

OMS2/xxx IS Interbus-S

Operating Manual Laser Measuring Device

Please keep for future use !

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Notation

Italics or **bold** print is used for titles of documents or for emphasis.

`Courier` type is used for text which is visible on the screen/display and for software menu selections.

" < > " is used to refer to the keys of your computer keyboard (e.g. <RETURN>).

Revision index

i

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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25.10.2002

Revision	Date
Correction of the wiring diagram and pin assignment concerning the bus reference potentials	06.12.2002
Completion of the malfunction code: <ul style="list-style-type: none">• 1001 = Intensity warning	13.12.2002

Table of Contents

1 Safety	6
1.1 General risk potential.....	6
1.2 Safety information.....	6
1.2.1 Hints on installation.....	7
1.2.1.1 General interference suppression measures	8
1.3 Intended purpose.....	9
1.4 Authorised operators	11
1.5 Safety measures at the installation site.....	11
2 Transportation / Start-up	12
2.1 Transportation / storage	12
2.2 Assembly instructions.....	13
2.2.1 Aligning of the reflector to the laser measuring device.....	13
2.2.2 Aligning of the laser light spot to the reflector	13
2.2.3 Parallel operation of laser linear paths	14
2.3 Start-up.....	15
2.3.1 General	15
2.3.2 Connecting the Cable Screening to the Bus-Cap.....	16
2.3.3 Wiring.....	17
2.3.4 Device interface (INTERBUS-S).....	20
2.3.4.1 Mapping of Laser Data in the Master (Controller)	21
2.3.4.2 Control Word (OUT-data relative to the master).....	22
2.3.4.3 Status Word (IN-data relative to the master)	24
3 Parameter programming	26
3.1 Parameter description	29
3.1.1 Resolution.....	29
3.1.2 Switching-off laser diode.....	29
3.1.3 Switching-on laser diode	29
3.1.4 Preset preselection.....	30
3.1.5 Switch off laser diode automatic if Interbus-S is inactive	30
3.1.6 Counting direction.....	30
3.1.7 Error value	30
3.1.8 Function external input	31
3.1.9 Clear Preset.....	31
3.1.10 Save parameters	31
4 Disturbances	32
4.1 Causes of Faults and Remedies	32
5 Maintenance	33
5.1 General Maintenance Information	33
5.2 Repair, Maintenance	33
6 Appendix	34
6.1 Specifications.....	34
6.1.1 Electrical ratings	34
6.1.2 Environmental conditions.....	35
6.2 Accessories	36

Pin assignment	LZ-ELE-TI-GB-0005
Drawings	
Dimensioned drawing	04-K2200-001

1 Safety

1.1 General risk potential

The Laser Measuring Device OMS2 Interbus-S 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 27). 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 mm^2 for data transfer purposes.
- Use a minimum earthing cable cross-section of 10 mm^2 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.

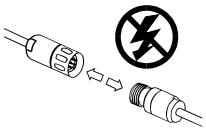
1.3 Intended purpose

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

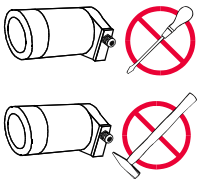


Switch off the voltage supply before carrying out wiring work or opening and closing electrical connections!

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!**

In particular the following uses are forbidden

- operation in areas where interruption of the laser beam, e.g. by covering the laser lens opening, can lead to equipment damage or injury to personnel
- in environments, in which strong rain, snow, fog, steams or direct insulations etc. can influence the laser beam intensity negatively
- operation in rooms with explosive atmospheres
- operation for medical purposes

With use-purposes over 115m measuring length, a special reflector must to be used! (see chapter "Accessories", page 36)

**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

Clean lens opening of the laser and the reflecting foil regularly!
(see chapter "Maintenance", page 33)



