



CAGE ASSEMBLY
For Use in S-56F

I. INTRODUCTION

The S-56F field regulator is designed for use with S-56 armature supplies, either speed or voltage regulated, to provide operation above base speed.

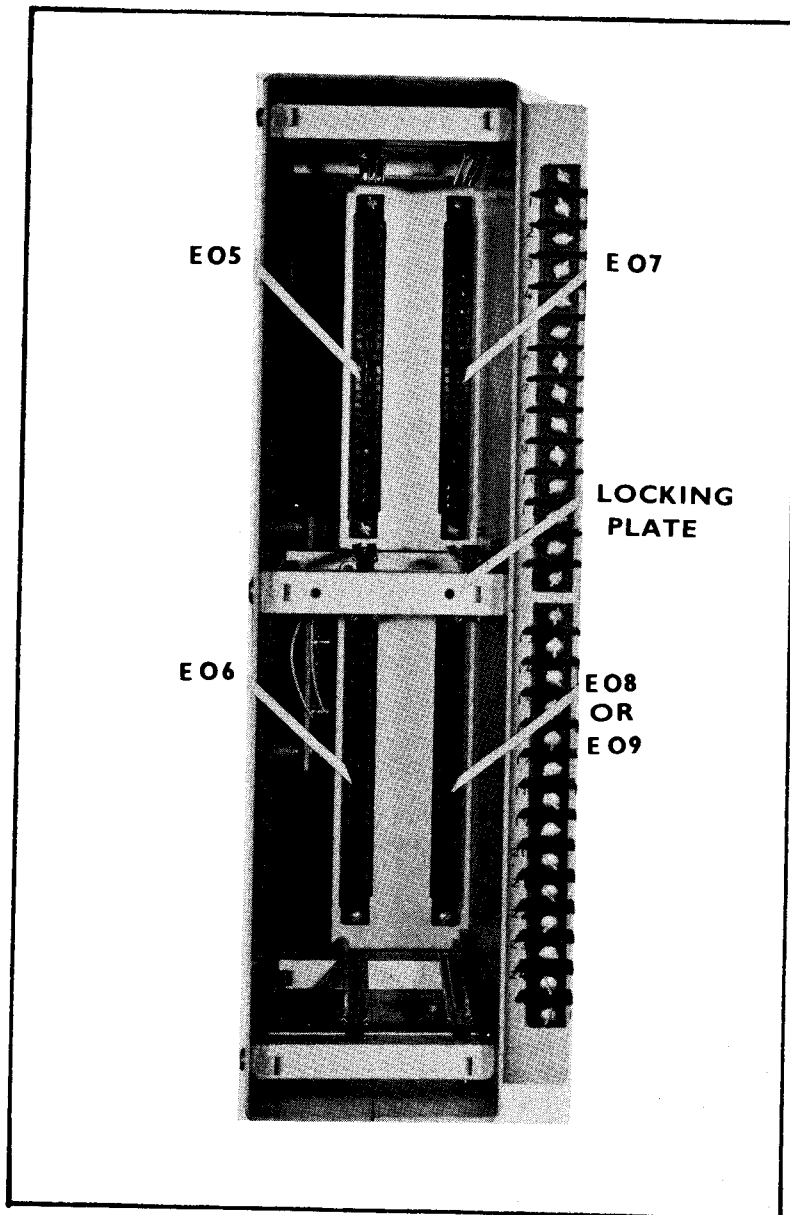


FIGURE 1a - FRONT VIEW (NO CARDS)

