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The power supplies system for 10MeV/20kW industry irradiation facility

NSRL
National Synchrotron Radiation Laboratory

CONTENTS

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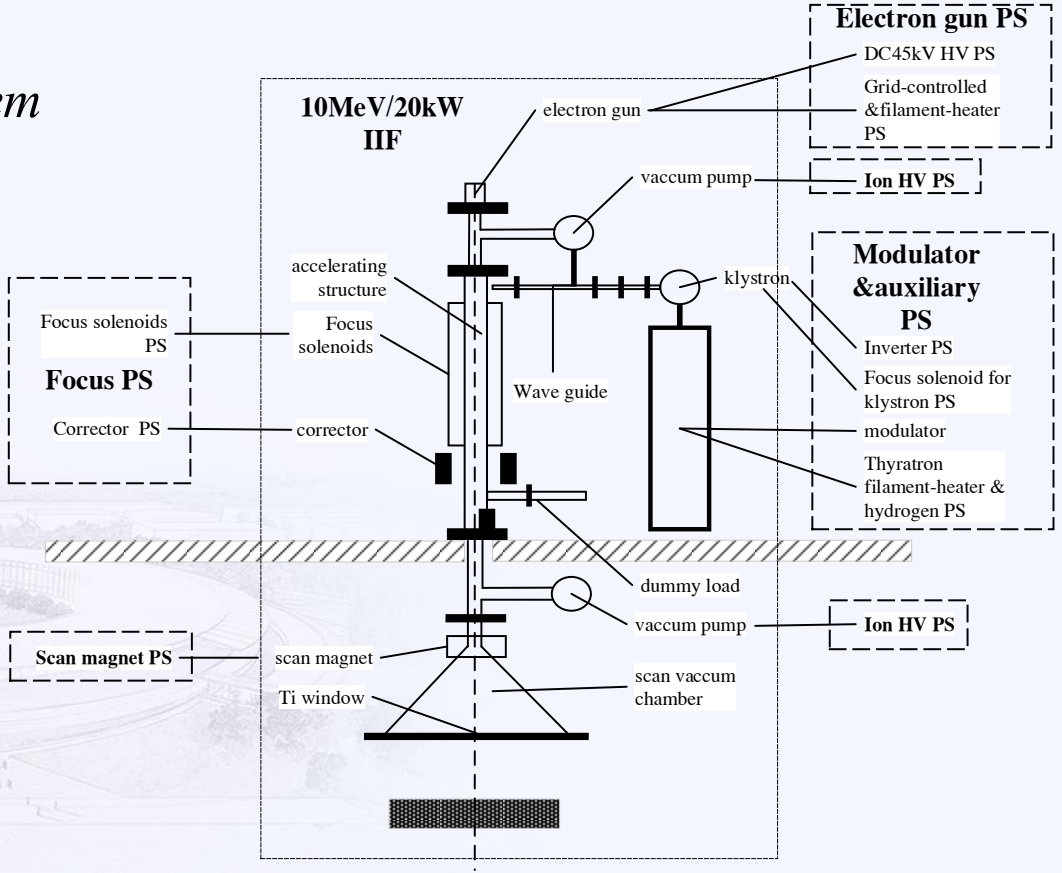
ABSTRACT

10MeV/20kW industry irradiation facility(IIF) has been designed by National Synchrotron Radiation Laboratory （NSRL) for years. Modular design power supplies are employed for the latest version, depend on the performance of these power supplies with high precision and high stability, the operating reliability of the IIF has been greatly improved.

