

auma®

Actuator controls

AUMA MATIC
AM 01.1/AM 02.1
INTERBUS-S



Certificate Registration No.
12 100 4269
12 104 4269

Short instructions for bus connection

Scope of these instructions: These instructions are valid for multi-turn actuators of the type ranges SA(R) 07.1 – SA(R) 16.1 and for part-turn actuators of the type range SG 05.1 – SG 12.1 with controls AUMA MATIC AM 01.1/AM 02.1 with INTERBUS-S interface.

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1. Safety instructions

1.1 Range of application

AUMA actuators are designed for the operation of industrial valves, e.g. globe valves, gate valves, butterfly valves and ball valves. For other applications, please consult us. The manufacturer is not liable for any possible damage resulting from use in other than the designated applications. Such risk lies entirely with the user.

Observance of these operation instructions is considered as part of the controls' designated use.

1.2 Commissioning (electrical connection)

During electrical operation certain parts inevitably carry lethal voltages. Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

1.3 Maintenance

The maintenance instructions must be strictly observed, otherwise a safe operation of the multi-turn actuator is no longer guaranteed.

1.4 Warnings and notes

Non-observance of the warnings and notes may lead to serious injuries or damage. Qualified personnel must be thoroughly familiar with all warnings and notes in these operation instructions. Correct transport, proper storage, mounting and installation, as well as careful commissioning are essential to ensure a trouble-free and safe operation. The following references draw special attention to safety-relevant procedures in these operation instructions. Each is marked by the appropriate pictograph.



This pictograph means: Note!

“Note” marks activities or procedures which have major influence on the correct operation. Non-observance of these notes may lead to consequential damage.



This pictograph means: Electrostatically endangered parts!

If this pictograph is attached to a printed circuit board, it contains parts which may be damaged or destroyed by electrostatic discharges. If the boards need to be touched during setting, measurement or for exchange, it must be assured that immediately before a discharge through contact with an earthed metallic surface (e.g. the housing) has taken place.



This pictograph means: Warning!

“Warning” marks activities or procedures which, if not carried out correctly, can affect the safety of persons or material.

2. Short description

AUMA actuators have a modular design. Motor and gearing are mounted in a common housing.

The actuators are driven by an electric motor and controlled with the electronic controls AUMA MATIC.

3. Setting of the limit and torque switching

The limit and torque switching as well as the setting of the electronic position transmitter RWG or the potentiometer (option) must be checked and, where necessary, set.

Perform setting according to the operation instructions of the actuator:

- Multi-turn actuators SA(R) 07.1 – 16.1 with AUMA MATIC AM 01.1/AM 02.1
- Part-turn actuators SG 05.1 – 12.1 with AUMA MATIC AM 01.1/AM 02.1

4. Power supply



Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

Perform mains connection according to the operation instructions of the actuator (see clause Electrical connection):

- Multi-turn actuators SA(R) 07.1 – 16.1 with AUMA MATIC AM 01.1/AM 02.1
- Part-turn actuators SG 05.1 – 12.1 with AUMA MATIC AM 01.1/AM 02.1

5. Bus connection



Disconnect power before removing the plug cover.

The connection board (figure B) is located in the AUMA plug/socket connector at the electrical connection (figure A)

Figure A: AUMA MATIC on multi-turn actuator SA(R)

