HADLER


Linear V

# Data sheet

Integrated emergency converter for fluorescent lamps zone 2 Ex
100,000 h suitable for zone 2 hazardous areas
For mains and battery supply
Integrated battery management

Luxtronic®

## Linear V
## Emergency converter

More than 25 years of experience in the design and development of electronic lighting products, the close cooperation with test authorities and the joint research in the sector of explosion protection enable the company Hadler to develop products in accordance with market trends which will exactly meet the requirements. Function and, above all, safety will take priority over other requirements.

Furthermore, in accordance with the company philosophy, Luxtronic ballasts also reflect the "second idea": Features offering an additional benefit and using the full competence of the company Hadler to allow for a unique position in the market. Both large-scale and small-scale series of the Luxtronic ballasts can be produced in a cost-effective way. The proximity to the market allows for short delivery times.

Michael Lamkowski
Head of Research & Development



## Table of contents

NLE 2 x 36 W T8, 230 V, 4 Ah, 1.5 h

**Input**

| | |
|---|---|
| Rated supply voltage | 220 – 240 V |
| Mains frequency | 50 – 60 Hz |
| Input voltage range a.c. | 198 – 264 V |
| Input voltage range d.c. | n.a. |
| Power factor | 0.98 at full load |
| Total Harmonic Distortion | < 11.5 % |

**Output**

| | |
|---|---|
| Lamp type | 2 x 36 W T8 |
| Connection type | Serial |
| Output dimming | n.a. |
| Dimming range | n.a. |

**Efficiency**

| | |
|---|---|
| Energy Efficiency Index | EEI = A2 |

**Battery**

| | |
|---|---|
| Type | 5 cells NiCd, 4 Ah |
| Charge current | 210 mA |
| Charge voltage | 4.8 – 7.55 V |
| Discharge current | 2.05 A |
| End of discharge | 4.8 V |
| Deep discharge current | < 3 mA |
| EBLF | 0.25 |

**Interface**

| | |
|---|---|
| Dimming Interface | n.a. |
| Interface control current | n.a. |
| Dimming curve | n.a. |

**Temperature, Lifetime**

| | |
|---|---|
| Ambient temperature range | -20 – 60 °C |
| Max. case temperature $T_c$ | 70 °C |

| | | | |
|---|---|---|---|
| $T_a$ | 40 °C | 50 °C | 60 °C |
| $T_c$ | 50 °C | 60 °C | 70 °C |
| lifetime | > 150,000 h | 100,000 h | 65,000 h |

**Max. No. of ECG per circuit breaker**

| | | |
|---|---|---|
| Type | B10 | 8 pcs. |
| | C10 | 13 pcs. |
| | B16 | 13 pcs. |
| | C16 | 22 pcs. |

**Wiring**

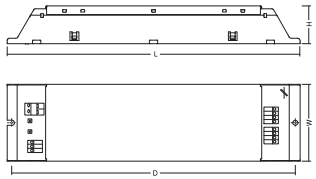
| | |
|---|---|
| Status LED cable length | 110 cm |
| Input wire cross-section | 0.5 – 1.5 mm² |
| Output wire cross-section | 0.5 – 1.5 mm² |

The wiring should be short and without crossings for best EMC results.

**Dimensions**

| | |
|---|---|
| Length x Width x Height | 248 x 65 x 32 mm |
| Mounting hole distance D | 240 mm |
| Mounting screws | M4 max. |

(see schematic view on the right)




**Ordering data**

| | |
|---|---|
| Weight | 0.4 kg |
| Packaging unit | 32 pcs. |
| Order No. | **3 E 236 03 0** |

NLE 2 x 36 W T8, 230 V, 4 Ah, 1.5 h

**Emergency lighting performance**

The emergency converter operates two lamps in series connection when in maintained mains mode. Because the normative declared EBLF relates to the emergency lamp only, total light output in emergency mode will be approximately 50% of the normative declared EBLF compared to the values in maintained mains mode.

The device will recharge the battery normally after abnormal operating conditions given in EN 61347-2-7 clause 22.3 (battery short-circuit).

Battery ground is internally connected to the functional earthing to reduce emitted interferences. The insulation against line conductors L and N meets the requirements for basic insulation.

To achieve sufficient lamp life in switched maintained operation both lamps are warm-started within 1.5 s. When switching to emergency mode, instant-starting is used to ensure that time-to-light is less than 0.5 s. The emergency converter is intended for use in luminaires for high-risk task area lighting.

