Operating instructions

LED Cleanroom light fitting

Series 6413/5

Contents:

1.0 General information
1.1 Manufacture

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1.2 Information regarding the operating instructions

ID no.: 308468 / 641360300010
Publication code: 2023-12-13·BA00·III·en·00

The original instructions are the English edition. They are legally binding in all legal affaires

1.3 Further documents

- Data sheet.

For documents in other languages, see r-stahl.com

1.4 Conformity with standard and regulations

For certificates and declaration of conformity, see r-stahl.com.

2.0 Explanation of symbols

2.1 Symbols used in these operating instructions

Symbol	Meaning
	Tips and recommendations on the use of the device
	General danger
	Danger due to explosive atmosphere
	Danger due to live components
	Risk of damage to the eyes caused by optical radiation.

2.2 Warning notes

Warning notes must be observed under all circumstances, in order to minimize the risk resulting from design engineering and operation. The warning notes have the following structure:

- Signalling word: DANGER, WARNING, CAUTION, NOTICE
- Type and source of danger/damage
- Consequences of danger
- Taking countermeasures to avoid the danger or damage

	**DANGER** Danger to persons Non-compliance with the instruction results in severe or fatal injuries to persons.
	**WARNING** Danger to persons Non-compliance with the instruction can result in severe or fatal injuries to persons.
	**CAUTION** Danger to persons Non-compliance with the instruction can result in light injuries to persons.

NOTICE

Avoiding material damage
Non-compliance with these instructions can result in material damage to the device and/or its surroundings.

2.3 Symbols on the device

Symbol	Meaning
IECEx	Device certified for hazardous areas according to the marking.

3.0 Safety notes

3.1 Operating instructions storage

- Carefully read the operating instructions.
- Store the operating instructions at the mounting location of the device.
- Observe applicable documents and operating instructions of the devices to be connected

3.2 Safe use

Before installation

- Read and observe the safety notes in these operating instructions!
- Ensure that the contents of these operating instructions are fully understood by the personnel in charge.
- Use the device in accordance with its intended and approved purpose only.
- Always consult R. STAHL if using the device under operating conditions which are not covered by the technical data.
- We cannot be held liable for damage to the device caused by incorrect or unauthorised use or non-compliance with these operating instructions.
- Only use the device in hazardous areas for which it is approved.

For mounting and installation

- Observe national mounting and installation regulations (e.g.IEC 60079-14).
- Observe national safety and accident prevention regulations.
- During installation and operation, observe the information (characteristic values and rated operating conditions) on the rating, data and information plates located on the device.
- Before installation, make sure that the device is not damaged.
- Do not open the device if an explosive atmosphere is present.
- Observe the degree of protection (cable entry) (see "Technical data" chapter).
- Switch the device off so that it is de-energised before opening it.
- Mount, install and operate the device so that it is protected against external heat sources and/or direct sunlight.
- Ensure that the device cannot become electrostatically charged.
- Do not install the device within arm's reach.

Maintenance, repair, commissioning

- Before commissioning, make sure that the device is not damaged.
- Work on the device, such as installation, maintenance, overhaul, repair, may only be carried out by appropriately authorised and trained personnel.
- Only perform the maintenance work and repairs described in these operating instructions

3.3 Intended use

The luminaire is equipment

- for lighting areas, work spaces and objects that can be used indoors and outdoors
- for stationary mounting
- for use in Zones 2, 21,22 and in the safe area

3.4 Modifications and alterations

	**DANGER** Explosion hazard due to modifications and alterations to the device! Non-compliance results in severe or fatal injuries • Do not modify or change the device.
	No liability or warranty for damage resulting from modifications and alterations

