2.2.2 BevSense VS-3000E Sensor System - Logix EtherNet/IP Setup

Connecting a BevSense VS-3000E System to CompactLogix PLC with EtherNet/IP

Objective:

- Integrating a VS-3000E Sensor System with a Logix PLC using EtherNet/IP

Equipment:

- Logix PLC
- Logix Instruction Manual
- RS/Logix 5000/RSLinx
- EtherNet/IP interface
- PC or laptop
- VS-3000E Sensor System

While every effort was made to verify the following information, no warranty of accuracy or usability is expressed or implied.

Overview:

The purpose of this document is to describe the configuration steps necessary to establish a communication path between the VS-3000E Sensor System and a Compact/Control Logix unit. You will need either a 1756-ENET/B or a 1756-ENBT/A together with a Compact/Control Logix controller. It may be possible to upgrade a 1756-ENET/A to the required 1756-ENET/B by flashing the firmware; you should check the hardware version with your vendor before hand to ensure its suitability. You will also need Rockwell Software's RSLinx and RSLogix 5000 software configuration utilities.

In the following example, the Compact/Control Logix will establish a Class1 connection and I/O data will be exchanged between the Compact/Control Logix and the Modular Controller. The network parameters used in this example will almost certainly not apply to your application. Be sure to consult your network administrator when selecting appropriate values.

The VS-3000E Sensor System has the ability for two way communications (inputs and outputs) with a Compact/Control Logix controller. Sensor measurement data can be sent real-time while tasks such as brand changes or system offsets can also set from the Compact/Control Logix.

Initial setup of VS-300 / VS-200 SMS for EtherNet/IP

If you have requested EtherNet/IP functionality with your order, then steps 3 & 4 will be configured for you at the BevSense factory

1. Connect the VS-300 / VS-200 SMS controller to the plant Ethernet network and PLC with an CAT-5 Ethernet cable. The Ethernet connection port is located on the bottom of the VS-300 / VS-200 SMS controller.

   NOTE: You may need to change the fixed IP address on your VS-300 / VS-200 to be in the same domain as the PLC / Plant Network. To do this you must first disable the Advantech Enhanced Write Lock Filter (which protects the system files from unintended changes).

2. Using a laptop or other networked computer, open Windows Remote Desktop Connection and connect to the VS-300/VS-200SMS (the default target IP address is 192.168.1.75). The username is "Administrator" and the password field is left blank.

3. The *VS-3000E DASHBOARD* program will already be running minimized on the Windows desktop. Maximize the program and click **Edit**>>Dashboard Parameters. Verify the number in the *Fieldbus* row; it should be "**4**" for EtherNet/IP. See the *Figure: 1* below.

4. Set the desired *Fieldbus Update Rate* (the speed at which VS-3000E Dashboard sends/receives information to/from the PLC). The default (recommended) value is 1000mses. Click *Save*, the *VS-3000E Dashboard* program will re-start

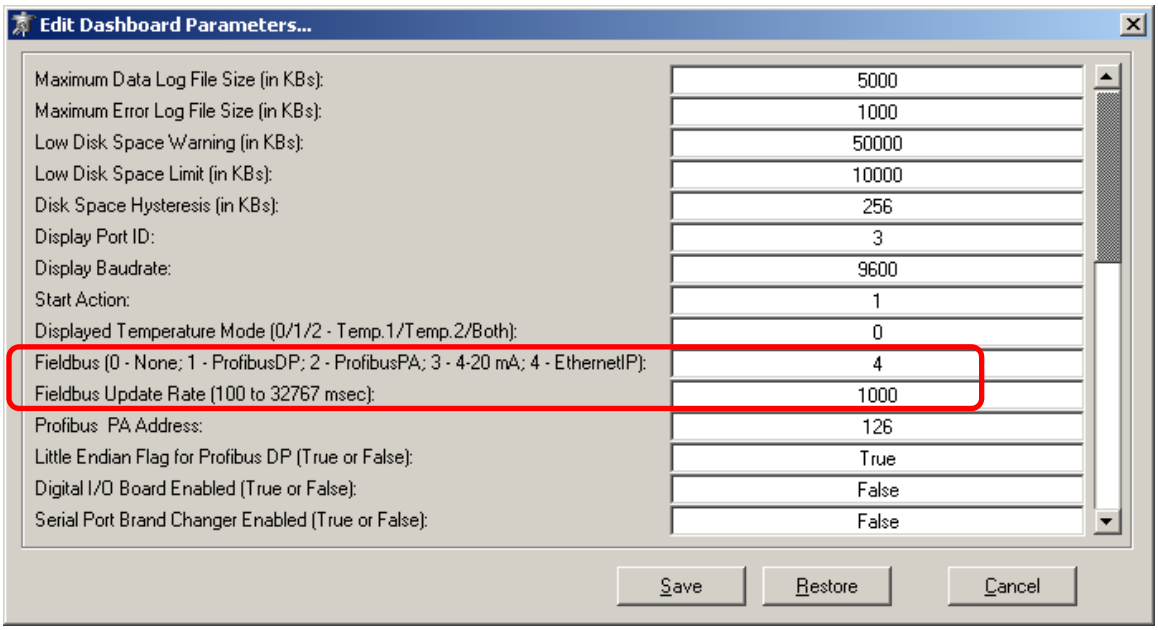

Fig. 1

5. After Dashboard re-starts. Click on **Edit**>>EtherNetIP.

   a. Enter the IP address of the Logix PLC. See *Fig. 2* below.

6. The input and output tag names **must match** the tags set in the RSLogix 5000 software.
    a. The defaults are "**VitalSensorsIn**" and "**VitalSensorsOut**".

7. The timeout parameters can also be changed on this screen.

8. If you plan to enter product / brand ID's into the VS-300 / VS-200 SMS, you will need to specify if product changes are handled by the PLC or VS-300 / VS-200 SMS (to avoid conflicting signals). See *Change Product Handling* in *Fig. 2* below. If you plan to enter brands/products in the PLC and only use raw sensor outputs, then ignore this function.
    a. The offset in Writing and Reading Parameters allows for memory location offsets

9. SAVE any changes made. Click "X" in the top right corner to close this menu.

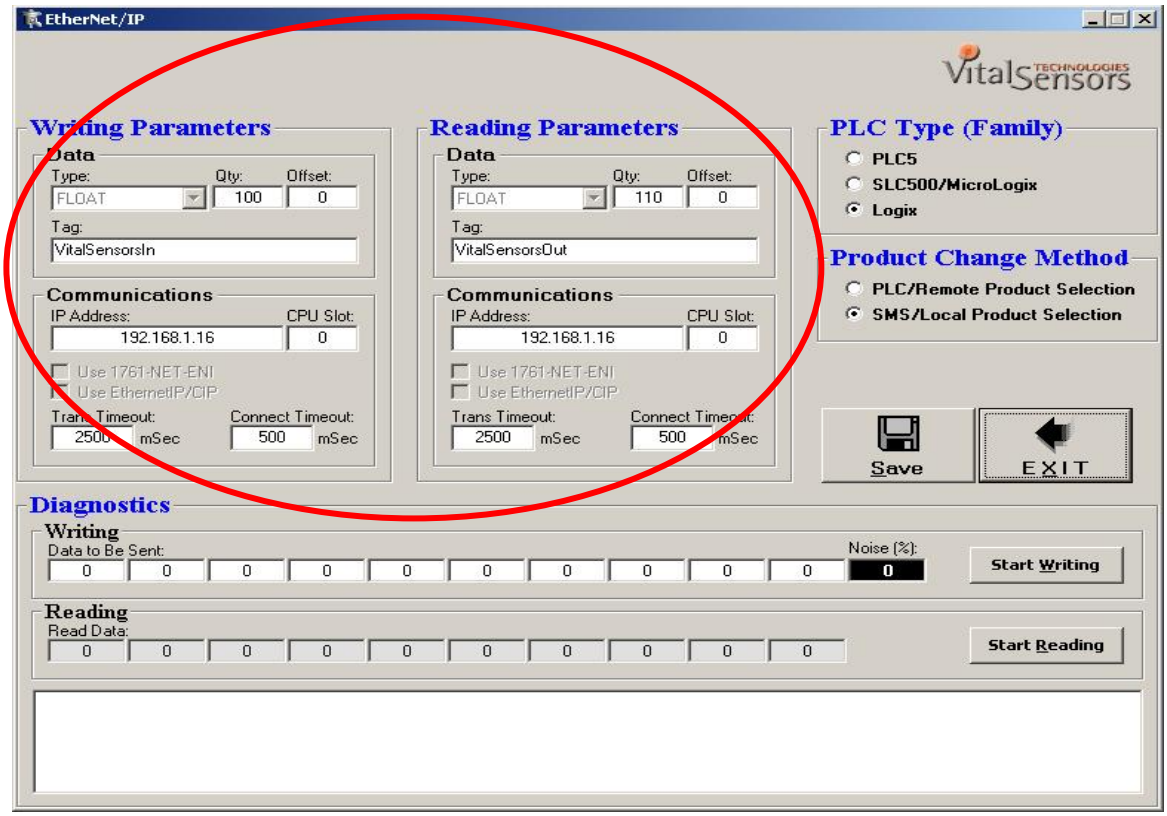

Fig. 2

The BevSense Documentation CD provided with this system contains a folder called EtherNet/IP. This folder contains .acd files and MS Excel spreadsheet with that can be used for controller tags. Please select either the beer or soft drink files.

