



Airfield. Our Field.

## Internally Illuminated IP54 LED Guidance Signs type PVL RPV LED retrofit kits

### Compliance with standards

ICAO: Annex 14, Volume I, para. 5.4 and Appendix 4 (current edition)  
CENELEC: pr ENV 50235:1997  
NATO: STANAG 3316  
CE: Approved

### Uses

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

## Features

- Generalises the advantages of LED technology to taxiway signs:
  - Reduced maintenance thanks to the long lifetime of the LEDs.
  - Reduced energy consumption.
  - Improved signal due to the optical characteristics of the LED light sources.
- Legibility
  - Exceeds ICAO requirements for luminance and colorimetry.
  - No additional internal reflector to achieve photometric requirements.
  - Very uniform luminance over the surface of the sign ensures excellent legibility even in the worst visibility conditions.
  - 2 level dimming as prescribed in Annex 14, Chapter 5.4.1.7 (in 6.6 A series supply only).
- Savings
  - Low power consumption. high power factor.
  - Low maintenance costs: long-life light sources, self-cleaning vertical panels collect less dirt than sloped or curved panels.
  - Innovative light source design (Patent).
- Reliability
  - Durable IP54 construction.
  - Reliable start and operation from -40°C to +55°C.
  - Distributed LED design safeguards signal legibility in case of partial light source failure.
- Construction
  - Opening via removable hinged front frame.
  - Message symbols provided by self adhesive film, vacuum applied on panel inner face.
  - Seamless message panels up to the ICAO recommended length of 3 m made of long-life, self-extinguishing polycarbonate. UV, abrasion and high temperature resistant.
  - 4 mm panel thickness exceeds industry standards for improved resistance to high winds and jet blast.
  - Modular construction: commonality of mechanical and electrical components throughout entire sign range
  - Frangibility according to ICAO or FAA requirements, withstanding jet blasts and wind velocities up to 322 km/h.

## Construction

### Materials and Finish

Construction consisting of aluminum sheet and extrusion profiles.

- Body: aluminum extrusions, panels, externally clamped on to the housing and mounting legs.
- Legend panel: long-life polycarbonate, UV and abrasion resistant, selfextinguishing.
- Plain stainless steel hardware.
- Baked polyester powder coating; colour: white RAL 9016.

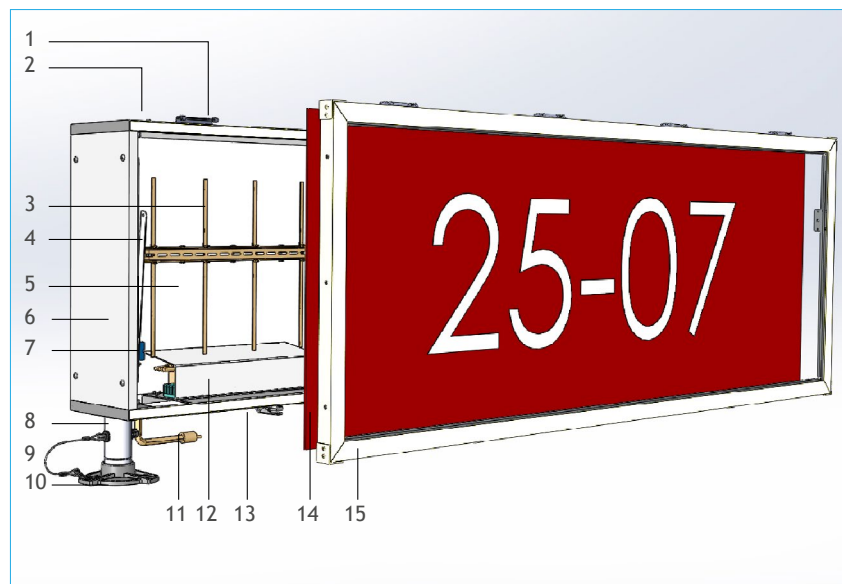


Fig. 2

### Construction

1. Cover clamp hinge
2. Cover
3. LED strips (on horizontal support)
4. Front frame holding arm
5. Rear panel
6. Side panel
7. Safety switch (operated outside, option)
8. Mounting leg
9. Tether or safety cable (option)
10. Mounting flange
11. 2 core cable assembly with flexible conduit (supplied separately)
12. Power adaptor
13. Bottom panel
14. Legend panel
15. Removable front frame
16. Not shown: M10 expansion bolt (option, supplied separately)

## Sign Selection

Extensive guidance material on the selection and the definition of the sign dimensions is provided in Chapter 5.4 and Appendix 4 of ICAO Annex 14. Sign sizes are governed by:

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

**Mandatory signs:** They include road-, taxi- and Cat I, II and III holding position signs, runway designation signs and "NO ENTRY" signs. They have white messages on red background (Fig. 2).

