

OMS1/100 IS Interbus-S

Operating Manual Laser Measuring Device

Please keep for future use !

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Revision index

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Note

The current revision number and date appears on the front cover of this document. Since the footer of each individual page contains its own revision number and date, the revision status may vary within the same document.

The drawings included in the appendix have their own revision index.

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1 Safety

1.1 General risk potential

The Laser Measuring Device OMS1/100 IS cannot be operated independently, but is installed as part of an overall system usually consisting of several interacting components. For this reason, the laser measuring device is not equipped directly with a protective device.



Warning

However, different error reports can be read out via a status word. The error reports are classified over a malfunction code. (see page 24). It is therefore essential to integrate the malfunction code into your **own safety system** via the evaluation software (e.g. a PLC).

The corresponding measures must be taken in order to avoid person and property damages.

All persons responsible for the assembly, start-up and operation of the device must

- be suitably qualified
- adhere strictly to this operating manual.

Your safety and the safety of your equipment depends on this!

1.2 Safety information

This operating manual contains information which must be observed in the interests of your own personal safety and that of your equipment. The safety hints are emphasised by a warning triangle and classified according to the degree of danger as follows:



Warning

means that failure to take the relevant safety precautions can lead to death, serious injury or major damage to property.



Caution

means that failure to take the relevant safety precautions can lead to minor injuries or damage to property.



Note

refers to important information and features of the product, plus tips on its application.

1.2.1 Hints on installation

Since the Laser Measuring Device is normally used as part of a larger system, these hints are merely intended as a guide for integrating the device safely into its environment.



Warning

- The safety and accident prevention regulations applicable to the specific application must be observed.
- In the case of permanently installed plants or systems without an all-pole mains switch and/or fuses, one of these devices must be installed accordingly and the equipment connected to a PE conductor.
- In the case of devices which run on mains voltage, make sure the set nominal voltage range coincides with the local mains voltage before start-up.
- In the case of 24 V supplies, make sure the extra-low voltage is reliably disconnected. Only use power supply units manufactured to the standards IEC 364 - 4 - 41 / HD 384.04.41 (VDE 0100 Part 410).
- Fluctuations or deviations of the mains voltage from the nominal value must not exceed the tolerance limits stated in the specifications, otherwise operational failures and dangerous states in the electrical assemblies cannot be ruled out.
- Precautionary measures must be taken to allow an interrupted program to be properly resumed following a voltage drop or failure. Dangerous operating conditions must not be permitted to arise even for short periods. If necessary, an **"EMERGENCY STOP"** must be forced.
- EMERGENCY STOP devices according to EN 60204/IEC 204 (VDE 0113) must remain operational in all operating modes of the programmable controller. The release of the EMERGENCY STOP devices must not trigger an uncontrolled or undefined reactivation of the equipment.
- Connecting and signal wires must be installed in such a way as to prevent the automation functions from being hampered by inductive and capacitive interference.
- The units of the automation system and their operating elements must be installed in such a way as to ensure adequate protection against accidental actuation.
- In order to prevent a wire or strand breakage on the signal side from causing undefined states in the programmable controller, suitable hardware and software safety precautions must be taken with regard to the I/O interface.

1.2.1.1 General interference suppression measures

- Lay the (shielded) connecting cable to the device at a sufficient distance or in a separate room from any power cables which are subject to interference.
- To ensure reliable data transmission, use fully shielded cables and make sure they are well earthed. For differential data transfer (RS422, RS485 etc.), twisted-pair wires must be used in addition.
- Use a minimum cable cross-section of 0.22 mm² for data transfer purposes.
- Use a minimum earthing cable cross-section of 10 mm² in order to avoid equipotential currents across the shield. Make sure the resistance of the earthing cable is much lower than that of the shield.
- Ensure continuous wiring of the shield and a large contact area on special shield connecting terminals.
- Avoid crossing cables where possible. If unavoidable, only cross them at right-angles.

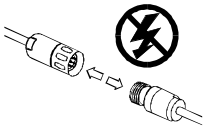
1.3 Intended purpose

The measuring system is used for recording linear movements and processing the measured data for a downstream control system with a INTERBUS-S interface according to DIN 19258.

The classification of the measuring system is defined according to the profile K3. At this the encoder data uses 2-word addresses for IN-data and 2-word addresses for OUT-data in the Master.



Warning

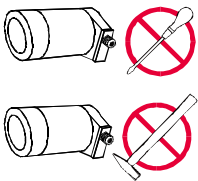


Switch off the voltage supply before carrying out wiring work or opening and closing electrical connections!

Short-circuits, voltage peaks, etc. can cause operating failures and uncontrolled operating states, as well as serious personal injuries and damage to property.

Check all electrical connections before switching on the system!

Incorrectly wired connections can cause operating failures, while wrong connections can lead to serious personal injuries and damage to property.



Mechanical or electrical modifications to the measuring systems **are prohibited for safety reasons!**

**Caution**

Laser beam

Do not look into the beam

Laser class : 2

Acc. to EN 60 825-1 : 1994

Max. laser power P_{\max} : ≤ 1 mW

Wavelength λ : 670 nm

- In the case of Class 2 laser devices, the eye is protected against brief, accidental glances at the beam by the blinking reflex. For this reason, devices of this class can be used without additional protective measures provided the operator is not required to look into the laser beam deliberately for longer periods, i.e. 0.25 s, or to look repeatedly into the laser beam itself or the directly reflected beam.
- The device must be installed in such a way that the exposure of persons to the laser beam can only happen accidentally.
- The laser beam may only extend as far as is necessary for the range measurement. The beam must be limited at the end of the useful range by a diffusely reflecting target area in such a way as to minimise the danger from direct or diffuse reflection. For this purpose, you should use the Leuze electronic reflecting foil supplied with the device.
- The area outside the operating range where the unshielded laser beam falls should be limited as far as possible and should remain out of bounds, particularly in the area above and below eye level.

i**Note**

The start-up, operating and programming instructions contained in this manual are mandatory.

