

# Genesis Compact Series 1 / 2 / 3 TRANSMITTER

## Operator's Manual

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# Genesis Compact Series TRANSMITTERS

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**FOREWORD (how to consult the manual)**

**1. MANUAL ORGANIZATION**

The manual of a generic equipment, which can be housed in a 12, 24 or 42–unit rack, consists of two sections as follows:

- section 1 "Operator's Manual" . . . . . including general information, installation guide, operations, maintenance and wiring diagrams;
- section 2 "Technical Manual" . . . . . dealing with units and sub–units which make up the equipment;

**2. CIRCUIT DIAGRAMS (HOW TO CONSULT THEM)**

**2.1 Acronyms**

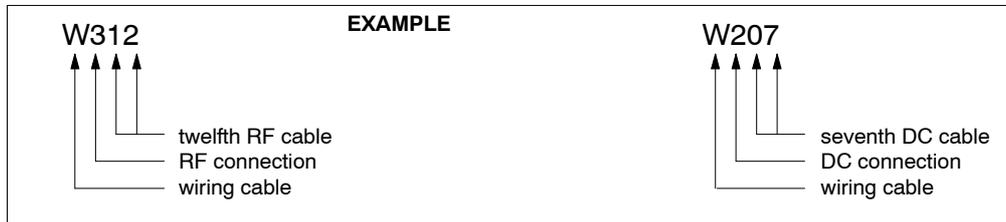
CIRCUIT DIAGRAMS ARE IDENTIFIED BY ACRONYMS AFTER THE DRAWING NUMBER (I.E.: 63206360821C). A LIST OF THE ACRONYMS USED IS GIVEN HERE BELOW:

<b>acronym</b>	<b>explanation</b>
IC	wiring diagram
ED	circuit diagram
CL	component layout
ML	Mechanical layout

**2.2 Classification of wiring cables**

Wiring cables (unipolar, multipolar, flat cables) are identified by an alphanumeric code on circuit diagrams; this code is composed of 4 digits as follows:

- 1st digit is 'W' (for wiring)
- 2nd digit identifies the type of wiring (e.g.: ac connections, dc connections, RF connections etc.) as follows:
  - 1 ... for **AC** connections;
  - 2 ... for **DC** connections;
  - 3 ... for **RF** connections;
  - 4 ... for **LF** connections;
  - 5 ... for logic signals, alarms connections.
- 3rd and 4th digits indicate the progressive numbering for each type of wiring.



**2.3 Connection of wiring cables**

The wiring cables between two connectors, are always intended pin–to–pin unless otherwise specified. In the event the wiring is not pin–to–pin, it is shown on the drawing.

**2.4 Symbols and identifications of connectors/terminal blocks**

Connectors and terminal boards arranged inside an equipment, a unit or a board, are identified on the associated circuit diagram, by symbols as follows:

<b>symbol</b>	<b>objetc</b>
	male connector identified by "Jx"
	female connector identified by "Jx"
	terminal block identified by "Kx"
	coaxial cable identified by "Wx"

Both for connectors and terminal blocks, the numbering is progressive within each equipment, unit, or board; that is on a general wiring diagram two or more "J6" (or "K3") may exist because they are arranged inside different equipment, unit or board.

Male and female connectors are identified respectively by "J" and "P" in some circuit diagrams before the year 2000.

However a connector (or terminal block) will always have the same identification number both on the general wiring diagram of the unit and on the general wiring diagram of the equipment where the unit is arranged.

**FOREWORD (how to consult the manual)**

**3. SAFETY INFORMATION**

**3.1 Introduction**

The equipment fully complies with the requirements for the safety of personnel as specified in IEC 215 rules. The equipment, if operated per specification, is designed and manufactured to protect the operator from high voltage, heat, radiation and other dangers.

Warning labels are attached to enclosures and/or various assemblies to identify potentially dangerous conditions to the operator. These Warning labels must be adhered to.

**3.2 Warning, Cautions and Notes**

Throughout the manual *Warning* and *Cautions* notices are used to identify procedures, conditions and materials that could be potentially cause death, injury or damage to equipment.

**WARNING!**

*Used to indicate a potential hazard that requires correct procedures or practises in order to prevent personal injury or damage to equipment.*

**CAUTION!**

*Used to indicate correct operation or maintenance in order to prevent damage to, or destruction of equipment or other property.*

 **NOTE!**

*Used to highlight important information or procedures.*

 **TIP**

*Tips on how alert the operator faster or easier to complete a task*



*Read the relevant Technical Manual*

**3.3 Hazard symbols**

Throughout the manual *hazard symbols* are used to alert the operator of a potential hazard related to the operation to be carried out.



**Warning**



**Shock hazard**



**Danger of getting crushed when working with loads.**



**Danger of falling off ladders while working**



**Danger when lifting heavy loads.**



**Danger of getting hands crushed when working.**



**Danger of burns on contact with hot surfaces.**

**3.4 Beryllia devices**

Some units or parts of the equipment may contain beryllia devices. Normally these components can be handled without risk, but there is a toxic hazard if beryllia dust from a damaged component is inhaled or implanted in the skin.

Units or parts containing beryllia oxide are identified by the label shown on the left.

For handling and disposal of beryllia devices, refer to "Safety Precautions" section, para 3. – "SPECIFICATION ON HANDLING AND DISPOSAL OF BERYLLIA DEVICES".



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# 1.: GENERAL INFORMATION

## 1.1 INTRODUCTION

### 1.1.1 Manual Applicability

This Operator's Manual provides system-oriented information, procedures and data for operation and installation of the **GENESIS COMPACT SERIES** Transmitter which encompasses:

- *GENESIS 1,*
- *GENESIS 2,*
- *GENESIS 3.*

From here on for the sake of simplicity, throughout this manual **GENESIS COMPACT SERIES** Transmitters, will be referred to as GENESIS TX.

The contents of the present manual are arranged in sections according to the following:

- 1.: General Information
- 2.: Installation
- 3.: Operating Instructions
- 4.: Maintenance

### 1.1.2 Physical description

GENESIS TXs encompass units operating both in VHF (band III) and in UHF (band IV/V) and delivering output power up to:

- 1000 (VHF)/600W (UHF) for digital TV;
- 2000 (VHF)/1400W (UHF) for analog TV (VHF/UHF).

GENESIS COMPACT SERIES transmitters are made up by a modulator unit and an amplifier unit. Both the modulator and the amplifier unit are forced air cooled: each unit is endowed with its own fans.

The equipments fully comply with the requirements for the safety of personnel as specified in IEC 215 rules. The configuration and typical views of the equipments are shown in Fig. 1.3.

One outstanding feature of GENESIS transmitters is their Multi-Standard Capability which makes them compatible with all worldwide standards used for digital transmission, with a special attention to latest development. GENESIS COMPACT SERIES represents a Multi-Standard platform supporting DVB- T2, DVB- T/H, ISDB- T/Tb, ATSC, ATSC 3.0, DAB, and Analog TV.

A band pass filter (*available as option*) can be arranged on the suitable plate close to the mains breaker.

Its compactness, modularity and redundancy have been applied to the design of the transmitter as well as of the cooling system.

### 1.1.3 Units Description

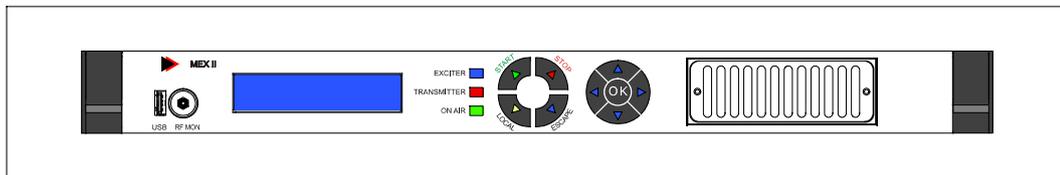
#### MODULATOR

MEX II is the State-of-The-Art Exciter capable of all modulation modes by means of fully digital signal processing. Only by changing the modulator card software, the exciter can implement *Analogue TV* (all standards) and *Digital TV* (DVB-T2, ATSC DTV). A wise use of the latest technologies and innovative and downsizing design of the plug-in cards, in particular the innovative single chip modulator, have enabled us to reduce significantly the overall dimensions of the exciter. The integration of the digital and RF stages in a single rack simplifies and improves the equipment.

The unit is arranged in a 19" - 1HE standard frame and has been designed in such a way that the digital modulator of the unit also includes the control system of the exciter. Two extractor fans, on rear panel of the unit, perform the forced air cooling.

MEX II is able to perform the *adaptive* precorrection in digital transmission and, in addition, it includes a measurement device which allows measuring two main parameters that characterize *DTV* signals: *MER* and *shoulder*. The exciter is equipped with AGC for optimizing the equipment output power in case of variation of operating conditions.

Line sockets and input/output connectors are arranged on rear panel, on front panel are available the indicator LEDs of the unit status, the keyboard to navigate within the menu, the push-buttons to start/stop the unit and the push-buttons to set local/remote functioning mode. A display on exciter front panel allows visualization of the exciter functional parameters.



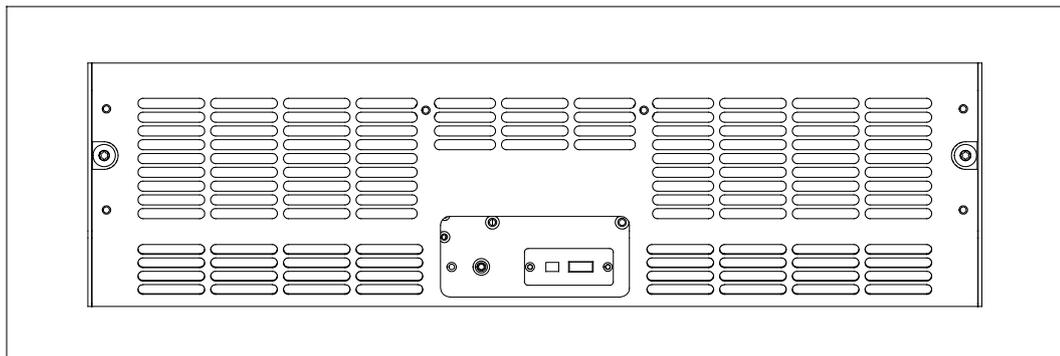
#### RF AMPLIFIER

The **High Power Amplifiers** used are listed in the following table along with the RF output power delivered:

**Tab. 1.1 - Configuration Data**

	VHF		UHF	
	HPA	Pwr out	HPA	Pwr out
GENESIS 1	W3-150A	350 $W_{avg}$ (DTV)	W6-150A	200 $W_{avg}$ (DTV)
		700 $W_{p.s.}$ (ATV)		500 $W_{p.s.}$ (ATV)
GENESIS 2	W3-215A	700 $W_{avg}$ (DTV)	W6-210A	400 $W_{avg}$ (DTV)
		1200 $W_{p.s.}$ (ATV)		1000 $W_{p.s.}$ (ATV)
GENESIS 3	W3-215A-A	1000 $W_{avg}$ (DTV)	W6-218A	600 $W_{avg}$ (DTV)
		2000 $W_{p.s.}$ (ATV)		1400 $W_{p.s.}$ (ATV)

The cooling system is built-in air forced, performed by DC fans: a fan for each pallet of the RF stages cooling and another one for the cooling of the power supply section. The amplifier unit is arranged in a 19" - 3HE mechanical frame. The amplifier final stages work in AB class to reach the maximum efficiency at the nominal power. The amplifier module is self-protected from overdrive of the RF input power, from incidental reflected power, from overvoltage of the amplifier power supply voltages and from driver and final stage abnormal absorption. The protections are performed through the module control section, which consists of a *CMI Board (Control Module Interface)* and a *Module Status Interface* boards.



**1.2 FUNCTIONAL DESCRIPTION OF THE EQUIPMENT**

**1.2.1 Modulator section**

The modulator is able to perform the *adaptive* precorrection in digital transmission and, in addition, it includes a measurement device which allows measuring two main parameters that characterize *DTV* signals: *MER* and *shoulder*.

The exciter is equipped with AGC for optimizing the transmitter output power in case of variation of operating conditions.

The amplifier section of the modulator is made up by a single pallet with a hybrid amplifier module and two MOSFET devices which are made to work in class "A". The gain is 32 dB ± 0.5 dB and the pallet is able to deliver 1W<sub>rms</sub>. The power supply voltage is 26V<sub>DC</sub>.

The directional coupler picks-up samples proportional to forward and reflected output power: the forward power sample is used for monitor and AGC purposes while the reflected power sample is routed to a *control circuitry* which performs the control of the amplifier functioning.

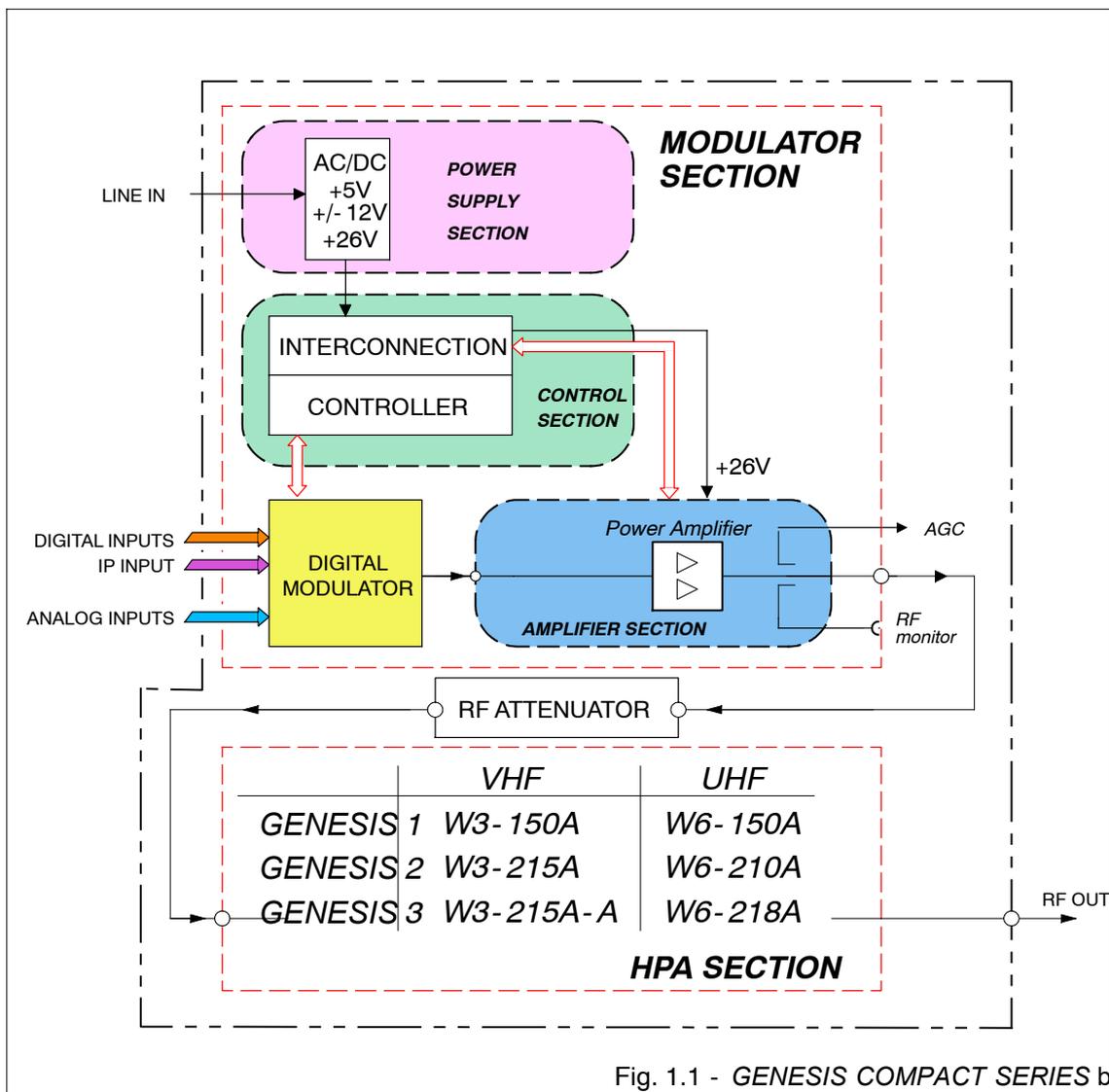


Fig. 1.1 - GENESIS COMPACT SERIES block diagram

**1.2.2 HPA section**

The RF Amplifier section (simplified block diagram in Fig. 1.2) mainly consists of the RF Input/Control board, arranged at the input of the whole amplifier chain, and of the RF Amplifier Stages (PreDriver, Driver and Final section) which consists of RF amplifiers combined in order to get the necessary output power (GENESIS 3, GENESIS 2) or of a single pallet (GENESIS 1).

