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Lumistar Luminaire Lumiflex USL 08 LF-Ex Conforms to UL 1598 & 844 Listed Class I, Div 1 & 2, Groups C & D

CE

3755.312 a

Lumistar Luminaire Lumiflex USL 08 LF-Ex

- **For mounting on sight glass fittings...**
  or for localised illumination of process operations in reactors, vessels and pipelines and also where there is limited space, primarily in potentially hazardous Ex zones.
  The unit is made up of a general-purpose sight glass luminaire that has been modified to provide a fibre optic system which is particularly suitable for use wherever processes in Class I, Divisions 1&2, Groups C&D need to be illuminated.
  The unit can be installed for combined light and sight purposes as well as with VISULEX Ex camera technology.

- **This Lumistar luminaire has been specifically developed for light guide applications and is characterised by its:**
  - Extremely high light output at only 39 W
  - Low energy consumption
  - Servicing intervals: filament lamp life greater than 6,000 hours

- **Applications:**
  For the illumination of process operations and/or the internals of vessels and plant in in potentially explosive environments, where the space available is limited.
  The light source can also be mounted at a distance from a vibrating vessel to extend the bulb life.

- **Protection:**
  Suitable for wet locations acc. to UL-1598 and CSA C22.2 No. 250.0-08, IP65/IP67 (similar to NEMA4+4x), Class I, Div 1 & 2, Groups C & D

- **Operating conditions:**
  Independent of internal vessel pressure/vacuum.
  Lumistar luminaire Lumiflex USL 08 LF-Ex is approved for use in ambient temperatures of up to 60°C.

- **Certified to:**
  CSA C22.2 No. 250 & CSA C22.2 No. 137

- **Protection:**
  - Luminaires for use in potentially explosive environments (UL 844)
  - Electric luminaires for use in potentially explosive environments (CSA C22.2 No. 137-M1981)

- **Explosion Groups:** C & D

- **Temperature class:**
  T5 complies with -20°C to +40°C
  T4 complies with -20°C to +60°C

- **Electrical data and parts:**
  In accordance with type examination certification

- **Power supply:** 120 V AC

- **Operating voltages:**
  Includes integral transformer: primary voltage 120 V AC, secondary voltage lamp bulb (10 V/39 W)

- **Simple electrical connection:**
  - Using integral terminal box; approx. 12.7 mm / ½" NPT connections (3 positions)
  - Connections meet requirements of the National Electric Code®

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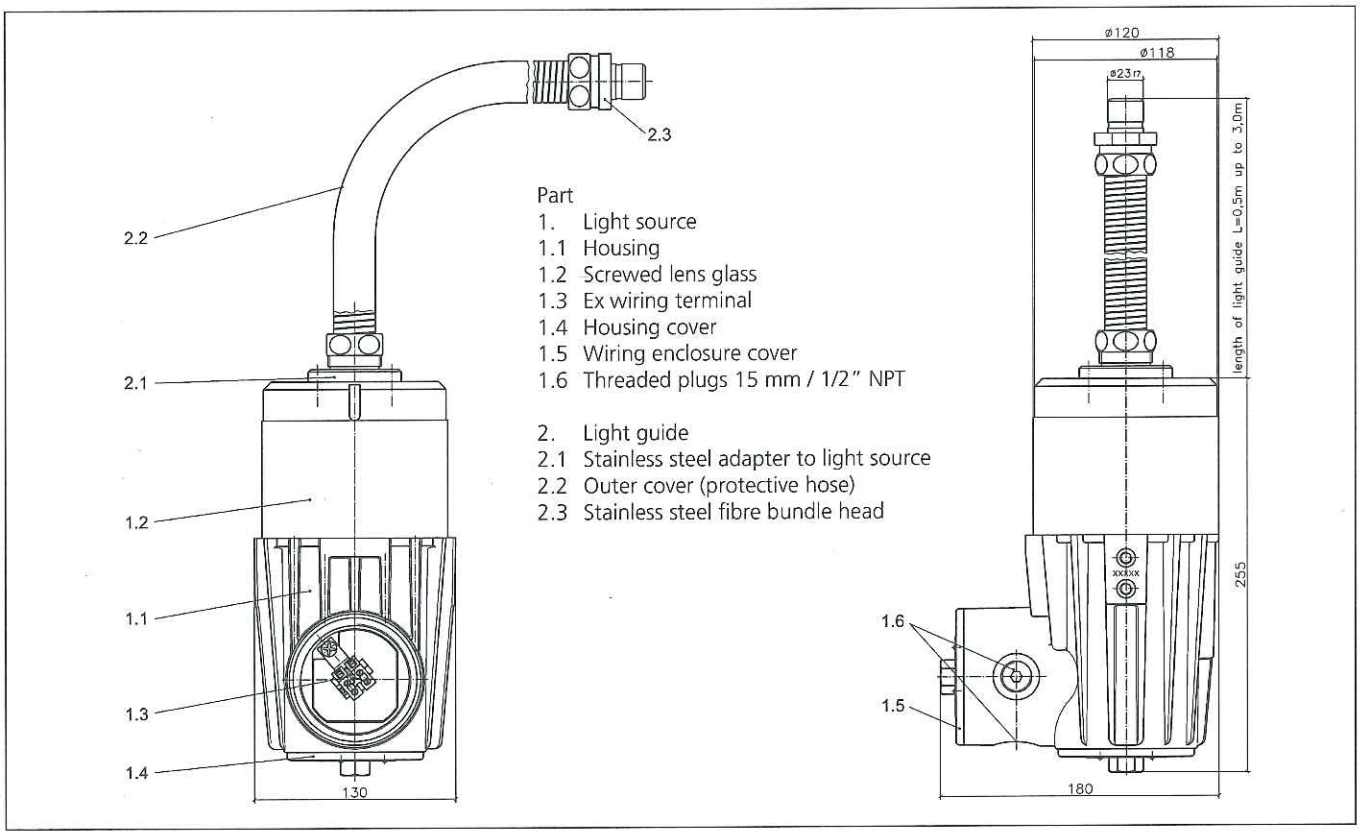
• Dimensions and components of Lumistar luminaire Lumiflex USL 08 LF-Ex:



• Description and materials:

- **Light generator:** non-corrosive cast aluminium alloy, GK-AlSi 12 Mg
- **Light aperture:** unit of aluminium ring, glass and O-ring
- **Fastening elements for light generator:** (2 pieces included in scope of supply) G-AlSi 10 Mg (part no. 0354.005.00)
- **Light guide** (please specify length!) including stainless steel fastening for light guide head (part no. 1947.005.00)
- **Weight:** 4.5 kg (excl. light guide)

• Connecting data for Lumistar luminaire Lumiflex USL 08 LF-Ex:

USL 08 LF-Ex	part no.	power supply V	built-in transformer	halogen lamp voltage wattage	halogen lamp part no.	temperature class at max. ambient temperature G 40°C	temperature class at max. ambient temperature G 60°C
120 V (10 V) 39 W	3540.336.00	120 ~	with	10 V/39 W	3232.280.00	T5	T4

• Order data:

Example: Lumistar luminaire Lumiflex USL 08 LF-Ex, 120/10 V, 39 W, part no. 3540.336.00 with light guide length 1.5 m, part no. 3383.023.00 (see also accessories).

• Straightforward mechanical assembly with special fixture ensures practical applications:

- Caution: Avoid looking into the light source – risk of damage to the eyes!
- The light generator (1) is mounted at a suitable place on the reactor, apparatus, etc., using the fastening element provided. The light guide must be mounted free of tension or twisting with a bending radius of at least 170 mm and installed with the light guide head holder.
- The light guide head (2.3) is screwed to the place to be illuminated using the relevant stainless steel fastening unit.

• Accessories:

- Claw spanner for screw-in lens, for opening the light generator, part no. 6805.002.00
- Light guides are available in the following standard lengths (please specify when ordering):

0.5 m	part no. 3383.021.00
1.0 m	part no. 3383.022.00
1.5 m	part no. 3383.023.00
2.0 m	part no. 3383.024.00
3.0 m	part no. 3383.026.00

Other lengths can be supplied as special versions.

• Warning:

Light should not be operated in hazardous location without fiber bundle securely attached.

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Lumistar Luminaire 'Lumiflex' ESL55LED-ALF-Ex
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

CE 0158

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Lumistar luminaire 'Lumiflex' ESL55LED-ALF-Ex

- **For mounting on sight glass fittings;** ideal for spotlighting processes on machines and reactors where space is restricted; suitable for use in potentially explosive operating areas.

- **This Lumistar luminaire has been specifically developed for light guide technology:**
  - extreme light efficiency thanks to high-power LEDs
  - low energy consumption
  - convenient to service due to long-life high-power LEDs
  - flexible light guide with stainless steel sheath
  - easy to clean

- **Application:**
  For illuminating special processes and/or the interior of reactors, containers and apparatuses in potentially explosive environments, zones 1 and 2 as well as zones 21 and 22.

- **Protection class:** IP 65 and IP 67 acc. to DIN EN 60529

- **Operating conditions:**
  Independent of vacuum/pressure in the vessel.
  Under no circumstances should a sight glass luminaire be used as a substitute for the cover flange or instead of the complete sight glass flange assembly, or on its own to close a vessel port.

- **Lumistar luminaires of this type are approved for use in ambient temperatures of between -20°C and +50°C.**

- **Technical data – Ex protection:**
  This luminaire fulfils the fundamental health and safety regulations by complying with the provisions for:
  a) **Gas**
  EN 60079-0: 2012 + A11: 2013 General requirements
  EN 60079-1: 2007 Flameproof encapsulation 'd'
  Explosion group: IIC (includes IIA and IIB)
  Temperature class: T6 at ambient temperature 50°C
  b) **Dust**
  EN 60079-0: 2012 + A11: 2013 General requirements
  EN 60079-31: 2009: Protection by enclosure 't'
  Explosion group: IIIC (includes IIIA and IIIB)
  Temperature class: T80°C at ambient temperature 50°C

- **EC type examination certificate:** BVS 14 ATEX E 172 X
  (X = The connecting cable must be protected against electrostatic discharge for applications in areas where there is a risk of dust explosions)
  II 2G Ex d IIC T6 Gb
  II 2D Ex tb IIIC T80°C Db

- **Operating voltage:**

24 V	AC/DC	LED 7 W
120-230 V	AC/DC	LED 7 W

  Protected by internal micro-fuse.

- **Voltage type:** AC/DC

- **Simple electrical connection by integrated cable tail or by Ex d cable entry gland**

- **Electrical connection – alternative options:**
  a) Using the factory-fitted, pressure-tight encapsulated power lead (standard length 2 m), which is temperature-resistant up to 110°C, complete with screwed gland. Other cable length available on request: 10 m
  b) By way of cable gland in compliance with EN 60079-14/ Section 10.
  c) Other types of cable glands and cables are shown in the table overleaf.

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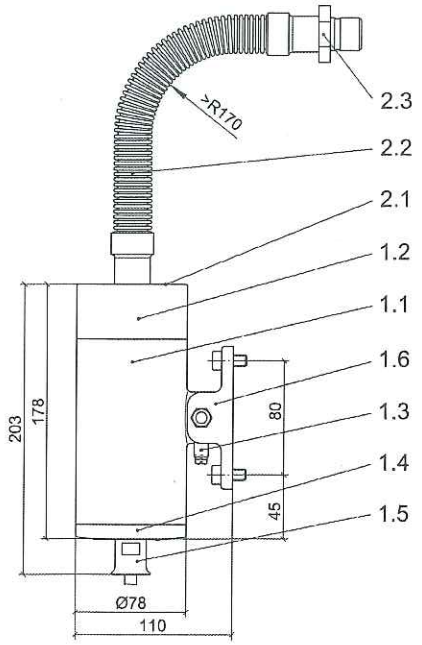
• Dimensions and electrical data for Lumistar luminaire 'Lumiflex' ESL55LED-ALF-Ex



Part
1. **Light generator** (luminaire enclosure)
1.1 Luminaire body 1.4404
1.2 Light port lens 1.4404
1.3 Protective conductor terminal, external
1.4 Cover of terminal box 1.4404
1.5 Cable gland M20 x 1.5 (Ex d)
1.6 Mounting attachment for luminaire

2. **Light guide** stainless steel
2.1 Attachment to light generator
2.2 Protective hose
2.3 Light guide head

• Description and materials:

- **Light generator:** non-corrosive stainless steel 1.4404
- **Light aperture:** unit consisting of stainless steel ring, glass and O-ring
- **Fastening elements for light generator:** bracket (included in scope of supply), stainless steel 1.4301, part no. 0354.031.00
- **Light guide** (please specify length!) stainless steel attachment for light guide head (part no. 1947.005.00
- **Weight:** 3.9 kg (excl. light guide)

• Connecting data for Lumistar luminaire 'Lumiflex' ESL55LED-ALF-Ex:

ESL55LED-ALF-Ex	Part No.	Mains voltage	Temperature class at ambient temperature -20°C to +50°C
24 V 7 W	3541.367.00	24 V AC/DC	T6 / T80°C
120 V-230 V 7 W	3541.368.00	120 V-230 V AC/DC	T6 / T80°C

• The following cable glands and cables should only be used in combination:

Cable gland types
HSK-M-Ex-d, part no. 9103.124.00 M20x1.5,1.4404 (from Hummel)
KU1BPM20-Ex-d-Alpha X part no. 9103.131.00 M20x1.5, Edelstahl (from RST)

Cable types
EVA sheathed cable, Sinotherm 110, part no. 3403.017.00, 3x1.5 qmm, ø 8.5 mm
Ölflex Heat 180, part no. 3403.045.00, 3x1.5 qmm, ø 8.9 mm
Ölflex Heat 180, Silflex UR-AWG18, part no. 3403.044.00, 5x1.0 qmm, ø 10.3 mm
Ölflex Classic 110 Black, part no. 3403.051.00, 3x1.5 qmm, ø 10.1 mm

• Straightforward mechanical installation using special fixture for practical application:

- Caution: avoid looking into the light source – risk of damage to the eyes!
- The light generator is mounted at a suitable place on the reactor, apparatus, etc., using the fastening element provided. The light guide must be mounted free of tension or twisting with a bending radius of at least 170 mm, together with the holder bracket of the light guide head.
- The light guide head is screwed to the place to be illuminated using the relevant stainless steel fastening unit.

