Exhibit 6: User's Manual

External Radio Frequency Power Amplifier OM2000+

Model 2000+

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1. GENERAL INFORMATION

1.1. Introduction

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

1.2. Specification

1.2.1. Parameters

Frequency Coverage	Amateur Bands 1.8 – 29.7 MHz including WARC + 50 MHz
Power Output	1500 W in SSB/CW on HF bands, 1500 W in CW/SSB on 6m 1500 W in RTTY
Input Power	Usually 70W for full Output Power
Input Impedance	50 Ohm, VSWR < 1.5 : 1
Power Gain	15 dB
Output Impedance	50 Ohm unbalanced
Maximum Output SWR	2 : 1
SWR protection	Automatic switching to STBY, when reflected power is 250W or higher
Intermodulation distortion	32dB below nominal output
Suppression of harmonics	< -50 dBc
Tubes	FU-728F Ceramic tetrode
Cooler	Centrifugal blower + Axial blower
Power supply	Switchable 220V, 230V, 240V, 50/60 Hz
Transformers	One toroidal transformer 3kVA
Dimensions	15,4“ x7,7” x 14,6” (width x height x depth)
Weight	24 kg / 52 lbs

1.2.2. Protection Circuits

There are several protection circuits used in the amplifier. They are activated when one or more of next parameters exceed defined values or some unwanted occasion 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 to high
- Soft start for fuses protection
- “switch-on blocking “ at opened amplifier

1.2.3. Indicators

Number of indicators visible on the front panel will inform you about value of some parameters or operation status:

OLED display	4 x 20 characters
Analog Wattmeter	Double system meter for forward and reflected power measuring
LED Indicators	ON AIR – amplifier in transmitting mode STBY – standby mode FAULT – failure, switching off for abt. 4 sec ON – ON status

1.2.4. Features

Manufacturer implemented some of the company’s current development results with most wanted operating and safety features into this new model:

- High level of protections
- Antenna switch for 3 different antennas
- Memory for faults and warnings, easy maintenance
- Automatic set-up anode current (BIAS) – no need to adjust manually after changing the tube
- Temperature controlled 2-speed centrifugal blower (turbine) + axial blower
- Full QSK with silent relay
- Many operational parameters to display
- Easy transport due to detachable HV transformer
- The smallest and lightest 2000 W PA on the market

2. SAFETY INSTRUCTIONS

WARNING!

DANGEROUS HIGH VOLTAGE INSIDE!

The power amplifier is using high voltage up to 3000V 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 NEXT RULES!

WARNING!

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!

WARNING!

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

WARNING!

The OM2000+ amplifier is neither to be used in a WET or HUMID environment nor to be exposed to RAINFALL!

WARNING!

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!

WARNING!

Before opening the upper lid of the amplifier make sure that power supply has been disconnected AT LEAST 10 minutes allowing the electrolytic capacitors to discharge fully. Disconnect power cord from the outlet!

WARNING!

Any work inside the PA (internal fuses replacement, tube replacement, etc.) can be carried out only by 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 long time operation ventilation grid can reach high temperature. Do not touch it!

CAUTION

The amplifier must be properly grounded during operation.

CAUTION

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

CAUTION

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.

CAUTION

Read this manual carefully. Fallow all of 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!

