Danfoss MG92N102 BACnet MS TP UBR-01 Communication with MBS Router User Guide

Contents

SIEMENS

Danfoss MG92N102 BACnet MS TP UBR-01 Communication with MBS Router

Product Information

Specifications

- **Product Name:** BACnet MS/TP UBR-01 Router
- **Manufacturer:** Danfoss
- **Website:** vlt-drives.danfoss.com

FAQ

- **Q:** Where can I find additional resources for setting up the UBR-01?
  - **A:** Additional resources for setting up the UBR-01 can be found at www.mbsugw.de/ubr-01bacnet-router/.
- **Q:** What should I do to ensure proper functionality of the BACnet MS/TP network?
  - **A:** Make sure to correctly cable the BACnet MS/TP network, paying attention to cable shield mounting and network termination. Do not connect the shield to terminal 61 on the frequency converter.

Introduction

Purpose of the Manual

This user guide provides information on the configuration and use of the universal BACnet Router UBR-01 from MBS with Danfoss VLT® HVAC Drive FC 102 and VACON® 100 HVAC, using the embedded BACnet MS/TP communication.

The user guide details:

- The electrical connection of the RS485.
- The IP settings of the PC.
- The settings of the UBR-01 router.
- The relevant communication parameters of the frequency converter.

For further settings of the UBR-01, refer to **www.mbsugw.de/ubr-01bacnet-router/**.

- VLT® is a registered Danfoss trademark.
- VACON® is a registered trademark.
- BACnet® is a registered trademark of ASHRAE.

Additional Resources

Resources available for the frequency converters and optional equipment:

- The VLT® HVAC Drive FC 102 Operating Guide provides the necessary information for getting the frequency converter up and running.
- The VLT® HVAC Drive FC 102 Design Guide provides detailed information about capabilities and functionality to design motor control systems.
- The VLT® HVAC Drive FC 102 Programming Guide provides greater detail on working with parameters and many application examples.
- The VACON® 100 BACnet Installation Manual describes how to commission and parameterize the BACnet protocol.
- The VACON® 100 HVAC Application Manual provides greater detail on the parameters and application examples.

Supplementary publications and manuals are available from Danfoss. See **drives.danfoss.com/knowledge-center/technical-documentation/** for listings.

Product Overview

Use the BACnet MS/TP UBR-01 router to enable communication in a BACnet network. The router is the device sending messages through the network. The messages can be from master to slave or slave to master, and the router can trigger alarms and/or warnings if the communication is lost.

Symbols, Abbreviations, and Conventions

Table 1.1 Symbols and Abbreviations

Abbreviation	Definition
BMS	Building management system
EMC	Electromagnetic compatibility
IP	Internet protocol
PC	Personal computer
TCP	Transmission control protocol

Conventions

- Numbered lists indicate procedures.
- Bullet lists indicate other information and description of illustrations.
- Italicized text indicates the following:
  - Cross-reference.
  - Link.
  - Parameter name.
  - Parameter option.
  - Parameter group name.
- All dimensions are in metric values (imperial values in brackets).
- An asterisk (*) indicates the default setting of a parameter.

Network

Network Set-up

The system consists of 2 networks:

- Ethernet network (shown as Network number 1-NW#1)
- BACnet MS/TP network (shown as Network number 2-NW#2)

For the correct function of this network system, it is mandatory to follow the instructions on installation of the communication cables given in this user guide.

