GEK-15019

INSTRUCTIONS

ELECTROHYDRAULIC CONTROL

FOR

BOILER FEEDPUMP TURBINES

3S7513TC300

GENERAL ELECTRIC

TABLE OF CONTENTS

ELECTRO HYDRAULIC CONTROL FOR BOILER FEEDPUMP TURBINES 3S7513TC300

INTRODUCTION

The electronic portion of an Electrohydraulic Control system for a boiler feedpump turbine drive is described in these instructions.

Any adjustment or maintenance of this equipment should be performed either by qualified turbine personnel or supervised by such personnel.

Drawing 44C300679 is a block diagram of a typical unit and is referred to later. This equipment is an electronic speed governor whose speed set point can be varied by an automatic boiler controller or by an operator from a remote control unit. Electronic redundancy and mechanical overspeed trip are used to provide a high degree of reliability and safety.

A block diagram, elementary diagram, and alignment diagram for a particular unit are included in these instructions. Since both the number and arrangement of auxiliary components vary with particular application, it is necessary to refer to the drawings furnished with each equipment to determine the correct connections and auxiliary components furnished in each instance.

RECEIVING, HANDLING AND STORAGE

RECEIVING AND HANDLING

Immediately upon receipt, the equipment should be carefully unpacked to avoid damaging the apparatus. Particular care should be exercised to prevent small parts being mislaid or thrown away in the packing material.

As soon as the equipment is unpacked it should be examined for any damage that might have been sustained in transit. If injury or rough handling is evident, a damage claim shall be filed immediately with the transportation company and the nearest General Electric Sales Office should be notified promptly.

STORAGE

If the equipment is not to be used as soon as it is unpacked, it should be stored in a clean dry place and protected from accidental damage. Particular care should be exercised to avoid storing the equipment in locations where construction work is in progress.

DESCRIPTION

The speed control loop will be described first. Starting outside the electronic control unit on the right hand side of block diagram 44C300679 an electrohydraulic valve receives a low power electrical signal from the electronic unit and controls the flow of oil to a double acting hydraulic cylinder which positions the turbine steam control valve. Turbine speed is sensed by two magnetic sensors mounted near the periphery of a shaft driven gear. Pulses whose frequency is directly proportional to turbine speed are generated as each gear tooth passes a sensor. Primary and secondary speed channels in the electronic control produce a DC voltage proportional to the frequency of the sensor outputs. Outputs of the two speed channels are fed into high valve gate number, one which rejects the lower of the two speed signals and passes on the higher valued signal. This redundancy permits one channel to fail without significantly affecting turbine speed. The secondary channel is adjusted for an output, 1% less than the primary channel. It is therefore uncontrolling, except in case of failure of the primary channel or if a "Backup Amplifier Test" switch in the cabinet is actuated which increases the output of the secondary channel to 1% greater than the primary channel. A test meter in the cabinet can be used to determine the controlling channel.

The speed signal from high valve gate one is summed with the speed set point to obtain a speed error. See the middle of the block diagram. The speed error is passed through a stability compensation and error amplifier, which includes a regulation adjustment to obtain a valve lift demand signal. This is summed with a valve position signal to obtain a valve position error which is passed through the servo amplifier to the servo valve. Increasing the speed set point increases valve lift demand, valve position error, and valve opening. Speed will increase until the rise matches the set point increase.

The valve position signal is obtained from a linear variable differential transformer (LVDT) whose core is positioned by the control valve. Three kilohertz excitation for the LVDT is generated in the electronic cabinet. A demodulator in the cabinet produces a DC signal proportional to the AC output of the LVDT which varies with core position.

The electronic control unit applies a strong close signal to the servo valve in the tripped condition. Before the control can be reset, it must generate a close valve signal from the governor. Relay circuitry also requires that the electrical connectors must be plugged into the servo valve, the LVDT, and the speed sensors before starting. The LVDT signal is biased to close the control valve if the LVDT connector is removed with the turbine running. The servo valve contains a 5% mechanical bias which will close the control valve in the absence of an electrical signal.

SPEED REFERENCE OR SET POINT

Identical motor driven LVDT's are used to generate the manual and automatic speed references. The core position is varied by a two-phase stepping motor which moves in discrete steps and locks in position when not running. Raise and Lower pushbuttons on the operator's manual control panel cause the reference to run from stop to stop in 80 to 90 seconds. Raise Fast and Lower Fast pushbuttons will run the reference from stop to stop in approximately 10 seconds. The automatic speed reference circuits contain interface circuitry for compatibility with a specific boiler controller. The automatic and manual speed references are fed into a low value gate which rejects the higher reference and passes on the lower reference to control turbine speed. A relay operated from this gate indicates which of the two references is controlling.

An overspeed test can be performed after first running both manual and automatic references to the high speed stop. The operator's overspeed test pushbutton is then actuated causing an additional speed reference to be generated which increases linearly with time at approximately 12% speed per minute. This is added to both manual and automatic references. Once the speed ramp starts, a relay energizes a lamp to indicate that a high reference condition exists. If turbine speed rises to 120% of rated, a speed signal will override the ramp generator and prevent further speed increase. Upon release of the Test pushbutton, the reference ramps back to normal at the same rate as it increased.

The control cabinet includes circuitry for driving position indicators from LVDT's mounted on the stop valves, but this circuitry is not a part of the governor.

Two rectifier-inverter-rectifier power supplies provide necessary DC voltages to the electronics. For startup and operating backup power, one supply is fed from 115 volts, 60 Hz, 1 phase. For primary operating power independent of the AC line, power is obtained from a turbine driven 3-phase permanent magnet generator (PMG).

The PMG also drives a frequency to voltage converter for a tachometer and operates speed relays. A 10% speed relay is combined with the output of speed signal high value gate 2 to cause the speed reference to go to zero if the PMG is above 10% speed and neither primary or secondary speed channel is working. Above 60% speed a relay unlocks the alarms on the PMG power supplies. Above 105% speed a relay unlocks the lock out valve in the emergency trip exerciser scheme.

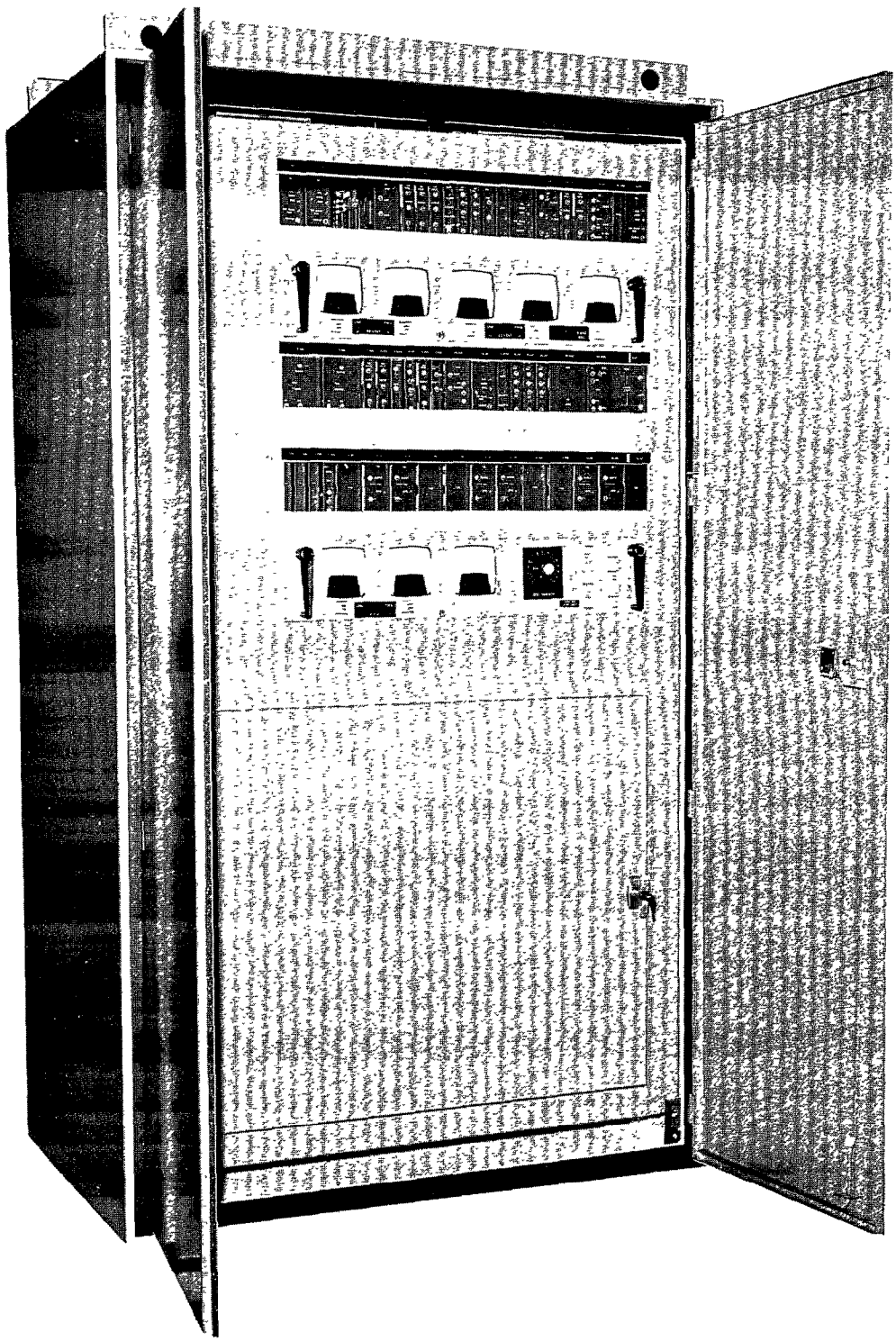
INVERTERS

Diagram 44D300970 shows the inverter components. Incoming AC power at C, 1-2 feeds transformer 2T. The output of 2T is rectified and filtered to obtain an operating DC bus level of 100 to 200 volts. Power elements of the inverter consist of 1-4 SCR thyristors together with commutating reactors, diodes, and capacitors which produce square-wave AC on the primary of transformer 1T. 1T has three secondaries whose outputs are rectified, filtered, and fed through series regulators. Thyristors 1 and 2 are operated as a pair such that when either is being fired the other is not fired. Thyristors 3 and 4 are operated similarily. Starting with 1 and 3 conducting and 2 and 4 non-conducting both points B and C are at DC bus level A and no voltage appears across the primary of 1T. 2SCR is then fired placing voltage B on 3-4 of 1X. By transformer action this voltage also appears on 1-2 of 1X which places 1 of 1X at twice voltage A to reverse bias and turn off 1SCR, capacitor 3C quickly discharges through 2 SCR and 1X to zero volts at B. Voltage now appears on 1T primary with C positive with respect to B. This voltage is integrated and when the desired volts-seconds on 1T is obtained 4 SCR is fired. 3 SCR is commulated off, and the voltage at C then goes to zero and the voltage on 1T is again zero. A frequency controlling master flip-flop then fires 1 SCR to raise B to bus level A which reverses the polarity of the voltage previously applied to 1T. Point B is now positive with respect to C. After accumulation of the required volt-seconds, 3 SCR is fired and point C raised to level A which completes one full cycle of the inverter.

Firing circuits 1-4 FC for the thyristors are shown by dotted blocks just below the bridge circuit and are shown in detail in the lower right corner. A 47 volt bus for the firing circuits is obtained from the DC bus through 2R and 1 ZD. Each firing circuit is a transistorized, transformer coupled blocking oscillator operating at 25 kHz to 100 kHz. A half-wave rectifier on the transformer output winding feeds the associated thyristor gate with pulses at the oscillating frequency. The circuit will oscillate in the absence of a control signal and stop oscillating when a signal is applied.

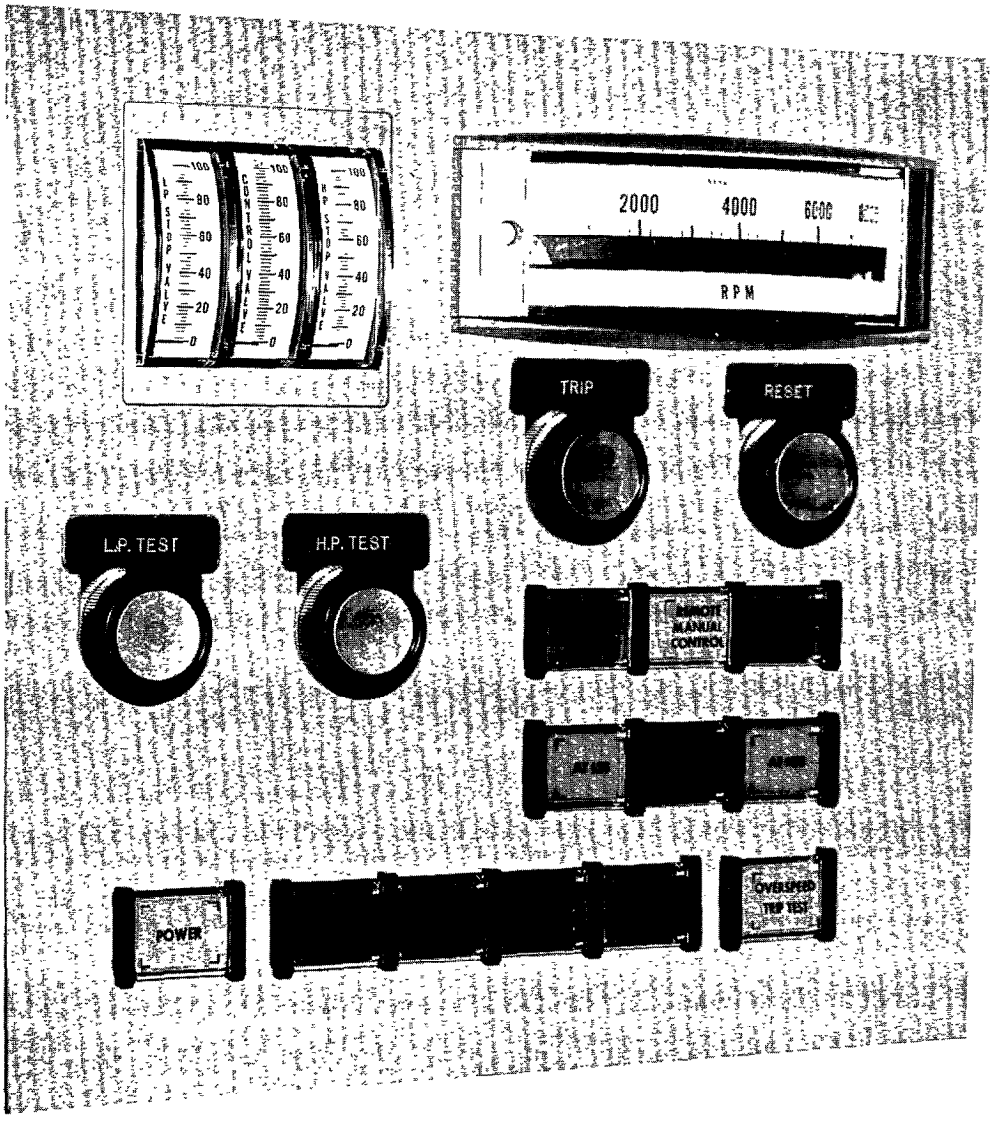
The inverter control circuitry diagram is shown on the lower portion of diagram 44D300970 from left to right. A 24 volt control bus is obtained from the DC bus through 1R and Zener diode 2 ZD.

The inverter output frequency is approximately 200 Hz is exactly half the frequency of the relaxation oscillator composed of 4C, 4R, 1SUS, and 1X. Capacitor 4C charges through resistor 4R until its voltage equals the break down voltage of silicon unilateral switch 1SUS. When 1SUS breaks down, the voltage drops to a low value placing 4C voltage on 1X and turning on 1Q for approximately 20 microseconds until the discharge of 4C and inductive reversal of voltage on 1X turns off 1Q and 1SUS. Capacitor 4C then begins to charge again. Each conduction pulse of 1Q triggers master flip-flop 1Q-2Q, switching conduction of 1SCR and 2SCR to initiate a half cycle



TYPICAL CABINET

Figure 1
GEK-15019



TYPICAL OPERATORS CONTROL UNIT

Figure 2
GEK-15019

of inverter output voltage. The end of each half cycle of output is obtained from switching conduction of 3-4 SCR by slave flip-flop 7Q-8Q.

Regulation of the output volt seconds is obtained from 3D through 8D, 4Q, 5Q, 6Q, 17Q, and associated components. Voltage waveforms for the output, flip-flops, 5-ID diodes, and 4Q, 5Q are shown in Figure 3.

Only during periods of output voltage is 5Q turned off and 8C allowed to charge. The voltage on 8C is the time integral of the current into it, which comes from the DC bus through 16R, 23R, and 1 P.

Transistors 6Q and 17Q trigger on when the capacitor voltage rises above the 6Q base voltage. The discharge of 8C generates a spike on 17 R to trigger slave flip-flop 7Q-8Q ending the half cycle of output voltage.

The remainder of the inverter control components shown to the right of slave flip-flop 7Q-8Q are used to obtain correct start-up of the inverter. When power is applied and voltage begins to build up on the DC bus, it is initially too low to cause conduction of 9Q. With 9Q off, 10Q is on, 12Q off, 13Q on, 14Q off, 15Q on and 16Q on. With 14Q off, its high collector voltage is coupled through 47R and 49R to 2FC and 4FC to inhibit firing of 2 and 4 SCR, letting the voltage on B and C rise with the bus voltage. With 16Q on, it feeds a relatively high current into 8C causing it to reach firing voltage very quickly so that the slave flip-flop remains in the output voltage state for a very short period. As the DC bus continues to rise, it reaches the point where 9Q conducts. This turns off 10Q raising the voltage on the base of 12Q but not enough to cause conduction. Following this, the first flip of the master flip-flop to the 2Q on state is capacitively coupled to 11Q through 11C to momentarily turn it off, allowing its collector to rise and raise the base of 12Q high enough to turn it on and turn off 13Q. The emitter voltage drops and 12Q remains on when the pulse from 11Q disappears. With 13Q off, 14Q is on and 2FC and 4FC are no longer inhibited from firing. 4SCR fires and a short duration output is obtained, quickly ended by the relactively high current into 8C triggering the state of the slave flip-flop to the no output voltage condition. With 14Q on 15Q is off and 13C begins to discharge, reducing the current from 16Q into 8C. The time for 8C to reach firing voltage of 6Q-17Q is increased as is the width of the output voltages waveform until 16Q stops conducting. At this time normal operation has been obtained. The only adjustment, 1P is set for 38 volts into the 30 volt series regulator.

The series regulator for the 30 volt supply is shown at the top of the diagram. The other two are identical. Output of the voltage sensing bridge consisting of 15R 16R, 17R, 1P and 2ZD is fed to 7Q and 8Q. An increase in output voltage raises the voltage on 8Q, increasing its conduction and lowering conduction of 7Q. Decreased current in 7Q decreases current in 4Q, 5Q, and 6Q dropping the output voltage until balance is restored. Excessive current output through 10R turns 3Q on 2Q off, and 1Q on, grounding the base of 7Q. With 7Q off, series regulators 4Q , 5Q, and 6Q are off and the output goes to zero. When 1C discharges, 3Q is turned off and output is restored. The circuit will oscillate between off and on until the cause of the high current is removed.

INSTALLATION AND ADJUSTMENT

The electronic control cabinet should preferably be mounted in a clean dry air conditioned environment. Ambient temperature should not exceed 104° F unless otherwise noted on the outline drawing for a specific unit.

Equipment adjustment and the required test equipment are covered in detail in an alignment diagram and alignment instructions furnished with each unit. See 44D302362 and 44A301479 for typical drawings.

The location of sub assemblies within the cabinet is shown on the internal connection diagram furnished with each control. Printed circuit board locations are shown on sheets 1 and 2 of the elementary diagram, see 44C300886.

OPERATION

Refer to the instruction book for the turbine.

MAINTENANCE

No periodic maintenance is required. Outage time due to component failure is best minimized by maintaining a complete set of spare parts. Elementary diagrams of the printed circuit boards are included in this instruction book. The assembly drawings showing component location on the printed circuit boards are furnished with each order except where component identifications are silk screened on the boards in which case assembly drawings are not furnished.

TROUBLESHOOTING

Most troubleshooting problems can be quickly isolated to a particular section of the control by use of the built-in test meter, the meter relays, and alarm lights. These used in conjunction with the alignment diagram indicate the operating condition of each section. An oscilloscope is recommended for pinpointing a defective component or components. Each printed circuit board can be removed from the rack for servicing without disconnection due to the use of terminal boards.

RENEWAL PARTS

When ordering renewal parts, address the nearest Apparatus Sales Office of the General Electric Company and supply the following information.

a. Catalog number stamped on the part and a complete description of the part, including its use and location.

b. Complete nameplate data appearing on the assembly of which the part is a component.

c. If possible, data on orginal order on which equipment was first supplied, including all numerical references.

Since operation of a steam turbine-generator is dependent upon operation of the feedpump control, it is suggested that an adequate stock of spare parts be carried on hand to minimize outage time due to component failure.

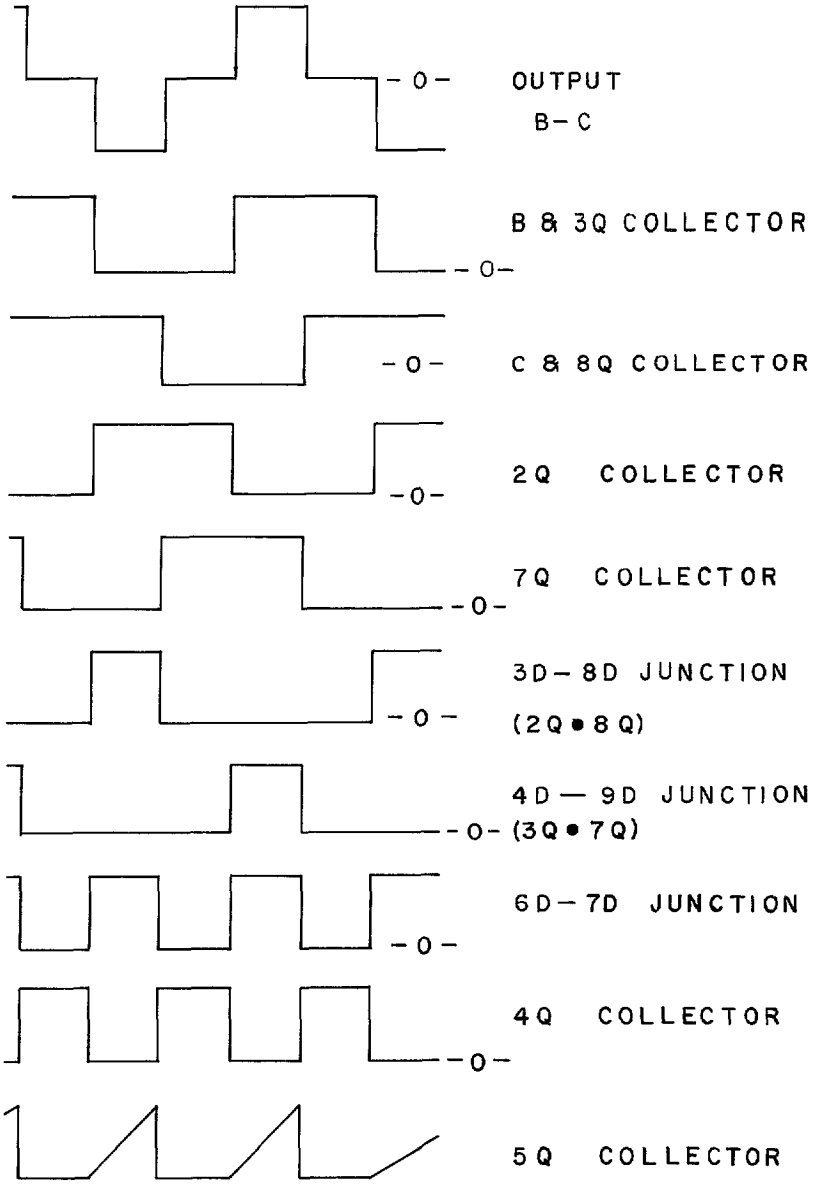
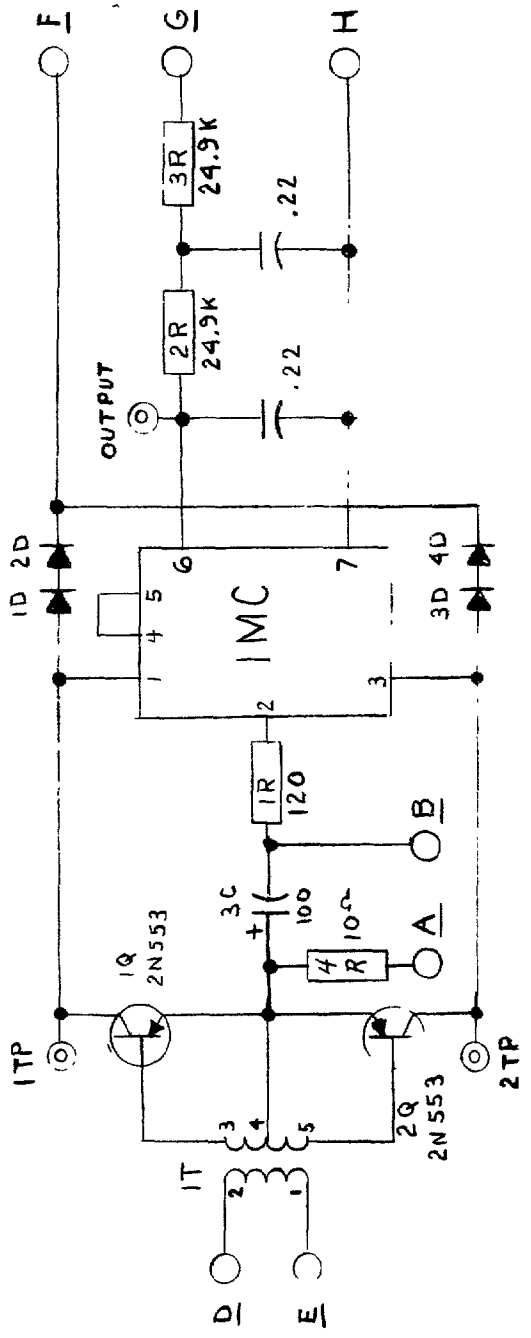


FIG. 3 Inverter Waveforms

GENERAL ELECTRIC

REV NO.	TITLE	44A300242
O	MAGACYCLER	CONT ON SHEET / SH NO
44A300242		1MC
CONT ON SHEET / SH NO.	FIRST MADE FOR 44D381587-G01	



CONNECTIONS

A +30 V
B 0 V
C -
D INPUT
E INPUT
F LOGIC OUTPUT
G SIGNAL OUTPUT
H SIGNAL OUTPUT

REVISIONS

1	H Chambers	MAY 28 1968
11		
12P-DFB		
FG-W		

PRINTS TO

MADE BY / ISSUED	APPROVALS		
H S Chambers 1/15/68 APR 17 1968	R Wimmer	SPECIALTY CONTROL DIV OR DEPT. WAYNESBORO, VA LOCATION	44A300242 CONT ON SHEET / SH NO.

