Leuze

AMS 308i

Optical laser measurement system – Ethernet TCP/IP

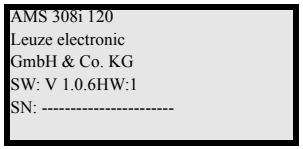
Original operating instructions

The Sensor People

We reserve the right to make technical changes
EN 2023/07/17 - 50113366

© 2023
Leuze electronic GmbH + Co. KG
In der Braike 1
D-73277 Owen / Germany
Phone: +49 7021 573-0
Fax: +49 7021 573-199
http://www.leuze.com
info@leuze.de

The main menus

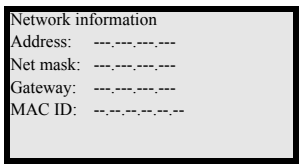


Device information - main menu

This menu item contains detailed information on

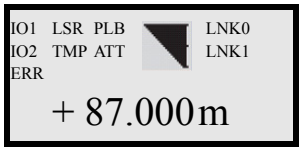
- Device type
- Manufacturer
- Software and hardware version
- Serial number

No entries can be made via the display.



Network information - main menu

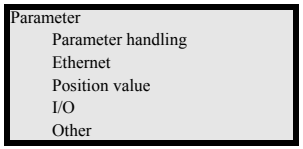
Under this menu item, you will find detailed information on the network addresses.
No entries can be made via the display.



Status and measurement data - main menu

- Display of status, warning and error messages.
- Status overview of the switching inputs/ outputs
- Bar graph for the received signal level.
- Activated interface.
- Measurement value

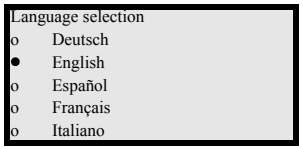
No entries can be made via the display.
See "Indicators in the display" on page 41.



Parameter - main menu

- Configuration of the AMS.

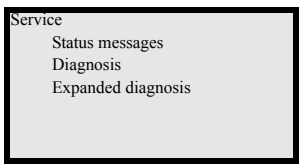
See "Parameter menu" on page 47.



Language selection - main menu

- Selection of the display language.

See "Language selection menu" on page 53.



Service - main menu

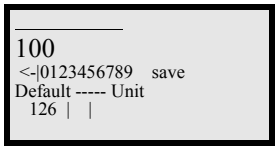
- Display of status messages.
- Display of diagnostic data.

No entries can be made via the display.
See "Service menu" on page 53.

Device buttons:

- Navigate **upward/sideways**
- Navigate **downward/sideways**
- **ESCAPE** leave
- **ENTER** confirm

Input of values



- + **Delete character**
- ... + **Enter digit**
- save + **Save input**

1 General information

1.1 Explanation of symbols

The symbols used in this technical description are explained below.

Attention!

This symbol precedes text messages which must strictly be observed. Failure to observe the provided instructions could lead to personal injury or damage to equipment.

Attention Laser!

This symbol warns of possible danger through hazardous laser radiation.

Note!

This symbol indicates text passages containing important information.

1.2 Declaration of Conformity

The AMS 308*i* absolute measuring optical laser measurement system was designed and manufactured in accordance with the applicable European directives and standards.

The AMS series is "UL LISTED" according to American and Canadian safety standards and fulfills the requirements of Underwriter Laboratories Inc. (UL).

Note!

The Declaration of Conformity for these devices can be requested from the manufacturer.

The manufacturer of the product, Leuze electronic GmbH & Co. KG in D-73277 Owen, possesses a certified quality assurance system in accordance with ISO 9001.

1.3 Description of functions AMS 308*i*

The AMS 308*i* 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 308*i* uses the "propagation time" of the light to calculate the distance to the reflector. The high absolute measurement accuracy of the laser measurement system and the fast response time are designed for position control applications.

With its AMS 3xx*i* product series, Leuze makes available a wide range of internationally relevant interfaces. Note that each interface version listed below corresponds to a different AMS 3xx*i* model.

AMS 304*i*

AMS 348*i*

AMS 355*i*

AMS 358*i*

AMS 335*i*

AMS 338*i*

AMS 308*i*

AMS 384*i*

AMS 301*i*

AMS 300*i*

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 is an absolute measuring optical laser measurement system which allows distance measurement of up to 300 m against a reflector.

Areas of application

The AMS is designed for the following areas of application:

- Positioning of automated, moving plant components
- Travel and lifting axes of high-bay storage devices
- Repositioning units
- Gantry crane bridges and their trolleys
- Elevators
- Electroplating plants

CAUTION

Observe intended use!

- *Only operate the device in accordance with its 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.*

  Leuze electronic GmbH + Co. KG is not liable for damages caused by improper use.
- *Read the technical description before commissioning the device. Knowledge of this technical description is an element of proper use.*

NOTE

Comply with conditions and regulations!

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

Attention

For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).

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
- as stand-alone safety component in accordance with the machinery directive [1)]
- for medical purposes

NOTE

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.

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 technical description of 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.

1) Use as safety-related component within the safety function is possible, if the component combination is designed correspondingly by the machine manufacturer.

2.4 Exemption of liability

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 60825-1:2014 / EN 60825-1:2014+A11:2021 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! The use of operating and adjustment devices other than those specified here or the carrying out of differing procedures may lead to dangerous exposure to radiation.*
- *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.

NOTE

Affix laser information and warning signs!

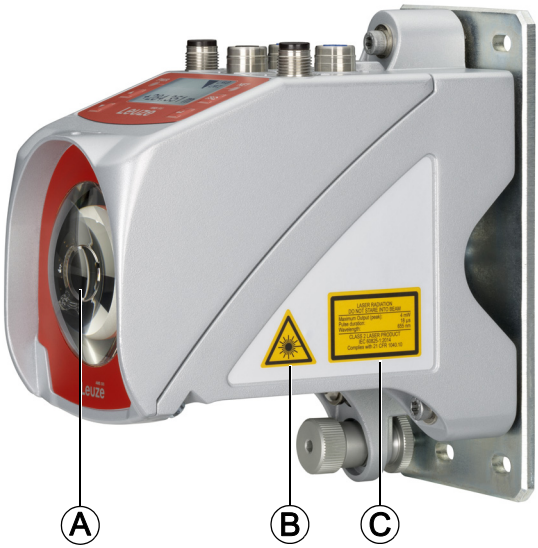
Laser information and warning signs are attached to the device (see figure 2.1). Also included with the device are self-adhesive laser warning and laser information signs (stick-on labels) in multiple languages (see figure 2.2).

- *Affix the laser information sheet to the device in the language appropriate for the place of use.*

  When using the device in the U.S.A., 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 can be read without the reader being exposed to the laser radiation of the device or other optical radiation.



A	Laser aperture
B	Laser warning sign
C	Laser information sign with laser parameters

Figure 2.1: Laser apertures, laser warning signs

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

3 Fast commissioning / operating principle

Note!

*Below you will find a **short description for the initial commissioning** of the AMS 308i. Detailed explanations for the listed points can be found throughout the handbook.*

3.1 Mounting the AMS 308*i*

The AMS 308*i* and the corresponding reflector are mounted on two mutually opposing, plane-parallel, flat walls.

Figure 3.1: Schematic illustration of mounting

Attention!

For error-free position measurement, there must be an unobstructed line-of-sight between the AMS 308i and the reflector.

3.1.1 Mounting the device

The laser is mounted using 4 screws (M5).

Alignment is performed using 2 adjustment screws. Adjust so that the laser light spot is positioned at the center of the reflector. The alignment is secured with the knurled nut and locked with the M5 nut.

Detailed information can be found in Chapter 5.2 and Chapter 5.3.

3.1.2 Mounting the reflector

The reflector is mounted using 4 screws (M5). The reflector is angled using the spacer sleeves included. Incline the reflector by approx. 1°.

Detailed information can be found in Chapter 6.4.

3.2 Connecting the voltage supply

The laser measurement system is connected using M12 connectors. The voltage supply (18 … 30VDC) is connected via the PWR M12 connection. 2 freely adjustable switching inputs/outputs for individual adaptation to the respective application are also available here.

Detailed information can be found in Chapter 7.

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.

Use the up/down buttons ▲ ▼ to the left of the display to read and change a wide range of data and parameters.

Detailed information can be found in Chapter 8.

3.4 AMS 308*i* on Ethernet TCP/IP

Note!

The AMS 308i 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 308*i*, the host interface of the superior system is connected to HOST/BUS IN. A star structure (Ethernet structure) is thus possible.

Network mode in Ethernet network

In network mode, the superior system (PC/PLC) is connected to the host interface of the AMS 308*i*. With the aid of the "switch" integrated in the AMS 308*i*, the bus connection to the next participant, e.g. another AMS 308*i*, can be made directly via the BUS OUT socket!

Note!

The AMS 308i has a built-in DHCP client for receiving automatically assigned addresses. In addition to assignment via DHCP, the addresses can also be assigned manually via the display. With manual assignment, make sure that the assigned IP addresses are unique. DHCP is deactivated by default.

3.5 Commissioning of AMS 308*i*

3.5.1 Manual configuration of the IP address

Note!

To set the network addresses, parameter enable must be activated as described in Chapter 8.4.

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 308*i*.
- *Set these values on the* AMS 308*i*.

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.

3.5.2 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; see Chapter 8.4.

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

Detailed information on entering address data can be found in Chapter 9.

3.5.3 Setting the Ethernet host communication

The AMS 308*i* 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 308*i* is to operate as a TCP client or as a TCP server.

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

TCP/IP

Note!

In the case of display entry, use the foldout on the last page to navigate through the menu structure.

In **TCP client mode**, the AMS 308*i* actively establishes the connection to the superior host system (PC / PLC as server). The AMS 308*i* 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 308*i* determines when and with whom a connection is established!

↳ *With a* AMS 308*i* *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 308*i* waits for the connection to be setup. The TCP/IP stack requires information from the user regarding the local port of the AMS 308*i* (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 308*i* (server mode) accepts the connection. Data can then be sent and received.

↳ *With a* AMS 308*i* *as TCP server, also set the following values:*

- Port number for the communication of the AMS 308*i* with the TCP client.

UDP

The AMS 308*i* 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 308*i* 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.

Note!

The AMS 308i also provides the possibility of automatic address and port adoption.

4 Technical data

4.1 Technical data of laser measurement system

4.1.1 General specifications AMS 308*i*

Measurement data	AMS 308*i* **40 (H)**	AMS 308*i* **120 (H)**	AMS 308*i* **200 (H)**	AMS 308*i* **300 (H)**
Measurement range	0.2 … 40 m	0.2 … 120 m	0.2 … 200 m	0.2 … 300 m
Accuracy	± 2 mm	± 2 mm	± 3 mm	± 5 mm
Reproducibility [1]	0.3 mm	0.5 mm	0.7 mm	1.0 mm
Light spot diameter	≤ 40 mm	≤ 100 mm	≤ 150 mm	≤ 225 mm
Output time	1.7 ms			
Response time	14 ms			
Basis for contouring error calculation	7 ms			
Resolution	Adjustable; see chapters on individual interfaces			
Temperature drift	≤ 0.1 mm/K			
Ambient temperature sensitivity	1 ppm/K			
Air pressure sensitivity	0.3 ppm/hPa			
Traverse rate	≤ 10 m/s			
Electrical data				
Supply voltage Vin [2]	18 … 30 VDC			
Current consumption	Without device heating: ≤ 250 mA / 24 VDC With device heating: ≤ 500 mA / 24 VDC			
Optical data				
Transmitter	Laser diode, red light			
Laser class	2 in acc. with IEC 60825-1:2014 / EN 60825-1:2014+A11:2021			
Wavelength	655 nm			
Impulse duration	≤ 0.8 µs			
Max. output power (peak)	≤ 4 mW			
Interfaces				
Interface type	2x Ethernet TCP/IP on 2x M12 (D)			
Protocol	Ethernet TCP/IP (client/server) / UDP			
Baud rate	10/100 Mbit/s			
Controls and indicators				
Keyboard	4 keys			
Display	Monochromatic graphical display, 128 x 64 pixels			
LED	4 LEDs, 2 of which are used to indicate the state of the Ethernet connection			