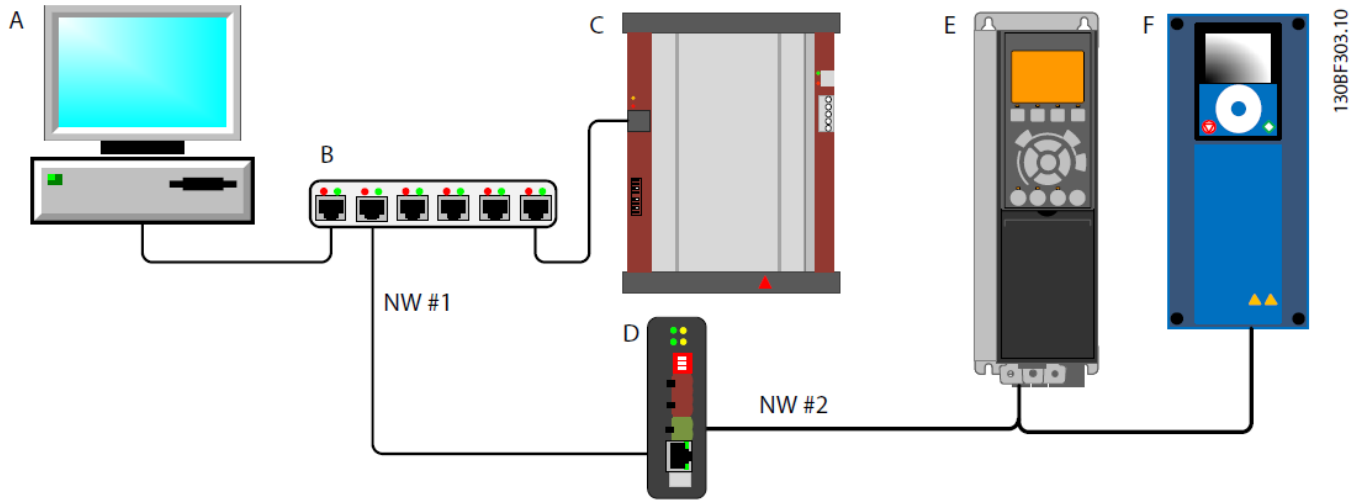


Illustration 2.1 Router Running BACnet Ethernet

A	PC with web browser
B	Ethernet switch
C	BMS controller
D	UBR-01 BACnet Ethernet to MS/TP router
E	VLT® HVAC Drive FC 102
F	VACON® 100 HVAC
NW #1	Ethernet network, network number 1
NW #2	BACnet MS/TP network, network number 2

Cabling of the Networks

BACnet MS/TP Cabling (NW #2)

To ensure correct functionality of the BACnet MS/TP network, be sure to do the cabling correctly. Pay special attention to mounting of the cable shield and to termination of the network.

NOTICE

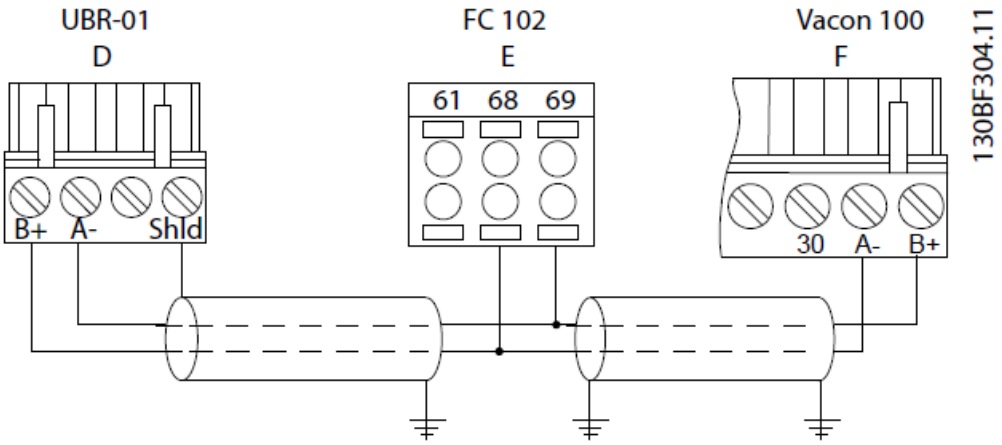


Illustration 2.2 Grounding Shielded Cables

- Never connect the shield to terminal 61 on the frequency converter.

Shielding of frequency converters connected to the same ground potential

1. Use an adequate equalizing cable to eliminate the risk of equalizing current running into the shield of the BACnet cables.
2. Mount the shield at the terminal marked Shld on the router.
3. On the frequency converters, connect the shield to the ground shield brackets.

Shielding of frequency converters without the same ground potential

- If the frequency converters do not have the same ground potential, only connect the shield to ground in 1 location.
- Expect a lower EMC performance.

