

INSTALLATION GUIDE and QUICK START



EU Declaration of Conformity (DoC)

According to Directive 2014/53/UE RED



We :
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Declare under our sole responsibility that the product:
ET10000X, ET8000X/10, ET7000X/10, ET5000X/10, ET4000X/10, ET3500X/10, ET3000X/10, ET2500X/10,
ET2000X/10, ET1500X/10, ET1000X/10
E10000X, E8000X/10, E7000X/10, E5000X/10, E4000X/10, E3500X/10, E3000X/10, E2500X/10, E2000X/10,
E1500X/10, E1000X/10

With intended purpose:
VHF FM broadcast transmitters and amplifiers (frequency range 87.5 – 108MHz)

And manufactured by:
ELENOS s.r.l.

Is in conformity with the relevant union harmonisation legislation:
Directive 2014/53
(Conformity assessment Annex III, module B EU-type examination)

The following standards and technical specifications have been applied:
EN 60215:1989 + A1:1992 + A2:1994 Safety requirements for radio transmitting equipment
DRAFT ETSI EN 301 489-53 V1.1.0 (2017-03) Electro Magnetic Compatibility (EMC) standard for radio equipment and services;
DRAFT ETSI EN 301 489-1 V2.2.0 (2017-03) Electro Magnetic Compatibility (EMC) standard for radio equipment and services;
ETSI EN 302 018-2 V2.1.1 (2017-04) Transmitting equipment for the Frequency Modulated (FM) sound broadcasting service;

Supplementary information:

According to the Directive 2014/53/EU, the Notified Body NEMKO S.p.A. (2051) performed the assessment of the technical Documentation and Issued the EU Type Examination Certificate n. 2051-RED-18.....
Place and Date: Ferrara June 08, 2018

Responsible person : Leonardo Busi (Amministratore unico)
e-mail: leonardobusi@elenos.com

Signature:

Exposure evaluation

Exposure assessment requires the identification of electric field values in places where the presence of people may occur.

The field values must refer to the type of stay and the exposed subjects, according to the provisions of current legislation.

The identification of the electric field values can be carried out in various ways, depending on the need for precision and the fact that one intends to perform a prediction, or a subsequent verification.

We intend to provide below elements that may be useful in the evaluation and measurements of electromagnetic fields, with particular reference to sound and television broadcasting systems.

Calculation in free space

A first approximate evaluation can be made by placing the following hypotheses:

- i) source located in far field
- ii) absence of obstacles

The first hypothesis (i) must be previously verified by applying the equation:

$$1. \quad d \geq \frac{D^2}{\lambda}$$

where “d” represents the distance between source and evaluation point, “D” the physical dimension of the source and “λ” the wavelength of the field.

Under these hypotheses, the electric field at distance “d” from the source is:

$$2. \quad E = \sqrt{P_r \eta} = \sqrt{\frac{P_t}{4\pi d^2} \eta}$$

where “Pt” is the power transmitted (ERP) in the direction of the evaluation point.

Introducing the polarization of the electric field, impressed by the particular type of antenna used in transmission, the relation 2 must be applied to the three components Ex, Ey, Ez of the field; the expression of the total electric field becomes:

$$3. \quad E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

In the specific case of broadcasting plants for sound and television broadcasting, the following recurrent characteristics can be found:

- a. the source is not isotropic, so the ERP should be calculated in the direction of the evaluation point
- b. in the case in which the worst case of exposure is concerned, it can be applied the expression 2 in which the maximum transmitted ERP power is considered, regardless of the direction, ignoring the radiation characteristics of the antenna system in the horizontal and vertical plane
- c. the polarization of the field is almost always vertical in the case of systems for sound broadcasting, while it can be vertical, horizontal or mixed in the case of television broadcasting. In all cases, the decomposition of the power transmitted in the various polarization components and the subsequent recombination by means of formula 3 allows, firstly, to disregard the polarization of the field and to directly apply the expression 2
- d. in the case of multiple sources, the total expression of the field must provide for the individual contributions of all sources

$$4. \quad E_{totN} = \sqrt{E_{tot1}^2 + E_{tot2}^2 + \dots + E_{toti}^2 + \dots + E_{totn}^2}$$

The following table gives an indication of the first approximation of the field value as a function of the power (in W) transmitted by the source and distance (in meters); the values shown (all in V/m) represent the worst case.

