



Design-in guide

Xitanium and Fortimo LED drivers for indoor use

PHILIPS
sense and simplicity

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Introduction

Thank you for choosing Philips Xitanium/Fortimo drivers. In this guide you will find the information needed to integrate these drivers into a luminaire or system.

Applications

The Xitanium and Fortimo LED drivers are designed to operate LED solutions for indoor lighting, like offices, public buildings, high end shops and retail environments. If you use Philips drivers in combination with our modules, such as Fortimo and Lexel, specific design-in guides are available from our below mentioned websites Fortimo and Lexel.

Information or support

Please consult your local Philips office or visit:

www.philips.com/support or

www.philips.com/oem

www.philips.com/xitanium

www.philips.com/fortimo

www.philips.com/lexel.

Range - Drivers and cables

Xitanium drivers



Xitanium 17 and 25 W
Xitanium 17 and 25 WTD,TE andTD with 12V
Xitanium 50W dimmableTD (linear housing)



Xitanium 45 W independent fixed output
Xitanium 50 W independent fixed output and dimmableTD
Xitanium 75 W independent fixed output



Xitanium 50 W built-in fixed output (/s version)



Xitanium 50 W built-in fixed output and dimmableTD



Xitanium 75 W dimmableTD

Drivers

The Fortimo and Xitanium LED drivers described in this guide are available in different versions, e.g. fixed-output and dimmable (trailing edge (TE) and Touch & DALI (TD)), in a wide range of power ratings that enable the most popular light output levels for general lighting applications. We recommend you always check our website for the most up-to-date overview of our range.

Flexibility in luminaire design is ensured by an adjustable output current (AOC) and a new modern 3-in-1 housing design. The adjustable output current enables operation of various LED configurations from different LED manufacturers whilst also ensuring the solution remains “future proof” for new LED generations.

The output current can be set by placing a resistor on your LED PCB (Level 2 board). Thermal derating of your LED PCB is possible by integrating an NTC (negative thermal coefficient) on the LED PCB.

In the digital 50 and 75 W “TD” versions it is possible to program the LED drivers. Using a specially configured software program, OEMs can define functions such as adjustable output current (AOC), constant light output (CLO) and thermal derating to suit their own requirements.

The housing design incorporates three different mounting options: independent, screw and click mounting. Most versions also feature a 12V output to operate active cooling. The digital 50 W “TD” versions feature a PWM 12V output, enabling dynamic regulation of the active cooling.

Nomenclature of the drivers

- I : independent housing design
- TE : trailing edge dimming
- TD : Touch & DALI dimming
- s : small version without 12V
- SH : square independent housing
- LH : linear independent housing

