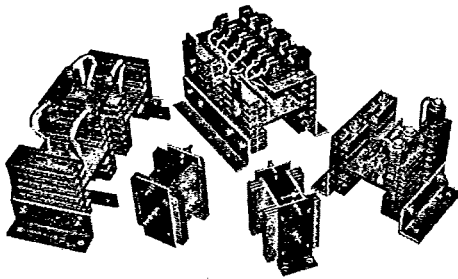


SECTION 2. ASSEMBLIES

Silicon Rectifier Stacks



Silicon rectifier stacks consist of silicon diodes and/or SCR's mounted on appropriate heat sinks and circuited to suit specific circuit requirements. Silicon rectifier stacks are often referred to according to the type of heat sinks they contain—M stack, N stack, etc. Stacks can be supplied in any of the configurations shown in the Standard Stack Circuits diagram, the Rectifier Design Diagrams in section 1, and in any special configurations you might require.

Silicon rectifier stack assembly begins with mounting rectifiers on heat sinks. (See the Silicon Diode Rectifiers section and the Silicon Controlled Rectifiers section for more information on the devices themselves.) Then, in most cases, one or more of these rectifier-heat sink modules is mounted in a structure that provides support, a means of mounting, and terminal connections for the assembly. And the completed assembly is referred to as the stack. In some cases, such as light-load, single-phase applications, the entire rectifier circuit can be contained in one stack. In other cases, such as heavy-load, three phase applications, the rectifier circuit for each phase is contained in a separate stack.

Probably the easiest way to select or specify a silicon rectifier stack is to follow through the Silicon Rectifier Stack Assembly Number chart (on page 16) and develop a CEHCO code number. This procedure ensures that all of the specification requirements are covered. Or if you are ordering a replacement, you will find the stack assembly number stamped on the assembly. (And of course, if you have problems or questions, just call CEHCO for assistance.)

The Silicon Rectifier Stack Assembly Number chart lists all of the variables

involved in assembling standard stacks. (Custom stacks can be assembled on special order.) An example of a stack assembly number is shown at the bottom of the chart. Decoded, this number means that the assembly has the following characteristics: The heat sink is 6 inches long and it is an M type (see the heat sink cross-section diagrams). Thus, on completion, this assembly would be called a 6M stack. Half of the style 300 diodes have standard polarity while the other half have reverse polarity (SR). The peak reverse voltage rating of the diodes is 400 volts (code 40). The circuit is a bridge (B) and the diodes are not in series (there is one per arm). The stack is mounted vertically with an insulated

bracket. Two diodes are mounted on each heat sink (code B) and, as a special feature, the stack is equipped with a surge suppressor (code S).

As you can see, with the number of variables involved, the possible number of stacks is huge—too big, in fact, to list in this catalog. Therefore, some of the more typical stacks in use are listed in the Typical Silicon Rectifier Stack Assemblies chart to provide an indication of the range available. Also, as an aid to selecting stacks, standard circuits are illustrated in the Standard Silicon Rectifier Stack Assembly Circuits chart.

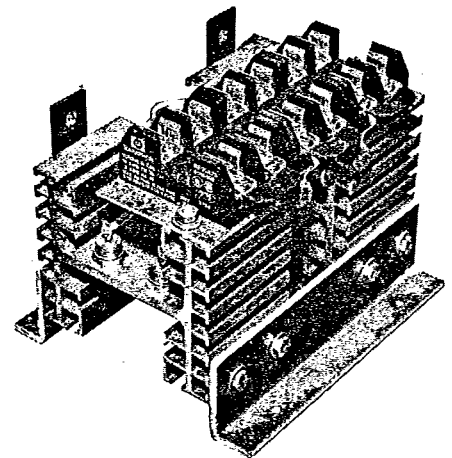
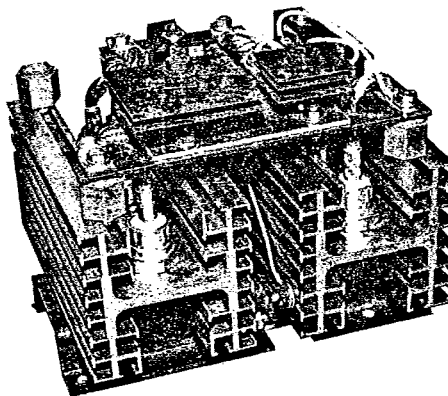
And finally, the stack section ends with dimension diagrams for several typical stacks.

