Lumiglas Ex Motor Drive EMA I-Ex
Ⓔx EEx d IIC T5

specifically developed for connecting to various control elements in potentially explosive environments.

- Versatile, high-performance Ex-class motor drive with compact dimensions for numerous applications

- This data sheet also incorporates the installation and operating instructions

- **Applications:**
  The Ex-class motor drive is mainly intended for operating wipers on sight glasses for short-term operation. For other applications it can also be used in long-term operation.

- **Special advantages of the Lumiglas Ex-class motor drive:**
  Especially in environments that require the remote monitoring of processes in reactors (e. g. biogas plants), ex-type cameras are frequently mounted on sight glasses, enabling process engineers to observe what is going on in the vessel from a central control room, which is frequently located at some distance from the reactor itself.
  This eliminates the need for physical presence at a reactor, frequently entailing safety-relevant situations made more difficult by adverse environmental conditions, e. g. bad weather.

  In certain processes, problems can arise if there are deposits of the substance in the reactor on the sight glass screen, thus making it difficult or even impossible for the camera to view the process. This can be remedied by using one of the proven wipers from the Lumiglas range: SW I and SWII. These wipers are normally operated by hand when the observer wants to inspect the reactor.

  In many cases, however, the remote observation of reactors, e. g. via Lumiglas camera technology, is mandatory, making it essential to install a motor-driven wiper that can be actuated remotely from the control room.

  The Ex motor drive EMA I-Ex has been developed specifically for such applications.

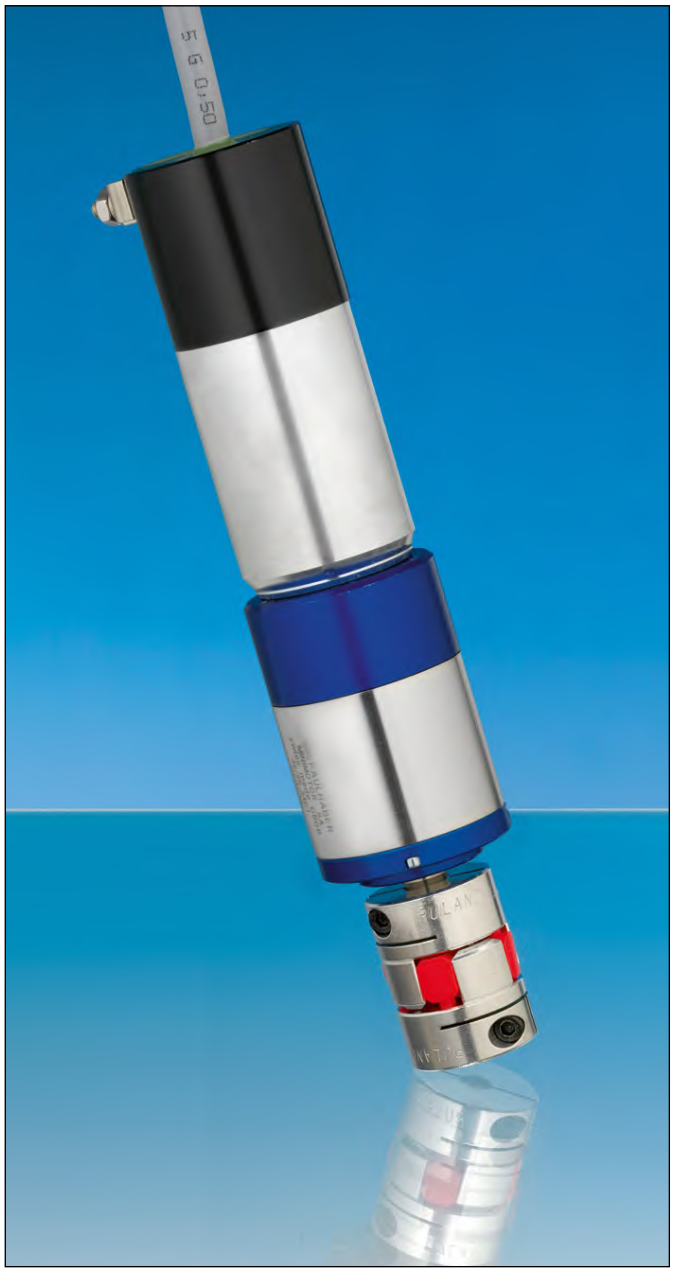
  Because remote observation is mainly carried out in potentially explosive environments, an Ex-class motor drive is now available in addition to the Ex camera.

- **Small dimensions, great effectiveness:**
  The Ex-class motor drive is designed for both short-term and continuous operations.

- **All development targets have been achieved:**
  Compact overall size; high turning moment; excellent motor power; low energy consumption.

