

DMS3

Actuator controls REMATIC Modbus XXR X.XPA

Modbus RTU

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1. General information about Modbus RTU

Serial bus systems for communication are used for exchange of information between automation systems and connected field devices. In comparison with conventional technology, savings in commissioning and maintenance are achieved by using bus technology. Bus systems used today are open and standardized.

The user can choose within a large product range. Modbus RTU is an international open bus protocol which is used successfully around the world.

The application range of bus technology includes automation in the areas of processing, manufacturing and construction.

1.1 Basic characteristics

Modbus distinguishes between master and slave devices.

Typical slave devices are actuators, valves, input/output devices and measuring transmitters.

Slave devices (such as the REMATIC MODBUS actuators) are peripheral devices.

The Modbus RTU communication is based on a protocol incl. slave addresses of functional codes with offset addresses, process data and checksums.

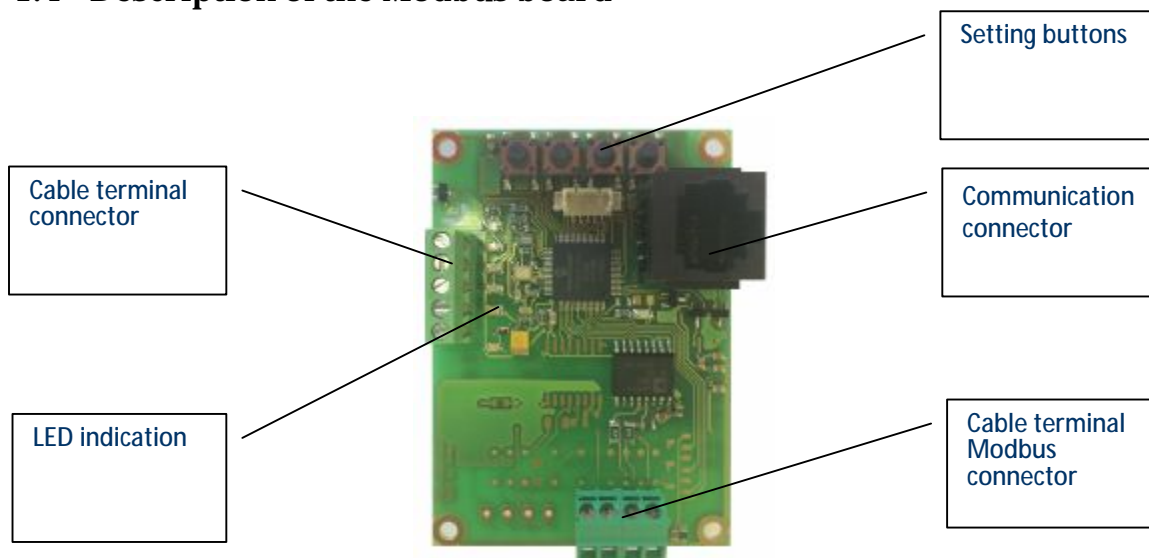
1.2 Range of application

DMS3 MX actuator controls are designed for the operation of REMATIC actuators.

1.3 Setting in operation

No special configuration file is required for a Modbus slave operation set up.

1.4 Description of the Modbus board



1.5 Description of the data interface

1.5.1 Communication Modbus - Registers

Address	Bit	Meaning	Supported instructions
1000	0	Open	Read Holding Registers (03) Write Single Register (06) Write Multiple Registers (16)
	1	Close	
	2	3P- 3 positional regulation 0=2 positional regulation by Open and Close 1=3 positional regulation setting in the %	
	3..15	-	
1001	0..9	Required position 0..1000 ‰ – high byte	
1002	0..9	Actual position 0..1000 ‰	Read Holding Registers (03)
1003	0	Torque Open	
	1	Torque Close	
	2	Blockage torques	
	3	Release blockage local control	
	4	Control	
	5	00 – OFF	
		01 – Remote	
		10 – Local	
		11 – OFF	
	6	Real direction of rotation sensor	
	7	00 – stop	
		01 – open 10 – close	
	8	Real direction of the motor	
	9	00 – stop	
		01 – open 10 – close	
10	Authorization writing of parameters		
11	Parameters protected by password or not admitted		
12	Errors		
13	Warnings		
14	Modbus Data Exchange channel 1		
15	Modbus Data Exchange channel 2		
1004	0	Relay READY	
	1	Relay 1	
	2	Relay 2	
	3	Relay 3	
	4	Relay 4	
	5	Relay 5	
	6..15	-	

