Operating Instructions

Explosion-proof Self-contained
LED-Emergency Light Fitting

Series
nD8611 L02/. W

The safety of people and equipment in hazardous areas depends on the observance of all safety standards. Exact knowledge about all applicable regulations and standards is mandatory for installation maintenance and repair of explosion proof equipment, especially

- the determinations of IEC/EN 60079-14 and IEC/EN 60079-17 for maintenance of explosion-proof appliances
- the generally accepted rules of the technical side
- the national rules for prevention of accidents and for safety standards
- the safety instructions of these operating instructions
- the characteristic data on the type plate and the instruction plates

1. Safety Instructions

- The light fitting must be selected in accordance with the specified protection rating and installed in compliance with the installation regulations.
- The light fitting must be protected against overvoltage, overcurrent, short circuits and other electrical failures and must be maintained in accordance with the applicable regulations.
- The light fitting must be operated in an undamaged condition only.
- The light fitting may only be opened if it has been disconnected from the mains supply completely.
- It is allowed to open the light fitting in a non-explosive (non hazardous) atmosphere only.
- The non-stationary use of the light fitting as well as any other inappropriate usage is prohibited.
- The operation of the light fitting is allowed within its assessment thresholds only.
- In regard to the minimum and maximum admissible ambient temperature potential sources of cold and heat (e.g. direct heat or solar radiation, cooling units) have to be considered.
- If the light fitting is subject to particular stresses - chemical, mechanical, thermal and electrical, as well as vibrations or moisture - prior consultation with Adolf Schuch GmbH is required.
- In areas where there is a high risk of mechanical danger, the light fitting must be protected by proper measures.
- Every structural modification will cause dangerous situations and consequently the certification of this light fitting will be null and void.
- **Caution - Risk of electrostatic discharge!**
  Fitting to be cleaned with damp cloth only!
- **In areas with risk of accidental electrostatic charge (e.g. by passing by) the light fitting must be protected by appropriate measures.**
- **The light fitting is not allowed to be installed in process areas where strong electrical fields may occur (i.e. HV Sparkling Electrodes or Particle Streams). Reason is to avoid any electrostatic charge of the light fitting itself.**
- The filling level of the connection cable should be quite high for avoiding any air penetrating the inside of the light fitting through the cable.
- Applying an explosion-proof breathing gland for pressure compensation is not allowed.
- Replace damaged parts by original spare parts from the Adolf Schuch GmbH only.
- LED-module and control gear of this light fitting must be replaced by A. Schuch GmbH, by a service technician who is instructed from Schuch or by any other person with equivalent qualification only.

2. Operating Advice

- The light fitting must be protected from moisture and transported and stored within its permissible ambient temperature range (see section 3, Technical Data). Temperature fluctuations and vibrations must be avoided.
- Emergency light batteries must be stored in a protected, dry place and under the most constant ambient conditions possible. A temperature of +5°C ... +25°C and a relative humidity of up to max. 60% is recommended.
- Because of the chemical resistance use only a damp cloth for cleaning the light fitting. If necessary with a mild and solvent-free cleaning agent.
- When using the light fitting outdoors, we recommend the use of a weatherproof roof to protect the light fitting from the direct effects of the weather.
- Any application of the light fitting that is incorrect or even forbidden will lead to the fact that the manufacturer's warranty is lost.
- LED are sensitive electronic components. Please ensure that the LED are protected against mechanical and electrostatic attacks whenever the light fitting is open. For this reason the LED must not be touched either.
- Due to harmful gases and other corrosive substances (e.g. ammoniac, sulphur- or chlorine compounds) it may come to damages of the LEDs. Depending on the substance, the concentration, the temperature and the dwell time, damages up to total black-out are possible. This may occur also to fittings with high degree of protection. The suitability of the light fitting for the respective application can only be checked by running a test at site.
- The light fitting has an additional Ex cable gland, which is locked by a closing plug and which is designed as a Test port to run the test for restricted breathing (see section 5.3, Testing the restricted breathing).

- **The Ex cable gland with closing plug, which is designed as a Test port, must not be used for cable entry!**
- The operation of this light fitting is only allowed if the Ex cable gland, which is designed as a Test port, is installed and locked with the provided closing plug!

2.1 Automatic Tests

According to EN 62034 the emergency light unit automatically checks the function and operating period of the fitting during the emergency operation. Running functional- and operating period test are indicated by a blinking green Signal-LED.

