

MERIDIS

Street Lighting System



DETAILED DATASHEET



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1. WHY MERIDIO®

Among the main challenges for those involved in energy management, maintenance and design of public lighting systems, a prominent place is occupied by the rationalization of consumption.

The serious environmental and economic problems of these times make the matter undelayable. In addition, European and national regulations are becoming more demanding in compliance with global protocols.

Finally there is a strong urgency to address these issues through increasingly "smart communication mode", for any person who wants to get in line with the most advanced solutions. Unlike the past, a technology capable to enter the user in a smarter and greener future is available today and it allows to:

1. optimize energy fruition while maximizing the results and thus considerably reducing consumptions and costs;
2. connect various citizen services in a more and more performing way.

Under such instances Menowatt Ge appears as a leading company, as it offers a range of modern answers and really effective, able to project the customer at a very advanced level of innovation, communication, conservation and environmental protection. In this set a primary position is occupied by MERIDIO.

Meridio is the result of Menowatt Ge ten-year experience and know-how in the field of products for energy efficiency, remote control and innovative Smart solutions, it is in fact a unique article of its kind because it has original skills developed by Menowatt Ge. MERIDIO introduces a new concept of public lighting as it turns the light point from a simple lighting system and urban decoration to a powerful multifunction station, which also provides services in the Smart City and Smart Metering field, MERIDIO introduces a new concept of public lighting, which turns the lamppost from simple lighting and street furniture in a powerful weight system, which also provides services in the Smart City and Smart Metering, using in a clever way an extensive network of public lamps in order to create the infrastructure of that network that turns a city into a "smart city".

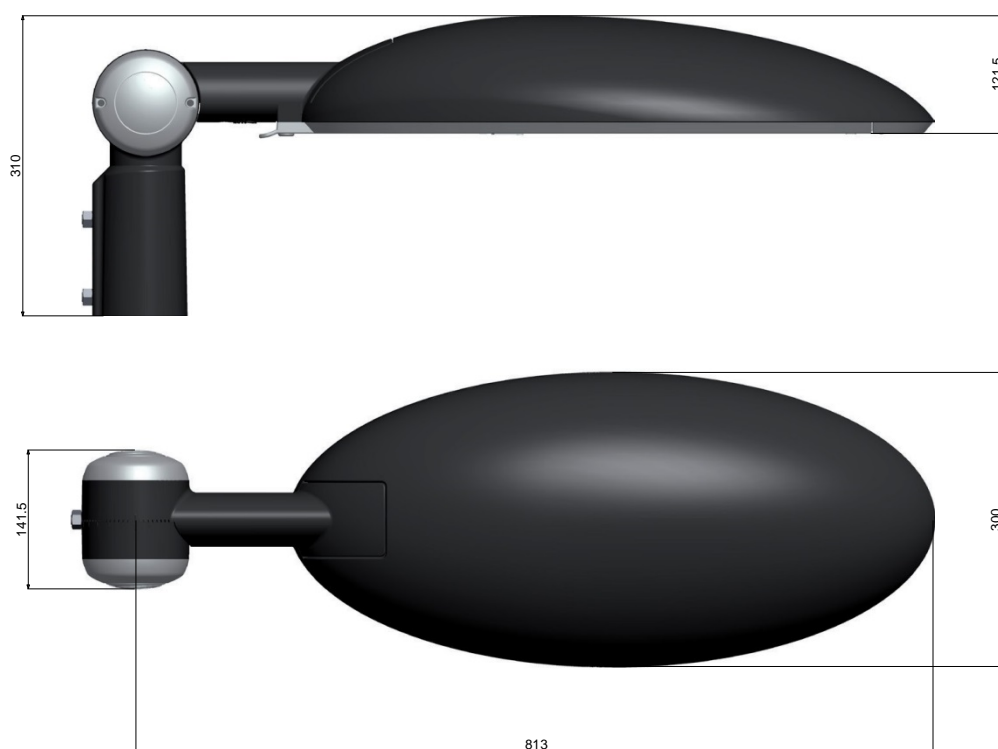
This means that we can not talk about Meridio® only as an high efficiency LED device, but as a multi-service system that integrates innovative characteristics of the light point, of the electronic ballast DibaDi® and SLIN 169® (Smart Lighting Network) family devices, all products designed and developed in the R & D Menowatt Ge Spa structure.

For this reason it can be stated that MERIDIO is a product entirely made in Italy, since the design, the production of the mechanical, the lighting section, the electronic are all processes entirely made from Italian Menowatt Ge team.

2. MERIDIO® AND ITS MECHANIC

MERIDIO is realized in die-cast aluminum with hidden radiators and a universal mounting system for masthead or arm pole.

The system has a swivel joint through 5 degrees regulations. These solutions allow the lighting body to adapt to any type of pre-existing pole, while maintaining the grade parallel to the ground as required by light pollution laws.



Tilt adjustment

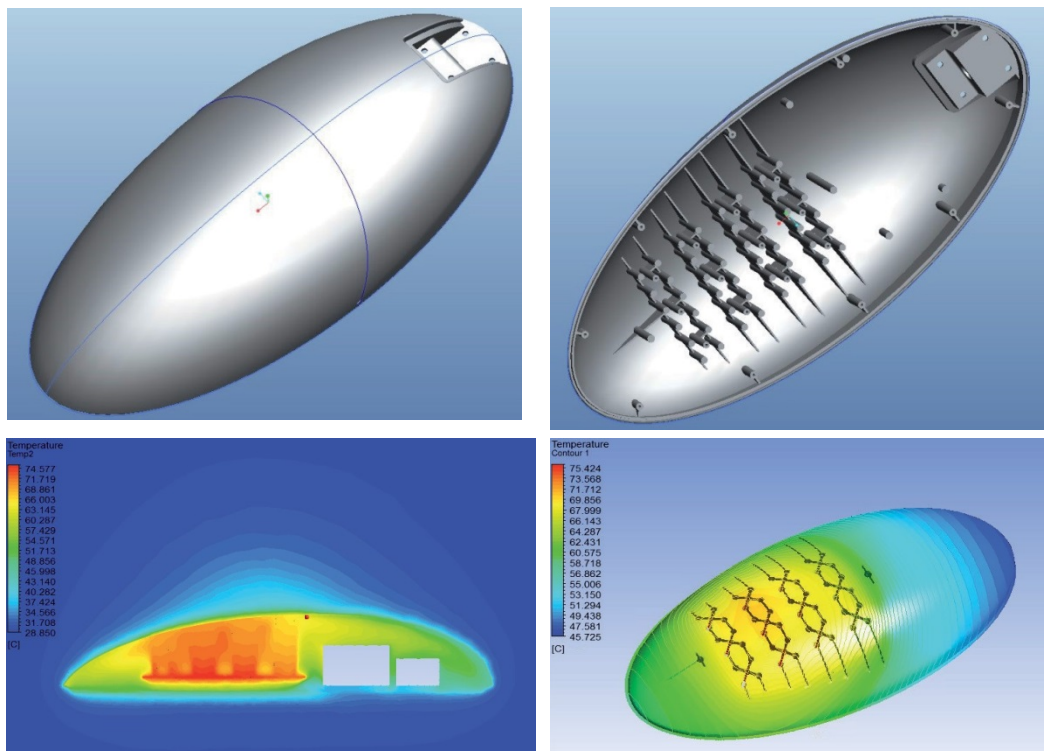


2.1. Hidden heatsink

Another important feature of the mechanical structure of MERIDIO is constituted by a retractable system for the optimal management of the heat disposal produced by the LED.

In contrast to what is observed with other products on the market, the heatsink is not located outside showing the profile with the usual cooling fins, but the entire metal surface acts as a heat dissipation system for LED. In fact, inside the ceiling, in the concave area, they are located a series of columns of aluminum, of suitable cross-section, height and shape, which allow the heat generated by the LEDs to be transported on the metal surface of MERIDIO and then disposed of by natural convection towards the external environment. These columns fit with each individual LED guaranteeing proper heat management.

The result of this technological solution restore to MERIDIO its elegant and rounded design that distinguishes it.



2.2. Personalise your MERIDIO®

Today a LED road lighting device must not only "shed light" but also give a touch of modernity and return to citizens a pleasant environment to live in and explore. With this goal MERIDIO contributes to the aesthetics of urban design by offering both the ability to choose the color of the aluminum cap and the unprecedented opportunity to place the customer logo on the domes of the joint.



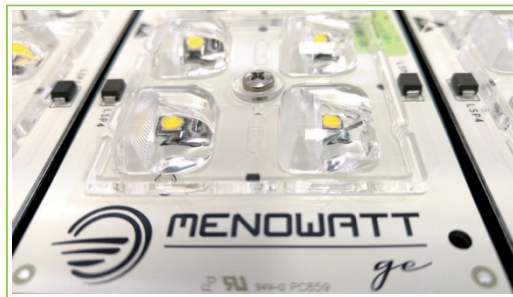
Customization with logo



2.3. Self-cleaning profile

The particular design of MERIDIO exploits atmospheric agents to which it is normally subjected, to achieve a natural self-cleaning action of all the parts that compose it. This helps to keep the urban decorum, to guarantee the aesthetic appearance of MERIDIO and also to keep unchanged in time the characteristic of heat dissipation of the LED. The convex shape of the cap also facilitates the sliding of any build-up of snow and ice. The quality of the individual components and the efficiency of the self-cleaning system significantly cut down maintenance costs by improving the life cycle of the product.

3. MERIDIO® AND THE LIGHT



MERIDIO is mainly designed as a modular lighting system of latest generation, capable of satisfying requirements and performance for different lighting categories defined according to the new reference (see. P.35 Overview).

MERIDIO is equipped with 4 independent modules that can be installed individually or in sequence, both of the two rows host 6 LED.

3.1 LED modules

The LED modules used within MERIDIO are also developed by Menowatt Ge and have a structure in high quality aluminum. The thermal contact with the dissipating surface of MERIDIO is guaranteed by an innovative thermal conductive material set down in the process of realization of the module, which maintains its performance even in case of possible substitutions.

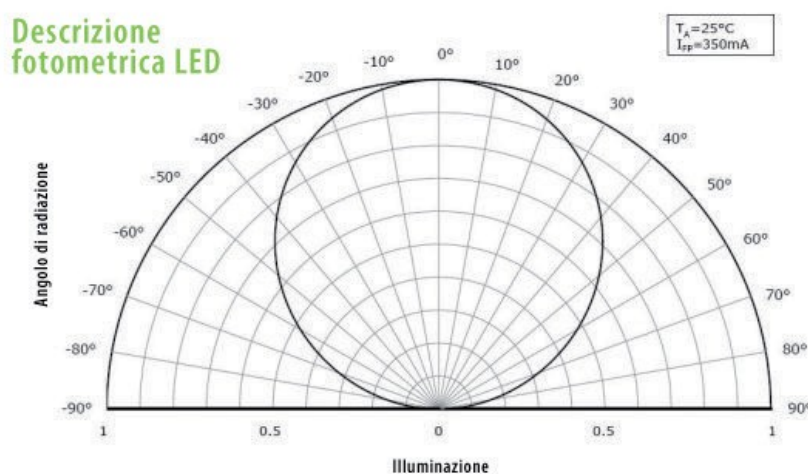
The LED modules are equipped with::

- By-pass system in case of LED failure, through double shunt.
This avoids a total shutdown of LED sources in the event of failure of 20% of the sources.
- Sensors for the temperature control connected with the power supply Dibadi.
- Sensors for the humidity control connected with the power supply Dibadi.
- Sensors for the estimation of the luminous flux emitted by MERIDIO, which allow the power supply Dibadi to automatically compensate the natural decay, due to aging of the LED sources during the period of operation (Costant Lighting System).