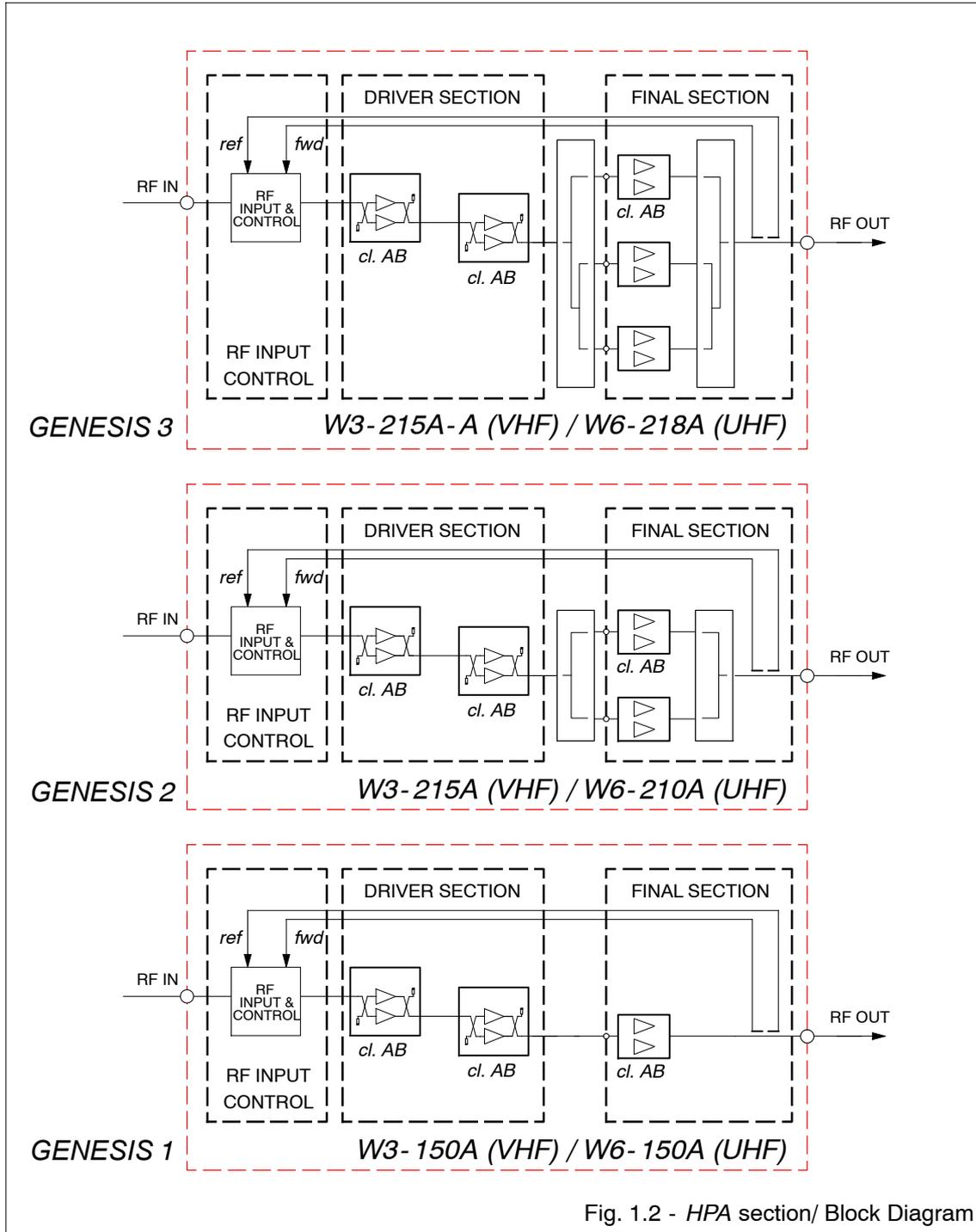
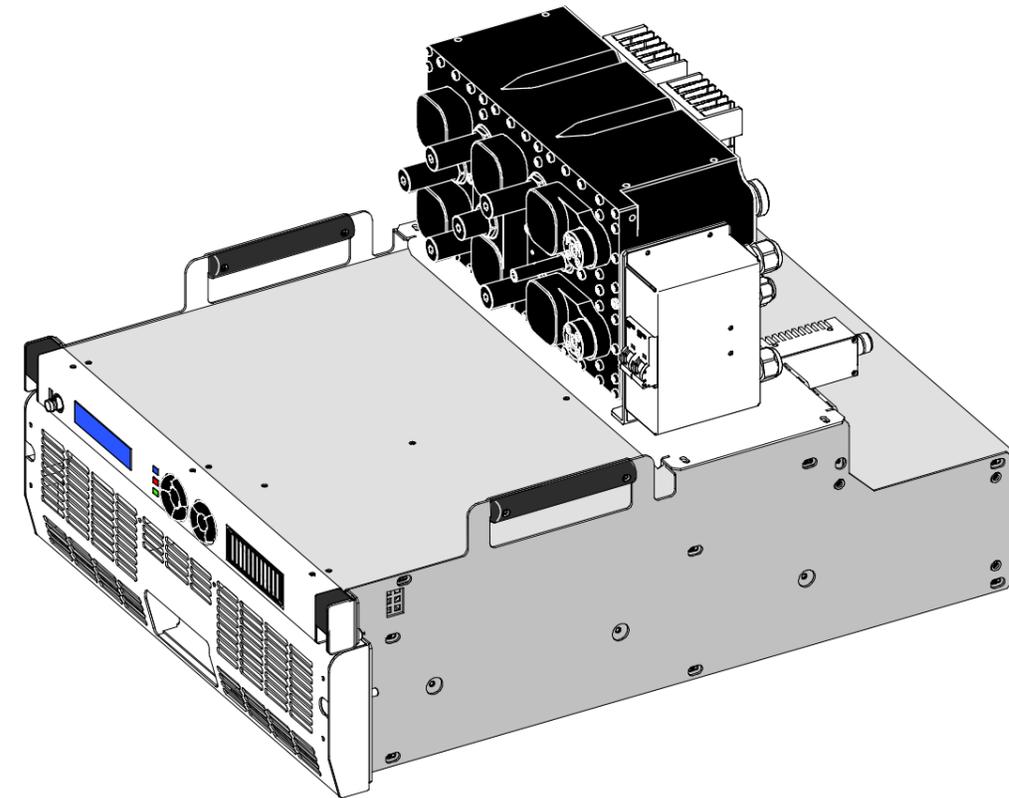
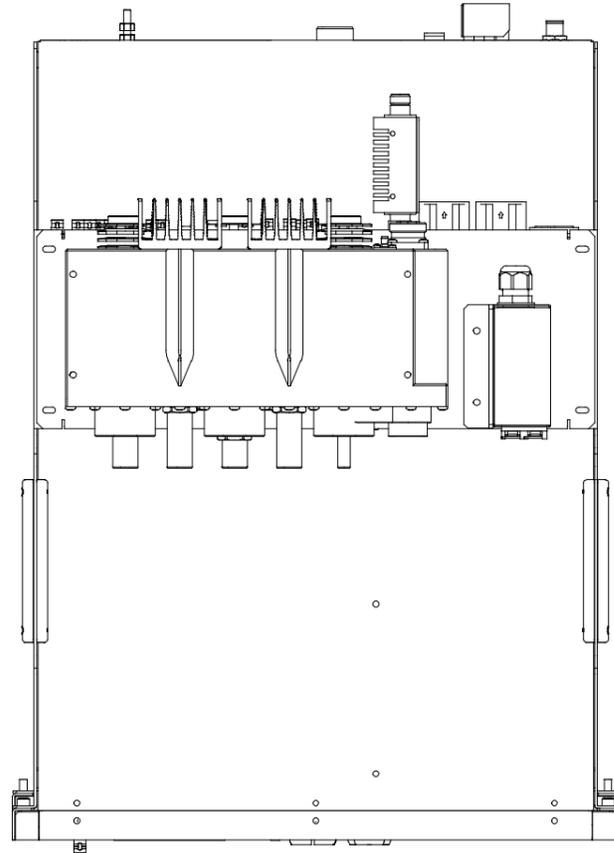
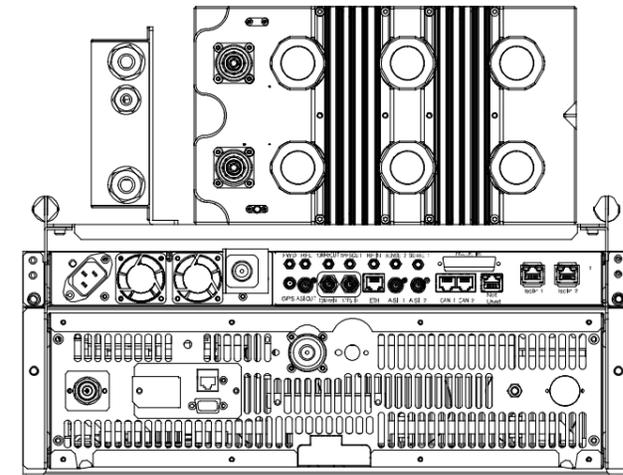
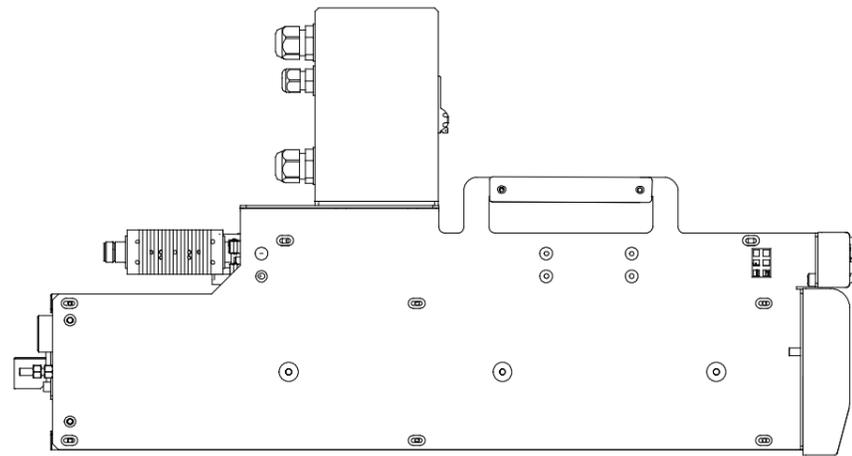
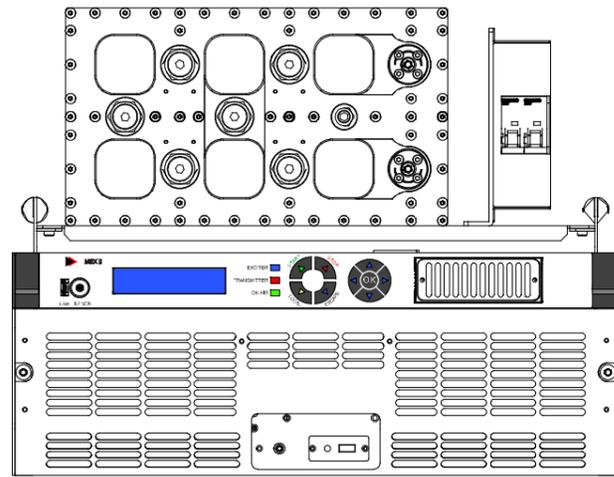


Fig. 1.2 - HPA section/ Block Diagram

### 1.3 TECHNICAL SPECIFICATIONS

RF DATA	
Frequency range	
<ul style="list-style-type: none"> <li>■ VHF band III 174 to 254 MHz</li> <li>■ UHF band IV-V 470 to 860 (870) MHz <i>class AB</i> 470 to 690 <i>Doherty mode</i></li> </ul>	
RF Output power	<i>refer to Tab. 1.1</i>
RF Output connector	7/16"
Shoulder	> 38 dB
MER	> 35 dB (DAB > 30 dB)
Crest factor	8.5 to 9.5 dB
Spurious Emissions	< - 60 dBc (< - 70 dBc with filter)
Harmonic Emissions	< - 60 dBc (< - 70 dBc with filter)
In band Spurious Emissions	< - 70 dBc
STANDARDS	
■ Digital TV	
Standards	DVB- T <i>(fully compliant with EN 300 744, TS 101 191)</i> DVB- T2 <i>(EN 302 755, TS 102 773; TR101 290; TS 102 2831)</i> ISDB- T/T <sub>b</sub> <i>(ARIB STB-B31, TR-B14)</i> ATSC, ATSC Mobile DTV, ATSC 3.0 DTMB
Channel Bnadwidth	
<ul style="list-style-type: none"> <li>● DVB- T 5/6/7/8 MHz</li> <li>● DVB- T2 1.7/5/6/7/8 MHz</li> <li>● ISDB- T/T<sub>b</sub> 6/8 MHz</li> <li>● ATSC 3.0 6 MHz, 7 MHz, 8 MHz</li> <li>● DTMB 8 MHz</li> </ul>	
Inputs	
<ul style="list-style-type: none"> <li>● DVB- T/T2, ISDB- T/T<sub>b</sub>, DTMB 2 BNC 75 Ω, DVB ASI, TS 188/204 packets, continuous and burst mode, 2 RJ45 GbE</li> <li>● ATSC, ATSC 3.0 2 SMPTE310M or 2 ASI, 75 Ω BNC, 2 RJ45</li> </ul>	
■ Digital Radio/Mobil tv in VHF band	
Standards	DAB, DAB+, T- DMB
Channel Bnadwidth	1.536 MHz
Inputs	
<ul style="list-style-type: none"> <li>● ETI 2 BNC 75 Ω, (NI, G703), (NA, G7049 5376, (NA,G704) 5592 and jitter tolerance according to G.823</li> <li>● EDI 2 RJ45, IP, RTP, UDP, IGMP (v2 &amp; v3)</li> </ul>	
■ Analog TV	
Standards (compliance to CCIR report 642- 2 volume XI part I, ETS 300 384)	B/G/D/K/K1/M/N//I1/L
Color transmission	PAL, NTSC, SECAM
Sound transmission	IRT dual- sound config, FM single sound and NICAM728 (- 13 dB/- 20 dB) <i>optional</i> , FM single sound (- 10 dB)
Inputs	
<ul style="list-style-type: none"> <li>● Video 2 BNC 75 Ω, 1 V<sub>pp</sub> ± 6 dB. Manual Gain or AGC on ITS line, DC Restore, White Limiter (85- 95%), Sync Restore (20- 30%)</li> <li>● Audio 2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm -3 dB +19 dB. In wideband mode input 2 works up to 120kHz (MPX)</li> <li>● Additional Audio 1 BNC 50 Ω/5 kΩ for MPX (up to 120 kHz) and 1 BNC 50 Ω for auxiliary services for standard M</li> <li>● NICAM audio 2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm ± 10 dB</li> <li>● NICAM data input 1 BNC TTL 728 Kbit/s ext. data, 1 BNC TTL 728 kHz ext. clock</li> </ul>	
MAINS SUPPLY VOLTAGE	
Ac supply	208V <sub>ac</sub> - 230V <sub>ac</sub> single phase
Frequency	50/60 Hz ± 4%
Power factor	> 0.95
Efficiency (COFDM)	<i>VHF: up to 27% class AB / 35% Doherty</i> <i>UHF: up to 22% class AB / 30% Doherty</i>
THD	< 6%
Safety	EN 60215/EN 60950
EMC	EN 301489

<b>REMOTE INTERFACES</b>	
Local control	Display(s), Keyboard(s), and USB ports
Remote control	Ethernet for HTTP (Web Server)/SNMP/NTP/SSL, RS232, Parallel
Test points	RF out monitor, RF amp output, RF exciter output
<b>SYNCHRONIZATION</b>	
Reference frequency	Internal (OCXO or integrated GPS)/Internal locked to the External (BNC 50 Ω, 10 MHz)
Reference pulse	1pps Internal (integrated GPS)/External (BNC 50 Ω, TTL)
Internal reference Accuracy	± 1 · 10 <sup>-8</sup> (0 to 70 °C) ± 5 · 10 <sup>-10</sup> per day (after 30 day) ± 1 · 10 <sup>-7</sup> per year
<b>METERING</b>	
<b>■ Digital TV</b>	- forward output power - reflected power
<b>■ Analog TV</b>	- vision carrier output power - sound carrier output power - forward output power - reflected power
<b>COOLING</b>	
	forced air
<b>MECHANICAL</b>	
DIMENSIONS (W x H x D, in mm)	482 x 372 x 635
WEIGHTS (kg)	40 approx.
COLOUR	light grey
<b>ENVIRONMENTAL</b>	
Ambient temperature range	0 °C to +55 °C
Storage temperature range	-30 °C to +70 °C
Relative humidity (@ 40 °C)	95% without condensation
Max. Operating altitude (asl)	Up to 3000 meters
Safety rules	EN 60215 / EN 60950
EMC	EN 301489



**NOTE!**  
*The illustrated Tx GENESIS is the UHF version (the VHF version differs only for the PB filter)*

Fig. 1.3 - GENESIS COMPACT SERIES general views

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INSTALLATION

2

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**INFORMATION FOR THE OPERATOR**

Throughout the manual *Warning* and *Caution* notices are used along with *hazard symbols*. *Warning* and *Caution* notices identify procedures, conditions and materials that could be potentially cause death, injury or damage to equipment.

*Hazard symbols* are used to alert the operator of a potential hazard related to the operation to be carried out.

Here below *Warning*, *Caution* notices and *hazard symbols* used, are shown.

**WARNING!**

*Used to indicate a potential hazard that requires correct procedures or practises in order to prevent personal injury or damage to equipment.*

**CAUTION!**

*Used to indicate correct operation or maintenance in order to prevent damage to, or destruction of equipment or other property.*

 **NOTE!**

*Used to highlight important information or procedures.*

 **TIP**

*Tips on how alert the operator faster or easier to complete a task*



**All electrical installation and connections are to be carried out only by qualified personnel.**

**In setting up racks observe the relevant regulations for the prevention of accidents.**

**These regulations especially refer to the following:**



**Shock hazard**



**Danger of getting crushed when working with loads.**



**Danger of falling off ladders while working**



**Danger when lifting heavy loads.**



**Danger of getting hands crushed when working.**

## 2.: INSTALLATION

### 2.1 INTRODUCTION

This chapter provides drawings and information concerning installation of GENESIS COMPACT SERIES transmitters. This paragraph deals with the actions normally performed when the equipment has to be moved. More in detail *paragraph 2.2* gives information and installation drawings, to mount and interconnect the equipment.

#### 2.1.1 Requirements for Installation

The definition of the site where the equipment has to be installed is determined by the careful analysis of its standard dimensions (see Fig. 2.1). There are no specific constraints in the installation of the equipment, however the site must be defined in order to satisfy the following requirements and ensure the best utilization of the equipment:

- Each unit must be installed in such a way to provide optimum performance as long as it is possible.
- The room in which the equipment is housed must to be provided with controls of the environmental conditions.
- The ambient temperature must be kept in a range from 0°C to +45°C. Outside this temperature range, regular functioning of the equipment is not guaranteed.
- The relative humidity can reach 90% maximum, without condensation. Higher humidity encourages corrosion and deterioration of the equipment structures and in a short time could damage the insulation among the electrical parts which are subject to high voltage.
- It also encourages *CONDENSATION* on the internal and external surfaces causing therefore severe damage especially to the electrical parts of the equipment subject to high voltage.
- In the room where the equipment is housed, filters must be present at all air inlets and louvres at all air outlets. No sources of dust, even potential, ought to be present; in fact the dust may cause the clogging of the cooling system.
- The space around the unit must be sufficient to permit installation and maintenance. The amount of clearance from walls or other equipments must include the space necessary to open the doors.
- Sufficient space for cable connectors must also be available. In light of the above, any solution which limits the accessibility must be considered unacceptable.

#### 2.1.2 Transport

The cabinet and the equipment units have been carefully packed for transport; the equipment cabinet may travel both in vertical and in horizontal position. Four eye-bolts placed on the upper part of the cabinet are used to lift it.



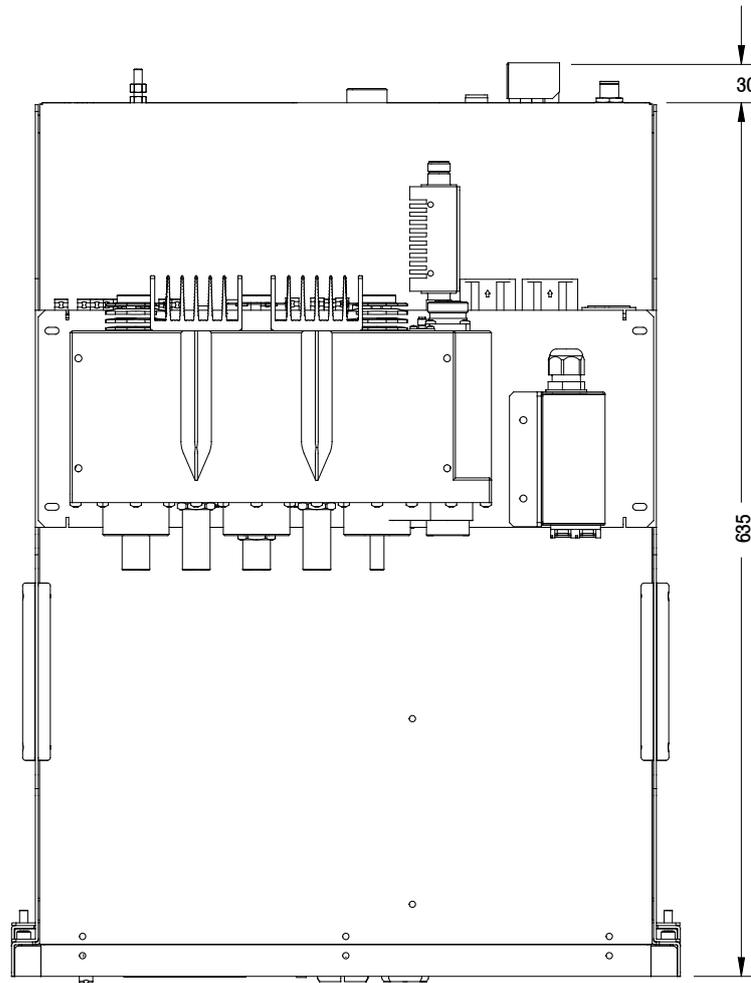
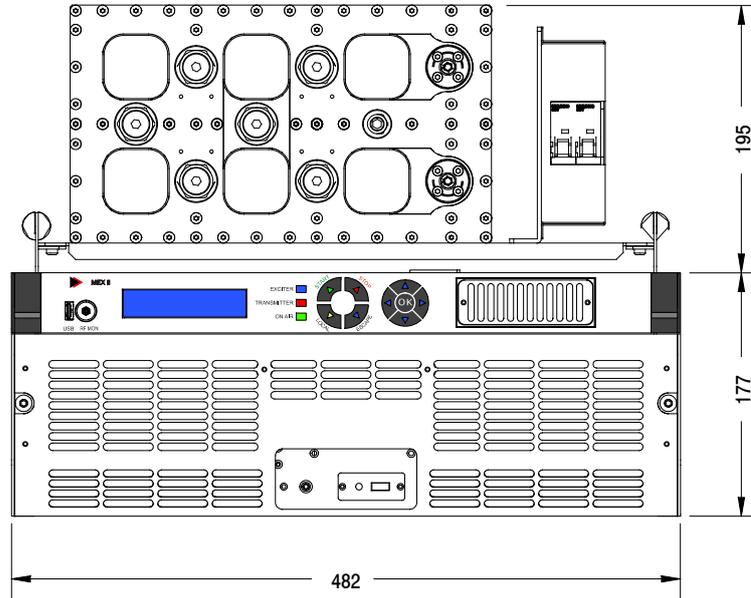
#### NOTE!

