

Altivar 212

Variable speed drives for asynchronous motors

Modbus communication manual

01/2011



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

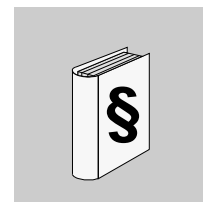
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Table of Contents



	Safety Information	5
	About the Book	6
Chapter 1	Introduction	9
Chapter 2	Hardware setup	11
	Pin out of the Open Style Modbus connector	12
	Connection via Open Style wiring system	13
	Open Style Reference	13
	Pin out of the RJ45 Modbus connector	13
	Connection via RJ45 wiring system	14
	RJ45 Reference	14
	Protection Against Interference	15
	Description of terminals	16
Chapter 3	Configuration	19
	Configuration of the communication parameters	20
	Configuration of the control source	21
	Configuration of the indirect blocks	27
	Configuration of the communication interruption	28
Chapter 4	Modbus services	31
	Principle of the Modbus protocol	32
	RTU mode	32
	Modbus functions available	33
	Read one word (03)	33
	Read indirect block (3)	34
	Write Single Register (6)	36
	Write multiple registers (16)	37
	Write indirect block (16)	38
	Read Device Identification (43/14)	40
	Error response	41
Chapter 5	Parameter list	43
	Referring to the Altivar 212 programming manual	44
	List of control parameters	45
	List of monitoring parameters	46
	Commands	48
	Setpoints	50
	Status	51
	Trip and alarm codes	53
	Monitoring and control of I/O from communication	55
Chapter 6	Appendix	61
	RS485 standard	62
	Modbus 2-wire standard schematic	62
Chapter 7	Migration	63
	Migration ATV21 - ATV212	64

Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

CAUTION

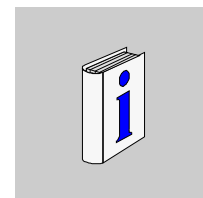
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage.

PLEASE NOTE

The word “drive” as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

About the Book



At a Glance

Document Scope

The purpose of this document is to show you how to configure the Altivar 212 to use Modbus for monitoring and control.

NOTE: Read and understand this document and all related documents (see below) before installing, operating, or maintaining your ATV212.

Validity Note

This documentation is valid for the Altivar 212 Modbus fieldbus.

Related Documents

Title of Documentation	Reference Number
ATV212 Quick Start	S1A53825
ATV212 Installation manual	S1A53832
ATV212 Programming manual	S1A53838
ATV212 BACnet manual	S1A53845
ATV212 Metasys N2 manual	S1A53846
ATV212 Apogée FLN P1 manual	S1A53847
ATV212 LonWorks manual	S1A53848
ATV212 other option manuals: see www.schneider-electric.com	

You can download the latest versions of these technical publications and other technical information from our website at www.schneider-electric.com.

Product Related Information

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the Altivar 212 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

Failure to follow these instructions will result in death or serious injury.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Read and understand this manual before installing or operating the drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
- **DO NOT** short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Before servicing the drive:
 - Disconnect all power, including external control power that may be present.
 - Place a "DO NOT TURN ON" label on all power disconnects.
 - Lock all power disconnects in the open position.
 - **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge.
 - Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
 - If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

DAMAGE DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link (1).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

Introduction



Data exchanges give access to all Altivar 212 functions:

- Control (start, stop, reset, setpoint),
- Monitoring (status, current, voltage, thermal state...),
- Diagnostics (alarms),
- Settings,
- Configuration.

The communication port has an RJ45 and an open style connector for the connection to the network. At the physical layer, it supports 2-wire RS485 and transmission speed at 9600 or 19200 bps.

4 Modbus functions are available:

- 3 (16#03) Read Holding Registers
- 6 (16#06) Write Single Register
- 16 (16#10) Write Multiple Registers
- 43/14 (16#2B/0E) Read Device Identification

Function 3 has a restricted implementation:

- with length 1 it permits to read any parameter of the drive, one by one, see page [33](#).
- with lengths 1 to 5 it permits to read a particular block of 1 to 5 indirect parameters. These 5 parameters can be configured through the operation panel to relevant monitoring parameters, see page [34](#).

Function 16 has a restricted implementation:

- with length 1 it permits to write any writable parameter of the drive, one by one, see page [37](#).
- with length 1 to 2 it permits to write a particular block of 1 to 2 indirect parameters. These 2 parameters can be configured through the operation panel to relevant control parameters, see page [38](#).

Hardware setup

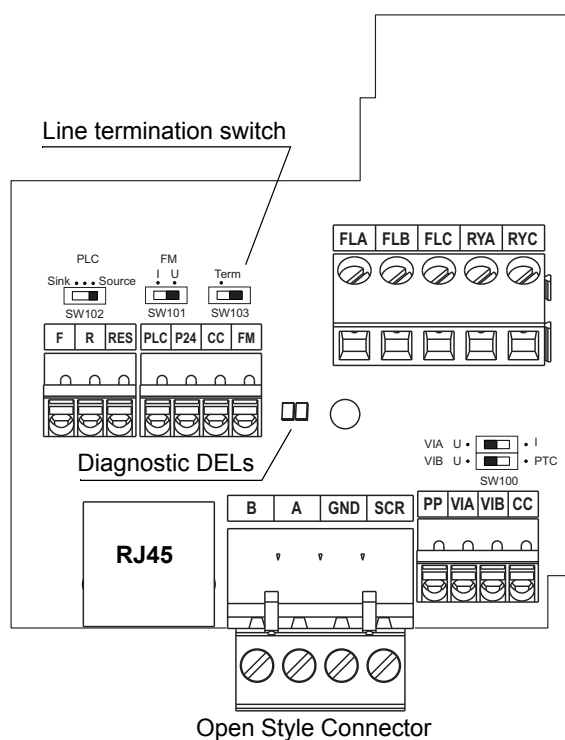
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What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Pin out of the Open Style Modbus connector	12
Connection via Open Style wiring system	13
Open Style Reference	13
Pin out of the RJ45 Modbus connector	13
Connection via RJ45 wiring system	14
RJ45 Reference	14
Protection Against Interference	15
Description of terminals	16

Pin out of the Open Style Modbus connector



Open Style Connector (screw cage plug style)

B	+
A	-
GND	Common
SCR	Shield

Note: It is possible to connect two wires inside one cage in order to be compliant to daisy chain requirements.

Cross section:
0.2 - 2.5 mm² / AWG 24-12

Tightening torque:
0.5-0.6 Nm / 4.4-5.3 lb/In.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Modify only the setting of the switches when the product is switched off.
- Do not change the setting of the SW102 unless your system is wired for SINK logic.

Failure to follow these instructions will result in death or serious injury.

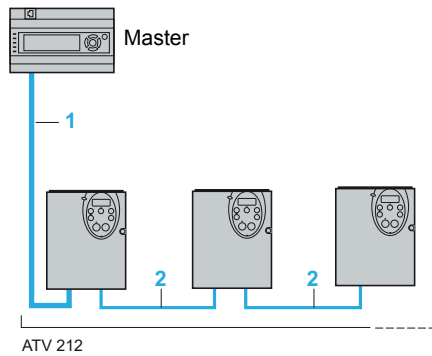
⚠ CAUTION

RISK OF BODY INJURY

Use a screwdriver to change the position of the switches.

Failure to follow these instructions will result in death or serious injury.

Connection via Open Style wiring system



1	Modbus cable depending on the type of master
2	RS 485 double shielded twisted pair cable

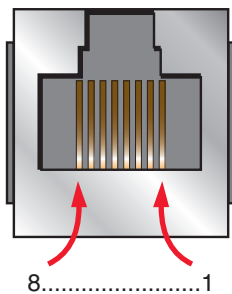
Open Style Reference

Modbus serial link connection is carried out using RS 485 double shielded twisted pair cables, supplied without connector (reference: TSX CSA 100). Maximum length is 100 m (328 ft). The ATV212 drive includes a line termination as standard. Set switch SW103 to Term to connect the internal 120 Ω termination resistor.

Pin out of the RJ45 Modbus connector

View from underneath

The following table describes the pin out of the ATV212 RJ45 connector.



Pin	Signal
1	Not connected
2	Common (common of the signal and power supply)
3	Not connected
4	D1 (Modbus name) or B (EIA / TIA485 name)
5	D0 (Modbus name) or A (EIA / TIA485 name)
6	Not connected
7	VP, 10 Vdc (supply for RS232/RS485 converter or graphic display option)
8	Common (common of the signal and power supply)

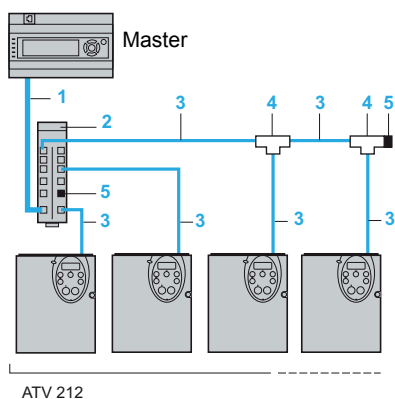
⚠ CAUTION

RISK OF DAMAGE TO THE DRIVE

Use wiring cables or taps that connect only signals D0, D1 and common.

Failure to follow this instruction can result in injury or equipment damage.

Connection via RJ45 wiring system



1	Modbus cable depending on the type of master
2	Modbus splitter box
3	Modbus drop cables
4	Modbus T-junction box
5	Line terminators

Description

RJ45 is factory set to connect the graphic display option.

Use the open style connector to connect the drive to Modbus fieldbus.

Using RJ45 to connect Modbus fieldbus is still possible but requires to modify parameter [\[Com channel choice\]](#) **F B 0 7** value. Set **F B 0 7** to **0 [RJ45]**.

RJ45 Reference

Connection accessories

Description		Reference
Modbus splitter block	10 RJ45 connectors and 1 screw terminal	LU9 GC3
Modbus T-junction boxes	With integrated cable (0.3 m)	VW3 A8 306 TF03
	With integrated cable (1 m)	VW3 A8 306 TF10
Line terminators	For RJ45 connector	R = 120 Ω, C = 1 nF
		R = 150 Ω

Connecting cables

Description	Length m	Connectors	Reference
Cables for Modbus bus	3	1 RJ45 connector and 1 stripped end	VW3 A8 306 D30
	0.3	2 RJ45 connectors	VW3 A8 306 R03
	1	2 RJ45 connectors	VW3 A8 306 R10
	3	2 RJ45 connectors	VW3 A8 306 R30
RS 485 double shielded twisted pair cables	100	Supplied without connector	TSX CSA 100
	200	Supplied without connector	TSX CSA 200
	500	Supplied without connector	TSX CSA 500

Type of master	Master interface	Modbus connection accessories for RJ45 wiring system	
		Description	Reference
Twido PLC	Adaptor or mini-DIN RS485 interface module	3 m cable fitted with a mini-DIN connector and an RJ45 connector	TWD XCA RJ030
	Adaptor or screw terminal RS485 interface module	3 m cable fitted with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (SUB-D 25 socket)	Cable fitted with a SUB-D 25 connector and stripped at the other end (for connection to the screw terminals of the LU9GC3 splitter block)	TSX SCY CM 6030
	PCMCIA card (TSX SCP114)	Stripped cable	TSX SCP CM 4030

Ethernet bridge (TSX ETG 100)	Screw terminal RS485	3 m cable fitted with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
Serial port PC	Male SUB-D 9 RS232 serial port PC	RS232/RS485 converter and 3 m cable fitted with an RJ45 connector and stripped at the other end (for connection to the screw terminals of the LU9GC3 splitter block)	TSX SCA 72 and VW3 A8 306 D30

Protection Against Interference

- Use the Schneider Electric cable with 2 pairs of shielded twisted conductors (reference: TSXCSA100, TSXCSA200, TSXCSA500).
- Keep the Modbus cable separated from the power cables (30 cm (11.8 in.) minimum).
- Make any crossovers of the Modbus cable and the power cables at right-angles, if necessary.

For more information, please refer to the TSX DG KBL E manual: "Electromagnetic compatibility of industrial networks and fieldbuses".

