

Fig. 1: PVO



Internally Illuminated Guidance Signs with fluorescent lamps

Type PVO

ADB
Airfield Solutions

Compliance with standards

ICAO: Annex 14, Volume I, para 5.4 and Appendix 4.

CENELEC: pr ENV 50235/1996.

NATO: STANAG 3316

Various national standards.

Uses

On Civil Aerodromes:

- Mandatory instruction signs
- Information signs
- VOR check-point sign

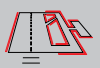
On Military Airbases: as above, plus:

- Runway distance-to-go signs
- Arrestor barrier signs.

Features

- Exceeds latest ICAO requirements for luminance and colorimetry (see photometric performances).
- Economical to run and to maintain: low electrical power demand, long life lamps, self-cleaning vertical panels collect less dirt than sloped or curved panels.
- Modular construction: commonality of mechanical and electrical components throughout entire sign range.
- No internal reflectors to achieve photometric requirements.
- 24 W – 10000 hours fluorescent lamp, common to all sizes.
- 75 lumen/watt lamp efficiency, 3 times that of a tungsten filament halogen lamp.
- 6000 K light source provides a cool white signal improving colour contrast and sign legibility.
- Reliable start and operation from -20°C to $+55^{\circ}\text{C}$.
- Multi-lamp design safeguards signal availability in case of partial lamp failure.
- Removable top panel for easy relamping.
- Message symbols obtained by self adhesive film, vacuum applied on panel inner face.
- Seamless message panels (up to 3.7 m long) made of long life, self-extinguishing polycarbonate; U.V., abrasion and high temperature resistant.
- 4 mm panel thickness exceeds industry standards for improved resistance to high winds and jet blast.
- 6.6 A series or 230 V parallel power supply, 50/ 60 Hz.
- High power factor.
- Low mass, frangible yet rigid construction based on aluminium extrusions and panels.
- Frangibility according to ICAO or FAA requirements, withstanding wind velocities up to 322 km/h.
- IP34 protection class, (IP44 in option).

Fig. 2



Construction (Fig. 3)

- 1 Cover clamp
- 2 Cover
- 3 Longitudinal struts
- 4 Intermediate leg support
- 5 Fluorescent lamp (supplied separately) with lampholder
- 6 Rear panel
- 7 Bottom panel
- 8 Legend panel
- 9 Mounting flange
10. M10 expansion bolt (option, supplied separately)
11. 2 core cable with FAA L823 plug (supplied separately)
12. Mounting leg
13. Power adaptor (only in case of series supply)
14. Side panel
15. Corner leg support
16. HF-lamp ballast.

Materials and Finish

Corrosion-proof, maintenance-free concept.

- Body: Aluminium extrusions, panels, corner leg supports and mounting legs.
- Legend panel: long-life polycarbonate, U.V. and abrasion resistant, self-extinguishing.
- Plain stainless steel hardware.
- Baked polyester powder coating, colour: white RAL 9016.

Sign Selection

Extensive guidance material on the selection and the definition of the length of signs is provided in chapter 5.4 and Appendix 4 of ICAO Annex 14.

Sign sizes are governed by:

- 1) the runway code they are associated to (for their height)
- 2) their type: Mandatory or Information
- 3) the message length.

Mandatory signs are used to identify a location beyond which an authorisation from the tower is required to proceed. They include road-, taxi- and Cat I, II and III holding position signs, runway designation signs and „NO ENTRY“ signs.

They have white legends on red background (Fig. 2 and Fig. 4).

Information signs are all other signs (except runway distance signs) providing information on routing (direction or destination) and on location. Information signs (Fig. 1) have black lettering on yellow background, except location signs.

Location signs have a yellow legend on a black background (Fig. 5). The message on stand-alone location signs is surrounded by a yellow border.

