auma®

Solutions for a world in motion

Actuator controls

AUMATIC AC 01.1/ACExC 01.1

Control:

Parallel

Profibus DP

Profibus DP with FO

Modbus

Modbus with FO

DeviceNet

→ Foundation Fieldbus

Manual

Operation and setting

Read operation instructions first

- Observe safety instructions.

Reference documents:

- Operation instructions (assembly, operation, commissioning) for actuator
- Manual (Fieldbus device integration) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus
  Can be downloaded from the Internet (www.auma.com) or ordered directly from AUMA (addresses from page 94).

Table of contents

Page

1 Safety instructions 5

1.1 General notes on safety 5
1.2 Range of application 6
1.3 Warnings and symbols 6

2 Identification 7

2.1 Name plate 7
2.2 Short description 8

3 Operation 9

3.1 Local operation 9
3.2 Operation from REMOTE 9
3.3 Menu navigation via push buttons (for settings and indications) 10
3.3.1 Short overview: functions of the push buttons 10
3.3.2 Structural design and navigation 11
3.4 Operation and setting via AUMA COM-AC programming software 12
3.4.1 Operation setting via COM-AC 12
3.5 Password change 13
3.6 Language change in the display 14
3.7 LCD contrast setting of the display (applies only to controls with green display) 14

4 Indications 15

4.1 Status indications in the display 15
4.1.1 Status indication S0/S6 - operation 15
4.1.2 Status indication S4 - torque 16
4.2 Torque indication: edit 16
4.3 Electronic name plate 17
4.3.1 Display indication: enable view 17
4.3.2 Electronic name plate: view 17
4.4 Indication lights/LEDs 19
4.4.1 Standard indication 19
4.4.2 Configuration of the signals: view/edit 20
4.4.3 Blinking behaviour of indication lights/LEDs: view/edit 21

5 Signals 22

5.1 Signals via fieldbus 22
5.1.1 Configuration of adjustable (user-definable) signals 22
5.2 Feedback via output contacts (binary) - (option) 23
5.2.1 Configuration for output contacts 1 to 5: view/edit 23
5.2.2 Configuration alarm contacts (collective fault signal): view/edit 25
5.2.3 Output contacts 1 to 5: use as running indication (blinker) 26
5.3 Feedback signals (analogue) - (option) 27
5.3.1 Position transmitter/actual position source (E2): view 27
5.3.2 Source of the torque signal E6: view 28
5.3.3 Feedback signals (configuration) via analogue output 1: view 28
5.3.4 Signal range at the analogue output 1: view/edit 29
5.3.5 Feedback signals (configuration) via analogue output 2: view 30
5.3.6 Signal range at the analogue output 2: view/edit 30

Page

6 Operation mode 31

6.1 Operation mode OFF 31
6.2 Operation mode LOCAL 32
6.2.1 Push-to-run operation or self-retaining: set for the operation mode LOCAL 32
6.3 Operation mode REMOTE 33
6.3.1 Push-to-run operation or self-retaining: set for operation mode REMOTE 33
6.4 Operation mode EMERGENCY 34
6.4.1 Operation mode (type of duty) activation for an emergency operation 34
6.4.2 EMERGENCY operation: switch on or off/signal behaviour definition 35
6.4.3 Actuator behaviour definition in case of an emergency operation 35
6.4.4 EMERGENCY position definition 36
6.4.5 Motor protection and/or torque switching: by-pass 36
6.5 Fault State behaviour in case of bus communication loss 37
6.6 Failure behaviour in case of analogue signal loss (option) 37

7 Functions 40

7.1 Type of seating: check/edit end positions 40
7.2 Torque switching: check/set 41
7.3 Limit switching setting 42
7.4 Intermediate positions (option) 43
7.4.1 Display indication: enable view 43
7.4.2 Intermediate positions: switch on or off 44
7.4.3 Intermediate position definition 44
7.4.4 Operation behaviour = actuator behaviour definition 45
7.4.5 Intermediate positions: set the signalling 45
7.5 Intermediate positions with multiport valve function (option) 47
7.5.1 Check: Multiport valve function available? 47
7.5.2 Check: Positioner active? 48
7.5.3 Display indication: enable view 48
7.5.4 Intermediate positions: switch on or off 48
7.5.5 Intermediate position setting 48
7.5.6 Operation behaviour = actuator behaviour definition 49
7.5.7 Intermediate positions signalling 49
7.5.8 Intermediate positions in LOCAL: direct approach without stopping 49
7.6 Positioner (operation mode SETPOINT MODE) 50
7.6.1 Adaptive behaviour: switch on or off 50
7.6.2 Overrun (inner dead band): set manually 51
7.6.3 Max. error variable (outer dead band): set manually 52
7.6.4 Dead time setting 52
7.6.5 Closing fully/opening fully (end position tolerance for setpoint E1) 53
7.6.6 Open-close duty (REMOTE) or modulating duty (SETPOINT) selection 53
7.6.7 Source of setpoint E1: view 54
7.6.8 Input range of setpoint 1: view/edit 55
7.7 Stepping mode (option) 56
7.7.1 Display indication: enable view 56
7.7.2 Stepping mode: switch on or off 57
7.7.3 Stepping range setting (start and end of stepping mode). 57
7.7.4 ON and OFF times setting 58
7.8 Local controls enable function (option) 59
7.8.1 Selector switch functions: enable/disable 59
7.9 EMERGENCY STOP function (option) 60
7.9.1 Description of the functions 60
7.9.2 Feedback signals on the display 61
7.9.3 Feedback signals setting via output contacts 61
7.9.4 Feedback signal setting via LEDs 61

		Page
7.10	Foundation Fieldbus interface	62
7.11	External inputs for bus (option)	63
7.11.1	Signals assignation for operation commands	63
7.12	Combination fieldbus/standard interface (option)	66
7.13	Monitoring and failure functions	67
7.13.1	Torque monitoring	67
7.13.2	Motor protection (thermal monitoring)	68
7.13.3	Monitoring of the max. number of starts per hour and max. running time per hour	69
7.13.4	Operating time monitoring	71
7.13.5	Reaction monitoring	72
7.13.6	Phase failure monitoring	73
8	**Corrective action**	**74**
8.1	Fault indications and warning indications	74
8.1.1	Status indication S0 - faults and warnings	74
8.1.2	Status indication S1 - faults	75
8.1.3	Status indication S2 - warnings	76
8.1.4	Status indication S3 - causes for not ready remote	77
8.2	Diagnostics	78
8.2.1	Operating data logging	78
8.2.2	Diagnostic indications (D) via the display	80
8.3	Troubleshooting	91
8.3.1	Problems with position feedback/indication E2 (from actuator)	91
8.3.2	Display hardly readable or illegible	91
8.3.3	Actuator does not run	91
8.3.4	Actuator does only operate from local	91
8.3.5	Actuator is not switched off by limit seating in direction CLOSE or OPEN	91
	Index	**92**
	Parameter index and indications on the display	**93**
	Addresses	**94**

1 Safety instructions

1.1 General notes on safety

Standards/directives

AUMA products are designed and manufactured in compliance with recognised standards and directives. This is certified in a declaration of incorporation and a declaration of conformity.
The end user or the contractor of the plant must observe national laws and regulations regarding assembly, electrical connection, and commissioning on site.
This includes in particular the fulfilment of the requirements in standards and directives for potentially explosive areas, such as e.g. EN 60079-17 “Inspection and maintenance of electrical installations in hazardous areas (other than mines) (IEC 60079-17:2002)”.
This includes, in particular the observance of the applicable configuration directives for fieldbus applications.

Safety instructions/ warnings

All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.

Qualification of staff

Assembly, electrical connection, commissioning, operation, and maintenance must be carried out exclusively by suitably qualified personnel authorised by the end user or contractor of the plant.
Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.
Work performed in potentially explosive atmospheres is subject to special regulations which have be observed. The end user or contractor of the plant are responsible for respect and control of these regulations, standards, and laws.

Commissioning

Prior to commissioning, it is important to check that all settings are in compliance with the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation.
The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

Safe operation

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Exclusively operate the device if it is in perfect condition while observing these instructions.
- Immediately inform about any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.

Protective measures

The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal safety equipment for the staff.

Maintenance

Any device modification requires the consent of the manufacturer.

1.2 Range of application

AUMA actuator controls are exclusively designed for the operation of AUMA actuators.

Other applications require explicit (written) confirmation by the manufacturer.

The following applications are not permitted, e.g.:

- motor activation
- pump activation

No liability can be assumed for inappropriate or unintended use.

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

1.3 Warnings and symbols

The following references and symbols are used in these instructions:

NOTICE Potentially hazardous situation. Failure to observe this warning may result in property damage.

Information The term **Information** preceding the text indicates important notes and information.

For assembly, operation, and commissioning, observe the additional safety and warning instructions of the reference documents (page 2).

 Symbol for CLOSED.

 Symbol for OPEN.

 **Via the menu to parameter**
Describes the path within the menu to the parameter. By using the push buttons of the local controls you may quickly find the desired parameter in the display.

 **Description of the parameter settings/indications**
Describes the setting/viewing possibilities of a parameter.

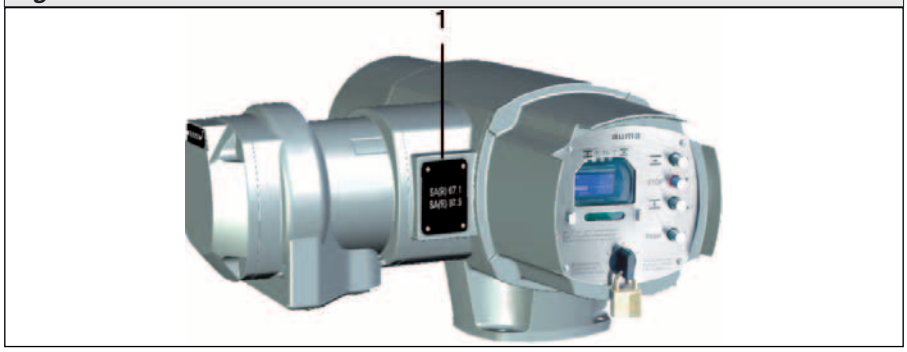
 **Step by step**
Provides a detailed description of each step for setting/viewing the parameter.

2 Identification

2.1 Name plate

Each device is equipped with a name plate (figure 1).

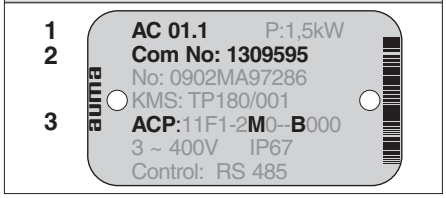
Figure 1



1 Name plate controls

Identification data on the controls' name plate:

Figure 2



1 Type and size of the controls
2 Commission number
3 Wiring diagram/control

Type and size

These instructions apply to the following controls types:
Type: AC = actuator controls AUMATIC
Size: 01.1

Commission number

An order-specific commission number is assigned to each device. You can use this number to download the wiring diagram, inspection records and further information from the Internet **(www.auma.com)**.

Wiring diagram/control

Controlling the actuator controls is performed via a **Foundation Fieldbus interface** , if the 11th position in the ACP wiring diagram contains the letters B or C. Example: ACP 11F1-2M0—**B**000.

The actuator controls are designed for the **Non-Intrusive** version (refer also to page 8), if the 7th position in the ACP wiring diagram contains the figure M, e.g.: ACP 11F1-2**M**0—B000.

2.2 Short description

Actuator controls

The AUMATIC actuator controls is used to operate AUMA actuators and is supplied ready for use.
The controls can be mounted directly to the actuator but also separately on a wall bracket.
The functions of the AUMATIC controls include standard valve control in OPEN - CLOSE duty, positioning, process control, logging of operating data, diagnosis functions right through control via fieldbus.

Local controls/ COM-AC/fieldbus

Operation, setting, and display can be performed on site directly at the controls or alternatively from REMOTE via a fieldbus interface.
On site it is possible to

- operate the actuator via the local controls (push buttons and display) and perform settings (contents of these instructions).
- read in or out data or modify and save settings via the AUMA COM-AC programming software (option), using a computer (laptop or PC). Depending on the version, the connection between computer and AUMATIC can be made with cable (infra-red interface) or without cable (Bluetooth interface)(not included in these instructions).

Intrusive – Non-Intrusive

Intrusive version:

- Limit and torque setting is performed via switches in the actuator.

Non-Intrusive version:

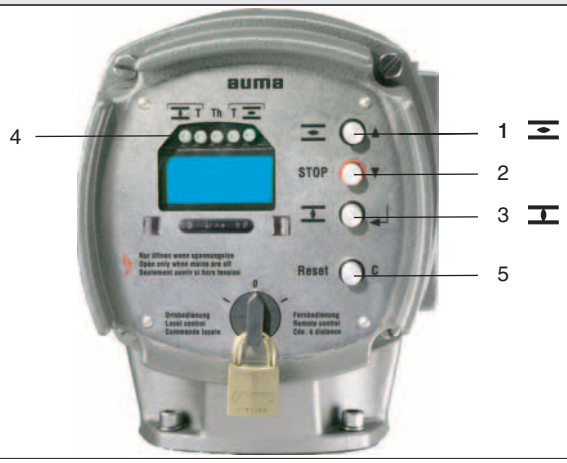
- Limit and torque setting is performed via the controls, actuator and controls housings do not have to be opened.
  For this purpose, the actuator is equipped with an MWG (magnetic limit and torque transmitter), also supplying analogue torque feedback signals/torque indication.

3 Operation

3.1 Local operation

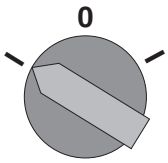
The local operation of the actuator is performed using the push buttons (figure 3).

Figure 3



1	Push button OPEN	4	Push button Reset
2	Push button STOP	5	Selector switch
3	Push button CLOSE	6	Indication lights/LEDs

→ Set selector switch (5) to position **Local control** (LOCAL).



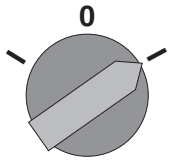
The actuator can now be operated using the push buttons (1 – 3).

1. Run actuator in direction OPEN: Press push button (1).
2. Stop actuator: Press push button (2).
3. Run actuator in direction CLOSE: Press push button (3).

Information The OPEN - CLOSE operation commands can be given either in push-to-run operation or in the self-retaining mode.

3.2 Operation from REMOTE

→ Set selector switch to position **Remote control** (REMOTE).



Now, it is possible to operate the actuator by remote control via operation commands (OPEN, STOP, CLOSE) or via analogue setpoint (e.g. 0 – 20 mA).

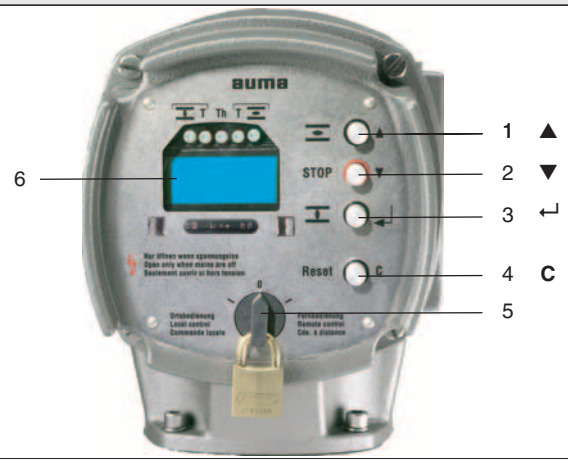
Information

- Use the MODE input (refer to wiring diagram) to select between REMOTE MODE (open-close duty) and SETPOINT MODE (modulating duty).
- The FAILURE MODE and EMERGENCY MODE operation modes are set via parameters.

3.3 Menu navigation via push buttons (for settings and indications)

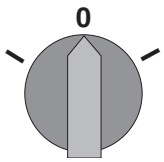
The push buttons of the local controls (figure 4) are used to view, edit, and show various indications on the display.

Figure 4



1 Push button ▲
2 Push button ▼
3 Push button ↵
4 Push button C
5 Selector switch
6 Display

→ Set selector switch (5) to position **0** (OFF).



Now, settings and indications can be performed via the push buttons (1 – 4).

3.3.1 Short overview: functions of the push buttons

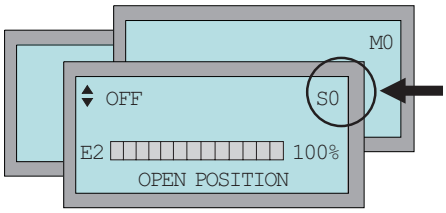
Table 1

Push buttons	Functions
▲ ▼	Scrolling within a group (The triangles ▲▼ in the display show the direction of scrolling.)
	Change values
	Enter figures from 0 to 9
↵	Confirm the selection to go to a new menu/subgroup.
C	Cancel process
	Return to previous display: press briefly
	Change to another group (S, M, D) - press for approx. 3 seconds until group M0 is displayed. - hold down for more than 3 seconds until group D0 is displayed (thereby, group M is skipped).

3.3.2 Structural design and navigation

The indications on the display are divided into 3 groups:
- Group S = status indications
- Group M = menu (settings)
- Group D = diagnostic indications

The active group is displayed on the top right corner of the display.



Change groups

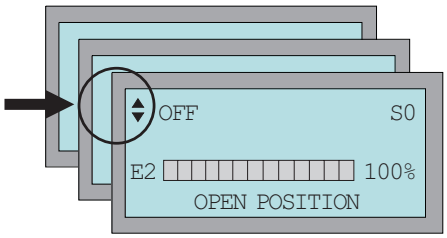
Change from group S to group M:
→ Press C push button and hold it down for approx. 3 seconds until group M0 appears.

Change from group S to group D:
→ Press C push button and hold it down until group D0 appears (group M is hereby skipped).

Change from any group M or D back to group S:
→ Briefly press C.

Scrolling

→ Press ▼▲:
The triangles ▲▼ in the top left corner of the display indicate the possible scrolling direction (within one group) of scrolling.



Enter the password

In the menu (group M), the settings are protected by a password.
To change the parameters, a password must first be entered.
The following default password is set in the factory: 0000.

After selecting EDIT, the following is displayed:

1. Select figures 0 to 9: Press ▼▲.
2. Move to the next position: Press ↵.
3. Repeat steps 1 and 2 for all four digits.
4. To cancel a process: Press C.

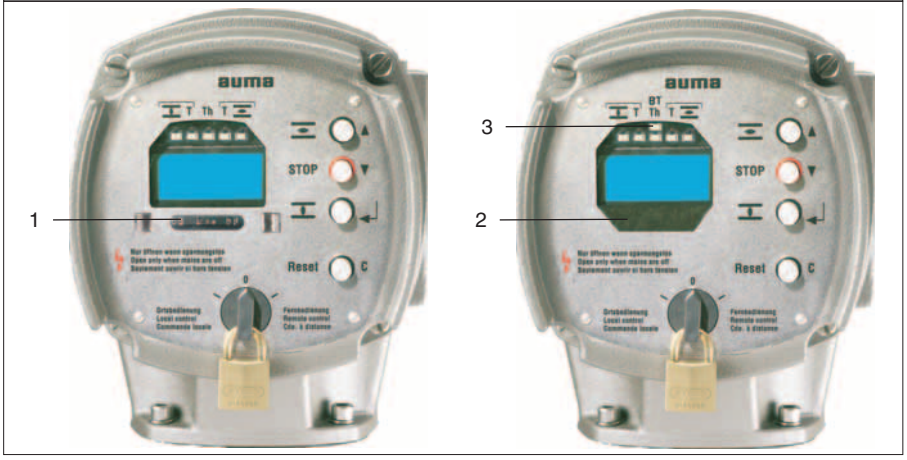
Information

If no input is received over a longer period of time (approx. 10 min), the controls automatically returns to the status indication S0.

3.4 Operation and setting via AUMA COM-AC programming software

Data from the actuator can easily be imported, exported and settings changed and saved using the AUMA COM-AC programming software (option) in combination with a computer.
Depending on the version, the connection between computer and AUMATIC can be performed with cable (infra-red interface) or without cable (Bluetooth interface) (not included in these instructions) .