3.2. Optics

The LED, defined as a single component, rarely emits light in the direction and in the desired shape: in general the light distribution of a LED without secondary optics is given by a protective dome which acts as a primary lens and as a protection of the materials which compose the semiconductor from atmospheric agents, that might cause oxidation.

The photometric distribution given by "primary optics" or by the naked LED can be considered, with good approximation, of "Lambertian" type.



To change the form of the solid photometric is therefore necessary to use a secondary lens, which serves to focus and direct the light.

In this context the engineering and the process have had a rapid development, also with regard to the materials to build optics, but the macro-families in which they are divided are substantially two:

- LENS: subject to the law of refraction and total internal reflection (TIR - Total Internal Reflection).
- REFLECTORS: subject to the law of reflection.

In MERIDIO we chose to use the macro-family of lenses rather than that of the reflectors. The reason for this is very simple: one of the benefits that you have using a lens is the precision with which you can control the light beam allowing to obtain different kinds of customizable configurations.

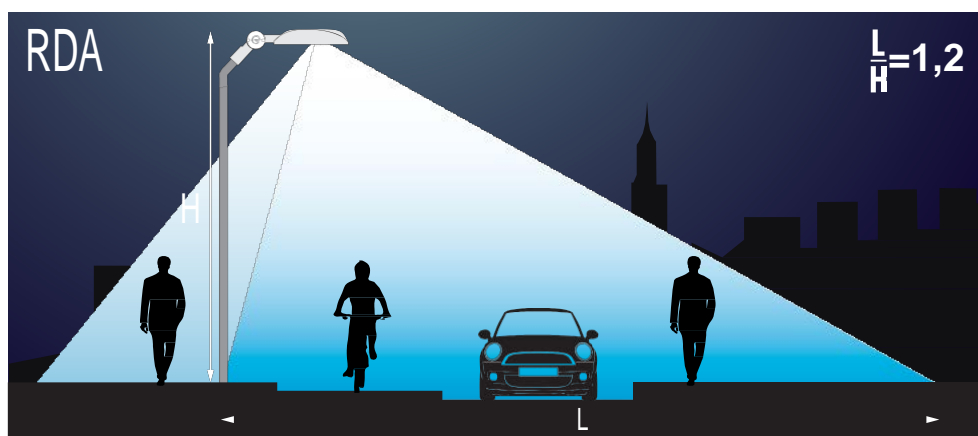
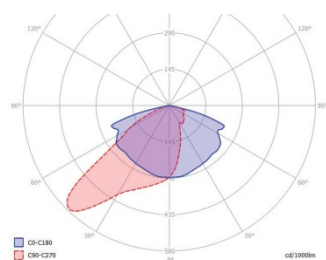
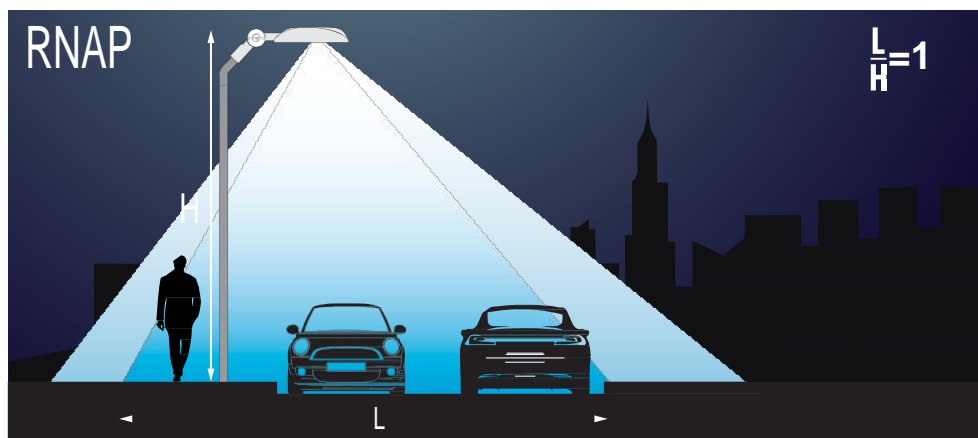
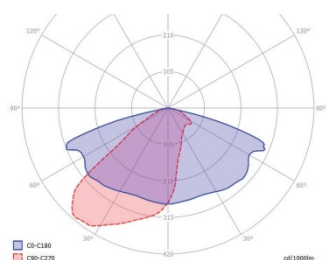
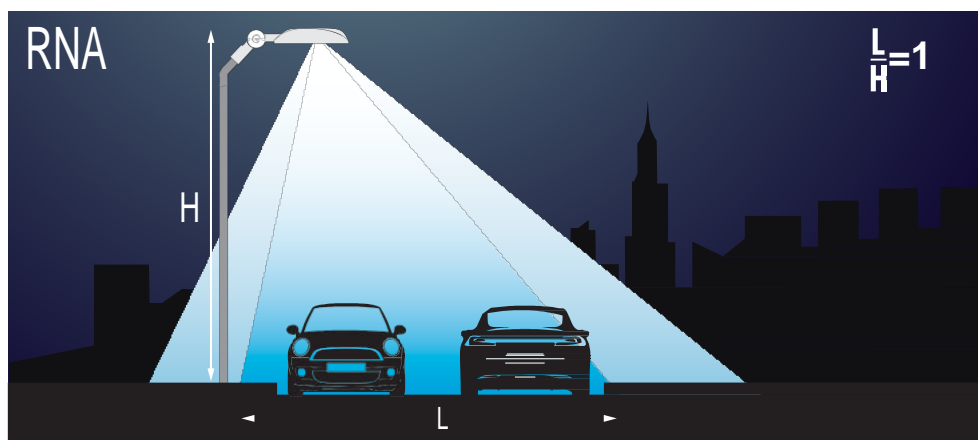
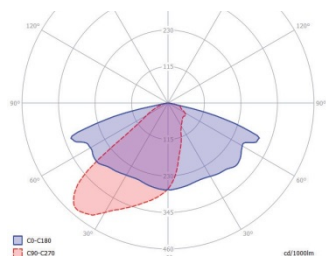
The LED lens may be realized with different materials. The optics mounted on MERIDIO are made of PMMA (polymethylmethacrylate) a highly malleable material which reaches up to 92% efficiency of light transmission. They are therefore of highly transparent and with a 2x2 LED geometry, which allows the maximum flexibility to customize.

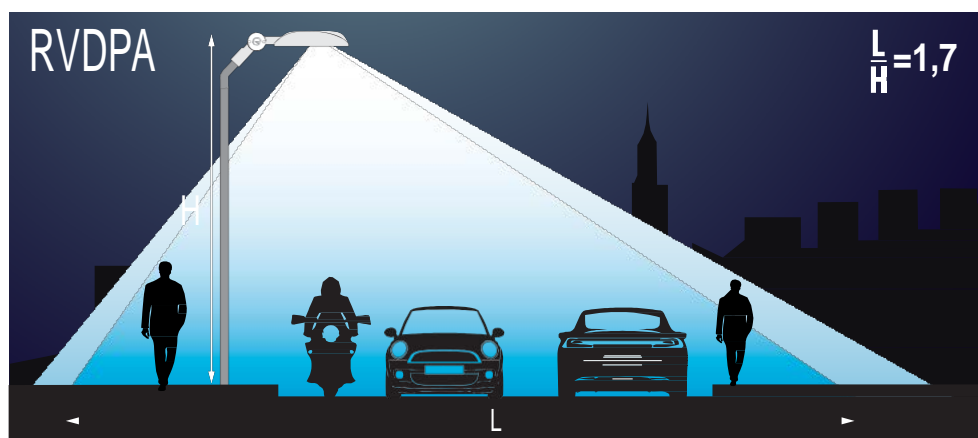
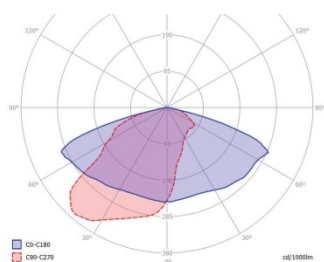
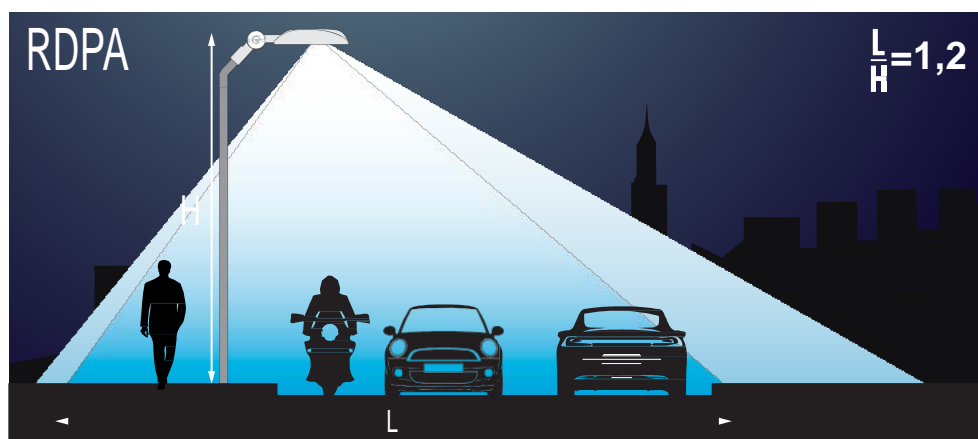
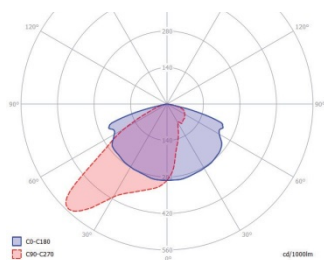
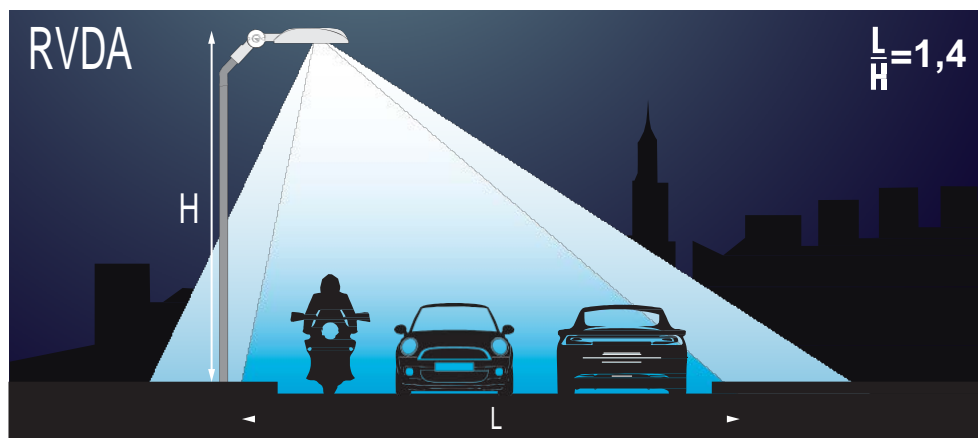
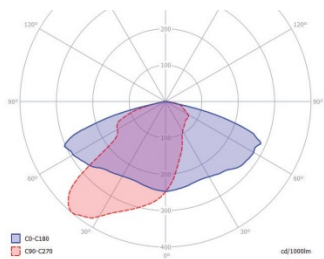
Menowatt Ge is therefore able to mount different optics for each LED depending on the environments and categories of road to be illuminated. By combining the various optical signals on the same LED plate, you can ensure that each streetlight emits different and personalized luminous beams.

