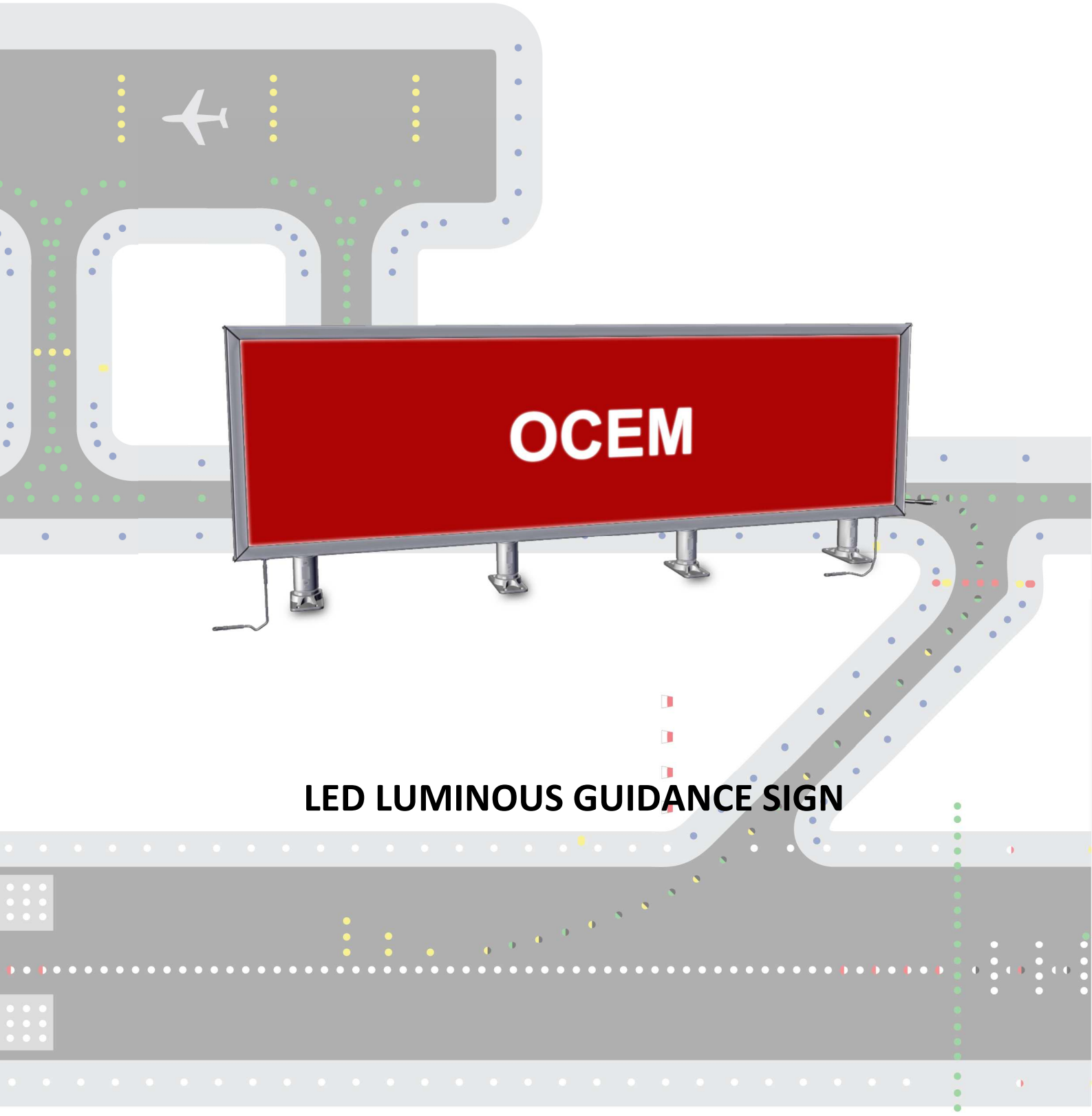
LIMS

Use and Maintenance Manual



LED LUMINOUS GUIDANCE SIGN

EN

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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.
This equipment complies with the requirements of the EEC directives 2004/108/EEC and 2006/95/EEC with regard to “Electromagnetic Compatibility” and “Low Voltage Electrical Apparatus” respectively.

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.

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ABBREVIATIONS AND TERMS

Term or abbreviation	Description
LED	Light Emitting Diode
ICAO	International Civil Aviation Organization
EASA	European Aviation Safety Agency
CCR	Constant Current Regulator
FAA	Federal Aviation Administration

1 GENERAL

The internally LEDs illuminated LIMS signs are designed to be used 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.
LIMS are single face signs in compliance with ICAO - Annex 14 Vol.1, EASA CS-ADR-DSN Chapter N and NATO-STANAG 3316. White on Red, Yellow on Black and Black on Yellow colour combination may be ordered with any desired message.
The signs described in this manual are manufactured to be used on airport series circuits, through isolating transformers, powered by 5-step (2.8 A - 6.6 A), 3-step (4.8 A - 6.6 A), and 1-step (6.6 A) Constant Current Regulators.
The signs can be powered also by a parallel circuit voltage range 110-240 VAC, 50/60 Hz .
Consult ICAO Specs - Annex 14 and ICAO Aerodrome Design Manual - Part 4 for sign features and use.

2 CLASSIFICATION OF SIGNS

2.1 Type

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

3 MAIN FEATURES

3.1 Signs Description

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

A. Frame
B. Supports
C. Panels
D. LEDs luminous source
E. Electronic board

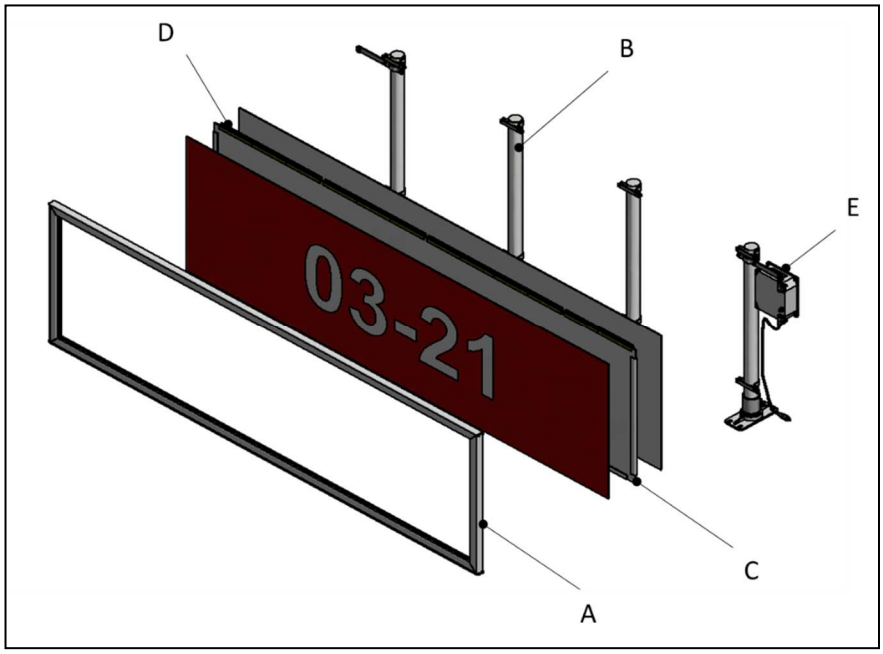


Figure 1: Exploded view

3.1.1 Frame

The frame principally consists of a bearing bottom structure, two sides and one top cover (Figure 2).
Bottom structure, sides and top cover are made of extruded aluminium profiles, realized according to our design.
The signs are equipped with a single top cover, locked to the main structure by means of four hexagonal knob. The main structure is white outside painted (other colours are available on request).

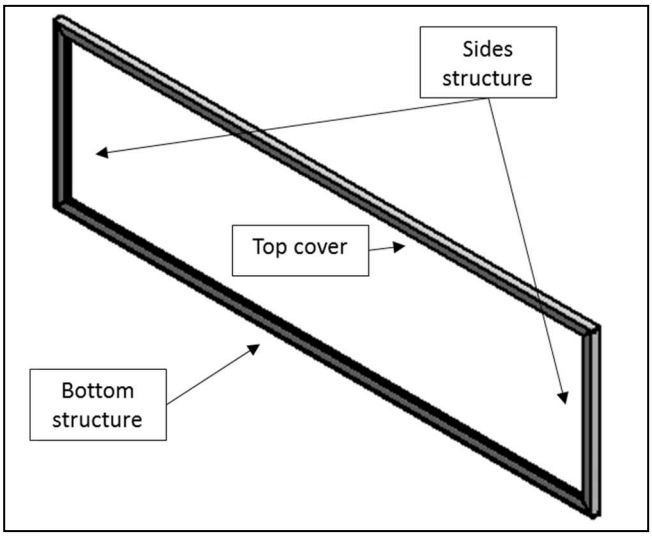


Figure 2: Frame

3.1.2 Supports

Each support includes a pole, a BREAKABLE COUPLING KIT and a floor flange (Figure 3). All components are made of aluminium. The supports are fixed to the structure with “C” clamps.

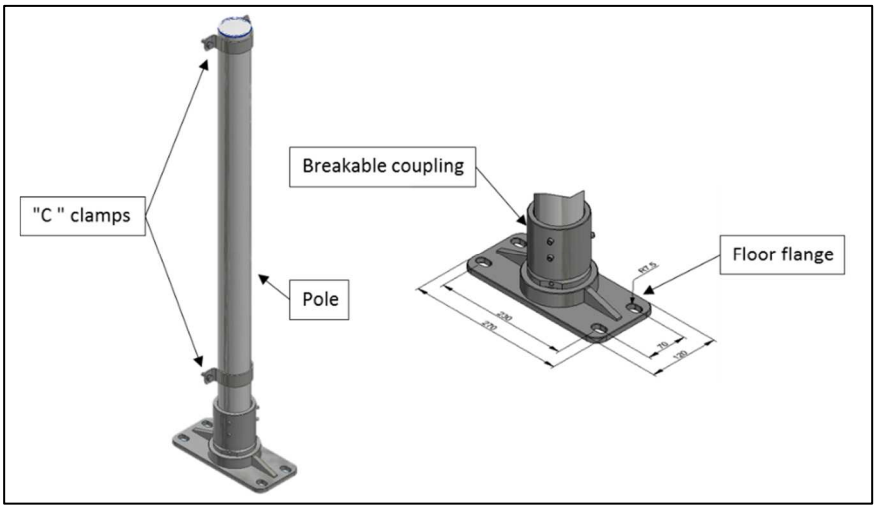


Figure 3: Support

3.1.3 Panels

The panels enclosed in the frame are (Figure 4):

- Text panel
- Light-guide panel
- Back panel

The text panel is made of polycarbonate 4 mm thick.
The light-guide panel is made of methacrylate, while the back panel is made of a composite material.

