

E10000X

FM SOLID STATE AMPLIFIER WITH WEB INTERFACE

Rev. 02- 18/05/2018
Cod. MAN1043UUK

ELENOS
World Broadcast Experience

USER MANUAL



World Broadcast Experience

Operative Office: via G. Amendola 9,
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C.C.I.A.A. 101 216, C.Fisc. e P.IVA IT00415540384



UNI EN ISO 9001:2008 certified company
Certificate No.102222A

We kindly remind you to register your product on <http://www.elenos.com/product-registration/>

For further information and help please contact the Customer Service:

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We kindly recommend you to fill in the RMA module (ITA <http://www.elenos.com/it/elenos-rma/> o ENG <http://www.elenos.com/elenos-rma/>) and to report the apparatus serial number (available on identification label).



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EU Declaration of Conformity (DoC)

According to Directive 2014/53/UE RED



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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-182602

Place and Date: Ferrara June 27, 2018

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Signature:

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Revision

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01	07/09/2017	Second release
02	18/05/2018	Third release

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1 Informative letter

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Dear Customer,

Thank you for choosing an Elenos product.

ELENOS s.r.l. produces solid state VHF/FM sound broadcasting transmitters ranging from minimum power of 10W to maximum power of 30kW, exchange units, remote control units, etc.

The equipment has been produced to ensure constant performance over time as long as periodical controls and essential maintenance works are carried out as required.

However, before attempting any kind of operation an accurate reading of this manual and of all relevant documentation attached is recommended to the user.

ELENOS s.r.l Management

AVVISO IMPORTANTE

Il presente apparato è utilizzabile solo da
titolari di Concessioni Governative
e/o Autorizzazioni Ministeriali

Elenos Srl

WARNING

The use of this device
is subject
to National Regulations.

Elenos Srl

1.1 Personnel in charge

This manual has to be intended as an integral part constituting the equipment, and **must be readily at hand to all the personnel responsible for its installation, use and maintenance.**

The installation, use and maintenance of the device concerned in this case must be permitted exclusively to properly trained and qualified personnel, who must have received the appropriate training on the use of the equipment and who are aware of every possible risk occurring when operating with devices connected to dangerous voltage electrical networks, operating with high internal voltages and generating high radiofrequency output power.

This manual does not claim to be a comprehensive collection of safety standards required for the use of the equipment.

However, **the user and the maintenance technician are required to know the content of these manual** and of all its connected attachments.

This equipment must be used only by holders of governmental licenses and/or ministerial authorizations only.

1.2 Warranty

The products sold to the Customer by Elenos Srl are covered by a 24-month warranty starting from the FOB date of shipment from Elenos Srl site; this warranty is granted both to the Customer and to any other possible subsequent purchaser of the product and covers any kind of fault caused by defective components of the product itself, as long as it is maintained in an excellent controlled condition. It is essential to the effective coverage of the warranty issued by Elenos Srl the registration of the product by the Customer through the web site www.elenos.com/product-registration/.

In case the Customer detects a failure under warranty, he must give immediate written notice to Elenos Srl and send the product at his own expense to the Elenos Srl headquarter or to the nearest qualified Elenos Srl centre; in case of shipment to its headquarter, the latter agrees to replace within the next 45 days for free the defective component; in case of shipment to a qualified service Elenos Srl, the latter shall refund the cost of the intervention on the faulty component on the basis of a fixed and agreed tariff in advance between the customer and Elenos Srl. If the product purchased by the customer forms part of the so-called products "Reduced mobility" (weight higher of Kg. 50), the maintenance or replacement of the defective component will be in the place where the equipment is located and will be done by the technicians of the closer technical center qualified by Elenos Srl. All this after the evaluation by a technician designated from Elenos on the presence of a case of exclusion from the guarantee.

For details, please consult the Terms and Conditions documents.

1.3 Exclusion

The customer expressly accepts the exclusion from the terms of Elenos Srl warranty's coverage all damages caused by electrical discharges (lighting) and incorrect power supply voltages, as well as by the Customer's negligence, carelessness or unskillfulness, or by unauthorized staff maintenance operations or by replacements of original parts of the equipment with new systems or spare parts not directly supplied by Elenos Srl or by its authorized distributors, or by a use of the product other than those intended for the same product, or from any action or fact attributed to third parties who have access to the product for the same Customer's approval or even without the Customer being aware thereof after that the latter has received the delivery of the products.

The warranty expressly excludes coverage for damages caused by fires, floods, or other natural disasters, wars, revolts, as well as in all cases the equipment becomes the material object of a crime.

The warranty is also expressly excluding coverage for damages occurred after the delivery of the equipment by Elenos Srl to the carrier, being the Customer responsible for any risk related to the transport, since its time-frames, costs and methods are chosen and covered by the same Customer.

1.4 Exemption from liability

The customer is responsible for installation, maintenance and control products, as well as verification that the climatic and environmental conditions, in which the products are placed, are suitable for their use and do not affect the operation. All in observance of Elenos Srl's manual attached to the product purchased, that must be the reference for the customer to require validly and effectively the replacement or repair under warranty. Conversely, if the customer fails to observe the precepts contained in the instruction manual, as well as the minimum care required to the normal user of such equipment, the guarantee granted by Elenos Srl will not operate and the customer himself will totally assume the risk of any damages occurred to the products.

Elenos Srl reserves the right to make possible changes to parts, details and accessories that may be considered opportune to be done for the improvement of the equipment, or to meet the needs connected to constructive and commercial requirements, in any moment, without prior notice of it and without committing to upgrade immediately this manual.

For details, please consult the Terms and Conditions documents.

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2 Identification

2 Identification 13

2.1 Labels..... 14

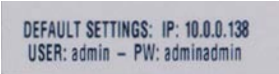
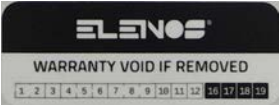
2.1.1 IDENTIFICATION LABEL 14

2.1.2 ASSISTANCE LABEL 14

2.1.3 WARRANTY LABEL..... 15

2.1.4 SERIAL NUMBER LABEL 15

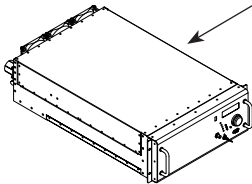
2.1.5 IP ADDRESS LABEL 15



2.1 Labels

2.1.1 IDENTIFICATION LABEL

It shows the key features equipment, such as: manufacturing company, product model, power supply type and power consumption. Warning: do not ever remove this label.

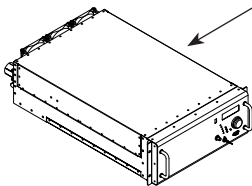


On the right side



2.1.2 ASSISTANCE LABEL

It shows the main Elenos customer assistance contacts.



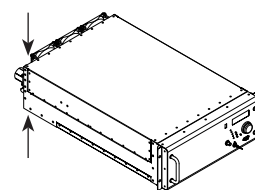
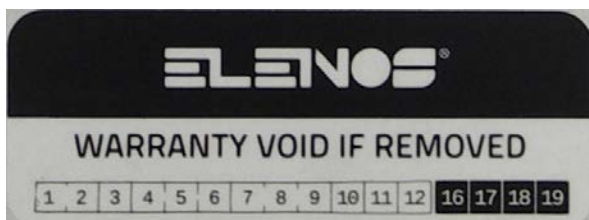
On the right side



Note: this label may not be present.

2.1.3 WARRANTY LABEL

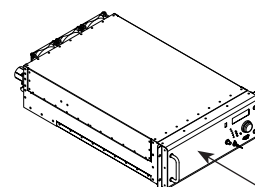
Unauthorized removal or tampering of this seal (positioned over the screws) will make void the warranty.



On the screws of the covers

2.1.4 SERIAL NUMBER LABEL

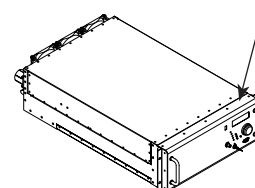
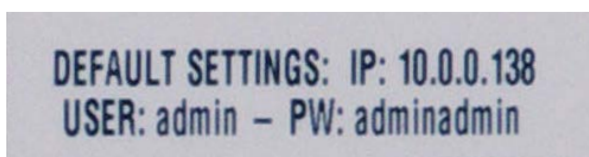
It shows the serial number of the equipment in numeric and barcode format. In addition, a qr-code for the registration is displayed.



On the front panel

2.1.5 IP ADDRESS LABEL

This label shows the IP address of the device (the value shown here is only an example). It also contains the user ID and password factory presetted. It's recommend to access the "Telemetry board config" screen to verify that the IP address is correct.



On the top of the panel

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3 Safety

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All ELENOS s.r.l products are compliant with the safety standards required for this type of equipment.



3.1 Safety precautions

Users must also respect the safety precautions listed below:

- The electrical configuration must not be modified. Upon receipt of the equipment, it's essential to check if the mains is compatible with the order requirements. In case of non-compliance, please report it immediately to Elenos Srl.
- Protective devices must not be disconnected (with exception of their replacement), altered or modified without authorization.
- Check all safety equipments (e.g. block varistors, current limiters, circuit breakers, etc.) periodically and after a fault occurrence.
- To ensure the staff safety and protect the equipment against damages, it's absolutely forbidden to use it while covers and/or protection panels aren't completely installed. In addition, the grounding connection must always be of extremely high quality and in accordance with regulations in force. It is also forbidden to disconnect and/or alter the equipment's protection systems.
- Before starting any operation, the equipment must be disconnected from the mains. Disconnection must be verified via visual inspection.
- The equipment must be powered exclusively by correct voltage. An incorrect power voltage may damage seriously the equipment and the staff who is working on it. The same information is shown on the product's nameplate, which is generally placed on the housing. Never remove the nameplate, even if the equipment is resold.
- The equipment must be powered only by electrical systems which are compliant with the regulations in force.
- Further informations may be shown in specific labels placed on the equipment. They are about safety warnings to follow by anyone works on it. The lack of compliance with the rules here described exempts the manufacturer from any responsibility for any damages or accidents that may occur to staff or owners and puts all responsibility to the user himself.
- To ensure the equipment correct working, do not block the fan grills. Do not place the unit near heat sources, flammable products, or in closed rooms with no ventilation.
- It is necessary to respect the general rules and fire fighting for the site that houses the equipment.
- Avoid any liquid contamination. Always disconnect the mains before making any cleaning. Don't use liquid or spray cleaners.
- Some components contain TOXIC SUBSTANCES, such as BERYLLIUM OXIDE. Please be aware that some countries may apply rules for storing and disposing of hazardous materials.
- Following a visual check, if some component looks damaged, broken or detached, take the utmost care during the equipment manipulation by hands or other means.

- Be sure that all people who use or maintain transmitters, in which one or more parts are under dangerous voltage, are able to perform artificial respiration and heart massage. All staff must be trained on how to provide medical first aid in case of emergency. It's strongly recommended to hang, in a visible place, an information poster with clear instructions on first aid to save the people injured in an accident at work and how to provide first aid kits the rooms where electrical devices are installed. It's also recommended to prepare an action plan in order to ensure fast access to the service of a public or private emergency body, so that it's easily available for all the people within the site.
- At the output connector (antenna connector) is present a high power Radio Frequency signal, up to 10 kW. It's necessary to avoid any loss of Radiofrequency power.
- A high power is applied to the transmitting antenna. The operators have to avoid to work close to the transmitting antenna, in order to avoid the exposure to a high level field. The safe levels of the field are regulated by the local laws, that cannot be disregarded.
- A high level of electric field may be generated by the transmitting antenna in the nearby area, up to a distance depending on the radiation characteristics of the antenna and on the characteristics of the soil. Local regulations regarding the exposure of the population to the electromagnetic fields has to be respected.
- Internal circuits are under high frequency, high voltage during operation. Any possibility to put in service the apparatus with internal circuits not completely covered, shielded, closed with the original panels/parts, has to be avoided.

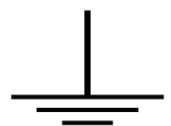
Hazardous voltage



The equipment is directly connected to the "building installation"



There is an interposed structure between the equipment and the "building connection"





3.2 First aid

This paragraph does NOT represent a complete guide on first aid procedures, but should be understood rather as a brief reference summary. It must be made an urgent duty for all staff who work with the equipment to provide appropriate first aid procedures, in order to prevent avoidable deaths.

3.2.1 Treatment of electrical burns

3.2.1.1 Extensive burns and skin cuts

- Cover the burned area with a clean sheet or cloth.
- Don't break blisters, don't remove the tissue, don't remove particles adhered to clothing, or apply any ointment.
- Treat the victim in according to the kind of shock suffered.
- Arrange the transportation to an hospital as quickly as possible.
- If arms and legs are injured, keep them raised.

WARNING:

If medical help is not available within one hour and the victim is conscious without gagging, give to drink salted water made of 1 teaspoon of salt and half a teaspoon of baking soda for each 250 ml warm water. Let the victim slowly sip this solution, for about four times (half a glass every 15 minutes).

Stop the operation if gagging occur. Avoid alcoholic beverages.

3.2.1.2 Less severe burns (1st and 2nd degree)

- On the burns, apply cool (not ice-cold) compress of gauze using the cleanest available cloth.
- Do not break blisters, don't remove tissue, don't remove particles adhered to clothing, or apply any ointment.
- If necessary, put on clean and dry clothes.
- Treat the victim in according to the kind of shock suffered.
- Arrange to transportation to an hospital as quickly as possible.
- If arms and legs are injured, keep them raised.

3.2.2 Treatment of electric shocks

3.2.2.1 If the victim is unconscious

Place him flat on his back on a hard surface

A) Airways (pict. a):

- if the victim is unconscious, open his airways
- push the victim's forehead backwards
- if necessary, open the victim's mouth
- check the victim's breathing

B) Artificial respiration (pict. b):

- if the victim cannot breathe, perform the artificial respiration
- incline the victim's head backwards
- close the victim's nostrils
- place your mouth on the victim's mouth
- perform 4 quick blows
- remember to start breathing immediately

C) Circulation (pict. c1):

- check the victim's pulse (pict. c1)
- if absent, start cardiac massage (pict. c2)
- compress the chest every 1.5 - 2 seconds
- if only one rescuer is present, perform 15 compressions in approximately 80 seconds, + 2 quick blows
- if there are two rescuers, perform 5 compressions in approximately 60 seconds, + 1 quick blow (pict. c3)

WARNING: Do not interrupt the rhythm of compressions when the second rescuer is performing artificial respiration.

3.2.2.2 If the victim is responsive

- cover the victim with a blanket
- keep him as calm as possible
- loosen his clothing and place him in a reclining position

WARNING: CALL FOR MEDICAL ASSISTANCE AS SOON AS POSSIBLE ALWAYS

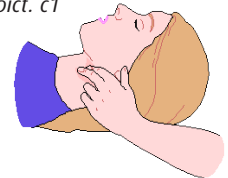
pict. a



pict. b



pict. c1



pict. c2



pict. c3



3.3 Workplace characteristics

3.3.1 Room characteristics

In order to work freely on the equipment and to be able to perform the relative installation or maintenance operations, it is necessary to keep a minimum distance from the walls on all sides of the machine.

The room must be equipped with an appropriate system of clean and dust-filtered air ventilation with a flow rate suitable for the characteristics of the equipment operating in the room itself.

The exhaust air discharged from the apparatus must be conveyed directly outside. If the length or size of the air duct is likely to introduce a significant loss of air pressure it's necessary to add an extraction device. The air duct outlet must be equipped with a protective device against the intrusion of insects or other animals. In additions, adequate precautionary measures should be applied against intrusion of liquids or other substances.

The equipment can operate properly if the temperature ranges si from -5°C to +45°C, with 95% RH non-condensing at +40°C.

3.3.2 Electrical system features

The mains installation must be set in accordance with the rules in force. The power supply network must allow an adequate power provision according to the rules in force in the country of installation about quality of the electrical energy supply service.

It's strongly recommended to use a transformer or network separator and a reduction network for discharging high voltage.

Install a protected overload switch (circuit breaker or fuse) with proper electrical characteristics (breaking capacity and current value) according to the absorption of the equipment model.

Use cables of adequate sizes in respect to the rated current absorbed.

Grounding must be performed according to the rules in force. Special care must be taken for the grounding of the antenna system since it's exposed to electrical atmospheric events. Never forget that, despite the grounding of the equipment frame and the whole antenna system, it's always dangerous to operate on the equipment in case of bad weather with atmospheric discharge. In fact, in the event of high energy discharge (flash), the equipment frame can instantly reach very dangerous voltage levels, due to the grounding connection inductance. For this reason, the equipment should be installed in rooms in which the staff can remain only for the time necessary for checks and repairs.

3.4 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.

3.4.1 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.
$$d \geq \frac{D^2}{\lambda}$$

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

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 E_x , E_y , E_z of the field; the expression of the total electric field becomes:

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

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 (see point)

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

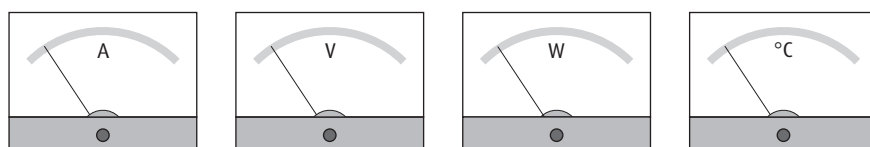
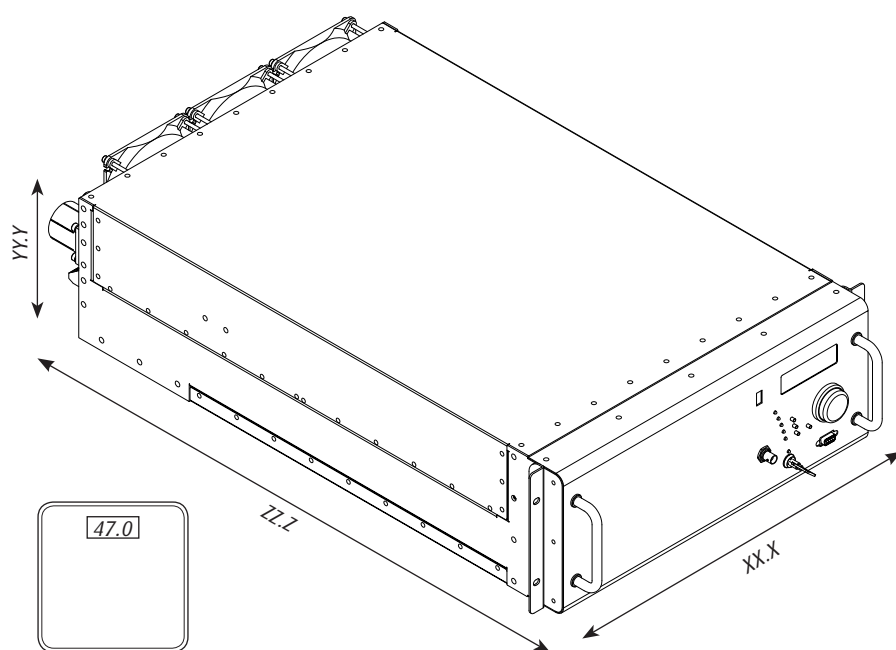
Power transmitted by the source (ERP) in Watts	Distance from the source of the evaluation point								
	30m 98.4ft	50m 164ft	100m 328ft	300m 984ft	500m 1,640ft	1,000m 3,280ft	3,000m 9,840ft 1.864mi	5,000m 16,400ft 3.107mi	10,000m 32,800ft 6.214mi
1	0.18	0.11	0.05	0.02	0.01	--	--	--	--
30	1.00	0.60	0.30	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.

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4 Presentation

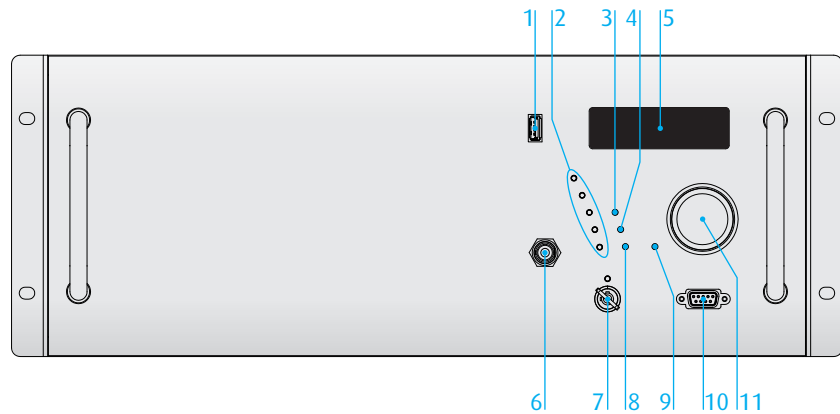
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4.1 Connections

4.1.1 Overview

4.1.1.1 Connections and controls - front panel

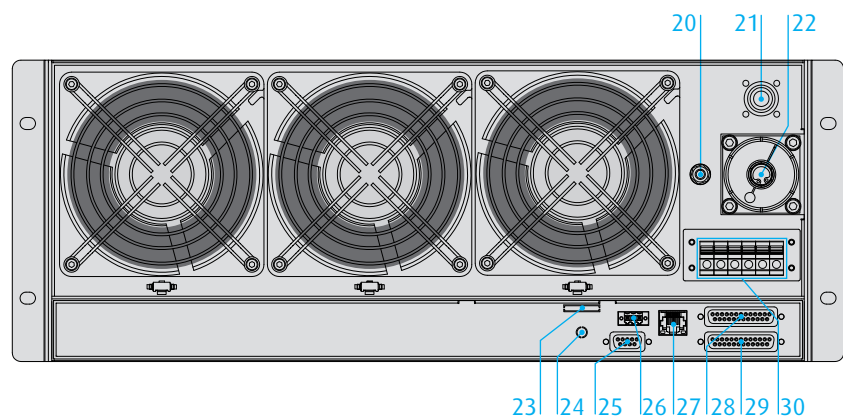


1 USB Port (Opt.)
2 Status LEDs
3 StandBy Button
4 OnAir Button

5 Graphic Display
6 RF Monitor
7 Local/Remote Switchkey
8 Life Extender Button

9 Escape Button
10 EIA485/Telemetry
11 Encoder/Selector

4.1.1.2 Connections - rear panel



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
26 Interlock
27 Ethernet Port

28 TC/TS
29 Profiles
30 AC Line Input

4.1.1.3 Connectors Pinout

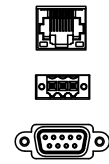
WARNING: the frontal USB port (optional) has the standard pinout but is designed exclusively for connecting portable devices such as pen drives. Don't connect hard disk drives. Maximum load: 200mA.



Interlock Connector			
Pin	Function	Type	Note
1	Common	Gnd	//
2	Float Intlk 1	//	//
3	Float Intlk 2	//	//

Ethernet Connector			
Pin	Function	Pin	Function
1	TD+	5	TCT
2	TD-	6	RD-
3	RD+	7	n.c.
4	n.c.	8	RCT

EIA485 (DB9)		
Pin	Function	Note
1	Tx+	EIA485/422
2	Tx-	EIA485/422
3	Rx+	EIA485/422
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)					
Pin	Function	Type	Note	Sym	Comment
1	Interlock	TC	Level		Status command. Active when grounded.
2	Tx On	TC	Pulse (500ms)		Pulse command. Active when grounded.
3	Tx Off	TC	Pulse (500ms)		Pulse command. Active when grounded.
4	Ref. Power	DTM	Voltage		0...4V
5	Common	Gnd	//	//	Connected to device frame.
6	n.c.	//	//	//	//
7	Exc. Enable	TC	Level		Status command. Active when grounded.
8	n.c.	//	//	//	//
9	Common	Gnd	//	//	Connected to device frame.
10	I IPA	DTM	Voltage		0...4V
11	Mains Fault	TS	Level (o.c.)		Externally powered. Open = active fault.
12	Tx On	TS	Level (o.c.)		Externally powered. Closed = Tx On
13	Warning	TS	Level (o.c.)		Externally powered. Open = active warning.
14	Alarm Reset	TC	Pulse		Pulse command. Active when grounded.
15	Low Power	TC	Pulse		Pulse command. Active when grounded.
16	Rsr Power	TC	Pulse		Pulse command. Active when grounded.
17	Fwd Power	DTM	Voltage		0...4V
18	Common	Gnd	//	//	Connected to device frame.
19	n.c.	//	//	//	//
20	n.c.	//	//	//	//
21	Common	Gnd	//	//	Connected to device frame.
22	V IPA	DTM	Voltage		0...4V
23	Audio Fault	TS	Level (o.c.)		Externally powered. Grounded = active alarm.
24	Fault	TS	Level (o.c.)		Externally powered. Open = active alarm.
25	Remote	TS	Level (o.c.)		Externally powered. Grounded = active alarm.

Profiles Connector (DB25)			
Pin	Function	Type	Note
1	Channel 1	TC	Pulse
2	Channel 3	TC	Pulse
3	Channel 5	TC	Pulse
4	Spare	TC	Pulse
5	Common	Gnd	//
6	Common	Gnd	//
7	n.c.	//	//
8	Common	Gnd	//
9	Common	Gnd	//
10	Common	Gnd	//
11	Channel 5	TS	Level
12	Channel 3	TS	Level
13	Channel 1	TS	Level
14	Channel 2	TC	Pulse
15	Channel 4	TC	Pulse
16	Channel 6	TC	Pulse
17	n.c.	//	//
18	Common	Gnd	//
19	Common	Gnd	//
20	Common	Gnd	//
21	Common	Gnd	//
22	Common	Gnd	//
23	Channel 6	TS	Level
24	Channel 4	TS	Level
25	Channel 2	TS	Level



For further information on the electrical connections, refer to the Quick Start.

4.2 Datasheet

GENERAL DATA	
Output Nominal Power	10,000 W (adjustable)
Operating band	87.5 - 108 MHz
Samples	RF sample
RS232/485 interface	Yes
Displayable parameters number	More than 50 on graphic OLED display or via web interface
Adjustments	By front panel / web interface
Power stage L-DMOS number	14
RF power stage technology	ICEFET and ECOSAVING
PSUs number	3 (5 kW each one)
Dimensions (rack units - W * H * D)	4HE - 48.5 * 17.5 * 80 cm 19,1 * 6,9 * 31,5 inches
Weight	47 kg - 103.6 lbs
Cooling fans number	6
CONNECTORS	
RF output	1 + 5/8"
RF input	N female
RF monitor	BNC female
Ethernet	RJ45
RS232/485	DB9 female (front + rear)
GSM antenna	SMA female
TC/TS	DB25 female
Profiles	DB25 female
Mains	6 * terminal blocks + grounding screw
Interlock	SL-SMT3.50 3pole
Grounding	M5 threaded screw
RF PERFORMANCE	
Input impedance	50 Ω
Output impedance	50 Ω
Automatic RF output power control	Stabilized on the set value
Overall RF output power stability	+/- 0,1 dB
VSWR	<ul style="list-style-type: none"> • 2:1 @ rated power • Automatic power reduction over 1.7:1 • Open and short circuit fast protection

Harmonic frequencies emission	Within ETSI standard
Spurious frequencies emission	within ETSI standard
Driving power	1,6W typical, with automatic increasing/decreasing notice for optimal driving power and protection against bad input levels
RF output power range	1,000 to 10,000 W adjustable
INSTALLATION REQUIREMENTS	
Power supply	<ul style="list-style-type: none"> • 208V - threephase Delta • 400V - threephase WYE • 230V monophase possible by parallel connection of suppliers
Power consumption	14kW typical - 15kW max
Recommended minimum wiring section	4sqmm / AWG11
Total current consumption	40A per phase @ 208 VAC 20A per phase @ 400 VAC Current absorption may increase in case of lower AC line voltage.
Overall efficiency	<ul style="list-style-type: none"> • 70-73% @ rated power • 68-70% @ -3dB power • 65% @ -6dB power
Power factor	> 0.95
COOLING SYSTEM	
Cooling type	Forced air-cooling
Air flow	1,000 cbm/h typical (depending on temperature)
ENVIRONMENT	
Operating temperature	-5 to +45 °C / 23 to 113 °F -5 to +39 °C / 23 to 102 °F Recommended
Operating humidity	95% @ 40 °C / 104 °F
Operatine altitude	<3,000 metres / <9840 feet
Storage temperature	-20 to +55 °C / -4 to 131 °F
Storage humidity	90% @ 55 °C / 131 °F
Storage altitude	<15,000 metres / <49,200 feet
TELECONTROL AND TELEMETRY	
Remote control	Yes
SNMP	Yes

4.3 Protections

4.3.1 Software protections

4.3.1.1 IPF (Intelligent Proportional Foldback)

The IPF is an intelligent system which reduces the equipment's output power in case of excess of load mismatch, thus preventing the equipment turning off.

Foldback acts if the load mismatch increases slowly. If the event is fast (examples: a spark into a connector, the detachment of a transmission line, a short circuit and so on), the protection acts quickly.

The activation of this feature is shown on display and via telemetry as alarm no. "026".

4.3.1.2 IPC (Intelligent Control Power)

When the equipment is properly working, the IPC keeps the output power constant within $\pm 1\%$ of the target set, irrespective of mains voltage, temperature and load variations.

This greatly contributes to making the equipment insensitive to its working conditions.

The IPC also allows to optimize the RF section efficiency by making work the MOSFETs constantly at maximum efficiency, thus minimizing overall electrical consumption.

4.3.1.3 Safety Management ("Lifextender" option) ®

The Safety Management consists of algorithms to perform real-time analysis of the transmitter's operating status. It works in order to maintain the output power set, according to kind and severity of any anomalies (internal or environmental) which may occur. The Safety Management may perform an output power reduction proportional to the severity of the anomaly that occurs, in order to avoid the propagation of the fault.

The algorithms act at different levels and in various sections of the equipment: Thermal Management on the RF unit; Current Management, Fault Management and Thermal Management on the power supply units; Fault management on the RF unit; Cooling Management on the fans.

Thermal Management on the RF unit (Lifextender) ®

When the temperature measured near to MOSFETs exceeds 72 °C, a first level of derating works moderately trying to reduce the temperature via an output power decrease. This power reduction is the minimum allowed in order to reach a thermal balance at a temperature lower than 72 °C. This decreasing never exceeds 48% in first derating level. Infact, the output power always remains above 52% of that set by the user so that the "-3 dB" warning and relative alarms don't occur. This first derating level is effective in virtually all cases. The activation of this feature is shown on the display and via telemetry as alarm no. "010".

If the first derating level will be insufficient (extremely rare cases), a second derating level starts, further reducing the power, thus obtaining a thermal balance status compatible with the safe operation of the equipment, even if the output power is below - 3dB (with subsequent alarm no. "005").

If also the second derating level will be ineffective (in case of external conditions which are not compatible with the safe operation of the equipment), the transmitter is switched off.

In this case, when the temperature decreases, the power increases proportionally. If it decreases by 10°C (i.e. it reaches 62 °C) the derating algorithm stops and the full power is restored. After five failed attempts, the logic control unit stops the equipment (alarm no. "003").

Current management on the power supply units (Lifextender) ®

This is activated when the maximum current rated for continuous operation of the power supply is exceeded. This value is lower than deliverable current limit and represents the threshold which can be exceeded only for short periods (maximum 1 minute each time). If this situation occurs, the "PSU current derating" function is activated (alarm "013" and, if necessary, alarm "014") and the ALC management algorithm, running in correct working mode, is replaced by another one wherein the VDS and Bias are determined by the user settings. The current delivered by the power supply units has the highest priority in this case.

The current derating is deactivated when the power delivered rises to the value set by the user if the maximum current provided by the power supply units is less than or equal to the maximum value allowed for continuous operation.

Thermal management on the power supply (Lifextender) ®

The power supply management algorithm works according to the temperature like that on the RF unit and is logically connected in "OR" to it.

The first derating level (acting directly on the output power) is activated when the power supply temperature exceeds 75°C, while the second level is activated - when the first is ineffective - if the temperature does not stabilize below this value. In the last case, the output power is decreased of - 3 dB via the same procedure described for the RF section. The activation of this feature is shown on the display and via telemetry as alarm no. "015" and possibly no. "016".

Fault Management on the RF modules (Lifextender) ®

It manages the maximum deliverable output power according to the number of correct working RF amplifier modules.

If one or more MOSFETs are considered faulty (this happens when their absorption is 10% below the average value), the RF output power is reduced to the theoretically expected value when occurs this kind of fault and the fans speed is immediately pushed to the maximum rate. The fault cases and the corresponding maximum power reachable levels are described by a complex table obtained via many tests. It is designed to stop the fault propagation and to prevent the MOSFETs that are still working from excessive stress by the ALC algorithm (which would require them to provide all the missing power output). In order to avoid an excessive number of alarms, no messages are sent when an alarm, if validated, occurs after the adjusting of the output power according to the parameters in table, and only if the -3dB condition is present.

The activation of this feature is shown on the display and via telemetry as alarms no. "008" and no. "009".

Cooling Management on the fan unit (Lifextender) ®

In respect to the current cooling requirements, the fan speed rotation is adjusted from a minimum of 60% to a maximum of 120% approx. (these values may change according to the models of used fan). The cooling demand evaluation is based on accurate measurements of the temperature close to each MOSFET and to the power supply units. The Cooling Management aims to:

1. extend the life of the fans;
2. minimize the quantity of dust which can be carried by the air flow;
3. allow the safe operation of the equipment also under extreme temperature conditions;
4. ensure that temperatures of mosfets and power supplies remain as stable as possible to avoid thermal and mechanical stress;
5. reduce the energy consumption when a strong heat extraction is not needed.

Without Lifextender, the fans always operate at 100%.

4.3.2 Hardware protections

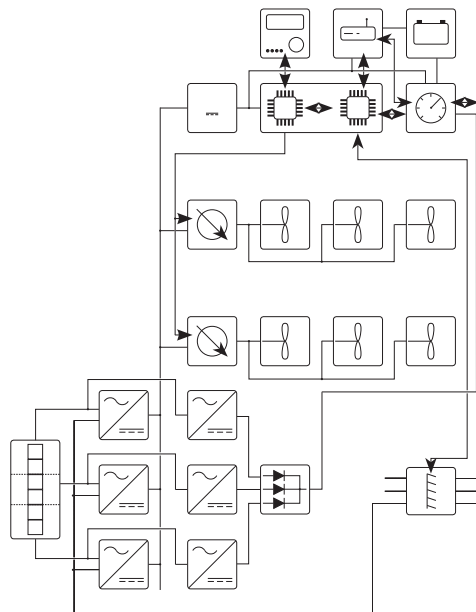
The hardware protection system comprises:

- fast electronic and fuse protection for power supply units;
- fast electronic protection on the fan power supply;
- fast protection against excess reflected power (SWR/VSWR) following a strong load mismatch.

