HF-R PL-R/PL-T/C

Product Description

- Flat, lightweight high-frequency electronic regulating control gear, using DALI (Digital Addressable Lighting Interface) or Touch and Dim push button protocol, for PL-T/C/R fluorescent lamps.

Features and Benefits

- The lamp power can be regulated from 100 to 1%. *
- Up to 75% reduction in energy consumption can be achieved by using automatic lighting control systems (e.g. Philips ActiLume).
- Quick programmed start: 0.5 sec, flicker-free warm start, preheating the lamp electrodes. This enables the lamps to be switched on and off without reducing useful life. Ideal for 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
- Smart power: constant light, independent of mains fluctuations.
- Unit is protected against excessive mains voltages, incorrect connections and incorrect lamp use.
- Striation-free operation, no stroboscopic effects.
- Lamp starts at 10% (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.
- Philips HF-REGULATOR II gear is equipped with Extended Cable Flexibility (ECF) Technology. ECF Technology is based on a dedicated integrated circuit that ensures independent control of lamps, and in doing so takes care that:
  - In case of long or asymmetrical wiring (e.g. with emergency units or bundled wiring) deep and stable dimming is guaranteed (possible consequences for electromagnetic interference and compatibility EMI/EMC to be checked
  - Systems always remain operational in extreme conditions (e.g. low temperatures, lamp impurities at burning-in) in combination with the integrated anti extinguish control
  - Lamp life is unaffected by dimming position whilst energy savings are maximized* HFR TD for PL-R dims to 3%

Applications

Typical areas of application include:

- DALI installations with daylight linking and/or movement detection
- DALI installations with remote control systems
- Installations with emergency back-up, according to IEC 60598-2-22

Quality

Philips Quality applies 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: Philips HF electronic regulating control gear comply with all relevant international rules and regulations.

Compliances and approvals

RFI < 30 MHz	EN 55015
RFI > 30 MHz	EN 55022 limit 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 EN 60068-2-29-Eb
Quality standard	ISO 9001
Environmental standard	ISO 14001
Approval marks	ENEC VDE-EMV
Temperature declared thermally protected	EN 61347-1
CE marking	

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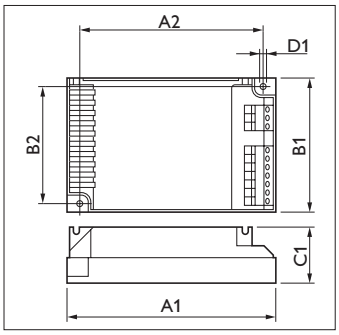
www.philips.com/OEM



HF-R PL-R/PL-T/C

Type	A1Nom	A2Nom	C1Nom	D1Nom
HF-Regulator TD 1 14-17 PL-R EII 220-240V	123	111	33	4.5

Inrush current

Type	Maximum ballast number on MCB (x)	Inrush current Peak (A)	Inrush current Width (ms)
HF-Regulator TD 1 14-17 PL-R EII 220-240V	28	27	0.25
HF-Regulator TD 1 26-42 PL-T/C EII 220-240V	28	27	0.35
HF-Regulator TD 2 26-42 PL-T/C EII 220-240V	12	45	0.35

Electrical data

Type	Number of Lamps (x)	Rated Ballast-Lamp Power	Power losses gear (W)	Energy Efficiency Index	Cable-Cap outputwires to earth (pF)	Cable-Cap outputwires mutual (pF)
HF-Regulator TD 1 14-17 PL-R EII 220-240V	1	14-17	3.2-3.5	A1	30	75
HF-Regulator TD 118 PL-T/C EII 220-240V 50/60Hz	1	18	3.5	A1	30	75
HF-Regulator TD 1 26-42 PL-T/C EII 220-240V	1	26-42	3.8-4.5	A1	30	75
HF-Regulator TD 2 14-17 PL-R EII 220-240V	2	14-17	4.0-4.5	A1	30	75
HF-Regulator TD 218 PL-T/C EII 220-240V 50/60Hz	2	18	5.5	A1	30	75
HF-Regulator TD 2 26-42 PL-T/C EII 220-240V	2	26-42	6.0-7.5	A1	30	75

