

Translation of original operating instructions

## AMS 108i

Optical laser measurement system – Ethernet TCP/IP



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# 1 About this document

## Used symbols and signal words

Tab. 1.1: Warning symbols and signal words

|                                                                                   |                                                                                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Symbol indicating dangers to persons                                                                                                                 |
|  | Symbol indicating dangers from harmful laser radiation                                                                                               |
|  | Symbol indicating possible property damage                                                                                                           |
| <b>NOTE</b>                                                                       | Signal word for property damage<br>Indicates dangers that may result in property damage if the measures for danger avoidance are not followed.       |
| <b>CAUTION</b>                                                                    | Signal word for minor injuries<br>Indicates dangers that may result in minor injury if the measures for danger avoidance are not followed.           |
| <b>WARNING</b>                                                                    | Signal word for serious injury<br>Indicates dangers that may result in severe or fatal injury if the measures for danger avoidance are not followed. |

Tab. 1.2: Other symbols

|                                                                                     |                                                                                                          |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|  | Symbol for tips<br>Text passages with this symbol provide you with further information.                  |
|  | Symbol for action steps<br>Text passages with this symbol instruct you to perform actions.               |
|  | Symbol for action results<br>Text passages with this symbol describe the result of the preceding action. |

## 2 Safety

This sensor was developed, manufactured and tested in line with the applicable safety standards. It corresponds to the state of the art.

### 2.1 Intended use

The AMS 100i optical laser measurement system is an absolute measuring optical laser measurement system for distance measurement up to 120 m against a reflector.

#### Areas of application

The AMS 100i is designed for the following areas of application:

- Positioning of automated, moving plant components
- Travel and lifting axes of stacker cranes
- Repositioning units
- Gantry crane bridges and their trolleys
- Elevators
- Electroplating plants

|  <b>CAUTION</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | <p><b>Observe intended use!</b></p> <p>The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not complying with its intended use.</p> <ul style="list-style-type: none"> <li>☞ Only operate the device in accordance with its intended use.</li> <li>☞ Leuze electronic GmbH + Co. KG is not liable for damages caused by improper use.</li> <li>☞ Read these operating instructions before commissioning the device. Knowledge of the operating instructions is an element of proper use.</li> </ul> |
|  <b>CAUTION</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | <p><b>UL applications!</b></p> <p>For UL applications, the device must be powered by a PS2 in accordance with EN / IEC / UL 62368-1 or an LPS in accordance with EN / IEC / UL 60950-1 or NEC Class 2.</p>                                                                                                                                                                                                                                                                                                                                            |
| <b>NOTICE</b>                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | <p><b>Comply with conditions and regulations!</b></p> <ul style="list-style-type: none"> <li>☞ Observe the locally applicable legal regulations and the rules of the employer's liability insurance association.</li> </ul>                                                                                                                                                                                                                                                                                                                           |

### 2.2 Foreseeable misuse

Any use other than that defined under "Intended use" or which goes beyond that use is considered improper use.

In particular, use of the device is not permitted in the following cases:

- in rooms with explosive atmospheres
- in circuits which are relevant to safety
- for medical purposes

| NOTICE                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Do not modify or otherwise interfere with the device!</b></p> <ul style="list-style-type: none"> <li>✎ Do not carry out modifications or otherwise interfere with the device. The device must not be tampered with and must not be changed in any way.</li> <li>✎ The device must not be opened. There are no user-serviceable parts inside. Opening the device voids the warranty. Warranted features cannot be guaranteed after the device has been opened.</li> <li>✎ Repairs must only be performed by Leuze electronic GmbH + Co. KG.</li> </ul> |

### 2.3 Competent persons

Connection, mounting, commissioning and adjustment of the device must only be carried out by competent persons.

Prerequisites for competent persons:

- They have a suitable technical education.
- They are familiar with the rules and regulations for occupational safety and safety at work.
- They are familiar with the operating instructions for the device.
- They have been instructed by the responsible person on the mounting and operation of the device.

#### Certified electricians

Electrical work must be carried out by a certified electrician.

Due to their technical training, knowledge and experience as well as their familiarity with relevant standards and regulations, certified electricians are able to perform work on electrical systems and independently detect possible dangers.

In Germany, certified electricians must fulfill the requirements of accident-prevention regulations DGUV (German Social Accident Insurance) provision 3 (e.g. electrician foreman). In other countries, there are respective regulations that must be observed.

### 2.4 Disclaimer

Leuze electronic GmbH + Co. KG is not liable in the following cases:

- The device is not being used properly.
- Reasonably foreseeable misuse is not taken into account.
- Mounting and electrical connection are not properly performed.
- Changes (e.g., constructional) are made to the device.

## 2.5 Laser safety notices

|  <b>ATTENTION</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | <p><b>LASER RADIATION – CLASS 2 LASER PRODUCT</b></p> <p><b>Do not stare into beam!</b></p> <p>The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of <b>laser class 2</b> and complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.</p> <ul style="list-style-type: none"> <li>↪ Never look directly into the laser beam or in the direction of reflected laser beams!<br/>If you look into the beam path over a longer time period, there is a risk of injury to the retina.</li> <li>↪ Do not point the laser beam of the device at persons!</li> <li>↪ Interrupt the laser beam using a non-transparent, non-reflective object if the laser beam is accidentally directed towards a person.</li> <li>↪ When mounting and aligning the device, avoid reflections of the laser beam off reflective surfaces!</li> <li>↪ <b>CAUTION!</b> Use of controls or adjustments or performance of procedures other than specified herein may result in hazardous light exposure.</li> <li>↪ Observe the applicable statutory and local laser protection regulations.</li> <li>↪ The device must not be tampered with and must not be changed in any way.<br/>There are no user-serviceable parts inside the device.<br/>Repairs must only be performed by Leuze electronic GmbH + Co. KG.</li> </ul> |
| <b>NOTICE</b>                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                 | <p><b>Affix laser information and warning signs!</b></p> <p>Laser information and warning signs attached to the device. Also included with the device are self-adhesive laser warning and laser information signs (stick-on labels) in multiple languages.</p> <ul style="list-style-type: none"> <li>↪ Affix the laser information sheet to the device in the language appropriate for the place of use.<br/>When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" notice.</li> <li>↪ Affix the laser information and warning signs near the device if no signs are attached to the device (e.g. because the device is too small) or if the attached laser information and warning signs are concealed due to the installation position.<br/>Affix the laser information and warning signs so that they are legible without exposing the reader to the laser radiation of the device or other optical radiation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



- 1 Laser aperture
- 2 Laser warning sign
- 3 Laser information sign with laser parameters

Fig. 2.1: Laser aperture, laser warning signs

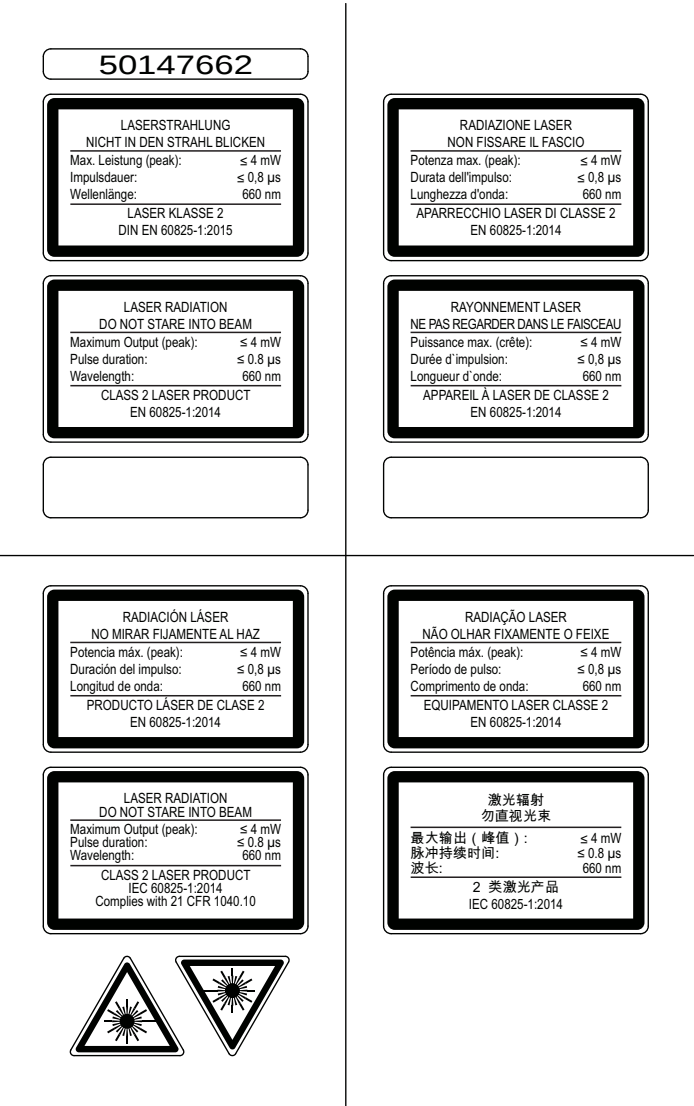


Fig. 2.2: Laser warning and information signs – supplied stick-on labels

### 3 Fast commissioning

Below you will find a short description for the initial commissioning of the AMS 100i. Detailed explanations for all listed points can be found throughout these operating instructions.

#### 3.1 Mounting

Depending on the purchased model, the AMS 100i can be mounted in various ways (see chapter 12 "Order guide and accessories"):

- with pre-mounted alignment unit (BTA)
- with adapter plate (BT)
- with the threaded holes in the housing (without accessories)

The AMS 100i and the corresponding reflector are mounted on two mutually opposing, plane-parallel, flat walls or system parts. For error-free position measurement, there must be an unobstructed line-of-sight between the AMS 100i and the reflector.

##### Mounting the device

Mounting with pre-mounted alignment unit (BTA):

- ✚ Secure the alignment unit together with mounted laser using four M5 screws.
- ✚ Align the laser using the two adjustment screws on the alignment unit. Adjust so that the laser light spot is positioned at the center of the reflector.

If the sensor was purchased without pre-mounted alignment unit (BTA),

- ✚ first mount either the adapter plate (BT) or one of the accessory parts to the sensor or
- ✚ secure the sensor directly using the threaded holes provided in the housing.

For further information, see chapter 5.2 "Mounting the device".

##### Mounting the reflector

- ✚ Secure the reflector with four M5 screws.
- ✚ Tilt the reflector by approx. 1° using the enclosed spacer sleeves.

For further information, see chapter 5.3 "Mounting the reflector".

#### 3.2 Connecting voltage supply

- ✚ Connect the AMS100i via the M12 connection XD1 PWR.

For further information, see chapter 6 "Electrical connection".

#### 3.3 Display

Once the laser measurement system is supplied with voltage, the device status as well as the measured position values can be read on the display. The display automatically switches to the display of the measurement values.

Navigate using the [DOWN]/[ENTER] buttons to read off and change the data and parameters.

For further information, see chapter 4.2.2 "Display".

#### 3.4 Ethernet interface

##### NOTICE



The AMS 108i can communicate via TCP/IP and UDP. Standard is TCP/IP. In the case of communication via UDP, the *UDP* protocol must be activated via the display under the menu item **Ethernet > Host communication**.

##### Standalone operation in Ethernet network

During stand-alone operation of the AMS 108i, the host interface of the superior system is connected to HOST/BUS IN. A star topology (Ethernet structure) is thus possible.

### 3.5 Manual configuration of the IP address

#### NOTICE



To set the network addresses, parameter enable must be activated.

If your system does not include a DHCP server or if the IP addresses of the devices are to be set permanently, proceed as follows:

- ↳ Have the network administrator specify the data for IP address, net mask and gateway address of the AMS 108i.
- ↳ Set these values on the AMS 108i.

The menu structure for display entry can be found at the end of the manual. Call up the appropriate menu levels and enter the respective addresses.

### 3.6 Automatically setting the IP address

If your system includes a DHCP server that is to be used to assign the IP addresses, note the following: DHCP address assignment is deactivated by default. To activate DHCP address assignment, you must first activate parameter enable.

The menu structure for display entry can be found at the end of the manual. Call up the corresponding menu levels to activate DHCP.

### 3.7 Setting the Ethernet host communication

The AMS 108i can communicate via TCP/IP and UDP. Standard is TCP/IP. In the case of communication via UDP, the "UDP" protocol must be activated via the display under the menu item "Ethernet" - "Host communication". UDP and TCP/IP can be activated simultaneously and used in parallel.

If you would like to use the TCP/IP protocol, you must also define whether the AMS 108i is to operate as a TCP client or as a TCP server.

- ↳ Contact your network administrator to determine which communication protocol is used.

### 3.8 TCP/IP

#### NOTICE



For orientation in the menu structure during display entry, see chapter 4.3.1 "Menu structure".

In TCP client mode, the AMS 108i actively establishes the connection to the superior host system (PC / PLC as server). The AMS 108i requires from the user the IP address of the server (host system) and the port number on which the server (host system) accepts a connection. In this case, the AMS 108i determines when and with whom a connection is established!

With an AMS 108i as TCP client, also set the following values:

- IP address of the TCP server (normally the PLC/host computer)
- Port number of the TCP server
- Timeout for the wait time for an answer from the server
- Repetition time for renewed communication attempt following a timeout

In TCP server mode, the superior host system (PC / PLC) actively establishes the connection and the connected AMS 108i waits for the connection to be setup. The TCP/IP stack requires information from the user regarding the local port of the AMS 108i port number on which the connection requests of a client application (host system) are to be accepted. If there is a connection request and a connection is established by the superior host system (PC / PLC as client), the AMS 108i (server mode) accepts the connection. Data can then be sent and received.

↳ With an AMS 108i as TCP server, also set the following values:

- Port number for the communication of the AMS 108i with the TCP client.

### UDP

The AMS 108i requires from the user the IP address and the port number of the communication partner.

In the same way, the host system (PC / PLC) requires the set IP address of the AMS 108i and the selected port number. By assigning these parameters, a socket is formed via which the data can be sent and received.

↳ Activate the UDP protocol.

↳ Also set the following values:

- IP address of the communication partner.
- Port number of the communication partner.

### NOTICE



The AMS 108i provides the possibility of automatic address and port adoption.

## 4 Device description

### 4.1 Operating principle

The AMS 100i optical laser measurement system calculates distances to fixed as well as moving system parts. The distance to be measured is calculated according to the principle of the propagation time of radiated light. Here, the light emitted by the laser diode is reflected by a reflector onto the receiving element of the laser measurement system. The AMS 100i calculates the distance to the reflector using phase-correlated time-of-flight measurement. The high absolute measurement accuracy of the laser measurement system and the fast response time are designed for position control applications.

### 4.2 Indicators and operational controls

#### 4.2.1 LED status indicators

##### PWR LED

Tab. 4.1: PWR indicators

| Color  | State            | Description                                                                                                                                                                                                                           |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | Off              | Device OFF, no supply voltage                                                                                                                                                                                                         |
| Green  | Flashing         | <ul style="list-style-type: none"> <li>No measurement value output</li> <li>Voltage connected</li> <li>Self test running</li> <li>Initialization running</li> <li>Parameter download running</li> <li>Boot process running</li> </ul> |
| Green  | Continuous light | <ul style="list-style-type: none"> <li>Device ok</li> <li>Measurement value output</li> <li>Self test successfully finished</li> <li>Device monitoring active</li> </ul>                                                              |
| Red    | Flashing         | <ul style="list-style-type: none"> <li>Device OK but warning message (ATT, TMP, LSR) set in display</li> <li>Light beam interruption</li> <li>Plausibility error (PLB)</li> </ul>                                                     |
| Red    | Continuous light | No measurement value output, details see chapter 4.2.2 "Display"                                                                                                                                                                      |
| Orange | Continuous light | <ul style="list-style-type: none"> <li>Parameter enable active</li> <li>No data on the host interface</li> </ul>                                                                                                                      |

##### NET LED

Tab. 4.2: NET indicators

| Color | State            | Description                             |
|-------|------------------|-----------------------------------------|
|       | Off              | No supply voltage (Power)               |
| Green | Continuous light | Ethernet interface is activated         |
| Green | Flashing         | Ethernet interface is being initialized |
| Red   | Continuous light | Device starting up                      |

#### 4.2.2 Display

Status and warning messages are shown in the display only if status changes or faults occur at the device.

