

AquaSense2

(User Manual)



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1. PROGRAM INSTALLATION

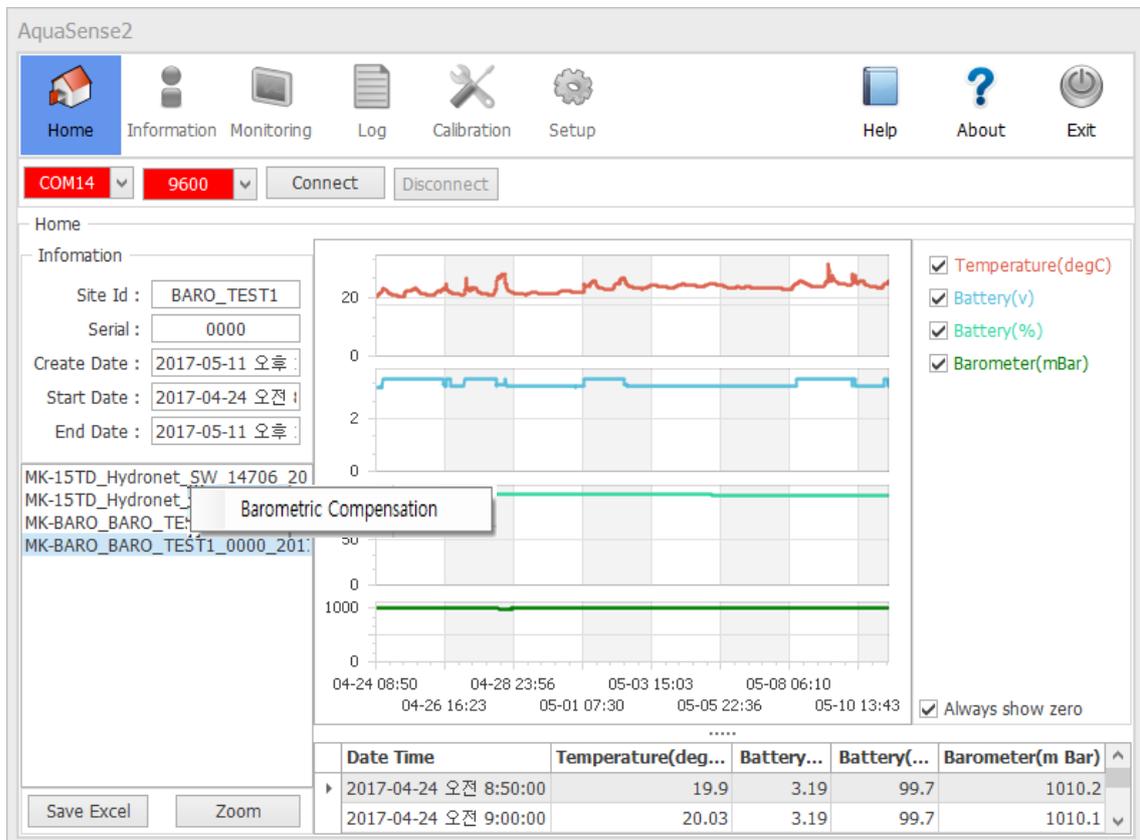
- 1) Hydronet provides the installation program by Zip file.
- 2) Please unzip the file to suitable folder.
- 3) IF you create shortcut icon on your wallpaper, you can operate the program easily.

2. PROGRAM EXECUTION

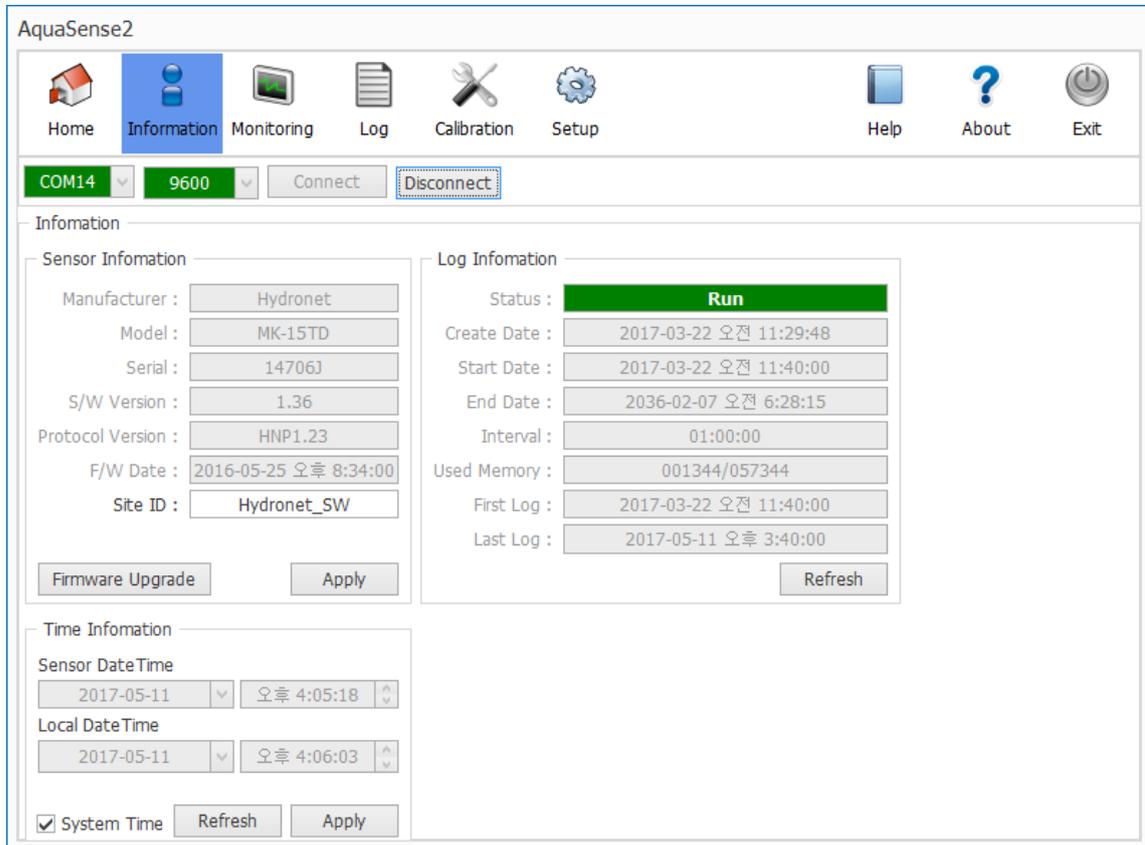
- 1) Please connect Hydronet sensor with RS485-USB connector to PC USB port.



- 2) Please double click "**AquaSense2.exe**" file in your unzip folder to run the program
- 3) If the program is in working normally, the program show Home screen (). This screen shows you the log file information saved in connected PC.



- 4) After searching COM Port and communication speed, if you click connect button, you can move to information () screen.

