



HFX & HFXE LED ELECTRONIC BALLAST & COMBINED ELECTRONIC BALLAST AND EMERGENCY INVERTER FOR EX-ENVIRONMENT



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1 Applications

The HFX and HFXE LED is a series of combined electronic ballasts and emergency light inverter to be used with LED lamp used in Ex-environments, suitable for installation in Ex e enclosures.

The HFX and HFXE will be suitable for use in explosive gas atmospheres like:

- Oil Industry Off- & On-shore Installations, Gas Stations, Fuel Reservoirs, Oil Tankers
- Mining Industry Mines, Plants, Mills
- Chemical Industry Production Plants

2 Approvals

Approvals :

- | | |
|-----------------------|--|
| - QAN/QAR | 0470 Nemko 01ATEX452Q/
NO/NEM/QAR08.0001/04 |
| - Ex protection Code | Ex II 2 G Ex eb mb IIC T4 |
| - IECEx Certificate : | IECEX PRE 14.0039U |
| - ATEX no. | Presafe 14 ATEX 5355U |
| - BRHZ no. | UL-BR 16.0484U |

Reference standards :

- | | |
|----------------|------|
| - IEC 60079-0 | 2017 |
| - IEC 60079-7 | 2015 |
| - IEC 60079-18 | 2014 |
| - EN 60079-0 | 2012 |
| - EN 60079-7 | 2015 |
| - EN 60079-18 | 2015 |

In accordance with:

(relevant clauses of)

- EN/IEC 55015
- EN/IEC 61000-3-2, 3-3
- EN/IEC 61547
- EN/IEC 61347-1, 2-3, 2-13

TECHNICAL PRODUCT INFORMATION

3 Technical data

3.1 Product range

All values ± 10%															
Name	Description	Model	Art	Lamp power	Input Voltage 50/60Hz		Input Current	PF	Battery	Light output in % of normal operation	Service temperature	T C	Dimension LxWxH	Weight	
HFX LED	Electronic ballast for LED lamp	LED	12949	25-50W	110-254VAC	220-250VDC	0,11-0,55A	0,92-0,96		NA	-42 to +65°C	80°C	285x41x32mm	510g	
HFxE LED	Electronic ballast and emergency inverter for LED lamp	LED	11949	25-50W	110-254VAC	220-250VDC	0,12-0,56A	0,9-0,95	4,8V/4Ah/1,5h	ARC600: 15%	-52 to +65°C	80°C	285x75x32mm	960g	
									4,8V/4Ah/3h	ARC1200: 11%					ARC600: 10%
Marking: Ex II 2 G Ex e mb IIC Gb T4, Acc to EN/IEC 60079-0, -7, -18				Ik max=1500A				All models meet CELMA Class EEI A2				Power-factor measured @230V/50Hz			
Light output, performance and Tc/ temperatures to be tested in actual application															
<i>Special conditions for HFxE operation from DC-input must be considered. Contact Barel for further assistance.</i>															

