



## DC DRIVE

### 3 PHASE DC CONVERTOR CARD



Power Source specification	Input - 380-480V 3 Phase AC 50/60Hz
Output Specification	Output - 01V - 540V DC $\pm$ 10%
Suitable for	Motor with permanent magnet Motor requiring field supply
Reference	0-10V DC or 4-20mA Reference type 1). Tone (Variable Resistance) 2). PID controller
Weight	1.55 Kg
Size	297 $\times$ 190 $\times$ 50 mm

We offer our clients a wide range of DC motor control cards in single phase options. These Cards are compact, all-in-one, low cost products that are known for their high functionality and modern interface. All the cards are entirely plug-ins

3 Phase Fully Controlled AC To DC Converter Card is suitable for

- a). DC Motor**
- b). DC Heater**
- c). AC Heater**
- d). Induction Heating**
- e). Variable transformer Input**
- f). Slow starter**

The cards have various control features like built in

- 1) Over temperature
- 2) Over voltage
- 3) Short circuit
- 4) Reverse supply protection
- 5) Over current
- 6) Max Volt output limit
- 7) Acceleration time
- 8) Zero speed running
- 9) Field Fail trip
- 10) Fully plug-in connections

## Safety Instructions and Warning

- 1). Improper operation may result in serious property damage, personal injury or death.
- 2). Wiring and periodic inspections should be performed at least 10 minutes after running the motor or heater.
- 3). Operate the switches with dry hands, otherwise you may get an electric shock.
- 4). Do not use the cable when its insulation is damaged or removed.
- 5). All plugs of control card is properly connected

## Caution

Install the control card on a non-flammable surface.

Do not place flammable material nearby, otherwise fire could occur.

Disconnect the Input power if, the shock on control card, it could result in fire.

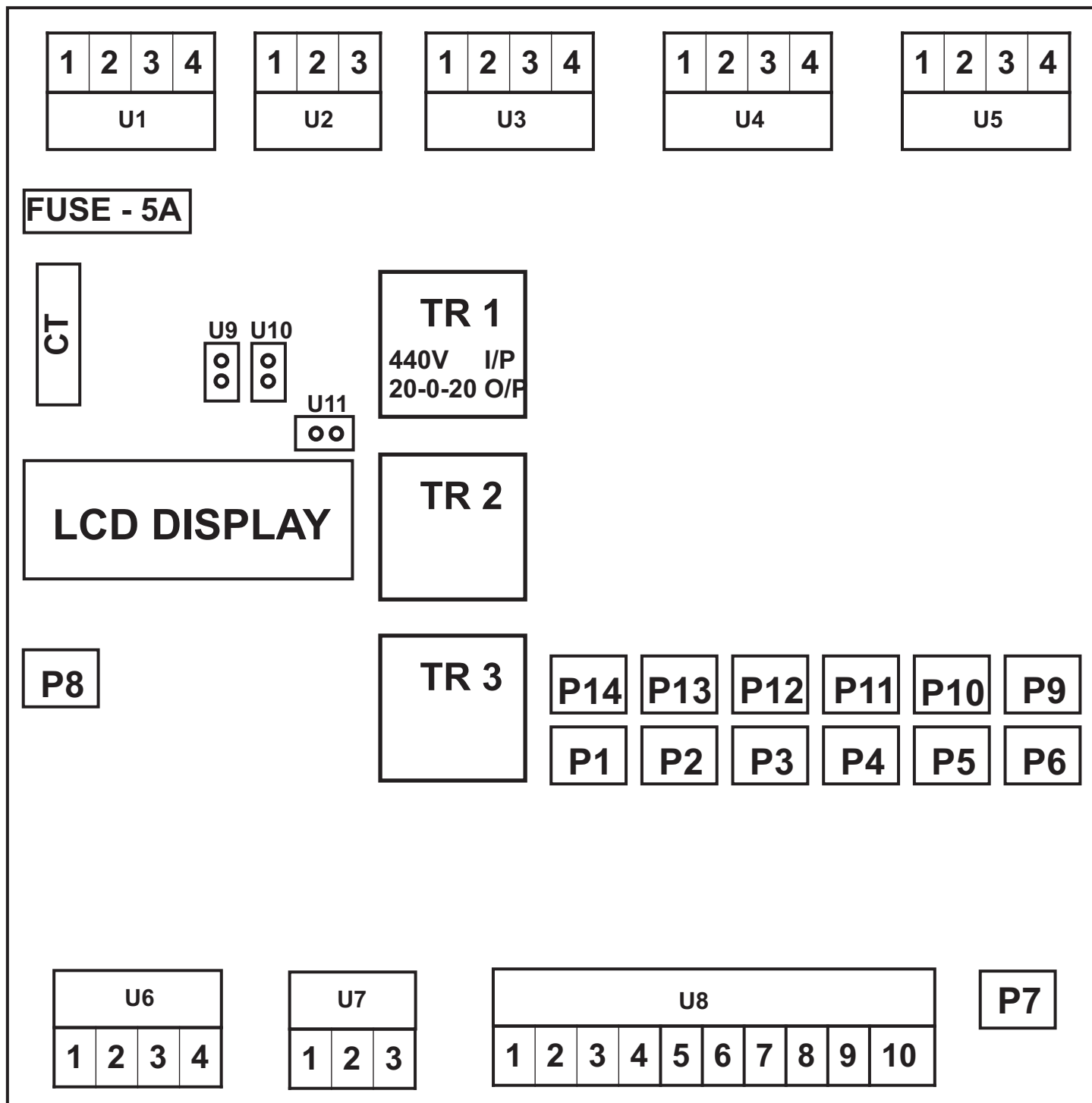
Disconnect the input power , if the part is damaged in SCR module.

