

MADE IN SLOVAKIA



OM2000+

SHORTWAVE POWER AMPLIFIER



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GENERAL INFORMATION

1.1. Introduction

The OM Power model OM2000+ is designed for all shortwave amateur bands from 1.8 to 29.7 MHz (including WARC bands) plus 50 MHz and all modes. It is equipped with a ceramic tetrodes FU-728F.

1.2. Specification

1.2.1. Parameters

Frequency Coverage	Amateur Bands 1.8 – 29.7 MHz including WARC + 50 MHz
Power Output	2000 W in SSB/CW on HF bands, 1500 W in CW/SSB on 6m 1200 W in RTTY and DIGI modes (50 MHz 800 W)
Input Power	Usually 40 to 60W for full Output Power (USA) 20 to 30W (World Gain model)
Input Impedance	50 Ohm, VSWR < 1.5 : 1
Power Gain	15 dB (USA), 17 – 18dB (World Gain model)
Output Impedance	50 Ohm unbalanced
Maximum Output SWR	3 : 1
SWR protection	Automatic switching to STBY, when reflected power is 350W or higher
Intermodulation distortion	-32dB below nominal output
Suppression of harmonics	< -50 dBc on HF, <-70dBc on 50 MHz
Tubes	1 x FU-728F Ceramic tetrode
Cooler	Centrifugal blower + Axial blower (external)
Power supply	switchable 220 ,230V, 240 V – 50 Hz (230, 240, 250V - 60 Hz for North America models)
Current max.	20 Amps (recommended minimal IE 20Amps Circuit breaker)
Transformers	One toroidal transformer 3 kVA
Dimensions	390 x 195 x 370mm (width x height x depth)
Weight	24 kg (53 lb)

1.2.2. Protection Circuits

There are several protection circuits used in the amplifier. They are activated when one or more parameters exceeds defined values, or some unwanted condition occurs.

- VSWR too high
- Anode current too high
- Anode voltage error
- Screen current too high
- Screen voltage error
- Grid current too high
- Grid voltage error
- Heating voltage error
- Mistuning of PA
- Temperature too high
- Soft start for fuse protection
- “switch-on blocking “at opened amplifier

1.2.3. Features

The manufacturer implemented some of the company's newest development results with the most wanted operating and safety features into this new model:

- High level of protection
- Memory for faults and warnings, easy maintenance
- Automatic set-up anode current (BIAS) – no need to adjust manually after changing the tube
- Three programmable working modes of the centrifugal blower (turbine) + axial blower
- Full QSK with silent relay
- Many operational parameters to display
- Easy transport due to detachable HV transformer

2. SAFETY INSTRUCTIONS



DANGEROUS HIGH VOLTAGE INSIDE!

The power amplifier is using high voltage up to 3300 V DC, which is very dangerous for human life! Read next safety instructions carefully first, before you will start to install and operate power amplifier! NEVER VIOLATE THE FOLLOWING SAFETY RULES!

NEVER ALLOW CHILDREN to play around PA or to touch power amplifier or connected cables in working condition, or to push anything into the case holes!

Never turn the amplifier on without the upper lid in place. DO NOT ATTEMPT TO SHORT OR BYPASS safety switch under upper lid!

The OM2000+ amplifier should not be used in a WET or HUMID environment or be exposed to RAINFALL!

Do not turn the amplifier ON without having connected the ANTENNA or properly rated DUMMY LOAD! A hazardous HF voltage may build up on the antenna connector after turning the amplifier on with no antenna or dummy load connected!

Before removing the upper cover of the amplifier make sure that power supply has been disconnected AT LEAST 15 minutes allowing for the electrolytic capacitors to discharge fully. Disconnect power cord from the outlet!

Any work inside the PA (internal fuses replacement, tube replacement, etc.) should be carried out only by a professionally qualified person!



CAUTION

The amplifier must be installed in such a way that free flow of hot air from the tube is allowed. The amplifier must not be installed in a constrained surrounding (i.e. tight shelves etc.). During extended operation the tube ventilation grid can reach high temperature. Do not touch it!

The amplifier must be properly grounded during operation.

During operation the amplifier must be installed in such a way that the rear side remains accessible.

The amplifier is an A category product. In a household it can influence other electric appliances. In such cases the user is to take proper actions to mitigate this disturbance.

Read this manual carefully. Follow all the instructions during installation and operation to avoid damage to the amplifier not covered by manufacturer's warranty! Do not attempt to perform any change of hardware or software!

3. GENERAL DESCRIPTION

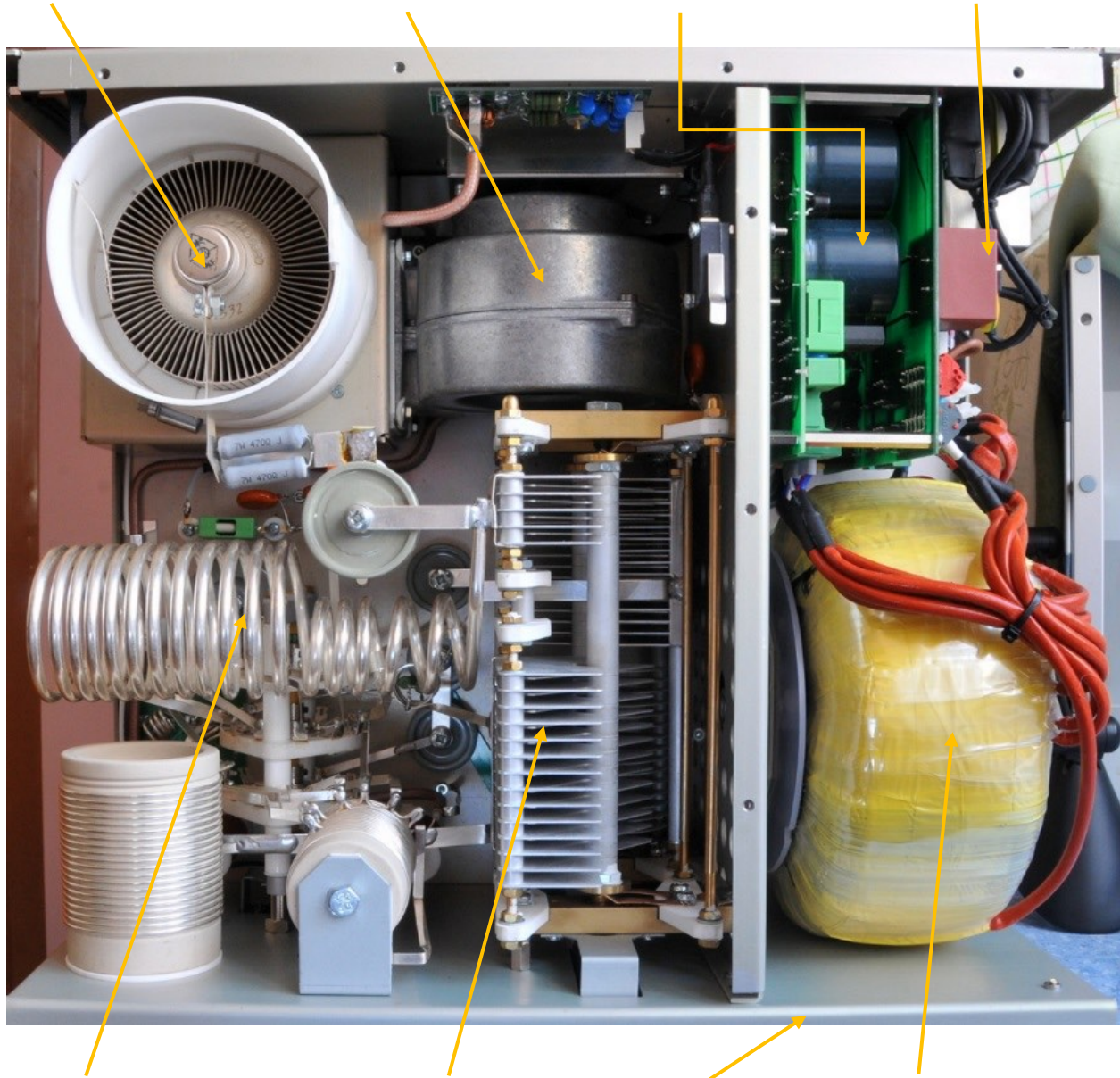
3.1. HF Compartment

This amplifier is using ceramic tetrode FU-728F in a grounded-cathode circuit (input into control grid). The OM2000+ amplifier achieves excellent linearity by the voltage stabilization of the control grid bias and the screen voltage. The power input is fed to the control grid, using a broadband input circuit with an input impedance of 50 Ohms. This adaptable input circuit ensures a good input SWR (better than 1.5 : 1) on all amateur bands.

The output of the amplifier is a Pi-L circuit. The variable capacitors for TUNE and LOAD are separate. This enables the amplifier to be tuned exactly and makes it possible to easily return to the previously set positions after band changes.

Top view on the opened OM2000+

Tetrode FU728F Blower Power supply Board Switch-ON Board



Output Pi-L Circuit

Tuning Capacitor

Front subpanel

HV transformer

3.2. Power Supply

This Power amplifier uses one 3 KVA toroidal transformer. A soft start is provided using relays and resistors (placed on the switch-ON board). The high voltage is made by combining 4 x 575V AC (total 3200V DC @ 1,2A. Each has its own rectifier and filter. In the high voltage circuit, safety resistors and fuse are employed to protect the amplifier against overload (placed on the power supply board).

