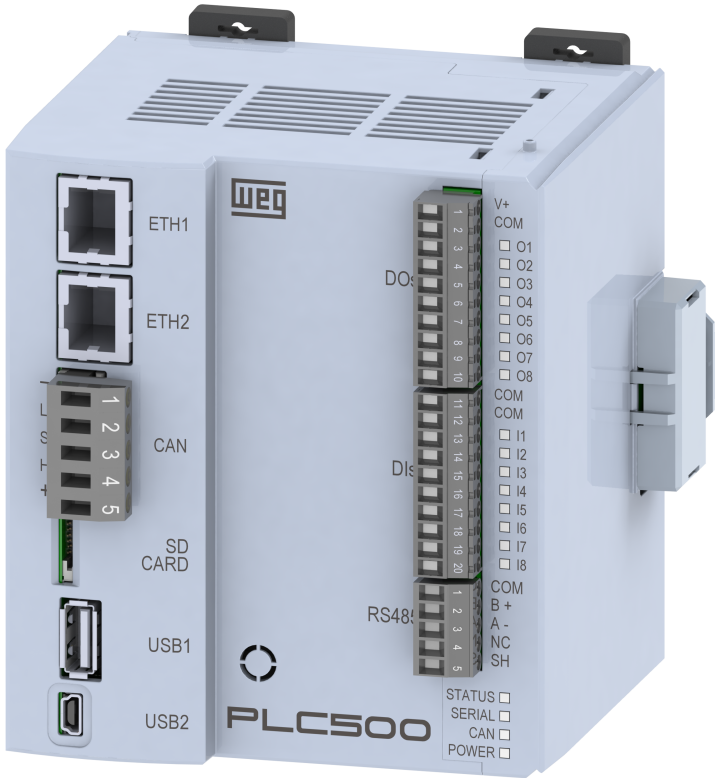


# Modbus/TCP - Network Master

## PLC500

### Application Note





# **Master Modbus/TCP - Application Note**

Series: PLC500

Language: English

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The information below describes the reviews made in this manual.

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-	R00	First edition

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# 1 INTRODUCTION

This application manual describes how to operate the PLC500 as a Modbus/TCP **network master**. For the PLC500 product settings, follow the steps described in this document to configure the Modbus/TCP network properly.

**ATTENTION!**  
This application manual is intended for professionals trained in industrial networks. The devices must be installed and configured according to manufacturer's manual.

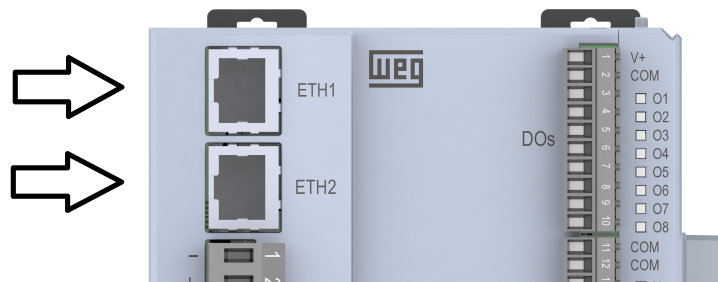
## 1.1 MODBUS/TCP NETWORK COMPONENTS

For the network passive components—cables, connectors, termination resistors, power supply—it is recommended to use only components certified for industrial applications. See the product documentation for information on the proper installation of the Ethernet network.

For a detailed description of the network operation Modbus/TCP and its settings, visit Codesys webpage at: <https://help.codesys.com/>.

## 1.2 ETHERNET INTERFACE

As indicated in Figure 1.1, Ethernet connections are used for Modbus/TCP communication. Initially, each port has the IPv4 address contained in Table 1.1, which can be changed at any time using the Codesys software or via website.