4.0 Function and devise design

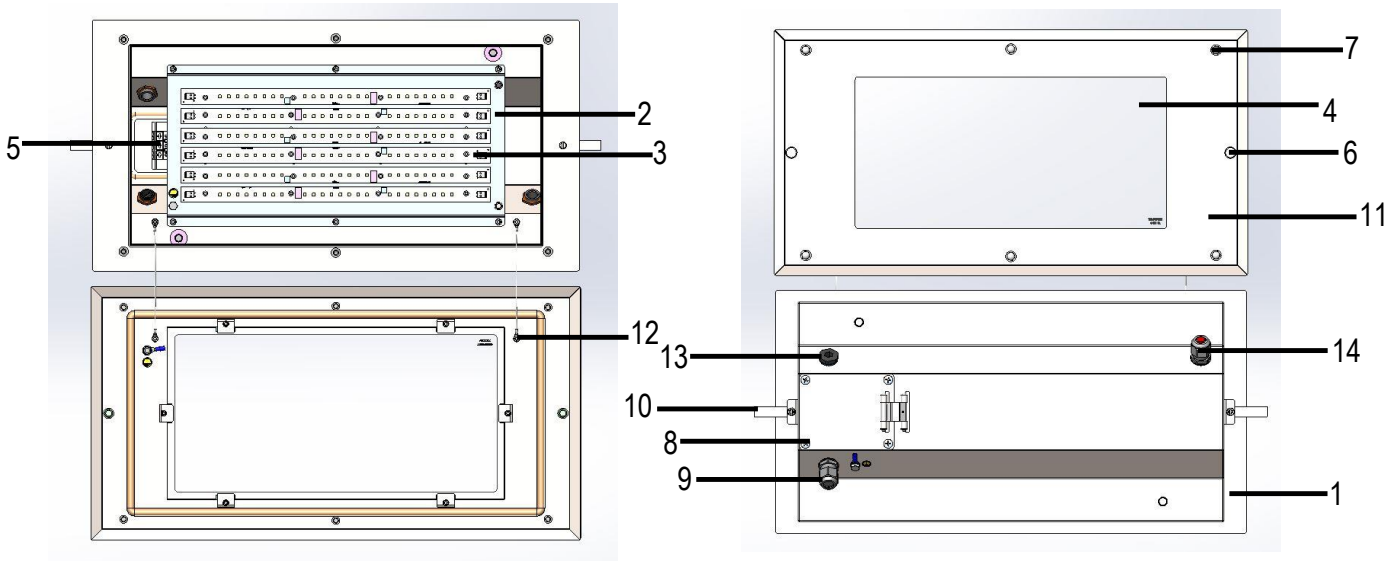
	**DANGER** Explosion hazard due to improper use! Non-compliance results in severe or fatal injuries. • Use the device only according to the operating conditions described in these operating Instructions. • Use the device only for the intended purpose specified in these operating instructions.

4.1 Function

Application range

The luminaire 6413/5 is equipment used for lighting areas, work equipment and objects. It can be used indoors. The luminaire is approved for use in hazardous areas of Zones 2, 21 and 22

4.2 Device design



1. Enclosure
2. PCB mounting plate
3. LED PCB
4. Toughened glass
5. Terminal
6. Silicon plug
7. Dome head screw
8. Terminal compartment
9. Cable gland
10. Height adjustable lever
11. Cover
12. Hinge wire
13. Stopping plug
14. Cable gland with red plug

5.0 Technical data
Explosion protection

Gas	IECEx IBE 23.0033X Ex nR IIC T4 GC ; Ex tb IIIC T100°C Db
Certification	IECEx

Electrical data

Rated operating Voltage: AC: 220 to 240 V ± 10%, 50/60 Hz
DC: 220 to 240 V ± 10%

Rated operating Current:

28W-6413/512	40W-6413/512	40W-6413/513	50W-6413/513
≤ 0.130 A	≤ 0.180 A	≤ 0.180 A	≤ 0.225 A

Startup current:

Variant	Power (W)	Startup current
6413/512.-2...-.	28	Ipeak = ≤ 51 A; Δ t = 127 µs
6413/512.-4...-.	40	Ipeak = ≤ 51 A; Δ t = 127 µs
6413/513.-4...-.	40	Ipeak = ≤ 51 A; Δ t = 127 µs
6413/513.-6...-.	50	Ipeak = ≤ 51 A; Δ t = 127 µs

Maximum number of luminaires per miniature circuit breaker at 230V

Variant	Type	10A	16A	20A	25A
6413/512.-2...-.	B	12	19	24	31
	C	20	33	41	51
6413/512.-2...-.	B	12	19	24	31
	C	20	33	41	51
6413/513.-2...-.	B	12	19	24	31
	C	20	33	41	51
6413/513.-2...-.	B	12	19	24	31
	C	20	33	41	51

Power factor: cos φ ≥ 0.9

THD:

28W-6413/512	40W-6413/512	40W-6413/513	50W-6413/513
<15%	<15%	<15%	<15%

Surge protection: internal surge protection

L-N	1 KV
L-PE	2 KV
N-PE	2 KV

Luminous Characteristics

Colour rendering Ra: ≥ 80

Variant*	Power (W)	Luminous Flux (lm)	Luminous efficacy (lm/W)
6413/512.-2...-.	28	2835	110
6413/512.-4...-.	40	4462	120
6413/513.-4...-.	40	4496	120
6413/513.-6...-.	50	5952	120

*) Values apply to colour temperature 5700K @ Ta 25°C

Ambient Conditions

Functional Temperature	6413/512.-....-. -20 °C ≤ Ta ≤ +45°C 6413/513.-....-. -20 °C ≤ Ta ≤ +60°C
Storage Temperature	6413/512.-....-. -20 °C ≤ Ta ≤ +60°C 6413/513.-....-. -20 °C ≤ Ta ≤ +60°C

Service life

LED	28W-6413/512	40W-6413/512	40W-6413/513	50W-6413/513
L90B50@Ta Max	1, 00,000 h	1, 00,000 h	1, 00,000 h	1, 00,000 h

LxBy

At the end of the service life

- Luminous flux declines to “x” percent
- Up to “y” percent of all luminaires do not reach “x”

Control gear	28W-6413/512	40W-6413/512	40W-6413/513	50W-6413/513
C10 @Ta Max	50,000 h	50,000 h	50,000 h	50,000 h

C10 = failure rate 10%

Mechanical Data

Degree of Protection	IP 66 (According to IEC 60598)
Impact strength (IK code)	IK 10 (According to IEC 62262)

Material

Enclosure&cover	SS304 brushed
Enclosure colour	NA
Seal	Silicon
Luminaire cover	Screwing
Enclosure lock	
Mounting	

Mounting/ Installation

Cable entry

Variant	Cable entry type/size (3 x entries at rear side)
6413/512.-2...-.	M20
6413/512.-4...-.	M20
6413/513.-4...-.	M20
6413/513.-6...-.	M20

Cable gland
Connectivity

1 X cable gland, 1 X cable gland with red plug and 1 X stopping plug
(IECEx certified cable glands and stopping plugs have to be used in accordance with IEC standards)
3 pole: L1,N,PE clamping range:
Standard: 1x1.5 to 4mm2 (Solid and finely stranded)
Optional: 1x1.5 to 6mm2 (Solid and finely stranded with core end sleeves)
(2 free clamping units per pole avalible)

Through wiring

Max. 3x10 A
For further technical details, see r-stahl.com

6.0 Transport and storage

- Transport and store the device only in the original packaging.
- Store the device in a dry place (no condensation) free of vibrations.
- Do not drop the device.

7.0 Mounting and installation

DANGER

Explosion hazard due to electrostatic discharges!
Noncompliance results in severe or fatal injuries
Do not use the device in strong charge generating environments
The following process/activities should be avoided:

- Accidental friction
- Particle flows

DANGER

Explosion hazard due to incorrect installation of the device! Non-compliance results in severe or fatal injuries.

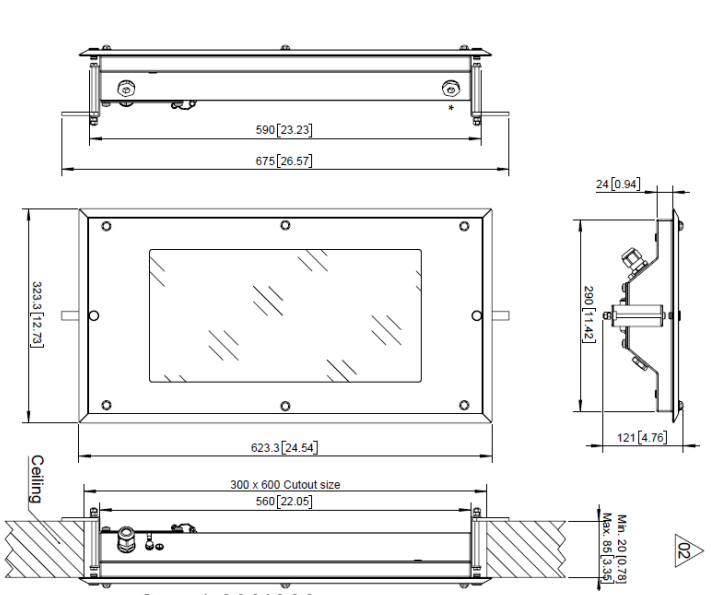
- Carry out installation strictly according to the instructions and national safety and accident prevention regulations to maintain explosion protection.
- Select and install the electrical device so that explosion protection is not affected due to external influences, i.e. pressure conditions, chemical, mechanical, thermal and electrical influences such as vibration, humidity and corrosion (seeIEC 60079-14).
- The device must only be installed by trained qualified personnel who are familiar with the relevant standards.

