

## **Panasonic**

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## Guidelines for Decision Making in Street Lighting Projects.

## ► Lighting Requirements in Streets

When designing or making changes in street lighting, it is important to first understand the light requirements of the road. Street lighting in India is classified in the Indian Standard (BIS, 1981), based on the traffic density of the road (see Table 1). Based on the classification in the code, the Lighting Designer matches the category of road, and designs and provides installation specifications for the street lighting system.

#### ► Retrofit or New Installation

Based on the purpose and lighting requirements of the roadway as well as the age of the existing lighting infrastructure, decisions have to be taken whether new design and installation of street lighting is required, or whether project goals can be accomplished by retrofitting the existing lighting system. To retrofit existing street lighting, it must be determined whether existing poles can be used with replacement of only the luminaires.

#### ► Retrofitting

Retrofitting is generally considered for energy and maintenance savings. Sometimes it is necessary to retrofit or replace luminaires or a pole – e.g., in cases where light is not distributed correctly, or where a pole has been damaged. Opportunities for significant efficiency improvements are limited in these cases, since the pole location does not change.

## ► New Installation or Replacement

This option involves removing existing street lighting and installing new equipment, or designing and installing a completely new system where street lighting did not previously exist. This option provides greater flexibility in the design with regard to location and number of poles. If a main street improvement project is planned, new poles and lighting fixtures may be the best option for the most effective energy-efficient design of the street lighting system.

Table 1: Classification of Roads (BIS, 1981)

Group	Description
A1	For very important routes with rapid and dense traffic where the only considerations are the safety and speed of the traffic and the comfort of drivers
A2	For main roads with considerable mixed traffic like main city streets, arterial roads, and thoroughfares
B1	For secondary roads with considerable traffic such as local traffic routes, and shopping streets
B2	For secondary roads with light traffic
С	For residential and unclassified roads not included in the previous groups
D	For bridges and flyovers
F	For roads with special requirements such as roads near airports, and railways

# **Cutoff luminaire:** A luminaire whose light distribution is characterized by rapid reduction of luminous intensity in the region between about $80^{\circ}$ and the horizontal. The direction of maximum intensity may vary but should be below 65°. The principal advantage of the cutoff system is the reduction of glare. Semi-cutoff luminaire: A luminaire whose light distribution is characterized by a less severe reduction in the intensity in the region of 80° to 90°. The direction of maximum intensity may vary but should be below 75°. The principal advantage of the semi-cutoff system is a greater flexibility in siting. Non-cutoff luminaire: A luminaire where there is no limitation on light distribution at any angle. This luminaire is permissible when a certain amount of glare may be accepted (when daytime appearance of the street is important) and when the luminaires are large and have reduced brightness.

Table 2: Recommended Levels of Illumination (BIS, 1981)

Types of Road	Road Characteristics	Average Level of Illumination on Road Surface in Lux	Ratio of Minimum/ Average Illumination	Type of Luminaire Preferred
A-1	Important traffic routes carrying fast traffic	30	0.4	Cutoff
A-2	Main roads carrying mixed traffic like city main roads/streets, arterial roads, throughways	15	0.4	Cutoff
B-1	Secondary roads with considerable traffic like local traffic routes, shopping streets	8	0.3	Cutoff or semi-cutoff
B-2	Secondary roads with considerable traffic like local traffic routes, shopping streets	4	0.3	Cutoff or semi-cutoff

Table 3: Specifications for Street Lighting Poles (BIS, 1981)

	Overall len	gth 11 m + 25 mm (	base plate)	Overall length 9.5 m +25 mm (base plate)			
Section	Outside Dia (mm)	Thickness (mm)	Length (mm)	Outside Dia (mm)	Thickness (mm)	Length (mm)	
Bottom section	139.7	4.85	5600	165.1	4.85	5000	
Middle section	114.3	4.5	2700	139.7	4.5	2250	
Top section	88.9	3.25	2700	114.3	3.65	2250	
Planting depth		1800 mm		1800 mm			
Nominal weight of the pole		160 kg			147 kg		

Tolerance on mean weight for bulk supply is 7.5 % Tolerance for single pole weight is 10%

Table 4: Mounting Height of Luminaires (BIS, 1981)

Group	Recommended Mounting Height
А	9 to 10 meters
В	7.5 to 9 meters
Others (roads bordered by trees)	Less than 7.5 meters

## Spacing

Spacing is the distance, measured along the center line of the road, between successive luminaires in an installation. To preserve longitudinal uniformity, the space-height ratio should generally be greater than 3.

