

### Troubleshooting tips on 2200-series P/S:

This applies to 2213A, 2215A, 222x, 223x scopes. 2213/2215 and 224x-series use a similar but slightly different supply. All parts references and numbers may differ.

If the mains fuse is blown then Q9070 is most likely also blown. If you are lucky this is the only fault but it may also take several other components with it as it breaks. Be sure to check at least CR908, Q908, R909, CR920 and CR907. Also make sure the connector to Q9070 is not damaged. Sometimes also U930 will be broken. It may be a little more difficult to determine. You can run the chip, still on the board, with an external power supply and check the pulses on the output. Be sure the mains cable is disconnected. Disconnect Q9070. Connect the external P/S across C925. Momentary raise it to about 25-30 V to initiate the startup circuit. Leave it at about 14 V. With reference to pin 13 (- of your P/S) you should now have 14 V at pins 8 and 11, 10-14 V at pin 12 and 5 V at pin 14. Still referenced to pin 13 you should have a ramp on pin 5 and pulses on pin 10. If this is the case U930 is OK.

If the mains fuse is not blown and there is no visible life or audible ticking then Q9070 may be open and probably the only fault.

To determine if the inverter and/or secondaries are OK you may also run it with an external power supply. With Q9070 disconnected connect a supply capable of supplying at least 1.5 A at 43 V to TP940 (+) and TP950 (-). Connect it already set to 43V, i.e. do not turn up voltage gradually since then the over current protection will trigger. If possible also set P/S current limit to 1.5 – 2.0 A. If everything is OK the scope should work as normal with a current draw from the P/S of about 1.25 – 1.5 A.

If there is an audible ticking indicating that the scope is continuously starting and shutting down there is secondary problem. The most common fault then is a shorted rectifier diode on the secondary windings of the transformer. Also a bad HV Multiplier or a supply shorted in any other way would produce the power supply burst mode.

Q9070: 151-1245-00 MTP6N55 or MTP6N60 (The manual EPL may say a different number but the original in all scopes has been replaced by this. There were also mod-kits to extensively modify the supply after breakdown.)

CR908: 152-0141-02 FDH9427 or 1N4152

Q908: 151-0164-01 MPS2907A

R909: 39  $\Omega$ , ¼ W

CR920: 152-0400-00 MB2501 or 1N4936

CR907: 152-0661-01 MUR460

U930: 156-1627-00 TL594CN

/Håkan