##### *INSPECTION FOR DAMAGE DURING TRANSPORT*

*When the equipment arrives at destination, it should be inspected immediately for possible damage incurred during transport.*

If any damage is found, both the insurance company and the shipping agent must be informed immediately. If the name of the insurance company is unknown, a Lloyd's inspector should be called in.

 **NOTE!**  
 The illustrated Tx GENESIS is the UHF version (the VHF version differs only for the PB filter)



dimensions in mm

Fig. 2.1 - Transmitter overall dimensions

### **2.1.3 Unpacking**

No particular procedures are necessary to unpack the crate. However, it is suggested to carry out this operation as close as possible to the final installation site.

Avoid damage to the crate and to the packing material inside them, so they can be re-utilized in case the equipment should be moved to another installation site.

### **2.1.4 Storage**

After the material contained in the crate has been inspected and it has been verified for damages, the unit shall be stored in its original packing until the time of installation. The storage deposit must be well protected and free from humidity.

Avoid keeping the units in storage for a long time, scheduling the delivery date precisely. Long time storage may cause frequency failures during the initial period of utilization.

If the equipment should be kept in storage for a long time, it is advisable to insert hygroscopic substances (such as silicon gel salts) in the crates.

### **2.1.5 Repacking**

The packing methods may be different according to: the transportation means, the environment, the expected period of inactivity and the storage.

The following suggestions are referred to a typical package able to withstand by land, by sea or by air transportation.

The cabinet must be inserted in a proper wooden box lined internally with polystyrene foam tailored to the cabinet dimensions. When the cabinet has been introduced, a packet of dehydrant must be added and the box must be closed with a polystyrene foam cover first and then with a wooden cover provided with hinges on one side and locking devices on the other side.

Finally the box must be properly wrapped with iron or plastic straps which can withstand very hard handling causing the box to be opened.

Each unit must be packed, wrapped with barrier paper and sealed with adhesive tape. The unit packaged must be introduced in a box internally lined with gummed horse hair.

The boxes must be closed with adhesive tape, wrapped with iron or plastic straps and then the identification tags must be applied.

## 2.2 PHYSICAL INSTALLATION

The installation procedure consists of the following steps:

### 2.2.1 Mounting the filter on the frame (refer to Fig. 2.2)

- Due to its weight and for safety reason the filter is packed separately, so it is necessary to fit it to the frame.

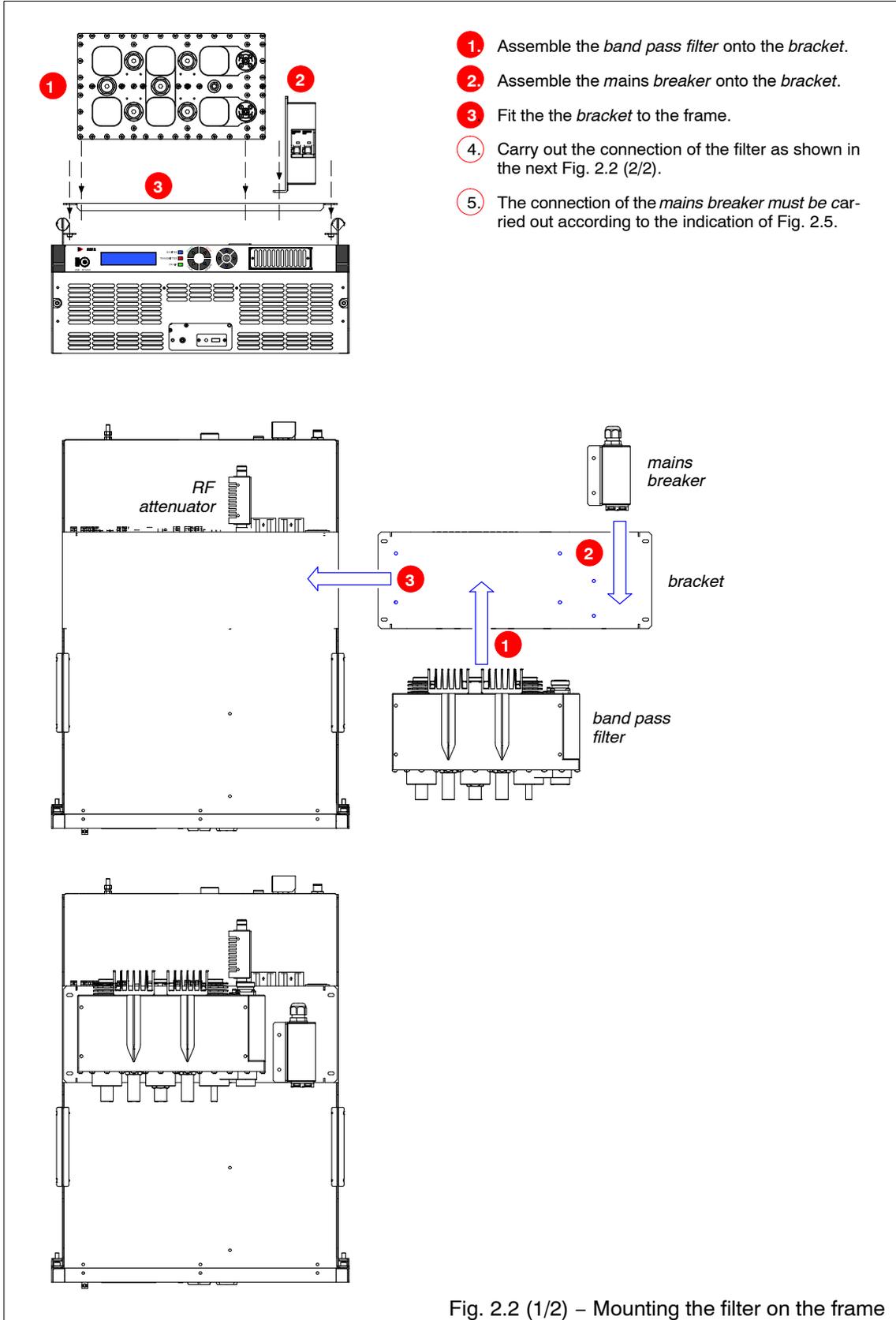


Fig. 2.2 (1/2) – Mounting the filter on the frame

- Once the band pass filter has been fit it to the frame, connect its RF input to the RF output of the *amplifier module* (HPA). The connection must be carried out with W301 c coaxial cable (delivered).

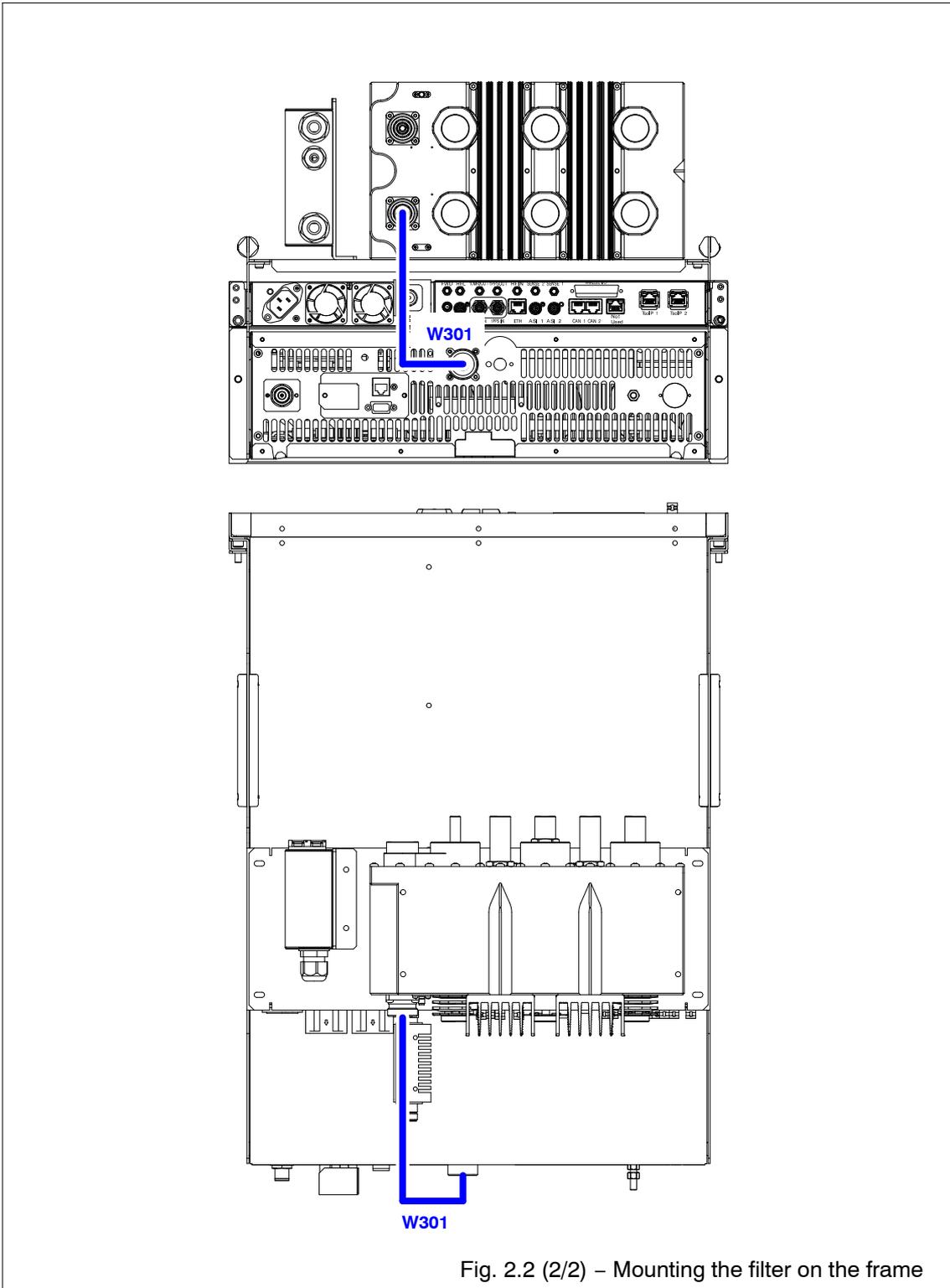


Fig. 2.2 (2/2) – Mounting the filter on the frame

### 2.2.2 Ground connections (refer to Fig. 2.3)

- Grounding is made using the special terminations found on rear panels of the modulator and amplifier units and pointed out by the label . The connection must be carried out separately on both units.

It should be kept in mind that good ground contact is not always achieved merely by locking through bolts. Defective grounding not only may represent a danger to personnel, but can also increase possibilities of interferences or abnormal functioning. To prevent or reduce interference between the transmitter and other telecommunication equipments all external shields must be connected to the ground terminal board. This connection also serves to prevent formation of static loads on the unit.

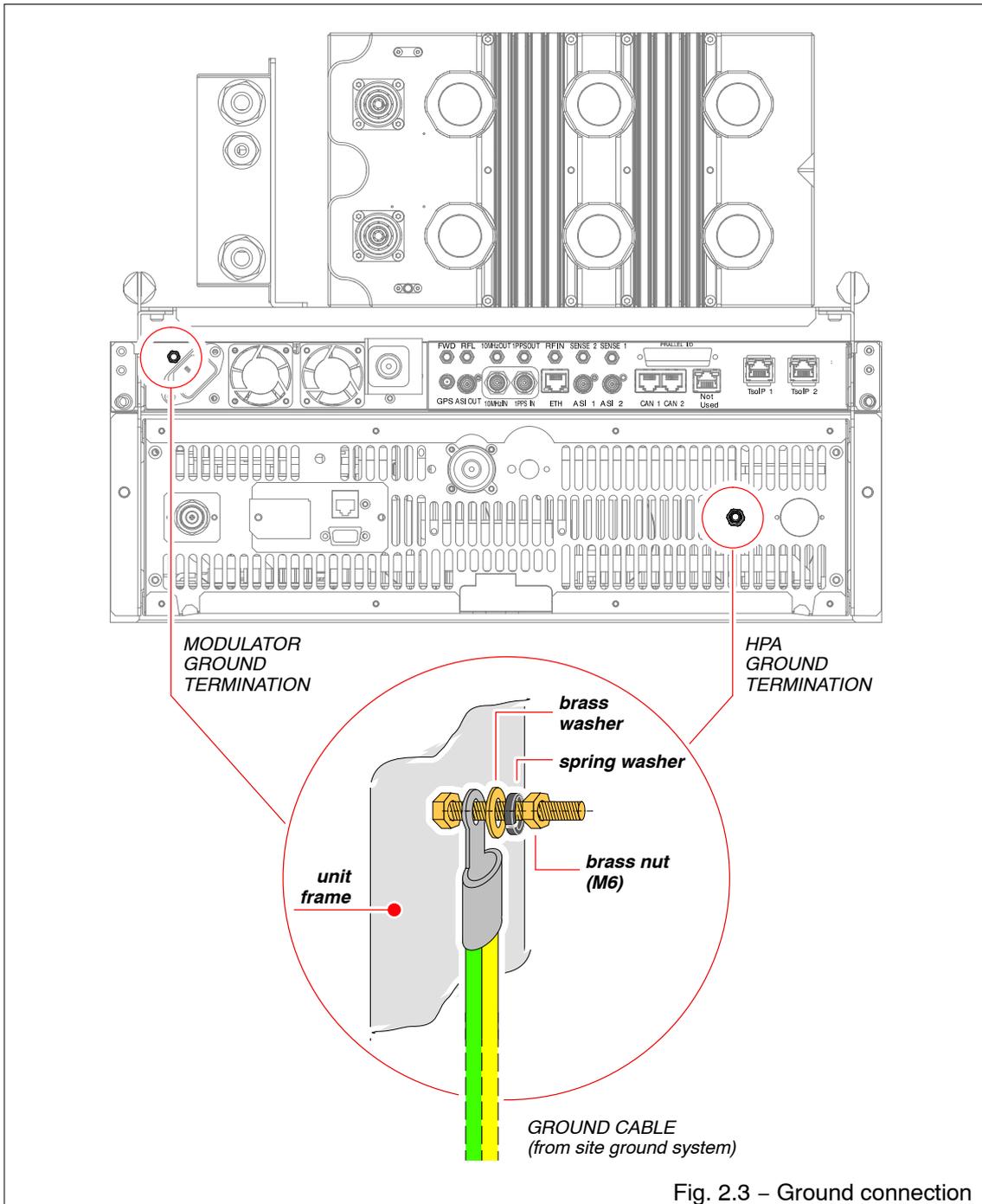


Fig. 2.3 – Ground connection

### 2.2.3 Connection to the antenna (refer to Fig. 2.4)

The RF output of the transmitter is available on the band pass filter frame. The connector ( $7/16''$  type) is the one close to the *monitor* connector (SMB female) and is labelled “RF OUT”. The connection to the antenna must be carried out via coaxial cable of the suitable dimension.

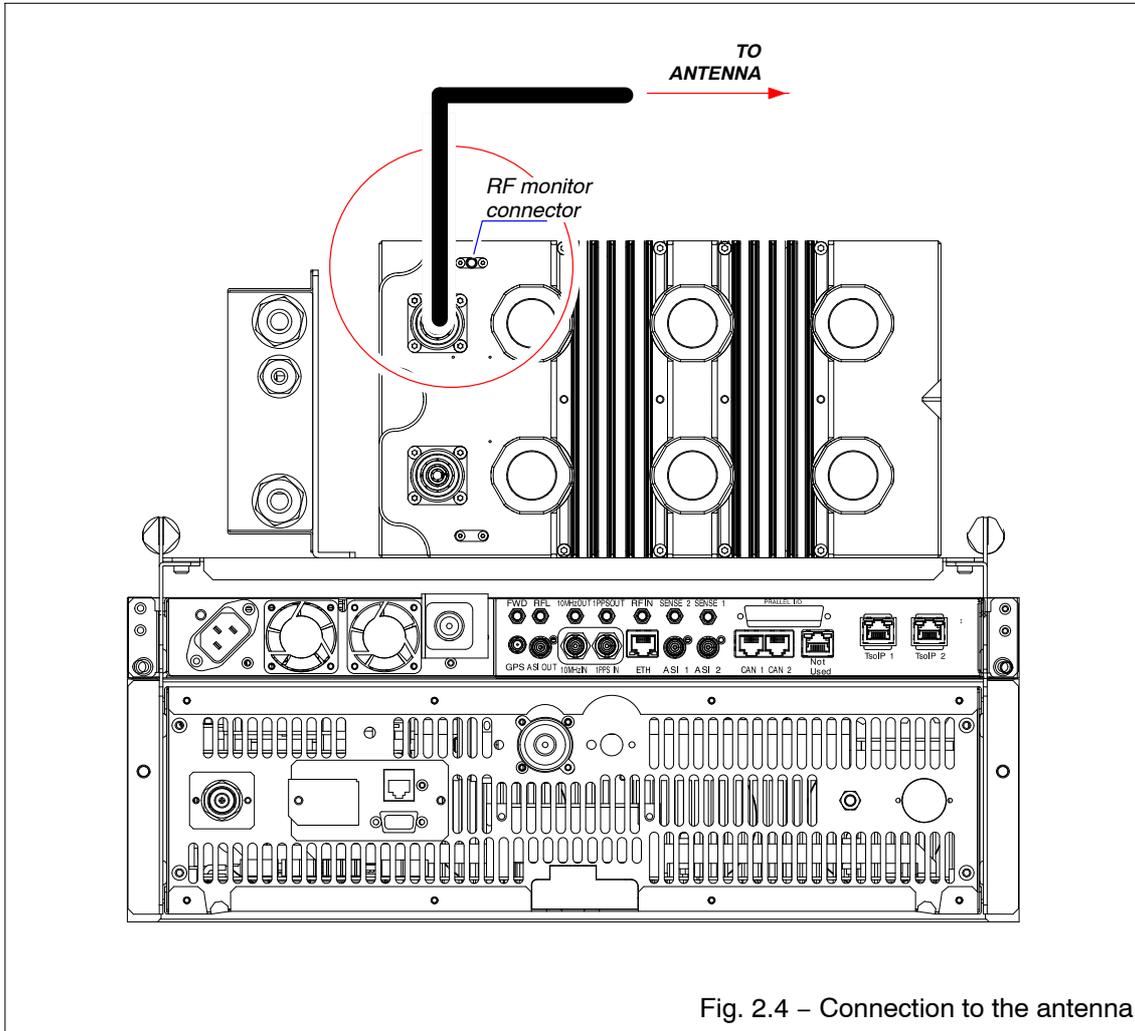


Fig. 2.4 – Connection to the antenna

#### 2.2.4 Mains connections (refer to Fig. 2.5 and wiring diagram of the transmitter)

##### UNITS PROVIDED WITH "MAINS DISTRIBUTION"

Before connecting the mains supply voltage for the transmitter, it is necessary to connect *Mains Distribution* (mains breaker) to *modulator* unit and to *amplifier module* (HPA). The connections must be carried out with the line cords delivered as indicated below:

- line cord W101 must be connected from *Mains Distribution* (mains breaker) to *modulator* unit;
- line cord W102 must be connected from *Mains Distribution* (mains breaker) to *amplifier module* (HPA).

