pbsSoftLogic Modbus Master Driver Configuration

Feb 2026

Ver. 1.1

Kamjoo Bayat

Kb@pbscontrol.com

1 – Introduction

This manual provides detailed instructions for configuring the pbsSoftLogic Modbus Master driver. The driver supports both Modbus RTU and Modbus TCP communication protocols, and this document outlines all configuration parameters, operational behaviors, and integration guidelines for each protocol layer.

2 - Modbus Master Driver configuration

You can add up to **30 Modbus Master drivers** to a single pbsSoftLogic project. To create a new Modbus Master driver, open the project **Options** page, right-click within the **Driver List**, and select **Add ModbusMaster Driver**. (See Figure 1.)

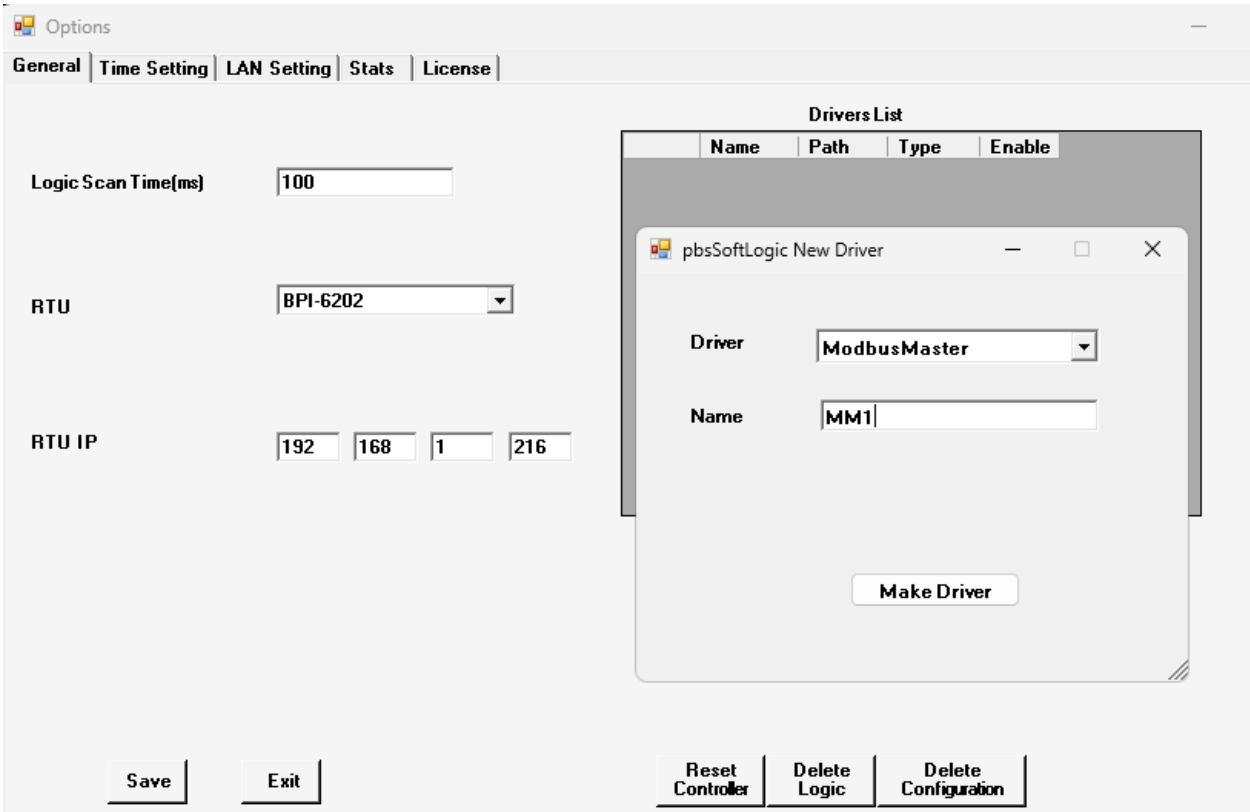


Figure 1

Each Modbus Master driver must be assigned a **unique name**. After entering the desired name, click the **Make Driver** button. pbsSoftLogic will automatically generate a new Modbus Master driver instance using default parameters, predefined function blocks, and initial tag structures.

To modify an existing Modbus Master driver, double-click the driver in the list, or right-click it and select **Edit**. This opens the **Modbus Master Configuration** page, as shown in Figure 2.

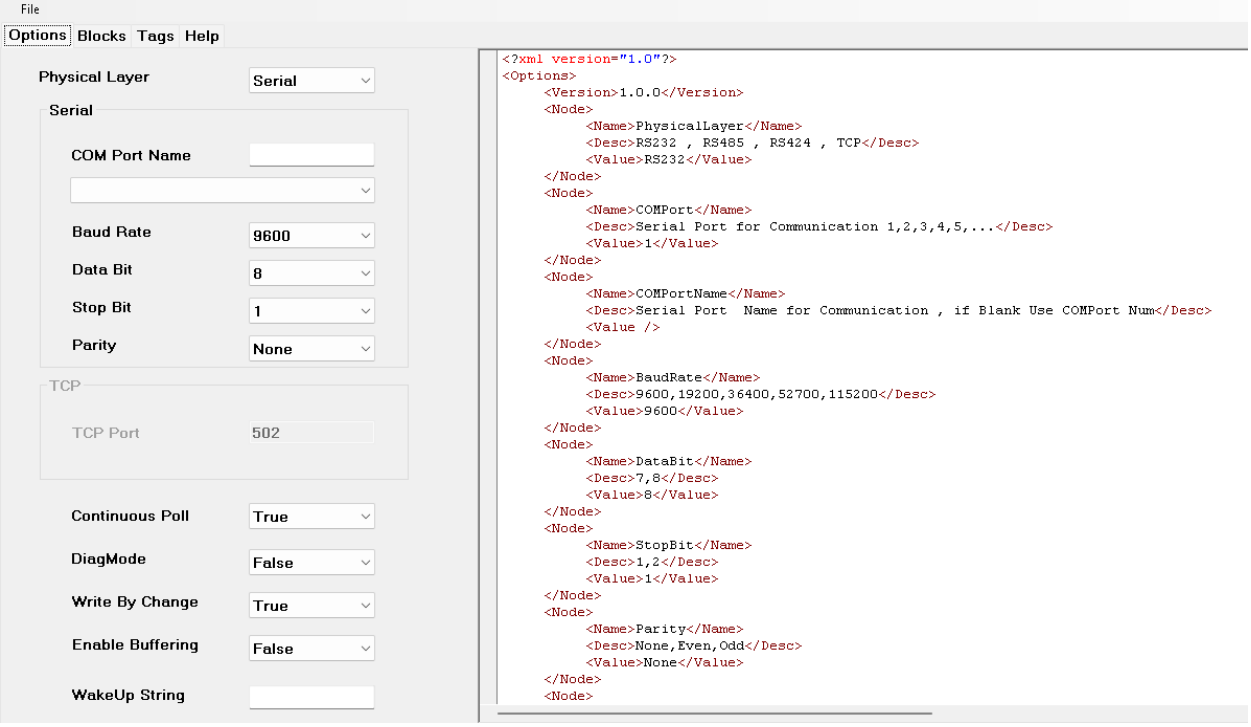


Figure 2

Physical Layer: Select **Serial** to use the **Modbus RTU** protocol. Select **TCP** to use the **Modbus TCP** protocol.

