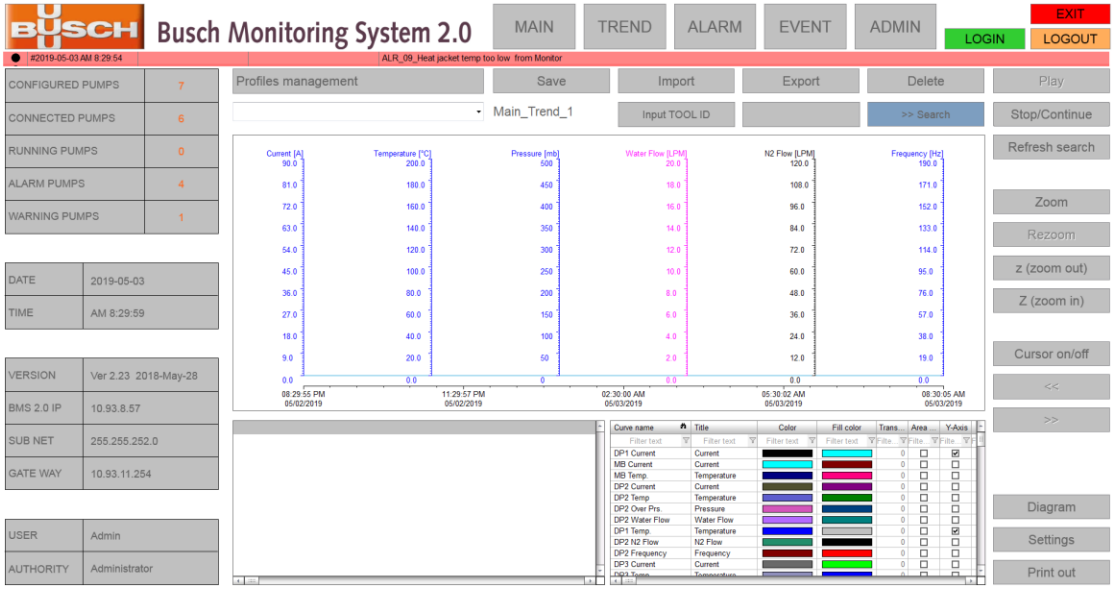
Each module's status, alarm, and warning information is also displayed on this page.

3.5 Trend Screen Page

To switch to Trend screen, press the TREND button or press the Tool ID on the main screen.



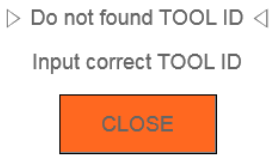
The screen is for loading past data of the pump to analyze trends and check the failure mode



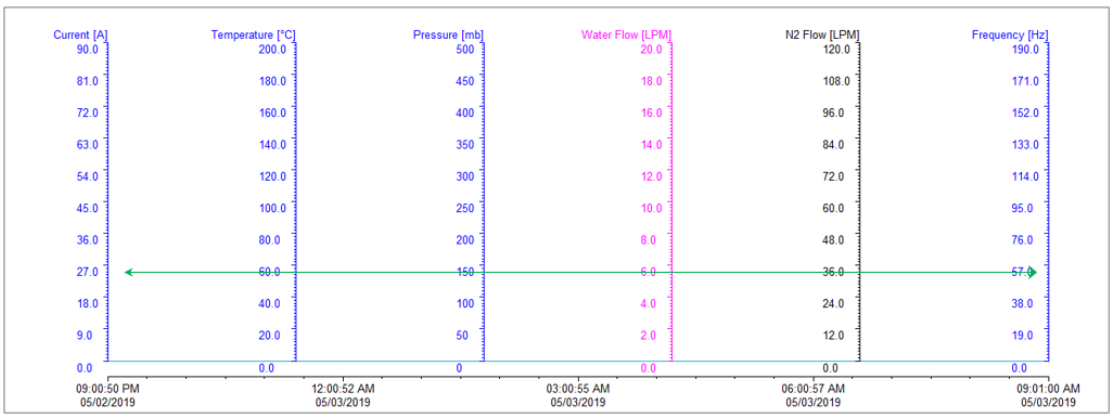
Main_Trend_1 : The information is displayed from 1 to 1000 and is expressed sequentially regardless of the tool ID.

