



## COMPACT/AS-i

### Sicherheits-Lichtvorhang und -Mehrstrahl-Sicherheits-Lichtschanke

Zusatzinformationen zur Anschluß- und Betriebsanleitung von COMPACT Sicherheits-Lichtvorhang und -Mehrstrahl-Sicherheits-Lichtschanke

### Safety light curtain and Multiple Light Beam Safety Device

Additional informations about Connecting and Operating Manual of COMPACT Safety light curtain and multiple light beam safety device




## About the Connecting and Operating Manual



This Connecting and Operating Manual contains additional information and instructions for the connection and operation of COMPACT safety light curtain and multiple light beam safety device, through the effective use of COMPACT/AS-i safety light curtain and multiple light beam safety device with integrated AS-i interface.

Safety tips and warnings are indicated by the  symbol.

Pointers to important items of information are indicated by the  symbol.

**Leuze lumiflex GmbH + Co. KG will not be responsible for damages that occur through inappropriate use of the equipment. Knowledge of the contents of this Connecting and Operating Manual shall be considered a part of the correct use of the equipment.**

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# 1 General Remarks

## 1.1 Short description

The COMPACT/AS-i safety light curtain and multiple light beam safety device are type 4 Active Optoelectronic Protective Devices (AOPDs) in accordance to IEC 61496-1, -2 and EN 61496-1. They can be connected to AS-Interface, as they have an integrated AS-i interface as part of their design. A two-dimensional protective field made of infrared light beams is produced between the transmitter and the receiver. When a person penetrates this protective field, the machine that is protected by AS-Interface and the AS-i safety monitor will be brought to a state of safety before the person can get into any situation of danger that might be caused by the machine.



A short description of the AS-Interface safety system may be found in chapter 1.6.

## 1.2 Manufacturer's certification



The manufacturer of the COMPACT/AS-i safety light curtain and multiple light beam safety device, Leuze lumiflex GmbH + Co. KG, of 82256 Fürstentfeldbruck, Germany, is in possession of a quality assurance system that has been certified in keeping with ISO 9001.

COMPACT/AS-i safety light curtain and multiple light beam safety device have been developed and are manufactured in adherence to the European standards and directives that apply to such articles.

## 1.3 Approval and EC declaration of conformity

EC prototype testing (Europe)  
in compliance with DIN EN 61496-1

TÜV Automotive GmbH  
Ridlerstr. 65,  
80339 Munich



The declaration of conformity will be found at the end of this Connecting and Operating Manual.

## 1.4 Definition of terms (on AS-Interface)

### Output switching element (safety output) of the AS-i safety monitor

An element that is activated by the monitor's program logic, which is in a position safely to switch off the control components subordinated to it. Only when all components function as indicated in the specifications should the output switching element be put into or allowed to remain in the On state.

**OSSD**

The one channel of the AS-i safety monitor to which safety-related AS-i components and functional components are assigned which are responsible for releasing the machine elements which create the unsafe movement.

**Integrated AS-i slave**

Component in which sensor and/or actuator functions are incorporated with the slave in a single unit.

**AS-i Master**

Component for data transmission, which controls the logical and temporal behaviour of the system on the AS-i line.

**Safety output**

See output switching element.

**Safety-related input slave**

Slave which reads the safety-related states On and Off of the sensor or command unit to which it is connected and transmits it to the master or safety monitor.

**Safety-related AS-i slave**

Slave for connecting safety-related sensors, actuators and other devices.

**Safety monitor**

Component which monitors the safety-related slaves and the correct functioning of the network.

**Slave**

Components for data transmission; the master cyclically addresses these components by their addresses. Only then do they generate an answer.

**Standard slave**

Slave for connecting non-safety-related sensors, actuators and other devices.

**1.5 Abbreviations**

<b>AS-i</b>	Actuator Sensor Interface (also known as AS-Interface)
<b>AOPD</b>	Active Optoelectronic Protective Device
<b>OSSD</b>	Output safety switching device
<b>PLC</b>	Programmable Logic Control
<b>EDM</b>	External Device Monitoring

**1.6 Short description of the AS-Interface**

The actuator-sensor interface (AS-interface, in short: AS-i) has established itself as a system for net-working primarily binary sensors and actuators at the lowest level of the automation hierarchy. The high number of installed systems, the ease of use and the reliable operating behaviour also make the AS-interface interesting in the area of machine safety.