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

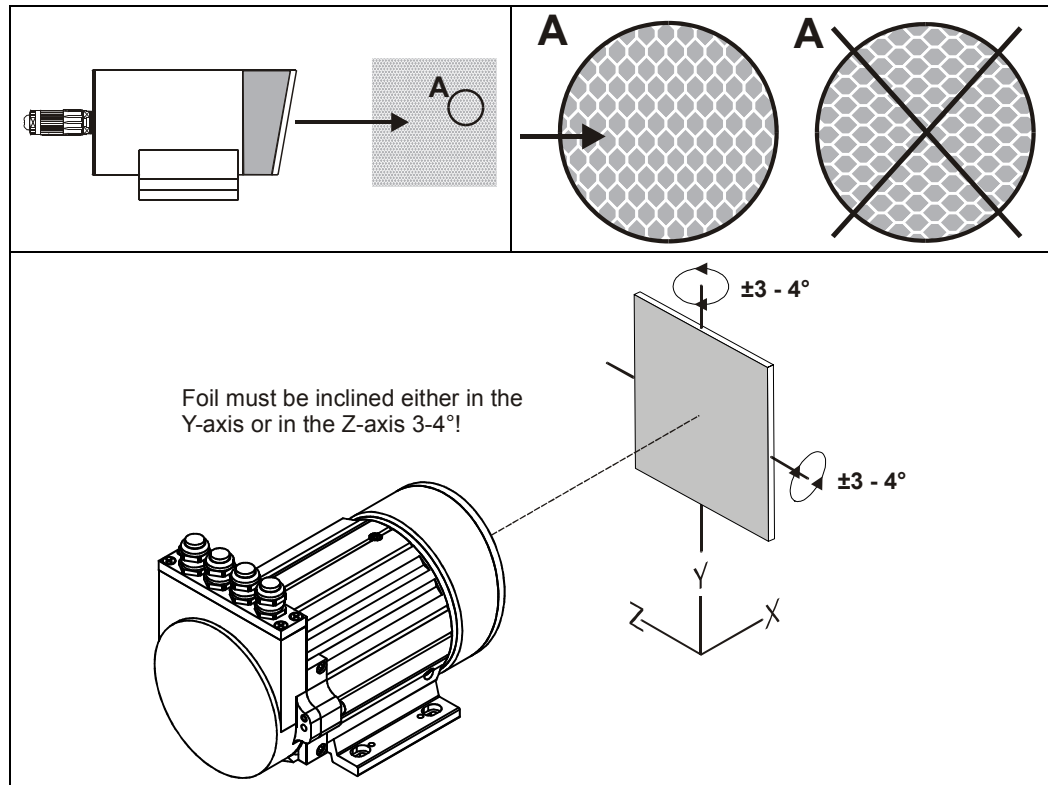
Storage temperature : -20 to +75°C

Store in dry conditions.

2.2 Assembly instructions

2.2.1 Aligning of the reflector to the laser measuring device

The coating of the reflector surface indicates a honeycombed structure. To guarantee an interference-free operation of the laser linear path, the alignment of the structure and the angle of inclination of the foil to the laser is from special importance:



2.2.2 Aligning of the laser light spot to the reflector

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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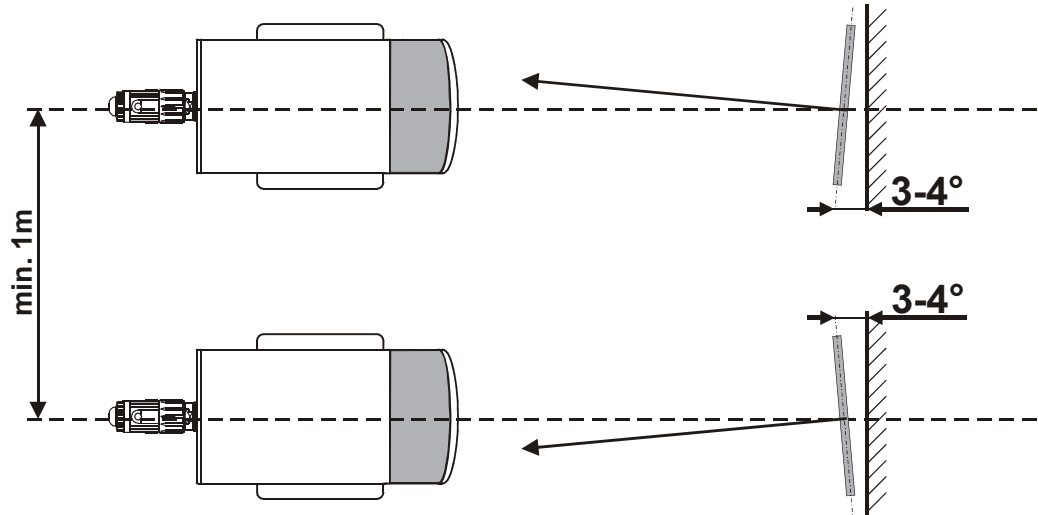
Note

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.

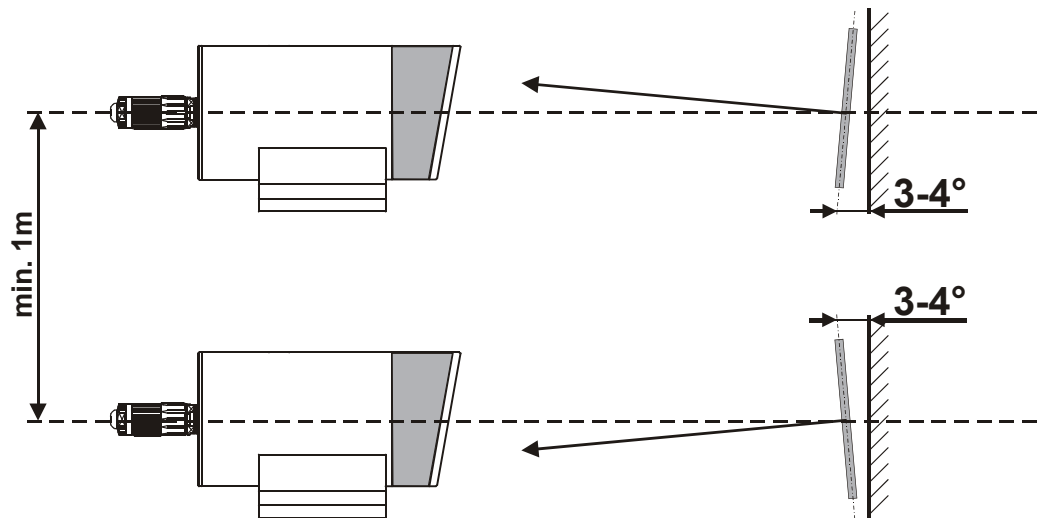
2.2.3 Parallel operation of laser linear paths

It has to be taken care in the parallel operation of laser linear paths that a minimum distance of 1 m is kept. The reflector foil inclination must be made in such a way that the foil surface points in each case to the other laser linear path away.