COM Port Name: Specify the full serial port name used by the controller. The dropdown list provides predefined serial port names for different supported controllers. (See Figure 3.)

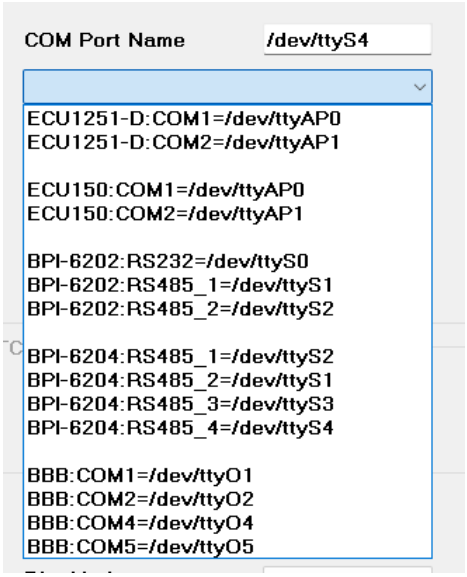


Figure 3

Serial Port Settings: When using **Modbus RTU**, you can configure all serial communication parameters through the following fields:

- **Baud Rate**
- **Data Bits**
- **Stop Bits**
- **Parity**

These options allow you to match the communication settings of the connected Modbus slave devices.

TCP Port: When the **TCP** physical layer is selected, this field specifies the Modbus TCP port number. The default port is **502**, which is the standard Modbus TCP port.

Driver Behavior Options

Continuous Poll: By default, the Modbus Master driver continuously polls data from the slave devices. However, polling can also be controlled directly from the logic program. (Details will be explained in the *System Tags* section.)

Diag Mode: When set to **True**, diagnostic mode enables viewing raw Modbus frames. This is available when running the pbsSoftLogic Runtime Kernel manually in RTU mode.

Write By Change: Default value: **False**

- When **False**, output blocks write to the slave device **only when the corresponding output tag value changes** inside the logic.
- When **True**, all output blocks are written to the slave device **every cycle**, similar to how input blocks are read. This option is useful for devices that require periodic writes regardless of value changes.

Enable Buffering: Default value: **False** This feature allows internal tag values to be passed between protocols inside the pbsSoftLogic Runtime Kernel **without additional programming**. For example, Modbus data can be read and automatically mapped to MQTT tags internally. Refer to the *pbsSoftLogic Tag Buffering Manual* for more details.

Wake-Up String: Some devices require a wake-up command before communication begins. If needed, enter the wake-up string here so the master sends it when initializing communication.

Modbus Block Definition

The Modbus protocol is a **block-based** communication protocol. This means the master can read or write **only one data type per frame**, and each frame operates on a **contiguous block of registers or coils**. Therefore, all Modbus data exchanges in pbsSoftLogic must be defined as **Blocks** within the **Block** section.

Each block includes the following parameters:

- **Name** – A unique identifier for the block.
- **Type** – The Modbus function type (e.g., coils, discrete inputs, holding registers, input registers).
- **Slave ID** – ID of Device
- **IP -** Slave IP for Modbus TCP setup
- **Start Address** – The first Modbus address to read or write.
- **Count** – The number of consecutive data points in the block.
- **Wait (ms)** – Delay time (in milliseconds) before executing the next block.
- **Enable** – Enables or disables the block during runtime.

As an example, the following Modbus blocks have been defined for a **Socomec DIRIS A30 Power Meter**, based on the register map provided in the device documentation:

```
<Block  Name="MainMeter1" Type="SLOS" SlaveID="1" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
<Block  Name="MainMeter2" Type="SLOS" SlaveID="1" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
<Block Name="Diag_1" Type="SYS" SlaveID="1" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />
```

Dec address	Hex address	Words count	Description	Unit	Data type
768	0x0300	2	Phase 1 Current	A / 1000	U32
770	0x0302	2	Phase 2 Current	A / 1000	U32
772	0x0304	2	Phase 3 Current	A / 1000	U32
774	0x0306	2	Neutral Current	A / 1000	U32
776	0x0308	2	Phase to Phase Voltage: U12	V / 100	U32
778	0x030A	2	Phase to Phase Voltage: U23	V / 100	U32
780	0x030C	2	Phase to Phase Voltage: U31	V / 100	U32
782	0x030E	2	Phase to Neutral voltage phase 1	V / 100	U32
784	0x0310	2	Phase to Neutral voltage phase 2	V / 100	U32
786	0x0312	2	Phase to Neutral voltage phase 3	V / 100	U32
788	0x0314	2	Frequency	Hz / 100	U32
790	0x0316	2	? active power +/- : P	W / 0.1	S32
792	0x0318	2	? reactive power +/- : Q	var / 0.1	S32
794	0x031A	2	? apparent power : S	VA / 0.1	U32
796	0x031C	2	? power factor : -: leadiing et + : lagging : PF	- / 1000	S32

858	0x035A	2	Reactive Energy +	varh / 0.001	U32
860	0x035C	2	Apparent Energy	VAh / 0.001	U32
862	0x035E	2	Active Energy -	Wh / 0.001	U32
864	0x0360	2	Reactive Energy -	varh / 0.001	U32
866	0x0362	2	Input pulse meter 1	-	U32

Each block must be assigned a **unique name**. In pbsSoftLogic, the combination of **Block Name + Tag Name** is used inside the logic to reference individual Modbus registers. This ensures that every register within the project can be uniquely identified and accessed during runtime.The pbsSoftLogic Modbus Master driver supports the following block types. Each type corresponds to a specific Modbus function code and data interpretation method:

Type	Description	Data Handling	Function Code Sent
DI	Digital Input	Read *Input Status*	FC **2**
AI	Analog Input	Read *Input Registers*	FC **4**
LI	Long Input	Read 2 registers as **Long**	FC **4**
FI	Float Input	Read 2 registers as **Float**	FC **4**
SLI	Swap Long Input	Read 2 registers as **Long**, swapped	FC **4**
SFI	Swap Float Input	Read 2 registers as **Float**, swapped	FC **4**
DO	Digital Output	Write *Coil*	FC **5** or **15**
AO	Analog Output	Write *Holding Register*	FC **6** or **16**
LO	Long Output	Write 2 registers as **Long**	FC **16**
FO	Float Output	Write 2 registers as **Float**	FC **16**
SLO	Swap Long Output	Write 2 registers as **Long**, swapped	FC **16**
SFO	Swap Float Output	Write 2 registers as **Float**, swapped	FC **16**
DOS	Digital Output Status	Read *Coil Status*	FC **1**
AOS	Analog Output Status	Read *Holding Registers*	FC **3**
LOS	Long Output Status	Read 2 registers as **Long**	FC **3**
FOS	Float Output Status	Read 2 registers as **Float**	FC **3**
SLOS	Swap Long Output Status	Read 2 registers as **Long**, swapped	FC **3**
SFOS	Swap Float Output Status	Read 2 registers as **Float**, swapped	FC **3**
SYS	System Block	Provides slave-device status information to the logic	—

In the Socomec example, the block type **SLOS** (Swap Long Output Status) is used. This means that for each value, the driver reads **two consecutive Holding Registers**, swaps their order, and then converts the result into a **32-bit Long** value.

