Wago 750 Ethernet TCP/IP (Modbus) Device Driver Guide

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August 8, 2005

1. Wago 750 TCP/IP (Modbus) Communications

1.1 Introduction to Wago 750 Ethernet

This manual describes the WebAccess TCP/IP Ethernet interface to WAGO IO System 750 with the WAGO field bus coupler for Ethernet TCP/IP along with the WAGO programmable field bus controller for Ethernet TCP/IP using the Modbus Ethernet communications protocol.

As of this writing, the WAGO item numbers are:

750-342 Ethernet TCP/IP 10 M Bit

750-842 Contr. Ethernet TCP 10 M Bit

75-4XX…6XX IO Modules

An RJ-45 Ethernet connection is used to the WAGO Field bus Coupler.

Hardware

View

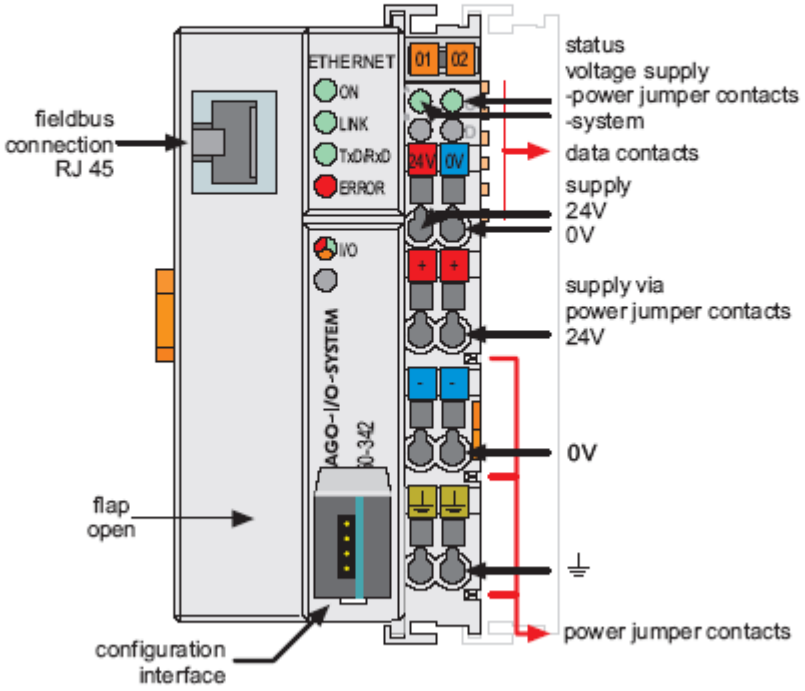


Fig. 3-1: Fieldbus coupler ETHERNET TCP/IP G034200a

The SCADA node must have a TCP/IP (typically Ethernet) connection pat to the WAGO 750 Device.

1.1.1 Introduction to Modbus Ethernet /TCPIP

WebAccess SCADA Node provides a Modbus master interface using Modbus RTU protocol implemented over TCP/IP for communicating with Modbus slave devices. Slave devices include Wago, AEG/Modicon 984 and Quantum FIELDBUS COUPLERs, GE Fanuc Series-6, Series-5, Series-90, and many others.

The Modicon driver accesses real-time data and control automation equipment with Modbus TCPIP RTU protocol.

Modbus is a "De-facto" standard for communications. Modbus is an "open" communications protocol designed for industrial control and monitoring applications. Programmable Logic Controllers, PLC, FIELDBUS COUPLERs, Single Loop and Multi-Loop Controllers, Remote Terminal Units (RTU), Distributed control Systems (DCS), computers, shop floor operator panels and

other devices can communicate throughout plants and substations via Modbus RTU or Modbus Ethernet network.

Especially for connection of SCADA and HMI systems to intelligent operator panels, FIELDBUS COUPLERs and controllers, Modbus became a de-facto standard. Many automation devices support the Modbus protocol in both Serial Modbus RTU and Modbus Ethernet.

1.1.2 Modbus Ethernet TCP/IP

The WebAccess Modicon Modbus Device Driver can communicate with either TCP/IP communications using a packet version of the Modbus RTU protocol. Any TCP/IP compatible medium is acceptable, the most common being Ethernet.

The WebAccess COM Ports are "virtual" in the WebAccess configuration for Modbus TCP/IP. The WebAccess driver will search all NIC (network Interface Cards) to find the addressed devices regardless of the configured Comport. For the Modbus TCP/IP driver, it is recommended to use a Com Port that does not utilize an actual Serial COM port.

The computer communication port must be designed for use with the Windows 32-bit operating system.

Modicon's Modbus TCP/IP network is a single master, multi-drop network, which supports up to 247 slave devices.

WebAccess can scan every 100 milliseconds over TCP/IP connections limited only by the FIELDBUS COUPLER, Controller or RTU and the network connection.

The Genuine WebAccess Modbus Driver is among the fastest Modbus TCP/IP drivers available, if not the fastest.

1.1.3 Ease of Use: Parameters

Like all Genuine WebAccess drivers, object-oriented "parameters" guide novice users with pre-built templates containing typical addresses.

AI is an Analog Input (30001 to 39999 range of addresses). These are typically read only numbers from the FIELDBUS COUPLER.

AO is an Analog Output (40001 to 49999 range of addresses). These are typically values written to the FIELDBUS COUPLER by operators and programs. Setpoints, Outputs, alarm limits are examples.

DI is a Digital Input (00001 to 09999 range of addresses). These are typically read only statuses (On, Off, True, False, etc) from the FIELDBUS COUPLER.

DO is a Digital Output (10001 to 19999 range of addresses). These are typically values written to the FIELDBUS COUPLER by operators and programs. On/ OFF, RUN/STOP are examples.

Users can select a parameter type, and then modify the address to the correct register in order to build a tag.

1.1.4 Redundant Comports

WebAccess supports redundant Comports. Two Ethernet comports can be used, the second acts as a backup to the first. The WebAccess COM Ports are "virtual" in the WebAccess configuration for Modbus TCP/IP. The WebAccess driver will search all NIC (network Interface Cards) to find the addressed devices regardless of the configured Comport. A Backup port does not need to be specified. However, a second IP address for the FIELDBUS COUPLER must be specified (i.e. the FIELDBUS COUPLER must have two Network Interface cards).

1.1.5 Modbus Protocols

1.1.5.1 Modbus Ethernet / TCP/IP

Modbus Ethernet network is a single master, multi-drop network, which supports up to 247 slave devices. The preferred physical layer for the Modbus Ethernet network TCP/IP over Ethernet, although any TCP/IP network connection is supported including the Internet, WANs and LANs. A single IP address can support up to 255 devices.

1.2 Configure Wago 750 device

The steps, in summary, are:

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **WebAccess Configuration**.
4. Open or Create a **Projec**t.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is a **TCPIP type Comport**.

Note - It is recommended to select a Comport number greater than 2 so that it does not conflict with a Serial comport that you may want to use later.

7. Configure a Scan time and Timeout for the Com Port.
8. Configure a **WAGO 750 Device** (determines the communications Protocol or Device Driver) using **Add Device**
9. Configure IP Address, Port Number, Unit Number and Device Number to match those in the FIELDBUS COUPLER.

Note – Many Modbus Ethernet devices ignore the Device Number if there is only one device at a given IP Address. Device Number = 0 uses the Unit Number as the Device Number. The Unit Number is used for display purposes in WebAccess. The Device Number is used by the communications protocol to the device.

10. Refer to later sections in this guide for other fields (they usually are not needed).
11. Use **Add Tag** or **Add Block** to create tags.
12. Select a Parameter (AI, AO, DI, DO) to match the type of data to be read (Analog Input, Analog Output, Digital Input, Digital Output). The Address of the data must match the Parameter Type:

    AI is an Analog Input (30001 to 39999 range of addresses). These are typically read only numbers from the FIELDBUS COUPLER.

    AO is an Analog Output (40001 to 49999 range of addresses). These are typically values written to the FIELDBUS COUPLER by operators and programs. Setpoints, Outputs, alarm limits are examples.

    DI is a Digital Input (00001 to 09999 range of addresses). These are typically read only statuses (On, Off, True, False, etc) from the FIELDBUS COUPLER.

    DO is a Digital Output (10001 to 19999 range of addresses). These are typically values written to the FIELDBUS COUPLER by operators and programs. On/ OFF, RUN/STOP are examples.
13. Modify the Address to match the actual address.
14. Apply a Tag name.
15. Edit Tags in Project Manager to assign **Alarms**, **Scaling**, **Engineering Units**, Description and other features.

1.3 TCPIP Comport Properties

The TCPIP Comport is usually associated with an Ethernet Network Interface Card on the SCADA Node PC. Any TCPIP compatible medium is supported as long as it complies with Microsoft TCPIP protocol stack.

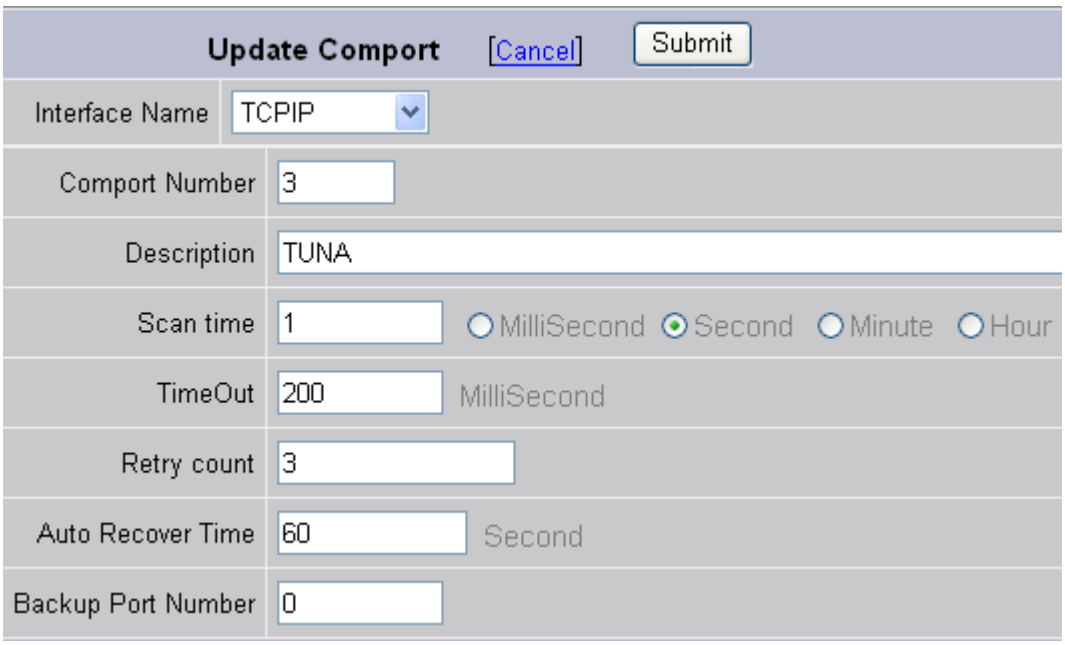


Figure 1.1 TCPIP Comport properties

1.3.1 Comport Number

The WebAccess COM Ports are "virtual" in the WebAccess configuration for TCP/IP. The WebAccess driver will search all NIC (Network Interface Cards) to find the addressed devices regardless of the configured Comport.

For the Modbus TCP/IP driver, it is recommended to use a Com Port number greater then 2 and that does not utilize an actual Serial com port (e.g. COM1, COM2, etc) on the SCADA Node.

1.3.2 Description

This is an optional field used for user reference.

1.3.3 Scan Time

This is the time in milliseconds to scan the FIELDBUS COUPLER. This must match the ability of the FIELDBUS COUPLER to respond.

If the FIELDBUS COUPLER cannot respond as fast as the SCAN Time entered, WebAccess will scan at a slower rate.

Scan Time is also network dependant, it is possible to enter a Scan Time faster than your network can respond, WebAccess will poll all devices and tags on the Comport before starting a new scan.

1.3.4 Timeout

Timeout is the time waited before re-sending a communications packet that did not have a reply.

Timeout specifies how long the software waits for a response to a data request, specifically to wait for a reply from one packet. A recommended value is 7 to 10 ticks, longer if the communication device is slow. This is protocol dependent: some protocols do not allow changes in time out.

Combined with Retry count, Timeout also determines time to consider a device or port as BAD. Timeout is the time to wait since last communication packet sent without a reply. Time is in milliseconds. The slow or poor quality communications require longer timeout. The faster the communications network or device, the shorter the timeout required. Shorter timeouts notify operators of communications failure more quickly.

TimeOut, multiplied by Retry Count plus scan time, is how long WebAccess will wait before it considers a device bad. WebAccess will send a packet, wait for the TimeOut for a reply. If retry count is non-zero, WebAccess will repeat the request, wait the Timeout, and repeat for the number of Retry Times. A device is marked Bad (or Failed) after the number of Retries fail.

In the example above, Scan Time is 1 second, Retry Count is 3, and Timeout is 200, WebAccess will:

- Waits 1 second
- Send a packet.
- Wait 200 Milliseconds for a reply.
- Send a packet again if no reply.
- Wait 200 Milliseconds.
- Send A Packet a third Time if no reply
- Wait 200 Milliseconds.
- Mark the device Bad (Failed) if no reply.

In the above example, after approximately 1 + .6 seconds after a device fails, WebAccess will mark it bad.

1.3.5 Retry Count

Number of times to retry communications if no reply is received from a device. Combined with Timeout, also determines time to consider a device or port as BAD.

In addition, Indicates the number of times after the first attempt has failed that communication should be attempted before indicating a failure. Specifically, how many times to send a single packet after the field device fails to respond to the first packet. After the retry count is exceeded, all the tags in the packet are marked with asterisks and the next packet of requests is sent. A reasonable value is 3 to 5 times. After this number of tries, the tags in this packet are marked as "fail to respond" (i.e. asterisks) and are disabled. In reality, increasing the number of retries hides failures on the part of the field device to respond to a request. Essentially, increasing the retries gives the field device more chances to reply.

