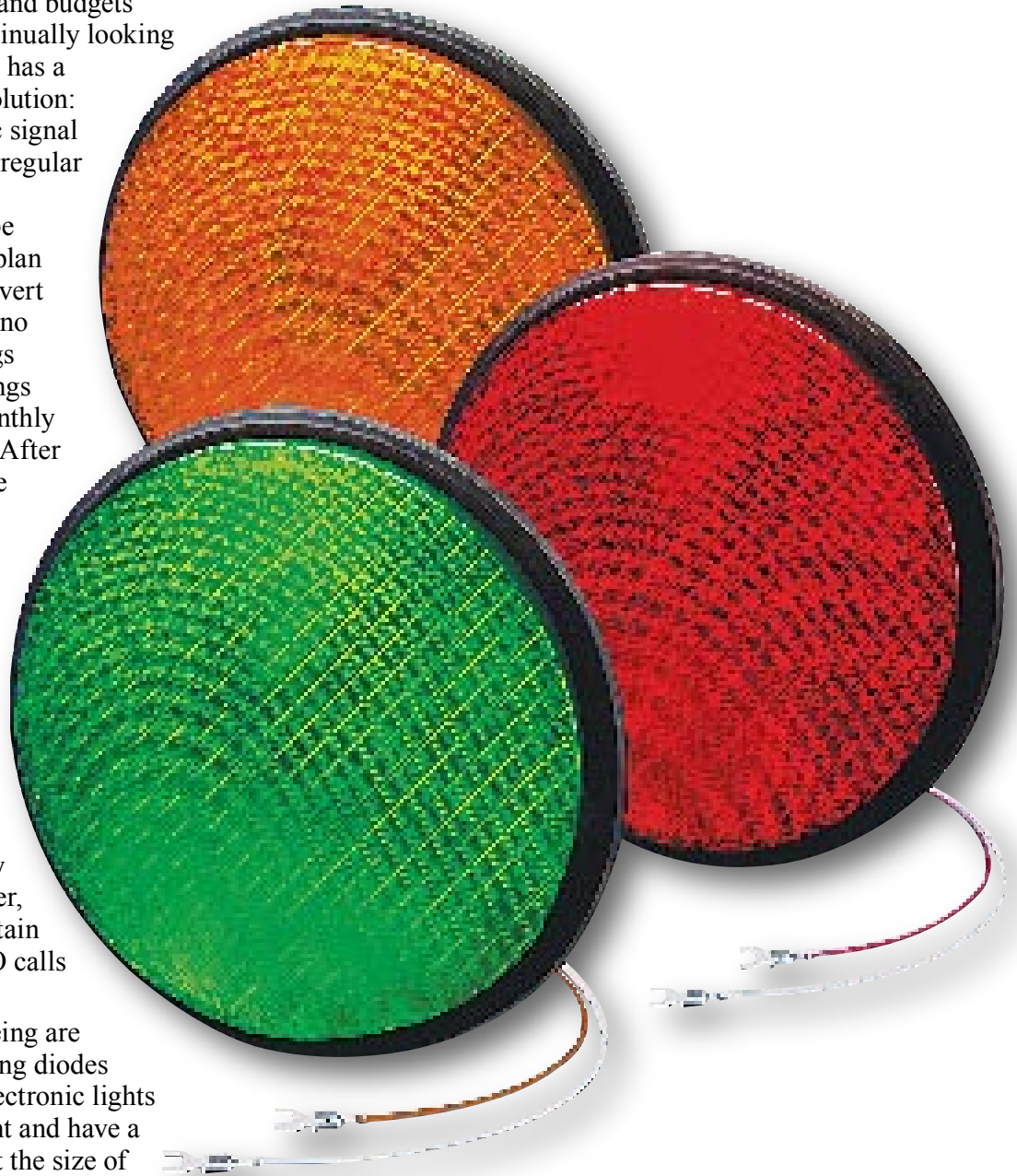


LED Replacement Modules

With energy costs skyrocketing, and budgets being cut, municipalities are continually looking for ways to save money. TAPCO has a quick, easy and budget-neutral solution: LED (light emitting diode) traffic signal head conversions. By converting regular signals with 165-watt modules to 5-watt LEDs, huge savings will be immediately realized. TAPCO's plan is really very simple; we will convert one or all of your signal heads at no initial charge. The energy savings will be calculated and those savings will be forwarded to TAPCO monthly until complete payment is made. After that, the city will realize all of the savings. In addition, LEDs last about 10 times longer than regular incandescent modules, thereby eliminating many hours of service and maintenance time needed on each signal. However, the greatest advantage to LEDs is the added safety of a much brighter light. Motorists can see the signal more clearly from further away and are able to react sooner. They are environmentally friendly, safer, and much less expensive to maintain and operate. That's what TAPCO calls a win, win, win.

The new traffic lights you are seeing are made out of arrays of light emitting diodes (LEDs). These are tiny, purely electronic lights that are extremely energy efficient and have a very long life. Each LED is about the size of a pencil eraser, so hundreds of them are used together in an array. The LEDs are replacing the old-style incandescent bulbs rated at between 67 and 165 watts. Most cities in the United States are in the process of replacing their incandescent traffic lights with LED units because of three big advantages, as explained on the following page.



LED Replacement Modules

- **LEDS ARE BRIGHTER.**

The LED arrays fill the entire “hole” and have equal brightness across the entire surface, making them brighter overall.

- **LED MODULES LAST FOR YEARS.**

While incandescent bulbs last for months, replacing bulbs costs money for the trucks and people who do the work, and it also ties up traffic. Increasing the replacement interval can save a city big dollars.

- **LED MODULES SAVE A LOT OF ENERGY.**