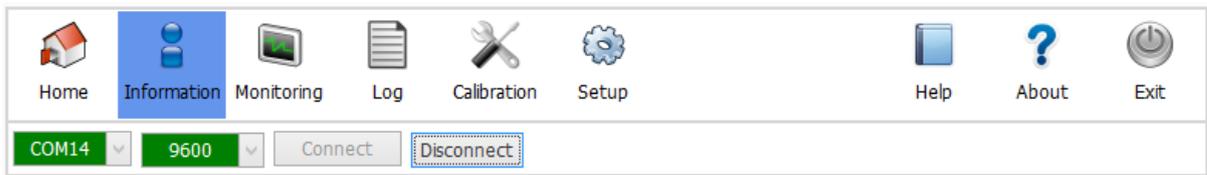


3. MAIN MENU FUNCTION

ICON	NAME	MAIN FUNCTION
	HOME	- Check log data saved PC and Save the file to Excel format.
	INFORMATION	- Check & Modify connected sensor information and - Time synchronization between Sensor and PC - Check information of log status
	MONITORING	- Monitoring real time data - Save real time monitored data to excel format.
	LOG	- Check & Set log status - Download logged data and Save it to excel format.
	CALIBRATION	- User Calibration
	SETUP	- Set installation information of sensor and calibration value by measurement item.
	HELP	- User Manual
	EXIT	- End the program.

4. MAIN

1) SCREEN



2) DETAILS

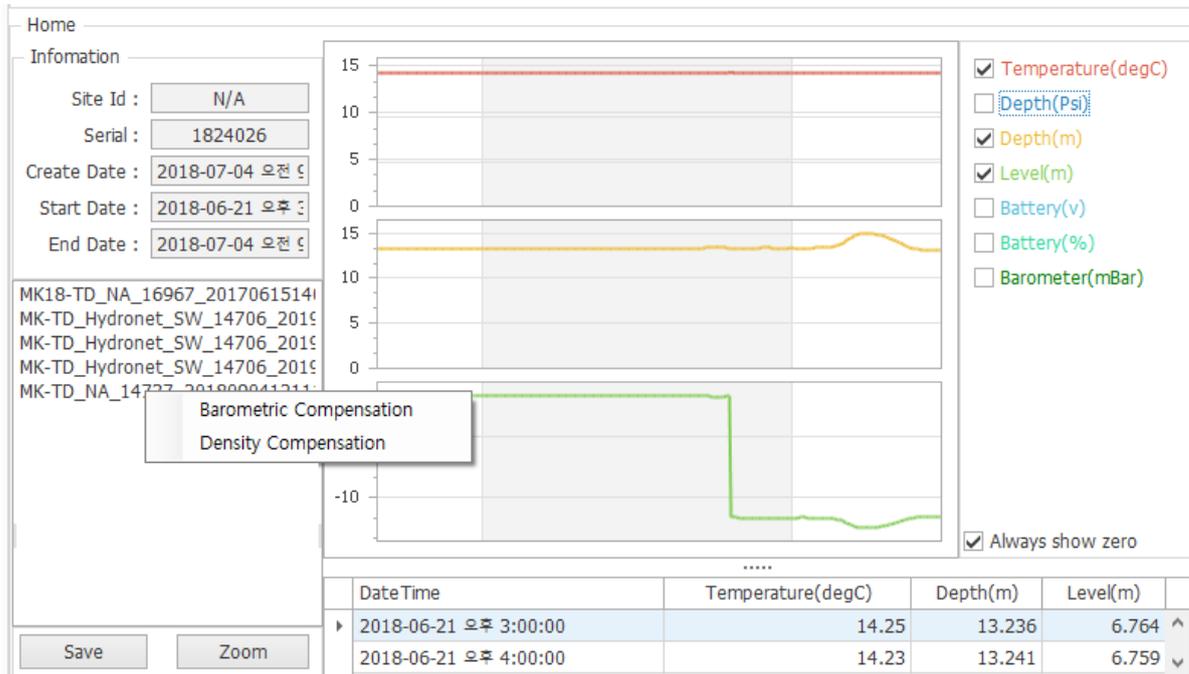
- This screen show you the menu list.
- You can search all of connected sensor ports.
- You can disconnect to sensor at any of screen.
- If the sensor is disconnected, you can't use <Inforamtion, Monitoring, Log, Calibration, Setup> Menu.
- IF the sensor is disconnected, background color of port name is **RED**, if connected, the color is changed to **GREEN**.
- If the sensor is connected to PC, "connect" button would be disabled. Otherwise, the buttons would be abled.
- If several sensors are connected to one PC, you can see the list by clicking the port number icon. .

3) ICON EXPLANATION

ICON	NAME	DETAILS
	COM###	- Show the searched sensor port
	Communication speed	- Show connected communication speed
	CONNECT	- Connect to COM### port
	DISCONNECT	- Disconnect port

5. HOME

1) SCREEN

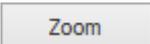
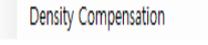


2) DETAILS

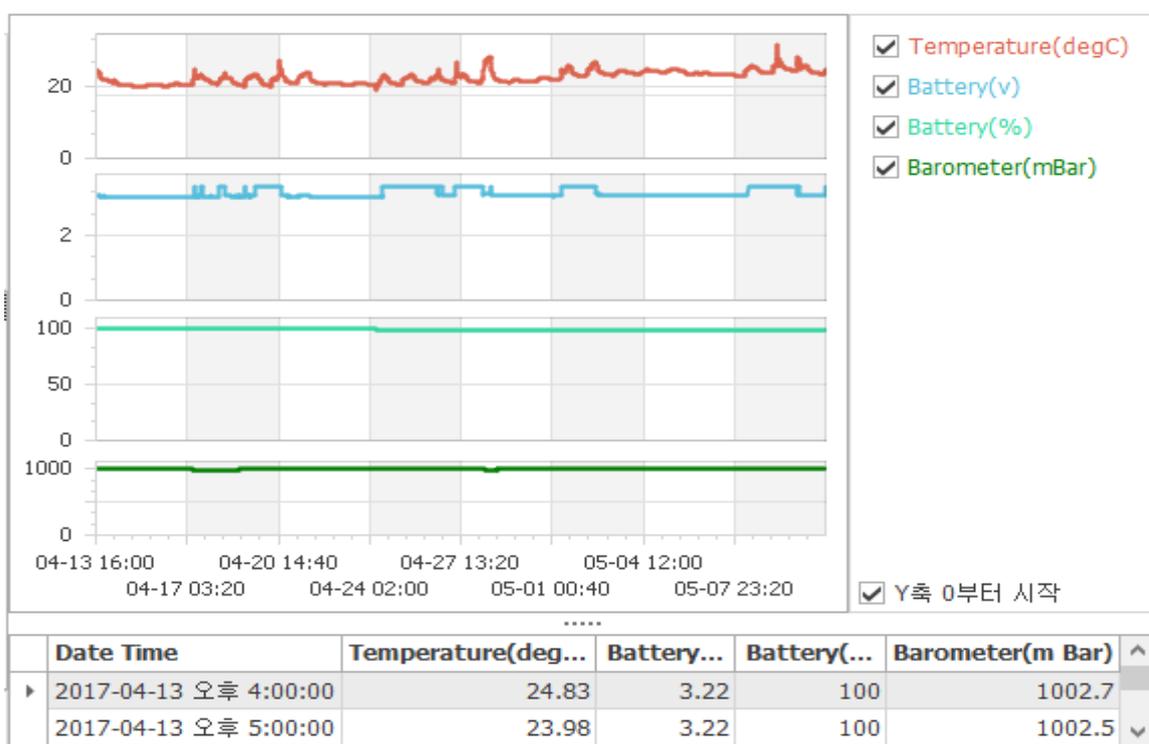
- This screen show you the log file information which is saved to connected PC.
- You can see the chart and graph of log data.
- You can save data to excel format.
- If your PC has no data, file list and data is not shown.
- You cannot modify Site ID, Serial number, create file date, start log date, and stop log date in home screen. If you wave the cursor over the box, whole information is shown by balloon shape. .
- If you choose the file in left list, selected data is shown to right side.
- If you want barometric compensation, you can do it through right-click relevant log file.
 - : In file list of left box, if you do right-click of relevant file, you can see the "Barometric Compensation" button.
 - : In this step, if you click this button, you can do barometric compensation.
 - : At the graph, if you push shift + mouse drag, you can view a large size of x-y coordinate value.

