Technical document

T-5196-02-b

By MS / 20.02.1996
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IDM 5196

PRECISION APPROACH PATH INDICATOR PAPI
3 - LAMP SHARP TRANSITION DEVICE.

Precision approach path indicator

3-lamp sharp transition device

IDM 5196

Versions covered by this manual:

IDM 5196 / 3x200W vertical alignment with precision spirit level

IDM 5196 / 3x200W vertical alignment with electronic inclinometer

Revision index

Revision:	Made by:	Date:	Checked by:	Description
T-5196-02-01	M. Salmi	20.02.1996	A. Tukia	New format
T-5196-02-02	A. Tukia	20.09.1996	K.Virtanen	Revision of chapter 2
T-5196-02-a	A. Tukia	31.03.1999	K.Virtanen	Removal of part list section
T-5196-02-b	A. Tukia	18.12.2001	K.Virtanen	New vertical alignment method included, installation paragraph revised

IDMAN AIRFIELD LIGHTING OY

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Contents

1 Safety precautions

The luminaire is connected to a constant current circuit with nominal current of 6,6 amperes via an isolating transformer. The primary voltages, depending on the circuitry, are usually several kilovolts and therefore lethal. Although the open circuit voltages of the isolating transformers are much lower, the peak voltage while opening the secondary circuit under current is also hazardous. So it is vitally important to follow all the safety regulations with adequate circumspection. In the design of this equipment all the practical safety aspects have been taken into account. Despite of that the existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions must be strictly pursued.

Electrical maintenance

The valid safety regulations must always be pursued. Never do any maintenance measures before the current is surely disconnected. Be especially careful when disconnecting or connecting high voltage primary connectors.

Mechanical maintenance

Also when maintaining mechanical components the instructions for electrical maintenance must be followed.

2 General information

The information concerning siting and location of the PAPI system provided in this manual is in simplified format. Although in accordance, for full details refer always to ICAO Annex 14 Volume I third edition July 1999 and Aerodrome Design Manual Part 4 Visual Aids third edition 1993.

The precision approach path indicator systems are designed to give visual indications of the desired approach slope. Possible system configurations are APAPI, PAPI on the left side of the runway and PAPI on both sides of the runway, if visual roll guidance is needed but not provided by other external means. System is to be provided if one or more of the following conditions exist:

- Turbojets or other airplanes with similar approach guidance requirements use the runway.
- Pilot has difficulties due to inadequate guidance or misleading information.
- Obstacles in the approach area involve serious hazard if an airplane descends below the normal approach path.
- Physical conditions cause a hazard at either end of runway in the event of possible overrun or undershoot.
- Terrain or meteorological conditions cause unusual turbulence to the airplane during its approach.

IDM 5196 has many advantages and special features:

- Two models: vertical alignment with precision spirit levels or with electronic inclinometer
- fulfils ICAO standards in categories I, II and III.
- effective and accurate light distribution with transition sector of 2,5 minutes of arc.
- corrosion resistant materials
- housing equipped with separate filter meets the highest standard in dust tightness which guarantees clean optics under all circumstances.
- light weight and breakable couplings minimizes the risk of damage.
- very stable optical performance due to floating optical chassis.

IDM 5196 meets or exceeds the requirements established in ICAO Annex 14, Volume I, 3rd edition, July 1999 paragraphs 5.3.5.23 - 5.3.5.45.

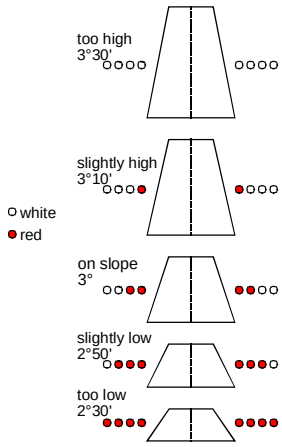


Figure 1 PAPI system information. The system comprises a four unit wing bar. The unit nearest the runway is set higher than the required approach angle, with progressive reduction in the setting of the units farther outboard. The normal difference in settings is 20 minutes of arc and the nominal approach angle shown is 3 degrees.

2.1 Siting and elevation settings

The APAPI light units shall be arranged according to basic configuration shown in figure 2 and PAPI units according to figure 3. The units are to be installed as low as possible to avoid risks to the airplane. The units in wing bar appear to be in a horizontal line perpendicular to the runway centre line. If wing bars are on both sides of the runway, corresponding units shall have the same angular settings to assure symmetrical signals at the same time. Small height adjustments (max 5 cm) between units are acceptable. Uniform lateral gradient of max 1,25 % can be accepted. The lateral spacing of 9 m may be applied to APAPI if greater distance is required or the system will later be extended to a full PAPI. In the latter case, the location of the inner APAPI unit shall be 15 m from the runway edge.

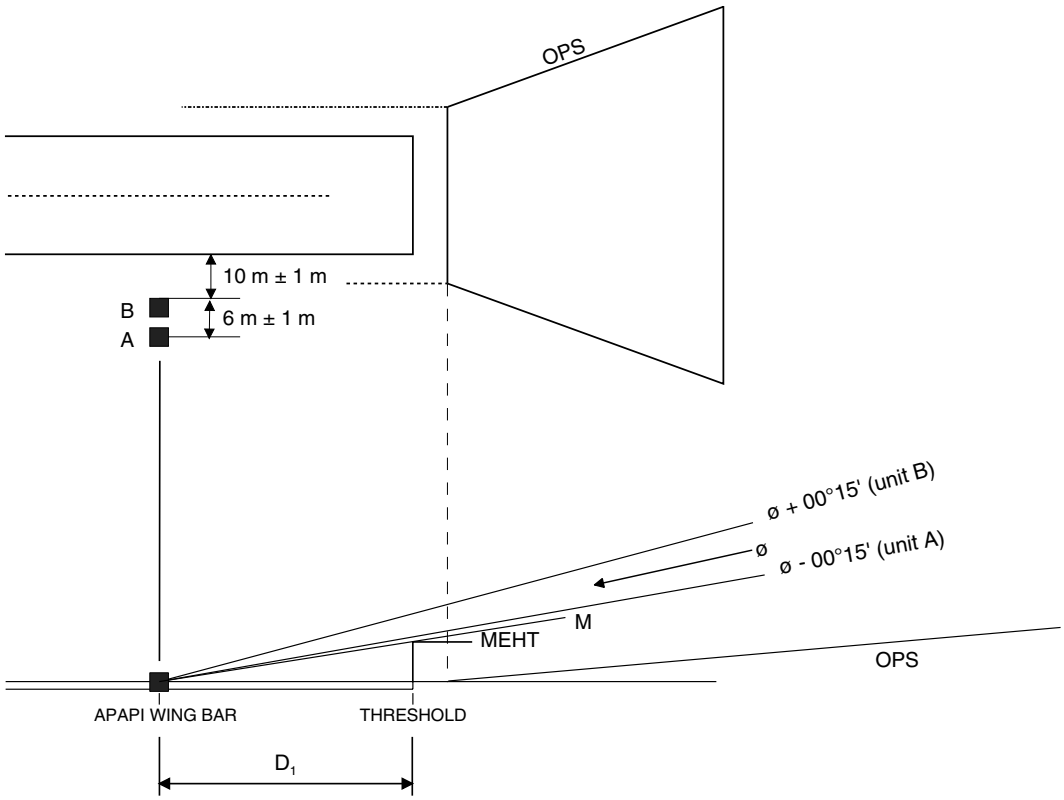


Figure 2 The arrangement of APAPI units. The dimensioning of OPS refer to table 2.