The standard configurations are 6:

- RNA: urban/suburban optic, asymmetric
- RNAP: urban street optic, sidewalk, asymmetric
- RDA: deep urban street optic, asymmetric
- RVDA: very deep urban street optic, asymmetric
- RDPA: deep urban street optic, sidewalk, asymmetric
- RVDPA: very deep urban street optic, sidewalk, asymmetric

Optics	Road width / height pole [L/H]	Lighting category	Note
RNA	1	ME3, ME4	
RNAP	1	ME4, CE4, CE5, S3	Performance residential areas
RDA	1,2	CE4, CE5, S3	Performance pedestrian areas
RVDA	1,4	ME3, ME4	Streets with wide tracks
RDPA	1,2	ME3, ME4	Performance pedestrian areas
RVDPA	1,7	CE4, CE5, S3	Streets with wide tracks and sidewalks





3.3. Models and working cycles available

MERIDIO is available in the following models: MERIDIO S, MERIDIO M, MERIDIO L e MERIDIO XL.

DEVICE FLUX* INCLUDING OPTICAL SYSTEM (T _a =25°C, 4000K, lm)				
Current	1 Module MERIDIO® S	2 Modules MERIDIO® M	3 Modules MERIDIO® L	4 Modules MERIDIO® XL
400mA	1849	3698	5547	7396
550mA	2361	4723	7084	9445
650mA	2785	5571	8356	11141
700mA	2949	5897	8846	11794

* Data concerning the RNA configuration

The following is a table that represents the standard working current of MERIDIO. The standard reduced current values and standard mini refers to the operating cycles of MERIDIO (see chapter 4.11).

Current max [mA]	Standard reduced current	Standard mini current [mA]	Dimmeration
400	400	400	✗
550	450	400	✓
650	550	500	✓
700	600	550	✓

All intermediate current values between 400mA and 700mA can vary in steps of 50mA 50mA, in the field, even with MERIDIO already installed, with the following modalities:

- Through Lemset (see pag. 28).
- Using reconfiguration through remote control if MERIDIO is equipped with the radio interfaces of the family RL by Menowatt Ge.

4. MERIDIO® AND DIBADI®

Meridio is powered by the driver DibaDi, also developed and produced by Menowatt Ge Spa. The combination of these two products provides exceptional integration between the illumination section and the government of the product. The DibaDi driver offers the following performance features, also subject of the patent:

- Protection against voltage surges and reduction of neutral on the power line system with OVP-NFP (Over Voltage Protection-Neutral Failure Protection).
- Protection against surges without external SPD.
- Architecture LLS (Long Life Strategy) through:
 - Double stage *PFC* (Interleaved Boundary Conduction Mode)
 - Double output capacitor *PFC*, oversized
- Piloting independently of the LED strings.
- Auto-dimmer mode with use of multiple work programs also configurable in the field.
- Dimming of the LED through the reduction current.
- LED dimmeration through external radio frequency controls (through the radio interfaces of RL series with piloting in IrDA).
- Protection against short-circuit in outputs.
- Protection against open output circuit.
- Measurement of the temperature of the LED plate.
- Measuring the output current for each LED strings.
- Measurement of humidity inside the unit.
- Measurement of dangerous voltage on the pole to prevent injuries.
- Datalogger mode to enable diagnostic support device.
- Dynamic change of the supply current even with installed device
- Check the brightness level and automatic correction of the supply current (Constant Lighting System).

4.1. Protection against voltage surges and reduction of neutral

One of the most important functions of DibaDi is to protect MERIDIO by excessive tensile loads that may occur on the power line during the greater availability of energy moments. DibaDi adopt OVP-NFP system (Over Voltage Protection-Neutral Failure Protection) that integrates the security features against surges and the fall of the neutral. It may happen, in fact, that voltage surges phenomena of the lines on lighting plants could be found as a result of the accidental disconnection of the neutral connection, also for a limited time. The power supply lines of the lighting source are generally single phase, but derived from primary and three-phase lines and the lack of the neutral cable implies that the line cables are connected to two phases. As a result, depending on the impedance of the load line, it could be found much higher voltages to the rated voltage of 230Vac, until reaching values of 400 Vac. DibaDi constantly monitors the electric voltage and if the power supply reaches values above 265 V, it disconnects itself while preserving the device from shocks and breakage. When the voltage returns to nominal values allowed the power is restored.

There aren't time restrictions that reduce the capacity of protection of the circuit, so that the power supply DibaDi can remain continuously subjected to abnormal voltage.



4.2. Protection against surges without external SPD

The surge is a sudden overvoltage of high current and power that is delivered instantaneously (approximately 50 μ s) on the network or on electric circuit. It is therefore able to cause severe damage to electronic equipment which are not protected from this kind of phenomenon. The surge may occur either in the presence of a lightning strike near a power transmission network, both at the time of connection or disconnection of large sections of the distribution network.

The Dibadi structure has a special circuit section composed of special electronic components that absorb the energy due to overvoltage, in order to protect the circuits belonging to the protection system. Another key feature is to have the intervention times in the order of microsecond: is much faster than both of relays that fuses that are normally used in security systems. Dibadi also has another significant advantage: the integration of the SPD system (Surge Protective Device) in class II. This makes it a more secure unit since it does not require a ground connection and respects the double level of protection, ensuring that MERIDIO could lie in the class II of insulation.

In addition, when it is mounted on the pole in fiberglass, it avoids the accumulation of electrostatic charges on the metal body, which may cause electrical discharge that can damage the LED modules.

4.3. LLS architecture (Long Life Strategy)

With classic street lighting plants we will found power supplies that can have a high life expectancy in the sight of the lamps, which however have a much lower life cycle.

With the new technology street lighting plants we will have a diametrically opposite situation: electronic ballasts won't guarantee a life expectancy comparable to that, much longer, of LED light sources.

The Menowatt Ge team has designed an architecture model called LLS - Long Life Strategy - which allowed to extend the electronic ballast Dibadi's life like that of the LED light sources.

This innovative system ensures that the crucial center of the power supply work will be maintained by the main causes of deterioration, foreseeing:

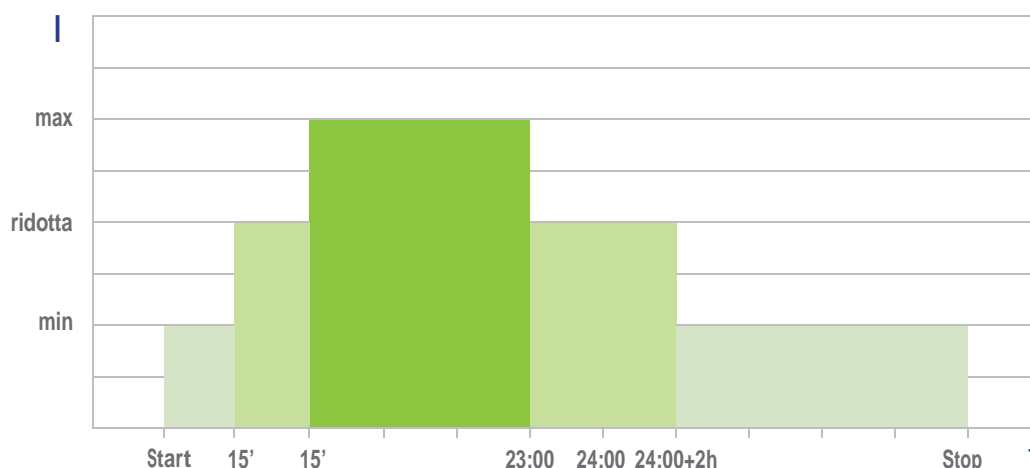
- Two stage PFC (Interleaved Boundary Conduction Mode).
- Dual output capacitor by the PFC, oversized.

Such systems allow the current load that circulates in Dibadi to be divided in half between two stages, on the contrary of the classical architecture that includes the passage of current on a single stage. This ensures that circuits, suitably dimensioned, are subjected to less stress and protected from premature deterioration.

4.4. Autodimmer mode

The Dibadi power supply involves the use of work programs that enable the autonomous management of the powers and the luminous flux of the LED strings.

Programme 1: 23M2



The Autodimmer function allows you to reduce the power (and therefore the lamp luminous flux), adapting to the different seasons. Some systems in fact reduce their power at fixed times (for example, 4 hours after the ignition system) with the result that in winter time the luminous flux decreases too soon. Dibadi instead activates the dimming function at a customizable time, offering more comfort and a greater safety on the roads.

Among the main functional features of the algorithm there are:

- "self-learning" mode: it saves the last 4 days of work in order to have a stable base of calculation even in the presence of abnormal behavior in the ignition cycle of the plant and / or power failures.
- start time customization depending on the user's needs for power reduction and based on the requirements of the Italian regional laws against light pollution.

4.5. Check of LED plate temperature

One of the main challenges of LED technology consists in checking the temperature generated by the light sources which is normally very high. It is known as this constitutes the main cause of LED breakage. A lighting system that wants to ensure a long service life should always pay high attention in managing this phenomenon.

Despite MERIDIO effectively drains the heat generated by LED, Dibadi performs a constant control with LED modules connected directly to sensors. This turns out to be a great feature, especially helpful in the event of breakdowns and / or abnormalities. When Dibadi receives the signal of a too high temperature (over 85 ° C), it automatically decreases the power as long as the temperature is out of range. Once the temperature returns to nominal values, Dibadi brings the power to its nominal value.

Moreover, in the presence of remote management (RL), Dibadi promptly informs the plant operator about the possibility of exceeding the levels of risk, allowing immediate maintenance work on streetlamp.

$T_{\text{INTERNA}} \geq 85^{\circ}\text{C}$



$l_m = 60\%$

$T_{\text{INTERNA}} < 85^{\circ}\text{C}$



$l_m = 100\%$

4.6. Check of internal humidity

Despite MERIDIO has a degree of protection against the input of dust and water (IP66), in case of protection screen damage is possible to find inside the cap a high percentage of humidity for the LED plant. Dibadi however, is capable of measuring the internal moisture through specific sensors for remote management and report any anomalies. Even the presence of a valve to control the pressure helps to tackle the problem, it is positioned on the cap and it offers safety and a very high protection for MERIDIO and for the electronics contained therein. The valve equalizes the pressure and prevents the formation of condensation, allowing air and gas to enter and exit freely from MERIDIO but at the same time blocking the entrance of solid and liquid contaminants.