Malfunction or device damage caused by condensation.
Non-compliance may lead to material damage!

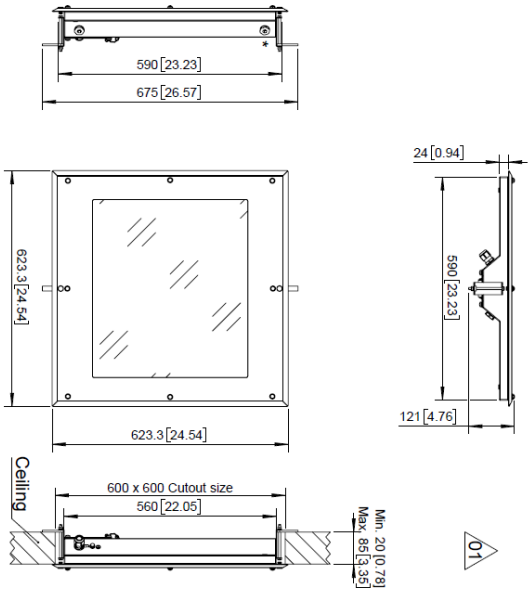
- Operate the luminaire continuously or periodically over extended periods of times.
- Avoid thermal bridges, use suitable installation accessories.

7.1 Dimensions/fastening dimensions

For recessed mount (with flushing frame)

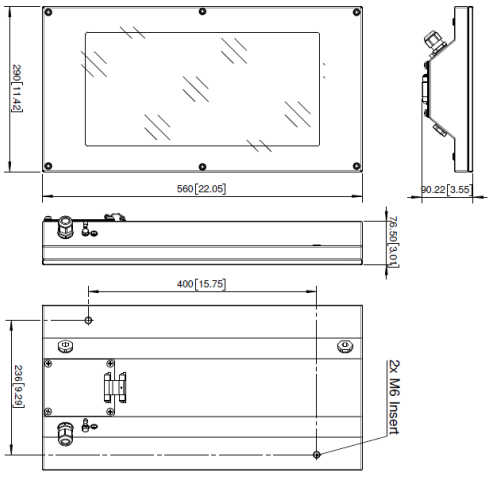


Size 1:600*300

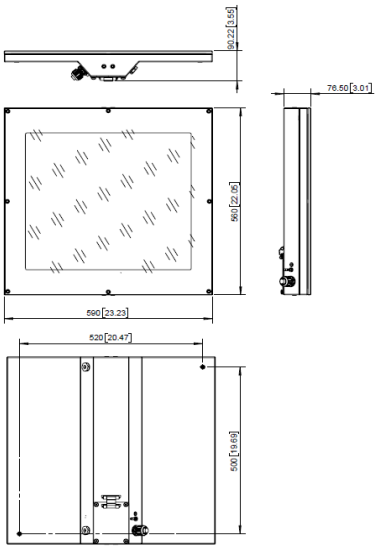


Size 2:600*600

For surface mount (without flushing frame)



Size 1:600*300

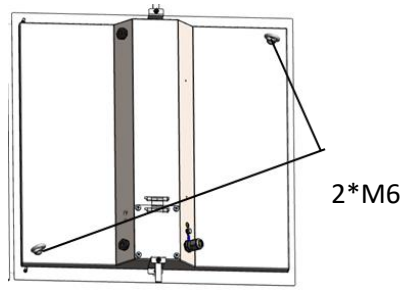


Size 2:600*600

7.2 Mounting/dismounting, operating position

	**DANGER** Explosion hazard due to impermissible heating! Non-compliance results in severe or fatal injuries. • Avoid external heat sources – comply with the ambient temperature range (risk of change of temperature class or change of maximum permissible surface temperature). • Do not exceed the maximum ambient temperature due to external heat sources (premature failure of equipment).
	**DANGER** Explosion hazard due to hot built-in components! Non-compliance results in severe or fatal injuries. • Only open the enclosure in switched-off state. • The device must be allowed to cool down for at least 15 minutes before opening it in explosive atmospheres.
	**CAUTION** Risk of damage to the eyes caused by optical radiation! Non-compliance can result in minor injuries! • Direct view of this luminaire is prohibited.

