

# NEW GENERATION LED EQUIPPED ALUMINUM OVERHEAD TRAFFIC SIGNAL POLE

## DEFINITIONS:

**Extrusion:** It is the continuous Plastic forming process under pressure with hot and cold materials.

**Aluminum Profile:** It is the Aluminum Alloy products obtained from extrusion process.

**Extrusion Ratio:** It is the ratio of the area of the raw materials entering the mold to the ones exiting it.

**Eloxal:** It is the surface process made to make the Aluminum profile resistant to corrosion and external effect as well as giving it a decorative look, by subjecting its surface to anodic oxidation with electrolysis method.

**Paint :** It is applied after bending and mechanical processes. The use of the right paint components and thinners for paint applications must be taken care of. This is the responsibility of the applicator. The paint applicator must have experience and technical specification information.

TRAFFIC SIGNAL POLES WILL BE PRODUCED ACCORDING TO TSEK 519 SPECIFICATIONS.

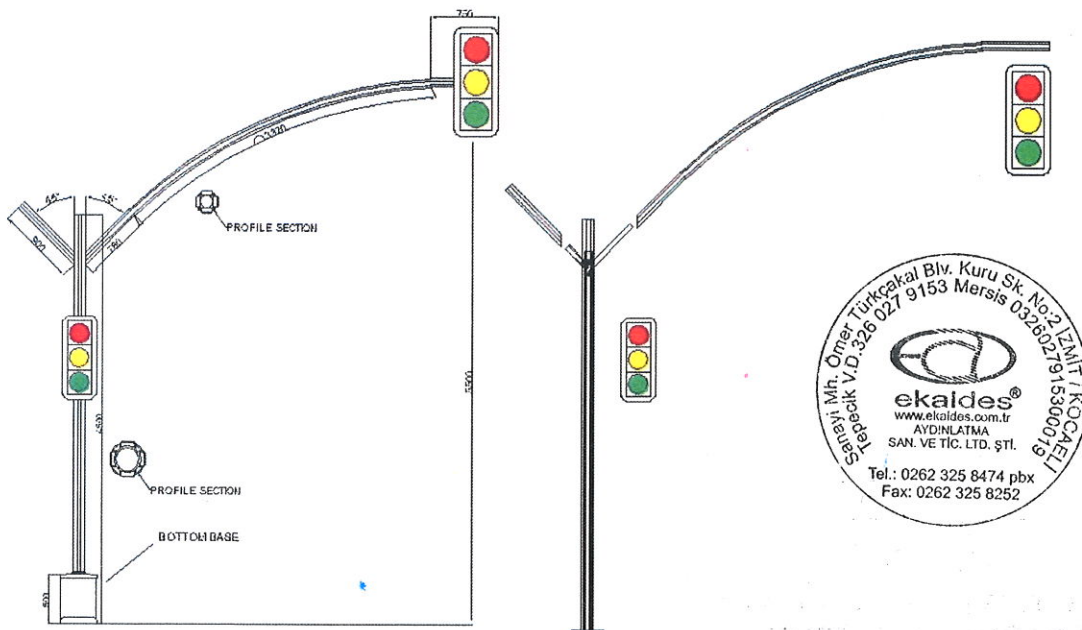
**1- The Aluminum Chemical mixtures used:** The aluminum raw material alloy to be used in manufacturing is EN-AW 6060 and the alloying elements must be within the limits specified in the table below.

Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	Other Total	Al
Min	0,41	0,17			0,44						
Max	0,46	0,22	0,02	0,05	0,48	0,02	0,02	0,02	0,05	0,15	Rest

## 2- The General View of the Overhead Traffic Signal Pole

2.1 The general view of the overhead traffic signal pole will be according to the technical drawing shown below.

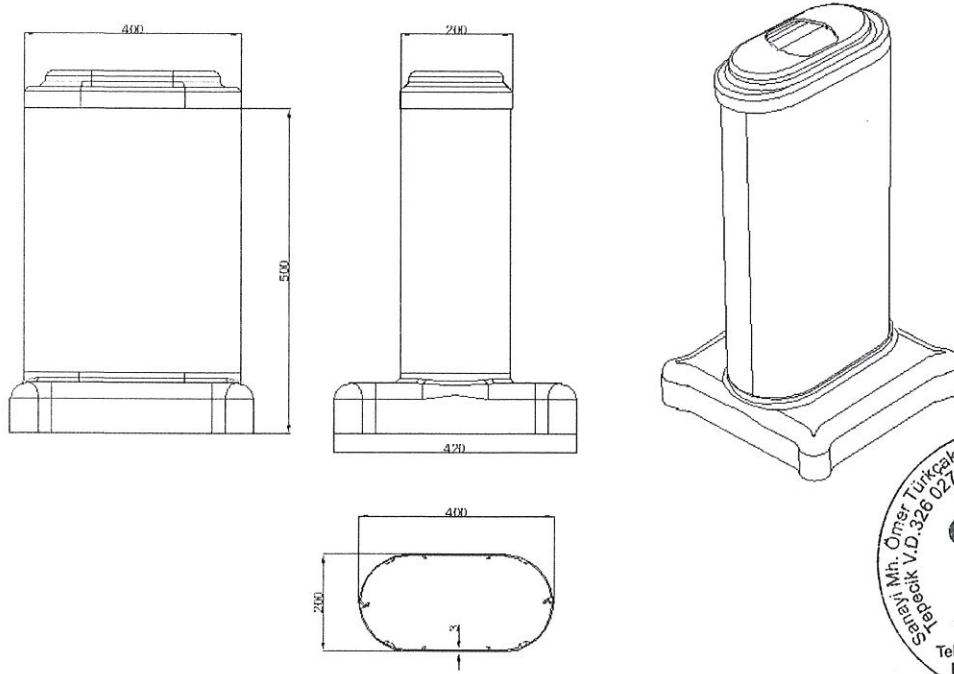
GENERAL VIEW OF NEW GENERATION OVERHEAD TRAFFIC SIGNAL POLE



### 3- Aluminum Profiles Production (Extrusion Process) and Properties

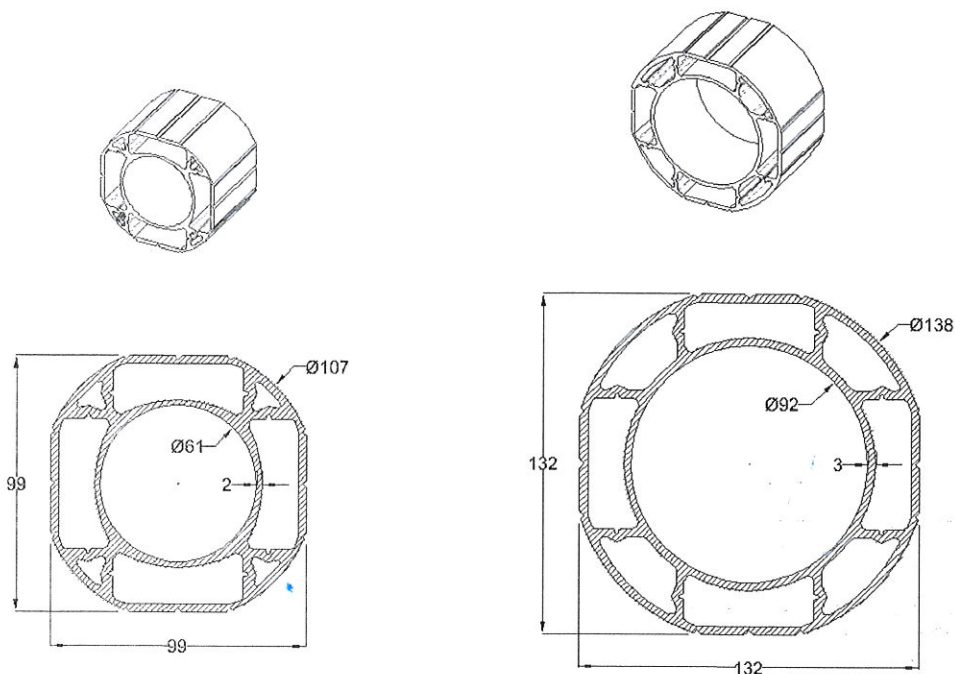
3.1 The aluminum anchor base will be manufactured from the profile on the direct anchorage tray shown in the following technical drawing.