The separate screen grid supply is regulated and stabilized with MOSFET circuits and delivers approx. 330V DC at 100mA. Control grid voltage is also stabilized (-120V DC). Change of stabilized first grid voltage is controlled by the software (EBS for example).

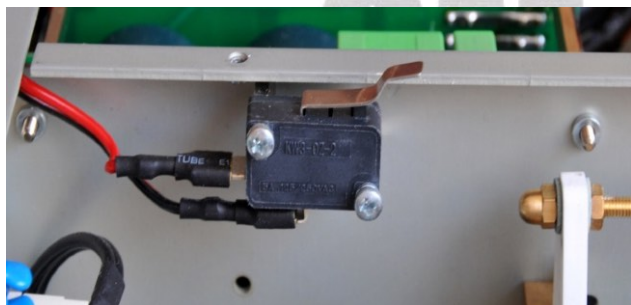


The transformer primary is Tap adjustable for 220, 230, 240 V AC, 50 Hz. The factory setting is 230 V AC (230, 240, 250V AC, 60 Hz for USA models, factory setting is 240 V AC)

If the AC voltage in your network is 220 or 240 Volts, you need to set the correct transformer tap before first starting the PA. See part 7.1. for more information. Other primary voltage is possible on request (for example 200V 50/60 Hz for Japan).

3.3. Safety Devices

Control and monitoring circuits ensure control and safety during malfunctions of the PA. These are placed on the Control board, which is located on the chassis subpanel.



One of the important safety elements is a mechanical switch for AC blocking an opened amplifier.

4. INSTALLATION



Read this chapter carefully prior to starting installation. Before unpacking inspect shipping carton for any damage. Keep all of packing parts for possible future shipment. Check unpacked power amplifier. If you find any damage, contact your dealer immediately to keep full warranty.

4.1. Grounding



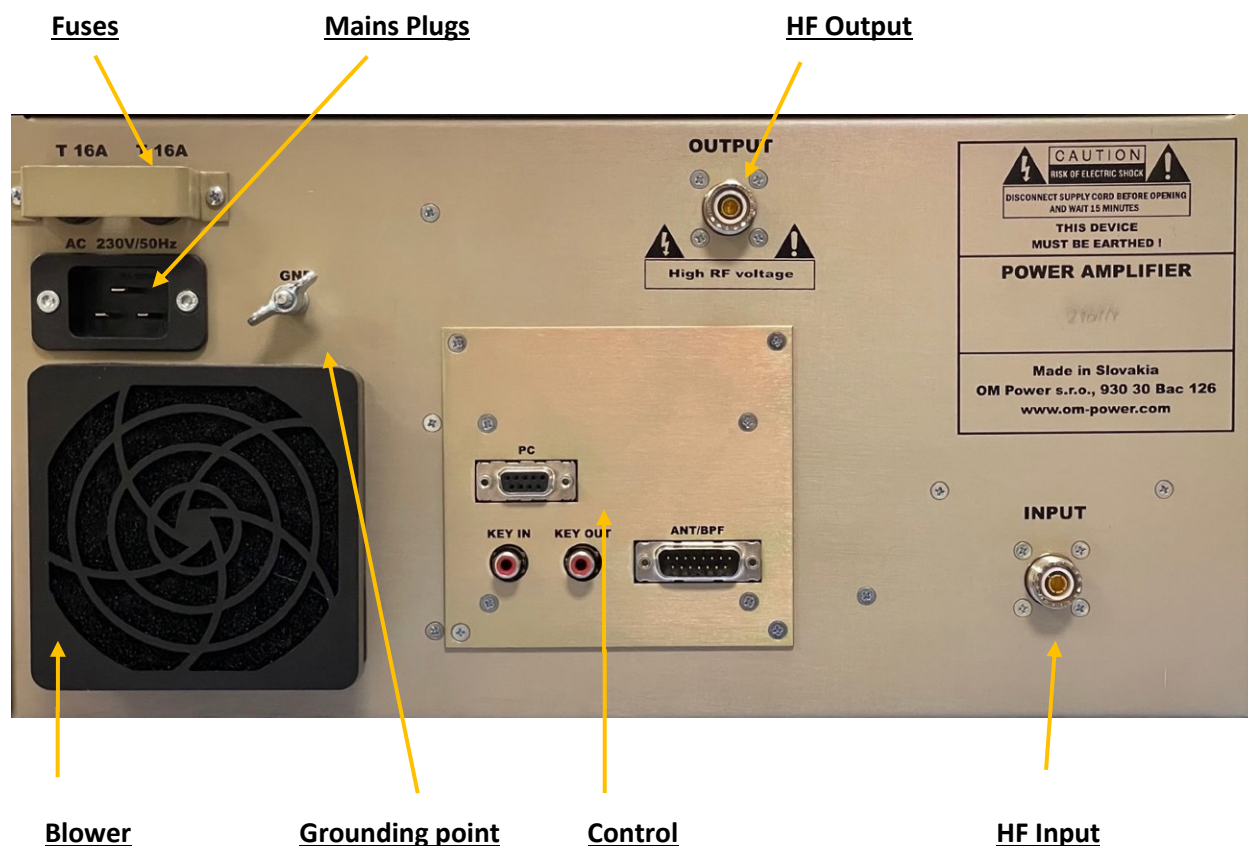
The amplifier must be grounded properly! Connect the screw on the rear panel of the amplifier to your local grounding system with a copper cable; use a cross-section of 4 mm² at least.

Connect your transceiver to the same grounding system of your shack carefully! Use minimum length cables and make certain that the connections are both physically and electrically sound. With poor grounding, you may risk damaging your equipment, have problems with TVI/BCI or possible distortion of your transmitted signal.

4.2. Coaxial Cable

The output of the transceiver is to be connected to the input of the amplifier via RG58 or similar 50 Ohm cable. For the connection between the power amplifier and the antenna, RG213 or similar coaxial cable suited for high power is recommended. SO-239 sockets with Teflon insulation are used for the HF INPUT and OUTPUT connectors.

Rear view of the amplifier OM2000+



4.3. Control Cable

Control cable maintains TX / RX switching of the PA (TX GND). The cable is shielded. On the side of the power amplifier is RCA socket used. On the side of your transceiver you have to use a socket suitable for this transceiver. During transmitting the middle pin is connected to the ground. The relays of the

OM2000+ must be switched earlier than HF is applied (cold switching). Modern transceivers have a time delay between PTT switching and power output, we recommend setting the time delay to 15ms.



If you are using an older transceiver or transmitters without time delay, we recommend to connect the PA in such a way that the transmit/receive switch (foot switch for example) is connected with the KEY IN socket of the amplifier. The KEY OUT socket is connected to the PTT socket at the transceiver. If it is possible to adjust TX delay in your TCVR, set the delay to 15ms, please.

The amplifier is equipped with safety devices, which ensure that the output relay is not switched under power mistakenly (hot switching).

KEY IN	RCA Phono - Input signal PTT (switching voltage / current - 5V / 2mA)
KEY OUT	RCA Phono - Output signal PTT (maximum switching of 30V / 50mA)



Be sure that your power system is correctly wired and properly rated! To use an adequately sized and connected grounding system is also very important!

4.4. Cooling



The amplifier must be installed in such a way that free flow of hot air from the tube is allowed. Do not obstruct air intake and exhaust areas of the PA.

The centrifugal blower provides the necessary cooling of the amplifier, even during long contests. The blower is activated by switching the PA on and it is turned off when cooling is finished (approx. 1-5 min after switching off the PA depending on the temperature of the tube). Blower working mode is programmable (3 modes). See page 17 for more details.

5. OPERATION



Before switching PA on, make sure that amplifier is grounded, antenna or dummy load is connected, and line cord is plugged into the outlet. Be sure you have selected the proper AC input TAP (Sect 7.1)



Do not turn PA on for at least 2 hours after unpacking and located in its operating location. Especially when amplifier is moved from a cold place to a warm one as condensation may develop. This condition could result in damage to the high voltage circuits.



We do not recommend changing antennas during a transmission. (Hot switching)



When you decide to have a short operating break, we recommend placing the amplifier to the standby mode rather than switch it off.

5.1. OM2000+ Front Panel

Front panel of the OM2000+ containing the touch TFT display, two control switches and three knobs for output circuit adjustment.



ON - Main Switch. After turning ON, a small 12V power supply for logic, protection circuits and the display will be activated. High voltage and RF circuits are still OFF.

OPR/STBY - Short press for switching between STBY and OPERATION mode.

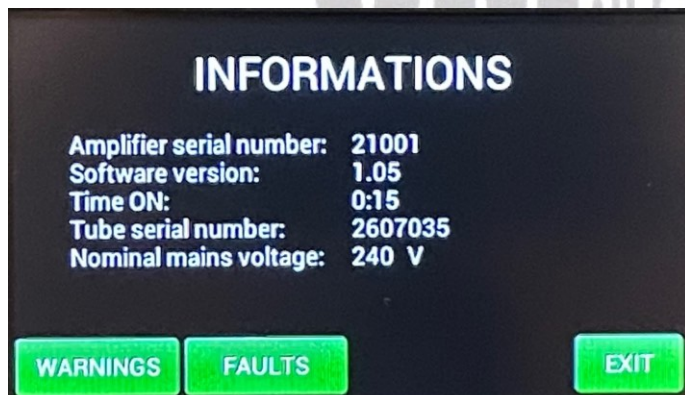
ON/OFF - Long press (hold for a 1 sec.) for switching the PA ON (first start to tube heating), 2 seconds for PA OFF. Always first use the ON/OFF push button as this allows for a predetermined (software controlled) time to cool down the tube and inside the PA compartment.