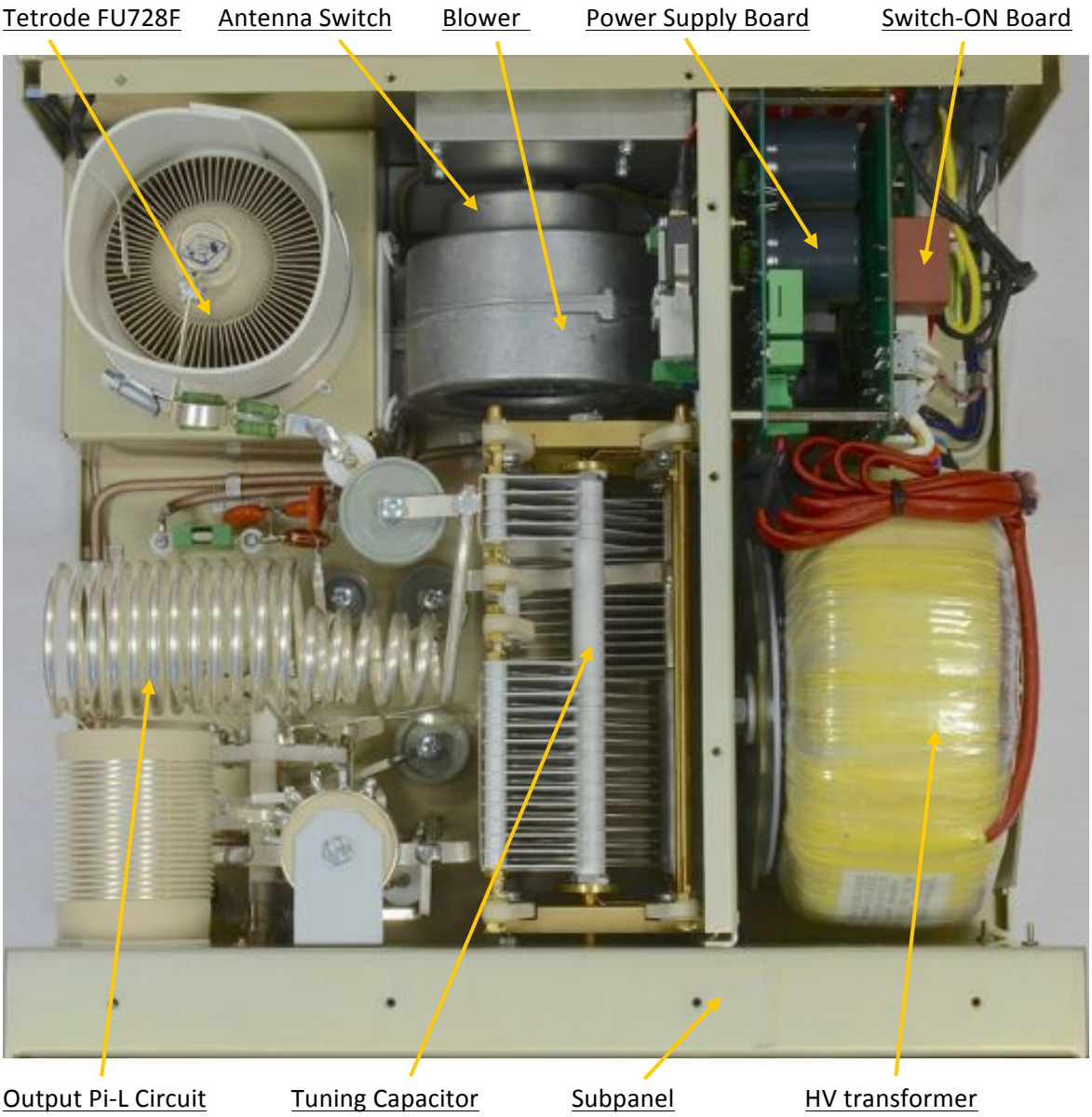
3. GENERAL DESCRIPTION

3.1. HF part

This amplifier is using a **ceramic tetrode FU-728F** in a grounded-cathode circuit (input into control grids). The OM2000+ amplifier achieves excellent linearity by the voltage stabilization of the control grid bias and the screen voltage. The power input is given to the control grids, using a broadband input circuit with an input impedance of 50 Ohms. This adaptable input circuitry 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 ceramic capacitor for TUNE and LOAD are divided. 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+



3.2. Power Supply

Power amplifier is using 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 530V AC (total abt. 2950V DC) @ 1.2A. Each has its own rectifier and filter. In the high voltage circuit, safety resistors are employed to protect the amplifier against overload (placed on the power supply board).

The separated supply for screen grid is regulated by stabilization with MOSFET and delivers abt. 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).

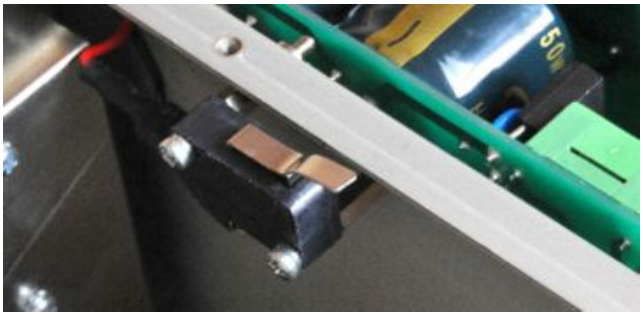
3 kVA toroidal transformer is visible on the left side. Switch-ON board is in the front, Power supply board behind it.

CAUTION

Primary section of the transformer is switchable for 220 - 240 VAC. Factory setting is 230VAC. If the AC voltage in your network is 220 or 240 Volts, you need to set the correct value before first starting of the PA. See part 7.1. for more information.

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 element is mechanical switch for AC blocking at opened amplifier.

4. INSTALLATION

NOTE

Read this chapter carefully prior you will start installation. Before unpacking inspect shipping carton first, if it is not damaged. Keep all of packing parts for possible future shipment. Check unpacked power amplifier. If you find some damaging, contact your dealer immediately to keep full warranty.

During installation go step by step according to the next parts.

