Operating TEL2 for abort gap cleaning

Vsevolod Kamerdzhiev July 10, 2007

Under normal circumstances the following actions will be sufficient to establish abort gap cleaning using Tevatron Electron Lens 2 (TEL2):

1. set T:L2DLY1 to 180 rfc *
2. turn on T:L2MP - turns on 110V power for the Marx in the tunnel
3. turn on T:L2MCV - enables the PS that provides input voltage for the Marx
4. set T:L2MCV to about 320 V – Marx generator input voltage.
5. check that TEL2 collector current T:L2COLI is in the range 10-13mA

The procedure assumes that all magnets, including correctors as well as collector, cathode, etc PSs are **on**. These always stay on and need attention only if something goes wrong or after tunnel access.

Critical TEL2 devices and their nominal values readback values are put in parentheses

Device name	Value	Description	Comments
T:L2SG	3 kG	Gun solenoid	
T:L2SM	30 kG	Main solenoid	Check QPM
T:L2SC	3 kG	Collector solenoid	
T:L2C2	80 kGmm	Corrector hor upstream	Check QPM
T:L2C4	-298 kGmm	Corrector vert upstream	Check QPM
T:L2C1	-68 kGmm	Corrector hor downstream	Check QPM
T:L2C3	230 kGmm	Corrector vert downstream	Check QPM
T:L2C5	-20 kGmm	Corrector hor long	Check QPM
T:L2C6	60 kGmm	Corrector vert long	Check QPM
T:L2VAC	ON	Vacuum interlock status	Permit for T:L2MCV
T:L2DLY1	180 rfc	Delay	e-pulse timing
T:L2MP	ON	Marx 110V power/status	Turn on before L2MCV
T:L2MCV	320 V	Marx input voltage	
T:L2MCI	0.2 (0,16) A	Marx input current	Readback = 0.16
T:L2COLI	(11) mA	Collector avg current	Has alarms
T:L2COLV	5100 V	Collector voltage	
T:L2CATV	5 kV	Cathode voltage	
T:L2CATI	0.4 (0) mA	Cathode current	noisy
T:L2FILI	6.2 A	Filament current	Ramps slow
T:L2GABV	200 V	Anode bias voltage	
T:L2EPV	0 V	Profiler voltage	
T:A0IGTU	(1E-9) Torr	Ion gauge	TEL2 beam vacuum
T:A0IPTA	(1E-9) Torr	Ion pump	TEL2 beam vacuum
T:A1CCT2	(7e-7) Torr	Cold cathode gauge	TEL2 cryostat vacuum
T:A1TRSI	(4.3) K	Main solenoid inlt temp	
T:A1TRSO	(4.35) K	Main solenoid out temp	

Turning on TEL2 after the quench

Vsevolod Kamerdzhiev March 1, 2007

1. On the T75 (support 1) page check vacuum; TEL2 beam pipe vacuum (T:A0IGTU, T:A0IPTA, T:A0IPTB, T:A0IPTD) should be in E-9 range or better and cryostat vacuum (T:A1CCT2) in E-7 range.

2. Turn on all magnets (solenoids and correctors) listed on T75 (general 1) page. If magnet PSs won't reset check QPM status on T75 (QPM 1) page – reset them.

3. Check the following devices on T75 (hivolt 1) page
    a. T:L2COLV TEL2: Collector Voltage…….5100 V
    b. T:L2CATV Cathode PS voltage….....……..…5 kV
    c. T:L2FILI TEL2:Filament Current……6.2 A
    d. T:L2GABV TEL2: Anode Bias Voltage……..200 V
    e. T:L2EPV TEL2: Profiler Voltage.....0 V

4. Reset vacuum interlock on T75 (general1) page

5. Follow procedure „Operating TEL2 for abort gap cleaning"

Troubleshooting:

1. Vacuum interlock won't reset – electron beam hits the gun electrodes or the beam pipe – check all magnets.

2. Magnet PS won't reset – QPMs detected a quench – reset QPMs.

3. Vacuum in E-8 – E-7 range – same cause as 1 – turn off T:L2MCV, check magnets

Fast cleaning

* TEL2 timing (T:L2DLY1) can be varied for faster cleaning. The range 110 – 193 rfc has been tested for electron pulse width of 750 ns. It is recommended to watch the TEL2 signals on tel2scope.fnal.gov (131.225.128.219) while changing the delay value. Use caution!