1.4 Authorised operators

The start-up and operation of this device may only be performed by qualified personnel. For the purposes of this manual, the term "qualified personnel" refers to persons who are authorised to operate, earth and label equipment, systems and power circuits according to recognised safety standards.

1.5 Safety measures at the installation site



Warning

Do not perform any welding work once the device is connected and switched on!

Variations in potential can destroy the device or restrict its operation.

Do not touch plug contacts with your hands!

Static charges may destroy electronic components of the device.

Do not connect unused inputs (see pin assignment)!

Observe the voltage supply range:

Standard device: 18-27 V DC (+/- 5 %)

Device with heating: 24 V DC



Note

Make sure that the environment of the installation site is protected against corrosive media (acids, etc.)

2 Transportation / Start-up

2.1 Transportation / storage

Transport instructions

Do not drop the device or expose it to shocks or vibrations!

Device contains an optical system with glass elements.

Only use the original packaging!

The wrong packaging material can cause damage to the device during transportation.

Storage

Storage temperature : -20 to +75°C

Store in dry conditions.

2.2 Assembly instructions

Aligning the Laser Measuring Device

The measuring device or reflector is attached to the moving object and the reflector/sensor to the fixed remote station in such a way that the reflector always remains within the visual field of the sensor. This can be done using the light spot of the laser diode, which is still clearly visible on the reflecting foil even at long distance. When aligning the laser measuring device, the user may need to take measures to ensure that it can be mechanically adjusted.

The size of the reflecting foil must be such that the light spot cannot be displaced from the reflector by vibrations. The device comes with a reflecting foil measuring 20 x 20 [cm], but other sizes can be ordered on request.

Once the Laser Measuring Device is optimally aligned with the reflecting foil, the device control command "Enable operation" must be sent for resetting the malfunction code 1100 (Intensity error).

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Note

Reflecting foils by other manufacturers should be used only after consultation with Leuze electronic, as all the information in the "Specifications" chapter refers to the foil already supplied with the device.

2.3 Start-up

2.3.1 General

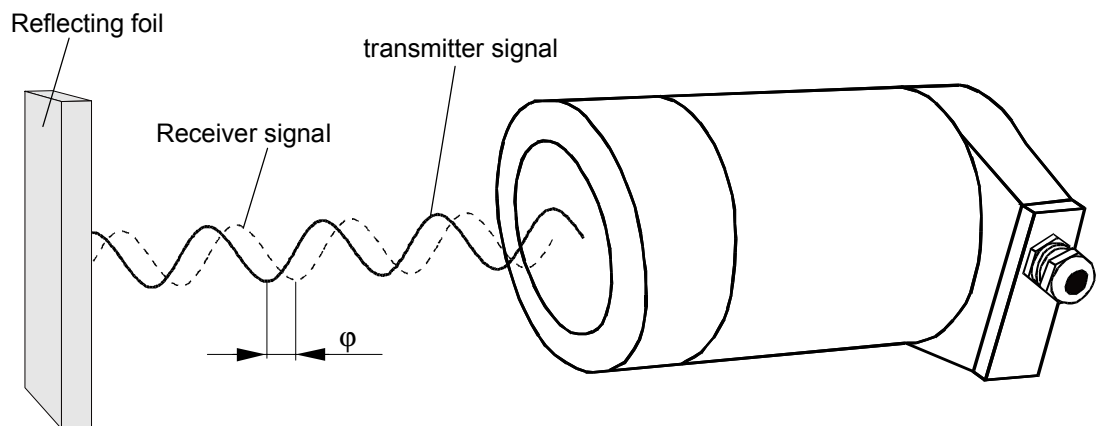
The OMS1 series Laser Measuring Devices are optical sensors for contactless measurement of the distance between the sensor and a reflector.

For this purpose, the measuring device or reflector attached to the moving object and the reflector/sensor to the fixed remote station in such a way that the reflector always remains within the visual field of the sensor.

The laser diode inside the device emits a beam which bounces back off the reflector and is re-received by a detector also housed inside the measuring device. The phase angle of the received signal in relation to the transmitted signal is the measure of distance. The absolute distance value thus obtained is then transferred to the control system via the interface.

The Laser Measuring Devices are configured by a automation device (PLC, process control computer) directly via the Interbus-S.

Principle:



φ = Phase displacement

d = Distance

$$d = f(\varphi)$$

2.3.2 Wiring

1. Configuration of the OMS1 via the Interbus-S

The OMS1 with Interbus-S interface offers the possibility to configure the most important device parameter via the Interbus-S.