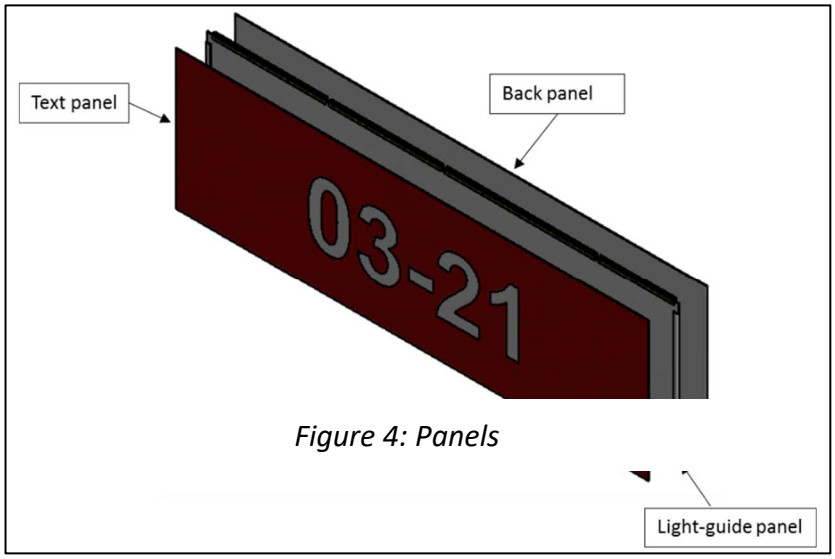


Figure 4: Panels

3.1.4 LEDs Luminous Source

The signs are illuminated by strips LEDs (Figure 5) inserted in suitable supports.
High efficiency white LEDs are used, with an average life of 60.000 hours.
The positioning of the LEDs has been determined through photometric tests in order to meet the luminance values as required by ICAO Specs - Annex 14.
Three different strips lengths are used (720, 960 and 1200 mm) for the different signs lengths (see Table 4).

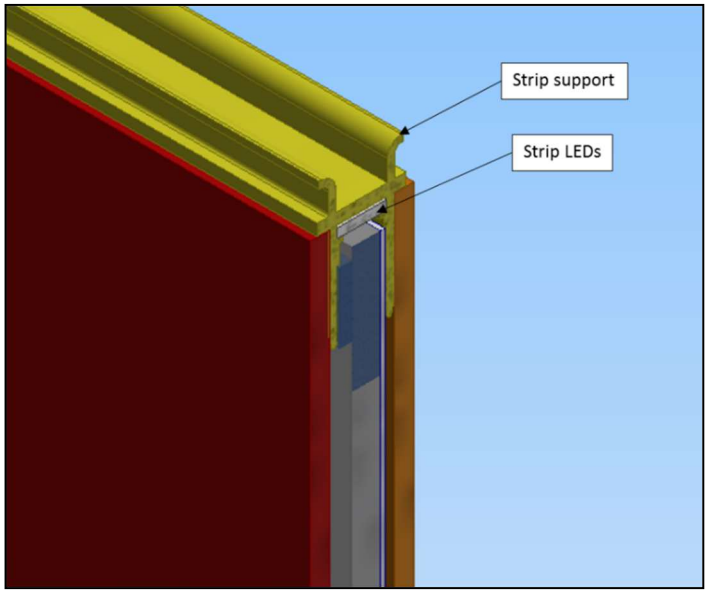


Figure 5: LEDs luminous source

3.1.5 Electrical circuit

Constant Current supply (AGL Series Circuit)
Signs for constant current series circuits are equipped with an electronic current converter housed inside a water proof aluminium box, mounted on a side of the external frame.
About the luminance levels, two versions are available:

- 1 luminance level over the whole input current range 2.8 A ÷ 6.6 A;
- 2 luminance levels depending on the input current value: in the standard version the current threshold at which the luminance level changes is 5.9 A (but optionally this threshold is customizable).

An option in available to monitor the light sources status, compliant with the fail open operation (see 3.1.8).

Further, to facilitate the feeding of the sign with different topologies of CCR, an optional stabilization circuit is available, composed by an inductor and a capacitor (see Figure 12Figure 12: Wiring diagram (series sign with circuit stabilizer)).

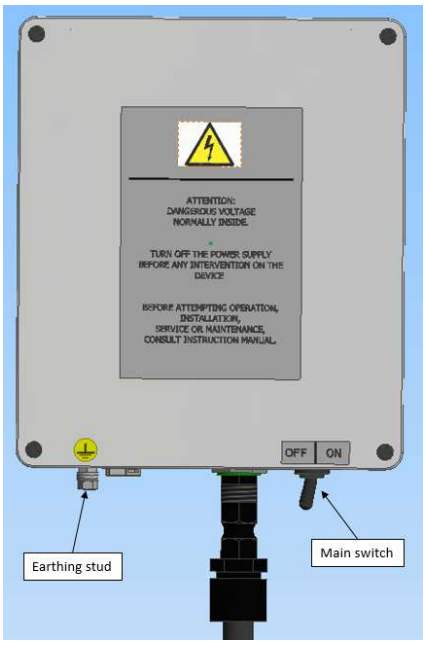


Figure 6: Electronic board

For the electrical connection to the isolating transformer the sign is equipped with a two-pole cable lead with L-823 plug, style 1, protected by a corrugated pipe.



IMPORTANT:

Follow the connection prescriptions in paragraph 4.1 in case of LIMS supplied by an AGL earthed series transformer.

The sign is also equipped by an external disconnecting switch (main switch), which allows to light off the sign and at the same time short circuit the isolating transformer. The main switch permits to light off the sign without disconnecting it from the series circuit.



The main switch MUST BE OPERATED ONLY WITH THE CCR OFF.
In general the CCR must be turned off before any intervention on the sign.

See Figure 11 and Figure 12 for the two types of wiring diagram of the signs (without and with stabilization circuit).

Parallel circuit voltage supply (110 -240 VAC, 50/60 Hz) (OPTION)
An option is available that permits to fed the sign through a parallel circuit voltage supply 110-240VAC, 50/60 Hz.
In this case the luminance level is constant and the monitoring of the sign status is not available.
For the electrical connection to the AGL circuit, the sign is equipped with a three-pole cable lead with L-823 plug, class B.
CAUTION: The three-pole plug are interconnectable with receptacle connector, take necessary measures to avoid dangerous connection.
Wiring: Please refer to the table below and see Figure 13 for correct wiring of the sign powered at 230VAC.

Wire	Name	Europe	USA
L	LIVE/HOT	Brown	Black or Red
N	NEUTRAL	Blue	White
PE	PROTECTIVE EARTH/GROUND	Green/Yellow striped	Green or Green/Yellow striped

（a）Connect the PE wire (green/yellow) of the sign to PE (green or green/yellow) of the power supply network.
（b）Connect the L wire (brown) of the sign to Live (black, brown or red) of the power supply network.
（c）Connect the N wire (blue) of the sign to Neutral (white or blue) of the circuit supply.

The sign is also equipped by an external disconnecting switch (main switch), which allows to light off the sign.

3.1.6 Protection earthing

On the aluminium box containing the electronics, an earthing stud is available (see Figure 6).

FOR SAFETY PURPOSES, A CABLE OF 4 MM^2 MINIMUM SECTION, CONNECTED TO THE EARTHING SYSTEM OF THE AGL CIRCUIT **MUST BE CONNECTED** TO THE EARTHING STUD OF THE SIGN.

3.1.7 Models

The main sign dimensions are depicted in Figure 7. The possible values for the lengths A, A', B, C, D and H are indicated in Table 3.

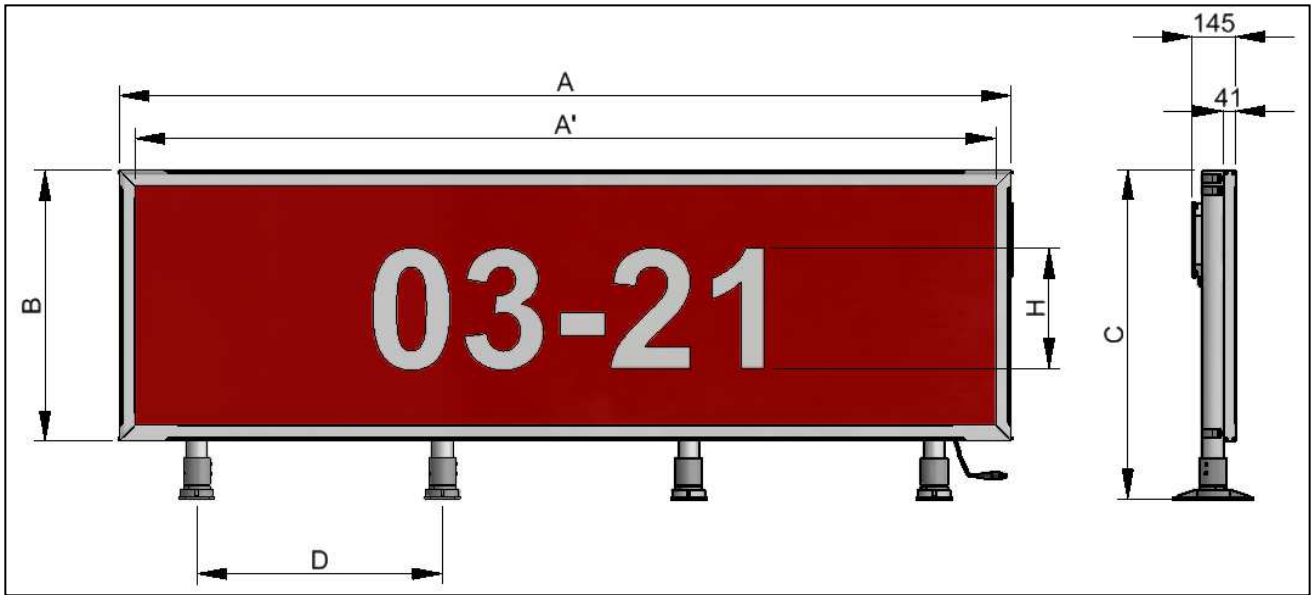


Figure 7: Overall dimensions

Length A [mm]	Visible length A' [mm]	H=300mm B=704mm C=900mm				H=400mm B=904mm C=1100mm			
		Wind @ 322 km/h		Wind @ 480 km/h		Wind @ 322 km/h		Wind @ 480 km/h	
		Supports quantity	Distance D [mm]	Supports quantity	Distance D [mm]	Supports quantity	Distance D [mm]	Supports quantity	Distance D [mm]
1094	990	2	580	2	580	2	580	2	580
1354	1250	2	840	2	840	2	840	3	420
1574	1470	2	1060	2	1060	2	1060	3	530
2054	1950	3	770	3	770	3	770	4	513
2294	2190	4	593	4	593	4	593	4	593
2534	2430	4	673	4	673	4	673	6	404
2994	2890	4	827	4	827	4	827	6	496

Table 3: Signs dimensions

Three different LED strips are possibly mounted on the signs, according to the overall sign lengths. The correspondence between sign length and LED strip length are showed in Table 4:

Sign length A [mm]	Strip LEDs	
	Quantity	Length [mm]
1094	1	960
1354	1	1200
1574	2	720
2054	2	960
2294	3	720
2534	2	1200
2994	3	960

Table 4: Sign-strip length combination

3.1.8 Monitoring Option

Note: Option available only for Signs powered by a constant current series circuits.
The electronic card of the signs with Monitoring Option has an electromechanical relay with a normally closed contact. This contact is assembled in series with the feeding circuit of the electronic card.
When one or more LED strips fail, the normally closed contact opens, turning off the electronic board and the sign lights off.
A manual intervention is needed to restore the relay contact in closed position and then to permit the sign to switch on again.