1005	0	Error/Warning – ESD
	1	-
	2	Error/Warning – Torque Calibration
	3	Error/Warning – Torque
	4	Error/Warning – Stroke
	5	Error/Warning – Rotation
	6	Error/Warning – EEPROM
	7	Error/Warning – Menu mode
	8	Error/Warning – RAM
	9	Error/Warning – Parameters
	10	Error/Warning – Torque sensor
	11	Error/Warning – Sensor of position 1
	12	Error/Warning – Sensor of position 2
	13	Error/Warning – Sensor of position 3
	14	Error/Warning – Sensor of position 4
1006	15	Error/Warning – Regulator calibration
	0	Error/Warning – Rotation
	1	Error/Warning – Temperature <
	2	Error/Warning – Temperature >
	3	Error/Warning – Module LED
	4	Error/Warning – Module Torque
	5	Error/Warning – Module Position
	6	Error/Warning – Bus error
	7	Error/Warning – Thermo fuse
	8	Error/Warning – Power supply/Relay module
	9	Error/Warning – Phase
	10	Error/Warning – Relay
	11	Error/Warning – Reset
	12	Error/Warning – ROM
	13	Error/Warning – Module LCD
14	Error/Warning – Wrong command	
1007	15	Error/Warning – Manual control
	0	Error/Warning – Wrong position
	1	Error/Warning – Module type Position
	2	Error/Warning – Module type Torque
	3	Error/Warning – Module type LED
	4	Error/Warning – Module type LCD
	5	Error/Warning – Module type Power Supply/Relay
	6	Error/Warning – I2C
	7	Error/Warning – Power frequency
	8	Error/Warning – Voltage +5V
	9	Error/Warning – Torque check
	10	Error/Warning – Modbus activity
1008	11	Error/Warning – E2P
	12..15	-
1008	0..15	Last error 1
1009	0..15	Last error 2
1010	0..15	Last error 3
1011	0..15	Torque -327..328 %
1012	0..15	Temperature -127..+128 °C

1.5.2 Diagnostics (08)

Subfunction [hex]	Account	Description
00 00	Loopback	There are returned data sent in response
00 0A	Clear Counters	Resetting of counters
00 0B	Return Bus Message Count	The counter of all messages on the bus
00 0C	Return Bus Communication Error Count	The counter of messages with CRC error or parity
00 0D	Return Bus Exception Error Count	The counter of messages addressed to module, where a negative response is returned
00 0E	Return Slave Message Count	The counter of messages addressed to module
00 0F	Return Slave No Response Count	The counter of messages addressed to module on which is none response
00 10	Return Slave NAK Count	The counter of messages addressed to module, where a negative response is returned 05 ACKNOWLEDGE
00 11	Return Slave Busy Count	The counter of messages addressed to module, where a negative response is returned 06 SLAVE DEVICE BUSY
00 12	Return Bus Character Overrun Count	The counter of UART buffer overflow

1.5.3 Report Slave ID (17)

Byte	Account	Description
0	Slave ID	00= DMS3 M1 01= DMS3 M2
1	Run Indicator	FF
2	Manufacturer	01=REGADA
3..6	Version FW DMS3 M	„1.06“
7..16	Serial number of actuator	„1234567890“

1.6 Bus cables

Only cables according to standard EN 50170-2, cable type A, may be used for bus wiring.

A maximum of up to 32 bus devices may be connected in one segment.

If more devices are to be connected to one bus network, more segments must be connected with repeaters.

The bus cable must be laid at a distance of min. 20 cm from other cables.

It should be laid in a separate, conductive and earthed cable wiring system.

