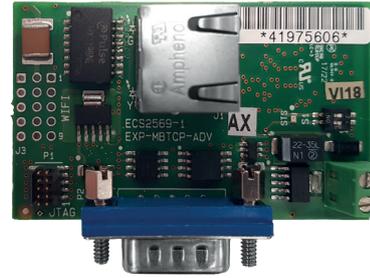


Instruction manual

EXP-MBTCP-ADV

Modbus TCP/IP-RTU Converter



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1. Introduction

This manual describes the EXP-MBTCP-ADV optional board (code S5L89), a serial/MODBUS TCP/IP interface converter.

The EXP-MBTCP-ADV board connects to the RS485 port of the AD200 family of drives and has an RJ45 port for connection via Modbus TCP/IP protocol — used for Drive-PC communication (with WEG_eXpress configuration software) — or via HTTPS protocol — for Drive-PC/network communication (with WEG_DriveLabs web application).

This manual is written for technicians and designers responsible for the maintenance and initial start-up.

1.1. Applicability

The card is designed to be easily installed inside the ADV200 family of drives: ADV200, ADV200-WA, ADV200-LC, FFE200 and AFE200.

1.2. FW compatibility

The EXP-MBTCP-ADV board can only be used with drives with a firmware version:

Drive	FW
ADV200	4.X.0 or higher
ADV200 WA	2.X.0 or higher
ADV200 LC	7.X.17 or higher
FFE200	1.X.0 or higher
AFE200	7.1XX or higher

1.3. Typical uses of the device

- Device configuration with WEB-SERVER: via a WEB page, the device enables configuration of the network and MODBUS RTU communication;
- Inverter data monitoring and configuration with WEG_eXpress: to read/write parameters and monitor FW and Application parameters;
- Communication with the drive makes the following possible:
 - debugging via Softscope,
 - creation of applications with MDPLC;
- Multiple device accesses by several users:
 - the device with MODBUS TCP/IP can be used by several users — up to a maximum of 5 simultaneous connections,
 - access to the WEB-SERVER configuration is permitted for a single connection at a time. The user must log off to enable a new connection.

1.4. Specifications

Operating temperature _____	-10...+50°C
Power supply _____	+5V (internal via RS-485)
Protocol _____	Modbus TCP
Communication speed _____	10/100Mbps
Interface _____	RS485 / Ethernet RJ45

1.5. Safety

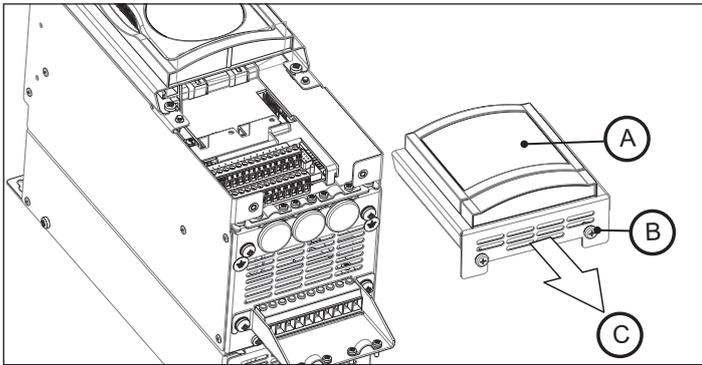
Before installing the board, carefully read the safety instructions section in the ADV200 Quick Start Guide, Chapter 1 - Safety Precautions.

The board must be installed with the drive switched off and DC-LINK unloaded.