Ethernet Cabling (NW #1)

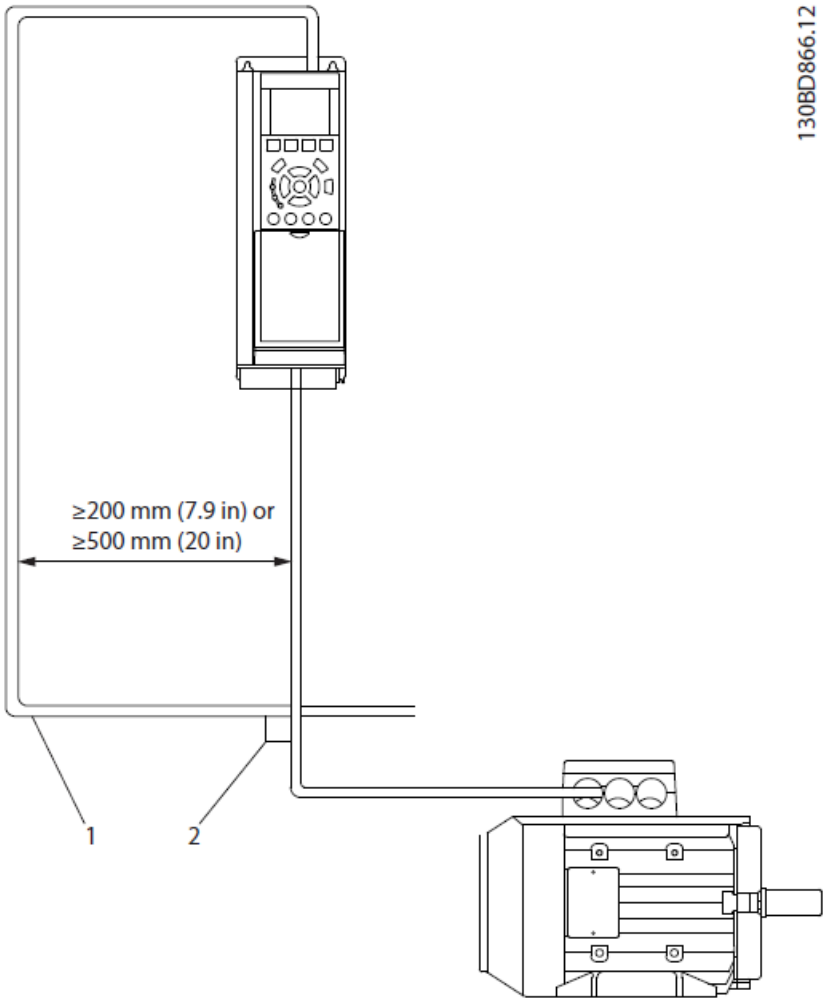
NOTICE: EMC INTERFERENCE

Use shielded cables for motor and control wiring, and separate cables for fieldbus communication, motor wiring, and brake resistor. Failure to isolate fieldbus communication, motor, and brake resistor cables can result in unintended behavior or reduced performance. Minimum 200 mm (7.9 in) clearance between power, motor, and control cables is required. For power sizes above 315 kW (450 hp), increase the minimum distance to 500 mm (20 in).

NOTICE

- When the fieldbus cable crosses a motor cable or a brake resistor cable, ensure that the cables cross at an angle of 90°.

Illustration 2.3 Cable Routing



1	Ethernet cable
2	90° crossing

For the Ethernet, use standard shielded Cat5e patch cables. Maximum cable length is 100 m (328 ft).
An Ethernet switch distributes the packets to the participants on the Ethernet network. For industrial installation, only use industrial graded products as other products may cause faults and sporadic loss of communication.

Addressing and Setting up the Devices on the Networks

For proper function of the network, configure each device correctly.