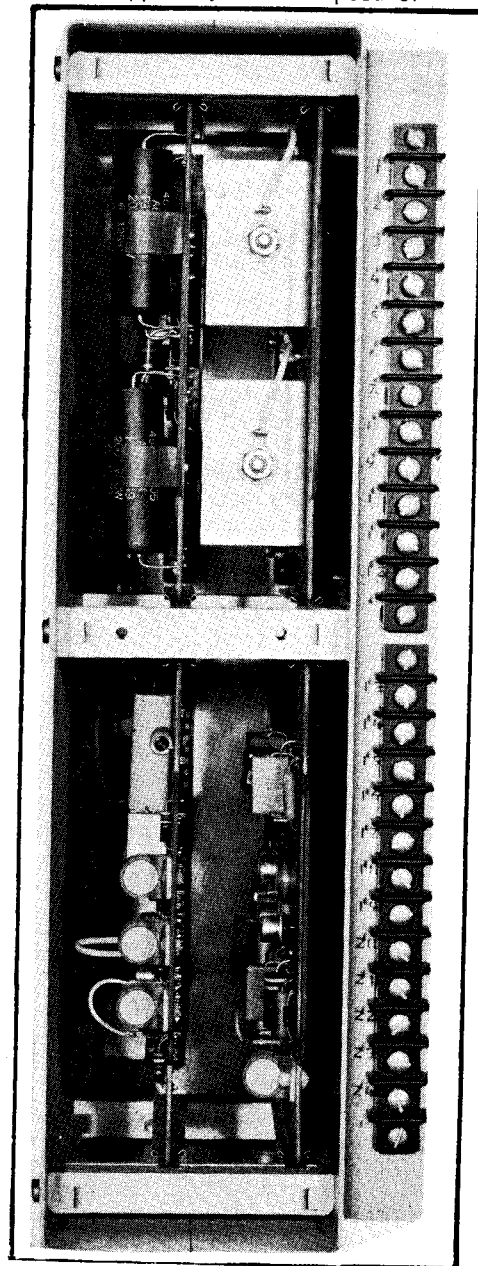


FIGURE 1b
FRONT VIEW
FIELD REGULATOR CAGE ASSEMBLY

Combinations of five, plug-in type, printed circuit boards are used to provide the functions required by the regulator. These boards are:

E05 --- S-56F gate pulse generator ----- I.L. 16-800-111
E06 --- S-56F field current controller --- I.L. 16-800-112
E07 --- S-56F power supply ----- I.L. 16-800-113
E08 --- S-56F field function generator --- I.L. 16-800-114
E09 --- S-56F voltage sensor ----- I.L. 16-800-115.

The cards, when required, occupy the cage positions shown in Figure 1a. As can be seen, the E08 and E09 board share a slot and therefore have the same keying. The E08 voltage sensor is used with armature speed regulators, and the E09 field function generator with armature voltage regulators.

A plastic insert is positioned in the AMP terminal block and pc cards are keyed to prevent them from being put in improper cage position. Rails are provided to aid insertion, and in conjunction with a locking plate fastened over the front edge of the cards, securely holds them in place.

Figure 1b is a front view of the field regulator used with S-56 speed regulators, showing the cards in position.

II. DESCRIPTION

In addition to providing support for pc boards, the following equipment is mounted in the rear of the cage assembly, as shown in Figure 2.

- (A) Interconnections
- (B) Thyristor Power Modulator (TPM)
- (C) Resistor Board.

A. Terminal blocks and wiring harnesses are identified by the letter A in Figure 2 and are outlined below:

- A1) Front accessible 24-point terminal block for required control inputs and outputs.
- A2) Seven-point terminal block for the single-phase ac input (U-V) and dc output (P-N) of the TPM.
- A3) Twisted pair of wires which connects to the armature TPM to complete the voltage feedback loop. Only required in field regulators using the E09 pc board (field regulators used with armature speed regulators).
- A4) Standard wiring harness which interconnects modules and components within the cage assembly. This harness remains the same regardless of the field regulator employed.

B. Thyristor Power Modulator (TPM)

With the single-phase semiconverter bridge configuration of Figure 3, (no free-wheeling diode across the load circuit) a gate pulse must be supplied thyristors each half cycle for proper commutation with continuous load current. This is insured by a built-in phase retardation limit of $\alpha = 160^\circ$ in the E05 gate pulse generator--i.e., regardless of the control input to the E05 card (I.L. 16-800-111), gate pulses are supplied no later than $\alpha = 160^\circ$. As proper commutation depends on presence of gate pulses, the E05 card must not be removed while the TPM is under load.

The TPM is designed for use with 120-volt fields and is identical for all field current ratings supplied (6.5a, 13a, 17.5a); maximum dc output ratings are 190 vdc, and 18 amps--vertically mounted and 55°C maximum ambient.

AC power to the field regulator cage is provided from an externally-mounted isolation transformer. The transformer supplied varies dependent on current requirements, and groups