LOGIX SOFTWARE CONFIGURATION

1. Create a NEW PROJECT in RSLogix 5000

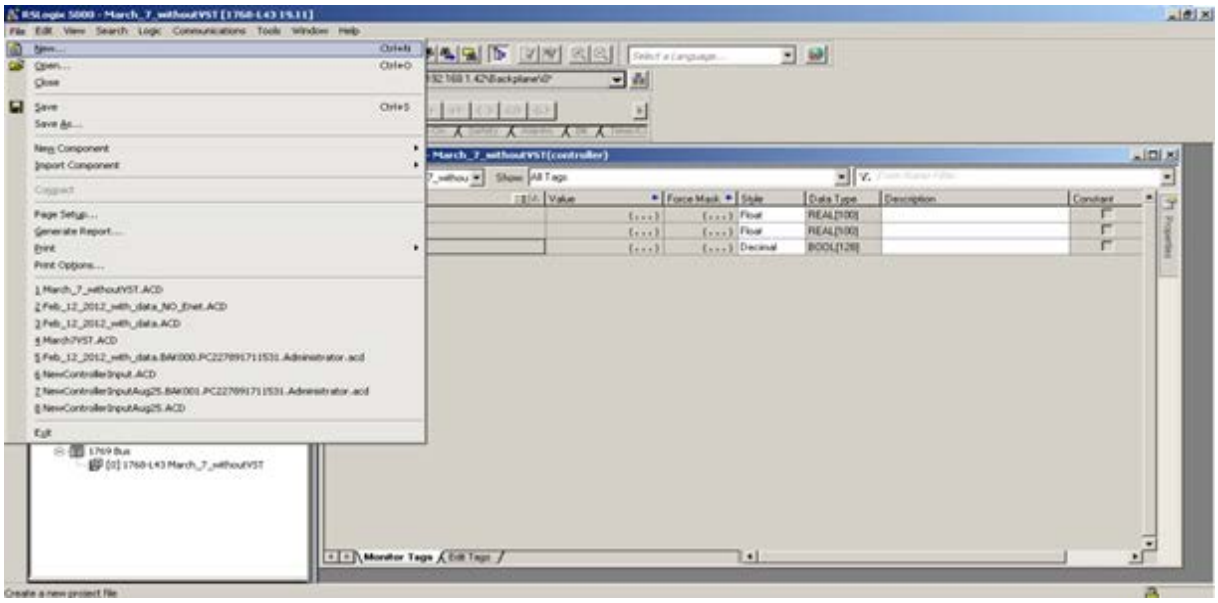

Fig. 3

2. Select appropriate PLC type and revision (find PLC type using RSLinx)

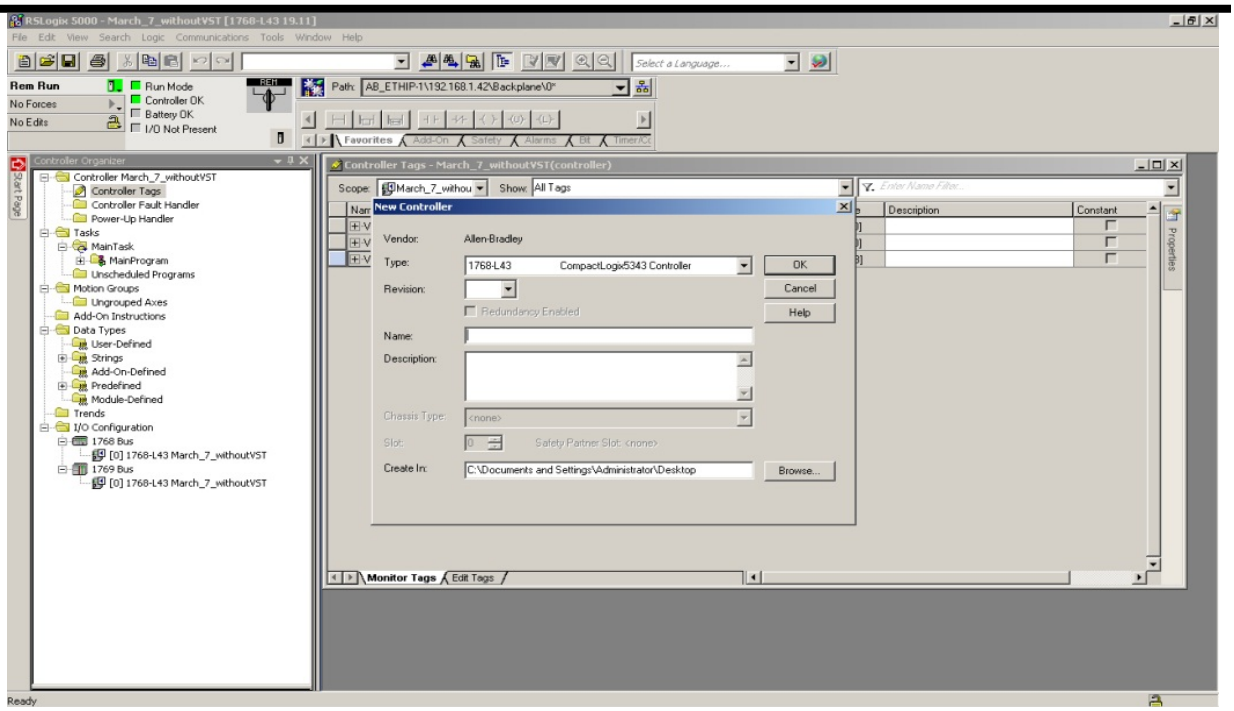

Fig. 4

3. Enter a Project Name and SAVE

4. Go to <u>COMMUNICATIONS</u> >> <u>WHO ACTIVE</u>.

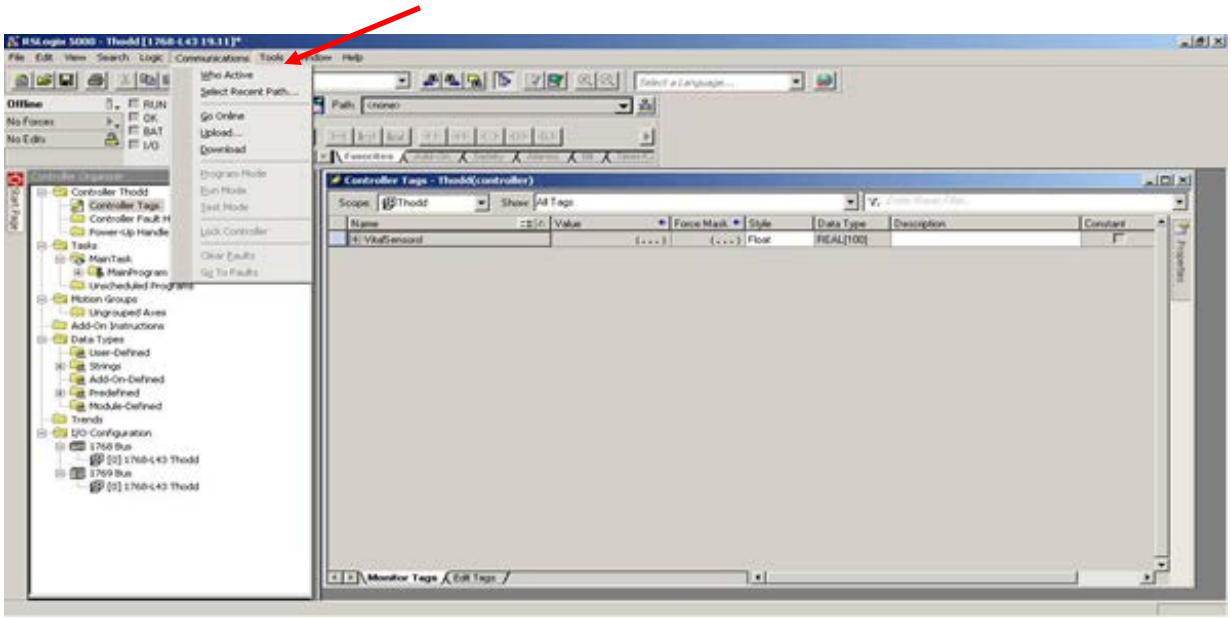

Fig. 5

5. Expand the ETHB node to find processor used and highlight. See *Fig. 6* Below

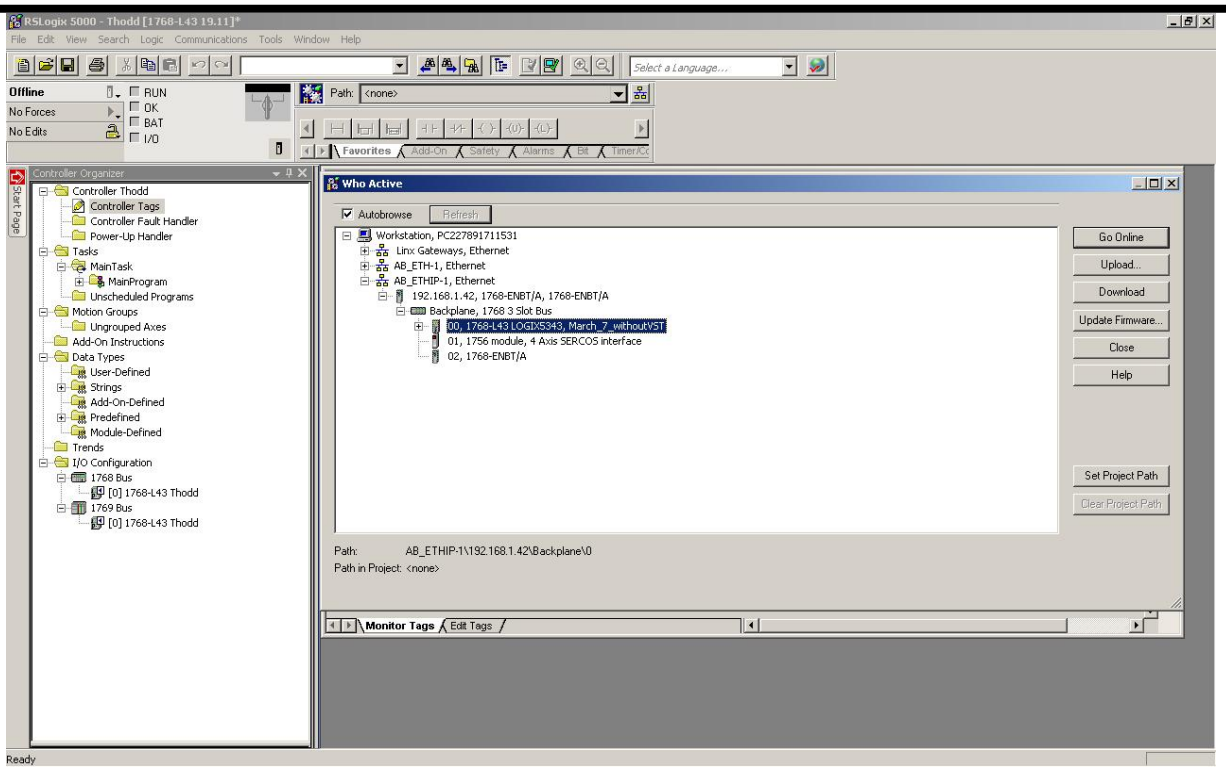

Fig. 6

6. In Controller Organizer double click on **CONTROLLER TAGS** and click on **EDIT TAGS** tab.

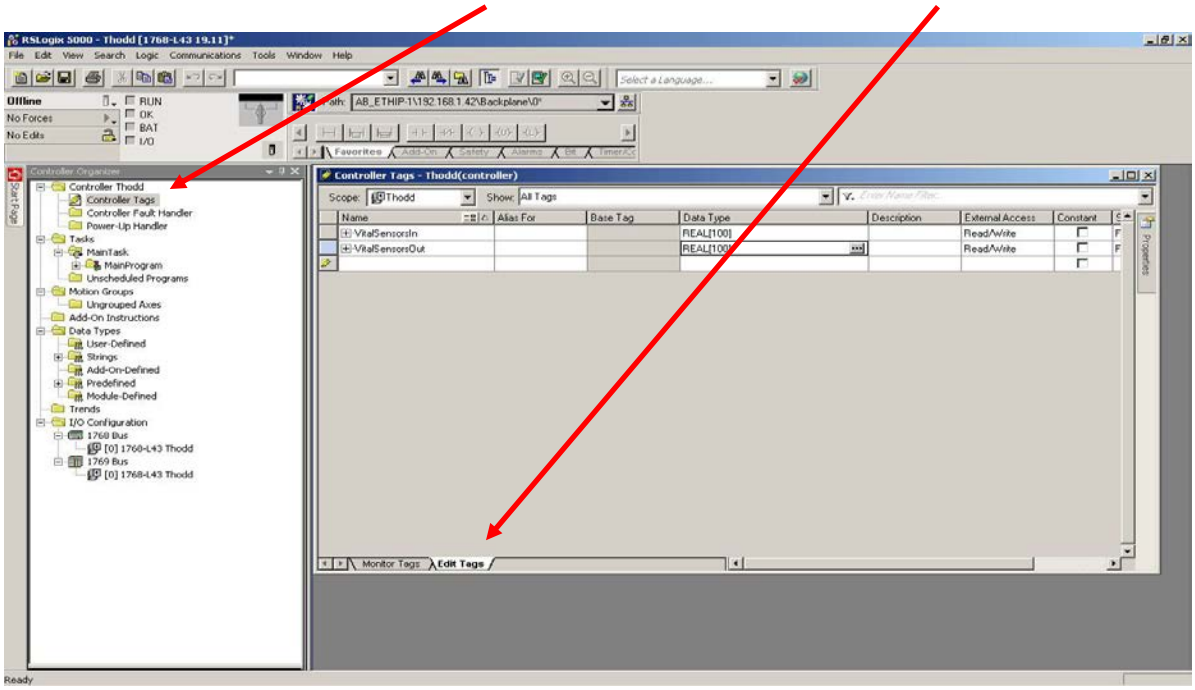

Fig. 7

7. Create Tag **VitalSensorsIn** for input REAL, **100** elements. See *Fig. 8* below.

8. Create Tag **VitalSensorsOut** for output REAL, **110** elements. See *Fig. 8* below.

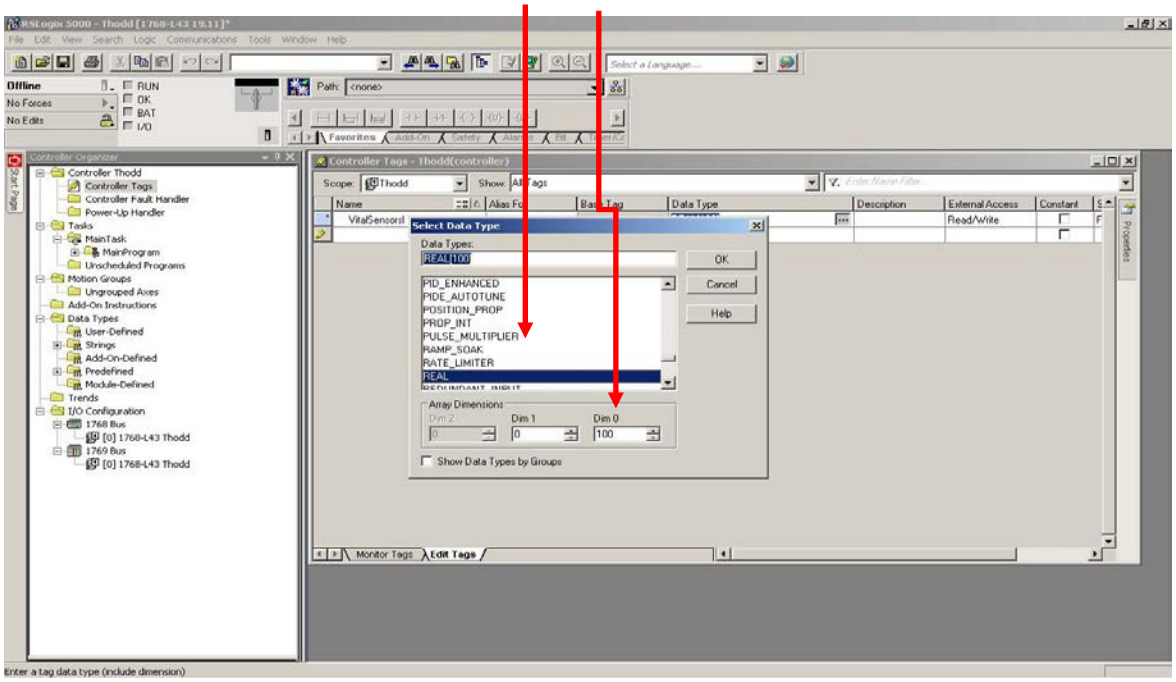

Fig. 8

9. Download new tag setup into PLC. See *Fig. 9* below

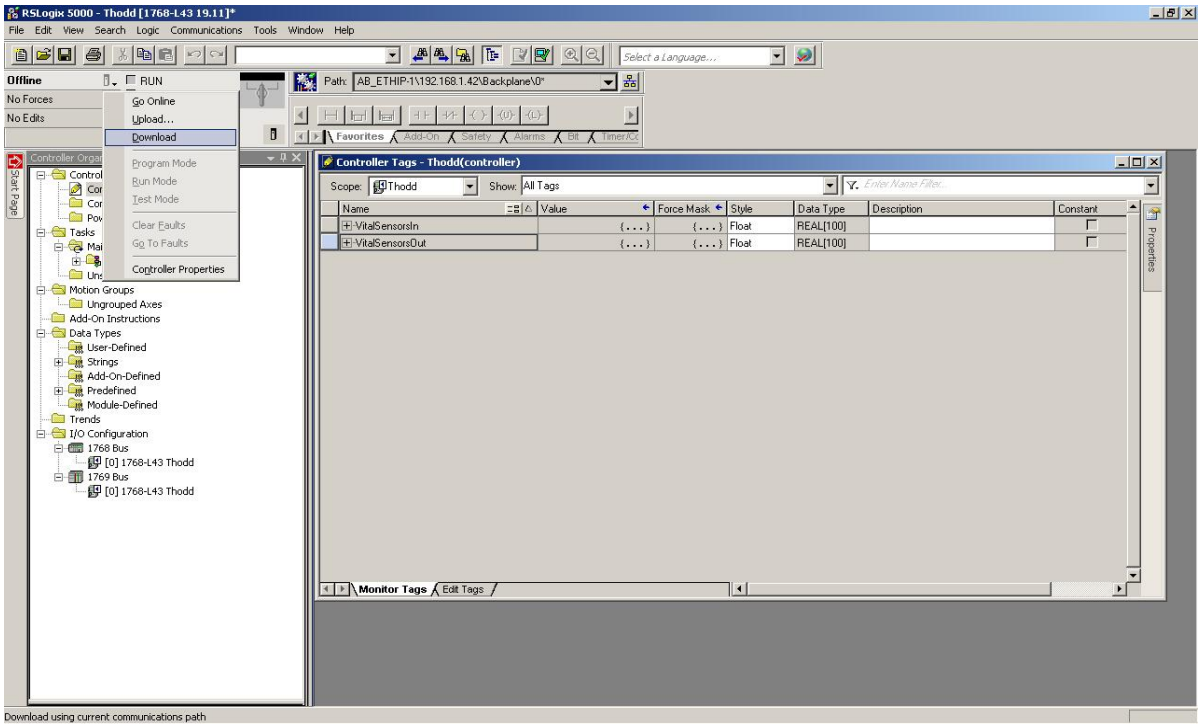

Fig. 9

10. Put PLC in run mode. See *Figure 10* Below.

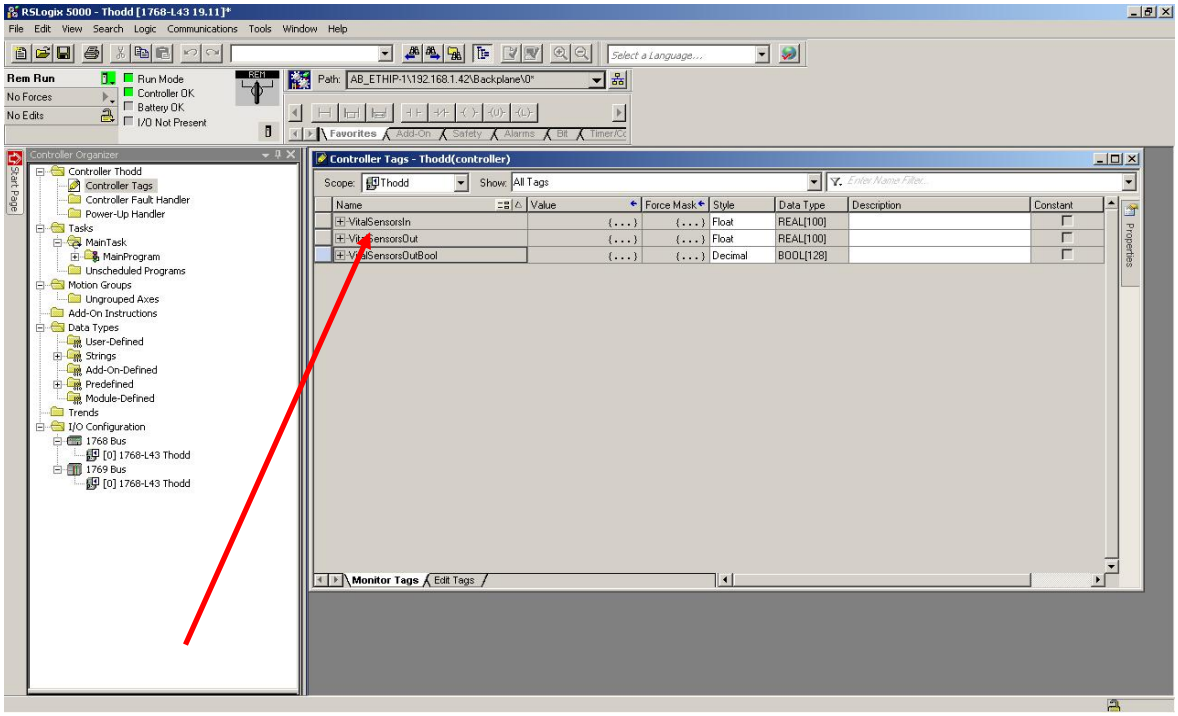

Fig. 10

Expanding the "+" signs on the tag names to see/edit the input and output values.

