Important safety instructions:

- The amplifier contains high voltage circuits. Never turn the amplifier on without the upper lid in place.

- The OM2500A amplifier is neither to be used in a wet or humid environment nor to be exposed to rainfall.

- 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 operation the upper lid and the vent grid of the amplifier can reach high temperatures that can cause burn injuries. Do not touch these parts of the amplifier during operation.

- The amplifier must be grounded during operation.

- During operation the amplifier must be installed in such a way that the rear power supplies are accessible.

- The amplifier can be operated only if both supply cables are connected. OM2500A reaches optimal parameters when it is connected to 2 phases.

- Do not turn the amplifier on without having connected the antenna. A hazardous HF voltage may build up on the antenna connector after turning the amplifier on with no antenna connected.

- Before opening the upper lid of the amplifier make sure that both power supplies have been disconnected for at least 5 minutes allowing the electrolytic capacitors to discharge fully. Never turn the amplifier on without the upper lid in place.

- Make sure that all screws holding the case together are properly in place and tied before carrying the amplifier by the handles.

- 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.
General description of the OM2500A Amplifier

The linear amplifier OM2500A is designed for all short wave amateur bands from 1.8 till 29 MHz (including WARC – bands ) and all modes . It is equipped with a ceramic tetrode GU84b. The OM2500A is automatically tuned to operating frequency of your TRX.

Specification of OM2500 A

- Frequency coverage: amateur bands 1.8 – 29.7 MHz including WARC
- Power output: 2500 W in SSB and CW 2000 W in RTTY, AM and FM
- Drive Power: usually 60 to 80 W for full Output Power
- Input impedance: 50 Ohm VSWR < 1.5 : 1
- Output amplification: 17 dB
- Output impedance: 50 Ohm unbalanced
- Maximum output SWR: 2:1
- SWR protection: automatic switching to STBY , when reflected power is 350W or higher
- Intermodulation distortion: 32 dB below nominal output
- Suppression of harmonics: < -50 dBc
- Tuning manual or AUTO
  - Response speed of AUTO less than 0,5s within same BAND
  - Less than 3s if out of BAND
- Supported TRXs-CAT ICOM, ELECRAFT, KENWOOD, TEN-TEC ORION, YEASU and Icom transceive protocol using by microHAM devices – CI-V OUPUT
- Tube: GU84b Ceramic tetrode
- Cooler: Centrifugal blower + axial blower
- Power supply: 2 x 230 V - 50 Hz one or two phases
- Transformers: 2 pcs of toroidal transformer 2,0 kVA
- Protection circuits: - SWR too high
  - Anode current too high
  - screen current too high
  - grid current too high
  - Mistuning of power amplifier
  - Hot switching protection
  - Soft start for protecting your fuses
  - “switch –on blocking “ at opened amplifier
- Bar graph indications: - Power output – bar graph 50 LED
  - reflected power – bar graph 20 LED
  - screen current ( Ig2 – bar graph 10 LED )
  - anode voltage, anode current, tuning – bar graph 30 LED
- LED indicators: grid current ( Igl – 2 LED )
  - WAIT – preheating of tube (180 sec )
  - STBY - standby
  - OPR – operating condition
  - FAULT – failure , switching off for abt. 2 sec
- OSD Indication LCD display 2x16 Characters
- Parameters: 485 x 200 x 455mm (width x height x depth)
- Weight: 40 kg
General Description of OM2500A POWER AMPLIFIER

HF PART
In this amplifier a tetrode GU 84b is used in a grounded-cathode circuit (input into control grid). This 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 grid, 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 short-wave 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 change.

Top view on the opened OM2500A

- Tetrode GU84B
- PWR meter
- Blower
- switch -on board
- Output Pi-L Circuit
- Tuning capacitor
- Power supply board
- Subpanel
POWER SUPPLY

Power supply of the amplifier is effected by two 2,0 kVA toroidal transformers. A soft start is realized with the help of relays and resistors.

The high anode voltage consists of 8 times 420V and 2A. Each of them has its own rectifier and filter. In the high voltage circuit safety resistors are employed to protect the amplifier against overload. The source for screen grid is stabilized by a parallel stabilization with BU508 transistors and delivers a voltage of 360V at 100mA. The -120V for the control grid is stabilized by means of zener diodes.

