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GE FANUC 90/30 and 90/70 Serial Device Driver Guide (GE9030 & GE9070) for devices capable of using SNP (Series Ninety Protocol)

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1. GE 90/30 and 90/70 SNP Serial Communications

1.1 Summary

The WebAccess SCADA Node provides an interface to the GE FANUC 90/30 and 90/70 series of Programmable using the SNP protocol (Series Ninety Protocol). This manual describes using a Serial RS232 or RS422 connection from the SCADA node to a GE SNP compatible device.

The WebAccess software configuration of both is identical. Both the 90/30 and 90/70 processors can be used concurrently on the same RS-422 network.

1.2 Wiring and Cabling

Typically, there are two methods to connect a SCADA Node to the GE Fanuc Series 90 Processor:

1. Point-to-point. A SCADA Node with serial connection a single GE Fanuc Series 90 Processor.
2. Multi-drop. A SCADA Node with serial connection to a maximum of 256 GE Fanuc processors. Sixteen groups of sixteen GE Fanuc processors can be connected to an RS-422 network through the use of isolated repeaters.

Please refer to the Manufacturer's Documentation for a description of wiring and cabling.

1.2.1 Serial port

1.2.1.1 RS485 port on Power Supply of the 90/30

Power supply of the 90-30 of many models has an RS-485/RS-422 Port. It is usually a 15 pin D-type (F).

Please refer to the Manufacturer's Documentation for a description of Interface capabilities.

1.2.1.2 RS485 port on 90/70 Processors

All CPUs of the 90/70 series have an RS-485/RS-422 compatible interface on the Processor Card. It is usually a 15 pin D-type (F).

1.2.1.3 RS232 / RS-422 converter

The Series 90 processors have an RS485/RS-422 port built-into the front panel. Unless you have an RS-422 internal bus card in your computer, you will have to use an RS-232/RS-422 converter. GE recommends you use their Mini-converter Kit, part No. IC690ACC901. This kit includes an RS-232/RS-422 converter that snaps on the front of the GE Series 90, a serial extension cable, and a 9-pin to 25-pin connector.

If using a RS-422 internal bus card, you must use a buffered card.

Please refer to the Manufacturer's Documentation for a description of Interface capabilities.

1.2.1.4 CMM Module: RS232 or RS-485

Some Series 90 Processors use a CIMM module for SNP communications. These can be either RS-232C or RS-485

Please refer to the Manufacturer's Documentation for a description of CIMM Module Interface capabilities.

1.3 PLC Settings

1.3.1 Password

If any data will be written to the PLC, level 2 access rights to the PLC must have password protection removed. There is no provision for passwords in the WebAccess GE9030 or GE9070 device driver.

1.3.2 Serial Port

On the front of every GE Fanuc Series 90 processor there is an RS-422 port. This port is configured using the "GE Logicmaster 90 Programming Software", or other software, from GE FANUC. The default port configuration is:

- Data Bits 8
- Stop Bits 1
- Parity Odd
- Baud Rate 19,200

Please refer to the Manufacturer's Documentation for a description of PLC settings.

2. WebAccess: Parameters

WebAccess drivers provide object-oriented "parameters" to guide novice users with pre-built templates containing typical addresses and provide a productivity tool for experienced users. Users can select a parameter type to start, and then modify the address to the correct register in order to build a tag.

A list of some of the more commonly used parameters for the GE 90/30 and GE 90/70 are listed below.

Parameter	Data Type	Description	Address format	Conv. Code	Length	Read / Write
AI	Analog	Analog Input	AI0001	Unsigned Integer	16	Read Only ₁
AQ	Analog	Analog Output	AQ0001	Unsigned Integer	16	Read Write ₁
R	Analog	Register	R0001	Unsigned Integer	16	Read Write ₁
G	Discrete	Global Data	G0001	Unsigned Integer	1	Read Write ₁
I	Discrete	Discrete Input	I0001	Unsigned Integer	1	Read Write ₁
M	Discrete	Discrete Internal	M0001	Unsigned Integer	1	Read Write ₁
Q	Discrete	Discrete Output	Q0001	Unsigned Integer	1	Read Write ₁
S	Discrete	S Discrete	S0001	Unsigned Integer	1	Read Write ₁
SA	Discrete	SA Discrete	SA0001	Unsigned Integer	1	Read Write ₁
SB	Discrete	SB Discrete	SB0001	Unsigned Integer	1	Read Write ₁
SC	Discrete	SC Discrete	SC0001	Unsigned Integer	1	Read Write ₁
T	Discrete	Discrete Temporary	T0001	Unsigned Integer	1	Read Write ₁

Note 1 – WebAccess cannot write reliably to a Register if Ladder Logic is also writing to the same register. Ladder Logic executes more quickly than WebAccess and will overwrite any write from WebAccess.