3.5.1 Search Pump

After entering the tool ID and searching, call up logdata of the tool ID.
Can use a duplicate tool ID on monitoring system. If search for a tool ID with the same name, will be load the fastest number Archive.
If the tool ID is not matching, the phrase "Do not found TOOL ID" will appear.



In Trend, data is loaded from the current point of view to the data one day ago, and the data is displayed include real-time data.



By default, 1 day of data is loaded.

3.5.2 Description of Button On Trend Screen

There are many buttons on the Trend screen and they are described below.

Play — This status window indicates whether data is being displayed, including real time data.

Stop/Continue — This button is used to turn off real-time data to identify trends. Press again to display Real time data.

Refresh search — This button is used to refresh the Trend screen itself.

Zoom — This is Button for Zoom to analyze Graph. However, you must turn off the Real time data function in order to use the function.

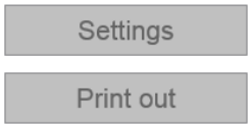
Rezoom — This function returns the function Zoom in to its original scale.

z (zoom out)
Z (zoom in) — Zoom-in and Zoom-out buttons and this function are also available with mouse cursors.

Diagram — When activate Cursor, a new Y-Axis occurs in the graph. You can use the arrows below to move the axis left or right, but you can also use the mouse to move the axis. And the values in which the axis is located are shown in the table below.

Date	Curve	Value	Measurin...	Status
2019-05-03 AM 4:06:55	DP1 Current	0.0	A	SPONT
2019-05-03 AM 4:06:55	MB Current	0.0	A	SPONT
2019-05-03 AM 4:06:55	MB Temp.	0.0	°C	SPONT
2019-05-03 AM 4:06:55	DP2 Current	0.0	A	SPONT
2019-05-03 AM 4:06:55	DP2 Temp	0.0	°C	SPONT
2019-05-03 AM 4:06:55	DP2 Over Prs.	0	mb	SPONT
2019-05-03 AM 4:06:55	DP2 Water Flow	0.0	LPM	SPONT
2019-05-03 AM 4:06:55	DP1 Temp.	0.0	°C	SPONT
2019-05-03 AM 4:06:55	DP2 N2 Flow	0.0	LPM	SPONT
2019-05-03 AM 4:06:55	DP2 Frequency	0.0	Hz	SPONT
2019-05-03 AM 4:06:55	DP3 Current	0.0	A	SPONT
2019-05-03 AM 4:06:55	DP3 Temp.	0.0	°C	SPONT

Cursor on/off
<<
>> — This button is used to change the setting of Graph. When want to change period for see data,
when only data want to see,
when want to change the scale of Y-Axis.
If leave the screen, the settings will be returned to their original settings.



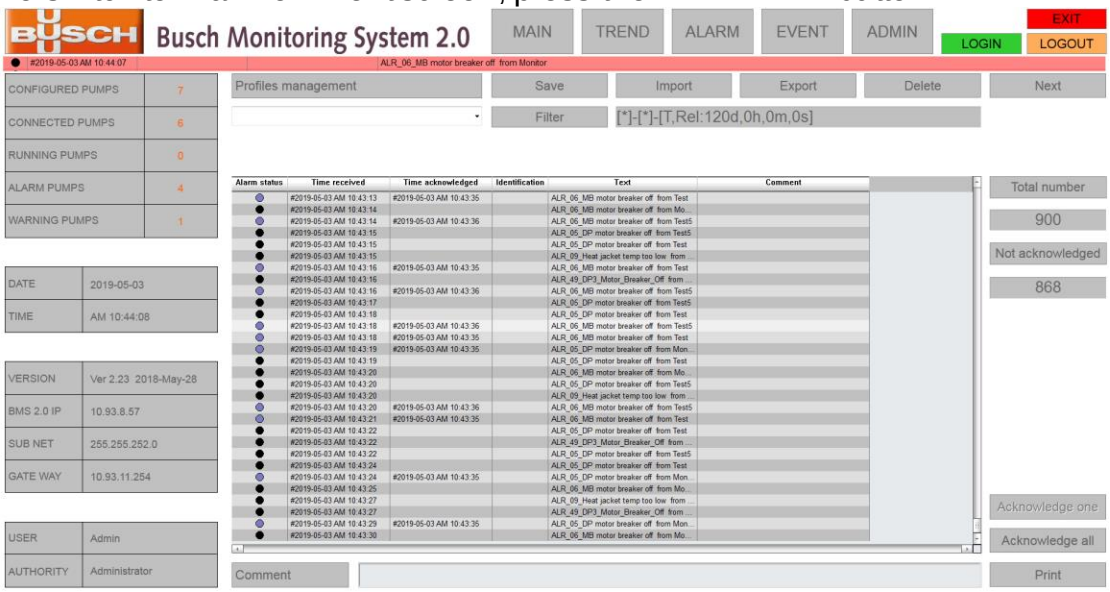
“Settings” is a button that changes the external frame settings of a graph.
You can print the current screen and graph using the Print out button.
The output is stored in the Export Folder, see Admin page for the path.