*Figure 1.1: Ethernet interface connector.*

*Table 1.1: Default address for Ethernet ports.*

Connection	Default IPv4 address
ETH1	192.168.1.10
ETH1	192.168.2.10

## 1.3 MODBUS/TCP NETWORK ARCHITECTURE

Figure 1.2 shows the topology of the network used. The computer programs the two devices through the Ethernet interface, and the communication between the devices is done by the same way.

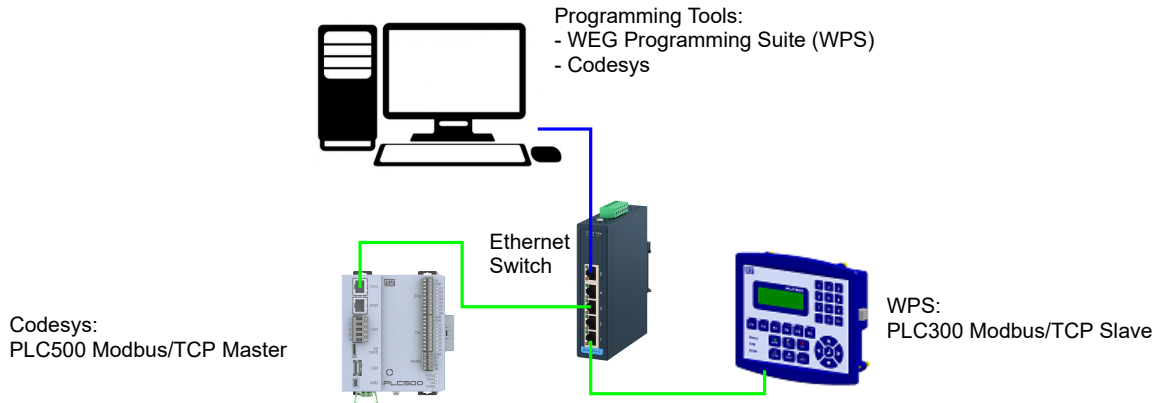


Figure 1.2: Network components.



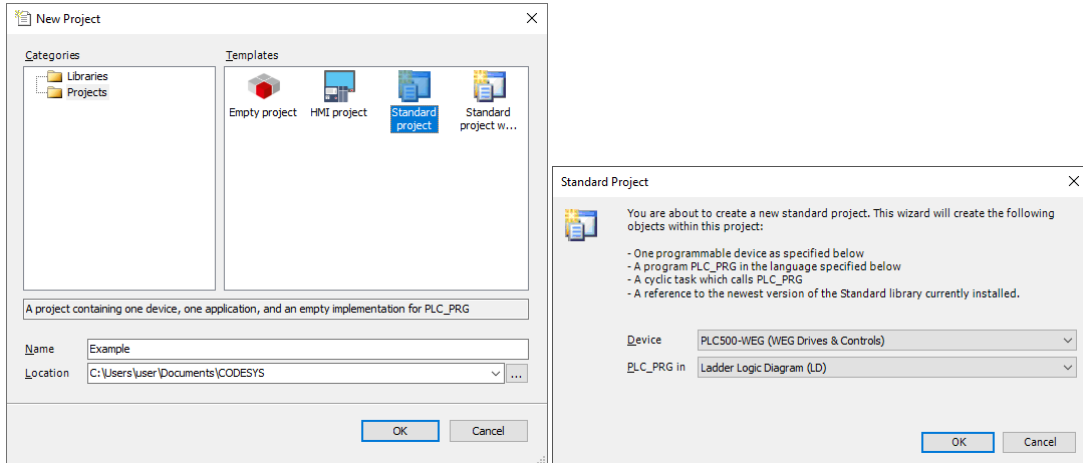
**NOTE!**

This application manual is intended for the PLC500 and the **Codesys** programming tool, we recommend using the **Codesys V3.5 SP18 or higher**. If you need more information about the Modbus/TCP communication protocol, see its manuals.