3) ICON EXPLANATION

ICON	NAME	DETAILS
	EXCEL SAVE	<ul style="list-style-type: none"> - Save chart and graph to excel format. - Basic file name is "serial number_file create date.xlsx."

	ZOOM	- Zoom the screen
	Barometric Compensation	- Do barometric compensation using log file(Depth, Level value) and barometric file(barometer value)
	Density Compensation	- Do density compensation using log file(Depth value) and density value

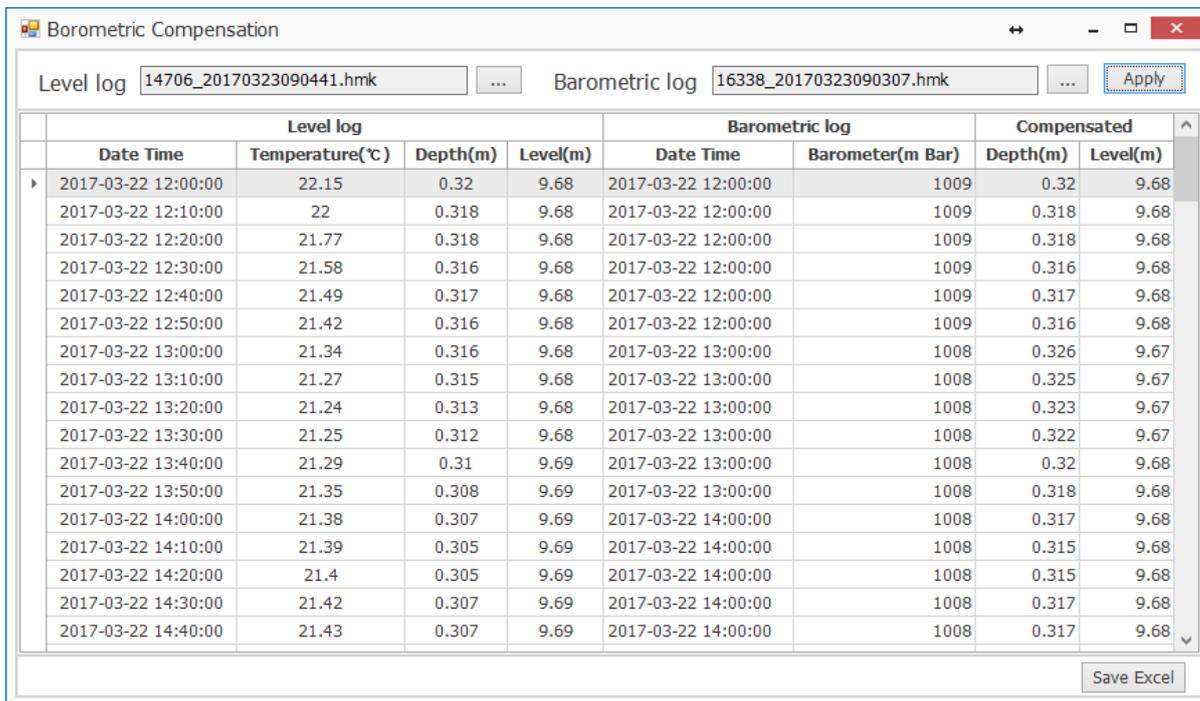
4) CHART AND GRAPH



- You can see the chart in the top of left.
- You can see the measurement items in the top of right.
- You can check the data in the bottom of screen.
- If you check "From the Y-Axis 0" at the right section of graph, you can show range of Y-Axis. (Default: Checked)
- If you wave the cursor over the chart, you can see the data of X-Coordinate.
- According to the check measurement items, you can see the items you want.
 - If you not check "Depth (m)", the data of depth (m) disappear in the chart and graph.
- If you are uncomfortable to check the data because of narrowed the space of graph, you can adjust the space through double click the wide column header edge.
- In graph, the data is shown from top to bottom according to the time order. And In chart, the data is shown from left and right according to the time order.

5) Barometric Compensation

- If you right-click of log file in home menu, you can see "barometric compensation" pop-up window.



- Level log: log file chosen at home screen. You can change log file using button.
- Barometric log: log file including Barometer value

ICON	NAME	DETAILS
	Start compensation	Calculate compensated depth value applying to Barometric value.
	EXCEL SAVE	Save compensated value to excel format.

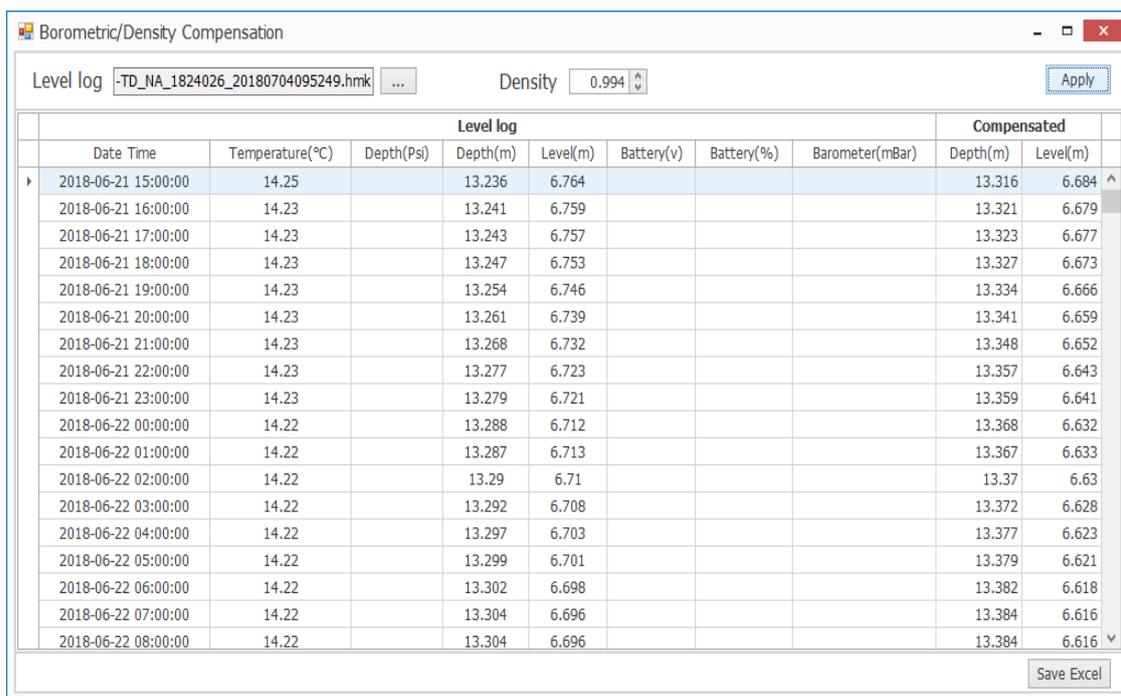
6) Barometric compensation Method

- Basically, compensation calculation can be applied during barometer logging period.
- ① Standard Barometer value: first measured barometer value during compensation period
- ② Current Barometer value: current measured barometer value
- ③ Conversion Factor: barometric(m Bar)/length(m) conversion constant(0.0101972)
- ④ Compensated Value: Barometric compensated value = (②-①) * ③
- Compensated Depth = Depth – Compensated value
- Compensated Level = Level + Compensated value