Commissioning test
To avoid discharging of the battery and misinterpretation of the LED signals during the installation phase the internal set-up process of the emergency unit starts only when there was an uninterrupted mains power supply for 5 days. Within the following 28 days the emergency electronic unit will conduct the internal commissioning test.

Functional test
During the functional test the function of the emergency electronic unit, the emergency battery and the LED are being checked by the emergency electronic unit. The test cycle will last approx. 5 sec. and will be carried out once a week. The first functional test starts one week after commissioning test has happened.

Operating period test
During the operating period test the emergency electronic unit is testing the capacity of the emergency battery. Operating period tests will take place every year. The first test starts one year after the commissioning test has happened.
If necessary the operating period test can be initiated manually at any point in time. This can be done by interrupting and restoring the mains supply (e.g. by means of an up-stream fuse) for 5 times within 60 seconds.

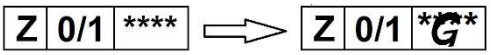
2.2 LED-Signals

The built-in two-colored Signal-LED (red/green) does show the working condition and the error state of the fitting. The following states are possible:

green permanent:	Normal operation, the emergency battery is being charged
green blinking fast:	Functional period test is running
green blinking slow:	Operating period test is running
red permanent:	LED failure
red blinking fast:	Battery charging failure
red blinking slow:	Insufficient capacity of the battery
green and red off:	Emergency mode

2.3 Later application of a pictogram

If the light fitting is subsequently provided with a pictogram, on it`s type plate a "G" must be written in the allowed space (see figure) with a water-resistant, light-resistant pin (for example: permanent marker):



3. Technical Data

Series:	nD8611 L02/. W Explosion-proof LED-Emergency Light Fittings for operating in hazardous areas of zones 2 and 22.
Explosion protection:	Ⓔx II 3 G Ex nR IIC T4 Gc Ⓔx II 3 D Ex tc IIIC T80 °C Dc
Certification:	SH 14.8611
Rated voltage:	220...240 V AC; 50/60 Hz
Isolation class:	I
Ingress protection:	IP65
Ambient temperatur:	0 °C ... +30 °C (maintained operation) 0 °C ... +40 °C (non-maintained operation)
Energy efficiency class:	This light fitting contains a light source of the energy efficiency class: C
Power consuption:	ca. 5 W
Locking:	2 screws M4x8
Operation position:	in any direction
Cable entry:	The built in Ex cable gland with thread size M20 x 1.5 only! (spare-part-no. 90120 9008) Sealing range: 8 - 13 mm Torques: Connection thread 2,3 Nm; Pressing screw 1,5 Nm (Ex cable gland with closing plug = Test port) or an Ex cable gland with an equivalent flat seal approved by the manufacturer or in accordance with national regulations for the types of protection nR and tc. Housing bore: 20.3 mm +0.2/-0; wall thickness: 1.7 mm If other cable glands are used, their operating instructions must be observed!

Test port: Ex cable gland with closing plug (spare-part-no. 90122 9001)

Connection per terminal: Ampacity: 16 A max. (At maximum current load, a cross section of 2.5 mm² is required)

Screw terminal: Clamping range: 1 x 0.75 - 2.5 mm² (solid core or stranded)
1 x 1,5 - 2,5 mm² (flexible)
Required stripping length: 7 – 7.5 mm
Torque of terminal screw: 0.5 Nm

Screwless terminal: Clamping range: 2 x 0.75 - 2.5 mm² (solid core or stranded)
2 x 1.5 - 2.5 mm² (flexible)
Required stripping length: 8 - 9 mm

Possible number of light fittings per circuit breaker*:

Type	B 10 A	B 16 A	C 10 A	C 16 A
nD8611 L02/. W	81	130	135	221

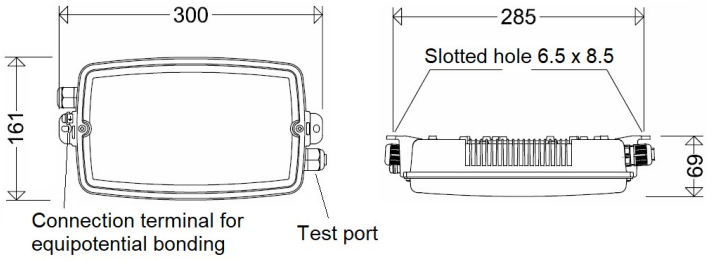
*) Typical values; possible deviations depending on make, cable impedance and temperature

