

ESERCITAZIONE DI ELETTRONICA

Scopo dell'esercitazione è prendere familiarità con gli strumenti del laboratorio e dimostrare sperimentalmente la teoria studiata sull'amplificatore operazionale montato nelle due diverse configurazioni: invertente e non invertente.

STRUMENTAZIONE

Scopo di questa esercitazione è acquisire familiarità con gli strumenti di laboratorio.

Strumentazione da laboratorio necessaria:

- Alimentatore in continua



Front Panel

Figure 2 shows the front-panel controls, connectors, and indicators with brief descriptions following the figure.

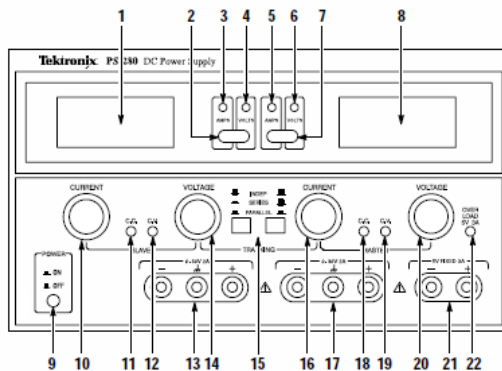


Figure 2: PS280 or PS283 Front Panel

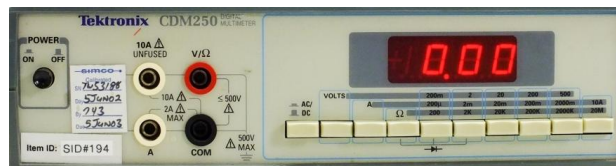
1. LED Display. Lights when the instrument is turned on. The numbers indicate the voltage or current produced by the left variable power supply.
2. AMPS/VOLTS Switch. This switch selects whether the LED display for the left variable power supply shows the current or the voltage. If the switch is pushed to the left, the display shows the current. If the switch is pushed to the right, the display shows the voltage.
3. AMPS Indicator. Lights when AMPS is selected with the AMPS/VOLTS switch for the left variable power supply.
4. VOLTS Indicator. Lights when VOLTS is selected with the AMPS/VOLTS switch for the left variable power supply.
5. AMPS Indicator. Lights when AMPS is selected with the AMPS/VOLTS switch for the right variable power supply.
6. VOLTS Indicator. Lights when VOLTS is selected with the AMPS/VOLTS switch for the right variable power supply.
7. AMPS/VOLTS Switch. This switch selects whether the LED display for the right variable power supply shows the current or the voltage. If the switch is pushed to the left, the display shows the current. If the switch is pushed to the right, the display shows the voltage.
8. LED Display. Lights when the instrument is turned on. The numbers indicate the voltage or current produced by the right variable power supply.
9. POWER Button. Turns on the instrument when pressed. When pressed again, it turns off the instrument.
10. CURRENT Knob. Use this control to set the output current for the right, variable power supply. If the instrument is in a tracking mode, the left power supply is the slave and the CURRENT knob has no effect.
11. C.C. Indicator. If this is lighted, the left variable power supply is producing a constant current. See Figure 3 on page 10 for an illustration of the constant voltage/constant current cross-over point.
12. C.V. Indicator. If this is lighted, the left variable power supply is producing a constant voltage. See Figure 3 on page 10 for an illustration of the constant voltage/constant current cross-over point.

13. Output Terminals. These terminals for the left, variable power supply allow you to plug in the test leads as follows:
 - The red terminal on the right is the positive polarity output terminal. It is indicated by a + sign above it.
 - The black terminal on the left is the negative polarity output terminal. It is indicated by a – sign above it.
 - The green terminal in the middle is the earth and chassis ground.
14. VOLTAGE Knob. Allows you to set the output voltage for the left variable power supply. If the instrument is in a tracking mode, the left power supply is the slave and the VOLTAGE knob has no effect.
15. TRACKING Buttons. These buttons select the test mode of the instrument. The PS280 or PS283 features two tracking modes: series and parallel. If both push-button switches are disengaged (out), the two variable power supplies operate independently. If the left switch is pushed in, the instrument operates in series mode. If both switches are pushed in, the instrument operates in parallel mode.