Do not allow water , oil, screw driver, flammable objects and other conductive material come in contact with the control card and SCR module to avoid any possible damage.

Risk of injury or electric shock: Read the safety instruction.

Risk of electric shock : Securely ground (earth) the converter card and module.

## DRIVE BLOCK CONNECTION DIAGRAM D



## Parameter List

Symbol	Purpose	Address	Set Range
ACC	Acceleration time	P1	1.0 - 10.0 sec Time delay (between reference to output)
DEC ( ACC used also for deacceleration)	Deacceleration	P1	1.0 - 10.0 sec Time delay (between reference to output)
MIN_SPD	Minimum Speed	P2	when reference is zero, DC Volt output can be adjusted Upto 0V - 50V DC
MAX_SPD	Maximum Speed	P3	after reference is maximum, DC Volt output can be adjusted Upto 300V - 510 V DC
I_LMT	Current limit	P5	Max Ampere limit
GAIN	Stability	P6	For DC motor, smooth Rotation
ZERO	Zero adjust	P7	0 output for Reference setting
AMP	Overload Setting	P8	Over load purpose
P9 to P14		Factory Default Setting and hence should not be altered	
ENB	Run/ Stop	U8 Terminal 3-4	3-4 Closed for the card to Run 3-4 Open for the card to Stop
RLY	RLY Output	U8 Terminal 8- 9-10	8 - NO 9 - COM 10 - NC  8-9 contact is short when card is healthy & H1 and R1 is displayed  If trip occurs at T1 to T6 , 9-10 contact is short, hence Faulty
REF	Reference for speed	U8 Terminal 5-6-7	5 - 10V DC from card 6 - Ref - to card 7 - GND/COM  Used for external reference or PID reference
RST	Reset SW	U8 Terminal 1-2	1-2 short to clear tripping 3-4 Open Circuit

## TRIPPING DETAIL AND DISPLAY AS ON LCD

DISPLAY	TRIP No	DETAIL
Field Fail Trip	T1	<p>The LCD displays Field Fail Drive Trip when motor and field current is below minimum value</p> <p>Note : Short Pin 1-2 of U9 Terminal to bypass this trip.</p> <p><i>permanent magnet motor do not required Field Supply from this terminal U1 and hence is bypassed</i></p>
Feed Back Fail Trip	T2	<p>The LCD displays Feedback Fail when the armature output/ feedback is not detected at U7 Terminal : Feedback can be in the form of Volt or Techo Feedback.</p> <p>Note : Short Pin 1-2 of U10 Terminal to bypass this trip.</p>
Over Temp Trip	T3	<p>Thermal switch (NC contact) connected to U11 Terminal which is used for the safety of SCR module gets opened to avoid over heating of SCR module to keep it safe from getting damaged. Thermal switch is fixed on heat sink</p> <p>Note : Short Pin 1-2 of U11 Terminal to bypass this trip.(only when thermal switch is not used)</p>
Over Current Trip	T4	<p>This tripping can occur for two reasons</p> <ol style="list-style-type: none"> <li>1). If the output of SCR module is short circuited</li> <li>2). If more than 80% load is detected at U6 terminal (based on CT used, eg for 100/5 CT, it will be 80 Amp)</li> </ol> <p>Note : This tripping can not be bypassed manually</p>
Enable Earlier Trip	T5	<p>If run command is given to U8 Terminal Before giving supply to U2 Terminal (Main supply to Control Card)</p> <p>This happens when the processing time is not given to the card to calibrate all the data, when supply is restored.</p>
Phase Fail/Phase Seq Not OK	T6	<p>This tripping occurs at terminal U2 for two reasons.</p> <ol style="list-style-type: none"> <li>1). R, Y, B phase is not connected in a proper sequence</li> <li>2) any one of the three phases is not being detected at the terminal</li> </ol>
Drive Healthy	H1	<p>No above tripping is there i.e. T1, T2, T3, T4, T5, T6 has not occurred : the card is running in healthy condition and is displayed on LCD</p>
Drive Running	R1	<p>When enabled by short 3-4 pins, the Drive will start and display this message</p>

