

4.5 MANUAL CONTROL DEFLECTION UNIT (MCDU-4C)

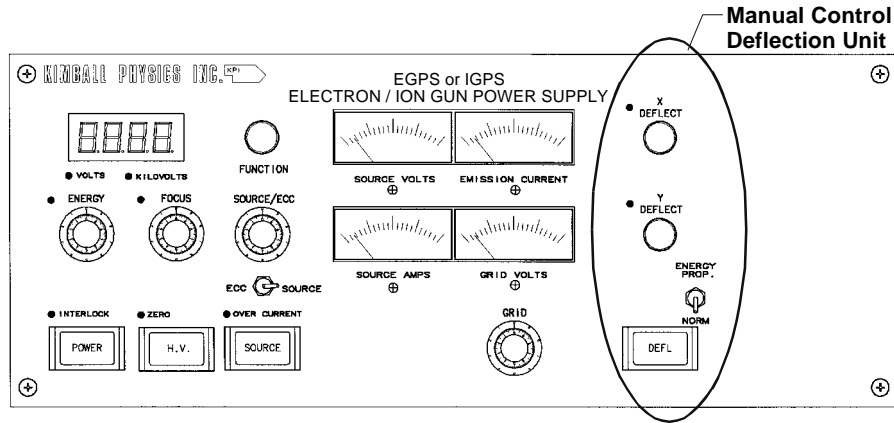


Figure 4.5.1 Front Panel of a typical Power Supply with Deflection, showing MCDU controls

The Deflection assembly consists of two pairs (X and Y) of deflection plates located near the beam-exit end of the gun. Potentials applied to these plates produce a deflecting force in a plane perpendicular to the direction of beam travel. Deflection, also called centering deflection, allows the beam to be guided by the operator to the target. For initial set-up and positioning, the spot can best be observed using a phosphor screen in the target area.

DESCRIPTION OF CONTROLS

- Deflection Switch:** A blue pushbutton switch labeled **DEFL** that enables or disables the power supplies in the deflection unit. (When off, outputs are grounded, so the deflection plates are grounded).
- X Deflection Control:** A ten-turn dial potentiometer labeled **X DEFLECT**, adjusts the deflection voltage in the X direction. A red LED next to the potentiometer indicates the monitoring of the X deflection voltage by the DVM (digital voltmeter).
- Y Deflection Control:** A ten-turn dial potentiometer labeled **Y DEFLECT**, adjusts the deflection voltage in the Y direction. A red LED next to the potentiometer indicates the monitoring of the Y deflection voltage by the DVM.
- Energy Prop /Normal Switch:** A toggle switch labeled **ENERGY PROP /NORMAL** switches the deflection output from the “energy proportional mode” to the normal “non-proportional mode”.
- Energy Prop. mode:** The deflection voltage is proportional to the beam energy as energy is changed. This enables *approximately* constant positioning of the spot as the beam energy is changed.
- Normal mode:** The deflection voltage remains constant as the beam energy is changed.
- Range switch: (Optional)** An optional toggle switch labeled **HIGH/LOW** that sets the range of the deflection voltages to be either -150 V to +150 V, or -10 V to +10 V.

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DEFLECTION OPERATION

1. Power Supply:
 - a. Press the blue **DEFL** pushbutton to turn on the Deflection unit; the pushbutton will light.
2. Select the mode with the **ENERGY PROP /NORMAL** toggle switch:
 - a. **In Energy Proportional mode:** The deflection voltage is proportional to the beam energy as energy is changed. This enables *approximately* constant positioning of the spot as the beam energy is changed.
For example: If Energy = 500 V initially and X Deflection = 50 V, when Energy is turned down to 50 V, the X Deflection voltage "tracks" down to 5 V.
 - b. **In Normal mode:** The deflection voltage remains constant as the beam energy is changed.
3. Monitoring Deflection voltages:
 - a. Set the rotary **FUNCTION** switch (on the Power Supply next to the DVM) so that either the X Deflect or Y Deflect LED (next to the corresponding deflection control knob) lights up.
 - b. Monitor the voltages on the deflection plates using the **DVM** (Digital Volt Meter).
4. Adjusting the Deflection plate voltages:
 - a. Using the **X DEFLECT** and **Y DEFLECT** potentiometers, vary the output voltage between -150 V and +150 V as needed to center or position the beam in the X and Y directions within the target plane.
(For an EMG-12 or EMG 14 Electron Gun: The range is -300 V to +300 V.)
 - b. **With the optional range switch:** This toggle switch controls the sensitivity of the X and Y potentiometer controls and the DVM display.
HIGH range = -150 V to +150 V, **LOW** range = -10 V to +10 V.
 - c. For initial set-up and positioning, the spot can best be observed using a phosphor screen in the target area.
5. To turn off the MCDU: Press the **DEFL** pushbutton switch off, (out position). Other MCDU controls may remain as set to simplify start up. When off, outputs are grounded, so the deflection plates are grounded.

NOTE: Depending on the gun model, non-uniformities in the deflecting electric field may cause the spot to become distorted if the beam is deflected too close to the deflection plates. Better spot shapes will be achieved if the amount of deflection is kept to a minimum. (See discussion in the theory section.)

This completes the Manual Control Deflection Unit Instructions.