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# QUICK START MANUAL

## **SOLID STATE HF/VHF LINEAR AMPLIFIER 1.8 - 54 MHz**

### ***RFpower* model HVLA700Q**

**- Manual for any QRP transceiver -**



## SUMMARY

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## INTRODUCTION

Thanks for the preference granted us in the purchase of our solid state HF/VHF linear amplifier model HVLA700Q (in succession called amplifier). The professional construction, the use of selected and oversized components and the technical solutions adopted make it a high quality product, accurate and reliable during the time. We recommend a suitable use of this amplifier and only for high distance links.

Finally, we advise to read this manual before operating this equipment.

This manual may be subject to changes and updates.

## GENERAL DESCRIPTION

The amplifier covers all the amateur bands from 1.8 MHz to 54 MHz and all the operative modes. Its peculiarities can be summed up in: no warm-up, no tuning operations, low consumption, noiseless and lightweight. It can be piloted by every type of QRP transceiver (also vintage). The absence of a software does not diminish the quality of the amplifier, on the contrary, it protects it from all the problems due to the software time response, however short they are, are sometimes source of serious damage.

It is composed by these circuits:

-Active input match/attenuator to protect, in a very effective way, the amps in case you exceed the drive power.

-Power amplifier stage push-pull AB class type composed by 4 X VRF151 RF Power Vertical Mosfet chosen for their robustness, resistant to high impedance mismatches and low Intermodulation Distortion (IMD).

-Output filters it is the only amplifier, built with high quality components planned for having a high suppression of the unwanted emissions (harmonics and spurious frequencies).

-ALC circuit essential for reduce the drive power level in the case the output power of the amplifier get to values that produce distortion. It works also when we are in the presence of an excessive level of antenna SWR.

-Protections that, thanks to the high quality of the "directional couplers" used, protect the amplifier in case of wrong change of the filter band, excessive VSWR, open antenna and short circuit antenna. The temperature sensors preserve the RF power Mosfets from excessive thermic stress and "shift" in the working class of the amplifier.

-Power supply of switching type, oversized, no "noise" and equipped with "Power Factor Corrector" circuit according to the new European Rules on energetic efficiency.

## TECHNICAL DATA

-Frequency Coverage:	1.8 to 54 MHz (all amateur frequencies)
-Operation Mode:	All modes
-Filter Bandswitch:	Manual
-Nominal Drive Power:	10 watts
-AMP Input VSWR:	1.5:1 max.
-Protection Output VSWR (typ.):	2:1
-Output Power:	700 watts - SSB-CW : do not exceed the output power level of 600 watts and 500 watts (VHF); - RTTY : do not exceed the output power level of 300 watts; - AM : do not exceed the output power level of 150 watts.
-Output Filter:	Low pass type
-Output Filter Band:	160 – 80 – 40 – 30/20 – 17/15 – 12/10 – 6 meter
-Harmonics Suppression:	HF = better than -50dB VHF = better than -60dB
-Third Order IMD:	-32dBc
-IN/OUT Impedance:	50 ohms unbalanced SO-239 connectors
-ALC:	Adjustable negative going level -5VDC (10Kohms)
-PA Transistor:	VRF151 MICROSEMI RF Power Vertical Mosfet
-Amplifier Circuitry:	Push pull AB class
-Cooling:	Quiet variable speed forced air cooling by built-in dual ball bearing fan
-RX/TX Switching Time:	Lower than 10ms
-Switching Power Supply Protections:	Short circuit, overload, over voltage, over temperature
-Protections:	High antenna VSWR (over 2:1), wrong band, input overdrive, over temperature
-AC Power Supply Range:	90 VAC to 260 VAC 50/60Hz
-Power Rating (max.):	1500 VA
-Power Line Fuse:	2 x 10 A (5x20 fast type)
-Color:	Black
-Dimensions:	37 x 36 x 19 cm - 14.5 x 14.2 x 7.5 in (L x D x H)
-Weight:	11 Kg (24,25 lb)

## PACKING

After removing the amplifier from its packing, that you have to keep conserved, verify carefully that it hasn't suffered damage in consequence of transport; in that case contact us immediately.

## DISLOCATION

Place the amplifier in a way that all the controls are easily accessible and put it in a place far from sources of heat. Is very important that the air circulates plentifully on every side of the amplifier setting it therefore far from other objects.

## GROUNDING

To avoid electrical shocks, RF and/or TVI interference, we advise you to connect the amplifier to a good electrical safety ground with the proper terminal labeled "GROUND" placed on the back. The connection has to be as much short as possible and with the suitable section. Do not connect with gas and water mains, radiators and/or metallic structures. You must always connect the "GROUND" of the amplifier to the "GROUND" of the transceiver.

## ELECTRICAL CONNECTION

IMPORTANT: verify that the AC socket and the relative power line are according to law and that they have the minimum characteristics to deliver the maximum power required by the amplifier.

## CONNECTIONS

a) Connect, with a quality 50 ohms coaxial cable headed with PL259 connectors, the antenna SO-239 connector of the transceiver to the SO-239 connector labeled "RF IN", placed on the back of the amplifier.

b) Connect the antenna, with a quality 50 ohms coaxial cable headed with PL259 plug to the output SO-239 connector labeled "RF OUT" placed on the back of the amplifier.

