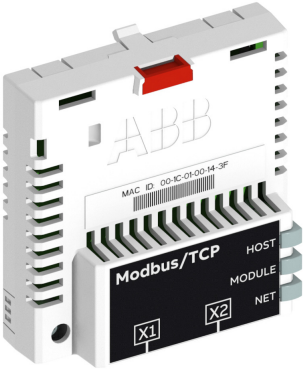
Options for ABB drives, converters and inverters

User's manual
FMBT-21 Modbus/TCP adapter module



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List of related manuals

Drive manuals and guides	Code (link lists) (EN/Multilingual)
ACS380-04 manuals	*9AAK10103A6193*
ACS480 manuals	*9AKK106930A8739*
ACS580-01 manuals	*9AKK105713A8085*
ACH580-01 manuals	*9AKK10103A0587*
ACQ580-01 manuals	*9AKK106713A2709*
ACS580-04 manuals	*9AKK106930A9060*
ACH580-04 manuals	*9AKK106930A9059*
ACQ580-04 manuals	*9AKK106930A9053*
ACS580-07 manuals	*9AKK106930A5239*
ACH580-07 manuals	*9AKK106930A5241*
ACQ580-07 manuals	*9AKK106930A3150*
ACS880-01 manuals	*9AKK105408A7004*
ACS880-04 manuals	*9AKK105713A4819*
ACS880-07 (45 to 710 kW) manuals	*9AKK105408A8149*
ACS880-17 (132 to 355 kW) manuals	*9AKK106930A3466*
ACS880-37 (132 to 355 kW) manuals	*9AKK106930A3467*

Option manuals and guides

FMBT-21 Modbus/TCP adapter module user's manual	*3AXD50000158607*

The links above contain lists of documents. You can find manuals and other product documents in PDF format on the Internet. See section *Document library on the Internet* on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

FMBT-21 manual

Fieldbus connectivity web page

User’s manual

FMBT-21 Modbus/TCP adapter module

3AXD50000158607 Rev A
EN
EFFECTIVE: 2017-11-30

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Further information

1

Safety instructions

Contents of this chapter

The chapter contains the warning symbols used in this manual and the safety instructions which you must obey when you install or connect an optional module to a drive, converter or inverter. If you ignore the safety instructions, injury, death or damage can occur. Read this chapter before you start the installation.

Use of warnings

Warnings tell you about conditions which can cause injury or death, or damage to the equipment. They also tell you how to prevent the danger. The manual uses these warning symbols:

Electricity warning tells you about hazards from electricity which can cause injury or death, or damage to the equipment.

General warning tells you about conditions, other than those caused by electricity, which can cause injury or death, or damage to the equipment.

Safety in installation

These instructions are for all who install or connect an optional module to a drive, converter or inverter and need to open its front cover or door to do the work.

WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur.

- If you are not a qualified electrician, do not do installation or maintenance work.
- Disconnect the drive, converter or inverter from all possible power sources. After you have disconnected the drive, converter or inverter, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you continue.
- Disconnect all dangerous voltages connected to other control signal connectors in reach. For example, it is possible that 230 V AC is connected from outside to a relay output of the drive, converter or inverter.
- Always use a multimeter to make sure that there are no parts under voltage in reach. The impedance of the multimeter must be at least 1 Mohm.

2

Introduction to the manual

Contents of this chapter

This chapter introduces this manual.

Purpose of the manual

The manual provides information on installing, commissioning and using the FMBT-21 Modbus/TCP adapter module.

Applicability

This manual applies to the FMBT-21 Modbus/TCP Ethernet adapter module, software version 1.00 and later.

Compatibility

The FMBT-21 Modbus/TCP adapter module is compatible with different ABB drives, solar inverters and wind turbine converters.

Note: Later in this manual, the term drive is used to refer converters and inverters as well.

Drives

The table below shows the compatibility of the FMBT-21 adapter module with different ABB drives.

Drives	FMBT-21
ACS380	x
ACS480	x
ACS580 series	x
ACH580 series	x
ACQ580 series	x
ACS880 series	x

Note: Not all compatible drives are listed here. For details of compatibility, check the drive's firmware manual.

Protocols

The FMBT-21 adapter module is compatible with Ethernet standards IEEE 802.3 and IEEE 802.3u.

The FMBT-21 adapter module supports these protocols from SW version 1.00 onwards:

- Modbus/TCP
- Modbus over UDP

In addition to these protocol, it is possible to have the no communication protocol running on the FMBT-21 adapter module. This configuration is called NONE protocol. In this setup, the FMBT-21 adapter module is used only for running Ethernet services which can be enabled/disabled via parameter **51.15 Service configuration**.

This table specifies the clients/masters that are compatible with the Modbus/TCP protocol.

Protocol	Compatible client/master
Modbus/TCP	All Modbus/TCP clients that support: • Modbus Application Protocol Specification v1.1b • Modbus Messaging on TCP/IP Implementation Guide v1.0b

Tools

The FMBT-21 adapter module can be used in the Ethernet tool network. The Ethernet tool network enables commissioning and monitoring several single drives, or inverter and supply units of a multi-drive from a single location by using the Drive composer pro PC tool.

Note: When the FMBT-21 adapter module is used only in the Ethernet tool network, the recommended setting for parameters **50.21 FBA A timelevel sel** and **50.51 FBA B timelevel sel** is *Slow* or *Monitoring*.

For more information on the Ethernet tool network, see:

- *Ethernet tool network for ACS880 drives application guide* (3AUA0000125635) [English])
- *Drive composer user's manual* (3AUA0000094606 [English]).

Target audience

This manual is intended for people who plan the installation, install, start up, use and service the adapter module. Before you do work on the module, read this manual and the applicable drive manual that contains the hardware and safety instructions for the product in question.

You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide. Both SI and imperial units are shown.

Contents

The manual consists of the following chapters:

- *Safety instructions* gives the safety instructions which you must obey when you install a fieldbus adapter module.
- *Overview of the Ethernet network and the FMBT-21 module* contains a short description of the Ethernet network and the adapter module.
- *Mechanical installation* contains a delivery checklist and instructions on installing the adapter module.
- *Electrical installation* contains instructions on cabling and connecting the adapter module to the Ethernet network.
- *Technical data* contains the technical data of the adapter module and the Ethernet link.
- *Appendix A – ABB IP configuration tool for FMBT-21* shows how to use the APP IP configuration tool for the FMBT-21.

Modbus/TCP protocol

- *Modbus/TCP – Start-up* presents the steps to take during the start-up of the drive with the adapter module and gives information on configuring the Modbus/TCP client.
- *Modbus/TCP – Communication profiles* describes the communication profiles used in the communication between the client, the adapter module and the drive.
- *Modbus/TCP – Communication protocol* describes the Modbus/TCP communication protocol for the adapter module.
- *Modbus/TCP – Diagnostics* explains how to trace faults with the status LEDs on the adapter module.

NONE protocol selection

- *NONE – Start-up* presents the steps to take during the start-up of the drive with the adapter module and gives examples of configuring the NONE protocol.
- *NONE – Diagnostics* explains how to trace faults with the status LEDs on the adapter module.

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Terms and abbreviations

General terms

Term	Definition
ACx580	ACS580, ACH580 or ACQ580
Command word	See Control word.
Control word	16-bit or 32-bit word from master to slave with bit-coded control signals (sometimes called the Command word).
Drive	Frequency converter for controlling AC motors. The drive consists of a rectifier and an inverter connected together by the DC link. In drives up to approximately 500 kW, these are integrated into a single module (drive module). Larger drives typically consist of separate supply and inverter units. This manual uses the term drive to refer converters and inverter as well.
FMBT-21 adapter module	One of the optional fieldbus adapter modules available for ABB drives. FMBT-21 is a device through which an ABB drive is connected to an Ethernet network.
Fieldbus adapter module	Device through which the drive is connected to an external communication network, that is, a fieldbus. The communication with the module is activated with a drive parameter.
MAC address	Media Access Control address. A unique factory-programmed identifier used to address a node in an Ethernet network.
Profile	Adaptation of the protocol for certain application field, for example, drives. In this manual, drive-internal profiles (eg, DCU or FBA) are called native profiles.
Status word	16-bit or 32-bit word from slave to master with bit-coded status messages.

Abbreviations

Abbreviation	Explanation
DHCP	Dynamic Host Control Protocol. A protocol for automating the configuration of IP devices. DHCP can be used to automatically assign IP addresses and related network information.
EMC	Electromagnetic compatibility
FBA	Fieldbus adapter
LSB	Least significant bit

Abbreviation	Explanation
MSB	Most significant bit
PLC	Programmable logic controller

Modbus/TCP terms and abbreviations

Term	Explanation
Exception code	If an error related to the requested Modbus function occurs, the data field contains an exception code that the server application can use to determine the next action to be taken.
Function code	The second byte sent by the client. The function tells the server what kind of action to perform.
Holding register	Holds data that will be later executed by an application program.

3

Overview of the Ethernet network and the FMBT-21 module

Contents of this chapter

This chapter contains a short description of the Ethernet network and the FMBT-21 adapter module.

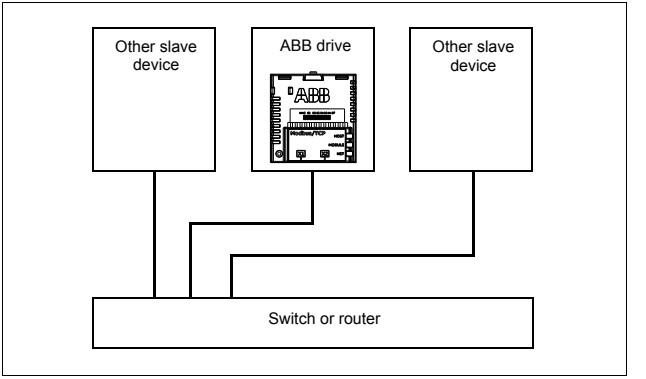
Ethernet network

Ethernet standards support a variety of physical media (coaxial cable, twisted pair, fiber optics) and topologies (bus and star). The FMBT-21 adapter module supports twisted pair as the physical media in a star topology.

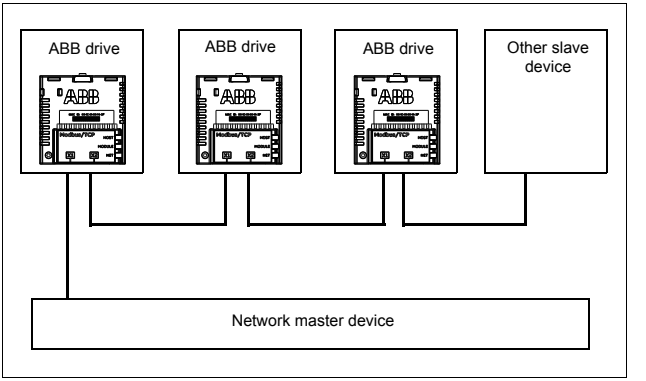
The maximum length for an Ethernet segment on twisted pair media is 100 meters. All twisted pair media between the Ethernet node and the switch or router must be shorter than 100 meters, including media within patch panels. For more information, see chapter *Technical data*.

