Leuze

Translation of original operating instructions

AMS 107i

Optical laser measurement system – SSI



The Sensor People

We reserve the right to make technical changes
EN • 2026-09-29 • 24-105915

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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
NOTE	Signal word for property damage Indicates dangers that may result in property damage if the measures for danger avoidance are not followed.
ATTENTION LASER RADIATION	Signal word for dangers from harmful laser radiation
CAUTION	Signal word for minor injuries Indicates dangers that may result in minor injury if the measures for danger avoidance are not followed.
WARNING	Signal word for serious injury 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 Text passages with this symbol provide you with further information.
	Symbol for action steps Text passages with this symbol instruct you to perform actions.
	Symbol for action results 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 200 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

⚠ CAUTION

Observe intended use!

The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not complying with its intended use.

- ↳ Only operate the device in accordance with its intended use.
- ↳ Leuze electronic GmbH + Co. KG is not liable for damages caused by improper use.
- ↳ Read these operating instructions before commissioning the device. Knowledge of the operating instructions is an element of proper use.

⚠ CAUTION

UL applications!

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

Comply with conditions and regulations!

- ↳ Observe the locally applicable legal regulations and the rules of the employer's liability insurance association.

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
	**Do not modify or otherwise interfere with the device!** ↳ 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. ↳ 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. ↳ Repairs must only be performed by Leuze electronic GmbH + Co. KG.

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

ATTENTION



LASER RADIATION – CLASS 2 LASER PRODUCT

Do not stare into beam!

The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of **laser class 2** 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.

- Never look directly into the laser beam or in the direction of reflected laser beams!
  If you look into the beam path over a longer time period, there is a risk of injury to the retina.
- Do not point the laser beam of the device at persons!
- Interrupt the laser beam using a non-transparent, non-reflective object if the laser beam is accidentally directed towards a person.
- When mounting and aligning the device, avoid reflections of the laser beam off reflective surfaces!
- CAUTION! Use of controls or adjustments or performance of procedures other than specified herein may result in hazardous light exposure.
- Observe the applicable statutory and local laser protection regulations.
- The device must not be tampered with and must not be changed in any way.
  There are no user-serviceable parts inside the device.
  Repairs must only be performed by Leuze electronic GmbH + Co. KG.

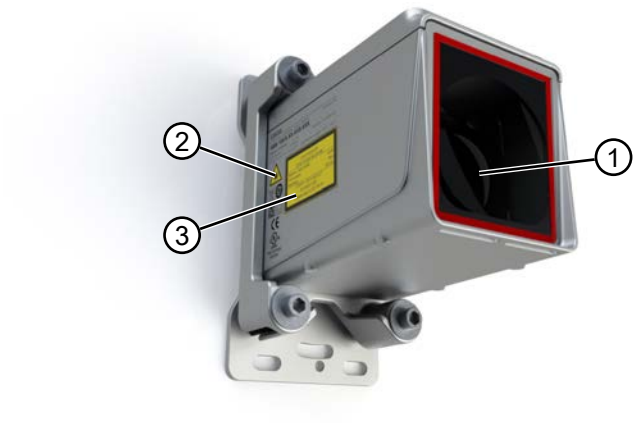
NOTICE



Affix laser information and warning signs!

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.

- Affix the laser information sheet to the device in the language appropriate for the place of use.
  When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" notice.
- 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.
  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.



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 13 "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 SSI interface

For correct data exchange between frequency inverter and AMS 100i, both devices must have the same settings for the following parameters:

- Encoding
- Number of data bits
- Resolution
- Error bit on/off

For further information, see chapter 7 "Putting into operation – SSI interface".

3.5 EtherNet/IP interface

For more information on installing the EtherNet/IP interface Starting up – Ethernet/IP interface.

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	• No measurement value output • Voltage connected • Self test running • Initialization running • Parameter download running • Boot process running
Green	Continuous light	• Device ok • Measurement value output • Self test successfully finished • Device monitoring active
Red	Flashing	• Device OK but warning message (ATT, TMP, LSR) set in display • Light beam interruption • Plausibility error (PLB)
Red	Continuous light	No measurement value output, details see chapter 4.2.2 "Display"
Orange	Continuous light	• Parameter enable active • No data on the host interface

NET LED

Tab. 4.2: NET indicators

Color	State	Description
	Off	No supply voltage (Power)
Green	Continuous light	SSI interface is activated
Green	Flashing	SSI 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: • Light beam interruption • Measurement range exceeded • Permissible internal device temperature exceeded • Traverse rate > 10 m/s 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:

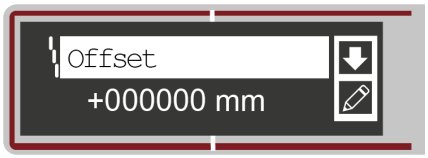


Fig. 4.2: Example of value entry

- 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

Tab. 4.5: Menu structure

Level 1	Level 2	Level 3	Level 4	Level 5
Device information	Product name			
	Part no.			
	Serial No.			
	HW revision			
	FW revision			
Parameter (see chapter 4.3.2 "Parameter menu")	Parameter handling	Parameter enable		
		Password	Activate password	
			Password entry	
		Parameters to default		

Level 1	Level 2	Level 3	Level 4	Level 5
Parameter (see chapter 4.3.2 "Parameter menu")	SSI	Activation		
		Encoding		
		Number of data bits		
		SSI resolution		
		Error bit		
		Error bit function		
		Update rate		
		Clock frequency		
	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	IP address	
			Port address	
		Heating control	Standard (10°C – 15°C)	
			Extended (30°C – 35°C)	
Language selection (see chapter 4.3.3 "Language selection menu")				

Level 1	Level 2	Level 3	Level 4	Level 5
Diagnosis (see chapter 4.3.4 "Diagnosis menu")	Status messages			

4.3.2 Parameter menu

Parameter handling

Tab. 4.6: Submenu *Parameter handling*

Level 3	Level 4	Selection/configuration options Description	Standard
Parameter enable		**Lock and enable parameter entry** ON/OFF The standard setting (OFF) prevents unintended parameter changes. With parameter enable activated (ON), the display is inverted. In this state, it is possible to change parameters manually.	OFF
Password	Activate password	**Set up password** ON/OFF To enter a password, parameter enable must be activated. If a password is assigned, changes to the AMS 107i can only be made after the password is entered. The master password 507 overrides the individually set password.	OFF
	Enter password	Setting a 4-digit numerical password. After confirmation of the password, the entered password is shown as "000" for reasons of discretion.	
Parameters to default		**Reset device to default settings** Pressing the [ENTER] button after selecting the menu item *Parameters to default* resets all parameters to their standard settings without any further security prompts. In this case, English is selected as the display language.	

SSI

Tab. 4.7: Submenu *SSI*

Level 3	Selection/configuration options Description	Standard
Activation	ON/OFF Activates or deactivates the AMS 100i as an SSI participant.	ON
Encoding	Binary/gray Specifies the output format of the measurement value.	Gray
Number of data bits	24-bit/25-bit/26-bit The measurement value can be represented on the SSI interface in this data width.	24 bit
SSI resolution	0.001 mm/0.01 mm/0.1 mm/1 mm/10 mm The measurement value can be displayed in these resolutions.	0.1 mm
Error bit	ON/OFF This parameter determines whether an error bit is also attached to the “number of data bits.” The error bit is the LSB and is not converted when the measurement value is represented in Gray code.	ON
Error bit function	The error bit can be assigned the following status messages: • Overflow • Intensity (ATT) • Temperature (TMP) • Laser (LSR) • Plausibility (PLB) • Hardware (ERR) In the case of multiple entries, the individual states in the error bit are processed in an OR function.	Plausibility (PLB) Hardware (ERR)
Update rate	1 ms (1.7 ms for V1.1.2 and earlier)	1 ms (1.7 ms for V1.1.2 and earlier)
Clock frequency	50-79 kHz/80-800 kHz Selection of the clock frequency	80-800 kHz

Position value

Tab. 4.8: Submenu *Position value*

Level 3	Level 4	Selection/configuration options Description	Standard
Unit		Metric/Inch Specifies the units of the measured distances. 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 Positive: The measurement value begins at 0 and increases with increasing distance. 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 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. If the preset value is activated, this has priority over the offset. Preset and offset are not offset against each other.	Maximum configurable value: +/- 200,000 mm +/- 800,000 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: +/- 200,000 mm +/- 800,000 inch/100
Error delay		ON/OFF 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 Specifies which position value is output after the error delay time elapses.	Zero
Filter type (as of firmware version V2.0.1)	Normal High Low AGV comp	Choosing the right filter type can improve measurement accuracy at extreme traverse rates (both positive and negative) and reduce measurement value noise. Normal: suitable for use in all areas High: for very high traverse rates Low: for very low traverse rates AVG comp: Compatibility mode	Normal

I/O

Tab. 4.9: Submenu *I/O settings*

Level 3	Level 4	Level 5	Selection/configuration options Description	Standard
I/O 1	Port configuration		Input/Output 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	Speed/intensity (ATT)/temperature (TMP)/laser (LSR)/plausibility (PLB)/ hardware (ERR) In the case of multiple entries, the individual functions are processed in an OR function.	Plausibility (PLB) Hardware (ERR)
		Activation	Low active/High active	Low active
I/O 2	Port configuration		Input/Output 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	Speed/intensity (ATT)/temperature (TMP)/laser (LSR)/plausibility (PLB)/ hardware (ERR) In the case of multiple entries, the individual functions are processed in an OR function.	Intensity (ATT) Temperature (TMP) Laser (LSR)
		Activation	Low active/High active	Low active
Limit values	Max. velocity	Activation		
		Max. velocity	max. adjustable value: 15,000 mm/s (60,000 inches/100 s)	

Other

Tab. 4.10: Submenu *Other*

Level 3	Level 4	Selection/configuration options Description	Standard
Display dimming		10 minutes/ON The display illumination is dimmed after 5 minutes and switched off after 10 minutes. If the *OFF* parameter is selected, dimming is permanently deactivated, i.e. the measurement value is always displayed.	10 min
Service Ethernet IP	IP address	The service interface is available for Leuze-internal purposes only.	192.168.60.101
	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 10 "Diagnostics and troubleshooting".