#### BASE DETAILS



3.2 The measurement tolerances of the profiles used shall comply with the values given in EN-755-9.

3.3 The aluminum profiles to be used in the signaling poles shall be in the form and dimensions specified in the following technical drawing.



3.4 The profile is produced in one piece as seamless or without weld. There mustn't be any mold line, tear, burr, or pick-up.

#### 4-The Mechanical Properties of the Aluminum Profiles.

4.1 EN AW- 6060 alloyed mentioned profiles shall be subjected to artificial aging heat treatment providing T66 tempering properties. These process and mechanical properties shall comply with TS EN 755-2.

4.2 According to TS EN 755-2 Standards, these profiles shall meet the following specifications:

Yield Strength: (Rp 0,2) min.160Mpa.

Tensile Strength: (Rm)min. 195Mpa.

Percentage Elongation: %6 with (A50MM).

4.3 The bending of the profiles should be done with the "Digital Radius size control CNC bending machine".

4.4 The strength and thermal properties must be as specified in the following table in accordance with EN AW 6063 (AIM g 0,7 Si) standards.

Temper	Wall Thickness	Rm (Tensile)	Rp0,2 (Yield)	A% (Elongation)	A(50)% Elongation
T4	e<15mm	120	60	16	14
T5	e<15mm	160	120	8	6
T66	e<15mm	215	160	8	6



Temper	Wall Thickness	Rm (Tensile)	Rp0,2 (Yield)	A% (Elongation)	A(50)% Elongation
T4	e<25mm	120	60	16	14
T5	5mm<e<25mm	140	100	8	6
T66	3mm<e<15mm	195	150	8	6

**T4 Temper:** It is obtained by heating to 520°C for one hour and then dipping into solution.

**T5 Temper:** After the thermal process level T4 temper, it shall be obtained by keeping it at 185°C for 3 hours.

**T66 Temper:** After obtaining the T4 Temper, it is heated to 177°C for 8 hours. Tempering processes after T5 are known as artificial aging. It is a process to increase the hardness and strength of the material. Also, due to the heat exchange, the metals forming the poles and the consoles have the feature that they do not cause image disturbance in the poles.