The typical elevation settings for APAPI and PAPI are shown in figures 2 and 3, respectively. For APAPI and approach angles up to 7 degrees the unit B is set 15' higher and the unit A 15' lower than the required approach angle (difference 30'). For approach angles greater than 7 degrees the settings are + 30' and - 30' respectively (difference 60'). The normal difference for PAPI is 20 minutes of arc when approach angle is from 2 to 4 degrees. When PAPI is used in conjunction with ILS / MLS the on-slope course may be enhanced to 30 minutes to ensure the harmonization between these aids. When approach angle is from 4 to 7 degrees the recommended difference is 30 minutes and for angles over 7 degrees the recommended difference is 1 degree.

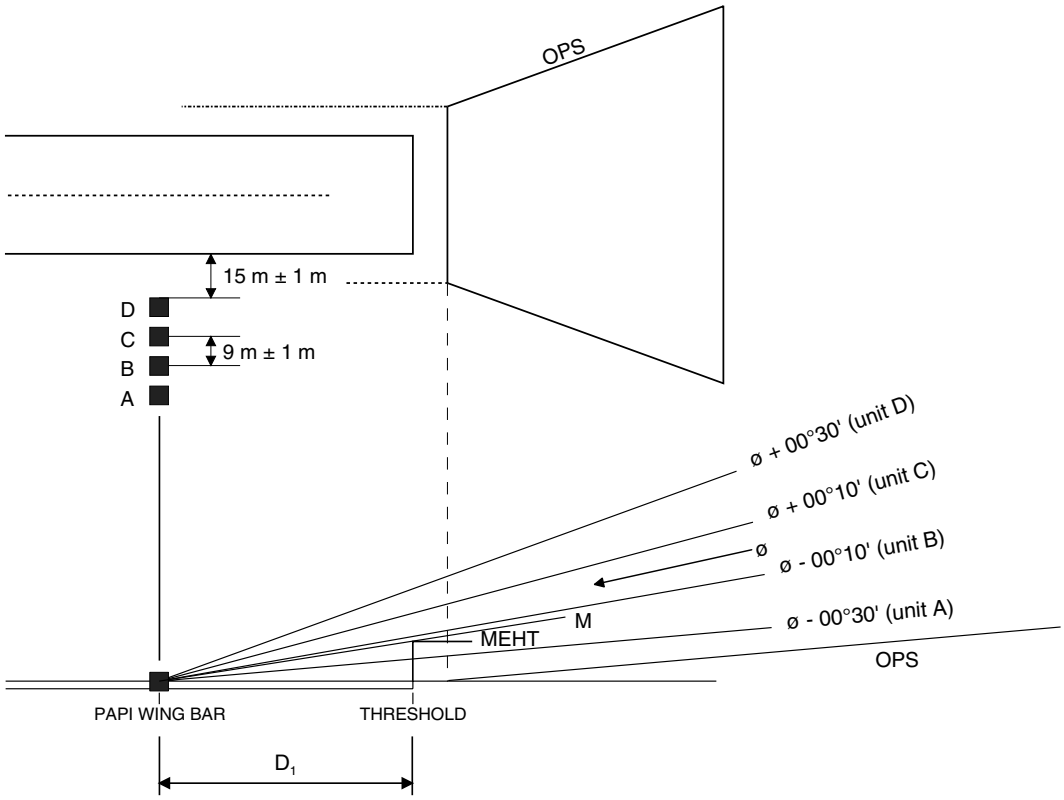


Figure 3 The arrangement of the PAPI units. The dimensioning of OPS refer to table 2.

2.2 Parameters for determining the distance from threshold.

The optimum distance of the PAPI / APAPI from the threshold is determined by:

- the requirement to provide adequate wheel clearance over the threshold for all types of aircraft landing on the runway
- the compatibility between PAPI / APAPI and any non-visual glide path indicator down to the minimum possible range and height
- the difference in elevation between the PAPI / APAPI units and the runway threshold.

The distance of the units from the threshold may have to be modified from the optimum after consideration of:

- the remaining length of runway available for stopping the aircraft
- obstacle clearance.

2.3 Nominal distance from threshold on runways without ILS / MLS

The calculation of the nominal distance from threshold is made on the assumption that the PAPI / APAPI units are at the same level as the runway centre line and that level is also the same than the level of threshold. In other words the slopes of the runway will be taken into account later on.

First the required approach angle and corresponding unit setting angles must be determined. Then the table 1 is referred to determine the eye-to wheel group and the wheel clearance to be provided at the threshold. Wheel clearance is related to the most demanding aircraft regularly using the runway.

Table 1 Wheel clearance over threshold.

Eye-to wheel height of airplane in the approach configuration	Desired wheel clearance (m)	Minimum wheel clearance (m)
< 3 m	6	3
3 ≤ EWH< 5	9	4
5 ≤ EWH< 8	9	5
8 ≤ EWH< 14	9	6

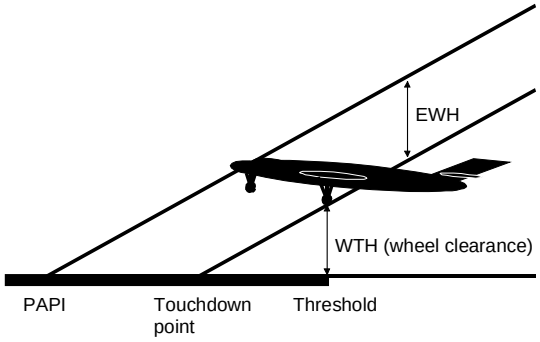


Figure 4 Wheel clearance over threshold for PAPI and APAPI. Where practical the desired wheel clearances shown in column 2 shall be provided. The clearances in column 2 may be reduced to no less than the clearances in column 3 where an aeronautical study indicates that such reduced clearances are acceptable, e.g. if the reduction in wheel clearance is more acceptable than a loss of landing distance.

The MEHT (Minimum Eye Height over the Threshold), which provides the appropriate wheel clearance over the threshold, is established by adding the approach configuration eye-to-wheel height of the most demanding aircraft regularly using the runway to the required threshold wheel clearance. For detailed information on eye-to-wheel and eye-to-aerial heights refer to Aerodrome Design Manual Part 4 Visual Aids 3rd edition - 1993 Appendix 6. The definition of angle M is 2 minutes of arc less than the setting of the unit which defines the lower boundary of the on-slope indication (unit B for PAPI and unit A for APAPI).