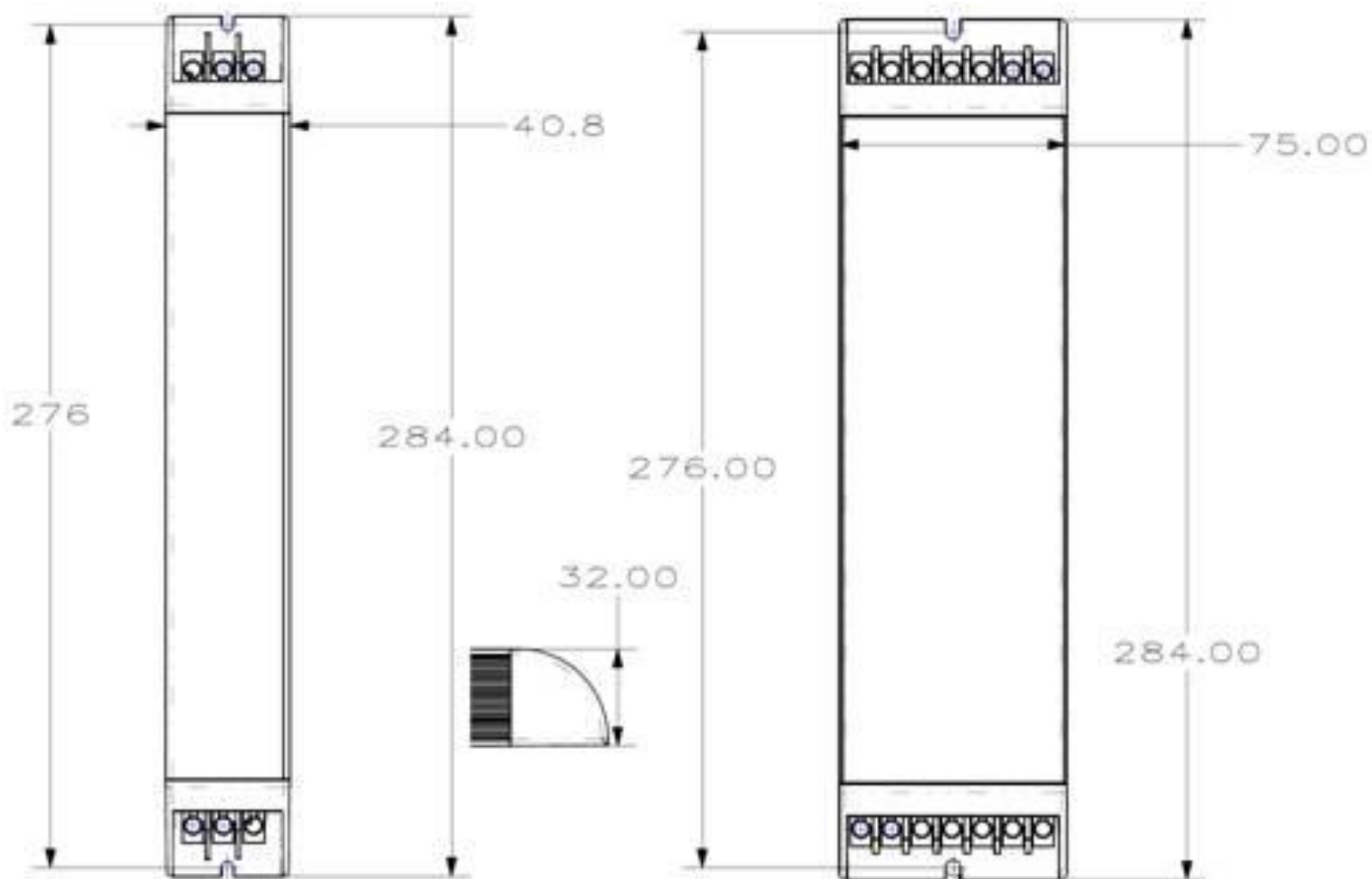


Barel reserves the right to change technical specifications without further notice



3.2 Mechanical data:

- Aluminum housing fastened with 2 screws in the plastic end-caps, c-c 276mm.



4 Installation

These components does not cause harm or injury when used as specified in these instructions. If this equipment is not utilised in a manner specified by the manufacturer, the protection by the equipment may be impaired.

Inrush current and circuit breaker characteristics/amount of units per circuit breaker must be considered in the installation.

Do not energize circuit before all components and lamps are connected properly.

In case of no function or malfunction: first de-energize the circuit. Disconnect mains and battery supply before lamps are disconnected.

- Connect all components and lamps.
 - HFXE only; connect battery.
- Check that all connections are made to the correct port, tightened to the correct torque and that no wires are loose or damaged.
 - The LED module must be connected to correct polarity. Do not operate the unit without lamp properly connected.