1.3.6 Auto Recover Time

Auto Recover Time is the time to wait after a Device is marked Bad (or Failed) before re-initializing communications. WebAccess will mark the device good, send a packet and begin the whole retry / timeout process above.

In the above example fro Timeout, WebAccess will wait 1 minute after a device fails before retrying communications. Every One minute the device will go Good, 1.6 seconds later it will be marked Bad if it is still failed, repeat.

If communications to the FIELDBUS COUPLER is unusually slow due to hardware, communications or network issues, you might consider increasing this value. If communications to the FIELDBUS COUPLER fails frequently, you may want to decrease this number in order to have WebAccess try to re-establish communications sooner.

If communications to the FIELDBUS COUPLER fails (i.e. exceeds Timeout) WebAccess will wait the Auto Recover Time before trying to re-establish communications.

1.3.7 Backup Port

This enables a redundant communications path to the Device. If communications cannot be established through this Comport, WebAccess will try a second Comport, specified as the Backup Port. You must configure the backup Port number in WebAccess, but without any devices on it. Usually the device must have two comports also. Not all Device Types support a backup Port.

The Backup Port is usually configured as the same type. However, some Device Types allow the backup port to be another physical type; for example, Modicon Device can use a Serial Port as a backup port to TCP/IP (network) port. The FIELDBUS COUPLER must have both TCPIP Interface and a Serial Interface connected to the SCADA node, in this example.

1.4 Device Properties – Wago 750

Add your device to the TCPIP Port, by selecting the Serial Port you have configured, then select **Add Device**.

To modify an existing Device, Select **Device Properties**. The Device Properties Page for a Serial Type Device appears.

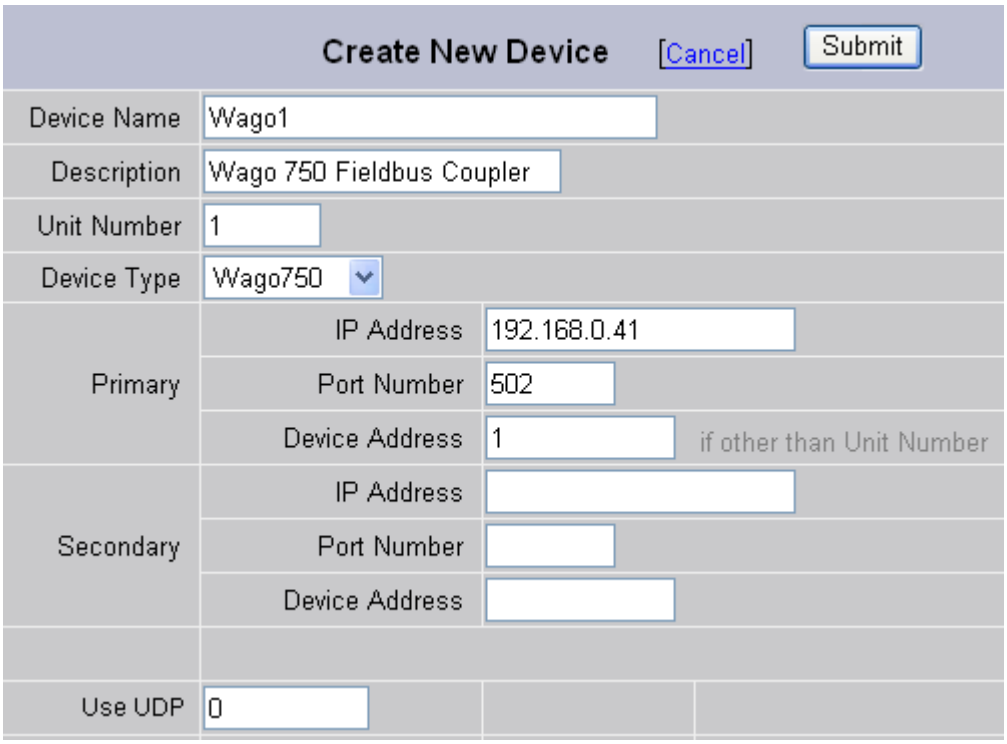


Figure 3-12 Wago 750 Modbus TCPIP Field bus coupler

Device Name is any user-defined name. See Device Name for more information.

Description is a user defined. See Description for more information.

Unit Number usually corresponds to the device address number. Unit Number is used for display purposes in WebAccess. Device Number = 0 uses the Unit Number as the Device Number. The Device Number is used by the communications protocol to the device.

Many Modbus Ethernet devices ignore the Device Number if there is only one device at a given IP Address. The **Device Type** is Modicon.

Device Type Modicon. WebAccess uses the official version the Modbus TCPIP specified by the inventors of Modbus, MODICON.

IP Address is the IP Address of the FIELDBUS COUPLER you are establishing communications with. The Primary IP Address must be specified. The Secondary IP Address is used only if the FIELDBUS COUPLER or device has redundant communication cards (i.e. two NICs in the FIELDBUS COUPLER).

Port Number is the TCP Port (or UDP port) of the FIELDBUS COUPLER. A common TCP Port for WAGO Field bus couplers is **502**. Note that yours maybe different and you should consult the configuration of your Wago Field bus Coupler or the Wago User Manual.

The Primary must be specified. The Secondary is used only if a Secondary IP address is used

Device Address is the Modbus Device Address (0 - 255) used by the Modbus RTU protocol. WAGO always uses 1 (and probably ignores this address) since there is usually only one FIELDBUS COUPLER at a given IP Address. How this is handled varies by device / manufacturer. Many Modbus TCP/IP devices ignore this Device Address (the Modbus RTU Address). Some Modbus TCP/IP devices have multiple FIELDBUS COUPLERs/ RTUs at the same IP Address, and use the Device Address to route to the correct FIELDBUS COUPLER sharing the same IP address.

Use UDP: The default protocol of the WebAccess TCP/IP driver and WAGO 750 is TCP. However, some devices use UDP. For the FIELDBUS COUPLER Use UDP = 0. If other Devices use UDP, then you must specify Use UDP = 1 for the WebAccess configuration of this device.

1.4.1 Device Name

A Device is a FIELDBUS COUPLER, Controller, VAV or other automation hardware or software entity. **Device name** is a User-assigned name that will appear in the Project Manager (Configuration Tool) and in runtime VIEW Displays. Choosing a descriptive Name can help technicians identify the location of your device.

Changing only the Device Name will rename the existing device.

Changing both the **Device Name** and the **Unit Number** will make a copy of the device (e.g. create another device).

1.4.2 Description

User assigned description up to 70 characters

1.4.3 Unit Number

For Modbus, this must correspond to the Unit Number used in the protocol addressing. This is the address configured in the device or by a dipswitch on the device. The range of Unit Numbers is 0 to 255 for Modbus.

This Unit Number will appear on the System Status Display, Point Detail, user-built displays and tags to reference the status of this device.

Changing only the Unit Number here will change the existing device.

Changing both the **Device Name** and the **Unit Number** will make a copy of the device (e.g. create another device).

1.4.4 Device Type

This is the communication Driver used to communicate with all devices on this Com Port. Only one communications protocol is supported on the same COM port. Once a Device Type is created on a COM port, the Device Type of additional devices will be limited to this Device Type.

To use another communications device, you must configure another COM port. Multiple TCP/IP type Com Ports can be added which use the same TCP/IP Network Card on your PC.

1.4.5 Com Port

Com Port is the WebAccess COM Port Number. If it is a TCP/IP type Port, WebAccess will search all network Cards on your SCADA Node PC. You can assign multiple IP Addresses to your SCADA Node Network card and use a single Network card on your SCADA Node. You can use multiple TCP/IP type Com Ports in WebAccess with only a single Network Card on the SCADA Node.

1.4.6 Unit Number

Unit Number is the Unit Number used by WebAccess. The Project Manager will force you to use a unique unit number for each Comport. There can be multiple FIELDBUS COUPLERs on the same comport, each with a unique Unit Number. There cannot be multiple FIELDBUS COUPLERs, PLCs or RTUs on the same Com Port with the same Unit Number.

1.4.7 Device Address

Device Address is the Modbus Device Address (0 - 255) used by the Modbus RTU protocol. For WAGO 750 use 1.

How this is handled varies by device / manufacturer. Many Modbus TCP/IP devices ignore this Device Address (the Modbus RTU Address). Some Modbus TCP/IP devices have multiple PLCs at the same IP Address, and use the Device Address to route to the correct FIELDBUS COUPLER sharing the same IP address.

If the Device Address is 0, WebAccess uses the Unit Number as the Device Address.

1.4.7.1 Multiple Devices with same Device Address

If you have multiple devices with the same Device Address (e.g. WAGO 750), your options are:

1. Configure a Different WebAccess **Unit Number** for each device and enter the actual Device Address (1) in the **Device Address** field.

2. Configure Multiple Comports and place the devices on separate comports so that each comport has no device with the same Unit Number. (This is especially true if the device address is 0).

Auto Recover Time is the time to wait after a Device is marked Bad (or Failed) before re-initializing communications. WebAccess will mark the device good, send a packet and begin the whole retry / timeout process above. In the above example, WebAccess will wait 1 minute after a device fails before retrying communications. Every One minute the device will go Good, 1.6 seconds later it will be marked Bad if it is still failed, repeat.

1.5 Configure a Tag

Summary of steps

This example is to configure two Tags that read an Analog Input (Address 30003) and an Analog Output (Address 40015).

1. Open **Internet Explorer**.
2. Connect to **Project Node**.
3. Start **WebAccess Configuration**.
4. Select **Project**.
5. Select **SCADA Node**.
6. Select the Modicon **Device**.
7. Select **Add Tag**.
8. From **Parameter** Pull Down List Select **AI**. This will configure an Analog Input. Wait for the Page to update.
9. Optionally, select **ALARM** from the ALARM pulldown list. Wait for the Page to update with a PINK highlight around alarm (an additional Alarm Fields at bottom of page).
10. Enter a **Tagname** users can use to identify this Analog Input measurement. For example, if this is a Flow measurement, enter **Flow1**.
11. Edit the **Address** to the actual address. From the example, Enter: **30003**
12. Enter a Description. This will help identify this tag to Users and Operators. For example, enter Boiler #1 Steam Flow.

13. Optionally enter, Scaling, Span Hi, Span Low, Engineering Units, and Alarms; enable data logging, etc.

14. Press **Submit**.

15. From **Parameter** Pull Down List Select **AO**. This will configure an Analog Output. Wait for the Page to update.

16. Optionally, select **ALARM** from the ALARM pulldown list. Wait for the Page to update with a PINK highlight around alarm (and additional Alarm Fields at bottom of page).

17. Enter a **Tagname** users can use to identify this Analog Output measurement. For example, if this is a signal to a Valve, enter **Valve1**.

18. Edit the **Address** to the actual address. From the above example, Enter: **40015**

19. Enter a Description. This will help identify this tag to Users and Operators. For example, enter Boiler #1 Steam Valve.

20. Optionally enter, Scaling, Span Hi, Span Low, Output Limits, Engineering Units, and Alarms; enable data logging, etc.

21. Press **Submit**.

Congratulations! You have just configured a Measurement and Output Tags to Modbus device.

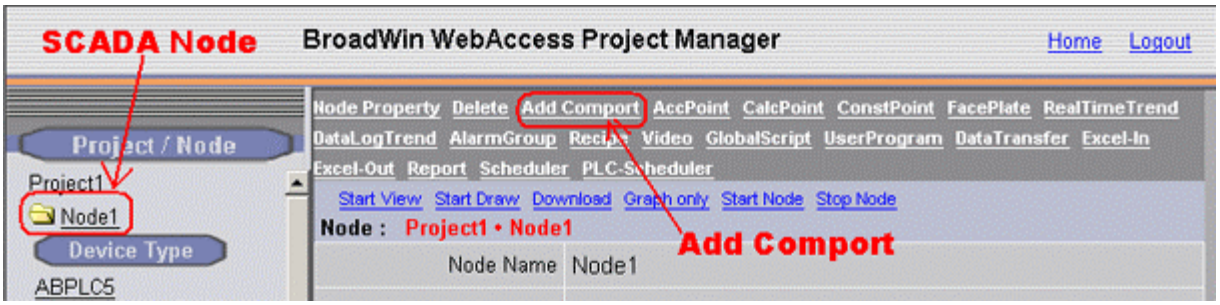
1.6 Step by Step Guide

It is recommended to use a Modbus FIELDBUS COUPLER with TCP/IP communications. If a FIELDBUS COUPLER is not available, it is recommended to install the Modbus TCP Simulator software on the student's PC. See the Appendix for more information on the Modbus Ethernet Slave simulator software.

1.6.1 Task 1: Configure a Communication Port

From the Project Manager (See 2.3.2 Connect to Project Node of the Engineering Manual, if you need help connecting)

1. Select your SCADA node under the Project/Node list.

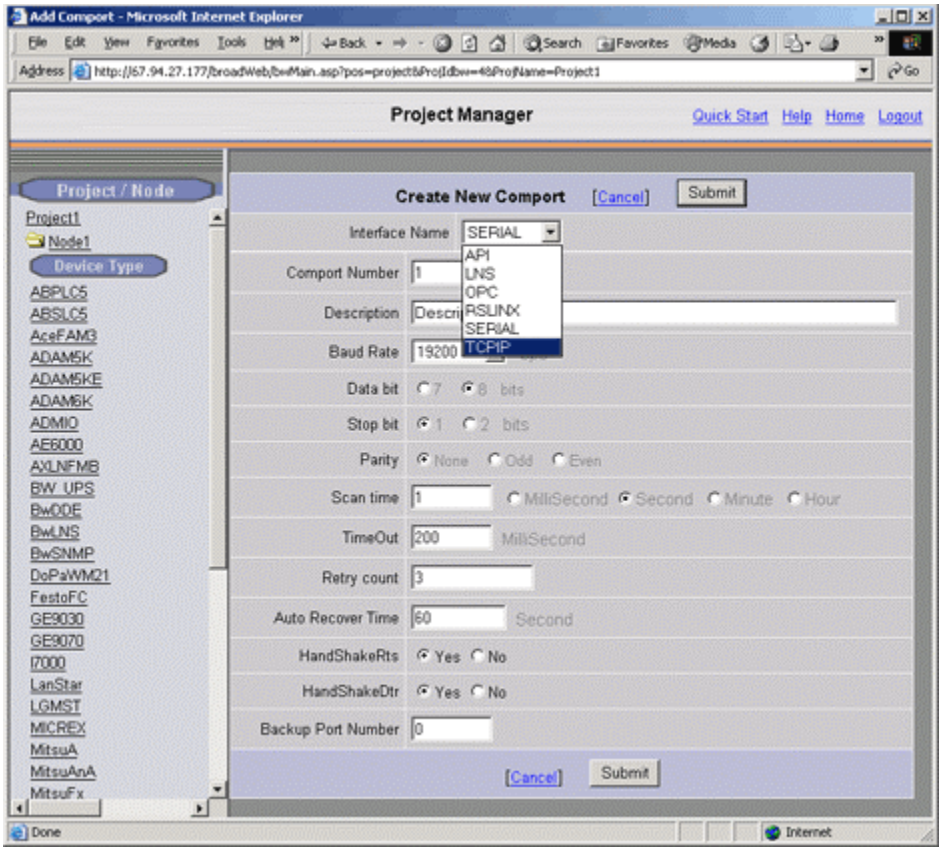


2. Select **Add Comport**

   This can take a long time while tables are created in the database on the Project Node / Web Server.