• Accessories:

- Light guides are available in the following standard lengths:
  0,5 m part no. 3383.021.00
  1,0 m part no. 3383.022.00
  1,5 m part no. 3383.023.00
  2,0 m part no. 3383.024.00
  3,0 m part no. 3383.026.00
  Other light guide lengths can be supplied as special accessories.

• Order data:

e. g. Lumistar luminaire 'Lumiflex' ESL 55-LED-ALF-Ex,
230 V/7W, part no. 3541.368.00
light guide, length 1.5 m, part no. 3383.023.00
bracket for light guide head, part no. 1947.005.00

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Lumistar Luminaire REL 01/REL 01-Ex, Stainless Steel

II 2G Ex ia IIC T4/T5/T6 Gb
I M2 Ex ia I Mb

• For mounting on rectangular sight glass units.

The REL 01 is a sight glass luminaire that has been specifically designed for attaching onto the side of rectangular sight glass units to achieve a combined sight and light port, enabling the convenient observation of filling levels. Lumiglas supply this stainless glass luminaire in two versions for use in potentially explosive environments and for normal operating conditions.

The Lumistar luminaire REL 01/REL 01-Ex is a complete unit ready for fitting. It is attached directly to the cover flange of a rectangular sight glass unit by means of two screws.

• Compact design, high light output, low energy consumption:
21 special LEDs ensure dazzle-free illumination. Together with the corresponding electronic switchgear, these LED are resin-cast into the **stainless steel housing** which is then secured to the rectangular fitting.

The service life of this luminaire is virtually unlimited; even if one of the diodes fails after a long period of operation, the remaining LED still provide more than enough light intensity.

• Application:
Designed for use with rectangular / longitudinal sight glass units installed in bioreactors, laboratory mixers, filters and, generally, all normally closed tanks, agitators, separators, pipelines and other vessels operated in explosion-hazardous environments (Zones 1 and 2) as well as in non-hazardous work areas.

• Suitable for use in the food processing sector

• Type of protection:
Provided the luminaire has been properly installed, it is dust- and splash-proof, IP65 acc. to DIN EN 60529/DIN VDE 0470 Part 1.

• Operating conditions:
- Independent of the internal pressure/vacuum in the vessel.
- Maximum admissible ambient temperature 80°C when used in non-hazardous environments.
- When installed in Ex-rated areas, the maximum ambient temperature is between -5°C and +60°C

• Certification
EC Type-Examination Certificate DMT 02 ATEX E 234 X
II 2G Ex ia IIC T4/T5/T6 Gb
I M2 Ex ia I Mb

• Technical data Ex protection:
- These luminaires meet the essential safety and health regulations by complying with the directives:
- EN 60079-0: 2012 General Requirements
  EN 60079-11: 2012 Intrinsic Safety 'i'
- Explosion group: IIC (includes IIA and IIB)
- Temperature classes: up to T6 (depending on power)

CE 0158

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Lumistar luminaire REL 01, attached to the cover flange of a rectangular sight glass unit, side view

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• Electrical data and components:
- Voltage: AC or DC
- Operating voltage: 24 V
- Power consumption: max. 2 W
- The Lumiglas lminaire REL 01 is supplied complete with 3 m connecting cable, 3 x 0.75 mm²; heat-resistant between -10°C and +90°C.

• Electrical data for installation in potentially explosive environments:
The Lumistar luminaire REL 01-Ex can be operated by appropriate series connected control gear (e. g. safety barriers, binary outputs, current supplies) in auxiliary circuits (see adja - cent drawing).

• Power circuit:

Voltage	U_i	AC/DC 30 V
Current	I_i	250 mA
Power	P_i	see "Temperature class" chart

Internal effective capacitance	C_i	negligible
Internal effective inductance	L_i	negligible

• Temperature class in relation to ambient temperature:

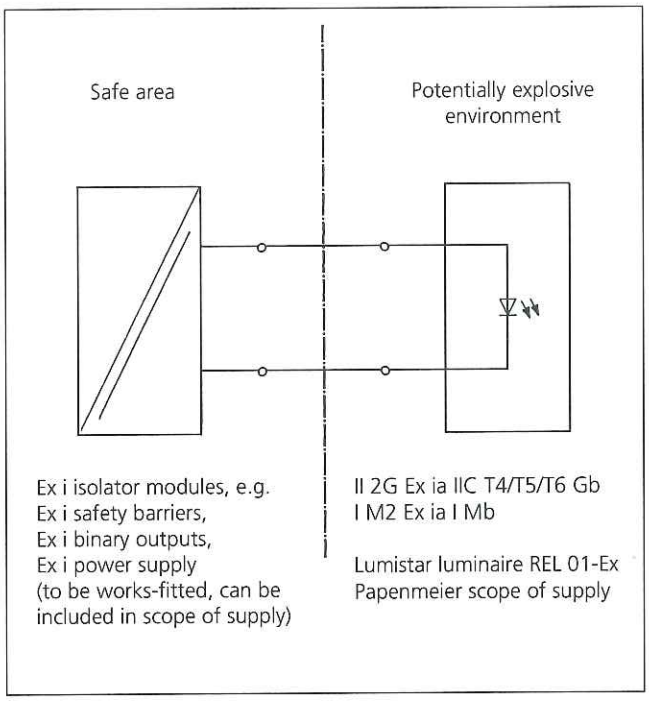
Temperature class	Max. permissible ambient temperature T_a	Power con-sumption P_i
T1 to T4	60°C	2.0 W
T5	60°C	1.5 W
T6	40°C	1.0 W

• Special requirements/conditions to ensure safe operation:
The light emitting diode module REL 01-Ex is suitable for use in ambient temperatures ranging from -5°C to +60°C.

The sight glass lumiaire should be fitted into or onto a housing that provides protection to at least IP20 as set out in EN 60529 for light emitting diode lines.

Internal wiring inside this enclosure shall compy with require-ments specified in clauses 6.3.12 and 7.6e of EN 60079-11.

When installing the sight glass luminaire type REL 01 it must be ensured that there is an air gap of at least 3 mm between the intrinsically safe circuit and any metal housing elements, and a gap of at least 50 mm between connecting components or bare parts of non-intrinsically safe circuits in other components (power supplies), or that they are isolated from the same by a separating wall conforming to 6.3.2 of EN 60079-11.



Front view of rectangular sight glass unit, length 250 mm, with side-mounted Lumistar luminaire REL 01 in stainless steel

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- **Components and materials:**
  - Luminaire housing and fastening parts: stainless steel 1.4301
  - Resin compound: silicone rubber
  - Ordering details:
    Lumistar luminaire REL 01 or REL 01-Ex
    part no.: 3544.130.00

- **Important, please note:**
  If this luminaire is to be used in explosion hazardous environments, it is essential that it is connected to an intrinsically safe power supply circuit. We will be pleased to quote you for the relevant components.

- **Simple installation thanks to special integrated carrier plate:**
  Caution: Do not look into light – Danger of impaired eyesight!

  The Lumistar luminaire REL 01 is provided with an integrated carrier plate with a 60 mm oblong hole at either end.

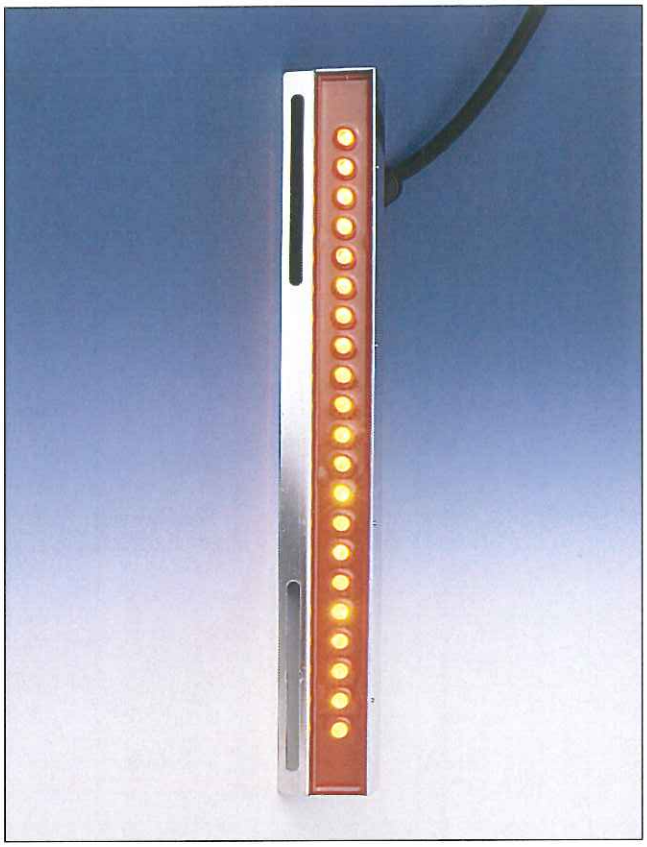
  The luminaire is attached to the cover flange of the rectangular sight glass fitting by means of the two M4 screws included with the unit. Two M4 blind holes have to be drilled and tapped in the appropriate positions to correspond with the rectangular sight glass unit, thus ensuring that the luminaire can be optimally matched up and screwed in place.

  The flat and spring washers provide for a secure fastening.

  To maximise the lighting effect and avoid dazzle, a reflector plate is supplied with the REL 01. This can be fitted onto the opposite side of the cover flange if necessary.

  After mechanical installation, the luminaire is ready for electrical connection.

  The luminaire is optimally designed for use with a 250 mm long rectangular sight glass unit.
  Additional Lumistar luminaires REL 01 can be installed if the fittings are longer.



Lumistar luminaire REL 01, luminary side

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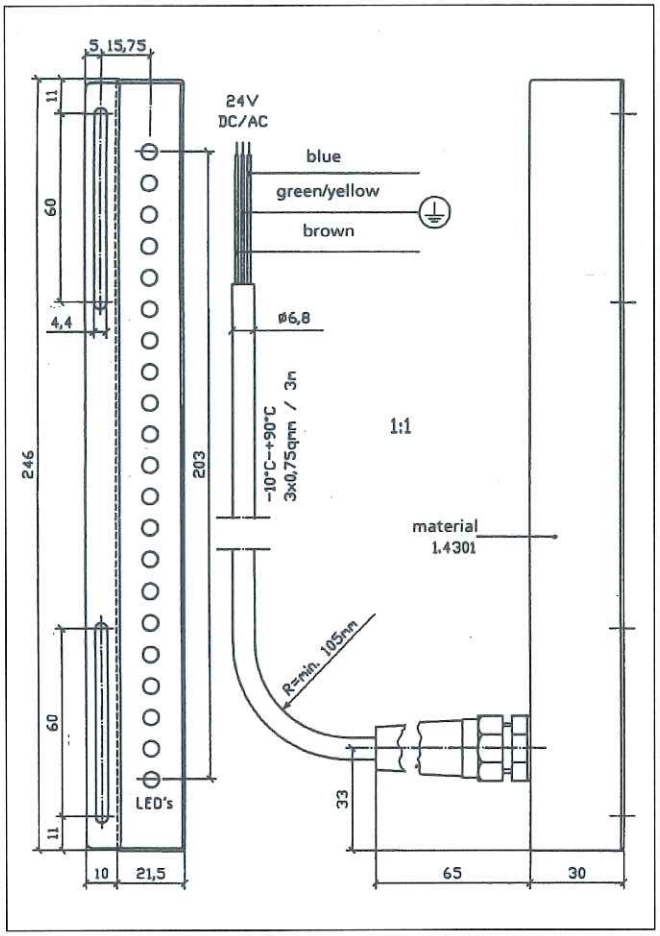
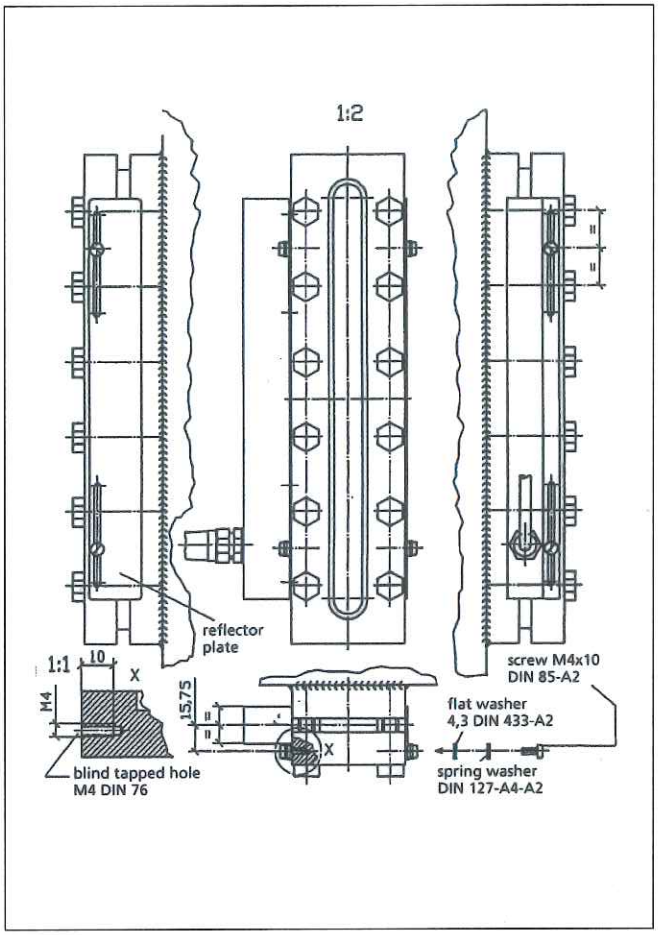
• Dimensions and electrical data for Lumistar luminaires REL 01 and REL 01-Ex:





All dimensions in mm unless stated otherwise. Subject to change without prior notice. 09.15

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Lumistar Ex vehicle luminaires for special vehicles operating in potentially explosive environments

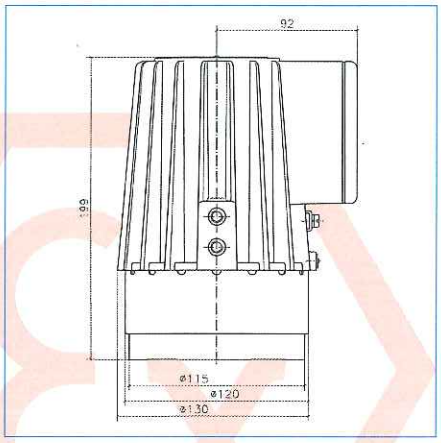
3755.273 b

Luminaires for vehicles used in Ex category environments must not only meet all requirements on driving safety, but also need to comply with the Ex directives specified by ATEX. At the same time, they are expected to be reasonably priced.
These complex demands are met by Lumistar Ex vehicle luminaires which are approved for use in potentially explosive environments: Gas: zone 1 and 2; Dust: zone 21 and 22.

