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ICAO Luminous Signs HIGS - Instruction manual for installation, use and maintenance

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ICAO Luminous Signs HIGS - Instruction manual for installation, use and maintenance

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From page 1 to page 20

LIMITED PRODUCT WARRANTY

THE FOLLOWING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT BY WAY OF LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

OCEM warrants to each original Buyer of Products manufactured by the Company that such Products are at the time of delivery to the Buyer, free of material and workmanship defects, provided that no warranty is made with respect to:

(a) any Product, which has been repaired or altered in such a way, in Company's judgement, as to affect the Product adversely;

(b) any Product which has, in Company's judgement, been subject to negligence, accident or improper storage;

(c) any Product which has not been operated and maintained in accordance with normal practice and in conformity with recommendations and published specification of Company.

OCEM's obligation under this warranty is limited to use reasonable efforts to repair or, at its option, replace, during normal working hours at the facility of the Company, any Product which in its judgement proved not to be as warranted within the applicable warranty period. All costs of transportation of Products claimed not to be warranted and of those repaired or replaced, to or from the facility of the Company shall be borne by Purchaser. Company may require the return of any Product claimed not to be as warranted to its facility, transportation prepaid by Purchaser, to establish a claim under this warranty. The cost of labour for the installation of a repaired or replaced Product shall be borne by Purchaser. Replacement parts provided under the terms of this warranty are warranted for the remainder of the warranty period of the Products upon which they are installed to the same extent as if such parts were original components thereof. Warranty services provided under the Agreement do not assure uninterrupted operations of Products; Company does not assume any liability for damages caused by any delays involving warranty service. The warranty period for the Products is 24 months from date of shipment or 12 months from date of first use whichever occurs first.

IMPORTANT: READ THIS DOCUMENT

Before proceeding to the operations of installation, commissioning, operation, maintenance or disposal, carefully read the entire document.

SAFETY INFORMATION

Extreme caution should be exercised when working with this equipment; it is normally used or connected to circuits that operate at dangerous voltages and can be fatal.
The following section contains important safety information that you must follow when installing and using the apparatus.
Misuse of the equipment or lack of care in applying safety procedures and prescriptions specified in this document, may result in a hazard.
Avoid contact with voltage or current sources.
For no reason the protections and the safety devices must be removed.

OPERATION ON THE EQUIPMENT - SKILLS

Operation on the equipment and access to its internal parts shall be done by experienced personnel, adequately trained and aware of the risks related to electricity and high voltages.
Safety rules shall be adopted when operating on the equipment, or on cables and other apparatus connected to the it.

DO NOT OPERATE ON ENERGIZED CIRCUITS

Do not carry out any operation on the converter or on apparatus connected to it when the circuits are energized.

WHEN HANDLING AND SERVICING THIS EQUIPMENT, OBSERVE PRECAUTIONS FOR HIGH VOLTAGE EQUIPMENT.

Before any access, inspection or intervention, be sure to have switched-off the unit, opened the main circuit breaker and removed the supply to the unit (by opening the circuit breaker/switch on the distribution board at the beginning of the supply line).
Then wait discharge time (at least 5 minutes), ground carefully the system, and check for voltage presence before accessing.

REANIMATION

The maintenance staff must be aware of the risks related to electricity, criteria to prevent the risk of electric shock and resuscitation techniques.

CE MARK

CE This equipment complies with the requirements of European regulations for the CE mark. The user has to respect all prescriptions reported in this document.

OUT OF SERVICE

In case of dismantling, decommissioning, destruction, disposal, the user shall follow all the required precautions for component and material elimination, according to local rules and applicable law.

INDEX

INDEX 5
INDEX OF FIGURES 5
INDEX OF TABLES 6
LIST OF ATTACHMENTS 6
1 GENERAL 7
2 CLASSIFICATION OF SIGNS 7
2.1 Types 7
2.2 Legend Sizes 7
2.3 Part Number Identification 8
3 MAIN FEATURES 9
3.1 Environmental Data 9
3.2 Electrical Data 9
3.3 Illuminance Data 9
3.4 Description of the signs 10
3.4.1 Main structure 10
3.4.2 Panels for faces 10
3.4.3 Lamps and lampholders 12
3.4.4 Electronic boards 12
4 INSTALLATION 15
5 MAINTENANCE 18
5.1 Periodical checks 18
5.2 Lamp replacement 18
5.3 Electrical/electronic equipment replacement 18
5.4 Trouble Shooting Guide 19
6 LIST OF THE RECOMMENDED SPARE PARTS 20
7 OPTIONS 20