Table 3.1 BACnet and Ethernet Settings

Device	Product	Device instance	MAC address	Network number	Baud rate	IP address	Subnet mask
A	PC	10000	N/A	N/A	N/A	192.168.0.xxx	255.255.255.000
B	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	N/A	1	N/A	1	N/A	N/A	N/A
D	UBR-01 router, RS485	100	0	1 & 2	38400	192.168.0.1	255.255.255.0
E	VLT® HVAC Drive FC 102, 1st frequency converter	1001	1	N/A	38400	N/A	N/A
F	VACON® 100 HVAC, 2nd frequency converter	1002	2	N/A	38400	N/A	N/A

Setting up the IP Address and Subnet Mask of the PC

On the PC, set up the IP address in the Internet Protocol Version 4 (TCP/IP) Properties configuration menu.

1. Open the Control panel window.
2. Select View network status and tasks.
3. Select Local Area Connection.
4. Select Properties.
5. Select Internet Protocol Version 4 (TCP/IPv 4).
6. Select Properties.
7. Select Use the following IP address.
8. Set the IP address to 192.168.0.xx, where xx must be a number not currently used on the network.
9. Set the subnet mask to 255.255.255.000.
10. Exit the windows to activate the new IP addresses.

Setting up the UBR-01

To route to and from the MS/TP network, configure the UBR-01 router via the router web page.
As factory setting, the UBR-01 has the IP address 192.168.0.1.

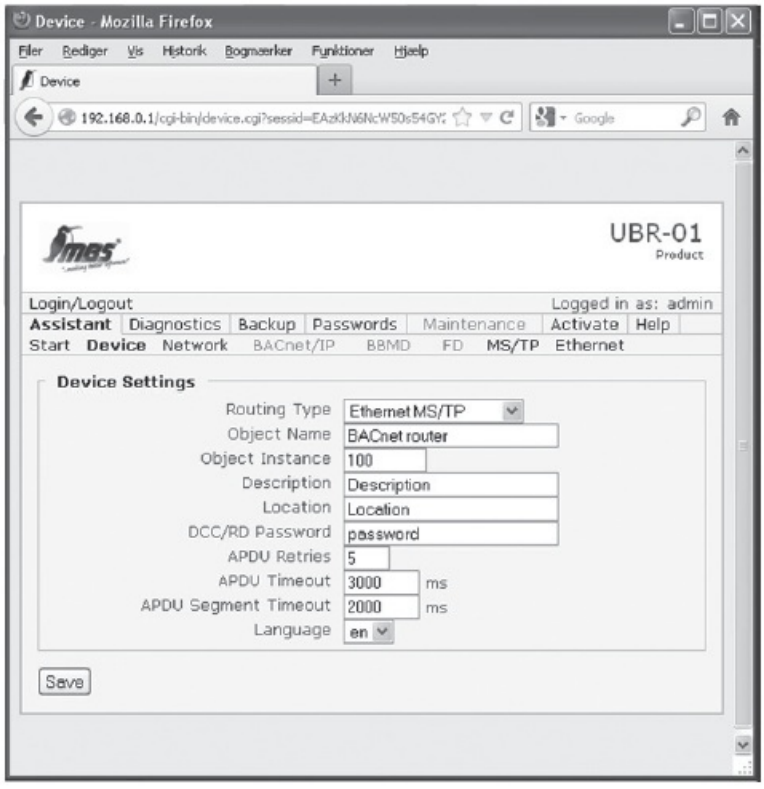
1. Enter the IP address 192.168.0.1 in the web browser address bar.
2. Press Enter.

130BF307.10

Illustration 3.1 Entering the IP Address in the Web Browser

- The main page of the router web page opens.