- Energize the unit from mains supply.
- The lamp will light up in normal mode.
 - HFxE only; the indicator LED will turn green 5 seconds after first connection. This indicates that the battery is connected and charging.
 - Test of HFxE; The battery must be properly charged before this test.
 - Disconnect mains supply
 - The HFxE will switch the internal source to battery supply, and lamp will light up in reduced mode.
 - The preset emergency operation time 1,5 or 3 hours will be completed before the HFxE will switch of the lamp.
 - When mains supply is reconnected the HFxE will stop battery operation and return to normal mode and normal light output.

4.1 Schedule of limitations:

- The temperature of the TC point must not be exceeded
- The minimum operating temperature of the
 - o HFX LED ballast is -42°C
 - o HFxE LED ballast is -52°C
- The HFX and HFxE LED have an output rating of 60-130V and 370mA. The current is limited to 850mA and breaking capacity of 1500A and has been tested together with Barel ARC LED 600 and 1200, certified Presafe 15 ATEX 6296U and IECEx PRE 15.0014U
- Charging current = 220mA, 80mA permanent
- With one fault condition of the charging system, the charging power is limited to 2W by an transformer and the current is limited to 300mA
- Discharge current = 0.9A - 1.75A
- Discharge cut-off voltage = 4.0V for 4.8V battery.
- The fault current on the battery input is limited to 6.8A
- The indicator LED outputs has the following nominal ratings: 3V, 14mA and is limited to 5.4V and 18.3mA
- The ballast shall be mounted inside an Ex e luminaire and not directly exposed to light
- The terminal has a rating of 450V, Torque 0.9Nm and capacity on the screw side of one conductor with dimensions 1.0 - 2.5mm² rigid or flex

4.2 Electrical connection

Electrical connections of the ballast must be done with mains power supply off, and disconnected. The mains supply must be disconnected by an external 2-pole switch (both phases must be off). Connect "GND" to Protective Earth and chassis of the luminaire or to a separate ground connection. The aluminium chassis is internally connected to the gnd pin. DC input: Connect - to "N" and + to "L/L1/L4". HFxE: Connect L1 via switch to allow battery charging while light is switched off. Indicator LED to be connected to 5-6 or 5-7 as indicated: (LED lamp connection according to marking label) (Do not connect HFX-HFxE LED to mains supply without LED lamp connected)



1	GND		<p>BAREL worlds top electronics N-9917 KIRKENES, NORWAY - WWW.BAREL.NO</p> <p>HFEX LED HF ELECTRONIC EMERGENCY INVERTER AND LED CONTROL GEAR Ex</p> <p>25-50W 110-254V 50/60Hz 0,11-0,55A 25-50W 220-250V DC 0,11-0,28A</p> <p>Tc: +80°C λ: 0,9-0,95 I_a max. 1500A</p> <p>EEI=A2</p> <p>Batch Date</p> <p>Battery 4.8V 4Ah</p>	<p>0470 II 2 G Ex eb mb IIC T4 Presafe 14ATEX5355U IECEX PRE14.0039U</p> <p>Barel art 11949</p>	<p>8</p> <p>+ White 9</p> <p>Output: LED 25-50W 60-135V 370mA</p> <p>10</p> <p>- Black 11</p> <p>NC 12</p> <p>- 13</p> <p>Battery 14</p> <p>+ 14</p>
2	N				
3	L1				
4	L4				
5	LED +				
6	LED 1.5h				
7	LED 3h				

1	L	<p>BAREL worlds top electronics N-9917 KIRKENES, NORWAY - WWW.BAREL.NO</p> <p>0470 II 2 G Ex eb mb IIC T4 Presafe 14ATEX5355U IECEX PRE14.0039U</p> <p>EEI=A2</p>	<p>HFX LED HF ELECTRONIC CONTROL GEAR Ex</p> <p>25-50W 110-254V 50/60Hz 0,11-0,55A 25-50W 220-250V DC 0,11-0,28A</p> <p>Tc: +80°C λ: 0,92-0,96 I_a max. 1500A</p> <p>EEI=A2</p> <p>Barel Art 12949</p>	<p>Batch Date</p> <p>Output: LED 25-50W 60-135V 370mA</p> <p>- BLACK 5</p> <p>+ WHITE 6</p>	4
2	N				5
3	GND				6

4.3 Battery

Batteries are to be assessed with final certification of luminaire. Charge and discharge characteristics are suitable for use with high-temp NiCd cells, 4,8V 4Ah (4C).