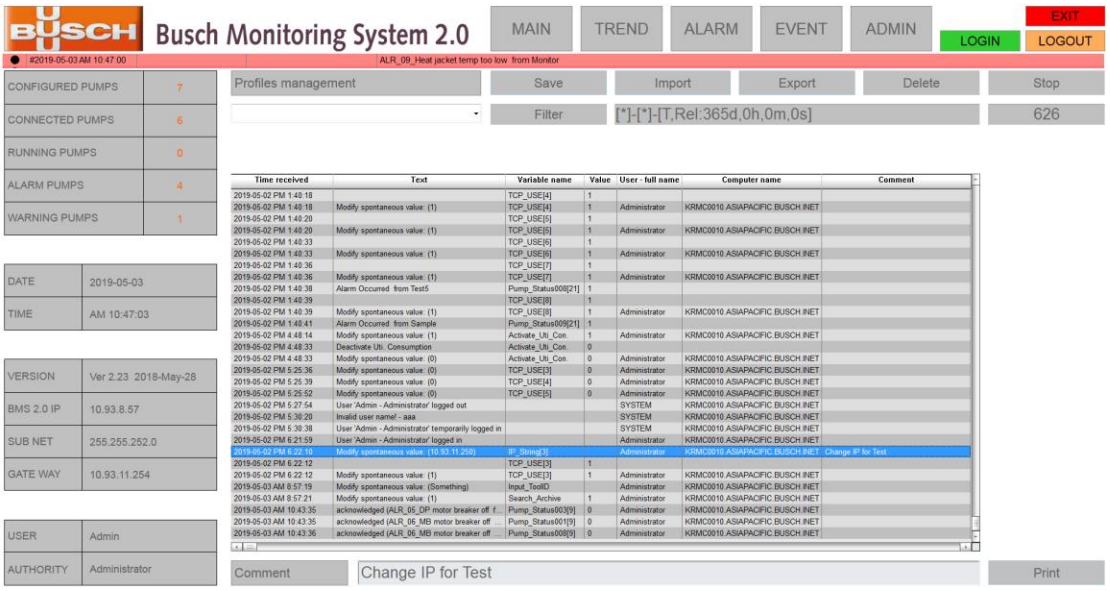
Trend has the filter function. can set the desired data, period, etc. through the filter function.
This filter setting can be saved, up to 250 can be saved.
You can also remove this setting from the outside and import and use it.

3.6 Alarm & Event Page

To switch to Alarm or Event screen, press the 

button.



