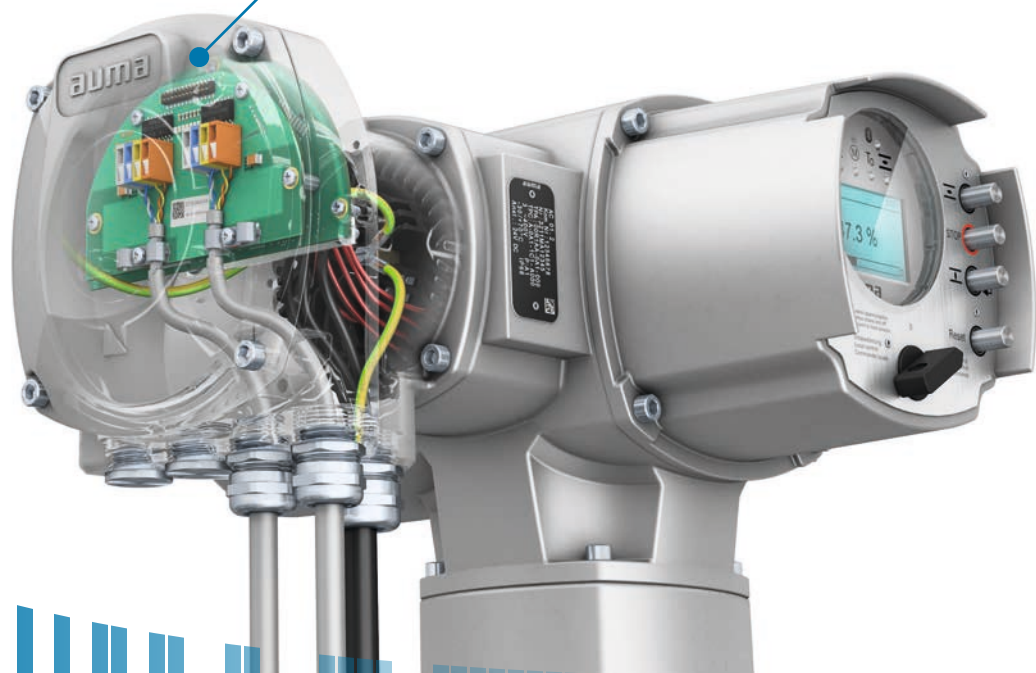


Actuator controls
AC 01.2
ACV 01.2
EtherNet/IP (integrated)

EtherNet/IP



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!

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1 Basic information on network connection

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

Refer to actuator operation instructions, "Electrical connection" chapter.

Information: The Electrical connection chapter of the operation instructions fully applies to the connection of the network cables. It is imperative to heed the safety and warning instructions of this chapter in particular.

EtherNet/IP cables For EtherNet/IP networks, the following minimum requirements with regard to the LAN cables used apply: Category 5 according to ISO/IEC 11801 Edition 2.0 Class D. Connector is suitable for wiring dual pair EtherNet/IP cables. The following tables list the available cable types, EtherNet/IP types A through C with regard to the respective application:

Table 1: Cable types for dual pair EtherNet/IP cables

Cable types	Application type A	Application type B	Application type C
Version	Dual pair data cable	Dual pair data cable	Dual pair data cable
Type of installation	Fixed installation, immobile after installation	Flexible installation, occasional movement, vibration or twisting after installation	Special applications (e.g. for continuous movement, vibration or torsion)
Cable parameter			
Marking	EtherNet/IP or PROFINET type A	EtherNet/IP or PROFINET type B	EtherNet/IP or PROFINET type C
Cross section	AWG 22/1 ≥ 0.318 mm²	AWG 22/7 ≥ 0.318 mm²	AWG 22/.. ≥ 0.318 mm²
Outer cable diameter	5.5 – 8.0 mm		depending on the application
Wire diameter	1.4 ± 0.2 mm		depending on the application
Colour of sheath	Green RAL6018		depending on the application
Colour of wire insulation	Pair 1: white, blue Pair 2: yellow, orange		
Number of wires	4		
Cable design	Dual pair or star quad		
Shield	Aluminium foil + copper braid		depending on the application
Communication requirements			
Applicable standards	ISO/IEC 11801 Edition 2.0 IEC 61140-1 IEC 61156-5 (minimum device group 5)		ISO/IEC 11801 Edition 2.0 IEC 61140-1 IEC 61156-6 (minimum device group 5)
Delay	≤20 ns/100 m		
Coupling attenuation	≥80 dB at 30 – 100 MHz “Channel Class D” according to EN 50174-2		

Minimum cable spacing The minimum spacing (according to IEC 61918) required between laying EtherNet/IP cables and other cables must be respected. They are shown in the table below.

