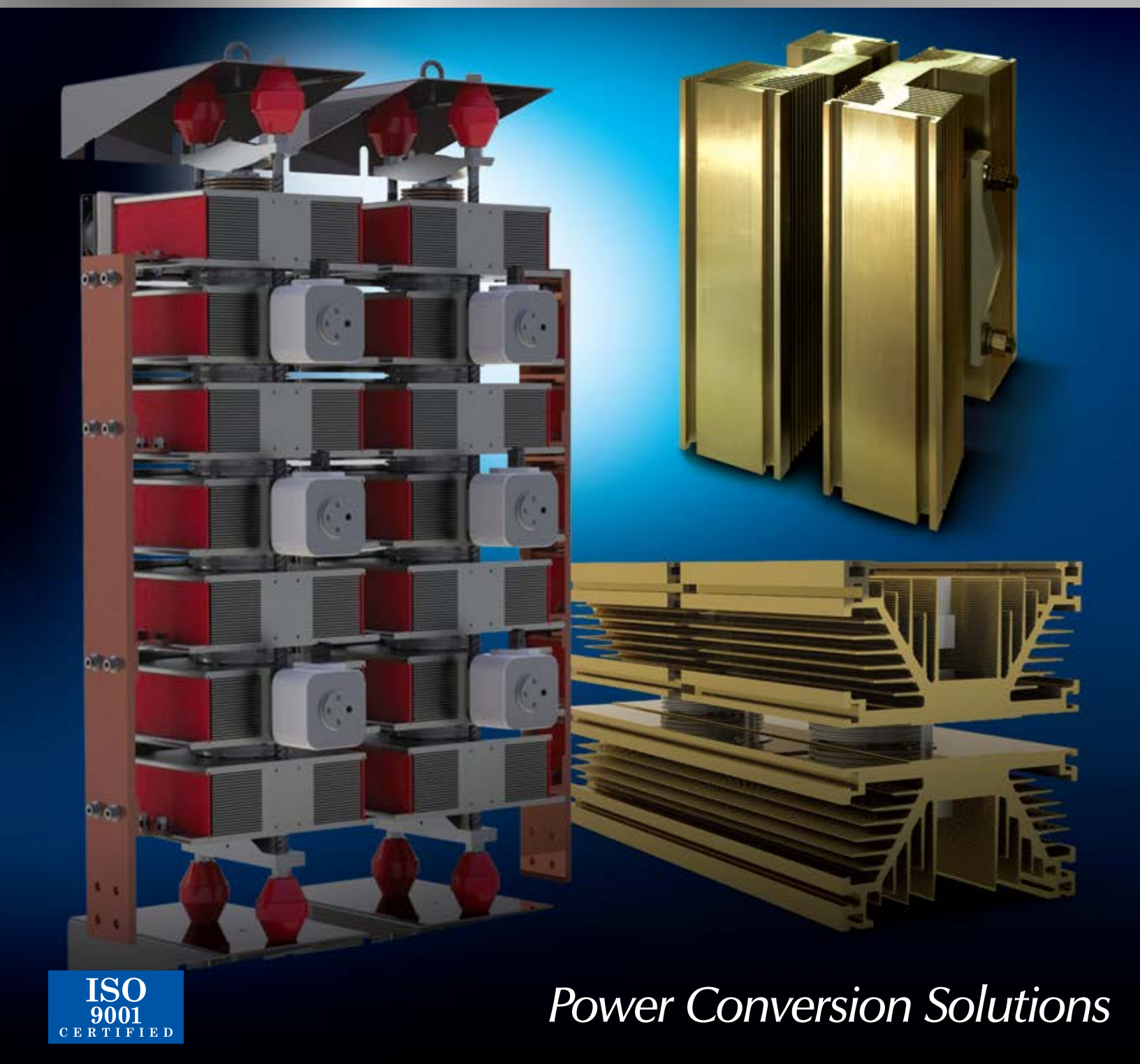
DARRAH ELECTRIC COMPANY

Power Conversion Solutions - Distribution - D.C. Power Supplies

Power Assemblies

Air Cooled Designs



ISO 9001 CERTIFIED

Power Conversion Solutions

800-621-0014 | www.darrahelectric.com

Bulletin 8001

Darrah's Commitment to Quality

Darrah Electric Company is committed to providing our customers with a reliable, high quality product at a low cost. We carry that commitment from the manufacturers we represent to the customers we supply.

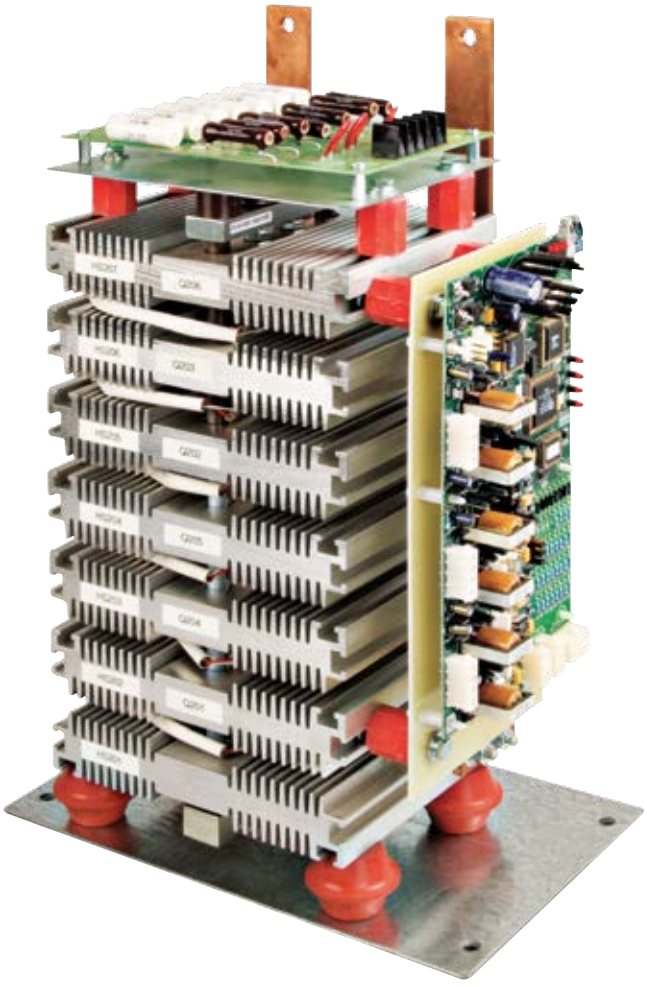
Our customers are our most important business partners. Darrah Electric Company adapts to our customer's changing needs at all times, in an environment of continual advancement.

Written instructions, bill of material, and mechanical 3D drawings are provided to the assembly department, testing department, and quality control department. Copies are also given to our customers.

All assemblies manufactured by Darrah are tested prior to shipping. Special arrangements or tests for specific operations is a common requirement. Full load testing with thermal data capture is available upon request for prototype or production products. Serial numbers and date codes are assigned for tracking and quality control.

ISO 9001 CERTIFIED

Darrah Electric is proud to be ISO 9001 Certified



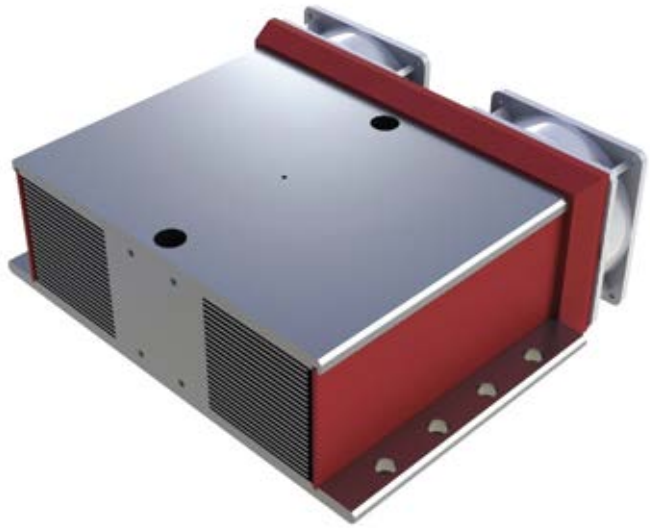
Introduction

Darrah Electric Company provides customized solutions to convert electrical energy using the latest in semiconductor technologies. We specialize in offering unique products and turn key solutions, tailored to your specific requirements.

In addition to Darrah's engineering experience, our team has direct access to the expertise from the engineers and staff of the product lines that we represent.

By combining our state of the art 3D Modeling, assembly experience and testing capabilities, Darrah Electric has positioned themselves as a dynamic company that can provide unlimited service and support to our customers.

Our diverse inventory along with "quick turn-around" standard offerings, make us a valuable partner for your company.



Typical Applications for Darrah High Current Power Assemblies

- **Battery Chargers**
- **High Power Rectification**
- **Inverters / Converters**
- **Magnet Supplies**
- **Pulsed Power**
- **Resistance Welding**
- **Motor Controls / Soft Starters**
- **Static Compensation**
- **Variable Speed Drives**
- **Industrial Drives**
- **Marine Drives**
- **Switch Reluctance / SR Drives**
- **Induction Heating**
- **Transit / Locomotive**
- **Uninterruptible Power Supplies / UPS**
- **Static Transfer Switches**
- **Power Generation / Excitation**
- **Co-Generation**
- **Wind Power**
- **Transmission and Distribution**
- **Metal Finishing: Plating, Anodizing, Electro-Coating**

Powering Ahead with Darrah

Darrah Electric's Power Semiconductor assembly department is focused on providing quality support and service for customers requiring more than just the basic semiconductor.

Engineering

Working with you, our engineering department will provide you with thermal calculations and 3D assembly drawings specific to your project.

Assembly

When the design is finalized, our highly trained assembly department will provide you with a finished assembly that is ready to install in your product. This provides a tremendous value added service.

High Reliability

We understand how critical the assembly is to your project. That's why we monitor our quality closely during the complete assembly process. Your finished assembly will pass three quality checks before it leaves our factory:

- **Component integrity**
- **Physical inspection**
- **Electrical testing**

Flexibility

Darrah Electric has access to the best worldwide sources of quality power semiconductors, heatsinks, clamps and accessories. In essence you will receive the best possible fully tested assembly there is today.

Cost Savings

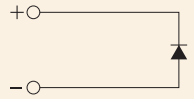
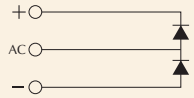
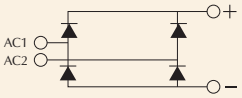
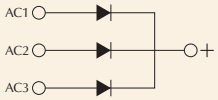
We are saving you time and money every step of the way by providing the engineering design, assembly and finished documentation, tailored to your requirements. Having one complete assembly will reduce your inventory, and will free up manufacturing staff. In addition, Darrah Electric provides a highly competitive price with quick delivery.

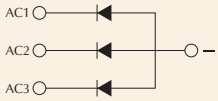
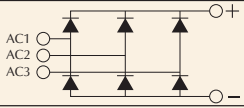
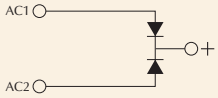
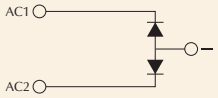
Additional Options

We also provide passive components such as R/C Snubbers, bus bars, fuses, thermostats, fans, terminal strips and current transducers for all of our assemblies.

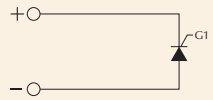
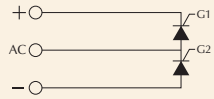
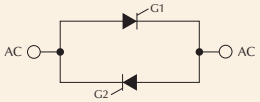
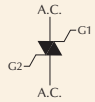
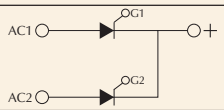
Choose Your Circuit

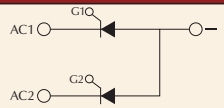
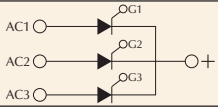
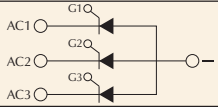
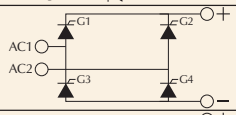
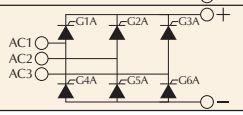
DIODE/RECTIFIER CIRCUITS

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
HALF-WAVE DIODE	**PRA**	
DIODE DOUBLER	**PRD**	
SINGLE PHASE DIODE BRIDGE	USE (2) **PRD** ASSEMBLIES	
DIODE COMMON CATHODE	**PRE**	

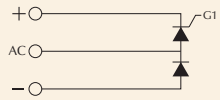
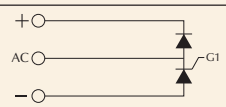
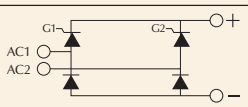
CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
DIODE COMMON ANODE	**PRF**	
THREE PHASE DIODE BRIDGE	USE (3) **PRD** ASSEMBLIES OR (1) **PRE** AND (1) **PRF** ASSEMBLY	
CENTER TAP COMMON CATHODE	**PRC**	
CENTER TAP COMMON ANODE	**PRA**	

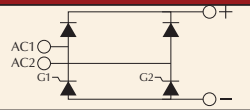
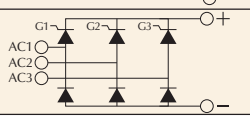
THYRISTOR/SCR CIRCUITS

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
HALF-WAVE SCR	**PTA**	
SCR DOUBLER	**PTD**	
A.C. SWITCH	**PAA**	
A.C. SWITCH	**PBT** BI-DIRECTIONAL CONTROL THYRISTOR	
SCR COMMON CATHODE	**PCG**	

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
SCR COMMON ANODE	**PAG**	
SCR COMMON CATHODE	**PAE**	
SCR COMMON ANODE	**PAF**	
SINGLE PHASE SCR BRIDGE	USE (2) **PTD** ASSEMBLIES OR (1) **PCG** AND (1) **PAG** ASSEMBLY	
THREE PHASE SCR BRIDGE	USE (3) **PTD** ASSEMBLIES OR (1) **PAE** AND (1) **PAF** ASSEMBLY	

HYBRID CIRCUITS DIODES/SCR

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
HYBRID DOUBLER	**PHD**	
HYBRID DOUBLER	**PHA**	
HYBRID BRIDGE COMMON CATHODE SCRS	USE (2) **PHD** ASSEMBLIES	

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS
HYBRID BRIDGE COMMON ANODE SCRS	USE (2) **PHA** ASSEMBLIES	
THREE PHASE HYBRID BRIDGE	USE (3) **PHD** ASSEMBLIES	

Ordering Made Easy by Darrah...

Darrah has made ordering simple, easy and efficient. Use our toll free number or email us your inquiry.

800-621-0014 fax: 216-631-0440

email: sales@darrahelectric.com

When placing your order, refer to our charts to assist in specifying a particular assembly.

If you have a question or concern on any part or application, we strongly recommend and welcome your call. We are confident you will find our in-house engineering staff knowledgeable and helpful.