Inputs/outputs

Quantity	2, programmable
Input	Protected against polarity reversal
Output	Max. 60 mA, short-circuit-proof

Mechanical data

Housing	Diecast zinc/aluminum
Optics	Glass
Weight	Approx. 2.45 kg
Degree of protection	IP 65 acc. to EN 60529 [3]

Environmental conditions

Operating temperature	
without device heating	-5 °C … +50 °C
with device heating	-30 °C … +50 °C [4]
Storage temperature	-30 °C … +70 °C
Air humidity	Max. 90 % rel. humidity, non-condensing
MTTF	31 years (at 25 °C) [5]

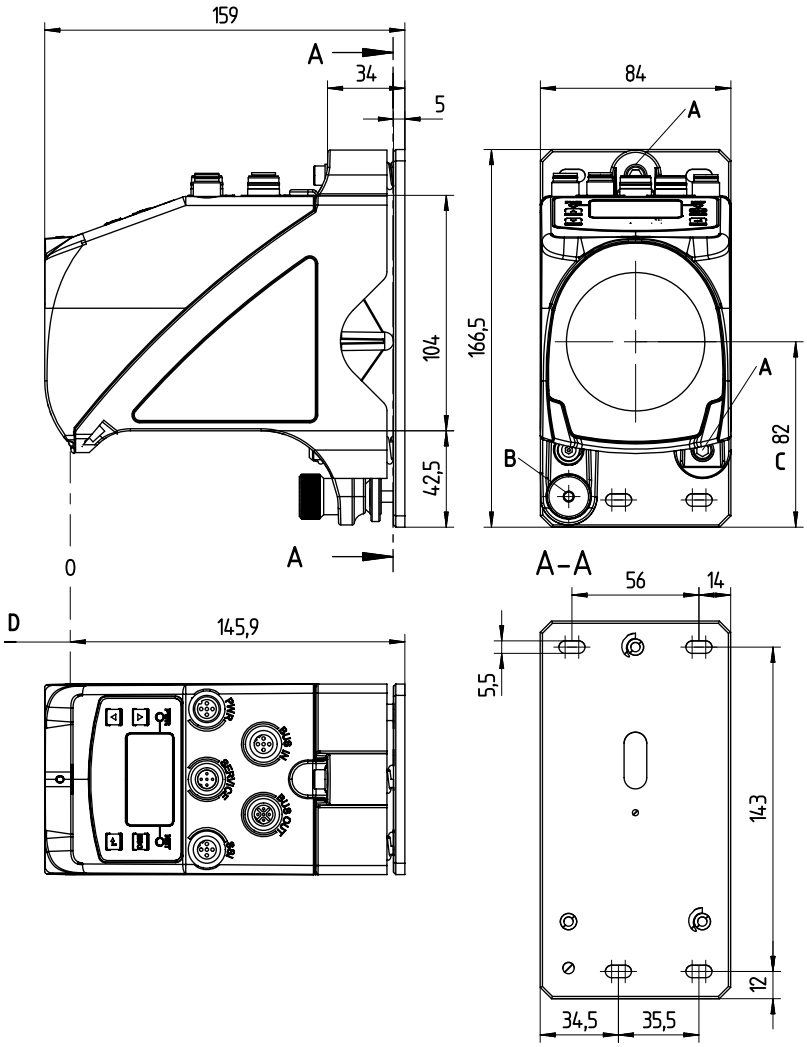
Mechanical/electrical loading capacity

Vibration	Acc. to EN 60068-2-6
Noise	Acc. to EN 60060-2-64
Shock	Acc. to EN 60068-2-27
EMC	Acc. to EN 61000-6-2 and EN 61000-6-4 [6]

1) Statistical error: 1 sigma; minimum switch-on time: 2 min.
2) For UL applications: only for use in "Class 2" circuits according to NEC.
3) With screwed-on M12 plugs or mounted caps.
4) With devices with heating, the switch on/off area of the internal heating can be extended to prevent condensation from forming. Total prevention of condensation cannot be guaranteed due to the limited heating capacity of the AMS 308*i*.
5) We reserve the right to make changes. (Value is updated at regular intervals.)
6) This is a Class A product. In a domestic environment this product may cause radio interference, in which case the operator may be required to take adequate measures.

The AMS 308*i* is designed in accordance with protection class III for supply with PELV (protective extra-low voltage).

4.1.2 AMS 308*i* dimensioned drawing



A	M 5 screw for alignment
B	Knurled nut with WAF4 hexagon socket and M5 nut for securing
C	Optical axis
D	Zero point of the distance to be measured

Figure 4.1: AMS 308*i* dimensioned drawing

4.1.3 Overview of AMS 308*i* types

AMS 308*i* (Ethernet TCP/IP)

Type designation	Description	Part no.
AMS 308*i*40	40m operating range, Ethernet TCP/IP interface	50113685
AMS 308*i*120	120m operating range, Ethernet TCP/IP interface	50113686
AMS 308*i*200	200m operating range, Ethernet TCP/IP interface	50113687
AMS 308*i*300	300m operating range, Ethernet TCP/IP interface	50113688
AMS 308*i*40 H	40m operating range, Ethernet TCP/IP interface, integrated heating	50113689
AMS 308*i*120 H	120m operating range, Ethernet TCP/IP interface, integrated heating	50113690
AMS 308*i*200 H	200m operating range, Ethernet TCP/IP interface, integrated heating	50113691
AMS 308*i*300 H	300m operating range, Ethernet TCP/IP interface, integrated heating	50113692

Table 4.1: Overview of AMS 308*i* types

5 Installation and mounting

5.1 Storage, transportation

Attention!

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
  - Brief manual

The name plate provides information as to what AMS 308*i* type your device is. For specific information, please refer to Chapter 11.2.

Name plates

Figure 5.1: Device name plate using the AMS 358*i* as an example

Note!

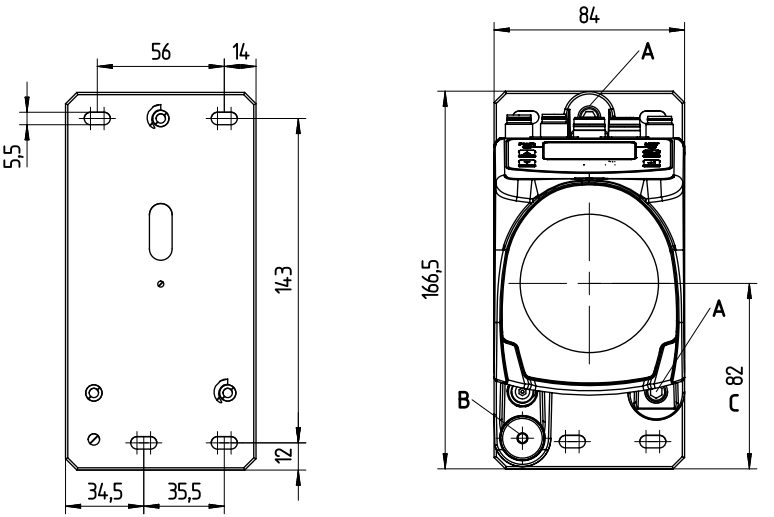
Please note that the shown name plate is for illustration purposes only; the contents do not correspond to the original.

- *Save the original packaging for later storage or shipping.*

If you have any questions concerning your shipment, please contact your supplier or your local Leuze sales office.

↳ *Observe the applicable local regulations when disposing of the packaging materials.*

5.2 Mounting the AMS 308*i*



A	M5 screw for alignment
B	Knurled nut and nut with WAF4 hexagon socket for securing
C	Optical axis

Figure 5.2: Mounting the device

The AMS 308*i* 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 308*i* and the reflector.

Use M5 screws to fasten the laser measurement system. Secure the screws with a lock washer to protect against loosening caused by vibrations.

Aligning the laser light spot with the center of the reflector

The laser light spot has to be aligned so that it always hits the center of the opposing reflector, both at close range as well as at the maximum measurement distance. **To align, use the two M5 Allen screws** ("**A**" in Figure 5.2). When aligning, please ensure that the knurled nut and the lock nut ("**B**" in Figure 5.2) are opened wide.

Attention!

To prevent the laser measurement system from moving out of alignment during continuous operation, subsequently hand-tighten the knurled nut and counterlock with the nut with WAF4 hexagon socket ("B" in Figure 5.2*). Knurled nut and nut must not be tightened until alignment has been completed.*

Attention!

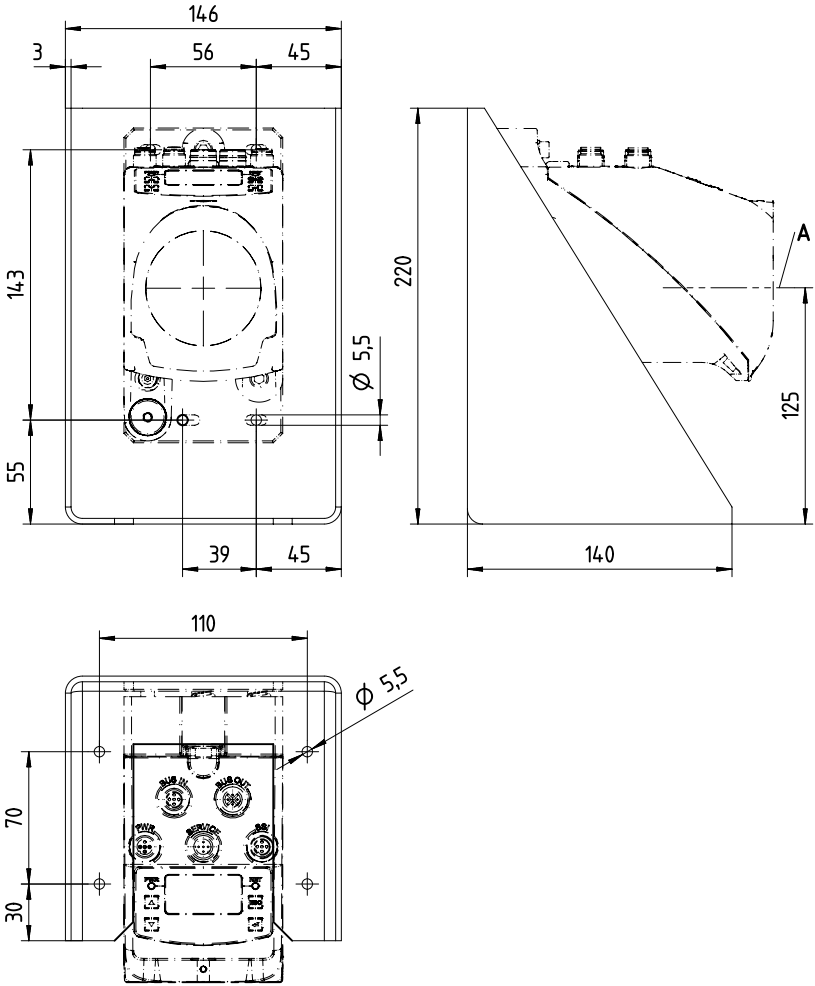
The device must not be opened. Failure to comply will render the guarantee void. Warranted features cannot be guaranteed after the device has been opened.

5.2.1 Optional mounting bracket

A mounting bracket for mounting the AMS 308*i* on a flat, horizontal surface is available as an optional accessory.

Type designation: MW OMS/AMS 01

Part no.: 50107255



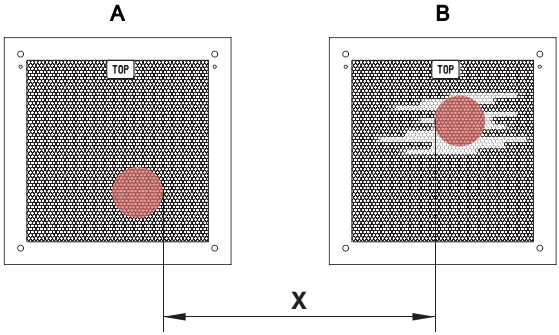
A Laser beam

Figure 5.3: Optional mounting bracket

5.2.2 Parallel mounting of the AMS 308*i*

Definition of the term "parallel spacing"

As shown in Figure 5.4, dimension X describes the "parallel spacing" of the inner edges of the two laser light spots on the reflector.