1.6. Montaggio

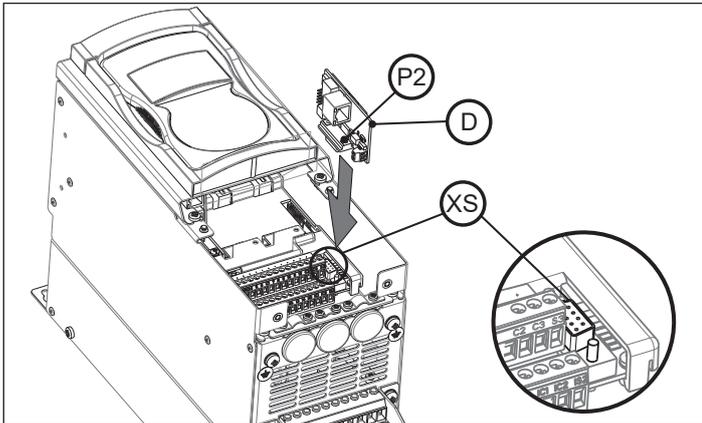
- 1) To remove the lower cover (A), unscrew the two screws (B) and withdraw it in the direction indicated (C), see figure 1.

Figure 1



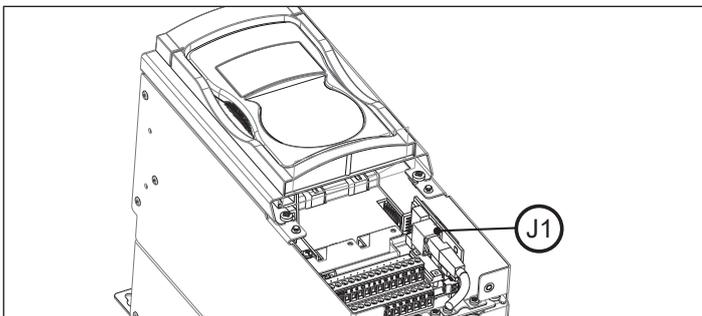
- 2) Position the EXP-MBTCP-ADV board (D) as shown in figure 2, inserting the board's RS-485 M connector (P2) all the way into the RS-485 F connector (XS), then fully tighten the two screws on the connector (P2).

Figure 2



- 3) Connect the Ethernet cable's male RJ45 connector to the female RJ45 connector (J1) on the EXP-MBTCP-ADV board, see figure 3.

Figure 3



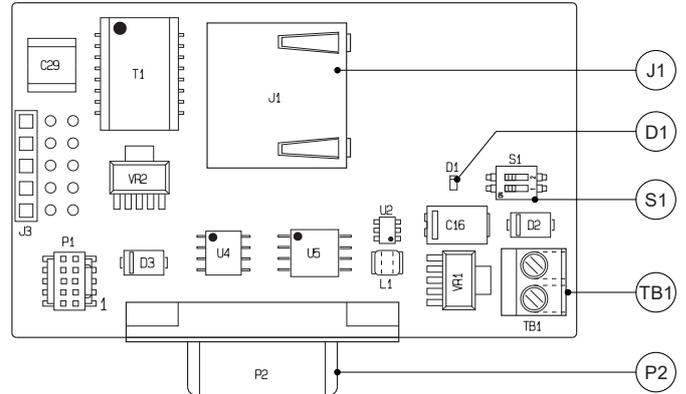
- 4) Replace the lower cover and tighten the two screws, see figure 1.



Caution

Use only the screws supplied.

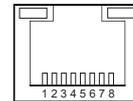
1.7. Connectors



(P2) RS-485 connector (9-pin D-SUB Male)

Pin	Signal	Description	IN/OUT
1	Internal use	-	-
2	Internal use	-	-
3	RxA/TxA	RS-485	IN-OUT
4	Equipotentiality (optional)	-	-
5	0V (reference 5V)	Power supply	-
6	+5V	Power supply	-
7	RxB/TxB	RS-485	IN-OUT
8	Internal use	-	-
9	Internal use	-	-

(J1) Ethernet RJ45 Connector



Pin	Signal	Description	IN/OUT
1	ENOTX+	Data transmission (+)	OUT
2	ENOTX-	Data transmission (-)	OUT
3	ENORX+	Data reception (+)	IN
4	N.C.	n.c.	-
5	N.C.	n.c.	-
6	ENORX-	Data reception (-)	IN
7	N.C.	n.c.	-
8	N.C.	n.c.	-