5.2. OM2000+ control

Turn ON the green Main Power switch and the **home screen** lights-up. Initial control touch buttons are visible on the bottom line.

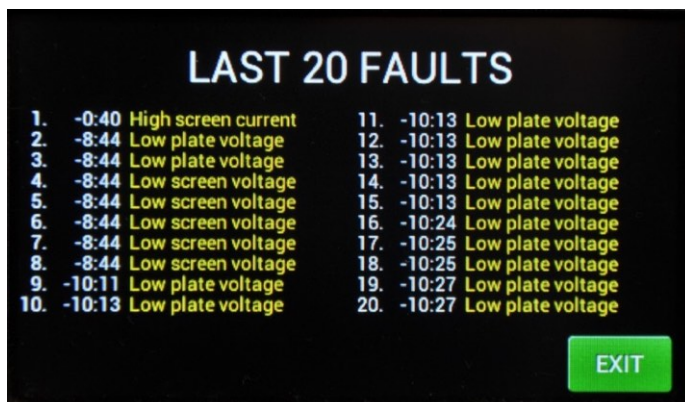


Remember that the touch screen is active for some information, while the PA is still OFF!



Information display shows basic information about the PA: serial number, software version, time ON, tube serial number and nominal mains voltage.

The information screen also provides an overview of the last 20 warnings and faults.



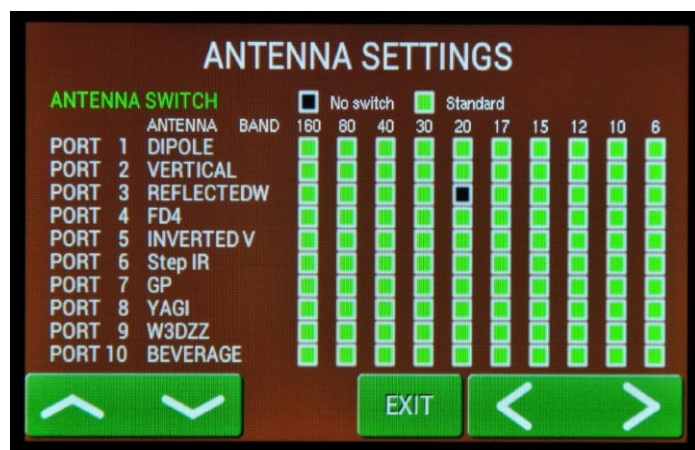
Press **FAULTS**.

Press **EXIT** to go back to the home screen.



Screen shows settings possibilities for ANTENNA, DISPLAY, EBS, BLOWER and other INFO

Scroll for choose (up or down) and press **SET**



Press **ANTENNA SETTINGS**. First select **ANTENNA SWITCH** (No switch, Standard). Use left or right arrows. If you select some switch, 10 ports for different antennas displays. Generally all of antennas are allowed in every band (green squares). To disable some square, select port (up/down), touch **SET** for antenna name and then select band (left/right). Press **SET**.



Four types of antennas for four different bands were disabled.

Black square means disabled combination.

Press **EXIT** to go back to **SETTINGS** menu

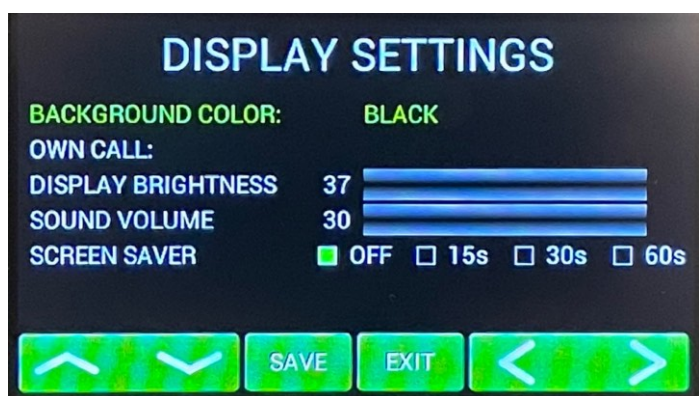


BCD code (4 bits) is used for automatic antenna and BPF switching (see Antenna/BPF connector on the Control panel (rear side of the PA). See section 7.9 for Control and ANT/BPF connectors pin-out.

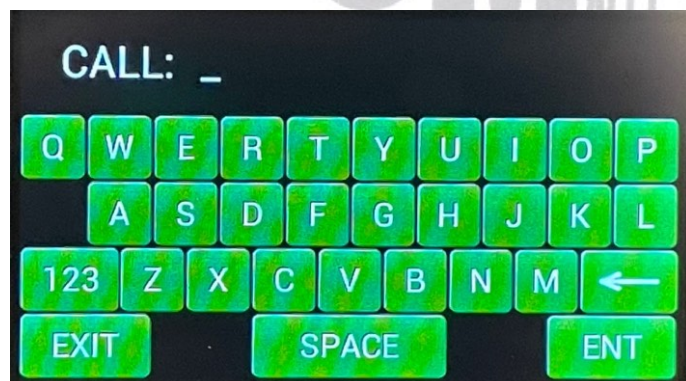


Next **SETTINGS** position is for display parameters. First choose the background color. Scroll on it and choose the color (left/right).

Press **SAVE** twice, then scroll to **OWN CALL**.



Press **SAVE** for your call sign edit. The keyboard displays.



Type your call sign and press ENT.



Use next lines and set brightness and sound volume (use up/down and left/right). Confirm with **SAVE**.



Next lines are for EBS (Electronic Bias Setting) ON/OFF and for EBS level selection.

We recommend **EBS ON**. See next comment for more details.

Electronic Bias Settings (EBS) is a significant feature of this power amplifier. It automatically allows lower plate current after pressing the PTT, regardless of whether operating CW or SSB mode, when no RF signal is present at the input. At the moment an RF signal is applied, the bias will automatically change to its working value.

EBS level means, level of the input power where EBS starts working. Default EBS value is 0.1 W. We recommend turning EBS ON. A significant feature of using EBS is PA operating temperature reduction.

NOTE: If you are not using compression in your TCVR, or you are not speaking loud enough, some syllables can be cut off. In such a case you should turn OFF the EBS.

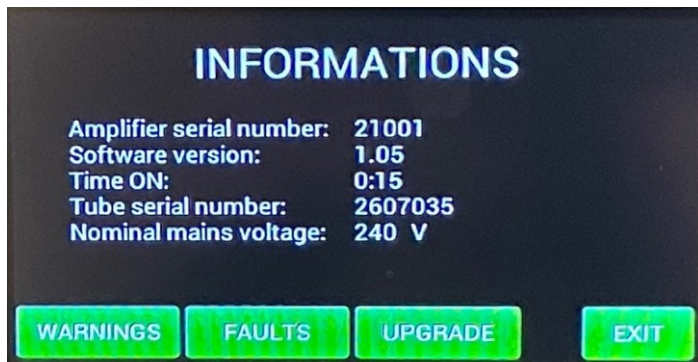


In the next line you can define working mode of the blower. In the first mode speed depends on the PA temperature (**TEMP**), In **PTT** mode the speed increases to maximum, and the **ALLWAYS** mode means maximum speed all the time during PA operation (recommended for DIGI modes).

Press **SAVE** to write the mode to the memory.



The INFO settings allow viewing all of the previous PA INFORMATION screen plus the addition of one more touch key to enter the UPGRADE mode.



UPGRADE touch button should **ONLY** be used if the EPROM or firmware files (or both) will be upgraded. In such a case see page 29.

5.3 Preparing for operation



In **STBY** the amplifier is in bypass-mode and your transceiver is directly connected to the antenna. Maximum allowed power in bypass mode is 200 Watts! The bypass RF power is displayed if PA is in standby mode.

To turn PA ON press ON/OFF button on the front panel (black one) and **hold it abt. 1 second**. PA will start tube heating. It will take 180 seconds. Turning PA ON is possible **ONLY** from the home screen! If you have other display active, press EXIT to go back to the home screen.



The "Tube Heating Timer" is visible on the display. Wait until the required 180 seconds is complete before placing the amplifier in **OPERATE** Mode.

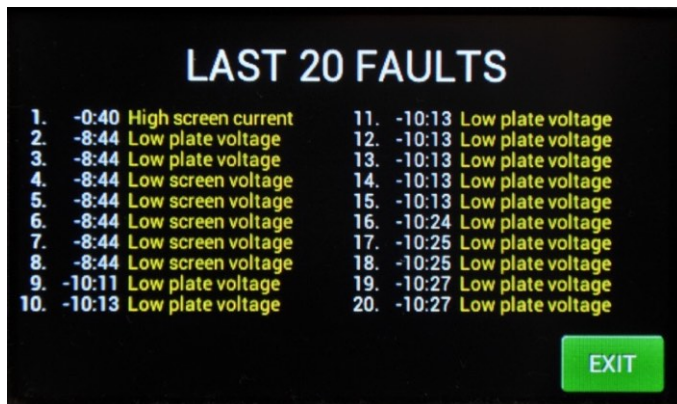


After heating is completed, the PA will light the **STBY** mode indicator and this **Main display** will appear.



The **Menu display** allows the user to go deeper into the **SETTINGS** mode, **MEAS**uring mode or **SERVICE** mode.