Figure 5



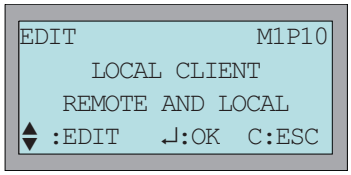
1 Infra-red interface
2 Bluetooth interface (option)
3 Bluetooth LED

3.4.1 Operation setting via COM-AC

The COM-AC software can transmit the operation commands OPEN, STOP, CLOSE to the actuator.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
      COM-AC CONTROL (M1P0)
         LOCAL CLIENT (M1P10)
```



Default value: REMOTE AND LOCAL

Description of the parameter settings:

REMOTE AND LOCAL
The actuator can be operated in selector switch position LOCAL CONTROL or REMOTE CONTROL via the COM-AC with the OPEN, STOP, CLOSE commands.

LOCAL CONTROL ONLY
The actuator can be operated in selector switch position LOCAL CONTROL via the COM-AC with the OPEN, STOP, CLOSE commands.
No operation control is possible in selector switch position REMOTE CONTROL.

3.5 Password change

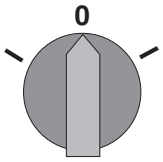
The following default password is set in the factory: 0000.

➡ **Via the menu to parameter:**

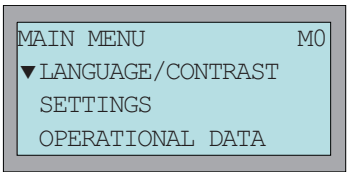
```
MAIN MENU (M0)
    SETTINGS (M1)
        CHANGE PASSWORD (M1D)
```

⇩ **Step by step:**

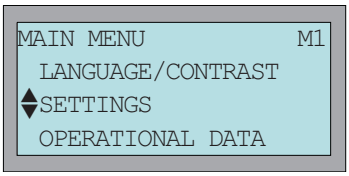
1. Set selector switch to position **0** (OFF).



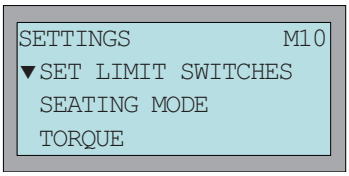
2. Press C and hold down it for approx 3 seconds.
   Display indicates:



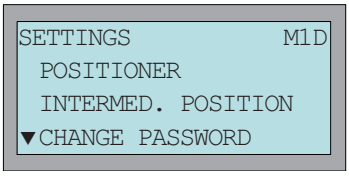
3. Press ▼.
   Display indicates:



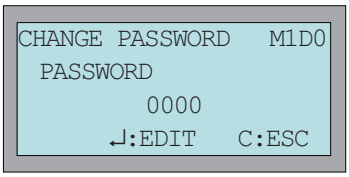
4. Press ↵.
   Display indicates:



5. Select CHANGE PASSWORD (M1D) using ▼.
   Display indicates:



6. Press ↵.
   Display indicates:

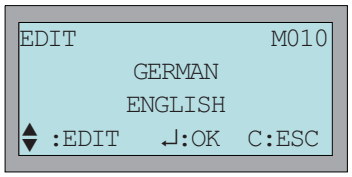


7. Enter password (see page 11).

3.6 Language change in the display

➡ **Via the menu to parameter:**

MAIN MENU (M0)
LANGUAGE/CONTRAS (M00)
LANGUAGE (M010)



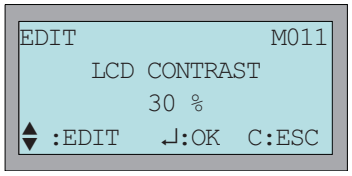
Default value: GERMAN
Setting range: GERMAN, PORTUGUESE, ITALIAN, SPANISH, FRENCH, ENGLISH, TUERKCE, POLSKI, MAGYAR

3.7 LCD contrast setting of the display (applies only to controls with green display)

To improve the legibility of the display under unfavourable lighting conditions, the contrast may be adjusted.
This setting is only possible for green displays. The contrast setting has no effect on the blue display.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
LANGUAGE/CONTRAST M00)
LCD CONTRAST (M011)



Default value: 80 %
Setting range: 0 % to 100 %

Information

Alternatively, the LCD contrast can be set as follows:

1. Press **C** and hold it down.
   The menus S, M, D are skipped.
   After approximately 10 seconds, the LED display will continuously change from bright to dark and vice versa.
2. Release push button
   The current brightness level is saved.

4 Indications

4.1 Status indications in the display

The status indications on the display locally indicate the current operation states in plain text or as bar chart.

Table of contents:

4.1.1 Status indication S0/S6 - operation
4.1.2 Status indication S4 - torque

Further information on this topic:
For status indications regarding faults and warnings, refer to pages 74 et seqq.

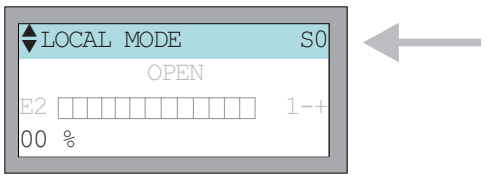
4.1.1 Status indication S0/S6 - operation

Information

For actuators equipped with active process controllers in the logic sub-assembly, status indication S6 is displayed instead of status indication S0 in selector switch position REMOTE. The description below applies to both indications (S0 and S6).

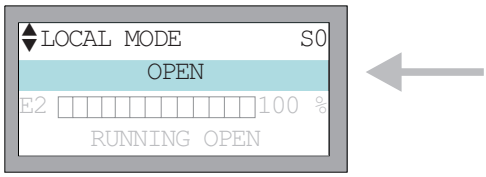
Operation mode display

Line 1 indicates the current operation mode (LOCAL MODE, OFF, SETPOINT MODE, ...)



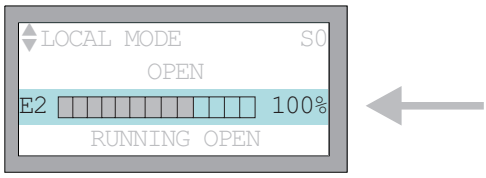
Operation command/ setpoint display

Line 2 indicates currently incoming operation commands (OPEN, STOP, CLOSE) or the setpoint E1 in % of the total travel.



Valve position display

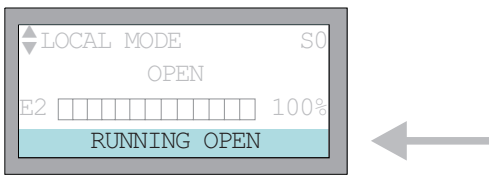
Line 3 indicates the valve position in % of the travel.
This indication is only available if the actuator is equipped with a position transmitter.



0 % = Actuator is in end position CLOSED
100 % = Actuator is in end position OPEN

End position/running indication

Line 4 indicates the current actuator status.



Description of indications in line 4:

RUNNING OPEN
Actuator runs logically OPEN (remains set during operation pauses).

RUNNING CLOSE
Actuator runs logically CLOSE (remains set during operation pauses).

OPEN POSITION
End position OPEN reached.

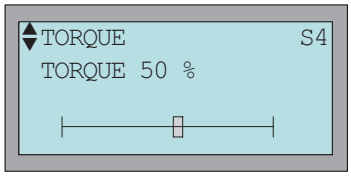
CLOSED POSITION
End position CLOSED reached.

SETPOINT POSITION
Setpoint (modulating actuators only).

Description of the fault signals:
See page 74.

4.1.2 Status indication S4 - torque

This indication is only available if the actuator is equipped with an MWG (magnetic limit and torque transmitter); refer to page 8.
A deflection to the left side indicates torque in direction CLOSE.
A deflection to the right side indicates torque in direction OPEN.



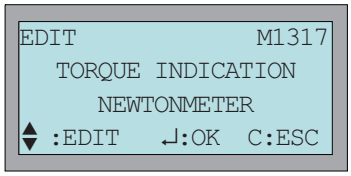
Example: SA 07.5 with 20 – 60 Nm
100 % corresponds to 60 Nm of the nominal torque.
50 % corresponds to 30 Nm of the nominal torque.

4.2 Torque indication: edit

The torque value can be displayed in percent, Newtonmeter (Nm) or in Lbs/ft.

Via the menu to parameter:

```
MAIN MENU (M0)
   SETTINGS (M1)
        LOCAL CONTROLS (M13)
             TORQUE INDICATION (M1317)
```



Default value: NEWTONMETER

Description of the parameter settings:

PERCENT
Indication of the nominal torque in percent

NEWTONMETER
Indication in Nm

LBS.FT.
Indication in Lbs./ft.

4.3 Electronic name plate

The electronic name plate provides information about the order data (important for enquiries in the factory)

Table of contents:

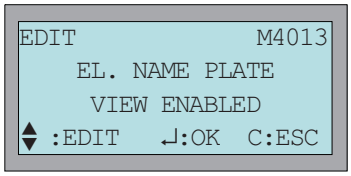
4.3.1 Display indication: enable view
4.3.2 Electronic name plate: view

4.3.1 Display indication: enable view

The EL. NAME PLATE setting must be set to VIEW ENABLED:

Via the menu to parameter:

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SPECIAL FUNCTIONS (M40)
             EL. NAME PLATE (M4013)
```



Default value: VIEW ENABLED

Description of the parameter settings:

VIEW NOT ENABLED
The electronic name plate is not shown in the display.

VIEW ENABLED
The electronic name plate is shown in the display.

4.3.2 Electronic name plate: view

Via the menu to parameter:

```
MAIN MENU (M0)
   EL. NAME PLATE (M3)
        ORDER DATA (M30)
        PRODUCT DATA (M31)
        PROJECT DATA (M32)
        SERVICE DATA (M33)
```

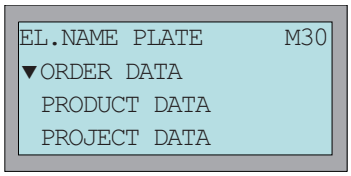


Table 2	
Order data (M30)	
COMMISS NO.AUMATIC	set in the factory
COMMISS NO.ACTUATOR	set in the factory
KKS NO.	set in the factory
VALVE NO.	adjustable
PLANT NO.	adjustable
Product data (M31)	
PRODUCT TYPE	set in the factory
WORKS NO. ACTUATOR	set in the factory
WORKS NO. AUMATIC	set in the factory
LOGIC SFTWR. VER.	software version of the logic, set in the factory
LOGIC HRDWR. VER.	hardware version of the logic, set in the factory
DATE OF FINAL TEST	set in the factory
WIRING DIAGRAM	set in the factory
TERMINAL PLAN	set in the factory

Project and user specific data are freely definable and can be entered by the user:

Table 3	
Project data (M32)	
PROJECT NAME	adjustable (fields for customer input)
CUSTOMER FIELD 1	adjustable (fields for customer input)
CUSTOMER FIELD 2	adjustable (fields for customer input)

Service information such as the AUMA service phone number and the AUMA Internet address can be indicated here:

Table 4	
Service data (M33)	
SERVICE PHONE	set in the factory
INTERNET ADDRESS	www.auma.com, set in the factory
SERVICE TEXT 1	can only be changed by service technician
SERVICE TEXT 2	can only be changed by service technician

4.4 Indication lights/LEDs

The indication lights/LEDs locally display the different operation states as optical signal. The assignment of signals is freely selectable.

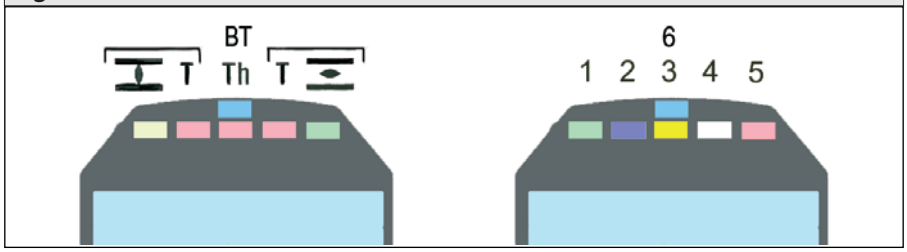
Table of contents:

4.4.1 Standard indication
4.4.2 Configuration of the signals: view/edit
4.4.3 Blinking behaviour of indication lights/LEDs: view/edit

4.4.1 Standard indication

Figure 6 shows the indication lights/LEDs on the local controls:

Figure 6



Version (standard): LED marking with letters

Version (option): LED marking with figures

Table 5 describes the standard indication.

Table 5

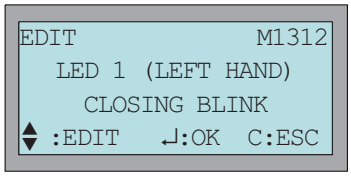
LED 1 (left) (symbol)	illuminated	Actuator is in end position CLOSED
	blinking	Running indication: Actuator runs in direction CLOSE
LED 2 (T)	illuminated	Torque fault CLOSE
LED 3 (Th)	illuminated	Motor protection tripped
LED 4 (T)	illuminated	Torque fault OPEN
LED 5 (right) (symbol)	illuminated	Actuator is in end position OPEN
	blinking	Running indication: Actuator runs in direction OPEN
LED 6 (BT) (option)	illuminated	Bluetooth connection available

Information The behaviour (blinking/illuminated) can be changed via the `BLINKER` parameter.

4.4.2 Configuration of the signals: view/edit

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    SETTINGS (M1)
        LOCAL CONTROLS (M13)
            LED 1 (LEFT HAND) (M1312)
            LED 2 (M1313)
            LED 3 (M1314)
            LED 4 (M1315)
            LED 1 (RIGHT HAND) (M1316)
```



Default values:

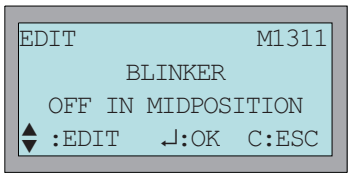
```
LED 1 (LEFT HAND) = CLOSING BLINK
LED 2 =             TORQUE FAULT (CLOSE)
LED 3 =             THERMO FAULT
LED 4 =             TORQUE FAULT (OPEN)
LED 5 (RIGHT HAND)= OPENING BLINK
```

Information Table 8, page 23 describes the signals which can be assigned to the LEDs. Table 8 applies to both the LEDs and the output contacts.

4.4.3 Blinking behaviour of indication lights/LEDs: view/edit

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    SETTINGS (M1)
        LOCAL CONTROLS (M13)
            BLINKER (M1311)
```



Default value: OFF IN MIDPOSITION

⬇ **Description of the parameter settings:**

OFF

Blinker is switched off.

LIT IN MIDPOSITION

Table 6		
LED 1 only (yellow)	illuminated	Actuator is in end position CLOSED
LED 1 (yellow)	blinking	Actuator runs in direction CLOSE (running indication)
LED 5 only (green)	illuminated	Actuator is in end position OPEN
LED 5 (green)	blinking	Actuator runs in direction OPEN (running indication)

OFF IN MIDPOSITION

Table 7		
LED 1 (yellow)	illuminated	Actuator is in end position CLOSED
	blinking	Actuator runs in direction CLOSE (running indication)
LED 5 (green)	illuminated	Actuator is in end position OPEN
	blinking	Actuator runs in direction OPEN (running indication)

Information The BLINKER parameter also influences the blinking behaviour of output contacts 1 to 5 if they are used as a running indication.

5 Signals

5.1 Signals via fieldbus

Feedback signals via Foundation Fieldbus can be configured.
The configuration is only defined via the transducer blocks and/or the function blocks.

Information

The DD (Device Description) can be downloaded from the Internet: www.auma.com

Please refer to the “Manual (Device integration Fieldbus) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus” regarding the feedback signals via Foundation Fieldbus and the parameter configuration via the fieldbus interface.

Table of contents:

5.1.1 Configuration of adjustable (user-definable) signals: view
5.1.2 Configuration of fault signals: view

5.1.1 Configuration of adjustable (user-definable) signals

The AUMATIC contains 3 function blocks (DIFB) allowing the user to configure 8 signals each out of the predefined set of signals. Configuration is exclusively defined via a Foundation Fieldbus configuration software. For further information, please refer to “Manual (Device integration Fieldbus) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus”.

5.2 Feedback via output contacts (binary) - (option)

These feedback signals are only available if a parallel interface is available in addition to the fieldbus interface (refer to page 66).
The output contacts can be used to indicate operation modes of the actuator or the controls as binary signals. The signals can be freely assigned. Example:
Output contact open = no thermal fault
Output contact closed = thermal fault in actuator
The output contacts are denominated in the wiring diagram as follows:

- Output contacts 1 to 5: DOUT1 to DOUT5
- Alarm contacts: NC fault/NO ready

Table of contents:

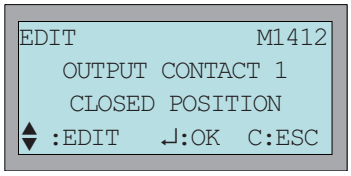
5.2.1 Configuration for output contacts 1 to 5: view/edit
5.2.2 Configuration for alarm contacts (collective fault signal): view/edit
5.2.3 Output contacts 1 to 5: use as running indication (blinker)

5.2.1 Configuration for output contacts 1 to 5: view/edit

Information Fault signals can be issued via the ALARM CONTACT parameter, other signals via the output contacts 1 to 5.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        I/O 1 (M14)
             OUTPUT CONTACT 1 (M1412)
             OUTPUT CONTACT 2 (M1413)
             OUTPUT CONTACT 3 (M1414)
             OUTPUT CONTACT 4 (M1415)
             OUTPUT CONTACT 5 (M1412)
```



Default values:
OUTPUT CONTACT 1 = END POSITION OPEN
OUTPUT CONTACT 2 = END POSITION CLOSED
OUTPUT CONTACT 3 = SELECTOR SWITCH REMOTE
OUTPUT CONTACT 4 = TSC FAULTS
OUTPUT CONTACT 5 = TSO FAULTS

Table 8 shows the signal descriptions for the LEDs and the output contacts:

Table 8

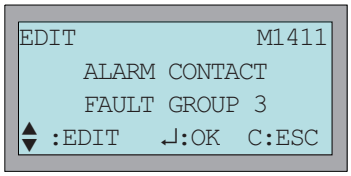
Signal	Description
NOT USED	No signals
CLOSED POSITION	Signals LSC (WSR) or LSC (WSR) and TSC (DSR) (depending on type of seating)
OPEN POSITION	Signals LSO (WOEL) or LSO (WOEL) and TSO (DOEL) (depending to type of seating)
RUNNING CLOSE	Actuator runs logically CLOSE
RUNNING OPEN	Actuator runs logically OPEN

Signal	Description
ACTUATOR MOVING	Actuator is running from LOCAL, REMOTE, or in manual operation (without position transmitter, only LOCAL or REMOTE operation are indicated).
LSC (WSR)	Limit switch CLOSE operated
LSO (WOEL)	Limit switch OPEN operated
TSC (DSR)	Torque switch CLOSE operated
TSO (DOEL)	Torque switch OPEN operated
THERMO FAULT	Motor protection has tripped (reset may be necessary)
TORQUE FAULT (CLOSE)	Torque fault in direction CLOSE occurred
TORQUE FAULT (OPEN)	Torque fault in direction OPEN occurred
TORQUE FAULT (GEN.)	Torque fault CLOSE or OPEN (combined signal)
SETPOINT E1 LOSS	Nominal value signal is by 0.3 mA lower than the lowest set value
FEEDBACK E2 LOSS	Actual position signal is by 0.3 mA lower than the lowest set value
SPEED E3 LOSS	not available
TORQUE E6 LOSS	Torque signal is by 0.3 mA lower than the lowest set value
WARNING OPER.TIME	The programmed max. operating time for an OPEN - CLOSE operation has been exceeded
WARNING STARTS/RUN	The max. number of starts/h or max. running time/h has been exceeded.
LOCAL SW. POSITION	Selector switch in position LOCAL
REMOTE SW. POSITION	Selector switch in position REMOTE
OFF SW. POSITION	Selector switch in position OFF
REMOTE MODE	Operation mode REMOTE active
SETPOINT MODE	Operation mode SETPOINT MODE
INTERMED. POS. 1	Signalisation of the intermediate positions 1 to 4. Signal behaviour according to POS.1 CONTROL to POS.4 CONTROL parameters
INTERMED. POS. 2	
INTERMED. POS. 3	
INTERMED. POS. 4	
STEPPING MODE	Programmed stepping range (START STEP STOP STEP parameters) has been entered
CLOSING BLINK	Signal is blinking for operation in direction CLOSE. Signal is active in end position CLOSED.
OPENING BLINK	Signal is blinking for operation in direction OPEN. Signal is active in end position OPEN.
FAULT IND.	Collective signal includes: internal fault, torque fault, phase loss, thermal fault, and internal fault (refer to status indications on page 75)
WARNING IND.	Collective signal includes: operation time warning, warning starts/run, no reference operation, internal warnings, and signal losses (refer to status indications on page 75)
NOT READY IND.	Collective signal includes: remote ready selector switch not REMOTE, incorrect operation command, emergency operation (refer to status indications on page 76)
SETPOINT REACHED	Actuator is in nominal position
LOSS OF PHASE	One phase is missing
I/O1 ANALOG IN2 LOSS	Signal loss of the parallel interface analogue input 2
I/O1 ANALOG IN1 LOSS	Signal loss of the parallel interface analogue input 1

5.2.2 Configuration alarm contacts (collective fault signal): view/edit

Via the menu to parameter:

```
MAIN MENU (M0)
    SETTINGS (M1)
        I/O 1 (M14)
            ALARM CONTACT (M1411)
```



Default value: FAULT GROUP 3

Information Faults interrupt or prevent the electrical operation of the actuator.

Description of the parameter settings:
Table 9 shows the value selection available for the fault signals:

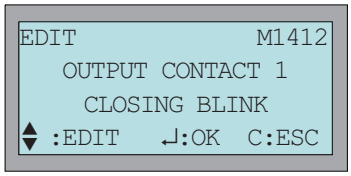
Table 9

Value	Signals (collective fault signal)
FAULT GROUP 1	– FAULT IND. – NOT READY IND.
FAULT GROUP 2	– FAULT IND. without torque fault – NOT READY IND.
FAULT GROUP 3	– FAULT IND.
FAULT GROUP 4	– FAULT IND. without torque fault
FAULT GROUP 5	– FAULT IND. – NOT READY IND. – WARNING IND.
FAULT GROUP 6	– FAULT IND. without thermal fault – NOT READY IND.
FAULT GROUP 7	– FAULT IND. without both torque and thermal faults – NOT READY IND.
FAULT GROUP 8	– FAULT IND. without thermal fault
FAULT GROUP 9	– FAULT IND. without both torque and thermal faults
FAULT GROUP 10	– FAULT without thermal fault – NOT READY IND. – WARNING IND.

5.2.3 Output contacts 1 to 5: use as running indication (blinker)

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        I/O 1 (M14)
             OUTPUT CONTACT 1 (M1412)
             OUTPUT CONTACT 2 (M1413)
             OUTPUT CONTACT 3 (M1414)
             OUTPUT CONTACT 4 (M1415)
             OUTPUT CONTACT 5 (M1416)
```



⬇ **Description of the parameter settings:**

CLOSING BLINK
Signal is active in end position CLOSED.
Signal is blinking for operation in direction CLOSE (depending on the BLINKER parameter).

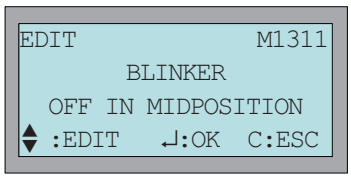
OPENING BLINK
Signal is active in end position OPEN.
Signal is blinking for operation in direction OPEN (depending on the BLINKER parameter).