Example:



Fig. 4.1: Example of status and warning message

Tab. 4.3: Status and warning messages in the display

| Display | Type of message                   | Meaning                                                                                                                                                                                                                                                                                                                                                                        |
|---------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Input 1 or output 1 active        | Function depending on configuration                                                                                                                                                                                                                                                                                                                                            |
| 2       | Input 2 or output 2 active        | Function depending on configuration                                                                                                                                                                                                                                                                                                                                            |
| LSR     | Laser pre-failure message warning | Laser diode old, device still functional, exchange or have repaired.                                                                                                                                                                                                                                                                                                           |
| TMP     | Temperature monitoring warning    | Permissible internal device temperature exceeded / not met                                                                                                                                                                                                                                                                                                                     |
| PLB     | Plausibility error                | Implausible measurement value. Possible cause: <ul style="list-style-type: none"> <li>• Light beam interruption</li> <li>• Measurement range exceeded</li> <li>• Permissible internal device temperature exceeded</li> <li>• Traverse rate &gt; 10 m/s</li> </ul> Depending on the configuration, either zero or the last valid measurement value is output at the interfaces. |
| ATT     | Reception signal warning          | Laser exit window or reflector soiled or fogged by rain, water vapor or fog. Clean or dry surfaces.                                                                                                                                                                                                                                                                            |
| ERR     | Internal hardware error           | The device must be sent in for inspection.                                                                                                                                                                                                                                                                                                                                     |

#### Position value

The measured position value is displayed in the configured unit of measurement.

+87.000 m      With the metric setting, the measurement value is always displayed in meters to three decimal places.

+87.0 in        With the inch setting, the measurement value is always displayed in inches to one decimal place.

#### 4.2.3 Control buttons

Tab. 4.4: Control buttons

|   |       |                                         |
|---|-------|-----------------------------------------|
| ▼ | DOWN  | Navigate downward/sideways              |
| ↵ | ENTER | Confirm/enter value, change menu levels |

#### Navigating within the menus

↵ Use the [DOWN] button to select the menus within a menu level.

↵ Use the [ENTER] button to activate the selected menu item.

When one of the buttons is actuated, the display illumination is activated for 10 minutes.

### Setting values

If a value can be entered, the display will look like the example below:



Fig. 4.2: Example of value entry

- ✎ Set the desired value using the [DOWN] button. If you have entered an incorrect digit, press the [DOWN] button until the desired digit appears again.
- ✎ Save the set value by pressing the [ENTER] button.
- ✎ With multi-digit numbers, after entering a digit press the [ENTER] button to move to the next digit on the right.

### Selecting options

If an option can be selected, the display will look like the example below:



Fig. 4.3: Example of option selection

- ✎ Select the desired option using the [DOWN] button.
- ✎ Activate the option by pressing the [ENTER] button.

## 4.3 Menus

| NOTICE                                                                              |                                                                                                                     |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|  | Terms may be shown in abbreviated form on the display. To improve readability, the terms are written in full below. |

### 4.3.1 Menu structure

#### Main menu (Level 1)

- Parameter
- Language selection
- Diagnosis
- Device information

#### Device information menu

- Product name
- Part no.
- Serial no.
- HW revision
- FW revision

## Parameter menu

Tab. 4.5: Parameter menu structure

| Level 2            | Level 3               | Level 4           | Level 5             | Level 6         |
|--------------------|-----------------------|-------------------|---------------------|-----------------|
| Parameter handling | Parameter enable      |                   |                     |                 |
|                    | Password              | Activate password |                     |                 |
|                    |                       | Password entry    |                     |                 |
|                    | Parameters to default |                   |                     |                 |
| Ethernet           | Ethernet interface    |                   |                     |                 |
|                    |                       | Address           |                     |                 |
|                    |                       | Gateway           |                     |                 |
|                    |                       | Net mask          |                     |                 |
|                    |                       | DHCP activated    |                     |                 |
|                    | Host communication    |                   |                     |                 |
|                    |                       | TCP/IP            |                     |                 |
|                    |                       |                   | Activation          |                 |
|                    |                       |                   | Mode                |                 |
|                    |                       |                   | Keep-alive interval |                 |
|                    |                       |                   | Client              |                 |
|                    |                       |                   |                     | IP address      |
|                    |                       |                   |                     | Port number     |
|                    |                       |                   |                     | Timeout         |
|                    |                       |                   |                     | Repetition time |
|                    |                       |                   | Server              |                 |
|                    |                       |                   |                     | Port number     |
|                    |                       | UDP               |                     |                 |
|                    |                       |                   | Activation          |                 |
|                    |                       |                   | IP address          |                 |
|                    |                       |                   | Port number         |                 |
|                    | Output cycle          |                   |                     |                 |
|                    | Position resolution   |                   |                     |                 |
|                    | Velocity resolution   |                   |                     |                 |

| Level 2        | Level 3                                     | Level 4                | Level 5       | Level 6 |
|----------------|---------------------------------------------|------------------------|---------------|---------|
| Position value | Unit                                        |                        |               |         |
|                | Counting direction                          |                        |               |         |
|                | Offset                                      |                        |               |         |
|                | Preset                                      |                        |               |         |
|                | Error delay                                 |                        |               |         |
|                | Position value in the case of failure       |                        |               |         |
|                | Filter type (as of firmware version V2.0.1) | Normal                 |               |         |
|                |                                             | High                   |               |         |
|                |                                             | Low                    |               |         |
|                |                                             | AVG comp               |               |         |
| I/O            | I/O 1                                       | Port configuration     |               |         |
|                |                                             | Switching input        | Function      |         |
|                |                                             |                        | Activation    |         |
|                |                                             | Switching output       | Function      |         |
|                |                                             |                        | Activation    |         |
|                | I/O 2                                       | Port configuration     |               |         |
|                |                                             | Switching input        | Function      |         |
|                |                                             |                        | Activation    |         |
|                |                                             | Switching output       | Function      |         |
|                |                                             |                        | Activation    |         |
|                | Limit values                                | Max. velocity          | Activation    |         |
|                |                                             |                        | Max. velocity |         |
| Other          | Display dimming                             |                        |               |         |
|                | Service Ethernet                            | IP address             |               |         |
|                |                                             | Port address           |               |         |
|                | Heating control                             | Standard (10°C – 15°C) |               |         |
|                |                                             | Extended (30°C – 35°C) |               |         |

Language selection menu  
(Language selection menu)

Diagnosis menu  
(see chapter 4.3.4 "Diagnosis menu")

## 4.3.2 Parameter menu

## Parameter handling

Tab. 4.6: Submenu *Parameter handling*

| Level 3               | Level 4           | Selection/configuration options<br>Description                                                                                                                                                                                                                                         | Standard |
|-----------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Parameter enable      |                   | <b>Lock and enable parameter entry</b><br>ON/OFF<br>The standard setting (OFF) prevents unintended parameter changes.<br>With parameter enable activated (ON), the display is inverted. In this state, it is possible to change parameters manually.                                   | OFF      |
| Password              | Activate password | <b>Set up password</b><br>ON/OFF<br>To enter a password, parameter enable must be activated.<br>If a password is assigned, changes to the AMS 108i can only be made after the password is entered.<br>The master password 507 overrides the individually set password.                 | OFF      |
|                       | Enter password    | Setting a 4-digit numerical password.<br>After confirming the password, the entered password will be censored with "000" for privacy reasons.                                                                                                                                          |          |
| Parameters to default |                   | <b>Reset device to default settings</b><br>Pressing the [ENTER] button after selecting the menu item <i>Parameters to default</i> resets all parameters to their standard settings without any further security prompts.<br>In this case, English is selected as the display language. |          |

## Ethernet TCP/IP

| Level 3            | Level 4  | Level 5 | Level 6 | Selection/configuration options<br>Description                                                                                                                                                                                                                                                   | Standard        |
|--------------------|----------|---------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Ethernet interface | Address  |         |         | The IP address can be set to any value in the format ---.---.---.---. Normally, the network administrator specifies the IP address that is to be set here. If DHCP is activated, the setting made here has no effect and the AMS 108i is set to the values that it obtains from the DHCP server. | 192.168.60.101  |
|                    | Gateway  |         |         | The gateway address can be set to any value in the format ---.---.---.---. The AMS 108i communicates with participants in other subnets via the gateway.                                                                                                                                         | 000.000.000.000 |
|                    | Net mask |         |         | The net mask can be set to any value in the format ---.---.---.---.                                                                                                                                                                                                                              | 255.255.255.0   |

| Level 3            | Level 4        | Level 5             | Level 6     | Selection/configuration options<br>Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Standard |
|--------------------|----------------|---------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                    | DHCP activated |                     |             | ON/OFF<br>If DHCP is activated, the AMS 108i obtains its settings for IP address, gateway and net mask from a DHCP server. The manual settings made above have no effect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OFF      |
| Host communication | TCP/IP         | Activation          |             | ON/OFF<br>TCP/IP communication with the host is activated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ON       |
|                    |                | Mode                |             | Server/client<br>Server defines the AMS 108i as TCP server: The primary host system (PC / PLC as client) actively establishes the connection and the connected AMS 108i waits for the connection to be set up. Under TCP/IP Server -> Port number, you must also specify the local port on which the AMS 108i receives communication requests from a client application (host system).<br>Client defines the AMS 108i as TCP client: The AMS 108i actively sets up the connection to the primary host system (PC / PLC as server). Under TCP/IP Client, you must also specify the IP address of the server (host system) and the port number on which the server (host system) accepts a connection. In this case, the AMS 108i determines when and with whom a connection is established. | Server   |
|                    |                | Keep-alive interval |             | In order for the device to determine whether the connection to the host still exists, keep-alive messages, which are answered by the host, can be cyclically transmitted. This parameter defines the time interval [ms] in which the keep-alive messages are transmitted. A value of 0 deactivates the transmission of keep-alive messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2000     |
|                    |                | Client              | IP address  | The IP address can be set to any value in the format ---.---.---.---. IP address of the host system with which the AMS 108i exchanges data as TCP client.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0.0.0  |
|                    |                |                     | Port number | The port number can be set to any value between 0 and 49151. Port number of the host system with which the AMS 108i exchanges data as TCP client.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10000    |

| Level 3             | Level 4 | Level 5     | Level 6         | Selection/configuration options<br>Description                                                                                                                                                                                                                                                                                                | Standard |
|---------------------|---------|-------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                     |         |             | Timeout         | The timeout can be set to any value between 100 and 60,000 ms. Time after which an attempt to establish a connection is automatically interrupted by the AMS 108i if the server (host system) does not respond.                                                                                                                               | 1000     |
|                     |         |             | Repetition time | The repetition time can be set to any value between 100 and 60,000 ms. Time after which another attempt is made to establish a connection.                                                                                                                                                                                                    | 5000     |
|                     |         | Server      | Port number     | The port number can be set to any value between 0 and 49151. Local port on which the AMS 108i receives connection requests from a client application (host system) as TCP server.                                                                                                                                                             | 10000    |
|                     | UDP     | Activation  |                 | ON/OFF<br>Activates the connection-free UDP protocol, which is suitable for e.g. transferring process data to the host. UDP and TCP/IP can be used in parallel. For network applications with changing partners or for only brief data transmissions, UDP is preferred as the connection-free protocol.                                       | OFF      |
|                     |         | IP address  |                 | IP address of the host to which data is to be sent. The IP address can be set to any value in the format ---.---.---.---. In the same way, the host system (PC / PLC) requires the set IP address of the AMS 108i and the selected port number. By assigning these parameters, a socket is formed via which the data can be sent and received | 0.0.0.0  |
|                     |         | Port number |                 | Port number of the host to which data is to be sent. The port number can be set to any value between 0 and 49151.                                                                                                                                                                                                                             | 10001    |
| Output cycle        |         |             |                 | Value input<br>Data output cycle in multiples of the AMS 108i measurement cycle of 1 ms (1.7 ms for V1.1.2 and earlier). The parameter is only valid if cyclical transmission of the position values is selected. Cyclical transmission is selected via the protocol.                                                                         | 1        |
| Position resolution |         |             |                 | 0.01 mm / 0.1 mm / 1 mm / 10 mm / free resolution<br>The measurement value can be displayed in these resolutions.<br>The value of the free resolution is determined in the "Position value" submenu in the "Free resolution value" parameter.                                                                                                 | 0.1 mm   |

| Level 3             | Level 4 | Level 5 | Level 6 | Selection/configuration options<br>Description | Standard |
|---------------------|---------|---------|---------|------------------------------------------------|----------|
| Velocity resolution |         |         |         | 1 mm/s / 10 mm/s / 100 mm/s                    | 1 mm/s   |

**Position value**Tab. 4.7: Submenu *Position value*

| Level 3                               | Level 4 | Selection/configuration options<br>Description                                                                                                                                                                                                                                                                                                             | Standard                                                              |
|---------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Unit                                  |         | Metric/Inch<br>Specifies the units of the measured distances.<br>The set values for preset, offset and velocity value are not automatically converted when the unit is changed. Before changing the unit, check these values and adjust if necessary.                                                                                                      | Metric                                                                |
| Counting direction                    |         | Positive/Negative<br>Positive: The measurement value begins at 0 and increases with increasing distance.<br>Negative: The measurement value begins at 0 and decreases with increasing distance. Negative distance values may need to be compensated with an offset or preset.                                                                              | Positive                                                              |
| Offset                                |         | Output value = measurement value + offset<br>The resolution of the offset value is independent of the selected "Position resolution" and is entered in mm or inch/100. The offset value is effective immediately after entry.<br>If the preset value is activated, this has priority over the offset. Preset and offset are not offset against each other. | Maximum configurable value:<br>+/- 120,000 mm<br>+/- 480.000 inch/100 |
| Preset                                |         | The preset value is accepted by means of teach pulse. The teach pulse can be placed on a hardware input of the M12 PWR connector. The hardware input must be appropriately configured. See also configuration of the I/Os.                                                                                                                                 | Maximum configurable value:<br>+/- 120,000 mm<br>+/- 480.000 inch/100 |
| Error delay                           |         | ON/OFF<br>Specifies whether, in the event of an error, the position value immediately outputs the value of the "Position value in the case of failure" parameter or the last valid position value for the configured error delay time.                                                                                                                     | ON/100 ms                                                             |
| Position value in the case of failure |         | Last valid value / zero<br>Specifies which position value is output after the error delay time elapses.                                                                                                                                                                                                                                                    | Zero                                                                  |

| Level 3                                     | Level 4                           | Selection/configuration options<br>Description                                                                                                                                                                                                                                                                    | Standard |
|---------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Filter type (as of firmware version V2.0.1) | Normal<br>High<br>Low<br>AGV comp | Choosing the right filter type can improve measurement accuracy at extreme traverse rates (both positive and negative) and reduce measurement value noise.<br><br>Normal: suitable for use in all areas<br>High: for very high traverse rates<br>Low: for very low traverse rates<br>AVG comp: Compatibility mode | Normal   |