Example topology of the Ethernet link

This figure shows an example of an allowable topology for an Ethernet network with FMBT-21.



This figure shows an example of an allowable topology for an Ethernet network with FMBT-21.



FMBT-21 Modbus/TCP adapter module

The FMBT-21 Modbus/TCP adapter module is an optional device for ABB drives which enables the connection of the drive to an Ethernet network.

Through the adapter module you can:

- give control commands to the drive (for example, Start, Stop, Run enable)
- feed a motor speed or torque reference to the drive
- give a process actual value or a process reference to the PID controller of the drive
- read status information and actual values from the drive
- reset a drive fault.

The protocol used to access these functionalities over Ethernet is described in chapter:

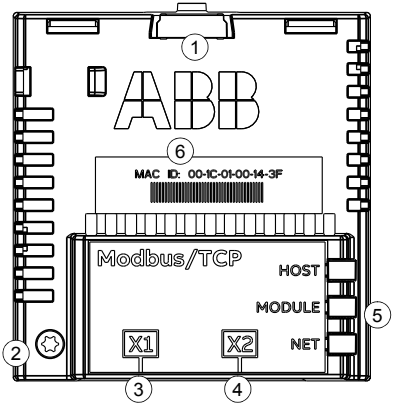
- *Modbus/TCP – Communication protocol*

The adapter module supports 10 Mbit/s and 100 Mbit/s data transfer rates and automatically detects the data transfer rate used in the network.

The adapter module is installed into an option slot on the drive control unit. See the drive manuals for module placement options.

Layout of the adapter module

This figure shows the layout of the FMBT-21 module.



No.	Description	See chapter
1	Lock	*Mechanical installation*
2	Mounting screw	*Mechanical installation*
3	Connector X1 to Ethernet	*Electrical installation*
4	Connector X2 for chaining another adapter module	*Electrical installation*
5	Diagnostic LEDs	*Modbus/TCP – Diagnostics* *NONE – Diagnostics*
6	MAC ID	

4

Mechanical installation

Contents of this chapter

This chapter contains a delivery checklist and instructions to install the adapter module.

Necessary tools and instructions

You will need a Torx TX10 screwdriver to secure the FMBT-21 adapter module to the drive. See also, the applicable drive hardware manual.

Unpacking and examining the delivery

1. Open the option package.
2. Make sure that the package contains:
   - Ethernet adapter module, type FMBT-21
   - quick installation and start-up guide.
3. Make sure that there are no signs of damage.

Installing the adapter module

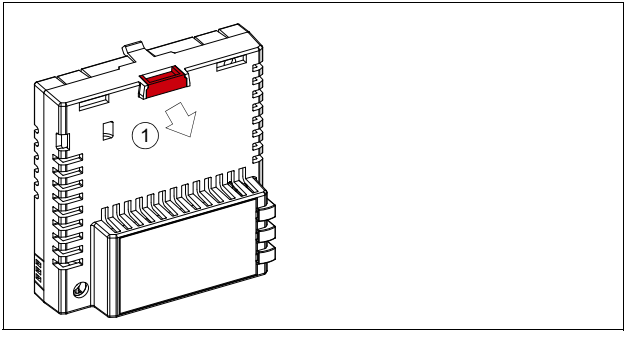
WARNING! Obey the safety instructions. See chapter *Safety instructions* on page 9. If you ignore the safety instructions, injury or death can occur.

The adapter module has a specific position in the drive. Plastic pins, a lock and one screw hold the adapter module in place. The screw also makes an electrical connection between the module and drive frame for cable shield termination.

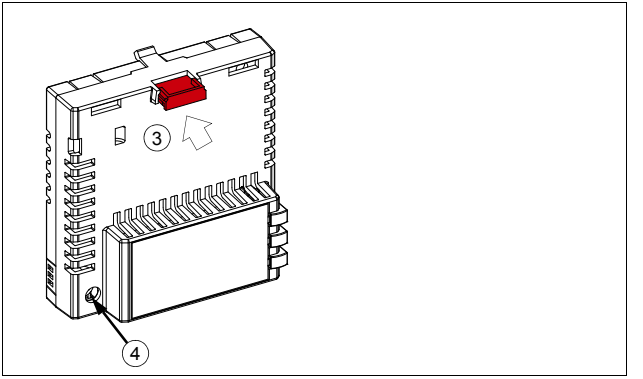
When the adapter module is installed, it makes the signal and power connection to the drive through a 20-pin connector.

When you install or remove the adapter module from the control unit:

1. Pull out the lock.



2. Install the module carefully to an option module slot of the drive. See the drive hardware manual.
3. Push in the lock.



4. Tighten the screw to torque 0.8 N·m using a Torx TX10 screwdriver.

WARNING! Do not use excessive force, or leave the screw too loose. Over-tightening can damage the screw or module. A loose screw decreases the EMC performance, and can even cause an operation failure.

See the applicable drive manual for further instructions on how to install the adapter module to the drive.

5

Electrical installation

Contents of this chapter

This chapter contains:

- general cabling instructions
- instructions on connecting the adapter module to the Ethernet network.

Warnings

WARNING! Obey the safety instructions. See chapter *Safety instructions* on page *9*. If you ignore the safety instructions, injury or death can occur. If you are not a qualified electrician, do not do electrical work.

Necessary tools and instructions

See the applicable drive hardware manual.

General cabling instructions

- Arrange the bus cables as far away from the motor cables as possible.
- Avoid parallel runs.
- Use bushings at cable entries.

Connecting the adapter module to the Ethernet network

The network cable can be CAT5 or higher, and type UTP, FTP or STP.

When CAT5 FTP or STP is used, the cable shield is connected to the drive frame through an RC network.

Connection procedure

1. Connect the network cable to the RJ-45 connector (X1) on the adapter module.
2. If you want to create a daisy chain with FMBT-21 adapter modules, connect the X2 connector of the first adapter module to X1 on the next adapter module, and so on.

Note: If a device in the daisy chain is powered off or fails, the rest of the chain is disconnected from the network.

Modbus/TCP protocol

7

Modbus/TCP – Start-up

Contents of this chapter

This chapter contains:

- information on configuring the drive for operation with the adapter module
- drive-specific instructions on starting up the drive with the adapter module
- information on configuring the client for communication with the adapter module.

Warnings

WARNING! Obey the safety instructions given in this manual and the drive documentation.

Drive configuration

The information in this section applies to all drive types compatible with the adapter module, unless otherwise stated.

Modbus/TCP connection configuration

After the adapter module has been mechanically and electrically installed according to the instructions in chapters *Mechanical installation* and *Electrical installation*, you must prepare the drive for communication with the module.

The detailed procedure of activating the module for Modbus/TCP communication with the drive depends on the drive type. Normally, you must adjust a parameter to activate the communication. See the drive-specific start-up sections starting on page *46*.

Once communication between the drive and the adapter module is established, several configuration parameters are copied to the drive. These parameters are shown in the tables below and must be checked first and adjusted where necessary. You can adjust the parameters via a drive control panel, a PC tool or a web user interface.

Note:

- Not all drives display descriptive names for the configuration parameters.
- The new parameter settings take effect only when you power up the module the next time or when you activate the fieldbus adapter refresh parameter **51.27 FBA A par refresh**.

FMBT-21 configuration parameters – group A (group 1)

Note: The actual parameter group number depends on the drive type. Group A (group 1) corresponds to:

- parameter group 51 in ACS380, ACS480, ACS580, ACH580 and ACQ580.
- parameter group is typically 51/54 (group 151/154 in some variants) in ACS880 if the adapter is installed as fieldbus adapter A/B.

No.	Name/Value	Description	Default
01	FBA type	**Read-only.** Shows the fieldbus adapter type as detected by the drive. The value cannot be adjusted by the user. If the value is **0** = None, the communication between the drive and the module has not been established.	Modbus/ TCP
02	Protocol/Profile	Selects the application protocol and communication profile for the network connection. The selections available for Modbus communication are listed below.	**0** = MB/TCP ABB C
	0 = MB/TCP ABB C	Modbus/TCP: ABB Drives profile - Classic	
	1 = MB/TCP ABB E	Modbus/TCP: ABB Drives profile - Enhanced	
	2 = MB/TCP T16	Modbus/TCP: Transparent 16-bit profile	
	3 = MB/TCP T32	Modbus/TCP: Transparent 32-bit profile	
	4 = MB/UDP ABB C	Modbus over UDP: ABB Drives profile - Classic	
	5 = MB/UDP ABB E	Modbus over UDP: ABB Drives profile - Enhanced	
	6 = MB/UDP T16	Modbus over UDP: Transparent 16-bit profile	
	7 = MB/UDP T32	Modbus over UDP: Transparent 32-bit profile	
03	Commrate	Sets the bit rate for the Ethernet interface.	**0** = Auto
	0 = Auto	Auto-negotiate	
	1 = 100 Mbps FD	100 Mbps, full duplex	
	2 = 100 Mbps HD	100 Mbps, half duplex	
	3 = 10 Mbps FD	10 Mbps, full duplex	
	4 = 10 Mbps HD	10 Mbps, half duplex	

No.	Name/Value	Description	Default
04	IP configuration	Sets the method for configuring the IP address, subnet mask and gateway address for the module.	**1** = Dyn IP DHCP
	0 = Static IP	Configuration will be obtained from parameters *05*…*13*.	
	1 = Dyn IP DHCP	Configuration will be obtained via DHCP.	
05	IP address 1	An IP address is assigned to each IP node on a network. An IP address is a 32-bit number that is typically represented in “dotted decimal” notation consisting of four decimal integers, on the range 0…255, separated by periods. Each integer represents the value of one octet (8-bits) in the IP address. Parameters *05...08* define the four octets of the IP address.	0
	0…255	IP address	
…	…	…	…
08	IP address 4	See parameter *05 IP address 1*.	0
	0…255	IP address	

No.	Name/Value	Description	Default
09	Subnet CIDR	Subnet masks are used for splitting networks into smaller networks called subnets. A subnet mask is a 32-bit binary number that splits the IP address into a network address and host address. Subnet masks are typically represented in either dotted decimal notation or the more compact CIDR notation, as shown in the table below.	0

