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.

Introduction

Saving the smart way
Focuses on saving energy and saving money (for initial and replacement markers).

Better light, better life
Focuses on improving performance by achieving constant light output and longer lamp life

You can depend on Philips
Focuses on safety and reliability of the Philips brand.

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, an 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;
- Flexibility 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 snd 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 CELMA 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 B1, B2 and C types.

The directive 2000/55/EC (O.J.EC 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 CELMA 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 21st. 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.

Fluorescent and compact fluorescent lamps control gear

Lamps and gear table – Fluo

		Recommended electronic system for the best performance				Alternative electromagnetic system for good performance			
Commercial name	**Technical lamp type**	**Ballast (1 lamp)**	**Ballast (2 lamps)**	**Ballast (3 lamps)**	**Ballast (4 lamps)**	**Ballast (1 lamp)**	**Starter**	**Ballast (2 lamps)**	**Starter**
TL5 16mm dia	MASTER TL5 HE Super 80 14W	EB-S 114 230-240 LH/LP/SP/SH							
	TL-5 Essential 14W	EB-E 114 TL5 220-230	EB-E 214 TL5 220-230						
		EB-S 114 TL5 220-240	EB-S 214 TL5 220-240	EB-S 314 TL5 220-240	EB-S 414 TL5 220-240				
		HF-P 1 14-35 TL5 HE	HF-P 2 14-35 TL5 HE EII	HF-P 3/414 TL5 HE EII	HF-P 3/414 TL5 HE EII				
		HF-M RED 114 SH TL/TL5							
		HF-R 114 TL5	HF-R 214 TL5	HF-R 3/414 TL5	HF-R 3/414 TL5				
		HF-R DALI 114 TL5	HF-R DALI 214 TL5	HF-R DALI 3/414 TL5					
					HF-R T 414 TL5				
TL5 16mm dia	MASTER TL5 HE Super 80 21W	EB-E 121 TL5 220-230							
	TL-5 Essential 21W	EB-S 121 TL5 220-240	EB-S 221 TL5 220-240						
		EB-S 121 220-240 LH/LP							
		HF-R 121 TL5	HF-R 221 TL5						
		HF-R DALI 121 TL5	HF-R DALI 221 TL5						
TL5 16mm dia	MASTER TL5 HE Super 80 28W	EB-E 128 TL5 220-230	EB-E 228 TL5 220-230						
	TL-5 Essential 28W	EB-S 128 TL5 220-240	EB-S 228 TL5 220-240						
		HF-P 1 14-35 TL5 HE	HF-P 2 14-35 TL5 HE EII						
		HF-R 128 TL5	HF-R 228 TL5						
		HF-R DALI 128 TL5	HF-R DALI 228 TL5						
		HF-R T 128 TL5	HF-R T 228 TL5						
		HF-R TD 1 28-35 TL5	HF-R TD 2 28-35 TL5						
TL5 16mm dia	MASTER TL5 HE Super 80 35W	EB-S 135 TL5 220-240	EB-S 235 TL5 220-240						
		HF-R 135 TL5	HF-R 235 TL5						
		HF-R DALI 135 TL5	HF-R DALI 235 TL5						
		HF-R T 135 TL5	HF-R T 235 TL5						
TL5 16mm dia	TL5 HO Super 80 49W	HF-P 149 TL5 HO	HF-P 249 TL5 HO EII						
		HF-R 149 TL5	HF-R 249 TL5						
		HF-R DALI 149 TL5	HF-R DALI 249 TL5						
		HF-R T 149 TL5	HF-R T 249 TL5						
		HF-R TD 149 TL5	HF-R TD 249 TL5						
TL5 16mm dia	MASTER TL5 HO Super 80 24W	HF-M RED 124 SH TL/TL5							
		HF-P 1 24-39 TL5 HO	HF-P 2 24-39 TL5 HO						
			HF-P 2 24-39 TL5 HO EII						
		HF-R 124 TL5	HF-R 224 TL5						
		HF-R DALI 124 TL5	HF-R DALI 224 TL5						
TL5 16mm dia	TL5 HO Super 80 39W	HF-P 1 24-39 TL5 HO	HF-P 2 24-39 TL5 HO						
			HF-P 2 24-39 TL5 HO EII						
		HF-R 139 TL5	HF-R 239 TL5						
		HF-R DALI 139 TL5	HF-R DALI 239 TL5						
		HF-R T 139 TL5							
TL5 16mm dia	TL5 HO Super 80 54W	HF-P 154 TL5 HO	HF-P 254 TL5 HO EII						
		HF-R 154 TL5	HF-R 254 TL5						
		HF-R DALI 154 TL5	HF-R DALI 254 TL5						
		HF-R T 154 TL5	HF-R T 254 TL5						
		HF-R TD 154 TL5	HF-R TD 254 TL5						
TL5 16mm dia	MASTER TL5 HO Super 80 80W	HF-P 180 TL5 HO EII	HF-P 280 TL5 HO EII						
		HF-R 180 TL5							
		HF-R TD 180 TL5/PLL							
TLD 26mm dia	TL-D Super 80 18W	EB-S 118 230-240 SH	EB-S 118 230-240 SP			BTA 18W 220V C SC	S10(-E)	BTA 36W 220V C SC	S2(-E)
	TL-D Xtreme 18W	EB-E 118 TLD 220-240	EB-E 218 TLD 220-240			BTA 18W 220V C DI	S10(-E)	BTA 36W 220V C DI	S2(-E)
	TL-D Xtra 18W	EB-S 118 TLD 220-240	EB-S 218 TLD 220-240	EB-S 318 TLD 220-240	EB-S 418 TLD 220-240	BTA 18W 220V/60Hz C SC	S10(-E)	BTA 36W 220V/60Hz C SC	S2(-E)
	TL-D 90 De Luxe Pro 18W/930	HF-P 118 TLD 220-240 EII	HF-P 218 TLD 220-240 EII	HF-P 3/418 TLD 220-240 EII	HF-P 3/418 TLD 220-240 EII	BTA 18W 220V/60Hz C DI	S10(-E)	BTA 36W 220V/60Hz C DI	S2(-E)
		EB-S ED 118 TLD 220-240	EB-S ED 218 TLD 220-240			BTA 18W 230V C SC	S10(-E)	BTA 36W 230V C SC	S2(-E)
		HF-M RED 118 SH TL/TL5				BTA 18W 230V C DI	S10(-E)	BTA 36W 230V C DI	S2(-E)
		HF-P 118 TLD EII	HF-P 218 TLD EII	HF-P 3/418 TLD EII	HF-P 3/418 TLD EII	BTA 18W 240V C SC	S10(-E)	BTA 36W 240V C SC	S2(-E)
		HF-R 118 TLD	HF-R 218 TLD	HF-R 3/418 TLD		BTA 18W 240V C DI	S10(-E)	BTA 36W 240V C DI	S2(-E)
		HF-R DALI 118 TLD	HF-R DALI 218 TLD	HF-R DALI 3/418 TLD	HF-R DALI 3/418 TLD	BTA 18W 220V B2 SC	S10(-E)	BTA 36W 220V B2 SC	S2(-E)
				HF-R T 3/418 TLD	HF-R T 3/418 TLD	BTA 18W 220V B2 DI	S10(-E)	BTA 36W 220V B2 DI	S2(-E)
						BTA 18W 220V/60Hz B2 SC	S10(-E)	BTA 36W 220V/60Hz B2 SC	S2(-E)
						BTA 18W 220V/60Hz B2 DI	S10(-E)	BTA 36W 220V/60Hz B2 DI	S2(-E)
						BTA 18W 220V B1 SC	S10(-E)	BTA 36W 220V B1 SC	S2(-E)
						BTA 18W 220V B1 DI	S10(-E)	BTA 36W 220V B1 DI	S2(-E)
						BTA 18W 230V B1 SC	S10(-E)	BTA 36W 230V B1 SC	S2(-E)

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Lamps and gear table – Fluo

		Recommended electronic system for the best performance				Alternative electromagnetic system for good performance			
Commercial name	**Technical lamp type**	**Ballast (1 lamp)**	**Ballast (2 lamps)**	**Ballast (3 lamps)**	**Ballast (4 lamps)**	**Ballast (1 lamp)**	**Starter**	**Ballast (2 lamps)**	**Starter**
						BTA 18W 230V B1 DI	S10(-E)	BTA 36W 230V B1 DI	S2(-E)
						BTA 18W 240V B1 SC	S10(-E)	BTA 36W 240V B1 SC	S2(-E)
						BTA 18W 240V B1 DI	S10(-E)	BTA 36W 240V B1 DI	S2(-E)
TLD 26mm dia	TL-D Super 80 RS 32W/840 SLV/25		EB-S 232 TLD 220-240						
TLD 26mm dia	TL-D Super 80 30W					BTA 30W 220V C SC	S10(-E)		
	TL-D Super 80 30W/840 ES					BTA 30W 220V C DI	S10(-E)		
	TL-D Food Pro 30W/79					BTA 30W 230V C SC	S10(-E)		
	TL-D 90 de Luxe Pro 30W/930					BTA 30W 230V C DI	S10(-E)		
						BTA 30W 240V C SC	S10(-E)		
						BTA 30W 240V C DI	S10(-E)		
						BTA 30W 220V B2 SC	S10(-E)		
						BTA 30W 220V/60Hz B2 SC	S10(-E)		
						BTA 30W 220V/60Hz B2 DI	S10(-E)		
TLD 26mm dia	TL-D Super 80 36W	EB-E 136 TLD 220-240	EB-E 236 TLD 220-240			BTA 36W 220V C SC	S10(-E)		
	TL-D Xtreme 36W	EB-S 136 TLD 220-240	EB-S 236 TLD 220-240	EB-S 336 TLD 220-240		BTA 36W 220V C DI	S10(-E)		
	TL-D Xtra 36W	HF-P 136 TLD 220-240 EII	HF-P 236 TLD 220-240 EII			BTA 36W 220V/60Hz C SC	S10(-E)		
	TL-D 90 De Luxe Pro 36W/930	EB-S ED 136 TLD 220-240	EB-S ED 236 TLD 220-240			BTA 36W 220V/60Hz C DI	S10(-E)		
	MASTER TL-D Reflex 36W/865	HF-P 136 TLD EII	HF-P 236 TLD EII			BTA 36W 230V C SC	S10(-E)		
		HF-R 136 TLD EII	HF-R 236 TLD EII			BTA 36W 230V C DI	S10(-E)		
		HF-R DALI 136 TLD	HF-R DALI 236 TLD			BTA 36W 240V C SC	S10(-E)		
		HF-R T 136 TLD	HF-R T 236 TLD			BTA 36W 240V C DI	S10(-E)		
		HF-R TD 136 TLD	HF-R TD 236 TLD			BTA 36W 220V B2 SC	S10(-E)		
						BTA 36W 220V B2 DI	S10(-E)		
						BTA 36W 220V/60Hz B2 SC	S10(-E)		
						BTA 36W 220V/60Hz B2 DI	S10(-E)		
						BTA 36W 220V B1 SC	S10(-E)		
						BTA 36W 220V B1 DI	S10(-E)		
						BTA 36W 230V B1 SC	S10(-E)		
						BTA 36W 230V B1 DI	S10(-E)		
						BTA 36W 240V B1 SC	S10(-E)		
						BTA 36W 240V B1 DI	S10(-E)		
TLD 26mm dia	TL-D Super 80 58W	EB-S 158 TLD 220-240	EB-S 258 TLD 220-240			BTA 58W 220V C SC	S10(-E)		
	MASTER TL-D Secura 58W	HF-P 158 TLD 220-240 EII	HF-P 258 TLD 220-240 EII			BTA 58W 220V C DI	S10(-E)		
	TL-D Super 80 HF 58W	EB-S ED 158 TLD 220-240	EB-S ED 258 TLD 220-240			BTA 58W 220V/60Hz C SC	S10(-E)		
	TL-D Xtreme 58W	HF-P 158 TLD EII	HF-P 258 TLD EII			BTA 58W 220V/60Hz C DI	S10(-E)		
	TLD-Xtra 58W	HF-R 158 TLD EII	HF-R 258 TLD EII			BTA 58W 230V C SC	S10(-E)		
	TL-D 90 Graphica Pro 58W/965	HF-R DALI 158 TLD	HF-R DALI 258 TLD			BTA 58W 230V C DI	S10(-E)		
	MASTER TL-D Reflex 58W/840	HF-R T 158 TLD	HF-R T 258 TLD			BTA 58W 240V C SC	S10(-E)		
		HF-R TD 158 TLD	HF-R TD 258 TLD			BTA 58W 240V C DI	S10(-E)		
						BTA 58W 220V B2 SC	S10(-E)		
TLE	TL-E 22W	EB-E 122 TLE 220-240				BTA 22W 220V C SC	S10(-E)		
	TL-E Super 80 22W					BTA 22W 220V C DI	S10(-E)		
						BTA 22W 230V C SC	S10(-E)		
						BTA 22W 230V C DI	S10(-E)		
						BTA 22W 240V C SC	S10(-E)		
						BTA 22W 240V C DI	S10(-E)		
						BTA 22W 220V B2 SC	S10(-E)		
						BTA 22W 220V/60Hz B2 SC	S10(-E)		
						BTA 22W 220V/60Hz B2 DI	S10(-E)		
TLE	TL-E 32W	EB-E 132 TLE 220-240				BTA 32W 220V C SC	S10(-E)		
	TL-E Super 80 32W					BTA 32W 220V C DI	S10(-E)		
						BTA 32W 230V C SC	S10(-E)		
						BTA 32W 230V C DI	S10(-E)		
						BTA 32W 240V C SC	S10(-E)		
						BTA 32W 240V C DI	S10(-E)		
						BTA 32W 220V B2 SC	S10(-E)		
						BTA 32W 220V/60Hz B2 SC	S10(-E)		
						BTA 32W 220V/60Hz B2 DI	S10(-E)		
TL5C	TL5 C Super 80 22W	HF-P 1 22-40 TL5C	HF-P 2 22-40 TL5C						
		HF-R 122 TL5C							
		HF-R DALI 122 TL5C							

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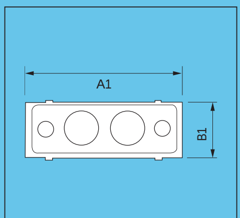
TL5C	TL5 C Super 80 55W	HF-P 155 TL5C							
		HF-R 155 TL5C							
		HF-R DALI 155 TL5C							
		HF-R T 155 TL5C							
TL5C	TL5 C Super 80 60W	HF-P 160 TL5C							
		HF-R 160 TL5C							
		HF-R DALI 160 TL5C							
		HF-R T 160 TL5C							
TL 38mm dia	TL RS 20W					BTA 18W 220V C SC	S10(-E)	BTA 36W 220V C SC	S2(-E)
	TL 20W					BTA 18W 220V C DI	S10(-E)	BTA 36W 220V C DI	S2(-E)
						BTA 18W 220V/60Hz C SC	S10(-E)	BTA 36W 220V/60Hz C SC	S2(-E)
						BTA 18W 220V/60Hz C DI	S10(-E)	BTA 36W 220V/60Hz C DI	S2(-E)
						BTA 18W 230V C SC	S10(-E)	BTA 36W 230V C SC	S2(-E)
						BTA 18W 230V C DI	S10(-E)	BTA 36W 230V C DI	S2(-E)
						BTA 18W 240V C SC	S10(-E)	BTA 36W 240V C SC	S2(-E)
						BTA 18W 240V C DI	S10(-E)	BTA 36W 240V C DI	S2(-E)
						BTA 18W 220V B2 SC	S10(-E)	BTA 36W 220V B2 SC	S2(-E)
						BTA 18W 220V B2 DI	S10(-E)	BTA 36W 220V B2 DI	S2(-E)
						BTA 18W 220V/60Hz B2 SC	S10(-E)	BTA 36W 220V/60Hz B2 SC	S2(-E)
						BTA 18W 220V/60Hz B2 DI	S10(-E)	BTA 36W 220V/60Hz B2 DI	S2(-E)
						BTA 18W 220V B1 SC	S10(-E)	BTA 36W 220V B1 SC	S2(-E)
						BTA 18W 220V B1 DI	S10(-E)	BTA 36W 220V B1 DI	S2(-E)
						BTA 18W 230V B1 SC	S10(-E)	BTA 36W 230V B1 SC	S2(-E)
						BTA 18W 230V B1 DI	S10(-E)	BTA 36W 230V B1 DI	S2(-E)
						BTA 18W 240V B1 SC	S10(-E)	BTA 36W 240V B1 SC	S2(-E)
						BTA 18W 240V B1 DI	S10(-E)	BTA 36W 240V B1 DI	S2(-E)
TL 38mm dia	TL RS 40W					BTA 36W 220V C SC	S10(-E)		
						BTA 36W 220V C DI	S10(-E)		
						BTA 36W 220V/60Hz C SC	S10(-E)		
						BTA 36W 220V/60Hz C DI	S10(-E)		
						BTA 36W 230V C SC	S10(-E)		
						BTA 36W 230V C DI	S10(-E)		
						BTA 36W 240V C SC	S10(-E)		
						BTA 36W 240V C DI	S10(-E)		
						BTA 36W 220V B2 SC	S10(-E)		
						BTA 36W 220V B2 DI	S10(-E)		
						BTA 36W 220V/60Hz B2 SC	S10(-E)		
						BTA 36W 220V/60Hz B2 DI	S10(-E)		
						BTA 36W 220V B1 SC	S10(-E)		
						BTA 36W 220V B1 DI	S10(-E)		
						BTA 36W 230V B1 SC	S10(-E)		
						BTA 36W 230V B1 DI	S10(-E)		
						BTA 36W 240V B1 SC	S10(-E)		
						BTA 36W 240V B1 DI	S10(-E)		
TL 38mm dia	TL RS 65W					BTA 58W 220V C SC	S10(-E)		
						BTA 58W 220V C DI	S10(-E)		
						BTA 58W 220V/60Hz C SC	S10(-E)		
						BTA 58W 220V/60Hz C DI	S10(-E)		
						BTA 58W 230V C SC	S10(-E)		
						BTA 58W 230V C DI	S10(-E)		
						BTA 58W 240V C SC	S10(-E)		
						BTA 58W 240V C DI	S10(-E)		
						BTA 58W 220V B2 SC	S10(-E)		
Miniature	TL Mini Aperture 8W/865 FA50	EB-S 109 230-240 LH							
	TL Mini Super 80 8W/830	EB-S 109 230-240 SH							
	TL Mini 6W/54	EB-S 109 230-240 LP							
		EB-S 109 230-240 SP							
		HF-M RED 109 SH PL-S/PL-C							
Miniature	TL Mini Aperture 13W/865 FA50	EB-S 114 230-240 LH							
	TL Mini 13W	EB-S 114 230-240 SH							
		EB-S 114 230-240 LP							
		EB-S 114 230-240 SP							
		HF-M RED 114 SH TL/TL5							


ActiLume luminaire-based system with HF-REGULATORII ballast

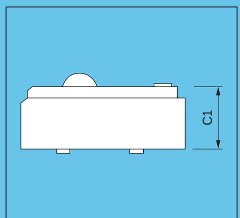

Sensor


Controller

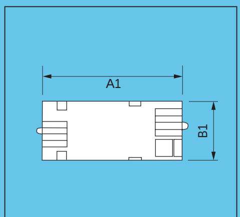
Dimensions in mm



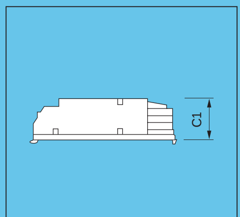
Sensor LRI1653/00



Sensor LRI1653/00



Controller LCC1653/00



Controller LCC1653/00

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 and Play solution for open plan (up to 9 luminaires) or cell offices (e.g. 4 luminaires). It is used in a master and slave luminaire 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-RegulatorII 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 cell offices, lobbies or toilets, and from corridor to small meeting rooms.

Product ID	A1	B1	C1
Sensor LRI1653/00	44.7	7.4	22
Controller LCC1653/00	794	30	21

- 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).

Plug & Play control regimes

- Mode 1: Switching light off when the area is not occupied, saving maximum energy in a cell office situation.
- Mode 2: Maintaining a (lower) light level when the area is not occupied, avoiding dark areas in an open plan office.
- Next to the modes the following functions can be changed independently:
  - Power up behaviour (see manual IRT8099/00)
  - Default light level (via the service button)
  - Background level (see manual IRT8099/00)

Related equipment

- ActiLume movement detector, extension sensor LRM8118/00
- Simple programming tool IRT8098/00
- Advanced mode selection tool IRT8099/00
- Two-key hand held transmitter IRT8010/00 and wall holder LRH8010/00
- Two-key transmitter IRT8050/00
- 4 preset transmitter IRT8030/00

Philips quality

This 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 lighting control equipment complies with all relevant international rules and regulations.

Compliances and approvals

• RFI<30 MHz:	EN 55015
• RFI>30 MHz:	EN 55022 A
• Immunity:	EN 61547
• Safety:	EN 61347-1
	EN 61374-2-11
• Quality standard:	ISO 9001
• Environmental standard:	ISO 14001
• Approval marks:	ENEC
• 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
Input power (system)	1,3..1,55W.

Output power (system)

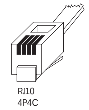
Number of ballasts	Number of extension sensors LRM
11	0
10	1
9	2

Technical data for design and mounting in fixtures

Operating conditions	
Ambient temperature	0 °C to 55 °C Sensor and controller
Rel. humidity	20% to 85%, no condensation
Tcase	75 °C
Storage Conditions	-25 °C to +85 °C
Rel. humidity	10% to 95%

Sensor LRI

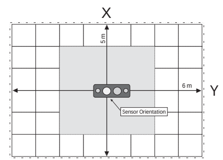
Connection	RJ-10 4-Pole Fixed to LRI1653/00, 100 cm cable



Housing (casing)	
Material	Polycarbonate UL94 V-0
Glow wire test	850 °C / 5 s
Safety, basic insulation	⩾ 1500 V

When placed at a height of 3 m the following values are valid:

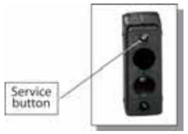
Infrared receiver	Signal Range
Light sensor	Ambient light monitoring monitoring 25 to 350 lux at sensor Monitoring area
Movement detector	Passive Infra Red (PIR) Detection area at 2.5 m height: • 4x4 m (sensitive for small movements) • 6x5 m (sensitive large movements)



Maximum height PIR: 3.5 m
- X-angle PIR: 82°
- Y-angle PIR: 100°

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.

b. Adjust the factory set reference light level
Pressing the service button (>3 seconds) until the lamp gives a light flash (wink) will start the automatic calibration procedure.

The light output of the luminaires connected to DALI_1 (window row) is set to 80%. The light output of the luminaires connected to DALI_2 (corridor row) is set to 100%.

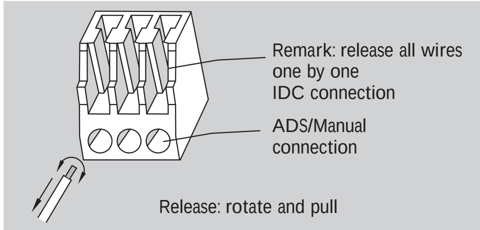
After 30 seconds the ActiLume controller is saving the actual light level as new reference light level (indicated by a second flash).
This 30 seconds time delay is required to have sufficient time to step aside or remove a stepladder.

Controller unit LCC1653/00

DALI Output	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 DALI_2 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.
Manual control	By connecting a mains rated springback switch to connection Ls (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.
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.

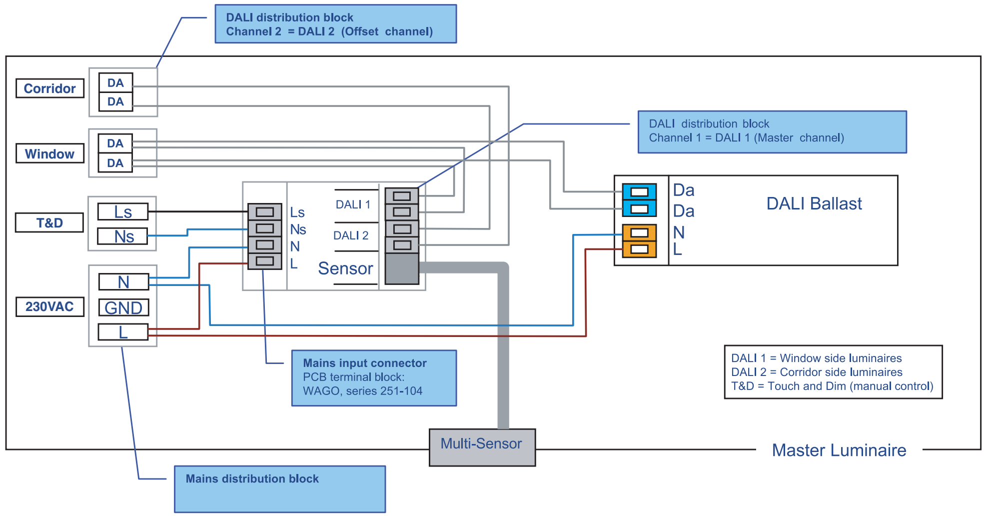
Connector type

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



Wire cross-section

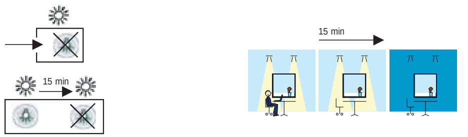
ADS manual connection	0.5 mm - 1.0 mm^2
IDC connection *Stranded wire	0.5 mm – 0.75 mm^2(*)
Strip length	8.0 – 9.0 mm



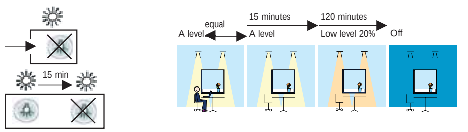
ActiLume Modes

Besides the two Plug and Play modes for cell office and open plan office, it is possible to recall 8 other application modes as mentioned below. This makes the ActiLume system very flexible for all different kinds of applications. With the aid of the advanced mode selection tool 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.

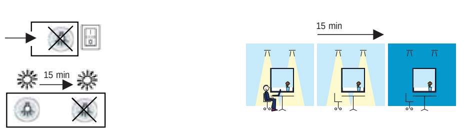
Mode 1 Cell office



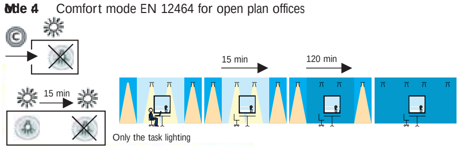
Mode 2 Open plan office



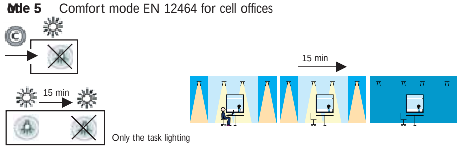
Mode 3 School/Classroom



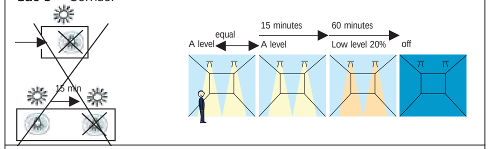
Mode 4 Comfort mode EN 12464 for open plan offices



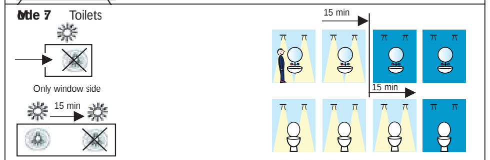
Mode 5 Comfort mode EN 12464 for cell offices



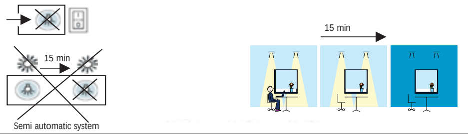
Mode 6 Corridor



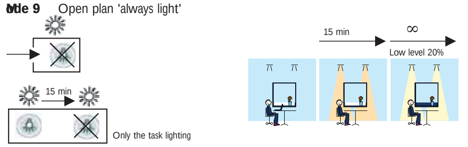
Mode 7 Toilets



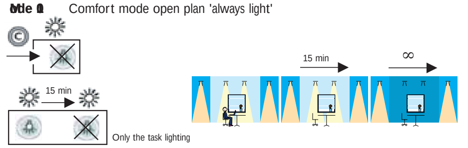
Mode 8 Meeting rooms



Mode 9 Open plan 'always light'

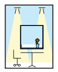


Mode 10 Comfort mode open plan 'always light'

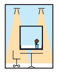


Legend

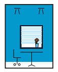
Presence
Area is occupied



Absence
Light stays on
(internal timer is activated to clock absence time)

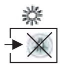


Absence
Light dims down to a background level (internal timer is activated to clock absence time) or surrounding light at 100%

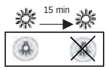


Absence
Light switched off

Comfort mode



When enough daylight is detected, the lights will NOT be switched on automatically when someone enters the room



When enough daylight is detected (measured over 15 minutes), the lights will automatically be switched off

Lights need to be switched on manually

Controller LCC

Extension sensor LRM

Extension sensor for ActiLume to cover movement in open plan or light lines solution.

Sensor LRI

Simple mode selection tool IRT

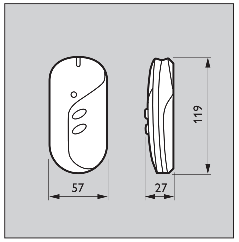
Simple mode selection tool for ActiLume (mode 1 and mode 2 selection).
Light set point calibrator.
Easy to Use.
Batteries are included.

Advanced mode selection tool IRT

Mode selection tool for ActiLume luminaires.
Inexpensive tool to adjust light levels and to switch between functionality modes.
Batteries are included.

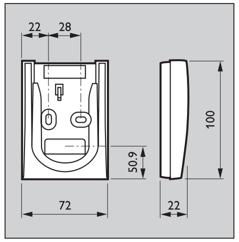
Product description	Weight (kg)	Packaging pcs	EOC
Controller LCC1653/00	0.03 (per piece)	48	910424 30
Sensor LRI1653/00	0.03 (per piece)	48	910462 30
Kit Controller & Sensor KIT1653/00	0.06 (per kit)	12	910448 30
Extension sensor LRM8118/00	0.20	1	730783 00
Simple mode selection tool IRT8098/00	0.08	1	730806 00
Advanced mode selection tool IRT8099/00	0.22	1	518893 00

Dimensions in mm



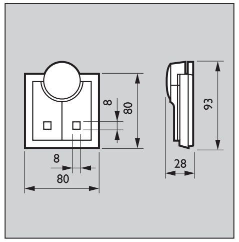
Hand-held two-key transmitter IRT8010/00

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.



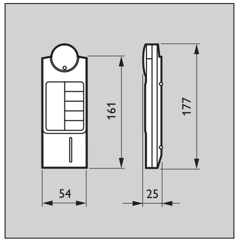
Wall holder LRH8010/00

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 table-top 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.



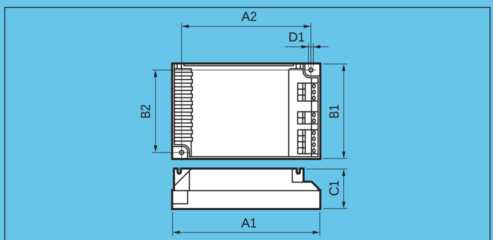
Four-preset hand-held transmitter IRT8030/00

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.

Product description	Weight (kg)	EOC
TRANSM IR POINT IRT8010/00	0.06	517490 00
MOUNT IR POINT LRH8010/00	0.03	517971 00
TRANSM IR 2KEY WALL IRT8050/00	0.12	517070 00
TRANSM IR TRIOS IRT8030/00	0.22	517636 00

HF-R DALI PL-T/PL-C

Dimensions in mm



Product description

Compact, lightweight high-frequency electronic regulating ballast using DALI (Digital Addressable Lighting Interface) protocol, for PL-T and PL-C compact fluorescent lamps.

Features and benefits

- The lamp power can be regulated down to 3%.
- Striation-free operation.
- Digital Addressable control input (DALI Protocol).
  Quick programmed start: flicker-free warm start, ideal for areas with a high switching frequency (movement detection applications), this enables the lamps to be switched on and off without reducing useful life.
- Up to 60% 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 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:
- 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 lobby's
- Conference rooms, Lecture theatres.
- Department stores, shops, supermarkets and malls
- Hotels, restaurants and bars
- Cinemas, museums
- Hospitals,
- Schools
- Factories, workshops
- Airports, railway stations

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 ballast's comply with a relevant international rules and regulations.

Product ID	A1	A2	B1	B2	C1	D1
1 Lamps	123	111	79	67	33	4.5
2 Lamps	123	111	79	67	33	4.5

Compliances and approvals

- RFI < 30 MHz: EN 55015*
- RFI > 30 MHz: EN 55022B
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
- 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
- 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: 0.95 at 100% power

Smart power: with AC mains voltage fluctuations, luminous flux varies by ± 2% max.: 202 - 254 V

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:
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 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

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.

Advised maximum cable capacity for optimum performance and EMI Suppression: max. 30 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. Care has to be taken for symmetrical wiring

Mains current at 230V

Ballast	Input current A
HF-R DALI 118 PL-T/C	0.09
HF-R DALI 218 PL-T/C	0.17
HF-R DALI 126 PL-T/C	0.13
HF-R DALI 226 PL-T/C	0.24
HF-R DALI 132 PL-T	0.17
HF-R DALI 232 PL-T	0.31
HF-R DALI 142 PL-T	0.22
HF-R DALI 242 PL-T	0.42

Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker type B16A	Inrush current Max. value time at typical mains impedance
HF-R DALI 118 PL-T/C	28	40A/110 μs
HF-R DALI 218 PL-T/C	28	35A/120 μs
HF-R DALI 126 PL-T/C	28	40A/110 μs
HF-R DALI 226 PL-T/C	28	35A/120 μs
HF-R DALI 132 PL-T	28	40A/110 μs
HF-R DALI 232 PL-T	12	45A/170 μs
HF-R DALI 142 PL-T	28	40A/110 μs
HF-R DALI 242 PL-T	12	45A/170 μs

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

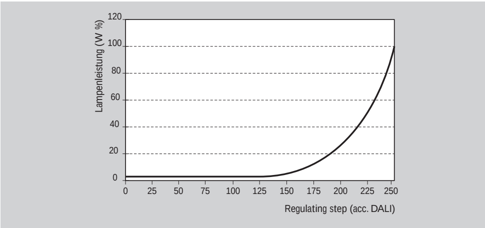
Type		Relative quantity of ballasts
B	16 A	100% (see table above)
B	10 A	63%
C	16 A	170%
C	10 A	104%
L, I	16 A	108%
L, I	10 A	65%
G, U, II	16 A	212%
G, U, II	10 A	127%
K, III	16 A	254%
		K, III%

Technical data in relation to energy saving

Lamp	Qty of lamps	Ballast	System power* W	System Efficacy lm/W	Lamp Power* W	Lamp Efficacy lm/W	Lumen* lm	EEI class. EEI
PL-T 18W	1	HF-R DALI 118 PL-T/C	21	57	16.5	73	1200	A1
PL-C 18W	1	HF-R DALI 118 PL-T/C	21	57	16.5	73	1200	A1
PL-T 18W	2	HF-R DALI 218 PL-T/C	38	63	16.5	73	1200	A1
PL-C 18W	2	HF-R DALI 218 PL-T/C	38	63	16.5	73	1200	A1
PL-T 26W	1	HF-R DALI 126 PL-T/C	29	62	24	75	1800	A1
PL-C 26W	1	HF-R DALI 126 PL-T/C	29	62	24	75	1800	A1
PL-T 26W	2	HF-R DALI 226 PL-T/C	54	67	24	75	1800	A1
PL-C 26W	2	HF-R DALI 226 PL-T/C	54	67	24	75	1800	A1
PL-T 32W	1	HF-R DALI 132 PL-T	38	63	32	75	2400	A1
PL-T 32W	2	HF-R DALI 232 PL-T	72	67	32	75	2400	A1
PL-T 42W	1	HF-R DALI 142 PL-T	50	63	43	74	3200	A1
PL-T 42W	2	HF-R DALI 242 PL-T	96	67	43	74	3200	A1

* At 100% power

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



Relationship between lamp power and digital regulation

Regulating level (lamp power) — 3 to 100%
The control input complies with EN60929 (Amendment 1, Annex E) and is compatible with Philips lighting control equipment.