Electric field values (V/m) as a function of power (W) and distance.

Power transmitted by the source (ERP) in Watts	Distance from the source of the evaluation point									
	30m 98.4ft	50m 164ft	100m 328ft	300m 984ft	500m 1,640ft	1,000m 3,280ft	3,000m 9,840ft 1.864mi	5,000m 16,400ft 3.107mi	10,000m 32,800ft 6.214mi	
1	0.18	0.11	0.05	0.02	0.01	--	--	--	--	
30	1.00	0.60	0.30	0.10	0.06	0.03	--	--	--	
50	1.29	0.77	0.39	0.13	0.08	0.04	0.01	--	--	
100	1.82	1.09	0.55	0.18	0.11	0.05	0.02	0.01	--	
300	3.16	1.90	0.95	0.32	0.19	0.09	0.03	0.02	0.01	
500	4.08	2.45	1.22	0.41	0.24	0.12	0.04	0.02	0.01	
1,000 (1k)	5.77	3.46	1.73	0.58	0.35	0.17	0.06	0.03	0.02	
3,000 (3k)	10.00	6.00	3.00	1.00	0.60	0.30	0.10	0.06	0.03	
5,000 (5k)	12.91	7.74	3.87	1.29	0.77	0.39	0.13	0.08	0.04	
10,000 (10k)	18.25	10.95	5.48	1.82	1.09	0.55	0.18	0.11	0.05	
30,000 (30k)	31.62	18.97	9.49	3.16	1.90	0.95	0.32	0.19	0.09	
50,000 (50k)	40.82	24.49	12.25	4.08	2.45	1.22	0.41	0.24	0.12	
100,000 (100k)	57.73	34.64	17.32	5.77	3.46	1.73	0.58	0.34	0.17	
300,000 (300k)	100.00	60.00	30.00	10.00	6.00	3.00	1.00	0.60	0.30	
500,000 (500k)	129.10	77.46	38.73	12.91	7.74	3.87	1.29	0.77	0.39	
1,000,000 (1M)	182.57	109.54	54.77	18.26	10.95	5.48	1.82	1.09	0.55	

Note: field values above 6V/m are highlighted in yellow; those ones that exceed 20V/m are highlighted in red.

Contacts

We kindly remember you to always register your product on:
<http://www.elenos.com/product-registration/>
For further informations and assistance please contact the technical assistance service

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Fax: +39 0532 829177
E-mail: info@elenos.com
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33122 Miami (Florida)
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It is kindly requested to fill in the RMA form:
(ITA) <http://www.elenos.com/it/elenos-rma/> or
(ENG) <http://www.elenos.com/elenos-rma/>
and to always communicate the device's S/N (available on the identification label).

INTENDED USE: Only professional, telecommunication sites.

USER: Only qualified personnel.

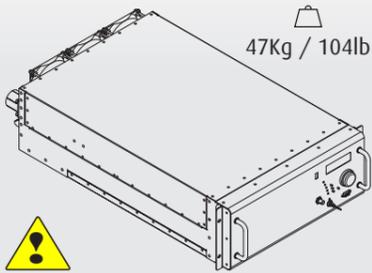
LICENSE: Needed (see national regulations for installation, requirements use and compatibility with environment and population. For transport, use only original packaging).

CURRENT CONSUMPTION: Up to 24A per phase! See national regulation for minimum wires section. Recommended: not less than 4sqmm / 11AWG.



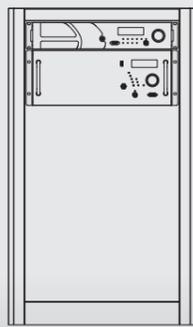
Handle with care, wearing individual equipment for safety against any injury due to the weight and dimensions of the product.

Limitations of use



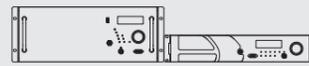
To extracting the equipment from the packaging and placing it into a rack (or any other housing) two people are recommended.