1. Front lamp or reversing light

Lumistar Ex vehicle luminaire type USL 07-Ex

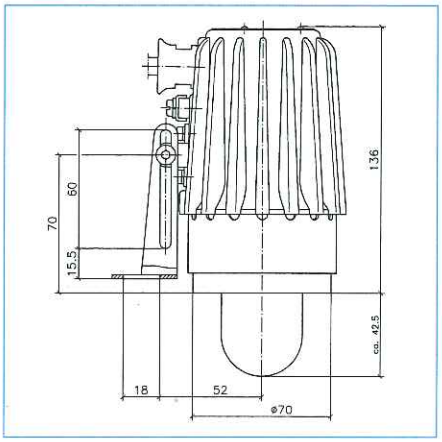
- **Rated voltage:** 24 V AC/DC
- **Certification:** EC Type-Examination Certificate BVS 08 ATEX E 136
  Ex II 2G Ex de IIC 120°C Gb
  II 2D Ex tb IIIC T120°C Db
- **Dimensions:**



2. Flashing light

Lumistar Ex flashing luminaire type USL 45A-Ex

- **Rated voltage:** 12 V, 24 V AC/DC, with 5 W halogen lamp
- **Connecting lead:** 5 m H07RN-F, 3x1.0 mm² (included)
- **Flasher relay:** required externally (installed in vehicle!)
- **Certification:** EC Type-Examination Certificate BVS 08 ATEX E 134
  Ex II 2G Ex d IIC 120°C Gb
  II 2D Ex tb IIIC T120°C Db
- **Dimensions:**



- **Application:**
  Primarily used on special vehicles operating in the industrial sector, such as fork lifters, stacker trucks, tank trucks, etc., that are mainly driven in explosion hazardous environments.

- **Variants of Lumiglas VISULEX Ex vehicle luminaires:**
  1. Driving lights – front headlight or reversing light
  2. Flasher – direction indicator (front)
  3. Combined brake light, rear lamp and rear flasher

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1. Lumistar Ex vehicle luminaire type USL 07-Ex with terminal box

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2. Lumistar Ex flashing luminaire type USL 45A-Ex with accessory: stainless steel mesh guard with hinged bracket

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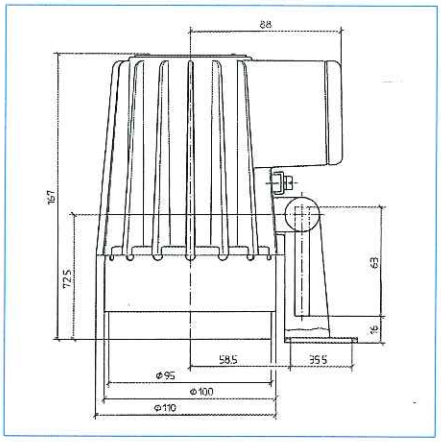
3. Combined brake light, rear lamp and direction indicator flasher

Lumistar Ex combination luminaire type USL 46-Ex

- **Rated voltage:** 12 V, 24 V DC with 7 W LED illuminant
- **Certification:** EC Type-Examination Certificate
  BVS 08 ATEX E 135
  Ⓔx II 2G Ex de IIC 120°C Gb
  II 2D Ex tb IIIC T120°C Db
- **Mounting:** Using either a hinged bracket or a (customised) three-point fastening
- **Dimensions:**



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Lumistar Ex vehicle luminaire,
type USL 46-Ex with terminal box

4. Criteria for all Lumistar Ex vehicle luminaires:

- **General technical data:**
  - Protection: IP65 and IP67 acc. to DIN EN 60529
  - Ambient temperature range: -20°C to +40°C

- **Explosion protection:**
  These lamps meet the essential health and safety regulations by complying with the directives for

  a) Gas

EN 60079-0:2012	General Requirements
EN 60079-1:2007	Flame-proof Enclosures
EN 60079-7:2007	Increased Safety (relates to terminal box)
Explosion group:	IIC (covers IIA and IIB)
Temperature class:	120°C

  b) Dust

EN 60079-0:2009	General Requirements
EN 60079-31:2009	Protection by Enclosures
Explosion group:	IIIC (covers IIIA und IIIB)
Temperature class:	T120°C

- **Components, design and materials:**
  - Body of luminaire: corrosion-resistant cast aluminium alloy, GK-Al Si 10 Mg
  - Lens: unit consisting of aluminium ring and glass with O-ring seal
  - USL 45 A-Ex:
    Screw-on glass lens with calotte: Unit consisting of aluminium ring with polycarbonate (Makrolon) calotte.

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Lumistar Timer for Ex- and Non Ex-hazardous areas, internal

The integrally fitted Lumistar timer enables the unit to be switched on directly or indirectly. After a preprogrammed interval (appx. 5 minutes) the luminaire is automatically switched off.

- **Application:**
  For better utilisation of theoperating life of the halogen filament lamp, and particularly useful where visual inspection procedures is only passing and brief illumination of vessel internals is required. Also saves power and keeps temperature down.

  The Lumistar timer is so compact that it will fit into almost all more sized Lumistar luminaires:

  Lumistar luminaires for non Ex hazardous areas:
  - Lumistar luminaires type Lumistar, size 175 to 225
  - Lumistar luminaires type USL, beginning from USL 06

  Lumistar luminaires for Ex hazardous areas:
  - Lumistar luminaires type USL, beginning from USL 06-Ex
  - Lumistar light guide luminaire USL 07 LF-Ex „Lumiflex"

- **Protection:** corresponds to luminaire specification

- **Fitting and function:**
  The Lumistar timer is either fitted or can be retrospectively fitted at manufacturer`s works into the relevant Lumistar luminaire.

- **Two alternative operating functions can be used:**
  Once voltage is applied to the luminaire, the timed lighting starts automatically and runs for a period of around five minutes.

  1. Remote control
  If the applied voltage is momentarily interrupted (for about 1 or 2 seconds), for instance by pressing a pushbutton (break contact), the automatical process is restarted.

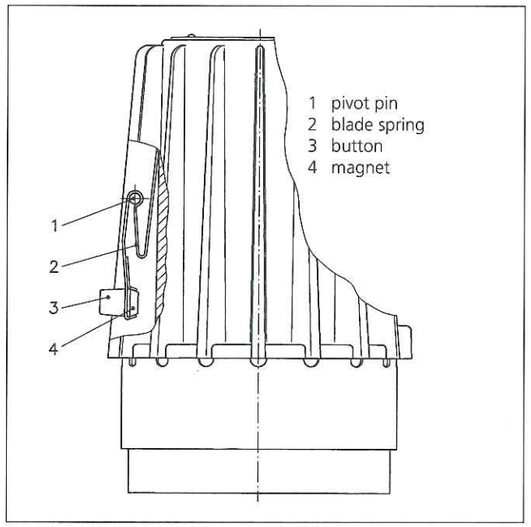
  2. Direct control
  The automatical process is restarted by a spring-loaded lever or a pushbutton located on the outside of the Lumiglas luminaire housing (depending on the version).

- **Operating voltage:** 12 V, 24 V, 120 V, 230 V

- **Power:** max. 50 W (12 V)
  max. 100 W (24 V, 120 V, 230 V)

3755.182 d

Lumistar timer as optional feature
for Ex- and Non Ex-Lumistar luminaires



Switching mechanism

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Lumistar Timer for Ex hazardous areas, external

II 2G Ex d e mb IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

Electronic timer as a stand-alone unit, particularly suitable for use with Lumistar luminaires and other electrical equipment operated in potentially explosive environments.

- **This data sheet also serves as installation and operating instructions**

- **Applications:**
  The timer enables consumer loads, such as e. g. the illumination system for process sequences, to be operated in a time-dependent manner. The timer is wired into the power line to the consumer load, consequently allowing the power to be switched according to the time setting.
  Pressing the button of the combined push-button/selector switch activates the consumer load for the preset time which has previously been programmed to meet the customer's specific needs. Continuous ON mode can also be selected via the combined push-button/selector switch. Alternatively, the device can be programmed to function as a flashing relay.

- **General operating conditions:**
  - Approved for use in potentially explosive environments, Zones 1 and 2 as well as Zones 21 and 22
  - Ambient temperatures: -20°C and +40°C

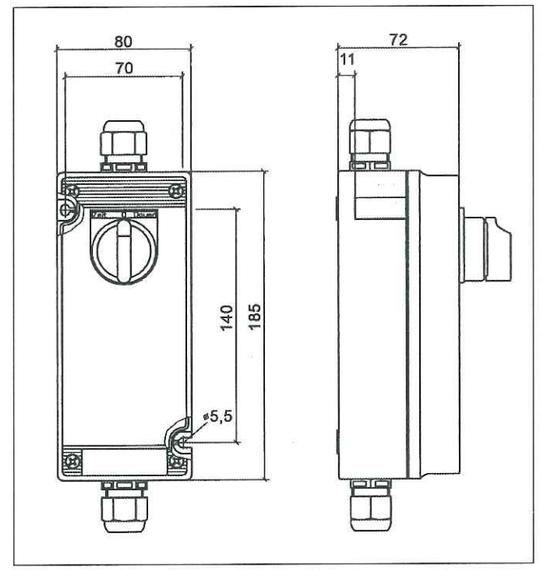
- **Function:**
  1. As a timer
  The combined push-button/selector switch on the front of the timer housing has a zero setting (marked 'off'), a momentary-contact switch (marked 'time') and a latched position for continuous operation (marked 'on').
  Turning the switch anti-clockwise starts the timer and turns on the power to the consumer load. Once the preset time has elapsed, the consumer is automatically switched off. By actuating the push-button again before the programmed time has elapsed, the timer will start a full cycle again.
  Turning the operating switch (clockwise) to the notched position will switch on the consumer load until the operating switch is returned to the zero position. The device will then remain in operation for the total preset time, after which it will finally switch off.
  2. As a flashing relay
  If the device is intended as a flashing light relay – the relevant programming and predefinition is carried out by the manufacturer – the flashing function is switched on once the supply voltage is applied. The combined push-button/selector switch is not in operation in this mode and is set to '0'. The flashing sequence stops once the power supply is interrupted.

- **Setting the time or flashing sequence:**
  The time sequence is variable between 10 sec. and 60 min.
  In flashing mode, the 'on' and 'off' phases can be independently set at between 1 sec. and 20 sec.
  Example: 'on' for 5 sec. – 'off' for 10 sec., etc.
  The data is factory-set by the manufacturer acc. to the customer's specifications and indicated on a label affixed to the device.
  Apart from the designated function of the unit as a 'Timer' or as a 'Flasher', the time interval in the case of the timer and the flashing sequence for the flasher function are also shown.

CE 820

3755.183 c

Lumistar timer for Ex hazardous areas



Dimensions for Lumistar timer

- **Please note:**
  Any intended reprogramming or modification to the function or the time cycles must be carried out outside the potentially explosive area and only by appropriately trained personnel of the manufacturer (F.H. Papenmeier GmbH & Co. KG) who shall use tools and equipment specially designed for this purpose.

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• Variants of the Lumistar timer:

Item	Nominal voltage AC/DC	Part no.
1	230 V - 240 V	8670.046.00
2	115 V - 120 V	8670.047.00
3	24 V	8670.048.00

• Order data:

When ordering, please state the required time setting or flashing frequency, as the case may be!

Example of order details:
Lumistar timer for Ex areas, 24 V,
Part no.: 8670.048.00, 6 min.
or
Lumistar timer for Ex areas, 115/120 V,
Part no.: 8670.047.00, flashing frequency: 10/15 sec.

• Technical data:

EC Type-Examination Certificate	ZELM 06 ATEX 0301 and 3rd Supplement Ⓔx II 2G Ex d e mb IIC T6 Gb / Ⓔx II 2D Ex tb IIIC T80°C Db
Explosion group	IIC and IIIC
Temperature classification	T6 equivalent to T80°C
Type of protection	IP66 to EN 60529/DIN VDE 0470 Part 1
Operating voltage AC/DC	Alternatively: 230-240 V; 115-120 V; 24 V
Ambient temperature	$-20°C \leq T_a \leq +40°C$
Termination	Max. 2.5 mm², finely stranded wire
Output contacts	1 make contact element
Nominal current	Max. 12 A
Switching capacity AC	Max. 3000 VA
Switching current DC	Alternatively: max 230 V, 0.3 A / 110 V, 0.45 A / 24 V, 12 A
Housing	Polyester resin (GF)

Installation Instructions

• Important precautions:

The timer should only be installed, connected and serviced in explosion-hazardous areas by personnel who have been specifically qualified and authorised to do such work.
The requirements of EC Type-Examination Certificate ZELM 06 ATEX 0301, incl. the 3rd Supplement thereto, must be observed.
The type approval for this equipment will become void if it is improperly used.

• Electrical termination:

The timer is to be wired into the supply line to the consumer load. Cables with a cross-section of 6-13 mm should be used for the M20 x 1.5 cable entry gland.

The applicable set-up regulations acc. to DIN EN 60079-14 must be observed.

To connect the timer, the housing lid is first removed by unscrewing the fastening screws. A wiring diagram is provided inside the lid. The operating voltage is connected to terminals 1 and 3. The switching contact is between terminals 5 and 6. The load cores are connected to terminals 2 and 5. If a potential-free make contact element is used, the works-fitted wire jumper between terminals 4 and 6 should be removed.

Once the equipment has been installed, the housing lid is screwed on again, making sure that the seal is properly fitted.

• Fuse protection:

A 16 A back-up fuse should be provided in the power line.