Type	EAN code 1 piece	Weight	Qty bulk packing	Dimensions bulk packing	EAN code bulk packing	EOC 8711500
HF-Regulator TD 1 14-17 PL-R EII 220-240V	871150091349 4	0.195 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091350 0	913494 30
HF-Regulator TD 118 PL-T/C EII 220-240V 50/60Hz	871150091344 9	0.195 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091345 6	913449 30
HF-Regulator TD 1 26-42 PL-T/C EII 220-240V	871150091340 1	0.22 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091341 8	913401 30
HF-Regulator TD 2 14-17 PL-R EII 220-240V	871150091346 3	0.2 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091347 0	913463 30
HF-Regulator TD 218 PL-T/C EII 220-240V 50/60Hz	871150091342 5	0.205 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091343 2	913425 30
HF-Regulator TD 2 26-42 PL-T/C EII 220-240V	871150091337 1	0.22 kg	12	25.7 cm x 24.8 cm x 8.6 cm	871150091338 8	913371 30

Electrical installation notes

Mains operation	
Rated mains voltage	220 - 240 V
With tolerances for safety +/- 10%	198 - 264 V
Performance tolerance +6%-8%	202 - 254 V
Mains frequency	50/60 Hz
Smart power	with AC mains voltage fluctuations, within 202-254 V, luminous flux varies by ± 2% max
Earth leakage current	< 0.5 mA per ballast
Maximum number of units 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
Automatic restart after lamp replacement or voltage dip	Yes
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 the above mentioned test is carried out and before the installation is put in operation.
Ignition time	Typical 0.5 sec. quick warm start.
Protected against accidental mains voltage connection	Yes

DC/Emergency operation

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 obtained at	220 - 240 V

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 control gear.

Control characteristics

Control input

Regulating level (lamp power)	1 to 100%* The control input complies with EN 60929 (Annex E) and is compatible with Philips lighting control equipment.
Standby power consumption	< 350 mW
Control input insulation, basic insulation	≥ 1500 V

* HFR TD for PL-R regulates from 3 to 100%

Option 1) DALI

Digital coded input signal according to "Digital Addressable Lighting Interface" protocol, including 16 presets and 64 addresses possibility.

Option 2) Touch and Dim

A short push on the button represents the On/Off command. Personal light levels can be stored in the internal memory by a firm longer push on the push button. Failure proof (non volatile) memory ensures that the control gear always remembers your setting when next time switched on or in case of power failure.

Maximum number of units connected in one circuit (switched on by one or multiple switches)	32 Pcs
Mains input signal	Retractive push-to-make switch
Ignore status, < 0.04 sec.	To avoid reaction on mains spikes!
Short push, between 0.04 sec. and 0.5 sec.	Switch On/Off
Long push, between 0.5 sec. and 10 sec.	Dim Up/Down
Reset push, >10 sec.	Set light to mid value (35% output)

The dim direction will toggle between up and down 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.

Inrush current

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

MCB type	Rating	Relative number of ballasts
B	16 A	100% (see table)
B	10 A	63%
C	16 A	170%
C	10 A	104%
L, I	16 A	108%
L, I	10 A	65%
G, U, II	16 A	212%
G, U, II	10 A	127%
K, III	16 A	254%
K, III	10 A	154%

Notes:

1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 $mm^2$and other 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800 mΩ the number of ballasts can increase 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 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 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.

Mechanical installation notes

Technical data for design and mounting in fixtures

Temperatures	Temperature range to ignite the lamp
With ignition aid 1..100%	0 °C to +50 °C
at a 70..100% dim input	-20 °C to +50 °C
Storage temperature range	-25 °C to +80 °C
Stable lamp operation assured	> 15 °C
Striation possible	< 10 °C
Max Tcase	75 °C

The lifetime of control gear depends on its temperature when operating. This means there is a relation between the Tc point on the control gear and its lifetime. HF-REGULATOR II control gear for PL-T/C and PL-R applications has a specified lifetime of 50,000 hrs with a maximum of 10% failures guaranteed at a measured Tcase of 75 °C. For more information regarding this subject consult the Philips Application guide for fluorescent lamp control gear.