Horizontal arrangement



Vertical arrangement



2.3 Start-up

2.3.1 General

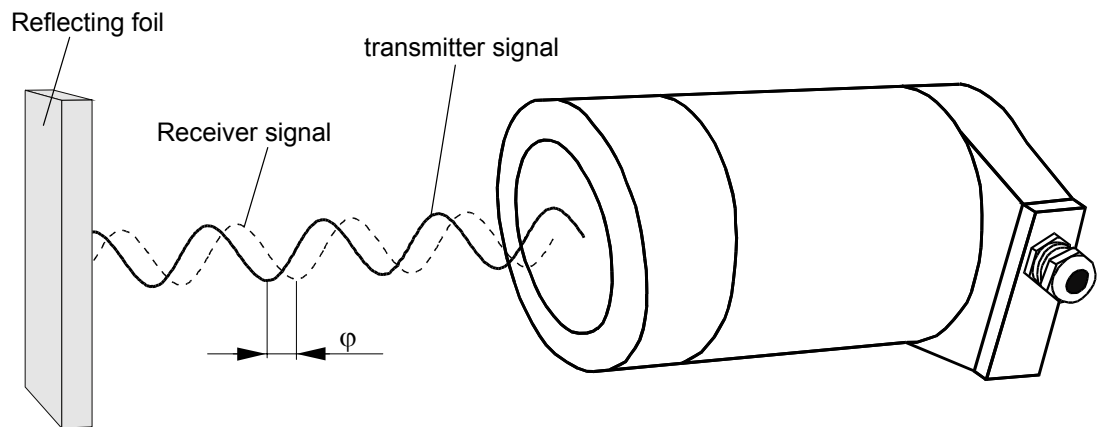
The OMS2 series Laser Measuring Devices are optical sensors for contactless measurement of the distance between the sensor and a reflector.

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.

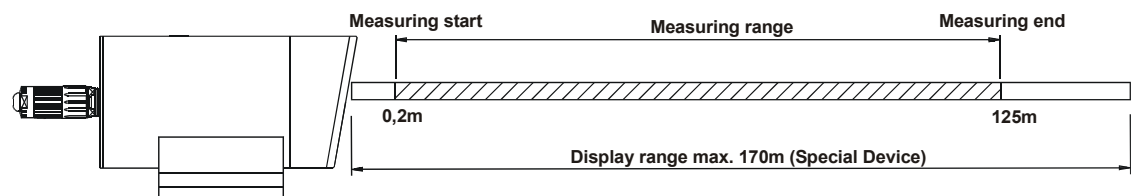
Principle:



φ = Phase displacement

d = Distance

$$d = f(\varphi)$$

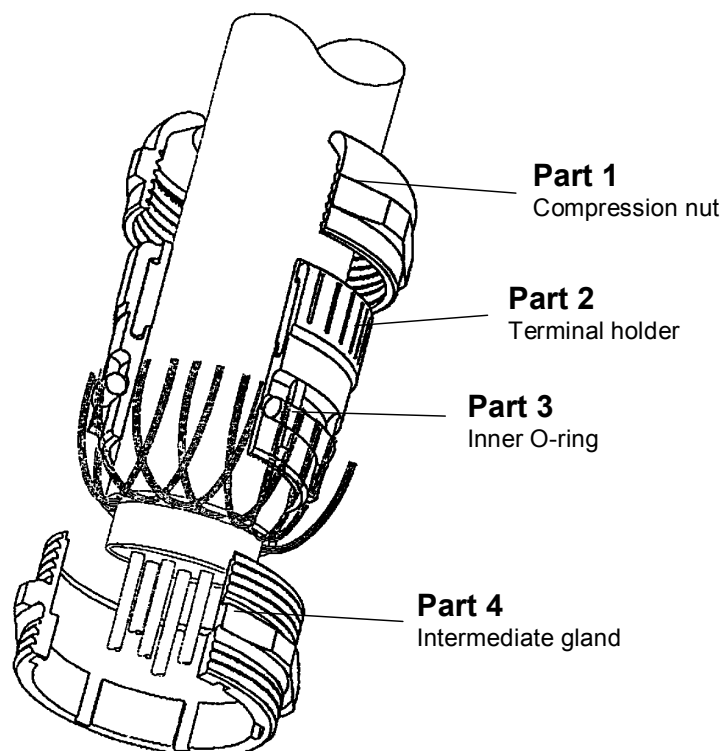


2.3.2 Connecting the Cable Screening to the Bus-Cap

To prevent disturbance signals entering the laser housing, we used cable screw glands with which it is possible to connect the screen on the inside. For this reason, **no** connection point for the screen is provided inside the cup-cap.