Rated luminous flux: 100%

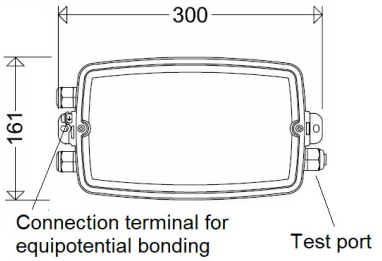
Emergency battery: 1-hour version: Type 8620 (spare-part-no. 90222 9026)
3,6 V, 2,2 Ah (battery pack composed of 3 NiMh-cells)

3-hour version: Type 8621 (spare-part-no. 90222 9027)
6 V, 2,2 Ah (battery pack composed of 5 NiMh-cells)

Dimensions:
(all measures in mm)



Special versions with the possibility for cable looping:



Equipotential bonding: Connection terminal for equipotential bonding on the outside of the light fitting
Clamping range: 4 mm² max.
Torque of terminal screw: 2 Nm max.

4. Installation

- The safety of this light fitting is only guaranteed as long as it is operated within its assessment threshold. Installation and maintenance must be done in accordance with the respective regulations!
- The installation of explosion-proof light fittings must be done by Ex-skilled electricians only!
- In regard to the minimum and maximum admissible ambient temperature potential sources of cold and heat (e.g. direct heat or solar radiation, cooling units) have to be considered!
- If there is a risk of accidental electrostatic charge the light fitting must be protected by appropriate measures!
- The application of this light fitting in an explosive dust atmosphere is depending on the properties of the surrounding dust. Please ensure that there will be an adequate difference between the maximum surface temperature of the fitting and the glowing and the ignition temperature of the respective dust!
- Applying an explosion-proof breathing gland for pressure compensation is not allowed!

4.1 How to open the light fitting

- The light fitting may only be opened if it has been disconnected from the mains supply completely!
- It is allowed to open the light fitting in a non-explosive (non hazardous) atmosphere only!
- Please ensure that the LED are protected against mechanical and electrostatic attacks whenever the light fitting is open. For this reason the LED must not be touched either!

– Loosen the two captive screws out of the diffuser.

– Lift the diffuser from the housing.

4.2 Electrical connection

- The filling level of the connection cable should be quite high for avoiding any air penetrating the inside of the light fitting through the cable!
- **The Test port for restricted breathing (Ex cable gland with closing plug, see illustration in section 3, Technical Data), must not be used for cable entry in any case!**

– After mounting the light fitting housing insert the connection cable through the Ex cable gland. An inlaid dust protective disc, if existing, must be removed before.

– Fasten the pressing screw of the Ex cable gland (Torque see section 3, Technical Data).

- **Outside** the light fitting appropriate measures (e.g. pull relief clips) must be taken to protect the connection cable from twist and it must be ensured that no tensile forces react on the wiring and the Ex cable gland!
- The diameter of the connection cable must correspond to the sealing range of the Ex cable gland (see section 3, Technical Data)!
- Ex cable glands that are not used for cable entry must be closed with the enclosed closure plug! An inlaid dust protective disc, if existing, must be removed before.
- The conductors must not be damaged when skinning resp. stripping the cable!
- When stripping the cable special attention needs to be paid to the correct length of the conductor end sections (see section 3, Technical Data)!

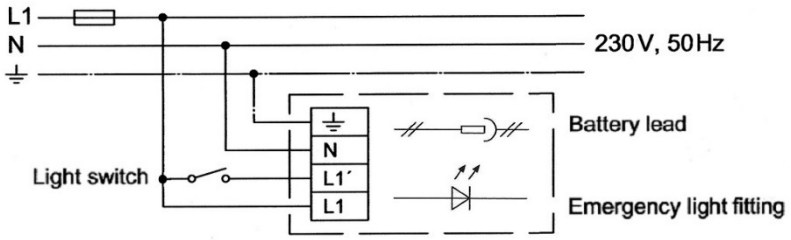
– Connect the conductors of the connection cable to the right terminals as per marking. Tighten connection screws - including those of the unused terminals (Torque see section 3, Technical Data).