4.3.5 Operation examples

Structure of menu items in display

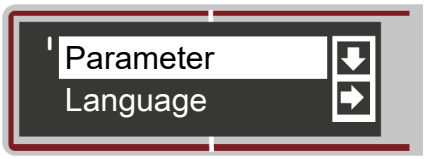
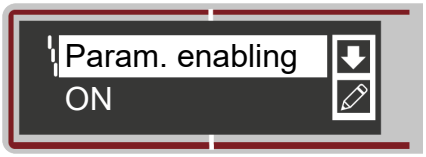
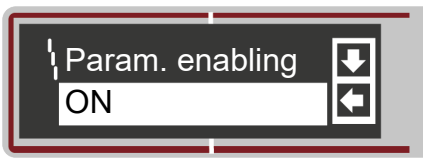
Two menu lines, one on top of the other, are always shown in the display.

Device information				
Network information				
Status and measurement data				
Parameter	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. 4.11: Operating example for "parameter enable"

	In the main menu, use the [DOWN] button to select the menu item *Parameter*.
	Press the [ENTER] button to enter the *Parameter* menu.
	Press the [DOWN] button to select the menu item *Parameter handling*.
	Press the [ENTER] button to enter the *Parameter handling* menu.
	In the *Parameter handling* menu, use the [DOWN] button to select the menu item *Parameter enable*.
	Press the [ENTER] button to enter the *Parameter enable* menu.
	In the *Parameter enable* menu, use the [DOWN] button to select the menu item *ON*.
	Press the [ENTER] button to activate parameter enable.

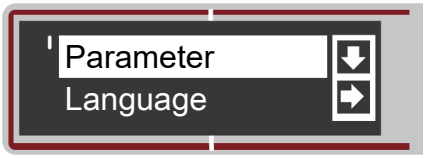
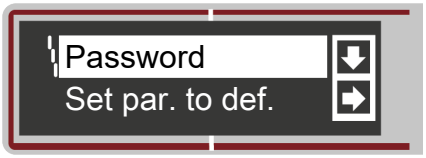
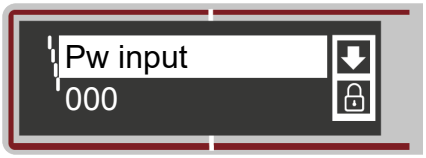
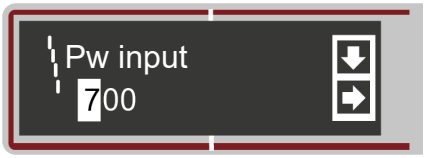
NOTICE
- As long as parameter enable is active, the entire AMS 100i display is inverted. - If a password was stored, parameter enable is not possible until this password is entered; see the example below. - For the SSI interface, communication between the control and the AMS 100i is active even if parameter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

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. 4.12: Operating example for "password for parameter enable"

	In the main menu, use the [DOWN] button to select the menu item *Parameter*.
	Press the [ENTER] button to enter the *Parameter* menu.
	Press the [DOWN] button to select the menu item *Parameter handling*.
	Press the [ENTER] button to enter the *Parameter handling* menu.
	In the *Parameter handling* menu, use the [DOWN] button to select the menu item *Password*.
	Press the [ENTER] button to enter the *Password* menu.
	In the *Password* menu, use the [DOWN] button to select the menu item *Password activation*.
	Press the [ENTER] button to enter the *Password activation* menu.
	In the *Password activation* menu, use the [DOWN] button to select the menu item *OFF*.
	Press the [ENTER] button to set password activation to *ON*.
	In the *Password* menu, use the [DOWN] button to select the menu item *Password entry*.
	Press the [ENTER] button to enter the *Password entry* menu.
	Now enter the password (digits), see chapter 4.2.3 "Control buttons".
	Press the [ENTER] button to confirm the value input.
	Exit the menu by pressing the [DOWN] button or wait until the AMS displays the measurement screen again.

	The next time you try to make a selection using the control buttons, you will now be prompted to enter the password to allow you to make entries.

	NOTICE
	The AMS 107i 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, microprism-based reflective material. The microprisms 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 13.4 "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 12.2.1 "Self-adhesive reflective tape"
- Reflective tape on carrier plate
  - The reflective tape (…x…-**M**) is affixed to a carrier plate.
  - Technical data: see chapter 12.2.2 "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 12.2.3 "Reflective tape with heating"

4.4.3 Selecting reflector size

Depending on the system dimensions, 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. 4.13: Recommended reflector size

Device type	Operating range (m)	Recommended reflector size (H x W)	Type of reflective tape …-S (self-adhesive) …-M (carrier plate) …-H (heating)	Part no.
AMS 107i 40	40	200x200 mm	REF 4-A-150x150[1]	50141015
			Reflective tape 200x200-S	50104361
			Reflective tape 200x200-M	50104364
			Reflective tape 200x200-H	50115020
			REF 4-A-300x300[1]	50141014
AMS 107i 120	120	500x500 mm	Reflective tape 500x500-S	50104362
			Reflective tape 500x500-M	50104365
			Reflective tape 500x500-H	50115021
AMS 107i 200	200	749x914 mm	Reflective tape 749x914-S	50104363
		914x914 mm	Reflective tape 914x914-M	50104366
			Reflective tape 914x914-S	50108988
			Reflective tape 914x914-H	50115022

[1] For landside mounting

NOTICE



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 model “-S,” see chapter 13.4 "Accessories – Reflective tapes".

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.

5 Mounting

5.1 Transport and storage

NOTICE
↳ 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 13.2 "AMS 107i type overview".



Fig. 5.1: Name plate of AMS 107i

↳ Save the original packaging for later storage or shipping.

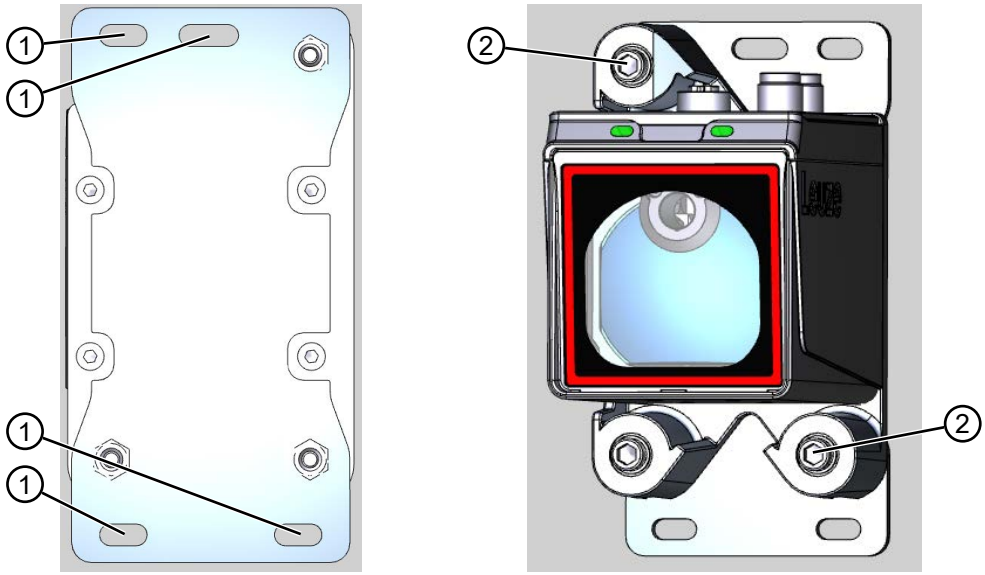
↳ If you have questions, please contact your supplier or Leuze customer service.

↳ 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

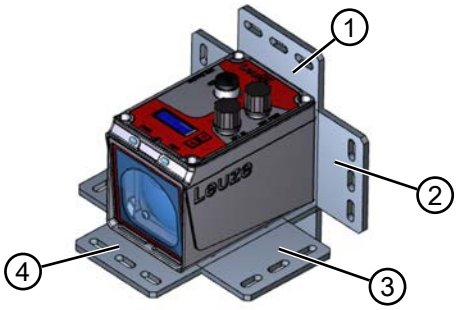
- Mount using four M5 screws.
- Guide the four M5 screws through the slotted holes of the alignment unit (1) and through the component to which the AMS 100i is to be attached.
- Secure the screws with a lock washer to protect against loosening caused by vibrations.

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.

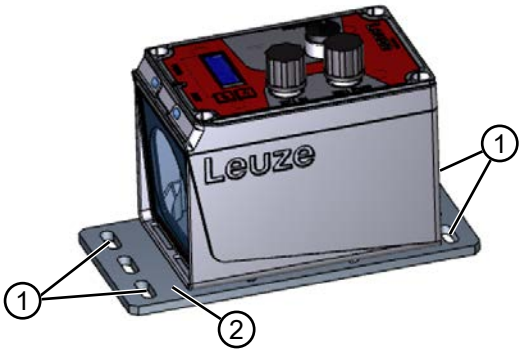
5.2.2 Mounting with adapter plate (BT)



1 Mounting option 1
2 Mounting option 2
3 Mounting option 3
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.

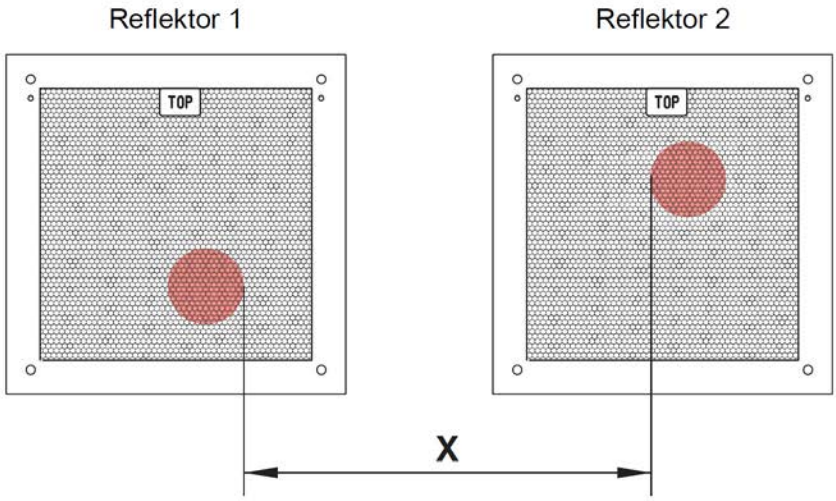


Fig. 5.5: Laser light spots parallel spacing

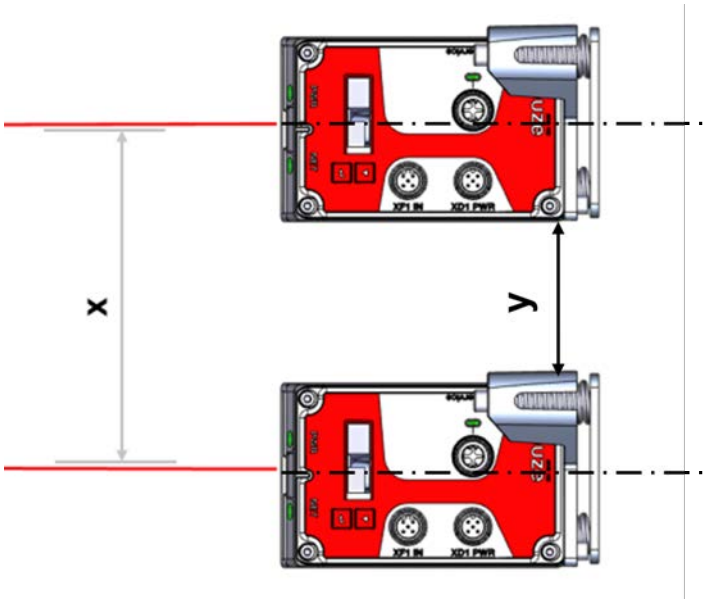


Fig. 5.6: Parallel mounting

The diameter of the light spot increases with distance.

