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LED STANAG LUMINOUS DISTANCE SIGNS

LSDS

INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

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1 GENERAL

The internally illuminated LSDS signs are designed to provide to the pilot the following different indications by day and by night:

a) the runway distance remaining from the runway end in thousand of feet;
b) the position of the pendant cables for arrester hook engagement;
c) the position where the pendant cables must be used to stop in case of failed take-off.

Colours may be White or Yellow on Black back ground; signs are available as single or double faced.
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), 1-step (6.6A) Constant Current Regulators.
Consult STANAG Specs 3316 and/or national military rules for sign features and use.

2 CLASSIFICATION OF SIGNS

The signs described in this manual are designed and manufactured in accordance with the requirements of STANAG 3316, the design being in compliance with FAA AC 150/5345-44 Specs too.

2.1 Types

Runway Distance signs	White number on black background
Arrester Cable signs	Yellow disk on black background
Arrester Cable Use signs (for failed take-off)	White “X” on black background

Table 1 – Type of signs

2.2 Legend Sizes

Height of numbers:	1000 mm
Width of the numbers:	600 mm max (number "4") - 200 mm min (number "1")
Diameter of the disk:	1000 mm
Height of "X":	1000 mm
Width of "X":	1000 mm

Table 2 – Characters

2.3 Part Number Identification

LSDSD1 – 1 – 02 - 70

Basic P/N:

Use Code:
D = Runway Distance Sign
B = Arrester Cable Sign
X = Use of Arrester Cable in Case of Failed Take-Off

Number of Faces:
1 = Single Face
2 = Double Face

Number of Modules:

Always installed:
02 = Tether (2)
70 = Bird Spikes

3 MAIN FEATURES

3.1 Environmental Data

Temperature	From -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 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:

TRANSFORMER RATING		
2.8 A-6.6 A	**4.8 A-6.6 A**	**6.6 A**
200 W	150 W	100 W

Table 4 – Electrical data

The power required to CCR per each sings is:

CCR Total Load		
2.8 A-6.6 A	**4.8 A-6.6 A**	**6.6 A**
190 VA	110 VA	80 VA

Table 5 – CCR Total Load

3.3 Luminance Data

The luminance of the sign faces is practically constant for any value of the series circuit current from 2.8 A through 6.6 A.

COLORS AT 6.6 A (cd/m^2)	
YELLOW	**WHITE**
190	350

TabLe 6 – Luminance Data

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:

a) main structure
b) panels for faces
c) LEDs luminous source
d) electronic boards.

3.4.1 Main Structure

The main structure principally consists of a bearing bottom structure, two sides, one top cover and assembling-supporting components.
Bottom structure, sides and top cover are made of extruded aluminium profiles, realized according to our design.
Each module is supported by four mountings, each including a leg, a breakable coupling and a floor flange. All these components are cast aluminium.
The signs are equipped with a single top cover, locked to the main structure by means of four hexagonal knob. The main structure is matt black outside painted.