Information The output contacts/LEDs of the local controls (page 19) can also be used to indicate whether the actuator is operated and if yes, in which direction.

Signal behaviour for BLINKER setting

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        LOCAL CONTROLS (M13)
             BLINKER (M1311)
```



Default value: OFF IN MIDPOSITION

⬇ **Description of the parameter settings:**

OFF
Signal is active in end position.
Blinker (running indication) is switched off.

LIT IN MIDPOSITION
Signal is active in end position and blinking during operation in direction of the end position. The signal remains active in intermediate position.

OFF IN MIDPOSITION
Signal is active in end position and blinking during operation in direction of the end position. The signal is off in intermediate position.

Information The BLINKER parameter also influences the blinking behaviour of the indication lights/LEDs on the local controls.

5.3 Feedback signals (analogue) - (option)

These feedback signals are only available if a parallel interface is available in addition to the fieldbus interface (refer to page 66).
Depending on the actuator equipment, different signals can be recorded and issued as continuous values, e.g. 4 to 20 mA.

Table of contents:

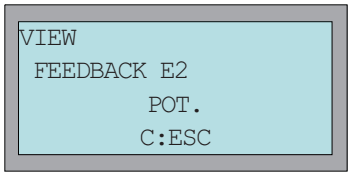
5.3.1	Position transmitter/actual position source (E2): view
5.3.2	Source of the torque signal E6: view
5.3.3	Feedback signals via analogue output 1: view
5.3.4	Signal range at the analogue output 1: view/edit
5.3.5	Feedback signals via analogue output 2: view
5.3.6	Signal range at the analogue output 2: view/edit

5.3.1 Position transmitter/actual position source (E2): view

The valve position can be transmitted as a continuous signal by various position transmitters: The type of position transmitter/actual position source (E2) installed in the actuator is indicated here.
This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SETUP (M41)
             FEEDBACK E2 (M4101)
```



Default value: POTENTIOMETER (for Non-Intrusive: MWG)

The following actual position sources (E2) are available:

⬇ **Description of the parameter settings:**

NONE
There is no position transmitter available in the actuator.

POT.
There is a potentiometer installed in the actuator.

0-20mA
There is an RWG installed in the actuator. The position feedback signal amounts to 0 – 20 mA.

4-20mA
There is an RWG installed in the actuator. The position feedback signal amounts to 4 – 20 mA.

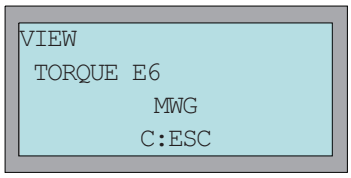
MWG
There is an MWG (magnetic limit and torque transmitter) installed in the actuator.

5.3.2 Source of the torque signal E6: view

This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SETUP (M41)
            TORQUE E6 (M4103)
```



Default value: depending on actuator

⬇ **Description of the parameter settings:**

NONE
There is no electronic torque monitoring available.

LOGIC ANALOG IN1
The torque signal is transmitted from an external sensor via the logic board to the analogue input 1.

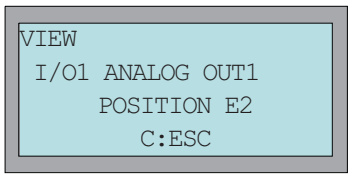
MWG
The torque signal is generated using the MWG installed in the actuator.

5.3.3 Feedback signals (configuration) via analogue output 1: view

Configuration of analogue output 1 (of the I/O).
Designation in the wiring diagram: ANOUT1.
This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SETUP (M41)
            I/O1 ANALOG OUT1 (M410A)
```



Default value: POSITION E2

⬇ **Description of the parameter settings:**

NOT USED
Analogue output 1 not used.

FEEDBACK E2:
Position feedback (analogue output 1 assigned to actual position signal).

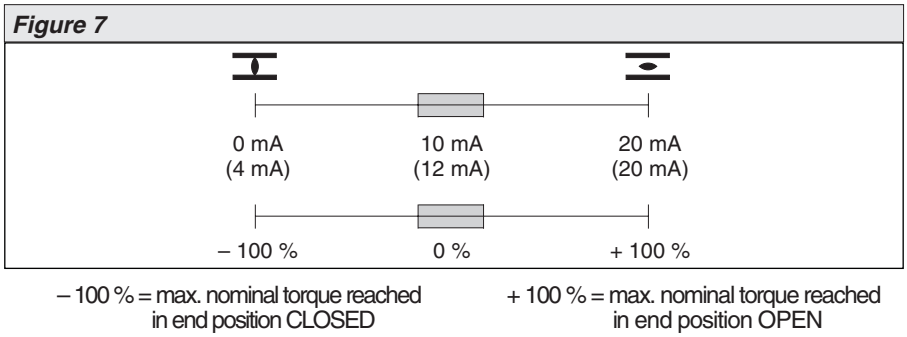
If the actuator is equipped with a position transmitter (potentiometer, RWG or MWG), an analogue position feedback (galvanically isolated) is available as a 0/4 – 20 mA signal at the electrical connection (see wiring diagram). An adjustment to the end positions or the defined travel is not required. An automatic adjustment is done via the end positions (LSC (WSR) and LSO (WOEL)).

For torque seating, the end positions OPEN and CLOSED of the limit switching should be set as close as possible to the end positions of the valve to minimise the deviation of the feedback.

TORQUE E6

Analogue torque feedback signal (analogue output 1 assigned to torque signal). If a magnetic limit and torque transmitter (MWG) is installed, an analogue torque feedback (galvanically isolated) is available as a 0/4 – 20 mA signal at the electrical connection (refer to wiring diagram). The zero point is in the centre of the selected output range (at 10 mA or 12 mA). The torque in direction CLOSE is indicated with 0 – 10 mA or 4 – 12 mA, the torque in direction OPEN with 10 – 20 mA or 12 – 20 mA. For 100 % of the nominal output torque, 0 or 4 mA is indicated in direction CLOSE, and 20 mA is indicated in direction OPEN.

Figure 7

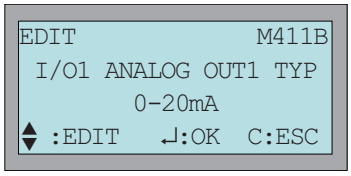


5.3.4 Signal range at the analogue output 1: view/edit

Signal range at the analogue output 1 (of the I/O).
This value must correspond to the desired feedback signal.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SETUP (M41)
             I/O1 ANALOG OUT1 TYPE (M411B)
```



Default value: 0-20mA

⬇ **Description of the parameter settings:**

0-20mA
Analogue output 1 generates a 0 – 20 mA signal.

4-20mA
Analogue output 1 generates a 4 – 20 mA signal.

20-0mA
Analogue output 1 generates a 20 – 0 mA signal.

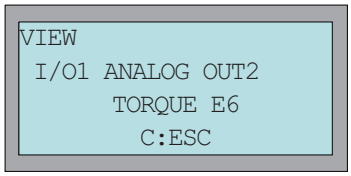
20-4mA
Analogue output 1 generates a 20 – 4 mA signal.

5.3.5 Feedback signals (configuration) via analogue output 2: view

Configuration of analogue output 2 (of the I/O).
Designation in the wiring diagram: ANOUT2.
This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SETUP (M41)
             I/O1 ANALOG OUT2 (M410C)
```



Default value: TORQUE E6

⬇ **Description of the parameter settings:**

NOT USED
Analogue output 2 not used.

FEEDBACK E2:
Position feedback (analogue output 2 assigned to actual position signal). Description see analogue output 1.

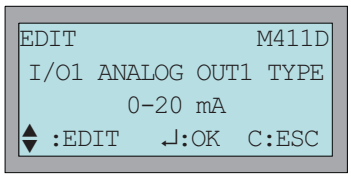
TORQUE E6
Analogue torque feedback signal (analogue output 2 assigned to torque signal). Description see analogue output 1.

5.3.6 Signal range at the analogue output 2: view/edit

Signal range at the analogue output 2 (of the I/O).
This value must correspond to the desired feedback signal.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SETUP (M41)
             I/O1 ANALOG OUT2 TYPE (M411D)
```



Default value: 0-20mA

⬇ **Description of the parameter settings:**

0-20mA
Analogue output 2 generates a 0 – 20 mA signal.

4-20mA
Analogue output 2 generates a 4 – 20 mA signal.

20-0mA
Analogue output 2 generates a 20 – 0 mA signal.

20-4mA
Analogue output 2 generates a 20 – 4 mA signal.

6 Operation mode

Different operation modes (operation types) are available:
The current operation mode is indicated in the first line of the display:

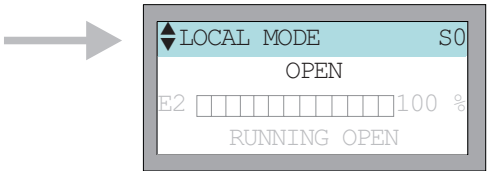


Table of contents and short description of the operation modes (operation types):

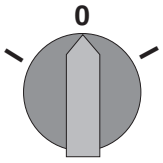
6.1	Operation mode **OFF** No local control, no remote control possible.
6.2	Operation mode **LOCAL** Control via push buttons OPEN, STOP, CLOSE at the local controls.
6.3	Operation mode **REMOTE** Control by commands OPEN-STOP-CLOSE from remote control room or process control system.
6.4	Operation mode **EMERGENCY** Control by command EMERGENCY from control room or process control system.
6.5	Operation mode **FAILURE** Actuator behaviour on loss of signal.

Further information in other clauses:

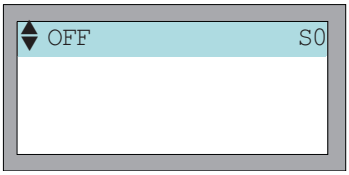
7.6	Positioner (operation mode **SETPOINT MODE**) Control via analogue setpoint, e.g. 0 - 20 mA.
7.8	Operation mode **RESTRICTED** Operation via the local controls of the AUMATIC is disabled.
7.9	Operation mode **EMERGENCY STOP** In combination with the EMERGENCY STOP button.

6.1 Operation mode OFF

→ Set selector switch to position **0** (OFF).



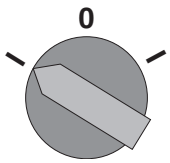
Display indicates:



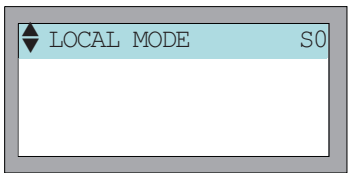
- No local control possible.
- No remote control possible.
- No EMERGENCY operation possible.
- The controls remain fully operative as far as signalling is concerned (controls' power supply is maintained).
- The ▲, ▼, ↵ , C push buttons can be used to set parameters and indications via the display.

6.2 Operation mode LOCAL

→ Set selector switch to position **Local control** (LOCAL).



Display indicates:

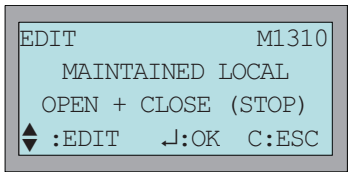


- The actuator can be controlled via OPEN - STOP - CLOSE push buttons of the local controls.
- Faults and warnings without automatic reset can be confirmed with the **Reset** push button.

6.2.1 Push-to-run operation or self-retaining: set for the operation mode LOCAL

Via the menu to parameter:

```
MAIN MENU (M0)
   SETTINGS (M1)
      LOCAL CONTROLS (M13)
         MAINTAINED LOCAL (M1310)
```



Default value: `OPEN + CLOSE (STOP)`

Description of the parameter settings:

OFF
Push-to-run operation off, self-retaining activated:
Actuator runs in direction OPEN or CLOSE after an operation command has been issued. If the operation command is removed, the actuator continues to run (self-retaining) until it is stopped by the STOP command or an end position or intermediate position has been reached.

OPEN
Push-to-run operation in direction OPEN activated:
Actuator only runs in direction OPEN while an operation command is issued. If the operation command is removed, the actuator stops.

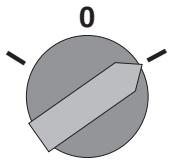
CLOSE
Push-to-run operation in direction CLOSE activated:
Actuator only runs in direction CLOSE while an operation command is issued. If the operation command is removed, the actuator stops.

OPEN + CLOSE (STOP)
Push-to-run operation in direction OPEN and CLOSE activated:
Actuator only runs in direction OPEN or CLOSE while an operation command is issued. If the operation command is removed, the actuator stops.

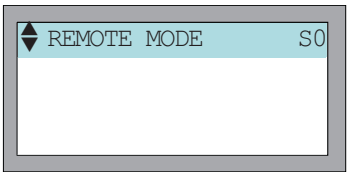
OPEN+CLOSE (NO STOP)
Self-retaining without STOP:
A direct reversal of the direction of rotation without STOP command is possible.

6.3 Operation mode REMOTE

→ Set selector switch to position **Remote control** (REMOTE).



Display indicates:



The actuator is controlled by external REMOTE commands OPEN - STOP - CLOSE.

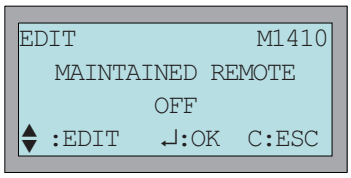
Information If SETPOINT MODE is displayed, a positioner (option) is available. In this case, selection can be made between REMOTE MODE and SETPOINT MODE (refer to page 53).

6.3.1 Push-to-run operation or self-retaining: set for operation mode REMOTE

The parameter has no influence on the operation commands transmitted via fieldbus.
Setting is only required if a further parallel interface is available in addition to the fieldbus interface (refer to page 66).

Via the menu to parameter:

```
MAIN MENU (M0)
   SETTINGS (M1)
       I/O 1 (M14)
            MAINTAINED REMOTE (M1410)
```



Default value: OFF

Description of the parameter settings:

OFF
Push-to-run operation off, self-retaining activated:
Actuator runs in direction OPEN or CLOSE after an operation command has been issued. If the operation command is removed, the actuator continues to run (self-retaining) until it is stopped by the STOP command or an end position or intermediate position has been reached.

OPEN
Push-to-run operation in direction OPEN activated:
Actuator only runs in direction OPEN while an operation command is issued. If the operation command is removed, the actuator stops.

CLOSE
Push-to-run operation in direction CLOSE activated:
Actuator only runs in direction CLOSE while an operation command is issued. If the operation command is removed, the actuator stops.

OPEN + CLOSE (STOP)
Push-to-run operation in direction OPEN and CLOSE activated:

Actuator only runs in direction OPEN or CLOSE while an operation command is issued. If the operation command is removed, the actuator stops.

OPEN+CLOSE (NO STOP)
Self-retaining without STOP:
A direct reversal of the direction of rotation without STOP command is possible.

6.4 Operation mode EMERGENCY

In an emergency, the actuator can be brought to a programmed EMERGENCY position by removing the EMERGENCY signal.
As the EMERGENCY signal works active low, 24 V DC must be present at the EMERGENCY input while in the normal state (refer to wiring diagram).
An EMERGENCY operation is performed when the signal is interrupted (0 V). During EMERGENCY operation the actuator does not perform any operation commands.
After initiating an EMERGENCY operation (the EMERGENCY input is again supplied with 24 V DC), the operation commands must be deleted and have to be reapplied. This does not apply to operation commands being transferred via the 0/4 – 20 mA input or via fieldbus telegrams. They will immediately be executed again.

Information

For actuators equipped with a fieldbus interface, the EMERGENCY operation behaviour is only available if an I/O interface (fieldbus standard combination, page 66) or additional control inputs (page 63) are available.

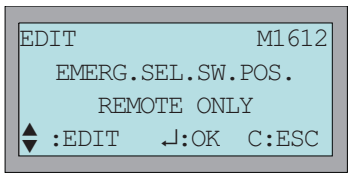
Table of contents:

6.4.1 Operation mode (type of duty) activation for an EMERGENCY operation
6.4.2 EMERGENCY operation: switch on or off/signal behaviour definition
6.4.3 Actuator behaviour definition in case of an emergency operation
6.4.4 EMERGENCY position definition
6.4.5 Motor protection and/or torque switching by-pass

6.4.1 Operation mode (type of duty) activation for an emergency operation

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        EMERGENCY BEHAVIOUR (M16)
             EMERG.SEL.SW.POS. (M1612)
```



Default value: REMOTE ONLY

Description of the parameter settings:

REMOTE ONLY
Emergency operation only possible in selector switch position REMOTE

REMOTE AND LOCAL
Emergency operation possible in selector switch position REMOTE and LOCAL

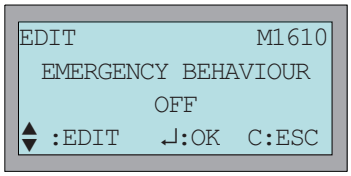
Information

- The operation mode EMERGENCY has the highest priority.
- No emergency operation is performed when the selector switch is in position OFF.

6.4.2 EMERGENCY operation: switch on or off/signal behaviour definition

Via the menu to parameter:

```
MAIN MENU (M0)
    SETTINGS (M1)
        EMERGENCY BEHAVIOUR (M16)
            EMERGENCY BEHAVIOUR (M1610)
```



Default value: OFF

Description of the parameter settings:

OFF
Emergency operation is switched off.

GOOD SIGNAL FIRST
An EMERGENCY operation is only triggered when the EMERGENCY signal at the EMERGENCY input drops from 24 V to 0 V, i.e. provided that a 24 V signal was previously connected to the EMERGENCY input.

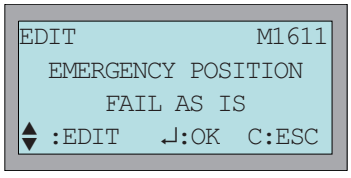
ACTIVE IMMEDIATE
An EMERGENCY operation is only initiated if 0 V are connected to the EMERGENCY signal input.

Information For ACTIVE IMMEDIATE, an EMERGENCY operation is initiated immediately after the actuator is switched on, when 0 V are connected to the EMERGENCY signal input.

6.4.3 Actuator behaviour definition in case of an emergency operation

Via the menu to parameter:

```
MAIN MENU (M0)
    SETTINGS (M1)
        EMERGENCY BEHAVIOUR (M16)
            EMERGENCY POSITION (M1611)
```



Default value: FAIL AS IS

Description of the parameter settings:

FAIL AS IS
The actuator stops in the current position.

FAIL CLOSE
The actuator runs to end position CLOSED.

FAIL OPEN
The actuator runs to end position OPEN.

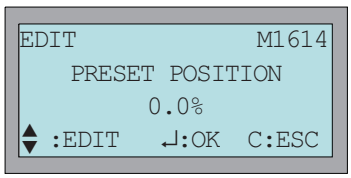
FAIL TO PRESET
The actuator runs to the predetermined position.

6.4.4 EMERGENCY position definition

If the EMERGENCY operation action FAIL TO PRESET (EMERGENCY POSITION parameter) is set, the actuator runs to the EMERGENCY position stated here.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
EMERGENCY BEHAVIOUR (M16)
PRESET POSITION (M1614)



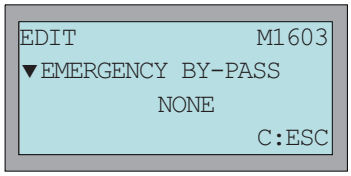
Default value: 0.0 %
Setting range: from 0.0 % to 100.0 % (from OPEN to CLOSED)

6.4.5 Motor protection and/or torque switching: by-pass

During the EMERGENCY operation, the motor protection and/or torque switching can be by-passed.
This value is set in the factory and can only be changed by the authorised AUMA staff.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
EMERGENCY BEHAVIOUR (M16)
EMERGENCY BY-PASS (M1603)



Default value: NONE

⬇ **Description of the parameter settings:**

NONE
No by-pass of motor protection

THERMAL
The signals of the thermoswitches or the PTC thermistors of the motor winding are by-passed.

TORQUE
The signals of the torque switching in the actuator (TSC (DSR)/TSO (DOEL)) are by-passed

THERMAL AND TORQUE
The signals of the thermoswitches or PTC thermistors and the signals of the torque switching are by-passed.

Information For actuators with explosion protection, the motor protection and the torque switching cannot be by-passed.

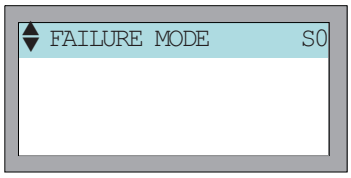
6.5 Fault State behaviour in case of bus communication loss

The fault state behaviour of the Foundation Fieldbus function blocks (AOFB or DOFB) have to be configured to activate the failure behaviour in case of Foundation Fieldbus communication loss.
The fault state behaviour is configured via Foundation Fieldbus by means of a configuration software.
For further information, please refer to “Manual (Device integration Fieldbus) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus”.

6.6 Failure behaviour in case of analogue signal loss (option)

The operation mode FAILURE enables an initiation of failure operations in case of signal loss of an analogue 4 – 20 mA setpoint signal.

If the FAILURE mode is enabled, the display indicates:

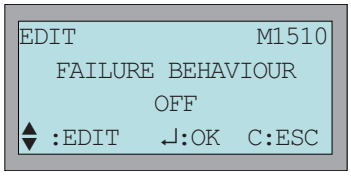


Conditions:
- in addition to the Foundation Fieldbus interface, the AUMATIC is equipped with a further parallel interface (refer to page 66).
- the AUMATIC is equipped with additional control inputs (refer to page 63).