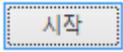
Level log				Barometric log		Compensated		
Date Time	Temp. (°C)	Depth (m)	Level (m)	Date Time	Barometer (m Bar)	compensated value	Depth (m)	Level (m)
2017-03-22 11:40	22.02	0.322	9.678	cannot be compensated because there isn't any standard barometer value in this period.				
2017-03-22 11:50	22.09	0.321	9.679					
2017-03-22 12:00	22.15	0.32	9.68	2017-03-22 12:00	① 1009	0.0000	0.320	9.680
2017-03-22 12:10	22	0.318	9.682	compensating using same time lot's data	1009	0.0000	0.318	9.682
2017-03-22 12:20	21.77	0.318	9.682		1009	0.0000	0.318	9.682
2017-03-22 12:30	21.58	0.316	9.684		1009	0.0000	0.316	9.684
2017-03-22 12:40	21.49	0.317	9.683		1009	0.0000	0.317	9.683
2017-03-22 12:50	21.42	0.316	9.684	1009	0.0000	0.316	9.684	
2017-03-22 13:00	21.34	0.316	9.684	2017-03-22 13:00	1008	-0.0102	0.326	9.674
2017-03-22 13:10	21.27	0.315	9.685	compensating using same time lot's data	1008	-0.0102	0.325	9.675
2017-03-22 13:20	21.24	0.313	9.687		1008	-0.0102	0.323	9.677
2017-03-22 13:30	21.25	0.312	9.688		1008	-0.0102	0.322	9.678
2017-03-22 13:40	21.29	0.31	9.69		1008	-0.0102	0.320	9.680
2017-03-22 13:50	21.35	0.308	9.692	1008	-0.0102	0.318	9.682	
2017-03-22 14:00	21.38	0.307	9.693	2017-03-22 14:00	② 1012	④ 0.0306	0.276	9.724
2017-03-22 14:10	21.39	0.305	9.695	compensating using same time lot's data	1012	0.0306	0.274	9.726
2017-03-22 14:20	21.4	0.305	9.695		1012	0.0306	0.274	9.726
2017-03-22 14:30	21.42	0.307	9.693		1012	0.0306	0.276	9.724
2017-03-22 14:40	21.42	0.307	9.693		1012	0.0306	0.276	9.724
2017-03-22 14:50	21.42	0.307	9.693	1012	0.0306	0.276	9.724	
2017-03-22 15:00	21.42	0.307	9.693	cannot be compensated because there isn't any standard barometer value in this period.				
2017-03-22 15:10	21.42	0.307	9.693					

7) Density compensation

- Right-click and the "Atmospheric Pressure Compensation" menu will appear on the log file.



- Density: the real density of groundwater (range 0.1 ~ 2.0)

iCon	Name	Detail
	Start density compensation	Calculate again the depth and water level using log file and density
	Save Excel file	Save the result of density compensation as Excel.

8) Density compensation Method

$$\text{Depthc} = \text{Deptho} / \text{density.}$$

$$\text{Levelc} + \text{Depthc} = \text{Levelo} + \text{Deptho} \quad \text{Levelc} = \text{Levelo} + \text{Deptho} - \text{Depthc}$$

6. SENSOR INFORMATION

1) SCREEN

The screenshot displays the 'Information' section of the AquaSense2 web interface, divided into three main panels:

- Sensor Information:** Fields for Manufacturer (Hydronet), Model (MK-15TD), Serial (12345), S/W Version (1.26), Protocol Version (HNP1.20), Site ID (ytre), and Address (6). Buttons for 'Firmware Upgrade' and 'Apply' are located below.
- Logger Information:** Fields for Status (Stop), Create Date (11/3/2015 10:15:38 AM), Start Date (10/28/2015 12:00:00 AM), End Date (2/7/2036 6:28:15 AM), Interval (00:00:01), Used Memory (002859/057344), First Log (11/3/2015 10:15:40 AM), and Last Log (11/3/2015 11:03:18 AM). A 'Refresh' button is at the bottom right.
- Time Information:** Fields for Sensor DateTime (11/4/2015 8:44:45 AM) and Local DateTime (11/3/2015 12:18:13 PM). A checkbox for 'System Time' is checked. 'Refresh' and 'Apply' buttons are at the bottom.

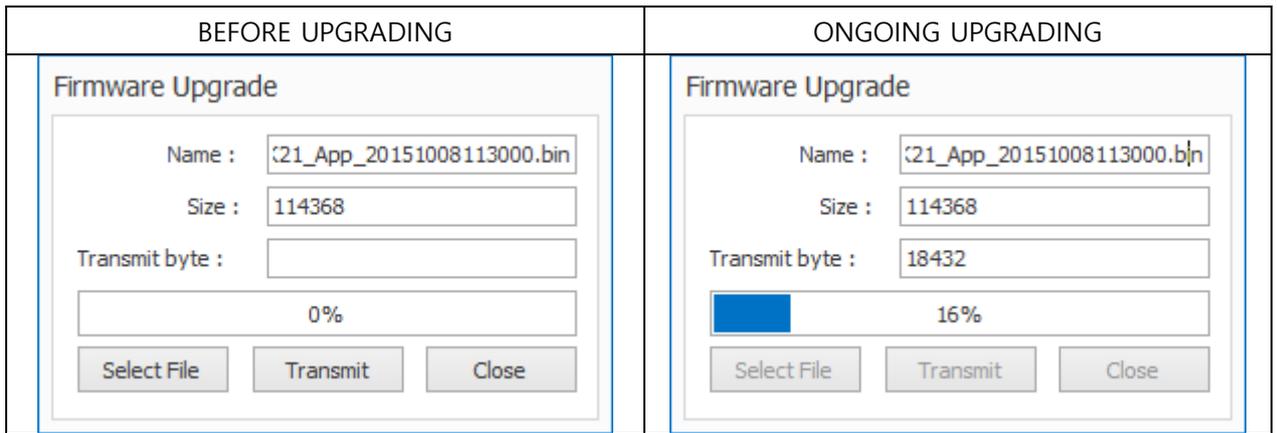
2) DETAILS

- This screen shows you the sensor information.
- You can change the site ID.
- The sensor time is synchronized to PC time.
 - If you check "System time", the time to push the button is applied. Otherwise, the time to set by user is applied.
- You can update sensor firmware in this screen.
- You can see the log status.
 - If the sensor is in log status, **RUN**. If the sensor is not in log status, **STOP**