Procedure:

1. Screw the cable screw gland into the housing.
2. Dismount the compression nut (1) and the terminal holder (2).
3. Push the compression nut (1) and the terminal holder (2) over the cable.
4. Strip the cable; push back the braiding around the terminal holder (2) such that the braiding goes over the inner O-ring (3) and does not lie over the cylindrical section or the torsional bars.
5. Insert the terminal holder (2) into the intermediate gland (4) such that the torsional bars fit into the intended lengthwise grooves in the intermediate gland (4).
6. Screw the compression nut (1) to the intermediate gland (4).



2.3.3 Wiring

1. Configuration of the OMS2 via the Interbus-S

The OMS2 with Interbus-S interface offers the possibility to configure the most important device parameter via the Interbus-S.

2. Configuration of the OMS2 via the PC-adapter and PC-program "OMSConfiguration Tool"

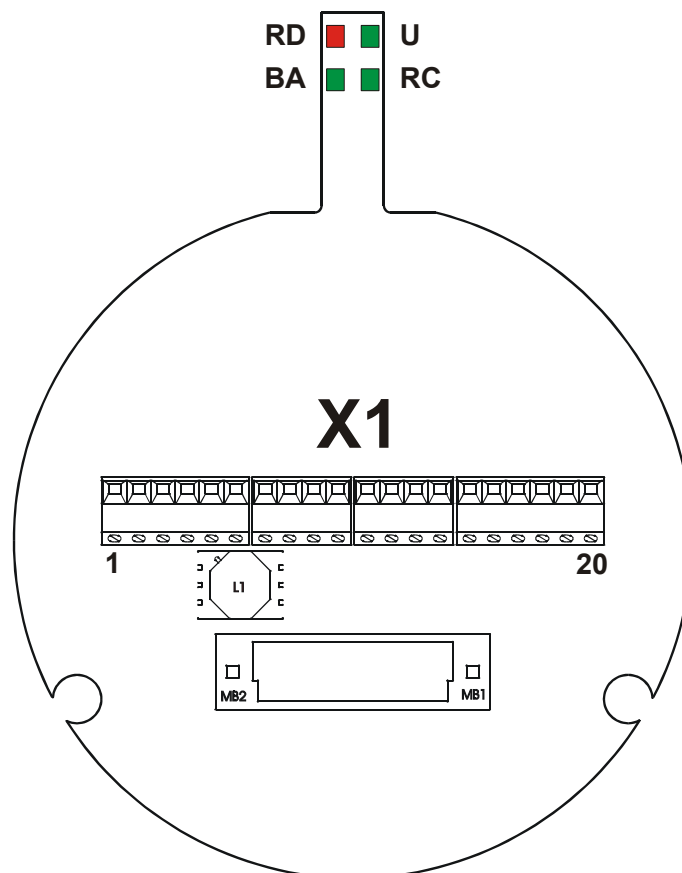
In addition, via an optional available PC adapter (MA OMS1 PCA), the OMS2 can be programmed with additional functions.

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

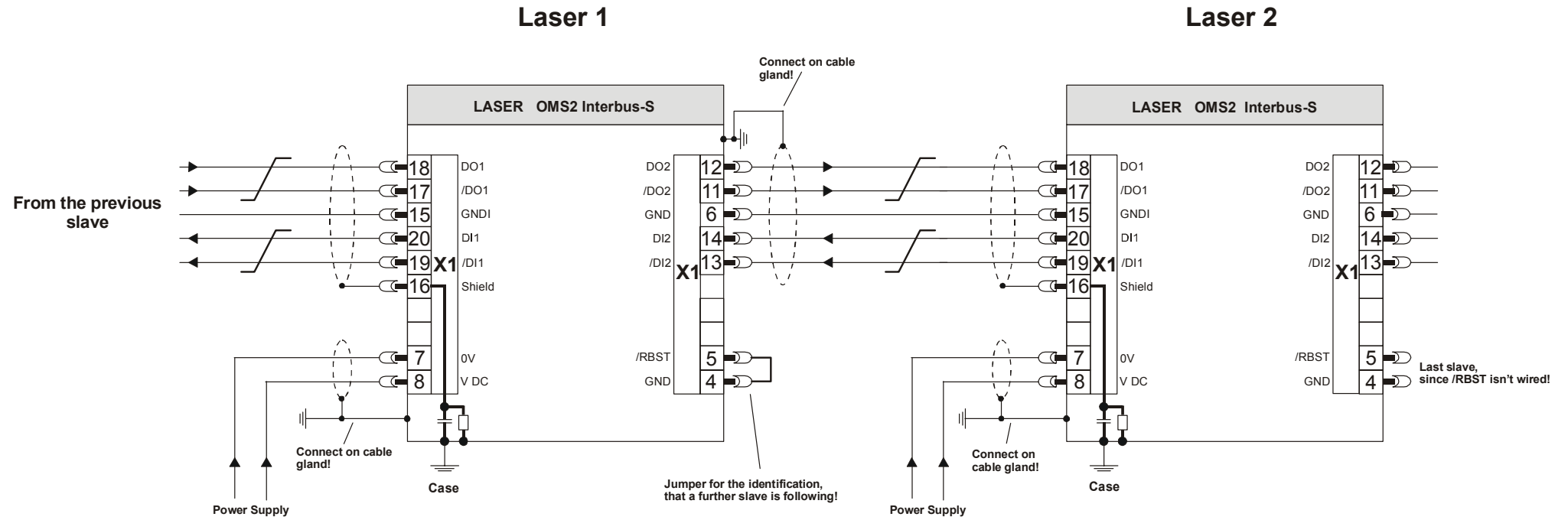
Pin 1 (RS 485-) and pin 2 (RS 485+) of the switch cabinet module must be connected with the OMS2 pin 9 (RS 485-) and pin 10 (RS 485+) (see wiring on the following pages).