> Warning – if multiple students are using a single project node that is using a 10-client limit for IIS, pressing Add Comport will open a new connection each time it is pressed. Be patient if you are sharing a Project Node with other students and do not press Add Comport more than once, otherwise you will get the error:
>
> The page cannot be displayed
>
> There are too many people accessing the Web site at this time.

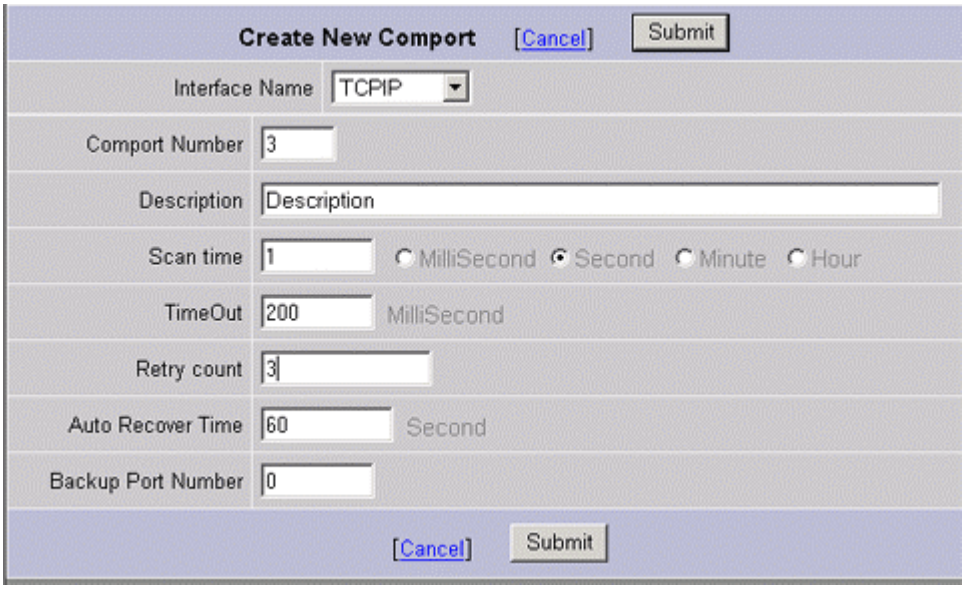
3. The **Create New Comport** page appears.



4. Select the **TCP/IP** as the **Interface Name** for this Comport. (Also called the Comport Type).

The fields change depending on the Comport Type.

5. The TCP/IP Comport Properties page appears.



TCPIP - TCP/IP (transmission Control Protocol / Internet Protocol). Specifies a "Virtual Port" that uses the TCP/IP service installed. Does not correspond to specific IO card or comport number. Will access any IO card that uses the TCP/IP service installed on your PC. For a description of the data entry fields for a TCP/IP Network Interface see the Engineering Manual, section 3.3.4 TCP/IP Com Port Properties.

6. Enter a **Comport Number**. It is recommended to use a number above 2 for TCP/IP ports, so you don't interfere with adding a serial comport. Most PCs have 2 serial comports, if you configured a TCP/IP comport as 1 or 2, you would not be able to use that serial comport in the future. It is not easy to change comport numbers.

7. Optionally, enter a Description. This is just for your own reference.

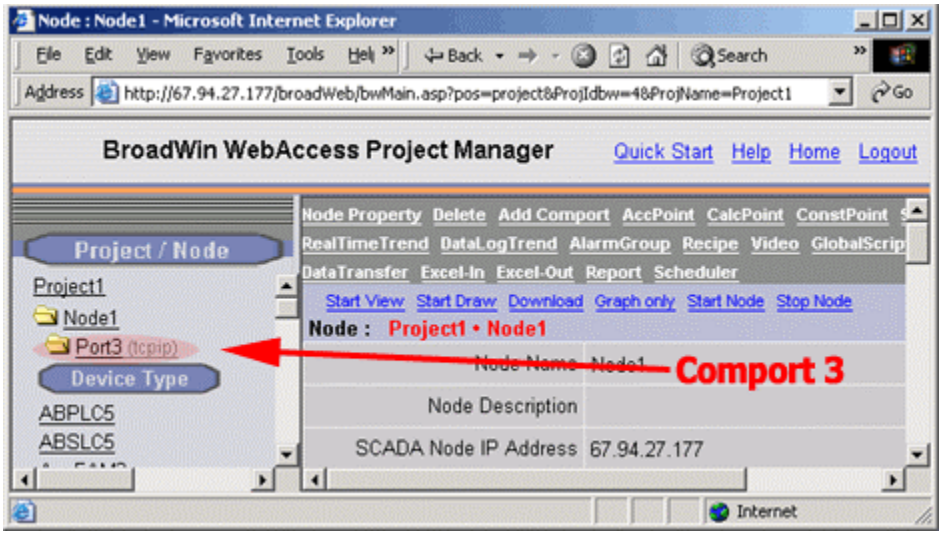
8. Enter a **Scan Time** and select the **radio button** for the units (Millisecond, Second, Minute or Hour).

   All devices are scanned at the same frequency on a given comport. All Constant Scan type Tags are scanned at the same frequency on a comport. Display Scan Tags are scanned at this same frequency, but only when they appear on a Display.

9. Accept the default values for the other fields, or modify them. For a description of the data entry fields for a TCP/IP Network Interface see, section 3.3.4 TCP/IP Com Port Properties.

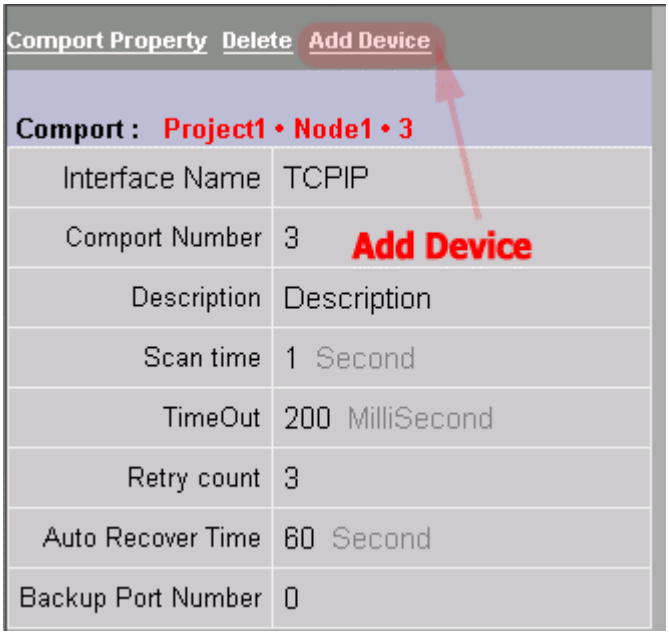
10. Click **Submit**.

11. The SCADA Node page appears. The Port should appear as a folder under the SCADA node. (In this example Port 3 under Node 1) in the menu tree at left.



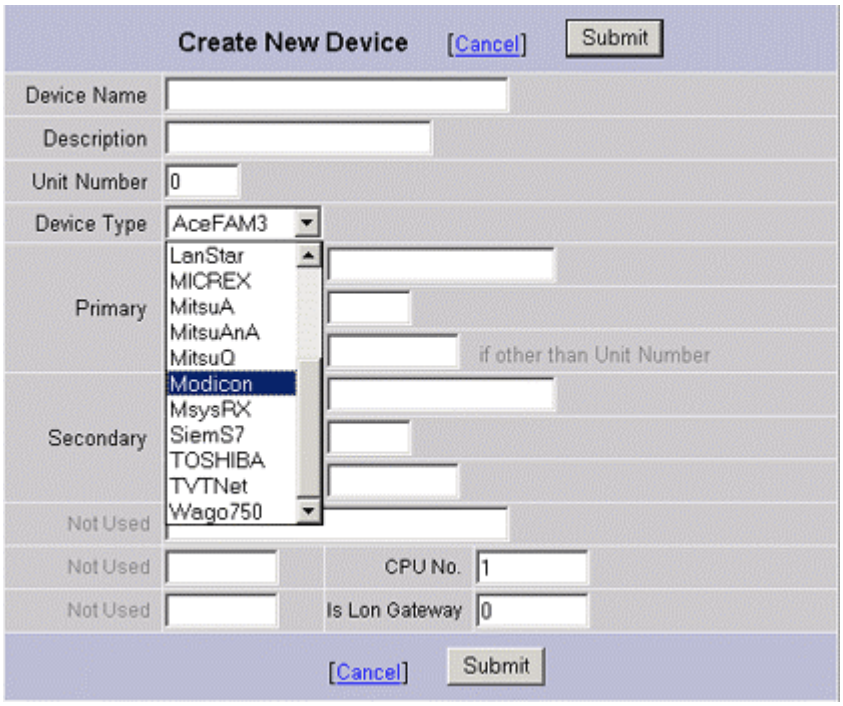
1.6.2 Task 2: Add Device (a FIELDBUS COUPLER)

12. Click on the Port hyperlink (Port3 in this example). The Com Port Properties page opens.



13. Select **Add Device**.

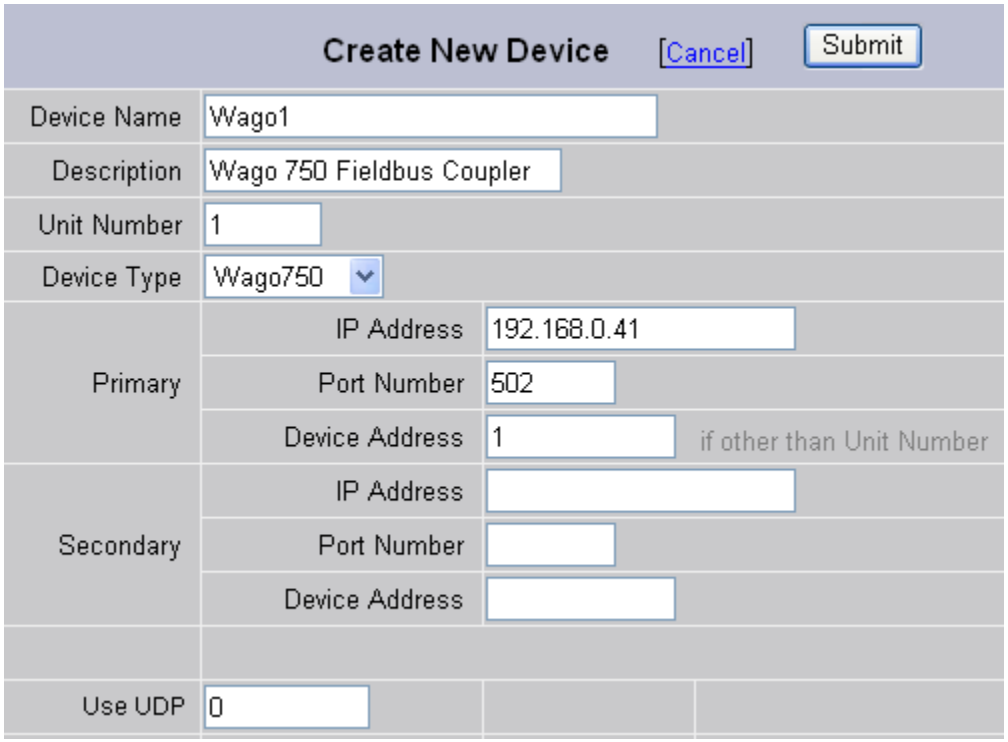
14. The **Create Device** Page opens. This also can take some time while data tables are created in the database on the Project Node.



15. Select **Modicon** form the Device Type pull down list.

    (Alternatively, you can select one of the other Modbus TCP/IP devices: ADAM 5000 Ethernet driver (ADAM5KE), ADAM 6000 (ADAM6K) or Wago 750.

16. Enter a **Device Name**. This will appear as a folder under the comport in the Project Manager. It will also appear in VIEW during runtime in the Point Detail Display for any tags created.



17. Optionally, enter a description.

18. Enter the **Unit Number**. This number will appear in VIEW during runtime on the Station Status display and will be the reference to Enable and Disable communications to the Device. It also will be the reference for communication alarms. (1 to 254)

    Logically, this usually matched the actual device number, but it is possible to assign a unit number that does not match the actual Modbus Protocol Device Address. For example, each Modbus FIELDBUS COUPLER has a unique IP Address and all FIELDBUS COUPLERs have Modbus Device address 1 at these unique IP Addresses.

19. Enter an **IP Address** for the Device.

Important! – Use the IP Address and Port given by your Instructor for the FIELDBUS COUPLER in your classroom. The Modbus TCP Simulator software can be installed locally on a SCADA node and use the SCADA nodes IP address.

If you installed the ModSim.exe simulator software on your PC, then enter the IP Address of your PC or 127.0.0.1

20. Enter the TCP or UDP **Port Number** for the Device. **502** is a common TCP Port for WAGO 750 field bus couplers. Yours may be different; consult your WAGO configuration or the WAGO 750 User manual.

