Fluorescent and compact fluorescent lamps control gear

The full range comprises electronic and electromagnetic control gear for almost every conceivable type of fluorescent lamp. Whatever the requirement, Philips Lighting can offer a suitable reliable solution.
Philips provide you the solution to upgrade in improving performance of your lighting systems.

**Electronic control gear**

Electronic ballasts offer numerous important benefits in comparison to traditional electromagnetic ballasts:

- The units are lighter in weight and relatively simple to install, requiring less wiring and fewer circuit components;
- They bring attractive cost savings, like a reduction in energy consumption of around 25% a substantially extended lamp life and a marked lowering of maintenance costs;
- They add to the overall lighting comfort in a variety of ways: no lamp-end flickering occurs, automatic safety switch turns off the circuit at the end of lamp life, smooth and rapid lamp starting is ensured, and no potentially dangerous stroboscopic effect can arise;
- Reliability is enhanced: installations with fluorescent lamps are dimmable, permitting adjustment of lighting levels to suit personal preferences and giving rise to additional savings on energy;
- Extra safety is assured through overvoltage detection, a noticeably lower operating temperature and, in most types, protected control of the mains voltage input.

Some fluorescent lamp types operate only on electronic control gear and, given the benefits of greater efficiency and comfort, others will follow. Further, specific ballasts are available to suit the application involved:

- **HF-Regulator**, for areas where regulation of lighting levels is required;
- **HF-Performer** and **EB-standard**, where the operational demands, such as increased convenience, are greater than normal;
- **EB Economy** for situations where the lighting is switched on and off infrequently;
- Actiume is an automatic lighting control system with a difference. The system consists of a sensor and controller unit built into the luminaire and is operated with the new Philips HF-Regulator II gear. It is the first true Plug and Play lighting control system on the market.

In addition, a full program of lighting controls, both luminaire-based and room-based, can be supplied (see separate chapter).

**Electromagnetic control gear**

Under this category fall the traditional, copper-iron control gear for fluorescent lamps, a field in which Philips Lighting has convincingly demonstrated its expertise over the years.

Such systems include the essential components like the ballast, starter and power-factor-correction capacitor. Different versions are available with either glow-switch or electronic starter and with standard or low-watt-loss ballasts. According to the ratings laid down by the CEMMA directive, ballasts are allotted an Energy Efficiency Index (EEI) which is quoted against each product type. As the name suggests, this index describes the ballast: A1 types are the most energy-efficient, A2 and A3 somewhat less so, with lowering efficiencies through the B5, B2 and C types.

The directive 2000/54/EC (OJEC L297 – 1 November 200) aims at reducing the energy consumption of ballasts and towards more efficient ones. The ballast, however, is only part of the energy consumption equation. The degree of energy efficiency of fluorescent lighting circuits depends upon the combination of ballast and lamp. As a consequence CEMMA has found it necessary to develop a ballast classification system based on this combination. The directive sets targets at what time low efficient ballasts have to be phased-out. Class D ballast is already banned since May 22nd 2002. Class C will follow per Nov 21st 2005.

The full range comprises control gear for almost every conceivable type of fluorescent lamp. Whatever the requirement, Philips Lighting can offer a suitable solution.
<table>
<thead>
<tr>
<th>Commercial name</th>
<th>Technical lamp type</th>
<th>Ballast (1 lamp)</th>
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<th>Ballast (4 lamps)</th>
<th>Alternative electromagnetic system for good performance</th>
</tr>
</thead>
</table>

**Recommended electronic system for the best performance**

- **6.4 Fluorescent and compact fluorescent lamps control gear**
- **Lamps and gear table - Fluorescent and compact fluorescent lamps control gear**
- **6.5 Lamps and gear**

**Commercial name**

- T5 Slimline
- T5 LED
- T5 Super
- T5 HL premium

**Technical lamp type**

- MINISTRT5L-HS Super 80
- T5 LED
- T5 Super
- T5 HL premium

**Ballast (1 lamp)**

- EBI 126 TL5 220-240
- EBI 240 TL5 220-240
- EBI 360 TL5 220-240
- EBI 480 TL5 220-240

**Ballast (2 lamps)**

- EBI 126 TL5 220-240
- EBI 240 TL5 220-240
- EBI 360 TL5 220-240
- EBI 480 TL5 220-240

**Ballast (3 lamps)**

- EBI 126 TL5 220-240
- EBI 240 TL5 220-240
- EBI 360 TL5 220-240
- EBI 480 TL5 220-240

**Ballast (4 lamps)**

- EBI 126 TL5 220-240
- EBI 240 TL5 220-240
- EBI 360 TL5 220-240
- EBI 480 TL5 220-240

**Alternative electromagnetic system for good performance**

- BTA 18W 220V C SC S10(-E) BTA 36W 220V C SC S2(-E)
### Recommended electronic system for the best performance

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<tr>
<td>TL5C</td>
<td>TL5C Super 40 W</td>
<td>HF-P 155 TL5C</td>
<td>HF-R 355 TL5C</td>
<td>HF-R 455 TL5C</td>
<td>HF-R DAU 555 TL5C</td>
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<tr>
<td>TL5C</td>
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<td>HF-P 250 TL5C</td>
<td>HF-R 555 TL5C</td>
<td>HF-R 655 TL5C</td>
<td>HF-R DAU 755 TL5C</td>
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**Recommended electronic system for the best performance**

- **Miniature**
  - TL Mini/Aperture 8W/865 E0-0, EBIS 109 230-240 1U1H
  - TL Mini/Bevel 8W/865 E0-0, EBIS 109 230-240 1U1H
  - TL Mini/Cat 8W/865 E0-0, EBIS 109 230-240 1U1H
  - TL Mini/Fluor. 8W/865 E0-0, EBIS 109 230-240 1U1H

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**Product description**

The Philips ActiLume lighting control system consists of a small, lightweight sensor and controller, designed for easy integration into luminaires. ActiLume is a true Plug & Play solution for open plan up to 9 luminaires or cell offices (eg 4 luminaires). It is used in a matter and slave luminance concept, easy to use and easy to install. Specific application brochures are available to help specify and apply the system in an optimal way. Commissioning is optional for other application modes than cell office or open plan. Using this method, functions can be changed without consequences for the electrical installation.

**Features and benefits**

- Philips ActiLume is a DALI based lighting control system designed for maximum comfort and energy savings of up to 75% in fully automatic mode and when used in combination with Philips HF-Regulator Touch and DALI ballasts. This to achieve a quick return on investment.
- ActiLume is a Plug & Play system, therefore no specific lighting control training is needed. Moreover, the system is supported with simple, dedicated application and installation sheets.
- The ActiLume system consists out of three state-of-art miniature sensors combined with a controller containing a series of pre-programmed modes.
- The two most applied modes, cell or open plan offices, can be selected via a simple push on the service button.
- The light sensor is sensitive for visible radiation (matching the human eye) providing automatic savings with daylight depending regulation, without any visible discomfort for the user.
- The movement detector is very sensitive to human movements and is combined with extended delays to provide optimal functionality in an office environment.
- Semi automatic solutions can be created by connecting a mains rated springback switch to the controller or by using an infrared remote control unit. In this way the settings can be manually overruled according to personal preferences.
- In addition ActiLume offers the possibility to choose specific modes specially developed in line with new legislation, which makes the system very versatile for use. These modes can be recalled by using a simple mode selection tool IRT8098/00.
- It is easy to change a specific application setting by selecting another mode on the advanced mode selection tool IRT8099/00.
- The ActiLume controller contains two DALI outputs. These outputs are pre-programmed (factory setting) as a window and corridor row with a fixed light offset.
- The system can control maximum nine ballasts and can be extended with two additional movement detectors, extension sensor type LRM8118/00.
- Factory light level setting is at 600 lux at a reflection factor of 0.3.

**Applications**

- The ActiLume system is designed for all office applications, from open plan to call offices, lobbies or toilets, and from corridor to small meeting rooms.
- It offers specific comfort modes, e.g. for schools, light lines and direct/indirect lighting concepts.
- It even contains a specific comfort mode combining maximum energy savings and additional comfort based on a practical EN 12464 solution (mode 4, 5 or 9).

**Installation**

- The ActiLume system consists of three state-of-art miniature sensors combined with a controller containing a series of pre-programmed modes.
- The two most applied modes, cell or open plan offices, can be selected via a simple push on the service button.
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**Technical data for installation**

- Mains operation: Rated mains voltage 220-240 V, 50/60 Hz, 1.3-1.55W.
- Output power (system): 220-240V, 180-264V, 202-254V, 50/60 Hz, 1.3-1.55W.
- Number of ballasts: 1-10, 1-20, 1-25.
- Number of extension sensors: 1-10, 1-20, 1-25.
- Rated mains voltage: 220-240 V.
- With tolerances for safety +/−10%, Tolerances for performance +6%/-8%.
- Mains frequency: 50/60 Hz.
- Input power (system): 1.3-1.55W.
- Maximum height PIR: 3.5 m.
- X-angle PIR: 82º.
- Y-angle PIR: 100º.
Fluorescent and compact fluorescent lamps control gear

**Service button**

- a) How to select the user mode (application)
  - The user mode can be toggled between mode 1 and 2 by means of a short push on the service button (<3 seconds).

  After key release the lamp will flash to indicate the selected user mode:
  - 1 flash = User mode 1 (Cell office application)
  - 2 flashes = User mode 2 (Open plan office application)
  - More modes can be recalled by using IRT8099/00.

  In user mode 1 and user mode 2 the system is programmed as one channel. When enough daylight enters the room the amount of artificial light will be automatically reduced and the DAU2 output (corridor row) is programmed with a light offset of 30%.

  In other modes (which can be recalled with IRT8099/00) ActiLume can use two channels depending the application functionality.

  By connecting a mains rated springback switch to connection L1 (line-switched), dimming and switching on/off will be possible according the Touch and Dim functionality. (Maximum 1 switch per controller)

  Switch to be mounted on the ballast.

  It is also possible to use remote control IRT8010/00, IRT8030/00 or IRT8050/00. The IRT8030/00 needs to be pointed to the sensor. The IRT8030/00 and IRT8050/00 has a X-Y-Z beam direction, making it suitable for wall mounting and table top use.

**Controller unit LCC1653/00**

- DAU Output

- Manual control

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- Switch to be mounted on the ballast.

**Wire cross-section**

- ADS manual connection: 0.5 mm – 1.0 mm

- IDC connection: 0.5 mm – 0.75 mm(*)

- Strip length: 8.0 – 9.0 mm

**Glow wire test**

- 850 ºC / 5 s

**Safety, basic insulation**

- ≥ 1500 V

**Material**

- Polycarbonate UL94 V-0

**Mounting**

- The controller housing contains snap-in pins for quick fixation.

  The diameter of the fixation holes should be maximum 4.5 mm.

  The snap-in pins are designed for a metal thickness of maximum 0.8 mm.

  The maximum distance between the fixation holes is 78 mm.

---

**Lighting Control**

**ActiLume Sensor/Controller**

**Lighting Control**

**Acts of Lume Sensor/Controller**

**Connector type**

- Connection wiring is greatly simplified through use of WAGO 251 universal connector. Suitable for both automatic wiring (ALS and ADS) and manual wiring.

**Remark: release all wires one by one**

**ADS Manual connection**

**Wire cross-section**

- DAU distribution block: Channel 1 = DAU1 (Offset channel)

**ADS Manual connection**

- DAU distribution block: Channel 1 = DAU1 (Offset channel)

**300 5 mm**

**Material**

- Polycarbonate UL94 V-0

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Extension sensor LRM8118/00

Extension sensor for ActiLume to cover movement in open plan or fluorescent and compact fluorescent lamps control gear light lines solution.

ActiLume System Components

ActiLume Modes

IRT8099/00 specific modes can be selected. Once selected, the mode can be stored and copied via a point and shoot method. The mode will be stored in a non-volatile memory. Even when the luminaires are switched off for a longer period, stored parameters are kept.

Legend

- Presence
- Area is occupied
- Absence
- 0.03 (per piece)
- 0.06 (per kit)
- 0.20
- 0.08
- 0.22
- 0.61

<table>
<thead>
<tr>
<th>Control mode</th>
<th>Controller LCC1653/00</th>
<th>Simple mode selection tool IRT8098/00</th>
<th>Advanced mode selection tool IRT8099/00</th>
<th>Price</th>
</tr>
</thead>
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<tr>
<td>1</td>
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<td>0.01</td>
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<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.01</td>
</tr>
</tbody>
</table>

- Simple mode selection tool IRT8098/00
- Advanced mode selection tool IRT8099/00

- Product description
- Weight
- Dimensions
- EOCPacking
- Weight
- EOCPacking

Batteries are included.

Legend:

- When enough daylight is detected, the lights will NOT be switched on automatically when someone enters the room.
- When enough daylight is detected, the lights will automatically be switched off (internal timer is activated to clock absence time).
- A level
- Light stays on
- Only the task lighting
- Light dims down to a background level (internal timer is activated to clock absence time) or surrounding light
- Absence
- 0.03 (per piece)
- 0.06 (per kit)
- 0.20
- 0.08
- 0.22
- 0.61

- Presence
- Area is occupied
- Absence
- 0.03 (per piece)
- 0.06 (per kit)
- 0.20
- 0.08
- 0.22
- 0.61
**Hand-held two-key transmitter IRT8010/00**

Hand-held two-key transmitter, for infrared control of various lighting control systems. ActiLume can also dim the lights (by pressing a button >0.5 sec). The unit is supplied with batteries. A wall holder is separately available.

**Wall holder LRH8010/00**

Wall holder for the IRT8010/00 hand-held two-key transmitter.

**Two-key infrared remote control IRT8050/00**

Two-key infrared remote control transmitter for wall mounting and tabletop use. The unit can be used in ActiLume. The actual function of the two large keys can be selected with a dip switch in the battery compartment. A dip switch is also used to select the group address.

**Four-preset hand-held transmitter IRT8030/00**

Four-preset hand-held transmitter, suitable for infrared control of ActiLume applications. It has 4 keys for presets and one key for “all off”. Keys for individual control and preset programming are located under a hinged cover at the bottom of the transmitter. The group address selector switch is contained in the battery compartment. The unit is supplied complete with wall holder and batteries.

<table>
<thead>
<tr>
<th>Product description</th>
<th>Weight (kg)</th>
<th>EDC</th>
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<tbody>
<tr>
<td>TRANSM IN POINT IRT8010/00</td>
<td>0.06</td>
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<tr>
<td>MOUNT IN POINT LRH8010/00</td>
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<td>TRANSM IN STAND IRT8030/00</td>
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<tr>
<td>MOUNT IN WALL LRH8030/00</td>
<td>0.03</td>
<td>517085 00</td>
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</table>
Lamp wiring: The use of 500 V rated components and wiring is advised for PL-T 32W and 42W types.

Ignition time: Typical 0.5 sec.

Achived maximum cable capacity for optimum performance and EMI Suppression:
- max. 30 pF: between two sets of lamp wires (each set of lamp wires connected to one electrode of the lamp)
- max. 75 pF: between one set of lamp wires (connected to one electrode of the lamp) and earth.

Care has to be taken for symmetrical wiring.

Compliance and approvals:
- Safety: EN 61347-2-3
- Performance: EN 60929
- Vibration & bump tests: IEC 68-2-6 FC
- IEC 68-2-29 Eb
- Quality standard: ISO 9001
- Environmental standard: EN 14001
- Approval marks: ENEC, VDE-EMV

Technical data for installation:

Mains operation:
- Rated mains voltage 220 - 240 V with tolerances for safety: +/- 10% 198 - 264 V tolerances for performance: +6% -8% 202 - 254 V
- Mains frequency 50/60 Hz
- Operating frequency > 42 kHz
- Power factor 0.95 at 100%

Fluorescent and compact fluorescent lamps control gear:
- Smart power: with AC mains voltage fluctuations, 202 - 254 V
- Electronics (Dimming): HF-Regulator DALI PL-T/C luminous flux varies by ± 2% max.

DC voltage operation (during emergency back-up):
- Required battery voltage for guaranteed ignition 198 - 254 V DC
- Required battery voltage for burning lamps 176 - 254 V DC
- Nominal light output is obtained at a voltage of 220V - 240V

Notes:
- Compact, lightweight high-frequency electronic regulating ballast using DALI (Digital Addressable Lighting Interface) protocol, for PL-T and PL-C compact fluorescent lamps.
- 1. For continuous DC application, an external fuse should be used in the luminaire.
- 2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

Features and benefits:
- The lamp power can be regulated down to 3%.
- Stabilization free operation.
- Digital Addressable control input (DALI) protocol.
- Quick programmed start: No-load-up warm start, ideal for areas with a high switching frequency (motion detection applications), this enables the lamps to be switched on and off without reducing useful life.
- Up to 66% reduction in energy consumption can be achieved by using automatic lighting control systems.
- Smart power: constant light independent of mains voltage fluctuations.

All Philips HF-Regulator electronic ballasts are equipped with control. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:
- a. lamp life is unaffected by dimming position
- b. lamp burning is stable in every dimming position; and
- c. energy saving when dimming are maximized.

Applications:
- Typical areas of application include:
  - DALI installations with daylight linking and/or movement detection (energy saving).
  - DALI installations with remote control systems (personal scene setting).
  - Installations with emergency back-up, according to VDE 0108

Examples:
- Office buildings, insurance companies, banks, government ministries.
- Cellular, open plan offices, corridors and lobbies.
- Conference rooms, lecture theatres.
- Department stores, shops, supermarkets and malls.
- Hotels, restaurants and bars.
- Cinemas, museums.
- Hospitals.
- Schools.
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  - Installations with emergency back-up, according to VDE 0108

Examples:
- Office buildings, insurance companies, banks, government ministries.
- Cellular, open plan offices, corridors and lobbies.
- Conference rooms, lecture theatres.
- Department stores, shops, supermarkets and malls.
- Hotels, restaurants and bars.
- Cinemas, museums.
- Hospitals.
- Schools.
- Airports, railway stations.

Technical data for installation:

Mains operation:
- Rated mains voltage 220 - 240 V with tolerances for safety: +/- 10% 198 - 264 V tolerances for performance: +6% -8% 202 - 254 V
- Mains frequency 50/60 Hz
- Operating frequency > 42 kHz
- Power factor 0.95 at 100% power

Smart power with AC mains voltage fluctuations, luminous flux varies by ± 2% max.

DC voltage operation (during emergency back-up):
- Required battery voltage for guaranteed ignition 198 - 254 V DC
- Required battery voltage for burning lamps 176 - 254 V DC
- Nominal light output is obtained at a voltage of 220V - 240V

Notes:
- For continuous DC application, an external fuse should be used in the luminaire.
- Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

Earth leakage current: ≤ 0.5 mA per ballast

Maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA: 30

Overvoltage protection: 48 hr at 320 V AC
- 2 hr at 350 V AC
- 5 min. at 380 V AC

Automatic restart after lamp replacement or voltage dip: yes

Insulation resistance test: 500V DC from Line/Neutral to Earth (not between Line and Neutral)
- Note: Ensure that the neutral is reconnected again after above mentioned test is carried out and before the installation is put in operation.

* Tested with ballast functional ground connected to earth.
Electronics (Dimming) HF-Regulator DALI PL-T/C

### Electrical data in relation to energizing

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qf</th>
<th>power*</th>
<th>Efficiency</th>
<th>lamp</th>
<th>dimming range</th>
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<th>Power*</th>
<th>lumen*</th>
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<td>24</td>
<td>75</td>
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<tr>
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<td>PL-C 42W</td>
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<td>3200</td>
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</table>

* At 100% power

** Notes:**
- Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.
- Earting: Earthing of the HF ballast in a luminare is necessary for EMC (electromagnetic compatibility).
- Class II luminaires: This application is not advisable only with extensive tests on luminaires can the correct operation be verified.
- Hum and noise level: Inaudible
- Permitted humidity is tested according to IEC 529 par.12. Note that no moisture or condensation may enter the ballast.

### Technical data for design and mounting in fixtures

- **Temperatures:**
  - Temperature range to ignite lamp with ignition aid: +10 ° to +50 °C
  - Stable lamp operation assured: > 15 °C
  - Striation possible: < 15 °C
  - Max. tcase = 75°C**

- **Relationship between lamp power and digital regulation:**
  - Regulating level (lamp power): 3 to 100%
  - Dims command for full lamp power (100%): step 254
  - Dims command for min lamp power (3%): step 126
  - Protected against accidental mains voltage connection: Yes
  - Control input insulation, basic insulation < 1500V

- **Electrical data for design and mounting in fixtures:**
  - Ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

### Notes:
- 1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 35 m-cable of 2.5mm² and another 20m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.
- 2. Measurements will be verified in real installations; therefore data are subject to change.
- 3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
- 4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
- 5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
- 6. First digital regulating steps (DALI) are fixed at 3% light output (dimming specification).
- 7. For optimum performance, note that wires from connection 1 and 2 should be kept short and equal in length.
- 8. Keep lamp wiring as short as possible; do not bunch wires from terminals 1&2 with those from terminals 3&4 (1-lamp ballasts), or wires from terminals 3, 4, 5 & 6 with those from terminals 1, 2, 7 & 8 (2-lamp ballasts).
- 9. Wire cross-section:
  - Mains connector [Orange] 0.5mm – 1.5mm 2
  - Control connector [Blue] 0.5mm – 1.5mm 2
  - Lamp(s) connector [gray] 0.5mm – 1.5mm 2

---

**Wiring diagrams:**
- Connection wiring is greatly simplified through use of insert contacts; earth connection can be made via housing or terminal block.
- Notes:
  - Earthing: Earthing of the HF ballast in a luminare is necessary for EMC (electromagnetic compatibility).
  - This application is not advisable only with extensive tests on luminaires can the correct operation be verified.
  - Class II luminaires: This application is not advisable only with extensive tests on luminaires can the correct operation be verified.
  - Hum and noise level: Inaudible
  - Permitted humidity is tested according to IEC 529 par.12. Note that no moisture or condensation may enter the ballast.
HF-Regulator EII Touch and DALI TL-5

**Product description**
Flat, lightweight high-frequency electronic regulating ballast, using DALI (Digital Addressable Lighting Interface) or Touch and Dim push button protocol, for TL5 fluorescent lamps. The HF-Regulator ballasts incorporate the new Philips EII technology offering full digital input (mains) and output (lamp) management.

**Features and benefits**
- The lamp power can be regulated from 100% to 1%.
- Flat ballast design, 21 mm high.
- Up to 75% reduction in energy consumption can be achieved by using automatic lighting control systems (e.g. Philips ActiLume luminaire-based system solutions).
- Quick-programmed start, 0.5 sec, flicker-free warm start, predetermining the lamp electrodes. This enables the lamps to be switched on and off without reducing useful life. Ideal for areas with a high switching frequency.
- Digital control input according to the industry-standard DALI (Digital Addressable Lighting Interface) combined with the Touch and Dim push button protocol.
- Low energy consumption in stand-by 0.35W. due to the new EII technology.
- Increased lamp life flexibility thanks to the Paratic Capacitance Compensation (longer lamp life possible up to 2 meter).
- Smart power: constant light, independent of mains voltage fluctuations.
- Unit is protected against excessive mains voltage, incorrect connections and incorrect lamp use.
- Striation-free operation, no stochastic effects.
- Lamp starts at 1% (DALI 1...100% in 100 ms).
- Automatic stop circuit is activated within five seconds in case of lamp failure (safety stop). Once the lamp has been replaced, the ballast resets automatically.
- Equipped with connectors suitable for automatic wiring machines.

The Philips HF-Regulator electronic ballasts are equipped with EII dim technology. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:
- a. lamp life is unaffected by dimming position
- b. lamp burning is stable in every dimming position; and
- c. energy savings, when dimming are maximised.

**Applications**
Typical areas of application include:
- DALI installations with daylight linking and/or movement detection (for energy savings)
- DALI installations with remote control systems (combining energy savings with comfort)
- Installations with emergency back-up, according to VDE 0108.
- Office applications were a simple and easy to install dimming system or personal light level adjustment is required.

**Complaints and approvals**
- RFI: >30 MHz: EN 55022 A
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
- Safety: EN 61347-2-3
- Performance:
- Approval marks:
- Environmental standard: ISO 14001
- Quality standard: ISO 9001
- CE marking
- Smart power: constant light, independent of mains voltage fluctuations, luminous flux varies by ±2.5% max.

**Specifications**
- DC voltage operation (during emergency back-up)
  - Required battery voltage for guaranteed ignition: 198V – 254V
  - Nominal light output is obtained at a voltage of 220V – 240V

**Notes**
1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

**Earth leakage current**
< 0.5 mA per ballast

**Maximum number of ballasts which can be incorporated in the luminaire**
30

**Overvoltage protection**
- 48 hrs at 320V AC
- 2 hrs at 350V AC

**Automatic restart after lamp replacement**
Yes

**Electronics (Dimming)**

**Dimensions in mm**

**Notes:**
- FLUORESCENT AND COMPACT FLUORESCENT LAMPS
- CONTROL GEAR
- Philips HF electronic regulating ballasts comply with all relevant international rules and regulations.
- As manufacturer of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained.
- Philips HF electronic regulating ballasts comply with all relevant international rules and regulations.
- System supplier
- Earth leakage current < 0.5 mA per ballast
- Maximum number of ballasts which can be incorporated in the luminaire
- Overvoltage protection
- Automatic restart after lamp replacement
- Voltage dip

**Specifications**
- RFI: >30 MHz: EN 55022 A
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
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**Applications**
- DALI installations with daylight linking and/or movement detection (for energy savings)
- DALI installations with remote control systems (combining energy savings with comfort)
- Installations with emergency back-up, according to VDE 0108.
- Office applications were a simple and easy to install dimming system or personal light level adjustment is required.