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



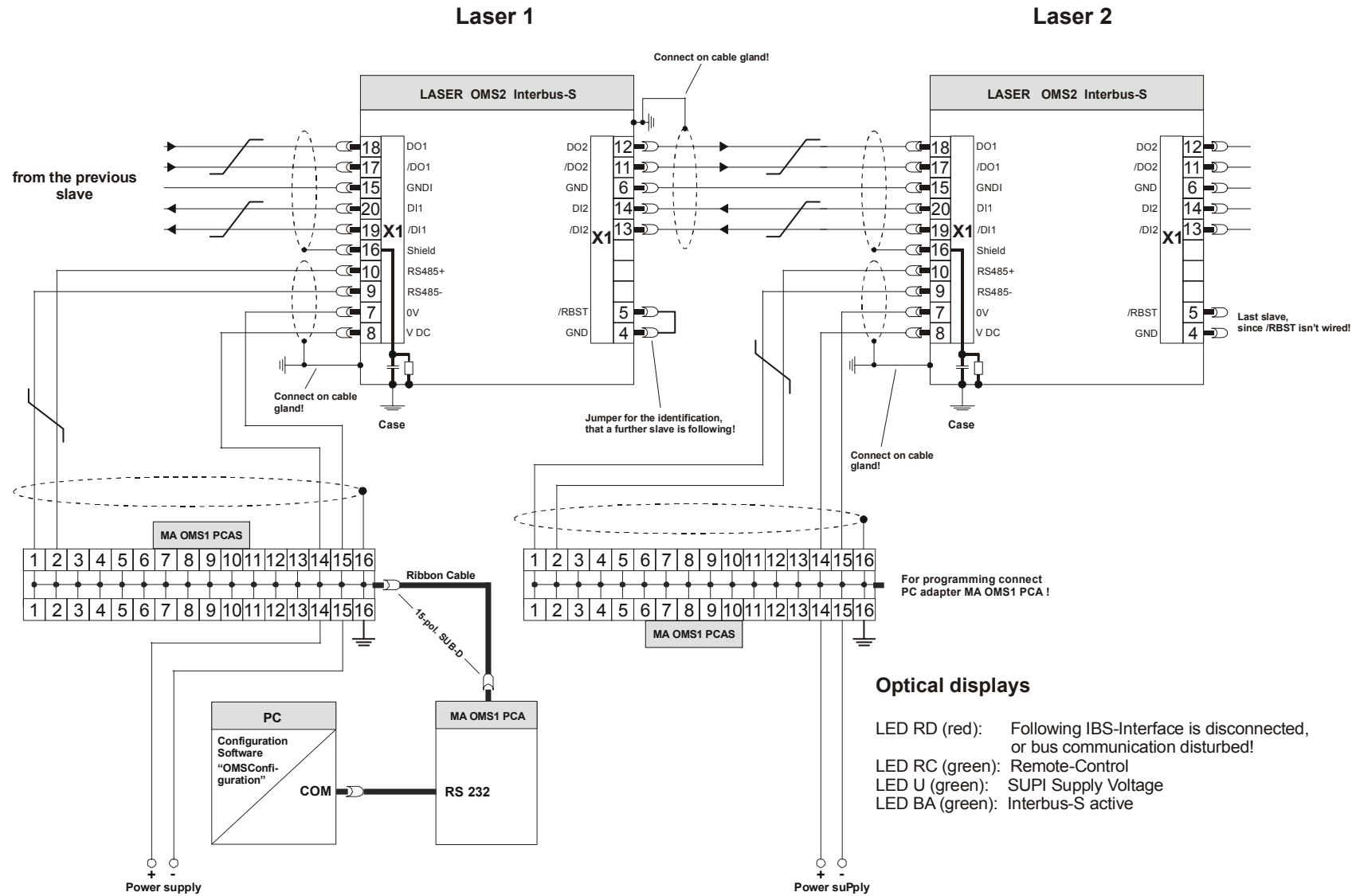
Connection diagram for Interbus-S connection



Optical displays

- LED RD (red): Following IBS-Interface is disconnected, or bus communication disturbed!
- 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 PC adapter MA OMS1 PCA / PC



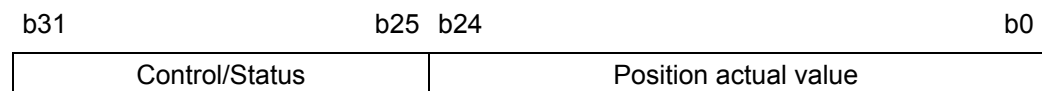
2.3.4 Device interface (INTERBUS-S)

The Laser Measuring Device OMS2 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 OMS2 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.