## 5- Technical Characteristics of Pole Installation Tray

5.1 It is the part used for fixing the pole to the embedment concrete.

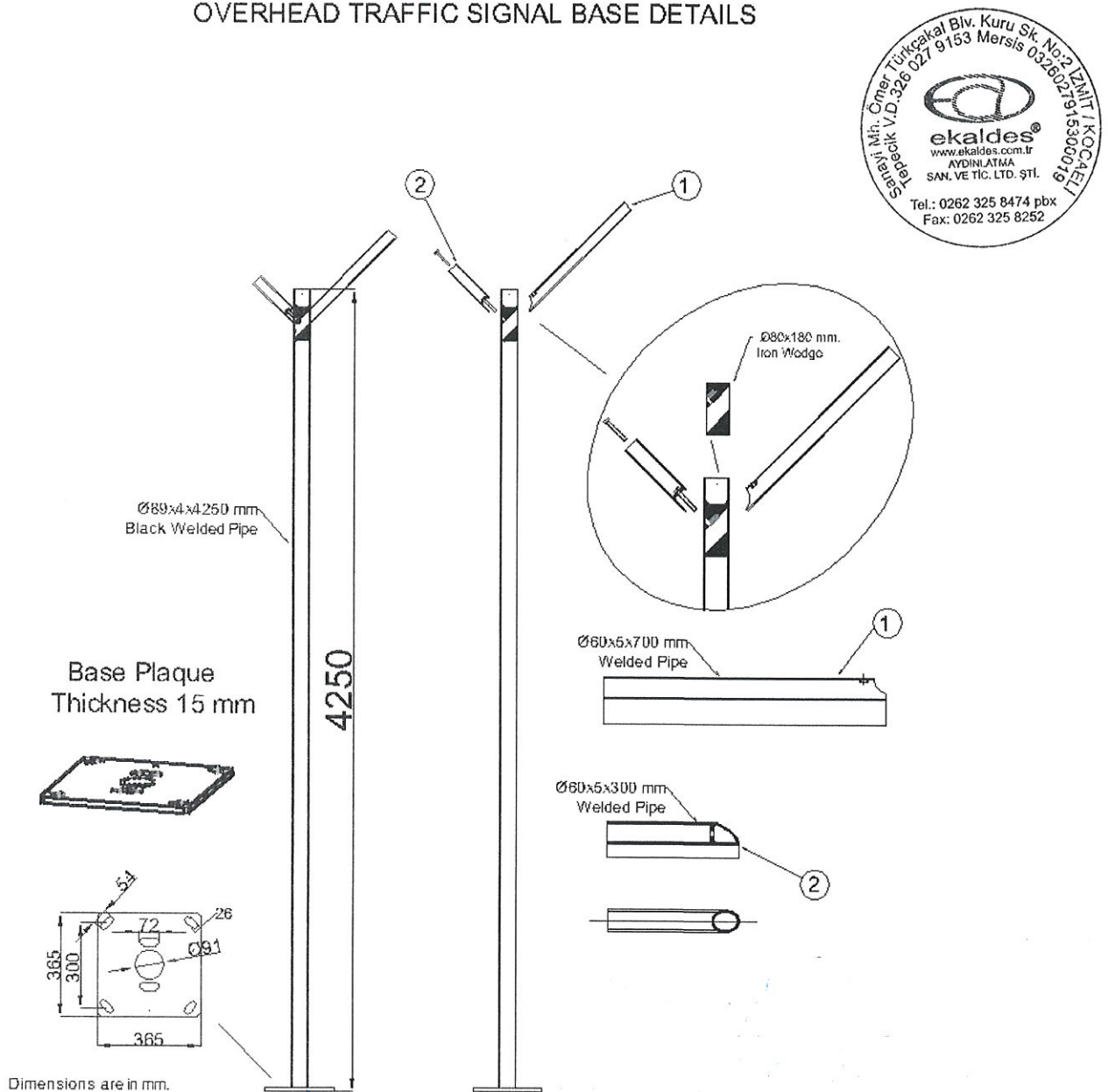
5.2 In the installation tray, a 4250-mm pipe with 89-mm diameter and 4-mm wall thickness shall be used.

5.3 This pipe shall be welded with special welding method to its place that have the shape and diameter of the pipe on the steel plate with 300x300x15mm dimensions.

5.4 The "Installation Table" which is formed by boiling with special welding method should be subjected to hot dip galvanizing process.