2. Configuration of the OMS1 via the PC adapter

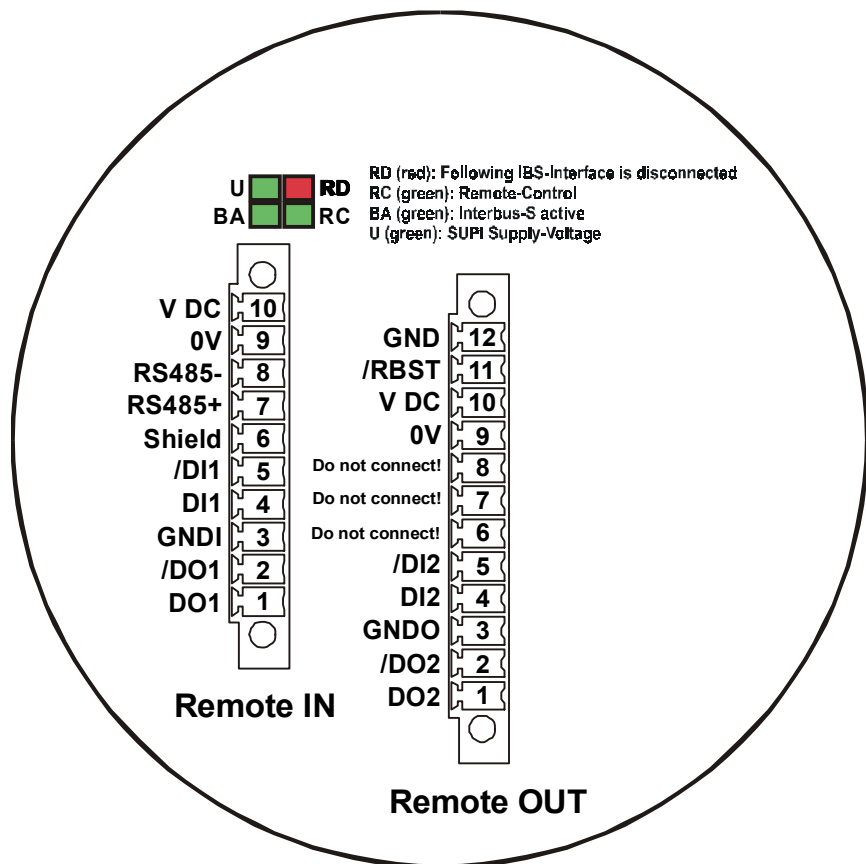
In addition, via an optional available PC adapter (MA OMS1 PCA), the OMS1 can be programmed with additional functions.

To this, the 15 pole connector of the PC adapter must be connected with the switch cabinet module (MA OMS1 PCAS).

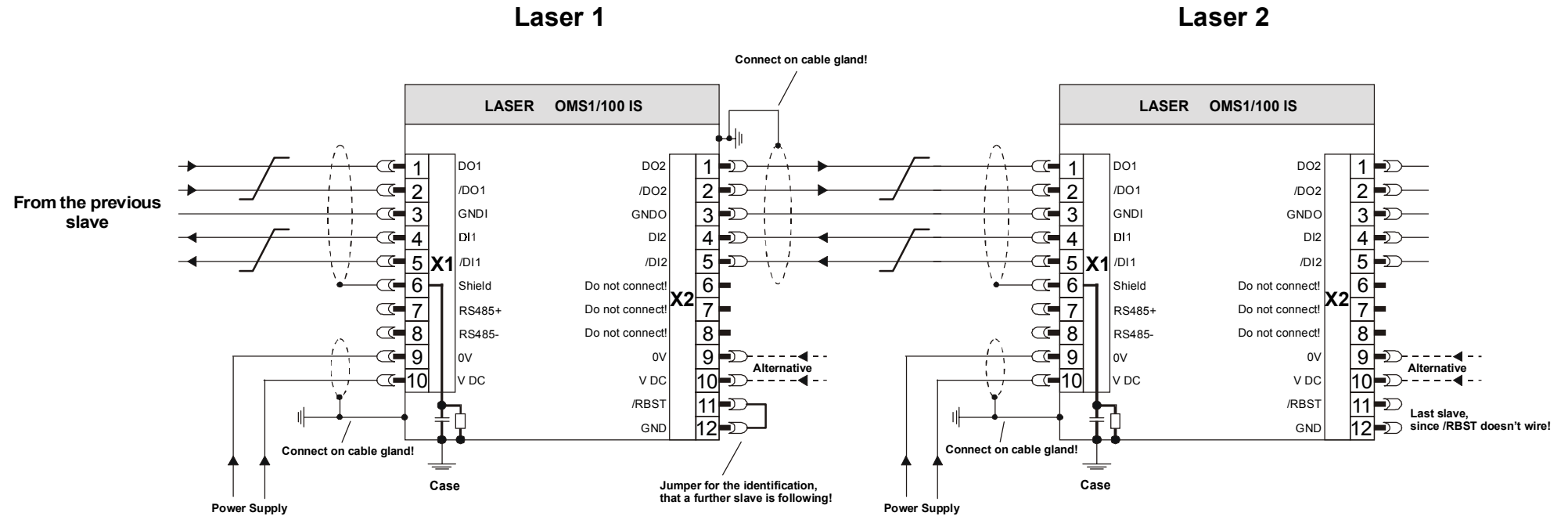
Pin 1 (RS 485-) and pin 2 (RS 485+) of the switch cabinet module must be connected with the OMS1/100 IS pin 8 (RS 485-) and pin 7 (RS 485+) (see wiring on the following page).

Via the PC adapter all device parameters are programmable, the main parameters of the device also can be configured via the Interbus-S. The parameters which are configured via the Interbus-S always have priority. If the control executes a "Download" of the slave parameters, these always have priority. Parameters, which possibly have been configured double via the PC adapter, will be retyped with the download of the control parameters.

