



The applications of FA-M3 PLC used in SSRF

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Introduction

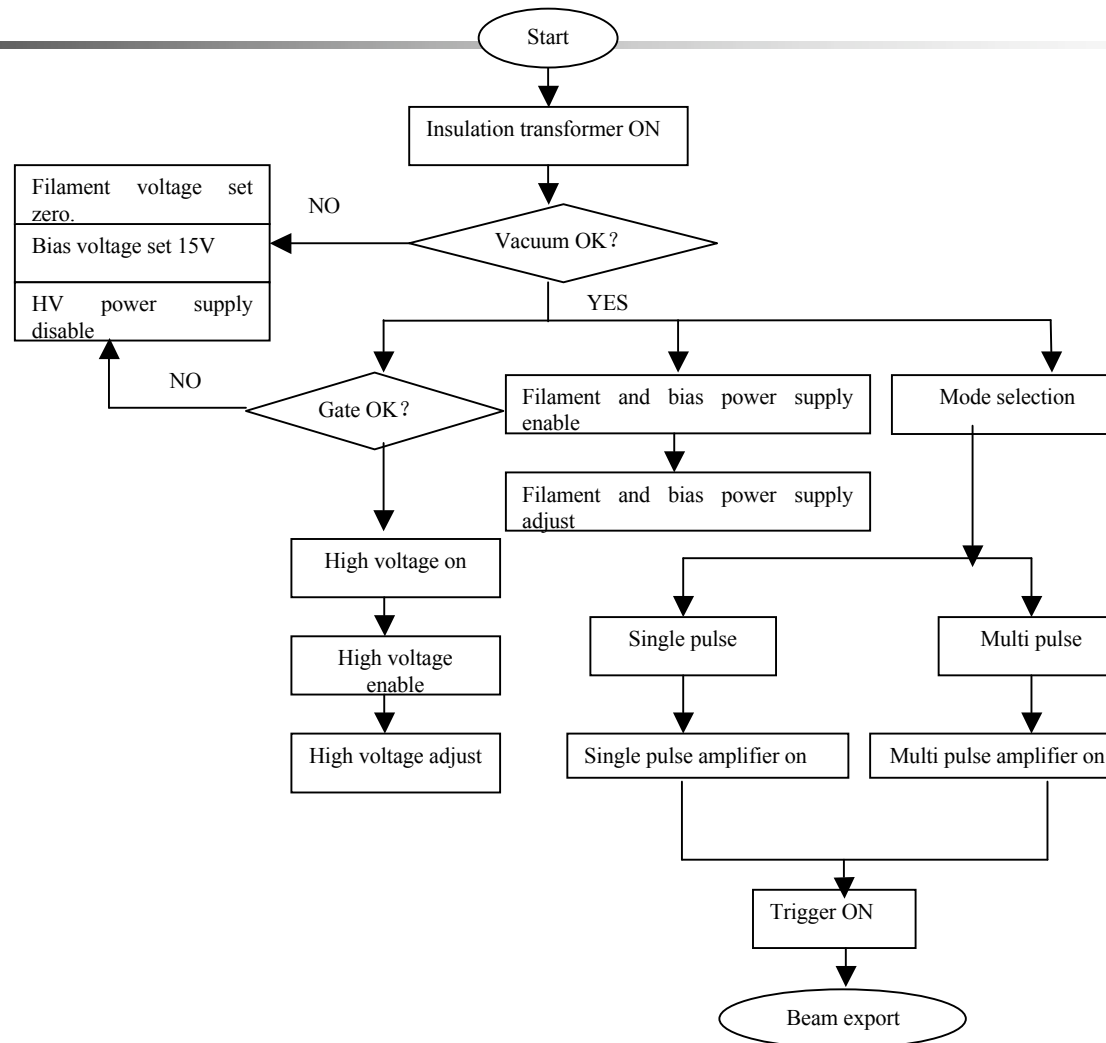
- There are a large amount of PLCs used as device controllers in SSRF.
- In the SSRF, the YOKOGAWA FA-M3 PLCs are used in the most device control systems. It was used in the linac electric gun control system, the booster and storage ring power supply interlock system and the SSRF's MPS (Machine Protection system).

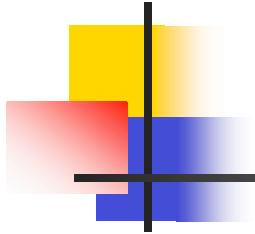


1 The linac eclectic gun control

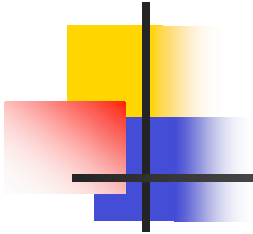
- System demands: set the electric gun working mode; monitor and control the filament voltage and current, the bias voltage and current; monitor its power; the system interlock control.