	AMS 100i
Max. measuring distance	200 m
Light spot diameter	≤ 160 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 mm + (max. measuring distance in mm × 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..

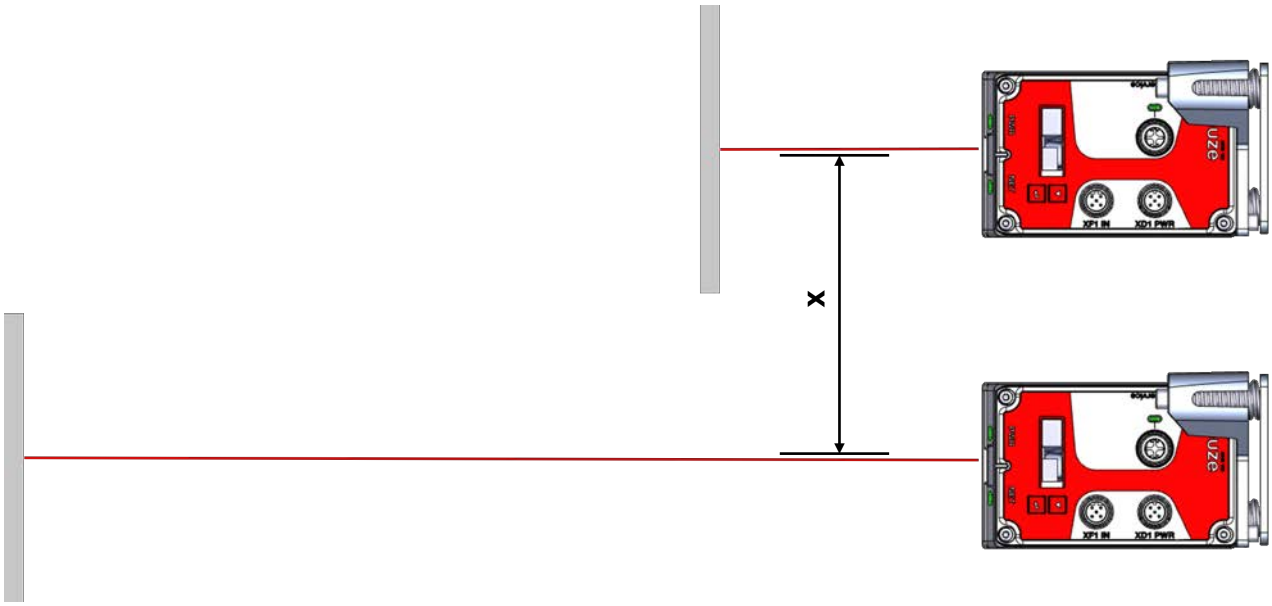


Fig. 5.7: Parallel mounting with moving reflectors

Measuring distance up to 200 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.

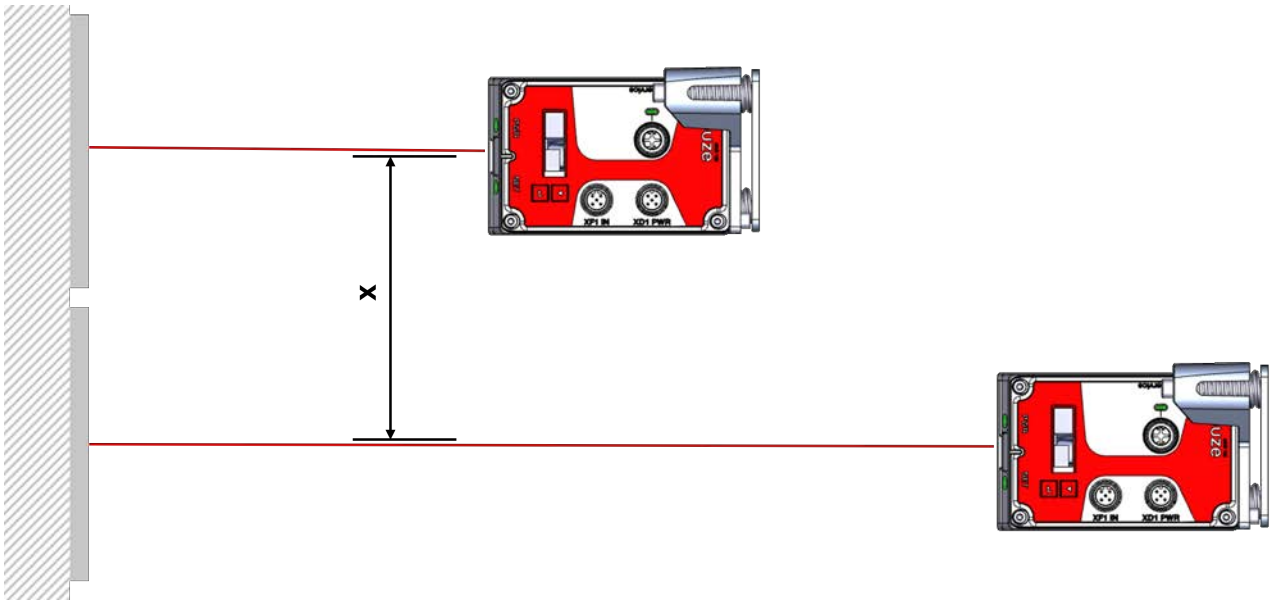


Fig. 5.8: Parallel mounting with moving AMS 100i units

Measuring distance up to 200 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

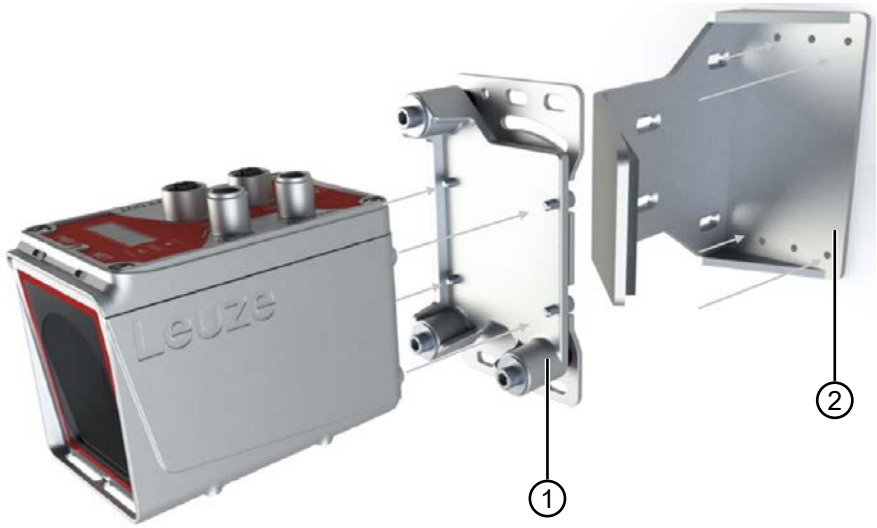
The optical data transceivers of the DDLS series and the AMS 107i do not interfere with one another. Depending on the size of the used reflector, the DDLS can be mounted with a minimum parallel spacing of 100 mm to the AMS 107i. The parallel spacing is independent of the distance.

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 13.3 "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 12.3 "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".

WARNING

Electrical work!

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 12.2.3 "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").

NOTICE

The reflector must be positioned at an angle. Use the spacer sleeves for this purpose.

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 Reflective tape 200x200-M	2 x 5 mm	
Reflective tape 200x200-H	2 x 15 mm	2 x 20 mm
Reflective tape 500x500-S 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 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