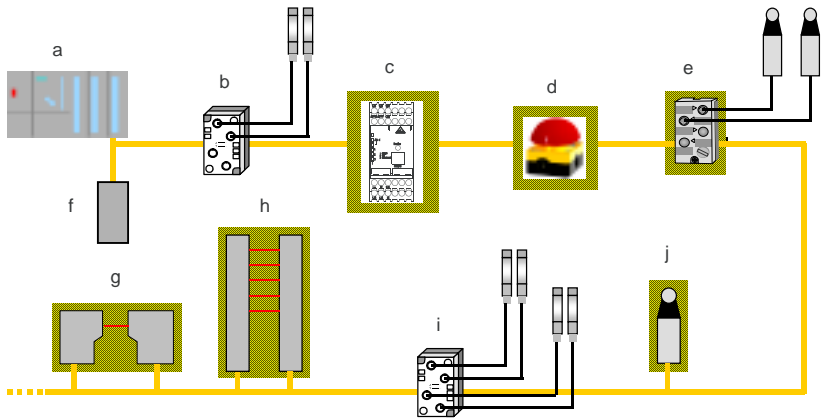
The safe AS-Interface system is intended for safety applications up to category 4 in accordance with EN 954-1. A mixed manner of operation, using both AS-i standard components and AS-i safety-related components, is possible.



A comprehensive description of safe AS-i transmission will be found in the Connecting and Operating Instructions for the AS-i safety monitor, chapter 11.

### 1.6.1 The AS-i safety monitor

Within an AS-i system, corresponding to the configuration that the user has specified by means of the configuration software, the AS-i safety monitor keeps a check on the safety-related AS-i slaves that are allocated to it. Depending on the device model, up to two dependent or independent OSSDs with contactor monitoring are available. In case of a Stop request or of a fault occurring, the AS-i safety monitor in protective mode will safely switch the system off, with a maximum response time of 40 ms when the system is fully extended. It is possible in this connection to link as many as 31 safety-related AS-i slaves into a system.



- |  |   |
|--|---|
| a: PLC controls with AS-i Master                         | g: safety light barrier, with integrated AS-i interface |
| b: Standard module                                       | h: Safety light grid, with integrated AS-i interface    |
| c: AS-i safety monitor                                   | i: Standard module                                      |
| d: EMERGENCY STOP button, with integrated AS-i interface | j: Position switch, with integrated AS-i interface      |
| e: Safe AS-i input module                                |   |
| f: AS-i power supply                                     |   |

**Abb. 1.6-1:** Safe and standard components in an AS-i network

Multiple AS-i safety monitors can be used within an AS-i system. In this way, a safety-related AS-i slave can be monitored by multiple AS-i safety monitors.

### 1.6.2 The safety-related AS-i slave

The safety-related information of the AS-i slave is transmitted by way of the non-safety-related transmission channel used by Standard AS-i. The same transmission mechanism applies to a safety-related transmission as it does to the Standard AS-Interface, that is to say, the 4-bit information that is delivered to the AS-i slave-IC will be transmitted. From a transmission perspective, information is transmitted from master to

slave and back again, but the safe data information is sent from the slave to the AS-i safety monitor only, which "listens in" to the entire exchange of information and monitors what is transmitted. Here the safety-related user data are defined as follows:

- Only 1 bit of user information is transmitted. The two possible states are interpreted as meaning **free** (=1) and **not free** (=0).

*Example:*

Emergency stop not activated = **free** ("hazardous movement approved")

Emergency stop activated = **not free** ("hazardous movement not approved")

- In the **not free** state the values 0,0,0,0 are statically registered in the 4 input bits of the AS-i slave-IC.
- In the **free** state, with every cycle a different value is registered in the 4 input bits. The values amount to a sequence of 8 4-bit values which vary in pairs, in such a way that each slave in the system has its own unique sequence. After the eighth sequence has been successfully transmitted, the system switches to the first sequence again (endless loop). The sequence is registered in a code table of the AS-i slave and can be generated in keeping with defined rules. It is assigned by the manufacturer of the AS-i slave as part of the manufacturing process.

Data bit	Light path free	Light path interrupted
D0	Code sequence	0
D1	Code sequence	0
D2	Code sequence	0
D3	Code sequence	0

**Tabelle 1.6-1:** Allocation of the data bits of the safety-related AS-i slave

## 2 Safety Notices

### 2.1 General safety notices



COMPACT/AS-i safety light curtain and multiple light beam safety device with integrated AS-i interface are intended exclusively for connection to AS-Interface Safety at Work and may not be used with any other applications. COMPACT/AS-i safety light curtain and multiple light beam safety device can only be connected with the machine controls by way of AS-Interface and the AS-i safety monitor.

Appropriate use of the COMPACT/AS-i safety light curtain and multiple light beam safety device shall entail the knowledge of the contents of the Connecting and Operating Manual for the COMPACT safety light curtain and multiple light beam safety device and COMPACT/AS-i safety light curtain and multiple light beam safety device. For operating the COMPACT/AS-i safety light curtain and multiple light beam safety device with AS-Interface, the user should also be familiar with the contents of the Connecting and Operating Manual for the AS-i safety monitor and the user's manual on the asimon configuration and diagnosis software for the AS-i safety monitor.



Please pay attention to the safety notices contained in the Connecting and Operating Manual for "COMPACT safety light curtain and multiple light beam safety device".

## 2.2 Proper use



The protection of operating personnel and equipment cannot be guaranteed, if the equipment is not used in keeping with the mode of use specified.