POWER SUPPLY SYSTEM

- *IIF Power supply system*



POWER SUPPLY SYSTEM

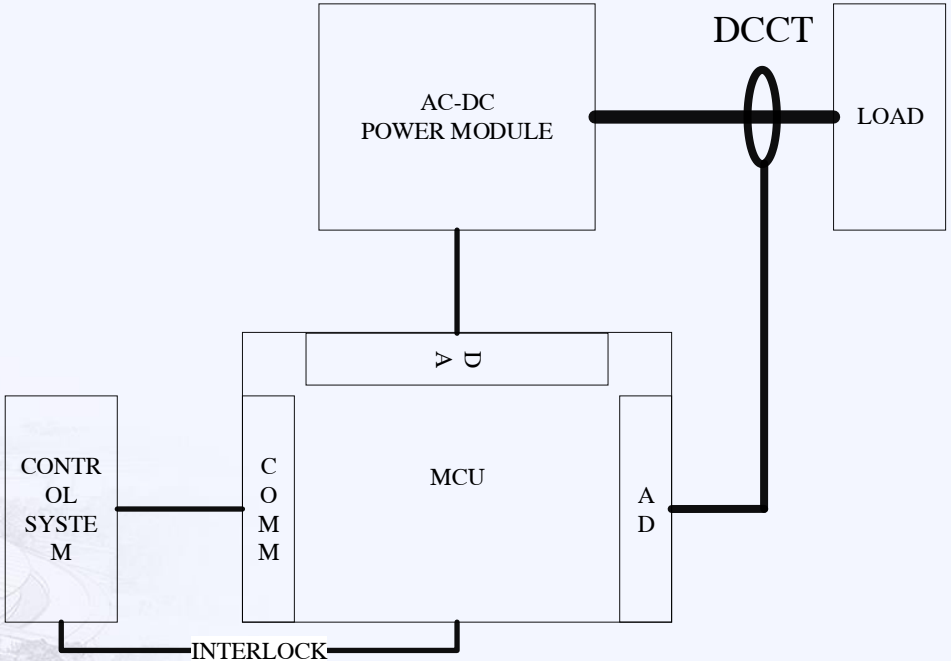
The details of the power supply system

Type	PS Function	Description
Unipolar DC PS	Focus solenoid for accelerating tube	30A/60V
	Corrector magnet	10A/10V
	E-gun Filament-heater	2.5A/6.3V
	Thyratron filament-heater	100A/15V
	Thyratron hydrogen	20A/15V
	Focus solenoid for klystron	40A/120V
Bipolar PS	Scan magnet	±10A/37Hz
Pulse PS	Grid-controlled pulse	+300V/pulse;-100V/DC bias
Modulator	For klystron	130kV/500Hz/16us
Inverter PS	AC klystron filament-heater	AC 3A/220V
High Voltage PS	E-gun HV	DC 45kV/200W
	Ion HV	DC 7kV/400W

POWER SUPPLY SYSTEM

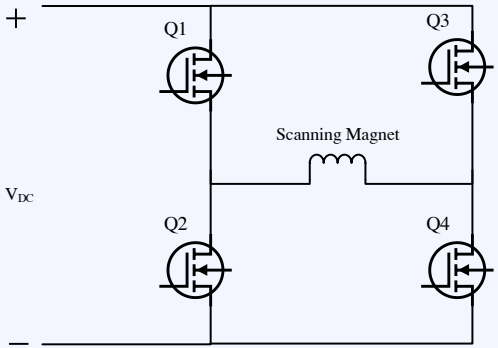
- *Unipolar DC power supply*

- 14 unipolar DC power supplies
- stability better than 200 ppm
- MTBF≥50000 hours.

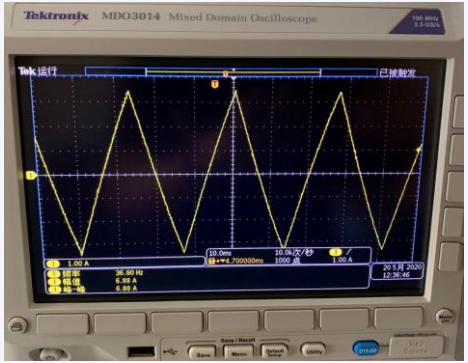


POWER SUPPLY SYSTEM

- *Bipolar power supply for scanning magnet*

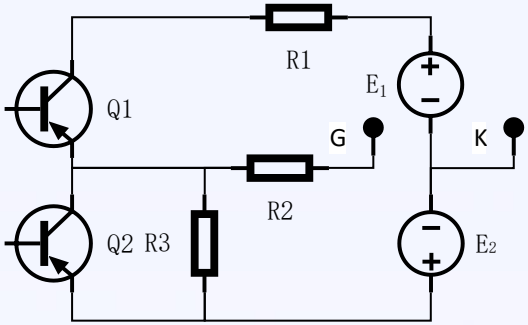


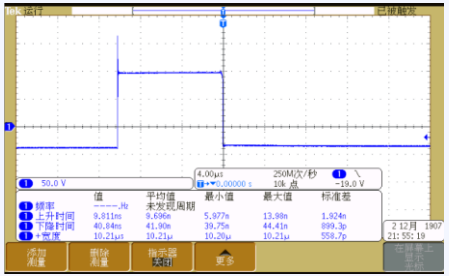
- 37Hz & ±10A
- Time to respond to failure≤200ms