Important! – Use the TCP Port specified in the configuration or the User Manual for the FIELDBUS COUPLER in your classroom. Port 502 is commonly used for WAGO, but yours could be different.

21. Enter a **Device Address** if different from the Unit Number. For Wago, this entry is usually 1.

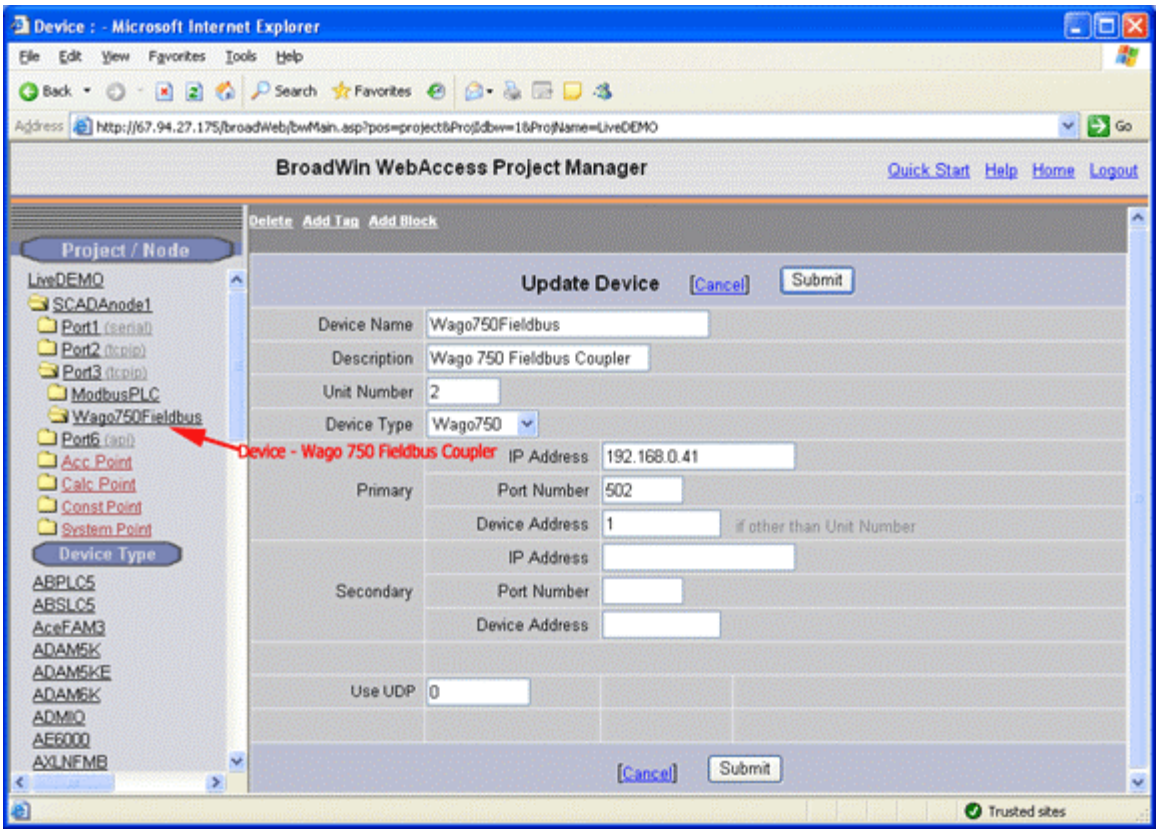
At the time of this writing, the WAGO 750 field bus coupler ignores the Device Address in the Modbus Protocol, Use the Device Address given by in the User Manual for the FIELDBUS COUPLER if it is specified.

22. Optionally, add Address and Port information for a redundant communication path to the Device. For example, if the FIELDBUS COUPLER has two Network Interface Cards (NICs).

23. If using TCP (the official Modbus Ethernet protocol for WAGO 750) enter **0** for **Use UDP.** This will use TCP protocol (not UDP).

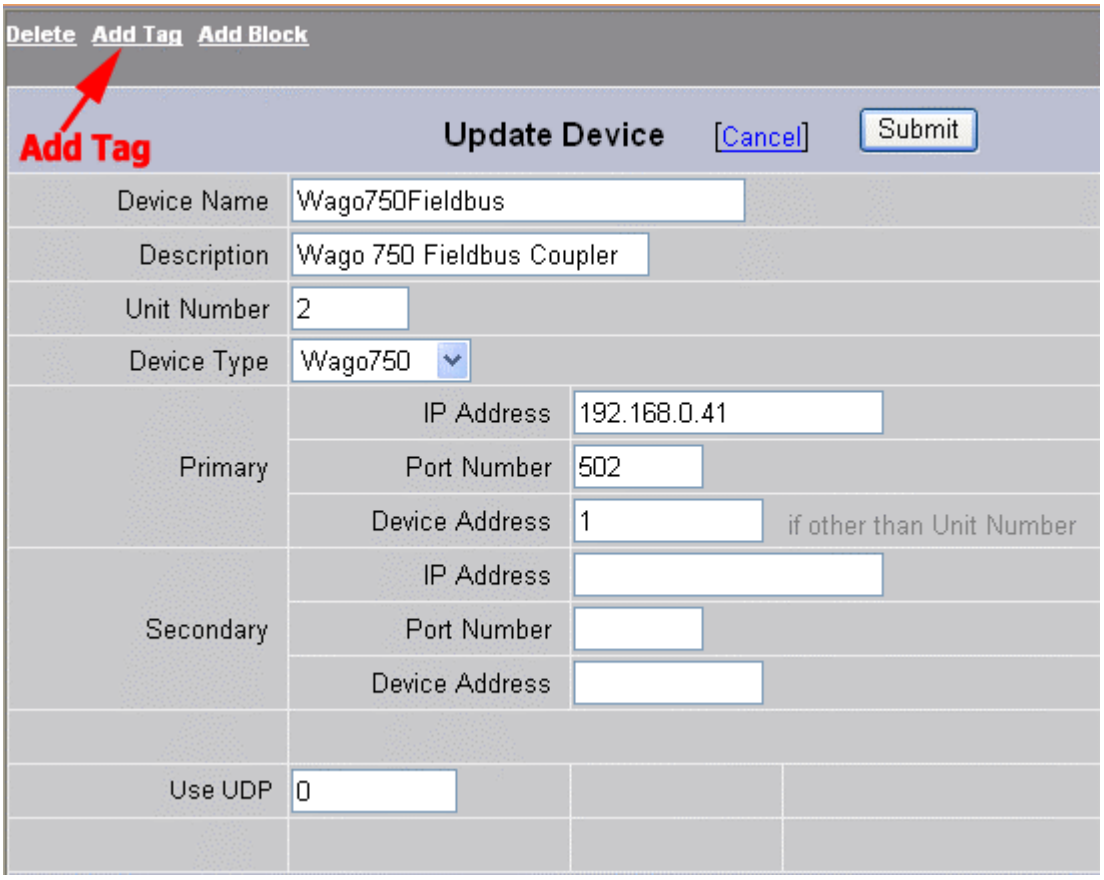
24. Press **Submit**. This can be a wait while data tables are created on the Project Node.

The FIELDBUS COUPLER appears as a folder under the comport in Project Manager.

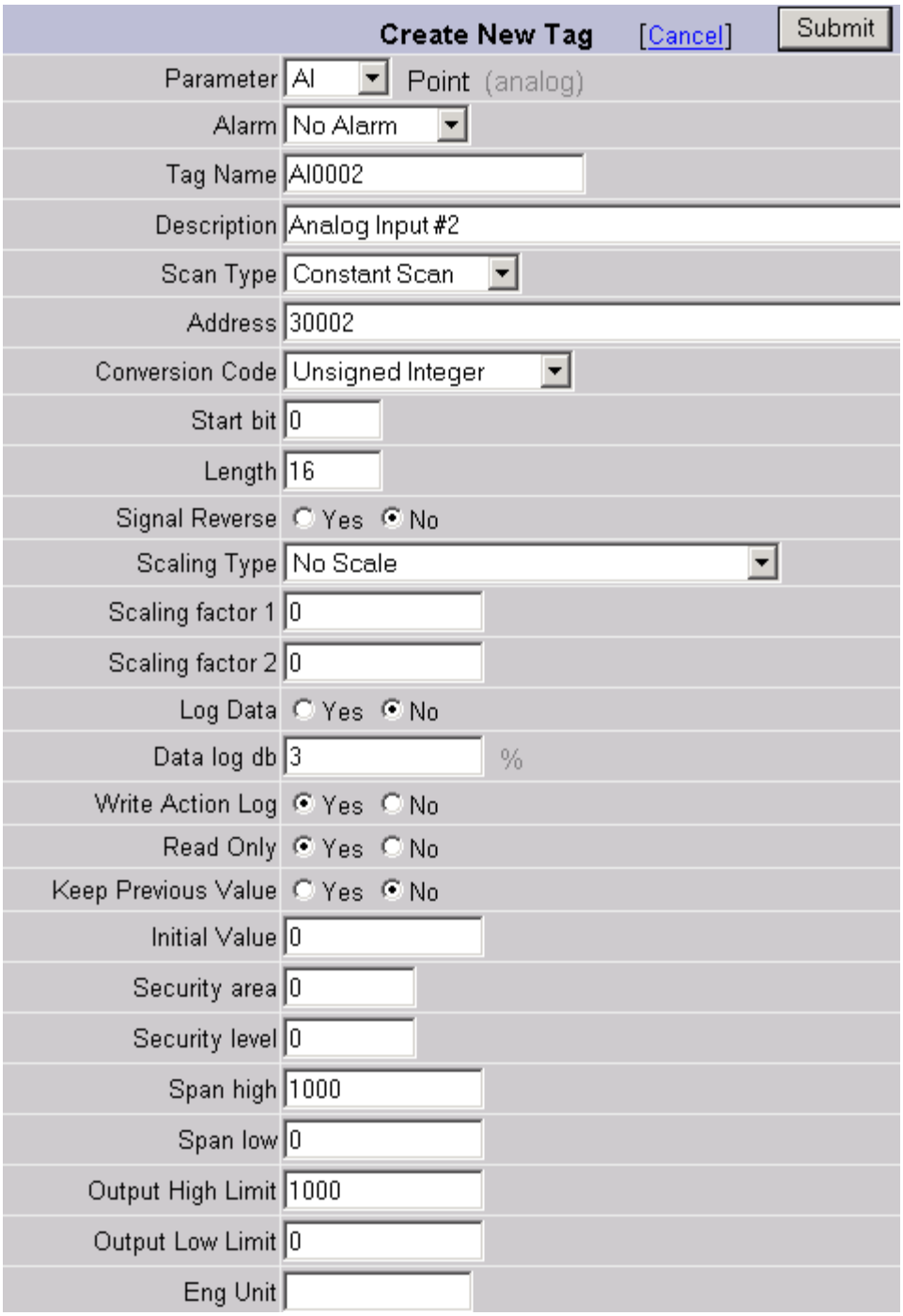


1.6.3 Task 3: Add an Analog Input Tag

25. The **Update Device** Page Appears.
26. Select **Add Tag**.



27. The **Create New Tag** page appears.
28. Use the **AI** Parameter from the **Parameter** pull down List
29. Enter a Tagname (**AI0002** in the example).
30. Modify the address (**30002** in the example).



32. Accept the default values for the other fields. Press **Submit**.

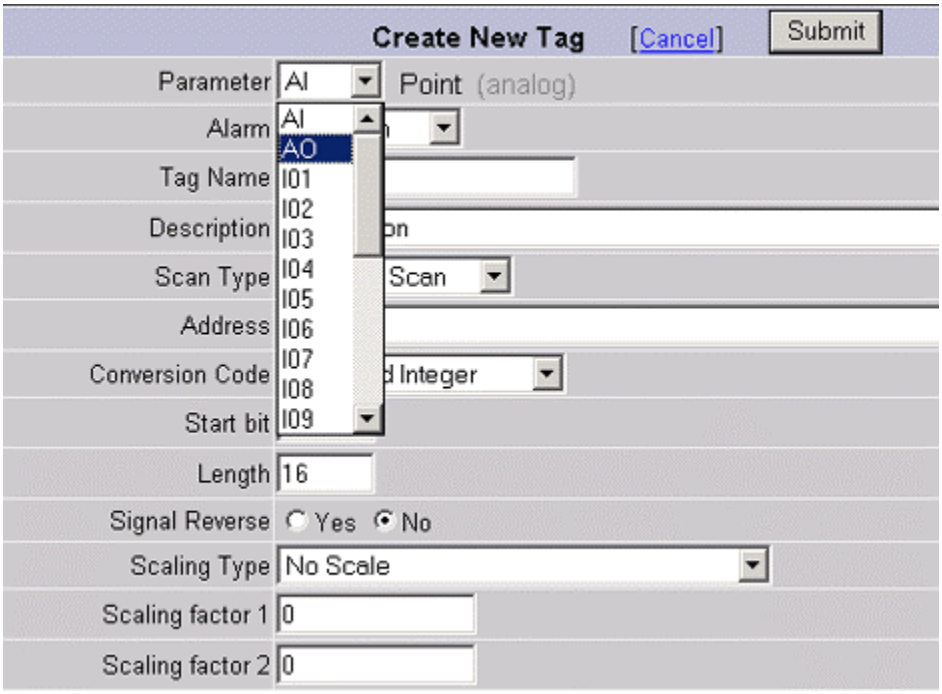
Important! – Press SUBMIT before continuing to next step or you will loose your data.

For more information, see Section 4.2 Analog Tag Properties in the Engineering Manual.