3) ICON EXPLANATION

ICON	NAME	DETAILS
	FIRMWARE UPGRADE	- Upgrade sensor's firmware file.
	REFRESH	- Refresh each data
	APPLY	- Apply setting value

4) Firmware Upgrade

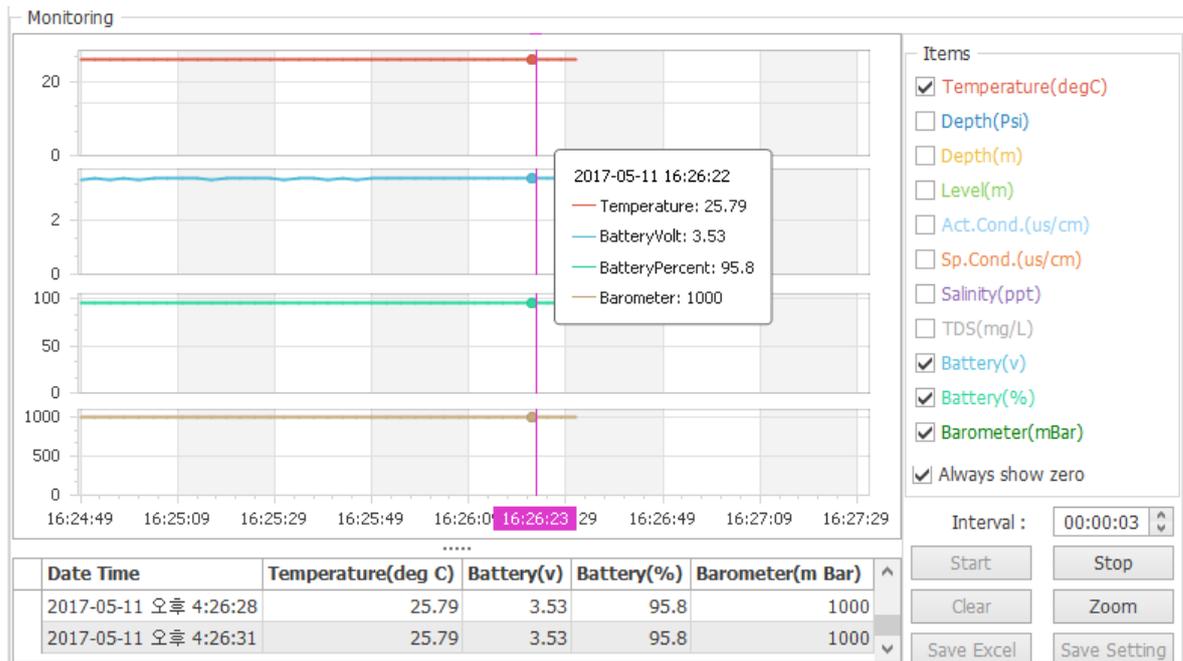


- You can upgrade sensor's firmware file.
- If the connecting is cut in the middle of upgrading, this leads serious problem to sensor!!
If you should upgrade the file, don't stop in the middle.
 - If the status is in 0%, please exit the program and try again.
 - If the connecting is cut in the middle of upgrading, please contact HydroNet immediately.

ICON	NAME	DETAILS
	SELECT FILE	- Select the file to upgrade
	TRANSMIT	- Start to upgrade file.
	CLOSE	- Close the upgrade pop-up screen.

7. MONITORING

1) SCREEN



2) DETAILS

- This screen shows you real time monitoring data of sensor.
- You can modify the measurement interval on monitoring.
- You can save the measured data to excel format.
 - For this function, you should stop to monitor the data.

3) ICON EXPLANATION

ICON	NAME	DETAILS
Start	START	- Start real time monitoring.
Stop	STOP	- Stop real time monitoring
Clear	DELETE	- Delete shown the chart and graph of data
Zoom	ZOOM	- Zoom the screen
Save Excel	EXCEL SAVE	- Save shown data to excel format.
Save Setting	SAVE SETTING	- Set selected items and interval values.

8. LOG

1) SCREEN

The screenshot shows the 'Logger' application window. On the left, the 'Logger Information' panel displays the status as 'Run' in a green box. It includes fields for 'Create Date' (11/3/2015 10:15:38 AM), 'Start Date' (10/28/2015 12:00:00 AM), 'End Date' (2/7/2036 6:28:15 AM), 'Interval' (00:00:01), 'Used Memory' (002859/057344), 'First Log' (11/3/2015 10:15:40 AM), and 'Last Log' (11/4/2015 8:59:29 AM). Below these are buttons for 'Refresh', 'Clear Log', 'Change', 'Start Logging', and 'Stop Logging'. On the right, the 'Log Download' panel lists items to be downloaded: Temperature(degC) (checked), Depth(Psi), Depth(m) (checked), Level(m), AC(uS/cm), SpCond.(uS/cm) (checked), Salinity(ppt), TDS(mg/L), Battery(v), and Battery(%). A 'Period' section shows 'Start' (10/30/2015 2:10:01 PM) and 'End' (11/3/2015 12:31:57 PM) with a progress bar at 0%. Buttons for 'Save Setting', 'Download', and 'Cancel' are at the bottom.

2) DETAILS

- You can check, start and stop to log the file.
- You can download the data saved into the sensor to PC.
- If you download log data to PC, you can save the data to excel format at any time.

3) SCREEN - Basic information

The status of stop log and measured log is none.	The status of stop log and there are measured log value
<p>This screenshot shows the 'Logger' application with the status set to 'Stop' in a red box. The 'Logger Information' panel shows the same configuration as the previous screen, but the 'First Log' and 'Last Log' fields are empty. The buttons at the bottom include 'Refresh', 'Clear Log', 'Create Log', 'Start Logging', and 'Stop Logging'.</p>	<p>This screenshot shows the 'Logger' application with the status set to 'Stop' in a red box. The 'Logger Information' panel shows the same configuration, but the 'First Log' field is populated with '11/3/2015 10:15:40 AM' and the 'Last Log' field is populated with '11/3/2015 11:03:18 AM'. The buttons at the bottom include 'Refresh', 'Clear Log', 'Change', 'Start Logging', and 'Stop Logging'.</p>

The status of log	
<div style="border: 1px solid #ccc; padding: 10px;"> <p>Logger</p> <p>Logger Information</p> <p>Status : Run</p> <p>Create Date : 11/3/2015 10:15:38 AM</p> <p>Start Date : 10/28/2015 12:00:00 AM</p> <p><input checked="" type="checkbox"/> On Time Apply</p> <p>End Date : 2/7/2036 6:28:15 AM</p> <p><input checked="" type="checkbox"/> Infinity Apply</p> <p>Interval : 00:00:01 Apply</p> <p>Used Memory : 002859/057344</p> <p>First Log : 11/3/2015 10:15:40 AM</p> <p>Last Log : 11/4/2015 8:59:29 AM</p> <p style="text-align: center;"> Refresh Clear Log Change </p> <p style="text-align: center;"> Start Logging Stop Logging </p> </div>	

4) DETAILS - Basic Information

- "Basic Information" shows you the status of log.
- You can start or stop to log file.
- In case of processing log, you can set start time, end time and interval etc.