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- CE marking
- Smart power: constant light, independent of mains voltage fluctuations, luminous flux varies by ±2.5% max.

**Specifications**
- DC voltage operation (during emergency back-up)
  - Required battery voltage for guaranteed ignition: 198V – 254V
  - Nominal light output is obtained at a voltage of 220V – 240V

**Notes:**
1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

**Earth leakage current**
< 0.5 mA per ballast

**Maximum number of ballasts which can be incorporated in the luminaire**
30

**Overvoltage protection**
- 48 hrs at 320V AC
- 2 hrs at 350V AC

**Automatic restart after lamp replacement**
Yes

**Voltage dip**

**Specifications**
- RFI: >30 MHz: EN 55022 A
- Harmonics: EN 61000-3-2
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- Performance:
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- CE marking
- Smart power: constant light, independent of mains voltage fluctuations, luminous flux varies by ±2.5% max.

**Specifications**
- DC voltage operation (during emergency back-up)
  - Required battery voltage for guaranteed ignition: 198V – 254V
  - Nominal light output is obtained at a voltage of 220V – 240V

**Notes:**
1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

**Earth leakage current**
< 0.5 mA per ballast

**Maximum number of ballasts which can be incorporated in the luminaire**
30

**Overvoltage protection**
- 48 hrs at 320V AC
- 2 hrs at 350V AC

**Automatic restart after lamp replacement**
Yes

**Voltage dip**
### Electronics (Dimming)

**HF-Regulator EL Touch and DALI TL-5**

#### Inrush current

<table>
<thead>
<tr>
<th>Qty of Lamps</th>
<th>Max. quantity of ballasts per Miniature Circuit Breaker Type</th>
<th>Impedance 1/2 value time at typical mains</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>HF-R TD 144/1 TL5</td>
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</tr>
<tr>
<td>2</td>
<td>HF-R TD 244/1 TL5</td>
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<td>3</td>
<td>HF-R TD 344/1 TL5</td>
<td>12</td>
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<td>4</td>
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<td>25</td>
</tr>
<tr>
<td>1</td>
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<td>2</td>
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#### Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breakers

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<th>MCB Type</th>
<th>Max. quantity of ballasts</th>
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<td>B</td>
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<td>12</td>
</tr>
<tr>
<td>C</td>
<td>16A</td>
<td>25</td>
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<td>L</td>
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<td>L2, II, III</td>
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<td>300</td>
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<tr>
<td>K</td>
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<tr>
<td>K1, K2</td>
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<td>1000</td>
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#### Technical data (all typical values at Vmains =230V)

<table>
<thead>
<tr>
<th>Lamp Qty of Lamps</th>
<th>Ballast</th>
<th>Power Factor</th>
<th>Max cable Cap* (Lp-Lp/Lp-Lgnd)</th>
<th>Operating Frequency</th>
<th>TyC max.</th>
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<tbody>
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<td>HF-R TD 144/1 TL5</td>
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<td>TL5 HE 14W 3</td>
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</tbody>
</table>

- * Typical values for 6000 measured at 100% power and 25 ºC lamp ambient temperature
- ** Typical values at 35 ºC (light top for MASTER TL5 Super 80 lamps)

**Inrush current**

**Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breakers**

**Lamps and Gear**

**Fluorescent and compact fluorescent lamps control gear**

624 Fluorescent and compact fluorescent lamps control gear Lamps and Gear 625
Electronics (Dimming)

HF-Regulator El Touch and DALI TL-5

Technical data for design and mounting in fixtures

Temperature range to ignite lamp: 0 °C to +50 °C
- With ignition aid: at a 70,100% dim input -20 °C to +50 °C
- Storage temperature range: -25 °C to +80 °C
- Stable lamp operation assumed: > 15 °C
- Shutdown possible: < -10 °C
- Max. T case: 75 °C
- The lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The HF-Regulator II ballast for TL5 applications has a specified lifetime of 50,000 hrs at a measured Tcase of 75 °C.

Class II luminaires: This application is not advisable; only with extensive tests on luminaires can the correct operation be verified.

EMI precautions have to be taken:

Outdoor Ballast IP=23
- In outdoor luminaire, there has to be sufficient IP rating.
- Permitted humidity is tested in accordance with EN 61347-1 par 11.
- Note that no moisture or condensation may enter the ballast.

Ignition aid:
- For optimum ignition, TL5 lamps should be mounted at a maximum distance of 6 mm from a metal plate.
- The metal plate should be electrically connected to the ballast housing.

Earthing:
- Earthing of the HF ballast in a luminaire is necessary for EMC (electromagnetic compatibility).

Notes:
1. Data based on a mains supply with an impedance of 400 mΩL50529 (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩL50529 the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations, therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB, but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is based on the assumption that these are all switched on at the same moment, i.e., by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is recommended to reduce the number of ballasts by 20%.
6. First digital regulating steps (DALI) are fixed at 1% light output (dimming specification).
7. For optimum performance care has to be taken for symmetrical wiring. Minimal 6 mm distance from lamp to earth plane.

Wiring diagrams

HF BALLAST

1 lamp

2 lamps

Connector type
- Connection wiring is greatly simplified through use of WAGO 251 universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.
- Release: rotate and pull
- Remark: release all wires one by one
- IDC connection
- ADS/Manual connection

Wire cross-section
- IDC connection: 0.5 mm - 1.0 mm
- ADS/Manual connection: 0.5 mm – 0.75 mm²
- Stranded wire
- Strip length: 8.0 – 9.0 mm
### Ordering and packaging data

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Quantity</th>
<th>Dimensions</th>
<th>EAN code</th>
<th>Weight</th>
<th>Vol.</th>
<th>Weight</th>
<th>EAN code</th>
<th>EAN code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R TD 120 TL5</td>
<td>12</td>
<td>400x200x76</td>
<td>8715400 90881 0</td>
<td>0.26</td>
<td>24</td>
<td>8715400 90881 10</td>
<td>0.0065</td>
<td>3.4</td>
</tr>
<tr>
<td>HF-R TD 245 TL5</td>
<td>12</td>
<td>400x200x76</td>
<td>8715400 90881 0</td>
<td>0.26</td>
<td>24</td>
<td>8715400 90881 10</td>
<td>0.0065</td>
<td>3.4</td>
</tr>
<tr>
<td>HF-R TD 249 TL5</td>
<td>12</td>
<td>400x200x76</td>
<td>8715400 90881 0</td>
<td>0.26</td>
<td>24</td>
<td>8715400 90881 10</td>
<td>0.0065</td>
<td>3.4</td>
</tr>
<tr>
<td>HF-R TD 280 TL5/PL-L</td>
<td>12</td>
<td>400x200x76</td>
<td>8715400 90881 0</td>
<td>0.26</td>
<td>24</td>
<td>8715400 90881 10</td>
<td>0.0065</td>
<td>3.4</td>
</tr>
</tbody>
</table>

*Under development*
**Electronics (Dimming)**

**HF-Regulator EII Touch and DALI TL-D/PL-L**

**Product description**
- Rat, lightweight, high-frequency electronic regulating ballast, using DALI (Digital Addressable Lighting Interface) or Touch and Dim push button protocol, for TL-D fluorescent lamps. The HF-Regulator ballasts incorporate the new Philips EII technology offering full digital input (mains) and output (lamp) management.

**Features and benefits**
- The lamp power can be regulated from 100% to 1%.
- The lamp ballast design, 21 mm high.
- Up to 75% reduction in energy consumption can be achieved by using automatic lighting control systems (i.e., Philips AutoLume luminaires-based system solutions).
- Quick-programmed start: 0.5 sec, flicker-free warm start, protecting the lamp electrodes. This enables the lamps to be switched on and off without reducing useful life. Ideal for areas with a high switching frequency.
- Digital control input according to the industry standard DALI (Digital Addressable Lighting Interface) combined with the Touch and Dim push button protocol.
- Low energy consumption in standby 0.35W due to the new EII technology.
- Increased lamp wire flexibility thanks to the Parasitic Capacitance Compensation (longer lamp wiring possible up to 2 meter).
- Smart power: constant light, independent of mains voltage fluctuations.
- Unit is protected against excessive mains voltages, incorrect connections and incorrect lamp use.
- Stabiliser-free operation: no stochastic effects.
- Lamp starts at 1% (DALI 1.200% in 100 ms).
- Automatic stop circuit is activated within five seconds in case of lamp failure (safety stop). Once the lamp has been replaced, the ballast resets automatically.
- Equipped with connectors suitable for automatic wiring machines.

The Philips HF-Regulator electronic ballasts are equipped with EII-dim technology. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:
- a. Lamp life is unaffected by dimming position
- b. Lamp burning is stable in every dimming position; and
- c. Energy savings are maximised when dimming is optimised.

**Applications**
- Typical areas of application include:
  - DALI installations with daylight linking and/or movement detection (for energy savings)
  - DALI installations with remote control systems (combining energy savings with comfort)
  - Installations with emergency back-up, according to VDE 0108
  - Office applications where a simple and easy dimming system or personal light level adjustment is required.

**Compliances and approvals**
- RF:80 MHz
- RF:30 MHz
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
- Safety: EN 61347-2-3
- Performance: EN 60929
- Vibration & shock tests: EN 60068-2-6:FC
- Quality standard: ISO 9001
- Environmental standard: ISO 14001
- Approval marks: ENEC
- Temp. declared thermally protected EN 61347-1
- CE marking

**Technical data for installation**
- Mains voltage: 230-240 V
- Mains frequency: 50/60 Hz
- Smart power: with AC mains voltage fluctuations, luminous flux varies by ±5% max.
- DC Voltage operation (during emergency back-up)
  - Required battery voltage for guaranteed ignition: 198V - 249V
  - Required battery voltage for burning lamps: 179V - 249V
  - Nominal light output is obtained at a voltage of 200V - 240V

**Electronics (Dimming)**

**HF-Regulator EII Touch and DALI TL-D/PL-L**

**Examples**
- Office buildings, insurance companies, banks, government ministries
- Cellular or open plan offices
- Conference rooms, lecture theatres, corridors
- Schools
- Hospitals
- Department stores, shops, supermarkets
- Hotels, restaurants and bars
- Cinemas, museums.

**Earth leakage current**
- < 0.5 mA per ballast

**Maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA**
- 3

**Overvoltage protection**
- 48 hrs at 320 V AC
- 2 hrs at 350 V AC

**Automatic restart after lamp replacement or voltage dip**
- Yes

**Mains current at 230 V**

<table>
<thead>
<tr>
<th>Mains and Gear</th>
<th>DALI TL-D/PL-L</th>
<th>DALI TL-D/PL-L</th>
<th>DALI TL-D/PL-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated mains voltage</td>
<td>220-240 V</td>
<td>198-260 V</td>
<td>200-254 V</td>
</tr>
<tr>
<td>With tolerances for safety +/- 10%</td>
<td>198-260 V</td>
<td>200-254 V</td>
<td></td>
</tr>
<tr>
<td>Tolerances for performance +6% / - 8%</td>
<td>200-254 V</td>
<td>200-254 V</td>
<td></td>
</tr>
<tr>
<td>Mains frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Smart power with AC mains voltage fluctuations, luminous flux varies by ±5% max.</td>
<td>200-254 V</td>
<td>200-254 V</td>
<td>200-254 V</td>
</tr>
<tr>
<td>DC voltage operation (during emergency back-up)</td>
<td>198V - 249V</td>
<td>179V - 249V</td>
<td>220V - 240V</td>
</tr>
</tbody>
</table>

**Notes**
1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198 V) can influence the lifetime of the ballast.

630 Fluorescent and compact fluorescent lamps control gear. Lamps and Gear

---

**Fluorescent and compact fluorescent lamps control gear**

630 Fluorescent and compact fluorescent lamps control gear. Lamps and Gear
### Inrush current

<table>
<thead>
<tr>
<th>Qty of Lamps</th>
<th>Max. quantity of ballasts</th>
<th>Inrush current 1/2 value time at typical mains impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-RTD 12WTL-D</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 18WTL-D</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 36WTL-D</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 36WPL-L</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 58WTL-D</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 236 PL-L</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 280 PL-L</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 360 PL-L</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>HF-RTD 360 PL-L</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>HF-LTTLPL-L</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>HF-LTTLPL-L</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

### Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breakers

<table>
<thead>
<tr>
<th>HCB Type</th>
<th>Relative quantity of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1A</td>
</tr>
<tr>
<td>B</td>
<td>1A</td>
</tr>
<tr>
<td>C</td>
<td>1A</td>
</tr>
<tr>
<td>L1</td>
<td>1A</td>
</tr>
<tr>
<td>L1</td>
<td>1A</td>
</tr>
<tr>
<td>G2/3</td>
<td>1A</td>
</tr>
<tr>
<td>G2/3</td>
<td>2A</td>
</tr>
<tr>
<td>K, K</td>
<td>1A</td>
</tr>
<tr>
<td>K, K</td>
<td>2A</td>
</tr>
</tbody>
</table>

### Technical data (all typical values at Vmains =230V)

<table>
<thead>
<tr>
<th>Lamp Qty of Lamps</th>
<th>Ballast</th>
<th>Power Factor</th>
<th>Max cable Capa.</th>
<th>Y ~ y/p</th>
<th>Lp-Lp/Lgnd/ground</th>
<th>Y ~ y/p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL-D 18W</td>
<td>1</td>
<td>HF-RTD 12WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1200</td>
</tr>
<tr>
<td>TL-D 18W</td>
<td>2</td>
<td>HF-RTD 12WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1500</td>
</tr>
<tr>
<td>TL-D 36W</td>
<td>3</td>
<td>HF-RTD 18WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1200</td>
</tr>
<tr>
<td>TL-D 36W</td>
<td>4</td>
<td>HF-RTD 18WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1500</td>
</tr>
<tr>
<td>TL-D 58W</td>
<td>1</td>
<td>HF-RTD 19WTL-D</td>
<td>37</td>
<td>32</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>TL-D 58W</td>
<td>2</td>
<td>HF-RTD 19WTL-D</td>
<td>37</td>
<td>32</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>TL-D 58W</td>
<td>1</td>
<td>HF-RTD 19WTL-D</td>
<td>65</td>
<td>50</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>TL-D 58W</td>
<td>2</td>
<td>HF-RTD 19WTL-D</td>
<td>65</td>
<td>50</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>PL-LP 18W</td>
<td>1</td>
<td>HF-RTD 136WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2500</td>
</tr>
<tr>
<td>PL-LP 18W</td>
<td>2</td>
<td>HF-RTD 136WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2500</td>
</tr>
<tr>
<td>PL-LP 36W</td>
<td>1</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7500</td>
</tr>
<tr>
<td>PL-LP 36W</td>
<td>2</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7500</td>
</tr>
<tr>
<td>PL-LP 58W</td>
<td>1</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7500</td>
</tr>
<tr>
<td>PL-LP 58W</td>
<td>2</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7500</td>
</tr>
<tr>
<td>PL-LP 80W</td>
<td>1</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9500</td>
</tr>
<tr>
<td>PL-LP 80W</td>
<td>2</td>
<td>HF-RTD 360WTL-D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9500</td>
</tr>
</tbody>
</table>

**Note:** Typical values for 900 measured at 100% power
HF-Regulator II Touch and Dim

Electronics (Dimming)

Wiring diagrams

Connector type
Connection wiring is greatly simplified through use of WAGO 251 universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.

Wiring tips
Each connection to be made via housing or mains connector. Wiring inside fixture should be straight and as short as possible. Lamp wires should not run parallel to mains or control wires to avoid EMC problems. For optimal performance, note that:

1. Data based on a mains supply with an impedance of 400 mΩ/L50529 (equal power distribution), under worst case conditions. With an impedance of 800 mΩ/L50529 the number of ballasts can be increased by 10%.
2. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is recommended to reduce the number of ballasts by 20%.
3. In some cases the maximum number of ballasts is not determined by the MCB, but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is based on the assumption that these are all switched on at the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is recommended to reduce the number of ballasts by 20%.
### Fluorescent and compact fluorescent lamps control gear

#### Ordering and packaging data

<table>
<thead>
<tr>
<th>Model</th>
<th>EAN code</th>
<th>Weight</th>
<th>Quantity</th>
<th>Dimensions</th>
<th>Volume</th>
<th>Weight</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R TD 118 TL-D</td>
<td>8711500 909657</td>
<td>0.20</td>
<td>12</td>
<td>40x20x7.6</td>
<td>0.0065</td>
<td>3.7</td>
<td>8711500 909644</td>
</tr>
<tr>
<td>HF-R TD 218 TL-D</td>
<td>8711500 909725</td>
<td>0.31</td>
<td>12</td>
<td>40x20x7.6</td>
<td>0.0065</td>
<td>4.0</td>
<td>8711500 909718</td>
</tr>
<tr>
<td>HF-R TD 3/418 TL-D</td>
<td>8711500 909732</td>
<td>0.31</td>
<td>12</td>
<td>40x20x7.6</td>
<td>0.0065</td>
<td>4.0</td>
<td>8711500 909718</td>
</tr>
</tbody>
</table>

Under development

### Electronics (Dimming)

**HF-Regulator ElTouch and DALI TL-D/PL-L**

(ordering and packaging data)

<table>
<thead>
<tr>
<th>Model</th>
<th>EAN code</th>
<th>Weight</th>
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<td>0.0065</td>
<td>4.0</td>
<td>8711500 909718</td>
</tr>
</tbody>
</table>

Under development
**Compliance and Approvals**

- **RFI < 30 MHz:** EN 55015
- **RFI > 30 MHz:** EN 55022 A
- **Harmonics:** EN 61000-3-2
- **Immunity:** EN 61310-1
- **Safety:** EN 61310-1
- **Performance:** EN 61347-2-3
- **Vibration & Bump tests:** IEC 68-2-6 FC
- **Environmental standard:** ISO 5290
- **Approvals:** EN 14013
- **CE marking.**

**Electronics (Dimming)**

**HF-Regulator TL-D/PL-L**

**Compliance and Approvals**

- **RFI < 30 MHz:** EN 55015
- **RFI > 30 MHz:** EN 55022 A
- **Harmonics:** EN 61000-3-2
- **Immunity:** EN 61310-1
- **Safety:** EN 61310-1
- **Performance:** EN 61347-2-3
- **Vibration & Bump tests:** IEC 68-2-6 FC
- **Environmental standard:** ISO 5290
- **Approvals:** EN 14013
- **CE marking.**

**Technical Data for Installation**

- **Mains Operation**
  - **Rated mains voltage:** 220 - 240 V (tolerance for safety: +/- 10%)
  - **Mains frequency:** 50/60 Hz
  - **Operating frequency:** > 42 kHz
  - **Power factor:** 0.95 at 100% power

- **Electronics (Dimming)**
  - **HF-Regulator TL-D/PL-L**

**Applications**

- **Typical areas of application include:**
  - 1-10V installations with daylight linking and/or movement detection (energy saving)
  - 1-10V installations with remote control systems (comfort)

**Notes:**

1. For a continuous DC application, an external fuse should be used
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

**Control Input**

- **Control voltage:** 1 - 10 V DC
- **Control input:** 1 - 10 V DC

**Controlled operation**

- ** Protected against accidental mains voltage connection:** yes

**Regulating level (lamp power)**

- The control input complies with EN 60000, (Amendment 1, Annex E) and is compatible with Philips lighting control equipment.

**Ignition time**

- < 2 s

**Earth leakage current**

- < 0.5 mA per ballast

**Maximum number of ballasts**

- which can be connected to one Residual Current Detector of 30 mA

**Overvoltage protection**

- 48 hrs at 320 V AC
- 2 hrs at 350 V AC

**Mains current at 1-10V DC**

- **Blade**
  - HF-R 136 TL-D
  - HF-R 236 TL-D
  - HF-R 158 TL-D
  - HF-R 258 TL-D
  - HF-R 136 PL-L
  - HF-R 236 PL-L
  - HF-R 140 PL-L
  - HF-R 240 PL-L
  - HF-R 155 PL-L
  - HF-R 255 PL-L

**Technical Data for Installation**

- **Mains Operation**
  - **Rated mains voltage:** 220 - 240 V (tolerance for safety: +/- 10%)
  - **Mains frequency:** 50/60 Hz
  - **Operating frequency:** > 42 kHz
  - **Power factor:** 0.95 at 100% power

- **Electronics (Dimming)**
  - **HF-Regulator TL-D/PL-L**

**Applications**

- **Typical areas of application include:**
  - 1-10V installations with daylight linking and/or movement detection (energy saving)
  - 1-10V installations with remote control systems (comfort)

**Notes:**

- For a continuous DC application, an external fuse should be used
- Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

**Control Input**

- **Control voltage:** 1 - 10 V DC
- **Control input:** 1 - 10 V DC

**Controlled operation**

- ** Protected against accidental mains voltage connection:** yes

**Regulating level (lamp power)**

- The control input complies with EN 60000, (Amendment 1, Annex E) and is compatible with Philips lighting control equipment.

**Ignition time**

- < 2 s

**Earth leakage current**

- < 0.5 mA per ballast

**Maximum number of ballasts**

- which can be connected to one Residual Current Detector of 30 mA

**Overvoltage protection**

- 48 hrs at 320 V AC
- 2 hrs at 350 V AC

**Mains current at 1-10V DC**

- **Blade**
  - HF-R 136 TL-D
  - HF-R 236 TL-D
  - HF-R 158 TL-D
  - HF-R 258 TL-D
  - HF-R 136 PL-L
  - HF-R 236 PL-L
  - HF-R 140 PL-L
  - HF-R 240 PL-L
  - HF-R 155 PL-L
  - HF-R 255 PL-L

**Technical Data for Installation**

- **Mains Operation**
  - **Rated mains voltage:** 220 - 240 V (tolerance for safety: +/- 10%)
  - **Mains frequency:** 50/60 Hz
  - **Operating frequency:** > 42 kHz
  - **Power factor:** 0.95 at 100% power

- **Electronics (Dimming)**
  - **HF-Regulator TL-D/PL-L**

**Applications**

- **Typical areas of application include:**
  - 1-10V installations with daylight linking and/or movement detection (energy saving)
  - 1-10V installations with remote control systems (comfort)

**Notes:**

- For a continuous DC application, an external fuse should be used
- Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

**Control Input**

- **Control voltage:** 1 - 10 V DC
- **Control input:** 1 - 10 V DC

**Controlled operation**

- ** Protected against accidental mains voltage connection:** yes

**Regulating level (lamp power)**

- The control input complies with EN 60000, (Amendment 1, Annex E) and is compatible with Philips lighting control equipment.

**Ignition time**

- < 2 s

**Earth leakage current**

- < 0.5 mA per ballast

**Maximum number of ballasts**

- which can be connected to one Residual Current Detector of 30 mA

**Overvoltage protection**

- 48 hrs at 320 V AC
- 2 hrs at 350 V AC
Electronics (Dimming)

HF-Regulator TL-D/PL-L

Electronics (Dimming)

HF-Regulator TL-D/PL-L

Wire cross-section:

- On the mains side (mains/control voltage): 0.5 - 1.5 mm²
- On the lamp side: 0.5 - 1.5 mm²

Conversion table for max. quantities of ballasts on other fixtures:

- Strip length: HF-R 3/4 18 TL-D 7.5 - 8.5 mm

Note:

- For optimum performance, note that wires from connection 1 and 2 for single-lamp versions, and from connections 3, 4 and 5 for twin-lamp versions, and from connections 5 and 6 for triple/quadruple-lamp versions should be kept short and equal in length.

- The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

Technical data in relation to energy saving:

- Lamp Q ty. of Ballast System Lamp C ELMA

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Qty.</th>
<th>Power*</th>
<th>Efficacy*</th>
<th>Power*</th>
<th>Efficacy*</th>
<th>Lumen*</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL-D 18 1</td>
<td>HF-R 118 TL-D</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL-D 18 2</td>
<td>HF-R 118 TL-D</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL-D 18 3</td>
<td>HF-R 118 TL-D</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL-D 18 1</td>
<td>HF-R 118 TL-D</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>PL-L 36 1</td>
<td>HF-R 116 PL-L</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>PL-L 36 2</td>
<td>HF-R 116 PL-L</td>
<td>39</td>
<td>69</td>
<td>10</td>
<td>1200</td>
<td>A1</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. For optimum performance, note that wires from connection 1 and 2 for single-lamp versions, and from connections 3, 4 and 5 for twin-lamp versions should be kept short and equal in length (see the advice on maximum cable capacity).

2. Measurements will be verified in real installations; therefore data are subject to change.

3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.

4. Note that the maximum number of ballasts is given when these are all switched on at the same moment, i.e. by a wall switch.

5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.

Wiring diagrams:

1 lamp

2 lamps

6.40 Fluorescent and compact fluorescent lamps control gear Lamps and Gear

Lamps and Gear 6.41 Fluorescent and compact fluorescent lamps control gear
Electronics Dimming

HF-Regulator TL5

Product description
Slim, lightweight, high-frequency electronic regulating ballast for TL5 fluorescent lamps.

Features and benefits
• The lamp power can be regulated down to 3%.
• Striation-free operation.
• 1 - 10 V control input (European standard).
• Programmable start/flicker-free warm start, ideal for areas with a high switching frequency.
• Up to 60% reduction in energy consumption can be achieved by using automatic lighting control systems.