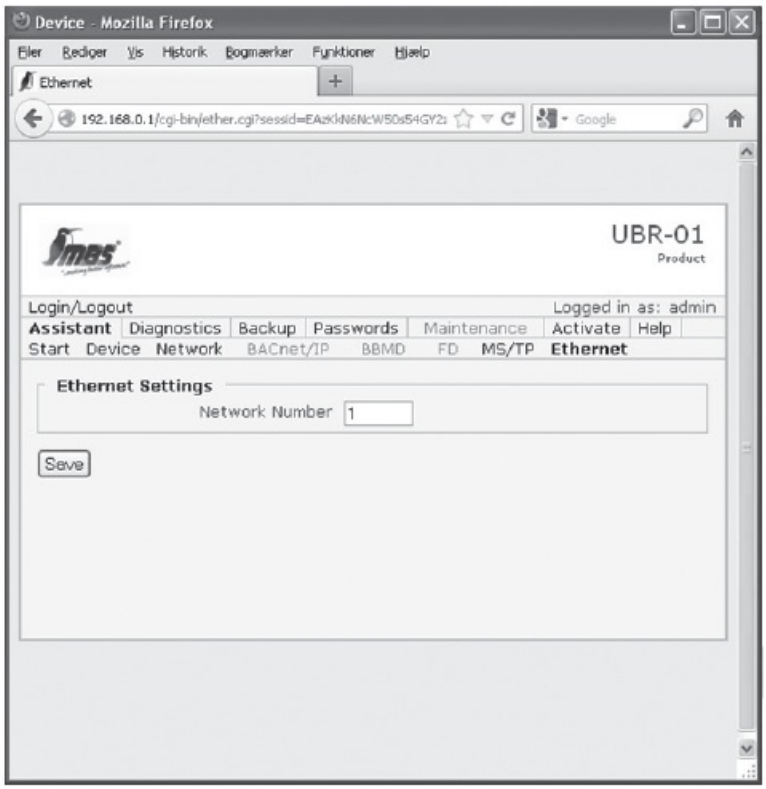
3. Consult the manual for the UBR-01 for login and password. Danfoss recommends to change the default login and password, since keeping the default is a security vulnerability.
4. Open the Device menu.



130BF308.10

Illustration 3.2 Settings in the *Device* Menu

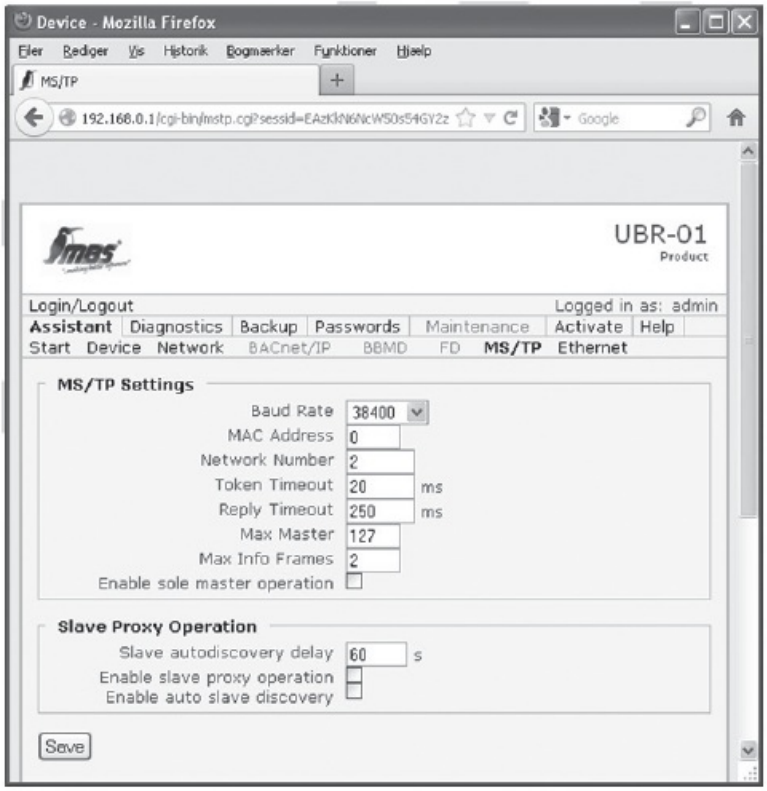
5. Enter the settings shown in Illustration 3.2.
6. Click Save.
7. Open the Ethernet menu.