  The Ex motor drive is thus ideally suited for operating, for instance, Lumiglas screen wipers:
  a) SW I (the wiper blade axis passes through a hole in the sight glass) – for low pressure
  b) SW II (the wiper blade axis is operated from the side through a hole in the sight glass fitting by means of a flexible shaft) – for higher pressure

  Combination with a spray facility is also possible.



Lumiglas Ex motor drive

- **General operating conditions:**
  - Approved for use in potentially explosive environments, zones 1 and 2 as well as 21 and 22
  - Approved for use in ambient temperatures of between -20°C and +50°C

- **Type of protection:**
  Terminal connection and motor enclosure IP68, motor shaft IP54

- **Structure of compact unit:**
  The unit is made up of a DC electric motor with a flanged drive and special coupling by way of which (e. g.) the wiper axis of a screen wiper is turned.

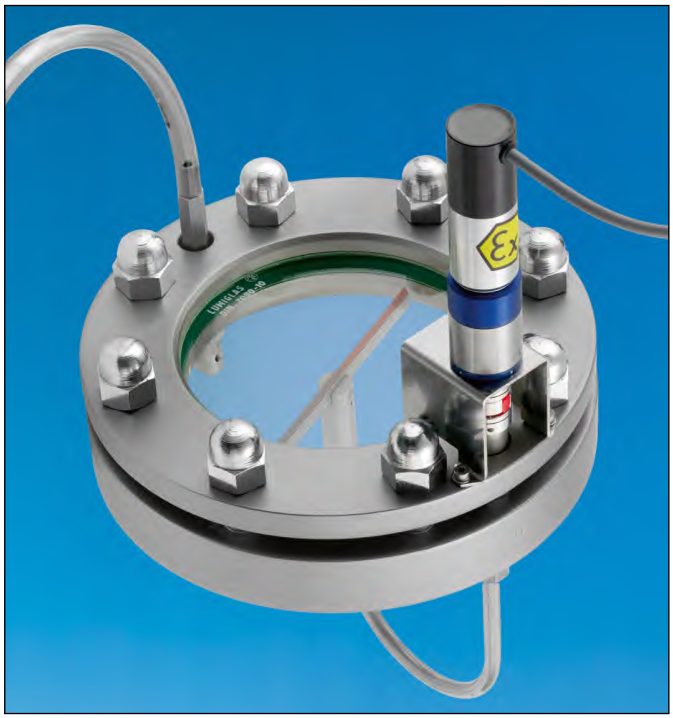
• **Special characteristics of the individual components:**

1. Motor
- Explosion-proof high-precision DC motor with non-ferrous armature
- High acceleration rate thanks to low weight of rotor
- High degree of efficiency (75% by 4.8 W power output) because there is no hysteresis loss
- Shaft supported on both sides by pre-stressed ball bearings
- Protected against excessive enclosure temperature: the motor is equipped with two non-resettable thermal fuses as protection; operation is also admissible with only one thermal fuse (see instructions for terminal connection)
- Type of protection: EEx d IIC T5
- Nominal voltage: 12 V DC
- Nominal current: up to 0.5 A continuous load at ambient temperature 40°C
- Direction of rotation: as required
- Connecting cable: 5 x 0.5 mm², 5 metres in length, fitted
- Material of motor enclosure: steel

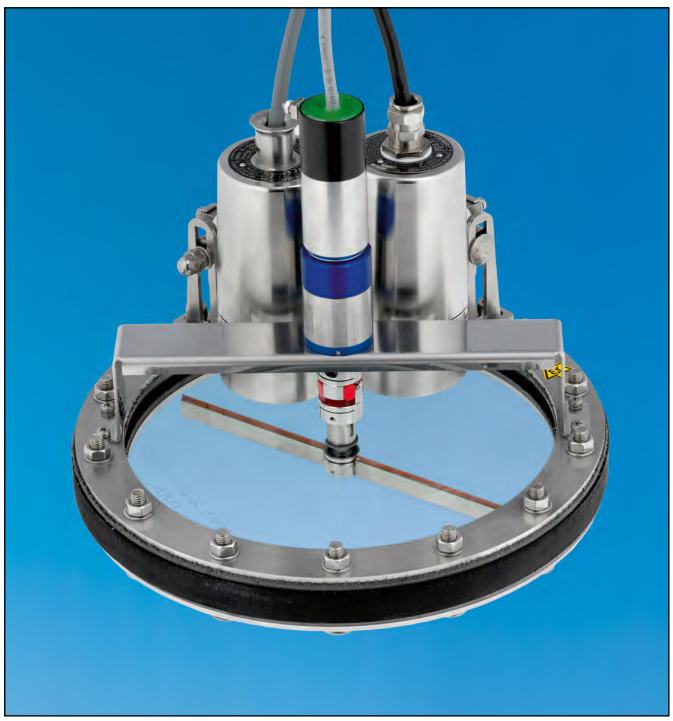
2. Flanged drive
- Planetary gear set, reduction gear ratio (nominal) 159 : 1
- Turning moment: 2 Nm for continuous operations, 4 Nm for short-term operations
- Direction of rotation of shaft: reversible in direction of arrow
- Drive shaft bearing: ball bearings, pre-stressed
- Material: stainless steel

3. Helical coupling
- Material: aluminium (also available as a special version in stainless steel)

4. Mounting
- The individually adapted stainless steel fittings for use in pressure environments (SWII) and in normal environments (SW I) are shown in the illustrations opposite.