The instances and sizes are arbitrary, as long as the instance, size, and direction are matched in the configuration of the VitalSensors Controller.
Assembly instance direction is always relative to the originator, which in the case of the current VitalSensors Controller Ethernet/IP implementation is always the device and never the VitalSensors Controller. An *input* instance therefore specifies data flow from the VitalSensors Controller to the device, and an *output* instance specifies data flow from the device to the VitalSensors Controller.

You should now see a new "ETHERNET-MODULE VitalSensors" branch of the 1756-ENET/B node in the I/O Configuration view. You should also see 3 new entries in the Controller Tags

Download the new I/O configuration to the controller. Once the download is complete, the controller will automatically establish a new Class 1 connection with the VitalSensors Controller.

Working With Inputs and Outputs

Depending on the type of sensor ordered, output channels are labeled as follows:

- <u>VS-3000E BSMA-SS: Beverage, Soft Drink and Juice Monitor</u>

Channel 1 =	Brix	*(if ordered)*
Channel 2 =	Acid	*(if ordered)*
Channel 3 =	CO2	*(if ordered)*
Channel 4 =	Acid 2 (reserved)	*(if ordered)*
Channel 5 =	Assay mL NaOH	*(if ordered)*
Channel 6 =	reserved	
Channel 7 =	reserved	
Channel 8 =	reserved	
Channel 9 =	reserved	
Channel 10 =	Acid % of Target	*(if ordered)*

- <u>VS-3000E BM-SS: Beer Monitor, Wine & Fermentation Monitor</u>

Channel 1 =	Ethanol (%w/w or %m/m)	*(if ordered)*
Channel 2 =	Real Extract (°Plato)	*(if ordered)*
Channel 3 =	CO2	*(if ordered)*
Channel 4 =	reserved	*(if ordered)*
Channel 5 =	Ethanol (%v/v)	*(if ordered*
Channel 6 =	OG/Stam (°Plato)	*(if ordered)*
Channel 7 =	Specific Gravity	*(if ordered)*
Channel 8 =	Real Degree of Fermentation	*(if ordered)*
Channel 9 =	Apparent Extract (EA)	*(if ordered)*
Channel 10 =	reserved	*(if ordered)*

Additional Calculated Measurement = Specific Gravity (SG)
Additional Calculated Measurement = Real Degree Fermentation (RDF)

Input Descriptions:

- Ch. 1, Ch. 2, Ch. 3, Ch. 4 and Channel 5 -- > *Alc (%w/w), RE, CO2, OG, Alc (%v/v)*
- Status / Alarm Code (value)
- Product ID (readback / echo)
- Product Offset(s) (readback / echo)

Output Descriptions:

The implementation of outputs requires careful attention due to the fact that a mistake can change all sensor settings. In order to send outputs to the sensor the following process must be followed.