Note: If the relay contact is restored after a LED strip failure and no replacement is performed, the monitoring functionality is automatically disabled. The monitoring will not be reactivated by the system until the failed LED strips will be replaced with good strips.

The Figure 8 shows the positions of the relay contact.

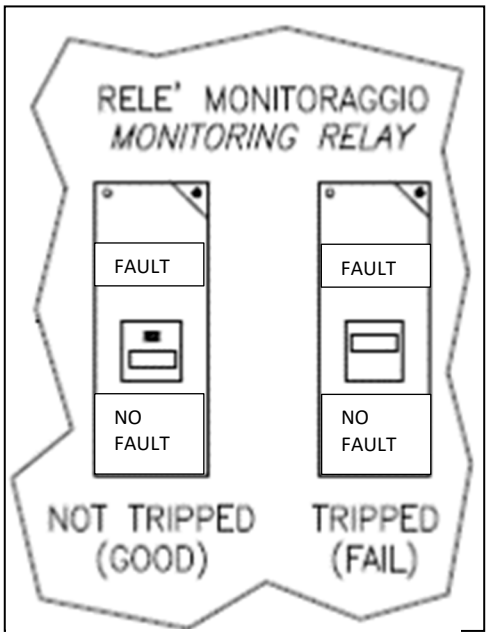


Figure 8: Electromechanical relay

3.2 Part Number Identification

LIMS01 – 3 – 20 – 1 – 01

Basic Part Number:

Version:

Message Size:
3 = Sign, 300 mm Legend Height
4 = Sign, 400 mm Legend Height

Type (visible length mm) (*):
10 = 990 20 = 1950 30 = 2890
13 = 1250 22 = 2190
15 = 1470 24 = 2430

Luminance Level:
1 = Constant Luminance
2 = Two Luminance Levels (**)

Options:
D2 = Parallel circuit voltage 110-240 VAC, 50/60 Hz (**)
01 = Tether (2 tethers for signs with number of supports ≥ 3 - Mandatory with option 48)
02 = Yellow frame (Special Version)
03 = Black frame (Special Version)
04 = Circuit Stabilizer
10 = Monitoring
48 = Reinforced version FAA-mode 3 (480 km/h)
69 = Orange rear side for single face signs
70 = Bird Spikes
S004 = Frame H600 with Legend H400

- Tables with retro-reflective panels (opt. 23) are available as a special version. Contact OCEM for further details.

(*) Other lengths are available as special version. Contact OCEM for further details.
(**) Not available with D2 option
(***) No need for transformer.

3.3 Environmental data

Temperature	-40°C to +55°C
Weather	All outdoor conditions, exposure to: driving rains, snow and icing, salt-laden atmospheres, relative humidity from 5 % to 95 %.
Wind Speed	322 Km/h (standard version) or 480 km/h (reinforced version – OPTION 48) ICAO Aerodrome Design Manual Part 6 Frangibility

Table 5: Environmental Data

3.4 Electrical Data

The luminous signs are powered by series circuits through isolating transformers compliant to FAA Specs FAA L830-L831 or through a parallel circuit voltage (110-240VAC). The power consumption of the LIMS signs is reported in Table 6. The power factor for the sign is:

- higher than 0.8 for all type of signs fed by parallel circuit voltage 110-240VAC;
- higher than 0.9 for all type of signs without Circuit Stabilizer[1] fed by series circuit.

Type	Power Consumption Series circuit [W]	Power Consumption Parallel circuit [W]
10	32	15
13	36	17
15	40	22
20	51	30
22	53	33
24	61	34
30	70	43

Table 6: Power consumption at maximum luminance for series and parallel powered signs.

The minimum size of the isolating transformer depends on both the sign type and the selected power supply (i.e. the number of current steps provided by the CCR), according to Table 7 and Table 8.

[1] Power factor with Circuit Stabilizer drops down to 0.5, for further information contact Energy Technology OCEM.

Type	CCR TYPE	CCR 5 STEP (2.8 A-6.6 A)		CCR 3 STEP (4.8 A-6.6)		CCR 1 STEP (6.6 A)
		Constant Luminance	Two Luminance Levels	Constant Luminance	Two Luminance Levels	Constant Luminance
10	SINUSOIDAL	150	65*	65*	65*	65*
	PHASE CUT	150	100	100	65*	65*
13	SINUSOIDAL	150	100	100	65*	65*
	PHASE CUT	150*	100	100*	100	100
15	SINUSOIDAL	150	100	100	100	65*
	PHASE CUT	200	100*	100*	100	100
20	SINUSOIDAL	200	100	100*	100	100
	PHASE CUT	200*	100*	150	100*	100*
22	SINUSOIDAL	200	100	150	100	100
	PHASE CUT	200*	100*	150	100*	100*
24	SINUSOIDAL	200*	100*	150	100*	100*
	PHASE CUT	300	150	150*	150	150
30	SINUSOIDAL	300	150	150	150	150
	PHASE CUT	300	150	200	150	150

(*) we suggest to select a larger transformer size in case individual monitoring is performed with MCC devices

Table 7: Isolating Transformer Size [Watt] without Circuit Stabilizer

Type	CCR Type	CCR 5 STEP (2.8 A-6.6 A)		CCR 3 STEP (4.8 A-6.6)		CCR 1 STEP (6.6 A)
		Constant Luminance	Two Luminance Levels	Constant Luminance	Two Luminance Levels	Constant Luminance
10	SINUSOIDAL	150	100*	100*	100*	100*
	PHASE CUT	150*	150	150	150	150
13	SINUSOIDAL	150	150	150	150	150
	PHASE CUT	200	150	150	150	150
15	SINUSOIDAL	150*	150	150	150	150
	PHASE CUT	200	150	150	150	150
20	SINUSOIDAL	200	150	150	150	150
	PHASE CUT	300	150*	150*	150*	150*
22	SINUSOIDAL	300	200	200	200	200
	PHASE CUT	300	300	300	300	300
24	SINUSOIDAL	300	200	200	200	200
	PHASE CUT	300	300	300	300	300
30	SINUSOIDAL	300	200*	200*	200*	200*
	PHASE CUT	300	300	300	300	300

(*) we suggest to select a larger transformer size in case individual monitoring is performed with MCC devices

Table 8: Isolating Transformer Size [Watt] with Circuit Stabilizer

3.5 Luminance Data

Two versions of LIMS signs are available, according to the luminance option selected.
One luminance level sign: available for both the power supply configurations. The luminance is constant for any value of the series circuit current from 2.8A to 6.6A and the relevant values are shown in Table 9.
Two luminance level sign: available only for signs powered by a series circuit. The high intensity level is selected with a current greater than 6A, while with any values between 2.8A and 6A the low intensity luminance is provided. The high and low luminance levels are reported in Table 9.

	High Intensity Level (and Constant Luminance)		**Low Intensity Level**	
	ICAO Requirements	Typical Value	ICAO Requirements	Typical Value
Average luminance yellow	>150 cd/m^2	180 cd	>50 cd/m^2	110
Average luminance red	>30 cd/m^2	40 cd	>10 cd/m^2	16
Average luminance white	>300 cd/m^2	350 cd	>100 cd/m^2	135
Maximum ratio between two adjacent points	<1.5	1.3	<1.5	1.3
Maximum ratio across sign	<5.0	1.8	<5.0	1.8

Table 9: Typical Photometric Performance

NOTE: for signs powered by a series circuit, 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.

4 INSTALLATION

a) Take as reference Table 3 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.

d) The concrete foundation for the sign should be flat and levelled. Refer to Figure 10 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.

e) It is recommended that the M12 anchor bolts used for the flange anchoring, are mounted after the completion of the concrete foundation. The anchor bolts must be walled accurately to assure the parallelism of the centreline marked on the flange and the sign centreline.

f) Remove the frangible couplings/floor flanges from the bottom of the sign by loosening the locking screws (set screw M8x14).

g) Taking 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) Connect the cable plug of the sign to the socket of the isolating transformer. The plug-socket connection should be secured depending upon the installation method.

j) **CONNECT** THE EARTHING STUD OF THE SIGN TO THE EARTHING SYSTEM OF THE AGL CIRCUIT THROUGH A CABLE OF AT LEAST 4 $MM^{2.}$

THE CONNECTION OF THE SIGN EARTHING STUD TO THE AGL EARTHING SYSTEM IS MANDATORY FOR SAFETY PURPOSES.

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.

