CONVERTER CIRCUIT

The NEW ENGINEERING Power Converter converts 220 volt AC power into 12 volt (or 12 and 24 volt) full-wave rectified (pulsating) DC power. This is accomplished using a heavy duty (3KVA) 24 Volt center tapped transformer and large power rectifiers The rectifiers are rated at 275 amps and 400 PIV and are mounted on fan-cooled aluminum heat sinks.12 volt power is attained using a standard 2-rectifier, center-tap circuit and works as follows .... (refer to drawing).....

As the "B" output of the transformer secondary coil reaches maximum negative voltage, the center tap "C" is 12 volts positive (with relation to the "B" out put) The "A" output is now 24 volts positive in relation to the "B" output. If a load is connected across the main NEG and 12V POS terminal posts, current will flow from the center tap to the 12V POS output post and through the load. The current then flows into the NEG heat sink and through the No. 1 rectifier (on the NEG heat sink) which is connected to the "B" transformer output. No current flows through any other rectifiers at this time. As the cycle reverses and the "A" output reaches max negative, the center tap becomes 12V POS in relation to the "A" output. Current again flows from the center tap, out the POS post and through the load. As the current enters the NEG heat sink, it now flows through the No.2 rectifier back to the transformer. Thus, in the 12 volt operating mode, the two NEG rectifiers (No.1 & No.2) take turns in pulsing full-wave power into the load. In the 24 volt operating mode, the NEG and the 24V POS posts, now form a four rectifier full-wave bridge used to rectify the 24V voltage across "A" and "B". The center tap "C" is not used. The 24 volt circuit works as follows....

As the "A" output of the transformer reaches max. positive voltage, current flows through the No.4 rectifier to the 24V POS heat sink. Current flows through the load to the NEG heat sink and then through the No.1 rectifier back to transformer tap "B" As the cycle reverses and "B" becomes positive, current flows through rectifier No.3 through the load through rect. No.1 and back to transformer "A". Thus, both 12V and 24V modes provide full-wave rectified DC power to the load. In addition, the 12V and 24V power outlets can be used SIMULTANEOUSLY so long as the maximum power rating for the Converter is not exceeded.

Power Converter
TROUBLE SHOOTING

The New Engrg. Power Converter is a rugged but simple power supply designed to give years of service. Should a problem arise, this trouble shooting guide should be followed to locate it. A brief description of the circuit will set the stage for trouble shooting Power (220 VAC) comes into the unit through the plug and line cord. The center prong on the power plug is connected to the green wire and is grounded to the case of the Converter. The black and white leads, which carry the 220 volts, both pass through a two-pole circuit breaker which also serves as the on-off switch. Power leaving the circuit breaker then goes to the input of the transformer as well as the fan and the pilot light. In some model Converters, the fan is controlled by a thermostat which turns the fan on only when needed. The output side of the transformer consists of three heavy leads. The center lead goes directly to the POSitive 12 volt output post of the Converter. The two outer leads each pass through a large rectifier. Both rectifiers are mounted on an aluminum heat sink which, in turn, is mounted on (or connected to) the NEGative output post. Experience shows that the transformer is the component least likely to fail This is due to its conservative design and the protection afforded by the circuit breaker. More likely to fail are the rectifiers. If this occurs, the failure is almost always a short. This short puts an overload an the transformer causing the breaker to trip. Attempts to re-set the breaker will be unsuccessful To test for this type of rectifier failure, simply remove the power plug from the 220V socket. Set the breaker to its **up** position and plug the power cord in. If the breaker trips, you can be 90% sure that one (or more) of the rectifiers has shorted. If the breaker will not stay in the **up** position even when the power line is disconnected, you have a bad breaker. To make a positive test on the rectifiers, follow these steps.

1. **REMOVE THE 220V POWER PLUG FROM THE SOCKET! Never work on open electrical equipment while it is plugged in! 220 volts will deliver a LETHAL SHOCK!**

2. Remove the six hex-head screws from the front panel of the Converter. This will enable you to move the panel far enough away from the main case to work inside the Converter.

3. Locate the two large rectifiers (usually located directly behind the Negative post). The rectifier pigtails are covered with insulating tape and/or sleeving. Locate the bulge under the insulation about 6 inches from the rectifier body. This is the connecting bolt which joins the rectifier to the transformer output lead.

4. Cut away the insulation on either of the two rectifier leads and remove the bolt thus breaking the connection between pigtail and transformer. Now both rectifiers can be tested.