130BF309.10

Illustration 3.3 Settings in the *Ethernet* Menu

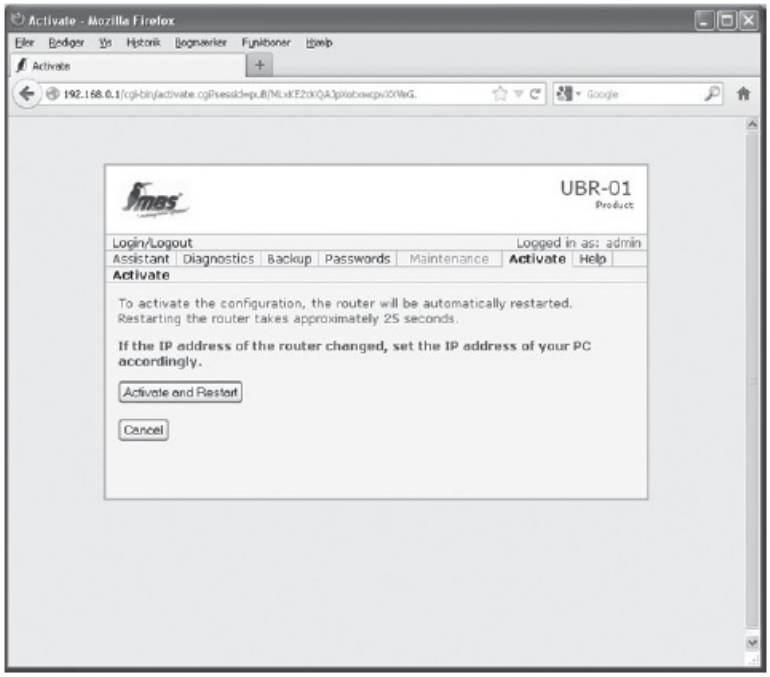
8. Enter the settings shown in Illustration 3.3.
9. Click Save.
10. Open the MS/TP menu.



130BF310.10

Illustration 3.4 Settings in the *MS/TP* Menu

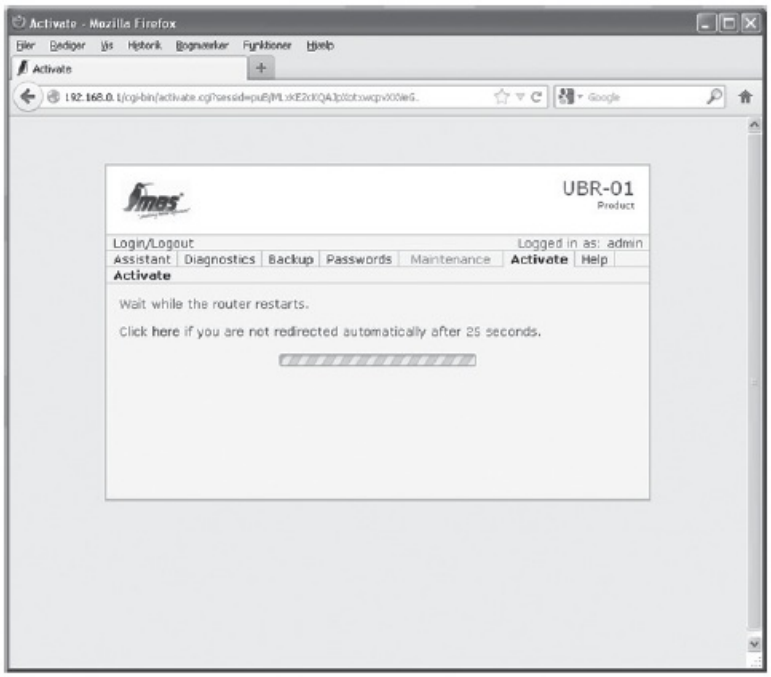
11. Enter the settings shown in Illustration 3.4.
12. Click Save.
13. Open the Activate menu.



130BF311.10

Illustration 3.5 Settings in the *MS/TP* Menu

14. Click Activate and restart to activate the settings, see Illustration 3.5.



130BF312.10

Illustration 3.6 Router Restarting

1. The router restarts and the new settings become active, see Illustration 3.6.

Configuring the Frequency Converters

To enable the frequency converters to communicate over the embedded BACnet MS/TP network, set the parameters listed in Table 3.2 and Table 3.3.
For correct programming of the frequency converter, see the VLT® HVAC Drive FC 102 Programming Guide for details on setting up motor size, motor voltage, ramp times, and more.