INDEX OF FIGURES

Figure 1 - HIGS Luminous Signs - Overall Dimensions 11
Figure 2 - HIGS Luminous Signs - One Module Wiring Diagram 13
Figure 3 - HIGS Luminous Signs - Four Module Wiring Diagram 14
Figure 4 - HIGS Luminous Signs - Flange Installation with anchor bolts 15
Figure 5 - HIGS Luminous Signs - Concrete Foundation 16

INDEX OF TABLES

Table 1 - Types of signs 7
Table 2 - Legend sizes 7
Table 3 - Environmental Data 9
Table 4 - Electrical Data 9
Table 5 - Illuminance Data in cd/m^2 6.6 A 9
Table 6 - Troubleshooting 19

LIST OF ATTACHMENTS

1 GENERAL

The internally illuminated HIGS signs are designed for use on airport taxiways and runways to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of Surface Movement Guidance.
White on Red and Yellow on Black and Black on Yellow colour combination may be ordered with any desired message.
Signs are available as single faced.
HIGS signs are in compliance with ICAO - Annex 14 Vol.1 and NATO-STANAG 3316.

The signs described in this manual are manufactured to be used on airport series circuits, through isolating transformers, powered by 5-step (2.8A - 6.6A), 3-step (4.8A - 6.6A), and 1-step (6.6A) Constant Current Regulators.

Consult ICAO Specs - Annex 14 and ICAO Aerodrome Design Manual - Part 4 for sign features and use.

2 CLASSIFICATION OF SIGNS

2.1 Types

Mandatory signs	White legend on Red background
Location signs	Yellow legend on Black background
Information (direction, destination, boundary) sign	Black legend on Yellow background

Table 1 - Types of signs

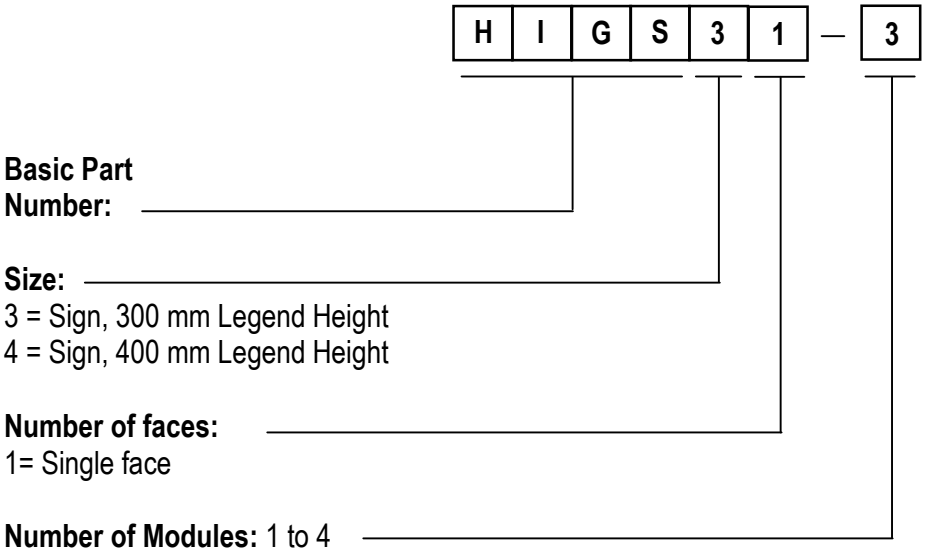
A sign may consist of multiple arrays of the above messages.

2.2 Legend Sizes

Height of large legend	400 mm
Height of mid legend	300 mm

Table 2 - Legend sizes

2.3 Part Number Identification



3 MAIN FEATURES

3.1 Environmental Data

Temperature	-55°C to +55°C
Weather	All outdoor conditions, exposure to: driving rains, snow and icing, salt-laden atmospheres, relative humidity from 5 to 95 per cent.
Wind Speed	322 km/h ICAO Aerodrome Design Manual Part 6 Frangibility
Radio Interference	None

Table 3 - Environmental Data

3.2 Electrical Data

The luminous signs are powered by series circuits through isolating transformers, meeting FAA Specs FAA L830-L831, in the following ratings (see *Table 4*).

Number of Sign Modules	Isolating Transformer Ratings 2.8 A / 6.6 A
1	100 W
2	200 W
3	300 W
4	400 W

Table 4 - Electrical Data

3.3 Illuminance Data

The illuminance of the sign faces varies with current, from 2.8 A through 6.6 A and the relevant values are shown in the *Table 5*.