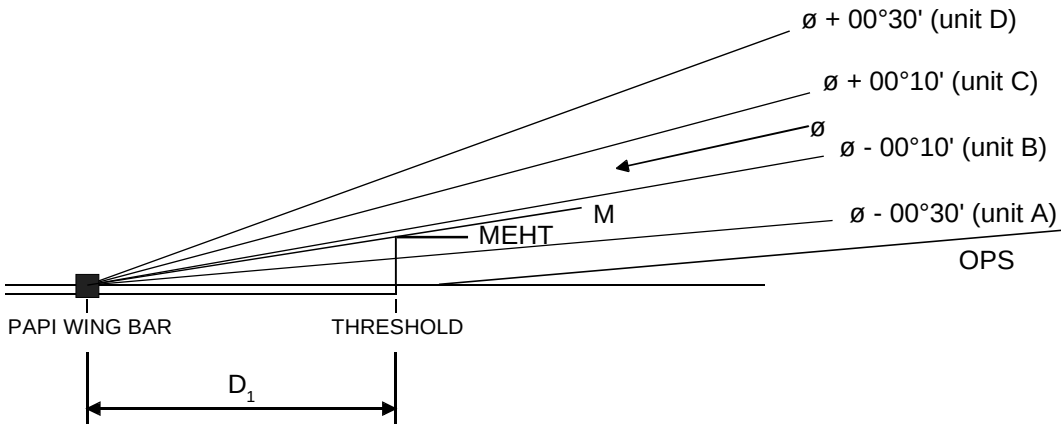


Figure 5 The geometry for determining the nominal distance D1 of PAPI wing bar.

MEHT = EWH + WTH ***(1)***

where MEHT = Minimum Eye Height over the Threshold

EWH = Approach configuration eye-to-wheel height of the most demanding amongst aircraft regularly using the runway

WTH = Desired wheel clearance

$$M = \phi_B - 00^0 02' \qquad (2)$$

where M = The angle establishing MEHT

ϕ_B = The setting angle of unit B for PAPI

$$D_1 = MEHT * cotg(M) \qquad (3)$$

where D_1 = Nominal distance from threshold

MEHT = Minimum Eye Height over the Threshold

M = The angle establishing MEHT

2.4 Nominal distance from threshold on runways with ILS / MLS

Due to the operational desirability that PAPI / APAPI is compatible with any non-visual glide path down to the minimum possible height and range, the PAPI / APAPI should be sited at or upwind of the effective ILS glide path or MLS minimum glide path origin. The distance depends on the average eye-to-aerial height of the aircraft regularly using the runway. The distance upwind of the ILS glide path / MLS minimum glide path origin equals to the product of the average eye-to-aerial height of aeroplanes regularly using the runway and the cotangent of the approach angle. The resulting distance from the runway threshold should not be less than that which provides the minimum wheel clearance established in table 1 column 3.

Siting and installation data of the ILS / MLS provides the height of the ILS / MLS glide path over the threshold (datum height) and the ILS / MLS glide path angle. Thus the effective glide path origin assuming a level runway can be calculated by multiplying the datum height with the cotangent of the glide path angle.

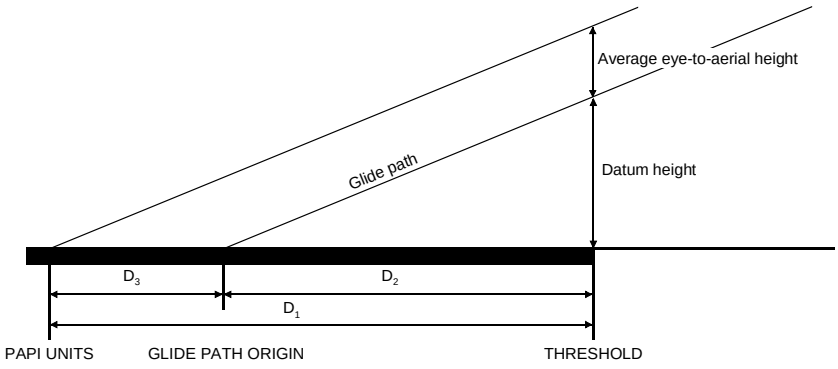


Figure 6 Geometry of approach situation with ILS / MLS.

$$D_2 = DH * cotg(\alpha) \qquad (4)$$

where D_2 = Distance of glide path origin from threshold

DH = Datum height over the threshold

α = ILS / MLS glide path angle

The necessary displacement upwind from the glide path origin due to average eye-to aerial height:

$$D_3 = AEAH * \text{cotg}(\alpha) \qquad (5)$$

where D_3 = Distance upwind from the glide path origin due to average eye-to aerial height of aircraft regularly using the runway

AEAH = Average eye-to-aerial height

α = ILS / MLS glide path angle

The nominal position of PAPI units is then gained:

$$D_1 = D2 + D3$$
$$= (DH+AEAH) * \text{cotg}(\alpha) \qquad (6)$$

Then the MEHT is checked according to equations (2) and (3)

$$MEHT = D_1 * \tan(\varnothing_B - 00^0 02')$$

When determining the angle settings for PAPI units it is allowed to increase the on-course sector from 20' to 30' to achieve better harmonization between PAPI and ILS / MLS. Finally the wheel clearances must be checked by the aid of previously calculated MEHT and eye-to-wheel heights of the aircraft using the runway. The results are then compared with the established wheel clearance requirements in table 1.

2.5 Compensation for runway slopes and unit dimensions

All previous calculations of the PAPI wing bar location consider that the PAPI units beam axis is at the same level as the threshold reference level. In fact longitudinal and transverse slopes exist on all runways and they are to be compensated by an adequate shift of the PAPI units. This shift shall be towards the threshold when the theoretical location is higher than the threshold and away from the threshold if the location is lower. These shifts shall also take into account the actual dimensions of the PAPI units and the real elevations of the ground determined by the ground survey.

If there is a difference exceeding 0,3 m between the elevation of the runway threshold and the elevation of PAPI unit B (APAPI unit A) at nominal distance from threshold, the displacement of units is necessary. The required displacement is determined by multiplying the difference in level by the cotangent of angle M (the angle establishing MEHT). The difference in level in displaced position is checked and new displacement procedure carried out until the difference is less than 0,3 m. When determining the differences in level, the height of the lens centre point of the unit with respect to the basement must also be taken into account. Moreover, the MEHT must be checked at the final position of PAPI / APAPI units.

The PAPI units should be the minimum practicable height above the ground level and ideally all units in the wing bar should lie in the same horizontal plane. A maximum height difference of 5 cm is allowed between adjacent units. A lateral gradient not greater than 1,25 % can be accepted, provided it is uniformly applied across the units.

2.6 Obstacle clearance

An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system. The characteristics of the obstacle protection surface, i.e. origin, divergence, length and slope shall correspond to those specified in Table 2 and in figure 7.

Table 2 Dimensions and slopes of the obstacle protection surface for PAPI and APAPI systems. The angle A is the setting angle of PAPI / APAPI unit A.

	Runway type / code number							
	Non-instrument Code number				**Instrument Code number**			
Surface dimensions	1	2	3	4	1	2	3	4
Length of inner edge /m	60	80	150	150	150	150	300	300
Distance from threshold /m	30	60	60	60	60	60	60	60
Divergence (each side)	10 %	10 %	10 %	10 %	15 %	15 %	15 %	15 %
Total length /m	7500	7500	15000	15000	7500	7500	15000	15000
Slope: PAPI	-	A-0,57^0	A-0,57^0	A-0,57^0	A-0,57^0	A-0,57^0	A-0,57^0	A-0,57^0
APAPI	A-0,9^0	A-0,9^0	-	-	A-0,9^0	A-0,9^0	-	-

If obstacles projecting above the surface exist one or more of the following measures should be taken:

- remove the obstacle if practicable.
- suitably raise the approach slope of the system.
- reduce the azimuth spread of the system so that the object is outside the confines of the beam.
- displace the axis of the system and its associated obstacle protection surface by no more than 5°.
- suitably displace the threshold.
- if displacement of the threshold is impractical suitably displace the PAPI system upwind of the threshold to provide an increase in threshold crossing height equal to the height of the object penetration.