## I/O

Tab. 4.8: Submenu *I/O settings*

| Level 3      | Level 4            | Level 5       | Selection/configuration options<br>Description                                                                                                                                                       | Standard                                            |
|--------------|--------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| I/O 1        | Port configuration |               | Input/Output<br>Defines whether I/O 1 functions as an output or input.                                                                                                                               | Output                                              |
|              | Switching input    | Function      | No function/teach preset/laser ON/OFF                                                                                                                                                                | No function                                         |
|              |                    | Activation    | Low active/High active                                                                                                                                                                               | Low active                                          |
|              | Switching output   | Function      | Velocity / intensity (ATT) / temperature (TMP) / laser (LSR) / plausibility (PLB) / hardware (ERR)<br><br>In the case of multiple entries, the individual functions are processed in an OR function. | Plausibility (PLB)<br>Hardware (ERR)                |
|              |                    | Activation    | Low active/High active                                                                                                                                                                               | Low active                                          |
| I/O 2        | Port configuration |               | Input/Output<br>Defines whether I/O 2 functions as an output or input.                                                                                                                               | Output                                              |
|              | Switching input    | Function      | No function/teach preset/laser ON/OFF                                                                                                                                                                | No function                                         |
|              |                    | Activation    | Low active/High active                                                                                                                                                                               | Low active                                          |
|              | Switching output   | Function      | Velocity / intensity (ATT) / temperature (TMP) / laser (LSR) / plausibility (PLB) / hardware (ERR)<br><br>In the case of multiple entries, the individual functions are processed in an OR function. | Intensity (ATT)<br>Temperature (TMP)<br>Laser (LSR) |
|              |                    | Activation    | Low active/High active                                                                                                                                                                               | Low active                                          |
| Limit values | Max. velocity      | Activation    |                                                                                                                                                                                                      |                                                     |
|              |                    | Max. velocity | Max. configurable value: 15,000 mm/s (60,000 inch/100s)                                                                                                                                              |                                                     |

## Other

Tab. 4.9: Submenu *Other*

| Level 3                 | Level 4      | Selection/configuration options<br>Description                                                                                                                                                                                                    | Standard |
|-------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Display dimming         |              | 10 minutes/ON<br>The display illumination is dimmed after 5 minutes and switched off after 10 minutes.<br>For the parameter <i>OFF</i> parameter is selected, dimming is permanently deactivated, i.e. the measurement value is always displayed. | 10 min   |
| Service Ethernet TCP/IP | Port address | The service interface is available for Leuze-internal purposes only.                                                                                                                                                                              | 7070     |

## 4.3.3 Language selection menu

The AMS 100i is delivered from the factory with the display preset to English.

5 display languages are available:

- English
- German
- French
- Italian
- Spanish

To change the language, no password needs to be entered and parameter enable does not need to be activated. The display language is a passive operational control and not a function parameter.

## 4.3.4 Diagnosis menu

A detailed description of the individual functions can be found in see chapter 9 "Diagnostics and troubleshooting".

## 4.3.5 Operation examples

## Structure of menu items in display

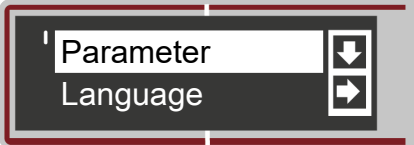
Two menu lines, one on top of the other, are always shown in the display.

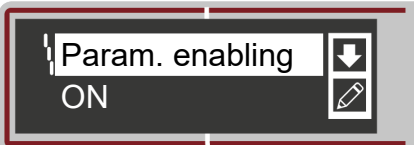
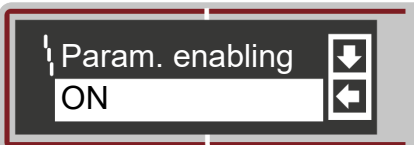
|                    |                    |                       |                   |     |
|--------------------|--------------------|-----------------------|-------------------|-----|
| Device information |                    |                       |                   |     |
| Status messages    |                    |                       |                   |     |
| Parameters         | Parameter handling | Parameter enable      |                   |     |
| Language selection |                    | Password              | Activate password | ... |
| Service            |                    | Parameters to default | Password entry    | ... |

## Parameter enable

During normal operation parameters can be viewed only. If parameters are to be changed, the *ON* menu item in the **Parameter > Parameter handling > Parameter enable** menu must be activated. To do this, proceed as follows.

Tab. 4.10: Operating example for "parameter enable"

|                                                                                     |                                                                                    |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  | In the main menu, use the [DOWN] button to select the menu item <i>Parameter</i> . |
|                                                                                     | Press the [ENTER] button to enter the <i>Parameter</i> menu.                       |

|                                                                                   |                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Press the [DOWN] button to select the menu item <i>Parameter handling</i>.</p> <p>Press the [ENTER] button to enter the <i>Parameter handling</i> menu.</p>                                  |
|  | <p>In the <i>Parameter handling</i> menu, use the [DOWN] button to select the menu item <i>Parameter enable</i>.</p> <p>Press the [ENTER] button to enter the <i>Parameter enable</i> menu.</p> |
|  | <p>In the <i>Parameter enable</i> menu, use the [DOWN] button to select the menu item <i>ON</i>.</p> <p>Press the [ENTER] button to activate parameter enable.</p>                              |

**NOTICE**

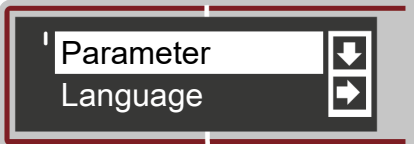
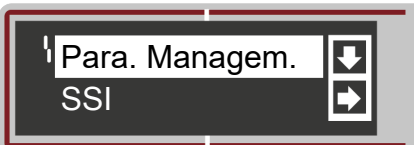
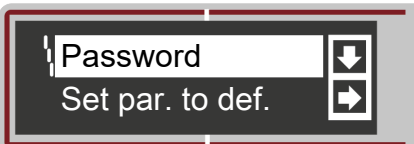
- As long as parameter enable is active, the entire AMS 100i display is inverted.
  - If a password was stored, parameter enable is not possible until this password is entered; see the example below.
  - For the SSI interface, communication between the control and the AMS 100i is active even if parameter enable is active.
- Changes to the SSI parameters via display entry have immediate effect.

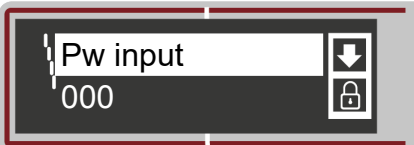
**Password for parameter enable**

Parameter entry on the AMS 100i can be protected with a password.

If a password is assigned, parameter enable must be activated using the password. If parameter enable has been activated after successfully entering the password, parameters can be changed via the display.

Tab. 4.11: Operating example for "password for parameter enable"

|                                                                                     |                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>In the main menu, use the [DOWN] button to select the menu item <i>Parameter</i>.</p> <p>Press the [ENTER] button to enter the <i>Parameter</i> menu.</p>                                |
|  | <p>Press the [DOWN] button to select the menu item <i>Parameter handling</i>.</p> <p>Press the [ENTER] button to enter the <i>Parameter handling</i> menu.</p>                              |
|  | <p>In the <i>Parameter handling</i> menu, use the [DOWN] button to select the menu item <i>Password</i>.</p> <p>Press the [ENTER] button to enter the <i>Password</i> menu.</p>             |
|  | <p>In the <i>Password</i> menu, use the [DOWN] button to select the menu item <i>Password activation</i>.</p> <p>Press the [ENTER] button to enter the <i>Password activation</i> menu.</p> |

|                                                                                   |                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>In the <i>Password activation</i> menu, use the [DOWN] button to select the menu item <i>OFF</i>.</p> <p>Press the [ENTER] button to set password activation to <i>ON</i>.</p>               |
|  | <p>In the <i>Password</i> menu, use the [DOWN] button to select the menu item <i>Password entry</i>.</p> <p>Press the [ENTER] button to enter the <i>Password entry</i> menu.</p>               |
|  | <p>Enter the password (digits), see chapter 4.2.3 "Control buttons".</p> <p>Press the [ENTER] button to confirm the value input.</p>                                                            |
|                                                                                   | <p>Exit the menu by pressing the [DOWN] button several times until <i>Exit menu</i> appears and then press the [ENTER] button, or wait until the AMS displays the measurement screen again.</p> |
|                                                                                   | <p>The next time you try to make a selection using the control buttons, you will be prompted to enter the password to allow you to make entries.</p>                                            |

**NOTICE**

The AMS 108i can be enabled at any time using the master password 507.

## 4.4 Reflectors

### 4.4.1 Description of the reflective tape

The AMS 100i measures distances against a reflective tape specified by Leuze. All technical data given for the AMS 100i, such as the operating range or accuracy, can only be achieved with the reflective tape specified by Leuze.

The reflective tape consists of a white, micropism-based reflective material. The micropisms are protected by a hard, highly transparent protective layer.

Under certain circumstances, the protective layer can cause surface reflections. The surface reflections can be directed past the AMS 100i by positioning the reflective tape at a slight incline. How to mount the reflective tape/reflectors is described in these operating instructions (see chapter 5.3 "Mounting the reflector").

A commercially available household detergent can be used for cleaning. Rinse with clear water and dry the surface. Do not use any abrasive agents.

Store reflective tapes in a cool and dry place.

### 4.4.2 Overview of reflective tapes

The reflective tapes/reflectors must be ordered separately, see chapter 12.4 "Accessories – Reflective tapes".

- Self-adhesive reflective tape
  - The reflective tape (...x...-S) must be bonded to a separate carrier plate (not included in the scope of delivery).
  - Technical data: see chapter 11.2.1 "Self-adhesive reflective tape"
- Reflective tape on carrier plate
  - The reflective tape (...x...-M) is affixed to a carrier plate.
  - Technical data: see chapter 11.2.2 "Reflective tape on carrier plate"

- Reflective tape with heating
  - The reflective tape (...x...-H) is affixed to a heated, thermally insulated carrier. The insulation results in a very high energetic efficiency. Only the reflective tape is kept at the specified temperature by the integrated heater. The insulation on the back prevents the generated heat from being dissipated via the steel construction. Energy costs are greatly reduced in the case of continuous heating.
  - Technical data: see chapter 11.2.3 "Reflective tape with heating"

#### 4.4.3 Selecting reflector size

Depending on the dimensioning of the system, the reflector can be mounted so that it moves with the vehicle or it can be mounted at a fixed location.

The choice of size is left to the user. In each case, the user must check whether the recommended reflector size is suitable for the respective application.

Tab. 4.12: Recommended reflector size

| Device type  | Operating range (m) | Recommended reflector size (H x W) | Reflective tape type<br>...-S (self-adhesive)<br>...-M (carrier plate)<br>...-H (heating)                                                           | Part no.                                                 |
|--------------|---------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| AMS 108i 40  | 40                  | 200x200 mm                         | REF 4-A-150x150 <sup>1</sup><br>Reflective tape 200x200-S<br>Reflective tape 200x200-M<br>Reflective tape 200x200-H<br>REF 4-A-300x300 <sup>1</sup> | 50141015<br>50104361<br>50104364<br>50115020<br>50141014 |
| AMS 108i 120 | 120                 | 500x500 mm                         | Reflective tape 500x500-S<br>Reflective tape 500x500-M<br>Reflective tape 500x500-H                                                                 | 50104362<br>50104365<br>50115021                         |

<sup>1</sup> For landside mounting

| NOTICE                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>The recommended reflector sizes apply to on-vehicle mounting of the AMS 100i. For stationary mounting of the AMS 100i, a smaller reflector is generally sufficient for all measurement distances. For this reason, two smaller reflector sizes are available in the self-adhesive variant "-S", see chapter 12.4 "Accessories – Reflective tapes".</p> <p>During system planning and design, always check whether mechanical travel tolerances require the use of a reflector larger than that which is recommended. This applies, in particular, when the laser measurement system is mounted on a vehicle. During travel, the laser beam must reach the reflector unobstructed. For on-vehicle mounting of the AMS 100i, the reflector size must accommodate any travel tolerances that may arise and the associated "wandering" of the light spot on the reflector.</p> |

## 5 Mounting

### 5.1 Transport and storage

| <b>NOTICE</b>                                                                     |                                                                                                                                                                              |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | ↪ Package the device for transport and storage in such a way that is protected against shock and humidity. Optimum protection is achieved when using the original packaging. |
|                                                                                   | ↪ Ensure compliance with the approved environmental conditions listed in the specifications.                                                                                 |

#### Unpacking

- ↪ Check the packaging content for any damage. If damage is found, notify the post office or shipping agent as well as the supplier.
- ↪ Check the delivery contents using your order and the delivery papers:
  - Delivered quantity
  - Device type and model as indicated on the name plate
  - Package insert

The name plate indicates your device's AMS 100i type, see chapter 12.2 "AMS 108i type overview".



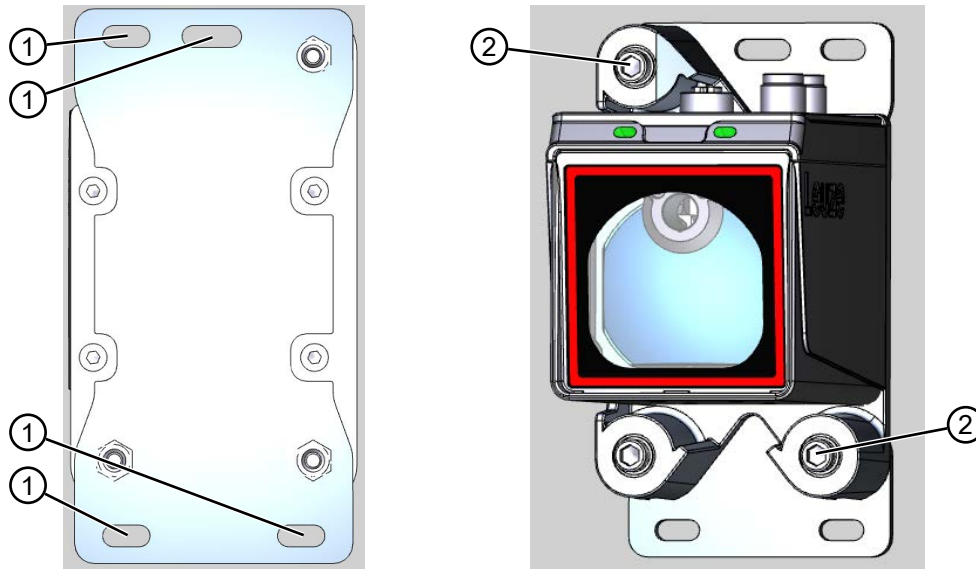
Fig. 5.1: Name plate of AMS 107i

- ↪ Save the original packaging for later storage or shipping.
- ↪ If you have questions, please contact your supplier or Leuze customer service.
- ↪ Observe the applicable local regulations when disposing of the packaging materials.

### 5.2 Mounting the device

The AMS 100i and the corresponding reflector are mounted on two mutually opposing, plane-parallel, flat walls or system parts. For error-free position measurement, there must be an unobstructed line-of-sight between the AMS 100i and the reflector.

### 5.2.1 Mounting with pre-mounted alignment unit (BTA)



- 1 Slotted holes for mounting
- 2 Adjustment screws with hexagon socket WAF4

Fig. 5.2: Mounting with pre-mounted alignment unit

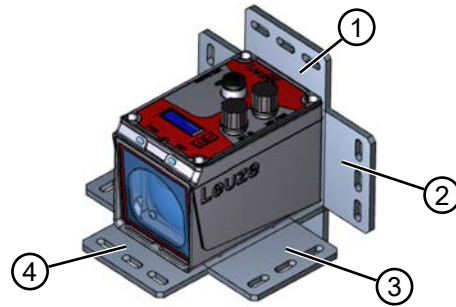
- ↳ Mount using four M5 screws.
- ↳ Guide the four M5 screws through the slotted holes of the alignment unit (1) and through the component to which the AMS 100i is to be attached.
- ↳ Secure the screws with a lock washer to protect against loosening caused by vibrations.

