

# Driving LED outdoor applications

**Xitanium Constant Currents Xtreme LED drivers** – for reliable and flexible LED outdoor lighting solutions



# PHILIPS

Long-lasting and low maintenance, LED-based light sources are an excellent solution for outdoor environments. For optimal performance, LED luminaires require reliable drivers which match the long lifetime of the LEDs. The Xitanium Constant Current (CC) Xtreme LED drivers are specifically designed to operate LED solutions in outdoor lighting applications, offering operating efficiencies up to 93% and rugged Xtreme construction.

Philips Xitanium CC Xtreme LED drivers provide constant current output, optimal for a single string of LEDs. The step adjustable output current models enable flexibility in LED fixture design. With exceptional operating efficiency, our drivers significantly reduce energy costs. The remarkable energy savings and CO<sub>2</sub> reductions achieved with LED lighting solutions can be further extended via dimming. The Xitanium portfolio offers both central and stand-alone dimming protocols. For even greater design freedom, the fully programmable driver delivers all dimming options and a range of currents in a single driver.

The products have exceptionally tough construction, facilitating durable luminaire design. All Xitanium Xtreme drivers are designed on the Xtreme LED platform, offering a long-lasting solution with robust protection against a wide range of temperatures, moisture and vibrations. The reliability of the luminaire is further extended with intelligent temperature monitoring. The full portfolio offers maximum flexibility with customizable LED current and temperature control settings, delivering optimal performance in different application designs.

#### Benefits

- Peace of mind on product performance
- Luminaire lifetime reliability with automatic dimming at critical temperature levels
- Design flexibility: one driver can be programmed for different luminaire designs - choose the current that is optimal for your LED PCB
- Improved logistics
- Future-proof, prepared for LED efficacy upgrades
- Additional energy savings through dimming

#### Features

- Adjustable output current
- Xtreme standard: long lifetime, robust protection against moisture, vibration and temperature extremes
- Module Temperature Protection
- Multiple dimming protocols

#### Applications

- Residential areas
- Street and road lighting
- Tunnels
- Under-canopy lighting
- Parking lots
- Architectural illumination

#### Compliances and approvals

Generated disturbances and EMI

- CISPR15 ed7.2: 2009
- EN 55015:2006 +A1:2007 +A2:2009
- IEC 61000-3-2 ed3.2: 2009
- EN 61000-3-2:2006 +A1:2009 +A2:2009
- IEC 61000-3-3 ed2.0: 2008
- EN 61000-3-3:2008

#### Immunity

IEC 61547 ed2: 2009, EN 61547:2009

#### Applied basic standards

European Standard	IEC
EN 61000-4-2:2009	IEC 61000-4-2:2008
EN 61000-4-3:2006	IEC 61000-4-3:2006
EN 61000-4-4:2004	IEC 61000-4-4:2004
EN 61000-4-5:2006	IEC 61000-4-5:2005
EN 61000-4-6:2009	IEC 61000-4-6:2008
EN 61000-4-8:1993	IEC 61000-4-8:1993
EN 61000-4-11:2004	IEC 61000-4-11:2004

#### Performance

- IEC 62384 ed1.0: 2006
- EN 62384:2006

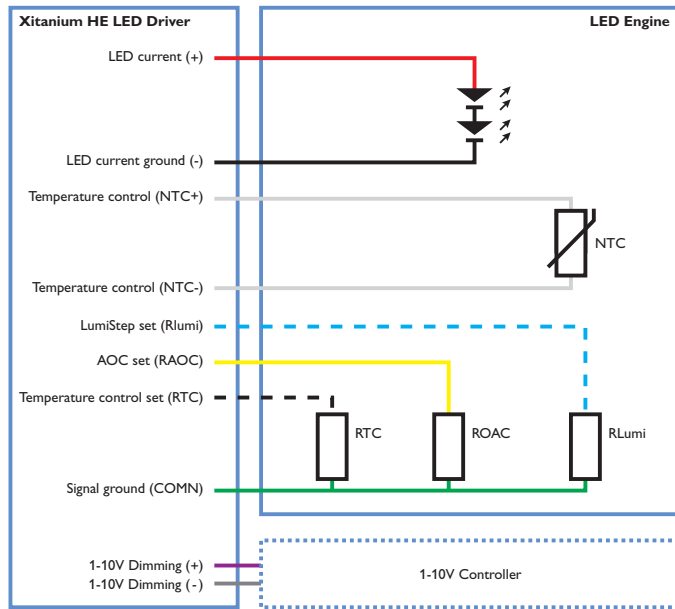
#### Safety standards

- IEC 61347-1 ed2.0: 2007; EN 61347:2008 (Lamp control gear Part 1: General and safety requirements)
- IIEC 61347-2-13 ed1.0: 2006; EN 61347-2-13:2006 (Lamp control gear Part 2-13: Particular requirements for DC or AC supplied electronic control gear for LED modules)

