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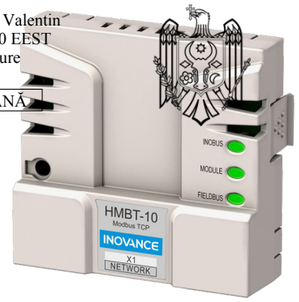


HMBT-10 Modbus TCP

Adaption Module User Guide

19012534A00

I. Overview

Thank you for purchasing the Modbus TCP adaption module (hereinafter referred to as HMBT-10 module).

The HMBT-10 module conforms to the Modbus TCP industrial Ethernet communication standard. When the module is installed on the MD880 AC drive, the MD880 can operate as the Modbus TCP industrial Ethernet server to be controlled by the Modbus TCP industrial Ethernet client. This improves the communication efficiency of the system and enriches the networking functions of the MD880.

Before using this product, read this user guide carefully to fully understand features of the product and ensure safe use. This guide describes product information, installation, wiring, and parameter configuration for your reference.

■ Features

- ◆ Supports networking through switches instead of routers
- ◆ Supports connection up to two Modbus TCP clients, with a minimum communication cycle of 6 ms for connection with one client and 12 ms for connection with two clients.
- ◆ Reads up to 123 parameters at a time
- ◆ Supports a maximum of 253 devices in a network
- ◆ Supports a maximum of 100 m transmission distance to the switch

2. Product Information

■ Nameplate and model

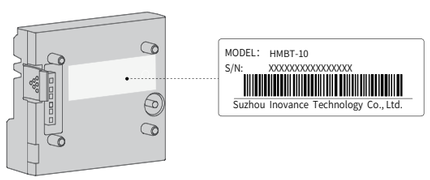


Figure1 Nameplate of the HMBT module

HMBT - 10
① ②

①	Product series HMBT: Modbus TCP Adaption Module	②	Product type 10: Version number

■ Specifications

Table1 Specifications

Items	Description
Ambient temperature	-10℃ to +55℃
Storage temperature	-40℃ to +70℃
Ambient humidity	5% RH to 95% RH, without condensation
Ambient conditions	Free from corrosive gases
Installation mode	Snap-fit joint and screw
IP rating	IP20
Heat dissipation	Natural ventilation

■ Product layout

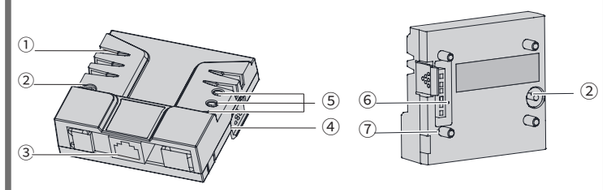


Figure2 HMBT-10 module layout

Table2 Description the HMBT-10 module layout

No.	Name	Description
①	Heat dissipation hole	Dissipates heat from the module
②	Fixing screw	Fixes the module to the HCU control module to ensure proper connection of the PE layer
③	Modbus TCP Communication (X1)	Ethernet communication terminal (RJ45)
④	Snap-fit joint	Fastens the module
⑤	Status indicators	Indicate running status of the module and bus
⑥	Slot terminal	Achieves electrical connection to the HCU control module
⑦	Guide post	Aligns the HMBT-10 module with the HCU control module for easy installation

Table3 Description of indicators

Name	Status	Description
INOBUS Internal communication status indicator		Steady green: Normal communication with the HCU control module
		Flahing green: Establishing or failed to establish communication with the HCU control module
MODULE Module status indicators		Steady green: Normal module status
		Flashing red: MAC address error
		Steady red: Failed to initailiza the protocol stack
		Flashing orange: Failed to obtain parameters (IP address)
FIELDBUS External communication status indicator		Steady green: Normal communication
		Flashing green: Received a normal Modbus TCP command
		Flashing orange: Abnormal response
		Flashing red: Obtaining the INOBUS response times out.

3. Installation Instructions

■ Safety precautions:

- ◆ Before installation or removal, ensure that the module is powered off to prevent damage to the module.
- ◆ Protect the HMBT-10 module from falling or impact to avoid damage to the module.
- ◆ Do not disassemble the HMBT-10 module to avoid damage to the module.
- ◆ Tighten the screws according to the required torque to avoid damage or loose fastening.