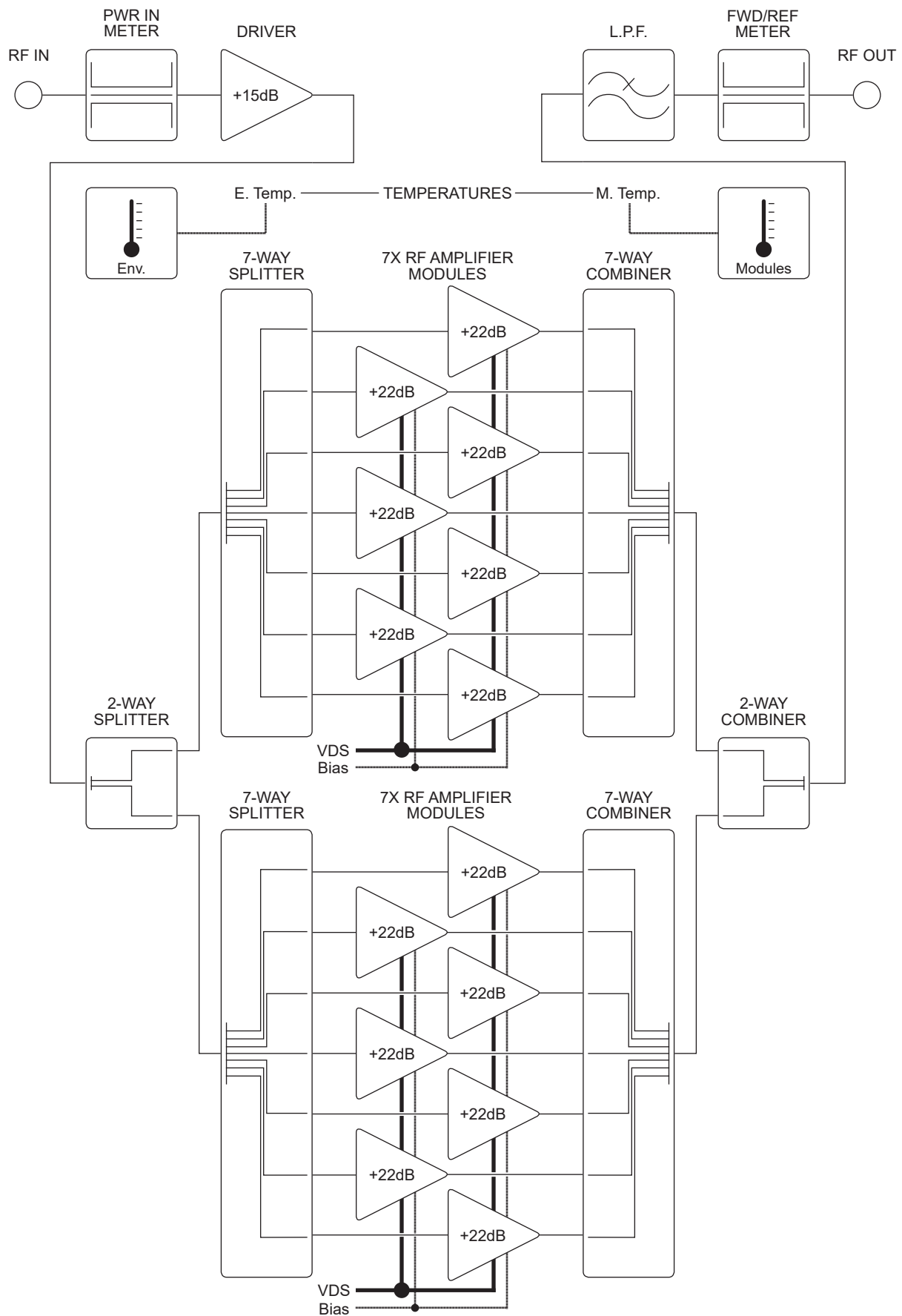
This protection is activated when the reflected power value exceeds 10% of the direct one.

5 Block diagram

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5.1.2 RF section



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6 Maintenance

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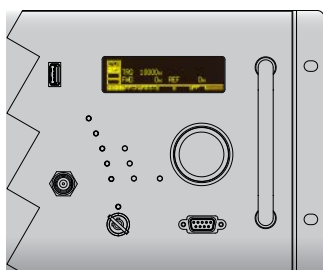
6.1 Maintenance

6.1.1 Periodic checks and replacements

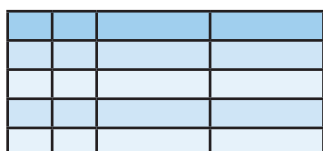
Checks		
Period		Intervention
Recommended when used under extreme conditions (temperature, humidity, dust, reflected power)	Needed, normal conditions	
2 weeks	1 month	Cleaning the air filters (if installed on the apparatus)
1 month	6 months	Cleaning the frontal grid (if air filters are not installed)
3 months	1 year	Verifying forward and reflected power values
3 months	1 year	Verifying proper fan working
3 months	1 year	Verifying the good status of electrical connections
1 year	2 years	Cleaning fan blades
6 months	1 year	Washing the air filters (if installed)
1 year	2 years	Replacing the air filters
6 months	2 years	Verifying the status of RF power transmission lines
6 months	1 year	Verifying current share between power supplies
6 months	1 year	Verifying the current value of each MOSFET
6 months	2 years	Cleaning from dust the environment in which the apparatus is installed
6 months	1 year	Performing the spectrum analysis
3 months	1 year	Verifying the correct working temperatures of MOSFETs
3 months	1 year	Verifying the correct working temperatures of power supplies
6 months	2 years	Presence of corrosion on connectors and boards

7 User instructions

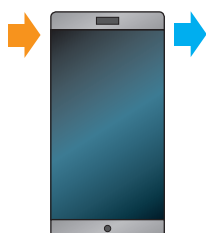
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Set of controls and indicators that allow the user to control the device via the menu in local mode



List of alarms, events and status that the unit can communicate to the user



List of status/commands that the unit can send/receive via SMS



External equipments that can be connected to the unit

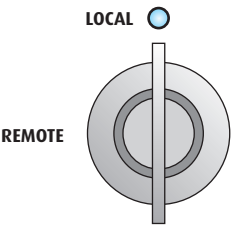
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7.1 User interface

All commands and data displayed by screen are listed on next pages.

Warning: The screens shown below are subject to change without notice and may look some different depending on system configuration.

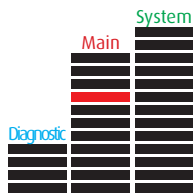
Important: to be sure that new values entered will be stored, please wait at least 60 seconds before shut down the apparatus.



To navigate the entire menu by encoder the equipment has to be set in Local Mode.
When the amplifier works in Remote Mode, navigating is possible but the following items of menus aren't available: "Password Settings"; "Life Extender"; "GSM/Modem Menu" and "Diagnostic Menu".



Rotate clockwise or counterclockwise the encoder to scroll the menu items, to select fields in the screens or to increase/decrease values.
Press the encoder to select a menu item, to confirm a selection or to save values.
A long press of encoder causes the return to the main screen.



Highlighted boxes show the actual position inside the multilevel menu.

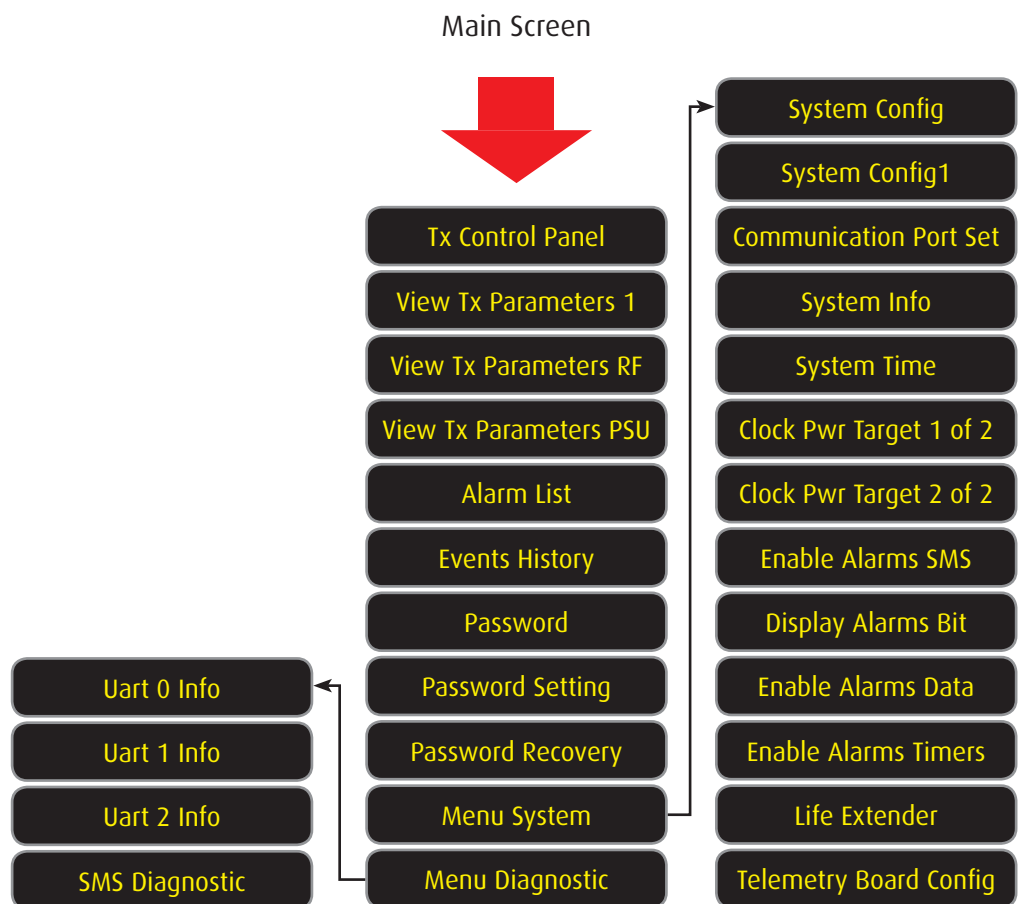


Press "ESC" button to exit quickly from the screen without using the encoder.



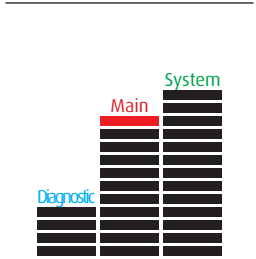
7.1.1 Menu Tree

The red harrow indicates the main screen that appears when the equipment operates in local mode. It's the first screen of main menu.



7.1.2 Amplifier Control Panel

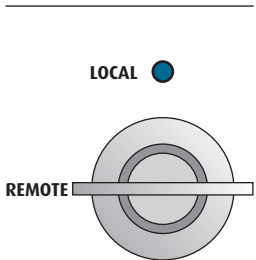
Main screen is automatically displayed when the amplifier works in Local Mode.
It permits to view and set the main working parameters.
It's also available by navigating main menu and selecting the item "Tx Control panel".



"ITLK" lit means that an interlock fault line is open.
"-3dB" lit means that the RF power output is lower than half target power.

Select on the value of the item "TRG", press and rotate the encoder to set the power target. Press again to confirm.
Select the item "MENU" and press the encoder to return to main menu.
Select the item "RFON" and press the encoder to switch on the amplifier section (if the amplifier IS operating, the item is "STBY" and by its selection the amplifier well be switched off).
Select the item "REST" and press the encoder to perform an alarm list reset.

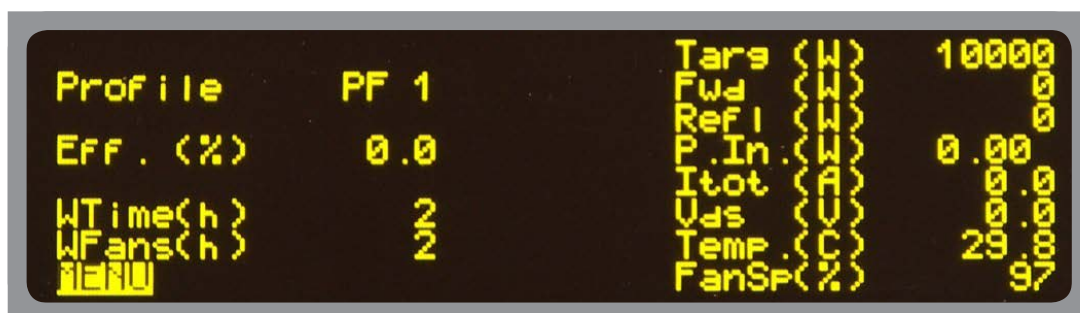
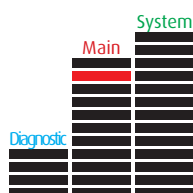
"FWD" indicates the forward power and "REF" the reflected one.
"PF 1" indicates that the first profile (Tx reserve in n+1 systems) is selected.



This screen is displayed when the amplifier works correctly (remote mode).
Information about the Life Extender option are shown if it's active. Default: active.

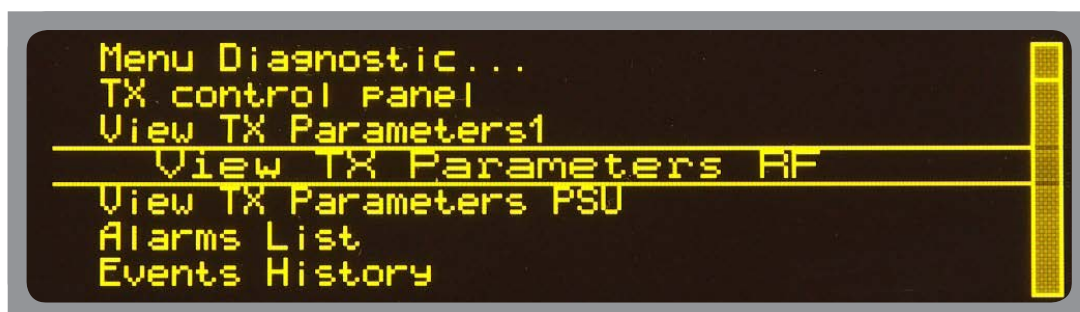


Item of main menu. It shows the general parameters of the amplifier.

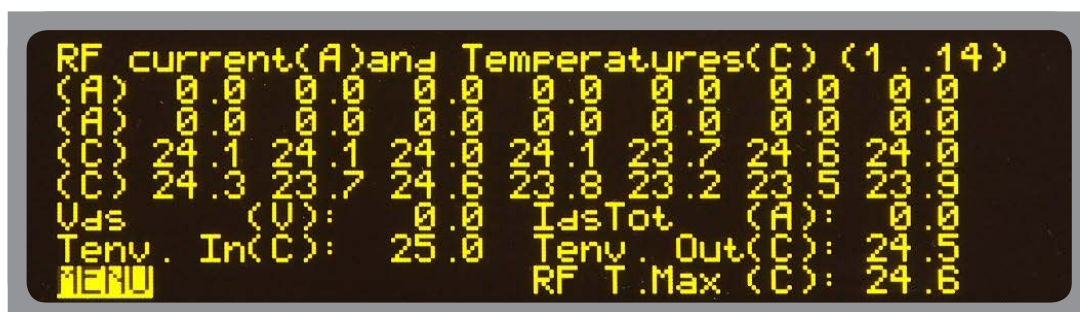
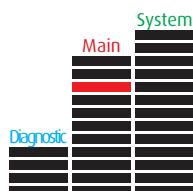


Read-only screen. In addition to the parameters shown in the main screen, they are listed: efficiency [Eff.(%)]; total working time [Wtime(h)] and that of fans [WFans(h)]; input power [P.In.]; voltage [Vds] and total current RF [Itot]; maximum temperature [Temp.] and fan speed [FanSp(%)].

Press "MENU" to return to main menu.



Item of main menu. It shows the specific parameters of the RF section.



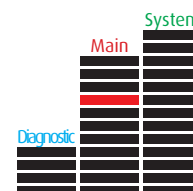
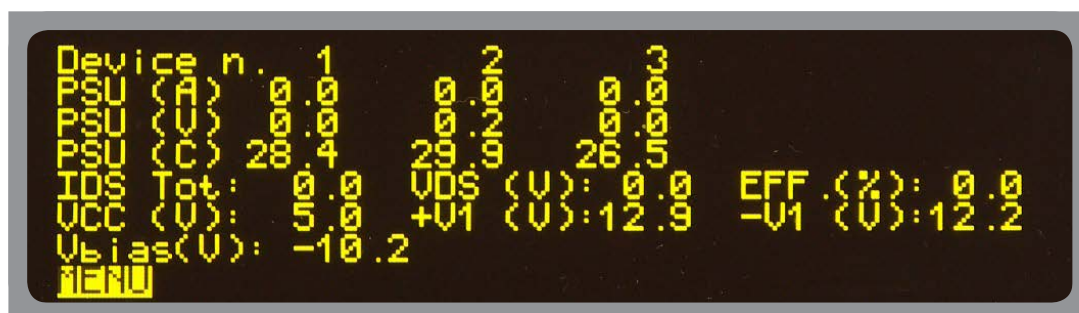
Read-only screen. The values of current [RF current(A)] and temperature [Temperatures(C)] of all RF modules are shown here. In addition to parameters displayed above, they are listed inlet temperature [Tenv. In(C)]; the outlet one [Tenv. Out(C)] and the RF max one [RF T.max(C)].

Press "MENU" to return to main menu.

User instructions



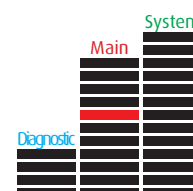
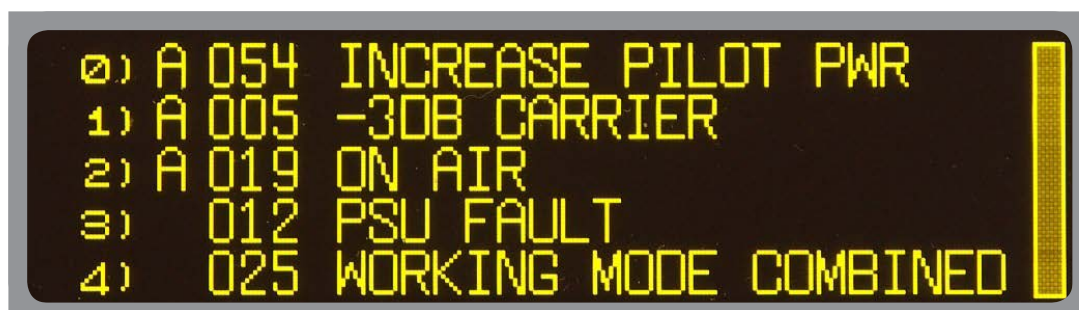
Item of main menu. It shows the specific parameters of the Power Supply Units.



Read-only screen. The parameters of the power supplies for the RF section and for the electronics are shown here. They are listed: currents [PSU(A)]; voltages [PSU(V)]; temperatures [PSU(C)]; total current consumption [IDS Tot]; VDS [VDS(V)]; efficiency [EFF(%)] and Bias voltage [Vbias(V)]. VCC(V); +V1(V) and -V1(V) are for electronics. Press "MENU" to return to main menu.



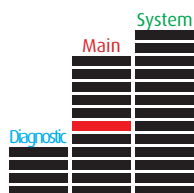
Item of main menu. It shows the list of occurred and active alarms.



Read-only screen. The list is sorted by reverse chronological order. The last occurred alarm is displayed first. The letter "A" indicates that the alarm is still active. Rotate the encoder to scroll the list. Up to 17 active alarms are displayed contemporarily. Press the encoder to return to main menu.



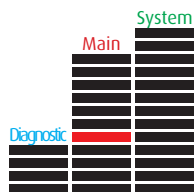
Item of main menu. It shows the list of all occurred events.



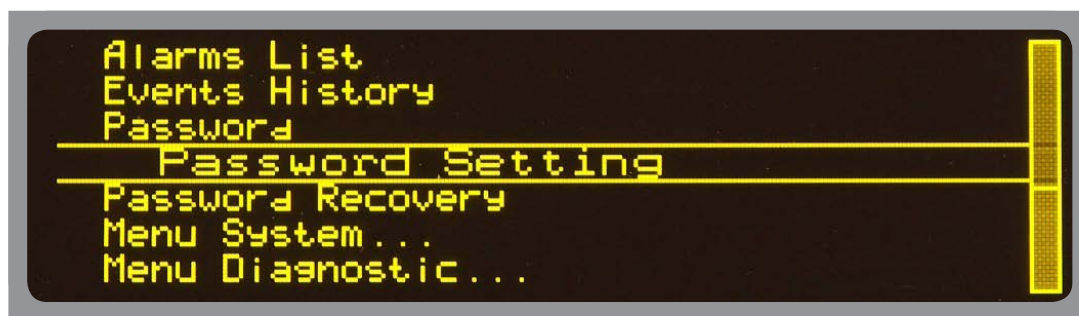
Read-only screen. It shows the list of all occurred events sorted by reverse chronological order (last one at the top) but progressively numbered. Date and time of occurrence are displayed under each item. Rotate the encoder to scroll the list. Up to 80 events can be shown, the older ones are deleted from the list. Press the encoder to return to main menu.



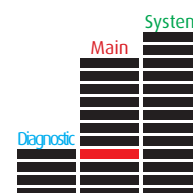
Item of main menu. It allows to enter the password for users.



Select each digit of the number and rotate the encoder to increase/decrease the value. Press to confirm. The status bar with the most important commands is displayed at the bottom. Press "MENU" to return to main menu.



Item of main menu. It allows to set the password for users.

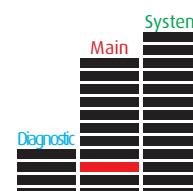


To prevent unauthorized use of the amplifier, the password must be set to a value different by the default. Select each digit of the number and rotate the encoder to increase/decrease the value. Press to confirm.

Press "MENU" to return to main menu.

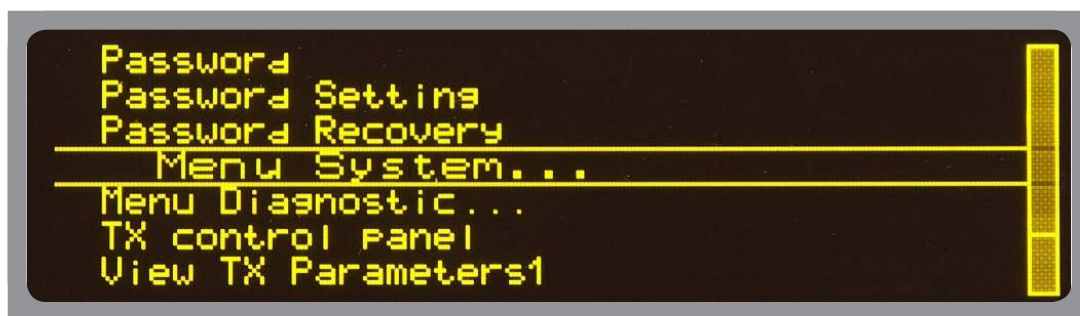
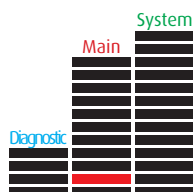


Item of main menu. It allows to set the password for users.



It allows to have a temporary password in case of lost.

The "UNLOCK CODE" must be sent to Elenos Service, which will provide a "PASSWORD RECOVERY" to unlock the device. Enter the password within 24 hours and follow the procedure for unlocking. It'll be necessary choose and enter a new password for the users. Press "MENU" to return to main menu.

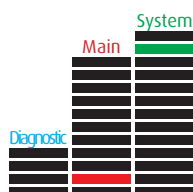
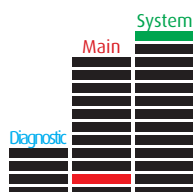


Item of main menu. It allows to enter into the submenu System.



"System config" and "System config1".

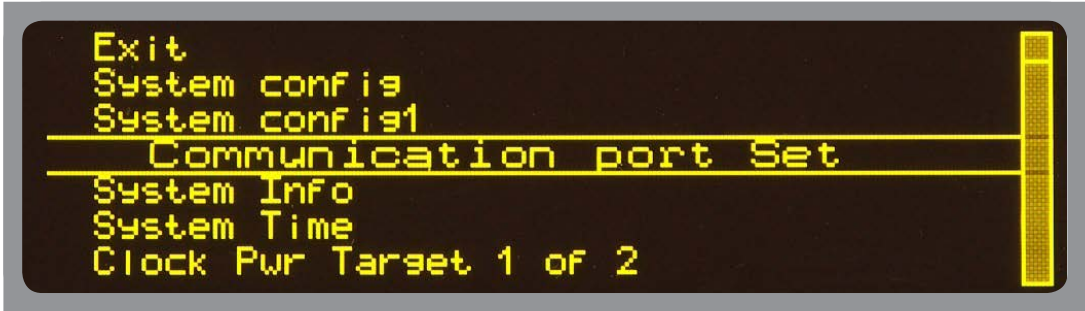
Items of submenu System. They allow to set the most important parameters.



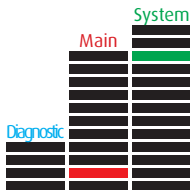
"Temp U." chooses between Celsius scale and Fahrenheit; [Show D.] set to "Always" shows the display also in Remote Mode; [PwOscChk] set to "True" protects the amplifier from power oscillations; [UPS T(W)] defines the Max Power Target in case of UPS; [Min T.Sen] is the min number of thermal probes that will be taken good; [Fwd Pwr Cal. (%)] is the adjusting for reading Fwd and Ref power; [SWR Foldback] sets the ROS protection; [IPA Bias Tres.] sets the treshold of the Bias; [Refl.Pwr T.N.(10%)] if active sets the treshold of REF to 10% of Target Power, otherwise the value is in [Refl.Pwr T.Lev.(W)]; [PAbias (V)] sets the polarization value of RF amp modules; [Max Target Pwr (W)] is the upper limit for the target; [Min Level Fwd Pwr Fault (W)] works in AND with the "-3dB" alarm, depending on which one be active before.

Press "MENU" to return.

User instructions



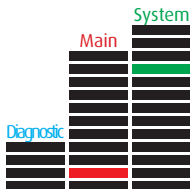
Item of submenu System. It allows to set address and speed of serial ports RS485.



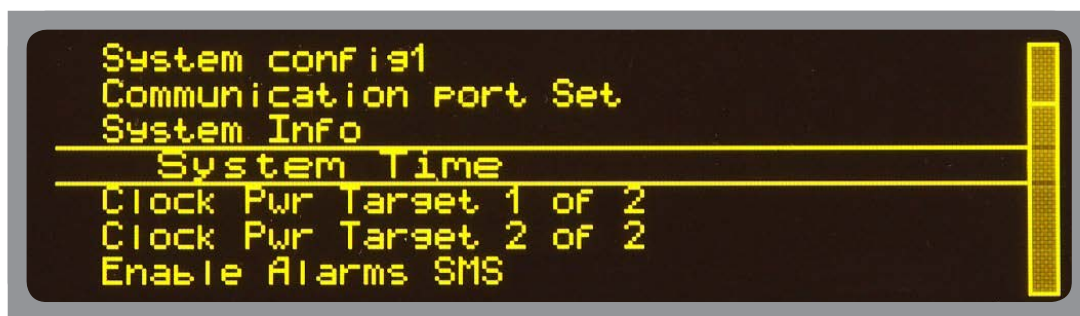
There are two serial ports, one on the front and one on the back (TC/TS connector). They must be set depending on the configuration of the transmitter. Typical values are 115K for speed and 0 for addresses.



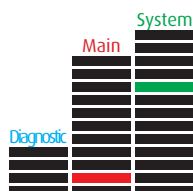
Item of submenu System. It allows to show firmware and protocol versions.



[Ver.Sw] indicated the version of firmware installed into the equipment, and [Ver.P.] is the protocol. In addition, [On air time] and [Fan work time] are displayed, both in format "hh:mm:ss". Select and press "R" to reset the time relative to fan. Press "MENU" to return.



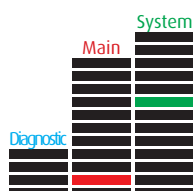
Item of submenu System. It allows to adjust system date and time.



The current date and time are displayed in the row referred [C:]. In addition, the day of the week is shown. Enter new values in the row below and press "SET" to confirm. Press "MENU" to return.



Item of submenu System. It allows to define the percentages of power target levels.

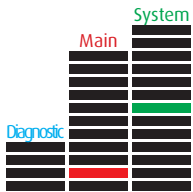
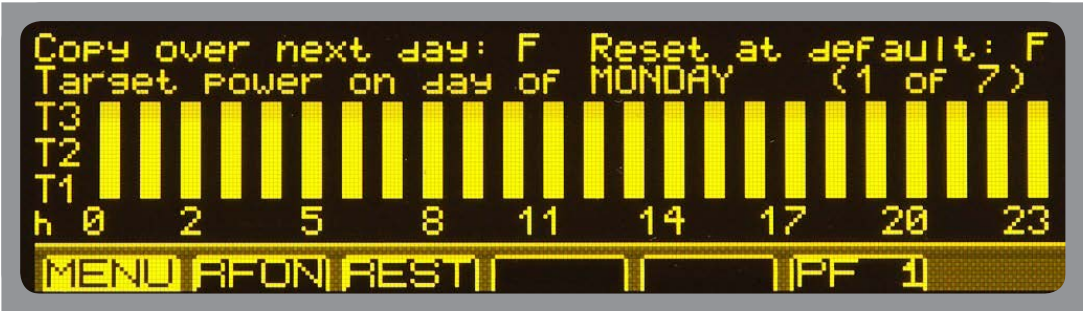


When the value of [Target Power Mode:] is "Fixed", the amplifier will not reduce the target power depending on time slots. To allow this, change it in "CLOCKED". Four levels of power, corresponding to 100%; 75%, 50% and 25%, are available. By setting the power value of the level [100%], the remaining ones will be automatically calculated. Press "MENU" to return.

User instructions



Item of submenu System. It allows to set the levels for each time slot.

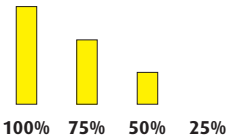


First select the day of the week, then choose the time slot to modify [0...23]. A full bar means 100%; a 2/3 of bar = 75%; 1/3 of bar = 50% and no bar means 25%. Rotate the encoder to increase / decrease the level and press to confirm.

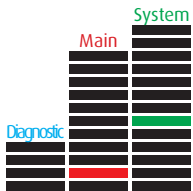
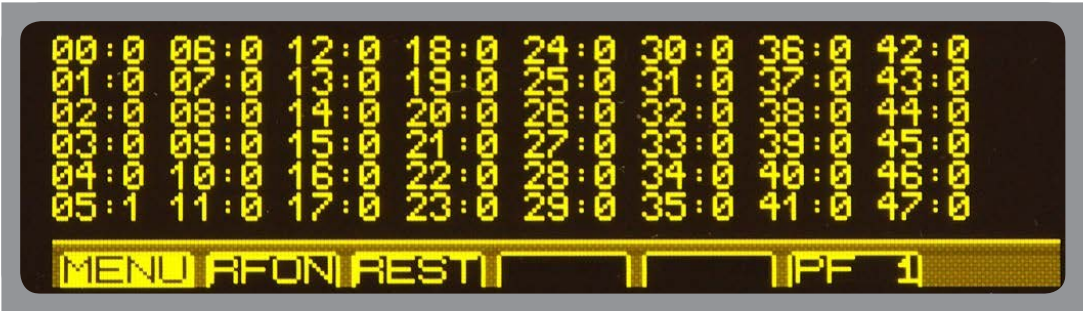
[Copy over next day:] set to "T" allows to save all the levels to the next day of the week.

[Reset at default:] set to "T" permits to recall the factory presets.

Press "MENU" to return.



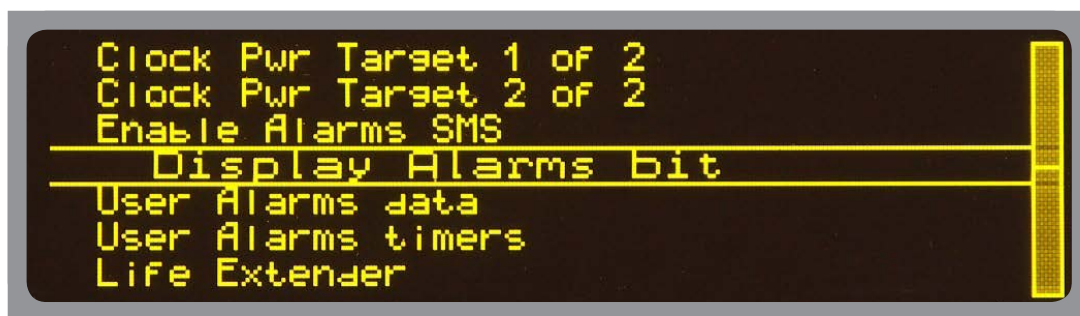
Item of submenu System. It allows to enable / disable the alarms depending on events.



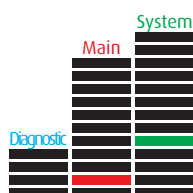
See also paragraph about alarm codes.

See also paragraph about alarm codes. At the right of each alarm code [00...47] there is a bit that can be "0" or "1". Set the bit to "0" for not having a SMS; to "1" for having it.

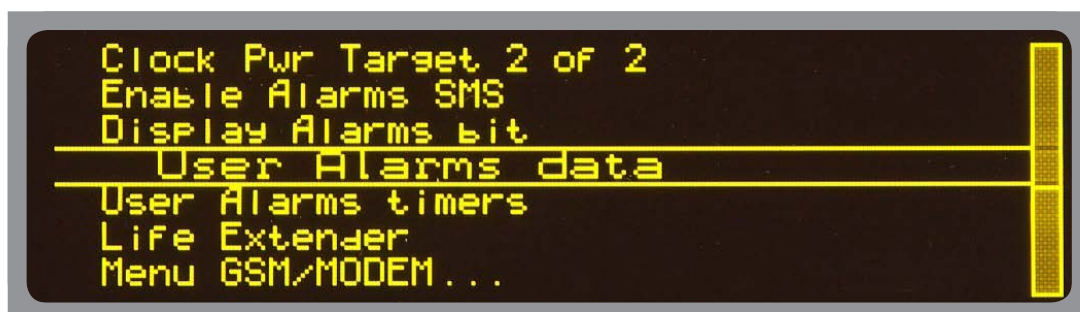
Press "MENU" to return.



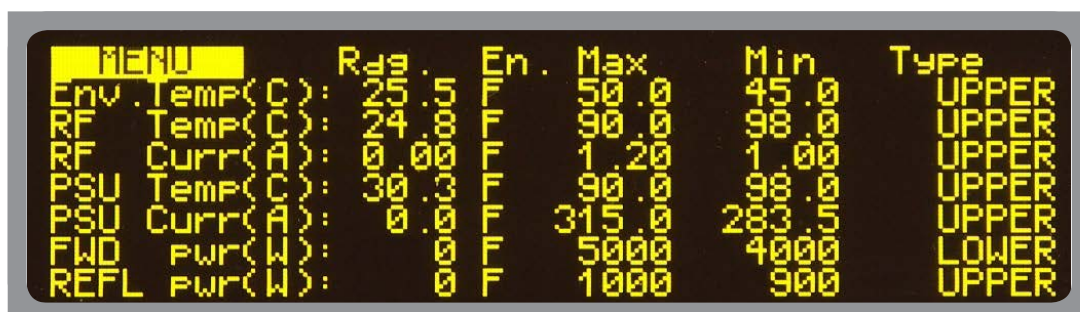
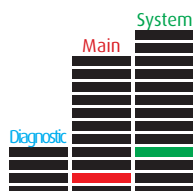
Item of submenu System. Read only screen, synoptic of enable and status of alarms.



The first section shows the enabled alarms (bit set to "1"), the second one displays which ones are active. If [SMS/PTSN StatusReady:] is "TRUE" it means that an event is active. When the reset of alarms is performed, its value become "FALSE" and remains so until a new event will be active.
Press "MENU" to return.

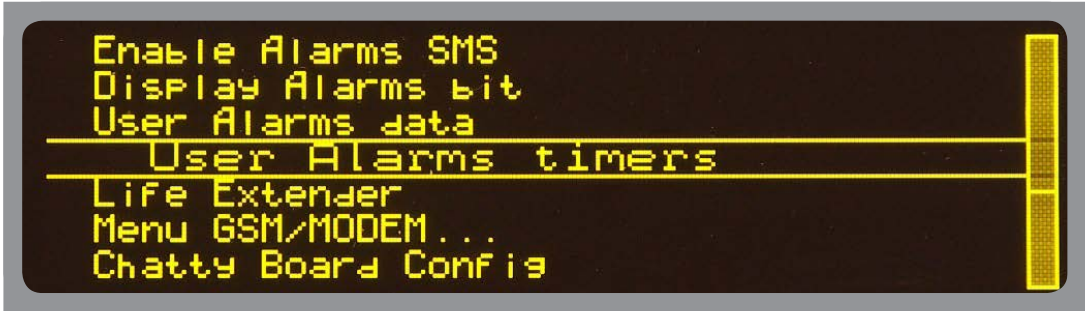


Item of submenu System. It allows to customize the alarms.