Count: The **Count** parameter specifies how many logical values are read or written. In this example, the block defines **15 values**, but because each value requires **2 registers**, the driver actually reads **30 Holding Registers** from the slave device.

Wait (ms): The **Wait** parameter defines how long the driver waits after sending a request before processing the next block. In this example, the wait time is **500 ms**.

Start Address: The first block begins reading at Modbus address **768**. In pbsSoftLogic, **all Modbus addresses are entered in decimal format**. For this block, the driver reads **30 Holding Registers** starting from address 768 and interprets them as **15 swapped Long values**.

Note that some devices shift their documented register addresses by one (0-based vs. 1-based addressing). In pbsSoftLogic, if the actual start address is **0**, you must explicitly set the block's **Start Address** to **0**.

The **SlaveID** field specifies the Modbus slave address of the device. For example, if you have **eight Socomec meters** connected on the same RS-485 network, and each device is assigned a unique Modbus ID such as **1, 2, 3, 4, .. 8**, then you must create **eight separate blocks**, each with the appropriate **SlaveID** value.

Each block uses the same structure (Type, Start Address, Count, etc.), but the **SlaveID** differentiates which physical device the master communicates with.

The Modbus Master driver processes blocks **in the exact order** they are listed in the **Block** section. In the example configuration, the driver reads the block **"MainMeter1"**, then **"MainMeter2"**, and finally **"PromouldBuilding1"**, following the defined sequence.

SYS blocks are not part of the read/write cycle. They are used exclusively for **monitoring the communication status** of the slave device and do not participate in the normal polling sequence.

Based on the block definitions in this example, the **total scan time** for completing one full cycle of all blocks is approximately **8 seconds**.

The **Wait** parameter often requires adjustment based on the performance and response characteristics of each slave device. This value determines how long the driver waits after sending a request before proceeding to the next block.

If the Wait time is set **too low**—for example, **50 ms**—some slave devices may not have enough time to respond, resulting in communication errors or incomplete data.

Because different devices have different processing speeds, the optimal Wait value must typically be determined through **trial and error**. Increase or decrease the value gradually until stable and reliable communication is achieved.

Options Blocks Tags Help

```
<?xml version="1.0"?>
<OPCSrvTags>
     <Version>1.0.0</Version>
    <Block  Name="MainMeter1" Type="SLOS" SlaveID="1" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="MainMeter2" Type="SLOS" SlaveID="1" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block  Name="Diag_1"     Type="SYS" SlaveID="1" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />

    <Block  Name="PromouldBuilding1" Type="SLOS" SlaveID="2" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="PromouldBuilding2" Type="SLOS" SlaveID="2" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block  Name="Diag_2"            Type="SYS" SlaveID="2" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />

    <Block  Name="HeronFitoutBuilding1" Type="SLOS" SlaveID="3" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="HeronFitoutBuilding2" Type="SLOS" SlaveID="3" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block  Name="Diag_3"               Type="SYS" SlaveID="3" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />

    <Block  Name="SwitchRoomPower1" Type="SLOS" SlaveID="5" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="SwitchRoomPower2" Type="SLOS" SlaveID="5" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block  Name="Diag_5"           Type="SYS" SlaveID="5" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />

    <Block  Name="Generator1" Type="SLOS" SlaveID="4" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="Generator2" Type="SLOS" SlaveID="4" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block  Name="Diag_4"     Type="SYS" SlaveID="4" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />



    <Block  Name="Inverter1" Type="SLOS" SlaveID="7" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="Inverter2" Type="SLOS" SlaveID="7" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block Name="Diag_6" Type="SYS" SlaveID="7" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />


    <Block  Name="Battery1" Type="SLOS" SlaveID="6" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="Battery2" Type="SLOS" SlaveID="6" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block Name="Diag_7" Type="SYS" SlaveID="6" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />


    <Block  Name="EV1" Type="SLOS" SlaveID="8" IP=""   StartAdd="768" Count="15" Wait="500" Enable="True" />
    <Block  Name="EV2" Type="SLOS" SlaveID="8" IP=""   StartAdd="856" Count="5" Wait="500" Enable="True" />
    <Block Name="Diag_8" Type="SYS" SlaveID="8" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />

</OPCSrvTags>
```

In the **Tags** section, you must define the individual tags associated with each Modbus block. Consider the following example:

Each tag contains the following fields:

- **BlockName** – The name of the block to which the tag belongs. All tags within the same block share the same BlockName.
- **Address** – The Modbus address of the tag. For the **first tag** in a block, this address must match the **Start Address** of the block. In the example, the first tag uses address **768**, and because the block type is SLOS, the driver uses **Holding Registers 768 and 769** to calculate the tag value.

For the **second tag**, the address depends on the **Block Type**. Since the block type in this example is **SLOS**, each value occupies **two registers**. Therefore, the second tag begins at address **770**, and the driver uses **Holding Registers 770 and 771** to compute the second tag value.