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 application	IP=20 In outdoor applications the luminaire has to be sufficiently IP rated and maximum permitted humidity is 95% non condensing. No moisture or condensation may enter the control gear.
Earthing	Earthing of the lamp control gear in a luminaire is necessary for EMC (electromagnetic compatibility)
Hum and noise level	Inaudible

Connector type:

Connection wiring is greatly simplified through use of WAGO 250 universal connector. Suitable for both automatic wiring (ADS) and manual wiring.

Wire cross-section:

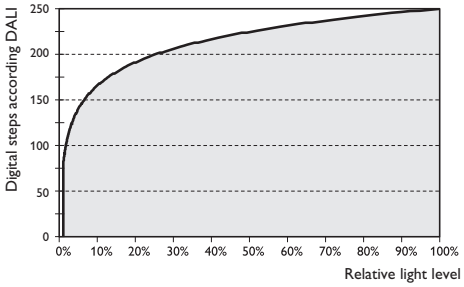
Mains connectors (orange)	0.5...1.5 mm^2
Touch & Dim or DALI connectors (blue)	0.5...1.5 mm^2
Lamps connectors (grey)	0.5...1.5 mm^2
Strip length	7.5 - 8.5 mm

Wiring tips:

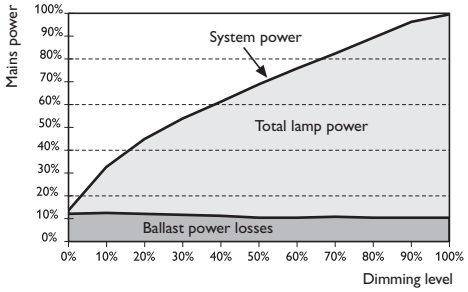
Earth connection to be made via the mains connector. Wiring inside fixture should be straight and as short as possible. Lamp wires should not run parallel to mains or control wires to avoid EMC problems. For optimal performance, note that:

1. For one lamp control gear keep wires 1 and 2 as short as possible, equal in length and a minimum of 50 mm from mains and dim wires. Keep lamp wires 3 and 4, equal in length.
2. For two lamps control gear keep wires 1,2,5 and 6 as short as possible, equal in length and a minimum of 50 mm from mains and dim wires. Keep lamp wires 3 and 4 and 7 and 8 equal in length.

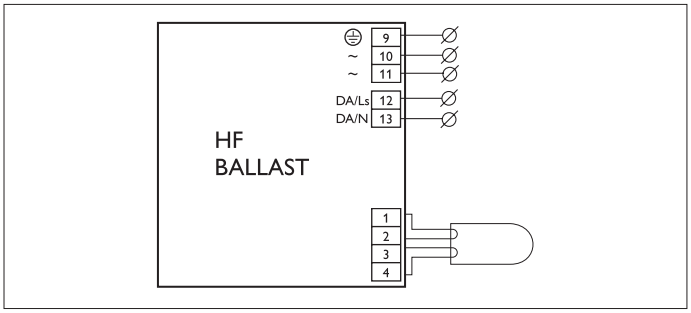
Ordering and packing data



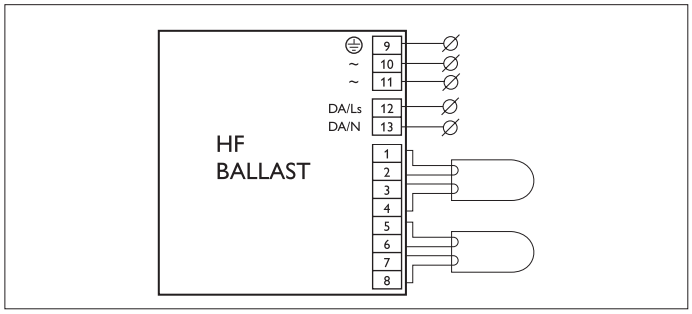
Relationship between lamp power and digital regulation



Input power vs dimlevel HF-REGULATOR II (Touch and DALI)



HF-R 1 PL-R/PL-T/C



HF-R 2 PL-R/PL-T/C