

MODEL 201 FIELD FIRING ASSEMBLY  
PART NUMBER 12M03-00117-02  
APPLICATION NOTES

1. At least four thyristor converter configurations can be used as shown in Figure 2. All provide fast field discharge by field voltage reversing for regeneration. Configurations (c) and (d) require the addition of the Model 220 Bi-directional Output Adaptor. All use a single supply transformer, center-tapped for configurations (b), (c), and (d).
  - a) Four Thyristor Bridge, Single Ended - Single transformer winding connected to the AC input of a four thyristor bridge. It provides full-wave rectification to a single field with regenerative discharge by field voltage reversing.
  - b) Two Thyristor Converter, Single Ended - Center-tapped transformer with two thyristors. This configuration may save on cost of thyristors where very high field currents are required. A free-wheeling diode must not be used.
  - c) Bi-directional Converter, Single-Ended Reversing - Center-tapped transformer with its outer legs connected to the AC input of a four thyristor bridge. A low resistance, center-tapped power resistor is connected between the plus and minus output legs to protect against potentially damaging fault current should both legs of the bridge fire simultaneously.
  - d) Four Thyristor Converter, Double-ended, Center-tapped transformer with its outer legs connected to the AC input of a four thyristor bridge. It provides dual (plus and minus) output with respect to the transformer center-tap to drive either of two fields.

NOTE: Do not substitute two separate transformers for the center-tapped transformer described in paragraphs b, c, and d, above. Resulting DC currents will saturate the cores of the transformers resulting in high losses. The center-tapped transformer avoids this problem because the single core alternately sees both polarities of DC.

2. If it is desired to disable the firing of a thyristor for troubleshooting or other purposes, the gate to cathode can be short-circuited without damage to the circuit. This is the preferred way to disable a thyristor since it avoids the possibility of noise pick-up or accidental connection of gate leads to a destructive voltage when a gate lead is disconnected to disable the thyristor.

3. The positive and negative 15 volt DC power supply is brought out to terminals 10 and 16 respectively. External devices connected to the terminal should be limited to 20mA, to avoid overloading the power supply. These terminals are normally connected to the corresponding terminals on the Model 220 Bi-directional Output Adaptor, essentially paralleling the two power supplies.
4. A nominal .22MFD should be wired from gate to cathode of each thyristor to enhance the dv/dt rating of the thyristor.
5. An integrating network is normally connected around the Summing Amplifier (terminals 14 and 15). Typical values are a 1K to 50K resistor in series with a 1 to 10MF NP capacitor.
6. AC control (terminals 19 and 20) must be connected to the same phase as the AC power to the thyristor bridge it is controlling.
7. Use a twisted pair or shielded wire from this assembly to the gate and cathode of each thyristor (four twisted pairs).
8. The higher powered bridges, such as the Reflex 12M04-00043 with dual-pack thyristors, require more gate power than is normally available from this assembly. A "Reset" circuit as shown below is usually required.