Tampering with or modification of the equipment, unless in a way expressly described in this manual, is not permitted.

## 2.3 Areas of application (AS-Interface)

The AS-i safety monitor, when used in accordance with the specifications, allows for the operation of the sensor-controlled personnel protection facilities and other safety components up to and including category 4 in accordance to EN 954-1. If sensors of a lower category should be used, the maximum category to be attained for the related safety path is defined in terms of these sensors. For example, laser scanners in accordance to EN 61496-3 can only be classified as type 3 at best. If laser scanners are incorporated in the AS-i safety network, a safety category of 3 is the maximum that may be attained for the related safety path. If there is a safety light curtain of type 4 connected to the same AS-i safety monitor, it remains unaffected by this, and may still be classified as category 4. The AS-i safety monitor also takes responsibility for the EMERGENCY STOP function, obligatory for all machines not operated by hand (stop category 0 or 1), for the dynamic monitoring of the restart function and for the external device monitoring function (EDM). In what follows we will give a few examples of the use of the AS-i safety monitor.

AS-i Safety at Work can be economically used in all cases where the standard AS-i bus recommends itself in view of its advantages as a local bus that requires little cabling. In this way, when the AS-i safety monitor is used, AS-i bus configurations that already exist as bus user devices can easily be added to, and safety components with the appropriate AS-i Safety at Work interface (e.g. COMPACT/AS-i) can easily be incorporated in the loop. If the safety component does not have an AS-i Safety at Work interface, what are known as coupling modules (e.g. the AS-i coupling module ASKM1) can effect the connection. Existing AS-i Masters and AS-i power supplies can as a rule be reused. In terms of industrial sector there are no limitations. Let us mention here a few of the more important areas of use:

- Expanded machining machines with multiple control elements and safety sensors for wood and metal applications
- Printing and paper processing machines, cutting machines
- Packaging machines, single and as part of a system
- Food processing equipment
- Piece and bulk material transport systems
- Machinery in the rubber and plastics industry
- Assembly machines and manipulators

## 2.4 Organisational measures

### Documentation

It is an absolute requirement that regard should be had to all the statements made in this Connecting and Operating Manual, in particular in the chapters "Safety Notices" and "AS-i System Integration". Please look after this Connecting and Operating Manual and treat it with care. It should be available at all times.

### Safety prescriptions

You should have regard to the statutory stipulations that apply locally and to the prescriptions of the relevant professional associations.

### Qualified personnel

The assembly, startup and maintenance of the equipment should be carried out only by qualified professional personnel. Electrical work may be carried out only by a professional electrician.

### Repairs

Repairs, in particular if they involve the opening of the housing, may only be carried out by the manufacturer or by a person whom the manufacturer has authorised. An exception to this rule is the disassembly of the end cap of the device on the connection side (on either the transmitter or the receiver) for an adjustment of the DIP switches if this should prove necessary (see chapter 3, Assignment of the DIP switches).

### Disposal



Electronic scrap is special category waste, and you should have regard to the regulations that apply locally to the disposing of such materials. COMPACT/AS-i safety light curtain and multiple light beam safety device do not contain any batteries that would need to be removed before the equipment is disposed of.

## 3 Design and Function



For this topic, see chapter 3 of the Connecting and Operating Manual for COMPACT safety light curtain and multiple light beam safety device.

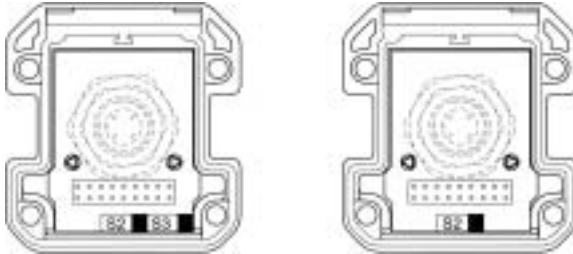
### 3.1 Assignment of DIP switches

For this topic, see the COMPACT Connecting and Operating Manual, chapter 3.5, "Selectable system functions".

The DIP switches are situated on the AS-i interface circuit board, within the device connection end cap of the transmitter and the receiver.

Receiver

Transmitter



**Abb. 3.1-1:** Function selection by means of the DIP switches on the AS-i interface circuit board of transmitter and receiver

Switch	Transmitter	Receiver
S2	Selection of transmission channel switch left = channel 1 (factory setting) switch right = channel 2	Selection of transmission channel switch left = channel 1 (factory setting) switch right = channel 2
S3	not available	Light grid sampling mode: switch left = standard (factory setting) switch right = double scan (d-scan)

**Tabelle 3.1-1:** Selectable system functions – programming of the DIP switches

The DIP switches, as shown in the diagram, are pre-set when leaving the factory.

## 4 Assembly



For this topic, see chapter 4 of the Connecting and Operating Manual for COMPACT safety light curtain and multiple light beam safety device.