Dim command for full lamp power (100%) — step 254
Dim command for min. lamp power (3%) — step 126

Protected against accidental mains voltage connection — Yes
Control input insulation, basic insulation — < 1500V

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

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**

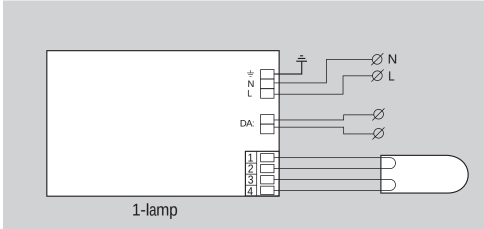
Note:
Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.

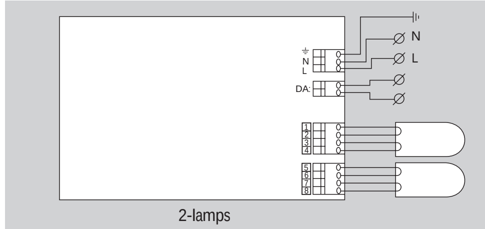
Earthing	Earthing of the HF ballast in a luminaire is necessary for EMC (electromagnetic compatibility)
Class II luminaires	This application is not advisable; only with extensive tests on luminaires can the correct operation be verified
Hum and noise level	inaudible

Permitted humidity is tested according to IEC 928 par.12 Note that no moisture or condensation may enter the ballast.

Connection wiring is greatly simplified through use of insert contacts; earth connection can be made via housing or terminal block.

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





Wiring diagrams

Connection wiring is greatly simplified through use of insert contacts; earth connection can be made via housing or terminal block.

Wire crosssection:

Mains connector	[Orange]	0.5mm – 1.5mm²
Control connector	[Blue]	0.5mm – 1.5mm²
Lamp(s) connector	[gray]	0.5mm – 1.5mm²
Strip length		7.5 – 8.5 mm

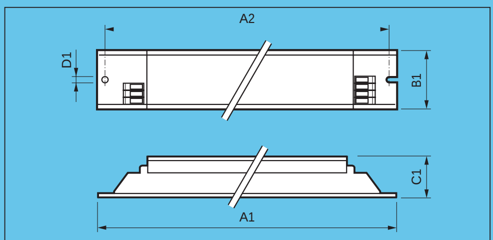
Notes:
7. For optimum performance, note that wires from connection 1 and 2 should be kept short and equal in length.
8. Keep lamp wiring as short as possible; do not bunch wires from terminals 1&2 with those from terminals 3&4 (1-lamp ballasts), or wires from terminals 3, 4, 5 & 6 with those from terminals 1, 2, 7 & 8 (2-lamp ballasts).
9. Ip-Ip between lamp wires
   Typical capacitance 1m wires close together (spacing 0.5 mm) 46pF
   Typical capacitance 0.5m wires close together (spacing 0.5 mm) 23pF
   Ip-Ig between lamp wires and ground
   Typical capacitance 1m wires close to ground (spacing 0.5 mm) 72pF
   Typical capacitance 0.5m wires close to ground (spacing 0.5 mm) 38pF

Ordering and packing data

Ballast	Piece EAN code	Piece Weight kg	Qty pcs	Bulk packing Dimensions l x w x h cm	Volume m³	Weight gross kg	EAN code	EOC
HF-R DALI 118 PL-T/C	8711500 929808	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929815	929808 30
HF-R DALI 218 PL-T/C	8711500 929884	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929891	929844 30
HF-R DALI 126 PL-T/C	8711500 929822	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929839	929822 30
HF-R DALI 226 PL-T/C	8711500 929907	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929914	929907 30
HF-R DALI 132 PL-T	8711500 929846	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929853	929846 30
HF-R DALI 232 PL-T	8711500 929921	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929938	929921 30
HF-R DALI 142 PL-T	8711500 929860	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929877	929860 30
HF-R DALI 242 PL-T	8711500 929945	0.2	12	22.0 x 21.1 x 8.8	0.006	3.0	8711500 929952	929945 30

Electronics (Dimming) HF-Regulator EII Touch and DALI TL-5

HF-R DALI TL5



Dimensions in mm

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*II* ballasts incorporate the new Philips E*II* 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, preheating 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 E*II* 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.
- Striation-free operation, no stroboscopic 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*II* electronic ballasts are equipped with E*II*-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.

Product ID	A1	A2	B1	C1	D1
1 Lamps	360	350	30	21	4.2
2 Lamps	360	350	30	21	4.2
2x80W	425	415	30	21	4.2
3/4 Lamps	360	350	39	21	4.2

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.

Philips quality

This 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 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 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 EMV-VDE
• Temp. declared thermally protected:	EN 61347-1
• 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
Smart power: with AC mains voltage fluctuations, luminous flux varies by ± 2% max.	202-254 V
DC voltage operation (during emergency back-up)	
Required battery voltage for guaranteed ignition	198V – 254 V
Required battery voltage for burning lamps	176V – 254 V
Nominal light output is obtained at a voltage of	220V – 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 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 320 V AC 2 hrs at 350 V AC
Automatic restart after lamp replacement or voltage dip	Yes

Mains current at 230 V

Ballast	Lamp type	Qty of lamps	Input current A
HF-R TD 114 TL5	TL5 14 W HE	1	-
HF-R TD 214 TL5	TL5 14 W HE	2	-
HF-R TD 3/414 TL5	TL5 14 W HE	3	-
HF-R TD 3/414 TL5	TL5 14 W HE	4	-
HF-R TD 121 TL5	TL5 21 W HE	1	-
HF-R TD 221 TL5	TL5 21 W HE	2	-
HF-R TD 128-35 TL5	TL5 28 W HE	1	0.139
HF-R TD 228-35 TL5	TL5 28 W HE	2	0.269
HF-R TD 128-35 TL5	TL5 35 W HE	1	0.172
HF-R TD 228-35 TL5	TL5 35 W HE	2	0.336
HF-R TD 124 TL5	TL5 24 W HO	1	-
HF-R TD 224 TL5	TL5 24 W HO	2	-
HF-R TD 3/424 TL5	TL5 24 W HO	3	-
HF-R TD 3/424 TL5	TL5 24 W HO	4	-
HF-R TD 139 TL5	TL5 39 W HO	1	-
HF-R TD 239 TL5	TL5 39 W HO	2	-
HF-R TD 149 TL5	TL5 49 W HO	1	0.240
HF-R TD 249 TL5	TL5 49 W HO	2	0.449
HF-R TD 154 TL5	TL5 54 W HO	1	0.262
HF-R TD 254 TL5	TL5 54 W HO	2	0.521
HF-R TD 180 TL5/PL-L	TL5 80 W HO	1	0.381
HF-R TD 280 TL5/PL-L	TL5 80 W HO	2	-

Inrush current

	Qty of Lamps	Max. quantity of ballasts per Miniature Circuit Breaker Type B16 A	Inrush current 1/2 value time at typical mains impedance
HF-R TD 114 TL5	1	-	-
HF-R TD 214 TL5	2	-	-
HF-R TD 3/414 TL5	3	-	-
HF-R TD 3/414 TL5	4	-	-
HF-R TD 121 TL5	1	-	-
HF-R TD 221 TL5	2	-	-
HF-R TD 128-35 TL5	1x28	28	19A/220 µS
HF-R TD 228-35 TL5	2x28	12	25A/200 µS
HF-R TD 128-35 TL5	1x35	28	19A/220 µS
HF-R TD 228-35 TL5	2x35	12	25A/200 µS
HF-R TD 124 TL5	1	-	-
HF-R TD 224 TL5	2	-	-
HF-R TD 3/424 TL5	3	-	-
HF-R TD 3/424 TL5	4	-	-
HF-R TD 139 TL5	1	-	-
HF-R TD 239 TL5	2	-	-
HF-R TD 149 TL5	1	28	19A/220 µS
HF-R TD 249 TL5	2	12	32A/300 µS
HF-R TD 154 TL5	1	28	24A/250 µS
HF-R TD 254 TL5	2	12	45A/400 µS
HF-R TD 180 TL5/PL-L	1	12	45A/400 µS
HF-R TD 280 TL5/PL-L	2	-	-

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

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

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 into operation.
TL5 lamp wiring	500 V rated components and wiring are required with HF-Regulator// TL5.
Ignition time	Typical 0.5 sec. quick warm start.

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

Lamps	Qty of Lamps	Ballast	System W	Lamp Power* W	Ballast Power* W	Efficacy Loss* lm/W	Lumen at 35 °C** lm	CELMA Nom.* EEI
TL5 HE 14W	1	HF-R TD 114 TL5	-	-	-	-	1200	A1
TL5 HE 14W	2	HF-R TD 214 TL5	-	-	-	-	2400	A1
TL5 HE 14W	3	HF-R TD 3/414 TL5	-	-	-	-	3600	A1
TL5 HE 14W	4	HF-R TD 3/414 TL5	-	-	-	-	4800	A1
TL5 HE 21W	1	HF-R TD 121 TL5	-	-	-	-	1900	A1
TL5 HE 21W	2	HF-R TD 221 TL5	-	-	-	-	3800	A1
TL5 HE 28W	1	HF-R TD 128-35 TL5	31.6	27.8	3.8	104	2600	A1
TL5 HE 28W	2	HF-R TD 228-35 TL5	61.3	2x27.8	5.7	104	5200	A1
TL5 HE 35W	1	HF-R TD 128-35 TL5	38.9	34.7	4.2	104	3300	A1
TL5 HE 35W	2	HF-R TD 228-35 TL5	76.6	2x34.7	7.2	104	6600	A1
TL5 HO 24W	1	HF-R TD 124 TL5	-	-	-	-	2000	A1
TL5 HO 24W	2	HF-R TD 224 TL5	-	-	-	-	4000	A1
TL5 HO 24W	3	HF-R TD 3/424 TL5	-	-	-	-	6000	A1
TL5 HO 24W	4	HF-R TD 3/424 TL5	-	-	-	-	8000	A1
TL5 HO 39W	1	HF-R TD 139 TL5	-	-	-	-	3500	A1
TL5 HO 39W	2	HF-R TD 239 TL5	-	-	-	-	7000	A1
TL5 HO 49W	1	HF-R TD 149 TL5	54.1	49.3	4.8	99	4300	A1
TL5 HO 49W	2	HF-R TD 249 TL5	106.1	2x49.3	7.5	99	8600	A1
TL5 HO 54W	1	HF-R TD 154 TL5	60.1	53.8	6.3	93	4450	A1
TL5 HO 54W	2	HF-R TD 254 TL5	118.8	2x53.8	11.2	93	8900	A1
TL5 HO 80W	1	HF-R TD 180 TL5/PL-L	87	80.1	6.8	88	6150	A1
TL5 HO 80W	2	HF-R TD 280 TL5/PL-L	-	-	-	-	12300	A1

* Typical values for /830 measured at 100% power and 25 °C lamp ambient temperature

** Typical values at 35 °C (light top for MASTER TL5 Super 80 lamps)

Electronics (Dimming) HF-Regulator EII Touch and DALI TL-5

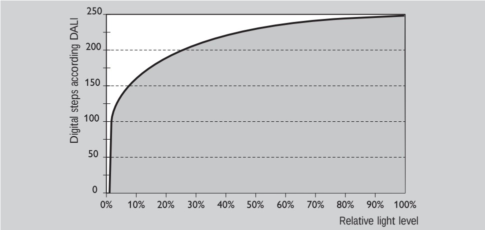
Lamp	Qty of Lamps	Ballast	Power Factor	Max cable Cap[1] Lp-Lp/Lp-Lgnd PF	Tc max °C	Operating Frequency kHz
TL5 HE 14W	1	HF-R TD 114 TL5	-	-	-	-
TL5 HE 14W	2	HF-R TD 214 TL5	-	-	-	-
TL5 HE 14W	3	HF-R TD 3/414 TL5	-	-	-	-
TL5 HE 14W	4	HF-R TD 3/414 TL5	-	-	-	-
TL5 HE 21W	1	HF-R TD 121 TL5	-	-	-	-
TL5 HE 21W	2	HF-R TD 221 TL5	-	-	-	-
TL5 HE 28W	1	HF-R TD 128-35 TL5	0.98	100/150	75	42.110
TL5 HE 28W	2	HF-R TD 228-35 TL5	0.98	50/75	75	42.110
TL5 HE 35W	1	HF-R TD 128-35 TL5	0.99	100/150	75	42.110
TL5 HE 35W	2	HF-R TD 228-35 TL5	0.99	50/75	75	42.110
TL5 HO 24W	1	HF-R TD 124 TL5	-	-	-	-
TL5 HO 24W	2	HF-R TD 224 TL5	-	-	-	-
TL5 HO 24W	3	HF-R TD 3/424 TL5	-	-	-	-
TL5 HO 24W	4	HF-R TD 3/424 TL5	-	-	-	-
TL5 HO 39W	1	HF-R TD 139 TL5	-	-	-	-
TL5 HO 39W	2	HF-R TD 239 TL5	-	-	-	-
TL5 HO 49W	1	HF-R TD 149 TL5	0.98	100/150	75	42.110
TL5 HO 49W	2	HF-R TD 249 TL5	0.99	50/75	75	42.110
TL5 HO 54W	1	HF-R TD 154 TL5	0.98	100/150	75	42.110
TL5 HO 54W	2	HF-R TD 254 TL5	0.99	50/75	75	42.110
TL5 HO 80W	1	HF-R TD 180 TL5/PL-L	0.99	100/150	75	42.110
TL5 HO 80W	2	HF-R TD 280 TL5/PL-L	-	-	-	-

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)

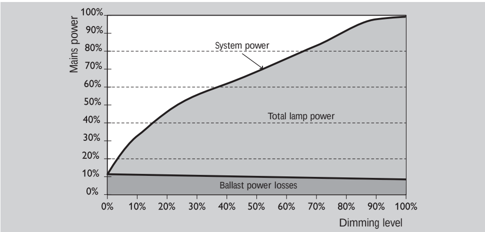
Protected against accidental mains voltage connection	Yes

Control input

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



Relation between lamp power and digital regulator



Input power vs dimlevel HF-REGULATORII (DALI/Touch and Dim)

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 ballast always remembers your setting when next time switched on or in case of power failure.

Maximum number of ballasts 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 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.

Technical data for design and mounting in fixtures

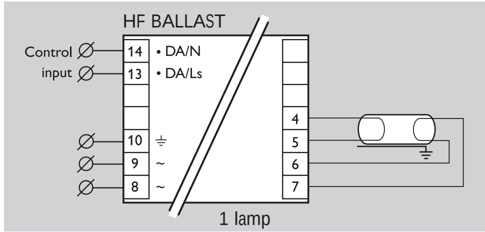
Temperatures	
Temperature range to ignite lamp	
With ignition aid	0 °C to +50 °C
at a 70..100% dim input	-20 ºC to +50 ºC
Storage temperature range	-25 ºC to +80 ºC
Stable lamp operation assured	> 15 °C
Striation possible	< 10 °C
Max t case	75 °C

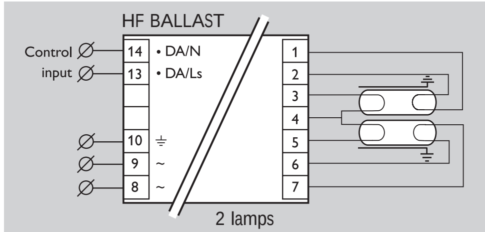
The lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The HF-Regulator*II* ballast for TL5 applications has a specified lifetime of 50,000 hrs at a measured Tcase of 75 °C.

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 the luminaire has to be sufficiently IP rated Permitted humidity is tested according to EN 61347-1 par 11 Note that no moisture or condensation may enter the ballast
Ignition aid	For optimum ignition the 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)
Hum and noise level	Inaudible

Electronics (Dimming) HF-Regulator EII Touch and DALI TL-5

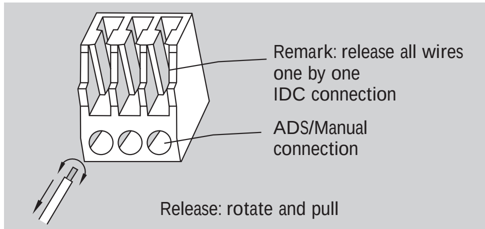
Wiring diagrams





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.



Wire cross-section

IDC connection	0.5 mm - 1.0 mm^2
ADS manual connection *Stranded wire	0.5 mm – 0.75 mm^2*
Strip length	8.0 – 9.0 mm

Wiring tips

Earth 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:

- For one lamp ballasts wires 4 and 5 as short as possible, equal in length and a minimum of 50 mm from mains or dim wires. Keep lamp wires 6 and 7 equal in length.
- For two lamp ballasts wires 3, 4 and 5 as short as possible, equal in length and a minimum of 50 mm from mains or dim wires. Keep lamp wires 6 and 7, and 1 and 2 equal in length.

Notes

1. Data based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm^2 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 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 MCB's. For multi-pole MCB's 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.

HF-Regulator EII Touch and DALI TL-5

Ordering and packaging data

Ballast	1 Piece			Bulk packaging				
	EAN code	Weight	Qty	Dimensions	Volume	Weight	EAN code	EOC
				l x w x h		Gross		
		kg	pcs	cm	m³	kg		
HF-R TD 128-35 TL5	8711500 908841	0.26	12	40.8x20.8x7.6	0.0065	3.4	8711500 908858	908841 30
HF-R TD 228-35 TL5	8711500 908865	0.29	12	40.8x20.8x7.6	0.0065	3.8	8711500 908872	908865 30
HF-R TD 149 TL5	8711500 908889	0.26	12	40.8x20.8x7.6	0.0065	3.4	8711500 908896	908889 30
HF-R TD 249 TL5	8711500 909596	0.31	12	40.8x20.8x7.6	0.0065	4.0	8711500 909602	909596 30
HF-R TD 154 TL5	8711500 909619	0.27	12	40.8x20.8x7.6	0.0065	3.5	8711500 909626	909619 30
HF-R TD 254 TL5	8711500 909633	0.33	12	40.8x20.8x7.6	0.0065	4.2	8711500 909640	909633 30
HF-R TD 180 TL5/PL-L	8711500 909657	0.29	12	40.8x20.8x7.6	0.0065	3.7	8711500 909644	909657 30

Ordering and packaging data

Ballast	1 Piece			Bulk packaging				
	EAN code	Weight	Qty	Dimensions	Volume	Weight	EAN code	EOC
				l x w x h		Gross		
		kg	pcs	cm	m³	kg		
HF-R TD 114 TL5								
HF-R TD 214 TL5								
HF-R TD 3/414 TL5								
HF-R TD 121 TL5								
HF-R TD 221 TL5								
HF-R TD 124 TL5				Under development				
HF-R TD 224 TL5								
HF-R TD 3/424 TL5								
HF-R TD 139 TL5								
HF-R TD 239 TL5								
HF-R TD 280 TL5/PL-L								

Electronics (Dimming)

Electronics (Dimming)

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

HF-REGULATORII (Touch and DALI)

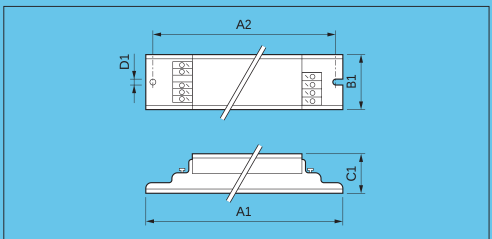
Product description
Flat, lightweight high-frequency electronic regulating ballast, using DALI (Digital Addressable Lighting Interface) or Touch and Dim push button protocol, for TL-D fluorescent lamps. The HF-Regulator*II* ballasts incorporates the new Philips E*II* technology offering full digital 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, preheating 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 E*II* 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.
- Striation-free operation, no stroboscopic 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*II* electronic ballasts are equipped with E*II*-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 dimming system or personal light level adjustment is required.

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
1 Lamps	360	350	30	21	4.2
2 Lamps	360	350	30	21	4.2
2x80W	425	415	30	21	4.2
3/4 Lamps	360	350	39	21	4.2

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.

Philips quality
This 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 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 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 EMV-VDE
• Temp. declared thermally protected:	EN 61347-1
• 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
Smart power: with AC mains voltage fluctuations, luminous flux varies by ± 2% max.	202-254 V
DC voltage operation (during emergency back-up)	
Required battery voltage for guaranteed ignition	198V – 254 V
Required battery voltage for burning lamps	176V – 254 V
Nominal light output is obtained at a voltage of	220V – 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 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 320 V AC 2 hrs at 350 V AC
Automatic restart after lamp replacement or voltage dip	Yes

Mains current at 230V
Ballast	Lamp type	Qty of lamps	Input current A
HF-R TD 118 TL-D	TL-D 18 W	1	-
HF-R TD 218 TL-D	TL-D 18 W	2	-
HF-R TD 3/418 TL-D	TL-D 18 W	3	-
HF-R TD 3/418 TL-D	TL-D 18 W	4	-
HF-R TD 136 TL-D	TL-D 36 W	1	0.170
HF-R TD 236 TL-D	TL-D 36 W	2	0.310
HF-R TD 158 TL-D	TL-D 58 W	1	0.250
HF-R TD 258 TL-D	TL-D 58 W	2	0.490
HF-R TD 136 PL-L	PL-L 36 W	1	-
HF-R TD 236 PL-L	PL-L 36 W	2	-
HF-R TD 140 PL-L	PL-L 40 W	1	-
HF-R TD 240 PL-L	PL-L 40 W	2	-
HF-R TD 155 PL-L	PL-L 55 W	1	-
HF-R TD 255 PL-L	PL-L 55 W	2	-
HF-R TD 180 TL5/PL-L	PL-L 80 W	1	0.381
HF-R TD 280 TL5/PL-L	PL-L 80 W	2	-

Electronics (Dimming)

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

Inrush current

	Qty of Lamps	Max. quantity of ballasts per Miniature Circuit Breaker Type B16 A	Inrush current 1/2 value time at typical mains impedance
HF-R TD 118 TL-D	1	-	-
HF-R TD 218 TL-D	2	-	-
HF-R TD 3/418 TL-D	3	-	-
HF-R TD 3/418 TL-D	4	-	-
HF-R TD 136 TL-D	1	28	25A/200 µS
HF-R TD 236 TL-D	2	12	32A/300 µS
HF-R TD 158 TL-D	1	28	25A/200 µS
HF-R TD 258 TL-D	2	12	32A/300 µS
HF-R TD 136 PL-L	1	-	-
HF-R TD 236 PL-L	2	-	-
HF-R TD 140 PL-L	1	-	-
HF-R TD 240 PL-L	2	-	-
HF-R TD 155 PL-L	1	-	-
HF-R TD 255 PL-L	2	-	-
HF-R TD 180 TL5/PL-L	1	12	45A/400 µS
HF-R TD 280 TL5/PL-L	2	-	-

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

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

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 into operation.
Ignition time	Typical 0.5 sec. quick warm start.

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

Lamps	Qty of Lamps	Ballast	System Power* W	Lamp Power* W	Ballast Loss* W	Efficacy lm/W	Lumen Nom.* lm	CELMA class. EEI
TL-D 18W	1	HF-R TD 118 TL-D	-	-	-	-	1300	A1
TL-D 18W	2	HF-R TD 218 TL-D	-	-	-	-	2600	A1
TL-D 18W	3	HF-R TD 3/418 TL-D	-	-	-	-	3900	A1
TL-D 18W	4	HF-R TD 3/418 TL-D	-	-	-	-	5200	A1
TL-D 36W	1	HF-R TD 136 TL-D	37	32	5	100	3200	A1
TL-D 36W	2	HF-R TD 236 TL-D	70.8	2x32	6.8	100	6400	A1
TL-D 58W	1	HF-R TD 158 TL-D	56.3	50	6.3	100	5000	A1
TL-D 58W	2	HF-R TD 258 TL-D	109.8	2x50	9.8	100	10000	A1
PL-L 36W	1	HF-R TD 136 PL-L	-	-	-	-	2900	A1
PL-L 36W	2	HF-R TD 236 PL-L	-	-	-	-	5800	A1
PL-L 40W	1	HF-R TD 140 PL-L	-	-	-	-	3500	A1
PL-L 40W	2	HF-R TD 240 PL-L	-	-	-	-	7000	A1
PL-L 55W	1	HF-R TD 155 PL-L	-	-	-	-	4800	A1
PL-L 55W	2	HF-R TD 255 PL-L	-	-	-	-	9600	A1
PL-L 80W	1	HF-R TD 180 TL5/PL-L	87	80.2	6.8	75	6000	A1
PL-L 80W	2	HF-R TD 280 TL5/PL-L	-	-	-	-	12000	A1

* Typical values for /830 measured at 100% power

Electronics (Dimming)

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

Lamp	Qty of Lamps	Ballast	Power Factor	Max cable Cap[1] Lp-Lp/Lp-Lgnd PF	Tc max °C	Operating Frequency kHz
TL-D 18W	1	HF-R TD 118 TL-D	-	-	-	-
TL-D 18W	2	HF-R TD 218 TL-D	-	-	-	-
TL-D 18W	3	HF-R TD 3/418 TL-D	-	-	-	-
TL-D 18W	4	HF-R TD 3/418 TL-D	-	-	-	-
TL-D 36W	1	HF-R TD 136 TL-D	0.98	100/150	75	42.110
TL-D 36W	2	HF-R TD 236 TL-D	0.99	75/50	75	42.110
TL-D 58W	1	HF-R TD 158 TL-D	0.99	100/150	75	42.110
TL-D 58W	2	HF-R TD 258 TL-D	0.99	75/50	75	42.110

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)

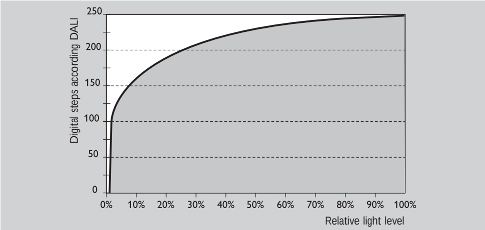
Protected against accidental mains voltage connection	Yes

Control input

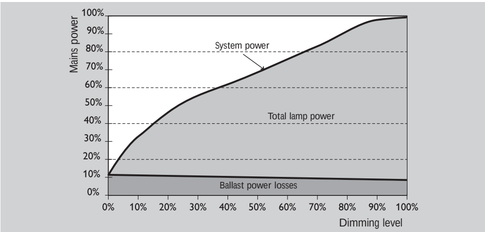
Regulating level (lamp power)	1 to 100%
The control input complies with EN 60929 (Amendment 1, Annex E) and is compatible with Philips lighting control equipment	
Standby power consumption	< 350 mW
Control input insulation, basic insulation	< 1500 V

Electronics (Dimming)

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



Relation between lamp power and digital regulation



Input power vs dimlevel HF-REGULATORII (DALI/Touch and Dim)

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

Option 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 ballast always remembers your setting when next time switched on or in case of power failure.

Maximum number of ballasts 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 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.

Technical data for design and mounting in fixtures

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

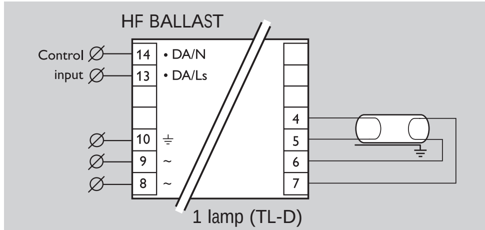
Lifetime of a ballast depends on the temperature of the ballast. This means there is a relation between the Tc point on the ballast and its lifetime. The HF-Regulator*II* ballast for TL5 applications has a specified lifetime of 50,000 hrs at a measured Tcase of 75 °C.

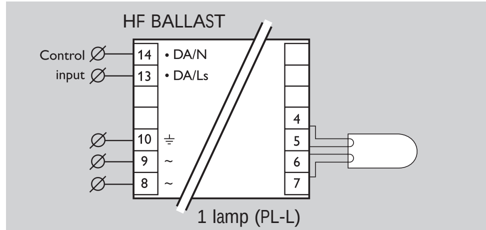
Class II luminaires	This application is not advisable; only with extensive tests on luminaires can the correct operation be verified EMI precautions have to be taken
Outdoor	Ballast IP=23 In outdoor the luminaire has to be sufficiently IP rated Permitted humidity is tested according to EN 61347-1 par 11 Note that no moisture or condensation may enter the ballast
Ignition aid	For optimum ignition the TL-D lamps should be mounted 13 mm from a metal plate. The metal plate should be electrically connected to the ballast housing For optimum ignition the PL-L lamps should be mounted 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)
Hum and noise level	Inaudible

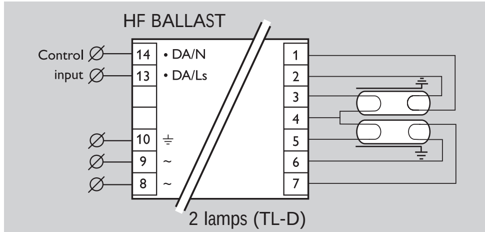
Electronics (Dimming)

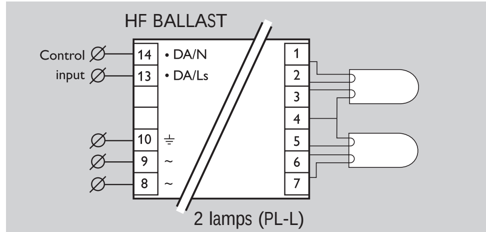
HF-Regulator EII Touch and DALI TL-D/PL-L

Wiring diagrams

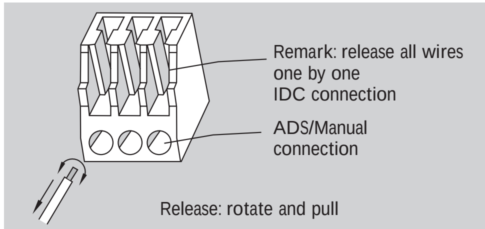








Connector type
Connection wiring is greatly simplified through use of WAGO 251 universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring.



Wire crosssection

ADS manual connection	0.5 mm - 1.0 mm^2
IDC connection *Stranded wire	0.5 mm – 0.75 mm^2(*)
Strip length	8.0 – 9.0 mm

Wiring tips
Earth 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:
- For one lamp ballasts wires 4 and 5 as short as possible, equal in length and a minimum of 50 mm from mains or dim wires. Keep lamp wires 6 and 7 equal in length.
- For two lamp ballasts wires 3, 4 and 5 as short as possible, equal in length and a minimum of 50 mm from mains or dim wires. Keep lamp wires 6 and 7, and 1 and 2 equal in length.

Notes
1. Data based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5 mm^2 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 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 MCB's. For multi-pole MCB's 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.