Mains supply must be connected to the terminal blocks of *Mains Breaker*. Connect the cables (L, N) of the mains and ground cable (PE) to the terminal blocks. Refer to Fig. 2.5 and to TX wiring diagram for carrying out the mains connections.

##### UNITS WITHOUT "MAINS DISTRIBUTION"

Mains supply must be connected to the line socket of the modulator unit (on the rear panel) with the suitable line cord and to the terminal block of the HPA (on the rear panel). Connect the cables (L, N) of mains and ground cable (PE). Refer to Fig. 2.5 and to TX wiring diagram for carrying out the mains connections.

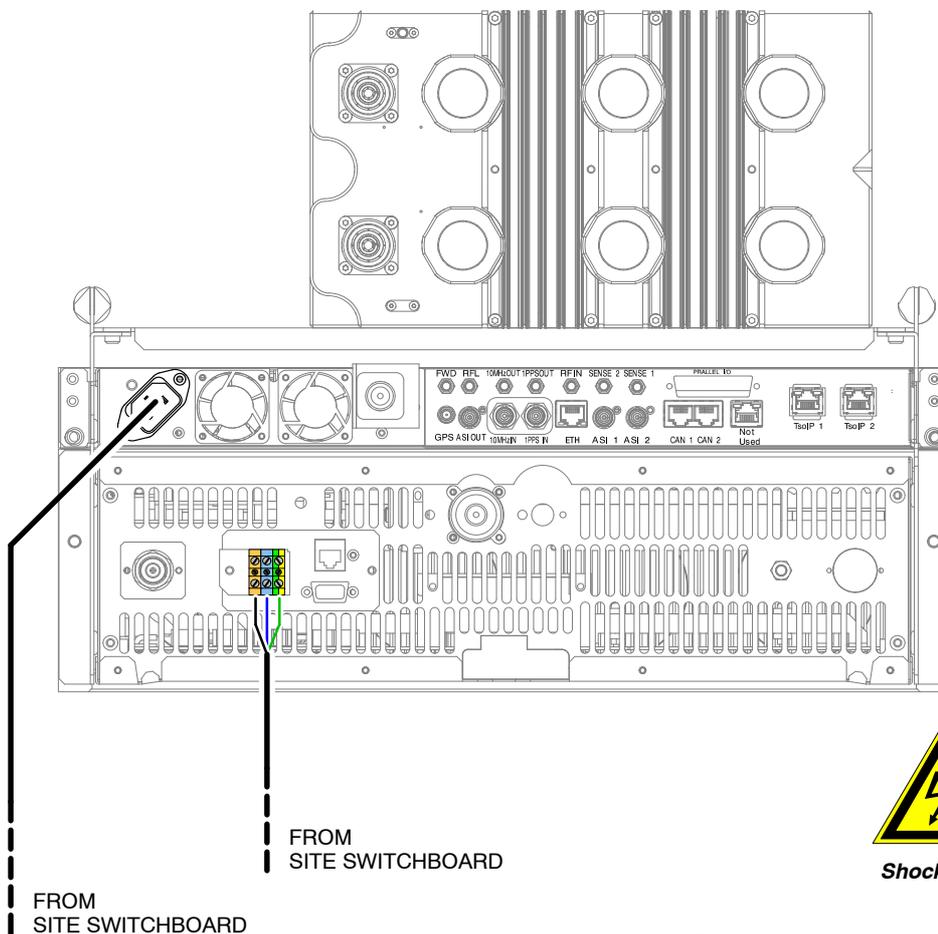
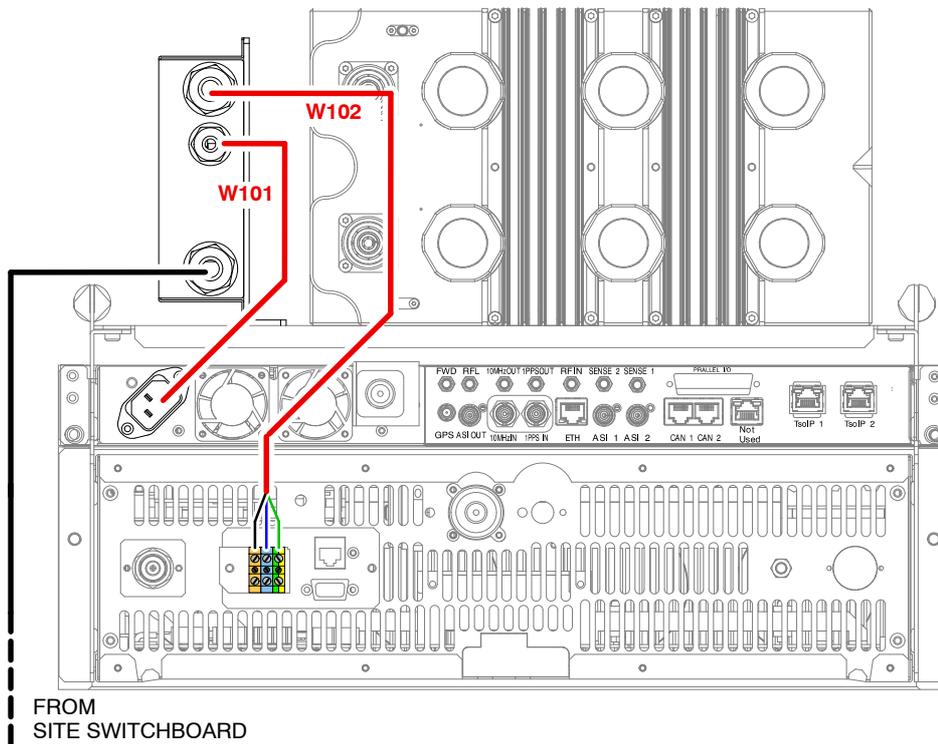


Fig. 2.5 – Mains connections

**2.2.5 Program signals connection** (refer to Fig. 2.6)

The connectors for the program signals are available on the rear panel of the modulator unit. Fig. 2.6 (1/2) is referred to the analogic version of the modulator and Fig. 2.6 (2/2) to the digital version.

10MHz and 1PPS signals too, must be connected to the modulator, also these connectors are available on rear panel of the modulator.

Refer to wiring diagram included on divider no. 6 “Wiring diagrams”.

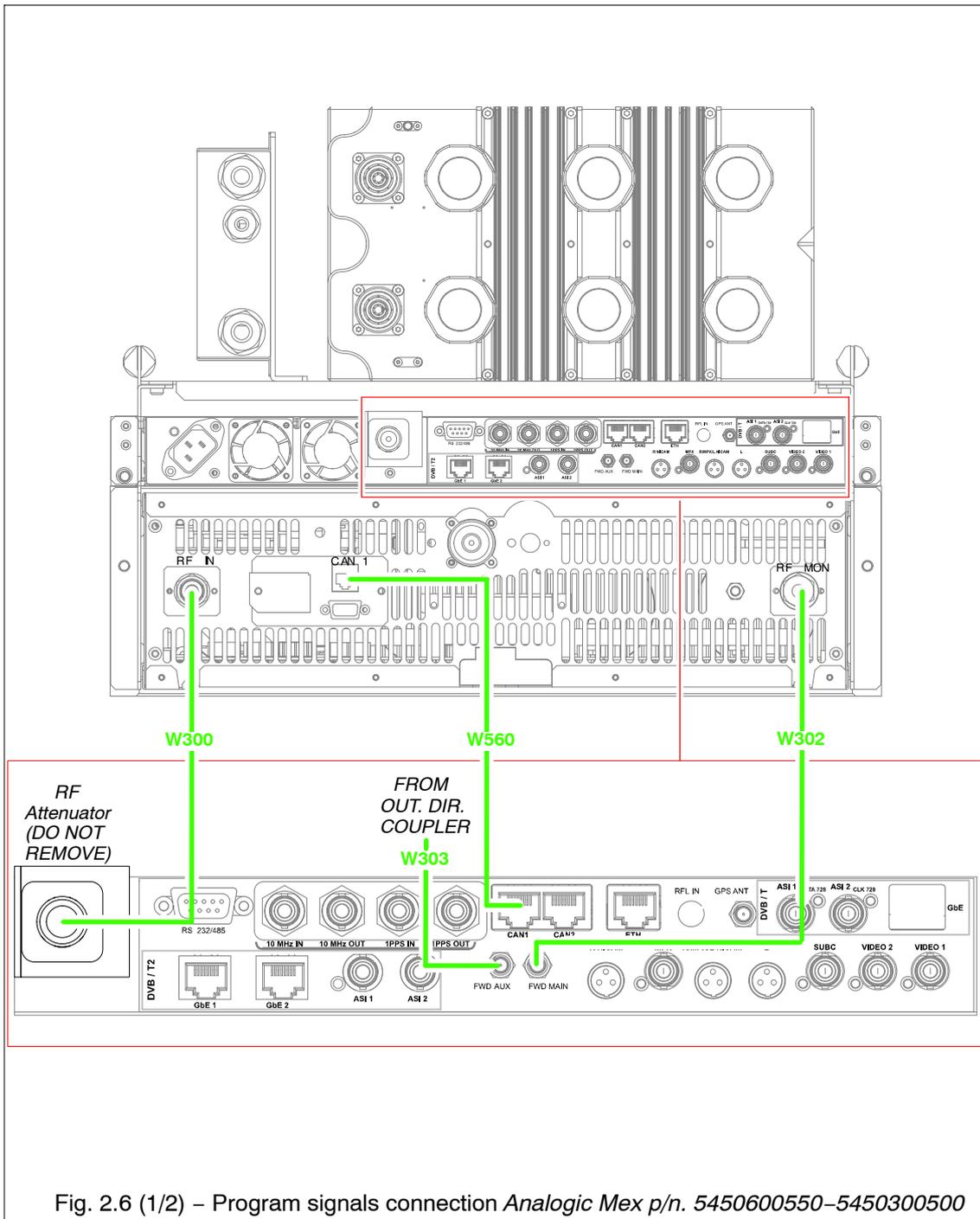
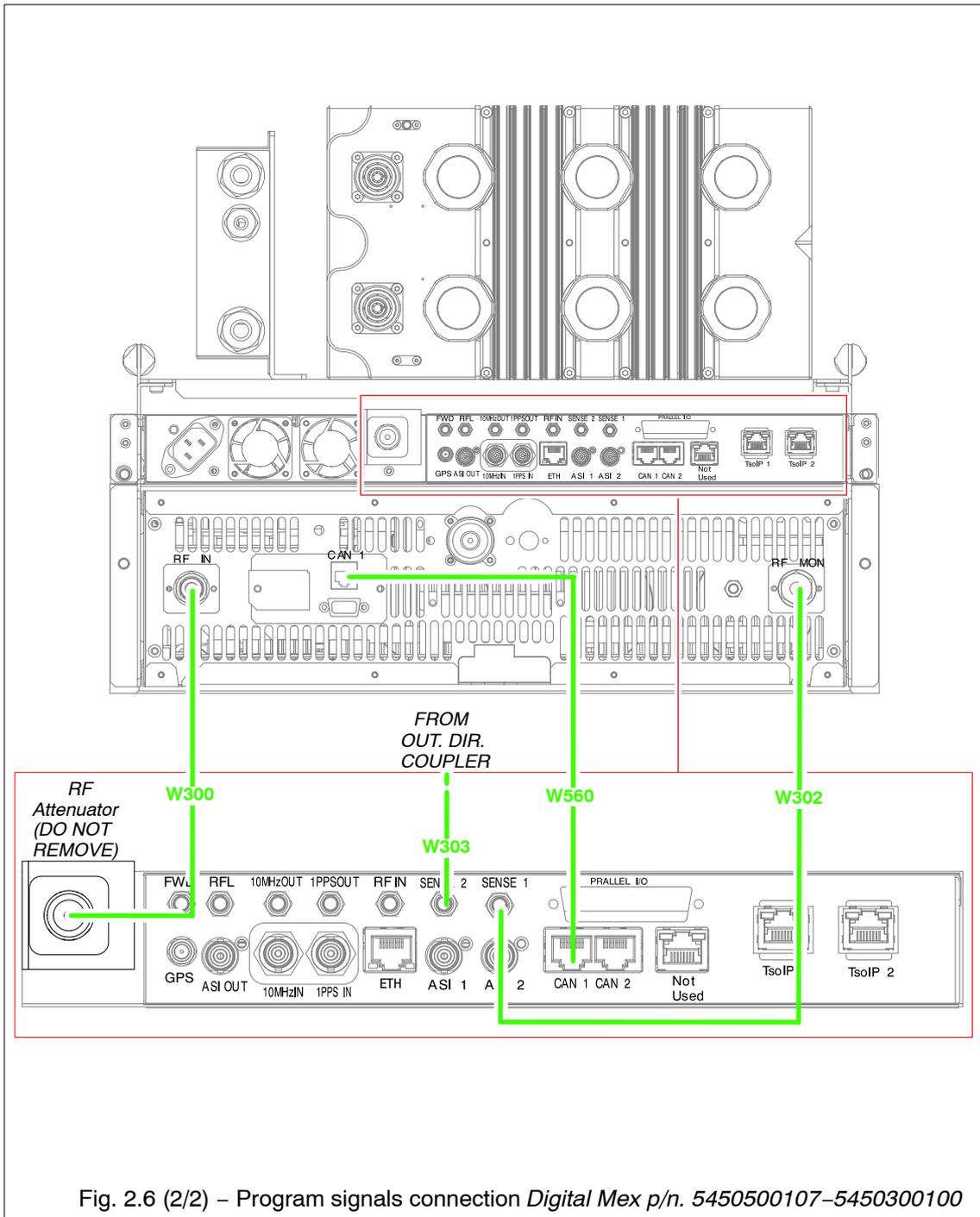


Fig. 2.6 (1/2) – Program signals connection *Analogic Mex p/n. 5450600550–5450300500*



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OPERATIONS 3

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## 3.: OPERATIONS

### 3.1 INTRODUCTION

The present chapter contains the operating instructions, the information and procedures necessary to enable the operating personnel to efficiently and effectively use the equipment.

### 3.2 CALL OUT OF CONTROLS AND INDICATORS ON TRANSMITTER FRONT PANELS

The following tables refer to the figures showing the call out of the front panel of the units included in the equipment, which have controls and connectors available to the operator.

Each number of the tables marks and indicator, connector, test point etc. located on the panels. A simple description of the function carried out is given for each number.

The content is subdivided as follows:

- Tab. 3.1 refers to Fig. 3.1 which is the call out of “MEX // Modulator” front panel
- Tab. 3.2 refers to Fig. 3.2 which is the call out of “HPA Unit” front panel

3.2.1 Call out of the units on transmitter cabinet

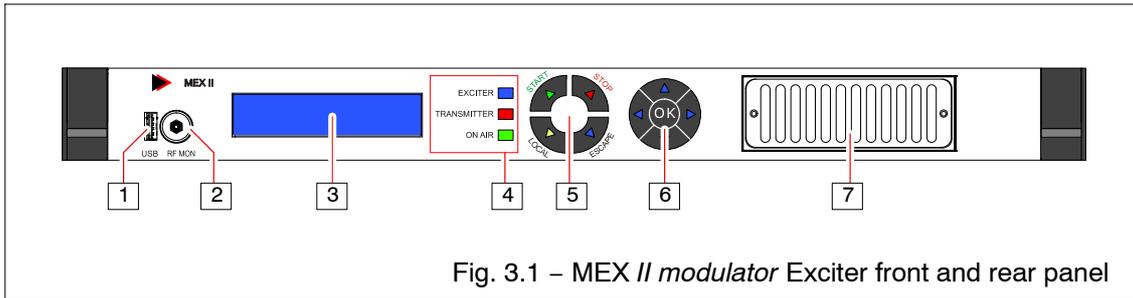


Fig. 3.1 – MEX II modulator Exciter front and rear panel

Tab. 3.1 – MEX II Exciter front panel call out (ref. Fig. 3.1)

No.	LABEL	FUNCTION
1		USB connection used only by <i>Itelco</i> for maintenance purposes. <i>Do not use for communication with DVB-T2 modulator.</i>
2	RF MONITOR	Monitor connector (SMB female); it allows monitoring the RF output signal of the unit.
3		LCD display of the unit; displays information and data relevant to the functioning of MEX II (4 lines x 30characters).
4	EXCITER	Led indicator (green/red/yellow); indicates MEX status according to the colours, as follows: <i>BLUE</i> MEX is delivering its nominal RF output power; <i>RED</i> failure condition of MEX (no RF ouput power); <i>YELLOW</i> warning condition of MEX (MEX is still working); <i>OFF</i> MEX is in <i>STOP</i> condition ( <i>EXCITER RF OFF</i> ).
	TRANSMITTER	Led indicator (green/red/yellow); it is active only when MEX operates also as control logic of the transmitter where it is housed. According to the colour, it shows the transmitter status, as follows: <i>GREEN</i> the transmitter is delivering its nominal RF output power; <i>RED</i> failure condition of the transmitter (no RF ouput power); <i>YELLOW</i> warning condition of the transmitter (transmitter is still working); <i>OFF</i> when the transmitter is in <i>STOP</i> condition.
	ON AIR	Led indicator (green); indicates MEX is on air.  ⓘ <i>The led blinks during the warm-up period (approx. 30sec.; at MEX-II swicthing-on); within this time interval all alarms are inhibited.</i>

**Tab. 3.1 – MEX // Exciter front panel call out (ref. Fig. 3.1)**

No.	LABEL	FUNCTION
5		<p>Push-buttons; allow setting the operating conditions of the unit:</p> <p><b>START</b> Push-button; it is active only if <i>local</i> functioning mode has been set. Under this condition, it operates as follows:</p> <ul style="list-style-type: none"> <li>• if <i>MEX operates only as exciter</i> starts the unit;</li> <li>• if <i>MEX operates as TX CTRL LOGIC</i> starts TX.</li> </ul> <p>When pushed, the associated green led, lights up.</p> <p><b>STOP</b> Push-button; it is active only if <i>local</i> functioning mode has been set. Under this condition, it operates as follows:</p> <ul style="list-style-type: none"> <li>• if <i>MEX operates only as exciter</i> switches-off the unit;</li> <li>• if <i>MEX operates as TX CTRL LOGIC</i> switches-off TX.</li> </ul> <p>When pushed, the associated red led, lights up.</p> <p><b>ESCAPE</b> Push-button; it allows to quit from current menu.</p> <p><b>LOCAL/REMOTE</b> Push-button which allows <i>local/remote</i> control of the equipment. When <i>local</i> mode is selected, "START" and "STOP" push-buttons and the keyboard are enabled. When <i>remote</i> mode is selected, "START" and "STOP" push-buttons and the keyboard are disabled.</p>
6		<p>Controller keyboard. It allows accessing the menu (listed on right-hand side of the display) and setting the functioning parameters of MEX.</p> <p>Accessing the menu and setting of the parameter is as follows:</p> <ul style="list-style-type: none"> <li>- "▲" and "▼" arrows select the menu; once accessed the menu, select the parameter to be changed; change the values of the parameters inside a menu.</li> <li>- "◀" and "▶" arrows allow scrolling the pages of each menu.</li> <li>- "OK" key is used to enter the selected menu and to confirm the setting carried out.</li> </ul>
7		Grid for the inlet of the cooling air of the unit.

