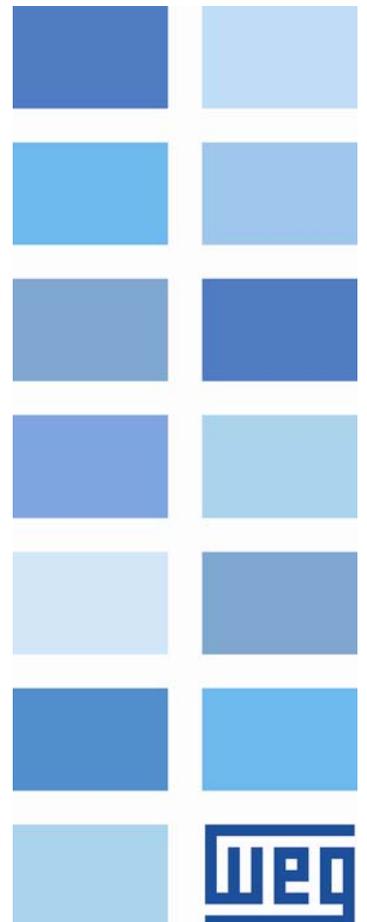


# CFW-11 configuration in a Modbus TCP network using PLC300

## Application Note





## **Application Note – Modbus TCP**

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## CFW-11 WITH MODBUS TCP INTERFACE

The CFW-11 is a high-end general purpose frequency inverter, with excellent performance for speed and torque control, besides integrated PLC functions for positioning. Among its features, several accessories for communication are available, which allow its use in different systems and applications.

The presented document describes how to use CFW-11 frequency inverter with Anybus-CC for Modbus TCP accessory. The following material has been used to configure and operate CFW-11 in the Modbus TCP network.

### Hardware:

PLC300HP (firmware version 1.33 or above);

Hirschmann RS30 Rail Switch;

CFW-11 frequency inverter (firmware version 2.00 or above) with Anybus-CC for Modbus TCP.

### Software:

WPS 1.40;

Anybus IPConfig V1.5.1.1 (supplied in the CFW-11 CD-ROM).

### Documents:

Installation, Configuration and Operation Guide for Anybus-CC

CFW-11 Programming Manual

Anybus-CC User's Guide for CFW-11

PLC300 Modbus TCP user's manual

Configuration of the PC in an Ethernet network guide



### **NOTE!**

Several options and procedures for using the necessary software for PLC programming are not described in this document. The user is required to have good knowledge about this software in order to follow the described steps.

**STEP 1: INSTALL MODBUS TCP INTERFACE AND CONFIGURE CFW-11 PARAMETERS**

In order to install Modbus TCP module in CFW-11, follow the procedures described at “Installation, Configuration and Operation Guide for Anybus-CC”.



**Figure 1:** Anybus-CC Installation

Only after the installation, the parameters related to Anybus-CC interface are available via keypad. Some important parameters<sup>1</sup> for Anybus-CC communication in CFW-11 are:

- **P0723 Anybus Identification:** read only parameter to verify if Anybus-CC accessory is properly installed and the model of Anybus-CC interface detected.
- **P0724 Anybus Communication Status:** read only parameter to check the communication status between drive and Modbus TCP client (master).
- **P0727 Anybus I/O Words:** parameter to program the number of I/O words for cyclic data exchange with the client.
- **P0728 to P0733 Anybus Read Words:** parameters to program which data should be available at input area (CFW-11 sends to client).
- **P0734 to P0739 Anybus Write Words:** parameters to program which data should be available at output area (client sends to CFW-11).

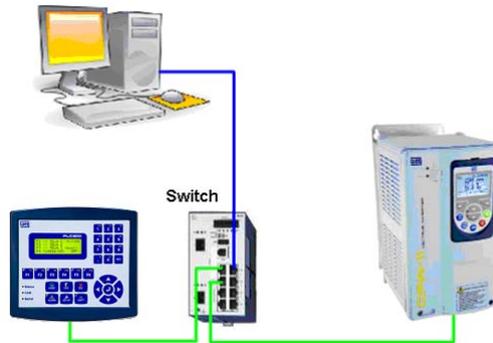

**NOTE!**

If any of these parameters are changed, it is important to power the drive off and on again.

<sup>1</sup> For the detailed description of these parameters, as well some other important parameters for drive communication, refer to Anybus-CC User’s Guide for CFW-11.