(TB1) +24V connector

Pin	Signal	Description	IN/OUT
1	+24V	Not used, reserved for future use	IN
2	0V		IN

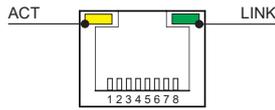
1.8. LEDs and Switches

(D1) LED Operation

The LED makes it possible to identify different modbus bridge conditions

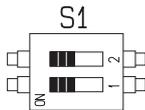
Color	Status	Meaning
Yellow	ON	Firmware Update mode: the LED signals update in progress
	OFF	Normal mode: device in operation
	Flashing (2xs)	Default parameter reset in progress
	Flashing (1xs)	Protected RTU port write mode active
	Flashing (1x2s)	Normal mode: connection in DHCP failed

(J1) Ethernet RJ45 LED Connector



Reference	Color	Displays	Status	Description
LINK (Eth0 IN)	Green	OFF	-	No connection
		ON	Connected	Device connected to a network
ACT (Eth0 IN)	Yellow	Flashing	Active	Network data is being transmitted through the port
		OFF	-	No connection
		ON	-	No communication

(S1) Dip-Switch



Switch	Default	Description
S1-1	ON	HW write protection ON = not protected OFF = protection active
S1-2	ON	Reset to default configuration ON = normal operation OFF = reset to default configuration



Caution

.....
 Dip-switch position must only be changed with the device
 switched off

1.9. Write protection

Device configuration parameters can be write-protected via HW or SW.

Write protection via HW (dip-switch S1-1):

- Switch off power to the drive, wait until the DC-LINK is discharged,
- Change dip-switch S1-1 position to OFF,
- Power the drive.

Write protection via SW (PAR 3810):

- Enter the COMMUNICATION/MODBUS CONFIG menu,
- select parameter 3810 **RTU Write Protect**,
- enable write protection by changing the setting from 0 (default) = not protected to 1 = protection active.

1.10. HW Reset

The device can be reset to default configuration using dip-switch **S1-2**. This may be done when the device cannot be reached due to incorrect network configuration.

Procedure:

- switch off power to the drive, wait until the DC-LINK is discharged
- change dip-switch S1-2 position to OFF
- power the drive
- check that LED D1 flashes in 2s intervals
- switch off power to the drive, wait until the DC-LINK is discharged
- change dip-switch S1-2 position to ON
- power the drive and access the board with a point-to-point connection at IP address 169.254.10.10.

1.11. MAC ADDRESS

The Web Server can read the device MAC ADDRESS in the MAC Address parameter PAR 9570 (COMMUNICATION/NETWORK CONFIG menu), see chapter "3. Webapp WEG_Bridge (Web Server)" on page 5.

2. Using the device

Some familiarity and knowledge of IP networking topics is required to establish communication between the drive and a PC.

2.1. Ethernet Communication

Cable type _____ category 5E shielded (min.)
Maximum length _____ 10mt.
Speed _____ 10/100 Mbit/s
Max. number of networked devices 5 users (in Modbus TCP), 1 user at a time with Webapp WEG_Bridge.

2.2. System requirements

Recommended browser:

- Google Chrome version 96.0.4664.104 or later.
- Safari version 15.2.1 or later.

Minimum resolution supported: 320 x 540.

2.3. Connection to the drive

The drive can be connected to the EXP-MBTCP-ADV board via a point-to-point connection with Static IP address (for direct PC/Drive connection) or with Dynamic IP address (for PC/Drive connection in a network).

2.3.1. Connection with Static IP (Default)

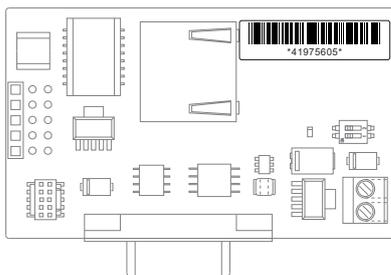
- Connect the Ethernet cable between PC Ethernet terminal and J1 (RJ45) board terminal,
- enter `http://169.254.10.10` into your browser.