All Philips HF-Regulator electronic ballasts are equipped with α-control. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:

a. lamp life is unaffected by dimming position.
b. lamp burning is stable in every dimming position.
c. energy savings, when dimming, are maximised.

Applications
Typical areas of application include:
• 1 - 10 V installations with daylight linking and/or movement detection (energy saving).
• 1 - 10 V installations with remote control systems (comfort).
• Installations with emergency back-up, according to VDE 0108.

Examples
• Office buildings
• Insurance companies
• Banks
• Government ministries
• Corridors
• Department stores
• Shops
• Supermarkets
• Hotels
• Hospitals
• Cinemas.

Philips quality
This implies optimum quality with respect to:
• System supplier
• As manufacturer of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained.
• International standards
• All Philips HF electronic regulating ballasts comply with all relevant international rules and regulations.

Compliances and approvals
• RFI < 30 MHz: EN 55015
• RFI > 30 MHz: EN 55022 A
• Harmonics: EN 61000-3-2
• Immunity: EN 61347-2-3
• Safety: EN 61547
• Performance: IEC 61347-2-3
• Vibration & bump tests: IEC 61347-2-3
• Approval marks: ENEC VDE-EMV, CE marking.

Technical data for installation
Mains operation
Rated mains voltage 220 - 240 V**
with tolerances for safety: +/- 10% 198 - 264 V**
tolerances for performance: +6% -8% 202 - 254 V
Mains frequency 50/60 Hz
Operating frequency > 42 kHz
Power factor 0.90*; 0.95 at 100% power
Smart power: with AC mains voltage fluctuations, luminous flux varies by ±2% max.
DC voltage operation (during emergency back-up)
Required battery voltage for guaranteed ignition 198 - 254 V DC
Required battery voltage for burning lamps 176 - 254 V DC
Nominal light output is obtained at a voltage of 220 - 240 V DC

Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltage (< 158 V) can influence lifetime of the ballast.

Control input
Control voltage 1 - 10 V DC
Protected against accidental mains voltage connection yes
Regulating level (lamp power) 3 to 100%
The control input complies with EN 60929, (Amendment 1, Annex E) and is compatible with Philips lighting control equipment.
Ignition time: < 2 s
Earth leakage current < 0.5 mA per ballast
Maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA 30
Overvoltage protection 48 hrs at 320 V AC
2 hrs at 350 V AC

Mains current at V
<table>
<thead>
<tr>
<th>Value</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1xTL5</td>
<td>0.09</td>
</tr>
<tr>
<td>2xTL5</td>
<td>0.12</td>
</tr>
<tr>
<td>3xTL5</td>
<td>0.15</td>
</tr>
<tr>
<td>4xTL5</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Lamp wiring for HF-R TL5
500 V rated components and wiring are required with HF-Regulator TL5.

Dual fixture master slave operation
Adviced maximum cable capacity for optimum performance and EMI suppression
max. 15 pF between two sets of lamp wires (each set of lamp wires is connected to one electrode of the lamp max. 75 pF between one set of lamp wires (connected to one electrode of the lamp and earth).

Automatic restart after lamp replacement or voltage dip
yes (for 1- and 2-lamp ballasts), for 3- and 4-lamp ballast, the mains power needs to be reset.

Insulation resistance test
500 V DC from Line/Neutral to Earth (not between Line and Neutral)

Notes:
Ensure that the neutral is reconnected again after abovementioned test is carried out and before the installation is put into operation.

Dimensions in mm
**Electronics (Dimming)**

**HF-Regulator TL5**

**Inrush current**

<table>
<thead>
<tr>
<th>MCB type</th>
<th>Relative quantity of ballasts</th>
<th>Inrush current</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16 A 100% (see table above)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>10 A  87%</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>8 A  64%</td>
<td></td>
</tr>
<tr>
<td>L, I</td>
<td>16 A 100%</td>
<td></td>
</tr>
<tr>
<td>L, II</td>
<td>10 A  87%</td>
<td></td>
</tr>
<tr>
<td>L, III</td>
<td>6 A  37%</td>
<td></td>
</tr>
</tbody>
</table>

**Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker**

<table>
<thead>
<tr>
<th>Lamp QTY. of Ballast System</th>
<th>Lamp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELMA lamps</td>
<td>Power*</td>
</tr>
<tr>
<td></td>
<td>Efficacy</td>
</tr>
<tr>
<td></td>
<td>Power*</td>
</tr>
<tr>
<td></td>
<td>Lumen*</td>
</tr>
<tr>
<td></td>
<td>Class</td>
</tr>
<tr>
<td>TL5 HE 14W</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL5 HE 16W</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>14</td>
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<tr>
<td></td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL5 HO 24W</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>1900</td>
</tr>
<tr>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL5 HE 21W</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>21</td>
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<tr>
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<td>90</td>
</tr>
<tr>
<td></td>
<td>1900</td>
</tr>
<tr>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>TL5 HO 39W</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>1900</td>
</tr>
<tr>
<td>A1</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Data is based on a mains supply with an impedance of 400Ω (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800Ω the number of ballasts can be increased by 10%.

2. Measurements will be verified in real installations; therefore data are subject to change.

3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.

4. Note that the maximum number of ballasts is given when these are all switched on at the same moment, i.e. by a wall switch.

5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.

6. First digital regulating steps are fixed at 3% light output (dimming specification).

**Technical data for design and mounting miniature ballasts in fixtures**

- **Temperatures**
  - Temperature range to ignite lamp: +10 °C to +50 °C
  - Stable lamp operation assured: > +15 °C
  - Striation possible: < +15 °C

- **Max. tcase = 75°C**

**Notes:**

1. Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.

- **Class II luminaires** this application is not advisable; only with extensive tests on luminaires can the correct operation be verified.

- **Hum and noise level**
  - Inaudible

- **Permitted humidity** is tested according to IEC 928 par. 12.

- **Note that no moisture or condensation may enter the ballast.**

- The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.
Connection wiring is greatly simplified through use of insert contacts; earth connection can be made via housing or terminal block.

**Wiring cross-section:**
- On the mains side (mains/control voltage): 0.5 - 1.5 mm²
- On the lamp side: 0.5 - 1.5 mm²

**Strip length:**
- 7.5 - 8.5 mm

**Note:** For optimum performance, note that wires from connection 1 and 2 for single-lamp versions, and from connections 3, 4 and 5 for twin-lamp versions, and from connections 5 and 6 for triple/quad-lamp versions should be kept short and equal in length.

### Ordering and packing data

<table>
<thead>
<tr>
<th>EAN code</th>
<th>Weight</th>
<th>Diameter</th>
<th>Length</th>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8711500 060044</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 114 TL5</td>
</tr>
<tr>
<td>8711500 742308</td>
<td>0.4</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 214 TL5</td>
</tr>
<tr>
<td>8711500 747433</td>
<td>0.5</td>
<td>10 cm</td>
<td>70 cm</td>
<td>0,009</td>
<td>HF-R 3/414 TL5</td>
</tr>
<tr>
<td>8711500 060068</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 121 TL5</td>
</tr>
<tr>
<td>8711500 742285</td>
<td>0.4</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 224 TL5</td>
</tr>
<tr>
<td>8711500 741790</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 128 TL5</td>
</tr>
<tr>
<td>8711500 742285</td>
<td>0.4</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 224 TL5</td>
</tr>
<tr>
<td>8711500 741790</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 128 TL5</td>
</tr>
<tr>
<td>8711500 744739</td>
<td>0.5</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 224 TL5</td>
</tr>
<tr>
<td>8711500 744722</td>
<td>0.5</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 224 TL5</td>
</tr>
<tr>
<td>8711500 060082</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 124 TL5</td>
</tr>
<tr>
<td>8711500 742285</td>
<td>0.4</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 224 TL5</td>
</tr>
<tr>
<td>8711500 741806</td>
<td>0.3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 128 TL5</td>
</tr>
<tr>
<td>8711500 742285</td>
<td>0,3</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,005</td>
<td>HF-R 124 TL5</td>
</tr>
<tr>
<td>8711500 744906</td>
<td>0.4</td>
<td>12,5 cm</td>
<td>70 cm</td>
<td>0,007</td>
<td>HF-R 239 TL5</td>
</tr>
</tbody>
</table>

**Wiring diagrams:**

1. **1 lamp 80 W**
2. **2 lamps**
3. **3 lamps**
**Compliance and Approvals**

- RFI <30 MHz: EN 55015*
- RFI >30 MHz: EN 55022 B
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
- Safety: EN 61347-2-3
- Performance: EN 60929
- Vibration & bump tests: EN 60068-2-6-FC

1. For continuous DC application, an external fuse should be used in the EN 60068-2-29-Eb luminaire.

**Features and Benefits**

- **Quality standard:** ISO 9001
- **Environmental standard:** ISO 14001
- **Approval marks:** ENEC

**Applications**

- Office buildings, insurance companies, banks, government ministries
- Cellular offices, open plan offices, corridors and lobbies
- Conference rooms, lecture theatres
- Department stores, shopping malls
- Hotels, restaurants and bars
- Cinemas, museums
- Hospitals
- Schools.

**Philips quality**

This applies optimum quality with respect to:

- System supplier
- As manufacturers of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained.
- International standards

International standards Philips HF-Regulator electronic regulating ballasts comply with all relevant international rules and regulations.

**Technical Data for Installation**

- **Mains operation**
  - Rated mains voltage: 220-240V
  - Tolerances for performance: ±5%
  - Mains frequency: 50/60 Hz
  - Operating frequency: >40 Hz
  - Power factor: 0.95≤ at 100% power
  - Power factor: HF-R 118 PL-T/C 0.90 at 100% power

- DC voltage operation (during emergency back-up)
  - Required battery voltage for guaranteed ignition: 198V-254V
  - Required battery voltage for burning lamps: 176V-254V
  - Nominal light output is obtained at a voltage of 220V-254V

**Inrush current**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp</th>
<th>Mains</th>
<th>Input current A</th>
<th>Input current A</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R 118 PL-T/C</td>
<td>PL-T/C 18W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 218 PL-T/C</td>
<td>PL-T/C 18W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 26W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 32W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 26W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 32W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 42W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 42W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
<td>6/10</td>
</tr>
<tr>
<td>HF-R 157 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
<td>45A/400µs</td>
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<td>6/10</td>
</tr>
<tr>
<td>HF-R 257 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
<td>6/10</td>
</tr>
</tbody>
</table>

**Notes**

1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.

Earth leakage current < 0.5 mA per ballast

Maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA 30

Overvoltage protection 48 hrs at 330 V AC 2 hrs at 350 V AC

Automatic restart after lamp replacement or voltage dip Yes

**Applications**

- Installations with daylight linking and/or movement detection (for energy savings)
- Installations with remote control systems (personal scene settings)
- Installations with emergency back-up, according to VDE 0108.

Examples:

- Office buildings, insurance companies, banks, government ministries
- Cellular offices, open plan offices, corridors and lobbies
- Conference rooms, lecture theatres
- Department stores, shopping malls
- Hotels, restaurants and bars
- Cinemas, museums
- Hospitals
- Schools.

**Contact Information**

For more information, please contact Philips Lighting at your local office or visit our website at philips.com.

**Technical Details**

- **Ballast ID:** A, B, C, D, E
- **Input Mains:** 180V-240V
- **Inrush mA:** 12A
- **Time at Inrush:** 100ms

**Bulb ID:** A, B, C, D

- **Voltage:** 150V
- **Current:** 10A
- **Time at Maximum Current:** 100ms

**Conversion Table for Maximum Quantities of Ballasts on Other Types of Mixture Circuit Breakers**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp</th>
<th>Input current A</th>
<th>Input current A</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R 118 PL-T/C</td>
<td>PL-T/C 18W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
</tr>
<tr>
<td>HF-R 218 PL-T/C</td>
<td>PL-T/C 18W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 26W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 32W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 26W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 32W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
<tr>
<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 42W</td>
<td>28</td>
<td>27A/250µs</td>
<td>109</td>
</tr>
<tr>
<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 42W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
<tr>
<td>HF-R 157 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
<tr>
<td>HF-R 257 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
</tbody>
</table>

**Inrush Current**

- **Rated voltage:** 220V-254V
- **Inrush current:** 27A/250µs
- **Time at Inrush:** 100ms

**Dimension for Maximum Quantities of Ballasts on Other Types of Mixture Circuit Breakers**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp</th>
<th>Input current A</th>
<th>Input current A</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R 118 PL-T/C</td>
<td>PL-T/C 18W</td>
<td>28</td>
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<td>HF-R 1 26-42 PL-T/C</td>
<td>PL-T/C 26W</td>
<td>28</td>
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<tr>
<td>HF-R 1 26-42 PL-T/C</td>
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<td>HF-R 2 26-42 PL-T/C</td>
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<td>28</td>
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<td>HF-R 2 26-42 PL-T/C</td>
<td>PL-T/C 42W</td>
<td>12</td>
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<tr>
<td>HF-R 157 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
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</tr>
<tr>
<td>HF-R 257 PL-T/C</td>
<td>PL-T/C 57W</td>
<td>12</td>
<td>45A/400µs</td>
<td>121</td>
</tr>
</tbody>
</table>
**Electronics (Dimming)**

HF-Regulator PL-T/C

---

**Insulation resistance test**

500V DC from Line/Neutral to Earth (not between Line and Neutral)

Note: Ensure that the neutral is reconnected again after the above mentioned test is carried out and before the installation is put into operation.

**Lamp wiring**

The use of 500V-rated components and wiring is advised for PL-T 32W, 42W and 57W types.

**Ignition time**

Typical 0.5 sec.

Adviced maximum cable capacity for optimum performance and EMC suppression

Max. 30 pF between two sets of lamp wires (each set of lamp wires is connected to one electrode of the lamp) and earth. Care has to be taken for symmetrical wiring.

**Technical data in relation to energy saving**

- Insulation resistance test 500 V DC from Line/Neutral to Earth (not between Line and Neutral)
- Protection against accidental mains voltage connection: Yes
- Regulating level (lamp power): 3 to 100%

**Control input**

- Control voltage: 1 – 10V DC
- Protected against accidental mains voltage connection: Yes
- Connecting wiring is greatly simplified through use of insert contacts:
  - Wire cross-section:
    - Mains connector [Orange] 0.5 mm – 1.5 mm
    - Control connector [Blue] 0.5 mm – 1.5 mm
    - Lamp(s) connector [Gray] 0.5 mm – 1.5 mm

**Wiring diagrams**

Connecting wiring is greatly simplified through use of insert contacts:

- Wire cross-section: 0.5 mm – 1.5 mm
- Control connector [Blue]: 0.5 mm – 1.5 mm
- Lamp(s) connector [Gray]: 0.5 mm – 1.5 mm

**Notes**

1. For optimum performance, note that wires from connection 1 and 2 should be kept short and equal in length.
2. Keep lamp wiring as short as possible. Do not bunch wires from terminals 1 & 2 with those from terminals 3 & 4 (1-lamp ballasts), or wires from terminals 3, 4, 5 & 6 with those from terminals 1, 2, 7 & 8 (2-lamp ballasts).
3. To avoid problems with ground suppression:
   - Typical capacitance 1m wires close together (spacing 0.5 mm): 46 pF
   - Typical capacitance 0.5m wires close together (spacing 0.5 mm): 23 pF
4. Data is based on a mains supply with an impedance of 400 mΩ/L50529 (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.

**Technical data for design and mounting in fixtures**

- Lamp operation: +10 °C to +50 °C
- With ignition aid: > 15 °C
- Max. case: 75 °C

**Earthing**

Earthing of the HF ballast in a luminaire is necessary for EMC (electromagnetic compatibility) and CLASS II luminaires.

This application is not advisable; only with extensive tests on luminaires can the correct operation be verified.

**Hum and noise level**

Inaudible

Permitted humidity is tested according to EN 61347 par.11. Note that no moisture or condensation may enter the ballast.

**Sizing and packaging data**

- Ballast 1: Piece B ulk packing
- EAN code: 8711 500 90873 0
- Weight: 0.195 kg
- Dimensions: 25.5x24.5x8.2 cm
- Volume: 0.01 m³
- 600674 10

**Relationship between lamp power and control voltage**

- Relationship between lamp power and control voltage

---

HF-Regulator PL-T/C

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**Fluorescent and compact fluorescent lamps control gear**

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Lamps and Gear
Electronics (Dimming)

HF-Regulator Touch and Dim (TL)

Product description

Slimline or Compact, lightweight high-frequency electronic regulating ballast, using a specific digital HF-Regulator Touch and Dim protocol. A dedicated range for TL5, TL5C and TLD fluorescent lamps.

Features and benefits

• Easy personal control, creating your personal lighting level at the touch of a button.
• Simple installation diagram. No control device required, ballast will work in combination with any standard retractive / push-to-make switch.
• A short push represents the On/Off command, and personal light level preference can be stored in the internal memory by a firm longer push on the button.
• Failure proof (Non volatile) memory ensures that ballast always remembers your setting when next time switched on, or in case of power failure.
• Presets can be selected and adjusted between 3% and 100% light output by a long push.
• Quick programmed soft-start: 0.5 sec, fading to default (100%) or fading to preset level.
• System reset/alignment by means of long push min 10 Sec. Light will adjust to 35% value.
• Smart power: constant light independent of mains voltage fluctuations.

All Philips HF-Regulator electronic ballasts are equipped with α-control. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:
- lamp life is unaffected by dimming position
- lamp burning is stable in every dimming position; and
- energy savings, when dimming are maximised

Applications

Typical areas of application include:
- Office applications were a simple and easy to install dim system or personal light level adjustment is required.
- Cellular office, free-floor standing luminaries.
- Open plan offices (up to 32 luminaires).
- Small conference rooms, Lecture theatres.
- Hotels, restaurants.
- Hospitals, Medical consultancy rooms.
- Schools.

Philips quality

This applies optimum quality with respect to:
• System supplier
As manufacturers of lamps electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained.

• International standards
Philips HF electronic regulating ballasts comply with a relevant international rules and regulations.

Compliance & approvals

- RFI<30 MHz: EN 55015*
- RFI>30 MHz: EN 55022 B
- Harmonics: EN 61000-3-2
- Immunity: EN 61000-4-2
- Performance:
  - Vibration & bump tests: IEC 68-2-6-FC
  - Environmental standards: EN 14001
  - Approval marks:
    - EMV/LED-BIM, ENEC, VDE-EMV
  - Smart power: constant light independent of mains voltage fluctuations.

Technical data for installation

- Rated mains voltage: 220-240V
- With tolerances for safety: +/- 10% 198-264V
- Tolerances for performance: +6% -8% 202-254V
- Mains frequency: 50/60 Hz
- Operating frequency: > 42 kHz
- Power factor: 0.95 at 100% power
- Smart power: with AC mains voltage fluctuations, 202-254V
- Luminous flux varies by ± 2% max.

DC voltage operation (during emergency back-up)

- Required battery voltage for guaranteed ignition: 198V - 254V
- Required battery voltage for burning lamps: 176V - 254V
- Nominal light output is obtained at a voltage of 220V - 240V

Notes

1. For continuous DC application, an external fuse should be used in the luminaire
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.
3. Earth leakage current: < 0.5 mA per ballast

Mains current at 230V

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-R T 149 TL5</td>
<td>0.25</td>
</tr>
<tr>
<td>HF-R T 154 TL5</td>
<td>0.28</td>
</tr>
<tr>
<td>HF-R T 160 TL5C</td>
<td>0.28</td>
</tr>
<tr>
<td>HF-R T 165 TL5C</td>
<td>0.28</td>
</tr>
<tr>
<td>HF-R T 170 TL5</td>
<td>0.30</td>
</tr>
<tr>
<td>HF-R T 175 TL5</td>
<td>0.36</td>
</tr>
<tr>
<td>HF-R T 180 TL5</td>
<td>0.39</td>
</tr>
<tr>
<td>HF-R T 185 TL5</td>
<td>0.39</td>
</tr>
<tr>
<td>HF-R T 190 TL5</td>
<td>0.39</td>
</tr>
<tr>
<td>HF-R T 195 TL5</td>
<td>0.51</td>
</tr>
<tr>
<td>HF-R T 200 TL5</td>
<td>0.53</td>
</tr>
<tr>
<td>HF-R T 205 TL5</td>
<td>0.57</td>
</tr>
<tr>
<td>HF-R T 210 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 215 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 220 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 225 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 230 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 235 TL5</td>
<td>0.63</td>
</tr>
<tr>
<td>HF-R T 240 TL5</td>
<td>0.63</td>
</tr>
</tbody>
</table>

* Tested with ballast functional ground connected to earth.
HF-Regulator Touch and Dim (TL)

Control input

Mains input signal
- Retractive push-to-make switch
- Ignore status, < 0.04 sec.
- Short push, between 0.04 sec. and 0.5 sec.
- Long push, between 0.5 sec. and 10 sec.
- Reset push, >10 Sec.

The dim function will toggle after each individual push. Except when the value is lower than 10% it will always dim up and when the light output is higher than 70% it will always dim down to perform according human perception.

Regulating level (lamp power)
3 to 100%

Control input insulation, basic insulation
Yes

Protcted against accidental mains voltage connection
Yes

Control input insulation, basic insulation
< 1500V

Maximum ballast connected in one circuit
32 Pcs.

Technical data in relation to energy saving

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qty of Lamps</th>
<th>Ballast Type</th>
<th>System Power</th>
<th>Efficacy*</th>
<th>Lamp Power*</th>
<th>Efficacy*</th>
<th>NOMINAL Lumen in (lm/W)</th>
<th>CELMA class, EEI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLS</td>
<td>14W 1</td>
<td>HF-R T 414 TL5</td>
<td>66</td>
<td>61</td>
<td>54</td>
<td>61</td>
<td>1200</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 2</td>
<td>HF-R T 128 TL5</td>
<td>62</td>
<td>61</td>
<td>54</td>
<td>61</td>
<td>2600</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 1</td>
<td>HF-R T 128 TL5</td>
<td>59</td>
<td>60</td>
<td>55</td>
<td>64</td>
<td>3000</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 2</td>
<td>HF-R T 128 TL5</td>
<td>67</td>
<td>60</td>
<td>56</td>
<td>64</td>
<td>3000</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 1</td>
<td>HF-R T 128 TL5</td>
<td>63</td>
<td>60</td>
<td>56</td>
<td>64</td>
<td>3000</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 2</td>
<td>HF-R T 128 TL5</td>
<td>75</td>
<td>60</td>
<td>57</td>
<td>64</td>
<td>3000</td>
<td>A1</td>
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<tr>
<td>TLS</td>
<td>14W 1</td>
<td>HF-R T 128 TL5</td>
<td>70</td>
<td>60</td>
<td>56</td>
<td>62</td>
<td>4600</td>
<td>A1</td>
</tr>
<tr>
<td>TLS</td>
<td>14W 2</td>
<td>HF-R T 128 TL5</td>
<td>80</td>
<td>60</td>
<td>57</td>
<td>62</td>
<td>4600</td>
<td>A1</td>
</tr>
</tbody>
</table>

Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>100% (see table above)</td>
</tr>
<tr>
<td>C</td>
<td>65%</td>
</tr>
<tr>
<td>L, I</td>
<td>30%</td>
</tr>
<tr>
<td>L</td>
<td>40%</td>
</tr>
<tr>
<td>G, U, II</td>
<td>40%</td>
</tr>
<tr>
<td>K, III</td>
<td>25%</td>
</tr>
<tr>
<td>L</td>
<td>65%</td>
</tr>
<tr>
<td>K, III</td>
<td>25%</td>
</tr>
<tr>
<td>L</td>
<td>65%</td>
</tr>
<tr>
<td>K, III</td>
<td>25%</td>
</tr>
</tbody>
</table>

Technical data for design and mounting in fixtures

<table>
<thead>
<tr>
<th>Temperatures</th>
<th>Temperature range to ignite lamp*</th>
<th>+10°C to +50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>With ignition aid</td>
<td>Stable lamp operation assured</td>
<td>&gt; 15ºC</td>
</tr>
<tr>
<td>Striation possible</td>
<td>Max t case</td>
<td>&lt; 15ºC</td>
</tr>
<tr>
<td>Permitted humidity</td>
<td>Value for TLD and PL-L +9ºC to +50ºC</td>
<td>75ºC</td>
</tr>
</tbody>
</table>

Earthing
- Earthing of the HF ballast in a luminaire is necessary for EMC (electromagnetic compatibility) and perfect lamp ignition.

Class II luminaires
This application is not advisable; only with extensive tests on luminaires can the correct operation be verified.

Hum and noise level
Insolation resistance
500V DC from Line/Neutral to Earth test (not between Line and Neutral naval)
Note: Ensure that the neutral is connected again after above mentioned test is carried out and before the installation is put in operation.

Class II luminaires
This application is not advisable; only with extensive tests on luminaires can the correct operation be verified.

Connecting wiring is greatly simplified through use of insert contacts.

Wire cross-section:
Mains connector [Orange] 0.5mm – 1.5mm
Control connector [Blue] 0.5mm – 1.5mm
Lamp(s) connector [gray] 0.5mm – 1.5mm
Strip length 7.5 – 8.5 mm

Wiring diagram: 1 Phase installation
3 Phase installation

Notes:
1. Data is based on a mains supply with an impedance of 400 mΩ (equal to a 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. Typical capacitance 1 m wires close together (spacing 0.5 mm) 46 pF
   Typical capacitance 0.5 m wires close together (spacing 0.5 mm) 23 pF
   Typical capacitance 1 m wires close together (spacing 0.5 mm) 72 pF
   Typical capacitance 0.5 m wires close together (spacing 0.5 mm) 38 pF

Ordering and packing data
**Electronics (Dimming)**

**HF-Regulator Touch and Dim (PL)**

**Product description**

Slimline or Compact, lightweight high-frequency electronic regulating ballast, using a specific digital HF-Regulator Touch and Dim protocol.