LEGEND SIZE	HEIGHT OF SIGN FACES	COLOURS		
		RED	YELLOW	WHITE
400 mm	800 mm	60	260	380
300 mm	600 mm	65	275	400

Table 5 - Illuminance Data in cd/m² 6.6 A

NOTE: the electrical and luminous data are referred to constant current regulators and isolating transformers manufactured and/or distributed by OCEM. The data may change with constant current regulators and/or transformers manufactured by other Companies.

3.4 Description of the signs

The signs practically include the following sections (*Figure 1*):

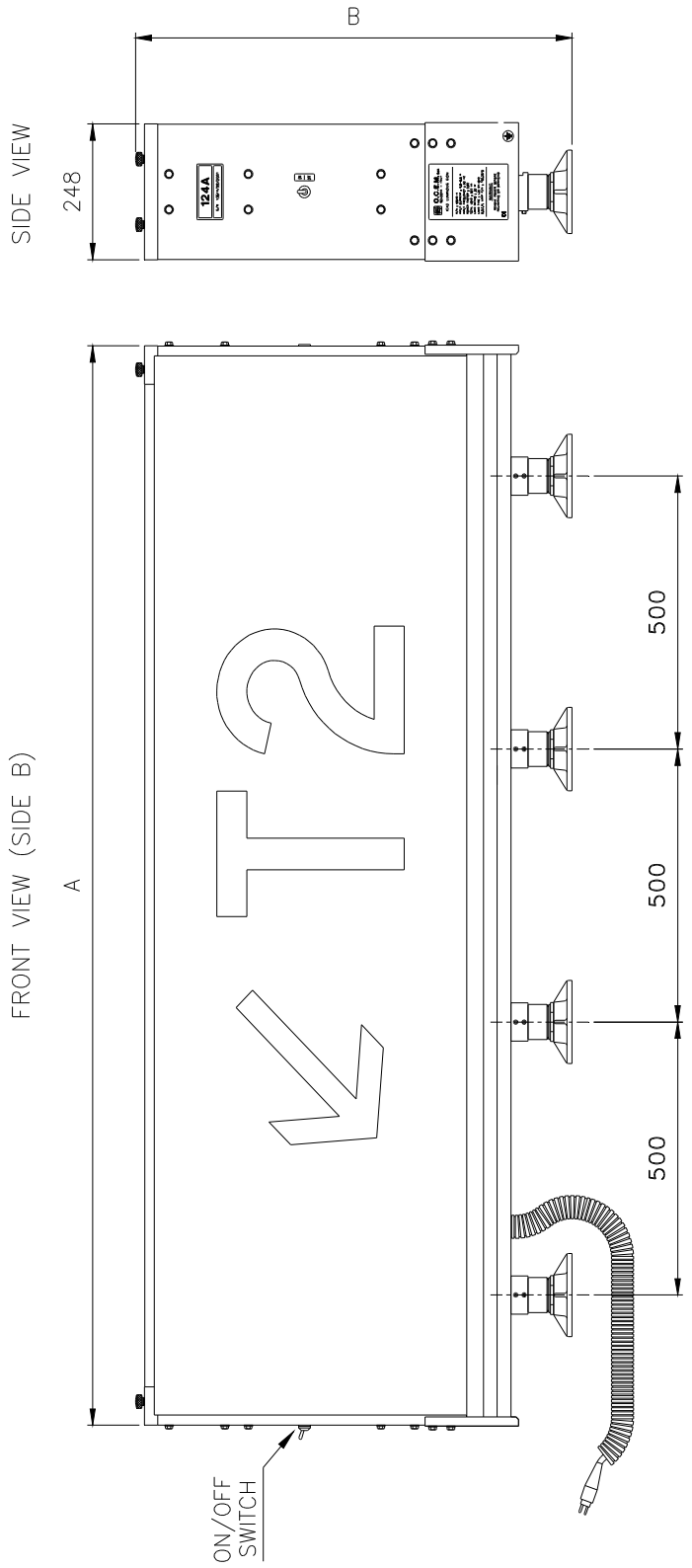
a) main structure
b) panels for faces
c) lamps and lampholders