Electronics (Dimming)

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

Ordering and packaging data

Ballast	1 Piece EAN code	Weight (kg)	Qty (pcs)	Bulk packaging Dimensions lxbxh (cm)	Volume (m³)	Weight Gross (kg)	EAN code	EOC
HF-R TD 136 TL-D	8711500 909671	0.27	12	40.8x20.8x7.6	0.0065	3.4	8711500 909688	909671 30
HF-R TD 236 TL-D	8711500 909695	0.30	12	40.8x20.8x7.6	0.0065	3,9	8711500 909701	909695 30
HF-R TD 158 TL-D	8711500 909718	0.27	12	40.8x20.8x7.6	0.0065	3.4	8711500 909725	909718 30
HF-R TD 258 TL-D	8711500 909732	0.31	12	40.8x20.8x7.6	0.0065	4.0	8711500 909749	909732 30

Ordering and packaging data

Ballast	1 Piece EAN code	Weight (kg)	Qty (pcs)	Bulk packaging Dimensions lxbxh (cm)	Volume (m³)	Weight Gross (kg)	EAN code	EOC
HF-R TD 118 TL-D								
HF-R TD 218 TL-D				Under development				
HF-R TD 3/418 TL-D								

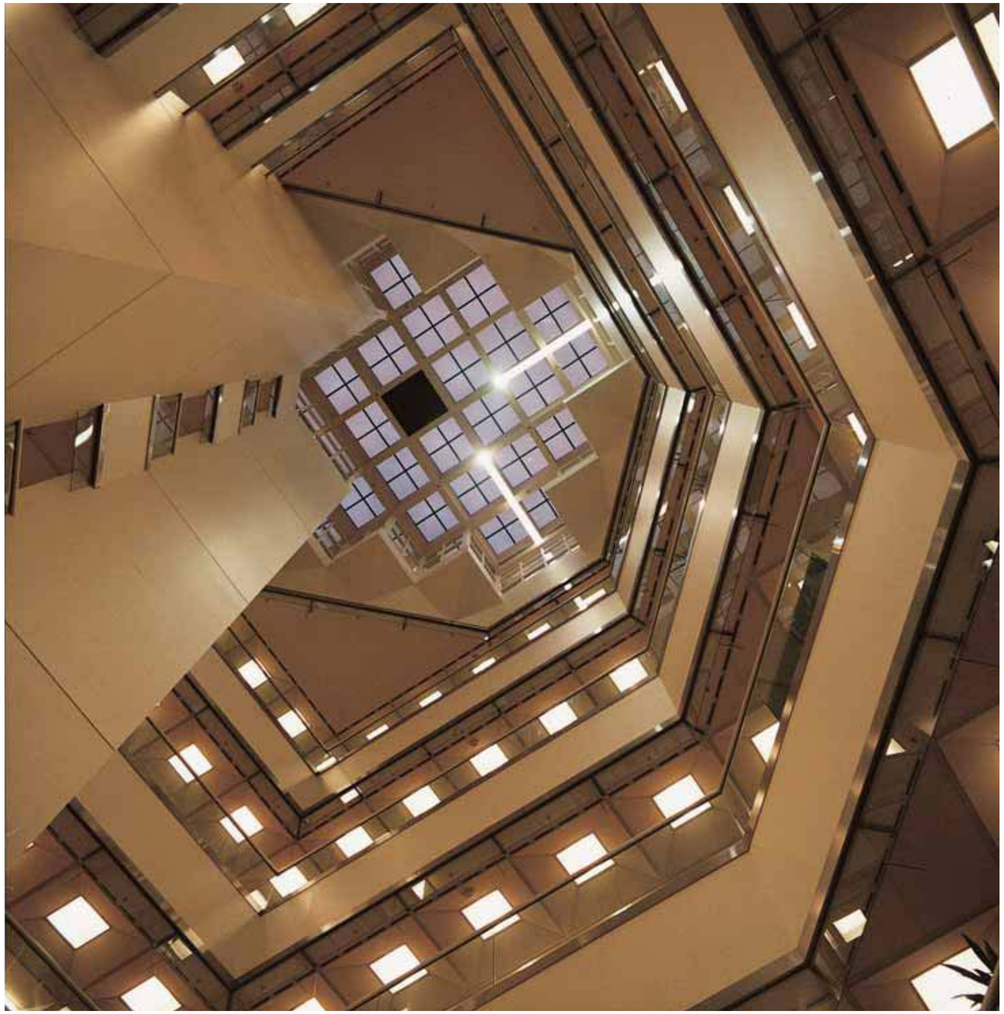
Ordering and packaging data

Ballast	1 Piece EAN code	Weight (kg)	Qty (pcs)	Bulk packaging Dimensions lxbxh (cm)	Volume (m³)	Weight Gross (kg)	EAN code	EOC
HF-R TD 180 TL5/PL-L	8711500 909657	0.20	12	40.8x20.6x7.6	0.0065	3.7	8711500 909644	909657 30

Ordering and packing data

Ballast	1 Piece EAN code	Weight (kg)	Qty (pcs)	Bulk packaging Dimensions lxbxh (cm)	Volume (m³)	Weight Gross (kg)	EAN code	EOC
HF-R TD 136 PL-L								
HF-R TD 236 PL-L								
HF-R TD 140 PL-L								
HF-R TD 240 PL-L				Under development				
HF-R TD 155 PL-L								
HF-R TD 255 PL-L								
HF-R TD 280 TL5/PL-L								

Electronics (Dimming)



Electronics (Dimming)

HF-Regulator TL-D/PL-L

HF-R TL-D

1-10V

Product description

Compact, lightweight high-frequency electronic regulating ballast for TL-D (Krypton) fluorescent lamps.

Features and benefits

- The lamp power can be regulated down to 3%
- Striation-free operation
- 1-10 V control input (European standard)
- Programmed start: flicker-free warm start, ideal for areas with a high switching frequency
- 50% longer lamp life than with conventional ballasts
- 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 stabler in every dimming position; and
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

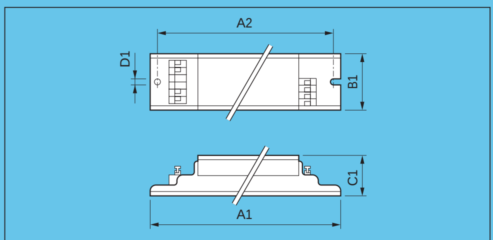
Examples

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

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
1 Lamps	335	325	39	28	4.2
2 Lamps	425	350	39	28	4.2

Electronics (Dimming)

HF-Regulator TL-D/PL-L

Compliances and approvals

- RFI < 30 MHz: EN 55015
- RFI > 30 MHz: EN 55022 A
- Harmonics: EN 61000-3-2
- Immunity: EN 61547
- Safety: EN 61347-2-3
- Performance: EN 60929
- Vibration & bump tests: IEC 68-2-6 FC, IEC 68-2-29Eb
- Quality standard: ISO 9001
- Environmental standard: EN 14001
- Approval marks: ENEC
- 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	0.95 at 100% power
Smart power: with AC mains voltage fluctuations, luminous flux varies by ± 2% max.	202 - 254 V
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

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.

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
Dual fixture; master slave operation	not advisable
Advised maximum cable capacity for optimum performance and EMI suppression	max. 30 pF: between two sets of lamp wires (each set of lamp wires is connected to one electrode of the lamp max. 150 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 ballasts, the mains power needs to be reset.
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 abovementioned test is carried out and before the installation is put in operation.

Mains current at 230V

Ballast	Input current A
HF-R 118 TL-D	0.09
HF-R 218 TL-D	0.18
HF-R 318 TL-D	0.27
HF-R 418 TL-D	0.34
HF-R 136 TL-D	0.18
HF-R 236 TL-D	0.34
HF-R 158 TL-D	0.26
HF-R 258 TL-D	0.52
HF-R 136 PL-L	0.18
HF-R 136 PL-L	0.34
HF-R 140 PL-L	0.21
HF-R 240 PL-L	0.42
HF-R 155 PL-L	0.26
HF-R 255 PL-L	0.52

Inrush current

Ballast	Max quantity of ballasts per Miniature Circuit Breaker type B16A	C16A	Inrush current Peak value time at typical mains impedance
HF-R 118 TL-D	28	48	25A / 200 µ sec
HF-R 218 TL-D	28	48	25A / 200 µ sec
HF-R 318 TL-D	28	48	32A / 300 µ sec
HF-R 418 TL-D	12	20	32A / 200 µ sec
HF-R 136 TL-D28	28	48	25A / 200 µ sec
HF-R 236 TL-D	28	48	25A / 300 µ sec
HF-R 158 TL-D	12	20	32A / 300 µ sec
HF-R 258 TL-D	12	20	32A / 300 µ sec
HF-R 136 PL-L	28	48	25A / 200 µ sec
HF-R 236 PL-L	28	48	25A / 200 µ sec
HF-R 140 PL-L	12	20	32A / 300 µ sec
HF-R 240 PL-L	12	20	32A / 300 µ sec
HF-R 155 PL-L	12	20	32A / 300 µ sec
HF-R 255 PL-L	12	20	32A / 300 µ sec

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

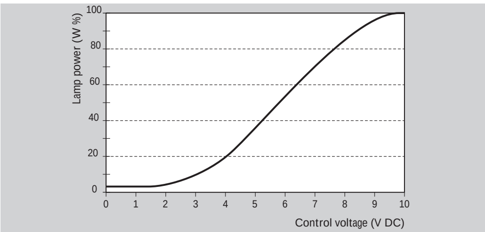
Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker

Type		Relative quantity of ballasts
B	16 A	100% (see table above)
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%

Technical data in relation to energy saving

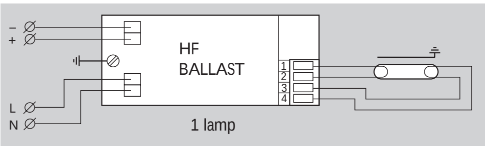
Lamp	Qty of lamps	Ballast	System Power* W	System Efficacy lm/W	Lamp Power* W	Lamp Efficacy lm/W	Lamp Lumen* lm	EEI class. EEI
TL-D 18	1	HF-R 118 TL-D	21	62	16	81	1300	A1
TL-D 18	2	HF-R 218 TL-D	39	66	16	81	1300	A1
TL-D 18	3	HF-R 3/418 TL-D	65	60	16	81	1300	A1
TL-D 18	4	HF-R 3/418 TL-D	79	65	16	81	1300	A1
TL-D 36	1	HF-R 136 TL-D	38	84	32	100	3200	A1
TL-D 36	2	HF-R 236 TL-D	74	87	32	100	3200	A1
TL-D 58	1	HF-R 158 TL-D	56	89	50	100	5000	A1
TL-D 58	2	HF-R 258 TL-D	113	88	50	100	5000	A1
PL-L 36	1	HF-R 136 PL-L	38	76	32	91	2900	A1
PL-L 36	2	HF-R 236 PL-L	74	78	32	91	2900	A1
PL-L 40	1	HF-R 140 PL-L	47	74	40	88	3500	A1
PL-L 40	2	HF-R 240 PL-L	92	76	40	88	3500	A1
PL-L 55	1	HF-R 155 PL-L	56	78	50	87	4350	A1
PL-L 55	2	HF-R 255 PL-L	113	77	50	87	4350	A1

** At 100%.*

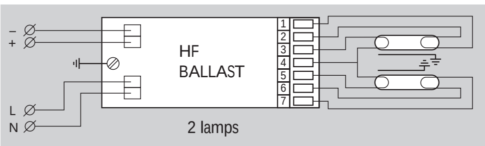


Relationship between lamp power and control voltage

Lamp circuits



Wiring diagrams



Technical data for design and mounting HF ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	+5 ° to +50 °C
Stable lamp operation assured	> 15 °C

Max. tcase = 75˚C**

Note:

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 connection wiring is greatly simplified through use of insert contacts, with push buttons. For 3/4-lamp ballasts, the earth connection can be made via housing or terminal block.

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

Wire crosssection:

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

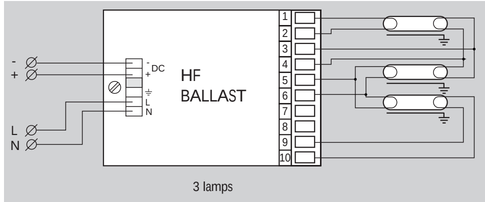
Strip length	9 - 10 mm
Strip length: HF-R 3/418 TL-D	7.5 - 8.5 mm.

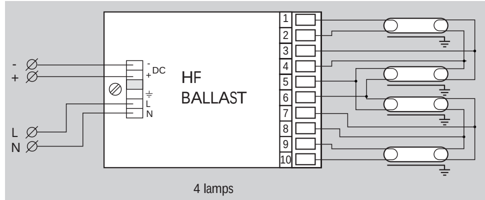
Note:

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/quad-lamp versions should be kept short and equal in length.

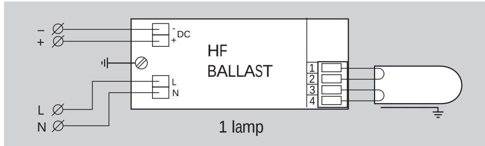
The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

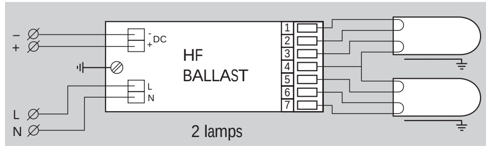
Lamp circuits





Lamp circuits





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 MCB's. For multi-pole MCB's it is advisable to reduce the number of ballasts by 20%.

Notes:

1. For optimum performance, note that wires from connections 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. Wiring diagrams for HF-R ballasts differ from the ETC...R/04 types; short and long wires have been interchanged.

Ordering and packing data

Ballast	Piece EAN code	Piece Weight kg	Box packing Qty pcs.	Dimensions l x w x h cm	Volume m³	Weight gross kg	EAN code	EOC
HF-R 118 TL-D	8711500 739681	0.35	10	38 x 21 x 8	0.006	3.7	8711500 739698	739681 30
HF-R 218 TL-D	8711500 740045	0.49	10	48 x 23 x 8	0.009	5.3	8711500 740052	740045 30
HF-R 3/418 TL-D	8711500 747457	0.50	10	48 x 22 x 8.5	0.009	5.7	8711500 747464	747457 30
HF-R 136 TL-D	8711500 737984	0.35	10	38 x 21 x 8	0.006	3.7	8711500 737991	737984 30
HF-R 236 TL-D	8711500 738790	0.49	10	48 x 23 x 8	0.009	5.3	8711500 738806	738790 30
HF-R 158 TL-D	8711500 737908	0.35	10	38 x 21 x 8	0.006	3.7	8711500 737915	737908 30
HF-R 258 TL-D	8711500 738813	0.49	10	48 x 23 x 8	0.009	5.3	8711500 738820	738813 30
HF-R 136 PL-L	8711500 737960	0.35	10	38 x 21 x 8	0.006	3.7	8711500 737977	737960 30
HF-R 236 PL-L	8711500 738752	0.49	10	48 x 23 x 8	0.009	5.3	8711500 738769	738752 30
HF-R 140 PL-L	8711500 737922	0.35	10	38 x 21 x 8	0.006	3.7	8711500 737939	737922 30
HF-R 240 PL-L	8711500 738738	0.49	10	48 x 23 x 8	0.009	5.3	8711500 738745	738738 30
HF-R 155 PL-L	8711500 737946	0.35	10	38 x 21 x 8	0.006	3.7	8711500 737953	737946 30
HF-R 255 PL-L	8711500 738776	0.49	10	48 x 23 x 8	0.009	5.3	8711500 738783	738776 30

Electronics (Dimming)

HF-Regulator TL5

HF-R TL5

1-10V

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)
- Programmed 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 stabler in every dimming position; and
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

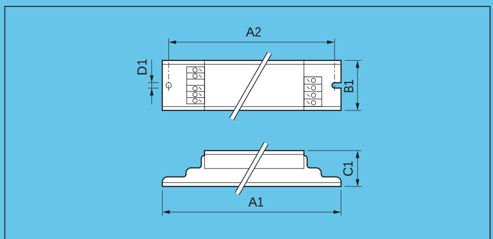
- Office buildings: insurance companies, banks, government ministries
- Corridors
- Department stores, shops, supermarkets
- Hotels
- Hospitals
- Cinemas.

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
  Philips HF electronic regulating ballasts comply with all relevant international rules and regulations.

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
1 Lamps	359	350	30	28	4.5
2 Lamps	425	415	30	28	4.5
3/4 Lamps	425	415	39	28	4.2

Electronics (Dimming)

HF-Regulator TL5

Compliances and approvals

• RFI < 30 MHz:	EN 55015
• RFI > 30 MHz:	EN 55022 A
• Harmonics:	EN 61000-3-2
• Immunity:	EN 61547
• Safety:	EN 61347-2-3
• Performance:	EN 60929
• Vibration & bump tests:	IEC 68-2-6 FC IEC 68-2-29Eb
• Quality standard:	EN 9001
• Environmental standard:	EN 14001
• 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.	202 - 254 V
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 (< 198 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

** Value for 1 x 14 W and 1 x 21 W types*
*** Value for 1 x 80 W*

Lamp wiring for HF-R...TL5	500 V rated components and wiring are required with HF-Regulator TL5
Dual fixture; master slave operation	not advisable
Advised 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 ballasts, the mains power needs to be reset.
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 abovementioned test is carried out and before the installation is put into operation.

Mains current at 230V

Ballast	Input current A
HF-R 114 TL5	0.09
HF-R 214 TL5	0.15
HF-R 314 TL5	0.23
HF-R 414 TL5	0.29
HF-R 121 TL5	0.12
HF-R 221 TL5	0.20
HF-R 124 TL5	0.12
HF-R 224 TL5	0.24
HF-R 128 TL5	0.16
HF-R 228 TL5	0.28
HF-R 135 TL5	0.19
HF-R 235 TL5	0.34
HF-R 139 TL5	0.19
HF-R 239 TL5	0.38
HF-R 149 TL5	0.25
HF-R 249 TL5	0.48
HF-R 154 TL5	0.27
HF-R 254 TL5	0.51
HF-R 180 TL5	0.38

Electronics (Dimming)

Inrush current

Ballast	Max quantity of ballasts per Miniature Circuit Breaker type B16A	C16A	Inrush current value time at typical mains impedance
HF-R 114 TL5	28	48	19A / 220 µs
HF-R 214 TL5	28	48	25A / 200 µs
HF-R 314 TL5	28	48	25A / 200 µs
HF-R 414 TL5	28	48	25A / 200 µs
HF-R 121 TL5	28	48	19A / 220 µs
HF-R 221 TL5	28	48	25A / 200 µs
HF-R 124 TL5	28	48	19A / 220 µs
HF-R 224 TL5	28	48	25A / 200 µs
HF-R 128 TL5	28	48	19A / 220 µs
HF-R 228 TL5	28	48	25A / 200 µs
HF-R 135 TL5	28	48	19A / 220 µs
HF-R 235 TL5	12	20	32A / 300 µs
HF-R 139 TL5	28	48	19A / 220 µs
HF-R 239 TL5	12	20	32A / 300 µs
HF-R 149 TL5	28	48	19A / 220 µs
HF-R 249 TL5	12	20	32A / 300 µs
HF-R 154 TL5	28	48	19A / 220 µs
HF-R 254 TL5	12	20	32A / 300 µs
HF-R 180 TL5	12	20	32A / 300 µs

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

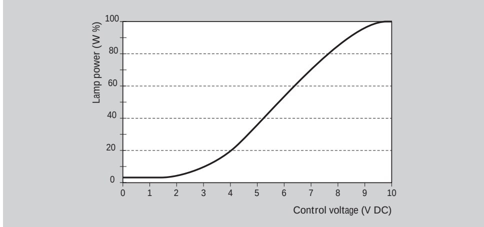
MCB type		Relative quantity of ballasts
B	16 A	100% (see table above)
B	10 A	63%
C	16 A	170%
C	10 A	104%
L, I	16 A	108%
L, I	10 A	65%
G, U, II	16 A	212%
G, U, II	10 A	127%
K, III	16 A	254%
K, III	10 A	154%

Technical data in relation to energy saving

Lamp	Qty of lamps	Ballast	System Power* W	System Efficacy lm/W	Lamp Power* W	Lamp Efficacy lm/W	Lamp Lumen* lm	EEI class. EEI
TL5 HE 14W	1	HF-R 114 TL5	18	75	14	86	1200	A1
TL5 HE 14W	2	HF-R 214 TL5	32	84	14	86	1200	A1
TL5 HE 14W	3	HF-R 3/414 TL5	50	81	14	86	1200	A1
TL5 HE 14W	4	HF-R 3/414 TL5	66	81	14	86	1200	A1
TL5 HE 21W	1	HF-R 121 TL5	25	84	21	90	1900	A1
TL5 HE 21W	2	HF-R 221 TL5	48	88	21	90	1900	A1
TL5 HE 28W	1	HF-R 128 TL5	33	85	28	93	2600	A1
TL5 HE 28W	2	HF-R 228 TL5	63	92	28	93	2600	A1
TL5 HE 35W	1	HF-R 135 TL5	40	87	35	94	3300	A1
TL5 HE 35W	2	HF-R 235 TL5	80	91	35	94	3300	A1
TL5 HO 24W	1	HF-R 124 TL5	28	71	23	76	1750	A1
TL5 HO 24W	2	HF-R 224 TL5	53	75	23	76	1750	A1
TL5 HO 39W	1	HF-R 139 TL5	43	81	38	82	3100	A1
TL5 HO 39W	2	HF-R 239 TL5	88	80	38	82	3100	A1
TL5 HO 49W	1	HF-R 149 TL5	55	91	49	88	4300	A1
TL5 HO 49W	2	HF-R 249 TL5	111	90	49	88	4300	A1
TL5 HO 54W	1	HF-R 154 TL5	60	83	54	82	4450	A1
TL5 HO 54W	2	HF-R 254 TL5	119	84	54	82	4450	A1
TL5 HO 80W	1	HF-R 180 TL5	88	80	80	77	6150	A1

** At 100% (25°/830).*

Electronics (Dimming)



Relationship between lamp power and control voltage

Technical data for design and mounting HF ballasts 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**

Note:

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.

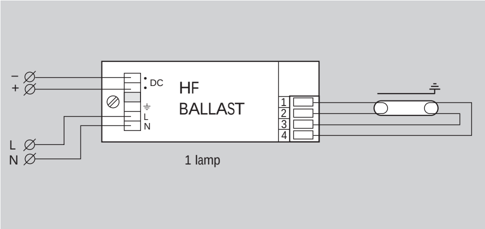
The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

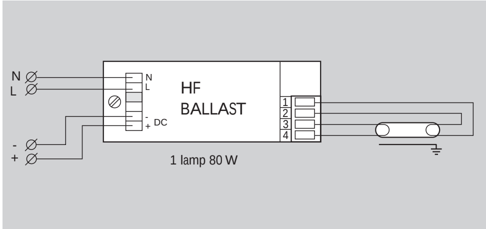
Notes:

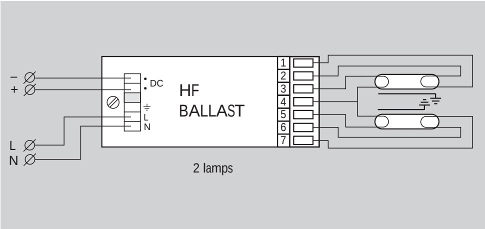
1. Data is based on a mains supply with an impedance of 400Ω (equal to 15 m cable of 2.5 mm^2 and another 20 m to the middle of the power distribution), under worst case conditions. With an impedance of 800Ω the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; 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 MCB's. For multi-pole MCB's it is advisable to reduce the number of ballasts by 20%.
6. First digital regulating steps are fixed at 3% light output (dimming specification).

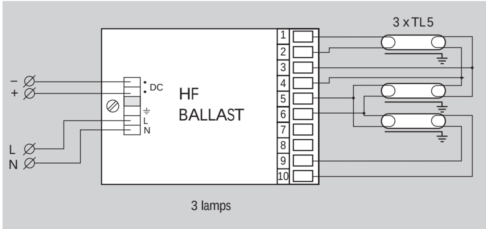
Electronics (Dimming)

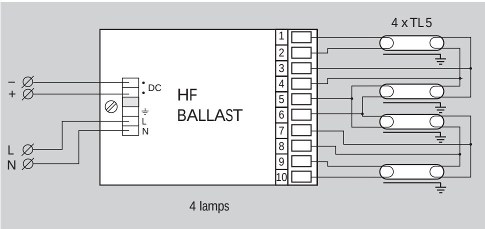
HF-Regulator TL5











Wiring diagrams

Connection wiring is greatly simplified through use of insert contacts; earth connection can be made via housing or terminal block.

Wire crosssection:

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.

Electronics (Dimming)

HF-Regulator TL5

Ordering and packing data

Ballast	Piece		Bulk packing					
	EAN code	Weight	Qty	Dimensions l x w x h	Volume	Weight gross	EAN code	EOC
		kg	pcs.	cm	m³	kg		
HF-R 114 TL5	8711500 060044	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 060051	060044 30
HF-R 214 TL5	8711500 742308	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 742315	742308 30
HF-R 3/414 TL5	8711500 747433	0.5	10	48.0 x 22.0 x 8.5	0.009	5.7	8711500 747440	747433 30
HF-R 121 TL5	8711500 060068	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 060075	060068 30
HF-R 221 TL5	8711500 744722	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 744739	744722 30
HF-R 124 TL5	8711500 060082	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 060099	060082 30
HF-R 224 TL5	8711500 744852	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 744869	744852 30
HF-R 128 TL5	8711500 741790	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 741806	741790 30
HF-R 228 TL5	8711500 742285	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 742292	742285 30
HF-R 135 TL5	8711500 741813	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 741820	741813 30
HF-R 235 TL5	8711500 744814	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 744821	744814 30
HF-R 139 TL5	8711500 060105	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 060112	060105 30
HF-R 239 TL5	8711500 744890	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 744906	744890 30
HF-R 149 TL5	8711500 741837	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 741844	741837 30
HF-R 249 TL5	8711500 742261	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 742278	742261 30
HF-R 154 TL5	8711500 060549	0.3	12	39.6 x 19.8 x 7.0	0.005	3.8	8711500 060556	060549 30
HF-R 254 TL5	8711500 746726	0.4	12	48.0 x 19.8 x 7.0	0.007	5.0	8711500 746733	746726 30
HF-R 180 TL5	8711500 538840	0.3	20	39.6 x 17.0 x 13.0	0.010	6.4	8711500 538857	538840 30

Electronics (Dimming)

HF-Regulator PL-T/C

HF-REGULATOR PL-T/C

1-10V

Description
Compact, lightweight, high-frequency electronic regulating ballast for PL-T and PL-C compact fluorescent lamps.

Features and benefits
- The lamp power can be regulated down to 3% (10-100% for HF-R 257 PL-T).
- 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 areas with a high switching frequency.
- Stable lamp operation, striation-free operation.
- 1-10V control input (European standard).
- Up to 50% longer lamp life than with conventional ballasts.
- Up to 75% reduction in energy consumption can be achieved by using automatic lighting control systems.
- Smart power: constant light output 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.

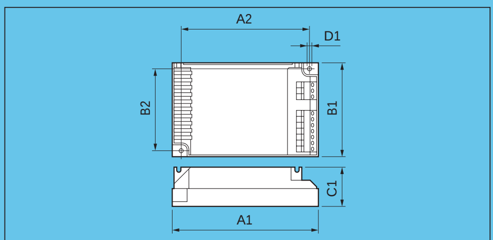
All Philips HF-Regulator electronic ballasts are equipped with α-control. This is a dedicated integrated circuit that ensures independent control of each electrode and, in doing so, takes care that:
a. lamp life is unaffected by dimming position
b. lamp burning is stable in every dimming position; and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

Applications
Typical areas of application include:
- Installations with daylight linking and/or movement detection (for energy savings)
- 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 offices, open plan offices, corridors and lobbies
- Conference rooms, lecture theatres
- Department stores, shops, supermarkets and 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
  Philips HF electronic regulating ballasts comply with all relevant international rules and regulations.

Dimensions in mm



Product ID	A1	A2	B1	B2	C1	D1
1 Lamps	123	111	79	67	33	4.5
2 Lamps	123	111	79	67	33	4.5

Electronics (Dimming)

HF-Regulator PL-T/C

Compliances 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, EN 60068-2-29-Eb
- Quality standard: ISO 9001
- Environmental standard: ISO 14001
- Approval marks: ENEC, VDE-EMV
- Temp. declared thermally protected: EN 61347-1
- CE marking

* Tested with ballast functional ground connected to earth.

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 320 V AC 2 hrs at 350 V AC
Automatic restart after lamp replacement or voltage dip	Yes

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
Power factor HF-R 118 PL-T/C	0.90 at 100% power
Smart power: with AC mains voltage fluctuations, Luminous flux varies by + 2% max.	202V - 254 V
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

Mains current at 230V

Ballast	Lamp	Input current A
HF-R 118 PL-T/C	PL-T/C 18W	0.09
HF-R 218 PL-T/C`	PL-T/C 18W	0.17
HF-R 1 26-42 PL-T/C	PL-T/C 26W	0.13
HF-R 1 26-42 PL-T/C	PL-T 32W	0.17
HF-R 1 26-42 PL-T/C	PL-T 42W	0.21
HF-R 2 26-42 PL-T/C	PL-T/C 26W	0.25
HF-R 2 26-42 PL-T/C	PL-T 32W	0.33
HF-R 2 26-42 PL-T/C	PL-T 42W	0.41
HF-R 157 PL-T	PL-T 57W	0.27
HF-R 257 PL-T	PL-T 57W	0.53

Inrush current

Ballast	Lamp	Max. quantity of ballasts per Miniature Circuit Breaker type B 16A	Inrush current value time at typical mains impedance
HF-R 118 PL-T/C	PL-T/C 18W	28	27A/250µs
HF-R 218 PL-T/C	PL-T/C 18W	28	27A/250µs
HF-R 1 26-42 PL-T/C	PL-T/C 26W	28	27A/250µs
HF-R 2 26-42 PL-T/C	PL-T/C 26W	28	27A/250µs
HF-R 1 26-42 PL-T/C	PL-T 32W	28	27A/250µs
HF-R 2 26-42 PL-T/C	PL-T 32W	12	45A/400µs
HF-R 1 26-42 PL-T/C	PL-T 42W	28	27A/250µs
HF-R 2 26-42 PL-T/C	PL-T 42W	12	45A/400µs
HF-R 157 PL-T	PL-T 57W	12	45A/250µs
HF-R 257 PL-T	PL-T 57W	12	45A/250µs

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

Type		Relative quantity of ballasts
B	16A	100%(see table on the left)
B	10A	63%
C	16A	170%
C	10A	104%
L, I	16A	108%
L, I	10A	65%
G, U, II	16A	212%
G, U, II	10A	127%
K, III	16A	254%
K, III	10A	154%

Electronics (Dimming)

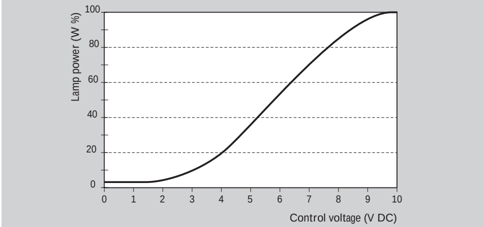
HF-Regulator PL-T/C

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.
Advised maximum cable capacity for optimum performance and EMI Suppression	Max. 30 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. Care has to be taken for symmetrical wiring

Control input

Control voltage	1 – 10V 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.



Relationship between lamp power and control voltage

Technical data for design and mounting in fixtures

Temperatures	
Temperature range to ignite lamp With ignition aid	+10 °C to +50 °C
Stable lamp operation assured	> 15 °C
Striation possible	< 15 °C
Max t case	75 °C
Earthing	Earthing of the HF ballast in a luminaire 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 EN 61347 par.11. Note that no moisture or condensation may enter the ballast.

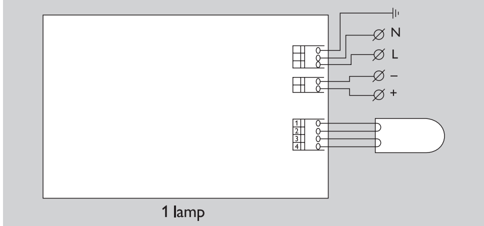
Technical data in relation to energy saving

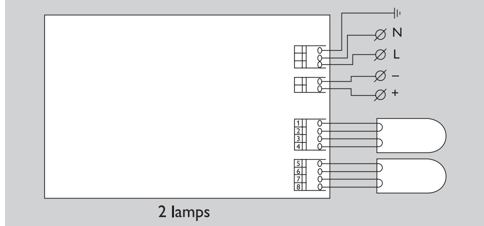
Lamp	Qty of lamps	Ballast	System power* W	System Efficacy lm/W	Lamp Power* W	Lamp Efficacy lm/W	Lamp Lumen* lm	CELMA class. EEI
PL-C 18W	1	HF-R 118 PL-T/C	20	60	16.5	73	1200	A1
PL-T 18W	1	HF-R 118 PL-T/C	20	60	16.5	73	1200	A1
PL-C 18W	2	HF-R 218 PL-T/C	39	62	16.5	73	1200	A1
PL-T 18W	2	HF-R 218 PL-T/C	39	62	16.5	73	1200	A1
PL-C 26W	1	HF-R 126-42 PL-T/C	30	60	24	75	1800	A1
PL-T 26W	1	HF-R 126-42 PL-T/C	30	60	24	75	1800	A1
PL-C 26W	2	HF-R 226-42 PL-T/C	56	64	24	75	1800	A1
PL-T 26W	2	HF-R 226-42 PL-T/C	56	64	24	75	1800	A1
PL-T 32W	1	HF-R 126-42 PL-T/C	39	62	32	75	2400	A1
PL-T 32W	2	HF-R 226-42 PL-T/C	72	67	32	75	2400	A1
PL-T 42W	1	HF-R 126-42 PL-T/C	48	67	43	74	3200	A1
PL-T 42W	2	HF-R 226-42 PL-T/C	93	69	43	74	3200	A1
PL-T 57W	1	HF-R 157 PL-T	63	68	56	77	4300	A1
PL-T 57W	2	HF-R 257 PL-T	119	70	56	77	4300	A1

* *At 100%*

Electronics (Dimming)

HF-Regulator PL-T/C





Wiring diagrams

Connecting wiring is greatly simplified through use of insert contacts:

Wire cross-section:		
Mains connector	[Orange]	0.5 mm – 1.5 mm²
Control connector	[Blue]	0.5 mm – 1.5 mm²
Lamp(s) connector	[Gray]	0.5 mm – 1.5 mm²

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. lp-lp between lamp wires
   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
   lp-lg between lamp wires and ground
   Typical capacitance 1 m wires close to ground (spacing 0.5 mm) 72 pF
   Typical capacitance 0.5 m wires close to ground (spacing 0.5 mm) 38 pF
4. 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%.
5. Measurements will be verified in real installations, therefore data are subject to change.
6. In some cases the maximum number of ballasts is not determined by the MCB, but by the maximum electrical load of the lighting installation.
7. Note that the maximum number of ballasts is based on the assumption that these are all switched on the same moment, i.e. by a wall switch.
8. Measurements were carried out on single-pole MCB's. For multi-pole MCB's it is recommended to reduce the number of ballasts by 20%.

Ordering and packaging data

Ballast	Piece EAN code	Piece Weight kg	Bulk packing Qty pcs	Dimensions l x w x h cm	Volume m³	Weight gross kg	EAN code	EOC
HF-R 118 PL-T/C	8711 500 908674	0.195	12	25.5x24.5x8.2	0.01	3.0	8711 500 908681	908674 30
HF-R 218 PL-T/C	8711 500 908698	0.205	12	25.5x24.5x8.2	0.01	3.0	8711 500 908759	908698 30
HF-R 126-42 PL-T/C	8711 500 908666	0.195	12	25.5x24.5x8.2	0.01	3.0	8711 500 908773	908666 30
HF-R 226-42 PL-T/C	8711 500 908680	0.225	12	25.5x24.5x8.2	0.01	3.0	8711 500 908797	908680 30
HF-R 157 PL-T	8711 500 908827	0.220	12	25.5x24.5x8.2	0.01	3.0	8711 500 908810	908827 30

Electronics (Dimming)

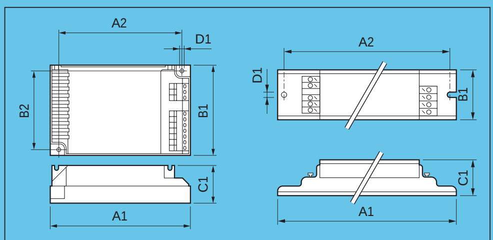
HF-Regulator Touch and Dim (TL)

HF-R Touch and Dim

HF-R Touch and Dim

Touch and Dim

Dimensions in mm



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.
- Striation-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.

Product ID	A1	A2	B1	B2	C1	D1
Linear						
1 Lamps	359	350	30		28	4.5
2 Lamps	425	415	30		28	4.5
3/4 Lamps	425	415	39		28	4.2
Square						
1 Lamps	123	111	79	67	33	4.5
2 Lamps	123	111	79	67	33	4.5

Electronics (Dimming)

HF-Regulator Touch and Dim (TL)

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 ballast's comply with a relevant international rules and regulations.