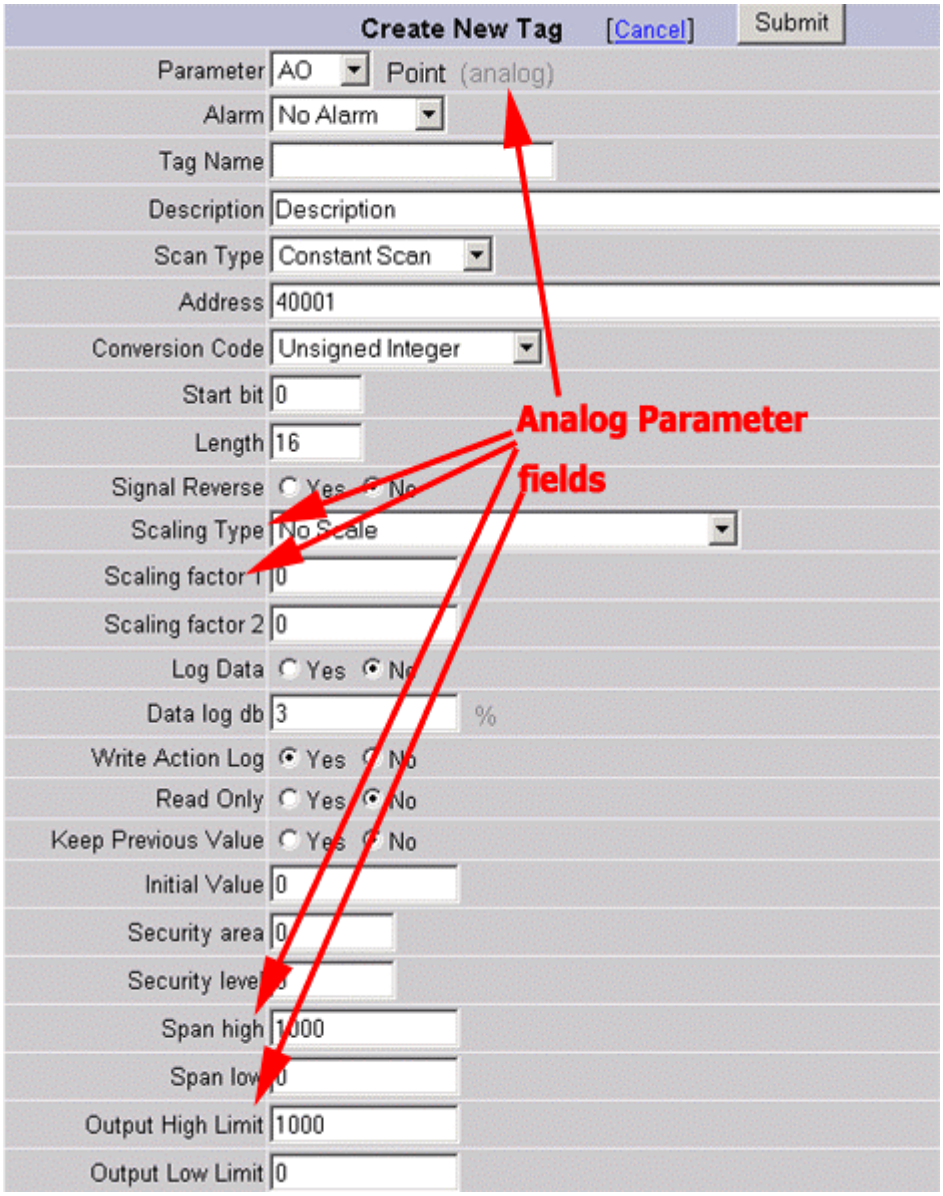
1.6.4 Task 4: Add an Analog Output Tag

33. Continuing from add Analog Input, the **Create New Tag** page appears.

34. Select the **AO** Parameter from the **Parameter** Pull Down List.



35. The AO Parameter Page opens.

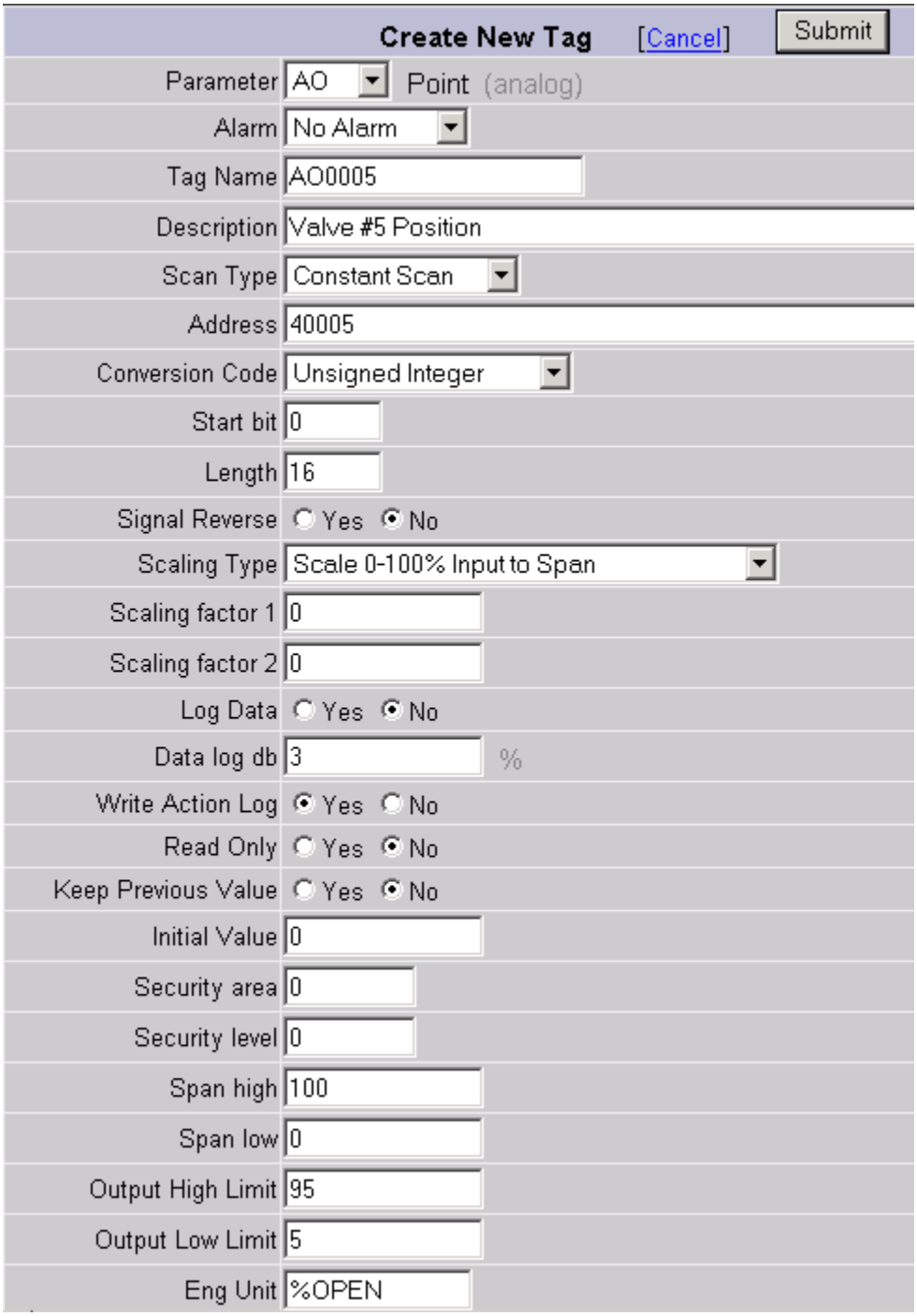


Notice that the Address field changes from 30001 (for AI) to 40001 (for the AO Parameter).

36. Create a Tag name **AO005**

Tag name	Tag fields
AO005	Parameter: AO Description: Valve #5 Position Address: 40005 Scaling Type: Scale 0 –100% Input to

	Span Span Hi: 100 Span Lo: -100 Output High Limit: 100 Eng Units: %OPEN Display Digits (Integer): 3 All other parameters: use default

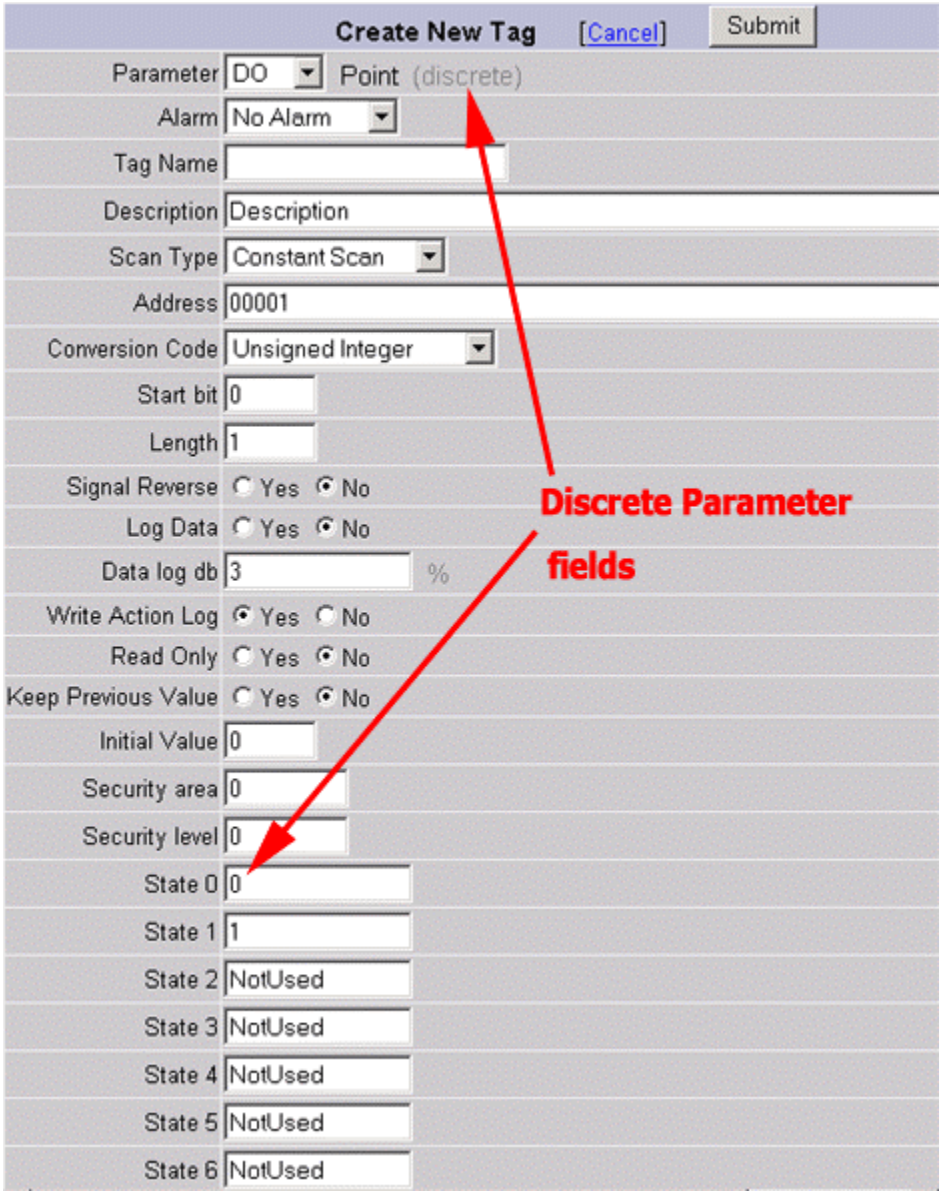


37. Press **Submit** when finished to create the tag.

Important! – Press submit to save your data before continuing with the next step.

1.6.5 Task 5: Add a Discrete Output (also called Digital Output)

38. Select **DO** from the Parameter pull down list (you have to scroll down to the bottom of the list.



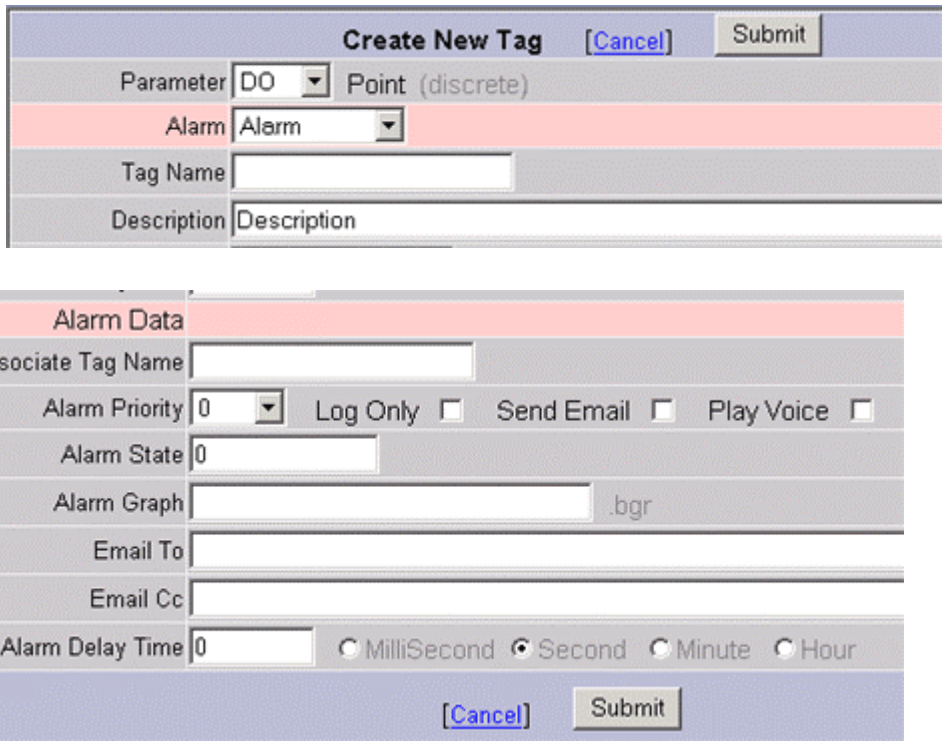
Notice that the Address field Changes to data type changes from analog to discrete. Also, the Data Fields change: State Descriptors appear. There is no Scaling, Span or Output Limits for a Discrete.

Also notice how any data entered is lost if you change the Parameter before pressing submit! It is best to select Parameter before entering tag name. You cannot change the parameter type of a tag once it is created.