➤ It is important to ensure that the bare conductor is fully inserted into the terminal and that no cable insulation is clamped!

Modes of operation

Non-maintained operation:
The light fitting switches on automatically in case of a mains failure.
The direct phase (L1) will be connected to connecting point L1 as mains supply monitor. Connecting point L1' will not be connected.

Maintained operation:
The light fitting switches on automatically and it may be used as a standard light fitting if mains voltage is on.
The same direct phase (L1) will be connected to connecting point L1 as mains supply monitor and to connecting point L1' as switched phase.



L1 and L1´must have the same phase

Connecting the emergency battery

In addition to the mains also the emergency battery must be connected. This is being done by connecting the plug with the red battery cable to the positive terminal of the battery. If mains voltage is available the battery is charged and the LED is lighting green.

➤ Only connect/disconnect the emergency light fitting and emergency battery in a non-explosive atmosphere.

4.3 Replacing LED circuit board and emergency light unit

Replacement of LED board and emergency light unit has been described in the separate instructions which can be found attached to the spare parts to be supplied.

4.4 How to close the light fitting

– Reput the diffuser back onto the housing.
– Screw the screws of the diffuser into the housing.

➤ After closing the light fitting please make sure that the gasket is correctly sealing it!

5. Commissioning

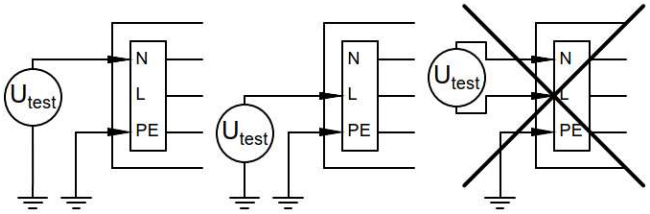
Before commissioning this explosion-proof lighting fitting please check and ensure that:

- the light fitting has been installed according to the regulations.
- the Ex cable glands are securely fixed in the housing and the closing plug is installed in a proper manner (Torques see section 3, Technical Data).
- the pressing screw of every Ex cable gland is tightened with the required torque (Torques see section 3, Technical Data).
- the connection cable has been firmly installed and is not subject to any tension whatsoever.
- the bare conductor is fully inserted into the terminal and that no cable insulation is clamped.
- the terminal screws of the connection terminals are firmly tightened (Torques see section 3, Technical Data).
- the light fitting is closed correctly.
- all gaskets are effective.
- the light fitting is not damaged whatsoever.

➤ The restricted breathing of the light fitting is condition for its safe operation! Therefore, prior to commissioning, check the restricted breathing in accordance with section 5.3.

5.1 Isolation measurement

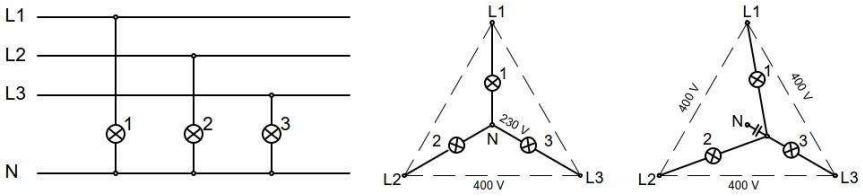
For measuring the isolating resistance the test voltage must be put on between the outer conductor and the earth conductor or between the neutral conductor and the earth conductor only.



After finishing the isolation test the conductor between the mains and the light fitting must be reconnected safely. Before starting operation the connection of the neutral conductor must be safe for avoiding any damage whatsoever of the electronic control gear caused by any inadmissible excess-voltage in case of an unbalanced mains load. (see section 5.2)

5.2 Emergency light unit in 3-phase-operation

The diagram shows the wiring for light fittings or light fitting groups in 3-phase circuits and with a common neutral conductor N. If the common neutral conductor is interrupted and voltage is present, then light fittings or groups of light fittings may be exposed to unacceptably high voltages and consequently the emergency light unit may be destroyed.



Light fittings with emergency light unit OK fault

5.3 Testing the restricted breathing

The test of the restricted breathing of the light fitting must be carried out after installation and at regular intervals. For this purpose, the light fitting is provided with a Test port, which consists of an Ex cable which is locked by a closing plug.

For testing, a negative pressure is to be generated in the light fitting via the Test port. Under constant temperature conditions, the vacuum must exceed a predetermined minimum value after a specified waiting time has elapsed.

