EDULABS DIDACTIC

POWER ELECTRONICS TRAINER

EXPERIMENT 27

EXPERIMENTS MANUAL

Objectives: The trainee is able to

1. Acquaintance the principle of Bedford Inverter.
2. Examine the DC to AC conversion through the Bedford Inverter.
3. Measure the voltage and current

Experiment Lists

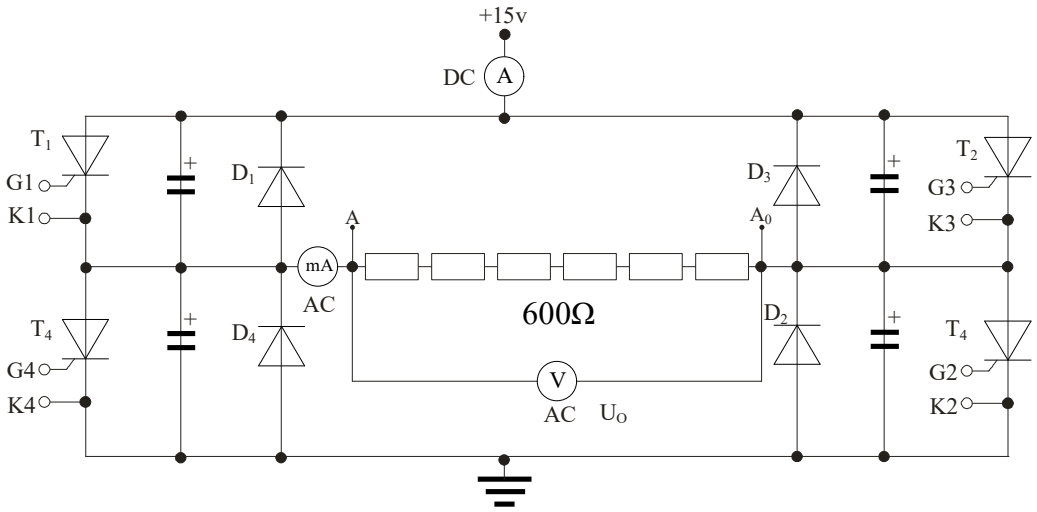
Experiment 27.1: DC to AC conversion using Bedford Inverter

Equipment Requirement

No.	Item	Model	Quantity
1	Group of Diode Module	EM-21-01-03	1
2	Group of SCR Module	EM-21-01-05	1
3	Two Pulse Controller	EM-21-02-01	1
4	PWM Controller	EM-21-02-03	1
5	Resistive Load Module (I)	EM-21-03-01	2
6	Capacitive Load Module	EM-21-03-03	2
7	Three Phase AC Power Supply	EM-21-04-01	1
8	DC Power Supply	EM-21-04-02	2
9	DC Ammeter	EM-30-13-02	1
10	AC Voltmeter	EM-30-13-03	1
11	AC Milliammeter	EM-30-13-05	1
12	4mm Stackable Connecting Lead Set	EM-30-15-12	1 Set
13	19mm Shunt Plug Set	PTL-2170	6
14	Digital Storage Oscilloscope	GDS-806S	1