FF-803-WF (2-67)
PRINTED IN U.S.A.

CODE IDENT NO. 2

GENERAL ELECTRIC

44A300243

REV NO. 0

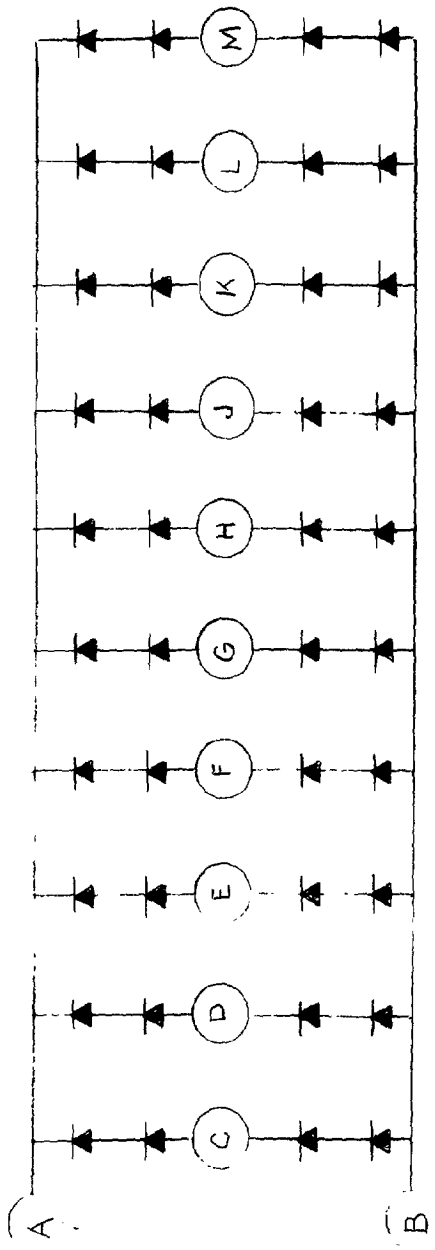
TITLE

DIODE BOARD IDB

CONT ON SHEET SH NO.

FIRST MADE FOR 44D236370-G01

REVISIONS



ALL DIODES 200 MA; 200 V.

11

DFB 12P

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2

GENERAL ELECTRIC

44A300261 CONT ON SHEET SH NO.

REV NO. 0

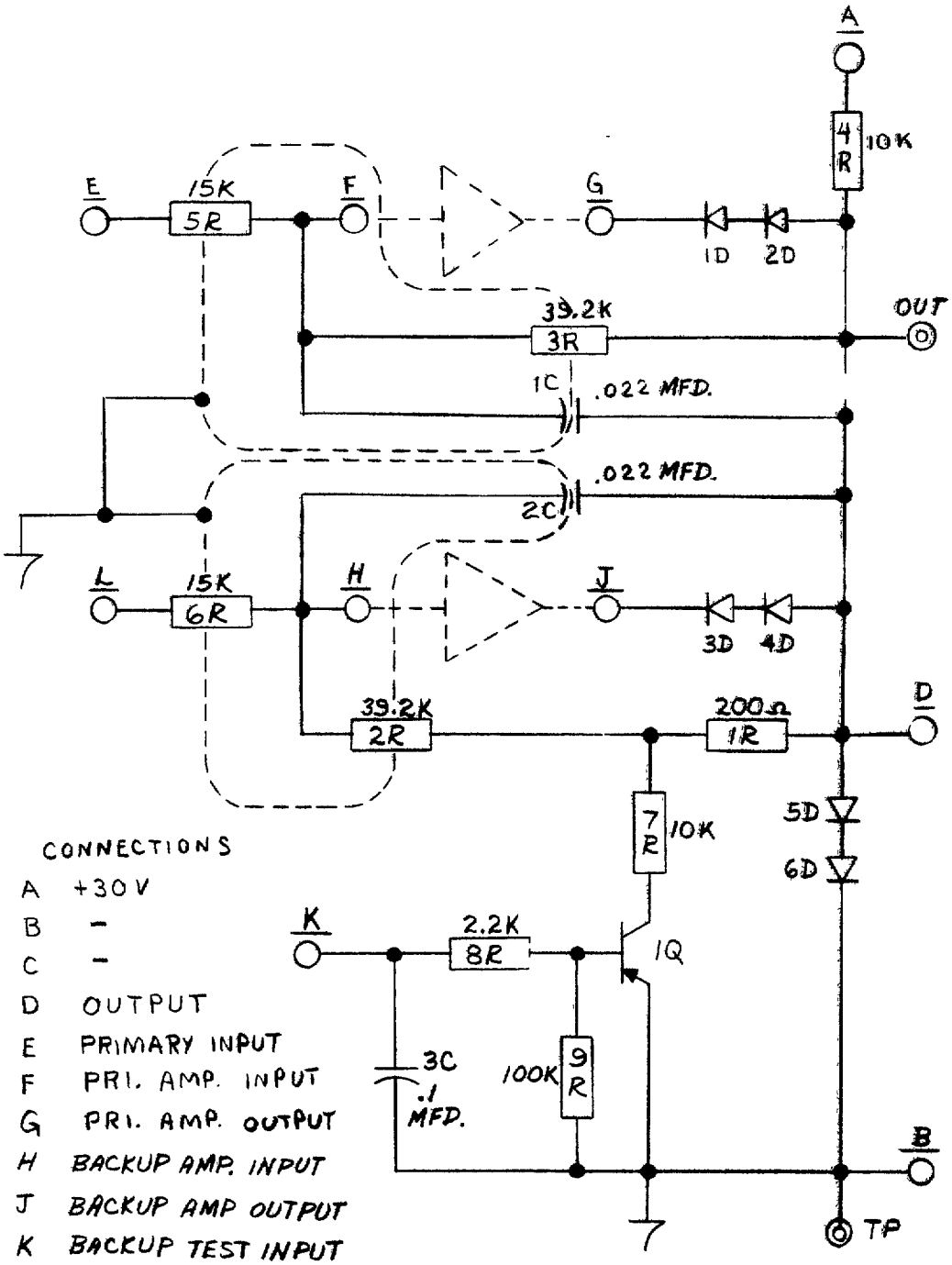
44A300261 CONT ON SHEET SH NO.

TITLE

SIGNAL LOW VALUE GATE 1LVG

FIRST MADE FOR 44D236372-G01

REVISIONS



CONNECTIONS

A +30V
B -
C -
D OUTPUT
E PRIMARY INPUT
F PRI. AMP. INPUT
G PRI. AMP. OUTPUT
H BACKUP AMP. INPUT
J BACKUP AMP OUTPUT
K BACKUP TEST INPUT
L BACKUP INPUT

NOV 21 [redacted]
R.M. BUKOSKEY
1
11
12P DFB
FG-W
PRINTS TO

MADE BY J. Wonderly MAR 7 1968
ISSUED [redacted]

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CODE IDENT NO 2

GENERAL ELECTRIC

44A300262 CONT ON SHEET SH NO.

REV NO. 0

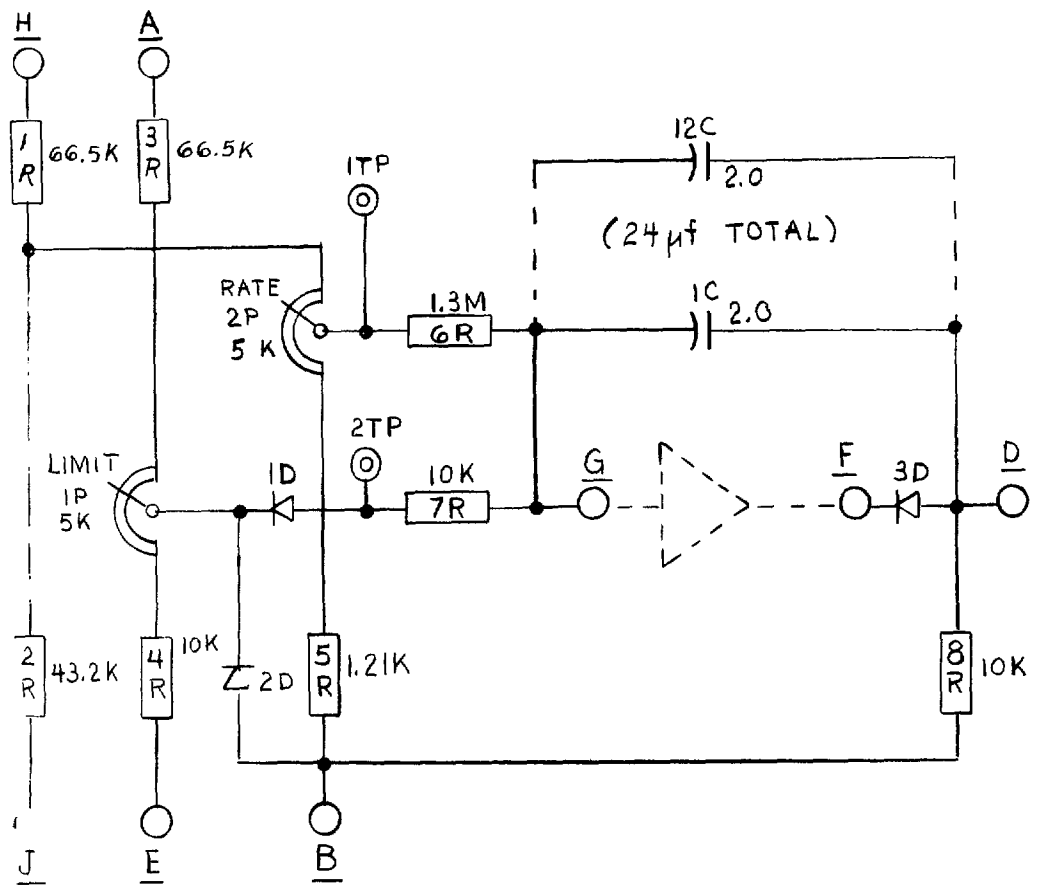
44A300262 CONT ON SHEET SH NO.

TITLE

OVERSPEED INTEGRATOR 1ØSI

FIRST MADE FOR 44D236373-G01

REVISIONS



CONNECTIONS

A +30V
B 0V
C N.C.
D OUTPUT
E SPEED SIGNAL
F AMPLIFIER OUTPUT
G AMPLIFIER INPUT
H POS. SUPPLY THROUGH RELAY
J NEG. SUPPLY THROUGH RELAY

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12P DFB

PRINTS TO

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ISSUED MAR 25 1968

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CODE IDENT NO 2

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GENERAL ELECTRIC

44A300281

REV NO. 0

CONT ON SHEET SH NO

TITLE

REFERENCE LOW VALUE GATE (2LVG)

CONT ON SHEET SH NO.

FIRST MADE FOR 44D236378-G01

REVISIONS

CHANGED 5R, 6R, 8P VALUES BUKOSKEY MAY 5 1968

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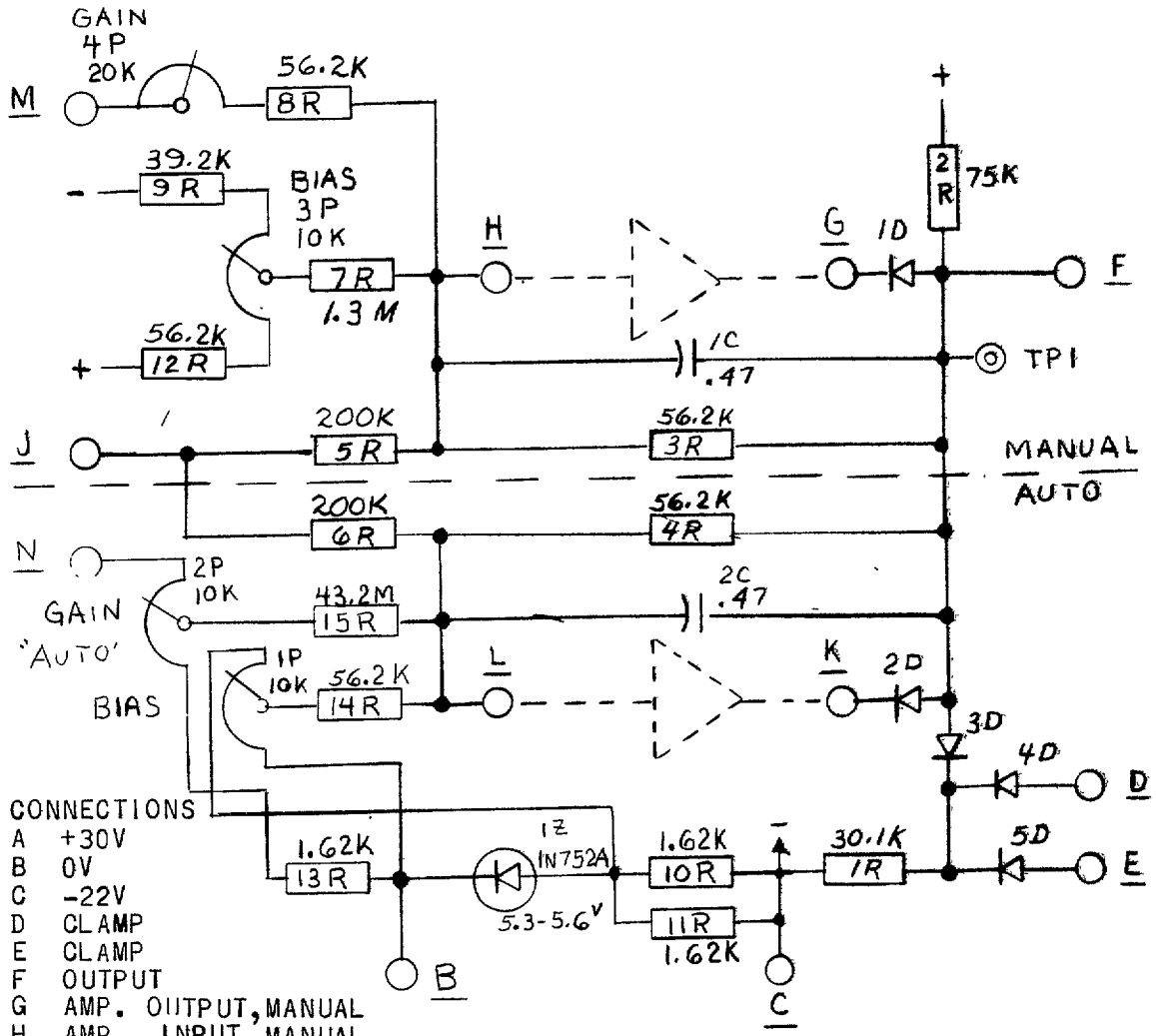

CLAMP NOTE: ZERO VOLTS ON D OR E WILL HOLD OUTPUT (F) AT ZERO.

ADJUSTMENT:

1: WITH AUTO INPUT AT HSS AND MANUAL AT LSS, ADJUST BIAS FOR ZERO OUTPUT AT F.

2: WITH BOTH GAINS MAX. (CW) AND INPUTS AT HSS, ADJUST MANUAL GAIN FOR 5 VOLTS OUTPUT.

3: DECREASE AUTO GAIN UNTIL OUTPUT OF THE ASSOCIATED AMPLIFIER SWITCHES NEGATIVE TO POSITIVE.

4: AUTO BIAS IS SET CCW INITIALLY. FINAL SETTING PER APPLICATION REQUIREMENT.

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12P DFR.

FG-W

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GENERAL ELECTRIC

44A301400 CONT ON SHEET SH NO.

REV NO

44A301400 CONT ON SHEET SH NO.

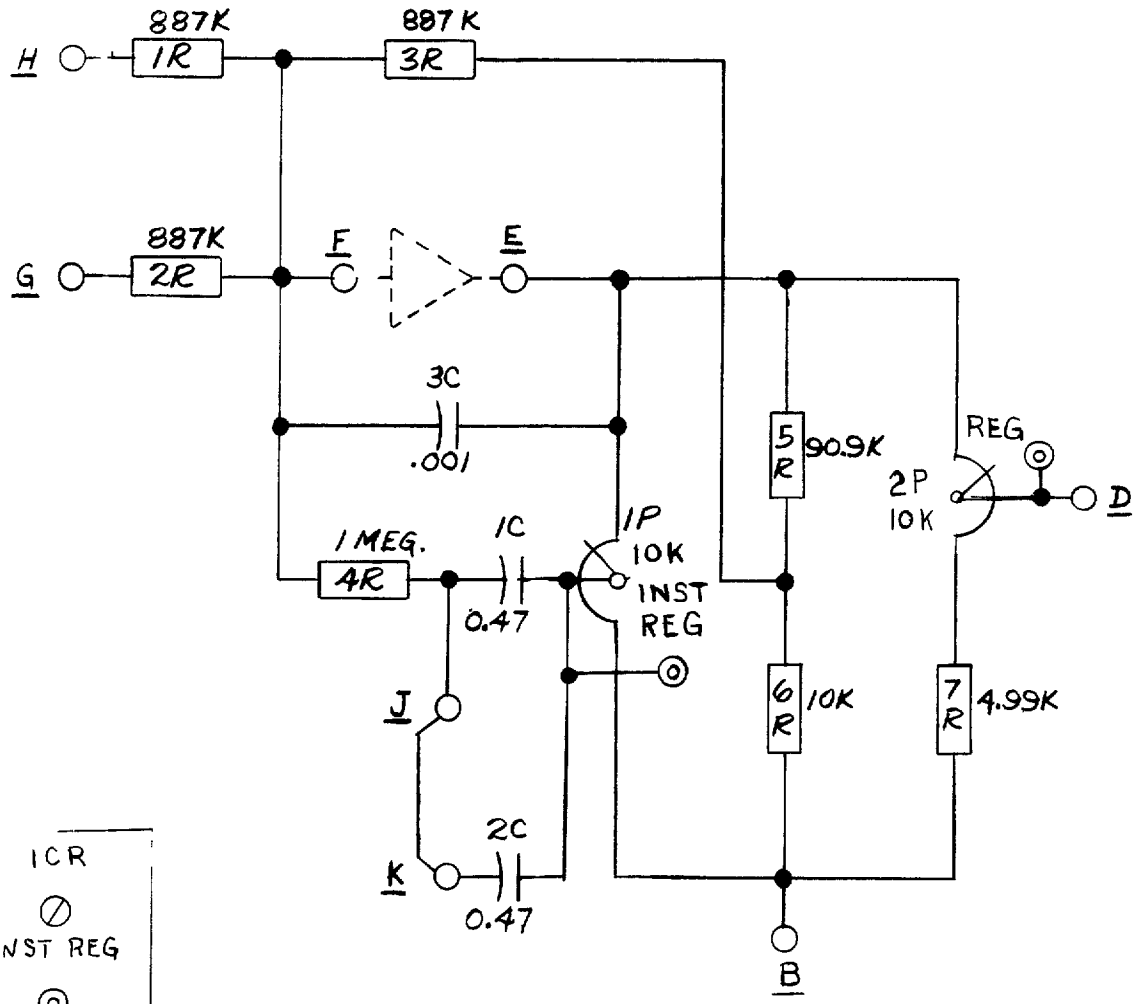
TITLE

COMPENSATION & REGULATION (ICR)

FIRST MADE FOR

REVISIONS

1 R.M. BUKOSKEY APR 1 1969



ICR

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ISSUED FEB 18 1969

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44A301400 CONT ON SHEET SH NO.

CODE IDENT NO

FF-803-WF (9-67)
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TITLE
ALIGNMENT INSTRUCTIONS
ELECTRONIC FEED PUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3, TURBINES 122451 & 122452

REVISIONS

— CONEMAUGH GROUP —

REFERENCE ALIGNMENT DIAGRAM 44D301726

TEST EQUIPMENT

1. AUDIO OSCILLATOR: HEWLETT PACKARD 201C, 200CD; GENERAL RADIO 1210C, OR EQUIVALENT. OUTPUT MUST BE 10 VOLTS RMS MINIMUM INTO 600 OHMS.
2. AC/DC DIGITAL VOLTMETER: 0.1 MV TO 100 V MAX.
3. DIGITAL FREQUENCY COUNTER: 6 VOLT RMS SENSITIVITY. 30 TO 5000 HZ.
4. TEN TURN POTENTIOMETER; NOT MORE THAN 5000 OHMS RESISTANCE.
5. TWO INPUT OSCILLOSCOPE, CALIBRATED SWEEP: X1 AND X10 PROBES.
6. OPTIONAL: BRUSH RECORDER; SPECIAL TESTS ARE DESIRED.
7. VOLT - OHM - MILLIAMMETER

I. PRELIMINARY

1. CHECK INTERCONNECTION OF CONTROL CABINET, OPERATOR'S CONTROL DEVICES, TURBINE DEVICES, ETC.
2. MECHANICALLY ZERO TEST METER IN CABINET AND OPERATOR'S TACHOMETER AND OTHER INSTRUMENTS.

II. LINE POWER SUPPLY 120V, 1Ø, 60HZ.

1. INVERTER OUT: APPLY POWER AND ADJUST INVERTER OUTPUT FOR 38 VOLTS AT D+ & E- IF 1SR, LOC. 0308. THE INVERTERS ARE IN THE BOTTOM OF THE CABINET WITH LINE INVERTER IN BACK AND PMG INVERTER IN FRONT.
2. DC SERIES REGULATORS: ADJUST POWER SUPPLIES AND METER CALIBRATIONS PER CHART

LINE SUPPLY	TEST POINTS	ADJUST
+30V	BUS BARS	0308
-22V	BUS BARS	0316
24V	+F LOC. 0322; -G LOC. 0324	0324

3. METER RELAY ALARMS: VARY ALARM SET POINT OF LINE SUPPLY METER RELAYS TO CHECK ALARM OPERATION. SET ALARMS FOR 95% AND 105%.

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12P-DFB2
FG-W

PRINTS TO

III. 3KHZ OSCILLATOR -0222,0225,0228

MEASURE OUTPUT FREQUENCY AT 0228 WITH COUNTER. IF FREQUENCY IS OUTSIDE LIMITS OF 3000HZ ± 30 HZ REMOVE 0222 AND ADJUST REACTOR.

ADJUST VOLTAGE LEVEL FOR 6.000 ± .006V. SET METER FOR 100%. CHECK METER RELAY ALARMS AND SET AT 95 AND 105 PERCENT.

IV. PMG SPEED MEASURING CIRCUITS

1. FREQUENCY TO VOLTAGE CONVERTER 1FVC, LOC. 0217: ADJUST ZERO FOR ZERO VOLTS TERMINALS D & B.
2. SET-UP: REMOVE LEAD FROM J OF 1FVC, 0217 AND CONNECT AUDIO OSCILLATOR AND COUNTER TO THIS POINT AND B.
3. TACHOMETER: AT RATED PMG FREQUENCY ADJUST OUTPUT I, 0217 FOR RATED RPM TACH INDICATION. SEE ALIGNMENT DIAGRAM.
4. SET VOLTAGE COMPARATOR, LOCATIONS 0218, 0219, AND 0220 PER ALIGNMENT DIAGRAM. CHECK EACH SETTING BY SLOWLY VARYING FREQUENCY ABOUT THE OPERATING POINT. OBSERVE OPERATION WITH OSCILLOSCOPE CONNECTED TO THE OUTPUT TEST POINTS. RELAY DROPOUT IS 0 VOLTS AND PICKUP APPROXIMATELY 0.3 VOLTS.
5. SECOND TACHOMETER 3A02, LOC. 0121: AT 0 FREQUENCY ADJUST B1AS FOR 0 INDICATION. ADJUST GAIN FOR TACH INDICATION PER ALIGNMENT DIAGRAM.
6. REMOVE TEST CONNECTIONS TO 0217 AND RECONNECT LEAD TO TERMINAL J.

V. SSPU SPEED MEASURING CIRCUITS

1. SET-UP: JUMPER T4 TO T7 AND T5 TO T8. CONNECT OSCILLATOR AND COUNTER TO T4 AND T5.
2. FREQUENCY TO VOLTAGE CONVERTERS 1MC, LOC. 0202 AND 0205 HIGH SPEED GATE 1LVG, LOC. 0209

2.1 PRIMARY: AT RATED SHAFT SPEED PICKUP FREQUENCY ADJUST 1MC, LOC. 0202, FOR -5.000 VOLTS AT OUTPUT TESTPOINT OF 1LVG, 0209. (OBSERVE WITH TEST METER IN POSITIONS 6 AND 7 THAT AMPLIFIER 7 IS MORE POSITIVE THAN 6; IF NECESSARY ADJUST 1MC, 0205, TO OBTAIN THIS CONDITION.)

2.2 BACKUP: DEPRESS BACKUP SPEED AMPLIFIER TEST SWITCH AND ADJUST 1MC, 0205, FOR -5.05 VOLTS AT OUTPUT TP, 0209.

3. REMOVE TERMINAL POINT JUMPERS AND OSCILLATOR AND COUNTER LEADS.

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12P-DFB²
FG-W

REVISIONS

VI. CONTROL VALVE RAM SERVO LOOP

1. CHECK LVDT CORE PER LEVER DIAGRAM.
2. DETECTOR INDICATOR 1DI, LOC. 0216.: WITH CONTROL VALVE FULL OPEN ADJUST NULL OF 1DI FOR 0.00 ± 0.01 VOLTS AT OUT TP. NOTE VOLTAGE READING ON ALIGNMENT DIAGRAM. WITH VALVE IN CLOSED OVERTRAVEL POSITION RECORD OUT TP VOLTAGE ON ALIGN. DIAG. ADJUST ZERO FOR 0 INDICATION OF CONTROL VALVE POSITION ON OPERATOR'S CONTROL CONSOLE. RETURN VALVE TO FULL OPEN POSITION AND ADJUST CALIBRATE FOR 100% POSITION INDICATION.
3. DETERMINE GAIN OF DETECTOR CIRCUIT IN VOLTS PER INCH BY DIVIDING THE DIFFERENCE IN OUT TP VOLTS AT EXTREME VALVE POSITIONS BY THE TOTAL VALVE TRAVEL IN INCHES, AND RECORD THIS FIGURE ON THE ALIGNMENT DIAGRAM.
4. MAKE ELECTRICAL CONNECTIONS TO SERVO VALVE.
5. SERVO AMPLIFIER, 2SA, LOC. 0214:

5.1. PS10 TRIP: CHECK FOR APPROX. -0.7 VOLTS AT "I" TP UNDER TRIP CONDITION.

5.2 CLOSE SIGNAL CHECK: WITH TURBINE TRIPPED, DISCONNECT DEMAND TERMINAL E AND LIFT TERMINAL D OF 2SA. CONNECT TEST POT WITH NEGATIVE OUTPUT TO TERMINAL D AND SET POT FOR ABOUT -3 VOLTS AT LIFT TP. THE OUTPUT OF AMPLIFIER 9 ON TEST METER POSITION 9 SHOULD BE ABOUT -10 VOLTS. TURN BIAS ADJUSTMENT CCW UNTIL AMP. 9 GOES TO +10 VOLTS. THERE SHOULD BE LITTLE OR NO CONTROL OF 9 AT INTERMEDIATE VOLTAGES. LEAVE 9 AT +10 VOLTS AND RESET TURBINE. SLOWLY REDUCE TOWARDS 0 THE TEST POT SETTING AND NOTE THAT 9 SWINGS FROM +10 TO A MINIMUM VALUE OF APPROX. -6.2 VOLTS. NOW APPLY MORE MEGATIVE VOLTAGE FROM THE TEST POT AND NOTE THAT 9 HAS A MAXIMUM VALUE OF APPROX. +6.2 VOLTS.