Compliance's 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:	IEC 68-2-6-FC
	IEC 68-2-29-Eb
• Quality standard:	ISO 9001
• Environmental standard:	EN 14001
• Approval marks:	ENEC, VDE-EMV,
• Temp. declared thermally protected	EN 61347-1 110
• CE marking	

* *Tested with ballast functional ground connected to earth.*

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, 202-254 V
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

Earth leakage current < 0.5 mA per ballast

Maximum number of ballast's 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
5 min. at 380 V AC

Automatic restart after lamp replacement or voltage dip yes

Mains current at 230V

Ballast	Input current A
HF-R T 414 TL5	0.29
HF-R T 128 TL5	0.15
HF-R T 228 TL5	0.28
HF-R T 135 TL5	0.18
HF-R T 235 TL5	0.34
HF-R T 139 TL5	0.20
HF-R T 239 TL5	0.39
HF-R T 149 TL5	0.25
HF-R T 249 TL5	0.47
HF-R T 154 TL5	0.28
HF-R T 254 TL5	0.53
HF-R T 122 TL5C	0.11
HF-R T 140 TL5C	0.20
HF-R T 155 TL5C	0.26
HF-R T 160 TL5C	0.28
HF-R T 318 TL-D	0.27
HF-R T 418 TL-D	0.34
HF-R T 136 TL-D	0.18
HF-R T 236 TL-D	0.33
HF-R T 158 TL-D	0.25
HF-R T 258 TL-D	0.49

Electronics (Dimming)

HF-Regulator Touch and Dim (TL)

Inrush current

Ballast	Max.quantity of ballast per Miniature Circuit Breaker Type B16A	Inrush current 1/2 value time at typical mains impedance
HF-R T 414 TL5	28	19A/190 µS
HF-R T 128 TL5	28	19A/220 µS
HF-R T 228 TL5	28	25A/200 µS
HF-R T 135 TL5	28	19A/220 µS
HF-R T 235 TL5	12	32A/300 µS
HF-R T 139 TL5	28	19A/220 µS
HF-R T 239 TL5	12	32A/300 µS
HF-R T 149 TL5	28	19A/220 µS
HF-R T 249 TL5	12	32A/300 µS
HF-R T 154 TL5	28	19A/220 µS
HF-R T 254 TL5	12	32A/300 µS
HF-R T 122 TL5C	28	19A/250 µS
HF-R T 140 TL5C	28	25A/250 µS
HF-R T 155 TL5C	12	19A/400 µS
HF-R T 160 TL5C	12	25A/400 µS
HF-R T 318 TL-D	12	32A/300 µS
HF-R T 418 TL-D	12	32A/300 µS
HF-R T 136 TL-D	28	19A/200 µS
HF-R T 236 TL-D	28	25A/200 µS
HF-R T 158 TL-D	12	32A/300 µS
HF-R T 258 TL-D	12	32A/300 µS

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

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

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

Lamp wiring — The use of 500 V rated components and Wiring is advised for TL-5 and PL-T 42W types

Ignition time — Typical 0.5 sec.

Advised maximum cable capacity for optimum performance and EMI Suppression — max. 30 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. Care has to be taken for symmetrical wiring

*value for TL5 is max.15pF between two sets of lamp wires.

Control input

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 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%
Protected against accidental mains voltage connection	Yes
Control input insulation, basic insulation According EN 61347-2-3 clause 15	< 1500V
Maximum ballast connected in one circuit (Switched by one or multiple switches)	32 Pcs.

Technical data for design and mounting in fixtures

Temperatures	
Temperature range to ignite lamp*	+10ºC to +50ºC
With ignition aid	
Sable lamp operation assured	> 15ºC
Striation possible	< 15ºC
Max t case	75ºC

** value for TLD and PL-L +5ºC to +50ºC*

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 — inaudible

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

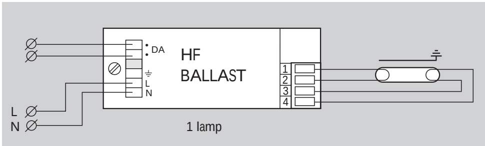
Electronics (Dimming)

HF-Regulator Touch and Dim (TL)

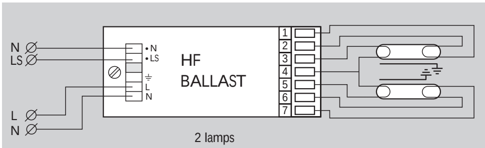
Technical data in relation to energy saving

Lamp	Qty. of Lamps	Ballast	System Power* W	Efficacy* lm/W	Lamp Power* W	Efficacy* lm/W	NOMINAL Lumen lm(25ºc)	CELMA class. EEI
TL5 'HE' 14W	4	HF-R T 414 TL-5	66	81	14	96	1200	A1
TL5 'HE' 28W	1	HF-R T 128 TL-5	32	90	28	104	2600	A1
TL5 'HE' 28W	2	HF-R T 228 TL-5	63	92	28	104	2600	A1
TL5 'HE' 35W	1	HF-R T 135 TL-5	39	93	35	104	3300	A1
TL5 'HE' 35W	2	HF-R T 235 TL-5	76	96	35	104	3300	A1
TL5 'HE' 39W	1	HF-R T 139 TL-5	43	81	38	82	3100	A1
TL5 'HE' 39W	2	HF-R T 239 TL-5	87	80	38	82	3100	A1
TL5 'HE' 49W	1	HF-R T 149 TL-5	55	91	49	102	4300	A1
TL5 'HE' 49W	2	HF-R T 249 TL-5	107	93	49	102	4300	A1
TL5 'HE' 54W	1	HF-R T 154 TL-5	62	81	54	93	4450	A1
TL5 'HE' 54W	2	HF-R T 254 TL-5	121	83	54	93	4450	A1
TL5C 22W	1	HF-R T 122 TL5C	27	67	22	82	1800	A1
TL5C 40W	1	HF-R T 249 TL5C	46	72	40	83	3300	A1
TL5C 55W	1	HF-R T 154 TL5C	61	72	55	80	4400	A1
TL5C 60W	1	HF-R T 254 TL5C	66	82	60	90	5000	A1
TL-D 18W	3	HF-R T 3/418 TLD	65	60	16	81	1300	A1
TL-D 18W	4	HF-R T 3/418 TLD	79	65	16	81	1300	A1
TL-D 36W	1	HF-R T 136 TLD	38	84	32	100	3200	A1
TL-D 36W	2	HF-R T 236 TLD	74	87	32	100	3200	A1
TL-D 58W	1	HF-R T 158 TLD	56	89	50	100	5000	A1
TL-D 58W	2	HF-R T 258 TLD	112	89	50	100	5000	A1

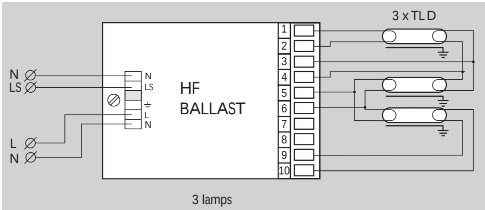
* At 100% power (25°C/830)



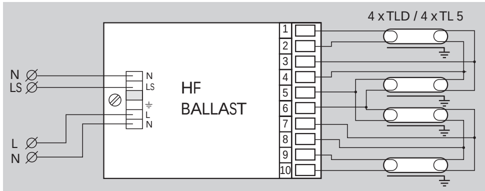
1 lamp



2 lamps



3 lamps



4 lamps

Connecting wiring is greatly simplified trough use of insert contacts;

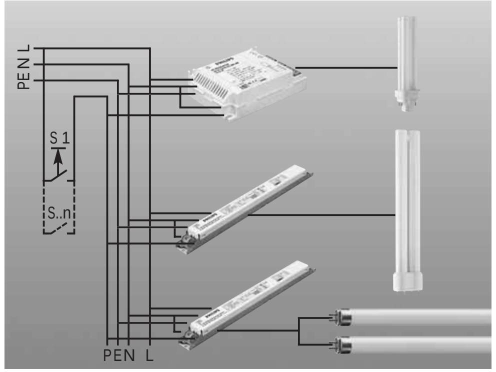
Wire cross-section:

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
Strip length	7.5 – 8.5 mm	

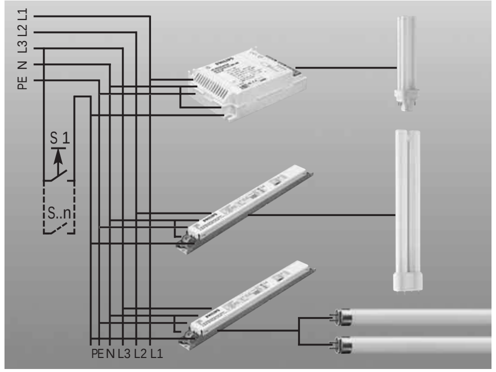
Wiring diagram: 1 Phase installation

Electronics (Dimming)

HF-Regulator Touch and Dim (TL)



3 Phase installation



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. lp-lp between lamp wires
   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
   lp-lg between lamp wires and ground
   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

Electronics (Dimming)

HF-Regulator Touch and Dim (TL)

Ordering and packing data

Ballast	1 Piece EAN code	Weight kg	Qty pcs	Bulk packing Dimensions l x w x h cm	Volume m³	Weight gross kg	EAN code	EOC
HF-R T 414 TL5	8711500 931689	0.44	10	48.0x22.0x8.5	0.009	4.7	8711500 931696	931689 30
HF-R T 128 TL5	8711500 929266	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929273	929266 30
HF-R T 228 TL5	8711500 929648	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929655	929648 30
HF-R T 135 TL5	8711500 929280	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929297	929280 30
HF-R T 235 TL5	8711500 929686	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929693	929686 30
HF-R T 139 TL5	8711500 929303	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929310	929303 30
HF-R T 239 TL5	8711500 929754	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929747	929754 30
HF-R T 149 TL5	8711500 929327	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929234	929327 30
HF-R T 249 TL5	8711500 929785	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929792	929785 30
HF-R T 154 TL5	8711500 929341	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929358	929341 30
HF-R T 254 TL5	8711500 929761	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929778	929761 30
HF-R T 122 TL5C	8711500 934635	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 934659	934635 30
HF-R T 140 TL5C	8711500 934598	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 934611	934598 30
HF-R T 155 TL5C	8711500 934574	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 934581	934574 30
HF-R T 160 TL5C	8711500 934550	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 934567	934550 30
HF-R T 3/418 TL-D	8711500 929501	0.44	10	48.0x22.0x8.5	0.009	4.7	8711500 929518	929501 30
HF-R T 136 TL-D	8711500 929389	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929396	929389 30
HF-R T 236 TL-D	8711500 929709	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929716	929709 30
HF-R T 158 TL-D	8711500 929402	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929419	929402 30
HF-R T 258 TL-D	8711500 929662	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 927679	929662 30

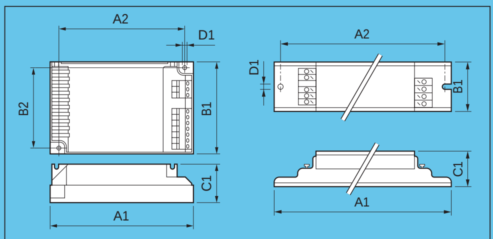
Electronics (Dimming)

HF-R Touch and Dim

HF-R Touch and Dim

Touch and Dim

Dimensions in mm



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.
- Striation-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.

Product ID	A1	A2	B1	B2	C1	D1
Linear						
1 Lamp	359	350	30		28	4.5
2 Lamps	425	415	30		28	4.5
Square						
1 Lamp	123	111	79	67	33	4.5
2 Lamps	123	111	79	67	33	4.5

Electronics (Dimming)

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 ballast's comply with a relevant international rules and regulations.

Compliance's 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:	IEC 68-2-6-FC IEC 68-2-29-Eb
• Quality standard:	ISO 9001
• Environmental standard:	EN 14001
• Approval marks:	ENEC, VDE-EMV,
• Temp. declared thermally protected	EN 61347-1 110
• CE marking	

* *Tested with ballast functional ground connected to earth.*

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, 202-254 V
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

Earth leakage current < 0.5 mA per ballast

Maximum number of ballast's 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
5 min. at 380 V AC

Automatic restart after lamp replacement or voltage dip yes

Mains current at 230V

Ballast	Input current A
HF-R T 118 PL-T/C	0.09
HF-R T 218 PL-T/C	0.17
HF-R T 126 PL-T/C	0.13
HF-R T 226 PL-T/C	0.24
HF-R T 142 PL-T	0.22
HF-R T 242 PL-T	0.42
HF-R T 155 PL-L	0.25
HF-R T 255 PL-L	0.50

Inrush current

Ballast	Max. quantity of ballast per Miniature Circuit Breaker Type B16 A	Inrush current 1/2 value time at typical mains impedance
HF-R T 118 PL-T/C	28	40A/110 µS
HF-R T 218 PL-T/C	28	35A/120 µS
HF-R T 126 PL-T/C	28	40A/110 µS
HF-R T 226 PL-T/C	28	35A/120 µS
HF-R T 142 PL-T	28	40A/110 µS
HF-R T 242 PL-T	12	45A/170 µS
HF-R T 155 PL-L	12	32A/300 µS
HF-R T 255 PL-L	12	32A/300 µS

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

Lamp wiring: The use of 500 V rated components and Wiring is advised for TL-5 and PL-T 42W types

Ignition time: Typical 0.5 sec.

Advised maximum cable capacity for optimum performance and EMI Suppression: max. 30 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. Care has to be taken for symmetrical wiring

Control input

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 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%
Protected against accidental mains voltage connection	Yes
Control input insulation, basic insulation According EN 61347-2-3 clause 15	< 1500V
Maximum ballast connected in one circuit (Switched by one or multiple switches)	32 Pcs.

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

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

Technical data for design and mounting in fixtures

Temperatures	
Temperature range to ignite lamp*	+10ºC to +50ºC
With ignition aid	
Sable lamp operation assured	> 15ºC
Striation possible	< 15ºC
Max t case	75ºC

** value for TLD and PL-L +5ºC to +50ºC*

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

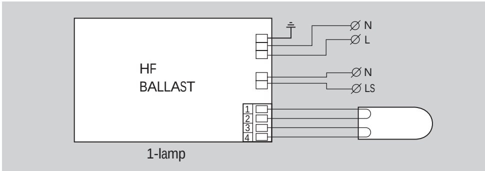
Hum and noise level: inaudible

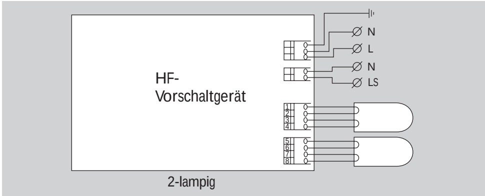
Permitted humidity is tested according to EN61347-1 clause 11 Note that no moisture or condensation may enter the ballast.

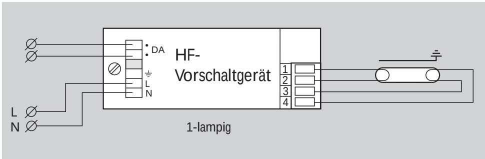
Technical data in relation to energy saving

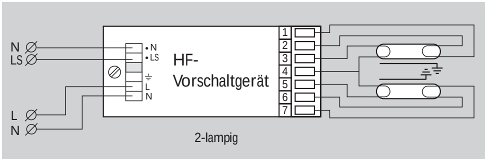
Lamp	Qty. of Lamps	Ballast	System Power* W	Efficacy* lm/W	Lamp Power* W	Efficacy* lm/W	NOMINAL Lumen lm(25ºc)	CELMA class. EEI
PL-C 18W	1	HF-R T 118 PL-T/C	21	57	16.5	73	1200	A1
PL-T 18W	1	HF-R T 118 PL-T/C	21	57	16.5	73	1200	A1
PL-C 18W	2	HF-R T 218 PL-T/C	38	63	16.5	73	1200	A1
PL-T 18W	2	HF-R T 218 PL-T/C	38	63	16.5	73	1200	A1
PL-C 26W	1	HF-R T 126 PL-T/C	29	62	24	75	1800	A1
PL-T 26W	1	HF-R T 126 PL-T/C	29	62	24	75	1800	A1
PL-C 26W	2	HF-R T 226 PL-T/C	54	67	24	75	1800	A1
PL-T 26W	2	HF-R T 226 PL-T/C	54	67	24	75	1800	A1
PL-T 42W	1	HF-R T 142 PL-T	50	63	43	74	3200	A1
PL-T 42W	2	HF-R T 242 PL-T	96	67	43	74	3200	A1
PL-L 55W	1	HF-R T 155 PL-L	56	78	50	87	4350	A1
PL-L 55W	2	HF-R T 255 PL-L	112	78	50	87	4350	A1

* At 100% power

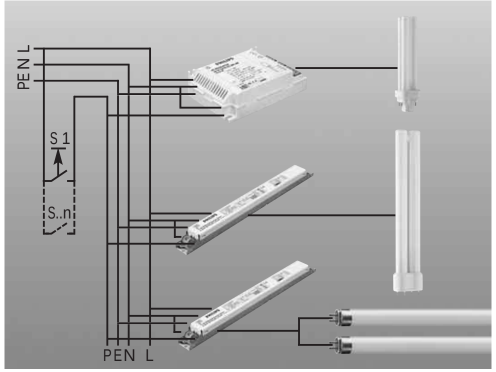




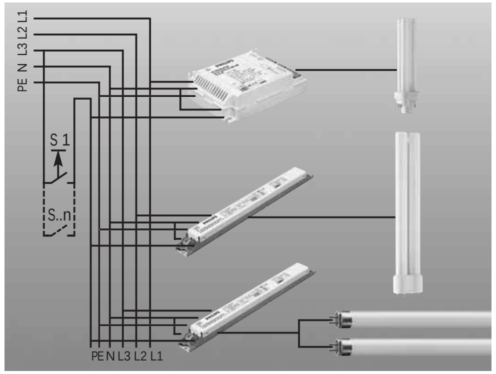




Wiring diagram: 1 Phase installation



3 Phase installation



Connecting wiring is greatly simplified trough use of insert contacts;

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
Strip length	7.5 – 8.5 mm	

Electronics (Dimming)

HF-Regulator Touch and Dim (PL)

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. lp-lp between lamp wires
   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
   lp-lg between lamp wires and ground
   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

Ballast	1 Piece		Bulk packing					
	EAN code	Weight	Qty	Dimensions l x w x h	Volume	Weight gross	EAN code	EOC
		kg	pcs	cm	m³	kg		
HF-R T 118 PL-T/C	8711500 930972	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 930989	930972 30
HF-R T 218 PL-T/C	8711500 930996	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 931009	930996 30
HF-R T 126 PL-T/C	8711500 931016	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 931023	931016 30
HF-R T 226 PL-T/C	8711500 931030	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 931047	931030 30
HF-R T 142 PL-T	8711500 931054	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 931061	931054 30
HF-R T 242 PL-T	8711500 931078	0.2	12	22.0x21.1x8.8	0.006	3.0	8711500 931085	931078 30
HF-R T 155 PL-L	8711500 929464	0.3	12	39.6x19.8x7.0	0.005	3.9	8711500 929471	929464 30
HF-R T 255 PL-L	8711500 929563	0.4	12	48.0x19.8x7.0	0.007	5.3	8711500 929570	929563 30

Electronics (Dimming)

HF-P/PL-L

Product description

Slim, lightweight high-frequency electronic ballast for PL-L 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:

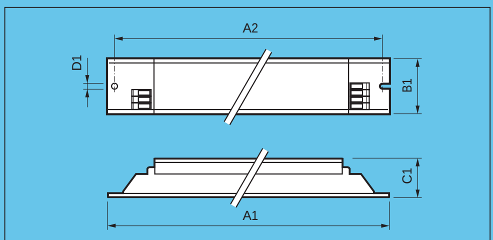
- Department stores, shops, supermarkets
- Suitable for use with infrared remote control systems
- Airports, railway stations
- Outdoor lighting
- Office buildings, for example, insurance companies, banks, government ministries
- Hospitals
- Hotels
- Industrial premises
- Emergency installations with 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.

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
136	280	265	30	28	4.2
236	280	265	30	28	4.2
140	280	265	30	28	4.2
240	280	265	30	28	4.2
155	280	265	30	28	4.2
255	280	265	30	28	4.2

Compliances 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 IEC 68-2-6 Fc, IEC 68-2-29 Eb
- Quality standard ISO 9000- 2000
- Environmental standard ISO 14001
- Approval marks ENEC-VDE-EMV
- CE marking
- Temperature declared thermally protected IEC61347-1

Technical data: (all typical values at mains = V)

Lamp	Qty of lamps	Ballast	System power W	Lamp power W	Ballast losses W	Lamp lumen lm	EEI
PL-L 36 W	1	HF-P 136 PL-L EII	37	32.6	3.9	2900	A2
PL-L 36 W	2	HF-P 236 PL-L EII	70	32.3	4.7	2900	A2
PL-L 40 W	1	HF-P 140 PL-L EII	44	40.2	3.2	3500	A2
PL-L 40 W	2	HF-P 240 PL-L EII	84	40.0	3.6	3500	A2
PL-L 55 W	1	HF-P 155 PL-L EII	58	53.8	4.4	4800	A2
PL-L 55 W	2	HF-P 255 PL-L EII	113	53.0	6.3	4800	A2

Technical date 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)		> 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

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 350V 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 EMI precautions have to be taken
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 above mentioned test is carried out and before the installation is put into operation.

Mains current at V

Ballast	Lamp	Input current A
HF-P 136 PL-L EII	PL-L 36W	0.16
HF-P 236 PL-L EII	PL-L 36W	0.30
HF-P 140 PL-L EII	PL-L 40W	0.19
HF-P 240 PL-L EII	PL-L 40W	0.36
HF-P 155 PL-L EII	PL-L 55W	0.25
HF-P 255 PL-L EII	PL-L 55W	0.49

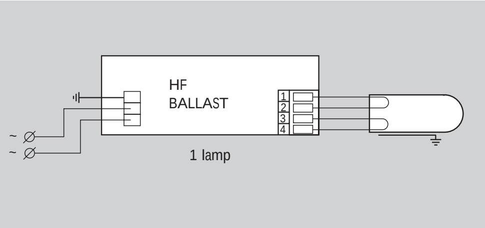
Electronics HF-Performer PL-L

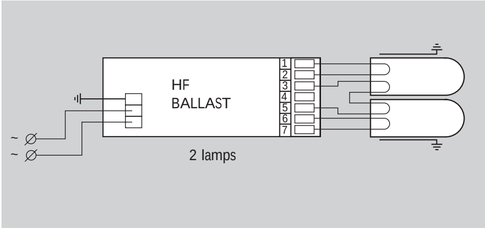
Inrush current

Ballast	Quantity of ballast per Miniature Circuit Breaker type B	type C	Inrush current value time at typical mains impedance
HF-P 136 PL-L EII	28	48	18 A / 250 µs
HF-P 236 PL-L EII	28	48	18 A / 250 µs
HF-P 140 PL-L EII	28	48	18 A / 250 µs
HF-P 240 PL-L EII	12	20	31 A / 350 µs
HF-P 155 PL-L EII	28	48	18 A / 250 µs
HF-P 255 PL-L EII	12	20	31 A / 350 µs

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

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





wiring diagrams

Technical data for design and mounting HF ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid: -25ºC to +50ºC

Max. Tcase = 75ºC
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 75ºC.

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 2 lamps:
Connector 4 can be connected, but this is not necessary

Wire crosssection:

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 MCB's. For multi-pole MCB's it is advisable to reduce the number of ballasts by 20%.
6. The maximum number of ballasts wich can be connected to one Residual Current Detector of 30 mA is 30.

Ordering and packing data

Ballast	Piece		Bulk packing					
	EAN code	Weight kg	Qty	Dimensions l x w x h cm	Volume m³	Weight gross kg	EAN code	EOC
HF-P 136 PL-L EII	8711500934178	0.22	12	32.8 X 20.6 X 8.7	0.006	2.9	8711500934192	934178 30
HF-P 236 PL-L EII	8711500934253	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500934260	934253 30
HF-P 140 PL-L EII	8711500934215	0.22	12	32.8 X 20.6 X 8.7	0.006	2.9	8711500934222	934215 30
HF-P 240 PL-L EII	8711500934277	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500934284	934277 30
HF-P 155 PL-L EII	8711500934239	0.22	12	32.8 X 20.6 X 8.7	0.006	2.9	8711500934246	934239 30
HF-P 255 PL-L EII	8711500934291	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500934307	934291 30

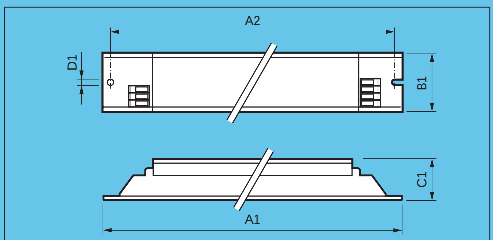
Electronics

HF-Performer II TL-D

HF-P // TL-D

EII TECHNOLOGY

Dimensions in mm



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
- Suitable for use with infrared remote control systems
- Airports, railway stations
- Outdoor lighting
- Office buildings, for example, insurance companies, banks, government ministries
- Hospitals
- 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.

Compliances 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	IEC 68-2-6 Fc IEC 68-2-29 Eb
• Quality standard	ISO 9000- 2000
• Environmental standard	ISO 14001
• Approval marks	ENEC-VDE-EMV
• CE marking	
• Temperature declared thermally protected	IEC61347-1

*HF-P 270 TL-D EII   *EN 55022 A*

Product ID	A1	A2	B1	C1	D1
118/136/158/170	280	265	30	28	4.2
218/236/258/270	280	265	30	28	4.2
3/418	280	265	39	28	4.2

Electronics

HF-Performer II TL-D

Technical data: (all typical values at mains V)

Lamp	No. of lamps	Ballast	System Power W	Lamp Power W	Ballast losses W	Nom. lamp lumen lm	EEI
TL-D 18 W	1	HF-P 118 TL-D EII	19	16.5	2.5	1350	A2
TL-D 18 W	2	HF-P 218 TL-D EII	37	16.5	3.5	1350	A2
TL-D 18 W	3	HF-P 3/418 TL-D EII	54	16.5	4.5	1350	A2
TL-D 18 W	4	HF-P 3/418 TL-D EII	70	16.0	5.5	1350	A2
TL-D 36 W	1	HF-P 136 TL-D EII	37	34.0	3.0	3350	A2
TL-D 36 W	2	HF-P 236 TL-D EII	70	33.0	4.0	3350	A2
TL-D 58 W	1	HF-P 158 TL-D EII	56	51.5	4.5	5200	A2
TL-D 58 W	2	HF-P 258 TL-D EII	107	50.5	6.0	5200	A2
TL-D 70 W	1	HF-P 170 TL-D EII	68	63.0	5.0	6200	A2
TL-D 70 W	2	HF-P 270 TL-D EII	129	61.0	8.0	6200	A2

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)		> 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

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 350V 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 EMI precautions have to be taken
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.

Mains current at V

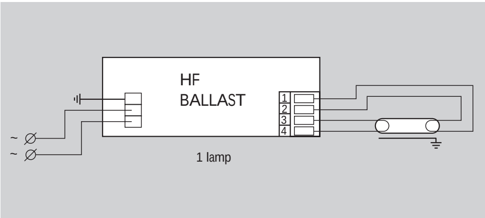
Ballast	No. of lamps	Input current A
HF-P 118 TL-D EII	1	0.09
HF-P 218 TL-D EII	2	0.19
HF-P 3/418 TL-D EII	3	0.25
HF-P 3/418 TL-D EII	4	0.33
HF-P 136 TL-D EII	1	0.16
HF-P 236 TL-D EII	2	0.31
HF-P 158 TL-D EII	1	0.24
HF-P 258 TL-D EII	2	0.48
HF-P 170 TL-D EII	1	0.30
HF-P 270 TL-D EII	2	0.59

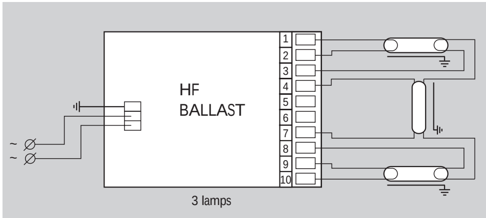
Inrush current

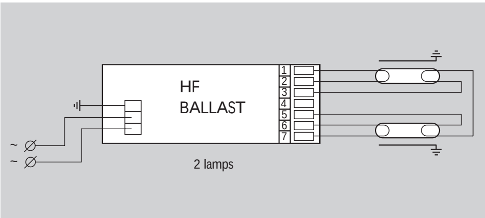
Ballast	Max. quantity of ballast per Miniature Circuit Breaker		Inrush current max. value time at typical mains impedance
	Type B 16A	Type C 16A	
HF-P 136 TL-D EII	28	48	18 A / 250 µs
HF-P 118 TL-D EII	28	48	18 A / 250 µs
HF-P 218 TL-D EII	28	48	18 A / 250 µs
HF-P 3/418 TL-D EII	12	20	31 A / 350 µs
HF-P 136 TL-D EII	28	48	18 A / 250 µs
HF-P 236 TL-D EII	28	48	18 A / 250 µs
HF-P 158 TL-D EII	28	48	18 A / 250 µs
HF-P 258 TL-D EII	12	20	31 A / 350 µs
HF-P 170 TL-D EII	28	48	18 A / 250 µs
HF-P 270 TL-D EII	12	20	31 A / 350 µs

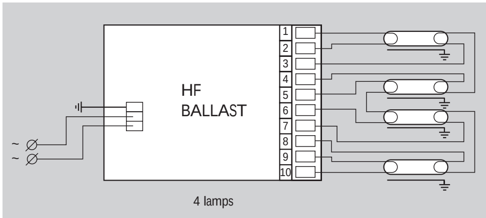
Conversion table for max. quantities of ballasts on other types of Miniature Circuit Breaker

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









wiring diagrams

Technical data for design and mounting HF ballasts in fixtures

Temperatures

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

Max. Tcase = 75ºC

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 75ºC.

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

Wiring diagram 2 lamps:

Connector 4 can be connected, but this is not necessary

Wire crosssection:

Lower connector

On the mains side: 0.5 - 1.0 mm^2

On the lamp side: 0.5 - 1.0 mm^2

Upper connector

On the mains side: 0.5 mm^2 solid wire; 0.75 mm^2 stranded wire

On the lamp side: 0.5 mm^2 solid wire; 0.75 mm^2 stranded wire

Strip length 8 - 9 mm

Notes

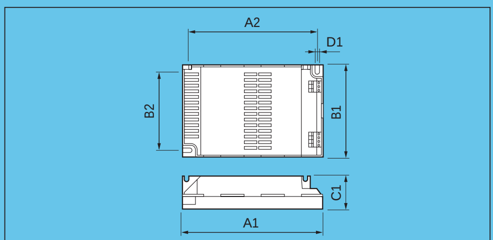
1. Data is based on a main supply with an impedance of 400 mT (equal to 15 m cable of 2,5 mm and another 20 m to te middle of the power distribution), under worst case conditions. With an impedance of 800 mT the number of ballasts can be increased by 10%.
2. Measurements will be verified in real installations; 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 het 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 wich can be connected to one Residual Current Detector of 30 mA is 30.

Ordering and packing data

Ballast	Piece			Box packing				
	EAN code	Weight kg	Qty	Dimensions l x w x h cm	Volume m^3	Weight gross kg	EAN code	EOC
HF-P 118 TL-D EII	8711500934086	0.22	12	32.8 X 20.6 X 8.7	0.006	2.9	8711500934093	934086 30
HF-P 218 TL-D EII	8711500934130	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500934154	934130 30
HF-P 3/418 TL-D EII	8711500931641	0.29	10	32.8 X 22.1 X 8.7	0.006	3.1	8711500931658	931641 30
HF-P 136 TL-D EII	8711500931467	0.23	12	32.8 X 20.6 X 8.7	0.006	3.0	8711500931474	931467 30
HF-P 236 TL-D EII	8711500931504	0.23	12	32.8 X 20.6 X 8.7	0.006	3.0	8711500931511	931504 30
HF-P 158 TL-D EII	8711500931481	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500931498	931481 30
HF-P 258 TL-D EII	8711500931528	0.25	12	32.8 X 20.6 X 8.7	0.006	3.3	8711500931535	931528 30
HF-P 170 TL-D EII	8711500934116	0.22	12	32.8 X 20.6 X 8.7	0.006	2.9	8711500934123	934116 30
HF-P 270 TL-D EII	8711500058638	0.25	12	32.8 X 20.6 X 8.7	0.006	3.2	8711500058645	058638 30

HF-P PL-H

Dimensions in mm



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 60929-1E
• Vibration & bump tests	IEC 68-2-6 FC
	IEC 68-2-29 Eb
• Quality standard	ISO 9000-2000
• Environmental standard	ISO 14001
• Approval marks	ENEC-VDE-EMV
• CE marking	
• Temperature declared thermally protected	IEC 61347-1 110

* Tested with ballast functional ground connected to earth

Product ID	A1	A2	B1	B2	C1	D1
160-120	158	146	102	90	38	4.5

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

Lamp	Qty. of lamps	Ballast	System power W	Lamp Power W	Ballast losses W	Lamp Lumen lm	EEI
PL-H 60W	1	HF-P PL-H 1 60-120	63	58	5.0	4000	A2
PL-H 85W	1	HF-P PL-H 1 60-120	91	85	5.5	6000	A2
PL-H 120W	1	HF-P PL-H 1 60-120	133	126	7.0	9000	A2

Ballast	Lamp	Power factor	Max. cable cap[1]) lp-lp/lp-gnd pF	Tc max °C	Oper[2]) Freq. (kHz)
HF-P PL-H 1 60-120	PL-H 60W	0.96	150/150	75	46
HF-P PL-H 1 60-120	PL-H 85W	0.98	150/150	75	46
HF-P PL-H 1 60-120	PL-H 120W	0.99	150/150	75	46

[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)
[2]) Tolerance ± 3 kHz

Technical data for installation
Mains operation

Rated mains voltage		220 - 240 V
with tolerances for safety:	+/- 10%	198 - 264 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 abovementioned test is carried out and before the installation is put into operation.

