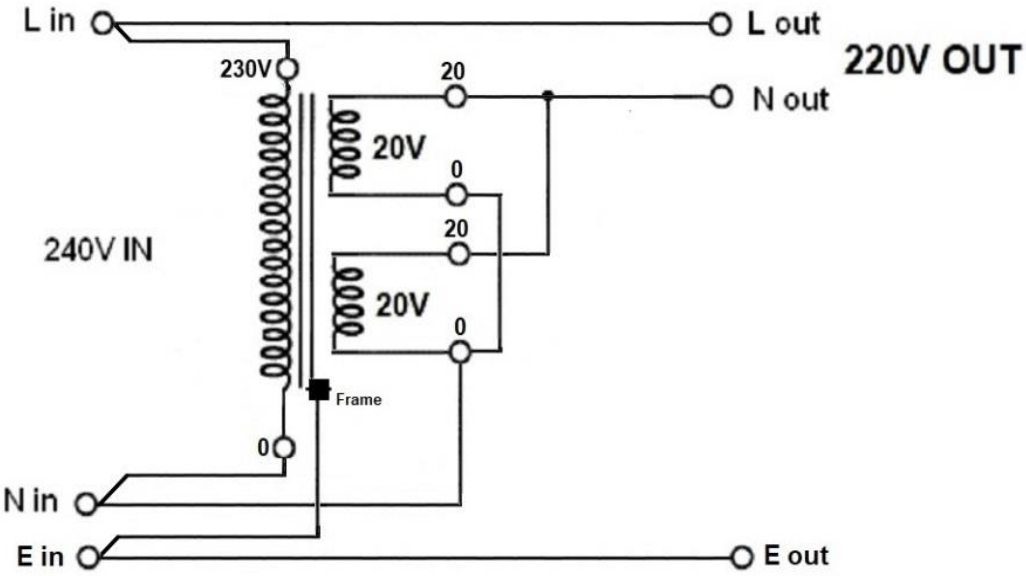
LES 'BUCK' BOX

Contents

INTRODUCTION

This is a box to help 220V designed Chinese equipment to operate on the UK mains supply which can be between 240 – 250V.
It was primarily designed to operate the Authors Yaqin MC100B power amplifier, the circuit is quite simple.



The most amazing part is how it takes the filament voltages down from a very unsatisfactory 7+ Volts to a more acceptable level around 6.3V. As a result the bias has to be readjusted as the output valves (KT88's) will be running with less Anode/Plate current than before.

The relief on the Cathode to Heater insulation must be substantial; it cannot be measured except in the fact that output valve failure seems to be very much reduced.

Construction is best left to the individual as some parts may be in the proverbial spares box.
The Author used a RS 20V 50VA transformer, stock number 504-628, this being 79L x 65D x 62H with 92mm fixing centres. The box chosen was a Camden Boss BIM2006/26-GY/GY (RS stock 505-577), it measures 190 x 110 x 90 so plenty of room inside for wiring.
Adding four rubber feet is recommended as they protect the bottom from causing scratches and also allow the use of Pan Head screws for a more reliable transformer mount.
Choice of power connections is also left to the individual; you could have a cable gland at both ends of the box or have a plain or fused IEC plug for input. RS in the UK supply a 5 metre length of 3-core cable with a IEC socket at one end and this was useful in enabling the Buck Box to be mounted down at floor level. The drawings in this document just show what the Author did; he adopted the usual output circuit of placing the 20V winding in the Neutral line as it relieves the low voltage winding from the full line voltage. It also ensures that a heavy fault current to Ground will not place undue strain on the transformers 20V winding as there is a direct path link between the fault and the supplies safety fuse.
The drawings adopted by the author are on Page 4, note that the supply input can be either through a fused or non-fused input connector, the non-fused version would be most suitable for UK supplies where a protection fuse is mounted into the plug connecting to the mains supply.