5) ICON EXPLANATION

ICON	NAME	DETAILS
Clear Log	DELETE	- Delete all of logged data of sensor. - It is impossible to restore deleted data. - If you want to delete logged data, you should stop to log.
Create Log	CREATE	- Create log file(In case of no log data)
Change	CHANGE	- Make to be able to modify start time, end time, interval in logging.
Start Logging	LOG START	- Start to measure data
Stop Logging	LOG STOP	- Stop to measure data
Refresh	REFRESH	- Refresh log information.

6) TERMS – Basic Information

TERMS	DETAILS
STATUS	- It means logging status.

Log create date	<ul style="list-style-type: none"> - In case there isn't any history of log in the PC, the start time is "Log Create Date". - "Log Create Date" means the time for user to push "LOG CREATE" button.
Log Start date	<ul style="list-style-type: none"> - It means the time to measure and save the data into the memory initially. - For example, you set it to future time, the sensor would start to measure at the setting time. - In case you set it to past time, the sensor immediately starts to measure based on the current time. (In this case, start date would be remained to setting time by user. (Not be changed to current time.) - If "On time" is checked, log start time would be set on time of setting date without reference to set-up time.
Log End date	<ul style="list-style-type: none"> - It means the time to end logging. - Log end date cannot be earlier than start date or current time. - If you check "Infinite", the sensor will measure until 2036 year.
Interval	- It means the cycle of measurement (hours, minutes, seconds unit).
Memory Usage	- It means the quantity of all memory and usage memory
First Log date	- It means the date of first log saved in the sensor.
Last Log date	- It means the date of last log saved in the sensor.

7) SCREEN – Log Download

The screenshot shows the 'Log Download' interface. On the left, under 'Items', there is a list of parameters with checkboxes:

- Temperature(degC)
- Depth(Psi)
- Depth(m)
- Level(m)
- AC(uS/cm)
- SpCond.(uS/cm)
- Salinity(ppt)
- TDS(mg/L)
- Battery(v)
- Battery(%)

 On the right, under 'Period', there are two rows of date and time pickers:

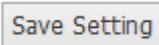
- Start : 10/30/2015 2:10:01 PM
- End : 11/3/2015 12:31:57 PM

 Below the period selection is an 'All Log' checkbox. A progress bar shows 0% completion. At the bottom, there are 'Total' and 'Count' fields, and three buttons: 'Save Setting', 'Download', and 'Cancel'.

8) DETAILS – Log Download

- You can choose downloading items.
- You can choose log file (selected period log file/All log file).
- You can cancel to download in downloading and check the status of downloading.
 - If you cancel to download the data, the data before cancelling would be saved to PC.
- In the process of downloading, you cannot select sensor connect/disconnect and move menu.

9) ICON EXPLANATION – Log Download

ICON	NAME	DETAILS
	SAVE SETTING	- Save setting value of selected measuring items, interval etc.
	DOWNLOAD	- Download log data saved into the sensor to PC.
	CANCEL	- Cancel to download

10) TERMS – Log Download

TERMS	DETAILS
PERIOD	- Download log data of setting period. - If you have downloaded file before, the start date would be "last log date based on the latest saved file. Otherwise, start date would be "Logging start date". - End date would be "current date".
ALL LOG	- Download all of saved data from sensor memory
TOTAL	- It means the number of downloading data.
COUNT	- It means the number of saved data

9. CALIBRATION

1) SCREEN

The screenshot shows a 'Calibration' window with four main sections: Temperature, Pressure, Conductivity, and Level. Each section has a unit dropdown, a 'Current Value' field, a 'Calibration Value' field with up/down arrows, and an 'Apply' button. The 'Refresh' section shows 'Current Time' and 'Last Refresh Time' with a 'Refresh' button. The 'Level' section includes a 'Depth' dropdown, 'H = Altitude(m)' and 'C = Installed Depth(m)' fields, and a 'Level' dropdown with its own 'Current Value' and 'Calibration Value' fields. A red text note at the bottom of the Level section reads 'GL, EL : C = Level + Pressure'.

2) DETAILS

- You can use this screen for user calibration for sensor.
- You can check the real value after calibration.
- If there is inaccessible measurement value, the relevant compensation button would be disable.

3) ICON EXPLANATION

ICON	NAME	DETAILS
	REFRESH	- Refresh the data by each item.
	APPLY	- Apply setting value to sensor by each item.

4) TERMS

TERMS	DETAILS
Temperature	- You can calibrate Celsius temperature.
Pressure	- You can calibrate pressure with PSI or Meter unit.
Conductivity	- You can calibrate Specific conductivity.
Level	- You can calibrate the cable length from surface of ground to surface of Water - In GL & EL level mode, installation depth is applied to "cable length + Pressure". - In SL level mode, you can't input cable length.

10. SETUP

1) SCREEN

2) DETAILS

- You can set detail setting by each item in this screen.
- You can check installation information of sensor and modify setting value.
- If there is inaccessible setting value, the relevant button would be disable.

3) ICON EXPLANATION

ICON	NAME	DETAILS
	REFRESH	- Refresh data by each item.
	APPLY	- Apply setting value to sensor

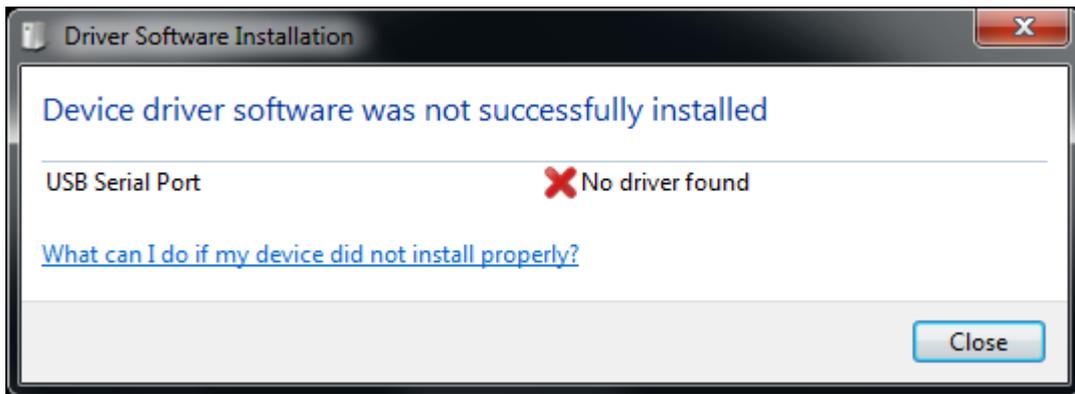
4) TERMS

ITEM	TERMS	DETAILS
Installed Information	Altitude	- Height from surface of earth to surface of sea
	Installed Depth	- In case of the Level Mode is GL or EL, the length of cable including sensor length. - In case of Level Mode is SL, the height from bottom of reservoir to sensor
	Level Mode	- Level measuring mode after installation - GL : the surface of earth ~ the surface of groundwater