#### Aligning laser light spot

- ↳ Undo the adjustment screws WAF4 (2) a few turns.
- ↳ Align the laser light spot so that it always hits the center of the opposing reflector, both at close range as well as at the maximum measurement distance.
- ↳ Tighten the adjustment screws WAF4 (2).

To ensure that the light spot on the reflector does not move over the reflector across the entire measurement distance, the reflector and AMS should be installed vertically. If the light spot does not move during the process, i.e. when the distance changes, then installation is vertical.

### 5.2.2 Mounting with adapter plate (BT)

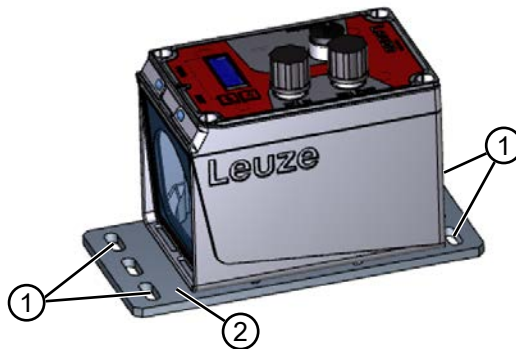


- 1 Mounting option 1
- 3 Mounting option 3

- 2 Mounting option 2
- 4 Mounting option 4

Fig. 5.3: Mounting options with adapter plate

- ✚ Position the adapter plate using one of the various options (1-4).
- ✚ Guide four screws (M4) from the rear side through the holes in the adapter plate.
- ✚ Screw the four screws (M4) into the internally threaded holes in the AMS 100i housing.



- 1 Slotted holes for mounting
- 2 Adapter plate (BT)

Fig. 5.4: Mounting example with adapter plate (BT)

- ✚ Guide four screws (M5) through the slotted holes (1) of the adapter plate (2) and through the component to which the AMS 100i is to be attached.
- ✚ Secure the screws with lock washers and nuts.

#### Aligning laser light spot

To ensure that the light spot on the reflector does not move over the reflector across the entire measurement distance, the reflector and AMS should be installed vertically. If the light spot does not move during the process, i.e. when the distance changes, then installation is vertical.

### 5.2.3 Mounting without accessories

- ✚ Mount using the four screws (M4).
- ✚ Guide the four screws (M4) from the rear side through the component to which the AMS 100i is to be secured.
- ✚ Screw the screws (M4) into the internally threaded holes of the AMS 100i housing.

#### Aligning laser light spot

To ensure that the light spot on the reflector does not move over the reflector across the entire measurement distance, the reflector and AMS should be installed vertically. If the light spot does not move during the process, i.e. when the distance changes, then installation is vertical.

### 5.2.4 Parallel mounting

#### Definition of the term "parallel spacing"

The dimension X describes the "parallel spacing" of the inner edges of the two laser light spots on the reflector.

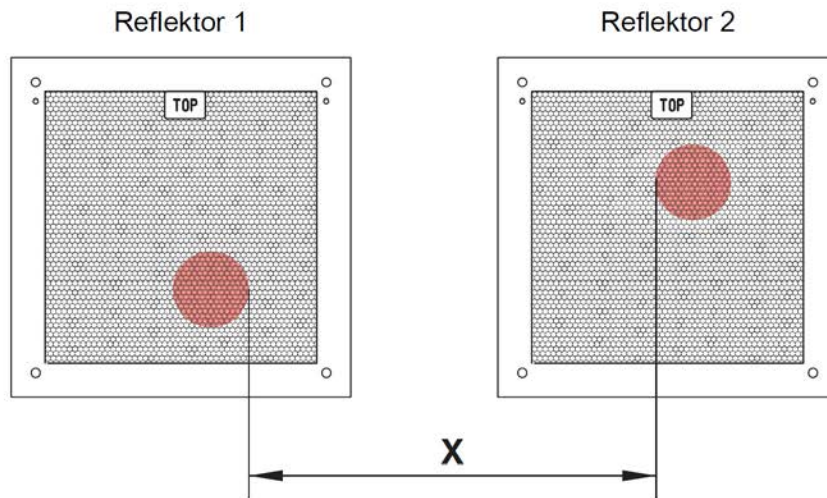


Fig. 5.5: Laser light spots parallel spacing

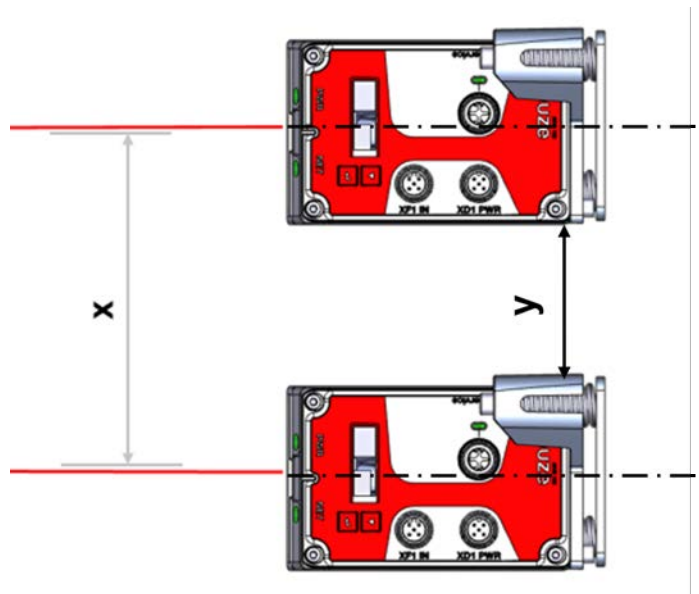


Fig. 5.6: Parallel mounting

The diameter of the light spot increases with distance.

|                           | AMS 100i      |
|---------------------------|---------------|
| Max. measurement distance | 120 m         |
| Light spot diameter       | $\leq 100$ mm |

Thus, the center-to-center spacing of the two AMS 100i devices with respect to one another can be calculated as a function of the maximum measurement distance.

To define the minimum parallel spacing between two AMS 100i devices, it is necessary to distinguish between three different arrangements of AMS 100i and reflectors.

The AMS 100i are mounted stationary and in parallel on one plane.  
Both reflectors move independently of one another at different distances to the AMS 100i.

Minimum parallel spacing X of the two laser light spots:

Formula no. 1:  $X = 100 \text{ mm} + (\text{max. measuring distance in mm} \times 0.01)$

The AMS 100i are mounted stationary and in parallel on one plane.  
Both reflectors move in parallel at the same distance to the AMS 100i..

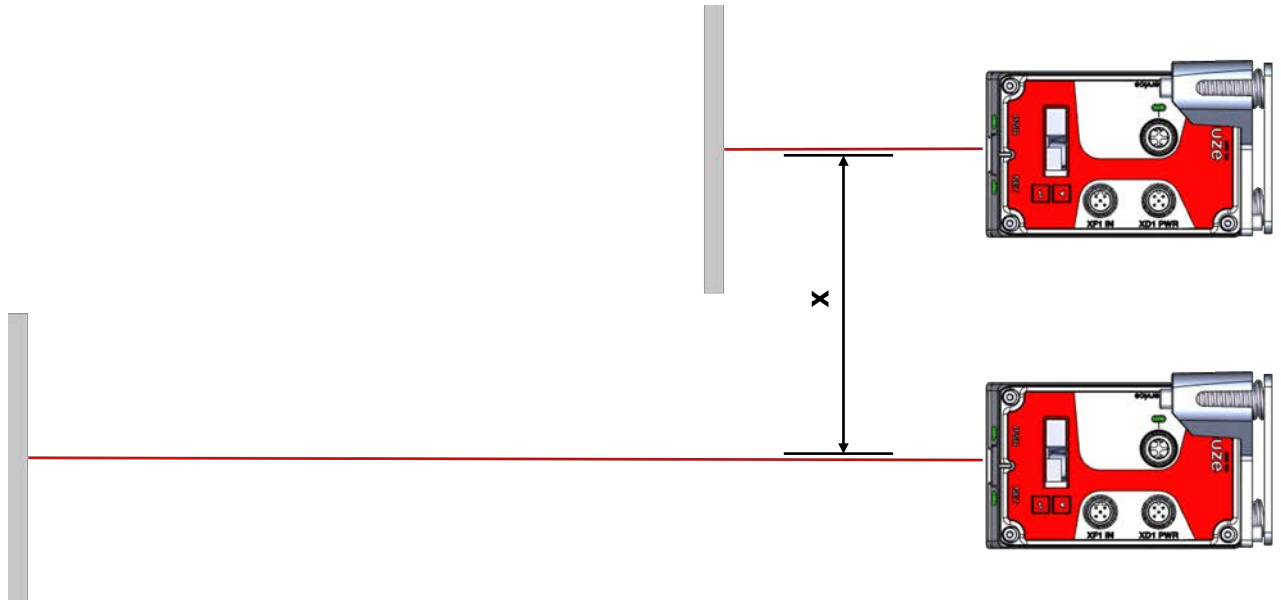


Fig. 5.7: Parallel mounting with moving reflectors

Measuring distance up to 120 m: see formula no. 1

The reflectors are mounted stationary and in parallel on one plane.  
Both AMS 100i move independently of one another at different or the same distances to the reflectors.

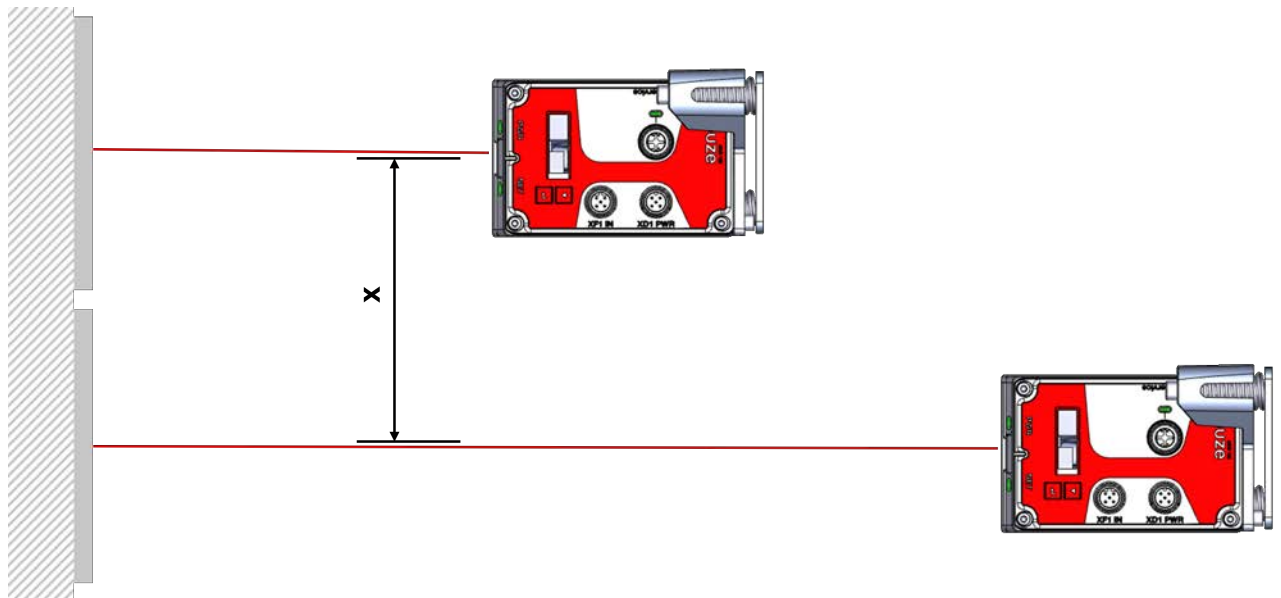


Fig. 5.8: Parallel mounting with moving AMS 100i units

Measuring distance up to 120 m: see formula no. 1

**NOTICE**

Note that when the AMS 100i units are mounted in a mobile manner, travel tolerances could cause the two laser light spots to move towards each other.

✎ Take the travel tolerances of the vehicle into account when defining the parallel spacing of adjacent AMS 100i units.

### 5.2.5 Parallel mounting of and DDLS optical data transmission

The optical data transceivers of the DDLS series and the AMS 108i do not interfere with one another. Depending on the size of the reflector used, the DDLS can be mounted with a minimum parallel spacing of 100 mm to the AMS 108i. The parallel spacing is independent of the distance.

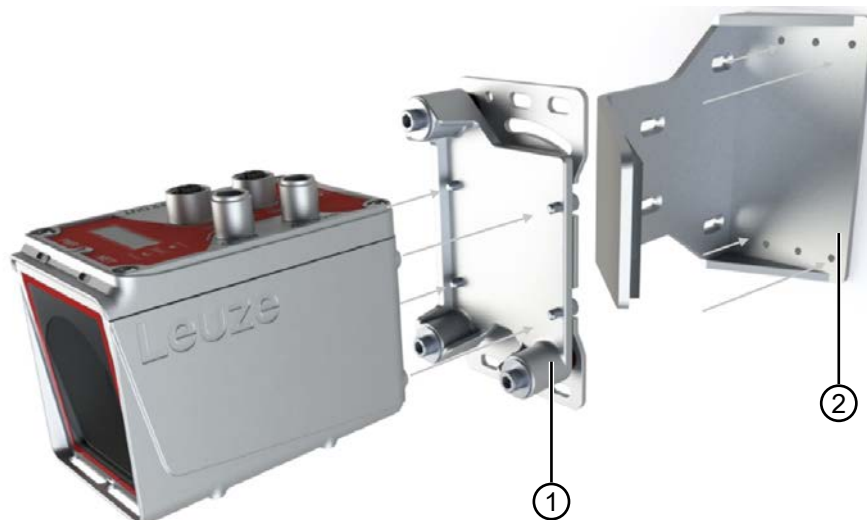
### 5.2.6 Mounting with laser beam deflector units

The two available deflector units are used for the 90° deflection of the laser beam, see chapter 12.3 "Accessories – Mounting".

**NOTICE**

The deflector units are designed for a maximum operating range of 40 m. Longer distances can be achieved by independently optimizing the mechanical conditions.

#### Mounting of deflector unit with integrated mounting bracket



1 Pre-mounted alignment unit BTA

2 Deflector unit US AMS 02

Fig. 5.9: Mounting with laser beam deflector unit

✓ To use the US AMS 02 deflector unit, an AMS 1xxi BTA must be used, i.e., one equipped with the BTA alignment device (see chapter 11.3 "Dimensioned drawings").

✎ Use the four M5 screws to mount the deflector unit.

✎ Screw the AMS 100i together with the pre-mounted alignment unit (1) to the US AMS 02 deflector unit (2).

✎ Secure the screws with a lock washer to protect against loosening caused by vibrations.

The AMS 100i can be mounted in the deflector unit in two directions so that the cables lead off in the preferred direction.

In addition, the deflector unit can be mounted either underneath or on the rear side.

If deflection to the left or right is required, the entire deflector unit can be mounted accordingly.

The deflector unit is mounted on plane-parallel, flat walls or system parts. For error-free position measurement, there must be an unobstructed line-of-sight between the AMS 100i and the deflecting mirror as well as between the deflecting mirror and the reflector.

### Mounting of deflector unit without mounting bracket

The US 1 OMS deflector unit and the AMS 100i are mounted separately.

- ↳ When mounting, make certain that the laser light spot of the AMS 100i is aligned with the center of the deflecting mirror.

To align the laser light spot with the reflector see chapter 5.2 "Mounting the device".

## 5.3 Mounting the reflector

The reflective tapes have a protective film that is easy to peel off.