4.4 Operation HFEXE

Setting of 1.5h and 3h operation is selected by connection of Charging Indicator (LED) to terminals 5, 6 and 7 as described in table below.

For manual operation (no selftest) a single colour (green) LED is used. The indicator LED will be green as long as the battery is in correct charge mode.

For a Selftest operation a bidirectional LED is used (RED / GREEN) connected such that OK = GREEN. For connection of the bicoulor LED the green coloured LED is refered to as Anode and Cathode

TEST :



NOTE : A full test should not be activated when the battery is empty or low capacity - this could result in a wrong error-message.

Manual test:

By disconnecting the mains when the battery has been charged for a minimum of 24 hours.

Status of the test must be observed manually. In case of failure: repair the problem and re-test, or reset unit by disconnecting mains.

Self test:

By using a bipolar LED connected to the 2 of the 3 pins 5, 6 or 7 as shown above, then a self-test will be performed. This test will automatically run a short test after 24h, then monthly and a full annual test operating the Emergency Lamp (LAMP 1) from the battery. The test-timer includes a random-period to avoid all luminaires to self-test at the same time. Disconnection/reset of mains and battery at the same time will reset the test-timer. Test-program is conducted acc to IEC 62034.

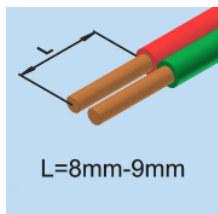


Indicator LED (green) no self-test	Indicator LED (red/green) self-test	System status	Action
Continuous green	Continuous green	System ok	Battery charging ok and no faults apparent.
No light	Continuous blinking red	Battery capacity problem	24 h charge periode after last discharge not completed, or faulty battery. Restest system after 24h charging period, or replace battery
No light	Continuous red	Charging error	Battery defective or missing. Connect or replace battery.
No light	No light	No function	Connect to mains supply voltage within specified limits.

4.5 Cable

Cable cross sectional area: 1 – 2,5 mm² (solid or multi wire).

Terminal torque: 0,9Nm.



Wire insulation voltage should be minimum 660V.

Suitable ferrule should be used to secure the connection of stranded wires.

For Aluminium cables; a bi metallic connector should be used to provide a copper connection.



5 What to do if...

Do not energize circuit before all components and lamps are connected properly.

In case of no function or malfunction: first de-energize the circuit. Disconnect mains and battery supply before lamps are disconnected.

- No light in LED lamp when connected to mains supply-
 - Make sure all components are the correct type and suitable for lamp/driver type, mains supply voltage and frequency range
 - Make sure all connections are correct.
 - Allow a reset of mains supply.

- Some internal protection circuits require a reset of mains supply before resuming operation after a fault is detected.
 - Contact Barel if no fault was found and the reset does not restart the unit.
- Do not attempt to open or repair these units. Both HFX/E and ARC should be replaced in case of failure – to avoid premature failure of the other component.
- HFXE only, No light in emergency mode:
 - Reconnect mains supply
 - Check the indicator LED status-
 - If green; There is a fault in the HFXE. De-energize the unit. Disconnect battery before lamp.

Contact Barel.

- If red or no light in indicator;
 - Allow the battery to charge 24h
 - Retest emergency mode.

If problems with conducted emission during EMC measurements, contact Barel for assistance.

Important issues are:

- Keep all wires short.
- Separate lamp wires from mains supply wires
- Ground the ballast through a short wire connection, and if possible separate from mains cabling internally in luminaire.