Precision Approach Path Indicator
PAPI or APAPI

PU3L

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Utilisation

- PAPI or A-PAPI Visual Precision Approach Path Indicator Systems

Compliance with standards

- ICAO : Annex 14 Volume I Paragraph 5.3.4 for use in CAT I, II and III Annex 14 Volume II Paragraph 5.3.4
- FAA : L-880 and L-881 AC 150/5345-28D
- CAP 168 on request
- BS 3224
PU3L  Precision Approach Path Indicator System

Operation Principle

The PAPI system allows the pilot to have the necessary visual information to place the aircraft on the ideal approach slope and can be used by day or night. The system can be used by all aircraft as soon as it is set up since it does not require any airborne instrumentation.

One system normally comprises of four identical indicators, each one producing a white beam above a certain angle and a red one underneath.

Red to white transition is accurate since it does not exceed 3 minutes.

Four indicators, once installed, form one single wing bar on the left side of the runway. They are adjusted according to the different site angles, this angle increasing from the farthest indicator to the nearest one, from the runway. The difference of site angle between two consecutive units is generally 20 minutes.

Two symmetrical wing bars (i.e. 8 indicators) are recommended when no horizontal indication can be given to pilots.

APAPI system is used as PAPI system but it is composed of one wing bar formed by just two units.

Location on the Field

<table>
<thead>
<tr>
<th>PAPI SYSTEM</th>
<th>APAPI SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUNWAY</td>
<td>RUNWAY</td>
</tr>
<tr>
<td>EDGE</td>
<td>EDGE</td>
</tr>
<tr>
<td>Threshold</td>
<td>Threshold</td>
</tr>
</tbody>
</table>

16 m +/- 1 m
9 m +/- 1 m
9 m +/- 1 m
9 m +/- 1 m

10 m +/- 1 m
6 m +/- 1 m

Main advantages

- The PU3L exist in three and two lamps versions.
- The unit is mounted on standard on 3 legs (mounting on 4 legs is possible).
- Only one lens to one lamp is necessary.
- Clear transition from white to red with value not exceeding 3 minutes.
- Excellent frangibility without sacrifice of any stability.
- Front glass protecting lenses against sand, wind and engine blast.
- Very easy site adjustment by using a clinometer (precision 1 minute).
- Design ensures very good water-tightness (IP54) and protection against corrosion.
- Easy maintenance : Replacement of main elements (lamps, front glass, lenses or reflectors) does not require either unit adjustment or any special tools.
- Very easy access to all components by removing the cover.
- Use of dichroic filters with high transmission factor and good thermal resistance.
- The units of a system could be, as an option, fitted with tilt switch sub-assembly devices.
- The units of a system could be, as an option, fitted with heating resistors for use in cold or wet areas.
- Light weight : less than 15 kg.

Technical characteristics

Lamps : Two or three, 6.6 Amps [200 W or 150 W for PAPI or 100 W for APAPI] pre-focused halogen lamps with Pk30d sockets. Lamp life greater than 1,000 hours at 6.6 Amps.

Coloured Filter: Red dichroic filter complying with Appendix 2 of ICAO Annex 14 recommendations.

Photometry : Each unit are compliant with ICAO requirements and supplies a luminous intensity exceeding 15,000 cd in red from -2° to +2° horizontal wide beam and from -2° to +2° vertical wide beam.

Visual Range: More than 11km by day and 30 km by night (meteorological visibility 14 km).

Safety : The unit is mounted on 3 (or 4) frangible legs.

Working temperature : Between -35° and +55°C the units could be fitted with heating resistors (with independent power supply) for use in very cold or wet areas.

Electrical supply : Two or three, two-poles secondary cables (one per lamp) must be mounted and connected to the Unit.

Tilt Switch: To Comply with FAA 150/5345-28D L880 and L-881, the units of the system must be equipped with "Tilt Switch" sub-assembly devices (one unit is the "Master" and the three other are the "Slaves"). This "Tilt Switch" option allow the system to power off when one of the four units is misaligned (for safety reason).

Finish : The Cover and the legs are made of phosphated aluminium alloy painted in aviation yellow by an electrostatic process (powdercoating). The base plate is made of anodised tempered aluminium alloy casting. All fixings and fastenings are stainless steel.
PU3L Precision Approach Path Indicator System

Design

1) PU3L Complete Leg (x 3 or x 4)
2) PU3L Base Plate
3) Lens and Fixation Accessories
4) Lens / Reflector Support and Fixing Screws
5) Dichroic Red Filter
6) Filter Support and Fixing Screws
7) Aluminium Reflector and Fixing Screws
8) PK30d type Halogen Lamp
9) Separating Screen
10) Primary Circuits Connection Terminal
11) Compression Packer for Cables Entry
12) PU3L Cover
13) Protection Front Glass Gasket
14) Protection Front Glass

Options

15) Heating Resistor
16) Tilt Switch Master Device
17) Tilt Switch Slave Device
18) Heating Resistor Terminal Plate

Photometrics

PAPI
ICAO and FAA L-880
PU3L (2 x 200 Watts)

APAPI
ICAO and FAA L-881
PU3L (2 x 100 Watts)
PU3L  Precision Approach Path Indicator System

Installation

Sizes

GROUND

CONCRETE BLOCK

340 mm  420 x 420 mm  340 mm
1100 x 800 mm

780 mm  555 mm

220 mm

420 mm  420 mm
PU3L  Precision Approach Path Indicator System

Optional Tilt Switch

A PAPI System complying with FAA AC 150/5345-28D L-880 and L-881 can be supplied. In this case all the units of the system have to be equipped with optional "Tilt Switch" sub-assembly devices which de-energise all the lamps of the system when the optical pattern of at least "one" unit is inadvertently lowered between ¼ and ½ degree or raised between ½ and 1 degree with respect to the preset aiming angle.