## 2 MODBUS/TCP SETTINGS

### 2.1 CREATING A PROJECT IN CODESYS

In the Codesys *software*, create a new project and choose the directory and application name. Then select the PLC500-WEG device and the desired programming language, as shown in Figure 2.1.



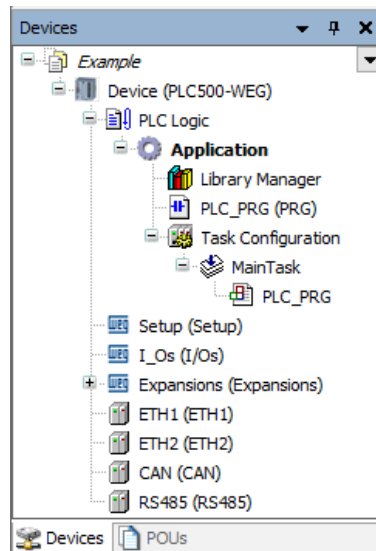
**Figure 2.1:** Project configuration in Codesys.



**NOTE!**

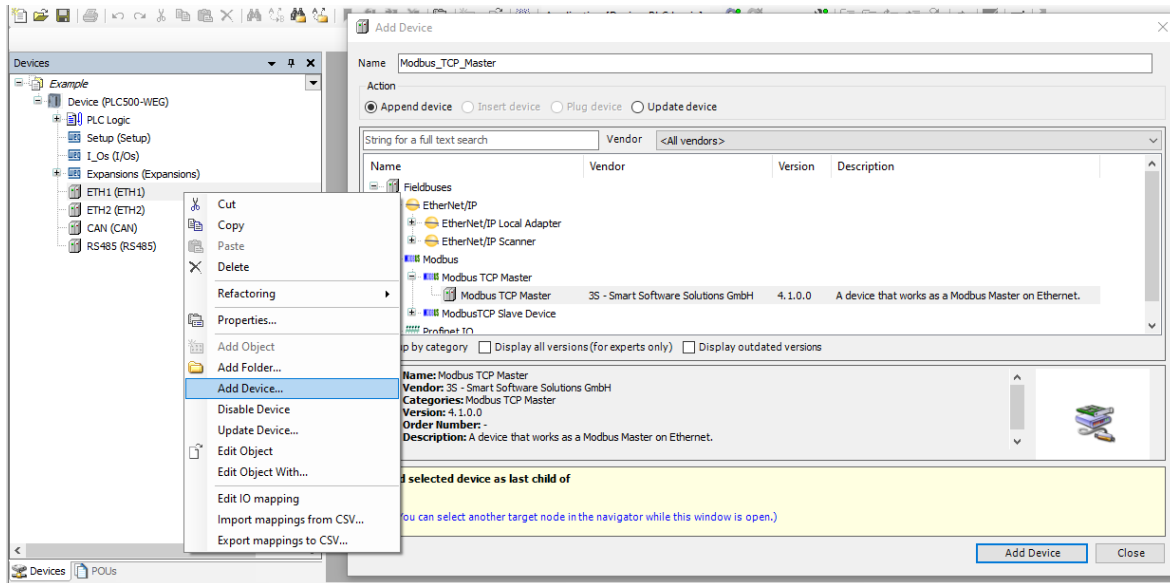
In case the device PLC500 is not available in the Cosys options yet, you must download and install the configuration file. See the **Product Manual** for the necessary steps and settings.

With the PLC500 device selected, you will have a project with the available networks already preset, as shown in Figure 2.2.