Note

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

2.3.4.1 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.

Double Input Word ID x

Data byte 3								Data byte 2								Data byte 1								Data byte 0							
B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0																
2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}	2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Input byte x+0								Input byte x+1								Input byte x+2								Input byte x+3							

Double Output Word OD x

Data byte 3								Data byte 2								Data byte 1								Data byte 0							
B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0																
2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}	2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Output byte x+0								Output byte x+1								Output byte x+2								Output byte x+3							

2.3.4.2 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 "0"

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 23, "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 15	Set zero shift 14	Manufacturer-specific 13	Parameter-No. 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 received within a second in the status word. (see also "Parameter programming", page 26)

Set zero shift

If in parameter-no. 1101 is programmed the value "0 = not clear", 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 26).

Manufacturer-Specific

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

2.3.4.3 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 "0"

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	Parameter - ization	Manufac- turer 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 27)

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 = 10 mm 1 = 1 mm 2 = 0,1 mm 3 = 0,01 mm 4 = 1 Inch 5 = 0,1 Inch
0 0 1 0	Switch off laser diode
0 0 1 1	Switch on laser diode
0 1 0 0	Preselection preset value
0 1 0 1	Automatic switching-off of the laser diode, if bus 15min. inactively: 0 = disabled 1 = active
0 1 1 0	Not defined !
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	Not defined !
1 0 1 0	Error value at beam interruption: 0 = NULL 1 = 0xFF 2 = Last valid position value
1 0 1 1	Not defined !
1 1 0 0	Function external input: 0 = disabled 1 = Preset 2 = Switch off laser diode
1 1 0 1	Clear preset (Zero mark is deleted): 0 = No clearing 1 = Clearing
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 1	Hardware error
1 0 0 1	Intensity warning (intensity <12%)
1 0 1 0	Laser diode is switched off
1 1 0 0	Intensity error (e.g. beam interruption)
1 1 1 0	Device temperature (outside the range 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		D0-D24	Status Word		D0-D24	
	D31	D25-D28		D30-D31	D25-D28		
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 = 10 mm 1 = 1 mm 2 = 0,1 mm 3 = 0,01 mm 4 = 1 Inch 5 = 0,1 Inch	0 - 5	1

3.1.2 Switching-off laser diode

For increase the life time of the laser diode the laser diode can be switched inactively with transmission of this parameter-no.. If under the parameter-no. 1100 "Function external input" the parameter value "2" = "Switch off laser diode" was programmed, or the parameter 0101 "Switch off laser diode automatic if Interbus-S is inactive" is active, this parameter is ineffective.

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

3.1.3 Switching-on laser diode

With transmission of this parameter-no. the laser diode is switched actively. If under the parameter-no. 1100 "Function external input" the parameter value "2" = "Switch off laser diode" was programmed, or the parameter 0101 "Switch off laser diode automatic if Interbus-S is inactive" is active, this parameter is ineffective.

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

3.1.4 Preset preselection

Determination of the position value on which the laser is adjusted when the preset function or the preset-input is activated
 (see " **Control Word, relative word address "0"** ", page 22 /
 "**Set zero shift**", page 23 and "**Function external input**", page 31).

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

3.1.5 Switch off laser diode automatic if Interbus-S is inactive

If the parameter is active, in case of an inactive Interbus-S the laser diode is switched off automatically after approx. 15 min.. If the Interbus-S will be active again, the laser diode is switched on again immediately.

If under the parameter-no. 1100 "Function external input" the parameter value "2" = "Switch off laser diode" was programmed, this parameter is ineffective.

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

3.1.6 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 - 1	0

3.1.7 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 = NULL 1 = 0xFF 2 = Last valid position value	0 - 2	0

3.1.8 Function external input

It determines whether the switching input is to be used as Preset input or for switching-off of the laser diode. With connection of the switching input as Preset-input the laser is adjusted on the predefined position value (see also "Preset preselection", page 30).

Parameter-No. B12 B9	Parameter value in D0 - D24	Value range	Default
1 1 0 0	0 = disabled 1 = Preset 2 = Switching input laser diode	0 - 2	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 = no clearing 1 = clear Preset	0 - 1	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 27). 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 26 and "Parameter description", starting from page 29).
0011 Memory error	Hardware error	If the error occurs at repeated service type, the device must be replaced.
1001 Intensity warning	The device determined an intensity of < 12%.	This message is only a warning and means that the measuring system optics, or the reflecting foil is to be cleaned. However, the device operates error-free furthermore.
1010 Laser diode switched off	The bit is set, if the laser diode was switched off over the bus, or the switching input.	Serves only for information purposes.
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 If the possibility of soiling or interruption of the laser signal can be ruled out, 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 Maintenance

5.1 General Maintenance Information

The Laser Measuring Device does not, in general, require maintenance by the operator.