DARRAH PART NUMBER DESIGNATION CODE

PTD 3 100 28 BRTS

Circuit Diagram

PRA – Half Wave Diode
PRD – Diode Doubler

PTA – Half Wave SCR
PTD – SCR Doubler
PAA – AC Switch

PHD – SCR / Diode Doubler

See Circuit Diagrams

Phase

1 – Single Phase
2 – Two / Split Phase
3 – Three Phase

Average Ampere Rating (X 10)

25 – 250 Amps
50 – 500 Amps
75 – 750 Amps
100 – 1000 Amps
120 – 1200 Amps
250 – 2500 Amps

Device Voltage Rating (X 100)

6 – 600 Volts
12 – 1200 Volts
18 – 1800 Volts
28 – 2800 Volts
42 – 4200 Volts
65 – 6500 Volts
85 – 8500 Volts

Special Features

B – Mounting Rails
C – Free-Wheeling
F1 – 115V Fan
F2 – 230V Fan
F3 – 24VDC Fan
FU – Line / Leg Fuses
M – MOV
P – 12 Pulse
R – R/C Snubber
S – Special
T – Thermostat
4Q – Reversing Bridge

Special Assembly Option:
Because your selection may require several design options, please contact Darrah to obtain the option(s) code for your final assembly.

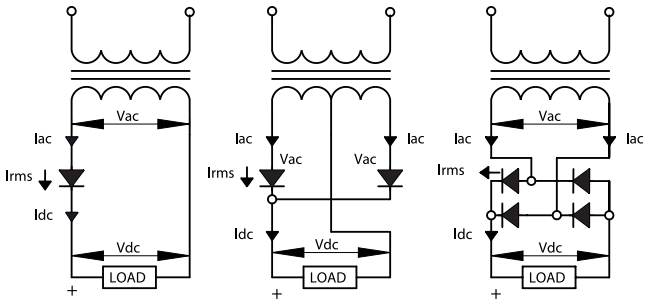
PTD 3 100 28 BRTS

PTD 3 – Three Phase SCR Bridge
100 – D.C. Output Rating 1000 Amps Continuous
28 – SCR Device Rating 2800 Volt (PIV)
B – Mounting Rails
R – R/C Snubber
T – Thermostats on each phase
S – As a special includes 115 Volt Fans and Line Fuse with Trigger Circuits.

Technical Reference

SINGLE PHASE CIRCUITS

HALF WAVE	FULL WAVE CENTER TAP	FULL WAVE BRIDGE



RESISTIVE OR INDUCTIVE LOAD

$Vdc = \frac{Vac}{2.26} - 1$

$Vac = 2.26 \times Vdc + 1$

$Iac = 1.57 \times Idc$

$Iavg = 1 \times Idc$

$Irms = 1.57 \times Idc$

RIPPLE = 121% MAX.

CAPACITIVE OR BATTERY LOAD

$Vdc = \frac{Vac}{1} - 1$

$Vac = 1 \times Vdc + 1$

$Iac = 2.3 \times Idc$

RESISTIVE OR INDUCTIVE LOAD

$Vdc = \frac{Vac}{1.13} - 1$

$Vac = 1.13 \times Vdc + 1$

$Iac = 0.707 \times Idc$

$Iavg = 0.5 \times Idc$

$Irms = 0.707 \times Idc$

RIPPLE = 48% MAX.

CAPACITIVE OR BATTERY LOAD

$Vdc = \frac{Vac}{0.85} - 1$

$Vac = 0.85 \times Vdc + 1$

$Iac = 1.15 \times Idc$

RESISTIVE OR INDUCTIVE LOAD

$Vdc = \frac{Vac}{1.13} - 2$

$Vac = 1.13 \times Vdc + 2$

$Iac = 1.11 \times Idc$

$Iavg = 0.5 \times Idc$

$Irms = 0.707 \times Idc$

RIPPLE = 48% MAX.

CAPACITIVE OR BATTERY LOAD

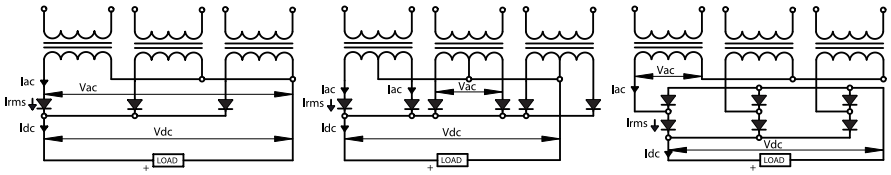
$Vdc = \frac{Vac}{0.85} - 2$

$Vac = 0.85 \times Vdc + 2$

$Iac = 1.65 \times Idc$

THREE PHASE CIRCUITS

HALF WAVE	FULL WAVE STAR	FULL WAVE BRIDGE



$Vdc = \frac{Vac}{0.855} - 1$

$Vac = 0.855 \times Vdc + 1$

$Iac = 0.577 \times Idc$

$Iavg = 0.333 \times Idc$

$Irms = 0.577 \times Idc$

RIPPLE = 18.3% MAX.

$Vdc = \frac{Vac}{0.74} - 1$

$Vac = 0.74 \times Vdc + 1$

$Iac = 0.408 \times Idc$

$Iavg = 0.167 \times Idc$

$Irms = 0.408 \times Idc$

RIPPLE = 4.2% MAX.

$Vdc = \frac{Vac}{0.74} - 2$

$Vac = 0.74 \times Vdc + 2$

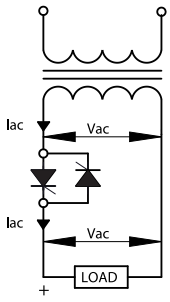
$Iac = 0.816 \times Idc$

$Iavg = 0.333 \times Idc$

$Irms = 0.577 \times Idc$

RIPPLE = 4.2% MAX.

SCR AC SWITCH



RESISTIVE OR INDUCTIVE LOAD

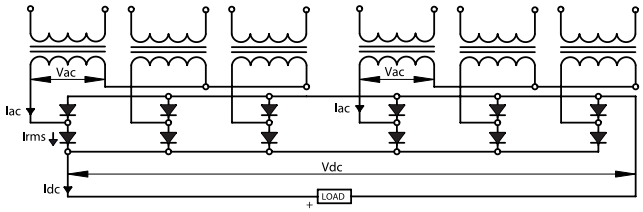
CURRENT THROUGH EACH SCR

$Iavg = 0.450 \times Iac$

$Irms = 0.707 \times Idc$

12 PULSE BRIDGE

WITHOUT INTERPHASE REACTOR



$Vdc = \frac{Vac}{0.715} - 1$

$Vac = 0.715 \times Vdc + 1$

$Iac = 0.577 \times Idc$

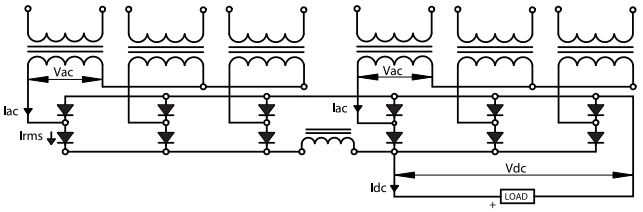
$Iavg = 0.167 \times Idc$

$Irms = 0.408 \times Idc$

RIPPLE = 1% MAX.

12 PULSE BRIDGE

WITH INTERPHASE REACTOR



$Vdc = \frac{Vac}{0.74} - 1$

$Vac = 0.74 \times Vdc + 1$

$Iac = 0.408 \times Idc$

$Iavg = 0.167 \times Idc$

$Irms = 0.29 \times Idc$

RIPPLE = 1% MAX.

Airflow Volume to Velocity Conversions

Airflow Volume to Velocity Conversions

Air velocity is calculated by dividing the output volumetric flow rate of the fan by the cross sectional area of outflow air pressure.

Velocity (LFM) = Volume (CFM) / area (ft^2)
Velocity (m/s) = Volume (m^3 / s) / area (m^3)

Although most fans are normally rated and compared at their free air delivery at zero backpressure, nearly all applications have some backpressure. For accuracy, the volume of output must be de-rated by 60% to 80% in the anticipation of backpressure.

Example:
The output air volume of a fan is given as 80 CFM. The output area is 6 inches or $36in^2$ or $0.25ft^2$.

To find velocity:
Velocity (LFM) = 80 CFM / $.025ft^2$ = 320 LFM
Velocity is 320 LFM, which at 80% de-rates to 256 LFM

Application Notes

Darrah offers a variety of reports providing product application, technical data, and protection circuits for Power Semiconductor products.

Call or visit our website www.darrahelectric.com for a copy of any of these reports.

- *IB1132 – GE Power Converter Handbook*
- *IB1153 – Selection of Press Pack Power Semiconductor Clamps*
- *IB1148 – Clamping Instructions for Power Semiconductor Clamps*
- *AN4840 – Gate Triggering and Gate Characteristics*
- *AN4870 – Effects of Temperature on Thyristor Performance*
- *IB1160 – ABB - Design of RC Snubbers for Phase Control Applications*
- *IB1152 – Trouble Shooting Silicon Controlled Rectifiers*
- *AN4506 – Calculation of Junction Temperature*
- *AN4503 – An Introduction to IGBT's*

Calculating Thermal Resistance (0° C/W) with Known Velocity/Heatsink Length/Perimeter

Air Velocity (LFM) = V
Heatsink Length (Inch) = L (Top & Bottom)
Heatsink Perimeter (Inch) = P
(Taken from Darrah Extrusion Details)

$$R\Theta sa = \frac{916}{2 * P * \sqrt{V*L}}$$

RΘsa for single device, double sided cooled, top and bottom sinks same length.

Clamp Force:
Multiply KiloNewtons by 224.8 to obtain pounds.
Multiply pounds by .004448 to obtain KiloNewtons.

Portable Power Semiconductor Testers

DARRAH ELECTRIC COMPANY offers a Portable Power Semiconductor tester that accurately tests Silicon Diodes, SCR's, GTO Thyristors, Transistors and IGBT's.

The DST5000 performs three important characteristic tests:

- Adjustable from 0 to 5000 Volts for both Forward and Reverse Blocking. A digital ammeter indicates leakage current at the semiconductor voltage rating.
- Adjustable voltage for Gating or Firing devices. A digital DC Voltmeter indicates actual gate trigger voltage (Vgt). A digital DC ammeter indicates actual gate current (Igt).

Product literature is available to fully explain the features and functionality of the tester. Operating instructions and test leads are included.

Options Include:

6ft Test Leads

Power Semiconductor Clamps

- Darrah's resources include a wide selection of Disk or Press Pack power semiconductor clamps.
- Darrah's semiconductor clamps have built in force indicators and require no special gauges or torque wrenches for achieving correct force.
- Highest Dielectric strength available. Single sided insulated clamps pass 2.5 kV testing. Double insulated are rated to 8 kV, and have been tested to 10 kV.
- Each clamp is individually calibrated and marked with the corresponding force.
- Available for all applications with mounting forces ranging from 4 kN (kilo Newtons) through 70 kN (900 lbs – 16,000 lbs).
- Low profile design.
- The mounting of press pack semiconductors demand the use of a clamp to exert precise force in accordance with the value indicated by the semiconductor manufacturer.
- Applying the correct force also assures a good electrical performance and a low thermal resistance.

Darrah's Heatsinks and Extrusions

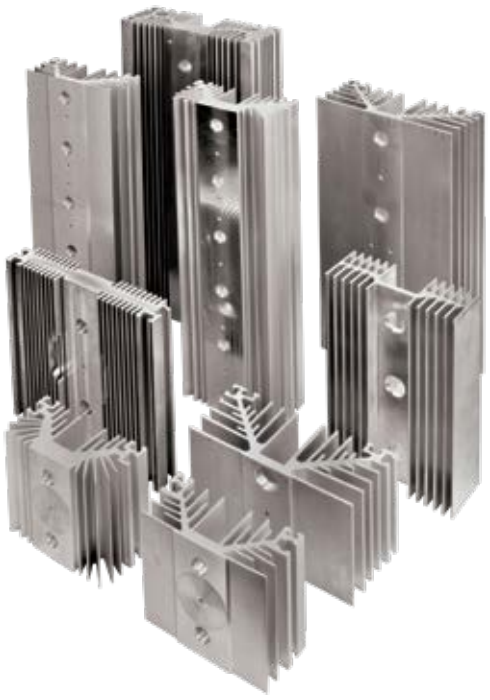
It is important to optimize the semiconductor performance by selecting the correct heat sink. Selection consideration depends on space availability, ambient temperature, transient conditions, overload capacity and whether the application relies on convection cooling or forced air-cooled methods.

Having more than 50 years experience in assembling power semiconductor stacks, Darrah has chosen to stock dozens of the more popular disk type extrusions. In addition, Darrah has its own range of **proprietary extrusions** that optimize the transfer of heat in natural convection and forced air cooled power assemblies.

Darrah's **heat sink** product line supports disk devices ranging in size from 19mm through 125mm contact surfaces.

Typical heat sink finishes include gold irridite, anodizing, plain aluminum, or clear coat, RoHS compliant.

All assemblies are built using proper machining and semiconductor mounting techniques.



Choose Your Assembly Options

Surge Voltage Protection

Transient voltage surges caused by transformer switching, inductive load switching, hole storage, line disturbances, etc., can arise in most circuits. It is recommended that a surge suppression network be fitted to limit transient voltages to less than the transient voltage rating of the unit.

Darrah Electric offers Metal Oxide Varistors (MOV) as part of your assembly package. MOV's have high clamping efficiency and low steady state power dissipation in addition to high surge capability with an instantaneous response. This offers considerable advantages in protecting the SCR contactor and control circuitry.

Bus Bars

Darrah's machining center is capable of a wide variety of standard and custom bus bars including flexible type bus straps. Materials include copper and aluminum. Nickel or tin plating is available to complete your assembly.

Terminal Strips

For thyristor assemblies, Darrah can provide terminal barrier strips for gate and cathode connections. All common types are available; screw fast on, plug, solder-less and din rail.

Insulated Mounting Feet

When heatsink assemblies are electrically live, there is a need to isolate them from their fixtures. Darrah offers three common forms of isolating and mounting your assembly.

Insulated Mounting Feet (NEMA XX Micarta)

A popular choice for isolating and mounting Darrah extrusions is the use of NEMA XX Micarta mounting rails. Darrah stocks a full range of mounting rails for each extrusion; single, double, triple and six device designs.

These mounting rails offer front accessibility, high dielectric isolation as well as non-absorbent and high temperature solution. Micarta machines very well and has high impact strength.

Micarta Grade	NEMA Grade	Water Absorption % by weight	Maximum Operating Temperature	Dielectric Strength Perpendicular VPM	Arc Resistance (seconds)
219	XX	0.5	120°C	500	(N/A)

Fiberglass Reinforced Channels/Angles

Darrah stocks and machines a full range of fiberglass-reinforced channels and angle profiles. These products offer a superior combination of electrical, mechanical and heat resistant properties.

Standoff Fiberglass Insulators

As a third choice for mounting your assembly, Darrah provides a broad range of fiberglass standoff insulators.

NEMA Grade	Water Absorption % by weight	Maximum Operating Temperature	Dielectric Strength Perpendicular VPM	Arc Resistance (seconds)
GPO-3	0.3	130°C	200	185

Thermostats

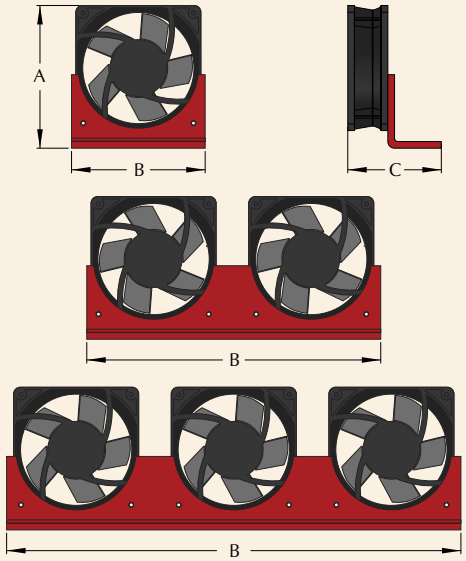
Darrah stocks the full line of thermostats commonly found on air-cooled stack assemblies. Choose from non-encapsulated or encapsulated packages in various temperature ratings. Thermostats are available in normally closed or normally open status.