Fortimo drivers



Fortimo 1100-3000 built-in fixed output
Fortimo 1100-3000 built-in dimmable

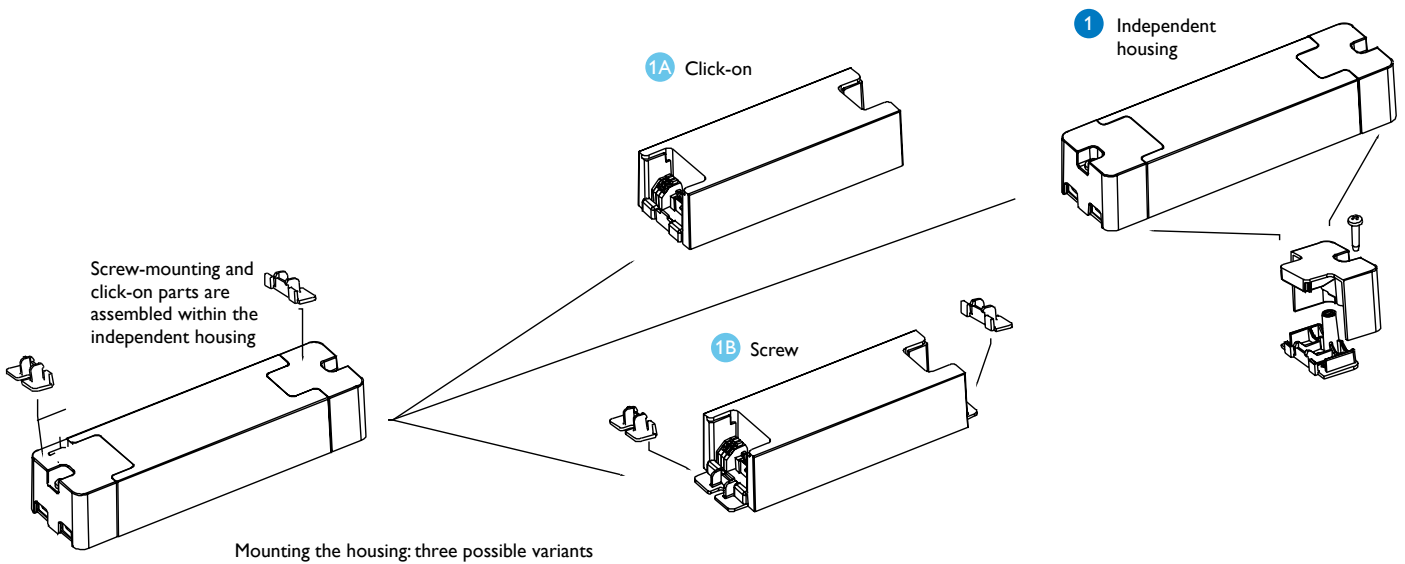


Fortimo 1100-3000 independent dimmable

Xtanium LED drivers

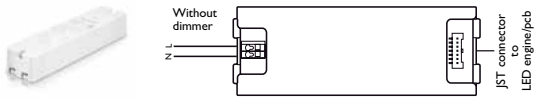
Flexible housing design

The new independent housing design of the 17W, 25W and 50W LH dimmable TD/TE driver, incorporates three different mounting options: Independent, Click-on and Screw mounting. The Click-on parts are included in every Independent product. Each option has different dimensions, which can be found in the tables on the following pages indicated by 1 1A 1B, see drawing below.



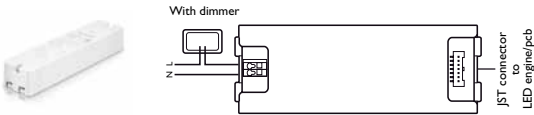
Xtanium 17 W driver

Fixed output, Independent housing (I)

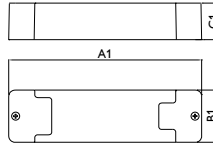


1 Independent 1A 1B Mounting variants

Trailing Edge (TE), Independent housing (I)

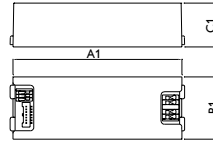


1 Independent 1A 1B Mounting variants



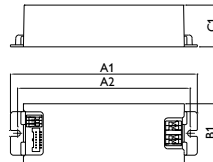
1 Independent housing

Dimensions	A1	B1	C1
Xtanium 17W 0.3-0.7A 24V I 230V	190	46	32
Xtanium 17W 0.3-0.7A 24V TE/I 230V	190	46	32



1A Click-on - Mounting variant

Dimensions	A1	B1	C1
Xtanium 17W 0.3-0.7A 24V I 230V	148	46	32
Xtanium 17W 0.3-0.7A 24V TE/I 230V	148	46	32

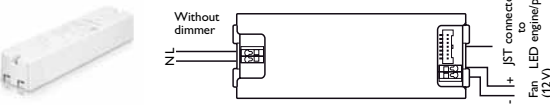


1B Screw - Mounting variant

Dimensions	A1	A2	B1	C1
Xtanium 17W 0.3-0.7A 24V I 230V	165	154	46	32
Xtanium 17W 0.3-0.7A 24V TE/I 230V	165	154	46	32

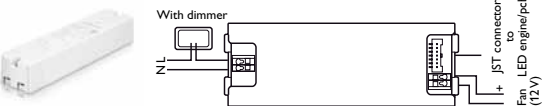
Xtanium 25 W driver

Fixed output, Independent housing (I)



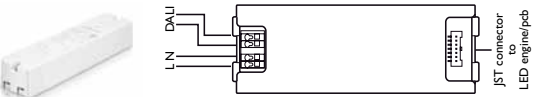
1 Independent 1A 1B Mounting variants

Trailing Edge (TE), Independent housing (I) housing



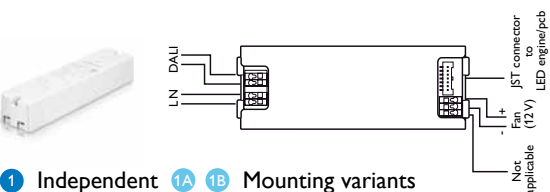
1 Independent 1A 1B Mounting variants

Touch and DALI (TD), small housing (I/s) without 12V output

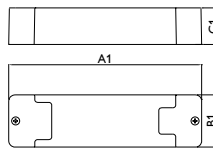


1 Independent 1A 1B Mounting variants

Touch and DALI (TD), 12V output

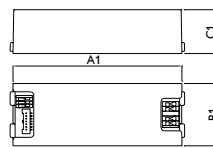


1 Independent 1A 1B Mounting variants



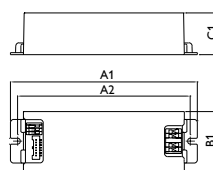
1 Independent housing

Type	A1	B1	C1
Xtanium 25W 0.3-0.7A 36V I 230V	190	46	32
Xtanium 25W 0.3-0.7A 36V TE/I 230V	190	46	32
Xtanium 25W 0.3-1A 36V TD/I 230V	170	46	32
Xtanium 25W/0.3-1A 36V TD/Is 230V	150	46	32



1A Click-on - Mounting variant

Type	A1	B1	C1
Xtanium 25W 0.3-0.7A 36V I 230V	148	46	32
Xtanium 25W 0.3-0.7A 36V TE/I 230V	148	46	32
Xtanium 25W 0.3-1A 36V TD/I 230V	128	46	32
Xtanium 25W/0.3-1A 36V TD/Is 230V	108	46	32

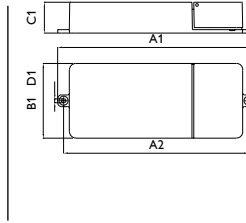
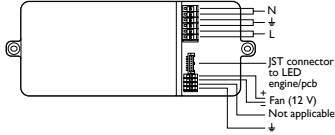