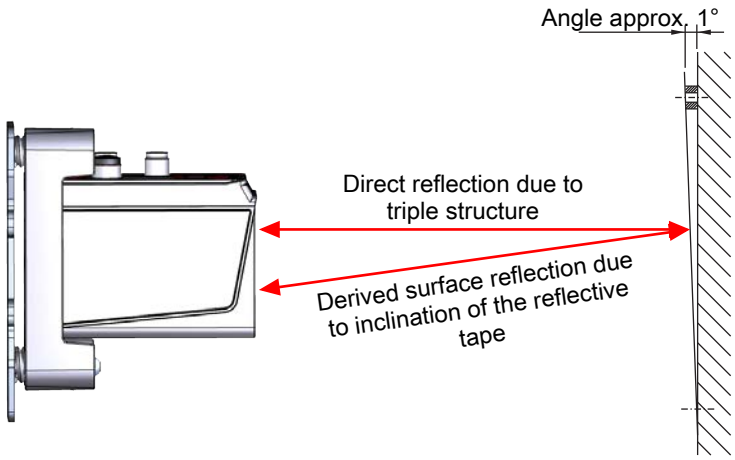


Fig. 5.10: Mounting the reflector

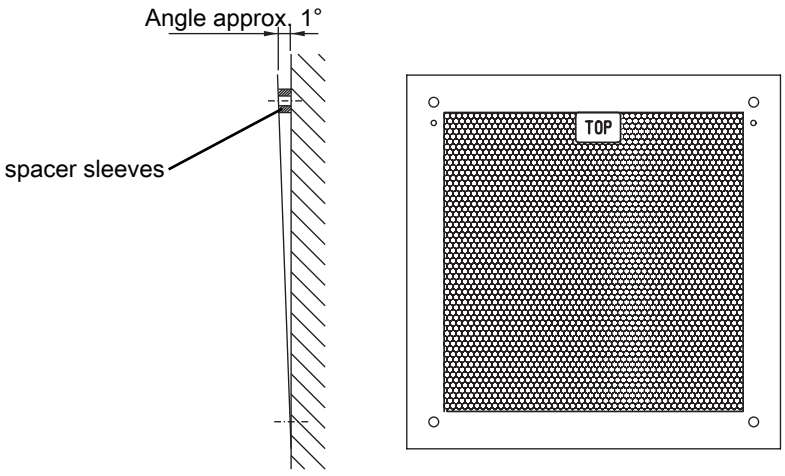


Fig. 5.11: Pitch of the reflector

Pitch of reflective tapes …-H

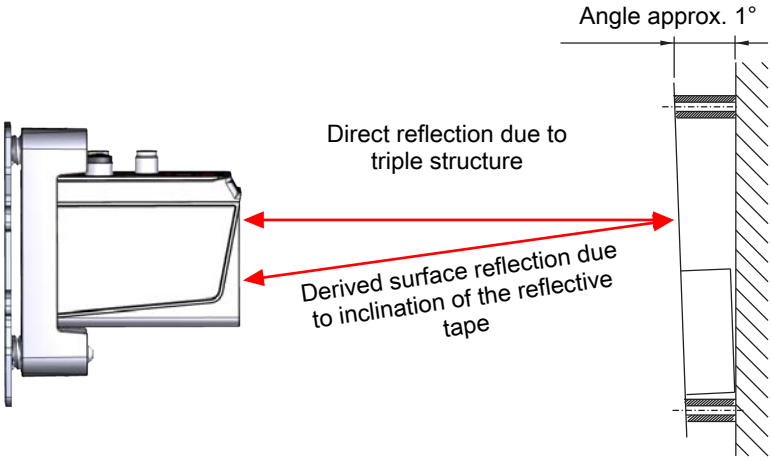


Fig. 5.12: Mounting of heated reflectors

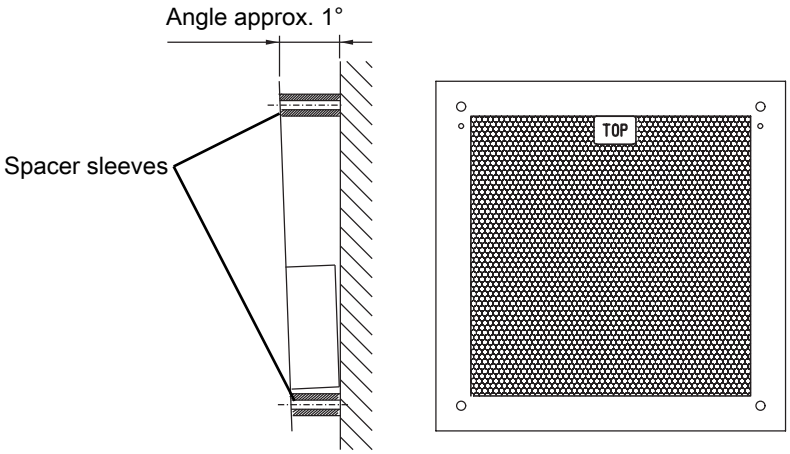


Fig. 5.13: Pitch of the heated reflector

6 Electrical connection

CAUTION

- Before connecting the device, be sure that the supply voltage agrees with the value printed on the name plate.
- Only allow competent persons to perform the electrical connection.
- Ensure that the functional earth (FE) is connected correctly. Fault-free operation is only guaranteed if the functional earth is connected properly.
- If faults cannot be rectified, take the device out of operation. Protect the device from accidentally being started.

CAUTION

UL applications!

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

Protective Extra Low Voltage (PELV)!

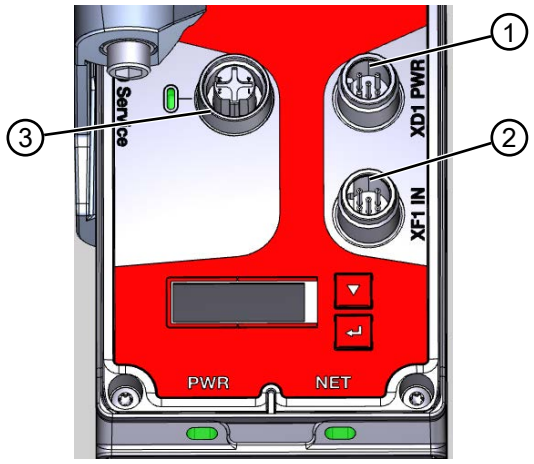
The device is designed in accordance with protection class III for supply with PELV (Protective Extra-Low Voltage).

NOTICE

Degree of protection IP65

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 XD1 PWR – voltage supply / switching input/output
2 X1 SSI
3 Service

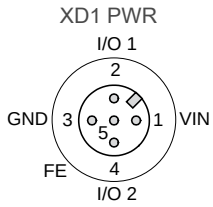
Fig. 6.1: AMS 107i connections

The corresponding mating connectors and preassembled cables are available as accessories for all connections, see chapter 13.5 "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 +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)

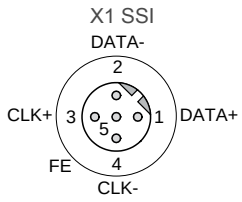
For configuration of the switching input/output, see chapter 7 "Putting into operation – SSI interface".

6.2 SSI

M12 connector, 5-pin, B-coded

Additional requirements for the SSI cable see chapter 7.2 "Cable length depending on the data rate".

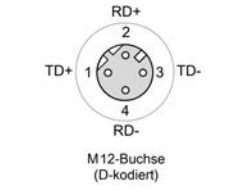
Tab. 6.2: SSI pin assignment

	Pin	Designation	Assignment
	1	DATA+	+ Data line SSI (output)
	2	DATA-	- Data line SSI (output)
	3	CLK+	+ Clock line SSI (Input electrically isolated)
	4	CLK-	- Clock line SSI (Input electrically isolated)
	5	FE	Functional earth
	Thread	FE	Functional earth (housing)

6.3 Service

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

Tab. 6.3: 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)

NOTICE	
	The service interface is designed only for use by Leuze.

7 Putting into operation – SSI interface

7.1 Operating principle of SSI interface

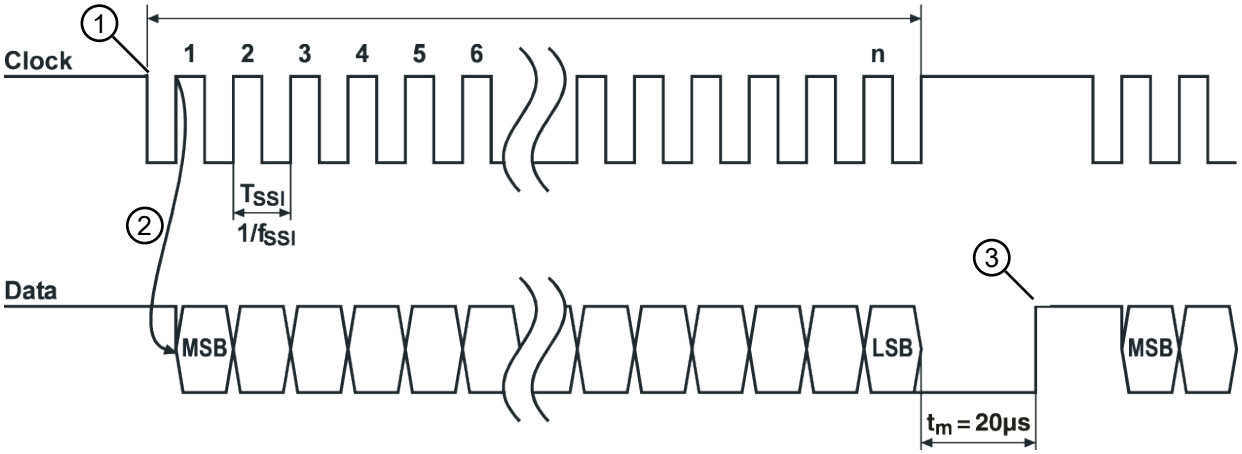


Fig. 7.1: SSI transmission cycle

Data communication of the SSI interface is based on differential transmission as is used for RS 422 interfaces. In this process, the position value is transmitted synchronously with a cycle (CLOCK) specified by the control, starting with the MSB (most significant bit).

In the idle state, both the clock line as well as the data line are at HIGH level. On the first HIGH-LOW edge (1), the data of the internal register are stored. This ensures that the data are not changed during serial transfer of the value.

With the subsequent change of the clock signal from LOW to HIGH level (2), transfer of the position value begins with the most significant bit (MSB). With each subsequent change of the clock signal from LOW to HIGH level, the next least-significant bit is transmitted on the data line. After the least significant bit (LSB) has been output, the clock signal switches from LOW to HIGH for one last time and the data line switches to LOW level (end of transmission).

A monoflop retriggered by the clock signal determines the time span before the SSI interface can be called for the next transmission. This results in the minimum pause time between two successive clock cycles. If time t_m = 20 µs has elapsed, the data line is returned to the quiescent level (HIGH) (3). This signals completed data communication and that the device is again ready for transmission.

Clock interruption

If the off-cycle of data transmission is interrupted for longer than t_m = 20 µs, the next cycle will begin with a completely new transmission cycle with a newly calculated value.

If a new transmission cycle is started before time t_m elapses, the previous value is output again.

NOTICE	
	The SSI interface can only represent positive distance values. If negative output values are ascertained due to the offset or counting direction, a *Zero* value is output at the SSI interface. In the event of a number overflow, all data bits are set to "1".

Error bit

In the default setting, the LSB bit is the error bit.

Value of the error bit:

By default, a 25th error bit (LSB) is appended to the 24-bit measurement value. The error bit is not included in the Gray encoding of the measurement value.

The error bit is 1 = active, 0 = not active.

Clock frequency

The data can be read out at a clock frequency between 80 kHz and 800 kHz or between 50 kHz and 79 kHz, depending on the parameter setting.

Update of the measurement values on the SSI interface

The measurement value on the SSI interface of the AMS 107i is updated approx. every 1 ms (default) irrespective of the clock frequency. For devices with firmware version V1.1.2 and earlier, the update occurs every 1.7 ms.

7.2 Cable length depending on the data rate

The SSI cables must satisfy the following requirements:

- Clock lines and data lines are routed under a common shield. Or alternatively
- Clock lines and data lines are each shielded separately. In this case, the two shields can be conductively enclosed by another common shield.

Both cable variants must satisfy the following requirements:

- The two clock lines of an SSI connection must be a twisted pair.
- The two data lines of an SSI connection must be a twisted pair.