- ↳ Remove the protective film before putting the overall system into operation.

### Self-adhesive reflective tape

- ↳ Bond the self-adhesive reflective tapes of the "Reflective tape ...x...-S" series to a flat, clean and grease-free surface. It is recommended to use a separate carrier plate (not included in the scope of delivery).
- ↳ Using a sharp tool, cut the tape along the side of the prism structure.
- ↳ Tilt the reflective tape; see chapter 5.3.1 "Pitch of the reflector".

### Reflective tape on carrier plate

The reflective tapes of the "Reflective tape ...x...-M" series have corresponding mounting holes.

Spacer sleeves are provided to enable mounting at the necessary pitch angle, see chapter 5.3.1 "Pitch of the reflector".

### Reflective tape with heating

The reflective tapes of the "Reflective tape ...x...-H" series have corresponding mounting holes.

Due to the voltage supply affixed on the rear, the reflector cannot be mounted flat. Four spacer sleeves in two different lengths are supplied. Use the spacer sleeves to ensure separation from the wall as well as to provide the necessary pitch for avoiding surface reflection see chapter 5.3.1 "Pitch of the reflector".

|                                                                                                    |                                                                                            |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  <b>WARNING</b> |                                                                                            |
|                 | <b>Electrical work!</b><br>Electrical work must be carried out by a certified electrician. |

- ↳ Connect the cable to the nearest power distribution point.
- ↳ Observe the current consumptions listed in the technical data, see chapter 11.2.3 "Reflective tape with heating".

### 5.3.1 Pitch of the reflector

- ↳ Connect the voltage supply of the AMS 100i.
- ↳ Mount the combination consisting of laser measurement system and reflective tape/reflector so that the laser light spot hits the film as centered as possible and without obstruction.
- ↳ To do so, use the mounting and adjustment options provided on the AMS 100i (see chapter 5.2 "Mounting the device").

|                                                                                     |                                                                                                                                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTICE</b>                                                                       |                                                                                                                                                      |
|  | The reflector must be positioned at an angle. Use the spacer sleeves for this purpose.<br>The correct pitch is given in the table "Reflector pitch". |

Tab. 5.1: Reflector pitch

| Reflector type                                         | Pitch using spacer sleeves |           |
|--------------------------------------------------------|----------------------------|-----------|
| Reflective tape 200x200-S<br>Reflective tape 200x200-M | 2 x 5 mm                   |           |
| Reflective tape 200x200-H                              | 2 x 15 mm                  | 2 x 20 mm |
| Reflective tape 500x500-S<br>Reflective tape 500x500-M | 2 x 10 mm                  |           |
| Reflective tape 500x500-H                              | 2 x 15 mm                  | 2 x 25 mm |
| Reflective tape 749x914-S                              | 2 x 20 mm                  |           |
| Reflective tape 914x914-S<br>Reflective tape 914x914-M | 2 x 20 mm                  |           |
| Reflective tape 914x914-H                              | 2 x 15 mm                  | 2 x 35 mm |

The spacer sleeves are included in the scope of delivery of reflective tapes ...-M and ...-H.

#### NOTICE



Reliable operation, the max. operating range and accuracy of the AMS 100i can only be achieved with the reflective tape specified by Leuze. Correct operation cannot be guaranteed if other reflectors are used.

#### Pitch of reflective tapes ...-S and ...-M

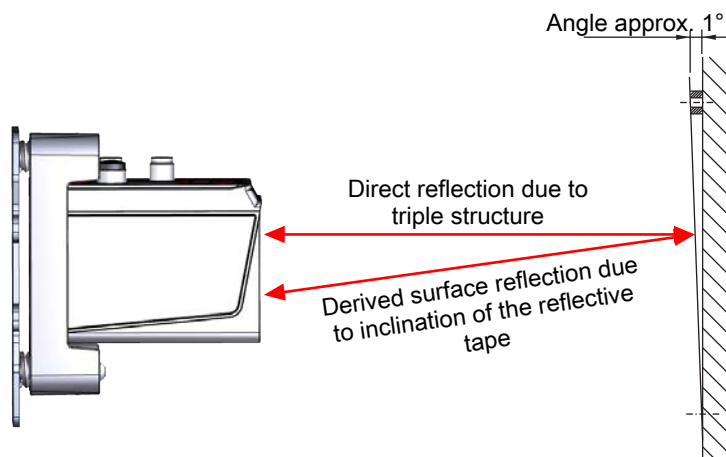


Fig. 5.10: Mounting the reflector

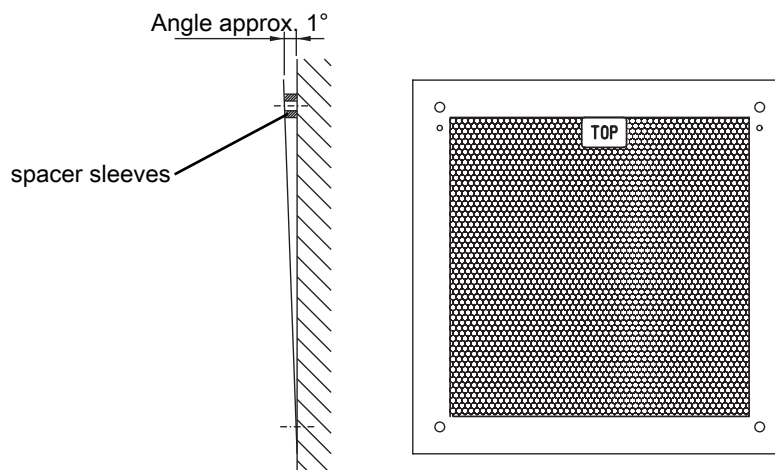


Fig. 5.11: Pitch of the reflector

## Pitch of reflective tapes ...-H

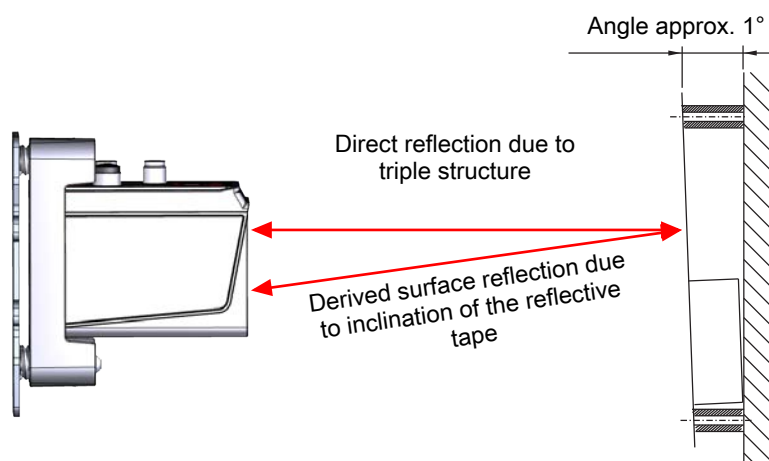


Fig. 5.12: Mounting of heated reflectors

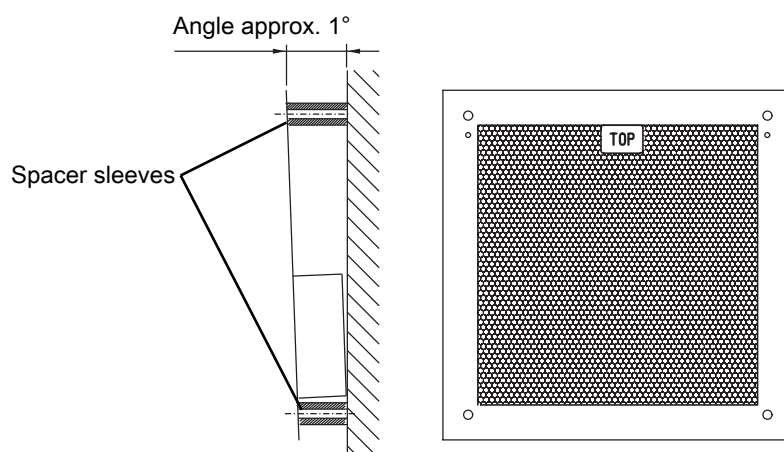
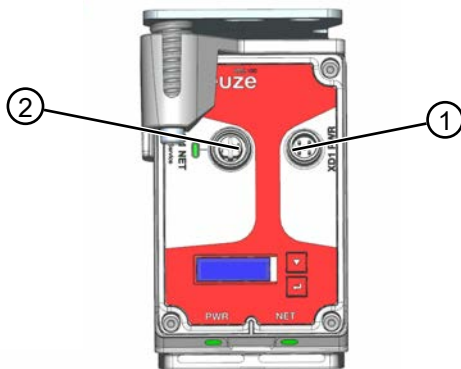


Fig. 5.13: Pitch of the heated reflector

## 6 Electrical connection

| CAUTION                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <ul style="list-style-type: none"> <li>Before connecting the device, be sure that the supply voltage agrees with the value printed on the name plate.</li> <li>Only allow competent persons to perform the electrical connection.</li> <li>Ensure that the functional earth (FE) is connected correctly. Fault-free operation is only guaranteed if the functional earth is connected properly.</li> <li>If faults cannot be rectified, take the device out of operation. Protect the device from accidentally being started.</li> </ul> |
| CAUTION                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|    | <b>UL applications!</b><br>For UL applications, the device must be powered by a PS2 in accordance with EN / IEC / UL 62368-1 or an LPS in accordance with EN / IEC / UL 60950-1 or NEC Class 2.                                                                                                                                                                                                                                                                                                                                          |
| NOTICE                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|    | <b>Protective Extra Low Voltage (PELV)!</b><br>The device is designed in accordance with protection class III for supply with PELV (Protective Extra-Low Voltage).                                                                                                                                                                                                                                                                                                                                                                       |
| NOTICE                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | <b>Degree of protection IP65</b><br>Degree of protection IP65 is achieved only if the connectors are screwed into place and caps installed.                                                                                                                                                                                                                                                                                                                                                                                              |

The AMS 100i is connected using variously coded M12 connectors.



- 1 PWR – voltage supply / switching input/output
- 2 Ethernet / Service

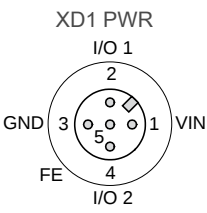
Fig. 6.1: AMS108i connections

The corresponding mating connectors and preassembled cables are available as accessories for all connections, see chapter 12.5 "Accessories – connection technology".

## 6.1 PWR – voltage supply / switching input/output

M12 connector, 5-pin, A-coded

Tab. 6.1: PWR pin assignment

|                                                                                   | Pin    | Designation | Assignment                                |
|-----------------------------------------------------------------------------------|--------|-------------|-------------------------------------------|
|  | 1      | VIN         | Positive supply voltage<br>+18 – +30 V DC |
|                                                                                   | 2      | I/O 1       | Switching input/output 1                  |
|                                                                                   | 3      | GNDIN       | Negative supply voltage 0 V DC            |
|                                                                                   | 4      | I/O 2       | Switching input/output 2                  |
|                                                                                   | 5      | FE          | Functional earth                          |
|                                                                                   | Thread | FE          | Functional earth (housing)                |

For configuration of the switching input/output, see chapter 7 "Starting up the device – Ethernet TCP/IP".

## 6.2 Ethernet TCP/IP

### NOTICE



The AMS 108i can communicate via TCP/IP and UDP. Standard is TCP/IP. In the case of communication via UDP, the "UDP" protocol must be activated via the display under the menu item "Ethernet" - "Host communication".

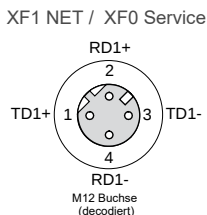
### Standalone operation in Ethernet network

During stand-alone operation of the AMS 108i, the host interface of the superior system is connected to HOST/BUS IN. A star structure (Ethernet structure) is thus possible.

## 6.3 Ethernet TCP/IP / Service

M12 connection, 4-pin, female, D-coded

Tab. 6.2: Ethernet TCP/IP / Service pin assignment

|                                                                                     | Pin    | Designation | Assignment                 |
|-------------------------------------------------------------------------------------|--------|-------------|----------------------------|
|  | 1      | TD+         | Transmit Data +            |
|                                                                                     | 2      | RD+         | Receive Data +             |
|                                                                                     | 3      | TD-         | Transmit Data -            |
|                                                                                     | 4      | RD-         | Receive Data -             |
|                                                                                     | Thread | FE          | Functional earth (housing) |

## 7 Starting up the device – Ethernet TCP/IP

### 7.1 General information on Ethernet

The AMS 108i is designed as an Ethernet device (acc. to IEEE 802.3) with a standard baud rate of 10/100 Mbit/s. A fixed MAC ID is assigned to each AMS 108i by the manufacturer; this ID cannot be changed.

The AMS 108i automatically supports the transmission rates of 10 Mbit/s (10Base T) and 100 Mbit/s (100Base TX), as well as auto-negotiation and auto-crossover.

The AMS 108i features multiple M12 connectors / sockets for the electrical connection of the supply voltage, the interface and the switching inputs or switching outputs.

Additional information on the electrical connection can be found in see chapter 6 "Electrical connection".

The AMS 108i supports the following protocols and services:

- TCP/IP (client / server)
- UDP
- DHCP
- ARP
- PING

For communication with the superior host system, the corresponding TCP/IP protocol (client/server mode) or UDP must be selected.

### 7.2 Ethernet – star topology

The AMS 108i can be operated as a single device (stand-alone) in an Ethernet star topology with individual IP address.

The address can either be set permanently via display or assigned dynamically via a DHCP server.

### 7.3 Manual configuration of the IP address

| <b>NOTICE</b>                                                                       |                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|  | To set the network addresses, parameter enable must be activated. |

If your system does not include a DHCP server or if the IP addresses of the devices are to be set permanently, proceed as follows:

- ↳ Have the network administrator specify the data for IP address, net mask and gateway address of the AMS 108i.
- ↳ Set these values on the AMS 108i.
- ↳ In the main menu, press the [ENTER] button to enter the Parameter menu.
- ↳ Use the [UP] [DOWN] buttons to select the Ethernet menu item.
- ↳ Press the [ENTER] button to enter the Ethernet menu.
- ↳ Use the [UP] [DOWN] buttons to select the Ethernet interface menu item.
- ↳ Press the [ENTER] button to enter the Ethernet menu.
- ↳ Use the buttons to successively select the Address, Gateway and Net mask menu items and set the desired values.
- ↳ Exit the Ethernet menu by pressing the [ESCAPE] button.

**Address Link Label:**

- The "Address Link Label" is an additional stick-on label that is affixed to the device. The "Address Link Label" contains the MAC address (Media Access Control address) of the device and makes it possible to enter the IP address and the device name manually. The area of the "Address Link Label" on which the MAC address is printed can be separated from the remainder of the stick-on label if necessary using the perforation.
- The "Address Link Label" can be removed from the device and affixed in the installation and layout diagrams to designate the device.
- Once it is affixed in the documents, the "Address Link Label" establishes a unique reference between the mounting location, the MAC address of the device, and the associated control program. The time-consuming searching, reading, and manually writing down of the MAC addresses of all devices installed in the system are eliminated.

**7.4 Automatically setting the IP address**

If your system includes a DHCP server that is to be used to assign the IP addresses, note the following: DHCP address assignment is deactivated by default. To activate DHCP address assignment, you must first activate parameter enable.

Starting at the main menu, use the buttons and the enter button to navigate to the Ethernet interface menu:

- ↵ Use the arrow buttons to select the DHCP activated menu item
- ↵ Press the enter button to enter the DHCP activated menu.
- ↵ Use the arrow buttons to select the ON menu item.
- ↵ Press the enter button to activate DHCP activation.
- ↵ ON DHCP activation is now switched on.
- ↵ Exit the Ethernet interface menu with the escape button.