5.3 GAIN: DETERMINE "V" VOLTS LIFT/VOLT I FROM ALIGNMENT DIAGRAM. VARY THE TEST POT SETTING UNTIL I TP IS 0.000 VOLTS AND NOTE LIFT TP VOLTAGE. CHANGE THIS VOLTAGE WITH THE TEST POT BY +V VOLTS. ADJUST GAIN UNTIL I TP READS -1.000 VOLTS. RECHECK 0 POINT, THEN CHANGE LIFT VOLTAGE BY -V VOLTS AND NOTE THAT I TP IS +1.000 VOLTS.

5.4 BIAS: DISCONNECT TEST POT AND RECONNECT THE LEAD REMOVED FROM D. WITH THE VALVE IN THE CLOSED OVERTRAVEL POSITION ADJUST BIAS FOR -0.035 VOLTS AT I TP. RECONNECT TERMINAL E.

6. AFTER REMOVING THE ELECTRICAL CONNECTOR, MOUNT THE SERVO VALVE AND VERIFY THAT THE MECHANICAL BIAS IS IN THE VALVE CLOSING DIRECTION.

11
12P-DFB
FG-W

PRINTS TO

VII. REGULATION AND COMPENSATION-1CR, LOC. 0212

1. REGULATION: SUBSTITUTE THE OUTPUT OF THE TEST POT WITH NEGATIVE SUPPLY FOR THE CONNECTION TO TERMINAL E. ADJJST REGULATION TO OBTAIN VALVE TRAVEL FROM EFFECTIVE ZERO TO FULL LOAD LIFT FOR 3.00 VOLTS CHANGE IN THE OUTPUT OF THE TEST POT.
2. COMPENSATION: VERIFY THAT JUMPER J-K IS CONNECTED PER ALIGNMENT DIAGRAM.
3. INSTANTANEOUS REGULATION: SET TEST POT FOR 1 VOLT OUTPUT AND ADJUST INST. REG. FOR A VOLTAGE EQUAL TO EFF. ROTATION PER ALIGNMENT DIAGRAM.

VIII. MANUAL SPEED REFRENCE (STAND-STILL CHECKS)

1. THIS REFERENCE IS OBTAINED FROM THE UPPER OF THE TWO MOTOR DRIVEN LVDT'S. WHEN POWER IS APPLIED IT SHOULD RUN TO LSS AND LIGHT THE LSS INDICATING LIGHT.
2. SLOW REFERENCE SPEED, 2CL, LOC. 0116.: SHUT OFF HIGH PRESSURE OIL SUPPLY OR DISCONNECT SERVO VALVE BEFORE RAISING MANUAL REFERENCE. ACTUATE RAISE PUSHBUTTON AND TIME TRAVEL TO HSS LIGHT INDICATION. TIME SHOULD BE 80-90 SECONDS. A CLOCK PERIOD OF 40 MILLISECONDS CAN BE MEASURED AT CLOCK TP.
3. FAST REFERENCE SPEED, 2CL, LOC. 0116: ACTUATE LOWER FAST PUSHBUTTON AND TIME MOTOR TRAVEL FROM HSS LIGHT TO LSS LIGHT. IT SHOULD BE 8 TO 10 SECONDS. A CLOCK PERIOD OF 4.17 MILLISECONDS CAN BE MEASURED AT CLOCK TP WHILE LOWER FAST PUSHBUTTON IS ACTUATED.
4. BIAS AND GAIN, MANUAL REFERENCE, 2LVG, LOC. 0113: DISCONNECT K OF 2LVG. RAISE MANUAL REFERENCE FROM LSS AND BACK INTO IT AT SLOW RATE WITH LOWER PUSHBUTTON. ADJUST MANUAL BIAS FOR 0.000 VOLTS AT OUTPUT TP, 0113. RAISE TO HSS AT SLOW RATE AND ADJUST MANUAL GAIN FOR OUTPUT VOLTAGE AT TP 0113 AS SPECIFIED BY ALIGNMENT DIAGRAM.

IX. AUTOSPEED REFERENCE (STAND-STILL CHECK)

1. SET-UP: AUTO REFERENCE CAN BE RUN TO HSS BY JUMPING T31 TO T32 AND TO LSS BY JUMPING T31 TO T33. THE EXTERNAL LEAD FROM THE BOILER CONTROLLER SHOULD BE DISCONNECTED FIRST, HOWEVER.
2. HSS, LSS 2SC, LOC. 0125: WITH AUTO REFERENCE AT LSS, JUMPER T31 TO T32 AND TIME TRAVEL TO HSS. TRAVEL TIME SHOULD BE ADJUSTED TO 40 SECONDS USING FREQUENCY POTENTIOMETER ON 2SC.

REVISIONS

11
12P-DFB²
FG-W

PRINTS TO

3. AUTO SPEED REFERENCE INDICATION, 1DI, LOC. 0128: ADJUST ZERO AT LSS AND CAL AT HSS TO OBTAIN 0 AND 100 INDICATIONS ON OPERATOR'S POSITION INDICATOR.

3.1. 3A02, LOC. 0121: AT HSS ADJUST GAIN OF 1BCI FOR 1MA AT 2A OUT TP.

4. AUTO SPEED REFERENCE STOPS, LSS, 2LVG, LOC. 0113: DISCONNECT G, 0113 AND WITH AUTO REFERENCE AT LSS ADJUST SC BIAS, 0113 FOR OUTPUT TEST POINT VOLTS PER ALIGNMENT DIAGRAM.

5. HSS, 2LVG, LOC. 0113.: WITH AUTO REFERENCE AT HSS ADJUST SC GAIN, 0113 FOR OUTPUT TEST POINT VOLTS PER ALIGNMENT DIAGRAM. RECONNECT G.

6. LOCAL/REMOTE CONTROL LIGHT, 1VC, LOC. 0114.: ADJUST REFERENCE, 0114 FOR 6.5 VOLTS AT L TP. CHECK THAT LOCAL CONTROL INDICATION IS OBTAINED WHEN AUTO REFERENCE IS AT LSS AND MANUAL REFERENCE IS BELOW APPROXIMATELY 50% POSITION.

X. OVERSPEED TEST INTEGRATOR, 10SI, LOC. 0109

1. RATE: CONNECT VOLTMETER TO OUTPUT TEST POINT 2LVG, 0113. WITH MANUAL AND AUTO REFERENCE AT HSS, ACTUATE OVERSPEED TRIP TEST PUSHBUTTON. VOLTMETER READING SHOULD INCREASE 0.6 ± 0.1 VOLTS PER MINUTE FOR 12 ± 2% SPEED INCREASE PER MINUTE. ADJUST RATE, 0109 AS REQUIRED.

2. LIMIT: CONNECT OSCILLATOR AND COUNTER TO T4 AND T5. SET FREQUENCY FOR 120% SSPU FREQUENCY. OVSERVE OUTPUT OF AMPLIFIER 5 WITH TEST METER. ACTUATE OTT PUSHBUTTON AND ADJUST LIMIT, 0109 FOR POINT AT WHICH AMPLIFIER SWITCHES FROM POSITIVE SATURATION TO ZERO VOLTS. CHECK BY REDUCING OSCILLATOR FREQUENCY AND SLOWLY INCREASING IT TO THE SWITCHING POINT FREQUENCY.

3. 120% SPEED INDICATION, 1VC, LOC. 0210.: WITH OSCILLATOR AT 120% SSPU FREQUENCY ADJUST REFERENCE, FOR DROPOUT. CHECK BY VARYING FREQUENCY.

4. HIGH SPEED REFERENCE LIGHT, 1VC, LOC. 0115.: ADJUST REFERENCE OF 1VC FOR +5 VOLTS. CHECK FOR DROPOUT AT OUTPUT TEST POINT WHEN AMPLIFIER 5 SWITCHES UPON ACTUATING OTT.

11
12P-DFB3
FG-W

REV NO

TITLE
ALIGNMENT INSTRUCTIONS
ELECTRONIC FEED PUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3, TURBINES 122451 & 122452

44A301479
CONT ON SHEET FNL SH NO 6

REVISIONS

XI. STOP VALVE POSITION INDICATOR, 1DI, LOC. 0102.
WITH STOP VALVE FULLY CLOSED ADJUST DIFF. TRANS. NULL FOR -3 VOLTS AT OUT TP AND METER ZERO FOR 0 POSITION. ADJUST CAL. FOR 100% WITH VALVE FULL OPEN.

XII. PMG POWER SUPPLY

1. INVERTER ADJUSTMENT: WITH THE TURBINE RUNNING AT 70 TO 100% RATED SPEED ADJUST THE PMG INVERTER (BOTTOM FRONT) FOR 38 VOLTS MEASURED AT D+ AND E-, 1SR, LOC. 0310.

2. INDIVIDUAL POWER SUPPLIES: ADJUST THE INDIVIDUAL POWER SUPPLY LEVELS UNTIL THE LINE SUPPLIES ARE CARRYING ONLY 0.1 AMPS AND THE PMG SUPPLIES ARE CARRYING THE REST OF THE LOAD. WHILE NOTING THAT THIS CONDITION IS MAINTAINED MAKE FINAL VOLTAGE LEVEL AND METER CALIBRATION ADJUSTMENTS. ALSO TEST AND SET METER RELAY ALARMS AT 95 AND 105%.

SUPPLY	LOCATION		TEST POINTS
	PMG.	LINE	
+30	0310	0308	BUS BARS
-22	0318	0316	BUS BARS
24	0326	0324	PMG +F, 0328; -G, 0326 LINE +F, 0322; -G, 0324

XIII SEE LEVER DIAGRAM FOR RUNNING CHECKS OF SPEED REGULATION.

XIV HP STOP VALVE POSITION INDICATOR 1DI, LOC. 0104.
SAME AS XI.

11
12P-DFB²
FG-W

PRINTS TO

MADE BY [signature] 7-2-69
ISSUED DEC 3 1969
APPROVALS
COMM. & CONTROL DEVICES DEPT. DIV OR DEPT
LOCATION
44A301479
CONT ON SHEET FNL SH NO 6

FF-803 WF (2-68)
PRINTED IN U S A

CODE IDENT NO 3

GENERAL ELECTRIC

44A302609

CONT ON SHEET SH NO

REV NO.

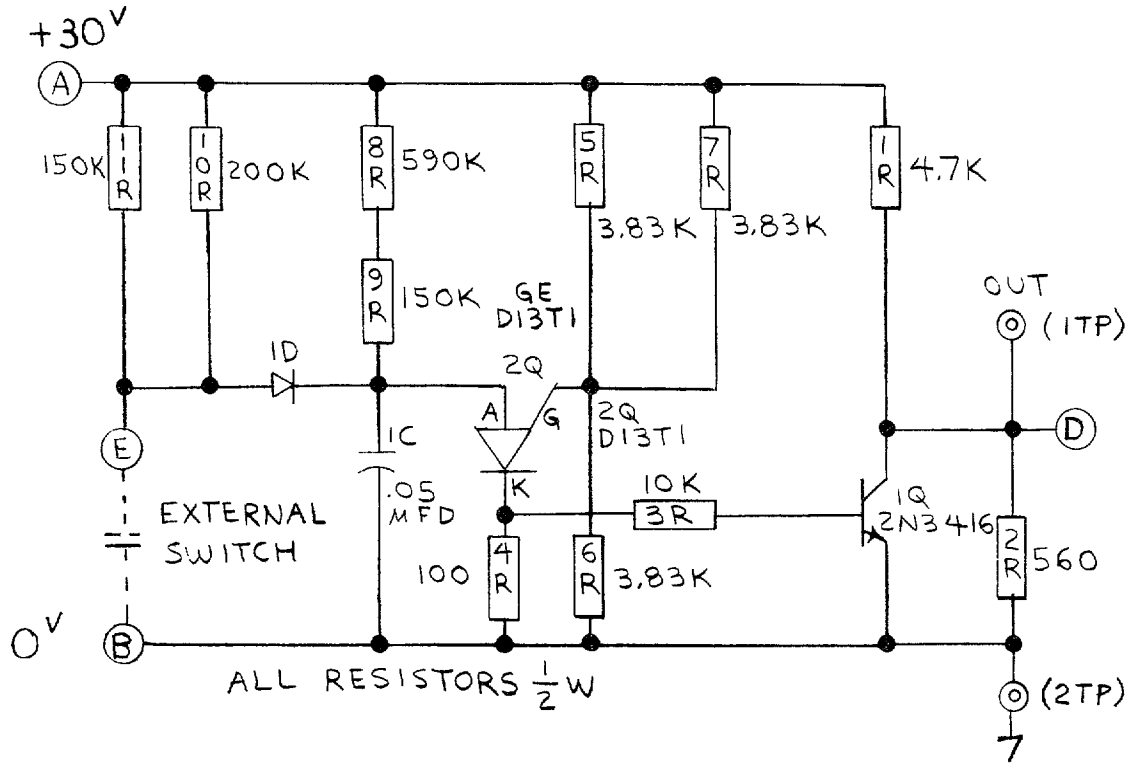
CONT ON SHEET SH NO

TITLE

CLOCK (2CL)

FIRST MADE FOR 3S7513TC300

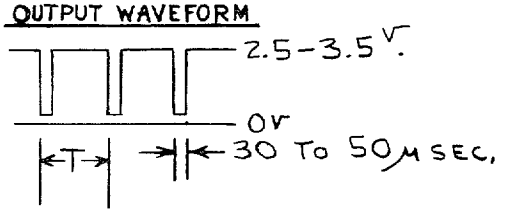
REVISIONS



THIS RELAXATION OSCILLATOR DEPENDS UPON THE CHARACTERISTICS OF PROGRAMMABLE UNIJUNCTION TRANSISTOR 2Q FOR ITS OPERATION. 1C CHARGES UNTIL ANODE VOLTAGE EXCEEDS GATE VOLTAGE BY A DIODE DROP AT WHICH TIME 2Q TURNS ON DISCHARGING 1C THROUGH 4R TURNING ON 1Q. AFTER DISCHARGE, THE ANODE CURRENT FROM 8R-11R IS LESS THAN HOLDING CURRENT OF 2Q, WHICH TURNS OFF AND THE CAPACITOR AGAIN CHARGES.

SWITCH	T
CLOSED	37-44 MSEC.
OPEN	4.17-4.6 MSEC.

OUTPUT WAVEFORM



11
12P-DFB2
FG-W

PRINTS TO

MADE BY J. Wordsley JUN 6 1969

ISSUED JUN 10 1969

APPROVALS

SPECIALTY CONTROL DIV OR DEPT

WAYNESBORO, VA. LOCATION

44A302609

CONT ON SHEET SH NO

CODE IDENT NO.

FF-803-WF (2-68)

PRINTED IN U.S.A.

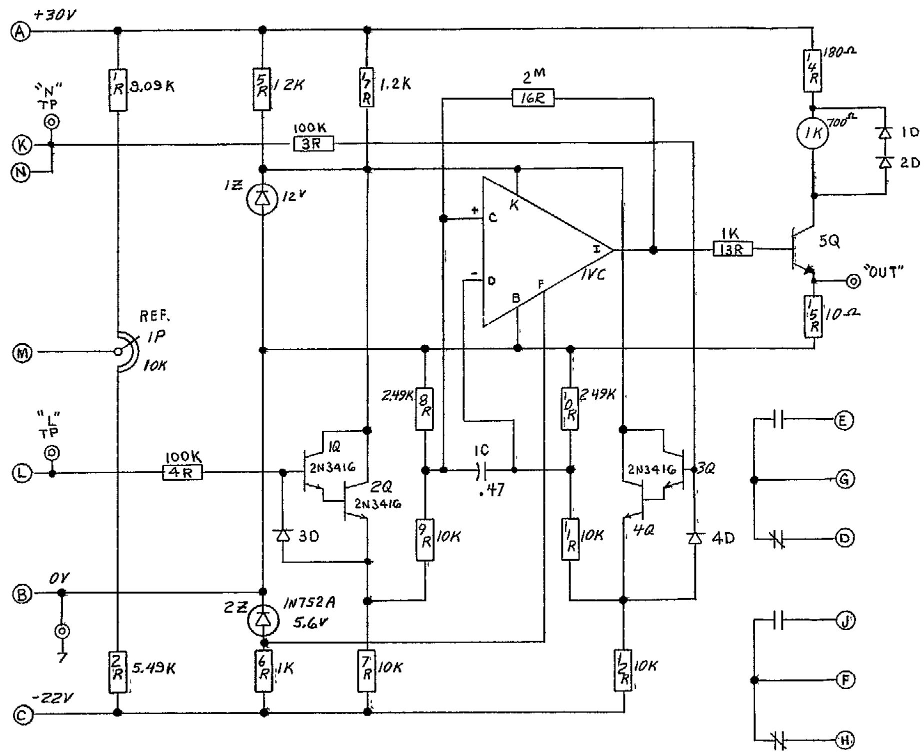
4

GENERAL ELECTRIC 44C300607

TITLE VOLTAGE COMPARATOR 1VC

FIRST MADE FOR 44D381582-G01

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±



CONNECTIONS

A +30V
B 0 V
C -22V
D
E
F
G
H
J

N, K INPUT
L SEE NOTE 2
M

NOTES:

1. IN NORMAL OPERATION THE RELAY IS ENERGIZED. IT CAN BE ADJUSTED TO DROPOUT ON EITHER INCREASING OR DECREASING SIGNALS BETWEEN PLUS AND MINUS 10 VOLTS.

2.

DROPOUT ON	INPUT	JUMPER	REF. TP
INCREASING SIGNAL	N	L-M	L
DECREASING SIGNAL	L	N-M	N

DROPOUT N>L

3. RELAY CONTACTS RATED 2A, 28VDC.

FACEPLATE: 1VC OUT, N, L, REF

REVISIONS

		PRINTS TO
1	MAY 28 1968	11
2	RM 1968	12P DB
3	ADDED 3R, 4R, 17R 3D, 4D DEC 6 1968	FG-W 29

MADE BY J. C. Glenn JAN 23 1968 — ISSUED APR 2 1968 — SPECIALTY CONTROL DEPT. WAYNESBORO, VA. — 44C300607

GENERAL ELECTRIC

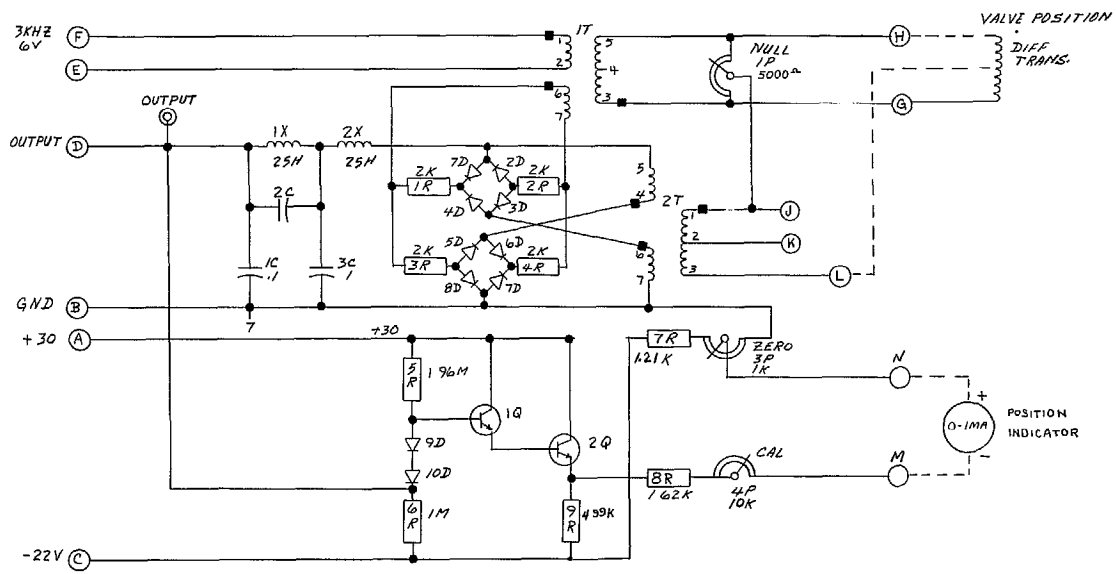
44C300609 CONT ON SHEET SH NO

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE: DETECTOR INDICATOR 1DI

FIRST MADE FOR 44D381585-G01



NOTES:

1. CONNECTIONS

A	+30V	G, H, J, K, L	DIFFERENTIAL TRANSFORMER CONNECTIONS
B	GROUND		
C	-22V		
D	OUTPUT		
E, F	6V, 3 KHZ	M, N	OUTPUT METER 0-1MA

REVISIONS			PRINTS TO
1	RMB	NOV 19 1968	11
2	RMB	MAY 15 1969	FG-W
3	V Mapes	OCT 19 1969	12P DFB
			29VN

R. W. Templeton JAN 23 1968 ISSUED APR 17 1968

APPROVALS: LBC

SPECIALTY CONTROL DIV OR DEPT WAYNESBORO, VA LOCATION

44C300609 CONT ON SHEET SH NO

REV NO 0

44C300609

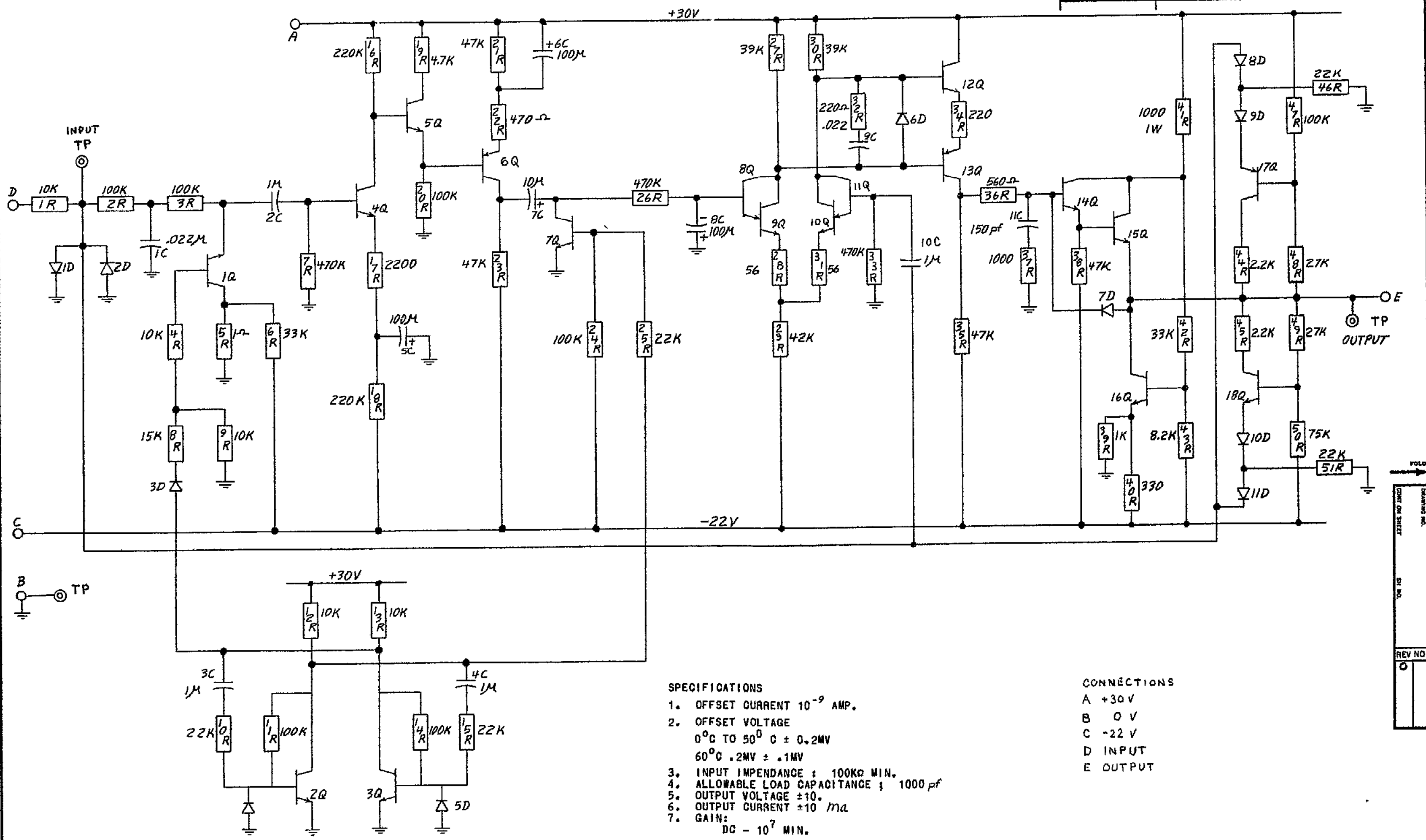
GENERAL ELECTRIC

44C300610 10A

TITLE: CHOPPER STABILIZED OPERATIONAL AMPLIFIER

FIRST MADE FOR 44D381589-G01

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±



SPECIFICATIONS

1. OFFSET CURRENT 10^{-9} AMP.
2. OFFSET VOLTAGE
   $0^{\circ}C$ TO 50° C ± 0.2MV
   $60^{\circ}C$ .2MV ± .1MV
3. INPUT IMPENDANCE : 100KΩ MIN.
4. ALLOWABLE LOAD CAPACITANCE ; 1000 pf
5. OUTPUT VOLTAGE ±10.
6. OUTPUT CURRENT ±10 ma
7. GAIN:
   DC – 10^{7} MIN.
   AC – 5000 MIN. AT 100 CPS
   CHARACTERISTIC: BREAK FREQUENCY – 250 CPS
   20 db PER DECADE TO CROSSOVER.
8. CHOPPER STABILIZER RECOVERY TIME: 1 MINUTE
9. POWER REQUIREMENTS: 30 VOLTS – 25 ma
   -22 VOLTS – 20 ma
10. AMPLIFIER PROTECTION:
    A. OUTPUT CURRENT LIMITED TO APPROX 10 ma
    B. OUTPUT LIMITED TO 10 VOLTS
    C. ALLOWABLE INPUT VOLTAGE BEFORE DAMAGE – 70 VOLTS.

CONNECTIONS
A +30 V
B 0 V
C -22 V
D INPUT
E OUTPUT

REVISIONS | PRINTS TO: 11, 12P-DFB, 29VN

REV NO 0

MADE BY J. C. Glenn JAN 22 1968 | ISSUED MAR 12 1968 | APPROVALS | SPECIALTY CONTROL DEPT, WAYNESBORO, VA. | 44C300610

FF-809-F (9-67) PRINTED IN U.S.A.