Description of terminals

Terminal symbol	Function	Electrical specifications	Internal circuits
F	Multifunctional programmable logic input. It has forward rotation function in default setting. ON: forward rotation drive OFF: slowdown and stop	Input for voltage-free contact 24 Vdc, 5 mA or less. SINK/SOURCE can be selected with SW102.	
R	Multifunctional programmable logic input. It has Preset speed command input 1 in default setting.		
RES	Multifunctional programmable logic input. It has Fault Reset in default setting		
PP	Voltage supply for reference potentiometer.	Voltage: 10 Vdc Max current: 10 mA Protected against short circuits.	
VIA	Switch-configurable voltage or current analog input using SW100. It has speed setpoint function in the default setting. (0 to 50 Hz frequency with 0 to 10 Vdc in voltage or with 0 to 20 mA in current input). In addition, This analog input is also configurable as a logic input.	Voltage: 10 Vdc Internal impedance: 30 kΩ Current: 0 - 20 mA	
VIB	Multifunction programmable analog input. It has speed setpoint function in the default setting (0 to 50 Hz frequency with 0 to 10 Vdc input). In addition, this terminal can be used as PTC (2) input by setting switch SW100 and the parameters [Mot PTC selection] F 6 4 5 and [PTC resistor value] F 6 4 6.	Voltage: 10 Vdc Internal impedance: 30 kΩ	
CC	Control circuit equipotential terminal	-	
PLC	This terminal is only active when the switch (SINK-SOURCE) is on PLC position. It allow to manage external sink or source with static outputs. PLC shall be connected to 0V (CC terminal) or +24V according to the type of outputs	Max. voltage: 50 Vdc	
P24	24 Vdc power supply output	Voltage: 24 Vdc, 50 mA	
FM	Switch-configurable voltage or current analog output using SW101.	Voltage analog output: 0...10 Vdc Minimum load impedance: 470 Ω Current analog output: 0...20 mA Maximum load impedance: 550 Ω	
FLA FLB FLC RYA RYC	Multifunctional programmable relay contact outputs. Default setting is set to detect the activation of the drive protection function. Contact across FLA-FLC is closed and FLB-FLC is open during normal operation. RYA -RYC is open.	Voltage: 30 Vdc, 0.5 A 250 Vac, 1A (cos φ = 1) Voltage: 250 Vac, 0.5A (cos φ = 0.4)	

(1) Voltage conversion

(2) PTC (Positive Temperature Coefficient): Resettable thermal fuse resistor for over current protection.

<p>B A GND</p>	<p>BACnet open style connector</p>	<p>RS485 transmission data, reception data.</p>	
<p>SCR</p>	<p>BACnet communication shield terminal. This terminal is not connected to other circuits in the board. Ground this terminal in a location separated from the ground of the power line.</p>		

Configuration

3

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Configuration of the communication parameters	20
Configuration of the control source	21
Configuration of the indirect blocks	27
Configuration of the communication interruption	28

The settings of communication-related parameters can be changed from the operation panel or from Modbus (PLC, computer or controller) or from graphic display option.

Note that there are two types of parameters: parameters whose settings take effect immediately after the setting and parameters whose settings do not take effect until the drive is turned back on or reset. In the table below, these 2 types are mentioned in the column "valid" by "After setting" and "After power cycle".

Configuration of the communication parameters

Access to the parameters

All parameters are accessible in the [COMMUNICATION MENU] *C O N* submenu of [PROGRAMMING MENU] Programming mode.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Refer to «Serial communication parameters» in the Altivar 212 Programming manual, for more information on how to set these serial communication parameters.

Failure to follow these instructions will result in death or serious injury.

Description

Parameters	Modbus address	Adjustment range	Default setting	Valid after
[Mdb RJ45 baud] (<i>F B 0 0</i>) Communication Modbus RJ45 Baud rate	2048 16#800	<i>0</i> [9600 bps] <i>1</i> [19200 bps]	1	Power cycle
[Mdb RJ45 parity] (<i>F B 0 1</i>) Communication Modbus RJ45 Parity	2049 16#801	<i>0</i> [No] (No parity) <i>1</i> [Even] (Even parity) <i>2</i> [Odd] (Odd parity)	1	Power cycle
[Modbus address] (<i>F B 0 2</i>) This address is used whatever the port used.	2050 16#802	<i>0</i> ... <i>2 4 7</i>	1	Setting
[Com. time out] (<i>F B 0 3</i>) Communication time out	2051 16#803	<i>0</i> or <i>1</i> ... <i>1 0 0</i> seconds	3	Setting
[Com channel choice] (<i>F B 0 7</i>) Communication channel choice	2055 16#807	<i>0</i> [RJ45] <i>1</i> [Open style]	1	Setting
[Mdb network baud] (<i>F B 2 0</i>) Modbus network baud rate	2080 16#820	<i>0</i> [9600 bps] <i>1</i> [19200 bps]	1	Power cycle
[Mdb network parity] (<i>F B 2 1</i>) Modbus network parity	2081 16#821	<i>0</i> [No] (No parity) <i>1</i> [Even] (Even parity) <i>2</i> [Odd] (Odd parity)	1	Power cycle
[Network protocol] (<i>F B 2 9</i>) Communication Network protocol selection	2089 16#829	<i>1</i> ... <i>5</i> <i>1</i> [Mdb RTU]	1	Power cycle

Notes:

- Baud rate and parity bit should be uniform inside the same network.
- Modbus address should not be duplicate inside the same network.
- Stop bit isn't configurable. ATV212 Tx is 2 stop bit, Rx is 1 or 2 stop bits. This permits a good communication with Master in 1 and 2 stop bits.
- *F B 0 0* and *F B 0 1* parameters are used to define the baudrate and parity of RJ45 port.
- *F B 2 0* and *F B 2 1* parameters are used to define the baudrate and parity of Open style connector port.
- *F B 0 2* and *F B 0 3* parameters are used to define the modbus address and communication time out for both ports (RJ45 et Open style connector). Set *F B 0 2* between *1* to *2 4 7* (address *0* is not active).
- *F B 0 7* parameter enables to select the communication command channel: RJ45 or Open style connector. The port not set as the communication command channel may be used for monitoring purposes to check that the setting change on *F B 0 7* was effectively taken into account.

Configuration of the control source

The Altivar 212 can receive commands and setpoint from the Modbus network or from the terminals (F, R, RES, VIA, VIB). In the default configuration, both commands and setpoint come from the terminals.

The LOC/REM key of the operation panel is available to switch the control to the operation panel. The inputs F, R or RES can be configured to switch the control from the Modbus network to the terminals.

Different usual possibilities are described in the chapters below:

- Control from the Modbus network,
- Control from the terminals, monitoring from the Modbus network,
- Control from the Modbus network or the terminals, switched via Modbus,
- Command from the Modbus network, setpoint from the Modbus network or the terminals switched to by a logic input.

Refer to these examples.

Control by the Modbus network

The commands and the setpoint come from the Modbus network. The signals wired on the terminals are ignored. The LOC/REM key is valid.

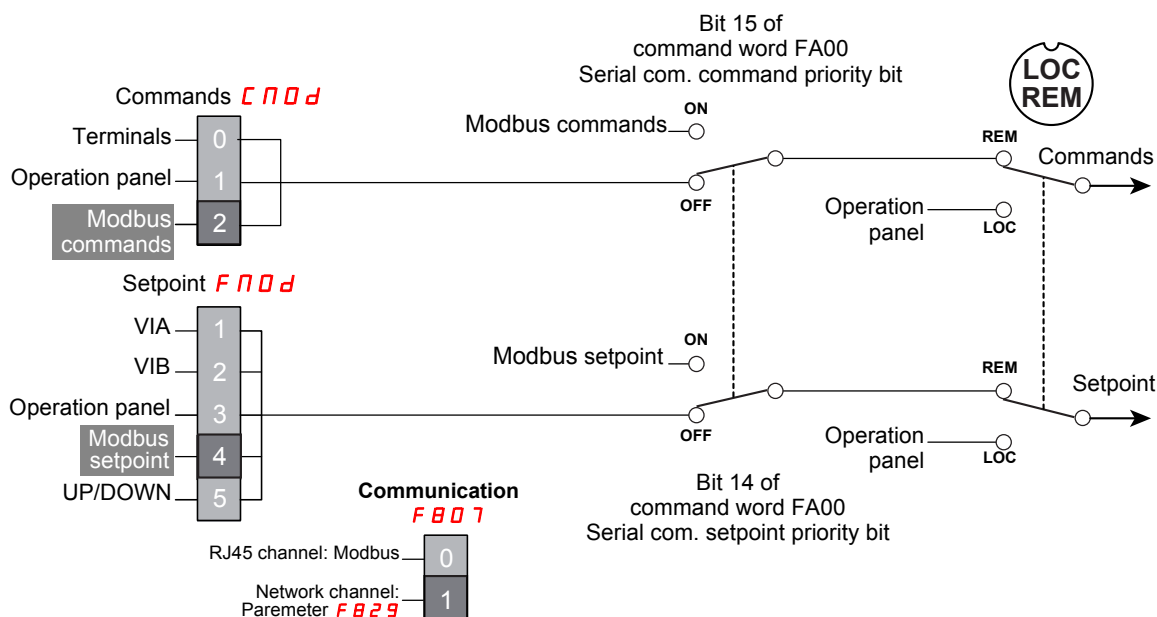
Below is the list of parameters that must be configured.

Access to the parameters

Parameters	Location
[Command mode sel] (C P O d) [Frequency mode sel] (F P O d)	[PROGRAMMING MENU] Programming mode
Other parameters	[COMMUNICATION MENU] C P O d submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Setting	Default setting	Valid after
[Command mode sel] (C P O d) Remote mode start/stop control	3 16#3	2 [Communication] Serial communication	0	Setting
[Frequency mode sel] (F P O d) Remote mode primary speed reference source	4 16#4	4 [Serial com ref.] Serial communication	1	Setting
[Com channel choice] (F B O 1) Communication channel selection	2055 16#807	0 [RJ45] or 1 [Open style]	1	Setting
[Network protocol] (F B 2 9) Communication Network protocol selection	2089 16#829	1 [Modbus-RTU protocol]	1	Power cycle



Control by the terminals, monitoring by the Modbus network

The commands and the setpoint come from the terminals.

The Altivar 212 is monitored via the Modbus network.

The LOC/REM key is valid.

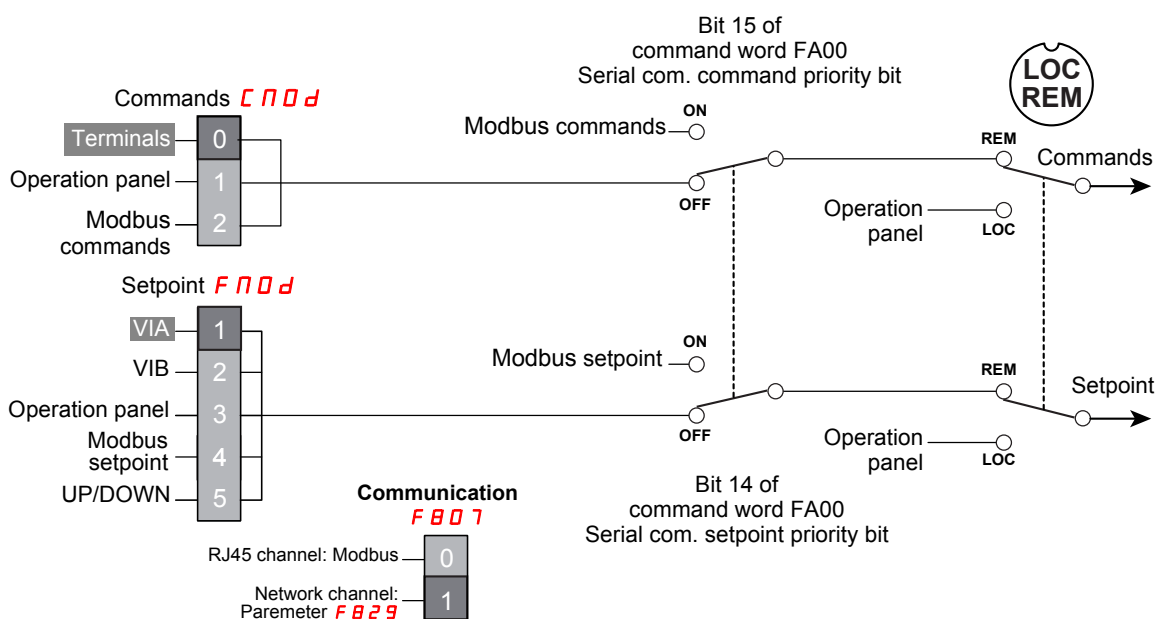
Below is the list of parameters that must be configured.