According to EN/IEC 60079-15:2019, section 12.2.2.1.2, three test methods can be used:

	Method 1	Method 2	Method 3
Underpressure at the beginning of the test	3 kPa (30 mbar)	0,3 kPa (3 mbar)	0,3 kPa (3 mbar)
Waiting time	14 s	14 s	90 s
Minimum underpressure after waiting time has elapsed	2,7 kPa (27 mbar)	0,27 kPa (2,7 mbar)	0,15 kPa (1,5 mbar)

➤ After completing the test, make sure that the closing plug is inserted back into the Ex cable gland and the pressing screw is tightened properly (Torque see section 3, Technical Data).

6. Maintenance

6.1 Repair- and maintenance works

- The light fitting may only be opened if it has been disconnected from the mains supply completely!
- It is allowed to open the light fitting in a non-explosive (non hazardous) atmosphere only!
- For applications in dusty atmospheres the light fitting must be cleaned before opening!
- Ensure that no dust can get into the light fitting when it is open!
- Working on the inner parts of the light fitting is allowed in non hazardous atmosphere only!
- Replace damaged parts by original spare parts from the Adolf Schuch GmbH only!

Spare Parts:
Due to the rapid development of LED technology, LED components quickly become obsolete and are no longer available. In order to be able to determine and offer suitable components nevertheless, in addition to the complete type designation the serial number of the light fitting must be stated when enquiring about spare parts. The serial number is printed on the type plate of the light fitting – on the bottom left.

6.2 Cleaning the light fitting

- At the plastic parts of the light fitting there is a danger of ignition due to electrostatic charging! For cleaning the housing and cover outside and inside and for cleaning internal plastic components use only cold or lukewarm water (if necessary with a mild cleaning agent) together with a viscose sponge or a soft fibrous-free cloth!

Pay attention to the following in case of application of this light fitting in dusty atmospheres:
Dust deposits show heat-insulating properties and thus reduce the service life of the light fitting. It is necessary to clean the fitting from dust regularly. In case the dust layer may be higher than 5 mm it must be ensured that the surface temperature of the light fitting does not exceed the maximum permissible surface temperature of the specific dust considering the thickness of the dust layer. The dust layer must not exceed 50 mm at any time.

6.3 Regular maintenance work

- Follow the instructions of section 6.1!

Explosion-proof light fittings need regular maintenance according to the national rules of the country they are installed. Especially components which are important for the Explosion Category have to be carefully checked. Therefore it must to be checked very carefully:

- diffuser, housing and gaskets for any kind of damages.
- effectiveness of gasket betweeen glass and housing.
- the correct installation and tightness of Ex cable glands and closing plug (Torques see section 3, Technical Data).
- all parts of plastic inside the light fitting to attend to colour change, deformation and damaging.
- the tight fit of the conductor and the condition of the cable insulation.
- that the light fitting is closed correctly and the gasket is effective.

- The restricted breathing of the light fitting is condition for its safe operation and must therefore be regularly checked under particular consideration of its operating conditions (see section 5.3, Testing the restricted breathing)!

The maintenance of the fitting as an emergency light fitting has to be done following the actual international and national regulations.

6.4 How to replace the emergency battery

The battery needs to be replaced if the slow blinking red Signal-LED is indicating a battery capacity failure.

- Only original batteries as per the battery type plate must be used for replacing the battery!
- Working on the inner parts of the light fitting is allowed in non hazardous atmosphere only – see section 6.1!
- The battery must be charged via the lighting fitting only!

After replacement of the battery and switching on the mains voltage the emergency light unit will initiate the commissioning test as soon as there was an uninterrupted mains power supply for 5 days (see section 2.1). Functional test and operating period test will take place as described in section 2.1.

6.5 Environmental advice

This device has got an accumulator which contains ecologically dangerous materials. There is a particular designation for this purpose. The people operating this device are obliged by law to return accumulators which have become waste and which contain any pollutant materials to organizations which are in the hands of the vendors or waste disposal holders being under public law.

6.6 Placing the fitting out of operation

To avoid unnecessary discharging of the battery the battery must disconnected from the emergency light unit when putting the fitting out of operation. To do so the plug must be disconnected from the positive terminal of the battery.

- To avoid any damages the battery should not be stored for more than 6 months without being re-charged periodically!