Dotted decimal	CIDR	Dotted decimal	CIDR
255.255.255.254	31	255.254.0.0	15
255.255.255.252	30	255.252.0.0	14
255.255.255.248	29	255.248.0.0	13
255.255.255.240	28	255.240.0.0	12
255.255.255.224	27	255.224.0.0	11
255.255.255.192	26	255.224.0.0	10
255.255.255.128	25	255.128.0.0	9
255.255.255.0	24	255.0.0.0	8
255.255.254.0	23	254.0.0.0	7
255.255.252.0	22	252.0.0.0	6
255.255.248.0	21	248.0.0.0	5
255.255.240.0	20	240.0.0.0	4
255.255.224.0	19	224.0.0.0	3
255.255.192.0	18	192.0.0.0	2
255.255.128.0	17	128.0.0.0	1
255.255.0.0	16		

	1…31	Subnet mask in CIDR notation	
10	GW address 1	IP gateways connect individual physical IP subnets into a unified IP network. When an IP node needs to communicate with an IP node on another subnet, the IP node sends the data to the IP gateway for forwarding. Parameters *10*…*13* define the four octets of the gateway address.	0
	0…255	GW address	
…	…	…	…
13	GW address 4	See parameter *10 GW address 1*.	0

No.	Name/Value	Description	Default
	0…255	GW address	
14	Commrate port 2	Sets the bit rate for the Ethernet port 2.	**0** = Auto
	0 = Auto	Auto-negotiate	
	1 = 100 Mbps FD	100 Mbps, full duplex	
	2 = 100 Mbps HD	100 Mbps, half duplex	
	3 = 10 Mbps FD	10 Mbps, full duplex	
	4 = 10 Mbps HD	10 Mbps, half duplex	
15	Service configuration	Disable services that are not required. Each service is represented by a single bit. Bit 0, Lock configuration, can be used to prevent accidental changing of this parameter. By default, all services are enabled and configuration is unlocked.	

Bit	Name	Information
0	Lock configuration	Changing of this parameter are no longer possible when this bit is set. Only reset fieldbus configuration to default will unlock the parameter.
1	Disable IP config tool	When this bit is set, access from ABB IP Configuration tool is prevented.
2	Disable ETH tool network	When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.
3	Disable ping response	When this bit is set, response to ICMP (ping) message is prevented.

	0000b…1111b	Service configuration	
16 … 18	Reserved	These parameters are not used by the adapter module when the module is configured for Modbus/TCP.	N/A

No.	Name/Value	Description	Default
19	T16 scale	Defines the reference multiplier/actual value divisor for the adapter module. **Note**: The parameter is effective only when the following conditions are satisfied: • transparent 16 profile is selected • drive is using the native communication profile (e.g, DCU or FBA) • drive is using a 16-bit transparent reference 1/actual value 1. Reference 1 is multiplied by the value of this plus one and the actual value 1 is divided by the value of this plus one. With value 0, the reference 1/actual value 1 scale in the adapter module is 1 = 1. With ACS380, ACx580 and ACS880: Generic reference type: *1 = (T16 scale + 1)/100 -> T16 scale = 99, 1 = 1.*	99
	0…65535	Reference multiplier/actual value divisor	
20	Timeout time	Defines the Modbus/TCP timeout value. The Modbus protocol does not specify a timeout mechanism for the application layer. A timeout mechanism may be desired when controlling a drive, so the adapter module provides a method for this purpose. • If the parameter value is zero, this feature is disabled. • If the parameter value is non-zero, the timeout is: (Modbus/TCP timeout value) * 100 milliseconds For example, a value of 22 results in a timeout of: 22 * 100 milliseconds = 2.2 seconds If a timeout occurs, the adapter module signals the drive that communication with the client has been lost. The drive configuration then determines how to respond. **Example:** If the Modbus/TCP timeout is 300 ms and the drive is configured to fault on a communication failure with a delay of 500 ms, the drive will fault 800 ms after communications is lost.	20
	0…65535	Modbus/TCP timeout value	

No.	Name/Value	Description	Default
21	Timeout mode	Selects which Modbus/TCP register accesses reset the timeout counter.	**2** = Control WR
	0 = None	The Modbus/TCP timeout feature is disabled.	
	1 = Any message	The timeout counter is reset when any Modbus register of the drive is accessed.	
	2 = Control RW	The timeout counter is reset when the drive receives either a new Control word or new reference value (REF1 or REF2) from the Modbus/TCP client.	
22	Word order	Selects in which order the 16-bit registers of 32-bit parameters are transferred. For each register (16-bit), the first byte contains the high order byte and the second byte contains the low order byte.	**1** = HILO
	0 = LoHi	The first register contains the low order word and the second register contains the high order word.	
	1 = HiLo	The first register contains the high order word and the second register contains the low order word.	
23	Address mode	Defines the mapping between parameters and holding registers in the 0...65535 Modbus register range.	**0** = Mode 0
	0 = Mode 0	Used when access to parameter indexes greater than 99 is not needed. Allows 5-digit addressing[1)] used by legacy Modbus masters. 16-bit access:[1)] Register address[2)] = 100 * parameter group + parameter index (16-bit values, groups 1...199, indexes 1...99) 32-bit access: Register address = 20000 + 200 * parameter group + 2 * parameter index (32-bit values, groups 1...199, indexes 1...99)	
	1 = Mode 1	16-bit access: Register address = 256 * parameter group + parameter index (16-bit values, groups 1...255, indexes 1...255) Example: 13057 (0x3301) is group 51 index 1 No access to 32-bit parameter values.	

No.	Name/Value	Description	Default
	2 = Mode 2	32-bit access: Register address = 512 * parameter group + 2 * parameter index (32-bit values, groups 1...127, indexes 1...255). Example: 26114 (0x6602) is group 51 index 1 Used when 32-bit parameter values are needed and there is no need to access groups 128 or higher.	
	3 = Mode 3	32-bit access: Register address = 256 * parameter group + 2 * parameter index (32-bit values, groups 1...255, indexes 1...127). Example: 13058 (0x3302) is group 51 index 1 Used when 32-bit parameter values are needed and there is no need to access parameter index 128 or higher.	
24 … 26	Reserved	These parameters are not used by the adapter module when the module is configured for Modbus/TCP.	N/A
27	FBA A/B par refresh	Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to **0** = Done. **Note:** This parameter cannot be changed while the drive is running.	**0** = Done
	0 = Done	Refreshing done	
	1 = Refresh	Refreshing	
28	FBA A/B par table ver	**Read-only.** Displays the parameter table revision of the fieldbus adapter module mapping file stored in the memory of the drive. In format **xyz**, where **x** = major revision number **y** = minor revision number **z** = correction number OR in format **axyz**, where **a** = major revision number **xy** = minor revision numbers **z** = correction number or letter.	N/A
		Parameter table revision	

No.	Name/Value	Description	Default
29	FBA A/B drive type code	**Read-only.** Displays the drive type code of the fieldbus adapter module mapping file stored in the memory of the drive.	N/A
		Drive type code of the fieldbus adapter module mapping file	
30	FBA A/B mapping file ver	**Read-only.** Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format.	N/A
		Mapping file revision	
31	D2FBA A/B comm status	**Read-only.** Displays the status of the fieldbus adapter module communication. **Note:** The value names may vary by drive.	
	0 = Idle	Adapter is not configured.	
	1 = Exec.init	Adapter is initializing.	
	2 = Time out	A timeout has occurred in the communication between the adapter and the drive.	
	3 = Conf.err	Adapter configuration error: The major or minor revision code of the common program revision in the fieldbus adapter module is not the revision required by the module or mapping file upload has failed more than three times.	
	4 = Off-line	Adapter is off-line.	
	5 = On-line	Adapter is on-line.	
	6 = Reset	Adapter is performing a hardware reset.	
32	FBA A/B comm SW ver	**Read-only.** Displays firmware patch and build number of the adapter module in the **xxyy** format, where: **xx** = patch number **yy** = build number Example: C80D ≥ 200.13 or 0 ≥ 0.0	N/A
		Common program version of the adapter module	

No.	Name/Value	Description	Default
33	FBA A/B appl SW ver	**Read-only.** Displays firmware version of the adapter module in xxyy format, where: **xx = major revision number** **yy = minor revision number** Example: 310 = 3.10 Version number is the form: <major>.<minor>.<patch>.<build> Example: 3.10.200.13 or 3.10.0.0	N/A
		Application program revision of the adapter module	

[1] 6-digit register addressing (400001) is used instead of 5-digit register addressing (40001) to describe register map.

[2] Register address = Register address + 40000 (0) if holding register area indication should be used.

For more information, see *Register addressing* on page *66*.

FMBT-21configuration parameters – group B (group 2)

Note: The actual parameter group number depends on the drive type. Group B (group 2) corresponds to:

- parameter group 53 in ACS380, ACS480, ACS580, ACH580, and ACQ580
- parameter group is typically 53/56 (group 153/156 in some variants) in ACS880 if the adapter is installed as fieldbus adapter A/B.

No.[1]	Name/Value	Description	Default
01	FBA A/B data out1 (client to drive)	Selects the drive parameter address into which the value of the Data out 1 register is written (from the client to the server). The Modbus register address maps are explained in chapter *Modbus/TCP – Communication protocol*. The content is defined by a decimal number in the range of 0 to 9999 as follows: 0 – Not used 1…99 – Virtual address area of drive control. Not used when the Modbus/TCP protocol is used. 101…9999 – Parameter area of the drive	**0** = None
	0 = None	Not used	
	101…9999	Parameter index with format **xxyy**, where • **xx** is the parameter group number (1…99) • **yy** is the parameter number index within that group (01…99). **Note:** In ACS480, ACS580 and ACS880, choose **Other** to display a list of mappable drive parameters.	
02…12	Data out 2 … Data out 12	See parameter *01 FBA A/B data out1*.	**0** = None

[1] The number of parameters in this group may vary by drive type and drive firmware.

FMBT-21 configuration parameters – group C (group 3)

Note: The actual parameter group number depends on the drive type. Group C (group 3) corresponds to:

- parameter group 52 in ACS480, ACS580, ACH580 and ACQ580.
- parameter group is typically 52/55 (group 152/155 in some variants) in ACS880 if the adapter is installed as fieldbus adapter A/B.