POST FITTING REMARKS

As mentioned on Page 2, you will notice that the bias voltages will be significantly lower than what you had the amplifier set to when it was being over-driven.
So reset your bias voltages, the Author found his Yaqin 100B was almost 100mV lower than when the KT88 heaters were being run at over 7 volts!

PARTS LIST

Qty.	Ref.	Description	UK supplier
1	Item 1	Camden Boss 2000 Grey, BIM2006/26-GT/GY, 190 x 110 x 90mm	RS COMPONENTS 505-577
1	Item 2	Power input, C14, non-fused. Alternative straight fused input	RS COMPONENTS 811-7207 RS COMPONENTS 811-7213
4	Item 3	Rubber Foot, (set of 4)	CRICKLEWOOD FTR194
1	Item 4	Power Transformer 230V Primary, 2 x 20V 25VA Secondary's	RS COMPONENTS 504-628
1	Item 5	M16 Cable Gland with Locknut	RS COMPONENTS 669-4667
1	-	5 Metre Cable with IEC power connector	CRICKLEWOOD LEU5V
A/R		Nuts/Bolts/Washers for Items 2, 3 and 4.	

PARTS COST AS AT 21st JUNE 2022.

Ref.	Description	UK supplier	Inc VAT
Item 1	Camden Boss 2000 Grey, BIM2006/26-GT/GY, 190 x 110 x 90mm	RS COMPONENTS 505-577	£16.68
Item 2	Power input, C14, non-fused. Alternative straight fused input	RS COMPONENTS 811-7207 RS COMPONENTS 811-7213	£0.94 £2.83
Item 3	Rubber Foot	CRICKLEWOOD FTR194	£4.80
Item 4	Power Transformer 230V Primary, 2 x 20V 25VA Secondary's	RS COMPONENTS 504-628	£25.78
Item 5	M16 Cable Gland with Locknut	RS COMPONENTS 669-4667	£4.93
-	5 Metre Cable with IEC power connector	CRICKLEWOOD LEU5V	£7.90

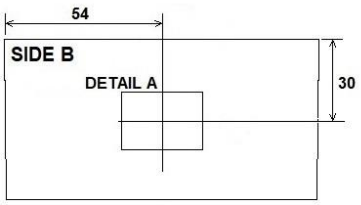
Total Cost £61.03

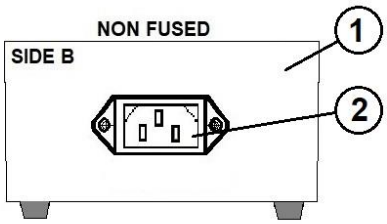
No doubt other savings can be made by careful search of places like eBay.

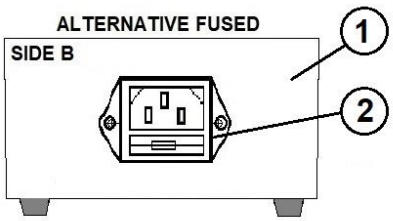
Demo of the box in action:- http://www.g4cnh.com/public/100B_With_Buck_transformer.mp4

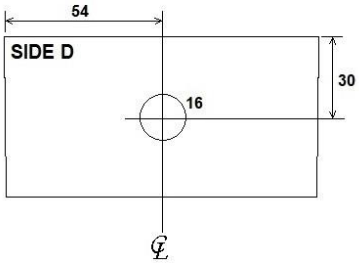
You may wish to fit a filtered Input connector or add an output socket such as the Farnell 8117193. If you fit the latter then you will need an IEC Plug fitted to the output cord e.g. Farnell 7769113.
The Author has constructed a filter Les Buck Box, see Page 6.