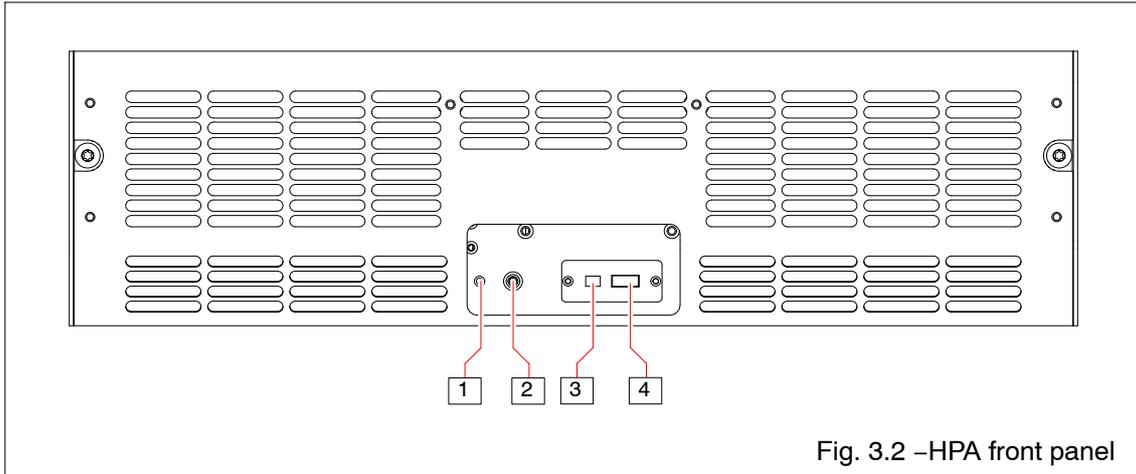


Fig. 3.2 –HPA front panel

**Tab. 3.2 –HPA front panel call out (ref. Fig. 3.2)**

No.	LABEL	FUNCTION
1		Push–button; it allows resetting logic section of the unit.
2		Connector (SMB, female); it allows monitoring RF output of the amplifier module.
3		Indicator led (multicolor); depending on the unit status it is lit: <i>SOLID GREEN</i> when the unit is AC supplied, but it does not deliver RF output power; <i>SOLID BLUE</i> when the unit is AC supplied and it delivers RF output power (normal operating conditions). <i>BLINKING BLUE/RED</i> when an alarm with <i>Warning level</i> has occurred (transmitter goes on). <i>SOLID RED</i> when an alarm with <i>Critical level</i> has occurred (transmitter stops).
4		USB connector; PC connection for monitoring the amplifier status. A dedicated software is needed.

**3.3 SUMMARY TABLE OF INDICATOR LEDS ON TX FRONT PANEL**

---

The following table refers to Fig. 3.3 which point out all the indicator LEDs available to the operator, on the front panels of the transmitter's units. A simple description of the function carried out is given for each number.

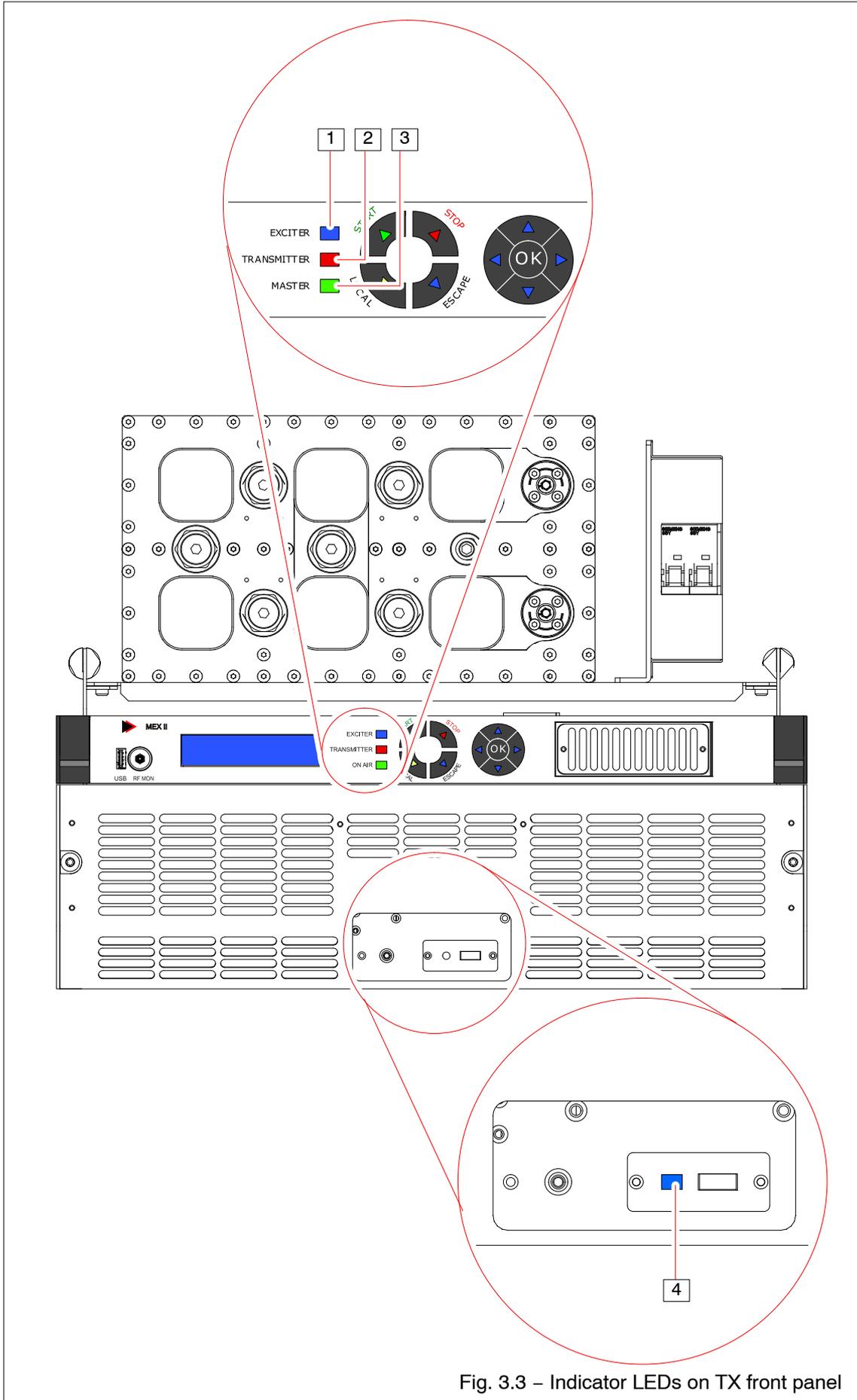


Fig. 3.3 – Indicator LEDs on TX front panel

**Tab. 3.3 – Indicator LEDs on TX front panel (ref. Fig. 3.3)**

No.	LED	COLOR	INDICATION
<b>“MEX” exciter</b>			
1	EXCITER	MULTICOLOR	<p>Led indicator (green/red/yellow); indicates MEX status according to the colours, as follows:</p> <p><i>BLUE</i> indicates MEX is delivering its nominal RF output power;</p> <p><i>RED</i> indicates a failure condition of MEX (no RF output power);</p> <p><i>YELLOW</i> indicates a <i>warning</i> condition of MEX (MEX is still working);</p> <p><i>OFF</i> when MEX is in <i>STOP</i> condition (<i>EXCITER RF OFF</i>).</p>
2	TRANSMITTER	MULTICOLOR	<p>Led indicator (green/red/yellow); it is active only when MEX operates also as control logic of the transmitter where it is housed. According to the colour, it shows the transmitter status, as follows:</p> <p><i>GREEN</i> indicates the transmitter is delivering its nominal RF output power;</p> <p><i>RED</i> indicates a failure condition of the transmitter (no RF output power);</p> <p><i>YELLOW</i> indicates a <i>warning</i> condition of the transmitter (transmitter is still working);</p> <p><i>OFF</i> when the transmitter is in <i>STOP</i> condition.</p>
3	ON AIR	GREEN	<p>Led indicator; indicates MEX is on air.</p> <p>☞ <i>The led blinks during the warm-up period (approx. 30sec.; at MEX swicthing-on); within this time interval all alarms are inhibited.</i></p>
<b>“THALNA” High Power Amplifier</b>			
4		MULTICOLOR	<p><i>SOLID GREEN</i> . . . . . when the unit is AC supplied, but it does not deliver RF output power;</p> <p><i>SOLID BLUE</i> . . . . . when the unit is AC supplied and it delivers RF output power (normal operating conditions).</p> <p><i>BLINKING BLUE/RED</i> . . when an alarm with <i>Warning level</i> has occurred (transmitter goes on).</p> <p><i>SOLID RED</i> . . . . . when an alarm with <i>Critical level</i> has occurred (transmitter stops).</p>

### 3.4 INSTALLATION CHECKS

---

After each unit has been installed, as described in the previous chapter, a series of checks must be performed to verify that:

- neither equipment nor cables have been damaged during installation;
- the equipment operates regularly and is fully able to carry out the functions for which has been installed.

The check procedure consists of two steps:

- Cold checks;
- Hot checks.

#### 3.4.1 Cold checks

Check that each unit has been installed in accordance with the instructions given in the previous chapter. Particularly verify that:

- ▶ the place of installation complies with the stated requirements;
- ▶ sufficient space is available around the unit for maintenance requirements;
- ▶ the unit is easily accessible to the operator;
- ▶ the unit is grounded;
- ▶ connectors and cables attached to the unit are well tightened
- ▶ RF output of the transmitter is connected to antenna or to a suitable dummy load

Then check that the unit has been connected in accordance with the indications given in the wiring diagrams, and check the ohmic continuity of all conductors.

#### 3.4.2 Hot checks

Upon completion of "cold" checks with the equipment switched off, switch it on (carry out steps 1 and 2 of Tab. 3.4) and verify that functioning is regular. It is advisable to check:

- ▶ all power supply voltages to the various units;
- ▶ regular functioning of equipment, on *MEX II* modulator display; regular functioning of the equipment may be also checked referring to Tab. 3.3 which lists the indicator LEDs on equipment front panels and their associated status (*alarm* or *regular*);
- ▶ air cooling system is efficient, making sure that the air can be felt from all nozzles.

### 3.5 SWITCHING-ON

The switching on procedure for the equipment is given on Tab. 3.4.

Tab. 3.4 – Switching on the equipment ( <i>local control procedure</i> )		
Step	DESCRIPTION	EXPECTED RESULT
1	– Close the <b>Mains Breaker</b> ( <i>if present!</i> ) or connect the mains supply voltage to the unit as indicated in chap 2.: Installation; para. 2.2.4 – Mains connections.	<p>These LEDs light up on front panels of the following units:</p> <p><u>MEX II modulator:</u></p> <ul style="list-style-type: none"> <li>● LOCAL (<i>yellow</i>) on relevant key;</li> <li>● ON AIR (<i>blinking blue/red</i>). See note (1).</li> </ul> <p>Display of modulator lights-up and it start the software loading ('loading...' operation).</p> <p><u>RF Amp. modules</u></p> <ul style="list-style-type: none"> <li>● modules supplied (<i>green</i>)</li> </ul>
2	– Press START key ([5] of Fig. 3.1) on <b>MEX II modulator</b> .	<p>These LEDs light up on front panels of the following units:</p> <p><u>MEX II modulator (<i>on-air</i>):</u></p> <ul style="list-style-type: none"> <li>● RF ON (<i>green</i>);</li> <li>● RF PRESENT (<i>green</i>).</li> <li>● ON AIR (<i>solid blue</i>).</li> </ul> <p><u>RF Amp. modules</u></p> <ul style="list-style-type: none"> <li>● modules delivering RF power (<i>blue</i>)</li> </ul> <p><b>TRANSMITTER DELIVERS RF POWER</b></p>

**NOTE**

(1) The units at the switching-on, are under the operative conditions they had before the switching-off. In this table it is stated that:

- Modulator were in *local* functioning and in *stop* condition (no RF power delivered); otherwise "*local*" LED should be off and "*rf on*", "*rf present*" LEDs should be lit (modulator delivering RF power).

### 3.6 SWITCHING-OFF

The equipment can be switched off locally only if it is working under this condition; if it is working in remote control, the switching-off must be carried out sending the relevant command from the remote control unit.

The switching off in '*local*' functioning is achieved carrying out the following operations:

- ▶ push 'STOP' ([5] of Fig. 3.1) on *MEX II modulator*;
- ▶ open the *Mains breaker* if it is present.

### 3.7 REMOTE CONTROL

The remote control of the transmitter is allowed over Ethernet by means of the Webservice function (Web browser control). A suitable “Ethernet” connector is available on modulator unit rear panel (Fig. 3.4) for the connection to a PC. The unit allows accessing the *web*, typing the associated address (i.e.: 192.4.0.186).

The *digital exciters* are endowed with two separate ethernet connetctors: the former for TX control, the latter for modulator control.

Further details about *ETHERNET* interfaces and connection protocols, are given in Appendix “C”: *Ethernet Iterface Installation Guide*.

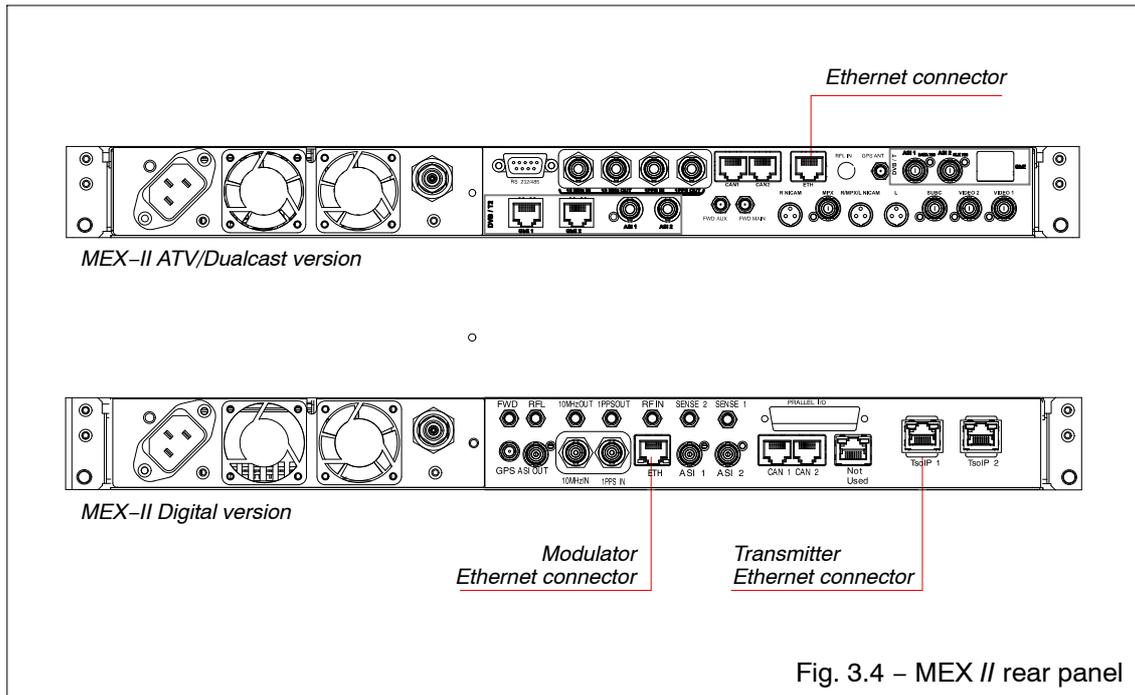


Fig. 3.4 – MEX II rear panel

### 3.8 REGULATION AND SETTINGS

#### 3.8.1 Measurement and Regulation of the transmitter Output Power

A transmitter unit replacement could change the transmitter output power, that is factory set. So it could be necessary to check the RF output power and eventually adjust it again. The procedure must be performed on Exciter.

Refer to *MEX II* Technical Manual for information on how to perform the RF output power adjustment.

The test-bench set-up is shown in Fig. 3.5.

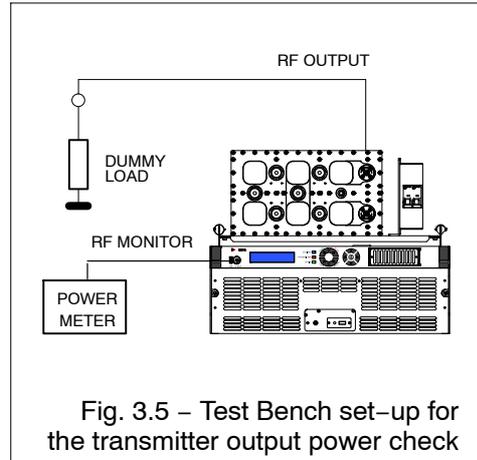


Fig. 3.5 – Test Bench set-up for the transmitter output power check

#### 3.8.2 Changing the transmission channel

The steps to be carried out to tune the transmitter to the transmission channel concern the units listed here below; for each of them is also given (*between parentheses*) the reference to the technical manual where the topic has dealt with.

CCU



(section 2, Tech Manual; Chap. 2 – paragraph 2.4.4 “Description of Menu”; Fig. 2.16 ‘Options/Configuration’ menu)

MEX II EXCITER



(section 2, Tech Manual; see the relevant description)



#### NOTE!

Keep in mind that the set-up relevant the two types of modulators (DVB-T and TV) are completely independent.

So changing the transmission channel on a modulator type, the other ones keeps its pre-existing set-up.

BAND PASS FILTER (if present)

- Tuning the filter cavities (refer to test report which comes with the equipment)

### 3.8.3 Changing the *dual-cast* modulator

The steps to be carried out to change the modulator operation from *analog* to *digital* and vice versa, concern the units listed here below; for each of them is also given (*between parentheses*) the reference to the technical manual where the topic has dealt with.

CCU



(section 2, Tech Manual; Cahp. 2 – paragraph 2.4.4 “Description of Menu”; Fig. 2.16 ‘Options/Configuration’ menu)

MEX // EXCITER



(section 2, Tech Manual; see the relevant description)



#### NOTE!

*Keep in mind that the set-up relevant the two types of modulators (DVB-T and TV) are completely independent.*

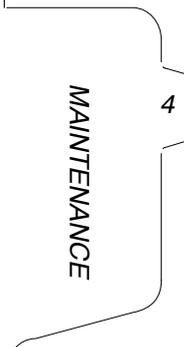
*So changing the transmission channel on a modulator type, the other ones keeps its pre-existing set-up.*

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## 4.: MAINTENANCE

### 4.1 INTRODUCTION

#### 4.1.1 Introduction to Maintenance

The purpose of this section is to assist the maintenance personnel in keeping the equipment at best operational status. Maintenance can be subdivided into the following actions:

- PREVENTIVE MAINTENANCE
- CORRECTIVE MAINTENANCE

Preventive maintenance refers to maintenance procedures which have to be carried out periodically so as to prevent malfunctions. Corrective maintenance includes a series of tables representing a troubleshooting guide used to locate the most likely area where a malfunction has occurred or reference to the equipment manuals.

#### 4.1.2 Maintenance tools

Maintenance tools include *Commercial*, *Standard* and *Special Tools* used for the 1st and 2nd levels of Maintenance. *Commercial Tools* include the tools normally used for the maintenance activities (screwdrivers, pliers, soldering irons, etc.) and are normally available on the local market. *Standards Tools* include those materials considered as standard for maintenance activities (coax cables of standard length, coax adapters, etc.) and are available on the local market and/or from the manufacturer of the Equipment. *Special Tools* include tools prepared by the manufacturer for maintenance requirements and are available only from the manufacturer of the Equipment for which they are designed.