Access to the parameters

Parameters	Location
[Command mode sel] (C P O d) [Frequency mode sel] (F P O d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F B O 7)	[COMMUNICATION MENU] C O P submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Setting	Default setting	Valid after
[Command mode sel] (C P O d) Remote mode start/stop control	3 16#3	0 [Logic inputs] Control terminal logic inputs	0	Setting
[Frequency mode sel] (F P O d) Remote mode primary speed reference source	4 16#4	1 [Ref source VIA] The source of the drive's speed reference is VIA.	1	Setting
[Com channel choice] (F B O 7) Communication channel selection	2055 16#807	0 [RJ45] or 1 [Open style]	1	Setting



Control by the Modbus network or the terminals, switched via Modbus

The commands come from the terminals if bit 15 of the command word [Command from serial communication] (*F A 0 0*) is "OFF" (value 0).

The commands come from the Modbus network if bit 15 of the command word (*F A 0 0*) is "enabled" (value 1).

The setpoint comes from the terminals if bit 14 of the command word (*F A 0 0*) is "OFF" (value 0).

The setpoint comes from the Modbus network if bit 14 of the command word (*F A 0 0*) is "enabled" (value 1).

The LOC/REM key is valid.

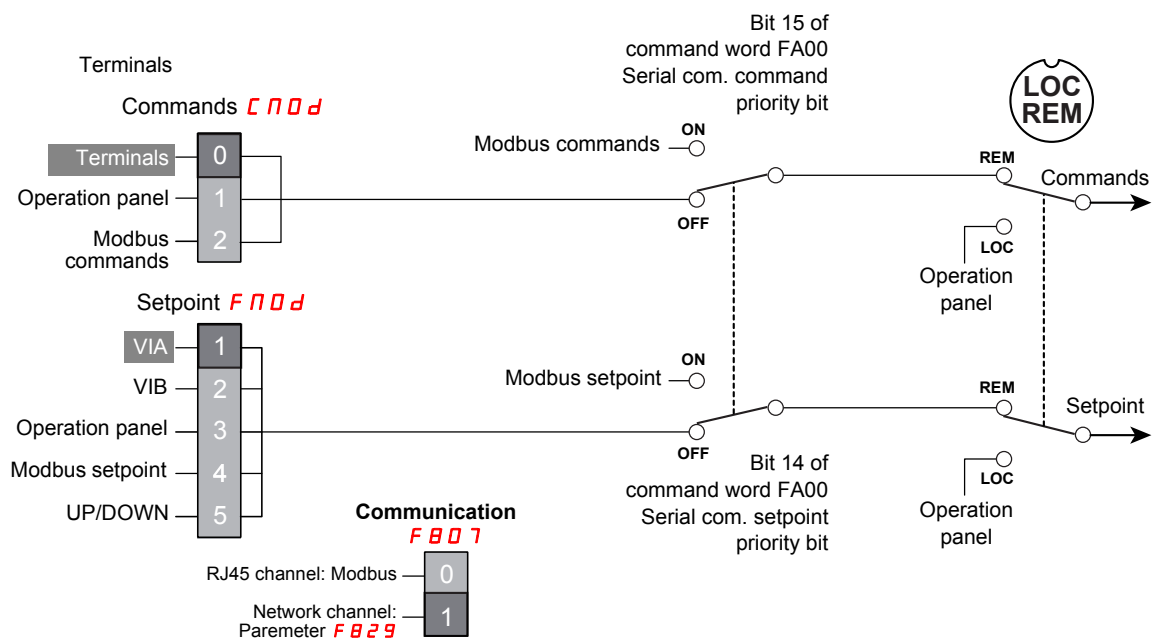
Below is the list of parameters that must be configured.

Access to the parameters

Parameters	Location
[Command mode sel] (<i>C P 0 d</i>) [Frequency mode sel] (<i>F P 0 d</i>)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (<i>F B 0 1</i>)	[COMMUNICATION MENU] <i>C P 1</i> submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Setting	Default setting	Valid after
[Command mode sel] (<i>C P 0 d</i>) Remote mode start/stop control	3 16#3	<i>0</i> [Logic inputs] Control terminal logic inputs	0	Setting
[Frequency mode sel] (<i>F P 0 d</i>) Remote mode primary speed reference source	4 16#4	<i>1</i> [Ref source VIA] The source of the drive's speed reference is VIA.	1	Setting
[Com channel choice] (<i>F B 0 1</i>) Selection of Communication channel: via RJ45 or Open style connector port	2055 16#807	<i>0</i> [RJ45] or <i>1</i> [Open style]	1	Setting



Control by the Modbus network or the terminals switched to by a logic input

The commands and the setpoint come from the Modbus network if logic input R is OFF.

The commands and the setpoint come from the terminals if logic input R is ON.

The function **4B [Forced local]** is assigned to the logic input R, **F 1 1 2 = 4B**.

The LOC/REM key is valid.

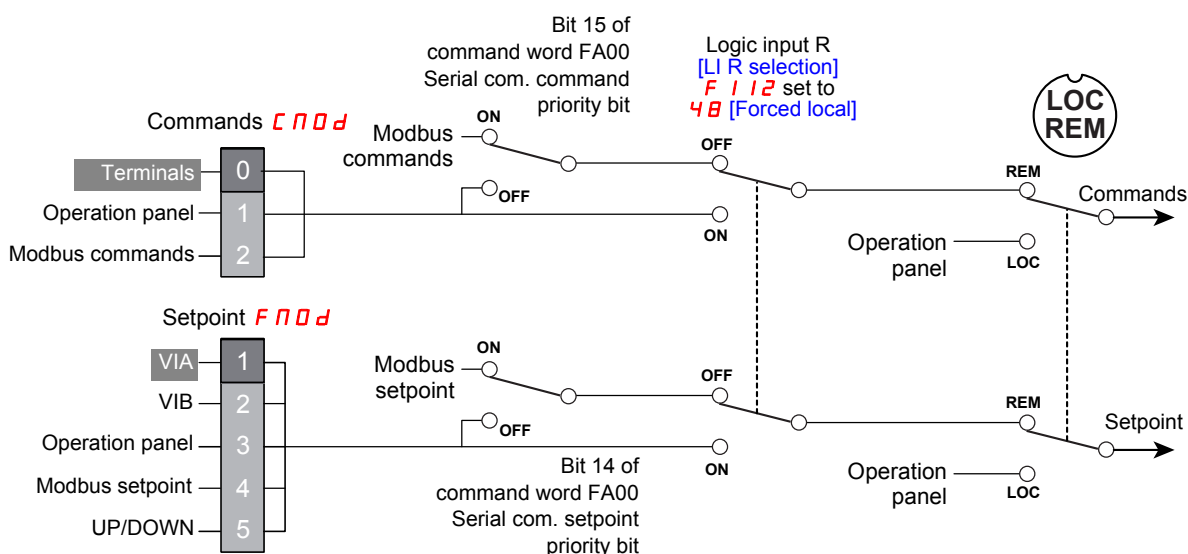
Below is the list of parameters that must be configured.

Access to the parameters

Parameters	Location
[Command mode sel] (C P O d) [Frequency mode sel] (F P O d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F 1 1 2)	[I/O MENU] 1 0 submenu of [PROGRAMMING MENU] Programming mode.
[Com channel choice] (F B O 1)	[COMMUNICATION MENU] C O N submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Setting	Default setting	Valid after
[Command mode sel] (C P O d) Remote mode start/stop control	3 16#3	0 [Logic inputs] Control terminal logic inputs	0	Setting
[Frequency mode sel] (F P O d) Remote mode primary speed reference source	4 16#4	1 [Ref source VIA] The source of the drive's speed reference is VIA.	1	Setting
[LI R selection] (F 1 1 2) R logic input function	274 16#112	4B [Forced local] : configured to Forced switching from remote to local control	6	Setting
[Com channel choice] (F B O 1) Selection of Communication channel: via RJ45 or Open style connector port	2055 16#807	0 [RJ45] or 1 [Open style]	1	Setting



Command by the Modbus network, setpoint by the Modbus network or the terminals switched to by a logic input

The commands come from the Modbus network.

The setpoint comes from the Modbus network if logic input R is OFF.

The setpoint comes from the terminals if logic input R is ON.

The function **3B** [Frequency source] is assigned to the logic input R, **F 1 1 2 = 3B**.

The LOC/REM key is valid.

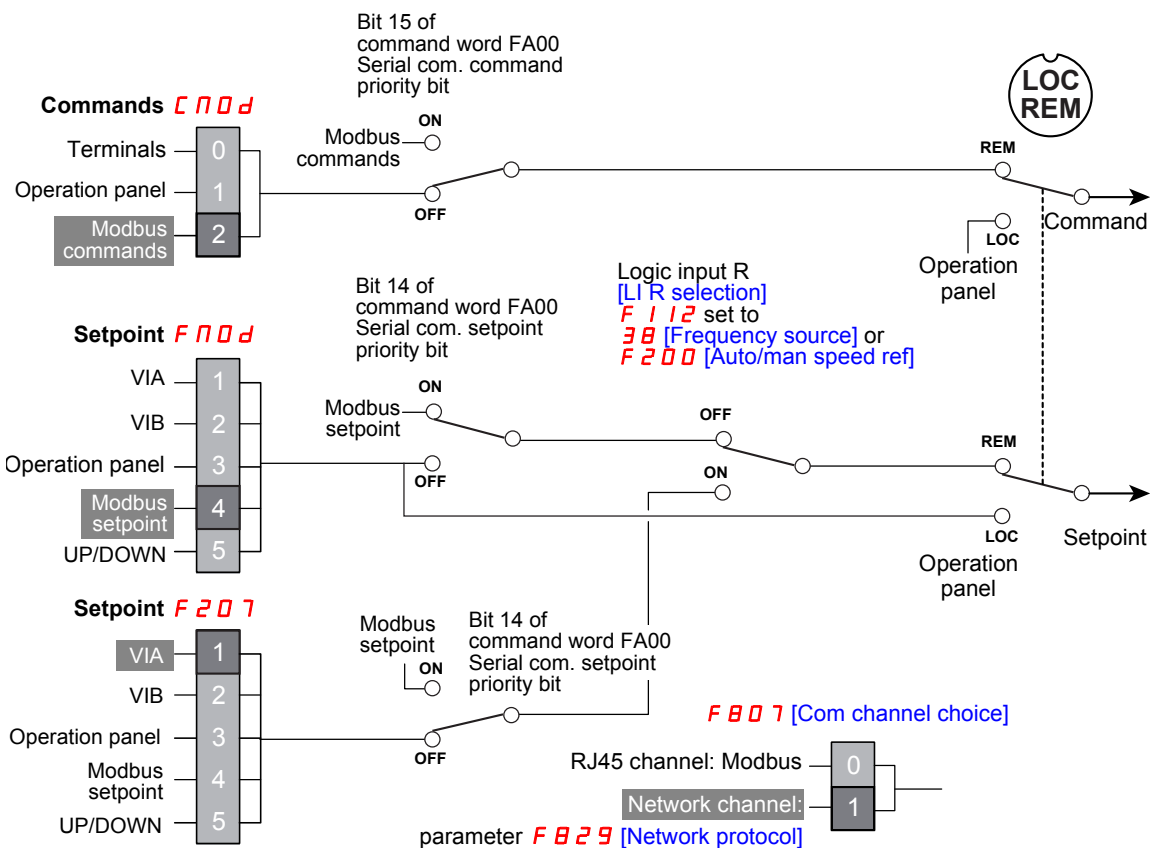
Below is the list of parameters that must be configured.