**STEP 2: MAKE ETHERNET CONNECTIONS AND SET IP ADDRESS**

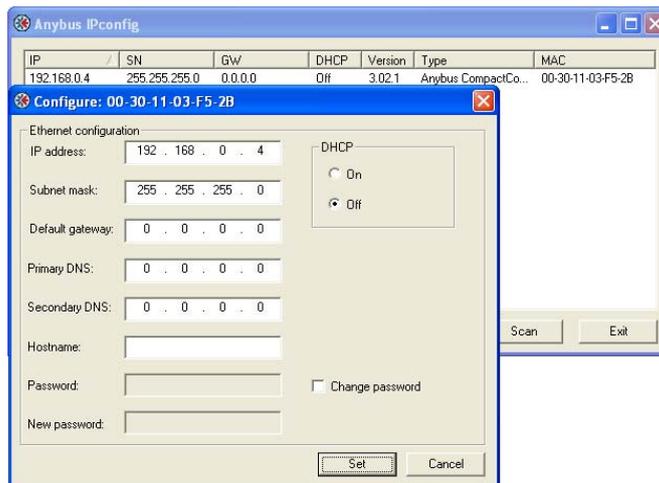
The following figure describes the devices connected to Ethernet network.



**Figure 2:** Ethernet Topology

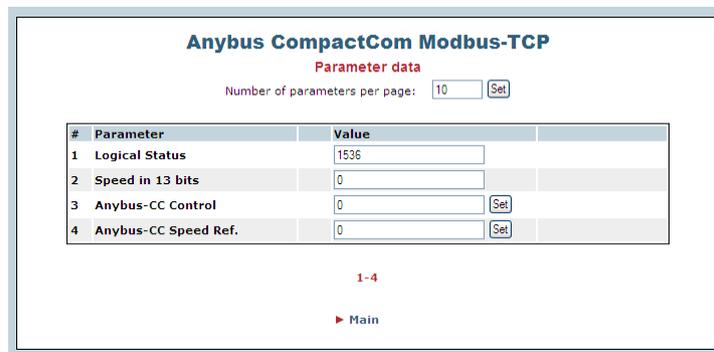
**Configure Anybus-CC module**

To set the IP address for Anybus-CC it is necessary to use the Anybus IPconfig software. Once the PC is connected to the network<sup>1</sup>, just install and run the software and it will show a list with all detected Anybus-CC modules. Double click the desired module and it will be possible to change the IP address and other properties, like the subnet and DHCP.



**Figure 3:** Anybus IPconfig software

With the IP address it is possible, for instance, to use a WEB browser to check I/O data for CFW-11.



**Figure 4:** WEB page with I/O data for CFW-11

<sup>1</sup> For the detailed description on how to configure the PC in the network, refer to the “Configuration of the PC in an Ethernet network” application note.

## Configure PLC300

Configure LAN options using the Setup Function on the keypad of the PLC300. This can also be done using the Setup Configuration tool in WPS.