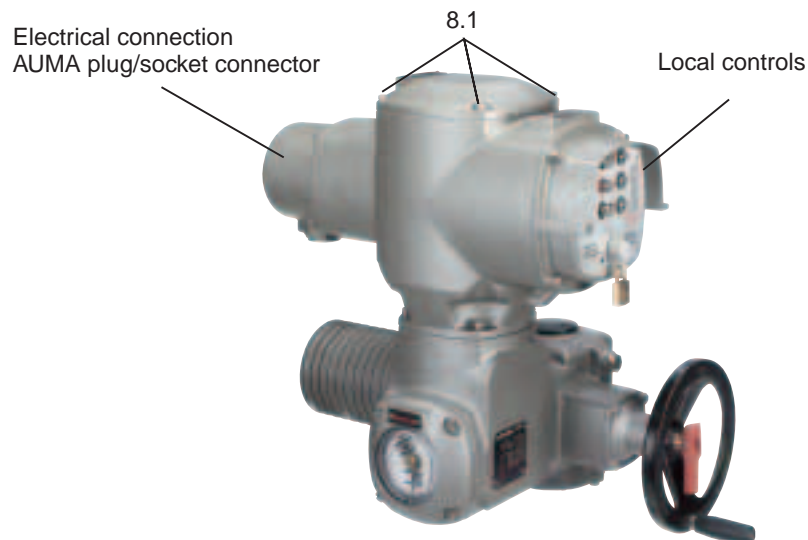
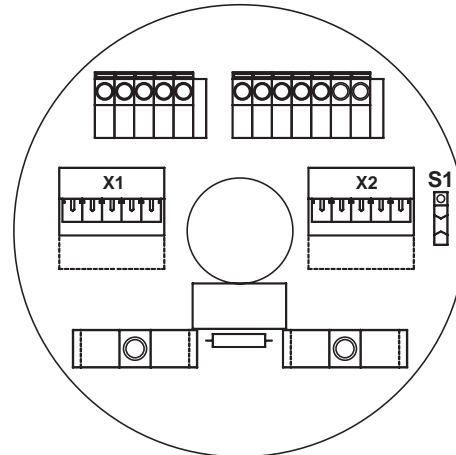




Figure B: Connection board**Table 1: Switch position S1**

 Dot not visible	Bus termination switched on No outgoing remote bus connected. Actuator is last device (delivery state).
 Dot visible	Bus termination switched off Outgoing remote bus connected, i.e. cable connected to X2. Actuator is not the last device.

X1 = Incoming remote bus

Pin 1 = DO1 Pin 2 = DO1
 Pin 3 = DI1 Pin 4 = DI1
 Pin 5 = GND_ISO

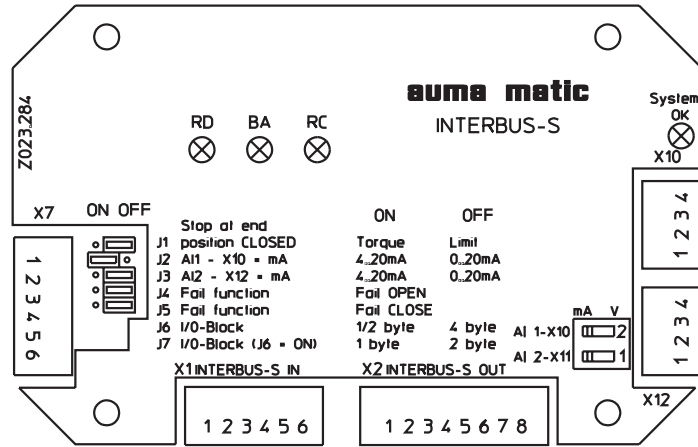
X2 = Outgoing remote bus

Pin 1 = DO2 Pin 2 = DO2
 Pin 3 = DI2 Pin 4 = DI2
 Pin 5 = GND Pin 5 = RBST
 Pin 6 = 5 V DC

6. INTERBUS-S board

The INTERBUS-S board is located in the controls AUMA MATIC and is accessible after loosening the screws 8.1 (figure A) and removal of the cover.

Figure C: INTERBUS-S board



6.1 Description of switches

With the switches AI1 and AI2 the input level of both analogue inputs X10 and X12 can be programmed.

AI 1 = Analogue input 1 (refer to wiring diagram)
Option: position feedback = always in position ON (mA)

AI 2 = Analogue input 2 (refer to wiring diagram),
Option: free customer input,
voltage signal = OFF (V), current signal = ON (mA)

6.2 Description of LEDs

a) INTERBUS-S specific LEDs:
RD (remote bus disabled) = red: ID cycle or outgoing remote bus switched off
BA (bus active) = green: active INTERBUS-S communication
RC (remote bus connected) = green: incoming remote bus is connected

b) System LED:
System OK = blinking green: the microcontroller of the INTERBUS board is active

6.3 Description of the jumpers

Seating mode for end position CLOSED
 J1 (figure C) OFF = LIMIT or no jumper /
 ON = Torque



Jumper position J1 (figure C) must correspond to switch S1-2 on logic board. See clause "Logic board".