With this high performing venting device, thanks to its 4,000 ml / min at a pressure differential of 70 mbar, it guarantees a very high air flow. The valve meets the most rigorous standards of IP protection: IP66, IP67, IP68 (immersion of one hour at a depth of two meters) and IP69K (high pressure steam), and is oleophobic and hydrophobic. It is also equipped with an o-ring optimized with flammability class UL 94 V-0. The membrane appears to be chemically inert, UV-resistant, not subject to disintegration and resistant to extreme weather conditions.

4.7. Measurement of electrical tension on the pole

Where the electrical power cable loses the isolation, despite the common safety means, it may happen that part of the supply voltage is transmitted to the metal pole that supports the lamp, causing accidental injury. It is possible to ensure that the electronic power supply can sense the presence of electric current on the metallic pole, and, thanks to the remote management system, communicate the alarm to the operations center that, through a particular cable connected from Dibadi to the metal structure of MERIDIO, will provide the problem resolution.

4.8. Datalogger mode

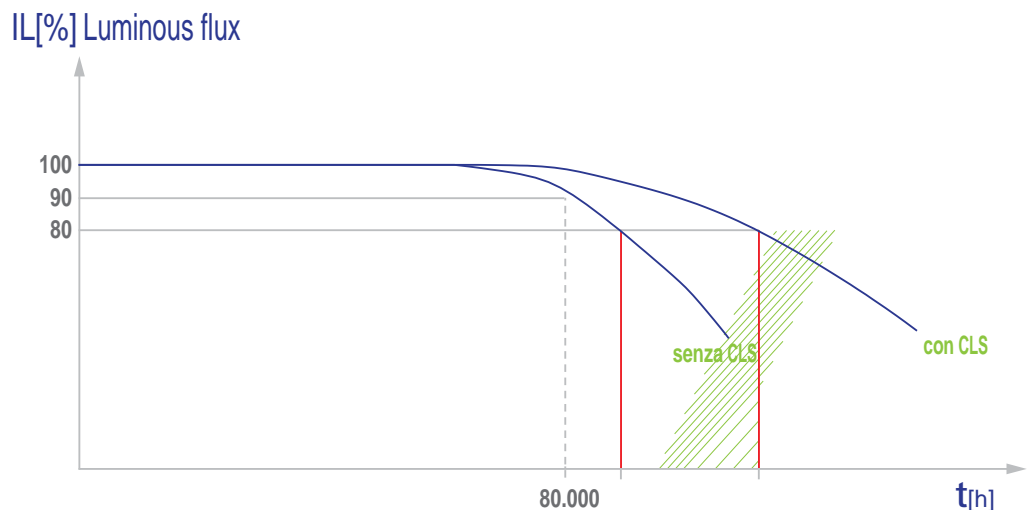
Through the remote management system, thanks to the datalogger functionality, it is possible to acquire and record the data transmitted from the various sensors referred to Dibadi (temperature, humidity, voltage, etc.) in a separate memory space. The operations center connected to the device can then make at any time the reading of the recorded data and the diagnosis of MERIDIO functions, controlling the parameters and events.

4.9. Dynamic change of the supply current

During the normal working cycle, LED consume less current; consequently they tend to give less light, lowering its intensity. To compensate this effect, Dibadi is able to constantly monitor and adjust the current of the LED modules installed on MERIDIO.

4.10 Check of the brightness level and its automatic correction

A further important feature of Dibadi consists in the ability to perform a constant check of the brightness level emitted from MERIDIO and automatically correct the intensity of the supply current of the LED modules. Through Constant Lighting System (CLS), the Dibadi, when the hours of operation of the LED increase, the current increases gradually and then the power used, allowing therefore the extension of LED life (L80). In fact, thanks to the introduction of this system, as can be seen from the graph below, it is possible to raise the number of hours in which it has the decay of the luminous flux of LEDs before they arrive below the threshold of 80%.



4.11. MERIDIO® working cycles

The Dibadi power supply involves the use of work programs that enable the autonomous management of the powers and the luminous flux of the LED strings.

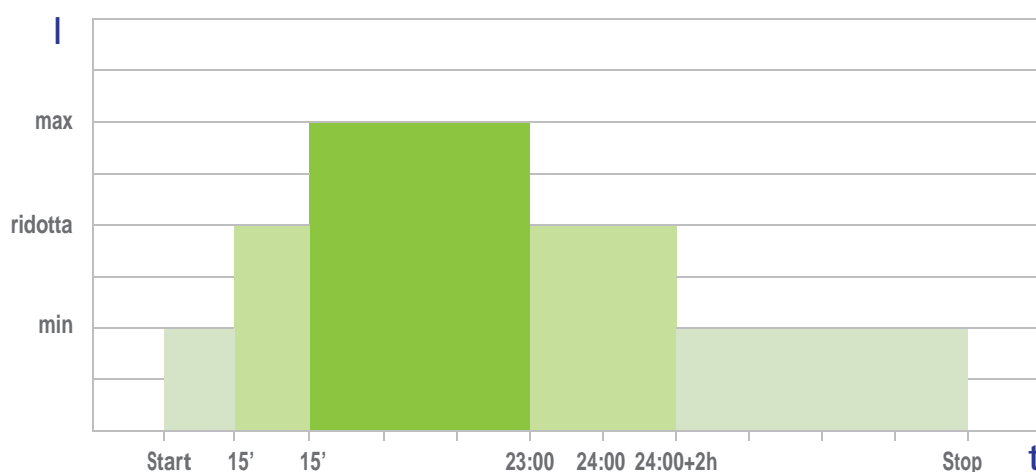
At first ignition, Meridio starts the EMX program (depicted below). This working cycle allows, during the first night following the installation, to measure the length, and then to calculate the sunrise and sunset times, necessary for the correct execution of the set program. From the second day, the working cycle selected by the customer becomes active. If you have not requested a particular program, MERIDIO activates the standard program 23M2.

Programme 6: EMX

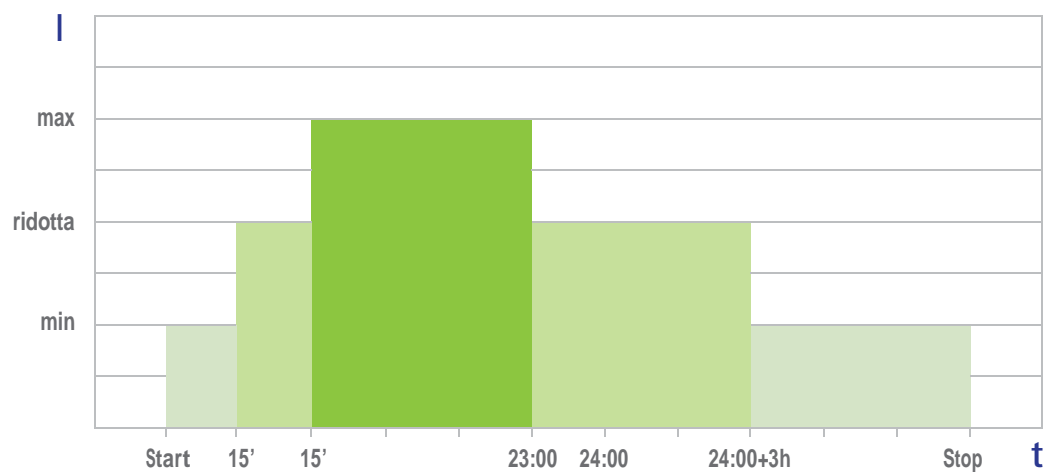


The available working cycles are 19 and are the following:

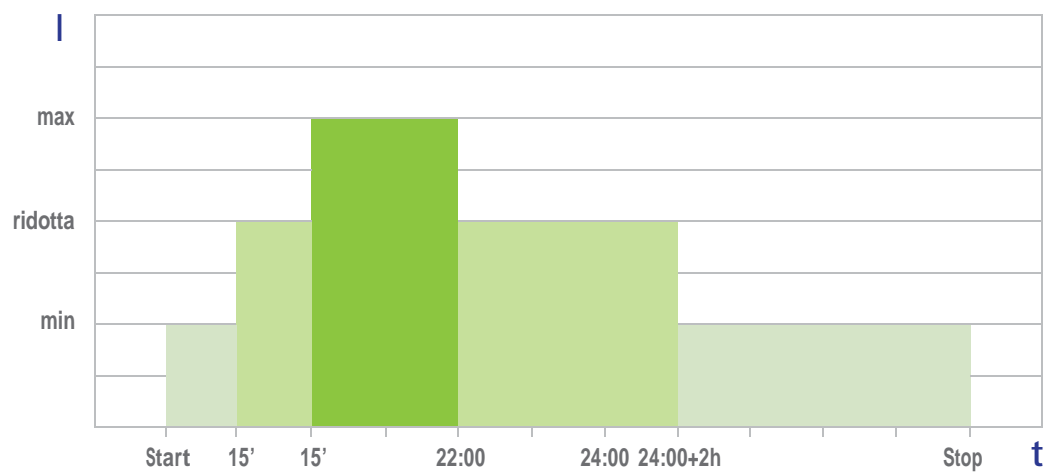
Programme 1: 23M2



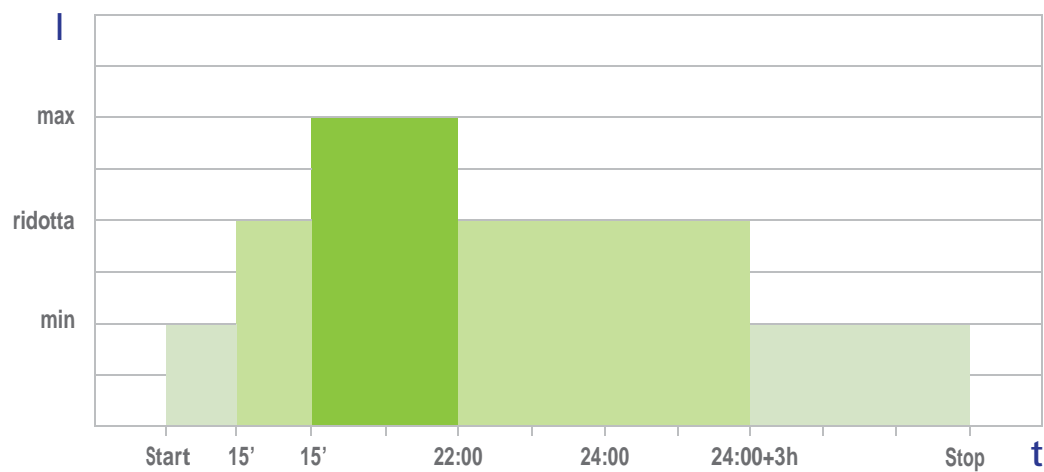
Programme 2: 23M3



Programme 3: 22M2



Programme 4: 22M3



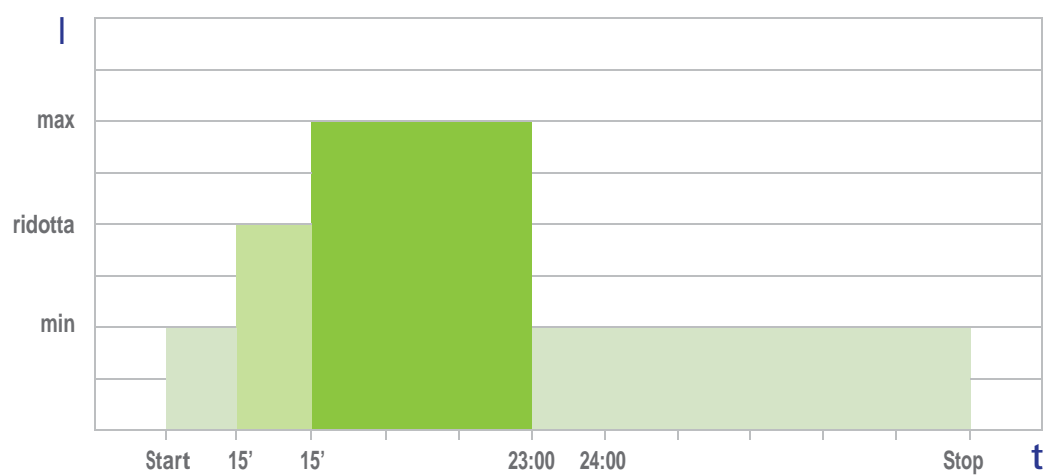
Programme 5: ERP



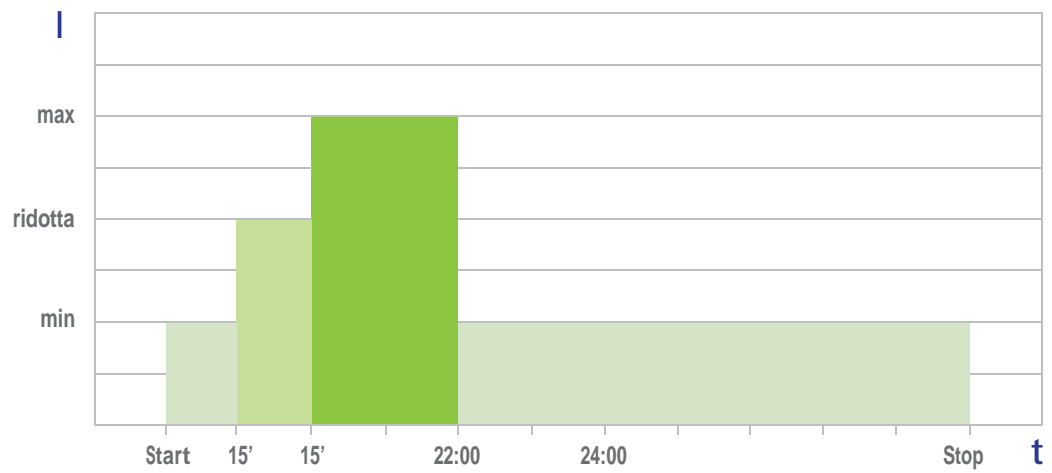
Programme 6: EMX



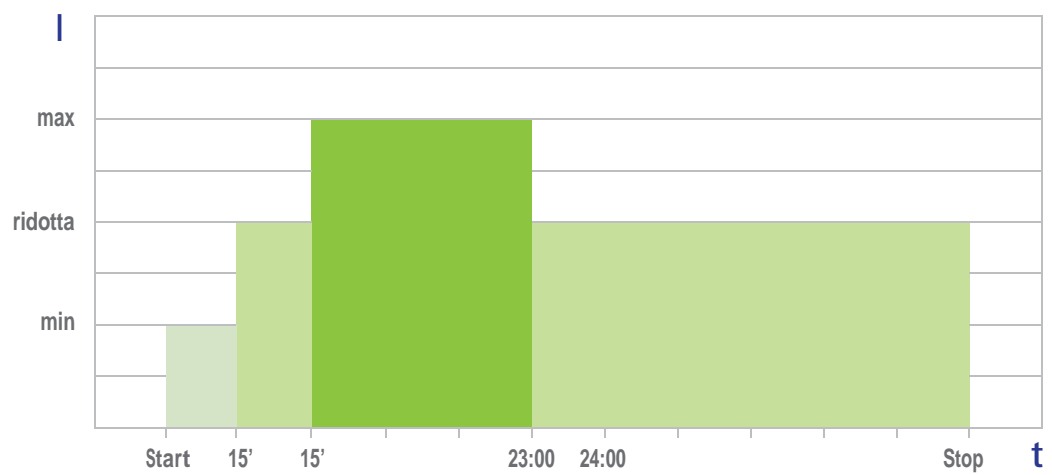
Programme 7: 23EMP



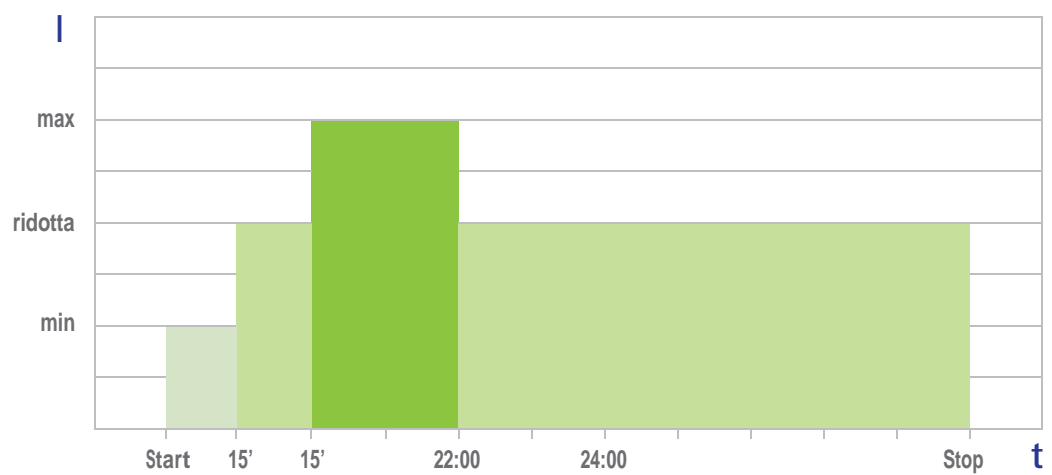
Programme 8: 22EMP



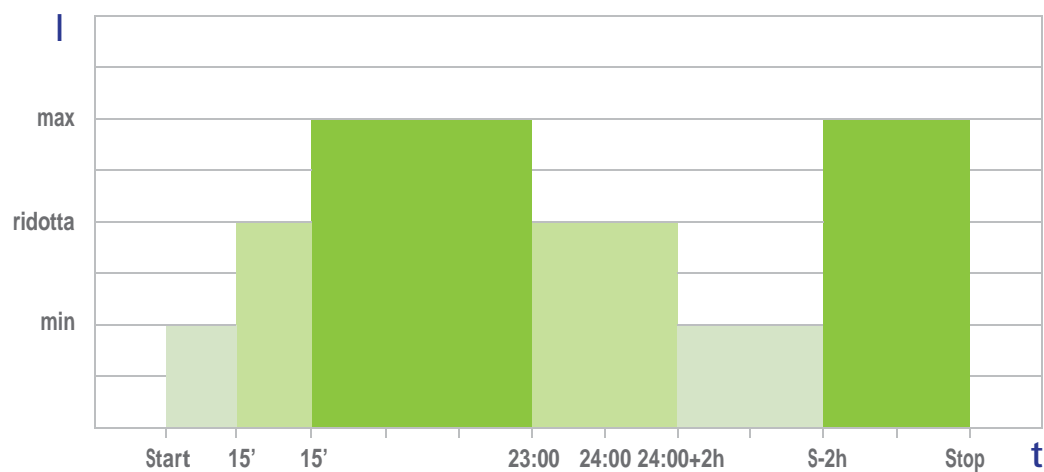
Programme 9: 23ERP



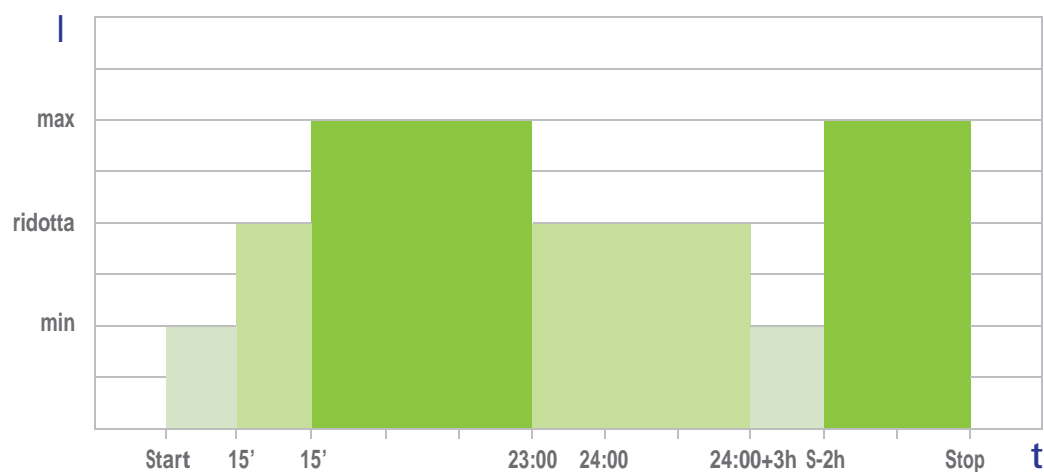
Programme 10: 22ERP



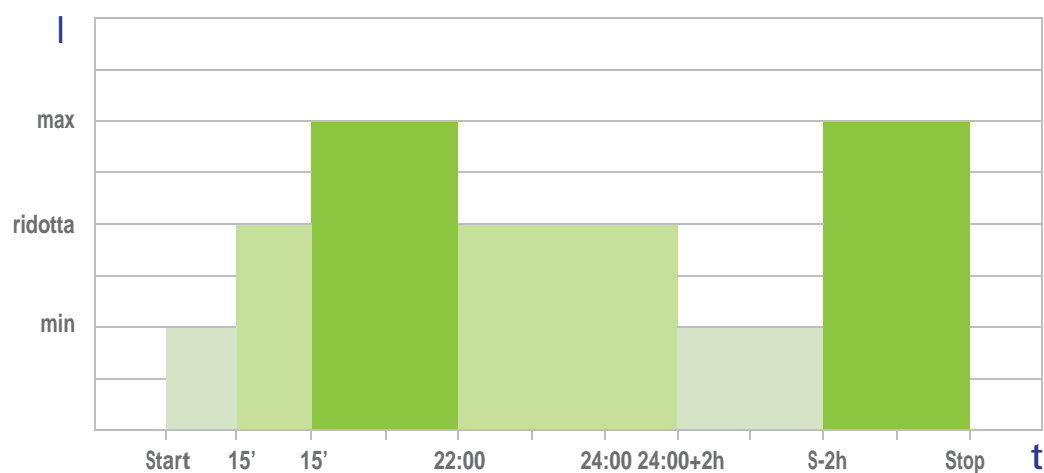
Programme 11: 23M2S2



