Quick start guide

X2 to BFI E3 Modbus TCP – iX script module

SER0060 – X2 ModBusTCP to BFI E3-MTP example

Beijer ELECTRONICS

1 Function and area of use

This document explains how to connect, configure and control one or multiple Beijer Frequency Inverters E3-MTP via ModBusTCP.

2 About this document

This quick start document should not be considered as a complete manual. It is an aid to be able to startup a normal application quickly and easily.

Use the following items to obtain a stable application:

In this document we have used following software and hardware

- iX Developer 2.40 SP5 / SP6
- X2 base/pro/marine/control/extreme series

For further information refer to

- iX Developer Reference Manual (MAxx831)
- iX Developer User's Guide (MAxx832)
- BFI-E3 User Guide
- BFI-E3 Start-Up Manual KI00369B
- Beijer Electronics knowledge database, HelpOnline

This document and other quick start documents can be obtained from our homepage.
Please use the address *support.europe@beijerelectronics.com* for feedback.

3 Table of Contents

4 Preparing the Communication

This section describes the settings both for the BFI and the iX ModBus Master controller and some other helpful information.

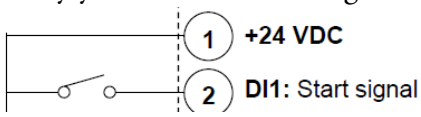
4.1 BFI parameter settings

BFI-E3:
- P12=3. Modbus TCP control with Acceleration and Deceleration time in parameter P-03/ P-04.
- P12=4. Modbus TCP control with Acceleration and Deceleration time sent by Modbus TCP.

Adjust if necessary:
- P14=201 to make all parameters available.
- P36 = Station number must be 1.
- P36 = Communication speed must be 115,2 Kbits/sec.
- P36 = Timeout.
  t => BFI will trip when no communication
  r => BFI will coast to stop

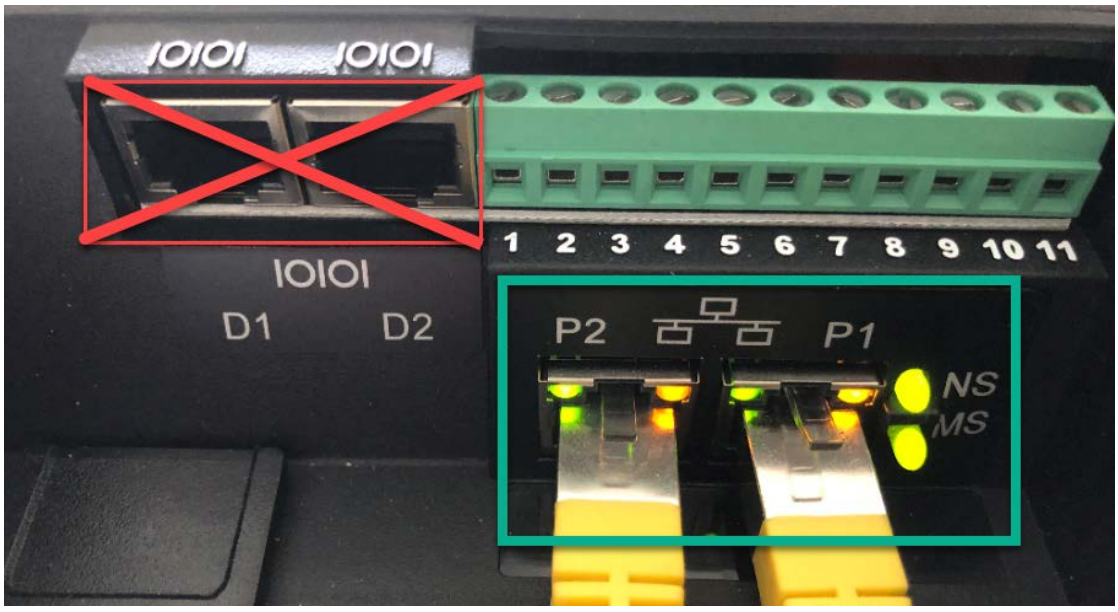
Function can either be disabled by setting 0 second or set to 30, 100, 1000 or 3000 milliseconds

Additionally you either have to brige Pin1 and Pin2 or use the start/direction switch to set the start signal.