R/C Snubber

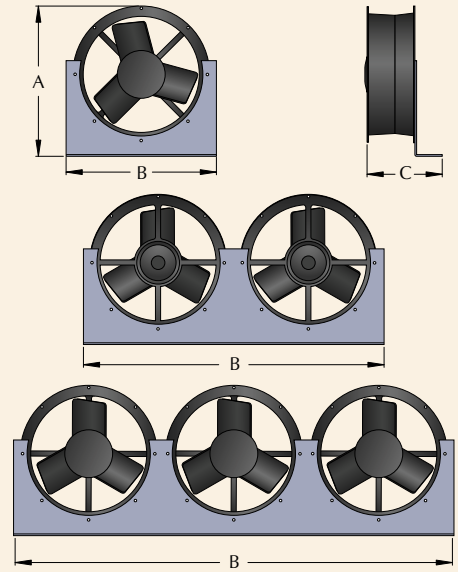
Darrah offers a wide variety of resistor and capacitor snubber circuits for protection from false firing and high voltage surges. Let Darrah recommend the correct snubber for your application.

Fan Assemblies

HEAT SINK MOUNTED GLASTIC BRACKETS



PANEL MOUNTED METAL BRACKETS



Heat Sink Mounted Fan Assemblies

Fan	Part Number	Dimensions			Fan Size	CFM	LFM
		A	B	C			
Heatsink Extrusion: A4							
Single Fan	FAHA4115-1	5.34	5.0	3.50	4.75″	100	454
Dual Fan	FAHA4115-2	5.34	10.0	3.50	4.75″	200	908
Triple Fan	FAHA4115-3	5.34	14.39	3.50	4.75″	300	1362
Heatsink Extrusion: A5, A7							
Single Fan	FAHA5115-1	5.34	5.0	3.50	4.75″	100	454
Dual Fan	FAHA5115-2	5.34	11.0	3.50	4.75″	200	908
Triple Fan	FAHA5115-3	5.34	17.0	3.50	4.75″	300	1362
Heatsink Extrusion: A6, A8, A10							
Single Fan	FAHA6115-1	7.60	7.0	4.0	6″	240	633
Dual Fan	FAHA6115-2	7.60	15.0	4.0	6″	480	1266
Triple Fan	FAHA6115-3	7.60	23.0	4.0	6″	720	1899
Heatsink Extrusion: A15							
Single Fan	FAHA15115-1	11.00	11.00	5.5	10″	550	867
Dual Fan	FAHA15115-2	11.00	22.00	5.5	10″	1100	1734

Panel Mounted Fan Assemblies

Fan	Part Number	Dimensions			Fan Size	CFM	LFM
		A	B	C			
Heatsink Extrusion: A9, A11, A16							
Single Fan	FAPA9115-1	11.00	11.00	5.50	10″	550	867
	FAPA11115-1						
	FAPA16115-1						
Dual Fan	FAPA9115-2	11.00	22.00	5.50	10″	1100	1734
	FAPA11115-2						
Triple Fan	FAPA9115-3	11.00	32.00	5.50	10″	1650	2601
	FAPA11115-3						

PART NUMBER DESIGNATION

FA	H	A7	115	1
Fan Assembly	**Heat Sink Mounted Panel Mounted**	**Extrusion Size**	**Voltage**	**Number of Fans**
FA	**H** – Heat Sink **P** – Panel	**A4** **A9** **A5** **A10** **A6** **A11** **A7** **A15** **A8** **A16**	**115** **230**	**1** **2** **3**

ABB

ABB Semiconductors Switzerland, is a world class manufacturer of large area / high voltage power semiconductors.

ABB's ongoing investment in Bi-Polar and BiMOS Technology offers a complete range of high power semiconductors. This investment coupled with more than 50 years experience in some of the most demanding applications in high power electronics gives you the assurance of working with the partner whose reputation for innovation, technology, reliability and service has become a benchmark in the industry.

Darrah's staff communicates closely with ABB engineers developing new designs for today's assemblies. Together we offer the latest technology for high power applications.

ABB's product line includes thyristors, rectifier diodes, IGBT's, IGCT's, bi-directional control thyristors, GTO thyristors, fast switching diodes, and power semiconductor clamps.

www.abb.com/semiconductors

POWEREX

Powerex is a leading supplier of discrete, modular and integrated high power semiconductor solutions.

With its class 100 clean-room manufacturing facility located in Youngwood, PA, the Powerex product line includes phase control and inverter grade thyristors from 40 Amps to 5000 Amps; standard and fast recovery rectifiers from 100 Amps to 10,000 Amps; and 5 sizes of isolated POW-R-BLOK modules from 60 Amps to 2500 Amps.

In addition, Powerex offers fifth generation IGBTs and Intelligent Power Modules (IPMs) from Mitsubishi Electric, the world leader in IGBTs and IPMs. Powerex and its strategic partners maintain a commitment to research and new product development.

Darrah stocks a wide range of Powerex products. Our relationship with the technical and product teams at Powerex enables us to offer our customers an unlimited source of power semiconductors.

www.pwrx.com

WESTCODE

Westcode Semiconductors is recognized as one of the world's foremost manufacturers of high power semiconductors. Westcode's Thyristor product line ranges up to 6.5 kV with silicon diameters to 100 mm making them particularly suitable for high power converters such as medium voltage DC drives, medium voltage soft starters, excitation and transfer switches.

The Westcode product line also includes silicon diodes, GTO thyristors, fast recovery diodes and fast turn-off thyristors.

Westcode was acquired by the IXYS Corporation and continues to manufacture in Chippenham, UK.

www.westcode.com

DYNEX SEMICONDUCTOR

Dynex Semiconductor is one of the leading power semiconductor component and sub-system suppliers who designs and manufactures high power bipolar semiconductors, high power insulated gate bipolar transistor (IGBT) modules and high power electronic assemblies. The company's products are used worldwide in power electronic applications including electric power transmission and distribution, renewable and distributed energy, marine and rail traction motor drives, aerospace, electric vehicles, industrial automation and controls and power supplies.

The Dynex Semiconductor product range includes a comprehensive choice of phase control thyristors, rectifier diodes, fast turn off thyristors and GTO thyristors up to 6 inches and 8500 Volts, as well as a large variety of IGBT modules up to 6500 Volts.

Dynex Semiconductor has two production sites located in Lincoln, England and Zhuzhou, China with fully integrated silicon fabrication, assembly and test, design and development operations which contain in total 900,000 bipolar devices and 100,000 IGBT modules capacity per annum.

Dynex Semiconductor is majority owned by Zhuzhou CSR Times Electric Co., Ltd based in Zhuzhou, China who is the leading supplier of the Chinese railway industry and mainly engaged in application research and engineering research of electric traction technology, industrial and civilian converter technology.

www.dynexsemi.com

LEM

LEM is a market leader in providing innovative and high quality solutions for measuring electrical parameters. Its core products, current and voltage transducers, are used in a broad range of applications in industrial, traction, energy and automotive markets.

LEM offers a complete range of reliable and galvanically isolated current transducers from 0.25 Amps to 24,000 Amps. Isolated voltage transducers are available from 10 Volts to 6,400 Volts.

Product Lines

- Isolated Measurements of Current and Voltage
- ASIC, Fluxgate, Open Loop, Closed Loop, and Rogowski Coil Technology
- Galvanically Isolated
- PCB (SMT & Through-Hole) and Panel Mount
- Current Transducers: 25mA to 24,000A
- Voltage Transducers: 10V to 6,400V

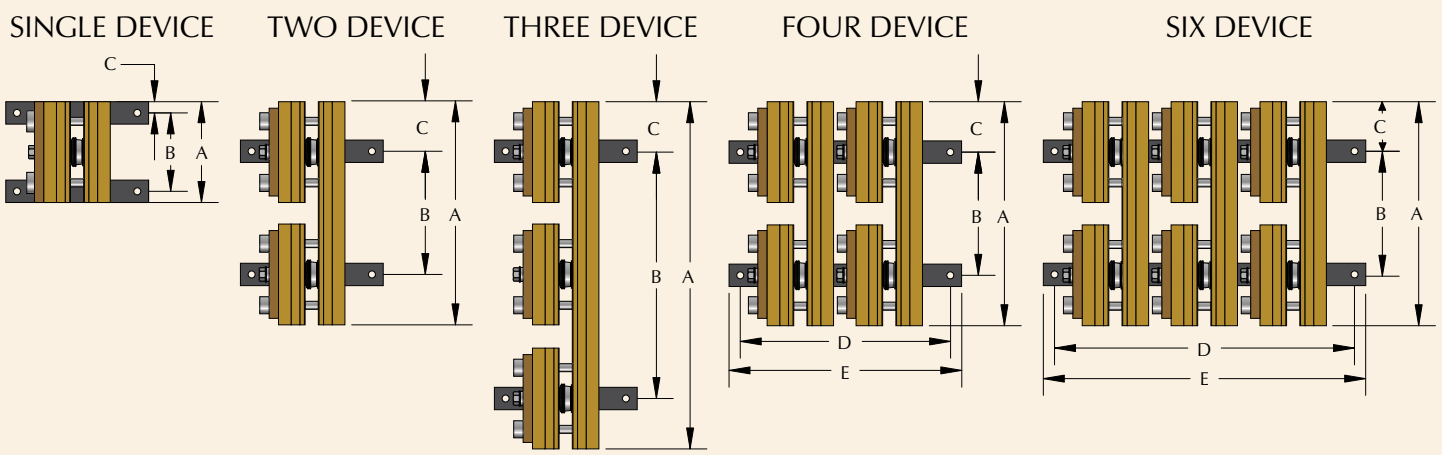
www.lem.com

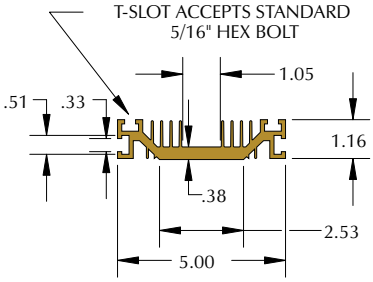
Before choosing the power semiconductor for your assembly, ask us – we probably have just what you need.

If you're not familiar with any one of these fine product lines, call us for data sheets, or log on to our website at **www.darrahelectric.com**

Our expertise in power semiconductor assemblies allows us to offer a complete solution to your application.

Darrah **A4** Extrusion

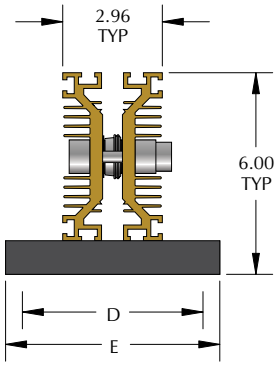


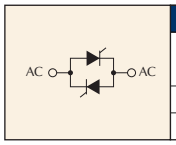


A4 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	4.50	3.50	0.50	5.38	6.38	4 LBS
Two Device	10.00	5.50	2.25	5.38	6.38	8 LBS
Three Device	15.50	11.00	2.25	5.38	6.38	12 LBS
Four Device	10.00	5.50	2.25	9.38	10.38	16 LBS
Six Device	10.00	5.50	2.25	14.38	14.38	23 LBS

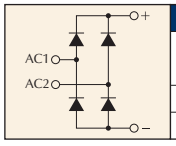
**All dimensions shown using 1/2" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 4.5" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	0.957	.667	.478	.391	.338	.303	.276	.256	.239	.226	.214	.175	.151	.135

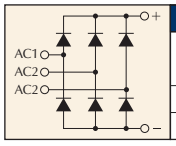




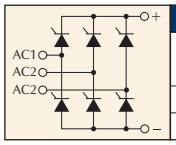
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PAA1918BT	33 mm	1800	90	134	179	234	300
PAA11018BT	40 mm	1800	100	144	192	253	326



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD11712BT	23 mm	1200	170	229	293	366	447
PRD13216BT	33 mm	1600	320	432	560	711	887



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD32312BT	23 mm	1200	230	296	370	452	540
PRD34216BT	33 mm	1600	420	541	683	847	1032



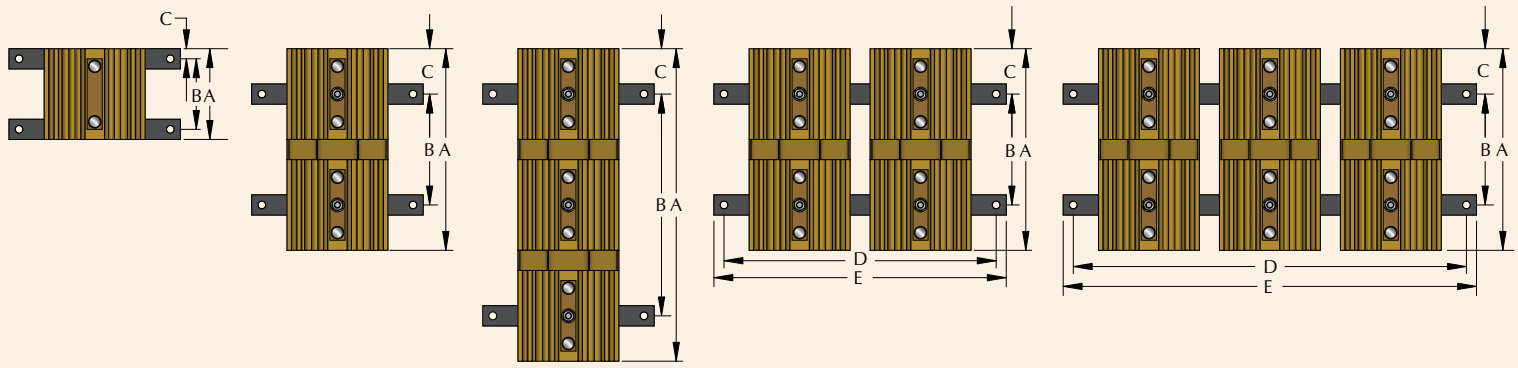
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PTD31218BT	33 mm	1800	120	165	214	274	343
PTD31318BT	40 mm	1800	130	178	233	299	376

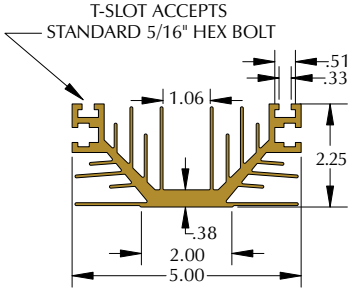
All Ratings are calculated for operation at a 50ºC Ambient with a 25ºC Junction Safety Factor

Perimeter:	Weight per foot:
31.91 IN.	2.98 LB./FT.