A Reflector 1
B Reflector 2

Figure 5.4: Minimum parallel spacing X between adjacent AMS 308*i*

The diameter of the light spot increases with distance.

	AMS 308*i* **40 (H)**	AMS 308*i* **120 (H)**	AMS 308*i* **200 (H)**	AMS 308*i* **300 (H)**
Max. measurement distance	40 m	120 m	200 m	300 m
Light spot diameter	≤ 40 mm	≤ 100 mm	≤ 150 mm	≤ 225 mm

Thus, the center-to-center spacing of the two AMS 308*i* 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 308*i*, it is necessary to distinguish between three different arrangements of AMS 308*i* and reflectors.

The AMS 308*i* are mounted stationary and in parallel on one plane.
Both reflectors move independently of one another at different distances to the AMS 308*i*.

Minimum parallel spacing X of the two laser light spots:

X = 100 mm + (max. measurement distance in mm x 0.01)

The AMS 308*i* are mounted stationary and in parallel on one plane.
Both reflectors move in parallel at the same distance to the AMS 308*i*.

Measurement distance **up to 120 m**: minimum parallel spacing **X ≥ 600 mm**

Measurement distance **up to 200 m**: minimum parallel spacing **X ≥ 750 mm**

Measurement distance **up to 300 m**: minimum parallel spacing **X ≥ 750 mm**

The reflectors are mounted stationary and in parallel on one plane.
Both AMS 308*i* move independently of one another at different or the same distances to the reflectors.

Measurement distance **up to 120 m**: minimum parallel spacing **X ≥ 600 mm**

Measurement distance **up to 200 m**: minimum parallel spacing **X ≥ 750 mm**

Measurement distance **up to 300 m**: minimum parallel spacing **X ≥ 750 mm**

Note!

Please note that when the AMS 308*i 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 308*i.*

5.2.3 Parallel mounting of AMS 308*i* and DDLS optical data transmission

The optical data transceivers of the DDLS series and the AMS 308*i* 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 308*i*. The parallel spacing is independent of the distance.

5.3 Mounting the AMS 308*i* with laser beam deflector unit

General information

The two available deflector units are used for the 90° deflection of the laser beam, see "Accessories – Deflector unit" on page 71.

Attention!

The deflector units are designed for a maximum range of 40 m.
Longer distances on request.

5.3.1 Mounting the laser beam deflector unit with integrated mounting bracket

The AMS 308*i* is screwed onto the mechanism of the US AMS 01 deflector unit. The mirror can be mounted for three deflection directions:

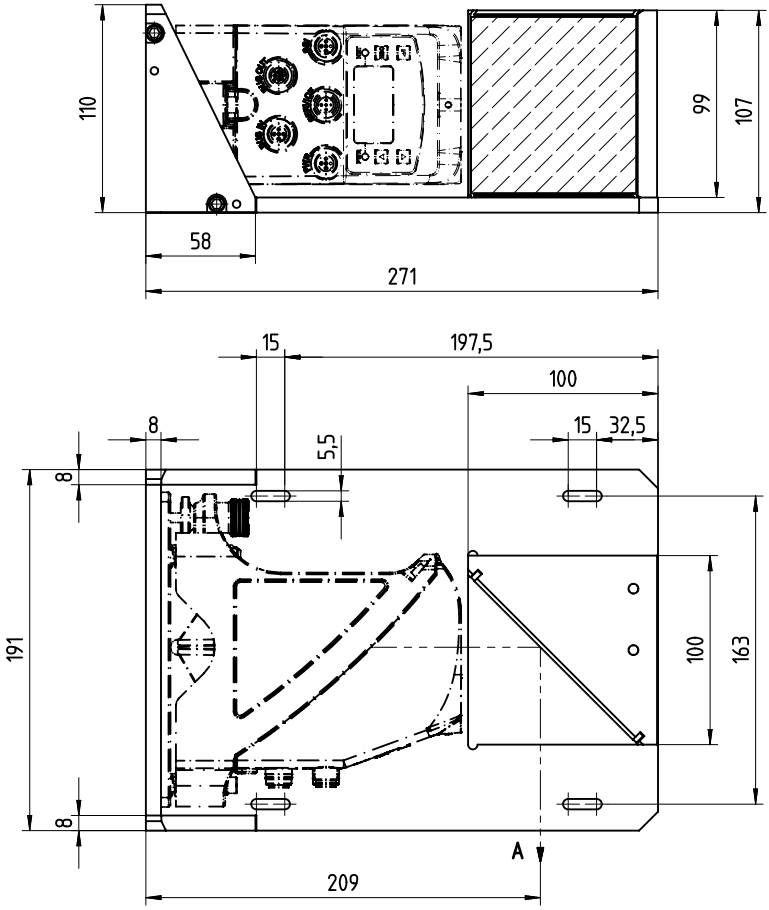
1. Upward beam deflection
2. Beam deflection to the left
3. Beam deflection to the right

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 308*i*... and the deflection mirror as well as between the mirror and the reflector.

Use the M5 screws to mount the deflector unit. Secure the screws with a lock washer to protect against loosening caused by vibrations.

Figure 5.5: Mounting variants of the US AMS 01 laser beam deflector unit

5.3.2 Dimensioned drawing of US AMS 01 deflector unit



A Laser beam

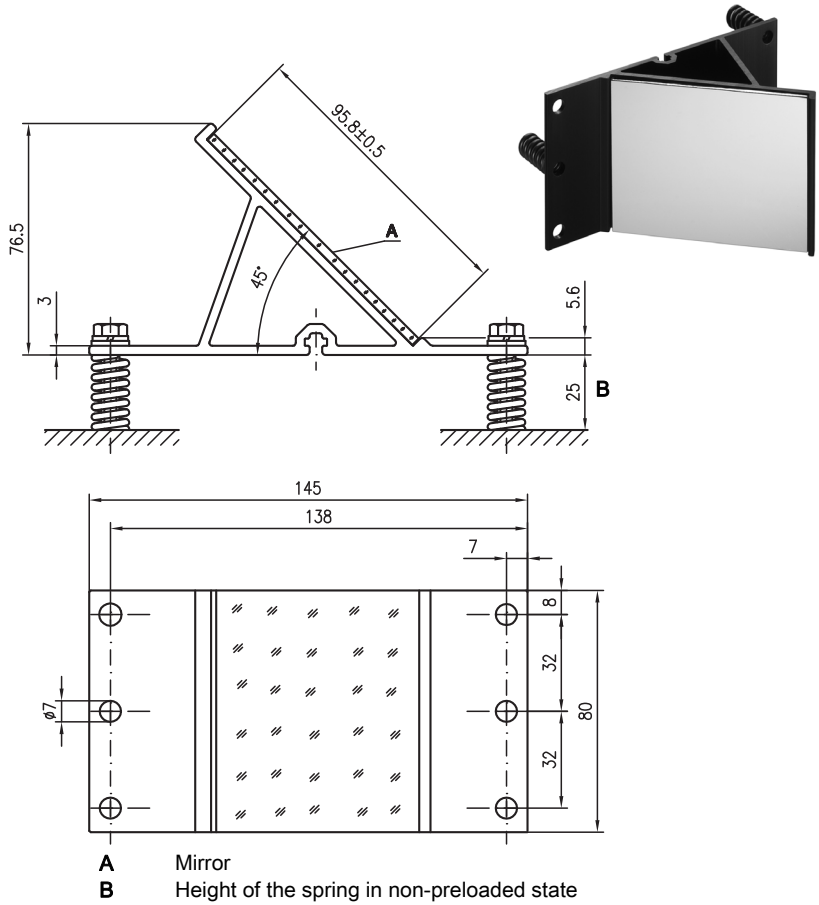
Figure 5.6: Dimensioned drawing of US AMS 01 deflector unit

5.3.3 Mounting the US 1 OMS deflector unit without mounting bracket

The US 1 OMS deflector unit and the AMS 308*i* are mounted separately.

Note!

When mounting, make certain that the laser light spot of the AMS 308*i* *is aligned with the center of the deflection mirror.*



A Mirror
B Height of the spring in non-preloaded state

Figure 5.7: Photo and dimensioned drawing of the US 1 OMS deflector unit

The laser light spot is aligned with the reflector as described in Chapter 5.2.

6 Reflectors

6.1 General information

The AMS 308*i* measures distances against a reflective tape specified by Leuze. All technical data given for the AMS 308*i*, such as the operating range or accuracy, can only be achieved with the reflective tape specified by Leuze.

The reflective tapes are available as self-adhesive tapes or affixed to a carrier plate and with an integrated heater especially for use at low temperatures. Reflective tapes with heating have the designation "**Reflective tape …x…-H**", where "**H**" is an abbreviation for the heating variant.

The reflective tapes/reflectors must be ordered separately. The choice of size is left to the user. In Chapter 6.3, recommendations on reflector size are given depending on the distance that is to be measured. In each case, the user must check whether the recommendation is suitable for the respective application.

6.2 Description of the reflective tape

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 308*i* by positioning the reflective tape at a slight incline. The inclination of the reflective tape/reflectors is described in Chapter 6.4.2. The required pitch can be found in Table 6.1 "Reflector pitch resulting from spacer sleeves" on page 37.

The reflective tapes have a protective film that is easy to peel off. It must be removed from the reflector before the complete system is put into operation.

6.2.1 Technical data of self-adhesive tape

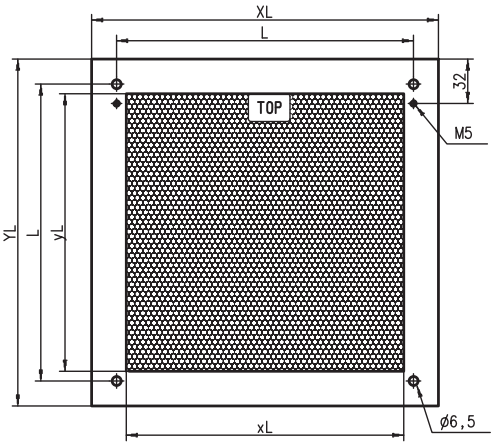
	Article				
Type designation	**Reflective tape 200x200-S**	**Reflective tape 500x500-S**	**Reflective tape 914x914-S**	**REF 4-A-150x150**	**REF 4-A-300x300**
Part no.	50104361	50104362	50108988	50141015	50141014
Film size	200 x 200 mm	500 x 500 mm	914 x 914 mm	150 x 150 mm	300 x 300 mm
Recommended application temperature for adhesive tape	+5 °C … +25 °C				
Temperature resistance, affixed	-40 °C … +80 °C				
Bonding surface	The bonding surface must be clean, dry and free of grease.				
Cutting tape	Cut with a sharp tool, always on the side with the prism structure.				
Cleaning	Do not use any abrasive agents. A conventional household detergent can be used as a cleaning agent. Rinse with clear water and dry the surface.				
Film storage	Store in a cool and dry place.				

6.2.2 Technical data of reflective tape on carrier plate

The reflective tape is affixed to a carrier plate. Included with the carrier plate are spacers for positioning at an incline in order to avoid surface reflections (see chapter 6.4.2 "Mounting the reflector").

	Article		
Type designation	**Reflective tape 200x200-M**	**Reflective tape 500x500-M**	**Reflective tape 914x914-M**
Part no.	50104364	50104365	50104366
Film size	200 x 200 mm	500 x 500 mm	914 x 914 mm
Outer dimensions of carrier plate	250 x 250 mm	550 x 550 mm	964 x 964 mm
Weight	0.4 kg	1.6 kg	6 kg
Cleaning	Do not use any abrasive agents. A conventional household detergent can be used as a cleaning agent. Rinse with clear water and dry the surface.		
Reflector storage	Store in a cool and dry place.		

6.2.3 Dimensioned drawing of reflective tape on carrier plate



Always align the **TOP** marking with the AMS connections! (Chapter 6.4.2)

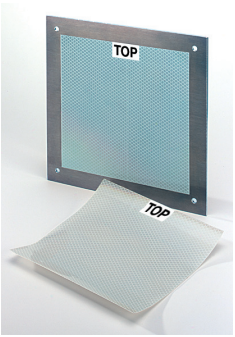


Figure 6.1: Dimensioned drawing of reflectors

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

6.2.4 Technical data of heated reflectors

The reflective tape 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.