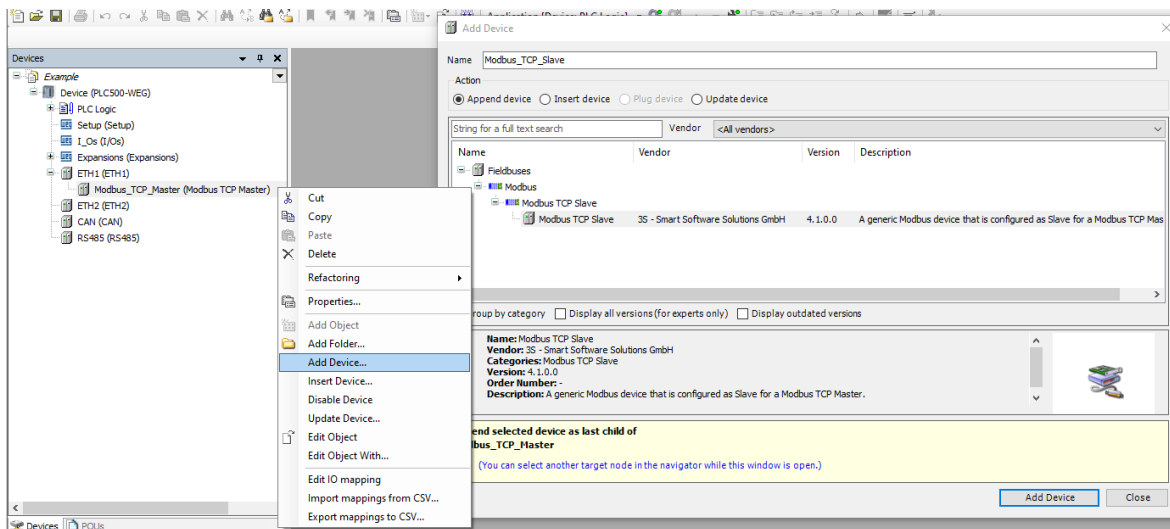
**Figure 2.2:** Network interfaces for the plc500.

In the **ETH1** or **ETH2** interface, add “**Modbus TCP Master**”, as shown in Figure 2.3.



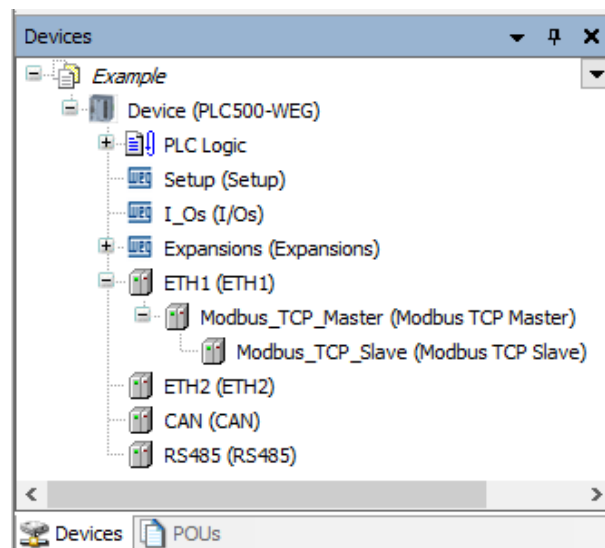
**Figure 2.3:** Codesys - Modbus/RTU Configuration Step 1.

In “Modbus TCP Master”, add “Modbus TCP Slave”, as shown in Figure 2.4.



**Figure 2.4:** Codesys - Modbus/RTU Configuration Step 2.

At this moment, the chosen **ETH** interface should have the items indicated in Figure 2.5.

