

MICE Muon Beam: conventional magnet power supplies: operating instructions

Preconditions:

1. Method statement and risk assessment agreed by Hall Manager/Principal Contractor¹ and/or MOM². **Authorisation to work obtained**;
2. Keys to magnet power supplies that will be operated obtained from MICE Hall Manager/Principal Contractor or MOM;
3. Area around magnet power supplies and magnets appropriately signed and fenced off;
4. Magnet Control PC in MICE Local Control Room must be booted up. (User ID/password available on the MICO Passwords page);
5. Magnet check list must be completed, see below.

Magnet power supply operating instructions

Powering up:

1. Remove padlock from power supply breaker and turn supply on; see **Appendix 1** for locations of the power supplies (a convenient place to store the lock while it is not in use is on top of the supply rack);
2. Twist 'Emergency Off' button so that button springs out into 'enable' position;
3. Use power-supply controls to:
 - i. If interlock warning LED is lit, identify and reset any interlock warnings;
 - a. Select 'Intl';
 - b. Select 'Internal' and 'External' and record interlock condition. Press 'Reset'. If this does not clear interlock alarm, contact MOM;
 - c. Once interlocks cleared, proceed to 3.ii.
 - ii. Set power supply to remote control:
 - a. Select 'CMD';
 - b. Select 'REM'.
4. From Magnet Control PC in the MLCR:
 - i. From the main menu panel click: "Magnet Power Supplies";
 - ii. Either select the power supply you want to operate, or select 'All'.

A panel will appear with the name of the power supply at the top (or, if 'All' was selected, a list of all magnets). See **Appendix 2** if the panel is in black/white and not operational. This panel contains "Status" and "Control" boxes.

The control box lets you control the supply. The status box:

 - Tells you the current and voltage for the power supply;
 - The green "LED" will be bright if the power is on;
 - The red "LED" will be bright if any interlocks are tripped.

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- iii. To turn the supply on or off select the "Power" switch. To turn on the power supply select 'On'; to turn it off, click 'Off';

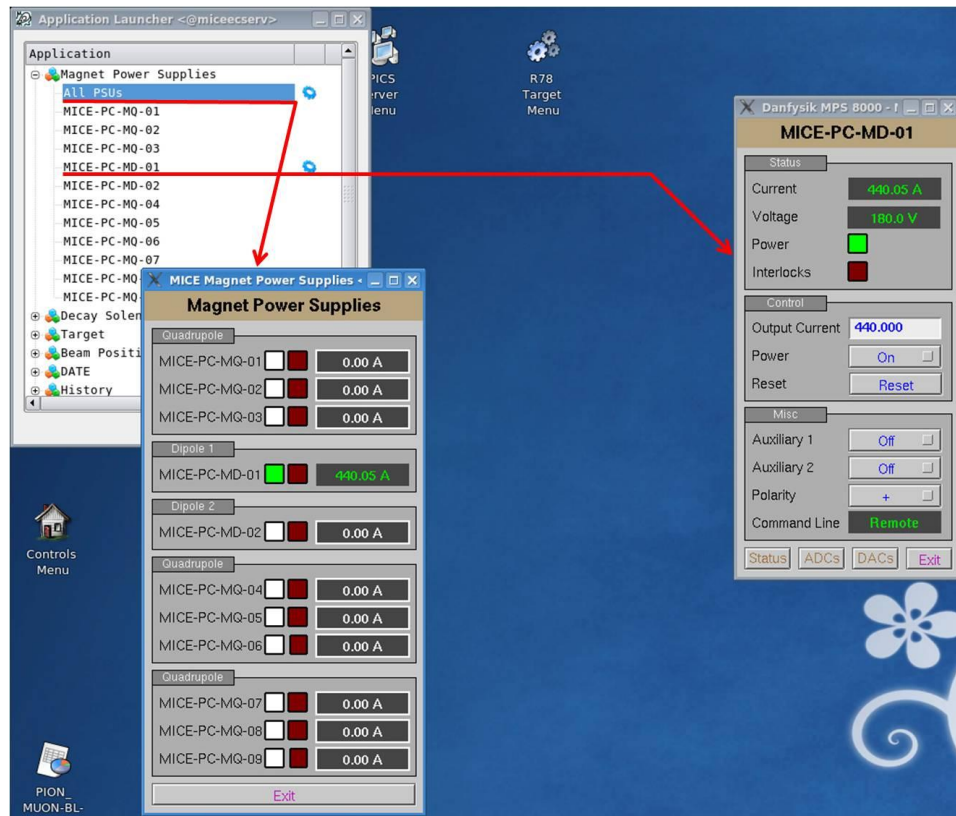


Figure 1: a screenshot from XXXXX machine in the MICE LCR showing the Application Launcher, the Power Supplies monitor and the Dipole1 (D1) control panel.

- iv. To set the current, type a number into the blue "Output Current" box and hit 'Enter' or 'Return'.
5. If the supply has tripped click the brown "Status" button at the bottom. This will bring up a larger panel showing all the status information. The red "LEDs" on the left show the current state of the latched interlocks.
- The yellow "LEDs" show the state at the time the trip occurred.
- Click the blue "Reset" button to reset the interlocks.
6. Fig. 1 shows the monitor and control panels for the Beamline conventional magnets.