Darrah **A5** Extrusion

SINGLE DEVICE TWO DEVICE THREE DEVICE FOUR DEVICE SIX DEVICE

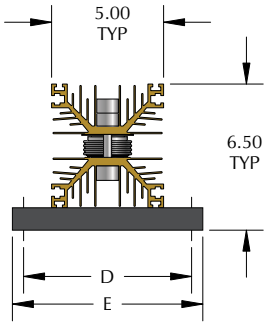


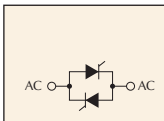


A5 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	4.50	3.50	0.50	7.50	8.50	5 LBS
Two Device	10.00	5.50	2.25	7.50	8.50	9 LBS
Three Device	15.50	11.00	2.25	7.50	8.50	14 LBS
Four Device	10.00	5.50	2.25	13.50	14.50	18 LBS
Six Device	10.00	5.50	2.25	19.50	20.50	28 LBS

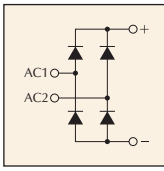
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 4.5" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	0.585	.414	.293	.293	.207	.185	.169	.156	.146	.138	.131	.107	.093	.083

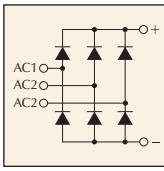




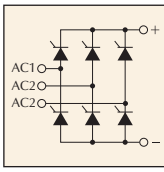
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PAA11518BT	33 mm	1800	150	200	260	330	409
PAA11918BT	38 mm	1800	190	256	337	435	551
PAA11628BT	34 mm	2800	160	214	282	366	464



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD12512BT	23 mm	1200	250	323	399	481	566
PRD14816BT	33 mm	1600	480	620	782	966	1168
PRD12628BT	34 mm	2800	260	360	476	617	782



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD33212BT	23 mm	1200	320	403	489	578	668
PRD35916BT	33 mm	1600	590	748	922	1115	1325
PRD33628BT	34 mm	2800	360	483	623	789	978



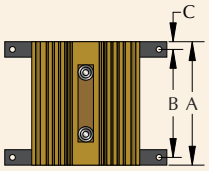
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PTD31816BT	33 mm	1600	180	238	302	374	454
PTD32318BT	38 mm	1800	230	305	393	495	612
PTD31928BT	34 mm	2800	190	257	331	419	520

All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

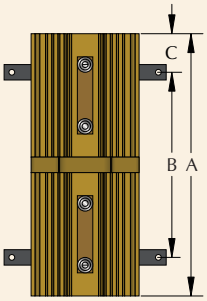
Perimeter:	Weight per foot:
52.17 IN.	4.22 LB./FT.

Darrah **A6** Extrusion

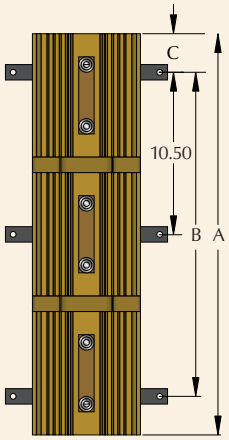
SINGLE DEVICE



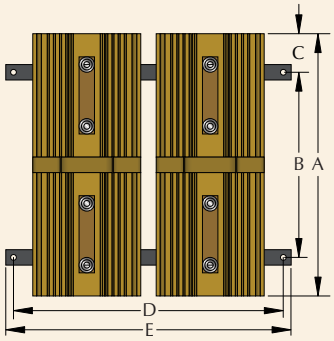
TWO DEVICE



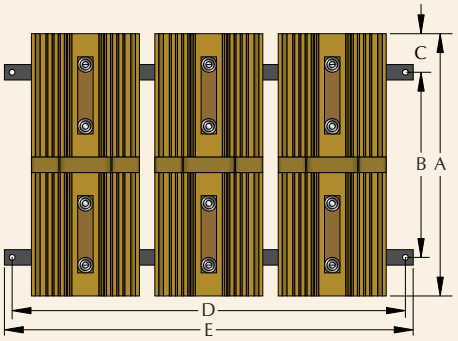
THREE DEVICE

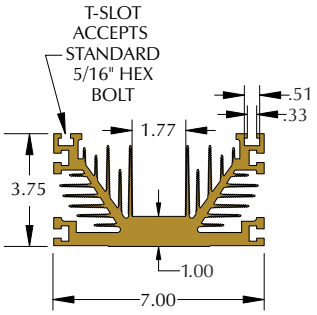


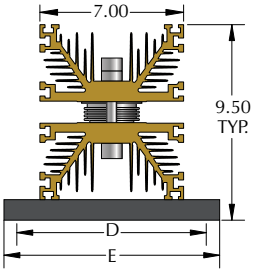
FOUR DEVICE



SIX DEVICE



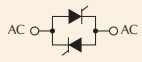




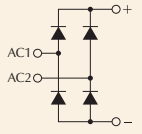
A6 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	8.00	7.00	0.50	9.50	10.50	18 LBS
Two Device	17.00	12.00	2.50	9.50	10.50	35 LBS
Three Device	26.00	21.00	2.50	9.50	10.50	53 LBS
Four Device	17.00	12.00	2.50	17.50	18.50	69 LBS
Six Device	17.00	12.00	2.50	25.50	26.50	103 LBS

**All dimensions shown using 1" high SCR's with optional mounting rails*

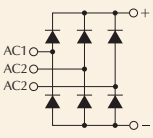
	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 8" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.20	.15	.127	.11	.10	.081	.077	.073	.069	.067	.062	.054	.049	.045



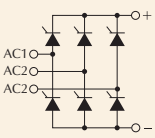
AC Switch			Output Current – RMS (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PAA14418BT	38 mm	1800	440	828	915	1045	1255
PAA13728BT	34 mm	2800	370	701	775	887	1068
PAA15012BT	50 mm	1200	500	1012	1143	1351	1714
PAA14728BT	50 mm	2800	470	930	1046	1228	1544
PAA15018BT	63 mm	1800	500	1072	1232	1494	1981
PAA14728BT	63 mm	2800	470	989	1133	1368	1803
PAA15228BT	78 mm	2800	520	1110	1276	1551	2066
PAA15042BT	78 mm	4200	500	1035	1183	1426	1875



Single Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD16328BT	34 mm	2800	630	1054	1167	1338	1617
PRD17316BT	50 mm	1600	730	1154	1255	1403	1633
PRD17428BT	50 mm	2800	740	1306	1474	1741	2208
PRD19528BT	78 mm	2800	950	1672	1907	2288	2988



Three Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PRD38028BT	34 mm	2800	800	1278	1401	1584	1879
PRD39116BT	50 mm	1600	910	1309	1413	1564	1797
PRD39828BT	50 mm	2800	980	1640	1829	2124	2630
PRD313228BT	78 mm	2800	1320	2118	2384	2809	3570



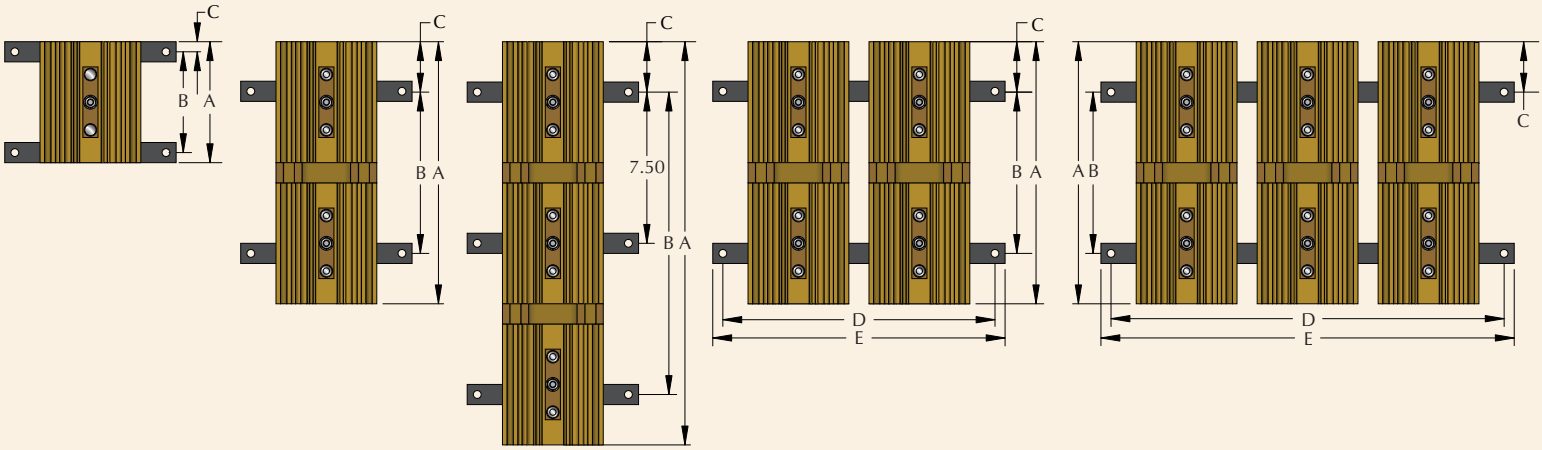
Three Phase SCR Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				100 LFM	200 LFM	400 LFM	800 LFM
PTD35018BT	38 mm	1800	500	603	663	753	898
PTD34228BT	34 mm	2800	420	512	563	641	766
PTD36112BT	50 mm	1200	610	758	852	1000	1256
PTD35628BT	50 mm	2800	560	687	769	896	1115
PTD36418BT	63 mm	1800	640	824	943	1136	1492
PTD35928BT	63 mm	2800	590	753	858	1030	1342
PTD36628BT	78 mm	2800	660	846	968	1168	1539
PTD36142BT	78 mm	4200	610	778	886	1060	1377

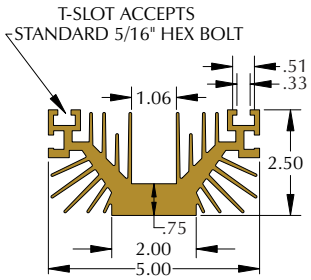
All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

Perimeter:	Weight per foot:
112.61 IN.	10.80 LB./FT.

Darrah A7 Extrusion

SINGLE DEVICE | TWO DEVICE | THREE DEVICE | FOUR DEVICE | SIX DEVICE

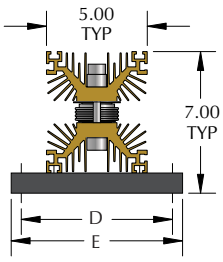


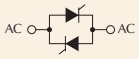


A7 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	6.00	5.00	0.50	7.50	8.50	4 LBS
Two Device	13.00	8.00	2.50	7.50	8.50	11 LBS
Three Device	20.00	15.00	2.50	7.50	8.50	17 LBS
Four Device	13.00	8.00	2.50	13.50	14.50	23 LBS
Six Device	13.00	8.00	2.50	19.50	20.50	34 LBS

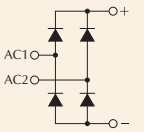
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 6" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.482	.341	.241	.197	.170	.152	.139	.129	.121	.114	.108	.088	.076	.068

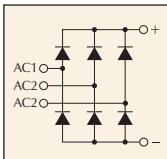




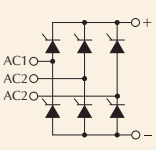
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PAA12218BT	38 mm	1800	220	297	388	496	620
PAA11828BT	34 mm	2800	180	249	376	418	523
PAA12312BT	50 mm	1200	230	318	430	573	750
PAA12228BT	50 mm	2800	220	303	407	538	699



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PRD13128BT	34 mm	2800	310	420	549	704	882
PRD14116BT	50 mm	1600	410	556	727	933	1173
PRD13428BT	50 mm	2800	340	474	638	847	1104



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PRD34228BT	34 mm	2800	420	556	710	889	1089
PRD35516BT	50 mm	1600	550	714	910	1139	1400
PRD34828BT	50 mm	2800	480	649	855	1108	1409



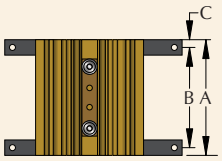
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PTD32718BT	38 mm	1800	270	351	447	557	681
PTD32228BT	34 mm	2800	220	296	378	472	578
PTD32912BT	50 mm	1200	290	398	528	688	880
PTD32728BT	50 mm	2800	270	370	485	626	793

All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

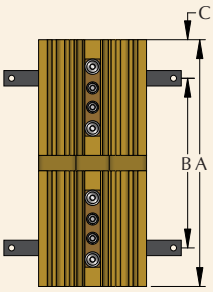
Perimeter:	Weight per foot:
54.85 IN.	5.87 LB./FT.

Darrah **A8** Extrusion

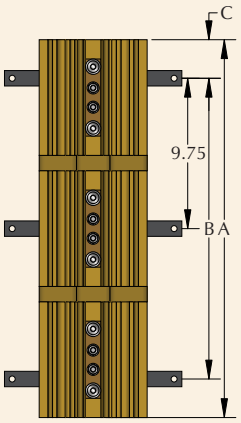
SINGLE DEVICE



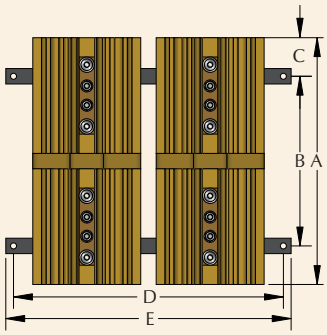
TWO DEVICE



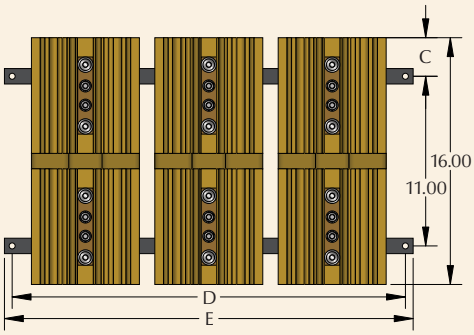
THREE DEVICE

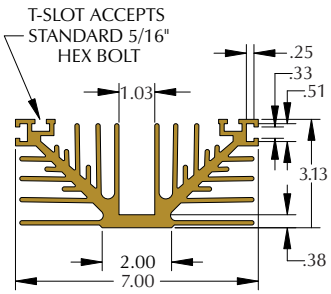


FOUR DEVICE



SIX DEVICE

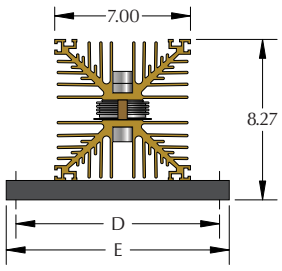


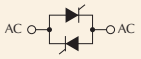


A8 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	7.50	6.50	0.50	10.50	11.50	13 LBS
Two Device	16.00	11.00	2.50	10.50	11.50	25 LBS
Three Device	24.50	19.50	2.50	10.50	11.50	38 LBS
Four Device	16.00	11.00	2.50	17.50	18.50	50 LBS
Six Device	16.00	11.00	2.50	25.50	26.50	75 LBS

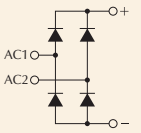
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 7.5" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.27	.191	.135	.110	.096	.085	.078	.072	.068	.064	.060	.049	.043	.038

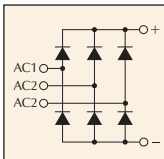




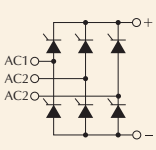
AC Switch			Output Current – RMS (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PAA13518BT	38 mm	1800	350	460	579	712	853
PAA13028BT	34 mm	2800	300	387	489	602	723
PAA13912BT	50 mm	1200	390	524	690	892	1127
PAA13728BT	50 mm	2800	370	494	645	826	1036