**Standards**

- EN 55015:2013
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61547:2009
- EN 61347-1:2008 + A1:2011 + A2:2013
- EN 61347-2-3:2011
- EN 61347-2-7:2012
- EN 60929:2012
- EN 60079-0:2012 + A11:2013
- EN 60079-15:2010

**Markings**

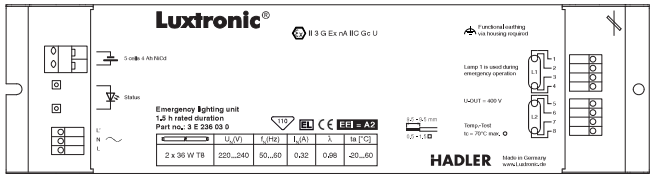
CE

EL

110 acc. to IEC 61374-1 C.5 e)

Ex

**Wiring diagram**



NLE 2 x 36 W T8, 230 V, 4 Ah, 1.5 h

**Safety instructions**

Please carefully read these instructions prior to installation and keep them for later reference.

This emergency converter is intended for operation of two T8 fluorescent lamps in explosion protected luminaires. Do not use this product for other than intended use.


II 3 G Ex nA IIC Gc U

Hadler GmbH declares that this device is in conformity with the EU explosion protection directive 94/9/EC (ATEX).

The sign "U" placed after ATEX marking indicates, that the corresponding declaration is not equivalent to a Statement of Conformity for an equipment or protective system. It is intended to be used as a basis for certifiying an equipment or protective system.

Detailed product datasheets are available at www.hadler-gmbh.de.

For operation conditions see pages 4 – 6.

**Installation precautions**

This control gear may be installed into housings of explosion protected luminaires with a minimum type of protection of the housing of IP54 according to IEC 60529.

Dismantled length of wires has to be between 8.5 and 9.5 mm. At use of multistrand wires, conductor sleeves have to be used. Permissible cross section of wires is from 0.5 up to 1.5 $mm^2$.

Maximum temperature rise at internal components is 60 K.

Status LED and connected cable need to be fixed to avoid mechanical stress on cable and solder joints.

Devices contain no field-serviceable parts. In case of malfunction, contact the manufacturer.

NLE 2 x 36 W T8, 230 V, 7 Ah, 3.0 h

**Input**

| | |
|---|---|
| Rated supply voltage | 220 – 240 V |
| Mains frequency | 50 – 60 Hz |
| Input voltage range a.c. | 198 – 264 V |
| Input voltage range d.c. | n.a. |
| Power factor | 0.98 at full load |
| Total Harmonic Distortion | < 11.5 % |

**Output**

| | |
|---|---|
| Lamp type | 2 x 36 W T8 |
| Connection type | Serial |
| Output dimming | n.a. |
| Dimming range | n.a. |

**Efficiency**

| | |
|---|---|
| Energy Efficiency Index | EEI = A2 |

**Battery**

| | |
|---|---|
| Type | 5 cells NiCd, 7 Ah |
| Charge current | 340 mA |
| Charge voltage | 4.8 – 7.55 V |
| Discharge current | 1.75 A |
| End of discharge | 4.8 V |
| Deep discharge current | < 3 mA |
| EBLF | 0.25 |

**Interface**

| | |
|---|---|
| Dimming Interface | n.a. |
| Interface control current | n.a. |
| Dimming curve | n.a. |

**Temperature, Lifetime**

| | | | |
|---|---|---|---|
| Ambient temperature range | -20 – 60 °C | | |
| Max. case temperature $T_c$ | 70 °C | | |
| | | | |
| $T_a$ | 40 °C | 50 °C | 60 °C |
| $T_c$ | 50 °C | 60 °C | 70 °C |
| lifetime | > 150,000 h | 100,000 h | 65,000 h |

**Max. No. of ECG per circuit breaker**

| | | |
|---|---|---|
| Type | B10 | 8 pcs. |
| | C10 | 13 pcs. |
| | B16 | 13 pcs. |
| | C16 | 22 pcs. |

**Wiring**

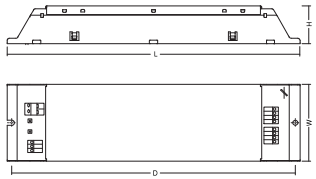
| | |
|---|---|
| Status LED cable length | 110 cm |
| Input wire cross-section | 0.5 – 1.5 mm² |
| Output wire cross-section | 0.5 – 1.5 mm² |

The wiring should be short and without crossings for best EMC results.