#### 4.1.3 Test Instruments

The Test Instruments required on-site in order to carry out the maintenance activities are listed in the technical manual pertinent to each unit. Please note that all the listed Test Instruments are of commercial type and may be substituted by equivalents available on the local market.

### 4.2 PREVENTIVE MAINTENANCE

This chapter deals with the suggested preventive maintenance operations to guarantee continued performance of the equipment. The preventive maintenance operations are grouped in a table according to their periodicity. The following paragraphs describe those operations which cannot be considered procedures but which have to be carried out for the correct operation of the Equipment. These operations are also listed in the preventive maintenance table.

#### 4.2.1 General Instruction

All Equipment parts shall be examined to check for dust or dirt, overheating, loose screws and foreign bodies. Dust, for example, may cause current discharges or leakages.

##### 1 *Cabinets*

Cabinets, through which the ventilation air flows, need to be internally cleaned from dust. Cleaning can be carried out using a vacuum cleaner for the accessible parts or a clean, dry cloth or bristle brush.

##### 2 *Air Filters*

Cabinet air filters shall be disassembled and cleaned to eliminate the dust accumulated during Equipment operation. The cleaning intervals depend on the number of Equipment operational hours and on the amount of dust present in the room where the Equipment operates. However, generally filters should be cleaned on monthly basis. If the dust layer is thin, it can be removed using a pressurized water spray; then dried by means of compressed air. If the dust layer is hard, dip the filter in hot water for approximately 20 minutes. Then clean the filter by means of a pressurized water spray, dry using compressed air; when perfectly dry, reassemble inside the cabinet.

### 3 Printed Circuit Boards (PCB)

PCBs shall not be removed unless dust is noted on their surface. In this case, the PCBs shall be removed one at a time. Use only moderately compressed air or a soft bristle brush to remove the dust. Clean the lance contacts of the connectors on the PCB using a bristle brush soaked in pure alcohol.

### 4 Power Supply Modules and Converters

Removal of the dust accumulated on the housing and components is normally sufficient to clean power supply modules. To clean the PCBs extract them from the Module, then carefully clean the connector pins using a bristle brush soaked in pure alcohol.

### 5 Indicator Lamps

Lamps must be well inserted in their socket. Remove any trace of corrosion, oxidation or dirt by the use of a cloth soaked in carbon tetrachloride.

### 6 Fuses

Fuse tips are subject to oxidation and must be periodically removed from their holders to check for any presence of oxidation. The oxidation or dust increases the resistance of the electrical circuit. Fuse tips shall be cleaned using a cloth soaked in carbon tetrachloride.



#### TIP

*FUSES SHALL BE REMOVED ONE AT A TIME IN ORDER TO AVOID INSERTING THEM INTO A WRONG HOLDER.*

*THE VALUE PRINTED ON THE FUSES SHALL CORRESPOND TO THAT PRINTED ON THEIR OWN HOLDERS.*

### 7 Connections Cables

Connection cables shall be periodically examined to ensure that breaks in the external insulating coating are not present to cause possible short-circuits. Cover the parts showing deterioration of the insulating coating. Coaxial cables shall be carefully examined since they can be easily damaged by crushing or sharp bends. Connectors shall be checked to ascertain that corrosion is not present on their metallic contacts. Cables showing damages must be protected and eventually replaced.

### 8 Terminal Boards

Terminal boards shall be examined to ascertain that there are no traces of dirt, loose wires or excess solder on the terminals, which could cause undue contacts with the adjacent terminals. Fixing screws or mounting brackets shall be tightened. Terminal boards shall be cleaned using a dry cloth or bristle brush.

### 9 Resistors

Resistors shall be checked for evidence of cracks, discoloration or "cooking". Discoloration indicates that the resistor is subject to overload which could be caused by an incorrect operation of the circuit. Examine resistor leads for dust, dirt or loose connections.

### 10 Transformers and Coils

Examine transformers and coil leads for any trace of dust, dirt or humidity. Check that they are secured in their seats; tighten fixing screws and mounting brackets. Housings, terminals and insulators supporting transformers and coils should be free from foreign objects. Use a dry cloth or, if necessary, moisten the cloth with a suitable solvent. Should the wiring be corroded, tag each wire, disconnect and clean the contact surface using emery paper with a fine grain and then clean the surfaces using a clean cloth. Reconnect the wires.

### 11 Mechanical Inspection

According to the environmental conditions, periodically check and lubricate the following mechanical parts:

- hinges of front doors;
- hinges of rear doors.

#### 4.2.2 Preventive maintenance Table

The preventive maintenance actions have been grouped according to periodicity; Tab. 4.1 gives the summary of periodical checks. The table is divided into four columns. The first column indicates the periodicity of the preventive maintenance. The second describes the function to be checked or the operation to be carried out. The third column contains applicable notes and/or references. The fourth column shows the time needed to carry out the maintenance procedure to allow planning of preventive maintenance for the whole Equipment.

<b>Tab. 4.1 – Summary of periodic checks</b>				
REF.	PERIODICITY	TYPE OF SERVICING	REFERENCE FOR THE EXECUTION	ESTIMATED EXECUTION TIME
2	Monthly	Cleaning of the air filters	Chapt. 4; para. 4.2.1 step 2, of this OPERATOR'S MANUAL	20 min.
3	Monthly	Checking of the voltage power supply of amplifier modules.	On <i>modulator</i> display ( <i>HPA/Summary menu</i> ). See relevant TECH. MAN.	1 min.
4	Monthly	Checking of the current absorption of amplifier modules.	On <i>modulator</i> display ( <i>HPA/Summary menu</i> ). See relevant TECH. MAN.	1 min.
5	Six-Monthly	Checking of the mains terminal blocks tightening	Chapt. 2; para.2.2.4 (Fig. 2.5), of this OPERATOR'S MANUAL	5 min.

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# **APPENDICES**

**A** ... *“ETHERNET INTERFACE”* INSTALLATION GUIDE

**B** ... SAFETY PRECAUTION



***“ETHERNET INTERFACE”***  
**USER’S GUIDE**

**ETHERNET INTERFACE USER'S GUIDE**

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## ETHERNET INTERFACE USER'S GUIDE

### 1.1 INTRODUCTION

The Itelco Ethernet Interface has inside three Internet Protocol Suite protocols:

- HTTP
- Telnet
- SNMP

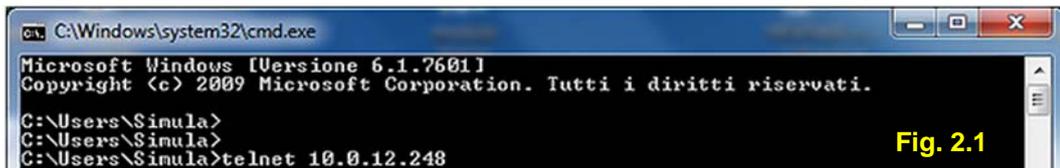
### 1.2 TELNET PROTOCOL

The manufacturer has developed Telnet server as a tools for changing basic parameters remotely. For connection to Telnet server a Telnet client is needed.

### 1.3 OPENING A TELNET SESSION

If you are connecting for the first time, these are the steps to follow:

1. Open the command prompt window, type "telnet <IP>" (in Fig. 2.1, the IP address is 10.0.12.248) and then push 'enter'. If the server does not answer, you have to wait a few seconds and try again. The hardware that handles the Ethernet protocol needs a while to initialize itself. If after some attempts the connection is impossible, you can reset the system.



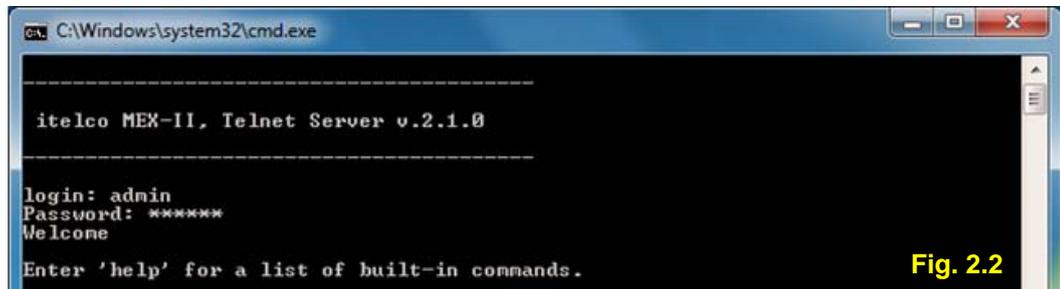
```

C:\Windows\system32\cmd.exe
Microsoft Windows [Versione 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. Tutti i diritti riservati.

C:\Users\Sinula>
C:\Users\Sinula>
C:\Users\Sinula>telnet 10.0.12.248
  
```

Fig. 2.1

2. For logging in, type "admin" and "system" as password. Now you are logged in (Fig. 2.2).



```

-----
itelco MEX-II, Telnet Server v.2.1.0
-----

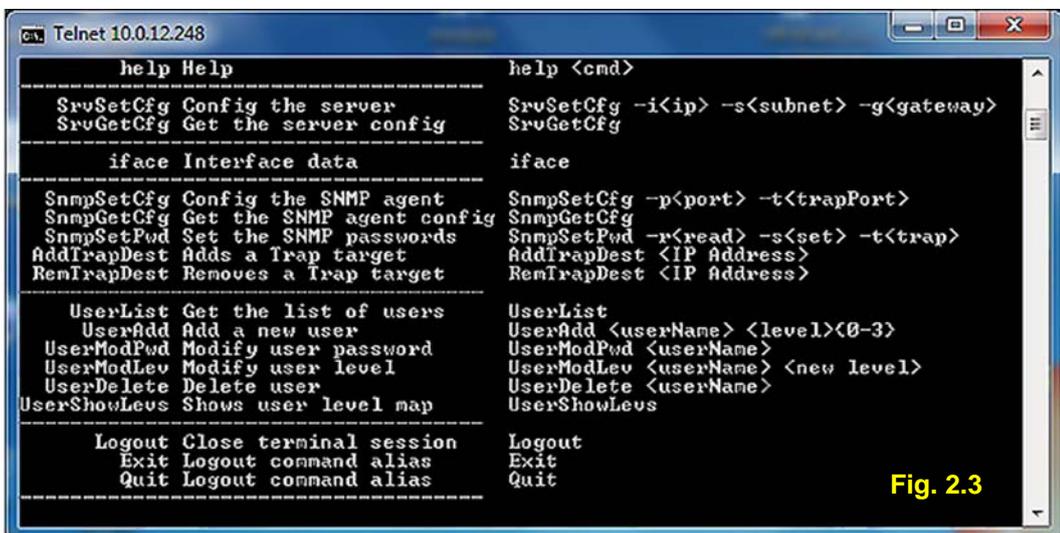
login: admin
Password: *****
Welcome

Enter 'help' for a list of built-in commands.
  
```

Fig. 2.2

### 1.4 HELP

Typing "help", the server will give a view of all command, of the syntax and a brief description of each command (Fig. 2.3):



```

Telnet 10.0.12.248

-----
help Help
-----
SrvSetCfg Config the server
SrvGetCfg Get the server config
-----
iface Interface data
-----
SnmpSetCfg Config the SNMP agent
SnmpGetCfg Get the SNMP agent config
SnmpSetPwd Set the SNMP passwords
AddTrapDest Adds a Trap target
RemTrapDest Removes a Trap target
-----
UserList Get the list of users
UserAdd Add a new user
UserModPwd Modify user password
UserModLev Modify user level
UserDelete Delete user
UserShowLevs Shows user level map
-----
Logout Close terminal session
Exit Logout command alias
Quit Logout command alias
-----
help <cmd>
-----
SrvSetCfg -i<ip> -s<subnet> -g<gateway>
SrvGetCfg
-----
iface
-----
SnmpSetCfg -p<port> -t<trapPort>
SnmpGetCfg
SnmpSetPwd -r<read> -s<set> -t<trap>
AddTrapDest <IP Address>
RemTrapDest <IP Address>
-----
UserList
UserAdd <userName> <level><0-3>
UserModPwd <userName>
UserModLev <userName> <new level>
UserDelete <userName>
UserShowLevs
-----
Logout
Exit
Quit
  
```

Fig. 2.3

## 1.5 COMMANDS

The server parameters and privilege tables are stored in a no-volatile memory. The commands make it possible to set the basic server parameters. These are:

- IP address
- Subnet
- Gateway

### 1.5.1 Changing the server IP address, Subnet and Gateway

When the connection is established, using the default parameters you can change the server ip address, subnet and gateway, with the following commands:

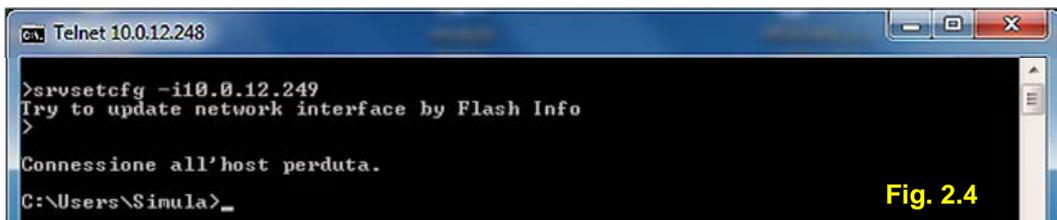
- “SrvSetCfg -i<new IP>”  
↑ type the new address here
- “SrvSetCfg -s<new subnet>”  
↑ type the new subnet here
- “SrvSetCfg -g<new gateway>”  
↑ type the new gateway here

You can change several parameters simultaneously typing the relevant commands, i.e:

- “SrvSetCfg -i<new IP>” -s<new subnet>”

*Take note the new server IP address, because this will be the new IP address that you will have to use for server connections.*

Example: (Fig. 2.4) We want change the server ip address. The new ip address that we want set is 10.0.12.249.



```

C:\Users\Simula> telnet 10.0.12.248
>srvsetcfg -i10.0.12.249
Try to update network interface by Flash Info
>
Connessione all'host perduta.
C:\Users\Simula>
  
```

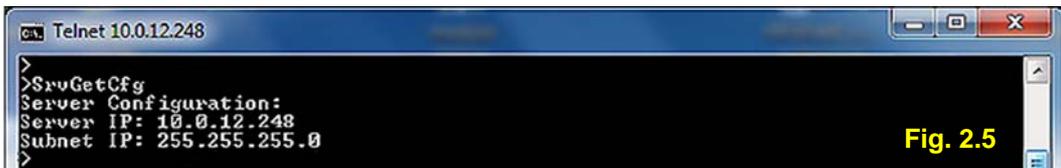


### NOTE!

*Once the IP address, subnet and gateway have been changed, the telnet session is terminated and you have to open a new one with the new IP address.*

### 1.5.2 Getting the server configuration

Typing "SrvGetCfg", you get information on server configuration (Fig. 2.5).



```

CA: Telnet 10.0.12.248
>
>SrvGetCfg
Server Configuration:
Server IP: 10.0.12.248
Subnet IP: 255.255.255.0
>

```

**Fig. 2.5**

### 1.5.3 About server parameters commands

The privilege management is completely achieved for all protocols (HTTP, SNMP, Telnet) through two tables.

The first one contains all users and the relevant passwords of the system.

Each user has only one level (from 0 to 3) showing the privilege of the user in the system management.

“**Level 3**” user (*System Administrator*) can access any possible operation on the equipment, that is:

- *Telnet session* for changing or updating the transmitter parameters and the users parameters.
- *FTP* for firmware upgrading.
- *HTTP page (R/W)* for reading information and sending commands to the equipment (supervisory system).
- *SNMP*. The SNMP access is managed with the community table. Then this table will have a description.

“**Level 2**” user (*Supervisor R/W*) can access:

- *FTP* for firmware upgrading.
- *HTTP page (R/W)* for reading information and sending commands to the equipment (supervisory system).
- *SNMP*. The SNMP access is managed with the community table. Then this table will have a description.

“**Level 1**” user (*Device Administrator*) can access:

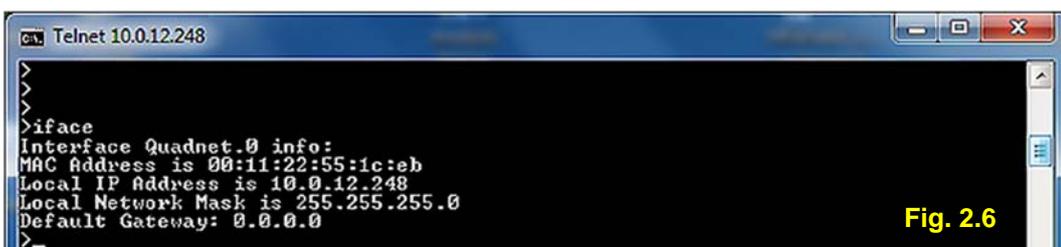
- *HTTP page (R/W)* for reading information and sending commands to the equipment (supervisory system).
- *SNMP*. The SNMP access is managed with the community table. Then this table will have a description.

“**Level 0**” user (*Read Only*) can access:

- *HTTP page (R)* for reading information about the equipment (supervisory system).
- *SNMP*. The SNMP access is managed with the community table. Then this table will have a description.

### 1.5.4 Getting the interface data

Typing "iface", you get information on interface data (Fig. 2.6).



```

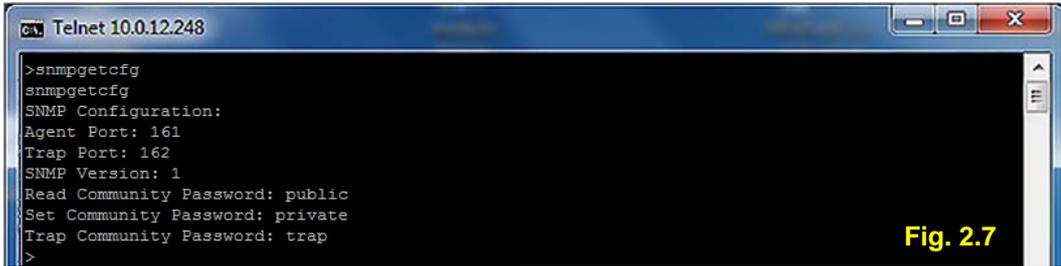
CA: Telnet 10.0.12.248
>
>
>iface
Interface Quadnet.0 info:
MAC Address is 00:11:22:55:1c:eb
Local IP Address is 10.0.12.248
Local Network Mask is 255.255.255.0
Default Gateway: 0.0.0.0
>

```

**Fig. 2.6**

### 1.5.5 Snmp agent

Typing "SnmpGetCfg", you get information on snmp agent configuration (Fig. 2.7).



```

>snmpgetcfg
snmpgetcfg
SNMP Configuration:
Agent Port: 161
Trap Port: 162
SNMP Version: 1
Read Community Password: public
Set Community Password: private
Trap Community Password: trap
>
  
```

**Fig. 2.7**

### 1.5.6 The SNMP community management

The SNMP protocol has a privilege management that we can consider disconnected to the management for HTTP and Telnet. In particular the management is made through the community table. There are 3 community and the related passwords that to default are:

Community	Password	Related level	Description
Read only	public	0	Read Only
Read/Write	private	1	Read and Write commands
Trap Receiver	trap	2	Receive Alarms

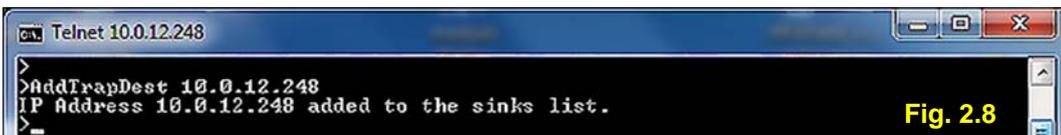
Changing the password requires to be a user of level 3 and to have the possibility to access to Telnet and to use the command:

- "SnmpSetPwd -r<read> -s<set> -t<trap>"
  - ↑ type the new pwd of read only community here
  - ↑ type the new pwd of read/write community here
  - ↑ type the new pwd of trap receiver community here

### 1.5.7 Adding/Removing a trap destination

A *trap destination* is an IP address (max 5) to which the system sends notifications of events occurred.