Failure behaviour: switch on or off

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
       FAILURE BEHAVIOUR (M15)
            FAILURE BEHAVIOUR (M1510)
```



Default value: OFF

Description of the parameter settings:

OFF
Failure behaviour is switched off.

GOOD SIGNAL FIRST
A failure operation is only initiated when no wire break is recognised after switching on, but wire break is recognised later through loss of signal. With this setting, it is ensured that the actuator does not perform a preset failure action (failure position) when switched on without signal E1 connected.

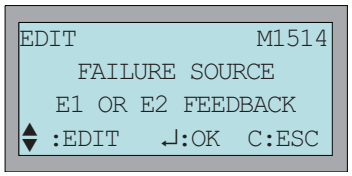
FAIL IMMEDIATE
A failure operation is initiated in case of cable break.

Information If FAIL IMMEDIATE is switched on, a failure operation is initiated immediately after the actuator is switched on if a loss of signal has occurred.

Source for initiation (failure source): set for failure operation

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
FAILURE BEHAVIOUR (M15)
FAILURE SOURCE (M1514)



Default value: SETPOINT E1

Information Recommended setting: SETPOINT E1

Description of the parameter settings:

SETPOINT E1
Failure behaviour is initiated if setpoint E1 fails.
The monitoring depends on the preset setpoint range, e.g.:
E1 = 4 – 20 mA, E1 lower than 3,7 mA = loss of signal
E1 = 10 – 20 mA, E1 lower than 9.7 mA = loss of signal
Monitoring of E1 = 0 – 20 mA is not possible

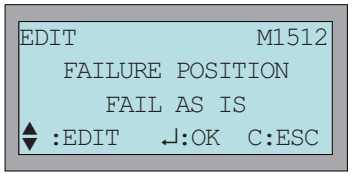
E1 OR E2 FEEDBACK
Failure behaviour is initiated if setpoint E1 or feedback E2 fail.
The following is monitored:
- for actuators with potentiometer: Cable break is detected
- for electronic position transmitter RWG 4 – 20 mA in actuator: E2 lower than 3.7 mA = signal loss
- for MWG in actuator: Communication faults and MWG internal faults are recognised

E1, E2 OR E4 FEEDBACK
Failure behaviour is initiated if setpoint E1, feedback E2, or process variable E4 fail.

Actuator reaction (failure position): setting on loss of signal

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
FAILURE BEHAVIOUR (M15)
FAILURE POSITION (M1512)



Standard value: FAIL AS IS

Description of the parameter settings:

FAIL AS IS
The actuator stops in the current position.

FAIL CLOSE
The actuator runs to end position CLOSED.

FAIL OPEN
The actuator runs to end position OPEN

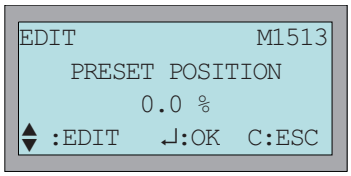
FAIL TO PRESET
The actuator runs to a predetermined position.

Preset position definition

If the FAIL TO PRESET failure action (FAILURE POSITION parameter) is set, the actuator runs to the preset position stated here.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        FAILURE BEHAVIOUR (M15)
             PRESET POSITION (M1513)
```



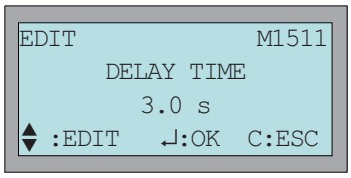
Standard value: 0.0 %
Setting range: from 0.0 % to 100.0 % (from OPEN to CLOSED)

Failure delay time setting

Determines the time elapsed between the recognition of a cable break and the initiation of the failure action.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        FAILURE BEHAVIOUR (M15)
             DELAY TIME (M1511)
```



Default value: 3.0 s
Setting range: 0.0 to 1200.0 seconds (20 minutes)

7 Functions

7.1 Type of seating: check/edit end positions

NOTICE

Valve damage due to incorrect setting!

→ The torque must suit the valve.
→ Only change the setting with the consent of the valve manufacturer.

Limit seating

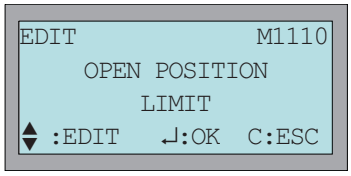
The limit switching is set in such a way that the actuator switches off at the desired switching points. The torque switching acts as an overload protection for the valve.

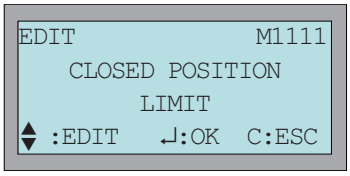
Torque seating

The torque switching is set to the desired tripping torque. After reaching the tripping torque the actuator is turned off.
The limit seating needs to be set in such a way that the limit switching is tripped shortly before reaching the set tripping torque. If this is not the case, one of the following fault signals is displayed: `TSO FAULTS` or `TSC FAULTS` (menu `S1`).

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    SETTINGS (M1)
        SEATING MODE (M11)
            OPEN POSITION (M1110)
            CLOSED POSITION (M1111)
```





Default value: `LIMIT`

7.2 Torque switching: check/set

This setting is only possible for the non-intrusive version.
For further information refer to page 8.

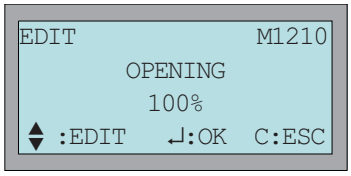
NOTICE

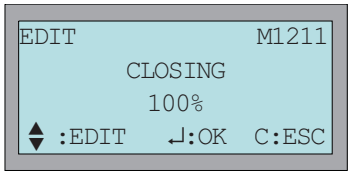
Valve damage due to incorrect setting!

→ The torque must suit the valve.
→ Only change the setting with the consent of the valve manufacturer.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
       TORQUE (M12)
            OPENING (M1210)
            CLOSING (M1211)
```





Default value: according to order data
Setting range: according to torque setting range
refer to actuator name plate

Information

The value can be displayed in percent, Newtonmeter (Nm), or in Lbs/ft.
To change the display unit, refer to page 16.
To display in percent:
100 % equals the max. torque indicated on the name plate of the actuator.
Example: SA 07.5 with 20 – 60 Nm: 100 % = 60 Nm
33 % = 20 Nm

Information

The following fault signals are sent if torque setting performed has been reached ***in mid-travel***:

- Status indication S0: operation mode OFF/LOCAL = FLT + NR
- Status indication S0/S6: operation mode REMOTE = FAULT IND.
- Status indication S1: TORQUE FAULT (OPEN) or TORQUE FAULT (CLOSE) (torque fault)
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Torque fault OPEN, 0x00000001 or Torque fault CLOSE, 0x00000002), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

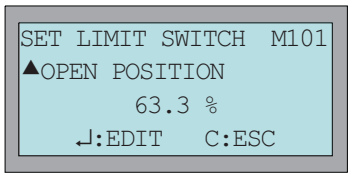
The fault has to be acknowledged before the operation can be resumed.
The acknowledgement is made:
1. either by an operation command in the opposite direction.
   – For TORQUE FAULT (CLOSE): Operation command in direction OPEN
   – For TORQUE FAULT (OPEN): Operation command in direction CLOSE
2. or, in case the torque present is smaller than the preset tripping torque:
   – via the **Reset** push button in selector switch position LOCAL.
   – via the APPLICATION_RESET Foundation Fieldbus parameter of the APVB transducer block (index 784).

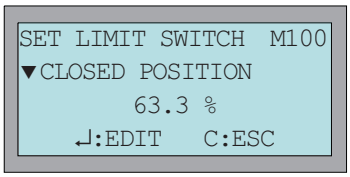
7.3 Limit switching setting

This setting is only possible for the non-intrusive version
For further information refer to page 8.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        SET LIMIT SWITCHES (M10)
             CLOSED POSITION (M100)
             OPEN POSITION (M101)
```





Information For end position setting, turn selector switch to LOCAL position and move the actuator into the end position, either via manual or motor operation (using the push buttons). Then turn the selector switch back to position OFF and accept end position.

NOTICE

Valve damage due to direct approaching of mechanical end stop during motor operation!

→ During motor operation, interrupt travel before reaching the mechanical valve end stop (press push button STOP).

Information If an end position cannot be set:

→ Check the type of control unit in actuator.

7.4 Intermediate positions (option)

The AUMATIC allows to define up to 8 intermediate positions.

Condition

The actuator is either equipped with:
- an MWG (for Non-Intrusive version), or
- a potentiometer (5 kΩ) or
- an RWG

In these versions, the positioning of the intermediate positions is made via software parameters.

Selection of the intermediate positions can be made either via push buttons from LOCAL or via the fieldbus interface from REMOTE with the standard commands OPEN and CLOSE. The actuator stops when reaching the intermediate position. The operation command has to be cleared and sent again to resume operation to the next intermediate position.

Information

If the intermediate positions are to be approached directly (without stop), the multiport valve function (page 47) is available as an option.

Table of contents:

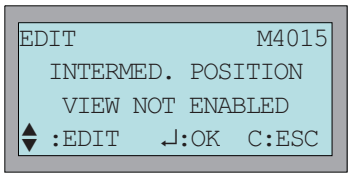
7.4.1 Display indication: enable view
7.4.2 Intermediate positions: switch on or off
7.4.3 Intermediate position definition
7.4.4 Operation behaviour = actuator behaviour definition
7.4.5 Intermediate positions: set the signalling

7.4.1 Display indication: enable view

The `INTERMED. POSITION` parameter must be set to `VIEW ENABLED` to carry out settings in the intermediate positions.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SPECIAL FUNCTIONS (M40)
             INTERMED. POSITION (M4015)
```



Default value: `VIEW NOT ENABLED`

Description of the parameter settings:

`VIEW NOT ENABLED`
The parameter for the intermediate positions are not indicated in the display.

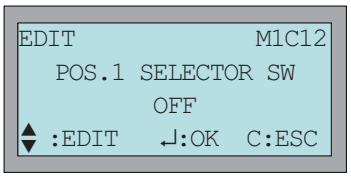
`VIEW ENABLED`
The parameter for the intermediate positions are indicated in the display.

7.4.2 Intermediate positions: switch on or off

Each intermediate position (POS.1 to POS8.) may individually be switched on/off.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
INTERMED. POSITION (M1C)
POS.1 SELECTOR SW. (M1C12)



Default value: OFF

⬇ **Description of the parameter settings:**

OFF
Intermediate position switched off.

REMOTE ONLY
Intermediate position only active in operation mode REMOTE.

LOCAL ONLY
Intermediate position only active in operation mode LOCAL.

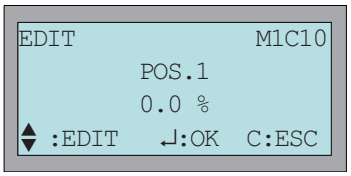
REMOTE AND LOCAL
Intermediate position active in operation modes REMOTE and LOCAL.

7.4.3 Intermediate position definition

Each intermediate position (POS.1 to POS.8) can be set to any value between 0 % and 100 % of the travel.
This function is only available the with position feedback.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
INTERMED. POSITION (M1C)
POS.1 (M1C10)



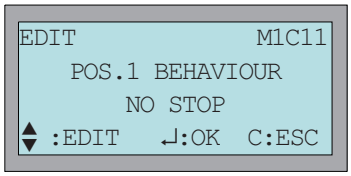
Default value: 0,0 %
Setting range: 0.0 % to 100.0 % of the travel (from OPEN to CLOSED)

7.4.4 Operation behaviour = actuator behaviour definition

The reaction of the actuator upon reaching an intermediate position can be programmed via the parameters "POS. 1: BEHAVIOUR to POS. 8: BEHAVIOUR.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
INTERMED. POSITION (M1C)
POS.1 BEHAVIOUR (M1C11)



Default value: NO STOP

⬇ **Description of the parameter settings:**

NO STOP
No intermediate stop, actuator continues the operation.

STOP OPENING DIR.
Actuator stops during operation in direction OPEN upon having reached the intermediate position. Actuator only runs after a new operation command is issued.
This function is not active in the operation mode SETPOINT MODE.

STOP CLOSING DIR.
Actuator stops during operation in direction CLOSE after reaching the intermediate position. Actuator only runs after a new operation command is issued.
This function is not active in the operation mode SETPOINT MODE.

STOP BOTH DIR.
Actuator stops after reaching the intermediate position. Actuator only runs after a new operation command is issued.
This function is not active in the operation mode SETPOINT MODE.

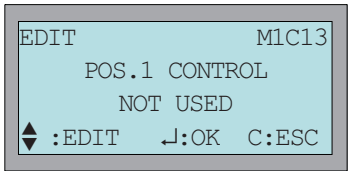
7.4.5 Intermediate positions: set the signalling

The reaching of an intermediate position can be signalled:
- via bus (see separate operation instructions)
- via the indication lights (LEDs) of the local controls (page 19) or
- via the output contacts (page 23)

The signal behaviour of the individual intermediate positions is set via the POS.1-8 control parameters:

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
INTERMED. POSITION (M1C)
POS.1 CONTROL (M1C13)



Default value: NOT USED

Description of the parameter settings:

NOT USED
No signal.

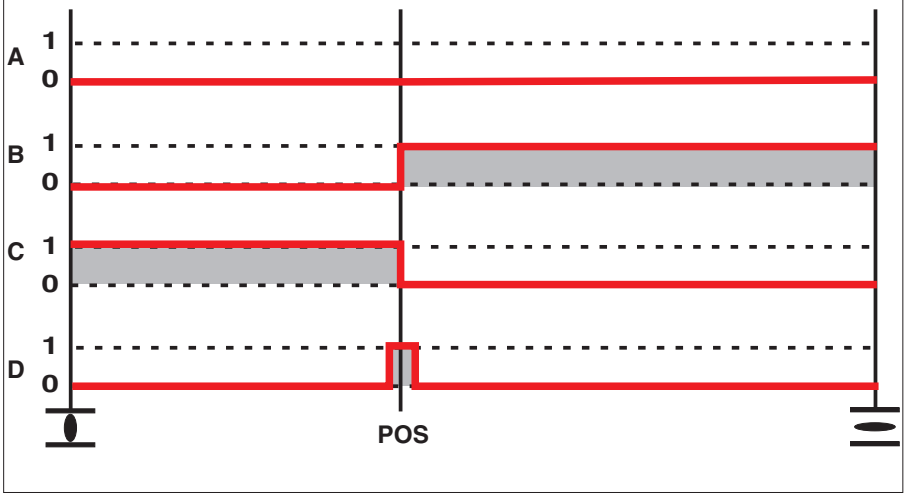
C_ _ _ POS‾‾‾‾‾O
Signal active from reaching the intermediate position to end position OPEN.

C‾‾‾‾‾POS_ _ _ O
Signal active from end position CLOSED to reaching the intermediate position.

C_ _ _ POS_ _ _ O
Impulse signal issued when going through intermediate position

Figure 8 shows the signal behaviour in intermediate positions.

Figure 8



A	NOT USED	1	Active signal
B	C_ _ _ POS‾‾‾‾‾O	2	Signal not activated
C	C‾‾‾‾‾POS_ _ _ O		
D	C_ _ _ POS_ _ _ O		POS = intermediate position

Further feedback signals which can be used together with the multiport valve function (option):

Description of the parameter settings:

SETPOINT REACHED
As each intermediate position is processed as a setpoint, the signal SETPOINT REACHED is issued after reaching any intermediate position.

ACTUATOR MOVING
Is signalled as long as the actuator is still running to the intermediate position and no intermediate position signal has been issued yet.

7.5 Intermediate positions with multiport valve function (option)

The multiport valve function allows the selection of the eight intermediate positions either directly from LOCAL (via push buttons) or from REMOTE (via special fieldbus commands). ***Hereby the selected intermediate position is approached directly, without stopping in another intermediate position***.
In this case, the actuator continues running until the selected intermediate position has been reached. Example: Operation from position 5 to 7 without stopping at position 6. This function is available with operation commands from LOCAL via the push buttons or from REMOTE via a fieldbus interface.

Limitation When equipped with a parallel interface (page 66), the direct selection function is only available in local operation, since the number of control cables is not sufficient to select a specific intermediate position.

Table of contents:

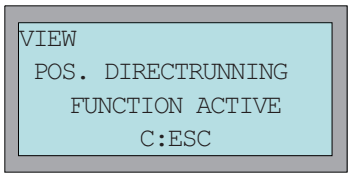
7.5.1 Check: Multiport valve function available?
7.5.2 Check: Positioner active?
7.5.3 Display indication: enable view
7.5.4 Intermediate positions: switch on or off
7.5.5 Intermediate position setting
7.5.6 Operation behaviour = actuator behaviour definition
7.5.7 Intermediate positions signalling
7.5.8 Intermediate positions in LOCAL: direct approach without stopping

7.5.1 Check: Multiport valve function available?

The multiport valve is available if the `POS. DIRECTRUNNING (M400B)` parameter is displayed in the `SPECIAL FUNCTIONS (M40)` menu.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
       SPECIAL FUNCTIONS (M40)
                 POS. DIRECTRUNNING (M400B)
```



Default value: `FUNCTION NOT ACTIVE`

⬇ **Description of the parameter settings:**

`FUNCTION NOT ACTIVE`
Multiport valve function off = selection of the respective subsequent intermediate position via OPEN - CLOSE commands

`FUNCTION ACTIVE`
Multiport valve function on = direct selection of intermediate positions possible from both REMOTE and LOCAL.

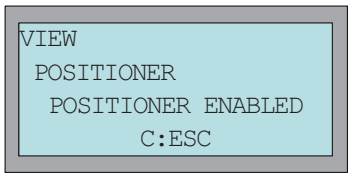
Information The function is either activated or deactivated via the `EDIT` menu. This value is set in the factory and can only be changed by the AUMA service.

7.5.2 Check: Positioner active?

The positioner must be available. This value is set in the factory.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SPECIAL FUNCTIONS (M40)
POSITIONER (M4000)



The POSITIONER parameter must be set to POSITIONER ENABLED.

⬇ **Description of the parameter settings:**

FUNCTION NOT ACTIVE
There is no positioner available.

POSITIONER ENABLED
The controls are equipped with a positioner.

7.5.3 Display indication: enable view

The indication of the multiport valve intermediate positions in the display is performed as described on page 17.

7.5.4 Intermediate positions: switch on or off

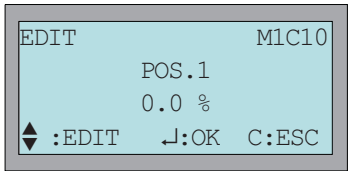
The multiport valve intermediate positions are switched on/off as described on page 44.

7.5.5 Intermediate position setting

Each of the 8 intermediate positions must be programmed. For direct selection of the intermediate positions from either LOCAL or REMOTE, it is sufficient to define the position (POS.1-8) parameter of each intermediate position.

➡ **Via the menu to parameter:**

MAIN MENU
SETTINGS (M1)
INTERMED. POSITION (M1C)
POS.1 (M1C10)



Setting ranges: 0.0 % to 100.0 % of the travel (from OPEN to CLOSED)
Typically all 8 outputs of the valve are distributed evenly over 360°, therefore the limit switch CLOSE should be set to output 1 and the limit switch OPEN to output 8. Afterwards the positions of the intermediate positions can be set:

Intermediate position 1:	POS.1	0.0 %	(output 1)
Intermediate position 2:	POS.2	14.3 %	(output 2)
Intermediate position 3:	POS.3	28.6 %	(output 3)
Intermediate position 4:	POS.4	42.9 %	(output 4)
Intermediate position 5:	POS.5	57.1 %	(output 5)
Intermediate position 6:	POS.6	71.4 %	(output 6)
Intermediate position 7:	POS.7	85.7 %	(output 7)
Intermediate position 8:	POS.8	100.0 %	(output 8)

7.5.6 Operation behaviour = actuator behaviour definition

The operation behaviour setting of the multiport valve intermediate positions is performed as described on page 45.

7.5.7 Intermediate positions signalling

The signalling of the multiport valve intermediate positions is performed as described on page 45.

Reaching an intermediate position can be signalled:
- via the bus (refer to separate manual)
- via the signal contacts (LEDs) of the local controls (page 19) or
- via the signal contacts (page 23)

In addition to the “intermediate position reached” signal, the following feedback signals can be used together with the multiport valve function:

SETPOINT REACHED

As each intermediate position is processed as a setpoint, the signal SETPOINT REACHED is issued after reaching any intermediate position.

ACTUATOR MOVING

Is signalled as long as the actuator is still running to the intermediate position and no intermediate position signal has been issued yet.

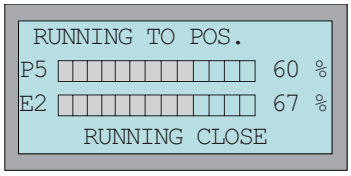
7.5.8 Intermediate positions in LOCAL: direct approach without stopping

➡ **Via the menu to parameter:**

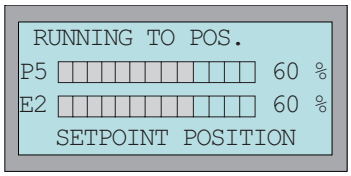
MAIN MENU (M0)
RUNNING TO POS. (M5)
POS. NUMBER (M50)
Now enter desired intermediate position

→ Set selector switch to position **Local control** (I).
Actuator runs to selected intermediate position

Indication on the display during operation:



Indication in display after having reached intermediate position:

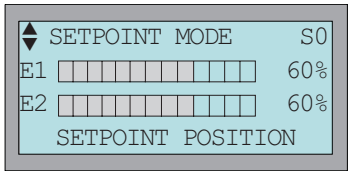


→ To approach a new intermediate position:
– Set selector switch to position **OFF** (0).
– Enter desired intermediate position.
– Set selector switch to position **Local control** (I).
Actuator runs to desired intermediate position.