Note 2 – The PLC must be in RUN mode for physical IO to be scanned by the PLC and written to memory of PLC.

3. Configure a GE 9030 or GE 9070 device

The configuration of both the 90/30 and 90/70 processors is identical. Both the 90/30 and 90/70 processors can be used concurrently on the same RS-422 network.

3.1 Summary

1. Start the Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Select **WebAccess Configuration**.
4. Open or Create a **Project**.
5. Select a SCADA Node or use **ADD SCADA node** to create one. (A SCADA node is the PC that will connect to the PLC5 or Interface Module).
6. Configure a serial comport using **ADD Comport** for the SCADA Node.
7. Select **Serial** type Comport.
8. Configure Baud Rate, Data Bit, Stop Bits and Parity to match those in the PLC. All PLCs on this Comport must use the same settings.
Typical settings are:
Data Length = 8 bits
Stop Bit = 1
Parity = Odd
Transfer Rate = 19200
HandShakeRts to match the RS232/RS422 converter's settings and cabling requirements.
HandShakeDtr to match the RS232/RS422 converter's settings and cabling requirements
9. Press Submit.
10. Select the Comport from the list at left.
11. Select **Add Device**.
12. Select **GE9030 or GE9070** as the **Device Type**.
13. Enter a **Unit Number**. This is a virtual number used by WebAccess.
14. Enter the **CPU ID** of the GE Processor.
15. Use **Add Tag** to create tags.
16. Select a **parameter** to match the type of data to be read (AI, AQ, DI, R, I, etc.). The data type of the parameter must match the data type being read (e.g. Analog or Digital/Discrete).
17. Modify the **Address** to match the actual address.
18. Apply a **Tag name**.
19. Optionally, assign Scaling, Engineering Units, Description and other features.

3.2 Serial Comport Properties

The Serial Comport is associated with an RS232C or RS422A port on the SCADA Node PC (usually an RS232C port). This number must match the actual COM1, COM2, etc on the SCADA node.

