

TITANIUM SUBLIMATOR

POWER SUPPLY

Model 302

PF/LS 4/72

1. GENERAL DESCRIPTION

Titanium sublimation power unit model 302 is designed to supply the correct current for heating titanium filaments used in sublimation pumps.

It also offers possibilities of selecting the best sublimation conditions : efficiency and pumping rate.

From that power supply it is feasible to successively operate up to four titanium filaments. A four step switch allows to heat the selected filament (6 steps switch on optional model).

The maximum sublimation current (60A, 11V) is adjusted by a manual potentiometer, " VARIAC " type, and controlled by an ammeter fitted with a shunt.

For automatic operation a timer is provided, allowing titanium sublimation during a preset period at regular intervals adjustable from 1 sec. to 40 hours.

Sublimation period is adjustable from 5 to 60 sec. The average adjustment being 30 sec. (heating during 15 sec., sublimation during 15 sec.)

PUSH BUTTONS AND LAMPS

Green	:	Power ON-OFF
Brown	:	Clock ON-OFF (TIMER)
Red	:	Filament ON-OFF

2. SPECIFICATIONS

Input power	:	220 V 4 A. Single phase 50 Hz
Output power	:	Voltage 11 V. current 0.60 Amps. adjustable Power 660 W

Duty cycle	;	sublimation time : adjustable from 5 sec. to 60 sec. normal value : 30 sec.
		sublimation frequency : adjustable from 1 sec. to 40 hours

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Dimensions

Power unit model 302 is supplied as a rack mounting which can be fitted in standard cabinets.

width	:	483 mm
height	:	177 mm (4 units)
depth	:	320 mm
weight	:	23 Kg

3. INSTALLATION

1. Connect the titanium filaments and the ground lead.
2. Connect the cooling fans of the system. A socket located on the rear panel of the power unit provides a 220 V voltage when power unit is turned on. This socket is connected to the fans and is generally provided to automatically start the fans.

4. TURN-ON PROCEDURE

A. Operating with continuous sublimation

1. Timer switch must be at " Off " position.
2. Set the " current adjust " knob at "Mini" position.
3. Turn on the filament switch. The red lamp is and remains lit, indicating that power unit is operating.
4. The variable voltage transformer must be slowly set to the required current. Wait until the filament has reached its equilibrium temperature to set the final adjustment. To select the right current or to increase the degassing current, refer to paragraph " C ".

B. Operating with sublimation cycling.

- 1°) - Adjust the timer at the desired time interval (to select this interval, refer to paragraph " C2 ".
- To adjust the timer, proceed as follows :

To select the time range, push and rotate the button located at the right of the dial, until the desired time-unit appears in the window. Rotating the button clockwise increases time. When the desired time range is set, push and rotate the hand knob until it reads the desired time interval on the dial.

- 2°) - Switch on the Timer switch. The red lamp of filament is lit during sublimation periods. Between sublimation periods, operating cycle can be verified by looking at the striped disc located on the timer : it must rotate.

- 3°) - From time to time read the filament current and adjust it with the autotransformer to counterbalance, if necessary, its wear.

C. HOW TO SELECT HEATING CURRENT AND CYCLING PERIOD. ADVICE TO DEGAS THE FILAMENTS.

The advice given further below only concern RIBER's filaments. The mentioned currents are approximate values, as slight differences may occur in the filaments.

1°) - Filament heating current setting

Two types of filaments are provided by RIBER :

- straight filaments model FT begin to sublime at 40 A and to melt at 48 A.
- spiral filaments model FTS begin to sublime at 45 A and to melt at 53 A.

So the current will be adjusted between these values. The filament current setting depends on various factors:

- time of the system pumpdown
- dimensions of the titanium sublimation well
- desired pumping speed
- filament operating life

The best way to adjust the filament current is to note the value giving a pumping effect.

The operating life of a titanium filament (when continuously operating) is about 15 to 30 hours at low current, and 3 to 5 hours at high current.

2°) - Cycling period setting

Cycling allows to save sublimated titanium and to increase the operating life of filaments. When the filament is cycled on, the heating period is normally 30 sec. which corresponds to 15 sec. for heating the filament, and 15 sec. for sublimating it.

This cycle period produces, for a normal adjustment of the current, a mono-molecular film on a 30 cm ID sublimation well.

The following times correspond to the sublimation times when titanium has lost half its efficiency (pumping speed divided by 2).

at 1.10^{-7} Torr	1 minute
at 1.10^{-8} Torr	6 minutes
at 1.10^{-9} Torr	1 hour
at 1.10^{-10} Torr	10 hours

We advise generally to sublime every 15 or 30 sec. until the system has reached 1.10^{-6} Torr.

Then, for instance, sublimator may be switched on

- every minute between 1.10^{-6} Torr and 1.10^{-7} Torr.
- every 6 minutes between 1.10^{-7} Torr and 1.10^{-8} Torr.
- every 20 minutes between 1.10^{-8} Torr and 1.10^{-9} Torr.

3°) -Advice for filaments degassing

When one or several worn filaments are changed or when filaments have been left at atmospheric pressure for a long time, it is necessary to degas them, as follows :

- a) switch on the power supply
- b) select a filament
- c) adjust (with potentiometer) the filament current at 10, 20, 30 Amps waiting a short time at each steps.
- d) set the filament at 30 amp for some minutes to heat titanium evenly.
- e) increase the current until the evaporation value, and operate during 30 sec.
- f) set the potentiometer at zero
- g) select an other filament and do the same operations again.

NOTE : Filament degassing can be repeated during pumpdown at 3 pressures, for instance : 1.10^{-7} , then 1.10^{-8} and 1.10^{-9} Torr.

D. OPERATION

The transformer (220 V - 11 V) which provides the current required for titanium sublimation, is limited to 60 A.

This transformer is maintained by an adjustable autotransformer which allows a very accurate current setting.

Two timers allow to adjust the sublimation frequency from 1 sec. to 40 hours, and the sublimation time from 5 to 60 sec. Each timer provides, at the end of its cycle, a pulse which monitors the forthcoming cycles operation.

E. WARRANTY

This power supply is warranted for 6 months after the date of delivery to be free of all defects in material and workmanship. This warranty is limited to replacing defective parts when the equipment appears to RIBER's satisfaction not to be defective through any fault of the user, and only if the equipment is operated in strict accordance with the instructions set forth in this manual.

Package and transportation charges will be paid by the customer.

F. SERVICE

If you need any further information, please contact

RIBER S.A.

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