



WebdynSun

Supervision of
Modbus devices



WebdynSun

The monitoring gateway for your
solar installation



1. Introduction

This document covers the integration of Modbus equipment into the WebdynSun gateway. A basic knowledge of the configuration system of the WebdynSun is necessary. This document is to be seen as complementary to the utilization manual of the **WebdynSun**.

http://www.webdyn.com/wp-content/uploads/2015/10/WebdynSun_MI_UK.pdf

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This document applies to all types of Modbus equipment (Meter, Sensor, Inverter, Display, other) whether they are accessible via a serial connection type RS485 or via an Ethernet network.

About inverters managed through Modbus:

For a broader presentation of which inverters are compatible with the WebdynSun please consult the document: **WebdynSun Inverter management** (*not available yet*)

Nevertheless, a particular chapter covering the management of inverters using the Sunspec system is available at the end of this document.

Regarding displays, BAS and other data collection systems:

The gateway WebdynSun exclusively behaves as a master/client on the Modbus RTU/TCP network. It does not respond to any Modbus request. However, in order to be able to use any data collected by the WebdynSun from another locally supervised device, it exists in the WebdynSun a mechanism that allows resending of the collected data.

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2. Network architecture, Set up of the equipment, cabling

The WebdynSun allows data collection from Modbus RTU device via serial port B. Modbus TCP device can be supervised simultaneously via the LAN port.

a. Modbus RTU

Equipment using a serial connection with the Modbus RTU protocol are hooked to the WebdynSun serial port-B. This serial interface can be configured as RS232 or RS485 2 or 4wires. Consult the document **WebdynSun cabling Instructions** (not available yet)

The RS232 connection allows connection to only 1 equipment.

Compatibility of equipment:

- Same type of connection RS485 2wires or 4wires.
- All devices shall be configured with identical bus characteristics. Same speed, same parity, same number of stop bit and of data bit on every equipment and on the WebdynSun.
- A unique Modbus address should be attributed to each device on the network (UnitID).

Serial devices (Modbus RTU) have a network architecture called bus or « Daisy-Chain » The maximum coverage of a serial connection is within a kilometer. This depends primarily of the speed and quality of the connection as well as the presence of termination resistors.

b. Modbus TCP

Equipment using an Ethernet connection with the Modbus TCP protocol are hooked up to the WebdynSun via the LAN port (RJ45).

Modbus TCP equipment should be configured with a unique IP address belonging to the same subnetwork as the WebdynSun.

Equipment using the Modbus TCP should use the classical architecture of the Ethernet network including switches and hubs.

The maximum coverage of the Ethernet connection is close to 100 meters.

3. Configuration of the Modbus interface of the WebdynSun

The file **IDSite_daq.ini** in the folder /CONFIG contains declaration for supervised equipments. Therefore, all adjustments have to be done in this file regarding the following parameters.

a. Configuring Serial Interface (Modbus RTU only)

For a serial communication it is necessary to configure the bus parameters: its speed, its parity, its number of data bits and number of stop bits.

Those parameters need to be configured on the equipment

Each equipment on the bus must be attributed a unique Modbus address (UnitID).

```
MODBUS_Mode=1
MODBUS_BaudRate=9600
MODBUS_Parity=0
MODBUS_DataBit=8
MODBUS_StopBit=1
```

with

MODBUS_Mode=	0 : RS232 / 1 : RS485 2 fils / 2 : RS485 4 fils
MODBUS_BaudRate=	speed (1200 / 2400 / 9600 / 19200 / 38400 / 57600 / 115200)
MODBUS_Parity=	parity (0 : Aucune 1 : Paire 2 : Impaire)
MODBUS_DataBit=	nb of databits : 8, 7
MODBUS_StopBit=	nb of stopbits : 1,2

b. Other parameters for the Modbus interface

DAQ_HeaderModbusIndex: If set to 1 allows to replace the address in the file header by the index of the equipment in the file daq.ini (refer to « n » in the next chapter). Initially, the WebdynSun did not support Modbus TCP, using the address of the bus was hence worthwhile. Introduction of this protocol has turned the RTU addresses obsolete and the data file header can no longer be used to identify the equipment.

MODBUS_TimeOut_TCP and *MODBUS_TimeOut_RTU* : They permit to regulate the waiting time of the respective devices using Modbus TCP and Modbus RTU.