Connection panel



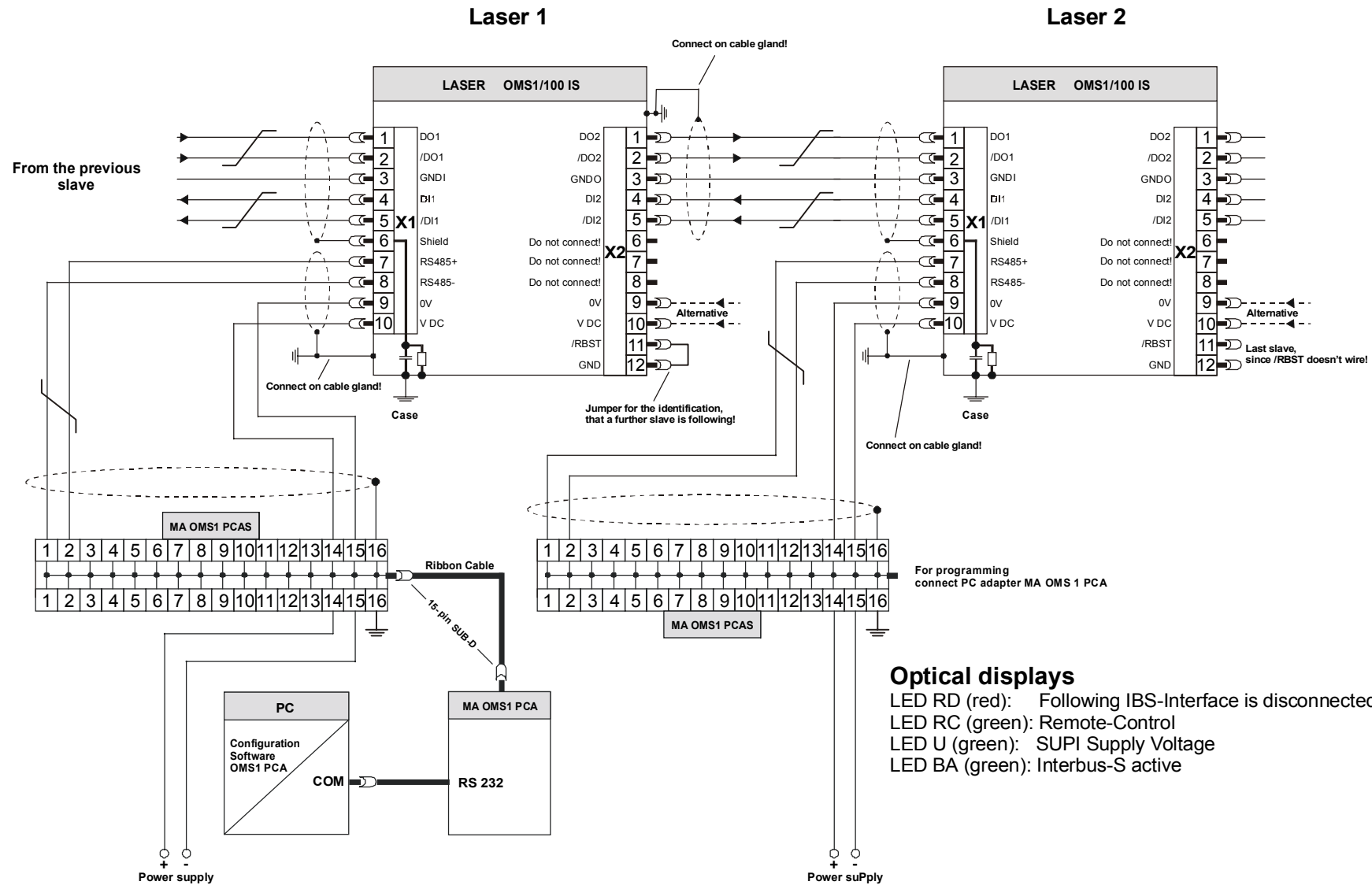
Connection diagram for Interbus-S connection



Optical displays

- LED RD (red): Following IBS-Interface is disconnected
- LED RC (green): Remote-Control
- LED U (green): SUP1 Supply Voltage
- LED BA (green): Interbus-S active

Connection diagram for Interbus-S connection with parametrizing possibility via MA OMS1 PCA / MA OMS1 PCAS



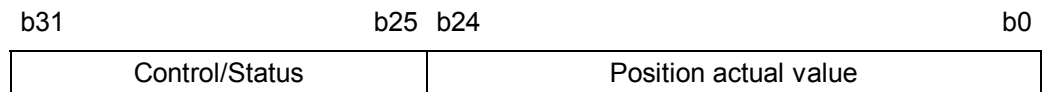
2.3.3 Device interface (INTERBUS-S)

The Laser Measuring Device OMS1/100 IS with INTERBUS-S interface is designed as a remote bus module with 32 I/O data. This makes it easy to integrate in the bus ring in the same way as a PHOENIX-CONTACT bus terminal. To ensure that the protocol meets INTERBUS-S requirements, an SUPI (serial microprocessor interface) is integrated between the OMS1/100 IS and the INTERBUS-S. The SUPI is an INTERBUS-S protocol chip developed by PHOENIX-CONTACT which carries out the following functions:

- BUS interfacing: Directions of reception and transmission
- CRC check
- Preset
- Transfer protocol
etc.

The classification of the Laser Measuring Device is defined after the profile K3 and has the Ident-No. 55 dec.

According to this profile the Laser Measuring Device delivers 32 bits of process data. These 32 bits contain a 25-bit position actual value and a 7 bit status bit and control bits. The position actual value of the laser is coded binary and right aligned in the bits 0 - 24 of the process data word. Bits 25 – 31 contain the status bit and control bits. They are fixed in this profile class. When all control bits are set to 0 and the OPERATION condition is displayed on the status bits, the laser outputs a valid value for bits 0 to 24.



i **Note**

At programming, data is exchanged between the laser and the master in binary form.

2.3.3.1 Mapping of Laser Data in the Master (Controller)

In the master, the laser data occupies two-word addresses for IN-data and two-word addresses for OUT-data. The position of the data in the controller depends on the physical or logical position of the encoder within the ring. For detailed information, refer to the manual of the master (controller) used. The laser should be considered to be a PHOENIX I/O bus terminal and the system processes it as such.

Position of the Laser Data Within the Two-Word Addresses

OUT-data relative to the master:

Relative word address "1"

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

MSB LSB

OUT-data relative to the master:

Relative word address "2"

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

MSB LSB

IN-data relative to the master:

Relative word address "1"

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

MSB LSB

IN-data relative to the master:

Relative word address "2"

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

MSB LSB

2.3.3.2 Control Word (OUT-data relative to the master)

Via the control word functions activated and the operational states of the laser are defined.