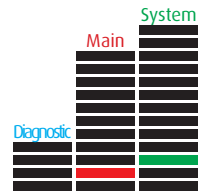
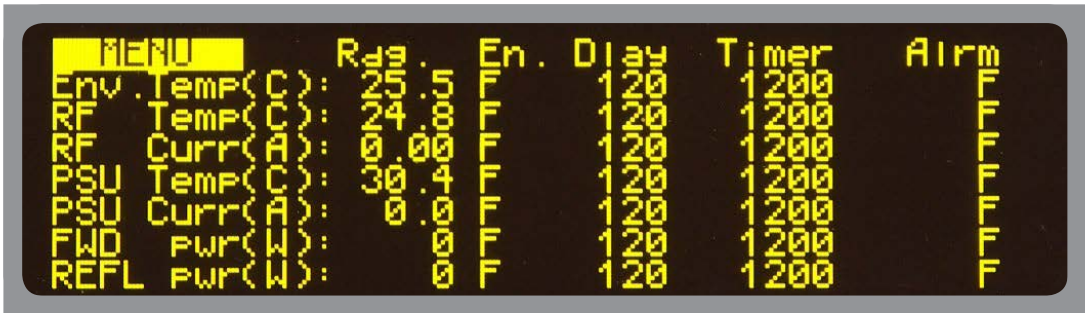


Some parameters can be customized about their conditions of activation. Typical units of measurement are: temperatures (°C or °F), power (W) and current (A); [Max] and [Min] are their limits that can be modified. [Type] indicates which kind of condition will activate the alarm. The options to choose are: "UPPER"; "LOWER"; "INSIDE" and "OUTSIDE". "T" or "F" in [En.] enables or disables the alarm.

User instructions



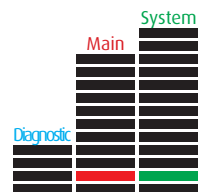
Item of submenu System. It allows to set the delays of each alarm.



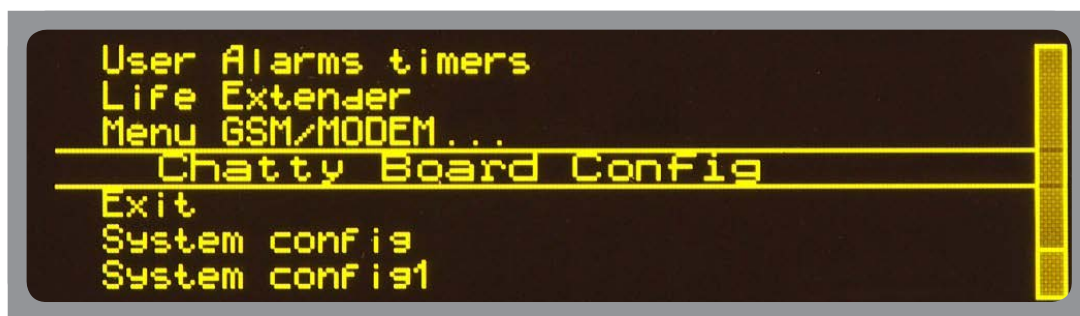
The values displayed in the previous step are proposed here again. In addition, for each alarm it can be set a delay after that it will be taken as active. The progress of delays can be monitored by watching the values of [Timer]. It's still possible to enable / disable the alarms.



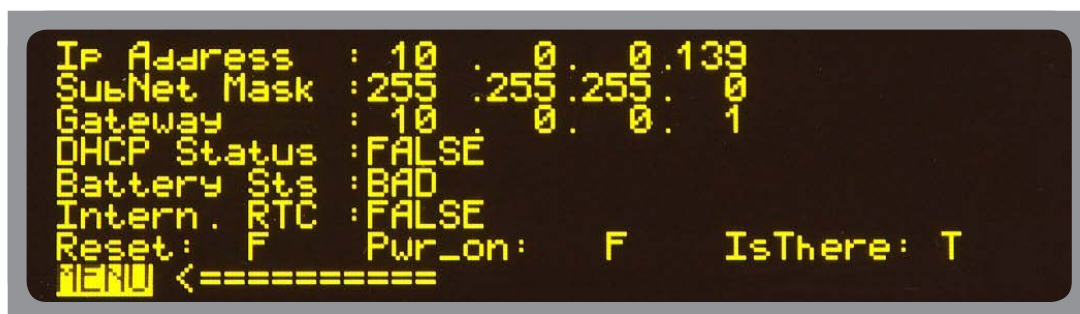
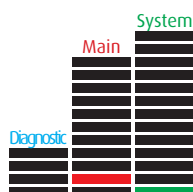
Item of submenu System. It allows to enable/disable the Life Extender algorithm.



[SerialNumber] is the serial number of the equipment and [Device Code] is the number to send to Elenos to obtain the [Activation/Deactivation Code]. [LIFE EXTENDER Status] shows if the algorithm is running or not. [Run Time(dd): Optimal] is the number of days of correct working; [Heavy:] is the amount of days of working in critical conditions. Press "MENU" to return.



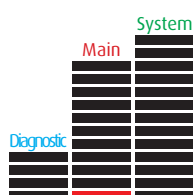
Item of submenu System. It allows to display the Ethernet Board parameters and others.



[Ip Address]; [SubNet Mask] and [Gateway] are displayed to permit the connection by LAN. [DHCP Status] is "FALSE" when the dynamic address is disabled. [Battery STS] indicates the charge level of the backup battery. [Intern. RTC] if "FALSE" means that the internal clock isn't used as the reference. [Reset:] if "T" restarts the board; [Pwr_on:] if "T" turns on the board; [IsThere:] if "F" means that the CPU works like if the board is absent. Press "MENU" to return.

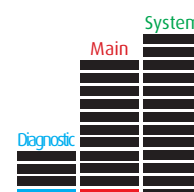
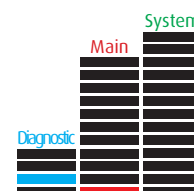
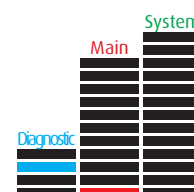
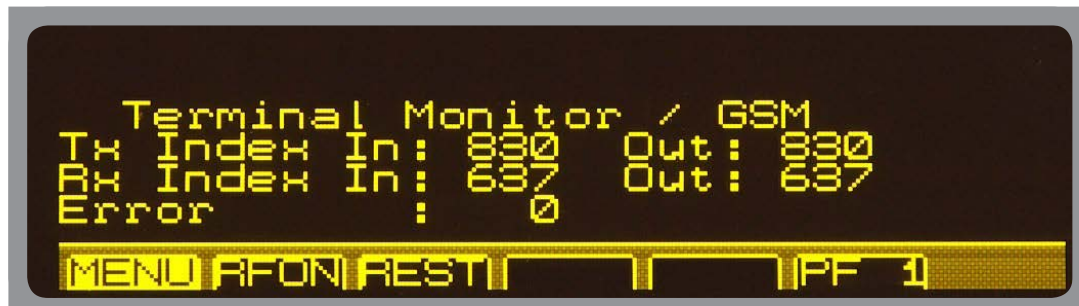
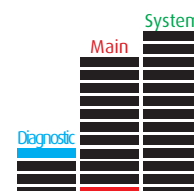


Item of main menu. It allows to enter in...



[Uart 0 Info]; [Uart 1 Info]; [Uart 2 Info] and [SMS Diagnostic] screens, that show parameters about all internal communications.





The first screen shows the status of communication with the Hostlink Slave (Uart 0).
The second one shows data about the Terminal Monitor or the GSM modem (Uart 1).
The third one shows data about Power Supply Units (Uart 2).

The last screen is specific for the modem parameters. The number of SMS correctly sent and received is displayed [Sent]/[Received]+[ok], together with the number of failures [Sent]/[Received]+[bad].

[Test send status SMS] set to "TRUE" forces the equipment to send a test message.

Press "MENU" to return to main menu.

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7.2 Alarms/Warnings/Status list

A task called “Alarms Managing” monitors all physical and logical quantities. Each of them is sampled and processed by a combinatorial network to evaluate if an alarm (or a warning) must be activated. This task and the ALC management have the same high priority for having a constant monitoring of the entire apparatus and intervene quickly. The last alarms occurred are stored in a list with the time and date of the occurrence. All events that may be occur are listed on next pages.



Alarm.
An event of this type means that a malfunctioning is occurring and maintenance could be necessary. However, the apparatus will attempt to minimize the failure by itself applying suitable algorithms.



Warning.
An event of this type means that a temporary irregular condition is occurring. Normally, there isn't an important failure and the apparatus will recover its functionality by itself applying suitable algorithms.



Status.
An event of this type notifies the operating condition of the apparatus and doesn't mean that a malfunctioning is occurring.

Event	Code	Message	Description
STATUS	000	CORRECT WORKING	No error. The apparatus is working correctly. The event "019 ON AIR" has an higher priority.
STATUS	001	SYSTEM RESET	The list of occurred alarms is under deleting process. Active ones aren't deleted.
WARNING	002	EEPROM CHKSUM ERROR	The data stored in memory is no longer reliable. The apparatus will be restarted with default parameters.
ALARM	003	BLOCKED	The apparatus is blocked after that five restore have been attempted. To restart it, a reset command is required.
STATUS	004	STOP	The apparatus is in StandBy mode with no active alarms, ready to work.
ALARM	005	-3dB CARRIER	The RF output power is less than half target power since one minute during the start up or five seconds during the correct working.
ALARM	006	HIGH REF PWR	High reflected power is detected after that a "Three Block Out" recovery protection has been attempted.
ALARM	007	MIN 12V	The negative voltage reference is no longer reliable. The apparatus attempts the "Three Block Out" recovery protection.
ALARM	008	RF AMP. FAULT	A failure is occurred in one or more RF amplifier modules.
WARNING	009	RF AMP. FAULT DERATING	As above, but the RF output power is reduced according to an algorithm.
WARNING	010	RF THERMAL DERATING	The temperature of one or more RF amplifier modules is been too high so that the RF output power is reduced according to an algorithm.
ALARM	011	RF OVER TEMPERATURE	The "RF THERMAL DERATING" failed and the apparatus attempts the "Three Block Out" recovery protection.
ALARM	012	PSU FAULT	A PSU malfunction is occurring.
WARNING	013	PSU CURRENT DERATING	One or more PSU overloads are occurred so that the apparatus is reducing the RF power output according to an algorithm.
ALARM	014	PSU OVER CURRENT	The apparatus was shut down in a minute since the current derating didn't decrease.
WARNING	015	PSU THERMAL DERATING	One or more PSU overheatings are occurred so that the apparatus is reducing the RF output power according to an algorithm.
ALARM	016	PSU OVER TEMPERATURE	The temperature of one or more PSU have been too high so that apparatus has been shut down.
ALARM	017	PSU COMM TIMEOUT	The RS485 internal bus dedicated to the communication between CPU and PSU isn't working correctly.
STATUS	018	EXTERNAL INTERLOCK	The interlock circuit is open and the apparatus is blocked.
STATUS	019	ON AIR	The apparatus works correctly.
STATUS	020	POWER UP	RF output power increase is occurring.
STATUS	021	POWER DOWN	RF output power decrease is occurring.
WARNING	022	PSU THERMAL DERATING/FAULT	One or more PSU are performing a thermal derating by reducing the current supplied.
WARNING	023	PSU LOW POWER	One or more PSU are in thermal derating so that the RF output power is reduced.
ALARM	024	PSU RF OFF	The RF section has been turned off so that the fans can quickly cool the apparatus.
STATUS	025	WORKING MODE COMBINED	The apparatus works in a combined transmitter.
WARNING	026	SWR FOLDBACK	High reflected power has been detected so that the apparatus is adjusting the RF output power according to an algorithm.
STATUS	030	OVER 2/3 CARRIER	The RF output power is rising up to 2/3 of the target after which a "-3dB" alarm has occurred.

Event	Code	Message	Description
WARNING	034	TEMPERATURE SENSOR ERROR	If the thermal probes installed are more than one, it means the fault of one of these because its read value is significantly different from the expected one.
ALARM	035	PWR FORWARD OSCILLATION	RF output power oscillation is detected and the apparatus attempts the "Three Block Out" recovery protection.
ALARM	036	THREE BLOCK OUT	The malfunction has not disappeared during the automatic protection time and the apparatus was stopped.
WARNING	037	USER ENV TEMP OUT LIMIT	The user-defined environmental temperature limits in "User Alarms Data" have been exceeded.
WARNING	038	USER RF TEMP OUT LIMIT	The user-defined RF temperature limits in "User Alarms Data" have been exceeded.
WARNING	039	USER PSU TEMP OUT LIMIT	The user-defined PSU temperature limits in "User Alarms Data" have been exceeded.
WARNING	040	USER RF CURRENT OUT LIMIT	The user-defined RF current limits in "User Alarms Data" have been exceeded.
WARNING	041	USER PSU CURRENT OUT LIMIT	The user-defined PSU current limits in "User Alarms Data" have been exceeded.
WARNING	042	USER FRW PWR OUT LIMIT	The user-defined RF forward power limits in "User Alarms Data" have been exceeded.
WARNING	043	USER RFL PWR OUT LIMIT	The user-defined RF reflected power limits in "User Alarms Data" have been exceeded.
ALARM	044	OUT PWR NOT VERIFIED	The RF output power measurement is not reliable.
STATUS	045	UPS ACTIVE	The apparatus works by drawing current from the UPS.
ALARM	046	SHUNT COMM TIMEOUT	Internal serial communication timeout. The apparatus has stopped working.
WARNING	047	WARNING TEMPERATURE SENSOR	A thermal probe is unreliable and its reading is discarded.
ALARM	049	DRAIN VOLTAGE TOO LOW	VDS voltage too low. The amplifier section has been stopped and will remain so until the disappearance of the cause.
WARNING	050	OVER FRW PWR ERROR	An overshoot of RF output power respect to the target is occurred.
WARNING	051	PSU VOLTAGE DERATING	One or more PSU are in voltage derating.
WARNING	052	PSU NET OVER VOLTAGE	Mains voltage too high.
STATUS	053	PILOT PWR GOOD	The RF input power level is correct.
WARNING	054	INCREASE PILOT PWR	The RF input power level is too low but not dangerous and must be increased.
WARNING	055	DECREASE PILOT PWR	The RF input power level is too high but not dangerous and should be decreased.
ALARM	056	BAD INPUT RF PROTECTION	RF input power level out of limit. The external modulator has been disconnected.
WARNING	059	BATTERY LOW	The CPU backup battery is low. In case of no mains, the clock will lose settings.
WARNING	060	REFERENCE VOLTAGE ERROR	The internal reference voltage is no longer reliable and the measurements will be incorrect. Some wrong alarms or warnings could be sent.
WARNING	062	DRAIN VOLTAGE CONTROL ERROR	VDS voltage is more than 4V different from the expected value. The adjustment is fixed at the last valid value. It restarts when the difference becomes less than 4V.
WARNING	065	RTC FAULT	The clock says a wrong time and it isn't possible to correct automatically. Some settings, such as "clock power target", will not run correctly.
STATUS	066	RTC USER UPDATED	The user has updated the internal clock.
STATUS	067	RTC AUTOMATIC RECOVERY	The apparatus has updated the internal clock automatically.

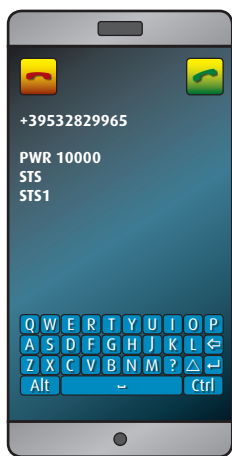
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7.3 SMS list

With internal modem option (or an external telemetry provided of a GSM modem) it's possible to send commands and receive the status of apparatus.

Syntax of command and status SMS are shown below.

See also the paragraph "User interface" for the settings relative to the user authorizations.



Commands.

Using a mobile, via GSM network, it's possible to send commands to the apparatus (if a modem is installed inside it).



Status.

The unit returns a response with the requested data. However, it always sends messages based on what is fixed by the user (see paragraph on SMS).

7.3.1 SMS commands (sending)



Command	SMS String
Set the RF output power at <i>nnnnn</i> watts	PWR <i>nnnnn</i>
Switch the unit to StandBy mode	STBY
	OFF
Switch the unit to On Air mode	ON
Status request	STS
Reset request	RES
Data setting request	STS1
Force the RF output power to Clocked mode	CLKP
Force the RF output power to Fixed mode	FIXP
Disabling the phone number that sends this SMS of receiving alarms / status SMS	SMSNO
The phone number <i>n</i> is not able to receive the alarm / status SMS	SMSNO <i>n</i>
The phone number <i>n</i> is able to receive the alarm / status SMS	SMSYES <i>n</i>

7.3.2 Status/alarm SMS (receiving) - examples



E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 STBY
 No mains *nn m*
 NoAudio
 AudioOK
nnn Signaling message
 FWD *nnnnn W*
 REFL *nnnnn W*
 VDS *nn.nV*
 IDS *nnn.nnA*
 TEMPMAX *nn.nC*
 TEMPENV *nn.nC*

E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 -3dB Alarm
 No mains *nn m*
 NoAudio
 AudioOK
nnn Signaling message
 FWD *nnnnn W*
 REFL *nnnnn W*
 VDS *nn.nV*
 IDS *nnn.nnA*
 TEMPMAX *nn.nC*
 TEMPENV *nn.nC*

E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 Set
 STBY
 [TRG]/[24hTRG]*nnnnW*
 SmsOver-2/3 OFF
 PwrAdj *nn%*
 Ver *n.nn-n.nn*
 MaxPwr *nnnnnW*



E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 Set
 STBY
 [TRG]/[24hTRG]*nnnnW*
 SmsOver-2/3 ON
 PwrAdj *nn%*
 Ver *n.nn-n.nn*
 MaxPwr *nnnnnW*

E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 Set
 ON AIR
 [TRG]/[24hTRG]*nnnnW*
 SmsOver-2/3 OFF
 PwrAdj *nn%*
 Ver *n.nn-n.nn*
 MaxPwr *nnnnnW*

E10000X ID *nn*
 SMS String
 +39*nnnnnnnnnnnn*
 Set
 ON AIR
 [TRG]/[24hTRG]*nnnnW*
 SmsOver-2/3 ON
 PwrAdj *nn%*
 Ver *n.nn-n.nn*
 MaxPwr *nnnnnW*

Meaning of items in status SMS

String	Meaning
E10000X ID <i>nn</i>	Description of the apparatus with indication of the ID number
SMS String	Customizable string of 10 characters
+39 <i>nnnnnnnnnn</i>	Telephone number that sent the last command
STBY / ON AIR	Status of the apparatus. It can be StandBy (off) or On Air (on)
-3dB Alarm	The apparatus is supplying half power or less.
Status	Reply to an SMS status command
Command	Acknowledge receipt (echo)
<i>nnn</i> Signaling message	Cause of stop or most important signaling
FWD <i>nnnnn</i> W	Forward power
REFL <i>nnnnn</i> W	Reflected power
VDS <i>nnn.nV</i>	Operating voltage of RF power amplifier section (VDS)
IDS <i>nnn.nA</i>	Total current actually absorbed
TEMPMAX <i>nnn.nC</i>	Max temperature between all internal thermal probes installed
TEMENV <i>nnn.nC</i>	Environmental temperature
Set	Information about settings
[TRG]/[24hTRG] <i>nnnnnW</i>	Target power / max target power in Clocked PWR mode
SmsOver-2/3 ON/OFF	The power supplied by the amplifier has risen to 2/3 of the target
PwrAdj <i>nnn%</i>	Adjusting of forward power shown at display
Ver <i>n.nn-n.nn</i>	Firmware and datamap release
MaxPwr <i>nnnnnW</i>	Power homologation

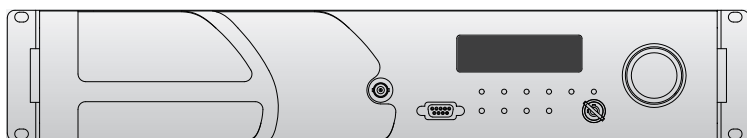
Please note: The SMS sending is suspended for an hour when more than 5 SMS are sent in 5 minutes.

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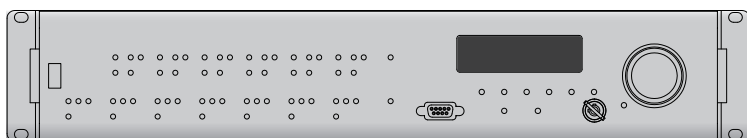
7.4 External devices connectable

The apparatus may be connected to the following devices:

- Exciters
- ECHOS6 (Changeover)
- BNC / XLR Audio Matrix
- LAN / PC



Exciters



ECHOS6
(Changeover)
and
Audio Matrix



LAN
(Switch/Router)



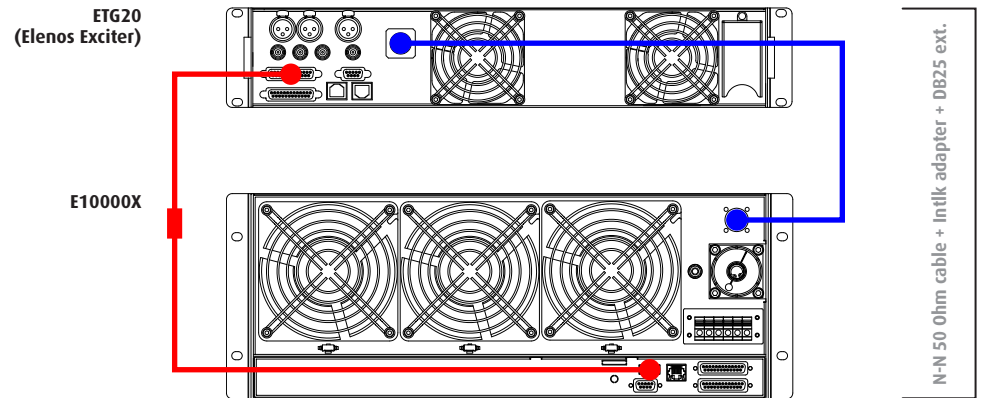
PC

7.4.1 Connecting to an Exciter

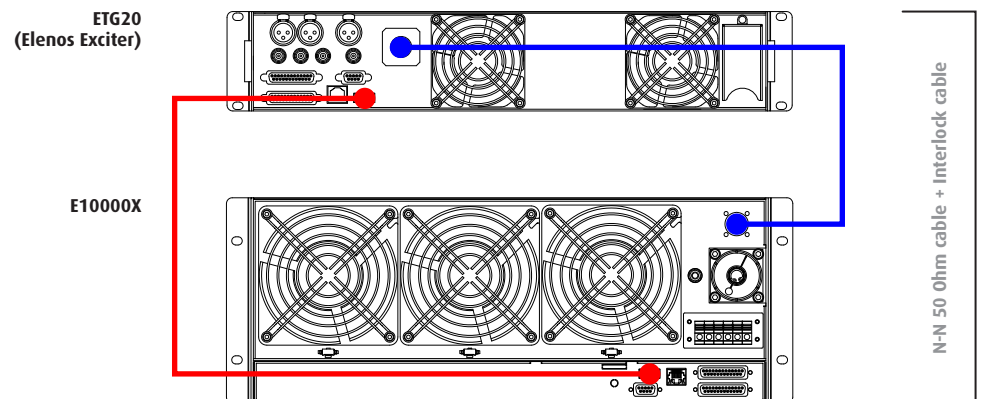
Typically, the E10000X amplifier requires the connection to an ETG20 Elenos exciter, both analog or digital version.

Depending on the exact modulator model, the connection diagram can be one of the following.

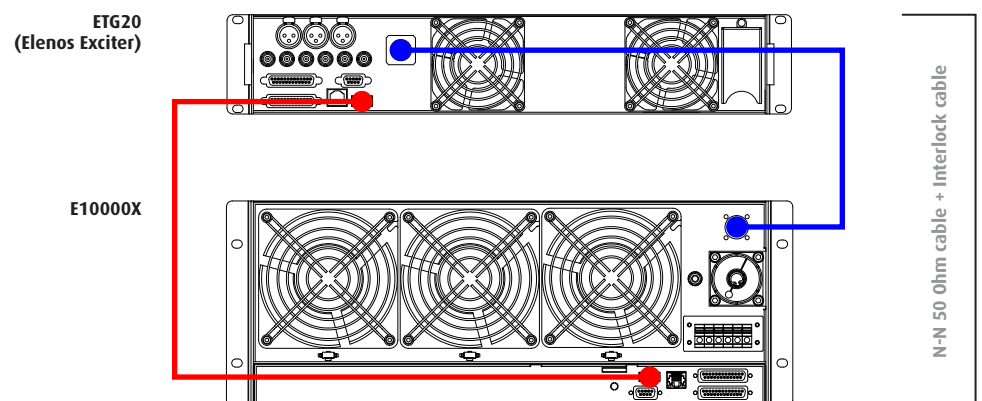
Tx with analogical exciter.



Tx with analogical exciter equipped with separate interlock connector.



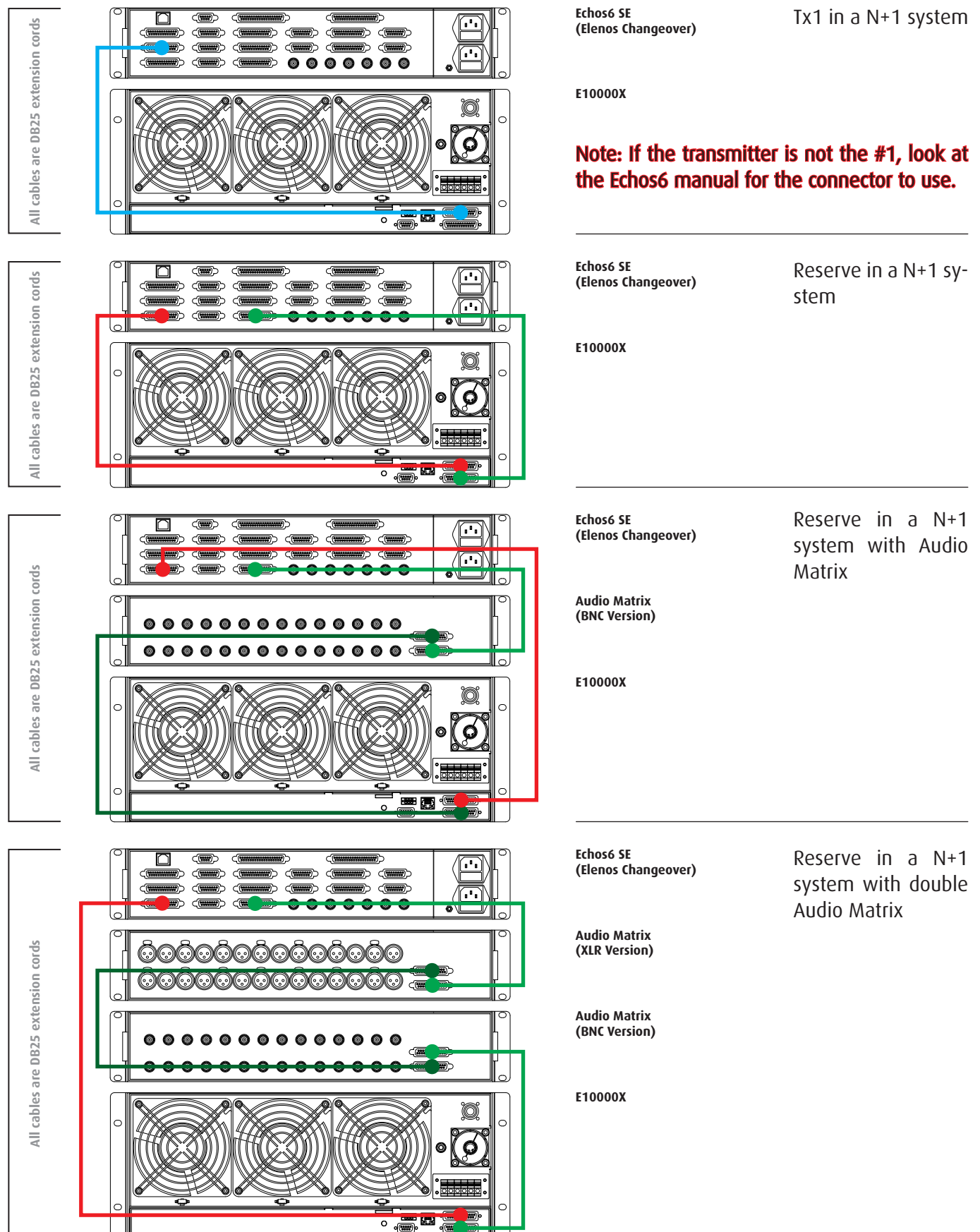
Tx with igital exciter equipped with separate interlock connector.



7.4.2 Connecting to a Changeover/Audio Matrix

In N+1 systems, the apparatus may be a transmitter or the reserve (the exciter and its connections aren't shown).

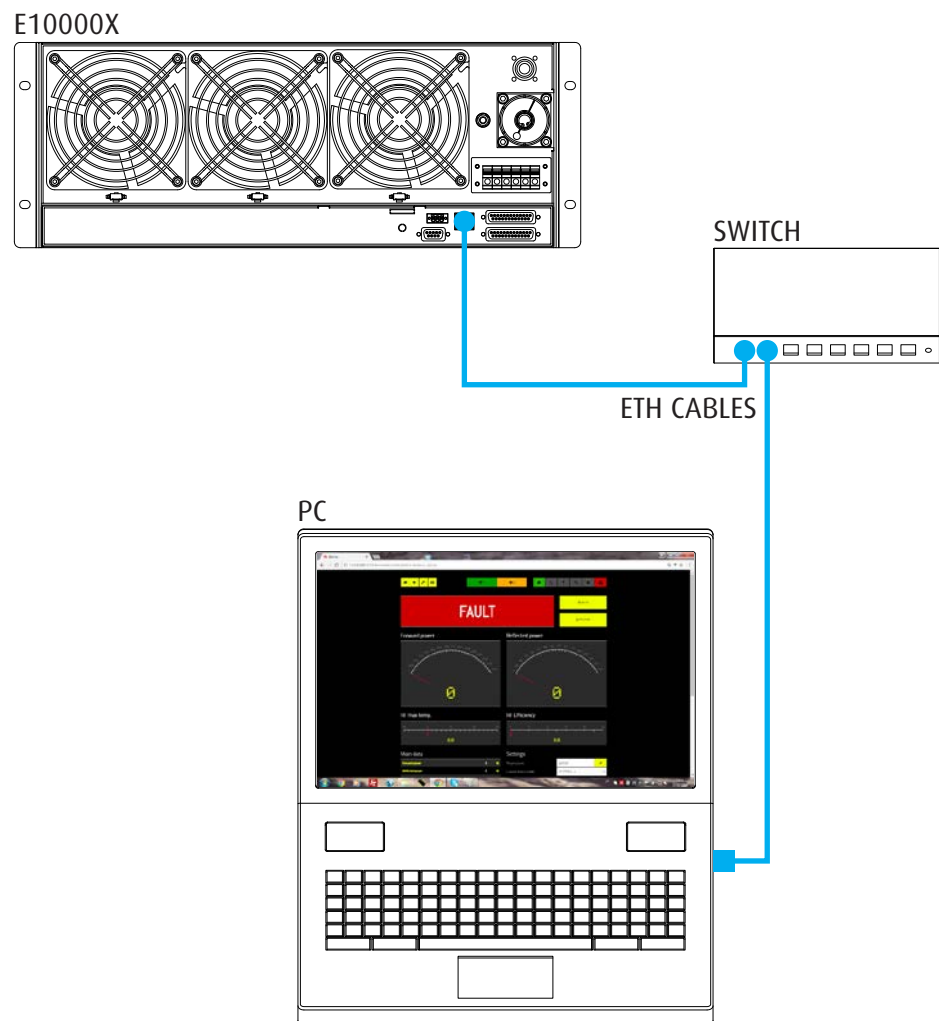
Examples of connections between these devices are shown below.



7.4.3 Connecting to a LAN/PC

Connect the apparatus to PC via LAN using a switch or any other device such as a router. Also the direct connection between apparatus and PC is possible. See web connection manual for all details.

See the label with the default IP address to make the first connection.

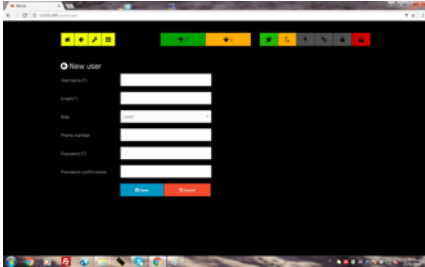


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WEB Interface Overview



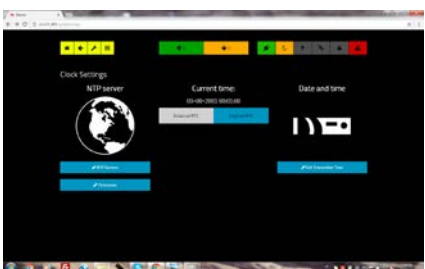
To create, delete, modify user accounts and edit them preferences.



To edit network interface and manage the installed modules.



To manage user profiles regarding events and them notifications.



To choose and set the time reference.



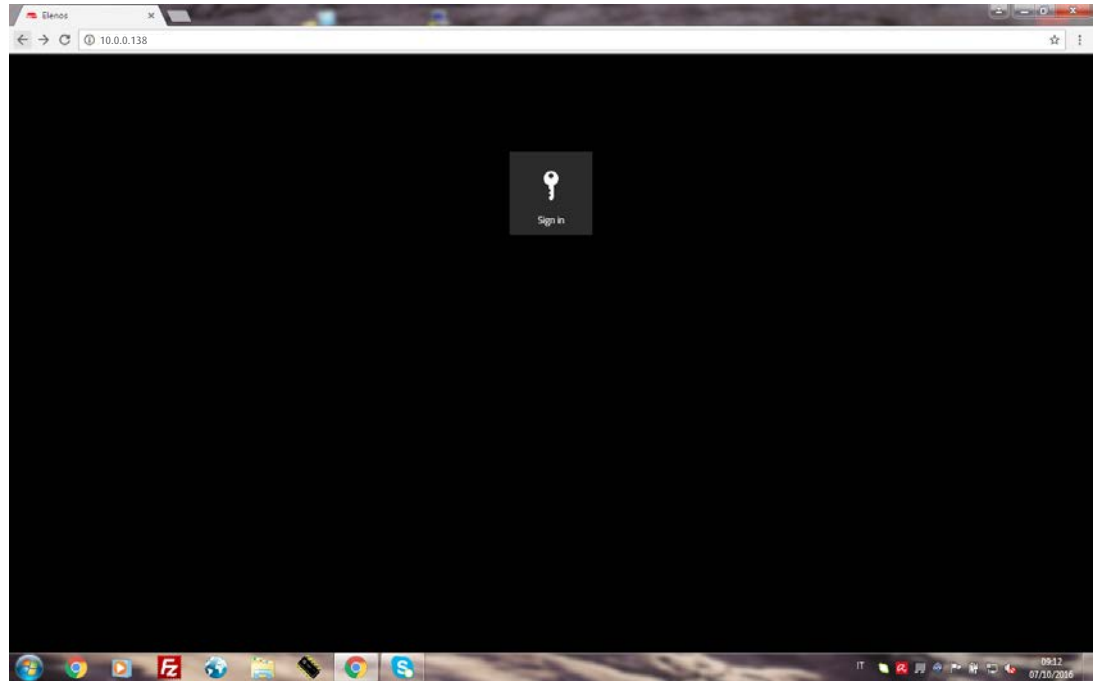
To view and set all parameters of the equipment.

8.1 Remote control - first connection

Connect a PC to LAN or directly to the equipment by an Ethernet cable, start a browser and enter the default IP address: 10.0.0.138.



Note: if the screen shown below doesn't appear, please check the IP address in "Telemetry board config" as indicated in the Quick Start or in the User Manual.



Sign in and continue as shown below.

Default Username: **admin**
Default Password: **adminadmin**



Note: the first connection must be performed by the administrator in order to define the user accounts and their respective levels of authorization.

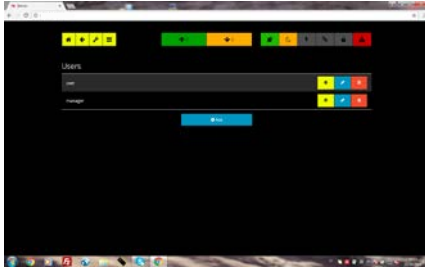
Default Username and Password must be redefined by the administrator.

The length of Username must be (characters):	5 (min)	15 (Max)
The length of Password must be (characters):	5 (min)	15 (Max)

Only uppercase, lowercase, numbers and symbols "-" and "_" for Username.
Any character is valid for the password.