7.2.1 Mounting ring eyes

	• Screw the ring eyes into the intended threaded holes. The ring eyes can be used to suspend the luminaire. • 2 x M6 on the top can be uses for anti-fall protection with safety chain for wall and pipe mounting.

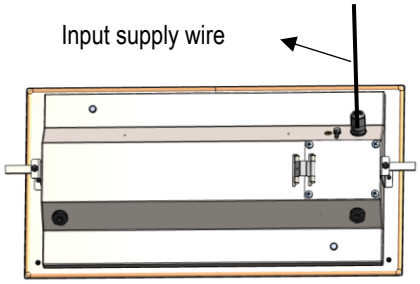
7.3 Installation

7.3.1 Opeining and closing the enclosure

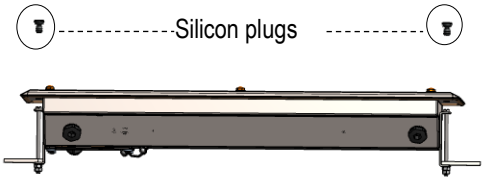
	**DANGER** • Luminaires not suitable for covering with thermally insulating material • The luminaire is intended for installation in a minimum space of 300mm from false to true ceiling where no heat accumulation occurs. • The mounting position with upward light emission is prohibited.

Bottom opening

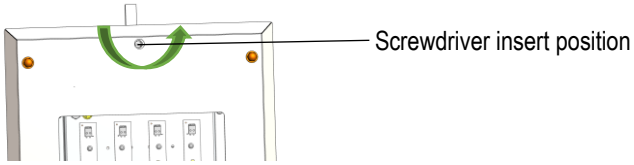
Step1: Loosen the cable gland properly and enter the input supply wire as below



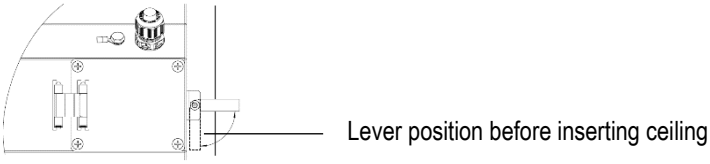
Step2: Remove the two silicon plugs gently with the help of hands.



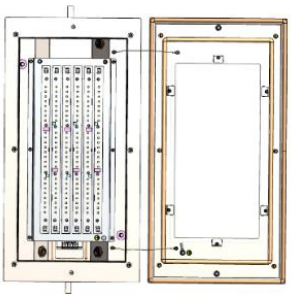
Step3: Tighten the height adjustable lever screws with the help of the screw driver as per below.
Make sure that the positioning of the lever should be properly attached to the ceiling



Note: Lever position should be in parallel with the frame before inserting in the ceiling. Refer the below image



Step4: Remove the M6 screws of the cover with the help of screw/nut extractor. The torque required to open the screw is 3.5Nm.



Step5: Insert the supply wire properly in the terminal as per the polarity.

Step6: Close the cover properly. Make sure that the hinge wires should not be placed in-between sealant and frame. Then put the silicon plugs properly.

(Please use spare silicone plugs in case of any damage"

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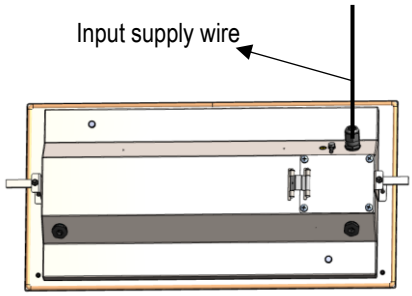
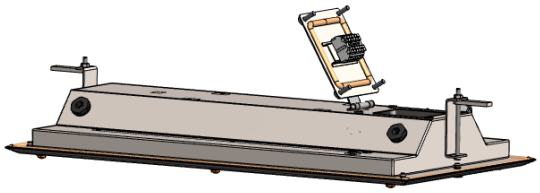
For top opening