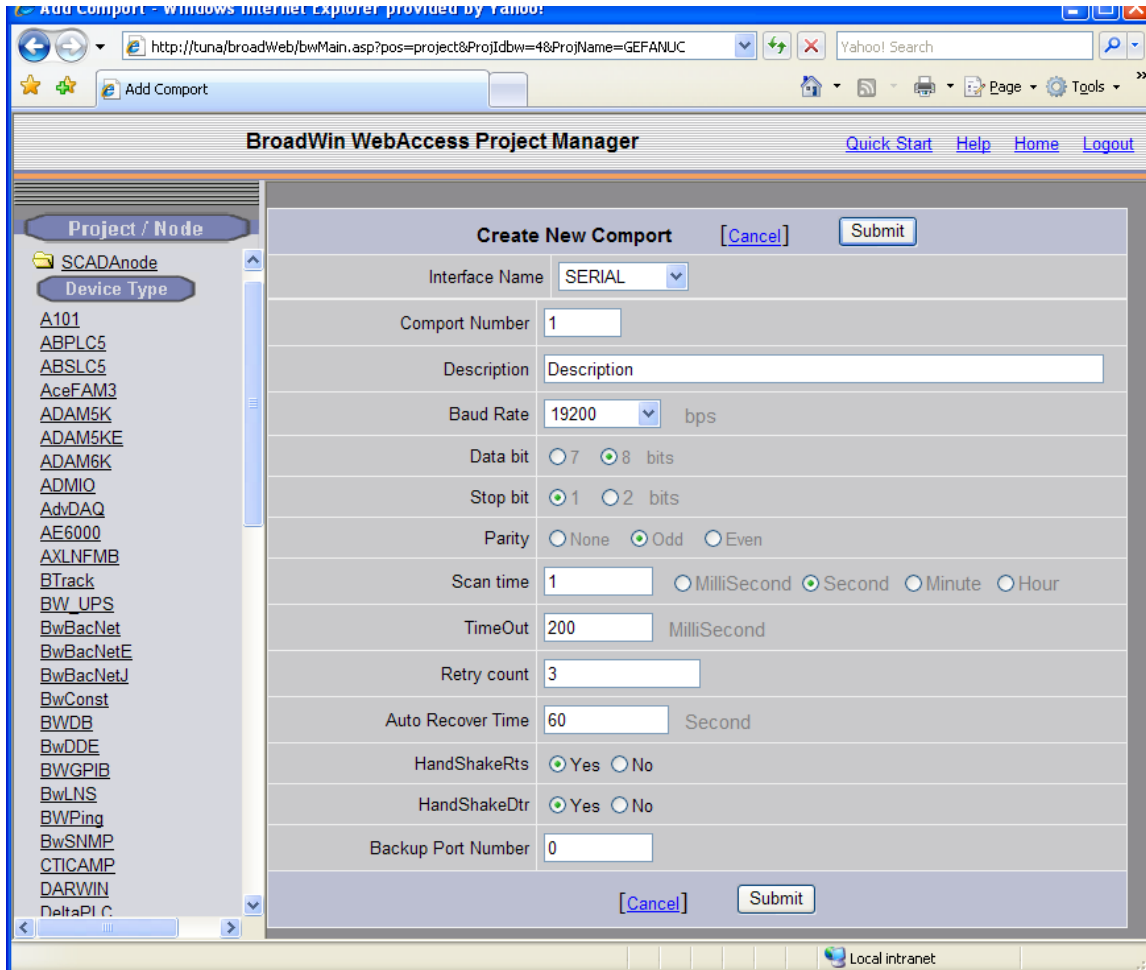


Figure 3.1 Serial Comport properties for GE 90/30 or 90/70, typical settings

3.2.1 Comport Number

The Serial Comport requires the comport number to match that of the physical interface (e.g. COM1, COM2, COM3, etc) on the SCADA Node.

3.2.2 Description

This is an optional field used for user reference.

3.2.3 Baud Rate

For the GE 90 Series, values are from 300 to 38400 baud. Typical setting is 19200. Use the highest baud rate the SCADA Node PC, cabling and PLC or RS232/422 converter can support to obtain the performance.

This must match the baud rate configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual baud rate set in the PLC.*

All PLCs connected to this comport must use the same Baud Rate.

3.2.4 Data Bits

For the GE 90 Series, the values are 7 or 8 Data Bits. The typical setting for a GE 90 Series is **8 bits**.

This must match the number of data bits configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Data Bits set in the PLC.*

All PLCs connected to this comport must use the same number of data bits. A typical value is 8 bits.

3.2.5 Stop Bits

For the GE 90 Series there can be 1 or 2 Stop Bits. The typical setting for a GE 90 Series is **1 Stop bit**.

This must match the number of stop bits configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Stop Bits set in the PLC.*

All PLCs connected to this comport must use the same number of stop bits.

3.2.6 Parity

For the GE 90 Series, the Parity can be None, Odd, Even or Disabled.

The typical setting for a GE 90/30 or GE 90/70 is **Parity = Odd**.

This must match the parity configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Parity set in the PLC.*

All PLCs connected to this comport must use the parity.

3.2.7 Scan Time

This is the time in milliseconds to scan the PLC. This must match the ability of the PLC to respond. **A typical scan rate is 1 per second.**

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

3.2.8 Timeout

With a 1 second scan rate, **a typical Time Out = 200 Milliseconds.**

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 one-fifth the scan rate, longer if the communication device is slow.

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. Slow or poor quality communications require longer timeout. The faster the communications, the shorter the timeout required. Shorter timeouts result in faster reconnects after communication failures.

3.2.9 Retry Count

A typical Retry count = 3.

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.

This is the number of times after the first attempt has failed that communication should be attempted before indicating a failure. (If Retry count is 3, a total of 4 failed requests have occurred before tags are marked bad). Specifically, this is 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.

3.2.10 Auto Recover Time

A typical Auto Recover Time = 60 Seconds.

Auto Recover Time is the time to wait before attempting to re-establish communications with a BAD device or port.

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

If communications to the PLC, RTU or device Fails (i.e. exceeds Timeout) WebAccess will wait the Auto Recover Time before trying to re-establish communications.

3.2.11 Hand Shake RTS

The RTS (Request To Send) signal is raised and lowered on the Serial Communications Port if this value set to Yes. RTS is determined by settings in the field device or the RS232/422 converter. *Refer to your device interface manual to determine the value for this field and the type of cable used.*

3.2.12 Hand Shake DTR

The DTR (Data Terminal Ready) signal raised and lowered on the Serial Communications Port if this value is set to Yes. DTR is determined by settings in the field device, or the RS232/422 converter and the type of cable used. *Please refer to the Manufacturer's Documentation to determine if DTR handshake is set in the PLC.*

3.2.13 Backup Port

The Backup Port has not been tested for the GE 90/30 or GE 90/70.