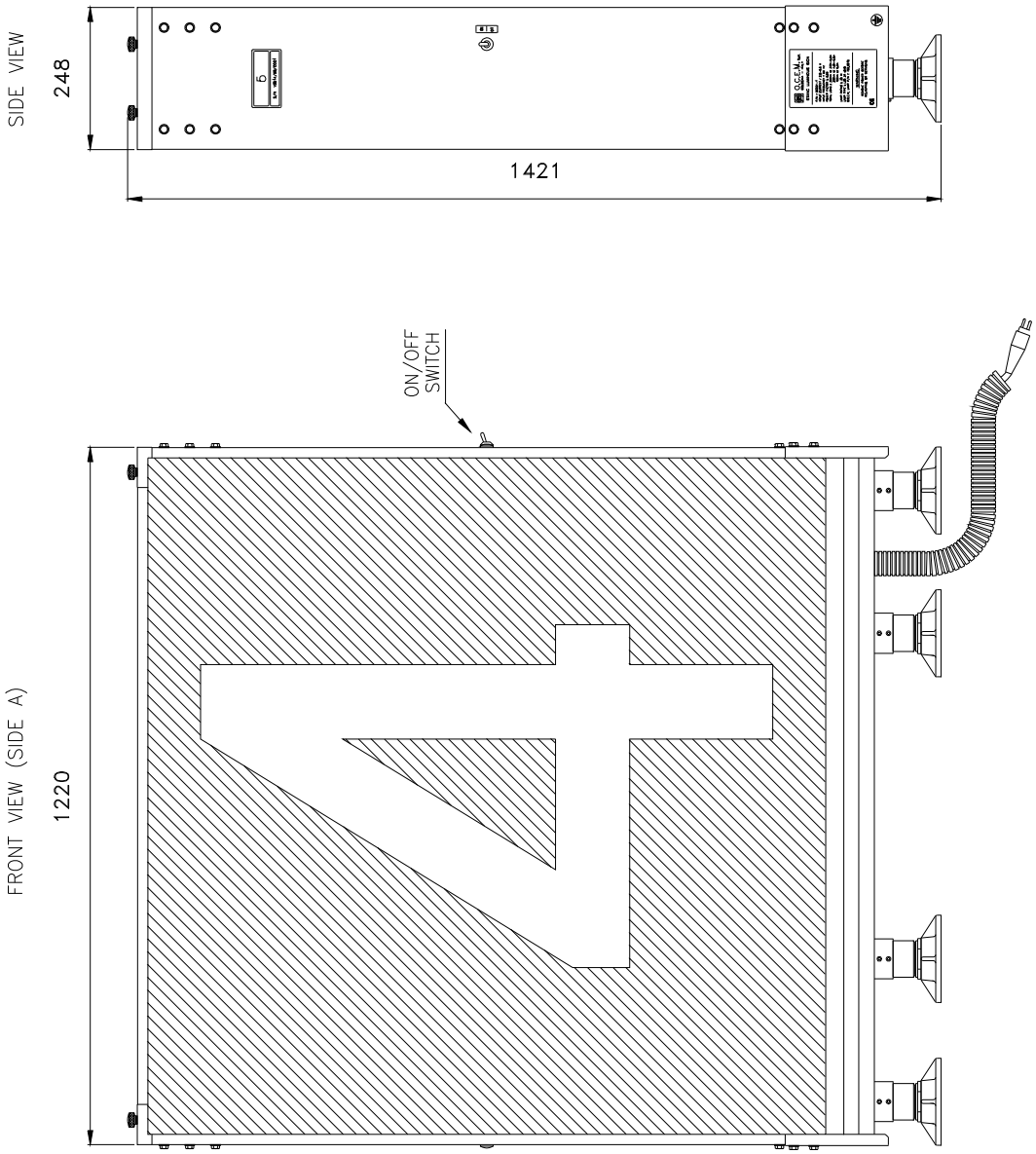

Figure 1 – Overall dimensions

3.4.2 Panel for Faces

The panels for faces are made of high performance methacrylate 5 mm thick.
The legend is obtained by means of adhesive coloured translucent films applied to the internal side of the panel.

3.4.3 LEDs Luminous Source

Each sign is illuminated by two luminous sources.
LEDs are high efficiency type, white colour with average life 60.000 hours.

The positioning of the LEDs has been determined through photometric tests so to meet the illumination values as required by STANAG 3316.

3.4.4 Electronic Board

For the power supply from the series circuit through the isolating transformer each sign is equipped with a current converter completely assembled on an encapsulated electronic board.
By varying the current of the CCR in the range 2.8 - 6.6 A, the power supply board provides a constant current to each luminous source. This allows a constant luminance regardless the step of the CCR.
For the electrical connection to the isolating transformer the sign is equipped with a two-pole cable lead with L-823 plug, 1650 mm long.
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.
See Figure 2 for the wiring diagram of each type of sign.