A dedicated range for PL-L, PL-T and PL-C fluorescent lamps.

**Features and benefits**

- Easy personal control, creating your personal lighting level at the touch of a button.
- Simple installation diagram. No control device required, ballast will work in combination with any standard retractive / push-to-make switch.
- A short push represents the On/Off command, and personal light level preference can be stored in the internal memory by a firm longer push on the button.
- Failure proof (Non volatile) memory ensures that ballast always remembers your setting when next time switched on, or in case of power failure.
- Presets can be selected and adjusted between 3% and 100% light output by a long push.
- Quick programmed soft-start: 0.5 sec, fading to default (100%) or fading to preset level.
- Bistable free-operation.
- System reset/alignment by means of long push min 10 Sec. Light will adjust to 35% value.
- Smart power: constant light independent of mains voltage fluctuations.

All Philips HF-Regulator electronic ballast’s are equipped with α-control. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:

- a. lamp life is unaffected by dimming position
- b. lamp burning is stable in every dimming position; and
- c. energy savings, when dimming are maximised

**Applications**

Typical areas of application include:

Office applications were a simple and easy to install dim system or personal light level adjustment is required.

**Examples**

- Cellular office, free-floor standing luminaries.
- Open plan offices (up to 32 luminaires).
- Small conference rooms, Lecture theatres.
- Hotels, restaurants.
- Hospitals, Medical consultancy rooms.
- Schools.

**Philips quality**

This applies optimum quality with respect to:

- System supplier
- As manufacturers of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained.
- International standards
- Philips HF electronic regulating ballasts comply with a relevant international rules and regulations.

**Compliance’s and approvals**

- RF = 30 MHz: EN 55015*
- RF = 30 MHz: EN 55022 B
- Harmonics: EN 61000-3-2
- Immunity: EN 61000-4-3
- Performance: EN 61547
- Vibration & bump tests: IEC 68-2-6-FC, IEC 68-2-20-Bs
- Quality standard: ISO 9001
- Environmental standard: EN 14001
- Approval marks: ENEC, VDE-EMV, EN 61347-1
- CE marking

* Tested with ballast functional ground connected to earth

**Technical data for installation**

<table>
<thead>
<tr>
<th>Mains current at 230V</th>
<th>Ballast</th>
<th>Input current A</th>
</tr>
</thead>
<tbody>
<tr>
<td>220-240V</td>
<td>HF-R T 118 PL-T/C</td>
<td>0.09</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 126 PL-T/C</td>
<td>0.13</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 218 PL-T/C</td>
<td>0.17</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 226 PL-T/C</td>
<td>0.24</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 115 PL-T</td>
<td>0.22</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 55 PL-L</td>
<td>0.25</td>
</tr>
<tr>
<td>202-254V</td>
<td>HF-R T 255 PL-L</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Notes**

1. For continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (<198V) can influence the lifetime of the ballast.
3. Earth leakage current < 0.5 mA per ballast

**Mains current**

- Luminous flux varies by ±1% max.
- DC voltage operation (during emergency back-up) required battery voltage for guaranteed ignition: 198V - 254V
- Required battery voltage for burning lamps: 176V - 254V
- Nominal light output is obtained at a voltage of 220V - 240V

**Automatically restart after lamp replacement or voltage dip** yes

**Earth leakage current** < 0.5 mA per ballast

**Maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA** 30

**Overvoltage protection**

- 48 hrs at 320V AC
- 2 hrs at 350V AC
- 5 min at 380V AC

**Product ID**

<table>
<thead>
<tr>
<th>Product ID</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>A1</td>
<td>A2</td>
<td>B1</td>
<td>B2</td>
<td>C1</td>
<td>D1</td>
</tr>
<tr>
<td>1 lamp</td>
<td>350</td>
<td>350</td>
<td>30</td>
<td>28</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>2 lamps</td>
<td>645</td>
<td>445</td>
<td>30</td>
<td>28</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Square</td>
<td>A1</td>
<td>A2</td>
<td>B1</td>
<td>B2</td>
<td>C1</td>
<td>D1</td>
</tr>
<tr>
<td>5 lamp</td>
<td>123</td>
<td>191</td>
<td>79</td>
<td>67</td>
<td>39</td>
<td>4.5</td>
</tr>
<tr>
<td>2 lamps</td>
<td>123</td>
<td>191</td>
<td>79</td>
<td>67</td>
<td>39</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Electronics (Dimming)
HF-Regulator Touch and Dim (PL)

**Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker**

<table>
<thead>
<tr>
<th>Bulb Type</th>
<th>Qty. of Ballast System</th>
<th>Lamp Type</th>
<th>Max. quantity of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16A</td>
<td>L1</td>
<td>16A</td>
</tr>
<tr>
<td>C</td>
<td>16A</td>
<td>L1, L2</td>
<td>16A</td>
</tr>
<tr>
<td>D, E, F</td>
<td>16A</td>
<td>L, K, B</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp Qty of Lamps</th>
<th>Ballast Qty.</th>
<th>System Power* (W)</th>
<th>Effacy* (lm/W)</th>
<th>Lamp Power* (W)</th>
<th>Effacy* (lm/W)</th>
<th>NOMINAL Lumen (lm/20%)</th>
<th>CELMA class, EEI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-C 18W</td>
<td>1</td>
<td>25</td>
<td>57</td>
<td>16.5</td>
<td>73</td>
<td>1200</td>
<td>A1</td>
</tr>
<tr>
<td>PL-T 18W</td>
<td>1</td>
<td>25</td>
<td>57</td>
<td>16.5</td>
<td>73</td>
<td>1200</td>
<td>A1</td>
</tr>
<tr>
<td>PL-T 24W</td>
<td>2</td>
<td>36</td>
<td>60</td>
<td>16.5</td>
<td>73</td>
<td>1200</td>
<td>A1</td>
</tr>
<tr>
<td>PL-T 36W</td>
<td>2</td>
<td>29</td>
<td>62</td>
<td>16.5</td>
<td>73</td>
<td>1200</td>
<td>A1</td>
</tr>
<tr>
<td>PL-L 35W</td>
<td>2</td>
<td>56</td>
<td>78</td>
<td>50</td>
<td>87</td>
<td>4350</td>
<td>A1</td>
</tr>
<tr>
<td>PL-L 55W</td>
<td>2</td>
<td>56</td>
<td>78</td>
<td>50</td>
<td>87</td>
<td>4350</td>
<td>A1</td>
</tr>
</tbody>
</table>

Insulation resistance: 500 V DC from Line/Neutral to Earth

Temperature range to ignite lamp* +10ºC to +50ºC

With ignition aid

<table>
<thead>
<tr>
<th>Sided lamp operation assured &gt; 15ºC</th>
<th>Striation possible &lt; 15ºC</th>
<th>Max t case 75ºC</th>
</tr>
</thead>
</table>

Electrical input signal

- Retractive push-to-make switch
- To avoid reaction on mains spikes
- Switch On/Off
- Dim Up/Down
- Set light to mid value

Connecting wiring is greatly simplified through use of insert contacts.

<table>
<thead>
<tr>
<th>Wire cross-section</th>
<th>Connecting wiring is greatly simplified through use of insert contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains connector</td>
<td>0.5mm – 1.5mm</td>
</tr>
<tr>
<td>Control connector</td>
<td>0.5mm – 1.5mm</td>
</tr>
<tr>
<td>Lamp(s) connector</td>
<td>0.5mm – 1.5mm</td>
</tr>
<tr>
<td>Strip length</td>
<td>75 – 85 mm</td>
</tr>
</tbody>
</table>

Wiring diagram: 1 Phase installation

- 3-lamp

2-lamp

3 Phase installation

- 3-lamp

2-lamp
Notes:
1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations, therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on at the same moment, i.e., by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. lp-lg between lamp wires and ground
   Typical capacitance 1 m wires close together (spacing 0.5 mm) 46pF
   Typical capacitance 0.5 m wires close together (spacing 0.5 mm) 23pF
7. lp-lp between lamp wires
   Typical capacitance 1 m wires close together (spacing 0.5 mm) 72pF
   Typical capacitance 0.5 m wires close together (spacing 0.5 mm) 38pF

Ordering and packing data

<table>
<thead>
<tr>
<th>Model</th>
<th>EAN code</th>
<th>Weight</th>
<th>Qty.</th>
<th>Dimensions</th>
<th>Volume</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-RT 118 PL-T/C</td>
<td>8711500 930972</td>
<td>0.2</td>
<td>12</td>
<td>220x21.4x11.8</td>
<td>0.006</td>
<td>3.0</td>
</tr>
<tr>
<td>HF-RT 218 PL-T/C</td>
<td>8711500 930996</td>
<td>0.2</td>
<td>12</td>
<td>220x21.4x11.8</td>
<td>0.006</td>
<td>3.0</td>
</tr>
<tr>
<td>HF-RT 126 PL-T/C</td>
<td>8711500 931016</td>
<td>0.2</td>
<td>12</td>
<td>220x21.4x11.8</td>
<td>0.006</td>
<td>3.0</td>
</tr>
<tr>
<td>HF-RT 226 PL-T/C</td>
<td>8711500 931030</td>
<td>0.2</td>
<td>12</td>
<td>220x21.4x11.8</td>
<td>0.006</td>
<td>3.0</td>
</tr>
<tr>
<td>HF-RT 155 PL-L</td>
<td>8711500 929464</td>
<td>0.3</td>
<td>12</td>
<td>39.6x19.8x7.0</td>
<td>0.005</td>
<td>3.9</td>
</tr>
<tr>
<td>HF-RT 255 PL-L</td>
<td>8711500 929563</td>
<td>0.4</td>
<td>12</td>
<td>48.0x19.8x7.0</td>
<td>0.007</td>
<td>5.3</td>
</tr>
</tbody>
</table>
HF-Performer PL-L

Reduced description
Slim, lightweight high-frequency electronic ballast for PL-L fluorescent lamps based on EEII technology.

Features and benefits
• Programmed start - warm start circuit preheating the lamp electrodes; this enables the lamps to be switched on and off without reducing useful life.
• 50% longer lamp life than with conventional ballasts.
• Up to 25% reduction in energy consumption at constant luminous flux compared with conventional gear.
• Smart power: constant light independent of mains voltage fluctuations.
• Unit is protected against excessive mains voltages and incorrect connections.
• Automatic stop circuit is activated within five seconds in case of lamp failure (safety stop); once the lamp has been replaced, the ballast resets automatically.
• Equipped with connectors suitable for automatic wiring machines.

Applications
Typical areas of application include:
• Department stores, shops, supermarkets.
• Suitable for use with infrared remote control systems.
• Airports, railway stations.
• Outdoor lighting.
• Office buildings, for example, insurance companies, banks, government ministries.
• Hotels.
• Industrial premises.
• Emergency installations with VDE 0108 with re-ignition < 0.5 s.

Philips quality
This assures optimum quality regarding:
• System supplier
As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
• European standards
Philips HF electronic ballast complies with all relevant international rules and regulations.

Compliance and approvals

<table>
<thead>
<tr>
<th>complied with</th>
<th>EN 55015</th>
<th>EN 55022 B</th>
<th>EN 61547</th>
<th>EN 61347-2-3</th>
<th>EN 65029</th>
<th>IEC 61547-2-6</th>
<th>IEC 61547-2-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFI &lt; 30 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>RFI &gt; 30 MHz</td>
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<td>Harmonics</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mains voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cables capacity</td>
<td>Max. 200 gFM between lamp wires, max. 200 gFM between lamp wires and earth</td>
<td>EMI precautions have to be taken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal light output is obtained at the DC voltage of</td>
<td>220 – 240 V</td>
<td>220 – 240 V</td>
<td>220 – 240 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technical specification

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Max. DC voltage during emergency back-up</th>
<th>Nominal light output is obtained at</th>
<th>220 – 240 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-L 36 W</td>
<td>198 – 254 V</td>
<td>2900 lm</td>
<td></td>
</tr>
<tr>
<td>PL-L 40 W</td>
<td>198 – 254 V</td>
<td>3500 lm</td>
<td></td>
</tr>
<tr>
<td>PL-L 55 W</td>
<td>198 – 254 V</td>
<td>4800 lm</td>
<td></td>
</tr>
</tbody>
</table>

Power factor
> 0.96

Insulation resistance test: 500 V DC from both mains inputs to Earth (not between Line and Neutral)

Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.
3. Earth leakage current < 0.5 mA per ballast.
4. Constant light operation: In case of mains voltage fluctuations within 202 – 254 V, the luminous flux changes by a maximum of ± 2%.
5. Overvoltage protection: 48 hrs at 320 V AC, 2 hrs at 350 V AC.
6. Dual fixture; master-slave operation: Possible, in general a maximum of 3m of lamp wires between ballast and lamp is allowed.

Compliance with EEC directive 89/336/EEC for EU countries.

<table>
<thead>
<tr>
<th>Input current at 25°C</th>
<th>Lamp</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFP-136 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-138 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-140 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-155 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-157.5 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-230 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-240 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HFP-255 PL-L 100</td>
<td>0.06</td>
<td></td>
</tr>
</tbody>
</table>

Technical date for installation

Mains operation
Rated mains voltage
| 220 – 240 V |
With tolerances for performance: +4% / -10%
| 220 – 254 V |
Mains frequency
| 50/60 Hz |
Operation frequency (typical)
| > 42 kHz (45 kHz) |
Power factor
| > 0.96 |

DC voltage operation during emergency back-up
Required battery voltage for guaranteed ignition
| 198 – 254 V |
Required battery voltage for burning lamps
| 176 – 254 V |
Nominal light output is obtained at the DC voltage of
| 220 – 240 V |

Lamp Q ty. of B allast S ystem L amp B allast N OMINAL EEI

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Power</th>
<th>Power Losses</th>
<th>W W W L umen</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-L 36 W</td>
<td>37</td>
<td>32.6</td>
<td>19</td>
</tr>
<tr>
<td>PL-L 40 W</td>
<td>44</td>
<td>40.3</td>
<td>21</td>
</tr>
<tr>
<td>PL-L 55 W</td>
<td>58</td>
<td>53.0</td>
<td>46</td>
</tr>
</tbody>
</table>

Photometric data

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Mains voltage</th>
<th>Ballast L amp Input current</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-L 36 W</td>
<td>220 – 240 V</td>
<td>0.16 A</td>
</tr>
<tr>
<td>PL-L 40 W</td>
<td>220 – 240 V</td>
<td>0.36 A</td>
</tr>
<tr>
<td>PL-L 55 W</td>
<td>220 – 240 V</td>
<td>0.45 A</td>
</tr>
</tbody>
</table>

Electronics

HF-Performer PL-L

6.65

Electronics

HF-Performer PL-L

6.64

Fluorescent and compact fluorescent lamps control gear

6.64

Lamps and Gear

Fluorescent and compact fluorescent lamps control gear

6.65
Electronics

HF-Performer PL-L

6.66 Fluorescent and compact fluorescent lamps control gear

Lamps and Gear

Fluorescent and compact fluorescent lamps control gear

Electronics

HF-Performer PL-L

6.67

Electronics

HF-Performer PL-L

Inrush current

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. quantity of Inrush current</th>
<th>Typical mains Breaker impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Value at</td>
<td>Type B 16 A</td>
</tr>
<tr>
<td></td>
<td>time</td>
<td>Type B 16 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>HFP- 136 PL-L</td>
<td>0.22</td>
<td>12</td>
</tr>
<tr>
<td>HFP- 236 PL-L</td>
<td>0.25</td>
<td>12</td>
</tr>
<tr>
<td>HFP- 140 PL-L</td>
<td>0.22</td>
<td>12</td>
</tr>
<tr>
<td>HFP- 240 PL-L</td>
<td>0.25</td>
<td>12</td>
</tr>
<tr>
<td>HFP- 155 PL-L</td>
<td>0.22</td>
<td>12</td>
</tr>
<tr>
<td>HFP- 255 PL-L</td>
<td>0.25</td>
<td>12</td>
</tr>
</tbody>
</table>

Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker

<table>
<thead>
<tr>
<th>MCB type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 16 A</td>
<td>100% (see table above)</td>
</tr>
<tr>
<td>B 10 A</td>
<td>63%</td>
</tr>
<tr>
<td>C 10 A</td>
<td>104%</td>
</tr>
<tr>
<td>L, I 16 A</td>
<td>108%</td>
</tr>
<tr>
<td>L, I 10 A</td>
<td>127%</td>
</tr>
<tr>
<td>G, U, II</td>
<td>212%</td>
</tr>
<tr>
<td>G, U, II</td>
<td>127%</td>
</tr>
<tr>
<td>K, III</td>
<td>254%</td>
</tr>
<tr>
<td>K, III</td>
<td>154%</td>
</tr>
</tbody>
</table>

Technical data for design and mounting HF ballasts in fixtures

Temperature range to ignite lamp -25°C to +50°C with ignition aid

Max. Tcase = 75°C

Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The HF-Performer II ballast for PL-L applications has a specified lifetime of 50,000 hrs, with a maximum of 10% failures guaranteed, at a measured Tcase of 75°C.

Hum and noise level

Inaudible

Permitted humidity is tested according to EN61347-1 par. 11.

Note that no moisture or condensation may enter the ballast.

The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

Connector types

Wago universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.

Wiring diagram

Lamps and Gear

Fluorescent and compact fluorescent lamps control gear

6.67 Fluorescent and compact fluorescent lamps control gear

Electronics
HF-Performer II TL-D

Product description
Slim, lightweight high-frequency electronic ballast for TL-D fluorescent lamps, based on EII technology.

Features and benefits
• Programmed start warm start circuit preheating the lamp electrodes; this enables the lamps to be switched on and off without reducing useful life
• 50% longer lamp life than with conventional ballasts
• Up to 25% reduction in energy consumption at constant luminous flux compared with conventional gear
• Smart power constant light independent of mains voltage fluctuations
• Unit is protected against excessive mains voltages and incorrect connections
• Automatic stop circuit is activated within five seconds in case of lamp failure (safety stop); once the lamp has been replaced, the ballast resets automatically
• Equipped with connectors suitable for automatic wiring machines.

Applications
Typical areas of application include:
• Department stores, shops, supermarkets
• Airports, railway stations
• Office buildings, for example, insurance companies, banks, government ministries
• Hospitals
• Hotels
• Industrial premises
• Emergency installations with VDE 0108 with re-ignition < 0.5 s.

Technical data

<table>
<thead>
<tr>
<th>Product ID</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>C1</th>
<th>D1</th>
<th>EII</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFP 118 TL-D 0</td>
<td>1</td>
<td>0.09</td>
<td>118/136/158/170</td>
<td>280</td>
<td>280</td>
<td>265</td>
</tr>
<tr>
<td>HFP 218 TL-D 0</td>
<td>2</td>
<td>0.31</td>
<td>218/236/258/270</td>
<td>280</td>
<td>280</td>
<td>265</td>
</tr>
<tr>
<td>HFP 318 TL-D 0</td>
<td>3</td>
<td>0.31</td>
<td>318/340/363/385</td>
<td>280</td>
<td>280</td>
<td>265</td>
</tr>
</tbody>
</table>

Technical data for installation

| Mains operation |
| Rated mains voltage | 220 – 240V |
| With tolerances for performance | +6%/-8% 202 – 254V |
| With tolerances for safety | +/- 10% 198 – 264V |
| Mains frequency | 50/60Hz |
| Operation frequency (typical) | > 45 kHz |

Compliance and approvals
- RFI < 30 MHz EN 55015
- RFI > 30 MHz EN 55022 A
- Harmonics EN 61000-3-2
- Immunity EN 61312-3
- Safety EN 61312-3
- Performance EN 60969
- Vibration & shock tests IEC 68-2-6 P
- Quality standard ISO 9000-2000
- Environmental standard ISO 14001
- Approval marks BSEN 50521/1
- CE marking
- Temperature declared thermally protected EIC-63473-1

Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast

Earth leakage current < 0.5 mA per ballast
Ignition time < 0.5 s
Constant light operation In case of mains voltage fluctuations within 202 – 254 V, the luminous flux changes by a maximum of ± 2%
Overvoltage protection 48 hrs at 320 V AC 2 hrs at 350 V AC
Dual fixture; master-slave operation Possible, in general a maximum of 3m of lamp wires between ballast and lamp is allowed
Cable capacity Max. 200 pF between lamp wires, max. 200 pF between lamp wires and earth

Automatic restart after lamp replacement or voltage dip
Yes, tested with a dip down to 30% with a duration of 10 mains cycles
Insulation resistance test: 500 V DC from both mains inputs to Earth (not between Line and Neutral)

Note: Ensure that the neutral is reconnected again after abovementioned test is carried out and before the installation is put into operation.
Electronics

HF-Performer II TL-D

Inrush current

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Start inrush</th>
<th>Max. quantity of inrush current</th>
<th>Value time at mains impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 118 TL-D EP</td>
<td>0.16 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
<tr>
<td>HF-P 126 TL-D EP</td>
<td>0.22 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
<tr>
<td>HF-P 218 TL-D EP</td>
<td>0.22 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
<tr>
<td>HF-P 236 TL-D EP</td>
<td>0.22 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
<tr>
<td>HF-P 316 TL-D EP</td>
<td>0.22 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
<tr>
<td>HF-P 336 TL-D EP</td>
<td>0.22 A</td>
<td>280 ms</td>
<td>12 A / 250 µs</td>
</tr>
</tbody>
</table>

Wiring diagrams

- 1 lamp
- 3 lamps
- 4 lamps

Technical data for design and mounting of ballasts in fixtures

- Temperatures
  - Temperature range to ignite lamp: -25°C to +50°C
  - Max. Tcase = 75°C
  - Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The HF-Performer II ballast for TL-D applications has a specified lifetime of 50,000 hrs with a maximum of 10% failures guaranteed, at a measured Tcase of 75°C.

- Hum and noise level: inaudible

- Permitted humidity is tested according to EN61347-1 par. 11. Note that no moisture or condensation may enter the ballast.

- The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

- Connector types:
  - Wago universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.

- Wire lengths:
  - For 1L circuits keep wires to terminals 3 and 4 short
  - For 2L circuits keep wires to terminals 1, 2, 6 and 7 short
  - For 3 & 4L circuits keep wires to terminals 1, 2, 9 and 10 short

- Wire cross-section:
  - Lower connector
    - On the mains side: 0.5 - 1.0 mm²
    - On the lamp side: 0.5 - 1.0 mm²
  - Upper connector
    - On the mains side: 0.5 mm² solid wire; 0.75 mm² stranded wire
    - On the lamp side: 0.5 mm² solid wire; 0.75 mm² stranded wire

- Strip length: 8 - 9 mm

Notes

1. Data is based on a main supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on at the same moment, i.e., by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts with which can be connected to one residual Current Detector of 30 mA is 30.

Ordering and packing data

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Order code</th>
<th>Gross weight</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 118 TL-D EP</td>
<td>8711500090086</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
<tr>
<td>HF-P 126 TL-D EP</td>
<td>8711500090087</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
<tr>
<td>HF-P 218 TL-D EP</td>
<td>8711500090088</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
<tr>
<td>HF-P 236 TL-D EP</td>
<td>8711500090089</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
<tr>
<td>HF-P 316 TL-D EP</td>
<td>8711500090090</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
<tr>
<td>HF-P 336 TL-D EP</td>
<td>8711500090091</td>
<td>0.22 kg</td>
<td>cm³</td>
</tr>
</tbody>
</table>

Conversion table for max quantities of ballasts on other types of Miniature Circuit Breaker (MCB)

<table>
<thead>
<tr>
<th>MCB type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 16A</td>
<td>100% (see table above)</td>
</tr>
<tr>
<td>B 10A</td>
<td>63%</td>
</tr>
<tr>
<td>C 10A</td>
<td>104%</td>
</tr>
<tr>
<td>L, I 16A</td>
<td>108%</td>
</tr>
<tr>
<td>L, I 10A</td>
<td>65%</td>
</tr>
<tr>
<td>G, U, II 16A</td>
<td>212%</td>
</tr>
<tr>
<td>G, U, II 10A</td>
<td>127%</td>
</tr>
<tr>
<td>K, III 16A</td>
<td>254%</td>
</tr>
<tr>
<td>K, III 10A</td>
<td>154%</td>
</tr>
</tbody>
</table>
**HF-Performer PL-H**

**Product description**
Compact, high power, lightweight, high frequency electronic ballast for PL-H lamps.

**Features and benefits**
- High light output compact fluorescent system
- Programmed start flicker-free warm start
- Constant light independent on mains fluctuations
- One multi-wattage ballast for three lamps (60, 85, 120 W)

**Applications**
Typical areas of application include:
- Shopping centers
- Public buildings
- Industrial environments
- Transport buildings
- Offices, indirect lighting

**Philips quality**
This implies optimum quality regarding:
- System supplier
- As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
- Philips HF electronic ballasts comply with all relevant international rules and regulations.