Note

If the lens opening of the laser or the reflecting foil become dirty, clean with a soft cloth.

Do not use an aggressive cleaning material such as thinner or acetone !

5.2 Repair, Maintenance

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

Contact your Leuze electronic GmbH distributor or service organisation should repairs be required. The addresses are listed on the last page of this description.

6 Appendix

6.1 Specifications



Note

The electric characteristics have validity, only after an operating time of approximate 30 minutes.

6.1.1 Electrical ratings

Measuring principle:	Phase delay time measurement
Range (measurement on reflecting foil):	0,2 – 125 m standard, max. 170m (special device)
Resolution:	selectable, physical resolution 0,7 mm
Operating voltage	
Standard device:	18-27 V DC ($\pm 5\%$)
Device with heating:	24 V DC ($\pm 5\%$)
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
Measured value output / refresh cycle:	1000 values / s
Reproducibility:	± 2 mm
Programming via RS485:	PC IBM compatible "OMSConfiguration" / 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 (programmable):.....	300 kbps net, 500 kbps gross or 2Mbaud (including control and status bytes)
Data refresh:	0,5 ms
Output code:.....	Binary
Special features:	Programming the following parameters via the INTERBUS-S:
	- Resolution
	- Switch off or switch on laser diode, automatic
	- Preset preselection
	- Counting direction
	- Error value
	- Programming of the external switching input
	- Clearing zero mark
Switching input/output programmable	
Levels switching input:	1-level > +8V, 0-level < +2V, up to ± 35 V, 5 kOhm
Levels switching output:.....	1-level > US-2V, 0-level < 1 V, up to 100mA

6.1.2 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.

6.2 Accessories

Article-No.:	Type	Description
500 32812	MA OMS1 PCA	PC adapter (RS232/RS485)
500 32813	MA OMS1 PCAS	Switch cabinet module for PC adapter
500 32816	RF1 200x200	Reflecting foil 200 x 200 mm for measurements up to 115m
Upon request	-	Fresnel-Retro-Reflector for measurements from 115 - 170m, 55.4x48 cm
Upon request	-	Installation CD "OMSConfiguration Tool" PC software with user manual German and English

Connector pin assignment Laser Measuring Device OMS2 INTERBUS-S, Encom-K3-Profile

General note:

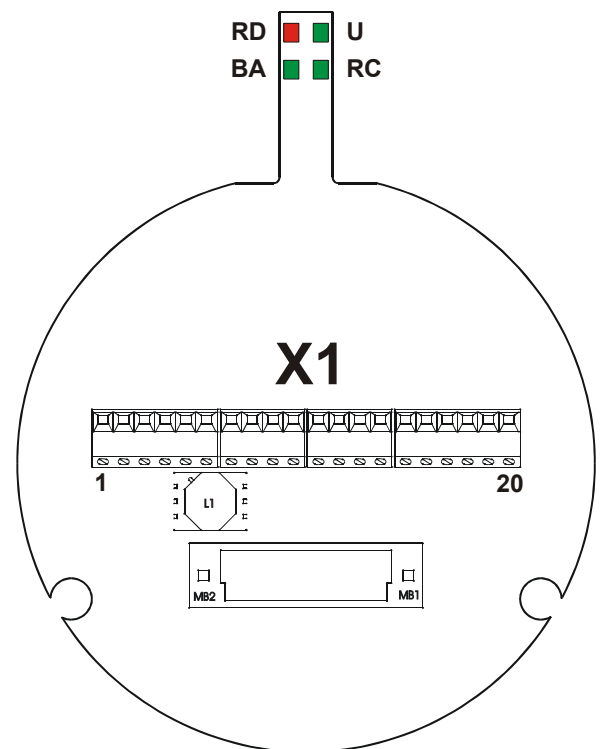
If the Laser Measuring Device is the last node in the ring, it must only be wired the signals for the incoming remote bus interface (Remote IN). If there are additional nodes in the ring after the Laser Measuring Device, it must be wired additionally the signals for the remote out interface to the subsequent node (Remote OUT). For the subsequent node to be detected, you must insert a jumper between PIN 5 "/RBST" and PIN 4 "GND". The Laser Measuring Device Identno. = 55 decimal (37 HEX). In the master, the laser data occupies two-word addresses for IN-data and two-word addresses for OUT-data.