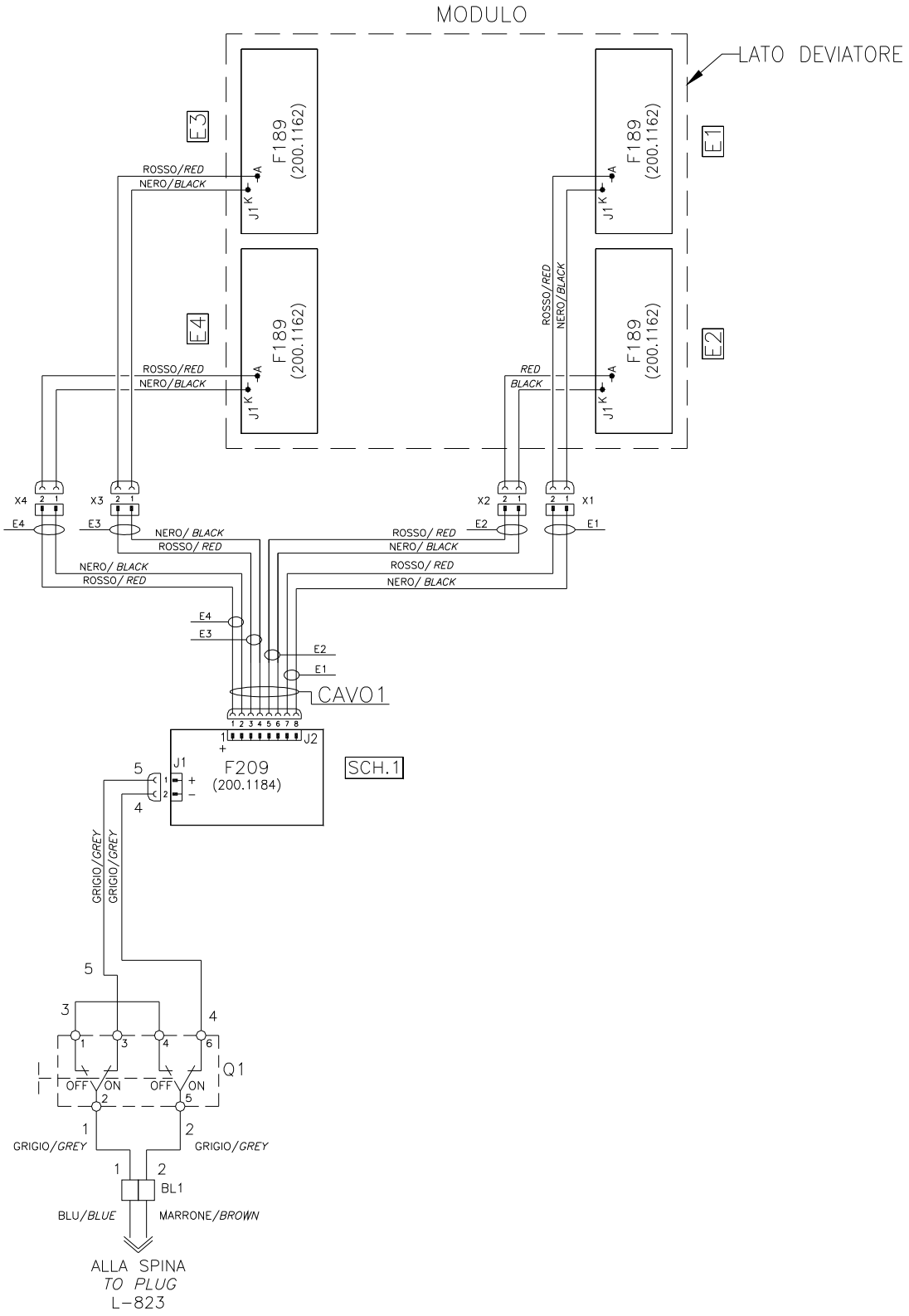

Figure 2 – Wiring diagram

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 4 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 3 and in manner 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) 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) After the signs have been installed, turn the circuit on to the lowest step and check to see that all the signs are lighted.