**Compliances and approvals**
- **RFI**: < 30 MHz EN 55015*
- **Harmonics**: EN 61000-3-2
- **Immunity**: EN 61547
- **Safety**: EN 61347-2-3
- **Performance**: EN 60529-1-1E
- **Vibration & bump tests**: IEC 68-2-6 FC
- **Quality standard**: ISO 9000-2000
- **Environmental standard**: ISO 14001
- **Approval marks**: ENEC-VD-E-MV
- **CE marking**:
- **Temperature declared thermally protected**: IEC 61347-1

* Tested with ballast functional ground connected to earth

**Technical data: (all typical values at Vmains = 230V)**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp Qty of lamps</th>
<th>Power factor</th>
<th>Max. (at fuse / fuse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P PL-H 1</td>
<td>PL-H 60W</td>
<td>0.96</td>
<td>150/150</td>
</tr>
<tr>
<td>HF-P PL-H 1</td>
<td>PL-H 85W</td>
<td>0.98</td>
<td>150/150</td>
</tr>
<tr>
<td>HF-P PL-H 1</td>
<td>PL-H 120W</td>
<td>0.99</td>
<td>150/150</td>
</tr>
</tbody>
</table>

* | | | |

**Technical data for installation**

### Mains operation
- Rated mains voltage: 220 - 240 V with tolerances for safety: ±10% 198 - 240 V with tolerances for performance: ±6% -8% 202 - 254 V
- Mains frequency: 50/60 Hz

### DC voltage operation (during emergency back-up)
- Required battery voltage for guaranteed ignition: 198 - 254 V DC
- Required battery voltage for burning lamps: 176 - 254 V DC
- Nominal light output is obtained at a voltage of: 220 - 240 V DC

### Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

**Smart power**
- **Constant light operation**: in case of mains voltage fluctuations within 202-254 V, the luminous flux changes by a maximum of ±2%

### Earth leakage current
- < 0.5 mA per ballast

### Ignition time
- < 0.5 s

### Overvoltage protection
- 48 hrs at 320 V AC
- 2 hrs at 350 V AC

**Dual fixture master-slave operation**
- no

**Automatic restart after lamp replacement or voltage dip**
- yes tested with a dip down to 30% with a duration of 10 mains cycles

**Insulation resistance test**
- 500 V DC from Line/Neutral to Earth (not between Line and Neutral)
- Note: Ensure that the Neutral is reconnected again after above mentioned test is carried out and before the installation is put into operation.

**Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker**

<table>
<thead>
<tr>
<th>MCB type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16A</td>
</tr>
<tr>
<td>C</td>
<td>10A</td>
</tr>
<tr>
<td>D</td>
<td>16A</td>
</tr>
<tr>
<td>H-C</td>
<td>10A</td>
</tr>
<tr>
<td>H-L</td>
<td>10A</td>
</tr>
<tr>
<td>H-L, C</td>
<td>10A</td>
</tr>
<tr>
<td>H-L, U</td>
<td>10A</td>
</tr>
<tr>
<td>H-U, D</td>
<td>10A</td>
</tr>
<tr>
<td>H-U, L</td>
<td>10A</td>
</tr>
<tr>
<td>H-U, N</td>
<td>10A</td>
</tr>
</tbody>
</table>

**Mains current / Emergency operation**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp Qty of ballasts per Miniature Circuit Breaker type B 16A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P PL-H 1</td>
<td>12</td>
</tr>
</tbody>
</table>

**Mains current / Energy classification / emergency operation**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Max. quantity of ballasts per Miniature Circuit Breaker type B 16A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P PL-H 1</td>
<td>12</td>
</tr>
</tbody>
</table>

**Specifications**

- **Dimensions in mm**

<table>
<thead>
<tr>
<th>Product ID</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-120</td>
<td>116</td>
<td>146</td>
<td>102</td>
<td>90</td>
<td>36</td>
<td>6.5</td>
</tr>
</tbody>
</table>

---

* Tested with lamp wires and ground
  "Typical value capacitance 4.7 pF/m (spacing between wires 0.5 mm)"

---

- **Specifications**

- **HF-Performer PL-H**

- **Technical data for installation**

- **Mains operation**

- **DC voltage operation (during emergency back-up)**

- **Notes**

- **Smart power**

- **Earth leakage current**

- **Ignition time**

- **Overvoltage protection**

- **Dual fixture master-slave operation**

- **Automatic restart after lamp replacement or voltage dip**

- **Insulation resistance test**

- **Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker**

---

* Tested with ballast functional ground connected to earth

---

* Tested with lamp wires and ground
  "Typical value capacitance 50 pF/m (spacing between wires 0.5 mm)"

---

* Tested with lamp wires
  "Typical value capacitance 72 pF/m (spacing between wires 0.5 mm)"

---

* Tested with lamp wires and ground
  "Typical value capacitance 72 pF/m (spacing between wires 0.5 mm)"

---

* Tested with lamp wires
  "Typical value capacitance 50 pF/m (spacing between wires 0.5 mm)"
Electronics

HF-Performer PL-H

Wiring diagrams

**Electrical data for design and mounting of Ballasts in figures:**

- Temperature range to ignite: -25°C - allowed maximum ballast lamp without ignition aid temperature
- Max. T_{case} = 75°C

Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime.

The HF-Performer ballast for PL-H applications has a specified lifetime of 50,000 hrs, with a maximum of 10% failures guaranteed, at a measured T_{case} of 75°C. This to enable acceptable lifetimes when the 120W lamp is used in all kinds of fixtures. For more information on this please consult the PL-H OEM guide.

Class II luminaires: EMI precautions have to be taken

Outdoor: ballast IP=23. In outdoor the luminaire has to be sufficiently IP rated

Permitted humidity is tested according to EN 60529 par. 12. Note that no moisture or condensation may enter the ballast.

The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

**Wire cross-section:**
- On the mains side: 0.5 - 1.5 mm²
- On the lamp side: 0.5 - 1.5 mm²
- Strip length: 7.5 - 8.5 mm

**Ordering and packing data**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Qty</th>
<th>Dimensions</th>
<th>Masse</th>
<th>EAN code</th>
<th>EO Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 1 60-120 PL-H</td>
<td>10</td>
<td>52.5 x 17.3 x 9.6</td>
<td>0.009</td>
<td>8711500182757</td>
<td>928757 31</td>
</tr>
</tbody>
</table>

1. Data is based on a mains supply with an impedance of 400 mOhm (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mOhm the number of ballasts can be increased by 10%.

2. Measurements will be verified in real installations therefore data are subject to change.

3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.

4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.

5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.

6. The maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA is 30.
**HF-Performer PL-L**

**Product description**
- Compact, lightweight, High Frequency electronic ballasts for PL-L compact fluorescent 18 W and 24 W lamps

**Features and benefits**
- Programmable start: flicker-free, warm-start circuit
- 50% longer lamp life than with conventional ballasts
- Up to 25% energy saving at constant luminous flux compared with conventional ballasts
- Constant light independent of mains voltage fluctuations
- Protected against excessive mains voltages
- Automatic stop circuit (safety stop) is activated within 5 seconds in case of lamp failure; ballast resets automatically after lamp replacement

**Applications**
- Ideal for applications with high switching frequency for example: Use with infrared remote control systems (e.g. movement detection)
- Department stores, shops, supermarkets, hotels, hospitals, office buildings, industrial premises
- Airports, railway stations
- Outdoor lighting in general suitable for Class I applications
- Suitable for installations with emergency back-up according to VDE 0108-100 / EN 60598-2-22 with re-ignition <0.5s

**Preferred selection**

**Product ID**

<table>
<thead>
<tr>
<th>Cable Cap</th>
<th>Cable Classification</th>
<th>Outputwires</th>
<th>Earth leakage [mA]</th>
<th>Mutual [pF]</th>
<th>Voltage running lamps [V]</th>
<th>Number of Lamps [x]</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-Performer 2 18-24 PL-L 220-240V 50/60Hz</td>
<td>A1 A2 B1 B2 C1 D1</td>
<td>1 lamp</td>
<td>123.0 93.5 67 57.5 30 4.5</td>
<td>12</td>
<td>198-254 Y</td>
<td>123.0 Y</td>
</tr>
<tr>
<td>HF-Performer 2 18-24 PL-L 220-240V 50/60Hz</td>
<td>A1 A2 B1 B2 C1 D1</td>
<td>2 lamps</td>
<td>123.0 111 79 67 33 4.5</td>
<td>2</td>
<td>198-254 Y</td>
<td>123.0 Y</td>
</tr>
</tbody>
</table>

**Dimensions in mm**

<table>
<thead>
<tr>
<th>Product</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 lamp</td>
<td>30</td>
<td>30</td>
<td>67</td>
<td>57.5</td>
<td>30</td>
<td>4.5</td>
</tr>
<tr>
<td>2 lamps</td>
<td>23</td>
<td>111</td>
<td>79</td>
<td>67</td>
<td>33</td>
<td>4.5</td>
</tr>
</tbody>
</table>
### Product description
Compact, lightweight, high-frequency electronic standard ballasts for TL5 Circular lamps.

### Features and benefits
- Programmed start: flicker-free warm start, ideal for areas with high switching frequency
- Up to 50% longer lamp life than with conventional ballasts
- Up to 25% reduction in energy consumption at constant luminous flux compared with conventional gear
- Smart power: constant light independent of mains voltage fluctuations.

### Applications
Typical areas of application include:
- Office buildings, e.g. executive and managers offices and conference/meeting rooms
- Shops and retail premises, e.g. fashion boutiques and local shops
- Hospitality, including hotels, motels and restaurants
- Public buildings, e.g. banks, galleries and museums.

### Philips quality
This implies optimum quality regarding:
- System supplier
  - As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
- International standards.
  - Philips HF electronic ballasts comply with all relevant international rules and regulations.

### Compliances and approvals
- **RR < 30MHz:** EN 55015
- **Harmonics:** EN 61000-3-2
- **Immunity:** EN 61347
- **Safety:** EN 61347-2-3
- **Performance:** EN 60921-1
- **Vibration & Impact tests:** IEC 68-2-4, 68-2-6
- **Quality standard:** ISO 9000-2000
- **Environmental standard:** ISO 14001
- **Approval marks:** EN/IC/VD/EM/8
- **CE marking:**
  - Temperature declared thermally protected: IEC 61347-1

*Tested with ballast, functional ground connected to earth

### Technical data for installation

#### Mains operation
| Rated mains voltage: | 220 - 240 V with tolerances for safety: +6% -8% |
| Mains frequency: | 50/60 Hz |

#### DC voltage operation (during emergency back-up)
| Required battery voltage for guaranteed ignition: | 108 - 254V DC |
| Required battery voltage for burning lamps: | 176 - 254V DC |
| Nominal light output is obtained at a voltage of: | 220 - 240V DC |

#### Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

### Technical data for installation

#### Smart power: constant light operation
- In case of mains voltage fluctuations within 202-254 V, the luminous flux changes by a maximum of ± 2%
- Earth leakage current: < 0.5 mA per ballast
- Ignition time: < 1.2 s
- Overvoltage protection: 48 hrs at 320 V AC
- 2 hrs at 350 V AC

#### Automatic restart after lamp replacement or voltage dip
- Tested with a dip down to 30% with a duration of 10 mains cycles.
- 500V DC from Line/Neutral to Earth (not between Line and Neutral)

#### Insulation resistance test
- Tested with a 500V DC (Line/Line + Neutral) to Earth (not between Line and Neutral)

#### Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker

<table>
<thead>
<tr>
<th>HBC Type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16 A</td>
</tr>
<tr>
<td>C</td>
<td>10 A</td>
</tr>
<tr>
<td>L</td>
<td>16 A</td>
</tr>
<tr>
<td>IU, IIX</td>
<td>16 A</td>
</tr>
<tr>
<td>IU, IIX</td>
<td>10 A</td>
</tr>
<tr>
<td>P</td>
<td>16 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ballast Type</th>
<th>Breaker Type</th>
<th>0.5%</th>
<th>20%</th>
<th>50%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>16 A</td>
<td>10 A</td>
<td>6.3A</td>
<td>3.4 A</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>10 A</td>
<td>6.3A</td>
<td>3.4 A</td>
<td>2.6 A</td>
</tr>
<tr>
<td>C</td>
<td>L</td>
<td>16 A</td>
<td>10 A</td>
<td>6.3 A</td>
<td>3.4 A</td>
</tr>
<tr>
<td>L</td>
<td>IU, IIX</td>
<td>16 A</td>
<td>10 A</td>
<td>6.3 A</td>
<td>3.4 A</td>
</tr>
<tr>
<td>IU, IIX</td>
<td>IU, IIX</td>
<td>10 A</td>
<td>6.3 A</td>
<td>3.4 A</td>
<td>2.6 A</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td>16 A</td>
<td>10 A</td>
<td>6.3 A</td>
<td>3.4 A</td>
</tr>
</tbody>
</table>

### Conversion table for max. quantities of ballasts

<table>
<thead>
<tr>
<th>HBC Type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16 A</td>
</tr>
<tr>
<td>C</td>
<td>10 A</td>
</tr>
<tr>
<td>L</td>
<td>16 A</td>
</tr>
<tr>
<td>IU, IIX</td>
<td>16 A</td>
</tr>
<tr>
<td>IU, IIX</td>
<td>10 A</td>
</tr>
<tr>
<td>P</td>
<td>16 A</td>
</tr>
</tbody>
</table>

---

**Dimensions in mm**

![Dimensions](dimensions.png)

---
**Electronics**

**HF-Performer TL5 Circular**

- **Technical data for design and mounting HF ballasts in fixtures**
  - Temperature range to ignite: -15°C to 150°C.
  - Max. tcase = 75°C (except HF-P 2 22+40 TL5C).

- **Ignition aid**
  - For optimum ignition TL5 lamps should be mounted at a maximum distance of 6 mm from a metal plate. The metal plate should be electrically connected to the ballast's functional ground.

- **Max. tcase**
  - 75°C (except HF-P 2 22+40 TL5C).

- **Lifetime**
  - The lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject, consult the Philips Application guide to fluorescent lamp control gear.

- **Class II luminaires**
  - EMI precautions have to be taken.

- **Outdoor use**
  - Ballast IP 20. In outdoor applications, the luminaire has to be suitably IP rated. Permitted humidity is tested according to EN 60529 par. 12. Note that no moisture or condensation may enter the ballast.

- **We crosssection**
  - On the mains side: 0.5 - 1.5 mm²
  - On the lamp side: 0.5 - 1.5 mm²
  - Strip length: 9 mm.

**Ordering and packing data**

- **Notes**
  1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2,5 mm and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ, the number of ballasts can be increased by 10%.
  2. Measurements will be verified in real installations; therefore data are subject to change.
  3. In some cases, the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
  4. Note that the maximum number of ballasts is given when these are all switched on at the same moment, i.e., by a wall switch.
  5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs, it is advisable to reduce the number of ballasts by 20%.
  6. The maximum number of ballasts with which a Residual Current Detector of 30 mA is 30.

---

6.80 Fluorescent and compact fluorescent lamps control gear  Lamps and Gear  Lamps and Gear  Fluorescent and compact fluorescent lamps control gear  6.81
Electronics

HF-Performer PL-T/C/Q

Product description
Compact, lightweight, high-frequency electronic ballasts for PL-T, PL-C and PL-Q compact fluorescent lamps

Features and benefits
- Programmed start: flicker-free warm start, ideal for areas with high switching frequency
- up to 50% longer lamp life than with conventional ballasts
- Up to 25% reduction in energy consumption at constant luminous flux compared with conventional gear
- Smart power constant light independent of mains voltage fluctuations

Applications
Typical areas of application include:
- Department stores, shops, supermarkets
- Installations with infrared remote control systems
- Airports, railway stations
- Office buildings of, for example, insurance companies, banks, government ministries
- Hotels

Philips quality
This implies optimum quality regarding:
- System supplier
As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
Philips HF electronic ballasts comply with all relevant international rules and regulations.

Compliances and approvals
- EMI < 30 MHz
- Harmonics
- Immunity
- Safety
- Performance
- Vibration & bump tests
- Quality standard
- Environmental standard
- Approval marks
- CE marking
- Temperature declared thermally protected
- Tested with ballast functional ground connected to earth

Dimensions in mm

Technical data: (all typical values at Vmains = 230V)

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qty. of lamps</th>
<th>System power W</th>
<th>Lamp Power W</th>
<th>Ballast to line (lm) W</th>
<th>NORM/AL Lumen L</th>
<th>EEI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-T 13 W</td>
<td>1</td>
<td>HFP 113 PL-T/C</td>
<td>1.4</td>
<td>12.0</td>
<td>210</td>
<td>900</td>
</tr>
<tr>
<td>PL-T 13 W</td>
<td>2</td>
<td>HFP 213 PL-T/C</td>
<td>2.8</td>
<td>12.0</td>
<td>420</td>
<td>900</td>
</tr>
<tr>
<td>PL-T 18 W</td>
<td>1</td>
<td>HFP 118 PL-T/C</td>
<td>1.8</td>
<td>16.5</td>
<td>150</td>
<td>1200</td>
</tr>
<tr>
<td>PL-T 18 W</td>
<td>2</td>
<td>HFP 218 PL-T/C</td>
<td>3.8</td>
<td>16.5</td>
<td>300</td>
<td>1200</td>
</tr>
<tr>
<td>PL-T 26 W</td>
<td>1</td>
<td>HFP 126 PL-T/C</td>
<td>5.5</td>
<td>25.5</td>
<td>300</td>
<td>1800</td>
</tr>
<tr>
<td>PL-T 26 W</td>
<td>2</td>
<td>HFP 226 PL-T/C</td>
<td>11.0</td>
<td>52.0</td>
<td>600</td>
<td>3600</td>
</tr>
<tr>
<td>PL-T 32 W</td>
<td>1</td>
<td>HFP 132 PL-T/C</td>
<td>3.5</td>
<td>32.0</td>
<td>300</td>
<td>2400</td>
</tr>
<tr>
<td>PL-T 32 W</td>
<td>2</td>
<td>HFP 232 PL-T/C</td>
<td>7.0</td>
<td>32.0</td>
<td>600</td>
<td>2400</td>
</tr>
<tr>
<td>PL-T 34 W</td>
<td>1</td>
<td>HFP 134 PL-T/C</td>
<td>4.6</td>
<td>43.0</td>
<td>300</td>
<td>2200</td>
</tr>
<tr>
<td>PL-T 42 W</td>
<td>1</td>
<td>HFP 142 PL-T/C</td>
<td>5.2</td>
<td>43.0</td>
<td>300</td>
<td>2200</td>
</tr>
<tr>
<td>PL-T 42 W</td>
<td>2</td>
<td>HFP 242 PL-T/C</td>
<td>10.4</td>
<td>86.0</td>
<td>600</td>
<td>4300</td>
</tr>
<tr>
<td>PL-T 57 W</td>
<td>1</td>
<td>HFP 157 PL-T</td>
<td>6.2</td>
<td>57.0</td>
<td>50</td>
<td>4300</td>
</tr>
<tr>
<td>PL-T 57 W</td>
<td>2</td>
<td>HFP 257 PL-T</td>
<td>12.5</td>
<td>57.0</td>
<td>100</td>
<td>4300</td>
</tr>
<tr>
<td>PL-C 10 W</td>
<td>1</td>
<td>HFP 113 PL-T/C</td>
<td>1.2</td>
<td>9.5</td>
<td>20</td>
<td>400</td>
</tr>
<tr>
<td>PL-C 10 W</td>
<td>2</td>
<td>HFP 213 PL-T/C</td>
<td>2.3</td>
<td>9.5</td>
<td>40</td>
<td>400</td>
</tr>
<tr>
<td>PL-C 13 W</td>
<td>1</td>
<td>HFP 113 PL-T/C</td>
<td>1.4</td>
<td>12.0</td>
<td>210</td>
<td>900</td>
</tr>
<tr>
<td>PL-C 13 W</td>
<td>2</td>
<td>HFP 213 PL-T/C</td>
<td>2.8</td>
<td>12.0</td>
<td>420</td>
<td>900</td>
</tr>
<tr>
<td>PL-C 18 W</td>
<td>1</td>
<td>HFP 118 PL-T/C</td>
<td>1.8</td>
<td>16.5</td>
<td>150</td>
<td>1200</td>
</tr>
<tr>
<td>PL-C 18 W</td>
<td>2</td>
<td>HFP 218 PL-T/C</td>
<td>3.6</td>
<td>16.5</td>
<td>300</td>
<td>1200</td>
</tr>
<tr>
<td>PL-C 26 W</td>
<td>1</td>
<td>HFP 126 PL-T/C</td>
<td>5.5</td>
<td>25.5</td>
<td>300</td>
<td>1800</td>
</tr>
<tr>
<td>PL-C 26 W</td>
<td>2</td>
<td>HFP 226 PL-T/C</td>
<td>11.0</td>
<td>52.0</td>
<td>600</td>
<td>3600</td>
</tr>
<tr>
<td>PL-C 38 W</td>
<td>1</td>
<td>HFP 138 PL-Q</td>
<td>3.8</td>
<td>35.0</td>
<td>30</td>
<td>2000</td>
</tr>
<tr>
<td>PL-C 38 W</td>
<td>2</td>
<td>HFP 238 PL-Q</td>
<td>7.6</td>
<td>35.0</td>
<td>30</td>
<td>2000</td>
</tr>
</tbody>
</table>

Technical data: (all typical values at Vmains = 230V)

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Lamp</th>
<th>Qty. of lamps</th>
<th>Power factor</th>
<th>Max. cable capacitance (pf)</th>
<th>Tc max °C</th>
<th>Opers Freq kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFP 113 PL-T/C</td>
<td>PL-T 13 W</td>
<td>0.96</td>
<td>120/65</td>
<td>75</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>HFP 126 PL-T/C</td>
<td>PL-T 26 W</td>
<td>0.95</td>
<td>120/120</td>
<td>75</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>HFP 157 PL-T</td>
<td>PL-T 57 W</td>
<td>0.98</td>
<td>120/65</td>
<td>75</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>HFP 113 PL-T/C</td>
<td>PL-C 13 W</td>
<td>0.96</td>
<td>120/65</td>
<td>75</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>HFP 126 PL-T/C</td>
<td>PL-C 26 W</td>
<td>0.95</td>
<td>120/120</td>
<td>75</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>HFP 157 PL-T</td>
<td>PL-C 57 W</td>
<td>0.98</td>
<td>120/65</td>
<td>75</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1) lp = between lamp wires
2) Tolerance ± 3 kHz

Dimensions in mm

Product ID A1 A2 A3 A4 B1 B2 B3 C1 C2 C3 C4 C5
1 12.0/13.0 14.2 14.2 12.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1
2 24.0/26.0 14.2 14.2 12.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1

* Typical voltage capacitance 50 pf/m (spacing between wires 0.5 mm)
Electronics

HF-Performer PL-T/C/Q

Design data for installation

Mains operation
- Rated mains voltage: 220 - 240V
- With tolerances for safety: +/- 10%
- With tolerances for performance: +6% - 8%
- Mains frequency: 50/60 Hz

DC voltage operation (during emergency back-up)
- Required battery voltage for guaranteed ignition: See table
- Required battery voltage for burning lamps: See table
- Nominal light output is obtained at a voltage of 220 - 240V DC

Notes:
1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.
3. Smart power: constant light operation in case of mains voltage fluctuations within 202-254 V, the luminous flux changes by a maximum of ±2%
4. Earth leakage current: < 0.5 mA per ballast
5. Ignition time: < 1.2 s (HF-P 118 PL-T/C)

Rated mains voltage:
- 220 - 240 V with tolerances for safety: +/- 10%
- 198 - 264 V with tolerances for performance: +6% - 8%

Mains current at 220 V:

<table>
<thead>
<tr>
<th>Model</th>
<th>Lamp</th>
<th>Input current</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 113 R-T/C</td>
<td>PL-T/C 18W</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>HF-P 113 R-T/C</td>
<td>PL-T/C 13W</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>HF-P 113 R-T/C</td>
<td>PL-T/C 10W</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>PL-T/C 18W</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>PL-T/C 13W</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>PL-T/C 10W</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>PL-T/C 26W</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>PL-T/C 26W</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>PL-T/C 22W</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>PL-T/C 22W</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>PL-T/C 17W</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>PL-T/C 17W</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>PL-T/C 13W</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>PL-T/C 13W</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>HF-P 157 R-T</td>
<td>PL-T 50W</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>HF-P 257 R-T</td>
<td>PL-T 57W</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>HF-P 138 R-Q</td>
<td>PL-Q 13W</td>
<td>0.17</td>
<td></td>
</tr>
</tbody>
</table>

DC voltage operation (during emergency back-up):

<table>
<thead>
<tr>
<th>Model</th>
<th>Ignition</th>
<th>Normal operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 113 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 113 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 157 R-T</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 257 R-T</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
<tr>
<td>HF-P 138 R-Q</td>
<td>176 – 276 V</td>
<td>176 – 276 V</td>
</tr>
</tbody>
</table>

Inrush current:

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. quantity of Inrush current</th>
<th>Typical Breaker mains impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 113 R-T/C</td>
<td>28 A/170 µs</td>
<td>B 16 A</td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>28 A/170 µs</td>
<td>B 10 A</td>
</tr>
<tr>
<td>HF-P 113 R-T/C</td>
<td>28 A/250 µs</td>
<td>C 16 A</td>
</tr>
<tr>
<td>HF-P 213 R-T/C</td>
<td>28 A/250 µs</td>
<td>C 10 A</td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 16 A</td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 13 A</td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 10 A</td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 8 A</td>
</tr>
<tr>
<td>HF-P 126-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 6 A</td>
</tr>
<tr>
<td>HF-P 226-42 R-T/C</td>
<td>28 A/250 µs</td>
<td>L 4 A</td>
</tr>
<tr>
<td>HF-P 157 R-T</td>
<td>28 A/250 µs</td>
<td>G 16 A</td>
</tr>
<tr>
<td>HF-P 257 R-T</td>
<td>28 A/250 µs</td>
<td>G 10 A</td>
</tr>
<tr>
<td>HF-P 138 R-Q</td>
<td>28 A/250 µs</td>
<td>G 6 A</td>
</tr>
<tr>
<td>HF-P 257 R-T</td>
<td>28 A/250 µs</td>
<td>G 4 A</td>
</tr>
</tbody>
</table>

Installation table for max. quantities of ballasts on other types of Miniature Circuit Breaker

<table>
<thead>
<tr>
<th>MCB type</th>
<th>Relative number of ballasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 16 A</td>
<td>100% (see table above)</td>
</tr>
<tr>
<td>B 10 A</td>
<td>63%</td>
</tr>
<tr>
<td>C 16 A</td>
<td>170%</td>
</tr>
<tr>
<td>C 10 A</td>
<td>100%</td>
</tr>
<tr>
<td>L 16 A</td>
<td>100%</td>
</tr>
<tr>
<td>L 13 A</td>
<td>45%</td>
</tr>
<tr>
<td>L 8 A</td>
<td>21%</td>
</tr>
<tr>
<td>G 16 A</td>
<td>127%</td>
</tr>
<tr>
<td>G 10 A</td>
<td>25%</td>
</tr>
<tr>
<td>G 6 A</td>
<td>12%</td>
</tr>
</tbody>
</table>

Wiring diagrams:

1 lamp
2 lamps 13W
2 lamps 18W
2 lamps 26, 32, 42W (multi)
2 lamps 57W
Electronics

HF-Performer PL-T/C/Q

Bibliography for design and mounting Ballasts in fixtures:
Temperature range to ignite -15°C...allowed maximum ballast lamp without ignition aid temperature

Mac.Tcase = see table
Lifetime of a ballast depends on the temperature of the ballast. The mean time between the first point on the ballast and its lifetime. The HF-Performer ballast for PL-T/C applications have a specified lifetime of 50,000 hours, with a maximum of 10% failures guaranteed, at a measured maximum Tcase as given in the table on page 2.