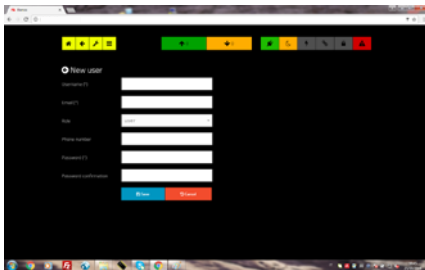
8.2 Accounts

Overview



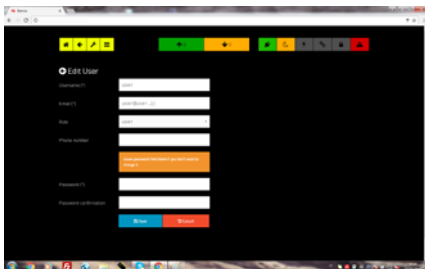
User management.

To create, delete, modify user accounts and edit their preferences in accordance with respective authorization levels.

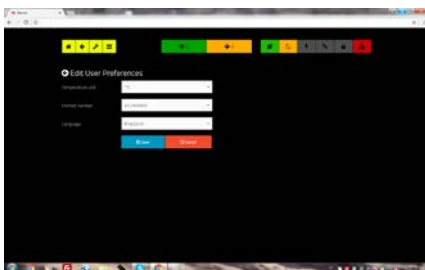


Adding a new user.

For each one they must be indicated username, email, role, phone number and password. The administrator can add and delete users.



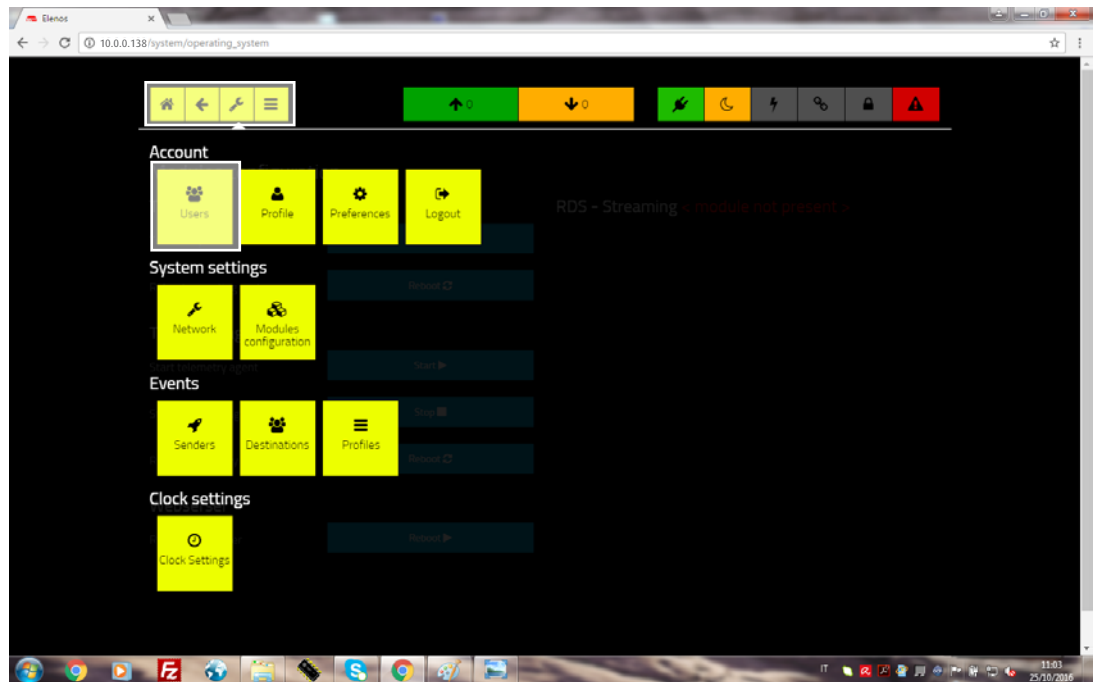
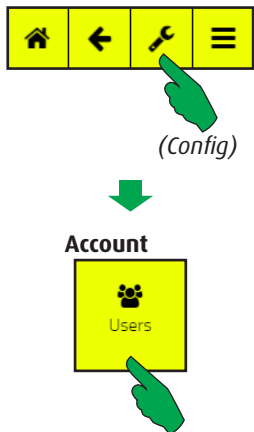
Modifying the properties of the user accounts.



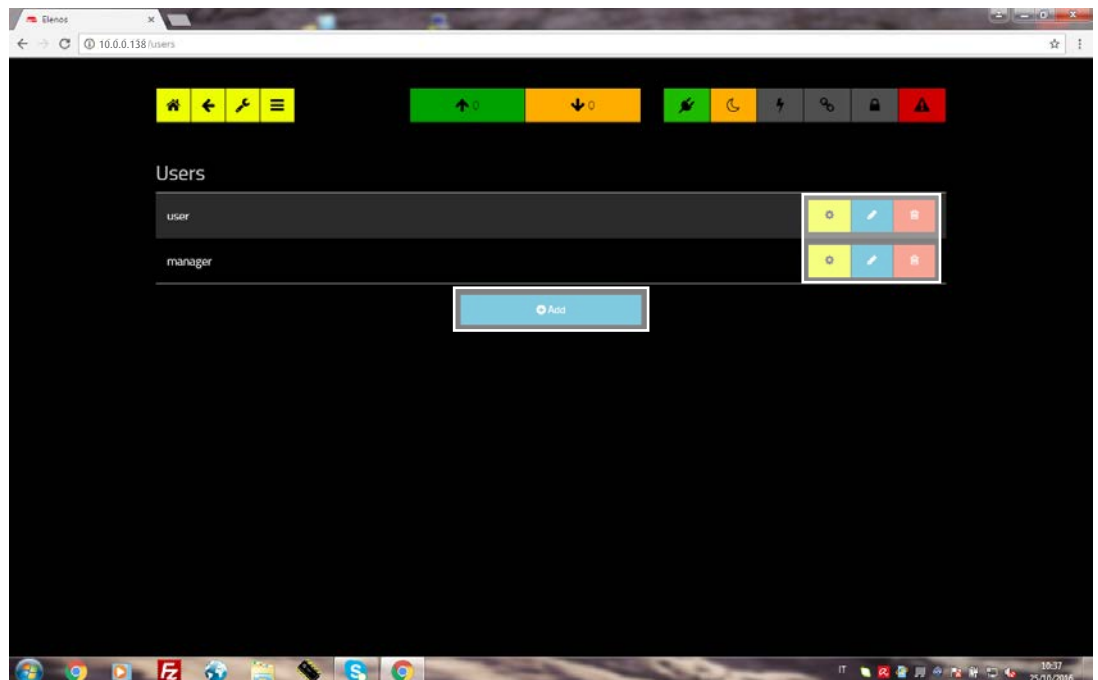
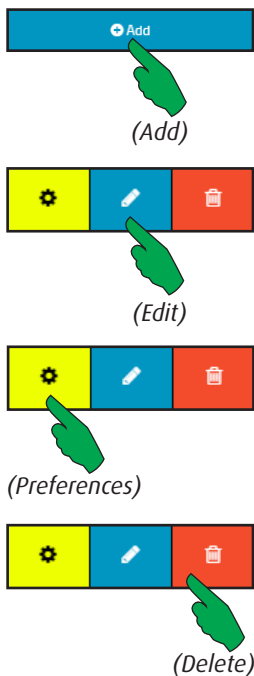
Modifying the users preferences.

8.2.1 Users management

To create, delete and modify user accounts.



In the main screen, first select the "Config" button, then the "Users" button in the "Account" bar.

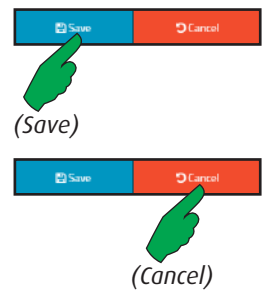
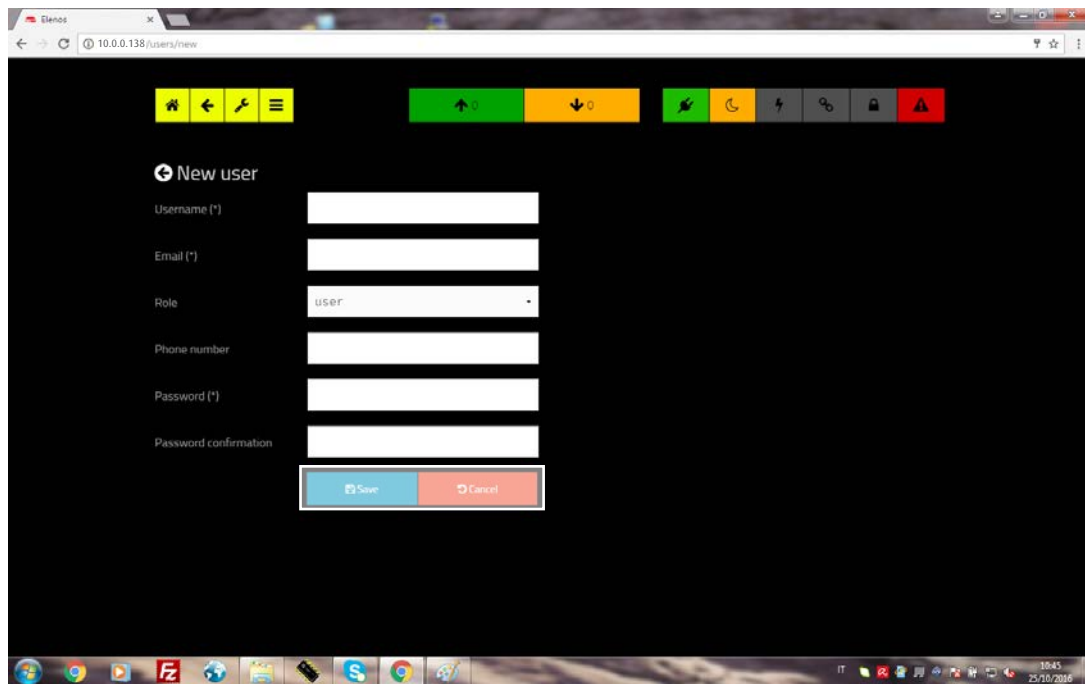


Select "Add" to insert a new user/manager; "Edit" to modify an existing one, or "Preferences" to edit his parameters. "Delete" button removes the current record from the list after confirmation.

See next pages for more details.

8.0.1.1 Adding a new user/manager

After selecting the type of user to be added as shown on the previous page, the following screen is shown.



For each new user/manager must be inserted the following items:

- | | | |
|-------------------------|------------|--------------------------------------|
| • Username | (required) | ●●...● (5 min) to ●●...● (15 max) |
| • Email | (required) | Any valid e-mail address |
| • Role | (required) | Selectable via the menu |
| • Phone number | (optional) | Any valid international phone number |
| • Password | (required) | ●●...● (5 min) to ●●...● (15 max) |
| • Password confirmation | (required) | Like above |

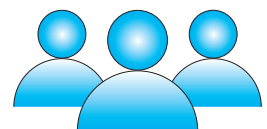
Press the "Save" button to confirm or the "Cancel" button to abort the operation.

◆ HIERARCHICAL CRITERION

3 authorization levels are available:

- User, who can access the screens in read-only mode;
- Manager, who can access the screens also in write mode but only for the equipments assigned to him;
- Administrator, who can also create accounts; modify the Ethernet network parameters, the Hostlink and SNMP ones if present.

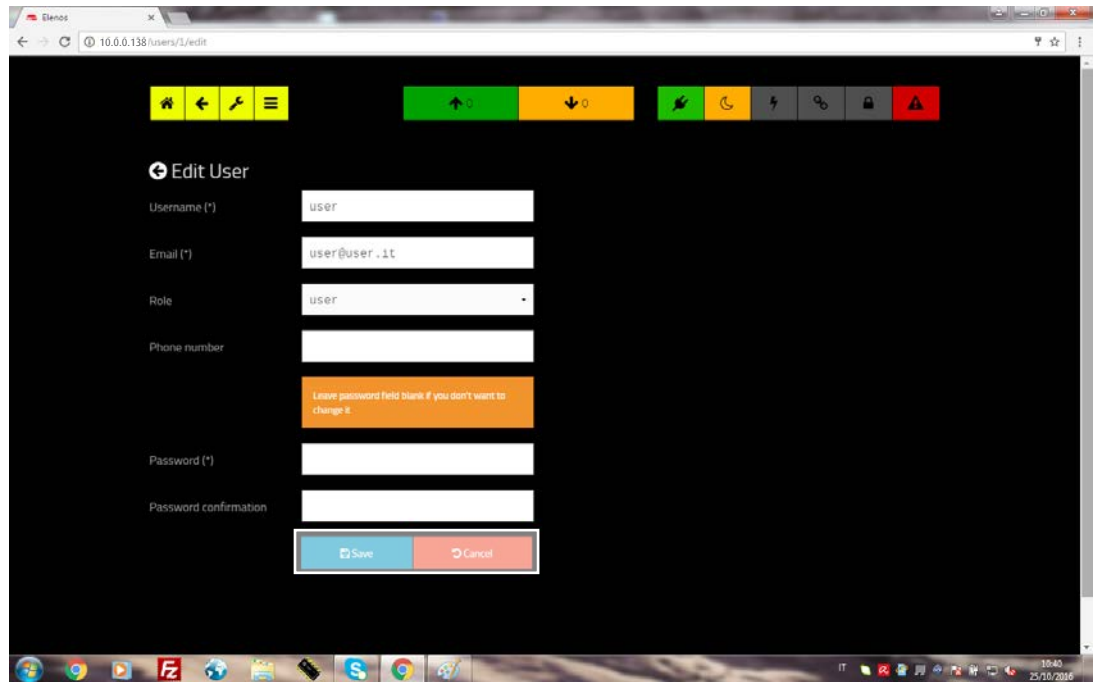
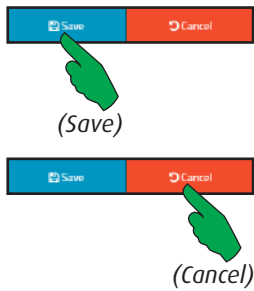
Users (accounts) can edit the their own password and preferences.



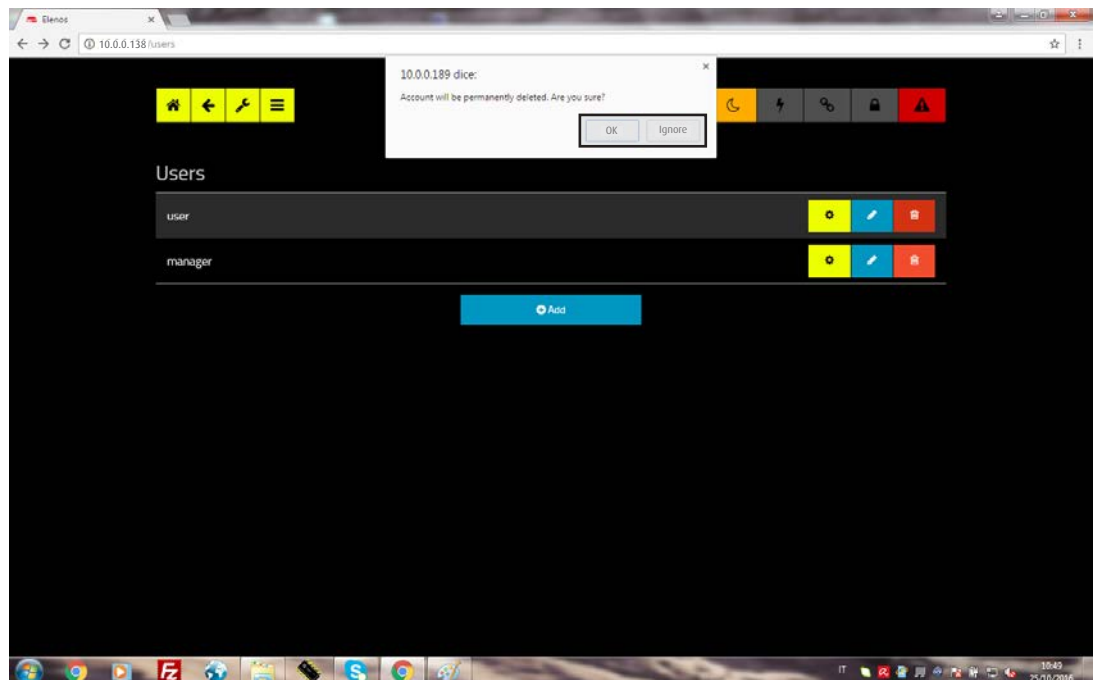
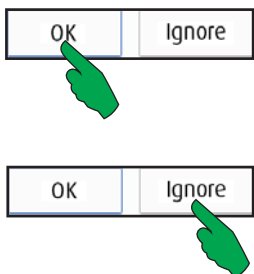
Introduction to the web interface operation.

8.0.1.2 Editing/deleting an existing account

All users, managers and administrators can change their own password. The rest of parameters can be edited only by members with higher levels of authorization.



The value of fields can be modified in according to a valid format. To not changing the password, leave blank the field "Password". Press the "Save" button to confirm or the "Cancel" button to abort the operation.



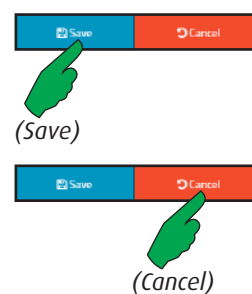
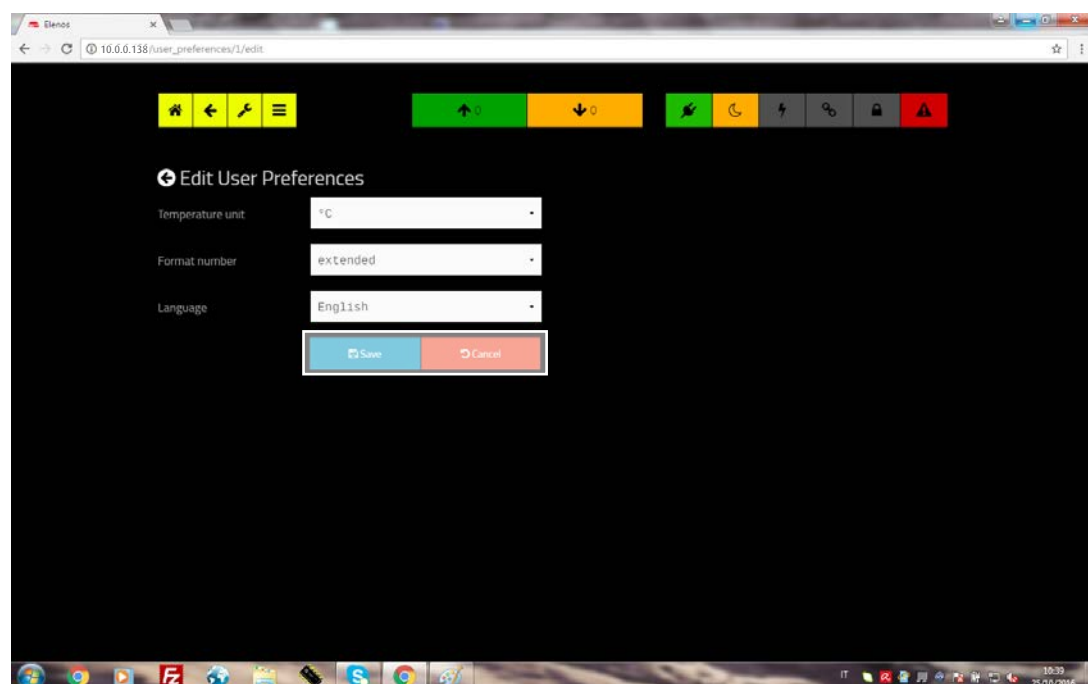
To delete an account, after selected "Delete" button, choose "Ok". To abort the operation, press the "Ignore" button.

WARNING: the account will be permanently deleted!

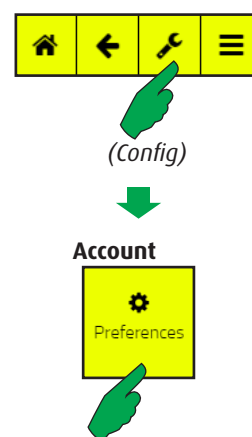
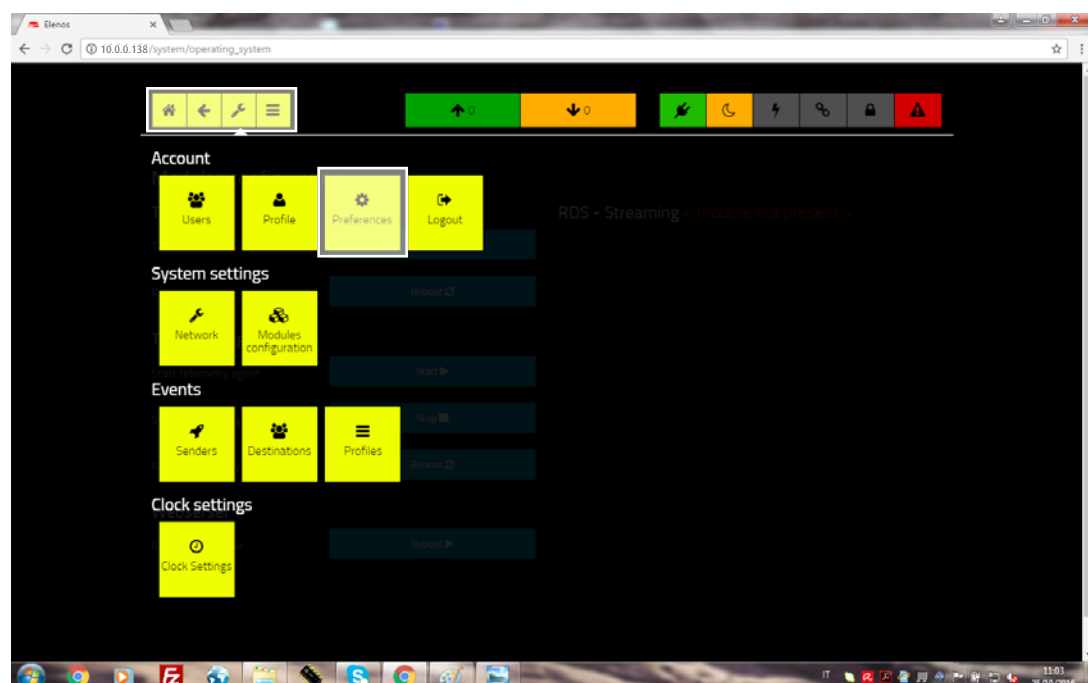


8.0.1.3 Editing the user's preferences

Some parameters of the users are customizable.



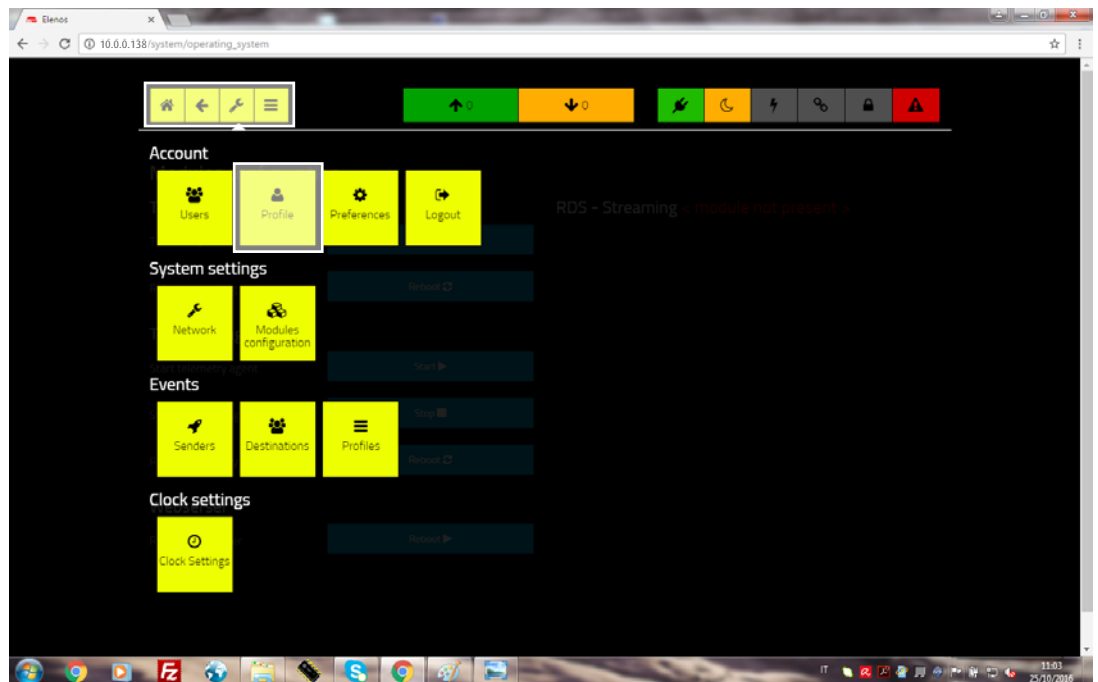
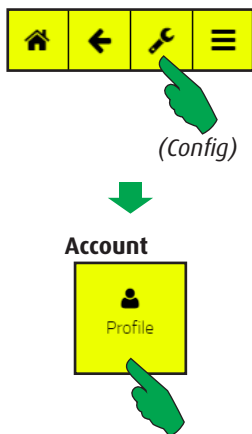
For each one it's possible to choose the scale of temperature, the format of telephone number and the language of messages.
Press the "Save" button to confirm or the "Cancel" button to abort the operation.



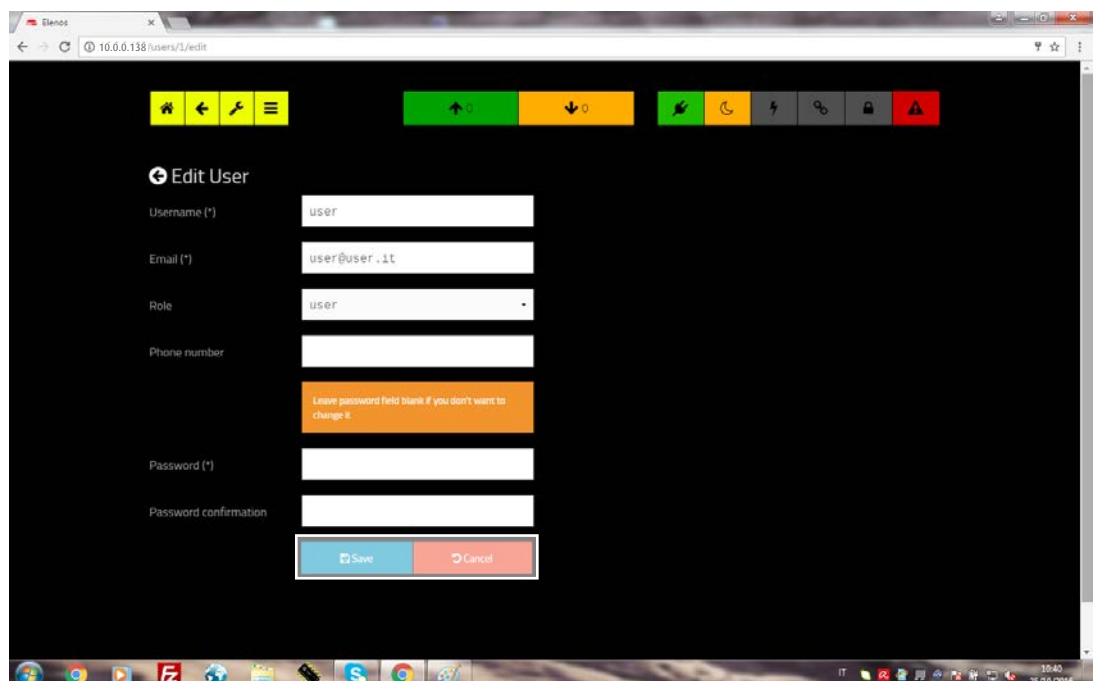
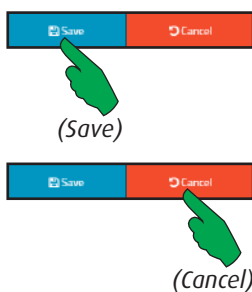
The user's preferences editor is available also via pressing "Preferences" button in the "Account" bar.

8.0.2 Profiles

8.0.2.1 Reconfiguring the own account.



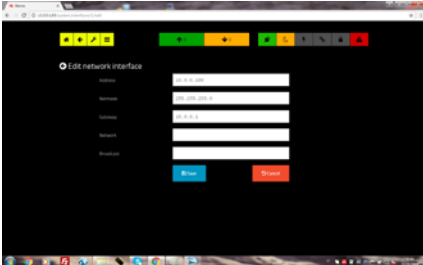
Each user is authorized to change parameters of the own account, such as Password or Username.



To hold the password leave blank its field. Fields marked with an asterisk are required. The email address must be written in a valid format. Press the "Save" button to confirm or the "Cancel" button to abort the operation.

8.1 System

Overview



Network interface parameters.

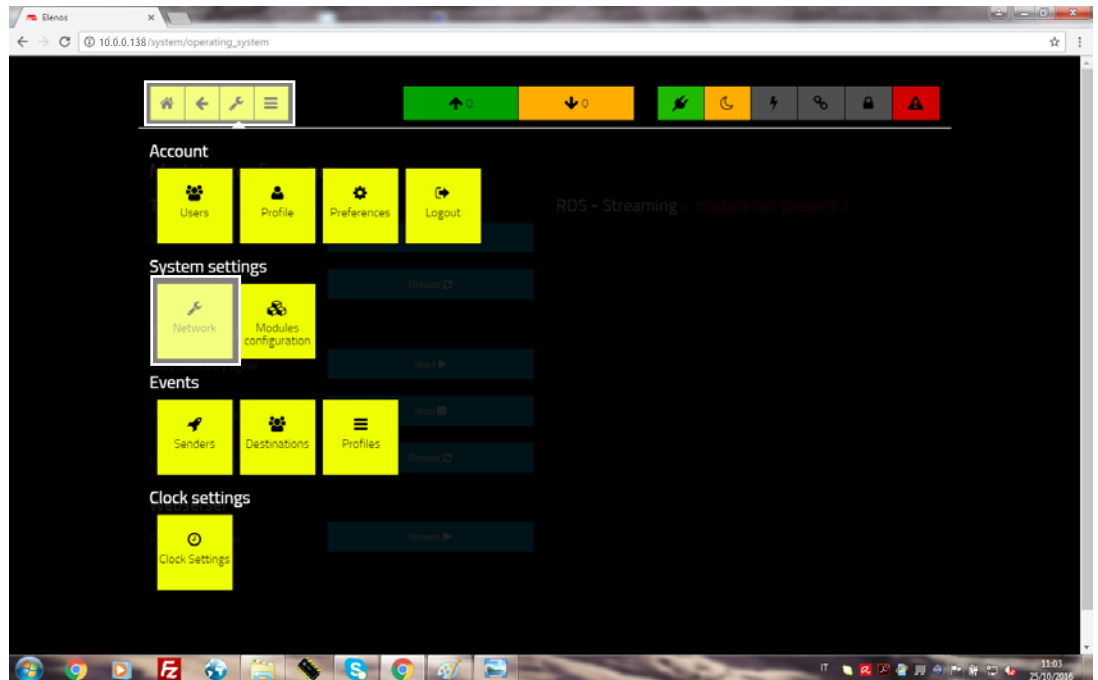
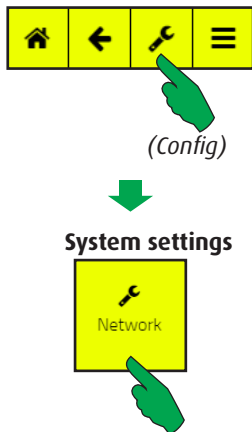


Installed modules configuration.

8.1.1 System Settings

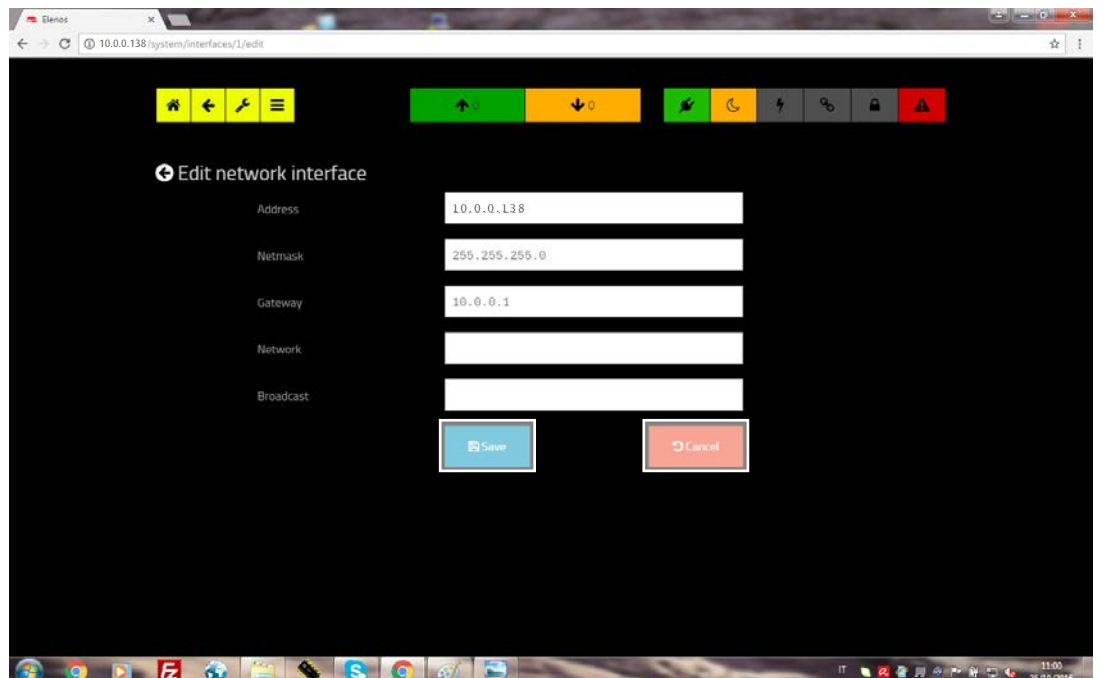
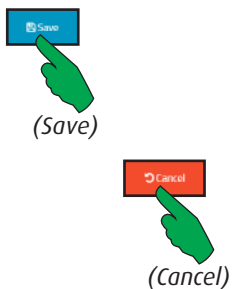
8.1.1.1 Network

Network parameters and internal configuration of equipment (optional boards installed).



First select the “Config” button, then the “Network” button in the “System settings” bar. IP address, Netmask and Gateway are here editable.

Only the local network administrator is authorized to change this data.



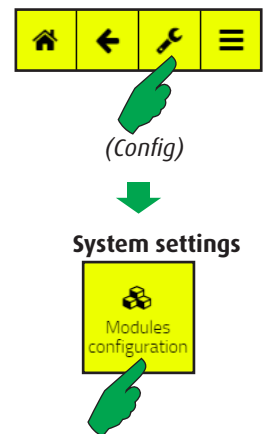
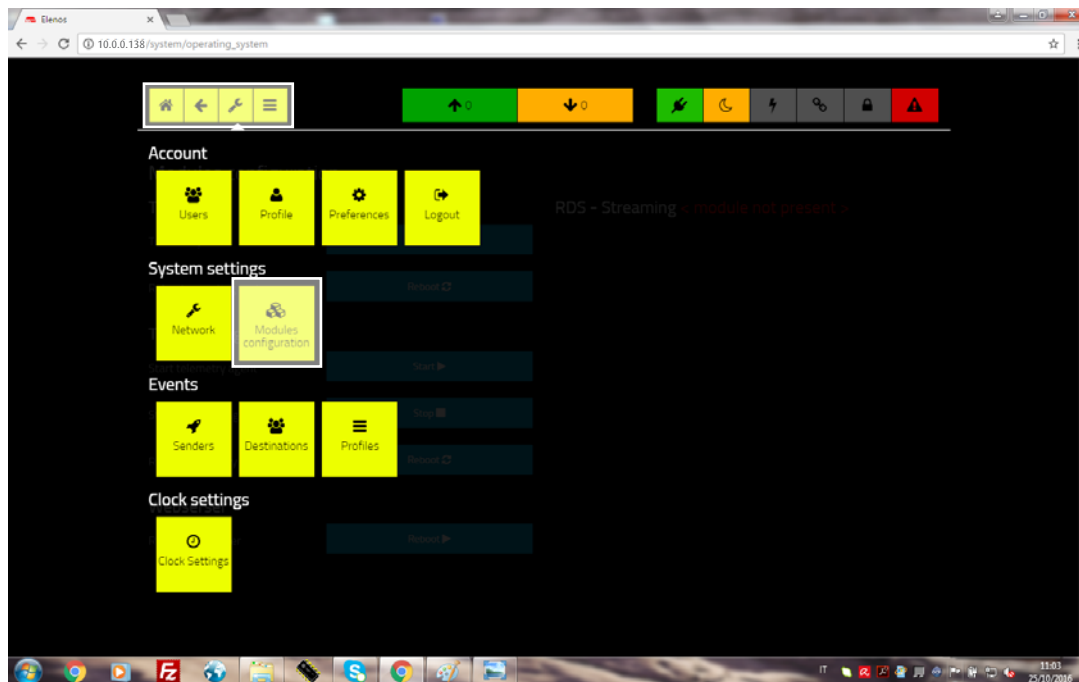
The factory default is: 10.0.0.138 - 255.255.255.0 - 10.0.0.1. In this screen it's also possible to enter additional non-mandatory information on the LAN (Network and Broadcast). Press the “Save” button to confirm or the “Cancel” button to abort the operation.

