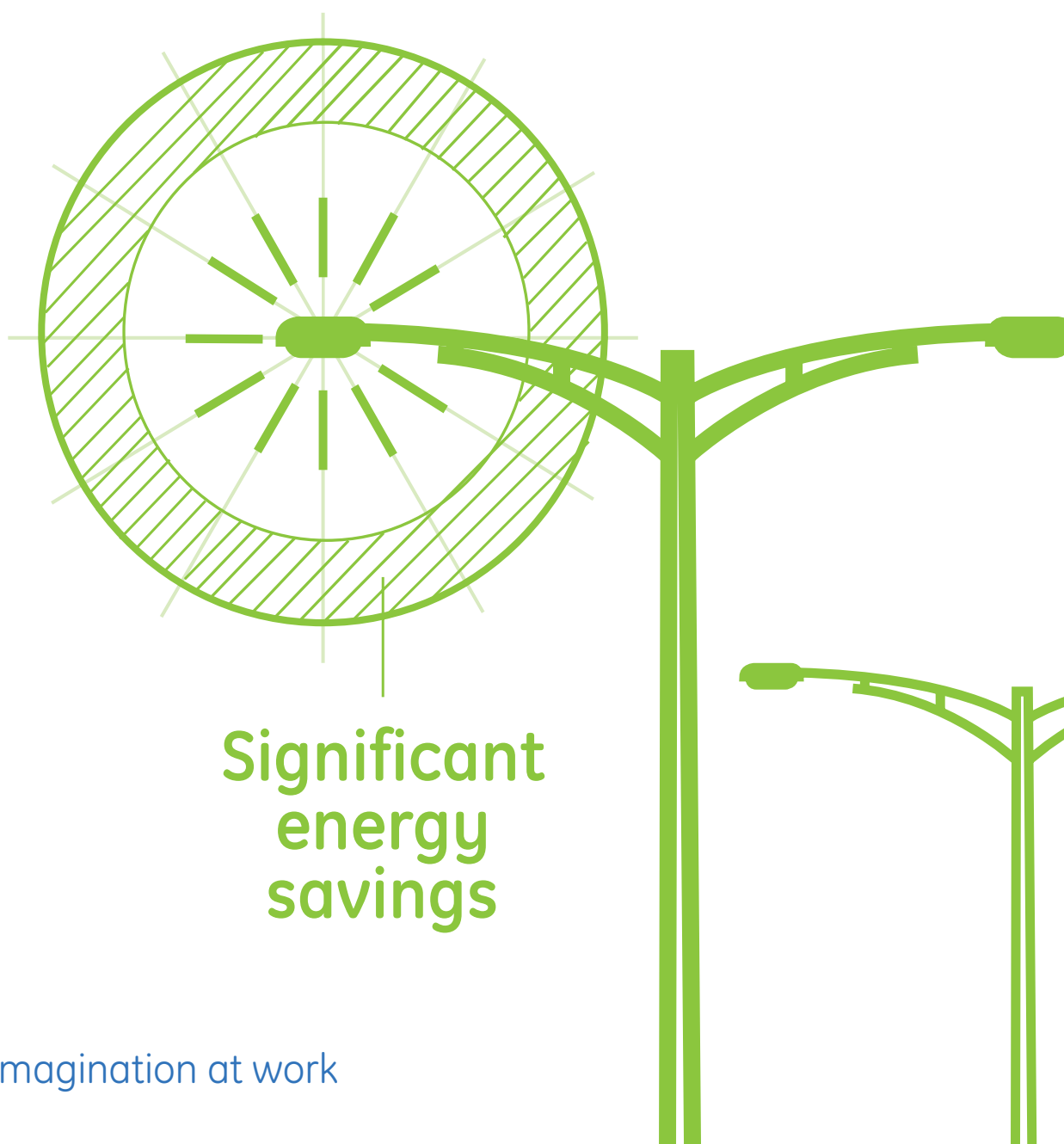


GradiLux™

Lighting dimmer-stabilizer
to control the power consumption

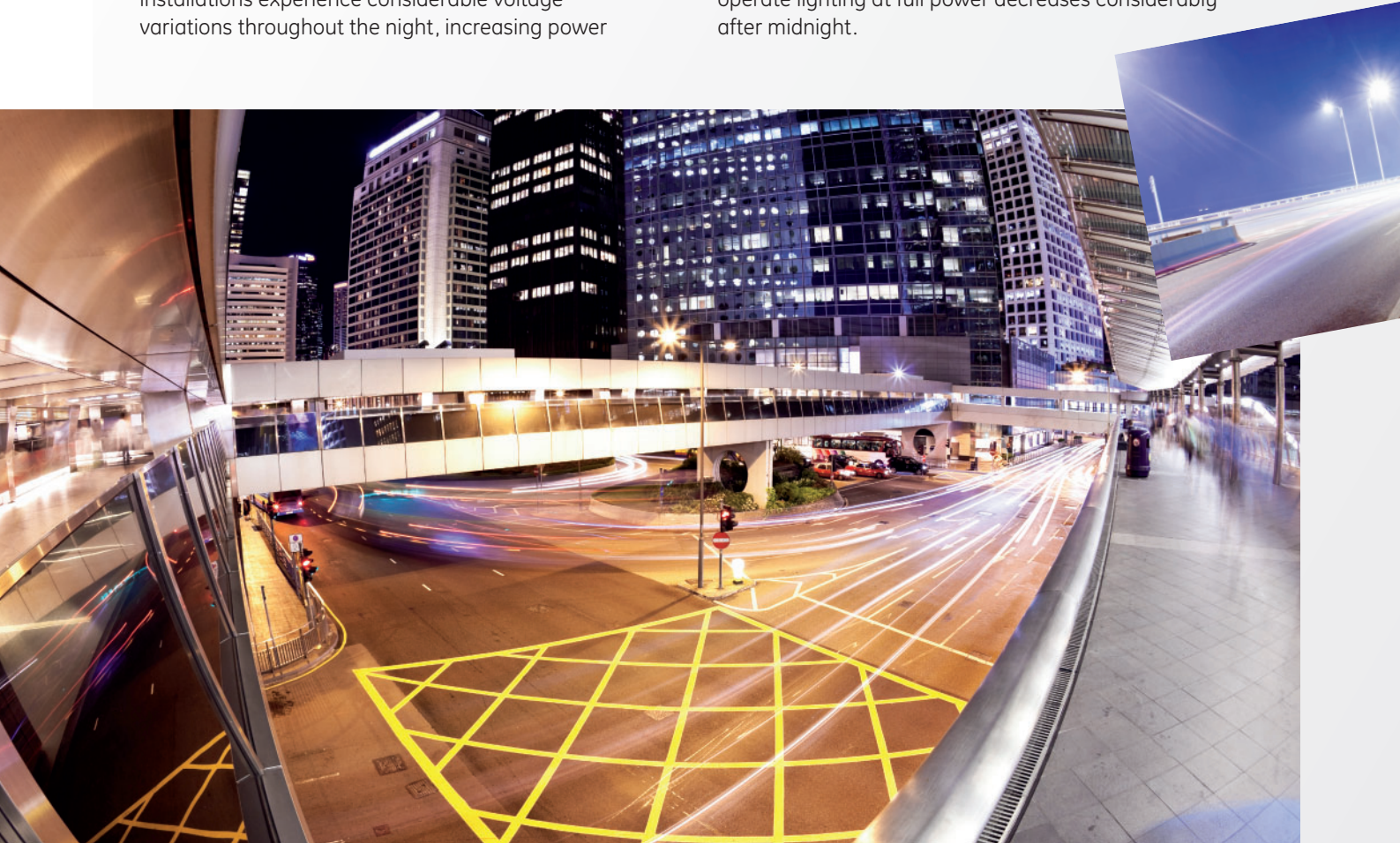


GE imagination at work

GradiLux™, reducing excessive power consumption

Public lighting installations operate at approximately 4000 annual hours, accounting for a major part of the municipal energy bill. These lighting installations experience considerable voltage variations throughout the night, increasing power

consumption and reducing lamp lifetime. Moreover, lighting levels are rarely adapted to vehicular traffic and pedestrians on public roads, even if the need to operate lighting at full power decreases considerably after midnight.



Minimize expenses while maintaining comfort

Controlling the energy consumption of lighting installations is essential to maximize efficiency and minimize expenses, while maintaining performance and comfort. The dimmer-stabilizer GradiLux uses state-of-the-art technology to achieve important reductions in consumption, resulting in faster payback and lower carbon emissions.