	Article		
Type designation	**Reflective tape 200x200-H**	**Reflective tape 500x500-H**	**Reflective tape 914x914-H**
Part no.	50115020	50115021	50115022
Voltage supply	230 VAC		
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	200 x 200 mm	500 x 500 mm	914 x 914 mm
Outer dimensions of base material	250 x 250 mm	550 x 550 mm	964 x 964 mm
Weight	0.5 kg	2.5 kg	12 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		
Cleaning	Do not use any abrasive agents. A conventional household detergent can be used as a cleaning agent. Rinse with clear water and dry the surface.		
Reflector storage	Store in a cool and dry place.		

6.2.5 Dimensioned drawing of heated reflectors

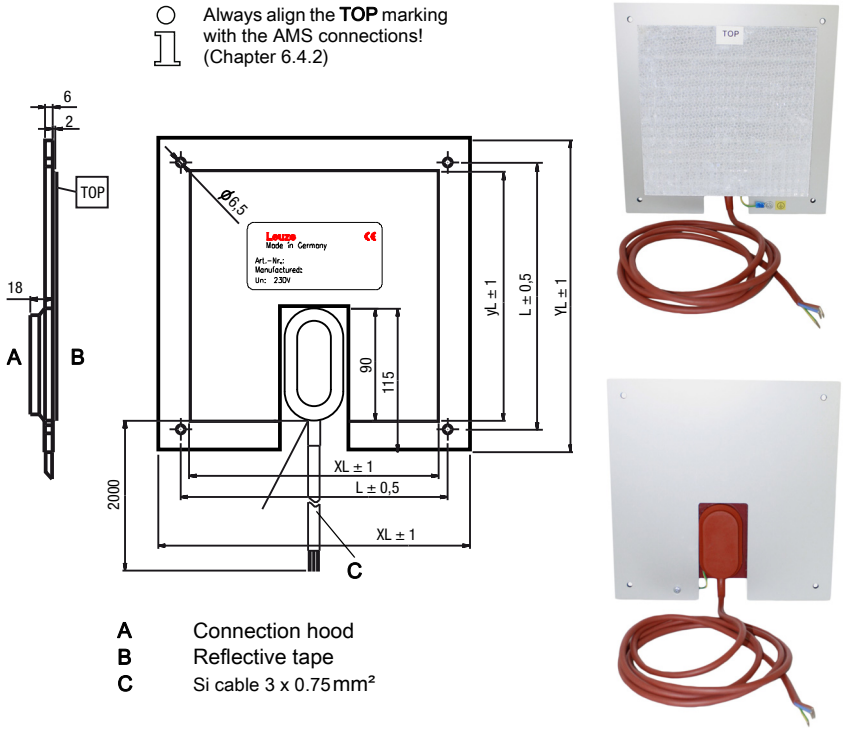


Figure 6.2: Dimensioned drawing of heated reflectors

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

6.3 Selecting reflector size

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

Attention!

The reflector sizes shown below are a recommendation from Leuze for on-vehicle mounting of the AMS 308i. For stationary mounting of the AMS 308i, 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".

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 308i, the reflector size must accommodate any travel tolerances that may arise and the associated "wandering" of the light spot on the reflector.

Overview of reflector types

Recommended reflector size			
Selected AMS 308i (operating range in m)	**Recommended reflector size (H x W)**	**Type designation …-S = self-adhesive …-M = Carrier plate …-H = heating**	**Part no.**
AMS 308i 40 (max. 40 m)	200 x 200 mm	REF 4-A-150x150[1)] Reflective tape 200x200-S Reflective tape 200x200-M Reflective tape 200x200-H REF 4-A-300x300[1)]	50141015 50104361 50104364 50115020 50141014
AMS 308i 120 (max. 120 m)	500 x 500 mm	Reflective tape 500x500-S Reflective tape 500x500-M Reflective tape 500x500-H	50104362 50104365 50115021
AMS 308i 200 (max. 200 m)	749 x 914 mm 914 x 914 mm	Reflective tape 749x914-S Reflective tape 914x914-M Reflective tape 914x914-S Reflective tape 914x914-H	50104363 50104366 50108988 50115022
AMS 308i 300 (max. 300 m)	749 x 914 mm 914 x 914 mm	Reflective tape 749x914-S Reflective tape 914x914-M Reflective tape 914x914-S Reflective tape 914x914-H	50104363 50104366 50108988 50115022

1) For landside mounting

6.4 Mounting the reflector

6.4.1 General information

Self-adhesive reflective tapes

The reflective tapes of the "Reflective tape …x…-**S**" series (self-adhesive) must be affixed to a flat, clean and grease-free surface. We recommend using a separate carrier plate, which is to be provided on-site.

As described in Table 6.1, the reflective tape must be at an angle.

Reflective tapes 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. For further information, see Table 6.1.

Heated reflectors

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. For further information, see Table 6.1.

The reflector has a 2m-long connection cable for supplying with 230VAC. Connect the cable to the nearest power distribution point. Observe the current consumptions listed in the technical data.

Attention!

Connection work must be carried out by a certified electrician.

6.4.2 Mounting the reflector

The combination of laser measurement system and reflective tape/reflector is mounted so that the laser light spot hits the film as centered as possible and without obstruction.

For this purpose, use the alignment elements provided on the AMS 308*i*… (see chapter 5.2 "Mounting the AMS 308i"). If necessary, remove the protective film from the reflector.

Attention!

The "TOP" label on the reflectors should be aligned the same as the connections of the AMS 308*i*.

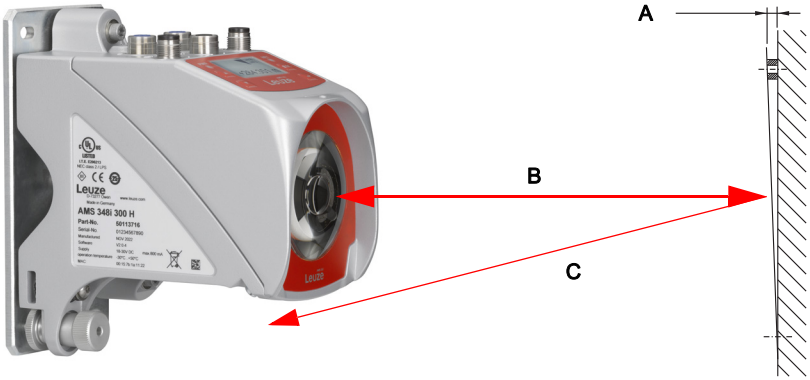
Example:

If the AMS 308*i is mounted so that the M12 connections are on the top, the "TOP" label of the reflector is also on the top. If the* AMS 308*i is mounted so that the M12 connections are on the side, the "TOP" label of the reflector is also on the side.*

Note!

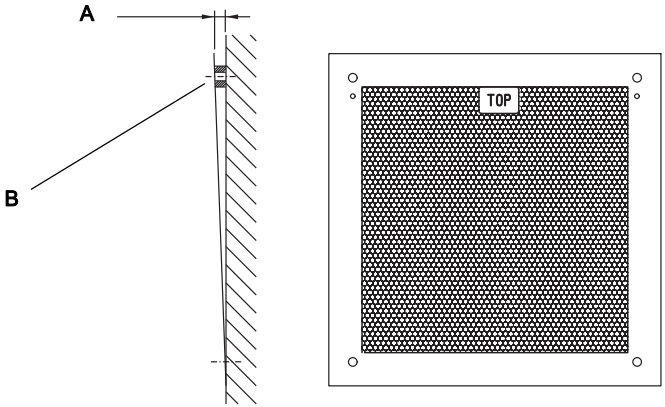
The reflector must be positioned at an angle. Use the spacer sleeves for this purpose. Angle the reflector so that the ***surface reflections of the foil seal are deflected to the left, right or upwards****.* Chapter 6.4.3 *gives the correct pitch with respect to the reflector size and, thus, the length of the spacers.*

Reflective tapes ...-S and ...-M



A	Pitch approx. 1°
B	Direct reflection due to the triple structure
C	Deflected surface reflection due to the pitch of the reflective tape

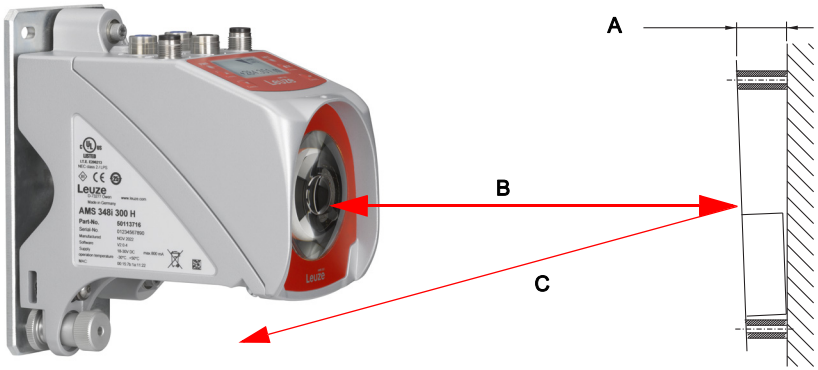
Figure 6.3: Mounting the reflector



A	Pitch approx 1°
B	Spacer sleeves

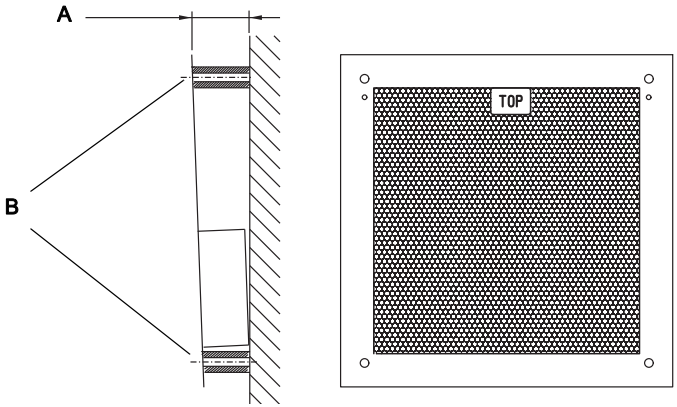
Figure 6.4: Pitch of the reflector

Reflective tapes ...-H



A Pitch approx. 1°
B Direct reflection due to the triple structure
C Deflected surface reflection due to the pitch of the reflective tape

Figure 6.5: Mounting of heated reflectors



A Pitch approx 1°
B Spacer sleeves

Figure 6.6: Pitch of the heated reflector

6.4.3 Table of reflector pitches

Reflector type	Pitch resulting from spacer sleeves [1]	
Reflective tape 200x200-S Reflective tape 200x200-M	**2 x 5mm**	
Reflective tape 200x200-H	**2 x 15mm**	**2 x 20mm**
Reflective tape 500x500-S Reflective tape 500x500-M	**2 x 10mm**	
Reflective tape 500x500-H	**2 x 15mm**	**2 x 25mm**
Reflective tape 749x914-S	**2 x 20mm**	
Reflective tape 914x914-S Reflective tape 914x914-M	**2 x 20mm**	
Reflective tape 914x914-H	**2 x 15mm**	**2 x 35mm**

1) Spacer sleeves are included with reflective tape …-**M** and …-**H**

Table 6.1: Reflector pitch resulting from spacer sleeves

Note!

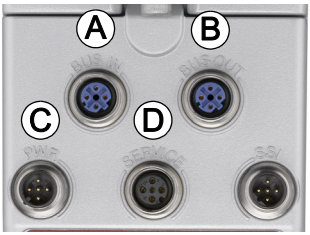
Reliable operation of the AMS 308i and, thus, max. operating range and accuracy can only be achieved with the reflective tape specified by Leuze. Correct operation cannot be guaranteed if other reflectors are used!

7 Electrical connection

The AMS 308*i* laser measurement systems are connected using variously coded M12 connectors. This ensures unique connection assignments.

Note!