• Norms:

EN 60079-0:2012 + A11:2013
EN 60079-1:2007
EN 60079-7:2007
EN 60079-31:2009
EN 60079-18:2009

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Lumiglas Timer

Externally located electronic timer, primarily for Lumistar luminaires and other electrical equipment

- Developed specifically for Lumistar luminaires
- Numerous time-setting options
- Timer can be retrofitted into existing systems
- Version with permanent operation switch is available

• **Time settings:** from 0.1 seconds to 20 hours

• **Protection class:** IP 65

• **Switching capacity, max.:**

Switching capacity Lumiglas timer		
	1 CO (SPDT) 16 A 250 V AC	
	AC1	4000 VA
	AC15 (230 V AC)	750 VA
	Ⓜ (230 V AC)	0,55 kW
	DC1 (30/110/220)V	(16/0.3/0.12)A

• **Cable entry gland:** 2 x M20x1.5 for cable 7-13 mm

• **Application temperature:** from -10 to +50°C

CE 3755.320

Lumiglas Timer in synthetic housing

Lumiglas Timer, stainless steel version

• **Bestellvorgaben:**

Lumiglas Timer	Version	Product No.
Without permanent operation switch	Stainless steel housing	8670.042.00
Without permanent operation switch	Plastic housing	8670.051.00
With permanent operation switch	Stainless steel housing	8670.043.00

All dimensions in mm unless stated otherwise. Subject to change without prior notice. 05.15

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Lumiglas Signalling Device M55-BD-Ex
Ⓔx II 2G Ex d IIC T6 Gb
Ⓔx II 2D Ex tb IIIC T80°C Db

CE 0158 3755.359 a

Lumiglas signalling device M55-BD-Ex

The smart motion detector/twilight switch:

- The smart motion detector/twilight switch: The M55-BD-Ex automatically switches the light or other users in potentially explosive (Ex) indoor or outdoor areas on and off again.
- Although it has been designed for explosion-protected environments, it can also be used in non-hazardous areas.
- The motion detector is equipped with radar sensor technology and the twilight switch is operated by an optical sensor.
- Implementing the M55-BD-Ex ensures energy-saving operation.
- Numerous applications are feasible thanks to the wide variety of sensor setting options. For instance, the motion detector and twilight switch can be used either separately or in combination.
- Typical applications are:
  - Alarm when entering hazardous areas
  - Switching lights on and off depending on brightness and/or motion
  - Useful as a signal generator for acoustic and optical devices (e.g. horns, warning lamps)
  - Leakage detector on or below container and/or installations (responds to drops)
- Potential-free contact means that the M55-BD-Ex can also be used to generate signals for other control units.
- Stainless steel body: 1.4404

• **Protection class:** IP 65 and IP 67

• **Operating conditions:**
Under no circumstances should the movement/brightness detector M55-BD-Ex be used to replace the cover flange or the complete sight glass fitting nor on its own as a closure for a vessel port.

• **For use in ambient temperatures: -20°C to +40°C**

• **EC type examination certificate:** BVS 15 ATEX E 057 X
Ⓔx II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

• **Operating voltage:** 230 V AC or 24 V AC/DC

• **Special conditions to ensure safe use:**
- Minimum length of connecting cable: at least 1 meter
- The connecting cable should be installed to ensure that no electrostatic hazard can occur

• **Convenient electrical connection with integrated connecting cable**

• **Mounting options:**
- Attachment using the hinged bracket included in the scope of supply, stainless steel 1.4301
- Alternative securing options on request

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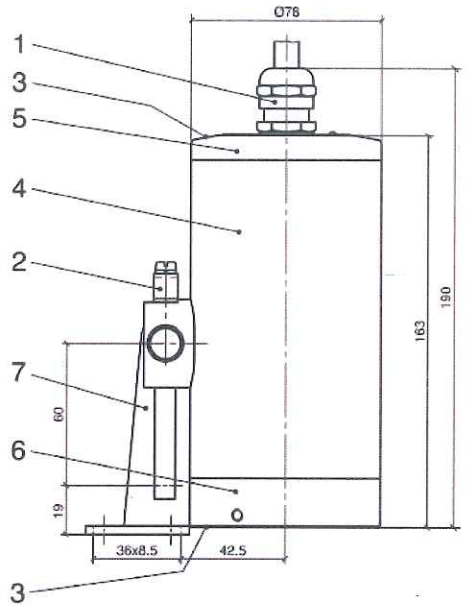
• Dimensions and technical data for Lumiglas signalling device M55-BD-Ex:



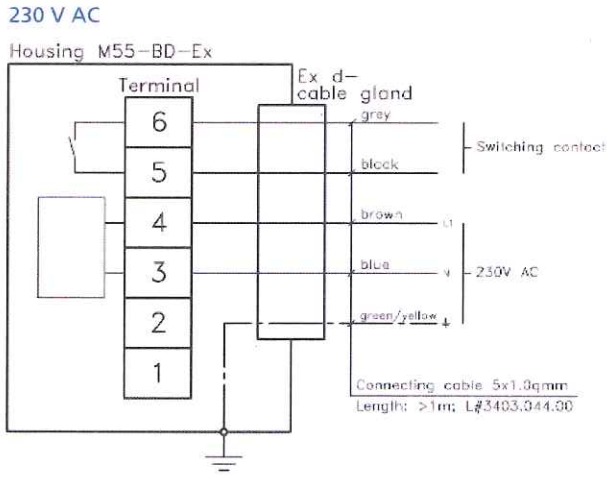
1 Ex d cable entry gland M20x1.5
2 External protective conductor terminal
3 Locking screws M4 A2-70
4 Body of detector
5 End cover
6 Sight glass
7 Mounting attachment (hinged bracket)

• Parts, description and materials:

- Body: stainless steel 1.4404
- Hinged bracket for attachment: stainless steel 1.4301
- Aperture for the sensors: borosilicate glass

- Weight incl. hinged bracket and 3 m connecting cable 3 x 1 mm²: 3.9 kg

• Electrical connection:



- Rated power of electronics: 5 W
- The potential-free contact (relay) switches up to 250 V AC / 5 A / 1250 VA
- Coverage of radar sensor: 72° horizontal and 60° vertical
- Radar sensor range: approx. 10 m
- Sensitivity of radar sensor is adjustable via switch
- Signalling time of switching contact is adjustable via potentiometer (between 5 sec. and 3 min. – other times possible)
- Twilight sensor range adjustable via potentiometer (1-1400 Lux)

Item	Type	Voltage V	Part no.
1	M55-BD-Ex	230 V AC	1702.702.00
2	M55-BD-Ex	24 V AC/DC	1702.701.00

• **Accessories:** Ex-e terminal box 8118, part no. 2507.020.00
Protective hood for outdoor applications, part no. 1988.026.00

• **Order data:** M55-BD-Ex, 230 V AC (part no. 1702.702.00), 5 m connecting cable, protective hood (part no. 1988.026.00)

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VISULEX camera systems Ex and non-Ex 8

data sheet no.

VISULEX camera systems Ex

VISULEX Ex-camera K06A-Ex, aluminium housing	3755.376
VISULEX Ex-camera K07ZP-Ex/K07ZN-Ex, aluminium housing	3755.377
VISULEX Ex-camera K25ZP-Ex/K25ZN-Ex, stainless steel housing	3755.309
VISULEX Ex-camera K55P-Ex/K55N-Ex, stainless steel housing	3755.381
Application questionaire for VISULEX Ex-camera systems	3755.219

VISULEX camera systems non-Ex

VISULEX camera K15-P-D/K15-N-D	3755.425
VISULEX camera K15-P-E/K15-N-E	3755.428
VISULEX camera K15ZP-E/K15ZN-E	3755.429
VISULEX camera K55-P/K55-N	3755.379

07.15 3755.187 I

Process observation and visual control system

lumiglas®

VISULEX Ex Camera System

Insight with far-sight: control and remote monitoring of operations in explosion-hazardous and non-explosive environments

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Lumiglas VISULEX Ex-camera system`insight with far-sight´

For inspection and remote observation of process operations, particularly in explosive environmentsand for monitoring objects that are not normally accessible via remote control.

Ex-cameras have a stainless steel housing, making them ideal for use in sterile room technology.

Greater safety, less down-time:
the continuous availability of visual process data in a central control room saves considerable costs as well as work and travel time.

On-site inspections of critical production areas or external facilities are no longer necessary – a significant contribution to accident prevention!

The Lumiglas VISULEX Ex-camera system meets these requirements with optimum cost effectiveness.

Visual process data is displayed for control and evaluation purposes and is also available for further image processing using on-screen or PC technology.

This enables, for instance, the digital storage of the entire process sequence for traceability purposes.

Supplementary to this, **Lumiglas Ex-luminaires** provide ideal lighting conditions to illuminate the object to be observed.

Ex-camera variants with zoom lens can also be operated by remote control from a control room in a non-ex area. The observer can thus adjust the camera settings to meet specific requirements.

Particular advantages are offered by the `Lumicam´ system and control software developed by Lumiglas VISULEX, which is included in the price of the camera.

This Lumicam software package (with Windows interface) provides the user with the following functions for controlling the installed Ex-camera via either a PC or a notebook:

Precision adjustment of:
- Zoom
- Focus
- Aperture, shutter, gain
- Date and time
- Preset functions

Image processing and storage

Image transmission in real time:
- Company-wide via LAN
- Worldwide via Internet/Videowebserver

All the advantages at a glance:
- Compact size of Ex-camera
- Simple installation and operation
- Minimal space requirement
- Data transfer in the Ex environment up to 500 m via video cable or worldwide via web
- Image presentation on screen or PC
- Storage option for single images or video sequences
- Presentation facility for large viewer groups
- Ideal combined with Lumiglas Ex-luminaires or fibre optic technology

Single-source solutions:
- Lumiglas offers complete, project specific services, tailored to the technical requirements of the plant operator. These include installation, commissioning, and PC link-up with all the necessary components.
The costing in these cases is on an individual project basis.
A performance specification is drawn up on the basis of a checklist.

Lumiglas VISULEX Ex-camera with fixed lens, type K 06-Ex, aluminium

Lumiglas VISULEX camera (non Ex) with fixed lens, type K 15, stainless steel

Lumiglas VISULEX Ex-camera with zoom lens, type K 25-Ex, stainless steel

Ex-camera technology

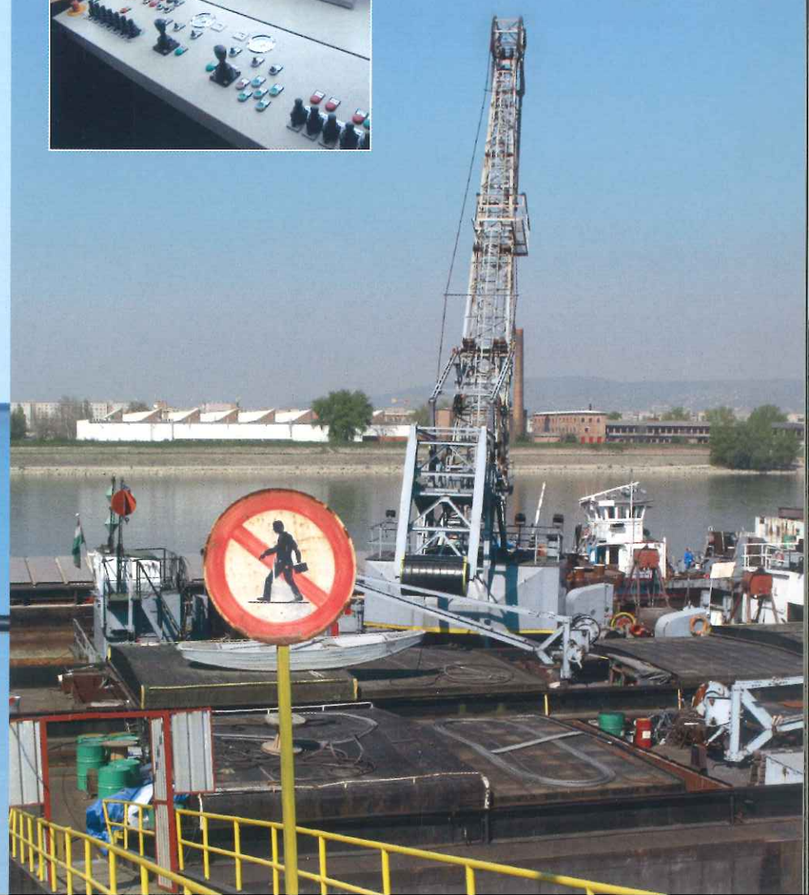
How does the camera system work?
The central element is the Lumiglas Ex-camera: this can be installed on a sight glass fitted to the reactor or set up to control outdoor objects such as gates, buildings or enclosures.

The combination that warrants consistently good viewing: Ex-camera, Ex-sight glass luminaire, wiper mechanism and spray device.

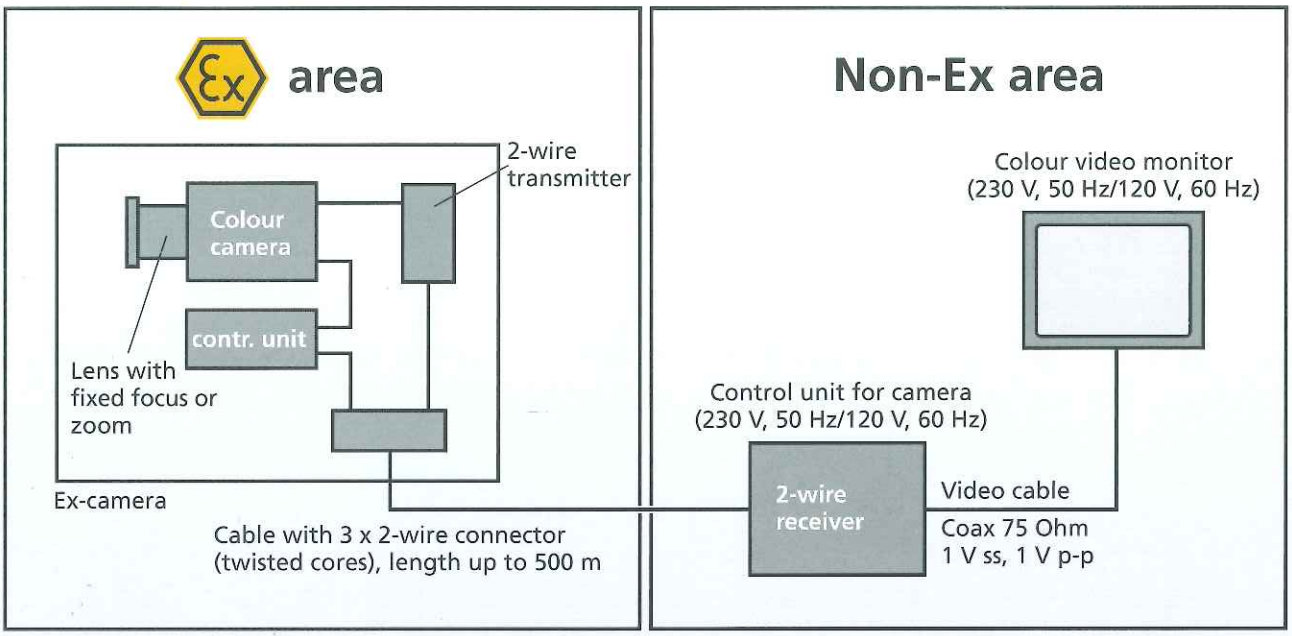
The images recorded by the camera in the ex-hazardous area are transmitted via cable to the control room and shown either on the screen of a PC (enabling further image processing) or a standard monitor.