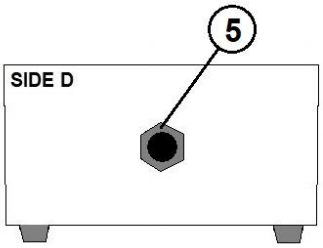
BOX DRILLING AND ASSEMBLY

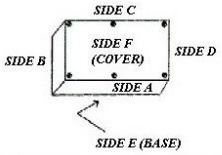




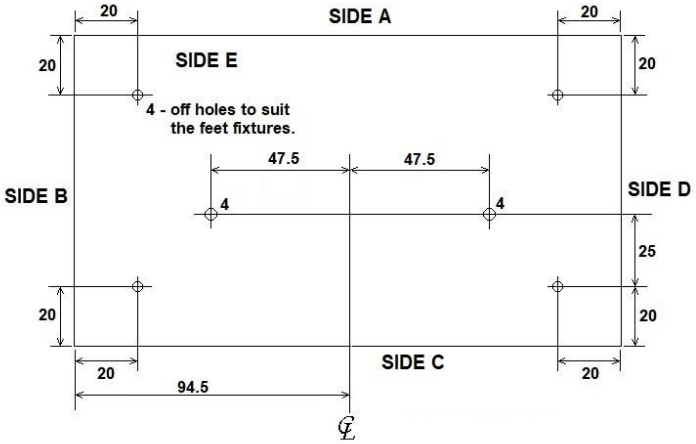


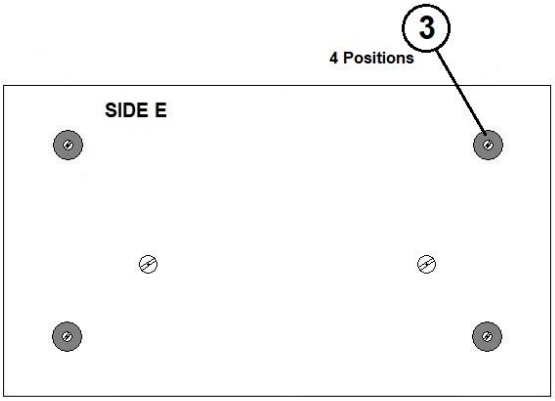




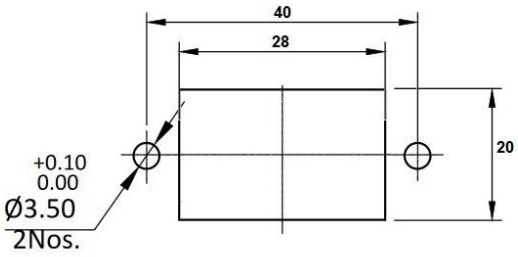


BOX SIDE IDENTIFICATION DRAWING

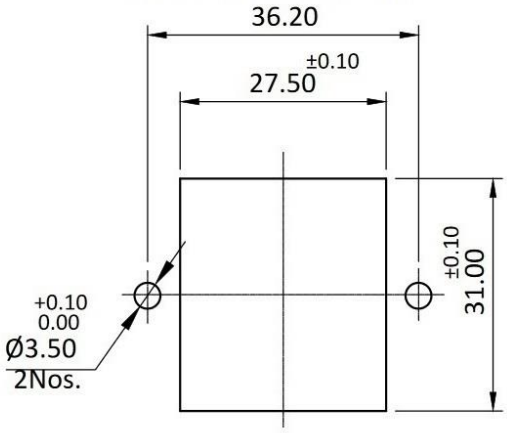




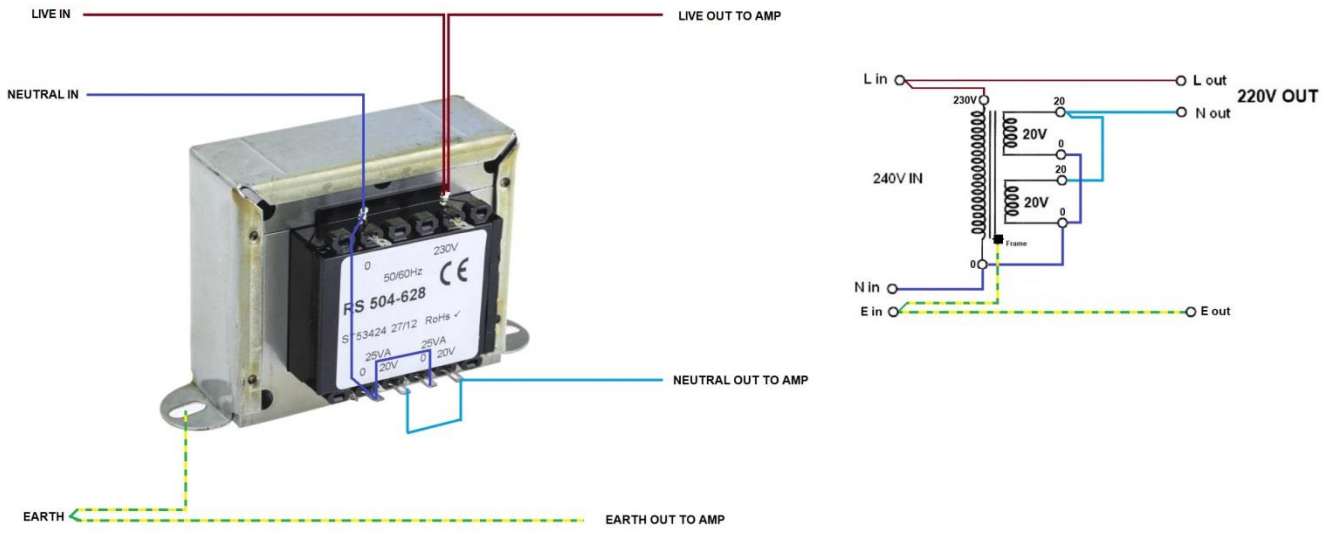
DETAIL A - NON FUSED



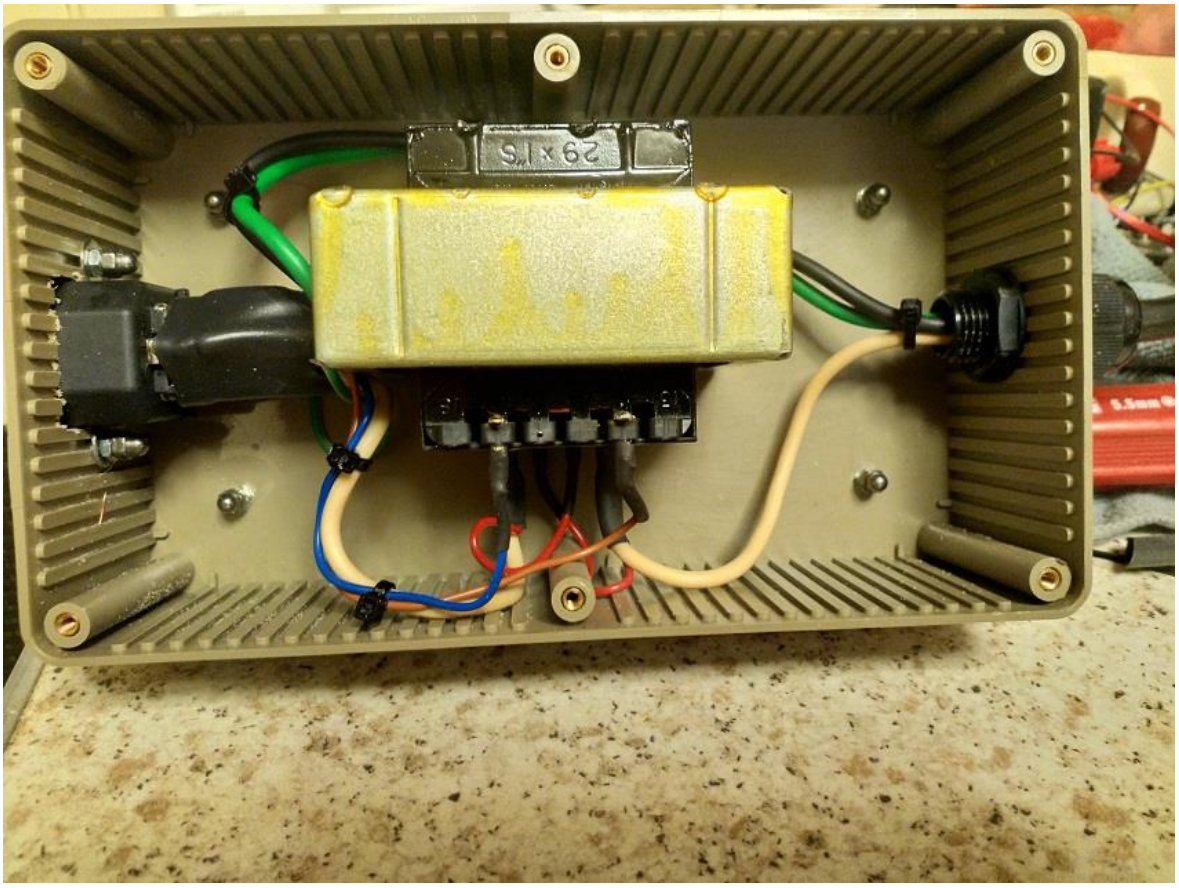