**7.5 Setting the Ethernet host communication**

The AMS 108i can communicate via TCP/IP and UDP. Standard is TCP/IP. In the case of communication via UDP, the "UDP" protocol must be activated via the display under the menu item "Ethernet" - "Host communication". UDP and TCP/IP can be activated simultaneously and used in parallel.

If you would like to use the TCP/IP protocol, you must also define whether the AMS 108i is to operate as a TCP client or as a TCP server.

- ↵ Contact your network administrator to determine which communication protocol is used.

**7.6 Communication protocol (Leuze binary protocol via TCP/IP)**

The Leuze binary protocol is integrated within the TCP/IP and UDP communication in the user data area.

**7.7 Request telegram to the AMS 108i**

|                                                 |                             |                              |                       |     |
|-------------------------------------------------|-----------------------------|------------------------------|-----------------------|-----|
| ETHERNET<br>HEADER<br>(Ethernet ad-<br>dresses) | IP HEADER<br>(IP addresses) | TCP HEADER<br>(port numbers) | TCP USER DATA<br>AREA | FCS |
|-------------------------------------------------|-----------------------------|------------------------------|-----------------------|-----|

**TCP user data area**

The Leuze binary protocol has a proprietary header. This is part of the user data and has the following functions:

- Transaction ID

The transaction ID enables unique assignment of a request telegram sent to the AMS 108i, to the response telegram. A transaction ID that is also used in the response telegram is entered in the request telegram. Simple incrementation of the transaction ID can, for example, ensure consecutive processing.

- Protocol ID

The identifier (0x4C31) is defined as the protocol ID for the AMS 108i binary protocol. The protocol ID remains unchanged for the binary protocol.

- Length

The number of consecutive user data bytes is entered. The TCP user data area is 2 bytes in length in a request telegram and 6 or 8 bytes in the response telegram, depending on the command.

- 0xFF

Reserve byte with the entry 0xFF.

|                            |                         |                    |                 |                          |
|----------------------------|-------------------------|--------------------|-----------------|--------------------------|
| Transaction ID<br>(16 bit) | Protocol ID<br>(16 bit) | Length<br>(16 bit) | 0xFF<br>(8 bit) | Function code<br>(8 bit) |
|----------------------------|-------------------------|--------------------|-----------------|--------------------------|

### Function code

Using the function code, the functions described in the table below can be activated on the AMS 108i.

| Byte value |     | Function                                      |
|------------|-----|-----------------------------------------------|
| Hex        | Dec |                                               |
| 0xF1       | 241 | Transfer single position value                |
| 0xF2       | 242 | Start cyclical transfer of the position value |
| 0xF3       | 243 | Stop cyclical transfer                        |
| 0xF4       | 244 | Laser on                                      |
| 0xF5       | 245 | Laser off                                     |
| 0xF6       | 246 | Transfer single velocity value                |
| 0xF7       | 247 | Start cyclical transfer of the velocity value |
| 0xF8       | 248 | Transfer single position and velocity value   |

Example: Transfer single position value

- Transaction ID (16 bit):

Value between 0x0000 and 0xFFFF

- Protocol ID (16 bit):

Always 0x4C31

- Length (16 bit):

Always 0x0002

- 0xFF (8 bit):

Always 0xFF

- Function code (8 bit):

0xF1 (depending on function, value between 0xF1 and 0xF8)

## 7.8 Response telegram from the AMS 108i

|                                                 |                             |                              |                       |     |
|-------------------------------------------------|-----------------------------|------------------------------|-----------------------|-----|
| ETHERNET<br>HEADER<br>(Ethernet ad-<br>dresses) | IP HEADER<br>(IP addresses) | TCP HEADER<br>(port numbers) | TCP USER DATA<br>AREA | FCS |
|-------------------------------------------------|-----------------------------|------------------------------|-----------------------|-----|

## 7.9 TCP user data area

|                            |                         |                    |              |                 |               |
|----------------------------|-------------------------|--------------------|--------------|-----------------|---------------|
| Transaction ID<br>(16 bit) | Protocol ID<br>(16 bit) | Length<br>(16 bit) | 0xFF (8 bit) | Status (16 bit) | Data (24 bit) |
|----------------------------|-------------------------|--------------------|--------------|-----------------|---------------|

### Response telegram for function code F1 to F8

Tab. 7.1: Response telegram

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0    | 0     | LASER | IO2   | IO1   | 0     | 0     | DIR   | MOV   |
| 1    | READY | LSR   | TMP   | ERR   | ATT   | PLB   | OVFL  | SIGN  |
| 2    | D23   | D22   | D21   | D20   | D19   | D18   | D17   | D16   |
| 3    | D15   | D14   | D13   | D12   | D11   | D10   | D9    | D8    |
| 4    | D7    | D6    | D5    | D4    | D3    | D2    | D1    | D0    |
| 5    | V15   | V14   | V13   | V12   | V11   | V10   | V9    | V8    |
| 6    | V7    | V6    | V5    | V4    | V3    | V2    | V1    | V0    |

Laser (actuation)

0 = Laser ON

1 = Laser OFF

IO1

0 = Signal level not active

1 = Signal level active

IO2

0 = Signal level not active

1 = Signal level active

DIR

When the movement status is activated, this bit indicates the movement direction:

0: Positive direction

1: Negative direction

MOV

Signals whether a movement > 0.1 m/s is currently being detected:

0 = No movement detected

1 = Movement detected

Ready

0 = AMS not ready

1 = AMS ready

LSR (laser prefailure message)

0 = OK

1 = Laser warning

TMP (temperature warning)

0 = ok

1 = Upper or lower temperature limit violated

ERR (hardware error)

0 = No error

1 = Hardware error

ATT (evaluation/received signal level warning)

0 = Received signal level ok

1 = Received signal level warning

PLB (plausibility of measurement values)

0 = Measurement values ok

1 = Implausible measurement value

OVFL (overflow; measurement value greater than 24 bit)

0 = ok

1 = Overflow

Sign (sign of measurement value)

0 = Positive

1 = Negative

D0 - D23 (distance value)

D0 = LSB; D23 = MSB

## 8 Care, maintenance and disposal

### Cleaning

If there is dust on the device or the warning message ATT is issued:

- ↳ Clean the device with a soft cloth; use a cleaning agent (commercially available glass cleaner) if necessary.
- ↳ Also check the reflector for possible contamination.

#### NOTICE



#### Do not use aggressive cleaning agents!

- ↳ Do not use aggressive cleaning agents such as thinner or acetone for cleaning the device. The use of such solvents can dull the reflector, the housing window and the display.

### Maintenance

The device does not normally require any maintenance by the operating company.

Repairs to the device must only be carried out by the manufacturer.

- ↳ For repairs, contact your responsible Leuze subsidiary or Leuze customer service (see chapter 10 "Service and support").

### Disposing

#### NOTICE



For disposal observe the applicable national regulations regarding electronic components.

## 9 Diagnostics and troubleshooting

### 9.1 Status messages

The status messages are written in a ring memory with 25 positions. The ring memory is organized according to the FIFO principle. No separate activation is necessary for storing the status messages. Power OFF clears the ring memory.

Example:

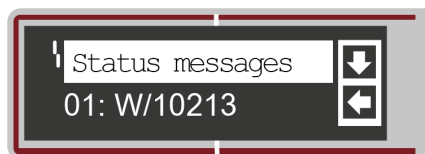


Fig. 9.1: Example of status message

#### Structure of status messages

**n: model/no.**

|      |                                                                               |
|------|-------------------------------------------------------------------------------|
| n    | Memory position in the ring memory                                            |
| Type | Type of message:<br>I = info, W = warning, E = error, F = severe system error |
| No.  | Internal error detection                                                      |

↵ Press the [ENTER] button to display the ring list of the messages.

↵ Use the [DOWN] button to navigate to all entries in succession.

↵ To exit the ring list, press the [ENTER] button again.

### 9.2 LED indicators

Tab. 9.1: PWR LED

| PWR LED display       | Possible error cause        | Measure                                                                       |
|-----------------------|-----------------------------|-------------------------------------------------------------------------------|
| OFF                   | No supply voltage connected | Check supply voltage                                                          |
|                       | Hardware error              | Send in device                                                                |
| Flashes red           | Light beam interruption     | Check alignment                                                               |
|                       | Plausibility error          | Traverse rate > 10 m/s                                                        |
| Red, continuous light | Hardware error              | For error description, see display, It may be necessary to send in the device |

Tab. 9.2: NET LED

| NET LED display | Possible error cause        | Measure                     |
|-----------------|-----------------------------|-----------------------------|
| OFF             | No supply voltage connected | Check supply voltage        |
|                 | Incorrect wiring            | Check wiring                |
|                 | Ethernet deactivated        | Activate Ethernet interface |

### 9.3 Display messages

Tab. 9.3: Warning messages in display

| Display                                                 | Error no. | Possible error message                                                                                  | Measure                                                                                                                               |
|---------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| PLB<br>(implausible measurement values)                 | 10212     | Laser beam interruption                                                                                 | Laser spot must always be incident on the reflector                                                                                   |
|                                                         |           | Laser spot outside of reflector                                                                         | Traverse rate < 10 m/s?                                                                                                               |
|                                                         |           | Measurement range for maximum distance exceeded                                                         | Restrict traversing path or select AMS with larger measurement range                                                                  |
|                                                         |           | Velocity greater than 10 m/s                                                                            | Reduce velocity                                                                                                                       |
|                                                         |           | Ambient temperature far outside permissible range (TMP display; PLB)                                    | Provide cooling                                                                                                                       |
| ATT<br>(insufficient received signal level)             | 10213     | Reflector soiled                                                                                        | Clean reflector                                                                                                                       |
|                                                         |           | Glass lens of the AMS soiled                                                                            | Clean glass lens                                                                                                                      |
|                                                         |           | Performance reduction due to snow, rain, fog, condensing vapor or heavily polluted air (oil mist, dust) | Optimize usage conditions                                                                                                             |
|                                                         |           | Laser spot only partially on reflector                                                                  | Check alignment                                                                                                                       |
|                                                         |           | Protective film on reflector                                                                            | Remove protective film from reflector                                                                                                 |
| TMP<br>(operating temperature outside of specification) | 10210     | Ambient temperatures outside specified range                                                            | In cold temperatures, an AMS with heating may help.<br><br>If temperatures are too high, provide cooling or change mounting location. |
| LSR<br>(laser diode warning)                            | 10211     | Laser diode prefailure message                                                                          | Send in device at next possible opportunity to have laser diode replaced.<br><br>Have replacement device ready.                       |
| ERR<br>(hardware error)                                 | -         | Indicates an uncorrectable error in the hardware                                                        | Send in device for repair                                                                                                             |

## 10 Service and support

### Service hotline

You can find the contact information for the hotline in your country on our website **www.leuze.com** under **Contact & Support**.

### Repair service and returns

Defective devices are repaired in our service centers competently and quickly. We offer you an extensive service packet to keep any system downtimes to a minimum. Our service center requires the following information:

- Your customer number
- Product description or part description
- Serial number or batch number
- Reason for requesting support together with a description

Please register the merchandise concerned. Simply register return of the merchandise on our website **www.leuze.com** under **Contact & Support > Repair Service & Returns**.

To ensure quick and easy processing of your request, we will send you a returns order with the returns address in digital form.

### What to do should servicing be required?

| <b>NOTICE</b>                                                                      |                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Please use this chapter as a master copy should servicing be required!</b></p> <p>✉ Enter the contact information and fax this form together with your service order to the fax number given below.</p> |

### Customer data (please complete)

|                            |  |
|----------------------------|--|
| Device type:               |  |
| Serial number:             |  |
| Firmware:                  |  |
| Display messages           |  |
| Status of LEDs:            |  |
| Error description:         |  |
| Company:                   |  |
| Contact person/department: |  |
| Phone (direct dial):       |  |
| Fax:                       |  |
| Street/No:                 |  |
| ZIP code/City:             |  |
| Country:                   |  |

### Leuze Service fax number:

+49 7021 573 - 199

## 11 Technical data

### 11.1 Optical laser measurement system

Tab. 11.1: Characteristic parameters

|      |                     |
|------|---------------------|
| MTTF | 27 years (at 25 °C) |
|------|---------------------|

Tab. 11.2: Measurement data

|                                                                       | AMS 108i 40                                                           | AMS 108i 120 |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Measurement range                                                     | 0.1 – 40 m                                                            | 0.1 – 120 m  |
| Accuracy                                                              | ±2 mm                                                                 | ±2 mm        |
| Reproducibility (1 sigma; typical values for standard filter types)   | 0.2 mm                                                                | 0.2 mm       |
| Light spot diameter                                                   | ≤ 40 mm                                                               | ≤ 100 mm     |
| Output time                                                           | 1 ms (1.7 ms for V1.1.2 and earlier)                                  |              |
| Response time (compatibility mode)                                    | 8 ms                                                                  |              |
| Basis for contouring error calculation                                | 7 ms                                                                  |              |
| Resolution                                                            | Adjustable, see chapter 7 "Starting up the device – Ethernet TCP/IP"  |              |
| Temperature drift                                                     | ≤ 1 mm/10K                                                            |              |
| Ambient temperature sensitivity                                       | 1 ppm/K                                                               |              |
| Air pressure sensitivity                                              | 0.3 ppm/hPa                                                           |              |
| Traverse rate                                                         | ≤ 10 m/s                                                              |              |
| Boot time                                                             | 18 s                                                                  |              |
| Operating temperature for standard version without integrated heating | -5°C – +60°C                                                          |              |
| Operating temperature for devices with integrated heating             | -30°C – +60°C                                                         |              |
| Warmup time for devices with integrated heating                       | approx. 30 min at +24 V DC and a minimum ambient temperature of -30°C |              |

Tab. 11.3: Optical data

|                          |                              |
|--------------------------|------------------------------|
| Light source             | Laser, red                   |
| Laser class              | 2 (acc. to IEC 60825-1:2014) |
| Wavelength               | 660 nm                       |
| Impulse duration         | ≤ 0.8 µs                     |
| Max. output power (peak) | 4 mW                         |

Tab. 11.4: Electrical data

|                            |                  |
|----------------------------|------------------|
| Supply voltage             | 18 – 30 V DC     |
| Current consumption        | ≤ 250 mA/24 V DC |
| Heater current consumption | ≤ 500 mA/24 V DC |
| VDE protection class       | III              |

|  <b>CAUTION</b> |                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <b>UL applications!</b><br>For UL applications, the device must be powered by a PS2 in accordance with EN / IEC / UL 62368-1 or an LPS in accordance with EN / IEC / UL 60950-1 or NEC Class 2. |
| <b>NOTICE</b>                                                                                    |                                                                                                                                                                                                 |
|                 | <b>Protective Extra Low Voltage (PELV)!</b><br>The device is designed in accordance with protection class III for supply with PELV (Protective Extra-Low Voltage).                              |

Tab. 11.5: Controls and indicators

|                      |                              |
|----------------------|------------------------------|
| Operational controls | Membrane keyboard, 2 buttons |
| Display              | LC display, 128x32 pixels    |
| LED                  | 2 LEDs, two-colored          |

Tab. 11.6: Mechanical data

|                      |                                                                           |
|----------------------|---------------------------------------------------------------------------|
| Housing              | Diecast aluminum                                                          |
| Optics cover         | Glass                                                                     |
| Weight               | Approx. 1 kg                                                              |
| Degree of protection | IP65 (acc. to EN 60529)<br>with screwed-on M12 connectors or mounted caps |