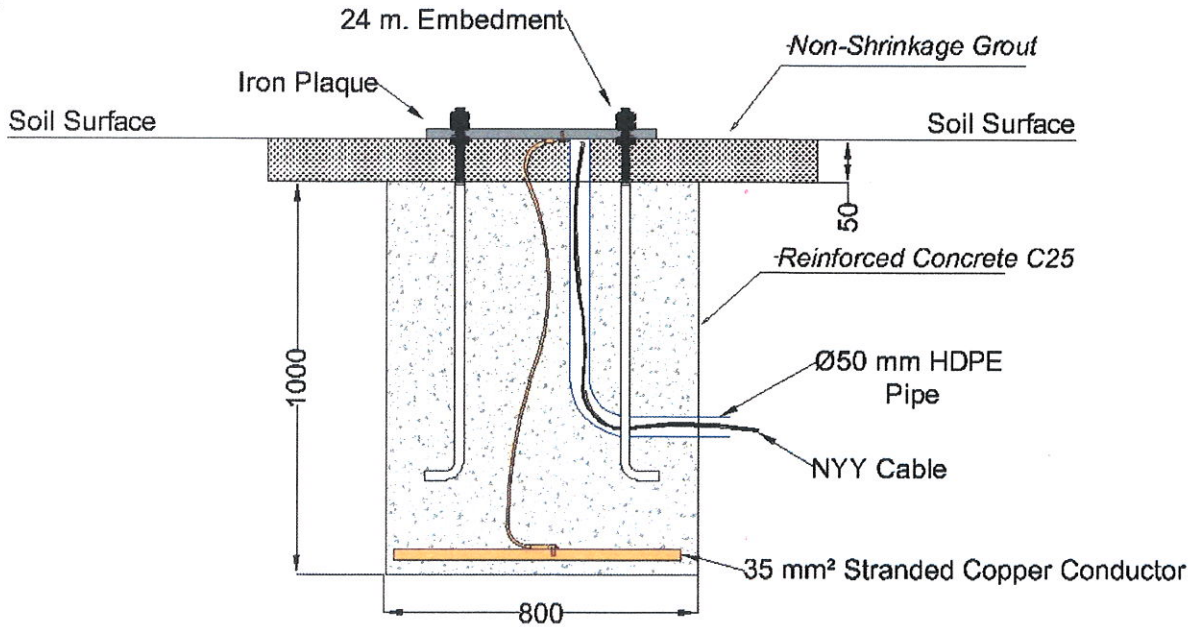
5.5 The dimensions of the installation table are presented in the technical drawing shown below. The production shall be made according to these dimensions.

### OVERHEAD TRAFFIC SIGNAL BASE DETAILS





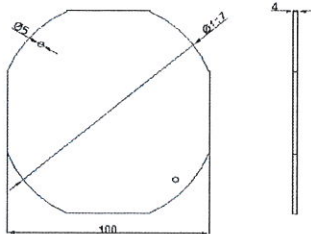
5.6 As seen in the basic concrete shown in the technical drawing below, 4 24m. / 1000mm bolts for each pole will be delivered with 2 washers and 3 nuts for each bolt.



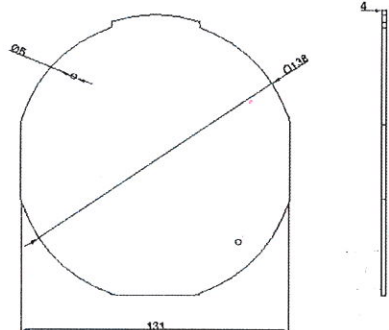
## 6-The Finishing Covers of the Profiles

6.1 The finishing covers of the profiles shall be of 2-mm Aluminum sheet in the form and dimensions specified in the following drawing.