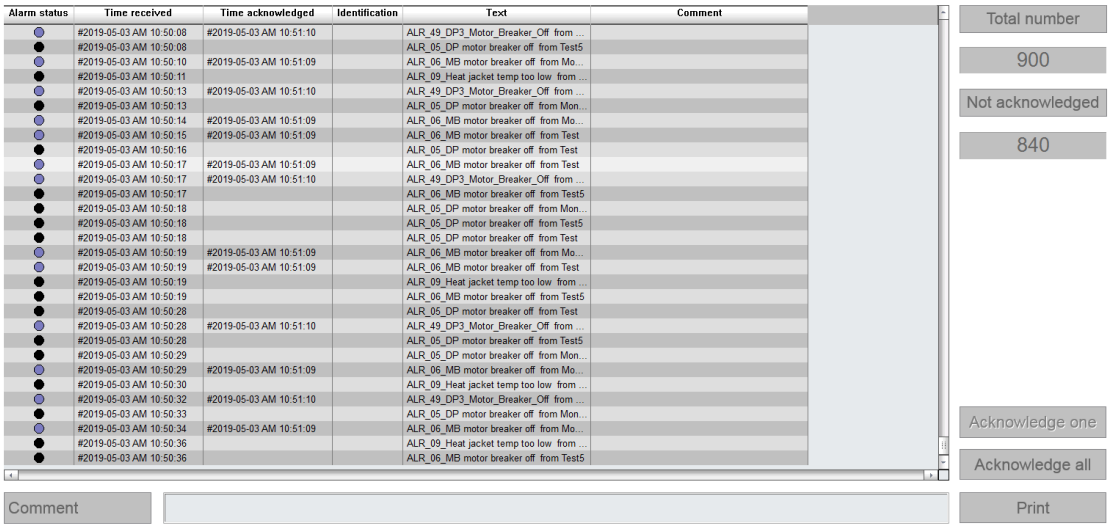


Alarm page and Event Page have very similar externalities.

However, the Alarm page displays only the Alarm history information, and the Event page stores all history.

Alarm & Event page has the filter function. can set the desired data, period, etc. through the filter function.
This filter setting can be saved, up to 250 can be saved.
You can also remove this setting from the outside and import and use it.

3.6.1 Description Alarm Screen



Alarm Status : The state in which the alarm is triggered and the state in which it is disabled is marked with a lamp.

Time Received : The time at which the alarm occurred is recorded.

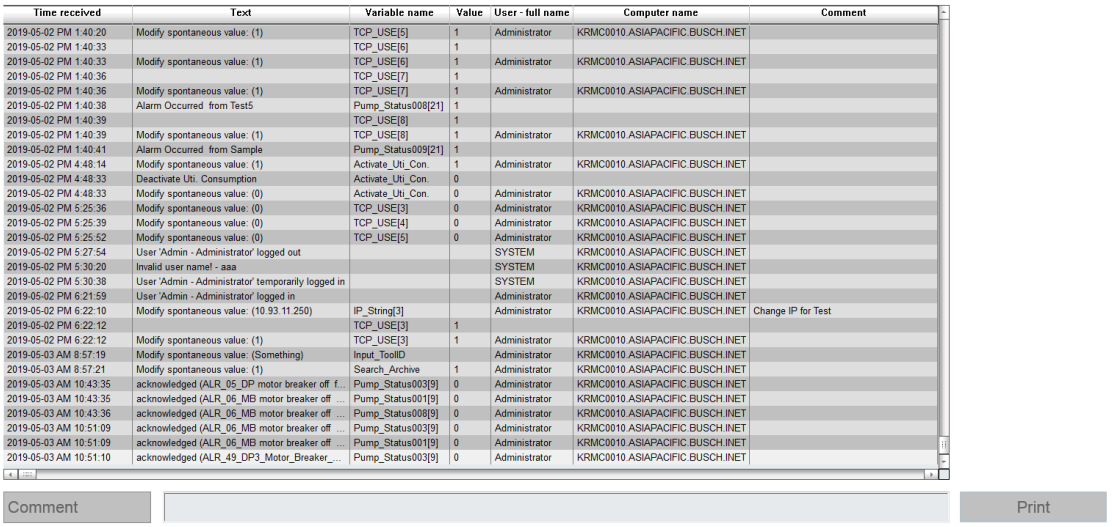
Time Acknowledged : A time of user checking is recorded in the monitoring program.

Text : The alarm name and the tool ID generated are recorded together.

On the right, can see the total number of alarms generated and the quantity checked.

You can print the alarm table using the Print out button.
The output is stored in the Export Folder, see Admin page for the path.