Tab. 11.7: Environmental data

|                                                                                                                                                          |                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Ambient temperature <ul style="list-style-type: none"> <li>• Operation</li> <li>• Operation with integrated device heating</li> <li>• Storage</li> </ul> | -5°C – +60°C<br>-30 °C – +60 °C<br>-30°C – +70°C |
| Relative air humidity                                                                                                                                    | Max. 90%, non-condensing                         |
| Vibration                                                                                                                                                | IEC 60068-2-6, test Fc                           |
| Shock                                                                                                                                                    | IEC 60068-2-27, test Ea                          |
| Noise                                                                                                                                                    | IEC 60068-2-64                                   |
| Electromagnetic compatibility                                                                                                                            | EN 61000-6-2<br>EN 61000-6-4                     |

## 11.2 Reflective tapes

### 11.2.1 Self-adhesive reflective tape

Tab. 11.8: Technical data of self-adhesive reflective tape

| Feature                                               | Reflective tape<br>200x200-S | Reflective tape<br>500x500-S | Reflective tape<br>914x914-S | REF 4-A-150x150 | REF 4-A-300x300 |
|-------------------------------------------------------|------------------------------|------------------------------|------------------------------|-----------------|-----------------|
| Part no.                                              | 50104361                     | 50104362                     | 50108988                     | 50141015        | 50141014        |
| Film size                                             | 200x200 mm                   | 500x500 mm                   | 914x914 mm                   | 150x150 mm      | 300x300 mm      |
| Recommended application temperature for adhesive tape | +5 °C ... +25 °C             |                              |                              |                 |                 |
| Temperature resistance, affixed                       | -40 °C ... +80 °C            |                              |                              |                 |                 |

### 11.2.2 Reflective tape on carrier plate

Tab. 11.9: Technical data of reflective tape on carrier plate

| Feature                           | Reflective tape<br>200x200-M | Reflective tape<br>500x500-M | Reflective tape<br>914x914-M |
|-----------------------------------|------------------------------|------------------------------|------------------------------|
| Part no.                          | 50104364                     | 50104365                     | 50104366                     |
| Film size                         | 200x200 mm                   | 500x500 mm                   | 914x914 mm                   |
| Outer dimensions of carrier plate | 250x250 mm                   | 550x550 mm                   | 964x964 mm                   |
| Weight                            | 0.8 kg                       | 4 kg                         | 25 kg                        |

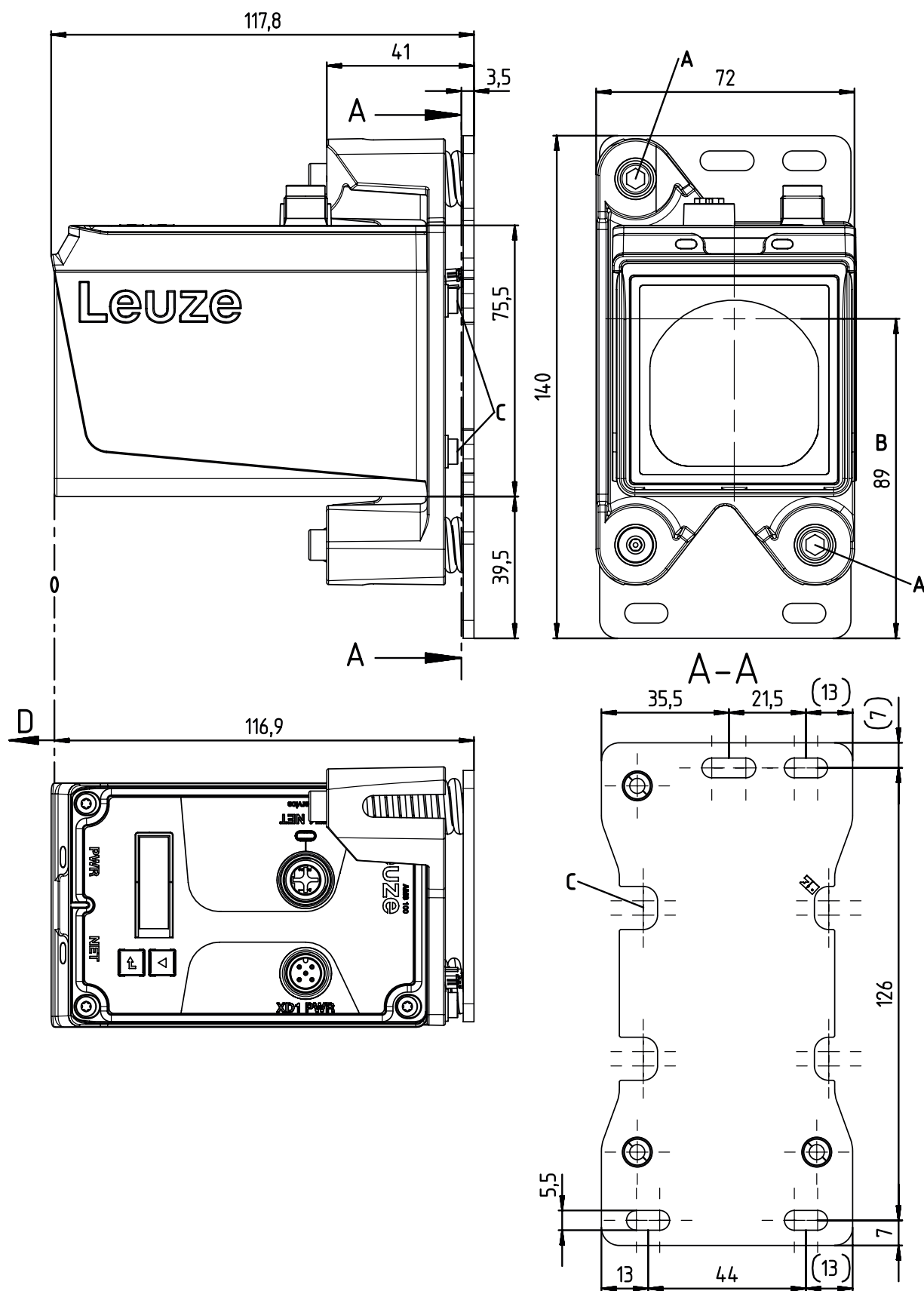
### 11.2.3 Reflective tape with heating

Tab. 11.10: Technical data of reflective tape with heating

| Feature                           | Reflective tape<br>200x200-H                                                                                   | Reflective tape<br>500x500-H | Reflective tape<br>914x914-H |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|
| Part no.                          | 50115020                                                                                                       | 50115021                     | 50115022                     |
| Voltage supply                    | 230 V AC                                                                                                       |                              |                              |
| Power                             | 100 W                                                                                                          | 600 W                        | 1800 W                       |
| Current consumption               | ~ 0.5 A                                                                                                        | ~ 3 A                        | ~ 8 A                        |
| Length of supply line             | 2 m                                                                                                            |                              |                              |
| Size of reflective tape           | 200x200 mm                                                                                                     | 500x500 mm                   | 914x914 mm                   |
| Outer dimensions of base material | 250x250 mm                                                                                                     | 550x550 mm                   | 964x964 mm                   |
| Weight                            | 0.5 kg                                                                                                         | 4.4 kg                       | 13.7 kg                      |
| Temperature control               | Controlled heating with the following switch-on and switch-off temperatures, measured at the reflector surface |                              |                              |
| Switch-on temperature             | ~ 5 °C                                                                                                         |                              |                              |
| Switch-off temperature            | ~ 20 °C                                                                                                        |                              |                              |
| Operating temperature             | -30°C – +70°C                                                                                                  |                              |                              |
| Storage temperature               | -40°C – +80°C                                                                                                  |                              |                              |
| Air humidity                      | Max. 90%, non-condensing                                                                                       |                              |                              |

### 11.3 Dimensioned drawings

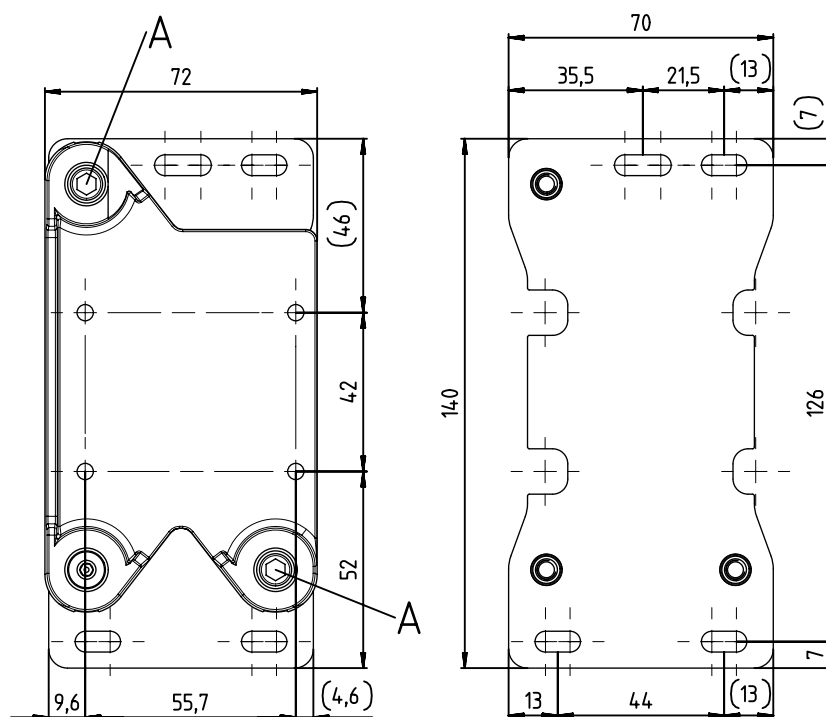
#### Optical laser measurement system AMS 108i



All dimensions in mm

Fig. 11.1: Optical laser measurement system AMS 108i

### Alignment unit BTA 0100M or BTA 0100 M.5

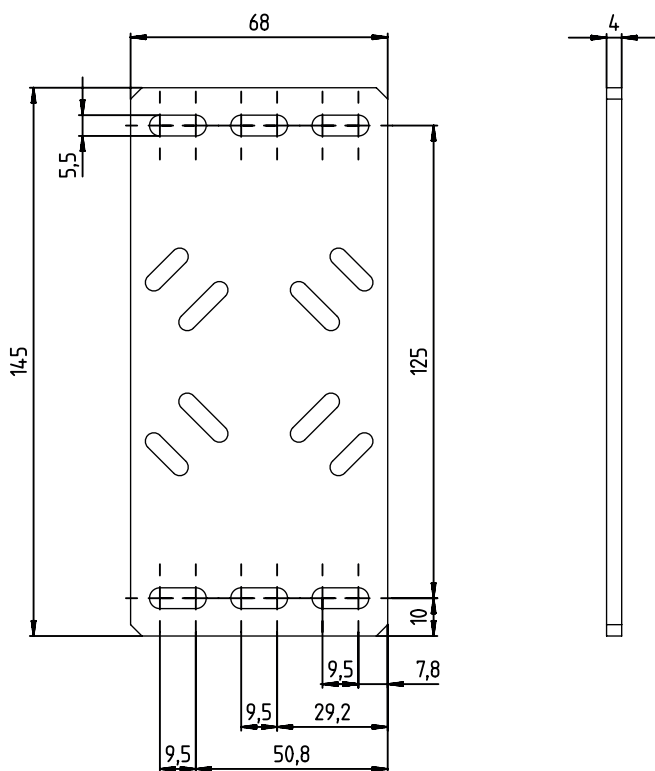


All dimensions in mm

A Adjustment screws with hexagon socket WAF4

Fig. 11.2: Alignment unit BTA 0100M (aluminum/steel) or BTA 0100 M.5 (stainless steel)