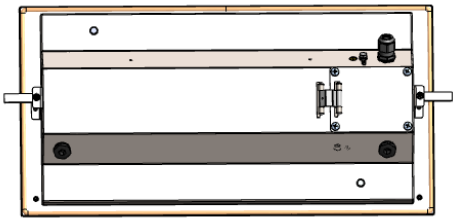
Step1: Loosen the cable gland properly and enter the input supply wire as below



Step2: Open the terminal cover by removing the 4*M6 screw with the torque of 3.5Nm.
Ensure that the screw should not fall down

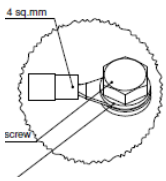


Step3: Insert the supply wire properly in the terminal as per the polarity.
Step4: Close the terminal cover properly. Make sure that the wires should not be placed in-between sealant and enclosure



Step5: Tighten the height adjustable lever screws with the help of the screw driver as per below.
Make sure that the positioning of the lever should be properly attached to the ceiling.

Note: External earthling should be done as per below…



7.3.2 Electrical connections

	DANGER

	Explosion hazard due to faulty installation!
	Non-compliance results in severe or fatal injuries.
	• Only use conductors provided by the manufacturer for explosive areas.
	• Make sure that the IP protection is preserved after installation.
	• Adhere to the relevant conductor cross-section:
	  • Standard: 1.5 to 4 mm^2 (solid and finely stranded)
	  • Optional: 1.5 to 6 mm^2 (solid and finely stranded with core end sleeves)

Mains connection

Observe the maximum clamping possibility of the connection terminals
(see chapter "Technical data").

Observe the following when connecting to the mains connection:

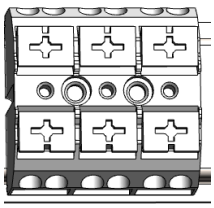
- Clamping must be carried out precisely!
- Do not clamp any part of the conductor insulation!
- Do not mix up the conductors.
- Observe the technical regulations when connecting the conductor.
- Clamp the conductor firmly.

Connection terminals

Clamping range:
Standard: 1 x 1.5 to 4 mm2 (solid and finely stranded)
Optional: 1 x 1.5 to 6 mm2 (solid and finely stranded with core end sleeves)
(2 free clamping units per pole available)

Stripping length: 10 to 11 mm

Standard:



L1 = phase
N = neutral conductor
⏚ = protective conductor

7.3.3 Cable entries

The standard luminaire is delivered with 1 X cable gland, 1 X cable gland with red plug and 1 X stopping plug

	DANGER
	Explosion hazard due to impermissible cable entries and stopping plugs! Non-compliance results in severe or fatal injuries. • Use cable entries and stopping plugs which have been separately tested and certified according which comply with the standard version stated in the certificate of the luminaire.

Please observe the following:

- the required dust resistance!
- the required type of protection!
- the required temperature resistance!
- the IP degree of protection according to the rating plate!
- the operating instructions of the cable entries and stopping plugs!
- the required tightening torques!
- the area for the permissible conductor diameter!
- insert the metal cable entries and/or stopping plugs into the PE!
- use barrier glands for conductor lengths less than 3 m!

8.0 Commissioning

	DANGER
	Explosion hazard due to incorrect installation! Non-compliance results in severe or fatal injuries. • Check the device for proper installation before commissioning. • Comply with national regulations.

NOTICE
Malfunction or device damage caused by condensation. Non-compliance may lead to material damage! • Operate the luminaire continuously or periodically over extended periods of time. • Avoid thermal bridges, use suitable installation accessories.

Before commissioning, ensure the following:

- Check the mounting and installation.
- Check the device for damage.
- Remove any foreign objects.
- If necessary, clean the connection chamber.
- Monitor whether the electrical lines have been inserted correctly.
- Monitor whether all screws and nuts have been tightened securely.
- Monitor whether all drilled holes are closed.
- Monitor whether all cable entries and stopping plugs have been tightened securely.
- Monitor whether all conductors have been clamped firmly.
- Monitor whether the line voltage and the rated operational voltage are consistent.
- Monitor whether the permissible conductor diameters for the corresponding cable entries have been used.
- Monitor whether the device is closed according to regulations.