SILICON RECTIFIER STACK ORDERING INSTRUCTIONS

The following outlines the information you need when you call to order silicon rectifier stacks. (If you are unable to find some of this information, call and we will be glad to assist you.)

1. Determine the CEHCO stack assembly number if possible. If not, try to proceed as follows:
2. Call CEHCO for additional assistance with the following information:

- a. Type of stack, i.e. single phase, three phase, half wave, etc.
- b. The load in amps.
- c. The type of load.
- d. The voltage the stack will see.
- e. If the stack must be fan cooled or convection cooled.
- f. Space available and type of mounting required.
- g. Environment and ambient temperature.

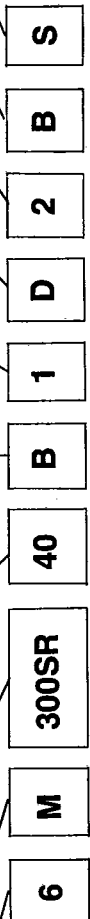


SILICON RECTIFIER STACK ASSEMBLY NUMBERS

Note: Read the lists in the columns vertically—there are no horizontal relationships in this chart. To illustrate, there is no relationship between an 01 diode and a 16CR SCR. And neither of them have a 50 V rating, even though these listings are horizontally adjacent to each other.

1	2	3		4	5	6	7	8	9	10
INCHES	HEAT SINK SIZE	DIODE	STYLE	PRV. VOLTAGE CODE RATING	TYPE CIRCUIT	DIODES IN SERIES	TYPE MOUNTING	DIODES IN PARALLEL	DIODES PER HEAT SINK	SPECIAL FEATURES
Length of heat sink in inches	M-4 1/8 x 4 7/8	01 } Axial 03 } Lead	Stud Mount	05 - 50 V	SINGLE PHASE H - Half Wave C - Center tap Positive N - Center tap Negative D - Double B - Bridge M - Open Bridge P - Inv. Parallel	Determined by RMS input voltage and inverse voltage ratings of diodes and circuitry. Indicates number of diodes in series per ARM.	N - Stud B - Horizontal Mount Insulated Bracket C - Bolt Mount D - Vertical Insulated Bracket	Determined by dc current requirements. Indicates number of diodes in parallel per arm.	A - 1 B - 2 C - 3 D - 4	F - Fan S - Surge Suppressors
	N-3 3/8 x 7	22 } 45 } 85 } Stud Mount, 150 } Std. and Reverse 300 } Polarity 400 } 500 }		10 - 100 V						
	P-2 1/2 x 5	600SE } 1400SG } Flat Pack 2100SH } 2500SH }		15 - 150 V						
	HX-1 5/16 x 2 7/8			20 - 200 V						
	A-Water Cooled			25 - 250 V						
				30 - 350 V						
				35 - 350 V						
				40 - 400 V						
				50 - 500 V						
				60 - 600 V						
				70 - 700 V						
				80 - 800 V						
				90 - 900 V						
				100 - 1000 V						
				110 - 1100 V						
				120 - 1200 V						
				140 - 1400 V						
				160 - 1600 V						

Stacks using two or more rectifier diodes in parallel may incorporate paralleling reactors to assure correct load current division.
A following circuit 1/2 diodes 1/2 SCRs
B following circuit - all SCRs



EXAMPLE OF STACK ASSEMBLY NUMBER

Note: it is good practice to protect rectified and SCR circuits with nonpolar surge suppressors (see the section on surge suppressors for more information).