Installing the Tx into a rack



Be sure that there is enough free space in the rack and the ventilation system is able to extract exhausted air up to 1000cm/h (35,315cft/h). Verify that rack and brackets can bear the weight of the equipment. Place the equipment and connect them according to the instructions, then attach the power cord to the mains and proceed to setting as shown in the following steps.

Installing the Tx without a rack



The transmitter can also operate without a standard rack. In this case it is extremely important to make the electrical connections in compliance with the current regulations to prevent any risk of shock. Make sure that the air grids can not be obstructed.

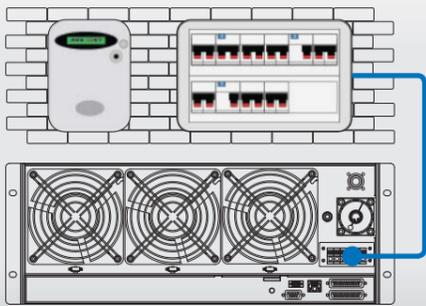
WARNING

After installation, perform all the checks and settings listed below.

Maintenance as prescribed in the equipment specifications.

An extracting air flow of at least 1000cm/h (35,315cft/h) is always required.

Unpacking and Positioning



Electrical panel features



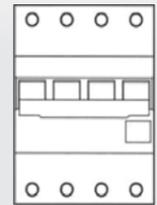
Dimensioning of breakers

The apparatus is not provided of electrical breaker neither overload protection.

All the devices needed for the electrical safety of the apparatus and for the electrical disconnections from the mains have to be present in the electrical mains network to which the apparatus is connected.

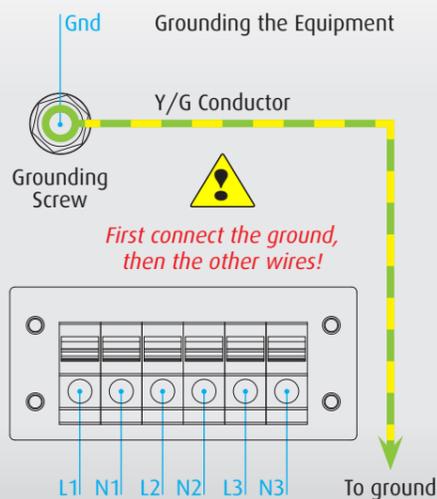
For the sizing of the devices, the laws and regulations in force has to be taken in account and the maximum absorptions declared in the proper sections of the technical documentation of the apparatus.

A fast response type of the protection devices is recommended (*).



(* Example: C-curve breakers)

Protections



Grounding the Equipment

Y/G Conductor

Grounding Screw

First connect the ground, then the other wires!

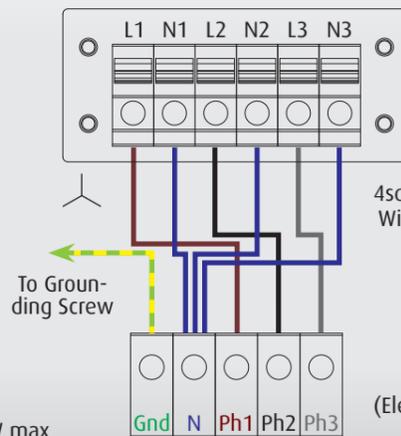
To ground

Threephase WYE Δ
L1 = AC Phase1 (1st PSU)
N1 = Neutral (1st PSU)
L2 = AC Phase2 (2nd PSU)
N2 = Neutral (2nd PSU)
L3 = AC Phase2 (3rd PSU)
N3 = Neutral (3rd PSU)

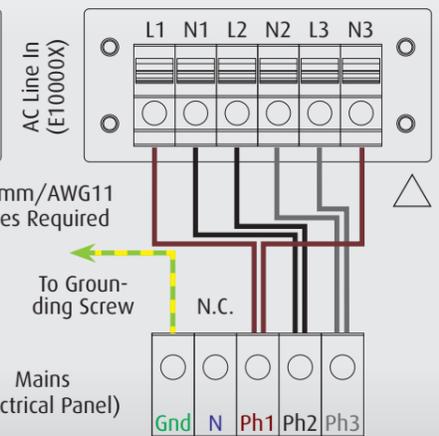
Threephase Delta Δ
L1 = AC Phase1 (1st PSU)
N1 = AC Phase2 (1st PSU)
L2 = AC Phase2 (2nd PSU)
N2 = AC Phase3 (2nd PSU)
L3 = AC Phase3 (3rd PSU)
N3 = AC Phase1 (3rd PSU)