1B Screw - Mounting variant

Type	A1	A2	B1	C1
Xtanium 25W 0.3-0.7A 36V I 230V	165	154	46	32
Xtanium 25W 0.3-0.7A 36V TE/I 230V	165	154	46	32
Xtanium 25W 0.3-1A 36V TD/I 230V	145	134	46	32
Xtanium 25W/0.3-1A 36V TD/Is 230V	125	114	46	32

Xtanium 45 W driver

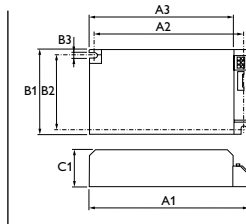
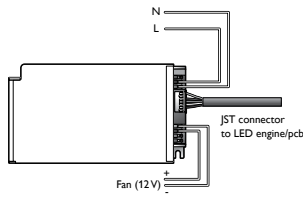
Fixed output, Independent housing (I)



Type	A1	A2	A3	B1	C1	D1
Xtanium 45W 0.2-0.7A 80V I 230V	220	206	193	83	35	4.1

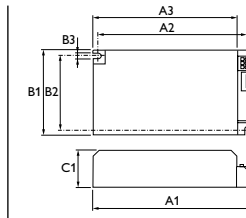
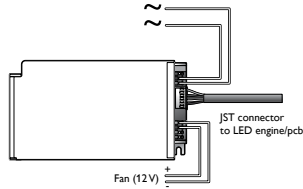
Xtanium 50 W driver

Fixed output



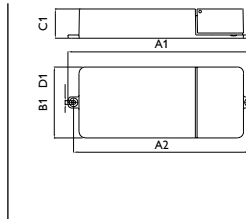
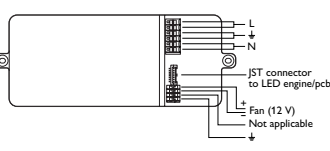
Type	A1	A2	B1	B2	C1
Xtanium 50W 0.3-1A 62V 230V	141	129	75	64	32

Fixed output, small housing (s)



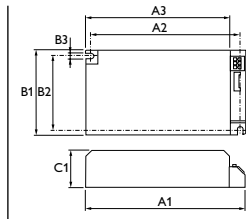
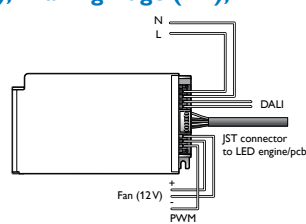
Type	A1	A2	B1	B2	C1
Xtanium 50W/s 0.3-1A 62V 230V	110	99	75	64	32

Fixed output, Independent housing (I)



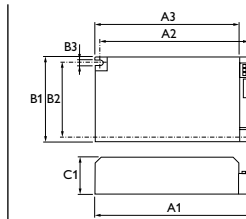
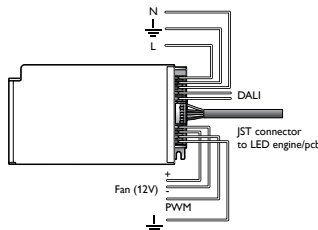
Type	A1	A2	B1	C1
Xtanium 50W SH 0.3-1A 62V I 230V	220	206	83	35

Touch and DALI (TD), Trailing Edge (TE), built in



Type	A1	A2	B1	B2	C1
Xtanium 50W 0.3-1A 62V TD/TE 230V	141	129	75	64	32

Touch and DALI (TD), Trailing Edge (TE), Independent housing (I)



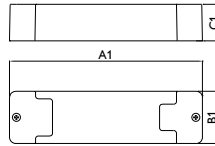
Type	A1	A2	B1	C1
Xtanium 50W SH 0.3-1A 62V TD/TE/I 230V	220	206	83	35

Xtanium 50 W driver (continuation)

Touch and DALI (TD), Trailing Edge (TE), Independent housing (I)

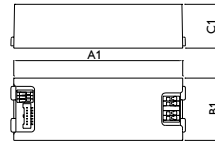


1 Independent 1A 1B Mounting variants



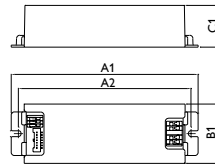
1 Independent housing

Type	A1	B1	C1
Xtanium 50W LH 0.3-1A 62V TD/TE/I 230V	190	46	32



1A Click-on - Mounting variant

Type	A1	B1	C1
Xtanium 50W LH 0.3-1A 62V TD/TE/I 230V	148	46	32

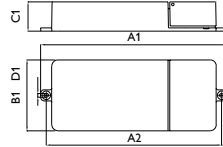
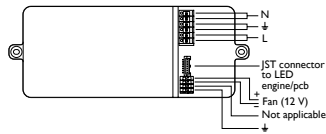


1B Screw - Mounting variant

Type	A1	A2	B1	C1
Xtanium 50W LH 0.3-1A 62V TD/TE/I 230V	165	154	46	32

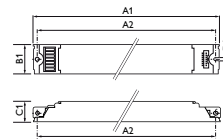
Xtanium 75 W driver

Fixed output, Independent housing (I)