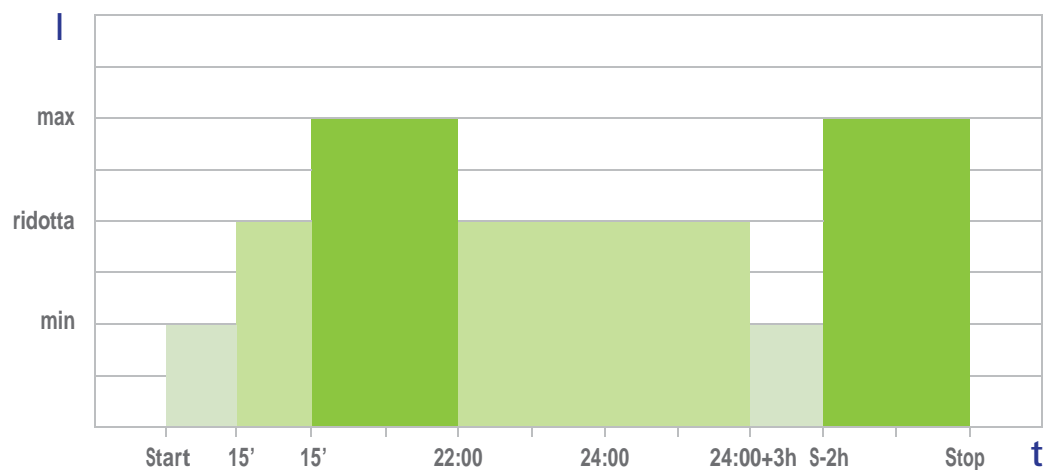
Programme 12: 23M3S2



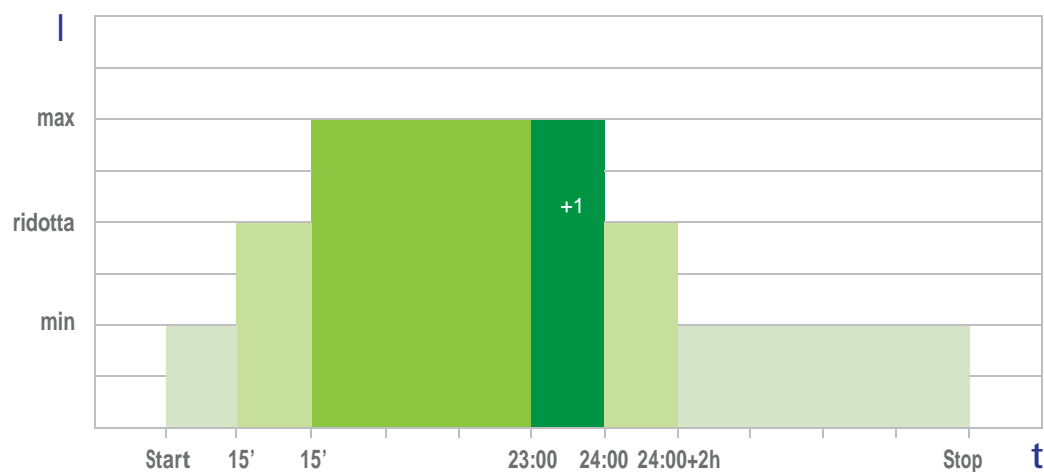
Programme 13: 22M2S2



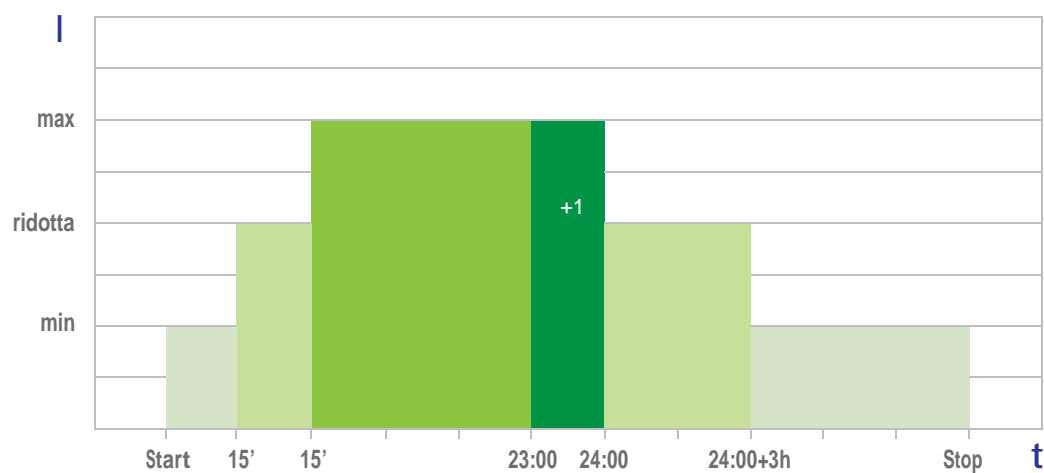
Programme 14: 22M3S2



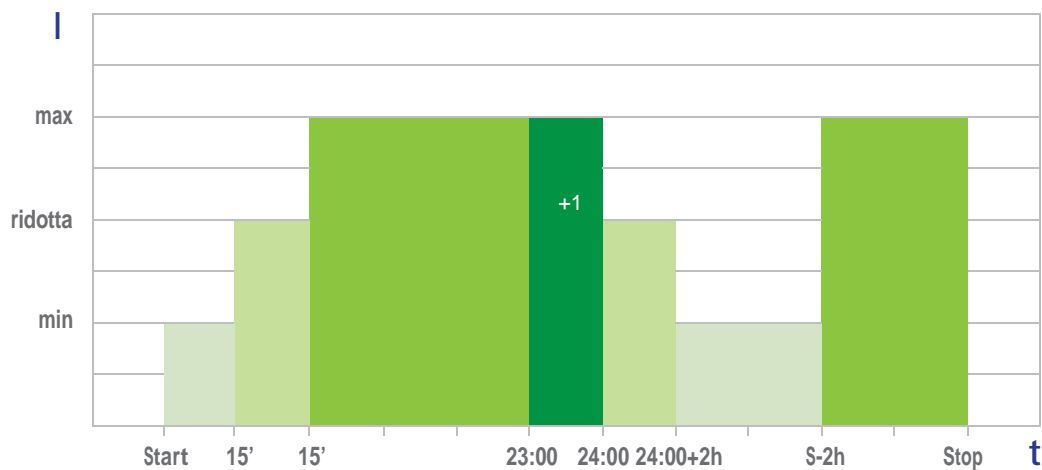
Programme 15: LSM2



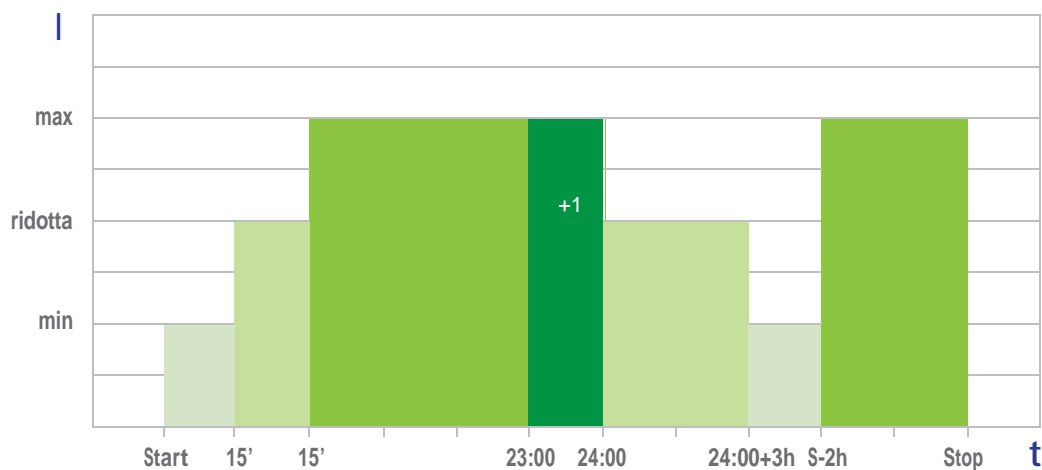
Programme 16: LSM3



Programme 17: LSM2S2



Programme 18: LSM3S2



Programme 19: R400



Can only be used on Meridio with LED current of 400mA

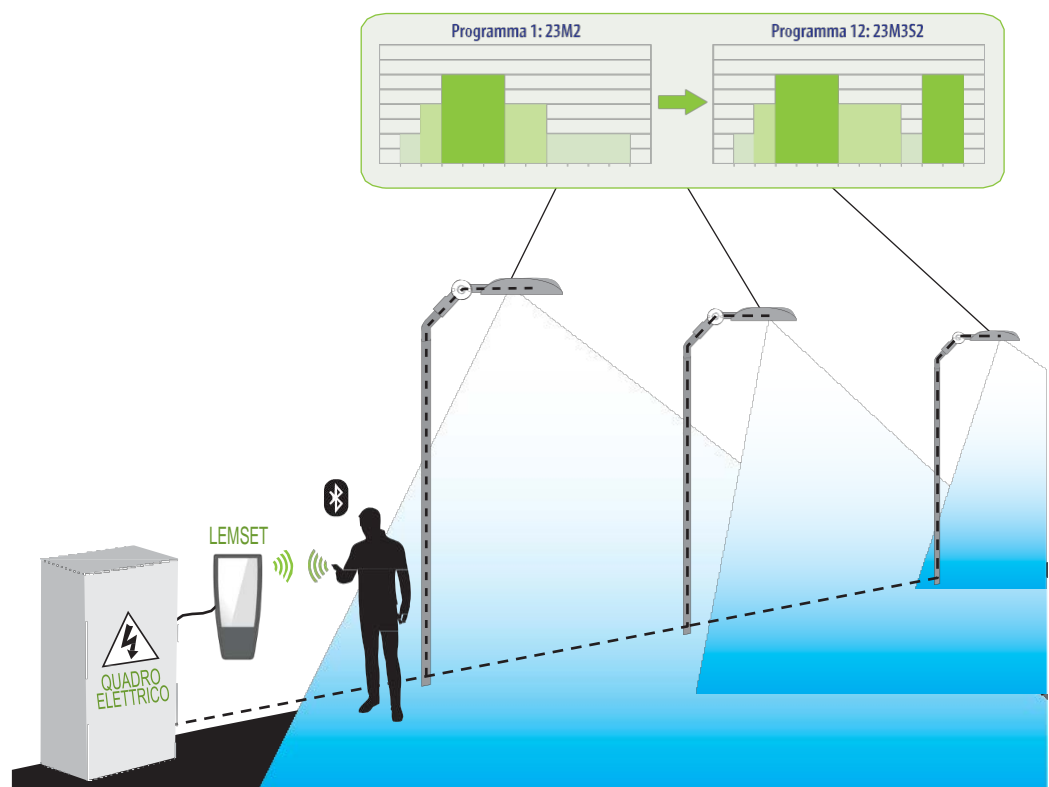
5. LEMSET®

The modification of MERIDIO working cycles takes place in a simple and immediate way using the Lemset external unit.