Control Word, relative word address "1"

Bit	Name	Mandatory	Bit No. in PD Channel
0	Reserved		16
1	Reserved		17
2	Reserved		18
3	Reserved		19
4	Reserved		20
5	Reserved		21
6	Reserved		22
7	Reserved		23
8	Reserved		24
9	Parameter no.	X	25
10	Parameter no.	X	26
11	Parameter no.	X	27
12	Parameter no.	X	28
13	Manufacturer-specific		29
14	* Set zero shift	X	30
15	Enable operation	X	31

* see page 20, "Set zero shift"

Device Control Commands

The device control commands are triggered by the following bit combinations in the control word:

DEVICE CONTROL COMMAND	Control Word (Bit)						
	Enable operation	Set zero shift	Manufacturer-specific	Parameter-No.			
	15	14	13	12	11	10	9
ENABLE OPERATION	0>1	0	X	0			
PARAMETERIZATION	0	0	X	1 . . . 15			

Parameter-No.

The bits 9 to 12 (D25 - D28) indicate the number of the parameter at the laser. The parameter data will transfer via the bits 0 to 24 of the process out data channel. The activation of parameter transfer is receipted within a second in the status word. (see also "Parameter programming", page 23).

Set zero shift

If in parameter-no. 1100 is programmed the value "1 = free", an edge change of "0" to "1" of the bit-no. 30 in the process out data channel is setting the laser to the preselected value in parameter-no. 0100 (see also "**Parameter Overview**", page 23).

Manufacturer-Specific

Bits 0 - 8 are reserved. Bit 13 is manufacturer-specific.

2.3.3.3 Status Word (IN-data relative to the master)

Information concerning the state of the laser and messages are shown in the status word.

Status Word, relative word address "1"

Bit	Name	mandatory	Bit No. in PD Channel
0	Reserved		16
1	Reserved		17
2	Reserved		18
3	Reserved		19
4	Reserved		20
5	Reserved		21
6	Reserved		22
7	Reserved		23
8	Reserved		24
9	Parameter no. or malfunction code	X	25
10	Parameter no. or malfunction code	X	26
11	Parameter no. or malfunction code	X	27
12	Parameter no. or malfunction code	X	28
13	Manufacturer-specific		29
14	Parameterization	X	30
15	Invalid position actual value	X	31

Device States

The device states are shown in the status word by the following bit combinations:

STATE	Status Word (bit)						
	Invalid position actual value	Parameterization	Manufacturer specific	Parameter-No.			
	15	14	13	12	11	10	9
OPERATION	0	0	X	0			
PARAMETERIZATION	1	1	X	1 ... 15			
MALFUNCTION	1	0	X	1 ... 15			

Parameter No. or Malfunction Code

The number of the parameter that was transmitted to the laser is acknowledged via bits 9 to 12, or a malfunction code is transmitted (in "malfunction" state). (see page 24)

Manufacturer-Specific

Bits 0 - 8 are reserved. Bit 13 is manufacturer-specific.

3 Parameter programming

The parameter data can be transferred via the bits 0 to 24 of the process out data channel of the master to the laser. To this the laser must be set to the parameterization state. This is achieved by outputting a parameter number unequal to zero on bits 9 to 12 of the control word (bits 25 to 28 of the process out data channel).

Parameter Overview

Parameter No. B12 B9	Function
0 0 0 0	Output in "operation" state
0 0 0 1	Resolution: 0 = 0,1 mm 1 = 1 mm 2 = 1 cm 3 = 0,01 mm 4 = free [1/1000 mm]
0 0 1 0	Not defined !
0 0 1 1	Not defined !
0 1 0 0	Preselection preset value 1
0 1 0 1	Not defined !
0 1 1 0	Measuring initial value
0 1 1 1	Not defined !
1 0 0 0	Counting direction: 0 = From the laser away, values increasing 1 = To the Laser, values increasing
1 0 0 1	Input of the resolution [1/1000 mm] (is active, if parameter number 0001 is programmed to "4")
1 0 1 0	Error value at beam interruption: 0 = Input 1 = Last valid position value 3 = "0" 4 = 0xFF
1 0 1 1	Input of the error value, 4 byte (is active, if parameter number 1010 is programmed to "0")
1 1 0 0	Preset: 0 = not active 1 = active
1 1 0 1	Clear preset (Zero mark is deleted)
1 1 1 0	Not defined !
1 1 1 1	Save parameters, D0 – D24 = "0"

The laser switches over to the "parameterization" state and indicates the successful transmission of the parameter with the return of the corresponding parameter number. The new parameter takes effect after the user has set the laser to the 'operation' state with the 'enable operation' device control command. If it was not possible for the parameter to take effect, the laser switches over to the 'malfunction' state –after the user has sent the 'enable operation' device control command - and outputs a malfunction number on bits 9 to 12 of the status word (bit 25 to 28 of the process data channel).

Malfunction code

Malfunction-No. b12 b9	Meaning
0 0 0 0	No malfunction
0 0 0 1	Invalid parameters from the host
0 0 1 0	Not active
0 0 1 1	Memory error
1 1 0 0	Intensity error (e.g. beam interruption)
1 1 0 1	Warm start
1 1 1 0	Device temperature (outside the area of 0-50 °C)
1 1 1 1	Manufacturer-specific malfunction code

EXAMPLE 1: Example of a Parameter Transmission

	Host to Laser			Laser to Host			Comment
	Control Word D31	D25-D28	D0-D24	Status Word D30-D31	D25-D28	D0-D24	
1	0	0	X	0 0	0	Actual value	Normal operation
2	0	P.No.	Parameter	0 0	0	Actual value	Host transmits parameter to laser, laser does not yet react
3	0	P.No.	Parameter	0 0	0	Actual value	Host continues to wait for acknowledgement from laser
4	0	P.No.	Parameter	1 1	1)	X	Laser has accepted the parameter and begins processing
5	0	P.No.	Parameter	1 1	1)	X	Parameter processing still running in laser
6	0	P.No.	Parameter	1 1	P.No.	Parameter	Processing of parameter is completed. Laser remains in "parameterization" state
7	1	0	0	1 1	P.No.	Parameter	Device control command "enable operation" from host to the laser. Laser does not yet react
8	1	0	0	0 0	0	Actual value	Laser once more in "operation" state
9	0	0	0	0 0	0	Actual value	Normal operating mode once more reached by both devices

1): You must make sure that when a parameter is transmitted, the same parameter number as that which has already been acknowledged by the laser is not sent. The repeated transmission of the same parameter is not valid without first leaving the "parameterization" state.