Type	A1	A2	A3	B1	C1	D1
Xtanium 75W SH 0.3-1A 110V I 230V	220	206	193	83	35	4.1

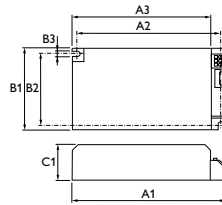
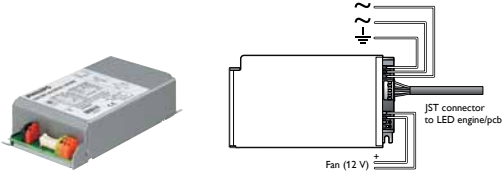
Touch and DALI (TD)



Type	A1	A2	B1	C1	D1
Xtanium 75W 0.2-0.4A 200V TD 230V	360	350	30	22	4.1

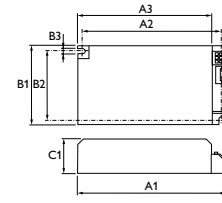
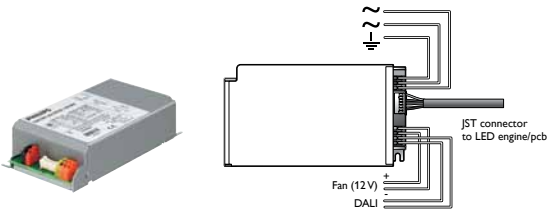
Fortimo LED driver 1100-3000

Fixed output, Built in



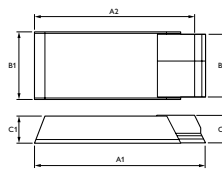
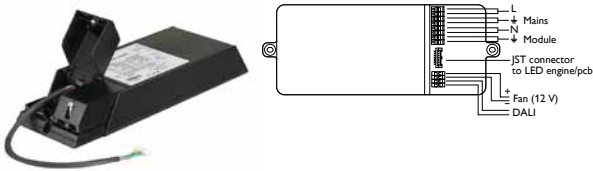
Type	A1	A2	A3	B1	B2	B3	C1
Fortimo LED driver 1100-3000	138	129	124.5	74	63.3	4.5	32

Touch and DALI (TD), Built in



Type	A1	A2	A3	B1	B2	B3	C1
Fortimo LED driver 1100-3000/TD	138	129	124.5	74	63.3	4.5	32

Touch and DALI (TD), Independent housing (I)

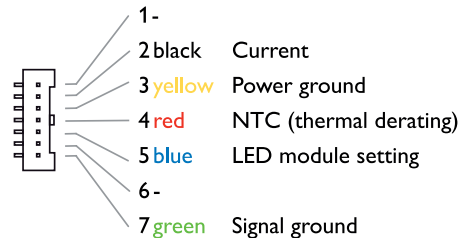


Type	A1	A2	B1	B2	C1	C2	C1
Fortimo LED driver 1100-3000/TDI	224	206	83	na	34.5	na	32

Cables

Explanation of Fortimo LED cables and connectors

The Fortimo and Xitanium LED drivers feature a specific JST connector with five functions, being:



JST connector in driver

The driver can be connected to a Philips LED module DLM or SLM via a Philips LED cable that is 250 mm in length. There are also 600 mm versions available for independent operation that features also a wire for connecting to protective earth.



Fortimo LED DLM cable 1100-2000 /I (for independent operation)

Connector details: DLM cables

- JST connector on cable to LED driver
 - Housing JST PAP-07V-S
 - Contact JST SPHD-001T-PO.5
- JST connector on cable to LED DLM module
 - Housing JST-PHR-7
 - Contact JST SPH-002T-PO.5S

Connector details: SLM cables

- JST connector on cable to LED driver
 - Housing JST PAP-07V-S
 - Contact JST SPHD-002T-PO.5
- Tyco connector on cable to LED SLM module
 - Housing Tyco HPI 440146-8
 - Contact Tyco HPI 440147-2

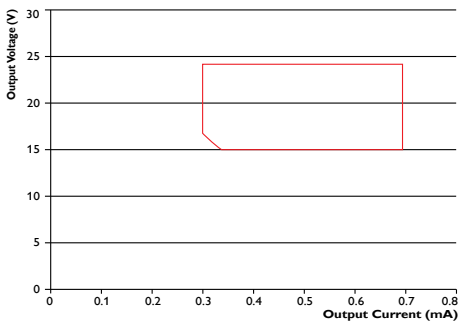
Special attention for 75 W Xitanium LED drivers

Due to the higher output voltage (>100 V) of this 75 W LED driver more creepage/clearance distance is required for safety reasons. The LED driver output current has therefore been moved from pin 2 to pin 1. Consequently a 7-wire cable instead of a 5-wire cable needs to be used.

Electrical design

Areas of application

One of the key features of the Xitanium LED drivers is the adjustable output current, offering flexibility and future-proof LED module/PCB design. The graphs below show the possible areas of application for the different drivers. The areas indicate the possible current /voltage combinations. The current you select will depend on the type and manufacturer of the LEDs or the specific LED configuration of the PCB design. The voltage is the sum of the LEDs used (total Vf string).