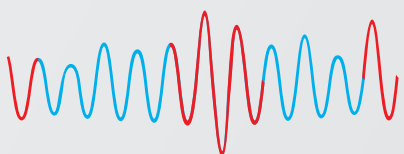


Ensuring the correct supply voltage

A high quality power supply is essential for the ability to save energy. The dimmer-stabilizer GradiLux ensures the correct supply voltage for lighting installations at all times, thus obtaining important reductions in both energy consumption as well as carbon emissions.

Stabilizing

Public lighting installations experience considerable voltage variations throughout the night. These voltage variations can be as high as 10%, increasing energy consumption by 21%. Stabilizing the light levels at nominal voltage results in substantial reductions of the energy consumption.



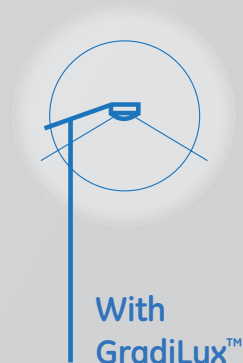
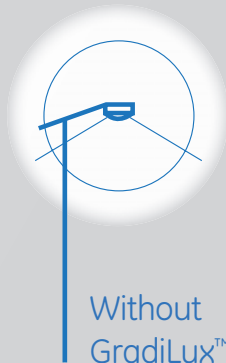
Without
GradiLux™



With
GradiLux™

Dimming

Public lighting installations generally maintain constant lighting levels throughout the night. Dimming the light levels after midnight, adapted to vehicular traffic and pedestrians on public roads, yields substantial savings in energy consumption.