4.2 BFI Ethernet ports

The 2 Ethernet ports are marked P1 and P2 and have the same IP-address.
The 2 ports on the left side marked D1 and D2 are serial ports not intended for Ethernet. Faulty connection of cables might cause damage to either BFI-E3 or other equipment.



4.3 Indication of status on LED of BFI-E3

Example of LED indication of ethernet ports in BFI-E3.

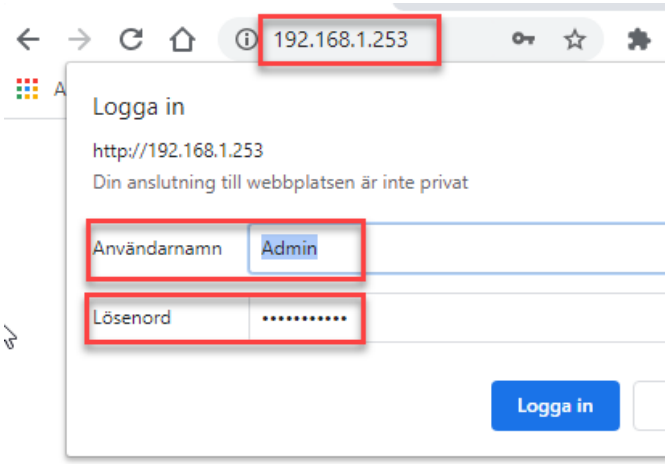
Communication working

Communication interruption

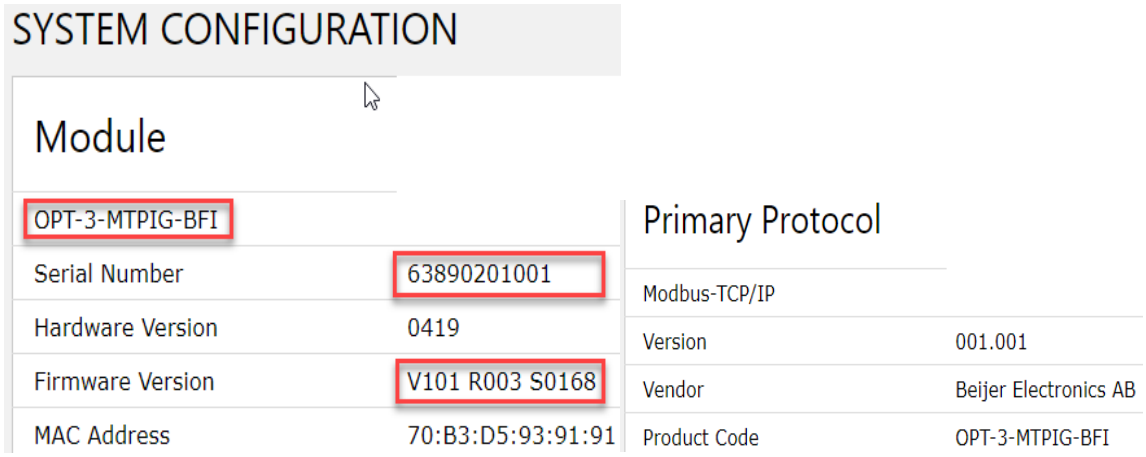
Network Status Indicator, NS	
State	**Indication**
Steady Off	BFI is not powered up or no IP address
Flashing Green	Online, no Modbus TCP connections active
Steady Green	Online, Modbus TCP connections active
Flashing Red	Connection Timeout after working Modbus TCP connection
Steady Red	Duplicate IP address

5 Web server in BFI-E3

Default IP-address of BFI-E3 is 192.168.1.253 and Subnet: 255.255.255.0
Enter IP-address in the web browser. Username is Admin and Password is the serial number of the BFI.