■ Tightening torque

The screws must meet the tightening torque listed below.

Screw	Tightening torque
M3	0.55 N · m

■ Dimensions

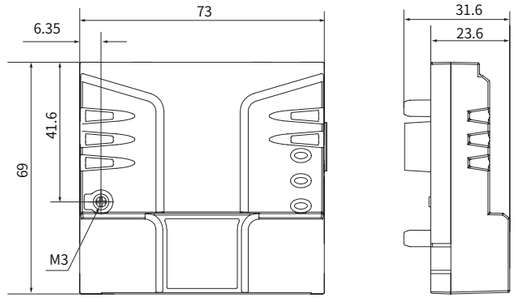
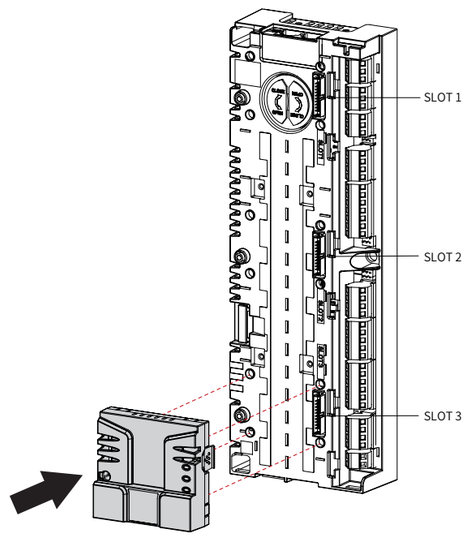


Figure3 Product dimensions (in mm)

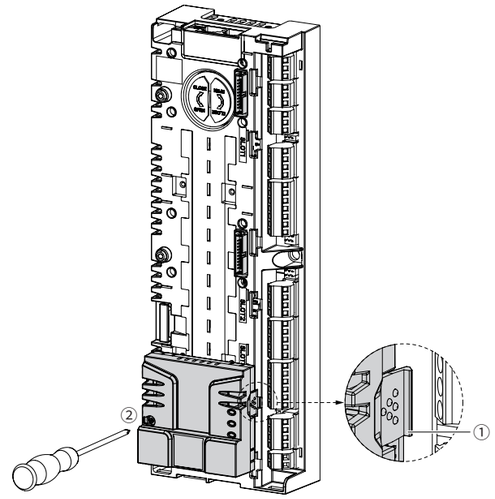
■ Installation procedure

The HMBT-10 module can be installed to any of slots 1 to 3 of the HCU control module (recommended to be installed to SLOT3). Here we install the The HMBT-10 module to SLOT3.

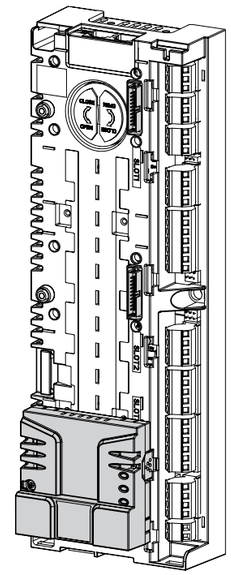
Step 1: Place the HMBT-10 module into SLOT3 of the HCU control module with the aid of four guide posts.



Step 2: Press the snap-fit joint ① of the HMBT-10 module inward into the slot, and fasten the grounding screw ② of the module with a Phillips screwdriver.



Step 3: The installation is complete.



■ Removal

Step 1: Disconnect all power supplies, and unplug all cables connected to the HMBT-10 module.

Step 2: Remove the grounding screw of HMBT-10 module with a Phillips screwdriver.

Step 3: Press the snap-fit joint at the right side of the module inward and pull out the module.

NOTE

- ◆ To meet the EMC requirements and for reliable operation of the module, tighten the screws to ensure reliable grounding.
- ◆ Ensure the HMBT-10 module is installed properly in the expansion slot of the HCU control module for electrical connection.
- ◆ The maintenance work must be done by professional personnel.

4. Electrical Connection

■ Electrical connection diagram

The HMBT-10 module is connected to the PLC master using the standard Ethernet RJ45 socket. The signal definitions of the module pins are the same as those of the standard Ethernet pins. The module can be connected using crossover cables or straight-through cables.