39. Select **Alarm** from the Pulldown list.

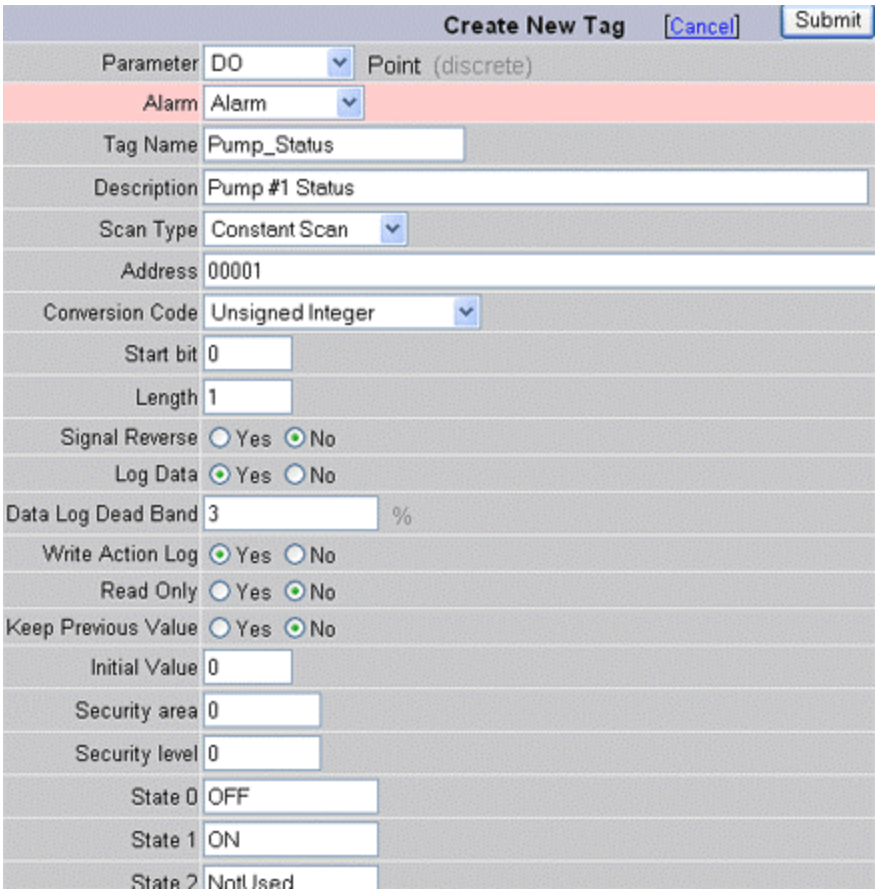
    Similar to changing the Parameter, selecting alarm changes the page and you will loose any data entered before pressing submit. You can add or remove alarming for a tag after you create.

    The page refreshes and alarm fields appear at the top and bottom of the page.



40. Enter a **Tag Name** of **PUMP_STATUS.**
    This will be how the information is referenced on Displays in VIEW. Typical Tag names are YS1001, SS4516, Pump_Start, B31_R11_STATUS. The end user usually has a Tag naming convention used at his facility. Tag name is 21 characters Maximum. For legal tag name characters, see the Engineering Manual section 4.11.1 Legal characters in a Tag Name.

41. Enter a **Description** of the tag: **Pump #1 Status**
    This will appear in VIEW and helps operators identify the information. It will also appear in the Alarm Summary and will be read by the Text-to-Speech Alarm Annunciator. The Description can be changed during runtime by modifying the DESCRP field associated with the tag.



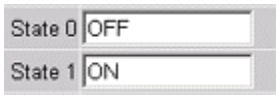
42. Enter the actual **Address** for the tag: **00001.**
    The parameter provides an example of a typical address for the Data type (00001 for Discrete Outputs, 10001 for Discrete Inputs, 30001 for Discrete Outputs and 40001 for Analog Outputs).

43. For this example, leave the default settings for
    Scan Type = Constant Scan
    Conversion Code = Unsigned Integer
    Start Bit = 0
    Length = 1
    Signal Reverse = No.

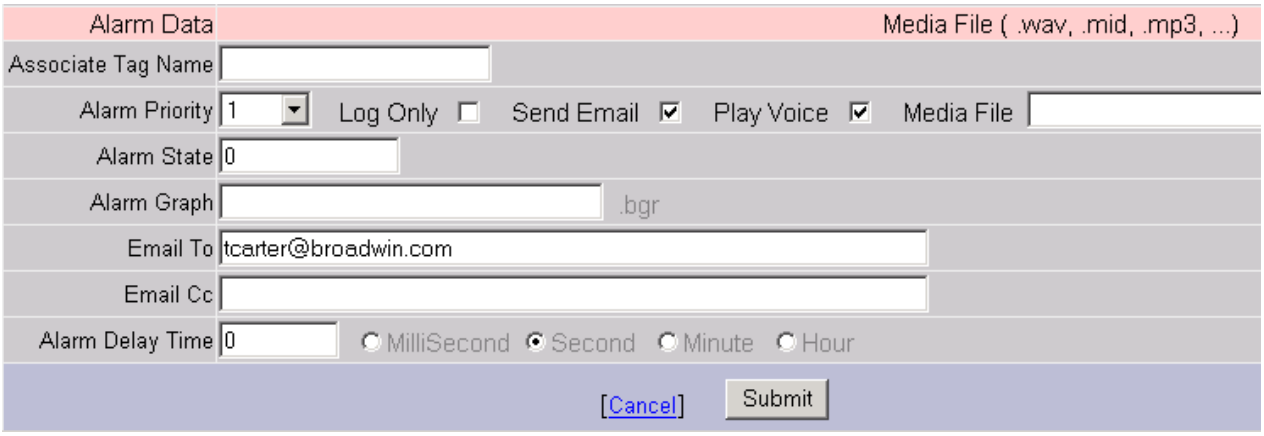
    For more information on these fields, see the Engineering Manual 4.3 Discrete Tag Properties

44. **Enable Data Logging** for the Tag by selecting the radio button next to **Log Data**.

45. Modify the State0 and State1 descriptors to read ON and OFF.



46. Modify the **Alarm Priority** to 1 or higher. An alarm priority of 0 = no alarms.



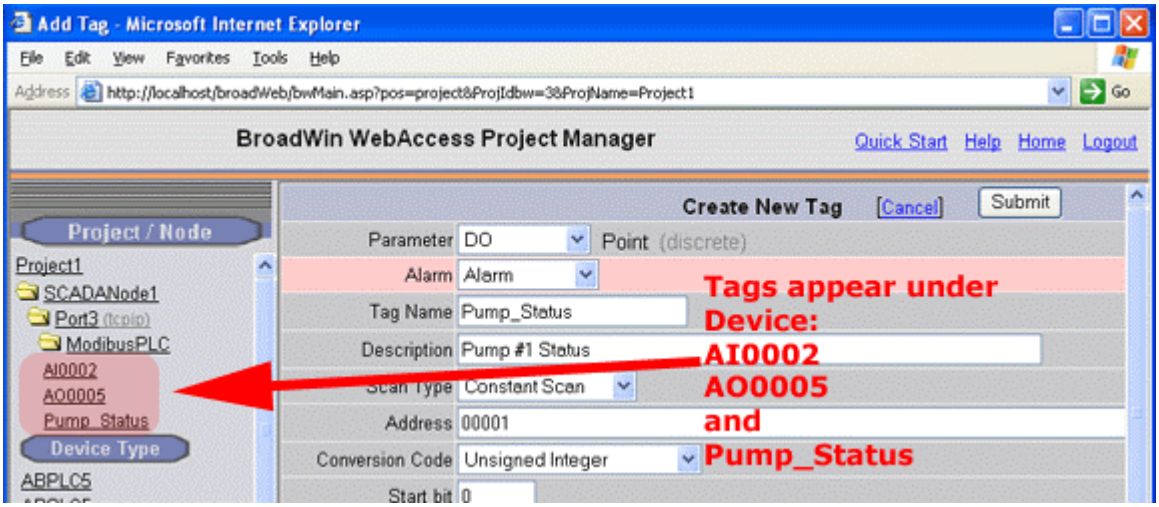
47. Optionally, enable **Play Voice** to here a Text-to-Speech Alarm annunciation on the SCADA Node.

48. Optionally, enable **Send Email** and enter your email address in the **Email To** fields to receive an Alarm Email.

49. In this example, leave the other fields at their default values. For more information on these fields, see the Engineering Manual 4.3 Discrete Tag Properties.

50. Press **Submit**.

    The Tag Name appears under the Device Name in the Project Manager (SCADNode1, Port3, Modbus FIELDBUS COUPLER in this example.) You should see three tags AI0002, AO0005 and PUMP_STATUS.



1.6.6 Task 6: Download changes to the SCADA Node

If you have not already done so, connect to the Project Node and Start WebAccess Configuration. Select your Project.

1. Select the SCADA Node under your Project Name in the Project/Node list (Figure 4-31).

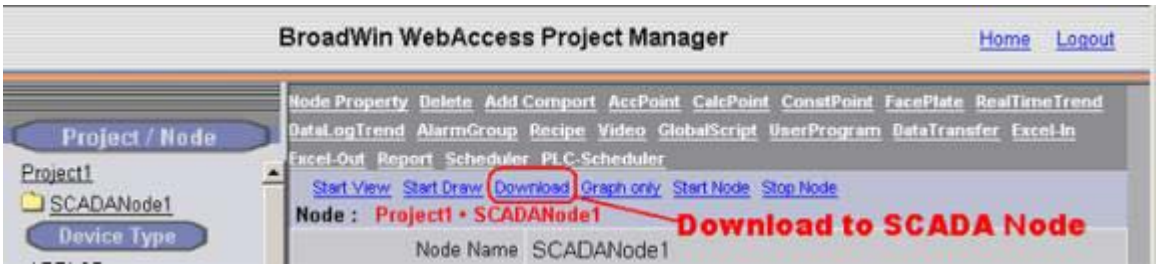


Figure 4-31 - SCADA Node Main page (Main.asp) - Download

2. Select **Download**.
3. The Download Dialog Box pops open (Figure 4-32).

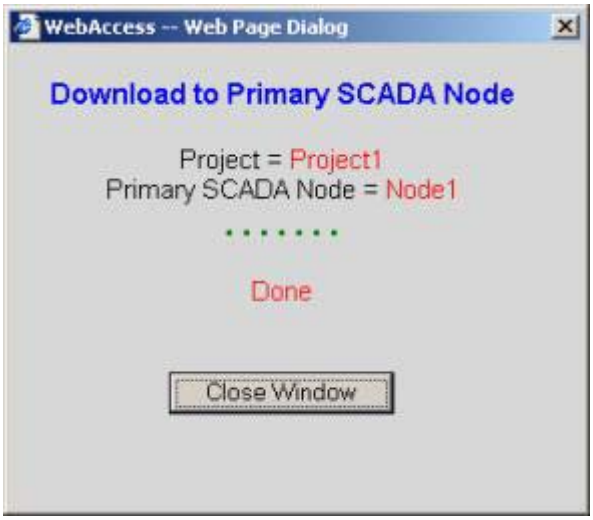


Figure 4-32 - Download SCADA Node

4. When download is finished, select **Close Window** (Figure 4-32).
5. From Project Manager Select **Start node** (Figure 4-31).
6. The Start Node Dialog Box pops open (Figure 4-33).

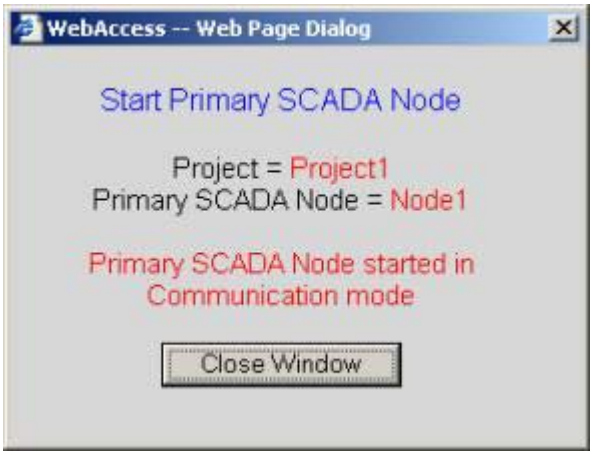


Figure 4-33 - Start SCADA Node

7. When Node is started, select Close Window (Figure 4-33).

Download to the SCADA Node will temporarily STOP the SCADA Node. Users will see a blank screen. Trend and reports will stop collecting data. Communications to field devices will stop. When the SCADA restarts, Alarms will be re-set to unacknowledged.

If you make changes to a Tag, you must download (which will stop and restart the SCADA Node).

Changes to Graphic Displays (and associated Screen Scripts, keymacro files) can be downloaded without stopping the SCADA Node by using **Graph Only** download link.

1.6.7 Task 7: Start the SCADA Node via Project Manager

If you have not already done so, connect to the Project Node and Start WebAccess Configuration. Select your Project.

1. Select the SCADA Node under your Project Name in the Project/Node list.

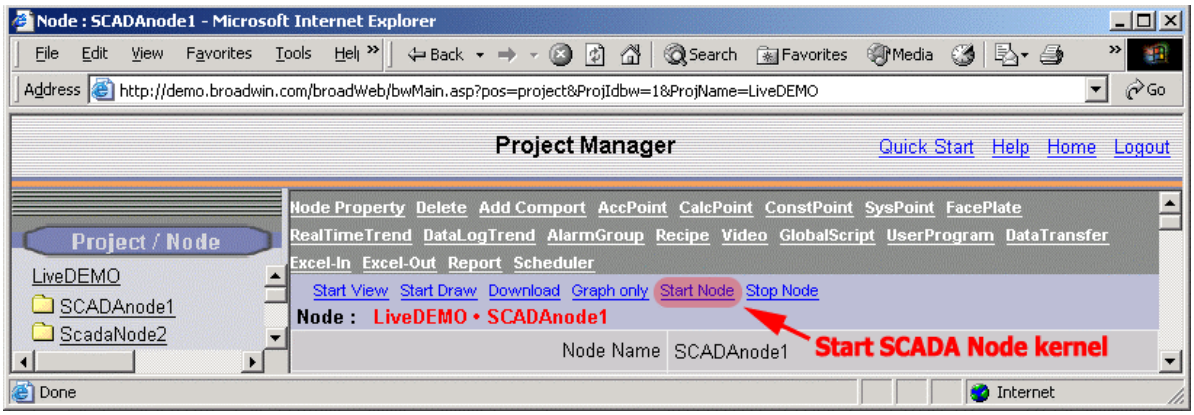


Figure 4.34 - Start SCADA Node kernel remotely via the Project Manager

2. From Project Manager select **Start node**.

3. If this is a redundant SCADA node, a dialog box opens asking you to confirm which one or both Primary and Backup should be started.