## Customizing Xitanium sAOC LED drivers

Xitanium LED drivers with sAOC functionality have multiple settings options. By placing a specific resistor between the appropriate wires, various output current and stand-alone dimming options can be set. Please refer to the schematic block diagram and table for details.

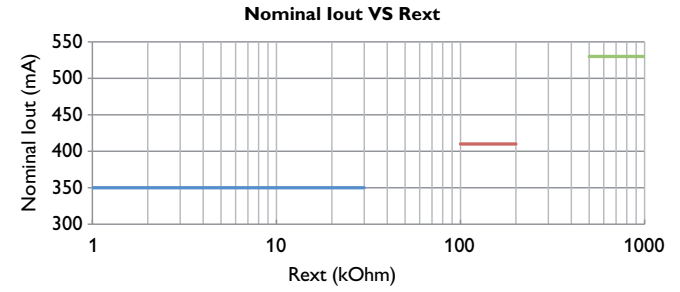
### Schematic block diagram



Note : do not connect Signal ground and LED current ground on LED engine

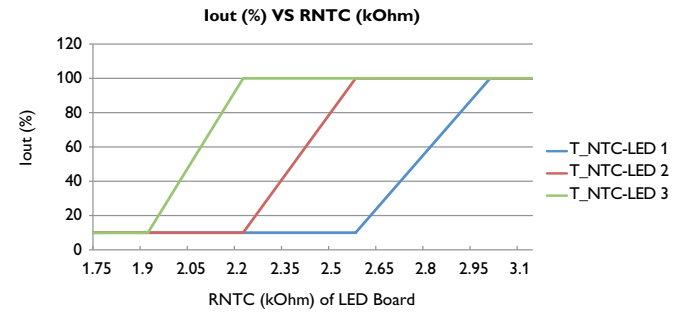
### Step Adjustable Output (sAOC) Settings:

<b>RAOC</b>	Short (or <30k)	100 - 200 kOhms	Open (or > 500 kOhms)
<b>Nominal Current (Iout)</b>	350 mA	410 mA	530 mA



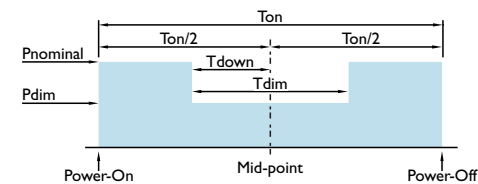
### Temperature Profile Settings:

<b>RTC</b>	Short (or <30k)	100 - 200 kOhms	Open (or > 500 kOhms)
<b>TC Profile</b>	Profile 2	Profile 1	Profile 0
<b>Trange</b>	70-75 C	65-70 C	60-65 C



### LumiStep Profile Settings:

Rlumi	LumiStep Profile	Dim Level (%)	T-dim (hrs)	T-down (hrs)	After Midpoint (hrs)
Short (or < 30 k)	Profile 1	50	6	2	4
100 - 200 k/Ohms	Profile 2	66	6	0	6
Open (or > 500 k/Ohms)	Profile 3	50	8	2	6



### Module Temperature Control and thermal design

The LED driver will start reducing the light output when the LEDs approach a critical temperature. The temperature is measured via a sensor (NTC) placed on the PCB. The level at which the driver begins dimming is defined by the Temperature Profile Settings table.

### Design flexibility with Adjustable Output Current

Xitanium LED drivers with sAOC functionality provide a choice of 3 different currents: 350, 410 and 530 mA. This enables greater flexibility in luminaire design, since the same LED driver form-factor can be used to deliver greater current output, providing a future-proof solution. The output current is selected by placing a specific resistor between

the AOC set (ROAC) and Signal ground (COMN) wires. Please refer to the schematic diagram and Step Adjustable Output Current Settings table above.