TYPICAL SILICON RECTIFIER STACK ASSEMBLIES

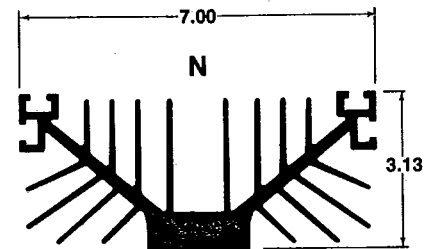
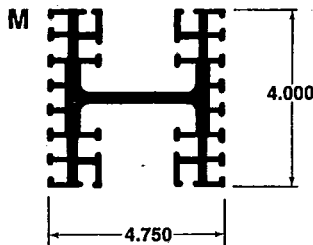
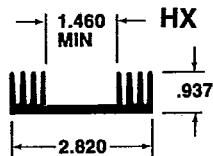
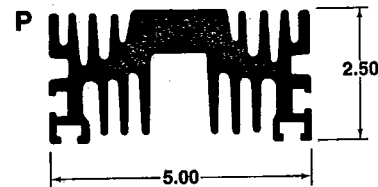
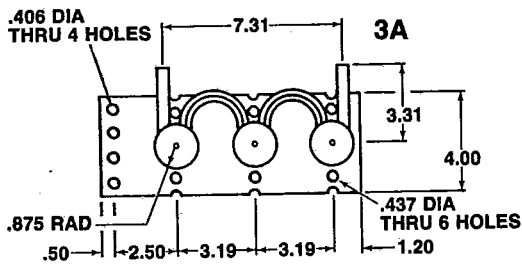
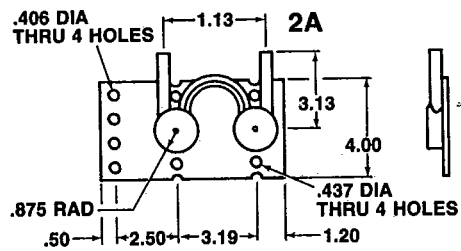
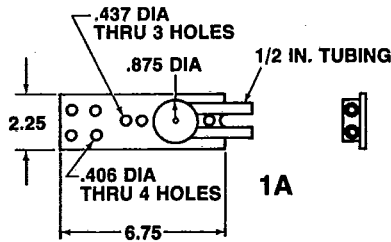
STACK ASSEMBLY NUMBER	40° RATING CONTINUOUS DC AMPERES		APPROXIMATE STACK SIZE (in inches)			MOUNT MOUNT
	Convection	Forced Air 800 LFM	Height	Width	Depth	
Single-Phase Bridge						
HX22SR---B1-1B	25	50	5	3¾	5	B
HX45SR---B1-1B	35	70	5	3¾	5	B
2M45SR---B1-1B	45	90	6	8½	7	B
3M85SR---B1-1B	60	150	6	11	7	B
4M85SR---B1-1B	85	170	6	14	7	B
6M150SR---B1-1B	140	320	8	14	8	B
6M150SR---B1-1A	170	430	8	14	12	B
6M300SR---B1-1A	200	500	8	14	12	B
Three-Phase Bridge						
HX22SR---Z1-1C	28	84	5	3¾	5	B
HX45SR---Z1-1C	35	104	5	3¾	5	B
2M45SR---Z1-1C	50	150	6	8½	7	B
4M85SR---Z1-1C	100	185	6	14	7	B
6M150SR---Z1-1C	170	430	8	14	8	B
6M150SR---Z1-1A	300	750	8	20	12	B
6M300SR---Z1-1C	200	750	8	20	8	B
6M300SR---Z1-1A	400	1100	8	20	12	B
8M300SR---Z1-2B	500	1450	10	20	12	B
			18	28	12	D
8N600SE---Z1-1A	470	1200	12	28	18	B
			18	28	12	D
8N1400SG---Z1-1A	700	2100	12	28	18	B
			18	28	12	D
8N2500SH---Z1-1A	1000	3000	12	28	18	B
Three-Phase Center Tap						
8M300S---X1-1A	625	1500	10	20	12	B
8M300S---X1-2B	750	2500	10	20	12	B
			18	28	12	D
8N600SF---X1-1A	700	1750	12	28	18	B
			18	28	12	D
8N1400SG---X1-1A	1050	2600	12	28	18	B
			18	28	12	D
8N2500SH---X1-1A	1500	3750	12	28	18	B