Press **SETTING** button.



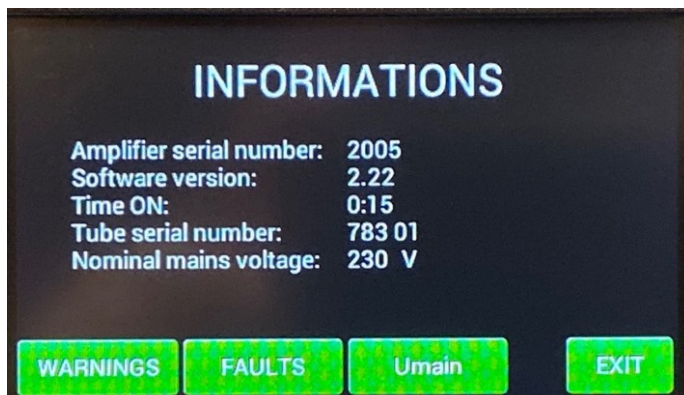
The **LAST EV** button allows the user to see last faults.

Press **BACK** button for returning to Main display



Pressing **SETTING** displays this screen.

Screen shows settings possibilities for **ANTENNA**, **DISPLAY**, **EBS**, **BLOWER** and functions are the same as was described before.



Scroll **DOWN** to **INFO** and press **SET**

A new button is visible – **SET Umain**. Press it.



Type in the actual setting of the primary voltage tap and press **ENT**.

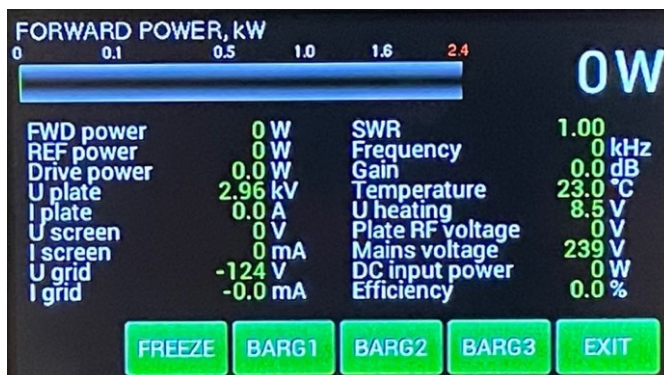
Press **EXIT** twice to go back to the **Menu** display.



This is not the actual physical setting of the primary voltage tap. It is just information for the processor, which protects the permitted limits (up or down) for a given value of the primary voltage.



Press **MEAS** button.



Pressing **MEAS** displays this screen. instantaneous values of the basic amplifier parameters are displayed.

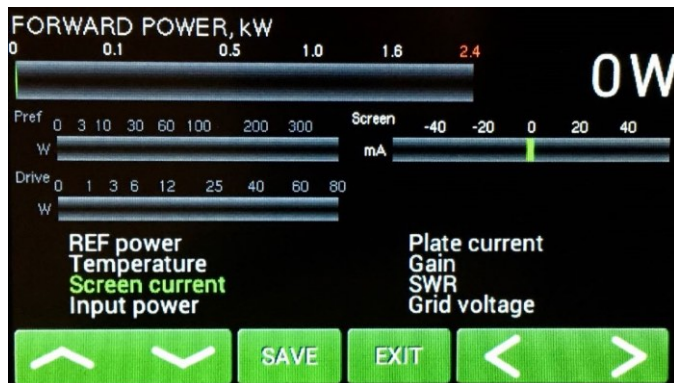
NOTE: You can **FREEZE** the screen and/or allow constant monitoring.

Three different bar graphs can be defined using BARG1, BARG2 or BARG3 buttons.

Press **BARG1** button.



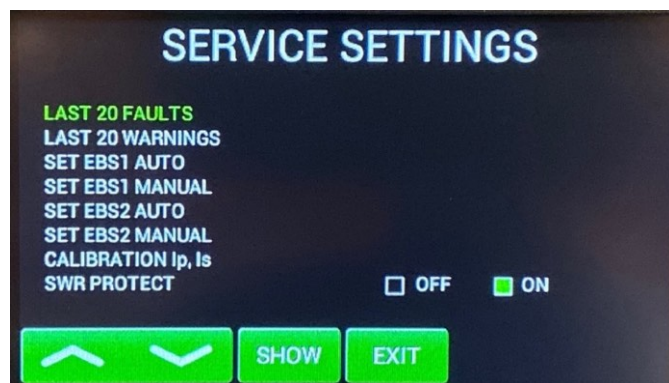
Green graph may show one of the user selectable 8 monitored parameters. Select the wanted parameter from the list at the bottom of the screen and press **SAVE**



Repeat these steps to populate **BARG2** and **BARG3** as desired

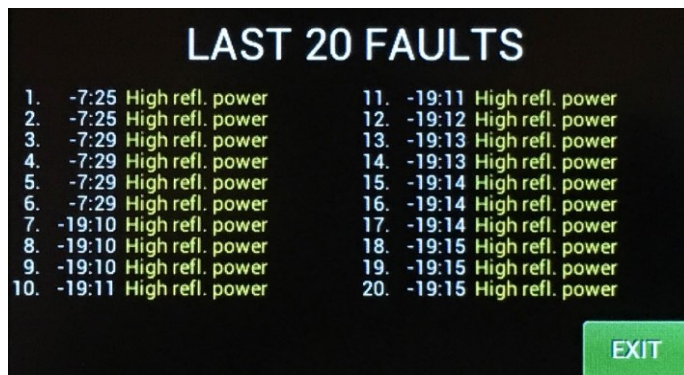


Press **EXIT** to go back to the **Menu display**, then press **SERVICE**.



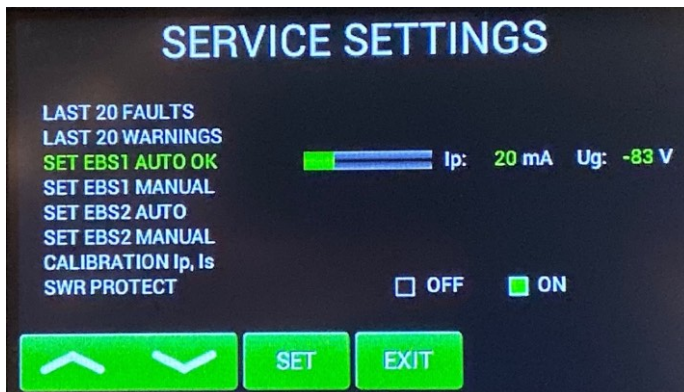
By pressing the **SERVICE** button, we are in the **SERVICE** settings mode.

Scroll to selected line and press **SHOW** or **SET** (depending on the line).



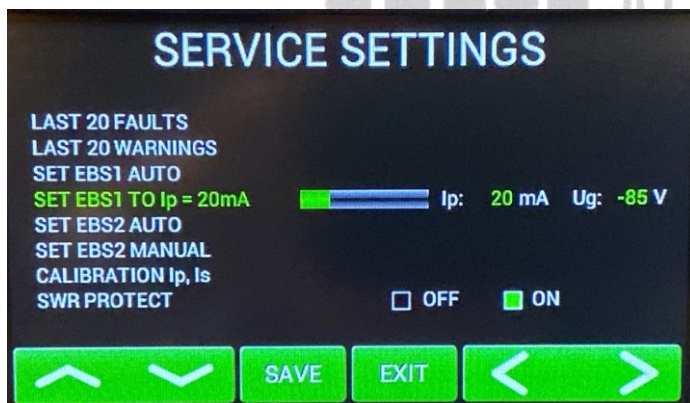
We selected last 20 **FAULTS** to show.

Press **EXIT**



Go to **SET EBS1 AUTO** and press **SET**.

PA will automatically set 20mA on the tube.
When finished successfully, you will see SET EBS1 AUTO OK on the screen



You can try to do this manually, too.

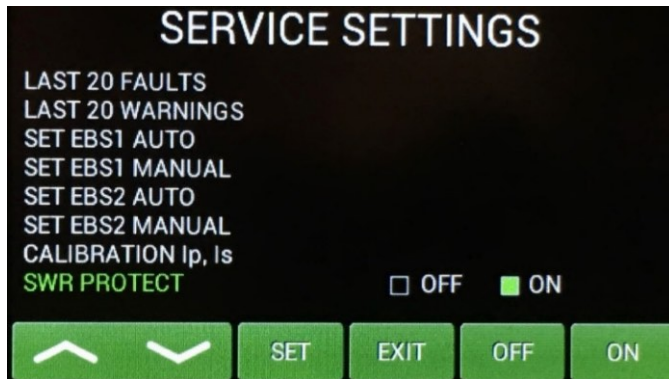
Scroll to **SET EBS1 MANUAL** and press **SET**.
Use up/down buttons to set 20mA or as close as possible value and press **SAVE**.

Similar ways **EBS2** can be preprogrammed (300 mA FU-728F).

Or another value of EBS2 by MANUAL Set.



Scroll to **CALIBRATION Ip, Is** and press **SET**.
Calibration will be done automatically.



Scroll to **SWR PROTECT** and press **SET**.

This feature allows the user to switch **OFF** the SWR protection.

We recommend setting it to **ON** (SWR protection circuit will stay active, max. allowed SWR is 3:1). If **OFF** is selected, higher SWR is allowed, but reflected power is measured. If it exceeds 350W, transmit will be blocked.