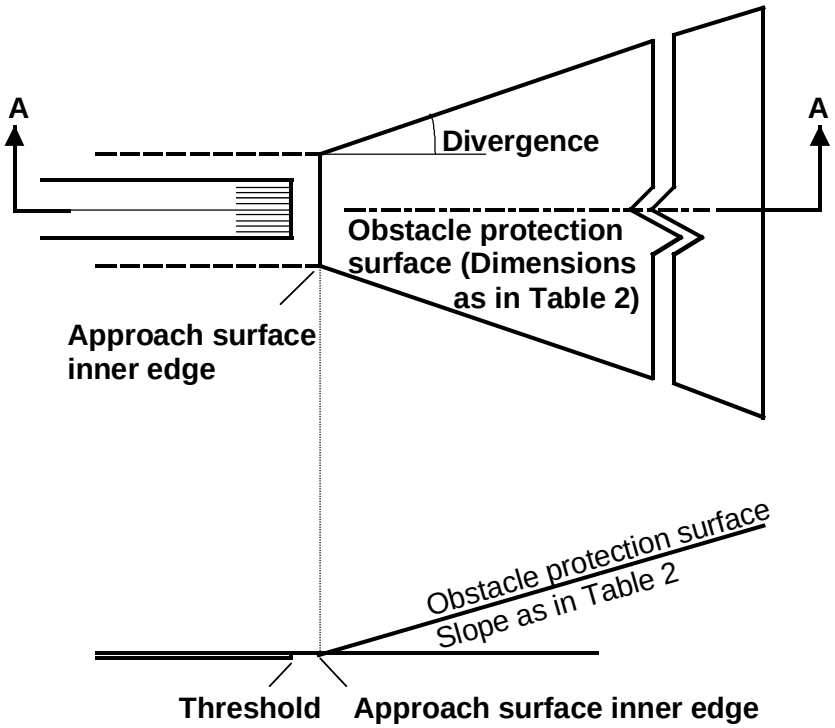


Figure 7 Obstacle protection surface for visual approach slope indicator systems.

3 Installation

3.1 Installation tools

- Spanners 10, 17, 22, 24, 26, 48 and 52 mm
- Key for housing
- Drilling machine
- Screwdriver

3.2 Foundation

The foundation of the PAPI unit has to be 900 mm x 700 mm rectangular or ø 1000 mm circular concrete base with a root deep enough not to be affected by frozen ground or flooding water. The surface of the concrete base should be smooth to enable secure fixing of the base plate. For specifying the location and installation tolerances refer to chapters 2 - 2.6.

3.3 Mounting

It is recommended to use M10x80 through bolt anchors to fasten the base plates to concrete. Place the base plates onto the concrete foundation according to the dimensions given in figure 8 and aligning the set to be parallel to runway centre line direction. Note the direction of threshold.

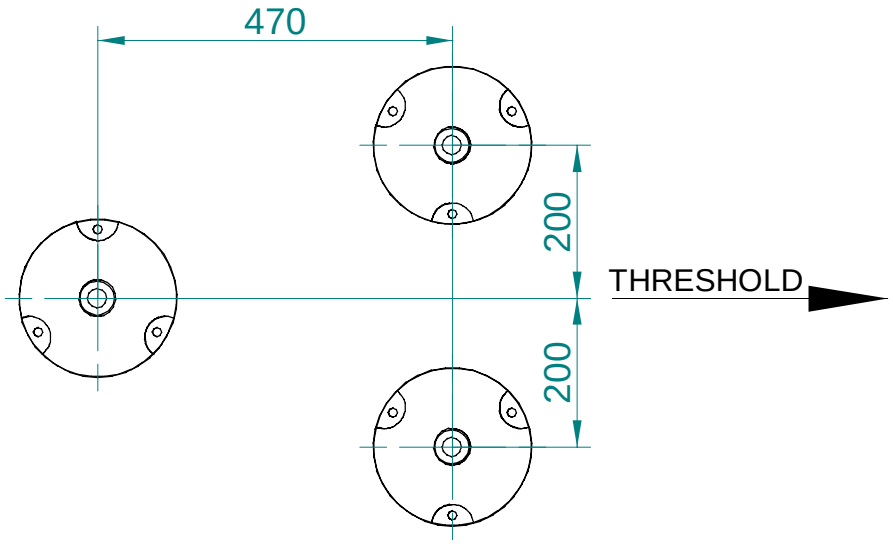


Figure 8 Installation of base plates

Figure 9 Recommended through bolt anchors

Drill holes of correct diameter and depth to the foundation through the holes in base plates and hit the anchors to the holes with hammer.

Fasten the base plates (17) to the basement by tightening the nuts in the through bolt anchors.

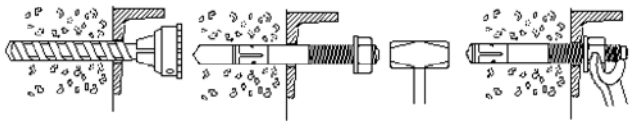


Figure 10 Installation of through bolt anchors.
1. *Drill a hole through the base plate*
2. *Hit the anchor to the drill hole through the hole in base plate with hammer*
3. *Tighten the anchor to fasten the base plate*

Fasten the legs to the base plates with screws (20).

Adjust the front legs roughly to the same height by first loosening the locking nuts (22, 23) and then adjusting the height with nut (21). Tighten the locking nuts by hand. Open the nuts (24) and remove the upper frangible couplings (14). Screw the couplings (14) to the eccentric mounting plates (28) so that the holes are perpendicular to the longitudinal axis of the unit. Tighten the nuts (26).

