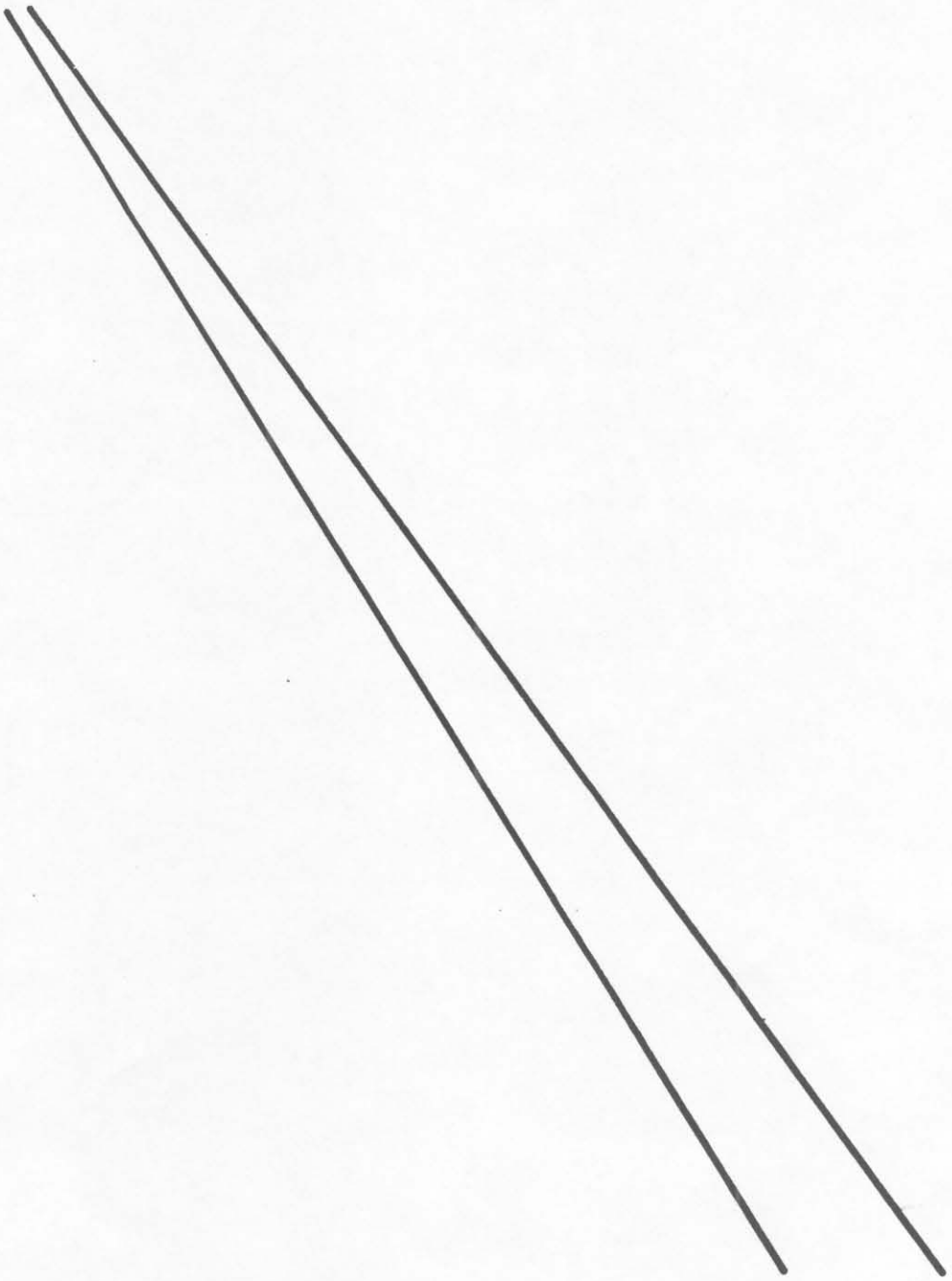
INSTRUCTION MANUAL



Basler Electric
Highland, Illinois

EXCITATION SUPPORT SYSTEM
Models SBO 221-223 (Previously SBO 121-123)
Part Numbers: 90 66800 101-103

Publication
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SECTION 1

DESCRIPTION

1.1 INTRODUCTION

1.1.1 This manual contains technical information describing the Series Boost Option (SBO), Part Numbers 90 66800-101, -102, and -103, manufactured by Basler Electric Company, Highland, Illinois.