MODBUS_ScanDelay: Permits to regulate the duration of a temporization between each emission of a Modbus request. By default, set at 200ms, it is suggested to be lifted to 1000ms (1s) in order not to use all resources of the WebdynSun.



c. Declaration of Modbus Equipment

In order to declare a Modbus equipment, the following few lines have to be added into the file **IDSite_daq.ini** and being repeated for each new equipment to be supervised
The index “n” between square brackets needs to be incremented for every new device and it should start at 0.

It is possible to simultaneously supervise RTU and TCP equipment.
(Cf. Annex A).

Declaration of a serial RTU equipment

```
MODBUS_Addr[n]=1  
MODBUS_Name[n]= Eqpt_1  
MODBUS_FileDefName[n]= IDSite_MODBUS_FileName.ini
```

Declaration of a TCP equipment

```
MODBUS_Addr[n]=1  
MODBUS_Name[n]= Eqpt_1  
MODBUS_FileDefName[n]= IDSite_MODBUS_FileName.ini  
MODBUS_Interface[n]=1  
MODBUS_IpAddr[n]=192.168.1.15:502
```

With:

n=	Equipment index (0 to 200)
MODBUS_Addr[n]=	unit ID, (Modbus address 1 to 246)
MODBUS_Name[n]=	arbitrary name chosen by the user
MODBUS_FileDefName[n]=	IDSite_MODBUS_FileName.ini (cf §)

Only necessary for the TCP equipment:

MODBUS_Interface[n]=1	(0 : serial interface (RS485/RS232) / 1 : Ethernet)
MODBUS_IpAddr[0]=	IP address and port (by default port 502)

Once declared and after integration of the new file daq.ini by the WebdynSun, equipments have to appear on the screen "supervision/modbus" of the web interface of the WebdynSun. A red cross indicates on the same page the absence of communication or a green tick indicates a correct communication with the respective equipment.

The SMS « diag » allows to carry out this control if access to a web page is given. The response to this SMS contains a Modbus=x/y where x represents the number of OK equipments and y the number of declared equipments.



d. Définition file

Definition files for Modbus equipment need to be stored in the folder DEF/MODBUS of the FTP server.

Their names need to be strictly identical to the declaration done within the file IDSite_daq.ini for each parameter MODBUS_FileDefName[n]=

It is possible to create/generate on your own the Modbus definition file for a specific equipment from its register table by following the user guide of the WebdynSun.

https://www.webdyn.com/wp-content/uploads/2019/01/Datasheet_WebdynSun-EN_V13.11.2018.pdf

§10.3 Structure d'un fichier de définitions Modbus Page 71.

Meanwhile our company policy implies to support you with all our definition files if asked for by the client thanks to the generous sharing culture of those files and our proper development.

At the same time, those definition files may not necessarily be complete and they may need corrections.

You will find the definition files known to Webdyn by following the link in the annexes (Work in progress)

If the WebdynSun can't recover the definition file of an equipment, its name will be highlighted in red on the supervision page of the Modbus equipment on the Web page of the WebdynSun.



4. Inverters

The automatic discovery of inverters can't be done if the inverters use Modbus protocols. Discovery is only available for a proprietary protocol generally implemented on the port RS485(A) of the gateway.

For further info, please consult the document ***WebdynSun Supervision of inverters (currently under development)***

Supervision of inverters communicating via Modbus is possible but these inverters will be recognized as Modbus equipment and not as inverters.

Their data file will be deposited into the folder /DATA/MODBUS.

Inverters using a serial connection need to be connected to the port RS485(B) of the WebdynSun and may function simultaneously with other serial Modbus devices under the condition that they share the same bus characteristics.

Equipment generally allow the modification of those characteristics sometimes locally through a display screen and sometimes via a software that may need a USB-serial converter.

Modbus Inverters need to be manually declared just as any other Modbus equipment. The same way than previously described in this document. (see ANNEX C : List of Modbus inverters)



5. SUNSPEC

SunSpec is an alliance primarily composed of equipment manufacturers which have decided to structure the Modbus register tables of their equipment in a similar way in order to facilitate the supervision.

In reality, the register table of an equipment consists of the aggregation of several tables described and identified as « Information Model » (IM) in this document: **SunSpec-Information-Model-Reference.xlsx**

For further info please look at SunSpec.org

The IMs are organized by equipment type. All IM can be implemented into the WebdynSun but IM's for inverters (series 100) and more precisely IM 101 to 113 are the most interesting.

Sunspec differentiates 3 types of inverters

- Single phase 101,111
- Split phase 102,112
- Three phase 103,113

Each may use 2 types of register tables.

- IM 101 to 103 describe tables using an organization known as « integer + SF » to encode the variables.
- IM 111 to 113 describe tables using a floating type of 32 bits to encode the variables.