- The specific number required must be set in the "Data Outputs"
- Global Read Enable must be set to "1" from "0" (only "1" enables the function)
- The specific task Read Enable must be set to "1" from "0" (only "1" enables the function)

Example: Changing Product / Brands on the VS-300 / VS-200 SMS

1. Set **Product / Brand ID** (*Word 2*) to the appropriate unique identifier (Brand Code)

2. Set Global Read Enable to "**1**" (only "1" enables the function)
3. Set Product/Brand ID Read Enable to "**1**" (only "1" enables the function)
4. The *SMS* will send a "readback" to the "Data Inputs" for verification *(Word 10)*
5. Once the data is verified and received in "Data Inputs" it is a good practice to return all "Read Enable" bits back to "**0**"

Output Description – Special Case:

- Line Stop enabled ("**1**") puts system on hold and stops sensor output until reset to "**0**"

Legend for PLC Inputs – Soft Drinks/Juice Sensor Measurements

(from VS-300 / VS-200 SMS to PLC)

VitalSensors EtherNet/IP to PLC - Soft Drinks/Juice

Floating Point (Real) Values	ID	Type
Activity Monitor (Random Integer)	VitalSensorsIn[0]	Dynamic
Brix	VitalSensorsIn[1]	Dynamic
Acid g/L	VitalSensorsIn[2]	Dynamic
CO2	VitalSensorsIn[3]	Dynamic
Acid 2	VitalSensorsIn[4]	Dynamic
Assay mL NaOH	VitalSensorsIn[5]	Dynamic
reserved	VitalSensorsIn[6]	Dynamic
reserved	VitalSensorsIn[7]	Dynamic
reserved	VitalSensorsIn[8]	Dynamic
reserved	VitalSensorsIn[9]	Dynamic
Acid % of Target	VitalSensorsIn[10]	Dynamic
Temp. Detector	VitalSensorsIn[11]	Dynamic
Temp. Fluid	VitalSensorsIn[12]	Dynamic
Error Code	VitalSensorsIn[13]	Dynamic
Current Product ID Short	VitalSensorsIn[14]	Static
Current Product Long ID (High)	VitalSensorsIn[15]	Static
Current Product Long ID (Low)	VitalSensorsIn[16]	Static
Line Status	VitalSensorsIn[17]	Dynamic
Brix Product Gain	VitalSensorsIn[18]	Static
Brix Product Offset	VitalSensorsIn[19]	Static
Brix Low Spec. Limit	VitalSensorsIn[20]	Static
Brix High Spec. Limit	VitalSensorsIn[21]	Static
Brix Target	VitalSensorsIn[22]	Static
Acid g/L Gain	VitalSensorsIn[23]	Static
Acid g/L Offset	VitalSensorsIn[24]	Static
Acid g/L Low Spec Limit	VitalSensorsIn[25]	Static
Acid g/L High Spec Limit	VitalSensorsIn[26]	Static
Acid g/L Target	VitalSensorsIn[27]	Static
CO2 Gain	VitalSensorsIn[28]	Static
CO2 Offset	VitalSensorsIn[29]	Static
CO2 Low Spec Limit	VitalSensorsIn[30]	Static
CO2 High Spec Limit	VitalSensorsIn[31]	Static
CO2 Target	VitalSensorsIn[32]	Static
Acid 2 g/L Gain	VitalSensorsIn[33]	Static
Acid 2 g/L Offset	VitalSensorsIn[34]	Static
Acid 2 g/L Low Spec Limit	VitalSensorsIn[35]	Static
Acid 2 g/L High Spec Limit	VitalSensorsIn[36]	Static

Acid 2 g/L Target	VitalSensorsIn[37]	Static
Assay mL NaOH Gain	VitalSensorsIn[38]	Static
Assay mL NaOH Offset	VitalSensorsIn[39]	Static
Assay mL NaOH Low Spec Limit	VitalSensorsIn[40]	Static
Assay mL NaOH High Spec Limit	VitalSensorsIn[41]	Static
Assay mL NaOH Target	VitalSensorsIn[42]	Static
reserved	VitalSensorsIn[43]	
reserved	VitalSensorsIn[44]	
reserved	VitalSensorsIn[45]	
reserved	VitalSensorsIn[46]	
reserved	VitalSensorsIn[47]	
reserved	VitalSensorsIn[48]	
reserved	VitalSensorsIn[49]	
reserved	VitalSensorsIn[50]	
reserved	VitalSensorsIn[51]	
reserved	VitalSensorsIn[52]	
reserved	VitalSensorsIn[53]	
reserved	VitalSensorsIn[54]	
reserved	VitalSensorsIn[55]	
reserved	VitalSensorsIn[56]	
reserved	VitalSensorsIn[57]	
reserved	VitalSensorsIn[58]	
reserved	VitalSensorsIn[59]	
reserved	VitalSensorsIn[60]	
reserved	VitalSensorsIn[61]	
reserved	VitalSensorsIn[62]	
Acid % of Target Gain	VitalSensorsIn[63]	Static
Acid % of Target Offset	VitalSensorsIn[64]	Static
Acid % of Target Low Spec Limit	VitalSensorsIn[65]	Static
Acid % of Target High Spec Limit	VitalSensorsIn[66]	Static
Acid % of Target - Target	VitalSensorsIn[67]	Static
Detector Temp Field Gain	VitalSensorsIn[68]	Static
Detector Temp Field Offset	VitalSensorsIn[69]	Static
Fluid Temp Field Gain	VitalSensorsIn[70]	Static
Fluid Temp Field Offset	VitalSensorsIn[71]	Static
Fast Avg. Filter (sec.)	VitalSensorsIn[72]	Static
Long Avg. Filter (sec.)	VitalSensorsIn[73]	Static
Median Filter (sec.)	VitalSensorsIn[74]	Static
Low Pass Filter (sec.)	VitalSensorsIn[75]	Static
Serial Number	VitalSensorsIn[76]	Static
System Clock (Year)	VitalSensorsIn[77]	Dynamic
System Clock (Month)	VitalSensorsIn[78]	Dynamic

System Clock (Day)	VitalSensorsIn[79]	Dynamic
System Clock (Hour)	VitalSensorsIn[80]	Dynamic
System Clock (Minute)	VitalSensorsIn[81]	Dynamic
System Clock (Second)	VitalSensorsIn[82]	Dynamic
Reserved	VitalSensorsIn[83]	
Reserved	VitalSensorsIn[84]	
Reserved	VitalSensorsIn[85]	
Reserved	VitalSensorsIn[86]	
Reserved	VitalSensorsIn[87]	
Reserved	VitalSensorsIn[88]	
Reserved	VitalSensorsIn[89]	
Reserved	VitalSensorsIn[90]	
Reserved	VitalSensorsIn[91]	
Reserved	VitalSensorsIn[92]	
Corrected Reference	VitalSensorsIn[93]	Dynamic
Corrected Active 1	VitalSensorsIn[94]	Dynamic
Corrected Active 2	VitalSensorsIn[95]	Dynamic
Corrected Active 3	VitalSensorsIn[96]	Dynamic
Corrected Active 4	VitalSensorsIn[97]	Dynamic
Temp 1 Counts	VitalSensorsIn[98]	Dynamic
Temp 2 Counts	VitalSensorsIn[99]	Dynamic

Table: 1

Legend for PLC Outputs

(from PLC to VS-300 / VS-200 SMS)

PLC EtherNet/IP to VitalSensors - Soft Drinks/Juice

Global Read Enable	VitalSensorsOut[0]	Static
New Product Short Read Enable	VitalSensorsOut[1]	Static
New Product Short ID	VitalSensorsOut[2]	Static
New Product Long Read Enable	VitalSensorsOut[3]	Static
New Product Long ID (High)	VitalSensorsOut[4]	Static
New Product Long ID (Low)	VitalSensorsOut[5]	Static
Line Stop Read Enable	VitalSensorsOut[6]	Static
Line Stop	VitalSensorsOut[7]	Static
CIP Read Enable	VitalSensorsOut[8]	Static
CIP	VitalSensorsOut[9]	Static
Set Zero Enable	VitalSensorsOut[10]	Static
Data Flow Enable	VitalSensorsOut[11]	Static
Brix Product Offset Read Enable	VitalSensorsOut[12]	Static
Brix Product Offset	VitalSensorsOut[13]	Static
Brix Low Spec Limit Read Enable	VitalSensorsOut[14]	Static