Power Consumption: 14kW typ. - 15kW max

Threephase WYE (400V - 50/60Hz)



Threephase Delta (208V - 50/60Hz)



4sqmm/AWG11 Wires Required

Mains (Electrical Panel)

Mains Connection

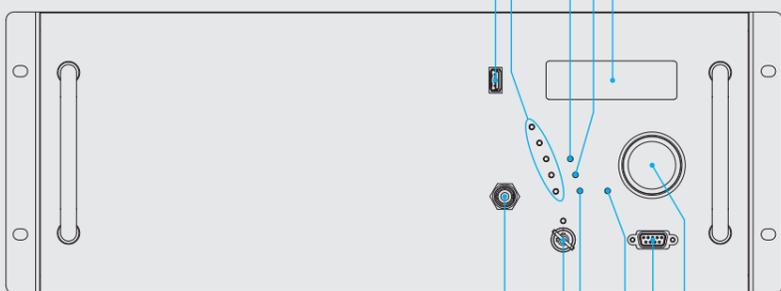
- 1 USB Port (Opt.)
- 2 Status LEDs
- 3 StandBy Button

- 4 OnAir Button
- 5 Graphic Display
- 6 RF Monitor

- 7 Local/Remote Switchkey
- 8 Life Extender Button
- 9 Escape Button

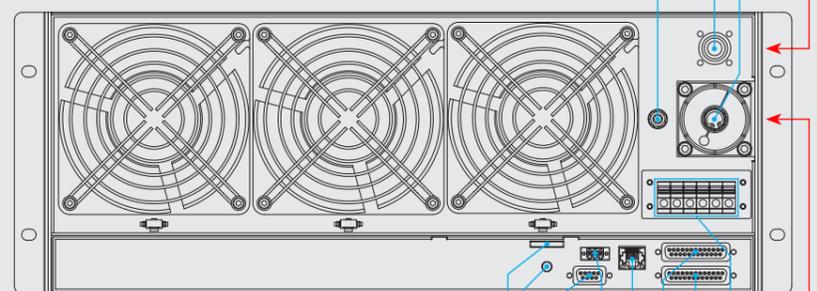
- 20 Grounding Screw
- 21 RF In N connector
- 22 RF Out 1+5/8" Line

- 23 Modem Card (Opt.)
- 24 Modem SMA Ant. (Opt.)
- 25 EIA485



FRONT PANEL

- 10 EIA485/Telemetry
- 11 Encoder/Selector



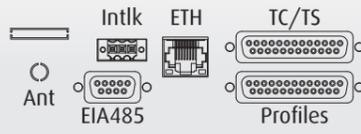
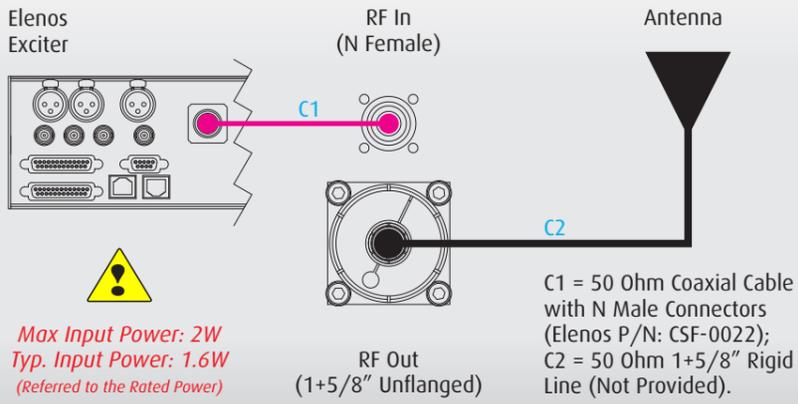
REAR PANEL