Mains current / Emergency operation

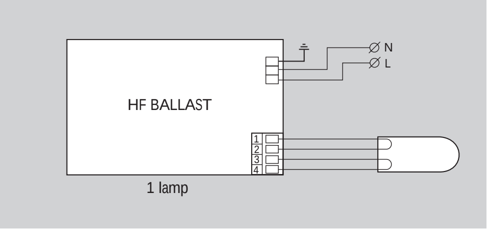
Ballast	Lamp	Input current A
HF-P 1 60-120 PL-H	PL-H 60 W	0.30
HF-P 1 60-120 PL-H	PL-H 85 W	0.40
HF-P 1 60-120 PL-H	PL-H 120 W	0.60

Mains current / energy classification/ emergency operation

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker type B 16 A	Inrush current 1/2 value time at typical mains impedance
HF-P PL-H 1 60-120	12	30A/450 µs

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

MCB type		Relative number of ballasts
B	16 A	100% (see table above)
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%



Wiring diagrams

Technical data for design and mounting HF ballasts in fixtures:

Temperature range to ignite lamp without ignition aid	-25°C .. allowed maximum ballast temperature

Max. Tcase = 75ºC
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 Tcare of 75ºC.
This to enable acceptable lifetimes when the 120W lamp is used in all kind of fixtures. For more information on this issue 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 60928 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 crosssection:

On the mains side:	0.5 - 1.5 mm^2
On the lamp side:	0.5 - 1.5 mm^2

Strip length	7.5 - 8.5 mm

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 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.

Ordering and packing data

Ballast	Piece		Bulk packing					
	EAN code	Weight	Qty	Dimensions lxwxh	Volume	Weight gross	EAN code	EOC
		kg	pcs	cm	m^3	kg		
HF-P 1 60-120 PLH	8711500 928757	0.29	10	52.5x17.3x9.6	0.009	2.9	8711500 928764	928757 31

HF-P

HF-P

Product description

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

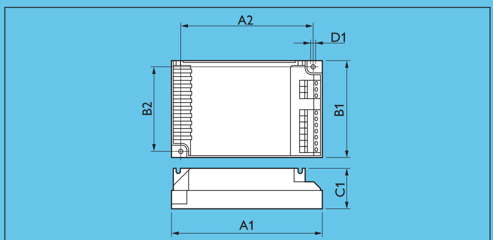
Features and benefits

- Programmed 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 <0.5 s

Dimensions in mm



Product ID	A1	A2	B1	B2	C1	D1
1 lamp	103	93.5	67	57.5	30	4.5
2 lamps	123	111	79	67	33	4.5

Electronics HF-Performer PL-L

Preferred selection

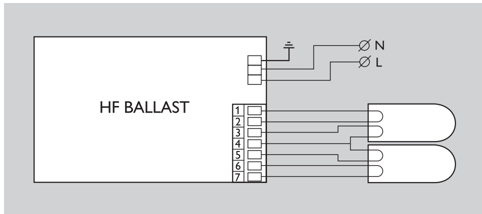
Product ID	Cable-Cap outputwires to earth [pF]	Celma classification	Length A1 [mm]	Automatic restart	Weight (kg)	Fixing Hole Distance A2 Length [mm]	CE declaration	Cable-Cap outputwires mutual [pF]	Battery voltage running lamps [V]	Number of Lamps [x]
HF-Performer 2 18-24 PL-L 220-240V 50/60Hz	100	A2	123.0	Yes	0.19	111.0	Yes	100	176-254	2

Product ID	Battery voltage lamp ignition [V]	ENEC certificate	Constant wattage deviation	T-case life [˚C]	T-case maximum [˚C]	Rated Lamptype	Width B1 [mm]	Fixing Hole Distance B2 Width [mm]	Conn.type input terminals	VDE-EMV certificate	Conn.type output terminals
HF-Performer 2 18-24 PL-L 220-240V 50/60Hz	198-254	Yes	-2%/+2%	75	75	PL-L	79.0	67.0	Insert	No	Insert

Product ID	Inrush current Peak [A]	Height C1 [mm]	Inrush current Width [ms]	Earth leakage current [mA]	Dual fixture Master/Slave	Max. cable length Device/Lamp [m]	Humidity conditions	Maximum ballast number on MCB [x]	Fixing Hole Diameter D1 [mm]	Mains voltage performance (AC)	Strip Length [mm]
HF-Performer 2 18-24 PL-L 220-240V 50/60Hz	31	33.0	0.35	0.5	No	1	Yes	12	4.5	-8%/+6%	7.5-8.5

Product ID	Mains voltage safety (AC)	Bump test	Vibration conditions	Wcs Input terminals [mmΩ]	Operating frequency [kHz]	Wcs Output terminals [mmΩ]	Overvoltage protection 320Vac [h]	Overvoltage protection 350Vac [h]	PowerFactor 100% output power
HF-Performer 2 18-24 PL-L 220-240V 50/60Hz	-10%/+10%	IEC 68-2-29 Eb	IEC 68-2-6 Fc	0.75-1.50	48	0.75-1.50	48	2	0.93

Product ID	Power losses gear [W]	Preheat time [s]	EOC	Line Frequency [Hz]	Line Voltage [V]	Rated Ballast-Lamp Power	Number of Lamps X Ballast Power	Packaging Configuration	Packaging Type	Comm Code
HF-Performer 2 18-24 PL-L 220-240V 50/60Hz	7.0	0.8	74970330	50/60	220-240	18-24	2 18-24	36	UNP	HFP21824PLL220240



Electronics

HF-Performer TL5 Circular

HF-P TL5 circular

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 with, 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:

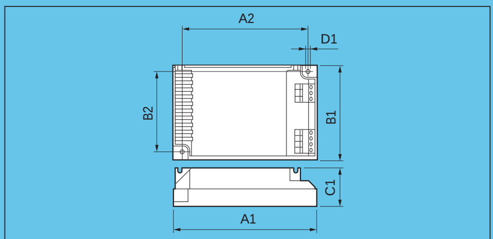
- System supplier
  As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
  Philips HF electronic ballasts comply with all relevant international rules and regulations.

Compliances and approvals

• RFI < 30MHz	EN 55015*
• Harmonics	EN 61000-3-2
• Immunity	EN 61547
• Safety	EN 61347-2-3
• Performance	EN 60929-1E
• Vibration & bump tests	IEC 68-2-6 FC IEC 68-2-29 Eb
• Quality standard	ISO 9000-2000
• Environmental standard	ISO 14001
• Approval marks	ENEC VDE-EMV
• CE marking.	
• Temperature declared thermally protected	IEC 61347-1

** Tested with ballast functional ground connected to earth*

Dimensions in mm



Product ID	A1	A2	B1	B2	C1	D1
1 22-40	103	93.5	67	57.5	30	4.5
155	103	93.5	67	57.5	30	4.5
160	103	93.5	67	57.5	30	4.5
2 22+40	123	111	79	67	33	4.5

Electronics

HF-Performer TL5 Circular

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

Lamp	Qty. of lamps	Ballast	System power W	Lamp Power W	Ballast losses W	NOMINAL Lamp Lumen lm	EEI
TL5C 22 W	1	HF-P 1 22-40 TL5C	25	22	3.0	1800	A2
TL5C 40 W	1	HF-P 1 22-40 TL5C	43.5	40	3.5	3300	A2
TL5C 55 W	1	HF-P 155 TL5C	60	55	5.0	4400	A2
TL5C 60 W	1	HF-P 160 TL5C	65	60	5.0	5400	A2
TL5C 22+40W	2	HF-P 2 22+40 TL5C*	71	22+40	8.0	1800 + 3300	A2

** For use with one 22W and one 40W lamp*

Ballast	Lamp	Qty. of lamps	Power factor	Max. cable cap¹) Ip-Ip/Ip-gnd pF	Tc max °C	Oper²) Freq. kHz
HF-P 1 22-40 TL5C	TL5C 22 W	1	0.97	120/60	75	45
HF-P 1 22-40 TL5C	TL5C 40 W	1	0.97	120/60	75	45
HF-P 155 TL5C	TL5C 55 W	1	0.98	120/60	70	45
HF-P 160 TL5C	TL5C 60 W	1	0.98	120/60	70	45
HF-P 2 22+40 TL5C	TL5C 22+40W	2	0.98	120/60	70	45

¹) Ip-Ip = between lamp wires — Typical wire capacitance 50 pF/m (spacing between wires 0.5 mm)
Ip-Ignd = between lamp wires and ground — Typical wire capacitance 72 pF/m (spacing between wires 0.5 mm)
²) Tolerance ± 3 kHz

Technical data for installation

Mains operation

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

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	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 abovementioned test is carried out and before the installation is put into operation.

Mains current / Emergency operation

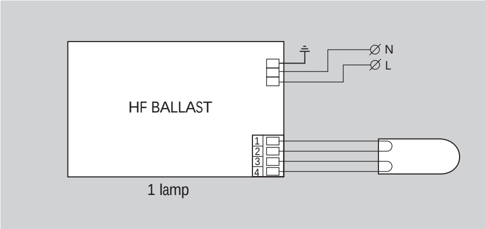
Ballast	Lamp	Input current A
HF-P 1 22-40 TL5C	22W	0.11
HF-P 1 22-40 TL5C	40W	0.19
HF-P 155 TL5C	55W	0.26
HF-P 160 TL5C	60W	0.28
HF-P 2 22+40 TL5C	22W + 40W	0.31

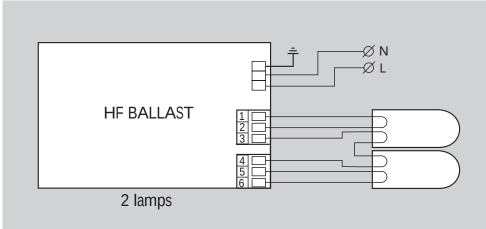
Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker Type B 16 A	Inrush current 1/2 value time at typical mains impedance
HF-P 1 22-40 TL5C	28	20A/170 µs
HF-P 155 TL5C	28	20A/170 µs
HF-P 160 TL5C	28	20A/170 µs
HF-P 2 22+40 TL5C	28	20A/170 µs

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

MCB type		Relative number of ballasts
B	16 A	100% (see table above)
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%





Wiring diagrams

Technical data for design and mounting HF ballasts in fixtures

Temperature range to ignite lamp without ignition aid	-15°C .. allowed maximum ballast temperature
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 ballasts functional ground

Max. tcase = 75˚C (except HF-P 2 22+40 TL5C)
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 sufficiently IP rated. Permitted humidity is tested according to EN 60928 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 crosssection:

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

Strip length 9 mm

Notes

1. Data is based on a main supply with an impedance of 400 mΩT (equal to 15 m cable of 2,5 mm and another 20 m to te 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 het 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 wich can be connected to one Residual Current Detector of 30 mA is 30.

Ordering and packing data

Ballast	Piece		Bulk packing					
	EAN code	Weight	Qty	Dimensions l x w x h	Volume	Weight gross	EAN code	EOC
		kg	pcs	cm	m³	kg		
HF-P 1 22-40 TL5C	8711500 749338	0.15	36	21.5 x 21.0 x 21.5	0.01	5.7	8711500 749345	749338 30
HF-P 155 TL5C	8711500 927767	0.15	36	21.5 x 21.0 x 21.5	0.01	5.7	8711500 927714	927767 30
HF-P 160 TL5C	8711500 927781	0.15	36	21.5 x 21.0 x 21.5	0.01	5.7	8711500 927798	927781 30
HF-P 2 22+40 TL5C	8711500 749437	0.22	36	22.4 x 22.4 x 22.0	0.01	7.4	8711500 749444	749437 30

HF-P 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
- Hospitals
- Hotels

Philips quality

This implies optimum quality regarding:

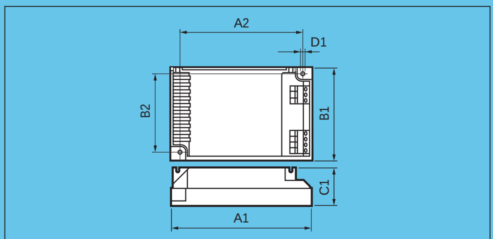
- System supplier
  As manufacturers of lamps and electronic control gear, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained
- International standards
  Philips HF electronic ballasts comply with all relevant international rules and regulations.

Compliances and approvals

• RFI < 30 MHz	EN 55015*
• Harmonics	EN 61000-3-2
• Immunity	EN 61547
• Safety	EN 61347-2-3
• Performance	EN 60929-1E
• Vibration & bump tests	IEC 68-2-6 FC
	IEC 68-2-29 Eb
• Quality standard	ISO 9000-2000
• Environmental standard	ISO 14001
• Approval marks	ENEC-VDE-EMV
• CE marking	
• Temperature declared thermally protected	IEC 61347-1

* Tested with ballast functional ground connected to earth

Dimensions in mm



Product ID	A1	A2	B1	B2	C1	D1
113/118/138/157	103	93.5	67	57.5	30	4.5
1 26-42	103	93.5	67	57.5	30	4.5
213/218/257	123	111	79	67	33	4.5
2 26-40	123	111	79	67	33	4.5

Electronics
HF-Performer PL-T/C/Q

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

Lamp	Qty. of lamps	Ballast	System power W	Lamp Power W	Ballast losses W	NOMINAL Lamp Lumen lm	EEI
PL-T 13 W	1	HF-P 113 PL-T/C	14	12.0	2.0	900	A3
PL-T 13 W	2	HF-P 213 PL-T/C	28	12.0	4.0	900	A3
PL-T 18 W	1	HF-P 118 PL-T/C	18	16.5	1.5	1200	A2
PL-T 18 W	2	HF-P 218 PL-T/C	38	16.5	3.0	1200	A2
PL-T 26 W	1	HF-P 1 26-42 PL-T/C	26	24.0	2.0	1800	A2
PL-T 26 W	2	HF-P 2 26-42 PL-T/C	54	25.5	3.0	1800	A2
PL-T 32 W	1	HF-P 1 26-42 PL-T/C	35	32.0	3.0	2400	A2
PL-T 32 W	2	HF-P 2 26-42 PL-T/C	70	33.0	4.0	2400	A2
PL-T 42 W	1	HF-P 1 26-42 PL-T/C	46	43.0	3.0	3200	A2
PL-T 42 W	2	HF-P 2 26-42 PL-T/C	92	43.0	6.0	3200	A2
PL-T 57 W	1	HF-P 157 PL-T	62	57.0	5.0	4300	A2
PL-T 57 W	2	HF-P 257 PL-T	121	56.0	9.0	4300	A2
PL-C 10 W	1	HF-P 113 PL-T/C	12	9.5	2.0	600	A2
PL-C 10 W	2	HF-P 213 PL-T/C	23	9.5	4.0	600	A2
PL-C 13 W	1	HF-P 113 PL-T/C	14	12.0	2.0	900	A3
PL-C 13 W	2	HF-P 213 PL-T/C	28	12.0	4.0	900	A3
PL-C 18 W	1	HF-P 118 PL-T/C	18	16.5	1.5	1200	A2
PL-C 18 W	2	HF-P 218 PL-T/C	38	16.5	3.0	1200	A2
PL-C 26 W	1	HF-P 1 26-42 PL-T/C	26	24.0	2.0	1800	A2
PL-C 26 W	2	HF-P 2 26-42 PL-T/C	54	25.5	3.0	1800	A2
PL-Q 38 W	1	HF-P 138 PL-Q	38	35.0	3.0	2800	A2

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

Ballast	Lamp	Qty. of lamps	Power factor	Max. cable cap¹) Ip-Ip/Ip-gnd pF	Tc max °C	Oper²) Freq. kHz
HF-P 113 PL-T/C	PL-T 13 W	1	0.96	120/60	70	45
HF-P 213 PL-T/C	PL-T 13 W	2	0.97	120/60	70	45
HF-P 118 PL-T/C	PL-T 18 W	1	0.93	120/120	75	48
HF-P 218 PL-T/C	PL-T 18 W	2	0.96	68/68	75	48
HF-P 1 26-42 PL-T/C	PL-T 26 W	1	0.95	120/120	75	48
HF-P 2 26-42 PL-T/C	PL-T 26 W	2	0.96	50/50	80	48
HF-P 1 26-42 PL-T/C	PL-T 32 W	1	0.95	120/120	75	48
HF-P 2 26-42 PL-T	PL-T 32 W	2	0.97	50/50	80	48
HF-P 1 26-42 PL-T/C	PL-T 42 W	1	0.95	120/120	75	48
HF-P 2 26-42 PL-T	PL-T 42 W	2	0.98	50/50	80	48
HF-P 157 PL-T	PL-T 57 W	1	0.98	120/60	70	45
HF-P 257 PL-T	PL-T 57 W	2	0.98	50/50	75	48
HF-P 113 PL-T/C	PL-C 10 W	1	0.96	120/60	70	45
HF-P 213 PL-T/C	PL-C 10 W	2	0.95	120/60	70	45
HF-P 113 PL-T/C	PL-C 13 W	1	0.96	120/60	70	45
HF-P 213 PL-T/C	PL-C 13 W	2	0.97	120/60	70	45
HF-P 118 PL-T/C	PL-C 18 W	1	0.93	120/120	75	48
HF-P 218 PL-T/C	PL-C 18 W	2	0.96	68/68	75	48
HF-P 1 26-42 PL-T/C	PL-C 26 W	1	0.95	120/120	75	48
HF-P 2 26-42 PL-T/C	PL-C 26 W	2	0.96	50/50	80	48
HF-P 138 PL-Q	PL-Q 38 W	1	0.98	130/65	75	42

¹) Ip-Ip = between lamp wires *Typical wire capacitance 50 pF/m (spacing between wires 0.5 mm)*
Ip-Ignd = between lamp wires and ground *Typical wire capacitance 72 pF/m (spacing between wires 0.5 mm)*
²) Tolerance ± 3 kHz

Technical data for installation

Mains operation

Rated mains voltage		220 - 240 V
with tolerances for safety:	+/- 10%	198 - 264 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	See table
Required battery voltage for burning lamps	See table
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	< 1.2 s < 0.5 s (HF-P 118 PL-T/C HF-P 257 PL-T) HF-P 1 26-42 PL-T/C HF-P 2 26-42 PL-T/C
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 abovementioned test is carried out and before the installation is put into operation

Mains current at 230 V

Ballast	Lamp	Input current A
HF-P 113 PL-T/C	PL-T/C 10W	0.05
HF-P 213 PL-T/C	PL-T/C 10W	0.11
HF-P 113 PL-T/C	PL-T/C 13W	0.06
HF-P 213 PL-T/C	PL-T/C 13W	0.12
HF-P 118 PL-T/C	PL-T/C 18W	0.09
HF-P 218 PL-T/C	PL-T/C 18W	0.18
HF-P 1 26-42 PL-T/C	PL-T/C 26W	0.13
HF-P 2 26-42 PL-T/C	PL-T/C 26W	0.22
HF-P 1 26-42 PL-T/C	PL-T 32W	0.17
HF-P 2 26-42 PL-T/C	PL-T 32W	0.30
HF-P 1 26-42 PL-T/C	PL-T 42W	0.22
HF-P 2 26-42 PL-T/C	PL-T 42W	0.45
HF-P 157 PL-T	PL-T 57W	0.27
HF-P 257 PL-T	PL-T 57W	0.50
HF-P 138 PL-Q	PL-Q 10W	0.17

DC voltage operation (during emergency back-up)

Ballast	Ignition	Normal operation
HF-P 113 PL-T/C	176 – 276 V	176 – 276 V
HF-P 213 PL-T/C	176 – 276 V	176 – 276 V
HF-P 113 PL-T/C	176 – 276 V	176 – 276 V
HF-P 213 PL-T/C	176 – 276 V	176 – 276 V
HF-P 118 PL-T/C	198 – 254 V	176 – 254 V
HF-P 218 PL-T/C	198 – 254 V	176 – 254 V
HF-P 1 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 2 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 1 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 2 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 1 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 2 26-42 PL-T/C	198 – 254 V	176 – 254 V
HF-P 157 PL-T	176 – 276 V	176 – 276 V
HF-P 257 PL-T	198 – 254 V	176 – 254 V
HF-P 138 PL-Q	176 – 276 V	176 – 276 V

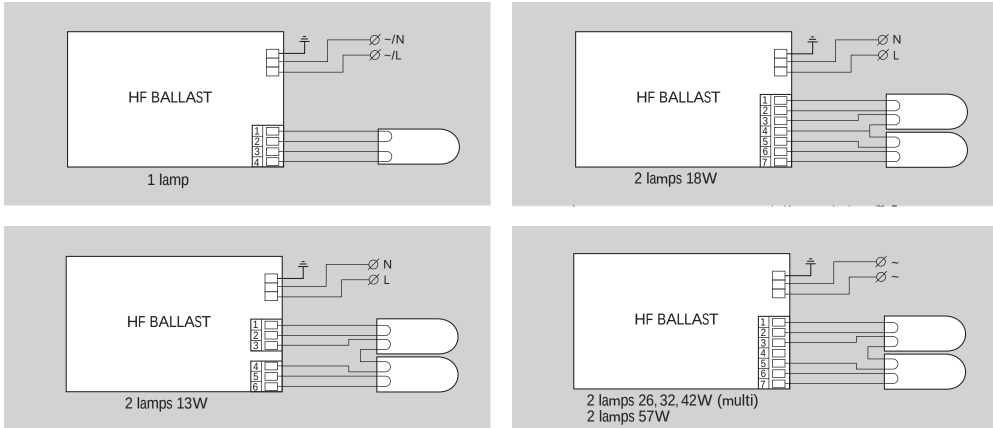
Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker type B16A	Inrush current Max. value time at typical mains impedance
HF-P 113 PL-T/C	28	20 A/170 µs
HF-P 213 PL-T/C	28	20 A/170 µs
HF-P 118 PL-T/C	28	27 A/250 µs
HF-P 218 PL-T/C	28	27 A/250 µs
HF-P 138 PL-Q	28	20 A/170 µs
HF-P 1 26-42 PL-T/C	28	27 A/250 µs
HF-P 2 26-42 PL-T/C	16	35 A/350 µs
HF-P 157 PL-T	28	20 A/170 µs
HF-P 257 PL-T	10	40 A/400 µs

Electronics HF-Performer PL-T/C/Q

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

MCB type		Relative number of ballasts
B	16 A	100% (see table above)
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%



Wiring diagrams

Technical data for design and mounting HF ballasts in fixtures:

Temperature range to ignite lamp without ignition aid: -15°C .. allowed maximum ballast temperature

Max. Tcase = see 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. 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 60928 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 crosssection:
On the mains side: 0.5 - 1.5 mm^2
On the lamp side: 0.5 - 1.5 mm^2

Strip length 7.5 - 8.5 mm

Extra features HF-P [illegible]
No L&N marking: Mains can be connected in either way
RFI >30 MHz: EN 55022 B

Extra features HF-P [illegible]
Wiring: Connector 4 can be connected, but this is not necessary

Notes
1. Data is based on a mains supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5mm^2 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 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.

Ordering and packing data

Ballast	1 Piece		Bulk packing					
	EAN code	Weight	Qty	Dimensions l x w x h	Volume	Weight gross	EAN code	EOC
		kg	pcs	cm	m3	kg		
HF-P 113 PL-T/C	8711500 749451	0.15	36	21.5x21.0x21.5	0.01	5.5	8711500 749468	749451 30
HF-P 118 PL-T/C	8711500 060280	0.13	12	22.1x21.7x 8.8	0.01	1.8	8711500 060174	060280 30
HF-P 138 PL-Q	8711500 063656	0.12	36	21.0x20.5x19.0	0.01	4.4	8711500 063694	063656 30
HF-P 1 26-42 PL-T/C	8711500 060310	0.13	12	22.1x21.7x 8.8	0.01	1.8	8711500 060198	060310 30
HF-P 213 PL-T/C	8711500 749413	0.22	36	22.4x22.4x22.0	0.01	7.9	8711500 749420	749413 30
HF-P 218 PL-T/C	8711500 749680	0.19	36	25.5x24.5x22.5	0.01	6.8	8711500 749697	749680 30
HF-P 2 26-42 PL-T/C	8711500 933997	0.22	12	25.5x24.5x 8.2	0.01	2.9	8711500 002181	933997 30
HF-P 157 PL-T	8711500 927804	0.15	36	21.5x21.0x21.5	0.01	5.5	8711500 927811	927804 30
HF-P 257 PL-T	8711500 934017	0.23	12	25.5x24.5x 8.2	0.01	2.8	8711500 934024	934017 30

Electronics

HF-Performer (flat) TL5

HF-P (flat) TL5

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

Features and benefits
- The combination HF-Performer and TL5 lamps offers opportunities for miniaturisation and reduced cost of ownership, thanks to the limited dimensions and the high system efficacy
- Programmed start: warm start circuit 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 lamp and reduction in system energy losses
- Low energy consumption
- 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 terminations suitable for automatic wiring machines

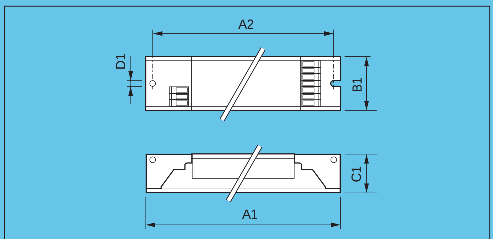
Applications
Typical areas of application include:
- Department stores, shops, supermarkets
- Airports, railway stations
- Office buildings, for example, insurance companies, banks, government ministries
- Hospitals
- Hotels
- Suitable for emergency installations with VDE 0108 with re-ignition < 0.5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

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
• RFI > 30 MHz	EN 55022 A
• Harmonics	EN 61000-3-2
• Immunity	EN 61547
• Safety	EN 61347-2-3
• Performance	EN 60929-1E
• Vibration & bump tests	IEC 68-2-6 FC IEC 68-2-29 Eb
• Quality standard	ISO 9000-2000
• Environmental standard	ISO 14001
• Approval marks	ENEC VDE-EMV
• CE marking.	
• Temperature declared thermally protected	IEC 61347-1

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
1 Lamps	360	350	30	21	4.2
2 Lamps	425	415	30	21	4.2

Note: for update of information see catalogue on www.lighting.philips.com

Electronics

HF-Performer (flat) TL5

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		See table

DC voltage operation (during emergency back-up)

Required battery voltage for guaranteed ignition	198 - 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.

Earth leakage current	< 0.5 mA per ballast
Ignition time	< 0.5 s
Smart power: constant light operation	in case of mains voltage fluctuations within 202 - 254 V, the luminous flux varies by a maximum of ± 2%
Lamp wiring for HF-P 2..TL5	Lamp wiring to both lamps must be inside one luminaire; length of wires to lamp 1 must be same (±10%) as length of wires to lamp 2 (wires to terminals 1 and 2 must be short and equal in length to wires 6 and 7; wires to terminals 3 and 4 must be long and equal in length to wires to terminals 4 and 5); max. length of lamp wiring to be equal to length of longest lamp (35 W/ 49 W), plus normal length needed for assembly (in practice, max. 1.8 to 2 m). For HF-P 1..TL5 it is advised to use 500 V rated components and wiring. 500 V rated components and wiring are required with HF-P 2..TL5.
Dual fixture; master-slave operation	not advised
Automatic restart after lamp replacement or voltage dip	yes: tested with a dip down to 30% with a duration of 10 mains cycles
Overvoltage protection	48 hr at 320 V AC 2 hr at 350 V AC
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 abovementioned test is carried out and before the installation is put into operation.

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

Mains current / Emergency operation

Ballast	Lamp	Input current A
HF-P 1 14-35 TL5 HE	TL5 14W	0.08
HF-P 2 14-35 TL5 HE	TL5 14W	0.15
HF-P 1 14-35 TL5 HE	TL5 21W	0.11
HF-P 2 14-35 TL5 HE	TL5 21W	0.20
HF-P 1 14-35 TL5 HE	TL5 28W	0.15
HF-P 2 14-35 TL5 HE	TL5 28W	0.27
HF-P 1 14-35 TL5 HE	TL5 35W	0.18
HF-P 2 14-35 TL5 HE	TL5 35W	0.34
HF-P 1 24-35 TL5 HO	TL5 24W	0.12
HF-P 2 24-35 TL5 HO	TL5 24W	0.23
HF-P 1 24-35 TL5 HO	TL5 39W	0.20
HF-P 2 24-35 TL5 HO	TL5 39W	0.35
HF-P 149 TL5 HO	TL5 49W	0.25
HF-P 249 TL5 HO	TL5 49W	0.49
HF-P 154 TL5 HO	TL5 54W	0.27
HF-P 254 TL5 HO	TL5 54W	0.54

Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker type B 16A	C 16A	Inrush current Max. value time at typical mains impedance
HF-P 1 14-35 TL5 HE	28	48	24A/250μs
HF-P 2 14-35 TL5 HE	15	20	31A/300μs
HF-P 1 24-39 TL5 HO	28	48	24A/250μs
HF-P 2 24-39 TL5 HO	15	20	31A/300μs
HF-P 149 TL5 HO	28	48	24A/250μs
HF-P 249 TL5 HO	15	20	31A/300μs
HF-P 154 TL5 HO	28	48	24A/250μs
HF-P 254 TL5 HO	15	20	31A/300μs

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

MCB type		Relative number of ballasts
B	16 A	100% (see table above)
B	10 A	63%
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%

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

Lamp	Qty. of lamps	Ballast	System power W	Lamp Power W	Ballast losses W	NOMINAL Lamp Lumen lm	EEI
TL5 HE 14W	1	HF-P 1 14-35 TL5 HE	18	15	2.6	1200	A2
TL5 HE 14W	2	HF-P 2 14-35 TL5 HE	32	15	2.8	1200	A2
TL5 HE 21W	1	HF-P 1 14-35 TL5 HE	25	22	2.9	1900	A2
TL5 HE 21W	2	HF-P 2 14-35 TL5 HE	46	21	3.6	1900	A2
TL5 HE 28W	1	HF-P 1 14-35 TL5 HE	33	30	3.5	2600	A2
TL5 HE 28W	2	HF-P 2 14-35 TL5 HE	62	29	5.0	2600	A2
TL5 HE 35W	1	HF-P 1 14-35 TL5 HE	40	36	3.4	3300	A2
TL5 HE 35W	2	HF-P 2 14-35 TL5 HE	77	35	6.7	3300	A2
TL5 HO 24W	1	HF-P 1 24-39 TL5 HO	28	24	4.0	1750	A2
TL5 HO 24W	2	HF-P 2 24-39 TL5 HO	51	23	4.8	1750	A2
TL5 HO 39W	1	HF-P 1 24-39 TL5 HO	45	40	4.2	3100	A2
TL5 HO 39W	2	HF-P 2 24-39 TL5 HO	83	39	5.9	3100	A2
TL5 HO 49W	1	HF-P 149 TL5 HO	56	51	4.8	4300	A2
TL5 HO 49W	2	HF-P 249 TL5 HO	111	51	8.8	4300	A2
TL5 HO 54W	1	HF-P 154 TL5 HO	61	55	6.0	4450	A2
TL5 HO 54W	2	HF-P 254 TL5 HO	118	55	8.0	4450	A2

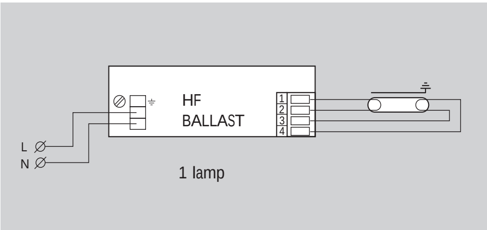
** Typical values for /830 colors at 25˚C lamp ambient temperature*

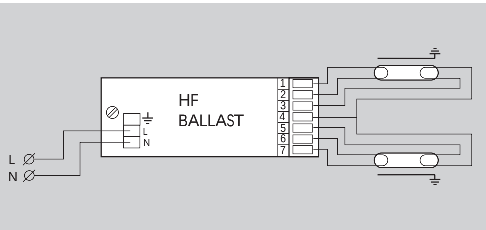
Ballast	Lamp	Qty. of lamps	Power factor	Max. cable cap[1] Ip-Ip/Ip-gnd pF	Tc max ˚C	Oper Freq. kHz
HF-P 1 14-35 TL5 HE	TL5 HE 14W	1	0.91	150/150	75	50
HF-P 2 14-35 TL5 HE	TL5 HE 14W	2	0.95	150/150	75	47
HF-P 1 14-35 TL5 HE	TL5 HE 21W	1	0.96	150/150	75	49
HF-P 2 14-35 TL5 HE	TL5 HE 21W	2	0.97	150/150	75	47
HF-P 1 14-35 TL5 HE	TL5 HE 28W	1	0.98	150/150	75	48
HF-P 2 14-35 TL5 HE	TL5 HE 28W	2	0.99	150/150	75	47
HF-P 1 14-35 TL5 HE	TL5 HE 35W	1	0.98	150/150	75	48
HF-P 2 14-35 TL5 HE	TL5 HE 35W	2	0.99	150/150	75	47
HF-P 1 24-39 TL5 HO	TL5 HO 24W	1	0.96	150/150	75	53
HF-P 2 24-39 TL5 HO	TL5 HO 24W	2	0.98	150/150	75	51
HF-P 1 24-39 TL5 HO	TL5 HO 39W	1	0.99	150/150	75	46
HF-P 2 24-39 TL5 HO	TL5 HO 39W	2	0.99	150/150	75	45
HF-P 149 TL5 HO	TL5 HO 49W	1	0.99	150/150	75	45
HF-P 249 TL5 HO	TL5 HO 49W	2	0.99	150/150	75	48
HF-P 154 TL5 HO	TL5 HO 54W	1	0.99	150/150	75	52
HF-P 254 TL5 HO	TL5 HO 54W	2	0.99	150/150	75	53

** On the HF-P 2 14-35 TL5 HE any combination of HE lamps can be used (e.g. 14&28; 35&21; etc)*

[1]) Ip-Ip = between lamp wires — Typical wire capacitance 50 pF/m (spacing between wires 0.5 mm)

Ip-Ignd = between lamp wires and ground — Typical wire capacitance 72 pF/m (spacing between wires 0.5 mm)





Electronics HF-Performer (flat) TL5

Technical data for design and mounting HF ballasts in fixtures:

Temperatures

Temperature range to ignite lamp with ignition aid	-15 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. 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	ballast IP=23. In outdoor the luminaire has to be sufficiently IP rated Permitted humidity is tested according to EN 60928 par. 12. Note that no moisture or condensation may enter the ballast.
Ignition aid	for optimum ignition the 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)
Hum and noise level	inaudible

Permitted humidity is tested according to EN 60928 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.

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

Wire lengths:

1 lamp version:	keep wires to terminals 1 and 2 short
2 lamp version:	keep wires to terminals 1, 2, 6 and 7 short

Wire cross-section:	on the mains side: 0.5 - 1.0 mm^2 on the lamp side: 0.5 - 1.0 mm^2
Strip length:	8 - 9 mm

Notes:
1. Data is based on a main supply with an impedance of 400 mT (equal to 15 m cable of 2,5 mm and another 20 m to te middle of the power distribution), under worst case conditions. With an impedance of 800 mT 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 het 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 wich can be connected to one Residual Current Detector of 30 mA is 30.