2.3.2. Connection with Dynamic IP

- Connect the Ethernet cable between PC Ethernet terminal and J1 (RJ45) board terminal,
- enter `http://169.254.10.10` into your browser.
- click on **Parameters**
- click on COMMUNICATION
- click on NETWORK CONFIG
- click on PAR 9604 **IP Assignment**
- open the drop-down menu in the 'New value' field and select DHCP
- click on **Write**
- close the browser, connect the PC and drive to the network
- **A) Device identification in the same sub-network**

Access the device locally with the board serial number* by entering the following in the browser:

`http://mb-00SERIALNUMBER.DNS specific suffix/`



SERIALNUMBER: this is an 8-digit numbers and is found on the label of the EXP-MBTCP-ADV board, e.g. 41975605.

DNS specific suffix to subnetwork communication: the DNS suffix can be identified with the IPCONFIG/all command:

```
Command Prompt
Microsoft Windows [Versione 10.0.18362.1256]
(c) 2019 Microsoft Corporation. Tutti i diritti sono riservati.

C:\Users\lmariorossi>IPconfig/all

Scheda Ethernet Ethernet:

    Stato supporto. . . . . : Supporto disconnesso
    Suffisso DNS specifico per connessione: DOMAIN_NAME
    Descrizione. . . . . : Killer E2500 Gigabit Ethernet Controller
    Indirizzo fisico. . . . . : 8C-E7-BA-72-42-32
    DHCP abilitato. . . . . : Si
    Configurazione automatica abilitata . . . : Si
```

Example:

`http://mb-00SERIALNUMBER.DOMAIN_NAME/`

or:

- **B) Device identification in the same network**

In the same network as the device, access is possible if the assigned IP is known.

The assigned DHCP can be obtained via the “ping” command issued from the “Command Prompt” by a PC running in the same subnet:

```
Command Prompt
Microsoft Windows [Versione 10.0.18362.1256]
(c) 2019 Microsoft Corporation. Tutti i diritti sono riservati.

C:\Users\lmariorossi>ping mb-0041975605.DOMAIN_NAME

Esecuzione di Ping mb-0041975605.DOMAIN_NAME [172.16.1.53] con 32 byte di dati:
Risposta da 172.16.1.53: byte=32 durata<1ms TTL=255

Statistiche Ping per 172.16.1.53:
    Pacchetti: Trasmessi = 4, Ricevuti = 4,
    Persi = 0 (0% persi),
    Tempo approssimativo percorsi andata/ritorno in millisecondi:
    Minimo = 0ms, Massimo = 0ms, Medio = 0ms

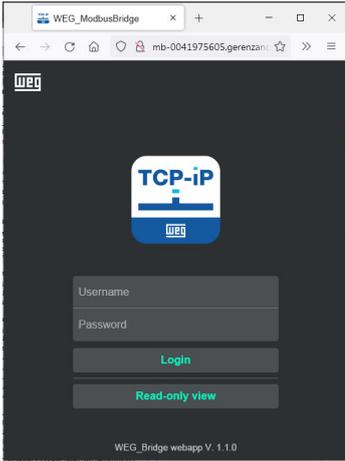
C:\Users\lmariorossi>
```

- Once device connection is established, the Login window appears, see details in the following chapter.



3. Webapp WEG_Bridge (Web Server)

3.1. Login and Access Levels Page



The first page loaded is the login page. 3 access levels (Usernames) are envisaged:

EASY: contains only the device configuration part (Wizard) and the basic Mod-bus + Network settings. The default password is Easy.

EXPERT: contains the Easy part + the device update section. Enables editing of EASY and EXPERT level passwords. The basic password is Expert.

SERVICE: reserved for GEFRAN Technical Support.

EXP-MBTCP-ADV card serial number.