When the address is changed the connection must be restarted with the new one.

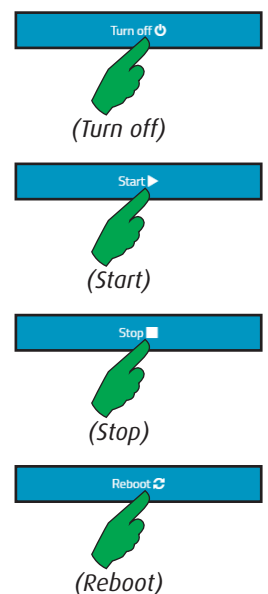
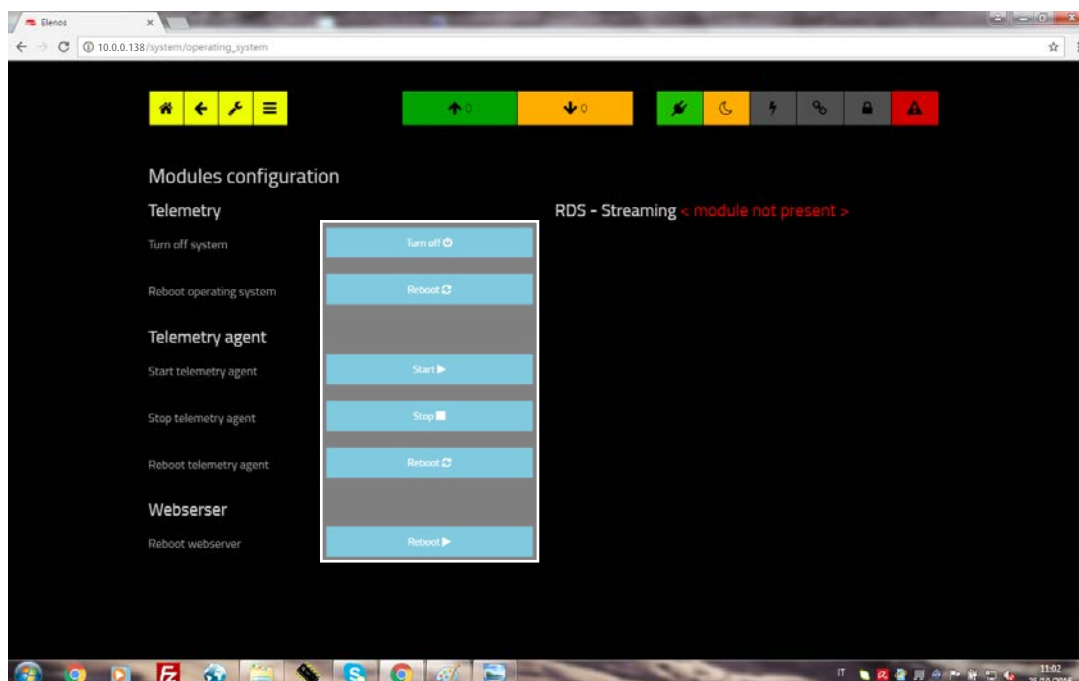


8.1.1.2 Modules configuration

The equipment may be provided in basic configuration or with optional modules.
The list of modules displayed depends on the specific configuration.



For their managing, first select the “Config” button, then the “Modules configuration” button in the “System settings” bar.



Basic set of the equipment includes Telemetry and Webserver modules.
The first one is composed by hardware and firmware. Hardware can be rebooted and turned off; firmware (Telemetry agent) can be started, stopped and rebooted.
The second one may only be rebooted.

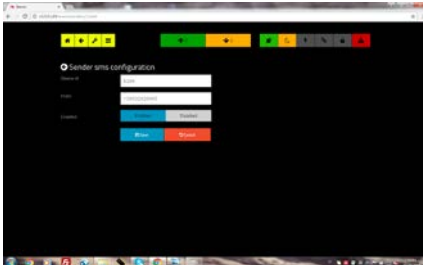
WARNING: by turning off the telemetry the website will stop working.



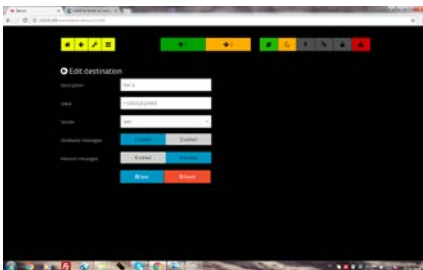
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8.2 Events

Overview



Senders configuration.
The equipment may send both SMS and email.



Destinations management.
They are the email addresses or the phone numbers of who receive the messages.

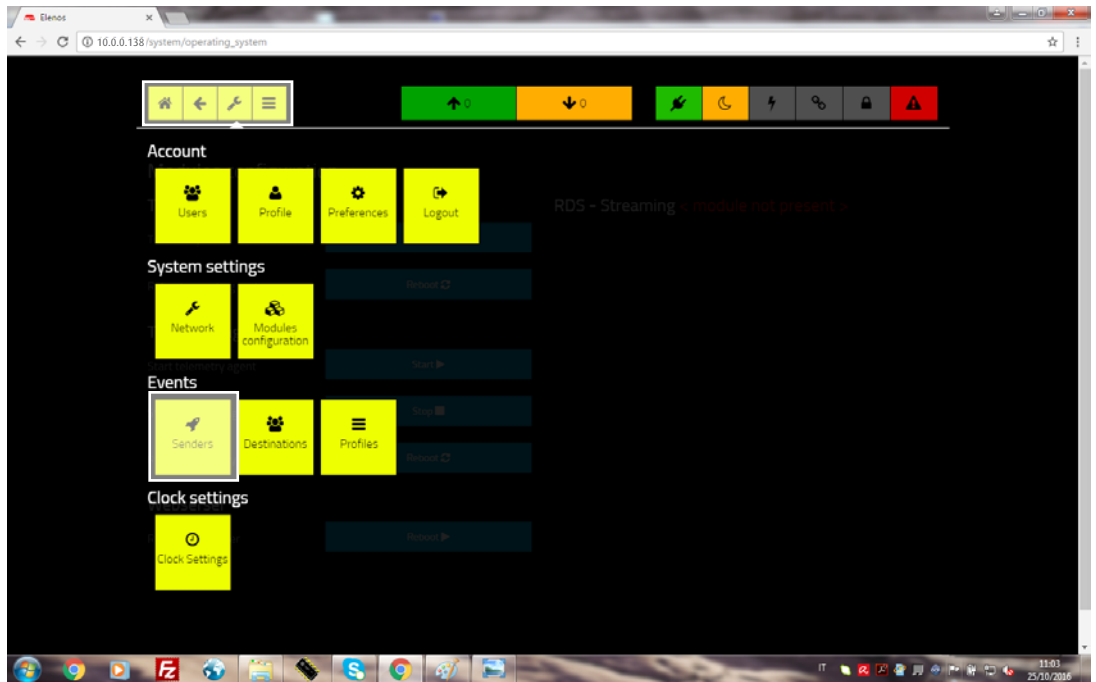
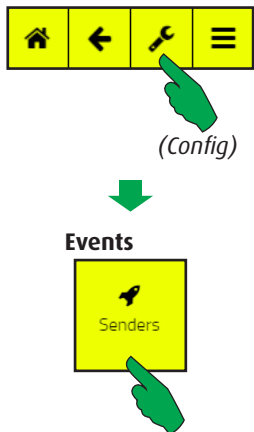


Profiles management.
It allows to customize the information set to send to the destinations.

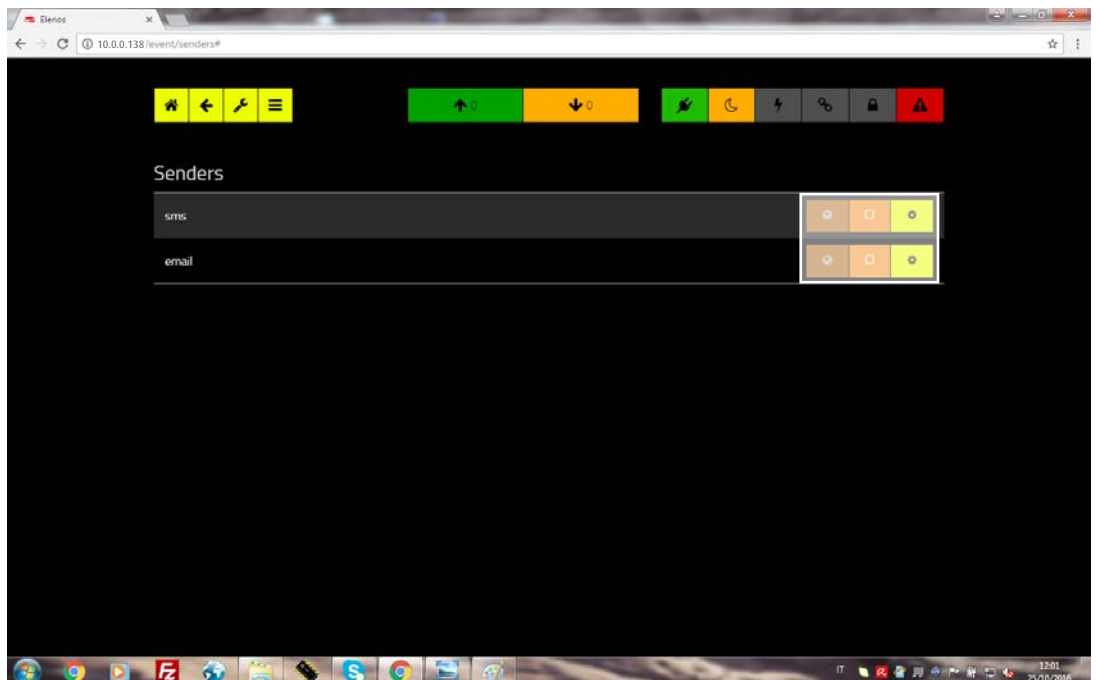
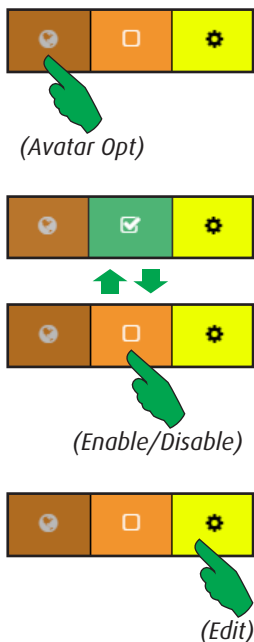
8.2.1 Events

8.2.1.1 Senders management

The equipment can send/receive SMS and send email.



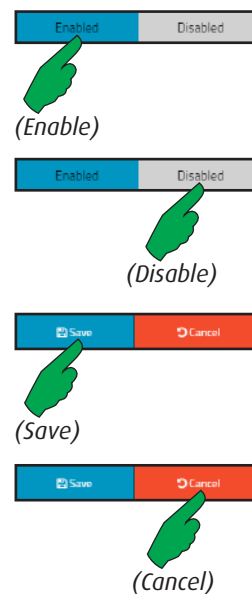
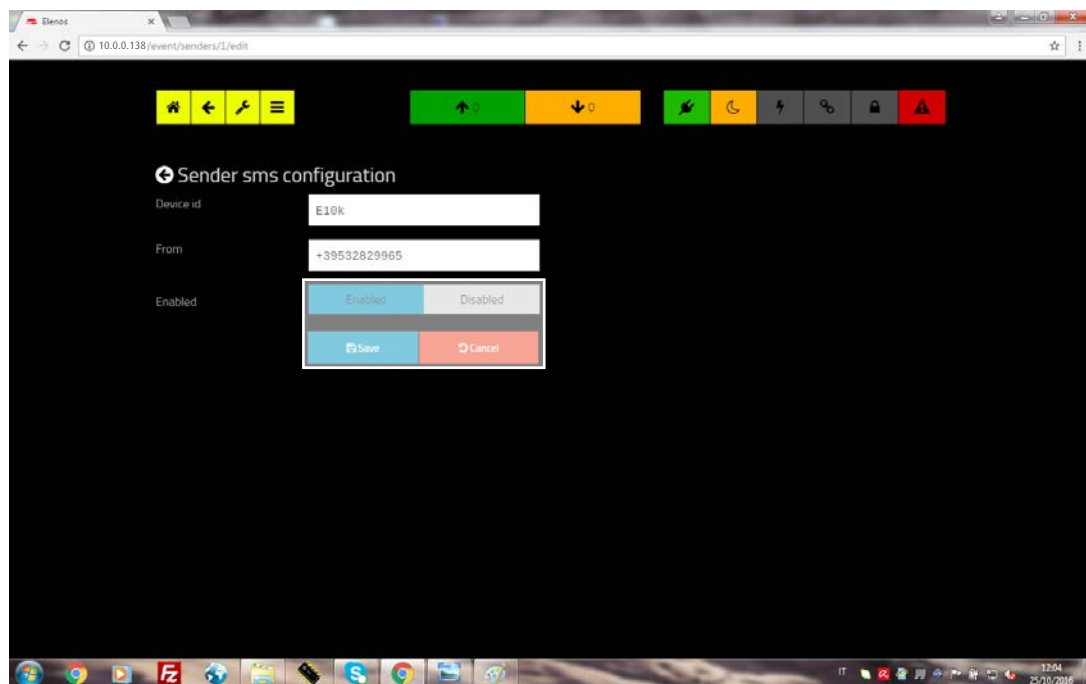
In the main screen, first select the “Config” button, then the “Senders” button in the “Events” bar.



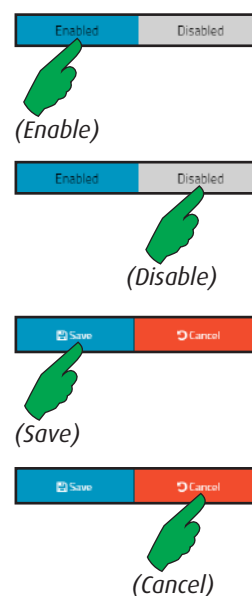
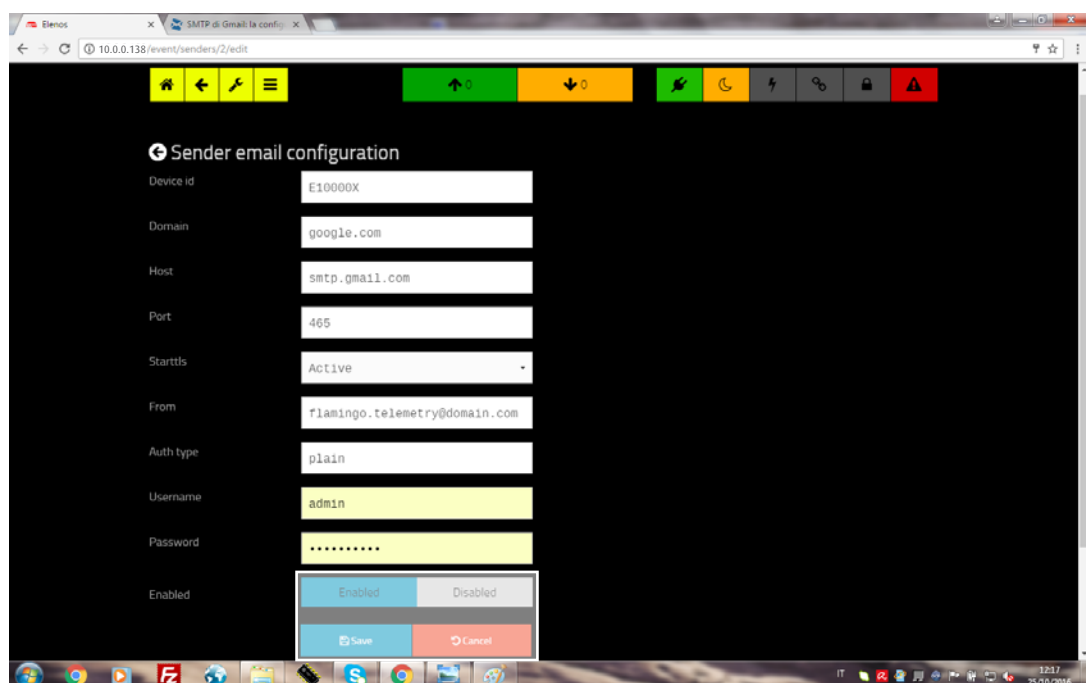
The “Avatar Opt” button allows to enable/disable the use of the Avatar equipment (optional). Press “Enable/Disable” button to select which one sender may be active. The “Edit” button gets into the mask for editing the sender’s data.

8.2.1.2 Sender SMS/email configuration

If the equipment must send SMS, press the “Edit” button in the “SMS” bar. The following editing mask will appear.



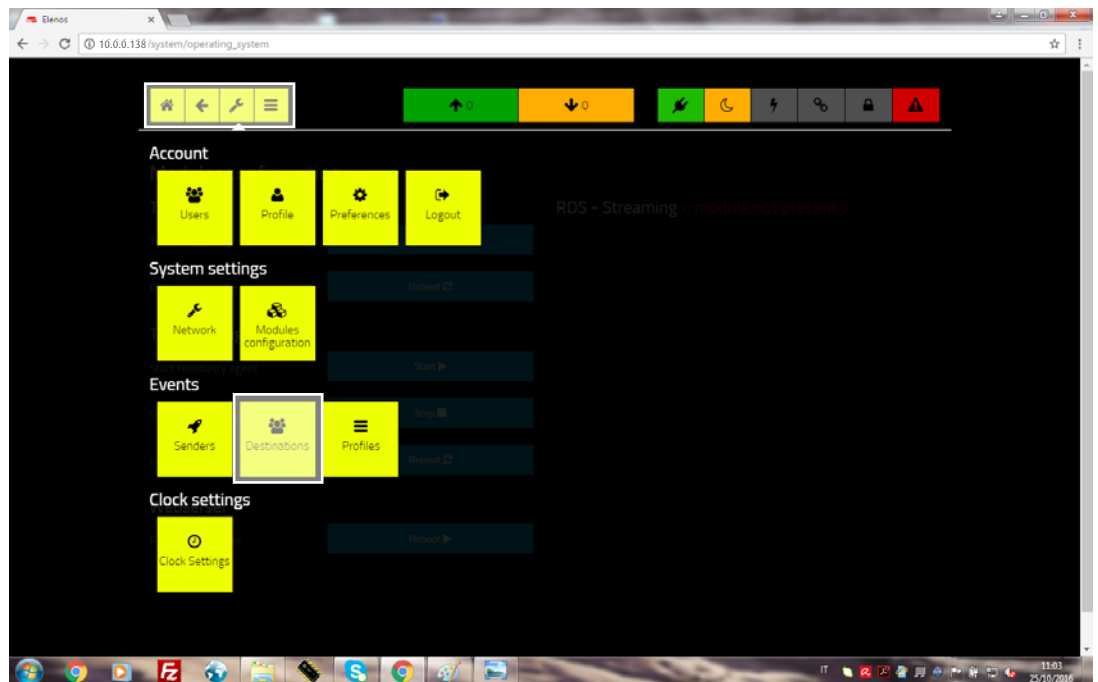
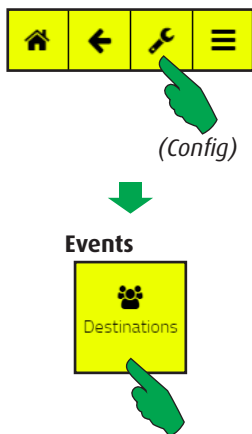
“Device id” is the name that will be wrote in the message sent; “From” is the telephone number (modem). The “Enable” button activates this feature; the “Disable” one deactivates it. Press the “Save” button to confirm or the “Cancel” button to abort the operation.



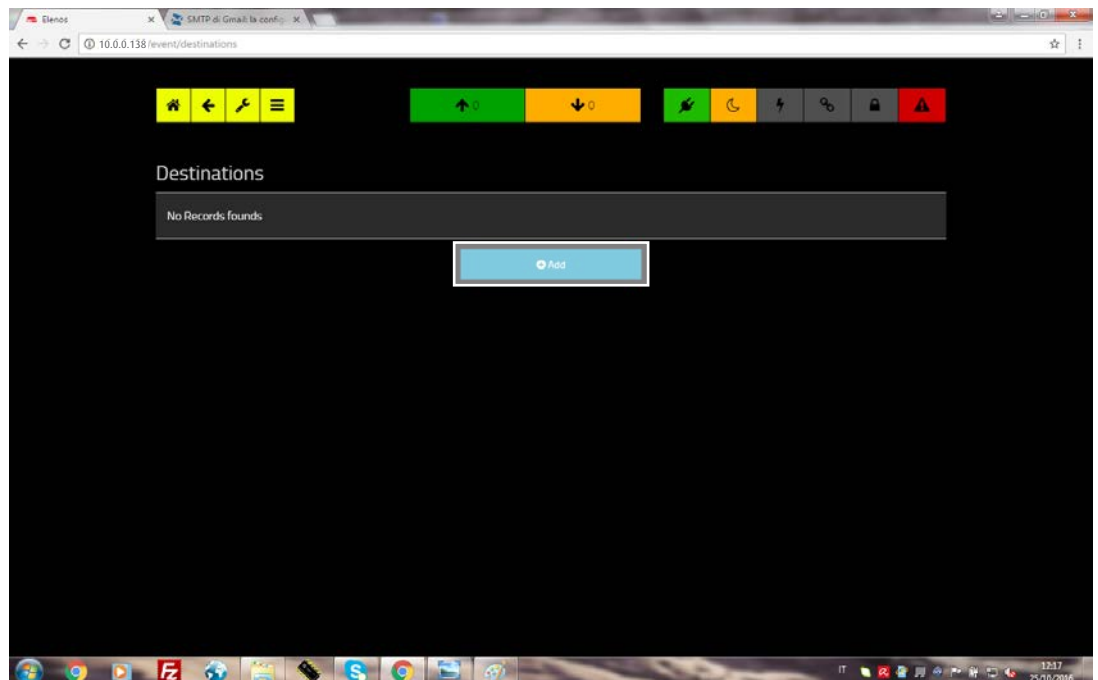
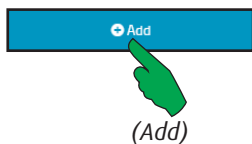
To allows sending emails, this mask must be completed by the network administrator with all required parameters. The “Enable” button activates this feature; the “Disable” one deactivates it. Press the “Save” button to confirm or the “Cancel” button to abort the operation.

8.2.1.3 Destinations management

Destinations are the receivers of SMS and/or email sent by the equipment.



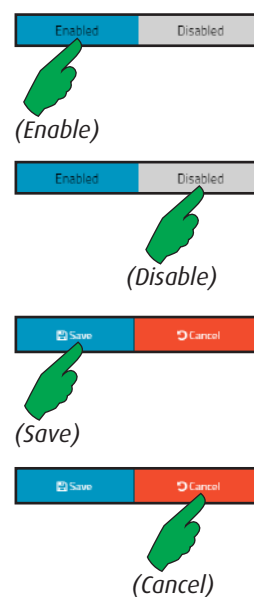
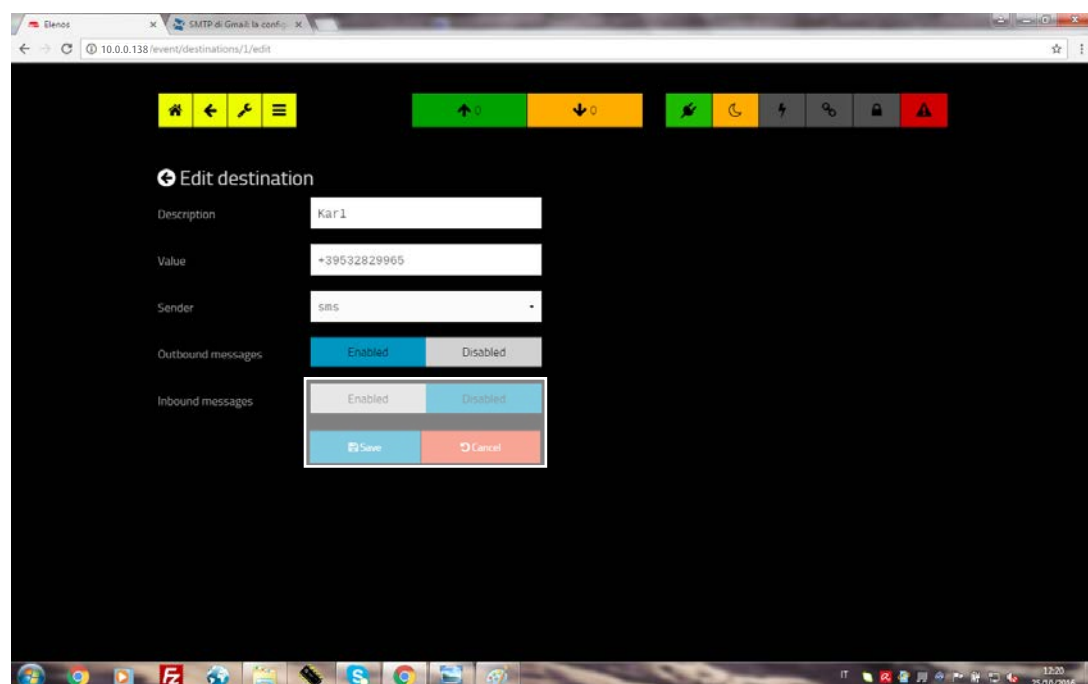
In the main screen, first select the "Config" button, then the "Destinations" button in the "Events" bar.



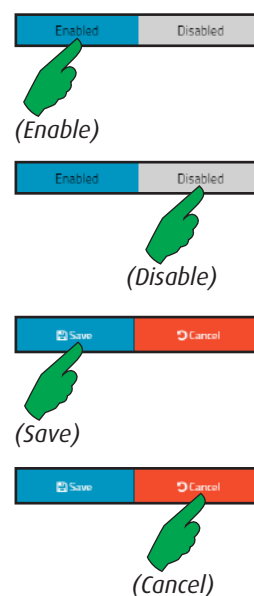
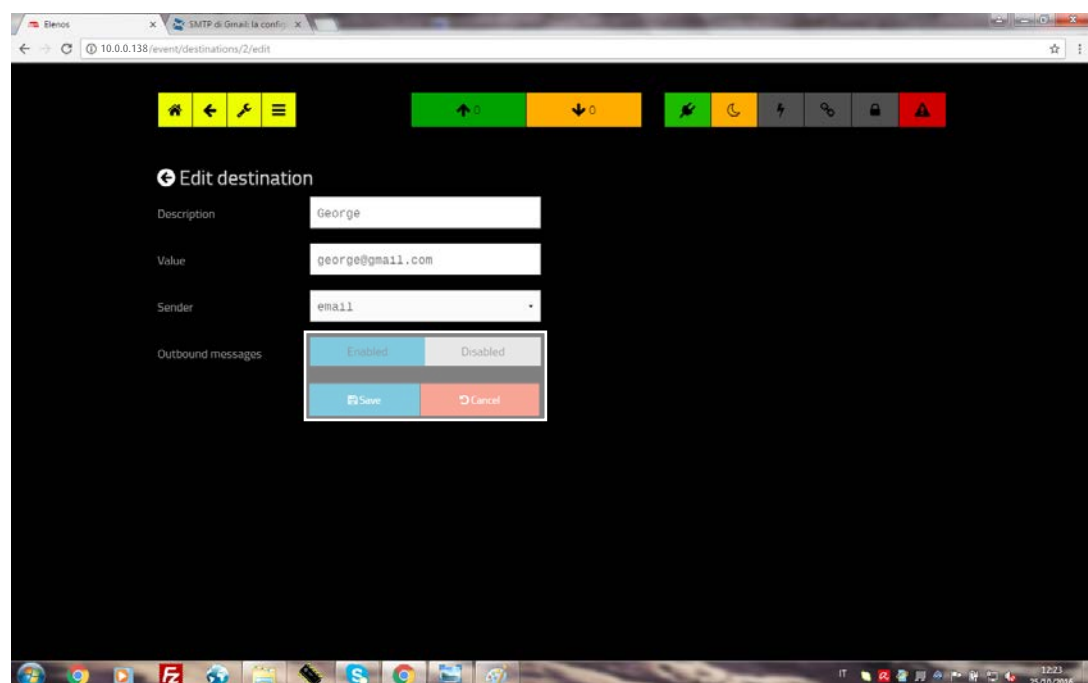
This section allows to relate senders with receivers of SMS and/or email. Initially the list is void, but new records can be added by authorized users. Press "Add" button to get into the editing mask.

8.2.1.4 Adding a new destination

Editing destination mask. The contents may be different depending on the kind of sender selected.



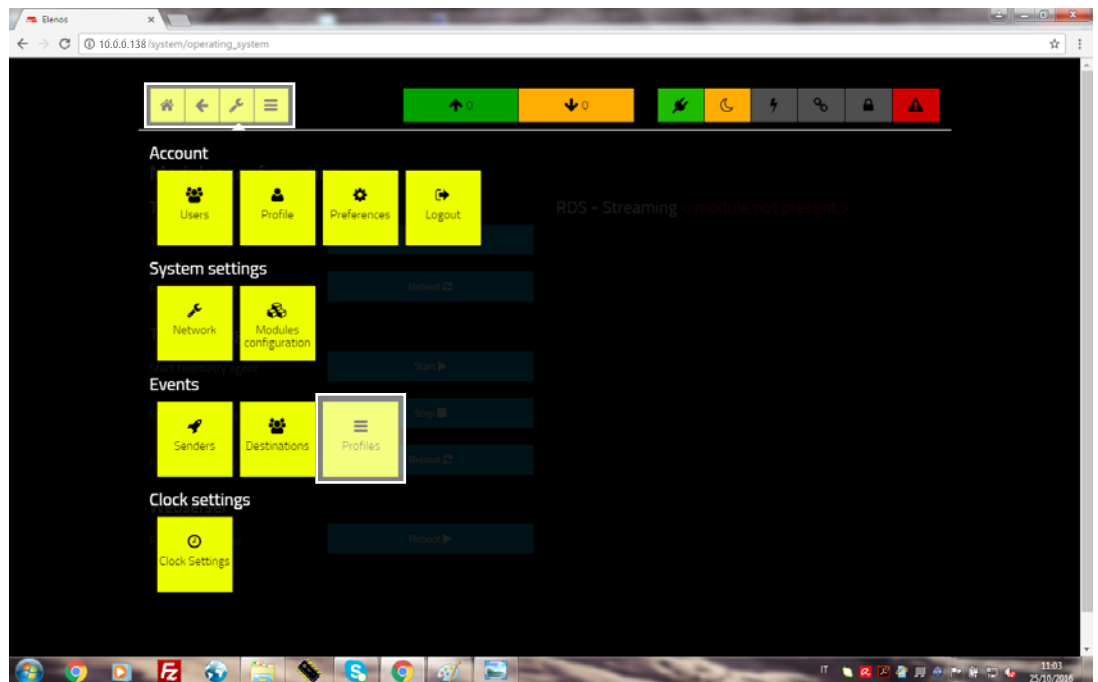
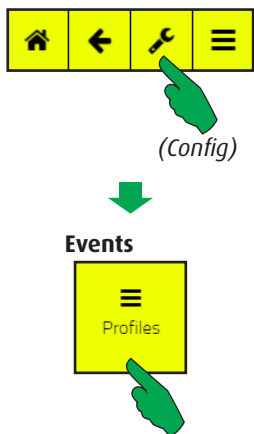
A destination is a mobile number which receives the messages sent by the equipment. In addition, the owner's name can be entered in the "Description" field. Press the "Save" button to confirm or the "Cancel" button to abort the operation.



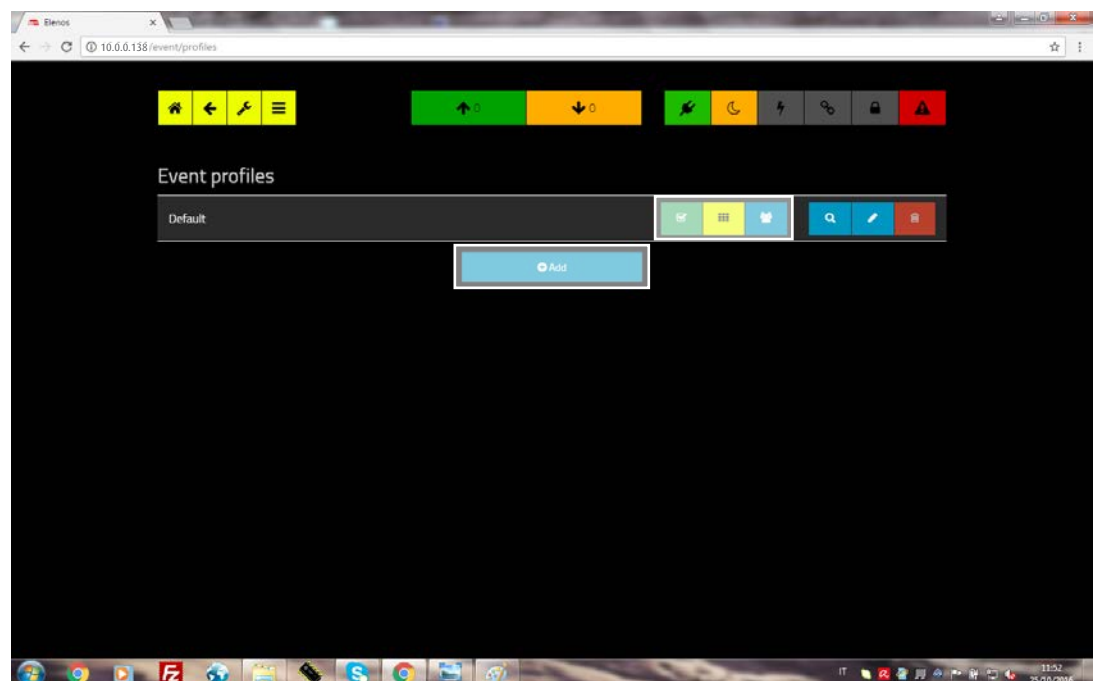
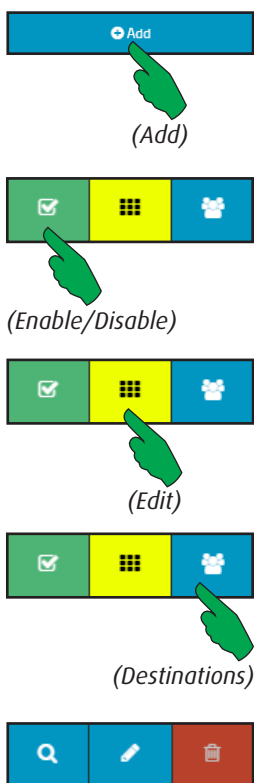
Case in which the destination is an email address.

8.2.1.5 Profiles management

Profiles of event lists which will be sent to the destinations in case of occurrence.



In the main screen, first select the "Config" button, then the "Profile" button in the "Events" bar.



Initially the list has only one profile named "Default" which contains all the possible events. This one can be customized and saved with the changes, however it's preferable to add new ones by giving them mnemonic names to identify their scope more quickly. See also next pages for further information.

8.2.1.6 Selecting the events to add to profiles

Events (“Default” profile in the example).