Brix Low Spec Limit	VitalSensorsOut[15]	Static
Brix High Spec Limit Read Enable	VitalSensorsOut[16]	Static
Brix High Spec Limit	VitalSensorsOut[17]	Static
Acid g/L Product Offset Read Enable	VitalSensorsOut[18]	Static
Acid g/L Product Offset	VitalSensorsOut[19]	Static
Acid g/L Low Spec Limit Read Enable	VitalSensorsOut[20]	Static
Acid g/L Low Spec Limit	VitalSensorsOut[21]	Static
Acid g/L High Spec Limit Read Enable	VitalSensorsOut[22]	Static
Acid g/L High Spec Limit	VitalSensorsOut[23]	Static
CO2 Product Offset Read Enable	VitalSensorsOut[24]	Static
CO2 Product Offset	VitalSensorsOut[25]	Static
CO2 Low Spec Limit Read Enable	VitalSensorsOut[26]	Static
CO2 Low Spec Limit	VitalSensorsOut[27]	Static
CO2 High Spec Limit Read Enable	VitalSensorsOut[28]	Static
CO2 High Spec Limit	VitalSensorsOut[29]	Static
Acid 2 g/L Product Offset Read Enable	VitalSensorsOut[30]	Static
Acid 2 g/L Product Offset	VitalSensorsOut[31]	Static
Acid 2 g/L Low Spec Limit Read Enable	VitalSensorsOut[32]	Static
Acid 2 g/L Low Spec Limit	VitalSensorsOut[33]	Static
Acid 2 g/L High Spec Limit Read Enable	VitalSensorsOut[34]	Static
Acid 2 g/L High Spec Limit	VitalSensorsOut[35]	Static
Assay mL NaOH Product Offset Read Enable	VitalSensorsOut[36]	Static
Assay mL NaOH Product Offset	VitalSensorsOut[37]	Static
Assay mL NaOH Low Spec Limit Read Enable	VitalSensorsOut[38]	Static
Assay mL NaOH Low Spec Limit	VitalSensorsOut[39]	Static
Assay mL NaOH High Spec Limit Read Enable	VitalSensorsOut[40]	Static
Assay mL NaOH High Spec Limit	VitalSensorsOut[41]	Static
reserved	VitalSensorsOut[42]	
reserved	VitalSensorsOut[43]	
reserved	VitalSensorsOut[44]	
reserved	VitalSensorsOut[45]	
reserved	VitalSensorsOut[46]	
reserved	VitalSensorsOut[47]	
reserved	VitalSensorsOut[48]	
reserved	VitalSensorsOut[49]	
reserved	VitalSensorsOut[50]	
reserved	VitalSensorsOut[51]	
reserved	VitalSensorsOut[52]	
reserved	VitalSensorsOut[53]	
reserved	VitalSensorsOut[54]	
reserved	VitalSensorsOut[55]	
reserved	VitalSensorsOut[56]	

reserved	VitalSensorsOut[57]	
reserved	VitalSensorsOut[58]	
reserved	VitalSensorsOut[59]	
reserved	VitalSensorsOut[60]	
reserved	VitalSensorsOut[61]	
reserved	VitalSensorsOut[62]	
reserved	VitalSensorsOut[63]	
reserved	VitalSensorsOut[64]	
reserved	VitalSensorsOut[65]	
Acid % of Target Product Offset Read Enable	VitalSensorsOut[66]	Static
Acid % of Target Product Offset	VitalSensorsOut[67]	Static
Acid % of Target Low Spec Limit Read Enable	VitalSensorsOut[68]	Static
Acid % of Target Low Spec Limit	VitalSensorsOut[69]	Static
Acid % of Target High Spec Limit Read Enable	VitalSensorsOut[70]	Static
Acid % of Target High Spec Limit	VitalSensorsOut[71]	Static
Detector Temp Field Offset Read Enable	VitalSensorsOut[72]	Static
Detector Temp Field Offset	VitalSensorsOut[73]	Static
Fluid Temp Field Offset Read Enable	VitalSensorsOut[74]	Static
Fluid Temp Field Offset	VitalSensorsOut[75]	Static
Brix Lab Value Read Enable	VitalSensorsOut[76]	Static
Brix Lab Value	VitalSensorsOut[77]	Static
Acid g/L Lab Value Read Enable	VitalSensorsOut[78]	Static
Acid g/L Lab Value	VitalSensorsOut[79]	Static
CO2 Lab Value Read Enable	VitalSensorsOut[80]	Static
CO2 Lab Value	VitalSensorsOut[81]	Static
Acid 2 g/L Lab Value Read Enable	VitalSensorsOut[82]	Static
Acid 2 g/L Lab Value	VitalSensorsOut[83]	Static
Assay mL NaOH Lab Value Read Enable	VitalSensorsOut[84]	Static
Assay mL NaOH Lab Value	VitalSensorsOut[85]	Static
reserved	VitalSensorsOut[86]	
reserved	VitalSensorsOut[87]	
reserved	VitalSensorsOut[88]	
reserved	VitalSensorsOut[89]	
reserved	VitalSensorsOut[90]	
reserved	VitalSensorsOut[91]	
reserved	VitalSensorsOut[92]	
reserved	VitalSensorsOut[93]	
Acid % of Target Lab Value Read Enable	VitalSensorsOut[94]	Static
Acid % of Target Lab Value	VitalSensorsOut[95]	Static
Fast Average Read Enable	VitalSensorsOut[96]	Static
Fast Average	VitalSensorsOut[97]	Static
Long Average Read Enable	VitalSensorsOut[98]	Static

Long Average	VitalSensorsOut[99]	Static
Fluid Flow Value	VitalSensorsOut[100]	Static
Reserved	VitalSensorsOut[101]	
Reserved	VitalSensorsOut[102]	
Reserved	VitalSensorsOut[103]	
Reserved	VitalSensorsOut[104]	
Reserved	VitalSensorsOut[105]	
Reserved	VitalSensorsOut[106]	
Reserved	VitalSensorsOut[107]	
Reserved	VitalSensorsOut[108]	
Reserved	VitalSensorsOut[109]	

Table: 2

Legend for PLC Inputs – Beer/Wine/Fermentation

(from VS-300 / VS-200 SMS to PLC)

VitalSensors EtherNet/IP to PLC - Beer/Wine/Fermentation

Activity Monitor (Random Integer)	VitalSensorsIn[0]	Dynamic
ABW	VitalSensorsIn[1]	Dynamic
RE/Sugars Plato	VitalSensorsIn[2]	Dynamic
CO2	VitalSensorsIn[3]	Dynamic
Acid by Weight	VitalSensorsIn[4]	Dynamic
ABV	VitalSensorsIn[5]	Dynamic
OG/OE Plato	VitalSensorsIn[6]	Dynamic
Specific Gravity	VitalSensorsIn[7]	Dynamic
RDF %	VitalSensorsIn[8]	Dynamic
Apparent Extract (Apparent Extract (AE))	VitalSensorsIn[9]	Dynamic
Acid % of Target	VitalSensorsIn[10]	Dynamic
Temp. Detector	VitalSensorsIn[11]	Dynamic
Temp. Fluid	VitalSensorsIn[12]	Dynamic
Error Code	VitalSensorsIn[13]	Dynamic
Current Product ID Short	VitalSensorsIn[14]	Static
Current Product Long ID (High)	VitalSensorsIn[15]	Static
Current Product Long ID (Low)	VitalSensorsIn[16]	Static
Line Status	VitalSensorsIn[17]	Dynamic
ABW Product Gain	VitalSensorsIn[18]	Static
ABW Product Offset	VitalSensorsIn[19]	Static
ABW Low Spec. Limit	VitalSensorsIn[20]	Static
ABW High Spec. Limit	VitalSensorsIn[21]	Static
ABW Target	VitalSensorsIn[22]	Static
RE/Sugars Plato Gain	VitalSensorsIn[23]	Static
RE/Sugars Plato Offset	VitalSensorsIn[24]	Static
RE/Sugars Plato Low Spec Limit	VitalSensorsIn[25]	Static
RE/Sugars Plato High Spec Limit	VitalSensorsIn[26]	Static
RE/Sugars Plato Target	VitalSensorsIn[27]	Static
CO2 Gain	VitalSensorsIn[28]	Static
CO2 Offset	VitalSensorsIn[29]	Static
CO2 Low Spec Limit	VitalSensorsIn[30]	Static
CO2 High Spec Limit	VitalSensorsIn[31]	Static
CO2 Target	VitalSensorsIn[32]	Static
Acid by Weight Gain	VitalSensorsIn[33]	Static
Acid by Weight Offset	VitalSensorsIn[34]	Static
Acid by Weight Low Spec Limit	VitalSensorsIn[35]	Static
Acid by Weight High Spec Limit	VitalSensorsIn[36]	Static
Acid by Weight Target	VitalSensorsIn[37]	Static