The parameter number must be consistent.

To transmit several parameters, repeat steps 4 to 6.

When transmitting a parameter, make sure that the parameter number is not output before the parameter.

When invalid or inconsistent parameters are sent, the laser goes into the "malfunction" state when trying to enable operation.

EXAMPLE 2: Sequence when Transmitting Inconsistent Parameters

	Host to Laser			Laser to Host			Comment
	Control Word		D0-D24	Status Word		D0-D24	
	D31	D25-D28		D30-D31	D25-D28		
1	0	0	X	0 0	1)	Actual value	Normal operation
2	0	1	5	0 0	1)	Actual value	Host sends the first value for programming of the resolution
3	0	1	5	0 0	1)	Actual value	Host continues to wait for acknowledgement from Laser
4	0	1	5	1 1	1)	X	Laser has accepted the parameter and begins processing
5	0	1	5	1 1	1)	X	Parameter processing still running in Laser
6	0	1	5	1 1	1	5	Processing of parameter is completed. Laser remains in "parameterization" state
7	0	8	1	1 1	1	5	Host sends the second value for programming of the counting direction (increasing to the Laser)
8	0	8	1	1 1	1	5	Host continues to wait for acknowledgement from laser
9	0	8	1	1 1	8	1	Processing of parameter is completed. Laser remains in "parameterization" state
10	1	0	0	1 1	8	1	Device control command "enable operation" from host to the laser. Laser does not yet react
11	1	0	0	0 1	1	Actual value	Laser switches to "malfunction" state, the malfunction code is "1". The position actual value is output on the process data channel.

An illegal parameter value (5) was programmed into line 2 for the parameter "resolution" which at first is accepted by the laser device and remains in the operational state "parameterization" furthermore.

In line 7, the counting direction of the laser was then programmed (increasing to the Laser).

In line 10, after finished programming the device control command "enable operation" was sent to the laser device.

The programmed values are checked only now (line 11) for their validity and the laser passes into the state "malfunction". The position value is output on the process data channel. This value is possibly faulty depending on which programmed parameter was illegal.

3.1 Parameter description

The range of values of parameter data in D0 - D24 is to be entered in two's complement. In the case of a value limit error, after the device control command "enable operation" the encoder is switching over to the "malfunction" state, no programming occurs.

(e.g. +1 dec.: Parameter data = 1 HEX

-1 dec.: Parameter data = 1 FF FF FF HEX)

3.1.1 Resolution

Determination of the measuring system resolution

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
0 0 0 1	0 = 0,1 mm 1 = 1 mm 2 = 1 cm 3 = 0,01 mm 4 = free [1/1000 mm]	0 - 4	1

3.1.2 Preset preselection

Determination of the position value on which the laser is adjusted when the preset function is activated (see " **Control Word, relative word address "1"** ", page 19 / "**Set zero shift**", page 20).

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
0 1 0 0	Freely selectable	Programmed measuring initial value to measuring length in steps	0

3.1.3 Measuring initial value

Determination of the measuring system initial value

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
0 1 1 0	Freely selectable	-16 777 216 to +16 777 215 (-1000000 HEX to +FF FF FF HEX)	0

3.1.4 Counting direction

Determination of the measuring system counting direction

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 0 0 0	0 = movement away from the laser, values increasing 1 = movement to the laser, values increasing	0 to 1	0

3.1.5 Input of the resolution

This parameter is active, if under the parameter "Resolution, 0001" the parameter value 4 = free [1/1000 mm] is programmed.

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 0 0 1	Freely selectable	16777216 (1 00 00 00 HEX)	0

3.1.6 Error value

Determination of the error value which is output instead of the actual value at a beam interruption.

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 0 1 0	0 = Input 1 = Last valid position value 3 = "0" 4 = 0xFF	0 to 4	1

3.1.7 Input of the error value

Input of the error value which is output instead of the actual value at a beam interruption, if under the parameter "Error value, 1010" the parameter value 0 is preselected. Programmed parameter values >0 are stored, but the parameters are inactive.

Value range inputs more than 25 bits are limited to 25 bits in the status register!

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 0 1 1	Freely selectable	-2 147 483 648 to +2 147 483 647 (-80 00 00 00 HEX) to +7F FF FF FF HEX)	0

3.1.8 Preset

Define whether the laser is adjusted to the predefined position value when the preset function (Device control command "**Set zero shift**", page 19 and 20) is activated.

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 1 0 0	0 = not active 1 = active	0 to 1	0

3.1.9 Clear Preset

Via this parameter, the zero-point correction calculated under the parameter "Preset preselection, 0100" is deleted. The correction arises from the difference of the desired preset value to the physical laser position. That means, after deletion of the zero-point correction the laser outputs his "real" physical position.

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 1 0 1	0	0	-

3.1.10 Save parameters

Via this parameter all programmed parameters are saved permanently. The parameters are also available after switch on the laser again.

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 1 1 1	0	0	-

4 Disturbances

4.1 Causes of Faults and Remedies

The fault causes are defined after the malfunction code (see page 24). For the resetting of the malfunction code, at first the error must be eliminated. After this the device control command "Enable Operation" must be sent to the laser.