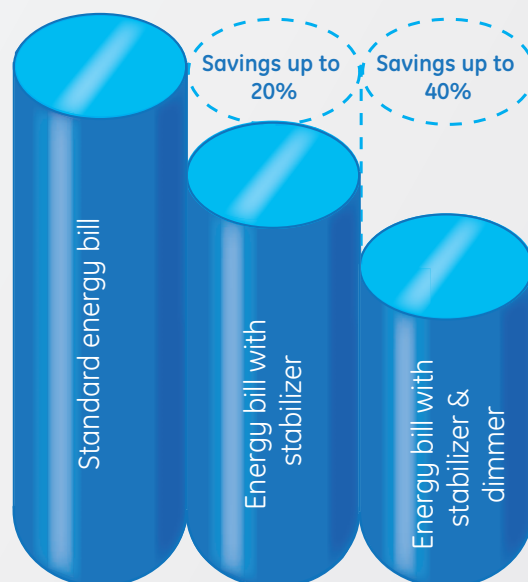




GradiLux™ benefits

The dimmer-stabilizer GradiLux reduces the energy consumption of lighting installations by dimming and stabilizing the light flow. GradiLux ensures the correct supply voltage for lighting installations at all times, thus obtaining important reductions in both energy consumption as well as carbon emissions.

- ☑ Minimize lighting expenses
- ☑ Maximize efficiency of lighting
- ☑ Save up to 40% on energy bill
- ☑ Reduce carbon emissions
- ☑ Achieve fast payback



The diagram illustrates the significant savings by using the dimmer-stabilizer GradiLux™.



Typical example

Assumptions:

- A city with 25000 inhabitants.
- An average of 1 lightpoint per 7 inhabitants, a total of 3600 lightpoints is required.
- These lightpoints are equipped with high pressure sodium lamps of 150W, resulting in a total installed power of 540kW.
- The average public lighting installation operates at approximately 4000 annual hours, dimming the voltage between 12pm and 6am.

Results:

Without GradiLux™	Consumption	Emissions
Operating at 230V with 10% overvoltage	2613 MWh	784 MTon

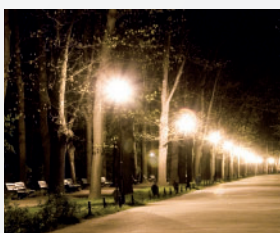
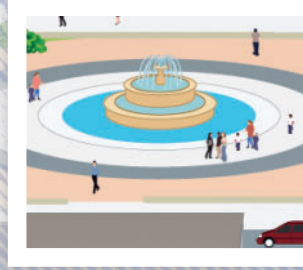
With GradiLux™	Consumption	Emissions	Savings
Stabilizing at 220V	1976 MWh	592 MTon	24%
Dimming at 180V	1618 MWh	485 MTon	14%
Total savings			38%

Total lighting solution for public and private applications

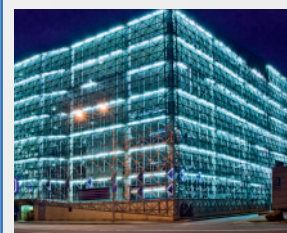
Airport



Tunnel

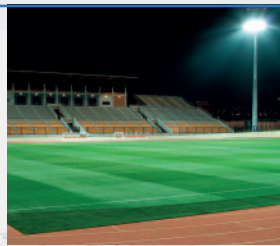


Park

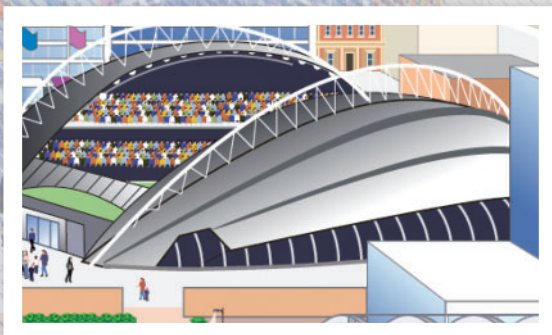


Car park

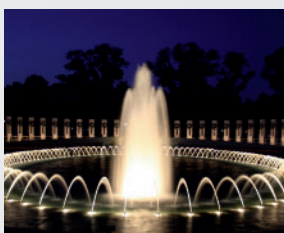
Sports arena



Harbour industry



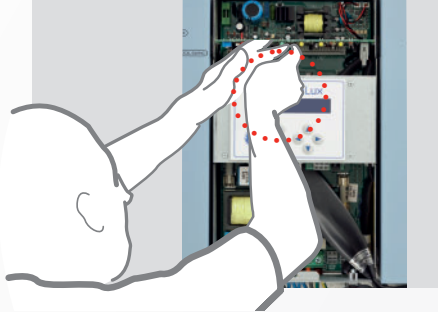
Fountain



Railway station

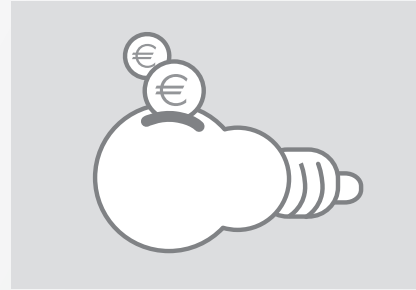


Why use GradiLux™?