Notes:

1. --- in stack assembly numbers indicates voltage (PRV) code.
2. - in stack assembly numbers indicates mounting code.
3. Terminal color code: Yellow - AC, red - DC positive, black - DC negative.
4. Mounting code: B - rail mount, D - panel mount.

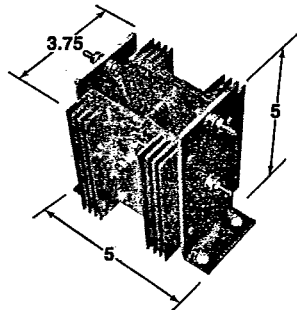
HEAT SINK EXTRUSIONS

Note: Dimensions in inches.

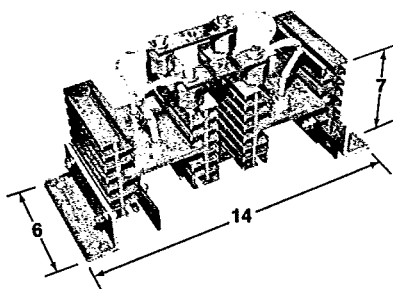


OTHER TYPICAL SILICON RECTIFIER STACK ASSEMBLIES

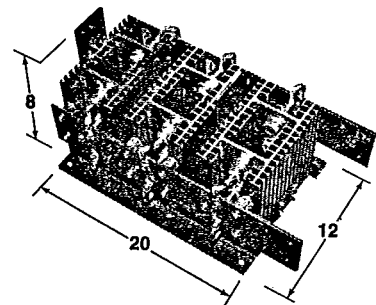
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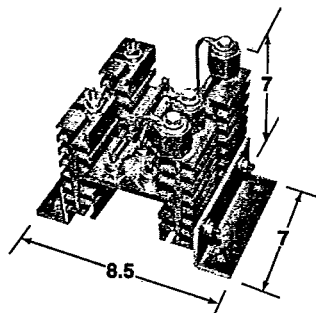
4M85SR120B1-1B