7.6 Positioner (operation mode SETPOINT MODE)

The positioner records position setpoint E1 and position feedback E2 for comparison. Depending on the detected deviation, the actuator motor then runs in direction OPEN or CLOSE.

→ Set selector switch to position REMOTE.
If the positioner is active, the display shows:



Information

If the display shows REMOTE MODE, the actuator is set to open-close duty and no modulation is performed. In this case, modulating duty has to be selected first, refer to page 53.

Table of contents:

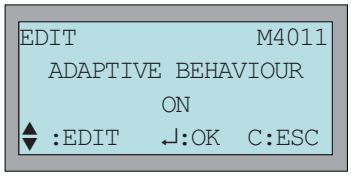
7.6.1	Adaptive behaviour: switch on or off
7.6.2	Overrun (inner dead band): manual setting
7.6.3	Max. error variable (outer dead band): manual setting
7.6.4	Dead time setting
7.6.5	Closing fully/opening fully (end position tolerance for setpoint E1)
7.6.6	Open-close and modulating duty selection
7.6.7	Source of setpoint E1: view
7.6.8	Input range of setpoint E1: view/edit

7.6.1 Adaptive behaviour: switch on or off

As standard, the adaptive positioning is switched on, i.e. overrun and max. error variable are automatically defined by the positioner (figure 9).
If the setting is to be made manually, the ADAPTIVE BEHAVIOUR parameter must be in position OFF.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SPECIAL FUNCTIONS (M40)
ADAPTIVE BEHAVIOUR (M4011)



Default value: ON

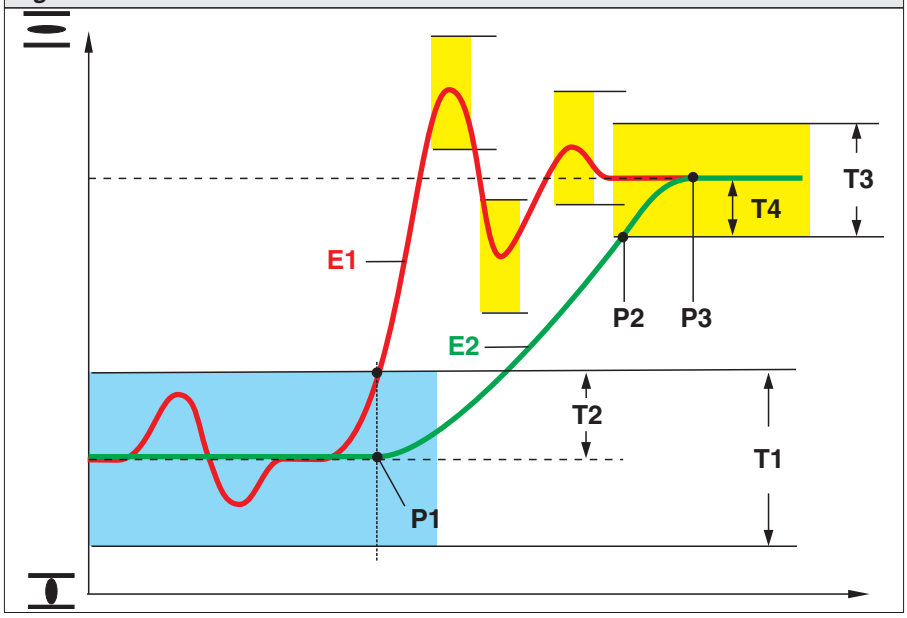
⬇ **Description of the parameter settings:**

OFF
Adaptive behaviour switched off.

ON
Adaptive behaviour switched on.

Figure 9 shows the modulating behaviour:

Figure 9



E1	Nominal value	T1	Outer dead band
E2	Actual value	T2	Max. error variable
P1	Switch-on point	T3	Inner dead band
P2	Switch-off point in direction OPEN	T4	Overrun
P3	Nominal value reached		

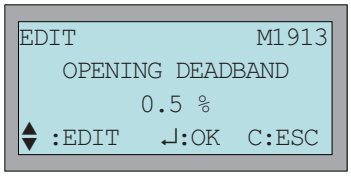
Information If the adaptive behaviour is switched off, overrun and max. error variable must be set manually (refer to subclauses 7.6.2 and 7.6.3).

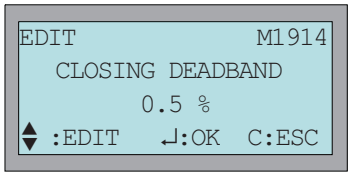
7.6.2 Overrun (inner dead band): set manually

The inner dead band determines the switch-off point of the actuator and, therefore, influences the overrun (figure 9).
The inner dead band may be set individually for the directions OPEN and CLOSE.
Manual setting is only possible if the adaptive behaviour (ADAPTIVE BEHAVIOUR parameter) is switched off.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    SETTINGS (M1)
        POSITIONER (M19)
            OPENING DEADBAND (M1913)
            CLOSING DEADBAND (M1914)
```





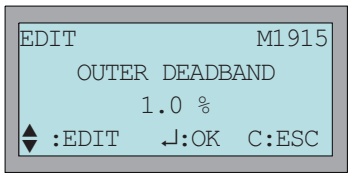
Default values: OPENING DEADBAND = 0.5 %
CLOSING DEADBAND = 0.5 %
Setting ranges: OPENING DEADBAND = 0.0 % to 9.9 %
CLOSING DEADBAND = 0.0 % to 9.9 %

7.6.3 Max. error variable (outer dead band): set manually

The outer deadband determines the switching-on point of the actuator. The motor starts if the actual value (input signal E2) or a change in nominal value is higher than the max. error variable determined by the outer dead band (refer to figure 9). Manual setting is only possible if the adaptive behaviour (ADAPTIVE BEHAVIOUR parameter) is switched off.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
POSITIONER (M19)
OUTER DEADBAND (M1915)



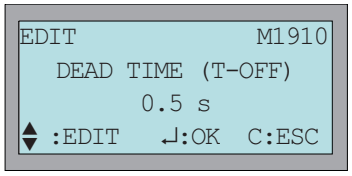
Default value: 1.0 %
Setting range: 0.1 % to 9.9 %

7.6.4 Dead time setting

The dead time prevents the operation to a new nominal position within a pre-determined time.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
POSITIONER (M19)
DEAD TIME (M1910)



Default value: 0.5 s
Setting range: 0.0 to 60.0 seconds

Information It must be ensured via the controls that the max. permissible number of starts of the actuator is not exceeded. This can be achieved by setting the dead time to a sufficiently high value.

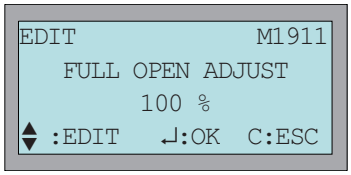
7.6.5 Closing fully/opening fully (end position tolerance for setpoint E1)

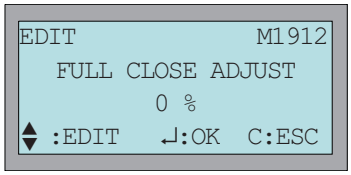
If the end positions cannot be reached due to inaccurate analogue setpoint signals (0/4 mA or 20 mA), a tolerance for the nominal value within the end position range can be set. If the tolerance is exceeded or not reached, the actuator continues the operation until the full end position has been reached. This ensures that the actuator opens and closes fully.

Information The tolerance ranges are not effective if the operation commands are transferred to the actuator as fieldbus telegrams. In this case the actuator runs completely CLOSED as soon as it receives the nominal value 0 % and completely OPEN as soon as it receives the nominal value 100.0 %.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        POSITIONER (M19)
             FULL OPEN ADJUST (M1911)
             FULL CLOSE ADJUST (M1912)
```





Default values: FULL OPEN ADJUST = 100 %
FULL CLOSE ADJUST = 0 %

Setting ranges: FULL OPEN ADJUST = 95 % to 100 % of travel
FULL CLOSE ADJUST = 0 % to 50 % of travel

7.6.6 Open-close duty (REMOTE) or modulating duty (SETPOINT) selection

Selection between open-close duty and modulating duty is defined by the appropriate function blocks:
Open-close duty: Use Discrete Output Function Block (DOFB).
Modulating duty: Use Analog Output Function Block (AOFB).

Information These two function blocks may not be used simultaneously.

The following versions also allow a change-over between open-close and modulating duty via the MODE input (refer to wiring diagram):

- in addition to the Foundation Fieldbus interface, the AUMATIC is equipped with a further parallel interface (refer to page 66)
- the AUMATIC is equipped with additional control inputs (refer to page 63).

MODE input: + 24 V DC = REMOTE MODE = open-close duty, i.e. the control is executed via commands OPEN - STOP - CLOSE

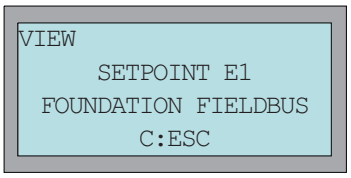
MODE input: 0 V (or input open) = SETPOINT = modulating duty, i.e. the control is executed via an analogue signal (e.g. 0/4 – 20 mA)

7.6.7 Source of setpoint E1: view

This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SETUP (M41)
            SETPOINT E1 (M4100)
```



Default value: FOUNDATION FIELDBUS

⬇ **Description of the parameter settings:**

NONE
There is no setpoint source available.

LOGIC ANALOG IN1
For AUMA service only (the setpoint E1 is transmitted from external via the analogue input 1 directly to the logic board).

I/O1 ANALOG IN1
The setpoint E1 is transmitted via the I/O board interface, analogue input 1.

I/O1 ANALOG IN2
The setpoint E1 is transmitted via the I/O board interface, analogue input 2.

FOUNDATION FIELDBUS
The setpoint E1 is transmitted via the Foundation Fieldbus interface board.

FF ANALOG IN1
The setpoint E1 is transmitted via the Foundation Fieldbus interface board, analogue input 1.

FF ANALOG IN2
The setpoint E1 is transmitted via the Foundation Fieldbus interface board, analogue input 2.

7.6.8 Input range of setpoint 1: view/edit

The parameters of this setting depend on the pre-set setpoint source (SETPOINT E1 (M4100) parameter, page 54).

Initial and end value via the Foundation Fieldbus interface

In Foundation Fieldbus standard version, the setpoint E1 is transmitted via the AO function block.

Initial and end value via I/O interface

As an option, the setpoint E1 can be supplied via an analogue input instead of using the fieldbus. This is possible for the following versions:

a) in addition to the Foundation Fieldbus interface, the AUMATIC is equipped with a further parallel interface (refer to page 66)

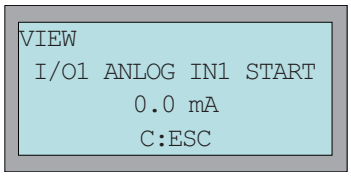
b) the AUMATIC is equipped with additional control inputs (refer to page 63)

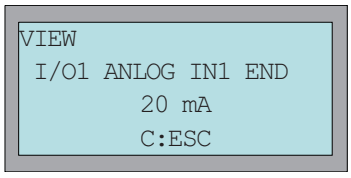
The input range amounts to 0/4 – 20 mA. It is possible to modify the input range via the display for both versions:

Version a) for setpoint source of parallel interface, analogue input 1:

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SETUP (M41)
I/O ANLOG IN1 START (M410H)
I/O ANLOG IN1 END (M410I)



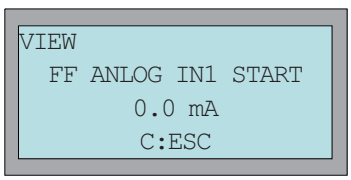


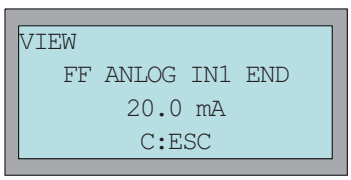
Default values: I/O ANLOG IN1 START = 0 mA
I/O ANLOG IN1 END = 20 mA
Setting ranges: I/O ANLOG IN1 START = 0 to 20 mA
I/O ANLOG IN1 END = 0 to 20 mA

Version b) for setpoint source of Foundation Fieldbus interface, analogue input 1:

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
FF-INTERFACE 1 (M1M)
FF ANLOG IN1 START (M1M00)
FF ANLOG IN1 END (M1M01)





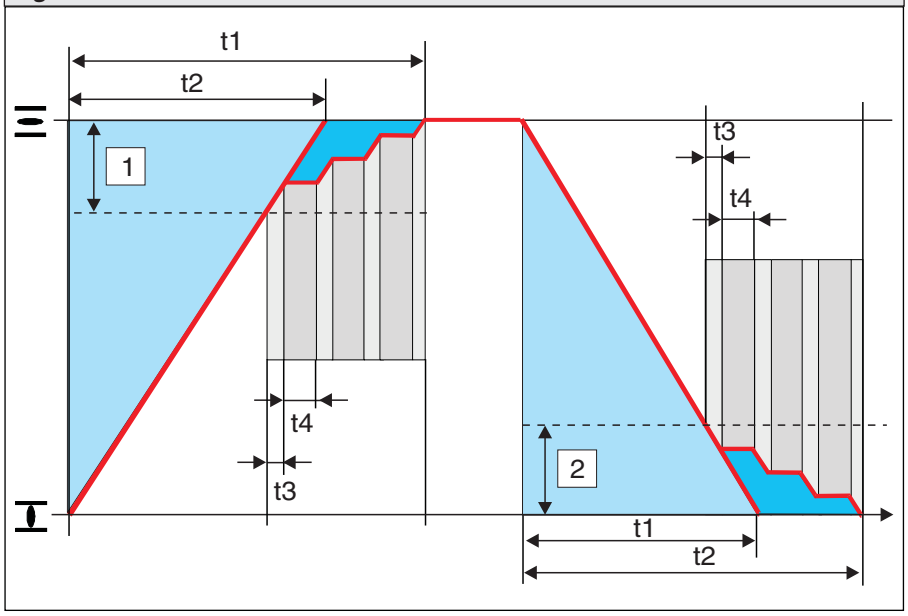
Default values: FF ANLOG IN1 START = 0 mA
FF ANLOG IN1 END = 20 mA
Setting ranges: FF ANLOG IN1 START = 0 to 20 mA
FF ANLOG IN1 END = 0 to 20 mA

Information If the measuring values are 0.3 mA below the initial value a wire break is indicated as a warning.

7.7 Stepping mode (option)

In stepping mode the operating time can be increased for the entire or any portion of the valve travel (refer to figure 10).

Figure 10



1	Stepping range OPEN	t1	Operating time for normal operation
2	Stepping range CLOSE	t2	Operating time for stepping mode
P1	Start of stepping mode	t3	Running time
P2	Stop of stepping mode	t4	OFF time (pause time)

Information Stepping mode is only possible if a position transmitter (potentiometer, RWG, or MWG) is installed in the actuator.

Table of contents:

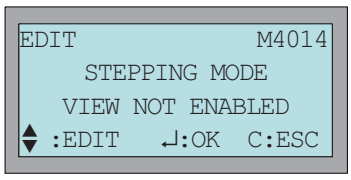
7.7.1 Display indication: enable view
7.7.2 Stepping mode: switch on or off
7.7.3 Stepping range setting (start and end of stepping mode). ON and OFF times setting

7.7.1 Display indication: enable view

To perform settings for stepping mode via the display, the `STEPPING MODE` setting must be in position `VIEW ENABLED`.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SPECIAL FUNCTIONS (M40)
            STEPPING MODE (M4014)
```



Default value: `VIEW NOT ENABLED`

⬇ **Description of the parameter settings:**

`VIEW NOT ENABLED`

The parameters for the stepping mode are not indicated in the display.

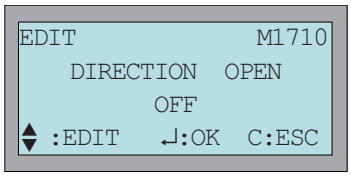
VIEW ENABLED
The parameters for the stepping mode are indicated in the display.

7.7.2 Stepping mode: switch on or off

Stepping mode can be individually activated for the directions OPEN and CLOSE.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        STEPPING MODE (M17)
             DIRECTION OPEN (M170)
             DIRECTION CLOSE (M1715)
```



Default values: DIRECTION OPEN = OFF
DIRECTION CLOSE = OFF

⬇ **Description of the parameter settings:**

OFF
Stepping mode is switched off

REMOTE ONLY
Stepping mode only possible in operation mode REMOTE.

LOCAL ONLY
Stepping mode only possible in operation mode LOCAL.

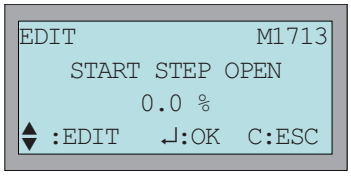
REMOTE AND LOCAL
Stepping mode in operation modes REMOTE and LOCAL possible

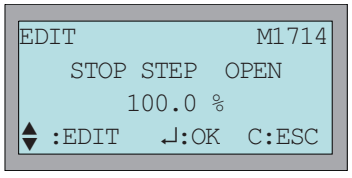
7.7.3 Stepping range setting (start and end of stepping mode).

For both directions the stepping range (start and end of stepping mode) can be set separately.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        STEPPING MODE (M17)
             START STEP OPEN (M1713)
             STOP STEP OPEN (M1714)
             START STEP CLOSE (M1718)
             STOP STEP CLOSE (M1719)
```





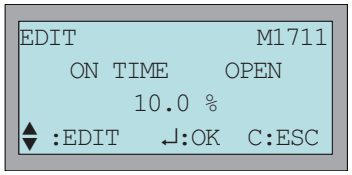
Default values: START STOP OPEN = 0.0 %
STOP STEP OPEN = 100.0 %
START STEP CLOSE = 100,0 %
STOP STEP CLOSE = 0.0 %
Setting ranges: START STEP OPEN = 0.0 % to 99.9 %
STOP STEP OPEN = 0.1 % to 100.0 %
START STEP CLOSE = 0.1 % to 100.0 %
STOP STEP CLOSE = 0.0 % to 99.9 %

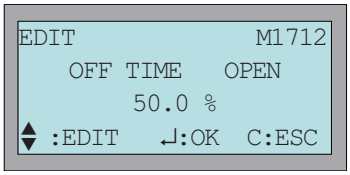
7.7.4 ON and OFF times setting

The ON or OFF times can be set individually for the directions OPEN and CLOSE.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    SETTINGS (M1)
        STEPPING MODE (M17)
            ON TIME      OPEN (M1711)
            OFF TIME     OPEN (M1712)
            ON TIME CLOSE (M1716)
            OFF TIME CLOSE (M1717)
```





Default values:	ON TIME	OPEN = 10.0 s
	OFF TIME	OPEN = 50.0 s
	ON TIME	CLOSE = 10.0 s
	OFF TIME	CLOSE = 50.0 s
Setting ranges:	ON TIME	OPEN = 1.0 to 300.0 seconds
	OFF TIME	OPEN = 1.0 to 300.0 seconds
	ON TIME	OPEN = 1.0 to 300.0 seconds
	OFF TIME	OPEN = 1.0 to 300.0 seconds

7.8 Local controls enable function (option)

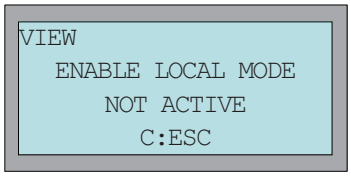
The selector switch functions on the local controls (LOCAL, OFF, and REMOTE) may be either enabled or disabled.

7.8.1 Selector switch functions: enable/disable

This value is set in the factory and can only be changed by the AUMA service.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SETUP (M41)
            ENABLE LOCAL MODE (M410W)
```



Default value: NOT ACTIVE

⬇ **Description of the parameter settings:**

NOT ACTIVE

All selector switch functions are enabled.

FOUNDATION FIELDBUS

This setting is only permissible if the local controls are equipped with a selector switch.
The selector switch function is enabled via the ENABLE_LOCAL_CONTROLS Foundation Fieldbus parameter of the APVB transducer block (index 785). The selector switch functions LOCAL, OFF, and REMOTE may be enabled or disabled either separately or combined. Please refer to “Manual (Device integration Fieldbus) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus”.
The following fault signals are emitted if one out of the three selector switch positions is not enabled while the Foundation Fieldbus communication is active.

- Status indication S0: RESTRICTED.
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Not ready indication, 0x00000010), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

If the communication via Foundation Fieldbus is not available, all three selector switch positions are enabled.

I/O INTERFACE

This setting is only permissible if the local controls are equipped with a selector switch.
The digital RELEASE input (refer to wiring diagram ACP) is used to enable or disable the actuator operation via the push buttons.

- Disabling operation via push buttons:
  no signal at input RELEASE (the status indication S0 in the display shows RESTRICTED).
- Enabling operation via push buttons:
  Apply + 24 V DC signal at the RELEASE input.

7.9 EMERGENCY STOP function (option)

As an option, the AUMATIC can be equipped with an EMERGENCY STOP push button. When engaged, this EMERGENCY STOP interrupts the 24 V AC control voltage of the contactors.

Figure 11

Information

The EMERGENCY STOP push button is not available for the ACExC, but only for the weatherproof versions of the AUMATIC.

