



### J-500 SERVICE

J-500 has been a milestone in the Jasco CD spectrometer production. Its production run started in 1978 and terminated in 1986 when J-600 was introduced. Many instruments of this type are still in operation and, if properly kept, can still provide *competitive* scientific data.

Anyway time is passing and average age is now high, let's consider in some detail the most typical failures you may reasonably expect after many years of operation.

#### Mirrors and optics

All mirrors are still available from Jasco, now in MgF<sub>2</sub> coated form.

M0 1002-0187A

M1 1003-0140A

M2-M5 1002-0124A

Also the quartz window after the lamp will age, its p/n is 1006-0009A

#### Lamp, its housing and its power supply

These are rather stressed areas, due to the high power dissipated.

Lamp itself (Osram 450W/4) is still currently available.

Lamp housing is very robust but:

-cooling is performed by a copper tube coiled over the housing; I remember only one case of a tube so corroded to drill a hole. From time to time pls flush with diluted acetic acid to keep it in good shapes

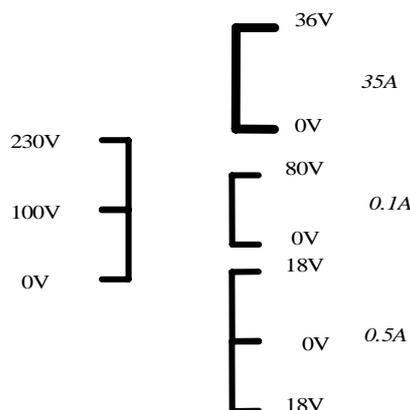
-lower electrode insulator is viceversa rather weak. From time to time it's necessary to crosscheck the fixing screws are tighten properly (this is a very hot area!). Cathode holder Teflon insulator (6020-0210A) may need replacement from time to time, same applies for the screw of the aluminum cathode holder itself (6020-0206B).

-the terminator of the black cable fitting the cathode holder is getting burnt out very easily. This is simple to repair, shortening slightly the cable.

*Pls keep in mind that any overheating will also shorten significantly lamp lifetime.*

Power supply itself is very reliable, a few variants had been built (originally ones only 100VAC).

Troubles here are mainly from the thermal switch built in the latest version (originally inside, later on with outside handle): best solution is to bypass it (very easy since cables are screw mounted). Also main transformer may give troubles, especially after many years of operation. Since replacement may be difficult to source, best idea is to have a new transformer properly rebuilt.



Another potential source of problems: aged cable connectors (particularly cathode) in the back of the power supply. Here high current is passing during operation (25A) and high voltage is applied when starting lamp. Insulator is easy to rebuild locally and connector may be simply welded if necessary.  
Last source, very occasional, of troubles may be the main switch itself.

### **Electromechanical parts**

The J-500 uses three special potentiometers (placed just behind the front panel of the optical bench), all mechanically linked to the wavelength scanning system, for:

- baseline correction
- PEM program
- slitdrive program

These may become dirty with time. The clear symptom is oscillating slitwidth. They can be dismantled and cleaned (it's boring, since realignment is also critical), but replacement are difficult to find. Adjusting gain and dumping pots of the slit servomotor board (RV402 and 403) may help a lot, to minimize the problem.

Another part wearing is the small brass gear on the top of the slit motor.

### **Electronics**

Usually very rugged and long lasting. Most components are still easily commercially available and low in cost.

#### *-Preamplifier*

This is the weakest part: a FET built in the LM-310H operation amplifier shorts up and output goes to – or + low voltage supply. LM310Hs are out from production and exact equivalent is impossible to find. But circuit may be easily modified using a modern FET OA as in more modern Js.

#### *-Fuse blown in $\pm 15V$ supply*

Probably most common problem, it may be dangerous since HT may go to maximum or so.

Fuses are mounted on the board labeled  $\pm 15V$  in the electronics rack. They blow up casually, probably for transient current at the switching off of the light source (3AG fuse 0.5A is OK for replacement)

#### *-IC failure in SC-2 scan control amplifier board*

Not smooth scanning or chart advance/return is usually caused by defective IC7 (SN7403), other nearby TTL ICs may be responsible. This is more frequent when old data processor (DP-500) or PC interface (IF-500II) are used. For easy troubleshooting you may exchange recorder with wavelength scan driving board (which are identical)

### **PEM related problems**

These are rather rare. Support material inside the housing may loose flexibility with time, in the electronics failure in the built in fuses on  $\pm 15V$  supply or more occasionally in the final power transistors are caused by overheating, due to improper tuning of the board. Other very seldom problem may come from the automatic temperature regulator (placed in the back side of the unit), typically the built in fuse is blown.

### **Support**

While unit is old a very decent, well detailed, service manual is available, copy can be obtained from your local Jasco office.

Your closer Jasco office will be able to provide still many parts, sometime also low cost second end components are available from traded in and dismantled units.

If you reach however the point that a new instrument is necessary (sometime it's not only a matter of basic performances, it's also a matter of convenience to use), pls remember that any J-500 may have a trade in value. Components such as the PEM with its drive and the lock-in amplifier may well be recycled for other polarized light experiments, while the photomultiplier tube is the same as the one mounted in current production instruments. In other cases also monochromator/light source assembly has been recycled as source of monochromatic light, while the C version (the one with range extended to 1000nm) had a built in linear polarizer of good value.