auma®
Solutions for a world in motion

Multi-turn actuators
TIGRON
TR-M30X – TR-M1000X
Modbus RTU

Use short instructions in combination with operation instructions only!

These short instructions are only complete with the respective operation instructions of the actuator. Safety and warning instructions contained in the actuator operation instructions must be heeded when performing work on the actuator!

Table of contents

1. Basic information on fieldbus connection

Electrical connection

The electrical connection of the actuator must be opened to be able to connect the fieldbus cables.

Refer to Operation instructions “Multi-turn actuators TIGRON TR-M30X – TR-M1000X” (Y009.100), “Electrical connection” chapter.

The “Electrical connection” chapter of the operation instructions fully applies to the connection of the fieldbus cables. It is imperative to heed the safety and warning instructions of this chapter in particular.

Fieldbus cable

Table 1:

Cable recommendation Only cables complying with the recommendations of EIA-485 specifications should be used for Modbus wiring.	
Impedance	135 to 165 Ohm, at a measurement frequency between 3 and 20 MHz
Cable capacity	< 30 pF per metre
Wire diameter	> 0.64 mm
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

Prior to installation, please note:

- Connect maximum 32 devices to one segment.
- If more devices are to be connected:
  - Connect several segments using repeaters.
- Install fieldbus cables at a distance of minimum 20 cm to other cables.
- If possible, fieldbus cables should be laid in a separate, conductive, and earthed cable tray.
- Ensure absence of equipotential earth bonding differences between the individual devices at fieldbus (perform an equipotential earth bonding).

Table 2: Transmission rate/cable length for line topology

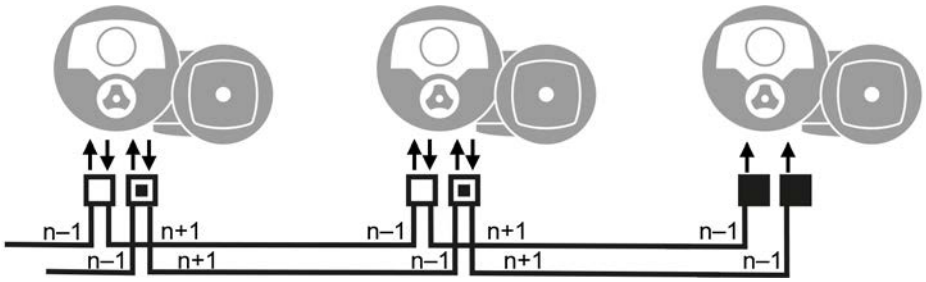
Baud rate (kbit/s)	Max. cable length (segment length) without repeater	Possible cable length with repeater (total network cable length)
9.6 – 115.2	1,200 m	Approx. 10 km

Table 3: Transmission rate/cable length for loop topology

Baud rate (kbit/s)	Max. cable length between actuators (without repeater)	Max. possible cable length of redundant loop
9.6 – 115.2	1,200 m	Approx. 290 km

2. Fieldbus connection for line topology

Figure 1: Line topology



□ Channel 1: Further fieldbus devices follow

▣ Channel 2 (redundancy only): further fieldbus devices follow

■ Last fieldbus device

n–1 Fieldbus cable from previous device (input)

n+1 Fieldbus cable to next device (output)

Connection at terminal carrier

For flexible cables, the fieldbus connection can be made via spring clamp terminals directly at the terminal carrier. For solid cables (single or multiple strands), additional support terminals must be used. ➪ page 4, Connection with support terminals

Information

For two flexible wires per terminal, a joint wire end sleeve must be used (twin wire end sleeve).

Figure 2: Terminal assignment at terminal carrier: Channel 1 (1A/1B)