Class II luminaires: EMI precautions have to be taken

Outdoor use: Ballast IP 20. In outdoor applications the luminaire has to be sufficiently IP rated. Permitted humidity is tested according to EN 60529 par 3.2. Note that no moisture or condensation may enter the ballast.

The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

We cross-section:
On the mains side: 0.5 - 1.5 mm²
On the lamp side: 0.5 - 1.5 mm²

Ordering and packing data

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Code</th>
<th>Qty</th>
<th>Dimensions cm</th>
<th>Weight Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-P 113 PL-T/C</td>
<td>8711500 749451</td>
<td>0.15</td>
<td>36</td>
<td>21.5x21.0x21.5</td>
</tr>
<tr>
<td>HF-P 138 PL-T/C</td>
<td>8711500 060174</td>
<td>0.15</td>
<td>36</td>
<td>22.1x21.7x8.8</td>
</tr>
<tr>
<td>HF-P 138 PL-Q</td>
<td>8711500 060174</td>
<td>0.15</td>
<td>36</td>
<td>22.1x21.7x8.8</td>
</tr>
<tr>
<td>HF-P 226-42 PL-T/C</td>
<td>8711500 749468</td>
<td>0.30</td>
<td>36</td>
<td>25.5x24.5x8.2</td>
</tr>
<tr>
<td>HF-P 257 PL-T</td>
<td>8711500 934017</td>
<td>0.23</td>
<td>36</td>
<td>25.5x24.5x8.2</td>
</tr>
</tbody>
</table>

Strip length: 75 - 85 mm

Electronics

HF-Performer PL-T/C/Q

Electronics
HF-Performer (flat) TL5

**Product description**

Flat, slim, multi wattage, lightweight high-frequency electronic ballast for TL5 fluorescent lamps.

**Technical data for installation**

- **Mains operation**
  - Rated mains voltage: 220 - 240 V
  - Rated mains current: 0.08 - 0.15 A
- **Operating frequency**
  - See table
- **DC voltage operation (during emergency back-up)**
  - Required battery voltage for guaranteed ignition: 108 - 254 V DC
  - Required battery voltage for burning lamps: 176 - 254 V DC
- **Nominal light output is obtained at a voltage of**
  - 220 - 240 V DC

**Notes:**

1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.

**Applications**

- Typical areas of application include:
  - Department stores, shops, supermarkets
  - Airports, railway stations
  - Office buildings, for example, insurance companies, banks, government ministries
  - Hospitals
  - Hotels
  - Suitable for emergency installations with VDE 0108 with re-ignition
  - Suitable for use with infrared remote control systems

**Tips on quality**

This implies optimum quality regarding:

- System supplier
- As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
  - Philips HF electronic ballasts comply with all relevant international rules and regulations.

**Compliances and approvals**

- **EN 55015**
- **EN 61000-3-2**
- **EN 63497**
- **IEC 61347-2-3**
- **IEC 60825-1**
- **IEC 62402-26-2**
- **ISO 9000-2000**
- **ENEC**
- **VDE-EN60900**
- **CE marking**
- **IEC 6347-1**
- **Temperature declared thermally protected**

**Mains current / Emergency operation**

<table>
<thead>
<tr>
<th>Mains current</th>
<th>Emergency operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated lamps</td>
<td>Rated lamps</td>
</tr>
<tr>
<td>Input current</td>
<td>Input current</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Insulation**

<table>
<thead>
<tr>
<th>Mains voltage</th>
<th>Mains voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated lamps</td>
<td>Rated lamps</td>
</tr>
<tr>
<td>Input current</td>
<td>Input current</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Dissipation table for manifolds of ballasts on other types of Mixture Bccul Bearer**

<table>
<thead>
<tr>
<th>Ballast type</th>
<th>Mains voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated lamps</td>
<td>Rated lamps</td>
</tr>
<tr>
<td>Input current</td>
<td>Input current</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Compliance with international standards**

- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**
- **IEC 68-2-29**

**Conversion table for max quantities of ballasts on other types of Mixture Bccul Bearer**

<table>
<thead>
<tr>
<th>Ballast type</th>
<th>Mains voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated lamps</td>
<td>Rated lamps</td>
</tr>
<tr>
<td>Input current</td>
<td>Input current</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Dimensions in mm**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>360</td>
</tr>
<tr>
<td>A2</td>
<td>350</td>
</tr>
<tr>
<td>B1</td>
<td>30</td>
</tr>
<tr>
<td>C1</td>
<td>21</td>
</tr>
<tr>
<td>D1</td>
<td>4.2</td>
</tr>
</tbody>
</table>

*Please refer to the Philips website for updated information.*
### Technical data (all typical values at V mains = 230V)

#### Technical data for design and mounting HF ballasts

- **Wago universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.**
- **Temperatures**: Temperature range to -15 to +50 °C ignite lamp with ignition aid.
- **Lamp Qty. of Ballast System Lamp Ballast Lamp EEI**

#### Lamp Qty. of Ballast System Lamp Ballast Lamp EEI

<table>
<thead>
<tr>
<th>Lamp Qty. of Ballast System Lamp Ballast Lamp EEI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 lamp version: keep wires to terminals 1 and 2 short</td>
</tr>
<tr>
<td>2 lamp version: keep wires to terminals 1, 2, 6 and 7</td>
</tr>
</tbody>
</table>

#### Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.

#### Wire cross-section:
- On the mains side: 0.5 - 1.0 mm²
- On the lamp side: 0.5 - 1.0 mm²

#### Strip length:
- 8 - 9 mm

#### Ordering and packing data

<table>
<thead>
<tr>
<th>Ballast</th>
<th>EAN code</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Piece</td>
<td>Bulk packing</td>
<td></td>
</tr>
</tbody>
</table>

---

*Typical values for 8.30 colors at 25°C lamp ambient temperature.*
**Product description**

Flat, Slim, lightweight high-frequency electronic ballast for TL-5 fluorescent lamps, based on EII technology.

**Technical data**

- **Product**: HF-Performer // (flat) TL5
- **Technical data**: (all typical values at $V_{\text{mains}} = 230V$

**Lamps**

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Power</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL5 HE 14W</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>TL5 HE 14W</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>TL5 HE 14W</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>TL5 HE 21W</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>TL5 HE 21W</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>TL5 HE 21W</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>TL5 HE 28W</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>TL5 HE 28W</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>TL5 HE 28W</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>TL5 HE 35W</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>TL5 HE 35W</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td>TL5 HE 35W</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>TL5 HE 42W</td>
<td>2</td>
<td>41</td>
</tr>
<tr>
<td>TL5 HE 42W</td>
<td>3</td>
<td>41</td>
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<tr>
<td>TL5 HE 42W</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>TL5 HE 54W</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>TL5 HE 54W</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>TL5 HE 54W</td>
<td>4</td>
<td>48</td>
</tr>
<tr>
<td>TL5 HO 24W</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>TL5 HO 24W</td>
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<tr>
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<td>4</td>
<td>21</td>
</tr>
<tr>
<td>TL5 HO 39W</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>TL5 HO 39W</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>TL5 HO 39W</td>
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<td>TL5 HO 49W</td>
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<td>31</td>
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<tr>
<td>TL5 HO 49W</td>
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<tr>
<td>TL5 HO 49W</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>TL5 HO 54W</td>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>TL5 HO 54W</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>TL5 HO 54W</td>
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<tr>
<td>TL5 HO 80W</td>
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<td>TL5 HO 80W</td>
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<td>50</td>
</tr>
<tr>
<td>PL-L 28W</td>
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<td>10</td>
</tr>
<tr>
<td>PL-L 28W</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>PL-L 28W</td>
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</tr>
<tr>
<td>PL-L 36W</td>
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<tr>
<td>PL-L 36W</td>
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<td>PL-L 36W</td>
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<td>12</td>
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<tr>
<td>PL-L 54W</td>
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<td>14</td>
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<td>PL-L 54W</td>
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<td>PL-L 54W</td>
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<td>PL-L 60W</td>
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<td>16</td>
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<tr>
<td>PL-L 60W</td>
<td>2</td>
<td>16</td>
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<tr>
<td>PL-L 60W</td>
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<td>16</td>
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<tr>
<td>PL-L 70W</td>
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<td>18</td>
</tr>
<tr>
<td>PL-L 70W</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>PL-L 70W</td>
<td>3</td>
<td>18</td>
</tr>
</tbody>
</table>

**Applications**

- Department stores, shops, supermarkets
- Industrial premises
- Airports, railway stations
- Outdoor lighting
- Office buildings, for example insurance companies, banks, government ministries
- Hospitals
- Hotels
- Suitable for use with infrared remote control systems
- Suitable for emergency installations with VDE 0108 with re-ignition < 0.5 s

**Technical data for installation**

- **Mains operation**: Rated mains voltage 220-240V, Tolerance for performance $\pm 15\%$.
- **Mains frequency**: 50/60 Hz
- **Earth leakage current**: $< 0.5$ mA per ballast
- **Ignition time**: 0.5 sec.

**Notes**

1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 18V) can influence the lifetime of the ballast.

**Philips quality**

As manufacturer of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.

**Compliance and approvals**

- **RFI < 30 MHz**
- **RFI > 30 MHz**
- **Safety**: EN 61347-2-3
- **EMC**: EN 61347-1
- **Safety**: EN 61347-1
- **Safety**: VDE 0108
- **International standards**
- **International rules and regulations**

**Dimensions in mm**

- **D**: 110
- **A2**: 35
- **A3**: 45

**Note**: for update of information see catalogue on www.lighting.philips.com
Fluorescent and compact fluorescent lamps control gear

HF-Performer // (flat) TL5

Mains current at 230V
2 hrs at 350 V AC

A

HF-P 3/4 TL5 EII TL5 HE 14W 3 0.26
HF-P 2 TL5 HO EII TL5 HO 35W 2 0.33
HF-P 3/4 TL5/PL-L EII TL5 HO 80W 2 0.75
HF-P 280 TL5/PL-L EII PL-L 80W 2 0.75
HF-P 180 TL5/PL-L 80W 1 0.38
HF-P 280 TL5/PL-L EII PL-L 80W 2 0.75

HF-PERFORMER TL5

Wire cross-section:
0.5mm – 0.75mm
(*)

Notes

1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5mm² and another 20m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.

2. Measurements will be verified in real installations; therefore data are subject to change.

3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.

4. Measurements were carried out on single-pole MCCBs. For multi-pole MCCBs it is advisable to reduce the number of ballasts by 20%.

6. The maximum number of ballasts that can be connected to one Individual Current Detector of 30mA is 30.

Wiring diagrams

HF-BALLAST

Ordering and packing data

6.94
6.95

Fluorescent and compact fluorescent lamps control gear
Lamps and Gear

Wiring diagram 2L

HF-BALLAST

Electronics

Circuit type

Typical mains

Inrush current

Ballast type

Maximum quantity

Comparison of lamp ballasts on other types

(*) Stranded wire

Notes

1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5mm² and another 20m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.

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4. Measurements were carried out on single-pole MCCBs. For multi-pole MCCBs it is advisable to reduce the number of ballasts by 20%.

6. The maximum number of ballasts that can be connected to one Individual Current Detector of 30mA is 30.
**HF-MatchboxRED**

**Product description**
Compact, lightweight, high-frequency electronic ballast for TL (8-13W), and compact fluorescent PL (7-18 W) lamps.

**Features and benefits**
The HF-MatchboxRED is a new generation of electronic energy-saving ballasts for systems up to 25 W. As well as saving energy they enhance design freedom for the Original Equipment Manufacturer.

- **Programmed start:** flicker-free, warm-start circuit preheating (0.8 s) at the lamp electrodes, this enables the lamps to be switched frequently without reducing useful life.
- **Up to 50% longer lamp life** then with electromagnetic ballasts.
- **Energy savings** of more than 25% (at equal luminous flux) compared with electromagnetic gear.
- **Multi-lamp ballast:** one type can be used to drive a single lamp of different types and wattages, e.g. a PL-C 10 or 13 W or a PL-S 12 W lamp can be connected to the HF-MatchboxRED 113 PL-S/PL-C ballast.
- **Compact power IC** gives the ballast compact dimensions and low weight compared to electromagnetic ballasts that this design replaces.
- **Rising centre for mounting** remains same as equivalent electromagnetic ballasts.

HF-MatchboxRED ballasts can be supplied either as an encased ballast or open printed circuit board ready for building into a luminaire, doing so ensuring optimum safety and lowest cost.

**Applications**
HF-MatchboxRED ballasts are designed for areas with high switching frequency.

- **Typical areas of application** in indoor and outdoor situations with movement/presence detection.
- **Suitable for installations** with emergency back-up, according to VDE 0108.
- For luminaires with protection class I and II; class I metal luminaires with earth connection require special measures for EMC compliance.

**Specifications**
- **Rf:** 30 MHz
- **Harmonics:** EN 61000-3-2
- **Immunity:**
  - Temperature declared thermally protected

**Electronics**

**HF-MatchboxRED**

- **System supplier:** As manufacturer of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
- **International standards:**
  - Philips electronic ballasts comply with relevant international rules and regulations.
  - **Product ID:** A 1 A 2 B 1 C 1 C 2 D 1 L W H

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Power Factor</th>
<th>Average Power Consumption</th>
<th>Energy Efficiency Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL 8W</td>
<td>0.63</td>
<td>9.1</td>
<td>7.3</td>
</tr>
<tr>
<td>TL 13W</td>
<td>0.60</td>
<td>15.9</td>
<td>11.6</td>
</tr>
<tr>
<td>TL 14W</td>
<td>0.60</td>
<td>16.2</td>
<td>12.9</td>
</tr>
<tr>
<td>PL-S 12W</td>
<td>0.63</td>
<td>9.7</td>
<td>7.1</td>
</tr>
<tr>
<td>PL-S 15W</td>
<td>0.63</td>
<td>12.9</td>
<td>11.1</td>
</tr>
<tr>
<td>PL-C 10W</td>
<td>0.63</td>
<td>10.2</td>
<td>9.9</td>
</tr>
<tr>
<td>PL-C 11W</td>
<td>0.63</td>
<td>14.0</td>
<td>12.3</td>
</tr>
<tr>
<td>PL-C 18W</td>
<td>0.63</td>
<td>17.8</td>
<td>16.2</td>
</tr>
<tr>
<td>PL-T 12W</td>
<td>0.63</td>
<td>13.6</td>
<td>12.5</td>
</tr>
<tr>
<td>PL-T 14W</td>
<td>0.63</td>
<td>19.8</td>
<td>17.2</td>
</tr>
<tr>
<td>TL-D 18W</td>
<td>0.63</td>
<td>23.7</td>
<td>21.1</td>
</tr>
<tr>
<td>PL-L 18W</td>
<td>0.63</td>
<td>16.4</td>
<td>14.7</td>
</tr>
<tr>
<td>PL-L 24W</td>
<td>0.63</td>
<td>22.2</td>
<td>19.3</td>
</tr>
<tr>
<td>TL-C 20W</td>
<td>0.63</td>
<td>26.7</td>
<td>23.8</td>
</tr>
</tbody>
</table>

**Technical data for installation**

- **Mains operation**
  - **Rated mains voltage:** 230-240 V
  - **Tolerance for safety:** ± 10%
  - **Performance tolerance:** ±8%

- **Mains frequency:** 50/60 Hz
- **Operating frequency:** < 30 kHz
- **DC voltage operation during emergency back-up** (external fuse is required):
  - **Required battery voltage for guaranteed ignition and burning:** 194-254 V
- **Lifetimes**
  - At Tc 65°C with 10% failures: 50,000 hrs

- **Overvoltage protection:** not applicable
- **Max. case:** 79°C
- **Lamp end-of-life detection/shut-off:** yes
- **Automatic restart after lamp replacement or voltage dip:** yes
- **Cable capacity to be advised:**
- **Insulation resistance test:** to be advised
- **Insulation resistance test:** not relevant

---

**Fluorescent and compact fluorescent lamps control gear**

Lamps and Gear  | Fluorescent and compact fluorescent lamps control gear | Lamps and Gear
The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

**Color coding**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Terminal color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF-MatchboxRED 109</td>
<td>Orange/black/orange</td>
</tr>
<tr>
<td>HF-MatchboxRED 113</td>
<td>Orange/grey/orange</td>
</tr>
<tr>
<td>HF-MatchboxRED 114</td>
<td>Orange/blue/orange</td>
</tr>
<tr>
<td>HF-MatchboxRED 118</td>
<td>Orange/orange/orange</td>
</tr>
<tr>
<td>HF-MatchboxRED 124</td>
<td>Orange/red/orange</td>
</tr>
</tbody>
</table>

To facilitate physical identification of PCBs, mains connector terminals are color-coded. The central connector terminal is colored according to type.

**Technical data for design and mounting HF ballasts in fixtures**

- **Temperature range to ignite lamp**: -10 to +40°C (ignition aid is not required)
- **Hum and noise level**: Inaudible
- **Max. case = 75°C**
- **Lifetime of a ballast depends on the temperature of the ballast.** This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.

**Wiring diagram**

**Ordering and packing data**

- **Supply options**: HF-MatchboxRED ballasts can be ordered either encased or as printed circuit boards. Encased ballasts are supplied fitted with plastic housings, and are either linear or square in shape. Encased ballasts are delivered in cardboard cartons.

- **Printed circuit boards (PCBs) have the same shape as the housings, and are supplied in multiple boards. Multiple boards will be supplied in cardboard cartons.**

A detailed ‘Instructions for use’ is included in the packing of the printed circuit boards.

**Ballast cross-section**

- **On the mains side**: 0.5 - 1.5 mm²
- **On the lamp side**: 0.5 - 1.5 mm²

**Trip length**: 8 - 9 mm

**Ballast lengths**

- **Distance between mains wires and lamp wires**: > 5 cm
- **Keep wires to terminals 1 and 2 as short as possible (< 30 cm)**
- **Keep wires to terminals 3 and 4 shorter than 150 cm**
Compact, lightweight, high frequency electronic standard ballast for TL5 fluorescent lamps.

**Product description**

- Typical areas of application include:
  - Office buildings
  - Hospitals
  - Retail supermarkets
  - Hotels
  - Industrial premises
  - Airports, railway stations
  - Outdoor lighting
  - In general suitable for class 1 applications
  - Installations with infrared remote control systems

**Technical data for installation**

- Mains operation
  - Rated mains voltage: 220 - 240 V
  - mains frequency: 50/60 Hz
  - Ballast input current:
    - EB-S 114 TL5 220-240: 0.08 A
    - EB-S 214 TL5 220-240: 0.15 A
    - EB-S 314 TL5 220-240: 0.22 A
    - EB-S 414 TL5 220-240: 0.28 A
    - EB-S 121 TL5 220-240: 0.10 A
  - Earth leakage current < 0.5 mA per ballast
  - Ignition time < 2 s
  - Dual failure master-slave possible; in general maximum 2 m length operation of lamp wires between ballast and lamp
  - Cable capacity max. 150 pF between lamp wires
  - Automatic restart after voltage dip: Yes, tested with dip down lamp to 30% with a duration of 10 mains cycles
  - Insulation resistance test: 500 V DC from Line/Neutral to Earth (not between Line and Neutral)

**Technical data for design and mounting ballasts in fixtures**

- Temperature range to ignite lamp with ignition aid: -15º to 50ºC
- Max. t case: 65ºC
- Humidity and noise level: < 30dB at 1m inaudible
- Permitted humidity is tested according to EN61347-2-3 par. 11. Note that no moisture or condensation may enter the ballast.
- Connection wiring is greatly simplified by the use of insert contacts with push buttons.

**Notes**

1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ, the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA is 30.
7. Data is measured with Merlin Jerin C45N/C10.
**Electrical data in relation to energising**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qty</th>
<th>Model</th>
<th>V</th>
<th>Efficacy</th>
<th>Lumen*</th>
<th>Ballast W Wiring diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL5 1W</td>
<td>1</td>
<td>EB-S 14TL5 220-240</td>
<td>175</td>
<td>140</td>
<td>96</td>
<td>1350</td>
</tr>
<tr>
<td>TL5 2W</td>
<td>2</td>
<td>EB-S 14TL5 220-240</td>
<td>335</td>
<td>140</td>
<td>96</td>
<td>1350</td>
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<tr>
<td>TL5 3W</td>
<td>3</td>
<td>EB-S 14TL5 220-240</td>
<td>480</td>
<td>140</td>
<td>96</td>
<td>1350</td>
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<tr>
<td>TL5 4W</td>
<td>4</td>
<td>EB-S 14TL5 220-240</td>
<td>630</td>
<td>140</td>
<td>96</td>
<td>1350</td>
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<tr>
<td>TL5 7W</td>
<td>1</td>
<td>EB-S 14TL5 220-240</td>
<td>235</td>
<td>140</td>
<td>96</td>
<td>1350</td>
</tr>
<tr>
<td>TL5 8W</td>
<td>2</td>
<td>EB-S 14TL5 220-240</td>
<td>460</td>
<td>140</td>
<td>96</td>
<td>1350</td>
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<tr>
<td>TL5 12W</td>
<td>1</td>
<td>EB-S 14TL5 220-240</td>
<td>640</td>
<td>200</td>
<td>104</td>
<td>2850</td>
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<tr>
<td>TL5 16W</td>
<td>2</td>
<td>EB-S 14TL5 220-240</td>
<td>820</td>
<td>200</td>
<td>104</td>
<td>2850</td>
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<tr>
<td>TL5 18W</td>
<td>3</td>
<td>EB-S 14TL5 220-240</td>
<td>940</td>
<td>200</td>
<td>104</td>
<td>3650</td>
</tr>
</tbody>
</table>

* Typical values for /830 and /840 colors

**Ordering and packing data**

<table>
<thead>
<tr>
<th>Model</th>
<th>Qty</th>
<th>Carton packing</th>
<th>Weight Kg</th>
<th>Dimensions mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>10</td>
<td>32 x 16 x 6.5</td>
<td>1.92</td>
<td>105/1050</td>
</tr>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>100</td>
<td>40 x 18 x 6.5</td>
<td>2.92</td>
<td>75/750</td>
</tr>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>100</td>
<td>46 x 18 x 8.0</td>
<td>3.95</td>
<td>60/600</td>
</tr>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>100</td>
<td>40 x 18 x 6.5</td>
<td>4.90</td>
<td>105/1050</td>
</tr>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>100</td>
<td>46 x 18 x 8.0</td>
<td>5.90</td>
<td>75/750</td>
</tr>
<tr>
<td>EB-S 14TL5 220-240</td>
<td>100</td>
<td>40 x 18 x 6.5</td>
<td>6.90</td>
<td>105/1050</td>
</tr>
</tbody>
</table>

**Electronics**

**Fluorescent and compact fluorescent lamps control gear**

1. After finishing system installation, please check carefully before you turn on the power.
2. Check whether lamps, ballast model and wiring are compatible according to Philips EB-Standard TL5 datasheet.
3. Ballasts and fixtures must be well grounded. This requires the ballast to be grounded to the fixture via the input connectors GND pin. The GND pin can be identified by the earthing symbol marked on the ballast label, in no case shall the earthing resistance exceed 0.5 Ohm (according to IEC 60598-1 clause 7.2.3).
Electronics

**Product description**
Compact, lightweight, high-frequency electronic standard ballast for TLD fluorescent lamps.

**Features and benefits**
- Rapid start; flicker-free warm start, ideal for areas with high switching frequencies
- Longer lamp life than with conventional gear
- Up to 20% reduction in energy consumption at equal luminous flux compared with conventional gear.