**Dimensions**

| | |
|---|---|
| Length x Width x Height | 248 x 65 x 32 mm |
| Mounting hole distance D | 240 mm |
| Mounting screws | M4 max. |

(see schematic view on the right)




**Ordering data**

| | |
|---|---|
| Weight | 0.4 kg |
| Packaging unit | 32 pcs. |
| Order No. | **3 E 236 03 3** |

NLE 2 x 36 W T8, 230 V, 7 Ah, 3.0 h

**Emergency lighting performance**

The emergency converter operates two lamps in series connection when in maintained mains mode. Because the normative declared EBLF relates to the emergency lamp only, total light output in emergency mode will be approximately 50% of the normative declared EBLF compared to the values in maintained mains mode.

The device will recharge the battery normally after abnormal operating conditions given in EN 61347-2-7 clause 22.3 (battery short-circuit).

Battery ground is internally connected to the functional earthing to reduce emitted interferences. The insulation against line conductors L and N meets the requirements for basic insulation.

To achieve sufficient lamp life in switched maintained operation both lamps are warm-started within 1.5 s. When switching to emergency mode, instant-starting is used to ensure that time-to-light is less than 0.5 s. The emergency converter is intended for use in luminaires for high-risk task area lighting.

**Standards**

- EN 55015:2013
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61547:2009
- EN 61347-1:2008 + A1:2011 + A2:2013
- EN 61347-2-3:2011
- EN 61347-2-7:2012
- EN 60929:2012
- EN 60079-0:2012 + A11:2013
- EN 60079-15:2010

**Markings**

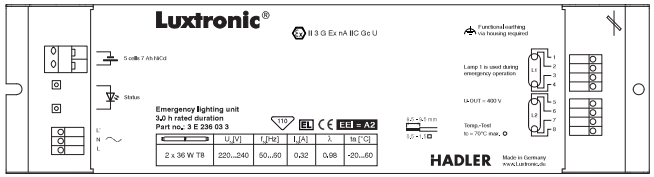
CE

EL

110 acc. to IEC 61374-1 C.5 e)

Ex

**Wiring diagram**



NLE 2 x 36 W T8, 230 V, 7 Ah, 3.0 h

**Safety instructions**

Please carefully read these instructions prior to installation and keep them for later reference.

This emergency converter is intended for operation of two T8 fluorescent lamps in explosion protected luminaires. Do not use this product for other than intended use.


II 3 G Ex nA IIC Gc U

Hadler GmbH declares that this device is in conformity with the EU explosion protection directive 94/9/EC (ATEX).

The sign "U" placed after ATEX marking indicates, that the corresponding declaration is not equivalent to a Statement of Conformity for an equipment or protective system. It is intended to be used as a basis for certifiying an equipment or protective system.

Detailed product datasheets are available at www.hadler-gmbh.de.

For operation conditions see pages 10 – 12.

**Installation precautions**

This control gear may be installed into housings of explosion protected luminaires with a minimum type of protection of the housing of IP54 according to IEC 60529.

Dismantled length of wires has to be between 8.5 and 9.5 mm. At use of multistrand wires, conductor sleeves have to be used. Permissible cross section of wires is from 0.5 up to 1.5 $mm^2$.

Maximum temperature rise at internal components is 60 K.

Status LED and connected cable need to be fixed to avoid mechanical stress on cable and solder joints.

Devices contain no field-serviceable parts. In case of malfunction, contact the manufacturer.

NLE 2 x 18 W T8, 230 V, 4 Ah, 1.5 h

**Input**

| | |
|---|---|
| Rated supply voltage | 220 – 240 V |
| Mains frequency | 50 – 60 Hz |
| Input voltage range a.c. | 198 – 264 V |
| Input voltage range d.c. | n.a. |
| Power factor | 0.96 at full load |
| Total Harmonic Distortion | < 19.3 % |

**Output**

| | |
|---|---|
| Lamp type | 2 x 18 W T8 |
| Connection type | Serial |
| Output dimming | n.a. |
| Dimming range | n.a. |

**Efficiency**

| | |
|---|---|
| Energy Efficiency Index | EEI = A2 |

**Battery**

| | |
|---|---|
| Type | 5 cells NiCd, 4 Ah |
| Charge current | 210 mA |
| Charge voltage | 4.8 – 7.55 V |
| Discharge current | 2.05 A |
| End of discharge | 4.8 V |
| Deep discharge current | < 3 mA |
| EBLF | 0.5 |

**Interface**

| | |
|---|---|
| Dimming Interface | n.a. |
| Interface control current | n.a. |
| Dimming curve | n.a. |