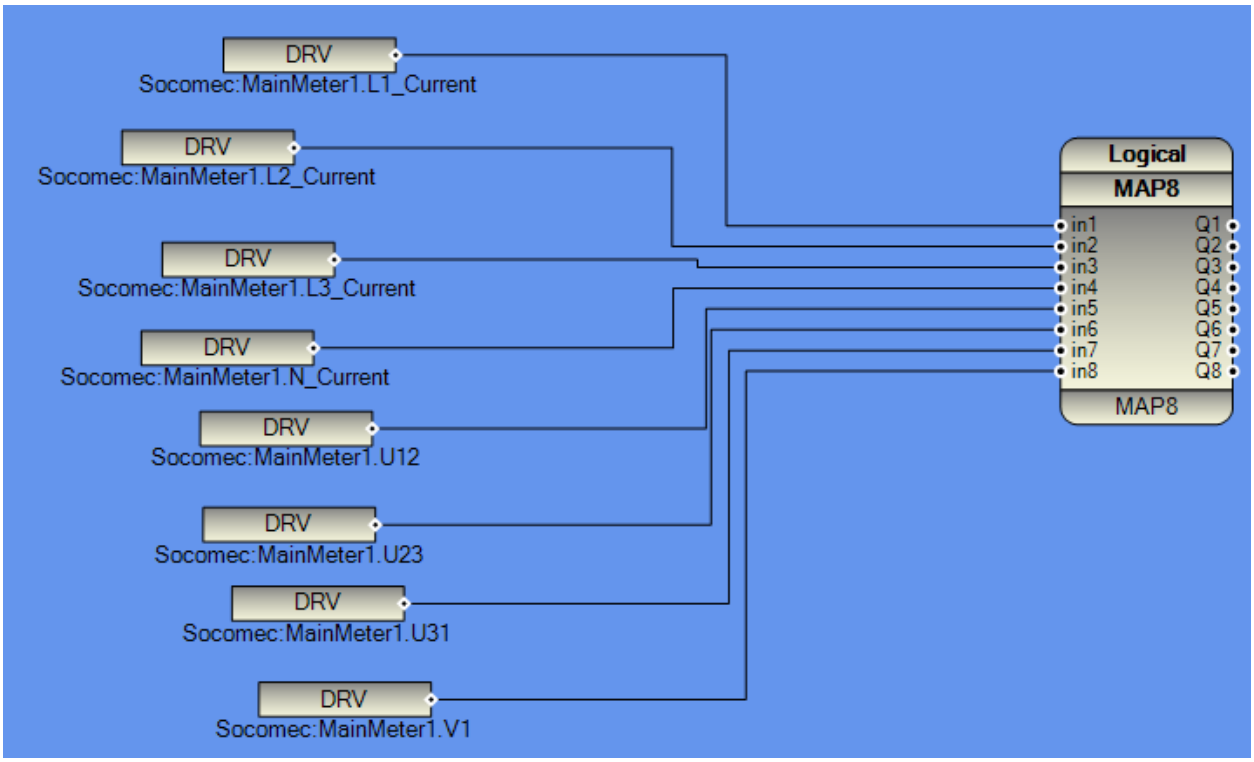
```
<Tag BlockName="MainMeter1" Address="768" Name="L1_Current" ScaleEnable="1" In_Min="0" In_Max="1000" Out_Min="0" Out_Max="1" SCADAAddress="1" />
<Tag BlockName="MainMeter1" Address="770" Name="L2_Current" ScaleEnable="1" In_Min="0" In_Max="1000" Out_Min="0" Out_Max="1" SCADAAddress="2" />
<Tag BlockName="MainMeter1" Address="772" Name="L3_Current" ScaleEnable="1" In_Min="0" In_Max="1000" Out_Min="0" Out_Max="1" SCADAAddress="3" />
<Tag BlockName="MainMeter1" Address="774" Name="N_Current" ScaleEnable="1" In_Min="0" In_Max="1000" Out_Min="0" Out_Max="1" SCADAAddress="4" />
<Tag BlockName="MainMeter1" Address="776" Name="U12" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="5" />
<Tag BlockName="MainMeter1" Address="778" Name="U23" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="6" />
<Tag BlockName="MainMeter1" Address="780" Name="U31" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="7" />
<Tag BlockName="MainMeter1" Address="782" Name="V1" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="8" />
<Tag BlockName="MainMeter1" Address="784" Name="V2" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="9" />
<Tag BlockName="MainMeter1" Address="786" Name="V3" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="10" />
<Tag BlockName="MainMeter1" Address="788" Name="Freq" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="11" />
<Tag BlockName="MainMeter1" Address="790" Name="Total_Active_Power" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="12" />
<Tag BlockName="MainMeter1" Address="792" Name="Total_Reactive_Power" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="13" />
<Tag BlockName="MainMeter1" Address="794" Name="Total_Real_Power" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="14" />
<Tag BlockName="MainMeter1" Address="796" Name="Total_Power_Factor" ScaleEnable="1" In_Min="0" In_Max="1000" Out_Min="0" Out_Max="1" SCADAAddress="15" />
<Tag BlockName="MainMeter2" Address="856" Name="Active_Energy_Pos" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="16" />
<Tag BlockName="MainMeter2" Address="858" Name="Reactive_Energy_Pos" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="17" />
<Tag BlockName="MainMeter2" Address="860" Name="Apparent_Energy" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="18" />
<Tag BlockName="MainMeter2" Address="862" Name="Active_Energy_Neg" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="19" />
<Tag BlockName="MainMeter2" Address="864" Name="Reactive_Energy_Neg" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="20" />
```

The **Name** field specifies the Tag Name. Inside pbsSoftLogic, each tag is referenced in the logic using the format:

DriverName : BlockName + TagName

This ensures that every Modbus register is uniquely identifiable within the project.

In the following example, you can see how Modbus tag names—constructed from the driver name, block name, and tag name—are used directly inside the logic.



Scaling (ScaleEnable, In/Out Min/Max)

The **ScaleEnable** option allows you to apply linear scaling to a Modbus tag. Scaling is useful when the raw Modbus value is in a different unit or magnitude than what you want to use inside the logic.

Each tag includes four scaling parameters:

- **In_Min** – Minimum value of the raw Modbus range
- **In_Max** – Maximum value of the raw Modbus range
- **Out_Min** – Minimum value of the scaled output
- **Out_Max** – Maximum value of the scaled output

pbsSoftLogic applies a linear transformation:

$$\text{ScaledValue} = \text{Out\_Min} + \frac{(\text{RawValue} - \text{In\_Min}) \times (\text{Out\_Max} - \text{Out\_Min})}{(\text{In\_Max} - \text{In\_Min})}$$

Example 1: Converting mA to A

In the example, the current values are provided in **milliampere (mA)**, and you want to convert them to **ampere (A)**. Since $1\ A = 1000\ mA$, you need to divide the raw value by 1000.

Set:

- **In_Min = 0**
- **In_Max = 1000**
- **Out_Min = 0**
- **Out_Max = 1**

This means:

- Raw value **0 → 0 A**
- Raw value **1000 → 1 A**
- Any other value is scaled proportionally (raw ÷ 1000)

The value used inside the logic will be the **scaled** value.

Example 2: Multiplying a Modbus Value by 100

If you want to multiply the raw Modbus value by **100**, configure scaling as:

- **In_Min = 0**

- **In_Max = 1**
- **Out_Min = 0**
- **Out_Max = 100**

This means:

- Raw value **1 → 100**
- Raw value **0.5 → 50**
- Raw value **0.2 → 20**

This technique is useful when the device sends normalized values (0–1) and you want to convert them to engineering units.

The **SCADAAddress** field is used for **internal Driver Tag Buffering** within pbsSoftLogic. This mechanism allows tags to be exchanged internally between different protocols or modules without additional programming. (Full details are provided in the *pbsSoftLogic Tag Buffering Manual*.)

When **SCADAAddress = –1**, buffering for that tag is **disabled**.