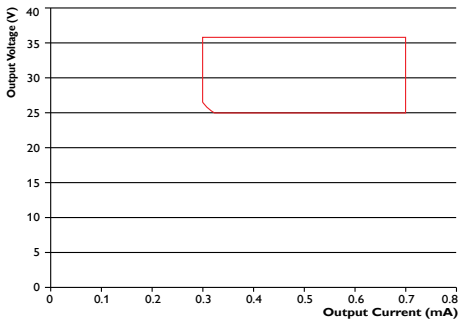
Xitanium 17 W 0.3-0.7 A 24V

Setting the output current

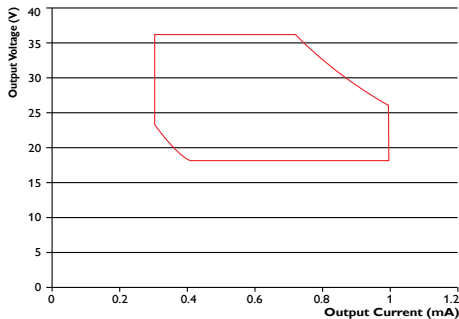
There are two ways to set the output current:

1. With a resistor on a PCB board, applicable to all Fortimo and Xitanium LED drivers. See explanation on next page.
2. Programmable via DALI. This feature is integrated into the following Xitanium LED drivers:
 - a. Xitanium 50W LH 0.3-1A 62V TD/TE 230V
 - b. Xitanium 50W SH 0.3-1A 62V TD/TE 230V
 - c. Xitanium 50W 0.3-1A 62V TD/TE 230V
 - d. Xitanium 75W 0.2-0.4A 200V TD 230V

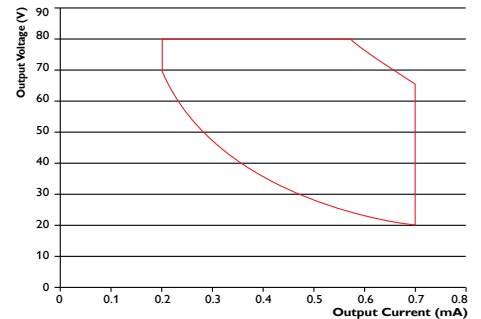
During 2011 more information on this feature will be included in this guide.



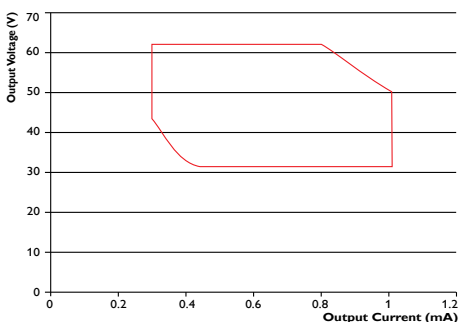
Xitanium 25 W 0.3-0.7 A 36V



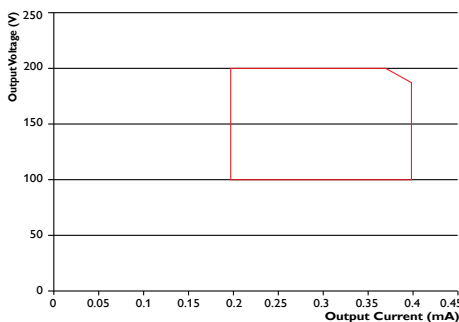
Xitanium 25 W 0.3-1 A 36V



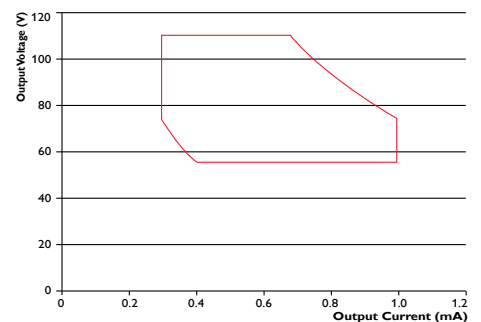
Fortimo 1100-3000 / Xitanium 45W 0.2-0.7 A 80V



Xitanium 50 W 0.3- 1 A 62V



Xitanium 75 W 0.2-0.4 A 200V



Xitanium 75 W 0.3-1 A 110V

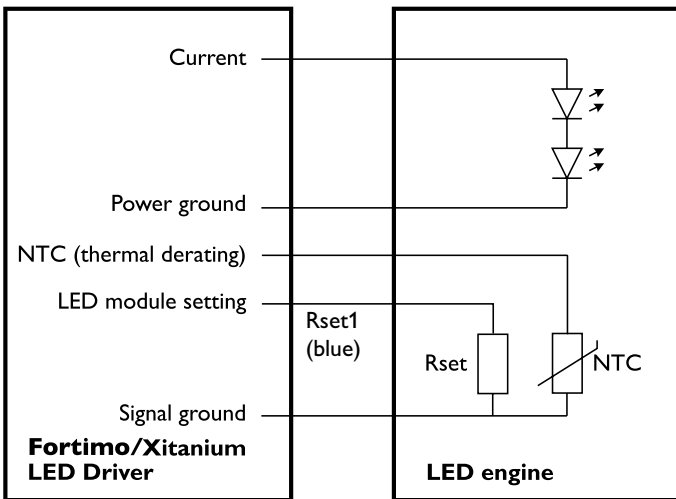
Setting desired output currents with a resistor

By inserting a resistor with a certain value you can determine the required current for your L2 board design. See on the table below.