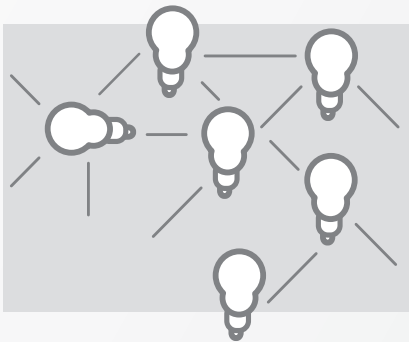
Simple installation

- Fast and simple upstream installation
- New and old installations
- Compact design with high power density



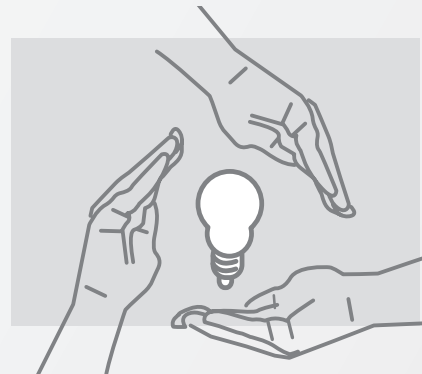
Fast payback

- Low maintenance costs
- Important savings in consumption
- Increased lamp lifetime



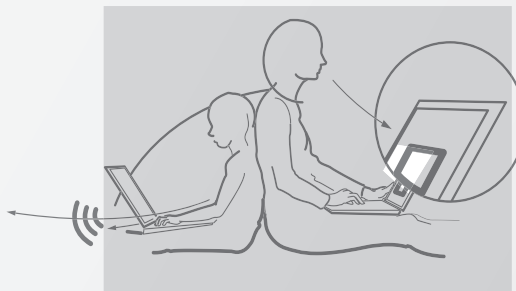
Versatile application

- Suitable for use of all type of lamps, except LED and lamps equipped with electronic ballast
- Available for wide range of power needs
- Stand-alone unit or modular unit



Safe and reliable

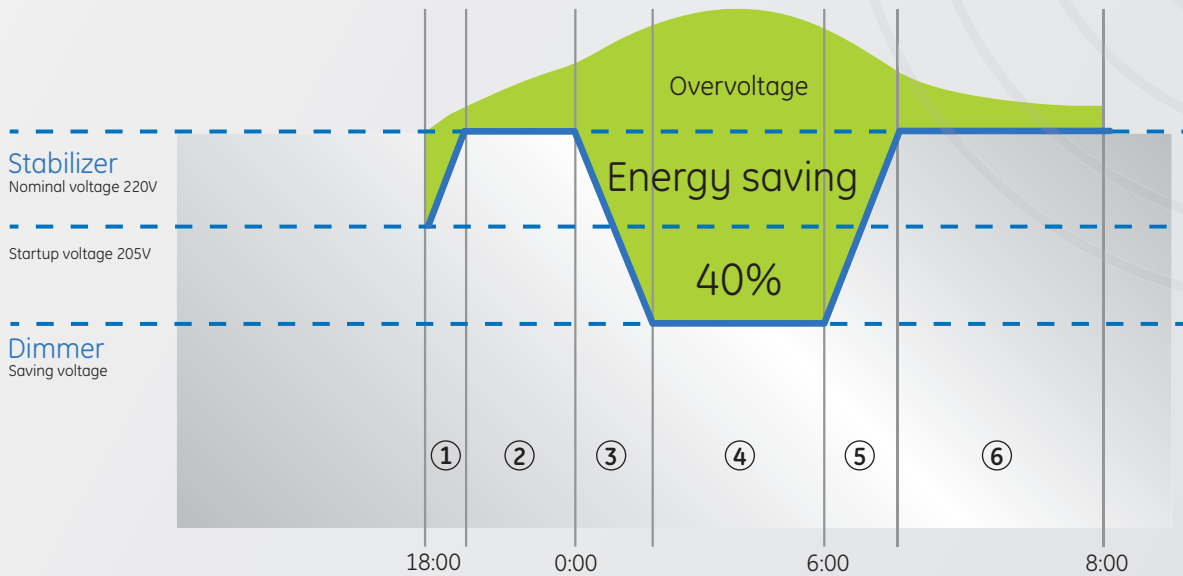
- State-of-the-art electronic technology
- Robust design with independent phases
- Automatic and manual bypass



Ease of use

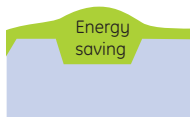
- Manual bypass option
- Remote monitoring and control
- Modular design

Principle



- ① **Progressive soft startup**, adapted to the warmup cycle of the lamps and avoiding initial overload.
- ② **Stabilization at nominal voltage**, with an accuracy of 1%, until the equipment initiates the saving mode of operation.
- ③ **Soft ramp down from nominal to saving voltage**. The maximum ramp speed is 6V per minute.
- ④ **Stabilization at saving voltage**, with an accuracy of 1%. The type of lamp determines the minimum saving voltage.
- ⑤ **Soft ramp up from saving to nominal voltage**. The maximum ramp speed is 6V per minute.
- ⑥ **Stabilization at nominal voltage**, with an accuracy of 1%, until the equipment is turned off.

Mode 0

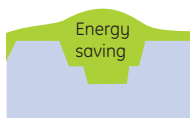


1 cycle - 1 saving voltage

- Parkings, industrial
- Airports, railways



Mode 1



1 cycle - 2 saving voltages

- Highways
- Cities



Mode 2



2 cycles - 1 saving voltage

- Tunnels



Recommended saving voltages

Type of lamp	Min. Voltage
High Pressure Sodium	180
Metal Halide	180
Low Pressure Sodium	190
Fluorescent	190
Mercury Vapor	200
Ceramic Metal Halide	205
Mixed lamps	205

- ✓ See datasheet of lamp manufacturers
- ✓ GradiLux cannot work with LED lamps and lamps equipped with electronic ballast

Low maintenance and easy to use

State-of-the-art technology

Design with 100% static electronic technology for direct and continuous AC/AC conversion. The absence of transformers and moving parts results in small size and low weight. The high power density thus simplifies integration with lighting installations.