The corresponding mating connectors and ready-made cables are available as accessories for all connections. For further information, see chapter 11 "Type overview and accessories"*.*



A	BUS IN, M12 socket (D-coded)
B	BUS OUT, M12 socket (D-coded)
C	PWR / IOs, M12 plug (A-coded)
D	Leuze SERVICE, M12 socket (A-coded)

Figure 7.1: Connections of the AMS 308*i*

7.1 Safety notices for the electrical connection

Attention!

Before connecting the device, be sure that the supply voltage agrees with the value printed on the name plate.
The device may only be connected by a qualified electrician.
Ensure that the functional earth (FE) is connected correctly. Unimpaired operation is only guaranteed when the functional earth is connected properly.
If faults cannot be cleared, the device should be switched off and protected against accidental use.

Attention!

For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).

The laser measurement systems are designed in accordance with protection class III for supply by PELV (protective extra-low voltage with reliable disconnection).

Note!

Degree of protection IP65 is achieved only if the connectors and caps are screwed into place!

Described in detail in the following are the individual connections and pin assignments.

7.2 PWR – voltage supply / switching input/output

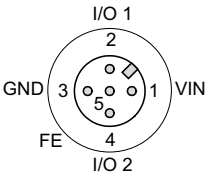
PWR (5-pin plug, A-coded)			
PWR  M 12 connector (A-coded)	**Pin**	**Name**	**Comment**
	1	VIN	Positive supply voltage +18 … +30 VDC
	2	I/O 1	Switching input/output 1
	3	GNDIN	Negative supply voltage 0 VDC
	4	I/O 2	Switching input/output 2
	5	FE	Functional earth
	Thread	FE	Functional earth (housing)

Table 7.1: Pin assignments - PWR

Further information on configuring the input/output can be found in Chapter 8 and Chapter 9.

7.3 Ethernet TCP/IP BUS IN

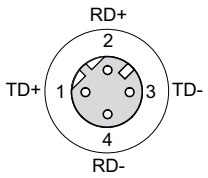
BUS IN (4-pin socket, D-coded)			
BUS IN  M12 socket (D-coded)	**Pin**	**Name**	**Comment**
	1	TD+	Transmit Data +
	2	RD+	Receive Data +
	3	TD-	Transmit Data -
	4	RD-	Receive Data -
	Thread	FE	Functional earth (housing)

Table 7.2: BUS IN pin assignment

7.4 Ethernet TCP/IP BUS OUT

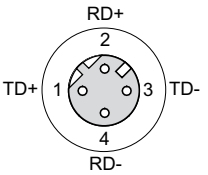
BUS OUT (4-pin socket, D-coded)			
BUS OUT  M12 socket (D-coded)	**Pin**	**Name**	**Comment**
	1	TD+	Transmit Data +
	2	RD+	Receive Data +
	3	TD-	Transmit Data -
	4	RD-	Receive Data -
	Thread	FE	Functional earth (housing)

Table 7.3: Pin assignment BUS OUT

7.5 Service

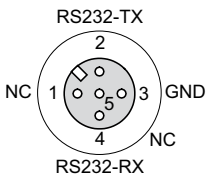
Service (5-pin socket, A-coded)			
SERVICE  M12 socket (A-coded)	**Pin**	**Name**	**Comment**
	1	NC	Not assigned
	2	RS232-TX	RS 232 transmission line/ service data
	3	GND	Voltage supply 0VDC
	4	RS232-RX	RS 232 receiving line/ service data
	5	NC	Not used
	Thread	FE	Functional earth (housing)

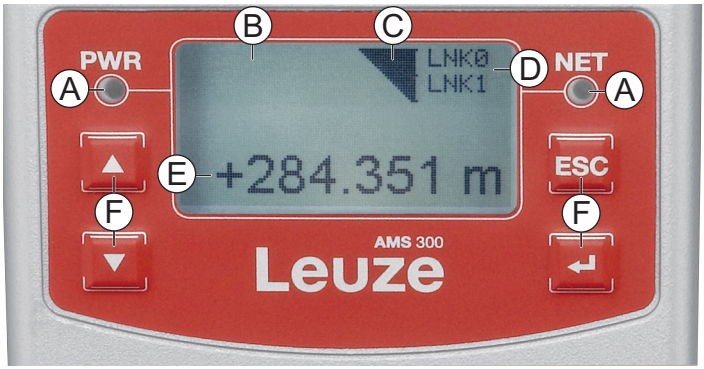
Table 7.4: Pin assignment - Service

Note!

The service interface is designed only for use by Leuze!

8 Display and control panel AMS 308*i*

8.1 Structure of the control panel



A LED
B Status indicator
C Bargraph
D Bus/interface info
E Distance measurement value
F Control buttons

Figure 8.1: Structure of the control panel using the AMS 304*i* PROFIBUS device variant as an example

Note!

The figure is for illustration purposes only and does not correspond to the AMS 308i with respect to specified bus/interface info.

8.2 Status indicators and operation

8.2.1 Indicators in the display

Status and warning messages in the display

IO1 **Input 1 or output 1 active:**
Function depending on configuration.

IO2 **Input 2 or output 2 active:**
Function depending on configuration.

LSR **Warning - laser prefailure message:**
Laser diode old, device still functional, exchange or have repaired.

TMP **Warning - temperature monitoring:**
Internal device temperature above/below permissible range.

PLB **Plausibility error:**
Implausible measurement value. Possible causes: light beam interruption, outside of measurement range, permissible internal device temperature considerably exceeded or traverse rate >10m/s.

Depending on the configuration, either zero or the last valid measurement value is output at the interfaces.

ATT **Warning - received signal:**
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.

Bar graph

Indicates the **strength of the received laser light**.

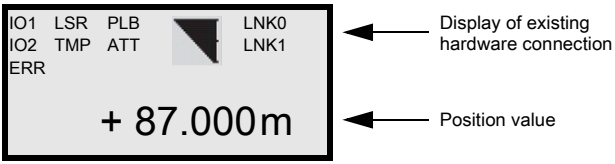
The center bar represents the **ATT** warning threshold. The distance value remains valid and is output at the interfaces.

If no bar graph is available, the **PLB** status information appears at the same time.

The measurement value is assessed as implausible. Depending on the configuration, either zero or the last valid measurement value is output at the interfaces.

Interface info

With "LNK0", the display indicates correct hardware connection on the BUS IN connector, and, with "LNK1", correct hardware connection on the BUS OUT connector.



Position value

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

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

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

8.2.2 LED status indicators

PWR LED

PWR 

Off

Device OFF
- No supply voltage

PWR 

Flashing green

Power LED flashes green
- No measurement value output
- Voltage connected
- Self test running
- Initialization running
- Boot process running

PWR 

Green continuous light

Power LED green
- AMS 308*i* OK
- Measurement value output
- Self test successfully finished
- Device monitoring active

PWR 

Red flashing

Power LED flashes red
- Device OK but warning message (ATT, TMP, LSR) set in display
- Light beam interruption
- Plausibility error (PLB)

PWR

Red continuous light

Power LED red
- No measurement value output; for details, see display

NET LED

NET

Off

NET LED off
- No voltage supply
- TCP communication deactivated

NET

Flashing green

NET LED flashes green
- Address assignment via DHCP activated, however the device has not been assigned an IP address. In this case, the device with the permanently set address connects to the network.

NET

Green continuous light — **NET LED green**

- TCP communication is activated, and a connection to another participant exists.

NET

Red continuous light — **LED red**

- TCP communication is activated, however NO connection to another participant exists.

Note!

Communication via UDP does not actuate the NET LED!

LINK LED for BUS IN and BUS OUT

A green/yellow multicolor LED below the BUS IN and BUS OUT connectors indicates the Ethernet connection status.

Green continuous light — **LINK LED on**

- The link exists, the hardware connection to the next connected participant is OK.

Flashing yellow — **LINK LED flashes yellow**

- Data is exchanged with the connected participants.

8.2.3 Control buttons

▲	**Up**	Navigate upward/sideways.
▼	**Down**	Navigate downward/sideways.
ESC	**ESC**	Exit menu item.
↵	**ENTER**	Confirm/enter value, change menu levels.

Navigating within the menus

The menus within a level are selected with the up/down buttons ▲ ▼.

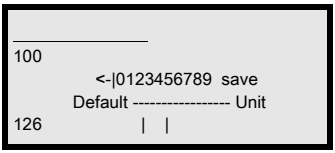
The selected menu item is activated with the enter button ↵.

Press the ESC button ESC to move up one menu level.

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

Setting values

If input of a value is possible, the display looks like this:



← + ↵ Delete character

0...9 + ↵ Enter digit

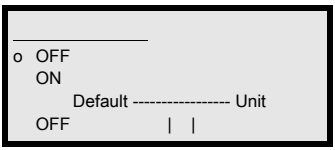
save + ↵ Save

Use the ▲ ▼ and ↵ buttons to set the desired value. An accidental, incorrect entry can be corrected by selecting <-| and then pressing ↵.

Then use the ▲ ▼ buttons to select save and save the set value by pressing ↵.

Selecting options

If options can be selected, the display looks like this:



Select the desired option with the ▲ ▼ buttons. Activate the option by pressing ↵.

8.3 Menu description

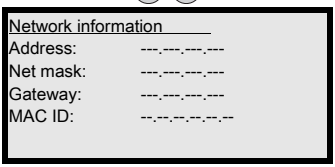
8.3.1 The main menus

After voltage has been applied to the laser, device information is displayed for several seconds. The display then shows the measurement window with all status information.

Device information - main menu

This menu item contains detailed information on
- Device type
- Manufacturer
- Software and hardware version
- Serial number

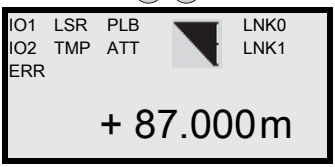
No entries can be made via the display.



Network information - main menu

- Display of the network settings.

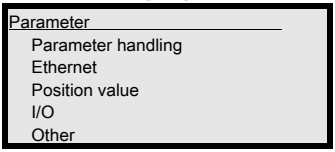
No entries can be made via the display.



Status and measurement data - main menu

- Display of status, warning and error messages.
- Status overview of the switching inputs/outputs
- Bar graph for the received signal level.
- Link
- Measurement value

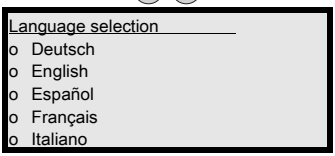
No entries can be made via the display.
See "Indicators in the display" on page 41.



Parameter - main menu

- Configuration of the AMS.

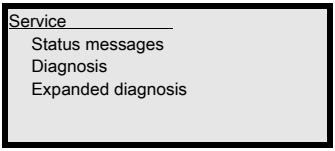
See "Parameter menu" on page 47.



Language selection - main menu

- Selection of the display language.

See "Language selection menu" on page 53.



Service - main menu

- Display of status messages.
- Display of diagnostic data.

No entries can be made via the display.
See "Service menu" on page 53.

Note!

The rear cover *of this manual includes a* ***fold-out page*** *with the complete* ***menu structure****. It describes the menu items in brief.*

8.3.2 Parameter menu

Parameter handling submenu

The following functions can be called up in the Parameter handling submenu:

- Lock and enable parameter entry
- Set up a password
- Reset the AMS 308*i* to the default settings

Table 8.1: Parameter handling submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
Parameter enable			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		ON/OFF To enter a password, parameter enable must be activated. If a password is assigned, changes to the AMS 308*i* can only be made after the password is entered. The master password 2301 overrides the individually set password.	OFF
	Password entry		For setting a four-digit numerical password.	
Parameters to default			By pressing the enter button ↵ after selecting Parameters to default, all parameters are reset to their standard settings without any further security prompts. In this case, English is selected as the display language.	

Additional important information on parameter handling can be found at the end of the chapter.

Ethernet submenu

Tabelle 8.2: Ethernet submenu

Level 3	Level 4	Level 5	Level 6	Selection/configuration option 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 308*i* is set to the values that it obtains from the DHCP server.	