TABLE 1-1 - SERIES BOOST OPTION MODELS

PART NUMBERS	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE
90 66800-101	SBO-221	208/240 ±10%	120/138 VAC at 8A
90 66800-102	SBO-222	416/480 ±10%	120/138 VAC at 8A
90 66800-103	SBO-223	575/600 ±10%	120/138 VAC at 8A

1.2 PURPOSE

1.2.1 The purpose of the SBO is to provide motor starting and fault clearing capabilities for generators having brushless exciters. The SBO makes the use of brushless generators practicable in applications which would normally require conventional generators with brush type rotary or series boost exciters. These SBO's were specifically designed for use with Basler Electric Voltage Regulators, Model Number KR2F.

1.3 DESCRIPTION

1.3.1 The SBO is a static type unit consisting of transformers, resistors, surge suppressors and capacitors. All components of this units, except the current transformer (CT), are mounted on a pan type sheet metal chassis (reservoir assembly). The CT is mounted externally and interconnected with the reservoir assembly. An outline drawing of the reservoir assembly is shown in Figure 2, and the outline drawing of the applicable CT's are shown in Figure 6.

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SECTION 2

PRINCIPLES OF OPERATION

2.1 GENERAL

2.1.1 The series boost option utilizes the principle of ferro-resonance to provide a source of regulated voltage for the KR2F voltage regulator. The series boost option basic circuit is shown below.

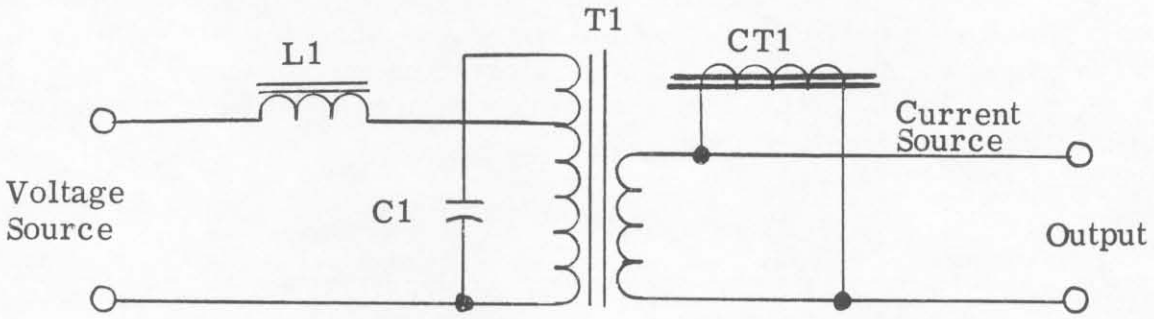

FIGURE 1 - SERIES BOOST OPTION BASIC CIRCUIT DIAGRAM

The excitation for the circuit is provided from two sources, a voltage source and a current source. The voltage source is taken from the generator output voltage and the current source is supplied from generator line current through the current transformer. Components T1, L1 and C1 (Figure 1) comprise a basic transformer regulating circuit (reservoir assembly) driven only by a voltage source. The reservoir assembly supplies the power requirements of the generator field through the KR2F voltage regulator when the generator system has no load. During no load conditions, the reservoir assembly should not be required to supply more than one-half of the total output capability of the voltage regulator.

2.1.2 The additional current necessary for the KR2F voltage regulator to provide the full load requirements of the generator is supplied by the current transformer. Current transformer CT1 (Figure 1) receives excitation from two of the generator load lines and provides a current which is added vectorially to the current from the voltage source in the reservoir assembly. Then the series boost option can supply the current necessary to maintain the maximum output of the KR2F voltage regulator. The exciter current necessary for motor starting and fault clearing is supplied entirely from generator line current.

2.1.3 During short circuit or motor starting conditions, the current transformer (CT must supply the current required by the exciter field, plus 5 amperes required by the SBO to maintain ferro-resonance. To obtain the

required output, the ratio of the secondary to primary turns of the CT must be correct for the amount of generator line current flowing in the primary. A wide range of turns ratio are available by various combinations of primary turns and secondary turns in the series of CT's designed for this applications. (See Figure 6.)

2.1.4 Table 5-1 shows the models of CT's available, the number of primary and secondary turns to be selected for the desired short circuit generator line current, and the rated exciter field current for short circuit conditions.

2.1.5 During short circuit the output of the KR2F will be 50 volts. If for this regulator output voltage the field current is substantially greater than that required to produce desired generator short circuit current, a resistor can be connected in series with the exciter field to limit field current and generator short circuit current.

CAUTION

RESISTOR VALUE MUST NOT
RESTRICT THE EXCITATION
AT FULL LOAD CONDITIONS.