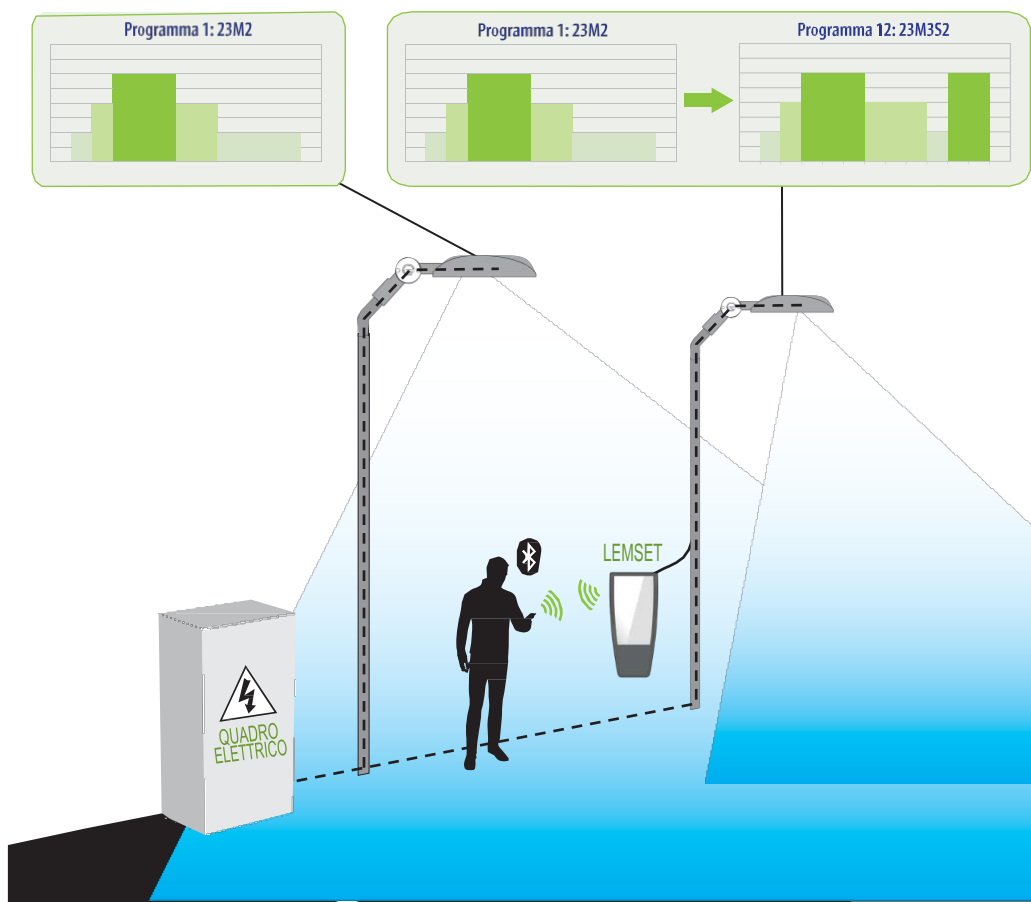
Lemset is an auxiliary device that allows you to directly manage the system for activation or modification of working cycles, choosing among 19 cycles already set or creating other customizable cycles. The device is able to act directly:

1. on the line. In this case Lemset is connected to the electrical panel and all MERIDIO connected to the line at the same time modify their working cycle.
2. on the single light source. The management is done by connecting Lemset to the door of the single pole we want to change the working cycle.

Lemset also allows, with the same conditions, to vary the LED current work, even with MERIDIO already installed.



Simultaneous modification of the working cycle on all Meridio connected to the line of the control cabinet



Modification of the working cycle on a single Meridio

6. MERIDIO® AND THE POINT-TO-POINT REMOTE MANAGEMENT

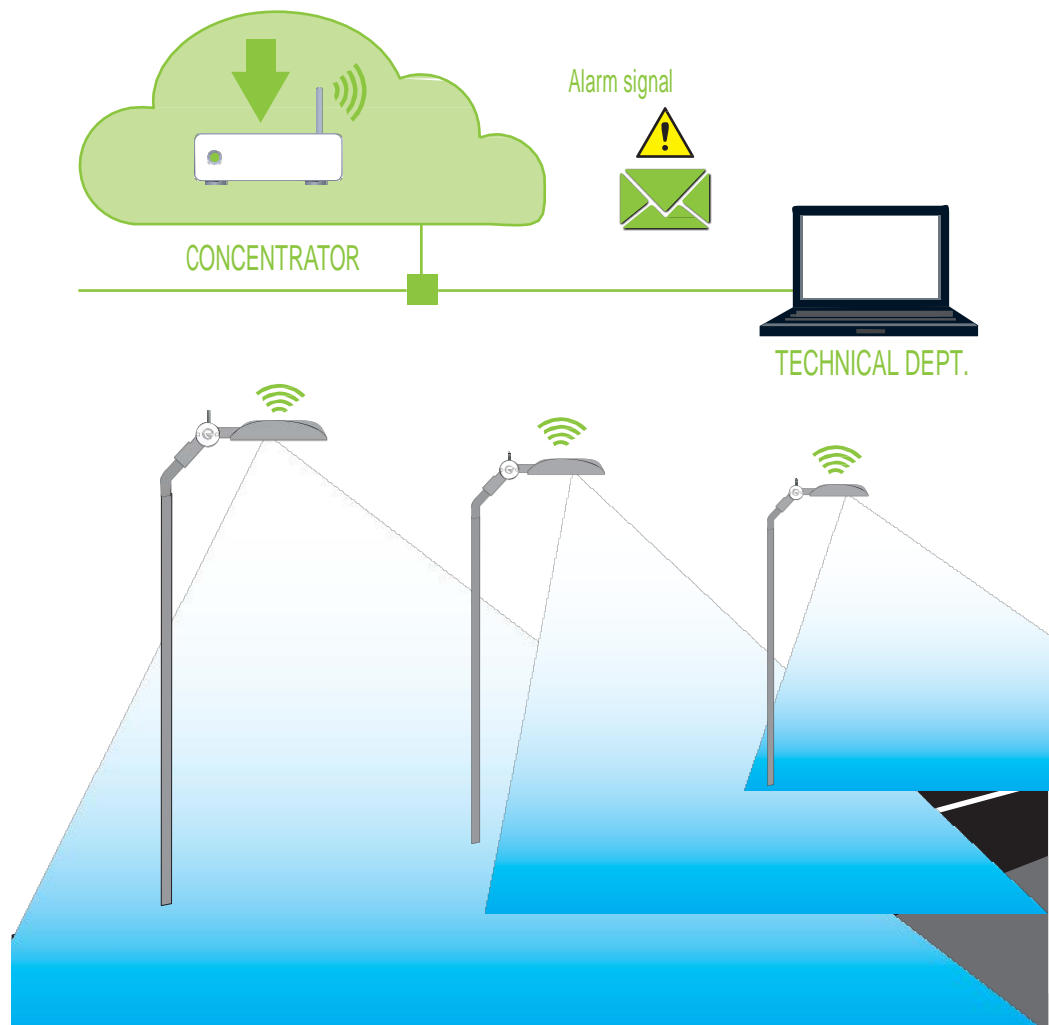
MERIDIO system is suitable for the point-to-point remote management of the public lighting system through the innovative methodology that employs the VHF radio frequency 169MHz (European standard Wireless-M-Bus for the electrical and gas consumption metering), through which each individual street lamp is in direct communication with the operations center. The 169MHz radio frequency was chosen because:

- conventional ripple control systems (Power Line Communication) are expensive and require, for optimal functioning, high-quality electrical lines, not easily found in public lighting lines;
- It does not need intermediate equipments in the switchboard level;
- despite of the frequency in the order of GHz, it allows a very wide area coverage, with a consequent reduction in the use of equipment and therefore lower costs;
- this frequency band has been designed by the European Commission to innovative services such as the Smart Metering.

MERIDIO therefore allows the operator to detect in remote management the energy data and the various electrical parameters of the light source, such as consumption (active and reactive power), voltage, current, cos phi, etc.

Exploiting the features of the unit Dibadi is also possible in remote management these operations:

- the survey of the operational functioning of the light source:
 - dangerous voltage on the metal post
 - device's temperature
 - device's humidity
- survey of the anomalies of operational functioning of the light source
- activation of the power cycles (on/off cycles), customized for each light source
- activation of dimmer cycles, customized for each light source



7. MERIDIO® AND SMART CITY

MERIDIO is studied and realized to integrate the systems of sensors and data transmission of the SLIN169 family of Menowatt Ge, of which the RL transmission devices are part, they can be housed in the compartment of instrumentation of MERIDIO. The RL devices are concerned with:

- detect signals from a network of environmental sensors, such as those for the noise pollution, air quality, liquid level gauges, etc. Such sensors may be those of the CA family, which are designed and manufactured by Menowatt Ge. They follow the evolution of the RL family as regards the transmission standards and complete the catalog of Smart City solutions proposed by Menowatt Ge.
- process the information and send them in 169 MHz radio frequency to an operation control center in Cloud Computing through hub configuration.