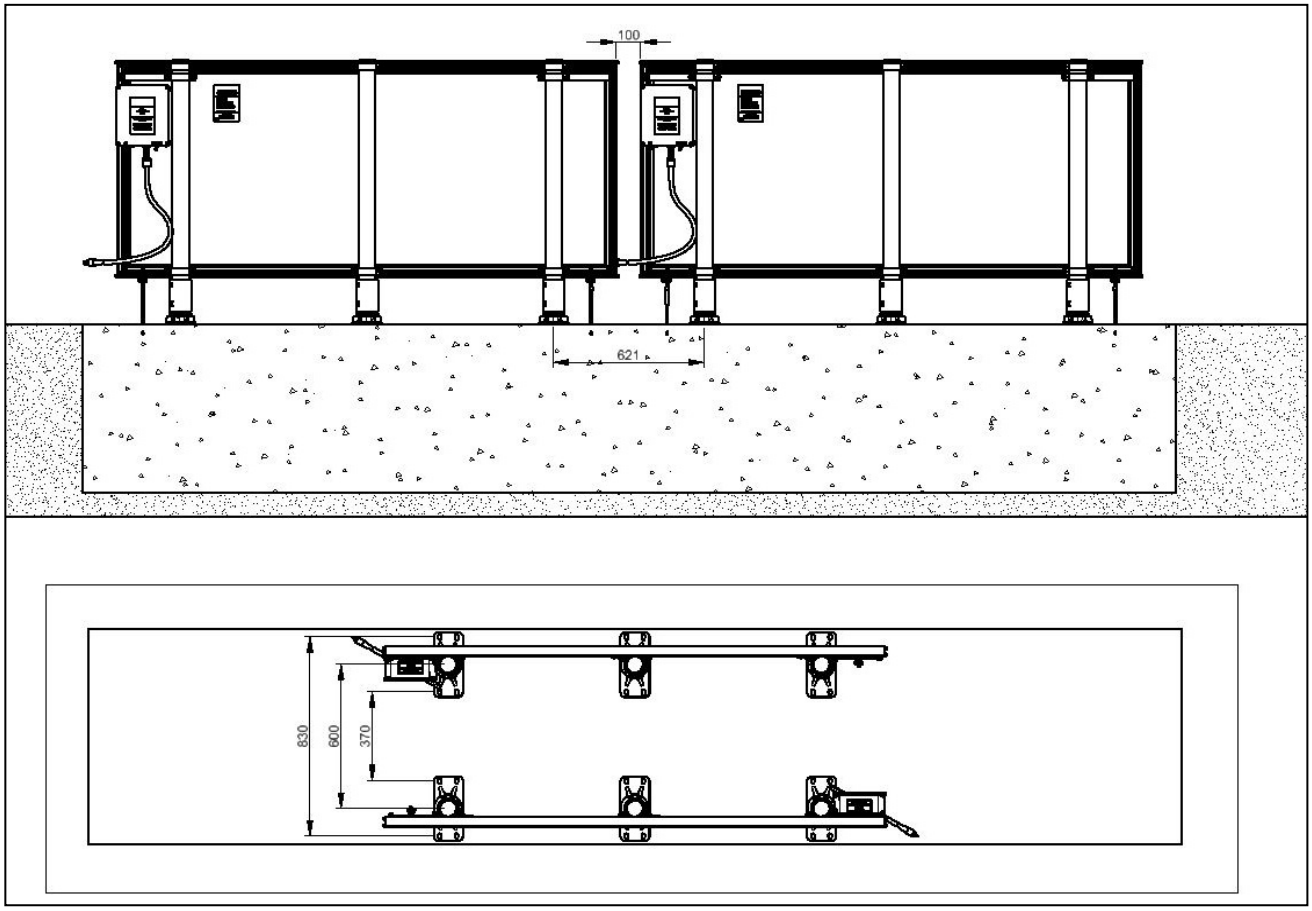


Figure 9: Side by side installation (up), front back installation (down)

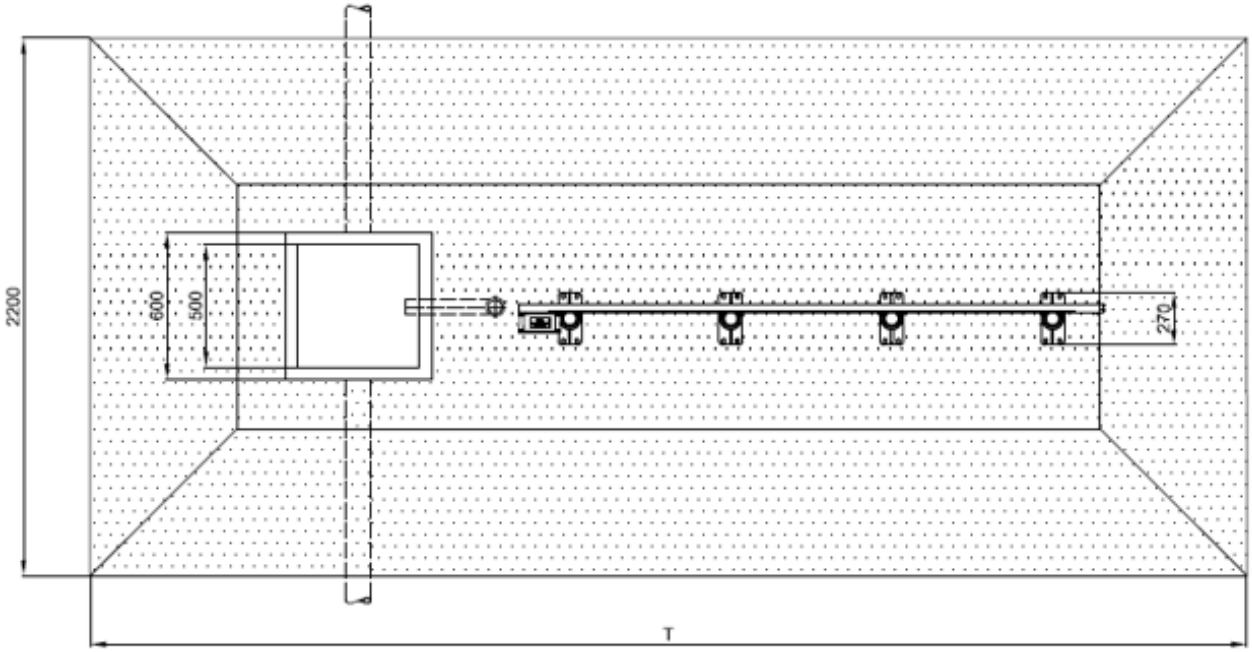


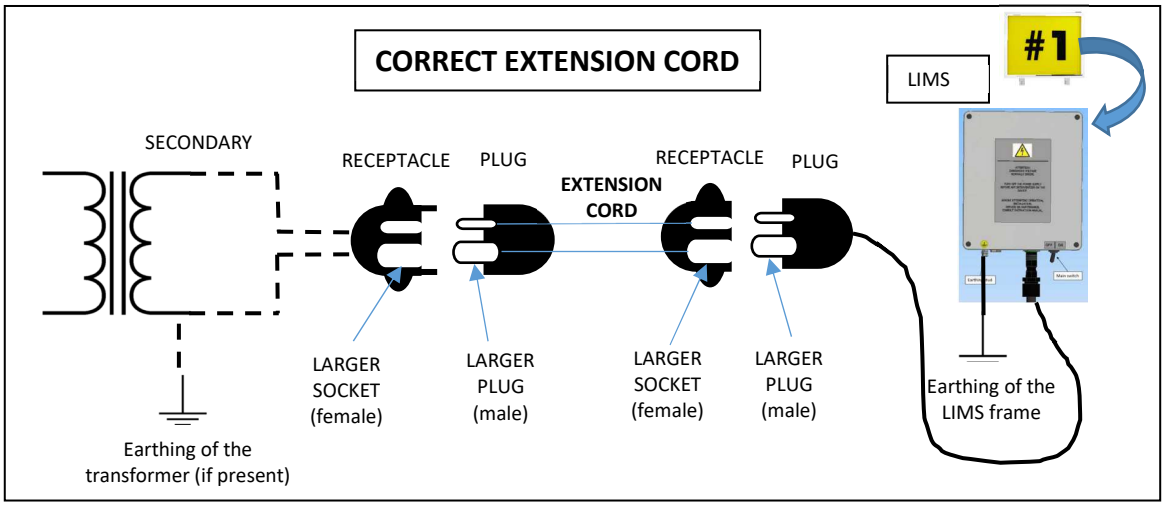
Figure 10: Foundation

Type	T [mm]
10	3469
13	3729
15	3949
20	4429
22	4669
24	4909
30	5369

Table 10: Foundation sizes

4.1 Power extension cord

MANDATORY
If any EXTENSION CORD is needed to connect the AGL series transformer to the LIMS, IT MUST BE GUARANTEE THAT THE LARGE PIN OF THE LIMS's PLUG IS CONNECTED TO THE LARGE PIN OF THE TRANSFORMER's SECONDARY RECEPTACLE.



4.2 Option 70 Bird Spikes

a) Remove the device from the packaging and clean the back of the device.

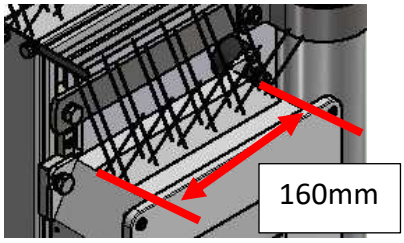


b) Remove the film from the double-sided adhesive tape.

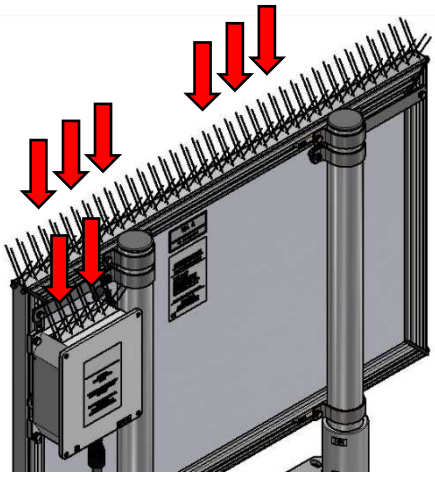


c) Apply the device on the double-sided adhesive by pressing hard.

- The 160mm detail must be applied to the Electronic Box.



- The other details on the table profile



5 MAINTENANCE

ATTENTION!

The power supply or CCR

MUST be TURNED OFF before any intervention on the sign.

5.1 Periodical Checks

Daily	Visual check from outside. If the sign brilliance or the message readability are impaired due to dirt, clean the external surface of the panel.
	Only if necessary, open the sign to troubleshoot and replace damaged components or to clean the internal surface of the panels
Monthly	Check for vegetation covering the panel. If necessary, remove vegetation
Semi-Annual	Check loose power wire connections
	Check for cracked or deteriorated power wires. If necessary, replace damaged components
	Check the correct installation of the sign, including torque of fixing bolts/screws, horizontal levelling and torque of the frame screws
Annual	Visual check from outside for discolored or faded panels

5.2 LEDs Luminous Source Replacement

a) Be sure that the power supply is turned OFF; in the case of series circuit, de-activate the CCR (CCR OFF).
In any case turn the main switch to OFF position.

b) Loosen the screws (without removing them) of the top “C” clamps of the supports. The number is variable based on the poles number.



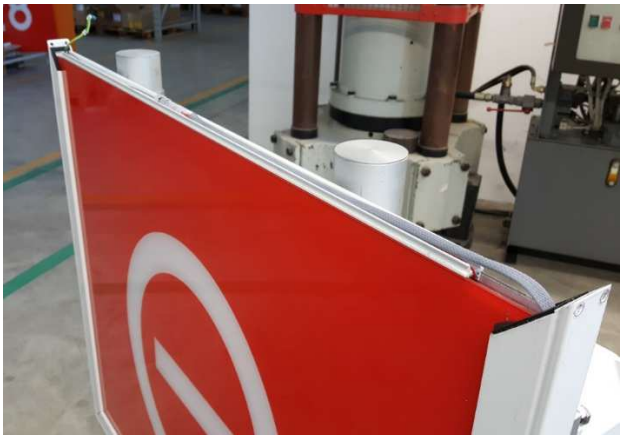
c) Remove four screws that connect the top cover with the sides of the structure.



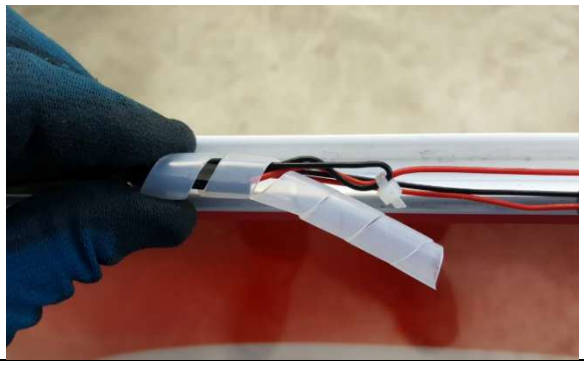
d) Lift the top cover carefully of a few centimeters, disconnect the earth cable and remove the top cover.