5. Use an ohm meter or a diode tester to determine the condition of both rectifiers If the machine is over three years old, you should consider replacing both rectifiers even if only one is bad. When replacing rectifiers, it is easiest to remove the aluminum heat sink from the output post stud.

6. After replacing faulty rectifiers), reconnect both rectifiers and cover the leads with several layers of electrical tape. Close the machine up in the reverse process of opening. On 12 & 24 volt models, there are two additional large rectifiers mounted on a heat sink directly behind the POS 24 volt output post. These rectifiers are tested and replaced just like the 12 volt rectifiers. Replacement of the circuit breaker or fan is straightforward. Just remember that you're working with 220 volts so all of your solder connections should be clean and neat. Replace the front panel completely before attempting to test the unit.

If you are unable to repair the unit, please contact the factory. It is sometimes quicker and simpler to return the Converter to us for repair.

Any questions?..... Call or write.....

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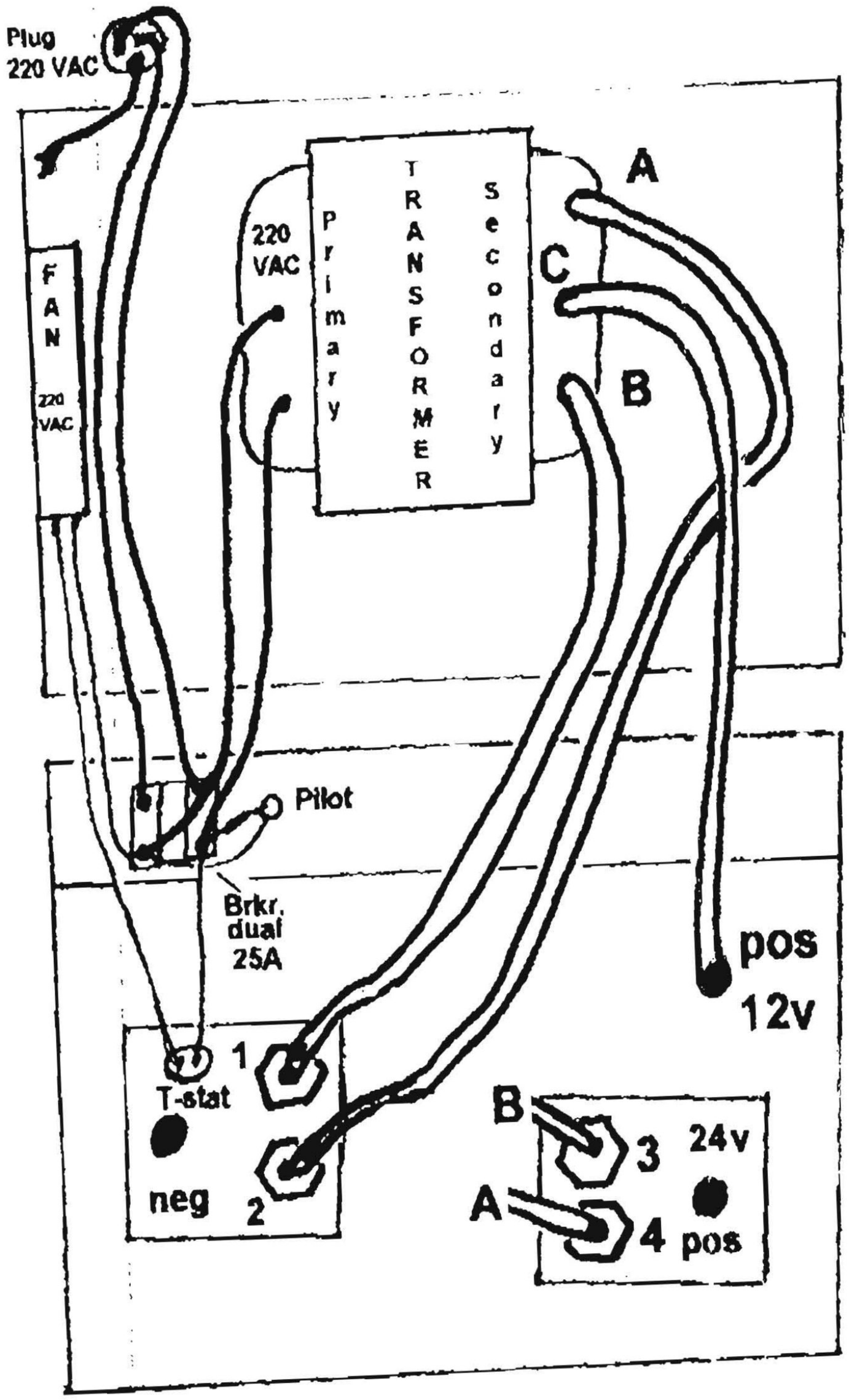
AUTOMOTIVE & INDUSTRIAL
EQUIPMENT