4.1. Grounding

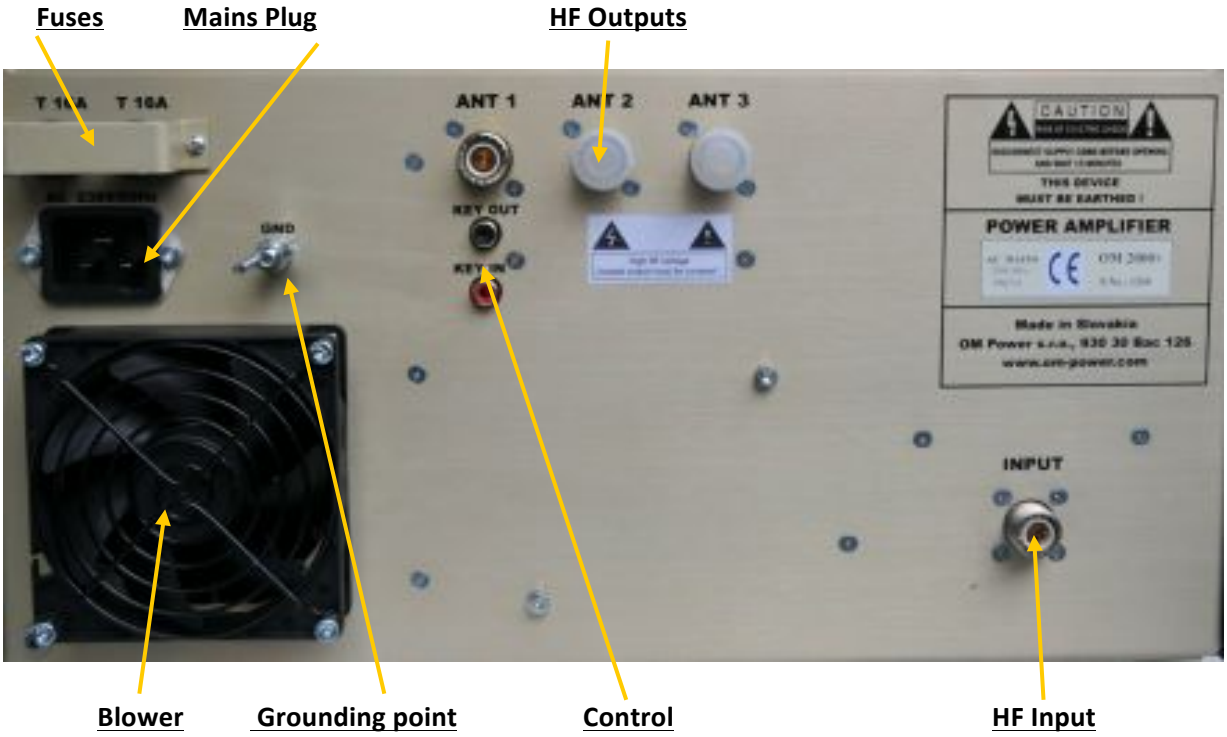
CAUTION
The amplifier has to be grounded properly! Connect the screw on the rear panel of the amplifier to your local grounding system with a copper cable; use a cross-section of 4 mm^2 at least.

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, having problems with TVI/BCI or your transmitted signal may be distorted.

4.2. Coaxial Cable

The output of the transceiver is to be connected to the input of the amplifier via RG58 or similar cable. For the connection between the power amplifier and the antenna, RG213 or similar coaxial cable suited for high power is recommended. All the INPUT and three OUTPUT (ANT1, ANT2, ANT3) SO-239 sockets with Teflon insulation are used.

Rier 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 a CINCH-socket is 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+ have to be switched earlier than HF is applied (cold switching). Modern transceivers they have a time delay between PTT switching and power output.

CAUTION

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 to be connected with the PTT socket at the transceiver.

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)

4.4. Main Supply

CAUTION

Be sure you got PA with properly terminated line cable, corresponding with your power system's outlet. If not, contact your dealer. In such a case you should make the necessary changes using a licensed electrician.

WARNING!

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

4.5. Cooling

CAUTION

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 speed (2 steps) is setting automatically according to the tube temperature.

Detailed view on the tube and blower area.
Antenna switch (above) is installed inside the metal box.

5. OPERATION

WARNING!

Before switching PA on, make sure that amplifier is grounded, antenna or dummy load is connected, and line cord is putted to the outlet. Be sure you selected AC input by 7.1.

CAUTION

Before switching PA on, check all connections between PA and TCVR.

CAUTION

Do not turn PA on for at least 2 hours after unpacking it and locating in its operating location. Especially when amplifier is moved from a cold place to a warm one because not visible condensation may develop, and this could result in damage to the high voltage circuits of the PA.

CAUTION

Never try to change antenna output during a transmission to avoid warranty loss.

NOTE

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

5.1. Operation elements

There is couple of operational elements accessible or visible on the front panel.

BAND - Band selector switch
TUNE - Anode capacitor for tuning
(higher frequencies to "0"; lower frequencies to „100“).

LOAD - Output capacitor tunes antenna load resistance to the amplifier.
Capacity is low at „100“ and high at "0" on the scale.

WATMETER - Analog double system meter for forward and reflected power measuring

ON / OFF - Long press (abt. 1 sec.) to switch PA ON/OFF
RESET - Short press to reset faults or warnings

0 / I Power ON **s**mall 12V APU for logic and protection circuits
You can switch Antenna ports even if PA is switched OFF.

S1 **S2** **S3** **S4**

ON AIR - Transmitting mode LED

STBY - Standby mode LED

FAULT - Failure LED

ON - PA is „ON“ LED

S1 - **OPER / STBY** - Press to switch between Standby and Operation mode
ESC - Return to the previous level

S2 - **MENU** - Enter the Menu
DOWN - Scroll down

S3 - **DSP** - Change display (DSP1, DSP2, DSP3)
UP - Scroll up

S4 - **ANT** - Change Antenna output (ANT1, ANT2, ANT3)
ENT - Confirm the selection

More functions of S1-S4 buttons will be described in next parts of this manual.

5.2. Preparation for operation

The first necessary thing after connecting AC to the power amplifier is switching main (green) switch to „ I “. Welcome message and then starting information appears on the display:

After switching main switch ON welcome message appears shortly.

Starting message shows which antenna is connected. To switch PA ON press ON-OFF button for abt. 1 second.

Warming time takes abt. 210 seconds. It is possible to enter **MENU** during this time, but with limited possibilities (display settings can be changed, for example).
You can change **ANT** output, if necessary.

If you change **DSP** during warming time, you lost count down information. Press **BACK (S1)** to restore starting message.

When warming time expires, PA switches itself automatically to the **STBY** mode.