### 4.1 Calculation of clearance/Calculation of response time with AS-i applications

The clearance S between hazard location and the protection zone is calculated in accordance with EN 999 according to the following formula:

$$S = (K \times T) + C$$

where:

**S** Minimum clearance between the protection zone and the hazard location in mm

**K** Rate of approach by the body or the person in mm/ms

**T** Overtravel time of the machine + the response time of the optoelectronic protection device (AOPD) + the response time of the AS-i bus system in ms

**C** Allowance in mm, which depends on the detection capacity d of the AOPD



The overall response time  $T$  is the time from the activation of the COMPACT/AS-i sensor to the machine-standstill. In case of AS-i applications it must be calculated the bus system time needed for AS-Interface data transmission and the AS-i safety monitor switch off (with a maximum of 40 ms) in addition to the sensor-response time and the machine-overtravel time.

## 5 Electrical Installation (from the AS-i side)

### 5.1 Prescriptions during installation



Regard should be had to the general advice on safety given in chapter 2. The electrical installation is to be carried out by properly instructed professionals.

### 5.2 AS-Interface power supply



The AS-i network component for provision of power supply to the AS-i components (COMPACT/AS-i for instance) must have a secure isolation from supply as defined by IEC 60742, and must also be able to bridge short-term network power cuts lasting up to 20 ms.

### 5.3 Connection technology

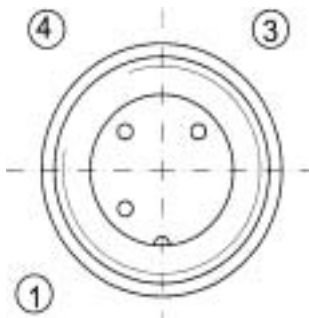
The sensors are designed with a 3-pole M12 connector plug for connection to the AS-i line. The connection to the AS-i line will normally be made by means of an M12 bus terminal (see chapter 9, selection and notes on ordering, AS-i safety accessories).




**Abb. 5.3-1:** Connecting the sensor with an M12 connector socket by means of an M12 bus terminal to AS-Interface

Connector pin	Transmitter (CT...)	Receiver (CR...)
1	ASI+	ASI+
3	ASI-	ASI-
4	not assigned	not assigned

**Tabelle 5.3-1:** PIN assignment on the 3-pole M12 connector plug




**Abb. 5.3-2:** Coding of the 3-pole M12 connector plug


 For tips and information on the design, installation and operation of AS-Interface systems, we would recommend the AS-Interface manual “The Actuator-Sensor Interface in Automated Systems” by Werner R. Kriesel and Otto W. Madelung (ed.), published by the Carl Hanser Verlag [Carl Hanser Publishers] of Munich and Vienna.

## 6 AS-i System Integration

### 6.1 Installing of components/functional testing

 For this topic, see also the Connecting and Operating Manual for the AS-i safety monitor, chapter 7 (“Functioning of the system and putting the system into operation”), as well as the COMPACT Connecting and Operating Manual chapter 6.1 (Functional testing).

You should proceed as follows:

<b>1</b>	<b>Give an address to the AS-i slave</b> The addressing is carried out by means of the M12 connector plug, using the standard AS-i addressing devices see chapter 9, selection and notes on ordering, AS-i accessories. Each address may only be used once on an AS-i network (possible bus addresses are 1 to 31).
<b>2</b>	<b>Install the AS-i Slave in the AS-Interface</b> Connection is effected by means of an AS-i bus terminal or an M12 connecting cable.
<b>3</b>	<b>Check that the sensor is power supplied by way of AS-Interface</b> The 7-segment displays and the red LED will light up on the COMPACT/AS-i receiver and transmitter.
<b>4</b>	<b>Check that there is communication between the COMPACT/AS-i transmitter and the COMPACT/AS-i receiver</b> The 7-segment displays will light up on the receiver and the transmitter, the green LED will light up on the receiver.  For system integration, that is to say, for programming the code table of the AS-i slave into the AS-i safety monitor, the COMPACT/AS-i safety light curtain must not be interrupted.

- |          |  |
|----------|--|
| <b>5</b> | <b>The safe AS-i slave can now be put into operation and configured with the help of the asimon configuration and diagnosis software of the AS-i safety monitor.</b> |
|----------|--|

## 6.2 Malfunctions and rectification of faults

For this topic, see the COMPACT Connecting and Operating Manual, chapter 6.2 (Tips fault clearance), as well as the Connecting and Operating Manual for the AS-i safety monitor, chapter 9 (Status messages, malfunctions and rectification of faults).

## 7 Maintenance




### 7.1 Replacement of safety-related AS-i slaves

If a safety-related AS-i slave is defective, it can also be replaced without using the PC, and the AS-i safety monitor may be reconfigured by means of the SERVICE button on the AS-i safety monitor.



For this topic, see the Connecting and Operating Manual for the AS-i safety monitor, chapter 9.4 (Replacing a defective safety-related AS-i slave).