NOTICE

- Install SSI cables that carry data separately and not parallel to the power supply cables of motors/frequency inverters or other power-carrying cables.
- Avoid crossing these cables.
- Protect the cables from mechanical damage, especially against crushing.
- When laying cables in the switch cabinet, make certain that the SSI data lines are laid to just before their clamping point in the switch cabinet under the shielded sheathing.

The maximum possible cable length depends on the cable used and the data rate:

Tab. 7.1: Max. cable length depending on the data rate

Data rate	80 kbit/s	100 kbit/s	200 kbit/s	300 kbit/s	400 kbit/s	500 kbit/s	1000 kbit/s
Max. cable length (typical)	500 m	400 m	200 m	100 m	50 m	25 m	10 m

7.3 Default settings

Tab. 7.2: Default settings of the SSI interface

Parameter	Default setting
SSI activation	ON
Measurement value coding	Gray
Transmission mode	24 bit measurement value + 1 bit error (error: 1 = active), error bit = LSB
Resolution	0.1 mm
Default error bit	Plausibility error or hardware error
Update rate	1 ms (1.7 ms for V1.1.2 and earlier)
Units	Metric
Counting direction	Positive (the SSI interface cannot represent negative values)
I/O 1	Output – plausibility error or hardware error
I/O 2	Output – temperature error, intensity error or laser prefailure message
Static preset	+000,000
Error handling procedures	Position output: 0 Suppress position status: active Position suppression time: 100 ms
Display language	English

Parameter	Default setting
Display illumination	OFF after 10 min
Display contrast	Medium
Password protection	Off
Password	0000

NOTICE

- ↳ To change parameters, activate parameter enable.
- ⇨ The SSI interface remains active even during parameter enable. Changes to parameters have an immediate effect.

8 Starting up the device – webConfig tool

With the Leuze webConfig tool, a web-technology based, graphical user interface is available for AMS configuration and diagnosis.

The webConfig tool can be run on any Internet-ready PC. The webConfig tool uses HTTP as communication protocol and the client-side restriction to standard technologies (HTML, JavaScript and AJAX) that are supported by modern browsers.

NOTICE
Configuration changes via the webConfig tool have no effect in SSI! ↳ **Always** perform the basic configuration using the display. In process operation, only the parameters set via the device are active.

NOTICE
The webConfig tool is offered in the following languages: German, English, Chinese, Italian, Spanish, French, Portuguese, Korean

8.1 System requirements

8.2 Start webConfig tool

NOTICE
The webConfig tool is only accessible on the AMS 107i via the Service port.

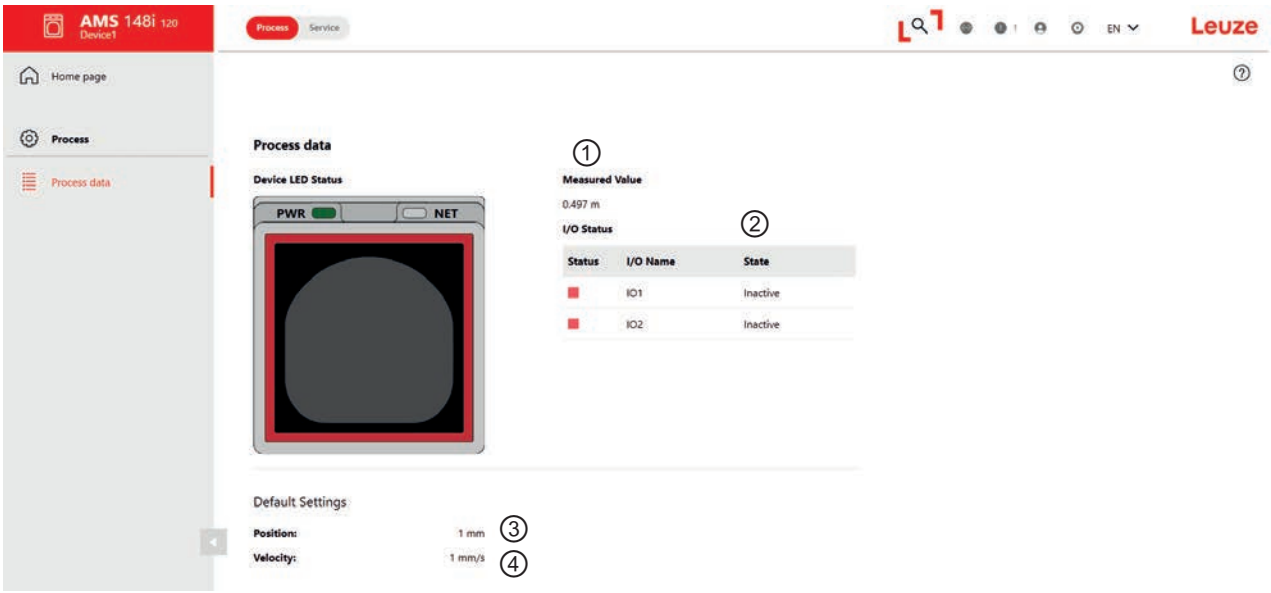
NOTICE
The webConfig tool is only accessible on the AMS 158i via the Service port.

↳ Connect the supply voltage to the AMS.

↳ Connect the AMS service interface to the PC.
The connection to the AMS service interface is made via the PC's RJ45 Ethernet interface. Use an Ethernet cable with a D-coded M12 connector and an RJ45 connector.
An Ethernet adapter also allows you to use the USB interface on the PC. To do this, use a standard cable with a Type A USB connector and a D-coded M12 Ethernet connector.

↳ Start the webConfig tool using your PC's Internet browser with IP address: **http://192.168.60.101**. This is the Leuze standard service address for communication with absolute measuring systems.

⇨ The webConfig start page appears on your PC.



1 Current measurement value
2 I/O state 1/2
3 Position value resolution
4 Velocity value resolution

Fig. 8.1: webConfig tool start page (example)

NOTICE

The webConfig tool always starts in *Process* mode after startup.

8.3 Short description of the webConfig tool

The menus and dialog boxes of the webConfig tool are intuitive to operate and provide texts and tool tips. The start page of the webConfig tool displays the current process information.

8.3.1 Switching operating mode

You can use the webConfig tool to switch between the following operating modes:

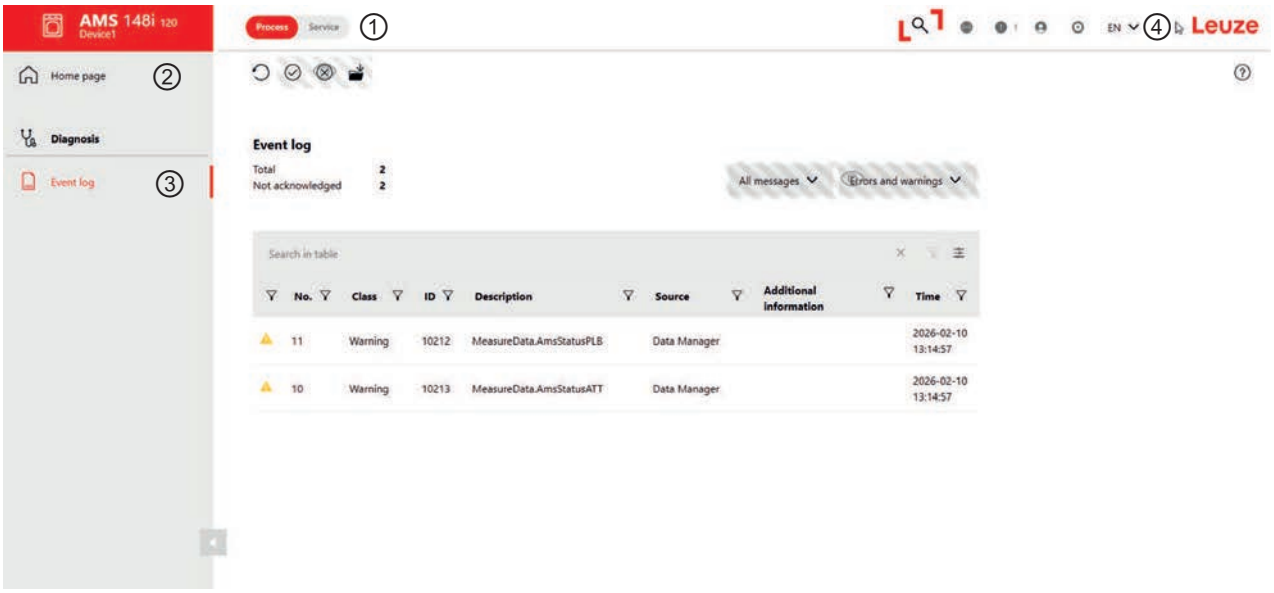
Process

- The device is connected to the control or to the PC.
- Process communication with the control is active and position values are provided via the interfaces.
- The switching inputs/outputs are activated.
- Allows read-only access to the process data and diagnosis registers.

Service

- The *Service* operating mode enables read and write access to all registers.
- The process communication to the control is interrupted and no position values are provided via the interfaces.
- The switching inputs/outputs are deactivated.

Located in the top left of every page of the webConfig tool is a software switch for changing the operating mode (Process – Service).



1 Switching between the process and service operating modes
2 Main menu
3 Diagnosis menu structure
4 Language switching

Fig. 8.2: webConfig tool overview

8.3.2 Menu overview

The [Home page] button displays the webConfig tool's menu overview.

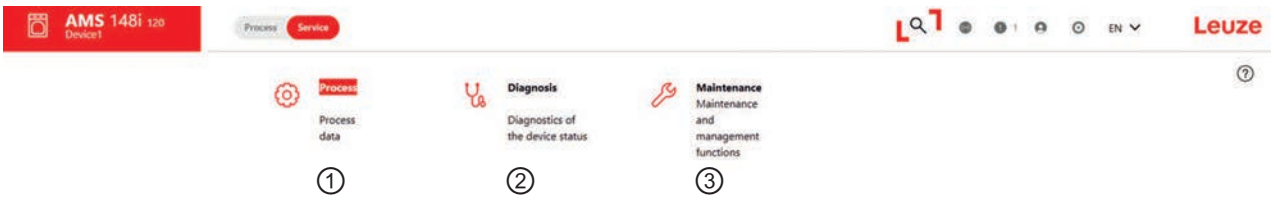


Fig. 8.3: webConfig menu overview

1. **Process**
   - Information on the current measurement value
   - Information about switching inputs and outputs
2. **Diagnosis**
   - Event logging of info, warnings and errors
3. **Maintenance**
   - User management
   - Backup/Restore
   - Firmware update
   - System clock

9 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 11 "Service and support").