## CONNECTION TERMINAL DESCRIPTION

TERMINAL	PARAMETER	DESCRIPTION												
U1	Field Supply  ( Only for motor)	<p>PIN 1,2 can be provided with single phase or double phase supply as per motor specification and from this AC supply generates DC supply for the field of motor. PIN 3,4 : DC output for motor field supply</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>L</td> <td>N</td> <td>S-</td> <td>S+</td> </tr> </table> <p>This is only applicable for motor application with external bridge for Load above 5 Amp field current</p>	1	2	3	4	L	N	S-	S+				
1	2	3	4											
L	N	S-	S+											
U2	Control Card 3 Phase Supply	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">PIN U2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td rowspan="2" style="vertical-align: middle;">only this sequence must be used</td> </tr> <tr> <td></td> <td style="text-align: center;">R</td> <td style="text-align: center;">Y</td> <td style="text-align: center;">B</td> </tr> </table> <p>This Terminal serves two main purpose: 1). Provides 3 Phase supply to power the card 2). Synchronization of SCR module with U3, U4, U5</p>	PIN U2	1	2	3	only this sequence must be used		R	Y	B			
PIN U2	1	2	3	only this sequence must be used										
	R	Y	B											
U3	the SCR module of R - Phase of Terminal U2 must be in synchronization with this U3 terminal	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>G-</td> <td>K-</td> <td>K+</td> <td>G+</td> </tr> <tr> <td colspan="4" style="text-align: center;">R - Phase</td> </tr> </table> <p>This connection is used to control the Voltage of R Phase of SCR module <i>Note: For more Details Check Diagram D1,D2,D3 and D4 configuration of SCR module</i></p>	1	2	3	4	G-	K-	K+	G+	R - Phase			
1	2	3	4											
G-	K-	K+	G+											
R - Phase														
U4	the SCR module of Y - Phase of Terminal U2 must be in synchronization with this U4 terminal	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>G-</td> <td>K-</td> <td>K+</td> <td>G+</td> </tr> <tr> <td colspan="4" style="text-align: center;">Y - Phase</td> </tr> </table> <p>This connection is used to control the Voltage of Y Phase of SCR module <i>Note: For more Details Check Diagram D1,D2,D3 and D4 configuration of SCR module</i></p>	1	2	3	4	G-	K-	K+	G+	Y - Phase			
1	2	3	4											
G-	K-	K+	G+											
Y - Phase														
U5	the SCR module of B - Phase of Terminal U2 must be in synchronization with this U5 terminal	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>G-</td> <td>K-</td> <td>K+</td> <td>G+</td> </tr> <tr> <td colspan="4" style="text-align: center;">B - Phase</td> </tr> </table> <p>This connection is used to control the Voltage of B Phase of SCR module <i>Note: For more Details Check Diagram D1,D2,D3 and D4 configuration of SCR module</i></p>	1	2	3	4	G-	K-	K+	G+	B - Phase			
1	2	3	4											
G-	K-	K+	G+											
B - Phase														

## CONNECTION TERMINAL DESCRIPTION

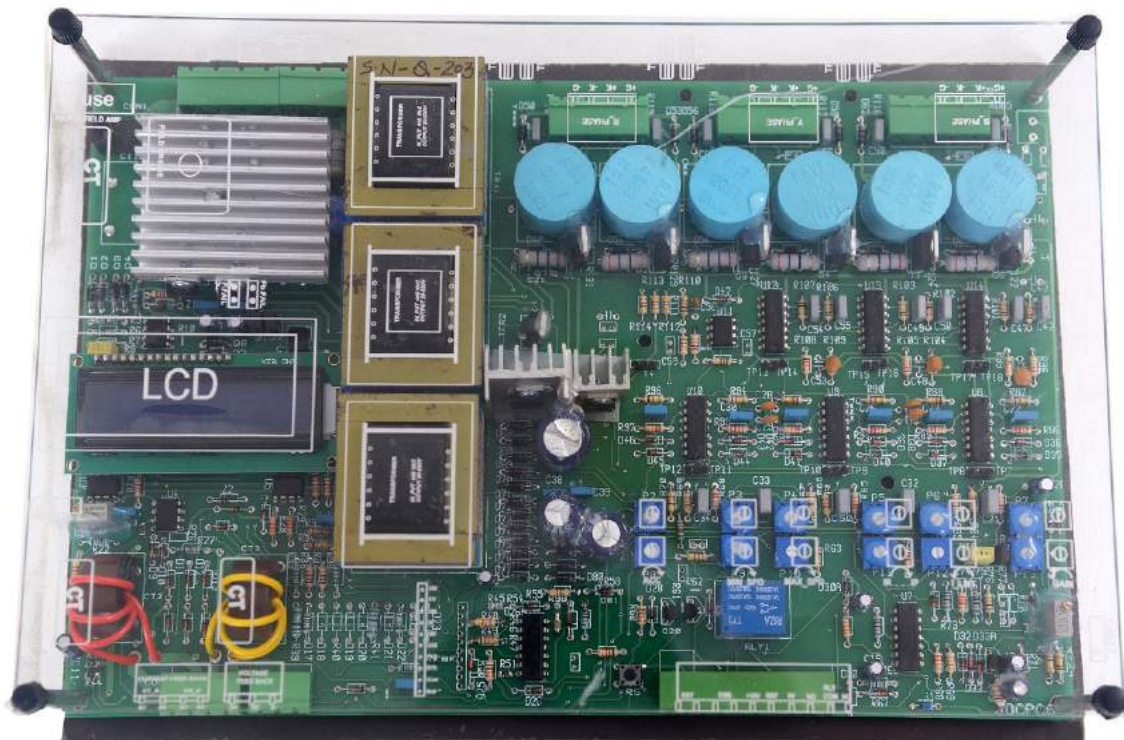
TERMINAL	PARAMETER	DESCRIPTION																
U6	CT Terminal	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td><b>S1</b></td> <td><b>S2</b></td> <td><b>S1</b></td> <td><b>S2</b></td> </tr> <tr> <td colspan="2" style="text-align: center;">┌───┐</td> <td colspan="2" style="text-align: center;">┌───┐</td> </tr> <tr> <td colspan="2" style="text-align: center;">R - Phase</td> <td colspan="2" style="text-align: center;">B - Phase</td> </tr> </table> <p>The connections of CT through which of AC supply to SCR module is connected to this terminal . It also provides for safety of SCR module <i>Note : CT should never be used for armature output</i></p>	1	2	3	4	<b>S1</b>	<b>S2</b>	<b>S1</b>	<b>S2</b>	┌───┐		┌───┐		R - Phase		B - Phase	
1	2	3	4															
<b>S1</b>	<b>S2</b>	<b>S1</b>	<b>S2</b>															
┌───┐		┌───┐																
R - Phase		B - Phase																
U7	Feed Back Output	<p>U7 used for output feed back to normal</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><b>A+</b></td> <td><b>NC</b></td> <td><b>A-</b></td> </tr> </table> <p>when motor is required to run on voltage feedback The output feedback of DC Heater configuration</p>	1	2	3	<b>A+</b>	<b>NC</b>	<b>A-</b>										
		1	2	3														
		<b>A+</b>	<b>NC</b>	<b>A-</b>														
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><b>T+</b></td> <td><b>NC</b></td> <td><b>T-</b></td> </tr> </table> <p>when motor is required to run on Techo feedback</p>	1	2	3	<b>T+</b>	<b>NC</b>	<b>T-</b>												
1	2	3																
<b>T+</b>	<b>NC</b>	<b>T-</b>																
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><b>U</b></td> <td><b>V</b></td> <td><b>W</b></td> </tr> </table> <p>The output feedback of AC Heater Transformer connected to this terminal</p>	1	2	3	<b>U</b>	<b>V</b>	<b>W</b>												
1	2	3																
<b>U</b>	<b>V</b>	<b>W</b>																
U8	Control Terminal	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>RST -sw</b></td> </tr> </table> <p>Short Pin 1 and 2 to clear any tripping</p>	1	2	<b>RST -sw</b>													
		1	2															
		<b>RST -sw</b>																
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>3</td> <td>4</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>RUN -sw</b></td> </tr> </table> <p>Short Pin 3 and 4 to give run the motor/Heater Open Pin 3 and 4 if you require to stop the motor in emergency conditions</p>	3	4	<b>RUN -sw</b>													
3	4																	
<b>RUN -sw</b>																		
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td><b>10V</b></td> <td><b>REF</b></td> <td><b>0V</b></td> </tr> <tr> <td colspan="3" style="text-align: center;">Analog Ref</td> </tr> </table> <p>Analog reference is given to these pins to control or match the speed of motor to the given reference. For temp control also reference from PID Controller can be given</p>	5	6	7	<b>10V</b>	<b>REF</b>	<b>0V</b>	Analog Ref											
5	6	7																
<b>10V</b>	<b>REF</b>	<b>0V</b>																
Analog Ref																		
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td><b>NO</b></td> <td><b>COM</b></td> <td><b>NC</b></td> </tr> <tr> <td colspan="3" style="text-align: center;">RLY output</td> </tr> </table> <p>This relay is used for safety purpose by providing interlock to any external device Pin 8 and 9 will be short if drive is running good pin 9 and 10 is short if there is any tripping specif - 230V AC/5A max Ld</p>	8	9	10	<b>NO</b>	<b>COM</b>	<b>NC</b>	RLY output											
8	9	10																
<b>NO</b>	<b>COM</b>	<b>NC</b>																
RLY output																		