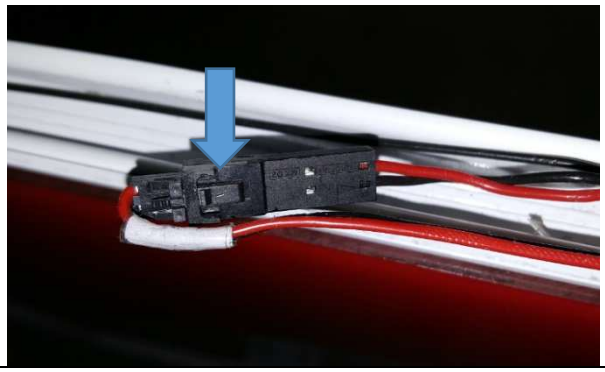






e) Remove the spiral and disconnect the connector of the damaged LEDs luminous source by pressing on the tab indicated by the arrow.

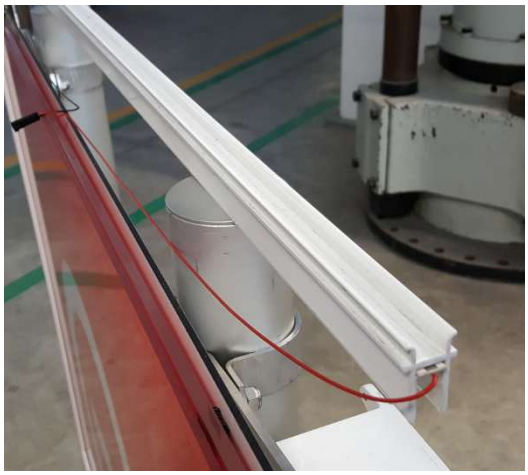




f) Cut the tie wrap.

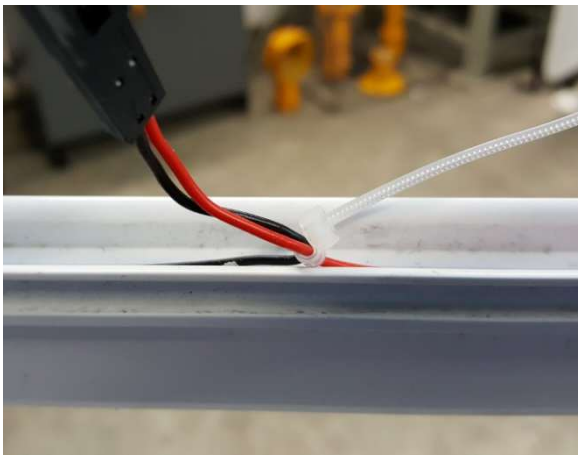


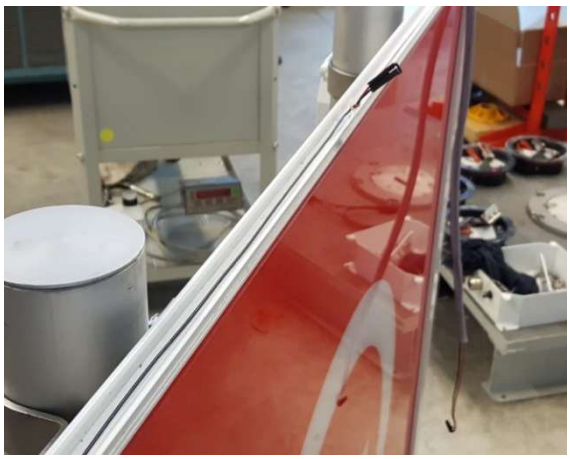
g) Lift and rotate the LEDs support and pull the LEDs strip as shown in figure.



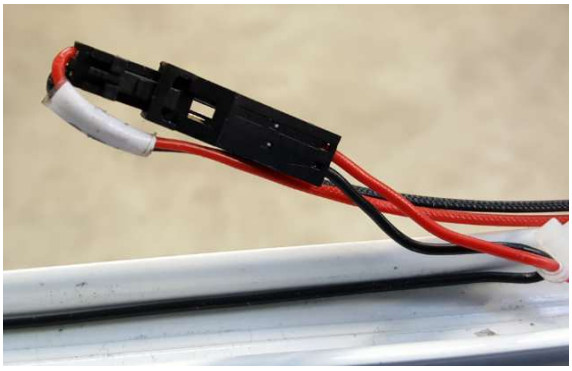


h) Insert the new strip LEDs in the support, link the wires with a tie wrap and reposition the support on the panels.



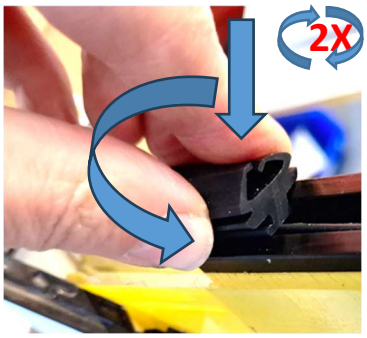


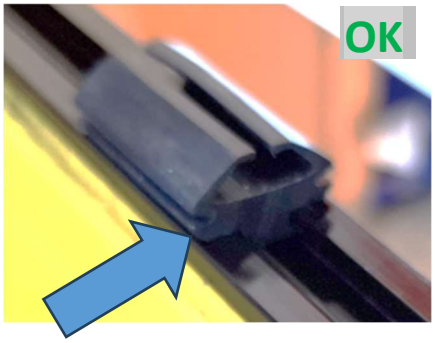
i) Reconnect the strip LEDs connector and insert the spiral.

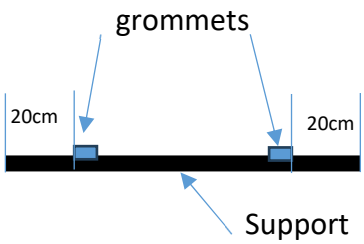




j) Insert 2 rubber grommets into each profile, positioned 20 cm from the edge of the profile, regardless of the profile's total length.
If a grommet happens to align with a connector or a cable tie, shift it either to the left or to the right—it does not matter which way—to clear the obstruction.







k) Connect the earth cable on the top cover and close the sign.
Remove the gasket and replace it with a new one.
Caution. The seals are one for the right side and one for the left side





l) Tighten the top cover screws and the screws of the “C” clamps.




m) Turn the main switch to ON position, turn ON the power supply (CCR ON for series circuit) and check the correct operation of the sign.

NOTE: if the sign has the Monitoring Option, prior to turn the CCR on, you have to restore in GOOD position the contact of the monitoring relay on the electronic board (see par. 3.1.8)

5.3 Electronic Card Replacement

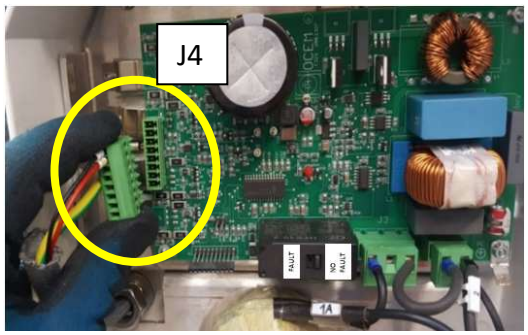
5.3.1 Series Circuit Signs

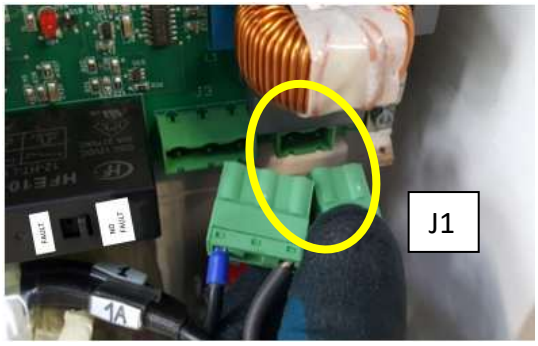
a) Be sure that the series circuit is de-energized (CCR OFF); in any case turn the main switch to OFF position.

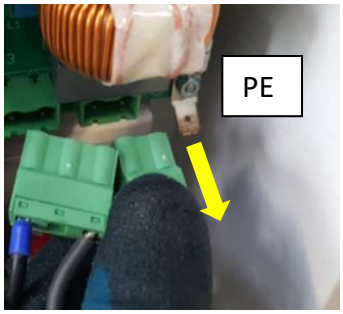
b) Remove the electronic board cover by unscrewing the relevant 4 screws.
TIP: to avoid losing some screws, at first unscrew a little bit all the 4 screws, and then complete unscrewing them.

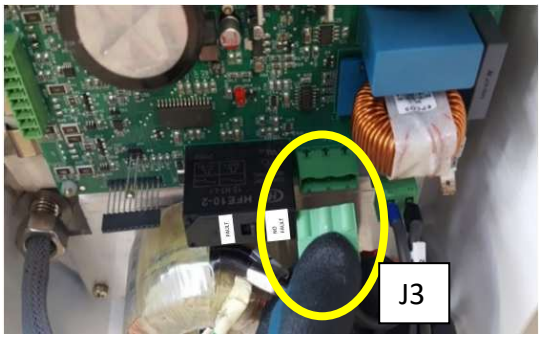


c) Unplug the connectors shown in the figures: J4 (LED connector), J1 (supply), faston PE (earth), possibly J3 (monitoring relay's contact, in case of monitoring option).



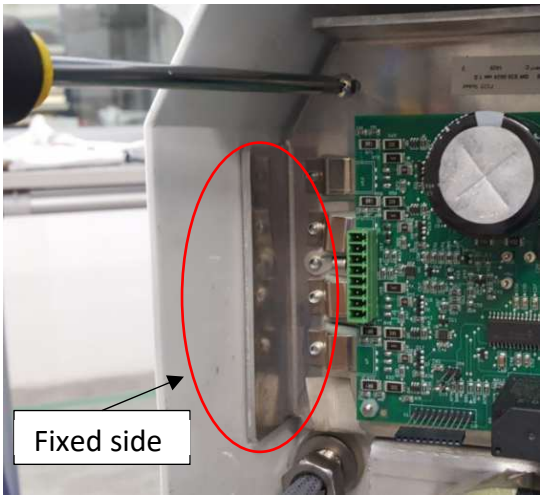




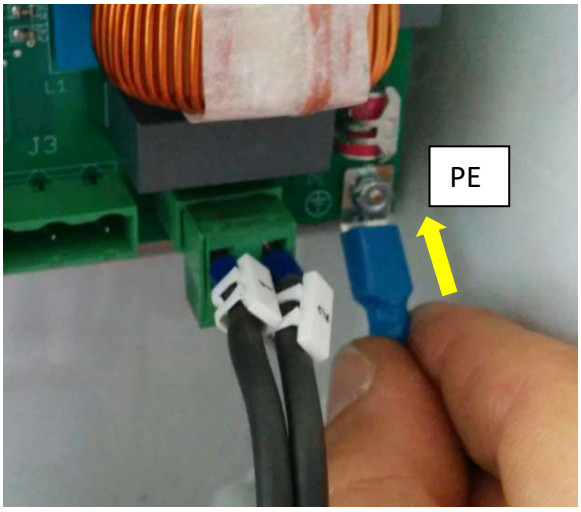


d) Remove the relevant two fixing screws, carefully unstick the left side of the electronic board from the box and pull it.