You have **two possibilities** now - switch PA to **OPER** mode and start operation, **OR** to go thru **MENU** and submenus to set display parameters, some hardware parameters or to enter the service menu.

In the **STBY** mode Antenna output can be changed (**ANT1, ANT2, ANT3**) by pressing **S4**.

Display information can be changed, too. Press **S3** to do it.

There are 3 different display settings possible in the OM2000+. To set display parameters, go to the next part of this manual for more details.

5.2.1. Display menu

The OLED display shows couple of parameters or texts. Display has 4 lines. Three of them are editable. In every line user can select different parameters, using MENU. See next pictures.

After pressing **MENU** (S2) S1–S4 buttons changed their functions. To edit display parameters, press **DISP** button.

Press **DIS1** to edit first display.

Now you can define parameters for first three rows. Start with first line, press **1Row** button**.**

Go **UP** or **DOWN** to select desired parameter. Press **ENT** to confirm selection.

There are 4 possible settings for the first line (one bar-graph or three pairs of different parameters):

- Forward bar-graph
- Forward Power _ Reflected Power
- Forward Power _ SWR
- Plate voltage Up _ Plate current Ip

Second and third line are divided to the left and the right side, editable independently. To each of these positions one of the 15 different parameters should be set.

If you finish first line settings, press **ESC** to go back to the row selection.

To start edit second line, press **2Row** button.

S2 and S3 now changed their functions.

To edit left side of the second line, press **LEFT** button.

Go **UP** or **DOWN** to select desired parameter. Press **ENT** to confirm selection.

If you finish left side settings, press **ESC** to go back to the side selection.

To start edit right side, press **RIGHT** button….etc.

Second and third line programmable parameters are:

- Forward Power
- Reflected Power
- Input Power
- SWR
- TUNE
- Temperature
- Frequency
- Plate voltage – Up
- Plate current – Ip
- Screen voltage – Us
- Screen current – Is
- Screen current – graph
- Grid voltage – Ug
- Grid current Ig
- Heating voltage – Uf

5.2.2. Settings menu

Settings menu offers EBS settings, factory default parameters restoring and display contrast settings (software version 6.1. or higher).

Electronic Bias Settings (EBS) is one of significant feature of the power amplifier. It allows to set low plate current after pressing the PTT regardless of whether you have CW or SSB mode, until RF signal is no present at the input. At the moment when RF signal comes to the input of PA, bias will automatically change to its working value.

EBS level means level of the Input power, where EBS starts working. Default EBS value is 0.2 W. We recommend using EBS ON. Significant accompaniment of used EBS is temperature reducing.

To enter Settings menu, go to **MENU** first, then press **SET** button.

Use **UP** or **DOWN** button to select EBS ON/OFF. Press **ENT** to enter EBS status settings.

Press **ON** or **OFF** to set status of EBS. Press **ENT** to confirm selection.

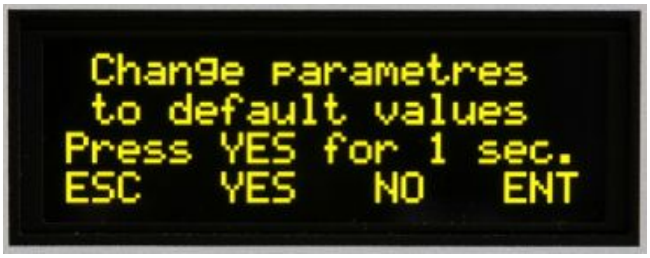
Press **ESC** to go one level back.

Use **UP** or **DOWN** button to select EBS level parameter. Press **ENT** to enter EBS level settings.

Use **UP** or **DOWN** button to set EBS level value. Press **ENT** to confirm EBS level value.

Press **ESC** to go one level back.

If you wish **to restore** factory default parameters, use **UP** or **DOWN** button to select Restore default parameters. Then press **ENT**.



Press **YES** for 1 second to confirm restoring.

Use **UP** or **DOWN** button to select LCD contrast. Press **ENT**.

Use **UP** or **DOWN** button to set contrast value. Press **ENT** to confirm settings.

5.2.3. Service menu

In the Service menu it is possible to verify **software version**. This menu allows user to check total **operating hours** and listing in the memory, where reported **faults and warning messages** are stored. You can display particularly warning messages and particularly error messages. See chapter 6 for more information regarding to warnings and faults occurrence. There you can find a coding table together with a limited values for the safety circuits activation also.

In the Service menu a value of **EBS1 and EBS2 can be automatically adjusted**. This is used for example when it is necessary to make adjustment **after replacing the tube**. Automatic control of EBS, however, can be done at any time. EBS1 default value is 20mA of Ip, EBS2 default value is 250mA of Ip.

Use Service menu after replacing the tube. This is step No. 1.

To enter Service menu, go to the **MENU** first, then press **SERV** button.

Use **UP** or **DOWN** button to check software version.

Use **UP** or **DOWN** button to select Time ON parameter. Press **ENT** to see total operating hours of the PA.

Press **ESC** to go back to the Service menu.

Use **UP** or **DOWN** button to select Faults. Press **ENT** to see fault numbers or letters (see the table in chapter 6).

Press **ESC** to go back to the Service menu.

Use **UP** or **DOWN** button to select Warnings. Press **ENT** to see warning numbers or letters (see the table in chapter 6).

Press **ESC** to go back to the Service menu.