SAFETY DEVICES

Control and monitoring circuits ensure control and safety of the circuits of the device during malfunction of the PA. They are placed on the Control board, which is located on the subpanel.

Putting the power amplifier into operation

Coaxial cable

The output of the transceiver is to be connected with 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 this high power is to be used. For INPUT and OUTPUT PL-259-sockets with Teflon isolation are used.

Mains plug 1  Mains plug 2
Fuses
OUTPUT

REMOTE
I / O Interface
INPUT

Rear view of the amplifier
MAIN SUPPLY:

The amplifier is connected to the mains with 2 cables with a EURO end. Each cable is to be switched to another phase of your main supply system! Both of them have to be able to deliver a power of 2.0 kVA!
If you use only one phase, you have to connect both cables to this one phase! Your main supply has to be able to deliver 4 kVA on this one phase! In this case the power amplifier can’t deliver full output!

ATTENTION:

In each case the power amplifier has to be connected to your main supply system with 2 cables! Normally the amplifier is used with 2 phases. If there is only one phase - connect both cables to the single one!

Grounding

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 mm² at least. Connect your transceiver to the same grounding system of your shack carefully!
If you use a power amplifier with higher output you have to be aware that your grounding system works properly. All parts have to be grounded to the same system. Use short cables and make sure that there are good contacts! Otherwise you run the risk of damaging your equipment, having problems with TVI/BCI or your signal may be distorted.
REMOTE

Control of the amplifier is possible remotely by using REMOTE BOX (optional). Connection is done by REMOTE socket, maximum cable length of 10 meters.

I / O box

Control of Amplifier and communication with TRX as well as antennas / BPF switching can be done via I / O Interface

<table>
<thead>
<tr>
<th>KEY IN</th>
<th>Input signal PTT  (switching voltage / current 5V / 2mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY OUT</td>
<td>Output signal PTT (maximum switching of 30V / 50mA)</td>
</tr>
</tbody>
</table>

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 OM2500 A have to be switched earlier than HF is applied (cold switching). Modern transceivers have a time delay between PTT switching and power output.
If you are using and older transceiver or transmitters without time delay we recommend to connect the PA in such a way that the transmit/ receive switch 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 two safety devices, which ensure that the Output relay is not switched under power mistakenly (hot switching).
CI-V - Mono 3.5mm Jack for connection of ICOM TRXs. For successful operation selection of ICOM radio and correct baud rate is important (9600 default)

TCVR - DB-9 -serial port RS232 for YAESU and ELECRAFT TRXs. Correct baud rate and TRX type is a must for successful operation. If both CI-V and TCVR cables are used then CI-V wins over RS232. Otherwise selection of interface is done via TRX type.

PC - DB9 RS232 port is used for communication of your TRX with PC. Please use setting you would normally use as if using direct TRX – PC connection.

ALC - RCA-Phono – Automatic Level Control is used when tuning the PA to block drive level. WARNING!!! We recommend to use this feature mainly while operating RTTY, FM and other 100% duty modes.

CONTROL - DB15 connector for use of single cable between PA and TRX
PIN OUT:
1. ALC Out
2. NC
3. INHIBIT Control voltage
4. TX INHIBIT for Yaesu and Elecraft – this supersedes ALC output
5. NC
6. KEY OUT
7. NC
8. KEY IN
9. –
10. GND
**ANT & BPF SW**
- r DB-25 is used for switching of external HP BPF or external Antenna Switch. Maximum switching of 30V / 0.5A is possible.

**PIN OUT:**
1. antenna port 1  
2. antenna port 2  
3. antenna port 3  
4. antenna port 4  
5. antenna port 5  
6. antenna port 6  
7. antenna port 7  
8. antenna port 8  
9. antenna port 9  
10. antenna port 10  
11. COMMON port of ANT SW  
12. NC  
13. GND  
14. BPF 160m  
15. BPF 80m  
16. BPF 40m  
17. BPF 30m  
18. BPF 20m  
19. BPF 17m  
20. BPF 15m  
21. BPF 12m  
22. BPF 10m  
23. COMMON BPF port  
24. NC  
25. GND

**Cooling**

The centrifugal blowers provide the necessary cooling of the amplifier, even during long contests. The main blower is activated by switching the PA on and it is turned off when after-cooling is finished (approx. 1-5 min after switching off the PA depending on the temperature of the tube). The supplemental fan is turned on depending on the temperature of the air exiting from the amplifier. It is switched on at 70°C and switched off at 60°C.
Operation

Operating elements (see photo)

TUNE - Anode capacitor for tuning, tuning of higher frequencies to "0", Lower frequencies to „100“.