The screenshot shows the 'Profile Default Events Management' interface. It has four main sections: Alerts (red boxes), Warnings (brown boxes), Defaults (blue boxes), and Successes (green boxes). Each section contains a grid of event buttons. Some buttons have a checkmark (selected) or an X (unselected). To the right of the screenshot, a series of five diagrams illustrate the selection process:

- 1. A green hand points to the 'Psu Current Derating' button in the Warnings section, which is highlighted in orange and has a checkmark. Below it is the text '(Selected)'.
- 2. A green hand points to the 'Psu Low Power' button in the Warnings section, which is highlighted in brown and has an X. Below it is the text '(Unselected)'.
- 3. A green hand points to the 'Undo' button in the bottom toolbar. Below it is the text '(Undo)'.
- 4. A green hand points to the 'Select all' button in the bottom toolbar. Below it is the text '(Select all)'.
- 5. A green hand points to the 'Clear selection' button in the bottom toolbar. Below it is the text '(Clear selection)'.
- 6. A green hand points to the 'Save' button in the bottom toolbar. Below it is the text '(Save)'.

All events are grouped in four classes:

- **Alerts** (critical errors or failures that may require repair);
- **Warnings** (events that don't require repair immediately);
- **Defaults** (equipment current status);
- **Successes** (most important targets);

To customize the current profile (its name is shown at the top) select/unselect the events to combine to the destination.

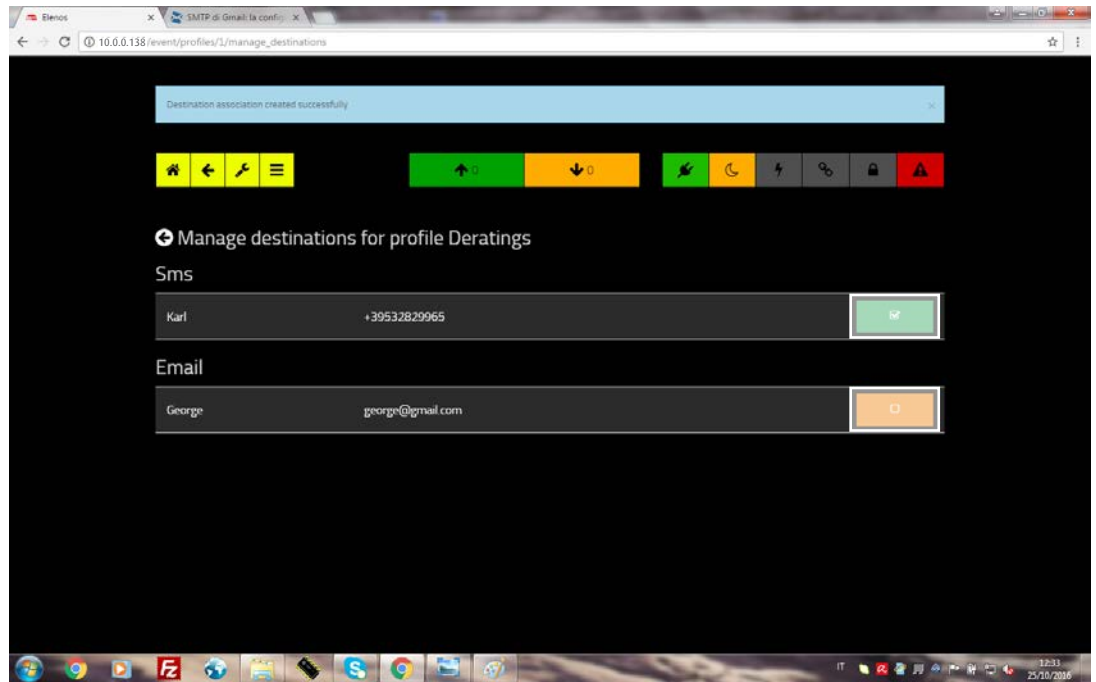
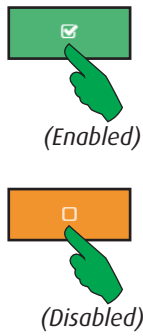
By default all events are deselected. Press one time an event button to add it to the profile, press again to remove it.

It's also possible select all events by pressing the “Select all” button, or deselect all by “Clear selection” one.

“Undo” button restores the profile and “Save” confirms the changes.

8.2.1.7 Destinations profile management

After selecting “Destination” button at the previous screen, the list of available destinations appears, both for SMS and email.



For each profile it's possible to choose which destinations to enable. More destinations can be added to the same profile.

8.3 RTC/UTC

Overview

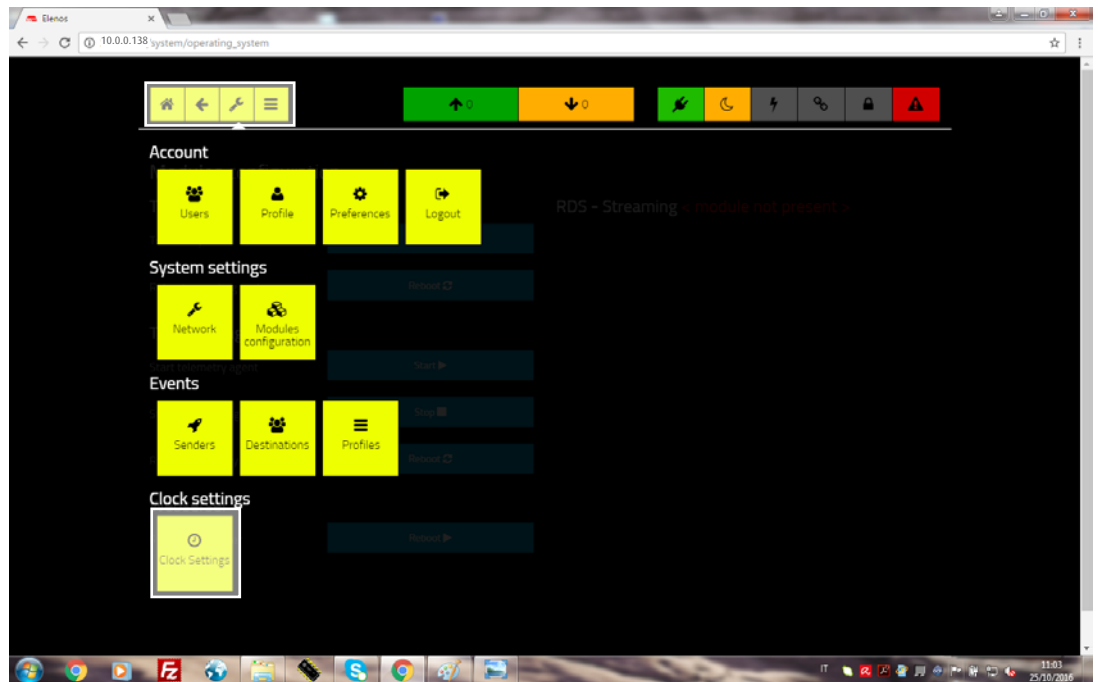
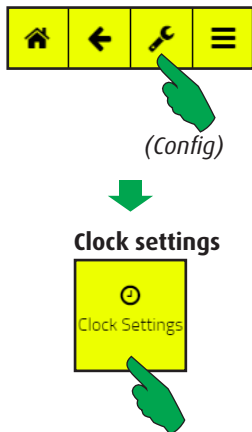


Clock settings.

It's possible to choose between the internal time reference (Real Time Clock) and the global one (Coordinated Universal Time).

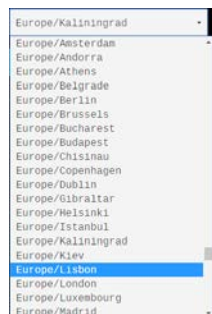
8.3.1 Clock Settings

Selecting the time reference



In the main screen, first select the “Config” button, then the “Clock Settings” button in the “Clock settings” bar.

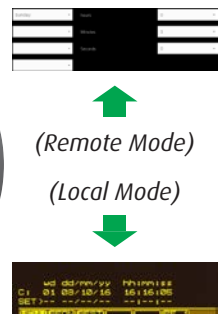
NOTE



UTC (Coordinated Universal Time)
External RTC



RTC (Real Time Clock)
Internal Clock



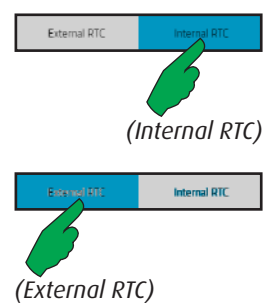
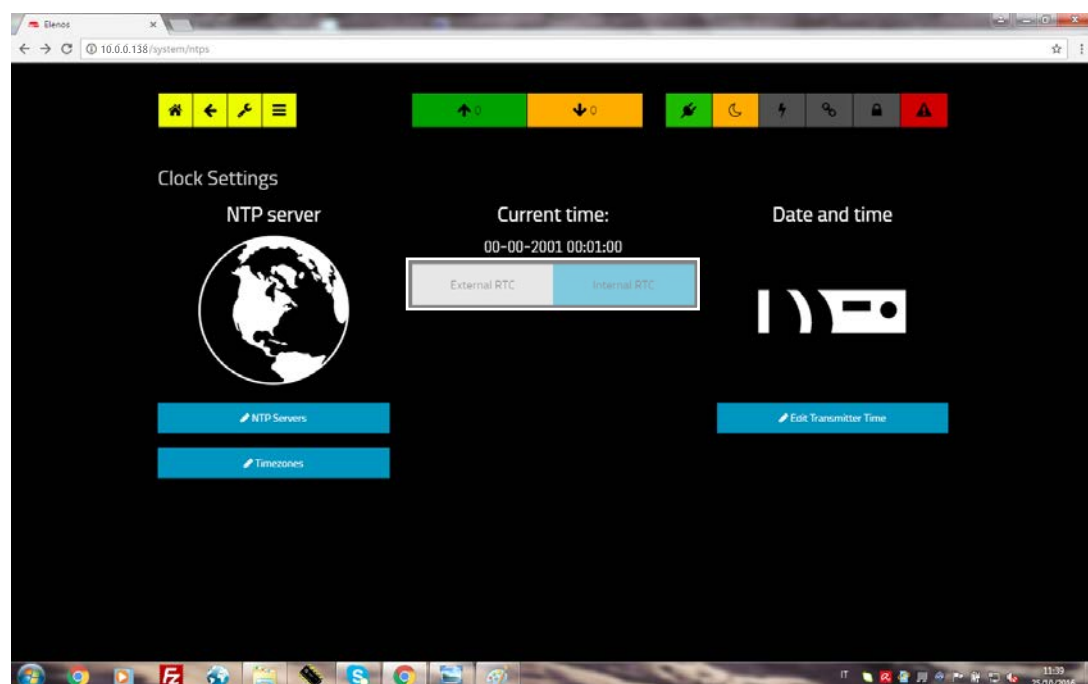
It's possible to choose if using the internal clock or an external one as system time reference.

By the external clock the system receives the time from a preset list of public NTP server. To properly display date and time it's necessary to select the appropriate timezone from the list of those ones available. Obviously, an internet connection is required.

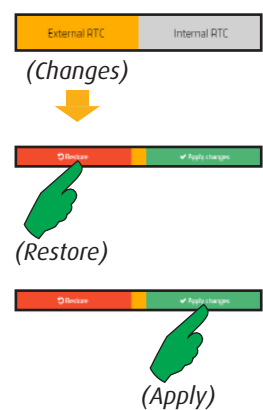
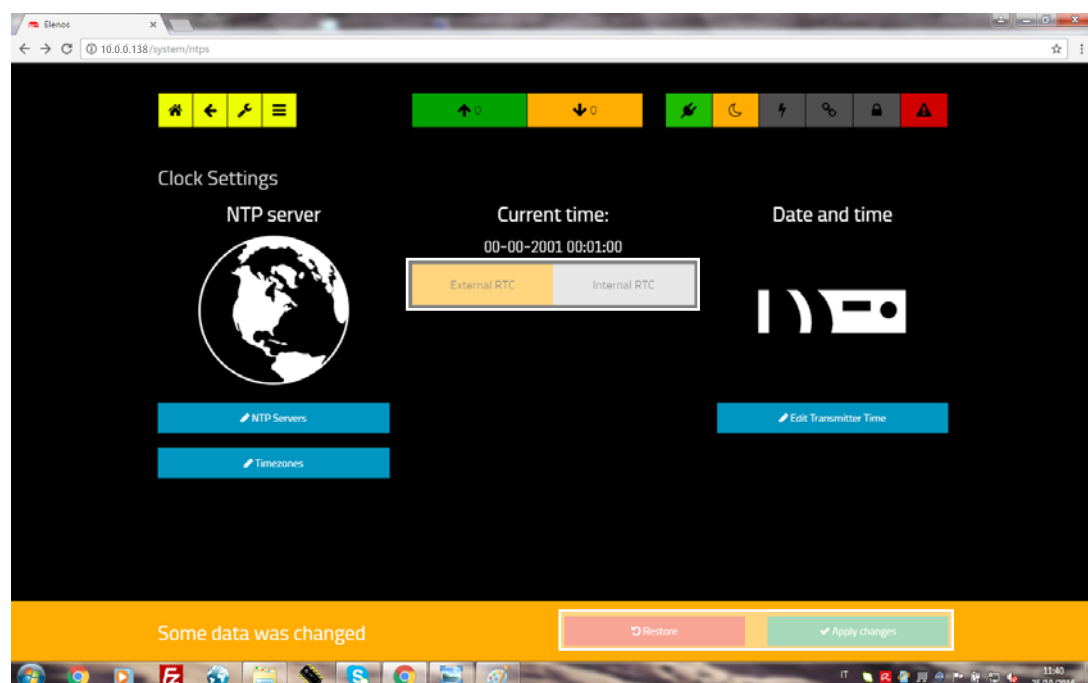
For using the internal clock, it will must be manually adjusted, both in Local and in Remote mode (see the User Manual for the last one).

8.3.1.1 Choosing between external and internal RTC

Selectable buttons are highlighted in blue.



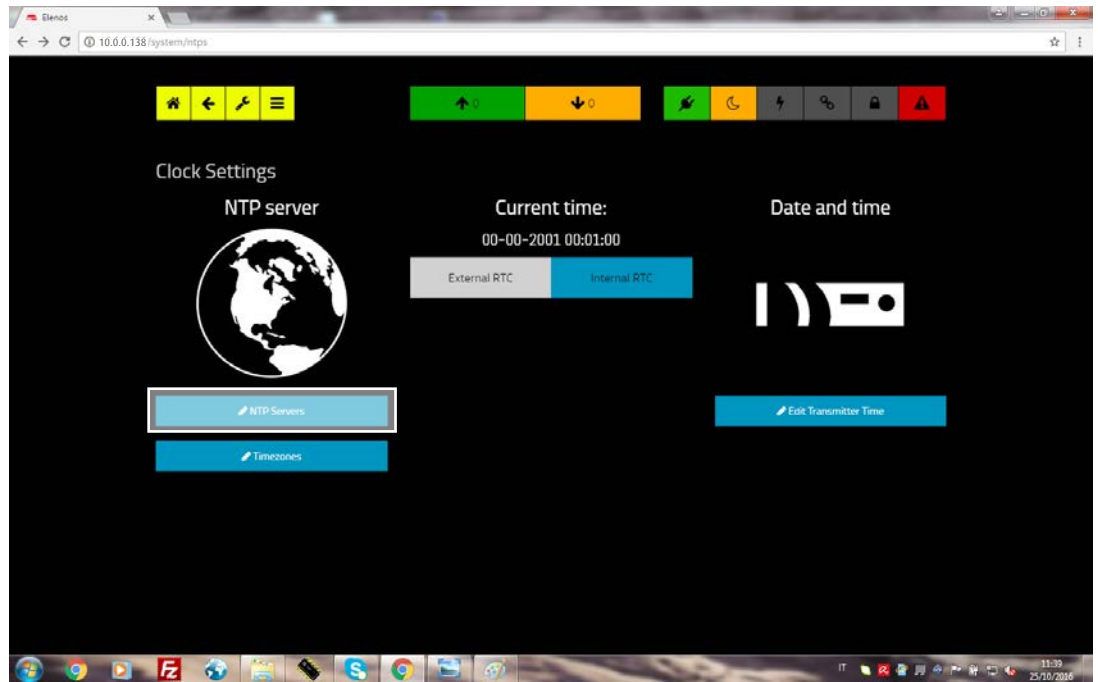
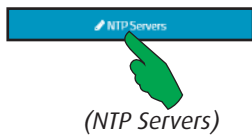
Press "External RTC" or "Internal RTC" button to toggle between the two modes.



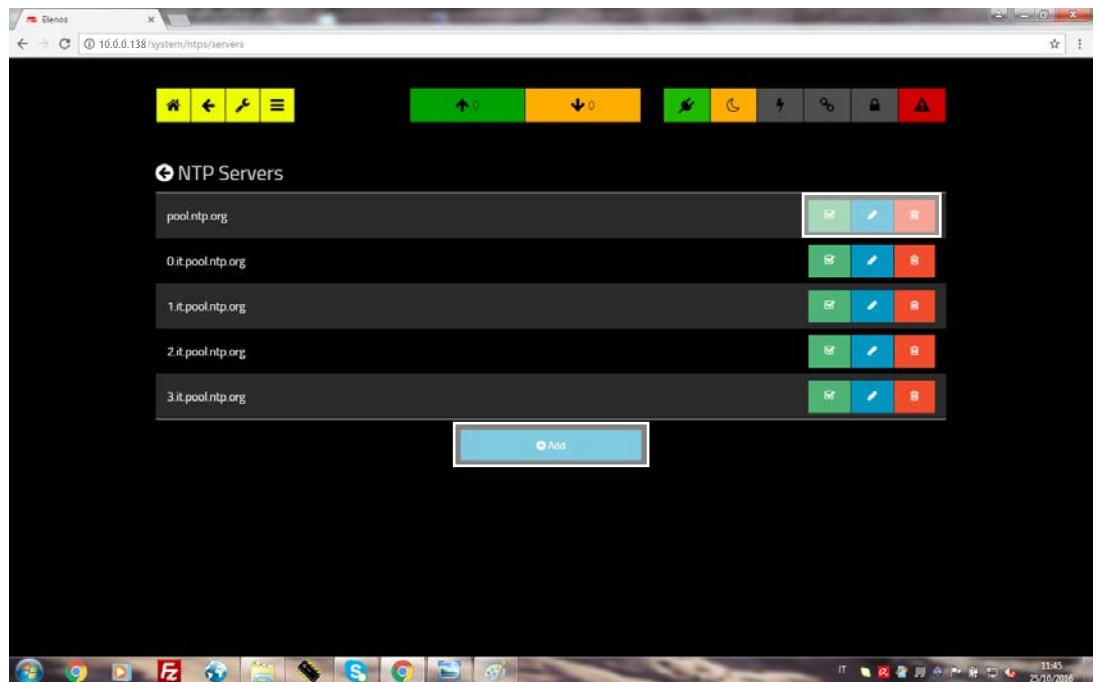
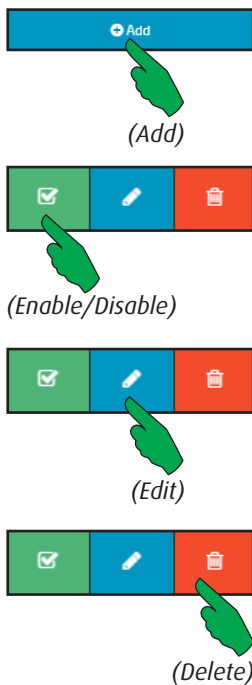
If the choice results in a change, the button turns orange and a confirmation is requested. "Restore" button allows to ignore the changes, while "Apply changes" confirms them.

8.3.1.2 Choosing a NTP server

A list of default NTP servers is stored in factory.



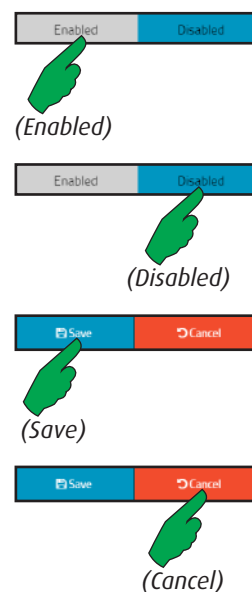
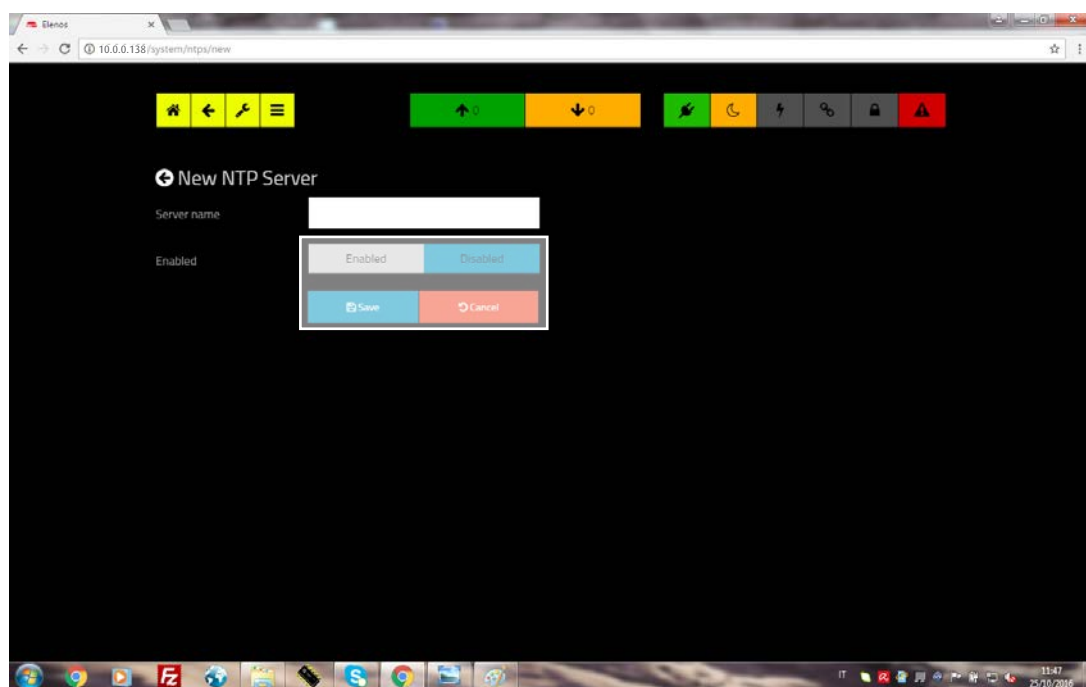
Press the “NTP server” button to enter and scroll through the list.



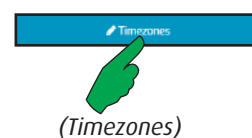
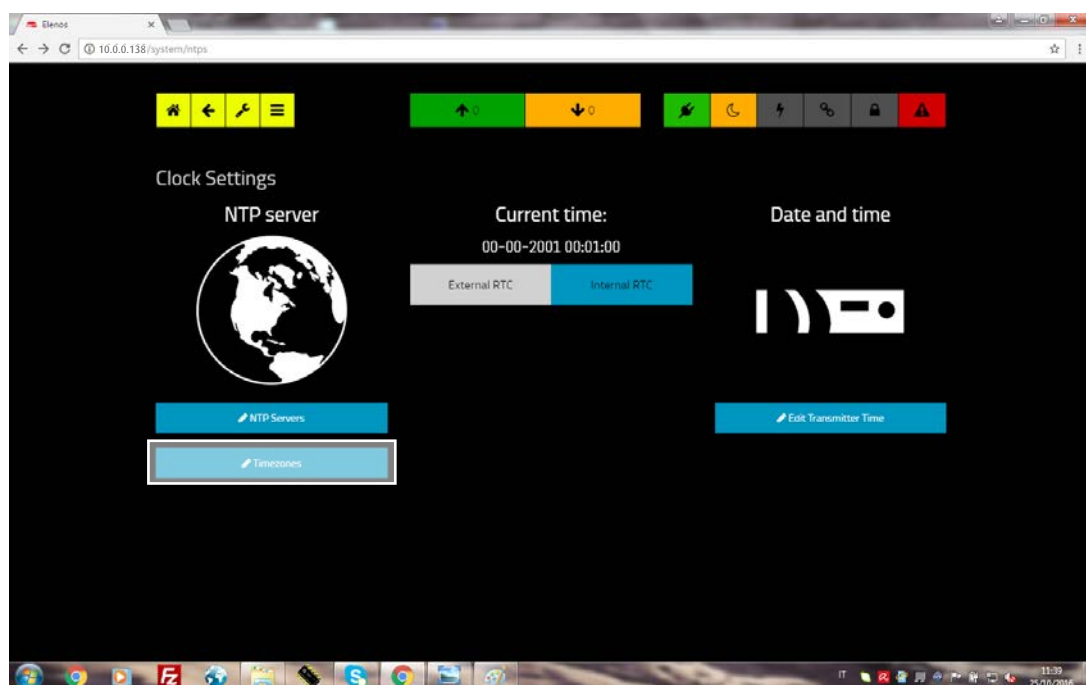
The “Add” button allows to insert a new NTP server (see next page). Press the “Enable/Disable” button to activate/deactivate the selected server (when the symbol “✓” is shown and the button is green the server is active). The “Edit” button allows to modify the server parameters, while by pressing “Delete” button the current record will be removed after confirmation.

8.3.1.3 Adding a new NTP server

A new NTP server can be added to the list.



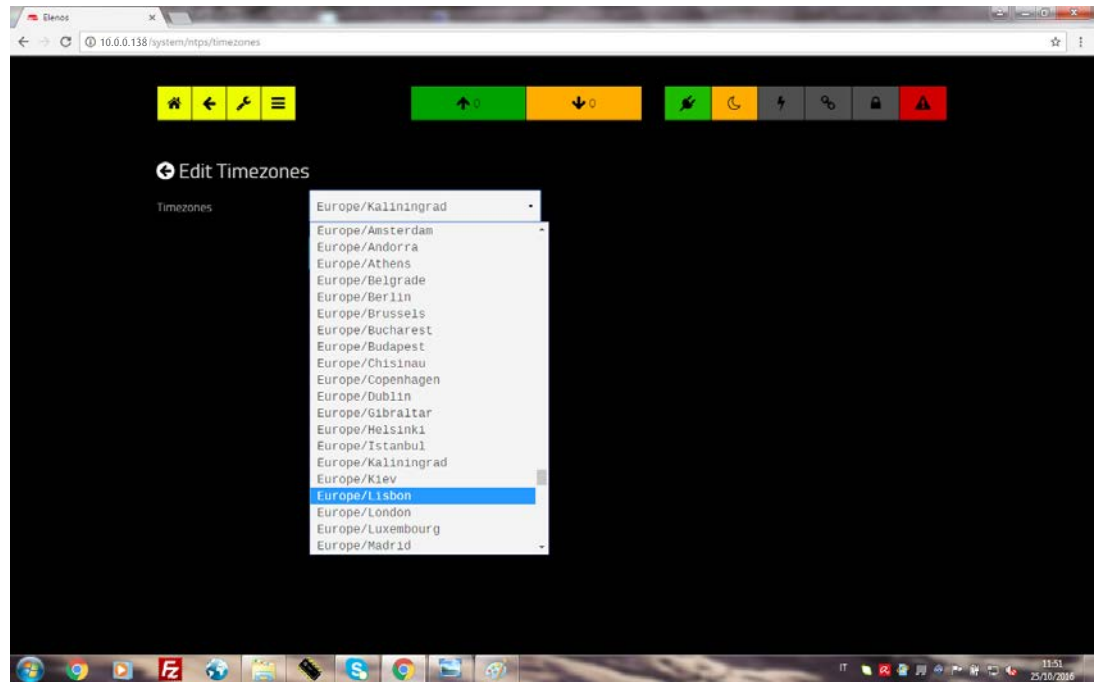
To define a new server it's necessary enter its name ("Server name") correctly. It's also possible to enable/disable it. The "Save" button allows to store the new server, while by pressing the "Cancel" button the current operation is aborted.



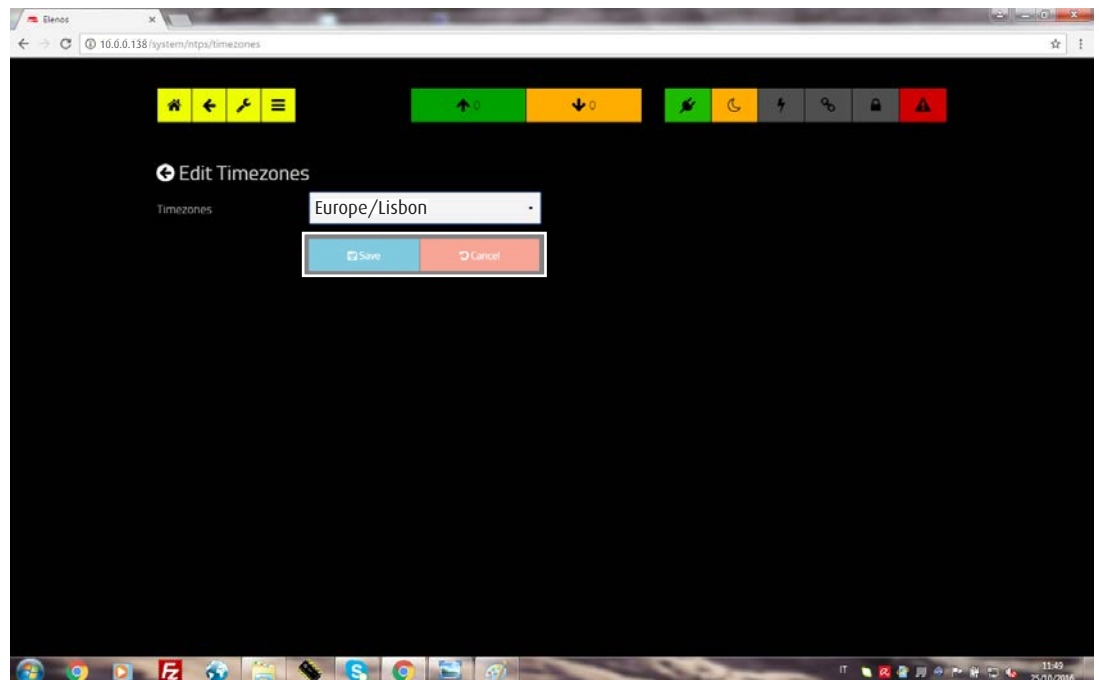
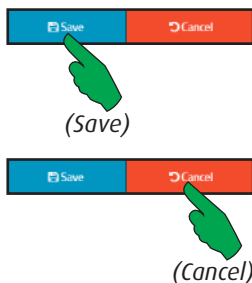
To complete the setting of the external RTC, it's necessary choosing a proper time zone. Press the "Timezones" button to enter and scroll through the list.

8.3.1.4 Choosing the Timezone

A complete list of timezones is stored in factory.



A popup containing all the timezones is available after pressing the down arrow shown at the right side of the box.



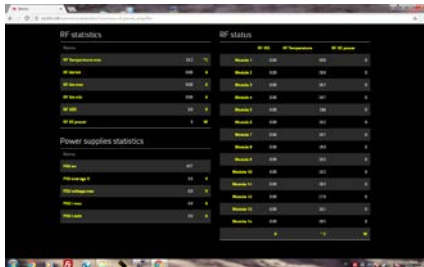
Press "Save" button to store the changes, "Cancel" to restore all values.



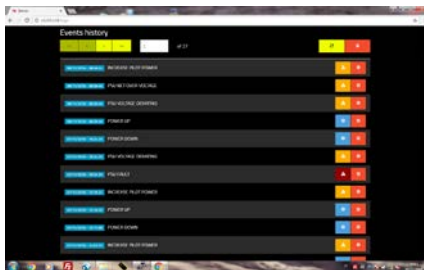
WARNING: in order to ensure that all automatisms will work correctly, choose the timezone of the country in which the equipment is installed.

8.4 User interface

Overview



Telemetry.
Viewing and settings of all equipment parameters grouped by type.



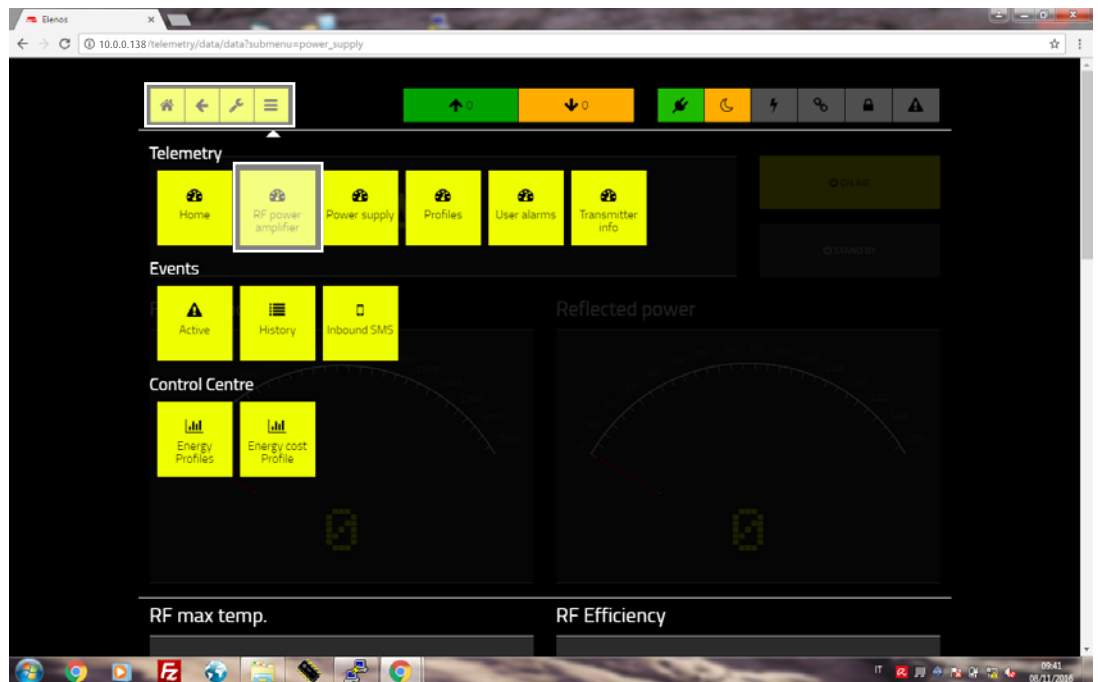
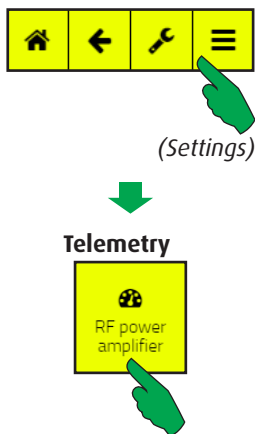
Events.
All kind of information about the working state, grouped by warning level.



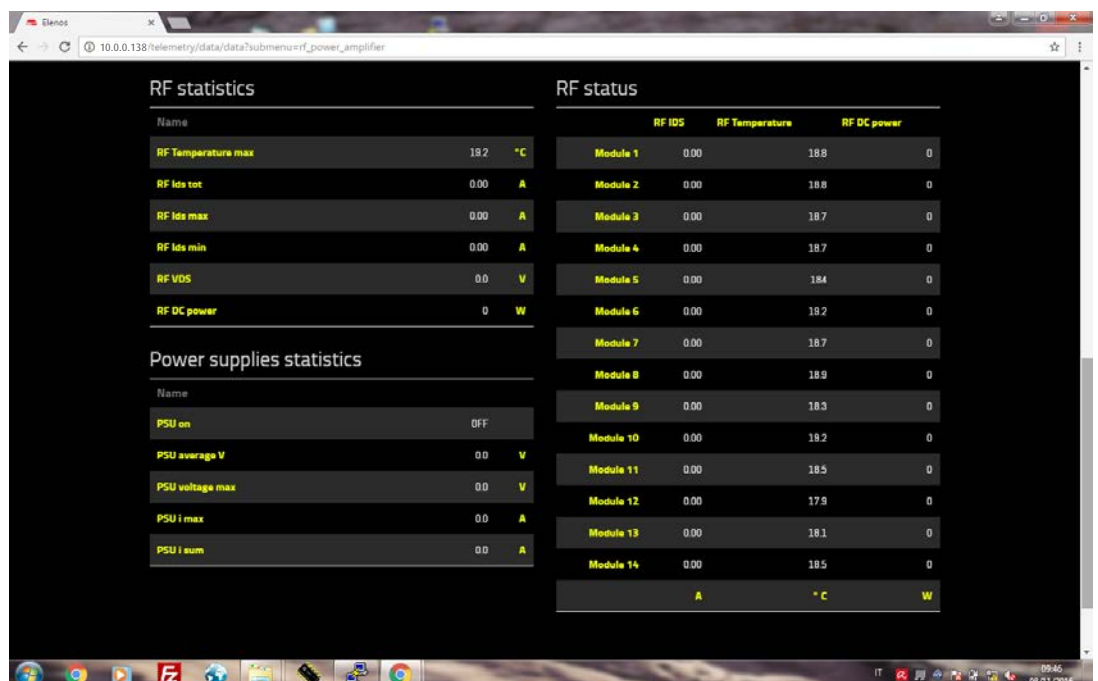
Control Centre.
Interface for the full managing of the equipment.