Malfunction Code	Cause	Remedy
0001 Invalid parameters from the host	Invalid parameter data, a parameter range error is available.	Check all programmed parameters after valid ranges of values (see "Parameter Overview", page 23 and "Parameter description", page 26).
0011 Memory error	Memory area in the EEPROM is defect	If the error occurs at repeated service type, the device must be replaced.
1100 Intensity error	The device checks the intensity of the received laser signal continuously, it was detected a below-minimum intensity.	<ol style="list-style-type: none"> 1. Clean measuring system optics 2. Clean reflecting foil 3. Rule out an interruption of the laser beam <p>If the possibility of soiling or interruption of the laser signal can be ruled out, the device must be replaced.</p>
1101 Warm start	The device checks the settings of its ports and the contents of its main memory continuously. If it detects illogical or illegal states, it assumes an electrical fault and performs a warm restart in order to reset the device	If this happens frequently, the device must undergo electrical interference suppression. Electrical interference can be avoided by means of cables with twisted-pair wires for the clock-pulse, data and supply lines. The cable shields should be earthed at both ends (see also chapter "Wiring", page 14). The only case where the shield should be earthed at one end only in the switch cabinet is if the machine earth is subject to strong interference in comparison with the switch cabinet earth. If the error persists in spite of these measures, the device must be replaced.
1110 Device temperature	The temperature has exceeded or fallen short of the range of 0 - 50°C in the housing of the device	Appropriate measures must be taken to prevent the device from overheating or undercooling.

5 Appendix

5.1 Specifications

5.1.1 Electrical ratings

Measuring principle:	Phase delay time measurement
Range (measurement on reflecting foil):	0,2 – 100 m
Range > 100m	upon request
Operating voltage	
Standard device:.....	18-27 V DC (+/- 5%)
Device with heating:.....	24 V DC
Power consumption (no-load):	< 6 watts
Power consumption with heating:	< 60 watts
Opto-transmitter:	Laser diode (red light)
Wavelength λ :	670 nm
Max. laser power:	$P \leq 1$ mW
Laser protection class:	2 (IEC 825)
Lifetime:	50 000 h
Opto-receiver:	Photodiode
Resolution:	$\geq 0,001$ mm
Updating / refresh cycle:	1000 values / s
Reproduction:	± 2 mm (at 5 sigma for sigma = 0,4 mm)
Integration time:	< 2 ms
Programming via RS485:	PC IBM compatible (OMS1 PCA) / Interbus-S
Interbus-S interface:	Interbus-S according to DIN 19258 Two-wire remote bus for transmission and receive direction, RS422 with galvanic isolation
Profile:	K3
Ident-No.:.....	55 dec.
Number of words:	2 IN / 2 OUT
Baud rate:.....	300 kbps net, 500 kbps gross (including control and status bytes)
Data refresh:.....	0,5 ms
Output code:.....	Binary
Special features:.....	Programming the following parameters via the INTERBUS-S:
	- Resolution
	- Preset preselection
	- Measuring initial value
	- Counting direction
	- Error value
	- Preset releasing

5.1.2 Environmental conditions

EMC:	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating temperature range	0-50°C
Device with heating:.....	-30 to +50°C
Thermal drift	1 ppm / °C
Storage temperature range:	-20 to +75°C
Relative air humidity:	98 % (no moisture condensation)
* Degree of protection	IP 65 (DIN 40 050)

* The degree of protection is based on the assumption that the Laser Measuring Device cables are correctly screwed in and connected.

5.2 Ordering information

5.2.1 Laser devices

Art-No.:	Type	Description
500 32738	OMS1 / 100 IS	Laser device IS-Interface 100 m
500 35284	OMS1 / 100 IS-H	Laser device IS-Interface 100 m with heating
500 35288	OMS1 / 100 IS-L	Laser device IS-Interface 100 m with linearization

5.2.2 Accessories

Art-No.:	Type	Description
500 32816	RF1 200x200	Reflector 200 x 200 mm

Connector pin assignment

Laser Measuring Devices OMS1/100 IS INTERBUS-S, Encom-K3-Profile

General note:

If the encoder is the last node in the ring, it must only be wired the connector X1 for the incoming remote bus interface. The encoder supply voltage can be connected either onto the connector X1 or onto the connector X2 since the power supply is connected internally with each other. If there are additional nodes in the ring after the encoder, it must be wired additionally the connector X2 for the remote out interface to the subsequent node. For the subsequent node to be detected, you must insert a jumper between PIN 11 "/RBST" and PIN 12 "GND" on connector X2. Encoder Identno. = 55 decimal (37 HEX). In the master, the encoder data occupies two-word addresses for IN-data and two-word addresses for OUT-data.

Phoenix- Terminals:

10 / 12-pole:	Connector Phoenix 8A/160V, grid spacing 3.81 mm		
Connection:	fixed 0,14 - 1,5 mm ²	flexible 0,14 - 1,5 mm ²	Conductor sizes (AWG) 28 - 16

REMOTE IN

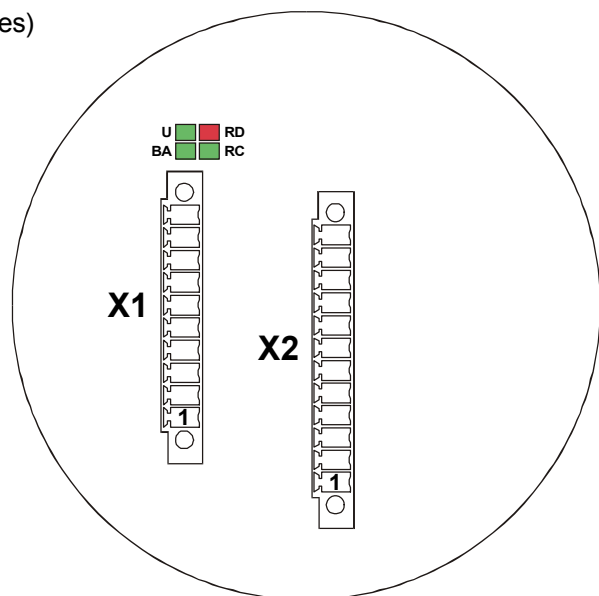
X1 – screw clamp, 10-pole

- Pin 10 * US - supply voltage
- Pin 9 0V-supply voltage
- Pin 8 Programming interface RS485 –
- Pin 7 Programming interface RS485 +
- Pin 6 Shield (intern via RC-element onto cases)
- Pin 5 DI1 inverted
- Pin 4 DI1
- Pin 3 GNDI (data reference potential)
- Pin 2 DO1 inverted
- Pin 1 DO1