3.4.1 Main structure

The main structure mainly consists of a bottom panel, two side panels, one top cover and assembling-supporting components.
Bottom panel, side panels and top covers are made of extruded aluminium profiles, which have cross section realized according to our design.
The signs may be considered as divided in modules, each approx 1000 mm long.
Quantity and types of assembling-supporting components depend on the number of sign modules.
Each module is supported by two mountings, each including a leg, a breakable coupling and a floor flange. All these components are cast aluminium.
Each leg, which is outside partially threaded, is housed inside a hole provided in the bottom panel and locked to it by means of a threaded locknut. Each leg matches the upper part of a breakable coupling, which is locked by means of two screws.
Each breakable coupling, which is outside threaded in the lower side for coupling with the floor flange, is provided with an hexagonal section for easy screwing and locking.
The side panels are fixed to the bottom panel by means of extruded aluminium angle profiles, inside mounted.
Suitable intermediate panels, C shaped, are provided inside signs with more modules to support lampholders and lamps, and to improve the rigidity of the structure.
Each module is illuminated by two lamps, mounted on suitable supports, fixed to the top structure.
The intermediate panels are fixed to the bottom panel and moreover they are assembled to the side panels (or to the adjacent intermediate panels) by means of the suitable connecting profiles.
The signs are equipped with a single top cover, locked to the main structure by means of captive knobs. The main structure is matt black outside painted.

3.4.2 Panels for faces

The panel for face is made of high performance material 5 mm thick.
The back panel is made of composite material that provides stiffness and lightness to the structure.
The legend is obtained by means of adhesive coloured translucid films applied to the internal side of the panel.



Lamp Modules	1	2	3	4
A	991	1976	2961	3946
Legend Height	300	400		
B	838	1038		

Figure 1 - HIGS Luminous Signs - Overall Dimensions

3.4.3 Lamps and lampholders

The lamps are tungsten halogen reflector lamps for series operation at 6.6 Ampere, wattage 48 W, average life 1500 hours. The top output performances of the lamps are reached within 5 minutes since the switching-on.

The lampholders are aluminium supports. The lamp is locked into its seat by a single elastic holder (stainless steel) in order to realize an easy and quick lamp replacement.

The positioning of the lamps has been determined through photometric tests so to meet the illumination values as required by ICAO Specs - Annex 14.

3.4.4 Electronic boards

The eventual failure of a lamp doesn't cause the black out of the sign legend.
F159 Board, manufactured by OCEM, is suitable for many daily ON-OFF operations. Its special design provides that the lamps are always powered within allowable limits.

Each lamp is powered directly from the series circuit through the isolating transformer.

For the electrical connection to the isolating transformer the sign is equipped with a two-pole cable lead with L-823 plug.
A flexible plastic pipe of suitable length is provided for cable protection; the pipe has to be fitted inside a coupling (included in the supply) with G 2" threaded lower section.

An external power disconnecting ON-OFF switch is provided to break all electrical connections to the sign for safe maintenance.

The internal wiring (see Figure 2 and Figure 3), between electronic and electrical component, is made by using teflon insulated cables, the wiring runs along the intermediate panels and the connecting profiles.