Access to the parameters

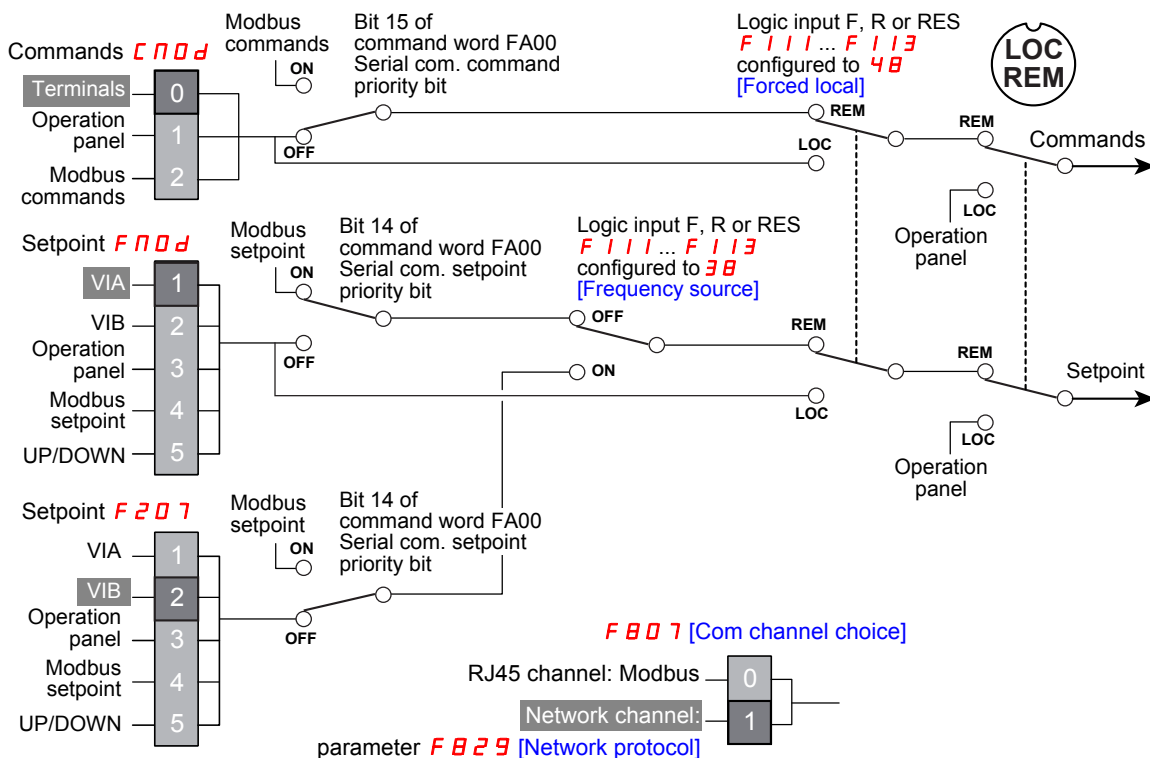
Parameters	Location
[Command mode sel] (C P 0 d) [Frequency mode sel] (F P 0 d)	[PROGRAMMING MENU] Programming mode
[Com channel choice] (F 1 1 2)	[I/O MENU] 1 0 submenu of [PROGRAMMING MENU] Programming mode.
[Remote spd ref 2] (F 2 0 7)	[EXTENDED MENU] F - - - submenu of [PROGRAMMING MENU] Programming mode.
[Com channel choice] (F B 0 7)	[COMMUNICATION MENU] C 0 0 0 submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Setting	Default setting	Valid after
[Command mode sel] (C P 0 d) Remote mode start/stop control	3 16#3	2 [Communication] Serial communication	0	Setting
[Frequency mode sel] (F P 0 d) Remote mode primary speed reference source	4 16#4	4 [Serial com ref.] Serial communication	1	Setting
[L I R selection] (F 1 1 2) R logic input function	274 16#112	3B [Frequency source] Configured to Frequency reference source switching	6	Setting
[Remote spd ref 2] (F 2 0 7) Remote mode secondary speed reference source that may override the source selected by F P 0 d	519 16#207	1 [VIA]: VIA	2	Setting
[Com channel choice] (F B 0 7) Selection of Communication channel: via RJ45 or Open style connector port	2055 16#807	0 [RJ45] or 1 [Open style]	1	Setting



Complete control diagram



Configuration of the indirect blocks

Configuration

These parameters configure the Modbus functions "Read indirect block (3)", page 34 and "Write indirect block (16)", page 38.

Access to the parameters

All parameters are accessible in the [COMMUNICATION MENU]   submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Adjustment range	Default setting	Valid after
[Block write data 1] (F B 7 0)	2160 16#870	0 [No select]: No selection 1 [Command word 1] 2 [Command word 2] 3 [Frequency Setpoint]	0	Power cycle
[Block write data 2] (F B 7 1)	2161 16#871	4 [Relay command]: Ouput data on the terminal board 5 [FM command]: Analog output for communication 6 [Speed Setpoint]		
[Block read data 1] (F B 7 5)	2165 16#875	0 [No select]: No selection 1 [Status info]	0	Power cycle
[Block read data 2] (F B 7 6)	2166 16#876	2 [Freq. out]: Output frequency 3 [Motor current]: Ouput current 4 [Ouput volt]: Ouput voltage		
[Block read data 3] (F B 7 7)	2167 16#877	5 [Alarm info]: Alarm information 6 [PID feedback value]		
[Block read data 4] (F B 7 8)	2168 16#878	7 [Input term. mon]: Input terminal board monitor 8 [Out term. mon]: Output terminal board monitor 9 [VIA monitor]: VIA terminal board monitor		
[Block read data 5] (F B 7 9)	2169 16#879	10 [VIB monitor]: VIB terminal board monitor 11 [Mot speed mon.]: Ouput motor speed monitor		

Configuration of the communication interruption

Configure the Modbus time out

A communication detected fault (*ErrS* and *ErrB*) is triggered if the Altivar 212 does not receive any valid Modbus requests at its address within a predefined time period (time out) set in the [Com. time out] (*FBD3*) parameter. The timer starts when the communication has been established for the first time (valid frame, drive address matches). Any Modbus request function is taken into account to reactivate the timer (read, write and identification).

Access to the parameter

This parameter is accessible in the [COMMUNICATION MENU] *C D N* submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameter	Modbus address	Setting	Unit	Default setting	Valid after
[Com. time out] (<i>FBD3</i>) Communication time out	2051 16#803	<i>0</i> : Communication detection disabled <i>1 ... 100</i> : 1 to 100 seconds	s	3	Setting

⚠ WARNING

LOSS OF CONTROL

- If *FBD3* is set to 0, communication control will be inhibited.
- For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special applications.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

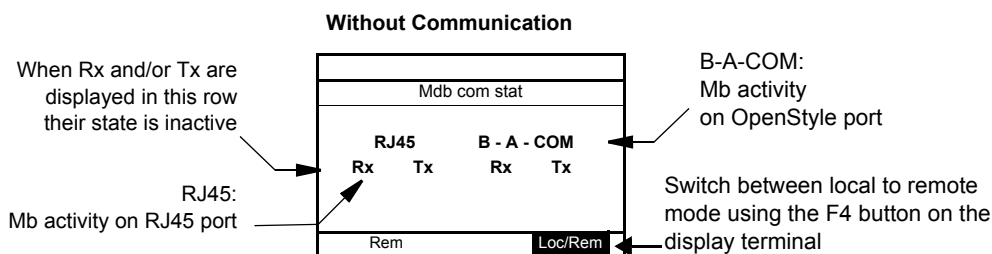
Monitoring the Modbus communication status

Modbus communication status are displayed in Monitoring mode. This parameter enables to check the modbus communication on RJ45 and OpenStyle port.

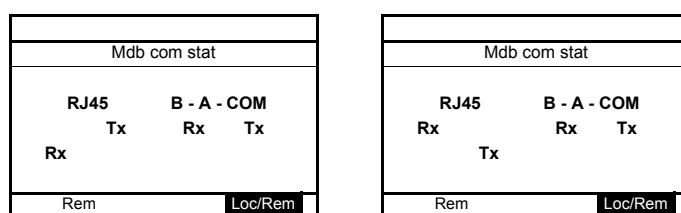
On the embedded display terminal

Display example	Display on graphic display option	Description
<i>n b i i i</i>	[Mdb com stat] Modbus communication status	<p>ON: ! OFF: .</p> <p>Legend: <i>n b i i i</i></p> <p>Diagram: RJ45 Rx, OpenStyle Tx, OpenStyle Rx, RJ45 Tx</p>

On the graphic display terminal



Example: With Communication on RJ45 port



Configure the drive behaviour

The drive trips in *Err5* [Com RJ45 fault] or *ErrB* [Network error fault] if the communication was established and the card no longer receives messages from the network.

The response of the drive in the event of a BACnet communication interruption can be configured by the parameter [Com. fault setting] *FBSI*.

Access to the parameter

This parameter is accessible in the [COMMUNICATION MENU] *CON* submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameter	Modbus address	Setting	Default setting	Valid after
[Com. fault setting] (<i>FBSI</i>) Communication detected fault setting	2129 16#851	<i>0</i> [Ramp stp (F/Cmod)] <i>1</i> [No active] <i>2</i> [Ramp stop] <i>3</i> [Freewheel] <i>4</i> [Err5 or Err8]	4	Setting

▲ WARNING
<p>LOSS OF CONTROL If <i>FBSI</i> is set to <i>1</i>, communication control will be inhibited. For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special application. Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

▲ WARNING
<p>LOSS OF CONTROL Know and understand the setting of parameter <i>FBSI</i>. This parameter controls the behavior of the drive in the event of a network communication loss. If the value of <i>FBSI</i> is <i>0</i>, <i>1</i>, <i>2</i>, or <i>3</i>, the drive will not trip on an <i>ErrB</i>. Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Modbus services

4

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Principle of the Modbus protocol	32
RTU mode	32
Modbus functions available	33
Read one word (03)	33
Read indirect block (3)	34
Write Single Register (6)	36
Write multiple registers (16)	37
Write indirect block (16)	38
Read Device Identification (43/14)	40
Error response	41

Principle of the Modbus protocol

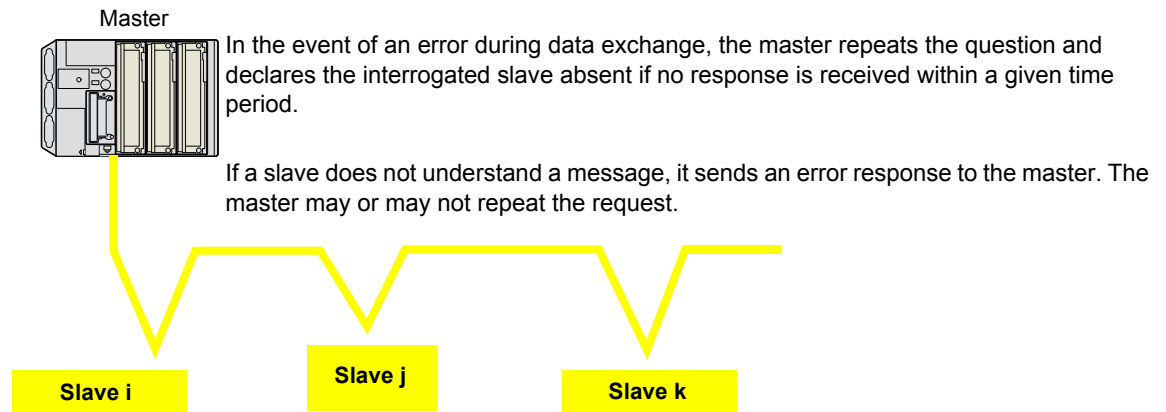
The Modbus protocol is a master-slave protocol.

Only one device can transmit on the line at any one time.

The master manages the exchanges and only it can take the initiative.

It interrogates each of the slaves in succession.

No slave can send a message unless it is invited to do so.



Two types of dialog are possible between master and slaves:

- The master sends a request to a slave and waits for it to respond. The request contains the slave address (1 ... 247).
- Broadcast: the master sends a request to all slaves. Slaves do not answer. The value of the slave address is 0.

Direct slave-to-slave communications are not possible.

For slave-to-slave communication, the master's application software must therefore be designed to interrogate one slave and send back data received to the other slave.

RTU mode

ATV212 supports RTU mode.

The Modbus RTU frame contains no message header byte, nor end of message bytes.

It is defined as follows:



The data is transmitted in binary code.

CRC16: Cyclic redundancy check parameter.

The end of the frame is detected on a silence greater than or equal to 3 characters.

The master must not introduce a space of more than 3.5 characters in a frame; otherwise the drive may recognize it as a start of new frame.

Modbus functions available

The following table indicates which Modbus functions are managed by the Altivar 212 and specifies their limits. The "read" and "write" functions are defined from the point of view of the master.

Code	Function name	Size of data	Altivar 212 function name	Broadcast
3 = 16#03	Read Holding Registers	1 object	Read one word	Yes
		1 ... 5 objects	Read indirect block	Yes
6 = 16#06	Write Single Register	1 objects		Yes
16 = 16#10	Write Multiple Registers	1 object	Write one word	Yes
		2 objects	Write indirect block	Yes
43/14 = 16#2B/0E	Read Device Identification	3 objects		No

Read one word (03)

Function 3, quantity = 1

One word function permits to read one parameter value. All parameter of the Altivar 212 can be read.