**Applications**
Typical areas of application include:
- Department stores, shops, supermarkets
- Airports, railway stations
- Office buildings, for example, insurance companies, banks, government ministries
- Hotels
- Industrial premises

**Ratings**
This implies optimum quality regarding:
- System supplier
- As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards

**Compliance and approvals**
- EEC: 89/336/EEC
- ANSI: C72.19-1006
- CB: 0101-E5
- UL: 2091
- EN 60928
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-3-8
- EN 61000-3-11
- EN 61000-4-3
- EN 61000-4-5
- EN 61000-4-11
- EN 61000-4-20
- EN 61000-4-21
- EN 61547
- EN 55015

**Technical data for installation**

<table>
<thead>
<tr>
<th>Mains voltage</th>
<th>Rated mains voltage</th>
<th>Ballast Input current</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 - 240 V</td>
<td>220 - 240 V</td>
<td>0.08 A</td>
</tr>
<tr>
<td>384 - 244 V</td>
<td>216 - 244 V</td>
<td>0.27 A</td>
</tr>
<tr>
<td>500 Hz</td>
<td>50/60 Hz</td>
<td>0.32 A</td>
</tr>
</tbody>
</table>

**Ectrical data for design and mounting ballasts in fixtures**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatures</td>
<td>0º to 50ºC</td>
</tr>
<tr>
<td>HM and noise level</td>
<td>Inaudible</td>
</tr>
<tr>
<td>Permitted humidity</td>
<td>According to EN 60608 par.12</td>
</tr>
</tbody>
</table>

**Notes**
1. Data is based on a mains supply with an impedance of 400 mOhms (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mOhms the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA is 30.
7. Data is measured with merlin jerin C45N/C10.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>Product ID</th>
<th>L</th>
<th>E</th>
<th>W</th>
<th>H</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW 5 TLD/PLL</td>
<td>280</td>
<td>270</td>
<td>36</td>
<td>28</td>
<td>4.2</td>
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<tr>
<td>SW 7 TLD/PLL</td>
<td>280</td>
<td>270</td>
<td>36</td>
<td>28</td>
<td>4.2</td>
</tr>
<tr>
<td>SW 5 PLL</td>
<td>280</td>
<td>270</td>
<td>36</td>
<td>28</td>
<td>4.2</td>
</tr>
<tr>
<td>SW 7 PLL</td>
<td>280</td>
<td>270</td>
<td>36</td>
<td>28</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Notes**
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2. Measurements will be verified in real installations; therefore data are subject to change.
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4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA is 30.
7. Data is measured with merlin jerin C45N/C10.
Electronics

EB-Standard TLD/PLL

Fluorescent and compact fluorescent lamps control gear

Lamps and Gear

6.108

Lamps and Gear

Fluorescent and compact fluorescent lamps control gear

Electronics

EB-Standard TLD/PLL

6.109

Electronics

EB-Standard TLD/PLL

Electronics

EB-Standard TLD/PLL

Electronics

EB-Standard TLD/PLL

Technical data in relation to energy saving

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qf of lamps</th>
<th>Ballast</th>
<th>Qf</th>
<th>Power</th>
<th>Efficacy</th>
<th>lumen*</th>
<th>Power</th>
<th>lumen</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>TLD 18W</td>
<td>1</td>
<td>EB-S 118 TLD 220-240</td>
<td>20</td>
<td>16</td>
<td>61</td>
<td>1300</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TLD 18W</td>
<td>2</td>
<td>EB-S 118 TLD 220-240</td>
<td>37</td>
<td>16</td>
<td>81</td>
<td>1300</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TLD 18W</td>
<td>3</td>
<td>EB-S 118 TLD 220-240</td>
<td>62</td>
<td>16</td>
<td>81</td>
<td>1300</td>
<td>14</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TLD 18W</td>
<td>4</td>
<td>EB-S 118 TLD 220-240</td>
<td>79</td>
<td>16</td>
<td>81</td>
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<td>TLD 32W</td>
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<td>EB-S 162 TLD 220-240</td>
<td>64</td>
<td>28</td>
<td>110</td>
<td>3080</td>
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<td>1</td>
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<tr>
<td>TLD 36W</td>
<td>1</td>
<td>EB-S 166 TLD 220-240</td>
<td>37</td>
<td>32</td>
<td>100</td>
<td>3200</td>
<td>5</td>
<td>6</td>
<td></td>
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<tr>
<td>TLD 36W</td>
<td>2</td>
<td>EB-S 166 TLD 220-240</td>
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<td>32</td>
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<td>3200</td>
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<td>12</td>
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<td>TLD 36W</td>
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<td>EB-S 166 TLD 220-240</td>
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<td>3000</td>
<td>12</td>
<td>3</td>
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<tr>
<td>TLD 36W</td>
<td>4</td>
<td>EB-S 166 TLD 220-240</td>
<td>130</td>
<td>50</td>
<td>100</td>
<td>5000</td>
<td>12</td>
<td>3</td>
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<td>EB-S 118 TLD 220-240</td>
<td>20</td>
<td>16</td>
<td>76</td>
<td>1232</td>
<td>8</td>
<td>5</td>
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<tr>
<td>PLL 18W</td>
<td>2</td>
<td>EB-S 118 TLD 220-240</td>
<td>37</td>
<td>16</td>
<td>76</td>
<td>1232</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PLL 36W</td>
<td>1</td>
<td>EB-S 166 TLD 220-240</td>
<td>37</td>
<td>32</td>
<td>90</td>
<td>2680</td>
<td>5</td>
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<tr>
<td>PLL 36W</td>
<td>2</td>
<td>EB-S 166 TLD 220-240</td>
<td>74</td>
<td>32</td>
<td>90</td>
<td>2680</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PLL 55W</td>
<td>1</td>
<td>EB-S 166 TLD 220-240</td>
<td>56</td>
<td>50</td>
<td>90</td>
<td>4500</td>
<td>6</td>
<td>5</td>
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<tr>
<td>PLL 55W</td>
<td>2</td>
<td>EB-S 166 TLD 220-240</td>
<td>112</td>
<td>50</td>
<td>90</td>
<td>4500</td>
<td>12</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

* Typical values for /830 and /840 colors
Product description
Compact, lightweight, high-frequency electronic ballast for PL-T, PL-C compacted fluorescent lamps.

Features and benefits
• The combination of EB-Standard and PL-T/PL-C lamps offers opportunities for miniaturization and reduced cost of ownership, thanks to the limited dimensions and the high system efficiency.
• Programmed start (triple warm start), preheating the lamp electrodes; this enables the lamps to be switched on and off without reducing useful life.
• Equipped with electrode heating cut-off circuit, ensuring optimal lamp operation with respect to lumen curve of the lamp and reduction in system energy losses.
• Automatic stop circuit is activated within five seconds in case of lamp failure (safety stop); once the lamp has been replaced, the ballast resets automatically.
• Up to 50% longer lamp life than with conventional ballasts.
• Up to 20% reduction in energy consumption at constant luminous flux compared with conventional gear.
• Low energy consumption due to the use of EI technology.
• Smart power: constant light independent of mains voltage fluctuations.

Applications
Typical areas of application include:
• Department stores, shops, supermarkets
• Office buildings, for example, insurance companies, banks, government ministries
• Hotels
• Airports, railway stations
• Hospitals

Philips quality
This implies optimum quality regarding:
• System supplier
  As manufacturers of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
• International standards
  Philips EB-S electronic ballasts comply with all relevant international rules and regulations.

Compliances and approvals
• RFI < 30 MHz
  EN 55015 (IEC) *
• Harmonics
  EN 61000-3-2 (IEC)
• Immunity
  EN 61000-3-3 (IEC)
• Safety
  EN 61347-2-3 (IEC)
• Performance
  EN 60065 (IEC)
• Vibration & bump tests
  EN 60068-2-6 Fc (IEC)
• EN 60068-2-29 Em (IEC)
• Quality standard ISO 9001
• Environmental standard ISO 14001
• Approval marks ENEC
• KEMA
• CCC
• CE marking

* Tested with ballast functional ground connected to earth

Technical data: (all typical values at V_mains = 230V)

<table>
<thead>
<tr>
<th>Lamp Qty. of Ballast System Lamp Ballast NOMINAL EEI</th>
<th>Power</th>
<th>Power Losses</th>
<th>Lamp Lumen</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-T 13 W</td>
<td>1</td>
<td>EB-S 113 PLT/C</td>
<td>14.5</td>
</tr>
<tr>
<td>PL-T 18 W</td>
<td>1</td>
<td>EB-S 118 PLT/C</td>
<td>19</td>
</tr>
<tr>
<td>PL-C 13 W</td>
<td>1</td>
<td>EB-S 113 PLC</td>
<td>14.5</td>
</tr>
<tr>
<td>PL-C 18 W</td>
<td>1</td>
<td>EB-S 118 PLC</td>
<td>19</td>
</tr>
<tr>
<td>PL-C 36 W</td>
<td>1</td>
<td>EB-S 226 PLC</td>
<td>27</td>
</tr>
</tbody>
</table>

| Ballast Qty. of Lamp Power Max. cable cap 1) Tc Oper 2) |
|---|---|---|---|
| EB-S 113 PLC | PL-T 13 W | 1 | 0.95 | 120/60 | 65 | 45 |
| EB-S 118 PLC | PL-T 18 W | 1 | 0.95 | 60/60 | 65 | 45 |
| EB-S 113 PLC | PL-C 13 W | 1 | 0.95 | 120/60 | 65 | 45 |
| EB-S 118 PLC | PL-C 18 W | 1 | 0.95 | 60/60 | 65 | 45 |

1) lp-lp = between lamp wires
Typical wire capacitance: 50 pF/m (spacing between wires 0.5 mm)

lp-lgnd = between lamp wires and ground
Typical wire capacitance: 72 pF/m (spacing between wires 0.5 mm)

* Tested with ballast functional ground connected to earth
Electronics

**Electrical data for installation**

- **Mains operation**: 220 - 240 V
  - Rated mains voltage: +10% - 15%
  - with tolerances for safety: +10%
  - with tolerances for performance: +6% - 8%

- **Mains frequency**: 50/60 Hz
  - Operating frequency (typical): > 42 K Hz

- **Power factor**: > 0.95

- **Ignition time**: < 2.0 s

- **Earth leakage current**: < 0.7 mA (peak) per ballast

- **Overvoltage protection**: 48 hrs at 276 V AC
  - 2 hrs at 320 V AC

- **Dissipation in the master-slave operation**: not advisable

- **Automatic restart after lamp replacement or voltage dip**: yes tested with a dip down to 30% with a duration of 10 mains cycles

- **Insulation resistance test**: 500 V DC from Line/Neutral to Earth (not between Line and Neutral) with an impedance of 400 Ω (equal to 15 m cable of 2.5mm² and another 20 m to the middle of the power distribution), under worst-case conditions. With an impedance of 800 Ω the number of ballasts can be increased by 10%.

**Power factor**: > 0.95

**Smart power**: with AC mains voltage fluctuations, 202-254V Luminous flux varies by +/-2% max

**DC voltage operation (during emergency back-up)**

- Yes for limited time (48hrs) only
- Required battery voltage for guaranteed ignition: 198 - 254V
- Required battery voltage for burning lamps: 176 - 254V

**Notes**

1. For a continuous DC application, an external fuse should be used in the luminaire.
2. Continuous low DC voltages (< 198 V) can influence the lifetime of the ballast.
3. Ignition time: < 2.0 s
4. Earth leakage current: < 0.7 mA (peak) per ballast
5. Overvoltage protection: 48 hrs at 276 V AC
6. 2 hrs at 320 V AC
7. Dual fixture master-slave operation: not advisable
8. Automatic restart after lamp replacement or voltage dip: yes tested with a dip down to 30% with a duration of 10 mains cycles
9. Insulation resistance test: 500 V DC from Line/Neutral to Earth (not between Line and Neutral) with an impedance of 400 Ω (equal to 15 m cable of 2.5mm² and another 20 m to the middle of the power distribution), under worst-case conditions. With an impedance of 800 Ω the number of ballasts can be increased by 10%.

**Data for design and mounting HF ballasts in fixtures**

- **Temperature**: 0º – 50ºC with ignition aid
- **Max. tcase**: 65°C
- **Lifetime of a ballast**: depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The EB-Standard ballast for PL-T/C applications has a specified lifetime of 50,000 hrs, with a maximum of 10% failures guaranteed, at a measured T-case of 65°C.

- **Hum and noise level**: inaudible
- **Permitted humidity**: tested according to EN61347-1 par. 11. Note that no moisture or condensation may enter the ballast.
- **Ballast that are thermally protected use a protective method of another type providing equivalent thermal protection.**

**Wiring diagram**

1. Wiring diagram 1L
2. Wiring diagram 2L

**Connector types**

- Connection wiring is greatly specified by the use of insert contacts with push buttons.
- **Wire cross-section**:
  - 1-lamp circuit, keep 1 & 2 lead wires short
  - 2-lamp circuit, keep 1, 2, 3 & 5 lead wires short
- **On the mains side**: 0.5 - 1.5 mm²
- **On the lamp side**: 0.5 - 1.5 mm²
- **Strip length**: 7.5 - 8.5 mm

**Notes**

1. For optimal performance, please ensure correct earthing and wiring before power on.

**Ordering and packing data**

- **Ballast QTY Input current**
  - Lamp A
  - EB-S 113 PLT/C 1 0.07
  - EB-S 213 PLT/C 2 0.12
  - EB-S 118 PLT/C 1 0.08
  - EB-S 218 PLT/C 2 0.17
  - EB-S 126 PLT/C 1 0.11
  - EB-S 226 PLT/C 2 0.25

- **Ballast Order number**
  - EB-S 113 PLT/C 9137 100650 0.12 12 21.9 x 21.5 x 7.8 1.6 48/576
  - EB-S 213 PLT/C 9137 100651 0.16 12 25.7 x 24.8 x 8.6 2.1 48/576
  - EB-S 118 PLT/C 9137 100652 0.12 12 21.9 x 21.5 x 7.8 1.7 48/576
  - EB-S 218 PLT/C 9137 100653 0.17 12 25.7 x 24.8 x 8.6 2.2 48/576
  - EB-S 126 PLT/C 9137 100654 0.12 12 21.9 x 21.5 x 7.8 1.7 48/576
  - EB-S 226 PLT/C 9137 100655 0.18 12 25.7 x 24.8 x 8.6 2.4 48/576

**Technical data for installation**

- **Mains operation**: 220 - 240 V
  - Rated mains voltage: +10% - 15%
  - with tolerances for safety: +10%
  - with tolerances for performance: +6% - 8%
- **Mains frequency**: 50/60 Hz
  - Operating frequency (typical): > 42 K Hz
- **Power factor**: > 0.95

- **Ignition time**: < 2.0 s

- **Earth leakage current**: < 0.7 mA (peak) per ballast

- **Overvoltage protection**: 48 hrs at 276 V AC
  - 2 hrs at 320 V AC

- **Dual fixture master-slave operation**: not advisable

- **Automatic restart after lamp replacement or voltage dip**: yes tested with a dip down to 30% with a duration of 10 mains cycles

- **Insulation resistance test**: 500 V DC from Line/Neutral to Earth (not between Line and Neutral) with an impedance of 400 Ω (equal to 15 m cable of 2.5mm² and another 20 m to the middle of the power distribution), under worst-case conditions. With an impedance of 800 Ω the number of ballasts can be increased by 10%.

- **Data for design and mounting HF ballasts in fixtures**
  - **Temperature**: 0º – 50ºC with ignition aid
  - **Max. tcase**: 65°C
  - **Lifetime of a ballast**: depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The EB-Standard ballast for PL-T/C applications has a specified lifetime of 50,000 hrs, with a maximum of 10% failures guaranteed, at a measured T-case of 65°C.
  - **Hum and noise level**: inaudible
  - **Permitted humidity**: tested according to EN61347-1 par. 11. Note that no moisture or condensation may enter the ballast.
  - **Ballast that are thermally protected use a protective method of another type providing equivalent thermal protection.**

**Wiring diagram**

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- **Wire cross-section**:
  - 1-lamp circuit, keep 1 & 2 lead wires short
  - 2-lamp circuit, keep 1, 2, 3 & 5 lead wires short
- **On the mains side**: 0.5 - 1.5 mm²
- **On the lamp side**: 0.5 - 1.5 mm²
- **Strip length**: 7.5 - 8.5 mm

**Notes**

1. For optimal performance, please ensure correct earthing and wiring before power on.

**Ordering and packing data**

- **Ballast QTY Input current**
  - Lamp A
  - EB-S 113 PLT/C 1 0.07
  - EB-S 213 PLT/C 2 0.12
  - EB-S 118 PLT/C 1 0.08
  - EB-S 218 PLT/C 2 0.17
  - EB-S 126 PLT/C 1 0.11
  - EB-S 226 PLT/C 2 0.25

- **Ballast Order number**
  - EB-S 113 PLT/C 9137 100650 0.12 12 21.9 x 21.5 x 7.8 1.6 48/576
  - EB-S 213 PLT/C 9137 100651 0.16 12 25.7 x 24.8 x 8.6 2.1 48/576
  - EB-S 118 PLT/C 9137 100652 0.12 12 21.9 x 21.5 x 7.8 1.7 48/576
  - EB-S 218 PLT/C 9137 100653 0.17 12 25.7 x 24.8 x 8.6 2.2 48/576
  - EB-S 126 PLT/C 9137 100654 0.12 12 21.9 x 21.5 x 7.8 1.7 48/576
  - EB-S 226 PLT/C 9137 100655 0.18 12 25.7 x 24.8 x 8.6 2.4 48/576
Electronics

**EB-Standard Micropower**

**Product description**
Compact, lightweight, high-frequency electronic ballast designed for TL (4 - 18 W), TL5 (14 - 24 W) and compact fluorescent PL (5 - 24 W) lamps.

**Features and benefits**
The EB-Standard Micropower is a new generation of electronic energy-saving ballasts for systems up to 25 W. As well as saving energy, they enhance design freedom for the Original Equipment Manufacturer.
- Instant start: flicker-free starting ideal for lighting applications with long burning hours and infrequent switching (up to three times per day); optimum lifetime of lamps compared to electromagnetic gear circuits is achieved in applications with long burning hours (IEC cycle). EB-5 Micropower should not be used in combination with movement/presence detection.
- Energy savings of more than 25% (at equal luminous flux) compared with electromagnetic gear.
- Multi-lamp ballast: one type can be used to drive a single lamp of different types and wattages, e.g. TL 6 or 18 W, or a PL 5 or 22 W lamp can be connected to the EB-S 105/109 TL/PL ballast.
- Fixing centres for mounting remain same as equivalent electromagnetic ballasts.
- EB-Standard Micropower ballasts can be supplied either as an encased ballast or open printed circuit board ready for building into a luminaire, in doing so ensuring optimum safety and lowest cost.

**Applications**
EB-Standard Micropower ballasts are designed for areas where the lighting is switched on and off infrequently.
- Typical areas of application in indoor residential situations include living rooms, kitchens (under cupboards), studies (desk-top), bedrooms, halls, staircases and garages.
- Typical outdoor residential situations include driveways, porches, front doors and galleries.
- For luminaries with protection class I and II, class I metal luminaires with earth connection require special measures for EMC compliance.

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Ballast type</th>
<th>Power factor current</th>
<th>lamp power W</th>
<th>lamp power factor</th>
<th>lamp current mA</th>
<th>lamp current mA</th>
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</thead>
<tbody>
<tr>
<td>TL 4W</td>
<td>EB-S 105 TL/PL SP</td>
<td>0.6</td>
<td>6.2</td>
<td>65</td>
<td>80</td>
<td>230</td>
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<tr>
<td>TL 6W</td>
<td>EB-S 109 TL/PL SP</td>
<td>0.6</td>
<td>8.3</td>
<td>66</td>
<td>65</td>
<td>225</td>
</tr>
<tr>
<td>TL 8W</td>
<td>EB-S 109 TL/PL SP</td>
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<td>69</td>
<td>70</td>
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<td>TL 13W</td>
<td>EB-S 114 TL/PL SP</td>
<td>0.6</td>
<td>15.0</td>
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<tr>
<td>TLD 30W</td>
<td>EB-S 114 TL/PL SP</td>
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<td>TLD 38W</td>
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<td>TL5 18W</td>
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<td>TL5 25W</td>
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<td>160</td>
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<tr>
<td>TLD 30W</td>
<td>EB-S 114 TL/PL SP</td>
<td>0.6</td>
<td>21.5</td>
<td>192</td>
<td>150</td>
<td>230</td>
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<td>TL5C 30W</td>
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<td>20.0</td>
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<td>145</td>
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<td>PLC 5W</td>
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<td>63.0</td>
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<td>360</td>
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**Specifications**
This implies optimum quality with regard to:
- System supplier: As manufacturer of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
- International standards: Philips electronic ballasts comply with relevant international rules and regulations.
- Compliance and approvals:
  - RFI < 30 MHz EN 55015
  - Harmonics EN 61000-3-2
  - Safety: EN 61347-2-3
  - Quality standard: ISO 9001
  - Environmental standard: ISO 14001
  - CE marking

**Product ID**

<table>
<thead>
<tr>
<th>Linear housing</th>
<th>L 1</th>
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<th>L 3</th>
<th>L H</th>
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<td>132</td>
<td>114/121</td>
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<th>W 1</th>
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<td></td>
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<td>114/121</td>
<td>56</td>
<td>36</td>
<td>20</td>
<td></td>
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<td>124</td>
<td>56</td>
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<td>20</td>
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</tr>
</tbody>
</table>
Electronics

6.114 Fluorescent and compact fluorescent lamps control gear

Electronics

EB-Standard Micropower

6.115 Electronics

EB-Standard Micropower

Technical data for installation

Mains operation
Rated mains voltage 220 – 240V
Tolerances for safety +/- 10%
Tolerances for performance +6% - 8%
Mains frequency 50/60Hz
Operation frequency < 30 kHz

DC voltage operation during emergency back-up (external fuse is required)
Required battery voltage for guaranteed ignition 198 – 254V
Required battery voltage for burning lamps 176 – 254V
Ignition time < 0.5 s

Over voltage protection up to 264V
Max. case 75ºC
Lamp end-of-life detection/ shut-off yes
Automatic restart after lamp no; manual restart required

Cable capacity to be advised
Insulation resistance test not relevant
Temperature range to ignite lamp -10 to +40ºC
(ignition aid is not required)
Hum and noise level inaudible
Connection wiring is greatly simplified by the use of insert contacts
Wire cross-section:
On the mains side: 0.5 – 1.5mm²
On the lamp side: 0.5 – 1.5mm²
Strip length: 8 – 9mm
Distance between mains wires and lamp wires > 5 cm
Length of lamp wires: Keep wires to terminals 1 and 2 as short as possible; Keep wires to terminals 3 and 4 shorter than 150 cm

Ordering and packing data

Ordering number
EB-S 105 220-240 LH
EB-S 105 220-240 SH
EB-S 105 220-240 LP
EB-S 105 220-240 SP
EB-S 109 220-240 LH
EB-S 109 220-240 SH
EB-S 109 220-240 LP
EB-S 109 220-240 SP
EB-S 114 220-240 LH
EB-S 114 220-240 SH
EB-S 114 220-240 LP
EB-S 114 220-240 SP
EB-S 118 220-240 LH
EB-S 118 220-240 SH
EB-S 118 220-240 LP
EB-S 118 220-240 SP
EB-S 121 220-240 LH
EB-S 121 220-240 SH
EB-S 121 220-240 LP
EB-S 121 220-240 SP
EB-S 124 220-240 LH
EB-S 124 220-240 SH
EB-S 124 220-240 LP
EB-S 124 220-240 SP

Supply options
EB-Standard Micropower ballasts can be ordered either encased or as printed circuit board.

Printed Circuit Boards (PCBs) have the same shape as the housings, and are supplied in multiple boards. Multiple boards will be supplied in cardboard cartons.

A detailed ‘Instructions for use’ is included in the package of the printed circuit boards.

The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

Coloring coding

To facilitate physical identification of PCBs, mains connector terminals are color-coded. The central connector terminal is colored according to type.

Wiring diagrams

Fluorescent and compact fluorescent lamps control gear

Lamps and Gear
Electronics

**Product description**
Compact, lightweight, high-frequency electronic standard ballast for TLD fluorescent lamps, ideal for applications with low switching frequency.

**Features and benefits**
- Flicker-free rapid start, ideal for areas with low switching frequency (maximum 3 times a day)
- Up to 20% reduction in energy consumption at equal luminous flux compared with conventional gear.