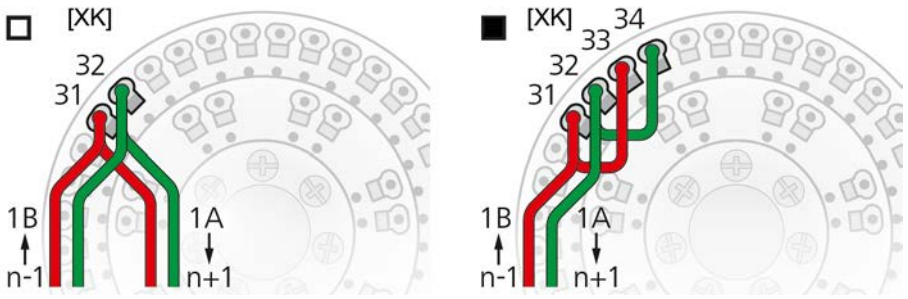
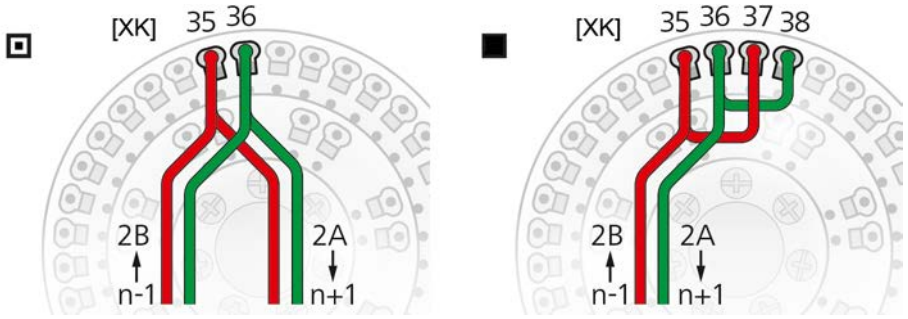


Figure 3: Terminal assignment at terminal carrier: Channel 2 (2A/2B)



[XK] Terminal assignment according to wiring diagram (customer connection):

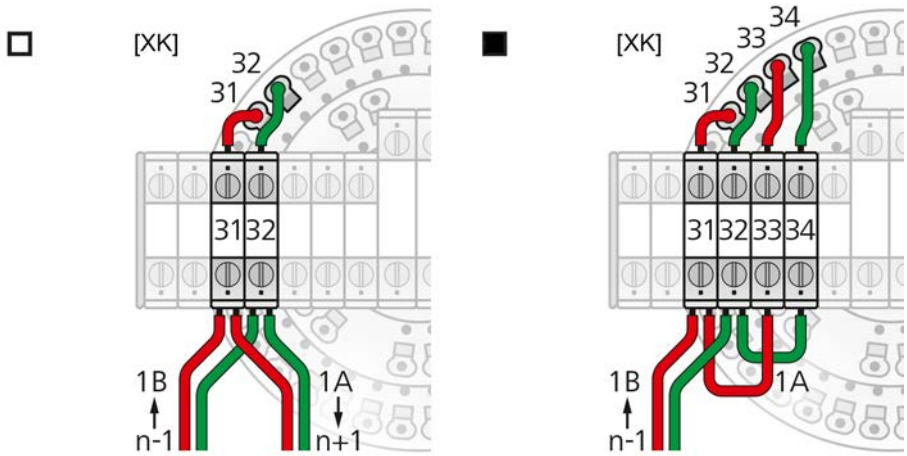
□ ▣ Channel 1 □ or channel 2 ▣ if further fieldbus devices follow

■ If the actuator is the last fieldbus device:
Channel 1: Link terminals 31/33 and 32/34
Channel 2: Link terminals 35/37 and 36/38

Connection with support terminals

When using solid cables (single or multiple strands), additional support terminals must be used. The support terminals (terminal blocks) are mounted above the terminal carrier.

Figure 4: Terminal assignment of support terminals: Channel 1 (1A/1B)

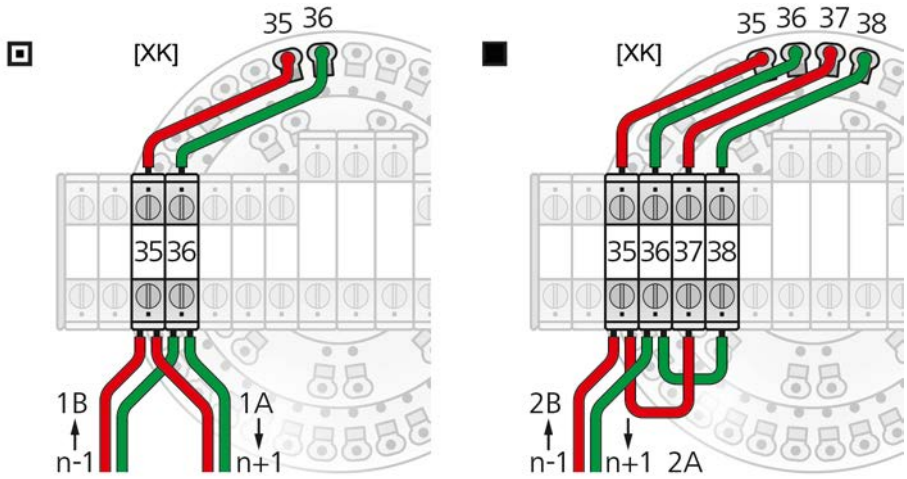


[XK] Terminal assignment according to wiring diagram (customer connection):