**Information signs** are all the other signs (except runway distance signs) providing information on routing (direction or destination) and on location. Information signs (Fig. 3) have black lettering on yellow background, except location signs. Location signs have a yellow legend on a black background (Fig. 1). The message on stand-alone location signs is surrounded by a yellow border.



Fig. 3

## Typical Photometric Performance

### Average sign luminance

Calculated as per ICAO Annex 14, Appendix 4 (Fig. 4.1. for the grid points)

Colour	Typical measured average luminance level (cd/m <sup>2</sup> )	ICAO min. average luminance level <sup>(1)</sup> (cd/m <sup>2</sup> )
Red	49.6	30
Yellow	197.3	150
White	371	300

<sup>(1)</sup> Appendix 4, 4a & 4b.

### Legibility factors:

- Red/ White ratio:  
1/5 < Ratio < 1/10
- Uniformity factors:  
Point to point ratio: all < 1.5  
Overall max. to min. 2.5 (specified: < 5/1)

### Colorimetry of sign in night conditions

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

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

Illuminant: internal source

CIE 1931 2. Standard Colorimetric Observer.

## Technical Data

### Electrical supply

Series (Fig. 4a): 2.8 to 6.6 A, 4.8 to 6.6 A or 6.6 A fix, 50 or 60 Hz; through (a) suitable series transformer(s) via a 2-core cable (length: 1 m) with FAA L-823, 2-pole plug supplied with the PVL.

Parallel (Fig. 4b): 230V +/- 10% - 50/60 Hz

Provision for earthing.

### Frangibility

PVL signs are frangible as per ICAO Design Manual Part 6 and withstand wind velocities up to 322 km/h.

### IP degree

IP54 provides excellent protection against excessive rain water and solid particles (dust/sand) ingress.

### MTBF

The individual LED have a lifetime of 50,000 hrs (nominal lifetime at operating current).

The MTBF of the light sources including their power converters varies with the length and type of sign from over 20.000 hrs to over 100.000 hrs (ICAO compliant lengths).



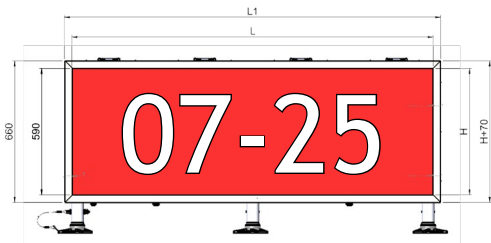


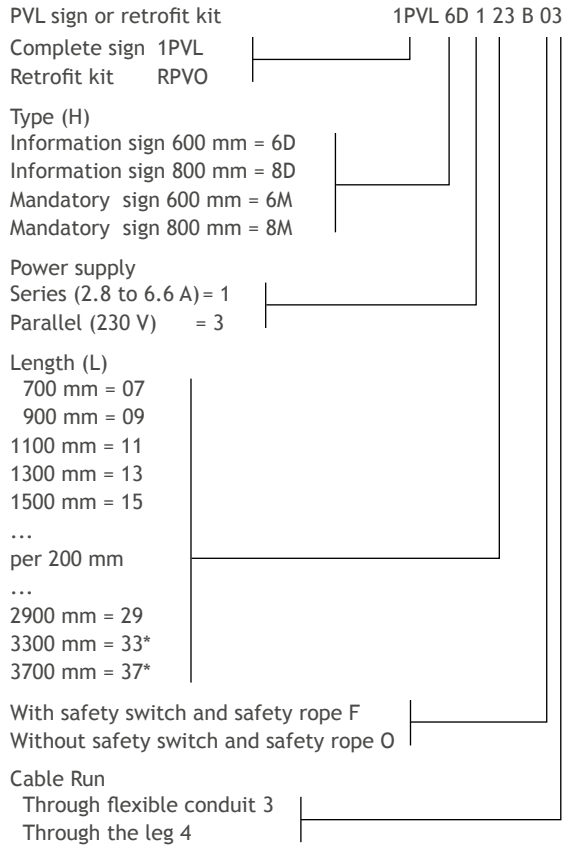
Fig. 6 Outside dimensions

L (mm)	700	900	1100	1300	1500	1700	1900
L1 (mm)	762	962	1162	1362	1562	1762	1962

L (mm)	2100	2300	2500	2700	2900	3300	3700
L1 (mm)	2162	2362	2362	2762	2962	3362	3762

H = 600 or 800 mm  
 Symbol height = H/2  
 T = 804 or 1010 mm

## Ordering Code



Notes: \*lengths above the ICAO recommendations for RPV only.  
 Special requirements to be specified in full text.  
 N.B: Each ordering code shall be completed with the legend panels and colours.