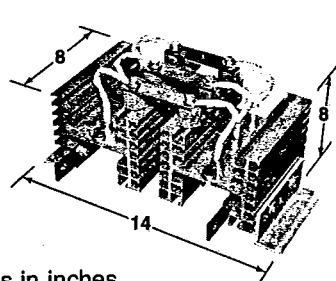
8M300SR30Z1-3C



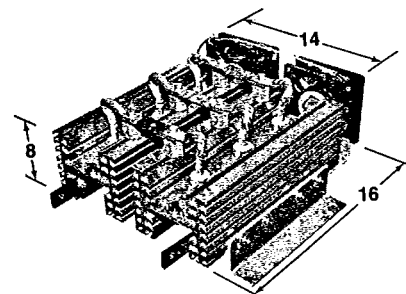
2M85SR120Z1-3C



6M85SR120Z1-1C



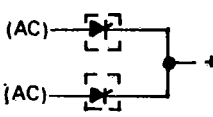
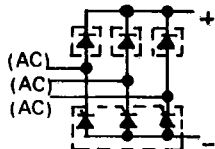
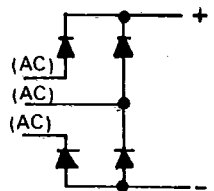
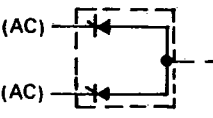
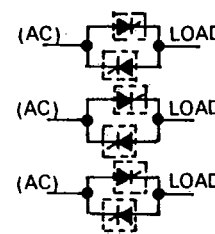
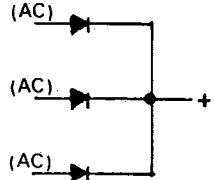
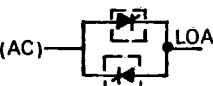
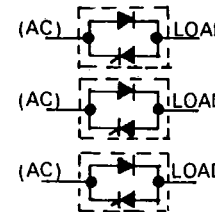
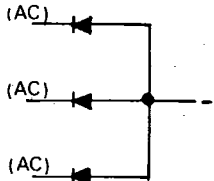
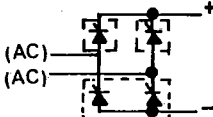
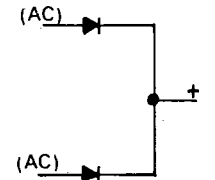
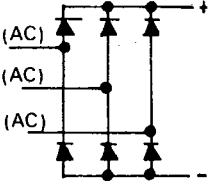
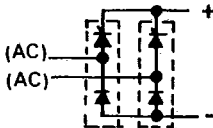
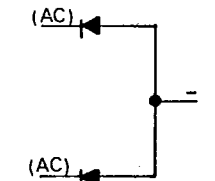
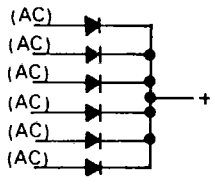
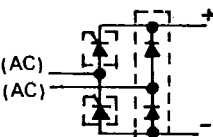
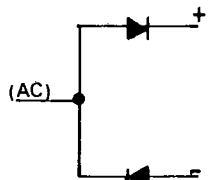
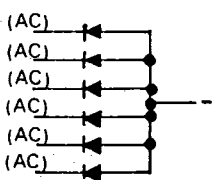
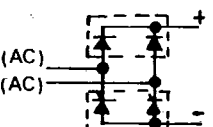
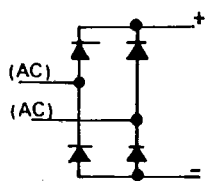
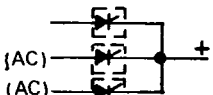
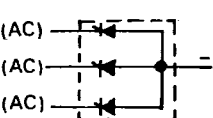
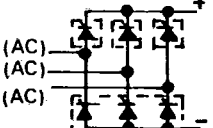
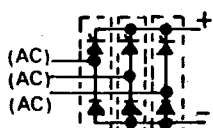
12M300SR30Z1-1CF



Note: Dimensions in inches.

SILICON RECTIFIER STACK ASSEMBLY CIRCUITS

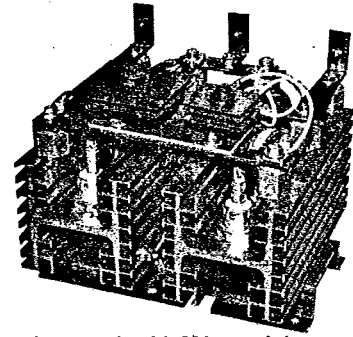
(Using Diodes, SCR's, or a Combination)