Table 2: Minimum spacing for EtherNet/IP

	Distance to EtherNet/IP cable		
	Without or with non-metal cutoff bridge	Aluminium cutoff bridge	Steel cutoff bridge
Signal transmission cable			
E.g. other EtherNet/IP cables, Profibus cables, data cables for PCs, programming devices, shielded analogue inputs	0 mm	0 mm	0 mm
Power supply cables			
Unshielded power supply cables	200 mm	100 mm	50 mm
Shielded power cables	0 mm	0 mm	0 mm

2 Connect network cables

When connecting network cables, attention must be paid to the specialities of the deployed network topology.

When setting the cycle rate or the watchdog within EtherNet/IP controller, the delay times which result from the selected network topology must be considered.

Table 3: Explanation of symbols for topology

↑	from the previous device	↓	to the next device
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Figure 1: Point-to-point or star topology

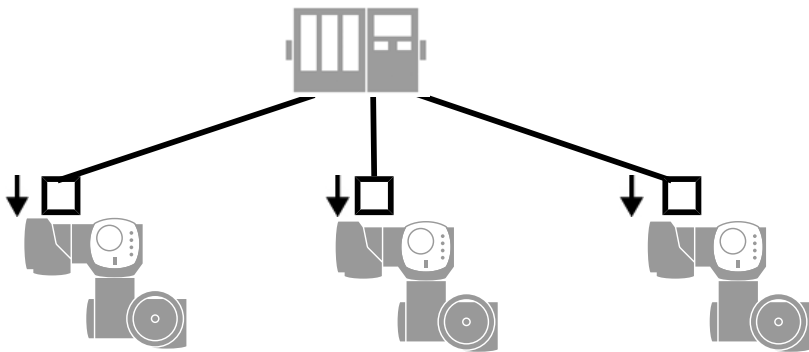
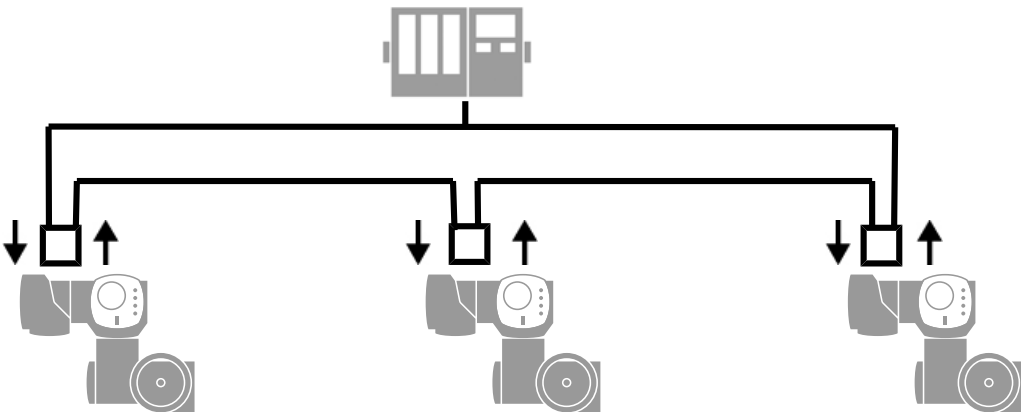
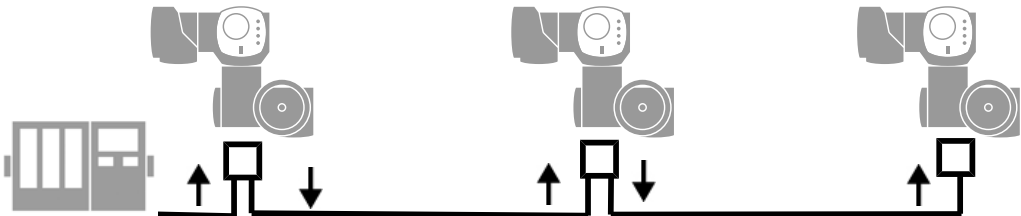