Fig. 3

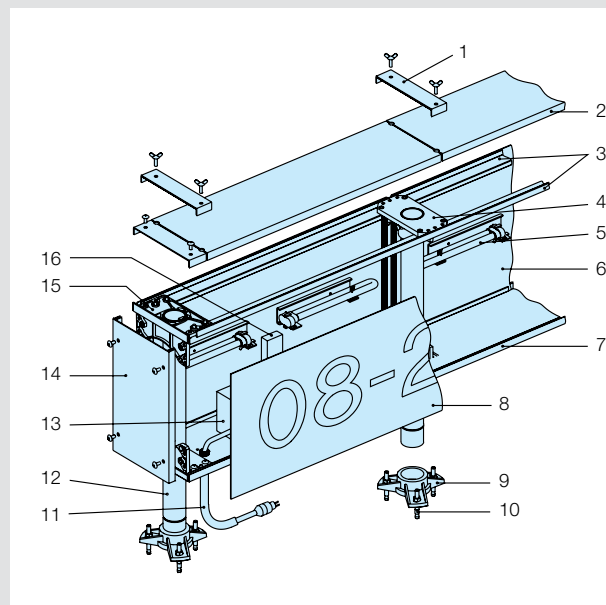


Fig. 4: Typical installation

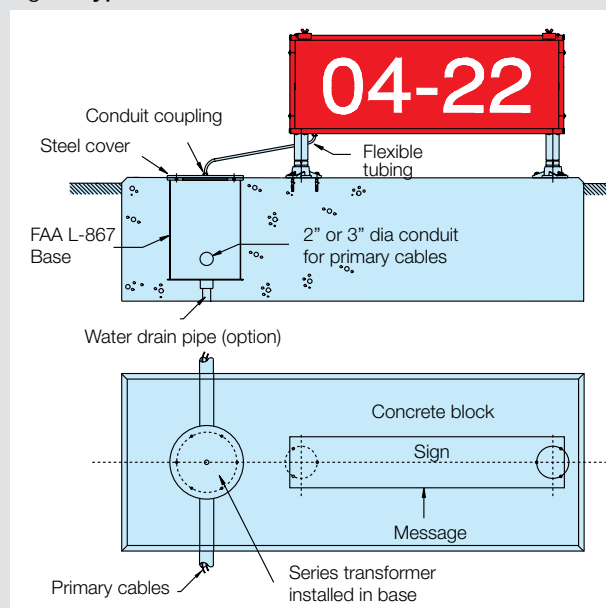


Fig. 5: Outline Dimensions (mm)

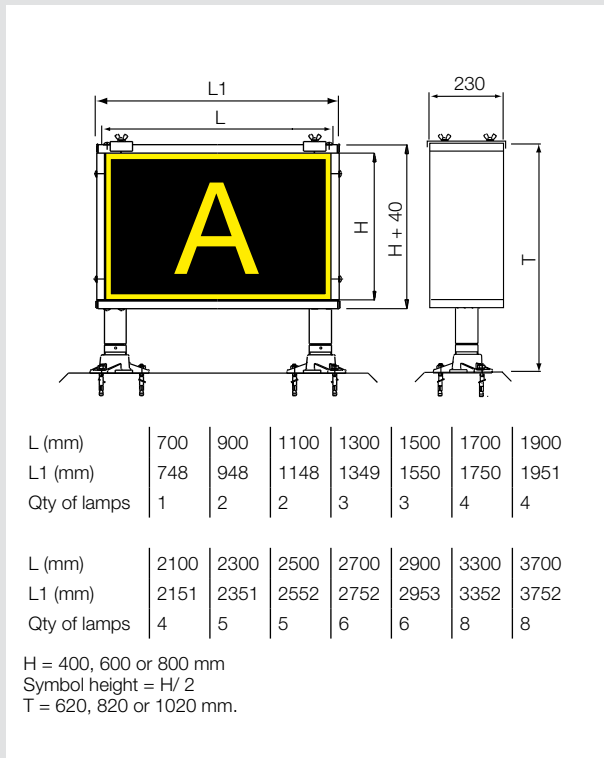


Fig. 6: Power consumption

Qty of lamps	Series supply					
	4.8 to 6.6 A		2.8 to 6.6 A		6.6 A fix	
	ADB RST series transformer (W)	CCR load at 6.6 A (VA)	ADB RST series transformer (W)	CCR load at 6.6 A (VA)	ADB RST series transformer (W)	CCR load at 6.6 A (VA)
1	100	130	100	130	100	100
2	100	160	100	165	100	100
3	100	160	200	280	150	200
4	200	300	200	300	150	200
5	200	320	300	400	200	320
6	200	340	300	430	200	320
8	1x100	500	1x100	595	1x100	420
	1x200		1x300		1x200	

Parallel supply: 30 VA per lamp.