Ex-class motor drive combined with Lumiglas wiper SW II



Ex-class motor drive combined with Lumiglas wiper SW I

• Installation/Assembly

1. Mounting

To enable wiper operations, the compact Ex-class motor drive is affixed to the cover flange of a round sight glass fitting by means of a special adapter. Each mounting (stainless steel) is individually adapted and depends on
a) the type and size of the sight glass fitting
b) the type of wiper.
Please provide accurate details of the application in your enquiry!

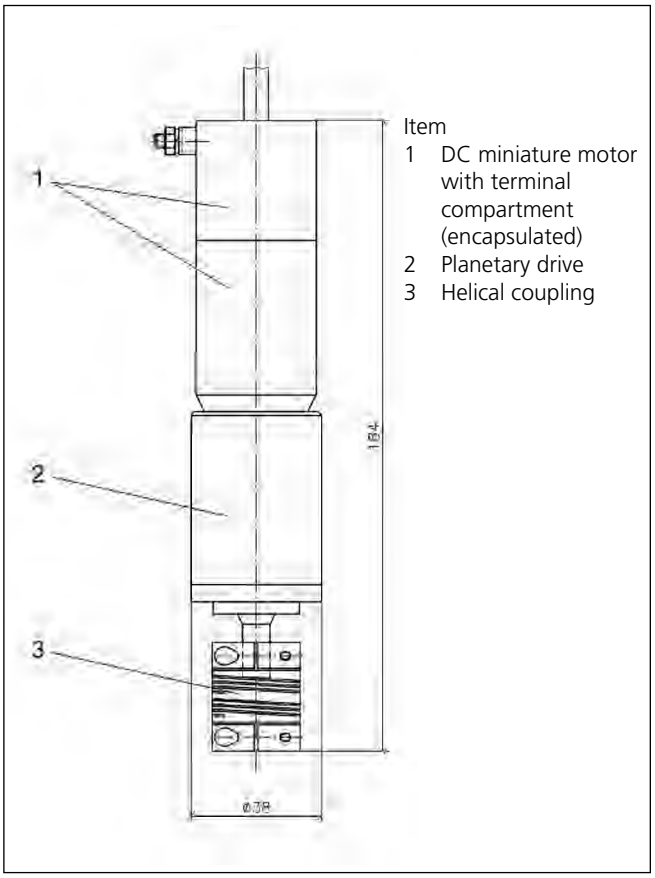
2. Coupling

- Once the mounting has been fastened to the planetary drive, the coupling is fitted on the drive shaft of the transmission and secured to the same with a hexagon socket screw.
- The wiper axis in then guided into the coupling. After that, the Ex-class motor drive is aligned with the attachment and mounted.
- Finally, when it has been positioned free of tension, the wiper blade axis is fixed over the hexagon socket screw.
- It is essential to avoid any strain when installing the coupling and the extension for actuating operating elements (wipers).

• Order data:

- Ex-class drive 12 V DC 0.5 A, part no. 3942.001.00
- Coupling, part no. 3065.001.00
- Ex-class terminal box, part no. 2507.020.00
- Non-Ex power supply unit 230 V AC / 12 V DC 0.42 A, part no. 9306.005.00

• Dimensions:



Item
1 DC miniature motor with terminal compartment (encapsulated)
2 Planetary drive
3 Helical coupling

• Technical data:

EC Type-Examination Certificate	PTB 03 ATEX 1131
Ignition protection type motor with drive	EEx d IIC T5 CE IIC GD 95°C
Explosion group	IIC (all explosion groups, includes explosion groups IIA and IIB)
Temperature classification	T5
Type of protection	Terminal connection and motor enclosure IP68, motor shaft IP54 acc. to EN 60529
Operating voltage	12V DC
Ambient temperature	-20°C ≤ Ta ≤ +50°C
Terminals (connecting cable fitted)	5 x 0.5 mm², cable 5 m
Nominal current	Up to 0.5 A continuous load at 40°C
Direction of rotation	User-defined
Speed	Approx. 13 rpm
Material: motor	Steel, zinc-plated, passivated
Material: drive	Stainless steel with anodised adaptor flange (aluminium)
Material: coupling	Aluminium 7075-T651
Weight	Approx. 1.1 kg