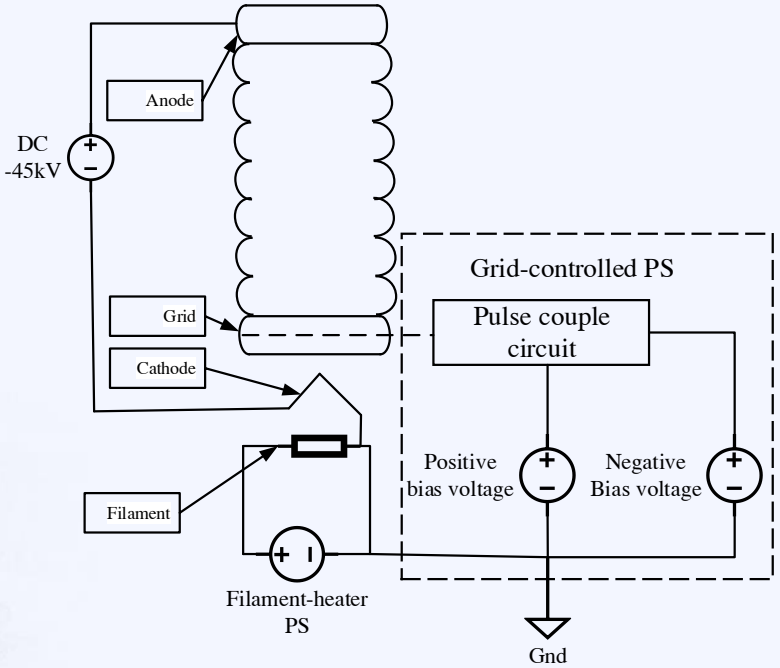


POWER SUPPLY SYSTEM

- *Power supply for DC electron gun*



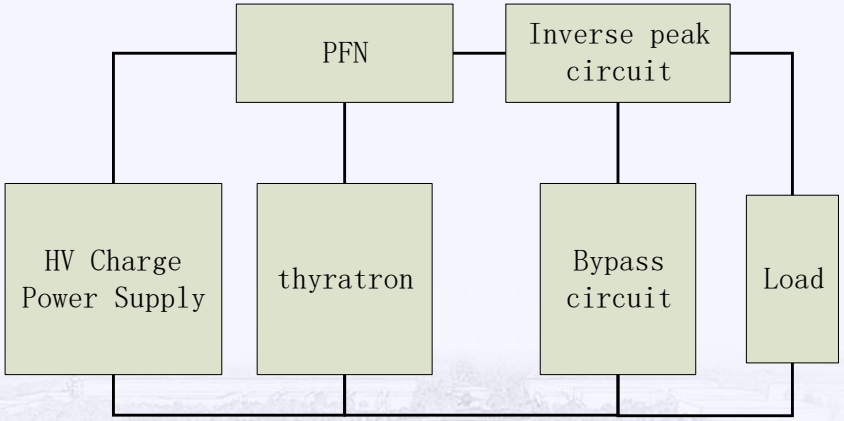


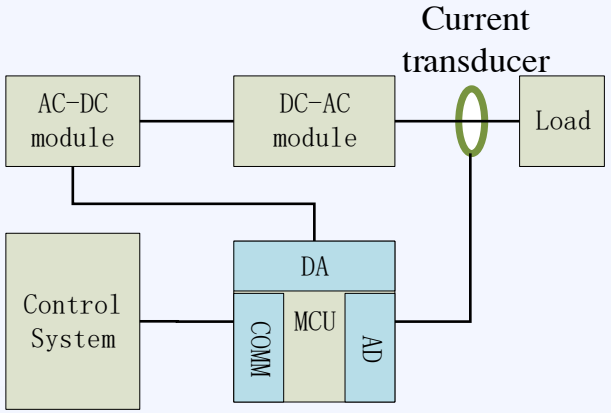


- rising edge <10ns
- the falling edge <42ns

POWER SUPPLY SYSTEM

- *Modulator and DC-AC inverter power supply*



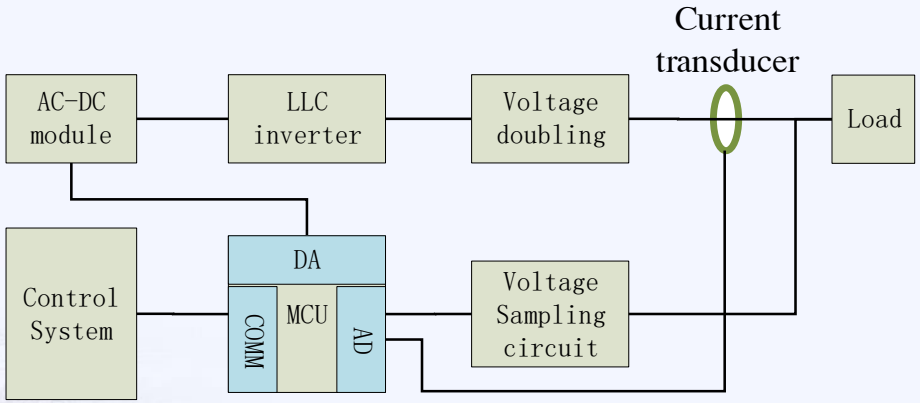


- Linear modulator
- DC-AC inverter power supply

POWER SUPPLY SYSTEM

- *High Voltage Power Supply*

  - LLC circuit
  - voltage doubling circuit



CUNCLUSION

The power supply system is used in IIF already, by use the modular design and the commercial products, MTBF is significantly improved and the debugging period is reduced.

REFERENCES

NSRL National Synchrotron Radiation Laboratory

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01