Diagnostic Monitoring of Slave Device Communication

When you define a **SYS block** and create its associated tags, you can monitor the communication status of each slave device directly inside the logic. In the following example, a block named **Diag_1** is created for the slave device with **SlaveID = 1**. For SYS blocks, only **Block Name** and **SlaveID (or IP for TCP devices)** need to be configured; all other parameters are identical for every device.

The SYS block provides the following diagnostic tags:

Online

Indicates whether the slave device is currently online.

- **1** → Device is online
- **0** → Device is offline

SendNum

Shows the total number of Modbus frames **sent** to the slave device. This value increments continuously and cycles between **1 and 32,000**.

RecNum

Shows the number of **valid Modbus frames received** from the slave device. This counter also increments as long as communication is healthy.

Poll

This tag is used when **Continuous Poll** is disabled. Some devices—especially battery-powered meters such as gas meters—should not be polled continuously, because constant communication will drain the battery quickly.

To handle such devices:

1. In the driver options, set **Continuous Poll = False**.
2. In the logic, set the **Poll** tag to **1** whenever the master needs to read data.
3. After the reading period is finished, set **Poll** back to **0**.

Example: If an RTU must read a gas meter **once every hour for 2 minutes**, the logic will:

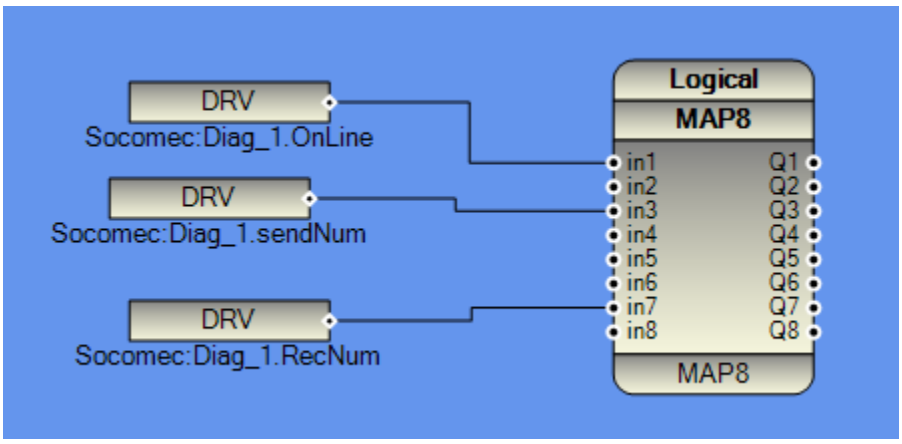
- Set **Poll = 1** for 2 minutes
- Then set **Poll = 0** for the remaining 58 minutes

This approach preserves battery life while still allowing periodic data collection.

```
<Block  Name="Diag_1"     Type="SYS" SlaveID="1" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />


<Tag BlockName="Diag_1" Address="100" Name="OnLine" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag_1" Address="101" Name="sendNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag_1" Address="102" Name="RecNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag_1" Address="103" Name="Poll" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```

In following figure, you can see how we use system tags in the logic.



In this example, we want to configure a project where multiple ASPAR I/O modules and one Paladin transducer are connected to **COM1** of an **ECU1251D RTU**, and several ComAp generator controllers are connected via **Modbus TCP**.

RS-485 (COM1) Devices

A total of **9 ASPAR modules** and **1 Paladin transducer** are connected to the RS-485 network:

Device Type	Slave IDs	Description
ASPAR DI Modules	1, 2	Each module provides **16 Digital Inputs**
ASPAR DO Modules	3, 4, 5	Each module provides **16 Digital Outputs**
ASPAR AI Module	6	Provides **8 Analog Inputs**
ASPAR AO Modules	7, 8, 9	Each module provides **8 Analog Outputs**
Paladin Transducer	11	Power/energy measurement transducer

Each module has a **unique Modbus Slave ID**, and each one requires its own block definition in pbsSoftLogic.

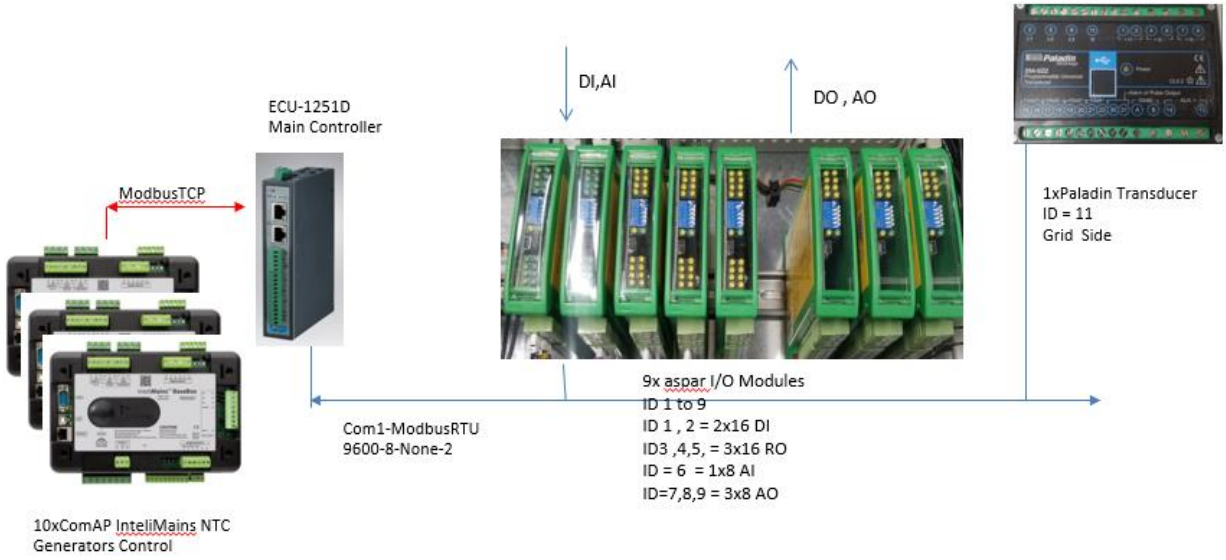
Modbus TCP Devices

In addition to the RS-485 devices, the RTU communicates with:

- **10 ComAp Generator Controller modules**
- All connected via **Modbus TCP**

Each ComAp controller will be configured as a separate TCP slave, typically using:

- **IP Address** of the controller
- **Modbus TCP Port** (default 502)
- One or more blocks depending on the required data set



The following figures illustrate the **addressing structure** of the ASPAR I/O modules.

Aspar 16 DI Modbus Address

Modbus Address	Dec Address	Hex Address	Register name	Access	Description
10801	800	0x320	Input 1	Read	Input 1 state
10802	801	0x321	Input 2	Read	Input 2 state
10803	802	0x322	Input 3	Read	Input 3 state
10804	803	0x323	Input 4	Read	Input 4 state
10805	804	0x324	Input 5	Read	Input 5 state
10806	805	0x325	Input 6	Read	Input 6 state
10807	806	0x326	Input 7	Read	Input 7 state
10808	807	0x327	Input 8	Read	Input 8 state
10809	808	0x328	Input 9	Read	Input 9 state
10810	809	0x329	Input 10	Read	Input 10 state
10811	810	0x32A	Input 11	Read	Input 11 state
10812	811	0x32B	Input 12	Read	Input 12 state
10813	812	0x32C	Input 13	Read	Input 13 state
10814	813	0x32D	Input 14	Read	Input 14 state
10815	814	0x32E	Input 15	Read	Input 15 state
10816	815	0x32F	Input 16	Read	Input 16 state

Aspar 16 RO Modbus Address

817	816	0x330	Output 1	Read & Write	Output 1 state
818	817	0x331	Output 2	Read & Write	Output 2 state
819	818	0x332	Output 3	Read & Write	Output 3 state
820	819	0x333	Output 4	Read & Write	Output 4 state
821	820	0x334	Output 5	Read & Write	Output 5 state
822	821	0x335	Output 6	Read & Write	Output 6 state
823	822	0x336	Output 7	Read & Write	Output 7 state
824	823	0x337	Output 8	Read & Write	Output 8 state
825	824	0x338	Output 9	Read & Write	Output 9 state
826	825	0x339	Output 10	Read & Write	Output 10 state
827	826	0x33A	Output 11	Read & Write	Output 11 state
828	827	0x33B	Output 12	Read & Write	Output 12 state
829	828	0x33C	Output 13	Read & Write	Output 13 state
830	829	0x33D	Output 14	Read & Write	Output 14 state
831	830	0x33E	Output 15	Read & Write	Output 15 state
832	831	0x33F	Output 16	Read & Write	Output 16 state

Aspar 8 AI Modbus address

30053	52	0x34	Analog 1	Read	Value of analog input in mV for voltage inputs in µA for current inputs
30054	53	0x35	Analog 2	Read	
30055	54	0x36	Analog 3	Read	
30056	55	0x37	Analog 4	Read	
30057	56	0x38	Analog 5	Read	
30058	57	0x39	Analog 6	Read	
30059	58	0x3A	Analog 7	Read	
30060	59	0x3B	Analog 8	Read	

Aspar 8AO Modbus Address

40053	52	0x34	Analog output 1	Read & Write	Value of analog output: in mV for voltage output (max 10240) in µA for current output 0 - 20mA (max 20480) in ‰ for current output 4-20mA (max 1000)
40054	53	0x35	Analog output 2	Read & Write	
40055	54	0x36	Analog output 3	Read & Write	
40056	55	0x37	Analog output 4	Read & Write	
40057	56	0x38	Analog output 5	Read & Write	
40058	57	0x39	Analog output 6	Read & Write	
40059	58	0x3A	Analog output 7	Read & Write	
40060	59	0x3B	Analog output 8	Read & Write	

In following figure, you can see Block Configuration:

```
<?xml version="1.0"?>
<OPCSrvTags>
     <Version>1.0.0</Version>
     <Block Name="DI1" Type="DI" SlaveID="1" IP="" StartAdd="800" Count="16" Wait="100" Enable="True" />
     <Block Name="Diag1" Type="SYS" SlaveID="1" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="DI2" Type="DI" SlaveID="2" IP="" StartAdd="800" Count="16" Wait="100" Enable="True" />
    <Block Name="Diag2" Type="SYS" SlaveID="2" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="DO3" Type="DO" SlaveID="3" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="DO3S" Type="DOS" SlaveID="3" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="Diag3" Type="SYS" SlaveID="3" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="DO4" Type="DO" SlaveID="4" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="DO4S" Type="DOS" SlaveID="4" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="Diag4" Type="SYS" SlaveID="4" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="DO5" Type="DO" SlaveID="5" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="DO5S" Type="DOS" SlaveID="5" IP="" StartAdd="816" Count="16" Wait="100" Enable="True" />
    <Block Name="Diag5" Type="SYS" SlaveID="5" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="AI6" Type="AI" SlaveID="6" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="Diag6" Type="SYS" SlaveID="6" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="AO7" Type="AO" SlaveID="7" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="AO7S" Type="AOS" SlaveID="7" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="Diag7" Type="SYS" SlaveID="7" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="AO8" Type="AO" SlaveID="8" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="AO8S" Type="AOS" SlaveID="8" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="Diag8" Type="SYS" SlaveID="8" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

     <Block Name="AO9" Type="AO" SlaveID="9" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="AO9S" Type="AOS" SlaveID="9" IP="" StartAdd="52"  Count="8"  Wait="100" Enable="True" />
    <Block Name="Diag9" Type="SYS" SlaveID="9" IP="" StartAdd="100" Count="8" Wait="100" Enable="True" />

    <Block Name="Paladin11_1" Type="SLOS" SlaveID="11" IP="" StartAdd="256" Count="16" Wait="500" Enable="True" />
    <Block Name="Paladin11_2" Type="SLOS" SlaveID="11" IP="" StartAdd="288" Count="16" Wait="500" Enable="True" />
    <Block Name="Paladin11_3" Type="SLOS" SlaveID="11" IP="" StartAdd="320" Count="17" Wait="500" Enable="True" />
    <Block Name="Paladin11_4" Type="SLOS" SlaveID="11" IP="" StartAdd="404" Count="4" Wait="500" Enable="True" />
    <Block Name="Diag11" Type="SYS" SlaveID="11" IP="" StartAdd="100" Count="8" Wait="500" Enable="True" />


</OPCSrvTags>
```

The following figures show the **tag definitions** for the first Digital Input (DI) block. Because this example is taken from a **real project**, the tag names are chosen based on the **actual signal list** wired to the ASPAR I/O module. This ensures that each tag name directly corresponds to a real field signal, making the logic easier to read, maintain, and troubleshoot.

Each tag in this block represents one digital input channel from the ASPAR module, and the naming convention reflects the real-world function of each signal (e.g., alarms, status inputs, interlocks, switches, etc.).

```
<Tag BlockName="DI1" Address="800" Name="DI0" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="801" Name="DI1" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="802" Name="Emergency_Action_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="803" Name="Emergency_Action_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="804" Name="Voltage_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="805" Name="Voltage_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="806" Name="PF_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="807" Name="PF_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="808" Name="MVar_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="809" Name="MVar_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="810" Name="DI10" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="811" Name="DI11" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="812" Name="Emergency_Soft_Stop_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="813" Name="Emergency_Soft_Stop_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="814" Name="Low_Frequency_response_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DI1" Address="815" Name="DITag15" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="100" Name="OnLine" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="101" Name="sendNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="102" Name="RecNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="103" Name="Poll" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```

Tag Definition for a DO Block:

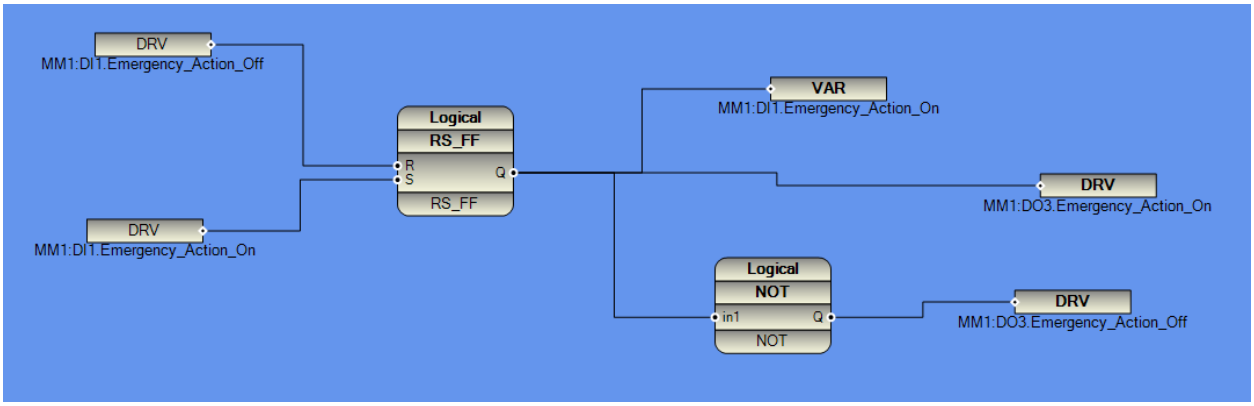
```
<Tag BlockName="DO3" Address="816" Name="VirtualBreakerOn" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="817" Name="VirtualBreakerOff" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="818" Name="Emergency_Action_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="819" Name="Emergency_Action_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="820" Name="Voltage_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="821" Name="Voltage_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="822" Name="PF_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="823" Name="PF_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="824" Name="MVAR_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="825" Name="MVAR_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="826" Name="DO10" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="827" Name="DO11" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="828" Name="Grid_Control_Selected" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="829" Name="Local_Control_Selected" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="830" Name="Low_Freq_Response_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3" Address="831" Name="Low_Freq_Response_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```

```
<Tag BlockName="DO3S" Address="816" Name="VirtualBreakerOn" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="817" Name="VirtualBreakerOff" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="818" Name="Emergency_Action_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="819" Name="Emergency_Action_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="820" Name="Voltage_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="821" Name="Voltage_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="822" Name="PF_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="823" Name="PF_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="824" Name="MVAR_Control_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="825" Name="MVAR_Control_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="826" Name="DO10" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="827" Name="DO11" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="828" Name="Grid_Control_Selected" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="829" Name="Local_Control_Selected" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="830" Name="Low_Freq_Response_On" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="DO3S" Address="831" Name="Low_Freq_Response_Off" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```

Sample tag Definition for AI Block:

```
<Tag BlockName="AI6" Address="52" Name="MW_Setpoint" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="53" Name="MVAR_Setpoint" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="54" Name="KV_Setpoint" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="55" Name="PF_Setpoint" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="56" Name="AI4" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="57" Name="Curtailment_Time_Setpoint" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="58" Name="AITag6" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="AI6" Address="59" Name="AITag7" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag6" Address="100" Name="OnLine" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag6" Address="101" Name="sendNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag6" Address="102" Name="RecNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag6" Address="103" Name="Poll" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```

In following figure, you can see a sample logic that used DI and DO tags:



In pbsSoftLogic, the convention of **inputs on the left** and **outputs on the right** applies specifically to **Logic Function Blocks**. This visual structure makes the logic easy to understand:

- The **left side** of a Logic Function Block is used for **input signals** such as conditions, statuses, interlocks, and measured values.
- The **right side** is used for **output signals**, including commands, control actions, and calculated results.

This left-to-right flow clearly shows how data enters the function, how it is processed, and what outputs are generated, making the logic diagrams intuitive and consistent across the entire project.

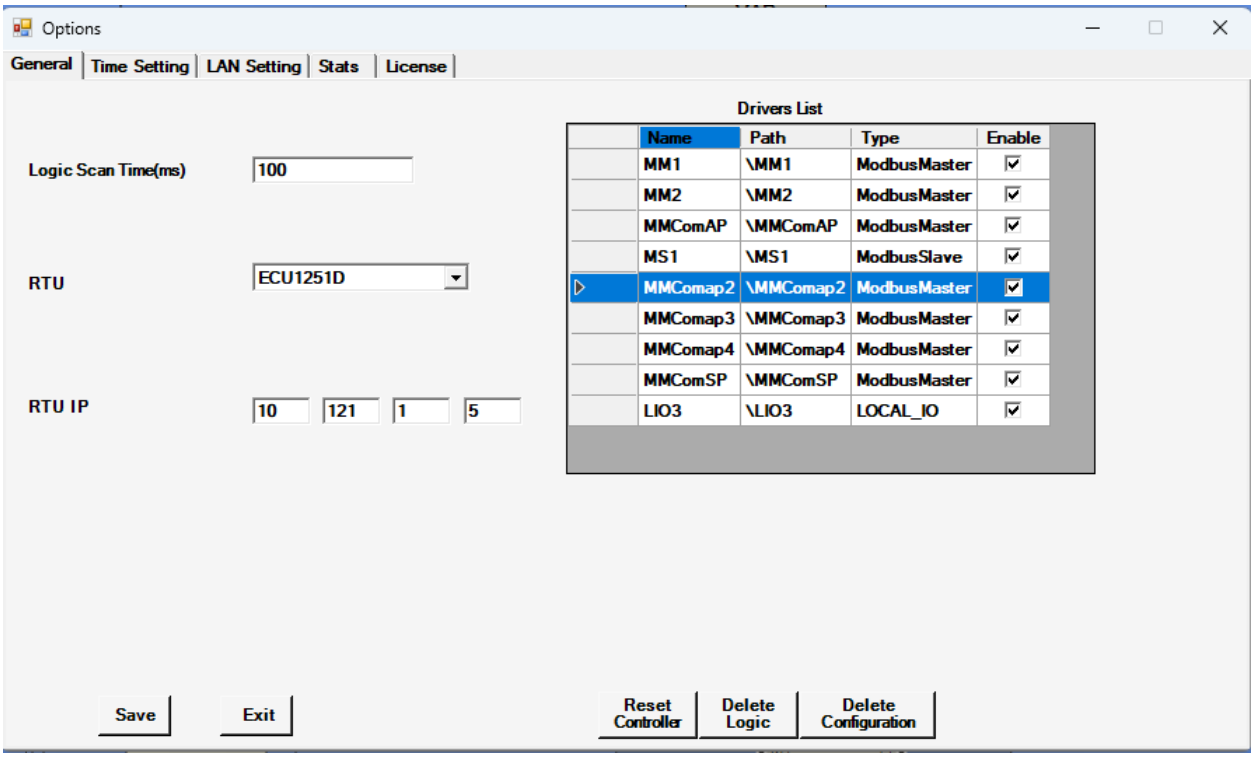
Modbus TCP Configuration for ComAp Modules

For reading data from the ComAp generator controllers, the project uses **three separate Modbus Master Drivers**. This approach distributes the communication load and ensures stable, reliable polling across all TCP devices.

- The drivers **MMComap2** and **MMComap3** each handle **four ComAp modules**.
- The final driver, also named **MMComap4**, manages the remaining **two ComAp modules**.

Each driver contains its own set of blocks, with the appropriate **IP addresses** and **Modbus TCP parameters** for the controllers assigned to it.

This structure allows the RTU to communicate with all **10 ComAp generator controllers** efficiently, without overloading a single driver instance.



Block definition for COMAP Module with IP = “192.168.3.11” and ID = “2”:

```
<Block Name="AO1_1" Type="AO" SlaveID="2"  IP="192.168.3.11" StartAdd="6338" Count="1" Wait="200" Enable="True" />
<Block Name="AOS1_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="248" Count="13" Wait="200" Enable="True" />
<Block Name="AOS2_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="263" Count="19" Wait="200" Enable="True" />
<Block Name="AOS3_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="287" Count="9" Wait="200" Enable="True" />

<Block Name="AOS4_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="12" Count="2" Wait="200" Enable="True" />
<Block Name="AOS5_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="104" Count="4" Wait="200" Enable="True" />
<Block Name="AOS6_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="115" Count="4" Wait="200" Enable="True" />
<Block Name="AOS7_1" Type="SLOS" SlaveID="2" IP="192.168.3.11" StartAdd="123" Count="1" Wait="200" Enable="True" />
<Block Name="AOS8_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="162" Count="2" Wait="200" Enable="True" />
<Block Name="AOS9_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="302" Count="2" Wait="200" Enable="True" />
<Block Name="AOS10_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="3008" Count="2" Wait="200" Enable="True" />
<Block Name="AOS11_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="557" Count="2" Wait="200" Enable="True" />
<Block Name="AOS12_1" Type="AOS" SlaveID="2" IP="192.168.3.11" StartAdd="3588" Count="2" Wait="200" Enable="True" />
<Block Name="AOS13_1" Type="SLOS" SlaveID="2" IP="192.168.3.11" StartAdd="3594" Count="2" Wait="200" Enable="True" />
<Block Name="AOS14_1" Type="SLOS" SlaveID="2" IP="192.168.3.11" StartAdd="3799" Count="1" Wait="200" Enable="True" />

<Block Name="Diag1" Type="SYS" SlaveID="2" IP="192.168.3.11" StartAdd="100" Count="8" Wait="200" Enable="True" />
```

In the following figures you can see how we define Modbus Tags for above Blocks:

```
<Tag BlockName="AO1_1" Address="6338" Name="WakeUp0" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />

<Tag BlockName="AOS1_1" Address="248" Name="Gen_V_L1_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="249" Name="Gen_V_L2_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="250" Name="Gen_V_L3_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="251" Name="Gen_V" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="252" Name="Gen_V_L1_L2" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="253" Name="Gen_V_L2_L3" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="254" Name="Gen_V_L3_L1" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="255" Name="Gen_Freq" ScaleEnable="1" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="256" Name="Gen_Freq2Dec" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="257" Name="Gen_CurrL1" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="258" Name="Gen_CurrL2" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="259" Name="Gen_CurrL3" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS1_1" Address="260" Name="Gen_PF" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS2_1" Address="263" Name="Act_powerkw" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="264" Name="Tag264" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="265" Name="Act_pwr_L1Kw" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="266" Name="Act_pwr_L2Kw" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="267" Name="Act_pwr_L3Kw" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="268" Name="React_powerKVAr" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="269" Name="Tag69" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="270" Name="React_pwr_L1_kVAr" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="271" Name="React_pwr_L2_kVAr" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="272" Name="React_pwr_L3_kVAr" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="273" Name="Appar_pwr_kVA" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="274" Name="Appar_pwr_L1_kVA" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="275" Name="Appar_pwr_L2_kVA" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="276" Name="Appar_pwr_L3_kVA" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="277" Name="Pwr_factor_L1" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="278" Name="Pwr_factor_L2" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="279" Name="Pwr_factor_L3" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="280" Name="Gen_V_unbal" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS2_1" Address="281" Name="Gen_I_unbal" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />


<Tag BlockName="AOS3_1" Address="287" Name="Bus_V_L1_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="288" Name="Bus_V_L2_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="289" Name="Bus_V_L3_N" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="290" Name="Bus_V" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="291" Name="Bus_V_L1_L2" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="292" Name="Bus_V_L2_L3" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="293" Name="Bus_V_L3_L1" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="294" Name="EarthFC" ScaleEnable="0" In_Min="-32767" In_Max="32767" Out_Min="0" Out_Max="65535" SCADAAddress="-1" />
<Tag BlockName="AOS3_1" Address="295" Name="Bus_freq" ScaleEnable="1" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS4_1" Address="12" Name="U_Bat" ScaleEnable="1" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS4_1" Address="13" Name="CPU_Temp" ScaleEnable="1" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS5_1" Address="104" Name="T_ChairAir" ScaleEnable="0" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS5_1" Address="105" Name="T_Coolant" ScaleEnable="0" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS5_1" Address="106" Name="Engine_Speed" ScaleEnable="0" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS5_1" Address="107" Name="P_LubeOil" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="AOS6_1" Address="115" Name="T_Fuel" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS6_1" Address="116" Name="T_Lube_Fuel" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS6_1" Address="117" Name="T_Cool_Int" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS6_1" Address="118" Name="P_Fuel" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="AOS7_1" Address="123" Name="EngineRunHours" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="AOS8_1" Address="162" Name="EngineState" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS8_1" Address="163" Name="BreakerState" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="AOS9_1" Address="302" Name="Slip_Freq" ScaleEnable="1" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS9_1" Address="303" Name="Angle" ScaleEnable="1" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS10_1" Address="3008" Name="Nomin_power" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS10_1" Address="3009" Name="Nomin_Current" ScaleEnable="0" In_Min="0" In_Max="10" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS11_1" Address="557" Name="Soot_Load" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS11_1" Address="558" Name="DEF_Level" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS12_1" Address="3588" Name="Num_Starts" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS12_1" Address="3589" Name="Num_Unsc_Starts" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />


<Tag BlockName="AOS13_1" Address="3594" Name="KWhours" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />
<Tag BlockName="AOS13_1" Address="3596" Name="KVArhours" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="AOS14_1" Address="3799" Name="KVAhours" ScaleEnable="0" In_Min="0" In_Max="100" Out_Min="0" Out_Max="1" SCADAAddress="-1" />

<Tag BlockName="Diag1" Address="100" Name="OnLine" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="101" Name="sendNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="102" Name="RecNum" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
<Tag BlockName="Diag1" Address="103" Name="Poll" ScaleEnable="0" In_Min="0" In_Max="0" Out_Min="0" Out_Max="0" SCADAAddress="-1" />
```