### LumiStep and energy savings with dimming

In addition to optimizing performance with multiple output current options and extending luminaire life with thermal monitoring, certain Xitanium drivers offer the option of dimming via integrated LumiStep protocols. Dimming delivers additional energy savings, reduces CO<sub>2</sub> impact, and improves quality of life for residents by minimizing spill-over light pollution. LumiStep provides 3 dimming protocols, all centered around the night mid-point.

## Product specifications

Type	Output current range (mA)	Output voltage range (V)	Output power (W)	Type of dimming	Dimming range (%)	Module Temperature Protection	Efficiency range, max load (%)	Input voltage range (Vac)	Inrush current peak (A)	Inrush current width to 50% (µs)	Power factor, 100% load	Power factor, dimmed 50%	Tc life (°C)	Lifetime @Tc life, 90% survivals <sup>1</sup> (hrs)
<b>Single output current</b>														
Xtitanium 150W 0.35A 230V sXt	350	120-425	42-150	n.a.	n.a.	no	92	220-240	130	165	0.98	0.96	67	80,000
Xtitanium 150W 0.70A 230V sXt	700	60-210	42-150	n.a.	n.a.	no	92	220-240	130	165	0.98	0.96	67	80,000
<b>Single output current with 1-10V dimming</b>														
Xtitanium 75W 0.70A 1-10V 230V sXt	700	30-107	21-75	1-10V	100-10	no	92	220-240	106	160	0.98	0.93	67	80,000
Xtitanium 150W 0.70A 1-10V 230V sXt	700	60-210	42-150	1-10V	100-10	no	92	220-240	130	165	0.98	0.96	67	80,000
Xtitanium 150W 1.05A 1-10V 230V sXt	1050	40 - 140	42 -150	1-10V	100-10	no	92	120-277	105	160	0.98	0.96	67	80,000
<b>Step AOC with 1-10V dimming</b>														
Xtitanium 150W .35/.41/.53A 1-10V 230V sXt	350/410/530	115-280	42-150	1-10V	100-10	yes	92	220-240	130	140	0.99	0.97	67	80,000
<b>Step AOC with LumiStep dimming</b>														
Xtitanium 75W .35/.41/.53A LS 230V sXt	350/410/530	60-140	21-75	LumiStep	100-50	yes	92	220-240	130	140	0.99	0.98	67	80,000
Xtitanium 150W .35/.41/.53A LS 230V sXt	350/410/530	115-280	42-150	LumiStep	100-50	yes	92	220-240	130	140	0.99	0.97	67	80,000
<b>AOC with 1-10V dimming</b>														
Xtitanium 75W 0.53A AOCM 1-10V 230V-Y sXt	100-530	71-142	20-75	1-10V	100-10	yes	92	220-240	82	100	0.98	0.95	69	100,000
Xtitanium 75W 0.7A AOCM 1-10V GL-Y sXt	100-700	54-107	20-75	1-10V	100-10	yes	92	120-277	70	120	0.98	0.96	72	100,000
<b>Programmable</b>														
Xtitanium 27W 1.0A Prog 230V-J sXt	100-1000	10-38	5-27	LineSwitch DALI/ Dynadimmer	100-10	yes	85	220-240	28	150	0.98	0.96	72	100,000
Xtitanium 40W 0.53A Prog+ GL-J sXt	100-530	38-77	15-40	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	88	120-277	65	100	0.96	0.92	74	100,000
Xtitanium 40W 0.7A Prog+ GL-J sXt	100-700	29-57	15-40	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	88	120-277	65	100	0.97	0.93	74	100,000
Xtitanium 40W 0.7A Prog 230V-J sXt	100-700	20-77	8-40	LineSwitch DALI/ Dynadimmer	100-10	yes	88	220-240	27	150	0.98	0.97	74	100,000
Xtitanium 75W 0.7A Prog+ GL-Z sXt	100-700	54-107	25-75	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	90	120-277	80	150	0.97	0.93	68	100,000
Xtitanium 75W 0.35-0.7A GL Prog sXt	350-700	80-152	30-75	1-10 V/DALI/ Dynadimmer	100-10	yes	92	120-277	108	140	0.97	0.92	71	100,000
Xtitanium 75W 0.7A Prog+ 230V-F sXt	100-700	50-150	15-75	1-10 V/AmpDim DALI/ Dynadimmer/DCemDIM	100-10	yes	90	220-240	64	190	0.98	0.96	72	100,000
Xtitanium 75W 1.05A Prog+ GL-F sXt	100-1050	36-75	25-75	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	90	120-277	100	160	0.97	0.94	70	100,000
Xtitanium 100W 0.53A Prog+ GL-Z sXt	100-530	94-189	35-100	1-10 V/DALI/ Dynadimmer	100-10	yes	92	120-277	80	150	0.97	0.94	66	100,000
Xtitanium 100W 0.7A Prog+ GL-Z sXt	100-700	71-143	35-100	1-10 V/DALI/ Dynadimmer	100-10	yes	92	120-277	80	150	0.97	0.94	69	100,000
Xtitanium 150W 0.20-0.35A Prog+ GL-H sXt	200-350	212-425	30-150	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	93	120-277	118	140	0.98	0.94	70	100,000
Xtitanium 150W 0.70A Prog+ 230V-H sXt	100-700	125-280	50-150	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	92	220-240	125	115	0.98	0.95	67	100,000
Xtitanium 150W 0.35-0.7A GL Prog sXt	350-700	125-280	30-150	1-10 V/DALI/ Dynadimmer	100-10	yes	93	120-277	108	140	0.97	0.94	71	100,000
Xtitanium 150W 0.70A Prog+ 230V-F sXt	100-700	90-280	45-150	1-10 V/AmpDim DALI/ Dynadimmer/DCemDIM	100-10	yes	92	220-240	70	190	0.98	0.96	72	100,000
Xtitanium 150W 1.05A Prog+ GL-F sXt	100-1050	70-148	30-150	1-10 V/AmpDim/ DALI/Dynadimmer	100-10	yes	92	120-277	110	150	0.98	0.95	70	100,000
Xtitanium 300W 1.5A Prog+ GL-R sXt	350-1500	80-280	90-300	1-10 V/DALI/ Dynadimmer/ AmpDim	100-10	yes	93	120-277	170	220	0.98	0.95	64	100,000