<p>CENTER TAP (COMM. +)</p> 	<p>THREE PHASE HYBRID BRIDGE (COMM. ANODE)</p> 	<p>SINGLE PHASE MAGNETIC AMPLIFIER BRIDGE</p> 
<p>CENTER TAP (COMM. -)</p> 	<p>THREE PHASE AC CONTROLLER</p> 	<p>THREE PHASE WYE (COMM. CATHODE)</p> 
<p>SINGLE PHASE AC CONTROLLER</p> 	<p>THREE PHASE HYBRID AC CONTROLLER</p> 	<p>THREE PHASE WYE (COMM. ANODE)</p> 
<p>SINGLE PHASE CONTROLLED BRIDGE</p> 	<p>CENTER TAP (COMM. CATHODE)</p> 	<p>THREE PHASE BRIDGE</p> 
<p>SINGLE PHASE HYBRID BRIDGE (COMM. CATHODE CONNECTION)</p> 	<p>CENTER TAP (COMM. ANODE)</p> 	<p>SIX PHASE STAR (COMM. CATHODE)</p> 
<p>SINGLE PHASE HYBRID BRIDGE DOUBLER CONNECTION</p> 	<p>DOUBLER</p> 	<p>SIX PHASE STAR (COMM. ANODE)</p> 
<p>SINGLE PHASE CONTROLLED BRIDGE (COMM. ANODE CONNECTION)</p> 	<p>SINGLE PHASE BRIDGE</p> 	<p>NOTE: Each box around one or more devices indicates a heat sink.</p>
<p>THREE PHASE WYE (COMM. CATHODE)</p> 		
<p>THREE PHASE WYE (COMM. ANODE)</p> 		
<p>THREE PHASE CONTROLLED BRIDGE</p> 		
<p>THREE PHASE HYBRID BRIDGE (COMM. CATHODE)</p> 		

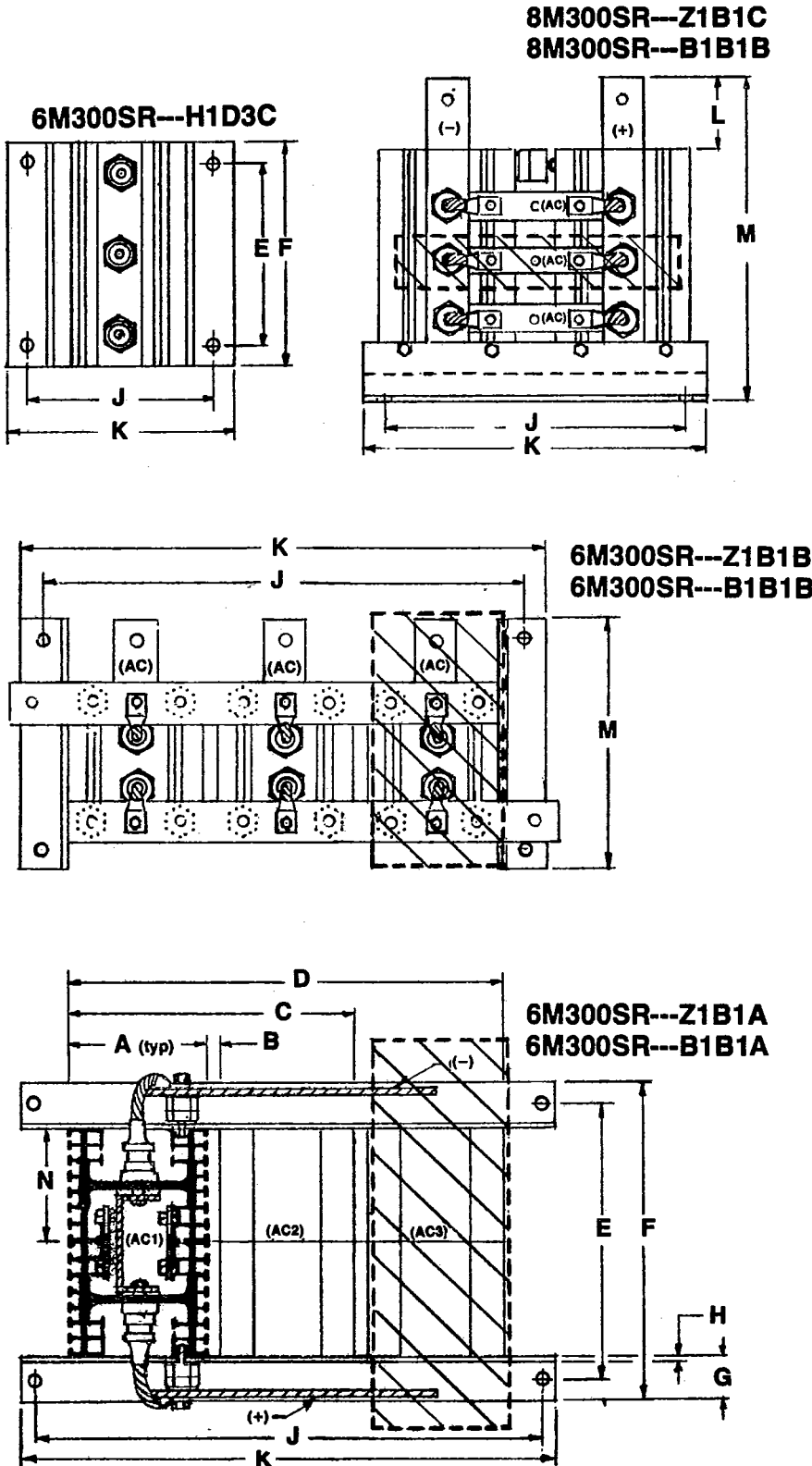
FOUR EXAMPLES OF TYPICAL M STACKS (Stacks with M Heat Sinks)