Figure 2: Ring topology



i If an actuator is part of a complete ring topology, the connection to other participants within the ring remains, even if the actuator is not supplied or defective. However, the ring is then interrupted, and a fault of a further ring participant leads to connection loss.

Figure 3: Line topology



i For EtherNet/IP, line topology is not recommended. If one participant fails, the other participants along the line are no longer accessible. Use ring topology instead.

Figure 4: Terminal compartment

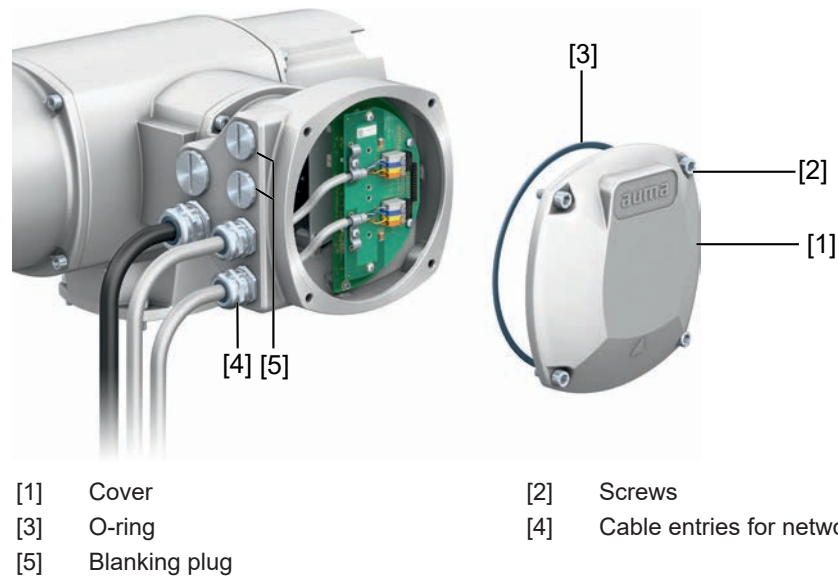
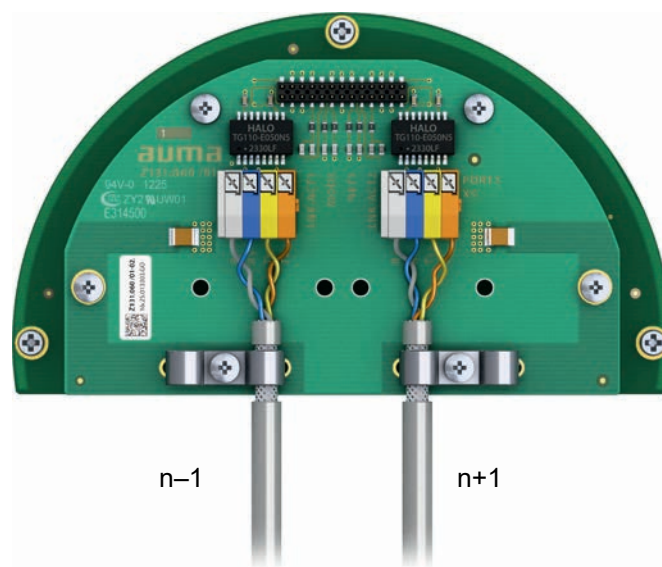


Figure 5: EtherNet/IP connection board with connection terminals



n-1 EtherNet/IP cable from the previous device
for line topology or redundant ring

n+1 EtherNet/IP cable to the next device



Stripped cables must be exposed for as short as possible. Leave the wires twisted until just before the terminal or do not untwist them.