DETAIL A - ALTERNATIVE FUSED



ADDITIONAL SKETCH THAT MAY AID TRANSFORMER (ITEM 4) WIRING.



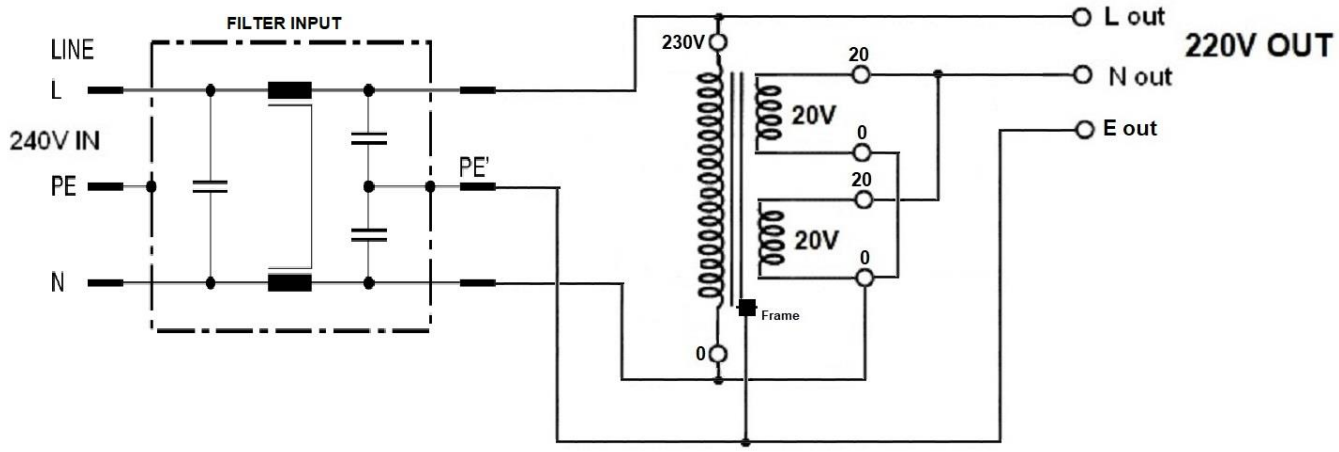
For folks in the U.S.A.
It is doubtful that the problem of over voltage exists in the USA as it does in the U.K. where 20 to 30V above 220V can sometimes be seen. Percentage wise this would probably equate to something like 120 to 125V being applied to the 110V input of the amplifier.
For the same 9% over-voltage (120V) on the 110V setting, this would need a reduction of 10V.
Now Transformers for 10V are a bit tricky to find so maybe 9V ones will do the job?
If your mains power is higher at 125V then a 15V should take it down to 110V.
Wiring will be the same unless you are using a dual 115/230V Primary Transformer whereby the two 115V windings are wired in parallel rather than in series when used on 230V supplies.