Press **EXIT**.

5.4. Operation mode



Before switching to operation mode, check all connections between PA and TCVR.



We are now back in the **Main display**. We are ready to go to the operation mode.

Press the black **STBY/OPER** push button on the front panel, or button **OPERATE** on touch screen display



We are now in **OPERATE** mode.

Note the light indicator on the touch screen has changed to **OPERATE**.



Now try to press PTT (foot switch for example).

We are now in TRANSMIT mode (without RF).

Note the new **TRANSMIT** light indicator on the touch screen.

NOTE: The OM2000+ is tested at factory at a maximum output power of 2000W into a 50 Ohm load. A unique **Tuning table**, with TUNE and LOAD values for every band, is supplied with each PA.

When the antenna impedance has greater variance from 50 Ohms, it may be the case that the PA cannot deliver the full power 2000W, or some of the protection circuits may be automatically activated. In such cases we recommend doing a manual tuning.

The best indication of proper PA tuning is the Screen Current. In the properly tuned PA this should be within 0 to + 20mA at full output power.

Tuning procedure:

- Set band switch with knob BAND at proper position and set knobs TUNE and LOAD at position according Tuning table

NOTE: Set input power to about 25 watts to begin.

- Press PTT and apply input power from TCVR, check the Ig2 (**I Screen on the display**). If it is ok (below +20mA), gradually increase the input power until the PA reaches about 70% of its maximum output power.
- Using the TUNE knob, adjust for maximum FORWARD POWER while monitoring the Screen current.
- When the Screen current exceeds +30mA, adjust the LOAD knob to decrease Screen current to about 0 mA. Readjust TUNE for maximum FORWARD POWER.
- Increase the PA input power until you reach the desired maximum output power. Keep watching the Screen current. If the Screen current exceeds +30mA decrease it by using the LOAD knob.
- Repeat using the TUNE knob to reach desired maximum FORWARD POWER and check Screen current.
- If the Screen current is lower than 0 mA (negative value), change it by turning the LOAD button until 0 mA is set and check again for maximum output power. Do not start with very low input power, set abt. 50% before beginning tune process.

- If you reached the desired maximum output power, and the PA Screen current is inside 0 / +20mA , then tuning process is finished.

Notice 1: If the tuning process takes more than 1 minute, allow for a short break to prevent temperature overloading of the PA.

Notice 2: If you use the PA with the output power adjusted lower than the maximum settings, screen current can take negative values. There is no need to readjust the PA, it is still working in the linear mode.

At the following picture you can see display of properly tuned amplifier



Output power is 2010 W, reflected power about 1W and screen current is about +5 mA.

If the amplifier demonstrates any malfunctions during tuning or it does not behave in accordance with the TUNE procedure, interrupt the tuning procedure immediately and check the amplifier! Be sure there are not any mistakes in choosing antennas or bands! Insure that VSWR is not higher than 3:1 and input power is not too high!

6. MAINTENANCE

6.1. Indication of Fault Conditions

If a fault condition appears during the operation of the amplifier, the safety circuits of OM2000+ will react immediately. There are several types of warning or fault messages that may appear on the display when any of the protection circuits are activated. The OM2000+ power amplifier provides the following protection:

- Power Out is too high
- Refl. power too high
- Power In is too high
- Low output power (tune)
- Plate current too high
- Screen current error
- Heating voltage error
- HARD FAULT

Plate voltage error
Grid voltage is low
Screen voltage error
SWR is too high
Amplifier is too hot



Most of the safety circuits are preset for two levels of activation. The first level is a warning level. In such a case a warning message appears on the display, but the power amplifier will stay in **normal operation**. See the table above for warning and fault conditions.



When a fault condition occurs during the tuning or operation of the amplifier, the safety circuits will **block transmitting**. The amplifier stays in **OPER** mode. After approx. 1 sec the control circuits will automatically switch the amplifier back to the transmitting mode. If the problem persists, the safety circuit will react again, and the appropriate fault message will appear on the PA status screen.

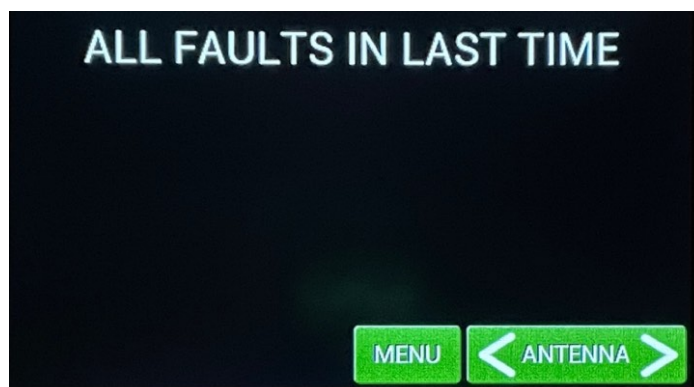


If the fault repeats 3 times during a 10 seconds interval, the safety circuits will turn the amplifier to STBY mode. Cancelling a fault condition takes a short press of the STBY/OPER button. The PA will stay in STBY mode.

NOTE: All the warning and fault messages are stored in the onboard memory. You can display particular warning messages and particular error messages. They are stored up to 20 at a time to the memory. You can view them on the menu display. If the error memory is full, every new message will delete the oldest one in the stack. It means that only the last 20 messages are visible on the display.



This is an example from a previous attempt at transmitting when the antenna was disconnected from the PA.



If you touch the “LAST EV.” box on the PA touch screen it will display the warning details.

In the case of some hardware failure or if your power amplifier is not working properly, please contact the manufacturer or your local dealer.



Never try to change or move any part inside the amplifier except the tube or fuses.
Substitution of parts may void intrinsic safety!

Manufacturer's contacts:

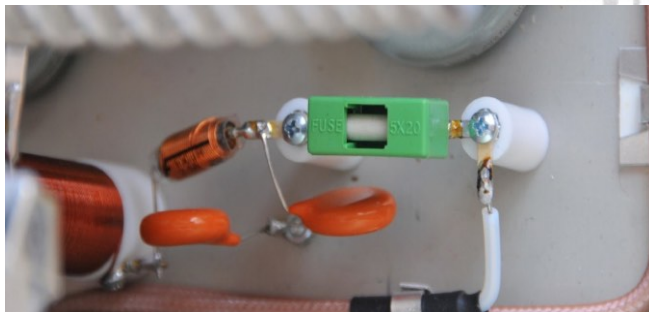
OM POWER, s.r.o.
930 30 Báč 126
SLOVAKIA
Email: om-power@om-power.co

Dealer in the USA:

Array Solutions
2611 North Belt Line Road
Suite # 109
Sunnyvale, TX 75182
Tel: [\(214\)954-7140](tel:(214)954-7140)
Email: sales@arraysolutions.com

6.2. Fuse replacement

The user is allowed to change mains fuses (6.3 x 32mm), accessible from the rear panel, only. In the case of fuse (fuses) interruption inside the power amplifier, **exchange can be carried out only by professionally qualified persons!** Internal fuses are located mainly on the SW ON board (next to the HV transformer).



One special fuse **F 4A**, filled with sand, is used in the model OM2000+. In the case of an accidental discharges or short within the tube this fuse (4 Amps fast, filled with sand) saves the HV supply circuits.

6.3. Tube Replacement

In the case of a damaged vacuum tube, contact the manufacturer or your dealer for ordering a new one. We will provide instructions for replacing the tube. **Replacement should be done by a professionally qualified person!** After tube replacement the **automatic BIAS adjustment** procedure must be done.

6.4. Cleaning

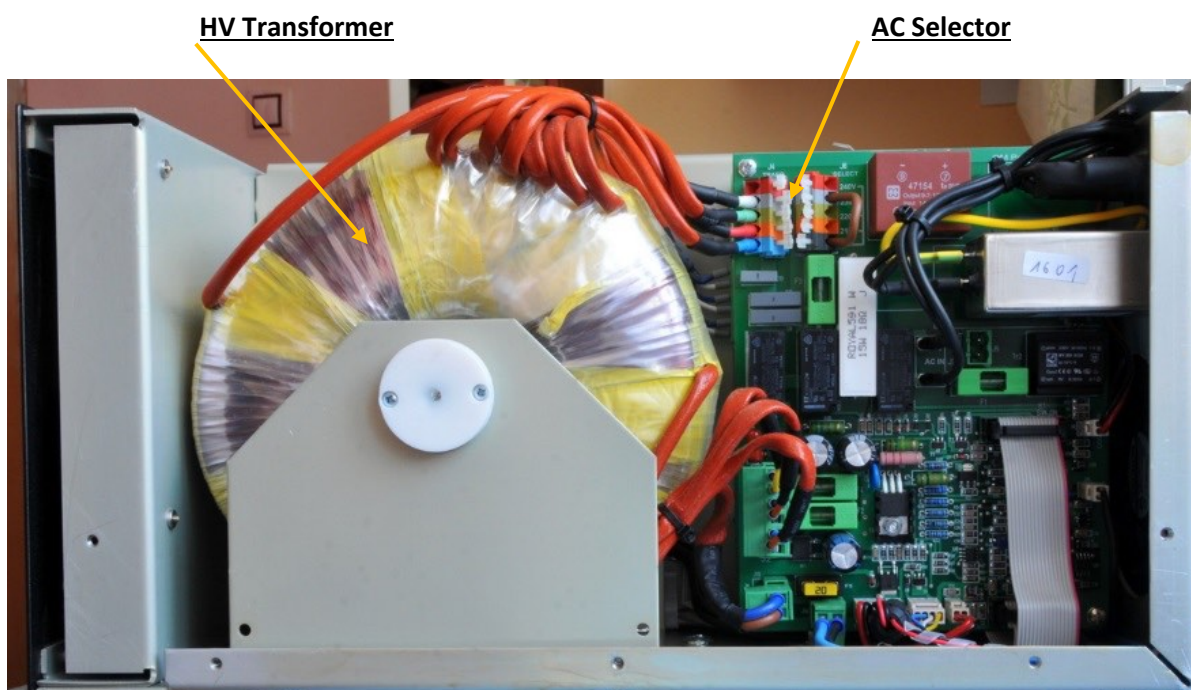
To prevent damage to the amplifier surface and plastic components, do not use aggressive chemicals for cleaning. Do not open the amplifier for cleaning. Outer surface cleaning may be safely accomplished by using a piece of soft cotton cloth moistened with clean water or window cleaner.