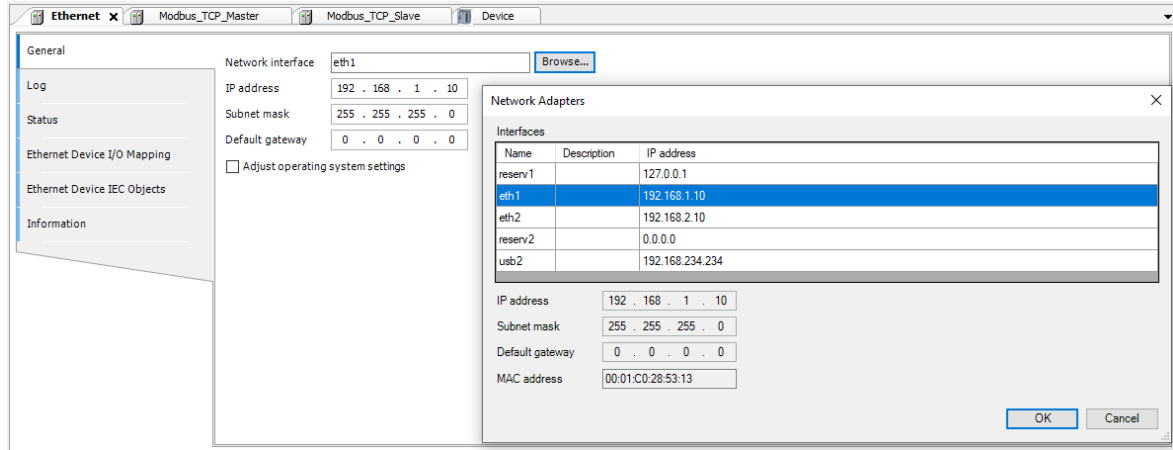


**Figure 2.5:** Project configuration in Codesys.



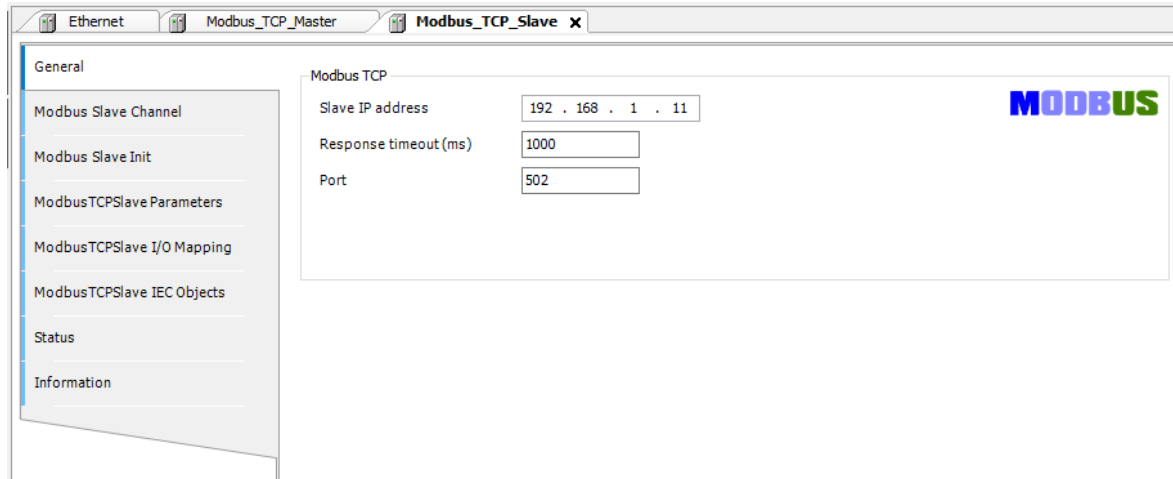
### 3 MASTER MODBUS/TCP SETTINGS

The network must be set with valid addresses for each connected master and slave device. Define them with unique addresses and select the allowed IPv4 address range; otherwise, the network will have problems. In figure 3.1, the master device settings are defined, and the **Browse** box is used when selecting the Ethernet interface while defining the IPv4 address.



*Figure 3.1: Network settings for the device programmed in Codesys.*

After this step, the network for the slave device is configured. Each one must have its own address and be within the available IPv4 address range. The other settings, such as baud rate, will be managed automatically by the network.



*Figure 3.2: Network settings for the slave device.*

#### 3.1 I/O SETTINGS

Variables and memory addresses set for a slave must be declared in the memory intervals reserved for the transmission variables. Then, addresses are read and written in the slave device register. Figure 3.3 shows the Modbus functions for reading and writing these data to the slave device.