8.4.1 Telemetry

8.4.1.1 RF Power Amplifier



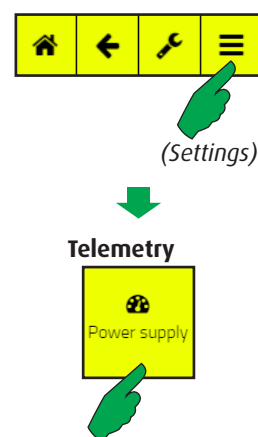
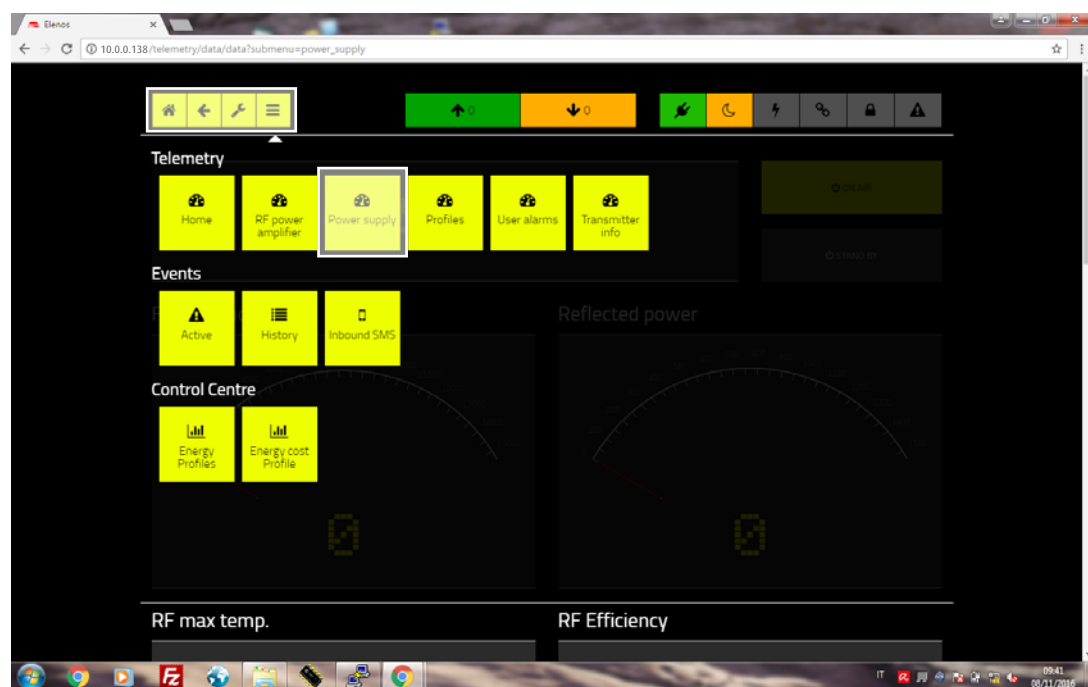
In the main screen, first select the "Settings" button, then the "RF power amplifier" button in the "Telemetry" bar.



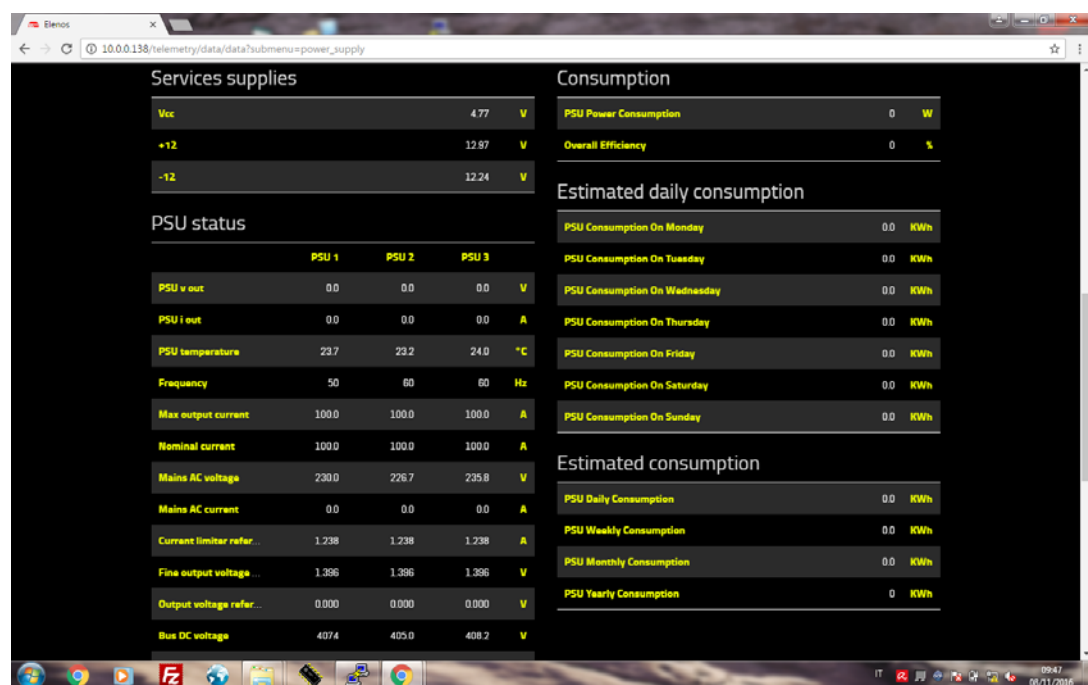
Temperatures, currents, voltages and powers of RF modules and power supplier units are shown in this screen, with statistics about functioning.

8.4.1.2 Power Supply Units (PSU)

All parameters and statistics about main and service PSUs



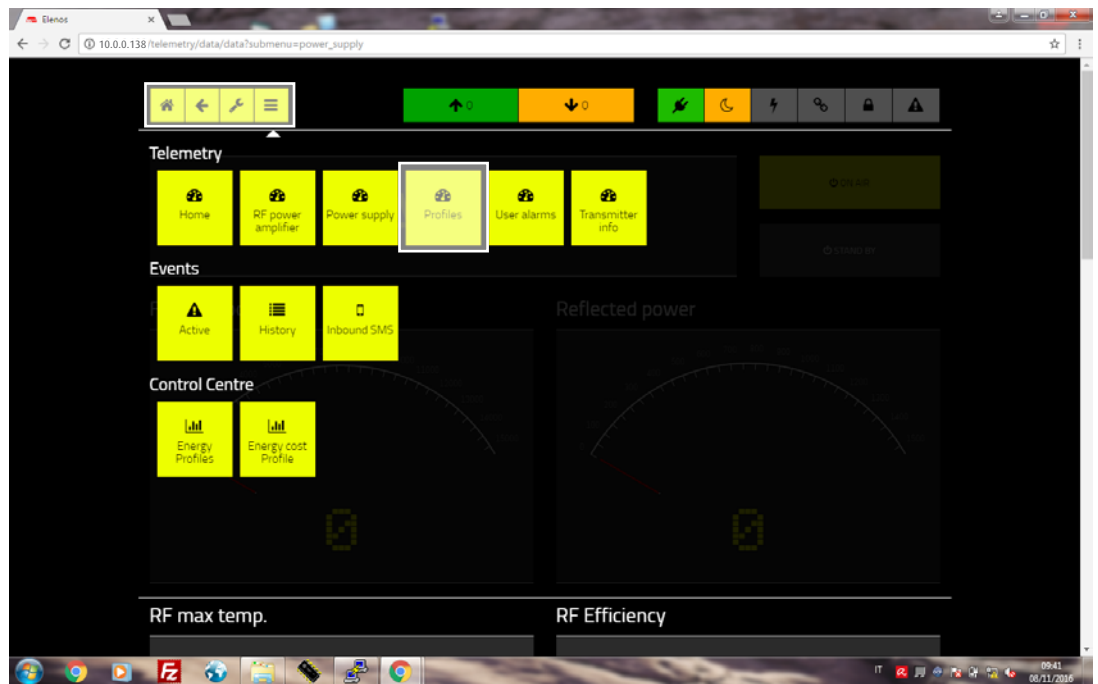
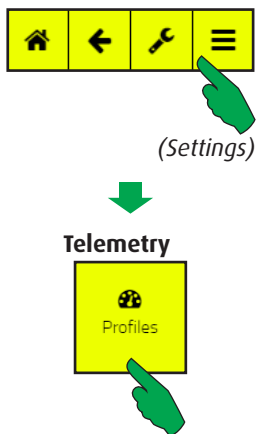
In the main screen, first select the "Settings" button, then the "Power supply" button in the "Telemetry" bar.



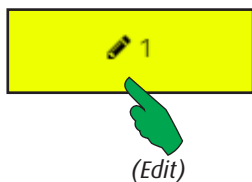
In this screen are grouped all parameters of power supply units, specifically about the device consumption. Estimates of daily, weekly, monthly and yearly consumptions are shown too.

8.4.1.3 Profiles

Power levels at which the equipment must work when it'll be a reserve transmitter.



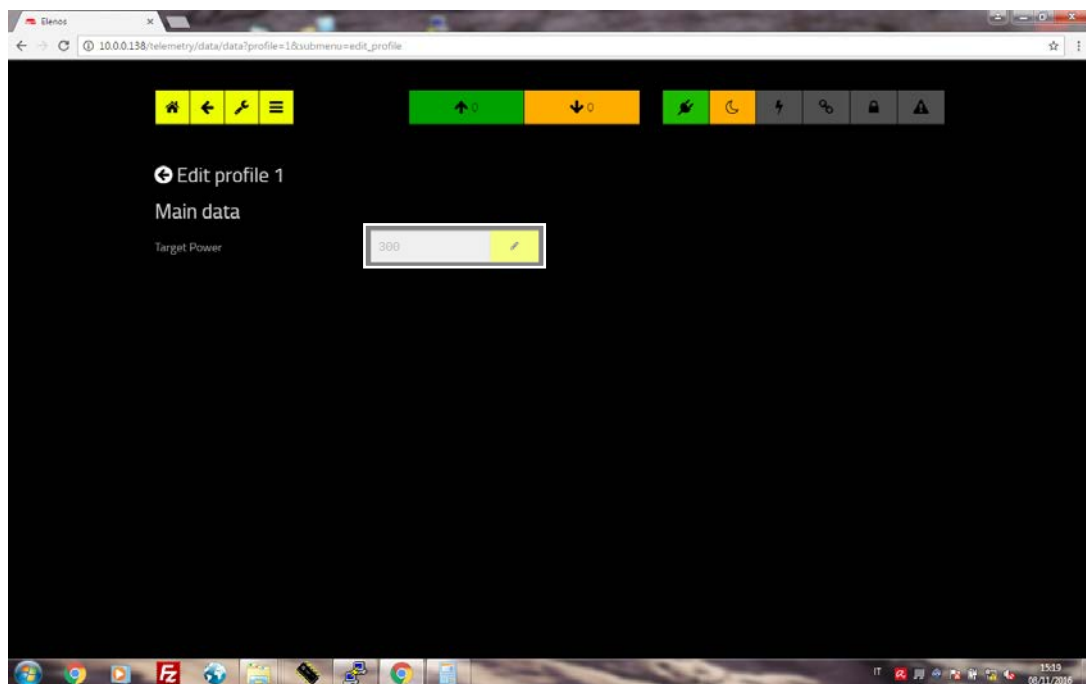
In the main screen, first select the "Settings" button, then the "Profiles" button in the "Telemetry" bar.



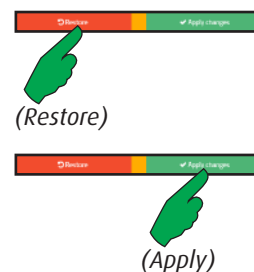
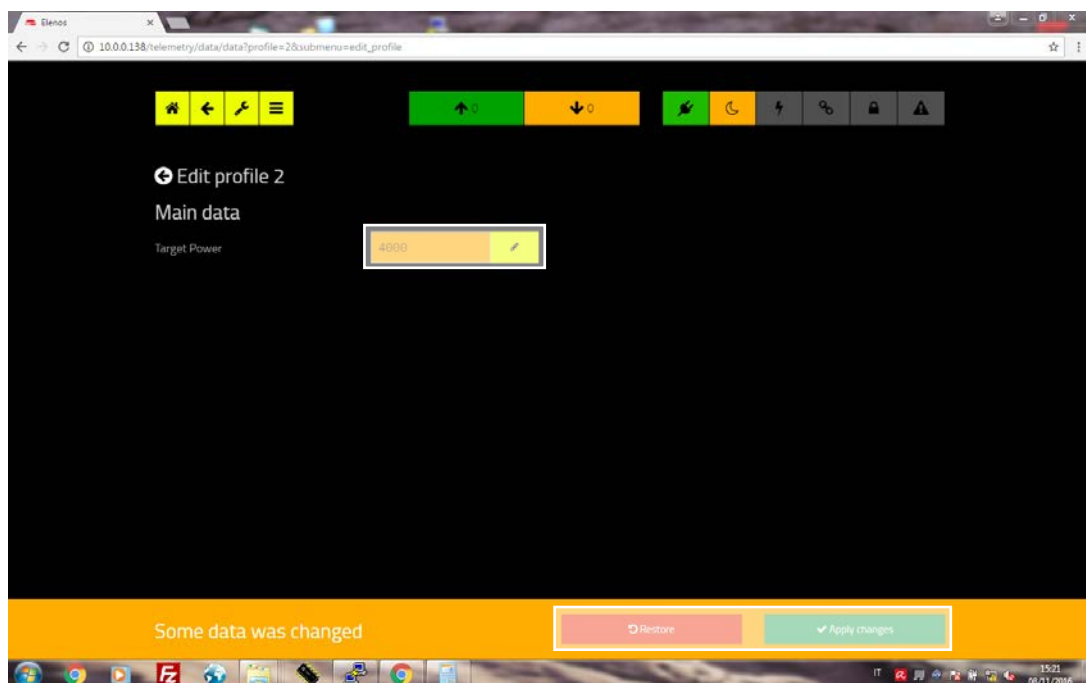
At the bottom of the screen there is a bar named "Target Power (W)" that displays 6 values of power. They indicate the profiles to which the equipment could be set. Press the "Edit" buttons to change the targets.

8.4.1.4 Editing profiles

Power levels at which the equipment must work when it'll be a reserve transmitter.



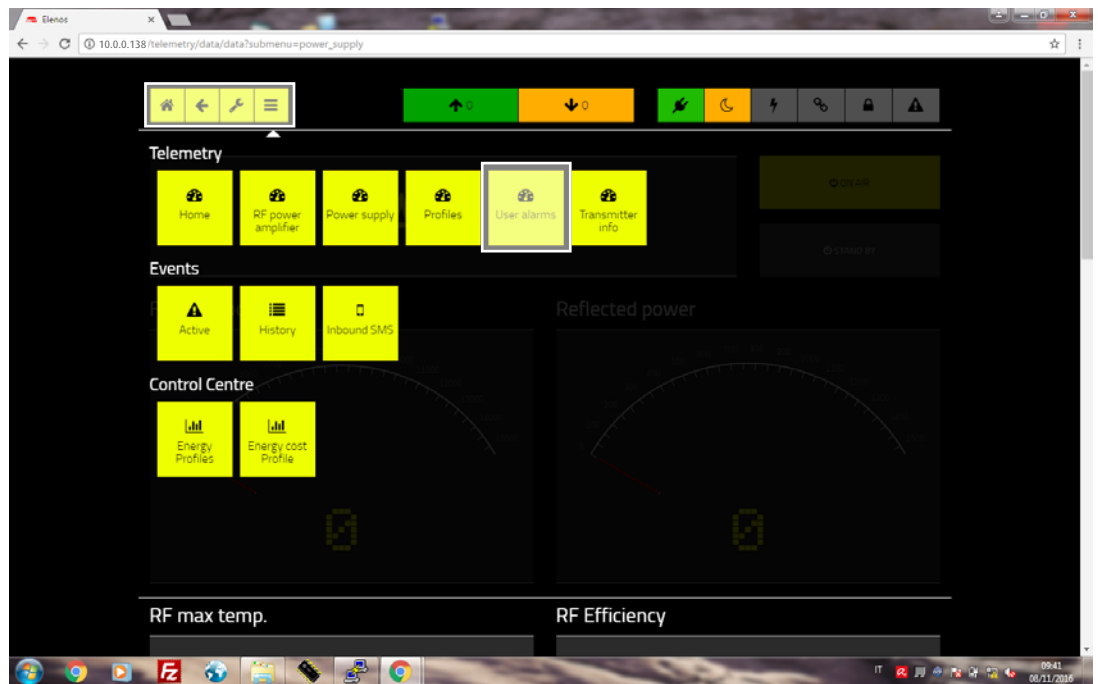
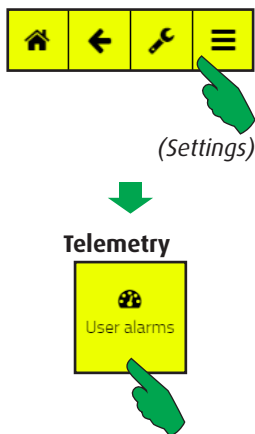
Press the local "Edit" button and write a new value in the field.



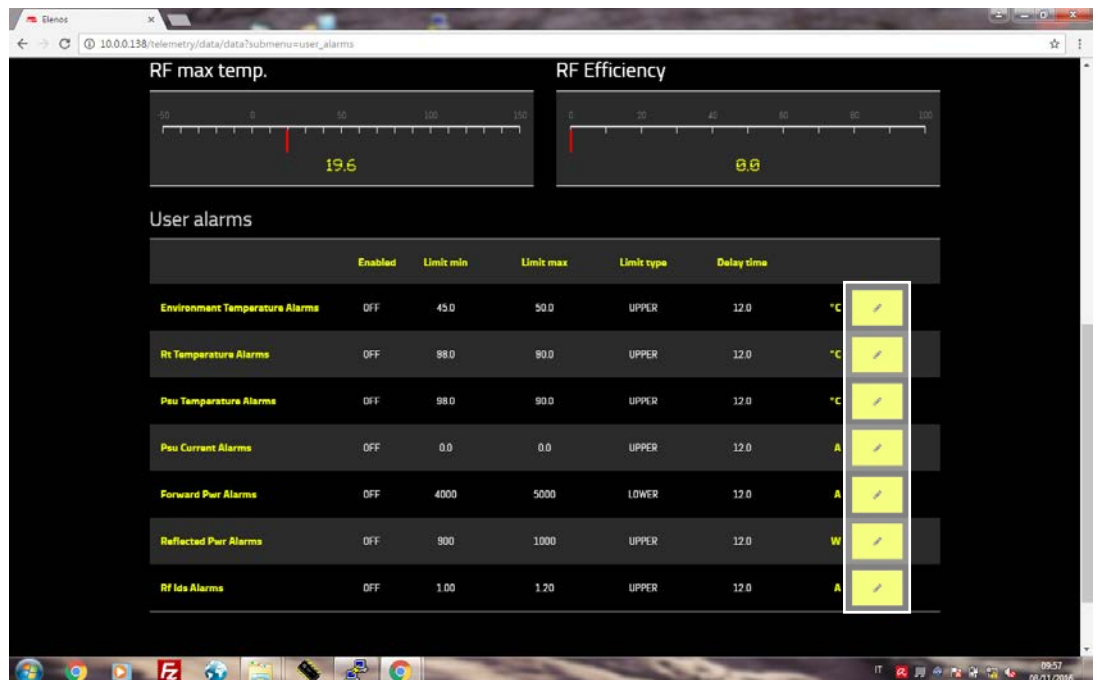
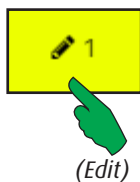
"Restore" button allows to ignore the changes, while "Apply changes" confirms them.

8.4.1.5 User Alarms

User defined alarms.



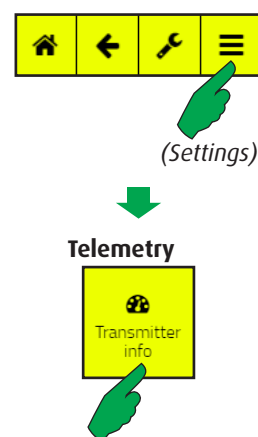
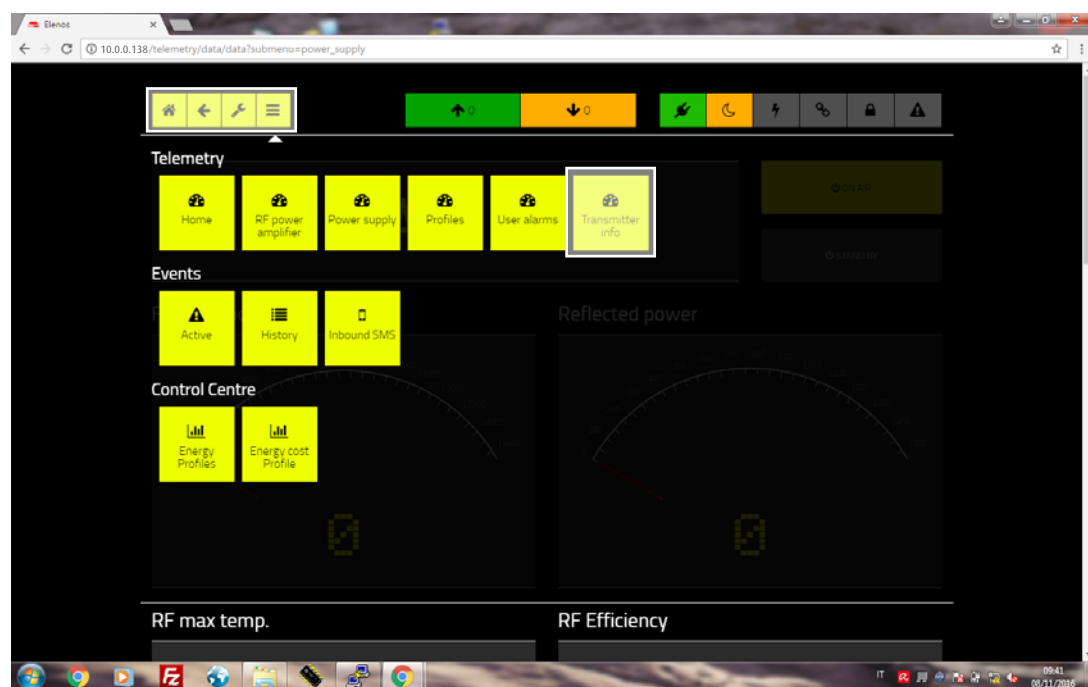
In the main screen, first select the “Settings” button, then the “User alarms” button in the “Telemetry” bar.



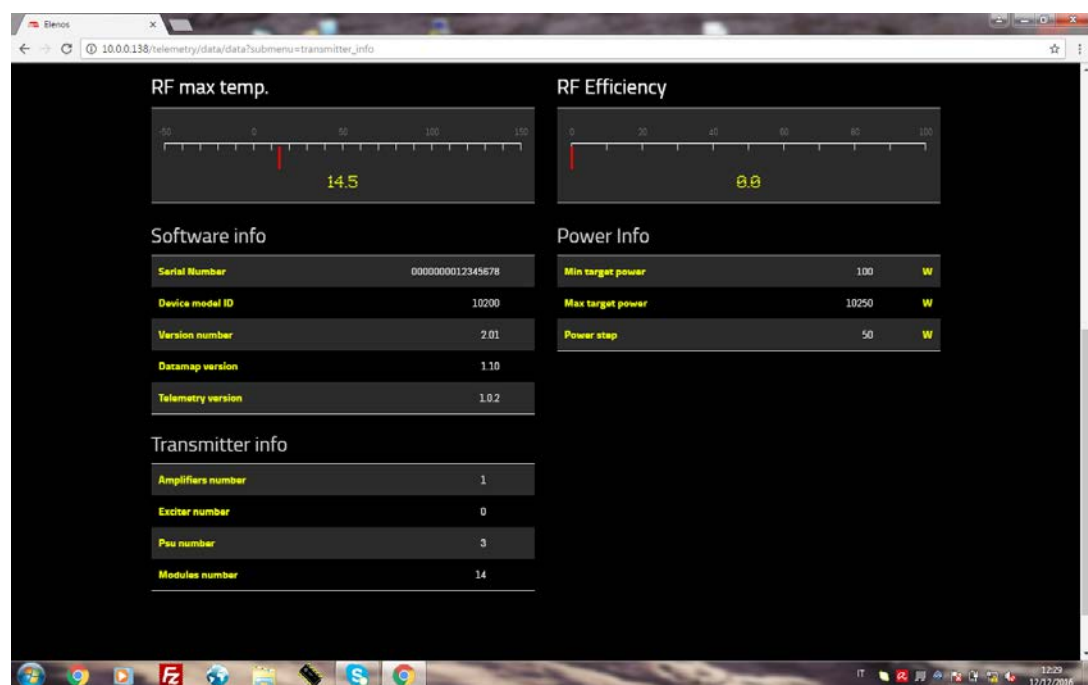
Some alarms may be customized, such as about currents and temperatures. Each user can define ranges and working logic of the alarms. After setting the “Limit Min” and “Limit max” values, choose the “Limit type”. Case “Upper” send the alarm when the parameters value are higher than upper limits; case “Lower” at the opposite. “Inside” or “Outside” when values are between limits or out of them.

8.4.1.6 Transmitter info

General data about the equipment.



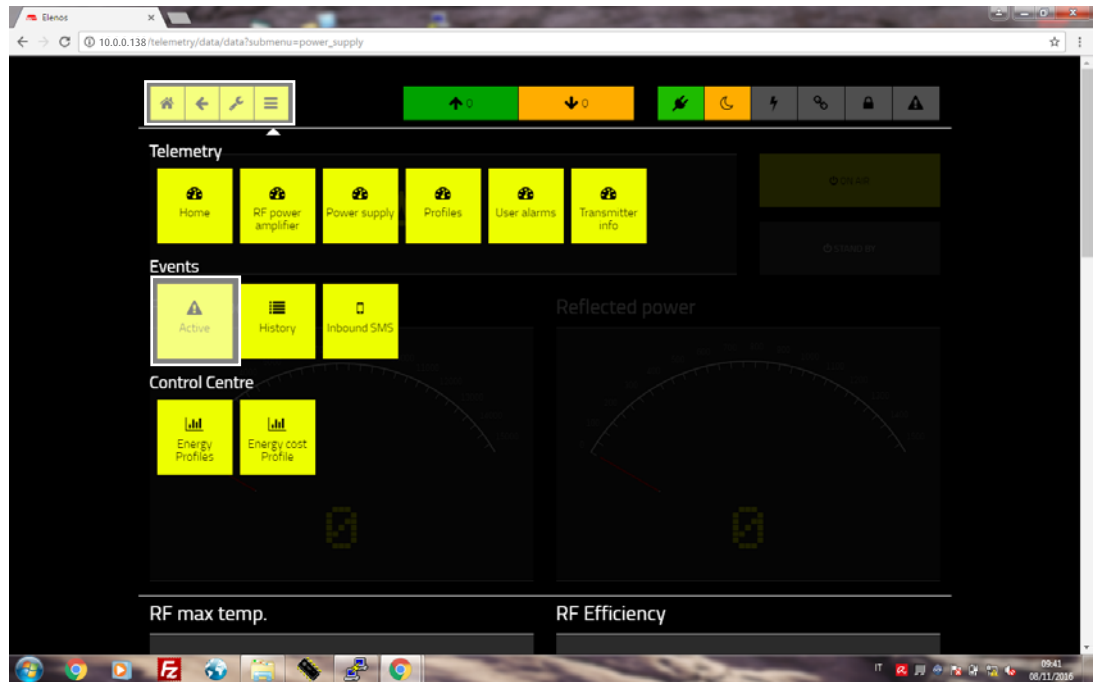
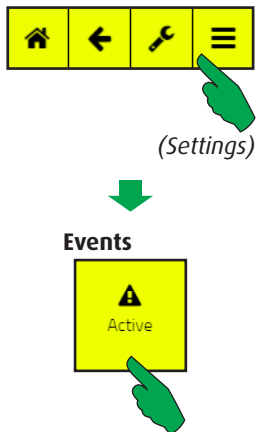
In the main screen, first select the “Settings” button, then the “Transmitter info” button in the “Telemetry” bar.



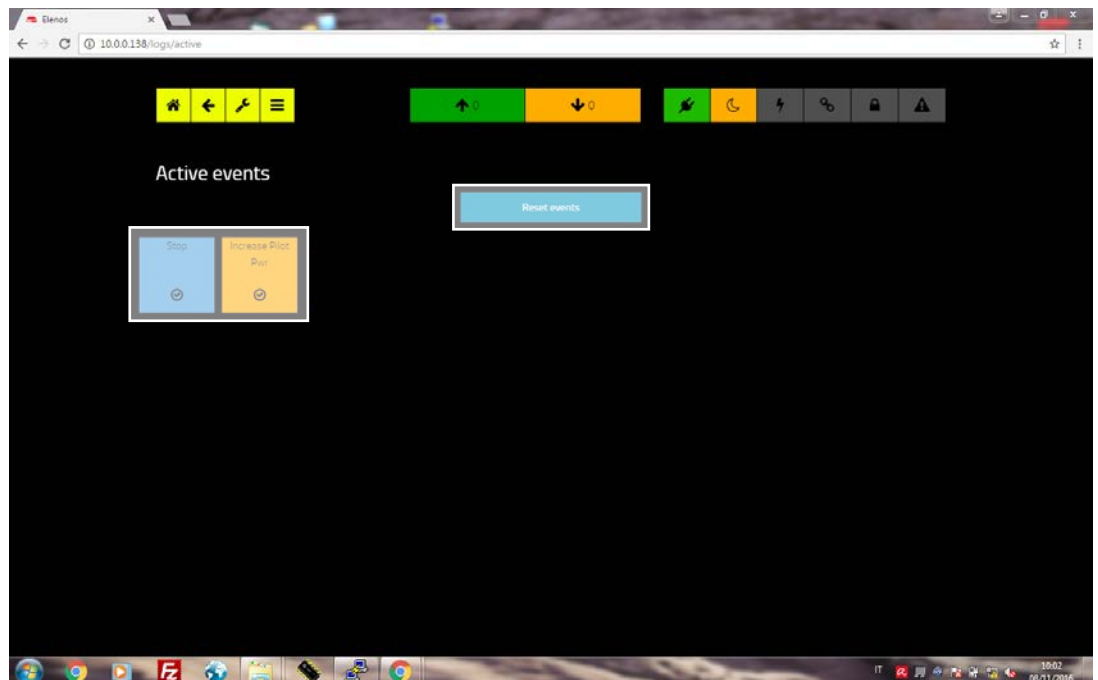
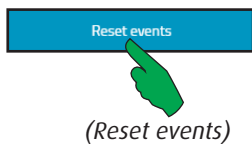
Information about RF output power, software and hardware installed are shown here.

8.4.2 Events

8.4.2.1 Active alarms.



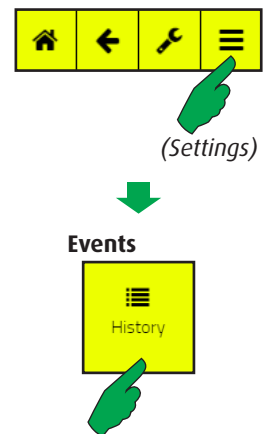
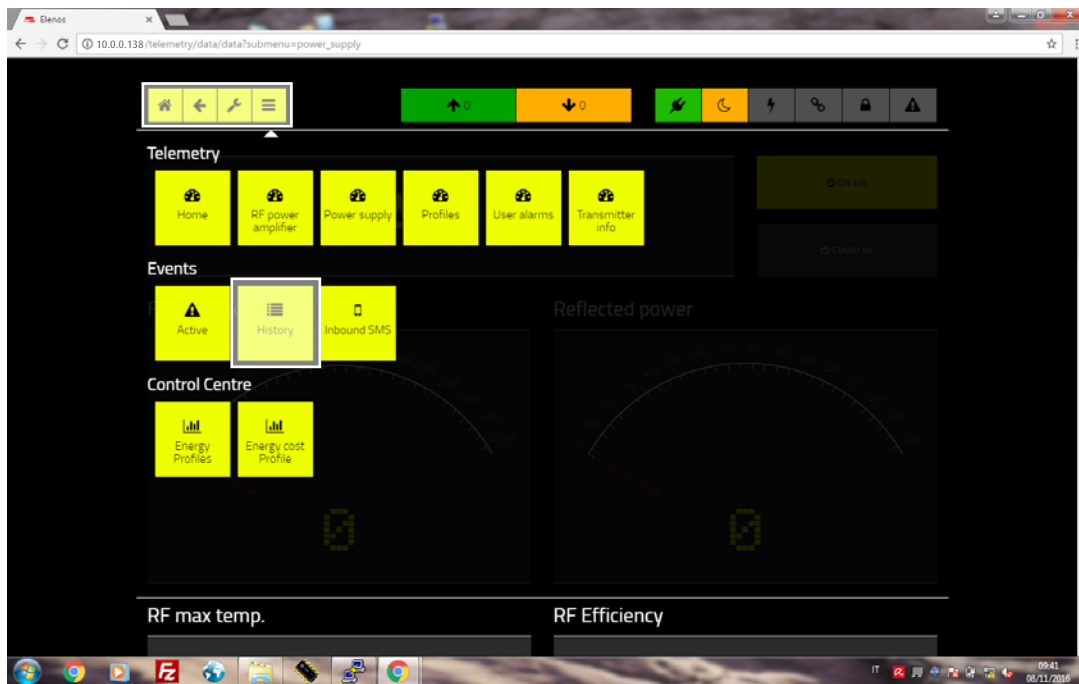
In the main screen, first select the “Settings” button, then the “Active” button in the “Events” bar.