• **Wiring diagram for power supply unit and Ex d wiper drive via terminal box:**

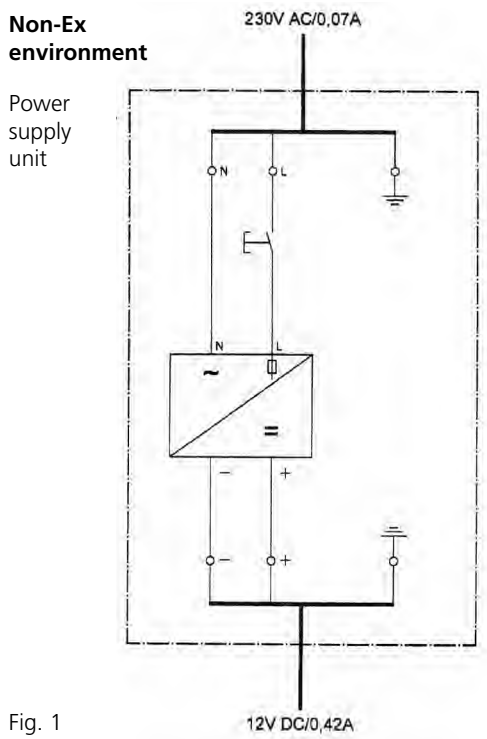


Fig. 1

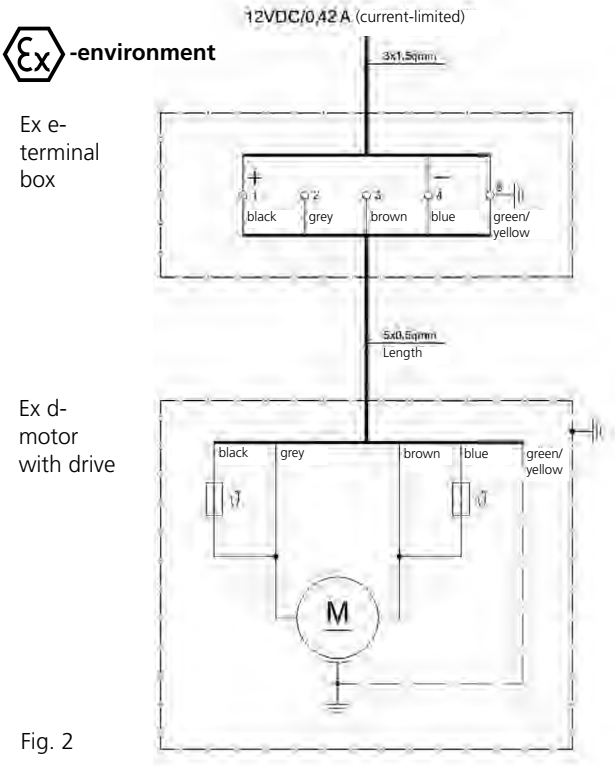


Fig. 2

Installation and Operating Instructions

• **Essential precautions:**

The Lumiglas Ex-class motor drive should only be installed, connected and serviced by staff who have been expressly trained and authorised for this purpose.

EC Type-Examination Certificate PTB03 ATEX 1131 must be complied with.

The operating permit for the equipment expires if it is used incorrectly.

• **Electrical termination**

The electrical supply required is 12V DC / 0.42 A (current-limited). If this is not available on-site, a suitable power supply unit is obtainable (to be ordered separately).

When the Lumiglas Ex motor drive is used in potentially explosive environments, the voltage from the non-Ex area is laid to a special Ex-e terminal box to be installed in the explosive zone (to be ordered separately).

The supply voltage is conducted via a 3 x 1.15 mm² line to the Ex-e terminal box and wired to the terminals as follows (see also Fig. 2):
+ to terminal 1
– to terminal 2
Protective conductor to terminal 5

The Ex-d motor is fitted with a connecting cable, 5 metres in length with 5 x 0.5 mm² wires.

The wires in the connecting cable are inserted and fixed by screws in the individual terminals as follows:
Black to terminal 1
Grey to terminal 2
Brown to terminal 3
Blue to terminal 4
Protective conductor (green/yellow) to terminal 5

The two thermal fuses (non-resettable) installed in the motor are activated as a result of this termination.

Caution:
Under certain circumstances, it is possible for the motor to run without the two thermal fuses. It is however essential that this operating mode is verified and approved by an expert prior to start-up!

If the motor is to be operated without thermal fuses, it is only necessary to connect the grey wire to terminal 2, brown to terminal 3, and the protective conductor to terminal 5.