## SCR Module Connection with Control Card in 3 Configuration

### Main Highlights

- 1). DC Configuration (Diagram D1)
- 2). AC Configuration (Diagram D2)
- 3). Half Bridge Configuration
  - Two types
    - a). +ve SCR Control (Diagram D3)
    - b). -ve SCR Control (Diagram D4)






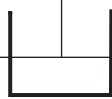
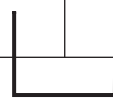
CONNECTION TO CONTROL CARD (DIAGRAM D1-A)												
Terminal control card Pins	U2			U6				U7				
	1	2	3	1	2	3	4	1	2	3		
Name of SCR module	R	Y	B	S1	S2	S1	S2	A+	T+	NC	A-	T-
SCR Terminal	AC INPUT			R Phase CT		B Phase CT		DC OUTPUT				

CONNECTION TO CONTROL CARD (DIAGRAM D1-B)												
Terminal control card Pins	U3				U4				U5			
	1	2	3	4	1	2	3	4	1	2	3	4
Name of SCR module	M2		M1		M4		M3		M6		M5	
SCR Terminal	6	7	4	5	6	7	4	5	6	7	4	5

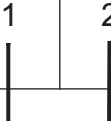

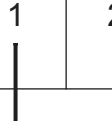
CONNECTION TO CONTROL CARD (DIAGRAM D2-A)												
Terminal control card Pins	U2			U6				U7				
	1	2	3	1	2	3	4	1	2	3		
Name of SCR module	R	Y	B	S1	S2	S1	S2	U	V	W		
SCR Terminal	AC INPUT			R Phase CT		B Phase CT		AC OUTPUT				

CONNECTION TO CONTROL CARD (DIAGRAM D2-B)												
Terminal control card Pins	U3				U4				U5			
	1	2	3	4	1	2	3	4	1	2	3	4
Name of SCR module	M2		M1		M4		M3		M6		M5	
SCR Terminal	6	7	4	5	6	7	4	5	6	7	4	5

<b>CONNECTION TO CONTROL CARD (DIAGRAM D3-A)</b>										
Terminal control card Pins	U2			U6				U7		
	1	2	3	1	2	3	4	1	2	3
Name of SCR module	R	Y	B	S1	S2	S1	S2	U	V	W
SCR Terminal	AC INPUT			R Phase CT		B Phase CT		AC OUTPUT		

<b>CONNECTION TO CONTROL CARD (DIAGRAM D3-B)</b>													
Terminal control card Pins	U3				U4				U5				
	1	2	3	4	1	2	3	4	1	2	3	4	
Name of SCR module			 M1				 M3				 M5		
SCR Terminal	NC	NC	4	5	NC	NC	4	5	NC	NC	4	5	