<table>
<tr><th>No.[1)]</th><th>Name/Value</th><th>Description</th><th>Default</th></tr>
<tr><td>01</td><td>FBA A/B data in1
(drive to client)</td><td>Selects the drive parameter address from which the data is read to the Data in 1 register (from the server to the client). The Modbus register address maps are explained in chapter Modbus/TCP – Communication protocol.
The content is defined by a decimal number in the range of 0 to 9999 as follows:<table><tr><td>0</td><td>Not used</td></tr><tr><td>1…99</td><td>Virtual address area of drive control. Not used when the Modbus/TCP protocol is used.</td></tr><tr><td>101…9999</td><td>Parameter area of the drive</td></tr></table></td><td>0 = None</td></tr>
<tr><td></td><td>0 = None</td><td>Not used</td><td></td></tr>
<tr><td></td><td>101…9999</td><td>Parameter index with format xxyy, where
• xx is the parameter group number (1…99)
• yy is the parameter number index within that group (01…99).
Note: In ACS480, ACS580 and ACS880, choose Other to display a list of mappable drive parameters.</td><td></td></tr>
<tr><td>02…12</td><td>Data in 2 …
Data in 12</td><td>See parameter 01 FBA A/B data in1.</td><td>0 = None</td></tr>
</table>

[1)] The number of parameters in this group may vary by drive type and drive firmware.

Control locations

ABB drives can receive control information from multiple sources including digital inputs, analog inputs, the drive control panel and a fieldbus adapter module. ABB drives allow the user to separately determine the source for each type of control information (Start, Stop, Direction, Reference, Fault reset, etc.).

To give the fieldbus client the most complete control over the drive, you must select the adapter module as the source of this information. The drive-specific parameter setting examples below contain the drive control parameters relevant in the examples. For a complete parameter list, see the drive documentation.

Starting up fieldbus communication for ACS480, ACx580 and ACS880 drives

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by selecting the correct slot number in parameter **50.01 FBA A enable**.

   The selection must correspond to the slot where the adapter module is installed. For example, if the adapter module is installed in slot 1, you must select slot 1.

3. With parameter **50.02 FBA A comm loss func**, select how the drive reacts to a fieldbus communication break.

   Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
4. With parameter **50.03 FBA A comm loss t out**, define the time between communication break detection and the selected action.
5. Select application-specific values for the rest of the parameters in group 50, starting from **50.04**.

Examples of appropriate values are shown in the tables below.

6. Set the module configuration parameters in group 51.
   - Select the communication protocol and profile with parameter **51.02** and configure the network settings with parameters **51.03**…**51.13**.
   - With parameters **51.20** and **51.21**, select how the adapter module detects fieldbus communication breaks.
7. Define the process data transferred to and from the drive in parameter groups 52 and 53.

   Note: The adapter module assigns the Control word, Status word, references 1…2 and actual values 1…2 automatically to Modbus registers. Process data groups are not available in the ABB Drives - Classic communication profile.
8. Save the valid parameter values to permanent memory with parameter **96.07 Parameter save manually**.
9. Validate the settings made in parameter groups 51, 52 and 53 with parameter **51.27 FBA A par refresh**.
10. Set the relevant drive control parameters to control the drive according to the application.

    Examples of appropriate values are shown in the tables below.

Parameter setting examples – ACS480 and ACx580 drives

Frequency control using the ABB Drives – Enhanced communication profile

This example shows how to configure a frequency control application that uses the ABB Drives - Enhanced profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the ABB Drives profile. For more information, see section *ABB Drives communication profile* on page *57*.

In the frequency control mode, when Reference 1 (REF1) is used, a reference value of ±20000 (4E20h) corresponds to the reference set with parameter **46.02 Frequency scaling** in the forward and reverse directions.

The minimum and maximum 16-bit integer values that can be given through the fieldbus are -32768 and 32767 respectively.

Output data	Modbus register	Input data	Modbus register
Control word	(4)00001	Status word	(4)00051
Frequency reference	(4)00002	Frequency actual value	(4)00052
Reference 2 (Not used)	(4)00003	Actual value 2 (Not used)	(4)00053
Constant frequency 1[1)]	(4)00004 (4)00005	Power[1)]	(4)00054 (4)00055
Constant frequency 2[1)]	(4)00006 (4)00007	DC bus voltage[1)]	(4)00056 (4)00057

[1)] Example

The table below gives the recommended drive parameter settings.

Drive parameter	Setting for ACS480 and ACS580 drives	Description
50.01 FBA A enable	**1** = Enable	Enables communication between the drive and the fieldbus adapter module.

Drive parameter	Setting for ACS480 and ACS580 drives	Description
50.02 FBA A comm loss func	**1** = Fault[2)]	Enables fieldbus A communication fault monitoring.
50.03 FBA A comm loss t out	3.0 s[2)]	Defines the fieldbus A communication break supervision time.
50.04 FBA A ref1 type	**0** = Speed or frequency	Selects the fieldbus A reference 1 type and scaling.
51.01 FBA A type	Modbus/TCP[1)]	Displays the type of the fieldbus adapter module.
51.02 Protocol/Profile	**1** = MB/TCP ABB E	Selects the Modbus/TCP protocol and the ABB Drives - Enhanced profile.
51.03 Commrate	**0** = Auto[2)]	Ethernet communication rate is negotiated automatically by the device.
51.04 IP configuration	**0** = Static IP[2)]	Configuration will be obtained from parameters *05*…*13*.
51.05 IP address 1	192[2)]	First part of the IP address
51.06 IP address 2	168[2)]	Second part of the IP address
51.07 IP address 3	0[2)]	Third part of the IP address
51.08 IP address 4	16[2)]	Last part of the IP address
51.09 Subnet CIDR	24[2)]	Sets the network mask as 255.255.255.0, allowing access only to the last subnet.
51.20 Timeout time	10[2)]	Sets the communication timeout as 1 second.
51.21 Timeout mode	**2** = Control RW[2)]	The timeout feature monitors the updating of the Control word and Reference 1.
52.01 FBA A data in1	01.14[2)]	Output power
52.03 FBA a data in3	01.11[2)]	DC voltage
53.01 FBA A data out1	28.26[2)]	Constant frequency 1
53.03 FBA A data out3	28.27[2)]	Constant frequency 2
51.27 FBA A par refresh	**1** = Refresh	Validates the FMBT-21 configuration parameter settings.

Drive parameter	Setting for ACS480 and ACS580 drives	Description
20.01 Ext1 commands	**12** = Fieldbus A	Selects the fieldbus A interface as the source of the start and stop commands for external control location 1.
22.11 Speed ref1 source	**4** = FB A ref1	Selects the fieldbus A reference 1 as the source for speed reference 1.
31.11 Fault reset selection	06.1.7	Selects the fieldbus interface as the source for the fault reset signal.

[1] Read-only or automatically detected/set

[2] Example

The start sequence for the parameter example above is given below.

Control word:

- Reset the fieldbus communication fault (if active).
- Enter 47Eh (1150 decimal) → READY TO SWITCH ON.

  Enter 47Fh (1151 decimal) → OPERATING (Scalar motor control mode).

Parameter setting examples – ACS880

Speed control using the ABB Drives – Enhanced communication profile

This example shows how to configure a speed control application that uses the ABB Drives - Enhanced profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the ABB Drives profile. For more information, see section *ABB Drives communication profile* on page *57*.

When Reference 1 (REF1) is used, a reference value of ±20000 (4E20h) corresponds to the reference set with parameter **46.01 Speed scaling** in the forward and reverse directions.

The minimum and maximum 16-bit integer values that can be given through the fieldbus are -32768 and 32767 respectively.

Output data	Modbus register	Input data	Modbus register
Control word	(4)00001	Status word	(4)00051
Speed reference	(4)00002	Speed actual value	(4)00052
Reference 2 (Not used)	(4)00003	Actual value 2 (Not used)	(4)00053
Constant speed 1 [32][1)]	(4)00004 (4)00005	Output power [32][1)]	(4)00054 (4)00055
Constant speed 2 [32][1)]	(4)00006 (4)00007	DC voltage [32][1)]	(4)00056 (4)00057

1) Example

The table below gives the recommended drive parameter settings.

Drive parameter	Setting for ACS880 drives	Description
50.01 FBA A enable	**1** = Option slot 1[2)]	Enables communication between the drive and the fieldbus adapter module.
50.02 FBA A comm loss func	**1** = Fault[2)]	Enables fieldbus A communication fault monitoring.

Drive parameter	Setting for ACS880 drives	Description
50.03 FBA A comm loss t out	3.0 s[2)]	Defines the fieldbus A communication break supervision time.
50.04 FBA A ref1 type	**4** = Speed	Selects the fieldbus A reference 1 type and scaling.

51.01 FBA A type	Modbus/TCP[1)]	Displays the type of the fieldbus adapter module.
51.02 Protocol/Profile	**1** = MB/TCP ABB E	Selects the Modbus/TCP protocol and the ABB Drives - Enhanced profile.
51.03 Commrate	**0** = Auto[2)]	Ethernet communication rate is negotiated automatically by the device.
51.04 IP configuration	**0** = Static IP[2)]	Configuration will be obtained from parameters *05*…*13*.
51.05 IP address 1	192[2)]	First part of the IP address
51.06 IP address 2	168[2)]	Second part of the IP address
51.07 IP address 3	0[2)]	Third part of the IP address
51.08 IP address 4	16[2)]	Last part of the IP address
51.09 Subnet CIDR	24[2)]	Sets the network mask as 255.255.255.0, allowing access only to the last subnet.
51.20 Timeout time	10[2)]	Sets the communication timeout as 1 second.
51.21 Timeout mode	**2** = Control RW[2)]	The timeout feature monitors the updating of the Control word and Reference 1.

52.01 FBA A data in1	01.14[2)]	Output power
52.03 FBA a data in3	01.11[2)]	DC voltage
53.01 FBA A data out1	22.26[2)]	Constant speed 1
53.03 FBA A data out3	22.27[2)]	Constant speed 2

51.27 FBA A par refresh	**1** = Refresh	Validates the FMBT-21 configuration parameter settings.

Drive parameter	Setting for ACS880 drives	Description
20.01 Ext1 commands	**12** = Fieldbus A	Selects the fieldbus A interface as the source of the start and stop commands for external control location 1.
22.11 Speed ref1 source	**4** = FB A ref1	Selects the fieldbus A reference 1 as the source for speed reference 1.
31.11 Fault reset selection	**30** = FBA A MCW bit 7	Selects the fieldbus interface as the source for the fault reset signal.

[1] Read-only or automatically detected/set

[2] Example

The start sequence for the parameter example above is given below.

Control word:

- Reset the fieldbus communication fault (if active).
- Enter 47Eh (1150 decimal) → READY TO SWITCH ON.
- Enter 47Fh (1151 decimal) → OPERATING (Speed mode).

Client configuration

After the adapter module has been initialized by the drive, you must prepare the client for communication with the module. Due to the large number of different Modbus clients, specific instructions cannot be provided here. Refer to the documentation of your client for more information.

Modbus register maps

The Modbus register map which the adapter module presents to the Modbus client is selected with parameter *02 Protocol/Profile* (see page *35*).