The linac eclectic gun control procedure

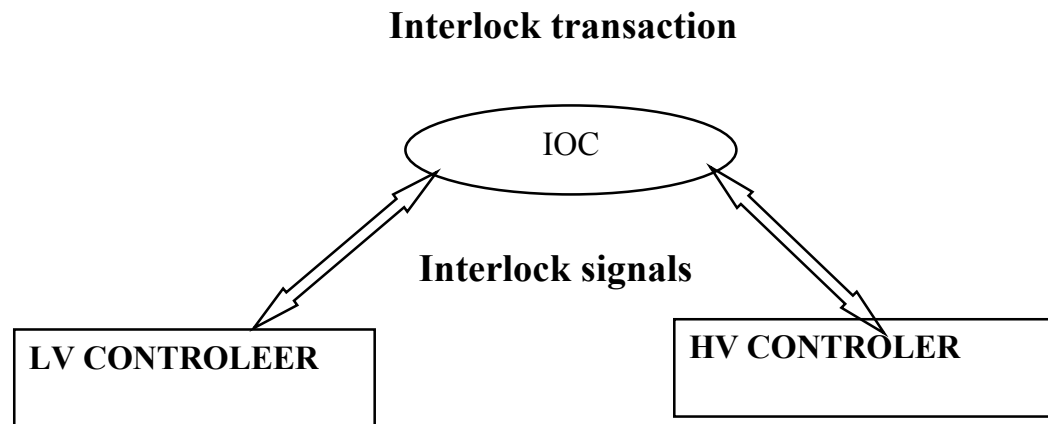




- The Linac E-gun control procedure are all realized by the ladder programs running in the two FA-M3 PLCs, except the interlock between the HV controller and the LV controller.



■ Interlock control



The control panel and the device controller



SSRF Linac E-gun Control System

Interlock Status

- Low Voltage Vacuum
- Gate Status
- Valve Status

System Start

Insulation Transformer Switch

HV Power Supply Switch

HV Power Supply Enable

HV PS Status

HV PS Enable

Power Supply Control

Bias Switch <input checked="" type="checkbox"/>	BiasSw Status <input checked="" type="checkbox"/>	Bias Voltage Adjust: 60.00	BiasVoltV Readback: 59.79	BiasVoltI Readback: 0.00
Filament Switch <input checked="" type="checkbox"/>	FilaSw Status <input checked="" type="checkbox"/>	Filament Current Adjust: 1.00	FilaVoltV Readback: 4.79	FilaVoltI Readback: 0.99

Mode Selection

Single Pulse Power Selection

Multi Pulse Power Selection

Pulse Power Supply Switch

SinglePulsSw

MultiPulsSw

SinglePulsSw Status

MultiPulsSw Status

LV Voltage and Current Monitor

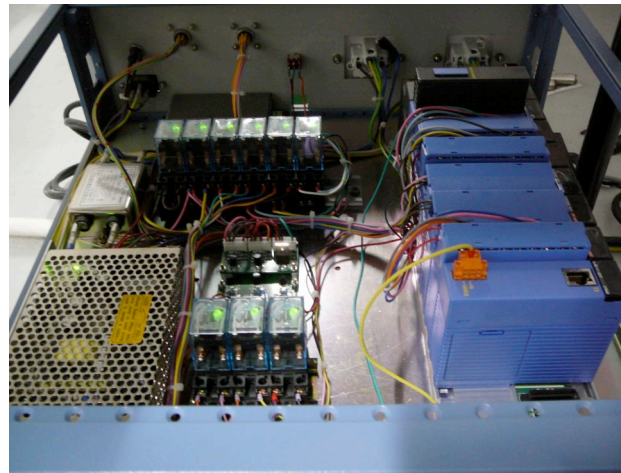
HV PS Voltage Adjust: 0.00	HV PS Voltage Monitor: 0.17
HV PS Current Limit Control: 0.00	HV PS Current Monitor: 0.00

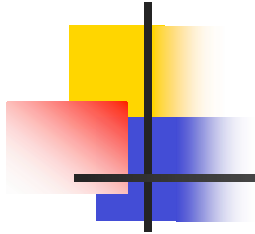
Trigger Power Supply

Trigger PS Status

Multi Pulse Power Tuning

Multi Pulse Power Monitor: 0.02





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- The electric gun control system is stable and easy to maintain and it only stops in the SSRF machine study or the other systems want the electric gun not working.



2 The booster and storage ring power supply interlock

- The storage ring power supply interlock also use FA-M3 PLC.
- The power supply interlock system only need to obtain the interlock signal from the power supply around the booster and the storage ring and give a interlock output.