7. APPENDIX

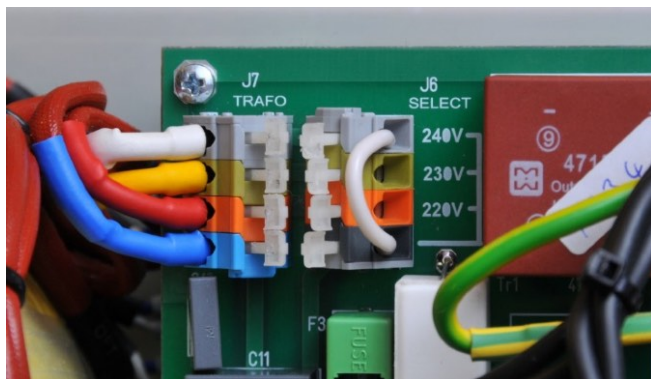
7.1. Primary AC voltage selection

Primary section of the HV transformer is switchable for three values of AC voltage (220, 230, 240V). Factory settings is 230V AC. Before first starting the PA we recommend checking that the correct value is selected according to the AC voltage in your network.

Side view on the opened OM2000+



Remove the upper lid first. On the right side of the PA, there are two PCBs mounted. On the right upper side is Switch ON board where AC selector is located.



Use flat screwdriver or finger and press carefully the white stick to release contact and move upper end of the white jumper to the proper position, if necessary.

Jumper must be connected between bottom contact and one of remaining contacts. AC voltage is marked next to every contact.

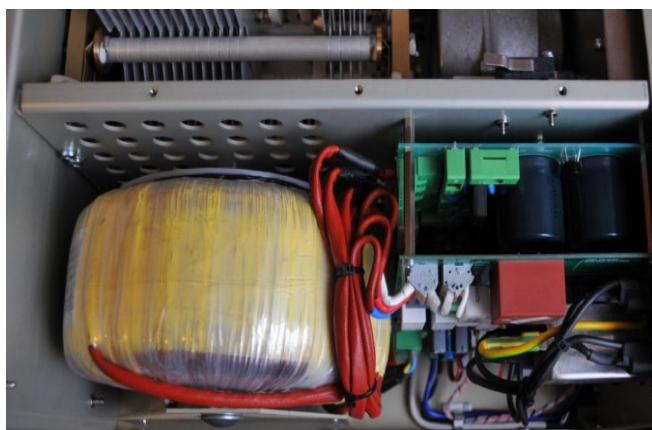


AC selector range can be changed according to the specific conditions in individual countries. Default settings is 220, 230, 240V / 50Hz for EU market and 230, 240, 250v / 60Hz for USA market. If you need different settings in the range of 200 – 260V, this should be specified in the order!

7.2. Removing the HV Transformer

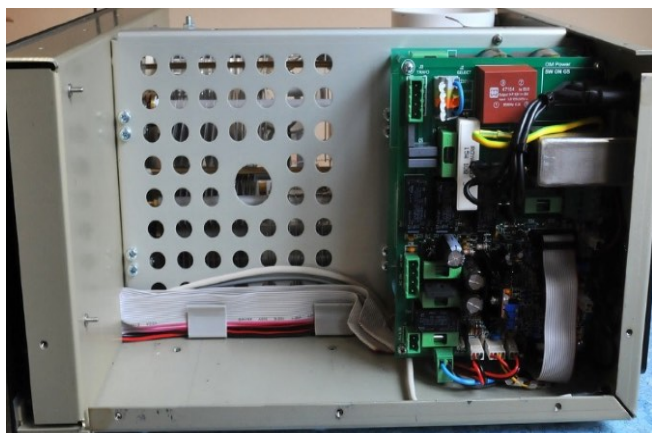
For simpler and easier transport of the PA, HV transformer can be removed and taken separately. This distributes the weight of the PA (24 kg) about half and half. Follow next steps to do it.

1. Remove upper lid from the PA (use Phillips screwdriver with bit PH1 !).
2. Turn the PA on the left side (transformer is up).
3. Disconnect **3 connectors** from the front board and **1 connector** from the rear board.
4. Release **4 screws** from the bottom side of the PA. Use Philips screwdriver bit P2. During the release of the last 2 screws hold the transformer by hand. Do not worry about its weight, it will move down just 1 cm and remains on the central rung of the PA.
5. Use both hands to take transformer away from the chassis.



Watch the released terminals, when moving the transformer!

Do not damage transformer insulation during removing and transportation.



Weight of the PA was distributed (transformer has 12 kg, rest of the PA has cca 12 kg, too).

When refitting the transformer, watch for the correct location of individual sections and wires.

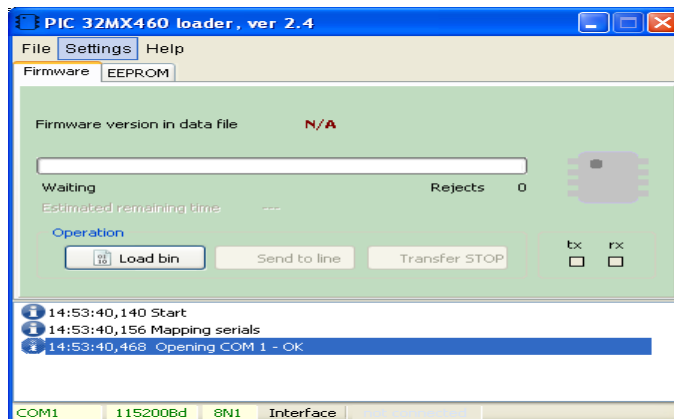


Manufacturer reserves the right to make future changes in the way of connecting the transformer to the board. Always mark the position of the terminals before disconnecting the transformer.

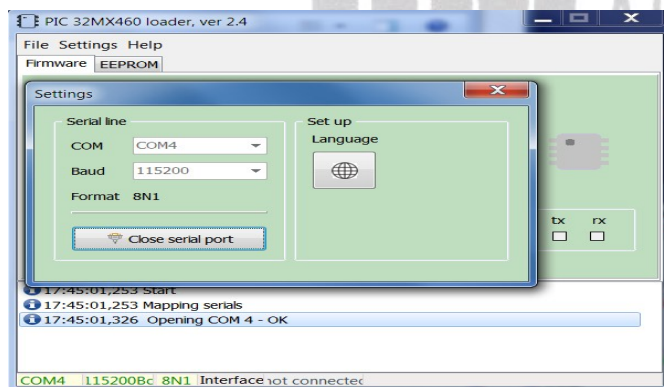
7.3. OM2000+ firmware upgrade

Download the firmware upgrade software and latest firmware file for the OM2000+ from the official OM Power website <http://www.om-power.com/downloads>. Store it to OM2000+ folder created on your PC.

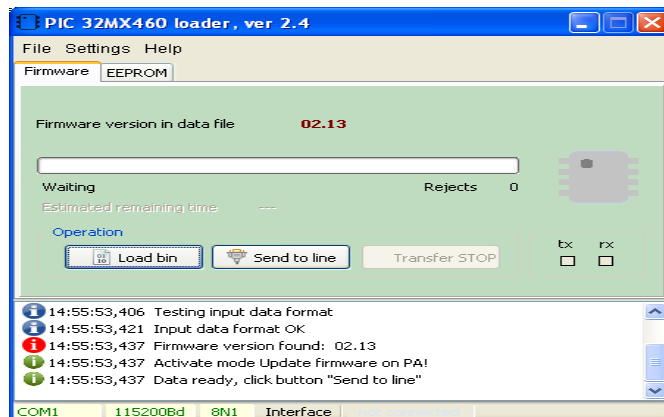
NOTE: Use a serial straight cable and connect to the PC port on the OM2000+ rear panel with a COM port on the PC.



Open folder OM2000+ on your PC, find the MX460L.exe file and run it.



Select SETTINGS and choose the COM port you want to use. Baud rate should be 115200. Close the window.



Select the Firmware tab and click on the LOAD BIN button.

Choose OM2000+ Vxxx.bin file in the folder.



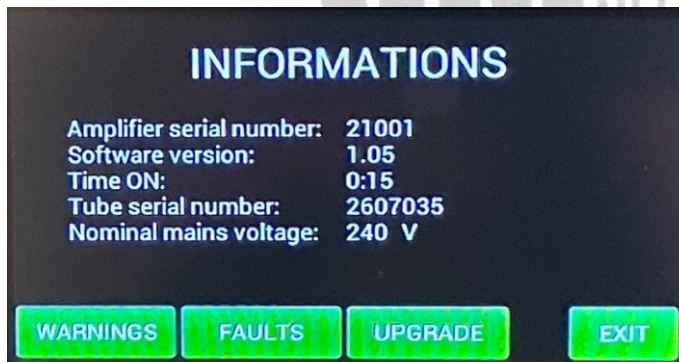
Turn on the power amplifier with the black ON switch on the front panel.