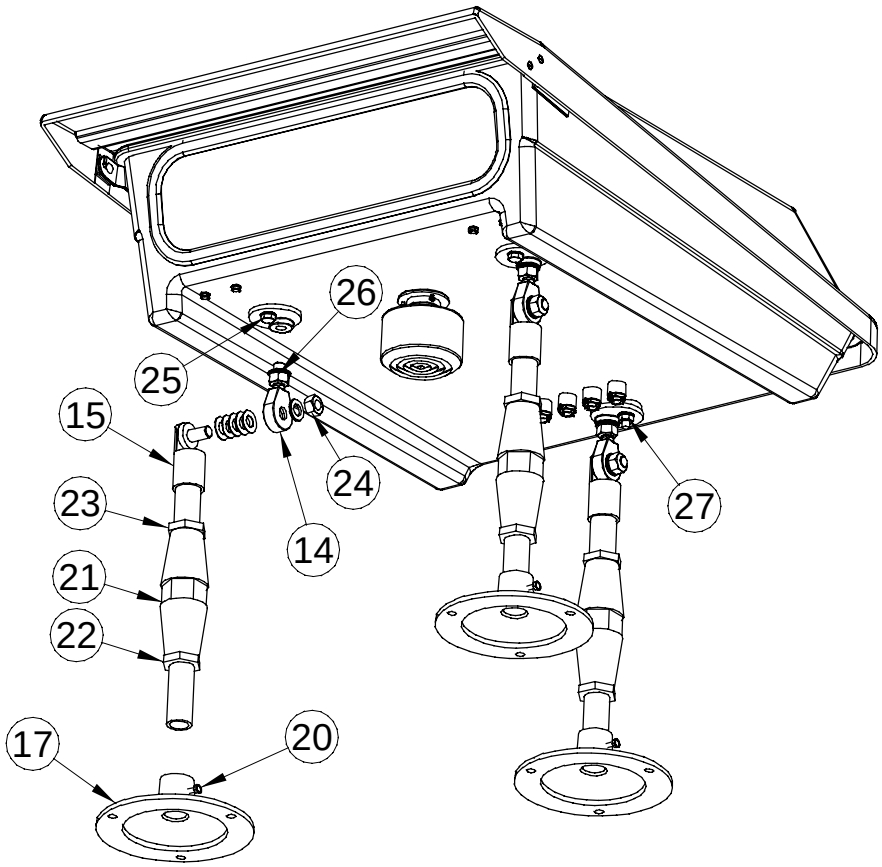


Figure 11 Installation of legs and unit

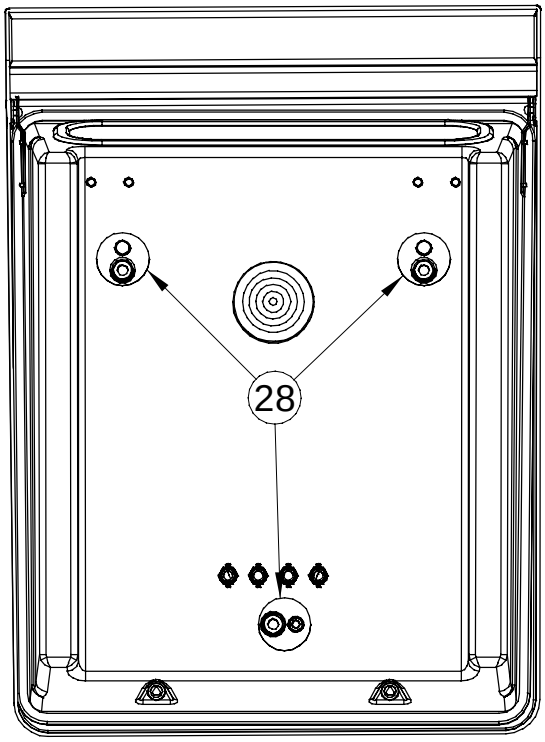


Figure 12 Initial orientation of eccentric leg mounting plates (28)

Install the unit to the legs. Notice the spring washers. Tighten the nuts (24). Align the unit.

3.4 Supply connections

Connect the luminaire cables from the transformer through the entries to the terminal blocks (3 pcs) as follows:

Pin 1: White
Pin 2: Black

Tighten the cable glands.

Plug in the connectors of the lamps.

If the heating cable is installed connect the grounding to the pin 1 of the heater terminal block.

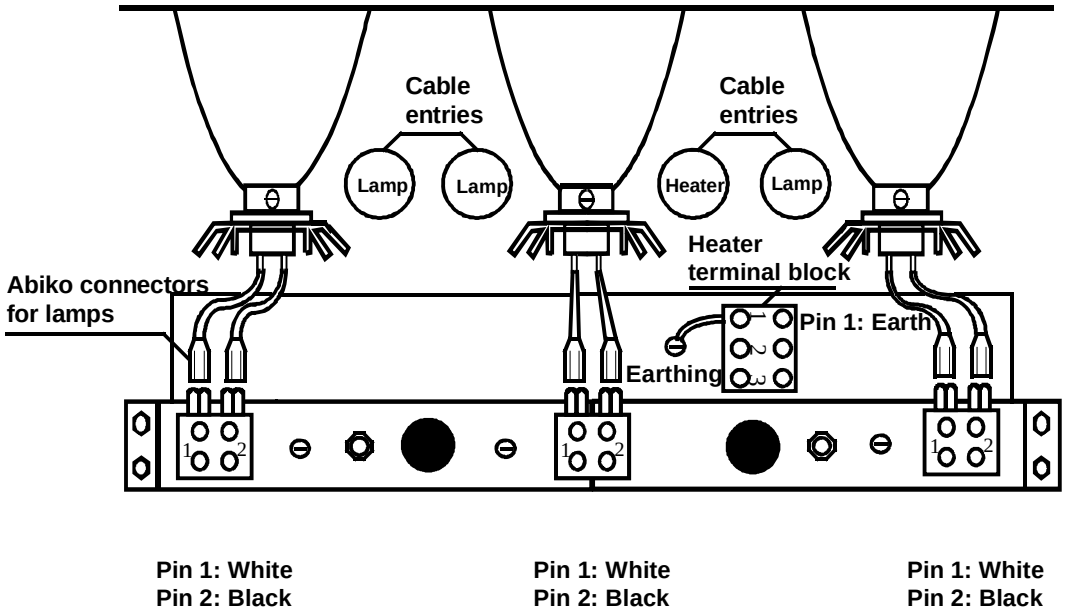


Figure 13 Connecting IDM 5196

3.5 Heater connections

Heating is an accessory to IDM 5196.

Connection of the heating cable and thermostat is done according to the fig. 12 A with 24V AC supply voltage, and according to picture 12 B with 220V AC supply voltage.

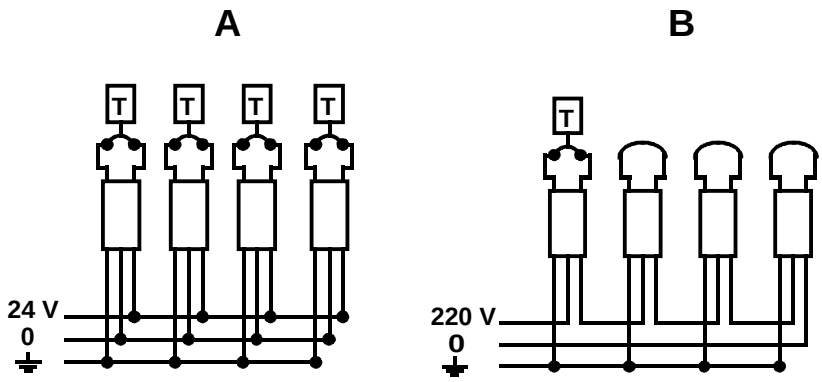


Figure 14 Alternative heater connections

4 Alignment

It is recommended to perform an initial flight inspection for a new installation by competent authority to confirm the correct operation of the system.

4.1 Alignment tools

- Precision spirit level 2 pcs (vertical alignment with precision machined angle wedges)
- Electronic inclinometer (angle wedges replaced by inclinometer platforms)
- Spirit level 1 pc
- Alignment device
- Spanners openings 10, 17, 48 and 52mm

4.2 General notes on alignment

There are two different types of IDM 5196 units, the difference being the vertical alignment method. If the units are angle wedge type units, each PAPI unit has unique angle wedges (2 pcs / unit) with the angle marked on the wedge. Make sure that the angle wedges correspond to the installation position. If the units are inclinometer type, angle wedges are replaced by inclinometer platforms and a unit can be installed to whatever position. Do not loosen nor adjust the sealed screws inside the unit. The flowchart in Figure 15 shows the alignment procedure.