Ordering and packing data

Ballast	1 Piece		Bulk packing					EOC
	EAN code	Weight kg	Qty. pcs.	Dimensions l x w x h cm	Volume m^3	Weight gross kg	EAN code	
HF-P 1 14-35 TL5 HE	8711500 928559	0.25	12	40.8x20.8x8.7	0.0074	3.3	8711500 928566	928559 30
HF-P 2 14-35 TL5 HE	8711500 928634	0.31	12	46.2x20.8x8.7	0.0090	4.0	8711500 928641	928634 30
HF-P 1 24-39 TL5 HO	8711500 928573	0.25	12	40.8x20.8x8.7	0.0074	3.3	8711500 928580	928573 30
HF-P 2 24-39 TL5 HO	8711500 928658	0.31	12	46.2x20.8x8.7	0.0090	4.0	8711500 928665	928658 30
HF-P 149 TL5 HO	8711500 928597	0.25	12	40.8x20.8x8.7	0.0074	3.3	8711500 928603	928597 30
HF-P 249 TL5 HO	8711500 928672	0.31	12	46.2x20.8x8.7	0.0090	4.0	8711500 928689	928672 30
HF-P 154 TL5 HO	8711500 928610	0.25	12	40.8x20.8x8.7	0.0074	3.3	8711500 928627	928610 30
HF-P 254 TL5 HO	8711500 928696	0.31	12	46.2x20.8x8.7	0.0090	4.0	8711500 928702	928696 30

HF-P // (flat) TL5

EII TECHNOLOGY

Product description

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

Features and benefits

- The combination of HF-Performer and TL5 lamps offers opportunities for miniaturization and reduced cost of ownership, thanks to the limited dimensions and the high system efficacy
- 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
- 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
- Smart power: constant light independent of mains voltage fluctuations
- Low energy consumption due to the use of EII technology
- 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 terminations suitable for automatic wiring machines

Applications

Typical areas of application include:

- 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

Philips quality

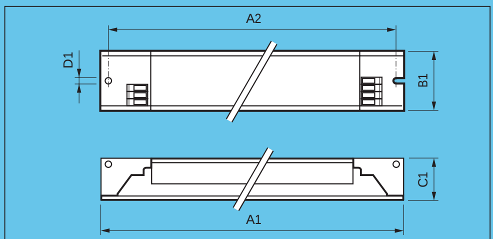
This assures optimum quality regarding:

- System supplier
  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.
- International standards
  Philips HF electronic regulating ballast's complies with all relevant international rules and regulations.

Compliances 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	IEC 600-68-2-6 Fc IEC 600-68-2-29 Eb
• Quality standard	ISO 9000-2000
• Environmental standard	ISO 14001
• Approval marks	ENEC EMV-VDE
• CE marking	
• Temperature declared thermally	protected IEC 61347-1

Dimensions in mm



Product ID	A1	A2	B1	C1	D1
1 Lamps	360	350	30	21	4.2
2 Lamps	425	415	30	21	4.2
3/4 Lamps	360	350	30	21	4.2
280	425	415	30	21	4.2

Note: for update of information see catalogue on www.lighting.philips.com

Technical data (all typical values at mains 230V)

Lamp	Qty of lamps	Ballast	System Power W	Lamp Power W	Ballast losses W	Lamp lumen lm	EEI class.
TL5 HE 14W	2	HF-P 2 14-35 TL5 HE EII	30	2x14	2	1200	A2
TL5 HE 14W	3	HF-P 3/414 TL5 EII	47	3x14	5	1200	A2
TL5 HE 14W	4	HF-P 3/414 TL5 EII	62	4x14	6	1200	A2
TL5 HE 21W	2	HF-P 2 14-35 TL5 HE EII	46	2x21	4	1900	A2
TL5 HE 21W	3	HF-P 3/414 TL5 EII	70	3x21	7	1900	A2
TL5 HE 28W	2	HF-P 2 14-35 TL5 HE EII	61	2x28	5	2600	A2
TL5 HE 35W	2	HF-P 2 14-35 TL5 HE EII	76	2x35	6	3300	A2
TL5 HO 24W	2	HF-P 2 24-39 TL5 HO EII	49	2x22	4	1750	A2
TL5 HO 24W	3	HF-P 3/4 24 TL5/PL-L EII	75	3x23	6	1750	A2
TL5 HO 24W	4	HF-P 3/4 24 TL5/PL-L EII	100	4x23	6	1750	A2
PL-L 24W	3	HF-P 3/4 24 TL5/PL-L EII	75	3x23	6	1800 (**)	A2
PL-L 24W	4	HF-P 3/4 24 TL5/PL-L EII	98	4x23	6	1800 (**)	A2
TL5 HO 39W	2	HF-P 2 24-39 TL5 HO EII	86	2x39	8	3100	A2
TL5 HO 49W	2	HF-P 249 TL5 HO EII	109	2x49	10	4300	A2
TL5 HO 54W	2	HF-P 254 TL5 HO EII	120	2x54	11	4450	A2
TL5 HO 80W	1	HF-P 180 TL5/PL-L EII	88	1x80	8	6150	A2
TL5 HO 80W	2	HF-P 280 TL5/PL-L EII	172	2x80	12	6150	A2
PL-L 80W	1	HF-P 180 TL5/PL-L EII	88	1x80	8	6000 (**)	A2
PL-L 80W	2	HF-P 280 TL5/PL-L EII	172	2x80	12	6000 (**)	A2

* Typical values for /830 at 25ºC lamp ambient temperature

** PL-L values are published at 25ºC lamp ambient temperature

Lamp	Qty of lamps	Ballast	Max. cable cap lp-lp/lp-gnd pF	Oper. Freq kHz
TL5 HE 14W	2	HF-P 2 14-35 TL5 HE EII	200/200	45
TL5 HE 14W	3	HF-P 3/414 TL5 EII	200/200	27
TL5 HE 14W	4	HF-P 3/414 TL5 EII	200/200	27
TL5 HE 21W	2	HF-P 2 14-35 TL5 HE EII	200/200	45
TL5 HE 21W	3	HF-P 3/414 TL5 EII	200/200	27
TL5 HE 28W	2	HF-P 2 14-35 TL5 HE EII	200/200	45
TL5 HE 35W	2	HF-P 2 14-35 TL5 HE EII	200/200	45
TL5 HO 24W	2	HF-P 2 24-39 TL5 HO EII	200/200	53
TL5 H0 24W	3	HF-P 3/4 24 TL5/PL-L EII	150/150	45
TL5 H0 24W	4	HF-P 3/4 24 TL5/PL-L EII	150/150	45
PL-L 24W	3	HF-P 3/4 24 TL5/PL-L EII	150/150	45
PL-L 24W	4	HF-P 3/4 24 TL5/PL-L EII	150/150	45
TL5 HO 39W	2	HF-P 2 24-39 TL5 HO EII	200/200	45
TL5 HO 49W	2	HF-P 249 TL5 HO EII	200/200	45
TL5 HO 54W	2	HF-P 254 TL5 HO EII	200/200	45
TL5 HO 80W	1	HF-P 180 TL5/PL-L EII	150/150	45
TL5 HO 80W	2	HF-P 280 TL5/PL-L EII	150/150	45
PL-L 80W	1	HF-P 180 TL5/PL-L EII	150/150	45
PL-L 80W	2	HF-P 280 TL5/PL-L EII	150/150	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)

Technical data for installation

Mains operation		
Rated mains voltage		220-240 V
Tolerances for performance	+6%-8%	202-254 V
With tolerances for safety:	+/– 10%	198-264 V
Mains frequency		50/60 Hz
Power factor		> 0.95

DC voltage operation (during emergency back-up)	
Required battery voltage for guaranteed ignition	198 - 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.

Earth leakage current	< 0.5 mA per ballast
Ignition time	0.5 sec.
Constant light operation	In case of AC mains voltage fluctuations, within 202-254 V, the luminous flux changes by a maximum of + 2%

Electronics
HF-Performer // (flat) TL5

Overvoltage protection	48 hrs at 320 V AC 2 hrs at 350 V AC
Dual fixture: master-slave operation	Not advised
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 above mentioned test is carried out and before the installation is put in operation
Lamp wiring	The use of 500 V rated components and wiring are required with HF-PERFORMER TL5

Mains current at V
Inrush current

Ballast	Lamp	Qty of lamps	Max quantity of ballasts per Miniature Circuit Breaker type B16A	Inrush current Peak value time at typical mains impedance
HF-P 2 14-35 TL5 HE EII	TL5 HE 14W	2	28	18A/250 µS
HF-P 3/414 TL5 EII	TL-5 HE 14W	3	28	18A/250 µS
HF-P 3/414 TL5 EII	TL-5 HE 14W	4	28	18A/250 µS
HF-P 3/414 TL5 EII	TL5 HE 21W	3	28	18A/250 µS
HF-P 2 14-35 TL5 HE EII	TL5 HE 21W	2	28	18A/250 µS
HF-P 2 14-35 TL5 HE EII	TL5 HE 28W	2	28	18A/250 µS
HF-P 2 14-35 TL5 HE EII	TL5 HE 35W	2	28	18A/250 µS
HF-P 2 24-39 TL5 HO EII	TL5 HO 24W	2	15	31A/350 µS
HF-P 3/4 24 TL5/PL-L EII	TL5 24 W	3	12	31A/350 µS
HF-P 3/4 24 TL5/PL-L EII	TL5 24 W	4	12	31A/350 µS
HF-P 3/4 24 TL5/PL-L EII	PL-L 24 W	3	12	31A/350 µS
HF-P 3/4 24 TL5/PL-L EII	PL-L 24 W	4	12	31A/350 µS
HF-P 2 24-39 TL5 HO EII	TL5 HO 39W	2	15	31A/350 µS
HF-P 249 TL5 HO EII	TL5 HO 49W	2	15	31A/350 µS
HF-P 254 TL5 HO EII	TL5 HO 54W	2	15	31A/350 µS
HF-P 180 TL5/PL-L EII	TL5 HO 80W	1	12	31A/350 µS
HF-P 280 TL5/PL-L EII	TL5 HO 80W	2	12	40A/400 µS
HF-P 180 TL5/PL-L EII	PL-L 80W	1	12	31A/350 µS
HF-P 280 TL5/PL-L EII	PL-L 80W	2	12	40A/400 µS

Mains current at V

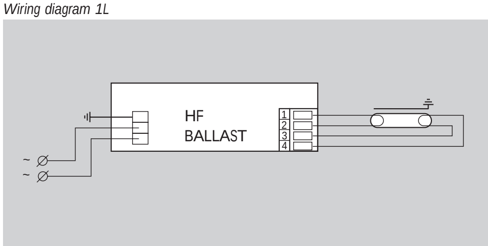
Ballast	Lamp	Qty of lamps	Input current A
HF-P 2 14-35 TL5 HE EII	TL5 HE 14W	2	0.14
HF-P 3/ 4 14 TL5 EII	TL5 HE 14W	3	0.20
HF-P 3/ 4 14 TL5 EII	TL5 HE 14W	4	0.26
HF-P 3/ 4 14 TL5 EII	TL5 HE 21W	3	0.30
HF-P 2 14-35 TL5 HE EII	TL5 HE 21W	2	0.2
HF-P 2 14-35 TL5 HE EII	TL5 HE 28W	2	0.27
HF-P 2 14-35 TL5 HE EII	TL5 HE 35W	2	0.33
HF-P 2 24-39 TL5 HO EII	TL5 HO 24W	2	0.22
HF-P 3/4 24 TL5/PL-L EII	TL5 HO 24 W	3	0.33
HF-P 3/4 24 TL5/PL-L EII	TL5 HO 24 W	4	0.44
HF-P 3/4 24 TL5/PL-L EII	PL-L 24 W	3	0.33
HF-P 3/4 24 TL5/PL-L EII	PL-L 24 W	4	0.43
HF-P 2 24-39 TL5 HO EII	TL5 HO 39W	2	0.39
HF-P 249 TL5 HO EII	TL5 HO 49W	2	0.49
HF-P 254 TL5 HO EII	TL5 HO 54W	2	0.52
HF-P 180 TL5/PL-L EII	TL5 HO 80W	1	0.38
HF-P 280 TL5/PL-L EII	TL5 HO 80W	2	0.75
HF-P 180 TL5/PL-L EII	PL-L 80W	1	0.38
HF-P 280 TL5/PL-L EII	PL-L 80W	2	0.75

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

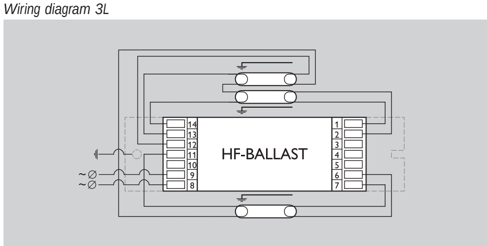
Type		Relative number of ballasts
B	16A	100%(see table above)
B	10A	63%
C	16A	170%
C	10A	104%
L, I	16A	108%
L, I	10A	65%
G, U, II	16A	212%
G, U, II	10A	127%
K, III	16A	254%
K, III	10A	154%

Wiring diagrams

Wiring diagram 1L



Wiring diagram 3L



Electronics
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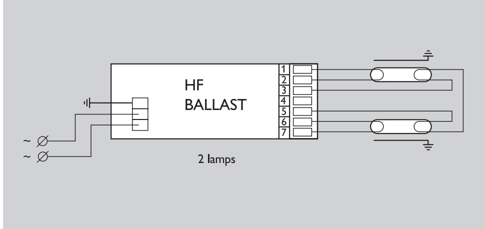
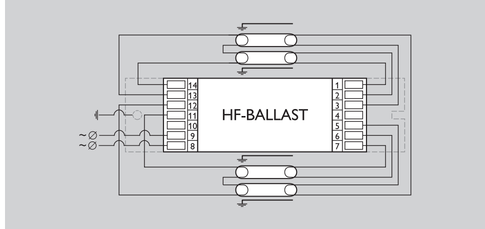
Wiring diagram 2L



Wiring diagram 4L



Technical data for design and mounting HF ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	–25ºC..+50ºC
Max t_{case}	75ºC

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. This ballast range has a specified lifetime of 50.000 hrs, with a maximum of 10% failures guaranteed, at a measured T case of 75ºC. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear

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 type:
Connection wiring is greatly simplified through use of WAGO universal connector. Suitable for both automatic wiring (ALF and ADS) and manual wiring; earth connection can be made via the earth terminal on the mains side.
Please note:
With the HF-P 3 /4 lamp ballasts (14,24W) earth connection must be made via the housing.

Wire length:
For optimal performance, note that following wires need to be kept short:
For one lamp circuits keep wires to terminals 1 and 2 short
For two lamp circuits keep wires to terminals 1, 2, 6 and 7 short
For triple and quad lamp circuits keep wires to terminals 1, 2, 13 and 14 short

Wire crosssection:

Lower connector:

Mains	Double insert "lower connector" 0.5mm – 1.0mm²
Lamp(s) connector	Double insert "lower connector" 0.5mm – 1.0mm²

Upper connector:

Mains & Control connector	Double insert "upper connector" 0.5mm – 0.75mm² (*)
Lamp(s) connector	Double insert "lower connector" 0.5mm – 0.75mm² (*)

(*) 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%.
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 30mA is 30.

Ordering and packing data

Ballast	Piece		Bulk packing					
	EAN code	Weight kg	Qty pcs	Dimensions LxWxH cm	Volume m³	Weight Gross kg	EAN code	EOC
HF-P 2 14-35 TL5 HE EII	8711500 910233	0.250	12	40,8x20.8x8.7	0.0074	3.3	8711500 910240	910233 30
HF-P 3 /414 TL5 HE EII	8711500 059840	0.265	12	40,8x20.8x8.7	0.0074	3.5	8711500 059857	059840 30
HF-P 2 24-39 TL5 HO EII	8711500 910257	0.260	12	40,8x20.8x8.7	0.0074	3.4	8711500 910264	910257 30
HF-P 3/4 24 TL5/PL-L EII	8711500 907752	0.265	12	40,8x20.8x8.7	0.0074	3.5	8711500 907769	907752 30
HF-P 249 TL5 HO EII	8711500 910271	0.270	12	40,8x20.8x8.7	0.0074	3.5	8711500 910288	910271 30
HF-P 254 TL5 HO EII	8711500 910295	0.270	12	40,8x20.8x8.7	0.0074	3.5	8711500 910301	910295 30
HF-P 180 TL5/PL-L	8711500 002398	0.260	12	40,8x20.8x8.7	0.0074	3.4	8711500 002204	002198 30
HF-P 280 TL5/PL-L	8711500 060167	0.390	12	46,8x20.8x8.7	0.0084	5.0	8711500 907561	060167 30


HF-MatchboxRED Square


HF-MatchboxBLUE Square

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) 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 11 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
- Fixing centres for mounting remain same as equivalent electromagnetic ballasts.

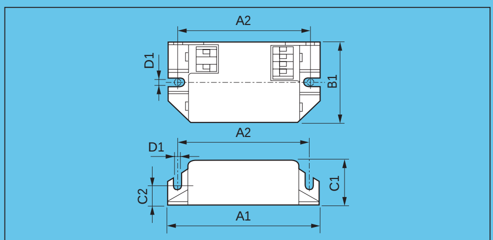
HF-MatchboxRED ballasts can be supplied either as an encased ballast or open printed circuit board ready for building into a luminaire, in doing so ensuring optimum safety and lowest cost.

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.

Dimensions in mm



Product ID	A1	A2	B1	C1	C2	D1	L	W	H
Square housing									
109	80	70	40	22	10	4.4			
113	80	70	40	22	10	4.4			
114	80	70	40	22	10	4.4			
118	80	70	40	22	10	4.4			
124	94	84	40	22	10	4.4			
Square pcb									
109							56	36	20
113							56	36	20
114							56	36	20
118							56	36	20
124							70	36	20

Philips quality

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.

Compliances and approvals

• RFI < 30 MHz:	EN 55015
• Harmonics:	EN 61000-3-2
• Immunity:	EN 61547
• Safety	EN 60928 EN 61347-2-3
• Performance	EN 60929
• Vibration & bump tests	IEC 68-2-6-Fc IEC 68-2-29-Eb
• Quality standard ISO 9000-2000	
• Environmental standard:	ISO 14001
• Approval marks:	ENEC KEMA
• CE marking.	
• Temperature declared thermally protected	IEC 61347-1

Technical data in relation to energy saving

Lamp	Ballast type Square	Energy efficiency index	System power W	Lamp power W	Power factor	Mains current mA	Lamp current mA
TL 8W	HF-MatchboxRED 109 SH/SP TL/PL-S	A2	9.1	7.3	0.63	62	159
TL 13W	HF-MatchboxRED 114 SH/SP TL/TL5	A2	15.9	11.6	0.60	114	139
TL5 14W	HF-MatchboxRED 114 SH/SP TL/TL5	A2	16.2	12.9	0.60	116	151
PL-S 7W	HF-MatchboxRED 109 SH/SP TL/PL-S	A2	7.5	6.1	0.63	52	165
PL-S 9W	HF-MatchboxRED 109 SH/SP TL/PL-S	A2	9.7	7.8	0.63	65	158
PL-S 11W	HF-MatchboxRED 113 SH/SP PL-S/PL-C	A2	12.9	11.1	0.63	89	164
PL-C 10W	HF-MatchboxRED 113 SH/SP PL-S/PL-C	A2	10.2	8.9	0.60	73	163
PL-C 13W	HF-MatchboxRED 113 SH/SP PL-S/PL-C	A3	14.0	12.3	0.63	96	161
PL-C 18W	HF-MatchboxRED 118 SH/SP PL-C/PL-T	A2	17.8	16.2	0.62	125	211
PL-T 13W	HF-MatchboxRED 113 SH/SP PL-S/PL-C	A3	14.0	12.3	0.63	96	161
PL-T 18W	HF-MatchboxRED 118 SH/SP PL-C/PL-T	A2	19.8	17.2	0.63	137	216
TL-D 18W	HF-MatchboxRED 124 SH/SP TL/TL5/PL-L	A2	17.4	14.5	0.59	128	276
PL-L 18W	HF-MatchboxRED 124 SH/SP TL/TL5/PL-L	A2	16.4	13.7	0.59	122	274
PL-L 24W	HF-MatchboxRED 124 SH/SP TL/TL5/PL-L	A2	22.2	19.3	0.61	158	257
TL5 24W	HF-MatchboxRED 124 SH/SP TL/TL5/PL-L	A2	22.7	19.8	0.61	161	258
TL5 C22W	HF-MatchboxRED 124 SH/SP TL/TL5/PL-L	A2	21.9	19.2	0.61	158	255

Technical data for installation

Mains operation	
Rated mains voltage	230-240 V
with tolerances for safety: +/- 10%	207-264 V
tolerances for performance: +6% -8%	212-254 V
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
Lifetime	
At t_c 65°C with 10% failures	50.000 hrs
Ignition time	0.8 s
Overvoltage protection	not applicable
Max t_{case}	75ºC
Lamp end-of-life detection/shut-off	yes
Automatic restart after lamp replacement or voltage dip However, stop circuit will be activated (to protect ballast) in case of rectifying lamp or broken glass, and manual restart is required	yes
Cable capacity	to be advised
Insulation resistance test	not relevant

Supply options

HF-MatchboxRED ballasts can be ordered either encased or as printed circuit board.
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 (pcb's) have the same shape as the housings, and are supplied in multiple boards. Multiple boards will be supplied in cardboard cartons.

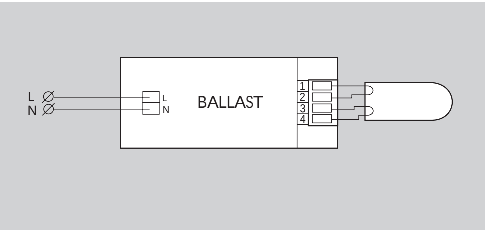
A detailed 'Instructions for use' is included in the packing of the printed circuit boards.

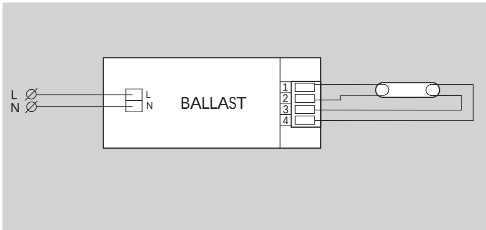
The ballasts that are thermally protected use a protective method of another type providing equivalent thermal protection.

Color coding

Type	Mains terminal color code
HF-MatchboxRED 109	Orange/black/orange
HF-MatchboxRED 113	Orange/grey/orange
HF-MatchboxRED 114	Orange/blue/orange
HF-MatchboxRED 118	Orange/orange/orange
HF-MatchboxRED 124	Orange/red/orange

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





Wiring diagram

Technical data for design and mounting HF ballasts in fixtures

Temperature range to ignite lamp -10 to +40ºC
(ignition aid is not required)

Hum and noise level inaudible

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. For more information regarding this subject consult the Philips Application guide to fluorescent lamp control gear.

Wire crosssection:
On the mains side: 0.5 - 1.5 mm²
On the lamp side: 0.5 - 1.5 mm²

Strip length 8 - 9 mm

Wire 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

Ordering and packing data

Ballast	1 Piece			Bulk packing					
	EAN code	Weight	Qty	Dimensions l x w x h	Volume	Weight gross	EAN code	EOC	
		kg	pcs	cm	m³	kg			
Square housed									
HF-MatchboxRED 109 SH TL/PL-S	8711500 931429	0.035	50	21.5 x 17.5 x 13	0.005	1.8	8711500 931436		931429 30
HF-MatchboxRED 113 SH PL-S/PL-C	8711500 927989	0.035	50	21.5 x 17.5 x 13	0.005	1.8	8711500 927996		927989 30
HF-MatchboxRED 114 SH TL/PL-S	8711500 931405	0.037	50	21.5 x 17.5 x 13	0.005	1.8	8711500 931412		931405 30
HF-MatchboxRED 118 SH PL-C/PL-T	8711500 928023	0.035	50	21.5 x 17.5 x 13	0.005	1.8	8711500 928030		928023 30
HF-MatchboxRED 124 SH TL/TL5/PL-L	8711500 910400	0.041	50	23.0 x 20.0 x 13	0.006	2.2	8711500 910417		910400 30
Square pcb									
HF-MatchboxRED 109 SP TL/PL-S	8711500 931368	0.020	540	59.5 x 34.5 x 22	0.045	12.8	8711500 931375		931429 30
HF-MatchboxRED 113 SP PL-S/PL-C	8711500 928009	0.020	540	59.5 x 34.5 x 22	0.045	12.8	8711500 928016		928009 30
HF-MatchboxRED 114 SP TL/PL-S	8711500 931382	0.022	540	59.5 x 34.5 x 22	0.045	17.3	8711500 931399		931399 30
HF-MatchboxRED 118 SP PL-C/PL-T	8711500 928047	0.022	540	59.5 x 34.5 x 22	0.045	17.3	8711500 928054		928054 30
HF-MatchboxRED 124 SH TL/TL5/PL-L	8711500 910387	0.023	432	59.5 x 34.5 x 22	0.045	11.3	8711500 910394		910387 30

Electronics

EB-Standard TL5

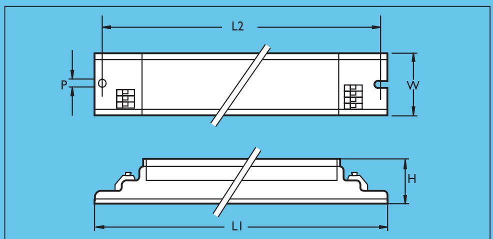
EB-S 128 TL5

EB-S 235 TL5

EB-S 314 TL5

EB-S 414 TL5

Dimensions in mm



Product description

Compact, lightweight, high frequency electronic standard ballast for TL5 fluorescent lamps.

Features and benefits

- Warm preheat start; flicker-free, 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:
- 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

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 EB-S 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
• Vibration & bump tests	IEC 68-2-6 FC IEC 68-2-29 Eb
• Quality standard	ISO 9001
• Environmental standard	ISO 14001
• CE marking	
• ENEC	
• CCC	
• AS/NZS	
• EE1=A2	

Product ID	L1	L2	W	H	P
114	280	271	25.2	22	4.5
121	280	271	25.2	22	4.5
128	280	271	25.2	22	4.5
135	280	271	25.2	22	4.5
214	359	350	30.2	22	4.5
221	359	350	30.2	22	4.5
228	359	350	30.2	22	4.5
235	359	350	30.2	22	4.5
314	424	415	30.2	28	4.5
414	424	415	30.2	28	4.5

Electronics

EB-Standard TL5

Technical data for installation

Mains operation

Rated mains voltage		220 - 240 V
With tolerances for safety	+ 15% - 20%	184 - 264 V
With tolerances for performance	+6% -8%	211 - 244 V
Mains frequency		50/60 Hz
Operating frequency		> 42 kHz
Power factor		0.96

Earth leakage current	< 0.5 mA per ballast
Ignition time	< 2 s
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 EMI precautions have be taken
Automatic restart after voltage dip	Yes: Tested with a 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) Note: Ensure that the neutral is reconnected again after above mentioned test is carried out and before the installation is put into operation.

Technical data for design and mounting ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	–15º to 50ºC
Max t_{case}	65ºC

Hum 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

Wire cross-section:	
On the mains side:	0.5mm – 1.5mm^2
On the lamp side:	0.5mm – 1.5mm^2
Strip length:	7.5 – 8.5mm

Mains current at 230V

Ballast	Input current A
EB-S 114 TL5 220-240	0.08
EB-S 214 TL5 220-240	0.15
EB-S 314 TL5 220-240	0.22
EB-S 414 TL5 220-240	0.28
EB-S 121 TL5 220-240	0.10
EB-S 221 TL5 220-240	0.20
EB-S 128 TL5 220-240	0.15
EB-S 228 TL5 220-240	0.30
EB-S 135 TL5 220-240	0.18
EB-S 235 TL5 220-240	0.36

Inrush current

Ballast	Max quantity of ballasts per Miniature Circuit Breaker A
EB-S 114 TL5 220-240	16.5
EB-S 214 TL5 220-240	26.7
EB-S 314 TL5 220-240	18.0
EB-S 414 TL5 220-240	26.5
EB-S 121 TL5 220-240	17.7
EB-S 221 TL5 220-240	28.0
EB-S 128 TL5 220-240	19.0
EB-S 228 TL5 220-240	28.0
EB-S 135 TL5 220-240	19.0
EB-S 235 TL5 220-240	28.0

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 jerin C45N/C10.

Technical data in relation to energy saving

Lamp	Qty of lamps	Ballast	System Power W	Lamp Power W	Efficacy lm/W	Lumen* lm	Ballast losses W	Wiring diagram Fig.
TL5 14W	1	EB-S 114 TL5 220-240	17.5	14.0	96	1350	3.5	1
TL5 14W	2	EB-S 214 TL5 220-240	33.5	14.0	96	1350	5.5	2
TL5 14W	3	EB-S 314 TL5 220-240	48.0	14.0	96	1350	6	3
TL5 14W	4	EB-S 414 TL5 220-240	63.0	13.8	96	1350	7.6	4
TL5 21W	1	EB-S 121 TL5 220-240	23.5	20.4	100	2100	3.1	1
TL5 21W	2	EB-S 221 TL5 220-240	46.0	20.5	100	2100	5	2
TL5 28W	1	EB-S 128 TL5 220-240	32.0	28.0	104	2900	4	1
TL5 28W	2	EB-S 228 TL5 220-240	64.0	28.0	104	2900	8	2
TL5 35W	1	EB-S 135 TL5 220-240	39.0	35.0	104	3650	4	1
TL5 35W	2	EB-S 235 TL5 220-240	78.0	35.0	104	3650	8.6	2

** Typical values for /830 and /840 colors*

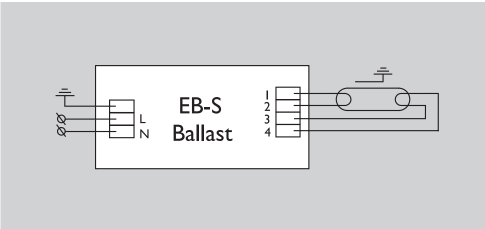


Fig. 1 TL5 1 Lamp

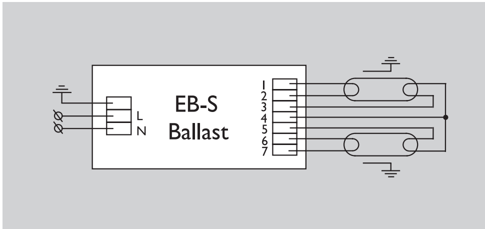


Fig. 2 TL5 2 Lamps

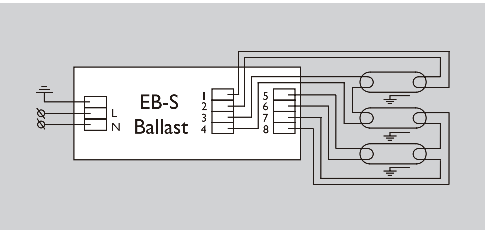


Fig. 3 TL5 3 Lamps

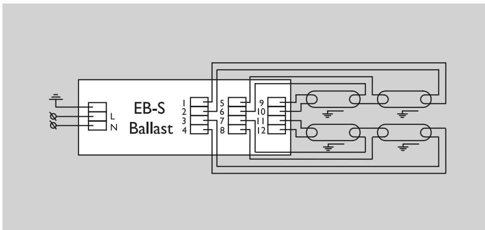


Fig. 4 TL5 4 Lamps

Wiring diagrams

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-Standard TL5 datasheet.
2. 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 0.5Ω (according to IEC 60598-1 clause 7.2.3).

Ordering and packing data

Ballast	Ordering number	Single unit Weight net kg	Carton packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit carton/pcs
EB-S 114 TL5 220-240	9137 100 614..	0.17	10	32 x 16 x 6.5	1.92	105/1050
EB-S 214 TL5 220-240	9137 100 615..	0.26	10	40 x 18 x 6.5	2.92	75/750
EB-S 314 TL5 220-240	9137 100 616..	0.25	10	46 x 18 x 8.0	2.95	60/600
EB-S 414 TL5 220-240	9137 100 617..	0.32	10	46 x 18 x 8.0	3.61	60/600
EB-S 121 TL5 220-240	9137 100 620..	0.18	10	32 x 16 x 6.5	1.94	105/1050
EB-S 221 TL5 220-240	9137 100 621..	0.26	10	40 x 18 x 6.5	2.90	75/750
EB-S 128 TL5 220-240	9137 100 618..	0.18	10	32 x 16 x 6.5	1.94	105/1050
EB-S 228 TL5 220-240	9137 100 619..	0.26	10	40 x 18 x 6.5	2.90	75/750
EB-S 135 TL5 220-240	9137 100 622..	0.18	10	32 x 16 x 6.5	1.90	105/1050
EB-S 235 TL5 220-240	9137 100 623..	0.26	10	40 x 18 x 6.5	2.90	75/750

Electronics

EB-Standard TLD/PLL

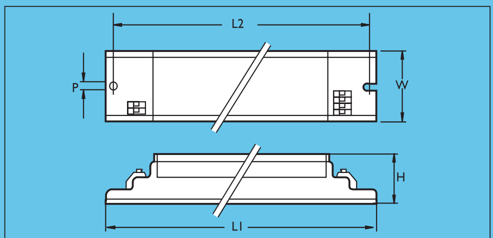
EB-S 318 TLD/PLL

EB-S 136 TLD/PLL

EB-S 236 TLD/PLL

EB-S 418 TLD/PLL

Dimensions in mm



Product description

Compact, lightweight, highfrequency 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
- Installations with infrared remote control systems
- Airports, railway stations
- Outdoor lighting:
  In general suitable for class 1 applications
- Office buildings, for example, insurance companies, banks, government ministries
- Hospitals
- Hotels
- Industrial premises

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 EB-S 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 60928
• Performance	EN 60929
• Vibration & bump tests	IEC 68-2-6 FC
	IEC 68-2-29 Eb
• Quality standard	ISO 9001
• Environmental standard	ISO 14001
• Approval marks	PSB
• CE marking	

Product ID	L1	L2	W	H	P
18W TLD/PLL	280	270	39	28	4.2
32W TLD	280	270	39	28	4.2
36W TLD/PLL	280	270	39	28	4.2
55W PLL	280	270	39	28	4.2
58W TLD	280	270	39	28	4.2

Electronics

EB-Standard TLD/PLL

Technical data for installation

Mains operation

Rated mains voltage		220 - 240 V
With tolerances for safety	+ 15% - 20%	184 - 264 V
With tolerances for performance	+6% -6%	216 - 244 V
Mains frequency		50/60 Hz
Operating frequency		> 42 kHz
Power factor		0.95

Earth leakage current	< 0.5 mA per ballast
Ignition time	< 2 s
Over voltage protection	< 350 V AC
Dual fixture; master-slave operation	possible, in general maximum 2m length of lamp wires between ballast and lamp
Cable capacity	max. 200pF between lamp wires and earth EMI precautions have be taken
Automatic restart after 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.