Table 3.2 Required Communication Parameters and their Correct Settings, VLT® HVAC Drive FC 102

Parameter	Setting
	First frequency converter (E)
Parameter 8-01 Control Site	[2] Control word only
Parameter 8-02 Control Source	[1] FC Port
Parameter 8-03 Control Timeout Time	10.0 s1)
Parameter 8-04 Control Timeout Function	[2] Stop1)
Parameter 8-10 Control Profile	[0] FC Profile
Parameter 8-30 Protocol	[5] BACnet
Parameter 8-31 Address	1
Parameter 8-32 Baud Rate	[4] 38400 Baud
Parameter 8-70 BACnet Device Instance	1001

Table 3.3 Required Communication Parameters and their Correct Settings, VACON® 100 HVAC

Parameter	Setting
	Second frequency converter (F)
Parameter 3.2.1 Control Place	FieldbusCTRL
Parameter 3.2.2 Local/Remote Control	Remote
Parameter 5.8.3.1.5 Communication Timeout	10.0 s1)
Parameter 3.9.1.6 (ID 733) Fieldbus Fault	Stop
Parameter 5.8.1.1 Protocol	BACnet MSTP
Parameter 5.8.3.1.2 MAC Address	2
Parameter 5.8.3.1.1 Baud Rate	38400
Parameter 5.8.3.1.3 Instance Number	1002

- **1)** To achieve a stable system, it is recommended that 3 write commands are sent within the timeout set in parameter 8-03 Control Timeout Time.

Testing the BACnet Settings in a Delta BMS System

For testing the settings in the UBR-01 router and in the frequency converters, a BMS tool is used for:

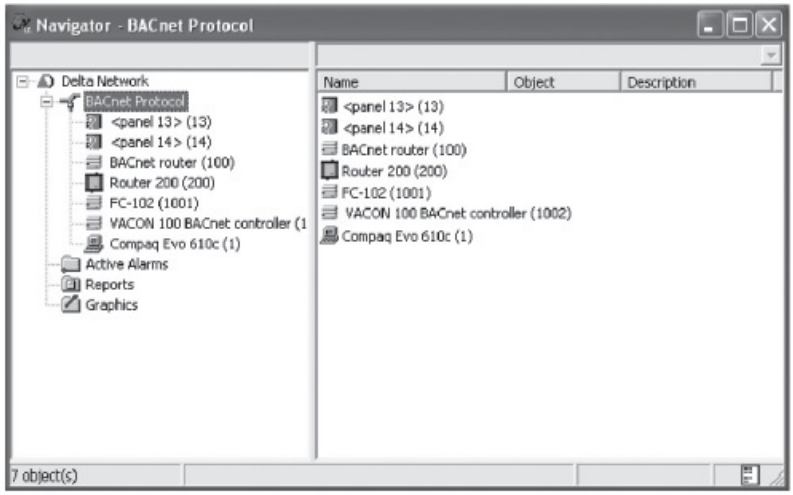


Illustration 4.1 BMS Tool Scanning the Network

- Scanning the network.
- Find the BACnet devices.
- Showing the device objects.

By selecting the frequency converter with device instance 1001, the BMS starts the discovery of the frequency converter objects and shows their present value. This proves the correct function of the UBR-01 and the frequency converters connected via BACnet.