Input level of analogue inputs:

J2 (figure C) Current level of analogue input 1:
 OFF or no jumper = 0...20 mA
 ON = 4...20 mA

J3 (figure C) Current level of analogue input 2:
 OFF or no jumper = 0...20 mA
 ON = 4...20 mA



J2 and J3 are only effective if AI1 and AI2 are in position ON. A loss of signal can only be recognised and indicated when J2 and J3 are in position ON. A loss of signal is indicated when the current signal is below 3.8 mA.

Behaviour on loss of communication:

- J4 (figure C) 'fail-safe' behaviour OPEN:
OFF or no jumper = fail as is
ON = fail open
- J5 (figure C) 'fail-safe' behaviour CLOSE:
OFF or no jumper = fail as is
ON = fail close



Only one jumper may be in position ON at any given time. When both jumpers are OFF, or rather when no jumper is connected, the reaction 'fail as is' is performed. Incorrect programming (J4=J5=ON) also results in 'fail as is' reaction.

The 'fail-safe' function is only available in selector switch position REMOTE. When the selector switch is in position 'LOCAL' or '0', no 'fail safe' operation is performed.

6.4 Data interface**Data width of the interface:**

- J6 (figure C) data width of the INTERBUS-S command
OFF or no jumper = 4 byte
ON = 2 byte or 1 byte, depending on J7
- J7 (figure C) only valid when J6 in position 'ON'
OFF or no jumper = 2 byte
ON = 1 byte



J6 has priority, if J6 is not connected or OFF, the position of J7 is ignored. Only when J6 = ON it is possible to select data width 2 byte (J7 = OFF) or 1 byte (J7 = ON).

J8 = not used

Factory setting:

- J1 = Limit
J2 = 4...20 mA
J3 = 0...20 mA
J4 = J5 = OFF = no jumper, i.e. fail as is
J6 = J7 = OFF, i.e. 4 byte data width

6.4.1 Interface configuration

Via the fieldbus the user has access to the data interface which consists of an input unit and an output unit.

The width of the interface can be programmed:

- Programming variant 1a: 1 byte input, 1 byte output
Programming variant 1b: 2 bytes input, 2 bytes output
Programming variant 2: 4 bytes input, 4 bytes output (default)

The programming of the interface is done via jumpers (J6 and J7) on the INTERBUS-S board:

Table 2

Variant	Data width of interface	Jumpers
2 (default)	4 bytes	J6 = OFF or jumper
1b	2 bytes	J6 = ON J7 = OFF or no jumper
1a	1 byte	J6 = ON J7 = ON



Data width 2 bytes or 1 byte can only be selected via J7 when J6 is in position ON. Default: J6 = OFF, J7 = OFF

6.4.1.1 Slave INPUT (= PLC OUTPUT)

Byte 1								Byte 2	Byte 3	Byte 4
7	6	5	4	3	2	1	0			
OPEN	CLOSE	STOP	reserved	reserved	OUTPUT 1/2	reserved	reserved	reserved	reserved	reserved

Signal	Description	Data type	Code	Notes
OPEN	Bus command for opening	1 bit	0 = no operation 1 = operation in dir. OPEN	
CLOSE	Bus command for closing	1 bit	0 = no operation 1 = operation in dir. CLOSE	
STOP	Bus command for operation stop	1 bit	0 = not active 1 = stops operation	
reserved		1 bit		
reserved		1 bit		
OUT 1/2	Selection of OUTPUT variants 1/2	1 bit	0 = OUTPUT 1 1 = OUTPUT 2	
reserved		2 bits		
reserved		24 bits		