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

OFF - You switch off the amplifier by pressing this button.

ON - You switch on the amplifier by pressing this button. Heating of tube is on and after 3min of delay the amplifier will be ready for operation.

OPR/STBY - „OPERATE“ puts unit ready for operation. At STBY, if WAIT-LED is on or the amplifier is off your transceiver is in bypass-mode directly connected to antenna. Maximum 400 Watts!

RF OUTPUT - Bar graph – shows output power.

REFLECTED POWER - Bar graph – shows reflected power of the antenna. 350W maximum or amplifier switches to STANDBY-mode

Ig2 bar graph – measures the currency of the second grid in the range from -20mA to +80mA

HV/IP/TUNE bar graph – measure the anode voltage, anode currency or tuning of the amplifier
INHIBIT – indicates interruption of operation during the tuning process of the PA. If indicated by RED LED then PA is in STBY mode. If retuning within same BAND then PA will retune according to QRG of TRX. When changing the BAND – INHIBIT will stay lid till KEY IN is triggered for even short period and tuning process will start. After that PA is automatically ready for operation.

ANT, ANT1, ANT2 – PA is capable of automatic antenna switching (ie. 80m CW and 80m SSB can be split between two antennas. PA will automatically select desired antennas by selecting last used antenna on given frequency.

SET - button for:
- MAIN MENU
- Confirmation of selection
- Saving of selected value
- Saving of tuning parameters

TUNE - selection of TUNE mode
AUTO - selection of Automatic mode
MAN - selection of manual mode
DWN / UP - selection of band, segment or parameter

Configuring and Operating the OM2500A Power Amplifier

When the button ON is pressed, amplifier will start and will heat the ceramic tube. While this is being done, PA will have STBY and WAIT LED lid on. If there is TRX connected to the correct port and all communication settings are right correct operating frequency and AUTO with type of transceiver will be indicated on the alphanumeric display. After successful heating of the TUBE (3 mins) you can enter operating mode by pressing the OPR button.
Example of AUTO mode using ICOM TRX

Example of AUTO mode using Kenwood TRX
For communication with TCVRs, that are not supported by OM2500A as for example JST-245 and older types of Kenwood an external IF-232 converter is to be used. You can use universal products of microHAM https://www.microham.com as MKII, MK2R+ etc., which process information about the frequency in ICOM format through the CI-V output. Then the PA will be connected in the following configuration: JST-245<> DB37- JST-245 cable <> MKII ( or other device from microHAM , which has a CI-V output ) <> PC , OM2500A is connected to the CI-V output of a microHAM device.

Example of communication

![Example of communication](image1)

If TRX is not connected or communication settings are incorrect the message COMMUNICATION LOST will be displayed. You can still use PA by entering MANUAL mode (MAN Button) or by fixing the communication problems

Example of Communication loss message

![Example of Communication loss message](image2)
**TRX support settings**

Press SET button and scroll using UP / DWN to CHOOSE TCVR

Confirm CHOOSE TCVR by pressing SET again and scroll UP / DWN to desired TRX Type. Confirm the selection by pressing SET.

Continue by selecting Baud Rate

Below – Baud rate for TRX – PA communication displayed by OSD

By scrolling UP / DWN select desired Baud Rate which must be same as baud rate used by connected TRX. (please refer to your TRX user guide) To confirm your selection press SET. When using Yaesu TRX you need to configure STOP BITs parameter and confirm selection with SET.

Communication settings menu can be left by pressing AUTO by pressing the AUTO button PA will enter AUTO mode but only if all settings are correct and connection has been established. You can check if correct frequency and TRX type has been displayed on OSD.
Example of connection for Icom
Example of connection for ELECRAFT
Example of connection with Yeasu
Antenna Switching Menu

If you have 3rd party external antenna switch connected to PA (i.e. Microham TEN SWITCH) you need to configure assignment of each port to specific band/antenna. By pressing SET and scrolling to ANTENNA SETTINGS and confirming by SET you get current band and its antenna selection. By scrolling UP / DWN you can select BAND which you want to assign to current ANTENNA selected.