The new 25, 50 and 75 W digital drivers have an output current range of 0.3 to 1 A and are the first drivers to have the facility to accommodate currents greater than the 0.7 A of previous drivers. Two Rset options are built into the drivers in order to ensure operation of Fortimo systems (DLM & SLM) specified at max. 700 mA and to enable operation up to 1 A.

Schematic block diagram of Rset1

Triggered by connector position 5/cable 4 (blue) of Fortimo LED DLM cable and covering a range of 200 to 700 mA.



Schematic block diagram of Rset1

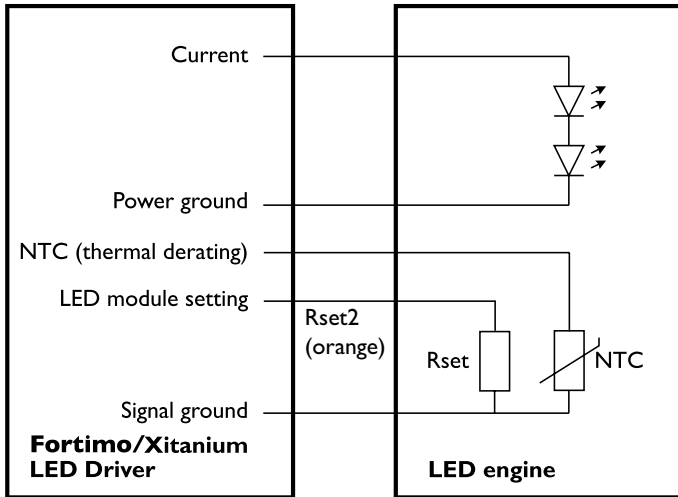
Do not connect Signal ground and Power ground to L2 (PCB).

Rset1 table

Rset Ω	Iout (mA)	Rset Ω	Iout (mA)	Rset Ω	Iout (mA)	Rset Ω	Iout (mA)
39	200.3	510	292.2	6,800	582.7	91,000	690.1
43	201.2	560	300	7,500	591.4	100,000	691.1
47	202.2	620	309	8,200	598.9	110,000	692
51	203.1	680	317.6	9,100	607.2	120,000	692.8
56	204.3	750	327.1	10,000	614.2	130,000	693.4
62	205.7	820	336.2	11,000	620.9	150,000	694.5
68	207.1	910	347.3	12,000	626.6	160,000	694.9
75	208.7	1,000	357.7	13,000	631.6	180,000	695.6
82	210.4	1,100	368.6	15,000	639.8	200,000	696.2
91	212.4	1,200	378.8	16,000	643.2	220,000	696.6
100	214.5	1,300	388.4	18,000	649	240,000	697
110	216.7	1,500	406	20,000	653.7	270,000	697.5
120	218.9	1,600	414.1	22,000	657.7	300,000	697.9
130	221.1	1,800	429	24,000	661	330,000	698.2
150	225.5	2,000	442.4	27,000	665.2	360,000	698.5
160	227.6	2,200	454.6	30,000	668.6	390,000	698.7
180	231.9	2,400	465.6	33,000	671.4	430,000	698.9
200	236	2,700	480.5	36,000	673.8	470,000	699.1
220	240.1	3,000	493.6	39,000	675.8	510,000	699.3
240	244.1	3,300	505.2	43,000	678	560,000	699.5
270	250	3,600	516.6	47,000	679.9	620,000	699.7
300	255.7	3,900	525	51,000	681.6	680,000	699.8
330	261.3	4,300	536.1	56,000	683.3	750,000	700
360	266.8	4,700	545.9	62,000	685	820,000	700.1
390	272.1	5,100	554.5	68,000	686.4	910,000	700.2
430	279	5,600	564.1	75,000	687.7	1,000,000	700.3
470	285.7	6,200	574.1	82,000	688.9		

Schematic block diagram of Rset 2

Rset2 is triggered by connector position 6/cable 6 (orange) and can cover a range of up to 1 A (although the plan is to make it possible to increase this to 2 A and beyond at a later stage). Rset2 is also preferred for new designs; Rset1 is present as well on most drivers for backwards compatibility.



Schematic block diagram Rset2

Do not connect Signal ground and Power ground to L2 (PCB)

Rset2 table

Rset Ω	Iset (mA)	Rset Ω	Iset (mA)
0	100	2,200	779.7414
100	100	2,400	823.4195
110	105.4598	2,700	883.477
120	110.9195	3,000	940.8046
130	116.3793	3,300	992.6724
150	124.569	3,600	1,041.81
160	130.0287	3,900	1,085.489
180	138.2184	4,300	1,142.816
200	146.408	4,700	1,191.954
220	154.5977	5,100	1,238.362
240	165.5172	5,600	1,292.96
270	176.4368	6,200	1,350.287
300	190.0862	6,800	1,402.155
330	203.7356	7,500	1,454.023
360	214.6552	8,200	1,503.161
390	228.3046	9,100	1,557.759
430	244.6839	10,000	1,604.167
470	261.0632	11,000	1,653.305
510	277.4425	12,000	1,694.253
560	296.5517	13,000	1,729.741
620	318.3908	15,000	1,792.529
680	340.2299	16,000	1,817.098
750	367.5287	18,000	1,863.506
820	392.0977	20,000	1,901.724
910	422.1264	22,000	1,934.483
1000	452.1552	24,000	1,964.511
1100	484.9138	27,000	2,000
1200	514.9425	>100,000	700
1300	544.9713		
1500	602.2989		
1600	632.3276		
1800	684.1954		
2000	733.3333		