6.4.2 OUTPUT (PLC INPUT)

6.4.2.1 Output variant 1

Byte 1								Byte 2	Byte 3	Byte 4							
7	6	5	4	3	2	1	0			7	6	5	4	3	2	1	0
TSC (DSR)	TSO (DÖL)	LSC (WSR)	LSO (WÖL)	SS-LOCAL	SS-REMOTE	STE	TH	ANALOGUE 1 8 bits (high-order) of the 10 bit accurate ANALOGUE 1 signal	ANALOGUE 2 8 bits (high-order) of the 10 bit accurate ANALOGUE 2 signal	Analogue 1.1	Analogue 1.0	Analogue 2.1	Analogue 2.0	FLT1	FLT2	ANAL. LOSS	FLT3

Signal	Description	Data type	Code	Notes
TSC (DSR)	Torque switch closing (clockwise rotation)	1 bit	0 = torque switch not tripped 1 = torque switch tripped	
TSO (DÖL)	Torque switch opening (counterclockwise rotation)	1 bit	0 = torque switch not tripped 1 = torque switch tripped	
LSC (WSR)	Limit switch closing (clockwise rotation)	1 bit	0 = limit switch not tripped 1 = limit switch tripped	
LSO (WÖL)	Limit switch opening (counterclockwise rotation)	1 bit	0 = limit switch not tripped 1 = limit switch tripped	
SS-LOCAL	Selector switch in position LOCAL	1 bit	0 = switch not in position LOCAL 1 = switch in position LOCAL	undefined = position OFF
SS-REMOTE	Selector switch in position REMOTE	1 bit	0 = switch not in position REMOTE 1 = switch in position REMOTE	undefined = position OFF
STE	Electrical fault (phase fault)	1 bit	0 = no fault 1 = electrical fault (phase fault)	

Signal	Description	Data type	Code	Notes
TH	Motor protection	1 bit	0 = motor protection not tripped 1 = motor protection tripped	
ANA-LOGUE1	Analogue input 1 (position feedback)	8 bit	min: 0 = 0mA / 0V max: 1,024 = 20mA / 5V	10 bits with bit 4.6 and bit 4.7 (ANALOGUE 1.0 and ANALOGUE 1.1)
ANA-LOGUE2	Analogue input 2 (spare)	8 bit	min: 0 = 0mA / 0V max: 1,024 = 20mA / 5V	10 bits with bit 4.4 and bit 4.5 (ANALOGUE 2.0 and ANALOGUE 2.1)
FLT1	Fault 1 (STE + TH)	1 bit	0 = no fault 1 = fault	
FLT2	Fault 2 (TSC (DSR), TSO (DÖL) tripped before LSC (WSR), LSO (WÖL))	1 bit	0 = no torque fault 1 = torque fault	
ANALOGUE LOSS	Loss of analogue signal	1 bit	0 = no loss of signal 1 = loss of signal	
FLT3	Fault 3 (24 V DC voltage supply fault)	1 bit	0 = no fault 1 = fault	

6.4.2.2 Output variant 2

Byte 1								Byte 2								Byte 3								Byte 4							
7	6	5	4	3	2	1	0																	7	6	5	4	3	2	1	0
TSC (DSR)	TSO (DÖL)	LSC (WSR)	LSO (WÖL)	SS-LOCAL	SS-REMOTE	STE	TH	ANALOGUE 1 8 bits (high-order) of the 10 bit accurate ANALOGUE 1 signal								ANALOGUE 2 8 bits (high-order) of the 10 bit accurate ANALOGUE 2 signal								Analogue 1.1	Analogue 1.0	Analogue 2.1	Analogue 2.0	R1	R2	R3	R4