<sup>1</sup> Result of minimum 90% survivals based on MTBF modeling. Ongoing field testing indicates much higher survival rates for the same duration under normal conditions.

## General product characteristics

Rated frequency : 50/60 Hz

THD : 20%

Isolation class : Class II

T ambient : -40 to +55°C

## Programming note

Xitanium Programmable LED drivers are shipped from factory with the following default settings:

Adjustable Output Current	: See datasheet	Over The Life indicator	: Disabled
Module Thermal Protection	: Enabled (NTC2-15 k+390 Ohm)	Dimming Interface Selection	: 1-10V (exception 27W: LineSwitch)
Adjustable Startup Time	: 1000 ms	Constant Light Output	: Disabled

For complete details, please refer to the Design-in Guide.

## External RSET (where applicable)

Factory default setting enables customization of the output current without the programming interface, offering choices in a continuous range specified for each driver. The current value is determined by placing a specific resistor between the AOC set (RSET1 or RSET2) and Signal ground (COMN) wires. Please refer to the Datasheet for full range of values.

## Technical Notes

### Isolation

For easy Class II system design, the isolation layer implemented towards housing is always double, so it is allowed to connect the metal casing directly to the luminaire.

### Lighting protection

Although all Xitanium Xtreme LED drivers have built-in surge protection of up to 4 kV, we advise all customers to install transient voltage surge suppression to prevent possible damage to the luminaire as a result of high surges (e. g. lightning strokes). The Philips Surge Protector is the ideal solution to the challenge of using LEDs in Outdoor lighting. The SPD clamps the voltage at the terminals of the luminaire, protecting the complete system against several nominal surges of up to 10 kV / 5 kA. For maximum-level of protection, the SPD can withstand a single hit of 10 kV /10 kA. The device also eliminates the need for all luminaire internal components – wires, connectors, wire nuts, etc. – to be designed to withstand 10 kV.

For more information, please contact your sales representative, or visit [www.philips.com/surgeprotection](http://www.philips.com/surgeprotection)