GENERAL ELECTRIC

44C300611

TITLE 3 KHZ OSCILLATOR 1ØSC, 2ØSC, 3ØSC

FIRST MADE FOR #1-44D236366-G01; #2-44D381586-G01 #3-44D236368-G01

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:—

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS FRACTIONS	DECIMALS	ANGLES
	✓	+ −	+ −	+ −

NOTES

1. THIS CIRCUIT IS COMPOSED OF 3 BOARDS

CONNECTIONS

BOARD 1	BOARD 2	BOARD 3
A —	—	METER RELAY
B GROUND	GROUND	GROUND
C -22V	-22V	-22V
D F OF #2	D OF #3	D OF #2
E FEEDBACK	E OF #3	E OF #2
F FEEDBACK	D OF #1	E OF #1
G FEEDBACK		OUTPUT
H FEEDBACK		OUTPUT
J		-22 & OUTPUT
K		-22 & OUTPUT
L		G OF #1
M		H OF #1
N		F OF #1

OPERATION:

THIS OSCILLATOR CONSISTS OF 3 CIRCUIT BOARDS. BOARD 1 IS THE OSCILLATOR CONSISTING OF 1Q AND ASSOCIATED CIRCUITRY. FREQUENCY OF OSCILLATION IS SET BY VARIABLE INDUCTOR 2X. AMPLITUDE IS CONTROLLED BY 1Q BIAS, ADJUSTED WITH 1P. A PREAMPLIFIER CONSISTING OF 2Q,3Q AND 4Q IS TRANSFORMER COUPLED TO THE POWER AMPLIFIER ON BOARD 2. NEGATIVE FEEDBACK FROM THE OUTPUT IS FED IN THROUGH 15R. THE POWER AMPLIFIER CONSISTS OF PUSH-PULL TRANSISTORS 101Q AND 102Q. IT FEEDS THE OUTPUT TRANSFORMER ON BOARD 3. A SECOND TRANSFORMER ON BOARD 3 FEEDS A FULL WAVE RECTIFIER ON BOARD 1 TO CONTROL BIAS OF 1Q AND THE OUTPUT LEVEL AT 6 VOLTS RMS.

ADJUSTMENT:

1.0 PRELIMINARY

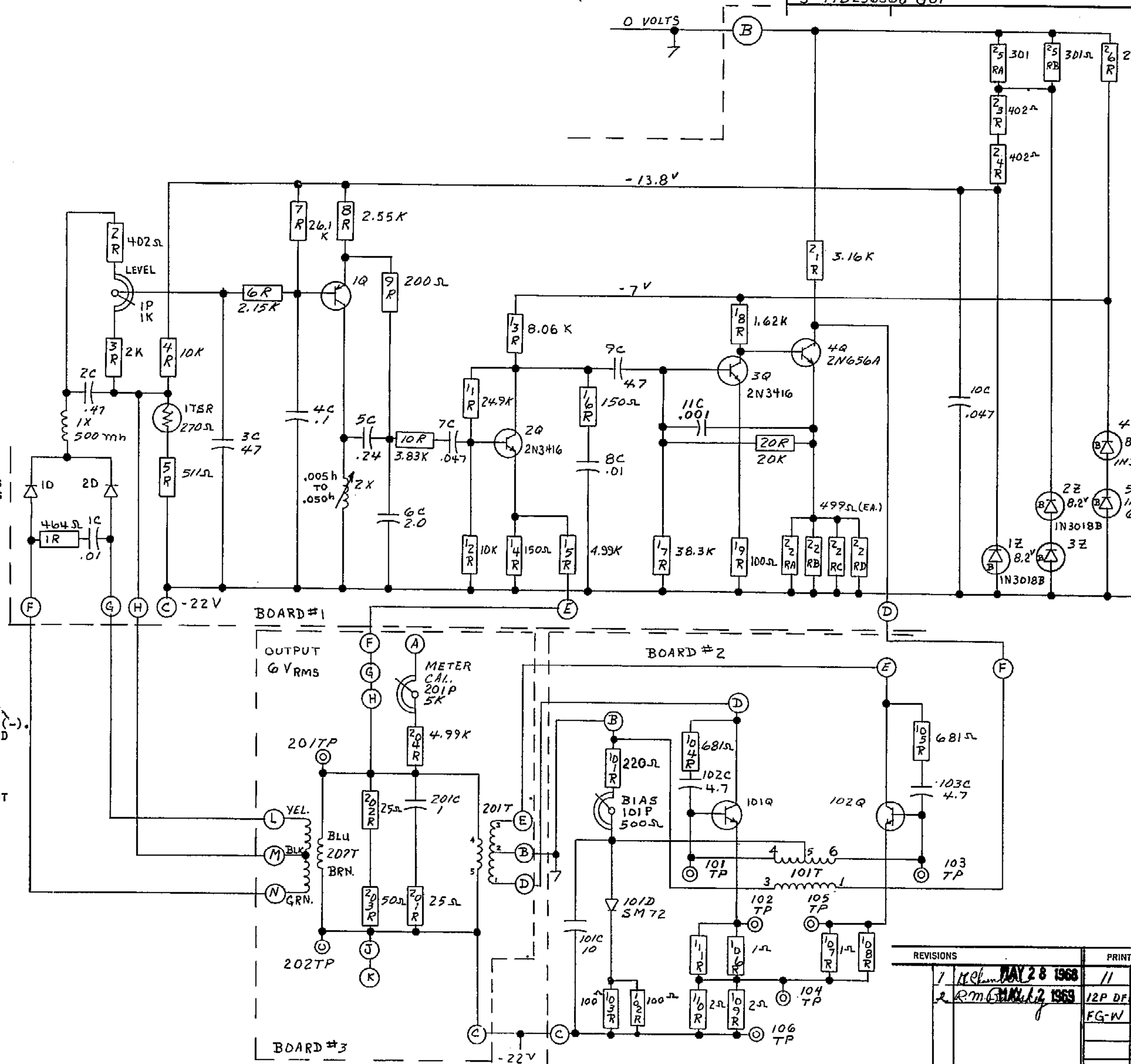
1P NONE REQUIRED
101P EXTREME CCW
201P NONE REQUIRED
2X MID RANGE (DO NOT FORCE)

2.0 ADJUST 2X FOR OSCILLATION AT 3KHZ.

3.0 ADJUST 101P FOR 0.8 VOLTS 104TP (+) TO 106TP(−). NOTE VOLTAGE 102TP TO 105TP SHOULD NOT EXCEED ± .040 VOLTS.

4.0 ADJUST 1P FOR OUTPUT OF 6VOLTS RMS AT TEST POINTS ON BOARD 3.

5.0 ADJUST 201P TO CALIBRATE EXTERNAL 1 MA OUTPUT METER.



REVISIONS	PRINTS TO
1 MAY 28 1968	11
2 MAY 12 1969	12P DFB
	FG-W

L. W. Templeton JAN 29 1968
ISSUED MAR 12 1968
SPECIALTY CONTROL DIV OR DEPT
WAYNESBORO, VA. LOCATION
44C300611 CONT ON SHEET — SH NO.
REV NO. 0

FF-609-F (9-67) PRINTED IN U.S.A.

GENERAL ELECTRIC

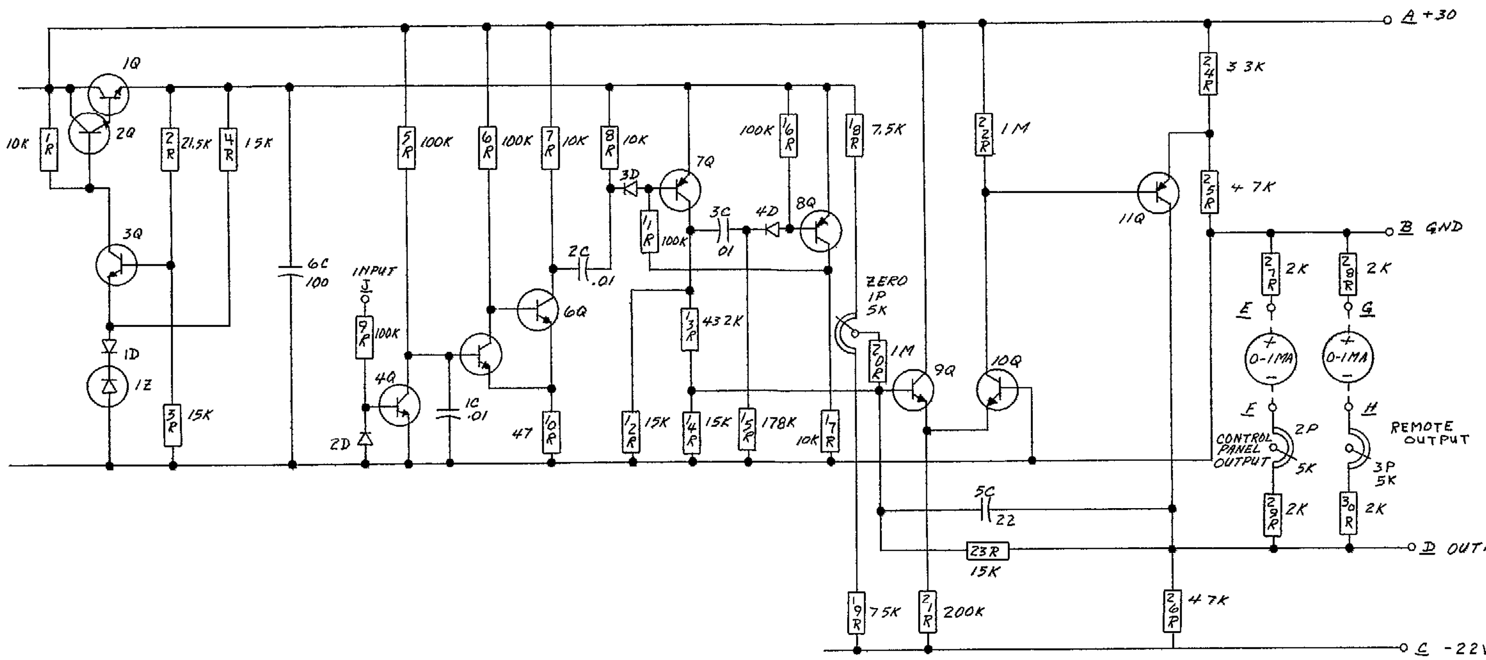
44C300612

TITLE FREQUENCY - VOLTAGE CONVERTER

1FVC

FIRST MADE FOR 44D236365-G01

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±



NOTES:

1. INPUT FREQ: 0-550 Hz,
   INPUT VOLTAGE: 1-150 V

   OUTPUT: TWO 1 MA. METERS AND APPROX. 5V @ 500Hz INTO 5K.

2. PIN CONNECTIONS

A	+30V		
B	GND		
C	-22V		
D	OUTPUT		
E	+	CONTROL PANEL	
F	-	INDICATOR	0-1MA
G	+	REMOTE	
H	-	INDICATOR	0-1MA
J	INPUT		

REVISIONS

PRINTS TO

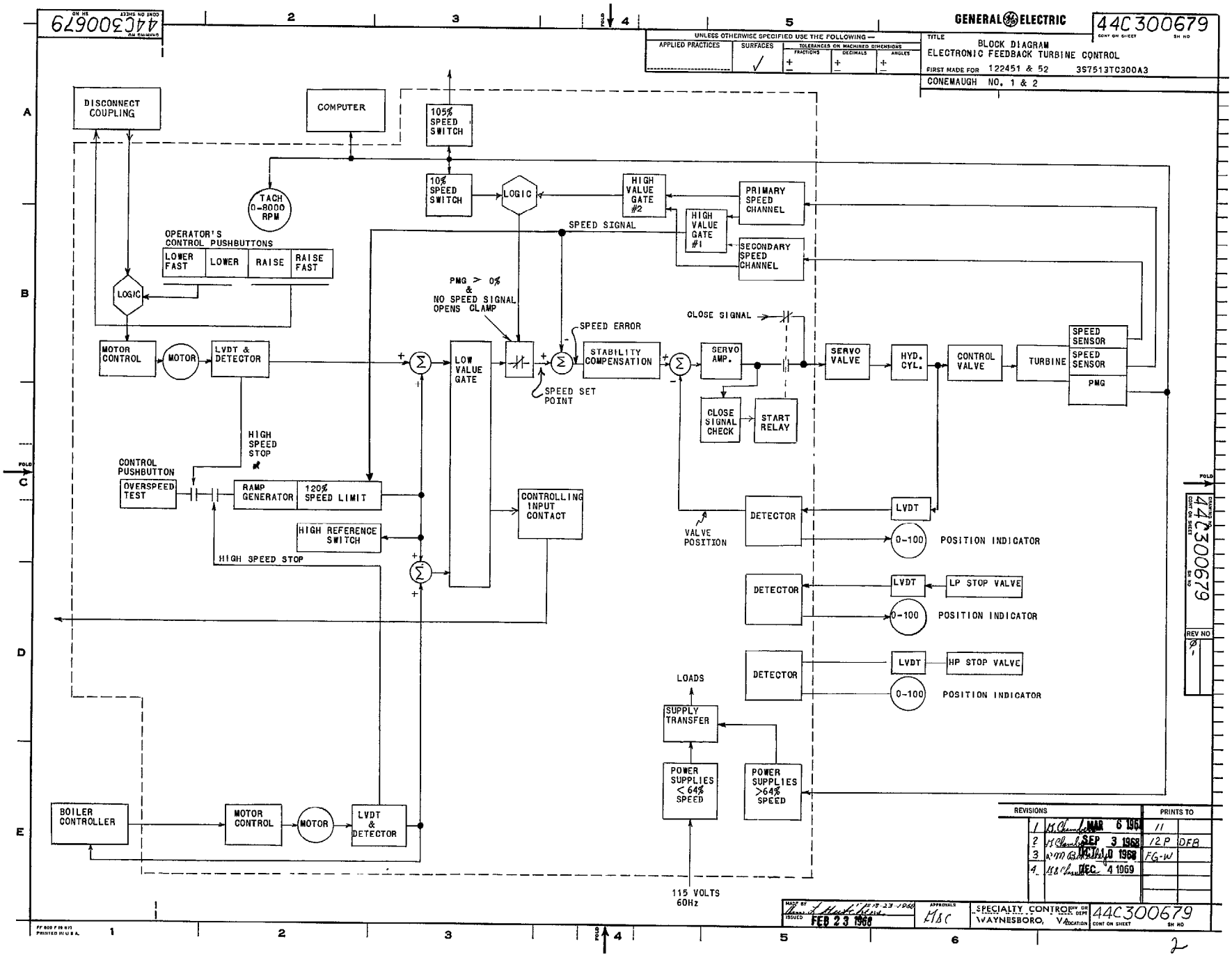
MADE BY H. W. Templeton JAN 26 1968

ISSUED APR 2 1968

APPROVALS

SPECIALTY CONTROL DEPT. WAYNESBORO, VA.

44C300612


44C300679
GENERAL ELECTRIC
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES
SURFACES
TOLERANCES ON MACHINED DIMENSIONS
FRACTIONS
DECIMALS
ANGLES
TITLE
BLOCK DIAGRAM
ELECTRONIC FEEDBACK TURBINE CONTROL
FIRST MADE FOR 122451 & 52 357513TC300A3
CONEMAUGH NO. 1 & 2
DISCONNECT COUPLING
COMPUTER
105% SPEED SWITCH
10% SPEED SWITCH
LOGIC
HIGH VALUE GATE #2
HIGH VALUE GATE #1
PRIMARY SPEED CHANNEL
SECONDARY SPEED CHANNEL
SPEED SIGNAL
TACH 0-8000 RPM
OPERATOR'S CONTROL PUSHBUTTONS
LOWER FAST
LOWER
RAISE
RAISE FAST
LOGIC
PMG > 0% & NO SPEED SIGNAL OPENS CLAMP
SPEED ERROR
CLOSE SIGNAL
MOTOR CONTROL
MOTOR
LVDT & DETECTOR
LOW VALUE GATE
STABILITY COMPENSATION
SERVO AMP.
SERVO VALVE
HYD. CYL.
CONTROL VALVE
TURBINE
SPEED SENSOR
SPEED SENSOR
PMG
SPEED SET POINT
CLOSE SIGNAL CHECK
START RELAY
HIGH SPEED STOP
CONTROL PUSHBUTTON
OVERSPEED TEST
RAMP GENERATOR
120% SPEED LIMIT
HIGH REFERENCE SWITCH
HIGH SPEED STOP
CONTROLLING INPUT CONTACT
VALVE POSITION
DETECTOR
LVDT
0-100
POSITION INDICATOR
LP STOP VALVE
HP STOP VALVE
LOADS
SUPPLY TRANSFER
POWER SUPPLIES < 64% SPEED
POWER SUPPLIES >64% SPEED
BOILER CONTROLLER
MOTOR CONTROL
MOTOR
LVDT & DETECTOR
115 VOLTS 60Hz
REVISIONS
PRINTS TO
1 MAR 6 1969 11
2 SEP 3 1969 12P DFB
3 OCT 10 1969 FG-W
4 DEC 4 1969
MADE BY
ISSUED FEB 23 1968
APPROVALS
MAC
SPECIALTY CONTROL DEV. DEPT
WAYNESBORO, VA LOCATION
44C300679
CONT ON SHEET
SH NO
REV NO
FOLD

GENERAL ELECTRIC

44C300613

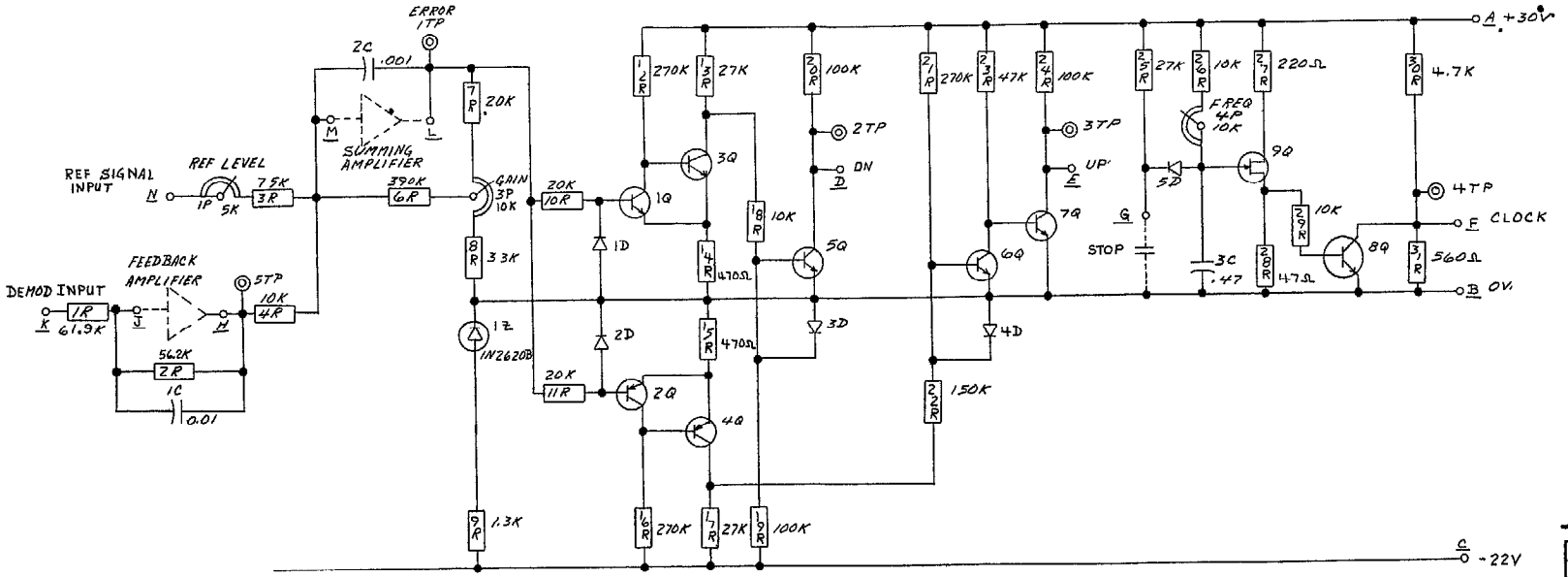
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS FRACTIONS ±	DECIMALS ±	ANGLES ±
	✓			

TITLE

SIGNAL CONVERTER (ISC)

FIRST MADE FOR 44D236367-G01



NOTES:

1. CONNECTIONS

A	+30V	H	OUT	FEEFBACK AMPLIFIER
B	0V	J	IN	
C	-22V	K	DEMOD. INPUT	
D	UP STEER	L	OUT	SUMMING AMPLIFIER
E	DN STEER	M	IN	
F	CLOCK	N	REF. INPUT	
G	STOP			

2. THIS BOARD COMPARES THE SPEED CONTROL SIGNAL FROM THE BOILER CONTROL EQUIPMENT, (N), WITH THE DIFFERENTIAL TRANSFORMER REFERENCE, (K). THE ERROR IS AMPLIFIED AND USED TO SWITCH (D) FROM +30V TO 1V FOR A POSITIVE ERROR AND TO SWITCH (E) FOR A NEGATIVE ERROR. THE REFERENCE TRANSFORMER DRIVE MOTOR IS STEPPED BY PULSES FROM THE CLOCK PULSE GENERATOR 8Q & 9Q. CONNECTING G TO GROUND WILL STOP THE CLOCK.

3. SEE 44C300615 FOR STEPPING MOTOR DRIVE

REVISIONS

1	MAY 23 1969	
2	May 23 1969	

PRINTS TO

11	
12P-DFB	
FG-W	

DRAWN M. W. Templeton JAN 26 1968

TRACED APR 2 1968

APPROVALS

SPECIALTY CONTROL DIV. OR DEPT. WAYNESBORO, VA. LOCATION

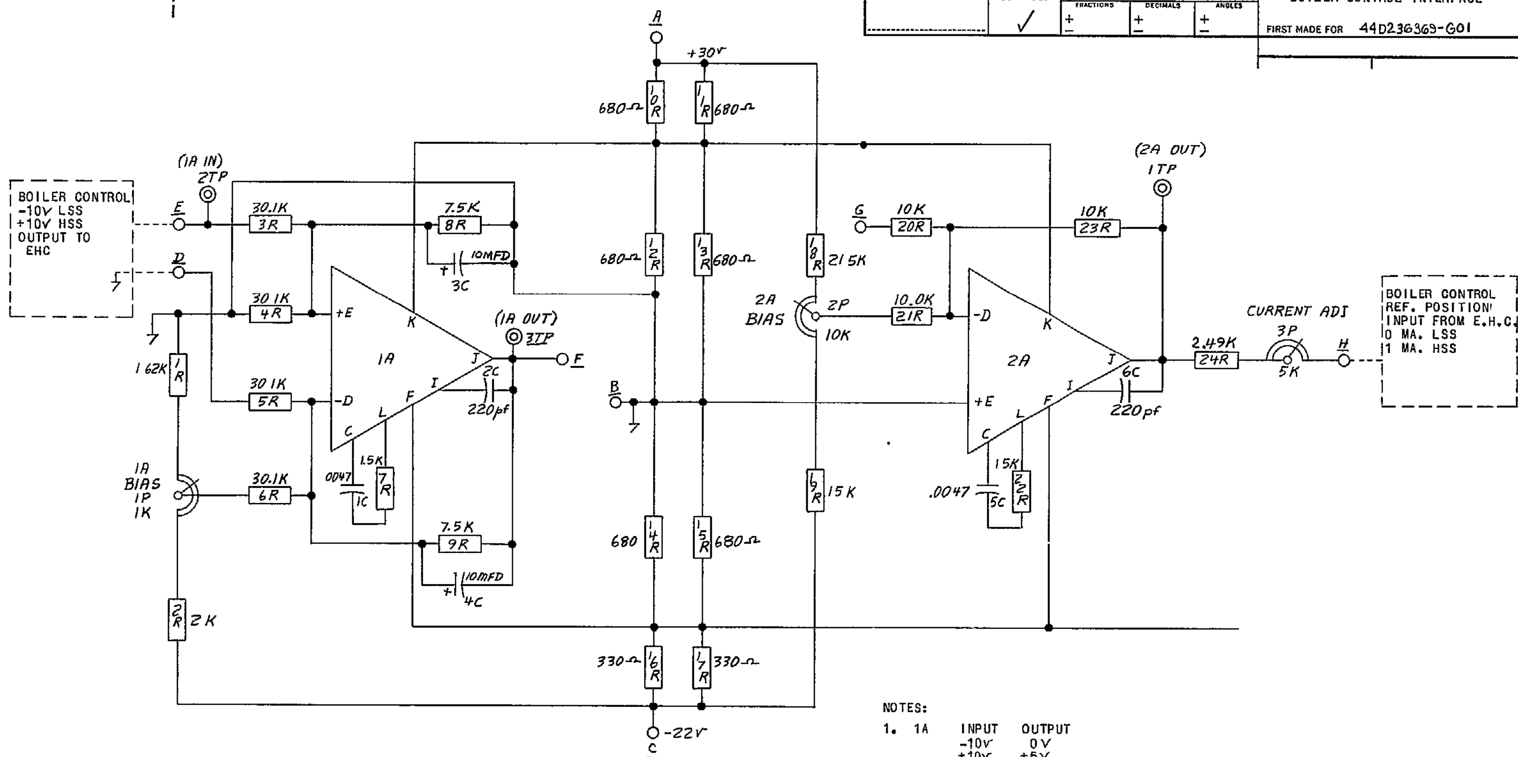
44C300613 CONT. ON SHEET SH. NO.