Technical data for design and mounting ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	0º to 50ºC
Max t_{case}	65ºC
Hum and noise level	inaudible

Permitted humidity is tested according to EN60928 par. 12.
Note that no moisture or condensation may enter the ballast.

Connection wiring is greatly simplified by the use of insert contacts with push buttons

Wire cross-section:

On the mains side:	0.5 – 1.5mm
On the lamp side:	0.5 – 1.5mm
Strip length:	9 – 10mm

Mains current at [illegible]V

Ballast	Input current A
EB-S 118 TLD 220-240	0.08
EB-S 218 TLD 220-240	0.18
EB-S 318 TLD 220-240	0.27
EB-S 418 TLD 220-240	0.33
EB-S 232 TLD 220-240	0.30
EB-S 136 TLD 220-240	0.18
EB-S 236 TLD 220-240	0.32
EB-S 336 TLD 220-240	0.48
EB-S 158 TLD 220-240	0.26
EB-S 258 TLD 220-240	0.49

Inrush current

Ballast	Max quantity of ballasts per Miniature Circuit Breaker [illegible]A
EB-S 118 TLD 220-240	18
EB-S 218 TLD 220-240	18
EB-S 318 TLD 220-240	18
EB-S 418 TLD 220-240	18
EB-S 232 TLD 220-240	18
EB-S 136 TLD 220-240	18
EB-S 236 TLD 220-240	18
EB-S 336 TLD 220-240	18
EB-S 158 TLD 220-240	18
EB-S 258 TLD 220-240	18

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 jerin C45N/C10.

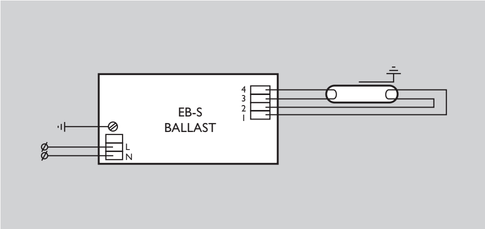


Fig. 1

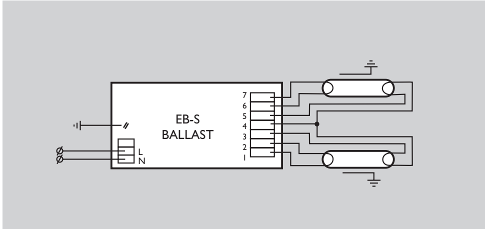


Fig. 2

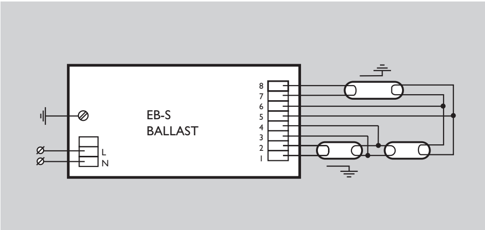


Fig. 3

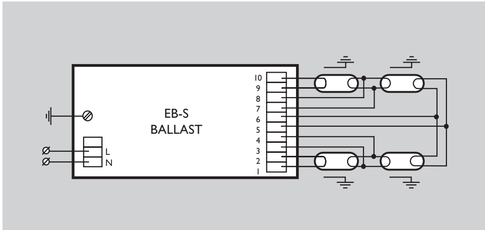


Fig. 4

Wiring diagrams

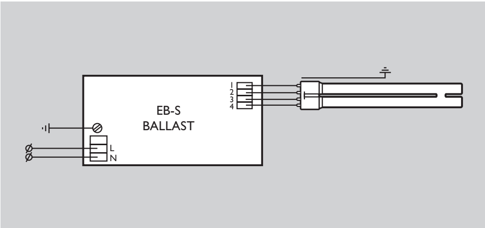


Fig. 5

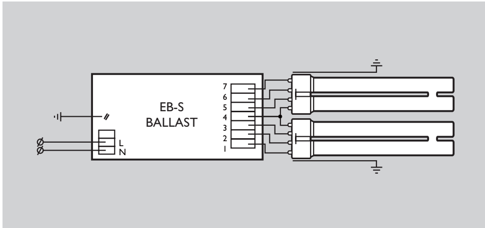


Fig. 6

Wiring diagrams

Technical data in relation to energy saving

Lamp	Qty of lamps	Ballast	System Power W	Lamp Power W	Efficacy lm/W	Lumen* lm	Ballast losses W	Wiring diagram Fig.
TLD 18W	1	EB-S 118 TLD 220-240	20	16	81	1300	4	1
TLD 18W	2	EB-S 218 TLD 220-240	37	16	81	1300	5	2
TLD 18W	3	EB-S 318 TLD 220-240	62	16	81	1300	14	3
TLD 18W	4	EB-S 418 TLD 220-240	75	16	81	1300	11	4
TLD 32W	2	EB-S 232 TLD 220-240	64	28	110	3080	8	1
TLD 36W	1	EB-S 136 TLD 220-240	37	32	100	3200	5	6
TLD 36W	2	EB-S 236 TLD 220-240	73	32	100	3200	9	2
TLD 36W	3	EB-S 336 TLD 220-240	108	32	100	3200	12	3
TLD 58W	1	EB-S 158 TLD 220-240	56	50	100	5000	6	1
TLD 58W	2	EB-S 258 TLD 220-240	112	50	100	5000	12	2
PLL 18W	1	EB-S 118 TLD 220-240	20	16	76	1220	4	5
PLL 18W	2	EB-S 218 TLD 220-240	37	16	76	1220	5	6
PLL 36W	1	EB-S 136 TLD 220-240	37	32	90	2880	5	5
PLL 36W	2	EB-S 236 TLD 220-240	73	32	90	2880	9	6
PLL 55W	1	EB-S 158 TLD 220-240	56	50	90	4500	6	5
PLL 55W	2	EB-S 258 TLD 220-240	112	50	90	4500	12	6

** Typical values for /830 and /840 colors*

Ordering and packing data

Ballast	Ordering number	Single unit Weight net kg	Carton packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Carton/pcs
EB-S 118 TLD 220-240	9137 100 204..	0.23	10	28.8 x 21 x 7.6	2.5	75/750
EB-S 218 TLD 220-240	9137 100 205..	0.23	10	28.8 x 21 x 7.6	2.5	75/750
EB-S 318 TLD 220-240	9137 100 206..	0.28	10	28.8 x 21 x 7.6	3.0	75/750
EB-S 418 TLD 220-240	9137 100 212..	0.25	10	28.8 x 21 x 7.6	2.7	75/750
EB-S 232 TLD 220-240	9137 100 294..	0.23	10	28.8 x 21 x 7.6	3.0	75/750
EB-S 136 TLD 220-240	9137 100 207..	0.23	10	28.8 x 21 x 7.6	2.5	75/750
EB-S 236 TLD 220-240	9137 100 208..	0.25	10	28.8 x 21 x 7.6	2.7	75/750
EB-S 336 TLD 220-240	9137 100 209..	0.28	10	28.8 x 21 x 7.6	3.0	75/750
EB-S 158 TLD 220-240	9137 100 210..	0.23	10	28.8 x 21 x 7.6	2.5	75/750
EB-S 258 TLD 220-240	9137 100 211..	0.23	10	28.8 x 21 x 7.6	3.0	75/750

EB-Standard PLT/PLC

EII TECHNOLOGY

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 efficacy.
- Programmed start: flicker-free 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 EII 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:

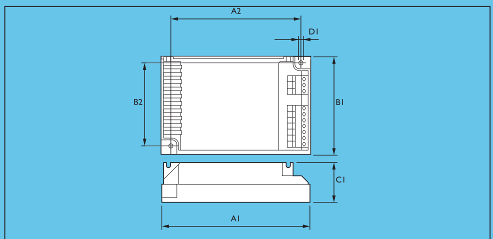
- System supplier
  As manufacturers of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum lamp/ballast performance is maintained.
- International standards
  Philips EB-S electronic ballasts comply with all relevant international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

Compliances and approvals

• RFI < 30 MHz	EN 55015 (IEC) *
• Harmonics	EN 61000-3-2 (IEC)
• Immunity	EN 61547 (IEC)
• Safety	EN 61347-2-3 (IEC)
• Performance	EN 60929 (IEC)
• Vibration & bump tests	EN 60068-2-6 Fc (IEC) EN 60068-2-29 Eb (IEC)
• Quality standard	ISO 9001
• Environmental standard	ISO 14001
• Approval marks	ENEC KEMA CCC AS/NZS
• CE marking	

* Tested with ballast functional ground connected to earth

Dimensions in mm



Product ID	A1	A2	B1	B2	C1	D1
113/118/126 PLT/C	104	93.5	68	57.5	30	4.0
213/218/226 PLT/C	123	111	79	67	33	4.2

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

Lamp	Qty. of lamps	Ballast	System Power W	Lamp Power W	Ballast Losses W	NOMINAL Lamp Lumen Lm	EEI
PL-T 13 W	1	EB-S 113 PLT/C	14.5	12.5	2.0	900	A3
PL-T 13 W	2	EB-S 213 PLT/C	28	12.5	3.0	900	A2
PL-T 18 W	1	EB-S 118 PLT/C	19	16.5	2.5	1200	A2
PL-T 18 W	2	EB-S 218 PLT/C	38	16.5	5	1200	A2
PL-T 36 W	1	EB-S 126 PLT/C	27	24	3	1800	A2
PL-T 36 W	2	EB-S 226 PLT/C	54	24	6	1800	A2
PL-C 13 W	1	EB-S 113 PLT/C	14.5	12.5	2.0	900	A3
PL-C 13 W	2	EB-S 213 PLT/C	28	12.5	3.0	900	A2
PL-C 18 W	1	EB-S 118 PLT/C	19	16.5	2.5	1200	A2
PL-C 18 W	2	EB-S 218 PLT/C	38	16.5	5	1200	A2
PL-C 36 W	1	EB-S 126 PLT/C	27	24	3	1800	A2
PL-C 36 W	2	EB-S 226 PLT/C	54	24	6	1800	A2

Ballast	Lamp	Qty. of lamps	Power factor	Max. cable cap[1]) lp-lp/lp-gnd pF	Tc max °C	Oper[2]) Freq. kHz
EB-S 113 PL/C	PL-T 13 W	1	0.95	120/60	65	45
EB-S 213 PL/C	PL-T 13 W	2	0.95	60/60	65	45
EB-S 118 PL/C	PL-T 18 W	1	0.95	120/60	65	45
EB-S 218 PL/C	PL-T 18 W	2	0.95	60/60	65	45
EB-S 126 PL/C	PL-T 26 W	1	0.95	120/60	65	45
EB-S 226 PL/C	PL-T 26 W	2	0.95	60/60	65	45
EB-S 113 PL/C	PL-C 13 W	1	0.95	120/60	65	45
EB-S 213 PL/C	PL-C 13 W	2	0.95	60/60	65	45
EB-S 118 PL/C	PL-C 18 W	1	0.95	120/60	65	45
EB-S 218 PL/C	PL-C 18 W	2	0.95	60/60	65	45
EB-S 126 PL/C	PL-C 26 W	1	0.95	120/60	65	45
EB-S 226 PL/C	PL-C 26 W	2	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)

2) Tolerance ± 3 kHz

Technical data for installation

Mains operation

Rated mains voltage		220 - 240 V
with tolerances for safety:	+10%, -15%	187 - 264 V
with tolerances for performance:	+6% -8%	202 - 254 V
Mains frequency		50/60 Hz
Operating frequency (typical)		> 42K Hz (45K Hz)
Power factor		> 0.95

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

DC voltage operation (during emergency back-up)
Yes for limited time (48hrs) only

Required battery voltage for guaranteed ignition	198 - 254V DC
Required battery voltage for burning lamps	176 - 254V DC
Nominal light output is obtained at DC 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.

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

Mains current at 230V

Ballast	Qty lamp	Input current 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

Inrush current

Ballast	Max quantity of ballasts per Miniature Circuit Breaker type B16A	Inrush current value time at typical mains impedance
EB-S 113 PLT/C	28	18A/250 µs
EB-S 213 PLT/C	28	18A/250 µs
EB-S 118 PLT/C	28	18A/250 µs
EB-S 218 PLT/C	28	18A/250 µs
EB-S 126 PLT/C	28	18A/250 µs
EB-S 216 PLT/C	28	18A/250 µs

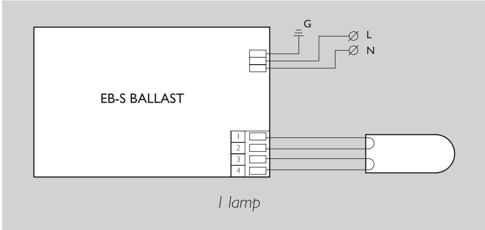
Conversion table for max quantities of ballasts on other types of Miniature Circuit Breaker

Type		Relative number of ballasts
B	16 A	100% (see table above)
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%

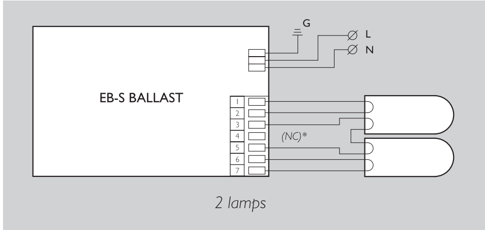
Notes

1. Data is based on a main supply with an impedance of 400 mΩ (equal to 15 m cable of 2.5mm^2 and another 20m to te 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 het 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%.

Wiring diagram 1L



Wiring diagram 2L



(NC): not connected*

Technical data for design and mounting HF ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	0º – 50ºC
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 65ºC.

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:
Connectiion wiring is greatly specified by the use of insert contacts with push buttons

Wire crosssection:
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 mm
On the lamp side: 0.5 - 1.5 mm

Strip length: 7.5 - 8.5 mm

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

Ordering and packing data

Ballast	Ordering number	Single unit Weight net kg	Carton packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Cartons/pcs
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


EB-S Linear

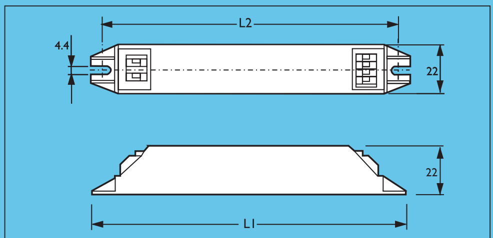
Product description
Compact, lightweight, high-frequency electronic ballast designed for TL (4 - 18 W), TL5 (14 - 24 W) and compact fluorescent PL (5 - 24 W) lamps.

Features and benefits
The EB-Standard Micropower is a new generation of electronic energy-saving ballasts for systems up to 25W. 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-S 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.a TL 6 or 8 W, or a PLS 7 or 9W lamp can be connected to the EB-S 109 TL/PLS ballast
- Fixing centres for mounting remain same as equivalent electromagnetic ballasts

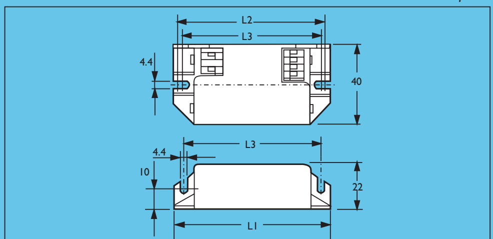
EB-Standard Micropower ballasts can be supplied either as an encased ballast or open printed circuit board ready for building into a luminaire, in doing so ensuring optimum safety and lowest cost.

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 luminaires with protection class I and II; class I metal luminaires with earth connection require special measures, for EMC compliance

Dimensions in mm *EB-S Linear*



EB-S Square



Product ID	L1	L2	L3	L	W	H
Linear housing						
105/109	144	132	-			
114/121	144	132	-			
124	144	132	-			
Square housing						
105/109	80	75	70			
114/121	80	75	70			
124	80	75	70			
Linear pcb						
105/109				120	18	20
114/121				120	18	20
124				120	18	20
Square pcb						
105/109				56	36	20
114/121				56	36	20
124				56	36	20


EB-S Square


EB-S Linear (PCB)


EB-S Square (PCB)

Philips quality
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

Compliances and approvals
- RFI < 30 MHz — EN 55015
- Harmonics — EN 61000-3-2
- Immunity — EN 61547
- Safety — EN 61347-2-3
- Quality standard — ISO 9001
- Environmental standard — ISO 14001
- CE marking

Technical data in relation to energy saving

Lamp	Ballast type Square	Linear	System power W	Lamp power W	Power factor	Mains current mA	Lamp current mA
TL 4W	EB-S 105 TL/PLS SH/SP	EB-S 105 TL/PLS LH/LP	6.2	4.5	0.6	40	210
TL 6W	EB-S 109 TL/PLS SH/SP	EB-S 109 TL/PLS LH/LP	8.3	6.6	0.6	65	215
TL 8W	EB-S 109 TL/PLS SH/SP	EB-S 109 TL/PLS LH/LP	10.0	8.2	0.6	70	200
TL 13W	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	15.0	13.0	0.6	105	175
TLD 10W	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	11.0	8.9	0.6	90	220
TLD 18W	EB-S 124 TL/TL5/PL SH/SP	EB-S 124 TL/TL5/PL LH/LP	17.4	15.0	0.6	125	280
TL5 14W HE	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	15.4	13.5	0.6	110	175
TL5 21W HE	-	EB-S 121 TL5 LH/LP	22.2	19.5	0.6	160	165
TL5C 22W HO	EB-S 124 TL/TL5/PL SH/SP	EB-S 124 TL/TL5/PL LH/LP	21.5	19.2	0.6	150	230
TL5 24W HO	EB-S 124 TL/TL5/PL SH/SP	EB-S 124 TL/TL5/PL LH/LP	20.8	18.7	0.6	145	235
PLS 5W	EB-S 105 TL/PLS SH/SP	EB-S 105 TL/PLS LH/LP	6.8	5.2	0.6	45	210
PLS 7W	EB-S 109 TL/PLS SH/SP	EB-S 109 TL/PLS LH/LP	8.9	7.0	0.6	65	215
PLS 9W	EB-S 109 TL/PLS SH/SP	EB-S 109 TL/PLS LH/LP	10.0	8.3	0.6	70	200
PLS 11W	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	14.0	12.3	0.6	100	200
PLC 10W	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	12.0	10.0	0.6	90	220
PLC 13W	EB-S 114 TL/TL5/PL SH/SP	EB-S 114 TL/TL5/PL LH/LP	14.6	12.8	0.6	105	185
PLC 18W	EB-S 118 PLC/PTL SH/SP	-	18.2	15.8	0.6	135	220
PLT 18W	EB-S 118 PLC/PTL SH/SP	-	19.4	17.2	0.6	140	215
PLL 18W	EB-S 124 TL/TL5/PL SH/SP	EB-S 124 TL/TL5/PL LH/LP	20.2	18.0	0.6	140	245
PLL 24W	EB-S 124 TL/TL5/PL SH/SP	EB-S 124 TL/TL5/PL LH/LP	16.4	14.0	0.6	120	290

Technical data for installation

Mains operation

Rated mains voltage		220 – 240V
Tolerances for safety	+/- 10%	198 – 264V
Tolerances for performance:	+6%-8%	202 – 254V
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 - 254 V
Required battery voltage for burning lamps	176 - 254 V

Ignition time	< 0.5 s
Over voltage protection	up to 264V
Max t_{case}	75ºC
Lamp end-of-life detection/ shut-off	yes
Automatic restart after lamp replacement or voltage dip	no; manual restart required
Cable capacity	to be advised
Insulation resistance test	not relevant
Temperature range to ignite lamp (ignition aid is not required)	-10 to +40ºC
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 – 1.5mm^2
On the lamp side:	0.5 – 1.5mm^2
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	(< 30 cm)
Keep wires to terminals 3 and 4 shorter than	150 cm

Supply options

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

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 (PCB's) have the same shape as the housings, and are supplied in multiple boards. Multiple boards will be supplied in cardboard cartons.

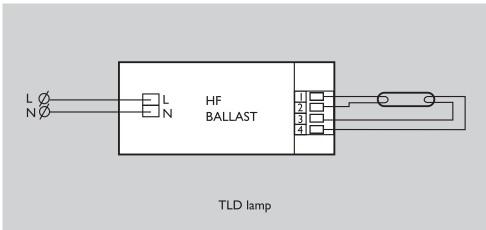
A detailed 'Instructions for use' is included in the package of the printed circuit boards.

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

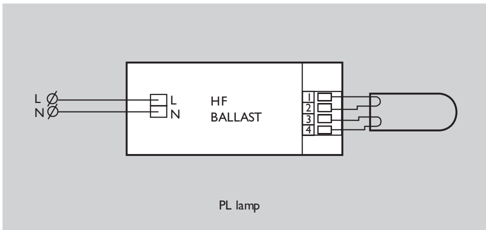
Coloring coding

Type	Mains terminal color code
EB-STANDARD Micropower 105	orange/black/orange
EB-STANDARD Micropower 109	orange/bue/orange
EB-STANDARD Micropower 114	orange/grey/orange
EB-STANDARD Micropower 118	orange/orange/orange
EB-STANDARD Micropower 121	orange/orange/orange
EB-STANDARD Micropower 124	orange/yellow/orange

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



TLD lamp



PL lamp

Wiring diagrams

Ordering and packing data

Ballast	Ordering number	Single unit Weight net kg	Carton packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Carton/pcs
EB-S 105 220-240 LH	9137 100 268..	0.040	50	23.0 x 16.0 x 13.0	2.5	200/10000
EB-S 105 220-240 SH	9137 100 269..	0.037	50	21.5 x 17.5 x 13.0	2.4	200/10000
EB-S 105 220-240 LP	9137 100 270..	0.023	50	20.0 x 17.3 x 12.3	1.3	200/10000
EB-S 105 220-240 SP	9137 100 271..	0.022	50	20.0 x 17.3 x 12.3	1.3	200/10000
EB-S 109 220-240 LH	9137 100 272..	0.041	50	23.0 x 16.0 x 13.0	2.5	200/10000
EB-S 109 220-240 SH	9137 100 273..	0.039	50	21.5 x 17.5 x 13.0	2.4	200/10000
EB-S 109 220-240 LP	9137 100 274..	0.024	50	20.0 x 17.3 x 12.3	1.4	200/10000
EB-S 109 220-240 SP	9137 100 275..	0.023	50	20.0 x 17.3 x 12.3	1.3	200/10000
EB-S 114 220-240 LH	9137 100 276..	0.045	50	23.0 x 16.0 x 13.0	2.5	200/10000
EB-S 114 220-240 SH	9137 100 277..	0.038	50	21.5 x 17.5 x 13.0	2.4	200/10000
EB-S 114 220-240 LP	9137 100 278..	0.023	50	20.0 x 17.3 x 12.3	1.3	200/10000
EB-S 114 220-240 SP	9137 100 279..	0.023	50	20.0 x 17.3 x 12.3	1.3	200/10000
EB-S 118 220-240 SH	9137 100 280..	0.039	50	21.5 x 17.5 x 13.0	2.4	200/10000
EB-S 118 220-240 SP	9137 100 281..	0.024	50	20.0 x 17.3 x 12.3	1.4	200/10000
EB-S 121 220-240 LH	9137 100 286..	0.042	50	23.0 x 16.0 x 13.0	2.6	200/10000
EB-S 121 220-240 LP	9137 100 288..	0.024	50	20.0 x 17.3 x 12.3	1.4	200/10000
EB-S 124 220-240 LH	9137 100 282..	0.042	50	23.0 x 16.0 x 13.0	2.6	200/10000
EB-S 124 220-240 SH	9137 100 283..	0.040	50	21.5 x 17.5 x 13.0	2.5	200/10000
EB-S 124 220-240 LP	9137 100 284..	0.025	50	20.0 x 17.3 x 12.3	1.4	200/10000
EB-S 124 220-240 SP	9137 100 285..	0.025	50	20.0 x 17.3 x 12.3	1.3	200/10000

EB-E 128 TLD

EB-E 228 TLD

Dimensions in mm *Fig A*

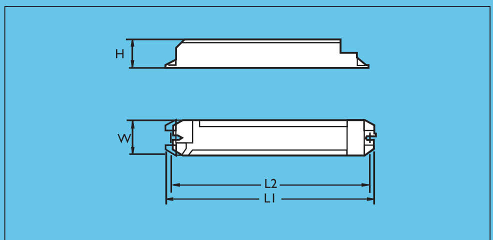
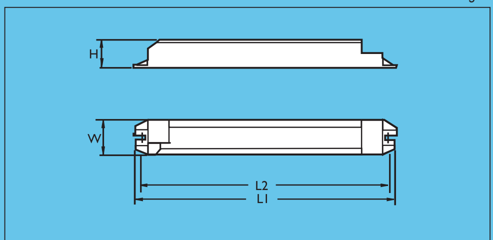


Fig B



Product description

Compact, lightweight, highfrequency 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 & bump tests	IEC 68-2-6 FC IEC 68-2-29 Eb
• Quality standard	ISO 9001
• Environmental standard	ISO 14001
• CCC	

Product ID	L1	L2	W	H	Fig
118	150	140	40	28	A
218	210	200	40	30	B
136	150	140	40	28	A
236	210	200	40	30	B

Electronics EB-Economy TLD

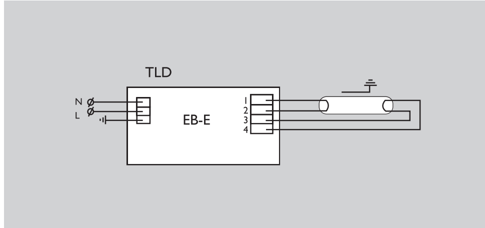


Fig. 1

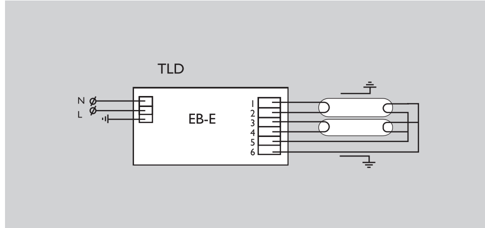


Fig. 2 *Wiring diagrams*

Technical data in relation to energy saving

Lamp	Qty. of Lamps	Ballast	System Power W	Lamp Power W	Lamp Efficacy lm/W	Lamp Lumen* lm	Ballast Losses W	Wiring diagram Fig.
TLD 18W	1	EB-E 118 TLD 220-230	19	16	80	1280	3	1
TLD 18W	2	EB-E 218 TLD 220-230	38	16	80	1280	6	2
TLD 36W	3	EB-E 136 TLD 220-230	37	32	100	3200	5	1
TLD 36W	4	EB-E 236 TLD 220-230	72	32	100	3200	8	2

** Typical values for /830 and /840 colors*

Technical data for installation

Mains operation

Rated mains voltage		220 – 230V
With tolerances for safety	+15% -20%	176 – 264V
With tolerances for performance:	+6%-6%	216 – 244V
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
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
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.
Automatic restart after lamp replacement	Yes

Mains current at 220V

Ballast	Input current 'TL'D A
EB-E 136 TLD 220-230	0.19
EB-E 236 TLD 220-230	0.34
EB-E 118 TLD 220-230	0.10
EB-E 218 TLD 220-230	0.19

Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker 16A
EB-E 136 TLD 220-230	18
EB-E 236 TLD 220-230	18
EB-E 118 TLD 220-230	18
EB-E 218 TLD 220-230	18

Technical data for design and mounting ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	0º to 50ºC
Max t_{case}	65ºC (70ºC for 236)
Hum and noise level	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

Wire cross-section:	
On the mains side:	0.5 – 1.5mm^2
On the lamp side:	0.5 – 1.5mm^2
Strip length:	9 – 10mm

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 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 jerin C45N/C10.

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 TLD datasheet.
2. Be sure the ground terminal of ballast are connected with metal luminaries or batten and earthed.

Ordering and packing data

Ballast	Ordering number	Single unit	Carton packing			Pallet unit
		Weight net kg	Qty pcs	Dimensions l x w x h cm	Weight gross kg	Carton/pcs
EB-E 118 TLD 220-230	9137 100 604..	0.20	20	31.0 x 21.0 x 8.0	4.2	120/2400
EB-E 218 TLD 220-230	9137 100 605..	0.30	20	41.8 x 22.0 x 8.0	6.3	80/1600
EB-E 136 TLD 220-230	9137 100 606..	0.20	20	31.0 x 21.0 x 8.0	4.2	120/2400
EB-E 236 TLD 220-230	9137 100 607..	0.30	20	41.8 x 22.0 x 8.0	6.3	80/1600

EB-E 128 TL5

EB-E 228 TL5

Product description

Lightweight, highfrequency 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 ownship, 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 sites

Philips quality

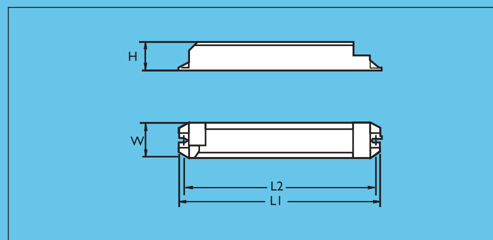
This assures optimum quality regarding:

- 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 & bump tests	IEC 68-2-6 FC
	IEC 68-2-29 Eb
• Quality standard	ISO 9001
• Environmental standard	ISO 14001
• CCC	

Dimensions in mm



Product ID	L1	L2	W	H
114	187	175	22	22
214	276	266	30	28.5
121	187	175	22	22
128	211	201	30	28.5
228	276	266	30	28.5

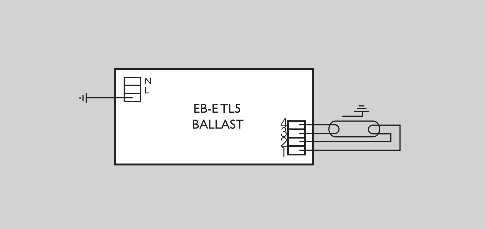


Fig. 1

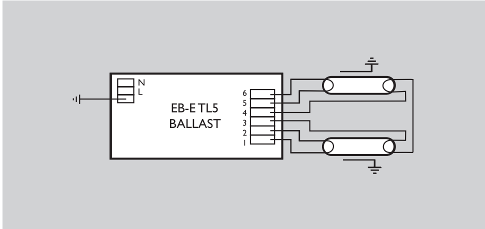


Fig. 2

Wiring diagrams

Technical data in relation to energy saving

Lamp	Qty. of Lamps	Ballast	System Power W	Lamp Power W	Lamp Efficacy lm/W	Lamp Lumen* lm	Ballast Losses W	Wiring diagram Fig.
TL5 14W	1	EB-E 114 TL5 220-230	17	14	89	1240	3	1
TL5 14W	2	EB-E 214 TL5 220-230	32	14	89	1240	4	2
TL5 21W	1	EB-E 121 TL5 220-230	24	21	92	1930	3	1
TL5 28W	1	EB-E 128 TL5 220-230	33	28	95	2670	5	1
TL5 28W	2	EB-E 228 TL5 220-230	63	28	95	2670	7	2

* Typical values for /830 and /840 colors

Technical data for installation

Mains operation

Rated mains voltage		220 – 230V
With tolerances for safety	+15% -20%	184 – 253V
With tolerances for performance:	+6%-8%	202 – 233V
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 lamp replacement	No
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.

Mains current at 220V

Ballast	Input current 'TL'D A
EB-E 114 TL5 220-230	0.12
EB-E 214 TL5 220-230	0.15
EB-E 121 TL5 220-230	0.19
EB-E 128 TL5 220-230	0.15
EB-E 228 TL5 220-230	0.30

Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker 16A
EB-E 114 TL5 220-230	18
EB-E 214 TL5 220-230	18
EB-E 121 TL5 220-230	18
EB-E 128 TL5 220-230	18
EB-E 228 TL5 220-230	18

Technical data for design and mounting ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	for -5ºC to 50ºC for 114/121 for 0ºC to 50ºC for 214/128/228
Max t_{case}	65ºC
Hum and noise level	< 30dB at 1m distance

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

Wire cross-section:	
On the mains side:	0.5 – 1.5mm^2
On the lamp side:	0.5 – 1.5mm^2
Strip length:	7.5 – 8.5mm

Electronics EB-Economy TL5

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. Data is measured with merlin jerin C45N/C10.

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 TL5 datasheet.
2. Be sure the ground terminal of ballast are connected with metal luminaries or batten and earthed.

Ordering and packing data

Ballast	Ordering number	Single unit Weight net kg	Carton packing Qty. pcs	Carton packing Dimensions l x w x h cm	Carton packing Weight gross kg	Pallet unit Carton/pcs
EB-E 114 TL5 220-230	9137 100 632..	0.11	50	20.3 x 20.0 x 13.0	5.9	200/10000
EB-E 214 TL5 220-230	9137 100 633..	0.13	20	35.4 x 32.4 x 7.9	3.1	54/1080
EB-E 121 TL5 220-230	9137 100 634..	0.11	50	20.3 x 20.0 x 13.0	5.9	200/10000
EB-E 128 TL5 220-230	9137 100 635..	0.20	20	32.4 x 28.8 x 7.9	4.3	72/1440
EB-E 228 TL5 220-230	9137 100 636..	0.13	20	35.4 x 32.4 x 7.9	3.1	54/1080

EB-E 122 TLE

Product description

Compact, lightweight, highfrequency electronic standard ballast forTLE 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

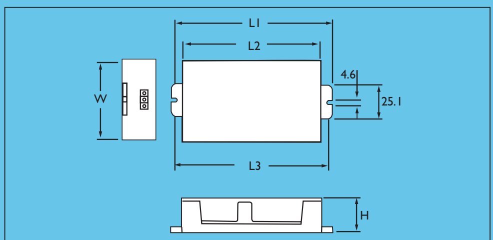
This assures optimum quality regarding:

- System supplier
  As 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 & bump tests — IEC 68-2-6 FC, IEC 68-2-29 Eb
- Quality standard — ISO 9001
- Environmental standard — ISO 14001
- CCC marking

Dimensions in mm



Product ID	L1	L2	L3	W	H
122	125	108	116.6	61	25
132	125	108	116.6	61	25

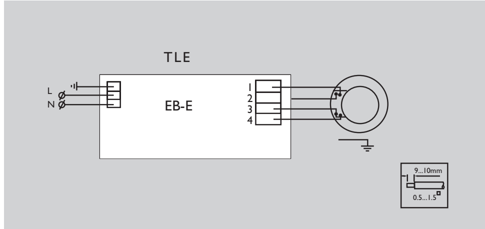


Fig. 1 *Wiring diagrams*

Technical data in relation to energy saving

Lamp	Qty. of Lamps	Ballast	System Power W 220V/230V	Lamp Power W 220V/230V	Lamp Efficacy lm/W	Lamp Lumen* lm 220V/230V	Ballast Losses W	Wiring diagram Fig.
TLE 22W	1	EB-E 122 TLE 220-230	23/24	20/21	50	1000/1050	3	1
TLE 32W	1	EB-E 132 TLE 220-230	35/37	30/32	52	1500/1660	5	1

** Typical values for philips 1830 and 1840 colors*

Technical data for installation

Mains operation

Rated mains voltage		220 – 230V
With tolerances for safety	+15% -20%	176 – 264V
With tolerances for performance:	+6%-6%	216 – 244V
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 lamp replacement	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 above mentioned test is carried out and before the installation is put into operation.