Use this procedure after replacing the tube. This is step No. 2. Scroll **UP** or **DOWN** to select EBS1 settings. Press **ENT** to start automatic adjustment of EBS1 (20 mA).

Automatically increasing of the grid voltage (decrease of the negative value) causes a gradual increase in the plate current. In the moment, when Ip reaches 20mA, adjustment stops. Press **ESC** after stopping.

Use this procedure after replacing the tube. This is step No. 3.

Scroll **UP** or **DOWN** to select EBS2 settings. Press **ENT** to start automatic adjustment of EBS2 (250 mA).

Automatically increasing of the grid voltage (decrease of the negative value) causes a gradual increase in the plate current. In the moment, when Ip reaches 250mA, adjustment stops. Press **ESC** after stopping.

Use **UP** or **DOWN** to select Calibration Ip & Is.
Press **ENT** to do it.

Ip and Is calibration runs in the background. Result only is visible on the display.

Press **ESC** to go one level back.

5.3. Operation mode

CAUTION

In STBY the amplifier is in bypass-mode and your transceiver is directly connected to the antenna. Maximum allowed power in bypass mode is 100 Watts! Passing RF power is measured with analog wattmeter only. It is not displayed if PA is either in standby mode or turned OFF.

Press **OPER** to activate operation mode. **STBY** LED switched OFF.

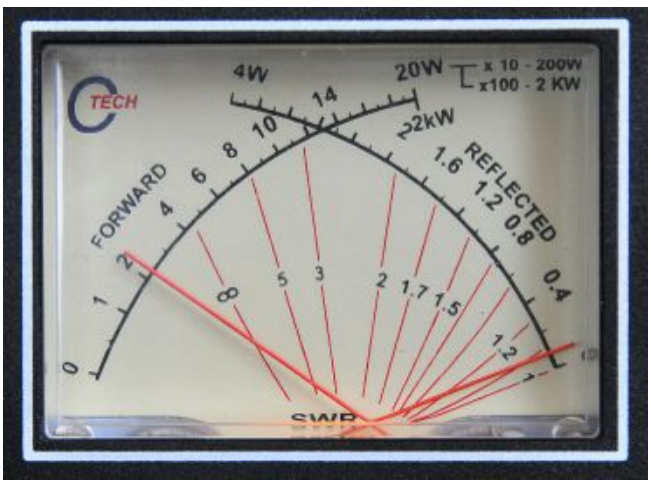
Changing of **DSP** allows user to watch couple of basic parameters of the PA in operation mode without input RF signal. Notice: These are three default display settings (software version 6.1.)

Check all connections again. Set BAND selector, TUNE and LOAD capacitors according to TCVR parameters and delivered tuning table (see next part for more details). Apply **low input power** and press PTT. Check Analog wattmeter first. Try to tune PA for maximum output power and minimum SWR.

Using foot switch in „KEY IN" we activated transmitting mode of the PA first.

"ON AIR" LED is ON.
EBS is active (Ip = 20mA)

In the transmitting mode all 4 buttons (S1, S2, S3, and S4) are blocked!



An example of standard tuning procedure using Analog wattmeter.

5.4. Tuning of the Power Amplifier

The OM2000+ power amplifier is operated in class AB. Thus it's possible to obtain a maximum output power at excellent linearity. For this purpose the amplifier has to be tuned carefully.

CAUTION

The operation of a mistuned PA will cause malfunctions, the increase of grid current and problems with TVI/BCI.

CAUTION

If the input power is higher than 10W and the power amplifier is NOT correctly tuned, the safety devices will switch it to STBY. After switching the amplifier to STBY, you need to switch it back to the **OPER** mode by pressing **RESET** button shortly.

A tuning table is delivered with the power amplifier. For **coarse tuning** select a band with **BAND** switch and choose the setting of "**TUNE**" and "**LOAD**" capacitors according to the table.

Band (MHz)	Tune	Load	Input PWR (W)	Output PWR (W)
1.845	70	45	75	1500
3.630	69	51	72	1500
7.050	50	90	71	1500
10.125	72	28	72	1500
14.175	69	40	70	1500
18.150	81	48	69	1500
21.230	47	67	65	1500
24.940	61	64	59	1500
28.450	33	76	52	1500
50.200	22	90	64	1500

NOTE

Delivered tuning table was made for 50 Ohm loading of PA (dummy load). Each amplifier should have different values depending on used frequency and used type of antenna. Make your own table valid for your real conditions.

There are two ways how to do fine tuning. **The first method** uses a gradual increase in the input power when tuning the PA (as most operators accustomed). In every case we recommend adjust the display for both of methods so it shows two parameters important for fine tuning - **TUNE** and **Is graph** (> I <).

Press **OPER** to enter operation mode. Apply **low input power** and press PTT. Be sure you selected right BAND, TUNE and LOAD knob positions. If you made some mistake, fault message appears:

Safety circuit stopped transmitting, fault LED is **ON** (Fault code 4 is saving to the memory).

Release PTT, set proper positions of BAND, TUNE and LOAD according to the table and **press PTT** again.

Another mistake can occur, if you have antenna connected to the wrong output. In such a case „**SWR is too high**" error message appears. Change antenna output using **S4** button.

This is not an optimal result, TUNE indicator must go between both arrows. Use **TUNE** knob **to get maximum output power** and LOAD knob **to get indicator between arrows.**

Another example of not optimal result, TUNE indicator must go between both arrows. Use **TUNE** knob **to get maximum output power** and **LOAD** knob **to get indicator between arrows** (in arrows direction)**.**

This is a **good result** of tuning.