2.1.6 When the SBO is used on three-phase system, correct phase relationship must be maintained between the input voltage to the reservoir assembly and the generator line current. Incorrect phasing will prevent the SBO from maintaining sufficient current to the KR2F voltage regulator and poor regulation will result.

2.1.7 Although the SBO is normallyused on three phase systems, it can also be used on single phase systems, when the appropriate current transformer is used. Contact the nearest Basler Electric Company sales representative or factory office for details.

SECTION 3

INSTALLATION

3.1 GENERAL

3.1.1 The reservoir assembly and the current transformer can be mounted in any position. An outline drawing of the reservoir assembly, with overall and mounting dimensions is shown in Figure 2.

3.2 INTERCONNECTION

3.2.1 The SBO must be interconnected as shown in Figure 7. Correct phase relationship must be observed.

3.2.2 The input to the SBO may be taken directly from the generator load lines if the voltage is within the limits specified in Table 1-1. An autotransformer or isolation transformer can be used to connect the unit to generators with line to line voltages other than those specified. The unit provides isolation for the KR2F voltage regulator and exciter or generator field.

3.3 MOUNTING

CAUTION

THE EQUIPMENT DESCRIBED HEREIN DISSIPATES UP TO 178 WATTS. THEREFORE, INSURE THAT SUFFICIENT AIR FLOW IS MAINTAINED TO PROVIDE ADEQUATE COOLING. FAILURE TO DO SO MAY RESULT IN EQUIPMENT DAMAGE.

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SECTION 4

MAINTENANCE

4.1 PREVENTIVE MAINTENANCE

4.1.1 Accumulations of dust and dirt should be removed from the SBO on a periodic basis, utilizing a soft brush or an air line that has a moisture trap.

4.2 CORRECTIVE MAINTENANCE

4.2.1 Field repair on the SBO will be such that any or all of the components can be removed and replaced.

4.3 SPECIAL TOOLS

4.3.1 The SBO can be maintained utilizing standard hand tools and test equipment.

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SECTION 5

TRANSFORMER SELECTION

5.1 GENERAL

5.1.1 When selecting transformer ratios, the following information is needed (See Table 5-1).

a) Single phase or three phase generator

b) Generator line current during short circuit

c) Exciter field current during short circuit
(Exciter field current depends on exciter field resistance.)

CURRENT TRANSFORMER SELECTION CHART

Short Circuit Line Current (Amps)	Current Transformer Part Number	Secondary Turns	Secondary Terminals
919	BE 02470 001	94	C-2
1031	BE 02470 001	94	C-2
1151	BE 02470 001	119	C-3
1302	BE 02470 001	119	C-3
1462	BE 02461 001	150	C-1
1635	BE 02461 001	150	C-1
1838	BE 02461 001	189	C-2
2062	BE 02461 001	189	C-2
2310	BE 02461 001	238	C-3
2604	BE 02461 001	238	C-3
2925	BE 02463 001	300	C-1
3270	BE 02463 001	300	C-1
3675	BE 02463 001	378	C-2
4125	BE 02463 001	378	C-2
4620	BE 02463 001	476	C-3
5205	BE 02463 001	476	C-3
5850	BE 02464 001	600	C-1
6540	BE 02464 001	600	C-1
7350	BE 02464 001	756	C-2
8250	BE 02464 001	756	C-2
9240	BE 02464 001	952	C-3
10410	BE 02464 001	952	C-3

SECTION 6

REPLACEMENT PARTS

6.1 GENERAL

6.1.1 The replacement parts list, Table 6-1, identifies the basic parts and assemblies of the SBO. Only those parts which are maintenance significant are included. When ordering parts, always specify the complete part number of the unit (such as 90 66800-101).

TABLE 6-1 - REPLACEMENT PARTS LIST

REFERENCE DESIGNATION	PART NUMBER	DESCRIPTION	QTY.
T1	BE 01486 001	Transformer	1
L1	BE 01487 001	Reactor	1
C1 & C2	04874	Capacitor	2
	03350	Resistor (250Ω 100W)	2
CR1	07040	Surge Arrestor	1