- 26 Interlock
- 27 Ethernet Port
- 28 TC/TS
- 29 Profiles
- 30 AC Line Input

Max output 10kW - 50 Ohm

Overview

RF Connections



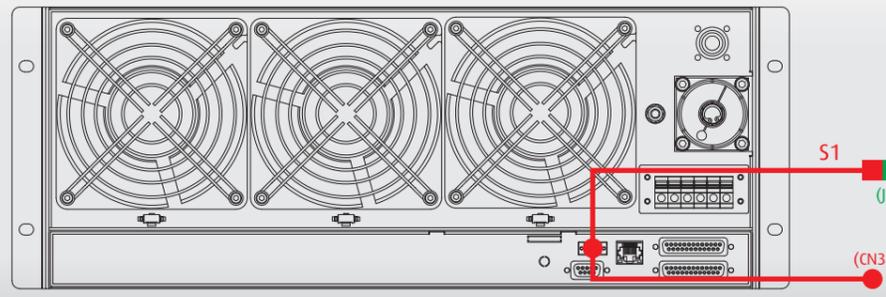
Pin-out Assignment of I/O, EIA485 and Interlock Connectors.

Interlock Connector				EIA485 (DB9)				Ethernet Connector			
Pin	Function	Type	Note	Pin	Function	Type	Note	Pin	Function	Type	Note
1	Common	Gnd		1	Tx+	EIA485/422		1	TD+	5	TCT
2	Float Intlk 1			2	Tx-	EIA485/422		2	TD-	6	RD-
3	Float Intlk 2			3	Rx+	EIA485/422		3	RD+	8	RCT
				4	Rx-	EIA485/422					
				5	Common	Gnd (frame)					
				6	Common	Gnd (frame)					
				7	Common	Gnd (frame)					
				8	Common	Gnd (frame)					
				9	Common	Gnd (frame)					

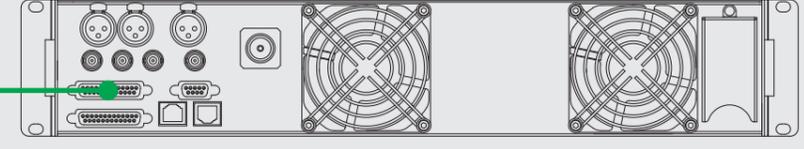
TC/TS Connector (DB25)				Profiles Connector (DB25)			
Pin	Function	Type	Note	Pin	Function	Type	Note
1	Interlock	TC	Level	1	Channel 1	TC	Pulse
2	Tx On	TC	Pulse	2	Channel 3	TC	Pulse
3	Tx Off	TC	Pulse	3	Channel 5	TC	Pulse
4	Ref. Power	DTM	Voltage	4	Spare	TC	Pulse
5	Common	Gnd		5	Common	Gnd	
6	n.c.			6	Common	Gnd	
7	Exc. Enable	TC	Pulse	7	n.c.		
8	n.c.			8	Common	Gnd	
9	Common	Gnd		9	Common	Gnd	
10	V PA	DTM	Voltage	10	Common	Gnd	
11	Mains Fault	IS	Level	11	Channel 5	IS	Level
12	Tx On	IS	Level	12	Channel 3	IS	Level
13	Warning	IS	Level	13	Channel 1	IS	Level
14	Alarm Reset	TC	Pulse	14	Channel 2	TC	Pulse
15	Low Power	TC	Pulse	15	Channel 4	TC	Pulse
16	Rsr Power	TC	Pulse	16	Channel 6	TC	Pulse
17	Fwd Power	DTM	Voltage	17	n.c.		
18	Common	Gnd		18	Common	Gnd	
19	n.c.			19	Common	Gnd	
20	n.c.			20	Common	Gnd	
21	Common	Gnd		21	Common	Gnd	
22	V IPA	DTM	Voltage	22	Common	Gnd	
23	Audio Fault	IS	Level	23	Channel 6	IS	Level
24	Fault	IS	Level	24	Channel 4	IS	Level
25	Remote	IS	Level	25	Channel 2	IS	Level