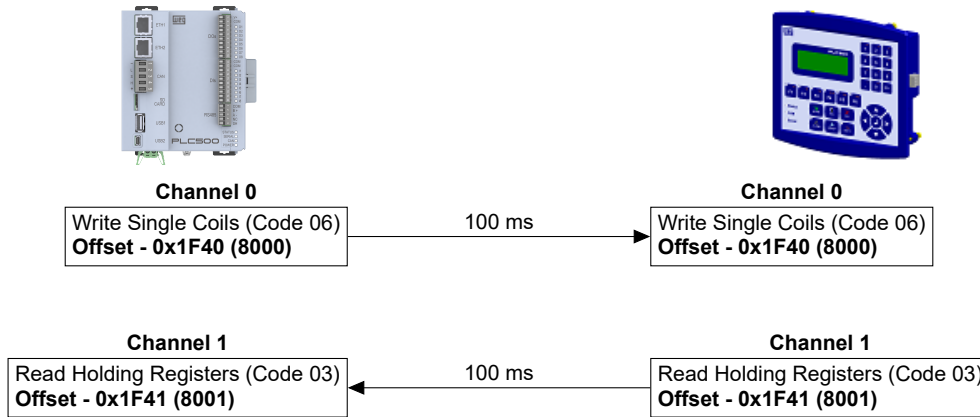


Figure 3.3: Settings for the transmission addresses.



**NOTE!**

The availability of Modbus addresses may vary from device to device. During the configuration, refer to the product manual to obtain information on the available addresses.

Configuring the slave in **Modbus\_TCP\_Slave** in Figure 3.4, the functions are declared by going to **Modbus Slave Channel** and following the functions required for the project in Figure 3.3.

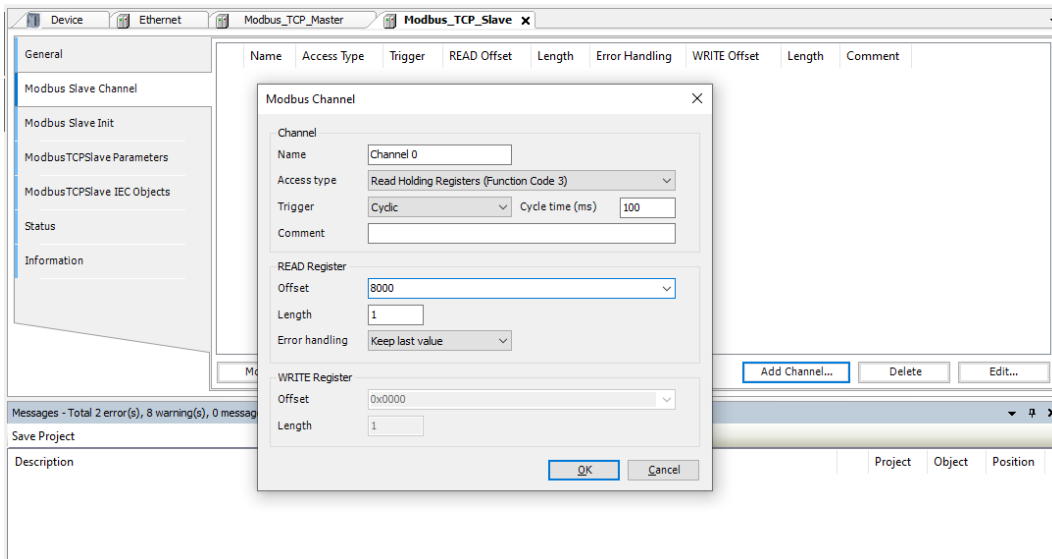


Figure 3.4: Declaration of addresses transmitted by the network slave device.

## 4 MONITORING

### 4.1 VARIABLE MONITORING

After setting the Modbus/TCP network and declaring the transmission addresses, we can monitor and control the data transmitted by the devices. You must declare the variables that you want to assign to the addresses. On the **Mapping** tab shown in Figure 4.1, it is possible to check and write the values in the network variables.