Table of contents:

7.9.1 Description of the functions
7.9.2 Feedback signals on the display
7.9.3 Feedback signals setting via output contacts
7.9.4 Feedback signal setting via LEDs

7.9.1 Description of the functions

As soon as this EMERGENCY STOP button is operated, several steps are performed in the AUMATIC:

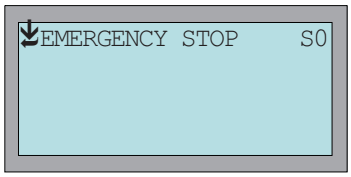
- The 24 V AC control voltage of the AUMATIC contactors is interrupted.
- Switching off the operation command and cancelling a possibly set self-retaining.
- Option: The operation status of the EMERGENCY STOP button is indicated by activating an output contact.
- Option: The operation status of the EMERGENCY STOP button is indicated by an indication light (LED) lighting up on the local controls.
- EMERGENCY STOP status display indication with the `EMCY STOP ACTIVE` entry in the `S3` diagnosis indication `NOT READY IND`
- Display indication on EMERGENCY STOP status in `S0` status indication: Operation status `EMERGENCY STOP`
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Not ready indication, 0x00000010), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

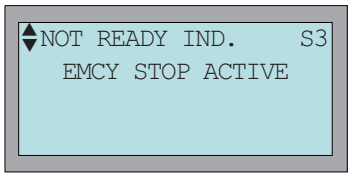
After unlocking the EMERGENCY STOP button, a possibly active operation command will ***not immediately*** be re-activated, but only upon confirmation by the user which, in turn, resets the EMERGENCY STOP status.
After this, operation commands as well as emergency and failure operations will immediately be performed.
The acknowledgement is made:

- via the **Reset** push button in selector switch position LOCAL.
- via the APPLICATION_RESET Foundation Fieldbus parameter of the APVB transducer blocks (index 784).

7.9.2 Feedback signals on the display

The following indications are displayed in status indications S0 and S3:





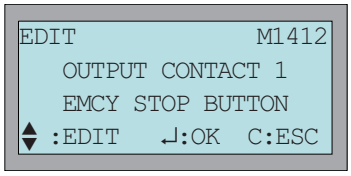
Description of the displays:

EMERGENCY STOP/EMCY STOP ACTIVE
The EMERGENCY STOP button has been operated and has put the AUMATIC into the EMERGENCY STOP status. This status can only be cancelled by unlocking the EMERGENCY STOP button and issuing a subsequent RESET command.

7.9.3 Feedback signals setting via output contacts

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
I/O 1 (M14)
OUTPUT CONTACT 1 - 5



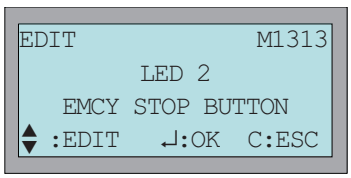
Description of the parameter settings:

EMCY STOP BUTTON
The selected output contact is activated, after the EMERGENCY STOP button was operated.
This signal can be cancelled by unlocking the EMERGENCY STOP button.

7.9.4 Feedback signal setting via LEDs

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
LOCAL CONTROLS (M13)
LED 1 - 4



Description of the parameter settings:

EMCY STOP BUTTON
The selected LED is illuminated after the EMERGENCY STOP button was operated.
This signal can be cancelled by unlocking the EMERGENCY STOP button.

7.10 Foundation Fieldbus interface

All Foundation Fieldbus interface settings (including the device address assignment) are made via the Foundation Fieldbus.
For this reason, the local operation (via the display) of the AUMATIC does not supply any Foundation Fieldbus relevant parameter.

In the following

```
MAIN MENU (M0)
   SETTINGS (M1)
        FF-INTERFACE 1 (M1M)
```

only those parameters are available used for setting both analogue inputs. These parameters only affect the local behaviour of the analogue inputs (e.g. when using as local analogue setpoint input). Irrespective of these parameter settings, the signal behaviour via Foundation Fieldbus is exclusively configured using the AIFB1 or AIFB2 function blocks.

7.11 External inputs for bus (option)

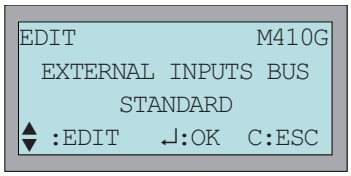
Parallel control via external inputs is possible for an AUMATIC with fieldbus interface.
Four binary 24 V DC inputs and two analogue 0/4 – 20 mA inputs are available.
Irrespective of the signal assignment of these inputs, the fieldbus communication with the DCS will remain intact.

7.11.1 Signals assignation for operation commands

This value is set in the factory.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SETUP (M41)
            EXTERNAL INPUTS BUS (M410G)
```



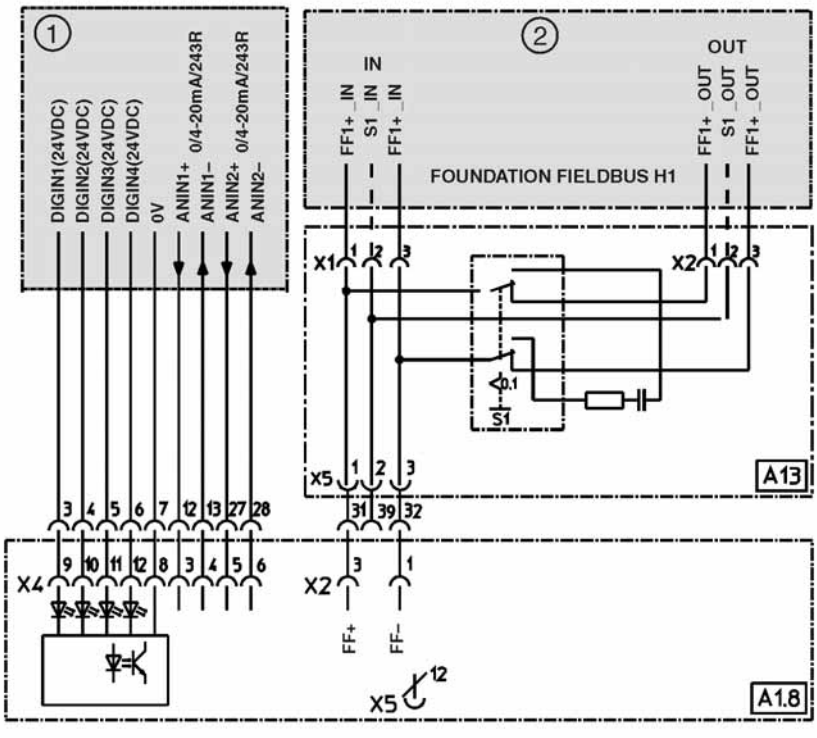
Default value: STANDARD

⬇ **Description of the parameter settings:**

STANDARD

Figure 12:
The external input signals are transferred to the process control system via the fieldbus They do not influence the operation behaviour of the actuator.

Figure 12



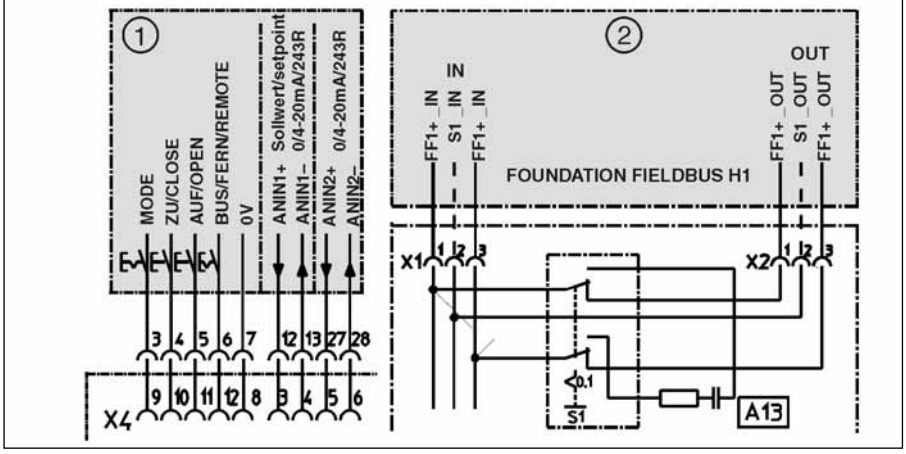
1 External inputs 2 Fieldbus interface

OPEN CLOSE CONTROL

Figure 13:

- Conventional control of the actuator is possible either in OPEN - CLOSE duty or in modulating duty (setpoint of 0/4 – 20 mA). Selection between open - close and modulating duty is made via the MODE input (refer to page 53).
- Operation commands can be issued via the fieldbus or via the external inputs. Switch-over is made via BUS/REMOTE input (see below).

Figure 13



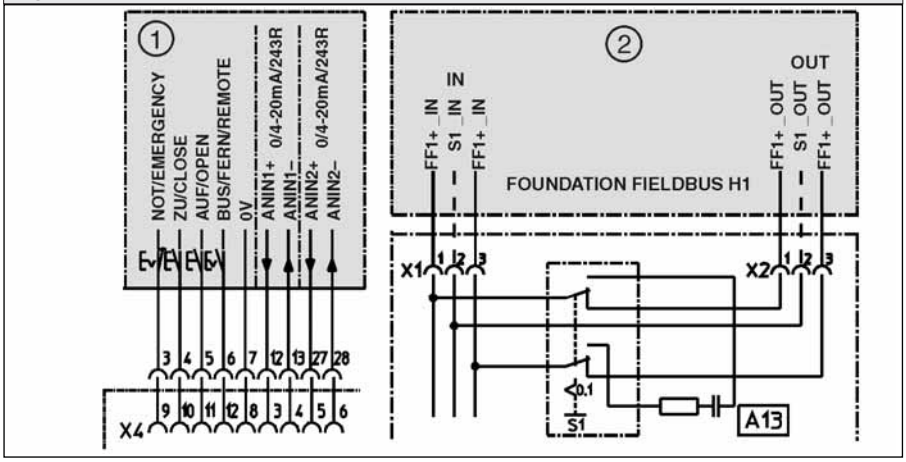
1 External inputs 2 Fieldbus interface

OPEN CLOSE ESD

Figure 14:

- Actuator control is possible in open-close duty (OPEN - CLOSE - EMERGENCY) only. Modulating duty is not possible.
- Operation commands can be issued via the fieldbus or via the external inputs. Switch-over is made via BUS/REMOTE input (see below).
- Operation commands are made in push-to-run operation only.
- If a voltage of 0 V is present at EMERGENCY input, the actuator performs the programmed EMERGENCY operation, irrespective of the BUS/REMOTE input.

Figure 14



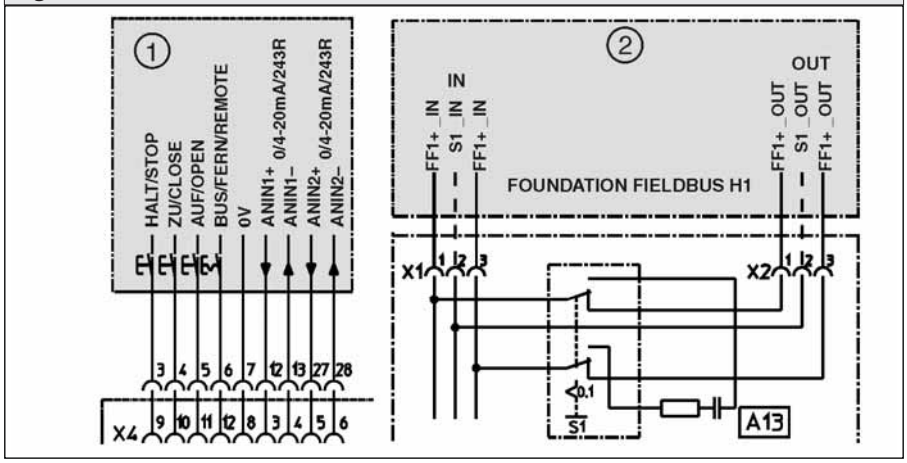
1 External inputs 2 Fieldbus interface

OPEN CLOSE STOP

Figure 15:

- Actuator control is possible in open-close duty (OPEN – CLOSE - STOP) only. Modulating duty is not possible.
- Operation commands can be issued via the fieldbus or via the external inputs. Switch-over is made via BUS/REMOTE input (see below).
- Operation commands are made in self-retaining only.

Figure 15



1 External inputs 2 Fieldbus interface

Information In the event of loss of bus communication, the external inputs do not automatically take over!

Information Please refer to the AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus manual (Device integration Fieldbus) for details on feedback signals.

Switching between operation commands via fieldbus and external inputs

→ Apply **0 V DC** (input open) at BUS/REMOTE input:
Controls react to fieldbus signals only.

→ Apply **+ 24 V DC** at BUS/REMOTE input.
Controls reacts to external input signals only:
MODE, CLOSE, OPEN, STOP, EMERGENCY, ANIN1 (the available external inputs depend on the parameter setting).

7.12 Combination fieldbus/standard interface (option)

The actuator controls is equipped with both a fieldbus interface **and** a parallel interface, if the `I/O STACK 2` parameter status shows `I/O`.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SETUP (M41)
             I/O STACK 2 (M410Q)
```

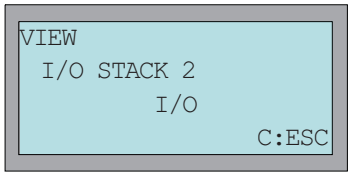
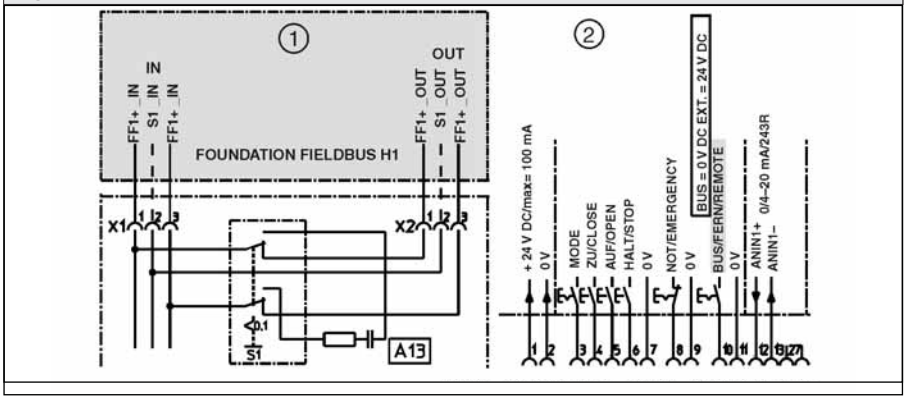


Figure 17 shows an extract of the wiring diagram with fieldbus interface (1) and parallel interface (2):

Figure 17



1 Fieldbus interface 2 Parallel interface

Switching between operation commands via fieldbus and parallel inputs

→ Apply **0 V DC** (input open) at BUS/REMOTE input:
Controls react to fieldbus signals only.

→ Apply **+ 24 V DC** (optional 115 V AC) at BUS/REMOTE input.
Controls reacts to parallel interface signals only:
MODE, CLOSE, OPEN, STOP, EMERGENCY, ANIN1+, ANIN1–

Information If a voltage of 0 V is present at the EMERGENCY input, the actuator performs the set EMERGENCY operation (refer to page 34), irrespective of the BUS/REMOTE input.

Information In the event of loss of bus communication, the external inputs do not automatically take over!

Information Please refer to the AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus manual (fieldbus device integration) for details on feedback signals.

7.13 Monitoring and failure functions

Table of contents:

7.13.1 Torque monitoring
7.13.2 Motor protection (thermal monitoring)
7.13.3 Monitoring of the max. number of starts and the max. running time
7.13.4 Operating time monitoring
7.13.5 Reaction monitoring
7.13.6 Phase failure monitoring

7.13.1 Torque monitoring

The torque monitoring serves as overload protection over the whole travel. Depending on the version, the required tripping torques are either set via the torque switching in the actuator or via the OPENING and CLOSING parameters (Non-Intrusive version).
If the set torques are reached ***in mid-travel***, the actuator will be stopped and the following fault signals will be sent:

- Status indication S0: operation mode OFF/LOCAL = FLT + NR
- Status indication S0/S6: operation mode REMOTE = FAULT IND.
- Status indication S1: TORQUE FAULT(OPEN) or TORQUE FAULT (CLOSE) (torque fault)
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Torque fault OPEN, 0x00000001 or Torque fault CLOSE, 0x00000002), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

The fault has to be acknowledged before the operation can be resumed.
The acknowledgement is made:
1. either by an operation command in the opposite direction.
   – For TORQUE FAULT (CLOSE): Operation command in direction OPEN
   – For TORQUE FAULT (OPEN): Operation command in direction CLOSE
2. or, in case the torque present is smaller than the preset tripping torque:
   – via the **Reset** push button in selector switch position LOCAL.
   – via the APPLICATION_RESET Foundation Fieldbus parameter of the APVB transducer block (index 784).

Setting the torque by-pass

The torque monitoring can be disabled during the set torque by-pass duration.
For this period, the torque by-pass is effective, irrespective of the actuator position.

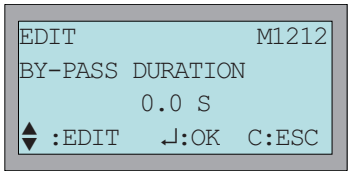
NOTICE

Valve damage due to excessive torque!

→ Only apply torque by-pass with the consent of the valve manufacturer.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   SETTINGS (M1)
        TORQUE (M12)
             BY-PASS DURATION (M1212)
```



Default value: 0.0 s

Setting range: 0 to 50 (= 0.0 to 5.0 seconds)

7.13.2 Motor protection (thermal monitoring)

In order to protect against overheating and impermissibly high temperatures at the actuator, PTC thermistors or thermoswitches are embedded in the motor winding. The thermoswitch is tripped as soon as the max. permissible winding temperature has been reached.
The actuator is switched off and the following signals are given:

- LED 3 (thermal fault) on the local controls is illuminated.
- Status indication S0: operation mode OFF/LOCAL = FLT + NR
- Status indication S0/S6: operation mode REMOTE = FAULT IND.
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Thermal fault, 0x00000200), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

The motor has to cool down before the operation can be resumed.
Depending on the parameter setting, the fault signal is either automatically reset or the fault signal has to be acknowledged.

The acknowledgement is made:

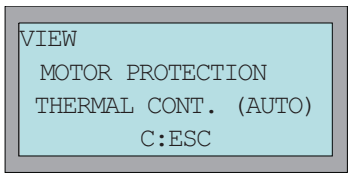
- via the **Reset** push button in selector switch position LOCAL.
- via the APPLICATION_RESET Foundation Fieldbus parameter of the APVB transducer block (index 784).

Viewing the motor protection

This value is set in the factory.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SETUP (M41)
MOTOR PROTECTION (M4108)



Default values: Non Ex actuators = THERMAL CONT.(AUTO)
Ex actuators = THERMISTOR (RESET)

⬇ **Description of the parameter settings:**

THERMAL CONT. (AUTO)
Automatic reset after the motor has cooled down.
Not possible for explosion-proof version ACExC 01.1

THERMAL CONT. (RESET)
Manual reset. After the motor has cooled down the fault must be reset, either

- the **Reset** push button at the local controls, or
- with the RESET command via the fieldbus.

If required the thermal overload relay has to be reset manually. To this end, remove the cover on the back of the AUMATIC and operate the RESET button on the thermal overload relay.

THERMISTOR (RESET)
Manual reset. After the motor has cooled down the fault must be reset, either

- the **Reset** push button at the local controls, or
- with the RESET command via the fieldbus.

THERMISTOR (AUTO)
Automatic reset after the motor has cooled down.
Not possible for explosion-proof version ACExC 01.1

7.13.3 Monitoring of the max. number of starts per hour and max. running time per hour

The AUMATIC monitors any exceeding of
- the maximum number of starts (motor starts) per hour
- the maximum running time (on-time) per hour.

If any of these values has been exceeded, the actuator will however not be stopped, but the following warning signals are sent:
- Status indication S0: operation mode OFF/LOCAL = WRN + NR
- Status indication S0/S6: operation mode REMOTE = WARNING IND.
- Status indication S2: WARNING STARTS/RUN

The warning signals will automatically be cleared if the number of starts per second and the set max. running time per hour are no longer reached.

An exceeding is also logged in the operating data counters WRN.STARTS/RUN1 and WRN.STARTS/RUN2 (page 78).
WRN.STARTS/RUN1 contains the total of all starts/running time warnings.
WRN.STARTS/RUN2 contains the max. time duration of a starts/running time warning.
Example:
The AUMATIC signals a total of 3 starts/running time warnings because of an exceeding of the set cycles/h or running time/h: once 20 min., once 15 min, once 22 min. Afterwards the operating data counters contain the following values:
WRN.STARTS/RUN1 = 57 min. = total of all time sections (20+15+22 min)
WRN.STARTS/RUN2 = 22 min. = longest time section

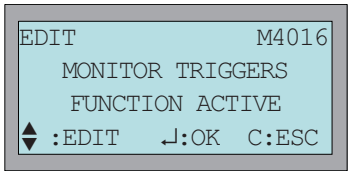
Switching on/off the monitoring of the max. number of starts and the max. running time

To be able to view settings or to perform modifications, the MONITORING parameter must be set to FUNCTION ACTIVE.

Information This parameter is also used to switch the operating time monitoring (page 71) on or off.

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
    CONFIGURATION (M4)
        SPECIAL FUNCTIONS (M40)
            MONITOR TRIGGERS (M4016)
```



Default value: FUNCTION ACTIVE

⬇ **Description of the parameter settings:**

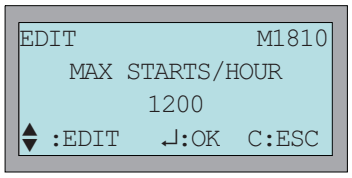
FUNCTION NOT ACTIVE
The MAX STARTS/HOUR and MAX DUTY CYCLE parameters are not shown in the display.

FUNCTION ACTIVE
The MAX STARTS/HOUR and MAX DUTY CYCLE parameters are shown in the display.