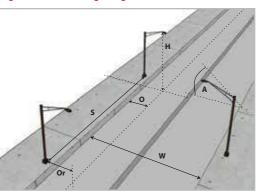
#### Outreach

Outreach is the horizontal distance between the center of the column and the center of the luminaire and is usually determined for architectural aesthetic considerations.

#### Overhang

Overhang is the horizontal distance between the center of a luminaire mounted on a bracket and the adjacent edge of a carriage way. In general, overhang should not exceed one-fourth of the mounting height to avoid reduced visibility of curbs, obstacles, and footpaths.

Figure 1: Street Lighting Features (BIS, 1981)



- A: Angle of Tilt
- H: Mounting Height
- 0: Overhang
- Or: Outreach
- S: Spacing
- W: Width

## Siting of Luminaires

## Four fundamental types of siting arrangements are recognized in street lighting (BIS, 1981).

- 1- Single side arrangement: where all the luminaires are on one side of the road. This is recommended only when the width of the road is equal to or less than the mounting height.
- **2- Staggered arrangement:** where the luminaires are placed on either side of the road in a zigzag formation. This is recommended when the road width is 1 to 1.5 times that of the mounting height.
- **3- Opposite mounting:** where the luminaires are situated on either side of the road opposite to one another. This is advisable for road widths more than 1.5 times that of the mounting height.
- **4- Axial mounting:** where the luminaires are placed along the axis of the road. This is recommended for narrow roads the width of which does not exceed the mounting height.

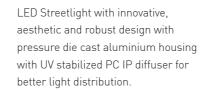


## 15W/20W/25W/30W/35W











- Parking Area
- Road Lighting
- Residential Colonies
- Internal Road
- Industrial Periphery





High on Efficacy Efficacy > 110 lm/W

Robust Design

light distribution.

Innovative, aesthetic and robust design with pressure die cast

stabilized IP PC Lens for better

aluminum housing and UV



Wide Operating Voltage





Safe & Reliable High Surge Protection: 6KV Power Factor > 0.95







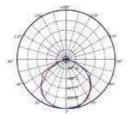
High Performance Electronic Driver 15W / 20W/ 25W: Non Potted Driver 30W / 35W: Potted Driver



Higher Life Life: 50,000 BH

### Light Distribution Diagram

Technical Diagram



## **TECHNICAL SPECIFICATION**

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM27158	15W	240V	0.070A	0.95	≤ 10%	5700K	0.85
PSTM27208	20W	240V	0.095A	0.95	≤ 10%	5700K	0.85
PSTM27258	25W	240V	0.115A	0.95	≤ 10%	5700K	0.85
PSTM27308	30W	240V	0.135A	0.95	≤ 10%	5700K	0.85
PSTM27358	35W	240V	0.150A	0.95	≤ 10%	5700K	0.85

## 45W/60W









LED Streetlight with innovative, aesthetic and robust design with pressure die cast aluminium housing with UV stabilized PC IP lens for better light distribution.

#### Applications

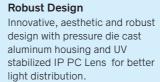
- Parking Area
- Road Lighting
- Residential Colonies
- Internal Road
- Industrial Periphery





## High on Efficacy Efficacy > 110 lm/W







## High Performance **Electronic Driver**

Potted Driver



## Wide Operating Voltage

Operating Voltage: 140-270V AC



## Safe & Reliable

Higher Life

Life: 50,000 BH

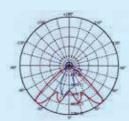
High Surge Protection: 6kV for 45W, 4kV + 10kV SPD inbuilt for 60W Power Factor >0.95







## Light Distribution Diagram



Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM27458	45W	240V	0.215A	0.95	≤ 10%	5700K	1.20
PSTM27608	60W	240V	0.265A	0.95	≤ 10%	5700K	1.20

## 90W









LED Streetlight with innovative , aesthetic and robust design with pressure die cast aAluminium housing with frame and IP PC lens for better light distribution .