5.1 Module Configuration



- OPT-3-MTPIG-BFI is the name for the internal Modbus TCP board .
- The serial number is the identification for the complete BFI.
- Hardware version is 0419
- Latest available firmware in October 2020 is V101 R003 S0168

5.2 Network Statistic

STATISTICS: NETWORK

Socket Type	State	Local Port	Timer	Remote Address	Remote Port
UDP	-	69	-	-	-
TCP	ESTABLISHED	80	120	192.168.1.29	63988

- 192.168.1.29 is the IP-address of the PC. Local port 80 with Socket type TCP is the web browser connection with BFI.

TCP	ESTABLISHED	47850	9	192.168.1.29	63944

- 192.168.1.29 is the IP-address of the PC. Local port 47850 with Socket type TCP is PC-program BFI-Tools running on the PC.

TCP	ESTABLISHED	502	120	192.168.1.40	49152

- 192.168.1.40 is the IP-address of one X2-Control.

5.3 Modbus Statistics

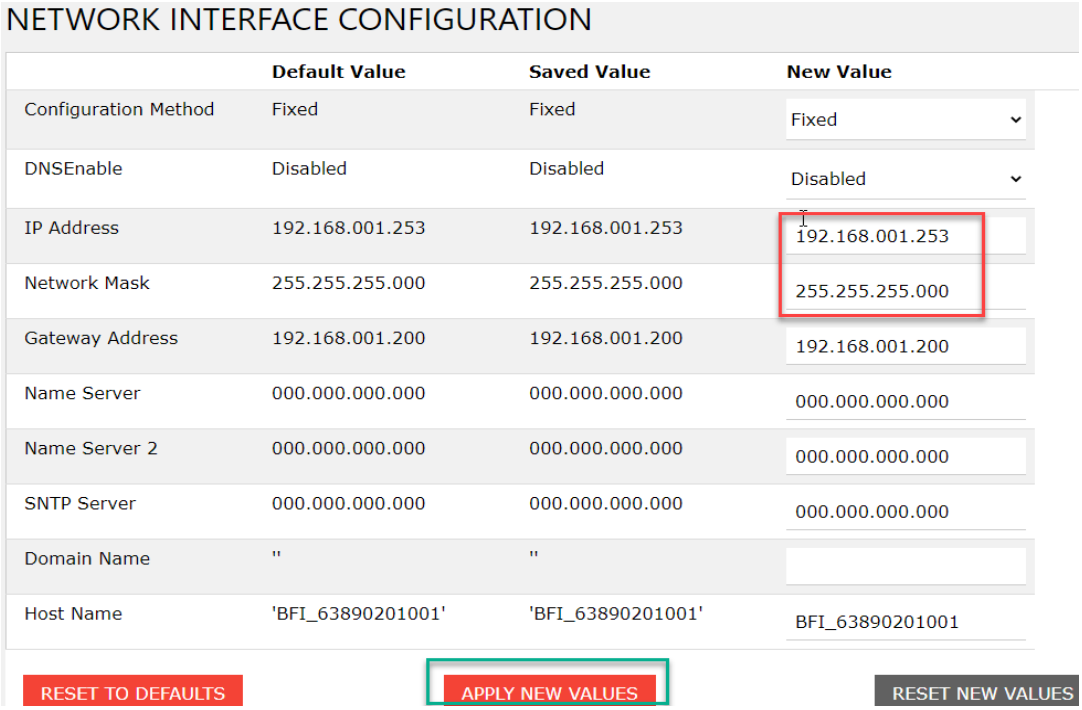
Correct working communication without any fault should look like below. Counter of Transmitted, Received and Successful Transmissions are calculating upwards Error counters stays at 0.

STATISTICS: MODBUS

	Count	
Transmitted Messages	8064	To Modbus/SL Slave(s)
Transmitted Bytes	40325	To Modbus/SL Slave(s)
Received Messages	8064	From Modbus/SL Slave(s)
Received Bytes	88646	From Modbus/SL Slave(s)
Broadcast Messages	0	To Modbus/SL Slave(s)
Successful Transactions	8064	
Server Exceptions	0	Modbus/SL Slave returned an exception code
Unsuccessful Transactions	0	Modbus/SL Slave response was not detected
Checksum Errors	0	Received messages with CRC errors
Unexpected Messages	0	Modbus/SL Slave returned out of sequence response
Other Errors	0	