In series mode, the master power supply controls the voltage for both power supplies, which can then range from 0 to 60 V. Refer to *Series* on page 20 for further details.

In parallel mode, the master power supply controls both the voltage and the current for both power supplies. The current can then range from 0 to 4 A (0 to 2 A for the PS283). Refer to *Parallel* on page 22 for further details.
16. CURRENT Knob. Use this control to set the output current for the right, variable power supply. If the instrument is in a tracking mode, the right power supply is the master and the CURRENT knob affects both variable power supplies.
17. Output Terminals. These terminals for the right, variable power supply allow you to plug in the test leads as follows:
 - The red terminal on the right is the positive polarity output terminal. It is indicated by a plus (+) sign above it.
 - The black terminal on the left is the negative polarity output terminal. It is indicated by a minus (–) sign above it.
 - The green terminal in the middle is the earth and chassis ground.
18. C.C. Indicator. If this is lighted, the power supply is producing a constant current. See Figure 3 on page 10 for an illustration of the constant voltage/constant current crossover point.
19. C.V. Indicator. If this is lighted, the power supply is producing a constant voltage. See Figure 3 on page 10 for an illustration of the constant voltage/constant current crossover point.
20. VOLTAGE Knob. Allows you to set the output voltage for the right variable power supply. If the instrument is in a tracking mode, the right power supply is the master and the VOLTAGE knob affects both variable power supplies.
21. Output Terminals. These terminals for the 5 V FIXED power supply allow you to plug in the test leads as follows:
 - The red terminal on the right is the positive polarity output terminal.
 - The black terminal on the left is the negative polarity output terminal.
22. The overload indicator lights when the current on the 5 V FIXED power supply becomes too large.

- **Multimetro**



Front Panel

Figure 2 shows the front-panel controls, connectors, and indicators with brief descriptions of the items following the figure.