Pin-out Assignment

Signal Connections



Elenos Exciter *For non-Elenos exciters a generic cable is available. The pin-out on exciter must be checked before its insertion.*

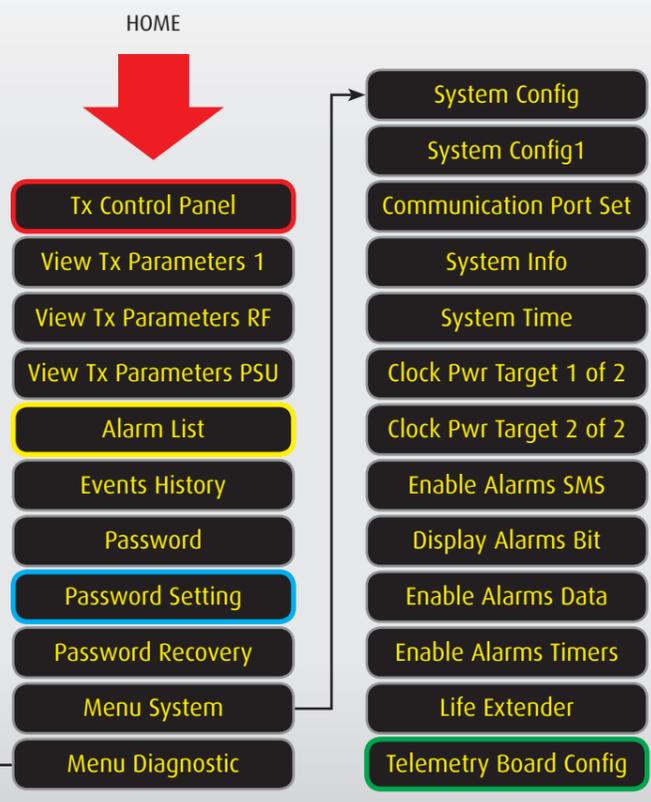


S1 = Interlock and Exciter Enable (Elenos P/N: CAB0864-0). **CN3 = Interlock**
S2 = Interlock and Exciter Test (Elenos P/N: CAB0588-0). Connect S1 to JP1 of S2

The menu shown here is available with the equipment in Local Mode.



Turn the encoder to scroll through the menu and press to enter the selected item. Push the encoder a long time (more than a second) to return to the main screen.



The red arrow shows the screen that appears when the key switch is turned to "LOCAL" and the blue LED is lit.

Some of the main menu items are access to submenus.

See the pictures on the right for more details about.

NOTE: The OnAir/StandBy function present in the mask "Tx Control Panel" is also directly available via buttons on front panel when the equipment works in Local Mode.

The equipment may be controlled via web. To ensure that it can work correctly, please check its IP address in the "Telemetry board config" mask. Factory preset is the value in the label placed on the case.



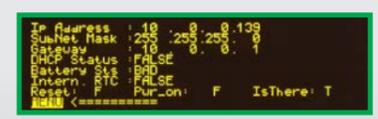
Chose **Tx Control Panel** to setting the power target, reset the alarms and switch on/off the RF amp section.



Chose **Alarm List** to checking if any alarm is active or occurred. Always verify this before leaving.



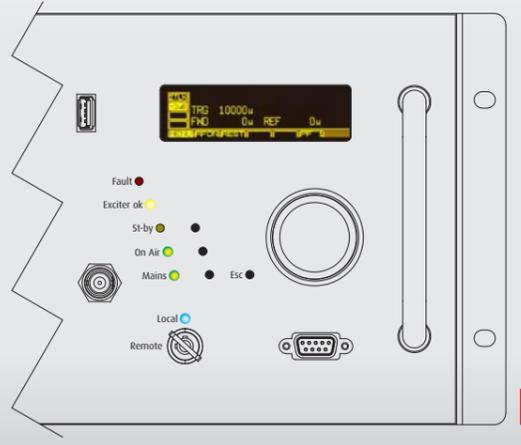
Chose **Password Setting** to set the new password. It's very important to prevent use by unauthorized staff.