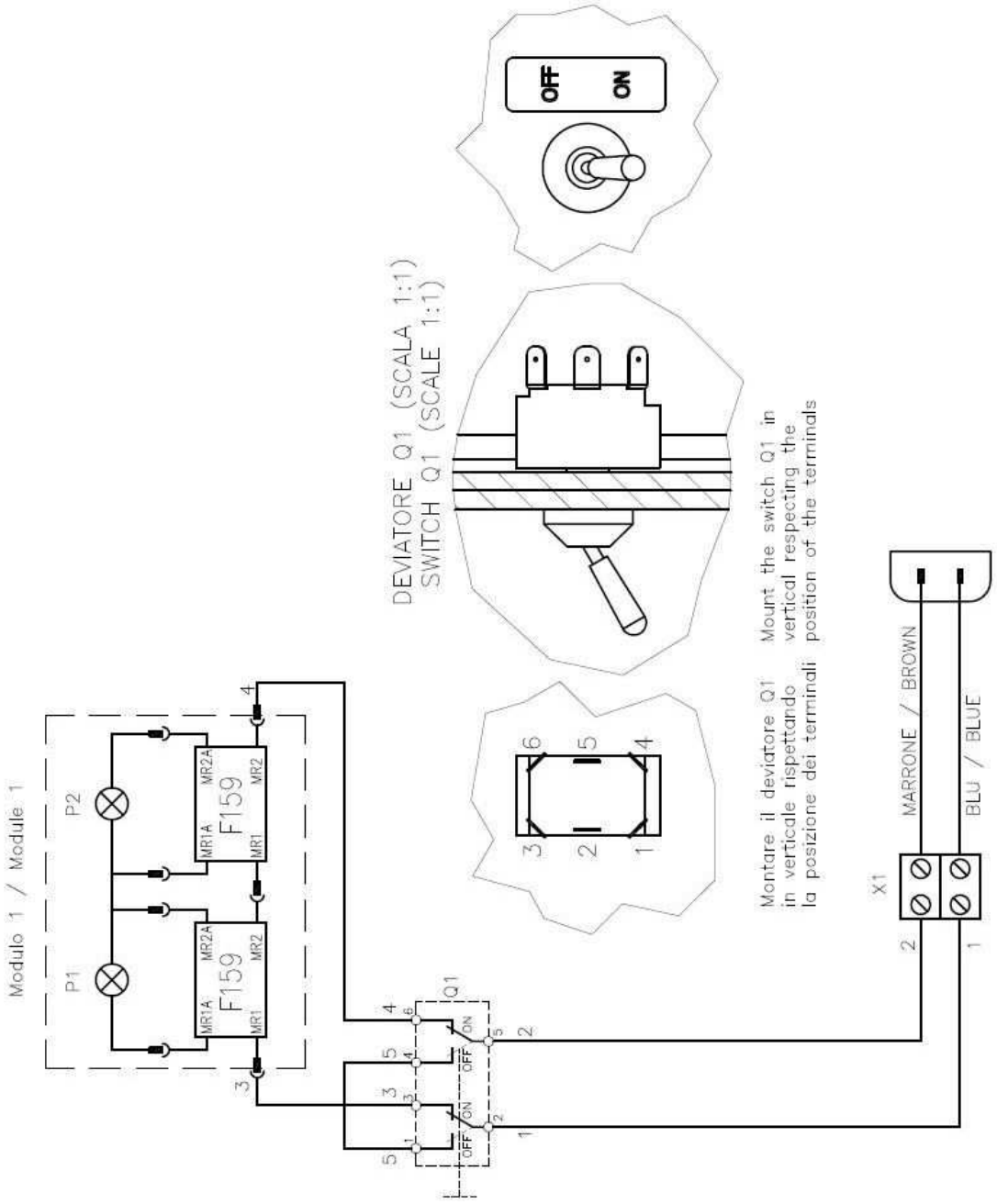


Figure 2 - HIGS Luminous Signs - One Module Wiring Diagram

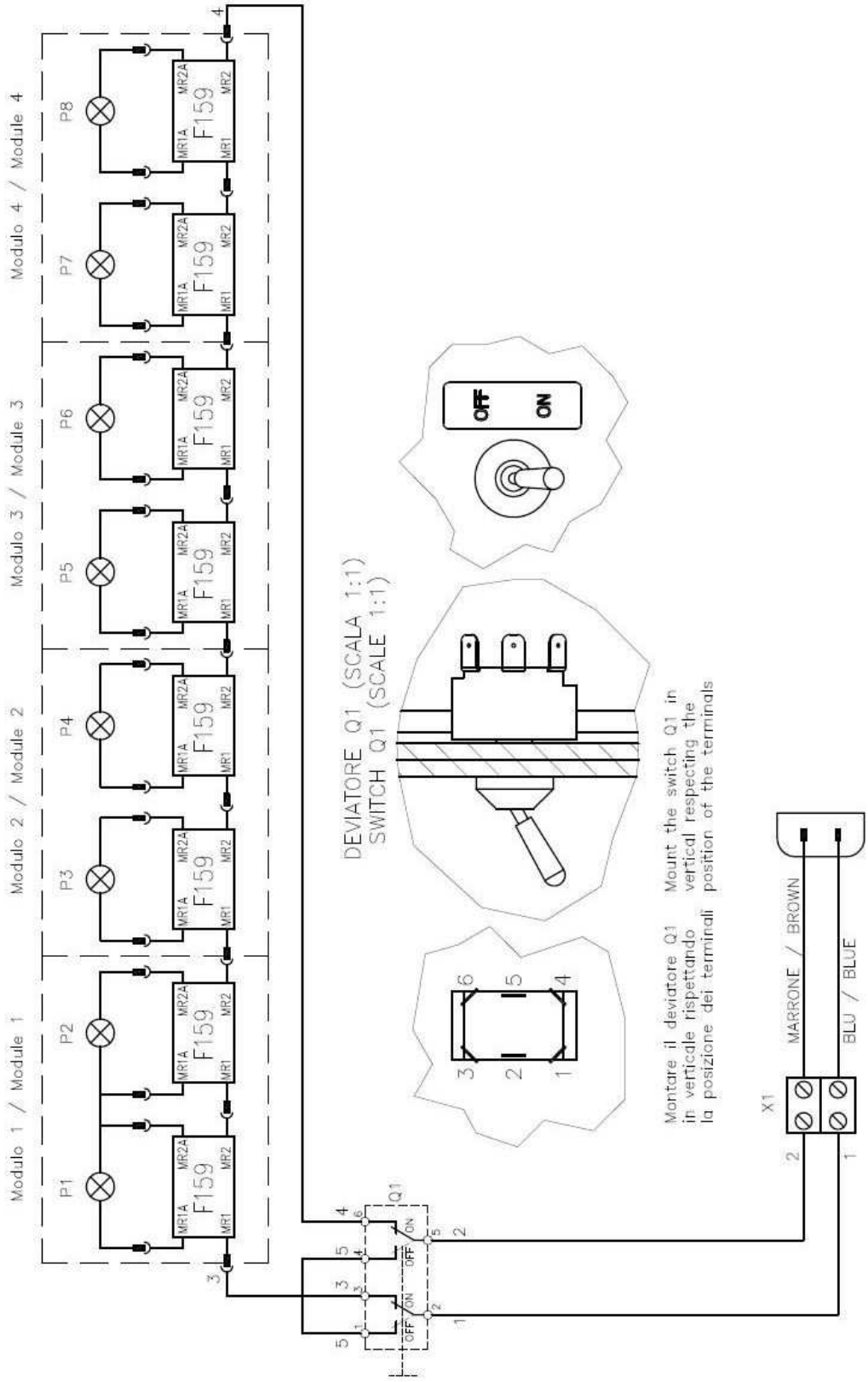


Figure 3 - HIGS Luminous Signs - Four Module Wiring Diagram

4 INSTALLATION

a) Take as reference *Figure 1* for spacing between breakable couplings.

b) Remove the sign from the relevant packing.

c) The signs are normally installed so that the cable entry is located toward the runway or taxiway edge. As general rule when facing side B the cable entry is placed on the left side.

d) The concrete foundation for the sign should be flat and levelled. Refer to *Figure 5* for relevant data. The isolating transformer must be placed inside a concrete pit complete with pipe elbow for the secondary cable passage or inside a steel base complete with upper plate with G 2" threaded coupling for the plug-socket connection.

e) It is recommended that the anchor bolts, used for the flange anchoring, are mounted after the completion of the concrete foundation. The anchor bolts have to be walled accurately as shown in *Figure 5* and *Figure 4* and in manner to assure the parallelism of the centreline marked on the flange and the sign centreline.