ABV Gain	VitalSensorsIn[38]	Static
ABV Offset	VitalSensorsIn[39]	Static
ABV Low Spec Limit	VitalSensorsIn[40]	Static
ABV High Spec Limit	VitalSensorsIn[41]	Static
ABV Target	VitalSensorsIn[42]	Static
OG/OE Plato Gain	VitalSensorsIn[43]	Static
OG/OE Plato Offset	VitalSensorsIn[44]	Static
OG/OE Plato Low Spec Limit	VitalSensorsIn[45]	Static
OG/OE Plato High Spec. Limit	VitalSensorsIn[46]	Static
OG/OE Plato Target	VitalSensorsIn[47]	Static
Specific Gravity Gain	VitalSensorsIn[48]	Static
Specific Gravity Offset	VitalSensorsIn[49]	Static
Specific Gravity Low Spec Limit	VitalSensorsIn[50]	Static
Specific Gravity High Spec Limit	VitalSensorsIn[51]	Static
Specific Gravity Target	VitalSensorsIn[52]	Static
RDF % Gain	VitalSensorsIn[53]	Static
RDF % Offset	VitalSensorsIn[54]	Static
RDF % Low Spec Limit	VitalSensorsIn[55]	Static
RDF % High Spec Limit	VitalSensorsIn[56]	Static
RDF % Target	VitalSensorsIn[57]	Static
Apparent Extract (AE) Plato Gain	VitalSensorsIn[58]	Static
Apparent Extract (AE) Plato Offset	VitalSensorsIn[59]	Static
Apparent Extract (AE) Plato Low Spec Limit	VitalSensorsIn[60]	Static
Apparent Extract (AE) Plato High Spec Limit	VitalSensorsIn[61]	Static
Apparent Extract (AE) Plato Target	VitalSensorsIn[62]	Static
Acid % of Target Gain	VitalSensorsIn[63]	Static
Acid % of Target Offset	VitalSensorsIn[64]	Static
Acid % of Target Low Spec Limit	VitalSensorsIn[65]	Static
Acid % of Target High Spec Limit	VitalSensorsIn[66]	Static
Acid % of Target - Target	VitalSensorsIn[67]	Static
Detector Temp Field Gain	VitalSensorsIn[68]	Static
Detector Temp Field Offset	VitalSensorsIn[69]	Static
Fluid Temp Field Gain	VitalSensorsIn[70]	Static
Fluid Temp Field Offset	VitalSensorsIn[71]	Static
Fast Avg. Filter (sec.)	VitalSensorsIn[72]	Static
Long Avg. Filter (sec.)	VitalSensorsIn[73]	Static
Median Filter (sec.)	VitalSensorsIn[74]	Static
Low Pass Filter (sec.)	VitalSensorsIn[75]	Static
Serial Number	VitalSensorsIn[76]	Static
System Clock (Year)	VitalSensorsIn[77]	Dynamic
System Clock (Month)	VitalSensorsIn[78]	Dynamic
System Clock (Day)	VitalSensorsIn[79]	Dynamic

System Clock (Hour)	VitalSensorsIn[80]	Dynamic
System Clock (Minute)	VitalSensorsIn[81]	Dynamic
System Clock (Second)	VitalSensorsIn[82]	Dynamic
Reserved	VitalSensorsIn[83]	
Reserved	VitalSensorsIn[84]	
Reserved	VitalSensorsIn[85]	
Reserved	VitalSensorsIn[86]	
Reserved	VitalSensorsIn[87]	
Reserved	VitalSensorsIn[88]	
Reserved	VitalSensorsIn[89]	
Reserved	VitalSensorsIn[90]	
Reserved	VitalSensorsIn[91]	
Reserved	VitalSensorsIn[92]	
Corrected Reference	VitalSensorsIn[93]	Dynamic
Corrected Active 1	VitalSensorsIn[94]	Dynamic
Corrected Active 2	VitalSensorsIn[95]	Dynamic
Corrected Active 3	VitalSensorsIn[96]	Dynamic
Corrected Active 4	VitalSensorsIn[97]	Dynamic
Temp 1 Counts	VitalSensorsIn[98]	Dynamic
Temp 2 Counts	VitalSensorsIn[99]	Dynamic

Table: 3

Legend for PLC Outputs

(from PLC to VS-300 / VS-200 SMS)

PLC EtherNet/IP to VitalSensors - Beer/Wine/Fermentation

Global Read Enable	VitalSensorsOut[0]	Static
New Product Short Read Enable	VitalSensorsOut[1]	Static
New Product Short ID	VitalSensorsOut[2]	Static
New Product Long Read Enable	VitalSensorsOut[3]	Static
New Product Long ID (High)	VitalSensorsOut[4]	Static
New Product Long ID (Low)	VitalSensorsOut[5]	Static
Line Stop Read Enable	VitalSensorsOut[6]	Static
Line Stop	VitalSensorsOut[7]	Static
CIP Read Enable	VitalSensorsOut[8]	Static
CIP	VitalSensorsOut[9]	Static
Set Zero Enable	VitalSensorsOut[10]	Static
Data Flow Enable	VitalSensorsOut[11]	Static
ABW Product Offset Read Enable	VitalSensorsOut[12]	Static
ABW Product Offset	VitalSensorsOut[13]	Static
ABW Low Spec Limit Read Enable	VitalSensorsOut[14]	Static
ABW Low Spec Limit	VitalSensorsOut[15]	Static

ABW High Spec Limit Read Enable	VitalSensorsOut[16]	Static
ABW High Spec Limit	VitalSensorsOut[17]	Static
RE/Sugars Plato Product Offset Read Enable	VitalSensorsOut[18]	Static
RE/Sugars Plato Product Offset	VitalSensorsOut[19]	Static
RE/Sugars Plato Low Spec Limit Read Enable	VitalSensorsOut[20]	Static
RE/Sugars Plato Low Spec Limit	VitalSensorsOut[21]	Static
RE/Sugars Plato High Spec Limit Read Enable	VitalSensorsOut[22]	Static
RE/Sugars Plato High Spec Limit	VitalSensorsOut[23]	Static
CO2 Product Offset Read Enable	VitalSensorsOut[24]	Static
CO2 Product Offset	VitalSensorsOut[25]	Static
CO2 Low Spec Limit Read Enable	VitalSensorsOut[26]	Static
CO2 Low Spec Limit	VitalSensorsOut[27]	Static
CO2 High Spec Limit Read Enable	VitalSensorsOut[28]	Static
CO2 High Spec Limit	VitalSensorsOut[29]	Static
Acid by Weight Product Offset Read Enable	VitalSensorsOut[30]	Static
Acid by Weight Product Offset	VitalSensorsOut[31]	Static
Acid by Weight Low Spec Limit Read Enable	VitalSensorsOut[32]	Static
Acid by Weight Low Spec Limit	VitalSensorsOut[33]	Static
Acid by Weight High Spec Limit Read Enable	VitalSensorsOut[34]	Static
Acid by Weight High Spec Limit	VitalSensorsOut[35]	Static
ABV Product Offset Read Enable	VitalSensorsOut[36]	Static
ABV Product Offset	VitalSensorsOut[37]	Static
ABV Low Spec Limit Read Enable	VitalSensorsOut[38]	Static
ABV Low Spec Limit	VitalSensorsOut[39]	Static
ABV High Spec Limit Read Enable	VitalSensorsOut[40]	Static
ABV High Spec Limit	VitalSensorsOut[41]	Static
OG/OE Plato Product Offset Read Enable	VitalSensorsOut[42]	Static
OG/OE Plato Product Offset	VitalSensorsOut[43]	Static
OG/OE Plato Low Spec Limit Read Enable	VitalSensorsOut[44]	Static
OG/OE Plato Low Spec Limit	VitalSensorsOut[45]	Static
OG/OE Plato High Spec Limit Read Enable	VitalSensorsOut[46]	Static
OG/OE Plato High Spec Limit	VitalSensorsOut[47]	Static
Specific Gravity Product Offset Read Enable	VitalSensorsOut[48]	Static
Specific Gravity Product Offset	VitalSensorsOut[49]	Static
Specific Gravity Low Spec Limit Read Enable	VitalSensorsOut[50]	Static
Specific Gravity Low Spec Limit	VitalSensorsOut[51]	Static
Specific Gravity High Spec Limit Read Enable	VitalSensorsOut[52]	Static
Specific Gravity High Spec Limit	VitalSensorsOut[53]	Static
RDF % Product Offset Read Enable	VitalSensorsOut[54]	Static
RDF % Product Offset	VitalSensorsOut[55]	Static
RDF % Low Spec Limit Read Enable	VitalSensorsOut[56]	Static
RDF % Low Spec Limit	VitalSensorsOut[57]	Static