1) Electrical connection for one module

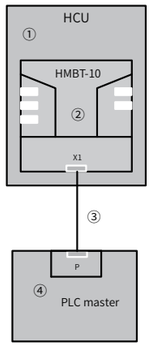


Figure4 Diagram of electrical connection for one module

Table4 Description of electrical connection for one module

No.	Name
①	HCU Control Module
②	HMBT-10 module
③	Network cable (It is recommended to use shielded twisted pair Cat 5e Ethernet cable, and the registered jack used for crimping must have a metal shell for grounding shield protection.)
④	PLC master

2) Electrical connection for multiple modules

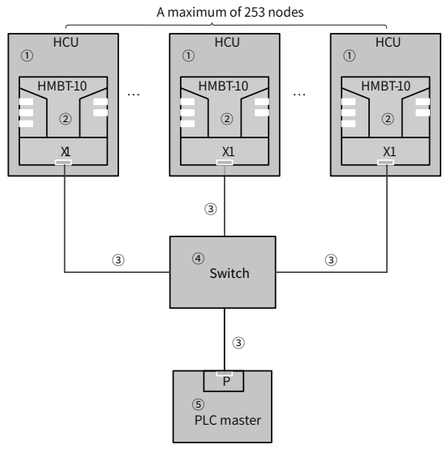


Figure5 Diagram of electrical connection for multiple modules

Table5 Description of electrical connection for multiple modules

No.	Name
①	HCU Control Module
②	HMBT-10 module
③	Network cable (It is recommended to use shielded twisted pair Cat 5e Ethernet cable, and the registered jack used for crimping must have a metal shell for grounding shield protection.)
④	Switch
⑤	PLC master

5. Parameter Configuration

■ Parameter configuration flow

After installing the HMBT-10 module to the HCU control module, complete communication configuration to enable the communication between the HCU control module and MD880.

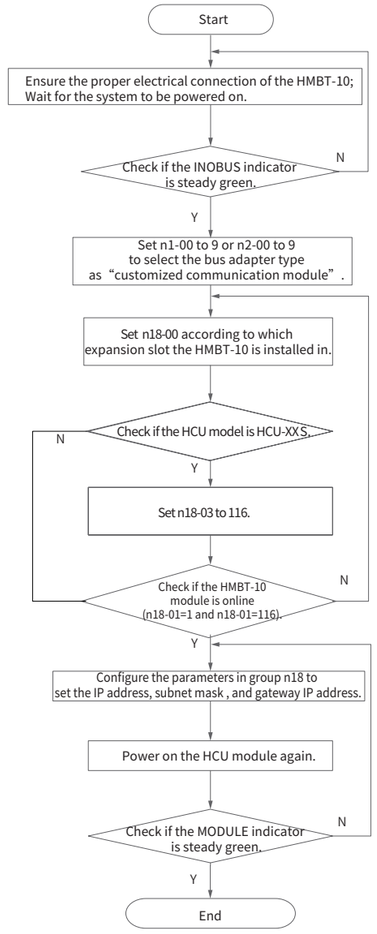


Figure6 Flowchart of HMBT-10 module configuration

■ Parameter configuration description

Before setting up the HMBT-10 module, verify the HCU model on the HCU nameplate ("MODEL") and confirm that it is HCU-XX or HCU-XXS, such as HCU-51 or HCU-51S. For details, see the HCU Control Module User Guide. Then configure the parameters as the following table.

Item		Parameters	Default	Setting	Description
HCU-XX	HCU-XXS				
n1-00	n1-00	Bus type for bus adapter A	0	9	Only one of the two parameters can be set to 9.
n2-00	n2-00	Bus type for bus adapter B	0	9	
n18-00	n18-00	Expansion slot selection	0	0: Disabled 1: Expansion slot 1_1 2: Expansion slot 1_2 3: Expansion slot 1_3 4: Expansion slot 2_1 5: Expansion slot 2_2 6: Expansion slot 2_3 7: Expansion slot 3_1	Select the expansion slot according to the actual need.
n18-01	n18-01	Status	0	0: Offline 1: Online	