Notes:

1. Components within dash lines are added for 3-phase stacks.
2. Multiple dashes in part numbers represent voltage codes.



Typical stack with M heat sink, surge suppressor, and other optional items.



DIMENSIONS (in inches)

PART NO.	A	B	C	D	E	F	G	H	J	K	L	M	N
6M300SR60H1D3C	4-13/16	NA	NA	NA	6-1/2	8	1-5/8	3/16	6-9/16	8	3	8-1/2	4-1/8
8M300SR60Z1-1C	4-13/16	1-3/8	11	NA	NA	NA	1-5/8	3/16	11	12-1/8	3	12	4-1/8
8M300SR60B1-1B	4-13/16	1-3/8	11	NA	NA	NA	1-5/8	3/16	11	12-1/8	3	12	4-1/8
6M300SR120Z1-1A	4-13/16	1-1/2	11-3/8	17-3/4	10-3/4	12-1/4	2	3/16	16-1/2	17-3/4	3	10	4-1/8
6M300SR--B1-1A	4-13/16	1-1/2	11-3/8	NA	10-3/4	12-1/4	2	3/16	10-5/8	11-1/2	3	10	4-1/8

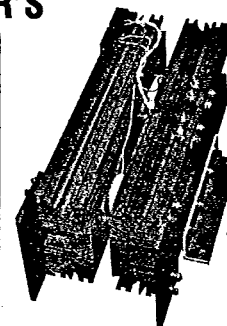
Notes:

1. The F dimension is the overall width.
2. The K dimension is the overall length.
3. The M dimension is the overall height.