#### Applications

- Parking Area
- Road Lighting
- IT Parks
- Residential Colonies
- Internal Road
- Industrial Periphery



## High on Efficacy Efficacy > 100 lm/W

Robust Design

light distribution.

Innovative, aesthetic and robust design with pressure die cast

stabilized IP PC Lens for better

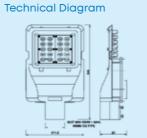
aluminum housing and UV



Wide Operating Voltage Operating Voltage: 140-270V AC







## Light Distribution Diagram



High Performance Electronic Driver 15W / 20W/ 25W: Non Potted Driver 30W / 35W: Potted Driver



Higher Life Life: 50,000 BH

## TECHNICAL SPECIFICATION

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM22908R1	90W	240V	0.395A	0.95	≤ 10%	5700K	2.5

## 120W/135W/150W









LED Streetlight with innovative, aesthetic and robust design with pressure die cast aluminium housing with frame, toughened glass for better light distribution .

#### **Applications**

- Parking Area
- Road Lighting
- IT Parks
- National Highway





## High on Efficacy Efficacy > 110 lm/W

Robust Design



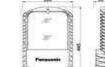
## Wide Operating Voltage

Operating Voltage: 140-270V AC



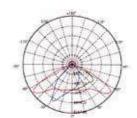
## Safe & Reliable

High Surge Protection: Power Factor: >0.95



Technical Diagram

## Light Distribution Diagram



## High Performance **Electronic Driver**

Potted Driver for Vibration proof -Zero maintenance

Innovative, aesthetic and robust

glass diffuser and Optics Type II

distribution for better uniformity

design with pressure die cast Aluminum Housing and Toughened



Higher Life Life: 50,000 BH

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM22CD8	120W	240V	0.530A	0.95	≤ 10%	5700K	4.4
PSTM231358	135W	240V	0.595A	0.95	≤ 10%	5700K	4.4
PSTM23FG8	150W	240V	0.655A	0.95	≤ 10%	5700K	4.4

## 180W/200W







LED Streetlight with innovative, aesthetic and robust design with pressure die cast Aluminium housing with frame and toughened glass for better light distribution .

#### **Applications**

- Parking Area
- Road Lighting
- IT Parks
- National Highway





High on Efficacy Efficacy > 110 lm/W

Robust Design

distribution .



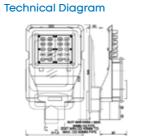
Wide Operating Voltage Operating Voltage: 140-270V AC



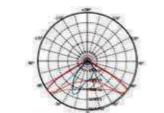
High Surge Protection: 4kV+10kV SPD inbuilf Power Factor > 0.95



Safe & Reliable



## Light Distribution Diagram





#### **High Performance Electronic Driver**

Potted Driver for Vibration proof -Zero maintenance

Innovative, aesthetic and robust

design with pressure die cast

aluminum housing with frame

and toughened glass for better



Higher Life Life: 50,000 BH

## **TECHNICAL SPECIFICATION**

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM23KL8	180W	240V	0.790A	0.95	≤ 10%	5700K	5.7
PSTM23MN8	200W	240V	0.870A	0.95	≤ 10%	5700K	5.7

## 220W/250W









LED Streetlight with innovative, aesthetic and robust design with pressure die cast aluminium housing with frame and UV stabilized toughened glass for better light distribution.

#### Applications

- Parking Area
- Road Lighting
- IT Parks
- National Highway





## High on Efficacy

Efficacy > 110 lm/W



## Robust Design

High Performance

Innovative, aesthetic and robust design with pressure die cast aluminum housing with frame and UV stabilized toughened glass for better distribution.



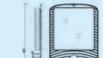
## Wide Operating Voltage

Operating Voltage: 140-270V AC



## Safe & Reliable

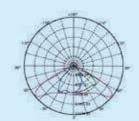
High Surge Protection: Power Factor: >0.95



Technical Diagram

## Light Distribution Diagram

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Electronic Driver
Potted Driver for Vibration proof -
7

Zero maintenance

Higher Life Life: 50,000 BH

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM230P8	220W	240V	0.942A	0.95	≤ 10%	5700K	9.8
PSTM23RS8	250W	240V	1.090A	0.95	≤ 10%	5700K	9.8

## 60W/75W/90W









Bloom street light luminaire comprises of die cast Aluminium housing with frame and Toughened Glass, pipe mounting. This luminaire is recommended for illuminating access roads, traffic routes etc.