Note:

For a comfortable operation of the CCR, it is recommended to limit the PVO load to maximum 50% (6.6 fix series supply: 100%) of the total load connected to the CCR. In this circumstance, the total load should not be more than 75% of the regulators nominal power. These values may be different for non-ADB regulators.

Standard options

Bird deterrent

These polycarbonate strips with bayonet spikes, to avoid the birds from sitting on the PVO, are located on the sign cover. An adhesive tape on the bottom of the strips and the provision for joining several strips, makes them easy to install.

Safety switch

This switch disconnects the power supply from the sign to allow safe maintenance.

Safety ropes

ADB strongly recommends the use of safety ropes in order to prevent signs flying around in case of accidental blow down due to exceptional wind gusts or jet blast.

Installation (Fig. 4)

The PVO's are shipped assembled. They have to be installed on a concrete foundation at the recommended distance from the runway or taxiway edge. Low-weight construction allows for ease of handling and installation of the PVO by two men. Leg flanges are secured on the foundation using expansion bolts (3 per flange).

The horizontal level of the PVO may be corrected by adjusting the mounting flanges in height (max. 1.5 cm).

The installation instructions are supplied with the equipment. The cable is run in a flexible conduit down to a conduit elbow (cat leaflet A.05.110) or to an FAA style transformer housing (cat. leaflet A.05.120) embedded in the concrete.

Photometric Performances (Typical values)

Lamp(s): 24 W, U-shaped fluorescent, 10000 hours.

Average sign luminance

Calculated as per ICAO Annex 14, Appendix 4, Fig. 4.1.

Colour	Luminance (cd/m²)	Min. ICAO requirement RVR <800 m
Red	79	30
Yellow	325	150
White	560	300

- Red/ White ratio: 1/ 7.1 (Specified: 1/5 < Ratio < 1/10)
- Uniformity factor: 2.5/ 1 (Specified: <5/1) between maximum and minimum values over whole sign area.

Colorimetry of sign in night condition

According to CIE no 39-2 (TC – 1,6) 1983 Fig. 4

Colour	x	y
Red	0.672	0.318
Yellow	0.515	0.480
White	0.344	0.360

Illuminant: internal source

CIE 1931 2. Standard Colorimetric Observer.

Electrical Supply

Series: 2.8 to 6.6 A, 4.8 to 6.6 A or 6.6 A fix, 50 or 60Hz ; through (a) suitable series transformer(s) (Fig.6).
 2-core cable (length: 1 m) with FAA L-823,
 2-pole plug supplied with the PVO.

Parallel: 230 V± 10%, 50 Hz or 60 Hz, single phase supply cable to be connected to terminals inside the PVO.

Provision for earthing.

Suggested Specification

The Internally Illuminated Guidance Signs shall be in full compliance with ICAO Annex 14, Vol.I, para. 5.4 and Appendix 4. The sign shall consist of a rigid, self-supporting aluminium housing of low mass. Construction shall be modular with commonality of mechanical and electrical components throughout the entire sign range. The housing shall be painted in RAL 9016 white, matte finish. Assembly of the sign mechanical components shall be by means of screws or similar devices to facilitate the repair of accidentally damaged signs. Welding of mechanical parts is not allowed. Its minimum thickness shall be 4 mm. The polycarbonate legend panel shall be U.V. and abrasion resistant and flame retardant. The message shall be obtained by applying, on the inner face of the panel only, a self-adhesive film, by means of a vacuum-based process. No paint shall be used. The legend panel shall be one-piece (seamless) for all sign sizes. A polyethylene sheath, to be removed after installation, shall protect it externally. To cleanly break in case of impact, the sign supporting legs shall include a weakening groove. Each leg shall have provision for attaching an optional safety rope to hold the sign captive to the mounting flanges, after breakage of the legs. The legs shall extend over the entire panel height and thus participate