REMOTE OUT

X2 – screw clamp, 12-pole

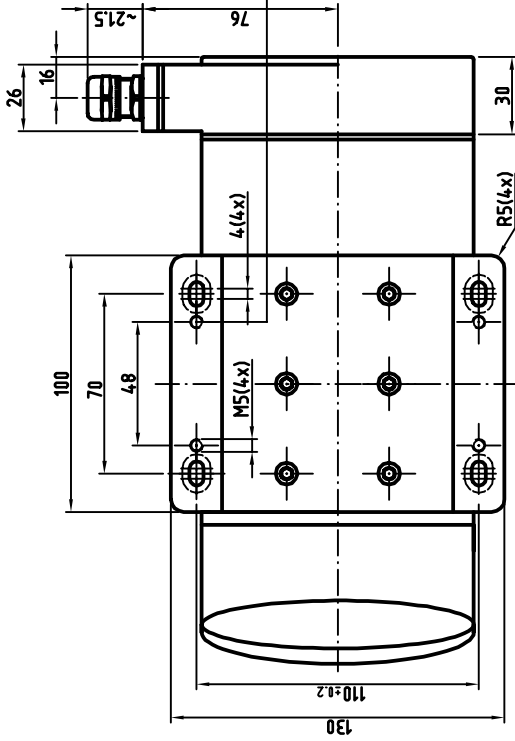
- Pin 12 GND
- Pin 11 RBST inverted
- Pin 10 * US - supply voltage
- Pin 9 0V-supply voltage
- Pin 8 Do not connect !
- Pin 7 Do not connect !
- Pin 6 Do not connect !
- Pin 5 DI2 inverted
- Pin 4 DI2
- Pin 3 GNDO (data reference potential)
- Pin 2 DO2 inverted
- Pin 1 DO2



LED's

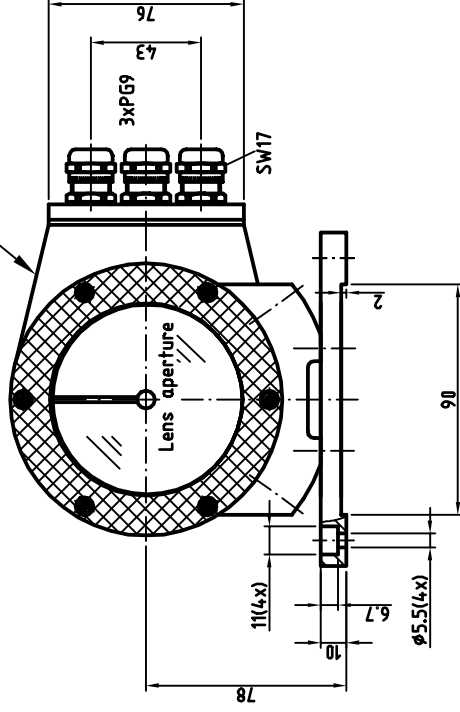
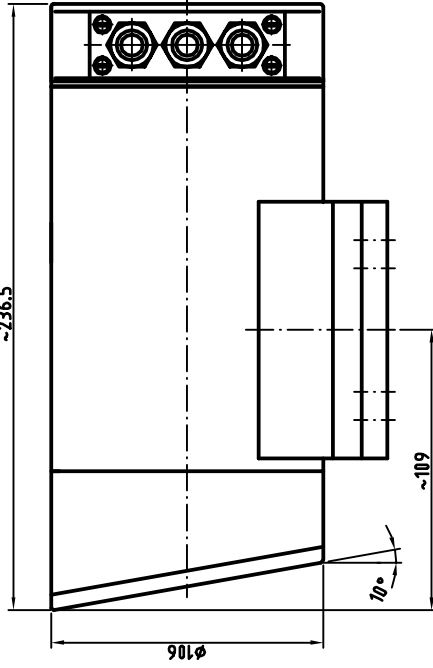
- RD (red): Following IBS-Interface is disconnected
- RC (green): Remote-Control
- BA (green): Interbus-S active
- U (green): SUPI Supply-Voltage

- * Standard device: 18 - 27 V DC (+/- 5 %)
- Device with heating: 24 V DC



Screws to the adjustment of the distance measurement (hexagon socket, 3mm)

Cable inlet rotatable (90° steps)



TYPE NAME: OMS1/100 IS

MEASURING RANGE 100m

INTERFACE INTERBUS-S

OUTPUT CONFIGURATION RS422

CODE PROGRAMMABLE

RESOLUTION 0.5mm

INPUT POWER SUPPLY VOLTAGE 18-27V

TEMPERATURE RATINGS 0-50°C

PROTECTION RATINGS IP65

LASER CLASS 2

CONNECTOR TYPE 3xPG9 radial

REFLECTOR yes

OPTION ENC PROGRAMMABLE, 500KBAUD

OPTIONS

Range 0.2-100m
 Power consumption 0.5A at 18V
 Power consumption 0.35A at 27V
 Max. Laser power P=<1mW



Leuze electronic GmbH + Co.
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 Telefon 07021/573-0

Datum		Name	
Erstellt	15.05.00	Habelier	
Bearb.			
Gepr.			
Norm			
Pin connections: LZ-ELE-TI-GB-0003			
Zust.	Anderung	Datum	Name

Maßstab 1:2 DIN A3 Projekt-Nr.:

Article-No.: 500 32738

Order-No.:

OMS1/100 IS

Drawing-No.:

E4-885-003

Blatt

1

B1

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