For Modbus register map definitions, see chapter *Modbus/TCP – Communication protocol*.

For definitions of the Control word, Status word, references and actual values for a given communication profile, see chapter *Modbus/TCP – Communication profiles*.

8

Modbus/TCP – Communication profiles

Contents of this chapter

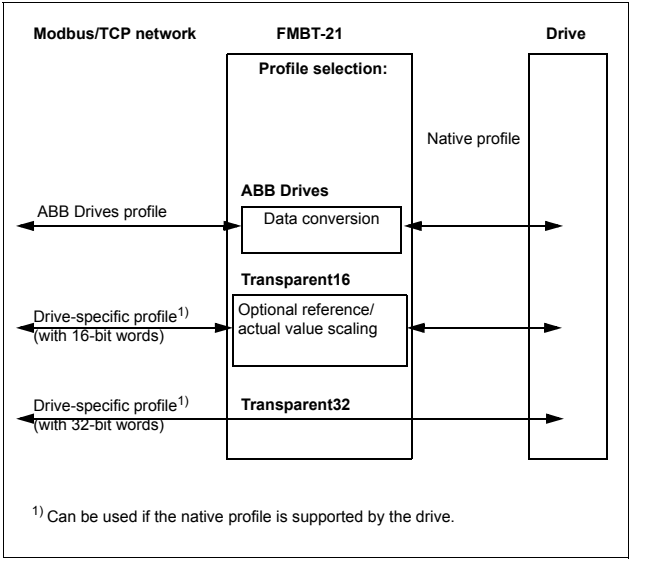
This chapter describes the communication profiles used in the communication between the Modbus/TCP client, the adapter module and the drive.

Communication profiles

Communication profiles are ways of conveying control commands (Control word, Status word, references and actual values) between the Modbus client and the drive.

With the FMBT-21 adapter module, the Modbus/TCP network may employ either the ABB Drives profile or one of two Transparent modes for 16-bit and 32-bit words respectively. For the ABB Drives profile, data is converted by the adapter module into the native profile (eg, DCU or FBA). For the Transparent modes, no data conversion takes place.

The figure below illustrates the profile selection:



The following sections describe the Control word, the Status word, references and actual values for the ABB Drives communication profile. Refer to the drive manuals for details on the native profiles.

ABB Drives communication profile

Control word and Status word

The Control word is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus client station to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the client in the Status word.

The contents of the Control word and the Status word are detailed below. The drive states are presented on page *61*.

Control word contents

The table below shows the contents of the Control word for the ABB Drives communication profile. The upper case boldface text refers to the states shown in the state machine on page *61*.

Bit	Name	Value	STATE/Description
0	OFF1_ CONTROL	1	Proceed to **READY TO OPERATE**.
		0	Stop along currently active deceleration ramp. Proceed to **OFF1 ACTIVE**; proceed to **READY TO SWITCH ON** unless other interlocks (OFF2, OFF3) are active.
1	OFF2_ CONTROL	1	Continue operation (OFF2 inactive).
		0	Emergency OFF, coast to stop. Proceed to **OFF2 ACTIVE**, proceed to **SWITCH-ON INHIBITED**.
2	OFF3_ CONTROL	1	Continue operation (OFF3 inactive).
		0	Emergency stop, stop within time defined by drive parameter. Proceed to **OFF3 ACTIVE**; proceed to **SWITCH-ON INHIBITED**. **Warning:** Ensure that motor and driven machine can be stopped using this stop mode.

Bit	Name	Value	STATE/Description
3	INHIBIT_ OPERATION	1	Proceed to **OPERATION ENABLED**. **Note:** Run enable signal must be active; see drive documentation. If the drive is set to receive the Run enable signal from the fieldbus, this bit activates the signal.
		0	Inhibit operation. Proceed to **OPERATION INHIBITED**.
4	RAMP_OUT_ ZERO	1	Normal operation. Proceed to **RAMP FUNCTION GENERATOR: OUTPUT ENABLED**.
		0	Force Ramp Function Generator output to zero. Drive ramps to stop (current and DC voltage limits in force).
5	RAMP_HOLD	1	Enable ramp function. Proceed to **RAMP FUNCTION GENERATOR: ACCELERATOR ENABLED**.
		0	Halt ramping (Ramp Function Generator output held).
6	RAMP_IN_ ZERO	1	Normal operation. Proceed to **OPERATION**. **Note:** This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.
		0	Force Ramp Function Generator input to zero.
7	RESET	0 → 1	Fault reset if an active fault exists. Proceed to **SWITCH-ON INHIBITED**. **Note:** This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.
		0	Continue normal operation.
8…9	Reserved.		
10	REMOTE_ CMD	1	Fieldbus control enabled.
		0	Control word and reference not getting through to the drive, except for CW bits OFF1, OFF2 and OFF3.
11	EXT_CTRL_ LOC	1	Select External Control Location EXT2. Effective if control location parameterized to be selected from fieldbus.
		0	Select External Control Location EXT1. Effective if control location parameterized to be selected from fieldbus.
12…15	Reserved or freely programmable control bits		

Status word contents

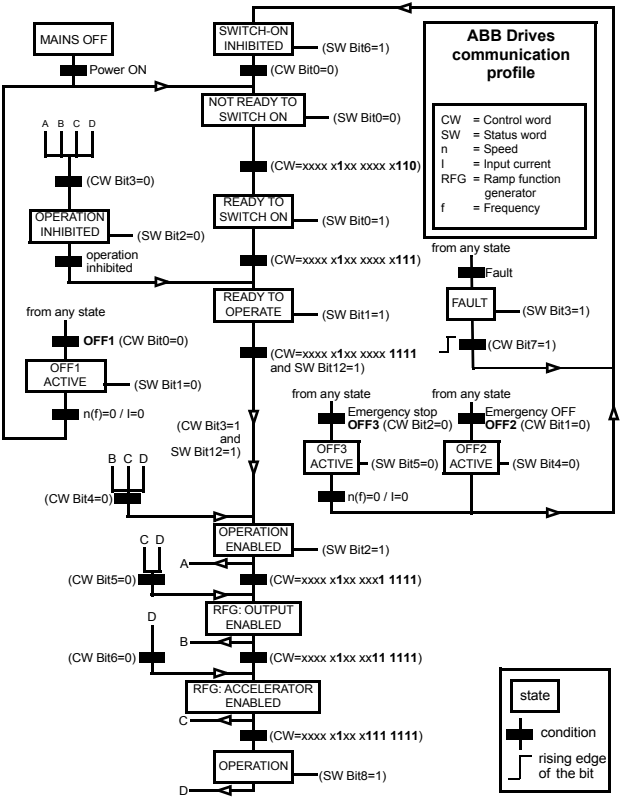
The table below shows the contents of the Status word for the ABB Drives communication profile. The upper case boldface text refers to the states shown in the state machine on page *61*.

Bit	Name	Value	STATE/Description
0	RDY_ON	1	**READY TO SWITCH ON**
		0	**NOT READY TO SWITCH ON**
1	RDY_RUN	1	**READY TO OPERATE**
		0	**OFF1 ACTIVE**
2	RDY_REF	1	**OPERATION ENABLED**
		0	**OPERATION INHIBITED**
3	TRIPPED	1	**FAULT**
		0	No fault
4	OFF_2_STA	1	OFF2 inactive
		0	**OFF2 ACTIVE**
5	OFF_3_STA	1	OFF3 inactive
		0	**OFF3 ACTIVE**
6	SWC_ON_ INHIB	1	**SWITCH-ON INHIBITED**
		0	–
7	ALARM	1	Warning/Alarm
		0	No warning/alarm
8	AT_ SETPOINT	1	**OPERATION.** Actual value equals reference (= is within tolerance limits, i.e., in speed control, speed error is 10% max. of nominal motor speed).
		0	Actual value differs from reference (= is outside tolerance limits.)
9	REMOTE	1	Drive control location: REMOTE (EXT1 or EXT2)
		0	Drive control location: LOCAL
10	ABOVE_ LIMIT	1	Actual frequency or speed equals or exceeds supervision limit (set by drive parameter). Valid in both directions of rotation.
		0	Actual frequency or speed within supervision limit
11	EXT_CTRL_ LOC	1	External Control Location EXT2 selected. **Note concerning ACS880:** This bit is effective only if the fieldbus interface is set as the target for this signal by drive parameters. User bit 0 selection (06.33)
		0	External Control Location EXT1 selected

Bit	Name	Value	STATE/Description
12	EXT_RUN_ ENABLE	1	External Run Enable signal received. **Note concerning ACS880:** This bit is effective only if the fieldbus interface is set as the target for this signal by drive parameters. User bit 1 selection (06.34)
		0	No External Run Enable signal received
13…14	Reserved or freely programmable status bits		
15	FBA_ERROR	1	Communication error detected by fieldbus adapter module
		0	Fieldbus adapter communication OK

State machine

The state machine for the ABB Drives communication profile is shown below.



References

References are 16-bit words containing a sign bit and a 15-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

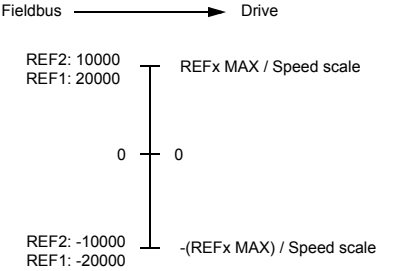
ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module (for example, FMBT-21). To have the drive controlled through the fieldbus, you must select the module as the source for control information, for example, reference.

Scaling

References are scaled as shown below.

Note: The values of REF1 MAX and REF2 MAX are set with drive parameters. See the drive manuals for further information.

In ACS480, ACS580, ACH580, ACQ580 and ACS880 the speed reference (REFx) in decimal (0…20000) corresponds to 0…100% of the speed scaling value (as defined with a drive parameter).



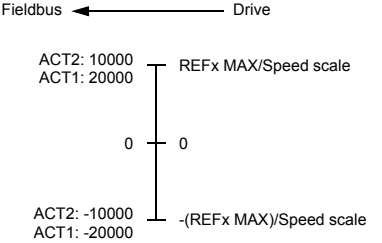
Actual values

Actual values are 16-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

Scaling

Actual values are scaled as shown below.

Note: The values of REF1 MAX and REF2 MAX are set with drive parameters. See the drive manuals for further information.



9

Modbus/TCP – Communication protocol

Contents of this chapter

This chapter describes the Modbus/TCP communication protocol for the adapter module.

Modbus/TCP

Modbus/TCP is a variant of the Modbus family of simple, vendor neutral communication protocols intended for supervision and control of automation equipment. Specifically, it covers the use of Modbus messaging over TCP connection on an IP network.