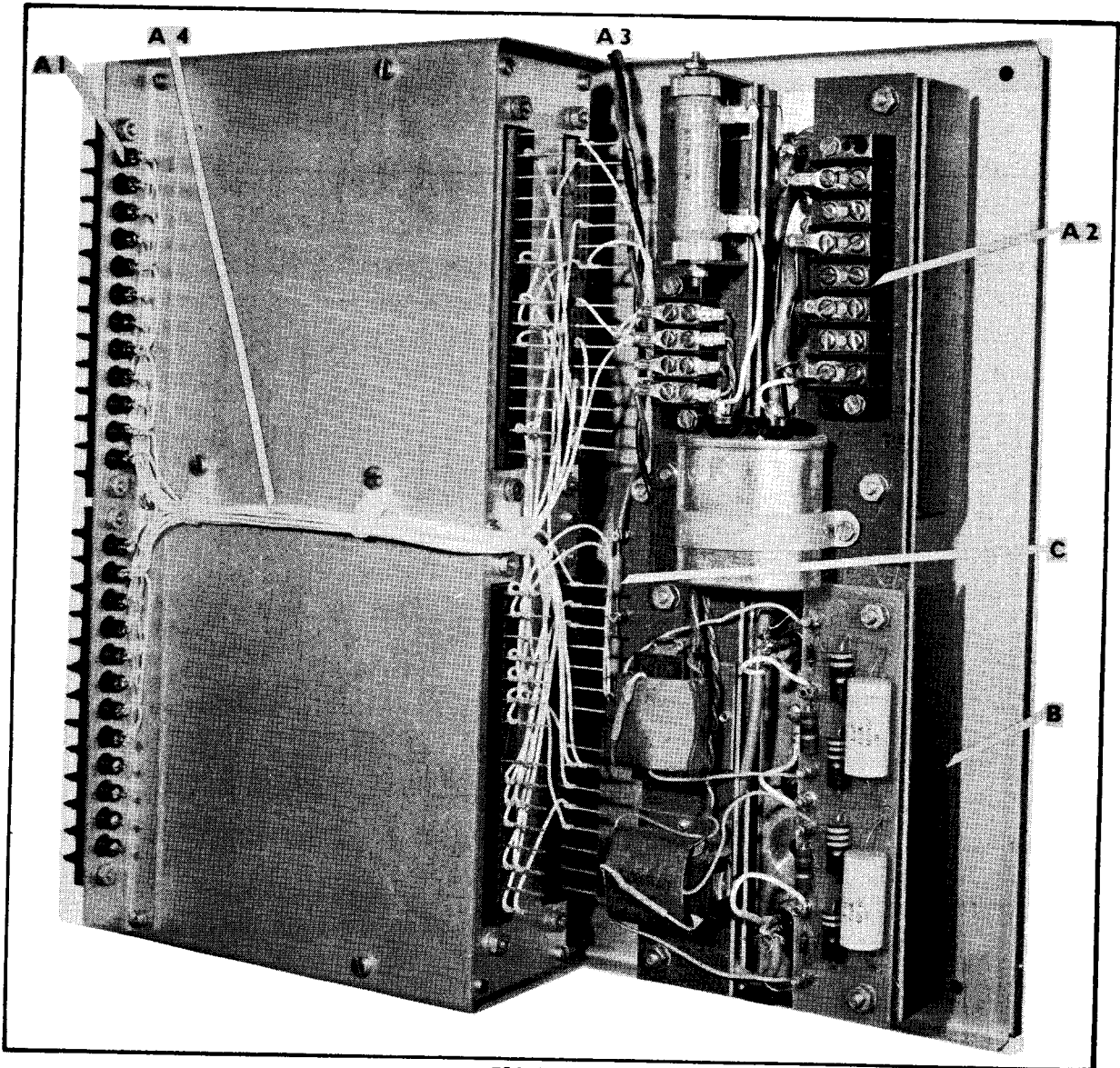


FIGURE 2
SIDE VIEW OF CAGE ASSEMBLY WITH A, B, C IDENTIFIED

are available to transform the most frequently encountered line voltages to the 230-volt rms and 115-volt center-tapped secondary voltages required by the regulator. Standard transformers available are outlined below:

Transformer Ratings:

Drawing #	Primary		Secondary	
475A489G01	230/460	60 Hz	230	6.5A
475A489G02	550	60 Hz	230	6.5A
475A489G03	380	50 Hz	230	6.5A
475A490G01	230/460	60 Hz	230	13A
475A490G02	550	60 Hz	230	13A
475A490G03	380	50 Hz	230	13A

Transformer Ratings (continued):

Drawing #	Primary	Secondary
475A491G01	230/460 60 Hz	230 17.5A
475A491G02	550 60 Hz	230 17.5A
475A491G03	380 50 Hz	230 17.5A