Rset2 priority behavior

Rset1	Rset2	Driver status
Open	Open	700 mA*
Rset	Open	Rset1
Open	Rset	Rset2
Rset	Rset	Rset2
Short	Open	Rset1 (min current setting)
Short	Short	Rset2 (min current setting)
Open	Short	Rset2 (min current setting)

* Default setting for all drivers if no resistor is used

Inrush current

Type	Maximum LED drivers on MCB (pcs)	Inrush current peak (A)	Inrush current width (ms)
Xitanium 17W 0.3-0.7A 24V I 230V	32	8.4	0.352
Xitanium 25W 0.3-0.7A 36V I 230V	32	8.4	0.352
Xitanium 17W 0.3-0.7A 24V TE/I 230V	74	3.3	0.11
Xitanium 25W 0.3-0.7A 36V TE/I 230V	44	6	0.16
Xitanium 25W 0.3-1A 36V TD/I 230V	28	16	0.22
Xitanium 25W 0.3-1A 36V TD/Is 230V	28	16	0.22
Xitanium 45W 0.2-0.7A 80V I 230V	12	48	0.18
Xitanium 50W 0.3-1A 62V 230V	14	22.2	0.37
Xitanium 50W SH 0.3-1A 62V I 230V	14	22.2	0.37
Xitanium 50W/s 0.3-1A 62V 230V	14	22.2	0.37
Xitanium 50W 0.3-1A 62V TD/TE 230V	30	4	0.8
Xitanium 50W LH 0.3-1A 62V TD/TE/I 230V	30	4	0.8
Xitanium 50W SH 0.3-1A 62V TD/TE/I 230V	30	4	0.8
Xitanium 75W SH 0.3-1A 110V I 230V	12	16	0.56
Xitanium 75W/0.2-0.4A 200V TD 230V	20	5	1
Fortimo LED driver 1100-2000	12	48	0.18
Fortimo LED driver 1100-2000/I	12	48	0.18
Fortimo LED driver 1100-2000 TD	12	48	0.18
Fortimo LED driver 1100-2000 TD/I	12	48	0.18

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

MCB type	Rating	Relative number of LED drivers
B	16A	100% (see table)
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%

Notes:

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

Mains voltage fluctuations

The driver is able to withstand high and low mains voltages for limited periods of time.

Low mains voltage

A continuous low AC voltage (<198V) can have an adverse effect on the driver's lifetime. The output power will be limited accordingly. A low voltage will not cause the driver to fail over a maximum period of 48 hours at minimum operating AC voltage and maximum ballast ambient temperature.

High mains voltage

A high mains voltage will stress the driver and have an adverse effect on its lifetime (maximum of 264-320 V for a period of 48 hours, 321-350 V for a period of two hours).

DC/Emergency operation

Depending on the Xitanium LED driver type they are released in compliance with IEC 61347-2-3 Part J or IEC 61347-2-7 lamp control gear standards. As a result these drivers are suitable for emergency luminaires in compliance with IEC 60598-2-22, excluding high-risk task areas.

Temperature design

Introduction

This chapter describes two aspects of the thermal design of the Xitanium/Fortimo LED drivers:

1. The LED driver itself and relationship between Tc point and lifetime of the LED driver
2. Temperature derating function to ensure lifetime of LED module/PCB.

Lifetime

The lifetime of LED drivers depends on the temperature during operation. This means there is a relationship between the Tc point on the LED driver and its lifetime. Fortimo and Xitanium LED drivers have a specified lifetime of 50,000 hours with a maximum of 10% failure guaranteed at the specified measured Tcase.

NTC (Negative Temperature Coefficient) temperature derating

NTC and thermal design

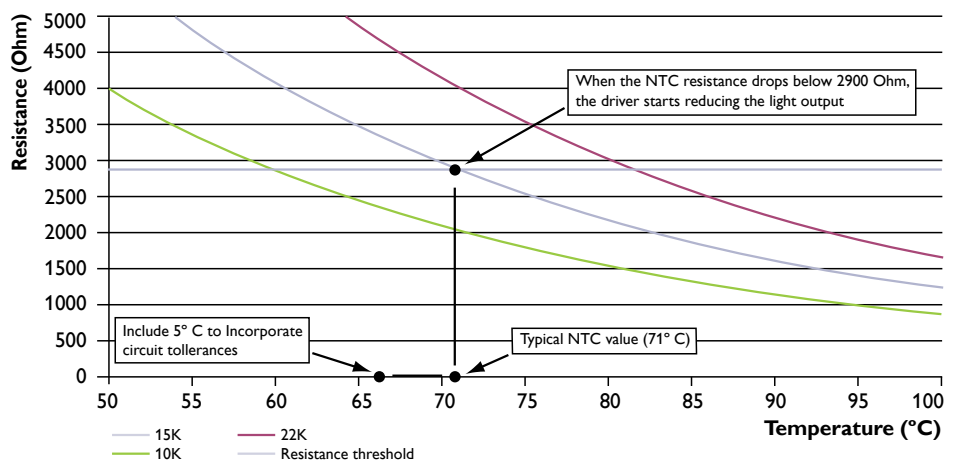
The thermal design of an LED module/PCB should be designed in such a way that the critical temperature (Tc) is not reached under normal application conditions.