A control unit wired into the circuit provides power for the camera and for controlling the data transfer and zoom lens.

Lumiglas VISULEX Ex-camera with zoom lens, type K 07-Ex, aluminium



Block wiring diagram Lumiglas VISULEX Ex-camera system:



Connecting the Ex-camera to a monitor and/or PC:

Monitor:
Any type of standard industrial monitor can be connected, provided it complies with the following specifications:
- Power supply: 230 V, 50 Hz or 120 V, 60 Hz
- Receive signal: 75 Ohm 1 V ss
- 75 Ohm BNC coaxial cable required

PC system requirements for LumiCam software:
- Mains connection, Ethernet 1000
- Windows 2000, XP-SP3, Win 7 and Win 8
- Screen resolution: at least 800 x 600 pixel
- Intel Pentium 4 processor or higher

The main functions of the Ex-camera can be accessed via the PC or the control unit.

Please ask for detailed technical data sheets for all Ex-camera versions including control unit!

We will be happy to arrange a personal meeting with you and provide a practical demonstration.

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VISULEX Ex-Camera K06A-Ex

II 2G Ex de IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

CE 0158 3755.376 d

VISULEX Ex-Camera K06A-Ex with fixed lens

- **Camera with fixed lens K06A-Ex:**
  During the installation process, the fixed lens of this standard camera is preset to focus on the object to be monitored (outdoor area/outdoor facility, or technical process components such as pressure vessels or agitators).

- **Design and applications:**
  - Pressure-resistant aluminium body with built-in colour CCD camera, 1/3" CCD sensor, 1 lux light sensitivity; a 2-wire transmitter with electronics, and aluminium mounting bracket are included
  - Approved for use in Ex zones 1 and 2 as well as zones 21 and 22
  - Type of protection: IP 65

- **Ambient temperatures:** between +5°C and +40°C

- **EC type examination certificate:** BVS 08 ATEX E 132
  II 2G Ex de IIC T6 Gb
  II 2D Ex tb IIIC T80°C Db

- **Ignition protection type:** Ex de

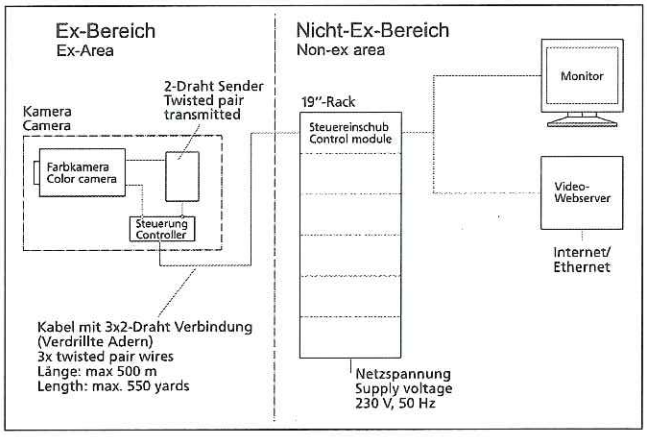
- **Explosion groups:** IIC (includes IIA and IIB)
  IIIC (includes IIIA and IIIB)

- **Lens with viewing angle:** 28°-120°
  Minimum lens-to-object distance: 80 mm
  (see order data overleaf)

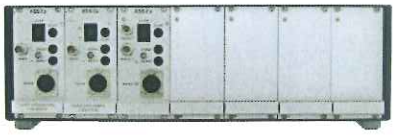
- **Electrical connection:**
  - Link-up is established via control line to the **control unit** (camera rack with camera control module) which should be ordered separately. For each camera, a camera control module is required which is inserted into the rack. Besides single racks, we also offer racks for up to 6 camera control modules.
  - **Camera:** supply voltage: 24 V DC (supplied by the control unit), Rated power: up to 20 W, 2-wire transmission

- **Control line:**
  - 6-core cable (3 twisted pairs)
  - Length: up to approx. 500 m (between camera and control unit)
  - Control line 3P x AWG 20 C

- **Weight:** 1.7 kg without control line



Single-camera rack



6-camera rack
equipped with three camera modules

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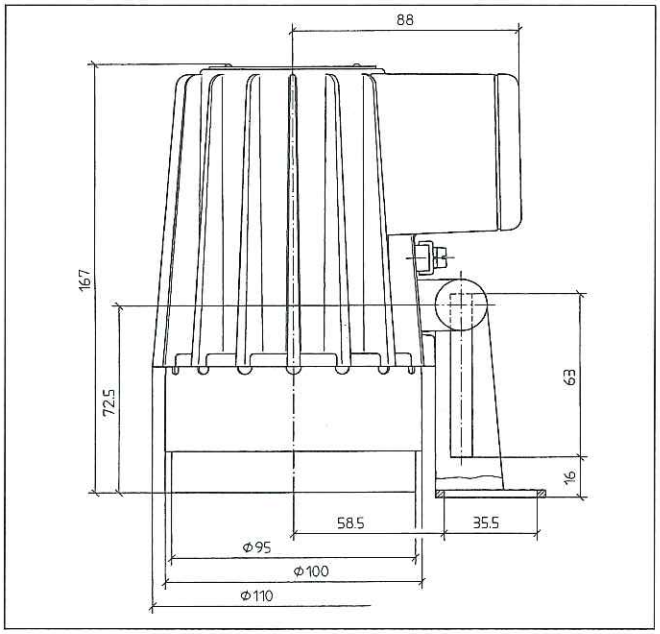
- **Simple installation with special bracket for practical use:**
  The camera is mounted on the cover flange of the circular sight glass fitting or flow sight glass using the hinged bracket. In the case of the screw-type sight glass fitting, it is attached to the slotted cover nut.

- **Illumination:**
  - If there is not sufficient natural light in the vessel, an appropriately dimensioned Lumistar luminaire can additionally be installed.
  - A separate arrangement consisting of light glass and camera glass is a further option for consideration. This combination depends on the process and the reactor size as well as on the surface of the vessel, the medium in question, and the angle of incidence.
  - Consistently uniform illumination should be ensured.

- **Dimensions and technical data for VISULEX Ex-Camera K06A-Ex:**

Camera	PAL	NTSC
Camera standard	CCIR (Europa)	EIA (USA)
Image sensor	1/3" CCD	1/3" CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	1 lux	1 lux
Resolution	460 lines (horizontal)	470 lines (horizontal)
Electronic shutter speeds	Automatic, 1/1-1/10,000	Automatic, 1/1-1/10,000
Signal-to-noise ratio	>48 dB	>48 dB
Aperture control	Automatic	Automatic
Colour system	PAL 752 x 582	NTSC 768 x 492

Control unit (rack and module)	Single-camera rack	6-camera rack
Power input	Max. 15 W	Base load 5 W; the rating increases by 15 W per module (max. 95 W)
Fuse protection (due to starting current)	1.6 A	6.3 A
Dimensions mm (H x W x D)	160 x 180 x 300	160 x 470 x 300



- **Order data:**

Item	Viewing angle	Part No.
1	120°	4502.021.00
2	90°	4502.018.00
3	78°	4502.022.00
4	60°	4502.019.00
5	54°	4502.023.00
6	39°	4502.020.00
7	28°	4502.024.00

Item	Component	Part No.
1	Single-camera rack	1590.032.00
2	6-camera rack	1590.033.00
3	Camera control module	1123.009.00
4	Transmission cable	3465.000027

For example: VISULEX Ex-Camera K06A-Ex
Viewing angle – see table above
- Important: please specify whether PAL or NTSC is required
- 370 m transmission cable (please state length in full metres)

- Rack for 1 or 6 cameras - see table above
- Camera control module, Part No. 1123.009.00

We recommend the 6-camera rack for connecting additional cameras at a later date.

All dimensions in mm unless stated otherwise. Subject to change without prior notice. 10.15

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VISULEX Ex-Camera K07ZP-Ex/K07ZN-Ex

II 2G Ex de IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

CE 0158

3755.377 c

VISULEX Ex-Camera K07ZP-Ex with zoom lens

- **Camera with zoom lens K07ZP-Ex/K07ZN-Ex:**
  The zoom lens of this camera is operated remotely from an external control room where the technical settings can be adjusted to meet the specific requirements.
  LumiCam system and control software provides the following functions for controlling the camera focused on the observed object using PC controls with a Windows interface:

- **Precision setting for:**
  - Zoom
  - Focus
  - Aperture, shutter, gain
  - Documentation aids such as date and time
  - Preset positions

- **Design and applications:**
  - Pressure-resistant aluminium body with built-in colour CCD camera, 1/4" CCD sensor, 2 lux light sensitivity, a 2-wire transmitter with electronics, and aluminium mounting bracket
  - Approved for use in Ex zones 1 and 2 as well as zones 21 and 22
  - Type of protection: IP 65

- **Ambient temperatures:** between +5°C and +40°C

- **EC type examination certificate:** BVS 08 ATEX E 132
  II 2G Ex de IIC T6 Gb
  II 2D Ex tb IIIC T80°C Db

- **Ignition protection type:** Ex de

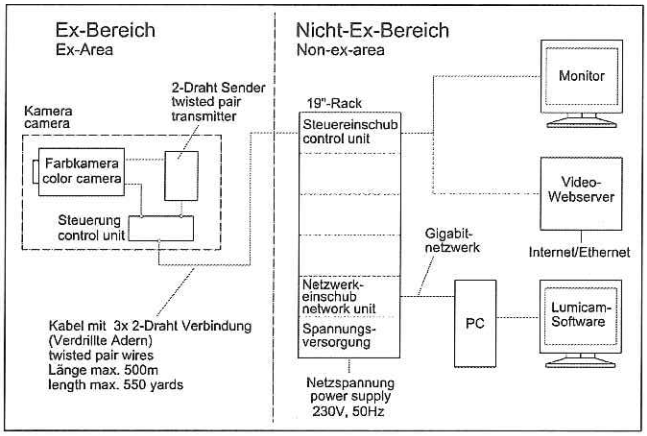
- **Explosion groups:** IIC (includes IIA and IIB)
  IIIC (includes IIIA and IIIB)

- **Zoom lens (standard version):**
  - Minimum lens-to-object distance: 100 mm
  - Focal length F = 4.2 to 42.0 mm
  - Optical zoom: 10 x
  - Digital zoom: 4 x more
  - Horizontal viewing angle at 1/4": 5° to 46°

- **Electrical connection:**
  - Link-up is established via control line to the **control unit** (camera rack with camera control modules and video server, if needed) which should be ordered separately. The CU must be installed and operated **outside the potentially explosive area.** A camera control module is required for each camera (or alternatively a video server) which is inserted into the rack. Besides single racks, we also offer racks for up to 6 camera control modules.
  - **Camera voltage:** 24 V DC (supplied by the control unit), Rated power: up to 25 W, 2-wire transmission

- **Control line:**
  - 6-core cable (3 twisted pairs)
  - Length: up to approx. 500 m (between Ex camera and control unit)
  - Transmission line 3P x AWG 20 C

- **Weight:** 2.7 kg



Single-camera rack
with video server

6-camera rack
equipped with three camera modules
and three video servers

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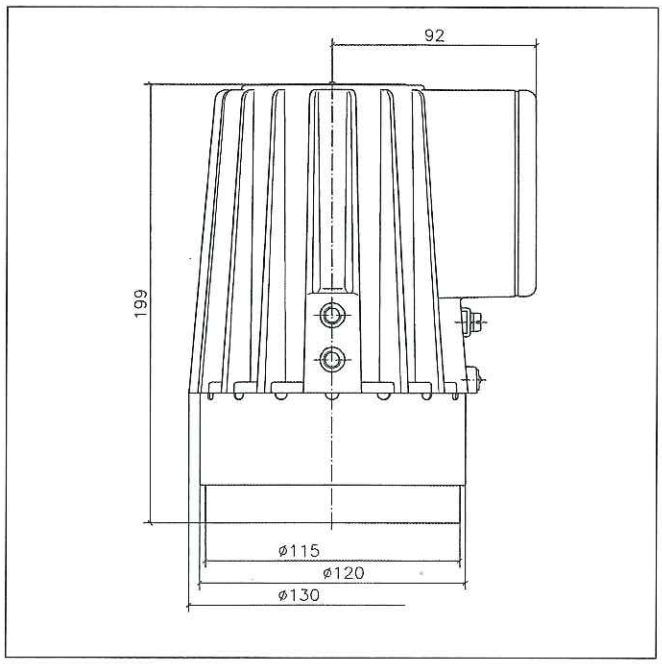
• Simple installation with special bracket for practical use:
The camera is mounted on the cover flange of the circular sight glass fitting or flow sight glass using the hinged bracket.
In the case of the screw-type sight glass fitting, it is attached to the slotted cover nut.