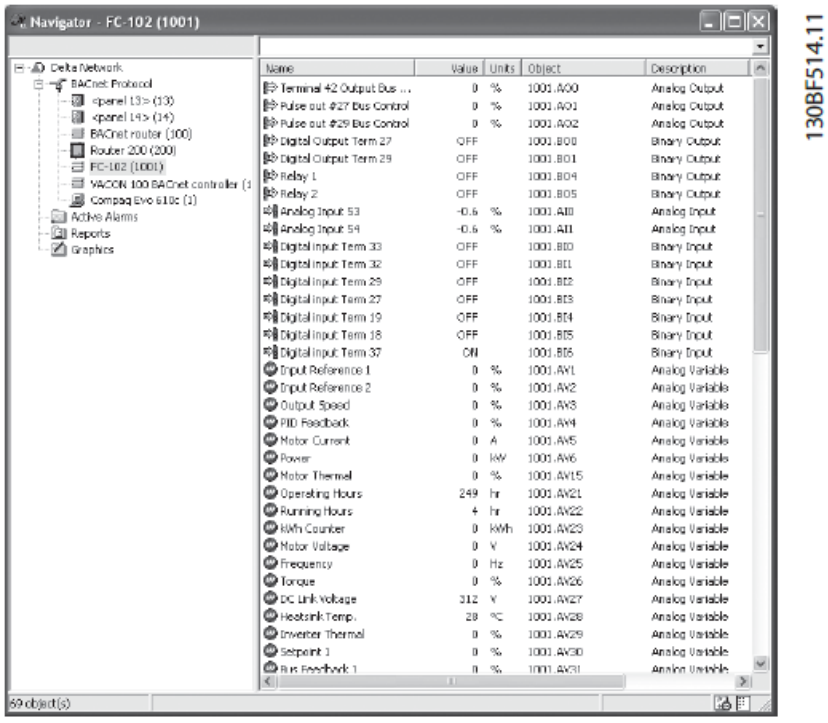


Illustration 4.2 List of VLT® HVAC Drive FC 102 Objects and their Values

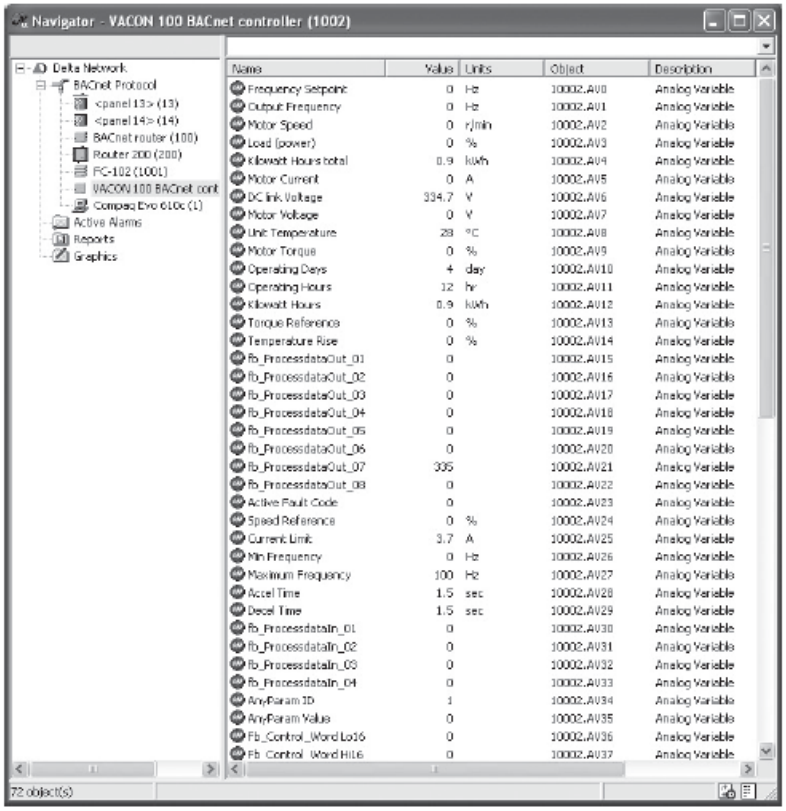


Illustration 4.3 List of VACON® 100 Objects and their Values

Danfoss A/S

- Ulsnaes 1 DK-6300 Graasten
- vlt-drives.danfoss.com

MG92N102

* M G 9 2 N 1 0 2 *

130R0724

Documents / Resources

	**Danfoss MG92N102 BACnet MS TP UBR-01 Communication with MBS Router** [pdf] User Guide MG92N102 BACnet MS TP UBR-01 Communication with MBS Router, BACnet MS TP UBR-01 Communication with MBS Router, Communication with MBS Router, MBS Router

References

- Search | Danfoss
- Global AC drive manufacturer - Danfoss Drives | Danfoss
- User Manual