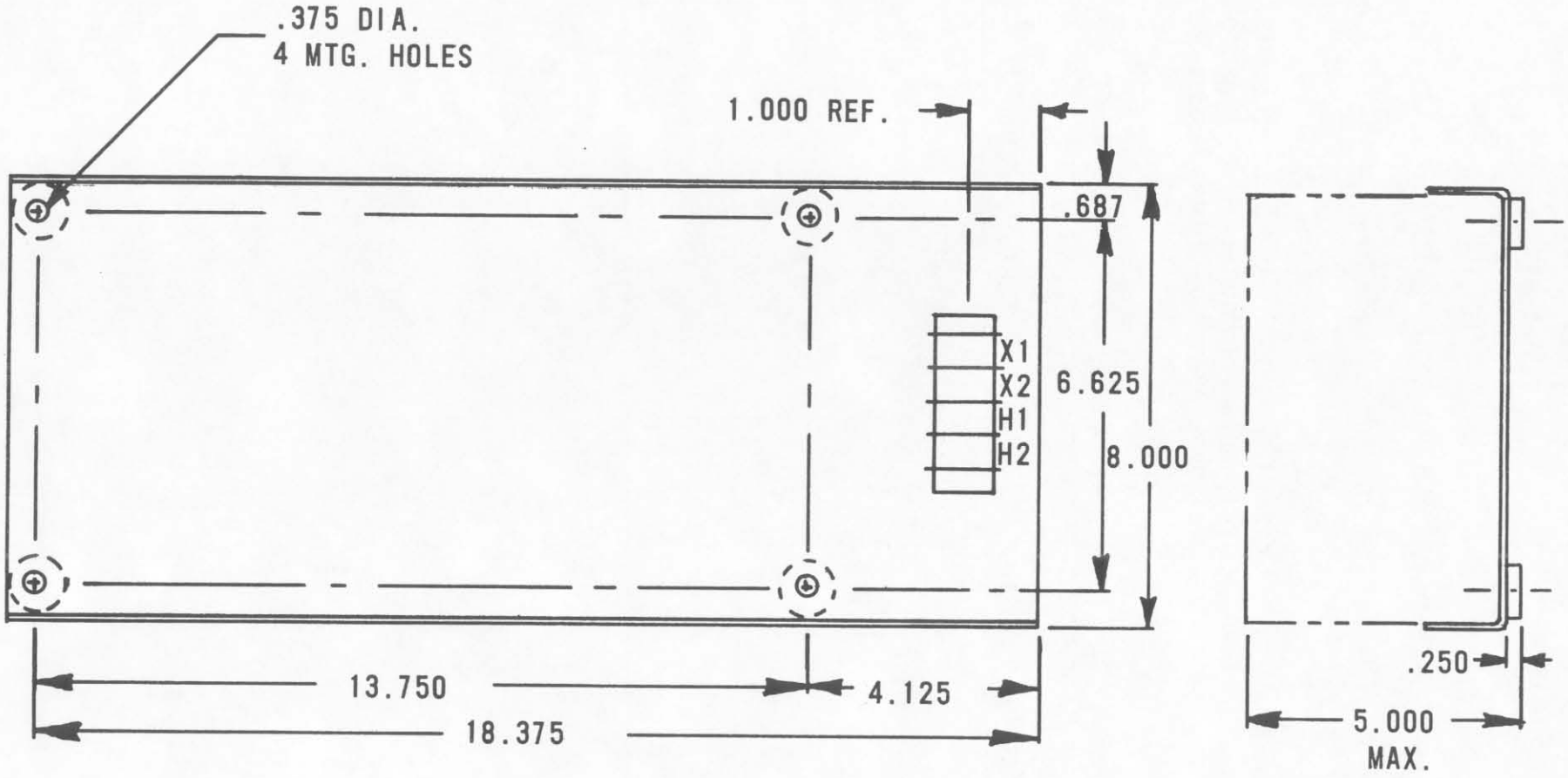

FIGURE 2 OUTLINE DRAWING

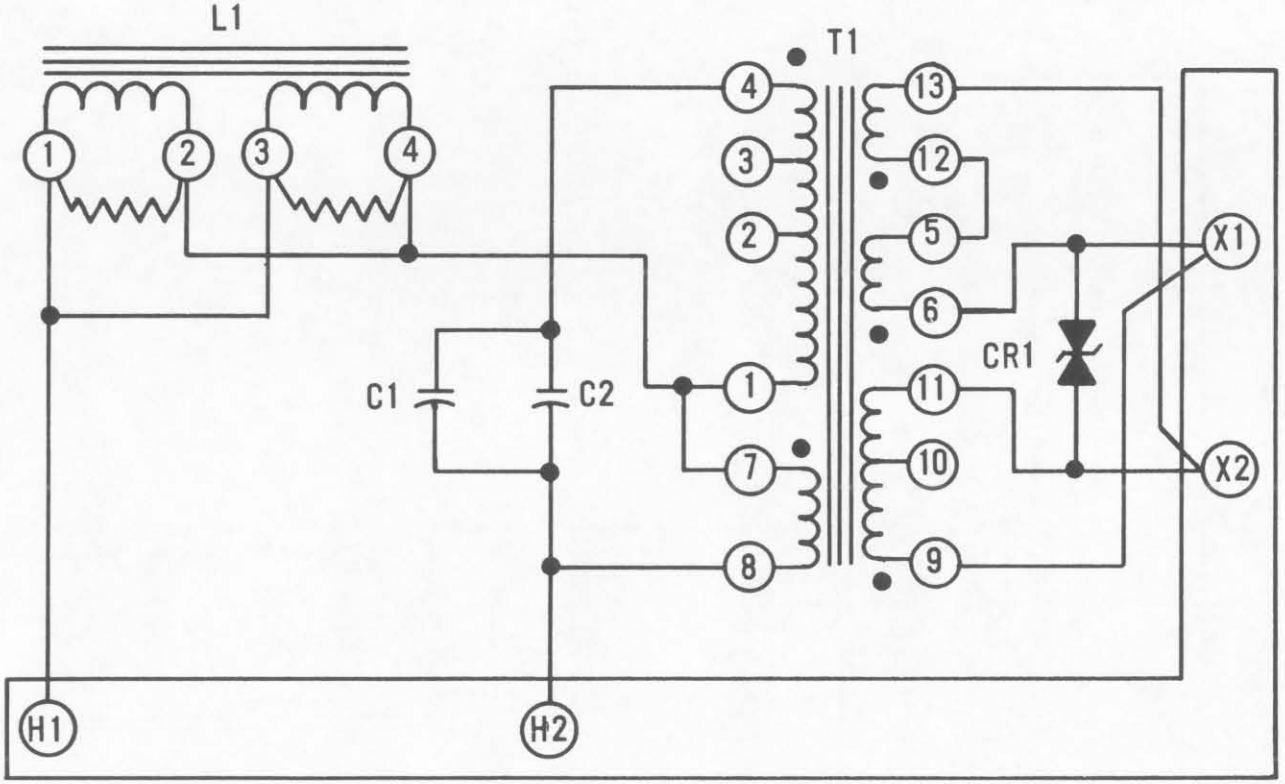

FIGURE 3 SCHEMATIC DIAGRAM
208-240 VOLT INPUT

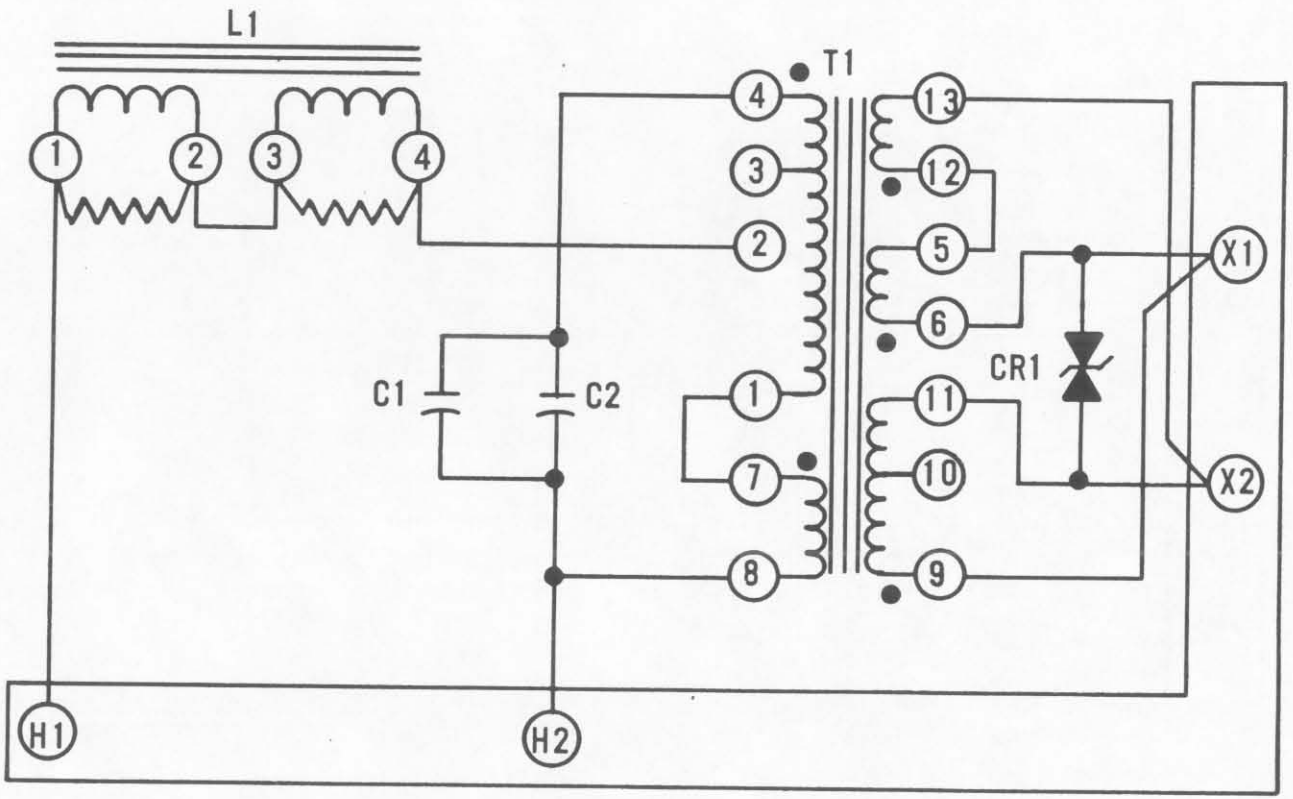