• Illumination:
- If there is not sufficient natural light in the vessel, an appropriately dimensioned Lumistar luminaire can additionally be installed.
- A separate arrangement consisting of light glass and camera glass is a further option for consideration. This combination depends on the process and the reactor size as well as on the surface of the vessel, the medium in question, and the angle of incidence.
- Consistently uniform illumination should be ensured.

• Dimensions and technical data for VISULEX Ex-Camera K07ZP-Ex/K07ZN-Ex:

Camera	K07ZP-Ex (PAL)	K07ZN-Ex (NTSC)
Camera standard	CCIR (Europa)	EIA (USA)
Image sensor	1/4" CCD	1/4" CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	2 lux	2 lux
Resolution	460 lines (horizontal)	470 lines (horizontal)
Electronic shutter speeds	Automatic, 1/1-1/10,000	Automatic, 1/1-1/10,000
Signal-to-noise ratio	>50 dB	>50 dB
Aperture control	Automatic or manual	Automatic or manual
Colour system	PAL	NTSC

Control unit (rack and module)	Single-camera rack	6-camera rack
Power input	Max. 15 W	Base load 5 W; the rating increases by 15 W per module (max. 95 W)
Fuse protection (due to starting current)	1.6 A	6.3 A
Dimensions mm (H x W x D)	160 x 180 x 300	160 x 470 x 300



• Order data:

Item	Component	Part No.
1	Single-camera rack	1590.053.00
2	6-camera rack	1590.051.00
3	Camera control module	1123.008.00
4	Network unit	1128.001.00
5	Network unit with video server	1128.002.00
6	Transmission cable	3465.000027

For example:
VISULEX Ex-Camera K07ZP-Ex
- 370 m transmission cable (please state length in full metres)
- Rack for 1 or 6 cameras (see table above)
- Camera control module, part no. 1123.008.00

We recommend the 6-camera rack for connecting additional cameras at a later date.

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VISULEX Ex-Camera K25ZP-Ex/K25ZN-Ex
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

CE 0158 3755.309 c

VISULEX Ex-camera K25ZP-Ex with zoom lens

- **Camera with zoom lens K25ZP-Ex/K25ZN-Ex:**
  The zoom lens of this camera is operated remotely from an external control room where the technical settings can be adjusted to meet the specific requirements.
  LumiCam system and control software provides the following functions for controlling the camera focused on the observed object using PC controls with a Windows interface:

- **Precision setting for**
  - Zoom
  - Focus
  - Aperture, shutter, gain
  - Documentation aids such as date and time
  - Preset positions

- **Design and applications:**
  - Pressure-resistant stainless steel body (grade 1.4404, polished) with built-in colour CCD camera, 1/4" CCD sensor, 2 lux light sensitivity, a 2-wire transmitter with electronics, and an aluminium mounting bracket
  - Approved for use in Ex zones 1 and 2 as well as zones 21 and 22
  - Type of protection: IP 65

- **Ambient temperatures:** between +5°C and +40°C

- **EC type examination certificate:** BVS 08 ATEX E 131
  II 2G Ex d IIC T6 Gb
  II 2D Ex tb IIIC T80°C Db

- **Ignition protection type:** Ex de

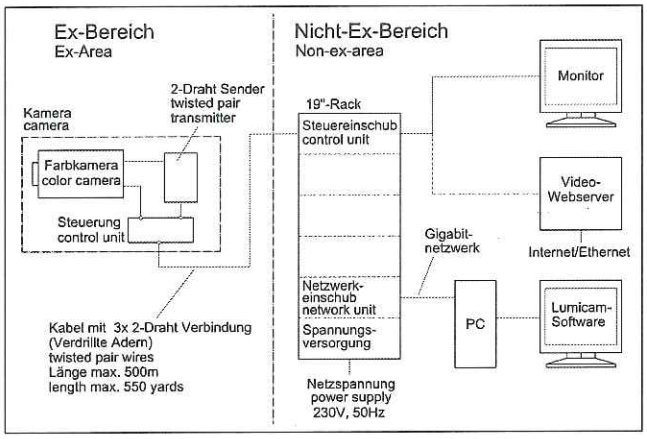
- **Explosion groups:** IIC (includes IIA and IIB)
  IIIC (includes IIIA and IIIB)

- **Zoom lens (standard version)**
  - Minimum lens-to-object distance: 100 mm
  - Focal length F = 4.2 to 42.0 mm
  - Optical zoom: 10 x
  - Digital zoom: 4 x more
  - Horizontal viewing angle at 1/4": 4.6° to 46°

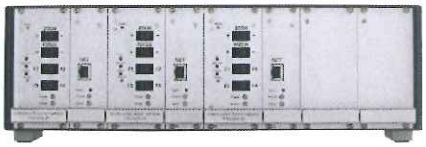
- **Electrical connection:**
  - Link-up is established via control line to the **control unit** (camera rack with camera control modules and video server, if needed) which should be ordered separately. The CU must be installed and operated **outside the potentially explosive area.** A camera control module is required for each camera (or alternatively a video server) which is inserted into the rack. Besides single racks, racks for up to 6 camera control modules are also available.
  - **Camera** supply voltage: 24 V DC (supplied by the control unit), Rated power: up to 8 W, 2-wire transmission

- **Control line:**
  - 6-core cable (3 twisted pairs)
  - Length: up to approx. 500 m (between Ex camera and control unit)
  - Transmission line 3P x AWG 20 C

- **Weight:** 2.0 kg



Single-camera rack
with video server



6-camera rack
equipped with three camera modules
and three video servers

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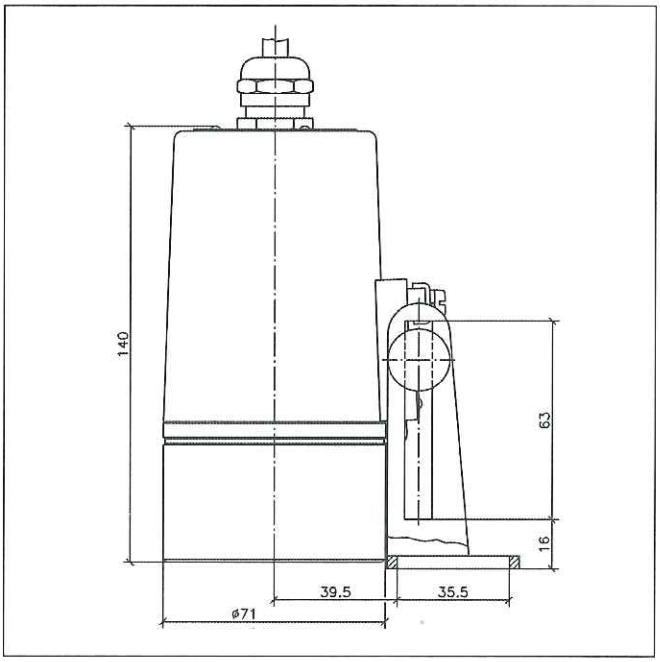
• Mounting:

- The camera is attached to the cover flange of a circular sight glass fitting (DIN 28120 or similar) using the stainless steel bracket provided. The method used is the same as for the internationally approved Lumistar luminaires. If there is not sufficient natural light in the vessel, an appropriately dimensioned Lumistar luminaire can additionally be installed.
- A separate arrangement consisting of light glass and camera glass is a further option for consideration. This combination depends on the process and the reactor size as well as on the surface of the vessel, the medium in question, and the angle of incidence.
- Consistently uniform illumination should be ensured.

• Dimensions and technical data for VISULEX Ex-Camera K25ZP-Ex/K25ZN-Ex:

Camera	K25ZP-Ex (PAL)	K25ZN-Ex (NTSC)
Camera standard	CCIR (Europa)	EIA (USA)
Image sensor	1/4'' CCD	1/4'' CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	2 lux	2 lux
Resolution	460 lines (horizontal)	470 lines (horizontal)
Electronic shutter speeds	Automatic, 1/1-1/10,000	Automatic, 1/1-1/10,000
Signal-to-noise ratio	>50 dB	>50 dB
Aperture control	Automatic or manual	Automatic or manual
Colour system	PAL	NTSC

Control unit (rack and module)	Single-camera rack	6-camera rack
Power input	Max. 15 W	Base load 5 W; the rating increases by 15 W per module (max. 95 W)
Fuse protection (due to starting current)	1.6 A	6.3 A
Dimensions mm (H x W x D)	160 x 180 x 300	160 x 470 x 300



• Order data:

Item	Component	Part No.
1	Single-camera rack	1590.053.00
2	6-camera rack	1590.051.00
3	Camera control module	1123.008.00
4	Network unit	1128.001.00
5	Network unit with video server	1128.002.00
6	Transmission cable	3465.000027

For example:
VISULEX Ex-Camera K25ZP-Ex
- 370 m transmission cable (please state length in full metres)
- Rack for 1 or 6 cameras (see table above)
- Camera control module, part no. 1123.008.00

We recommend the 6-camera rack for connecting further cameras at a later date.

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Lumiglas

VISULEX Ex Camera K55P-Ex/K55N-Ex
II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIC T80°C Db

CE 0158 3755.381 a

VISULEX camera K55P-Ex with fixed lens

Terminal box for VISULEX camera K55P-Ex

- **Camera K55P-Ex/K55N-Ex with fixed lens:**
  During the installation process of this standard camera, its fixed lens is focused on the object to be monitored (outdoor area/ facility or technical process components such as pressure vessels or agitators).

- **Design and applications:**
  - Pressure-resistant stainless steel body with built-in colour CCD camera, 1/3" CCD sensor, 1 lux light sensitivity
  - Approved for use in Ex zones 1 and 2 as well as zones 21 and 22
  - Type of protection: IP 65

- **Application temperature range:** between -10°C and +45°C

- **EC type examination certificate:** BVS 15 ATEX E 056 X
  II 2G Ex d IIC T6 Gb
  II 2D Ex tb IIIC T80°C Db

- **Ignition protection type:** Ex d

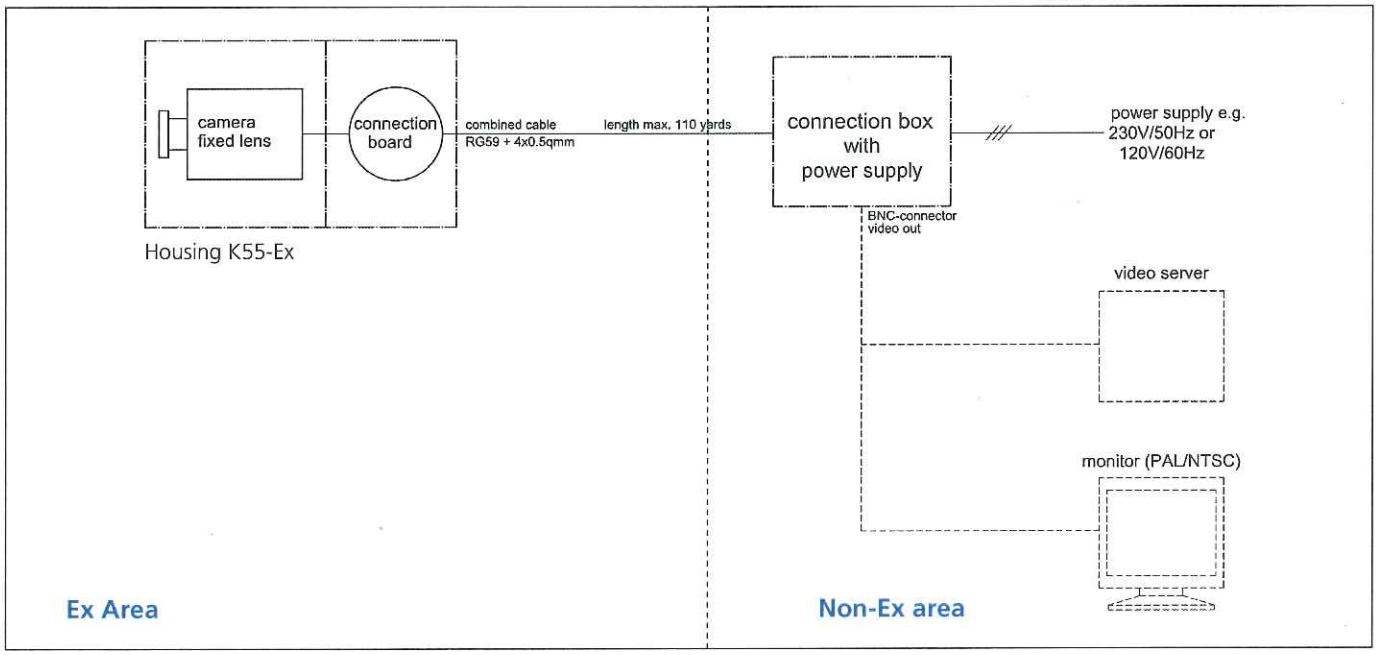
- **Explosion groups:** II C (incorporating II A and II B)
  IIIC (incorporating IIIA and IIIB)

- **Lens with viewing angle:** 28°- 60°
  Minimum lens-to-object distance: 80 mm (see data overleaf)

- **Electrical connection:**
  - Link-up is established via an external connection box included in the scope of supply. (Assembly should be carried out in a non-Ex area!)
  - Terminal box: Primary 100-230 V 50/60Hz, secondary 12 V DC
    Total power draw: 7.5 W (incl. camera)
  - Protection class: IP 40
  - Camera:
    Supply voltage: 12 V DC (supplied by the power adapter unit)
    Rated power: up to 5 W

- **Control line:**
  - Coaxial cable with four cores and PUR sheathing
  - Length: up to 100 m (between camera and terminal box)

- **Weight:** 3.2 kg without control line



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• Mounting:
Similar to the internationally renowned Lumistar luminaires, the camera is secured to the cover flange of a circular sight glass fitting (to DIN 28120 or similar) using the hinged bracket included in the scope of supply (hinged bracket - 1.4301). Alternatively, the special camera head can be mounted by way of a flanged adapter.