Aluminum Finishing Cover



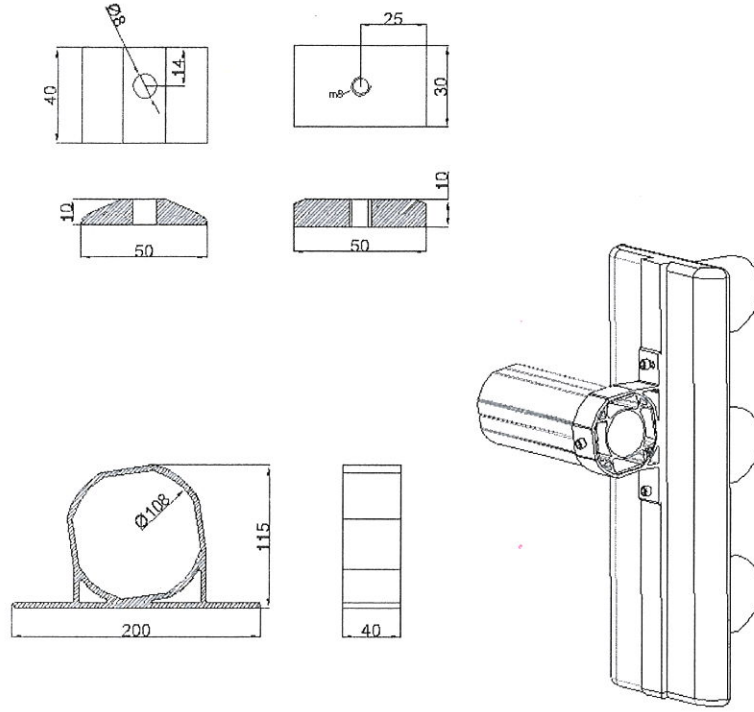
Aluminum Finishing Cover



## 7- The Details of the Connection of the Traffic Signal Group

7.1 The signaling group connection details shall be made in accordance with the following technical drawing.

Aluminum Group Connection Metal Sheet



## 8- The Details of the Signaling LED Modules

### 8.1 Definitions

- 8.1.1 LED (Light Emitting Diode):** Optical radiation under the influence of an electric current is a p-n junction semiconductor circuit element.
- 8.1.2 LED Packet:** Led chip is fixed with reflector, distributor, optical surfaces, air ducts and metal connections.
- 8.1.3 PCB (Printed Circuit Board):** It is a printed circuit board on which LED packages are arranged.
- 8.1.4 LED Module:** One or more LED packages are assembled on a PCB.
- 8.1.5 Combination Temperature:** It is the temperature of the junction area of p-n semiconductors in a LED chip.
- 8.1.6 Color Temperature:** It is the black cistern temperature with the same spectrum as the light source being evaluated. Its unit is Kelvin (K).
- 8.1.7 Light Flow:** The light flow of a light source is the flow of energy that is evaluated according to the spectral sensitivity curve of this daylight image that emerges from this light source. Its unit is Lumen (Lm).

## 8.2 Working Conditions

8.2.1 Place of Use	With cable bus system
8.2.2 Operating voltage	230V /50-60 Hz
8.2.3 Supply Power / Voltage	5W/24V
8.2.4 Operating Ambient Temperature	-30°C +85°C
8.2.5 Oval LED Colors	Red/Green/Yellow/
8.2.6 Oval LED Colors' Signals Maximum Power	Pmax(Red)=2.4W Pmax(Green)=0.4W Pmax(Yellow)=2.4W

## 8.3 Technical Properties

8.3.1 Module external measurements shall not exceed 250x36x15mm.

8.3.2 PCB thickness shall be 1.6mm, black ground.

8.3.3 The LEDs shall have a narrow angle and a light flow that can be seen in sunlight.

8.3.4 Red, yellow, green LED shall be arranged to give homogenous light on PCB.

8.3.5 Modules shall be insulated by coating with polymer material.

8.3.6 Module feeds shall be done with wired bus system.

8.3.7 Connections shall be made with protected sockets.

8.4.8 The supply cable connections shall be insulated using a spanner.

8.4.9 The LED modules shall be mounted so that they can withstand the vibrations that may occur in the aluminum profiles.

8.4.10 Modules shall be able to be changed individually in case of failure.

8.4.11 The LED modules under the vertical signaling group must be protected by taking into the UV-resistant transparent polycarbonate profiles, which are resistant to puncture and external interferences.