The energy savings of LED lights can be huge. Assume that a traffic light uses 100-watt bulbs today. The light is on 24 hours a day, so it uses 2.4 kilowatt-hours per day. If you assume power costs 8 cents per kilowatt-hour, it means that one traffic signal costs about 20 cents a day to operate, or about \$73 per year. There are perhaps eight signals per intersection, so that’s almost \$600 per year in power per intersection. A big city has thousands of intersections, so it can cost millions of dollars just to power all the traffic lights. LED modules might consume 15 or 20 watts instead of 100, so the power consumption drops by a factor of five or six. A city can easily save a million dollars a year by replacing all of the bulbs with LED units. These low-energy modules also open the possibility of using solar panels instead of running an electrical line, which saves money in remote areas.



EXCERPTED FROM ENERGY POLICY ACT OF 2005

- The Energy Policy Act of 2005 contains provisions on the energy efficiency traffic signal and pedestrian modules.
- The intent of the legislation is to facilitate the deployment of light emitting diode (LED) traffic signal and pedestrian modules for the purpose of energy conservation;



LED Replacement Modules (Meets 1999 ITE Specifications)

Dialight LED Traffic Signals



SPECIFICATIONS

- Fuse and transient suppressor incorporated for line and load protection
- Power factor: > 0.9
- Total harmonic distortion < 20%
- Meets FCC title 47, subpart B, Section 15 Regulations for electrical noise
- Conforms to NEMA Moisture Resistant D 250-1991 for Type 4 enclosures (ITE 6.4.6.2 Moisture Resistance)
- Provided with quick connect terminals. Spade Tab Adapter, Part No. 943105S, available
- Operating Voltage Range:
12VDC = 9VDC to 15VDC -- 120VAC = 80VAC to 135VAC

8" Dialight LED Traffic Signals - Typical Operating Characteristics

| TAPCO Part No. | Manufacturer Part No. | Note | Description | Volts | Typical Wattage @ 25°C | Min. Luminance Intensity (cd) | Dominant Wavelength (nm) |
|----------------|-----------------------|---------|-------------|--------|------------------------|-------------------------------|--------------------------|
| 220-24 | 433-1110-003 | ① ② ③ ⑤ | Red | 120VAC | 6.0 | 420 | 622 |
| 220-16 | 433-3130-001 | ① ③ ⑤ | Yellow | 120VAC | 12.0 | 840 | 590 |
| 220-22 | 433-2120-001 | ① ② ③ ⑤ | Green | 120VAC | 11.0 | 933 | 505 |
| 220-34 | 431-1110-005 | ⑤ | Red | 12VDC | 9.1 | 319 | 622 |
| 220-35 | 431-3130-005 | ⑤ | Yellow | 12VDC | 13.2 | 639 | 590 |
| 220-36 | 431-2171-005 | ⑤ | Green | 12VDC | 4.0 | 678 | 505 |