Mains current at 220V

Ballast	Input current 'TL'E A
EB-E 122 TLE 220-230	0.10
EB-E 132 TLE 220-230	0.16

Inrush current

Ballast	Max. quantity of ballasts per Miniature Circuit Breaker 16A
EB-E 122 TLE 220-230	28
EB-E 132 TLE 220-230	28

Technical data for design and mounting ballasts in fixtures

Temperatures

Temperature range to ignite lamp with ignition aid	-0ºC to 50ºC
Max t_{case}	70ºC
Hum and noise level	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

Wire cross-section:

On the mains side:	0.5 – 1.5mm^2
On the lamp side:	0.5 – 1.5mm^2
Strip length:	9 – 10mm

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 mm^2 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 jerin C45N/C10.

Caution:

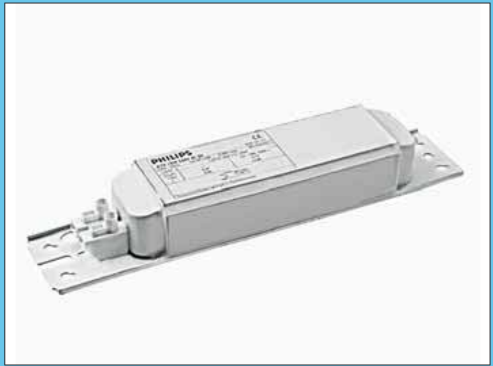
After finishing system installation, please check carefully before you turn the power on.

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.

Ordering and packing data

Ballast	Ordering number	Single unit	Carton packing			Pallet unit
		Weight net	Qty	Dimensions l x w x h	Weight gross	
		kg	pcs	cm	kg	Carton/pcs
EB-E 122 TLE 220-230	9137 100 608..	0.22	20	26.5 x 26.5 x 7.3	4.7	120/2400
EB-E 132 TLE 220-230	9137 100 609..	0.22	20	26.5 x 26.5 x 7.3	4.7	120/2400

Electronics



BTA 58W

BTA 36W

Dimensions in mm *Fig A*

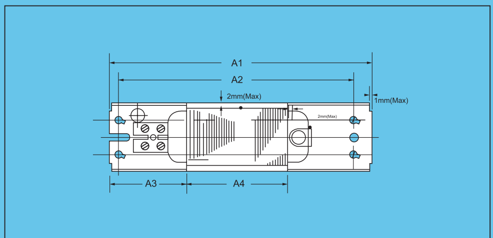
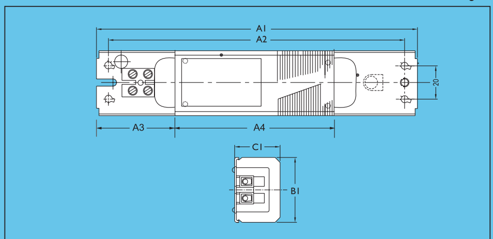


Fig B



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 / IEC921
- Tw 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.

Product ID	A1	A2	B1	C1	Fig
18W	155	140	39	28	A
22W	155	140	39	28	A
30W	155	140	39	28	A
32W	155	140	39	28	A
36W	155	140	39	28	A
58W	195	180	39	28	B

Technical data

1. Standard range for TL and TLD

Lamp	Qty of lamps	Ballast	Watt loss W	Input power W	Mains current during operation mA	Power factor	Capacitor µF/V	Wiring diagram Fig.	Starter type	tw °C	Δt °C
TLD 18W/TL 20W	1	BTA 18W 220V C SC	8.8	26.8/28.8	354	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 220V C DI	8.8	26.8/28.8	354	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 220V/60Hz C SC	8	26/28	352	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 220V/60Hz C DI	8	26/28	352	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 230V C SC	9	27/29	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 230V C DI	9	27/29	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 240V C SC	9.3	27.3/29.3	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 240V C DI	9.3	27.3/29.3	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	2	BTA 36W 220V C SC	8.8	44.8	402	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 220V C DI	8.8	44.8	402	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 220V/60Hz C SC	8.3	44.3	410	>0.85	3.2 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 220V/60Hz C DI	8.3	44.3	410	>0.85	3.2 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 230V C SC	9	45	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 230V C DI	9	45	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 240V C SC	9.2	45.2	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 240V C DI	9.2	45.2	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	65
TLD 30W	1	BTA 30W 220V C SC	7.8	37.8	350	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	60
	1	BTA 30W 220V C DI	7.8	37.8	350	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	60
	1	BTA 30W 230V C SC	8.1	38.1	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 30W 230V C DI	8.1	38.1	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 30W 240V C SC	8.4	38.4	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 30W 240V C DI	8.4	38.4	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	65
TLD 36W/TL 40W	1	BTA 36W 220V C SC	8.8	44.8/48.8	402	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 220V C DI	8.8	44.8/48.8	402	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 220V/60Hz C SC	8.3	44.3/48.3	410	>0.85	3.2 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 220V/60Hz C DI	8.3	44.3/48.3	410	>0.85	3.2 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 230V C SC	9	45/49	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 230V C DI	9	45/49	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 240V C SC	9.2	45.2/49.2	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 240V C DI	9.2	45.2/49.2	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	65
TLD 58W/TL 65W	1	BTA 58W 220V C SC	12	70/77	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 220V C DI	12	70/77	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 220V/60Hz C SC	11.2	69.2/76.2	624	>0.85	5.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 220V/60Hz C DI	11.2	69.2/76.2	624	>0.85	5.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 230V C SC	13	71/78	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 230V C DI	13	71/78	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 240V C SC	13.2	71.2/78.2	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 58W 240V C DI	13.2	71.2/78.2	624	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	65

Technical data

2. Standard range for TL and TLD

Lamp	Qty of lamps	Ballast	Watt loss W	Input power W	Mains current during operation mA	Power factor	Capacitor µF/V	Wiring diagram Fig.	Starter type	tw °C	Δt °C
TLD 18W/TL 20W	1	BTA 18W 220V B2 SC	7.8	25.8/27.8	361	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 220V B2 DI	7.8	25.8/27.8	361	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 220V/60Hz B2 SC	8	26/28	361	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 220V/60Hz B2 DI	8	26/28	355	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 18W 230V B2 SC	8.2	26.2	355	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 230V B2 DI	8.2	26.2	355	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 240V B2 SC	8.6	26.6	355	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 240V B2 DI	8.6	26.6	355	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 18W 220V B1 SC	5.4	23.4/25.4	361	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 18W 220V B1 DI	5.4	23.4/25.4	361	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 18W 230V B1 SC	5.3	23.3/25.3	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 18W 230V B1 DI	5.3	23.3/25.3	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 18W 240V B1 SC	5.4	23.4/25.4	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 18W 240V B1 DI	5.4	23.4/25.4	361	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	2	BTA 36W 220V B2 SC	8	44	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
	2	BTA 36W 220V B2 DI	8	44	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
	2	BTA 36W 220V/60Hz B2 SC	8	44	412	>0.85	3.2 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 220V/60Hz B2 DI	8	44	412	>0.85	3.2 ±10%, 250V	2	S2(-E)	130	65
	2	BTA 36W 230V B2 SC	8.2	44.2	407	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
	2	BTA 36W 230V B2 DI	8.2	44.2	407	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
	2	BTA 36W 240V B2 SC	8.5	44.5	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
	2	BTA 36W 240V B2 DI	8.5	44.5	412	>0.85	4.0 ±10%, 250V	2	S2(-E)	130	55
TLD 30W	1	BTA 30W 220V B2 SC	7	37	350	>0.85	3.5 ±10%, 250V	1	S10(-E)	130	50
	1	BTA 30W 220V/60Hz B2 SC	7.4	37.4	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	60
	1	BTA 30W 220V/60Hz B2 DI	7.4	37.4	350	>0.85	3.0 ±10%, 250V	1	S10(-E)	130	60
TLD 36W/TL 40W	1	BTA 36W 220V B2 SC	8	44/48	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 220V B2 DI	8	44/48	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 220V/60Hz B2 SC	8	44/48	412	>0.85	3.2 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 220V/60Hz B2 DI	8	44/48	412	>0.85	3.2 ±10%, 250V	1	S10(-E)	130	65
	1	BTA 36W 230V B2 SC	8.2	44.2	407	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 230V B2 DI	8.2	44.2	407	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 240V B2 SC	8.5	44.5	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 240V B2 DI	8.5	44.5	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 36W 220V B1 SC	5.3	41.3/45.3	412	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 36W 220V B1 DI	5.3	41.3/45.3	412	>0.85	4.5 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 36W 230V B1 SC	5.35	41.35/45.35	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 36W 230V B1 DI	5.35	41.35/45.35	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 36W 240V B1 SC	5.45	41.45/45.45	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
	1	BTA 36W 240V B1 DI	5.5	41.5/45.5	412	>0.85	4.0 ±10%, 250V	1	S10(-E)	130	30
TLD 58W/TL 65W	1	BTA 58W 220V B2 SC	11.2	69.2/76.2	630	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 58W 230V B2 SC	10.4	68.4	640	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 58W 230V B2 DI	10.4	68.4	640	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 58W 240V B2 SC	10.8	68.8	640	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	55
	1	BTA 58W 240V B2 DI	10.8	68.8	640	>0.85	6.0 ±10%, 250V	1	S10(-E)	130	55

Electromagnetic BTA EM ballasts for TL fluorescent lamps

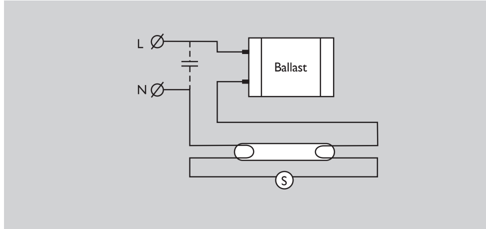


Fig. 1

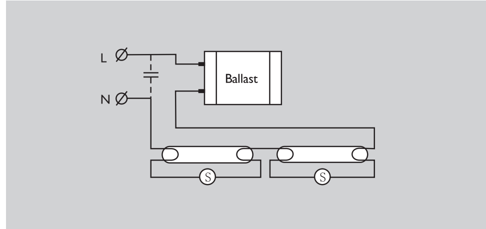


Fig. 2

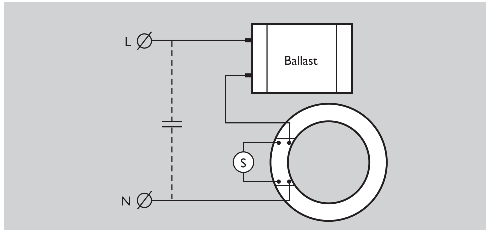


Fig. 3 *Wiring diagrams*

Technical data

3. Standard and premium range for TLE

Lamp	Qty of lamps	Ballast	Watt loss W	Input power W	Mains current during operation mA	Power factor	Capacitor µF/V	Wiring diagram Fig.	Starter type	tw °C	Δt °C
TLE 22W	1	BTA 22W 220V C SC	9	31	383	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 220V C DI	9	31	383	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 230V C SC	9.2	31.2	383	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 230V C DI	9.2	31.2	383	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 240V C SC	9.5	31.5	383	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 240V C DI	9.5	31.5	383	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 220V B2 SC	8.7	30.7	383	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	60
	1	BTA 22W 220V/60Hz B2 SC	8.3	30.3	383	>0.85	3.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 22W 220V/60Hz B2 DI	8.3	30.3	383	>0.85	3.5 ±10%, 250V	3	S10(-E)	130	65
TLE 32W	1	BTA 32W 220V C SC	9.5	41.5	426	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 32W 220V C DI	9.5	4.5	426	>0.85	4.5 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 32W 230V C SC	10	42	426	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	70
	1	BTA 32W 230V C DI	10	42	426	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	70
	1	BTA 32W 240V C SC	10	42	426	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	70
	1	BTA 32W 240V C DI	10	42	426	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	70
	1	BTA 32W 220V B2 SC	9	41	430	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 32W 220V/60Hz B2 SC	8.6	40.6	430	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	65
	1	BTA 32W 220V/60Hz B2 DI	8.6	40.6	430	>0.85	4.0 ±10%, 250V	3	S10(-E)	130	65

1) In accordance with IEC921 tw indicates the maximum permissible temperature of the windings.
2) Temperature measurements (average values) in accordance with IEC921.
3) Temperature marking tw/Δt in accordance with IEC921.
4) To obtain HPF circuit (cos $\phi \geqslant 0.85$) by means of a parallel capacitor across the main.
Capacitor tolerance ±10%.

Electromagnetic BTA EM ballasts for TL fluorescent lamps

Ordering and packing data

1Standard and range for TL and TLD

Ballast	Ordering number	Weight net kg	Packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Cartons/pcs
BTA 18W 220V C SC	9137 101 197..	0.46	32	32.3 x 16.0 x 13.1	15.22	54/1728
BTA 18W 220V C DI	9137 101 198..	0.46	32	32.3 x 16.0 x 13.1	15.22	54/1728
BTA 18W 220V/60Hz C SC	9137 101 183..	0.446	32	32.3 x 16.0 x 13.1	14.57	54/1728
BTA 18W 220V/60Hz C DI	9137 101 185..	0.446	32	32.3 x 16.0 x 13.1	14.57	54/1728
BTA 18W 230V C SC	9137 101 117..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 18W 230V C DI	9137 101 121..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 18W 240V C SC	9137 101 119..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 18W 240V C DI	9137 101 123..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 36W 220V C SC	9137 101 195..	0.465	32	32.3 x 16.0 x 13.1	15.22	54/1728
BTA 36W 220V C DI	9137 101 196..	0.465	32	32.3 x 16.0 x 13.1	15.22	54/1728
BTA 36W 220V/60Hz C SC	9137 101 184..	0.442	32	32.3 x 16.0 x 13.1	14.57	54/1728
BTA 36W 220V/60Hz C DI	9137 101 186..	0.442	32	32.3 x 16.0 x 13.1	14.57	54/1728
BTA 36W 230V C SC	9137 101 118..	0.51	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 36W 230V C DI	9137 101 122..	0.51	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 36W 240V C SC	9137 101 120..	0.51	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 36W 240V C DI	9137 101 124..	0.51	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 220V C SC	9137 101 175..	0.48	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 220V C DI	9137 101 176..	0.48	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 230V C SC	9137 101 179..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 230V C DI	9137 101 180..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 240V C SC	9137 101 181..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 30W 240V C DI	9137 101 182..	0.5	32	32.3 x 16.0 x 13.1	16.33	54/1728
BTA 58W 220V C SC	9137 101 187..	0.78	24	24.0 x 19.5 x 12.5	19.86	40/960
BTA 58W 220V C DI	9137 101 188..	0.78	24	24.0 x 19.5 x 12.5	19.86	40/960
BTA 58W 220V/60Hz C SC	9137 101 189..	0.72	24	24.0 x 19.5 x 12.5	17.7	40/960
BTA 58W 220V/60Hz C DI	9137 101 190..	0.72	24	24.0 x 19.5 x 12.5	17.7	40/960
BTA 58W 230V C SC	9137 101 191..	0.857	24	24.0 x 19.5 x 12.5	20.94	40/960
BTA 58W 230V C DI	9137 101 192..	0.857	24	24.0 x 19.5 x 12.5	20.94	40/960
BTA 58W 240V C SC	9137 101 193..	0.857	24	24.0 x 19.5 x 12.5	20.94	40/960
BTA 58W 240V C DI	9137 101 194..	0.857	24	24.0 x 19.5 x 12.5	20.94	40/960
BTA 18W 220V B2 SC	9137 101 100..	0.542	32	32.3 x 16.0 x 13.1	17.75	54/1728
BTA 18W 220V B2 DI	9137 101 212..	0.542	32	32.3 x 16.0 x 13.1	17.75	54/1728
BTA 18W 220V/60Hz B2 SC	9137 101 113..	0.491	32	32.3 x 16.0 x 13.1	16.12	54/1728
BTA 18W 220V/60Hz B2 DI	9137 101 115..	0.491	32	32.3 x 16.0 x 13.1	16.12	54/1728
BTA 18W 230V B2 SC	9137 101 236..	0.57	32	32.3 x 16.0 x 13.1	18.5	54/1728
BTA 18W 230V B2 DI	9137 101 242..	0.57	32	32.3 x 16.0 x 13.1	18.5	54/1728
BTA 18W 240V B2 SC	9137 101 237..	0.57	32	32.3 x 16.0 x 13.1	18.5	54/1728
BTA 18W 240V B2 DI	9137 101 243..	0.57	32	32.3 x 16.0 x 13.1	18.5	54/1728
BTA 18W 220V B1 SC	9137 101 159..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 18W 220V B1 DI	9137 101 167..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 18W 230V B1 SC	9137 101 163..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 18W 230V B1 DI	9137 101 171..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 18W 240V B1 SC	9137 101 165..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 18W 240V B1 DI	9137 101 173..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 30W 220V B2 SC	9137 101 101..	0.542	32	35.7 x 18.2 x 13.6	17.75	54/1728
BTA 30W 220V/60Hz B2 SC	9137 101 177..	0.491	32	35.7 x 18.2 x 13.6	16.12	54/1728
BTA 30W 220V/60Hz B2 DI	9137 101 178..	0.491	32	35.7 x 18.2 x 13.6	16.12	54/1728
BTA 36W 220V B2 SC	9137 101 102..	0.542	32	35.7 x 18.2 x 13.6	17.75	54/1728
BTA 36W 220V B2 DI	9137 101 213..	0.542	32	35.7 x 18.2 x 13.6	17.75	54/1728
BTA 36W 220V/60Hz B2 SC	9137 101 114..	0.491	32	35.7 x 18.2 x 13.6	16.12	54/1728
BTA 36W 220V/60Hz B2 DI	9137 101 116..	0.491	32	35.7 x 18.2 x 13.6	16.12	54/1728
BTA 36W 230V B2 SC	9137 101 238..	0.597	32	35.7 x 18.2 x 13.6	19.36	54/1728
BTA 36W 230V B2 DI	9137 101 244..	0.597	32	35.7 x 18.2 x 13.6	19.36	54/1728
BTA 36W 240V B2 SC	9137 101 239..	0.597	32	35.7 x 18.2 x 13.6	19.36	54/1728
BTA 36W 240V B2 DI	9137 101 245..	0.597	32	35.7 x 18.2 x 13.6	19.36	54/1728

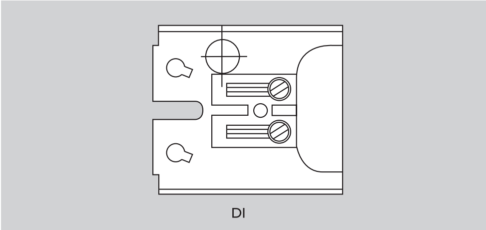
Ordering and packing data

Ballast	Ordering number	Weight net kg	Packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Cartons/pcs
BTA 36W 220V B1 SC	9137 101 160..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 36W 220V B1 DI	9137 101 168..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 36W 230V B1 SC	9137 101 164..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 36W 230V B1 DI	9137 101 172..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 36W 240V B1 SC	9137 101 166..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 36W 240V B1 DI	9137 101 174..	0.911	24	24.0 x 19.5 x 12.5	22.23	40/960
BTA 58W 220V B2 SC	9137 101 103..	0.925	24	24.0 x 19.5 x 12.5	22.59	40/960
BTA 58W 230V B2 SC	9137 101 240..	0.93	24	24.0 x 19.5 x 12.5	22.58	40/960
BTA 58W 230V B2 DI	9137 101 246..	0.93	24	24.0 x 19.5 x 12.5	22.58	40/960
BTA 58W 240V B2 SC	9137 101 241..	0.94	24	24.0 x 19.5 x 12.5	22.58	40/960
BTA 58W 240V B2 DI	9137 101 247..	0.94	24	24.0 x 19.5 x 12.5	22.58	40/960

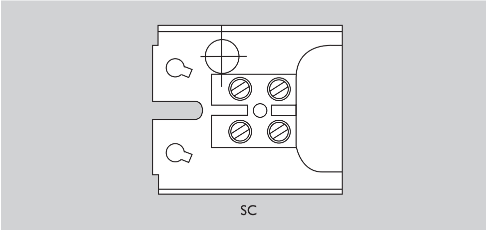
Ordering and packing data

2Standard and premium range for TLE

Ballast	Ordering number	Weight net kg	Packing Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Cartons/pcs
BTA 22W 220V C SC	9137 101 125..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 22W 220V C DI	9137 101 127..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 22W 230V C SC	9137 101 133..	0.5	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 22W 230V C DI	9137 101 135..	0.5	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 22W 240V C SC	9137 101 137..	0.5	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 22W 240V C DI	9137 101 139..	0.5	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 22W 220V B2 SC	9137 101 104..	0.53	32	32.3 x 16.0 x 13.1	17.75	12/384
BTA 22W 220V/60Hz B2 SC	9137 101 129..	0.47	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 22W 220V/60Hz B2 DI	9137 101 131..	0.47	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 32W 220V C SC	9137 101 126..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 32W 220V C DI	9137 101 128..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 32W 230V C SC	9137 101 134..	0.51	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 32W 230V C DI	9137 101 136..	0.51	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 32W 240V C SC	9137 101 138..	0.51	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 32W 240V C DI	9137 101 140..	0.51	32	32.3 x 16.0 x 13.1	16.33	12/384
BTA 32W 220V B2 SC	9137 101 105..	0.53	32	32.3 x 16.0 x 13.1	17.75	12/384
BTA 32W 220V/60Hz B2 SC	9137 101 130..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384
BTA 32W 220V/60Hz B2 DI	9137 101 132..	0.48	32	32.3 x 16.0 x 13.1	16.12	12/384



Installation option 1



Installation option 2

Electromagnetic

BPL EM ballasts for Compact fluorescent lamps


BPL 18W


BPL 26W

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 IEC61347-2-8 / IEC921
- Tw 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.

Dimensions in mm

Fig A

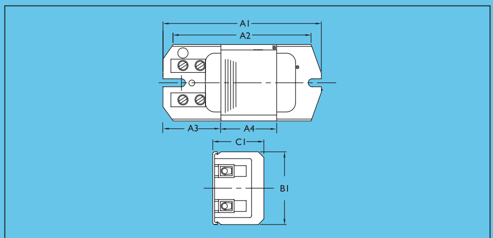
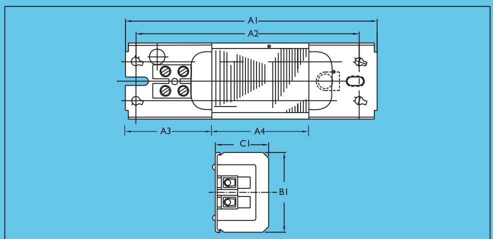


Fig B



Product ID	A1	A2	B1	C1	Fig
9W	85		39	28	A
13W	85		39	28	A
18W	85		39	28	A
26W	130	115	39	28	B

Notes: On Fig A pf BPL sheet, length A2 is to taken off.

Electromagnetic

BPL EM ballasts for Compact fluorescent lamps

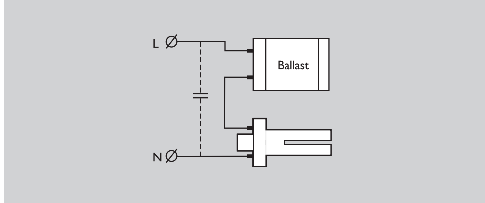


Fig. 1

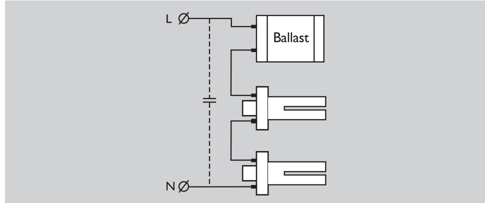


Fig. 2

Wiring diagrams

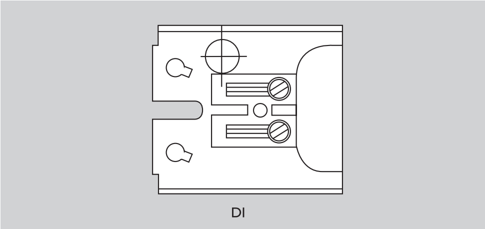
Technical data

Lamp	Qty of lamps	Ballast	Watt loss W	Input power W	Mains current during operation mA	Power factor	Capacitor µF/V	Wiring diagram Fig.	tw °C	Δt °C
PL-S 7W/9W/11W	1	BPL 9W 220V B2 SC/DI	4.7	11.7/13.7/15.7	160/170/150	>0.85	2.0 ±10%, 250V	1	130	55
PL-S 7W	2	BPL 9W 220V B2 SC/DI	4.7	18.7	140	>0.85	2.0 ±10%, 250 V	2	130	55
PL-C 13W	1	BPL 13W 220V B2 SC/DI	4	17	165	>0.85	1.6 ±10%, 250 V	1	130	50
PL-S 7W/9W	2	BPL 13W 220V B2 SC/DI	4	18/22	140/170	>0.85	1.6 ±10%, 250 V	2	130	50
PL-C 13W	1	BPL 13W 220V B1 SC	4	17	165	>0.85	1.6 ±10%, 250 V	1	130	50
PL-S 7W/9W	2	BPL 13W 220V B1 SC	4	18/22	140/170	>0.85	1.6 ±10%, 250 V	2	130	50
PL-C 18W	1	BPL 18W 220V B2 SC/DI	5.3	23.3	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 18W	1	BPL 18W 220V B1 SC	5.3	23.3	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 26W	1	BPL 26W 220V B2 SC/DI	6.4	32.4	310	>0.85	3.0 ±10%, 250 V	1	130	55
PL-S 7W/9W/11W	1	BPL 9W 220V/60Hz B2 SC	4.5	11.5/13.5/15.5	160/170/150	>0.85	2.0 ±10%, 250V	1	130	55
PL-S 7W	2	BPL 9W 220V/60Hz B2 SC	4.5	18.5	140	>0.85	2.0 ±10%, 250 V	2	130	55
PL-C 13W	1	BPL 13W 220V/60Hz B2 SC	3.8	16.8	165	>0.85	1.4 ±10%, 250 V	1	130	50
PL-S 7W/9W	2	BPL 13W 220V/60Hz B2 SC	3.8	17.8/21.8	140/170	>0.85	1.4 ±10%, 250 V	2	130	50
PL-C 13W	1	BPL 13W 220V/60Hz B1 SC	3.8	16.8	165	>0.85	1.4 ±10%, 250 V	1	130	50
PL-S 7W/9W	2	BPL 13W 220V/60Hz B1 SC	3.8	17.8/21.8	140/170	>0.85	1.4 ±10%, 250 V	2	130	50
PL-C 18W	1	BPL 18W 220V/60Hz B2 SC	5.3	23	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 18W	1	BPL 18W 220V/60Hz B1 SC	5.3	23	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-S 7W/9W/11W	1	BPL 9W 230V B2 SC/DI	5.1	12.1/14.1/16.1	160/170/150	>0.85	2.0 ±10%, 250V	1	130	60
PL-S 7W	2	BPL 9W 230V B2 SC/DI	5.1	19.1	140	>0.85	2.0 ±10%, 250 V	2	130	60
PL-C 13W	1	BPL 13W 230V B2 SC	4.1	17.1	165	>0.85	1.6 ±10%, 250 V	1	130	55
PL-S 7W/9W	2	BPL 13W 230V B2 SC	4.1	18.1/22.1	140/170	>0.85	1.6 ±10%, 250 V	2	130	55
PL-C 13W	1	BPL 13W 230V B1 SC	4.1	17.1	165	>0.85	1.6 ±10%, 250 V	1	130	55
PL-S 7W/9W	2	BPL 13W 230V B1 SC	4.1	18.1/22.1	140/170	>0.85	1.6 ±10%, 250 V	2	130	55
PL-C 18W	1	BPL 18W 230V B2 SC/DI	5.4	23.4	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 18W	1	BPL 18W 230V B1 SC/DI	5.4	23.4	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 26W	1	BPL 26W 230V B2 SC/DI	6.9	32.9	308	>0.85	3.0 ±10%, 250 V	1	130	55
PL-S 7W/9W/11W	1	BPL 9W 240V B2 SC	5.2	12.2/14.2/16.2	160/170/150	>0.85	2.0 ±10%, 250V	1	130	60
PL-S 7W	2	BPL 9W 240V B2 SC	5.2	19.2	140	>0.85	2.0 ±10%, 250 V	2	130	60
PL-C 13W	1	BPL 13W 240V B2 SC	4.4	17.4	165	>0.85	1.6 ±10%, 250 V	1	130	55
PL-S 7W/9W	2	BPL 13W 240V B2 SC	4.4	18.4/22.4	140/170	>0.85	1.6 ±10%, 250 V	2	130	55
PL-C 13W	1	BPL 13W 240V B1 SC	4.4	17.4	165	>0.85	1.6 ±10%, 250 V	1	130	55
PL-S 7W/9W	2	BPL 13W 240V B1 SC	4.4	18.4/22.4	140/170	>0.85	1.6 ±10%, 250 V	2	130	55
PL-C 18W	1	BPL 18W 240V B2 SC	5.8	23.8	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 18W	1	BPL 18W 240V B1 SC	5.8	23.8	212	>0.85	2.0 ±10%, 250 V	1	130	60
PL-C 26W	1	BPL 26W 240V B2 SC/DI	7.3	33.3	310	>0.85	3.0 ±10%, 250 V	1	130	55

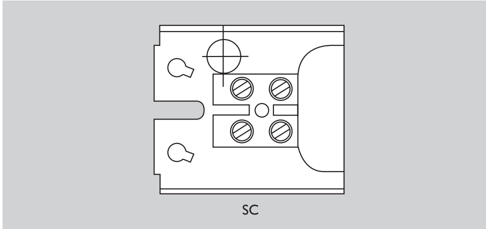
1) In accordance with IEC921 tw indicates the maximum permissible temperature of the windings.
2) Temperature measurements (average values) in accordance with IEC921.
3) Temperature marking tw/Δt in accordance with IEC921.
4) To obtain HPF circuit ($\cos \phi \geqslant 0.85$) by means of a parallel capacitor across the main.
   Capacitor tolerance ±10%.

Electromagnetic

BPL EM ballasts for Compact fluorescent lamps



Installation option 1



Installation option 2

Ordering and packing data

Ballast	Ordering number	Weight net kg	Boxpacking Qty pcs	Dimensions l x w x h cm	Weight gross kg	Pallet unit Carton/pcs
BPL 9W 220V B2 SC	9137 101 106..	0.28	48	26.0 x 18.8 x 12.8	13.7	16/768
BPL 9W 220V B2 DI	9137 101 223..	0.28	48	26.0 x 23.8 x 12.8	13.7	12/576
BPL 13W 220V B2 SC	9137 101 215..	0.29	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 13W 220V B2 DI	9137 101 224..	0.29	48	26.0 x 23.8 x 12.8	14.7	12/576
BPL 13W 220V B1 SC	9137 101 107..	0.29	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 18W 220V B2 SC	9137 101 216..	0.295	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 18W 220V B2 DI	9137 101 225..	0.295	48	26.0 x 23.8 x 12.8	14.7	12/576
BPL 18W 220V B1 SC	9137 101 108..	0.295	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 26W 220V B2 SC	9137 101 201..	0.48	32	35.7 x 15.7 x 13.6	15.7	32/384
BPL 26W 220V B2 DI	9137 101 202..	0.48	32	35.7 x 15.7 x 13.6	15.7	32/384
BPL 9W 220V/60Hz B2 SC	9137 101 141..	0.27	48	26.0 x 18.8 x 12.8	13.7	16/768
BPL 13W 220V/60Hz B2 SC	9137 101 217..	0.275	48	26.0 x 18.8 x 12.8	13.7	16/768
BPL 13W 220V/60Hz B1 SC	9137 101 142..	0.275	48	26.0 x 18.8 x 12.8	13.7	16/768
BPL 18W 220V/60Hz B2 SC	9137 101 218..	0.285	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 18W 220V/60Hz B1 SC	9137 101 143..	0.285	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 9W 230V B2 SC	9137 101 147..	0.29	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 9W 230V B2 DI	9137 101 221..	0.29	48	26.0 x 20.6 x 12.8	14.7	12/576
BPL 13W 230V B2 SC	9137 101 219..	0.29	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 13W 230V B2 DI	9137 101 234..	0.29	48	26.0 x 20.6 x 12.8	14.7	12/576
BPL 13W 230V B1 SC	9137 101 148..	0.29	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 18W 230V B2 SC	9137 101 220..	0.31	48	26.0 x 18.8 x 12.8	15.1	16/768
BPL 18W 230V B2 DI	9137 101 214..	031	48	26.0 x 23.8 x 12.8	15.1	12/576
BPL 18W 230V B1 SC	9137 101 149..	0.31	48	26.0 x 18.8 x 12.8	15.1	16/768
BPL 18W 230V B1 DI	9137 101 235..	0.31	48	26.0 x 20.6 x 12.8	15.1	12/576
BPL 26W 230V B2 SC	9137 101 203..	0.5	32	35.7 x 15.7 x 13.6	17	32/384
BPL 26W 230V B2 DI	9137 101 204..	0.5	32	35.7 x 15.7 x 13.6	17	32/384
BPL 9W 240V B2 SC	9137 101 153..	0.29	48	26.0 x 18.8 x 12.8	14.5	16/768
BPL 13W 240V B2 SC	9137 101 211..	0.295	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 13W 240V B1 SC	9137 101 154..	0.295	48	26.0 x 18.8 x 12.8	14.7	16/768
BPL 18W 240V B2 SC	9137 101 222..	0313	48	26.0 x 18.8 x 12.8	16	16/768
BPL 18W 240V B1 SC	9137 101 155..	0.313	48	26.0 x 18.8 x 12.8	16	16/768
BPL 26W 240V B2 SC	9137 101 205..	0.5	32	35.7 x 15.7 x 13.6	17	12/384
BPL 26W 240V B2 DI	9137 101 206..	0.5	32	35.7 x 15.7 x 13.6	17	12/384