The purpose of the NTC is to assure the lifetime of the LED module/PCB if external thermal influences result in the critical temperature being exceeded. If the temperature of an LED module/PCB exceeds its critical temperature the light output will be regulated to remain below the critical temperature.

Setting the customized thermal derating threshold via NTC

The LED driver will start regulating the light output when the NTC reaches a value of 2900 Ω. The NTC should be selected such that 2900 Ω represents the desired critical temperature inside your LED module/PCB. For example: The Fortimo LED DLM has a defined Tc life at 65° C. Taking the tolerances of the NTC into account results in ±5° C. This gives a typical value for the NTC of 71 ±5° C. To match 2900 Ω at this temperature, the NTC from Vishay 15 K Ω ±2% (2381 615 54153) has been selected (see graph).

NTC resistance as function of temperature



Controllability

Control characteristics

Control input

Regulating level (lamp power)	10 to 100%	The control input complies with EN 60929 (Annex E) and is compatible with Philips Lighting control equipment
Standby power consumption	< 375 mW	
Control input insulation, basic	≥ 1500 V AC	

Option 1. DALI

Digital coded input signal in compliance with the “Digital Addressable Lighting Interface” protocol, including up to 16 presets and 64 addresses.

Option 2. Touch and DIM

A short push of the button represents the on/off command. Personal light levels can be set by a firm, longer push of the button. The failure-proof (non-volatile) memory ensures that the driver always retains your setting when it is switched back on again or in the event of a power cut.

Maximum number of drivers	28 pcs connected in one circuit (switched on by one or multiple switches)
Polarity-free mains input signal	Retractive push-to-make switch
Ignore status: < 0.04 seconds	To prevent reaction to mains spikes
Short push of button: between 0.04 and 0.5 seconds	Switch on/off
Long push of button: between 0.5 and 10 seconds	Dim up/down
Reset push of button: > 10 seconds	Set light to mid value (35% output)

Notes

1. The dim direction will toggle after each individual push of the button. It will always dim up, except when the value is lower than 10%, and it will always dim down when the light output is higher than 70% in order to perform in accordance with human perception.
2. First digital regulating steps (DALI) are fixed at 1% light output (dimming specification).

Recommended dimmer list for trailing edge (TE) dimming types

- Busch-Jaeger: 6513U-102
- Jung Licht-Management: 225T DE
- Siemens: 5TC8 284
- PEHA Tronic-Dimmer: 433 HAB
- Wuyun: W13-C 162
- Everflourish: EFE700D

Compliance and approval

Generated disturbances and EMI

CISPR15 ed 7.2 2009 Conducted EMI 9 kHz-30 MHz

CISPR15 ed 7.2 2009 Radiated EMI 30 MHz-300 MHz

EN 55015 Amendment A2

IEC 61000-3-2 ed 3.0 + A1 + A2

IEC 61000-3-3 ed 2 2008

Immunity

IEC 61547 ed 2 2009, IEC 61000-4-2 ed1.2: 2001

IEC 61000-4-3 ed 3.0 + A1 IEC 61000-4-4 ed2.0

IEC 61000-4-5 ed 2.0 IEC 61000-4-6 ed 2.2

IEC 61000-4-11 ed 2

Performance

IEC 62384

Safety standards

IEC 61347-1 (Lamp control gear Part 1: General and safety requirements)

IEC 61347-2-13 (Lamp control gear Part 2: Specific LED requirements for AC or DC supplied electronic control gear for LED modules)

IEC 60598 (Class II / SELV output)

Emergency standards

IEC 61347-2-3 Part J (Particular additional safety requirement for AC/DC supplied electronic ballasts for emergency lighting)

IEC 61347-2-7 (Particular requirement for DC supplied electronic ballasts for emergency lighting)

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Abbreviations

AWG	American Wire Gauge
CISPR	Comité International Spécial des Perturbations Radioélectriques (Special International Committee on Radio Interference)
CRS	Customer Requirements Specification
CSA	Canadian Standards Association
EC	European Community
EMC	Electromagnetic Compatibility
EP	European Parliament
FCC	Federal Communications Commission
FR	Flame Retardant
IEC	International Electrotechnical Commission
IP	Ingress Protection
ISO	Organisation Internationale de Normalisation (International Organization for Standardization)
LED	Light Emitting Diode
NTC	Negative Temperature Coefficient
PCB	Printed Circuit Board
PCE	Power Conversion Efficiency
RF	Radio Frequency
RoHS	Restriction of Hazardous Substances
RTI	Relative Temperature Index
SDCM	Standard Deviation of Color Matching
SLM	Spot Lighting Module
T _c	Case temperature; at center of back of module
TIM	Thermal Interface Material
UL	Underwriters Laboratories

For more information please visit:

www.philips.com/fortimo

www.philips.com/xitanium



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Document order number: 3222 635 ?????
06/2011