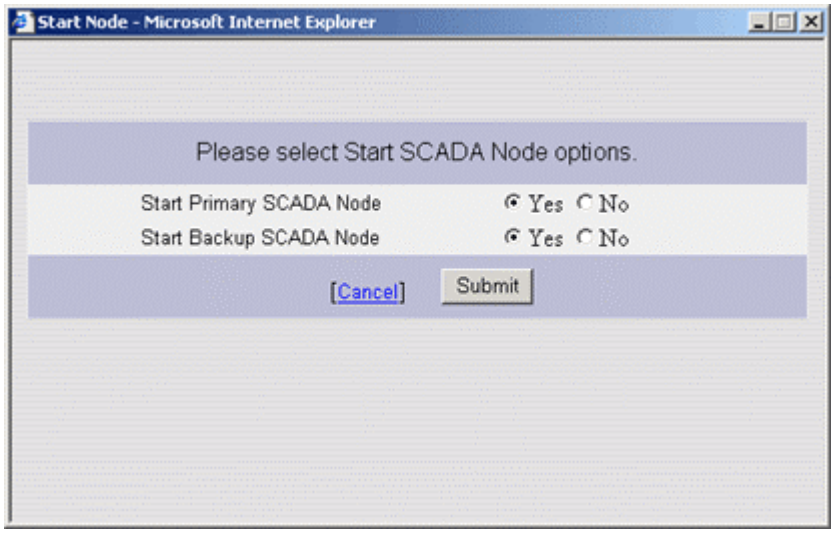


Figure 4.35 - Appears only if redundant SCADA node.

Use the radio button to unselect a node and the click Submit to continue.

6. The Start Node Dialog Box pops open.

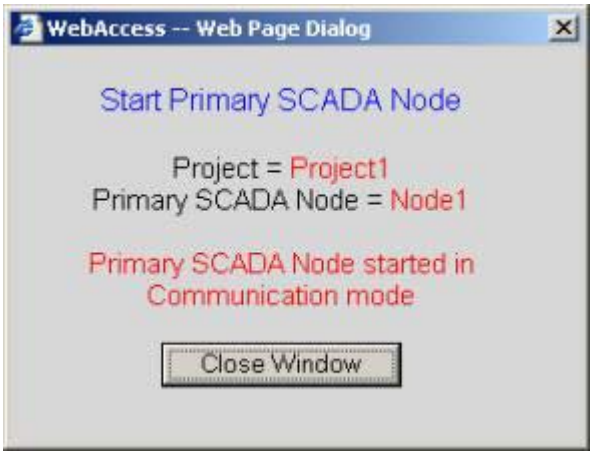


Figure 4.36 – Download Complete and SCADA Node restarted

7. When Node is started, select Close Window.

Warning - if communications times out between the SCADA Node and Project Node, you will still get the above Dialog Box stating the Node has started. You should always start View and connect to that SCADA node to confirm it has started. It may take a long time to start if there are many Data Log files and/or the hard drive is fragmented.

Note – Not all Downloads require restarting the SCADA Node. Only downloading new Tags and new SCADA Node Properties requires the use of the Download from SCADA (which temporarily stops the SCADA Node kernel). Graphics, Scripts, Recipes, the Scheduler and other features can be downloaded from their respective properties page without stopping the SCADA node.

1.6.8 Task 8: Start VIEW to verify communications to FIELDBUS COUPLER

Continuing from Step 7 in the previous section (or see Download the SCADA Node in the Engineering Manual).

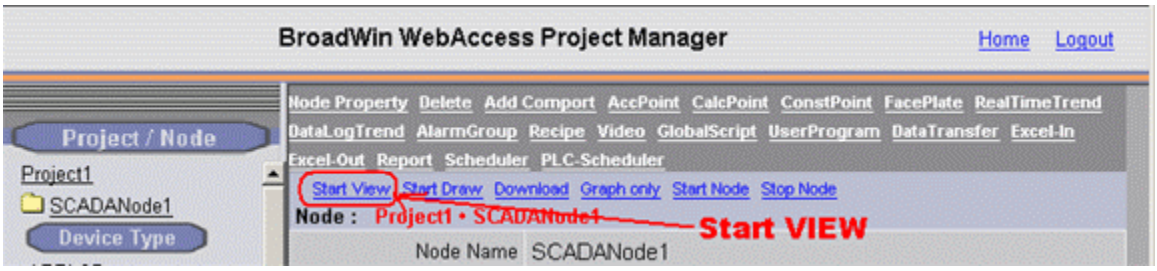


Figure 4.37- Start VIEW from Project Manger

8. Select **Start View** (Figure 4-37).

There are other ways to START VIEW described in VIEW Client Options and Start WebAccess VIEW

9. If you have not already installed the Client, you will see a message: "**Please Click here to install WebAccess Client first**".

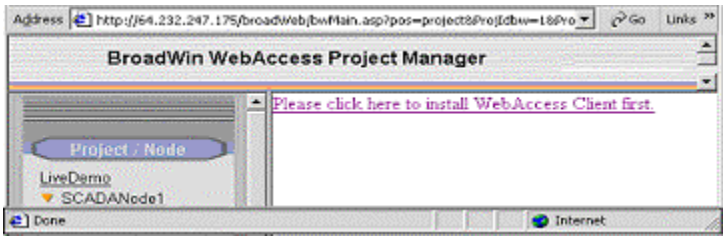


Figure 4-38 - Prompt to download and install WebAccess Client

If you get this message, just follow the steps to download and install the client.

Hint - After Downloading Client, close all Web browser windows before running the Client Setup program. If you close all web browser windows, you will not have to reboot your computer.

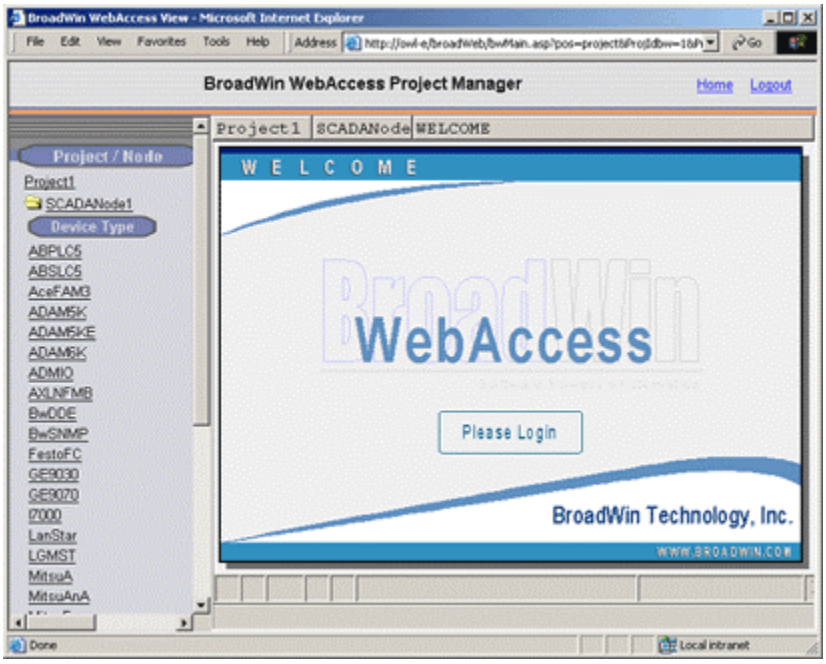


Figure 4-39 - Login page, start VIEW – from Project Manager

10. Welcome to WebAccess Login appears (Figure 4-39) if the Client is installed.

11. Select **Please Login**

12. The User Login Dialog Box Appears (Figure 4-40).

Figure 4-40- Login Password Dialog Box

13. Enter Username: **admin**
    and no Password:

14. **Right Click** with the mouse or press the **Enter** key.

15. The default Main Graphic Display appears (you can edit or create a new Main.bgr later)

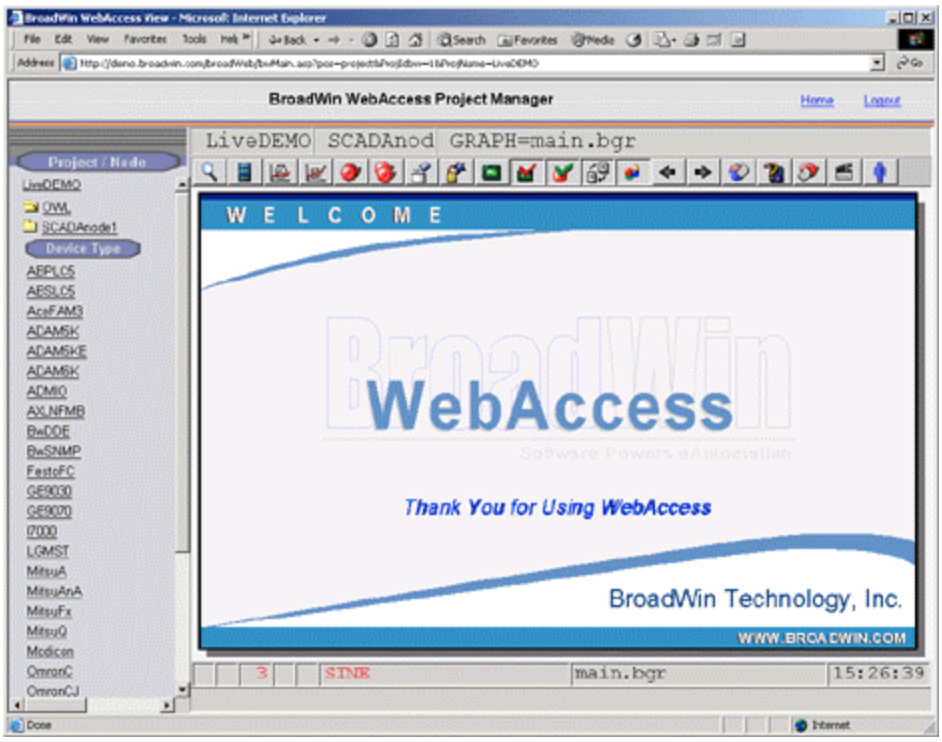


Figure 4-41 - default MAIN Graphic Display

1.6.9 Task 9: Use Point Info (Tag Browser) to verify new tag

The **Point Info Dialog Box** is opened using:

- Pressing the  icon on the Toolbar.
- Pressing **Ctrl + F5** on the Keyboard.
- Pressing a Pushbutton that uses the **<CTL_F5>** keymacro.
- Pressing a Pushbutton that uses the **<DIALOG>POINTINFO** keymacro.
- **Right Click -> Goto -> Point Info** (ViewDAQ users skip the right click)

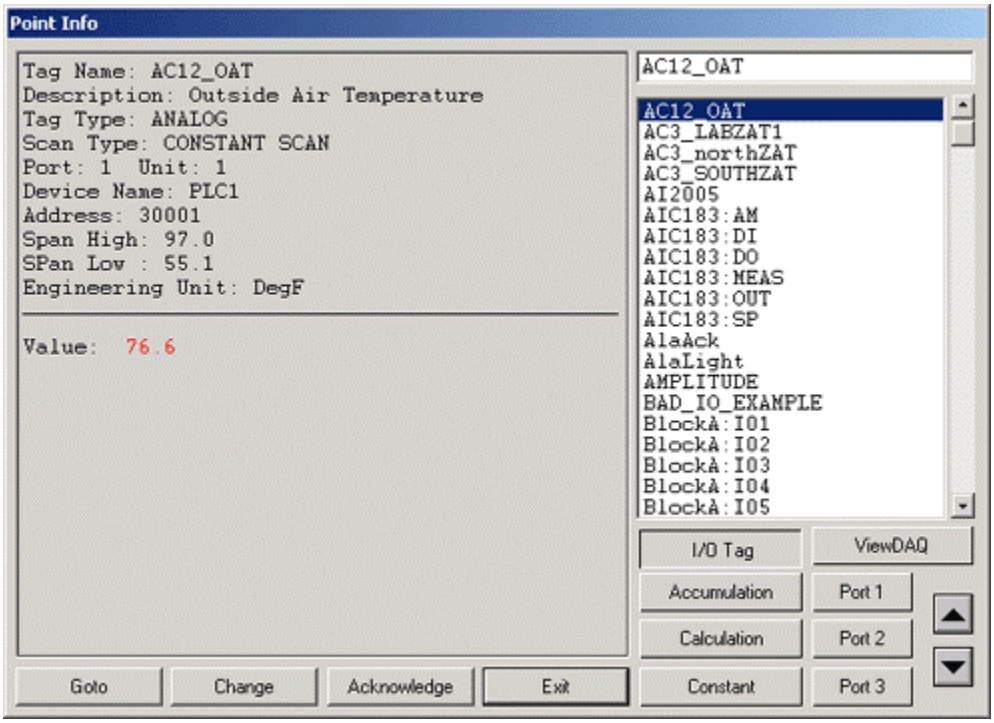
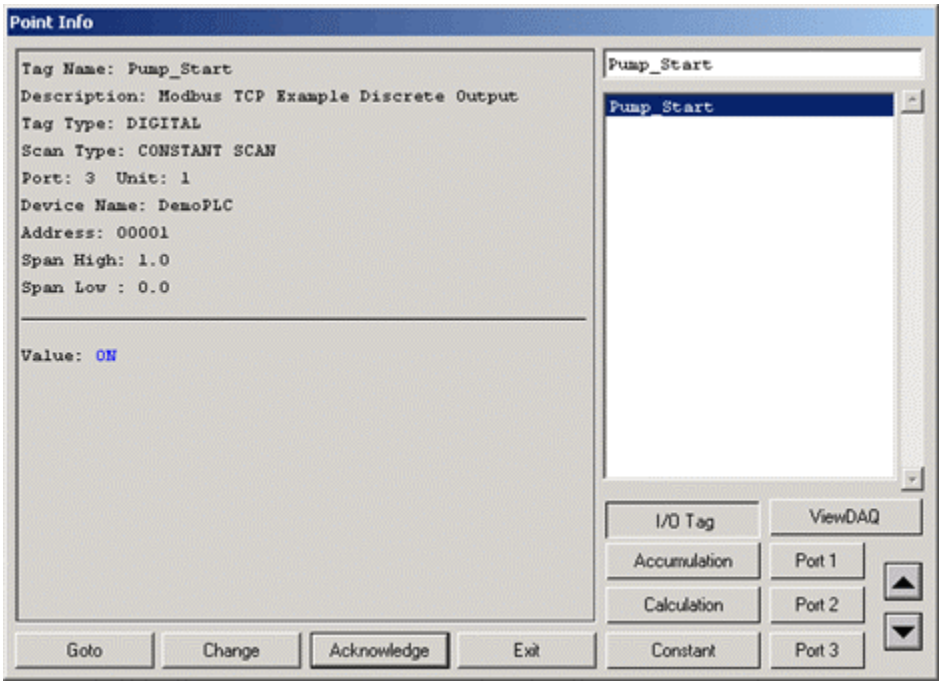


Figure - Point Info Dialog Box – red is Alarm

16. Scroll down (if necessary) to see the Tag.
17. Click on the Tag Name
18. You should see a ON or OFF as the value. It may be flashing Red if in Alarm.