actively in the sign's mechanical strength. The sign shall withstand wind velocities up to 322 km/h (ICAO and FAA). Sign illumination shall be by means of fluorescent lamps with a life span of not less than 10000 hours. Lamp color temperature shall be 6000 K. The same type of lamp, in appropriate number, shall be used for all sign sizes. Lamp power shall not exceed 30 W per half meter panel length, irrespective of panel height. Lamp ballasts shall be of the solid-state, high frequency type. Power supply shall be either 230V AC or 6.6 A series with fixed or variable intensity down to 2.8 A. The necessary solid-state power converter shall be built into the sign. Re-lamping shall require no tools. Removal of the front panel or other wind-sensitive large-size panels for the purpose of re-lamping or trouble shooting, shall not be permitted. No internal reflectors shall be used. Protection class of the sign shall be IP34 or better. The sign shall start and operate reliably from -20°C to +55°C ambient air temperature. The sign shall be delivered fully assembled and tested, with its mounting flanges, ready for installation. Lamps shall be packed separately.

Ordering Code

1 PVO 06 1 23 002 S

Face height (H)	
400 mm = 04	
600 mm = 06	
800 mm = 08	
Power supply	
Series (4.8 to 6.6 A) = 1	
Series (2.8 to 6.6 A) = 2	
Parallel (230 V) = 3	
Series (6.6 A fix) = 5	
Length (L)	
700 mm = 07	
900 mm = 09	
1100 mm = 11	
1300 mm = 13	
1500 mm = 15	
...	
per 200 mm	
...	
2900 mm = 29	
3300 mm = 33	
3700 mm = 37	
Special requirements to be specified in full text = S	

N.B: Each ordering code shall be completed with the legend panels and colours

Complete, delete or modify as necessary.

Packing Data

Length code	H = 400			H = 600			H = 800		
	Net Weight (kg)	Packing sizes (mm)	Gross Weight (kg)	Net Weight (kg)	Packing sizes (mm)	Gross Weight (kg)	Net Weight (kg)	Packing sizes (mm)	Gross Weight (kg)
07	22	350 x 630 x 800	27	27	350 x 830 x 800	32	32	350 x 1030 x 800	37
09	24	350 x 630 x 1000	33	29	350 x 830 x 1000	38	34	350 x 1030 x 1000	43
11	28	350 x 630 x 1200	37	33	350 x 830 x 1200	42	38	350 x 1030 x 1200	47
13	32	350 x 630 x 1400	41	37	350 x 830 x 1400	46	42	350 x 1030 x 1400	51
15	37	350 x 630 x 1600	46	42	350 x 830 x 1600	51	47	350 x 1030 x 1600	56
17	45	350 x 630 x 1800	55	52	350 x 830 x 1800	62	61	350 x 1030 x 1800	71
19	47	350 x 630 x 2000	59	56	350 x 830 x 2000	66	63	350 x 1030 x 2000	75
21	49	350 x 630 x 2200	63	57	350 x 830 x 2200	70	65	350 x 1030 x 2200	79
23	54	350 x 630 x 2400	70	64	350 x 830 x 2400	80	74	350 x 1030 x 2400	90
25	58	350 x 630 x 2600	75	68	350 x 830 x 2600	85	78	350 x 1030 x 2600	95
27	63	350 x 630 x 2800	80	73	350 x 830 x 2800	90	83	350 x 1030 x 2800	100
29	68	350 x 630 x 3000	85	78	350 x 830 x 3000	95	88	350 x 1030 x 3000	105
33	77	350 x 630 x 3400	95	87	350 x 830 x 3400	105	97	350 x 1030 x 3400	115
37	87	350 x 630 x 3800	105	97	350 x 830 x 3800	115	107	350 x 1030 x 3800	125

N.B. Panel height 1200 mm available on request.

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