Shield connection

1. Strip network cables.
2. Remove network cable shield at a short section and connect to the shield connection. Ensure absence of electrical contact to the terminal.
Information: Should cables be too thin for clamping, fold over the shielding and clamp it underneath.
Information: Strain relief must always be made via cable glands. For this, the shielding connection may not be used.

Connect network cable

3. EtherNet/IPConnect cables separately via Ethernet capable spring clamp terminals. The colour coding of the connection terminals matches the colours of the Ethernet cable (white/blue/yellow/orange).
⇒ Refer to Terminal cross sections table below.
⇒ Refer to Connection terminals table below.

4. Fasten cable glands with the torque as specified by the manufacturer to ensure respect of required enclosure protection.

Table 4: Terminal cross sections

Designation	Wire type	Cross section	
		min. [mm²]	max. [mm²]
Network cables	solid	0.5	1.5
	flexible	0.5	1.5
	flexible with wire end sleeve without plastic sleeve	0.5	1.0
	AWG	AWG 20	AWG 16

Table 5: Connection terminal assignment

Signal	Function	Colour of wire insulation
TD +	Transmit Data +	Yellow
TD –	Transmit Data –	Orange
RD +	Receive Data +	White
RD –	Receive Data –	Blue

Description of LEDs on connection board

Table 6: MODS (Module status)

MODS (Module status)	Explanation
Red LED: off + Green LED: off	No power
Green LED: illuminated	Controlled via scanner/controller in the Run State
Green LED: blinking	Not configured or controller in the Idle State
Red LED: illuminated	Major fault occurred
Red LED: blinking	Recoverable fault: The device is configured. However, the stored parameters differ from currently used parameters.

Table 7: NETS (network status)

NETS (network status)	Explanation
Red LED: off + Green LED: off	No power supply or no connection to the controller.
Green LED: illuminated	Connection to controller established.
Green LED: blinking	Device is online, however, there are no connections active.
Red LED: illuminated	Duplicate IP address detected: fatal error.
Red LED: blinking	Time-out for one or more connections detected (CIP Class 1 or 3).

Table 8: LINK/ACT1, LINK/ACT2

LINK/ACT1, LINK/ACT2 (Link/activity port 1 / 2)	Explanation
Red LED: off + Green LED: off	No communication at port 1 or 2
Green LED: illuminated	Port 1 or 2 are in "Link Established" status.
Green LED: blinking	Data communication via port 1 or port 2 (100 Mbit/s)

3 Set IP address

DHCP is activated as default setting in the factory. The DHCP server automatically assigns an IP address.

Network settings like the IP address can also be set as indicated below:

- using the network connection via web server or via network services
- using the device interfaces such as Bluetooth or via the local controls of the device

The following parameter determines which interface can be used for parametrising the network settings:

If parameter **Source network conf.** is set to **Device interface/display**, the network parameters can be set using the device interfaces such as Bluetooth or via the local controls of the device.

If parameter **Source network conf.** is set to **Network/web server**, the network parameters can be set using the network connection via web server or via network services.

4 Overview of EtherNet/IP parameters in the device menu

Table 9: EtherNet/IP parameters

Menu	Setting values
Device configuration [M0053]	
EtherNet/IP [M3865]	
	Source network conf.
	Network/web server
	Device interface/display
Settings port 1	
	Ethernet port 1 [M2872]
	Function not active
	Function active
	Settings port 1 (Ethernet communication settings)
Settings port 2	
	Ethernet port 2 [M2873]
	Function not active
	Function active
	Settings port 2 (Ethernet communication settings)
EnableWebServer [M3680]	
	Function not active
	Function active
EnableFTPServer [M3064]	
	Function not active
	Function active
EnableAcidCapable [M3881]	
	Function not active
	Function active
Enable DHCP [M3882]	
	Function not active
	Function active
IP address EIP [M3902]	
Subnet mask EIP [M3903]	
Gateway address EIP [M3904]	



Solutions for a world in motion

AUMA Riester GmbH & Co. KG

Location Muellheim

PO Box 1362

79379 Muellheim, Germany

Tel +49 7631 809 - 0

Fax +49 7631 8091250

info@auma.com

www.auma.com