GENERAL ELECTRIC 44C300614

TITLE BOILER CONTROL INTERFACE — IBCI

FIRST MADE FOR 44D236369-G01

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES; SURFACES ✓; TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ±, DECIMALS ±, ANGLES ±



NOTES:

1. 1A — INPUT / OUTPUT: -10V / 0V; +10V / +5V
   BIAS RANGE APPROX. 7V -12V AT INPUT
2. 2A — IN / OUT: 0 / 0; -5 / +5V
3. CONNECTIONS
   - A +30V
   - B GROUND
   - C -22V
   - D BOILER CONTROL GND
   - E INPUT FROM BOILER CONTROL
   - F AMPLIFIED BOILER CONTROL SIGNAL
   - G EHC REF
   - H REF POSITION OUTPUT TO BOILER CONTROL

REVISIONS: 1 ... AUG 18 1969 — PRINTS TO: // Drd 12P

REV NO 0

MADE BY J.C. Glenn JAN 23 1968 — ISSUED MAR 12 1968 — APPROVALS RC — SPECIALTY CONTROL DEPT, WAYNESBORO, VA. — 44C300614

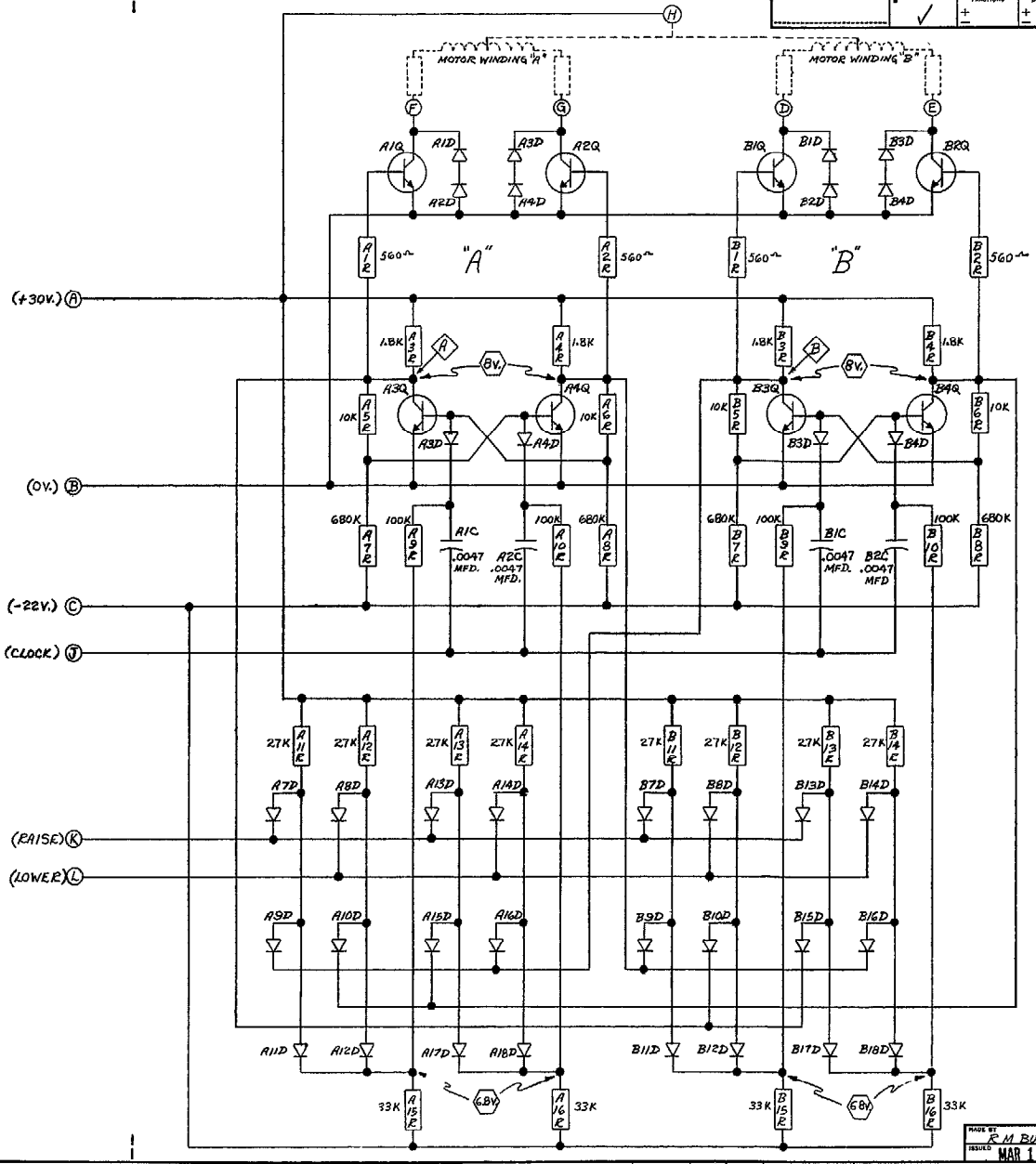
GENERAL ELECTRIC

44C300615

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES | SURFACES | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±

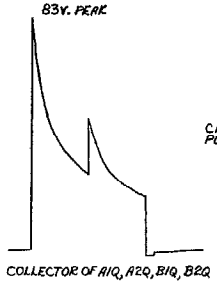
TITLE
STEPPING MOTOR DRIVE

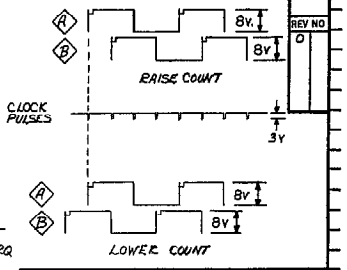
FIRST MADE FOR 44D381580-G01



OPERATION NOTES

1. THIS BOARD CONSISTS OF TWO FLIP-FLOPS "A" & "B" WITH DIODE LOGIC TO FORM A REVERSIBLE COUNTER. OUTPUT OF THE FLIP-FLOPS FEEDS POWER AMPLIFIERS A1Q, A2Q, B1Q, & B2Q. THE STEPPING MOTOR WINDINGS ARE CONNECTED DIRECTLY TO THE COLLECTORS OF THESE FOUR TRANSISTORS.
2. THE CLOCK PULSES ARE THREE VOLTS AMPLITUDE WITH FAST FALL TIME. NORMAL CLOCK FREQUENCY IS 240 PULSES PER SECOND.
3. RAISE COUNTING RESULTS FROM 0 TO 1 VOLT ON TERMINAL (K) & +6 VOLTS OR MORE ON TERMINAL (L). REVERSING THE VOLTAGE ON TERMINALS (K) & (L) RESULTS IN LOWER COUNTING. A POSITIVE VOLTAGE ON TERMINAL (K) & (L) WILL INHIBIT COUNTING. 0 TO 1 VOLT ON BOTH (K) & (L) IS NOT PERMISSIBLE.





REVISIONS | PRINTS TO

12P DFB

MADE BY R M BUKOSKY 11-26-67
ISSUED MAR 12 1968
APPROVALS
SPECIALTY CONTROL DIV. OR DEPT. WAYNESBORO, VA LOCATION

44C300615 CONT ON SHEET SH NO

44C300615 REV NO 0

GENERAL ELECTRIC

44C300886 CONT ON SHEET 1A SH NO. 1

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±

TITLE
ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3 122451 & 122452
CONEMAUGH NO. 1

PRINTED CIRCUIT BOARD LOCATIONS

RACK 1

Slot	Function	Board
1–2	LP STOP VALVE	1DI
3–4	HP STOP VALVE	1DI
5		
6		
7		
8–9	OVERSPEED TEST	1ØSI
10	OVERSPEED TEST	1ØA
11	REF. LVG	1ØA
12	REF. LVG	1ØA
13	REF. LVG	2LVG
14	LOCAL	1VC
15	REF. HI	1VC
16	MANUAL REF.	2CL
17	MANUAL REF.	1SMD
18–19	MANUAL REF.	1DI
20–21	AUTO REFERENCE	3AØ2
22	AUTO REFERENCE	
23	AUTO REFERENCE	1ØA
24–25	AUTO REFERENCE	2SC
26	AUTO REFERENCE	1SMD
27–28	AUTO REFERENCE	1DI

RACK 2

Slot	Function	Board
1–3	PRI SPEED	1MC
4–6	SEC. SPEED	1MC
7	SIGNAL LVG	1ØA
8	SIGNAL LVG	1ØA
9	SIGNAL LVG	1LVG
10	120% SPEED	1VC
11	REGULATION & COMPENSATION	1ØA
12	REGULATION & COMPENSATION	1CR
13–14	SERVO VALVE LOOP	2SA
15–16	SERVO VALVE LOOP	1DI
17	SERVO VALVE LOOP	1FVC
18	SPEED SENSING 10%	1VC
19	SPEED SENSING 60%	1VC
20	SPEED SENSING 105%	1VC
21–23	3KHZ OSC	1ØSC
24–25	3KHZ OSC	2ØSC
26–28	3KHZ OSC	3ØSC

RACK 3

Slot	Function	Board
1		1DB
2		1DB
3		1DB
4		
5–6	30 VOLT SUPPLY (LINE)	1REC
7–8	30 VOLT SUPPLY (LINE)	1SR
9–10	30 VOLT SUPPLY (PMG)	1SR
11–12	30 VOLT SUPPLY (PMG)	1REC
13–14	22 VOLT SUPPLY (LINE)	1REC
15–16	22 VOLT SUPPLY (LINE)	1SR
17–18	22 VOLT SUPPLY (PMG)	1SR
19–20	22 VOLT SUPPLY (PMG)	1REC
21–22	24 VOLT SUPPLY (LINE)	1REC
23–24	24 VOLT SUPPLY (LINE)	1SR
25–26	24 VOLT SUPPLY (PMG)	1SR
27–28	24 VOLT SUPPLY (PMG)	1REC

FRONT VIEW

REVISIONS		PRINTS TO
1	R.M.B. JAN 3 1969	11
2	R.M.B. JAN 17 1969	12P DFB
3	R.M.B. MAR 25 1969	FG-W
4	R.M.B. ... 9 1969	

MADE BY J Wonaerty MAR 22 1968 — ISSUED OCT 14 1968 — SPECIALTY CONTROL DEPT, WAYNESBORO, VA.

44C300886 CONT ON SHEET 1A SH NO. 1

GENERAL ELECTRIC — 44C300886 CONT ON SHEET 2 SH NO 1A

TITLE: ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3 122451 & 122452
CONEMAUGH NO. 1

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±

PRINTED CIRCUIT BOARD AND SUB. ASM. LIST

PRINTED CIRCUIT BOARD

SYMBOL	TITLE	ELEM. DIAG	ORDER NO.	QTY.
3AØ2	ANALOG OUTPUT	44C301622	44D236379-G03	1
2CL	CLOCK BOARD	44A302609	44D236376-G02	1
1CR	COMPENSATION & REGULATION	44A301400	44D236388-G01	1
1DB	DIODE BOARD	44A300243	44D236370-G01	3
1DI	DETECTOR INDICATOR	44C300609	44D381585-G01	5
1FVC	FREQ. VOLTAGE CONVERTER	44C300612	44D236365-G01	1
1LVG	SIGNAL LOW VALUE GATE	44A300261	44D236372-G01	1
1MC	MAGACYCLER	44A300242	44D381587-G01	2
1REC	SERIES REG. BD. #1	{44D300969 44D300970	44B317827-G01	6
1ØA	OPERATIONAL AMPLIFIER	44C300610	44D381589-G01	7
1ØSC	3KHZ OSC. BOARD 1	44C300611	44D236366-G01	1
1ØSI	OVERSPEED INTEGRATOR	44A300262	44D236373-G01	1
2SA	SERVO AMPLIFIER	44C300689	44D236389-G01	1
2SC	SIGNAL CONVERTER	44C301648	44D236367-G02	1
1SMD	STEPPING MOTOR DRIVE	44C300615	44D381580-G01	2
1SR	SERIES REG. BOARD #2	{44D300969 44D300970	44D236371-G01	6
1VC	VOLTAGE COMPARATOR	44C300607	44D381582-G01	6
2LVG	REF. LOW VALUE GATE	44A300281	44D236378-G01	1
2ØSC	3KHZ. OSC. BOARD 2	44C300611	44D381586-G01	1
3ØSC	3KHZ. OSC. BOARD 3	44C300611	44D236368-G01	1
——	REGULATOR DRIVER	SAME AS 1SR & 1REC	44D331909-G01	2
——	FIRING CIRCUIT BOARD	" " " " "	44A238528-G01	8

SUB. ASSEMBLIES - PANELS -

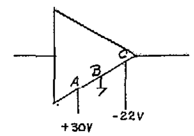
TITLE	ORDER NO.	CONNECTION DIAGRAM	
POWER PANEL (PMG)	3S7513KF300A2	44C301169	
POWER PANEL (LINE)	3S7513KF300A3	44C301170	
INVERTER PANEL	3S7513KF309A1	44C301154	
FILTER PANEL	3S7513KF304A1	44C300865	
RESISTOR PANEL	3S7513KF305A1	44A300278	
METER PANEL	3S7513KF306A3	44C301245	T.B. 122451
METER PANEL	3S7513KF306A4	44C301246	T.B. 122451
RELAY PANEL	3S7513KF307A3	44C301153	
DIFF. XFMR. DRIVE	44D315178-G01	44C300882	
METER PANEL	3S7513KF306A5	44C303284	T.B. 122452
METER PANEL	3S7513KF306A6	44C303285	T.B. 122452

ALIGNMENT DWG. 44D302362
ALIGNMENT INSTRUCTIONS 44A301479

CUSTOMER NOTES

1. INDICATES ZERO REFERENCE POTENTIAL, NOT CASE GROUND.
2. INDICATES STATION GROUND.
3. ALL OPERATIONAL AMPLIFIERS HAVE ADDITIONAL CONNECTIONS NOT SHOWN ELSEWHERE

EXAMPLE:



4. THE LOCATION OF THE PRINTED CIRCUIT BOARDS IS SHOWN BY THE NUMBERS APPEARING IN OR NEAR THE SQUARE WHICH REPRESENTS THE P.C. BD. EXAMPLE 0215 WOULD BE RACK #2 AND SLOT #15.
5. 1MR TO 7MR (SHEET 10) ARE METER RELAYS.
6. * INDICATES ITEMS NOT FURNISHED BY WAYNESBORO.
7. INDICATES SHIELDED CABLE
8. INDICATES TWISTED WIRES
9. INDICATES TERMINALS AT EHC CASE FOR CUSTOMER CONNECTION
10. INDICATES TERMINALS AT TURBINE
11. INDICATES SUB-PANEL & PC BOARD TERMINALS IN EHC CASE

REVISIONS
1 RMB ... 5 1969
2 RMB ... 9 1969

PRINTS TO: // ; 2P BFB ; FG-W

MADE BY J. Wonderly MAR 22 1968
ISSUED OCT 14 1968
APPROVALS: [signature] Waynesboro, Va.

44C300886 CONT ON SHEET 2 SH NO 1A

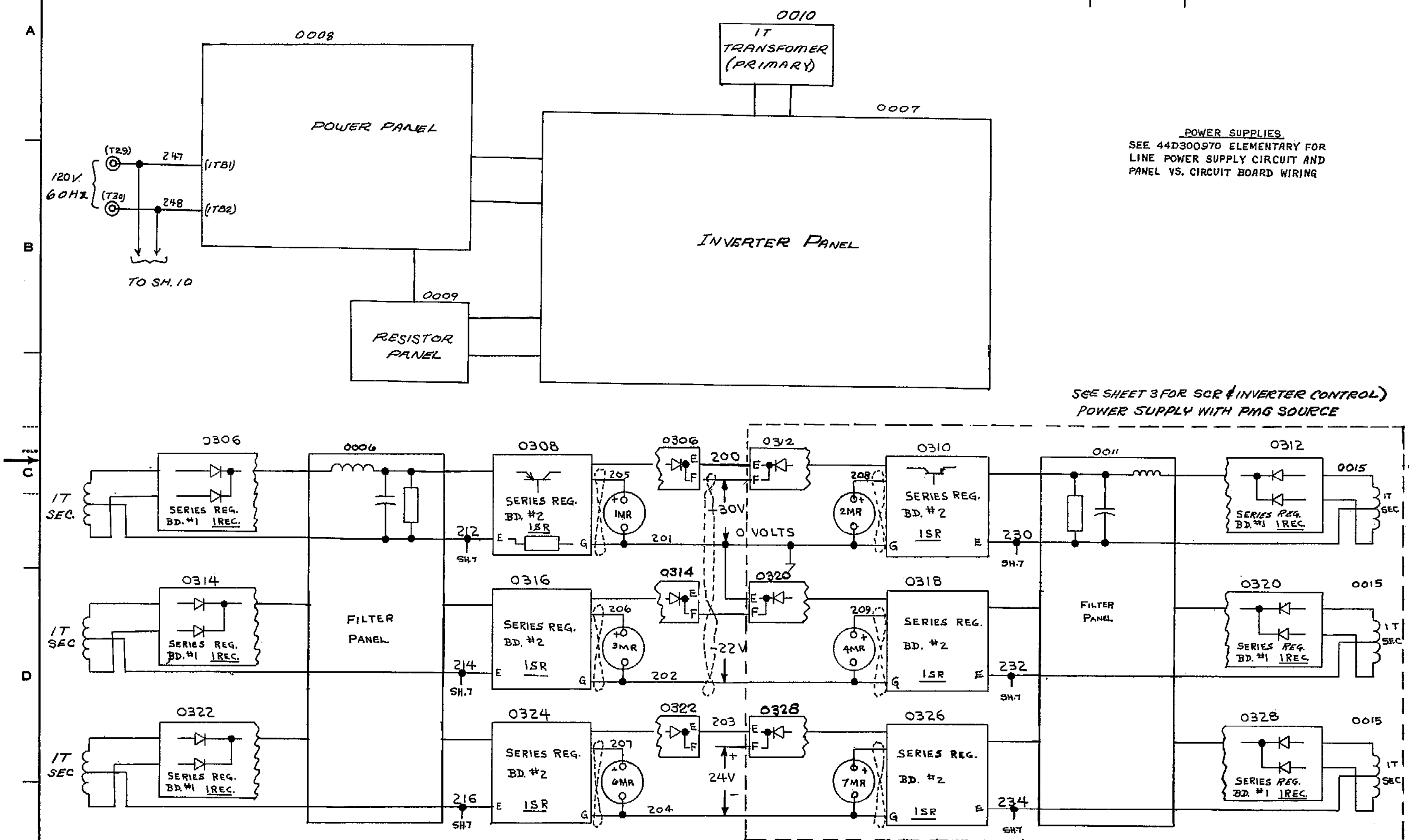
GENERAL ELECTRIC

44C300886 — CONT ON SHEET 3 — SH NO. 2

TITLE: ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3 122451 & 122452
CONEMAUGH NO. 1

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:—

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS — FRACTIONS	DECIMALS	ANGLES
	√	±	±	±



0008
POWER PANEL
0010
IT TRANSFOMER (PRIMARY)
0007
INVERTER PANEL
0009
RESISTOR PANEL
(T29)
(T30)
120V. 60Hz
247
248
(1TB1)
(1TB2)
TO SH. 10
SEE SHEET 3 FOR SCR & INVERTER CONTROL)
POWER SUPPLY WITH PMG SOURCE
0306
0314
0322
IT SEC.
SERIES REG. BD. #1 1REC.
0006
FILTER PANEL
0308
0316
0324
SERIES REG. BD. #2 1SR
212
214
216
SH. 7
205
206
207
1MR
3MR
6MR
201
202
204
0306
0314
0322
200
203
-30V
0 VOLTS
-22V
24V
0312
0320
0328
208
209
2MR
4MR
7MR
0310
0318
0326
230
232
234
0011
FILTER PANEL
0312
0320
0328
0015

POWER SUPPLIES
SEE 44D300970 ELEMENTARY FOR LINE POWER SUPPLY CIRCUIT AND PANEL VS. CIRCUIT BOARD WIRING

REVISIONS
1 R.M. Bukosky JAN 3 1969

PRINTS TO
11
12P DFB
FG-W

MADE BY T. Wanderly MAR 22 1968 — APPROVALS
ISSUED OCT 14 1968
SPECIALTY CONTROL DEPT
WAYNESBORO, VA.
44C300886 — CONT ON SHEET 3 — SH NO. 2

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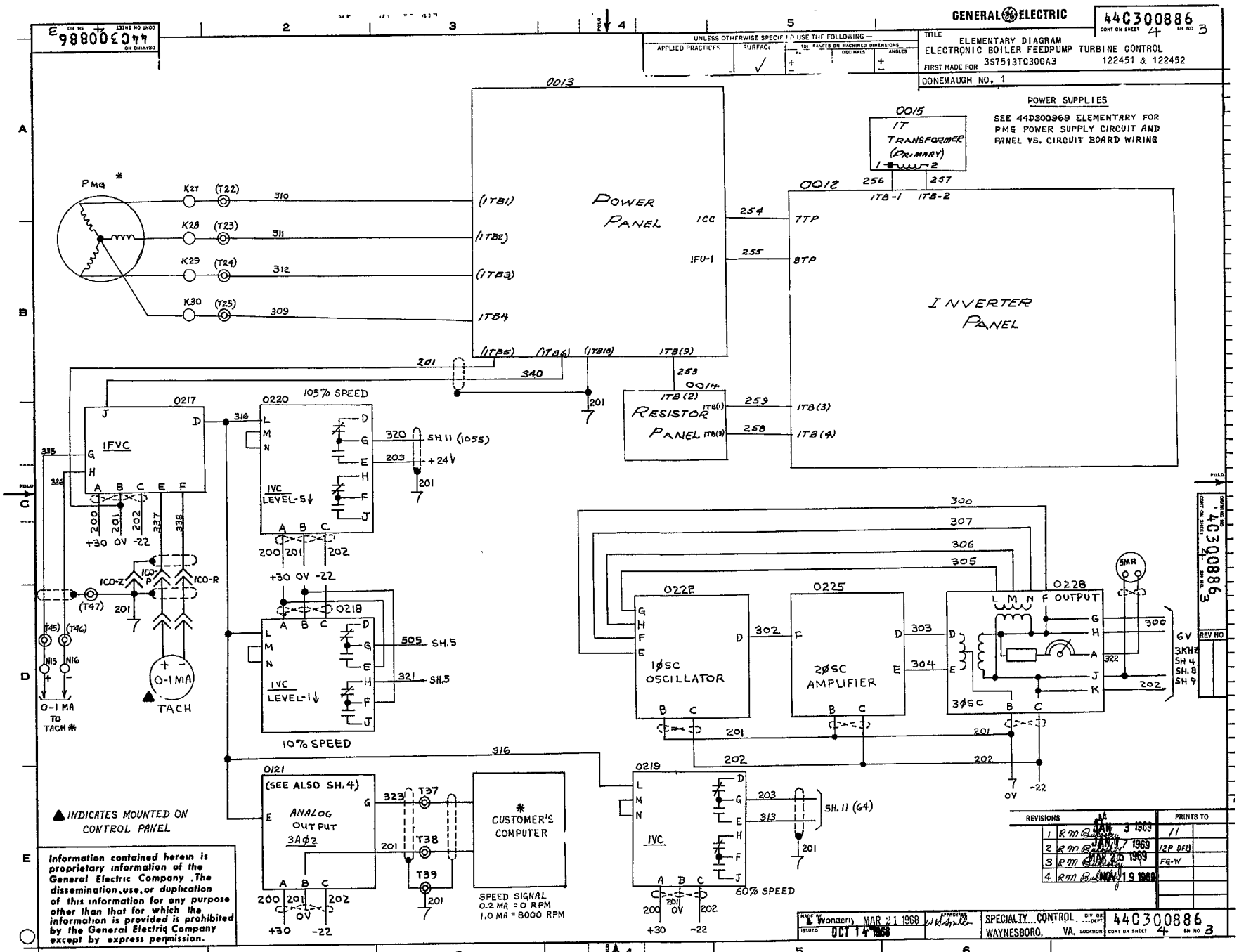
GENERAL ELECTRIC
44C300886 CONT ON SHEET 4 SH NO 3
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING—
APPLIED PRACTICES
SURFACE
TOL. PLACES ON MACHINED DIMENSIONS DECIMALS ANGLES
TITLE
ELEMENTARY DIAGRAM
ELECTRONIC BOILER FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3 122451 & 122452
CONEMAUGH NO. 1
POWER SUPPLIES
SEE 44D300969 ELEMENTARY FOR PMG POWER SUPPLY CIRCUIT AND PANEL VS. CIRCUIT BOARD WIRING
0013
POWER PANEL
ITB1
ITB2
ITB3
ITB4
ITB5
ITB6
ITB10
ITB9
ICC
IFU-1
0015
1T TRANSFORMER (PRIMARY)
0012
INVERTER PANEL
7TP
8TP
ITB-1
ITB-2
0014
RESISTOR PANEL
ITB(1)
ITB(2)
ITB(3)
ITB(4)
PMG
K27 (T22)
K28 (T23)
K29 (T24)
K30 (T25)
310
311
312
309
254
255
256
257
259
258
253
201
340
0217
IFVC
0220
105% SPEED
320
SH.11 (105S)
203
+24V
IVC LEVEL-5
316
335
336
200
201
202
337
338
+30
0V
-22
0218
IVC LEVEL-1
505
SH.5
321
10% SPEED
ICO-Z
ICO-P
ICO-R
(T47)
(T45)
(T46)
NIS
NIG
0-1 MA TO TACH *
0-1MA
TACH
0222
1ØSC OSCILLATOR
0225
2ØSC AMPLIFIER
0228
3ØSC
OUTPUT
300
307
306
305
302
303
304
322
6V 3KHZ SH 4 SH 8 SH 9
5MR
0121
(SEE ALSO SH.4)
ANALOG OUTPUT 3AØ2
323
T37
T38
T39
CUSTOMER'S COMPUTER
SPEED SIGNAL
0.2 MA = 0 RPM
1.0 MA = 8000 RPM
0219
IVC
203
313
SH.11 (64)
60% SPEED
▲ INDICATES MOUNTED ON CONTROL PANEL
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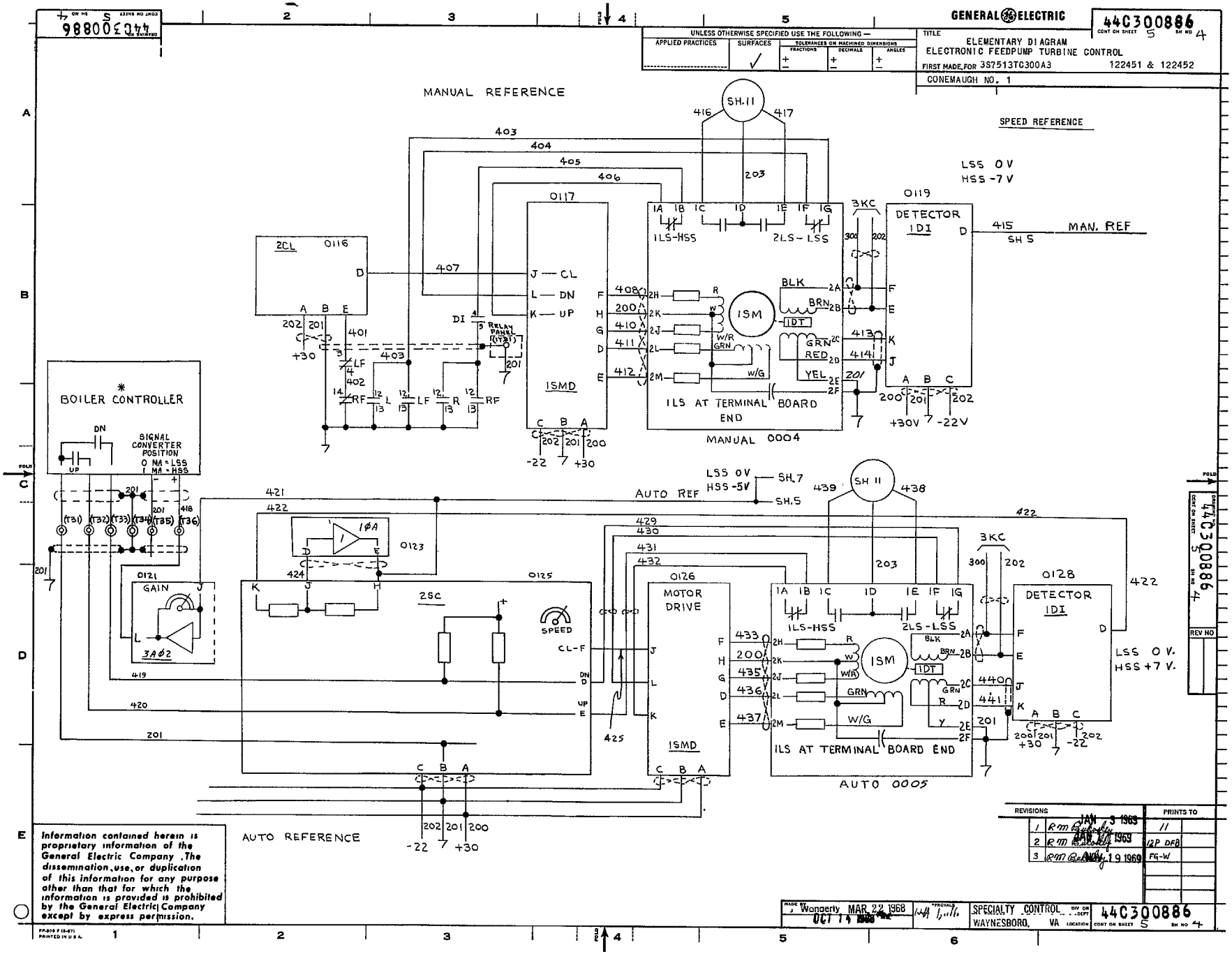
REVISIONS
1 RM JAN 3 1969
2 RM JAN 17 1969
3 RM MAR 26 1969
4 RM NOV 19 1969
PRINTS TO
11
12P DFB
FG-W
MADE BY Wonderly MAR 21 1968
ISSUED OCT 14 1968
APPROVED
SPECIALTY CONTROL DIV OR DEPT
WAYNESBORO, VA. LOCATION
44C300886 CONT ON SHEET 4 SH NO 3