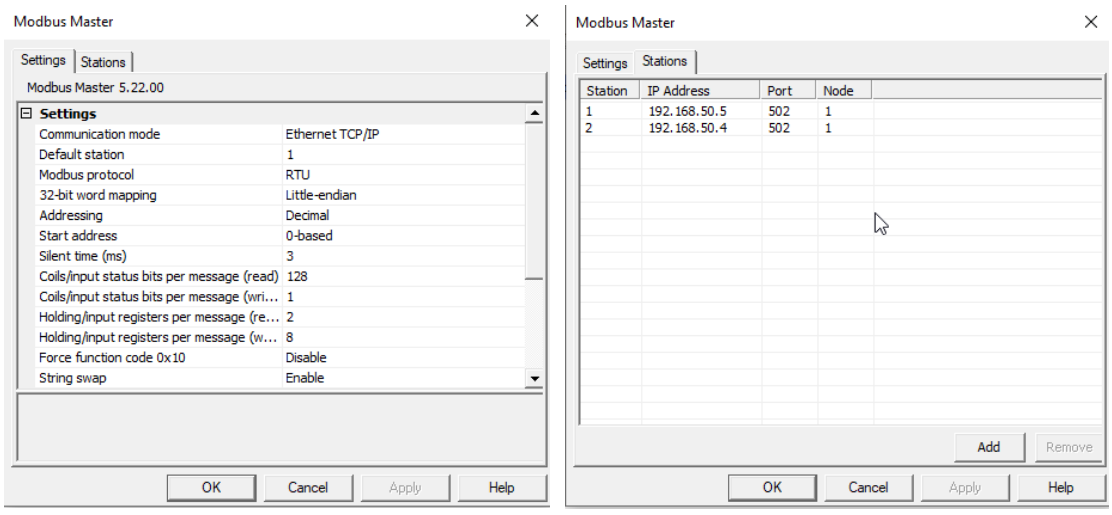
5.4 How to change IP-address and Network mask

- Enter new IP-address and/or Network Mask
- Push on Apply New Values



5.5 iX ModBusTCP settings

Configure the controller settings as shown below.



5.6 ModBusRTU and ModBusTCP parallely

It is not possible to run ModBus RTU and ModBus TCP at the same time!

6 The iX Project

The most important screens of the iX are the Main menu (Demo_Main) and the All Parameters menu (Demo_AllPar).

Besides these 2 screens there are a couple of other nice to have screens.

6.1 Main Menu

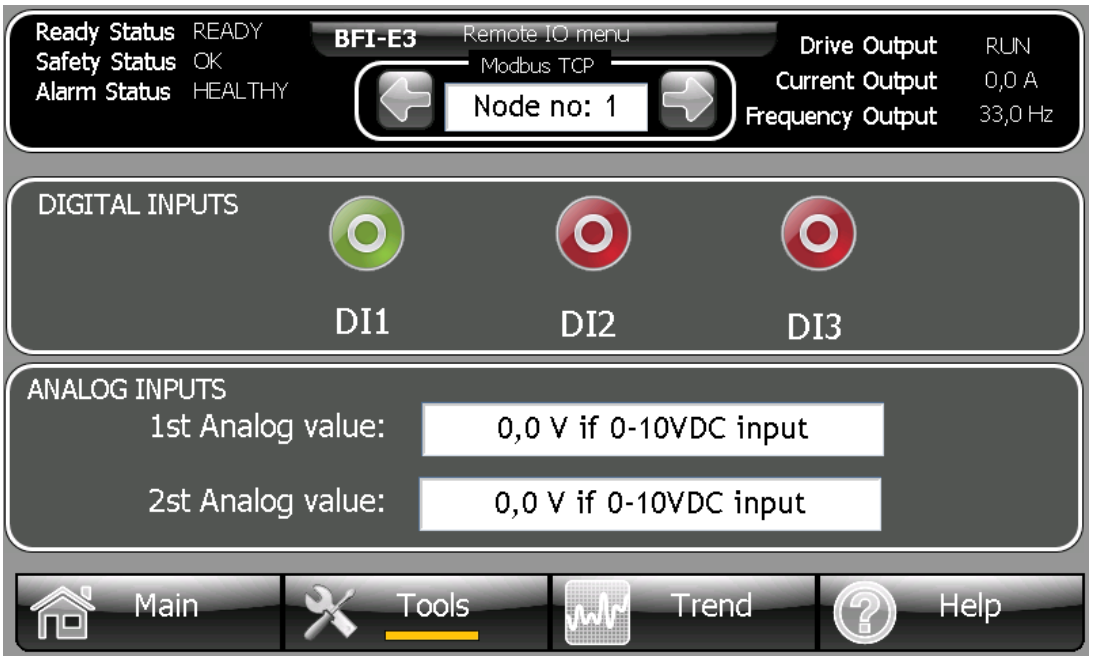
On this screen you get feedback from the BFI concerning it´s type (BFI-E3) and you see the most import status and output data. In addition to that you can set the frequency, start/stop the BFI and you can also switch between multiple BFI´s by changing the Node Id.