Single Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PRD15028BT	34 mm	2800	500	653	824	1015	1219
PRD16616BT	50 mm	1600	660	864	1094	1356	1644
PRD15828BT	50 mm	2800	580	776	1018	1309	1648



Three Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PRD36528BT	34 mm	2800	650	830	1024	1236	1457
PRD38416BT	50 mm	1600	840	1063	1315	1595	1897
PRD37828BT	50 mm	2800	780	1023	1309	1644	2023



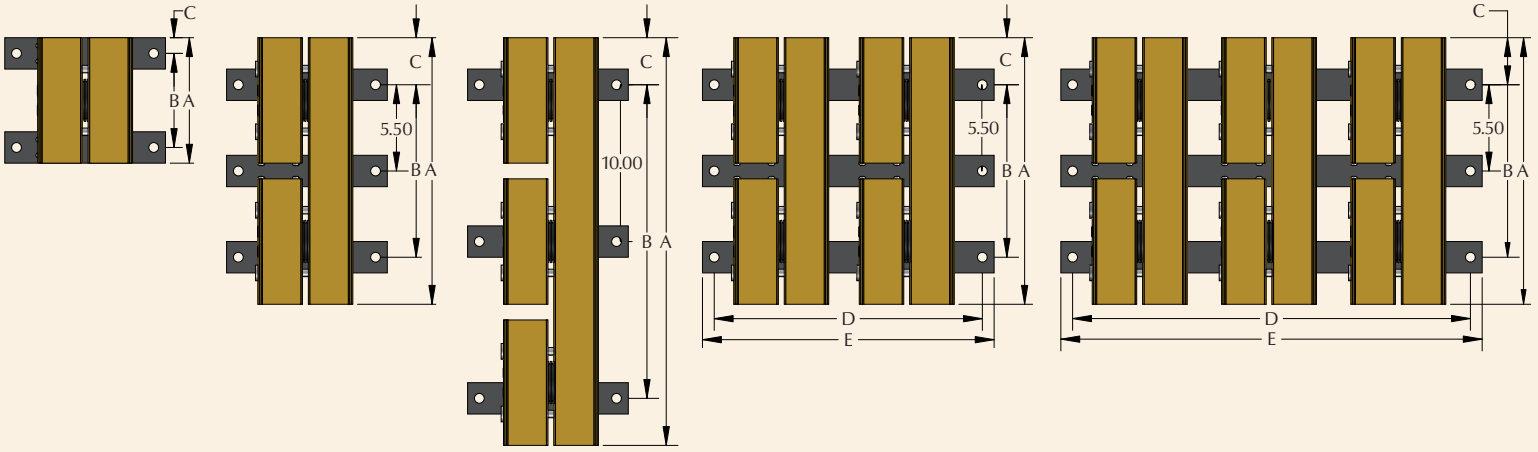
Three Phase SCR Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 100 LFM	Forced Air 200 LFM	Forced Air 400 LFM	Forced Air 800 LFM
PTD34118BT	38 mm	1800	410	521	641	771	906
PTD33528BT	34 mm	2800	350	441	544	656	773
PTD34812BT	50 mm	1200	480	634	816	1029	1271
PTD34428BT	50 mm	2800	440	579	738	922	1128

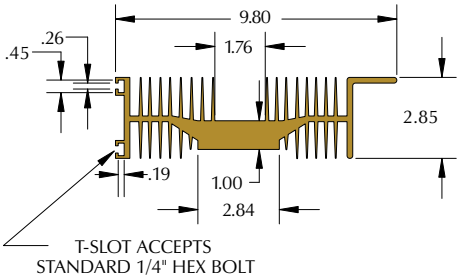
All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

Perimeter:	Weight per foot:
87.50 IN.	7.37 LB./FT.

Darrah **A9** Extrusion

SINGLE DEVICE TWO DEVICE THREE DEVICE FOUR DEVICE SIX DEVICE

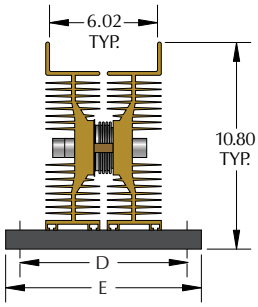


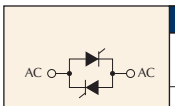


A9 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	8.00	6.00	1.00	8.75	10.25	17 LBS
Two Device	17.00	11.00	3.00	8.75	10.25	34 LBS
Three Device	26.00	20.00	3.00	8.75	10.25	51 LBS
Four Device	17.00	11.00	3.00	17.10	18.60	68 LBS
Six Device	17.00	11.00	3.00	25.87	26.87	102 LBS

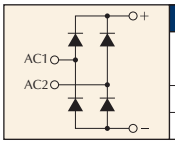
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 8" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.215	.152	.108	.088	.076	.068	.062	.058	.054	.051	.048	.039	.034	.030

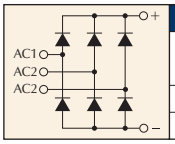




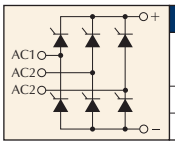
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 200 LFM	Forced Air 500 LFM	Forced Air 1000 LFM	Forced Air 2000 LFM
PAA14418BT	63 mm	1800	440	823	1192	1541	1947
PAA14228BT	63 mm	2800	420	766	1102	1418	1785



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 200 LFM	Forced Air 500 LFM	Forced Air 1000 LFM	Forced Air 2000 LFM
PRD17516BT	50 mm	1600	750	1216	1585	1825	2189
PRD16628BT	50 mm	2800	660	1151	1577	1949	2349



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 200 LFM	Forced Air 500 LFM	Forced Air 1000 LFM	Forced Air 2000 LFM
PRD39416BT	50 mm	1600	940	1445	1835	2147	2458
PRD38928BT	50 mm	2800	890	1464	1944	2351	2781



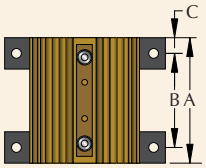
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air 200 LFM	Forced Air 500 LFM	Forced Air 1000 LFM	Forced Air 2000 LFM
PTD35718BT	63 mm	1800	570	1023	1442	1826	2258
PTD35328BT	63 mm	2800	530	930	1298	1633	2009

All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

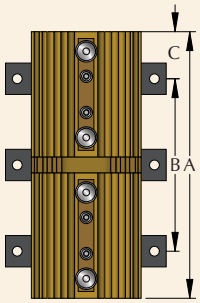
Perimeter:	Weight per foot:
106.79 IN.	11.0 LB./FT.

Darrah **A10** Extrusion

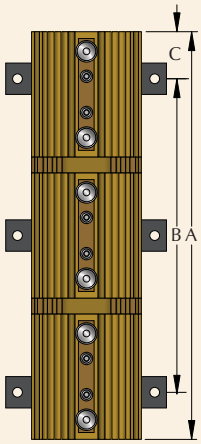
SINGLE DEVICE



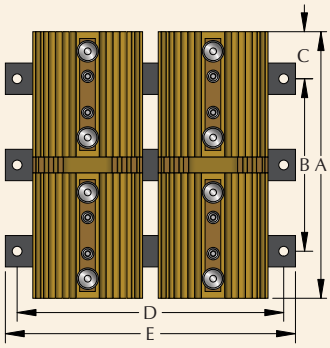
TWO DEVICE



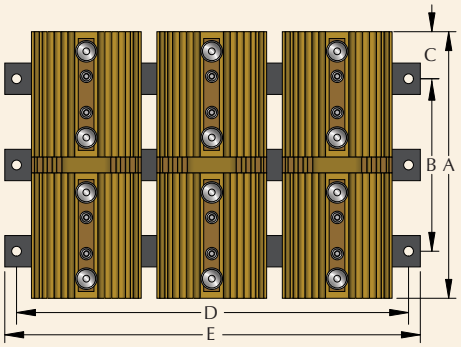
THREE DEVICE

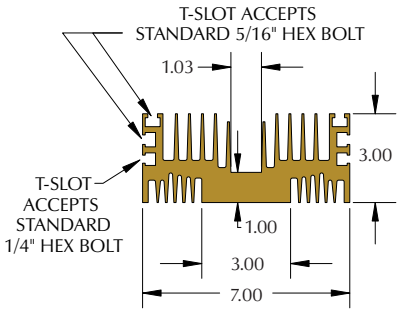


FOUR DEVICE



SIX DEVICE

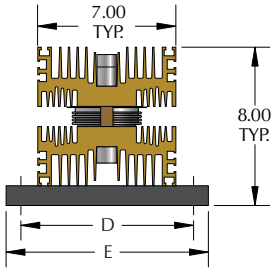


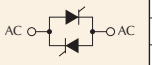


A10 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	8.0	6.00	1.00	8.75	10.25	21 LBS
Two Device	17.00	11.00	3.00	8.75	10.25	43 LBS
Three Device	26.00	20.00	3.00	8.75	10.25	64 LBS
Four Device	17.00	11.00	3.00	17.00	18.00	86 LBS
Six Device	17.00	11.00	3.00	25.00	26.50	130 LBS

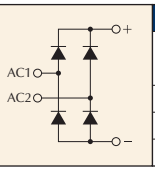
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 8" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.308	.218	.151	.126	.109	.097	.089	.082	.077	.073	.069	.056	.049	.044

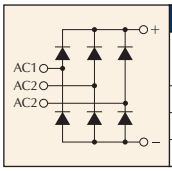




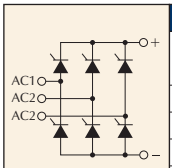
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PAA13418BT	63 mm	1800	340	636	938	1234	1591
PAA13128BT	63 mm	2800	310	593	870	1140	1464
PAA13528BT	78 mm	2800	350	665	986	1306	1699
PAA13342BT	78 mm	4200	330	630	923	1209	1556



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD16016BT	50 mm	1600	600	1000	1338	1624	1925
PRD15128BT	50 mm	2800	510	917	1288	1624	2000
PRD17428BT	78 mm	2800	740	1347	1937	2501	3170



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD37616BT	50 mm	1600	760	1213	1575	1875	2188
PRD37028BT	50 mm	2800	700	1192	1620	1996	2407
PRD310028BT	78 mm	2800	1000	1741	2418	3043	3765



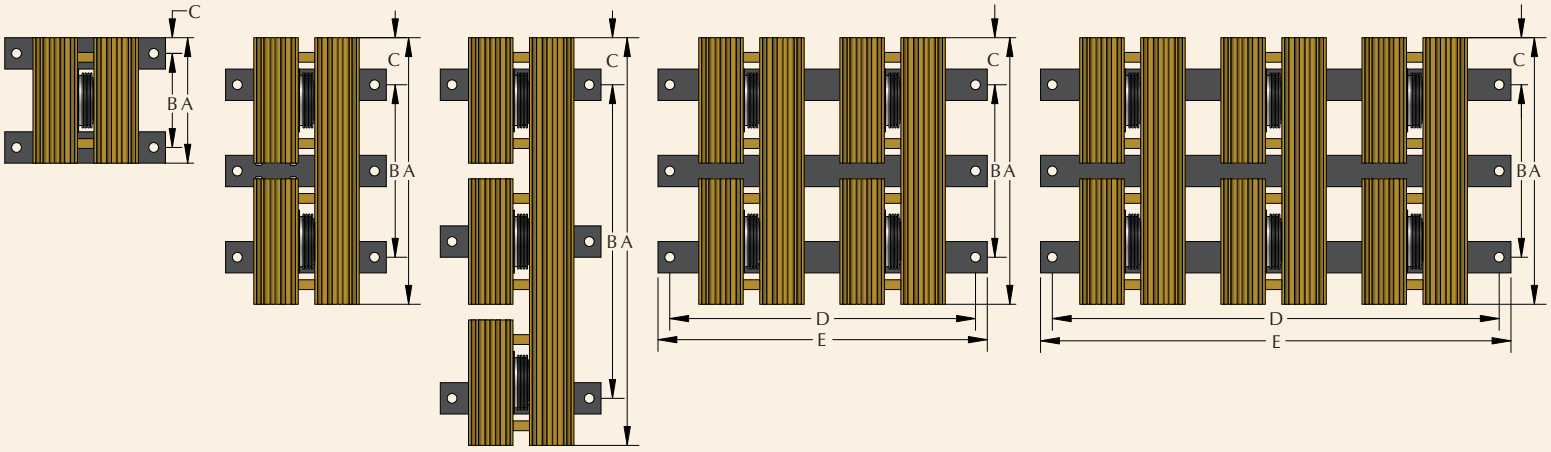
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PTD34418BT	63 mm	1800	440	803	1155	1489	1880
PTD34028BT	63 mm	2800	400	734	1046	1339	1680
PTD34528BT	78 mm	2800	450	824	1188	1536	1949
PTD34242BT	78 mm	4200	420	759	1076	1375	1724

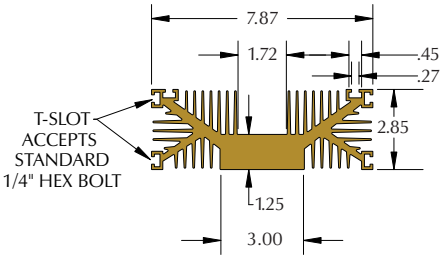
All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

Perimeter:	Weight per foot:
77.21 IN.	12.5 LB./FT.