GENERAL ELECTRIC
44C300886
TITLE
ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3
122451 & 122452
CONEMAUGH NO. 1
MANUAL REFERENCE
SPEED REFERENCE
LSS 0V
HSS -7V
BOILER CONTROLLER
SIGNAL CONVERTER POSITION
0 MA = LSS
1 MA = HSS
0116
0117
0119
0121
0123
0125
0126
0128
ISMD
ISM
DETECTOR
MOTOR DRIVE
GAIN
SPEED
ILS-HSS
2LS-LSS
ILS AT TERMINAL BOARD END
MANUAL 0004
AUTO 0005
AUTO REFERENCE
AUTO REF
LSS 0V
HSS -5V
SH.7
SH.5
SH.11
SH.5
MAN. REF
LSS 0V.
HSS +7V.
+30V
-22V
+30
-22
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REVISIONS
PRINTS TO
SPECIALTY CONTROL
WAYNESBORO, VA
MADE BY Wangerty MAR 22 1968
APPROVED
OCT 14 1968
44C300886

GENERAL ELECTRIC

44C300886 — CONT ON SHEET 6 — SH NO 5

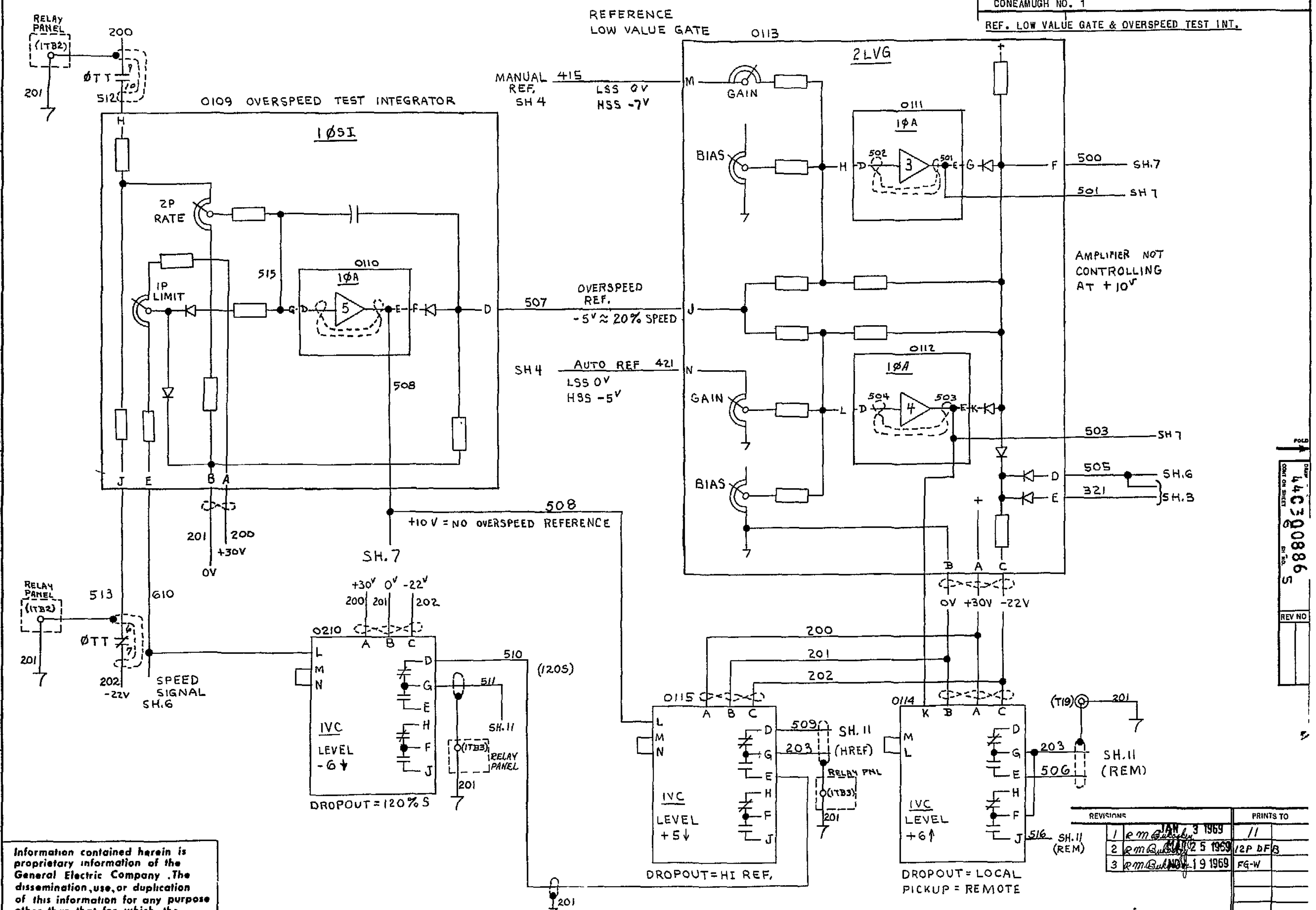
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES / SURFACES ✓ / TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±

TITLE: ELEMENTARY DIAGRAM ELECTRONIC FEEDPUMP TURBINE CONTROL

FIRST MADE FOR 3S7513TC300A3 122451 & 122452

CONEAMUGH NO. 1

REF. LOW VALUE GATE & OVERSPEED TEST INT.



RELAY PANEL (1TB2)
200
201
ØTT
512
0109 OVERSPEED TEST INTEGRATOR
1ØSI
2P RATE
1P LIMIT
515
0110
1ØA
5
508
+10 V = NO OVERSPEED REFERENCE
SH. 7
201 200 +30V 0V
513
610
SPEED SIGNAL SH.6
202 -22V
0210
IVC LEVEL -6↓
DROPOUT = 120% S
+30V 0V -22V
510
511
SH.11
(1TB3) RELAY PANEL
(120S)
REFERENCE LOW VALUE GATE
0113
2LVG
MANUAL REF. SH 4
415
LSS 0V HSS -7V
GAIN
BIAS
0111
1ØA
3
502
501
500 SH.7
501 SH 7
AMPLIFIER NOT CONTROLLING AT +10V
507
OVERSPEED REF. -5V ≈ 20% SPEED
SH 4
AUTO REF 421
LSS 0V HSS -5V
0112
1ØA
4
504
503
503 SH 7
505 SH.6
321 SH.3
0V +30V -22V
200
201
202
0115
IVC LEVEL +5↓
DROPOUT = HI REF.
509 SH. 11 (HREF)
203
RELAY PNL (1TB3)
0114
IVC LEVEL +6↑
DROPOUT = LOCAL PICKUP = REMOTE
(T19)
506
SH.11 (REM)
516 SH.11 (REM)

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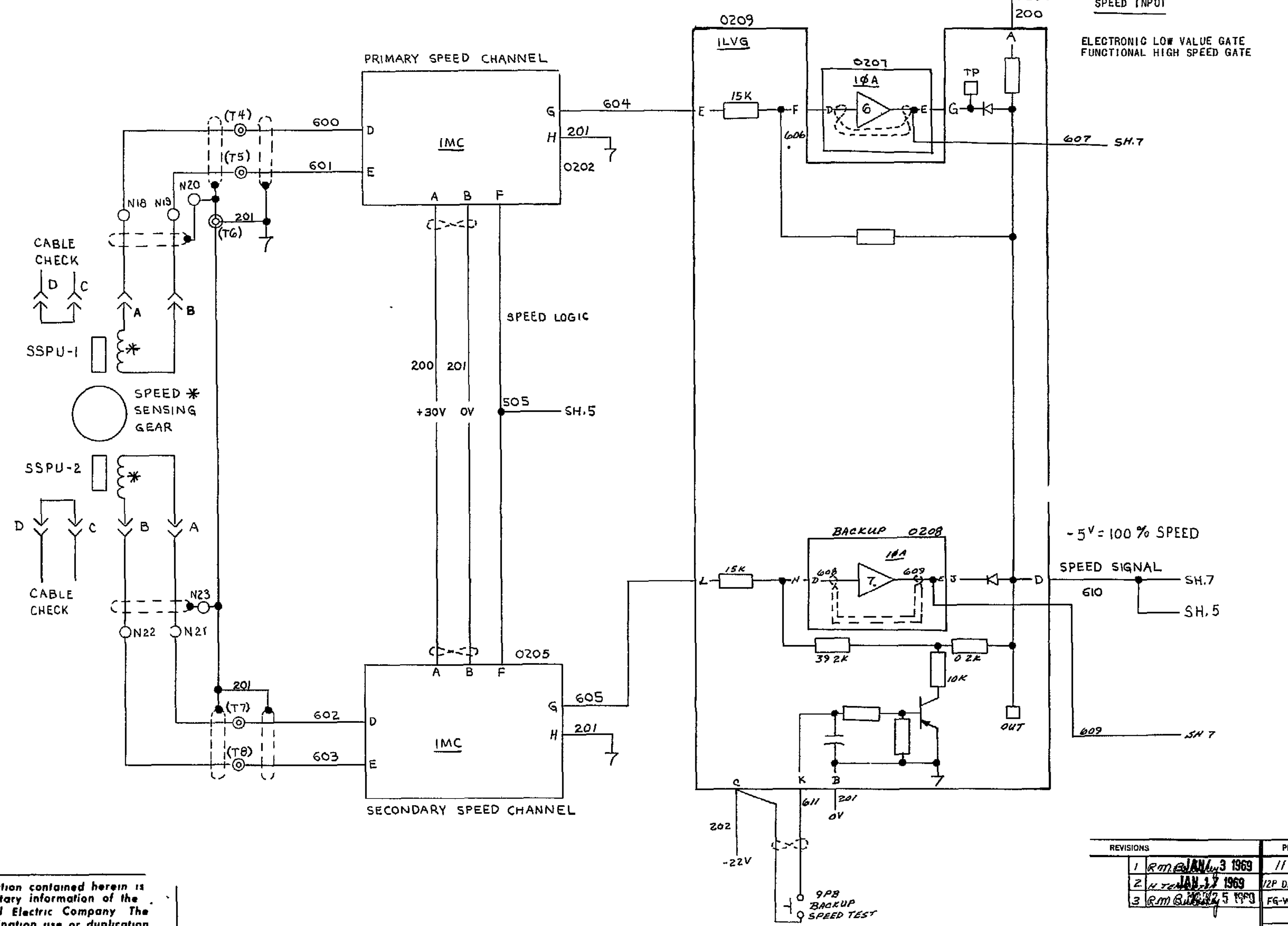
MADE BY J Wonderly MAR 22 1968 — ISSUED OCT 14 1968 — SPECIALTY CONTROL — WAYNESBORO, VA — 44C300886 — CONT ON SHEET 6 — SH NO 5

GENERAL ELECTRIC

44C300886 — CONT ON SHEET 7 — SH NO 6

TITLE: ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TC300A3 122451 & 122452
CONEMAUGH NO. 1

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±



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REVISIONS		PRINTS TO
1	RMB JAN 3 1969	11
2	H.T. JAN 17 1969	12P DFB
3	RMB MAR 5 1969	FG-W

MADE BY J. Wonderly MAR 22 1968 — ISSUED OCT 14 1968 — APPROVALS — SPECIALTY CONTROL DEPT — WAYNESBORO, VA. — 44C300886 — CONT ON SHEET 7 — SH NO 6

FF 609 F (8-67) PRINTED IN U.S.A.

GENERAL ELECTRIC

44C300886 — CONT ON SHEET 8 — SH NO 7

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

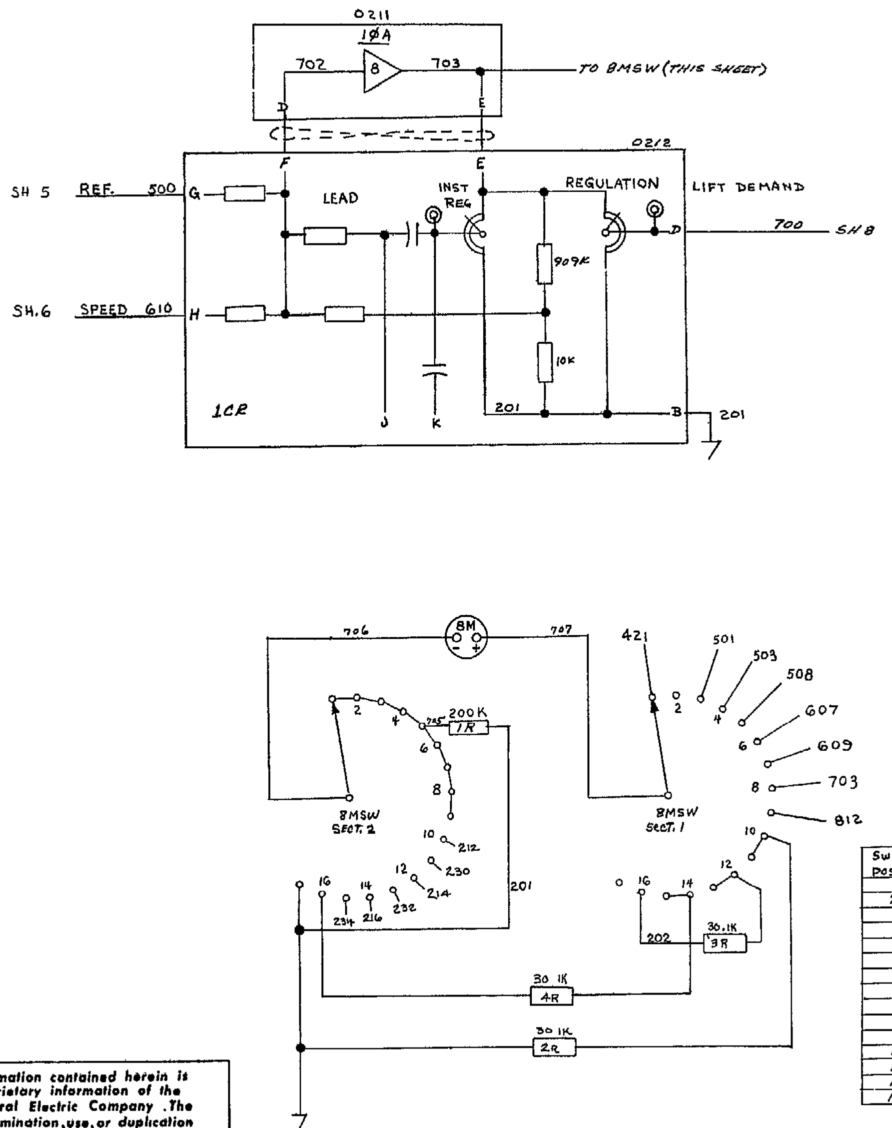
APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

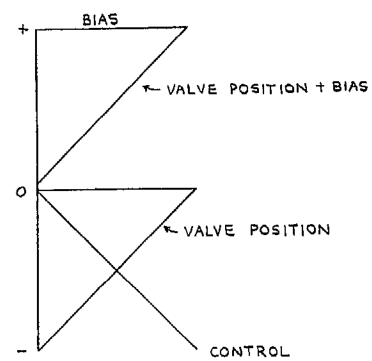
TITLE: ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL

FIRST MADE FOR 3S8513TC300A3 122451 & 122452

CONEMAUGH NO. 1

REGULATION & STABALIZATION



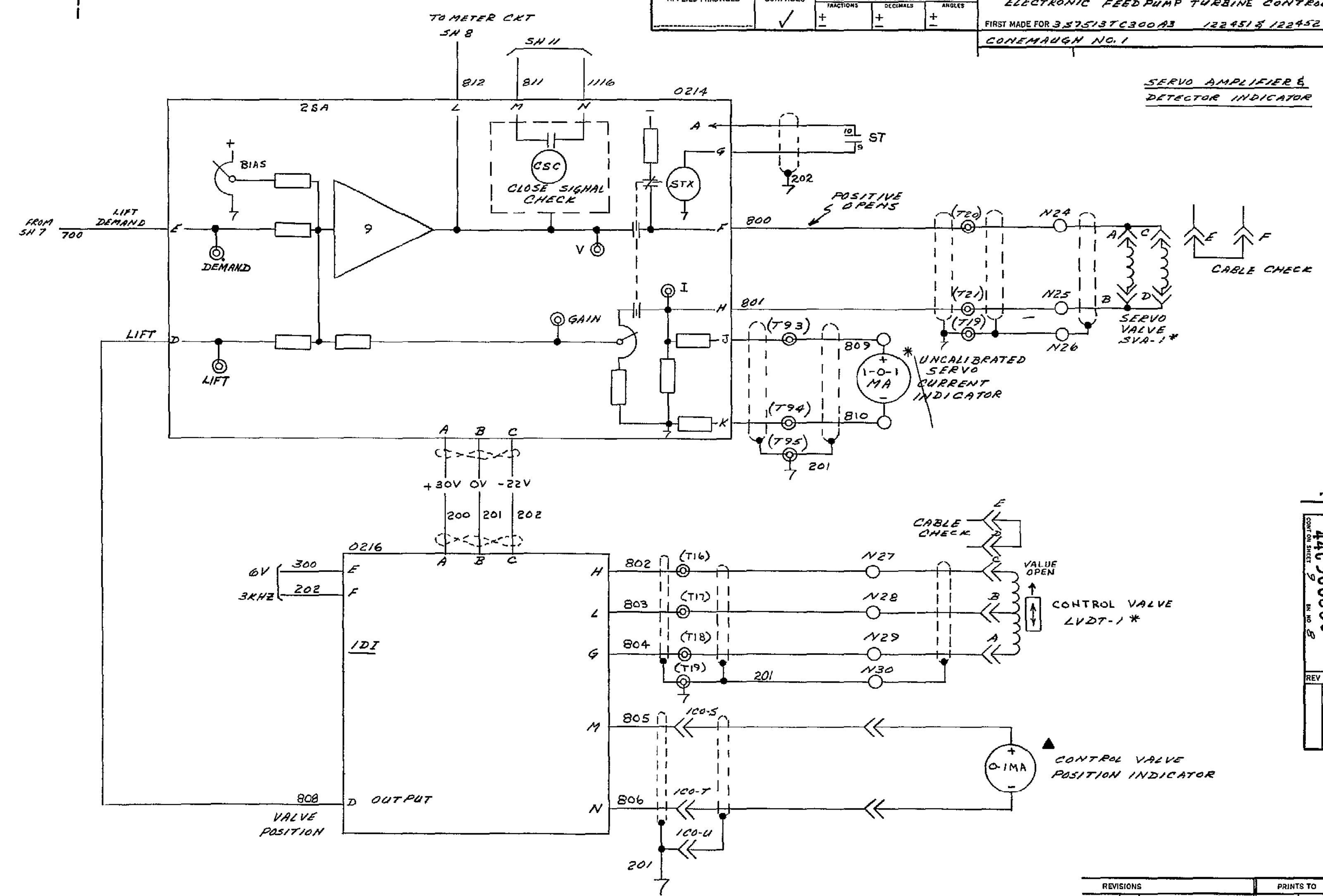


SWITCH POSITION			FULL SCALE
1	1	AMPLIFIER OUTPUT	APPROX 10 VOLTS
2			
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	30V LINE	POWER SUPPLY LOAD CURRENT	APPROX 5 AMPS.
11	30V PMG		
12	22V LINE		
13	22V PMG		
14	24V. LINE		
15	24V. PMG		

REVISIONS		PRINTS TO
1	H. [illegible] JAN 3 1969	11
2	RM Bukoski MAR 25 1969	12P DFB
3	RM Bukoski NOV 19 1969	FG-W

MADE BY J Wonders MAR 22 1968 — ISSUED OCT 14 1968 — APPROVALS [signature] — SPECIALTY CONTROL DEPT — WAYNESBORO, VA. — 44C300886 CONT ON SHEET 8 SH NO 7

PRINTED IN U.S.A.



TO METER CKT SH 8
SH 11
812
811
1116
0214
2SA
BIAS
9
CSC
CLOSE SIGNAL CHECK
STX
ST
202
POSITIVE OPENS
FROM SH 7
700
LIFT DEMAND
DEMAND
V
800
GAIN
I
801
LIFT
(T20)
(T21)
(T19)
N24
N25
N26
SERVO VALVE SVA-1 *
CABLE CHECK
(T93)
(T94)
(T95)
809
810
201
1-0-1 MA
* UNCALIBRATED SERVO CURRENT INDICATOR
+30V OV -22V
200 201 202
0216
6V 300
3KHZ 202
IDI
OUTPUT
808
VALVE POSITION
802
803
804
805
806
(T16)
(T17)
(T18)
(T19)
N27
N28
N29
N30
CABLE CHECK
VALVE OPEN
CONTROL VALVE LVDT-1 *
120-S
120-T
120-U
0-1MA
CONTROL VALVE POSITION INDICATOR

▲ INDICATES ITEMS MOUNTED ON CONTROL PANEL

GENERAL ELECTRIC

44C300886 CONT ON SHEET 9 SH NO 8

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES / SURFACES ✓ / TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±

TITLE ELEMENTARY DIAGRAM ELECTRONIC FEEDPUMP TURBINE CONTROL

FIRST MADE FOR 3S7513TC300A3 122451 & 122452

CONEMAUGH NO. 1

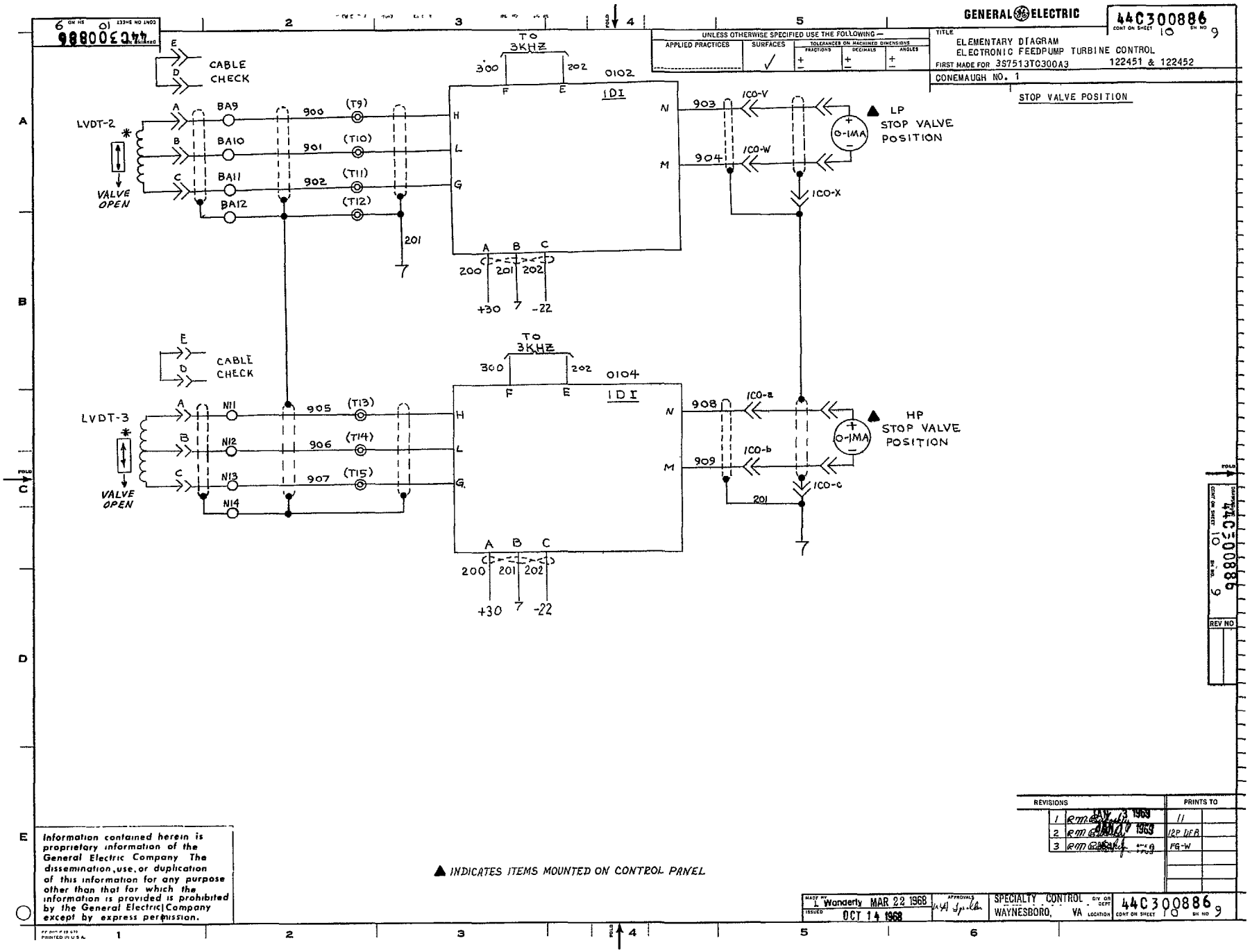
SERVO AMPLIFIER & DETECTOR INDICATOR

REVISIONS		PRINTS TO
1	REDRAWN W/CHANGES LAST REV WAS 0 ... JAN 8 1969	11 / LP DFB
2	RM ... JAN 17 1969	FG-W
3	RM ... MAR 25 1969	
4	... NOV 19 1969	

MADE BY J. WONDERLY MAR. 22, 1968 — ISSUED JAN 3 1969

SPECIALTY CONTROL — WAYNESBORO, VA.