## Ordering & packing data

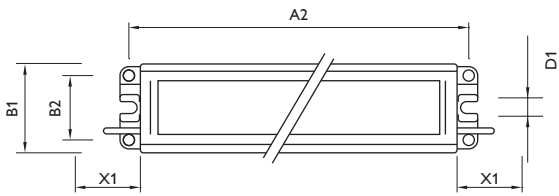
Type	Qty. box packing (pcs)	EOC	GPC
Xitanium 150W 0.35A 230V sXt	10	8727900 801330 00	9137 108 50002
Xitanium 150W 0.70A 230V sXt	10	8727900 809176 00	9137 108 59002
Xitanium 75W 0.70A 1-10V 230V sXt	10	8718291 150619 00	9290 007 05503
Xitanium 150W 0.35A 1-10V 230V sXt	10	8727900 928822 00	9137 012 18202
Xitanium 150W 0.70A 1-10V 230V sXt	10	8718291 150084 00	9137 012 11603
Xitanium 150W 1.05A 1-10V 230V sXt	10	8718291 123439 00	9290 007 04712
Xitanium 75W .35/.41/.53A LS 230V sXt	10	8727900 924923 00	9137 012 15102
Xitanium 150W .35/.41/.53A 1-10V 230V sXt	10	8727900 924930 00	9137 012 15302
Xitanium 150W .35/.41/.53A LS 230V sXt	10	8727900 924947 00	9137 012 15402
Xitanium 75W 0.53A AOCM 1-10V 230V-Y sXt	10	8718291 691532 00	9290 007 12403
Xitanium 75W 0.7A AOCM 1-10V GL-Y sXt	12	8718291 220534 00	9290 007 08003
Xitanium 27W 1.0A Prog 230V-J sXt	12	8718291 707295 00	9290 007 12303
Xitanium 40W 0.53A Prog+ GL-J sXt	12	8718291 245056 00	9290 007 10303
Xitanium 40W 0.7A Prog+ GL-J sXt	12	8718291 245032 00	9290 007 08803
Xitanium 75W 0.7A Prog+ GL-Z sXt	12	8718291 245155 00	9290 007 10103
Xitanium 75W 0.35-0.7A GL Prog sXt	10	8718291 118879 00	9290 007 02302
Xitanium 75W 0.35-0.7A GL Prog+ sXt	10	8718291 149958 00	9290 007 04903
Xitanium 75W 0.7A Prog+ 230V-F sXt	10	8718291 765653 00	9290 007 18903
Xitanium 75W 1.05A Prog+ GL-F sXt	10	8718291 212003 00	9290 007 08903
Xitanium 100W 0.53A Prog+ GL-Z sXt	12	8718291 245179 00	9290 007 10403
Xitanium 100W 0.7A Prog+ GL-Z sXt	12	8718291 24519 300	9290 007 08703
Xitanium 150W 0.20-0.35A Prog+ GL-H sXt	6	8718291 183686 00	9290 007 07503
Xitanium 150W 0.70A Prog+ 230V-H sXt	6	8718291 230458 00	9290 007 10503
Xitanium 150W 0.35-0.7A GL Prog sXt	10	8727900 783513 00	9290 007 02202
Xitanium 150W 0.35-0.7A GL Prog+ sXt	10	8718291 149965 00	9290 007 05103
Xitanium 150W 0.70A Prog+ 230V-F sXt	10	8718291 765639 00	9290 007 12503
Xitanium 150W 1.05A Prog+ GL-F sXt	10	8718291 211983 00	9290 007 09003
Xitanium 300W 1.5A Prog+ GL-R sXt	4	8718696 436783 00	9290 007 12703

LS : LumiStep

Prog : Programmable

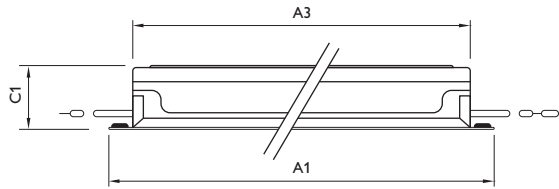
sXt : start Xtreme protection (excl. lightning)

**Dimensions F-can (typical data; ± 2 mm)**



A1	A2	A3	B1	B2	C1	D1	X1
240.5	226.2	211.1	59.1	42.9	37.1	8	500

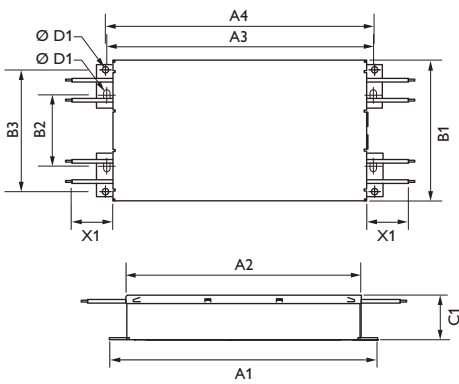
- Xtitanium 150 W Fixed
- Xtitanium 75 W / 150 W 1-10 V
- Xtitanium 150 W sAOC+1-10 V
- Xtitanium 75 W / 150 W sAOC+LS
- Xtitanium 75 W / 150 W Programmable