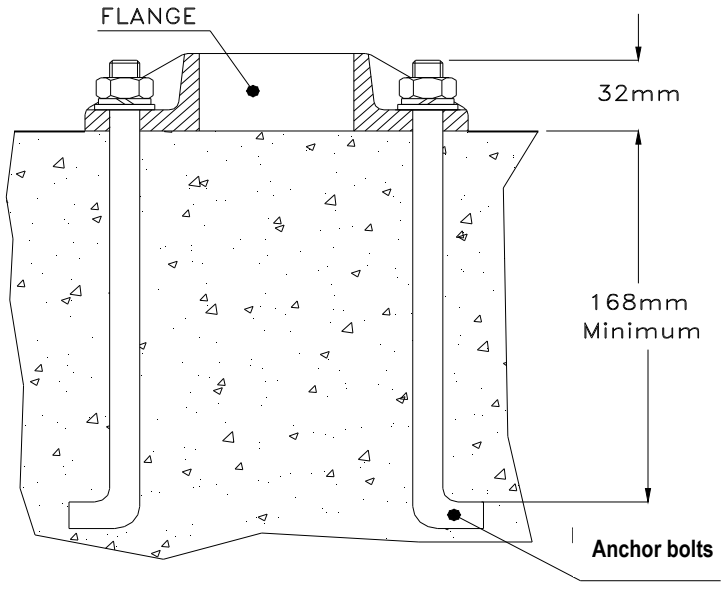


Figure 4 - HIGS Luminous Signs - Flange Installation with anchor bolts

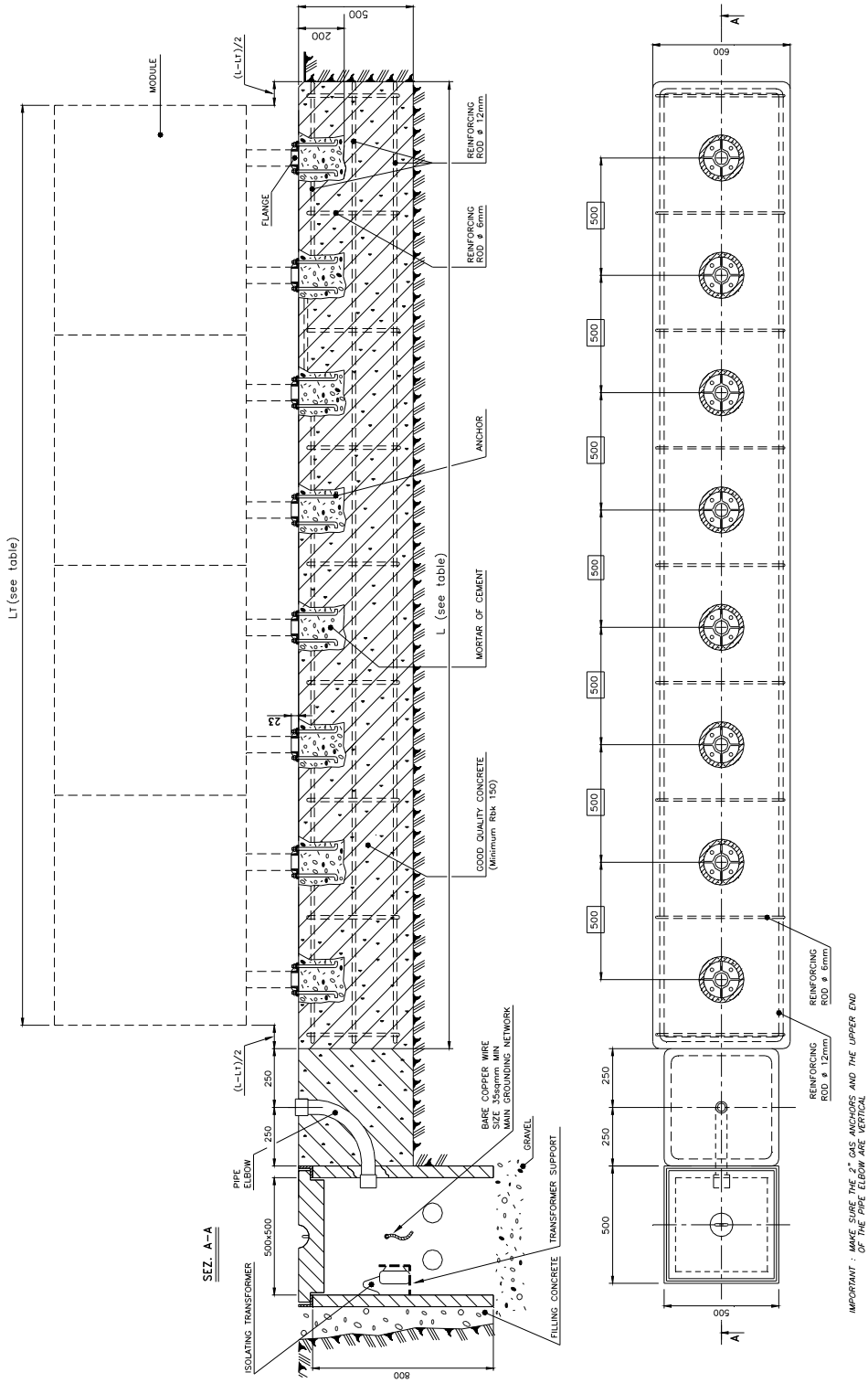


Figure 5 - HIGS Luminous Signs - Concrete Foundation

f) Remove the frangible couplings/floor flanges from the bottom of the sign by loosening the locking screws (HSWH - M8 x 14).

g) To take care of the levelling of the floor flanges is very important to ease the installation of the sign. Place a long carpenter level across the top of the breakable couplings to verify their alignment and levelling. Do not tighten the flanges anchor nuts, tight (only finger-tight) until the sign installation is complete.
Lower the sign with the legs onto the frangible couplings and tight the locking screws. Check the sign to be sure that it is levelled. Shim the floor flanges as required and put drying grout under the flange if necessary.