44C300886 CONT ON SHEET 9 SH NO 8


GENERAL ELECTRIC
44C300886
ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513T0300A3 122451 & 122452
CONEMAUGH NO. 1
STOP VALVE POSITION
CABLE CHECK
LVDT-2
VALVE OPEN
BA9
BA10
BA11
BA12
900
901
902
(T9)
(T10)
(T11)
(T12)
201
TO 3KHZ
300
202
0102
1D1
H
L
G
N
M
903
904
ICO-V
ICO-W
ICO-X
0-1MA
LP STOP VALVE POSITION
A B C
200 201 202
+30 -22
CABLE CHECK
LVDT-3
VALVE OPEN
NI1
NI2
NI3
NI4
905
906
907
(T13)
(T14)
(T15)
0104
908
909
ICO-a
ICO-b
ICO-c
HP STOP VALVE POSITION
▲ INDICATES ITEMS MOUNTED ON CONTROL PANEL
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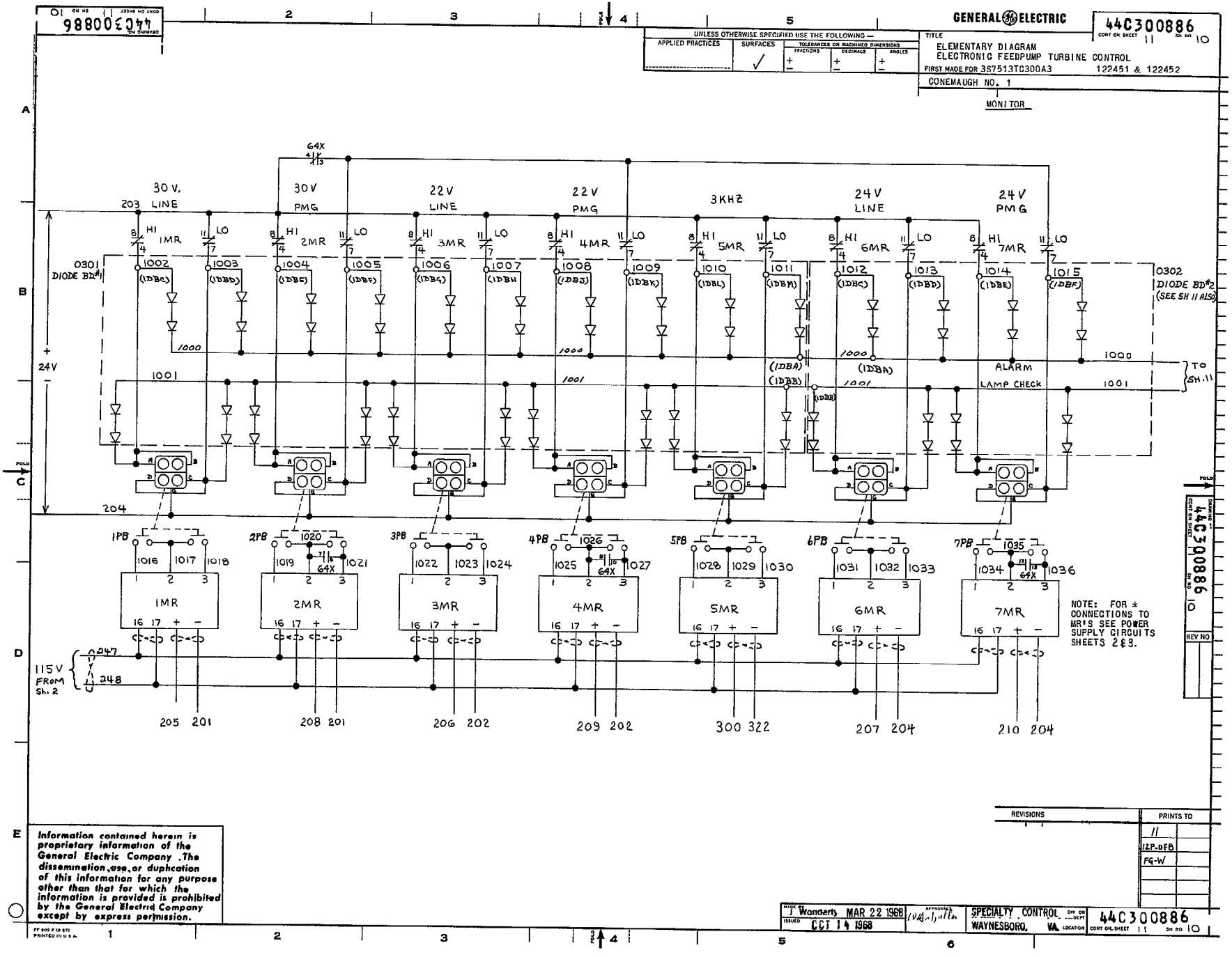
REVISIONS
PRINTS TO
MADE BY L Wanderly MAR 22 1968
ISSUED OCT 14 1968
SPECIALTY CONTROL WAYNESBORO, VA
44C300886


GENERAL ELECTRIC
44C300886
CONT ON SHEET 11 SH NO 10
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES | SURFACES | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±
TITLE
ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TG300A3 122451 & 122452
CONEMAUGH NO. 1
MONITOR
64X
30 V. 203 LINE
30V PMG
22V LINE
22V PMG
3KHZ
24V LINE
24V PMG
1MR
2MR
3MR
4MR
5MR
6MR
7MR
HI
LO
0301 DIODE BD #1
0302 DIODE BD #2 (SEE SH 11 ALSO)
+ 24V −
1000
1001
(IDBA)
(IDBB)
(IDBC)
(IDBD)
(IDBE)
(IDBF)
(IDBH)
(IDBJ)
(IDBK)
(IDBL)
(IDBM)
(IDBR)
ALARM LAMP CHECK
TO SH. 11
204
1PB
2PB
3PB
4PB
5PB
6PB
7PB
1016 1017 1018
1019 1020 1021
1022 1023 1024
1025 1026 1027
1028 1029 1030
1031 1032 1033
1034 1035 1036
16 17 + −
115V FROM Sh. 2
247
248
205 201
208 201
206 202
209 202
300 322
207 204
210 204
NOTE: FOR ± CONNECTIONS TO MR'S SEE POWER SUPPLY CIRCUITS SHEETS 2 & 3.
REVISIONS
PRINTS TO
11
12P-DFB
FG-W
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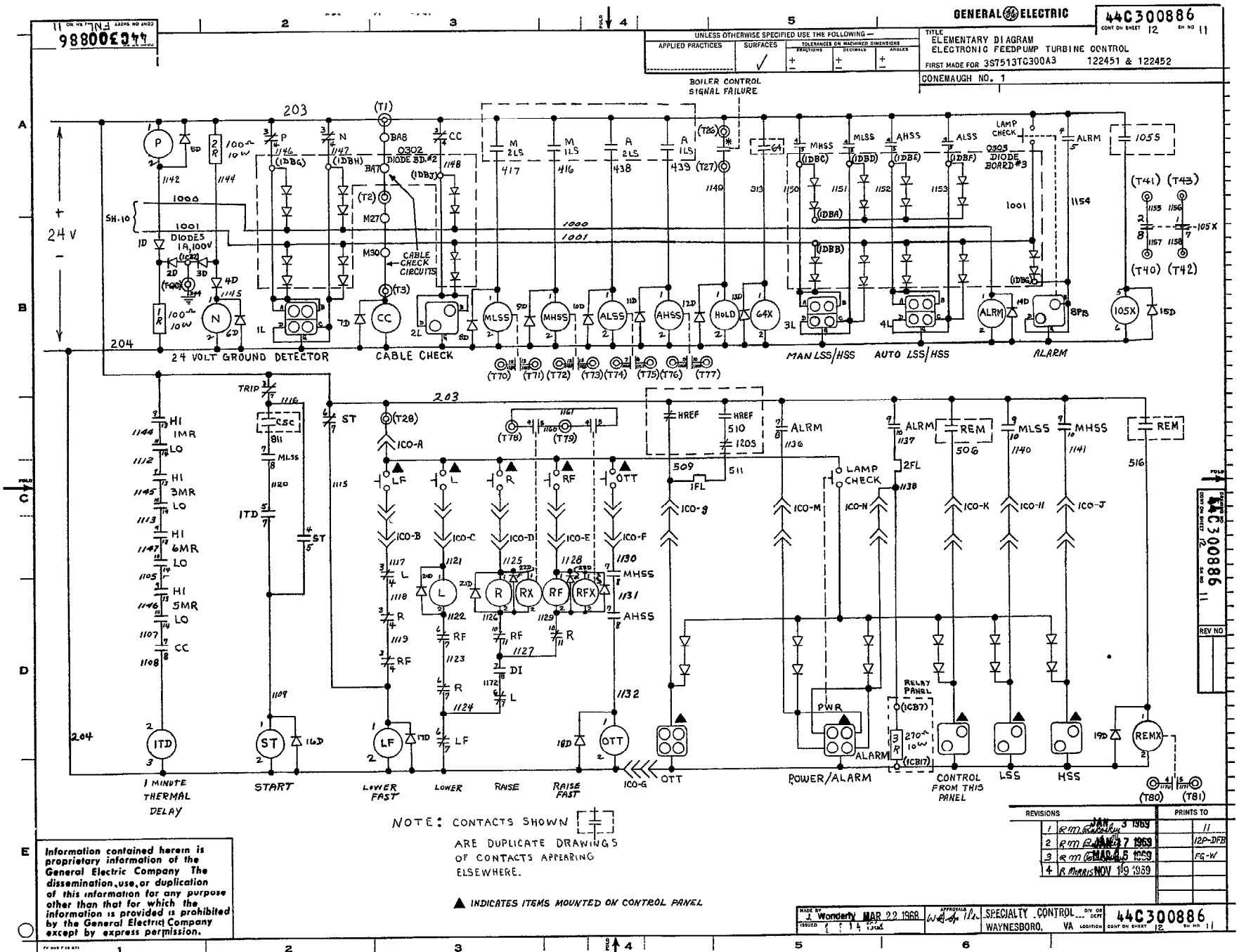
MADE J Wonderly MAR 22 1968
ISSUED OCT 14 1968
APPROVED
SPECIALTY CONTROL DIV OR DEPT
WAYNESBORO, VA LOCATION
44C300886
CONT ON SHEET 11 SH NO 10

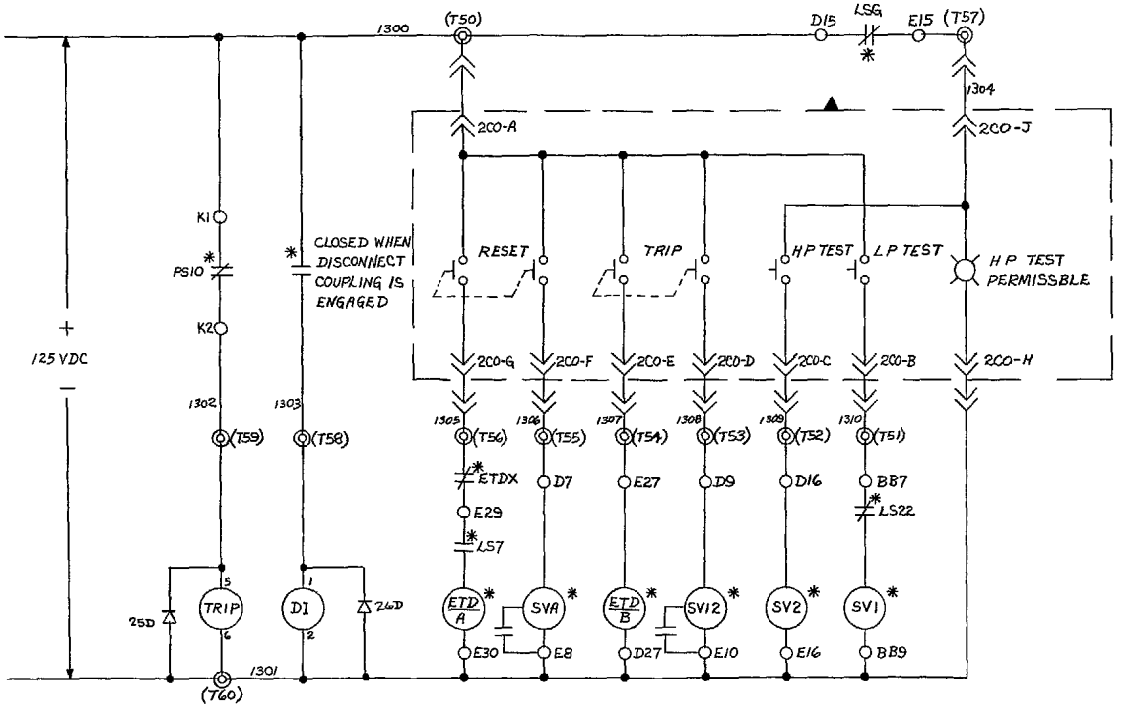

GENERAL ELECTRIC
44C300886
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES
SURFACES
TOLERANCES ON MACHINED DIMENSIONS
FRACTIONS
DECIMALS
ANGLES
TITLE
ELEMENTARY DIAGRAM
ELECTRONIC FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S7513TG300A3 122451 & 122452
CONEMAUGH NO. 1
BOILER CONTROL SIGNAL FAILURE
+ 24 V -
203
204
24 VOLT GROUND DETECTOR
CABLE CHECK
MAN LSS/HSS
AUTO LSS/HSS
ALARM
1 MINUTE THERMAL DELAY
START
LOWER FAST
LOWER
RAISE
RAISE FAST
OTT
POWER/ALARM
CONTROL FROM THIS PANEL
LSS
HSS
NOTE: CONTACTS SHOWN ARE DUPLICATE DRAWINGS OF CONTACTS APPEARING ELSEWHERE.
▲ INDICATES ITEMS MOUNTED ON CONTROL PANEL
Information contained herein is proprietary information of the General Electric Company The dissemination, use, or duplication of this information for any purpose other than that for which the information is provided is prohibited by the General Electric Company except by express permission.
REVISIONS
PRINTS TO
MADE BY J Wonderly MAR 22 1968
SPECIALTY CONTROL WAYNESBORO, VA
44C300886

GENERAL ELECTRIC

44C300886

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES | SURFACES | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±

TITLE
ELECTRONIC BOILER FEEDPUMP TURBINE CONTROL
FIRST MADE FOR 3S75/3TC300A3
CONEMAUGH NO 1 122451 & 122452



▲ INDICATES ITEMS MOUNTED ON CONTROL PANEL

REVISIONS			PRINTS TO
1	R M Bilkoskey	JAN 27 1969	11
2	R M Bilkoskey	MAR 25 1969	12P DFB
3	R Mackey	NOV 19 1969	FG-W

MADE BY R N BILKOSKEY 12 30 68 ISSUED JAN 3 1969
APPROVALS
SPECIALTY CONTROL DIV OR DEPT
WAYNESBORO, VA LOCATION
44C300886 CONT ON SHEET FNL SH NO 12

DRAWING NO 44C300886 CONT ON SHEET FNL SH NO 12
REV NO

GENERAL ELECTRIC

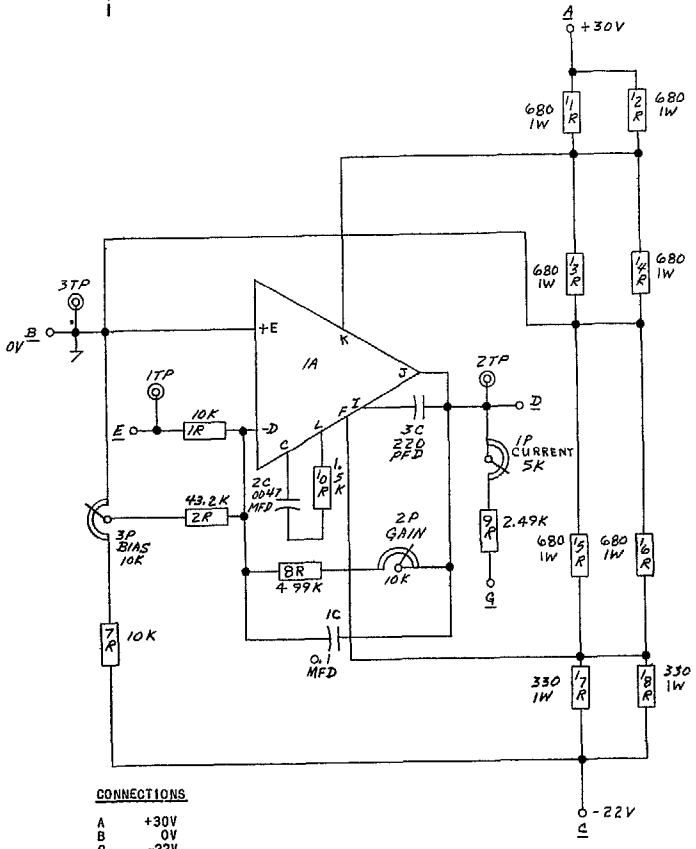
44C301639 CONT ON SHEET SH NO

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE
ANALOG OUTPUT 2AØ2

FIRST MADE FOR
44D236379-G012



CONNECTIONS

A	+30V
B	0V
C	-22V
D	1A VOLTAGE OUTPUT
E	1A INPUT
G	1A CURRENT OUTPUT

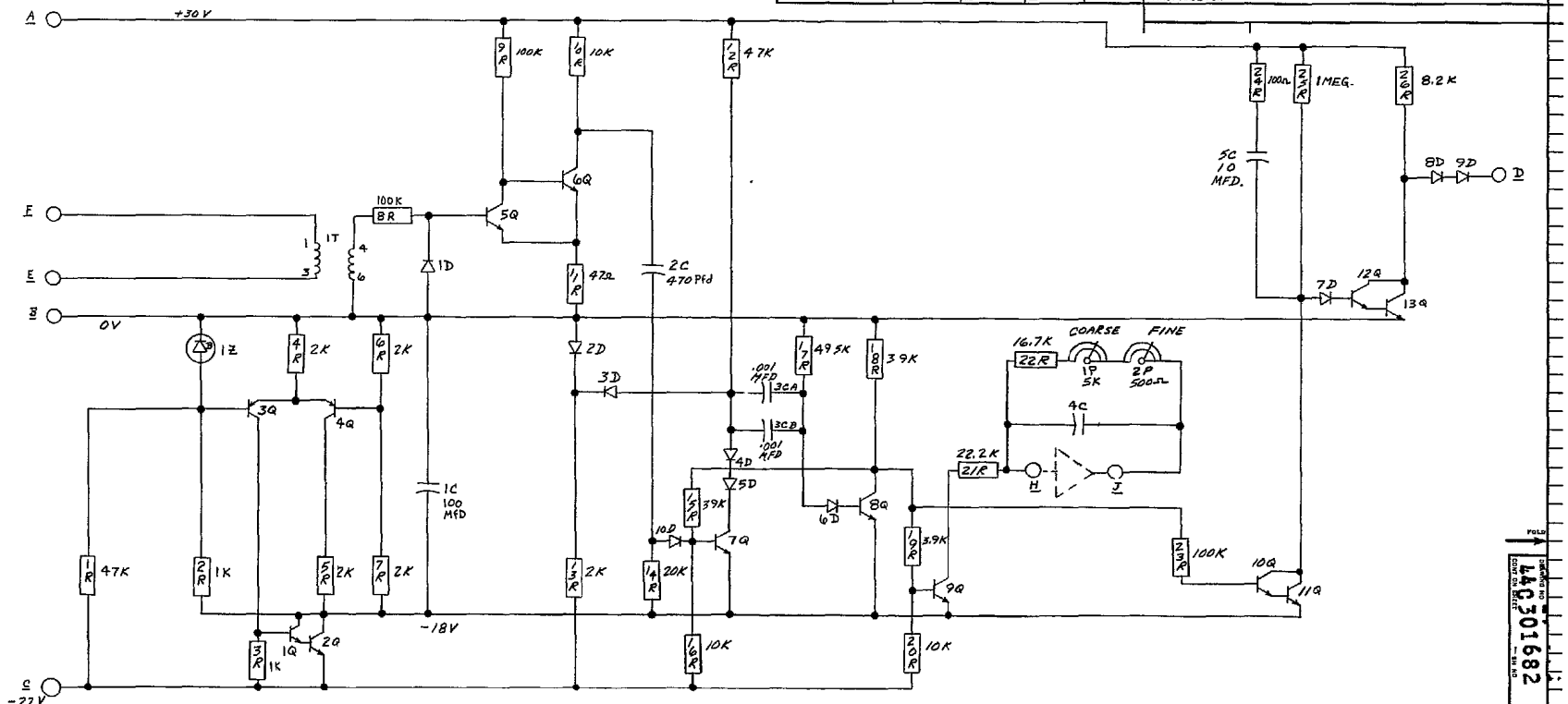
44C301639 CONT ON SHEET SH NO

REV NO

REVISIONS

PRINTS TO
11
20V

MADE BY B.F. Lancaster OCT. 8, 1968
ISSUED OCT 16 1968
APPROVALS R.M.M.
SPECIALTY CONTROL DIV OR DEPT
WAYNESBORO, VA LOCATION
44C301639 CONT ON SHEET SH NO



GENERAL ELECTRIC

44C301682

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS FRACTIONS ±	DECIMALS ±	ANGLES ±
	✓			

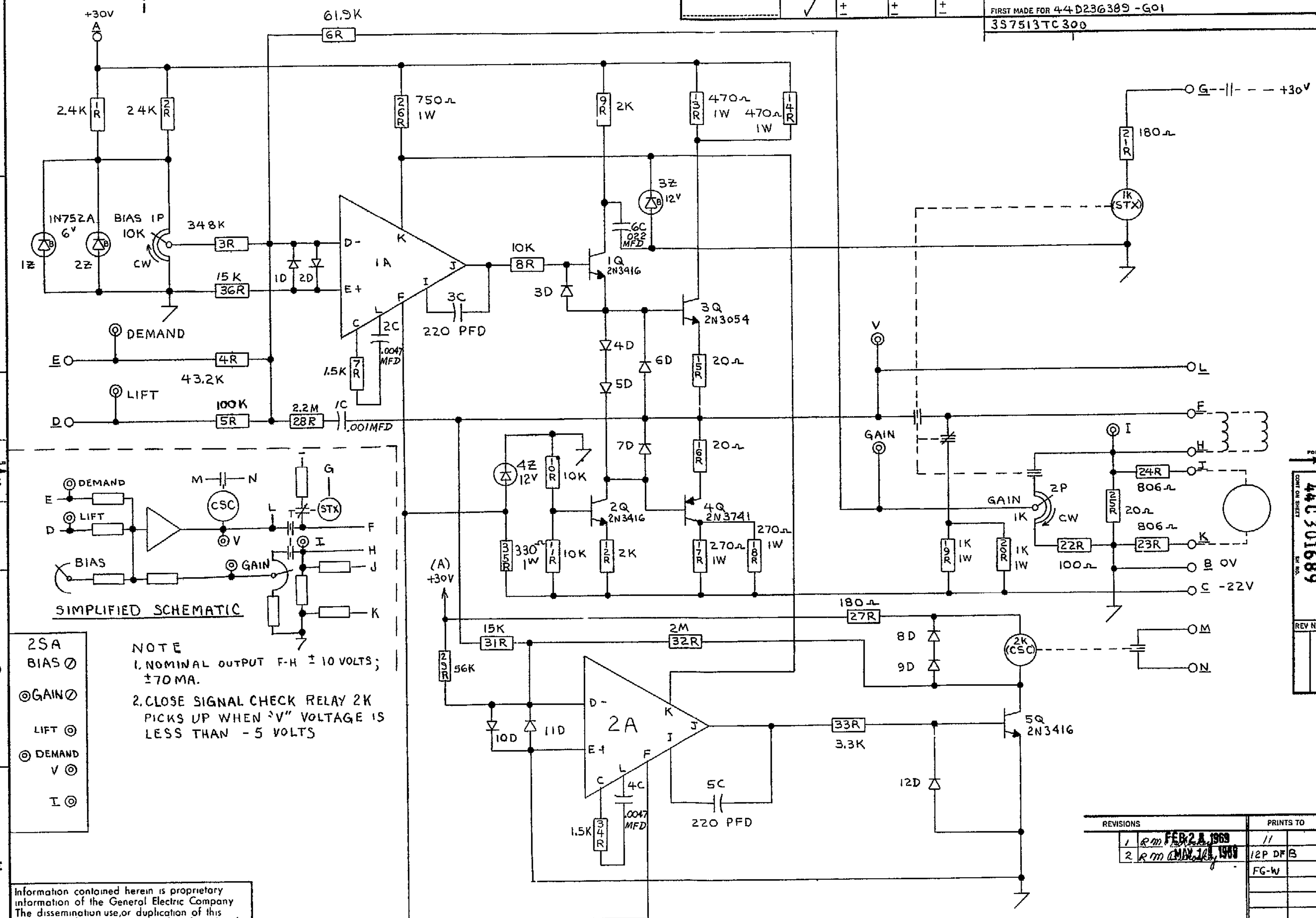
TITLE

FREQUENCY-VOLTAGE CONVERTER (2FVC)

FIRST MADE FOR

REVISIONS	PRINTS TO
	12P-DFB
	TGW

DRAFTSMAN	APPROVALS	SPECIALTY CONTROL	DIV. OF DEPT	44C301682
R. W. Templeton NOV 15 1968		WAYNESBORO, VA	LOCATION	CONT ON SHEET — SH NO
ISSUED OCT 3 1969				


+30V
A
61.9K
6R
2.4K 1R
24K 2R
750Ω 1W 26R
9R 2K
13R 470Ω 1W
470Ω 1W 14R
G --||- - - +30V
21R 180Ω
1K STX
IN752A 6V
1Z
2Z
BIAS 1P 10K CW
348K 3R
15K 36R
1D 2D
D- K 1A J I F L C E+
3C 220 PFD
2C .0047 MFD
1.5K 7R
10K 8R
3D
1Q 2N3416
6C .022 MFD
3Z 12V
3Q 2N3054
4D 5D 6D 7D
15R 20Ω
16R 20Ω
DEMAND
E
4R 43.2K
LIFT
D
100K 5R
2.2M 28R
1C .001MFD
4Z 12V
10R 10K
2Q 2N3416
4Q 2N3741
35R 330Ω 1W
11R 10K
12R 2K
17R 270Ω 1W
18R 270Ω 1W
V
L
F
GAIN
I
H
J
K
2P GAIN 1K CW
24R 806Ω
25R 20Ω
23R 806Ω
22R 100Ω
19R 1K 1W
20R 1K 1W
B 0V
C -22V
(A) +30V
180Ω 27R
15K 31R
2M 32R
29R 56K
8D 9D
2K CSC
M
N
10D 11D
D- 2A K J I F L C E+
4C .0047 MFD
1.5K 34R
5C 220 PFD
33R 3.3K
5Q 2N3416
12D
DEMAND
LIFT
BIAS
M N
CSC
V
GAIN
STX
G
SIMPLIFIED SCHEMATIC

NOTE

1. NOMINAL OUTPUT F-H ± 10 VOLTS; ±70 MA.
2. CLOSE SIGNAL CHECK RELAY 2K PICKS UP WHEN "V" VOLTAGE IS LESS THAN -5 VOLTS

2SA	
BIAS ⊘	
◎GAIN⊘	
LIFT ◎	
◎ DEMAND	
V ◎	
I ◎	

GENERAL ELECTRIC

44C301689

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE SERVO AMPLIFIER (2SA)

FIRST MADE FOR 44D236389-G01

3S7513TC300

REVISIONS	
1	RM FEB 24 1969
2	RM MAY 14 1969

PRINTS TO: 11, 12P DF B, FG-W

J. Wonderley NOV 25 1968
ISSUED DEC 2 1968

SPECIALTY CONTROL DEPT
WAYNESBORO, VA.

44C301689

FF 909 F (6-67) PRINTED IN U.S.A.