**HALF COSINE OUTPUT  
ON 12M03-00117-02**

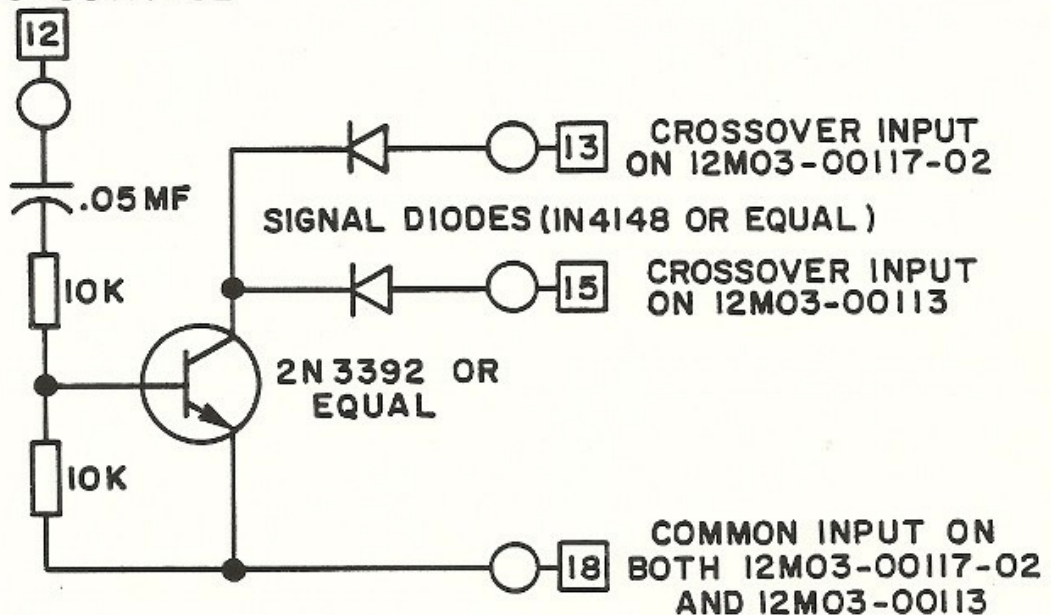
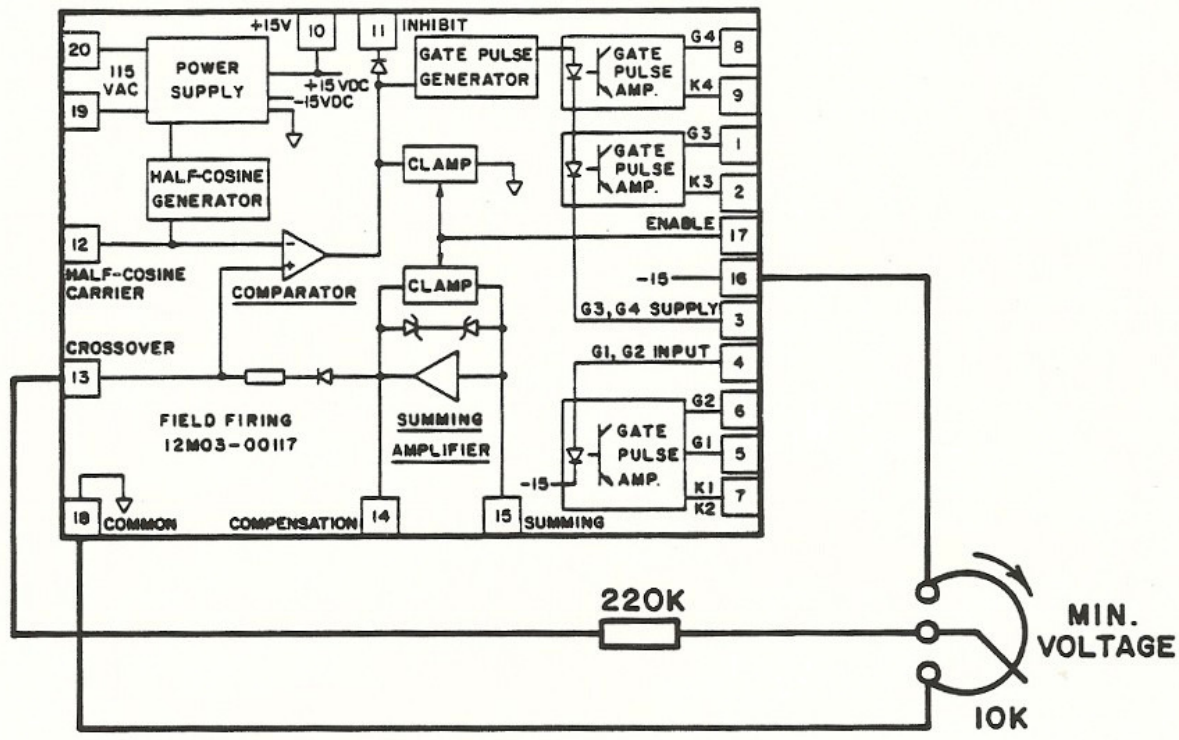


FIGURE 1

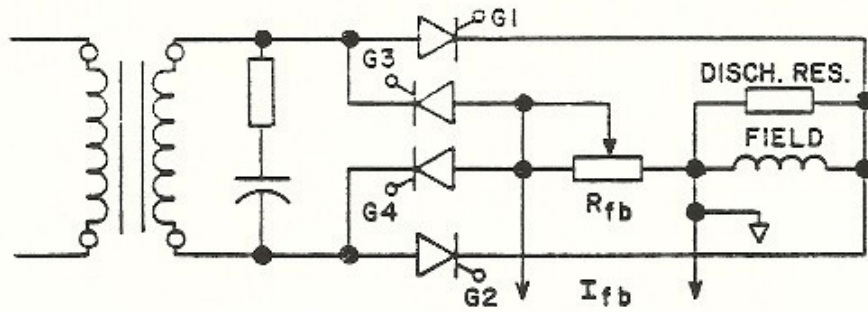
8. (Continued) This circuit "Resets" the firing signal to zero at the end of each half cycle. When the firing signal is reestablished through capacitors 8, 9, 10 and 11C, a pulse of approximately 200% of the normal DC level is available to fire the thyristors.
9. This assembly is designed to fire into a highly inductive load. When used with a resistive or motor armature load, minimum output may be 10 to 15% of full rated output unless a bias is added. This consists of a 10K potentiometer between terminals 16 and 18 (common) to supply 0 to -15V DC from the wiper through 220K ohms to the Crossover terminal 13.