① Approved by Caltrans ② Meets or exceeds IE VTC Part 2 ③ Illuminated by LumiLeds ④ Clear lens optional ⑤ EN 12368 class A2/1 type W

12" Dialight LED Traffic Signals - Typical Operating Characteristics

| TAPCO Part No. | Manufacturer Part No. | Note | Description | Volts | Typical Wattage @ 25°C | Min. Luminance Intensity (cd) | Dominant Wavelength (nm) |
|----------------|-----------------------|---------|-------------|--------|------------------------|-------------------------------|--------------------------|
| 220-5 | 433-1210-003 | ① ② ③ ⑤ | Red | 120VAC | 10.0 | 420 | 622 |
| 220-10 | 433-3230-001 | ① ③ ⑤ | Yellow | 120VAC | 18.0 | 840 | 590 |
| 220-19 | 433-2220-001 | ① ② ③ ⑤ | Green | 120VAC | 14.0 | 933 | 505 |
| 220-31 | 431-3230-005 | ⑤ | Red | 12VDC | 18.0 | 319 | 622 |
| 220-30 | 431-1210-005 | ⑤ | Yellow | 12VDC | 25.4 | 639 | 590 |
| 220-32 | 431-2271-005 | ⑤ | Green | 12VDC | 10.3 | 678 | 505 |

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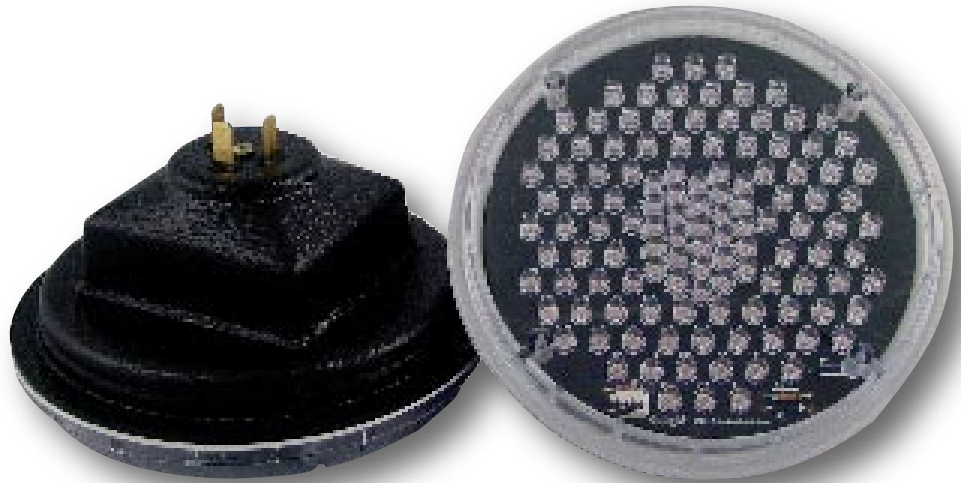


LED Replacement Modules

LED Lamp Modules for Programmable Visibility (PV) Signals

Features & Benefits

- Direct retrofit replacement for incandescent lamps used in Programmable Visibility (PV) signals
- Compatible with McCain and 3M signal heads
- CalTrans qualified
- 90% reduction in power vs. incandescent
- Long life: up to 10 times longer than incandescent
- Failure of single LED results in loss from that light only
- Moisture and dust resistant