RDF % High Spec Limit Read Enable	VitalSensorsOut[58]	Static
RDF % High Spec Limit	VitalSensorsOut[59]	Static
Apparent Extract (AE) Product Offset Read Enable	VitalSensorsOut[60]	Static
Apparent Extract (AE) Product Offset	VitalSensorsOut[61]	Static
Apparent Extract (AE) Low Spec Limit Read Enable	VitalSensorsOut[62]	Static
Apparent Extract (AE) Low Spec Limit	VitalSensorsOut[63]	Static
Apparent Extract (AE) High Spec Limit Read Enable	VitalSensorsOut(64)	Static
Apparent Extract (AE) High Spec Limit	VitalSensorsOut[65]	Static
Acid % of Target Product Offset Read Enable	VitalSensorsOut[66]	Static
Acid % of Target Product Offset	VitalSensorsOut[67]	Static
Acid % of Target Low Spec Limit Read Enable	VitalSensorsOut[68]	Static
Acid % of Target Low Spec Limit	VitalSensorsOut[69]	Static
Acid % of Target High Spec Limit Read Enable	VitalSensorsOut[70]	Static
Acid % of Target High Spec Limit	VitalSensorsOut[71]	Static
Detector Temp Field Offset Read Enable	VitalSensorsOut[72]	Static
Detector Temp Field Offset	VitalSensorsOut[73]	Static
Fluid Temp Field Offset Read Enable	VitalSensorsOut[74]	Static
Fluid Temp Field Offset	VitalSensorsOut[75]	Static
ABW Lab Value Read Enable	VitalSensorsOut[76]	Static
ABW Lab Value	VitalSensorsOut[77]	Static
RE/Sugars Plato Lab Value Read Enable	VitalSensorsOut[78]	Static
RE/Sugars Plato Lab Value	VitalSensorsOut[79]	Static
CO2 Lab Value Read Enable	VitalSensorsOut[80]	Static
CO2 Lab Value	VitalSensorsOut[81]	Static
Acid by Weight Lab Value Read Enable	VitalSensorsOut[82]	Static
Acid by Weight Lab Value	VitalSensorsOut[83]	Static
ABV Lab Value Read Enable	VitalSensorsOut[84]	Static
ABV Lab Value	VitalSensorsOut[85]	Static
OG/OE Plato Lab Value Read Enable	VitalSensorsOut[86]	Static
OG/OE Plato Lab Value	VitalSensorsOut[87]	Static
Specific Gravity Lab Value Read Enable	VitalSensorsOut[88]	Static
Specific Gravity Lab Value	VitalSensorsOut[89]	Static
RDF % Lab Value Read Enable	VitalSensorsOut[90]	Static
RDF % Lab Value	VitalSensorsOut[91]	Static
Apparent Extract (AE) Lab Value Read Enable	VitalSensorsOut[92]	Static
Apparent Extract (AE) Lab Value	VitalSensorsOut[93]	Static
Acid % of Target Lab Value Read Enable	VitalSensorsOut[94]	Static
Acid % of Target Lab Value	VitalSensorsOut[95]	Static
Fast Average Read Enable	VitalSensorsOut[96]	Static
Fast Average	VitalSensorsOut[97]	Static

Long Average Read Enable	VitalSensorsOut[98]	Static
Long Average	VitalSensorsOut[99]	Static
Fluid Flow Value	VitalSensorsOut[100]	Static
Reserved	VitalSensorsOut[101]	
Reserved	VitalSensorsOut[102]	
Reserved	VitalSensorsOut[103]	
Reserved	VitalSensorsOut[104]	
Reserved	VitalSensorsOut[105]	
Reserved	VitalSensorsOut[106]	
Reserved	VitalSensorsOut[107]	
Reserved	VitalSensorsOut[108]	
Reserved	VitalSensorsOut[109]	

Table: 4

VS-3000E EtherNet/IP Alarms:

System alarms are sent to the PLC as a numerical inputs via EtherNet/IP. Alarms are sent to *Word* 6 of the input controller tag (called *VitalSensorsIn* by default). Each code corresponds to a specific condition. See *Table 3* below.

Alarms are prioritized in the order shown below in *Table 1*. The actual number of the alarm itself does not indicate priority. If two alarm conditions exist, the higher priority alarm will be displayed and the lower alarm ignored.

LIST OR ALARM CODES						
Alarm #/#	**Description**	**Comments**				
		Error Type	**70**	**79**	**80**	**89**
0	No Errors	-	-			
1	Sensor Disconnected	**Sensor's Errors**				
2	Sensor Occluded					
38	Sensor Saturated					
63	System on Hold	User Errors				
20	Disk Is Full	SMS Errors				
21	Low Disk Space					
3	Fieldbus Serial Port Error (requires reboot)	User Errors				
4	Invalid Product ID					
39	Product NOT Calibrated		-			
5	Sensor Ch. 1 Spec Low Limit Violated	Process Errors (Specification Limits)	ABW	RE	Brix	Brix
26	Sensor Ch. 5 Spec Low Limit Violated		ABV	ABV	-	-
6	Sensor Ch. 2 Spec Low Limit Violated		RE	RE	Acid	Acid
7	Sensor Ch. 3 Spec Low Limit Violated		CO2	Acid	CO2	-
22	Sensor Ch. 4 Spec Low Limit Violated		OE	OE	Assay	Assay
30	Sensor Ch. 6 Spec Low Limit Violated		RDF	RDF	-	-
31	Sensor Ch. 7 Spec Low Limit Violated		AE	AE	-	-
8	Sensor Ch. 1 Spec High Limit Violated		ABW	RE	Brix	Brix
27	Sensor Ch. 5 Spec High Limit Violated		ABV	ABV	-	-
9	Sensor Ch. 2 Spec High Limit Violated		RE	RE	Acid	Acid
10	Sensor Ch. 3 Spec High Limit Violated		CO2	Acid	CO2	-
23	Sensor Ch. 4 Spec High Limit Violated		OE	OE	Assay	Assay
32	Sensor Ch. 6 Spec High Limit Violated		RDF	RDF	-	-
33	Sensor Ch. 7 Spec High Limit Violated		AE	AE	-	-
11	Sensor Ch. 1 Control Low Limit Violated	Process Errors (Control Limits)	ABW	RE	Brix	Brix
28	Sensor Ch. 5 Control Low Limit Violated		ABV	ABV	-	-
12	Sensor Ch. 2 Control Low Limit Violated		RE	RE	Acid	Acid

13	Sensor Ch. 3 Control Low Limit Violated		CO2	Acid	CO2	-
24	Sensor Ch. 4 Control Low Limit Violated		OE	OE	Assay	Assay
34	Sensor Ch. 6 Control Low Limit Violated		RDF	RDF	-	-
35	Sensor Ch. 7 Control Low Limit Violated		AE	AE	-	-
14	Sensor Ch. 1 Control High Limit Violated		ABW	RE	Brix	Brix
29	Sensor Ch. 5 Control High Limit Violated		ABV	ABV	-	-
15	Sensor Ch. 2 Control High Limit Violated		RE	RE	Acid	Acid
16	Sensor Ch. 3 Control High Limit Violated		CO2	Acid	CO2	-
25	Sensor Ch. 4 Control High Limit Violated		OE	OE	Assay	Assay
36	Sensor Ch. 6 Control High Limit Violated		RDF	RDF	-	-
37	Sensor Ch. 7 Control High Limit Violated		AE	AE	-	-
17	4-20 Ports Disabled	4-20 Errors	-			
18	4-20 Port 1 Disabled					
19	4-20 Port 2 Disabled					

NOTE: ***The list is sorted by priority (from highest to lowest)***

Table: 3