NOTE: In order to verify constantly the efficiency of the amplifier and of the antenna system, we recommend to use a good "VSWR-Wattmeter" instrument connected to the antenna and to verify that, coaxial cable and antenna, are able to bear the maximum power delivered by the amplifier.

c) Connect, with a shielded audio cable, the ALC input of the transceiver with the female RCA jack labeled "ALC OUT" placed on the back of the amplifier.

d) Connect, with a shielded audio cable, the output of the transceiver dedicated to the drive of the linear amplifier with the female RCA jack labeled "RELAY" placed on the back of the amplifier.

NOTE: the switching occurs closing to ground the input and it can be done through a electromechanical contact (relay) or by a signal with to ground going level; refer also to the user manual of the transceiver.

e) Connect the power cable to the AC socket verifying that the voltage value corresponds to the one of the amplifier.

## OPERATION

- a) Turn ON the amplifier operating on the switch placed on the back of the amplifier; the green LED labeled "POWER ON" placed on the frontal indicating the "stand-by" position of the amplifier will light.
- b) Rotate the frontal switch labeled "FILTER BAND" so that the work band of the filter coincides with the band in which you intend to operate; each band is marked with the lighting of the respective green LED placed on the frontal.
- c) Rotate the frontal switch labeled "STBY-RTTY-SSB" from the "stand-by" position of the amplifier to the working position marked by the lighting of the green LED labeled "OPERATE" placed on the frontal.  
NOTE: The frontal switch labeled "STBY-RTTY-SSB" is a three position switch:  
The first position is a "stand-by" position;  
The second position is recommended when the amplifier work in "RTTY" mode;  
The third position is recommended when the amplifier work in "SSB-CW" mode.
- d) At this point, the amplifier is ready for the use and, every time that you will go in transmission with the HF apparatus, the green LED labeled "ON AIR" placed on the frontal will light.

To turn OFF the amplifier is sufficient to operate again on the switch placed on the back of the amplifier.

### ON THE DRIVE POWER

Premise that is possible to operate with minimum drive power levels, it is recommended to adjust the drive power in such a way as not to exceed the output power level, by emission mode, as indicated on page nr. 4 of this manual.

### ON THE FILTER BAND SWITCH "FILTER BAND"

In the case in which you select a wrong band, two situations can happen:

- 1) if the selected filter cut-off frequency (or correspondent band) is lower than the one of the transceiver, the protection will immediately intervene;
- 2) if the selected filter cut-off frequency (or correspondent band) is higher than the one of the transceiver, the protection will not intervene and there will not be any damage to the amplifier, but you will have an emission full of unwanted harmonics contents.

**NOTE: WHEN YOU ARE IN TRANSMISSION, DO NOT ABSOLUTELY OPERATE ON THE SWITCH.**

### ABOUT THE "AUX" POSITION OF THE FILTER BAND SWITCH

This function is not active.

#### ON THE ALC REGULATION "ALC LEVEL ADJ"

On the back of the amplifier you find a knob labeled "ALC LEVEL ADJ" (in succession called knob) which serve for dosing the negative ALC voltage that has to be sent to the HF transceiver; seen that a specific voltage does not exist, we recommend to operate in the following way:

NOTE: transceiver initial settings = BAND: 20m - MODE: RTTY or FM - PWR OUT: 8 watts

- 1) Rotate completely the knob anticlockwise (as by factory).
- 2) Insert a good "Wattmeter" instrument at the output of the amplifier, make operative the amplifier with a drive power of 8 watts and take note of the output power.

NOTE: we recommend to use a 50 ohms dummy load at the output of the amplifier; in alternative, the antenna must present a VSWR value as lower as possible (ideal 1.1:1).

- 3) Set in "stand-by" the amplifier.
- 4) Set the output power of the transceiver at 10 watts.
- 5) Make operative the amplifier and regulate the knob clockwise until you read on the Wattmeter a output power corresponding this one to a drive power of 8 watts.
- 6) Set in "stand-by" the amplifier.
- 7) Set the drive power of the amplifier, by emission mode, to the desired value.

NOTE: if you note a delay in the output power, adjust the knob anticlockwise still.

The regulation is done and now you can remove the Wattmeter.

NOTE: The yellow LED labeled "ALC" placed on the front provide an indication the ALC working.

#### ON THE PROTECTION "ALARM"

When:

- a) the frontal switch labeled "FILTER BAND" is placed in a wrong working band;
- b) the antenna system shows a high VSWR value (more than 2:1), open antenna or short circuit antenna;
- c) the input drive power is more.

the protection will immediately intervene signaling, with the lighting of the red LED labeled "ALARM" placed on the frontal, the happened anomaly.

After checking and solved the cause, operate on the frontal switch labeled "STBY-RTTY-SSB", to restore the normal operation of the amplifier.

#### ON THE PROTECTION "OVER TEMP"

When:

- a) the duty cycle and/or the operative mode of the amplifier is particularly intense and/or heavy;
- b) the drive power is excessive;
- c) you do not use the ALC circuit;
- d) the antenna system has a high VSWR but no able to make intervene the protection;
- e) the ambient temperature, in which the amplifier works, is particularly high;
- f) the air apertures are, in some ways, obstructed;
- g) the amplifier has not abundant air circulation in all the sides;
- h) there is a damage in forced air cooling system;

the protection will immediately intervene signaling, with the lighting of the red LED labeled "OVER TEMP" placed on the frontal and the contemporary switch OFF of the green LED labeled "OP" placed on the frontal, the happened anomaly putting the amplifier in the "stand-by" position.

When the temperature reaches its normal values, the amplifier will automatically return in operation.