**Applications**
- Typical areas of application include:
  - Department stores, shops, supermarkets with long lamp burning hours
  - Industrial premises with long lamp burning hours
  - Railway stations
  - Offices
  - Corridors
  - Outdoor lighting in general suitable for class 1 applications

**Philips quality**
This assures optimum quality regarding:
- System supplier
- As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained

**Compliances and approvals**
- RFI < 30 MHz EN 55015
- Harmonics EN 61000-3-2
- Safety EN 61347-2-3
- Vibration & shock tests: IEC 68-2-6, 7, 25
- Quality standard: ISO 9001
- Environmental standard: ISO 14001
- CCC

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qty of Lamps</th>
<th>Ballast</th>
<th>System Power W</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLD 18W</td>
<td>1</td>
<td>EB-E 118 TLD 220-230</td>
<td>10</td>
</tr>
<tr>
<td>TLD 18W</td>
<td>2</td>
<td>EB-E 118 TLD 220-230</td>
<td>16</td>
</tr>
<tr>
<td>TLD 18W</td>
<td>3</td>
<td>EB-E 118 TLD 220-230</td>
<td>30</td>
</tr>
<tr>
<td>TLD 36W</td>
<td>6</td>
<td>EB-E 218 TLD 220-230</td>
<td>52</td>
</tr>
</tbody>
</table>

* Typical values for 830 and 840 colors

**Technical data for installation**

- **Mains operation**
  - Rated mains voltage: 220 – 230V
  - With tolerances for safety: +15% – 20%
  - With tolerances for performance: +6% – 6%
  - Mains frequency: 50-60Hz
  - Operation frequency > 42 kHz
  - Power factor: 0.95
- **Earth leakage current**: < 0.5 mA per ballast
- **Ignition time**: < 1 s
- **Over voltage protection**: 48 hrs at 270V AC
- **Cable capacity**: Max. 230V between lamp wires and earth
- **Insulation resistance test**: 500V DC from Line/Neutral to Earth (not between Line and Neutral)
  - Ensure that the neutral is reconnected after above mentioned test is carried out and before the installation is put into operation.
- **Automatic restart after lamp replacement**: Yes

**Technical data for design and mounting ballasts in fixtures**

- **Temperatures**
  - Temperature range to Earth (not between Line and Neutral)
  - Max. 65°C (70°C for 236)
- **Hum and noise level**: Insaudible
- **Permitted humidity**: Tested according to EN 61347-2-3 par. 11
- **Connection wiring**: Greatly simplified by the use of insert contacts with push buttons

**Product ID**

<table>
<thead>
<tr>
<th>Product ID</th>
<th>L1</th>
<th>L2</th>
<th>W</th>
<th>H</th>
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<td>130</td>
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<td>236</td>
<td>210</td>
<td>230</td>
<td>40</td>
<td>30</td>
<td>B</td>
</tr>
</tbody>
</table>

**Dimensions in mm**

- Fig A
- Fig B

**Electronics**

EB-E 228 TLD

**Technical data for installation**

- **Mains current at 220V**
  - Input current TLD 118W
  - Input current TLD 236W

- **Inrush current**
  - Maximum quantity of ballasts per Miniature Circuit Breaker: 25A

- **Technical data for design and mounting ballasts in fixtures**
  - Temperature range to Neutral: 0°C to 50°C
  - Igniters with igniter aid: 65°C (70°C for 236)
  - Note: that no moisture or condensation may enter the ballast.
  - Permitted humidity: Tested according to EN 61347-2-3 par. 11
  - Connection wiring: Greatly simplified by the use of insert contacts with push buttons

**Wiring diagrams**

- Fig 1
- Fig 2

**Technical data for installation**

- **Mains operation**
  - Rated mains voltage: 220 – 230V
  - With tolerances for safety: +15% – 20%
  - With tolerances for performance: +6% – 6%
  - Mains frequency: 50-60Hz
  - Operation frequency > 42 kHz
  - Power factor: 0.95
- **Earth leakage current**: < 0.5 mA per ballast
- **Ignition time**: < 1 s
- **Over voltage protection**: 48 hrs at 270V AC
- **Cable capacity**: Max. 230V between lamp wires and earth
- **Insulation resistance test**: 500V DC from Line/Neutral to Earth (not between Line and Neutral)
  - Ensure that the neutral is reconnected after above mentioned test is carried out and before the installation is put into operation.
- **Automatic restart after lamp replacement**: Yes

**Technical data for design and mounting ballasts in fixtures**

- **Temperatures**
  - Temperature range to Earth (not between Line and Neutral)
  - Max. 65°C (70°C for 236)
- **Hum and noise level**: Insaudible
- **Permitted humidity**: Tested according to EN 61347-2-3 par. 11
- **Connection wiring**: Greatly simplified by the use of insert contacts with push buttons
Electronics

**EB-Economy TLD**

**Notes**
1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ, the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts which can be connected to one Residual Current Detector of 30 mA is 30.
7. Data is measured with Merlin Jermy C45N/C10.

**Ordering and packing data**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Branching number</th>
<th>Single unit</th>
<th>3-phase unit</th>
<th>4-tron packing</th>
<th>5-tron packing</th>
<th>Weight unit</th>
<th>Dimensions (l x w x h)</th>
<th>Gross (kg)</th>
</tr>
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<tbody>
<tr>
<td>EB-E 118 TLD 220-230</td>
<td>9137 100-600</td>
<td>0.30</td>
<td>20</td>
<td>30.0 x 21.0 x 6.0</td>
<td>4.2</td>
<td>120 / 2400</td>
<td>31.0 x 21.0 x 8.0</td>
<td>4.2</td>
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<tr>
<td>EB-E 218 TLD 220-230</td>
<td>9137 100-600</td>
<td>0.30</td>
<td>20</td>
<td>30.0 x 21.0 x 6.0</td>
<td>4.2</td>
<td>120 / 2400</td>
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<td>30.0 x 21.0 x 6.0</td>
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<tr>
<td>EB-E 236 TLD 220-230</td>
<td>9137 100-600</td>
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<td>80 / 1600</td>
<td>41.8 x 22.0 x 8.0</td>
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**EB-Economy TL5**

**Product description**
Lightweight, high-frequency electronic standard ballast for TL5 fluorescent lamps, ideal for applications with low switching frequency.

**Features and benefits**
- The combination of EB-Economy and TL5 lamps offers opportunities for miniaturization and reduced cost of ownership, thanks to the limited dimensions and the high system efficacy.
- Low energy consumption.
- Flicker-free start, ideal for areas with low switching frequency (maximum 3 times a day).

**Applications**
Typical areas of application include:
- Small shops
- Small offices
- Home atlas

**Warranty**
This assures optimum quality regarding:
- System supplier
As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.

**Compliances and approvals**
- RFI < 30 MHz
- Harmonics
- Safety
- Vibration & bump tests
- Quality standard
- Environmental standard
- CCC

<table>
<thead>
<tr>
<th>Product ID</th>
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**Fluorescent and compact fluorescent lamps control gear**

6.118 Fluorescent and compact fluorescent lamps control gear

---

6.119 Electronics

**EB-Economy TL5**

**Dimensions in mm**

---

6.139 Lamps and Gear
Electronics

**EB-Economy TL5**

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp Qty of Lamps</th>
<th>Ballast</th>
<th>System Power W</th>
<th>Lamp Power W</th>
<th>Efficacy lm/W</th>
<th>Lumen* lm</th>
<th>Ballast Loose W</th>
<th>Wiring diagram</th>
<th>Fig.</th>
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<td>EB-E 114 TL5 220-230</td>
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<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TL5 14W 2</td>
<td>EB-E 114 TL5 220-230</td>
<td>32</td>
<td>14</td>
<td>89</td>
<td>1240</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TL5 21W 1</td>
<td>EB-E 121 TL5 220-230</td>
<td>24</td>
<td>21</td>
<td>92</td>
<td>1930</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TL5 21W 1</td>
<td>EB-E 121 TL5 220-230</td>
<td>33</td>
<td>21</td>
<td>92</td>
<td>2670</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TL5 28W 1</td>
<td>EB-E 128 TL5 220-230</td>
<td>43</td>
<td>28</td>
<td>95</td>
<td>2670</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TL5 28W 2</td>
<td>EB-E 228 TL5 220-230</td>
<td>63</td>
<td>28</td>
<td>95</td>
<td>2670</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

* Typical values for /830 and /840 colors.

**Technical data for installation**

**Mains operation**

- Rated mains voltage: 220 – 230V
- With tolerances for safety: +15% to -20% for 220V, +20% to -25% for 230V
- Mains frequency: 50 Hz
- Operation frequency: EB-E 114/121 20 – 30 kHz, EB-E 128/214/228 > 40 kHz
- Power factor: EB-E 114/121: 0.60, EB-E 128/214/228: > 0.90

- Earth leakage current: < 0.7 mA peak per ballast
- Ignition time: < 2 s
- Over voltage protection: 12 hrs at 270V AC
- Dual fixture master-slave operation: possible, in general maximum 2m length of lamp wires between ballast and lamp
- Cable capacity: max. 120pF between lamp wires and earth
- Automatic restart after lamp: No
- Insulation resistance test: 500V DC from Line/Neutral to Earth (not between Line and Neutral)

**Technical data for design and mounting ballasts in fixtures**

- Temperature range: for +5°C to 50°C for 114/121 for 0°C to 50°C for 214/228/229
- Hum and noise level: < 30dB at 1m distance
- Permitted humidity: tested according to EN61247-2-3 par. 11
- Note that no moisture or condensation may enter the ballast.
- Connection wiring is greatly simplified by the use of insert contacts with push buttons

- **Note:** Ensure that the neutral is reconnected again after the above mentioned test is carried out and before the installation is put into operation.

**Ordering and packing data**

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Ordering number</th>
<th>Single unit</th>
<th>Carton packing</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Pallet unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB-E 114 TL5 220-230</td>
<td>1907 100 650.</td>
<td>0.11</td>
<td>50</td>
<td>20.4 x 20.0 x 13.0</td>
<td>5.9</td>
<td>200/200000</td>
</tr>
<tr>
<td>EB-E 121 TL5 220-230</td>
<td>1907 100 650.</td>
<td>0.11</td>
<td>50</td>
<td>20.4 x 20.0 x 13.0</td>
<td>5.9</td>
<td>200/200000</td>
</tr>
<tr>
<td>EB-E 128 TL5 220-230</td>
<td>1907 100 650.</td>
<td>0.13</td>
<td>20</td>
<td>32.6 x 28.6 x 7.9</td>
<td>4.3</td>
<td>72/1440</td>
</tr>
<tr>
<td>EB-E 228 TL5 220-230</td>
<td>1907 100 650.</td>
<td>0.15</td>
<td>20</td>
<td>30.6 x 30.4 x 7.9</td>
<td>4.1</td>
<td>54/5400</td>
</tr>
</tbody>
</table>

**Notes**

1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 35m cable of 2.5mm and another 20m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations, therefore data are subject to change.
3. In some cases the maximum number of ballasts is not determined by the MCB but by the maximum electrical load of the lighting installation.
4. Note that the maximum number of ballasts is given when these are all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCBs. For multi-pole MCBs it is advisable to reduce the number of ballasts by 20%.
6. Data is measured with merlin jerin C45N/C10.
**Product description**
Compact, lightweight, high frequency electronic standard ballast for TLE TL5 fluorescent lamps, for applications with low switching frequency.

**Features and benefits**
- Flicker-free rapid start, ideal for areas with low switching frequency (maximum 3 times a day)
- Up to 20% reduction in energy consumption at equal luminous flux compared with conventional gear.

**Applications**
Typical areas of application include:
- Department stores, shops, supermarkets with long lamp burning hours
- Industrial premises with long lamp burning hours
- Kitchens
- Bathrooms
- Corridors
- Outdoor lighting in general suitable for class 1 applications

**Philips quality**
This assures optimum quality regarding:
- System supplier
- As manufacturer of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.

**Compliances and approvals**
- **RFI** < 30 MHz
- **Harmonics** EN 55015
- **Safety** EN 61347-2-3
- **Vibration & shock: TLE** IEC 68-2-6 Fc
- **Humidity** IEC 68-2-29 Eb
- **Quality standard** ISO 9001
- **Environmental standard** ISO 14001

**Technical data in relation to energy saving**

<table>
<thead>
<tr>
<th>Lamp Qty. of Lamps</th>
<th>Ballast System</th>
<th>Power W</th>
<th>Efficiency lm/W</th>
<th>Lumen lm</th>
<th>Ballast Losses W</th>
<th>Wiring diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>220V 230V</td>
<td>1 EB-E 122 TLE 200-230</td>
<td>220</td>
<td>205</td>
<td>3000</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>220V 230V</td>
<td>1 EB-E 122 TLE 200-230</td>
<td>220</td>
<td>205</td>
<td>3000</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

* Typical values for Philips 1830 and 1840 colors

**Technical data for installation**

**Mains operation**
- Rated mains voltage: 220 – 230V
- With tightness for safety: +15% -- 20%
- With tightness for performance: +6% -- 6%
- Mains frequency: 50/60 Hz
- Operation frequency: > 42 kHz
- Power factor: 0.95
- Earth leakage current: < 0.5 mA per ballast
- Ignition time: < 1 s
- Over voltage protection: 48 hrs at 270V AC
- Dual fixture master-slave operation: possible, in general maximum 2m length of lamp wires between ballast and lamp
- Cable capacity: max. 150pF between lamp wires and earth
- Automatic restart after lamp replacement: yes
- Insulation resistance test: 500V DC from Line/Neutral to Earth (not between Line and Neutral)

**Note:** Ensure that the neutral is reconnected again after above mentioned test is carried out and before the installation is put into operation.

<table>
<thead>
<tr>
<th>Lamp Qty. of Lamps</th>
<th>Ballast System</th>
<th>Power W</th>
<th>Efficiency lm/W</th>
<th>Lumen lm</th>
<th>Ballast Losses W</th>
<th>Wiring diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>220V 230V</td>
<td>1 EB-E 122 TLE 200-230</td>
<td>220</td>
<td>205</td>
<td>3000</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>220V 230V</td>
<td>1 EB-E 122 TLE 200-230</td>
<td>220</td>
<td>205</td>
<td>3000</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Technical data for design and mounting ballasts in fixtures**

- **Temperatures**
  - Temperature range to ignite lamp with ignition aid
  - Max temperature: 70°C
- **Humidity**
  - Provided and noise level: Insidious
- **Humidity and noise level**
  - Permitted humidity is tested according to EN61347-2-3 par. 11.
  - Note: no moisture or condensation may enter the ballast.
- **Connection wiring**
  - Connection wiring is greatly simplified by the use of insert contacts with push buttons.
- **Cable capacity**
  - On the mains side: 0.5 – 1.5mm²
  - On the lamp side: 0.5 – 1.5mm²
  - Strip length: 9 – 10mm

**Dimensions in mm**

<table>
<thead>
<tr>
<th>Product ID</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>W</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>125</td>
<td>108</td>
<td>1368</td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td>132</td>
<td>125</td>
<td>108</td>
<td>1368</td>
<td>41</td>
<td>25</td>
</tr>
</tbody>
</table>
Electronics

EB-Economy TLE

Notes:
1. Data is based on a mains supply with an impedance of 400 mΩ
   (equal to 15 m cable of 2.5 mm² and another 20 m to the middle of
   the power distribution), under worst case conditions. With an
   impedance of 800 mΩ the number of ballasts can be increased by
   10%.
2. Measurements will be verified in real installations; therefore data are
   subject to change.
3. In some cases the maximum number of ballasts is not determined by
   the MCB but by the maximum electrical load of the lighting
   installation.
4. Note that the maximum number of ballasts is given when these are
   all switched on the same moment, i.e. by a wall switch.
5. Measurements were carried out on single-pole MCB’s. For multi-pole
   MCB’s it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts which can be connected to one
   Residual Current Detector of 30 mA is 30.
7. Data is measured with Merlin Gerin C45N/C10.

Ordering and packing data:

<table>
<thead>
<tr>
<th>Ballast number</th>
<th>Order unit</th>
<th>Single unit</th>
<th>QTY.</th>
<th>Dim.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB-E 122 TLE 220-230</td>
<td>Carton/pcs</td>
<td>100</td>
<td>608.5 x 26.5 x 7.3</td>
<td>4.7</td>
<td>1200/2400</td>
</tr>
<tr>
<td>EB-E 132 TLE 220-230</td>
<td>Carton/pcs</td>
<td>100</td>
<td>609.5 x 26.5 x 7.3</td>
<td>4.7</td>
<td>1200/2400</td>
</tr>
</tbody>
</table>

Caution:
After finishing system installation, please check carefully before you turn
the power on:
1. Check whether lamp, ballast model and wiring are compatible
   according to Philips EB-Economy datasheet.
2. Be sure the ground terminal of ballast are connected with metal
   luminaries or batten and earthed.

Electronics
Electromagnetic BTA EM ballasts for TL fluorescent lamps

Product description
- All “BTA” ballasts to be applied in circuits for TL,TLD,TLE,TLU fluorescent lamps and operating on nominal mains supply as indicated.

Features and benefits
- Reliable electrical and mechanical performance
- Long life
- Compact dimensions
- Quick and easy wiring
- Optimum lamp performance under optimum temperature conditions

Features
- Complies with IEC61347-2-8 / IEC606
- Tc marking 130ºC (average life time of 10 years of continuous operation)
- Double insert and screw contacts for solid core wire 0.5-1.0mm, strip length +/-8mm, insulation diameter max.2.6mm
- Embossed mounting plate for noise reduction

Applications
- Department stores, shops, supermarkets
- Office buildings
- Industry
- Airports, railway stations

Philips quality
This implies optimum quality regarding:
- System supplier
- As manufacturers of lamps and control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
- Philips BTA, electromagnetic ballasts comply with all relevant international rules and regulations.

Technical data

| Lamp | Qty of lamps | Ballast Watt loss Input power Mains current during operation mA Power factor Capacitor Wiring diagram Starter type W W V | |
|------|--------------|------------------|-----------------|-----------------|-----------------|---------|----|-------|
| TLD 36W/TL 28W | 1 | BTA 36W 220V C SC | 8.8 | 44.8 | 402 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |
| 2 | BTA 36W 220V C DI | 8.8 | 44.8 | 402 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |
| 3 | BTA 36W 230V C SC | 9.3 | 46.3 | 410 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |
| 4 | BTA 36W 230V C DI | 9.3 | 46.3 | 410 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |
| 5 | BTA 36W 240V C SC | 9.3 | 46.3 | 410 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |
| 6 | BTA 36W 240V C DI | 9.3 | 46.3 | 410 | >0.85 | 4.0 | ±10% | 2 S2(-E) 130 65 |

Dimensions in mm

Fig A

Fig B
### Technical data

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Qty of lamps</th>
<th>Ballast</th>
<th>Watt loss</th>
<th>Input power</th>
<th>Mains current during operation mA</th>
<th>Power factor</th>
<th>Capacitor tolerance</th>
<th>Wiring diagram</th>
<th>Starter type</th>
<th>bw</th>
<th>L TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TLD 38W/TL 220V</strong></td>
<td>1</td>
<td>BTA 36W 220V B2 SC</td>
<td>11.2</td>
<td>69.2/76.2</td>
<td>630</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>410 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BTA 36W 220V B2 DI</td>
<td>11.2</td>
<td>69.2/76.2</td>
<td>630</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>410 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BTA 36W 230V B2 SC</td>
<td>10.4</td>
<td>68.4</td>
<td>640</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>410 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BTA 36W 230V B2 DI</td>
<td>10.4</td>
<td>68.4</td>
<td>640</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>410 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
<tr>
<td><strong>TLD 58W/TL 220V</strong></td>
<td>1</td>
<td>BTA 58W 220V B2 SC</td>
<td>11.5</td>
<td>71.5</td>
<td>765</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>510 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BTA 58W 220V B2 DI</td>
<td>11.5</td>
<td>71.5</td>
<td>765</td>
<td>&gt;0.85</td>
<td>±10%</td>
<td>510 ±10%/250V</td>
<td>3</td>
<td>55 ±20%</td>
<td></td>
</tr>
</tbody>
</table>

1. In accordance with IEC 950. bw indicates the maximum permissible temperature of the windings.
2. Temperature measurements (average values) in accordance with IEC 950.
3. Loading measurements ±10% in accordance with IEC 950.
4. To obtain HPF circuit (cos φ > 0.85) by means of a parallel capacitor across the mains. Capacitor tolerance ±10%.
## Flourescent and compact fluorescent lamps control gear

### BTA EM ballasts for TL fluorescent lamps

**Ordering and packing data**

<table>
<thead>
<tr>
<th>Ballast Order</th>
<th>Weight</th>
<th>Box packing</th>
<th>Pallet unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTA 36W 220V B1 SC</td>
<td>0.911</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 18W 220V C SC</td>
<td>0.465</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 230V B1 DI</td>
<td>0.911</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 18W 220V/60Hz C SC</td>
<td>0.442</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 230V B1 SC</td>
<td>0.465</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 58W 220V B2 SC</td>
<td>0.925</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 18W 240V C SC</td>
<td>0.5</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 58W 230V B2 DI</td>
<td>0.93</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 58W 240V B2 SC</td>
<td>0.94</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 58W 240V B2 DI</td>
<td>0.94</td>
<td>24</td>
<td>40/960</td>
</tr>
<tr>
<td>BTA 36W 220V/60Hz C DI</td>
<td>0.442</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 230V C SC</td>
<td>0.465</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 230V C DI</td>
<td>0.51</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 220V C SC</td>
<td>0.465</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 220V/60Hz C SC</td>
<td>0.442</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 220V C DI</td>
<td>0.51</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 230V C DI</td>
<td>0.51</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 240V C SC</td>
<td>0.51</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 36W 240V C DI</td>
<td>0.51</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 30W 220V C SC</td>
<td>0.48</td>
<td>32</td>
<td>54/1728</td>
</tr>
<tr>
<td>BTA 58W 220V C DI</td>
<td>0.78</td>
<td>24</td>
<td>19.86</td>
</tr>
<tr>
<td>BTA 58W 220V/60Hz C SC</td>
<td>0.491</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 58W 220V C DI</td>
<td>0.78</td>
<td>24</td>
<td>19.86</td>
</tr>
<tr>
<td>BTA 58W 220V/60Hz C DI</td>
<td>0.78</td>
<td>24</td>
<td>19.86</td>
</tr>
<tr>
<td>BTA 58W 230V C SC</td>
<td>0.72</td>
<td>24</td>
<td>17.7</td>
</tr>
<tr>
<td>BTA 58W 230V C DI</td>
<td>0.72</td>
<td>24</td>
<td>17.7</td>
</tr>
<tr>
<td>BTA 58W 240V C SC</td>
<td>0.72</td>
<td>24</td>
<td>17.7</td>
</tr>
<tr>
<td>BTA 58W 240V C DI</td>
<td>0.72</td>
<td>24</td>
<td>17.7</td>
</tr>
<tr>
<td>BTA 22W 220V C SC</td>
<td>0.48</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 22W 220V C DI</td>
<td>0.48</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 22W 230V C SC</td>
<td>0.5</td>
<td>32</td>
<td>17.75</td>
</tr>
<tr>
<td>BTA 22W 230V C DI</td>
<td>0.5</td>
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<td>17.75</td>
</tr>
<tr>
<td>BTA 22W 240V C SC</td>
<td>0.5</td>
<td>32</td>
<td>17.75</td>
</tr>
<tr>
<td>BTA 22W 240V C DI</td>
<td>0.5</td>
<td>32</td>
<td>17.75</td>
</tr>
<tr>
<td>BTA 32W 220V C SC</td>
<td>0.48</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 22W 220V B2 SC</td>
<td>0.53</td>
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<td>17.75</td>
</tr>
<tr>
<td>BTA 22W 220V/60Hz B2 SC</td>
<td>0.47</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 32W 220V C DI</td>
<td>0.48</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 22W 230V B2 SC</td>
<td>0.48</td>
<td>32</td>
<td>16.12</td>
</tr>
<tr>
<td>BTA 32W 230V C SC</td>
<td>0.51</td>
<td>32</td>
<td>16.12</td>
</tr>
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### Installation option 1

#### Installation option 2

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**Flourescent and compact fluorescent lamps control gear**

Lamps and Gear

6.130 Fluorescent and compact fluorescent lamps control gear Lamps and Gear

6.131 Fluorescent and compact fluorescent lamps control gear Lamps and Gear
Electromagnetic

BPL EM ballasts for Compact fluorescent lamps

**Product description**
- All BPL ballasts to be applied in circuits for PLC, PL-T or PLS compact fluorescent lamps and operating on nominal mains supply as indicated

**Benefits**
- Reliable electrical and mechanical performance
- Long life
- Compact dimensions
- Quick and easy wiring
- Optimum lamp performance under optimum temperature conditions

**Features**
- Complies with IEC 61347-2-8 / IEC 921
- Tw marking 130°C (average life time of 10 years of continuous operation)
- Double insert and screw contacts for solid core wire 0.5-1.0mm, strip length ±8mm, insulation diameter max.2.6mm
- Embossed mounting plate for noise reduction

**Applications**
- Department stores, shops, supermarkets
- Office buildings
- Industry
- Airports, railway stations

**Philips quality**
- This implies optimum quality regarding:
  - System supplier
- As manufacturers of lamps and control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
- Philips BTA electromagnetic ballasts comply with all relevant international rules and regulations.

**Technical data**

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<tr>
<th>Lamp</th>
<th>Qty of lamps</th>
<th>Ballast 1</th>
<th>Watt</th>
<th>Input power</th>
<th>Mains current during operation mA</th>
<th>Power factor</th>
<th>Capacitor tolerance ±10%</th>
<th>Wiring diagram</th>
<th>curr A</th>
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<td>1</td>
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<td>4.7</td>
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<td>20 ±0.5% 250V</td>
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<td>PL-C 13W</td>
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</table>

1) In accordance with IEC 921
2) Temperature measurements (average values) in accordance with IEC 921
3) Temperature marking tw/atl in accordance with IEC 921
4) To obtain HPF circuit (cos φ=0.85) by means of a parallel capacitor across the mains. Capacitor tolerance ±10%.

**Figures**

- Fig A: Dimensions in mm
- Fig B: Wiring diagrams

**Notes:**
- On Fig A, BPL sheet, length A2 is to be taken off.
### Electromagnetic

#### BPL EM ballasts for Compact fluorescent lamps

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<td>260 x 188 x 12.8</td>
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