## Applications

- Parking Area
- Road Lighting
- Residential Colonies • Internal Road
- Industrial Periphery







Wide Operating Voltage Operating Voltage

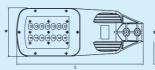
Safe & Reliable



High Surge Protection:

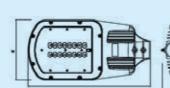
4kV + 10kV SPD inbuilt

Power Factor >0.95



Technical Diagram







#### Robust Design

Innovative, aesthetic and robust design with pressure die cast aluminum housing and UV stabilized toughened glass for better light distribution.

High Performance Electronic Driver

Constant Current Integral Driver.



Higher Life
Life: 50,000 BH

## **TECHNICAL SPECIFICATION**

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM16608	60W	240V	0.250A	0.95	≤ 10%	5700K	1.6
PSTM16758	75W	240V	0.320A	0.95	≤ 10%	5700K	2.6
PSTM16908	90W	240V	0.380A	0.95	≤ 10%	5700K	2.6

## 120W/150W/180W









Bloom street light luminaire comprises of die cast Aluminium housing with frame and Toughened Glass, pipe mounting. This luminaire is recommended for illuminating access roads, traffic routes etc.

#### **Applications**

- Parking Area
- Road Lighting
- Residential Colonies
- Internal Road
- Industrial Periphery



## High on Efficacy

Efficacy > 110/120 lm/W



## Robust Design

Innovative, aesthetic and robust design with pressure die cast aluminum housing and UV stabilized toughened glass for better light distribution.



## Wide Operating Voltage

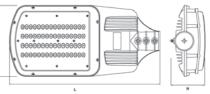
Operating Voltage: 220-240V AC

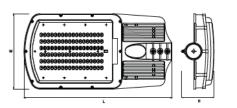


## Safe & Reliable

High Surge Protection: 4kV + 10kV SPD inbuilt for 60W Power Factor >0.95







[ ]	High Performance Electronic Drive
1 +	Constant Current Integral Driver.

Higher Life Life: 50,000 BH

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM16CD8	120W	240V	0.500A	0.95	≤ 10%	5700K	3.6
PSTM16CD8A*	120W	240V	0.500A	0.95	≤ 10%	5700K	4.8
PSTM16FG8	150W	240V	0.640A	0.95	≤ 10%	5700K	4.8
PSTM16FG8A*	150W	240V	0.640A	0.95	≤ 10%	5700K	4.8
PSTM16KL8	180W	240V	0.770A	0.95	≤ 10%	5700K	6.6

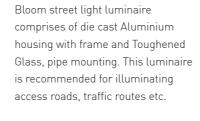
<sup>\*</sup>A-Series with 1-10V analog dimming.

## 200W/220W/250W









#### **Applications**

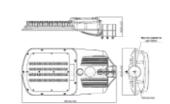
- IT Park
- Road Lighting
- National Highway
- Industrial Periphery



## High on Efficacy High on Emeas, Efficacy > 110/135 lm/W



Wide Operating Voltage Operating Voltage: 220-240V AC



Technical Diagram

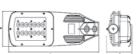
#### Robust Design

Innovative, aesthetic and robust design with pressure die cast aluminum housing and UV stabilized toughened glass for better light distribution.



## Safe & Reliable

High Surge Protection: 4kV + 10kV SPD inbuilt Power Factor > 0.95







#### High Performance Electronic Driver Constant Current Integral Driver.



## Higher Life Life: 50,000 BH

## TECHNICAL SPECIFICATION

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM16MN8	200W	240V	0.855A	0.95	≤ 10%	5700K	6.6
PSTM160P8	220W	240V	0.940A	0.95	≤ 10%	5700K	6.6
PSTM16RS8N	250W	240V	1.070A	0.95	≤ 10%	5700K	7.0
PSTM16RS8	250W	240V	1.070A	0.95	≤ 10%	5700K	8.0

## 60W/75W/90W/100W









Bloom street light luminaire comprises of die cast Aluminium housing with frame and Toughened Glass, pipe Amounting. This luminaire is recommended for illuminating access roads, traffic routes etc.