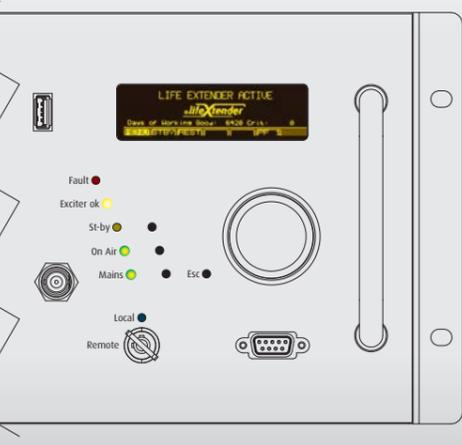
Chose **Telemetry Board Config** to verify the IP address if the equipment is connected to a LAN.

Menu Tree and Most Important Screens

Example of Display and LEDs Status during the setting



Display and LEDs Status in Correct Working Mode



Interface

- Encoder
- Buttons
- Key Switch
- Display
- Fault (R)
- Exciter Ok (Y)
- Stand By (Y)
- On Air LED (G)
- Mains LED (G)
- Local LED (B)

After performed the steps listed here, and set the exciter according to what is stated in its manual, check that the equipment looks as following:

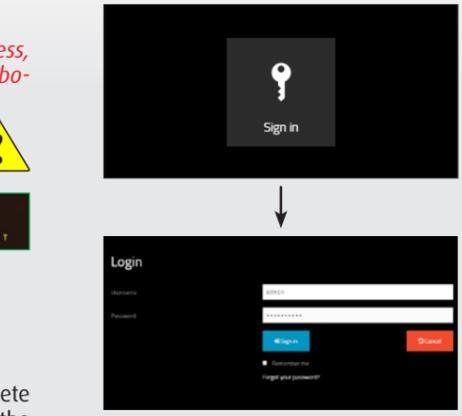
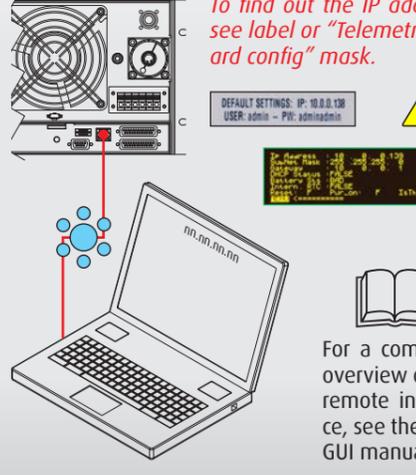
Status LEDs

- Inactive
- Inactive
- "Remote" Position
- As Shown in Picture
- Off
- Lit (not blinking)
- Off
- Lit (not blinking)
- Lit (not blinking)
- Off

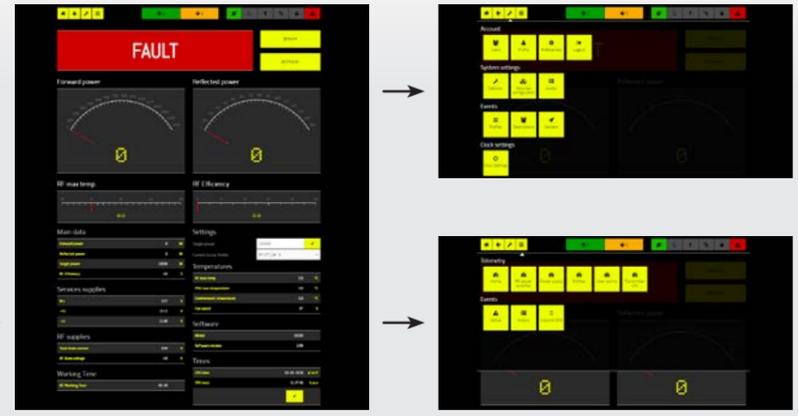
Any other configuration of Display and LEDs means that the amplifier doesn't correctly work, and it'll be necessary to check the system to remove the failure.

Correct Working

Connect PC to the LAN and start a Browser



Press the "Sign In" button and enter Username e Password. Default are: Username = "admin" and Password = "adminadmin". The main window shows the most important parameters, such as direct and reflected power, temperatures, efficiency, current and so on. The most common operation are available with "Settings" and "Menu" buttons (see last two pictures).



Remote Control (WEB)