The FMBT-21 adapter module acts as a Modbus/TCP server with support for the ABB Drives and Transparent profiles. The adapter module also supports Modbus over UDP. The only difference between Modbus/TCP and Modbus/UDP is that in Modbus/UDP the transport layer protocol is UDP instead of TCP.

The supported Modbus commands are listed in section *Function codes* on page *66*. Two simultaneous Modbus/TCP connections are supported, that is, two clients can be connected to the adapter module at a time.

For information of the port used with Modbus/TCP or Modbus/UDP, see *TCP and UDP service ports* on page *102*.

Further information on the Modbus/TCP protocol is available at www.modbus.org.

Register addressing

The address field of Modbus Requests for accessing Holding registers is 16 bits. This allows the Modbus protocol to support addressing of 65536 Holding registers.

Historically, Modbus client devices used 5-digit decimal addresses from 40001 to 49999 to represent Holding register addresses. 5-digit decimal addressing limited to 9999 the number of holding registers that could be addressed.

Modern Modbus client devices typically provide a means to access the full range of 65536 Modbus Holding registers. One of these methods is to use 6-digit decimal addresses from 400001 to 465536. This manual uses 6-digit decimal addressing to represent Modbus Holding register addresses.

Modbus client devices that are limited to 5-digit decimal addressing may still access registers 400001 to 409999 by using 5-digit decimal addresses 40001 to 49999. Registers 410000-465536 are inaccessible to these clients.

Function codes

The adapter module supports the Modbus function codes shown below.

Function code	Name	Description
03h	Read Holding Registers	Reads the contents of a contiguous block of holding registers in a server device.
06h	Write Single Register	Writes a single holding register in a server device.

Function code	Name	Description
10h	Write Multiple Registers	Writes the contents of a contiguous block of holding registers in a server device.
17h	Read/Write Multiple Registers	Writes the contents of a contiguous block of holding registers in a server device, then reads the contents of a contiguous block of holding registers (same or different than those written) in a server device.
2Bh/0Eh	Encapsulated Interface Transport / Read Device Identification	Allows reading identification and other information of the server. Parameter "Read Device ID code" allows one to define three access types: • 01: Request to get the basic device identification (stream access) • 02: Request to get the regular device identification (stream access) • 04: Request to get one specific identification object (individual access).

Encapsulated Interface Transport / Read Device Identification

The adapter module supports the Modbus EIT/RDI objects shown below.

Object ID	Name
00h	Vendor Name
01h	Product Code
02h	Major/Minor Revision
03h	Vendor URL
04h	Product Name

Exception codes

The adapter module supports the Modbus exception codes shown below.

Exception Code	Name	Description
01h	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server.
02h	ILLEGAL DATA ADDRESSS	The data address received in the query is to an allowable address for the server.
03h	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the server.
04h	SLAVE DEVICE FAILURE	An unrecoverable error occurred while the server was attempting to perform the requested action.
06h	SLAVE DEVICE BUSY	The server is engaged in processing a long-duration command. The client should retransmit the message later when the server is free.

Communication profiles

Modbus is an application layer messaging protocol. It describes how data is transferred between the client and a server, but not the meaning of that data. Communication profiles are used to define the meaning of the data.

ABB Drives profile - Classic

The ABB Drives profile - Classic communication profile provides register mapped access to the control, status, reference and actual values of the ABB Drives profile in the classic format for backward compatibility.

Register Address[1)]	Register Data (16-bit)
(4)00001	ABB Drives Profile Control
(4)00002	ABB Drives Profile Reference 1
(4)00003	ABB Drives Profile Reference 2
(4)00004	ABB Drives Profile Status
(4)00005	ABB Drive Profile Actual 1
(4)00006	ABB Drive Profile Actual 2
(4)00101…(4)09999	Drive Parameter Access (16-bit) Register Address = (4)00000 + 100 × Group + Index Example for Drive Parameter 3.18: (4)00000 + 100 × 3 + 18 = 400318 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).
(4)20000…(4)29999	Drive Parameter Access (32-bit): Register Address = (4)20000 + 200 × Group + 2 × Index Example for Drive Parameter 1.27: (4)20000 + 200 × 1 + 2 × 27 = 420254 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).

1) 6-digit register addressing ([4]00001) is used instead of 5-digit register addressing ([4]0001) to describe the register map. See section *Register addressing* on page *66* for additional information.

ABB Drives profile - Enhanced

The ABB Drives profile - Enhanced communication profile provides register mapped access to the control, status, reference and actual values of the ABB Drives profile. The mapping of the registers has been enhanced to allow writing of control and reading of status in a single Read/Write Multiple Register request.

Register Address [1), 2)]	Register Data (16-bit)
(4)00001	ABB Drives Profile Control
(4)00002	ABB Drives Profile Reference 1
(4)00003	ABB Drives Profile Reference 2
(4)00004	DATA OUT 1
(4)00005	DATA OUT 2
(4)00006	DATA OUT 3
(4)00007	DATA OUT 4
(4)00008	DATA OUT 5
(4)00009	DATA OUT 6
(4)00010	DATA OUT 7
(4)00011	DATA OUT 8
(4)00012	DATA OUT 9
(4)00013	DATA OUT 10
(4)00014	DATA OUT 11
(4)00015	DATA OUT 12
(4)00051	ABB Drives Profile Status
(4)00052	ABB Drive Profile Actual 1
(4)00053	ABB Drive Profile Actual 2
(4)00054	DATA IN 1
(4)00055	DATA IN 2
(4)00056	DATA IN 3
(4)00057	DATA IN 4
(4)00058	DATA IN 5
(4)00059	DATA IN 6
(4)00060	DATA IN 7

Register Address [1), 2)]	Register Data (16-bit)
(4)00061	DATA IN 8
(4)00062	DATA IN 9
(4)00063	DATA IN 10
(4)00064	DATA IN 11
(4)00065	DATA IN 12
(4)00101…(4)09999	Drive Parameter Access (16-bit) Register Address = (4)00000 + 100 × Group + Index Example for Drive Parameter 3.18: (4)00000 + 100 × 3 + 18 = 400318 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).
(4)20000…(4)29999	Drive Parameter Access (32-bit): Register Address = (4)20000 + 200 × Group + 2 × Index Example for Drive Parameter 1.27: (4)20000 + 200 × 1 + 2 × 27 = 420254 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).

1) 6-digit register addressing ([4]00001) is used instead of 5-digit register addressing ([4]0001) to describe register map. See section *Register addressing* on page *66* for additional information.

2) Register addresses of the 32-bit parameters cannot be accessed by using 5-digit register numbers.

Transparent 16-bit

The Transparent 16-bit communication profile provides unaltered 16-bit access to the configured drive profile.

Register Address [1), 2)]	Register Data (16-bit)
(4)00001	Native Drive Profile Control
(4)00002	Native Drive Profile Reference 1
(4)00003	Native Drive Profile Reference 2
(4)00004	DATA OUT 1
(4)00005	DATA OUT 2
(4)00006	DATA OUT 3
(4)00007	DATA OUT 4
(4)00008	DATA OUT 5
(4)00009	DATA OUT 6
(4)00010	DATA OUT 7
(4)00011	DATA OUT 8
(4)00012	DATA OUT 9
(4)00013	DATA OUT 10
(4)00014	DATA OUT 11
(4)00015	DATA OUT 12
(4)00051	Native Drive Profile Status
(4)00052	Native Drive Profile Actual 1
(4)00053	Native Drive Profile Actual 2
(4)00054	DATA IN 1
(4)00055	DATA IN 2
(4)00056	DATA IN 3
(4)00057	DATA IN 4
(4)00058	DATA IN 5
(4)00059	DATA IN 6
(4)00060	DATA IN 7
(4)00061	DATA IN 8
(4)00062	DATA IN 9
(4)00063	DATA IN 10

Register Address [1), 2)]	Register Data (16-bit)
(4)00064	DATA IN 11
(4)00065	DATA IN 12
(4)00101…(4)19999	Drive Parameter Access (16-bit) Register Address = 400000 + 100 × Group + Index Example for Drive Parameter 3.18: (4)00000 + 100 × 3 + 18 = 400318 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).
(4)20000…(4)29999	Drive Parameter Access (32-bit): Register Address = (4)20000 + 200 × Group + 2 × Index Example for Drive Parameter 1.27: (4)20000 + 200 × 1 + 2 × 27 = 420254 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).

1) 6-digit register addressing ([4]00001) is used instead of 5-digit register addressing ([4]0001) to describe register map. See section *Register addressing* on page *66* for additional information.

2) Register addresses of the 32-bit parameters cannot be accessed by using 5-digit register numbers.

Transparent 32-bit

The Transparent 32-bit communication profile provides unaltered 32-bit access to the configured drive profile.

Register Address [1), 2)]	Register Data (16-bit)
(4)00001	Native Drive Profile Control - Least Significant 16-bits
(4)00002	Native Drive Profile Control - Most Significant 16-bits
(4)00003	Native Drive Profile Reference 1 - Least Significant 16-bits
(4)00004	Native Drive Profile Reference 1 - Most Significant 16-bits
(4)00005	Native Drive Profile Reference 2 - Least Significant 16-bits
(4)00006	Native Drive Profile Reference 2 - Most Significant 16-bits
(4)00007	DATA OUT 1
(4)00008	DATA OUT 2
(4)00009	DATA OUT 3
(4)00010	DATA OUT 4
(4)00011	DATA OUT 5
(4)00012	DATA OUT 6
(4)00013	DATA OUT 7
(4)00014	DATA OUT 8
(4)00015	DATA OUT 9
(4)00016	DATA OUT 10
(4)00017	DATA OUT 11
(4)00018	DATA OUT 12
(4)00051	Native Drive Profile Status - Least Significant 16-bits
(4)00052	Native Drive Profile Status - Most Significant 16-bits
(4)00053	Native Drive Profile Actual 1 - Least Significant 16-bits
(4)00054	Native Drive Profile Actual 1 - Most Significant 16-bits
(4)00055	Native Drive Profile Actual 2 - Least Significant 16-bits
(4)00056	Native Drive Profile Actual 2 - Most Significant 16-bits
(4)00057	DATA IN 1

Register Address [1), 2)]	Register Data (16-bit)
(4)00058	DATA IN 2
(4)00059	DATA IN 3
(4)00060	DATA IN 4
(4)00061	DATA IN 5
(4)00062	DATA IN 6
(4)00063	DATA IN 7
(4)00064	DATA IN 8
(4)00065	DATA IN 9
(4)00066	DATA IN 10
(4)00067	DATA IN 11
(4)00068	DATA IN 12
(4)00101…(4)09999	Drive Parameter Access (16-bit) Register Address = (4)00000 + 100 × Group + Index Example for Drive Parameter 3.18: (4)00000 + 100 × 3 + 18 = 400318 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).
(4)20000…(4)29999	Drive Parameter Access (32-bit): in group A (51/151, 54/154) Register Address = (4)20000 + 200 × Group + 2 × Index Example for Drive Parameter 1.27: (4)20000 + 200 × 1 + 2 × 27 = 420254 **Note**: Addressing depends on the address mode selected with parameter group 23 in group A (51/151, 54/154).