#### Applications

- Parking Area
- Road Lighting
- Residential Colonies
- Internal Road
- Industrial Periphery





## High on Efficacy Efficacy > 110 lm/W



## Robust Design

High Performance

**Electronic Driver** 

**TECHNICAL SPECIFICATION** 

Innovative, aesthetic and robust design with pressure die cast aluminum housing and UV stabilized toughened glass for better light distribution.

Constant Current Integral Driver.



## Wide Operating Voltage Operating Voltage:

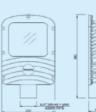
240V AC



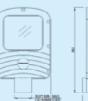
## Safe & Reliable

High Surge Protection: 4kV + 10kV SPD inbuilt Power Factor >0.95













## Higher Life Life: 50,000 BH

Product Code	System Wattage (W	Input Voltage (V)	Mains Current (A)	Power Factor	THD	Colour Temp. (CCT)	Weight (kg)
PSTM22608	60W	240V	0.260A	0.95	≤ 10%	5700K	3.0
PSTM22758	75W	240V	0.313A	0.95	≤ 10%	5700K	3.0
PSTM22908	90W	240V	0.395A	0.95	≤ 10%	5700K	3.0
PSTM22AB8	100W	240V	0.435A	0.95	≤ 10%	5700K	3.0
PSTM22CD8	120W	240V	0.530A	0.95	≤ 10%	5700K	4.4
PSTM22FG8	18NW	24NV	0.655Δ	N 95	< 10%	5700K	4.4



## INTELLIGENT STREET LIGHTING SOLUTION

Traditionally, street lights exist in either "On" or "Off" state leading to wastage of energy, increased costs when over illuminated and cause safety and security hazards when under illuminated

The intricate requirements of the transportation network demands varied levels of illumination based on ever changing situations. Smart Street light contribute to more livable cities by helping to improve safety and reduce congestion, reduce energy cost.

The need of the hour is Smart lighting, Lighting that is efficient, can be controlled from a remote location and can be programmed according to one's convenience.

Introducing CITY CONNECTED, an intelligent solution to manage all your street lighting needs.

CITY CONNECTED street lights can be remotely monitored and controlled by any device having an internet access, program your street lights for changing situations, monitor individual parameters, control dimming, manage assets, generate actionable reports, analyze, optimize and much more.

Usher in the future with CITY CONNECTED system today! With Panasonic leading the way, the future is smart and bright.

## **BENEFITS**



Seamles



Remote Monitoring and Control



Alarms and Events



High System



**((☆)**)

GIS Mapping



Communication Agnostic

There are two common ways of automatic smart streetlight :-

## 1) Group Control Lighting management system

- Controller located in feeder panel and control streetlights distributed on 3 phase under that feeder.
- It can only turn streetlights ON or OFF. This controller communicate with central server using GPRS, received command and execute.

#### 2) Individual addressable streetlight management system

- Central controller can be placed in feeder panel
- Central controller talk to individual streetlight through wireless
- Communication to streetlight can be either turn them ON/OFF or DIM
- These controller also report faults with luminaire.

## **System Architecture**



## LED SMART STREET LIGHT

Excellent energy efficient performance

IK10, IP66, separate optical & control compartments

Potted driver, IP67

Lamp controller IP67 with lighting protection



## DASHBOARD, REPORTS & ANALYTICS

Powerful dash boarding
Generate actionable reports
Export logs and reports
Predict your maintenance