You should proceed as follows:

<b>1</b>	<b>Isolate the defective AS-i slave from the AS-i line</b> The AS-i safety monitor ASM1 will bring the system to a halt.
<b>2</b>	<b>Press the SERVICE button on the AS-i safety monitor</b>
<b>3</b>	<b>Install the new AS-i slave</b>  As delivered from the factory, Leuze lumiflex AS-i slaves are assigned the bus address "0". When they are replaced, the AS-i Master will automatically program the replacement device with the former bus address of the defective device. Thus the reassignment of the replacement device to the bus address of the defective device is not required.
<b>4</b>	<b>Check that the sensor is power supplied by way of AS-Interface</b> The 7-segment displays and the red LED will light up on the COMPACT/AS-i receiver and transmitter.
<b>5</b>	<b>Check that there is communication between the COMPACT/AS-i transmitter and the COMPACT/AS-i receiver</b> The 7-segment displays will light up on the receiver and the transmitter, the green LED will light up on the receiver.  For system integration, that is to say, for programming the code table of the AS-i slave into the AS-i safety monitor, the COMPACT/AS-i safety light curtain should not be interrupted.
<b>6</b>	<b>Press the SERVICE button on the AS-i safety monitor</b>
<b>7</b>	<b>Activate the starting signal in order to restart the AS-i system</b>  The system will be restarted in dependence on the AS-i configuration of the AS-i safety monitor, which may involve a restart interlock or else an automatic restart (for this topic, see the asimon Users' Manual – Configuration and diagnosis software for the AS-i safety monitor ASM1).

When the SERVICE button is pressed for the first time, the system will ascertain whether just one AS-i slave is missing. This will be noted in the error memory of the AS-i safety monitor. The AS-i safety monitor now switches to configuration mode. When the SERVICE button is pressed for the second time, the code sequence of the new AS-i slave will be programmed in and checked for correctness. If this is found satisfactory, the AS-i safety monitor switches back into guard mode.



**Warning!**

After a defective safety-related AS-i slave has been replaced, it is absolutely necessary that the correct functioning of the new AS-i slave should be checked.


**7.2 Checking of safety switch-off procedure**

The correct functioning of the safe AS-i system, that is to say, the safe switching off of the AS-i safety monitor when a safety-related sensor (COMPACT/AS-i, for instance) is triggered, should be checked by the safety officer on an annual basis.



For this purpose, the COMPACT/AS-i slave should be activated once a year, and its switching properties checked by observing the safety outputs of the AS-i safety monitor.

**8 Technical Specifications and scaled Drawings**

Safety classification	Type 4 in accordance to IEC 61496-1, -2 and EN 61496-1 (self-monitoring)
Protective field height	150...1800 mm for series C14/A and C30/A 450... 3000 mm for series C50/A 750... 3000 mm for series C90/A
Width of protective field, range	0.3 ... 6 m for series C14/A 0.8 ... 18 m for series C30/A, C50/A, C90/A, Cxx0/A 0,6 ... 60 m for series Cxx1/A
Resolution (object sensitivity)	14 mm, 30 mm, 50 mm, 90 mm or entire person with 2, 3 or 4 beams
Response time sensor (from interruption of protective field till switch-off command by way of AS-Interface)	Series C14/A: 12...44 ms (d-scan 15...83 ms) Series C30/A: 12...25 ms (d-scan 15 to 44 ms) Series C50/A: < 22 ms (d-scan 38 ms) Series C90/A: < 18 ms (d-scan 25 ms) For exact response times, see Tabelle 8.0-1 auf Seite 43.
 Response time of system	response time COMPACT/AS-i + response time AS-i safety monitor (max. 40 ms)
Enclosure rating	IP 65
Power consumption	Transmitter: max. 130 mA / Receiver: max 140 mA
Operating mode	Guard mode without restart interlock

Restart time (after release of the protective field results in the OSSDs being switched on again)	100 ms for series C14, C30, C50,C90
	500 ms for series Cxx1 (2-, 3-, 4-strahlig) Cxx0
Synchronisation of transmitter/receiver	Optical synchronisation, 2 transmission channels may be selected
Suppression of infrared interfering light	2 procedures may be selected Standard = high level of suppression d-scan = extremely high level of suppression (for the exact response times, see Tabelle 8.0-1 auf Seite 43.)
Measurements	Cross section 55 * 52 mm Length, depending on height of protective field, 234 ..... 3084 mm
Air humidity	15 ... 95 %
Ambient temperature	0...+55 °C
Storage temperature	-25....+70 °C

<b>Specific to AS-i:</b>	
Power supply	AS-i (26.5..31.6V, depending on AS-i specifications)
ID code (receiver)	B
I/O code (receiver)	0 (four bits as outputs)
Slave address (receiver)	Active bus component, will be programmed by the user in the range 1 to 31 (status on delivery: bus address = 0), power supply from the AS-i network
Slave address (transmitter)	Passive bus component (no bus address), power supply from the AS-i network
Cycle time in keeping with AS-i specifications	5 ms
AS-i profile	safe slave
Electrical connection	M12 connector plug: pin 1 = ASI +, pin 3 = ASI -