Tabelle 8.2: Ethernet submenu

Level 3	Level 4	Level 5	Level 6	Selection/configuration option Description	Standard
	Gateway			The gateway address can be set to any value in the format ---.---.---.---. The AMS 308*i* communicates with participants in other subnets via the gateway.	
	Net mask			The net mask can be set to any value in the format ---.---.---.---.	
	DHCP activated			ON/OFF If DHCP is activated, the AMS 308*i* 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 TCP/IP communication with the host is activated.	ON
		Mode		Server/client Server defines the AMS 308*i* as TCP server: The primary host system (PC / PLC as client) actively establishes the connection and the connected AMS 308*i* waits for the connection to be set up. Under TcpIP Server -> Port number, you must also specify the local port on which the AMS 308*i* receives communication requests from a client application (host system). Client defines the AMS 308*i* as TCP client: The AMS 308*i* actively sets up the connection to the primary host system (PC / PLC as server). Under TcpIP 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 308*i* now 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
		TCP/IP 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 308*i* exchanges data as TCP client.	
			Port number	The port number can be set to any value between 0 and 65535. Port number of the host system with which the AMS 308*i* exchanges data as TCP client.	10000
			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 308*i* 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

Tabelle 8.2: Ethernet submenu

Level 3	Level 4	Level 5	Level 6	Selection/configuration option Description	Standard
		TCP/IP server	Port number	The port number can be set to any value between 0 and 65535. Local port on which the AMS 308*i* receives connection requests from a client application (host system) as TCP server.	1000
	UDP	Activation		ON/OFF 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 308*i* and the selected port number. By assigning these parameters, a socket is formed via which the data can be sent and received	---.---.---.---
		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 65535.	10001
Output cycle				Value input Output cycle of data in multiples of the AMS 308*i* measurement cycle of 1.7 ms. 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 The measurement value can be displayed in these resolutions. The value of the free resolution is determined in the "Position value" submenu in the "Free resolution value" parameter.	0.1 mm
Velocity resolution				1 mm/s / 10 mm/s / 100 mm/s	1 mm/s

Position value submenu

Table 8.3: Position value submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
Unit			Metric/Inch Specifies the units of the measured distances	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

Table 8.3: Position value submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
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.	0 mm
Preset			The preset value is accepted by means of teach pulse. The teach pulse can be applied to a hardware input of the M12 PWR connector. The hardware input must be appropriately configured. See also configuration of the I/Os.	0 mm
Free resolution value			The measurement value can be resolved in increments of 1/1000 within the 5 … 50000 value range. If e.g. a resolution of 0.875 mm per digit is required, the parameter is set to 875.	1000
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

I/O submenu

Table 8.4: I/O submenu

Level 3	Level 4	Level 5	Selection/configuration option 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	Pos. limit value 1 / Pos. limit value 2 / Velocity / Intensity (ATT) / Temp. (TMP) / Laser (LSR) / Plausibility (PLB) / Hardware (ERR) The individual functions are "ORed" on the selected switching output.	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

Table 8.4: I/O submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
	Switching output	Function	Pos. limit value 1 / Pos. limit value 2 / Velocity / Intensity (ATT) / Temp. (TMP) / Laser (LSR) / Plausibility (PLB) / Hardware (ERR) The individual functions are "ORed" on the selected switching output.	Intensity (ATT), Temp. (TMP), Laser (LSR)
		Activation	Low active/High active	Low active
Limit values	Upper pos. limit 1	Activation	ON/OFF	OFF
		Limit value input	Value input in mm or inch/100	0
	Lower pos. limit 1	Activation	ON/OFF	OFF
		Limit value input	Value input in mm or inch/100	0
	Upper pos. limit 2	Activation	ON/OFF	OFF
		Limit value input	Value input in mm or inch/100	0
	Lower pos. limit 2	Activation	ON/OFF	OFF
		Limit value input	Value input in mm or inch/100	0
	Max. velocity	Activation	ON/OFF	OFF
		Max. velocity	Value input in mm/s or inch/100s	0

Other submenu

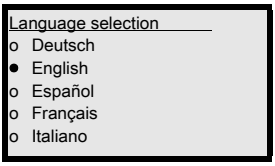
Table 8.5: Other submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
Heating control			Standard (10°C … 15°C)/Extended (30°C … 35°) Defines a switch-on/switch-off range for the heating control. The extended switch-on/switch-off range for heating may provide a remedy in the event of condensation problems. Due to the limited heating capacity, it cannot be guaranteed that no condensation will form on the optics in the extended switch-on/switch-off range. This parameter is available as standard, but functions only for devices with integrated heating (AMS 308*i*... **H**).	Standard

Table 8.5: Other submenu

Level 3	Level 4	Level 5	Selection/configuration option Description	Standard
Display illumination			10 minutes/ON Display illumination is switched off after 10 minutes or, if the parameter is set to "ON", illumination is always on.	10 min
Display contrast			Weak/Medium/Strong The display contrast may change at extreme temperature values. The contrast can subsequently be adapted using the three levels.	Medium
Service RS232	Baud rate		57.6 kbit/s / 115.2 kbit/s The service interface is only available to Leuze personnel.	115.2 kbit/s
	Format		8,e,1 / 8,n,1 The service interface is only available to Leuze personnel.	8,n,1

8.3.3 Language selection menu



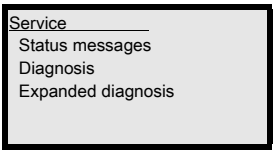
5 display languages are available:

- German
- English
- Spanish
- French
- Italian

The AMS 308*i* is delivered from the factory with the display preset to English.

To change the language, no password needs to be entered nor must parameter enable be active. The display language is a passive operational control and is therefore not a function parameter per se.

8.3.4 Service menu



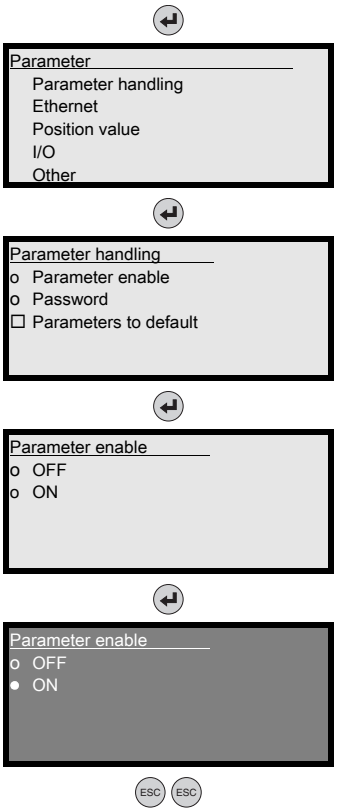
A detailed description of the individual functions can be found in Chapter 10.

8.4 Operation

An operating process is described here using parameter enable as an example.

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.



In the main menu, press the enter button to enter the Parameter menu.

Use the ▲▼ buttons to select the Parameter handling menu item.

Press the enter button to enter the Parameter handling menu.

In the Parameter handling menu, use the ▲▼ buttons to select the Parameter enable menu item.

Press the enter button to enter the Parameter enable menu.

In the Parameter enable menu, use the ▲▼ buttons to select the ON menu item.

Press the enter button to activate parameter enable.

The PWR LED lights up orange; the display is inverted. You can now set the individual parameters on the display.

Press the ESC button twice to return to the Parameter menu.

Viewing and editing parameters

As long as parameter enable is active, the entire AMS 308*i* display is inverted.

Note!

If a password was stored, parameter enable is not possible until this password is entered; see "Password for parameter enable" below.

Password for parameter enable

Note!

The **master password 2301** *can enable the* AMS 308*i* *at any time.*

9 Ethernet TCP/IP interface

9.1 General information on Ethernet

The AMS 308*i* 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 308*i* by the manufacturer; this address cannot be changed.

The AMS 308*i* 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 308*i* features multiple M 12 connectors / sockets for the electrical connection of the supply voltage, the interface and the switching inputs and outputs. Additional information on the electrical connection can be found in Chapter 7.

The AMS 308*i* 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.

Further information on commissioning can be found in Chapter 9.

9.1.1 Ethernet – star topology

The AMS 308*i* 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.

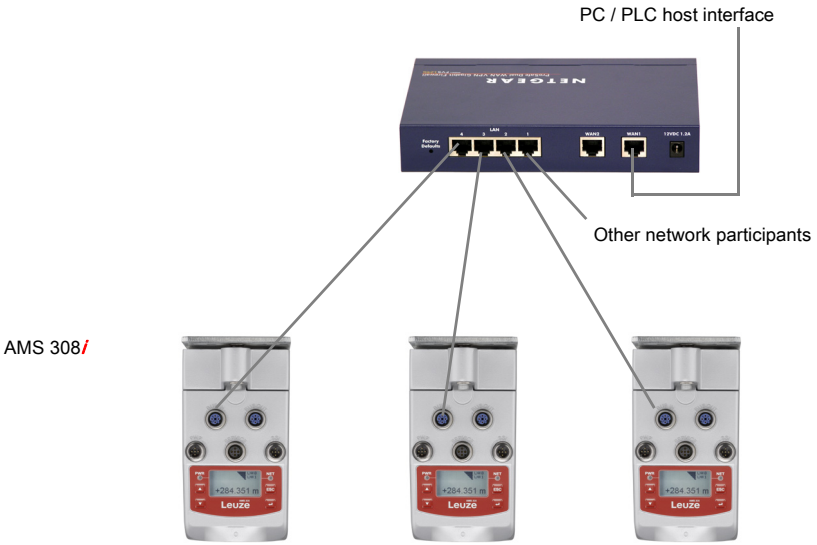


Figure 9.1: Ethernet in a star topology

9.1.2 Ethernet in a linear topology

The innovative further development of the AMS 308*i* with integrated switch functionality offers the option of connecting multiple AMS of type AMS 308*i* to one another without direct connection to a switch. In addition to the classic "star topology", a "linear topology" is thus also possible.

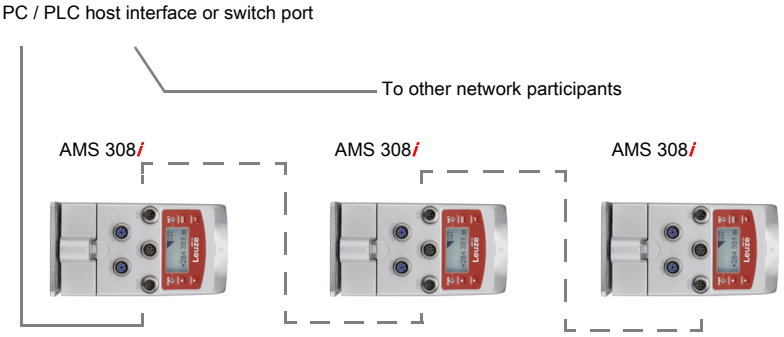


Figure 9.1: Ethernet – linear topology

Each participant in this network requires its own unique IP address which must be assigned to it via display. Alternatively, the DHCP method can also be used.

The maximum length of a segment is limited to 100 m.

9.2 Electrical connection

BUS IN (4-pin socket, D-coded)		
Pin	**Name**	**Comment**
1	**TD+**	Transmit Data +
2	**RD+**	Receive Data +
3	**TD-**	Transmit Data -
4	**RD-**	Receive Data -
Thread	**FE**	Functional earth (housing)

BUS OUT (4-pin socket, D-coded)		
Pin	**Name**	**Comment**
1	**TD+**	Transmit Data +
2	**RD+**	Receive Data +
3	**TD-**	Transmit Data -
4	**RD-**	Receive Data -
Thread	**FE**	Functional earth (housing)

Figure 9.2: Ethernet - Electrical connection

Note!

*For connecting **BUS IN** and **BUS OUT**, we recommend our ready-made Ethernet cables (see chapter 11.4.4 "Accessories – Ready-made cables for voltage supply").*

To set up an Ethernet network with other participants in a linear topology, the AMS 308*i* provides an additional Ethernet interface. The use of this interface reduces the cabling requirements, as only the first AMS 308*i* requires a direct connection to the switch. All other participants can be connected in series to the first AMS 308*i*, see Figure 9.1.

If you use ready-made cables, note the following:

Note!