Now increase input power slowly and watch the display.

Two of important information is visible – **screen current increased**, but still is within the allowed limits. Turn **LOAD** knob slightly in arrows direction **to get TUNE indicator between arrows.**

Display indicates **correct tuning** of the Power amplifier.

Remember

Always use **TUNE** knob to get maximum output power. Use **LOAD** knob to get TUNE indicator on the display to the middle position between both arrows. Simultaneously check if **Is graph** indicator stays within the boundaries. Repeat both steps more times.

Proper operation mode of FU-728F requires the plate voltage to be close to 3 kV. If anode voltage without RF power is much lower, watch the heating voltage, too. Normally, heating voltage must be in boundaries from 8.5 to 9 V without RF signal (DSP3). **Heating voltage level is a reliable indicator of correct AC selector adjustment**. If you see heating voltage lower than 8.5V without RF signal, change primary AC voltage selector one step down (if possible). Conversely, if the voltage is higher than 9V, try to move AC selector one step up (for example from 220 to 230 VAC). Check heating voltage under full load (full output power), also. If the heating voltage without RF signal is OK but under full load drops more than 1.5 V, this relates to the „soft“ AC network and is solvable only by „changing“ the AC network...

Without RF power the plate voltage is OK.

Without RF power the plate voltage is 2.85 kV. Check the heating voltage, too. If it is below 8.5 V, this indicates the need to change AC selector position one step down (for example from 230 to 220 VAC).

To **start the second method** of fine tuning, press **S2 (TUNE**) button in **OPER** mode.

PA is in the operation mode. After **TUNE** button (S2) was pressed, it changes its function. Now **STOP** is blinking.

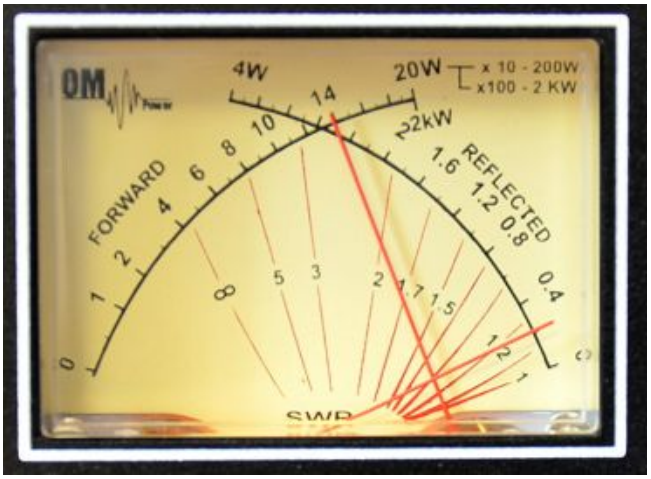
Do not press STOP button yet!

Apply input power according tune table (or lower) for selected band and press **PTT**. Use **TUNE** knob to get maximum output power. Use **LOAD** knob to get Is graph indicator within the boundaries.

Display shows properly tuned PA.

TUNE indicator is in the middle, Screen current is higher, but still inside the limits.

After proper fine tuning release **PTT** and press **STOP** button. PA is now prepared for operation.



View on the properly tuned PA. Analog wattmeter shows forwarded and reflected power.

After this procedure the amplifier is tuned correctly and ready to give 1500 W output power in all operation modes. At optimal tuning and full output power a positive max. 50mA current goes through the second grid.

CAUTION

If the amplifier demonstrate any malfunctions during tuning or it does not behave in accordance witch the description, interrupt the tuning procedure immediately and check the amplifier! Be sure not to do any mistakes in choosing bands or TUNE/LOAD values! Be sure that VSWR is not higher than 2:1 and input power is LOW!

After excluding possible human mistakes you will be able to work for long time with this amplifier!

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. There are several warning or fault messages possible to appear on the display, when some of the protection will be activated. The OM2000+ power amplifier can report one of the following messages:

1 - Power Out is too high
2 - Refl. power too high
3 - Power In is too high
4 - Low output power (tune)
5 - Plate current too high
6 - Grid current is high
7 - Screen current error
8 - N/A
9 - Heating voltage error
A - HARD FAULT
B - Plate voltage error
C - Grid voltage is low
D - Screen voltage error
E - SWR is too high
F - Amplifier is too hot

NOTE

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

NOTE

When a fault condition appears during the tuning or operation of the amplifier, the safety circuits will **block transmitting** and **FAULT LED starts blinking**. The amplifier stays in **OPER** mode. After approx. 1 sec the control circuits will automatically switch the amplifier back to the transmitting mode. If problem persists, safety circuit will react again.

CAUTION

If the fault will repeat 3 times during 10 seconds, the safety circuits will turn the amplifier to STBY mode. FAULT LED stays ON. To cancel fault status, press RESET shortly. Power amplifier will stay in STBY mode.

All the warning and fault messages are stored in the memory. You can display particularly warning messages and particularly error messages. See the Service menu in the 5.2.3., how to select service display. All of messages are stored and displayed as a numbers or letters as indicated in this chapter (1 - 9; A - F). They are stored one by one to the memory. You can see them on the display in three lines, on every second display position (maximum 10 per row, maximum 30 messages for warnings and 30 messages for errors). If memory is full, every new message will delete oldest one and move rest of

them one position back. It means that every time last 30 messages are visible on the display. Next table shows limited values for the safety circuits activation.