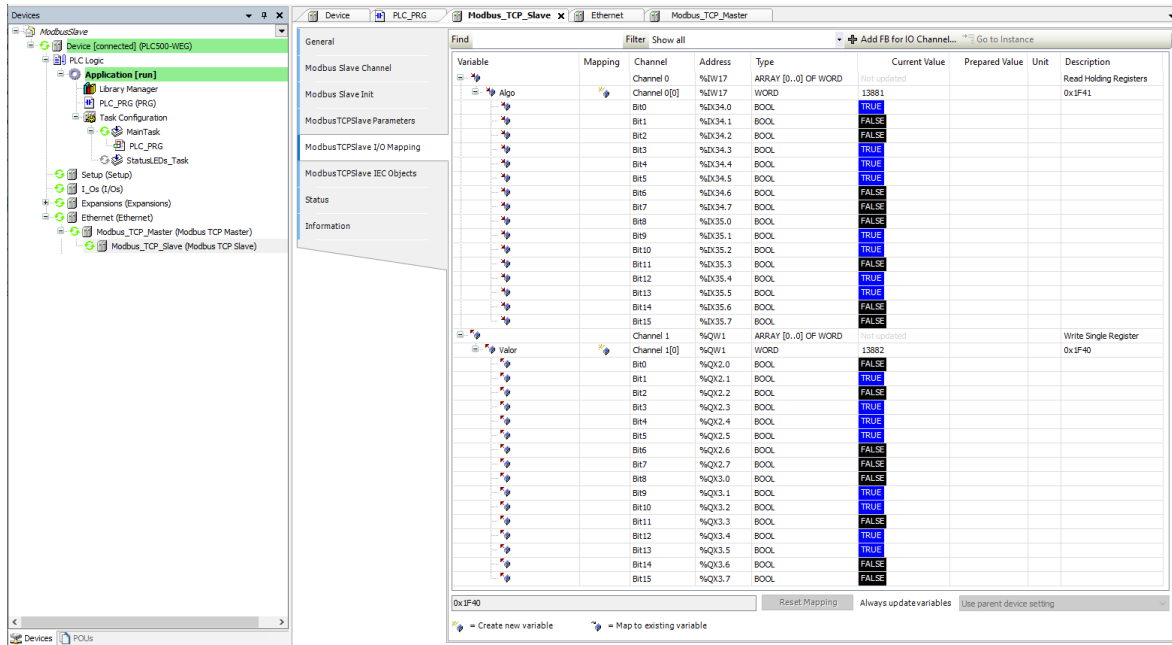


Figure 4.1: Declaration of variables transmitted by the network slave device.

The variables declared in the network can be monitored through two methods: first, to add the variable values to the **Codesys** program and monitor them online; second, to enable **Always Update Variables** at the bottom of the previous page, as shown in Figure 4.2.