9546	WiFi S/N	0
Reserved for future use.		
184	Application name	0
Reserved for future use.		
174	Firmware version	0.12.5
Application firmware version.		
498	Firmware Build	13/06/2022 15.18.54
Card programming date and time.		
182	Boot version	0.3.0
Card boot version.		
9544	WiFi Fw version	0.0.0
Reserved for future use.		
192	Application version	0.0.0
Reserved for future use.		

BRIDGE/USERS

Menu for managing access level parameters: display and change current Username and Password. If modified, it prompts you to run the "Save all parameters" command.

Note! In this menu, the min/max length indicated in section 3.6 Settings does not apply.

IPA	Parameter name	Read
9610	Readonly Username	readonly
Username for Readonly menu.		
9618	Readonly Password	readonly
Password for Readonly menu.		
9626	Easy Username	easy
Username for Easy menu.		
9634	Easy Password	easy
Password for Easy menu.		
9658	Expert Username	expert
Username for Expert menu.		
9666	Expert Password	expert
Password for Expert menu.		

BRIDGE/MONITOR

Display menu.

IPA	Parameter name	Read
3820	Modbus forwarded packets	0
Packages sent by module.		
3822	Modbus error packets	0
Number of incorrectly addressed packets.		
3824	Response average time	0.0 ms
Average response times on RTU network.		
3826	Response minimum time	0.0 ms
Minimum response times on RTU network.		
3828	Response maximum time	0.0 ms
Maximum response times on RTU network.		
1000	Bridge status	9
Display of a status WORD indicating device operation. The WORD is composed as follows:		

Read-only-view: Makes it possible to access the app in monitor mode without a password.

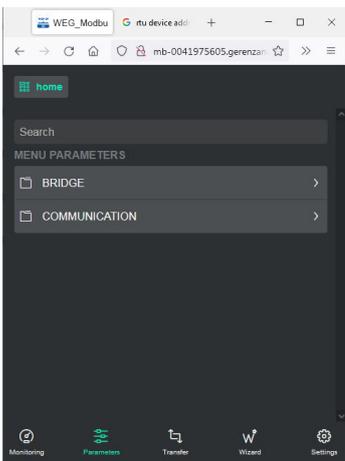
3.2. Home page



All WebApp functions can be accessed from the main page.

Wizard and Support are not available in Easy mode.

3.3. Parameters



To access the BRIDGE and COMMUNICATION menus.

Buttons for quick access to the main Webapp pages (Home, Parameters, Transfer, Wizard and Settings) are present at the bottom of the page.

BRIDGE

The parameters in this menu display board information.

BRIDGE/INFO

IPA	Parameter name	Read
520	Product S/N	41975605

BIT 0:
0: indicates an anomaly,
1: the software is active (general check).

BIT 1, Dip-Switch S1-1 configuration (reset default):
0: normal operation,
1: DIP-SWITCH in reset position

BIT 2, Dip-Switch S1-2 configuration (write protection):
0: function off
1: write-protection active;

BIT 3, address configuration
0: static address,
1: dynamic DHCP address

BIT 4
0: normal operation DHCP or static,
1: DHCP IP search failed and system switched to LOCAL-HOST configuration.

COMMUNICATION

Menu for modbus TCP/IP and RTU configuration.

COMMUNICATION/MODBUS CONFIG

IPA	Parameter name	Default
3800	TCP port	502
TCP port address.		
3802	RTU baudrate	38400
Setting the RTU serial communication speed.		
3804	RTU parameter	None,8,1
Setting the RTU serial line format.		
3806	RTU timeout	1500 ms
Setting the response reception Timeout.		
3808	RTU Turnaround	0 ms
Indicates the permissible slave response delay. If left at 0ms, it is handled automatically.		
3810	RTU Write Protect	0
Enables the write protection parameters 0 = not protected, 1 = protection active		
3812	RTU Device Address	1
Setting the device address.		