Press SETTING to enter the SETTING Menu.

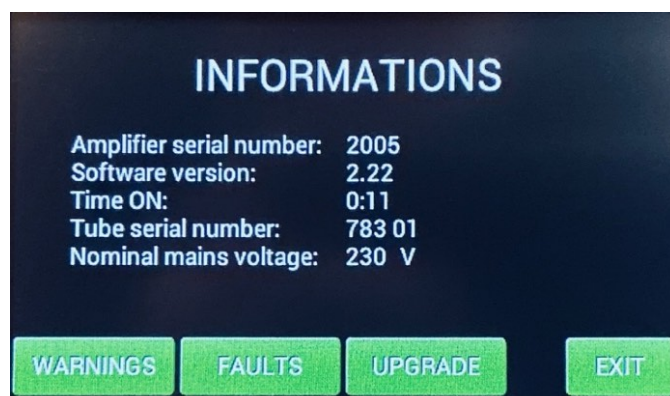


Choose **INFO**

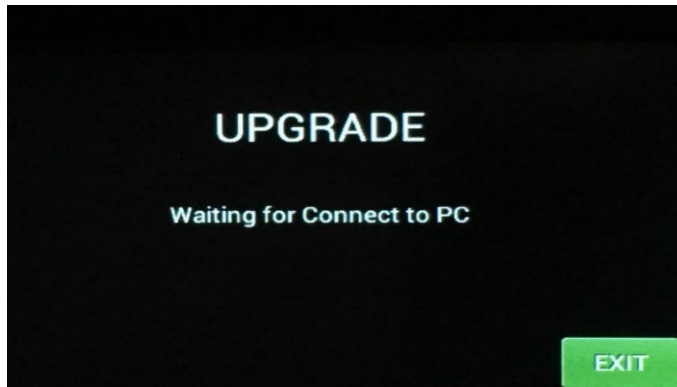
The INFO settings allow viewing all of the previous PA INFORMATION screen plus the addition of one more touch key to enter the UPGRADE mode.



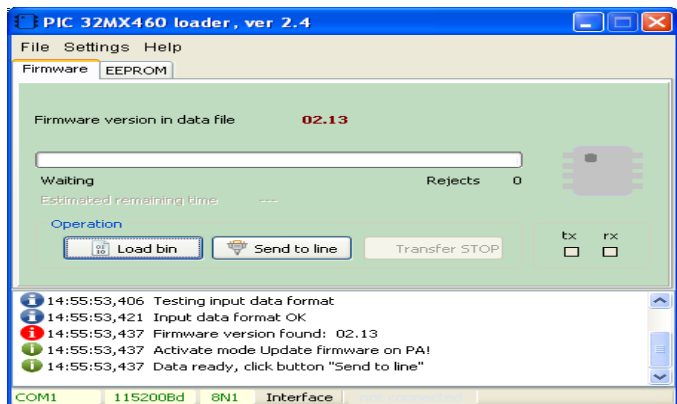
Press **UPGRADE** button to start the Amplifier upgrade process.



Press UPGRADE to start the Amplifier upgrade process.



When you see this screen on the PA, go to the PC and the PIC Loader software and press the **SEND TO LINE** button.



Press the **SEND TO LINE** button.



Press **LOAD** on the OM2000+ screen to start loading.



You can see the loading progress on the bar graph

LOADING NEW FIRMWARE

PLEASE WAIT 30 sec.

DO NOT TURN OFF THE
POWER AMPLIFIER!!!

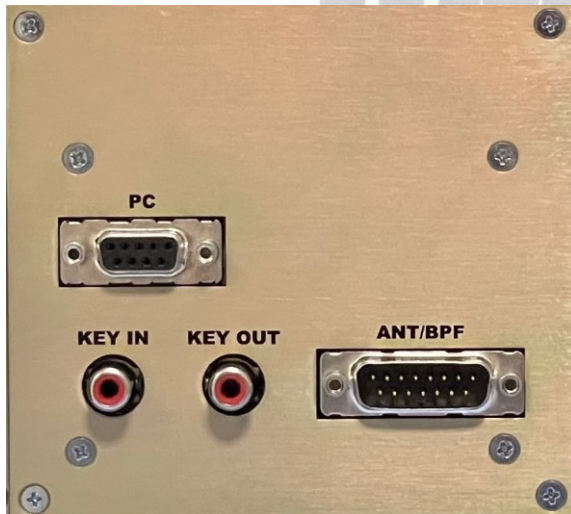
You will see this screen after the firmware was successfully loaded

Usually, it takes about 30 seconds but sometimes it might take a little bit longer.

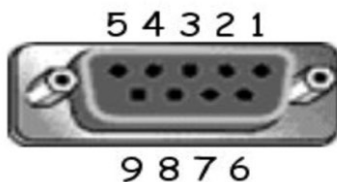
NOTE: Do not take any action until this screen disappears!

At the end you will return to the main screen of OM2000+. Turn the PA OFF, disconnect the PC serial cable and you are ready to use the OM2000+ with the new firmware.

7.4. Control panel (rear side) connectors pin-out

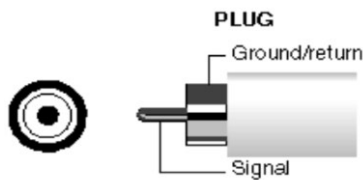


PC connector DB 9 female



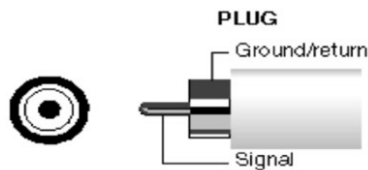
RS232 connection to the computer. For UPRADE firmware communication connect pin 2 TX-D, pin 3 RX-D and pin 5 GROUND

KEY IN – RCA connector



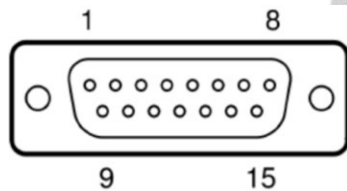
Input signal PTT switching voltage / current 5V / 2mA)

KEY OUT – RCA connector



Output signal PTT (maximum switching of 30V / 50mA)