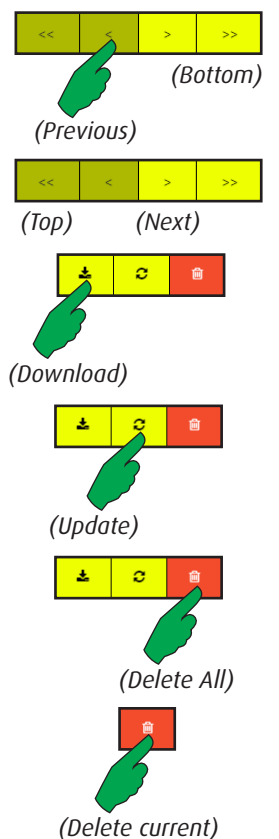
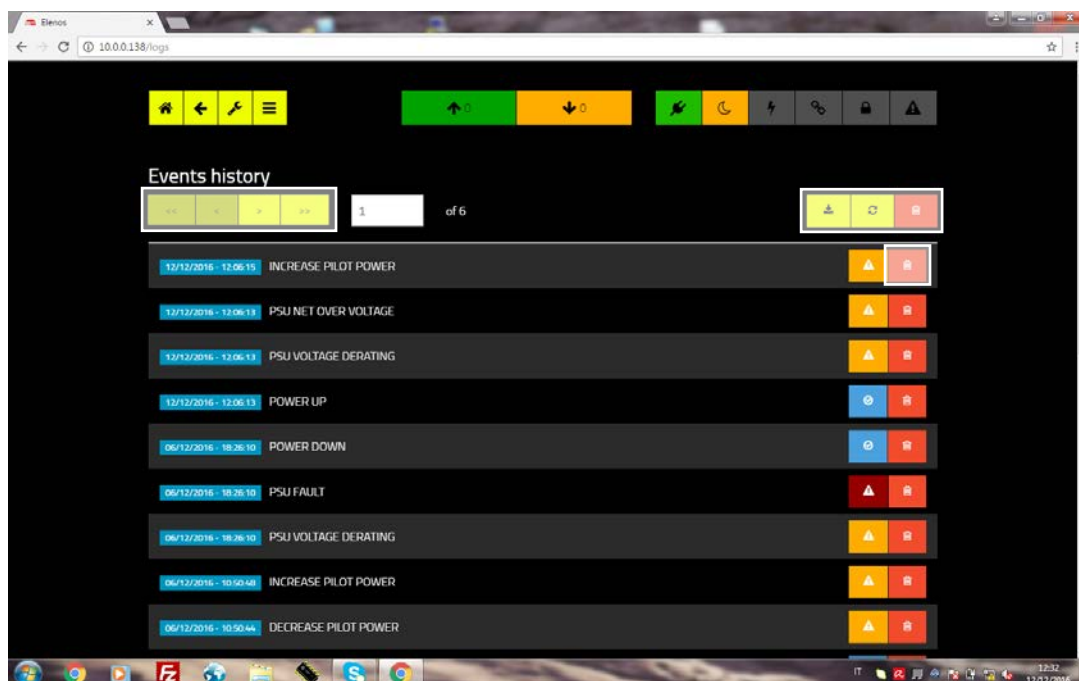
In this screen the active events are displayed. Status (events that don't require intervention by user) are shown in blue boxes. Press “Reset events” button to clear the list.

8.4.2.2 Events history

List of occurred events.



In the main screen, first select the "Settings" button, then the "History" button in the "Events" bar.

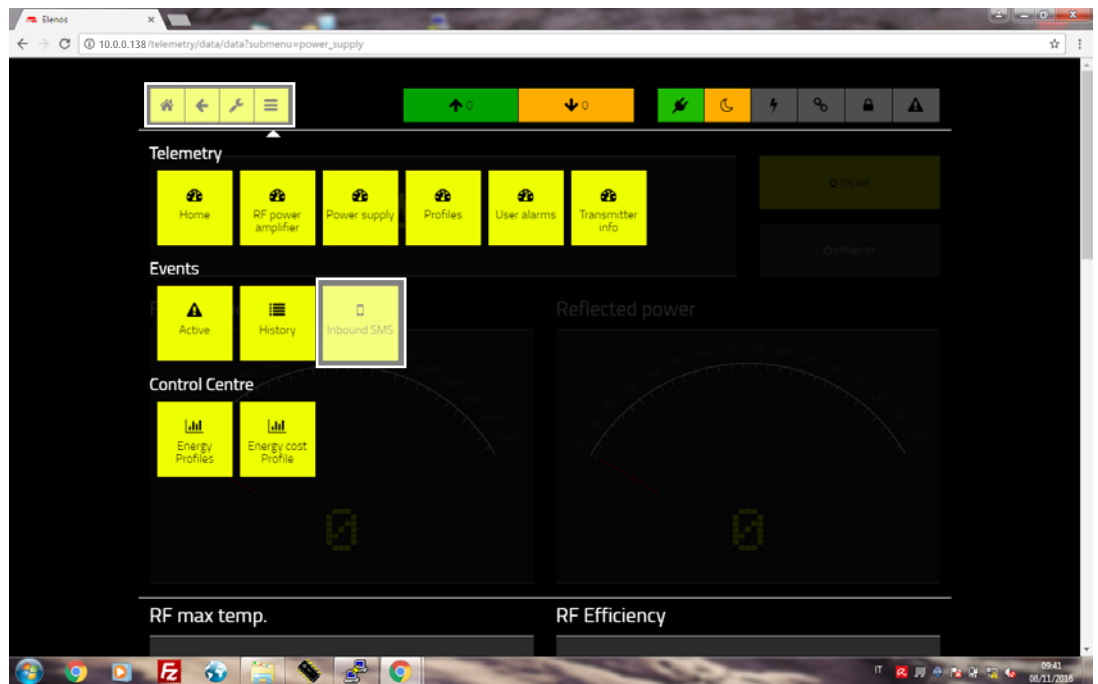


The events are sorted in reverse chronological order, so that the latest ones are immediately visible.

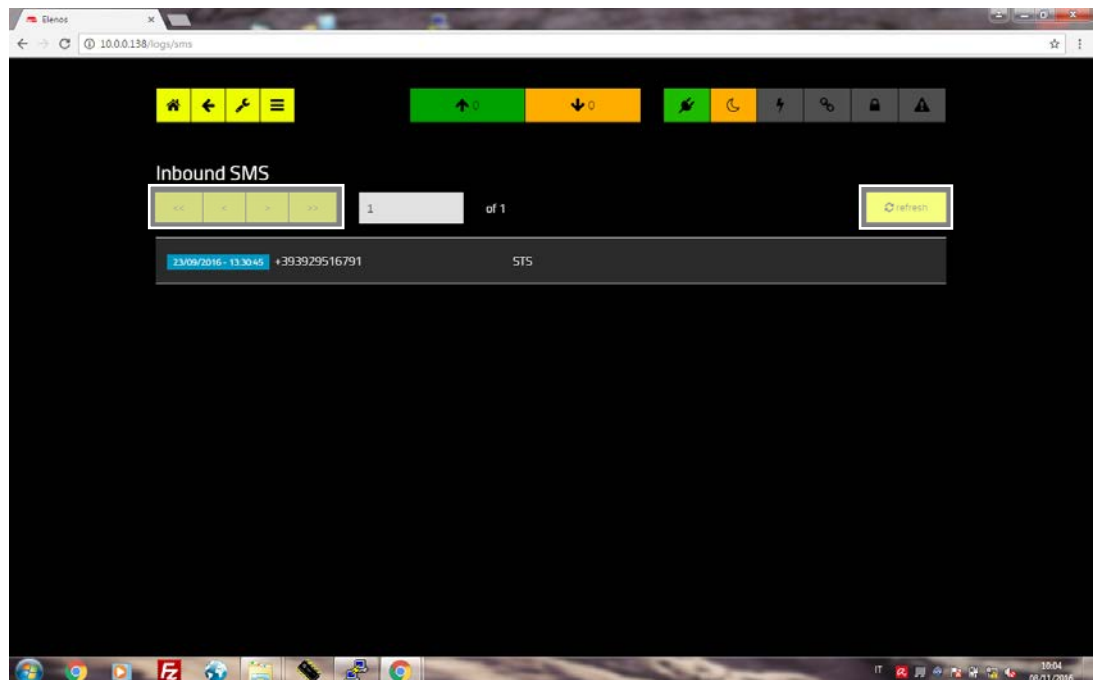
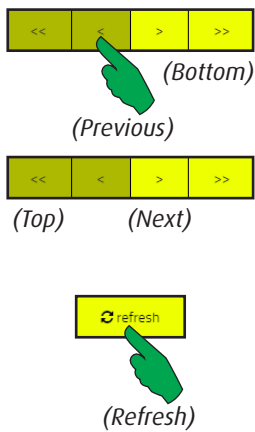
It's possible to scroll the pages with the navigation keys, update the list, remove individual warnings or clear the entire list. By pressing "Download" button, a "csv" format file, containing the entire list, is written in the default download folder.

8.4.2.3 Inbond SMS

List of received SMS.



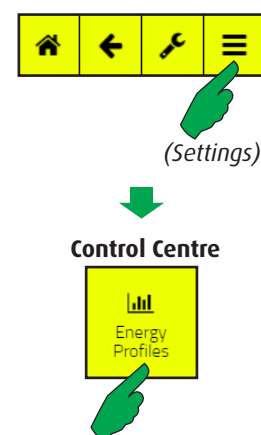
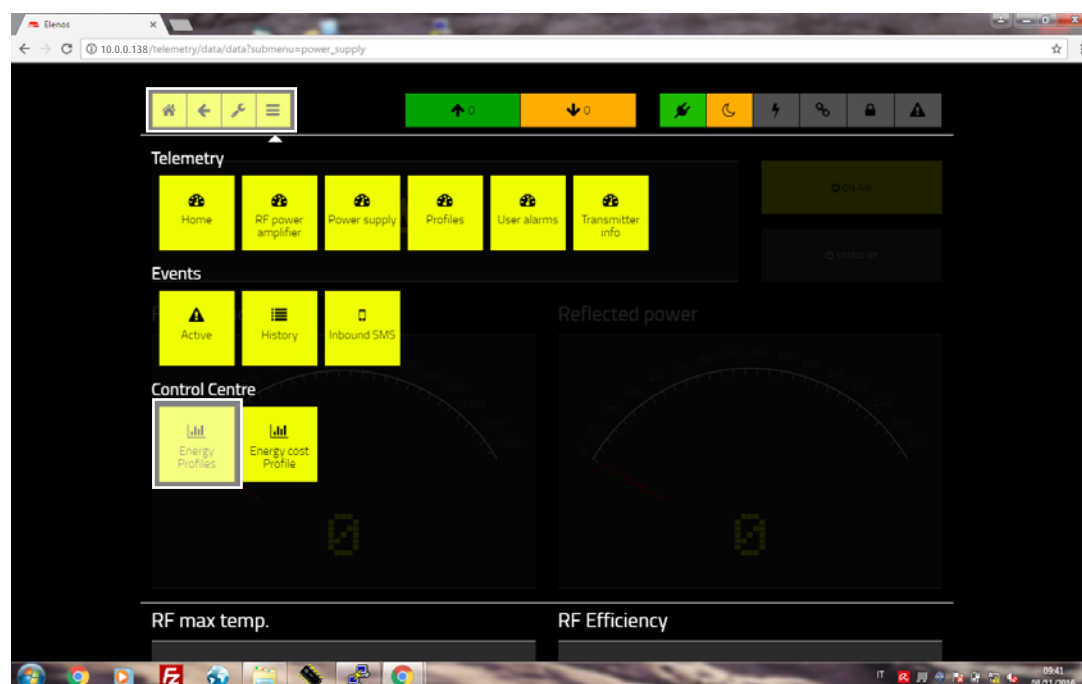
In the main screen, first select the “Settings” button, then the “Inbound SMS” button in the “Events” bar.



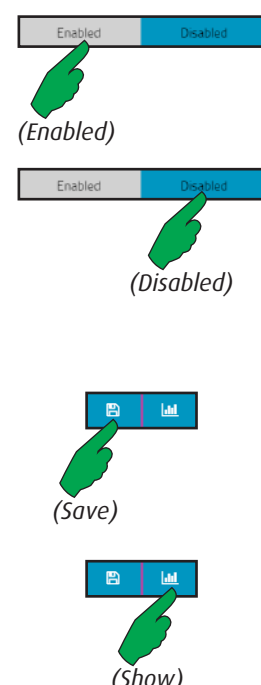
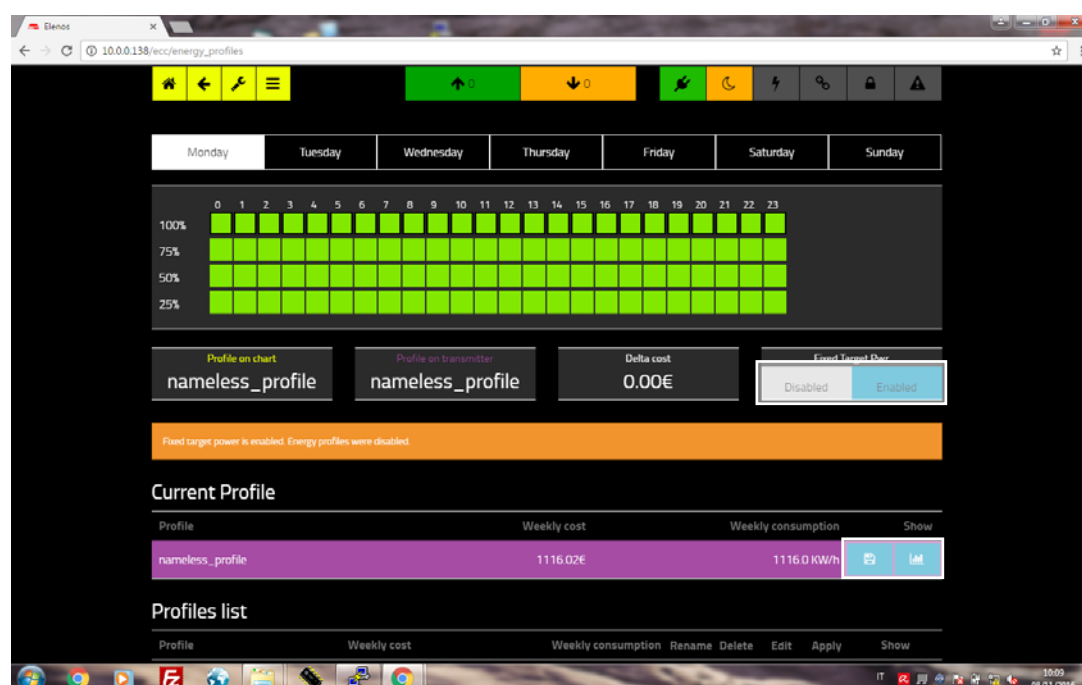
The list of commands received via SMS is shown in this screen, to update it press the “Refresh” button.
To scroll the messages use the navigation keys.

8.4.3 Control Centre

8.4.3.1 Energy Profiles.



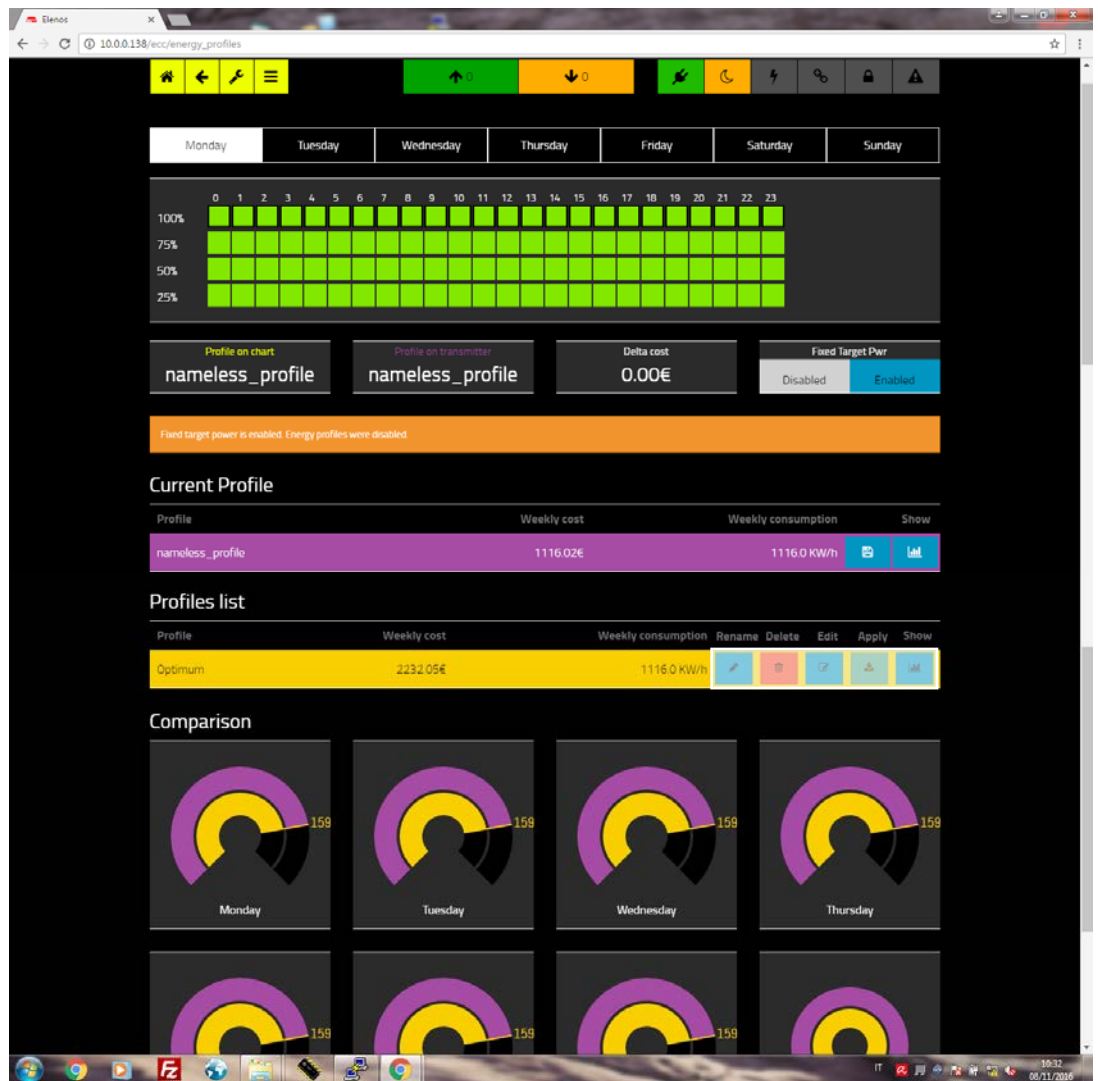
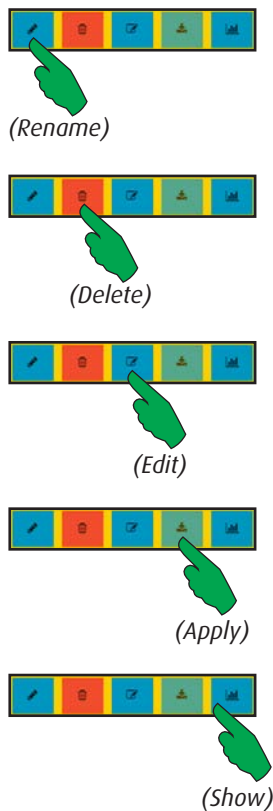
In the main screen, first select the “Settings” button, then the “Energy profiles” button in the “Control Centre” bar.



It's possible to select, edit, add, delete or compare profiles. In addition, the preview of inactive profiles may be shown and the “Fixed Target Power” mode can be enabled/disabled.

Please, look at the next page for the complete screen and details about features.

“Energy Profiles” full screen.



A generic profile is stored in memory by factory. It may be edited and duplicated by the “Save as” option (see next paragraph) to obtain a new profile.

- By pressing the “Rename” button it’s possible to give a new name to an existing profile, without any other changes. If it was the active one, it will remain active.
- By pressing the “Delete” button the selected profile will be permanently removed from memory. It’s impossible to remove an active profile.
- The “Edit” button enters into the screen shown at next paragraph and allows to redefine an existing profile. Changes will be automatically applied.
- By pressing the “Apply” button the selected profile will be activated.
- The “Show” button allows to see an inactive profile overview on the top of the screen (green boxes matrix). To change the day of the week, press the corresponding button on the overlying bar.

Note that the value of “Delta cost” field changes automatically when a non-active profile is selected (but not activated by the “Apply” button). It allows to evaluate the difference of cost between the active profile and the selected one (see “Comparison” diagrams at the bottom of the screen).

8.4.3.2 Editing an Energy Profile

Example of a complete weekly profile list.

The screenshot shows the 'Edit Optimum' web interface. It features a grid for each day of the week (Mon-Sun) with 24 time slots (0-23) and four power levels (100%, 75%, 50%, 25%). All cells are currently set to 100% and highlighted with a black border. At the bottom, it shows 'Optimum Cost (€/Week): 2232.05 €' and 'Estimated new Cost (€/Week): 1084.89 €' with a green arrow. Two buttons, 'Save as' and 'Save', are visible at the top right and bottom right. Annotations with green arrows point to these buttons, with '(Save as)' for the top 'Save as' button and '(Save)' for the bottom 'Save' button.

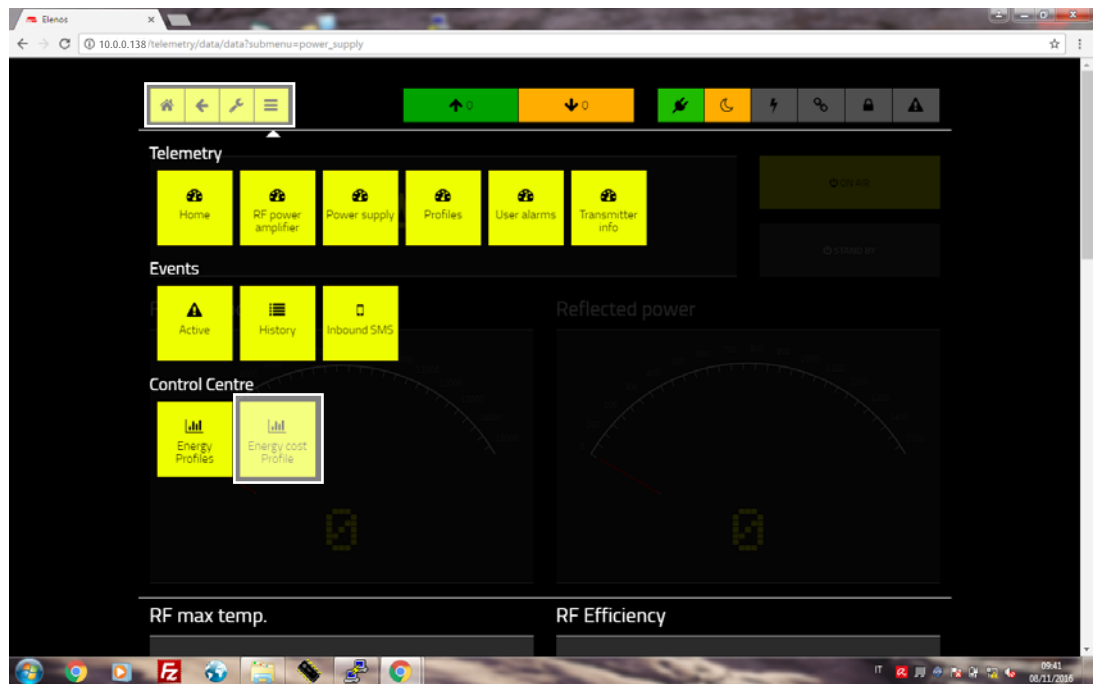
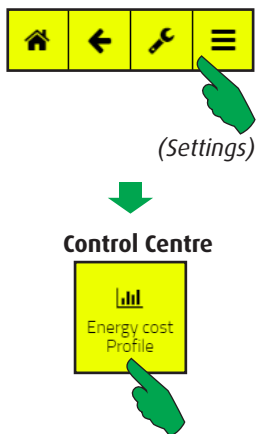
After pressing the “Edit” button, a sinoptik square containing the entire profile matrix appears. All days of the week are subdivided in time slots of an hour each one. Four power levels are available: 100%, 75%, 50 and 25% of the target. They are selectable by pressing on the green squares. An active level is highlighted by a black border (in the screen shown above they are all set at 100%).

After changes, press the “Save” button to store the current profile, or “Save as” to memorize a new profile. In the second case, the new profile will maintain the changes and the old one will not be modified.

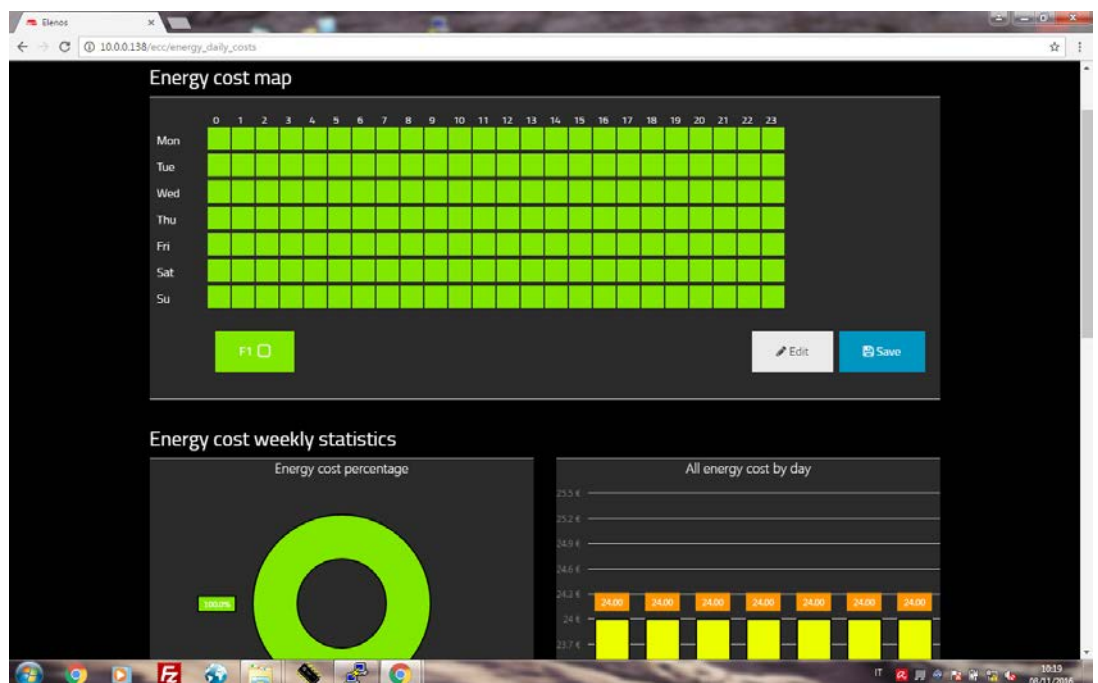


8.4.3.3 Energy Cost Profiles

List of Energy Cost Profiles.



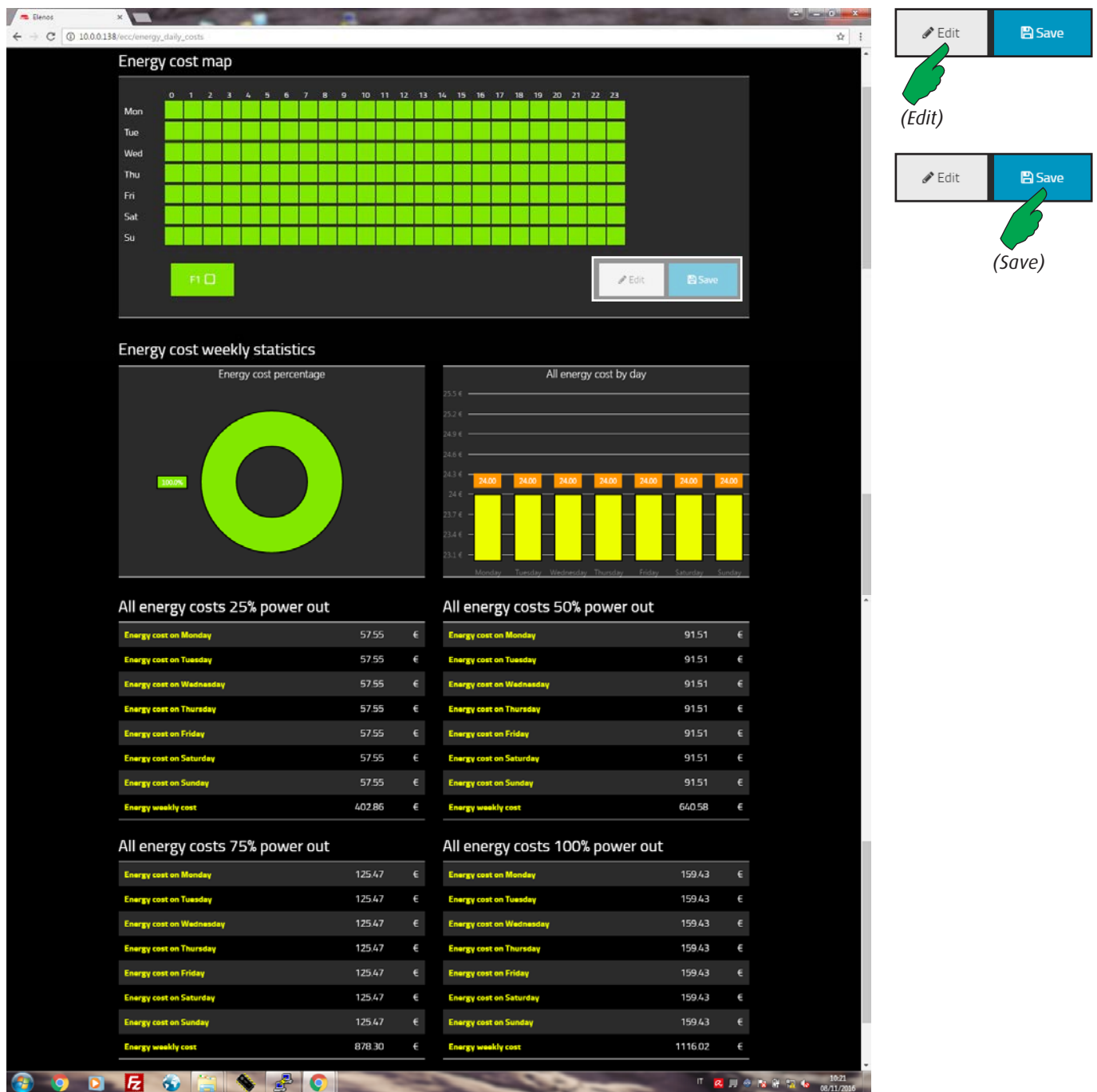
In the main screen, first select the “Settings” button, then the “Energy Cost Profiles” button in the “Control Centre” bar.



Overview of an “Energy Cost Profile”. The complete screen is displayed in the next page.

8.4.3.4 Editing an Energy Cost Profile

Example of a complete Energy Cost Profile screen.



Energy cost map.

The map is shown at the top of the screen. By factory default, the list of "Energy Bands Costs" includes only one item and all the squares of the map are painted by the same color of that band (green in the example). In this case, the band is named "F1".

To add new bands, press the "Edit" button (see also next paragraph).

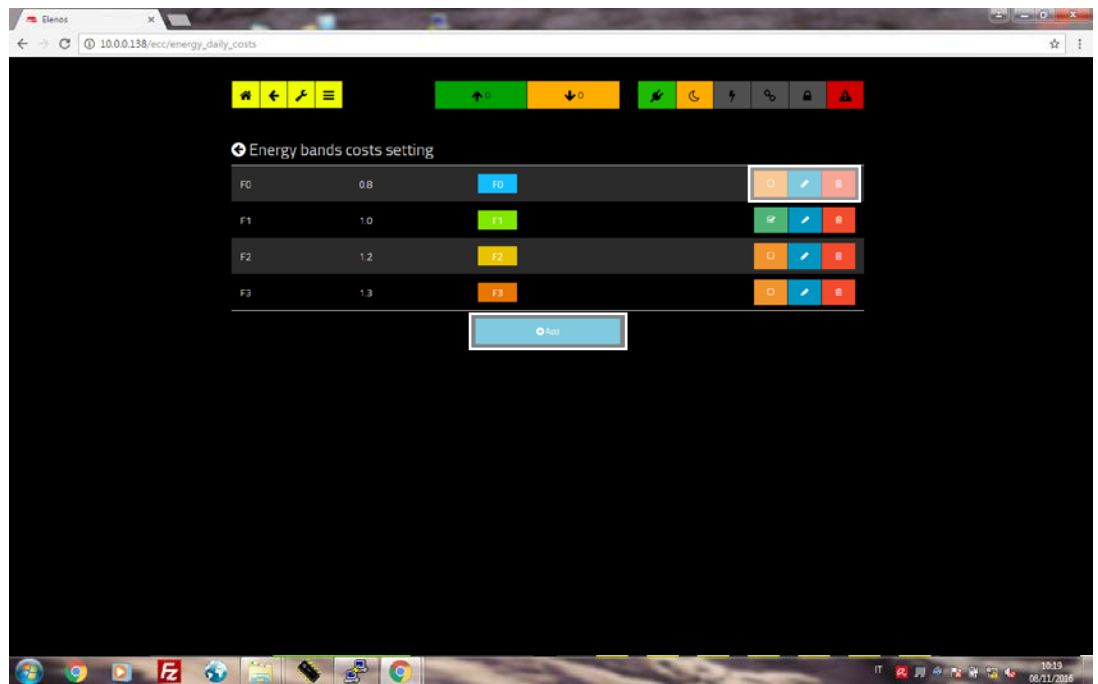
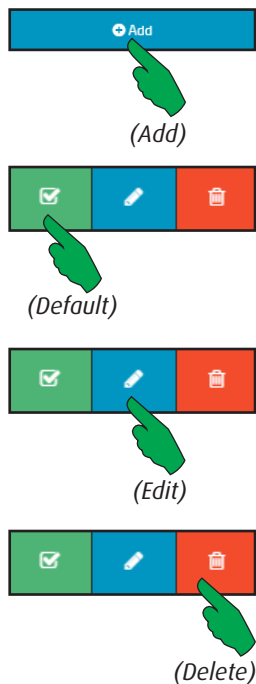
Below the map, statistics about weekly costs are displayed.

To update the map, first select the band to apply, then press on the time slots to modify. The squares selected will be painted with the same color of the new band cost.

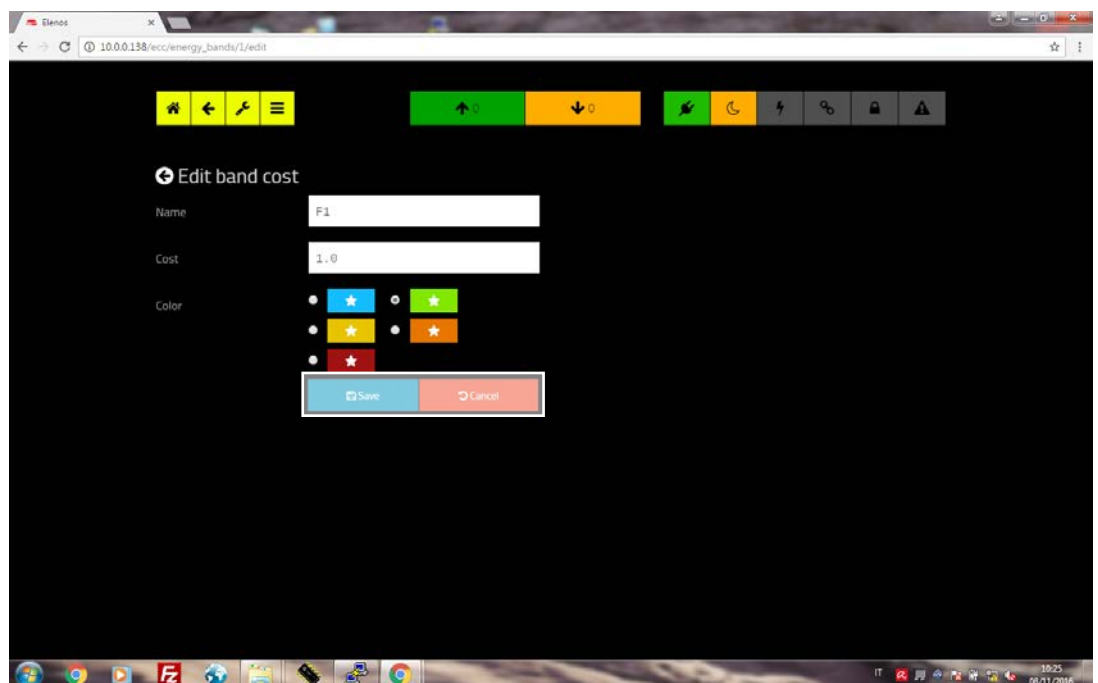
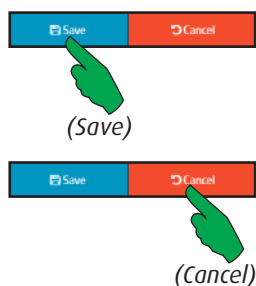
In the next pages, an example with more bands costs is shown.

8.4.3.5 Editing an Energy Band Cost

List of Energy Bands Costs.



After pressing the “Edit” button, this screen appears. It’s possible to add up to 4 bands. To make default a band cost, press its “Default” button. Costs will be calculated by it.



To change a band cost, press the “Edit” button. This screen appears. “Name” is an arbitrary name chosen by the user and “Cost” the cost per hour. For clarity, different colors may be assigned to the bands costs. Press “Save” button to store the changes, “Cancel” to restore all values.

Example of Cost Map in which 4 different bands are inserted.



Statistics are updated in real time.

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