Disposing

	NOTICE
	For disposal observe the applicable national regulations regarding electronic components.

10 Diagnostics and troubleshooting

10.1 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. 10.1: Example of status message

Structure of status messages

n: Type/No./1

n	Memory position in the ring memory
Type	Type of message: I = info, W = warning, E = error, F = severe system error
No.	Internal error detection
1	Frequency of the event (always "1" because no summation occurs)

Select the status messages in the ring memory using the [DOWN] button. Use the [ENTER] button to call up detailed information about the respective status message:

Type: type of message + internal counter

UID: Leuze-internal message encoding

ID: description of the message

Info: not currently used

Within the detailed information, press the [ENTER] button again to activate an action menu with the following functions:

- Acknowledge message
- Delete message
- Acknowledge all
- Delete all

10.2 LED indicators

Tab. 10.1: 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. 10.2: NET LED

NET LED display	Possible error cause	Measure
OFF	No supply voltage connected	Check supply voltage
	Incorrect wiring	Check wiring
	SSI deactivated	Activate SSI interface in AMS 107i

10.3 Display messages

Tab. 10.3: Warning messages in display

Display	Error no.	Possible error message	Measure
PLB (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 (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 (operating temperature outside of specification)	10210	Ambient temperatures outside specified range	In cold temperatures, an AMS with heating may help. If temperatures are too high, provide cooling or change mounting location.
LSR (laser diode warning)	10211	Laser diode prefailure message	Send in device at next possible opportunity to have laser diode replaced. Have replacement device ready.
ERR (hardware error)	-	Indicates an uncorrectable error in the hardware	Send in device for repair

11 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?

	NOTICE
	**Please use this chapter as a master copy should servicing be required!** ↳ Enter the contact information and fax this form together with your service order to the fax number given below.

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

12 Technical data

12.1 Optical laser measurement system

Tab. 12.1: Characteristic parameters

MTTF	27 years (at 25 °C)

Tab. 12.2: Measurement data

	AMS 107i 40	**AMS 107i 120**	**AMS 107i 200**
Measurement range	0.1 – 40 m	0.1 – 120 m	0.1 – 200 m
Accuracy	±2 mm	±2 mm	±3 mm
Reproducibility (1 sigma; typical values for standard filter types)	0.2 mm	0.2 mm	0.25 mm
Light spot diameter	≤ 40 mm	≤ 100 mm	≤ 160 mm
Output time	1 ms (1.7 ms for V 1.1.2 and earlier)		
Response time (compatibility mode)	8 ms		
Basis for contouring error calculation	7 ms		
Resolution	Adjustable, see chapter 7 "Putting into operation – SSI interface"		
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	20 s		
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. 12.3: 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. 12.4: 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

CAUTION

UL applications!

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

Protective Extra Low Voltage (PELV)!

The device is designed in accordance with protection class III for supply with PELV (Protective Extra-Low Voltage).

Tab. 12.5: SSI interface

Clock frequency	50 kHz – 800 kHz
Switching inputs/switching outputs • Quantity • Input • Output	 • 2, configurable • Protected against polarity reversal • Max. 60 mA, short-circuit proof

Tab. 12.6: Controls and indicators

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

Tab. 12.7: Mechanical data

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

Tab. 12.8: Environmental data

Ambient temperature, operation Ambient temperature, storage	-5°C – +60°C -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 EN 61000-6-4

12.2 Reflective tapes

12.2.1 Self-adhesive reflective tape

Tab. 12.9: Technical data of self-adhesive reflective tape

Feature	Reflective tape 200x200-S	Reflective tape 500x500-S	Reflective tape 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				

12.2.2 Reflective tape on carrier plate

Tab. 12.10: Technical data of reflective tape on carrier plate

Feature	Reflective tape 200x200-M	Reflective tape 500x500-M	Reflective tape 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

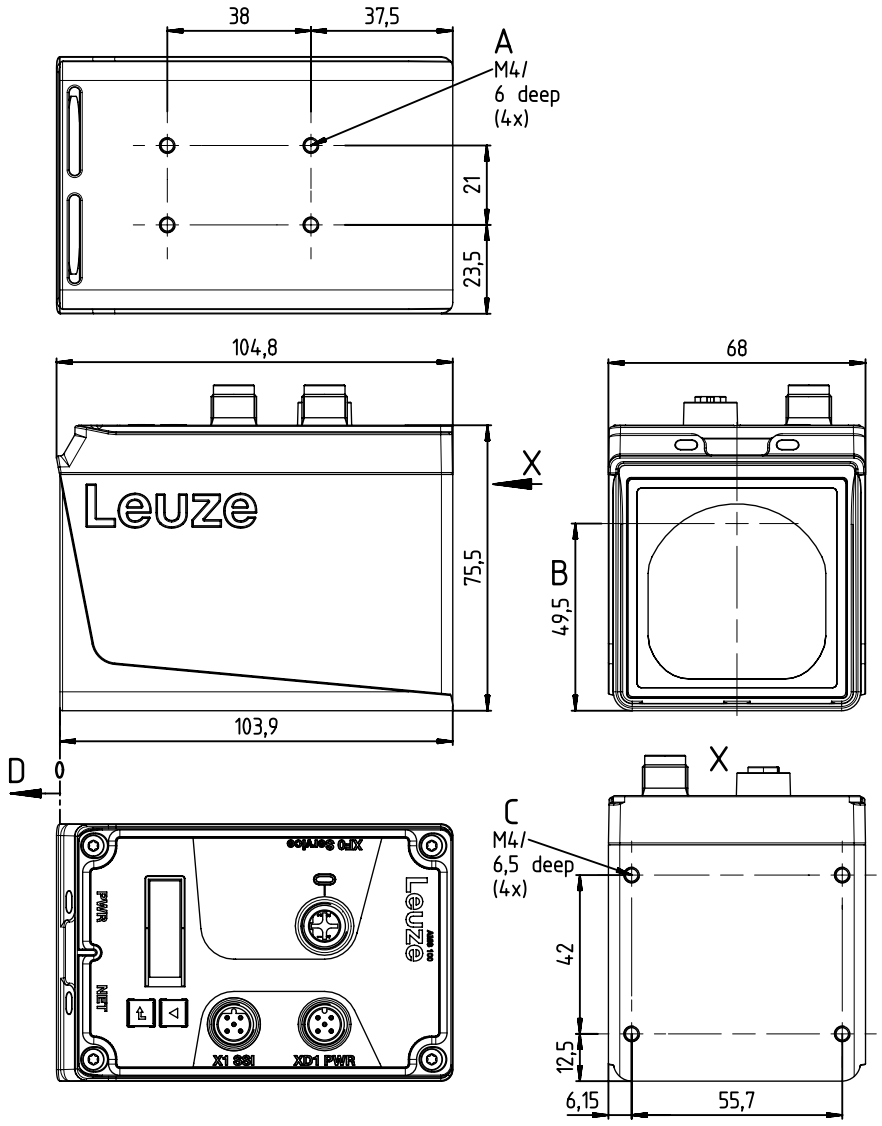
12.2.3 Reflective tape with heating

Tab. 12.11: Technical data of reflective tape with heating

Feature	Reflective tape 200x200-H	Reflective tape 500x500-H	Reflective tape 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		

12.3 Dimensioned drawings

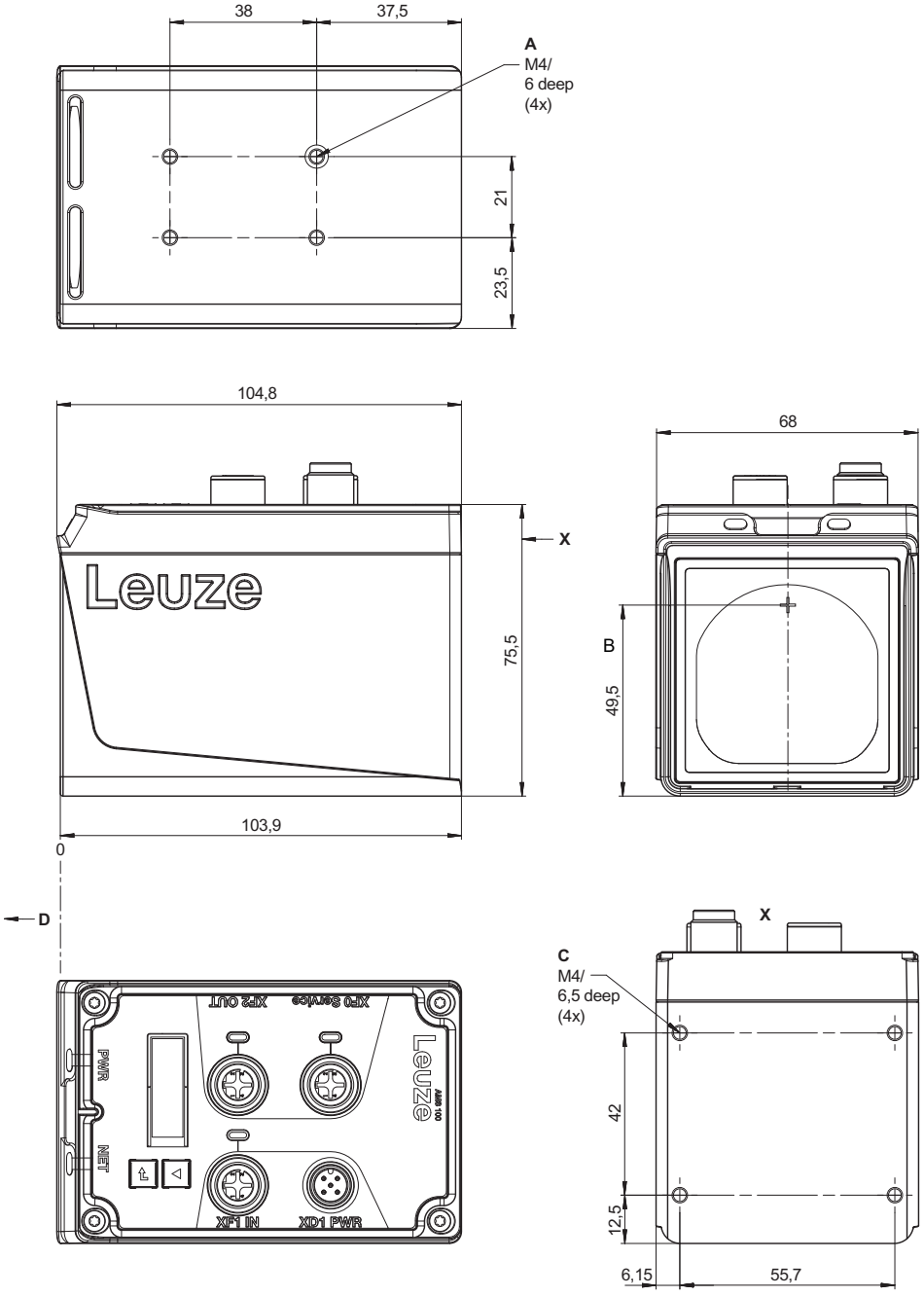
Optical laser measurement system AMS 107i