Typing "AddTrapDest", allows you adding a trap destination (Fig. 2.8).

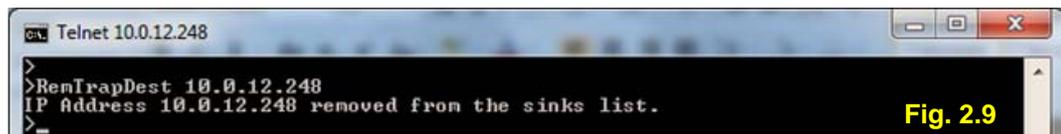


```

>AddTrapDest 10.0.12.248
IP Address 10.0.12.248 added to the sinks list.
>
  
```

**Fig. 2.8**

Typing "RemTrapDest", allows you removing a trap destination (Fig. 2.9).



```

>RemTrapDest 10.0.12.248
IP Address 10.0.12.248 removed from the sinks list.
>
  
```

**Fig. 2.9**

### 1.5.8 User List

Typing "UserList", you have the list of the users (Fig. 2.10).



```

Telnet 10.0.12.248
>
>UserList
User: admin - Password: system - Level: 3
>

```

Fig. 2.10

### 1.5.9 Adding/Deleting a User

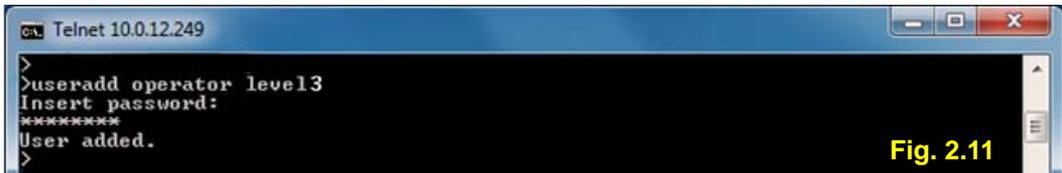
In order to insert a new user type the command "UserAdd" (Fig. 2.11).

The user name or the password is a word up to 10 characters and not shorter of 4, consisting of numbers or letters. The level is a number in the range (0 – 3).

"UserAdd <userName> <level><0-3>"  
↑ *type new user here*      ↑ *type the level here*

If the user name you want insert already exists, the server will send you an error message.

In the example of Fig. 2.11, the new user added is "operator" with level "3".



```

Telnet 10.0.12.249
>
>useradd operator level3
Insert password:
*****
User added.
>

```

Fig. 2.11

In order to delete a user type the command "UserDelete" (Fig. 2.12). In the example here below the user "operator" has been deleted.



```

Telnet 10.0.12.248
>
>UserDelete operator
User deleted.
>

```

Fig. 2.12

Note that a user of level 3 can erase or update any user.

Default user of the unit is a level 3 user with user name "admin" and password "system". Adding a new user of level 3, overwrites the "admin" user.



#### NOTE!

Take note of the password of user "admin".

Erasing the last user of level 3, restores "admin" user with its pwd:

- "system" if it has not been changed;
- last pwd set if "system" has been changed.

#### WARNING!

The passwords cannot be recovered! If the only administrator user forgets its password, it is no more possible to open a telnet session.

### 1.5.10 Modifying the User Password and/or level

In order to modify the user, type the command (Fig. 2.13):

```
"UserModPwd <userName>"
```

↑ *type the user name you want to modify the pwd*

You have to type the old password and then the new one.



```

c:\ Telnet 10.0.12.249
>usermodpwd admin
Insert old password:*****
Insert new password:*****
Password modified.
>

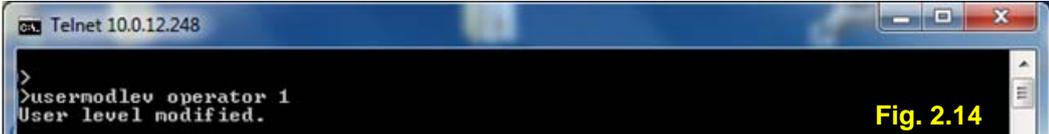
```

**Fig. 2.13**

The same operation leads to the modification of the user level (Fig. 2.14). Now the command is:

```
"UserModLev <userName> <new level>"
```

↑ *type user name here*                      ↑ *type the new level here*



```

c:\ Telnet 10.0.12.248
>
>usermodlev operator 1
User level modified.
>

```

**Fig. 2.14**

### 1.5.11 User Level Map (Level of security offered to protect against unauthorised control access to remote transmitter when connected over the corporate LAN/WAN system)

Typing "UsersShowLevs", you get a map of the users with the associated levels (Fig. 2.15). For further details refer to para. 1.5.3 "About server parameters commands".



```

c:\ Telnet 10.0.12.249
>
>usershowlev
Level: 0: Read Only
Level: 1: Supervisor R/W
Level: 2: FTP/TFIP Access
Level: 3: Telnet Access
>

```

**Fig. 2.15**

The application related to the Ethernet Interface of the Tx and N+1 Changeover CCU, the Exciters and the IEC devices implements control over IP.

No encryption is provided (no SSL ecc.).

The application uses a 4 level privileges defined by a user-id and a password :

**"Level 3"** user (System Administrator) can access any possible operation on the equipment, that is:

- \_ Telnet session for changing or updating the transmitter parameters and the users privileges parameters.
- \_ FTP for firmware upgrading.
- \_ HTTP page (R/W) for reading information and sending commands to the equipment (supervisory system).
- \_ SNMP. The SNMP access is managed with the community table.

**"Level 2"** user (Supervisor) R/W can access:

- \_ FTP for firmware upgrading.
- \_ HTTP page (R/W) for reading information and sending commands to the equipment (supervisory system).
- \_ SNMP. The SNMP access is managed with the community table.

“**Level 1**” user (Device Administrator) can access:

- \_ HTTP page (R/W) for reading information and sending commands to the equipment (supervisory system).
- \_ SNMP. The SNMP access is managed with the community table.

“**Level 0**” user (Read Only) can access:

- \_ HTTP page (R) for reading information about the equipment (supervisory system).
- \_ SNMP. The SNMP access is managed with the community table.

The SNMP Agent offers protection by the use of one community for Read-Only GET queries and one community for the Read-Write SET commands.

Only the System Administrator can set and change the community table.

#### 1.5.12 Closing terminal session

Typing “Logout”, the connection is closed. The system will be reset and will be ready (after few seconds) to accept a new connection.



#### **NOTE!**

*If you do not press any key for 120 seconds, the session is terminated due to timeout.*

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# **SAFETY PRECAUTIONS**

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B	19.11.04		

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  - 1.3 General
- 2. SAFETY OPERATION**
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  - 2.3 Rescue
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  - 2.5 Emergency First Aid instructions
    - 2.5.1 Rescue Breathing
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- 3. SPECIFICATION ON HANDLING AND DISPOSAL OF BERYLLIA DEVICES**
  - 3.1 Handling
  - 3.2 Disposal
- 4. ABSTRACT OF APPENDIX “E” OF CEI EN 60215 SAFETY RULES**

*Guide to safety precautions which must be observed by the personnel operating with radio-transmitters*

---

## 1 INTRODUCTION

---

### 1.1 Application notes

The following rules apply to radio-transmitters, included every auxiliary equipment requested for their functioning, working under the responsibility of trained personnel. Antennas system and their supplying lines are excluded.

### 1.2 Purpose

The content of this section provides information concerning safety precautions which must be observed by the operating personnel. Para. 4 provides in addition, an abstract of the "Appendix E of CEI EN 60215 Safety Rules".

The information given throughout this section concerns the safety operations (protection against electric shock, burns, dangerous radiations, sundry risks) and the specifications on handling and disposal of beryllia devices.

These directions do not ensure necessarily the safety of not-trained personnel operating with the equipment when it is not working in normal conditions.

### 1.3 General

Itelco® equipments have been designed and manufactured taking into due consideration:

- personnel safety requirements as specified by IEC 215 Standard;
- Council recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz) [1999/519/EC].

Depending upon the material to be highlighted, the following attention headings are used in the technical content.

**WARNING!**

An operating or maintenance procedure, practice, condition and statement which, if not strictly observed, could result in injury to or death personnel.

**CAUTION!**

An operating or maintenance procedure, practice, condition and statement which, if not strictly observed, could result in damage to or destruction of equipment or loss of mission effectiveness.

**NOTE!**

An essential operating or maintenance procedure, condition and statement which must be highlighted.

When a precaution is required which relates specifically to a part of the technical content, the information is given in the relevant part of the manual. WARNING and CAUTIONS precede applicable text.

## 2 SAFETY OPERATIONS

---

### 2.1 Introduction

The following are general safety precautions that are not related to any specific procedure and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

#### KEEP AWAY FROM LIVE CIRCUIT

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustment, inside the equipment with the high voltage supply turned on.

Under certain conditions, dangerous potentials may exist when the power breaker is in the OFF position, also due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground a circuit before touching it.

#### DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person initiate servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

### 2.2 Electric shock

Factors affecting electric shock consequence are:

- amount of current flown thru human body;
- current path thru human body;
- contact duration.

The following table gives probable effects of electric shock described by MIL-STD-454C specification.

CURRENT (mA)		EFFECT ON HUMAN BODY
A.C. 50/60 HZ	D.C.	
0 to 1	0 to 4	SENSATION SURPRISE REFLECTED ACTION MUSCLES INHIBITION CHOCKING FATAL
1 to 4	4 to 15	
4 to 21	15 to 80	
21 to 40	80 to 160	
40 to 100	160 to 300	
> 100	> 300	

### 2.3 Rescue

In case of electric shock, shut off the high voltage at once and ground circuits. If the high voltage cannot be turned off without delay, free the victim from the contact with the live conductor as promptly as possible.

Avoid direct contact with either the live conductor or the victim's body. An axe with a dry wooden handle may be used to cut the high voltage wire. Use extreme caution to avoid the resulting electric flash.

### 2.4 Resuscitation

Personnel working with or near high voltage should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

## 2.5 Emergency First Aid instructions

### WARNING!

VOLTAGES THAT ARE DANGEROUS TO LIFE ARE INVOLVED IN THE OPERATION OF THIS ELECTRONIC EQUIPMENT.

OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATION.

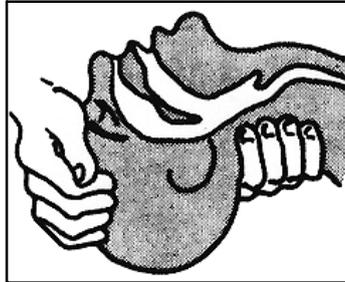
DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH THE VOLTAGES APPLIED.

DANGEROUS CONDITIONS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE "OFF" POSITION DUE TO CHARGES RETAINED BY CAPACITORS, ETC.

ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM TO AVOID PERSONAL INJURY OR LOSS OF LIFE.

Personnel engaged in the installation, operation, or maintenance of this equipment or similar equipment are urged to become familiar with the following rules both in theory and practice. It is the duty of all operating personnel to be prepared to give adequate Emergency First Aid and thereby prevent avoidable loss of life.

### 2.5.1 Rescue breathing



1. Find out if the person is breathing.

You must find out if the person has stopped breathing. If you think he is not breathing, place him flat on his back. Put your ear close to his mouth and look at his chest. If he is breathing, you can see his chest move up and down. If you do not feel the air or see the chest move, he is not breathing.

2. If he is not, open the airway by tilting his head backward.

Lift up up his neck with one hand and push down on his forehead with the other. This opens the airway. Sometimes doing this will let the person breathe again by himself. If it does not, begin rescue breathing.

3. If he is still not breathing begin rescue breathing:

Keep his head tilted backward.  
Pinch his nose shut.  
Put your mouth tightly over his mouth.  
Blow into his mouth once every five seconds.  
Do Not Stop Rescue Breathing Until Help Comes.

**LOOSEN CLOTHING  
KEEP WARM**

Do this when the victim is breathing by himself or help is available. Keep him quiet as possible and from becoming chilled. Otherwise, treat him for shock.

## 2.5.2 Burns

### SKIN REDDENED:

Apply ice cold water to burned area to prevent burn from going deeper into skin tissue. Cover area with clean sheet or cloth to keep away air. Consult a physician.

### SKIN BLISTERED OR FLESH CHARRED:

Apply ice cold water to burned area to prevent burn from going deeper into skin tissue. Cover area with clean sheet or cloth to keep away air. treat the victim for shock and take to hospital.

### EXTENSIVE BURN-SKIN BROKEN:

Cover area with clean sheet or cloth to keep away air. Treat the victim for shock and take to hospital.

## 3 SPECIFICATION ON HANDLING AND DISPOSAL OF BERYLLIA DEVICES

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### 3.1 Handling

Normally the components can be handled without risk, but there is a toxic hazard if beryllia dust from a damaged component is inhaled or implanted in the skin. It is therefore necessary to follow the indications described below:

- cover cuts and abrasions with dressing;
- wear disposable gloves;
- do not eat, drink, smoke, make up;
- wash hands and face after the contact with these damaged components;
- if beryllia penetrates under the skins through cuts or abrasions, the wound has to be cleaned and treated by a qualified medical personnel.

### 3.2 Disposal

The disposal procedure is normally laid down by Operating Authority and must be strictly adhered to. However, in the absence of such instructions the following points will be of assistance.

The disposal procedure is divided into two categories:

- Electrically faulty, but not mechanically damaged.

The faulty component should be placed in a polythene bag which is to be sealed and placed in a Beryllia scrapbox <sup>(1)</sup>.

- Mechanically damaged components.

Using disposable gloves and tweezers, all visible parts are to be placed in a polythene bag which is to be sealed and placed in a Beryllia scrapbox <sup>(1)</sup>.

Still wearing gloves, clean the area with a damp cloth then place the cloth and gloves into a polythene bag, seal the bag and place it in a Beryllia scrapbox.

The hands must be thoroughly washed after handling damaged components.

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<sup>(1)</sup> Ideally the Beryllia scrapbox is a sealed metal container clearly marked with a warning.

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## 4 ABSTRACT OF APPENDIX “E” OF CEI EN 60215 SAFETY RULES

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### E **Guide to safety precautions which must be observed by the personnel operating with radio-transmitters**

#### E.1 **INTRODUCTION**

*For the safety of the staff working on radio-transmitters and associated equipment, a full evaluation of the several dangers which may occur is necessary.*

*The considered factors are:*

- *the special precautions which have to be taken in presence of voltages over 1000V of peak;*
- *the special precautions which have to be taken when high radiofrequency voltages, often higher than the previous ones, are being used;*
- *the effects of electromagnetic fields, present by the antennas and their conductors, which may present dangers of fire for the surroundings, of electric shock and of burns for the staff;*
- *dangers of explosion in presence of inflammable gas;*
- *dangers of falls of the staff working on structures or buildings, which can get worse because of shakes caused by the accidental contact with conductors under voltage.*

#### E.4 **A RADIO-TRANSMITTER’S FUNCTIONING**

**E.4.1** *The equipment has to be kept in such a way as to fulfil the safety rules.*

**E.4.2** *A person, competent and certified by the responsible units, has to make sure, at regular intervals, of the good functioning of the equipment and of the protection and safety devices.*

*Functioning tests have to be carried out on door block devices, on mechanical blocks, on line- and earth breakers, on parallel resistors, and on protection devices against overvoltages and overcurrents.*

*The above said tests have to be carried out as well when a protection or safety device works after a failure has occurred.*

*The safety devices have not either to be altered or disconnected, except for the substitution, nor to be modified without approval, in any case, of the responsible units.*

**E.4.3** *All the covers assuring protection against accidental contacts with parts under dangerous voltage must be kept in their position during the ordinary service. They can be taken off, for maintenance or repair operations, only under the responsibility of the charged staff.*

**E.4.4** *All the covers and metal casings of the electric and electronic equipment have to be grounded with effective methods, and particular attention must be paid to the maintenance of these connections to the protection ground.*

**E.4.5** *The rooms occupied by parts of equipment having open structure are considered as fences.*

**E.4.6** *If a radio transmitter is put under voltage, the trained person in charge of it has to personally verify that: no other person is working on the transmitter or on the associated antenna; that each work carried out is sufficiently completed in order to allow the transmission; that no tool, test equipment or portable lamp remains inside or on the transmitter; and that all test or auxiliary equipment used for the tests has been disconnected.*

## **E.6 PROCEDURE TO VERIFY ABSENCE OF VOLTAGE**

*After the equipment has been sectioned, the absence of voltage has to be verified on the work place. This can be carried out by using voltage indicators, measuring instruments, neon lamps indicating radiofrequency voltages or any other convenient means.*

## **E.7 WORK ON CIRCUITS UNDER VOLTAGE**

*Work on circuits under voltage with peak voltages over 72V, or in proximity of such circuits, has to be reduced to the lowest. Such a work can be performed only if the following conditions are fulfilled.*

- *The work has to be carried out by an authorized person, qualified in electrical engineering, supervised at least by another person who has been trained and who can immediately interrupt the voltage, and furthermore who has been trained to administer first aid through artificial respiration and heart massage.*
- *No risk of ionizing or non-ionizing radiation has to exist.*
- *The work has to be carried out in such a way as not to run the risk of formation of arcs or currents through the body.*
- *For the safe execution of the work, adequate equipment, devices and test tools have to be employed.*
- *Adequate safety measures for the indication of the dangerous areas have to be taken.*
- *The work has to be carried out only for urgent reasons, e.g. if it is not possible to carry out the work or locate a failure in absence of voltage.*

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*NOTE In some Countries stricter rules and/or regulations may be applied.*

## **E.8 OTHER DANGERS**

### **E.8.1 DANGERS OF RADIOFREQUENCY RADIATIONS**

*a) The utmost power levels in the field of microwaves and/or lower radio frequencies electric or magnetic field, which the staff can be exposed to, have not to exceed the limits foreseen by the laws of the considered Country. For those Countries where a national law for the levels of non-ionizing radiation does not still exist, directions from the IEC 657 and World Health Organization Publication can be obtained: "Hygienic rules of the surrounding environment 16" (1981).*

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*NOTE Limits given are applied to the radio transmitter, except for its antenna, in a frequency range from 30 MHz to 30 GHz. Under 30 MHz, higher limits can be appropriate.*

*b) During the transmission period the staff has never to look directly at a radiator, spotlight, waveguide or any other irradiating element which concentrates energy in a narrow, intense beam.*