Setting the max. permissible number of starts

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
MONITOR TRIGGERS (M18)
MAX STARTS/HOUR (M1810)

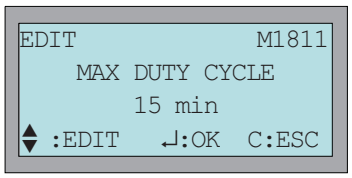


Default value: 1200
Setting range: 0 to 1800 starts (motor starts)

Setting the max. permissible running time

Via the menu to parameter:

MAIN MENU (M0)
SETTINGS (M1)
MONITOR TRIGGERS (M18)
MAX DUTY CYCLE (M1811)



Default value: 15 MIN

Description of the parameter settings:

15 MIN
The max. permissible running time (on-time) per hour amounts to 15 min.

24 MIN
The max. permissible running time (on-time) per hour amounts to 24 min.

30 MIN
The max. permissible running time (on-time) per hour amounts to 30 min.

7.13.4 Operating time monitoring

This function allows the monitoring of the operating time of the actuator. If the actuator needs longer than the set time (MAX. RUN TIME parameter) to move from end position OPEN to end position CLOSED, the following warning signals are given (the actuator is not stopped):

- Status indication S0: operation mode OFF/LOCAL = WRN + NR
- Status indication S0/S6: operation mode REMOTE = WARNING IND.
- Status indication S2: WARNING OPER. TIME

The warning signals are automatically cleared when a new operation command is executed.

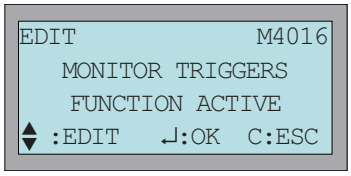
When the actuator moves from an intermediate position to an end position, the set monitoring time for the whole stroke is assigned in relation to the remaining stroke/travel.

Switching the operating time monitoring on/off

Information This parameter is also used to switch the monitoring of the max. number of starts per hour and the max. running time per hour (page 67) on/off.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SPECIAL FUNCTIONS (M40)
MONITOR TRIGGERS (M4016)



Default value: FUNCTION ACTIVE

⬇ **Description of the parameter settings:**

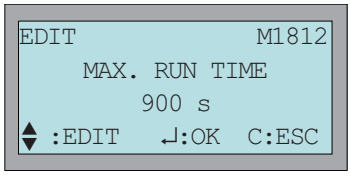
FUNCTION NOT ACTIVE
The operating time monitoring is switched off.

FUNCTION ACTIVE
The operating time monitoring is switched on.

Setting the max. permissible operating time

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
MONITOR TRIGGERS (M18)
MAX. RUN TIME (M1812)



Default value: 900 s
Setting range: 4 to 36000 seconds (4 seconds to 10 hours)

7.13.5 Reaction monitoring

The AUMATIC controls monitor the actuator reaction via the control unit of the actuator.
If no reaction is recorded at the output drive of the actuator within a set time (REACTION TIME parameter), the actuator is switched off and the following fault signals are given:

- Status indication S0: operation mode OFF/LOCAL = FLT + NR
- Status indication S0/S6: operation mode REMOTE = FAULT IND.
- Status indication S1: INTERNAL FAULT
- Diagnostics indication D2: NO REACTION
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (Electronics Failure, 20 (0x14)) and XD_ERROR_EXT (Internal electronics error, 0x00040000), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

The fault has to be acknowledged. The acknowledgement is made:

- via the **Reset** push button in selector switch position LOCAL.
- via the APPLICATION_RESET Foundation Fieldbus parameter of the APVB transducer block (index 784).

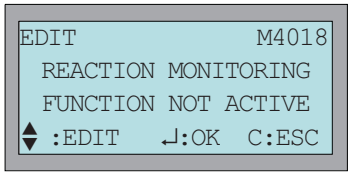
In case of operation from an intermediate position, reaction monitoring will only be performed if the actuator has a position feedback.

Switching the reaction monitoring on/off

This value is set in the factory and may not be changed.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
CONFIGURATION (M4)
SPECIAL FUNCTIONS (M40)
REACTION MONITORING (M4018)



Default value: FUNCTION NOT ACTIVE

⬇ **Description of the parameter settings:**

FUNCTION NOT ACTIVE
The reaction monitoring is switched off.

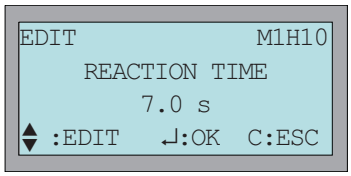
FUNCTION ACTIVE
The reaction monitoring is switched on.

Setting/editing the reaction time

The reaction time is set in the factory.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
REACTION TRIGGER (M1H)
REACTION TIME (M1H10)



Default value: 7 s
Setting range: 1.0 to 15.0 seconds

7.13.6 Phase failure monitoring

When connected to a 3-phase AC power supply, the electronics is supplied via two of the three phases. In case of losing one of the two phases, the controls are inoperable and the actuator stops.
The AUMATIC monitors the third phase. If the third phase fails, the controls remain fully operable. The controls stop the actuator in case of third phase loss and the following fault signals are generated:

- Status indication S1: PHASE FAILURE.
- The Foundation Fieldbus APVB transducer block signals a fault via XD_ERROR (General Error, 17 (0x11)) and XD_ERROR_EXT (Loss of phase, 0x00000100), thus generating an operation mode change of the DOFB or AOFB to the IMan status.

Information

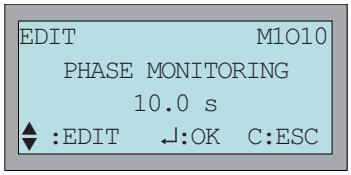
In case of one phase loss during motor operation, this does not necessarily lead to an immediate standstill of the actuator. The reason is that the rotating motor generates the missing phase itself. This leads, however, to a reduction of the motor output torque.
If the third phase fails and the torque is still sufficient for valve operation, the missing third phase is only detected when switching off (e.g. in an end position) and above mentioned fault signals are generated.

Setting/editing the phase monitoring

Faults in supply voltage (e.g. voltage drops) do not generate a fault signal during the period adjustable for this parameter.

➡ **Via the menu to parameter:**

MAIN MENU (M0)
SETTINGS (M1)
PHASE MONITORING (M1O)



Default value: 10.0 s
Setting range: 0.0 to 30.0 seconds

Information

The phase loss monitoring is only valid for connections to 3-phase AC power supplies. The phase loss monitoring is not available for the following versions:
Numbering system of wiring diagram:

- 3rd position in ACP wiring diagram = I, Q (DC motor)
- 5th position in ACP wiring diagram = B (heater with external supply)
- 6th position in ACP wiring diagram = 7 (external supply of electronics with 24 V DC, without transformer, without voltage output)

Example: ACP 11**I**2B7P0CA-002

Numbering system of terminal plan:

- KMS 44TP in terminal plan = 44 (motor connection via terminal box), example: KMS **44**TP502/001
- KMS 44TP in terminal plan = 42 (motor connection via plug/socket connector), example: KMS **42**TP480/001

8 Corrective action

8.1 Fault indications and warning indications

Faults interrupt or prevent electrical actuator operation.
Warnings have no influence on the electrical actuator operation. They only serve information purposes.
Fault and warning indications are shown on the display.

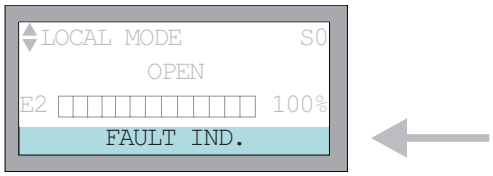
Table of contents:

8.1.1 Status indication S0 - Faults and warnings
8.1.2 Status indication S1 - Faults
8.1.3 Status indication S2 - Warnings

For further status indications in the display, refer to page 15 et seqq.

8.1.1 Status indication S0 - faults and warnings

Line 4 of status indication S0 shows faults and warnings.



Description of the fault indications:

FAULT IND.
A fault has occurred
→ For further information, press ▼▲ and go to status indication S1.

WARNING IND.
A warning has occurred
→ For further information, press ▼▲ and go to status indication S2 .

FAULT + WARNING
Faults as well as warnings have occurred.
→ For further information, press ▼▲ and go to status indication S1 (faults) or S2 (warnings).

NOT READY IND.
The actuator cannot be operated from REMOTE. The actuator can only be operated via the local controls.
→ For further information, press ▼▲ and go to status indication S3 (cause of fault signals).

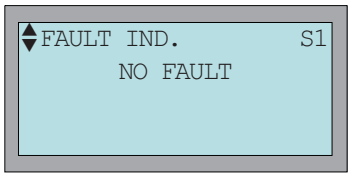
FLT + NR
Faults and the NOT READY IND. signal have occurred.
→ For further information, press ▼▲ and go to status indications S1 or S3 .

WRN + NR
Faults and the NOT READY IND. signal have occurred.
→ For further information, press ▼▲ and go to status indications S2 or S3 .

FLT + WRN + NR
Faults, warnings, and the NOT READY IND. signal have occurred.
→ For further information, press ▼▲ and go to status indication S1 to S3.

8.1.2 Status indication S1 - faults

Faults are indicated within this group:



Description of the fault indications:

NO FAULT

No fault has occurred.

INTERNAL FAULT

Internal fault has occurred.
For further information:

1. Go to group D0: Press C and hold down until the diagnostic indication D0 is displayed.
2. Go to diagnostic indication D2 : Press ▼ twice.

TORQUE FAULT (CLOSE

Torque fault in direction CLOSE.

→ Operation command in direction OPEN, or
→ Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button, or
→ Issue reset command via fieldbus.

TORQUE FAULT (OPEN)

Torque fault in direction OPEN

→ Operation command in direction CLOSE, or
→ Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button, or
→ Issue reset command via fieldbus.

LOSS OF PHASE

One phase is missing.

→ Test/connect phases.

THERMAL FAULT

Motor protection tripped.

→ Cool off, wait.
– If the fault indication display persists after cooling off:
Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button
– Issue reset command via fieldbus.
→ Check fuse F4.

CONFIGURATION FAULT

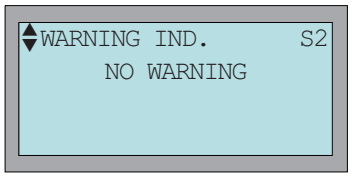
The controls' configuration is incorrect.
For further information:

→ Cool off, wait.

1. Go to group D0: Press C and hold down until the D0 diagnostic indication is displayed.
2. Go to diagnostic indication D4: Press ▼ four times.

8.1.3 Status indication S2 - warnings

Warnings are indicated within this group:



Description of the warnings:

NO WARNING

No warnings have occurred.

WARNING RUN.TIME

The preset running time for a travel between end position OPEN and end position CLOSED has been exceeded.

→ Set the running time (MONITOR TRIGGERS parameter) in accordance with the actual running time.
→ Check tripping behaviour of end position switches.
→ Check actuator mechanics.

WARNING STARTS/RUN

The preset values for max. starts/h or max. running time/h have been exceeded.

→ Check modulating behaviour.
→ Increase dead time.
→ Reduce number of setpoint changes.

INTERNAL FEEDBACK

Position transmitter (potentiometer or RWG) is not standardised.

→ Operate actuator into both end positions (OPEN and CLOSED), one after the other.

INTERNAL WARNING

Internal warnings have occurred.
For further information:

1. Go to group D0: Press C and hold down until the D0 diagnostic indication is displayed.
2. Go to diagnostic indication D3 : Press ▼ three times.

FEEDBACK E2 LOSS

Signal loss of position transmitter.

→ Check position transmitter signal.

1. Go to group D0: Press C and hold down until the diagnostic indication D0 is displayed.
2. Go to diagnostic indication D7 , D8, or D9 . Press ▼ either seven, eight, or nine times.

→ Check position transmitter wiring (potentiometer or RWG).
→ Check POSITION E2 parameter. The setting must correspond to the wiring diagram.

SETPOINT E1 LOSS

Signal loss of the set point.

→ Check wiring.

TORQUE E6 LOSS

Signal loss of torque source.

→ Check wiring.

I/O1 ANALOG IN1 LOSS

Signal loss of parallel interface of analogue input 1(only for fieldbus/standard interface combinations, page 66).

→ Check wiring.

I/O1 ANALOG IN2 LOSS

Signal loss of parallel interface of analogue input 2 (only for fieldbus/standard interface combinations, page 66).

→ Check wiring.

P-FEEDBACK E4 LOSS

Signal loss of process feedback E4 (only if process controller of logic sub-assembly is available and active).
→ Check wiring.

FIBRE OPTIC LOSS

Signal loss of fibre optic cable (only for bus with fibre optic loop topology).
→ Check wiring.

ANALOG IN1 BUS1 LOSS

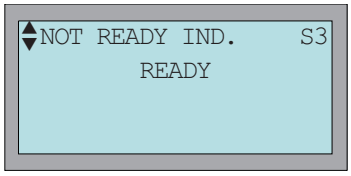
Signal loss of analogue input 1.
→ Check wiring.

ANALOG IN2 BUS1 LOSS

Signal loss of analogue input 2.
→ Check wiring.

8.1.4 Status indication S3 - causes for not ready remote

The causes for the NOT READY IND. fault signals (status indication S0) are indicated within this group.



Description of the fault indications:

READY

Actuator can be operated from REMOTE.

NOT REMOTE

Actuator **cannot** be operated from REMOTE.
Possible causes:
Selector switch in position LOCAL or OFF.

WRONG COMMAND

Indicates the fact that several operation commands were received simultaneously via the fieldbus (e.g. REMOTE OPEN and REMOTE CLOSE simultaneously or REMOTE CLOSE/REMOTE OPEN and REMOTE SETPOINT (nominal) simultaneously) or that the max. value for a nominal position has been exceeded.

EMERGENCY MODE

The operation mode EMERGENCY is active.

EXTERNAL CONTROLS BUS

For combination fieldbus/standard interface function:
Operation via parallel interface.

EMCY STOP ACTIVE

The EMERGENCY STOP button has been operated.

ACTUATOR LOCKED

The actuator is locked (only set for special applications, e.g. bypass function).

8.2 Diagnostics

Table of contents:

8.2.1 Operating data logging
8.2.2 Diagnostic indication (D) via the display

8.2.1 Operating data logging

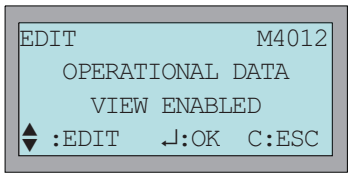
The operating data provides details e.g. about the running time, the number of starts, number of torque faults etc.
The analysis of this data provides valuable information regarding the optimization of both actuator and valve. When using this information purposefully, actuator and valve will be carefully operated, e.g. through appropriate parameter setting.
In case of fault, the logging of operating data makes a quick error diagnostics possible.

Enable viewing

The OPERATIONAL DATA configuration must be set to VIEW ENABLED:

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   CONFIGURATION (M4)
        SPECIAL FUNCTIONS (M40)
             OPERATIONAL DATA (M4012)
```



Default value: VIEW ENABLED

⬇ **Description of the parameter settings:**

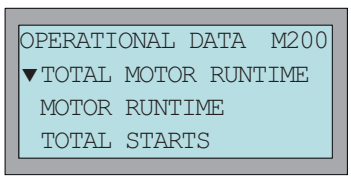
VIEW NOT ENABLED
The operational data is not indicated in the display

VIEW ENABLED
The operational data is indicated in the display

Viewing the operational data

➡ **Via the menu to parameter:**