All dimensions in mm

Fig. 12.1: Optical laser measurement system AMS 107i

Optical laser measurement system AMS 158i



All dimensions in mm

A Mounting variant: Bottom of the device

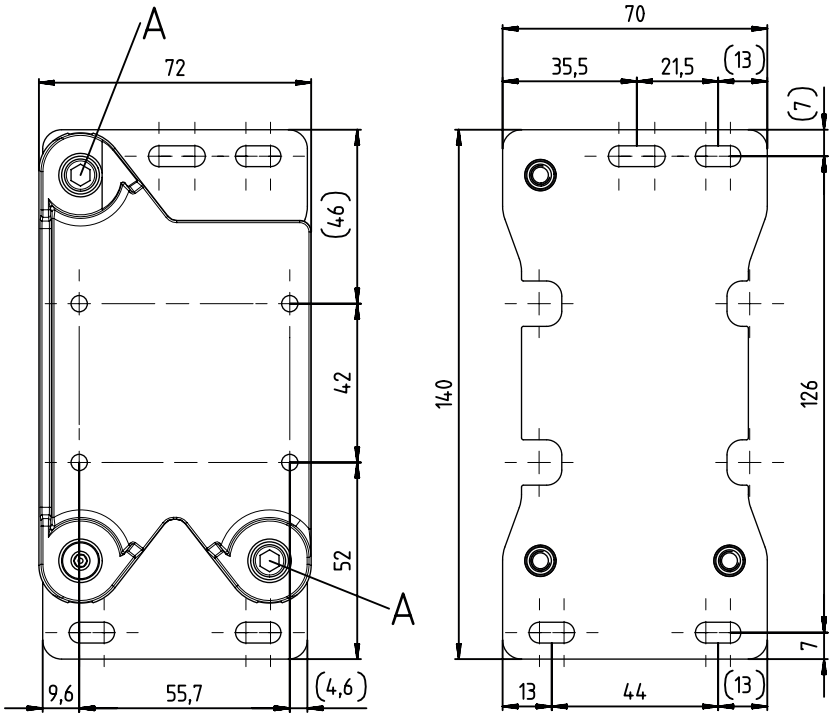
B Optical axis

C Mounting options for the BTA alignment unit

D Zero point of the distance to be measured

Fig. 12.2: Optical laser measurement system AMS 158i

Alignment unit BTA 0100M or BTA 0100 M.5

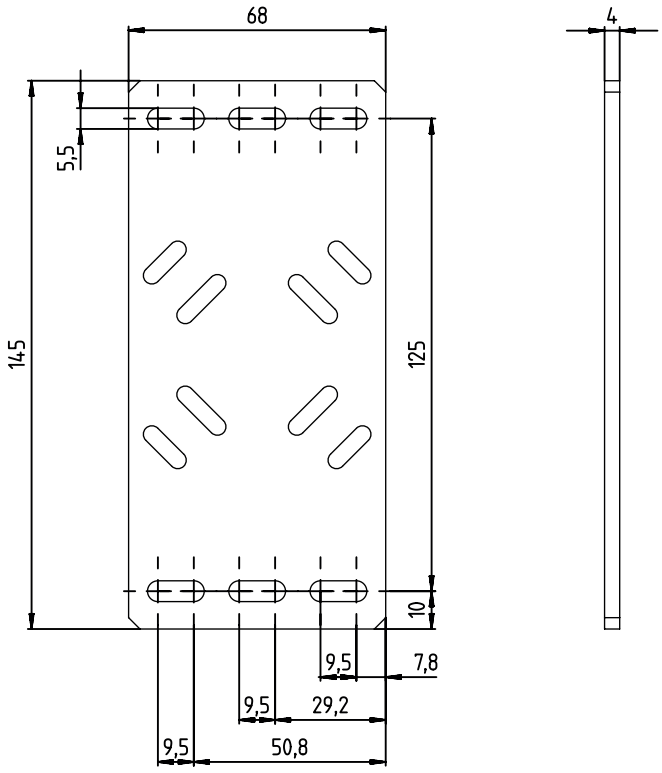


All dimensions in mm

A Adjustment screws with hexagon socket WAF4

Fig. 12.3: Alignment unit BTA 0100M (aluminum/steel) or BTA 0100 M.5 (stainless steel)