COMMUNICATION/NETWORK CONFIG

IPA	Parameter name	Default
9556	IP Address set	169.254.10.10
Displays the IP address in use.		
9558	IP Netmask set	255.255.0.0
Enters the subnet IP address entry.		
9560	IP Gateway set	0.0.0.0
Enters the gateway IP address.		
9604	Ip Assignment	DHCP
IP address assignment (DHCO or Static).		
9562	IP Address	172.16.1.53
Enters the network IP address.		
9564	IP Netmask	255.255.0.0
Subnet IP address in use.		
9566	IP Gateway	0.0.0.0
Gateway IP address in use.		

9570 **Mac address** **88c9b3a00103**

Displays the drive's MAC address.

9528 **WiFi Network Name**

Reserved for future use.

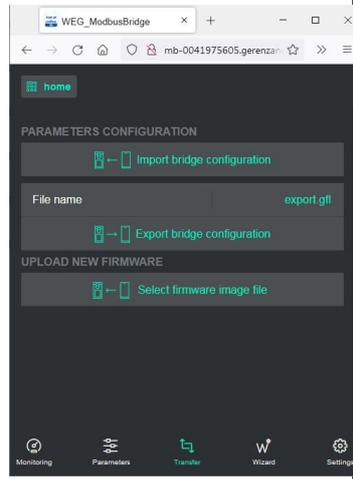
9536 **WiFi Network Pass**

Reserved for future use.

9554 **WiFi Network Channel** **0**

Reserved for future use.

3.4. Transfer



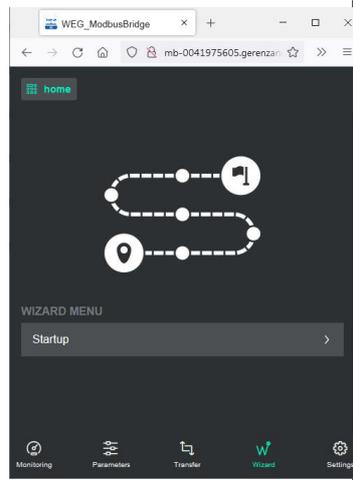
Import bridge configuration (*): to import a previously saved configuration.

Export bridge configuration: to export the current configuration.

Select firmware image file (*): to update the device FW.

(*) not available in Easy

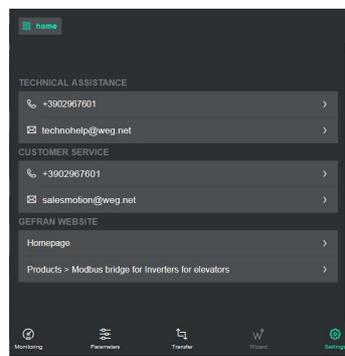
3.5. Wizard



Wizard to configure the main Modbus TCP and Modbus RTU parameters.

Not available in Easy

3.6. Support



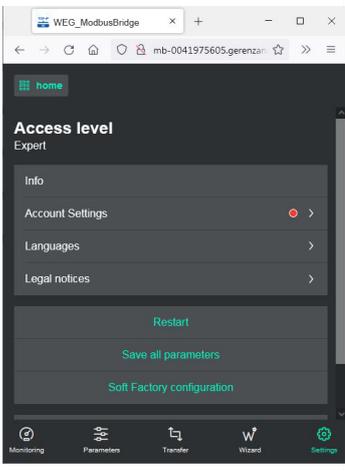
This section lists all contacts for support, customer service and direct links to pages on the GEFRA website.

3.7. Info



Displays the firmware version and EXP-MBTCP-ADV Card serial number.

3.8. Settings



The first line at the top, below the Home button, displays the current access level (Expert in the example)

Note! The red LED is displayed if the default password for the current access level has not been changed

Info: displays the firmware version and EXP-MBTCP-ADV Card serial number.

Clicking on **Support** calls up a list of all contacts for support, customer service and direct links to pages on the Gefran website.

Account Settings: credentials management menu. Not available in Easy mode.

To change access credentials, proceed as follows:

- Enter the current password in the "Your password" box
- Select the credentials you want to change under "Role you want to change".
- Enter the new username and password
- Confirm the new password.