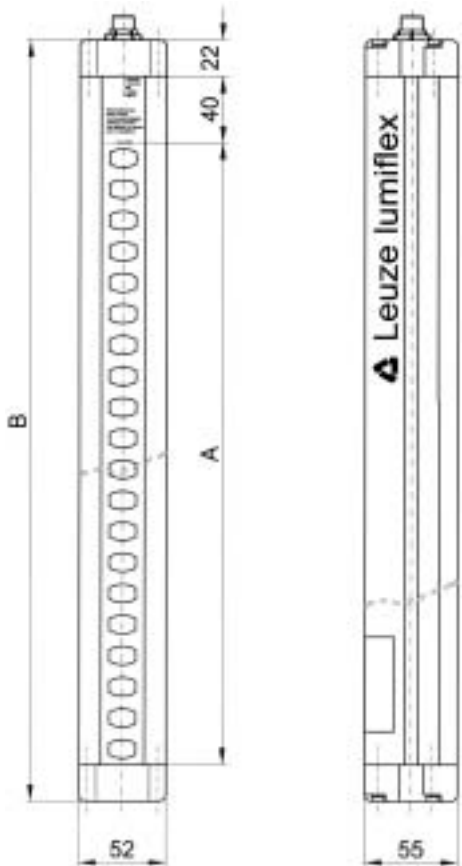
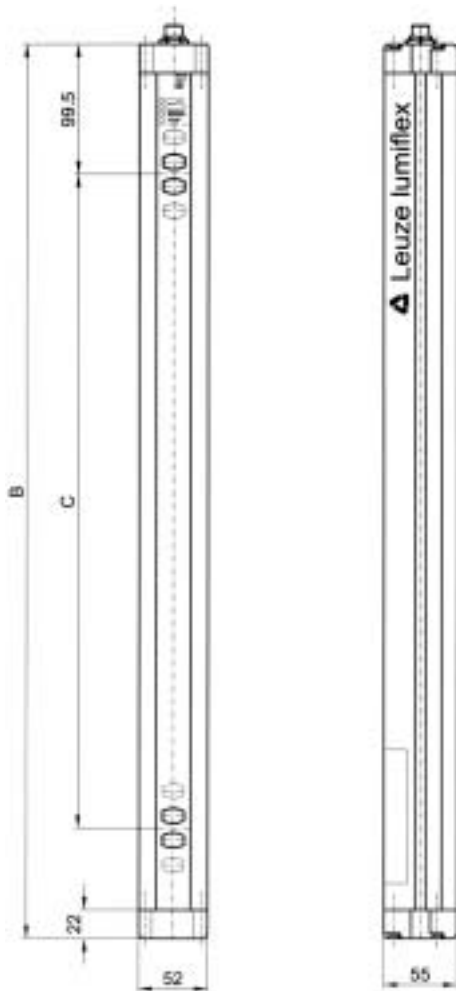
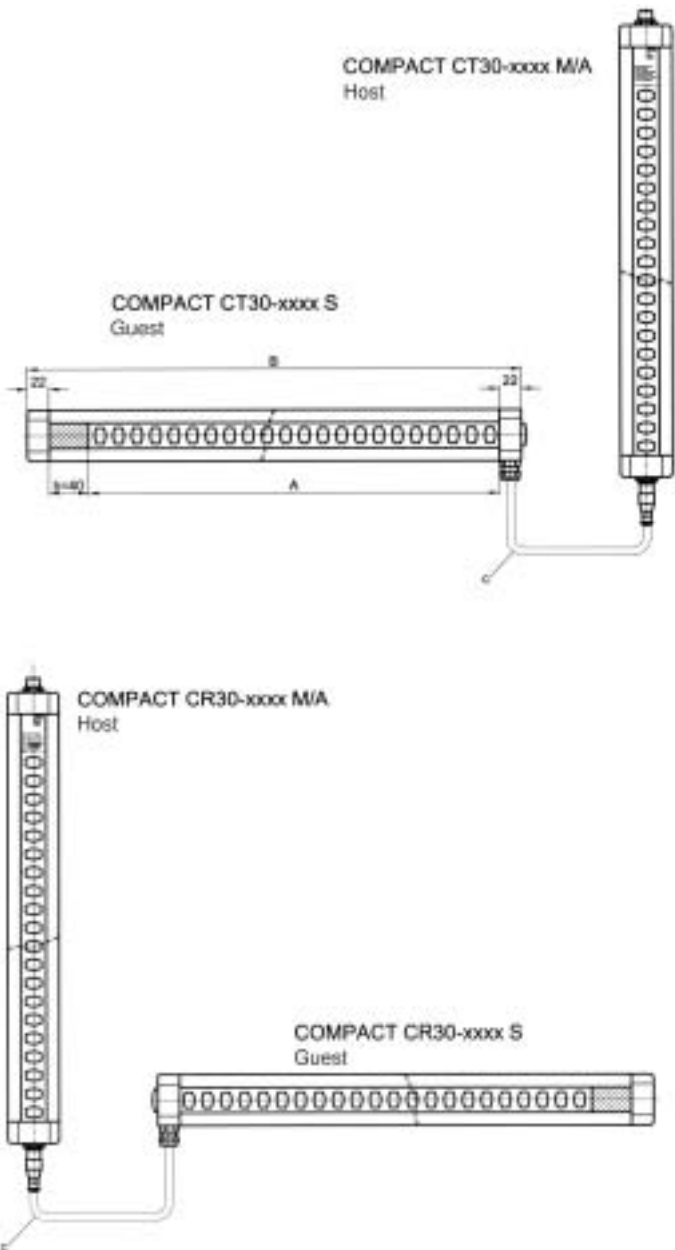