**Dimensions Y-can (typical data; ± 2 mm)**

A1	A2	A3	B1	B2	C1	D1	X1
167.5	151.6	138.1	59.1	42.9	37.7	8	500

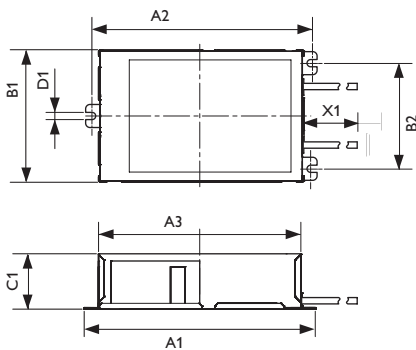
- Xtitanium 75 W AOCM



**Dimensions R-can (typical data; ± 2 mm)**

A1	A2	A3	A4	B1	B2	B3	C1	D1
240.50	213.87	224.62	226.22	118.26	63.8 / 55.8	102.7	37.61	4.8

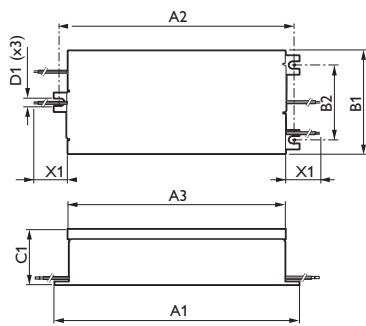
- Xtitanium 300 W Programmable



**Dimensions H-can (typical data; ± 2 mm)**

A1	A2	A3	B1	B2	C1	D1	X1
160.5	151.5	141.2	89.2	73.0	38.8	5.0	400

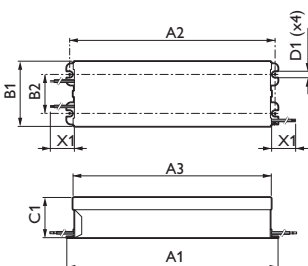
- Xtitanium 150 W Programmable



**Dimensions Z-can (typical data; ± 2 mm)**

A1	A2	A3	B1	B2	C1	D1	X1
165.0	155.0	147.4	70.0	50.0	38.0	6	275

- Xtitanium 75 W Programmable
- Xtitanium 100 W Programmable



**Dimensions J-can (typical data; ± 2 mm)**

A1	A2	A3	B1	B2	C1	D1	X1
148.2	144.2	139.3	45.6	27.4	28.3	5	275

- Xtitanium 27W / 40 W Programmable

### **Customizing Xitanium Programmable LED drivers**

The Xitanium Programmable LED drivers offer a unique level of flexibility, with a large number of options which can be customized for an optimal solution in each and every luminaire design. Luminaire creators are able to streamline logistics without compromising on performance. Programming requires the Philips MultiOne programming interface between your computer and the programming wires on the driver. To request the MultiOne, please contact your Philips sales representative.

### **Design freedom**

Programmable drivers offer a broad output current range which can be set to perfectly suit each luminaire. This feature will accommodate the inevitable improvements in LED efficacy, removing the need to design-in a new LED driver every 6 months.

### **Optimized energy use**

All lighting sources experience a reduction in light output over time. To ensure the minimum required light levels at lamp's end of life, most systems consume more power than necessary, wasting as much as 15% of energy on average during their lifetime. The Constant Light Output (CLO) functionality ensures that LEDs will always deliver the required light. By estimating the lumen depreciation, the driver can be programmed to gradually increase the current over the lifetime of the module, compensating for the reduction in light.

### **Fully flexible dimming**

Xitanium Programmable drivers offer a full range of dimming options, with both stand-alone (integrated Dynadimmer), cabinet-based (AmpDim and LineSwitch) and network-controlled (1-10V and DALI protocols). AmpDim functionality enables cabinet-controlled dimming down to 30% of light output. The DALI interface makes any installation with the Xitanium Programmable driver ready for a fully networked control system, meeting the growing demand for professionalization of municipal services.

### **Simplicity for the end user**

Even the most robust LED solutions eventually approach end of useful life. The luminaire manufacturer can program the End of Life (EOL) indicator function to signal that the LED module should be replaced. After the specified period, the driver will instruct the light engine to blink for 2.5 seconds on activation, and then resume normal luminaire operation.



**For more information, visit:**  
**[www.philips.com/Xitanium](http://www.philips.com/Xitanium)**

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