Procedure

Experiment 27.1: DC to AC conversion using Bedford Inverter



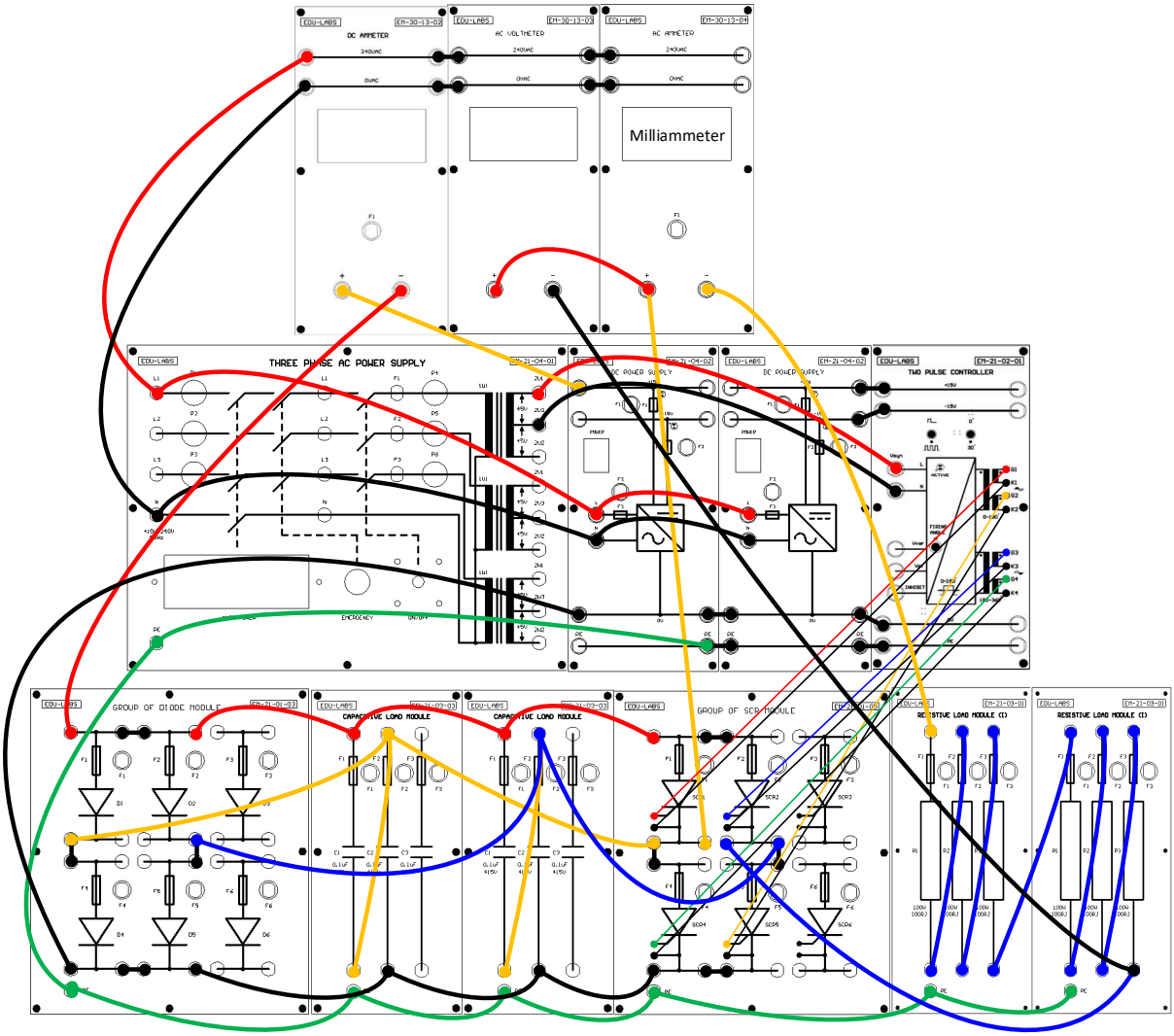


Figure 27.1 Wiring Diagram for Bedford Inverter

NOTE: DO NOT CONNECT THE +15 AND -15V TERMINALS OF THE DC POWER SUPPLY TO THE OTHER DC POWER SUPPLY TO PREVENT BURNING OF BOTH THE DC POWER SUPPLIES.