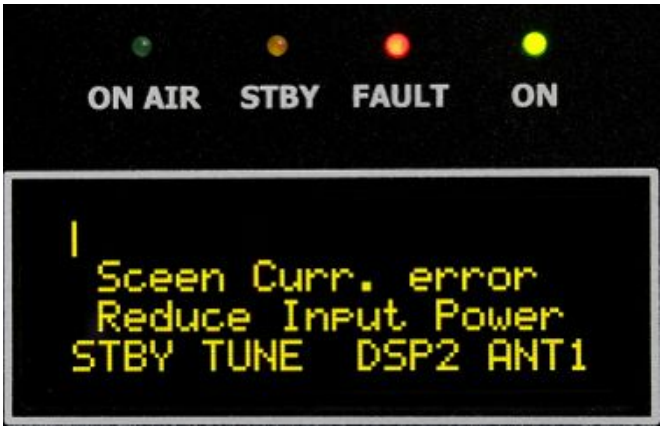
Fault code	Parameter	Warning level	Fault level
1	Power Output is too high	2200W 1700W (50MHz)	2300W 1800 (50MHz)
2	Reflected power is too high	250W	300W
3	Power Input is too high	80W	100W
4	Low output power (tune)		> 3dB below*
5	Plate current is too high	1.8A	2.0A
6	Grid current is too high	10mA	20mA
7	Screen current is too high	50mA	60mA
8	N/A		N/A
9	Heating voltage error	+/- 2V ***	+/- 2.5V
A	HARD FAULT (from 3.1 version)		Plate current >2.5A ****
B	Plate voltage error	Min. 1800V Max. 3400V	Min. 1500V Max. 3500V
C	Grid voltage is low	-40V	-30V
D	Screen voltage error	Min. 250V Max. 400V	Min. 220V Max. 420V
E	SWR is too high		3:1
F	Amplifier is too hot	80 deg. C *****	90 deg. C *****

1. * This fault indicates mistuning of the PA. It works for Input power higher than 10W. If output power decreases more than 3dB below value corresponding with the applied Input power, fault message „**Low output power**“ appears. You have to tune the PA correctly.

2. *** When the heating voltage exceeds boundaries 9V +/- 2V, warning message „**Heating voltage error**“ appears. Check proper position of AC selector (page 25). Heating voltage without RF signal should be between 8.5 and 9V.

3. **** **„HARD FAULT”** appears if the plate current exceeds 2.5 A. In such a situation hardware will immediately disconnect high voltage from the plate. Fault is signed with the letter „**A**“ in the memory. If error occurs frequently, consult this situation with the manufacturer, please.

4. ***** If temperature sensor inside the PA detects of 80 deg. Celsius, warning message „**Amplifier is too hot**“ appears on the display. At 90 degrees protection circuit will automatically block transmitting (fault condition). You have to decrease the power or wait couple of minutes to be ready transmitting again. Fault is signed with the letter „**F**“ in the memory.



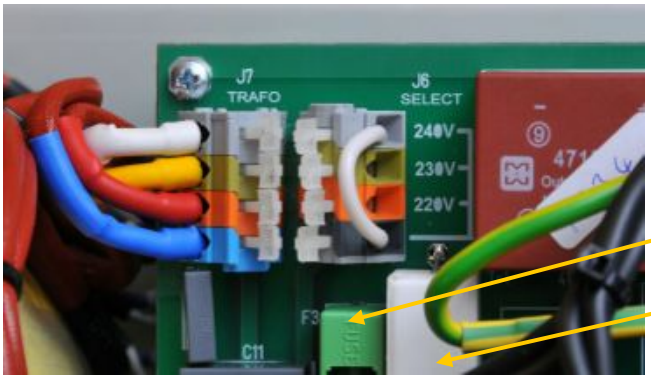
An example shows situation when Input power is too high. By pressing PTT safety circuit will react quickly, error message appears and FAULT LED starts blinking. In this case screen current exceeds limited value (60mA).

After abt. 1 sec. PA returns to TX mode. Reduce Input power to avoid fault repeating.

This is the situation, when problem with high Input power persists. Safety circuits reacted 3 times, and then switched PA to STBY mode. Permanent fault appears.

To return PA to the normal operation, decrease Input power first, then reset fault status and go back to the OPER mode.

If resistor R1 or fuse F3 is damaged, safety circuit stops starting of the PA and fault message appears on the display. It is necessary to replace the damaged component.



Fuse F3

Resistor R1

If there is a fault condition, always try to remove the cause first. If it is not a hardware failure, it usually succeeds. For example high VSWR, high Input power, mistune of PA, high temperature, etc.

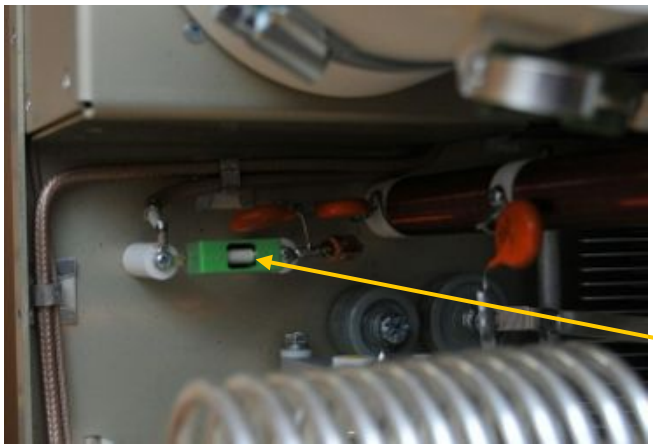
In the case of some hardware failure or if your power amplifier is not working properly, please contact the manufacturer or your dealer.