6.2 All Parameters Menu

On this screen you can read and write the BFI parameters.

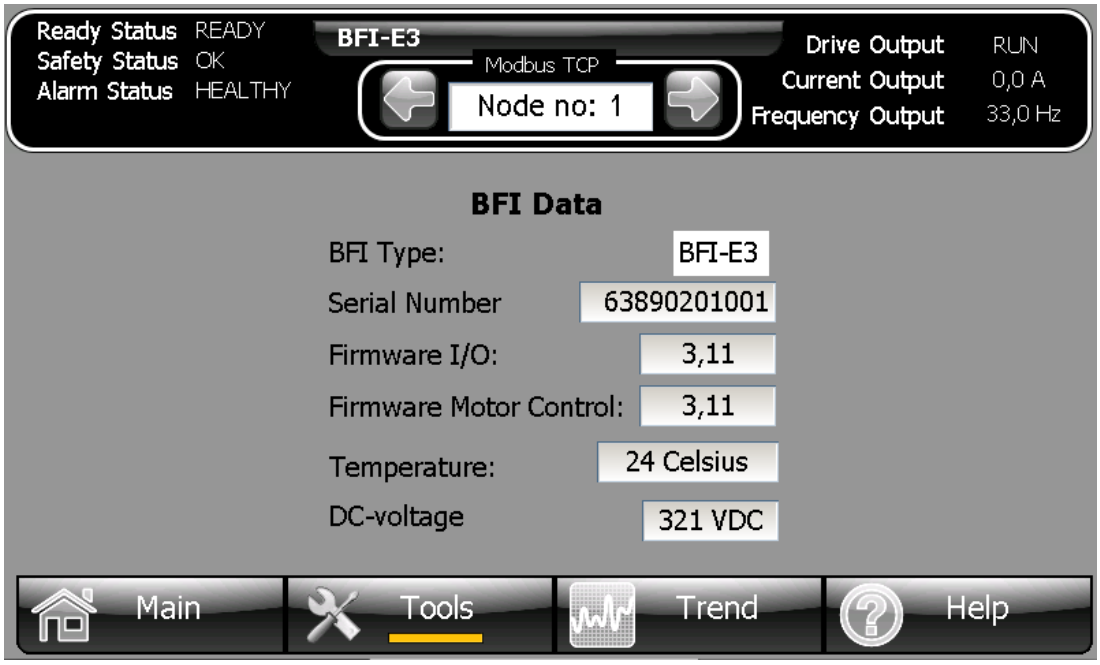
6.3 Remote IO Menu

On this screen you can see the sate of the digital and analog Inputs.