1) 6-digit register addressing ([4]00001) is used instead of 5-digit register addressing ([4]0001) to describe register map. See section *Register addressing* on page *66* for additional information.

2) Register addresses of the 32-bit parameters cannot be accessed by using 5-digit register numbers.

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Modbus/TCP – Diagnostics

Contents of this chapter

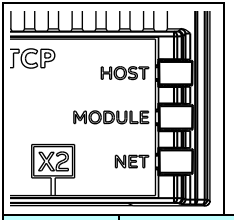
This chapter explains how to trace faults with the status LEDs on the adapter module when the module is used for Modbus/TCP communication.

Fault and warning messages

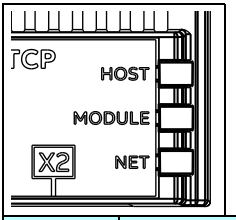
For the fault and warning messages concerning the adapter module, see the drive firmware manual.

LEDs

The adapter module is equipped with three bicolor diagnostic LEDs. The LEDs are described below.



Name	Color	Function
HOST	Blinking green	Establishing communication to host
	Green	Connection to host OK
	Blinking red	Communication to host lost temporarily
	Blinking orange, alternating with the MODULE blinking orange	Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative.
MODULE	Off	There is no power applied to the device.
	Flashing orange	Device is attempting to obtain IP configuration from the DHCP server.
	Orange	Device is executing Duplicate Address Detection.
	Flashing green	Device is waiting for a Modbus request.
	Green	Device has received a Modbus request within the Modbus/TCP Timeout period.
	Flashing red	Ethernet link is down.
	Red	Ethernet interface is disabled. Duplicate Address Detection may have detected a duplicate address. Check the IP configuration and either initiate a Fieldbus Adapter parameter refresh or cycle power to the drive.
	Flashing orange, alternating with the HOST flashing orange	Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative.



Name	Color	Function
NETWORK/NET	Off	Ethernet link is down.
	Flashing green	Ethernet link is up at 100 Mbps. Flashing indicates activity on interface.
	Flashing orange	Ethernet link is up at 10 Mbps. Flashing indicates activity on interface.

Internal error code registers

A Modbus query can fail in many ways in the drive. The Modbus standard does not specify detailed error descriptions. In addition to the standard error codes, the FMBT-21 adapter module provides an internal error register area for more detailed diagnostics.

The internal error register area is used if Modbus error code 0x04 occurs. The registers contain information about the last query. You can figure out the reason of the failure by reading the registers. The internal error register is cleared when a query has finished successfully.

Address	Registers (16-bit word)
(4)00090	Reset internal error registers (0 = Do nothing, 1 = Reset)
(4)00091	Function code of the failed query
(4)00092	Internal error code; see the error number.
(4)00093	Failed register
(4)00094	Last register that was written successfully
(4)00095	Last register that was read successfully

Error code	Description	Situation
0x00	No error	Used when a Modbus query was successful
0x02	Low or high limit exceeded	Change access with a value outside the value limits
0x03	Faulty subindex	Access to an unavailable subindex of an array parameter
0x05	Incorrect data type	Change access with a value that does not match the data type of the parameter
0x65	General error in drive communication	Undefined error when handling a Modbus query
0x66	Timeout	Timeout in drive communication when handling a Modbus query
0x70	Read-only	An attempt to write a non-zero value to a read-only drive parameter

Error code	Description	Situation
0x71	Parameter group ended	An attempt to write to multiple parameter groups
0x72	MSB is not zero	An attempt to write a 16-bit parameter with a 32-register address and the MSB bytes are not zero
0x73	LSB query start	An attempt to access only the LSB register of the 32-bit parameter
0x74	MSB query end	An attempt to access only the MSB register of the 32-bit parameter

NONE protocol selection

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NONE – Start-up

Contents of this chapter

This chapter contains:

- information on configuring the drive for operation with the adapter module
- drive-specific instructions on starting up the drive with the adapter module
- information on configuring the client for communication with the adapter module.

Warnings

WARNING! Obey the safety instructions given in this manual and the drive documentation.

Drive configuration

The information in this section applies to all drive types compatible with the adapter module, unless otherwise stated.

Connection configuration using NONE protocol

After the adapter module is mechanically and electrically installed according to the instructions in chapters *Mechanical installation* and *Electrical installation*, you must prepare the drive for communication with the module.

The detailed procedure of activating the module using the NONE protocol with the drive depends on the drive type. Normally, you must adjust a parameter to activate the communication. See the drive-specific start-up sections starting on page *93*.

Once communication between the drive and the adapter module is established, several configuration parameters are copied to the drive. These parameters are shown in the tables below and must be checked first and adjusted where necessary. You can adjust the parameters via a drive control panel or a PC tool.

Note:

- Not all drives will display the descriptive names for the configuration parameters.
- The new parameter settings take effect only when you power up the module the next time or when you activate the fieldbus adapter refresh parameter.
- Use the NONE protocol selection when no fieldbus protocol is required. For example, when only the Ethernet tool network is used.

FMBT-21 configuration parameters – group A (group 1)

Note: The actual parameter group number depends on the drive type. Group A (group 1) corresponds to:

- parameter group 51 in ACS380, ACS480, ACS580, ACH580 and ACQ580.
- parameter group 51 in ACS880 if the adapter is installed as fieldbus adapter A or group 54 if the adapter is installed as fieldbus adapter B.

No.	Name/Value	Description	Default
01	FBA TYPE	**Read-only.** Shows the fieldbus adapter type as detected by the drive. The value cannot be adjusted by the user. If the value is **0** = None, the communication between the drive and the module has not been established.	Mod-bus/TCP
02	Protocol/Profile	Selects the application protocol and communication profile for the network connection. The selections available for NONE protocol are listed below.	**0** = Modbus/TCP
	0 = Modbus/TCP	ABB Drives profile - Classic	
	200 = NONE	NONE protocol	
03	Commrate	Sets the bit rate for the Ethernet interface.	**0** = Auto
	0 = Auto	Autonegotiate	
	1 = 100 Mbps FD	100 Mbps, full duplex	
	2 = 100 Mbps HD	100 Mbps, half duplex	
	3 = 10 Mbps FD	10 Mbps, full duplex	
	4 = 10 Mbps HD	10 Mbps, half duplex	
04	IP configuration	Sets the method for configuring the IP address, subnet mask and gateway address for the module.	**1** = Dyn IP DHCP
	0 = Static IP	Configuration is obtained from parameters *05…13*.	
	1 = Dyn IP DHCP	Configuration is obtained via DHCP.	

No.	Name/Value	Description	Default
05	IP address 1	An IP address is assigned to each IP node on a network. An IP address is a 32-bit number that is typically represented in “dotted decimal” notation consisting of four decimal integers, on the range 0…255, separated by periods. Each integer represents the value of one octet (8-bits) in the IP address. Parameters *05...08* define the four octets of the IP address.	0
	0…255	IP address	
…	…	…	…
08	IP address 4	See parameter *05 IP address 1*.	0
	0…255	IP address	

No.	Name/Value	Description	Default
09	Subnet CIDR	Subnet masks are used for splitting networks into smaller networks called subnets. A subnet mask is a 32-bit binary number that splits the IP address into a network address and host address. Subnet masks are typically represented in either dotted decimal notation or the more compact CIDR notation, as shown in the table below.	0

Dotted decimal	CIDR	Dotted decimal	CIDR
255.255.255.254	31	255.254.0.0	15
255.255.255.252	30	255.252.0.0	14
255.255.255.248	29	255.248.0.0	13
255.255.255.240	28	255.240.0.0	12
255.255.255.224	27	255.224.0.0	11
255.255.255.192	26	255.224.0.0	10
255.255.255.128	25	255.128.0.0	9
255.255.255.0	24	255.0.0.0	8
255.255.254.0	23	254.0.0.0	7
255.255.252.0	22	252.0.0.0	6
255.255.248.0	21	248.0.0.0	5
255.255.240.0	20	240.0.0.0	4
255.255.224.0	19	224.0.0.0	3
255.255.192.0	18	192.0.0.0	2
255.255.128.0	17	128.0.0.0	1
255.255.0.0	16		

	1…31	Subnet mask in CIDR notation	
10	GW address 1	IP gateways connect individual physical IP subnets into a unified IP network. When an IP node needs to communicate with an IP node on another subnet, the IP node sends the data to the IP gateway for forwarding. Parameters *10…13* define the four octets of the gateway address.	0
	0…255	GW address	
…	…	…	…
13	GW address 4	See parameter *10 GW address 1*.	0

No.	Name/Value	Description	Default
	0…255	GW address	
14	Commrate port 2	Sets the bit rate for the Ethernet port 2.	**0** = Auto
	0 = Auto	Autonegotiate	
	1 = 100 Mbps FD	100 Mbps, full duplex	
	2 = 100 Mbps HD	100 Mbps, half duplex	
	3 = 10 Mbps FD	10 Mbps, full duplex	
	4 = 10 Mbps HD	10 Mbps, half duplex	
15	Service configuration	Disable services that are not required. Each service is represented by a single bit. Bit 0, Lock configuration, can be used to prevent accidental changing of this parameter. By default, all services are enabled and configuration is unlocked.	

Bit	Name	Information
0	Lock configuration	Changing of this parameter are no longer possible when this bit is set. Only reset fieldbus configuration to default will unlock the parameter.
1	Disable IP config tool	When this bit is set, access from ABB IP Configuration tool is prevented.
2	Disable ETH tool network	When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.
3	Disable ping response	When this bit is set, response to ICMP (ping) message is prevented.