4.3 Horizontal alignment

Remove the lid. Attach the alignment device on top of the reflector and colour filter assembly so that the groove in the bottom of the device will settle on the fastening screw of the colour filter retaining spring and the groove in the L-frame of the device settles on the upper fastening screw of the middle reflector. Make sure that the L-frame of the alignment device matches to the reflector assembly frame. Horizontal alignment is carried out by using an aiming point, which is equidistant from the runway centre line than the centre line of the unit to be aligned (Figure 16, Figure 17). Loosen slightly nuts (26, 27) and bolts (25) in the legs and align the unit horizontally by moving the rear end of the PAPI unit. When tightening the nuts and bolts be careful not move the unit. Finally check the horizontal alignment.

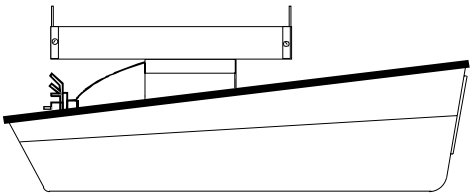


Figure 16 Horizontal alignment device attached to the unit

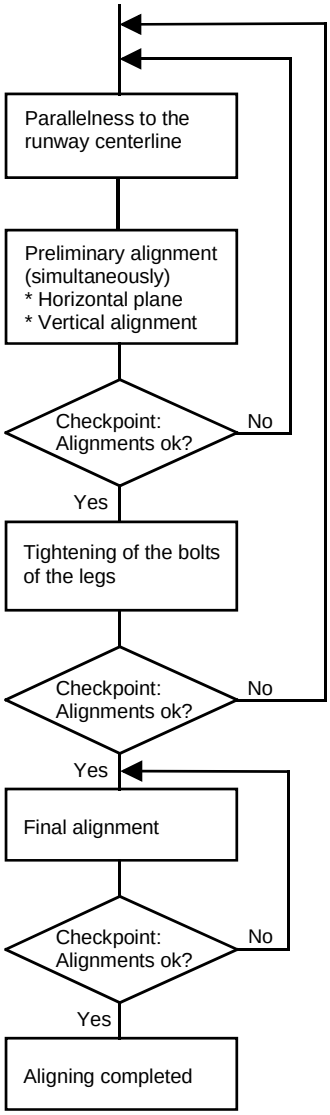


Figure 15 Alignment procedure

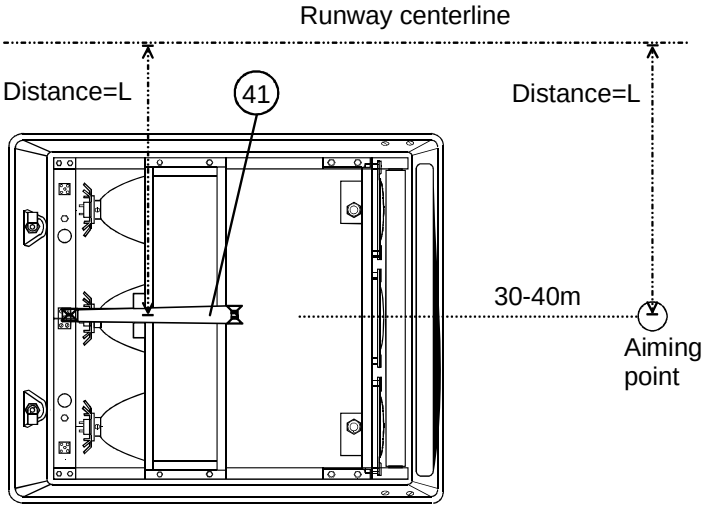


Figure 17 Horizontal alignment

4.4 Preliminary vertical alignment

Read carefully the Operator's Manual supplied with the electronic inclinometer. When testing the functions of the inclinometer, never press simultaneously the ENTER-HOLD and SELECT-PRINT buttons, because this will erase the calibration values from memory. Switch on the inclinometer and set the display mode to show either degrees.decimals or degrees minutes depending on the manner how the setting angles are established.

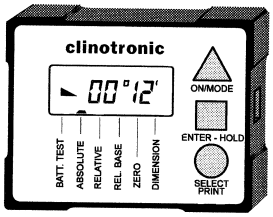


Figure 18 Electronic inclinometer.

When horizontal direction is aligned the next step is to level the unit in transverse direction to runway centre line. Also the desired lens center height must be adjusted in this stage. This is done by placing spirit levels on top of lens assembly and reflector and colour filter assembly (see Figure 19 positions b). Loosen the locking nuts (22, 23) in the front legs and adjust the unit by turning the adjustment nuts (21). After fastening the locking nuts check once again that the unit is leveled in transverse direction. The vertical alignment is done in two phases. First the unit is roughly adjusted to the desired angle by turning the adjustment nut in the rear leg. Place the precision spirit levels on the angle wedges (position a, Figure 19). Loosen the locking nuts in the rear leg and adjust the unit as close as possible to the desired angle. Tighten the locking nuts. If the unit is of inclinometer type, place the electronic inclinometer on the platform, switch it on and adjust the rear leg to achieve the desired angle as close as possible.

4.5 Final vertical alignment

Place the precision spirit levels on the angle wedges and loosen the fastening nuts (11, Figure 19). Loosen the locking nuts of the thumb screws. Adjust the thumb screws so that the bubbles in both precision spirit levels are centralised. Note that the graduation of scale is 20 seconds of arc. When vertical alignment is correct first tighten the nuts (11) and then the locking nuts of the thumb screws. Check the alignment. When doing the final adjustment on inclinometer units, place the electronic inclinometer alternately on both platforms and continuously monitor the angle. The actual adjustment is done similarly to angle wedge models. The setting is easier if two electronic inclinometers are used simultaneously on both platforms.