Request:

Slave no.	Function code	Starting address		Quantity of registers (fixed)		CRC16	
	03	Hi	Lo	00	01	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Response:

Slave no.	Function code	Byte count	Register value		CRC16	
	03		Hi	Lo	Lo	Hi
1 byte	1 byte	1 byte	2 bytes		2 bytes	

Error response:

Slave no.	Function code	Exception code	CRC16	
	83		Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte

Example: Read [\[Output frequency\]](#) (FD 00) on Altivar 212 at slave address 1

Request:

01	03	FD 00	00 01	B5 A6
----	----	-------	-------	-------

Response:

01	03	02	17 70	B6 50
----	----	----	-------	-------

Example: Invalid read of 2 words

Request:

01	03	FD 00	00 02	F5 A7
----	----	-------	-------	-------

Error response:

01	83	03	01 31
----	----	----	-------

Read indirect block (3)

Function 3, quantity = 1 ... 5

The Read indirect block function permits to read 1 to 5 parameters. These parameters can be chosen by parameters F875 ... F879 (refer to "Configuration of the indirect blocks", page 27)

Access to the parameter

This parameter is accessible in the [COMMUNICATION MENU] **C D F** submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Adjustment range	Default setting	Valid after
[Block read data 1] (F B 7 5)	2165 16#875	0 [No select]: No selection 1 [Status info]	0	Power cycle
[Block read data 2] (F B 7 6)	2166 16#876	2 [Freq. out]: Output frequency 3 [Motor current]: Ouput current 4 [Ouput volt]: Ouput voltage		
[Block read data 3] (F B 7 7)	2167 16#877	5 [Alarm info]: Alarm information 6 [PID feedback value]		
[Block read data 4] (F B 7 8)	2168 16#878	7 [Input term. mon]: Input terminal board monitor 8 [Out term. mon]: Output terminal board monitor 9 [VIA monitor]: VIA terminal board monitor		
[Block read data 5] (F B 7 9)	2169 16#879	10 [VIB monitor]: VIB terminal board monitor 11 [Mot speed mon.]: Ouput motor speed monitor		

Request:

Slave no.	Function code	Starting address		Quantity of registers		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	18 (fixed)	75 (fixed)	00	02 to 05		

Response:

Slave no.	Function code	Byte count	First register value		Last register value	CRC16	
			Hi	Lo		Hi	Lo
1 byte	1 byte	1 byte	2 bytes		2 bytes	2 bytes	

Error response:

Slave no.	Function code	Exception code	CRC16	
			Lo	Hi
1 byte	1 byte	1 byte	1 byte	

Example: Read indirect block in an drive with slave address 1.

Configuration parameters:

- [Block read data 1] (F B 7 5) = **1**: [drive Status] (F d 0 1)
- [Block read data 2] (F B 7 6) = **2**: [Output frequency] (F d 0 0)
- [Block read data 3] (F B 7 7) = **3**: [Output current] (F E 0 3)
- [Block read data 4] (F B 7 8) = **4**: [Output voltage] (F E 0 5)
- [Block read data 5] (F B 7 9) = **5**: [Alarm code] (F C 9 1)

- Read indirect block of 5 parameters:

Request:	01	03	18 75	00 05	92 B3
----------	----	----	-------	-------	-------

Response:	01	03	0A	64 04	17 70	00 00	26 FB	00 80	1E 29
-----------	----	----	----	-------	-------	-------	-------	-------	-------

- Read indirect block of 2 parameters:

Request:

01	03	18 75	00 02	D3 71
----	----	-------	-------	-------

Response:

01	03	04	64 04	17 70	AA D6
----	----	----	-------	-------	-------

- Error response on invalid starting address:

Request:

01	03	18 76	00 02	23 71
----	----	-------	-------	-------

Response:

01	83	03	01 31
----	----	----	-------

- Error response on invalid quantity of registers:

Request:

01	03	18 75	00 06	D2 B2
----	----	-------	-------	-------

Response:

01	83	03	01 31
----	----	----	-------

Note: Reading values of parameters F875 to F879. Value of parameter F87● can be read by reading the address 187●.

Example for parameter F875:

0875: parameter assignment

1875: parameter value

Write Single Register (6)

The Write Single Register function permits to write value of one parameter. Not all Altivar 212 parameters can be written.

Request and response:

Slave no.	Function code 06	Register address		Register value		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Error response:

Slave no.	86	Exception code	CRC16
			Lo Hi
1 byte	1 byte	1 byte	1 byte

Example: Write value 60 Hz to the parameter [\[Frequency reference from serial comm.\] \(F R D I\)](#) in Altivar 212 slave 1.

Request and response:

01	06	FA01	1770	E6C6
----	----	------	------	------

Example: Error response due to invalid register address.

Request:

01	06	FFFF	0000	89EE
----	----	------	------	------

Error response:

01	86	02	C3A1
----	----	----	------

Write multiple registers (16)

Function 16 = 16#10, quantity = 1

This function code is used to write a block of contiguous registers (1 to approx. 120 registers). Read only parameters can't be written.

Request:

Slave no.	Function code	Starting address	Quantity of register		Byte count	First register value	CRC16
	10		00 (fixed)	01 (fixed)	02 (fixed)		
1 byte	1 byte	2 bytes	2 bytes		1 byte	2 bytes	2 bytes

Response:

Slave no.	Function code	Starting address	Quantity of register		CRC16
	10		00 (fixed)	01 (fixed)	
1 byte	1 byte	2 bytes	2 bytes		2 bytes

Error response:

Slave no.	Function code	Exception code	CRC16
	90		
1 byte	1 byte	1 byte	2 bytes

Refer to "Error response", page [41](#).

Example: Write value 60Hz in the parameter [[Frequency reference from serial comm.](#)] (*F R D I*) in Altivar 212 slave 1.

Request:

01	10	FA 01	00 01	02	17 70	F3 9A
----	----	-------	-------	----	-------	-------

Response:

01	10	FA 01	00 01	60 D1
----	----	-------	-------	-------

Write indirect block (16)

Function 16 = 16#10, quantity = 2

The Write indirect block function permits to write 2 parameters. These parameters can be chosen by parameters [Block write data 1] (*F B 7 0*) and [Block write data 2] (*F B 7 1*) (refer to "Configuration of the indirect blocks", page 27).

Access to the parameter

This parameter is accessible in the [COMMUNICATION MENU] *C 0 0* submenu of [PROGRAMMING MENU] Programming mode.

Description

Parameters	Modbus address	Adjustment range	Default setting	Valid after
[Block write data 1] (<i>F B 7 0</i>)	2160 16#870	<i>0</i> [No select]: No selection <i>1</i> [Command word 1] <i>2</i> [Command word 2] <i>3</i> [Frequency Setpoint] <i>4</i> [Relay command]: Ouput data on the terminal board <i>5</i> [FM command]: Analog output for communication <i>6</i> [Speed Setpoint]	0	Power cycle
[Block write data 2] (<i>F B 7 1</i>)	2161 16#871			

Request:

Slave no.	Function code	Starting address	Quantity of register	Byte count	First register value	CRC16
	10	18 (fixed) 70 (fixed)	00 (fixed) 02 (fixed)	04 (fixed)		
1 byte	1 byte	2 bytes	2 bytes	1 byte	2 bytes	2 bytes

Response:

Slave no.	Function code	Starting address	Quantity of register	CRC16
	10	18 (fixed) 70 (fixed)	00 (fixed) 02 (fixed)	
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Error response:

Slave no.	Function code	Exception code	CRC16
	90		
1 byte	1 byte	1 byte	2 bytes

Refer to "Error response", page 41.

Example: Write value 60Hz in the parameter [Frequency Command] (*F A 0 1*) and run forward command in Altivar 212 slave 1.

Configuration:

[Block write data 1] (*F B 7 0*) = *1*: [Command word 1] (*F A 0 0*)

[Block write data 2] (*F B 7 1*) = *3*: [Frequency reference from serial comm.] (*F A 0 1*)

- The Altivar 212 accepts the request:

Request:

01	10	18 70	00 02	04	C4 00	17 70	6D AF
----	----	-------	-------	----	-------	-------	-------

Response:

01	10	18 70	00 02	43 B3
----	----	-------	-------	-------

- The Altivar 212 rejects the request because it is busy or *F B 7 0* is 0:

Request:

01	10	18 70	00 02	04	C4 00	17 70	6D AF
----	----	-------	-------	----	-------	-------	-------

Response:

01	90	04	4D C3
----	----	----	-------

- The Altivar 212 rejects the request because of an invalid starting address:

Request:

01	10	18 71	00 02	04	C4 00	17 70	AC 63
----	----	-------	-------	----	-------	-------	-------

Response:

01	90	03	0C 01
----	----	----	-------

- The Altivar 212 rejects the request because of an invalid quantity of registers:

Request:

01	10	18 70	00 03	04	C4 00	17 70	6C 7E
----	----	-------	-------	----	-------	-------	-------

Response:

01	90	03	0C 01
----	----	----	-------

- The Altivar 212 rejects the request because of an invalid byte count:

Request:

01	10	18 70	00 02	03	C4 00	17 70	D8 6F
----	----	-------	-------	----	-------	-------	-------

Response:

01	90	03	0C 01
----	----	----	-------

Note: Reading values of parameters F870 and F871. Value of parameter F87● can be read by reading the address 187●.

Example for parameter F870:

0870: parameter assignment

1870: parameter value

Read Device Identification (43/14)

Function 43/14 = 16#2B/0E

Request:

Slave no.	Function code	MEI type	Read Device Id code	Object Id	CRC16	
	2B	0E	01 ... 03	00	Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte	2 bytes	

Response:

Slave no.	Function code	MEI type	Read Device Id code	Conformity level	-----
	2B	0E	01 ... 03	01	
1 byte	1 byte	1 byte	1 byte	1 byte	

-----	More follows	Next object Id	Number of objects	-----
	00	00	03	
	1 byte	1 byte	1 byte	

-----	Id of object no. 1	Length of object no. 1	Value of object no. 1	-----
	00	0D	"Télemécanique"	
	1 byte	1 byte	13 bytes	

-----	Id of object no. 2	Length of object no. 2	Value of object no. 2	-----
	01	0D	"ATV212H075M3X"	
	1 byte	1 byte	13 bytes	

-----	Id of object no. 3	Length of object no. 3	Value of object no. 3	-----
	02	04	"0182"	
	1 byte	1 byte	4 bytes	

-----	CRC16		
	Lo	Hi	
	1 byte	1 byte	

The total response size given in this example equals 46 bytes.

The response contains the following four objects:

- Object no. 1: Manufacturer name (always "Télemécanique", i.e., 13 bytes).
- Object no. 2: Device catalog number (ASCII string; for example: "ATV212H075M3X", i.e., 13 bytes). The length of this object varies according to drive type. Use the "Length of object no. 2" field to determine the length.
- Object no. 3: Control version, in "MMmm" format where "MM" represents the major revision and "mm" the minor revision (4-byte ASCII string; *for example*: "0182" for version 1.82).

Error response:

Slave no.	Function code	Exception code	CRC16	
	AB		Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte

Refer to "Error response", page [41](#).

Error response

An error response is returned by the Altivar 212 when it is unable to perform the request.

Format of an error response:

Slave no.	Function code	Exception code	CRC16	
			Lo	Hi
1 byte	1 byte	1 byte	2 bytes	

Function code: request code + H'80.

Exception code:

Exception Code	Description
01	Unknown function: The function code received in the query is not an allowable action for the drive. - The function is not supported by the drive error. - Function code 43 but MEI Type not equal: to 14.
02	Illegal data address: The data address received in the query is not an allowable address for the drive. - Modbus address is not supported. - Request to write a read only parameter.
03	Illegal data value: A value contained in the query data field is not an allowable value for the drive. - Data range not allowed. - Fixed data not allowed. - Function code 43 and MEI Type 14 but invalid Read Device ID Code (Read Dev ID code > 3).
04	Unable to execute: The request commands an operation that the Altivar 212 is not able to execute due to another task or condition. - Request to write in a parameter that cannot be changed during running. - Request to write during executing "tyP" (return to factory setting ...). - Interruption occurs during writing data.

Parameter list

5

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Referring to the Altivar 212 programming manual	44
List of control parameters	45
List of monitoring parameters	46
Commands	48
Setpoints	50
Status	51
Trip and alarm codes	53
Monitoring and control of I/O from communication	55
Identification	58

Referring to the Altivar 212 programming manual

General

Parameters are described in the Altivar 212 programming manual.

For communication purposes, the section "Table of parameter and data" references Modbus address, unit, range... The table below is an abstract, just for example.

Additional parameters, not listed in the Altivar 212 programming manual, are described in the present section.