Explanation of terms:

SMKDS 1-3,5:	Print-Clamp Phoenix Contact 10A/160V, grid 3.5 mm, connection direction 55°		
Connection:	inflexible 0,14 - 1,5 mm ²	flexible 0,14 - 1 mm ²	Conductor size (AWG) 26 - 16
	flexible with wire end sleeve without plastic sleeve: 0,25 - 0,5 mm ²		flexible with wire end sleeve with plastic sleeve: 0,25 - 0,5 mm ²
US:	Supply Voltage Standard Device: 18 - 27 V DC, device with heating: 24 V DC (± 5%)		
US-input:	1-level > +8V, 0-level < +2V, up to ±35V, 5 kOhm		
US-output:	1-level > US-2V, 0-level < 1 V, up to 100mA		
GNDI / GND	galvanically from each other separate data reference potentials		

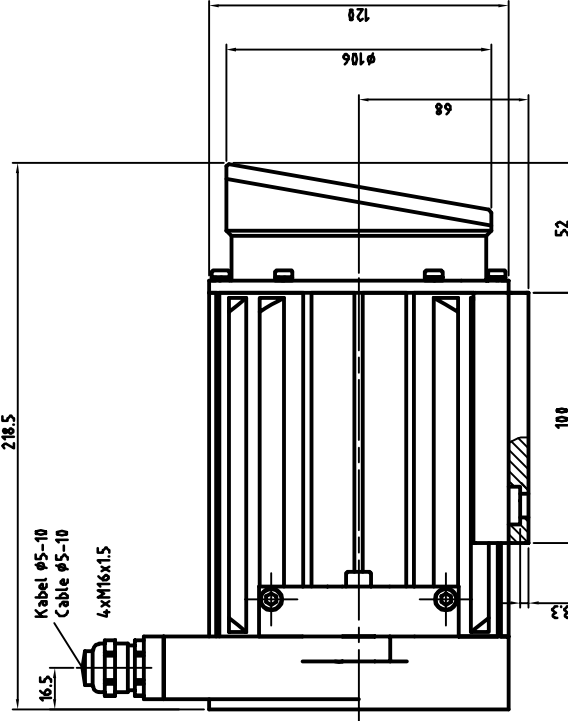
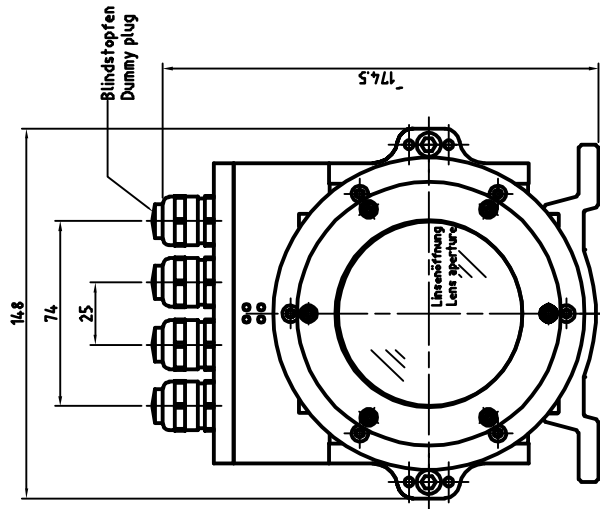
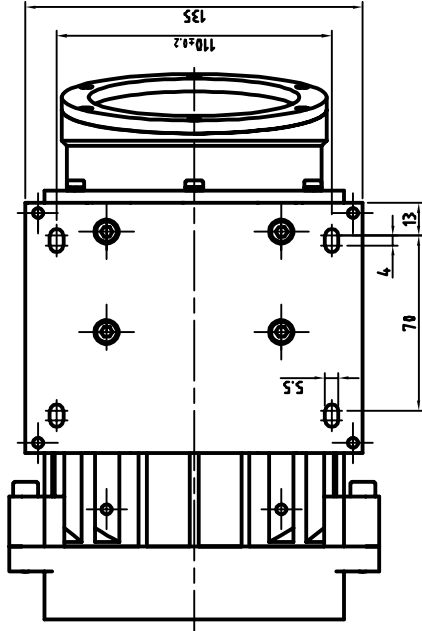
X1 – screw clamp, 20-pole

Programming, Supply, Control	Pin 1	Signal GND (reference potential pin 2)
	Pin 2	US-output, programmable
	Pin 3	US-input, programmable
	Pin 4	GND (reference potential for RBST)
	Pin 5	RBST inverted
	Pin 6	GND (reference potential outgoing Bus)
	Pin 7	0V-supply voltage
	Pin 8	US-supply voltage
	Pin 9	Programming interface RS485 –
	Pin 10	Programming interface RS485 +
Remote OUT	Pin 11	DO2 inverted
	Pin 12	DO2
	Pin 13	DI2 inverted
	Pin 14	DI2
Remote IN	Pin 15	GNDI (reference potential incoming Bus)
	Pin 16	Shield (internal via RC-element onto case)
	Pin 17	DO1 inverted
	Pin 18	DO1
	Pin 19	DI1 inverted
	Pin 20	DI1




LEDs

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



Artikel-Nr. und Steckerbelegung: siehe Datenblatt
 Article-No. and pin connections: see data sheet

 Leuze electronic GmbH + Co. In der Bräule 1 D-73277 Owen/Teck Telefon 07021/573-0		Maßstab 1:2 DIN A3 Projekt-Nr.		Zeichnungs-Nr. nur für diese Ausführung gültig Drawing-No. only for this type valid	
		OMS2		Zeichnungs-NR./Drawing-No.: 04-K2200-001	
Datum Erstellt 30.10.02		Name Habelter		Blatt 1	
Bearb.		Gepr.		Norm	
1 Justagebohrungen Zust. Änderung		02.12.02 Habelter		Datum Name	

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