LOOKING FOR A BUCK BOX WITH A POWER LINE FILTER?

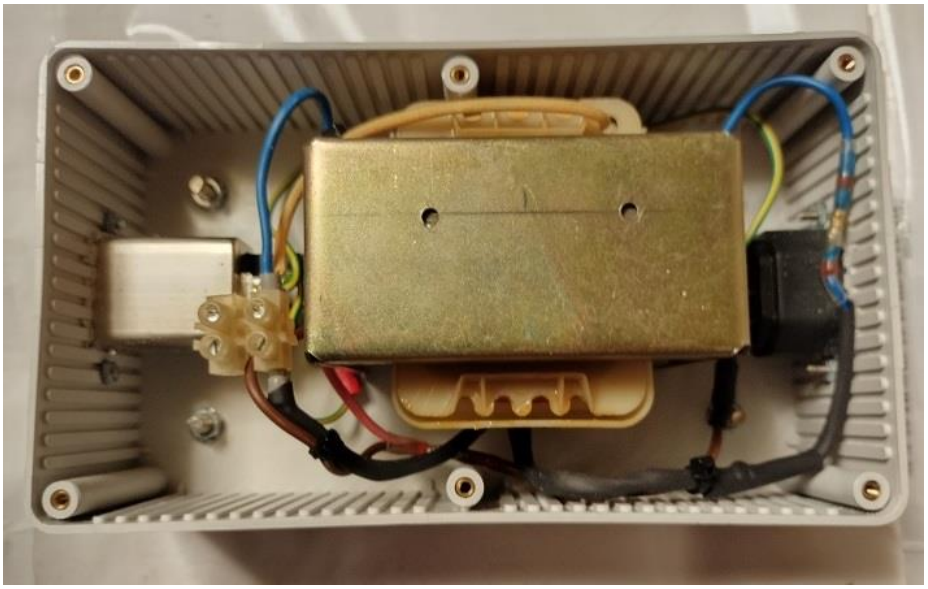
A spare 20V high current transformer came along, having been rescued from an old CB Power Supply.
At first it was felt that it would be too large but the Author decided to have a go anyway and at the same time introduce an in-line power filter and all connections via IEC plugs and sockets. The power filter used (Item 6) was an EPCOS B84771, 6A and has its own IEC C14 input.
An IEC C15 Output socket (Item 7), as often fitted to P.C.'s, would suffice for the amplifier connection.
A ready-made 2 metre cable connects the Buck Box to the MC100B or whatever you are protecting.

The new circuit is thus:-



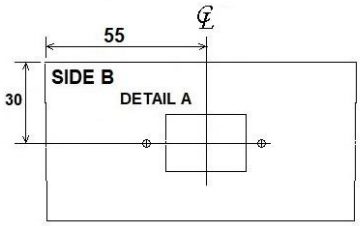
It is <u>not advisable</u> to use 0.25" push-on connectors due to space limitations.

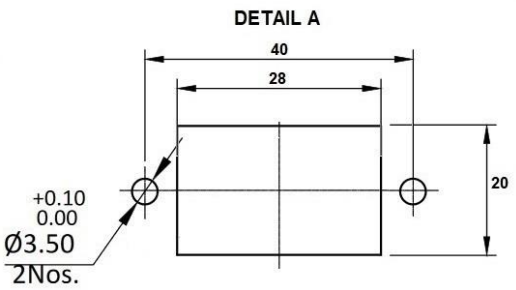
Direct solder connections with some suitable heat shrink tubing was found to be OK.
Because of the difference in depth of the filter and output connectors, the following drill/assembly drawing on Page 7 was drawn up. It just means the transformer has to be shifted 15mm to give more space for the filter connections, whilst leaving sufficient for the output connector**.**