## Packaging Data PVL

Sign Height	H=600mm			H=800mm			
	Sign length (mm)	Net weight (kg)	Packing Dimensions (mm)	Gross weight (kg)	Net weight (kg)	Bruto	Gross weight (kg)
700	30	350 x 830 x 700	35				
900	33	350 x 830 x 900	40	37	350 x 1030 x 900		45
1100	36	350 x 830 x 1100	45	42	350 x 1030 x 1100		52
1300	41	350 x 830 x 1300	50	46	350 x 1030 x 1300		56
1500	46	350 x 830 x 1500	55	52	350 x 1030 x 1500		62
1700	57	353 x 830 x 1700	67	67	353 x 1030 x 1700		72
1900	62	350 x 830 x 1900	72	69	350 x 1030 x 1900		74
2100	63	354 x 830 x 2100	76	72	354 x 1030 x 2100		80
2300	70	350 x 830 x 2300	86	81	350 x 1030 x 2300		92
2500	75	350 x 830 x 2500	92	86	350 x 1030 x 2500		98
2700	80	350 x 830 x 2700	97	91	350 x 1030 x 2700		103
2900	86	350 x 830 x 2900	103	97	350 x 1030 x 2900		109

## Suggested Specification

The Internally Illuminated Guidance Signs shall be in full compliance with ICAO Annex 14, Vol. I, Paragraph 5.4 and appendix 4. The sign shall consist of a rigid, self-supporting aluminum housing of low mass. Its 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, mat finish and have a protection degree IP54 minimum.

Assembly of the sign mechanical components shall be done by means of screws or similar hardware to facilitate the repair of accidentally damaged signs. Welding of mechanical parts is not allowed.

The legend panel shall consist of a high grade U.V., abrasion resistant and flame retardant polycarbonate with a thickness of 4 mm minimum. The legend panel shall be a (seamless) one-piece mechanically clamped, exchangeable panel. This implies that the use of chemical sealant should be avoided.

The message shall be obtained by means of self-adhesive films applied on the inside of the sign. No paint shall be used. A polyethylene sheet, to be removed after installation, shall protect it externally.

The mounting legs shall form an integrated part of the sign housing so that the legs cannot be dissociated from the housing in case of extreme wind gusts. In order to cleanly break in case of impact, the sign supporting legs shall include a weakening groove. At least one of the legs shall have provision for

attaching an optional safety cable to hold the sign captive to a mounting flange should the legs break. The legs shall extend over the entire panel height and thus participate actively in the sign's mechanical strength.

The sign shall withstand the ICAO specified wind velocity of 322 km/h.

Sign illumination shall be realized via indirect light from LED with a life span of not less than 50,000 hours.

The signs shall be powered either from a 6,6Amps series circuit or from the 230V mains power grid via a single power adapter, installed inside the sign. The power requirements shall not exceed 50W per meter panel length, irrespective of the panel height. The accessibility to the inside of the sign will be facilitated by a removable hinged front frame. Light source replacement shall require no tools.

The sign shall start and operate reliably from -40°C to +55°C ambient air temperature.

The sign shall be delivered fully assembled ready for installation.

### Give your PVO signs a second life while reducing the maintenance costs.

The LED arrangement of a PVL sign can also be mounted easily in any ADB PVO sign already installed. To do that, only the existing power adapter and the fluo tubes need to be removed. Any other equipment including the series transformers can remain as is. The retrofit kit includes the LEDs and their fittings, making it possible to mount them directly in the sign using quick connectors, without the need for any modification, a new power converter and the necessary cabling. It takes a maximum of 20 minutes to replace the light engine for a 1500 mm long sign and the operation does not require equipment other than the usual tools available in every maintenance tool kit.

Just mail the following PVO characteristics to your ADB sales contact to receive a quotation:

- Length and height of the sign or legend panel
- Type of sign: mandatory or information sign
- Power requirements: 6.6A series supply or 230V parallel supply

#### Retrofit kit

Retrofit Kit with	Volume ( L x W x H) mm	Gross weight
1 power adapter	1500 x 500 x 215	+12 kg