3.3 Device Properties – GE 9030 and GE 9070 Serial

Add your device to the Serial Port, by selecting the Serial Port you have configured, then select **Add Device**. Or, to modify an existing Device, Select **Device Properties**.

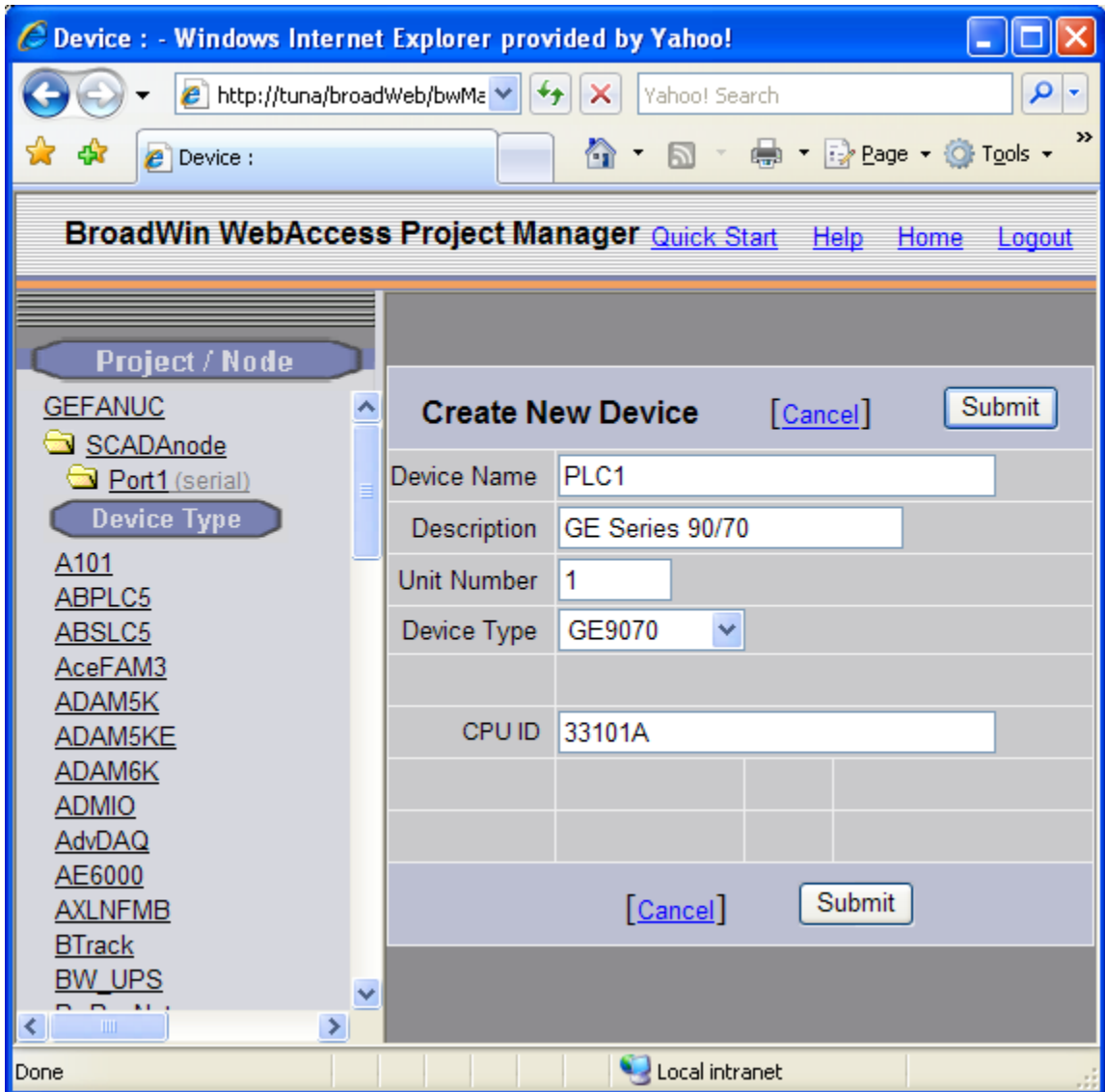


Figure 3-12 GE 9070 Device

3.3.1 Device Name

A Device is a PLC, 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).

3.3.2 Description

User assigned description up to 32 characters

3.3.3 Unit Number

Unit Number is a virtual number used by WebAccess (for the device type). This does not affect the GE9030 or GE9070 device communications.