<b>CONNECTION TO CONTROL CARD (DIAGRAM D4-A)</b>										
Terminal control card Pins	U2			U6				U7		
	1	2	3	1	2	3	4	1	2	3
Name of SCR module	R	Y	B	S1	S2	S1	S2	U	V	W
SCR Terminal	AC INPUT			R Phase CT		B Phase CT		AC OUTPUT		

<b>CONNECTION TO CONTROL CARD (DIAGRAM D4-B)</b>													
Terminal control card Pins	U3				U4				U5				
	1	2	3	4	1	2	3	4	1	2	3	4	
Name of SCR module	 M2				 M4				 M6				
SCR Terminal	6	7	NC	NC	6	7	NC	NC	6	7	NC	NC	

## DC MOTOR OR DC HEATER CONFIGURATION DIAGRAM D1

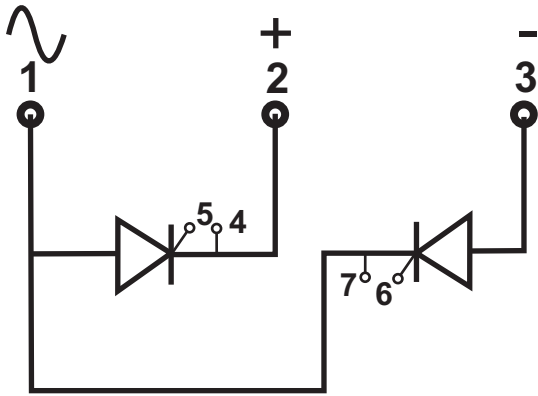
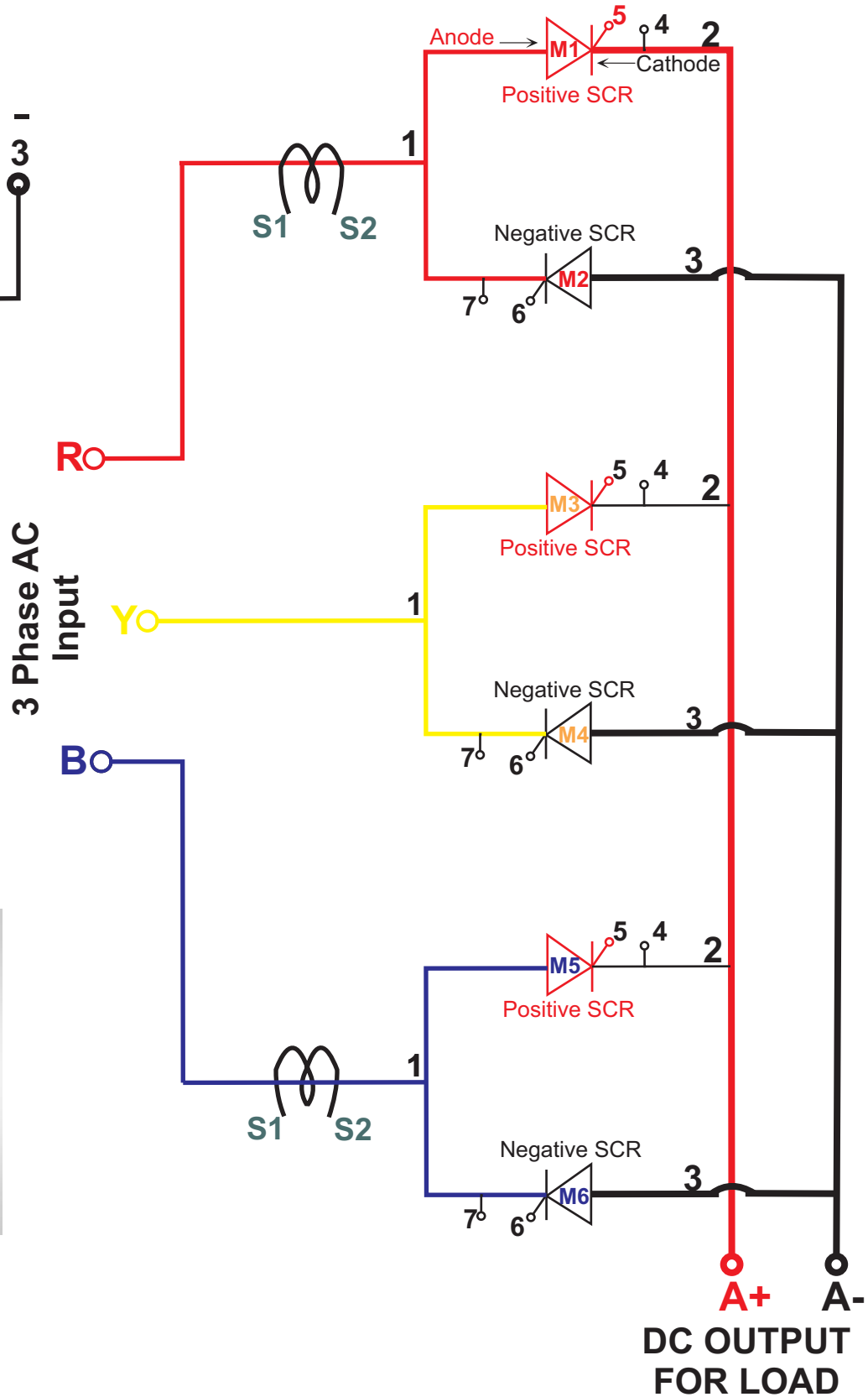