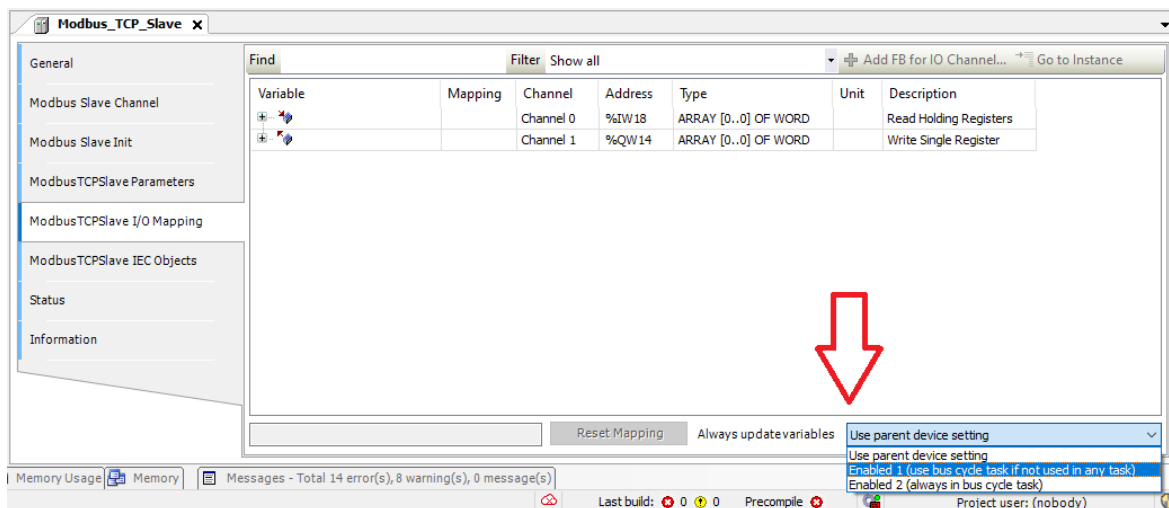
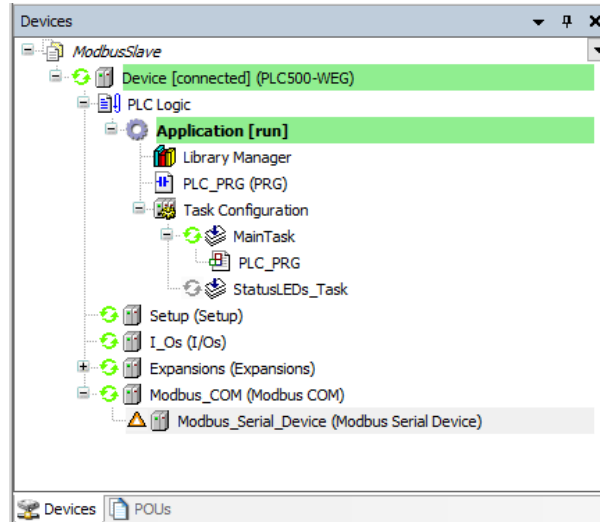


Figure 4.2: Selecting the option to always update the value of the variables.

### 4.2 COMMUNICATION ERRORS

The status of the networks in the *Codesys software* PLC500 can be monitored in **Devices**, which indicates the status of each communication step and the **Status**, as shown in Figure 4.3. If you encounter connection problems, connect to the PLC500 and access the **Status** and **Log** tab within the created items; Codesys will report the problem hindering the communication.



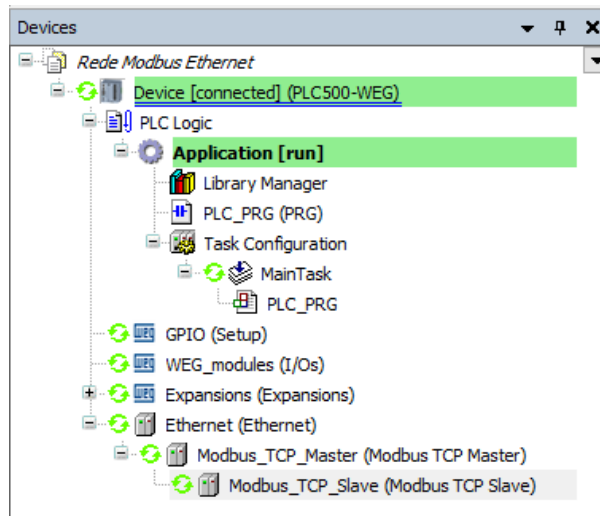
**Figure 4.3:** Communication error indication.



**NOTE!**

If you encounter problems, check that the cables are properly connected and that the respective network LED is turned on.

When the settings are correct and the devices identify each other, the application should show as in Figure 4.4.



**Figure 4.4:** Communication correctly configured and devices communicating.



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