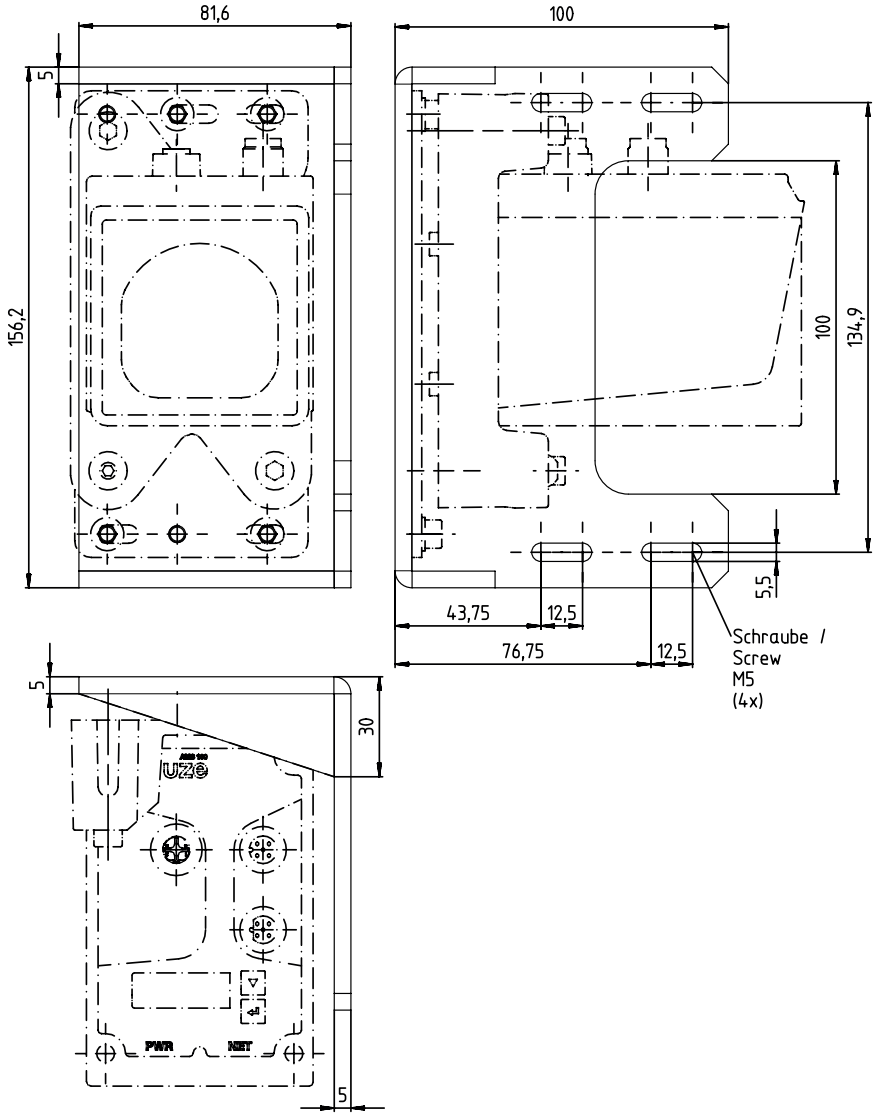
Adapter plate BT 0100M



All dimensions in mm

Fig. 12.4: Mounting device BT 0100M for mounting without an alignment unit

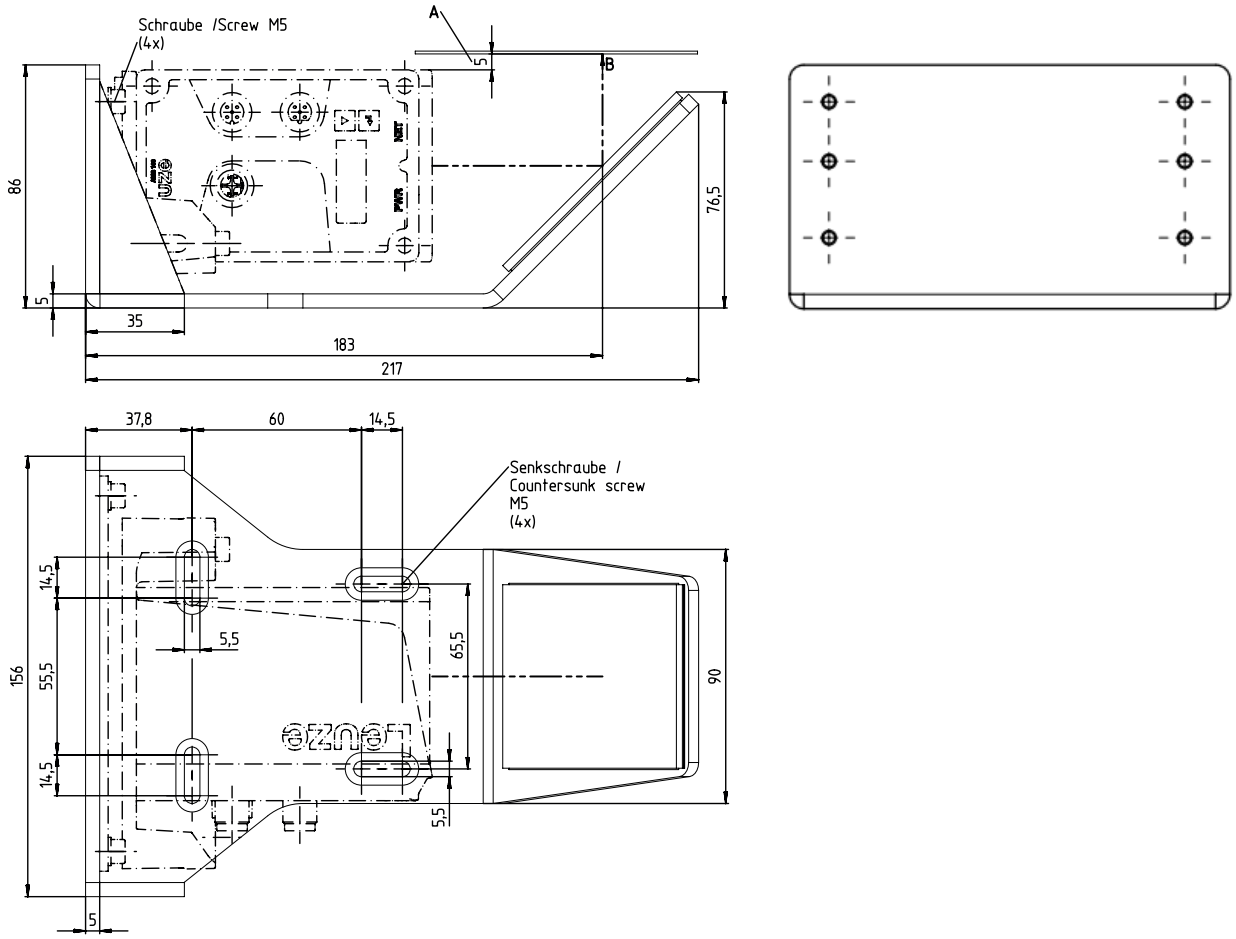
Floor holder BT 0100M-F



All dimensions in mm

Fig. 12.5: Mounting device BT 0100M-F for floor mounting or horizontal surfaces

Deflector unit US AMS 02



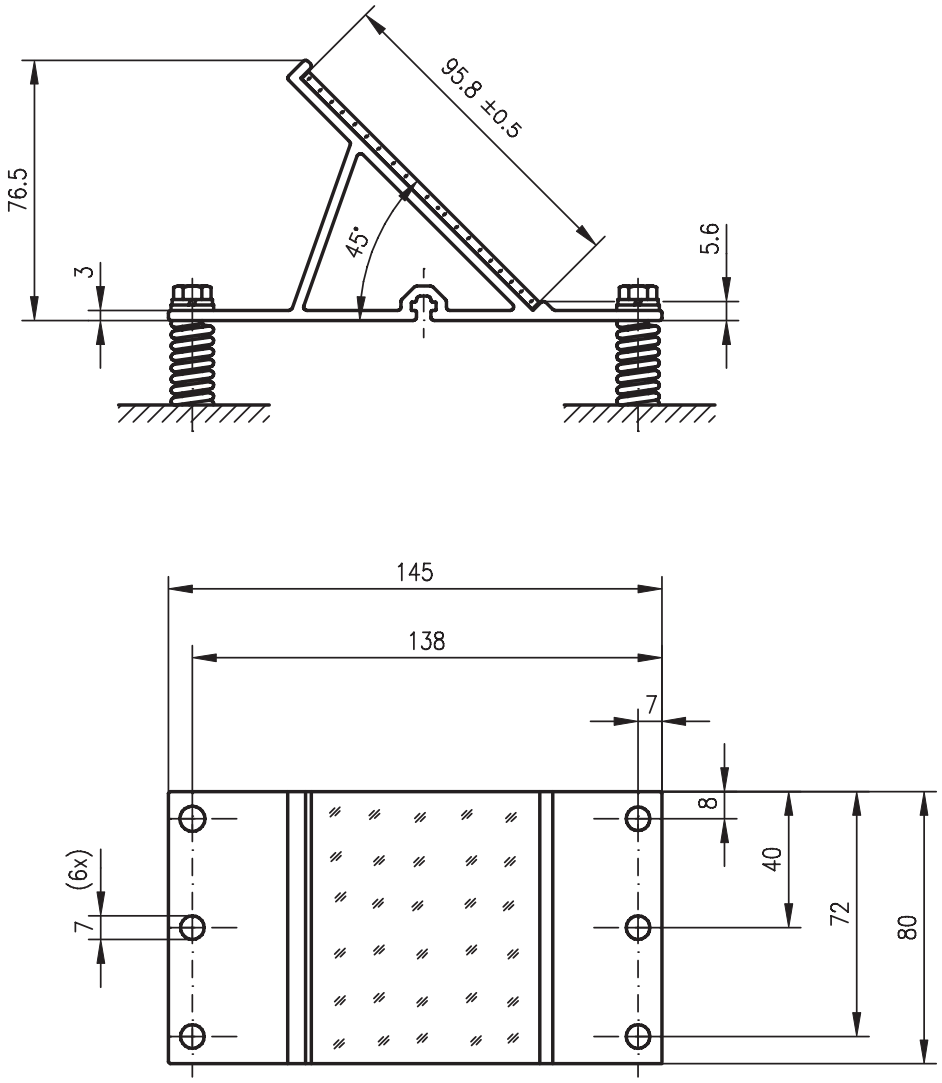
All dimensions in mm

A Minimum distance from the reflector

B Optical axis

Fig. 12.6: Deflecting mirror US AMS 02 – For use with AMS 1xxi … BTA

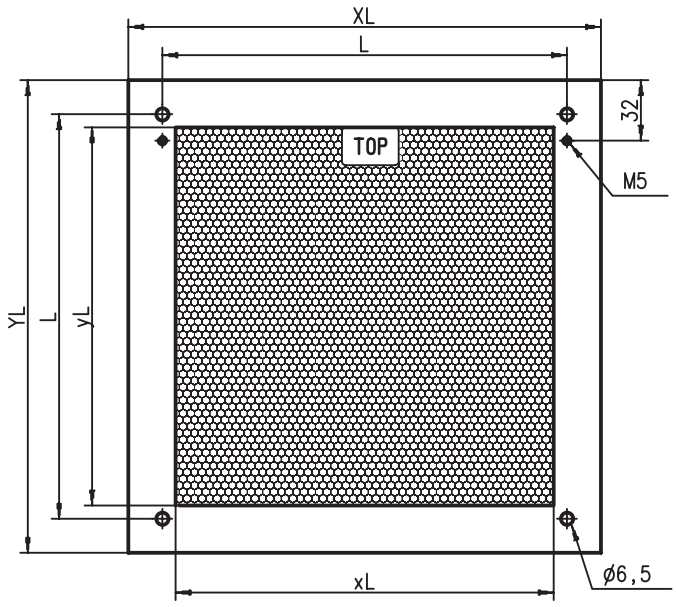
Deflector unit US 1 OMS



All dimensions in mm

Fig. 12.7: Deflecting mirror US 1 OMS without mounting bracket for simple 90° deflection of laser beam

Reflector



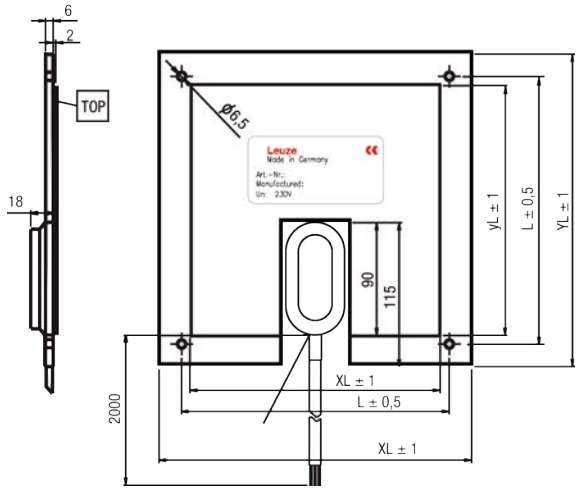
All dimensions in mm

Fig. 12.8: Reflective tape …-M on carrier plate

Tab. 12.12: 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. 12.9: Reflective tape …-H

Tab. 12.13: 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

13 Order guide and accessories

13.1 Part number code

AMS 1xxi yyy zzz

AMS	Optical laser measurement system (absolute measurement system)
1	Series: AMS 100i
xx	Interface: 07: SSI 08: Ethernet TCP/IP 38: EtherCAT 48: PROFINET 58: EtherNet/IP
i	i: Integrated fieldbus technology
yyy	Operating range: 40: max. operating range in m 120: max. operating range in m 200: max. operating range in m
zzz	Mounting accessories: see chapter 13.3 "Accessories – Mounting"

NOTICE

A list with all available device types can be found on the Leuze website **www.leuze.com**.

13.2 AMS 107i type overview

Tab. 13.1: AMS 107i

Type designation	Description	Part no.
AMS 107i 40	40 m operating range, SSI interface	50144691
AMS 107i 120	120 m operating range, SSI interface	50144692
AMS 107i 200	200 m operating range, SSI interface	50155730
AMS 107i 40 BTA	40 m operating range, SSI interface, pre-mounted alignment unit	50144688
AMS 107i 120 BTA	120 m operating range, SSI interface, pre-mounted alignment unit	50144687
AMS 107i 200 BTA	200 m operating range, SSI interface, pre-mounted alignment unit	50155729
AMS 107i 40 H	40 m operating range, SSI interface, integrated heating	50144693
AMS 107i 120 H	120 m operating range, SSI interface, integrated heating	50144694
AMS 107i 200 H	200 m operating range, SSI interface, integrated heating	50155731
AMS 107i 40 BTA H	40 m operating range, SSI interface, pre-mounted alignment unit, integrated heating	50144689
AMS 107i 120 BTA H	120 m operating range, SSI interface, pre-mounted alignment unit, integrated heating	50144690

Type designation	Description	Part no.
AMS 107i 200 BTA H	200 m operating range, SSI interface, pre-mounted alignment unit, integrated heating	50155732

13.3 Accessories – Mounting

Tab. 13.2: 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

13.4 Accessories – Reflective tapes

Tab. 13.3: 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 749x914 – S	Self-adhesive reflective tape, 749 x 914 mm	50104363
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

13.5 Accessories – connection technology

Tab. 13.4: 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

14 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
	You can download the EC Declaration of Conformity from the Leuze website. ↳ Call up the Leuze website: *www.leuze.com*. ↳ 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.”. ↳ The documents can be found on the product page for the device under the *Downloads* tab.

15 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 *Licenses*tab.

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

We can provide you with the source code of these software components on a data carrier/by download if you submit a request to our customer support within three years of distribution of the product at the following address:

Service center

Leuze electronic GmbH + Co. KG

In der Braike 1

D-73277 Owen / Germany

AMS 100i source code