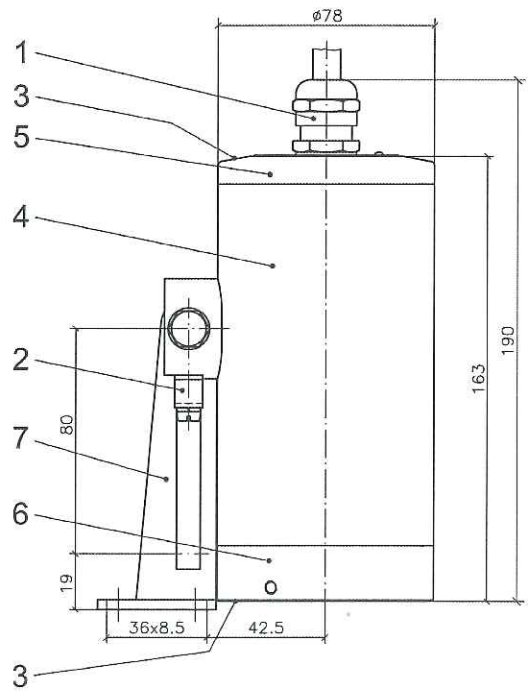
• Illumination:
- If there is not sufficient natural light in the vessel, an appropriately dimensioned Lumistar luminaire can be additionally installed.
- A separate arrangement consisting of light glass and camera glass is a further option for consideration. This combination depends on the process and the reactor size as well as on the surface of the vessel, the medium in question, and the angle of incidence.
- Consistently uniform illumination should be ensured.

• Dimensions and technical data for VISULEX camera K55P-Ex/K55N-Ex:

Camera	PAL	NTSC
Camera standard	CCIR (Europa)	EIA (USA)
Image sensor	1/3''-CCD	1/3''-CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	1 lux	1 lux
Resolution	480 lines (horizontal)	480 lines (horizontal)
Electronic shutter speeds	automatic, 1/1-1/10.000	automatic, 1/1-1/10.000
Signal-to-noise ratio	>48 dB	>48 dB
Aperture control	automatic	automatic
Colour system	PAL 752 x 582	NTSC 768 x 492

Power supply unit	Primary	Secondary
Voltage and power	100-230 V AC 50/60 Hz 7.5 Watt	12 V DC
Dimensions mm (H x W x D)	65 x 108 x 120	

Please note: Power supply unit for 24 V DC/12 V DC available on request.



1 Cable entry gland, M20 x 1.5 Ex d
2 Protective conductor terminal, external
3 Locking screws M4 A2-70
4 Body
5 Connection cover
6 Sight glass lens
7 Body mounting (hinged bracket)

• Order data:

Item	Viewing angle	Part No.
1	60°	4502.019.00
2	54°	4502.023.00
3	39°	4502.020.00
4	28°	4502.024.00

For example:
- VISULEX camera K55P-Ex or VISULEX camera K55N-Ex
- Viewing angle, see table
- Control cable, please specify length in full metres (max. 100 m)
- Terminal box with power supply
- Mains connection cable (USA, GB, D, etc.)

All dimensions in mm unless stated otherwise. Subject to change without prior notice. 08.15

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VISULEX Camera K15-P-D/K15-N-D, Stainless Steel

CE

3755.425 c

- **Camera with fixed lens K15-P-D/K15-N-D:**
  The lens of this basic standard camera is focused during the installation process on the object to be monitored (external facilities/outdoor areas or technical process elements such as e. g. boilers or agitators).

- **Structure and application:**
  - Stainless steel housing with built-in colour CCD camera, 1/3" CCD sensor, 1 lux photosensitivity; including electronics and stainless steel hinge as a mounting bracket
  - Type of protection: IP 65
  - Operating conditions: Ambient temperature +5° C to +40° C

- **Angle of view:** 28°-120°
  Minimum lens-to-object distance: 80 mm
  (see order info on reverse)

- **Electrical connection:**
  - Via an external power supply unit (included in the scope of supply), primary 100-240 V 50/60 Hz, secondary 12 V DC
  - Voltage: 12 V DC (via power supply unit)
  - Power rating: up to 20 W

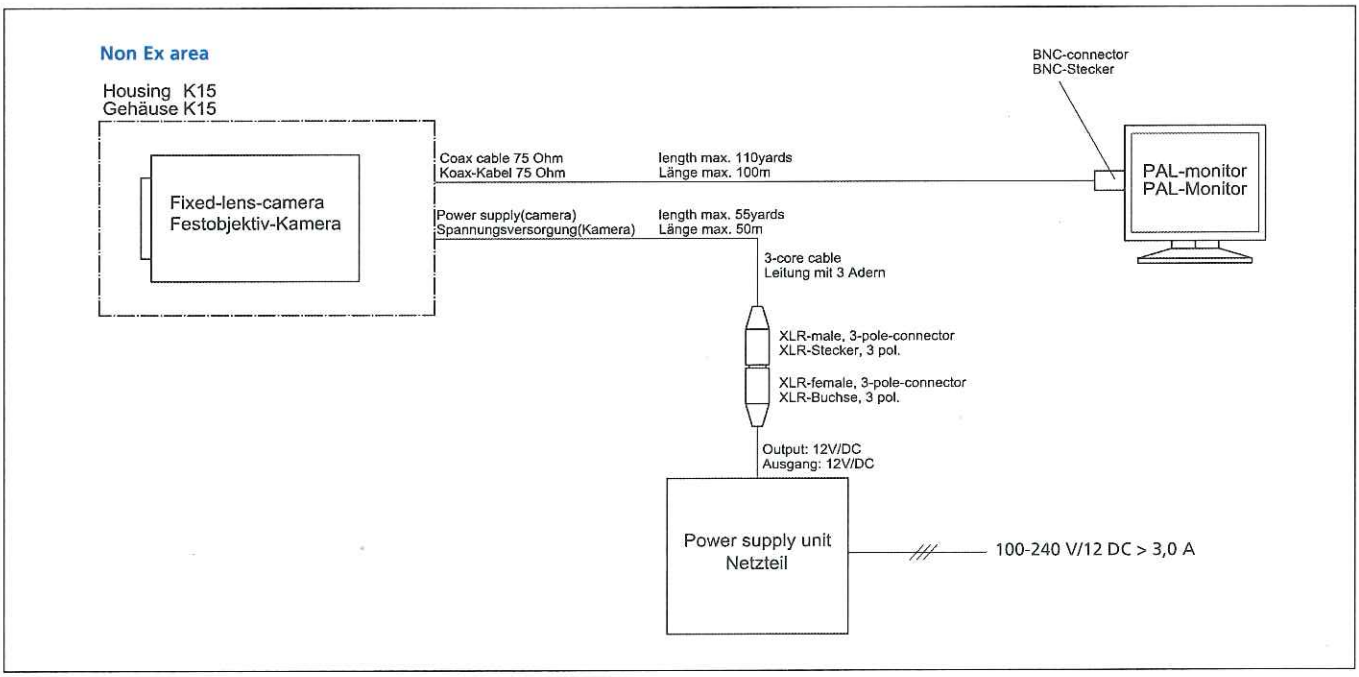
- **Installation:**
  - The camera is attached to the cover flange of a circular sight glass (DIN 23120 or equivalent) using the stainless steel bracket provided (hinge 1.4301). The method used is the same as for the internationally approved Lumiglas luminaires. If there is insufficient natural light in the vessel, an appropriately dimensioned Lumiglas luminaire can be installed additionally.
  - A separate arrangement of lighting glass and camera glass is a further option to be considered. This depends not only on the process and the reactor size, but also on the surface of the vessel, the medium in question, and the angle of incidence.
  - Consistently uniform illumination is essential.

VISULEX camera K15-P-D with fixed lens

- **Control wire:**
  - Coaxial cable 75 Ω
  - Length: up to approx. 100 m
    (between camera and display monitor)

- **Power supply line:**
  Power supply to camera: 3-core cable, length max. 50 m

- **Weight:** 0.8 kg excluding control wire



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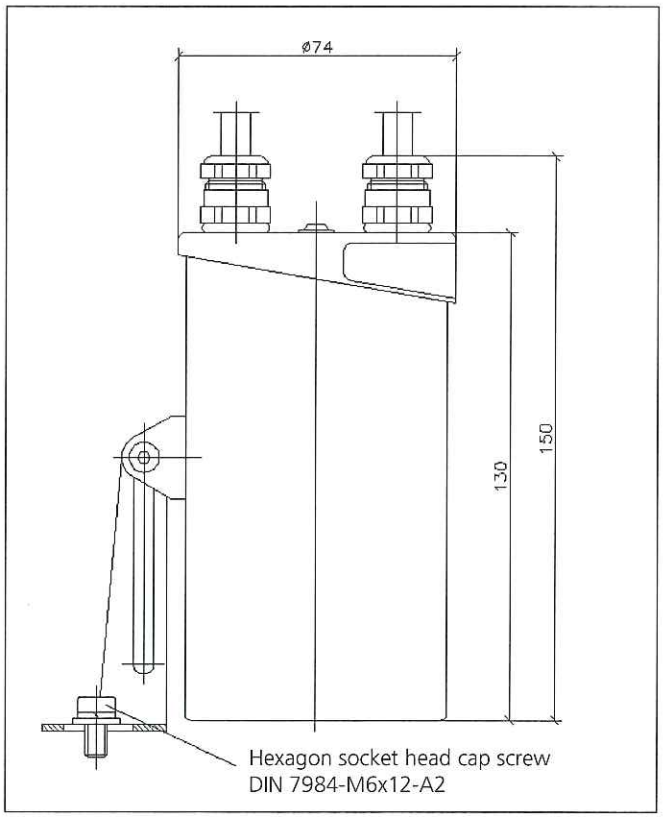
• Dimensions and technical data for VISULEX Camera K15-P-D/K15-N-D:

Camera	K15-P-D (PAL)	K15-N-D (NTSC)
Camera standard	CCIR (Europe)	EIA (USA)
Image sensor	1/3"-CCD	1/3"-CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	1 lux	1 lux
Resolution	480 lines (horizontal)	480 lines (horizontal)
Electronic shutter speeds	automatic, 1/1-1/10,000	automatic, 1/1-1/10,000
S/N ratio	>48 dB	>48 dB
Aperture control	automatic	automatic
Colour system	PAL 752 x 582	NTSC 768 x 492

Power supply unit	primary	secondary
Voltage and power consumption	100-240 V AC 50/60 Hz 1,5 A	12 V DC > 3,0 A
Dimensions mm (H x W x D)	40 x 150 x 70	40 x 150 x 70

Note: Power supply unit for 24 V DC/12 V DC on request.



• Order data:

Item	Angle of view	Part No.
1	120°	4502.021.00
2	90°	4502.018.00
3	78°	4502.022.00
4	60°	4502.019.00
5	54°	4502.023.00
6	39°	4502.020.00
7	28°	4502.024.00

For example:
VISULEX Camera K15-P-D
- angle of view, see table
- max. 100 m control wire
  (please state wire length in full metres)

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VISULEX Camera K15-P-E/K15-N-E, Stainless Steel

CE

3755.428 c
Data Sheet 06.71.01

VISULEX Camera K15-P-E with fixed lens

- **Camera with fixed lens K15-P-E/K15-N-E:**
  The lens of this basic standard camera is focused during the installation process on the object to be monitored (external facilities/outdoor areas or technical process elements such as e. g. boilers or agitators).

- **Design and application:**
  - Stainless steel housing with built-in colour CCD camera, 1/3" CCD sensor, 1 lux photosensitivity; including 2-wire transmitter, electronics, stainless steel hinge as mounting bracket
  - Type of protection IP 65
  - Operating conditions: Ambient temperature +5° C to +40° C

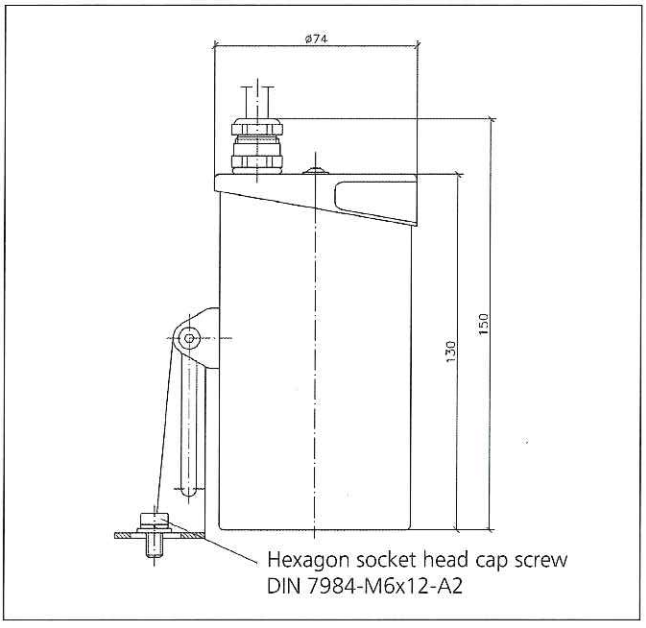
- **Lens with angle of view:** 28°-120°
  Minimum lens-to-object distance: 80 mm
  (see order info on reverse)

- **Electrical connection:**
  - Link-up is established via control wire to the control unit (camera rack and camera control module, to be ordered separately).
    A module is inserted into the camera rack for each camera. In addition to single racks, we also offer racks that take modules for up to 6 cameras.
  - Voltage: 24 V DC (supplied by the control unit)
  - Power input: up to 20 W
  - 2-wire transmission

- **Control wire:**
  - 6-core cable (3 twisted pairs)
  - Length: up to approx. 500 m (between camera and control unit)
  - Control lead 3P x AWG 20 C

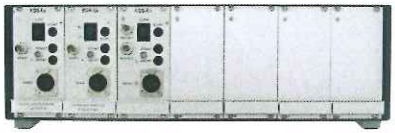
- **Weight:** 0.8 kg excluding control wire

- **Installation:**
  - The camera is mounted on the cover flange of a round sight glass fitting (DIN 28120 or similar) using the stainless steel bracket included in the scope of supply (hinge in grade 1.4301). The installation method is the same as that implemented for internationally approved Lumiglas luminaires.
  - If there is insufficient natural light in the vessel, a supplementary appropriately dimensioned Lumiglas luminaire can be installed.
  - A separate arrangement of lighting glass and camera glass is a further option to be considered. This depends on the engineering process and the size of the reactor as well as on the surface of the vessel, the medium in question, and the angle of incidence.
  - Consistently uniform illumination is essential.