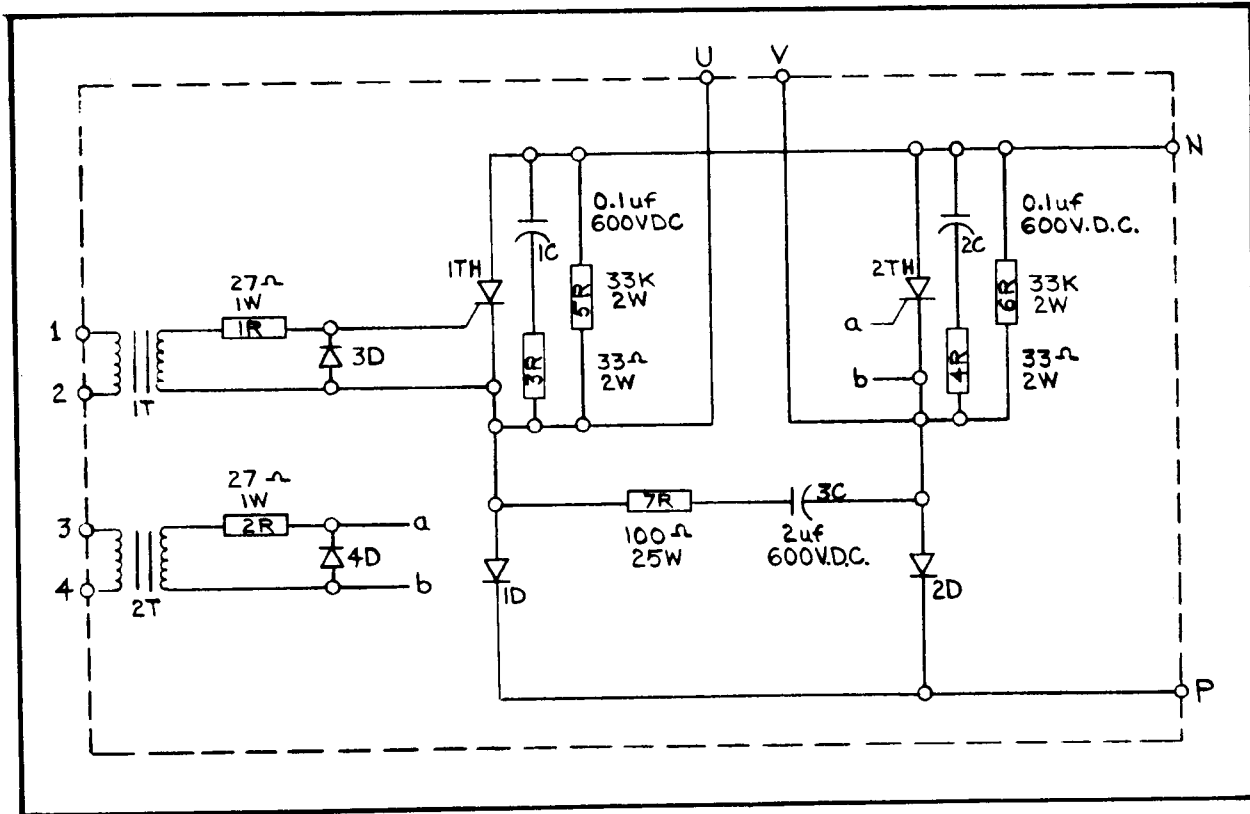


FIGURE 3

C. Resistor Board

Resistors on this component board complete the differential voltage feedback loop to the E09 pc board. The size of the resistor is dependent on the output voltage rating of the armature TPM, and the four combinations available are listed in Figure 4.

Armature Voltage (Va)	Cage Style No.	R _Ω
250	1298A72G01	1 Meg
375	1298A72G02	1.56 M
500	1298A72G03	2.0 M
Any*	1298A72G04	NONE

* G04 of the field regulator cage assembly is used with armature voltage regulators. This assembly does not use the E09 voltage sensor; hence, the resistor board is eliminated.

FIGURE 4

III. SERVICE

Operation of the field regulator cage assembly may be quickly checked using an oscilloscope, multimeter, and information contained in relative instruction leaflets.

With ac power applied, check:

- (1) Input voltages from the externally-mounted isolation transformer.
- (2) Phase control range of the TPM. With the current controller board (E06) removed, an external control signal adjustable from 0 to -10 volts applied to terminals 13(-) with respect to 14 should phase control the TPM output from ≈ 12 v to 190 vdc. If not, check the gate pulse characteristics and phasing per I.L. 16-800-111.
- (3) Presence of ± 24 vdc from the power supply pc card (E07).

Remaining problems in the cage assembly (open feedback resistors, faulty connections, etc.) may be found by continuity checks.

Semiautomatic equipment is available at the factory to test performance and wiring of the field regulator cage assembly. Major repairs are facilitated by returning the assembly to:

Westinghouse Electric Corporation
Industrial Systems Division
P.O. Box 225
Buffalo, New York 14240.