Turning off:

1. Set the current to '0' using the control programme on the Magnet Control PC;
2. Turn the power supply off at the Magnet Control PC;
3. Go to the power supply in the MICE Hall and:
 - i. Set the power supply to 'Local':
 - a. Select 'CMD', then 'Local';

- ii. Press the 'Emergency off' button;
 - iii. Set the circuit breaker to OFF;
 - iv. Lock the circuit breaker in the OFF position.
4. Return the magnet-power-supply key to the MICE Hall Manager/Principal Contractor or MOM.

Completing magnet power supply check list

1. Obtain magnet check list from folder in MLCR, fill in name, name of MOM, date, and time;
2. Strike out magnets that will not be used;
3. Check water flow to magnet is greater than minimum:
 - i. Compare meter readings to the reference values given on the magnet check list. These values are handbook minima for the flow through Q1 – Q3, D1 and D2, and measured minima for Q4 – Q9. It is necessary to do this manually at the location of the meters in the Hall. See Appendix 1 for the locations of the flow meters;
4. Magnet power-supply polarity (MGT/PS polarity) must be checked at the back of the power supply:
 - i. With power supply OFF, open the back of the power supply. The wiring convention is:
 - For positive particles, the positive lead should be connected to the positive terminal and the negative lead to the negative terminal;
 - For negative particles, the negative lead should be connected to the positive terminal and the positive lead to the negative terminal.See MICE Note 198 for further details;
5. Check that all interlocks on the power supply are cleared (PS Interlocks column on check list). Instructions to clear interlocks are given above. If the water-flow interlock on, it may be necessary to adjust the water flow manually, contact the MOM;
6. Check that the control from the Magnet Control PC in the MLCR is available (MLCR CTRL on the check list);
7. Finally, if all magnet conditions are 'OK' tick the magnet OK box on the check list.

Appendix 1 – Location of the power supplies in the MICE Hall

Q1,2,3 in a single rack behind the staircase to the second floor, North-East corner.



Rack with **Q1,2,3**
power supplies and
remote control

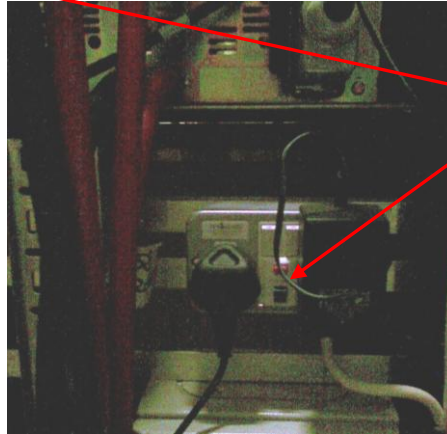
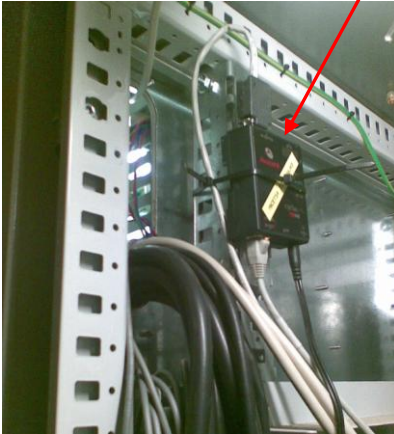
(Note that the orange locking tabs must be removed in order to turn on the supplies)

D1,2 and Q4-9 along the North wall of the MICE Hall



Appendix 2: Problems with the remote control from the PC micecon1

Check the status of the remote control unit and its communication with the PC micecon1: locate the remote control unit in the rack with power supplies for D1,2,3, (see Appendix 1) open its rear door (key available in the key press at the North-West corner of the hall) and locate the communication unit (see **photo**). The LEDs should blink indicating data transfer. If not, reset the power of the unit by pressing the red and then the black buttons on the power socket (see **photo**) the two red **LED** on the front panel should blink. If not, reset the unit by switching OFF/ON.



The communications computer in the power-supply rack may also need to be initialised. To do this, start a Terminal window on the MICECON1 PC in the MICE LCR and type the following:

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telnet micets4 7001<return>
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<return>
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Ctrl-x
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after which VxWorks will boot on the remote computer and issue many messages, which may be ignored and the Terminal window closed.

Appendix 3 – Location of water flow meters for magnets & power supplies.

System	Location	Reference flow rate	Photo	Comment
D1, Q1-3 Mgts	Within cage entrance to DSA	D1 > 22 l/m Q1,2,3 > 25 l/m		If flow too low contact J.Govans, extn 1804 or from ISIS MCR
D2, Q4-9 Mgts	In 2 boxes in the water trench, opposite to entry staircase	D2 > 22 l/m Q4,5,6 > 23 l/m Q7,8,9 > 23 l/m		If flow too low, adjust yellow levers on both flow & return (see on both photos)

<p>All power supplies</p>	<p>In the water trench, at far end near the synchrotron wall and around the entry staircase</p>	<p>Flow-meters between the marks</p>	 A photograph showing a series of industrial flow meters and valves mounted on a metal rail. The flow meters are cylindrical with red and yellow markings. Blue and red hoses are connected to the system. The background shows a dimly lit industrial environment.	<p>If flow too low, check yellow/red valve open. Also check disc valve open.</p>
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