DIAGRAM - D1.A



DIAGRAM D1.B



## AC HEATER & INDUCTION HEATING CONFIGURATION DIAGRAM D2

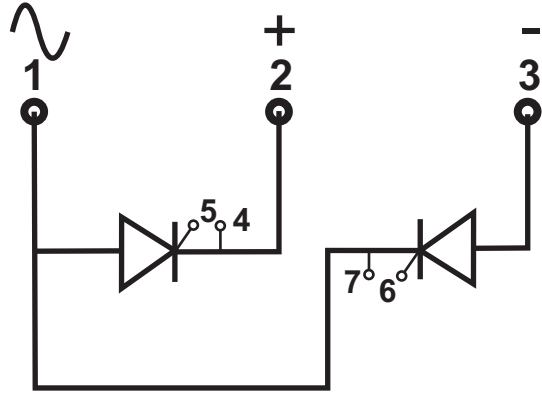
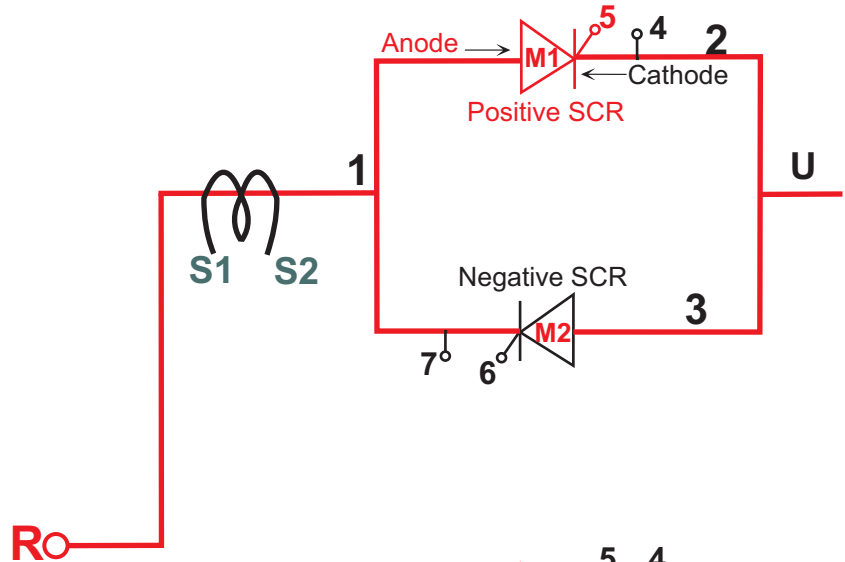
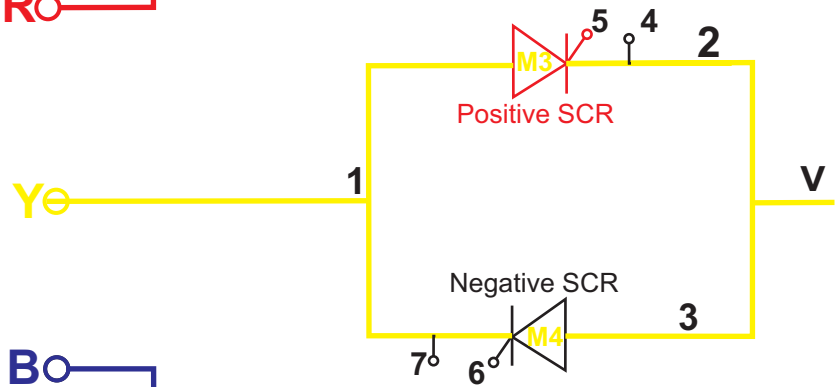