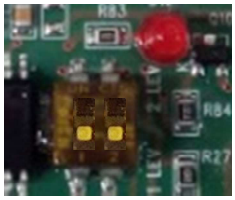
e) Paste the thermal-conductive adhesive on the left side of the new electronic board and reassemble everything with reverse procedure.
CAUTION: make sure to connected the earth cable to the earth tab PE (right low corner of the board).

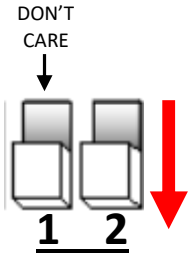


f) Set the RIGHT dip-switch of the electronic board in the correct configuration for 1 or 2 brightness levels, as shown below:

- One brightness level

LIMS01-x-xx-1-…..

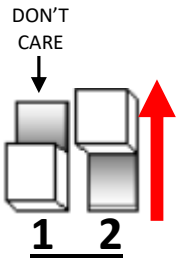




- Two brightness level

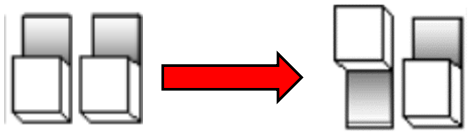
LIMS01-x-xx-2-…..



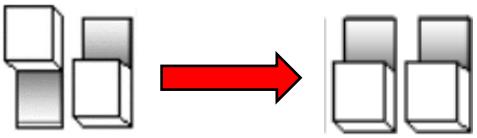


g) IN CASE OF MONITORING RELAY

Change the position of the LEFT dip-switch: if it is in the upper position, move it in the lower position and viceversa.



BEFORE AFTER



BEFORE AFTER

NOTE: this operation will indicate the electronic board to perform an automatic calibration procedure at the following turn-on (ATTENTION: during this procedure the LED strips can temporarily change their brightness).

h) Turn the main switch of the sign to ON position and turn the CCR ON.

i) Check the correct operation of the sign.
The RED LED on the electronic board makes 2 LONG FLASHES then begins to make SHORT FLASHES CONTINUOUSLY (continuous short flashes of the RED LED indicates that the electronic board is correctly running)

j) Close the electronic board cover by screwing the relevant 4 screws.



5.3.2 Parallel Circuit Signs

a) Be sure that the power supply is OFF; in any case turn the switch of the sign to OFF position.

b) Remove the electronic board cover by unscrewing the relevant 4 screws.

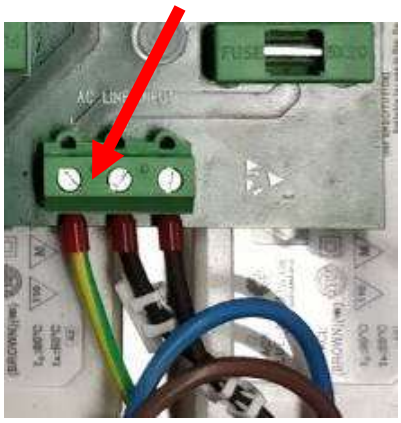


c) Unscrew the relevant 4 screws of the protection panel and remove it.

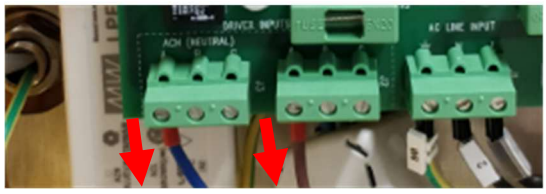


d) Disconnect from the electronic card the cable nr. 1 and 2 and the grounding cable connected on J1 screw terminal block.

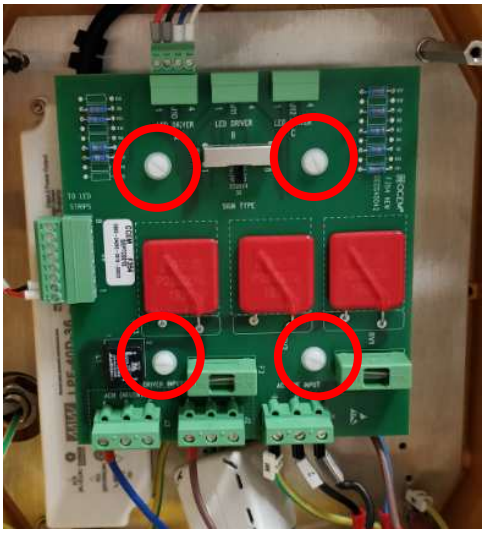




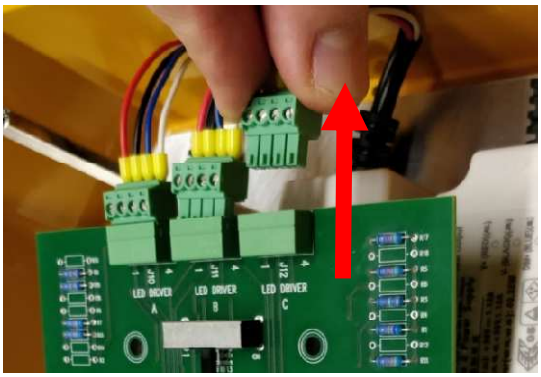
e) Disconnect all the cable connected on J2 and J3 screw terminal block on the bottom side of the electronic card.



f) Unscrew the relevant 4 screws of the electronic card.



g) Disconnect the light source connectors.



h) Assembly the new electronic card by reversing the procedure.

i) Turn ON the power supply and check the correct operation of the sign.

If it is necessary to replace the driver, proceed with the following procedure:

a) Unscrew the 2 fixing screw of the driver.



b) Disconnect all the connectors of the driver.

c) Remove the driver and install the new driver by reversing the procedure.

5.4 Front Panel Replacement

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

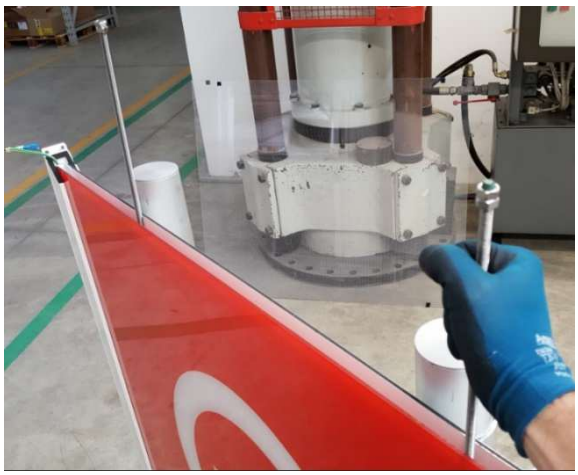
b) Follow the instructions up to the point “e” of the paragraph 5.2.

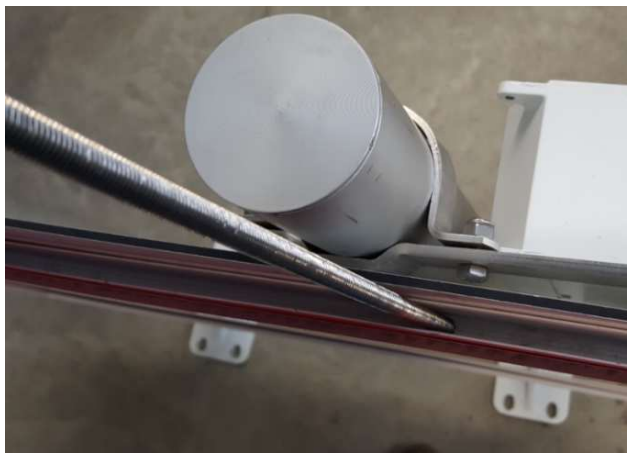
c) Lift the LEDs support and the light-guide panel carefully.





d) Screw the threaded bars onto the horizontal spacers (located at the bottom, between the text panel and the back panel) and extract them. The number of the spacers depends on the type of sign. Careful not to scratch the back panel!





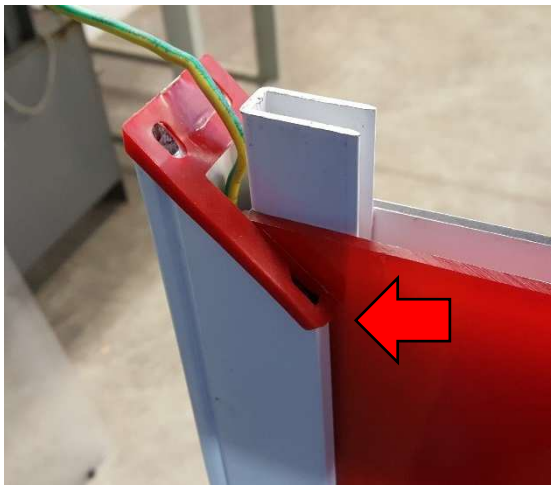
e) Extract the vertical spacers with the help of a screwdriver using the hole at the top, pushing them inwards and lifting them up

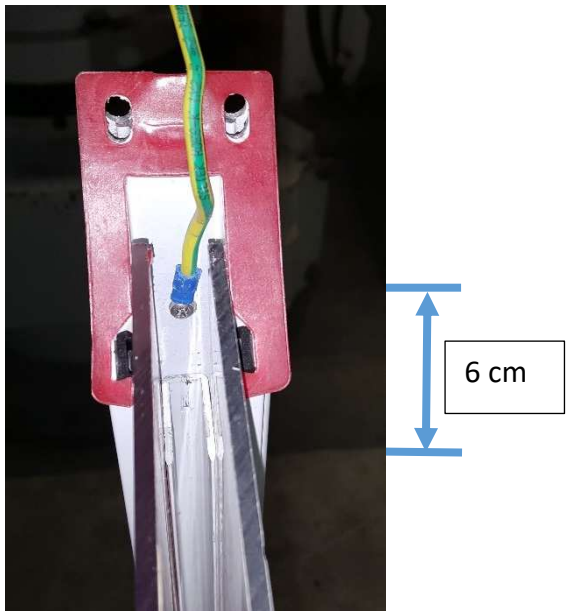


f) Extract the old text panel and insert the new one.



g) Insert the spacers keeping them adhered to the walls. <u>Be careful not to scratch the panels!</u>





h) Insert the horizontal spacers with the help of the threaded bars and push them until they touch the lower structure.



<u>Careful not to scratch the panels!</u>





i) Reposition the light-guide panel carefully and the LEDs support on the panels.





j) Follow the instructions in the paragraph 5.2 from point “I” to “l” to restore the sign.