It must be ensured that there are no differences in potential between the individual devices on the bus (perform a potential compensation).

Cable specification

Impedance: 135 to 165 Ohm, at a frequency of 3 to 20 MHz.

Cable capacity: < 30 pF per metre

Cable diameter > 0.64mm

Cross section: > 0.34 mm², corresponds to AWG 22

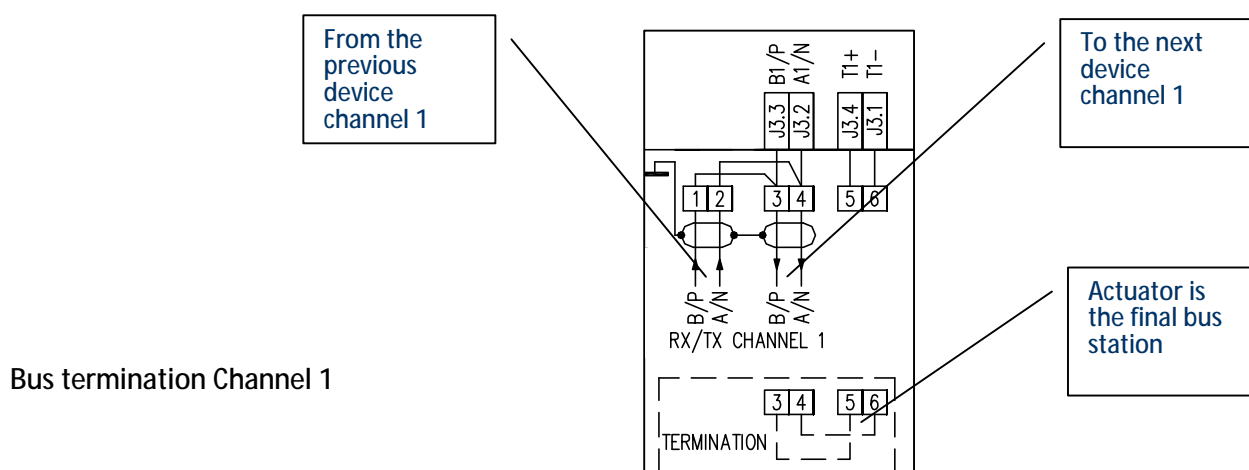
Loop resistance: 110 Ohm per km

Screening: CU shielding braid or shielding braid and shielding foil

1.7 Bus connection and termination

Bus connection for channel 1

Another bus station follows the actuator



Bus termination Channel 1

1.8 Shield connection for REMATIC

Use cable glands suitable for connecting cables. (The enclosure protection stated on the name plate is only ensured if suitable cable glands are used).

The bus screen should be considerably connected with the respective metric threads.

The shielding of bus cables should be connected with cable glands.

2. System DMS3 Modbus RTU - Technical data

Technical parameters:

Marking:	DMS3 M1 or DMS3 M2
Function:	fieldbus module Modbus RTU (Control unit)
LED indicator:	1xgreen, 2xyellow, 1xred
Communication protocol :	Modbus RTU (8-bit binary data)
Options:	Single-channel version Duo Channel version with cable or component redundancy or with repeater (common address and communication parameters).
Transmission medium	Twisted, screened copper cable according to IEC 61158
Modbus interface, line specification:	EIA-485 (RS485) 2-wire version, half duplex
Device types	Modbus slave
Bus access	Token-passing between the masters and polling between master and slave Polling between masters and slaves (query-response)
Number of devices	32 devices in each segment without repeater, with repeater expandable to 247
Address:	1..247
Parity:	Even Parity (1 stop bit) Odd Parity (1 stop bit) None Parity (2 stop bits)
Supported baud rate	300 Baud 600 Baud 1200 Baud 2400 Baud 4800 Baud 9600 Baud 19200 Baud 38400 Baud 57600 Baud 115200 Baud

Transmission speed/ Cable length	Baud rate (bit/s)	Max. cable length (Segment length) Without repeater	Possible cable length with repeaters (total network cable length)
		300 – 115 200	1 200 m

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