ANT / BPF Connector - D-sub 15 male



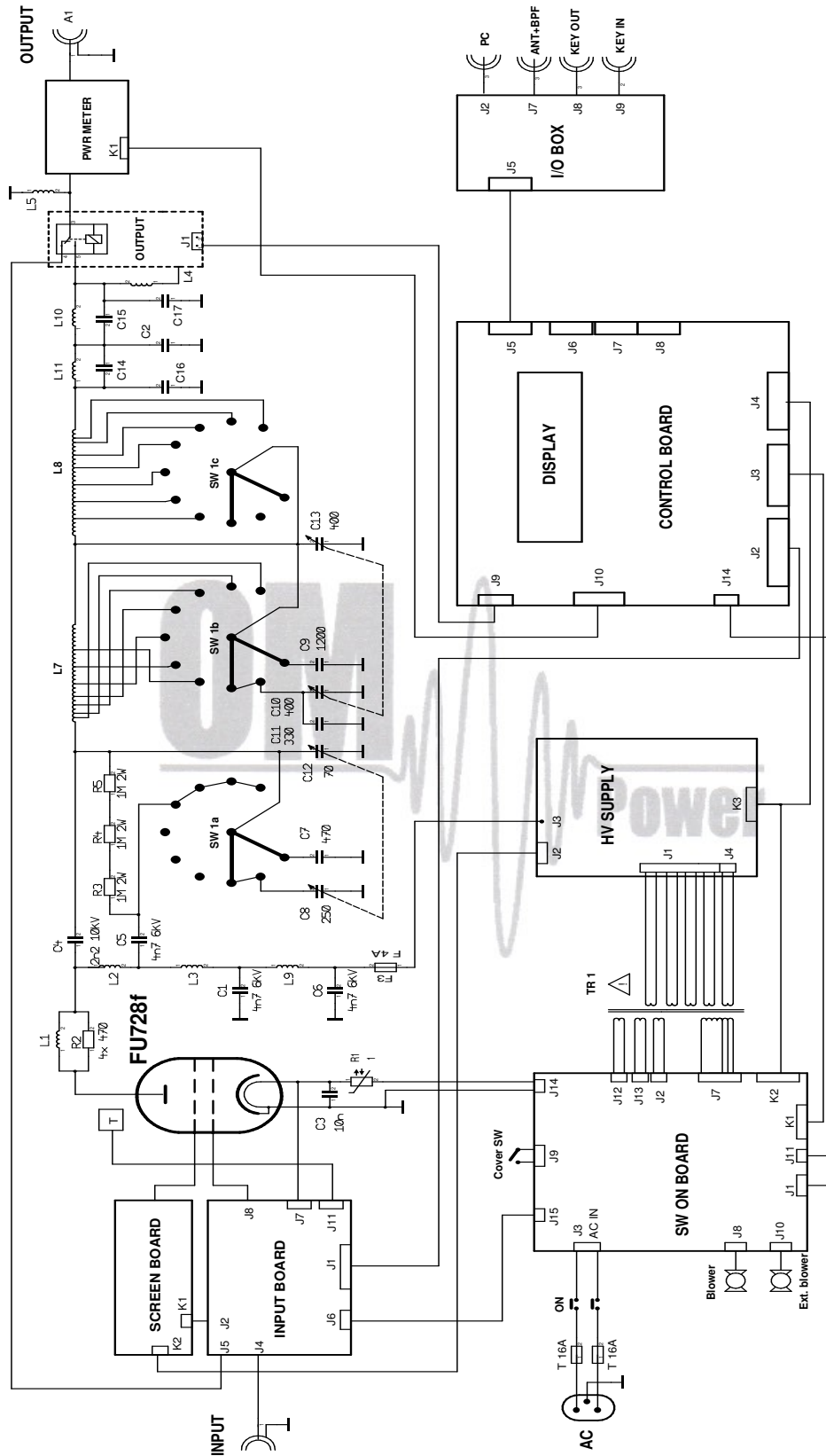
**DA-15
male**

- Pin 1 - ANT data D - output BCD code - bit 3 for antenna switching
- Pin 2 - ANT data C - output BCD code - bit 2 for antenna switching
- Pin 3 - ANT data B -- output BCD code - bit 1 for antenna switching
- Pin 4 - ANT data A - output BCD code - bit 0 for antenna switching
- Pin 5 - Not connected
- Pin 6 - GND
- Pin 7 - GND
- Pin 8 - +12V /100mA - output supply 12V maximum 100mA for antenna BCD decoder
- Pin 9 - BAND data A - output BCD Yaesu BAND data compatible code. Use for automatic bandpass filter OM6BPF
- Pin 10 - BAND data B - output BCD Yaesu BAND data compatible code. Use for automatic bandpass filter OM6BPF
- Pin 11 - BAND data C - output BCD Yaesu BAND data compatible code. Use for automatic bandpass filter OM6BP
- Pin 12 - BAND data D - output BCD Yaesu BAND data compatible code. Use for automatic bandpass filter OM6BPF
- Pin 13 - Not connected
- Pin 14 - GND
- Pin 15 - 12V /100mA – the same as pin 8

OM2000A+ can address up to 10 antenna port, see antenna BCD code table below

D	C	B	A	Logic value	Antenna port
0	0	0	0	0	UNDEFINED
0	0	0	1	1	ANT 1
0	0	1	0	2	ANT 2
0	0	1	1	3	ANT 3
0	1	0	0	4	ANT 4
0	1	0	1	5	ANT 5
0	1	1	0	6	ANT 6
0	1	1	1	7	ANT 7
1	0	0	0	8	ANT 8
1	0	0	1	9	ANT 9
1	0	1	0	A	ANT 10
1	0	1	1	B	UNDEFINED
1	1	0	0	C	UNDEFINED
1	1	0	1	D	UNDEFINED
1	1	1	0	E	UNDEFINED
1	1	1	1	F	UNDEFINED

7.5. Block Diagram of the OM2000+ Power Amplifier



OM 2000+ block diagram

Rev.: 5.12.2021

7.6. Troubleshooting

The OM2000+ power amplifier contains several protection circuits, which constantly monitor operation of the Amplifier. When the firmware defined parameters exceed defined operating levels, a WARNING appears in the LAST EVENTS window of the PA front panel. If some parameters exceed a defined critical level, a FAULT is activated and the PA will automatically switch to STBY mode. The LAST EVENTS window will then display the fault information.

All of these events are written to the FAULT and WARNING memories. The Last event is visible after the LAST EVENTS button is pressed including information about possible causes.

There are several warning or fault messages that may appear on the display:

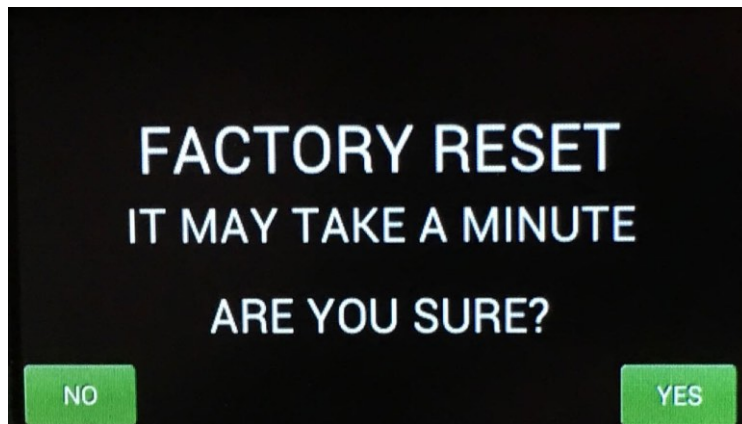
Warning / Fault	Action	Description
Power Out is too high	Reduce input power	Output power exceeds maximum level, reduce the input power.
Refl. power too high	Check your antenna Reduce output power	Reflected power exceeds maximum allowed level. Check if proper antenna is connected. In the case of higher SWR reduce the input power and thus the output and reflected power will be lower.
SWR is too high	Check your antenna Check antenna switch	Antenna SWR is too high (SWR 3 for WARNING and SWR 5 for FAULT). Check if proper antenna is connected. Check antenna switch configuration. If you want to use an antenna with higher SWR, this SWR protection can be switched off (page 22). But reflected power will stay checked (max.350W).
Power In is too high	Reduce input power Check amplifier tuning	PA input is too high - decrease it! If maximum output power is not achievable, check plate voltage and PA tuning.
Low output power (tune)	Tune mistake. Retune your amplifier	The PA has lower gain and may not be properly tuned. Check the plate voltage and Screen current. If they are ok, manually adjust for optimal tuning of the PA
Plate current too high	Reduce input power Check amplifier tuning Check EBS setting	Plate current too high. Check the following: • Too high input power – reduce it • Improper tuning of the PA – bad antenna impedance matching. Tune the PA properly. • Improper BIAS setting. Check EBS1 and EBS2.
Grid current is high	Reduce input power Check amplifier tuning	Grid current too high is due to overdriving the PA. Reduce the input power. If maximum output power is no reachable due to high plate current, check the PA tuning.
Screen current error	Reduce input power Check amplifier tuning Check plate voltage fuse	High screen current is usually due to the following reasons: • Overdriving the PA – reduce the input power • Improper PA tuning. At maximum output power the screen current must be inside the range of 0 mA to +30 mA • Plate voltage is missing. Press PTT without driving. If screen current is higher than +20mA, check plate voltage fuse (page 26).

Plate voltage error	Check plate power supply	High voltage supply fault. Check the fuses on HV board.
Grid voltage is low	Check grid power supply	Low voltage on the grid. Check fuse F9 on HV supply board.
Screen voltage error	Check screen power supply	Check fuse F10 and F11 on HV supply board and fuse F1 on the Screen board.
Amplifier is too hot	Check cooling system Set up additional blower	Check the airflow (ventilation grid on the rear panel). Cooling exhaust must be free from any obstructions. During extended use set the blower speed to ALWAYS ON (page 16).
HARD FAULT	Check HV circuits and Tube	Protection circuit saved HV against overload. If high current from the HV supply caused the HARD FAULT then is activated the protection and the PA is automatically switched OFF. Check HV circuits, blocking capacitors and the tube itself.
Heating voltage error	Set up proper transformer voltage selector	This error is usually due to improper setting of the primary voltage on the transformer (page 27). In normal condition filament voltage Uh readings should be 9V +/- 0,3V for FU-728F tube.
Cooling error	Check blower rotation	Main blower problem. Check its functionality.
Mains error	Check mains voltage and set up nominal mains voltage Set up proper transformer voltage selector	This error may be caused by the improper setting of the nominal value of Um . Check your AC mains voltage and set it as nominal Um (page 18). Check the primary voltage setting on the transformer. This fault may also be caused by “soft” mains, when during transmitting the AC voltage drops to a very low level.

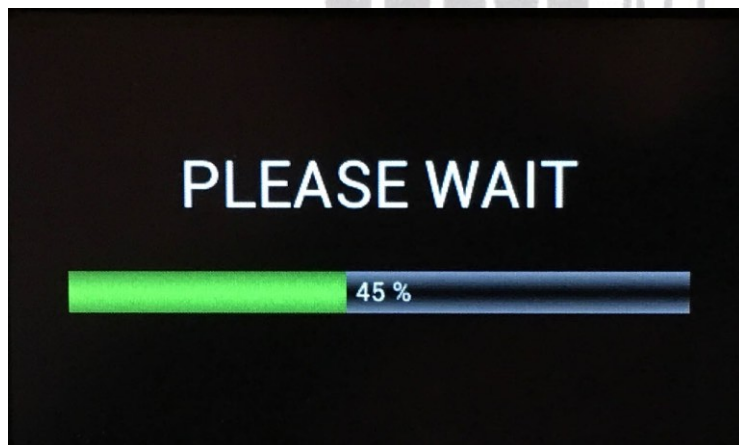
7.7. Factory reset:

In the case of very abnormal behaviour of the OM2000+ it is possible to do a factory reset. This will reset all the amplifier parameters back to the factory default values.

Press and hold the ON/OFF button and press the green Main power switch for several seconds until the following display appears.



If you are sure, and you want a factory settings, press YES.



After the FACTORY RESET completes the PA is ready for operation.

Important notice: Perform a Factory Reset only if absolutely necessary to clear abnormal behaviour, because personalized settings and any USER settings must be re-input.