GEMINI CONTROLS LLC
CURRENT ISOLATOR ASSEMBLY

PART NUMBER 12M03-00132-01
APPLICATION NOTES

1. The output impedance ranges from 9 ohms to 75 ohms depending on the switch setting. It should be used in a circuit with a minimum of 2000 ohms external load on the output of the Isolator.

2. When used for current feedback, accuracy is of little concern; but if used for metering, accuracy should be considered in the calibration of the meter. Accuracy is ±2% of full scale for all settings, but also depends on the 5A current transformers that feed this assembly.

3. The Model 242 Isolator should never be used in a half-wave (three-pulse) configuration because the free-wheeling diode allows current flow that does not pass through the AC lines and would not be measured.

4. A Phase Loss and Unbalance Detector such as the REFLEX Model 211 may be connected to the output of the Model 242 Current Isolator to shut down the control or sound an alarm if desired when current unbalance exceeds a preset level.

5. The Current Isolator is furnished as a 10 terminal, chassis mounting, printed circuit board and is designed for use with two separately mounted 5A, 5VA, current transformers having the desired ratio.

6. The Current Isolator is normally calibrated so that maximum current produces approximately 2 volts DC output. It can be calibrated for other values to produce 2 volts depending on the application.

7. A six-pulse DC drive may be protected by heater type overloads in the AC supply. These can be used with higher horsepowers by scaling load currents to a lower value with current transformers.

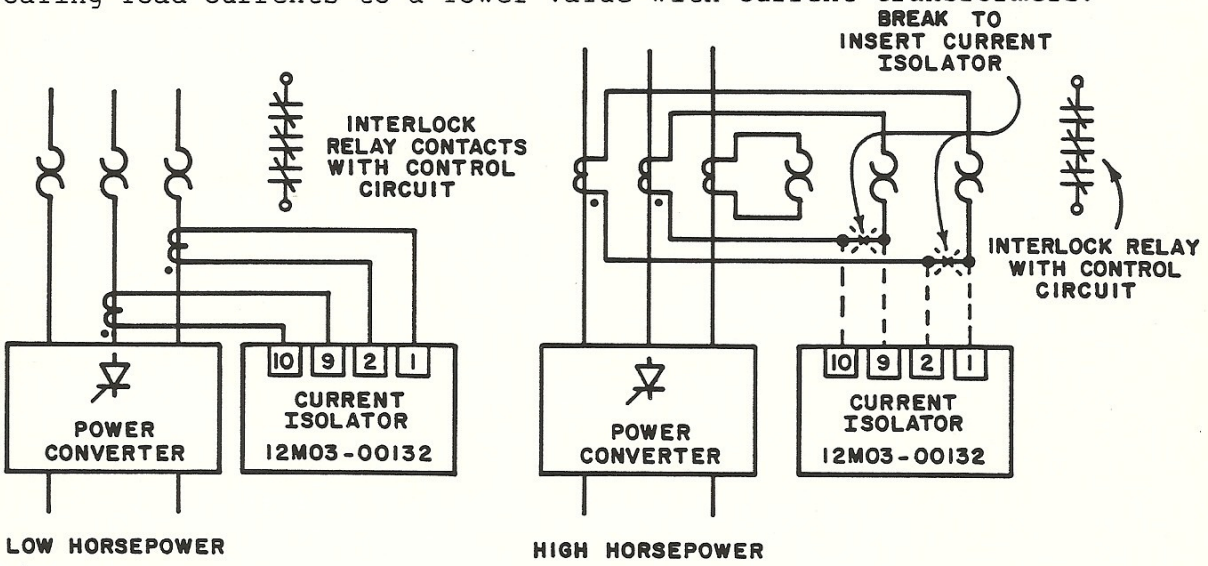

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FIGURE 1

Only two current transformers are needed for feedback, but national codes require three for protection as shown above.

8. The current transformers used should have a rating of at least 5 volt-amperes to minimize saturation and non-linearity or inaccuracy, particularly when used with thermal overload relays. The turns ratio should be such that the maximum input current to the assembly is always less than 8 amperes.

   The 5VA current transformers can be sized for RMS currents as follows:

   - o AC-DC Bridge I_{AC} RMS = .815 x I_{DC} output (See Para.9B(c) below)
   - o AC-AC Bridge I_{AC} RMS = 1.0 x AC line current

9. The normal output of the assembly is 2 volts DC, at maximum current. This can be calculated for sinusoidial AC input based on the binary switch setting as follows.

   A. For use with an AC to AC bridge:

   (a) I_{AC} which will provide 2 volts = (Switch Setting +1) x CT ratio

   Example: Switch Setting = 4A (5A total)
   CT Ratio = 300 to 5
   I_{AC} = (4+1) x 300/5 = 300 amperes

   (b) Output voltage $(V) = \frac{2 \times I_{AC}}{(\text{Switch Setting} +1)(\text{CT Ratio})}$

   Example: (using the same values in (a) above)

   $$V = \frac{2 \times 300}{(4+1)\ 300/5} = 2 \text{ volts}$$

CAUTION-DO NOT OPERATE CONTINUOUSLY WITH CURRENTS THAT PRODUCE MORE THAN 4 VOLTS OUTPUT.

B. For use with an AC to DC bridge having an inductive load such as a motor armature or field:

(a) I_{DC} to provide 2 volts $= \frac{(\text{Switch Setting} +1)(\text{CT Ratio})}{1.33}$

Example: Switch Setting = 4A (5A total)
CT Ratio = 300 to 5

$$I_{DC} = \frac{(4+1) \times 300/5}{1.33} = 225 \text{ amperes}$$

(b) Output voltage (V) = $\frac{1.5 \times I_{DC}}{(\text{Switch Setting} + 1)(\text{CT Ratio})}$

Example: (using the same values as (a) above)

$$V = \frac{2 \times 1.33 \times 225}{(4+1)\ 300/5} = 2 \text{ volts}$$

(c) To choose a transformer primary rating to provide 2 volts DC output with a 5 amp secondary and a switch setting of 4 (Total:4 + 1 = 5), multiply DC current by 1.33.

Example: Primary current Rating = 1.33 x I_{DC}

I_{DC} = 1500 Amperes

Primary Current Rating = 1.33 X I_{DC} = 2000 Amps

Order two 2000:5, 5 volt-amp current transformers

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