Param.		Parameters	Default	Setting	Description
HCU-XX	HCU-XXS				
/	n18.02	Expansion slot module type	0: No expansion module	/	Upon correct configuration, "116: Modbus TCP module" is displayed.
/	n18.03	Customized communication module ID	0	116	If not configured, the adaption module status will be offline.
n18-02 to n18-04	n18-11 to n18-13	Customized communication card parameters 1-3 (reserved)	0	/	/
n18-05 to n18-08	n18-14 to n18-17	Specifies the IP address of the Modbus TCP communication	0	0 to 255	Select according to the actual need.
n18-09 to n18-12	n18-18 to n18-21	Specifies the subnet mask of the Modbus TCP communication	0	0 to 255	Select according to the actual need.
n18-13 to n18-16	n18-22 to n18-25	Specifies the gateway of the Modbus TCP communication	0	0 to 255	Select according to the actual need.
n18-17	n18-26	Customized communication card parameters 16 (reserved)	0	/	/
n18-18	n18-27	Specifies the timeout period for receiving the Modbus TCP data in the unit of 100 ms. The value 0 indicates to disable timeout function. (customized communication card parameters 17)	0	-	Select the expansion slot according to the actual need.

■ IP address configuration example

The HMBT-10 module does not require a station number but needs to set the IP address since each module has a MAC address and IP address for PLC to identify.

Table6 IP address configuration example

Item		Parameters	Default	Description
HCU-XX	HCU-XXS			
n18-05	n18-14	Customized communication card parameter 4	192	IP address
n18-06	n18-15	Customized communication card parameter 5	168	
n18-07	n18-16	Customized communication card parameter 6	0	
n18-08	n18-17	Customized communication card parameter 7	2	

Item		Parameters	Default	Description
HCU-XX	HCU-XXS			
n18-09	n18-18	Customized communication card parameter 8	255	Subnet mask
n18-10	n18-19	Customized communication card parameter 9	255	
n18-11	n18-20	Customized communication card parameter 10	255	
n18-12	n18-21	Customized communication card parameter 11	0	
n18-13	n18-22	Customized communication card parameter 12	192	Gateway
n18-14	n18-23	Customized communication card parameter 13	168	
n18-15	n18-24	Customized communication card parameter 14	0	
n18-16	n18-25	Customized communication card parameter 15	1	

■ Fault description and handling

Indicator	Status	Fault description	Solution
INOBUS Internal communication status indicator		Flashing green: Handshaking between the HMBT-10 module and the HCU module failed.	◆ Ensure the proper and reliable electrical connection of the HMBT-10 module. ◆ Power on again or replace the module.
MODULE Module status indicator		Flashing green: The protocol stack is starting.	◆ Please wait.
		Flashing red: MAC address error	◆ The HMBT-10 module does not have the MAC address. Change the module.
		Steady red: Protocol stack startup times out.	◆ Power on again or replace the module.
		Flashing orange: HCU communication parameters are set incorrectly or obtaining the IP address fails.	◆ Set the correct expansion slot in the background to activate the Modbus TCP module and power on the module again.
FIELDBUS External communication status indicator		Steady green: The module has established TCP connections, but no data is exchanged.	◆ No Modbus TCP command is sent.
		Flashing orange: Abnormal response	◆ Modbus TCP operations are abnormal, such as reading illegal address. Adjust the PLC according to the error code.
		Flashing red: Obtaining the INOBUS response times out.	◆ Power on again.

INOVANCE Warranty Agreement

The warranty period of the product is 18 months (subject to information indicated by the barcode on the product). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, Inovance will be responsible for free maintenance.

Within the warranty period, maintenance will be charged for the damages due to the following causes:

1) Improper use or uninstallation/repair/modification without prior permission
2) Damage caused by fire, flood, abnormal voltage, other disasters, and secondary disasters;
3) Hardware damage caused by equipment fall-off or that caused during transportation;
4) Damage caused by failure to operate the product according to the user guide provided by Inovance;
5) Faults and damages caused by external factors, such as peripheral devices;

If there is any failure or damage to the product, correctly fill out the Product Warranty Card.

The maintenance fee is charged according to the latest Maintenance Price List of Inovance.

The Product Warranty Card is not re-issued. Keep the card and present it to the maintenance personnel when seeking maintenance.

If there is any problem during the service, contact Inovance or Inovance agents.

You are assumed to agree on terms and conditions of this warranty agreement by purchase of the product. This agreement shall be interpreted by Suzhou Inovance Technology Co., Ltd.