□ Terminals 31 and 32 if another fieldbus device follows

■ Terminals 31 – 34 if the actuator is the last fieldbus device

Figure 5: Terminal assignment of support terminals: Channel 2 (2A/2B)



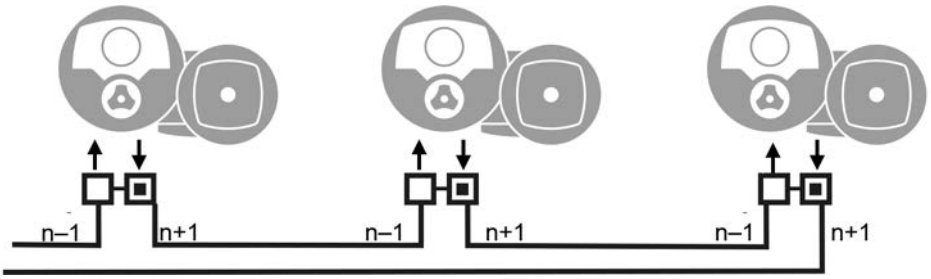
[XK] Terminal assignment according to wiring diagram (customer connection):

▣ Terminals 35 and 36 if another fieldbus device follows

■ Terminals 35 – 38 if the actuator is the last fieldbus device

3. Fieldbus connection for loop topology

Figure 6: Loop topology



□ Channel 1
▣ Channel 2
■ Last fieldbus device
n–1 Fieldbus cable from previous device (input)
n+1 Fieldbus cable to next device (output)

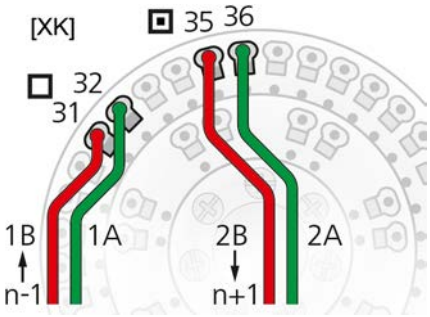
Information

- For loop topology, automatic termination is performed once the actuator controls are connected to the power supply.
- In case of a power outage of actuator controls, the two RS-485 loop segments will be automatically connected so that the actuators following these segments remain available.
- When using a SIMA master station, a redundant loop topology may be established.

Connection at terminal carrier

For flexible cables, the fieldbus connection can be made via spring clamp terminals directly at the terminal carrier. For solid cables (single or multiple strands), additional support terminals must be used. ➪ page 6, Connection with support terminals

Figure 7: Terminal assignment at terminal carrier (2-channel)

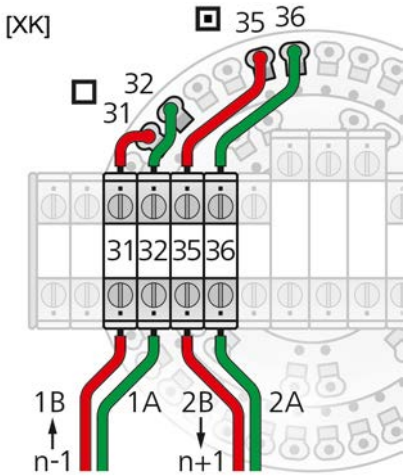


[XK] Terminal assignment according to wiring diagram (customer connection)
□ Channel 1
▣ Channel 2
n–1 Fieldbus cable from previous device (input via channel 1)
n+1 Fieldbus cable to next device (output via channel 2)

Connection with support terminals

When using solid cables (single or multiple strands), additional support terminals must be used. The support terminals (terminal blocks) are mounted above the terminal carrier.

Figure 8: Terminal assignment of support terminals (2-channel)



[XK] Terminal assignment according to wiring diagram (customer connection)

□ Channel 1

▣ Channel 2

n–1 Fieldbus cable from previous device (input via channel 1)

n+1 Fieldbus cable to next device (output via channel 2)

4. Set fieldbus (slave address) via device menu

Information

Local actuator settings are made using the Combi-Switch.

- Operate the yellow shuttle dial of the Combi-Switch to scroll within the menu ▲▼.
- Operate the black selector switch (outer ring), either to confirm the selected menu ↵ or to go one step back (ESC).

For further information on menu operation using the Combi-Switch, refer to the actuator operation instructions.

How to proceed

1. Open device menu.

   Information: If the ID of the indicated page starts with M, PRM, ..., you have already entered the device menu.