DIAGRAM - D2.A



3 Phase AC Input



AC OUTPUT FOR LOAD

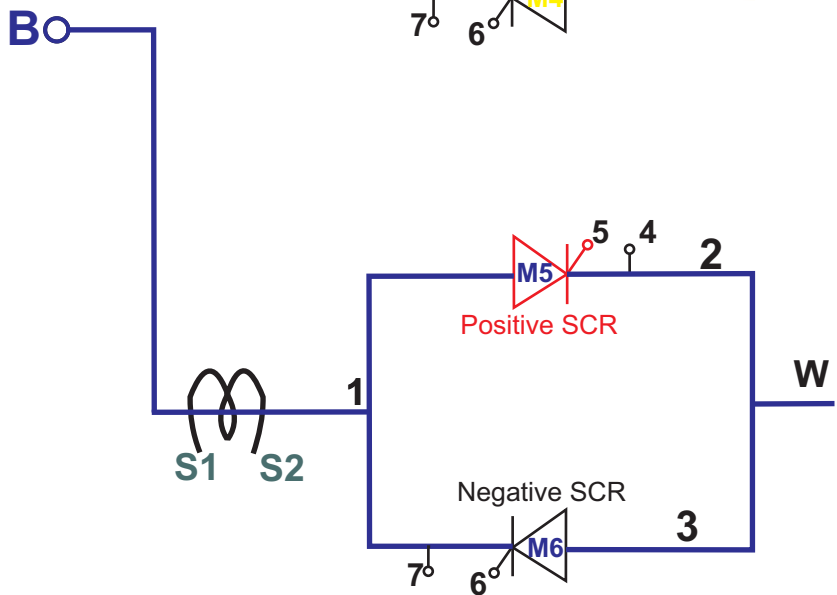


DIAGRAM D2.B

## AC HEATER & INDUCTION HEATING USING HALF BRIDGE CONFIGURATION TYPE 1

For +ve SCR Control  
**DIAGRAM D3**

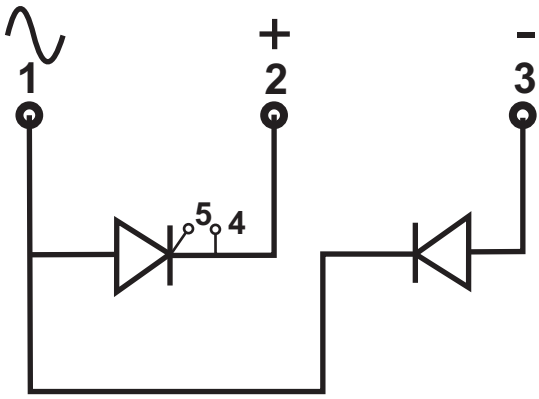
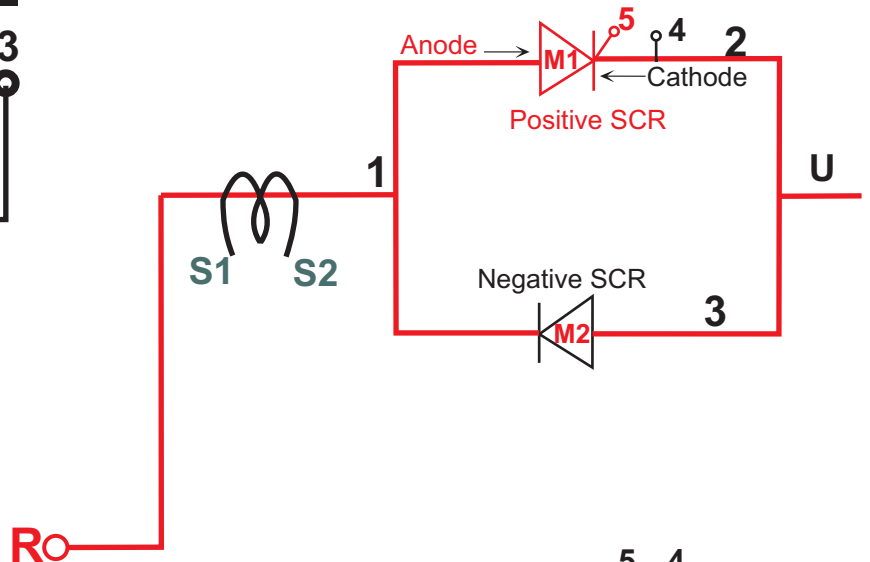
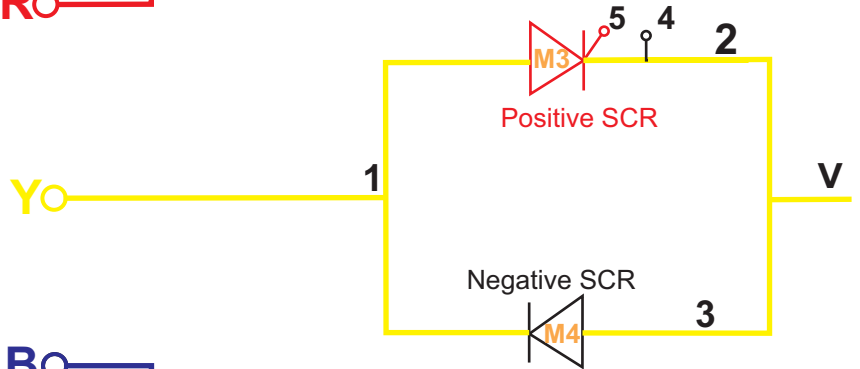