Abb. 8.0-1: Scaled drawing: COMPACT/ASi, series C14/A, C30/A, C50/A, C90/A



**Abb. 8.0-2:** Scaled drawing: COMPACT/ASi, series C30x/4/A, C40x/3/A, C50x/2/A



**Abb. 8.0-3:** Scaled drawing: COMPACT/AS-i  
Host-Guest: cascading, basic device to subordinate device

Series C14/A, C30/A, C50/A, C90/A

Pr. field height measurements A [mm]	Response time [ms] n = standard; d = d-scan							
	C14/A		C30/A		C50/A		C90/A	
	n	d	n	d	n	d	n	d
150	12	15	12	15				
225	15	20	15	20				
300	18	25	12	15				
450	15	25	15	20	15	20		
600	18	31	18	25	12	15		
750	22	38	14	22	14	18	14	18
900	25	44	15	25	15	20	15	20
1050	28	51	17	28	17	23	11	14
1200	31	57	18	31	18	25	12	15
1350	35	64	20	35	13	10	13	16
1500	38	70	22	38	14	22	14	18
1650	41	77	23	41	14	23	14	19
1800	44	83	25	44	15	25	15	20
2100					17	28	17	23
2400					18	31	18	25
2700					20	35	13	20
3000					22	38	14	22

Series C30x/4/A, C40x/3/A, C50x/2/A

Type	Response time [ms] n = standard; d = d-scan	
	n	d
C30x/4/A	10	13
C40x/3/A	10	13
C50x/2/A	10	13

**Table 8.0-1:** Response times of the COMPACT/AS-i safety light curtain and multiple light beam safety device

## 9 Selection and Notes on Ordering

Device specifications and order numbers for light curtains C14/A and C30/A, and for light grids C50/A and C90/A:

Example a: CT14A-1050M/A  
CabbA-dddd e/A

- C** : COMPACT  
**a** : T = transmitter, R = receiver  
**bb** : Detection capacity, resolution [mm]  
**A** : Only in the version with akkalite front panels (proof against welding sparks)  
**dddd** : Height of protective field [mm]  
**e** : Only for devices with cascade facility:  
M = basic device (Host), S = subordinate device (Guest)  
**/A** : AS-i device version

Type	C14/A	C30/A	C50/A	C90/A
	bb = 14	bb = 30	bb = 50	bb = 90
CTbb-150/A	581151	581351		
CRbb-150/A	584151	584351		
CTbb-225/A	581152	581352		
CRbb-225/A	584152	584352		
CTbb-300/A	581153	581353		
CRbb-300/A	584153	584353		
CTbb-450/A	581154	581354	581554	
CRbb-450/A	584154	584354	584554	
CTbb-600/A	581156	581356	581556	
CRbb-600/A	584156	584356	584556	
CTbb-750/A	581157	581357	581557	581957
CRbb-750/A	584157	584357	584557	584957
CTbb-900/A	581159	581359	581559	581959
CRbb-900/A	584159	584359	584559	584959
CTbb-1050/A	581160	581360	581560	581960
CRbb-1050/A	584160	584360	584560	584960
CTbb-1200/A	581162	581362	581562	581962
CRbb-1200/A	584162	584362	584562	584962

Type	C14/A	C30/A	C50/A	C90/A
	bb = 14	bb = 30	bb = 50	bb = 90
CTbb-1350/A	581163	581363	581563	581963
CRbb-1350/A	584163	584363	584563	584963
CTbb-1500/A	581165	581365	581565	581965
CRbb-1500/A	584165	584365	584565	584965
CTbb-1650/A	581166	581366	581566	581966
CRbb-1650/A	564116	584366	584566	584966
CTbb-1800/A	581168	581368	581568	581968
CRbb-1800/A	584168	584368	584568	584968
CTbb-2100/A			581571	581971
CRbb-2100/A			584571	584971
CTbb-2400/A			581574	581974
CRbb-2400/A			584574	584974
CTbb-2700/A			581577	581977
CRbb-2700/A			584577	584977
CTbb-3000/A			581580	581980
CRbb-3000/A			584580	584980