Darrah **A11** Extrusion

SINGLE DEVICE TWO DEVICE THREE DEVICE FOUR DEVICE SIX DEVICE

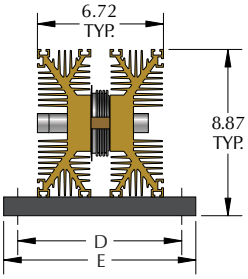


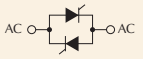


A11 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	8.00	6.00	1.00	8.75	10.25	22 LBS
Two Device	17.00	11.00	3.00	8.75	10.25	44 LBS
Three Device	26.00	20.00	3.00	8.75	10.25	65 LBS
Four Device	17.00	11.00	3.00	19.50	21.00	88 LBS
Six Device	17.00	11.00	3.00	22.50	24.00	131 LBS

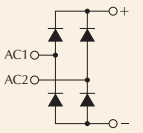
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 8" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.2150	.1629	.1152	.0941	.0815	.0729	.0665	.0616	.0576	.0543	.0515	.0421	.0364	.0326

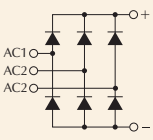




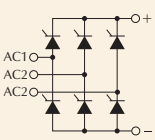
AC Switch				Output Current – RMS (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PAA14418BT	63 mm	1800	440	819	1186	1534	1940
PAA14128BT	63 mm	2800	410	762	1097	1412	1778
PAA14628BT	78 mm	2800	460	859	1253	1635	2091
PAA14442BT	78 mm	4200	440	808	1163	1501	1897



Single Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD17516BT	50 mm	1600	750	1211	1580	1880	2184
PRD16628BT	50 mm	2800	660	1146	1571	1942	2342
PRD19628BT	78 mm	2800	960	1707	2411	3064	3819



Three Phase Diode Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD39416BT	50 mm	1600	940	1441	1830	2141	2453
PRD38828BT	50 mm	2800	880	1458	1937	2344	2773
PRD312028BT	78 mm	2800	1200	2158	2944	3652	4452



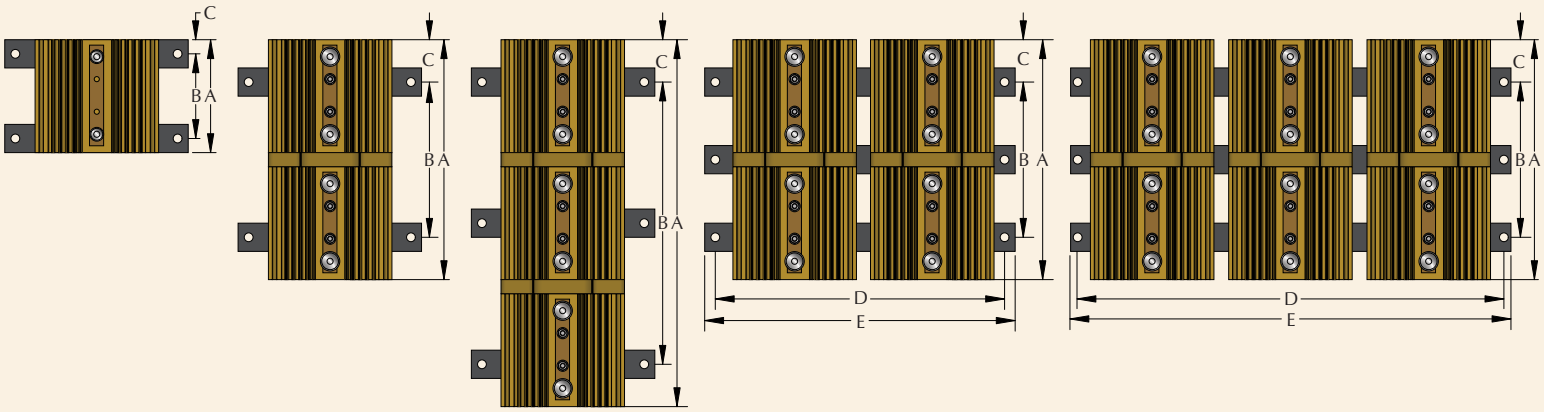
Three Phase SCR Bridge				Output Current – Average Amps (Typical Ratings)			
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PTD35718BT	63 mm	1800	570	1018	1436	1818	2250
PTD35228BT	63 mm	2800	520	926	1293	1626	2002
PTD35828BT	78 mm	2800	580	1046	1480	1884	2351
PTD35442BT	78 mm	4200	540	954	1327	1669	2060

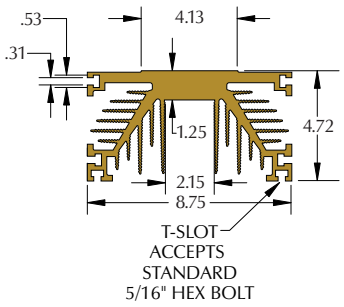
All Ratings are calculated for operation at a 50°C Ambient with a 25°C Junction Safety Factor

Perimeter:	Weight per foot:
99.37 IN.	11.75 LB./FT.

Darrah **A15** Extrusion

SINGLE DEVICE TWO DEVICE THREE DEVICE FOUR DEVICE SIX DEVICE

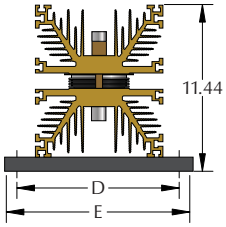


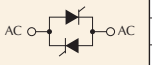


A15 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	10.00	8.00	1.00	11.50	13.00	37 LBS
Two Device	21.00	15.00	3.00	11.50	13.00	54 LBS
Three Device	32.00	26.00	3.00	11.50	13.00	74 LBS
Four Device	21.00	15.00	3.00	20.50	22.00	110 LBS
Six Device	21.00	15.00	3.00	30.25	31.25	164 LBS

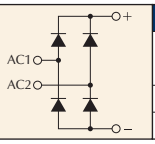
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 10" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.19	.10	.08	.07	.06	.05	.035	.028	.025	.023	.021	.016	.014	.012

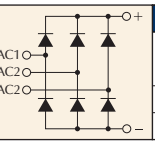




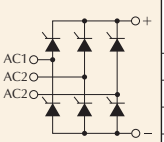
AC Switch			Output Current – RMS (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PAA15528BT	78 mm	2800	550	1160	1660	2950	3600
PAA15242BT	78 mm	4200	520	1080	1530	2600	3200
PAA16018BT	100 mm	1800	600	1330	1950	3700	4800
PAA16228BT	100 mm	2800	620	1340	1950	3600	4500



Single Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD111028BT	78 mm	2800	1100	2250	3130	5200	6200
PRD110028BT	100 mm	2800	1000	2120	3070	5500	7000



Three Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PRD314028BT	78 mm	2800	1400	2760	3700	5900	6900
PRD313028BT	100 mm	2800	1300	2750	3850	6500	8000



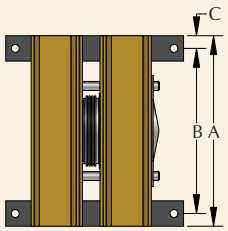
Three Phase SCR Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				200 LFM	500 LFM	1000 LFM	2000 LFM
PTD36928BT	78 mm	2800	690	1380	1910	3200	3900
PTD36442BT	78 mm	4200	640	1240	1700	2750	3300
PTD37818BT	100 mm	1800	780	1640	2350	4200	5200
PTD37528BT	100 mm	2800	750	1600	2280	3900	4800
PTD36842BT	100 mm	4200	680	1340	1870	3180	3800

All Ratings are calculated for operation at a 50ºC Ambient with a 25ºC Junction Safety Factor

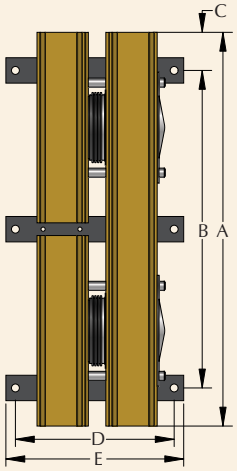
Perimeter:	Weight per foot:
143.28 IN.	15.91 LB./FT.

Darrah **A16** Extrusion

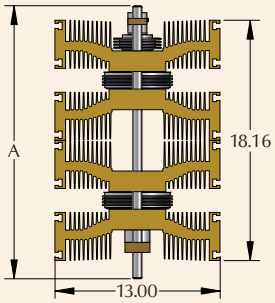
SINGLE DEVICE

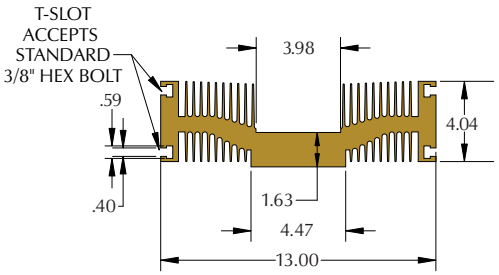


TWO DEVICE



TWO DEVICE STACK

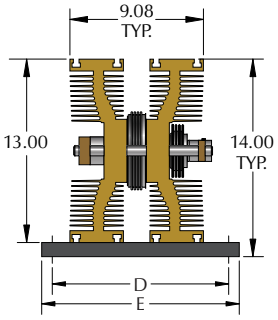


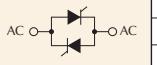


A16 Assembly Dimensions						
Extrusion	A	B	C	D	E	Approx. WT. w/ Mtg. Rails
Single Device	15.00	13.00	1.00	12.50	14.00	79 LBS.
Two Device	31.00	25.00	3.00	12.50	14.00	160 LBS.
Two Device Stack	21.50	N/A	N/A	N/A	N/A	168 LBS.

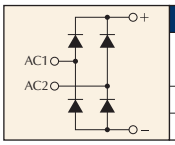
**All dimensions shown using 1" high SCR's with optional mounting rails*

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for Single Device, Double Sided Cooled 15" Sink												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.1030	.0780	.0551	.0450	.0390	.0349	.0318	.0295	.0276	.0260	.0247	.0201	.0174	.0156

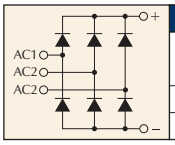




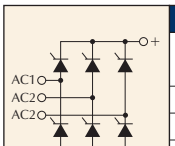
AC Switch			Output Current – RMS (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				500 LFM	1000 LFM	1500 LFM	2000 LFM
PAA18928BT	78 mm	2800	890	2153	2683	3018	3262
PAA18342BT	78 mm	4200	830	1951	2406	2689	2896
PAA19918BT	100 mm	1800	990	2601	3337	3820	4184
PAA110028BT	100 mm	2800	1000	2565	3254	3902	4037



Single Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				500 LFM	1000 LFM	1500 LFM	2000 LFM
PRD118028BT	78 mm	2800	1800	3919	4769	5295	5676
PRD117028BT	100 mm	2800	1700	3959	4974	5627	6113



Three Phase Diode Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				500 LFM	1000 LFM	1500 LFM	2000 LFM
PRD323028BT	78 mm	2800	2300	4557	5441	5982	6372
PRD322028BT	100 mm	2800	2200	4853	5957	6656	7170

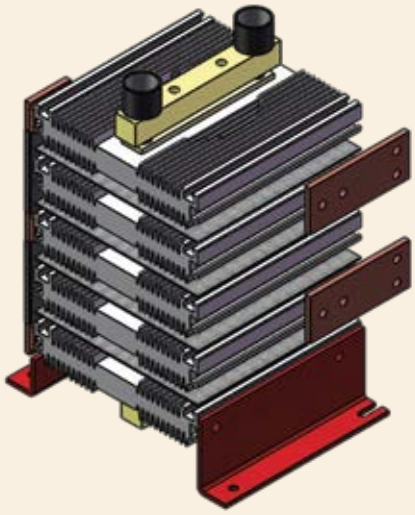


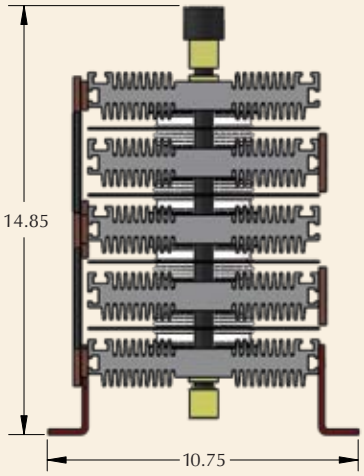
Three Phase SCR Bridge			Output Current – Average Amps (Typical Ratings)				
Darrah Part Number	Package	PIV	Natural Convection	Forced Air			
				500 LFM	1000 LFM	1500 LFM	2000 LFM
PTD310028BT	78 mm	2800	1000	2413	2940	3267	3503
PTD39842BT	78 mm	4200	980	2112	2548	2816	3010
PTD312018BT	100 mm	1800	1200	3046	3816	4311	4678
PTD312028BT	100 mm	2800	1200	2899	3590	4030	4354

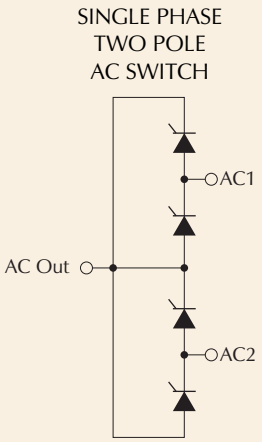
All Ratings are calculated for operation at a 50ºC Ambient with a 25ºC Junction Safety Factor

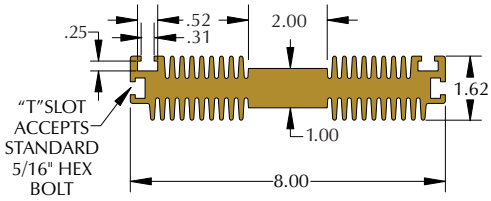
Perimeter:	Weight per foot:
151.6 IN.	23.9 LB./FT.

Darrah **A28** Extrusion







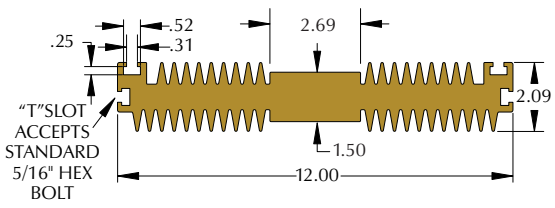


Perimeter:	Weight per foot:
59.81 IN.	9.57 LB./FT.

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for a Single Device Double Sided Cooled, 8" In Length												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.31	0.27	0.19	0.16	0.13	0.12	0.11	0.10	0.096	0.09	0.086	0.070	0.061	0.054

	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for a Single Device Double Sided Cooled, 10" In Length												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.34	0.24	0.17	0.14	0.12	0.11	0.099	0.092	0.086	0.081	0.077	0.063	0.054	0.048

Darrah **A29** Extrusion

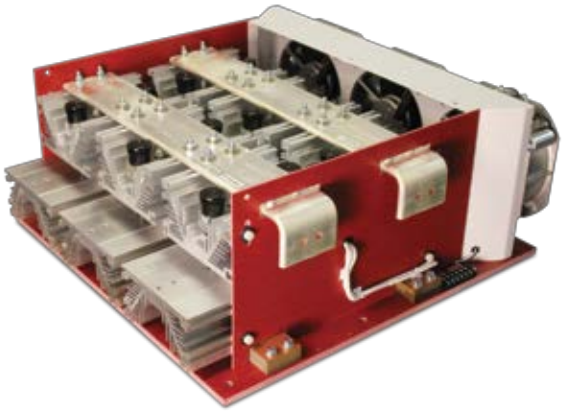


Perimeter:	Weight per foot:
76.31 IN.	19.93 LB./FT.