A complete PAPI "Tilt Switch" system is composed of one PU3L "Master" and three PU3L "Slaves". The supply of "Tilt Switch" devices requires one supplementary isolating transformer connected to the "Master" PU3L.

WIRING DRAWING

1. Isolating Transformer for the Lamps
2. Isolating Transformer for the Supply of Tilt Switch devices
3. Primary Cable
4. Secondary Cable
5. Heating Resistor Supply (Optional)
6. Alarm Feed Back Cable (Optional)
7. Cable between Units : Mercury contact Loop, Relays Power Supply, Heating Resistor Supply (Optional)

Optional Heating Resistor

In Order to operate in very low temperature or in high humidity conditions without loss of performance, the PU3L unit can be equipped with additional "Heating Resistor". As the heating effect must be efficient even if PAPI system is switched off, the resistor has to be connected to an independent power supply (120 to 230 Vac 50/60 Hz).
**PU3L**

**Ordering Code**

- **PU3L Box (alone)**
  - **ICAO Standard**
    - 2 Lamps
    - 3 Lamps
  - **British Standard**
    - 2 Lamps
    - 3 Lamps

**Accessories**
- Lamps (2 or 3 per PU3L)
  - * 100W PK30d Lamp
  - * 150W PK30d Lamp
  - * 200W PK30d Lamp
- Mounting Accessories
  - * Set of 3 Complete Legs (Tubes Diameter 60 mm Length = 400 mm + Threaded Rods
  - * 2" NPS Frangible Coupling (3 per PU3L)
  - * 2" BSP Frangible Coupling (3 per PU3L)
  - * 2" NPS Tripod Stand (3 per PU3L)
  - * 2" BSP Tripod Stand (3 per PU3L)
- Optional Accessories
  - Heating Resistor (1 Kit per PU3L)
  - Heating Resistor Kit
  - Tilt Switch Device (1 per PU3L)
  - * Master Tilt Switch Device (1 per PAPI)
  - * Slave Tilt Switch Device (3 per PAPI)
- Setting Tools
  - * Setting Tools Suitcase

**Cardboard packing data**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Volume in m³</th>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU3L box alone</td>
<td>0.144</td>
<td>580 x 225 x 800</td>
<td>17</td>
</tr>
<tr>
<td>PK30d lamp (x 100)</td>
<td>0.115</td>
<td>1000 x 500 x 230</td>
<td>1.8</td>
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<tr>
<td>Set of 3 Complete legs</td>
<td>0.025</td>
<td>560 x 180 x 250</td>
<td>7.5</td>
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<tr>
<td>Frangible Coupling</td>
<td>0.002</td>
<td>115 x 115 x 100</td>
<td>0.8</td>
</tr>
<tr>
<td>Tripod Stand (x 8)</td>
<td>0.053</td>
<td>220 x 220 x 170</td>
<td>3.1</td>
</tr>
<tr>
<td>Sealing Rods (x 100)</td>
<td>0.005</td>
<td>205 x 205 x 170</td>
<td>8.5</td>
</tr>
<tr>
<td>Heating Resistor Kit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilt Switch Device</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting Tools Suitcase</td>
<td>0.001</td>
<td>355 x 300 x 90</td>
<td>2</td>
</tr>
</tbody>
</table>

**Specification**

PU3L indicators shall comply with ICAO recommendations in Annex 14, Volume I paragraph 5.3.5 or in Annex 14, Volume II paragraph 5.3.5, FAA 1880 and L-881, CAP 168 (on request) standards and BS 3224.

- It shall be equipped with two or three pre-focused halogen lamps of 200W (PAPI) or 100W (APAPI).
- The lamp life shall be greater than 1,000 hours at 6.6 Amps.
- Luminous intensity shall exceed 16,000 cd in red from -2° to +2° horizontal wide beam and from -2° to +2° vertical wide beam.
- Each optical beam system shall comprise of only one optical lens, one red dichroic filter and one reflector made of pure aluminium.

The base plate shall be an anodised aluminium alloy casting. The Cover and the legs are made of phosphated aluminium alloy painted in aviation yellow by an electrostatic process (powdercoating). All fixings and fastening are to be stainless steel.

Each unit shall be mounted in standard on three legs (mounting on four legs is possible). Site adjustment of the beam shall be made by means of a clinometer.

Main elements (lamp, reflector) shall be easily replaceable without requiring the unit to be adjusted.

Lenses shall be protected against sand wind and engine blast by a front glass.