activity



### **USER & ASSET MANAGEMENT**

Manage user permissions
Generate multiple projects
Tag assets and monitor

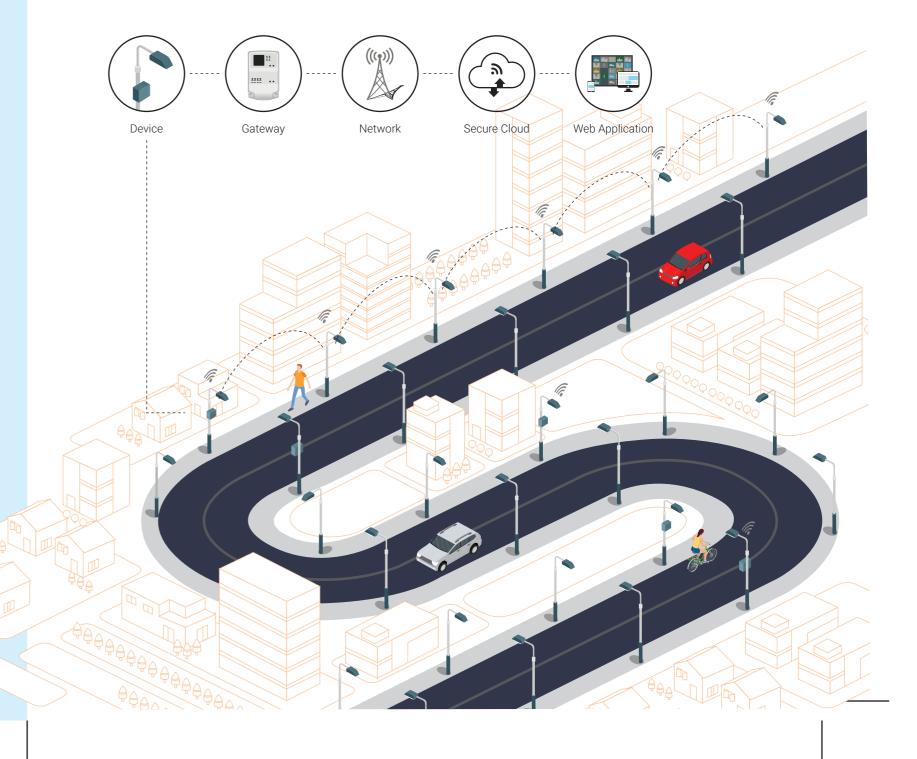
individual parameters

Sort by street, category and groups

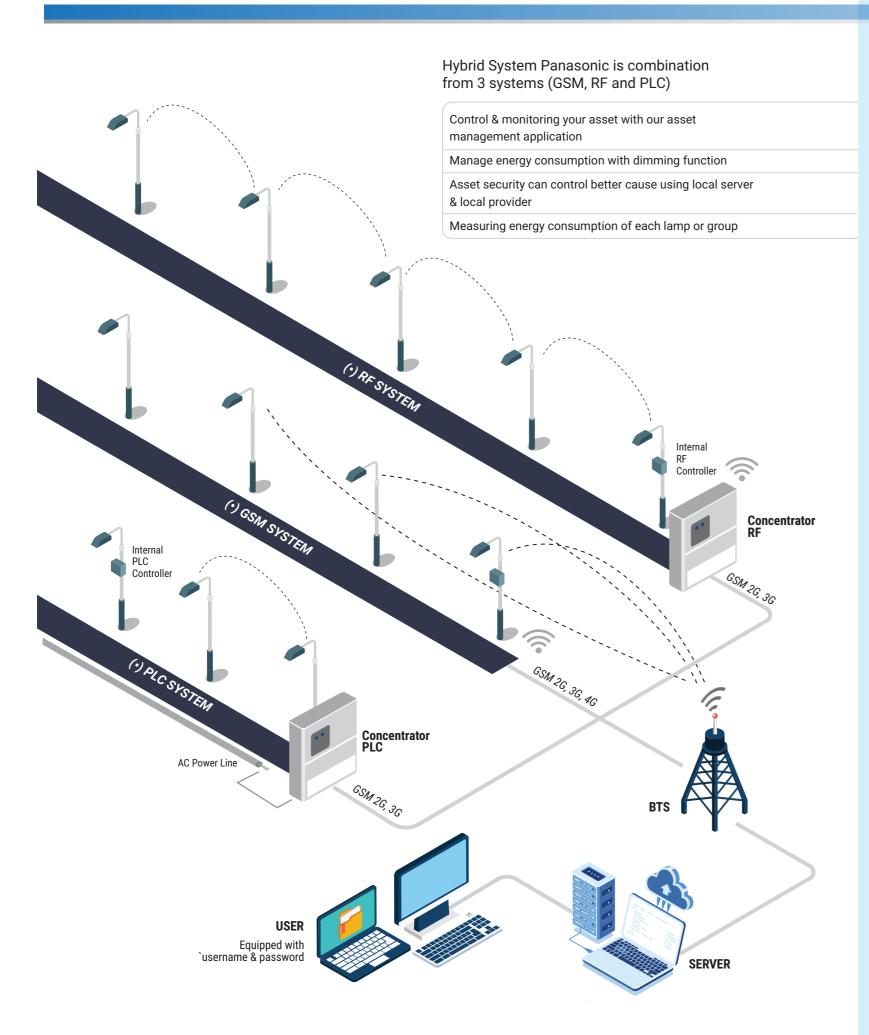


#### **WEB APPLICATION**

Secure and safe
Intuitive user interface
Scalable, flexible & responsive
Access via PC, tablet or phone