The entire interconnection cable must be shielded. The shielding connection must be at the same potential at both ends of the data line. This serves to prevent potential equalization currents over the shield and possible interference coupling through compensating currents. The signal lines must be stranded in pairs.
Use CAT 5 cables for the connection.

Note!

Termination at the end of a linear topology (AMS 308i last participant) is performed automatically via the integrated TCP/IP controller. External termination via the BUS OUT port is not necessary.

9.3 Ethernet – Commissioning of AMS 308*i*

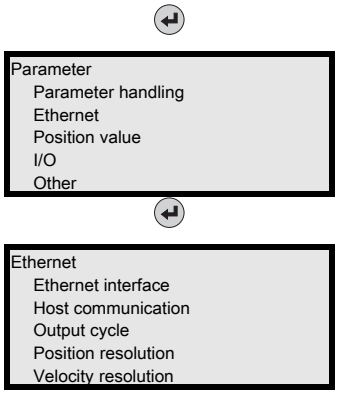
9.3.1 Manual configuration of the IP address

Note!

To set the network addresses, parameter enable must be activated as described in Chapter 8.4.

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 308i.*
- *Set these values on the AMS 308i.*

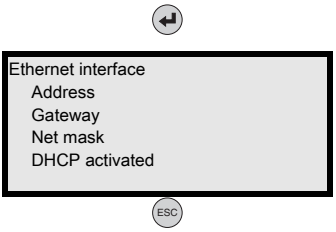


In the main menu, press the enter button to enter the Parameter menu.

Use the ▲ ▼ buttons to select the Ethernet menu item.

Press the enter button to enter the Ethernet menu.

Use the ▲ ▼ 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.

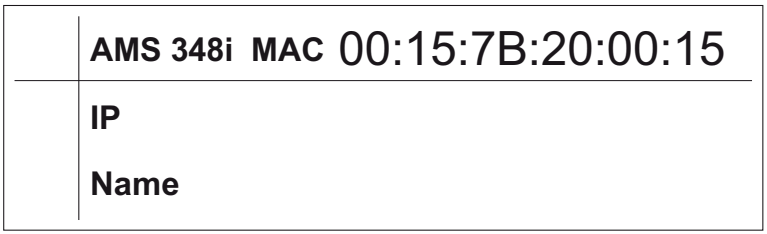


Figure 9.1: Example of an "Address Link Label"; the device type varies depending on the series

- 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 or 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.

Note!

Each device with Ethernet interface is uniquely identified via the MAC address assigned during production. The MAC address is also listed on the name plate of the device. If multiple devices are commissioned in a system, the MAC address of each installed device must be correctly assigned, e.g., during programming of the control.

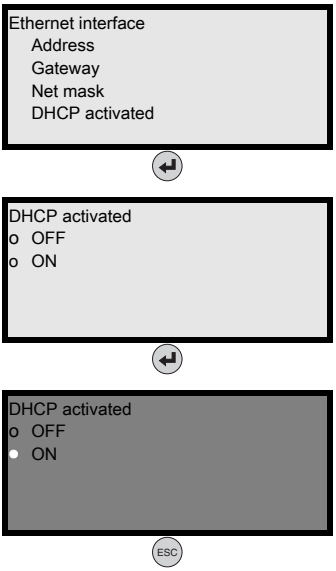
- *Remove the "Address Link Label" from the device.*
- *If necessary, add the IP address and the device name to the "Address Link Label".*
- *Affix the "Address Link Label" in the documents, e.g., in the installation diagram, according to the position of the device*

9.3.2 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; see Chapter 8.4.

↳ *Starting at the main menu, use the ▲ ▼ buttons and the enter button ↵ to navigate to the Ethernet interface menu as described in Section 9.3.1:*



Use the ▲ ▼ buttons to select the DHCP activated menu item.

Press the enter button to enter the DHCP activated menu.

Use the ▲ ▼ buttons to select the ON menu item.

Press the enter button to activate DHCP activation.

DHCP activation is now switched on.

Exit the Ethernet interface menu with the ESCAPE button.

9.4 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.

9.4.1 Request telegram to the AMS 308*i*

ETHERNET HEADER (Ethernet addresses)	IP HEADER (IP addresses)	TCP HEADER (port numbers)	TCP USER DATA 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 308*i*, 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 308*i* 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 (16 bit)	Protocol ID (16 bit)	Length (16 bit)	0xFF (8 bit)	Function code (8 bit)

Function code

Using the function code, the functions described in the table below can be activated on the AMS 308*i*.

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

Table 9.1: Functions

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)

9.4.2 Response telegram of AMS 308*i*

ETHERNET HEADER (Ethernet addresses)	IP HEADER (IP addresses)	TCP HEADER (port numbers)	TCP USER DATA AREA	FCS

9.4.2.1 TCP user data area

Transaction ID (16 bit)	Protocol ID (16 bit)	Length (16 bit)	0xFF (8 bit)	Status (16 bit)	Data (24 bit)

Response telegram for function code F1 to F8

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

Table 9.2: Response telegram

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

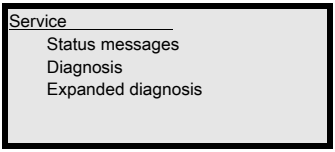
D0 - D23 (distance value)

D0 = LSB; D23 = MSB

10 Diagnostics and troubleshooting

10.1 Service and diagnosis in the display of the AMS 308*i*

In the main menu of the AMS 308*i*, expanded "Diagnostics" can be called up under the Service heading.



From the Service main menu, press the enter button to access the underlying menu level.

Use the up/down buttons to select the corresponding menu item in the selected level; use the enter button to activate the selection.

Return from any sub-level to the next-higher menu item by pressing the ESC button.

10.1.1 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.

Basic representation of the status messages

n: Type / No. / 1

Meaning:

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)

The status messages within the ring memory are selected with the up/down buttons. Use the enter button to call up **detailed information** about the respective status message:

Detailed information about a status message

Type: type of message + internal counter

UID: Leuze-internal coding of the message

ID: description of the message

Info: not currently used

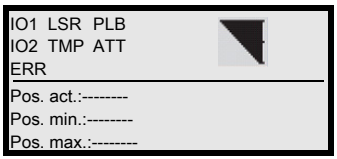
Within the detailed information, press the enter button ↵ again to activate an **action menu** with the following functions:

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

10.1.2 Diagnosis

The diagnostics function is activated by selecting the Diagnostics menu item. The ESC button ESC deactivates the diagnostics function and clears the contents of the recordings.

The recorded diagnostic data is displayed in 2 fields. In the upper half of the display, status messages of the AMS and the bar graph are displayed. The lower half contains information used for Leuze-internal evaluation.



Use the up/down buttons ▲ ▼ to scroll in the bottom half between various displays. The contents of the scrollable pages are intended solely for Leuze for internal evaluation.

The diagnostics have no influence on communication with the host interface and can be activated during operation of the AMS 308*i*.

10.1.3 Expanded diagnosis

The Expanded diagnosis menu item is used for Leuze-internal evaluation.

10.2 General causes of errors

LINK LED for BUS IN and BUS OUT

A green/yellow multicolor LED below the BUS IN and BUS OUT connectors indicates the Ethernet connection status.

Green continuous light — **LINK LED green**

- The link exists, the hardware connection to the next connected participant is OK.

Off — **LINK LED off**

- No Ethernet communication.
  Possible cause:
  No correct Ethernet connection to the AMS.
  Trouble shooting: exchange Ethernet cable or check PIN assignment on the RJ45 connector.

Flashing yellow — **LINK LED flashes yellow**

- Data is exchanged with the connected participants.

10.2.1 Power LED

See also Chapter 8.2.2.

Error	Possible error cause	Measure
PWR LED "OFF"	No supply voltage connected	Check supply voltage.
	Hardware error	Send in device.
PWR LED "flashes red"	Light beam interruption	Check alignment.
	Plausibility error	Traverse rate >10m/s.
PWR LED "static red"	Hardware error	For error description, see display, It may be necessary to send in the device.

Table 10.1: General causes of errors

10.3 Interface errors

10.3.1 NET LED

Error	Possible error cause	Measure
NET LED "OFF"	No supply voltage connected to the device	Check supply voltage.
	TCP communication deactivated	Activate TCP communication.
NET LED "flashes green"	Address assignment via DHCP activated, but no IP address assigned. In this case, the device with the permanently set address connects to the network.	Assign IP address.
NET LED "static red"	TCP communication is activated, but NO connection to another participant.	
Sporadic network errors	Check wiring for proper contacting	Check wiring: • check wire shielding in particular, • check wires used.
	EMC coupling	• Observe contact quality of screwed or soldered contacts in the wiring. • Avoid EMC coupling caused by power cables laid parallel to device lines. • Separate laying of power and data communications cables.
	Network expansion exceeded	Check max. network expansion as a function of the max. cable lengths.

Table 10.2: Bus error

10.4 Status indicators in the display of the AMS 308*i*

Display	Possible error cause	Measure
PLB (implausible measurement values)	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)	Select AMS with heating or ensure cooling.
ATT (insufficient received signal level)	Reflector soiled	Clean reflector or glass lens.
	Glass lens of the AMS soiled	
	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)	Ambient temperatures outside specified range	In case of low temperatures, remedy may be an AMS with heating. If temperatures are too high, provide cooling or change mounting location.
LSR Laser diode warning	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.

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 at 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 and batch number
- Reason for requesting support together with a description

For this purpose, 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.

Note!

Please use Chapter 10 *as a master copy should servicing be required.*
Cross the items in the "Measures" column which you have already examined, fill out the following address field and fax the pages together with your service contract to the fax number listed below.

Customer data (please complete)

Device type:	
Company:	
Contact person/department:	
Phone (direct dial):	
Fax:	
Street / no.:	
ZIP code / City:	
Country:	

Leuze Service fax number:

+49 7021 573 - 199

11 Type overview and accessories

11.1 Part number code

AMS 3xx *i* yyy H

Heating option	H =	With heating
Operating range	40	Max. operating range in m
	120	Max. operating range in m
	200	Max. operating range in m
	300	Max. operating range in m
	i =	Integrated fieldbus technology
Interface	00	RS 422/RS 232
	01	RS 485
	04	PROFIBUS DP / SSI
	08	TCP/IP
	35	CANopen
	38	EtherCAT
	48	PROFINET RT
	55	DeviceNet
	58	EtherNet/IP
	84	Interbus
	AMS **A**bsolute **M**easurement **S**ystem	

11.2 Overview of AMS 308*i* types (Ethernet TCP/IP)

Type designation	Description	Part no.
AMS 308*i*40	40m operating range, Ethernet TCP/IP interface	50113685
AMS 308*i*120	120m operating range, Ethernet TCP/IP interface	50113686
AMS 308*i*200	200m operating range, Ethernet TCP/IP interface	50113687
AMS 308*i*300	300m operating range, Ethernet TCP/IP interface	50113688
AMS 308*i*40 H	40m operating range, Ethernet TCP/IP interface, integrated heating	50113689
AMS 308*i*120 H	120m operating range, Ethernet TCP/IP interface, integrated heating	50113690
AMS 308*i*200 H	200m operating range, Ethernet TCP/IP interface, integrated heating	50113691
AMS 308*i*300 H	300m operating range, Ethernet TCP/IP interface, integrated heating	50113692

Table 11.1: Overview of AMS 308*i* types

11.3 Overview of reflector types

Type designation	Description	Part no.
REF 4-A-150x150	Reflective tape, 150x150mm, self-adhesive	50141015
Reflective tape 200x200-S	Reflective tape, 200x200mm, self-adhesive	50104361
REF 4-A-300x300	Reflective tape, 300x300mm, self-adhesive	50141014
Reflective tape 500x500-S	Reflective tape, 500x500mm, self-adhesive	50104362
Reflective tape 914x914-S	Reflective tape, 914x914mm, self-adhesive	50108988
Reflective tape 200x200-M	Reflective tape, 200x200mm, affixed to carrier plate	50104364
Reflective tape 500x500-M	Reflective tape, 500x500mm, affixed to carrier plate	50104365
Reflective tape 914x914-M	Reflective tape, 914x914mm, affixed to carrier plate	50104366
Reflective tape 200x200-H	Reflective tape, 200 x 200mm, heated	50115020
Reflective tape 500x500-H	Reflective tape, 500 x 500mm, heated	50115021
Reflective tape 914x914-H	Reflective tape, 914 x 914mm, heated	50115022