9.0 Maintenance, overhaul, repair

	CAUTION
	Risk of electric shock or malfunction of the device due to unauthorised work! Non-compliance can result in minor injuries! • Switch off the voltage supply before working on the device. • Work performed on the device must only be carried out by authorised and appropriately trained qualified electricians.

	WARNING
	Risk of burns due to hot surfaces! Non-compliance can result in severe injuries and material damage. • Allow the enclosure, the protective glass and the lamp to cool down for approx. 15 min before touching them.

9.1 Maintenance and overhaul

- Consult the relevant national regulations to determine the type and extent of inspections.
- Tailor inspection intervals to the operating conditions.
- Perform maintenance and repair work in accordance with IEC 60079-17 and IEC 60079-19.

	Observe the relevant national regulations in the country of use.

During maintenance/overhaul of the device, the following points must be checked:

- Proper function of glass dome and enclosure,
- Condition of the connection lines,
- Connection of the protective conductor and equipotential bonding,
- Proper function and secure fit of cable entries,
- Seals within the cable entries,
- Cleanliness and proper function of the enclosure interiors,
- Secure fit of the suspension mounting screws,
- Good visual condition of the flameproof joint (dirt or damage),
- Whether the permissible temperatures are complied with (according to IEC 60079),
- Whether the device is used as intended and functions properly

9.1.1 Restricted breathing test:

The luminaire is equipped with a test device for restricted breathing.Restricted breathing must be checked after installation and during regular maintenance acc. to IEC/EN 60079-15.

	Recommendation: Check the luminaire by using the handheld testing instrument for restricted breathing from R. STAHL website (see data sheet).
	The test should only be carried out at constant temperature conditions.

Preparing the luminaires for testing:
• Remove the red stopping plug.

Test:
• Insert the hose of the test device into the cable entry for testing restricted breathing.
• Hand-tighten the cable entry.
• Use the hand pump to create a vacuum of 0.3 kPa (3 mbar).The test has been passed if after 180 seconds a vacuum of at least 0.15 kPa (1.5 mbar) is still present in the luminaire.

After the test:
• Remove the hose of the test device for testing restricted breathing from the cable entry.
• Close the luminaire using the red stopping plug.

Alternative pressure and time specifications:

	Alternative 1	Alternative 2
Vacuum at start of test	3.0 kPa (30 mbar)	0.3 kPa (3 mbar)
Test duration	27 seconds	27 seconds
Vacuum after testing	2.7 kPa (27 mbar)	0.27 kPa (2.7 mbar)

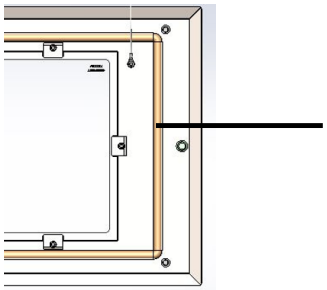
9.2 Repairs

DANGER

Explosion hazard due to improper repair!
Non-compliance results in severe or fatal injuries.

- Repair work on the devices must be performed only by R. STAHL.

If the seal is not damaged, the luminaire can be operated without another restricted breathing test. (see chapter restricted breathing test)
If the seal is damaged, it has to be replaced. In case of covers with foamed seal, the complete cover has to be replaced



9.3 Returning the device

- Only return or package the devices after consulting R. STAHL! Contact the responsible representative from R. STAHL.
- R. STAHL's customer service is available to handle returns if repair or service is required.

10.0 Cleaning

	DANGER
	• Dust layers should not be allowed to accumulate on the fitting surface and good housekeeping is required for safe operation. Dust in layers has the potential to form ignitable clouds and to burn at lower temperatures. Refer to IEC 60079-10-2 & IEC 60079-14 for additional details of selection and installation.

- Devices located in hazardous areas may only be cleaned with a damp cloth to avoid electrostatic charge.
- When cleaning with a damp cloth, use water or mild, non-abrasive, non-scratching cleaning agents.
- Do not use abrasive cleaning agents or solvents

11.0 Disposal

- Observe national, local and statutory regulations regarding disposal.
- Separate materials for recycling.
- Ensure environmentally friendly disposal of all components according to statutory regulations.

12.0 Accessories and spare parts

NOTICE
Malfunction or damage to the device due to the use of non-original components. Non-compliance may lead to material damage! • Use only original accessories and spare parts from R. STAHL.