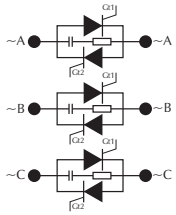
	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for a Single Device Double Sided Cooled, 10" In Length												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	.27	.19	0.13	0.11	0.095	0.085	0.077	0.072	0.067	0.063	0.06	0.049	0.042	0.038

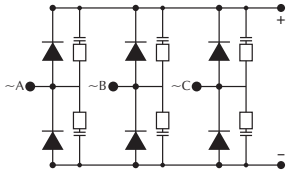
	Natural Convection	Thermal Resistance (°C/W) Airflow (LFM) for a Single Device Double Sided Cooled, 12" In Length												
LFM		100	200	300	400	500	600	700	800	900	1000	1500	2000	2500
RΘsa	0.24	0.17	0.12	0.10	0.087	0.077	0.071	0.065	0.061	0.058	0.055	0.045	0.039	0.035

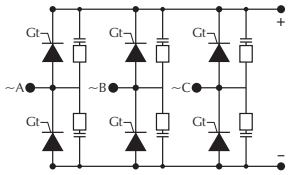
AC Controller, Controlled & Un-Controlled Bridge Rectifiers



Available Ratings

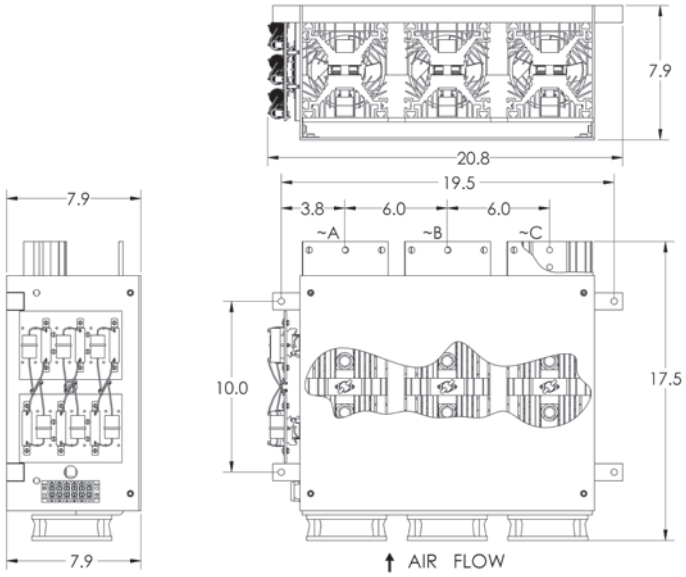
Three-Phase AC Controller					
Part Number	AC Current Rating	AC Voltage Rating	Ambient Temp	Outline	Circuit
PAA32022BRT	200A (N/C)	480-690V	40 Deg C	Fig 1	
PAA32522BRT	250A (N/C)	480-690V	40 Deg C	Fig 1	
PAA34022BRT	400A (N/C)	480-690V	40 Deg C	Fig 2	
PAA38022BF1RT	800A	480-690V	40 Deg C	Fig 2	
PAA310022BF1RT	1000A	480-690V	40 Deg C	Fig 2	
PAA314022BF1RT	1400A	480-690V	40 Deg C	Fig 2	
PAA316022BF1RT	1600A	480-690V	40 Deg C	Fig 2	
PAA320022BF1RT	2000A	480-690V	40 Deg C	Fig 3	
PAA325022BF1RT	2500A	480-690V	40 Deg C	Fig 3	
PAA330022BF1RT	3000A	480-690V	40 Deg C	Fig 3	

Three-Phase Un-Controlled Diode Bridge Rectifier					
Part Number	AC Current Rating	AC Voltage Rating	Ambient Temp	Outline	Circuit
PRD35022BF1RT	500A	480-690V	40 Deg C	Fig 4	
PRD310022BF1RT	1000A	480-690V	40 Deg C	Fig 4	
PRD312022BF1RT	1200A	480-690V	40 Deg C	Fig 4	
PRD318022BF1RT	1800A	480-690V	40 Deg C	Fig 5	
PRD325022BF1RT	2500A	480-690V	40 Deg C	Fig 5	
PRD336022BF1RT	3600A	480-690V	40 Deg C	Fig 6	
PRD340022BF1RT	4000A	480-690V	40 Deg C	Fig 6	
PRD360022BF1RT	6000A	480-690V	40 Deg C	Fig 7	

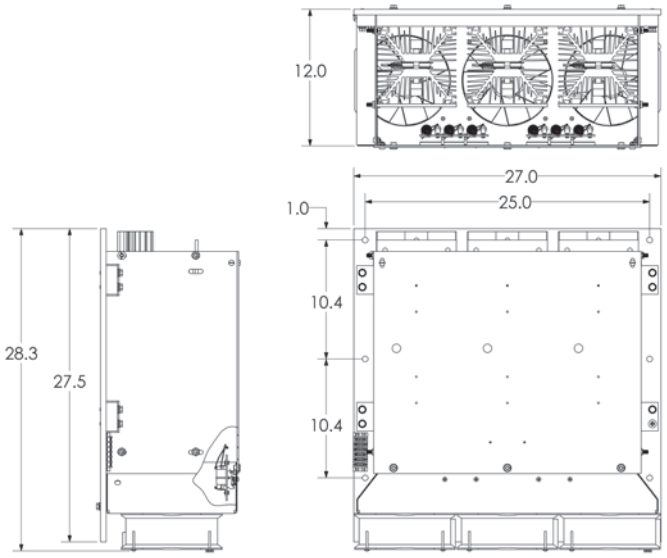
Three-Phase Fully Controlled Thyristor Bridge Rectifier					
Part Number	AC Current Rating	AC Voltage Rating	Ambient Temp	Outline	Circuit
PTD34022BF1RT	400A	480-690V	40 Deg C	Fig 4	
PTD36022BF1RT	600A	480-690V	40 Deg C	Fig 4	
PTD310022BF1RT	1000A	480-690V	40 Deg C	Fig 5	
PTD315022BF1RT	1500A	480-690V	40 Deg C	Fig 5	
PTD318022BF1RT	1800A	480-690V	40 Deg C	Fig 6	
PTD325022BF1RT	2500A	480-690V	40 Deg C	Fig 6	
PTD330022BF1RT	3000A	480-690V	40 Deg C	Fig 7	
PTD340022BF1RT	4000A	480-690V	40 Deg C	Fig 7	
PTD350022BF1RT	5000A	480-690V	40 Deg C	Fig 7	

Ratings are based on an ambient temperature of 40°C, Frequency is 60Hz, Volts AC is 480-690V, 0.85 power factor.
N/C - Natural Convection Cooled
All assemblies shown are forced air cooled unless noted. For Natural Convection ratings contact factory.

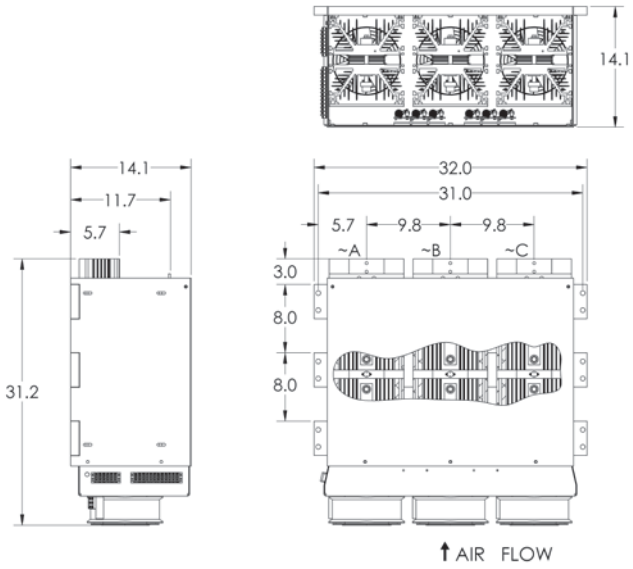
AC Switches Fig. 1



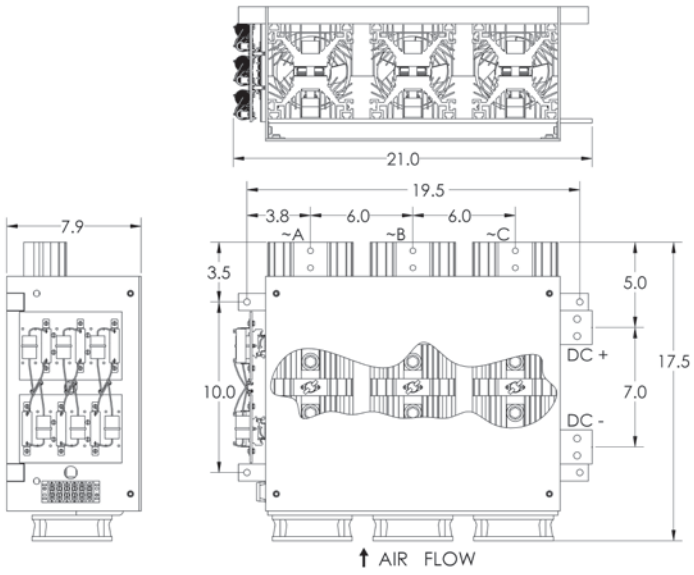
AC Switches Fig. 2



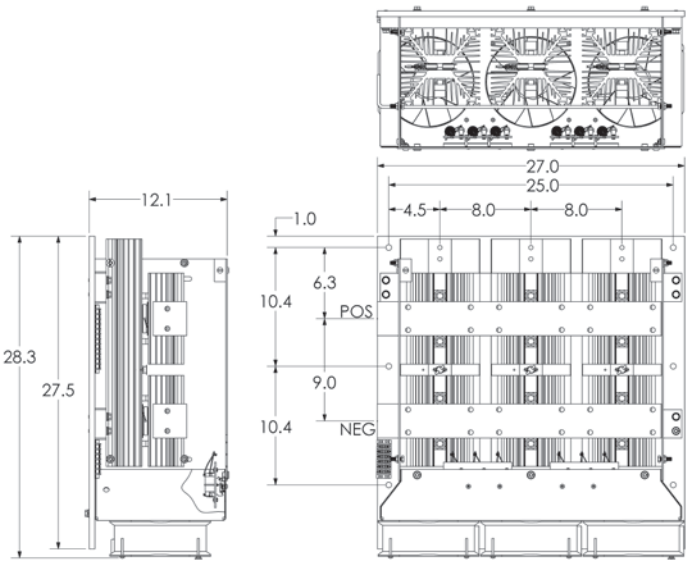
AC Switches Fig. 3



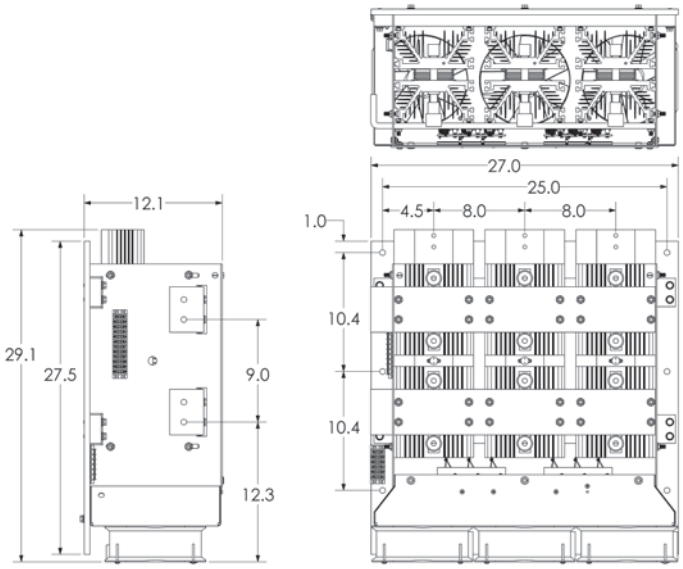
Bridge Rectifiers Fig. 4



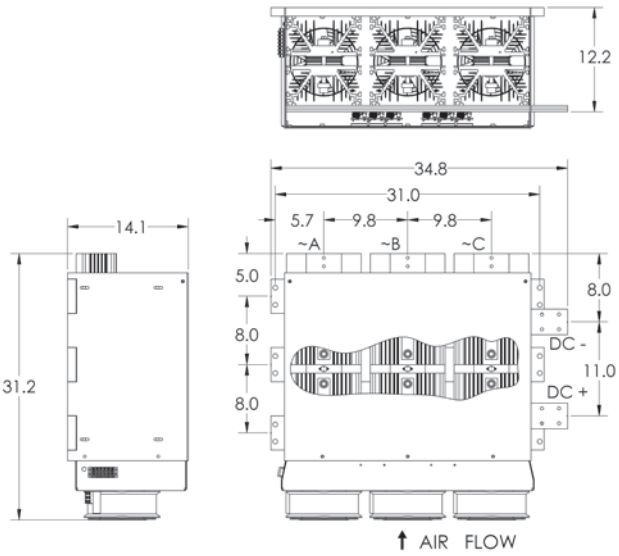
Bridge Rectifiers Fig. 5



Bridge Rectifiers Fig. 6



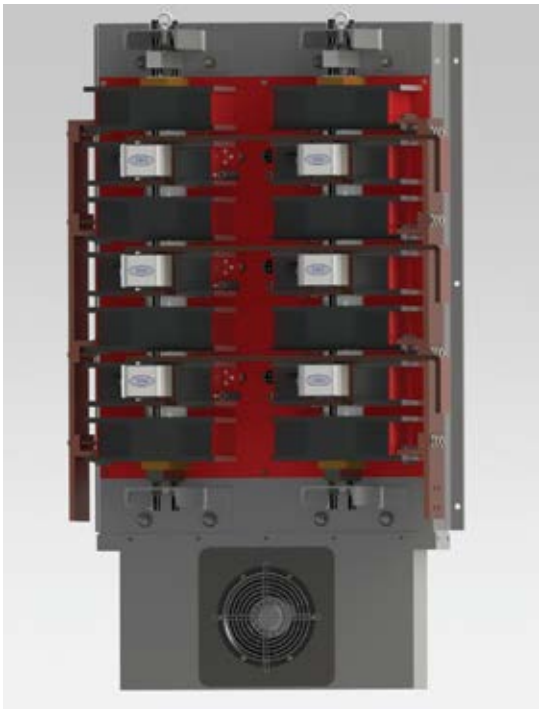
Bridge Rectifiers Fig. 7



4 Quadrant Re-Gen Rectifier Assemblies

Main Features

- Compatible with all control systems
- Reduced time to market - “ready to use” designs
- Flexible design approach covers a broad range of power levels
- Various voltage levels available
- Modular approach allows for paralleling for higher power requirements
- Compact design enables users to mount in standard industrial cabinets



Applications

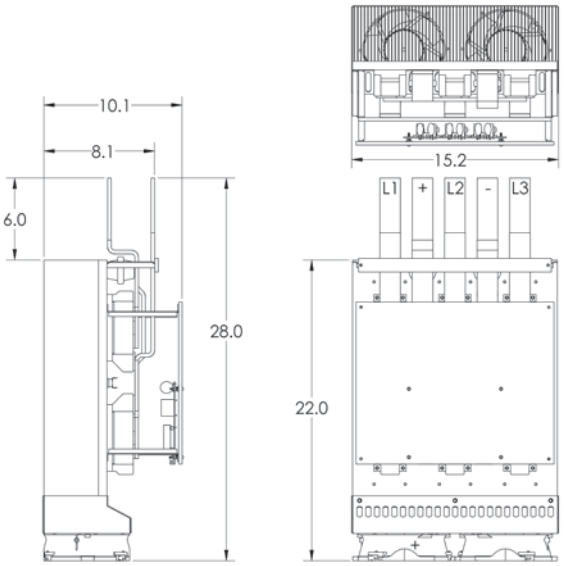
- New or retrofit markets
- Industrial drives
- Mining
- Steel and paper mills
- Marine

General Features

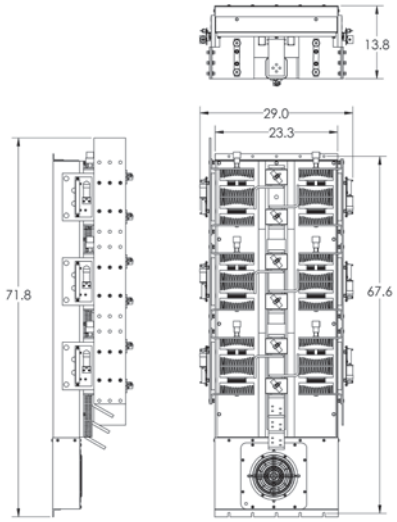
- SCR modules (≤600A) & press pack SCR’s.
- Leg fuses with micro switches
- Thermostats and/or RTD’s
- R/C Snubbers
- High reliability fans
- Shunts and/or current sensors