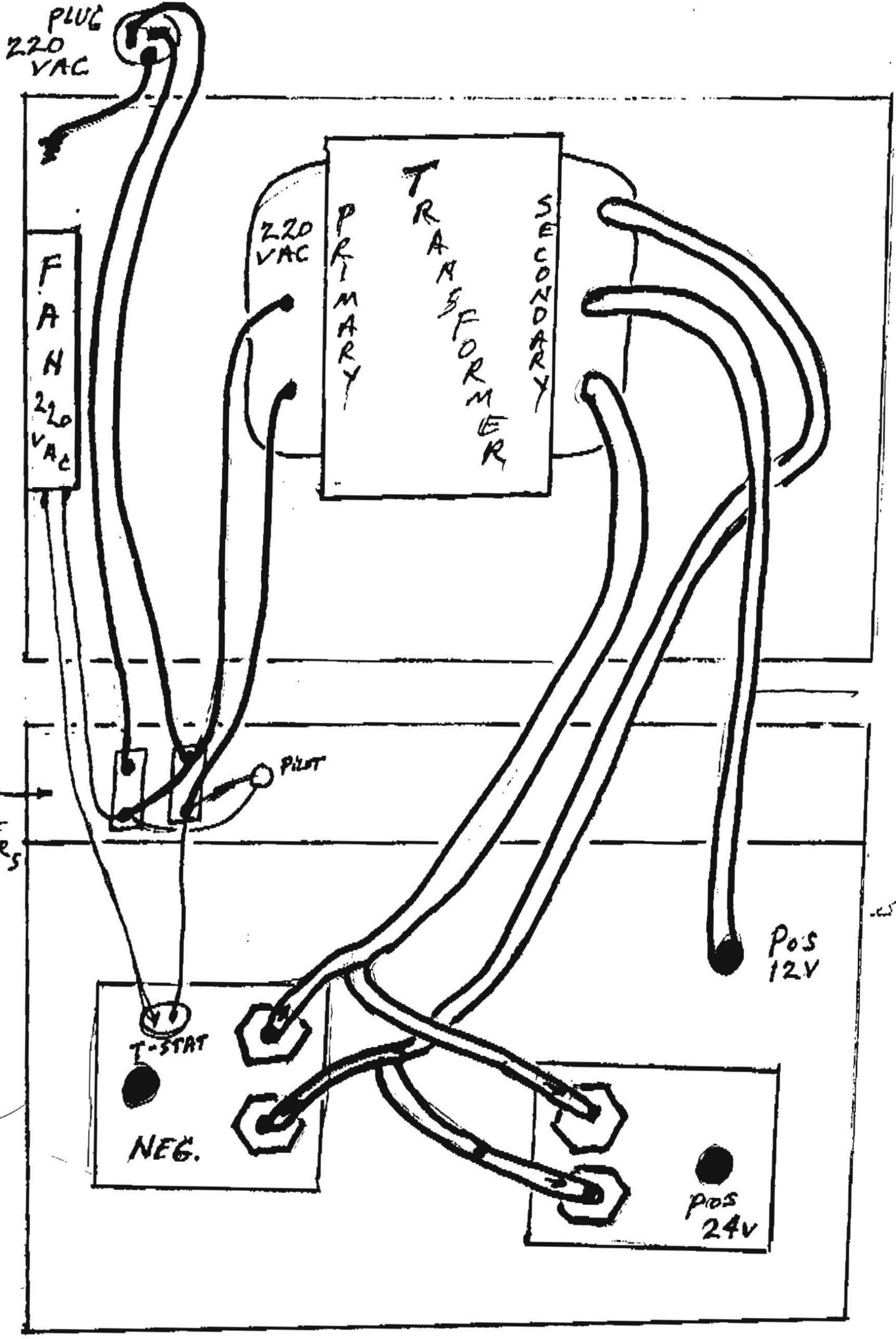
C-24



Main Cabinet viewed from above

Front Panel laid open and viewed from above

C-12/24H



MAIN CABINET VIEWED FROM ABOVE

SHUNT 400 Amp 50m

FRONT PANEL LAID OPEN AND VIEWED FROM ABOVE

DOUG
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