WARNING!
Never try to change or move any part inside the amplifier except of 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.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 person!** Internal fuses are located mainly on the SWITCH-on board (next to the HV transformer).



One special fuse is used in the model OM2000+. In the case of an accidental discharges in the tube this fuse saves HV supply circuits.

6.3. Tube Replacement

In the case of vacuum tube damaging, contact the manufacturer or your dealer for ordering new one. You will get instructuions how to change it. **Exchange can be carried out only by professionally qualified person!** After tube replacing **automatic BIAS adjustment** must be done. Read Service menu (5.2.3.) and pictures on page No. 20 for more details.

6.4. Cleaning

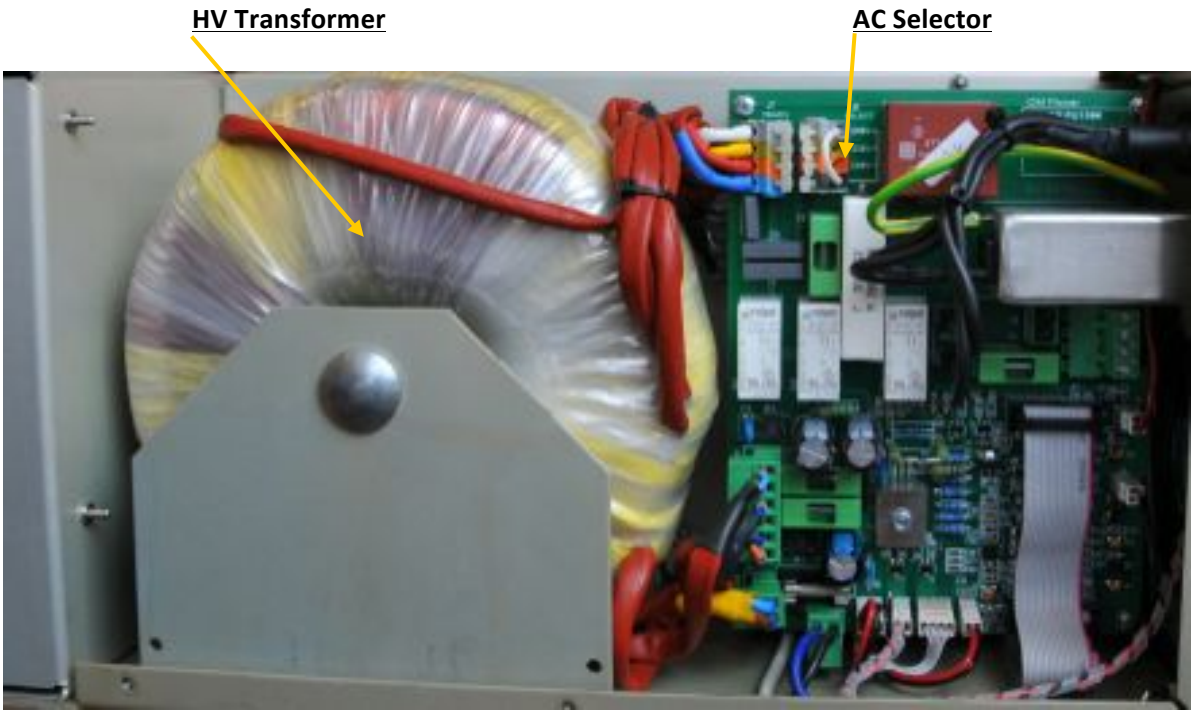
To prevent damage to amplifier surface and plastic components do not use aggressive chemicals for cleaning. Do not open the amplifier for cleaning. Outer surface may be safely accomplished by using piece of soft cotton cloth moistured with clean water or window cleaner.

7. APPENDIX

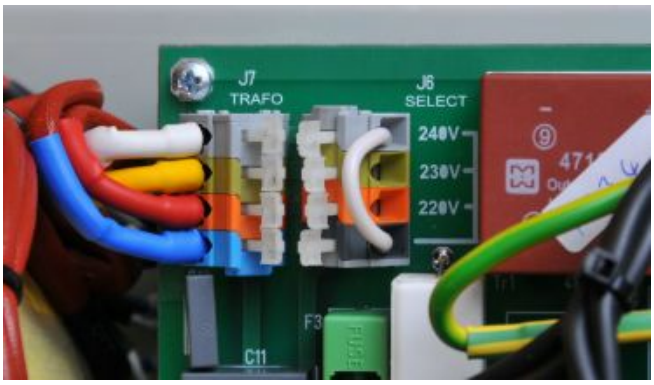
7.1. Primary AC voltage selection

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

Side view on the opened OM2000+



Remove the upper lid first. On the right side of the PA, next to the HV transformer there are two PCBs mounted. On the left upper side of the front (Switch-ON) board connector J6 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.

NOTE

AC selector range can be changed in the production according to the specific conditions in individual countries.

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.
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 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 to the correct location of individual sections and wires.

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

7.3. Block Diagram of OM2000+ Power Amplifier