Specifications

- Operating Voltage Range: 80 VAC to 135 VAC (120 VAC nominal)
- Fuse and transient suppressor incorporated for line and load protection
- Operating Temperature Range -40°C to +74°C
- Turn-On/turn-Off Time = 75 msec max
- Power factor: > 0.9
- Total harmonic distortion < 20%
- Meets FCC title 47, subpart B, Section 15 Regulations for electrical noise
- Conforms to MIL-STD-810F for blowing rain

| TAPCO Part Number | Manufacturer Part Number | Color | Dominant Wavelength (nm) | Typical Wattage @ 25°C | Minimum Luminous Intensity (Cd) |
|-------------------|--------------------------|--------|--------------------------|------------------------|---------------------------------|
| 220-40 | P46-3R33-003 | Red | 622 | 10 | 500 |
| 220-41 | P46-3Y33-003 | Yellow | 590 | 17 | 500 |
| 220-42 | P46-3G33-003 | Green | 505 | 14 | 500 |



Uniform Appearance (Meets 2005 ITE Specifications)

LED Replacement Modules

A complete line of fully ITE Compliant LED Signals.

- Red, Yellow, and Green Circular Signals
- Red, Yellow, and Green Arrows
- Pedestrian Signals



The first ITE Compliant Yellows (meet ITE luminous intensity at 74°C)

The ITE specifications require all LED signals including yellows, to comply with specified minimum maintained luminous intensity values up to 165°F (74°C). Solar loading alone often causes internal temperature in LED modules, including yellows, to rise to 165°F (74°C). The light intensity of a yellow LED module designed for 77°F (25°C) performance will likely drop to less than half at 165°F (74°C).

Most uniform appearance LED countdown pedestrian signals.

Meets City of Los Angeles countdown pedestrian specifications (toughest spec in North America.) Ped icons meet ITE PTC SI - Part 2 specifications.

Features & Benefits

- All modules (including yellow) meet the ITE VTCSH-LED Circular Signal Supplement over the full temperature range of -40°C to +74°C
- This yellow meets ITE luminous intensity requirements up to 74°C instead of only 25°C
- Robust Hi-Flux LED technology
- Meets or exceeds ITE uniformity specifications
- Expanded view radiation pattern suitable for span wire and steep grade applications
- Transient suppression exceeds ITE and NEMA specifications (up to 6KV)
- Lowest wattage Red, Yellow, Green package on the market
- Long life; up to 10 times longer than incandescent
- Meets or exceeds ITE moisture intrusion specifications
- Meets or exceeds ITE failed state impedance specifications
- Hard coated lenses for abrasion resistance.

8" Dialight LED Traffic Signals - Typical Operating Characteristics

| TAPCO Part No. | Manufacturer Part No. | Note | Description | Volts | Typical Wattage @ 25°C | Min. Luminance Intensity (cd) | Dominant |
|----------------|-----------------------|---------|-------------|--------|------------------------|-------------------------------|----------|
| 2406-13 | 433-1110-003X | ① ② ③ ⑤ | Red | 120VAC | 6.0 | 420 | 625 |
| 2406-12 | 433-3130-001X | ① ③ ⑤ | Yellow | 120VAC | 13.0 | 840 | 590 |
| 2406-11 | 433-2120-001X | ① ② ③ ⑤ | Green | 120VAC | 6.0 | 933 | 500 |

① Approved by Caltrans ② Meets or exceeds IE VTC Part 2 ③ Illuminated by LumiLeds ④ Clear lens optional ⑤ EN 12368 class A2/1 type W

12" Dialight LED Traffic Signals - Typical Operating Characteristics

| TAPCO Part No. | Manufacturer Part No. | Note | Description | Volts | Typical Wattage @ 25°C | Min. Luminance Intensity (cd) | Dominant Wavelength (nm) |
|----------------|-----------------------|---------|-------------|--------|------------------------|-------------------------------|--------------------------|
| 2406-1 | 433-1210-003XL | ① ② ③ ⑤ | Red | 120VAC | 6.0 | 420 | 625 |
| 2406-2 | 433-3230-001XL | ① ③ ⑤ | Yellow | 120VAC | 19.0 | 840 | 590 |
| 2406-3 | 433-2220-001XL | ① ② ③ ⑤ | Green | 120VAC | 9.0 | 933 | 500 |

① Approved by Caltrans ② Meets or exceeds IE VTC Part 2 ③ Illuminated by LumiLeds ④ Clear lens optional ⑤ EN 12368 class A2/1 type W