Signal	Description	Data type	Code	Remarks
TSC (DSR)	Torque switch closing (clockwise rotation)	1 bit	0 = torque switch not tripped 1 = torque switch tripped	
TSO (DÖL)	Torque switch opening (counterclockwise rotation)	1 bit	0 = torque switch not tripped 1 = torque switch tripped	
LSC (WSR)	Limit switch closing (clockwise rotation)	1 bit	0 = limit switch not tripped 1 = limit switch tripped	
LSO (WÖL)	Limit switch opening (counterclockwise rotation)	1 bit	0 = limit switch not tripped 1 = limit switch tripped	
SS-LOCAL	Selector switch in position LOCAL	1 bit	0 = switch not in position LOCAL 1 = switch in position LOCAL	undefined = position OFF
SS-REMOTE	Selector switch in position REMOTE	1 bit	0 = switch not in position REMOTE 1 = switch in position REMOTE	undefined = position OFF
STE	Electrical fault (phase fault)	1 bit	0 = no fault 1 = electrical fault (phase fault)	

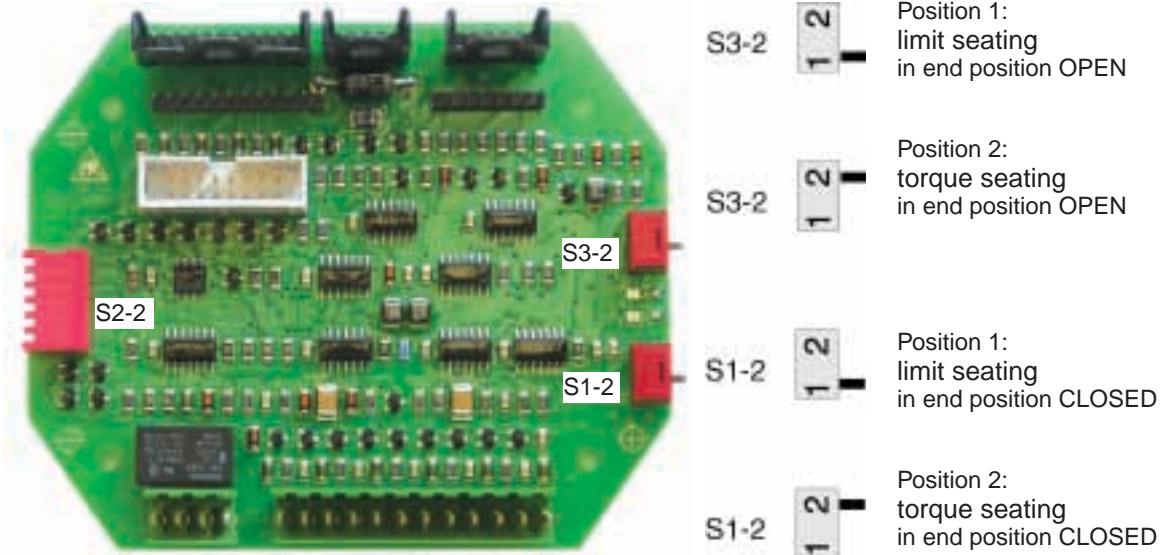
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ANA-LOGUE1	Analogue input 1 (position feedback)	8 bit	min: 0 = 0mA / 0V max: 1,024 = 20mA / 5V	10 bits with bit 4.6 and bit 4.7 (ANALOGUE 1.0 and ANALOGUE 1.1)
ANA-LOGUE2	Analogue input 2 (spare)	8 bit	min: 0 = 0mA / 0V max: 1,024 = 20mA / 5V	10 bits with bit 4.4 and bit 4.5 (ANALOGUE 2.0 and ANALOGUE 2.1)
R1	Digital input 1	1 bit	Coding depending on connection	
R2	Digital input 2	1 bit	Coding depending on connection	
R3	Digital input 3	1 bit	Coding depending on connection	
R4	Digital input 4	1 bit	Coding depending on connection	

7. **Typical wiring diagram** MSP 1B1 T00---F17E1 KMS TP 104/001

8. **ID number** ID number of AUMA INTERBUS-S interface: '3'

9. **Logic board** The type of seating - limit or torque seating - (switch S1-2 and switch S3-2, figure D) must be determined by the valve manufacturer.

Figure D: Logic board A2



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Information also available on the Internet:

Wiring diagram, inspection records and further actuator information can be downloaded directly from the Internet by entering the order no. or comm. no. (refer to name plate).
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