Modular design

The modular power configuration significantly improves operation and maintenance of the equipment. Each lighting phase is regulated by an independent module, achieving total isolation of the lighting phases. Moreover, each module can be replaced separately in case of breakdown or maintenance interventions.

Reliable operation

The automatic and manual bypass ensures reliable operation of the lighting installation at all times. The automatic bypass, independent for each phase, provides protection with automatic reset against overloading, high temperatures and malfunction. The manual bypass allows for maintenance, while keeping the lighting installation operational.

Safe protection

Varistors at the input and output avoid transitory overloading, while EMI filters provide protection in compliance with EMC regulations. These components are protected by fuses for protection against prolonged overloading. An optional surge arrester is available.





Total control

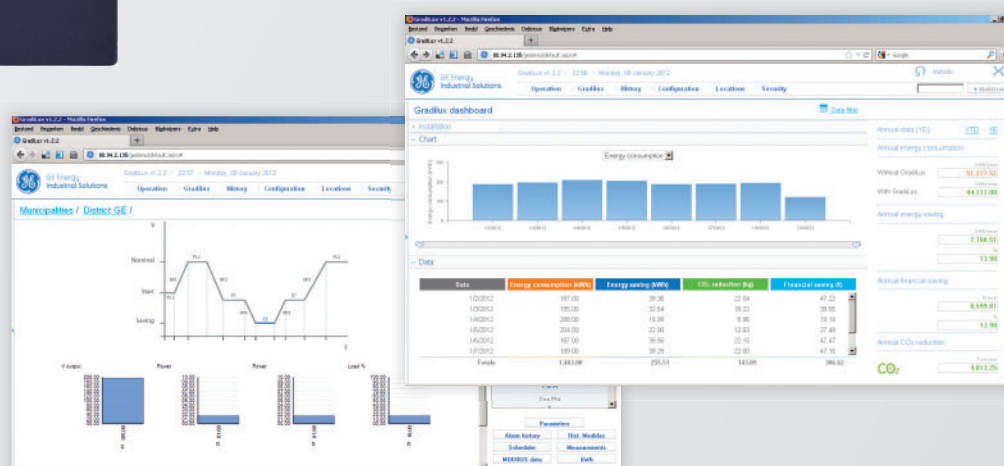
The display enables total control of the equipment with extended measuring accuracy, advanced data monitoring and parameter configuration. The serial MODBUS interface allows for easy integration with building management systems. General purpose digital inputs/outputs (I/O) complement the equipment for local control. The display provides complete on site configuration of the equipment.



Display control panel

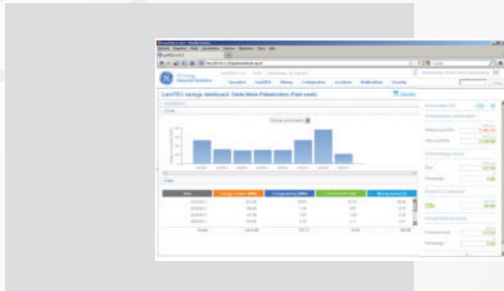
Remote management

The Ethernet communication card supports TCP/IP and SNMP protocols for easy web access, while the GPRS modem provides a wireless communication link to the web. The web portal for remote management includes features for remote control, configuration and diagnostics of the equipment fleet.



Communication

Remote control



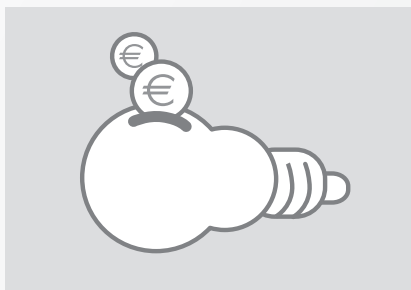
Dashboard

- Summary based on different data
- Reports about GradiLux community (different installations and cities)
- Visualise each GradiLux on detailed map or inside device tree
- Wide range of analysis options (daily/monthly/annual graphs, energy and CO₂ savings...)



Safety

- Secured webserver
- Control in safe environment via VPN
- Configuration of GradiLux community, define other users with monitoring and control access

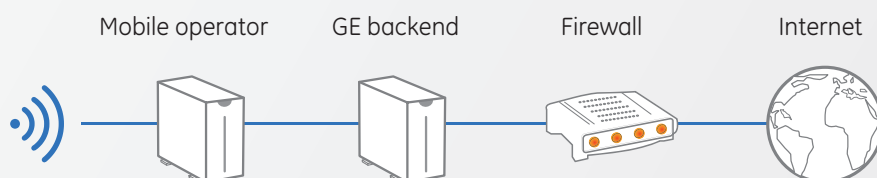


Savings

- Reduce maintenance costs by receiving alarms notifications
- Allows quick diagnostic on real time data from each GradiLux with status and measurement information

GradiLux

End user



Secured VPN GPRS connection

HTTPS Web browsing

GradiLux™ selection guide

On communication

1. Display version

Controller with display for local configuration and control.

- Display: local control and configuration.
- Including calendar and timer scheduling an astronomical clock and alarm log.
- Access to input and output voltages, active and apparent power, power factor, load and savings measurements.
- Communications port: RS232 with RJ45 connector for local MODBUS communication.

