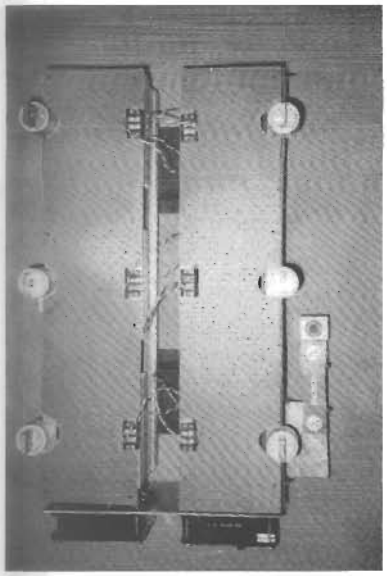

1

Kinetics

CONTROL SYSTEMS

Division of Kinetics Industries Inc.
140 Stokes Ave., Trenton, N.J. 08638

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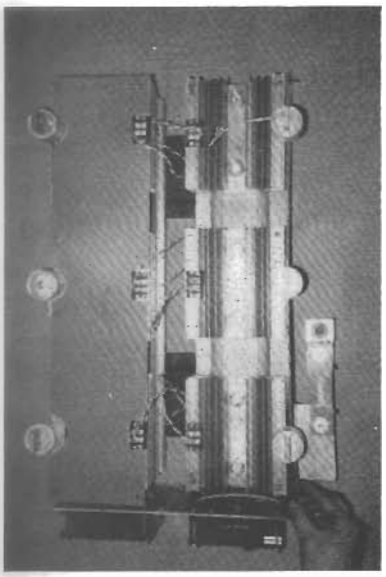
Procedure For Changing Semiconductors In Kinetics Power Heat Sink Modules

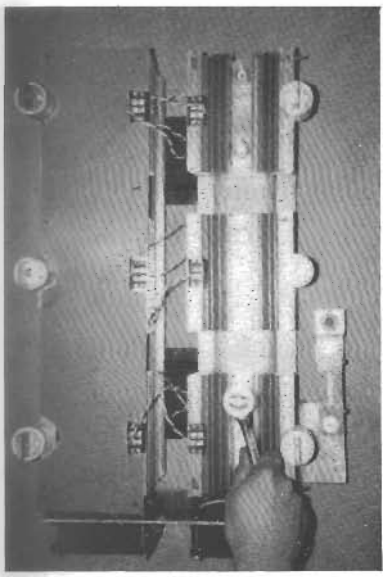


2

This procedure, when followed step by step, will enable you to quickly and easily interchange a hockey puck type semiconductor device used in a Kinetics power module. The procedure also allows servicing personnel to regain the factory preset torque levels on the clamping bolts to obtain the desired clamping pressure on the semiconductor device.

Necessary tools include a 7/16 socket wrench for the clamping bolts. If the devices to be changed are SCRs, then a screw driver will also be required to remove and reconnect the cathode and gate terminals to the trigger terminal strip. A clean wiping cloth, some conductive, thermal, non-oxidizing grease as used for semiconductor mounting and an ohmmeter for testing continuity and shorts should also be available.

Figure 1 shows a semiconductor power module as it may be found in a typical Kinetics rectifier or drive system.



3

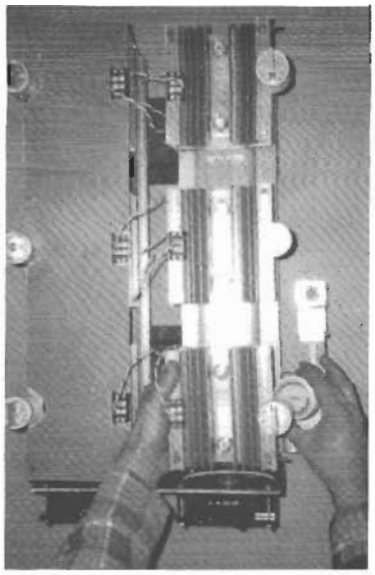
The first step towards changing the device is to remove the air ducts which are attached to the heatsinks' front and sides with snap fasteners. The duct material can be released from the fastener by grasping the ducting material with the thumb behind the material and the fore finger on the tip of the fastener and squeezing, thus forcing the fastenter through the hole in the ducting material as shown in figure 2.

If the semiconductors are SCRs, remove the gate and cathode leads from the trigger terminal strip at this time.

Using the 7/16 socket wrench, back off exactly 5 complete 360 degree turns on both clamping bolts as shown in figure 3. (It is important that the number of turns be exact.)