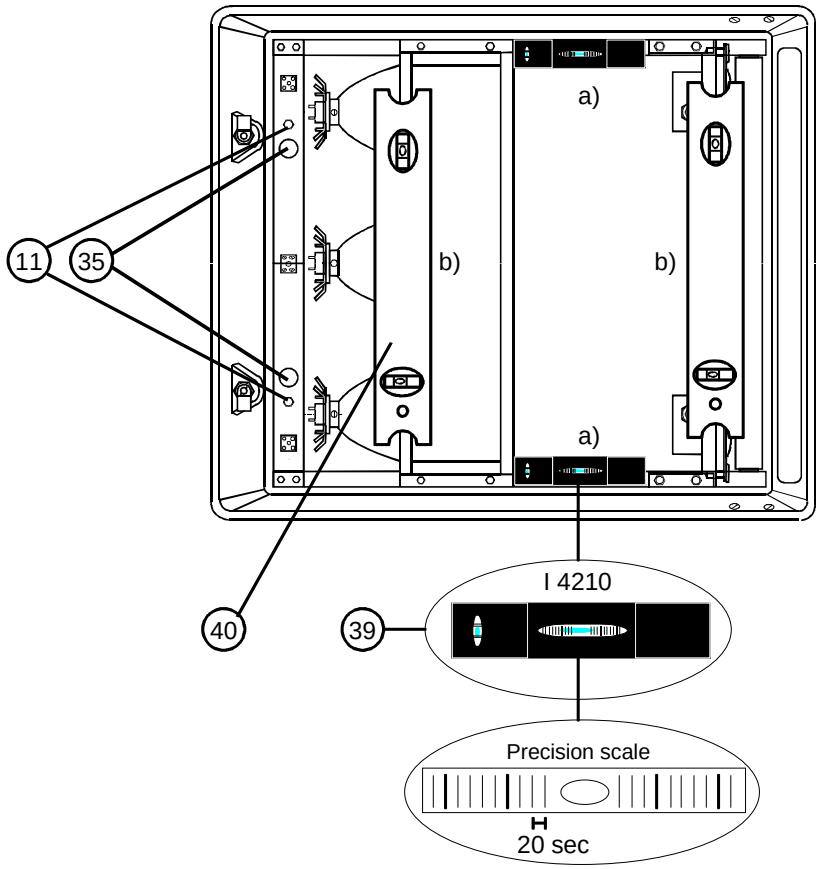


Figure 19 Vertical alignment of a unit with angle wedges

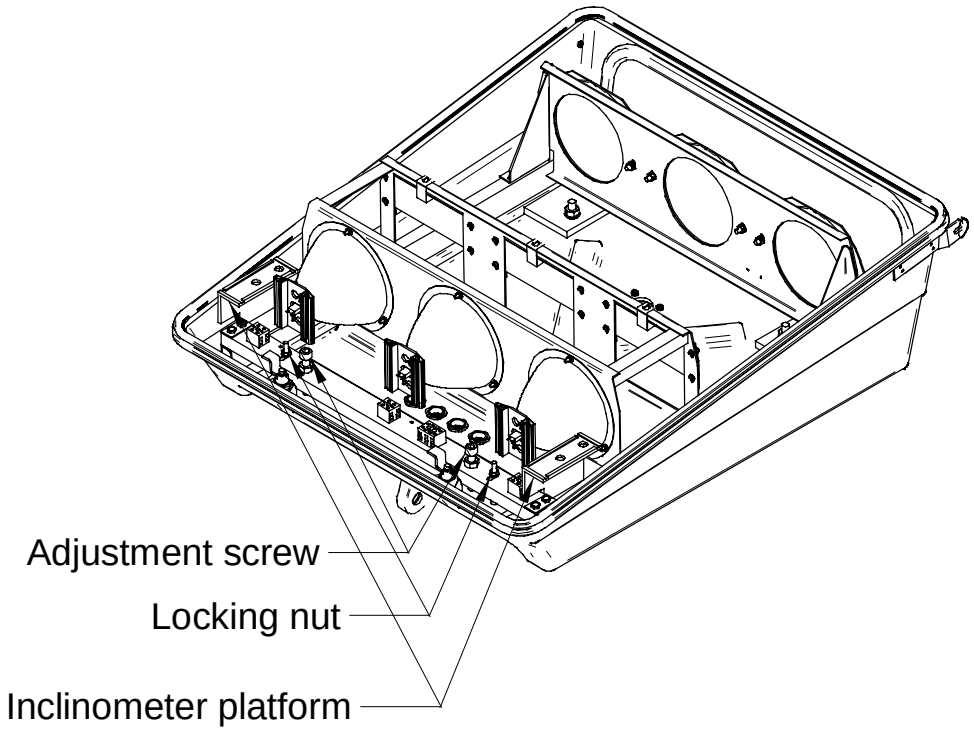


Figure 20 Inclinometer platforms

5 Maintenance

5.1 Regular checking and maintenance

Daily:

- Visual check of the units.

- Check from the approach direction that all lamps operate and that the colour filters are not damaged. When inspecting at a relatively short distance use only 1 % intensity and preferably dark eye protection lenses.

- Check that the transition of optical elements in one unit is coincident and that the lenses are not contaminated.

Monthly:

- Clean the outside surface of the PAPI unit with a soft brush.

- Wash the outside surface of the front glass with mild soap solution.

- Check the tightening of screws.

- Check the angular settings of the units.

Every six months:

- Due to possible ground movements in autumn and in spring check that all units are in the same level.

- Check the angular settings and the horizontality of the units.

- A flight test is recommended.

- Check the front glass for wear.

Every five years:

- Change dust filter. In case of very dusty conditions it is recommended to change the filter every year.

5.2 Housing

- Open the locks (37) with locking key (38) and lift the cover from the back edge with the help of the hinge in the front edge. Lift off the top cover.

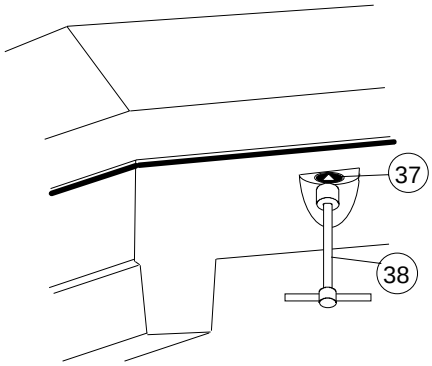


Figure 21 Opening the cover.

- When closing the unit, pull cover backwards and check before tightening locking screws that the sealing of the cover is properly seated.

- Always when opening the unit, clean dust and moisture which have possibly penetrated into it. Use dry, soft cotton cloth for cleaning of reflectors, colour filters, lenses and front glass.

NOTE ! Do not touch the inner surfaces of reflectors or surfaces of colour filters nor glass parts of the lamps with bare hands. Use cotton gloves when handling these parts.

5.3 Lamp

- Open the unit. Disconnect the lamp wires from connector (12).

- Loosen the screws by two turns, turn the heat sink (4) clockwise and detach the cooling plate from the lamp holder by pulling it gently and pull off the lamp (3).

- Pass the wires of the new lamp (200 W, 6.6 A) through the opening of the cooling plate and put the new lamp to its place, so that the semicircular hole in the lamp socket matches to the steering pin. Put the cooling plate back. Before tightening the screws, check that the lamp is properly seated. Connect the wires to the connector (12) and close the unit.

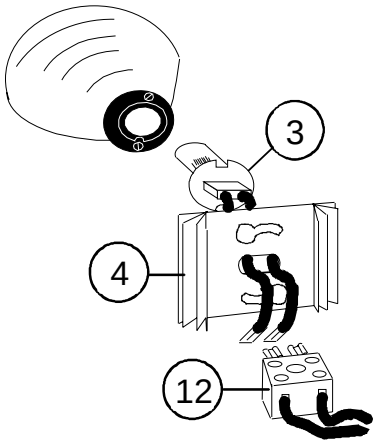


Figure 22 Changing a lamp

NOTE ! Do not touch the glass parts of the lamp with bare hands.

5.4 Colour filter

- Open the unit.

- Use cotton gloves or similar in order not to make greasy fingerprints on the colour filter (5).

- Press the retaining spring (6) and pull it slightly backwards to release the colour filter.

- Remove the colour filter by lifting it straight up.

- When assembling the new colour filter by pushing it between the frame and the supporting springs (7) make sure that the polished edge of the filter comes downwards.

- Attach the retaining spring on the colour filter.

- Close the unit.

NOTE ! Do not touch the filter with bare hands.