Submenu or parameter description	Modbus address	Setting	Unit	Default setting
[5 LAST PARAM CHANGE] (R U H) History function		Operation panels parameters in groups of five in the reverse order to that in which their settings were changed (possible to edit).	-	-
[Quick menu] (R U F) Wizard function		The R U F submenu provides ready access to the ten basic parameters commonly used in programming the drive. In many cases, programming the ATV212 drive is complete when these 10 parameters and motor parameters have been properly set.	-	-
[Auto ramp] (R U I) Automatic acceleration/ deceleration	0 16#0	<input type="checkbox"/> [Disabled]: Manual <input type="checkbox"/> [Enable]: [Acceleration time 1] (R C C) and [Deceleration time 1] (D E C) <input type="checkbox"/> [ACC only]: [Acceleration time 1] (R C C) only	-	1
[Acceleration time 1] (R C C) Slope of the acceleration ramp and the time it takes for the output frequency of the drive to increase from 0 Hz to the setting of [Max frequency] (F H)	9 16#9	0.0 to 3200	s	According to drive model

- "Modbus address" identifies the parameter for communication.
In Modbus protocol, it is also called "register address" or "Parameter address".
- "Adjustment range" or "Range" means the data cannot be written outside the range.
The data is expressed in the decimal notation. For writing the data through the communication function, take the minimum setting unit into consideration, and use hexadecimal notation.
- "Minimum setting unit" is the unit of a single data.
For example, the "Minimum setting unit" of [Acceleration time 1] (R C C) is 0.1. 1 corresponds to 0.1s. For setting the R C C to 10 seconds, transmit 16#03E8 by communication [$10 \div 0.01 = 1000 = 16\#03E8$].

List of control parameters

These parameters are only in the RAM and not in the EEPROM, they return to initial values when the power is turned off, after the drive has been reseted, or when factory setting is done.

Commands from serial communication

Parameter description	Modbus address	Range	Min. setting unit	Initial value	Write during operation	EEPROM
Command word 1 (<i>F A 0 0</i>) from serial communication	64000 16#FA00	0 to 65535	-	0	Yes	None
Command word 2 (<i>F A 2 0</i>) from serial communication	64032 16#FA20	0 to 65535	-	0	Yes	None

Setpoints from serial communication

Parameter description	Modbus address	Range	Min. setting unit	Initial value	Write during operation	EEPROM
Frequency reference from serial comm. (<i>F A 0 I</i>)	64001 16#FA01	0 to Max. frequency (FH)	0.01 Hz	0	Yes	None
Speed reference from network (<i>F A I 3</i>)	64019 16#FA13	0 to 24000	1 min ⁻¹ (1 rpm)	0	Yes	None

Outputs control from serial communication

Parameter description	Modbus address	Range	Min. setting unit	Initial value	Write during operation	EEPROM
Terminal output data from comm. (<i>F A S 0</i>)	64080 16#FA50	0 to 255	0	0	Yes	None
Analog output data from comm. (<i>F A S I</i>)	64081 16#FA51	0 to 1023 (10-bit resolution)	0	0	Yes	None

List of monitoring parameters

General

Monitoring parameters are read only.

Status

Parameter description	Modbus address
Status word (<i>F d 0 1</i>)	64769 16#FD01
Status word 2 (<i>F d 4 2</i>)	64834 16#FD42
Status word 3 (<i>F d 4 9</i>)	64841 16#FD49
Status word at last trip (<i>F E 0 1</i>)	65025 16#FE01
Status word 2 at last trip (<i>F E 4 2</i>)	65090 16#FE42
Status word 3 at last trip (<i>F E 4 9</i>)	65097 16#FE49
Command mode status (<i>F E 4 5</i>)	65093 16#FE45
Setpoint mode status (<i>F E 4 6</i>)	65094 16#FE46

Frequency and speed

Parameter	Modbus address	Unit	Description
Output frequency (<i>F d 0 0</i>)	64768 16#FD00	Hz	Current value
Output frequency at last trip (<i>F E 0 0</i>)	65024 16#FE00	Hz	Value before trip
Output speed (<i>F E 9 0</i>)	65168 16#FE90	rpm	-
Estimated speed (<i>F E 1 6</i>)	65046 16#FE16	Hz	Value before trip
Frequency reference before ramp (<i>F E 0 2</i>)	65026 16#FE02	Hz	Value before trip (before PI and speed ramp)
Frequency reference after ramp (<i>F E 1 5</i>)	65045 16#FE15	Hz	Value before trip (after PI and speed ramp)
PID feedback value (<i>F E 2 2</i>)	65058 16#FE22	Hz	Value before trip

Current and torque

Parameter	Modbus address	Unit	Description
Output current (<i>F E 0 3</i>)	65027 16#FE03	%	-
Torque (<i>F E 1 8</i>)	65048 16#FE18	%	-
Torque current (<i>F E 2 0</i>)	65056 16#FE20	%	Value before trip
Exciting current (<i>F E 2 1</i>)	65057 16#FE21	%	Value before trip

Voltage

Parameter	Modbus address	Unit	Description
Output voltage (<i>F E 0 5</i>)	65027 16#FE05	%	Value before trip
Voltage at DC bus (<i>F E 0 4</i>)	65048 16#FE04	%	-

Power and energy

Parameter	Modbus address	Unit	Description
Input power (<i>FE29</i>)	65065 16#FE29	kW	Value before trip
Output power (<i>FE30</i>)	65072 16#FE30	kW	Value before trip
Input energy (<i>FE76</i>)	65142 16#FE76	kWh	-
Output energys (<i>FE77</i>)	65143 16#FE77	kWh	-

Maintenance

Parameter	Modbus address	Unit	Description
Motor load (<i>FE26</i>)	65062 16#FE26	%	Value before trip
Inverter load (<i>FE27</i>)	65063 16#FE27	%	Value before trip
Cumulative run time (<i>FE14</i>)	65044 16#FE14	h	-
Cumulative power on time (<i>FE80</i>)	65152 16#FE80	h	-

I/O values

Parameter	Modbus address	Description
Digital inputs status <i>Fd06</i>	64774 16#Fd06	Current value
Digital outputs status <i>Fd07</i>	64775 16#Fd07	Current value
Digital inputs status at last trip <i>FE06</i>	65030 16#FE06	Value before trip
Digital outputs status at last trip <i>FE07</i>	65030 16#FE07	Value before trip
Analog input VIA value <i>FE35</i>	65077 16#FE35	-
Analog input VIB value <i>FE36</i>	65078 16#FE36	-

Trip and alarm codes

Parameter	Modbus address	Description
Trip code <i>FC90</i>	64656 16#FC90	-
Alarm code <i>FC91</i>	64657 16#FC91	-
Alarm of run <i>FE79</i>	65145 16#FE79	-
Latest trip code <i>FE10</i>	65040 16#FE10	-
2nd previous trip code <i>FE11</i>	65041 16#FE11	-
3rd previous trip code <i>FE12</i>	65042 16#FE12	-
4th previous trip code <i>FE13</i>	65043 16#FE13	-

Commands

Command word (**F A D D**)

Bit	Specifications	0	1	Remarks
0	Preset speed operation 1	000: preset speed operation disabled 001: preset speed 1 010: preset speed 2 011: preset speed 3 100: preset speed 4 101: preset speed 5 110: preset speed 6 111: preset speed 7		
1	Preset speed operation 2			
2	Preset speed operation 3			
3	-	Reserved		Do not set to "1".
4	Motor selection (1 or 2) (THR 2 selection)	Motor 1 (THR 1)	Motor 2 (THR2)	THR1 : PT=set value, uL, ub, tHr THR2 : PT=0, F170, F172, F173
5	PI control	Normal operation	PI OFF	
6	Acceleration/deceleration pattern selection (1 or 2) (AD2 selection)	Acceleration/deceleration pattern 1 (AD1)	Acceleration/deceleration pattern 2 (AD2)	AD1 : ACC, DEC AD2 : F500, F501
7	DC braking	No braking	Forced DC braking	
8	-	-	-	
9	Forward/reverse run selection	Forward selection	Reverse selection	
10	Run/stop	Stop	Run	
11	Coast stop command	No stop	Coast stop	
12	Emergency stop	No stop	Emergency stop	"E" trip
13	Drive reset in fault state	No reset	Reset	
14	Setpoint priority selection	Disabled	Enabled	Enabled regardless of the setting of FMOD
15	Command priority selection	Disabled	Enabled	Enabled regardless of the setting of CMOD

Commands and setpoint can be enabled through communication irrespective of settings of the command mode (**C P D d**) and setpoint mode (**F P D d**).

Refer to "Configuration of the control source", page [21](#).

Once the command word (**F A D D**) is set to enable communication command priority and frequency priority, both priorities will be enabled unless OFF is set, power is turned off or is reset, or factory setting (**E Y P**) is selected.

Emergency stop, RY terminal output hold and OUT terminal output hold are enabled even though communication command priority is not set.

If the command word (**F A D D**) is enabled and the "Preset speed operation is used (bits 0, 1 or 2 set to "1"), the analog setpoint is disabled, the velocity is controlled by preset speeds through the communication, irrespective of the setpoint selection.

Examples:

Run forward (*C P O d* and *F P O d* configured to serial communication)

FA00 = 16# 0400

Run reverse (*C P O d* and *F P O d* configured to serial communication)

FA00 = 16# 0600

Run forward, commands and setpoint from Modbus (irrespective of *C P O d* and *F P O d*)

FA00 = 16# C400

Run reverse, commands and setpoint from Modbus (irrespective of *C P O d* and *F P O d*)

FA00 = 16# C600

Command word 2 (*F R 2 0*)

Bit	Function	0	1	Note
0	Reserved	-	-	-
1	Energy reset	No reset	Reset	Input energy (FE76) Output energy (FE77)
2 to 11	Reserved	-	-	Do not set to "1"
12	Over-current stall level change	OC stall 1	OC stall 2	OC1 (F601), OC2 (F185)
13 to 15	Reserved	-	-	Do not set to "1"

Energy reset (bit 1):

This command is enabled regardless of the command priority selection (bit 15 of common word (*F R 0 0*)).

It is necessary to reset it after the command is performed.

Over-current stall level change (bit 12):

This command word is enabled only when the communication command is enabled. Set Bit 15 of the Command word (*F R 0 0*) to "1" [enabled].

This command word will be disabled is set (value 0), power is turned off or is reset, or factory setting [Parameter reset] (*L Y P*) is selected.

Setpoints

Frequency setpoint (*F R D I*)

Frequency setpoint from Modbus

Unit: 0.01 Hz

Range: 0 to [Maximum frequency] (*F H*)

This setpoint is enabled by setting *4* [serial communication] to the setpoint selection parameter (*F P D d*) or setting to *1* [enabled] setpoint priority selection (Bit 14 of Command word (*F R D D*)).

Once enabled, this setpoint selection is enabled till disabled ("0") is set in the setpoint priority selection (bit 14 of the command word (*F R D D*)), power is turned off or is reset, or factory setting (*E Y P*) is selected.

Example: Frequency setpoint 80Hz

80Hz = 80 ÷ 0.01 = 8000 = 16# 1F40

Request:

01	06	FA 01	1F 40	B5 A6
----	----	-------	-------	-------

Response:

01	06	FA 01	1F 40	B5 A6
----	----	-------	-------	-------

Speed setpoint (*F R I 3*)

Speed setpoint from Modbus

Unit: min-1 (rpm)

Range: 0 ... 24 000 min-1

With this setpoint, it is possible to control the drive with rpm instead of Hz.

This reference is converted into Frequency Setpoint using "Number of motor poles" (*F B 5 6*).