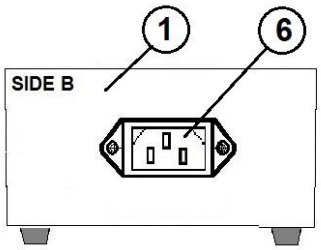


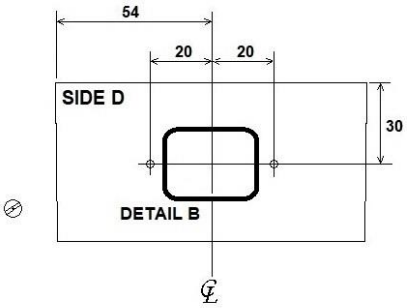
Note: This was a one-off using a scrap CB PSU Power transformer but having similar Size and output rating.

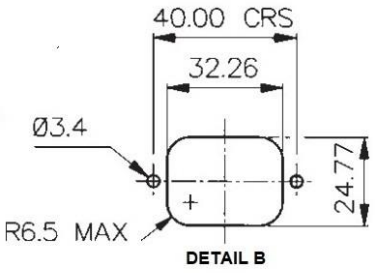
DRILLING FOR THE FILTERED LES BUCK BOX.

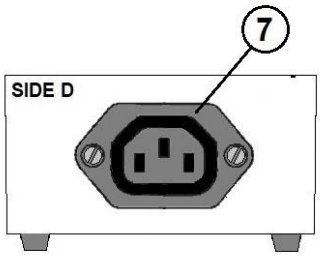


