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Service Note

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DC POWER IN API ANALYZERS

I. SCOPE:

This document explains the circuitry used in the API analyzers to create and monitor the DC voltages used by the analyzer.

II. TOOLS:

None

III. PROCEDURE:

Refer to the attached schematic #01465 for the following:

A. AC power: foreign. A power autoformer is used by the analyzer to step 220, 230 or 240 VAC down to 115 VAC for internal use.

B. AC power: a transformer is used to step the 115 VAC down to the correct levels needed to produce 4 different DC voltages used internal to the chassis. These AC voltages enter the schematic on the side at P1-2 – P1-10.

C. The AC is converted to DC for the +5, +12 and ±15 by similar circuits. Refer to the bottom circuit of the schematic for the following description:
AC is taken to the bridge rectifier, CR3, where it is converted into pulsating DC. This DC is provided off the right side as positive pulses and off the left side as negative pulses. The pulses are filtered out by C9 and C10 capacitors, leaving smooth, unregulated DC. The DC enters a voltage regulator, U3 for the +15 and U5 for the –15, which holds the output voltage constant under varying input voltages and output loads.

D. An additional circuit, U4B, is included in this circuit to cause the +15V regulator's output to be tied to the –15V regulator output. This is called "tracking" and is a means of keeping the ±15V equal across the ground.

E. The last circuit consists of R8-R11 and U4A. The resistors are placed across the 4 DC outputs and the resulting voltage is buffered to the output of U4A. This creates a voltage of 2.5 ± .2 VDC at the output of U4A when the 4 voltage circuits are operating properly.

F. At the top of the schematic, P2-7 has a "V UNREG" voltage going out which is sent to the status/temp card (refer to attached schematic #01087, sheet 1 0f 2). This unregulated voltage runs at about 7.5 VDC. It is used by the +5V regulator on the power supply board to create the +5V. This voltage is sent to U5-2 of the status/temp card where it is compared to the +5V signal from the regulator. If the unregulated voltage drops below 6.5 VDC, the regulator is in danger of going out of regulation, so the output of this circuit, U5-57, will send a warning to the CPU at this time. This is called the "Brownout" warning. When the CPU receives the Brownout warning, it blanks the display momentarily and tries to reset the Brownout latch, U4.

If the low voltage continues, the latch will set again and the Brownout warning will repeat.

If you have questions regarding this or any API equipment, please contact an API Customer Service representative.