2 The booster and storage ring power supply interlock

- The control panel.

home/ssrf/prod/ops/ed/mpps/bs_ps.ed

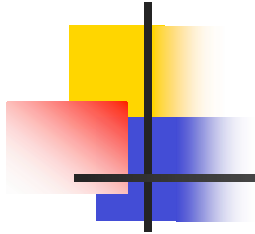
Booster power monitor

Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Output	
01GFT1	04B1T1	07B1T1	10B1T1	13B1T1	17B1T1	20B1T1	23B1T1	26B1T1	29B1T1	HTB1T1						B1	
01BT1	04B1W1	07B1W1	10B1W1	13B1W1	17B1W1	20B1W1	23B1W1	26B1W1	29B1W1	HTB2T1						B1	
01BW1	04GF1	07GF1	10GF1	13GF1	17GF1	20GF1	23GF1	26GF1	29GF1	HTB3T1						B2	
01ODW1	04B2T3	07B2T3	10B2T3	13ODW1	17B2T3	20B2T3	23B2T3	26B2T3	29ODT1	HTB4T1						B2	
02GF1	04GDT1	07GDT1	10GDT1	14B1T1	17GDT1	20GDT1	23GDT1	26GDT1	29GDT1	HTB5T1						B2	
02BT3	0	0	0	0	14GFT1	0	0	0	0							GF	
02GDT1	05B1T3	08B1T3	11B1T3	14GDT1	18B1T3	21B1T3	24B1T3	0	0							GF	
0	05GF1	08GF1	11GF1	0	18GF1	21GF1	24GF1	0	0							GF	
03B1T1	05B2T1	08B2T1	11B2T1	15GFT1	18B2T1	21B2T1	24B2T1	27B1T1								OD	
03B1W1	05B2W1	08B2W1	11B2W1	15B1T1	18B2W1	21B2W1	24B2W1	27B1W1								OD	
03GF1	05GDT1	08GDT1	11GDT1	15B1W1	18GDT1	21GDT1	24GDT1	27GF1								OD	
03B2T3	06B1T1	09B1T1	12B1T1	15GDT1	18B1T1	22B1T1	25B1T1	27GDT1								HB	
03GDT1	06B1W1	09B1W1	12B1W1	16GF1	19B1W1	22B1W1	25B1W1	28B1T1								HB	
0	06GF1	09GF1	12GF1	16B1T1	19GF1	22GF1	25GF1	28GF1								HB	
0	06B2T3	09B2T3	12B2T3	16GDT1	19B2T3	22B2T3	25B2T3	28GDT1								HB	
0	06GDT1	09GDT1	12GDT1	0	19GDT1	22GDT1	25GDT1	0								HB	
01GF1	04B1T3	07B1T3	10B1T3	13GFT1	17B1T3	20GFT1	23GFT1	26GFT1	29B1W1								
01BT3	04GF1	07GF1	10GF1	13GFT1	17GF1	20GF1	23GFT1	26GF1	29B2W1								
01GDT1	04B2T1	07B2T1	10B2T1	13ODT1	17B2T1	20B2T1	23B2T1	26B2T1	29B3W1								
01GF1	04B2W1	07B2W1	10B2W1	14B1T1	17B2W1	20B2W1	23B2W1	26B2W1	HTB4W1								
02BT1	04GDT1	07GDT1	10GDT1	14B1W1	17GDT1	20GDT1	23GDT1	26GDT1	HTB5W1								
02B1W1	05B1T1	08B1T1	11B1T1	14GF1	18B1T1	21B1T1	24B1T1	0									
02GDT1	05B1W1	08B1W1	11B1W1	14GDT1	18B1W1	21B1W1	24B1W1	0									
0	05GF1	08GF1	11GF1	0	18GF1	21GF1	24GF1	0									
03B1T3	05B2T1	08B2T1	11B2T1	15GF1	18B2T1	21B2T1	24B2T1	27B1T1									
03GF1	05GDT1	08GDT1	11GDT1	15B1T1	18GDT1	21GDT1	24GDT1	27GF1									
03B2T1	0	0	0	15GDT1	0	0	0	27GDT1									
03GDT1	05B1T3	08B1T3	12B1T3	16GFT1	19B1T3	22B1T3	25B1T3	28B1T1									
03ODW1	06GF1	09GF1	12GF1	16B1T1	19GF1	22GF1	25GF1	28B1W1									
0	06B2T1	09B2T1	12B2T1	16B1W1	19B2T1	22B1W1	25B1W1	28GF1									
0	06B2W1	09B2W1	12B2W1	16GDT1	19B2W1	22B2W1	25B2W1	28GDT1									
0	06GDT1	09GDT1	12GDT1	0	19GDT1	22GDT1	25GDT1	0									