Note: An alignment mark has been placed on the clamping bolt head and heatsink so that the two can be exactly realigned easily. Loosening the bolts 5 turns will provide sufficient slack between the heatsinks for the device to be removed.

Using both hands, hold the upper heatsink in one hand and remove the device with the other, as shown in figure 4. The device may seem to stick to one of the heatsinks. This is normal, but a small amount of pressure will dislodge the device and allow easy removal.



4

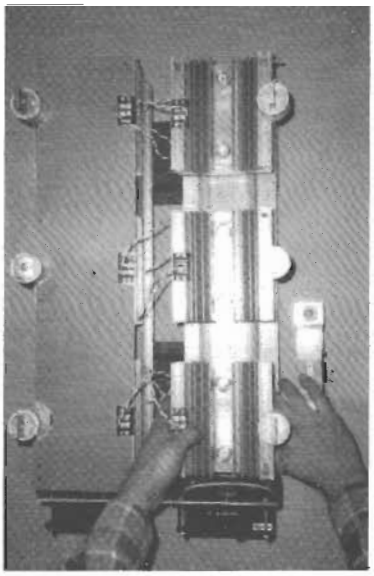
Before installing a new device, check for proper polarity. It is normal for the devices to be installed differently in the modules where the continuous heatsinks can be both positive and negative. Look at the arrow on the device. The arrow points toward the cathode of the device or toward the more positive heatsink. One or both of the heatsinks for the device will be identified as positive or negative (+ or −).
i.e. If the long heatsink is marked +, then install the device with the arrow pointing toward the long heatsink. Conversely, if the long heatsink is marked −, install the device with the arrow pointing away from the long heatsink.

Caution: Improper polarity can create distructive short circuits.

Insert an exploratory finger between the heatsinks and locate the locating pin which will usually be found on the long heatsink. This pin will enable the device to be accurately positioned by slipping the hole in the center of the device over this pin.

Prepare the device for insertion by wiping both faces of the device with a clean cloth. Lightly lubicate the face of the device with a conductive, thermal, non oxidizing grease and then lightly wipe the faces again so that only a thin film remains.

Holding the top heatsink with one hand, insert the device, being sure that (A.) The device is being installed with the proper polarity and (B.) that the locating pin is placed in the centering hole of the device. This is shown in figure 5.



5

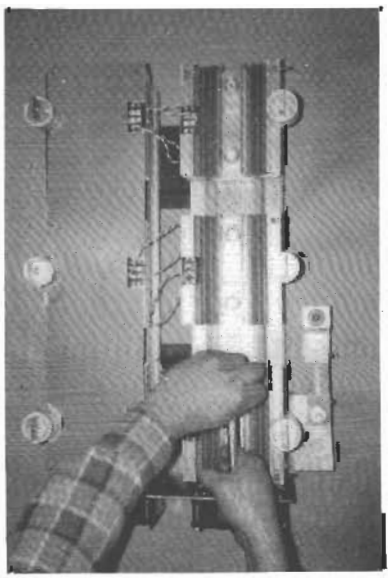
Figure 6 shows the clamping bolts being retightened: It is important that the bolts be tightened alternately. We suggest that the following sequence be followed:

Bolt #1	Bolt #2
2.0 turns then	3.0 turns then
1.5 turns then	1.0 turns then
1.0 turns then	1.0 turns then
.5 turns.	

Be sure that the markings on the clamping bolts are aligned with the heatsink marks. The bolt torque will now be within 2% of the original settings.

It is good practice to now test between the heatsinks with an ohmmeter to be sure that the insulation on the clamp has not been damaged or that the semiconductor is not faulted. (It is not unheard of that a new semiconductor which has not been put under pressure will fail upon applying the necessary clamping pressure which ranges from 750 lbs. for small devices to 5000 lbs for larger devices). The fuses should also be tested for continutity.

If the device is an SCR, reconnect the cathode and gate leads to the trigger terminal strip. Now reinstall the air ducting.



6

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Manufacturing Concept:

To provide the customer with prompt deliveries and the highest quality product; Kinetics is a self-sufficient manufacturing facility containing:

- **Production of rectifier and control assemblies.**
- **Design and assembly of printed circuit boards.**
- **Design and manufacture of power transformers: core & coil.**
- **Design and fabrication of enclosures.**
- **Unit operational testing facilities.**

Being a self-contained manufacturing facility enables Kinetics to design and manufacture power systems to a customer's application requirements at competitive pricing with prompt deliveries.