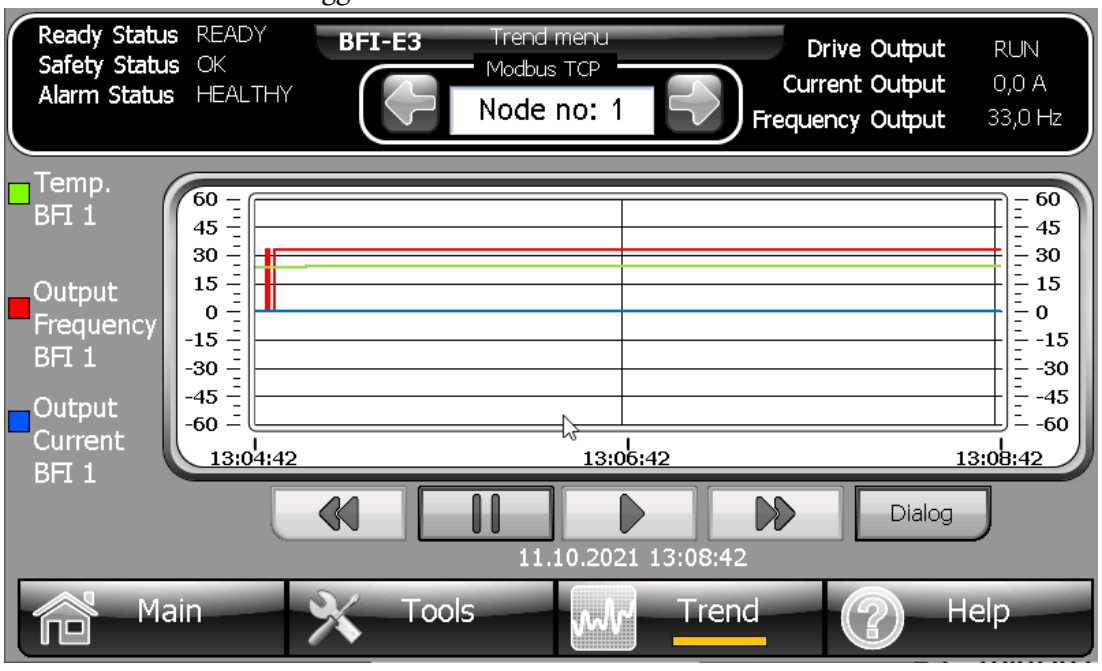


6.4 Other Screens

General BFI information.



Trend based on a DataLogger.

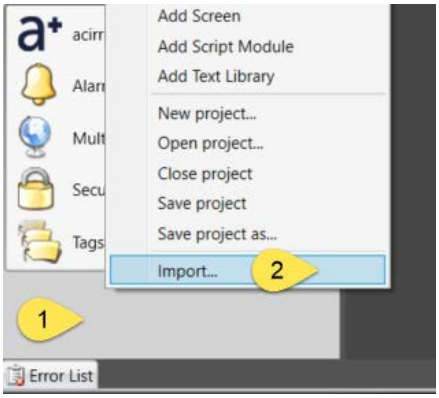


Additionally there are a Help screen and a System Information screen.

This example works well for X2 baseV2/pro/marine/control/extreme series devices.

Please follow below guidelines how to install into your application.

7 Import the project parts



Follow the steps to add the enclosed screenS and the script module to your iX project:

1. Unpack the enclosed example ZIP-file to a temporary folder.
2. Start iX Developer and load your project.
3. In the Project Explorer, right-click in the lower left corner (1. in the picture)
4. In the list, select Import... (2. in the picture)
5. Navigate to the temporary folder, where you unpacked the ZIP-file and select ScriptModule_iX_BFI_E3_ModbusTCP.neo, click [Open].
6. Select TextLibrary.neo, click [Open].
7. Select Background.neoxaml, click [Open].
8. Select Demo_Main.neoxaml, click [Open].
9. Select Demo_AllPar.neoxaml, click [Open].
10. Optionally Select Demo_Drive_Info.neoxaml, click [Open].
11. Optionally Select Demo_Help.neoxaml, click [Open].
12. Optionally Select Demo_RemoteIO.neoxaml, click [Open].
13. Optionally Select Demo_Tools.neoxaml, click [Open].
14. Optionally Select Demo_Trend.neoxaml and DataLogger1.neo, click [Open].
15. Optionally Select Diagnostic.neoxaml, click [Open].
16. Assign the Background screen to all imported screens.
17. If you get validation errors when building the project, export the all Tags of the example project and import/merge it with your project Tags.
18. Check the DataTypes of all Tags, Scaling, Initial Values, Index Registers and connected Tag Actions as some properties are not exported/imported!
19. Done!

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