Scope of delivery includes: COMPACT/AS-i complete with standard mounting bracket set, sliding blocks and screws

**Device specifications and order numbers for light grids C500/A, C400/A, C300/A, C501/A, C401/A, C301/A:**

Example b: CR500A/2/A

Ca bbhA/k/A

- C** : COMPACT  
**a** : T = transmitter, R = receiver  
**bb** : Beam centre to centre distance [cm]  
**h** : Range (0 = 18 m, 1 = 60 m)  
**A** : Only in the version with alkalite front panels (proof against welding sparks)  
**k** : Number of beams (2, 3 or 4)  
**/A** : AS-i device version

<b>COMPACT/AS-i -Safety light grids, 18 m range</b>		<b>Order no.</b>
C500/2/A	2-beam light grid	
CT500/2/A	Transmitter	587502
CR500/2/A	Receiver	588502
C400/3/A	3-beam light grid	
CT400/3/A	Transmitter	587403
CR400/3/A	Receiver	588403
C300/4/A	4-beam light grid	
CT300/4/A	Transmitter	587304
CR300/4/A	Receiver	588304

<b>COMPACT/AS-i -Safety light grids, 60 m range</b>		<b>Order no.</b>
C501/2/A	2-beam light grid	
CT501/2/A	Transmitter	587512
CR501/2/A	Receiver	588512
C401/3/A	3-beam light grid	
CT401/3/A	Transmitter	587413
CR401/3/A	Receiver	588413
C301/4/A	4-beam light grid	
CT301/4/A	Transmitter	587314
CR301/4/A	Receiver	588314

Scope of delivery includes: COMPACT/AS-i complete with standard mounting bracket set, sliding blocks and screws

#### **AS-i Safety accessories**

<b>Article specification</b>	<b>Description</b>	<b>Order no.</b>
APG-02	AS-i programming device for entry of standard/A/B addresses of AS-i slaves	580003
AM06	M12 AS-i bus terminal for AS-i cable	50024346
AKB 01	AS-i cable (1 unit per metre)	50024750
KB-095-1000-3AW	M12 connection lead (1 m, axial/angled)	50024748
KB-095-2000-3AW	M12 connection lead (2 m, axial/angled)	50024749

## AS-i safety monitor ASM1/ASM1E

Article specification	Description	Order no.
ASM1/1	AS-i safety monitor, 1 OSSD	580020
ASM1/2	AS-i safety monitor, 2 OSSDs	580021
ASM1E/1	AS-i safety monitor, enhanced, 1 OSSD	580024
ASM1E/2	AS-i safety monitor, enhanced, 2 OSSDs	580025
<b>Accessories</b>		
ASM1-SWC	ASM1/ASM1E installation set with software, Connecting and Operating Manual, asimon software users' manual, programming cable and device replacement data cable	580032
ASM1-PK	ASM1 programming cable	580030
ASM1-DK	ASM1 device replacement data cable	580031
ASM1-TM	Manual: Connecting and Operating Instructions ASM1/ASM1E	607020
ASM1-SM	Manual: asimon configuration and diagnosis software	607030



# Leuze lumiflex

## EC-Declaration of Conformity

according to EC Machinery Directive 98/37/EC, Annex I C

We, **Leuze lumiflex GmbH + Co.KG**  
 Liebigstr. 4  
 82256 Fürstenfeldbruck

herewith declare that the following described safety components in our delivered version complies with the appropriate basic safety and health requirements of the EC Machinery Directive 98/37/EC based on its design and type, as brought into circulation by us. In case of alteration of the safety components, not agreed upon by us, this declaration will lose its validity.

Description of the safety component: safety light curtain / safety light grid with integrated AS-interface

Safety component Type: **COMPACT/AS-I C14/A, C30/A, C50/A, C90/A, C300/A/A, C400/A, C500/A, C301/A/A, C401/A, 501/A**

Serial number: see type plate

Safety category: AOPD type 4

Safety function: electronic sensitive protective device

Applicable directives and standards: EC machinery directive (98/37/EC)  
 EN 954-1 (1996)  
 EN 61498-1 (1998)  
 IEC 61498-2 (1997)  
 EN 55022 (1998)  
 EN 61000-6-2 (1998)  
 EN 50178 (1997)  
 EN 60204-1 (1997)  
 EN 50295 (1999)

Notified body according to annex VII: TÜV PRODUCT SERVICE GmbH  
 Zertifizierungsstelle  
 Pilsenerstraße 31  
 D-80339 München

Charged to do: EC - type examination  
 Examination certificate no. Z10 04 05 22735 045

CE-marking: **The compliance with the directives 73/23/EEC and 89/336/EEC is certified by the CE-mark.**

Fürstenfeldbruck 27.05.2004

Dr. Volker Lehmitz  
 Manager product unit  
 Safety at work

Werner Lehmitz  
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