**Temperature, Lifetime**

| | |
|---|---|
| Ambient temperature range | -20 – 60 °C |
| Max. case temperature $T_c$ | 70 °C |

| | | | |
|---|---|---|---|
| $T_a$ | 40 °C | 50 °C | 60 °C |
| $T_c$ | 50 °C | 60 °C | 70 °C |
| lifetime | > 150,000 h | 100,000 h | 65,000 h |

**Max. No. of ECG per circuit breaker**

| | | |
|---|---|---|
| Type | B10 | 8 pcs. |
| | C10 | 13 pcs. |
| | B16 | 13 pcs. |
| | C16 | 22 pcs. |

**Wiring**

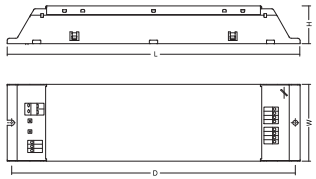
| | |
|---|---|
| Status LED cable length | 70 cm |
| Input wire cross-section | 0.5 – 1.5 mm² |
| Output wire cross-section | 0.5 – 1.5 mm² |

The wiring should be short and without crossings for best EMC results.

**Dimensions**

| | |
|---|---|
| Length x Width x Height | 248 x 65 x 32 mm |
| Mounting hole distance D | 240 mm |
| Mounting screws | M4 max. |

(see schematic view on the right)




**Ordering data**

| | |
|---|---|
| Weight | 0.4 kg |
| Packaging unit | 32 pcs. |
| Order No. | **3 E 218 03 0** |

NLE 2 x 18 W T8, 230 V, 4 Ah, 1.5 h

**Emergency lighting performance**

The emergency converter operates two lamps in series connection when in maintained mains mode. Because the normative declared EBLF relates to the emergency lamp only, total light output in emergency mode will be approximately 50% of the normative declared EBLF compared to the values in maintained mains mode.

The device will recharge the battery normally after abnormal operating conditions given in EN 61347-2-7 clause 22.3 (battery short-circuit).

Battery ground is internally connected to the functional earthing to reduce emitted interferences. The insulation against line conductors L and N meets the requirements for basic insulation.

To achieve sufficient lamp life in switched maintained operation both lamps are warm-started within 1.5 s. When switching to emergency mode, instant-starting is used to ensure that time-to-light is less than 0.5 s. The emergency converter is intended for use in luminaires for high-risk task area lighting.

**Standards**

- EN 55015:2013
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61547:2009
- EN 61347-1:2008 + A1:2011 + A2:2013
- EN 61347-2-3:2011
- EN 61347-2-7:2012
- EN 60929:2012
- EN 60079-0:2012 + A11:2013
- EN 60079-15:2010

**Markings**

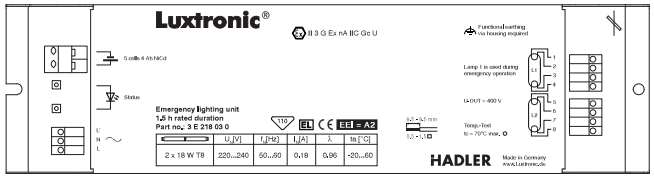
CE

EL

110 acc. to IEC 61374-1 C.5 e)

Ex

**Wiring diagram**



NLE 2 x 18 W T8, 230 V, 4 Ah, 1.5 h

**Safety instructions**

Please carefully read these instructions prior to installation and keep them for later reference.

This emergency converter is intended for operation of two T8 fluorescent lamps in explosion protected luminaires. Do not use this product for other than intended use.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Detailed product datasheets are available at www.hadler-gmbh.de.

For operation conditions see pages 16 – 18.

**Installation precautions**

This control gear may be installed into housings of explosion protected luminaires with a minimum type of protection of the housing of IP54 according to IEC 60529.

Dismantled length of wires has to be between 8.5 and 9.5 mm. At use of multistrand wires, conductor sleeves have to be used. Permissible cross section of wires is from 0.5 up to 1.5 $mm^2$.

Maximum temperature rise at internal components is 60 K.

Status LED and connected cable need to be fixed to avoid mechanical stress on cable and solder joints.

Devices contain no field-serviceable parts. In case of malfunction, contact the manufacturer.