8. MERIDIO® AND SMART METERING

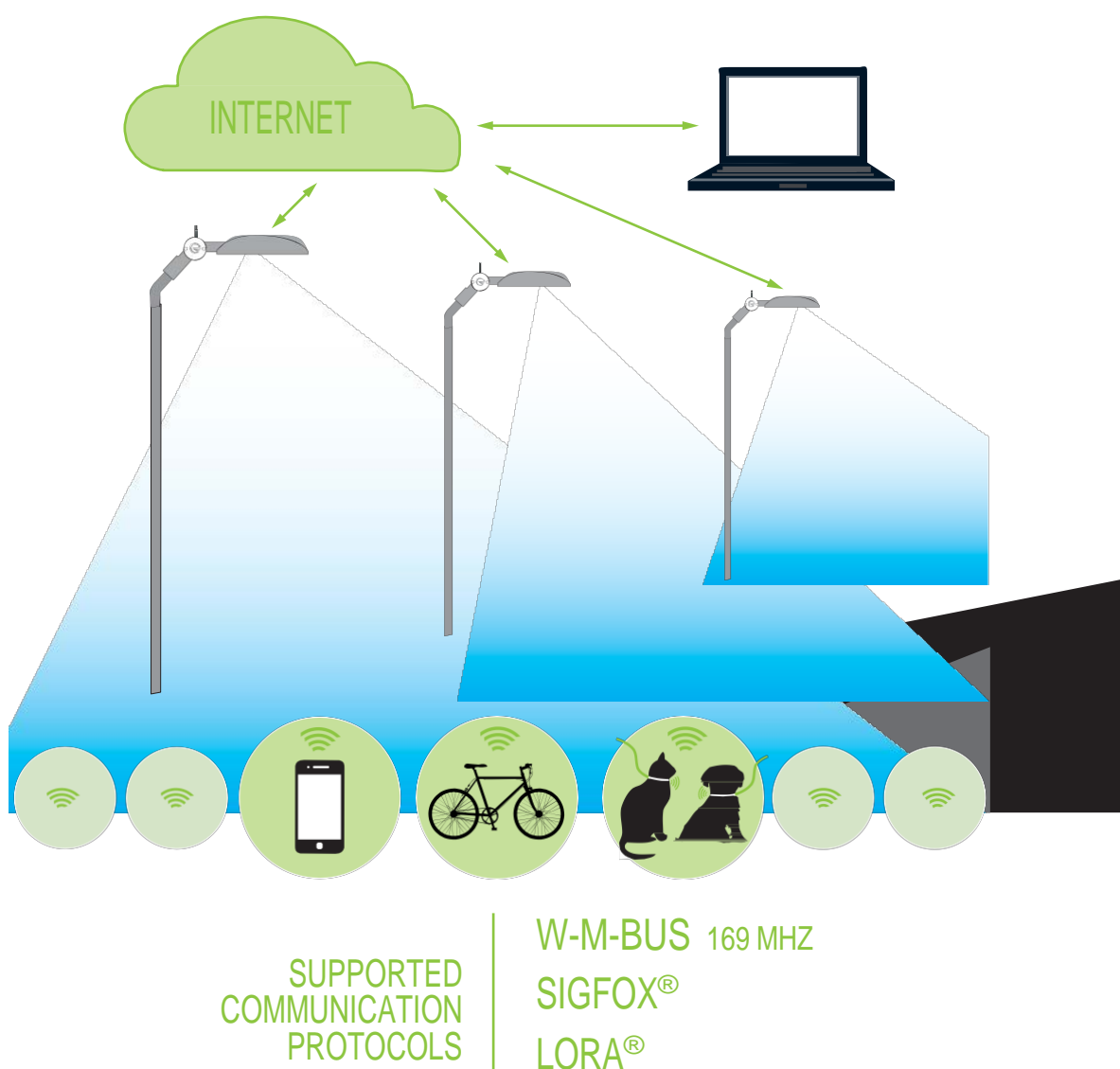
The integration of the RL devices inside MERIDIO allows its usage for the innovative features of the consumption data detection of smart meters for gas and water, thanks to its ability to connect to hub repeaters. The AEEGSI (Electricity and Gas Authority and Water System) have placed the obligation for gas distributors to install smart meter devices at their customers. These devices are able to transmit by radio, in automatic and continuous manner (i.e. without operator intervention), the data relating to consumption. Even distribution companies of drinking water are working at the same way. The perfect MERIDIO's interfacing with smart meters is guaranteed by the fact that all these systems operate in the frequency band 169 MHz, indicated by the European Commission and UNI for Smart Metering services. Considering that gas and water distribution companies must ensure the realization of a radio network infrastructure capable of send/receive data which directly come from meters, it becomes obvious that the usage of the public lighting plant, that is widely spread on territory, represents a strategic advantage for the industry and for the public owner of the lighting network. MERIDIO, equipped with the radio frequency interfaces suitable to manage the consumption data, is the best smart choice.



9. MERIDIO® AND INTERNET OF THINGS

MERIDIO was developed to be placed in an Internet of Things application system (IoT). The device is therefore able to interface with networks operating on typical communication IoT environment protocols, such as Lora® and Sigfox®. The connection with these protocols is achieved through the use of radio interfaces of RL family integrated with Dibadi driver. This allows the management of remote services and telemetry of MERIDIO.

MERIDIO is also able to prepare itself as a support for additional communication protocols, such as 6LoWPAN and others. This avant-garde features makes MERIDIO ready to place itself at the service of web connection network that is intended to involve many different aspects of the city life.



10. OVERVIEW

Applications	Public Lighting System
Optics and light sources	Asymmetrical optics for urban street lighting, extra-urban and pedestrian (various lighting categories) Colour temperature: 4000K CRI ≥ 70 Photobiological safety class: EXEMPT GROUP Photometric classification IES: 38 – 72 – 96 – 100 Efficiency of LED source: 148lm/W @ 700mA, Tj=25°C Maintenance code of the luminous flux: 9
Insulation class	II
Protection degrees	IP66 with Shift Valve Diaphragm Pressure IK 09 (mechanical shock resistance)
LED modules	Removable optical drive
Inclination	Masthead: circular adjustment in steps of 5° Arm: circular adjustment in steps of 5° Fully cut-off on arm with any angulation ULOR: 0
Dimension	See images pag.5
Weight	max. 9,5Kg
Mounting	Arm or Masthead Ø48-76mm
Cabling	Removable plate and wire
Working temp.	-40°C / +50°C
Stockage temp.	-40°C / +80°C
Brands	CE (ENEC pending)
Standards	EN 60598-1, EN 60598-2-3, EN 62471, EN 61347, EN 62384, EN 62031, EN55015, EN 61547, EN 61000-3-2, EN 61000-3-3, EN 61000-4-5, IEC 62778
IPEA	A++

ELECTRICAL AND ELECTRONIC SPECIFICATIONS	
Supply	220-240V 50Hz
LED current	400mA, 550mA, 650mA, 700mA Customization of the operating current in steps of 50mA; Modification of the LED current even with MERIDIO installed on the plant by use of Lemset device; Automatic correction of the supply current of the LED light source through light flux compensation issued to the occurrence of the natural aging of the LED (Constant Lighting System); Measurement of the output current of the LED strings to compensate any variations for thermal drift
Power factor	>0,98 (full power)
Standby power	<0,4W
Disconnecting switch	Included
Network connection	For wire max. 4mm ² Cable already wired with plug-socket system without opening the luminaire
Protections against surges and overvoltage	8KV For overvoltage < 275Vac and accidental loss of neutral with no time limits, with automatic reset (system OVP-NFP)
Electronic ballast Dibadi efficiency	>0,90 (a 650mA)
Control and lighting system	Inside the luminaire Functioning independently without additional wires along the lighting system: <ul style="list-style-type: none"> • Automatic dimming with 19 work cycles (profiles) predefined • Dimming with custom profiles by using LEMSET⁽¹⁾ (produced by Menowatt Ge Spa), optional Personalized work cycles via Internet through the applet MyLed • Dimming via radio frequency with the RL device
Measurement of dangerous voltage on the pole	Dangerous native voltage control function on the pole with report alarm to the Control Center (with use of the remote control system)
Datalogger	Storage function of the working parameters and events of Meridio and download on PC

RELIABILITY FEATURES		
Average fault rate percentage	F_{05}, F_{12}	
Useful life (survival rate of 50% of the components of LED lamps)	550mA (Ta=25°C)	700mA (Ta=25°C)
	L ₈₀ (10k), TM-21 calculated 234.000hr actual >80.000hr	L ₈₀ (10k), TM-21 calculated 325.000hr actual >80.000hr

CONSTRUCTION AND MATERIALS	
Arms	Die-cast aluminum EN AB 46100. Powder coating, standard UNI EN 1706
Top cover	Die-cast aluminum EN AB 46100. Powder coating, standard UNI EN 1706
Bottom cover	Nylon reinforced with 30% glass
Screen	4 mm tempered glass with high transparency
Joint	Polyurethane rubber EPDM
Colour	Anthracite, RAL 7016 Traffic Black, RAL Powder coating
Heatsink	Tucked inside the unit (see drawings)

RADIO SYSTEM FEATURES W-M-BUS 169MHZ (FOR POINT-TO-POINT REMOTE MANAGEMENT, SMART CITY, SMART METERING)	
Radio protocols	CEI EN 13757-3, CEI EN 13757-4 (Wireless M-Bus)
Frequency bands	VHF 169,4-169,8125MHz
Minimum modulations	GMSK/GFSK/4GFSK
Data rate	Up to 19200bit/s
Max RF output power	Up to 500mW (+27dBm)
Minimum receiver sensitivity	-117dBm
Data transmission	Bidirectional
Data encryptions	AES-128 (optional)
Antenna	detached lambda/4 with coaxial cable RG174 provided
Supply	230 Vac with back-up battery

SIGFOX® RADIO SYSTEM FEATURE (FOR POINT-TO-POINT REMOTE MANAGEMENT, SMART CITY, SMART METERING)	
Radio protocols	Sigfox®
Tension	AC
Tension Level	230V
Modulation type	UNB (Ultra-Narrow Band) DBPSK uplink GFSK downlink
Work frequency	868MHz ETSI 300-220 (nominal 868,13 MHz +/- 100 kHz)
Sigfox® Classification	1u SIGFOX classified
Daily transmission numbers	140 messages uplink (max 12 byte each) 4 messages downlink (max 8 byte each)
Latency	3-5 msec
Antenna	External dipole with RG174 coax cable

LORA® RADIO SYSTEM FEATURE (FOR POINT-TO-POINT REMOTE MANAGEMENT, SMART CITY, SMART METERING)	
Radio protocols	LoRa®
Frequency band	433/868 MHz ISM
Channel width	8x125 kHz
Range	2-5 km (urban), 15 km (rural)
End node transmit power	< 14 dBm
Safety and privacy	AES 128 – protection against “Man-in-the-Middle”
Uplink data rate	300bps to 50kbps
Downlink data rate	300bps to 50kbps
Antenna	External dipole with RG174 coax cable

LUMINOUS FLUX* INCLUDING OPTICAL SYSTEM (T _a =25°C, 4000K, lm)				
Current	1 Module Meridio S	2 Modules Meridio M	3 Modules Meridio L	4 Modules Meridio XL
400mA	1849	3698	5547	7396
550mA	2361	4723	7084	9445
650mA	2785	5571	8356	11141
700mA	2949	5897	8846	11794

* Data related to RNA configuration

DEVICE POWER (T _a =25°C, 4000K, W)				
Current	1 Module Meridio S	2 Modules Meridio M	3 Modules Meridio L	4 Modules Meridio XL
400mA	15	30	45	60
550mA	20	40	60	80
650mA	25	49	73	98
700mA	26	52	77	103

LUMINOUS EFFICIENCY* INCLUDING OPTICAL SYSTEM (T _a =25°C, 4000K, lm/W)				
Current	1 Module Meridio S	2 Modules Meridio M	3 Modules Meridio L	4 Modules Meridio XL
400mA	122	122	123	123
550mA	119	118	118	119
650mA	114	114	114	114
700mA	114	115	114	114

* Data related to RNA configuration

Given the high technological content of the Meridio system, Menowatt Ge Spa reserves the right to modify this document without notice.

WARNING: pending patent procedure.



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Certificato N° 33957/16/S
organizzazione con sistema di Gestione
per la Qualità certificato UNI EN ISO 9001:2015

The quality system is certified Menowatt Ge according to UNI EN ISO 9001: 2015
Menowatt Ge has SOA certification.

Menowatt Ge Energy Service Company is accredited by the Authority for Electricity and Gas.

Menowatt Ge is certified according to UNI EN ISO 11352 (ESCo management).

Menowatt Ge is a member of the Italian Electrotechnical Committee (IEC) and Italian Organization for Standardization (UNI)