2. Web version

Includes additional communication features for remote configuration and control.

- ComiTEQ card or box: communication device, providing an Ethernet communication interface supporting TCP/IP & SNMP protocols for remote access from the web portal.
- Optional GPRS modem: communication device for wireless remote access from the web portal.
- Data logger function with 6000 data values, programmable from 1 second to 1 hour.
- Alarm log for 200 events.

3. I/O version

Includes additional digital communication features for local configuration and control.

- 5 digital inputs and 5 relay outputs
- RS232 and RS485 communication port for local MODBUS communication
- 2 analogue ports



On implementation

1. Stand-alone unit

Three modules mounted on a vertical or horizontal frame for fast and easy installation.



2. Modular unit

One or three modules with fixing and interconnection kit for user specific installation.

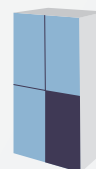
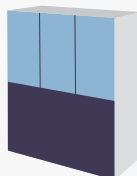


Catalogue number nomenclature

G	L	I	N/X	## (kVa)	K / V / H	S / CC / IC / CIC	-B
Gradi	Lux	IGBT with display	N = 1ph X = 3ph	03= 3.5kVA 06= 6.7kVA 07= 7.5kVA 10= 10kVA 15= 15kVA 20= 20kVA 25= 25kVA 30= 30kVA 45= 45kVA	K = Modular kit V = Vertical H = Horizontal	S = Standard CC= ComiTEQ card IC =Digital I/O card CIC = ComiTEQ and I/O cards	Include manual bypass

Order codes

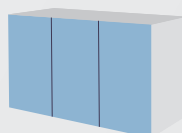
Stand-alone units



	Power (kVA)	HORIZONTAL				VERTICAL			
		Without manual bypass		With manual bypass		Without manual bypass		With manual bypass	
		Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.
Standard	7.5	GLIX07HS	817718	GLIX07HS-B	817732	GLIX07VS	817711	GLIX07VS-B	817725
With communication card		GLIX07HCC	817818	GLIX07HCC-B	817832	GLIX07VCC	817811	GLIX07VCC-B	817825
With I/O card		GLIX07HIC	817218	GLIX07HIC-B	817232	GLIX07VIC	817211	GLIX07VIC-B	817225
With Com & I/O cards		GLIX07HCIC	817318	GLIX07HCIC-B	817332	GLIX07VCIC	817311	GLIX07VCIC-B	817325
Standard	10.5	GLIX10HS	817719	GLIX10HS-B	817733	GLIX10VS	817712	GLIX10VS-B	817726
With communication card		GLIX10HCC	817819	GLIX10HCC-B	817833	GLIX10VCC	817812	GLIX10VCC-B	817826
With I/O card		GLIX10HIC	817219	GLIX10HIC-B	817233	GLIX10VIC	817212	GLIX10VIC-B	817226
With Com & I/O cards		GLIX10HCIC	817319	GLIX10HCIC-B	817333	GLIX10VCIC	817312	GLIX10VCIC-B	817326
Standard	15	GLIX15HS	817720	GLIX15HS-B	817734	GLIX15VS	817713	GLIX15VS-B	817727
With communication card		GLIX15HCC	817820	GLIX15HCC-B	817834	GLIX15VCC	817813	GLIX15VCC-B	817827
With I/O card		GLIX15HIC	817220	GLIX15HIC-B	817234	GLIX15VIC	817213	GLIX15VIC-B	817227
With Com & I/O cards		GLIX15HCIC	817320	GLIX15HCIC-B	817334	GLIX15VCIC	817313	GLIX15VCIC-B	817327
Standard	20	GLIX20HS	817721	GLIX20HS-B	817735	GLIX20VS	817714	GLIX20VS-B	817728
With communication card		GLIX20HCC	817821	GLIX20HCC-B	817835	GLIX20VCC	817814	GLIX20VCC-B	817828
With I/O card		GLIX20HIC	817221	GLIX20HIC-B	817235	GLIX20VIC	817214	GLIX20VIC-B	817228
With Com & I/O cards		GLIX20HCIC	817321	GLIX20HCIC-B	817335	GLIX20VCIC	817314	GLIX20VCIC-B	817328
Standard	25	GLIX25HS	817722	GLIX25HS-B	817736	GLIX25VS	817715	GLIX25VS-B	817729
With communication card		GLIX25HCC	817822	GLIX25HCC-B	817836	GLIX25VCC	817815	GLIX25VCC-B	817829
With I/O card		GLIX25HIC	817222	GLIX25HIC-B	817236	GLIX25VIC	817215	GLIX25VIC-B	817229
With Com & I/O cards		GLIX25HCIC	817322	GLIX25HCIC-B	817336	GLIX25VCIC	817315	GLIX25VCIC-B	817329
Standard	30	GLIX30HS	817723	GLIX30HS-B	817737	GLIX30VS	817716	GLIX30VS-B	817730
With communication card		GLIX30HCC	817823	GLIX30HCC-B	817837	GLIX30VCC	817816	GLIX30VCC-B	817830
With I/O card		GLIX30HIC	817223	GLIX30HIC-B	817237	GLIX30VIC	817216	GLIX30VIC-B	817230
With Com & I/O cards		GLIX30HCIC	817323	GLIX30HCIC-B	817337	GLIX30VCIC	817316	GLIX30VCIC-B	817330
Standard	45	GLIX45HS	817724	GLIX45HS-B	817738	GLIX45VS	817717	GLIX45VS-B	817731
With communication card		GLIX45HCC	817824	GLIX45HCC-B	817838	GLIX45VCC	817817	GLIX45VCC-B	817831
With I/O card		GLIX45HIC	817224	GLIX45HIC-B	817238	GLIX45VIC	817217	GLIX45VIC-B	817231
With Com & I/O cards		GLIX45HCIC	817324	GLIX45HCIC-B	817338	GLIX45VCIC	817317	GLIX45VCIC-B	817331