	0000b…1111b	Service configuration	
16 … 25	Reserved	These parameters are not used by the adapter module when using the NONE protocol.	N/A
26	Reserved	These parameters are not used by the adapter module when using the NONE protocol.	N/A

No.	Name/Value	Description	Default
27	FBA A/B par refresh	Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to **0** = Done. **Note:** This parameter cannot be changed while the drive is running.	**0** = Done
	0 = Done	Refreshing done	
	1 = Refresh	Refreshing	
28	FBA A/B par table ver	**Read-only.** Displays the parameter table revision of the fieldbus adapter module mapping file stored in the memory of the drive. In format **xyz**, where **x** = major revision number **y** = minor revision number **z** = correction number OR in format **axyz**, where **a** = major revision number **xy** = minor revision numbers **z** = correction number or letter.	N/A
		Parameter table revision	
29	FBA A/B drive type code	**Read-only.** Displays the drive type code of the fieldbus adapter module mapping file stored in the memory of the drive.	N/A
		Drive type code of the fieldbus adapter module mapping file	
30	FBA A/B mapping file ver	**Read-only.** Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format.	N/A
		Mapping file revision	
31	D2FBA A/B comm status	**Read-only.** Displays the status of the fieldbus adapter module communication. **Note:** The value names may vary by drive.	**0** = Idle or **4** = Off-line or **2** = Time out
	0 = Idle	Adapter is not configured.	
	1 = Exec.init	Adapter is initializing.	
	2 = Time out	A timeout has occurred in the communication between the adapter and the drive.	

No.	Name/Value	Description	Default
	3 = Conf.err	Adapter configuration error: The major or minor revision code of the common program revision in the fieldbus adapter module is not the revision required by the module or mapping file upload has failed more than three times.	
	4 = Off-line	Adapter is off-line.	
	5 = On-line	Adapter is on-line.	
	6 = Reset	Adapter is performing a hardware reset.	
32	FBA A/B comm SW ver	**Read-only.** Displays firmware patch and build number of the adapter module in the **xxyy** format, where: **xx** = patch number **yy** = build number Example: C80D ≥ 200.13 or 0 ≥ 0.0	N/A
		Common program version of the adapter module	
33	FBA A/B appl SW ver	**Read-only.** Displays firmware version of the adapter module in xxyy format, where: **xx = major revision number** **yy = minor revision number** Example: 310 = 3.10 Version number is the form: <major>.<minor>.<patch>.<build> Example: 3.10.200.13 or 3.10.0.0	N/A
		Application program revision of the adapter module	

Starting up fieldbus communication

1. Power up the drive.
2. Enable communication between the adapter module and the drive by selecting the correct slot number in parameter 50.01 FBA A enable.

   The selection must correspond to the slot where the adapter module is installed. For example, if the adapter module is installed in slot 1, you must select slot 1.
3. Set the module configuration parameters in group 51.
   - select the communication protocol and profile with parameter 51.02, and
   - configure the network settings with parameters 51.03…51.13.
4. Save the valid parameter values to permanent memory with parameter 96.07 Parameter save manually.
5. Validate the settings made in parameter groups 51 with parameter 51.27 FBA A par refresh.

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NONE – Diagnostics

Contents of this chapter

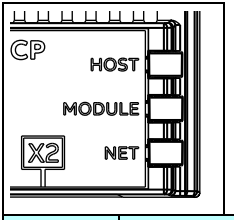
This chapter explains how to trace faults with the status LEDs on the adapter module using the NONE protocol.

Fault and warning messages

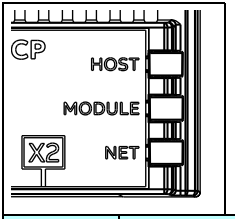
For the fault and warning messages concerning the adapter module, see the drive firmware manual.

LEDs

The adapter module is equipped with three bicolor diagnostic LEDs. The LEDs are described below.



Name	Color	Function
HOST	Blinking green	Establishing communication to host
	Green	Connection to host OK
	Blinking red	Communication to host lost temporarily
	Blinking orange, alternating with the MODULE blinking orange	Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative.
MODULE	Off	There is no PC tool connected to the device.
	Flashing orange	Device is attempting to obtain IP configuration from the DHCP server.
	Orange	Device is executing Duplicate Address Detection.
	Green	PC tool is connected to the device.
	Flashing red	Ethernet link is down.
	Red	Ethernet interface is disabled. Duplicate Address Detection may have detected a duplicate address. Check the IP configuration and either initiate a Fieldbus Adapter parameter refresh or cycle power to the drive.
	Flashing orange, alternating with the HOST flashing orange	Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative.



Name	Color	Function
NETWORK/NET	Off	Ethernet link is down.
	Flashing green	Ethernet link is up at 100 Mbps. Flashing indicates activity on interface.
	Flashing orange	Ethernet link is up at 10 Mbps. Flashing indicates activity on interface.

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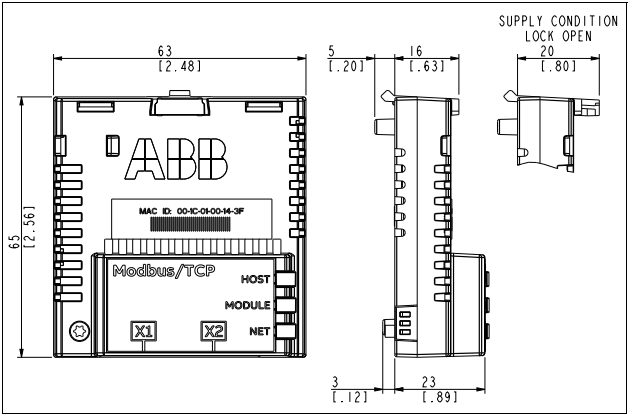
Technical data

Contents of this chapter

This chapter contains the technical specifications of the adapter module and the Ethernet link.

FMBT-21

The figure below shows the enclosure of the adapter module from the front and side.



Installation	Into an option slot on the drive control unit
Degree of protection	IP20
Ambient conditions	The applicable ambient conditions specified for the drive in its manuals are in effect.
Package	Cardboard. Plastic wrapping: Antistatic air bubble sheet (PE).
Indicators	Three bicolor LEDs (HOST, MODULE, NETWORK/NET)
Connectors	A 20-pin connector to the drive RJ-45 connector to Ethernet (X1) RJ-45 connector for chaining another adapter module (X2)
Power supply	+3.3 V ±5% max. 400 mA (supplied by the drive)
General	Complies with EMC standard EN 61800-3:2004 Printed circuit board conformal coated

Ethernet link

Compatible devices	Ethernet Standard IEEE 802.3 and IEEE 802.3u devices
Medium	10BASE-TX or 100Base-TX with Auto-negotiation and Auto-MDIX (Auto-crossover) • Wiring: CAT5/6 UTP, CAT5/6 FTP, CAT5/6 STP • Connector: RJ-45 • Termination: Internal • Maximum segment length: 100 m / 328 ft
Topology	Bus or star. Max. 50 nodes allowed for FMBT-21 in a daisy chain topology.
Transfer rate	10 Mbps or 100 Mbps
Serial communication type	Half or full duplex
Protocol	Modbus/TCP

TCP and UDP service ports

There are multiple in-bound and out-bound network services running on the FMBT-21. Some ports are protocol specific and are not used when other protocols are selected.

Port	Service	Purpose
502 (TCP/UDP)	Modbus/TCP	Communication between the drive and a PLC. **Note**: Used only when Modbus/TCP protocol is selected
68 (UDP)	DHCP	DHCP client **Note**: Used only when IP configuration method is selected as "Dyn IP DHCP"
24576 (UDP)	ABB Netconfig	• Auto discovery protocol • Used by ControlBuilder plus (IP Configuration tool) and Drive composer pro and DriveWindow 2.40 PC tools • Discovers ABB specific Ethernet devices in a local network segment, by listening to and responding to UDP broadcasts. To disable, go to **Service Configuration parameter 51.15**.

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Appendix A – ABB IP configuration tool for FMBT-21

Contents of this chapter

This chapter shows how to use the ABB IP configuration tool to:

- find configured and unconfigured FMBT-21 adapter modules in the network
- rewrite the IP configuration of the adapter modules.

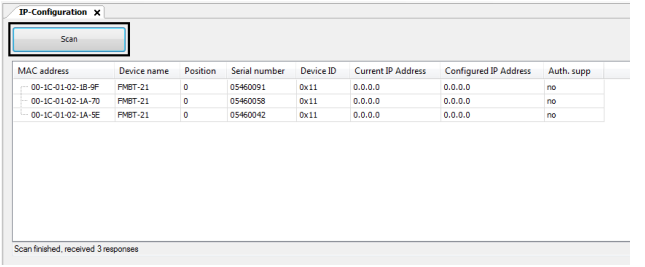
Installation

The ABB IP configuration tool is part of the Control Builder Plus software. No separate installation is needed.

Finding adapter modules in the network

1. Open the ABB IP configuration tool.
2. Click the **Scan** button.

   The FMBT-21 adapter modules present in the network appear on the results list.

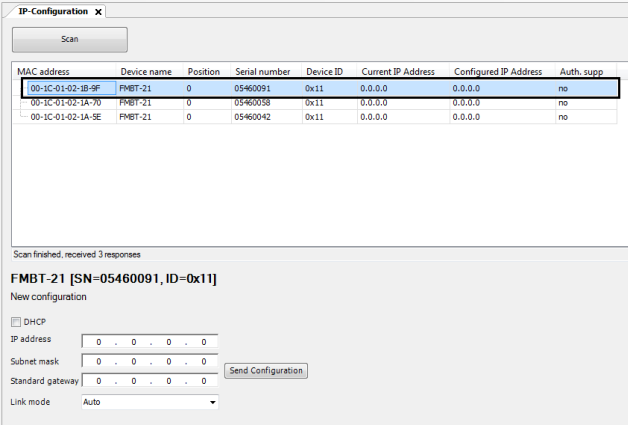


Rewriting the IP configuration of adapter modules

1. Scan the network for adapter modules.

   For instructions, see section *Finding adapter modules in the network* on page *104*.

2. On the results list, click to select the adapter module whose IP configuration you want to modify.

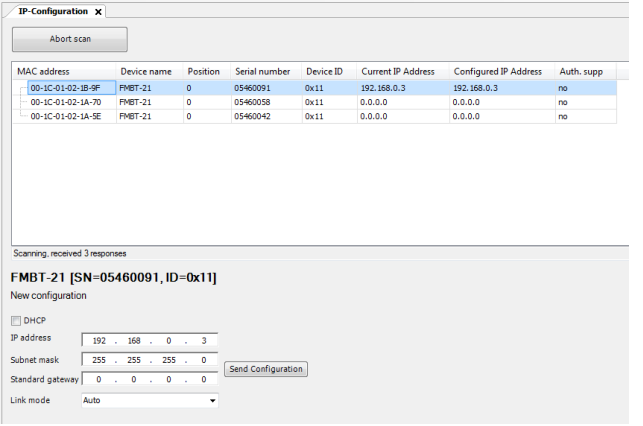


3. Below **New configuration**, define the IP configuration settings according to your network configuration.

4. If you want the adapter module to use a static IP address instead of DHCP, clear the **DHCP** check box.

5. To apply the new settings, click the **Send Configuration** button.

   The new current IP address and configured IP address appear on the results list.



Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/searchchannels.

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