NLE 2 x 18 W T8, 230 V, 4 Ah, 3.0 h

**Input**

| | |
|---|---|
| Rated supply voltage | 220 – 240 V |
| Mains frequency | 50 – 60 Hz |
| Input voltage range a.c. | 198 – 264 V |
| Input voltage range d.c. | n.a. |
| Power factor | 0.96 at full load |
| Total Harmonic Distortion | < 19.3 % |

**Output**

| | |
|---|---|
| Lamp type | 2 x 18 W T8 |
| Connection type | Serial |
| Output dimming | n.a. |
| Dimming range | n.a. |

**Efficiency**

| | |
|---|---|
| Energy Efficiency Index | EEI = A2 |

**Battery**

| | |
|---|---|
| Type | 5 cells NiCd, 4 Ah |
| Charge current | 210 mA |
| Charge voltage | 4.8 – 7.55 V |
| Discharge current | 1 A |
| End of discharge | 4.8 V |
| Deep discharge current | < 3 mA |
| EBLF | 0.25 |

**Interface**

| | |
|---|---|
| Dimming Interface | n.a. |
| Interface control current | n.a. |
| Dimming curve | n.a. |

**Temperature, Lifetime**

| | | | |
|---|---|---|---|
| Ambient temperature range | -20 – 60 °C | | |
| Max. case temperature $T_c$ | 70 °C | | |
| | | | |
| $T_a$ | 40 °C | 50 °C | 60 °C |
| $T_c$ | 50 °C | 60 °C | 70 °C |
| lifetime | > 150,000 h | 100,000 h | 65,000 h |

**Max. No. of ECG per circuit breaker**

| | | |
|---|---|---|
| Type | B10 | 8 pcs. |
| | C10 | 13 pcs. |
| | B16 | 13 pcs. |
| | C16 | 22 pcs. |

**Wiring**

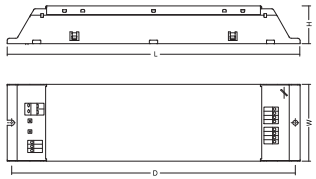
| | |
|---|---|
| Status LED cable length | 70 cm |
| Input wire cross-section | 0.5 – 1.5 mm² |
| Output wire cross-section | 0.5 – 1.5 mm² |

The wiring should be short and without crossings for best EMC results.

**Dimensions**

| | |
|---|---|
| Length x Width x Height | 248 x 65 x 32 mm |
| Mounting hole distance D | 240 mm |
| Mounting screws | M4 max. |

(see schematic view on the right)




**Ordering data**

| | |
|---|---|
| Weight | 0.4 kg |
| Packaging unit | 32 pcs. |
| Order No. | **3 E 218 03 2** |

NLE 2 x 18 W T8, 230 V, 4 Ah, 3.0 h

**Emergency lighting performance**

The emergency converter operates two lamps in series connection when in maintained mains mode. Because the normative declared EBLF relates to the emergency lamp only, total light output in emergency mode will be approximately 50% of the normative declared EBLF compared to the values in maintained mains mode.

The device will recharge the battery normally after abnormal operating conditions given in EN 61347-2-7 clause 22.3 (battery short-circuit).

Battery ground is internally connected to the functional earthing to reduce emitted interferences. The insulation against line conductors L and N meets the requirements for basic insulation.

To achieve sufficient lamp life in switched maintained operation both lamps are warm-started within 1.5 s. When switching to emergency mode, instant-starting is used to ensure that time-to-light is less than 0.5 s. The emergency converter is intended for use in luminaires for high-risk task area lighting.

**Standards**

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**Markings**

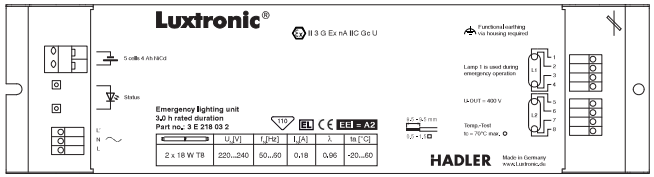
CE

EL

110 acc. to IEC 61374-1 C.5 e)

Ex

**Wiring diagram**



NLE 2 x 18 W T8, 230 V, 4 Ah, 3.0 h

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For operation conditions see pages 22 – 24.

**Installation precautions**

This control gear may be installed into housings of explosion protected luminaires with a minimum type of protection of the housing of IP54 according to IEC 60529.

Dismantled length of wires has to be between 8.5 and 9.5 mm. At use of multistrand wires, conductor sleeves have to be used. Permissible cross section of wires is from 0.5 up to 1.5 $mm^2$.

Maximum temperature rise at internal components is 60 K.

Status LED and connected cable need to be fixed to avoid mechanical stress on cable and solder joints.

Devices contain no field-serviceable parts. In case of malfunction, contact the manufacturer.

http://www.hadler-gmbh.de/en/luxtronic/all-products/

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Luxtronic®