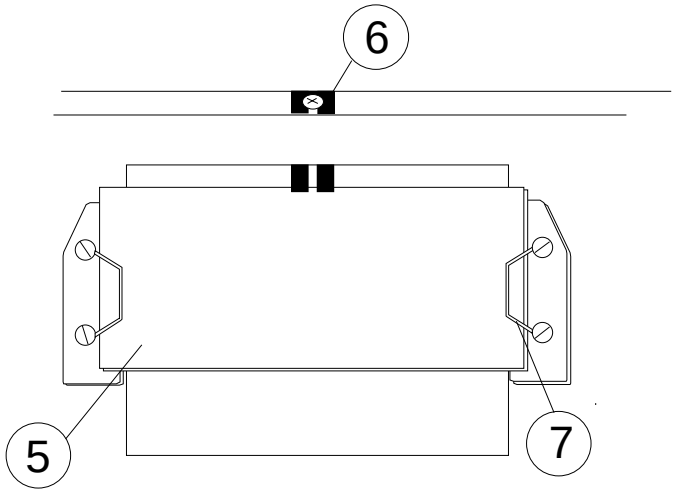


Figure 23 Changing a colour filter.

5.5 Reflector

- Open the unit.

- Disconnect the lamp wires from the terminal block (12) and remove the lamp.

- Unfasten the screws (A) and remove the reflector from the frame.

- Open the screws B to be able to remove the lamp holder from reflector.

- Replace the lamp holder to the new reflector and fasten the screws (B). Be careful not to scratch the reflecting surface with screwdriver.

- Fasten reflector to its frame with screws A.

- Replace the lamp and connect the wires to terminal block (12).

- Close the unit.

NOTE ! Do not touch the inner surface of the reflector with bare hands.

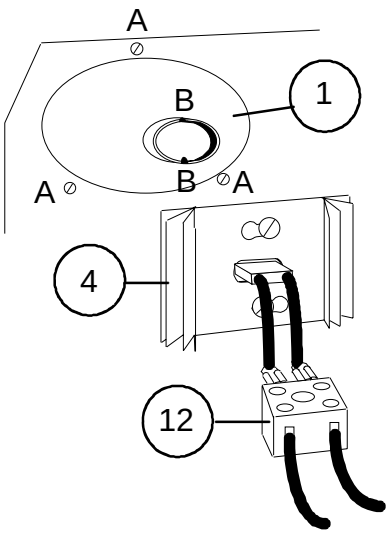


Figure 24 Changing a reflector.

5.6 Front glass

- Clean properly the old front glass and the surrounding housing to prevent the dirt from penetrating into the housing.

- Open the unit.

- Protect the optics with paper or similar.

- Remove the wedge rubber from its trace by suitable hook.

- Press the front glass from inside to remove the glass from the gasket.

- Check the gasket and if necessary replace. If old gasket is used clean it properly before fitting the gasket to the housing. The joint must be directed upwards.

- Press front glass into the groove of the gasket using rounded hook. Be careful not to damage the gasket. Attach the wedge rubber into its trace by suitable tool. The joint must be directed downwards.

- Remove the protection of the optics.

- Close the unit.

5.7 Dust filter

- Remove the dust filter by turning it clockwise.

- Remove the protection cover from the threaded end of the dust filter.

- Before putting new dust filter on its place, check that the gasket is on its place on the bottom of the threading part.

- Fasten the dust filter by turning it counter-clockwise.

- Remove the seal cap from the bottom of the dust filter if existing.

5.8 Cover sealing

- Open the unit.

- Remove the old sealing by pulling it straight out from the unit.

- Put the new sealing on its place and check that the edge of the cover comes tightly all over in the sealing trace.

- Close the unit.

5.9 Heating cable and thermostat

- Switch off the electricity of the heating circuit.

- Open the unit.

- Change faulty thermostat or heating cable for a new one.

- Check that the heating cable is in such a position that it cannot be burnt by sunbeam or light beam through the lenses.

- Check that the heating cable is not overlapping itself.

- Close the unit.

6 Technical data

Specifications:

According to ICAO Annex 14 Volume I third edition July 1999 paragraphs 5.3.5.23 - 5.3.5.45.

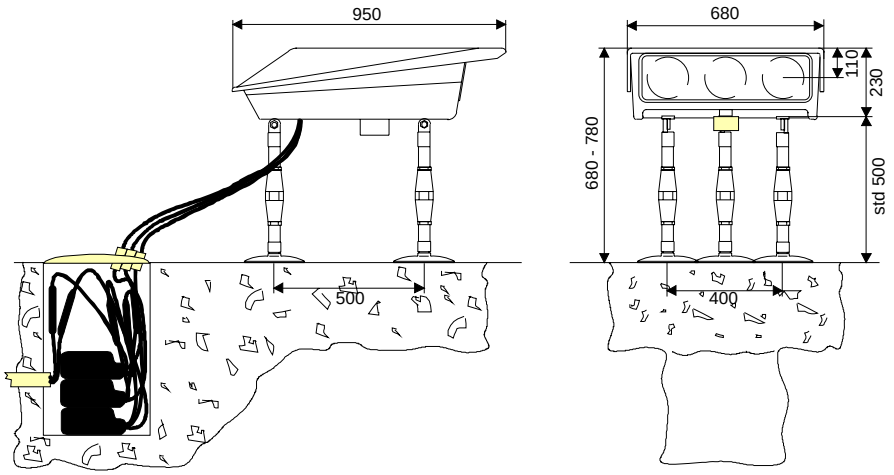
General description:

3-lamp 3-leg sharp transition device for PAPI / APAPI systems. Floating optical chassis in dust-proof housing guarantees sharp transition sector and stable optical performance in all circumstances. Light weight combined with breakable couplings in legs minimises the risk of damage for aircraft in possible collision.

Main dimensions:

Weight: 27 kg

Protection degree: IP64



Materials:

Reinforced fibreglass housing

Chassis of anodised aluminium and stainless steel

Silicone rubber gaskets

Stainless steel hardware

Cables and connectors:

Plugs: FAA L-823 Style 5

Receptacles FAA L-823 Style 12

Secondary cable FAA 150/5345-70

CIE chromaticity:

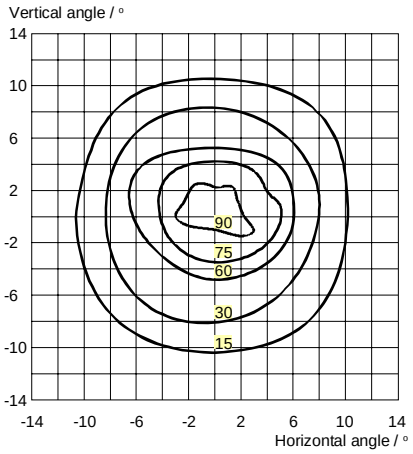
	Red		Clear	
Intensity step	x	y	x	y
6,6 A	0,700	0,288	0,430	0,393
5,2 A	0,705	0,286	0,462	0,403
4,2 A	0,707	0,286	0,497	0,406
3,4 A	0,712	0,284	0,529	0,404
2,8 A	-	-	-	-
2,2 A	-	-	-	-
2,0 A	-	-	-	-

Photometric data:

The colour transition between red and white occurs at a vertical angle of 2.5 minutes.

Intensity distribution:

3x200 W Without red filters



Light source:

200W 6,6A, Pk30d base prefocused halogen lamp. Average lifetime 1000 hours at rated current.