FIGURE 4 SCHEMATIC DIAGRAM
416-480 VOLT INPUT

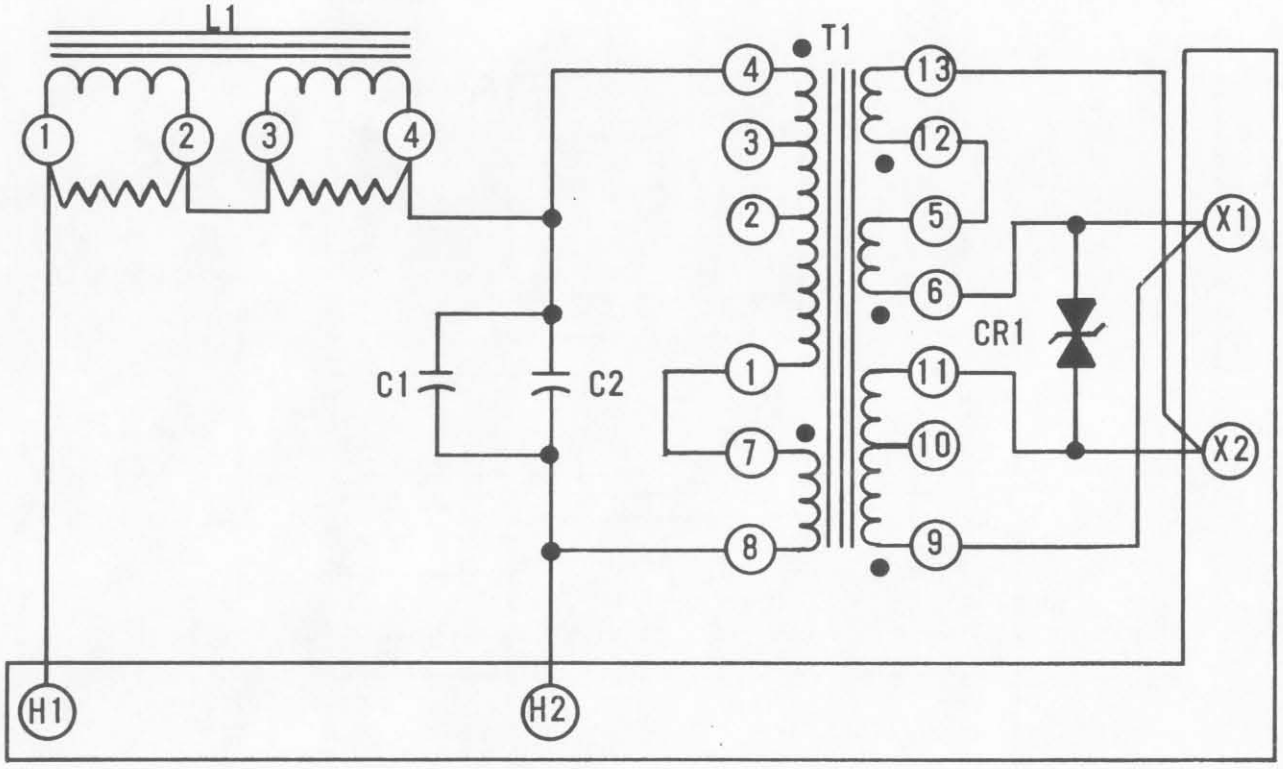

FIGURE 5 SCHEMATIC DIAGRAM
575-600 VOLT INPUT

TRANSFORMER	A	B	C	D	E	F	G	H	TURNS RATIO			
									C-1	C-2	C-3	C-4
BE-2461	10 1/2	7 3/4	5 3/8	5	6	4 3/8	5	2	150	188	238	
BE-2463	12 1/2	9 3/4	5 3/8	5 3/4	6	4 3/8	7	3	300	378	476	
BE-2464	11 1/2	10	4 5/8	5	6	3 5/8	7	3	600	756	952	1200
BE-2470	9 1/2	7 3/4	7 3/4	7	6	6 3/4	4	2	75	94	119	