Then we select how many antennas we want per current band (1 or 2) always confirm your selection by pressing SET. The by scrolling UP / DWN you assign which PORT is used on your external antennas switch for this particular antennas. (ANT 1 ON PORT 01)

Shall you decide to use 2 antennas for this band then after confirming that with SET configuration continues to other antenna selection / port selection. To finish Antennas switch configuration you can either press AUTO or MAN.
Example of connection with antenna switch and BPF
**Bandpass filter switching**

Switching of external band pass filters is automatic and needs to follow pin out of BPF connector. For more see section ANT & BPF Switching

**Loading factory default settings**

In rare case of need to restore factory default settings press SET and scroll using UP / DWN to LOAD DEF VALUES and confirm by SET.

Then we select if want to erase all settings (pressing TUNE) or just one settings parameter (SET button). In case we are defaulting just single parameter use UP / DWN to select which option and confirm by SET.
Example for connection with another accessories, for example USB micro KEYER II with IC7800 and IC7700.
Example for connection with another accessories, for example USB micro KEYER II with another Icom’s.
Example for connection with another accessories, for example USB micro KEYER II with Yeasu and ELECRAFT
Example of connection PA with Microham MKII, (MK2R+ etc) with CI-V output
Configuring the MUTE option

When operating PA with Icom TRX without TX INHIBIT for disabling TX we recommend blocking of the TX while tuning using ALC control. (mainly while operating FM / RTTY / AM) ALC Input of your TRX needs to be connected to ALC Out of OM2500A. Using SET and scrolling UP / DWN we select SET MUTE and confirm it by SET. Then we configure MUTE LEVEL for each band so it results in no power being transmitted by TX when performing TUNE procedure.

LCD Settings Menu

By pressing SET and scrolling UP / DWN and selecting LCD CONTRAST (Confirming by SET) and pressing Up or DWN we can set Level on Contrast. After we are happy with the result we confirm the setting by pressing SET.

Operating in MANUAL mode
To enter Manual mode of the PA please press MAN. By pressing MAN repeatedly you select BAND and band’s segment. You can control the segment or band by scrolling the UP / DWN buttons.

TUNE

OM2500A has been design to deliver maximum output power at 50 Ohms load. To deliver maximum output to real load you need to adjust the tuning according to your real antenna impedance.

Entering the TUNE mode is done by pressing the TUNE button. OM2500A then switches the TRX to RTTY and sets the frequency to corresponding segment. By changing the values of TUNE and LOAD capacitors we tune the PA as per manual tuning instructions (below in next part of manual) Optimally tuned PA delivers full output without reaching maximum Screen Current of 30mA!!!

After tuning the PA we save the settings by pressing SET and PA will automatically tune frequency of TRX to next band segment. Follow the same procedure for all bands and segments if needed.

By pressing MAN or AUTO buttons PA and TRX will return to standard operating mode.

<table>
<thead>
<tr>
<th>Band (MHz)</th>
<th>1.8</th>
<th>3.5</th>
<th>7</th>
<th>10</th>
<th>14</th>
<th>18</th>
<th>21</th>
<th>24</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of the segments (kHz)</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

TUNING

The OM2500A amplifier is operated in class AB. Thus it’s possible to obtain a maximum output power at an excellent linearity. For this purpose the amplifier has to be tuned carefully. The operation of a mistuned PA will cause malfunctions, the increase of grid current (the GRID-MAX-LED will light up) and problems with TVI/BCI.
The grid-current is shown with 2 LED diodes. It’s normal if the green LED is flashing or may be shining a little bit during peak operation. If you overload the amplifier the output power increases the grid current at very small rates and the red GRID-MAX-LED is shining and the safety devices switch the PA to STBY. You must decrease the input power. In SSB you will have a good output power if the green LED lights up a bit. The current of screen grid is measured and shown in a Bar graph indicator. The amplifier has to be tuned in such a way that the current is between - 20 mA to +50 mA. At currents beyond these values the operating point will be shifted and IM-products will be rapidly increased. If a value of + 70mA is exceeded, the safety devices will switch the amplifier to STBY mode.