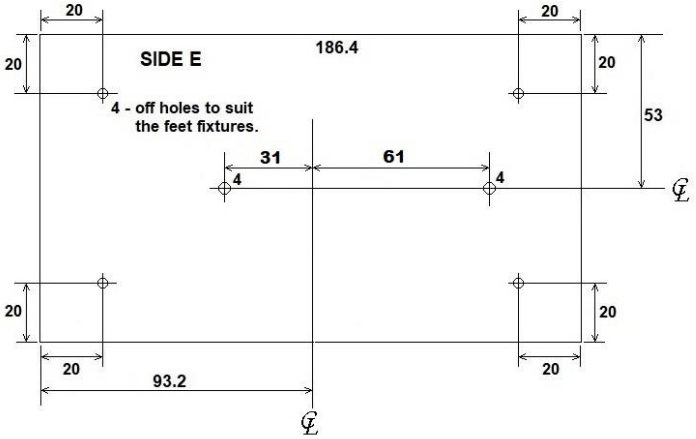


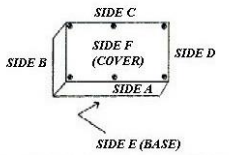






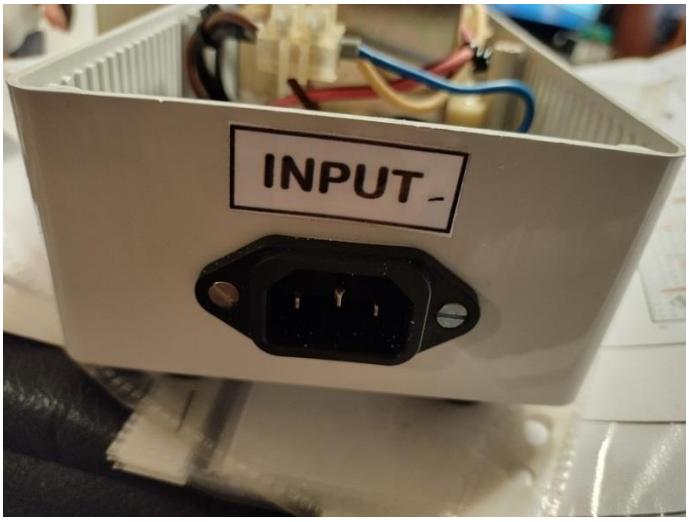


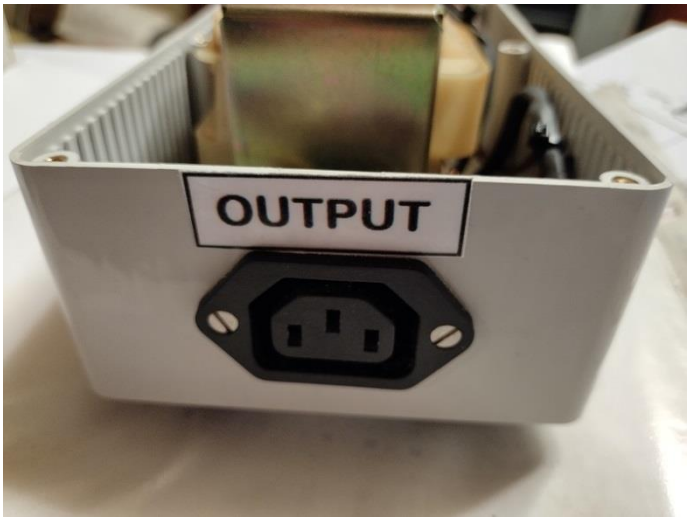




BOX SIDE IDENTIFICATION DRAWING

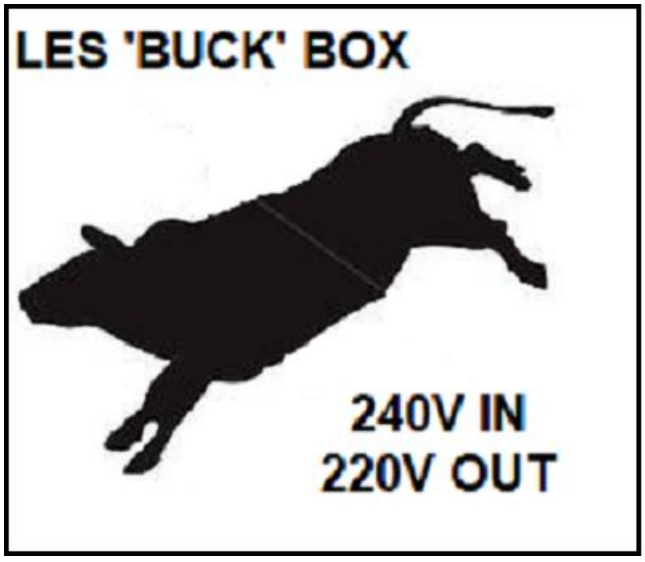
SIDE B AND SIDE D

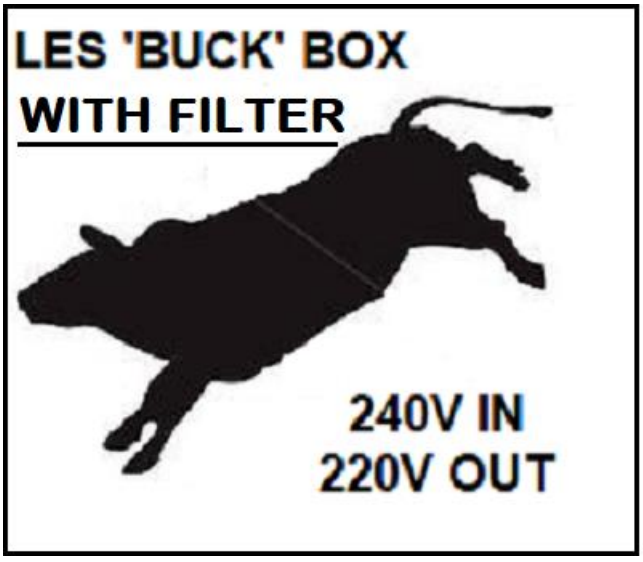




COMPLETE

TYPICAL LABELS





INPUT

OUTPUT