Order codes

Modular units



SINGLE PHASE		
Without manual bypass		
Power (kVA)	Cat. No.	Ref. No.
3.5	GLIN03KS	817700
6.7	GLIN06KS	817701
10	GLIN10KS	817702
15	GLIN15KS	817703

THREE PHASE		
Without manual bypass		
Power (kVA)	Cat. No.	Ref. No.
7.5	GLIX07KS	817704
10.5	GLIX10KS	817705
15	GLIX15KS	817706
20	GLIX20KS	817707
25	GLIX25KS	817708
30	GLIX30KS	817709
45	GLIX45KS	817710

Options

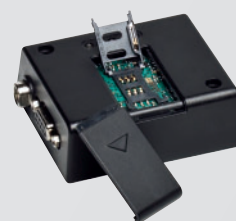
Description	Power (kVA)	Input	Cat. No.	Ref. No.
ComiTEQ box	3.5 - 45kVA	Single and three phase	GLCB	817801
I/O digital box	3.5 - 45kVA		GLIOB	817803
Modem GSM/GPRS	3.5 - 45kVA		GLCMDM	817806



ComiTEQ box



I/O digital box



Modem GSM/GPRS

Specifications

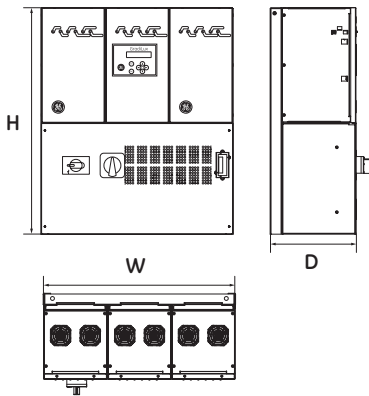
TECHNOLOGY		Bidirectional "Buck" IGBT converter, electronic, static without transformer
INPUT	Voltage	Single phase: 230V / Three phase: 3 x 400V
	Regulation range	+25% / -7% nominal voltage
		+25% / -17% reduced voltage HPSV (High Pressure Sodium Vapor)
		+25% / -10% reduced voltage MV (Mercury Vapor)
	Frequency	48 - 65 Hz
	Module protection	Input and output fuses and varistors for fault and surge protection
OUTPUT	Protection per phase of equipment	Disconnecter
	Voltage	Configurable from 215V to 230V (standard 220V)
	Regulation accuracy	Better than $\pm 1\%$ for input voltage range 230V +20% -3%
		Better than $\pm 2.5\% \pm 2V$ for input voltage range 230V -3% -7%
	Soft start voltage	Preset at 205V and configurable
	Saving level	Configurable from 180V to 210V
	Transition speed setting	From 1 to 6V/min
	Response time	< 40ms
	Regulation	Linear and independent for each phase
	Efficiency	> 96%
	Imbalance between phases	100% permissible
	Reduced voltage adjustment	Using LCD panel or RS232 communication
	Permissible surge	Nominally 110%, 120% & 150% (duration limits apply)
	ByPASS	Without zero crossing
	Type	Automatic, reversible, independent of each phase, independent operation, input for manual activation
COMMUNICATION	Features	Automatic, reversible, independent of each phase, independent operation, input for manual activation
	Activation criteria	Overheating, surge, fault, output fault, manual activation
	Reactivation	Automatic due to alarm cancellation. Number of retries: 5 - Time between retries: 2 minutes
GENERAL	Ports	RS232 and RS485
	Remote monitoring	ComiTEQ TCP/IP communication card required
FORMATS	Operating temperature	-20°C up to +55°C (Derating applies at 4%/°C at 40°C or 45°C depending on the module power and working voltage)
	Protection degree	IP20 (not suitable for unprotected outdoor use)
	Relative humidity	Up to 95%, without condensation
	Maximum altitude	2000m
	Mean time between failures (MTBF)	24000 hours (5kVA & 6.7kVA) 21682 hours (10kVA & 15kVA)
	Noise level at 1 metre	<48dBA (with typical load)
	Stand-alone unit	Modules assembled on a mounting base (chassis made of cold-rolled carbon steel) with drill holes for fixing to wall
STANDARD	Modular kit	3 modules + fixing supports + controls interconnection kit
	Safety	EA0032:2007
OPTIONS	Electromagnetic compatibility (EMC)	IEC 62041:2003
	Surge arrester	Protection against destructive overvoltage surges
	Manual bypass	Interrupts the regulator for maintenance without switching off the light
	GPRS modem	Communication module for access to web portal
	ComiTEQ communication card or box	Module enabling TCP/IP communication for internet access
	Digital I/O card or box	General purpose digital I/O