home/ssrf/prod/ops/ed/sr-magnetP5/sr_ps.ed

SR Magnet Power Supply Input

Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status	Signal	Status
01S01T1	04S01T1	07S01T1	10S01T1	13S01T1	16S01T1	19S01T1	22S01T1	25S01T1	28S01T1						
01S03T1	04S03T1	07S03T1	10S03T1	13S03T1	16S03T1	19S03T1	22S03T1	25S03T1	28S03T1						
01S05T1	04S05T1	07S05T1	10S05T1	13S05T1	16S05T1	19S05T1	22S05T1	25S05T1	28S05T1						
01S07T1	04S07T1	07S07T1	10S07T1	13S07T1	16S07T1	19S07T1	22S07T1	25S07T1	28S07T1						
01B02T1	04B02T1	07B02T1	10B02T1	13B02T1	16B02T1	19B02T1	22B02T1	25B02T1	28B02T1						
02S01T1	05S01T1	08S01T1	11S01T1	14S01T1	17S01T1	20S01T1	23S01T1	26S01T1	29S01T1						
02S03T1	05S03T1	08S03T1	11S03T1	14S03T1	17S03T1	20S03T1	23S03T1	26S03T1	29S03T1						
02S05T1	05S05T1	08S05T1	11S05T1	14S05T1	17S05T1	20S05T1	23S05T1	26S05T1	29S05T1						
02S07T1	05S07T1	08S07T1	11S07T1	14S07T1	17S07T1	20S07T1	23S07T1	26S07T1	29S07T1						
02B02T1	05B02T1	08B02T1	11B02T1	14B02T1	17B02T1	20B02T1	23B02T1	26B02T1	29B02T1						
03S01T1	06S01T1	09S01T1	12S01T1	15S01T1	18S01T1	21S01T1	24S01T1	27S01T1	30S01T1						
03S03T1	06S03T1	09S03T1	12S03T1	15S03T1	18S03T1	21S03T1	24S03T1	27S03T1	30S03T1						
03S05T1	06S05T1	09S05T1	12S05T1	15S05T1	18S05T1	21S05T1	24S05T1	27S05T1	30S05T1						
03S07T1	06S07T1	09S07T1	12S07T1	15S07T1	18S07T1	21S07T1	24S07T1	27S07T1	30S07T1						
03B02T1	06B02T1	09B02T1	12B02T1	15B02T1	18B02T1	21B02T1	24B02T1	27B02T1	30B02T1						
01S02T1	04S02T1	07S02T1	10S02T1	13S02T1	16S02T1	19S02T1	22S02T1	25S02T1	28S02T1						
01S04T1	04S04T1	07S04T1	10S04T1	13S04T1	16S04T1	19S04T1	22S04T1	25S04T1	28S04T1						
01S06T1	04S06T1	07S06T1	10S06T1	13S06T1	16S06T1	19S06T1	22S06T1	25S06T1	28S06T1						
01B01T1	04B01T1	07B01T1	10B01T1	13B01T1	16B01T1	19B01T1	22B01T1	25B01T1	28B01T1						
01P1W1	04P1W1	07P1W1	10P1W1	13P1W1	16P1W1	19P1W1	22P1W1	25P1W1	28P1W1						
02S02T1	05S02T1	08S02T1	11S02T1	14S02T1	17S02T1	20S02T1	23S02T1	26S02T1	29S02T1						
02S04T1	05S04T1	08S04T1	11S04T1	14S04T1	17S04T1	20S04T1	23S04T1	26S04T1	29S04T1						
02S06T1	05S06T1	08S06T1	11S06T1	14S06T1	17S06T1	20S06T1	23S06T1	26S06T1	29S06T1						
02B01T1	05B01T1	08B01T1	11B01T1	14B01T1	17B01T1	20B01T1	23B01T1	26B01T1	29B01T1						
02P1W1	05P1W1	08P1W1	11P1W1	14P1W1	17P1W1	20P1W1	23P1W1	26P1W1	29P1W1						
03S02T1	06S02T1	09S02T1	12S02T1	15S02T1	18S02T1	21S02T1	24S02T1	27S02T1	30S02T1						
03S04T1	06S04T1	09S04T1	12S04T1	15S04T1	18S04T1	21S04T1	24S04T1	27S04T1	30S04T1						
03S06T1	06S06T1	09S06T1	12S06T1	15S06T1	18S06T1	21S06T1	24S06T1	27S06T1	30S06T1						
03B01T1	06B01T1	09B01T1	12B01T1	15B01T1	18B01T1	21B01T1	24B01T1	27B01T1	30B01T1						
03P1W1	06P1W1	09P1W1	12P1W1	15P1W1	18P1W1	21P1W1	24P1W1	27P1W1	30P1W1						



Thanks!