8.4.12 The LED modules used in the overhead traffic signal poles shall be 18 in the upper horizontal console, 3 in the pedestrian's console 3 in the upper part of the vertical signaling console and min. 7 – max. 9 in the lower part of the vertical signaling console.



## 9- Traffic Signal Power Supplier Details:

### 9.1 Definitions:

**9.1.1 Operating Voltage:** The voltage symbol is U or E, and its unit is Volt with symbol V. The operating voltage of any electrical receiver is between 110V and 380 V.

**9.1.2 Supply Voltage:** It is the voltage required for the device to operate with all functions of the equipment or the vehicle.

**9.1.3 Operating Temperature:** It is expressed as the maximum and minimum temperature values at which the inverter can operate.

### 9.2 Operating Conditions and Technical Specifications (HLG 240-24V)

9.2.1 Place of Use	AC-DC LED Driver
9.2.2 Operating Voltage	90 – 305 VAC
9.2.3 Supply Power/Voltage	240W/24V
9.2.4 Operating Ambient Temperatures	-40~ +90°C°
9.2.5 Protection Class	IP-67
9.2.6 Output Voltage	24V
9.2.7 Rated Current	10A
9.2.8 Rated Power	240W



HLG 240-24 Power Supplier General View



## 10- Traffic Signal Pole's Control Unit Details:

### 10.1 Definitions:

**10.1.1 Operating Voltage:** The voltage symbol is U or E, and its unit is Volt with symbol V. The operating voltage of any electrical receiver is between 110V and 380 V.

**10.1.2 Supply Voltage:** It is the voltage required for the device to operate with all functions of the equipment or the vehicle.



**10.1.3 Operating Temperature:** It is expressed as the maximum and minimum temperature values at which the inverter can operate.

**10.1.4 Astronomical Relay:** It is intelligent time relays with a real-time clock that can automatically calculate sunrise and sunset times. They are designed to control devices connected to their contacts at user-set times, sunrise or sunset times.

**10.1.5 Thermoplastic Material:** Plastic group that softens when heated and hardens when cooled. It has covalent, chain-to-chain van der Waals bonds in the chain. All polymers show a high rigidity at low temperatures and are loose (its elastic module and shear module are high).

## 10.2. Working Conditions

10.2.1 Place of Use	Outdoor
10.2.2 Operating Voltage	230V /50-60 Hz
10.2.3 Supply Power/Voltage	240W/24V
10.2.4 Operating Ambient Temperature	-30°C– 85°C
10.2.5 Color Canals	Red/Green/Yellow/White
10.2.6 Color Signal's Maximum Power	$P_{max}(R/Y/G) = 150W$



## 10.3. Control Unit's General Specifications

**10.3.1** The LED system used throughout the traffic signal pole must be controlled by the converter circuit board, which will enable the signals from the traffic signal controller to operate the system.

**10.3.2** The control card shall also adjust the brightness of the LEDs according to the state of the daylight while enabling the led system to work with the traffic signal controller.

**10.3.3** The IP66 shall be inside the box to provide insulation for the circuit board.

## 10.4 Technical Specifications:

**10.4.1 Body Materials:** Thermoplastic materials conforming to TS-EN 60670 criteria are used as body material.

**10.4.2 Dimensions:** The measurements of the control unit used are stated as 110x210x70mm.

**10.4.3 Signalization Transition Sensitivity:** This transition is specified in seconds and is defined as 1ms.

**10.4.4 Control Unit Night Mode Support:** At the control circuit with the aid of the astronomical relay, day-night mode is defined differently.

**10.4.5 Short Circuit and Polarity:** The device must be protected against short circuit and reverse polarity.

**10.4.6 Relay and Dimming :** An astronomical relay is used in the control circuit where the latitude and longitude addresses can be entered.

**10.4.7 Dimming Levels:** With the astronomical relay going to the night mode, the brightness of the LEDs will be adjusted. The dimming levels were determined as 10% -20% -40% -50% -100%.