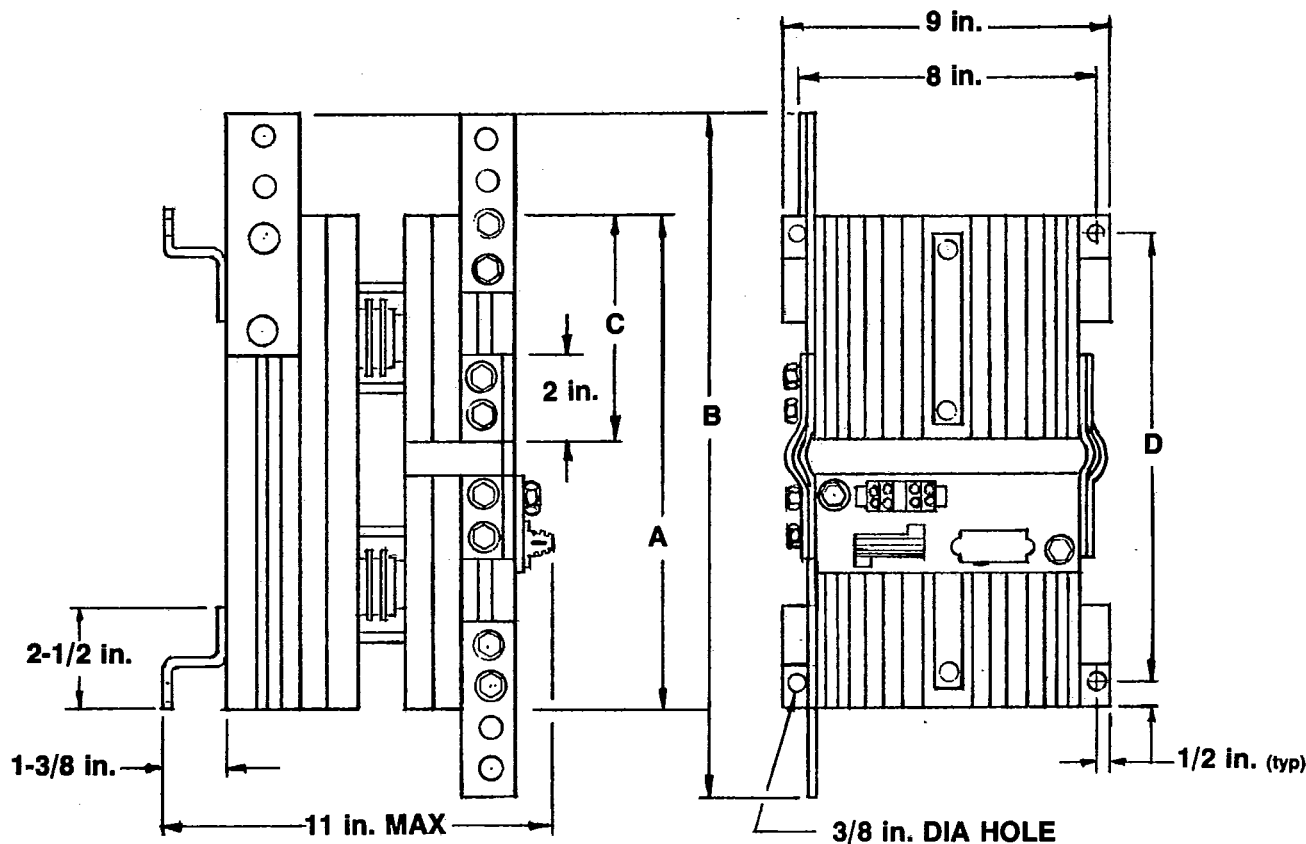
EXAMPLES OF TYPICAL N STACKS (Stacks with N Heat Sinks) USING FLAT-PACK DIODES OR SCR'S

Notes:

1. Standard Configuration shown, other configurations are available.
2. Drawing shows single stack module. Additional modules may be required, depending on the application.
3. --- in part numbers (stack assembly numbers) represents voltage (PRV) code.



Typical stack with N heat sink and flat-pack SCR's.



PART NO.	CIRCUIT	DIMENSIONS (in Inches)				MODULES REQUIRED	NOTES
		A	B	C	D		
6N-SF---X1D1A	Three-phase center tap	12	18	5 3/4	11	3	1. Single phase circuits available with the same module construction (two modules required)
6N-SG---X2D1A		12	18	5 3/4	11		
8N-SH---X1D1A		16	22	7 3/4	15		
6N-SF---Z1D1A	Three-phase bridge	12	18	5 3/4	11	3	
6N-SG---Z1D1A		12	18	5 3/4	11		
8N-SH---Z1D1A		16	22	7 3/4	15		
6NF-SF---ZA1D1A	Three-phase hybrid bridge	12	18	5 3/4	11	3	
6NG-SG---ZA1D1A		12	18	5 3/4	11		
8NH-SH---ZA1D1A		16	22	7 3/4	15		
6N-CRE---UB1D1A	Three-phase inverse parallel	12	18	5 3/4	11	3	
6N-CRG---UB1D1A		12	18	5 3/4	11		
8N-CRH---UB1D1A		16	22	7 3/4	15		