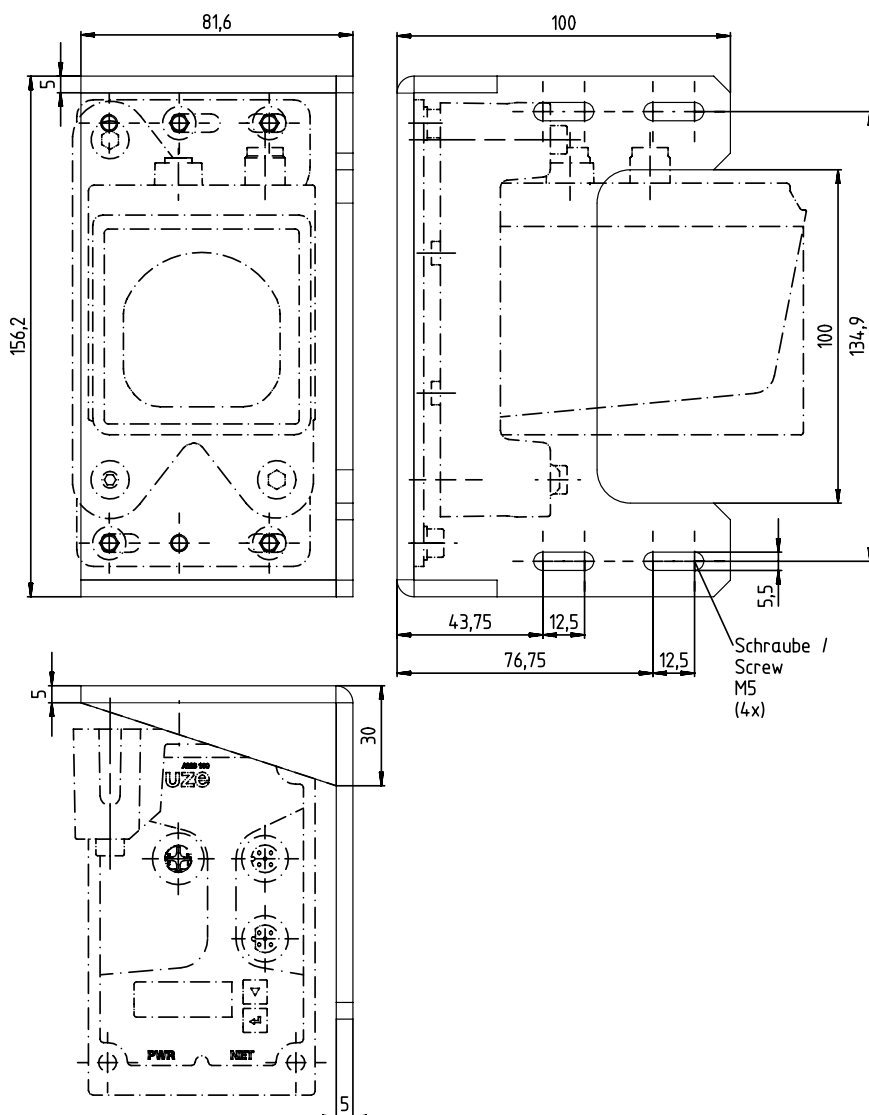
### Adapter plate BT 0100M



All dimensions in mm

Fig. 11.3: Mounting device BT 0100M for mounting without an alignment unit

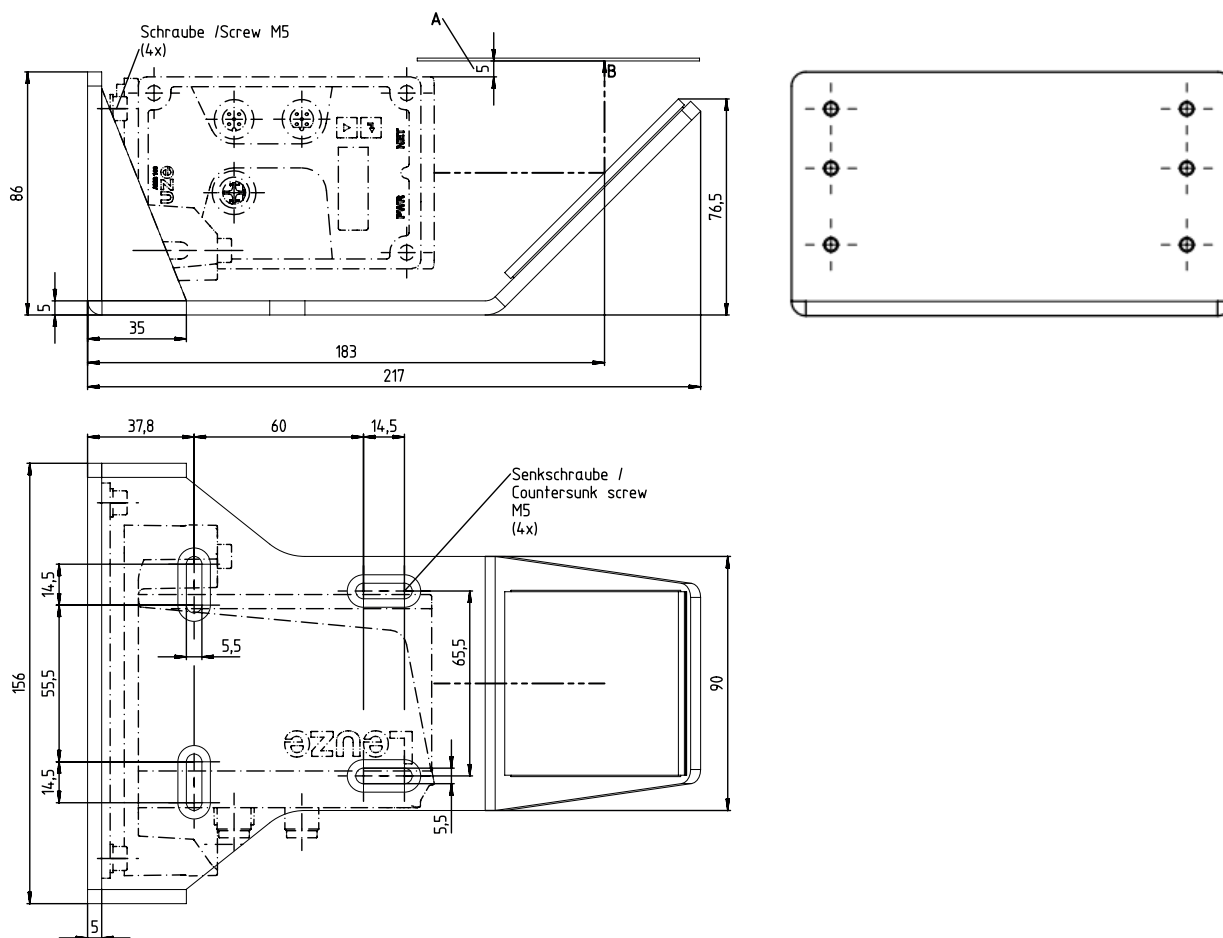
Floor holder BT 0100M-F



All dimensions in mm

Fig. 11.4: Mounting device BT 0100M-F for floor mounting or horizontal surfaces

# Deflector unit US AMS 02



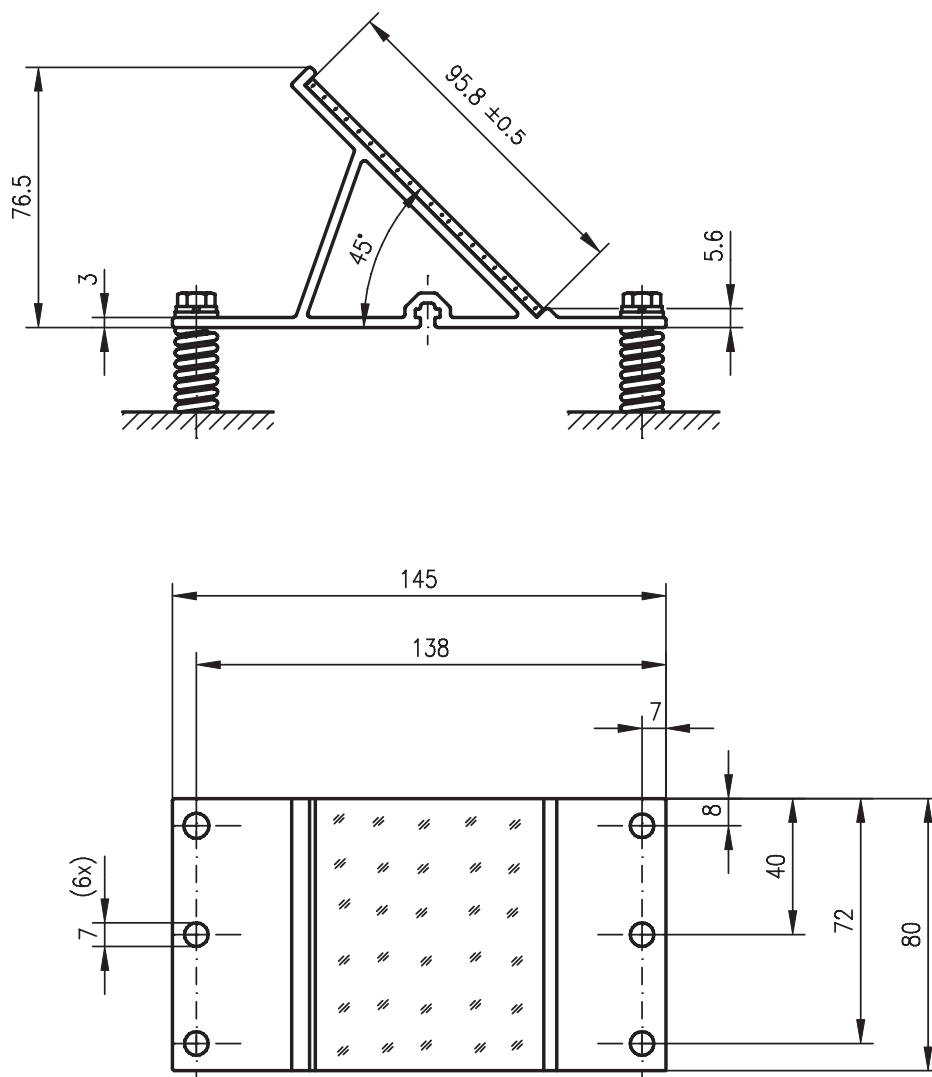
All dimensions in mm

A Minimum distance from the reflector

B Optical axis

Fig. 11.5: Deflecting mirror US AMS 02 – For use with AMS 1xxi ... BTA

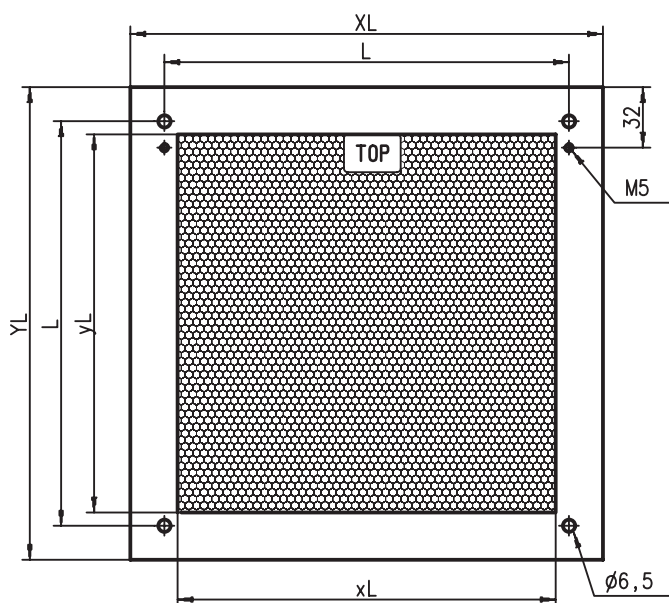
### Deflector unit US 1 OMS



All dimensions in mm

Fig. 11.6: Deflecting mirror US 1 OMS without mounting bracket for simple 90° deflection of laser beam

# Reflector



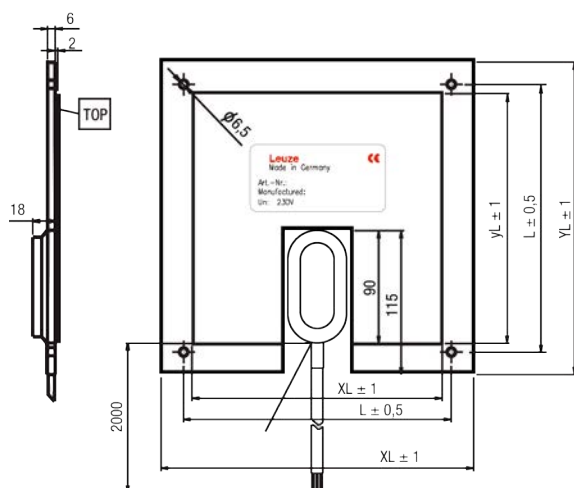
All dimensions in mm

Fig. 11.7: Reflective tape ...-M on carrier plate

Tab. 11.11: Dimensions of reflective tape on carrier plate

| Article                   | Reflective tape [mm] |     | Reflector plate [mm] |     |     |
|---------------------------|----------------------|-----|----------------------|-----|-----|
|                           | xL                   | yL  | XL                   | YL  | L   |
| Reflective tape 200x200-M | 200                  | 200 | 250                  | 250 | 214 |
| Reflective tape 500x500-M | 500                  | 500 | 550                  | 550 | 514 |
| Reflective tape 914x914-M | 914                  | 914 | 964                  | 964 | 928 |

# Heated reflector



All dimensions in mm

Fig. 11.8: Reflective tape ...-H

Tab. 11.12: Dimensions of heated reflectors

| Article                   | Reflective tape [mm] |     | Insulated carrier plate [mm] |     |     |
|---------------------------|----------------------|-----|------------------------------|-----|-----|
|                           | xL                   | yL  | XL                           | YL  | L   |
| Reflective tape 200x200-H | 200                  | 200 | 250                          | 250 | 214 |
| Reflective tape 500x500-H | 500                  | 500 | 550                          | 550 | 514 |
| Reflective tape 914x914-H | 914                  | 914 | 964                          | 964 | 928 |

## 12 Order guide and accessories

### 12.1 Part number code

#### AMS 1xxi yyy zzz

|     |                                                                                                                       |
|-----|-----------------------------------------------------------------------------------------------------------------------|
| AMS | Optical laser measurement system (absolute measurement system)                                                        |
| 1   | Series: AMS 100i                                                                                                      |
| xx  | Interface:<br>07: SSI<br>08: Ethernet TCP/IP<br>38: EtherCAT<br>48: PROFINET                                          |
| i   | i: Integrated fieldbus technology                                                                                     |
| yyy | Operating range:<br>40: max. operating range in m<br>120: max. operating range in m<br>200: max. operating range in m |
| zzz | Mounting accessories:<br>see chapter 12.3 "Accessories – Mounting"                                                    |

#### NOTICE



A list with all available device types can be found on the Leuze website [www.leuze.com](http://www.leuze.com).

### 12.2 AMS 108i type overview

Tab. 12.1: AMS 108i

| Type designation   | Description                                                                               | Part number |
|--------------------|-------------------------------------------------------------------------------------------|-------------|
| AMS 108i 40        | 40 m operating range, Ethernet interface                                                  | 50144691    |
| AMS 108i 120       | 120 m operating range, Ethernet interface                                                 | 50144692    |
| AMS 108i 40 BTA    | 40 m operating range, Ethernet interface, pre-mounted alignment unit                      | 50144688    |
| AMS 108i 120 BTA   | 120 m operating range, Ethernet interface, pre-mounted alignment unit                     | 50144687    |
| AMS 108i 40 H      | 40 m operating range, Ethernet interface, integrated heating                              | 50144693    |
| AMS 108i 120 H     | 120 m operating range, Ethernet interface, integrated heating                             | 50144694    |
| AMS 108i 40 BTA H  | 40 m operating range, Ethernet interface, pre-mounted alignment unit, integrated heating  | 50144689    |
| AMS 108i 120 BTA H | 120 m operating range, Ethernet interface, pre-mounted alignment unit, integrated heating | 50144690    |

## 12.3 Accessories – Mounting

Tab. 12.2: Mounting

| Type designation | Description                                                                           | Part no. |
|------------------|---------------------------------------------------------------------------------------|----------|
| US AMS 02        | Deflecting mirror for 90° deflection of the laser beam, for use with AMS 1xxi ... BTA | 50144969 |
| US 1 OMS         | Deflector unit without mounting bracket for simple 90° deflection of laser beam       | 50035630 |
| BTA 0100 M       | Alignment unit                                                                        | 50144385 |
| BTA 0100 M.5     | Stainless steel alignment unit                                                        | 50151594 |
| BT 0100 M        | Adapter plate for mounting without alignment unit                                     | 50144968 |
| BT 0100M-F       | Mounting plate for floor assembly and/or horizontal surfaces                          | 50144970 |

## 12.4 Accessories – Reflective tapes

Tab. 12.3: Overview of reflective tape types

| Type designation          | Description                                           | Part no. |
|---------------------------|-------------------------------------------------------|----------|
| REF 4-A-150x150           | Self-adhesive reflective tape, 150 x 150 mm           | 50141015 |
| Reflective tape 200x200-S | Self-adhesive reflective tape, 200 x 200 mm           | 50104361 |
| REF 4-A-300x300           | Self-adhesive reflective tape, 300 x 300 mm           | 50141014 |
| Reflective tape 500x500-S | Self-adhesive reflective tape, 500 x 500 mm           | 50104362 |
| Reflective tape 914x914-S | Self-adhesive reflective tape, 914 x 914 mm           | 50108988 |
| Reflective tape 200x200-M | Reflective tape on carrier plate, 200 x 200 mm        | 50104364 |
| Reflective tape 500x500-M | Reflective tape on carrier plate, 500 x 500 mm        | 50104365 |
| Reflective tape 914x914-M | Reflective tape on carrier plate, 914 x 914 mm        | 50104366 |
| Reflective tape 200x200-H | Reflective tape on heated carrier plate, 200 x 200 mm | 50115020 |
| Reflective tape 500x500-H | Reflective tape on heated carrier plate, 500 x 500 mm | 50115021 |
| Reflective tape 914x914-H | Reflective tape on heated carrier plate, 914 x 914 mm | 50115022 |

## 12.5 Accessories – connection technology

Tab. 12.4: Connection cables

| Type designation    | Description                              | Part no. |
|---------------------|------------------------------------------|----------|
| KS ET-M12-4A-P7-020 | Connection cable, length 2 m, shielded   | 50135073 |
| KS ET-M12-4A-P7-050 | Connection cable, length 5 m, shielded   | 50135074 |
| KD U-M12-5A-V1-020  | Connection cable, length 2 m, unshielded | 50132077 |
| KD U-M12-5A-V1-050  | Connection cable, length 5 m, unshielded | 50132079 |

### 13 EC Declaration of Conformity

The optical laser measurement systems of the AMS 100i series have been developed and manufactured in accordance with the applicable European standards and directives.

| NOTICE                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>You can download the EC Declaration of Conformity from the Leuze website.</p> <ul style="list-style-type: none"><li>↪ Call up the Leuze website: <a href="http://www.leuze.com">www.leuze.com</a>.</li><li>↪ Enter the type designation or part number of the device as the search term. The article number can be found on the name plate of the device under the entry "Part. No.".</li><li>↪ The documents can be found on the product page for the device under the <i>Downloads</i> tab.</li></ul> |

## 14 Licenses

The service interface can be accessed via a web browser using the IP address 192.168.60.101, either through the webConfig tool or after connecting an Ethernet cable.

↳ To do this, go to Settings and open the *Licensestab*.

The license texts for the software packages can then be selected via the drop-down menu.