```
MAIN MENU (M0)
   OPERATIONAL DATA (M2)
```



Various data is monitored by the AUMATIC and saved to a non-volatile memory (EEPROM). Two counters are provided, one of them is erasable. The recorded data can be read and deleted via the display. The access right for deletion is password-protected.

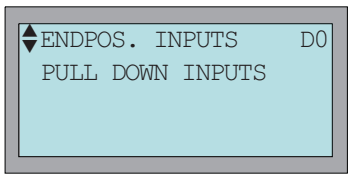
Table 10	
Operational data	
TOTAL MOTOR RUNTIME	Motor running time in the complete lifetime
MOTOR RUNTIME	Reset to 0 possible
TOTAL STARTS	Number of start (motor starts) in the complete lifetime
STARTS	reset to 0 possible
TOTAL TSC STOPS	Number of torque switch trippings in direction CLOSE in the complete lifetime
TSC STOPS	Reset to 0 possible
TOTAL LSC STOPS	Number of limit switch trippings in direction CLOSE in the complete lifetime
LSC STOPS	reset to 0 possible
TOTAL TSO STOPS	Number of torque switch trippings in direction OPEN in the complete lifetime
TSO STOPS	Reset to 0 possible
TOTAL LSO STOPS	Number of limit switch trippings in direction OPEN in the complete lifetime
LSO STOPS	Reset to 0 possible
TOTAL TSC FAULTS	Number of torque faults in direction CLOSE in the complete lifetime
TSC FAULTS	Reset to 0 possible
TOTAL TSO FAULTS	Number of torque faults in direction OPEN in the complete lifetime
TSO FAULTS	Reset to 0 possible
TOTAL THERMAL FLT.	Number of thermal faults (motor protection) in the complete lifetime
THERMAL FAULTS	Reset to 0 possible
TOT.WRN.STARTS/RUN1	Total of all time sections during which a start/run warning was signalled in the complete lifetime.
WRN.STARTS/RUN1	Reset to 0 possible
TOT.WRN.STARTS/RUN2	Max. time section during which a start/run warning was signalled in the complete lifetime.
WRN.STARTS/RUN2	Reset to 0 possible
TOTAL NO. POWER ON	Number of all system starts in the complete lifetime
NO. POWER ON	Reset to 0 possible

8.2.2 Diagnostic indications (D) via the display

The information contained in the diagnostic indications is only provided for the AUMA service and for enquiries in the factory.

1. Change from the status indications (group S) to the diagnostic indications (group D): Press **C** push button and hold it down until the group D0 appears (menu M is hereby skipped).
2. To return to the status indications:
   Press **C** push button briefly once.

Wiring of the end position inputs (D0)

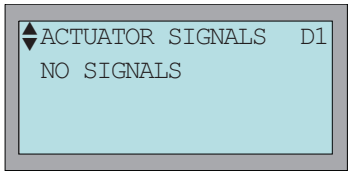


Description of the displays:

PULL DOWN INPUTS
Pull Down resistors are used for the inputs of the end position signals (limit and torque switches) on the logic board.

PULL UP INPUTS
Pull Up resistors are used for the inputs of the end position signals (limit and torque switches) on the logic board.

Actuator signals (D1)



Description of the displays:

NO SIGNALS
No actuator signals set

TSC (DSR)
Torque signal CLOSED in actuator tripped (not stored)

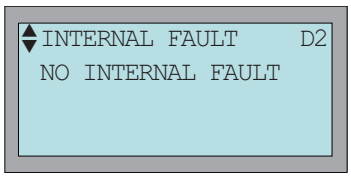
TSO (DOEL)
Torque signal OPEN in actuator tripped (not stored)

LSC (WSR)
Limit switching CLOSED in actuator tripped

LSO (WOEL)
Limit switching OPEN in actuator tripped

THERMAL FAULT
Motor protection tripped. Remedy:
Wait for cool-down; the signal is then either cancelled automatically or if not, bring selector switch to position **Local operation** and operate **Reset** push button. Check fuse F4.

Internal faults (D2)



Description of the displays:

NO INTERNAL FAULT
No internal fault has occurred

THERMISTOR
A fault in the TMS tripping device was detected during start-up. Remedy: Check wiring diagram and MOTOR PROTECTION (M4108)). Check TMS tripping device.

SELECTOR SWITCH
The selector switch recognition is defective (no Hall sensor is tripped or more than one Hall sensor is tripped). Remedy: Check local control board, check mechanical attachment of the local controls in the housing

OUTPUT TRANSISTOR
The output of the operation commands to the relay board is defective, remedy: Check logic board and relay board

I/O1 CAN
No communication to parallel interface available. Remedy: Setting of I/O1 STACK 1 (M4106) must be in accordance with the wiring diagram, check wiring, check parallel interface

PHASE DETECTION
The phase sequence detection on the power supply is defective. Remedy: Check phase sequence detection, check wiring

24VDC FAULT
The internal 24 V supply of the AUMATIC is not within the supply voltage limits. Remedy: Check supply voltage, check power supply unit, check wiring of the AUMATIC voltage supply.

LOGIC CAN
The logic cannot establish any communication

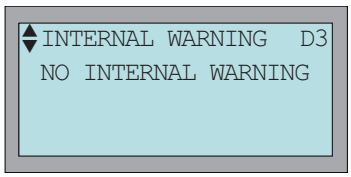
NO REACTION
Fault signal of the reaction monitoring

MWG CAN
No communication to MWG available. Remedy: The I/O STACK 1 (M4106) setting must be in accordance with the wiring diagram; check wiring, check MWG.

MWG DEFECTIVE
The internal diagnostics of the MWG have detected a fault.
Remedy: Replace/reconfigure MWG.

LOCAL CONTROL FAULT
Hardware fault of the local controls.

Internal warnings (D3)

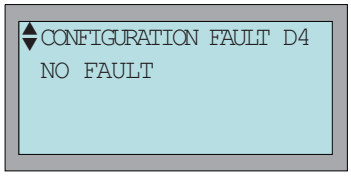


Description of the displays:

NO INTERNAL WARNING
No internal warnings have occurred

NO FACTORY PARAMS
No valid factory settings are available.

Configuration fault (D4)



Description of the displays:

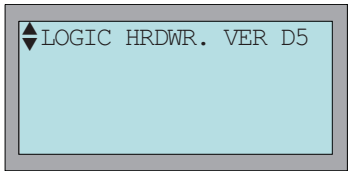
NO FAULT
AUMATIC has been correctly configured.

ENDPOS. INPUTS
The LIMIT/TORQUE-SWITCH parameter setting does not correspond to the ENDPOS. INPUTS parameter configuration (can only be modified by the AUMA service).

NO SWITCHING OFF
The LIMIT/TORQUE-SWITCH parameter setting does not correspond to the CONTROL UNIT) parameter configuration (can only be modified by the AUMA service).

E1-IN NOT EXISTING
The SETPOINT E1 parameter setting does not correspond to the I/O STACK 1 (M4106) parameter configuration (can only be modified by the AUMA service).

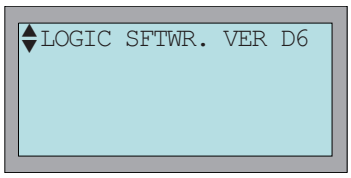
Hardware version of the logic (D5)



Description of the display:

LOGIC HRDWR. VER
Display of hardware version of the logic

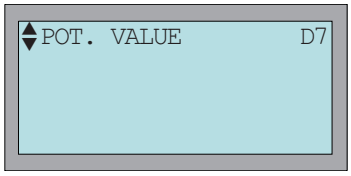
Software version of the logic (D6)



Description of the display:

LOGIC SFTWR. VER
Display of software version of the logic

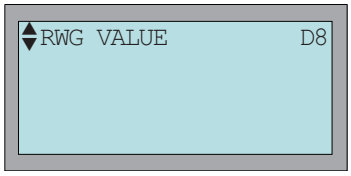
Potentiometer value (D7)



Description of the display:

POT. VALUE
The voltage values are displayed here if a potentiometer is installed:
in line 2 the value in end position CLOSED,
in line 3 the current value and
in line 4 the value in end position OPEN

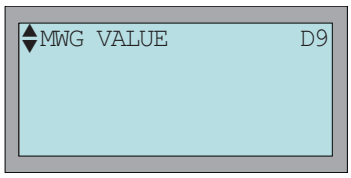
RWG value (D8)



Description of the display:

RWG VALUE
The current values are displayed here if an RWG is installed:
in line 2 the value in end position CLOSED,
in line 3 the current value and
in line 4 the value in end position OPEN

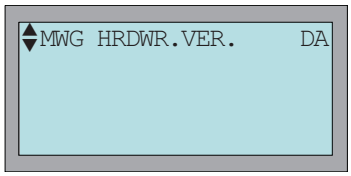
MWG value (D9)



Description of the display:

MWG VALUE
The current values are displayed here if an MWG is installed:
in line 2 the value in end position CLOSED,
in line 3 the current value and
in line 4 the value in end position OPEN

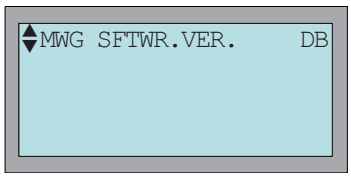
MWG hardware version (DA)



Description of the display:

MWG HRDWR.VER.
Hardware version of the MWG

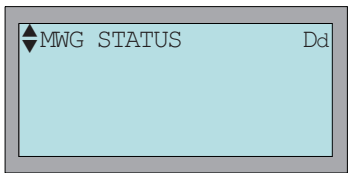
MWG software version (DB)



Description of the display:

MWG SFTWR.VER.
Software version of the MWG

MWG status (Dd)



Description of the displays:

MWG OK
MWG is working, no faults.

HALLSENSOR ERROR
Remedy: Exchange MWG.

E2PROM ERROR
Remedy: Exchange MWG.

NOT CALIBRATED
Remedy: Re-calibrate MWG (can only be performed in the factory).

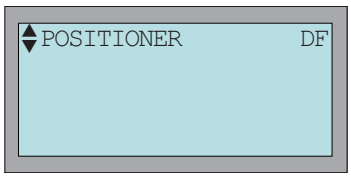
NO POSITION REFEREN.
Remedy: Re-calibrate MWG (can only be performed in the factory).

TORQUE SYSTEM FAULT
Remedy: Exchange MWG.

NO ENDPOSITIONS
Remedy: Re-set limit end positions (can only be performed in the factory).

NO TORQUE LIMITS
Remedy: Re-set torque pivot points (can only be performed in the factory).

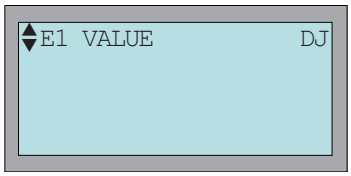
Positioner (DF)



Description of the display:

POSITIONER
Determined values of the adaptive positioner.
Line 2: inner deadband CLOSED, line 3: outer deadband, line 4: inner dead band OPEN.

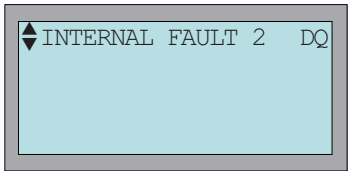
E1 value (DJ)



Description of the display:

E1 VALUE
Shows setpoint E1 in mA (only for standard I/O interface)

Internal fault 2 (DQ)



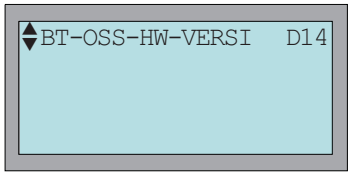
Description of the displays:

RAM FAILURE
RAM of the logic defective.
Remedy: Replace logic.

EEPROM FAILURE
EEprom of the logic defective. Remedy: Check logic, if necessary exchange Eeprom.

FF CAN
No communication to the Foundation Fieldbus interface available. Remedy: I/O STACK 1 (M4106) must agree with the wiring diagram. Check wiring. Check I/O interface.

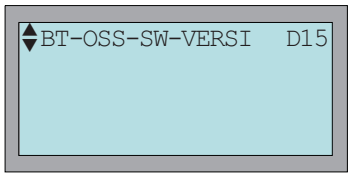
Bluetooth hardware version (D14)



Description of the display:

BT-OSS-HW-VERSION
Hardware version of the Bluetooth local controls

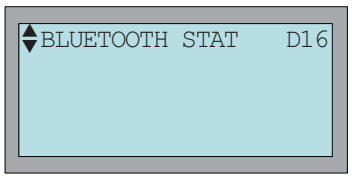
Bluetooth software version (D15)



Description of the display:

BT-OSS-SW-VERSION
Software version of the Bluetooth local controls

Bluetooth status (D16)

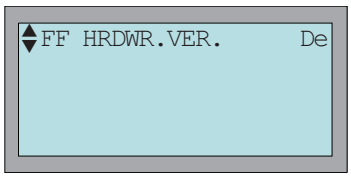


Description of the displays:

BLUETOOTH READY
Bluetooth connection available.

BLUETOOTH NOT RDY
No Bluetooth connection available.

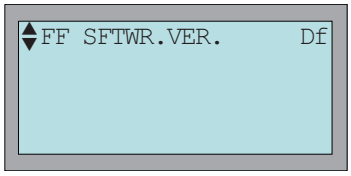
FF hardware version (De)



Description of the display:

FF HRDWR.VER.
Hardware version of the Foundation Fieldbus interface

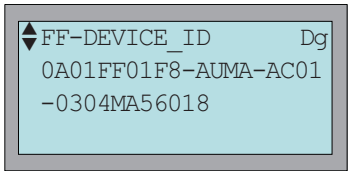
FF software version (Df)



Description of the display:

FF SFTWR.VER.
Software version of the Foundation Fieldbus interface

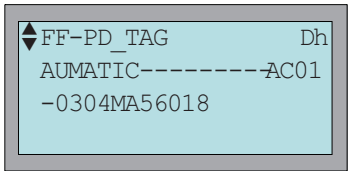
FF device ID (Dg)



Description of the displays:

FF-DEVICE_ID
The device ID is a worldwide unambiguous device identification. It serves the purpose of recognising a Foundation Fieldbus device by means of the fieldbus and, therefore, cannot be modified. The device ID comprises 32 characters and consists of the manufacturer ID (0x0A01FF), the device type (0x01F8), the text -AUMA-AC01-, as well as the AUMATIC works number.

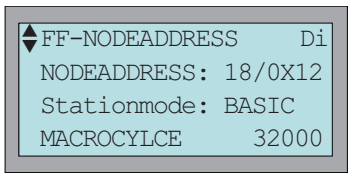
FF PD tag (Dh)



Description of the display:

FF-PD_TAG
The PD Tag (Physical Device Tag) is the physical device name. The PD Tag comprises 32 characters and consists of the text AUMATIC -AC01- and the works number as default, when leaving the factory. The PD Tag serves the purpose of device identification within a plant and, therefore, the user may adapt the identification via Foundation Fieldbus as required.

FF node address (Di)



Description of the display:

NODEADDRESS

The current device address as decimal and hexadecimal value.

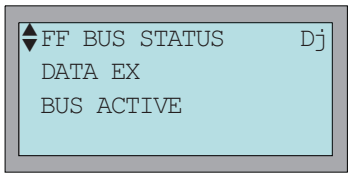
Stationmode

: BASIC, when configurating the AUMATIC as Basic Device.
: LM, when configurating the AUMATIC as Link Master Device.
: LAS, if the AUMATIC has been configured as Link Master device and is working as LAS (Link Active Scheduler).

MACROCYLE

The preset macro cycle of the Foundation Fieldbus (unit 1/32 ms).

FF bus status (Dj)



Description of the displays:

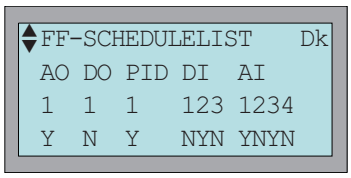
DATA EX

Indicates active actuator controls via the Foundation Fieldbus interface; for this, the APVB transducer block must be activated in AUTO and the DOFB or AOFB within the AUMATIC must be included in the FF Scheduling. Thus, DATA EX signals an operable local Foundation Fieldbus application within the AUMATIC.

BUS ACTIVE

Indicates, that besides the AUMATIC, further Foundation Fieldbus devices are connected to the same bus. This indicates correct wiring.
To ensure perfect function in combination with other devices, both DATA EX and BUS ACTIVE must be set.

FF schedule list Dk

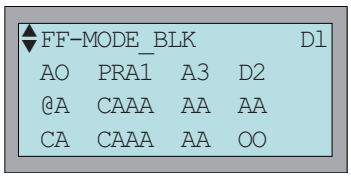


Description of the displays:

FF-SCHEDULELIST

The FF schedule list comprises the AUMATIC function blocks which can be called up within the AUMATIC due to a function block application configured by the user and loaded into the AUMATIC.
The transducer blocks pertaining to the function blocks are not shown, as they are directly called up by the used function blocks; the same is valid for the resource block not being shown, as it will be automatically called up within the AUMATIC.
The character below the function block number indicates, whether the respective function block is being called up within the AUMATIC or included in the FF Scheduling (“Y”) or not (“N”).

FF mode block Dl



0	AOFB	5	AITB1
1	APVB	6	AIFB3
2	PID	7	AITB3
3	RESOURCE	8	DIFB2
4	AIFB1	9	DITB2

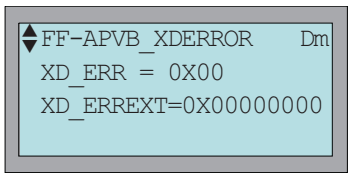
Description of the displays:

This display shows the target and actual operation modes of all function blocks called up within the AUMATIC. The pertaining transducer block is shown with each function block (exceptions: resource block and PID function block).
Only those function blocks are shown being called up in the AUMATIC.
The following identifications are used for the target and actual operation modes of the function blocks:

r	ROut	Remote Output
R	RCas	Remote Cascade
C	Cas	Cascade
A	Auto	Automatic
M	Man	Manual
L	LO	Local Override
I	IMan	Initialisation Manual
O	OOS	Out of Service
@	AUTO+CAS	Automatic and Cascade

This way, the states of all function blocks can be shown on one display page.

FF APVB-XD error Dm



Description of the displays:
Actuator problems or fault signals are signalled back to the function blocks via the transducer blocks. The faults occurred are shown in the transducer blocks by means of the variables XD_ERROR and XD_ERROR_EXTENDED. The most important actuator fault signals are combined via the APVB and transferred to the DOFB or AOFB, which will in turn take on a safe operation status. The contents of these two variables are shown on the FF-APVB_XDERROR diagnostic page. For further references regarding the interpretation of the error codes shown, please refer to the “Manual (Device integration Fieldbus) AUMATIC AC 01.1/ACExC 01.1 Foundation Fieldbus". Any existing error is simultaneously shown via the hitherto existing status and diagnostic displays of the AUMATIC.

FF live list Dn

Description of the displays:
This diagnostic displays lists the first 15 device addresses comprised within the Foundation Fieldbus system. The comma after the last displayed device address indicates that further participants are available.
It is only possible to dress the live list, if the AUMATIC is operated as Link Master Device (LM); otherwise the following is displayed:
BASIC MODE, NO LIVE_LIST

8.3 Troubleshooting

8.3.1 Problems with position feedback/indication E2 (from actuator)

→ Check FEEDBACK E2 (M4101) parameter, page 27):
Value must correspond to the installed position transmitter.
→ Check I/O1 ANALOG OUT1 (M410A) parameter:
Value must correspond to wiring diagram.
→ Check I/O ANLOG OUT1 TYPE (M410A) parameter:
Value must correspond to desired feedback.
→ Check fieldbus configuration
→ Check diagnostic indications D7 or D8 (depending on the type of position transmitter installed in the actuator):
The value in the upper line is the raw value in the end position CLOSED, the value in the bottom line is the raw value in the end position OPEN while the value in the middle line is the current position transmitter raw value (it must change evenly throughout the complete stroke when the output drive shaft is turning).
→ For torque seating:
Set limit end position as close as possible to torque switching off point
→ Check galvanically isolated 24 V DC supply of the position feedback

8.3.2 Display hardly readable or illegible

→ Check AUMATIC 24 V voltage supply (e.g. when switching on, all LEDs of the local controls must briefly light up, if necessary, check fuses).
→ Change LCD contrast (for green display only). For this, change LCD CONTRAST(M011) parameter (the higher the value the darker the display) .

8.3.3 Actuator does not run

→ Check motor voltage supply.
→ Check AUMATIC 24 V voltage supply (e.g. when switching on, all LEDs of the local controls must briefly light up, if necessary, check fuses).
→ Check fault signals (status indication S1 or diagnostic indication D2).
Actuator cannot be operated when fault signals have occurred.

8.3.4 Actuator does only operate from local

→ Check setting of I/O STACK 1 (M4106). The setting must correspond to wiring diagram.
→ Check NOT READY IND. (status indication S3) indication.

8.3.5 Actuator is not switched off by limit seating in direction CLOSE or OPEN

The actuator is set to torque seating.
Set actuator to limit seating:
→ Set parameter CLOSED POSITION (page 40) to LIMIT.
→ Set parameter OPEN POSITION (page 40) to LIMIT.

Index

A
Actuator behaviour 35
Actuator reaction 38
Adaptive behaviour 50
Alarm contact 25
Analogue output 1 feedback signals 28
Analogue output 2 feedback signals 30
Analogue position feedback signal 29

B
Blinker 21,26
Bluetooth interface 12

C
Collective fault signal 25
COM-AC 12
COM-AC (software) 8
Combination fieldbus/standard interface 66
Commission number 7
Contrast 14
Control 7
Corrective action 74

D
Dead band 51
Dead time 52
Delay time 39
Diagnostics 78
Display - indications 15

E
Electronic name plate 17
EMERGENCY behaviour 34,36
EMERGENCY operation 34
EMERGENCY Position 36
EMERGENCY STOP function 60
End position tolerance 53
External inputs for bus 63

F
Failure behaviour 37
Failure delay time 39
Failure functions 67
Failure operation 38
Failure position 38
Failure source 38
Faults 74
Feedback E2 27
Feedback signals 27
Feedback via output contacts 23
Foundation Fieldbus interface 62
Functions of the AUMATIC 40

I
I/O stack 2 66
Identification 7
Indication lights 19
Indications 15
Infra-red interface 12
Input MODE 53
Intermediate positions 43
Internet 7
Intrusive 8

L
Language change in the display 14
LCD contrast 14
LEDs 19
Limit seating 40
Limit switching 42
Local controls 9
Local controls enable function 59
Logging of operating data 78

M
Max. error variable (outer dead band) 52
Max. permissible operating time 71
MODE input 53
Monitoring functions 67
Motor protection 68
Motor protection by-pass 36
Multiport valve function 47

N
Name plate 7
Non-Intrusive 8
Non-Intrusive (version) 8
Number of starts 69

O
OFF times 58
ON times 58
Open-close duty
  Open-close duty - modulating duty selection 53
Operating time monitoring 71
Operation 9
Operation mode 31
Operation mode EMERGENCY 34
Operation mode FAILURE 37
Operation mode LOCAL 32
Operation mode OFF 31
Operation mode REMOTE 33
Operation mode SETPOINT MODE 50
Output contacts 23
Overrun (inner dead band) 51

P
Password change 13
Password entry 11
Phase failure monitoring 73
Position feedback signals 27
Position transmitter 27
Positioner 50
Preset position 39
PTC thermistors 68
Push-to-run operation 9,32,33

R
Range of application 6
Reaction monitoring 72
Running indication 19,21,26
Running time per hour 69
Running time, max. permissible 70

S
Safety instructions 5
Self-retaining 9,32,33
Setpoint E1
  Input range 55
  Source 54
Short description 8
Signals 22
Signals via fieldbus 22
Size 7
Source for initiation 38
Status indication 15
Stepping mode 56
Stepping range 57

T
Thermoswitches 68
Torque by-pass 67
Torque E6 28
Torque feedback signal 29
Torque indication 16
Torque monitoring 67
Torque seating 40
Torque switching by-pass 36
Torque switching: check/set 41
Type 7
Type of seating 40

V
Valve position 15

W
Warnings 74
Wiring diagram (name plate) 7

Parameter index and display indications

A
ADAPTIVE BEHAVIOUR 50
ALARM CONTACT 25

B
BLINKER 21,26

C
CHANGE PASSWORD 13
CLOSED POSITION 40,42
CLOSING 41
CLOSING DEADBAND 51

D
DEAD TIME 52
DELAY TIME 39
DIAGNOSTIC INDICATIONS
D0 - ENDPOS. INPUTS 80
D1 - ACTUATOR SIGNALS 80
D14 - BT-OSS-HW-VERSI 86
D15 - BT-OSS-SW-VERSI 86
D16 - BLUETOOTH STAT 86
D2 - INTERNAL FAULT 81
D3 - INTERNAL WARNINGS 82
D4 - CONFIGURATION FAULT 82
D5 - LOGIC HRDWR. VER 82
D6 - LOGIC SFTWR. VER 83
D7 - POT. VALUE 83
D8 - RWG VALUE 83
D9 - MWG VALUE 84
DA - MWG HRDWR.VER. 84
DB - MWG SFTWR.VER. 84
Dd - MWG STATUS 84
De - FF HRDWR.VER. 87
Df - FF SFTWR.VER. 87
DF - POSITIONER 85
Dg - FF-DEVICE_ID 87
Dh - FF-PD_TAG 87
DI - FF-NODE-ADDRESS 88
DJ - E1 VALUE 85
Dj - FF BUS STATUS 88
Dk - FF-SCHEDULELIST 89
Dl - FF-MODE_BLK 89
Dm - FF-APVB-XDERROR 90
Dn - FF-LIVE-LIST 90
DQ - INTERNAL FAULT 285
DIRECTION CLOSE 57
DIRECTION OPEN 57

E
EL. NAME PLATE 17
EMERG.SEL.SW.POS. 34
EMERGENCY BEHAVIOUR 35
EMERGENCY BY-PASS 36
EMERGENCY POSITION 35
ENABLE LOCAL MODE 59
EXTERNAL INPUTS BUS 63

F
FAILURE BEHAVIOUR 37
FAILURE POSITION 38
FAILURE SOURCE 38
FEEDBACK E2 27
FF ANLOG IN1 END 55
FF ANLOG IN1 START 55
FULL CLOSE ADJUST 53
FULL OPEN ADJUST 53

I
I/O 1 33
I/O ANLOG IN1 END 55
I/O ANLOG IN1 START 55
I/O1 ANALOG OUT1 28
I/O1 ANALOG OUT1 TYPE 29
I/O1 ANALOG OUT2 30
I/O1 ANALOG OUT2 TYPE 30
INTERMED. POSITION 43

L
LANGUAGE 14
LCD CONTRAST 14
LED 1 (LEFT HAND) 20
LED 2 20
LED 3 20
LED 4 20
LED 5 (RIGHT HAND) 20
LOCAL CLIENT 12

M
MAINTAINED LOCAL 32
MAINTAINED REMOTE 33
MAX DUTY CYCLE 70
MAX STARTS/HOUR 70
MAX. RUN TIME 71
MONITOR TRIGGERS 69,70,71
MOTOR PROTECTION 68

O
OFF TIME CLOSE 58
OFF TIME OPEN 58
ON TIME CLOSE 58
ON TIME OPEN 58
OPEN POSITION 40,42
OPENING 41
OPENING DEADBAND 51
OPERATIONAL DATA 78
ORDER DATA 17
OUTER DEADBAND 52
OUTPUT CONTACT 1 23
OUTPUT CONTACT 2 23
OUTPUT CONTACT 3 23
OUTPUT CONTACT 4 23
OUTPUT CONTACT 5 23

P
POS NUMBER 49
POS. 1 44,48
POS. DIRECTRUNNING 47
POS.1 BEHAVIOUR 45
POS.1 CONTROL 45
POS.1 SELECTOR SW 44
POSITIONER 48
PRESET POSITION 36,39
PRODUCT DATA 17
PROJECT DATA 17

R
REACTION MONITORING 72

S
SEATING MODE 40
SERVICE DATA 17
SET LIMIT SWITCHES 42
SETPOINT E1 54
START STEP CLOSE 57
START STEP OPEN 57
STEPPING MODE 56
STOP STEP CLOSE 57
STOP STEP OPEN 57

T
TORQUE 41,67
TORQUE BY-PASS DURATION 67
TORQUE E6 28
TORQUE INDICATION 16

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