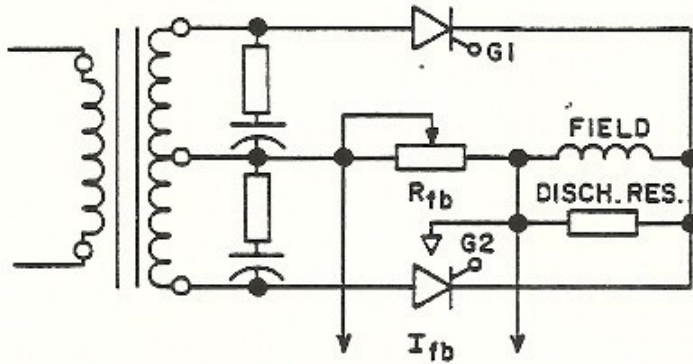
GEMINI CONTROLS LLC  
 W61 N14280 TAUNTON AVE.  
 PO BOX 380  
 CEDARBURG, WI 53012  
 www.geminicontrols.com

PHONE: (262)-377-8585  
 FAX: (262)-377-4920  
 email: sales@geminicontrols.com

Fig. 2 Thyristor Converter Configurations

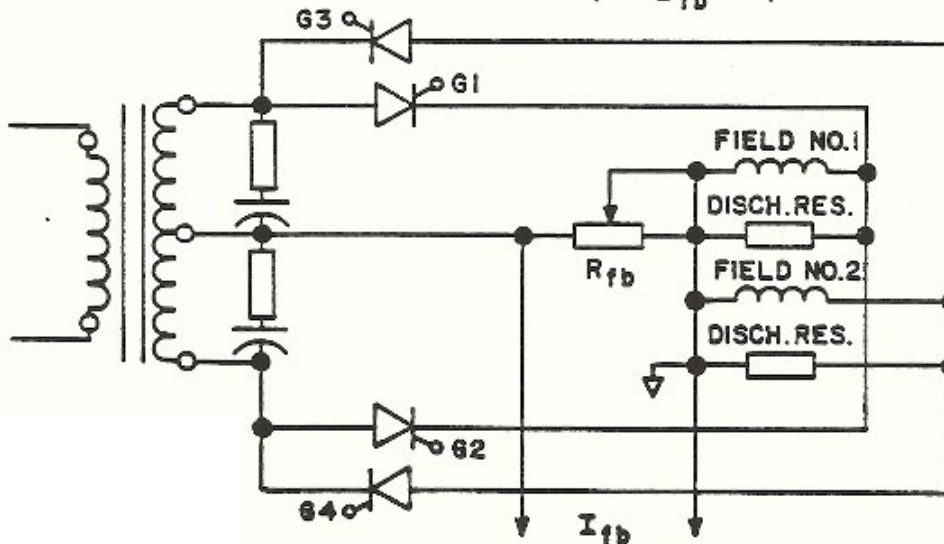
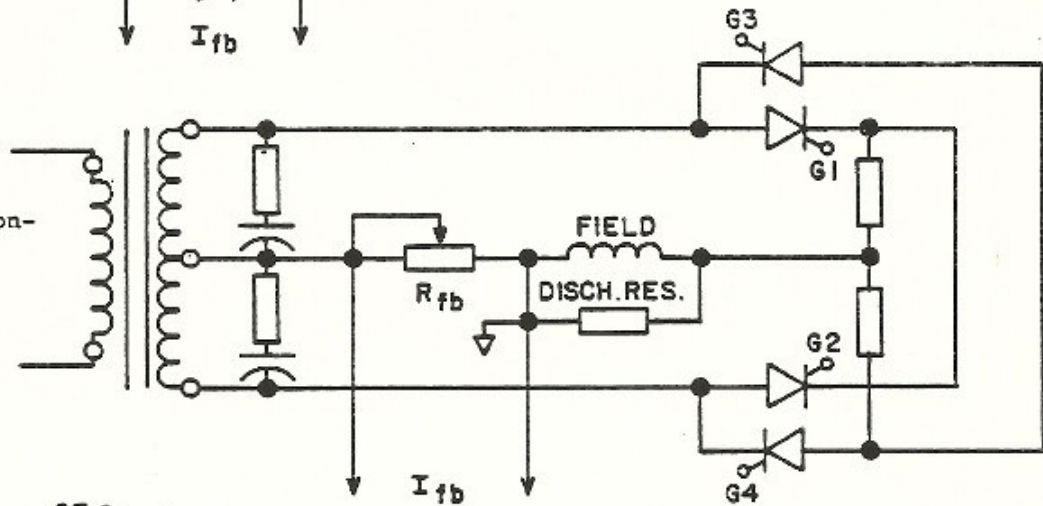


a. Four Thyristor Bridge, Single Ended



b. Two Thyristor Converter, Single Ended

Bi-directional Converter, Single-ended Reversing



d. Four Thyristor Converter, Double-ended