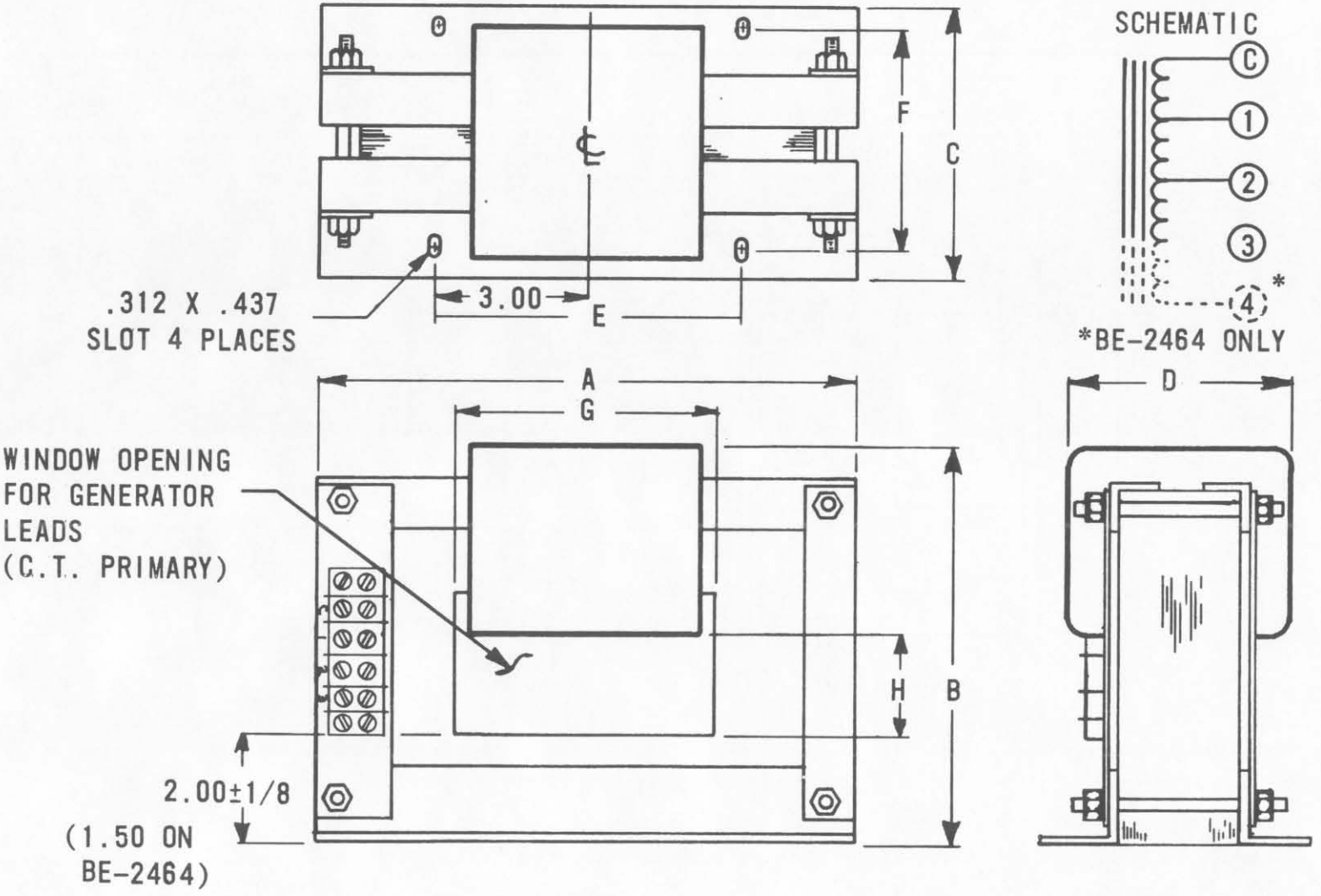

FIGURE 6 CURRENT TRANSFORMER OUTLINE DRAWING

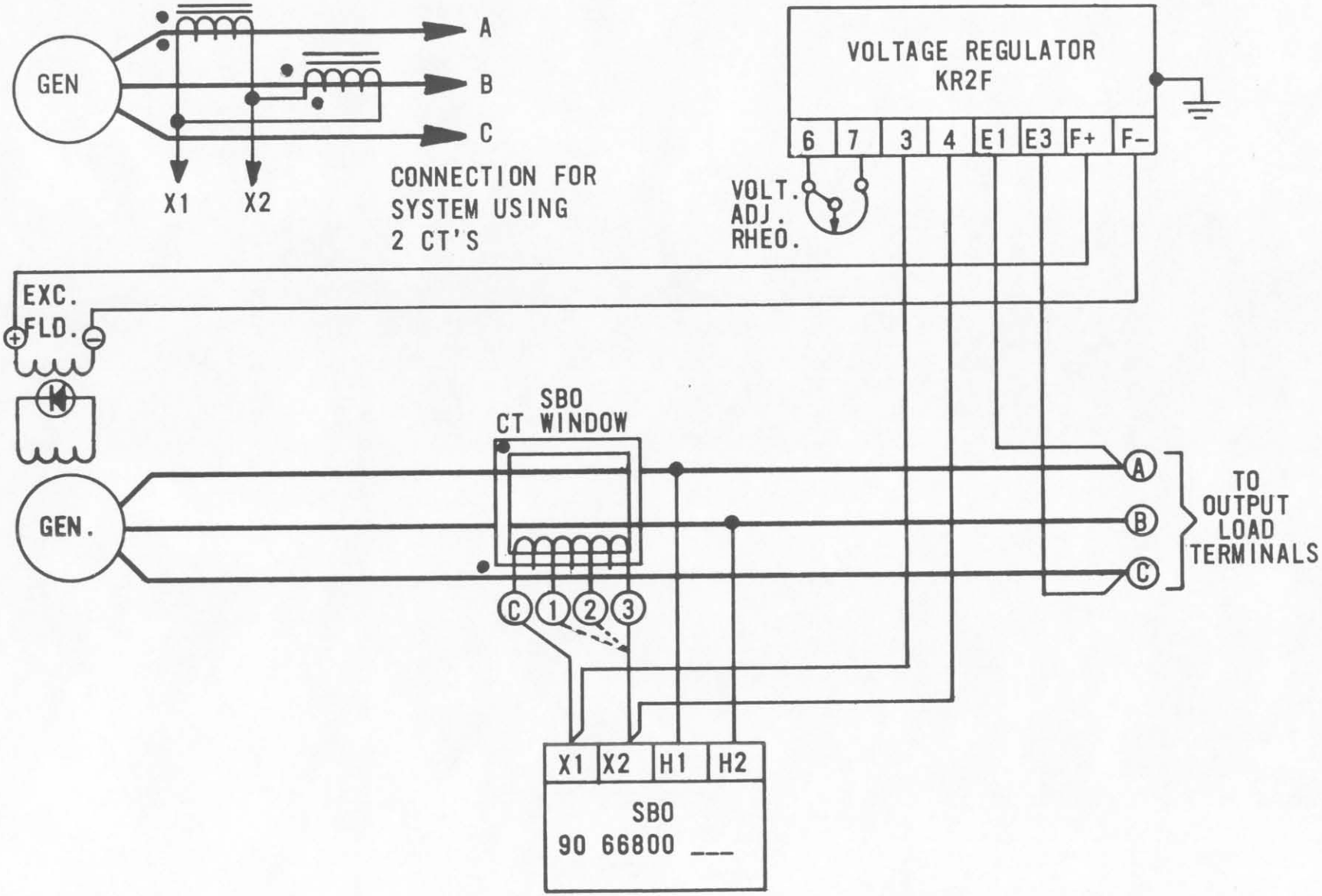

FIGURE 7 INTERCONNECTION DIAGRAM

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Date:
Order No.:

Customer:

Generator _____ KVA, _____ RPM, _____ Volts

Use Current Transformer _____

with _____ turns of lead L1 and _____ turns of lead L2 through window to give a 3-phase sustained short circuit current of _____ amps. Connect X1 on reservoir terminal board to C, and X1 on reservoir terminal board to _____ respectively on the current transformer terminal board. The reservoir assembly schematic is _____.

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