3.6.2 Description Event Screen



Time received	Text	Variable name	Value	User - full name	Computer name	Comment
2019-05-02 PM 1:40:20	Modify spontaneous value: (1)	TCP_USE[5]	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 1:40:33		TCP_USE[6]	1			
2019-05-02 PM 1:40:33	Modify spontaneous value: (1)	TCP_USE[6]	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 1:40:36		TCP_USE[7]	1			
2019-05-02 PM 1:40:36	Modify spontaneous value: (1)	TCP_USE[7]	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 1:40:38	Alarm Occurred from Test5	Pump_Status008[21]	1			
2019-05-02 PM 1:40:39		TCP_USE[8]	1			
2019-05-02 PM 1:40:39	Modify spontaneous value: (1)	TCP_USE[8]	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 1:40:41	Alarm Occurred from Sample	Pump_Status009[21]	1			
2019-05-02 PM 4:48:14	Modify spontaneous value: (1)	Activate_Uti_Con.	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 4:48:33	Deactivate Uti. Consumption	Activate_Uti_Con.	0			
2019-05-02 PM 4:48:33	Modify spontaneous value: (0)	Activate_Uti_Con.	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:25:36	Modify spontaneous value: (0)	TCP_USE[3]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:25:39	Modify spontaneous value: (0)	TCP_USE[4]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:25:52	Modify spontaneous value: (0)	TCP_USE[5]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:27:54	User 'Admin - Administrator' logged out			SYSTEM	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:30:20	Invalid user name! - aaa			SYSTEM	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 5:30:38	User 'Admin - Administrator' temporarily logged in			SYSTEM	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 6:21:59	User 'Admin - Administrator' logged in			Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-02 PM 6:22:10	Modify spontaneous value: (10.93.11.250)	IP_String[3]		Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	Change IP for Test
2019-05-02 PM 6:22:12		TCP_USE[3]	1			
2019-05-02 PM 6:22:12	Modify spontaneous value: (1)	TCP_USE[3]	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 8:57:19	Modify spontaneous value: (Something)	Input_ToolID		Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 8:57:21	Modify spontaneous value: (1)	Search_Archive	1	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:43:35	acknowledged (ALR_05_DP motor breaker off f...	Pump_Status003[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:43:35	acknowledged (ALR_06_MB motor breaker off ...	Pump_Status001[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:43:36	acknowledged (ALR_06_MB motor breaker off ...	Pump_Status008[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:51:09	acknowledged (ALR_06_MB motor breaker off ...	Pump_Status003[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:51:09	acknowledged (ALR_06_MB motor breaker off ...	Pump_Status001[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	
2019-05-03 AM 10:51:10	acknowledged (ALR_49_DP3_Motor_Breaker_...	Pump_Status003[9]	0	Administrator	KRMC0010.ASIAPACIFIC.BUSCH.INET	

Comment

Print

Time Received : The time at which the event occurred is recorded.

Text : The event name generated are recorded.

Variable name : The program variable on which the event occurred is logged.goek

Value : The value of the corresponding program variable is recorded.

User – full name : Record of the login user when the event occurred.

Computer name : The name of computer on which Busch Monitoring System is running is recorded.

Comment : If write a further explanation of event in comment window below, it will be recorded in comment column.

You can print the event table using the Print out button.
The output is stored in the Export Folder, see Admin page for the path.

4 Appendix

4.1 Maintenance

Security must also be ensured with computers that are taken out of operation. Ensure that, in your company, there is a defined process that regulates how systems on which BMS 2.0 are installed are taken out of operation. Ensure that this process is carried out and adhered to.

For taking systems on which BMS 2.0 is installed, Busch Vacuum recommends the following steps:

- Examine the existing data.
- Back up the data still required.
- Check to see whether the backups created can also be restored.
- Physically destroy the data media. This prevents saved information being able to be subsequently read.
- Make any data backups on other systems or data media unusable.

The IT department may be able to support you with the secure installation and secure operation of computers with BMS 2.0. In doing so, please note the special features of the systems in the production environment: For example, an email server can be restarted in the night without problems in order to install security updates. For a system with BMS 2.0 Runtime, this is generally only possible by agreement and during a maintenance interval.

Recommendation:

- Commission expert people with the planning, design, installation and operation of the operating system for the computers in your automation system. This can also include computers on which the BMS 2.0 Editor is used.

Recommendation:

- Always only install the components and programs required for the operation.

Anti-virus

- Real-time protection from anti-virus software can slow processes if these processes access the data medium. Check the interaction of anti-virus software with BMS 2.0. If necessary, defined exceptions for real-time protection in the anti-virus software to enable BMS 2.0 Runtime to have access to Runtime data.
- Establish processes in the company that define what exactly is to happen if anti-virus software discovers malware.