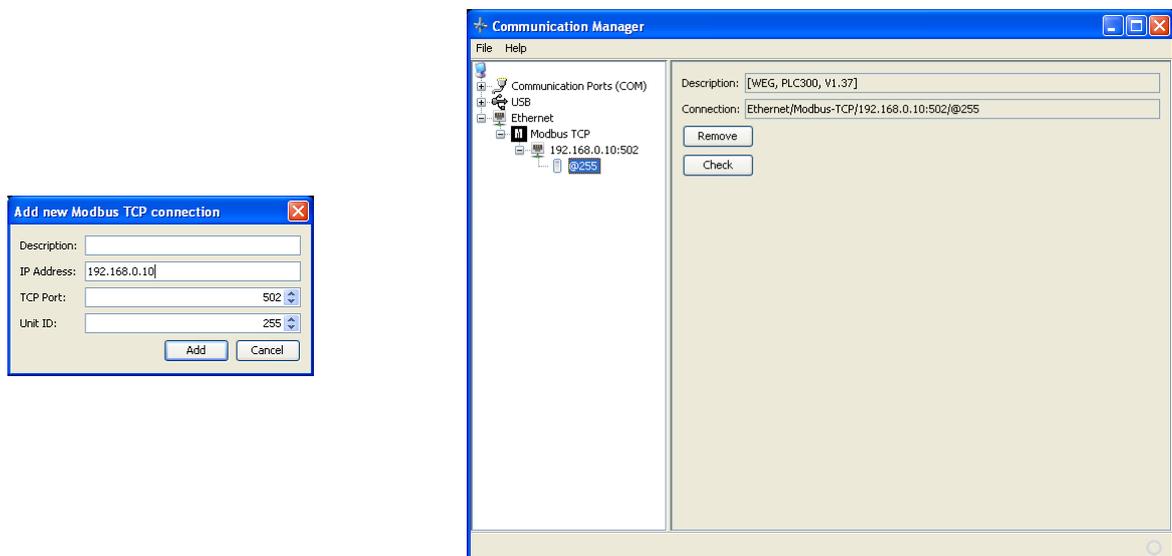


**Figure 5:** PLC300 LAN Setup Configuration

## Configure WPS

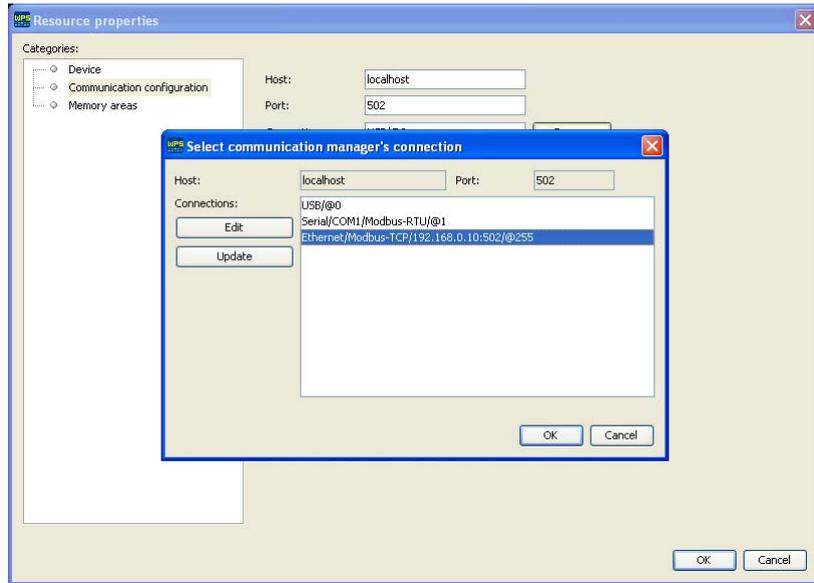
For program downloading and online monitoring via Ethernet, it is necessary to configure the communication between PLC300 and WPS using the Communication Manager tool.

Using WPS 1.40 create a new configuration and select the desired equipment and version – in this case, PLC300 V1.37. On the Communication Manager, create a new Modbus TCP Ethernet Connection for the address of the PLC300 (according to programmed at PLC300 Setup).



**Figure 6:** Communication Manager Modbus TCP Ethernet connection

On the WPS Resource Properties, change the Communication Configuration to use this new connection.



**Figure 7:** Communication Configuration

## STEP 3: ACCESS I/O DATA FOR DEVICE MONITORING AND CONTROLLING

Create a new ladder file, using the Modbus TCP blocks for reading and writing registers, configure the communication as described below to access CFW-11 I/O data.

CFW-11 Modbus TCP Server configuration:

- **IP:** 192.168.0.4;
- **TCP Port:** 502;
- **Unit ID:** 255;

Read Words:

- **Modbus Function:** 04h Read Input Registers;
- **Initial data address:** 0 (Input Register 01)<sup>1</sup>;
- **Number of data:** 2 registers (the I/O data size programmed at P0727, in words);

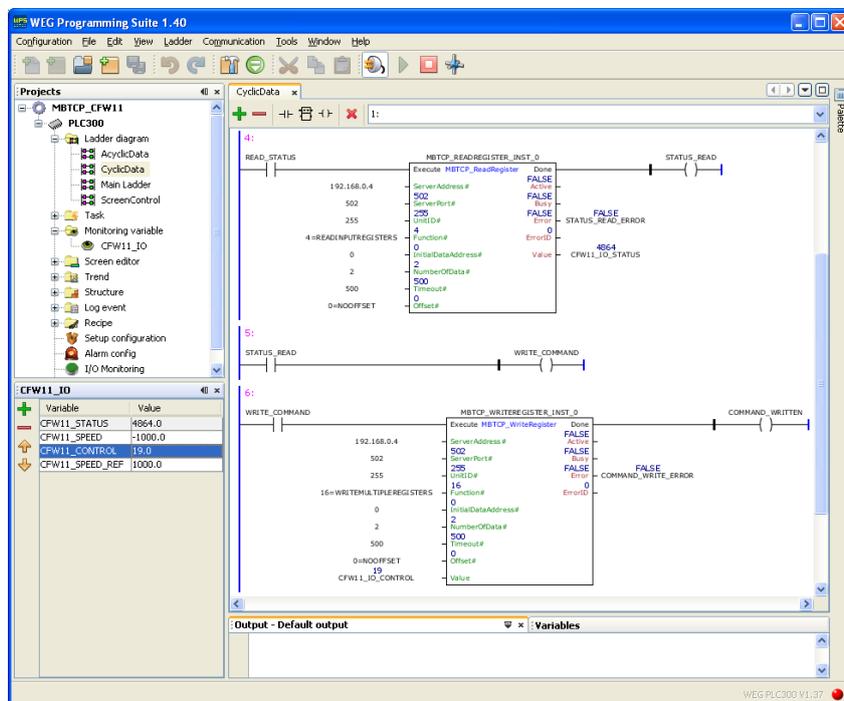
Write Words:

- **Modbus Function:** 0Fh Write Multiple Registers;
- **Initial data address:** 0 (Holding Register 01);
- **Number of data:** 2 registers (the I/O data size programmed at P0727, in words);

Once the program is complete, just compile and download it to PLC300 to start communicating with CFW-11.

With the project downloaded and the program running, the communication status indicated at P0724 should go to “Online”. This indicates there is cyclic communication between the PLC300 and CFW-11.

In online mode it is possible to access the CFW-11 I/O data using the “Monitoring Variables” tool. Here, it is possible to monitor the 2 input words, for status and motor speed, and control the 2 output words, for command and speed reference.



**Figure 8:** Monitor and control I/O data

Using this structure, it's possible to monitor the received values or manually change the transmitted values to the drive. The presented variables should be used by the ladder program to control the drive as requested by the application.

<sup>1</sup> Refer to the CFW-11 Anybus-CC User's Guide for the detailed Modbus mapping of the Anybus I/O words.

#### STEP 4: ACYCLIC REQUESTS

Besides the I/O data exchange with CFW-11, it is possible to send acyclic requests to access other drive parameters via Modbus TCP.

The drive parameters are mapped to the Holding Registers area. To find the address of the register corresponding to the parameter, just add the value 527 to the parameter number.

Example:

$$P0003 = 527 + 3 = 530$$

$$P0100 = 527 + 100 = 627$$

With the desired register address identified, it is possible to access the parameter using Modbus **03h Read Holding Registers**, **06h Write Single Register** and **10h Write Multiple Registers** functions.

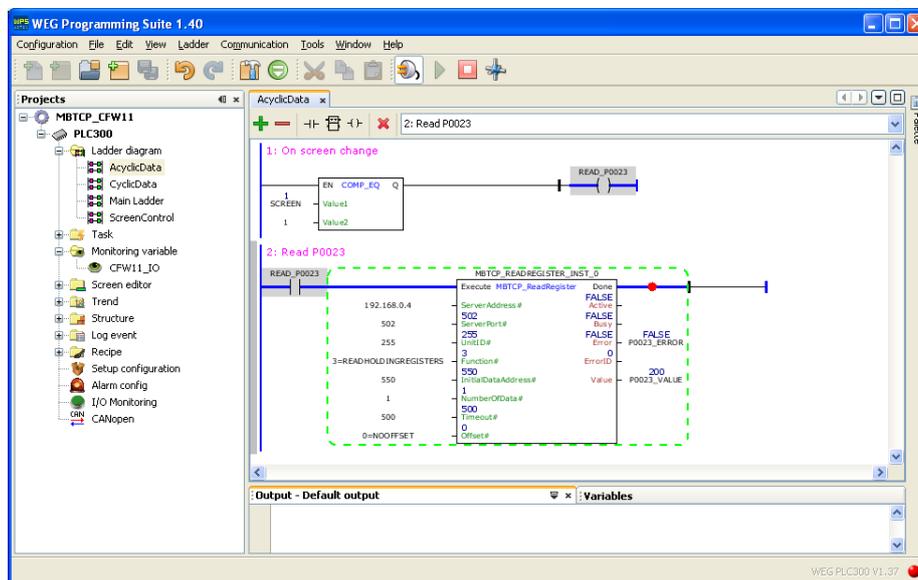
We will use a MBTCP\_READREGISTER block to read equipment parameters. In this block, set the IP address of the CFW-11, the default TCP port for Modbus TCP (502) and standard UnitID (255).

Because the parameters are mapped to the holding registers area, we use the function **03h Read Holding Registers** with the address calculated as in the example and 1 register as amount of data to be returned by CFW-11. The received value will be stored in the variable set to the **Value** output of the block.

Every time the EXECUTE input of MBTCP\_READREGISTER block is activated, the Modbus TCP client will send a request message to the drive.

For this example, a request has been sent to read the value of P0023 – Software Version. The value was stored at “P0023\_VALUE” variable. The read or write values are always transmitted as an integer value, with no decimal representation. So, for this example, the value 200 for P0023 represents the software version V2.00.

To execute the block, you must navigate to screen 1 by pressing the F6 key on the PLC300 Home screen.



**Figure 9:** Acyclic read request



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