3.3.4 Device Type

The **Device Type** is **GE9030** or **GE9070**. The devices are identical and either driver can be used for communications to both device types.

3.3.5 CPU ID

The CPU ID must be entered in the exact syntax as that configured using the GE Logicmaster Programming Software or other programming software from GE FANUC. Communications will not be successful without the proper CPU ID. An example of a CPU ID syntax is **33101A**

The CPU ID is assigned to the processor using the Logicmaster 90 programming software, or other software, from GE FANUC.

4. Configure Tags

4.1 Analog Tag

This example is to configure a Tag that reads an Analog Input from the AI range of registers (Address AI0001).

1. Open **Internet Explorer**.
2. Connect to **Project Node**.
3. Start **WebAccess Configuration**.
4. Select your **Project**.
5. Select **SCADA Node**.
6. Select the GE 90 Series **Device**.
7. Select **Add Tag**.

The screenshot shows the 'Create New Tag' form in the BroadWin WebAccess Project Manager. The form is titled 'Create New Tag' and has 'Cancel' and 'Submit' buttons. The form fields are as follows:

Parameter	AI	Point (analog)
Alarm	No Alarm	
Tag Name	Gas_Flow1	
Description	Analog Input Gas Flow measurement	
Scan Type	Constant Scan	
Address	AI0002	
Conversion Code	Unsigned Integer	
Start bit	0	
Length	16	
Signal Reverse	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Scaling Type	No Scale	
Scaling factor 1	0	
Scaling factor 2	0	
Log Data	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Data Log Dead Band	3	%
Write Action Log	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Read Only	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Keep Previous Value	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Initial Value	0	

8. From **Parameter** Pull Down List select the **AI** parameter. 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 Gas Flow measurement, enter **Gas_Flow1**.
11. Edit the **Address** to the actual address. From the example, Enter: **AI0002**
12. Enter a Description. This will help identify this tag to Users and Operators. For example, enter Gas Flow to Unit 1.
13. Optionally enter, Scaling, Span Hi, Span Low, Engineering Units, and Alarms; enable data logging, etc.
14. Press **Submit**.

4.2 Digital Tag

This example is to configure a Tag that writes a Digital Output (Address **Q0001**).

15. Select the GE 90 Series **Device**.
16. Select **Add Tag**.
17. From **Parameter** Pull Down List select **Q**. This will configure an Analog Input. Wait for the Page to update.
18. Optionally, select **ALARM** from the ALARM pull down list. Wait for the Page to update with a PINK highlight around alarm (an additional Alarm Fields at bottom of page).

The screenshot displays the 'Add Tag' configuration window in Internet Explorer. The browser title is 'Add Tag - Windows Internet Explorer provided by Yahoo!'. The address bar shows the URL: `http://tuna/broadWeb/bwMain.asp?pos=project&ProjIdbw=4&ProjName`. The page title is 'BroadWin WebAccess Project Manager'. The main content area is titled 'Create New Tag' and contains the following fields:

Parameter	Q	Point (discrete)
Alarm	No Alarm	
Tag Name	DO1	
Description	Discrete Output 1	
Scan Type	Constant Scan	
Address	Q0001	
Conversion Code	Unsigned Integer	
Start bit	0	
Length	1	
Signal Reverse	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Log Data	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Data Log Dead Band	3	%
Write Action Log	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Read Only	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Keep Previous Value	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Initial Value	0	
Security area	0	
Security level	0	
State 0	OFF	
State 1	ON	

The left sidebar shows a tree view with 'Project / Node' and 'Device Type' sections. Under 'Device Type', various device models are listed, including A101, ABPLC5, ABSLC5, AceFAM3, ADAM5K, ADAM5KE, ADAM6K, ADMIO, AdvDAQ, AE6000, AXLNFBM, BTrack, BW_UPS, BwBacNet, BwBacNetE, BwBacNetJ, BwConst, BWDE, BwDDE, BWGPIB, BwLNS, BWPing, BwSNMP, CTICAMP, and DARWIN.

19. Enter a **Tagname** users can use to identify this Discrete Output measurement. For example, enter **DO1**.

20. Edit the **Address** to the actual address. From the example, Enter:
Q0001
21. Enter a Description. This will help identify this tag to Users and Operators. For example, enter Discrete Output 1.
22. Optionally enter, State 0 Description, State 1 Description, Alarms, enable data logging, etc. For example, State 0 = OFF and State 1 = ON.
23. Press **Submit**.

Congratulations! You have just configured a Measurement and Output Tags to GE 90 Series device.