NOTE: some vertical adjustment can be obtained by rotating the frangible couplings a turn or two in the floor flanges.

h) Once the sign has been levelled, tighten the anchor nuts securely. (NOTE: anchor hardware is not supplied with the sign). Anchor hardware should be corrosion resistant.

i) Pass the cable lead with plug through the coupling for flexible pipe and connect the cable lead with plug of the sign to the socket of the isolating transformer (be sure that the cable lead with plug be passed through the coupling for flexible pipe). The plug-socket connection should be secured inside the pipe elbow by using the suitable pair of plastic rings or inside the baseplate by using the relevant supporting ring. Screw the coupling to the pipe elbow or to the baseplate, fit the flexible pipe inside it and provide sealing between pipe and coupling.

j) Turn the main switch to ON position and carry out the following checks.

k) After the signs have been installed, turn the circuit on to the lowest step and check to see that all the signs are lighted. Repeat for each available step. If there is any indication of improper sign operation, see para. 5.4 for trouble shooting procedures.

5 MAINTENANCE

ATTENTION!

Never operate on electrical and electronic equipment while the CCR is ON.

5.1 Periodical checks

Daily	Check for burned-out lamps
Monthly	Check for dirty panels
Semi-Annual	Check for loose wire connections
	Check for cracked or deteriorated wires

5.2 Lamp replacement

When replacement becomes necessary, follow the procedure below:

a. be sure that the series circuit is de-activated (CCR OFF); in any case turn the sign main switch to OFF position

b. loose the captive knobs of the cover and remove it

c. disconnect the two leads, and extract the lamp from the support

d. replace the lamp with a new one and reconnect the leads

e. replace the cover and lock the relevant screws

f. turn the main switch to ON position, turn On the CCR and check the correct operation of the sign.

5.3 Electrical/electronic equipment replacement

If troubles to the electrical/electronic F159 are suspected proceed as follows:

a. be sure that the series circuit is de-activated (CCR OFF); in any case turn the main switch to OFF position

b. remove the top cover by loosening the relevant captive knobs

c. check the wiring, the lamp-board connections and the continuity

d. replace the electronic board F159 depending on the type of problem. Take as reference par. 5.4

e. mount the cover with reverse procedure

f. turn the main switch to ON position, turn On the CCR and check the correct operation of the sign.

5.4 Trouble Shooting Guide

Problem	Probable cause	Solution
The sign is totally or partially not lighted	Defective lamp(s)	Replace lamp(s)
	Defective isolating transformer	Replace isolating transformer
	Defective F159 board	Replace F159 board
	After lamp replacement, the main switch is left to OFF position	Turn the switch to ON position
	Bad connection	Check wiring
One or more lamps flicker	Defective isolating transformer	Replace isolating transformer
	Defective F159 board	Replace F159 board

Table 6 - Troubleshooting

6 LIST OF THE RECOMMENDED SPARE PARTS

Article	Description
303.7325	Breakable coupling for sign with 400 mm legend height
303.7335	Breakable coupling for sign with 300 mm legend height
303.7310	Floor flange
760.2186	48 W incandescence lamp
150.3349	F159 electronic board
323.2367	Cable lead with plug
464.0238	ON-OFF switch
470.0218	Rubber cap for switch

7 OPTIONS

Article	Description
013.0010	Set of two ryton rings for receptacle support inside pipe elbow
013.0008	Galvanized steel pipe elbow with upper threaded end only
315.3210	Galvanized steel pipe elbow with both threaded ends
315.1228	Base L-867, Class I, Size B, 24” deep
315.1062	Baseplate for L-867 base with gasket and cable clamp
011.2077	Transformer for series circuits FAA L-831 100 W 6.6/6.6 A
011.2036	Transformer for series circuits built as FAA L-831 100 W 6.6/6.6 A, suitable for ICAO prescribed secondary grounding
011.2056	Transformer for series circuits FAA L-831 200 W 6.6/6.6 A
011.2003	Transformer for series circuits built as FAA L-831 200 W 6.6/6.6 A, suitable for ICAO prescribed secondary grounding
011.2060	Transformer for series circuits FAA L-831 300 W 6.6/6.6 A
011.2006	Transformer for series circuits built as FAA L-831 300 W 6.6/6.6 A, suitable for ICAO prescribed secondary grounding
011.2080	Transformer for series circuits FAA L-831 400 W 6.6/6.6 A
011.2040	Transformer for series circuits built asFAA L-831 400 W 6.6/6.6 A, suitable for ICAO prescribed secondary grounding
011.2559	54-E6-E6 Connector kit L-823, 10-12 AWG (6 sq.mm), 0.42” to 0.585” O.D
011.2558	54-E4-E4 Connector kit L-823, 8 AWG (10 sq.mm), 0.42” to 0.585” O.D