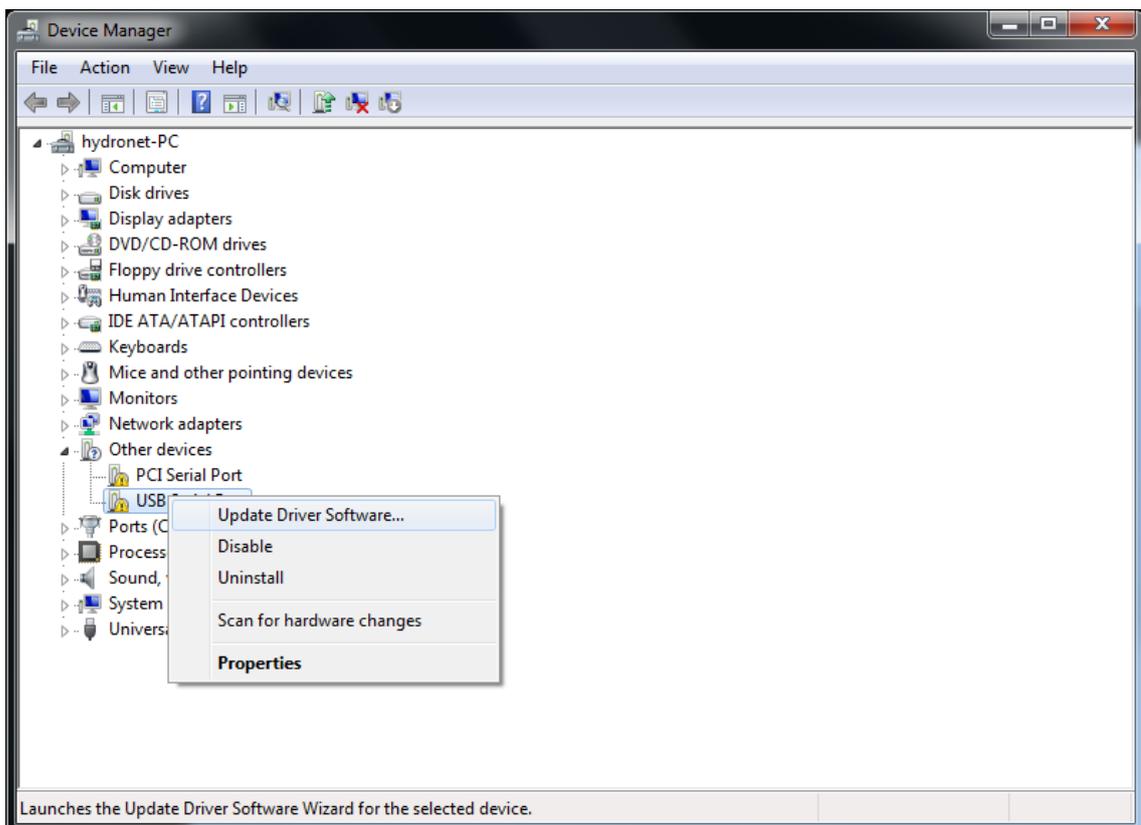
		<ul style="list-style-type: none"> - EL : the surface of sea ~ the surface of groundwater - SL : bottom of reservoir ~ the surface of groundwater
Depth Compensation	PSI to Meter Convert Method	<ul style="list-style-type: none"> - set pressure compensation formula. - If you set "System", the formula is applied to setting value by system. - If you set "Custome", you can input the compensation value by yourself.
	PSI to Meter Conversion Constant	<ul style="list-style-type: none"> - If you set "Custome", this menu is available to set multiplication constant for conversion from PSI to meter. - The range is from 0.50000 to 0.99999(default: 0.70307)
	Temperature Compensation	<ul style="list-style-type: none"> - If you set "System", you can input the constant value for temperature compensation by yourself. - If you set "Measured Temp", the measure temperature by sensor would be used. - The range is from 00.00 to 99.99.
	Latitude	<ul style="list-style-type: none"> - If you set "System", this menu is available to set constant for latitude compensation when the pressure is changed. - If you set "Enable", you can input the compensation constant. - If you set "Disable", you will not compensate latitude. - The range is from -99.99 to 99.99
	Altitude	<ul style="list-style-type: none"> - If you set "System", this menu is available to set constant for altitude compensation when the pressure is changed. - If you set "Enable", the system compensate altitude. - If you set "Disable", you will not compensate altitude
Conductivity	Range	<ul style="list-style-type: none"> - You can set the rough range of conductivity for installed groundwater - You can select "Auto, Low, Middle, High."
	Compensation Mode	<ul style="list-style-type: none"> - You can set the temperature compensation formula for calculating the conductivity value. - You can select "Fresh, Salt, Standard, None."

11. REFERENCE

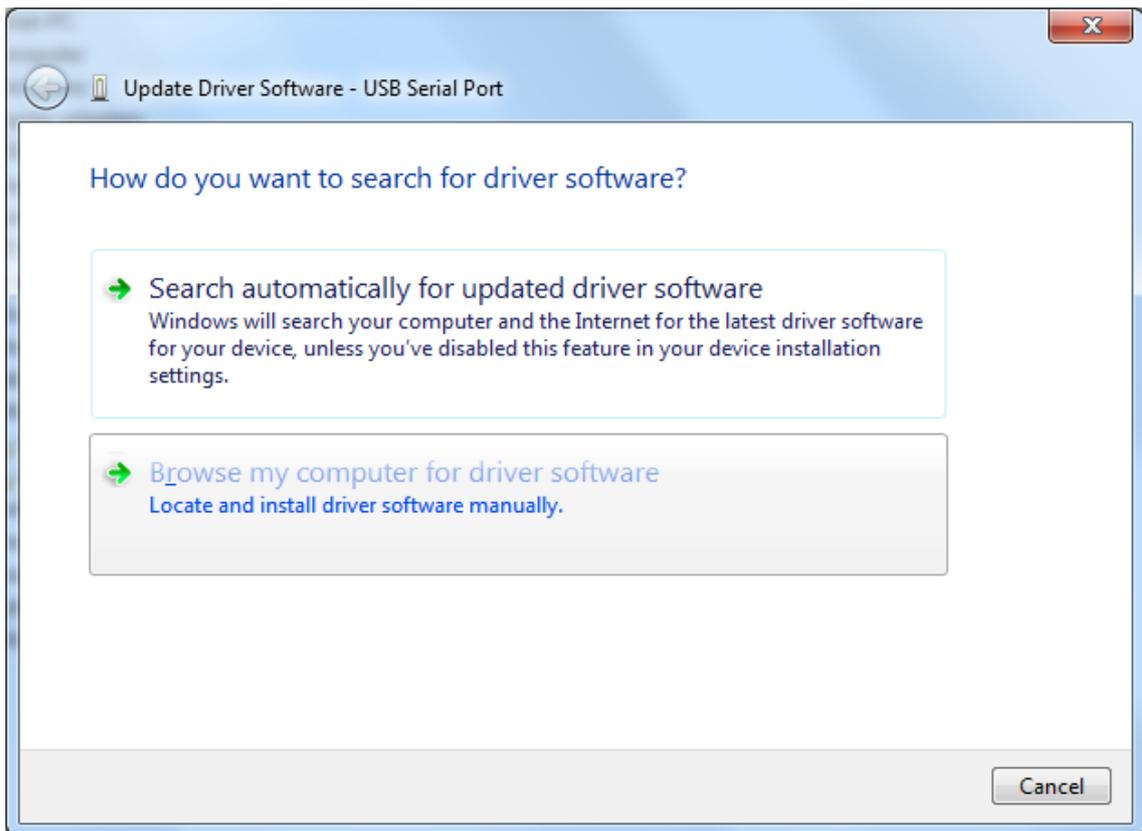
- 1) In case of disconnecting sensor to PC
 - If your computer is above window 7 and installed service pack 1, necessary driver for connecting sensor will be automatically installed.
 - Like in the case of below picture, the driver is not installed automatically, please follow below method.