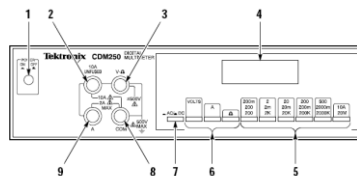


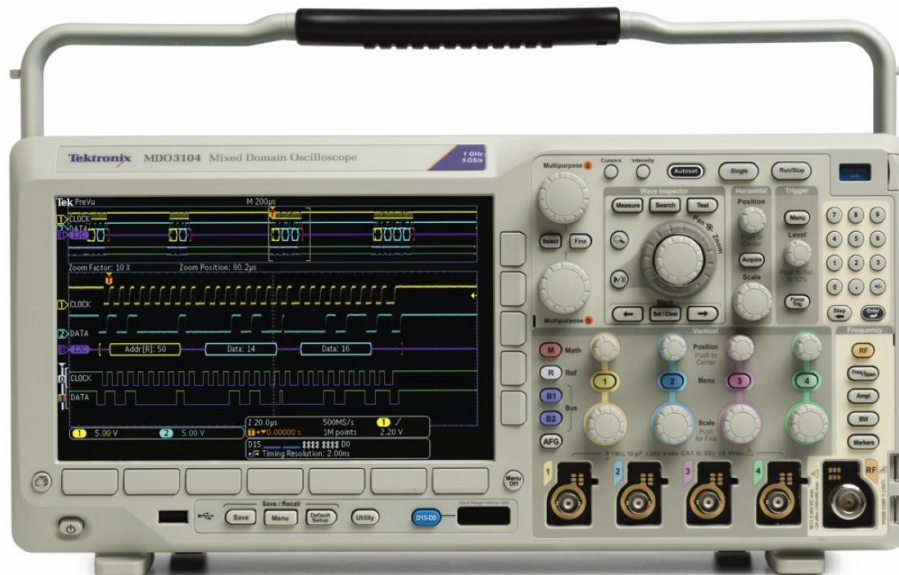
Figure 2: Front Panel

1. POWER button. Powers the CDM250 on or off. Power ON is indicated by the LED display.
2. 10 A UNFUSED jack. Input connector for positive (red) test lead when instrument is used to measure high current (over 2 A but less than 10 A).
3. V-Ω Input connector for positive (red) test lead. Used for AC volts, DC volts, and ohms (Ω) functions.
4. LED Display. Shows voltage, current, or resistance value. Display shows the number 1 at the extreme left in an overrange condition. Negative voltages or currents are indicated automatically with a minus (–) sign at the extreme left of the display.
5. RANGE buttons. Push to select the highest value of the voltage, current, or resistance to be measured.
6. FUNCTION buttons. Push in only one button to select VOLTS (voltage), A (current), or Ω (resistance). Only one function will work at a time.
7. AC/DC button. Push in to measure alternating current or AC voltage; reset to the out position for direct current or DC voltage. The AC/DC button may be in either position when the meter is used for checking resistance.
8. COM jack. Input connector for common (black) test lead. Used for AC or DC volts, ohms, and current functions. This connector is not connected to the power source ground through the instrument.
9. 2 A jack. Input connector for positive (red) test lead when instrument is used to measure current values up to 2 A.

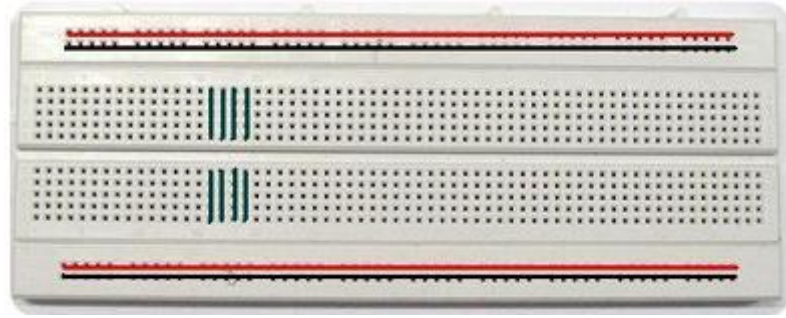
- *Generatore di funzioni*



- *Oscilloscopio (per la visualizzazione contemporanea del segnale di ingresso e di uscita);*



- *Bread-board (basetta) su cui montare il circuito.*



- *Componentistica varia*



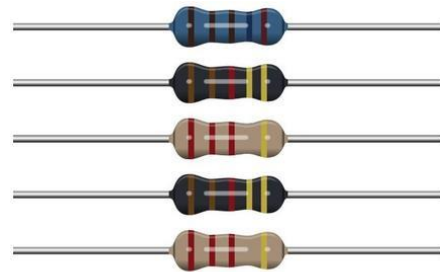
Cavo banana-coccodrillo



Vaco BNC-coccodrillo



Cavo BNC-BNC



Resistenze

ESERCITAZIONE 1

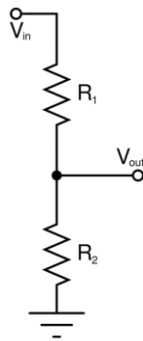
A) Fornire all'oscilloscopio (sul canale 1) un segnale sinusoidale di ampiezza pari a 2V picco-picco e frequenza pari a 200 Hz.

Settare opportunamente l'asse delle x e delle y del canale 1 affinché il segnale sia correttamente visualizzato. Tramite la funzione misure dell'oscilloscopio valutare la frequenza, la media, l'ampiezza di picco e quella picco-picco del segnale sinusoidale.

Ripetere la procedura nel caso di un onda quadra (0-5V) e frequenza pari a 200 Hz.

B) Misurare tramite il multimetro il valore delle tre resistenze fornite.

C)



Realizzare il circuito in figura, applicando all'ingresso, mediante il generatore di funzione, un segnale sinusoidale di frequenza pari a 200 Hz e di ampiezza pari a 1V picco-picco. Mediante l'oscilloscopio, visualizzare e confrontare le forme d'onda di ingresso e di uscita.

Confrontare il risultato teorico con quello sperimentale.

Visualizzare tramite la funzione xy dell'oscilloscopio la relazione tra la forma d'onda di ingresso e di uscita.