Table 11.2: Overview of reflector types

11.4 Accessories

11.4.1 Accessories – Mounting bracket

Type designation	Description	Part no.
MW OMS/AMS 01	Mounting bracket for mounting AMS 308*i* to horizontal surfaces	50107255

Table 11.3: Accessories – Mounting bracket

11.4.2 Accessories – Deflector unit

Type designation	Description	Part no.
US AMS 01	Deflector unit with integrated mounting bracket for AMS 308*i*. Variable 90° deflection of laser beam in different directions	50104479
US 1 OMS	Deflector unit without mounting bracket for simple 90° deflection of laser beam	50035630

Table 11.4: Accessories – Deflector unit

11.4.3 Accessories – M12 connector

Type designation	Description	Part no.
S-M12A-ET	M12 connector, Ethernet, D-coded, BUS IN, BUS OUT	50112155
KDS ET M12/RJ45 W - 4P	Converter from M12 D-coded to RJ45 socket	50109832
KD 095-5A	M12 connector, A-coded socket, Power (PWR)	50020501

Table 11.5: Accessories – M12 connector

11.4.4 Accessories – Ready-made cables for voltage supply

Contact assignment/core color of PWR connection cable

PWR connection cable (5-pin socket, A-coded)			
PWR I/O 1 2 VIN 1 3 GND 5 4 FE I/O 2 **M12 socket (A-coded)**	**Pin**	**Name**	**Core color**
	1	VIN	**Brown**
	2	I/O 1	**White**
	3	GND	**Blue**
	4	I/O 2	**Black**
	5	FE	**Gray**
	Thread	FE	**Bare**

Technical data of the cables for voltage supply

Operating temperature range	In idle state: -30°C … +70°C In motion: -5°C … +70°C
Material	Sheathing: PVC
Bending radius	> 50 mm

Order codes of the cables for voltage supply

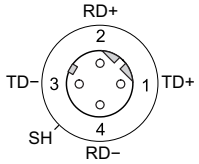
Type designation	Description	Part no.
K-D M12A-5P-5m-PVC	M12 socket, A-coded, axial plug outlet, open cable end, cable length 5 m	50104557
K-D M12A-5P-10m-PVC	M12 socket, A-coded, axial plug outlet, open cable end, cable length 10 m	50104559

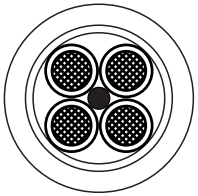
11.4.5 Accessories - Ready-made cables for Ethernet

General

- Cable **KB ET…** for connecting to Ethernet via M12 connector
- Standard cable available in lengths from 2 … 30m
- Special cable on request.

Contact assignment of M12 Ethernet connection cable KB ET …-SA

M12 Ethernet connection cable (4-pin plug, D-coded, on both sides)			
EtherNet  M12 connector (D-coded)	**Pin**	**Name**	**Core color**
	1	TD+	**Yellow**
	2	RD+	**White**
	3	TD-	**Orange**
	4	RD-	**Blue**
	SH (thread)	FE	**Bare**



Core colors

WH
YE
BU
OG

Conductor class: VDE 0295, EN 60228, IEC 60228 (Class 5)

Accessory M12 Ethernet connection cable, open cable end

Cable designation: KB ET - … - SA

Accessory Ethernet connection cable with both-sided D-coded M12 connector

Cable designation: KB ET - … - SSA, cable assignment 1:1, not crossed

Accessory Ethernet connection cable, M12-/RJ45

Cable designation: KB ET - … - SA-RJ45

Note regarding connection of the Ethernet interface!

The entire interconnection cable must be shielded. The shielding connection must be at the same potential at both ends of the data line. This serves to prevent potential equalization currents over the shield and possible interference coupling through compensating currents. The signal lines must be stranded in pairs.
Use CAT 5 cables for the connection.

Technical data of the Ethernet connection cable

Operating temperature range
In idle state: -50°C … +80°C
In motion: -25°C … +80°C
In motion: -25°C ... +60°C
(when used with drag chains)

Material
Cable sheath: PUR (green), wire insulation: PE foam,
Free of halogens, silicone and PVC

Bending radius
> 65 mm, suitable for drag chains

Bending cycles
> 10^6, perm. acceleration < 5 m/s^2

Order codes for Ethernet connection cables

Type designation	Description	Part no.
M12 plug for BUS IN, axial connector, open cable end		
KB ET - 1000 - SA	Cable length 1 m	50106738
KB ET - 2000 - SA	Cable length 2 m	50106739
KB ET - 5000 - SA	Cable length 5 m	50106740
KB ET - 10000 - SA	Cable length 10 m	50106741
KB ET - 15000 - SA	Cable length 15 m	50106742
KB ET - 20000 - SA	Cable length 20 m	50106743
KB ET - 25000 - SA	Cable length 25 m	50106745
KB ET - 30000 - SA	Cable length 30 m	50106746
M12 plug for BUS IN to RJ-45 plug		
KB ET - 1000 - SA-RJ45	Cable length 1 m, cable 1:1, not crossed	50109879
KB ET - 2000 - SA-RJ45	Cable length 2 m, cable 1:1, not crossed	50109880
KB ET - 5000 - SA-RJ45	Cable length 5 m, cable 1:1, not crossed	50109881
KB ET - 10000 - SA-RJ45	Cable length 10 m, cable 1:1, not crossed	50109882
KB ET - 15000 - SA-RJ45	Cable length 15 m, cable 1:1, not crossed	50109883
KB ET - 20000 - SA-RJ45	Cable length 20 m, cable 1:1, not crossed	50109884
KB ET - 25000 - SA-RJ45	Cable length 25 m, cable 1:1, not crossed	50109885
KB ET - 30000 - SA-RJ45	Cable length 30 m, cable 1:1, not crossed	50109886
M12 connector + M12 connector for BUS OUT to BUS IN		
KB ET - 1000 - SSA	Cable length 1 m, cable 1:1, not crossed	50106898
KB ET - 2000 - SSA	Cable length 2 m, cable 1:1, not crossed	50106899
KB ET - 5000 - SSA	Cable length 5 m, cable 1:1, not crossed	50106900
KB ET - 10000 - SSA	Cable length 10 m, cable 1:1, not crossed	50106901
KB ET - 15000 - SSA	Cable length 15 m, cable 1:1, not crossed	50106902
KB ET - 20000 - SSA	Cable length 20 m, cable 1:1, not crossed	50106903
KB ET - 25000 - SSA	Cable length 25 m, cable 1:1, not crossed	50106904
KB ET - 30000 - SSA	Cable length 30 m, cable 1:1, not crossed	50106905

12 Maintenance

12.1 General maintenance information

With normal use, the laser measurement system does not require any maintenance by the operator.

Cleaning

In the event of dust build-up or if the warning message (ATT) is displayed, clean the device with a soft cloth; use a cleaning agent (commercially available glass cleaner) if necessary.

Also check the reflector for possible soiling.

Attention!

Do not use solvents and cleaning agents containing acetone. The use of such solvents can dull the reflector, the housing window and the display.

12.2 Repairs, servicing

Attention!

Access to or changes on the device, except where expressly described in this operating manual, is not authorized.
The device must not be opened. Failure to comply will render the guarantee void. Warranted features cannot be guaranteed after the device has been opened.

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

↳ *Contact your Leuze distributor or service organization should repairs be required. The addresses can be found on the inside of the cover and on the back.*

Note!

When sending laser measurement systems to Leuze for repair, please provide an accurate description of the fault.

12.3 Disassembling, packing, disposing

Repacking

For later reuse, the device is to be packed so that it is protected.

Note!

Electrical scrap is a special waste product! Observe the locally applicable regulations regarding disposal of the product.

Level 1 ▲▼ : Selection	Level 2 ▲▼ : Selection ESC : Back	Level 3 ▲▼ : Selection ESC : Back	Level 4 ▲▼ : Selection ESC : Back	Level 5 ▲▼ : Selection ESC : Back	Level 6 ▲▼ : Selection ESC : Back	Selection/configuration option ▲▼ : Selection ↵ : Activate ESC : Back	Detailed information on
Device information							Page 46
Network information							Page 46
Status and measurement data							Page 46
Parameter ↵	Parameter handling	↵ Parameter enable				ON/OFF	Page 47
		↵ Password	↵ Activate password			ON/OFF	
			↵ Password entry			For setting a four-digit numerical password	
		↵ Parameters to default				All parameters are reset to their factory settings	
	↵ Ethernet	↵ Ethernet interface	↵ Address			IP address entry in the format ---.---.---.---	
			↵ Gateway			Gateway address entry in the format ---.---.---.---	
			↵ Net mask			Entry for the net mask in the format ---.---.---.---	
			↵ DHCP activated			ON/OFF	
		↵ Host communication	↵ TCP/IP	↵ Activation		ON/OFF	
				↵ Mode		Server/client	
				↵ Keep-alive interval		Value input in ms	
				↵ TCP/IP client	↵ IP address	Value input in the format ---.---.---.---	
					↵ Port number	0 … 65535	
					↵ Timeout	100 … 60.000 ms	
					↵ Repetition time	100 … 60.000 ms	
				↵ TCP/IP server	↵ Port number	0 … 65535	
			↵ UDP	↵ Activation		ON/OFF	
				↵ IP address		Value input in the format ---.---.---.---	
				↵ Port number		0 … 65535	
		↵ Output cycle				Value input	
		↵ Position resolution				0.01 mm / 0.1 mm / 1 mm / 10 mm / free resolution	
		↵ Velocity resolution				1 mm/s / 10 mm/s / 100 mm/s	
	↵ Position value	↵ Unit				Metric/Inch	
		↵ Counting direction				Positive/Negative	
		↵ Offset				Value input	
		↵ Preset				Value input	
		↵ Error delay				ON/OFF	
		↵ Position value in the case of failure				Last valid value / zero	
		↵ Free resolution value				5 … 50000	
	↵ I/O	↵ I/O 1	↵ Port configuration			Input/Output	Page 50
			↵ Switching input	↵ Function		No function/teach preset/laser ON/OFF	
				↵ Activation		Low active/High active	
			↵ Switching output	↵ Function		Pos. limit value 1 / Pos. limit value 2 / Velocity / Intensity (ATT) / Temp. (TMP) / Laser (LSR) / Plausibility (PLB) / Hardware (ERR)	
				↵ Activation		Low active/High active	

			I/O 2	Port configuration			Input/Output	
				Switching input	Function		No function/teach preset/laser ON/OFF	
					Activation		Low active/High active	
				Switching output	Function		Pos. limit value 1 / Pos. limit value 2 / Velocity / Intensity (ATT) / Temp. (TMP) / Laser (LSR) / Plausibility (PLB) / Hardware (ERR)	
					Activation		Low active/High active	
			Limit values	Upper pos. limit 1	Activation		ON/OFF	
					Limit value input		Value input in mm or inch/100	
				Lower pos. limit 1	Activation		ON/OFF	
					Limit value input		Value input in mm or inch/100	
				Upper pos. limit 2	Activation		ON/OFF	
					Limit value input		Value input in mm or inch/100	
				Lower pos. limit 2	Activation		ON/OFF	
					Limit value input		Value input in mm or inch/100	
				Max. velocity	Activation		ON/OFF	
					Max. velocity		Value input in mm/s or inch/100s	
		Other	Heating control				Standard/extended (10 °C … 15 °C/30 °C … 35 °C)	Page 51
			Display background				10 minutes/ON	
			Display contrast				Weak/Medium/Strong	
			Service RS232	Baud rate			57.6kbit/s / 115.2kbit/s	
				Format			8,e,1 / 8,n,1	
Language selection							Deutsch / English / Español / Français / Italiano	Page 53
Service		Status messages					Number of readings, reading gates, reading rate / non-reading rate etc.	Page 53
		Diagnosis					Only for use by Leuze personnel for service purposes	
		Expanded diagnosis					Only for use by Leuze personnel for service purposes	