
TOROID DE-GAUSSING **PROCEDURE**

This procedure describes how to de-gauss the Toroid magnet in the collision hall.

Approvals:

_____ (CDF Department Head)

_____ (Date)

1.0 Controlled Copies of this procedure.

Copies of this procedure are located in :

1. CDF Department Office
2. CDF Gas Tech. Operations Bench
3. CDF Operations Electrical Group Leaders Office

All other copies will be marked, " INFORMATIONAL COPY ONLY "

2.0 The Procedure.

1. The following procedures must be done before continuing on with this procedure.

**CDF procedure 501 "Toroid System Inspection " and
CDF procedure 502 " Toroid Power supplyLCW Checklist Procedure"
CDF procedure 17 up to step 5 " CDF Toroid Power On Access
Procedure"**

**THIS PROCEDURE REQUIRES ACCESS WITH POWER
ON THE TOROID MAGNET AND SPECIAL PERMISSION
MUST BE OBTAINED FROM THE SR. ACCELERATOR SAFETY
OFFICER TO DO THIS.**

**THREE PEOPLE ARE NEEDED TO PERFORM THIS PROCEDURE.
TWO IN THE COLLISION HALL AND ONE AT THE SUPPLY.**

FOLLOW ALL NUMBERED STEPS IN SEQUENCE

2. Make sure Toroid Power supply is locked and tagged out with the
" **Toroid Administrative Lock** ".

Keys to administrative locks are only issued to personnel trained and authorized to operate the device in question. The training insures that qualified operators are familiar with all the hazards associated with the equipment.

The key for the "Toroid Administrative Lock" can be obtained from cryogenics personnel. It is key #17 in their key tree.

3. Check Collision Hall air ventilation system. (lower level elevator area.) Fans to be checked are: FC-1, FC-2, FC-3 and FC-4. Any 2 of 4 should be ON.
4. Obtain permission to turn on TOROID POWER SUPPLY from the CDF Scientific Coordinator (ext. 2079).

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5. Have the SOD Operator obtain permission to turn on TOROID POWER SUPPLY from the Accelerator Main Control Room Crew Chief (ext. 3721). Wait till The SOD operator tells you that he has been given permission.
 6. The power supply **MUST BE OFF** whenever reversing switch door is open. The person who is going to open the reversing switch door must put another lock and tag on the power supply disconnect switch following Fermilab lockout/tagout procedures and maintain this key in his position through STEP 9.
 7. Make access into collision hall following appropriate access procedures, to install gauss meter.
 8. Open door on appropriate reversing switch and measure voltage to insure voltage is zero. It takes 5 minutes for the voltage to reach zero if the supply was operating at 1000 Amps. If zero volts is measured, reverse polarity by putting switch into down position and close door.
 9. The person who opened the reversing switch door should now go back up to the toroid power supply and remove their lock and tag.
 10. Reenter the collision hall and inform power supply operator that you are ready to proceed.
 11. The power supply operator can now turn on 1000 amp circuit breaker in power panel DHP-B0-3, location: Cryo-console area.
NOTE: Rotating red light at Power Supply Magnet Filter should now be ON.
 12. Unlock and remove the " **Toroid Administrative Lock** " from the power supply disconnect.
 13. Remove Accelerator Safety Interlock and install test jumper plug.
 14. Turn on power supply disconnect.
 15. Control function switch should be in Local.
 16. Turn on control power switch.
 17. Reset interlocks (fault reset).
 18. Power supply operating mode - current regulate mode.
 19. Reference module - Internal
 20. Time Constant setting - .3 seconds

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21. Check internal reference potentiometer control - it should be set to zero on reference module.
 22. Inform the people in the collision hall that you are about to turn on the power supply. Wait until they respond that they understand and are clear of the magnet.
 23. Turn D.C. on.
 24. Operating current is approximately 100 amps. Begin slowly !! increasing internal reference on reference module. (approximate dial setting 103). Approximately $\Delta v/\Delta t = 10$ volt/sec.
Note: Front Panel voltage and current meters should not be relied upon. Use a digital Voltmeter.
 25. The person in the collision hall should notify power supply operator when the field reaches zero and you want the power supply turned off.
 26. SLOWLY decrease internal reference on reference module to zero $\Delta 10$ v/sec.
 27. Turn D.C. off.
 28. Turn off control power switch and inform people in the collision hall that power is off.
 29. If further de-gaussing is needed repeat steps 16 thru 28, adjusting current appropriately. **Note if at any time the reversing switch door must be opened because of over shooting in the wrong direction repeat steps 6 thru 28.**
 30. Turn off power supply disconnect and lock it out with the " **Toroid Administrative Lock** ".
 31. The power supply operator should inform the people in the collision hall that the supply is off.
 32. The person who will open reversing switch door to put the switch back up into its normal position must now exit the collision hall and put a lock and tag on the power supply disconnect switch following Fermilab lockout/tagout procedures and maintain this key in his position through STEP 35.
 33. The person who will be opening the reversing switch door can now open it and measure the voltage. It should read zero volts.
 34. If zero volts put reversing switch back to the normal position and close the door.
 35. Remove personal locks from the toroid power supply.
DO NOT REMOVE THE " Toroid Administrative Lock ".

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36. Remove Accelerator Safety Interlock test jumper and install Accelerator Safety Interlock
plug.
 37. Proceed to step 5 in CDF PROC-17.
 38. Complete CDF PROC - 505 "Toroid Power Supply Turn Off Procedure "
 39. Sign toroid checklist sheet on front of toroid power supply.

3.0 Checklist

See Next Page

4.0 Deviations from the Procedure

NONE

5.0 Required Training and Authorized Training Personnel.

You must go through this procedure with an instructor and demonstrate that you have a good working knowledge of it.

The training must be documented on a standard Fermilab Training Form and the completed form must be inserted in the CDF Department Office copy of this procedure.

List of authorized instructors.

Keith Schuh	ID # 2282
Mark Knapp	ID # 5384

Both are qualified because of work experience with the toroid system.

6.0 Training Materials.

Section 2.0 of this procedure, Fermilab training sheet and a tour of the toroid power supply and LCW systems. CDF PROC-17 and CDF PROC-501,502,505.

7.0 List of Trained People for this procedure.

Eventually the list may reside in a lab-wide database.

Until that time, a list of trained personnel for this Toroid De-Gaussing Procedure should be maintained in the CDF Department Office copy of the procedure in a separate section at the end of this procedure.

The CDF Department is responsible for the list and for updating all the copies.

8.0 References and Supporting Documentation.

None