Note: GradiLux cannot work with LED and lamps equipped with electronic ballast

Dimensions

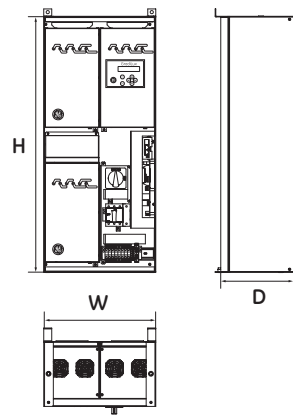
Stand-alone unit - Horizontal

Power (kVa)	Dimensions (mm) (H x W x D)	Weight (kg)
7.5	610 x 520 x 231+35	35
10		35
15		35
20		38
25	770 x 520 x 231+35	50
30		50
45		53



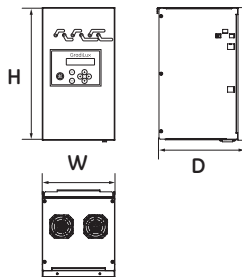
Stand-alone unit - Vertical

Power (kVa)	Dimensions (mm) (H x W x D)	Weight (kg)
7.5	823 x 350 x 245	35
10		35
15		35
20		38
25	1142 x 350 x 245	50
30		50
45		53



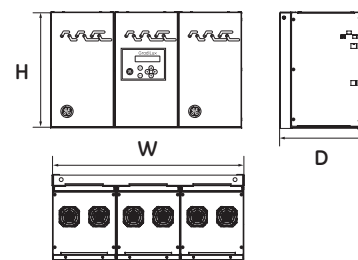
Modular unit - Single phase

Power (kVa)	Dimensions (mm) (H x W x D)	Weight (kg)
3.5	346 x 172 x 200	8
6.7		9
10	470 x 172 x 200	13
15		14



Modular unit - Three phase

Power (kVa)	Dimensions (mm) (H x W x D)	Weight (kg)
7.5	346 x 516 x 200	24
10		24
15		24
20		27
25	470 x 516 x 200	39
30		39
45		42



High efficiency solutions

	Enclosure	Lamps	EM ballast
ODYSSEY*	Flat glass	HPS	50W 70W 100W 150W
		CMH CMH StreetWise™	50W 70W 100W 150W
	Tempered curved glass	HPS	50W 70W 100W 150W
		CMH CMH StreetWise™	50W 70W 100W 150W
IBERIA PREMIUM*	Flat glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
	Tempered curved glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
EURO-2	Tempered curved glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
LUNALYS	Tempered curved glass	HPS	70W 100W 150W 250W
		CMH CMH StreetWise™	70W 100W 150W 250W

* Iberia Premium and Odyssey: utilise a specialised reflector for use with the CMH StreetWise™ lamp.
All others operate with a standard reflector.

	Enclosure	Lamps	EM ballast
LUNA MINI	Tempered curved glass	HPS	50W 70W 100W 150W
		CMH CMH StreetWise™	50W 70W 100W 150W
SVRA	Flat glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
	Tempered curved glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
BRISA	Tempered curved glass	HPS	70W 100W 150W 250W 400W
		CMH CMH StreetWise™	70W 100W 150W 250W 400W
BRISA MINI	Tempered curved glass	HPS	50W 70W 100W 150W 250W
		CMH CMH StreetWise™	50W 70W 100W 150W 250W
DUNA PREMIUM	Direct symmetric	HPS	50W 70W 100W 150W
		CMH CMH StreetWise™	50W 70W 100W 150W
	Direct asymmetric	HPS	50W 70W 100W 150W
		StreetWise™	50W 70W 100W 150W

ConstantColor™ CMH



NEW Tubular Ceramic Metal Halide Lamps 50W, 70W, 100W, 150W

Until now, public authorities and other organisations have had to choose between high cost, high quality outdoor illumination or low cost alternatives which, even at peak efficiency, make streets and other areas look dingy or dull.

GE's new generation of CMH StreetWise™ lamps especially designed for outdoor lighting offers the best of both worlds. Bright, white, 'natural' light and low costs for both running and maintenance.

With CMH lighting, streets and other public spaces can feel safer for pedestrians. More than that, their "daylight" colour rendering improves the ability of drivers to recognise shapes and colours, especially in peripheral vision. This also promotes quicker driver response times.

Features

- Very efficient, up to 110 lm/W
- Outstanding lumen maintenance, 80% at 12000 hours
- Dimmable to achieve further energy saving, except 50W on electromagnetic ballast
- Direct retrofit to HPS
- Best white light alternative for mercury, HPS and standard ceramic solutions
- Long life 24000 hours
- System flexibility - operates on both electronic and electromagnetic ballasts
- Lowest cost new system - standard base, standard ballast, standard optics
- Horizontal burning position



Application areas

- Street lighting
- City beautification
- Indoor lighting
- Residential lighting
- Area lighting
- Architectural floodlighting
- Parking areas

Product range

GE's new, feature-rich product range expands offerings both in new installations and replacements from 50 up to 150W. Standard, robust base of E27 and E40 provides easy installation. The whole range delivers cost savings combined with excellent lamp quality characteristics and a long re-lamp cycle.

Industrial Solutions, a division of GE Energy, is a first class European supplier of low and medium voltage products including wiring devices, residential and industrial electrical distribution components, automation products, enclosures and switchboards. Worldwide demand for GE Industrial Solutions' products comes from industrial facilities, wholesalers, installers, panelboard builders, contractors, OEMs and utilities.

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GE imagination at work