5.5 Electronic Equipment Replacement

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

a) Be sure that the series circuit is de-activated (CCR OFF) or the power supply is TURNED OFF

b) Turn the main switch of the sign in OFF position

c) Remove the top cover of the electronic box by loosening the relevant four screws

d) Check the wiring, the connection to the terminal strips and the continuity

e) If necessary replace the electronic board and then check again the wire connections.
The electronic board for the series sign has to be replaced for sure if the GDT1 gas discharger is tripped. This could be checked by disconnecting the J1 plug and measure the ohmic resistance between the two pins of the J1 PCB connector: the GDT1 discharger is tripped if the measured resistance is zero or near zero (see Figure 11).

f) The electronic board for the parallel sign has to be replaced when at least one varistor RV1/RV2 or RV3 is burned after a surge event or thermal runaway. This could be verified by visual inspection (burned varistor).

g) Mount the top cover with reverse procedure

h) Turn the main switch of the sign to ON position

i) Turn the CCR or power supply ON and check the correct operation of the sign.

5.6 Troubleshooting

5.6.1 Series Signs

Problem	Problem cause	Solution
The sign is partially not lighted	LEDs strip completely open or partially short circuited	Replace the LEDs strip.
	LEDs strip connector unplugged	Plug the LEDs strip connector (check the connector on the electronic card and the connectors inside the top cover)
The sign is totally not lighted	Main switch left in off position	Move the main switch in on position (with the CCR off)
	Isolation transformer damaged	Replace isolating transformer
	Electronic card damaged	Replace the electronic card
	Bad connection	Check the connections
The text panel looks bad	The text panel is dirty	Clean the text panel with a glass cleaner and a soft cloth
	The text panel is broken	Replace the text panel

5.6.2 Parallel Signs

Problem	Problem cause	Solution
The sign is partially not lighted	LEDs strip completely open or partially short circuited	Replace the LEDs strip.
	LEDs strip connector unplugged	Plug the LEDs strip connector (check the connector on the electronic card and the connectors inside the top cover)
	LEDs driver malfunction for signs that have more than 2 LED driver (length signs greater than L= 13 dm)	Replace the LEDs driver
The sign is totally not lighted	Main switch left in off position	Move the main switch in ON position (with power supply off)

	Fuse blown	Replace the Fuse
	Varistor burn out	Replace the electronic card
	Electronic card damaged	Replace the electronic card
	LEDs driver malfunction	Replace the LED driver
	Bad connection	Check the connections
The text panel looks bad	The text panel is dirty	Clean the text panel with a glass cleaner and a soft cloth
	The text panel is broken	Replace the text panel

6 DRAWINGS

6.1 Wiring diagram series signs

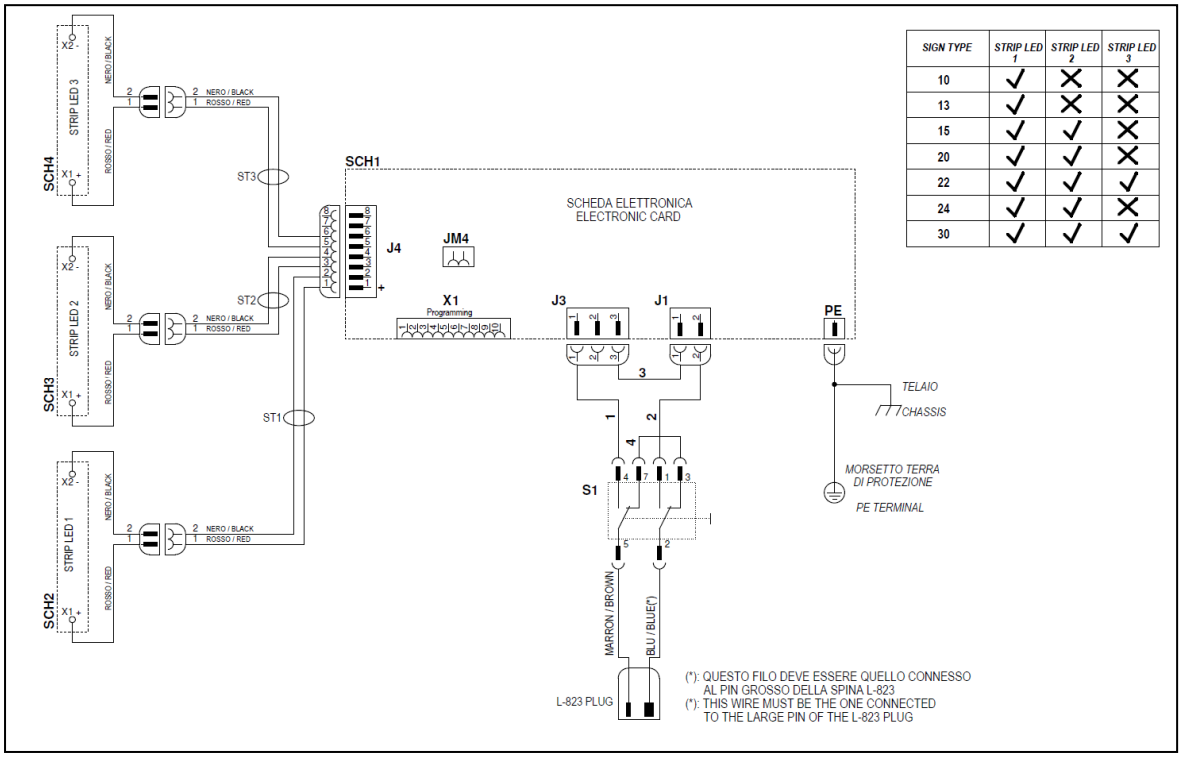
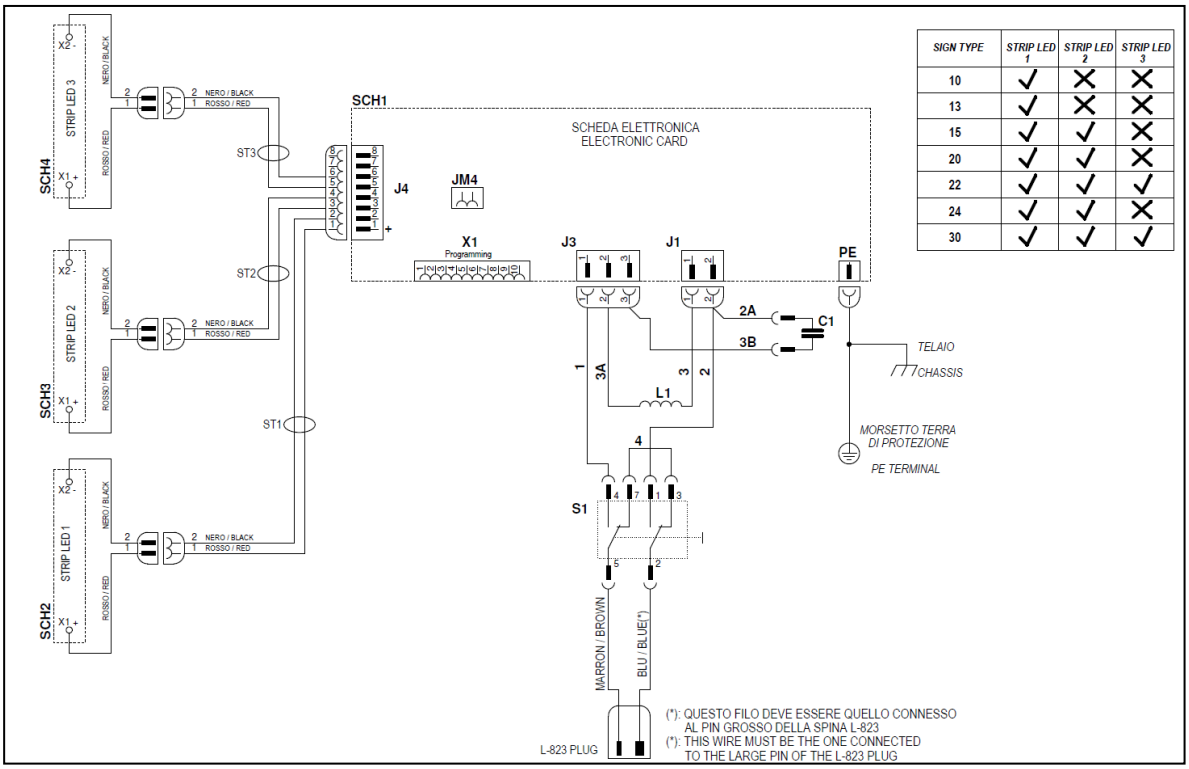


Figure 11: Wiring diagram (series sign without circuit stabilizer)



SIGN TYPE	STRIP LED 1	STRIP LED 2	STRIP LED 3
10	✓	✗	✗
13	✓	✗	✗
15	✓	✓	✗
20	✓	✓	✗
22	✓	✓	✓
24	✓	✓	✗
30	✓	✓	✓

Figure 12: Wiring diagram (series sign with circuit stabilizer)

6.2 Wiring diagram parallel signs

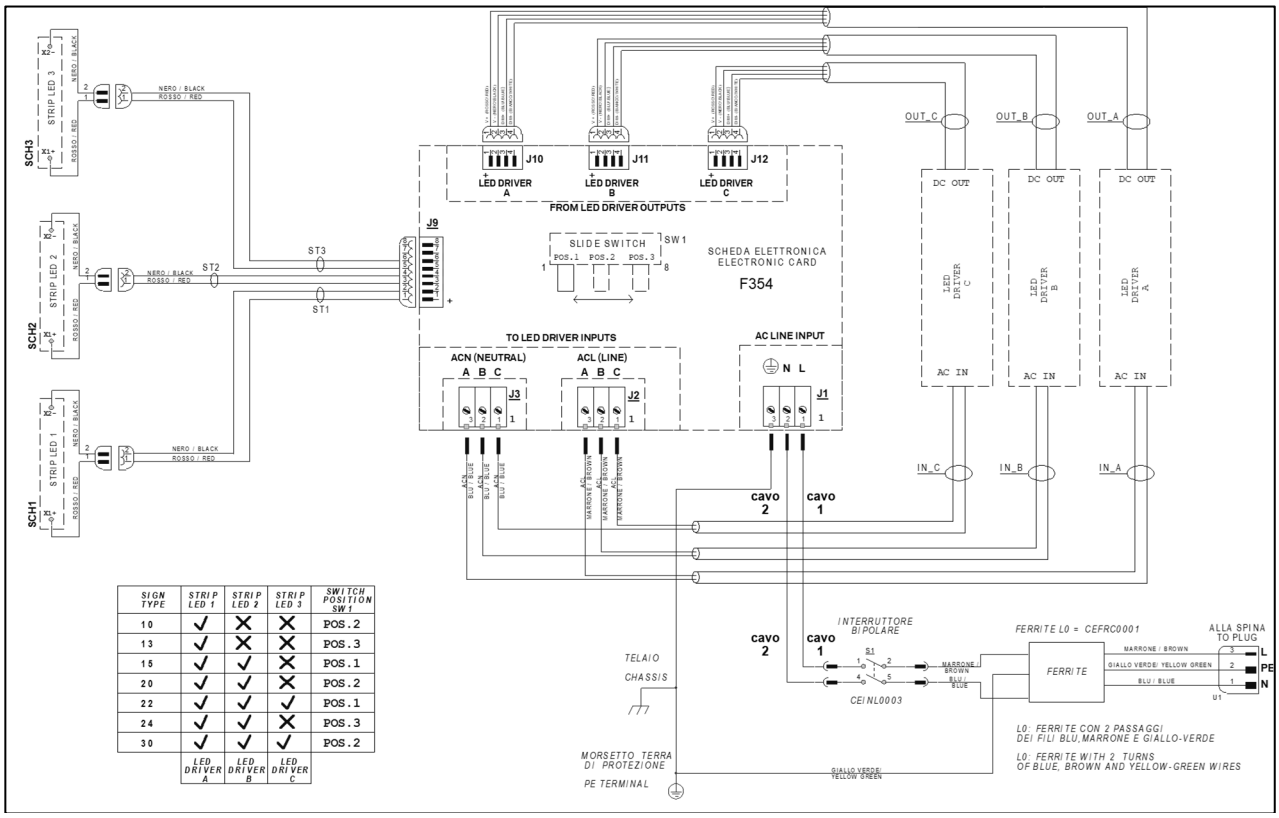


Figure 13: Wiring diagram (parallel signs powered at 110-230 VAC)