Note: With a false-positive report, cleaning of the system can, under certain circumstances, disable the computer or impair functionality. If an executable file of BMS 2.0 software is detected as possibly infected, check the validity of the digital signature first. In the event of doubt, contact your local Busch Service support.

- If malware is in fact discovered, it is not sufficient to delete the infected file or prevent access to the file. There must also be an investigation to find out how the malware got into the system, how far it has spread and what damage it may already have caused.

Operating system updates

- In principle, it is recommended that the operating system is always kept current and that the security updates at least are installed. Check updates on your own system before installation for possible interaction with BMS 2.0.
- Check in time to see what it means for the systems in your company if an operating system is discontinued and consequently no more security updates are provided by the manufacturer. Plan updates for systems carefully and check the systems in a test environment.
-
- Check in time to see what it means for the systems in your company if an operating system is discontinued and consequently no more security updates are provided by the manufacturer. Plan updates for systems carefully and check the systems in a test environment. The current version of BMS 2.0.

System backup

- Create a backup of the system each time a change is made. Take good care of the backups and note who has access to the backups. Also check whether the backup can actually be restored. A system backup is only for restarting the system in the event of an emergency. It can also serve to carry out a forensic comparison with the current system or tests in a test environment.

Windows offers a number of security settings. With regard to this, please also read the Microsoft documentation.

Recommendations:

- Deactivate Autorun for all drives.
- Prevent the automatic execution of updates for the operating system and applications.
- Only install updates after you have examined them for smooth operation with their applications in a test environment.
- Please note that some Service Packs/Updates can reactivate the automatic update property without notifying the user.
- Deactivate all non-essential services.
- Set a strong password for every account.
- Also create passwords for deactivated guest accounts.
- Disable automatic login.
- Prevent network access to the accounts of local administrators and guest accounts.
- Protect shared printers.

- Only enable the printer for a precisely-defined group of users

Protect physical access to your systems. The room with server cabinets should be locked and access should be monitored. Replace the standard locks that come with server cabinets with security locks. Cabinets for equipment computers and controllers should be locked. Cable connections should also be protected.
For unmanned areas, use camera systems with motion detection and alarming.
Consider which components you store, so that critical components can be replaced, even when there are supplier bottlenecks.
Ensure that you are informed if a product is discontinued or can no longer be supplied by the manufacturer and create a replacement strategy.

Busch Corporation has annual maintenance contracts, and for continuous technical support, please contact your local Busch Service Support team.

Busch
Vacuum Solutions

We shape vacuum for you.

Argentina
info@busch.com.ar

Australia
sales@busch.com.au

Austria
busch@busch.at

Bangladesh
sales@busch.com.bd

Belgium
info@busch.be

Brazil
vendas@buschdobrasil.com.br

Canada
info@busch.ca

Chile
info@busch.cl

China
info@busch-china.com

Colombia
info@buschvacuum.co

Czech Republic
info@buschvacuum.cz

Denmark
info@busch.dk

Finland
info@busch.fi

France
busch@busch.fr

Germany
info@busch.de

Hungary
busch@buschvacuum.hu

India
sales@buschindia.com

Ireland
sales@busch.ie

Israel
service_sales@busch.co.il

Italy
info@busch.it

Japan
info@busch.co.jp

Korea
busch@busch.co.kr

Malaysia
busch@busch.com.my

Mexico
info@busch.com.mx

Netherlands
info@busch.nl

New Zealand
sales@busch.co.nz

Norway
post@busch.no

Peru
info@busch.com.pe

Poland
busch@busch.com.pl

Portugal
busch@busch.pt

Romania
office@buschromania.ro

Russia
info@busch.ru

Singapore
sales@busch.com.sg

South Africa
info@busch.co.za

Spain
contacto@buschiberica.es

Sweden
info@busch.se

Switzerland
info@buschag.ch

Taiwan
service@busch.com.tw

Thailand
info@busch.co.th

Turkey
vakutek@ttmail.com

United Arab Emirates
sales@busch.ae

United Kingdom
sales@busch.co.uk

USA
info@buschusa.com

0870731454/-_en / © Busch Korea, Inc.