## **SMART STREET LIGHTING**



## **TYPICAL USING SMART STREET LIGHT**

With Panasonic Smart System, we can use street light more flexible, with GSM, RF-GSM and PLC-GSM.

#### RF - GSM PLC - GSM Separately, with minimalist totally More efficient in grouping area, More efficient in grouping area with a of the lamp, such as 1-10 lamp. 1 Concentrator can control until wiring standard. 1 Concentrator can 200 luminaire. control more than 200 luminaire. And Lamp must be in good signal suitable in street such as street at the Can working in areas where the mountain. GSM signal is unequal. No need panel controller. PLC with internal controller suitable to Such as subway, underpass, use in the pole with constant distance. tunnel, etc. PLC with external controller suitable to Equipped with measurement use in the pole with not constant and control features in the distance. Concentrator panel. Can working in areas where the GSM signal is unequal, because using cable for the communication Communication of the lamp using cable PJU and not easily distracted from external signal

From the advantages and disadvantages of each TECHNOLOGY of the LIGHTS, HYBRID TECHNOLOGY more suitable to complete each other, so that is a RELIABLE system.

#### Conclusion :

Hybrid Technology is integrated of system GSM, system RF-GSM and system PLC-GSM so that it can be easily applied to all areas can be easily to control of the lamp from web using internet.

## **FEATURES**

	GSM	RF (Zigbee – GSM)	PLC – GSM
Distance	~ 20 to 30km (Lamp to BTS)	~ 1 50m (Lamp `Lamp) (Lamp to DCU)	~ 100m (Lamp to Lamp) (Lamp to DCU)
Structure	Client – Server	Mesh, Star, Ad HOC, P2P	Power line communication
Frequency	900Mhz – 1800Mhz	RF: 2.4Ghz / ISM band (Country specific) GSM: 900Mhz – 1800Mhz	PLC: Primary – 125 – 140kHz PLC: Secondary – 95 – 125 kHz GSM: 900Mhz – 1800Mhz
Speed	86.5Kbps - 10Mbps	256Kbps	5.5Kbps
Nos of Lamps	10k to 15k lamps/BTS	150-200 lamps in group/DCU	150-200 lamps in group/DCU
Remarks	Can be used where     public GSM is present	1. Unlicensed band	Communication depends upon the existing wiring network
	Communication depends upon     weather conditions and     network congestion	2. Additional DCU required	2. Additional DCU required
	3. High Network Subscription cost	3. Low network subscription cost	3. Low network subscription cost

# CITY CONNECTED

## SMART SYSTEM STREET LIGHT

LED Smart Street Light Panasonic is the best choice for city lighting, lighting system can control and monitoring, a more economic, effective and efficient.

## **SPECIFICATIONS**

Input Power	40W	90W	120W	200W				
Color Temperature	5000K							
V AC Input	AC 100 - 240V							
Frequency	50 - 60 Hz							
Power Factor	> 0.95							
THD		< 20%						
IP Module	IP67							
IP Driver	IP67							
IP Lamp	IP66							
Cover Lens	IK-10							
Body	Die Casting Aluminum							
Life Time	50000 H							
Max Surge	15 kV [10 kA]							
Dimmable	0 - 100%							
Dimension LxWxH (mm)	492x385x165	555x385x165	630x385x165	780x385x165				
Diameter Hole Pole	Φ 71mm							
Weight	6.5 Kg 7.7 Kg 8.95 Kg 11.2 Kg							
Remark	1. Control each lamp or group 2. Certificate and testing report 3. Complete and available spare parts							

#### Cloud Application Overview







Project & User Control



Street Lighting Configuration



Direct Monitoring Lamp Condition



Reporting & Evaluation

## System Interface