Note! Username and password must be between 6 and 12 characters long. The types of characters that can be used are upper case letters, lower case letters, numbers and the following special characters:

! # \$ % & () * + , - . / : ; < > = ? @ [\] ^ _ { | }

Languages: language selection, English (default), Español and Italiano available.

Legal notices: General Service Terms and Conditions.

Restart: Caution! This command reboots the device and you will be disconnected.

Save all parameters: Caution! This command saves the modified Modbus EXP-MBTCP-ADV converter parameters.

Soft factory configuration: resets all parameters to default settings except for COMMUNICATION/Network Config menu parameters.

Logout: disconnects the Webapp server..

3.8.1. Credentials management error messages

Message	Cause	Solution
Provided credential are invalid	The 'Your password' field is incorrect	Enter correct password
Malformed credential	The newly entered credentials do not meet compliance parameters	Make certain that the credentials are between 6 and 12 characters long. Admissible characters: upper case letters, lower case letters, numbers Special characters: ! # \$ % & () * + , - . / : ; < > = ? @ [\] ^ _ { }
Username already in use	The username entered is already used for another access level	Enter a different username
Internal error	Credentials could not be updated	Check connection. Try again.

4. WEG_eXpress Tool

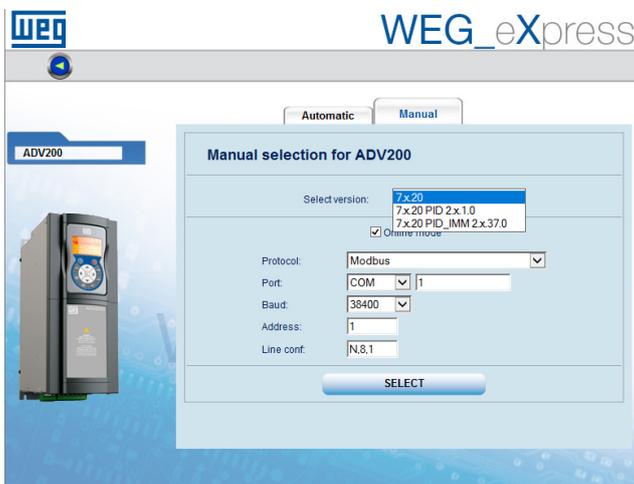
To configure device parameters from WEG_eXpress, the function must be enabled within the TCP/IP communication tool.

Procedure:

1. Open the WEG_eXpress tool and select DRIVES, then select INVERTER and choose the ADV200 family of drives from the drop-down menu:

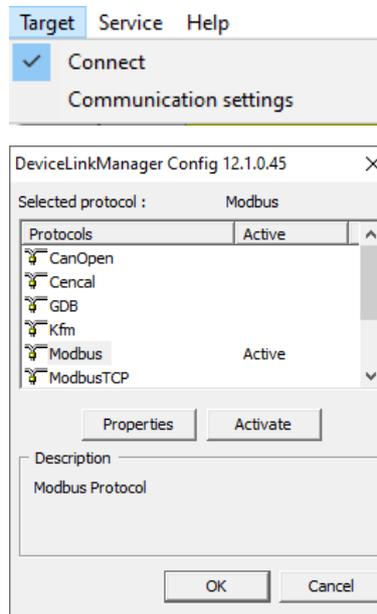


2. Click **Manual** to set manual configuration (automatic mode is not available);
3. Select the FW of the connected drive (click **Select version**) and then set the communication data and press **Select**.



- Protocol: **Modbus**
- Port: **COM, 1**
- Baud: **38400**
- Address: **1**
- Line conf: **N,8,1** (frame settings)

4. To enable communication with TCP / IP, open the **Target / Communication settings** drop-down menu and select **ModbusTCP**:



5. Click **Activate** and then **Properties**; this calls up a window where the IP address and Modbus address can be set for the connected device.

Press OK