Load Cycles													
Part Number	Ta	DC1 Cont	DC2		DC3		DC4		US Rating Ta=45°C		Darrah Rating Ta=45°C		Outline
			15min 100%	60secs 150%	15min 100%	120secs 150%	15min 100%	10secs 200%	15min 100%	60secs 150%	15min 100%	60secs 150%	
	°C	A	A	A	A	A	A	A	A	A	A	A	
480V, 4Q													
DTRC443018-4Q	40	400	300	450	275	415	250	500	250	375	425	637	Fig 1
DTRC446018-4Q	40	600	480	720	450	675	420	840	390	585	510	765	Fig 1
PTD390018-4Q	40	900	720	1080	675	1012	630	1260	585	877	765	1147	Fig 2
PTD3120018-4Q	40	1200	960	1440	900	1350	840	1680	780	1170	1020	1530	Fig 2
PTD3180018-4Q	40	1800	1440	2160	1350	2025	1260	2520	1170	1755	1530	2295	Fig 2
PTD3250018-4Q	40	2500	2000	3000	1875	2812	1750	3500	1625	2437	2125	3187	Fig 3
PTD3300018-4Q	40	3000	2400	3600	2250	3375	2100	4200	1950	2925	2550	3825	Fig 3
PTD3400018-4Q	40	4000	3200	4800	3000	4500	2800	5600	2600	3900	3400	5100	Fig 3
PTD3500018-4Q	40	5000	4000	6000	3750	5625	3500	7000	3250	4875	4250	6375	Fig 3
690V, 4Q													
PTD390028-4Q	40	900	720	1080	675	1012	630	1260	585	877	765	1147	Fig 2
PTD3120028-4Q	40	1200	960	1440	900	1350	840	1680	780	1170	1020	1530	Fig 2
PTD3180028-4Q	40	1800	1440	2160	1350	2025	1260	2520	1170	1755	1530	2295	Fig 2
PTD3250028-4Q	40	2500	2000	3000	1875	2812	1750	3500	1625	2437	2125	3187	Fig 3
PTD3300028-4Q	40	3000	2400	3600	2250	3375	2100	4200	1950	2925	2550	3825	Fig 3
PTD3400028-4Q	40	4000	3200	4800	3000	4500	2800	5600	2600	3900	3400	5100	Fig 3
PTD3500028-4Q	40	5000	4000	6000	3750	5625	3500	7000	3250	4875	4250	6375	Fig 3

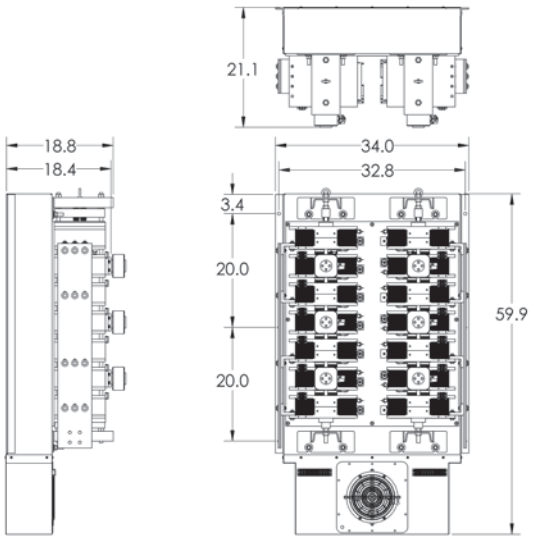
4-Quadrant Bridge Fig. 1



4-Quadrant Bridge Fig. 2



4-Quadrant Bridge Fig. 3



Diode, Thyristor, IGBT Module Assemblies

Darrah offers a complete range of isolated module assemblies in air and water cooled designs.

All common circuit configurations are available utilizing diodes, thyristors, and IGBT's.

In addition to our standard offerings, we can provide customized solutions to meet your individual needs.

Single and Three Phase A.C. Inverters

- Air and Water Cooled Designs
- Diode, Thyristor, or Active Front End
- Integrated or Discrete IGBT Gate Drivers

Features:

- Under voltage monitoring.
- Transient over voltage protection.
- Short circuit and over current protection.
- Line to ground fault protection.
- Over voltage protection of the DC link voltage.

Liquid Cooled Assemblies

Darrah manufactures a comprehensive line of water cooled assemblies. Choose from discrete or modular designs with DIRECT or INDIRECT COOLING.

Darrah is a major supplier of SCR CONTACTORS FOR RESISTANCE WELDING CONTROLLERS. A full range of solid state contactors are available in current ratings up to 5000 Amps, and in voltage ratings to 6.5 kV.

Stud Assemblies

DARRAH offers a complete line of stud-mounted air cooled assemblies. All common circuit configurations are available using both diodes and thyristors. Stack ratings range from 10 through 750 Amps output with natural convection cooling.

Typical options include thermostats, R/C snubbers, surge suppression and fuses.

Air Cooled Module Assemblies

Darrah Part Number Designation Code

Use Darrah's simple part number designation code to order or request common SCR or Diode Assemblies. Thermal calculations and mechanical drawings are available.

D	T	T	C18	130F	120	B

Darrah Module Assembly

A = A.C. Switch
R = Rectifier / Diode Circuit
T = Thyristor / SCR Circuit
H = Hybrid Circuit

S = Single Phase Circuit
T = Three Phase Circuit

Heat Sink Length
C12 = 4.72″ 120mm
C18 = 7.09″ 180mm
C30 = 11.81″ 300mm

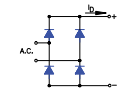
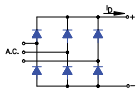
Average Ampere Rating of the Assembly
F = Forced Air Cooling
No Letter = Natural Cooling

Device Voltage Rating
40= 400 Volt
60= 600 Volt
80= 800 Volt
100= 1000 Volt
120= 1200 Volt
140= 1400 Volt
160= 1600 Volt

Special Features
B = Mounting Rails
M = MOV
R = R/C Snubber
T = Thermostat
C = Free-Wheeling Diode
A = Special
E = 230 Volt Fan

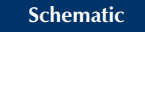
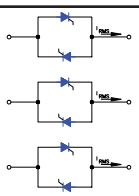
Common SCR and Diode Circuits

Diode/Rectifier Circuits

Circuit Schematic	Circuit Type	ID Amp Rating	Darrah Part Number	Fan
	Single-Phase Bridge	50	DSR C18 50 --	No
		65	DSR C18 65 --	No
		95F	DSR C18 95F --	Yes
		130F	DSR C18 130F --	Yes
	Three-Phase Bridge	65	DTR C18 65 --	No
		85	DTR C18 85 --	No
		122F	DTR C18 122F --	Yes
		175F	DTR C18 175F --	Yes
		290F	DTR C18 290F --	Yes

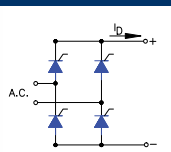
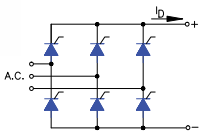
--Indicates device voltage rating

Thyristor/SCR Circuits

Circuit Schematic	Circuit Type	ID Amp Rating	Darrah Part Number	Fan
	AC Switch Single-Phase	40	DSA C18 40 --	No
		50	DSA C18 50 --	No
		70	DSA C18 70 --	No
		80	DSA C18 80 --	No
		110	DSA C18 110 --	No
		130F	DSA C18 130F --	Yes
		190F	DSA C18 190F --	Yes
	Three-Phase AC Switch	55	DTA C18 55 --	No
		60F	DTA C18 60F --	Yes
		65	DTA C18 65 --	No
		85F	DTA C18 85F --	Yes
		100F	DTA C18 100F --	Yes
		115F	DTA C18 115F --	Yes
		135F	DTA C18 135F --	Yes
		160F	DTA C18 160F --	Yes

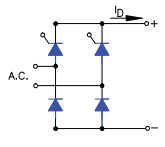
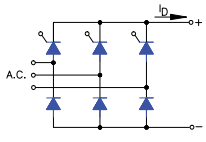
--Indicates device voltage rating

Thyristor/SCR Circuits

Circuit Schematic	Circuit Type	ID Amp Rating	Darrah Part Number	Fan
	Full SCR Bridge Single Phase	35	DST C18 35 --	No
		50	DST C18 50 --	No
		59	DST C18 59 --	No
		60F	DST C18 60F --	Yes
		64	DST C18 64 --	No
		72	DST C18 72 --	No
		85F	DST C18 85F --	Yes
		100F	DST C18 100F --	Yes
		117F	DST C18 117F --	Yes
		140F	DST C18 140F --	Yes
		170F	DST C18 170F --	Yes
	Full SCR Bridge Three-Phase	47	DTT C18 47 --	No
		60	DTT C18 60 --	No
		70	DTT C18 70 --	No
		75	DTT C18 75 --	No
		77F	DTT C18 77F --	Yes
		85	DTT C18 85 --	No
		110F	DTT C18 110F --	Yes
		130F	DTT C18 130F --	Yes
		146F	DTT C18 146F --	Yes
		175F	DTT C18 175F --	Yes
		205F	DTT C18 205F --	Yes
		240F	DTT C18 240F --	Yes
		255F	DTT C18 255F --	Yes

--Indicates device voltage rating

Hybrid Circuits Diodes/SCR

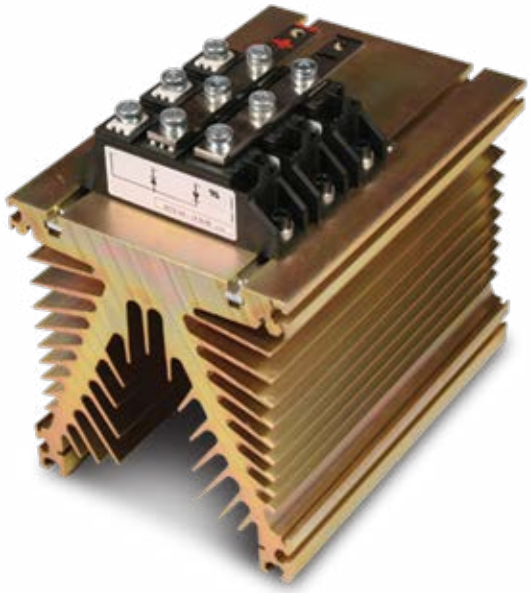
Circuit Schematic	Circuit Type	ID Amp Rating	Darrah Part Number	Fan
	Single-Phase Hybrid Bridge Common Cathode SCR's	38	DSH C18 38 --	No
		48	DSH C18 48 --	No
		60	DSH C18 60 --	No
		72	DSH C18 72 --	No
		100F	DSH C18 100F --	Yes
		117F	DSH C18 117F --	Yes
		140F	DSH C18 140F --	Yes
	Three-Phase Hybrid Bridge Common Cathode SCR's	47	DTH C18 47 --	No
		60	DTH C18 60 --	No
		70	DTH C18 70 --	No
		75	DTH C18 75 --	No
		85	DTH C18 85 --	No
		110F	DTH C18 100F --	Yes
		146F	DTH C18 146F --	Yes
		175F	DTH C18 175F --	Yes

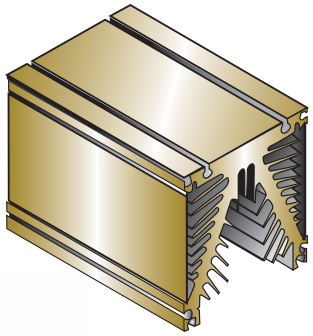
--Indicates device voltage rating

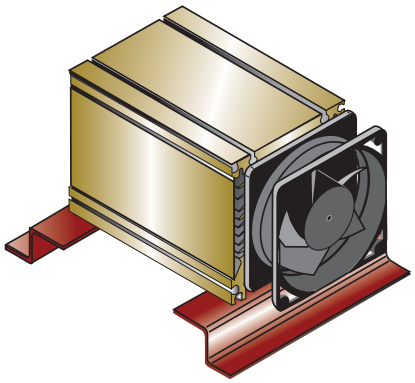
Air Cooled Module Assemblies

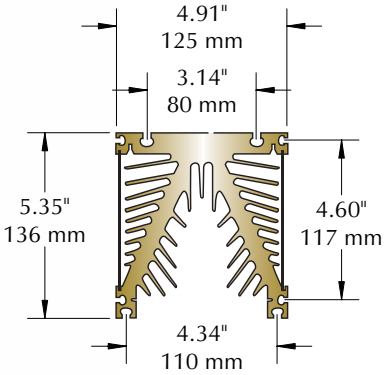
Standard Features Include:

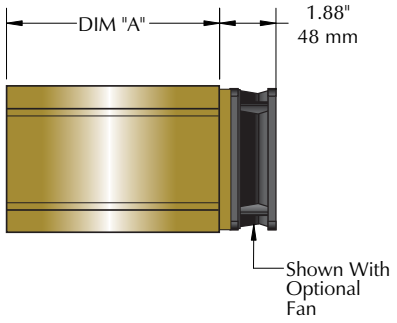
- R/C snubber circuits
- Transient voltage suppression
- Thermostats and/or RTD's
- Fans or blowers, all common AC or DC voltages
- Copper bus bars – nickel or tin plated
- Insulated Mounting rails

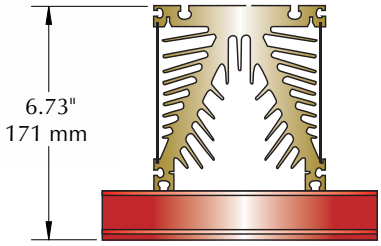


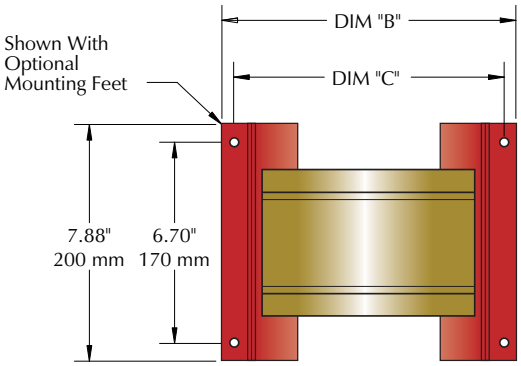






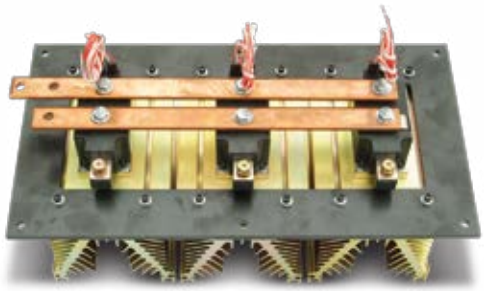






Extrusion Details	Extrusion	DIM "A"	DIM "B"	DIM "C"
Perimeter - 91.34	C12	4.72 - 120mm	7.41 - 188mm	6.63 - 168mm
Wt - 12.18 lb/ft	C18	7.09 - 180mm	9.78 - 248mm	9.00 - 229mm
Rthsa - 0.83 Deg C/Watt/3"	C30	11.81 - 300mm	14.5 - 368mm	13.72 - 348mm

If optional fan is included, add 1.88" - 48mm to Dim "A"



Thermal Resistance of Module Heatsinks

	Modules On Sink*	C12 (120mm)	C18 (180mm)	C30 (300mm)
		TH. RES.	TH. RES.	TH. RES.
Natural Convection 50°C Rise	One	0.64	0.52	0.40
	Two	0.58	0.48	0.38
	Three	0.53	0.43	0.37
		°K/W	°K/W	°K/W
Forced Convection One 100CFM Fan with Baffles	One	0.14	0.12	0.10
	Two	0.13	0.11	0.09
	Three	0.12	0.10	0.08
		°K/W	°K/W	°K/W

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