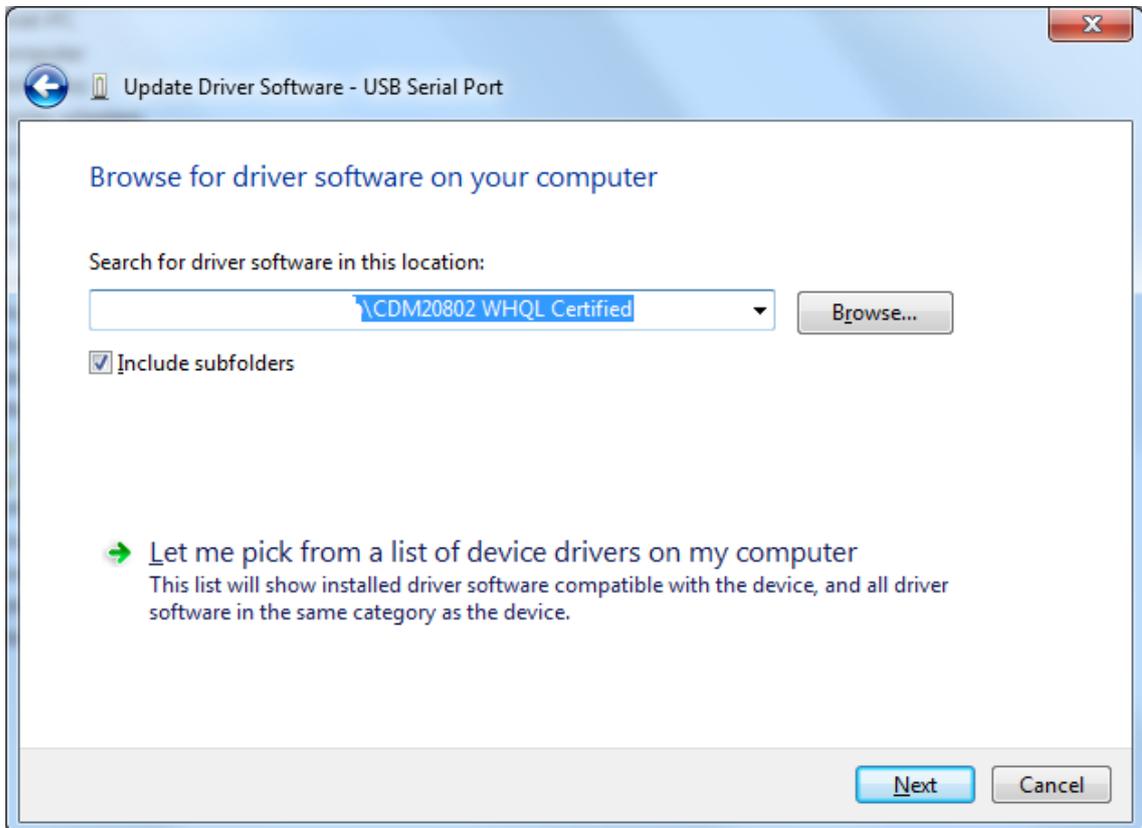
- Please select "My computer" -> double click of right mouse button -> choose second menu(management) -> execute "Device Manager".



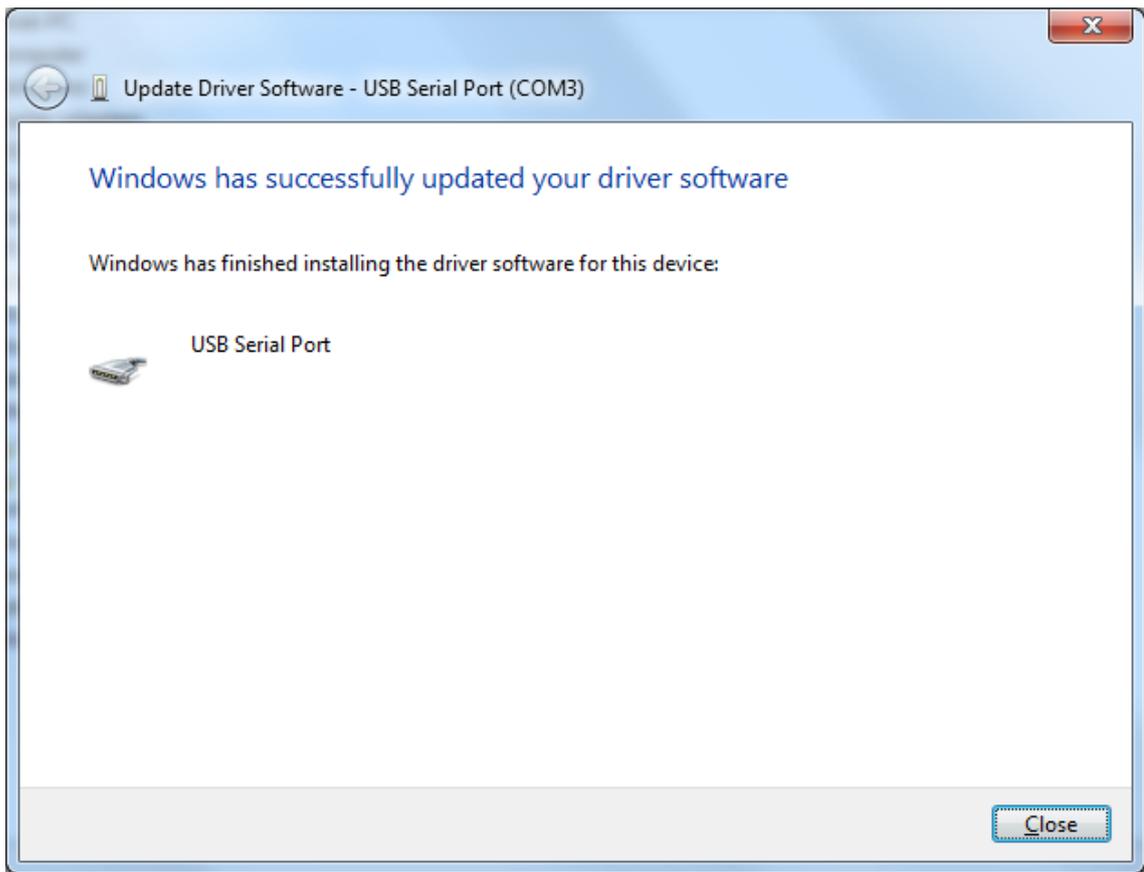
- You can see exclamation mark of FT232R USB UART In "other devices". Then, double click of right button of mouse and select driver software update.



- Select "Browse my computer for device software".



- Please select correspondence folder and click "Next", then, the driver will be installed.



- If the exclamation mark is also appeared to USB Serial Port, please install the driver as like above method.
- 2) Run time error
- This Aquasense 2 program is made by .Net Framework 4.0 version.
 - In case of error as like below, please execute "dotNetFx40_Full_x86_x64.exe" file in the CD and install the Framework.