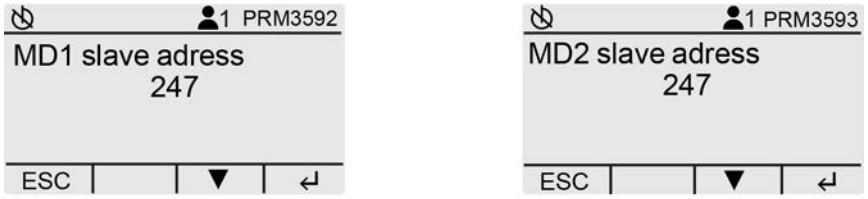
2. Select M0342 or M0409 menu for setting the address:

   Customer settings M0041
   Modbus M0341
   MD1 slave address M0342
   MD2 slave address M0409

   Information: MD2 slave address M0409 menu will only be available if parameter Redundancy M0800 has been set to value AUMA redundancy I. For settings AUMA redundancy II and Loop redundancy, the address of the second channel is automatically assigned: MD1 slave address = MD2 slave address

➥ The display shows parameter PRM3592 or PRM3593.

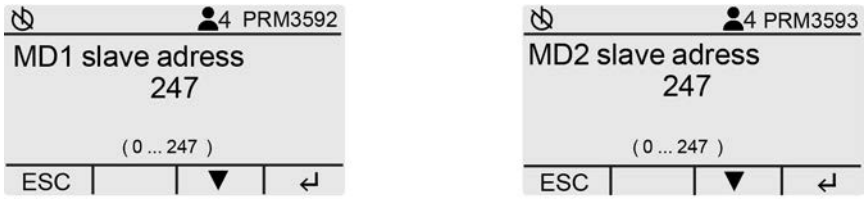
Figure 9: For user levels 1–3 (read parameters only):



Information

Use ↵ (Enter) to change from user levels 1–3 to a higher user level.

Figure 10: For user levels 4–6 (settings can be changed):



Change settings

3. Select new value via ▲▼. (At least user level 4 required.)

   Information: The adjustable address range is shown in round brackets.

4. Save new value via ↵ (Enter).

➥ The display shortly indicates Value saved!. The fieldbus address setting for the selected channel is now complete.

5. Press ESC (Escape) to allow the setting of further parameters.

5. Modbus parameter overview in device menu

Device menu parameters can also be set via the **AUMA CDT** software. For information on AUMA CDT, refer to the operation instructions and our website at www.auma.com.

For further information on these parameters and all other settings, refer to the Manual (Operation and setting).

Table 4: Modbus parameters

Menu	Setting values	Menu	Setting values
Customer settings M0041		Device configuration M0053	
Modbus M0341		Modbus M0799	
MD1 slave address M0342		Redundancy M0800	
1 ... 247, default value = 247		None (default value)	
Baud rate M0343		AUMA redundancy I	
1 ... 247, default value = 247		AUMA redundancy II	
Baud rate M0343		Loop redundancy	
Auto (default value)		Connection type M1967	
9.6 kbit/s		AUMATIC .2 (default value)	
19.2 kbit/s		AM Triple Play	
38.4 kbit/s		AC 01.1	
57.6 kbit/s		AM/VM 0...1000 ‰	
115.2 kbit/s		AM/VM 0...100 %	
Parity/stop bit M0782		DeviceNet like AC 01.1	
Even, 1 stop bit (default value)			
Odd, 1 stop bit			
None, 2 stop bits			
None, 1 stop bit			
Monitoring time M0781			
0.1 ... 900.0 [s] seconds, default value = 15.0 [s]			
Response Timeout M0916			
0.1 ... 5.0 [s] seconds, default value = 2.5 [s]			
Bus termin. ch 1 M2566			
Function not active (default value)			
Function active			
Bus termin. ch 2 M2935			
Function not active (default value)			
Function active			
Self.ret. fieldbus M2896			
Off (push-to-run op.) (default value)			
OPEN			
CLOSE			
OPEN and CLOSE			
OPEN & CL w/o STOP			
Fieldbus comm. eval. M2897			
Level controlled (default value)			
Edge controlled			

Information MD2 slave address M0409 menu will only be available if parameter Redundancy M0800 has been set to value AUMA redundancy I. For settings AUMA redundancy II and Loop redundancy, the address of the second channel is automatically assigned: MD1 slave address = MD2 slave address

Information Bus termin. ch 1 M2566 and Bus termin. ch 2 M2935 menus will only be available if parameter Redundancy M0800 has been set to value AUMA redundancy I or AUMA redundancy II.

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Y009.410/003/en/1.21