Troubleshooting

19. If you see an asterisk (*) with a number (typically 8000), communications has failed. You have the IP Address wrong, the port wrong, the address wrong or some other communication problem.

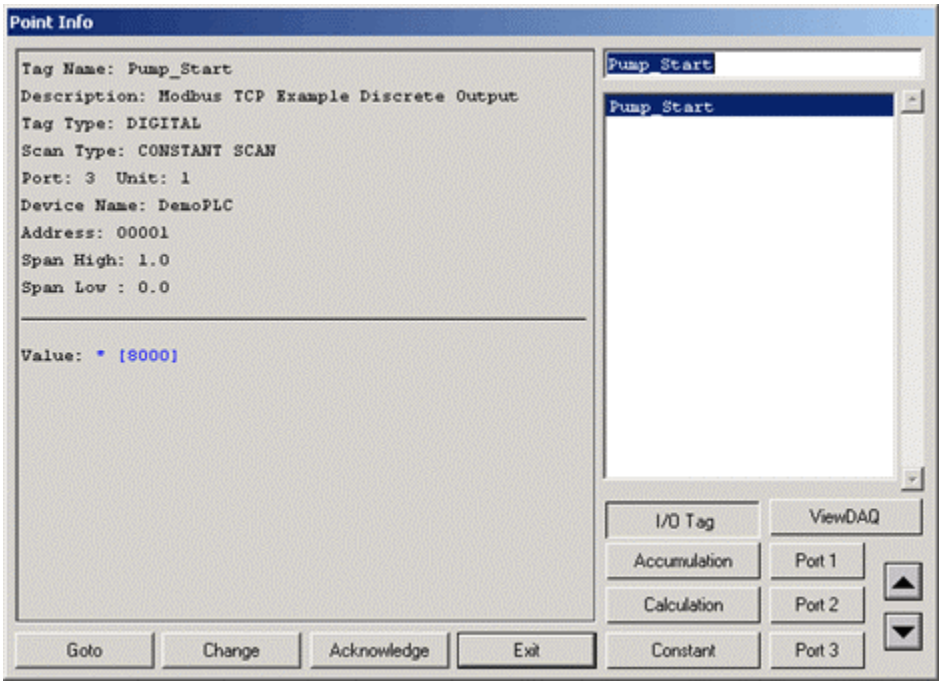


Figure - BAD communications

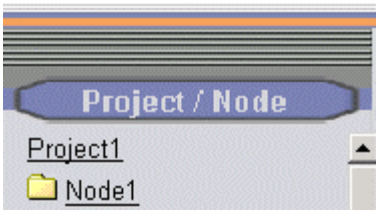
20. Go to the Station Status Display (see Appendix).

1.6.10 Task 10: Review the Port and Device List

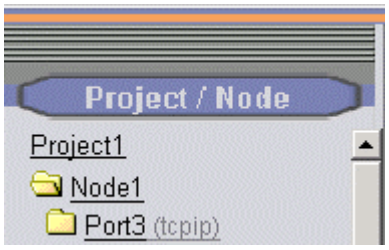
The SCADA Node, Ports, Devise, Tags and Blocks are organized in a folder style list at the left of the Project Manger. You may have to open or close a folder to see the information you are looking for.

This section assumes you have started Internet Explorer 6 or later Web Browser and connected to your Project Node.

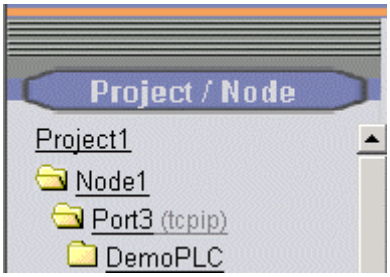
1. Start **WebAccess Configuration.**
2. Login with User Name and Password.
3. Select your **Project Name.**
4. The **Project Manger** opens.
5. You may need to expand the Port List by clicking on the Folder icon to the left of **SCADA Node** (Node 1 in the example).



7. You may need to expand the list of **Devices** under your Comport by clicking on the Folder icon to the left of the Comport.

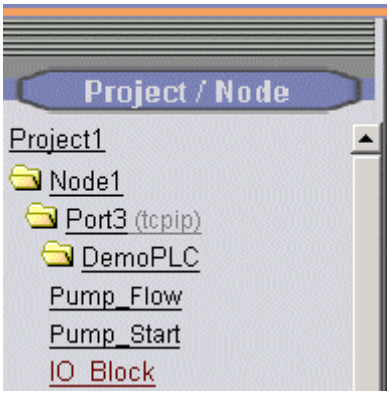


8. Drag the slider bar on the left Frame down to reveal **Communication Port** (e.g. Port 3 in the example above).



9. You may need to expand the list of **Devices by** clicking on the Folder icon to the left of the **Port** (in the example, pick Port3).

10. You may need to expand the list of **Tags** and **Blocks by** clicking on the Folder icon to the left of the **device** (in the example, pick DemoPLC).



Tags are listed in Black.

Blocks are listed in Brown after all tags.

You may have to scroll down to see the Tag or Block associated with the device.

1.7 Addendum

1.7.1 Device Failure

If a FIELDBUS COUPLER fails, it will not usually affect the other FIELDBUS COUPLERs' communications with WebAccess SCADA node, especially with TCP/IP. WebAccess will mark the Device as Bad (asterisks will appear on displays for Tags with Keep Last Value = No).

If the failed device sends gibberish on the network that somehow blocks communication (unlikely with TCP/IP), a failed device might affect others. This is possible with multi-drop serial connections on a single TCP/IP address, but unlikely.

1.7.2 Troubleshooting an asterisk (*)

If you see an asterisk (*) with a number (typically 8000), communications has failed. You have the IP Address wrong, the port wrong, the address wrong or some other communication problem.

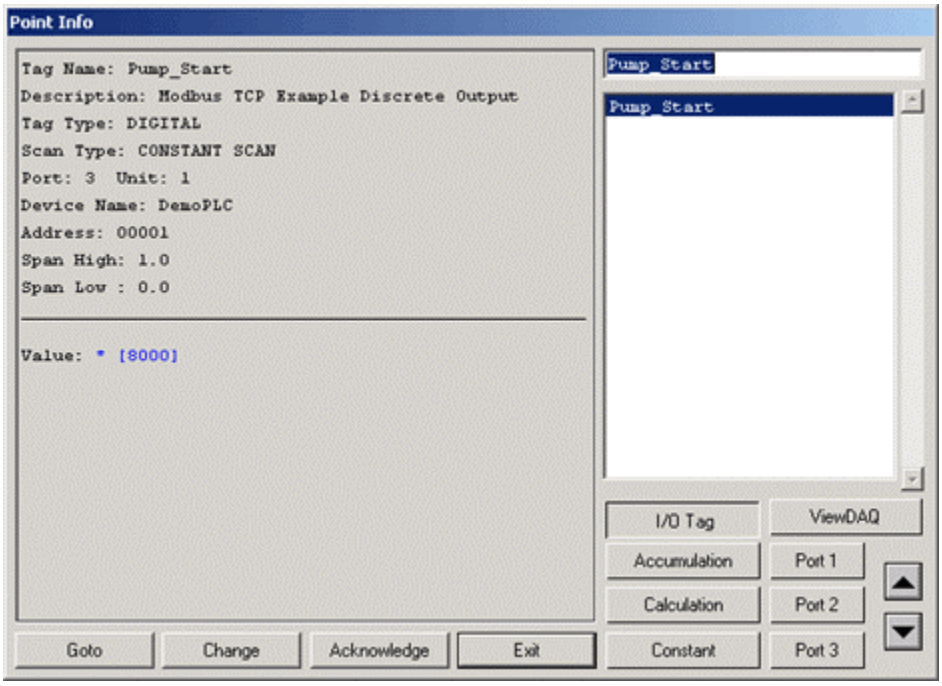


Figure - BAD communications

1.7.3 Use Station Status to diagnose problems

The Station Status Display can be viewed from the **Toolbar**  or **Ctrl+F7** function key or a pushbutton with the **<GOTO>STATION** keymacro. The **Right-Click Menu** can also call up the Action Log (**Right Click -> Goto -> Station Status**).

Only Power Users and the admin account can view the Station Status through a Web Browser. (General Users and Restricted users cannot view the Station Status through a Web Browser). All users can view the Station Status locally on the SCADA node using ViewDAQ.

The Station Status Display shows status of all communication Ports and automation devices (e.g. stations).

A Communications Alarm will appear in the Status Bar at the bottom of all displays (a Red letter **C**). See the Engineering Manual, section 7.10 , for more information on the Alarm Windows in the Status Bar.

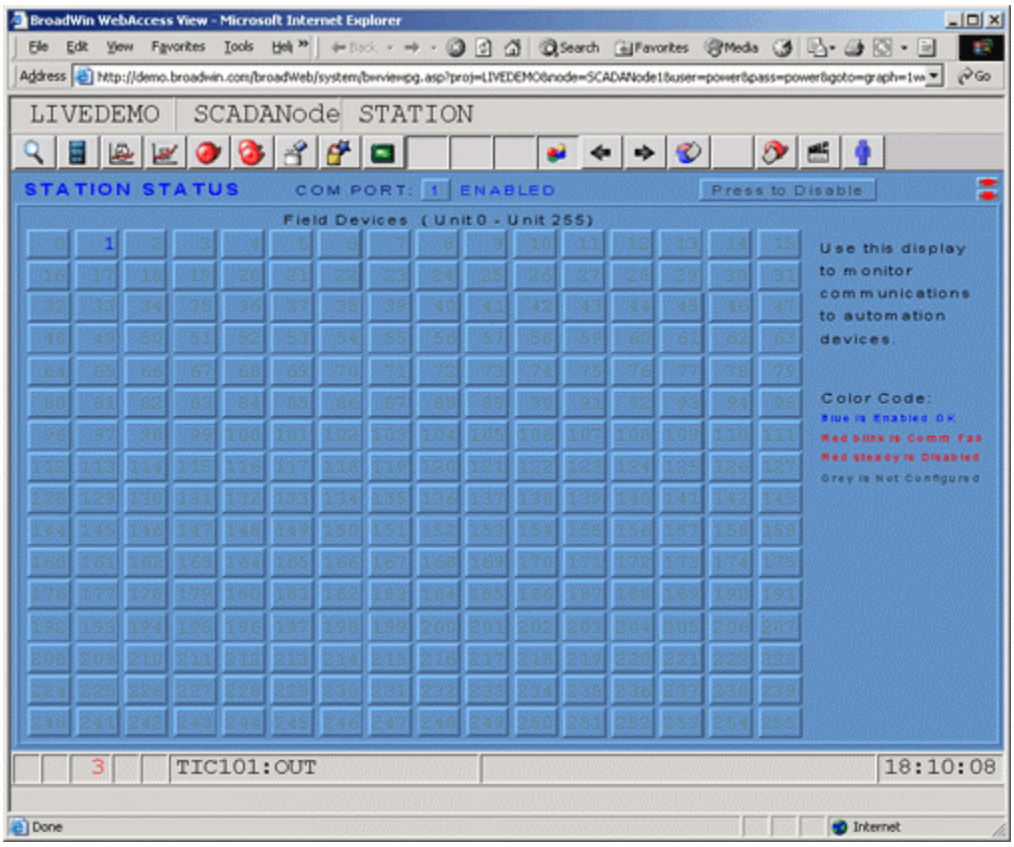


Figure 4-59 Station Status Display

Using the Ramp Keys  , users can change the Comport viewed.

The Numbered pushbuttons (1 through 255) represent the Devices (e.g. Stations) connected to the Comport. These are typically the FIELDBUS COUPLERs, Controllers and automation devices.

A **Grey** number is not configured (no device configured)

A **Blue** Number is OK or RETRYING

A Flashing Red is Communication Failure

A Steady Red is DISABLED (by user).

21. If the Device is Blue, this implies you have the Tags Address wrong (e.g. the Modbus Address, 00001, 00002, 00003, etc.)
22. If communication to the Device failed, it will be flashing RED. This implies you have the IP Address, TCP Port or Device Address wrong.
23. Try to ping the FIELDBUS COUPLER Address from the Windows Command prompt. (For more help, see Eng. Manual, 22.2.11 PING to test TCP/IP communications).
24. Confirm the TCP Port and Modbus Device Address from the FIELDBUS COUPLER configurator or Jumper settings on its Network Card (NIC).