Dimensions

Single-camera rack



6-camera rack with camera control modules

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• Dimensions and technical data for VISULEX Camera K15-P-E/K15-N-E:

Camera	K15-P-E (PAL)	K15-N-E (NTSC)
Camera standard	CCIR (Europe)	EIA (USA)
Image sensor	1/3''-CCD	1/3''-CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	1 lux	1 lux
Resolution	480 lines (horizontal)	480 lines (horizontal)
Electronic shutter speeds	automatic, 1/1-1/10,000	automatic, 1/1-1/10,000
S/N ratio	>48 dB	>48 dB
Aperture control	automatic	automatic
Colour system	PAL 752 x 582	NTSC 768 x 492

Control unit (rack and module)	single-camera rack	6-camera rack
Power input	max. 15 W	Base load 5 W; the consumption increases by 15 W per module (max. 95 W)
Fuse protection (due to starting current)	1.6 A	6.3 A
Dimensions mm (H x W x D)	160 x 180 x 300	160 x 470 x 300

• Order data:

Item	Angle of view	Part No.
1	120°	4502.021.00
2	90°	4502.018.00
3	78°	4502.022.00
4	60°	4502.019.00
5	54°	4502.023.00
6	39°	4502.020.00
7	28°	4502.024.00

Item	Part	Part No.
1	Single-camera rack	1590.032.00
2	6-camera rack	1590.033.00
3	Camera control module	1123.009.00
4	Control wire	3465.000027

For example:
VISULEX Camera K15-P-E
- angle of view, see table
- 370 m control wire (please state wire length in full metres)
- single-rack or 6-camera rack, see table
- camera control module, part-no. 1123.009.00

If supplementary cameras are to be added at a later date, we recommend the 6-module rack.

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Lumiglas

VISULEX Camera K15ZP-E/K15ZN-E, Stainless Steel

CE

3755.429 c

- **Camera with zoom lens K15ZP-E/K15ZN-E:**
  The zoom lens of this camera is operated remotely from an external control room where the technical settings can be adjusted to meet the specific requirements.
  LumiCam system and control software provides the following functions for controlling the camera focused on the observed object using PC controls with a Windows interface:

- **Precision adjustment of**
  - Zoom
  - Focus
  - Aperture, shutter, gain
  - Documentation aids such as date and time
  - Presetting functions

- **Design and applications**
  - Stainless steel housing with built-in colour CCD camera, 1/4" CCD sensor, 2 lux photosensitivity; including 2-wire transmitter, electronics, stainless steel hinge as mounting bracket
  - Type of protection IP 65
  - Ambient temperature +5°C to +40°C

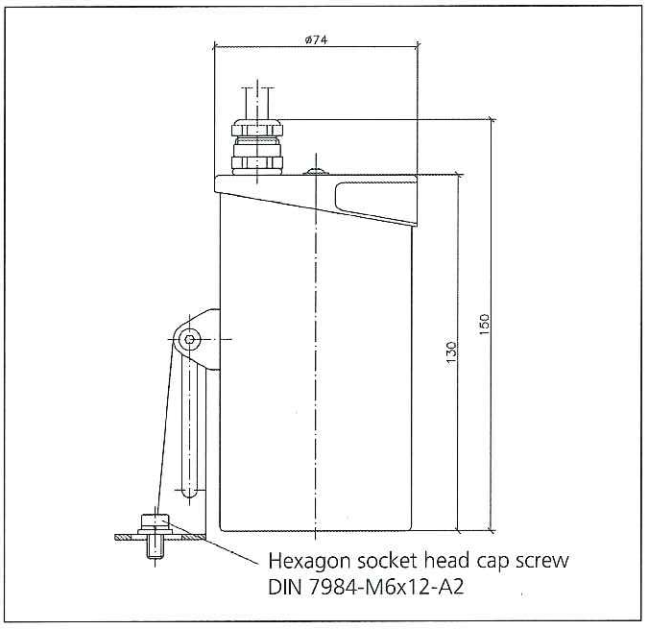
- **Zoom lens (standard version)**
  - Minimum lens-to-object distance: 100 mm
  - Focal length F = 4.2 to 42.0 mm
  - Optical zoom 10 x
  - Digital zoom 4 x extra
  - Horizontal angle of view with 1/4": 4.6° to 46°

- **Electrical connection:**
  - Link-up is established via control line to the control unit (camera rack with camera control module and video server, if needed) which should be ordered separately.
    A camera control module is required for each camera (or alter natively a video server) which is inserted into the rack. Besides single racks, racks for up to 6 camera control modules are also available.

- **Control wire:**
  - 6-core cable (3 twisted pairs)
  - Length: up to approx. 500 m (between camera and control unit)
  - Control lead 3P x AWG 20 C

- **Weight:** 1.1 kg excluding control wire

VISULEX Camera K15ZP-E with zoom lens



Dimensions

Single-camera rack with video server

6-camera rack equipped with three camera modules and three video servers

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• Installation:

- The camera is mounted on the cover flange of a round sight glass fitting (DIN 28120 or similar) using the stainless steel bracket included in the scope of supply. The installation method is thesame as that implemented for internationally approved Lumistar luminaires. If there is too little natural light in the vessel, an appropriately dimensioned additional Lumistar luminaire can be mounted.
- A separate arrangement of lighting glass and camera glass is a further option to be considered. This depends on the engineering process and the size of the reactor as well as on the surface of the vessel, the medium in question, and the angle of incidence.
- Consistently uniform illumination is essential.

• Dimensions and technical data for VISULEX Camera K15ZP-E/K15ZN-E:

Camera	K15ZP-E (PAL)	K15ZN-E (NTSC)
Camera standard	CCIR (Europa)	EIA (USA)
Image sensor	1/4''-CCD	1/4''-CCD
Pixels	ca. 440,000	ca. 380,000
Light sensitivity	2 lux	2 lux
Resolution	460 lines (horizontal)	470 lines (horizontal)
Electronic shutter speeds	automatic, 1/1-1/10.000	automatic, 1/1-1/10.000
S/N ratio	>50 dB	>50 dB
Aperture control	automatic oder manual	automatic oder manual
Colour system	PAL	NTSC

Control unit (rack and module)	single-camera rack	6-camera rack
Power input	max. 15 W	Base load 5 W; the consumption increases by 15 W per module (max. 95 W)
Fuse protection (due to starting current)	1.6 A	6.3 A
Dimensions mm (H x W x D)	160 x 180 x 300	160 x 470 x 300

• Order data:

Item	Part	Part No.
1	Single-camera rack	1590.053.00
2	6-camera rack	1590.051.00
3	Camera control module	1123.008.00
4	Network unit	1128.001.00
5	Network unit with video server	1128.002.00
6	Control wire	3465.000027

For example:
VISULEX Camera K15ZP-E
- 370 m control wire (please state wire length in full metres)
- single-rack or 6-camera rack, see table
- camera control module, part-no. 1123.008.00

If supplementary cameras are to be added at a later date, we recommend the 6-module rack.

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VISULEX Camera K55-P/K55-N, Stainless Steel

CE 3755.379

• Camera with fixed lens K55-P/K55-N:
The lens of this standard camera is focused during the installation process on the object to be monitored (external facilities/outdoor areas or technical process elements such as e. g. boilers or agitators).

• Design and application:
- Stainless steel housing with built-in colour CCD camera, 1/3" CCD sensor, 1 lux photosensitivity; stainless steel hinge as a mounting bracket
- Type of protection: IP 65
- Operating conditions: Ambient temperature +5° C to +45°C

• Voltage: 12 V DC (via connecting box)

• Angle of view: 28°-60° (see order info on reverse)
Minimum lens-to-object distance: 80 mm

• Electrical connection:
- Via an externalconnection box (included in the scope of supply), primary 100-230 V 50/60 Hz, secondary 12 V DC
- Power rating: 7.5 Watt
- Connection box: type of protection IP 40

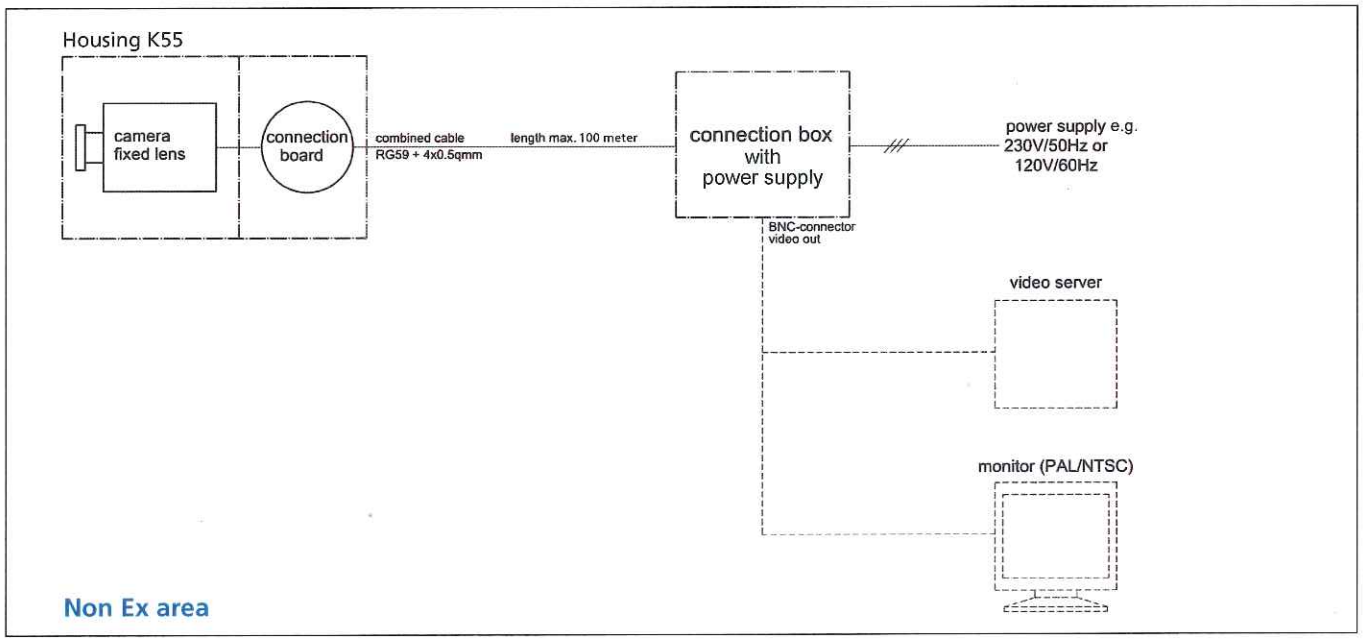
• Installation:
- The camera is attached to the cover flange of a circular sight glass (DIN 28120 or equivalent) using the stainless steel bracket provided (hinge 1.4301). The method used is the same as for the internationally approved Lumistar luminaires. If there is insufficient natural light in the vessel, an appropriately dimensioned Lumistar luminaire can be installed additionally.
- A separate arrangement of lighting glass and camera glass is a further option to be considered. This depends not only on the process and the reactor size, but also on the surface of the vessel, the medium in question, and the angle of incidence.
- Consistently uniform illumination is essential.

VISULEX Camera K55-P with fixed lens

Connection box for VISULEX Camera K55-P

• Control wire:
- Coaxial cable with four wires and PUR sheath
- Length: up to approx. 100 m (between camera and connection box)

• Weight: 3.2 kg excluding control wire



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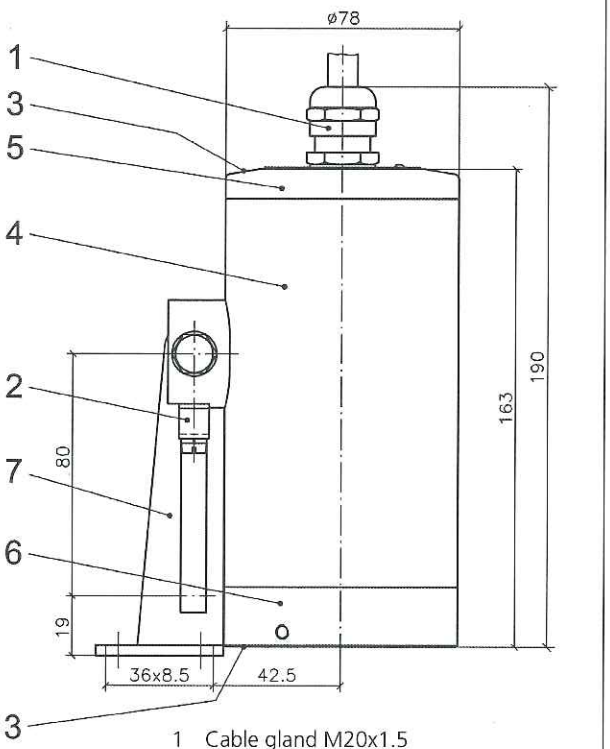
• Dimensions and technical data for VISULEX Camera K55-P/K55-N:

Camera	K55-P (PAL)	K55-N (NTSC)
Camera standard	CCIR (Europe)	EIA (USA)
Image sensor	1/3''-CCD	1/3''-CCD
Pixels	approx. 440,000	approx. 380,000
Light sensitivity	1 lux	1 lux
Resolution	480 lines (horizontal)	480 lines (horizontal)
Electronic shutter speeds	automatic, 1/1-1/10,000	automatic, 1/1-1/10,000
S/N ratio	>48 dB	>48 dB
Aperture control	automatic	automatic
Colour system	PAL 752 x 582	NTSC 768 x 492

Power supply unit	primary	secondary
Voltage and power	100-230 V AC 50/60 Hz 7,5 W	12 V DC 3 W
Dimensions mm (H x W x D)	65 x 108 x 120	

Note: Power supply unit for 24 V DC/12 V DC on request.



1 Cable gland M20x1.5
2 External protection conductor terminal
3 Locking screw M4 A2-70
4 Body of camera
5 Connection box
6 Camera viewglass
7 Mounting attachment (hinged bracket)

• Order data:

Item	Angle of view	Part No.
1	60°	4502.019.00
2	54°	4502.023.00
3	39°	4502.020.00
4	28°	4502.024.00

For example:
- VISULEX Camera K55-P or VISULEX Camera K55-N
- Angle of view, see table
- Control wire, please state wire length in full metres (max. 100 m)
- Connection box with power supply
- Power supply cable (USA, GB, Germany...)

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