Status

Status word (F E 0 I F d 0 I)

Status immediately before the occurrence of a trip: [Communication Number] (F E 0 I)

Current status: [Communication Number] (F d 0 I)

Bit	Specifications	0	1	Remarks
0	FL state	Not active	Active	
1	Drive state	Not tripped	Tripped	Trip statuses include rtry and trip retention status.
2	Alarm	No alarm	Alarm issued	
3	MOFF	Normal	MOFF	Main circuit undervoltage alarm.
4	Motor section (1 or 2) (THR 2 selection)	Motor 1 (THR 1)	Motor 2 (THR 2)	THR1: PT=set value, uL, ub, Thr THR2: PT=0, F170, F172, F173
5	PI control OFF	PI control permitted	PI control prohibited	
6	Acceleration/deceleration pattern selection (1 or 2)	Acceleration/deceleration pattern 1 (AD 1)	Acceleration/deceleration pattern 2 (AD 2)	AD1: ACC, DEC, AD2: F500, F501
7	DC braking	OFF	Forced DC braking	
8	Reserved	-	-	
9	Forward/reverse run	Forward run	Reverse run	
10	Run/stop	Stop	Run	
11	Coast stop (ST=OFF)	ST=ON	ST=OFF	
12	Emergency stop	Not emergency stop status	Emergency stop status	
13	Standby ST=ON	Start-up process	Standby	Standby: Initialization completed, not detected fault stop status, not alarm stop status (MOFF, LL forced stop or forced stop due to a momentary power OFF), ST=ON, and RUN=ON
14	Standby	Start-up process	Standby	Standby: Initialization completed, not detected fault stop status, and not alarm stop status (MOFF, LL forced stop or forced stop due to a momentary power OFF)
15	Local/Remote status	Remote	Local	Command is "FA08"

Status word 2 (FE42 FD42)

Status 2 immediately before the occurrence of a trip: Communication Number FE42

Current status 2: Communication Number FD42

Bit	Function	0	1	Remarks
0	Reserved	-	-	
1	Electric Power Counting (FE76,FE77) status	Counting	Resetting	
2 to 7	Reserved	-	-	
8	Acceleration/deceleration pattern selection1	Acc/Dec 1	Acc/Dec 2	
9 to 11	Reserved	-	-	
12	Over-current stall level change	OC stall 1	OC stall 2	OC1: F601, OC2: F185
13 to 15	Reserved	-	-	

Status word 3 (FE49 FD49)

Status 3 immediately before the occurrence of a trip: Communication Number FE49

Current status 3: Communication Number FD49

Bit	Function	0	1	Remarks
0	RY terminal output hold	OFF	Holding	
1 to 11	Reserved	-	-	
12	RCH	OFF	ON	F102
13	RCHF	OFF	ON	F101, F102
14 and 15	Reserved	-	-	

Command mode status (FE45)

This parameter monitors the source of the commands.

Data	Function
0	Terminal board
1	Operation panel
2	Serial communication

Setpoint mode status (FE46)

This parameter monitors the source of the setpoint.

Data	Function
0	-
1	VIA
2	VIB
3	Operation panel
4	Serial communications
5	TB up down frequency
6	-
255	Preset speed operation

Trip and alarm codes

Alarm code (FC91)

Bit	Specifications	0	1	Remarks (Code operation paneled on the panel)
0	Overcurrent	Normal	Alarming	"C" blinking
1	Drive overload	Normal	Alarming	"L " blinking
2	Motor overload	Normal	Alarming	"L" blinking
3	Overheat	Normal	Alarming	"H" blinking
4	Overvoltage	Normal	Alarming	"P" blinking
5	Main circuit undervoltage	Normal	Alarming	
6	Reserved	-	-	-
7	Undercurrent	Normal	Alarming	-
8	Over-torque	Normal	Alarming	-
9	Reserved	-	-	-
10	Cumulative operation hours reached	Normal	Alarming	-
11	Reserved	-	-	-
12	Reserved	-	-	-
13	Main circuit undervoltage alarm same as MS-relay status	Normal	Alarming	"MOFF" blinking
14	At the time of the instant blackout, Forced deceleration/stop	-	Decelerating, stopping	Related: F256 setting
15	An automatic stop during the lower limit frequency continuance	-	Decelerating, stopping	Related: F302 setting

Alarm of run time (FE79)

Bit	Specifications	0	1	Remarks
0	Fan life	Normal	Alarming	-
1	Circuit board life	Normal	Alarming	-
2	Main-circuit capacitor life	Normal	Alarming	-
3	User set	Normal	Alarming	-
4-15	Reserved	-	-	-

Trip code (current status: **FC 90**, historic records: **FE 10 to FE 13**)

Code	Value (hexadecimal number)	Value (decimal number)	Description
NErr	0	0	[No error]
DC 1	1	1	[Over-current during acceleration]
DC 2	2	2	[Over-current during deceleration]
DC 3	3	3	[Over-current during constant speed operation]
DCL	4	4	[Over-current in load at startup]
DCA	5	5	[Short circuit in arm]
EPH 1	8	8	[Input phase failure]
EPHO	9	9	[Output phase failure]
DP 1	A	10	[Overvoltage during acceleration]
DP 2	B	11	[Overvoltage during deceleration]
DP 3	C	12	[Overvoltage during constant speed operation]
DL 1	D	13	[Over-LOAD in inverter]
DL 2	E	14	[Over-LOAD in motor]
DH	10	16	[Overheat trip]
E	11	17	[Emergency stop]
EEP 1	12	18	[EEPROM fault 1] (writing operation)
EEP 2	13	19	[EEPROM fault 2] (reading operation)
EEP 3	14	20	[EEPROM fault 3] (other)
Err 1	-	-	[Speed ref alarm]
Err 2	15	21	[RAM fault]
Err 3	16	22	[ROM fault]
Err 4	17	23	[CPU fault]
Err 5	18	24	[Communication error trip]
Err 7	1A	26	[Current detector fault]
Err 8	1B	27	[Optional circuit board type error]
Err 9	1C	28	[Graphic keypad communication error]
UC	1D	29	[Small-current trip]
UP 1	1E	30	[Trip due to undervoltage in main circuit]
Ot	20	32	[Over-torque trip]
EF 2	22	34	[Ground fault trip] (hardware detection)
DC 1P	25	37	[Overcurrent flowing in element during acceleration]
DC 2P	26	38	[Overcurrent flowing in element during deceleration]
DC 3P	27	39	[Overcurrent flowing in element during operation]
Et 4P	29	41	[Inverter type error]
DH 2	2E	46	[External thermal input]
SOUt	2F	47	[VIA cable break]
E - 18	32	50	[Break in an analog signal cable]
E - 19	33	51	[CPU fault]
E - 20	34	52	[Excess torque boost]
E - 21	35	53	[CPU fault]
Et n 1	54	84	[Auto-tuning error]
Fd 1	48	72	[Closed damper 1 fault]
Fd 2	49	73	[Closed damper 2 fault]
CF 12	-	-	[Download transfer fault]

Monitoring and control of I/O from communication

The digital inputs, digital outputs, analog input and output signals of the drives can be controlled by communication.

Digital inputs status (*F d 0 6*, *F E 0 6*)

Digital inputs status immediately before the occurrence of a trip: [Status of input terminal block] (*F E 0 6*)

Current digital inputs status: [Status of input terminal block] (*F d 0 6*)

In case "0: No assignment function" is selected in function selection, drive operations will not be affected even when terminals are turned

on and off. Therefore, the terminals can be used as input terminals for customer's own use.

The input terminal function selection parameter is used to select a function for each input terminal.

Bit	Terminal name	Function (parameter title)	0	1
0	F	[LI F selection] (<i>F 1 1 1</i>)	OFF	ON
1	R	[LI R selection] (<i>F 1 1 2</i>)	OFF	ON
2	RES	[LI RES selection] (<i>F 1 1 3</i>)	OFF	ON
3 to 6	Reserved	-	-	-
7	VIA (1)	[VIA LI selection] (<i>F 1 1 8</i>)	OFF	ON
8 to 15	Reserved	-		

(1): It is valid only when it is selected as contact input by [VIA Input Function] (*F 1 0 9*).

Example: When both F and RES terminals are ON: *F E 0 6* = 16#0005

FE06:	BIT 15	0	0	0	0	0	0	0	0	0	0	0	1	0	1	BIT 0
		0	0	0	0	0	0	0	0	0	0	0	5			

Digital outputs status (*F d 0 7*, *F E 0 7*)

Digital outputs status immediately before the occurrence of a trip: [Status of output terminal block] (*F E 0 7*)

Current digital outputs status current status: [Status of output terminal block] (*F d 0 7*)

The output terminal function selection parameter is used to select a function for each output terminal.

Bit	Terminal name (extended)	Function (parameter title)	0	1
0	RY	Output terminal selection1 (<i>F 1 3 0</i>)	OFF	ON
1	Reserved	-	-	-
2	FL	Output terminal selection3 (<i>F 1 3 2</i>)	OFF	ON
3 to 15	Reserved	-	-	-

Example: When both the RY and FL terminals are ON: *F E 0 7* = 16#0005

<i>F E 0 7</i> :	BIT 15	0	0	0	0	0	0	0	0	0	0	0	1	0	1	BIT 0
		0	0	0	0	0	0	0	0	0	0	0	5			

Analog inputs values (F E 3 5, F E 3 6)

[Analog input VIA value] (F E 3 5)

[Analog input VIB value] (F E 3 6)

Data: 10bit resolution (Data range 0 to 1023)

Digital outputs command (F A 5 0)

The digital outputs (relays) of the drive can be controlled directly by communication.

Before controlling them, select Function Number 38 or 39 in Output terminal function selection ([FL Relay Function] (F 132)) and select Function Number 40 or 41 in Output terminal function selection ([RY Relay Function 1] (F 130), [RY Relay Function 2] (F 137)).

Bit	Output Terminal Function	0	1
0	Relay FL (F 132)	OFF	ON
1	Relay RY (F 130 and F 137)	OFF	ON
2 to 15	Reserved	-	-

Example: Controlling only relay RY by communication

Set 40 [Ser. data relay RY] in F 130 in advance.

Set "0002H" in FA50 to turn relay RY on.

Analog outputs command (F A 5 1)

The analog output FM on the drive can be controlled directly by communication.

Select 18 [Com data] in [AO funct. selection] (F 75 L) parameter before controlling them.

The data adjustment range is 0 to 1023 (10bit resolution). Refer to "Meter Setting and adjustment" in the ATV 212 programming manual for complete information.

Communication feedback (F A 4 9)

Damper function. This function applies to the ventilation ducts. The aim is to control the opening of the duct (shutter device called a "damper") when the fan starts up.

Damper opening command

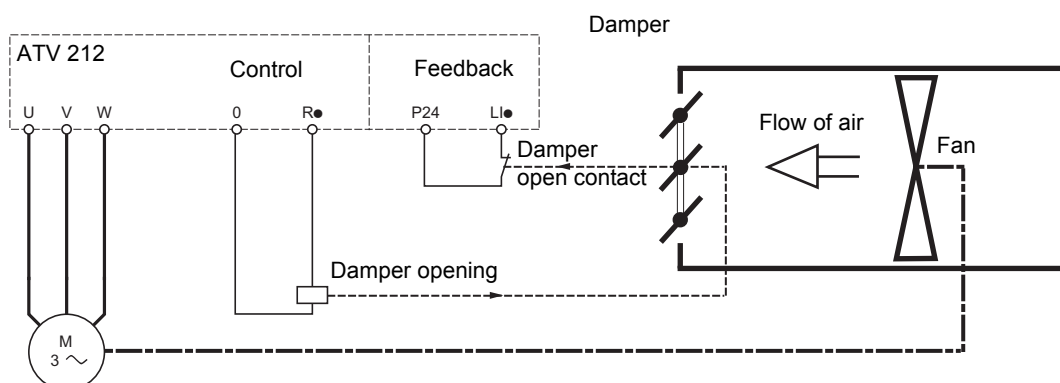
The opening command can be assigned to a relay via the F 130 or F 132 parameters to the function [Damper] 68 or [Inv. damper] 69. The damper is closed automatically when there is no longer an opening command.

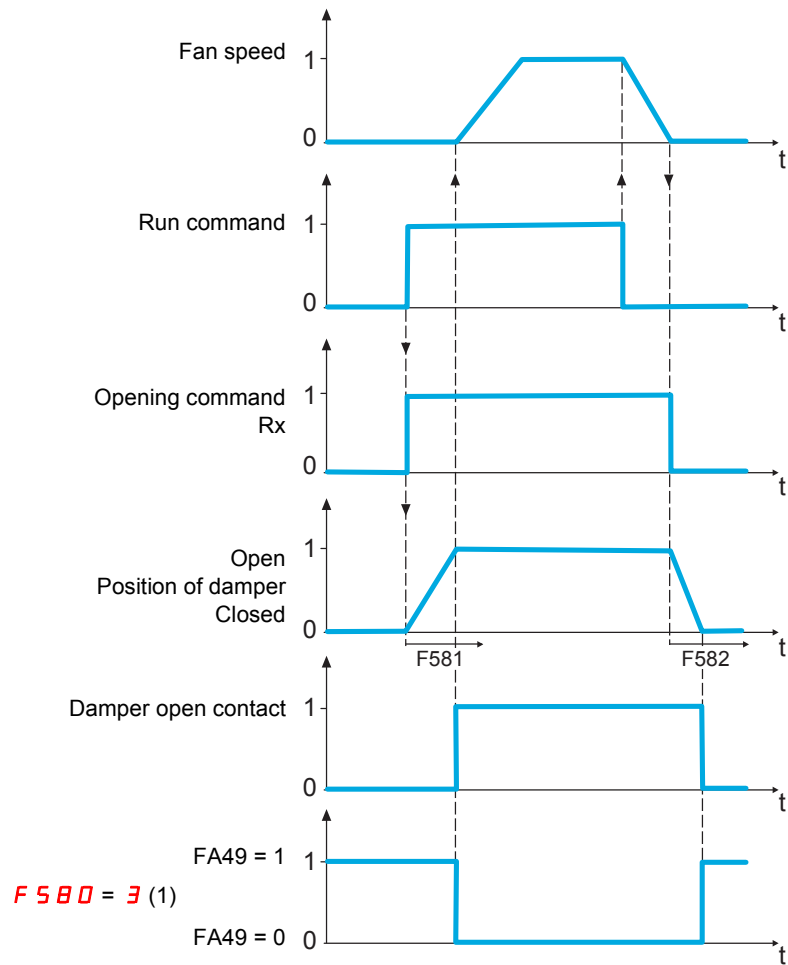
Damper opening feedback

Opening is controlled by a bit or a logic input that can be assigned via the F 111 or F 112 or F 113 parameters to the function 73. The corresponding logic input or bit can be configured via the parameter [Damper fdb type] F 5 B 0.