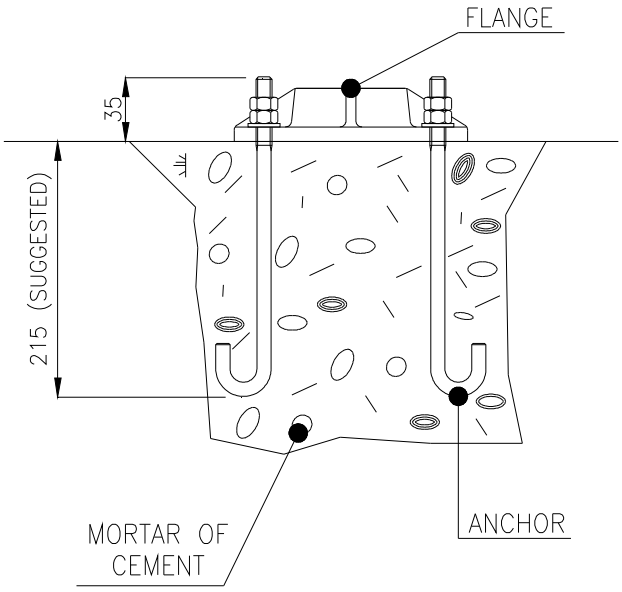

Figure 3 – Flange installation with anchor bolts

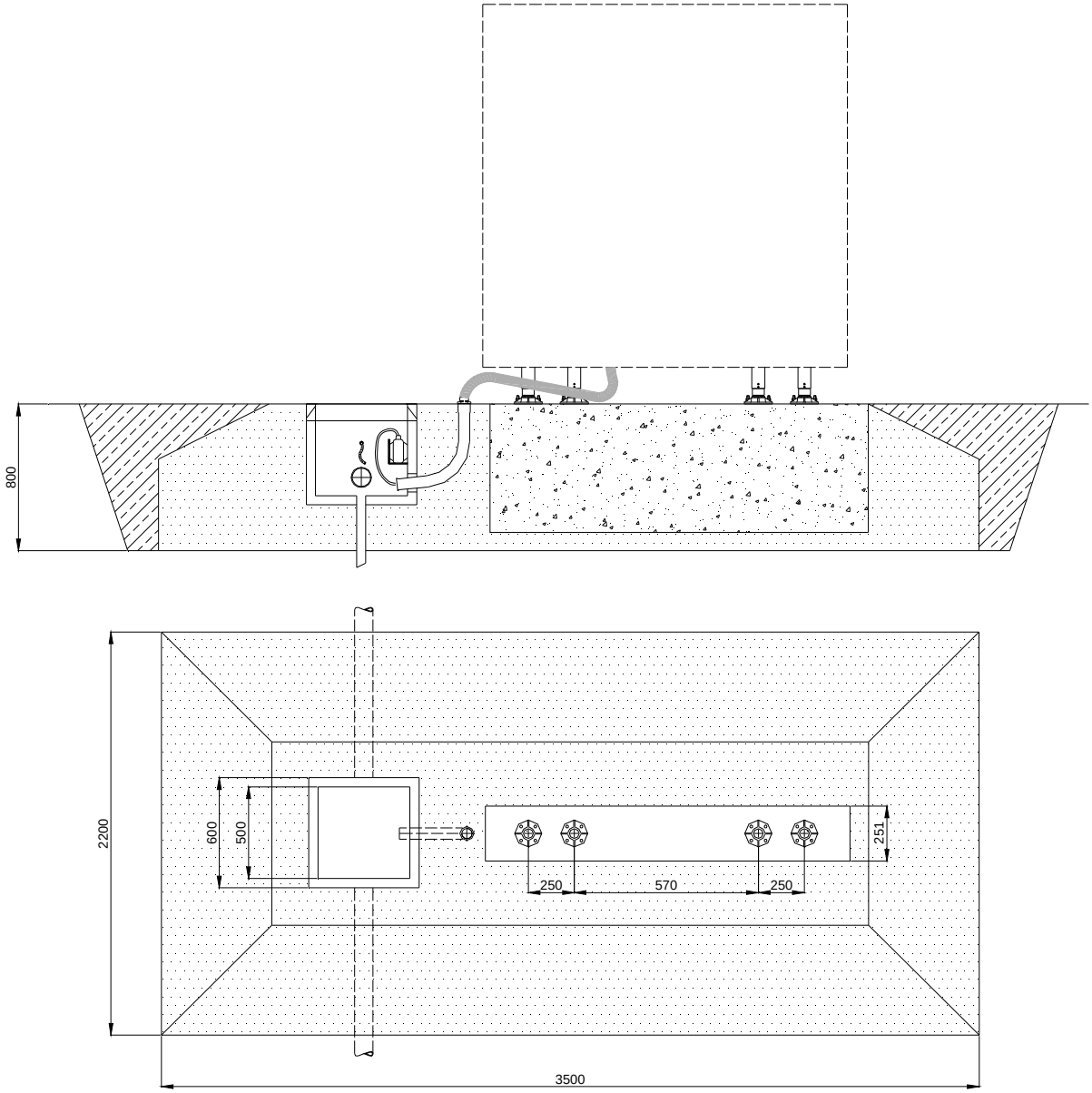

Figure 4 – Concrete foundation

5 MAINTENANCE

ATTENTION!

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

5.1 Periodical Checks

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

5.2 LEDs Luminous Source Replacement

LEDs used in the sign have a long average life. 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 main switch to OFF position
b) Loose the four screws of the cover and remove it
c) Disconnect the connectors of the damaged LEDs luminous source and loosen the four nuts at the angles of the support, then slide and lift the support to extract it from its seat
d) Unscrew the six screws of the damaged LEDs luminous source, replace it and restore the initial condition
e) Mount the top cover with reverse procedure
f) Turn the main switch to ON position, turn On the CCR and check the correct operation of the sign.

5.3 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); in any case turn the main switch to OFF position
b) Remove the top cover by loosening the relevant four screws
c) Check the wiring, the connection to the terminal strips and the continuity
d) If necessary replace the power supply board
e) Mount the top 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 Troubleshooting

Problem	Problem cause	Solution
The sign is totally or partially not lighted	Defective LED(s) on luminous source(s)	Replace the LED(s) luminous source(s)
	Defective isolating transformer	Replace isolating transformer
	Defective power supply board	Replace power supply board
	The main switch is left to OFF position	Turn the switch to ON position
	Bad connection	Check wiring

6 LIST OF RECOMMENDED SPARE PARTS

CODE	DESCRIPTION
RISLG0001	F189 LEDs luminous source board
RISLG0002	F209 power supply board
RISLG0025	Breakable coupling (x4)
RISLG0006	Cable lead with plug, ON-OFF switch with rubber cap