Tuning instruction:

Please note:
Before starting tuning you have to check if the right antenna or a 50 Ohms load resistance is connected at the antenna output!

Switching on the amplifier:

- put the switch at the multimeter to HV position
- put the OPR/STBY switch to STBY position
- press the „ON“ button

The amplifier is prepared for operation with the following steps:

- the toroidal transformers are switched step by step.
- the blower of tube is switched on.
- the multimeter bar graph measures the high voltage; the normal value is 2.8 kV
- the WAIT LED lights up

After switching on you have to check the functioning of the blower. Air must be blown out of the ventilating apertures above the tube. (If there is any failure you have to press the „OFF“-button immediately!)

Heating the tube takes about 150 seconds. After this time the WAIT LED goes out and the amplifier is ready for operation.

Tuning the amplifier to an output of 2000 W

OM2500A will tune automatically to either TRX frequency via CAT interface or by frequency sampled by PA.

1. Reduce the power output of your transceiver to the 0.
2. Switch OPR/STBY to „OPR“ position (OPR LED lights up)
3. Choose TUNE position of multimeter.
4. Switch the PA and increase driver power to 10W (OUTPUT power will be abt. 500W)
Please note!

If the input power is higher than 15 W and the power amplifier is not correctly tuned, the safety
devices will switch to STBY.
After switching the amplifier to PTT, the amplifier will automatically reset and switch back to OPR
mode after approximately 2 seconds.

5. Set TUNE in such a way, that the TUNE-LED lights up maximum left.
6. Set LOAD in such a way, that the TUNE LED on the TUNE scale lights up under
the “V” sign. If it is possible to obtain the LOAD in 2 positions, set the position
that is father to the right.
7. Repeat tuning several times according to 5 and 6.
8. Increase the input power until an output power of approximately 2500 W is reached.
9. Repeat steps 6 and 7
10. Set TUNE to maximum output power

After this procedure the amplifier is tuned correctly and ready to give 3500W output power in all
operation modes. At optimal tuning and full output power a positive 50mA voltage goes through the
second grid. On 24 and 28 MHz bands optimal tuning can be achieved when one or two LEDs are lit
up to the left from the position “V”. If less output is desired you can simply decrease the load of the
transceiver.

Please note: Should the amplifier demonstrate any malfunctions during
tuning or should it not behave in accordance with the description,
interrupt the tuning procedure immediately and check the amplifier!
Be sure to have not done any mistakes in choosing bands or TUNE/LOAD
values!
Be sure that SWR is not higher than 1:2 and input power is LOW!
After excluding human mistakes you will be able to work for long time with
this amplifier!
**Indication of fault conditions**

OM2500A has the following indication LED on the front panel:

- **GRID MIN**: indication of first grid current
- **GRID MAX**: max. First grid current exceeded
- **HV**: measuring of anode voltage by bar graph
- **IP**: measuring of anode currency by bar graph
- **FAULT**: fault
- **OPR**: amplifier in operation mode
- **STBY**: amplifier in standby mode
- **WAIT**: heating of tube after switching on the amplifier

Should a fault condition appear during the tuning or operation of the amplifier the safety circuits of OM3500A will react. The amplifier will be turned to STBY mode. After approx. 1 sec the control circuits will switch the amplifier back to OPR. If the fault will repeat 3 times after each other the control circuits will turn the amplifier to STBY. Bringing the amplifier to OPR is enabled by using the OPR/STBY switch.

After the reaction of safety circuits the FAULT LED will be lit up for approx. 5 sec depending on the nature of the fault.

**Flashing LED signalizes:**

- **IP**: anode currency exceeded
- **HV**: low anode voltage
- **FAULT**: reflected output exceeded
- **GRID MAX**: first grid currency exceeded
- **screen grid currency exceeded**
- **GRID MAX + HV**: maximum load power exceeded
- **GRID MAX + IP**: zero output power during tuning
- **HV + IP**: tuning fault, incorrect tuning of the Pi-L output circuit

**In case your OM2500A amplifier is not working correctly, please contact the manufacturer or your distributor,**

**Manufacturer’s contacts:**  **OM POWER, s.r.o.**

930 30 Báč 126
SLOVAKIA

e-mail: ompower@nextra.sk