DIAGRAM - D3.A



3 Phase AC  
Input



AC OUTPUT  
FOR LOAD

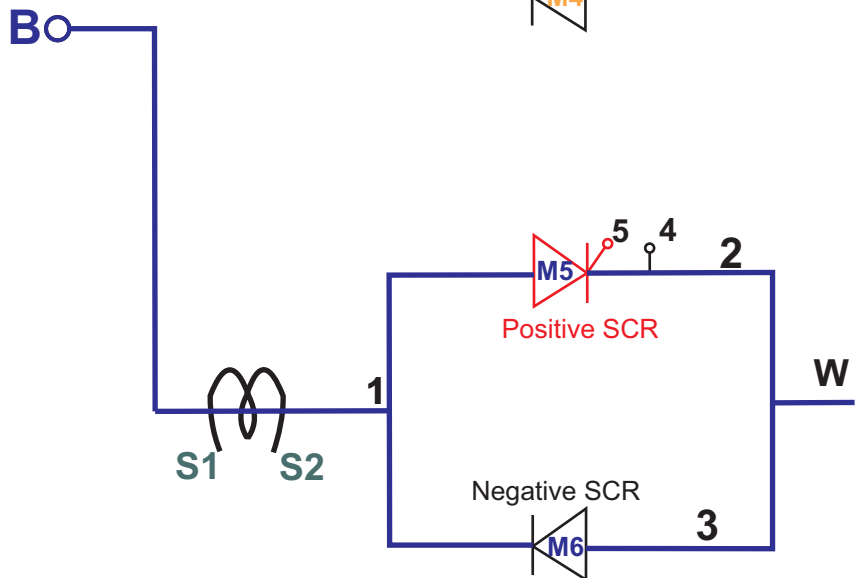


DIAGRAM D3.B

## AC HEATER & INDUCTION HEATING USING HALF BRIDGE CONFIGURATION TYPE 2

For +ve SCR Control  
**DIAGRAM D4**

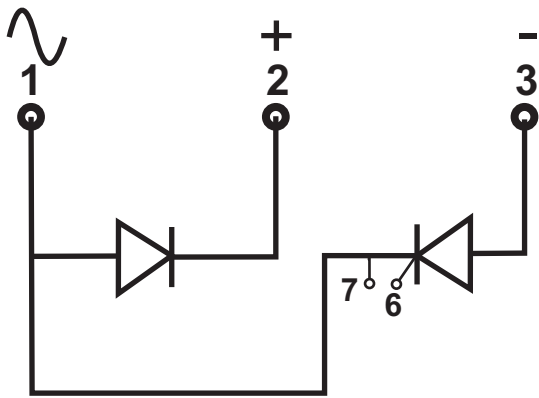
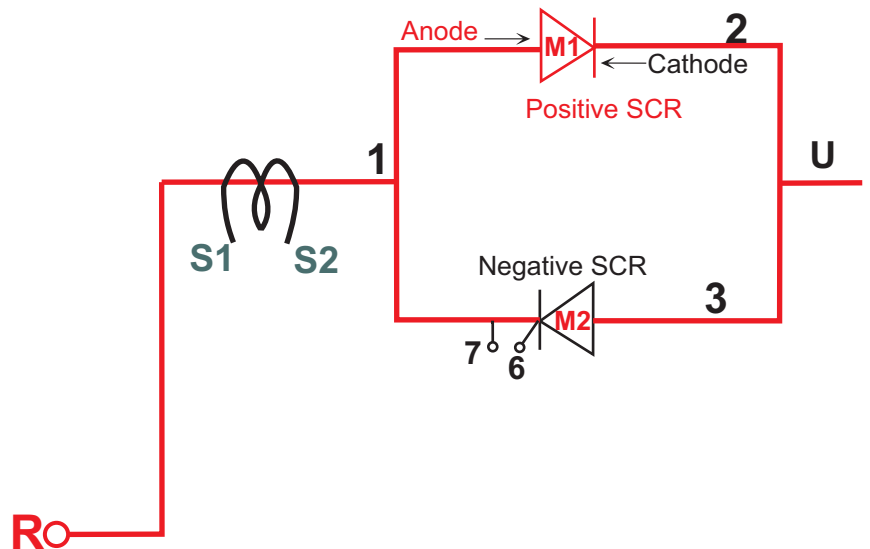
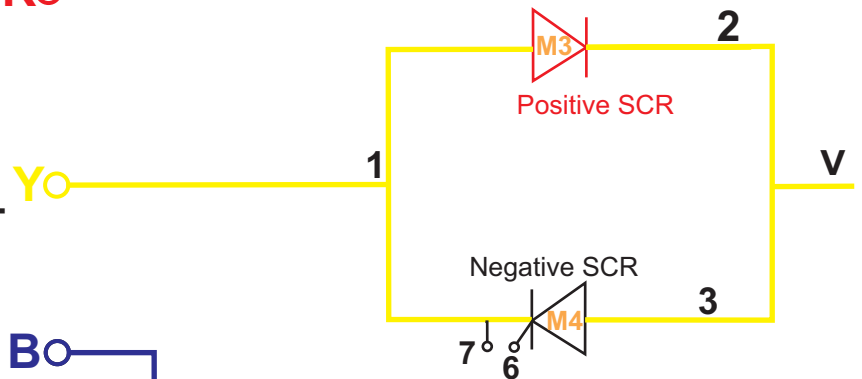


DIAGRAM - D4.A



3 Phase AC  
Input



AC OUTPUT  
FOR LOAD

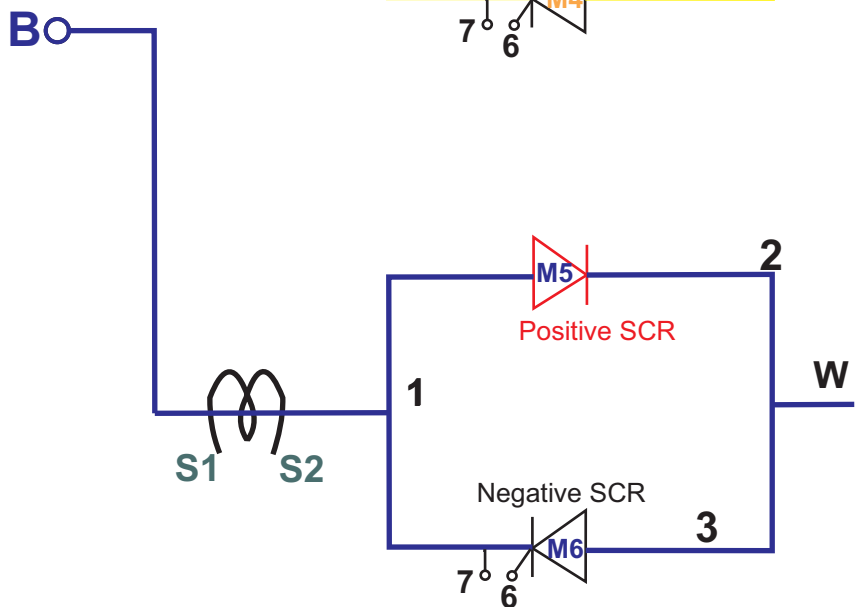


DIAGRAM D4.B