When there is an inconsistency, the drive goes on a [Damper fault 1] F d 1 if the damper does not open and on a [Damper fault 2] F d 2 if it does not close.

The parameter [Time open damper] F 5 B 1 can be used to delay tripping on an opening fault when a run command is sent and the parameter [Time close damper] F 5 B 2 delays the closing fault when a stop command is sent.





(1) [Com channel choice] **F B 0 7** must be set to **0** [RJ45] to manage the damper feedback on RJ45 port or set to **1** [Open style] to manage the damper feedback on Open Style port.

FA49 can only be active when [Damper fdb type] **F 5 8 0** is set to **3** [Com. LIL set] or **4** [Com. LIH set].

[Com. LIL set]: Serial link to communication bit selected by **F B 0 7** and active at level 0 (shunt).

[Com. LIH set]: Serial link to communication bit selected by **F B 0 7** and active at level 1 (open).

Identification

drive model code (FB05)

Model	Voltage Power Rating	Code (FB05)	Class (FB72:bit8)
ATV212H075M3X	3ph 200V 0.75kW	4	0
ATV212HU15M3X	3ph 200V 1.5kW	6	0
ATV212HU22M3X	3ph 200V 2.2kW	7	0
ATV212HU30M3X	3ph 200V 3kW	8	0
ATV212HU40M3X	3ph 200V 3.7kW / 4kW	9	0
ATV212HU55M3X	3ph 200V 5.5kW	10	0
ATV212HU75M3X	3ph 200V 7.5kW	11	0
ATV212HD11M3X	3ph 200V 11kW	108	0
ATV212HD15M3X	3ph 200V 15kW	109	0
ATV212HD18M3X	3ph 200V 18.5kW	110	0
ATV212HD22M3X	3ph 200V 22kW	111	0
ATV212HD30M3X	3ph 200V 30kW	112	0
ATV212H075N4	3ph 400/460V 0.75kW	36	0
ATV212HU15N4	3ph 400/460V 1.5kW	38	0
ATV212HU22N4	3ph 400/460V 2.2kW	39	0
ATV212HU30N4	3ph 400/460V 3.0kW	40	0
ATV212HU40N4	3ph 400/460V 3.7/4 kW	41	0
ATV212HU55N4	3ph 400/460V 5.5kW	42	0
ATV212HU75N4	3ph 400/460V 7.5kW	43	0
ATV212HD11N4	3ph 400/460V 11kW	44	0
ATV212HD15N4	3ph 400/460V 15kW	45	0
ATV212HD18N4	3ph 400/460V 18.5kW	46	0
ATV212HD22N4S	3ph 400/460V 22kW	32	0
ATV212HD22N4	3ph 400/460V 22kW	47	0
ATV212HD30N4	3ph 400/460V 30kW	48	0
ATV212HD37N4	3ph 400/460V 37kW	49	0
ATV212HD45N4	3ph 400/460V 45kW	50	0
ATV212HD55N4	3ph 400/460V 55kW	51	0
ATV212HD75N4	3ph 400/460V 75kW	52	0
ATV212W075N4	3ph 400/460V 0.75kW IP54	0136	0
ATV212WU15N4	3ph 400/460V 1.5kW IP54	0138	0
ATV212WU22N4	3ph 400/460V 2.2kW IP54	0139	0
ATV212WU30N4	3ph 400/460V 3.0kW IP54	0140	0
ATV212WU40N4	3ph 400/460V 3.7/4 kW IP54	0141	0
ATV212WU55N4	3ph 400/460V 5.5kW IP54	0142	0
ATV212WU75N4	3ph 400/460V 7.5kW IP54	0143	0
ATV212WD11N4	3ph 400/460V 11kW IP54	0144	0
ATV212WD15N4	3ph 400/460V 15kW IP54	0145	0
ATV212WD18N4	3ph 400/460V 18.5kW IP54	0146	0
ATV212WD22N4S	3ph 400/460V 22kW IP54	32	0
ATV212WD22N4	3ph 400/460V 22kW IP54	0147	0
ATV212WD30N4	3ph 400/460V 30kW IP54	0148	0

Model	Voltage Power Rating	Code (FB05)	Class (FB72:bit8)
ATV212WD37N4	3ph 400/460V 37kW IP54	0149	0
ATV212WD45N4	3ph 400/460V 45kW IP54	0150	0
ATV212WD55N4	3ph 400/460V 55kW IP54	0151	0
ATV212WD75N4	3ph 400/460V 75kW IP54	0152	0
ATV212W075N4C	3ph 400/460V 0.75kW IP54+ClassB	136	1
ATV212WU15N4C	3ph 400/460V 1.5kW IP54+ClassB	138	1
ATV212WU22N4C	3ph 400/460V 2.2kW IP54+ClassB	139	1
ATV212WU30N4C	3ph 400/460V 3.0kW IP54+ClassB	140	1
ATV212WU40N4C	3ph 400/460V 3.7/4 kW IP54+ClassB	141	1
ATV212WU55N4C	3ph 400/460V 5.5kW IP54+ClassB	142	1
ATV212WU75N4C	3ph 400/460V 7.5kW IP54+ClassB	143	1
ATV212WD11N4C	3ph 400/460V 11kW IP54+ClassB	144	1
ATV212WD15N4C	3ph 400/460V 15kW IP54+ClassB	145	1
ATV212WD18N4C	3ph 400/460V 18.5kW IP54+ClassB	146	1
ATV212WD22N4C	3ph 400/460V 22kW IP54+ClassB	147	1
ATV212WD30N4C	3ph 400/460V 30kW IP54+ClassB	148	1
ATV212WD37N4C	3ph 400/460V 37kW IP54	149	1
ATV212WD45N4C	3ph 400/460V 45kW IP54	150	1
ATV212WD55N4C	3ph 400/460V 55kW IP54	151	1
ATV212WD75N4C	3ph 400/460V 75kW IP54	152	1

Appendix



6

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
RS485 standard	62
Modbus 2-wire standard schematic	62

RS485 standard

The RS485 standard (ANSI/TIA/EIA-485-A-1998) allows variants of certain characteristics:

- Polarization
- Line termination
- Distribution of a reference potential
- Number of slaves
- Length of bus

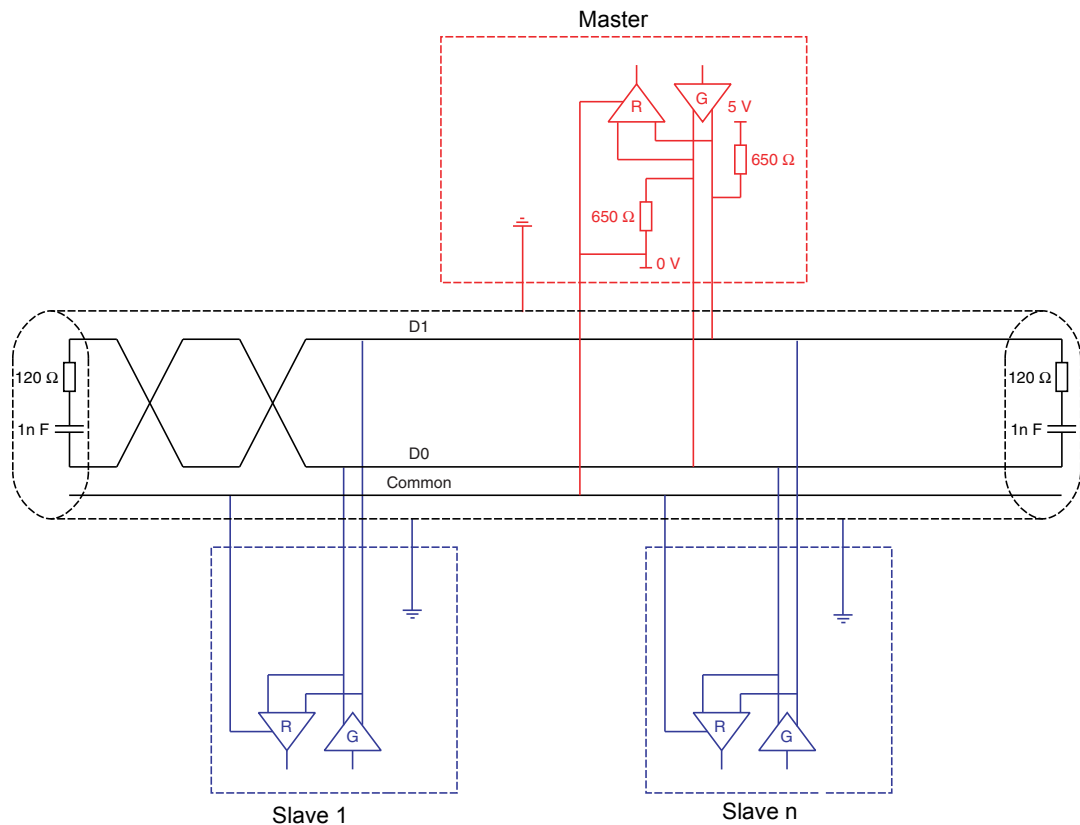
It does not specify the connector type or pinout.

The Modbus specification published on www.modbus.org in 2002 contains precise details of these characteristics. They are also summarized in the next sections (Modbus 2-wire and 4-wire standard schematics). The latest generation Schneider Electric devices conform to this specification.

Modbus 2-wire standard schematic

The standard schematic corresponds to the Modbus specification published in 2002 on www.modbus.org (Modbus_over_serial_line_V1.pdf, Nov 2002) and, in particular, to the 2-wire multipoint serial bus schematic.

Schematic diagram



Migration



What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Migration ATV21 - ATV212	64

Migration ATV21 - ATV212

General

The ATV212 is compatible with the ATV21

Migration Modbus ATV21 to ATV212: When controlling ATV21 using Modbus RJ45, parameter [Network protocol] (F B 2 9) should be set to 1.

With ATV212, parameter F B 2 9 should also be set to 1 and parameter [Com channel choice] (F B 0 7) set to [RJ45] (0). Factory setting is [Network] (1).

Settings of other communication parameters described in the programming manual remain the same as on ATV21.

A configuration transfer from ATV21 to ATV212 is possible.

For example:

You can upload a configuration from an ATV21 via PC Soft (and selected the drive Type : ATV21) and download it into ATV212.

After a transfer from ATV21 to ATV212, the new parameters stay at their factory setting:

[Damper fdb type] (F 5 B 0), [Time open Damper] (F 5 B 1), [Time close Damper] (F 5 B 2), [Damper fit behavior] (F 5 B 3), [Forced fire control] (F 6 5 0), [Forced fire function] (F 6 5 9), [Com channel choice] (F B 0 7), [Mdb network baud] (F B 2 0), [Mdb network parity] (F B 2 1) and [LL for ov.cur. prev.] (F 3 9 0).

The download configuration is not allowed if the drive is running.

In case of an interruption of download configuration transfer to the drive and detected fault, the C F 1 2 is set. This detected fault code keeps also present even after power off of the drive.

To reset the download transfer detected fault code C F 1 2:

- Make a new successful transfer
- Make a factory setting on the drive (using E 4 P parameter)

At the end of download transfer, the drive cannot run if a logic input configured to a function is active. To use the function and run the motor, it's necessary to disable and enable the logic input.

Commissioning

Compatible loader tool with ATV21

- PC Soft V1.0 and higher

Compatible loader tools with ATV212:

- PC Soft V1.06 and higher,
- Multi-Loader V3.11 and higher,
- SoMoveMobile V2.2 and higher,