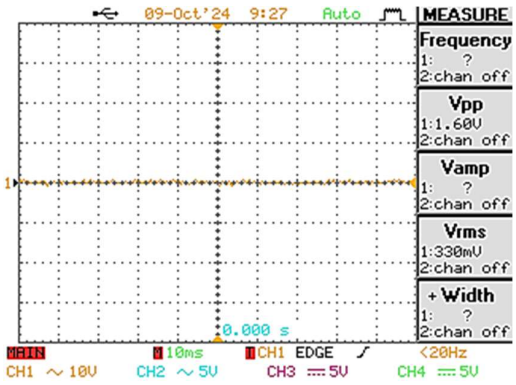
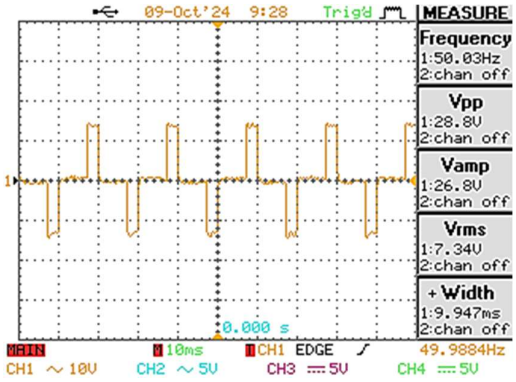
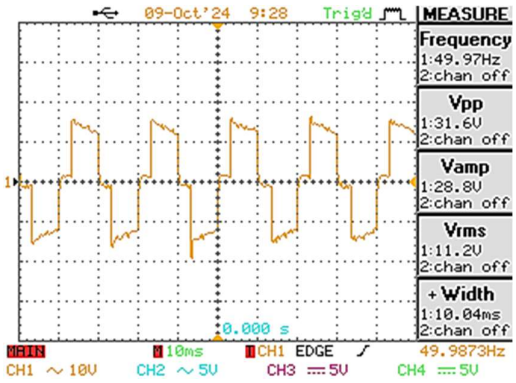
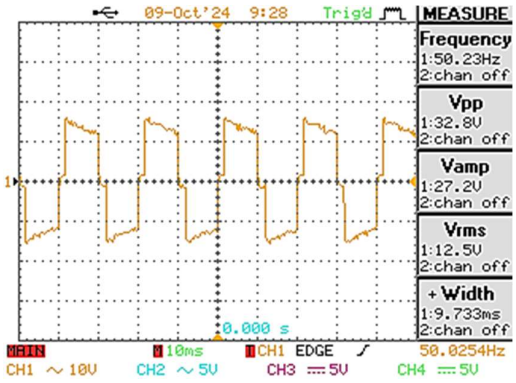
1. Construct the circuit according to circuit diagram Figure 27.1.
2. Connect the terminal of two pulse controller G1, G2, K1 and K2 to the corresponding gate and cathode terminal of SCR (for delay angle $\alpha = 0°$ to $180°$) and connect terminal G3, G4, K3 and K4 (for delay angle $\alpha = 180°$ to $360°$)
3. Connect the voltage supply ± 15 V to two pulse controller
4. Interconnect the two pulse controller terminal between V_{st} and V_{var}
5. Connect the power Supply; 2U1 and 2U3 to the synchronization voltage (V_{syn}) L-N, relatively
6. Use DC Ammeter (EM-30-13-02) to measure the input current; I_S
7. Use AC Voltmeter (EM-30-13-03) to measure the output voltage; U_O (average).
8. Use AC Ammeter (EM-30-13-04) to measure the output current; I_O (average).
9. Oscilloscope setting;
   - Time/Div = 10ms
   - Volts/Div = 10V
   - Coupling = Channel 1 (AC Coupling)
6. Switch on the DC power supply and the Three Phase AC power supply.
7. Measure and record the voltage U_O Table 27.1.1.
8. Connect CH1 to A and ground lead probe to A0. Turn ON the power supply and record the output voltage waveform; U_O, and output current; Io on Table 27.1.1.
9. Repeat step 6 to step 14 by adjusting the firing angle; α to 0°, 45°, 90°, 135°, 180°. Record all the waveform on Table 27.1.1.
10. Switch off the DC power supply and the Three Phase AC power supply.

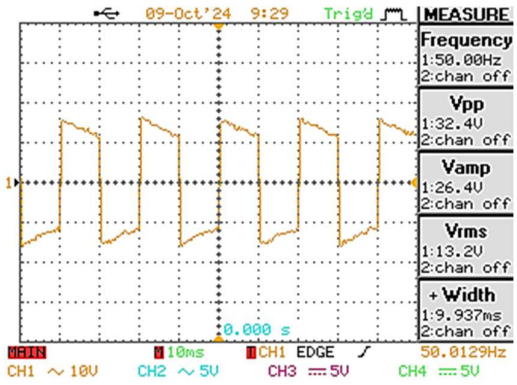
Experimental Table 27.1.1

Firing Angle	Waveform	Uo (VAC)	Io (AAC)
0°			

45°			
90°			
135°			
180°			

Expected Result Table 27.1.1

Firing Angle	Waveform	Uo (VAC)	Io (AAC)
0°		2V	0A
45°		6V	10mA
90°		11V	15mA
135°		13V	19mA

180°	 09-Oct'24 9:29 Trig'd MEASURE Frequency 1:50.00Hz 2:chan off Vpp 1:32.4V 2:chan off Vamp 1:26.4V 2:chan off Vrms 1:13.2V 2:chan off +Width 1:9.937ms 2:chan off 0.000 s MAIN 10ms CH1 EDGE 50.0129Hz CH1 10V CH2 5V CH3 5V CH4 5V	16V	22mA

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