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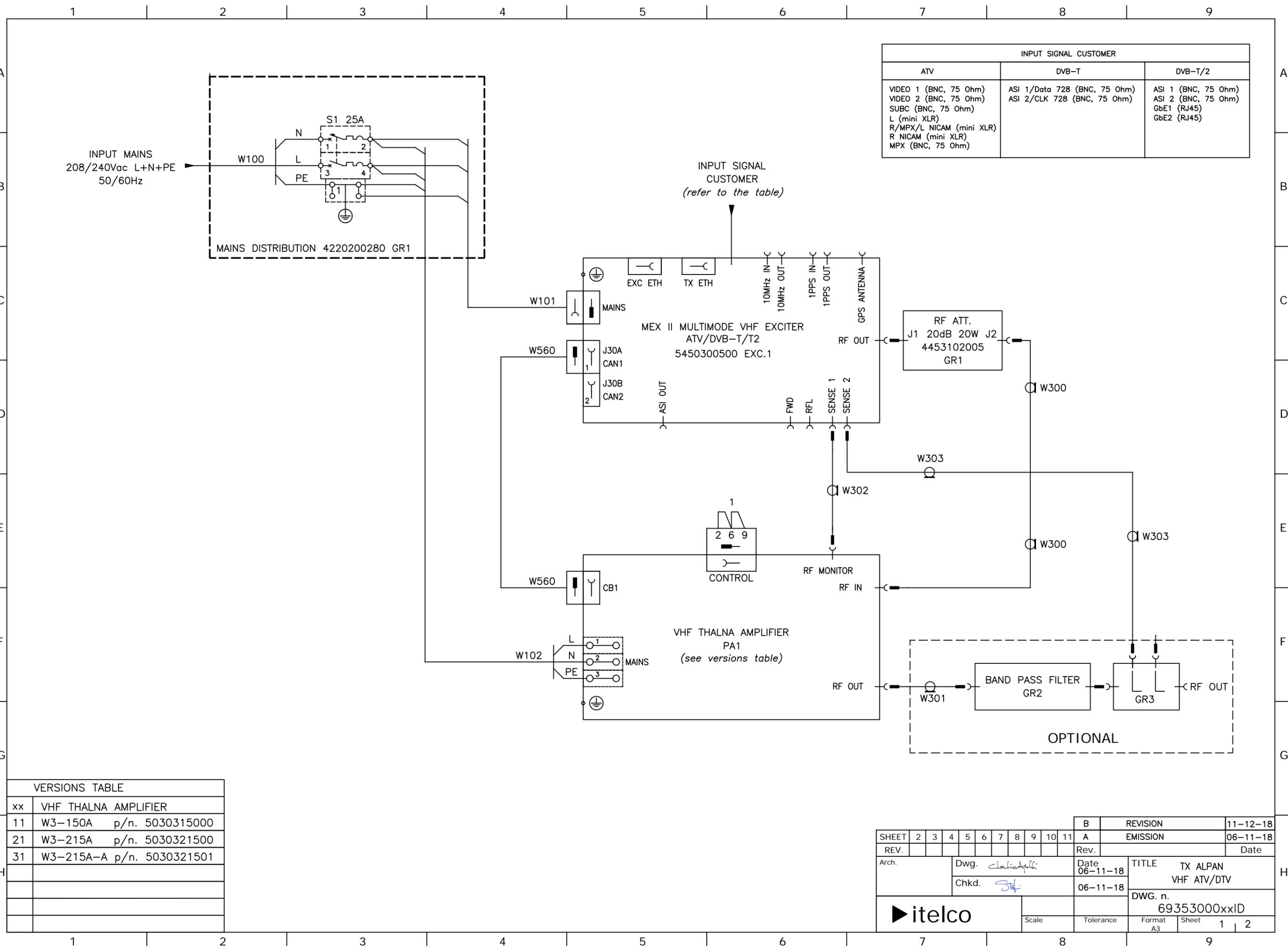
## 6. WIRING DIAGRAMS

6  
WIRING  
DIAGRAMS

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INPUT SIGNAL CUSTOMER		
ATV	DVB-T	DVB-T/2
VIDEO 1 (BNC, 75 Ohm)	ASI 1/Data 728 (BNC, 75 Ohm)	ASI 1 (BNC, 75 Ohm)
VIDEO 2 (BNC, 75 Ohm)	ASI 2/CLK 728 (BNC, 75 Ohm)	ASI 2 (BNC, 75 Ohm)
SUBC (BNC, 75 Ohm)		GbE1 (RJ45)
L (mini XLR)		GbE2 (RJ45)
R/MPX/L NICAM (mini XLR)		
R NICAM (mini XLR)		
MPX (BNC, 75 Ohm)		

VERSIONS TABLE	
xx	VHF THALNA AMPLIFIER
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21	W3-215A p/n. 5030321500
31	W3-215A-A p/n. 5030321501

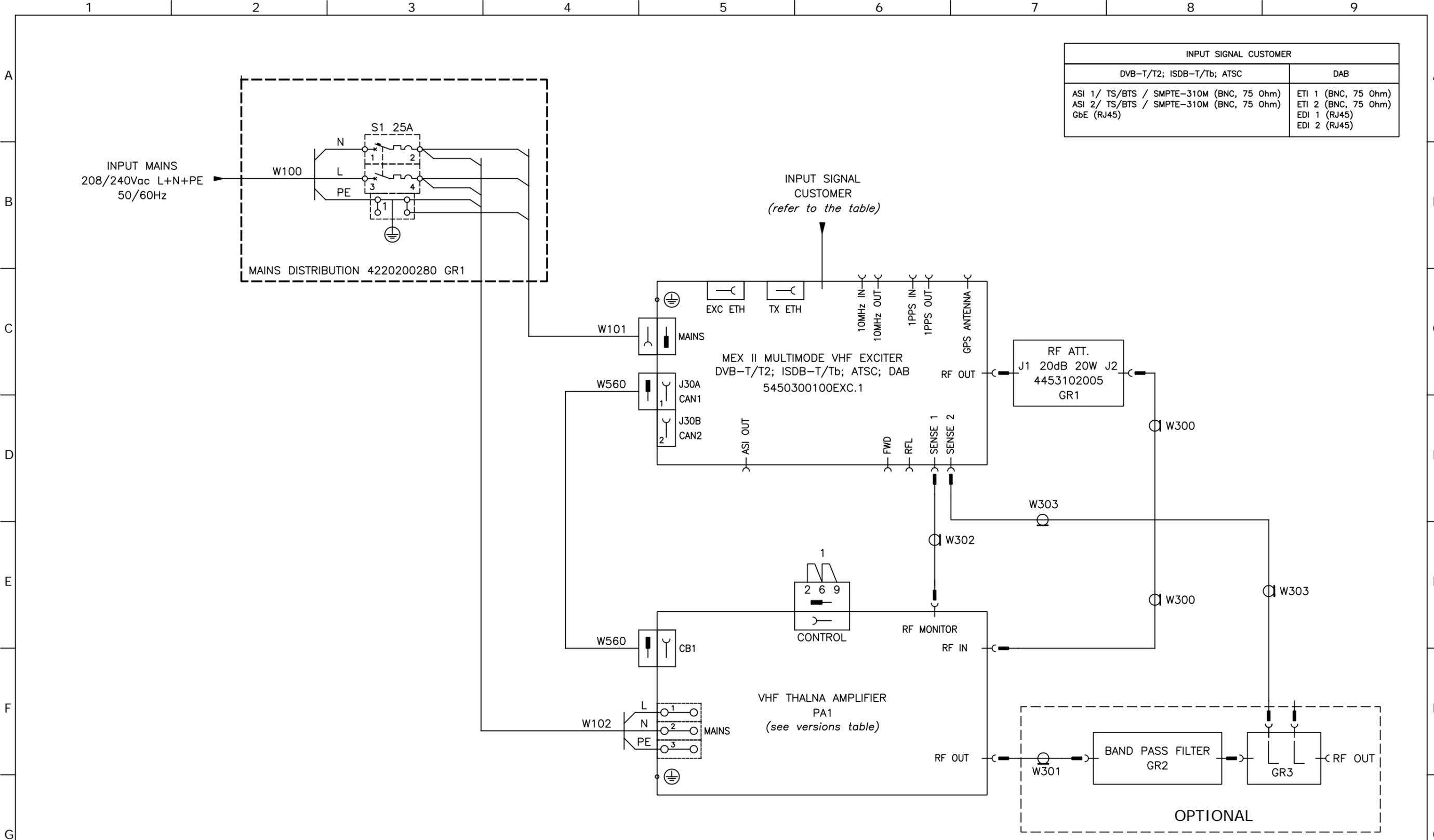
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REV.											A	EMISSION	06-11-18
Arch.	Dwg. <i>Clalio Agli</i>		Date		06-11-18		TITLE		TX ALPAN		Date		
	Chkd. <i>Stf</i>		06-11-18				VHF ATV/DTV						
Dwg. n.		69353000xxID											
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INPUT SIGNAL CUSTOMER	
DVB-T/T2; ISDB-T/Tb; ATSC	DAB
ASI 1/ TS/BTS / SMPTE-310M (BNC, 75 Ohm)	ETI 1 (BNC, 75 Ohm)
ASI 2/ TS/BTS / SMPTE-310M (BNC, 75 Ohm)	ETI 2 (BNC, 75 Ohm)
GbE (RJ45)	EDI 1 (RJ45)
	EDI 2 (RJ45)

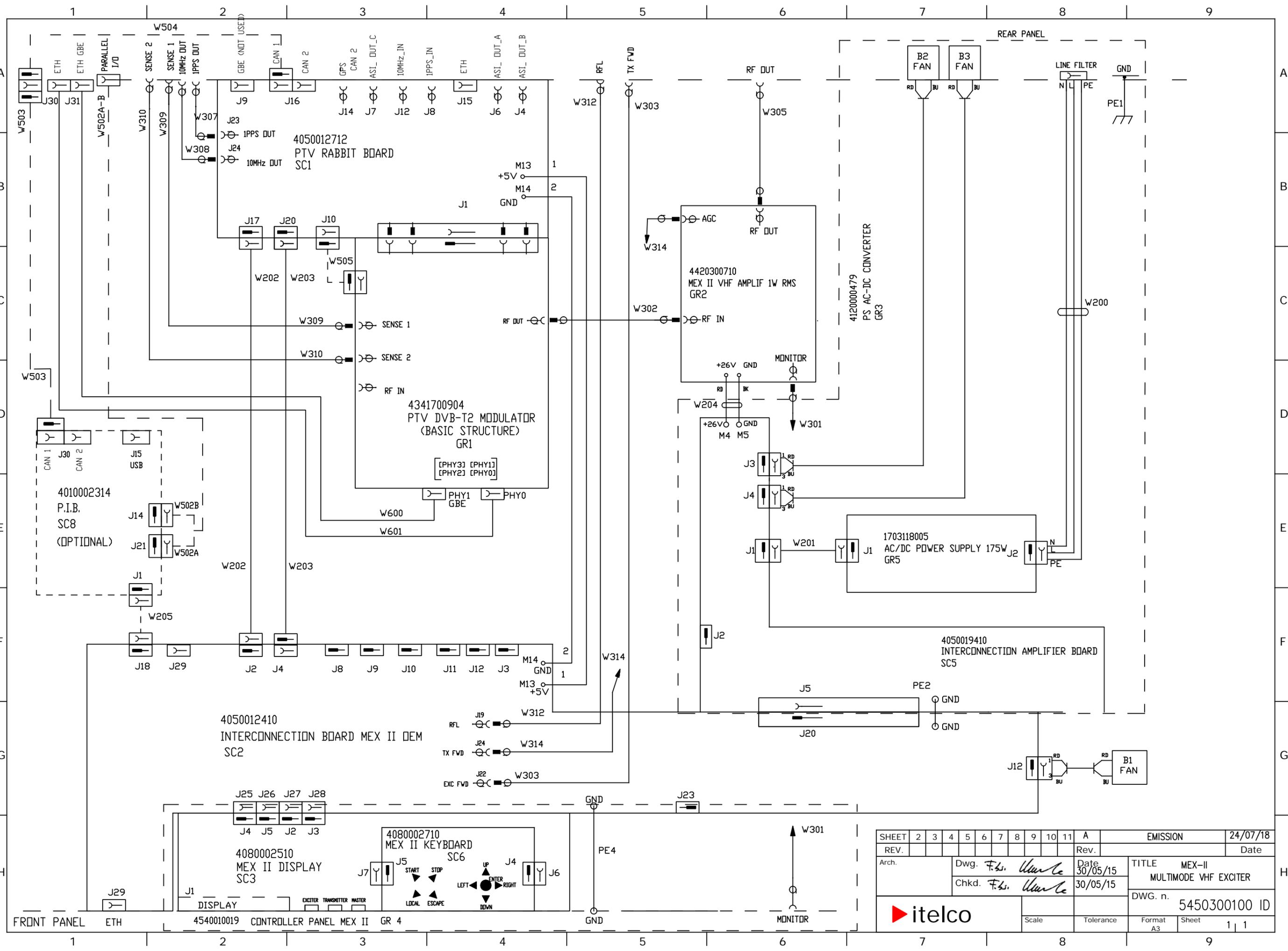


VERSIONS TABLE	
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21	W3-215A p/n. 5030321500
31	W3-215A-A p/n. 5030321501

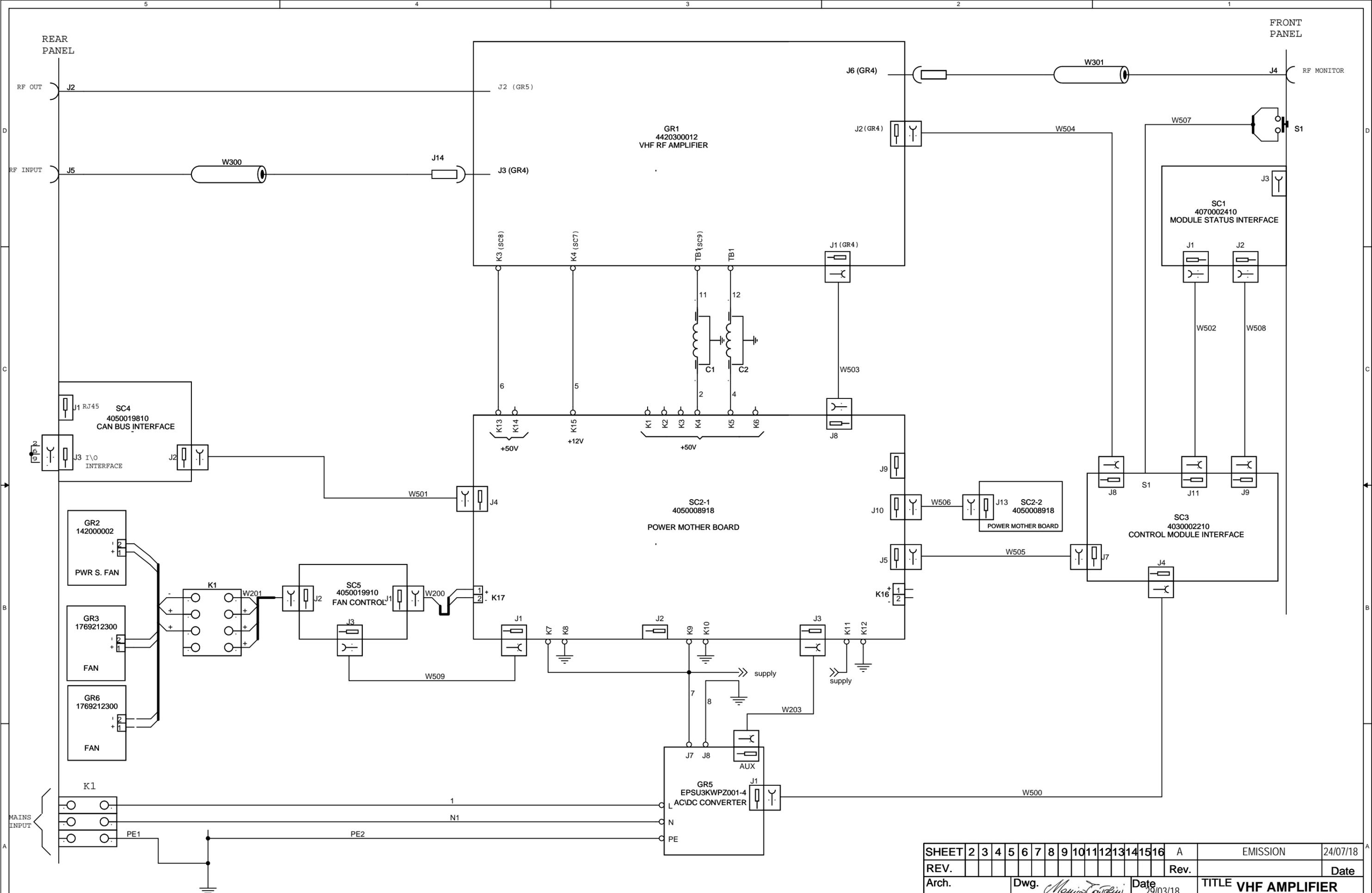
DWG. n. 69353000xx ID	TITLE TX ALPAN VHF ATV/DTV

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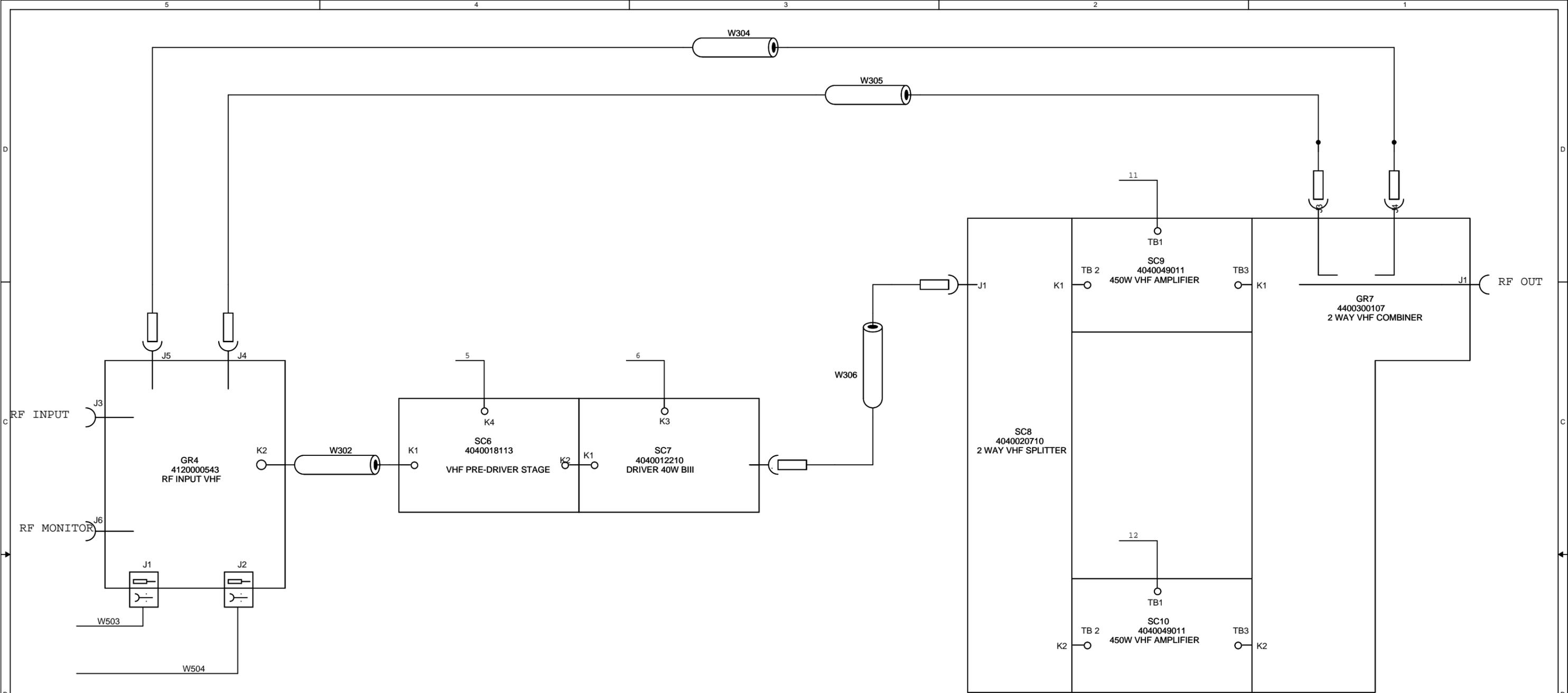
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