7 LIST OF RECOMMENDED SPARE PARTS

CODE	DESCRIPTION
RISLT0003	Electronic Card F323 - SESPC0022- power supply board w/o monitoring 1/2 levels
RISLT0004	White strip LEDs 720 mm
RISLT0005	White strip LEDs 960 mm
RISLT0006	White strip LEDs 1200 mm
RISLT0007	Toggle diverter 2P 16A 250V and RUBBER CUP FOR SWITCH FEME B3T18/1
RISLT0008	BREAKABLE COUPLING KIT L10 H300
RISLT0009	BREAKABLE COUPLING KIT L13/L15 H300
RISLT0010	BREAKABLE COUPLING KIT L20 H300
RISLT0011	BREAKABLE COUPLING KIT L22 H300
RISLT0012	BREAKABLE COUPLING KIT L24/L30 H300
RISLT0013	BREAKABLE COUPLING KIT L10 H400
RISLT0014	BREAKABLE COUPLING KIT L13/L15 H400
RISLT0015	BREAKABLE COUPLING KIT L20 H400
RISLT0016	BREAKABLE COUPLING KIT L22 H400
RISLT0017	BREAKABLE COUPLING KIT L24/L30 H400
RISLT0018	BREAKABLE COUPLING KIT 480Kh L10/13/15 H300
RISLT0019	BREAKABLE COUPLING KIT 480Kh L20 H300
RISLT0020	BREAKABLE COUPLING KIT 480Kh L22/24/30 H300
RISLT0021	BREAKABLE COUPLING KIT 480Kh L10 H400
RISLT0022	BREAKABLE COUPLING KIT 480Kh L13 H400
RISLT0023	BREAKABLE COUPLING KIT 480Kh L15 H400
RISLT0024	BREAKABLE COUPLING KIT 480Kh L20/22 H400
RISLT0025	BREAKABLE COUPLING KIT 480Kh L24 H400
RISLT0026	BREAKABLE COUPLING KIT 480Kh L30 H400
RISLT0027	Plug 2P L-823 600V VUL. 2X2.5 L250cm
RISLT0028	FRONT PANEL L10 H300 with writing digital printing
RISLT0029	FRONT PANEL L13 H300 with writing digital printing
RISLT0030	FRONT PANEL L15 H300 with writing digital printing
RISLT0031	FRONT PANEL L20 H300 with writing digital printing
RISLT0032	FRONT PANEL L22 H300 with writing digital printing
RISLT0033	FRONT PANEL L24 H300 with writing digital printing
RISLT0034	FRONT PANEL L30 H300 with writing digital printing
RISLT0035	FRONT PANEL L10 H400 with writing digital printing

CODE	DESCRIPTION
RISLT0036	FRONT PANEL L13 H400 with writing digital printing
RISLT0037	FRONT PANEL L15 H400 with writing digital printing
RISLT0038	FRONT PANEL L20 H400 with writing digital printing
RISLT0039	FRONT PANEL L22 H400 with writing digital printing
RISLT0040	FRONT PANEL L24 H400 with writing digital printing
RISLT0041	FRONT PANEL L30 H400 with writing digital printing
RISLT0042	STABILIZER 3.5mH max 20dm LIMS
RISLT0043	STABILIZER 7mH da 22dm LIMS
RISLT0045	Electronic Card F323 - SESPC0023- power supply board with Monitoring 1/2 levels
RISLT0046	Driver for Led Strip L=960mm for LIMS L= 10, 20, 30 powered at 230 V
RISLT0047	Driver for Led Strip L=1200mm for LIMS L= 13, 24 powered at 230 V
RISLT0048	Driver for Led Strip L=720mm for LIMS L= 15, 22 powered at 230 V
RISLT0049	Electronic Card F354 for 1 luminance level Signs, powered by a parallel circuit (230 V)
RISLT0050	Kit Plug and Receptacle 3P L-832
RISLT0051	H300 Sign Pole with Accessories
RISLT0052	H400 Sign Pole with Accessories
RISLT0053	Seal Grease - Minimum 1kg package
RISLT0054	Tether LIMS
RISLT0057	FRONT PANEL L10 H300 with writing (film)
RISLT0058	FRONT PANEL L13 H300 with writing (film)
RISLT0059	FRONT PANEL L15 H300 with writing (film)
RISLT0060	FRONT PANEL L20 H300 with writing (film)
RISLT0061	FRONT PANEL L22 H300 with writing (film)
RISLT0062	FRONT PANEL L24 H300 with writing (film)
RISLT0063	FRONT PANEL L30 H300 with writing (film)
RISLT0064	FRONT PANEL L10 H400 with writing (film)
RISLT0065	FRONT PANEL L13 H400 with writing (film)
RISLT0066	FRONT PANEL L15 H400 with writing (film)
RISLT0067	FRONT PANEL L20 H400 with writing (film)
RISLT0068	FRONT PANEL L22 H400 with writing (film)
RISLT0069	FRONT PANEL L24 H400 with writing (film)
RISLT0070	FRONT PANEL L30 H400 with writing (film)
RISLT0072	BREAKABLE COUPLING Fixing Flange
RISLT0073	25 meter Anti-Bird Kit
RISLT0074	LED holder support L=720 - 2x LIMS-15; 3x LIMS-22

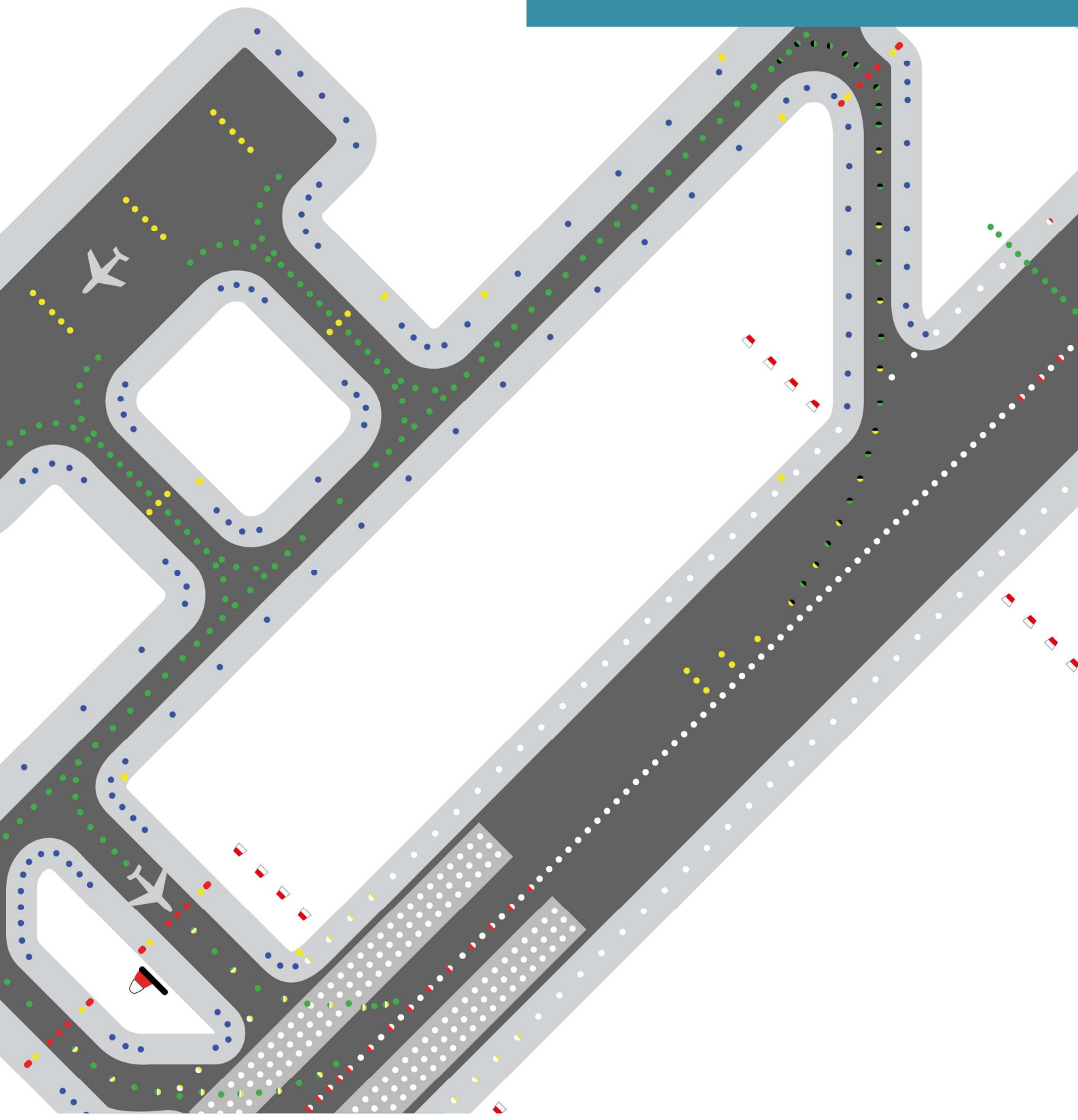
CODE	DESCRIPTION
RISLT0075	LED holder support L=960 - 1x LIMS-10; 2x LIMS-20; 3x LIMS-30
RISLT0076	LED holder support L=1200 - 1x LIMS-13; 2x LIMS-24
RISLT0077	Collar Kit for Tightening 1 Pole

8 ACCESSORIES

CODE	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	Galvanized steel pipe elbow with both threaded ends
315.1062	Baseplate for L-867 base with gasket and cable clamp
011.3100	Consolidating harness

Contact us

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