It is suggested if possible, to use a floating type on 32 bits.



6. Trouble shooting

Verify the declaration in the file **daq.ini**

Verify that the declared elements appear in the supervision

Verify the state of the equipment (red signifies no connection)

Verify the presence of the definition files in /DEF/MODBUS

Verify the state of the definition file in Supervision (red signifies impossible to recover the file)

Before contacting support team of Webdyn and if all prior elements have been verified, please activate “debugging logs” using the following parameters in the file **config.ini** of the folder /CONFIG :

Log_Enable=1

Log_Level=7

MODBUS_Debug=2

After recovery of the new configuration by the WebdynSun, the connection will force deposit of a new file under the format XXX_debug.log.gz in the folder /LOG

Please provide some pertinent sample of those files to our support under support@webdyn.com

Field test :

It is possible to test the functioning of the Modbus network with a computer and Modbus simulation software.

In case of an Ethernet network, direct access via a computer is given whereas by using a serial connection, you'll need a converter USB/RS485.

Technicians of Webdyn will usually use the software Modbus Doctor ([lien](#)) to carry out those tests.

This allows to test some inquiries in order to assure that the connected equipment responds correctly.



Annex A : Example of a daq.ini file :

```
Daq_Period=10
Daq_Period_sec=0
Daq_FileHeaderOption=1
Daq_HeaderModbusIndex=0
TIC_Mode=1
IO_FileDefName=WD00ABCD_IO.ini

MODBUS_Mode=1
MODBUS_Baudrate=115200
MODBUS_Parity=0
MODBUS_DataBits=8
MODBUS_StopBits=1
MODBUS_TimeOut_TCP=1000
MODBUS_TimeOut_RTU=1000
MODBUS_ScanDelay=1000

MODBUS_Interface[0]=0
MODBUS_Addr[0]=1
MODBUS_Name[0]=irradiation
MODBUS_FileDefName[0]=WD00ABCD_MODBUS_cellule.ini

MODBUS_Addr[1]=2
MODBUS_Name[1]= température 1
MODBUS_FileDefName[1]=WD00ABCD_MODBUS_temperature.ini

MODBUS_Addr[2]=1
MODBUS_Name[2]= Onduleur 1
MODBUS_FileDefName[2]=WD00ABCD_MODBUS_INV1.ini
MODBUS_Interface [2]=1
MODBUS_IpAddr[2]=192.168.1.15

MODBUS_Addr[3]=2
MODBUS_Name[3]= Onduleur 2
MODBUS_FileDefName[3]=WD00ABCD_MODBUS_INV1.ini
MODBUS_Interface [3]=1
MODBUS_IpAddr[3]=192.168.1.15

MODBUS_Addr[4]=1
MODBUS_Name[4]= Onduleur 3
MODBUS_FileDefName[4]=WD00ABCD_MODBUS_INV2.ini
MODBUS_Interface [4]=1
MODBUS_IpAddr[4]=192.168.1.16

MODBUS_Addr[5]=3
MODBUS_Name[5]= température 2
MODBUS_FileDefName[5]=WD00ABCD_MODBUS_temperature.ini
```



Annexe B: List of Modbus definition files (without inverters)

Document is currently being written

Meanwhile please directly approach technical support of Webdyn by mail under support@webdyn.com.

Annexe C: List of inverter brands that use Modbus

ABB	Yes, Sunspec
Advanced Energy	Yes, Sunspec
AEG	No
Bonfiglioli	Yes
CEFEM	Yes
Conergy	No
CyberPower	Yes, Sunspec
Danfoss	No
Delta	Yes, Sunspec
Dielhako	No
Efasolar	Yes
Enphase	No
Fronius	Yes, Sunspec
Goodwe	No
Growatt	Yes
Huawei	Yes, Sunspec
Ingeteam	Yes, Sunspec
Kaco	Yes, Sunspec
Kostal	Yes, Sunspec
LTI	No
Mastervolt	No
Omnik-Solar	No
Photowatt-PWI	No
Platinum	No
PowerElectronics Freesun	No
PowerOne	Yes, Sunspec
Refusol	Yes, Sunspec
Samil	No
Schneider	Yes
Schuko	No
Siemens	Yes
SMA	Yes, Sunspec
Socomec	Yes
SolarEdge	Yes, Sunspec
Solarmax	Yes, Sunspec
Solax	Yes, Sunspec
Solectria	Yes, Sunspec
Sputnik engineering	No
Steca	No
Studer	No
Sungrow	Yes
SunPower	No
Tata	Yes
Total énergie gridfit	No
Victron	Yes