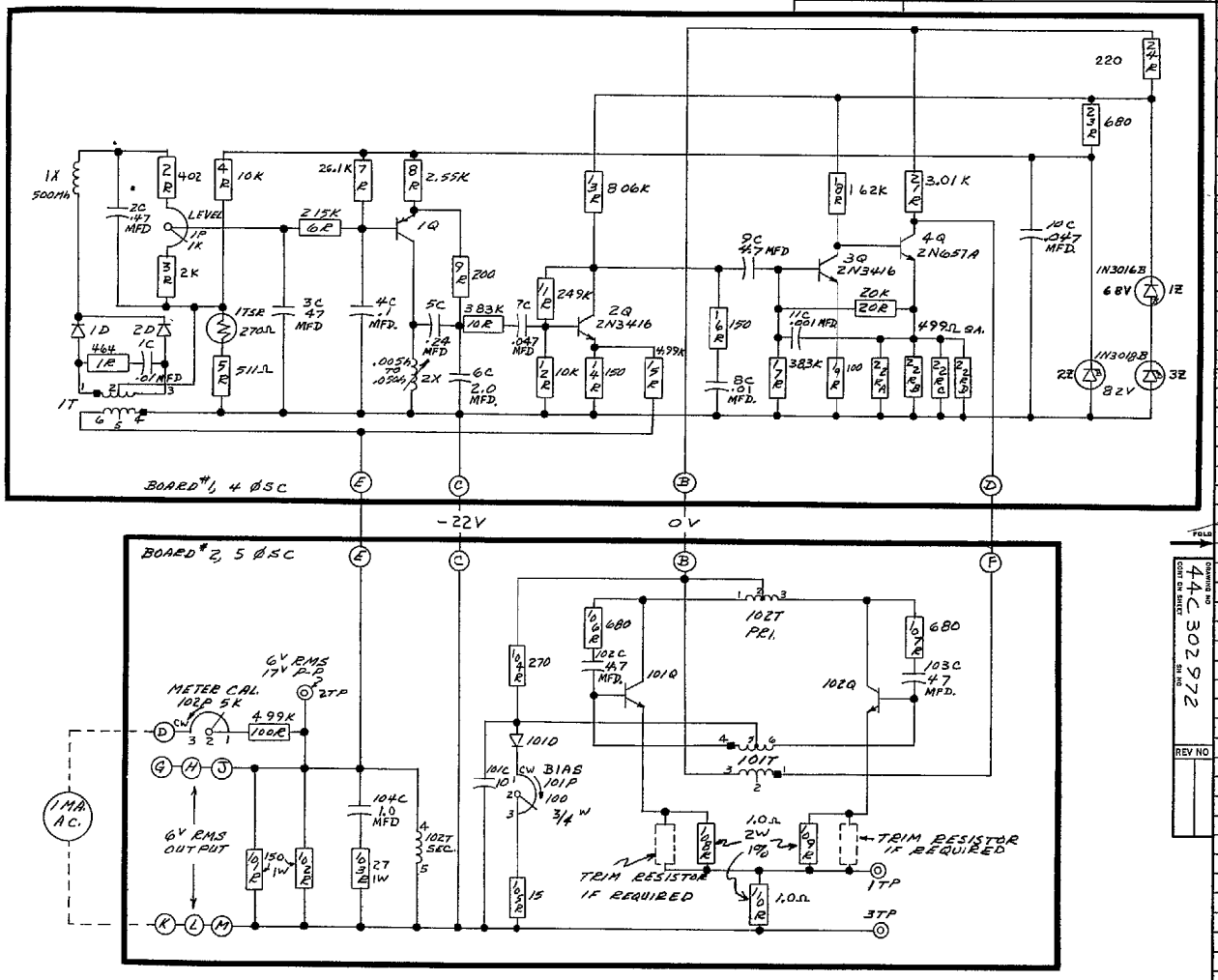
GENERAL ELECTRIC

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —				
APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE: 3KHZ OSCILLATOR BD.1 4 ØSC, BD.2 5 ØSC

FIRST MADE FOR BD.1 44D

BD.2 44D



OPERATION:

THIS OSCILLATOR CONSISTS OF 2 CIRCUIT BOARDS. BOARD 1 IS THE OSCILLATOR CONSISTING OF 1Q AND ASSOCIATED CIRCUITRY. FREQUENCY OF OSCILLATION IS SET BY VARIABLE INDUCTOR 2X. AMPLITUDE IS CONTROLLED BY 1Q BIAS, ADJUSTED WITH 1P. A PREAMPLIFIER CONSISTING OF 2Q, 3Q AND 4Q IS TRANSFORMER COUPLED TO THE POWER AMPLIFIER ON BOARD 2. NEGATIVE FEEDBACK FROM THE OUTPUT IS FED IN THROUGH 15R. THE POWER AMPLIFIER CONSISTS OF PUSH-PULL TRANSISTORS 101Q AND 102Q AND OUTPUT TRANSFORMER 102T. FEEDBACK TRANSFORMER 1T FEEDS A FULL WAVE RECTIFIER ON BOARD 1 TO CONTROL BIAS OF 1Q AND THE OUTPUT LEVEL AT 6 VOLTS RMS.

ADJUSTMENT:

1.0 PRELIMINARY

1P NONE REQUIRED
101P EXTREME CCW
102P NONE REQUIRED
2X MID RANGE (DO NOT FORCE)

2.0 ADJUST 2X FOR OSCILLATION AT 3KHZ.

3.0 ADJUST 101P FOR 0.8 VOLTS (+) TO (-). NOTE VOLTAGE SHOULD NOT EXCEED ± .040 VOLTS.

4.0 ADJUST 1P FOR OUTPUT OF 6 VOLTS RMS.

5.0 ADJUST 201P TO CALIBRATE EXTERNAL 1 MA OUTPUT METER.

REVISIONS	PRINTS TO
	11

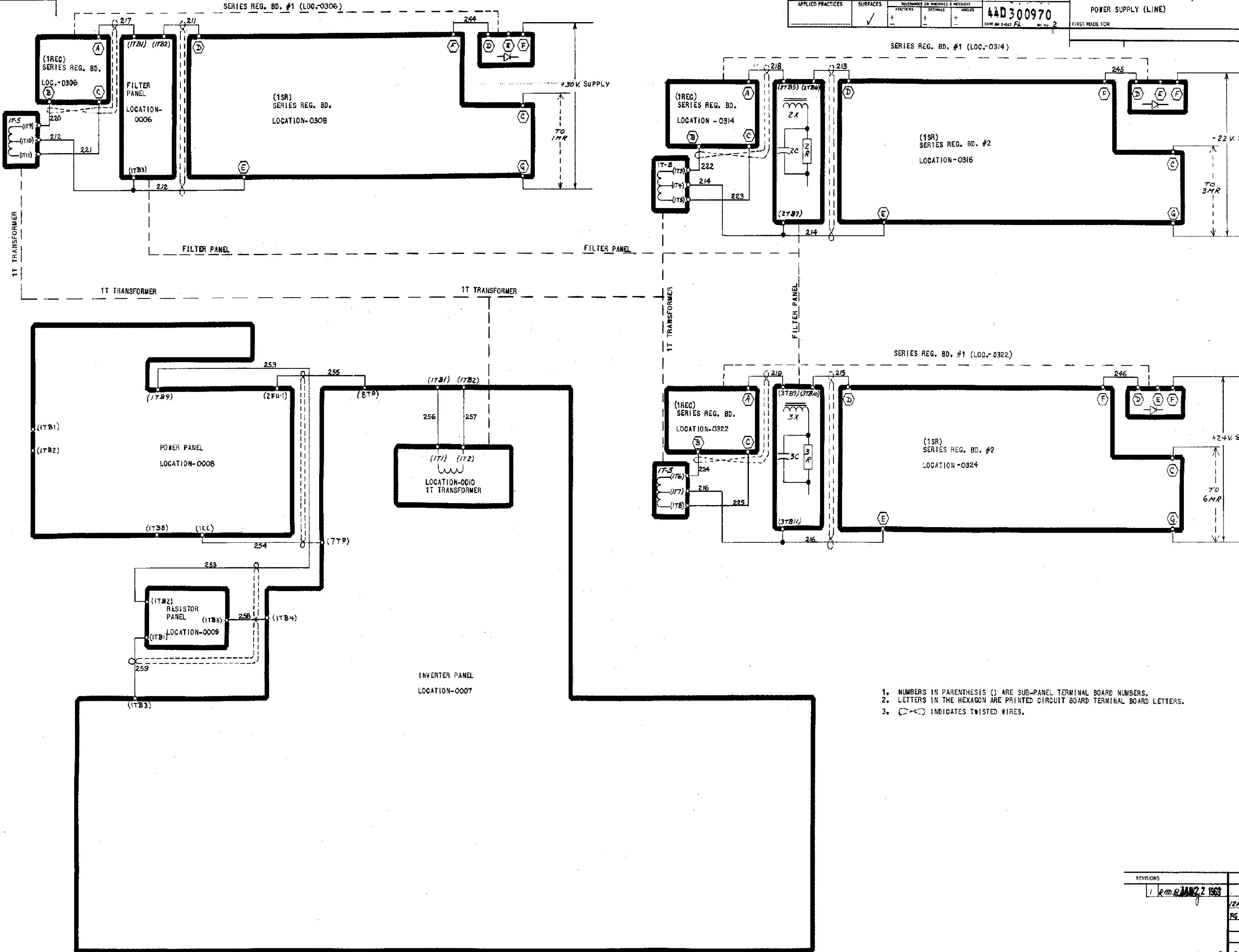
MADE BY ISSUED JUN 17 1969 — APPROVED — SPACE AVIONICS DIV OR DEPT JAYNI SBORO,VA. LOCATION — 44C302972 CONT ON SHEET SH NO

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±

REV NO. 44D300970 CONT ON SHEET FL. SH NO. 2

TITLE: POWER SUPPLY (LINE)

FIRST MADE FOR


SERIES REG. BD. #1 (LOC.-0306)
(1REC) SERIES REG. BD. LOC.-0306
FILTER PANEL LOCATION-0006
(1SR) SERIES REG. BD. LOCATION-0308
+30V. SUPPLY
TO 1MR
1T TRANSFORMER
FILTER PANEL
SERIES REG. BD. #1 (LOC.-0314)
(1REC) SERIES REG. BD. LOCATION-0314
(1SR) SERIES REG. BD. #2 LOCATION-0316
-22V. SUPPLY
TO 3MR
SERIES REG. BD. #1 (LOC.-0322)
(1REC) SERIES REG. BD. LOCATION-0322
(1SR) SERIES REG. BD. #2 LOCATION-0324
+24V. SUPPLY
TO 6MR
POWER PANEL LOCATION-0008
LOCATION-0010 1T TRANSFORMER
RESISTOR PANEL LOCATION-0009
INVERTER PANEL LOCATION-0007

1. NUMBERS IN PARENTHESIS () ARE SUB-PANEL TERMINAL BOARD NUMBERS.
2. LETTERS IN THE HEXAGON ARE PRINTED CIRCUIT BOARD TERMINAL BOARD LETTERS.
3. (>-<) INDICATES TWISTED WIRES.

REVISIONS	PRINTS TO
1 emr JAN 22 1969	11
	12RDG
	FG-W

D300969

C.W. Templeton JUN 11 1968 — ISSUED AUG 12 1968 — APPROVALS MBC — SPECIALTY CONTROL DEPT, WAYNESBORO, VA. — 44D300970 CONT ON SHEET FL. SH NO. 2

GENERAL ELECTRIC

44D303090

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:

APPLIED PRACTICES	SURFACES	FRACTIONS	DECIMALS	ANGLES
	✓	+ -	+ -	+ -

EHC ALIGNMENT DIAGRAM

FIRST MADE FOR 3S7513TC300A3 122451 & 122452

CONEMAUGH GROUP

ALIGNMENT INSTR. 44A301479

TACH: 5200 RPM @ 410 HZ PMG

VOLTAGE COMPARATOR SETTINGS

LOC	FUNCTION	OPERATING POINT
0218	10% SPEED	DO 41 HZ PMG
0219	60% SPEED	DO 246 HZ PMG
0220	105% SPEED	DO 430 HZ PMG
0210	120% SPEED	DO 4897 HZ SSPU
0114	REMOTE/LOCAL	DO +6.5V NTP
0115	HI REF.	DO +5V LTP

VALVE LIFT

	CONTROL	STOP LP	STOP HP	OUT VOLTS IDI, 0216
COT.	0"	0"	0"	(1)
EFF. O	7/8			
FULL OPEN	.13"	5.6"	1.41"	(2)
FULL LOAD LIFT	7/8 + 8.21"			

GAIN = (2) - (1) / 13 = VOLT / INCH

REF. STOPS 2LVG,0113 OUTPUT TP

	MAN	AUTO
LSS	0V	5.78V
HSS	5.329V	5.329V

COMPENSATION REG.-0211

TERMINALS J-K- JUMPERED

INST. REG.-EFF. ROT. 0.338

REG. 6% SEE INSTRUCTIONS

OVERSPEED INTEGRATOR, 0109

RATE 12±2%/MINUTE } SEE

LIMIT 120% SPEED } INSTRUCTIONS

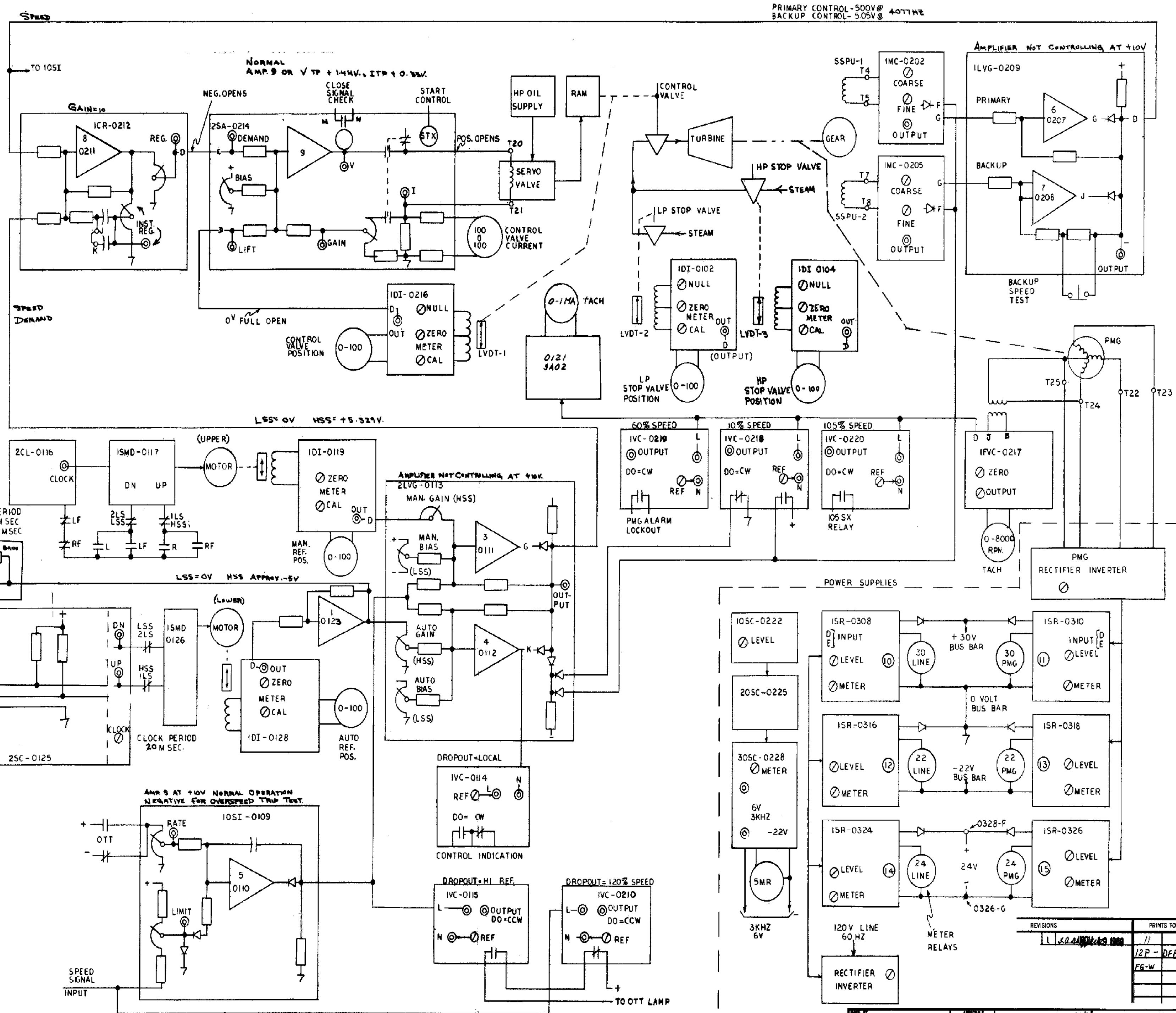
SERVO AMP-0215

BIAS } SEE

GAIN } INSTRUCTIONS

VOLTS LIFT/VOLT I = G (SEE ABOVE) / 1.22

METER RELAY SETTINGS: ±5% OF OPERATING POINT



SPEED
TO 10SI
GAIN=10
ICR-0212
8 0211
REG.
INST. REG.
NORMAL AMP. 9 OR V TP + 1.44V., ITP + 0.36V.
NEG. OPENS
2SA-0214
DEMAND
BIAS
LIFT
GAIN
CLOSE SIGNAL CHECK
START CONTROL
STX
POS. OPENS
T20
T21
HP OIL SUPPLY
RAM
SERVO VALVE
CONTROL VALVE CURRENT
SPEED DEMAND
0V FULL OPEN
CONTROL VALVE POSITION
IDI-0216
NULL
ZERO
METER
CAL
OUT
LVDT-1
0-1MA TACH
0121 3A02
CONTROL VALVE
TURBINE
HP STOP VALVE
STEAM
LP STOP VALVE
GEAR
LVDT-2
LVDT-3
IDI-0102
IDI 0104
(OUTPUT)
LP STOP VALVE POSITION
HP STOP VALVE POSITION
SSPU-1
SSPU-2
IMC-0202
IMC-0205
COARSE
FINE
OUTPUT
AMPLIFIER NOT CONTROLLING AT +10V
ILVG-0209
PRIMARY
BACKUP
6 0207
7 0208
BACKUP SPEED TEST
PMG
T22
T23
T24
T25
PRIMARY CONTROL-500V @ 4077HZ
BACKUP CONTROL-5.05V @
LSS= 0V HSS= +5.329V.
2CL-0116
CLOCK
ISMD-0117
DN UP
(UPPER)
MOTOR
IDI-0119
MAN. REF. POS.
CLOCK PERIOD SLOW 40M SEC FAST 4.17M SEC
LF
RF
2LS LSS
ILS HSS
AMPLIFIER NOT CONTROLLING AT +10V.
2LVG-0113
MAN. GAIN (HSS)
MAN. BIAS
(LSS)
3 0111
4 0112
AUTO GAIN
(HSS)
AUTO BIAS
(LSS)
OUT-PUT
60% SPEED
IVC-0219
OUTPUT
DO=CW
REF
PMG ALARM LOCKOUT
10% SPEED
IVC-0218
105% SPEED
IVC-0220
105SX RELAY
IFVC-0217
ZERO
OUTPUT
0-8000 RPM.
TACH
PMG RECTIFIER INVERTER
LSS=0V HSS APPROX.-5V
BOILER CONTROL
(LOWER)
ISMD 0126
0123
IDI-0128
AUTO REF. POS.
CLOCK PERIOD 20 M SEC.
2SC-0125
DN
UP
CLOCK
DROPOUT=LOCAL
IVC-0114
DO= CW
CONTROL INDICATION
AMP 5 AT +10V NORMAL OPERATION NEGATIVE FOR OVERSPEED TRIP TEST.
10SI-0109
RATE
LIMIT
5 0110
OTT
SPEED SIGNAL INPUT
DROPOUT=HI REF.
IVC-0115
DO=CCW
DROPOUT=120% SPEED
IVC-0210
TO OTT LAMP
POWER SUPPLIES
10SC-0222
LEVEL
20SC-0225
30SC-0228
METER
6V 3KHZ
-22V
5MR
3KHZ 6V
ISR-0308
INPUT
ISR-0310
ISR-0316
ISR-0318
ISR-0324
ISR-0326
30 LINE
30 PMG
22 LINE
22 PMG
24 LINE
24 PMG
+30V BUS BAR
0 VOLT BUS BAR
-22V BUS BAR
24V
0328-F
0326-G
120V LINE 60 HZ
RECTIFIER INVERTER
METER RELAYS

NOTE

TEST METER IN SWITCH POSITIONS 1 TO 9 READS OUTPUT OF AMPLIFIERS 1 TO 9. APPROX. 10 VOLTS FULL SCALE.

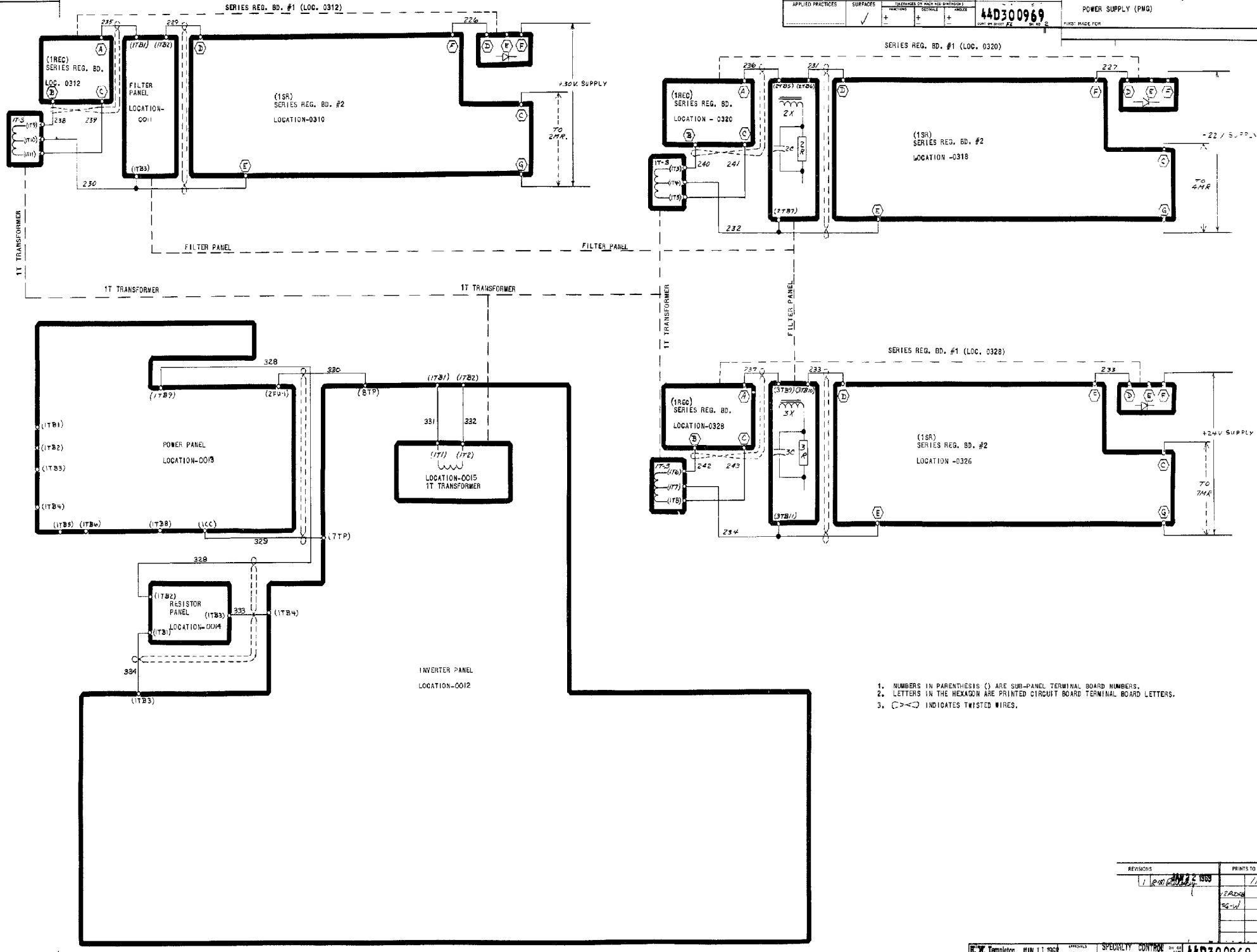
SWITCH POSITIONS 10 TO 15 READ OUTPUT CURRENT OF SERIES REGULATORS. SEE CIRCLED NUMBERS ON EACH ISR SYMBOL AT RIGHT APPROX. 5 AMPERES FULL SCALE

REVISIONS	PRINTS TO
1	11
	12P - DFB 2
	FG-W

SPECIALTY CONTROL

WAYNESBORO VA.

44D303090



1. NUMBERS IN PARENTHESIS () ARE SUB-PANEL TERMINAL BOARD NUMBERS.
2. LETTERS IN THE HEXAGON ARE PRINTED CIRCUIT BOARD TERMINAL BOARD LETTERS.
3. ⊃⊂ INDICATES TWISTED WIRES.

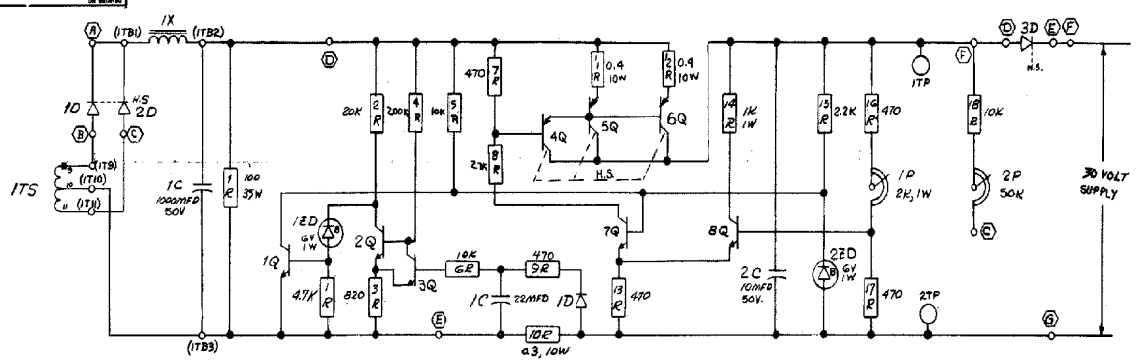
REVISIONS: 1 JAN 22 1969

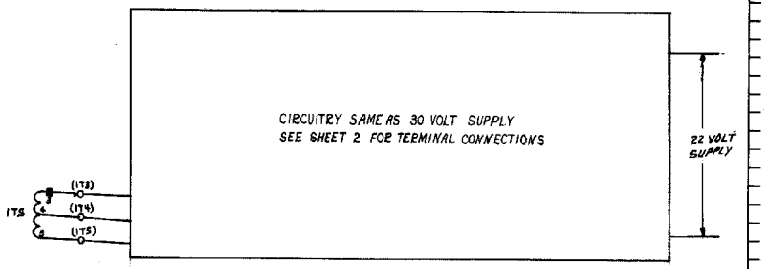
PRINTS TO: 11

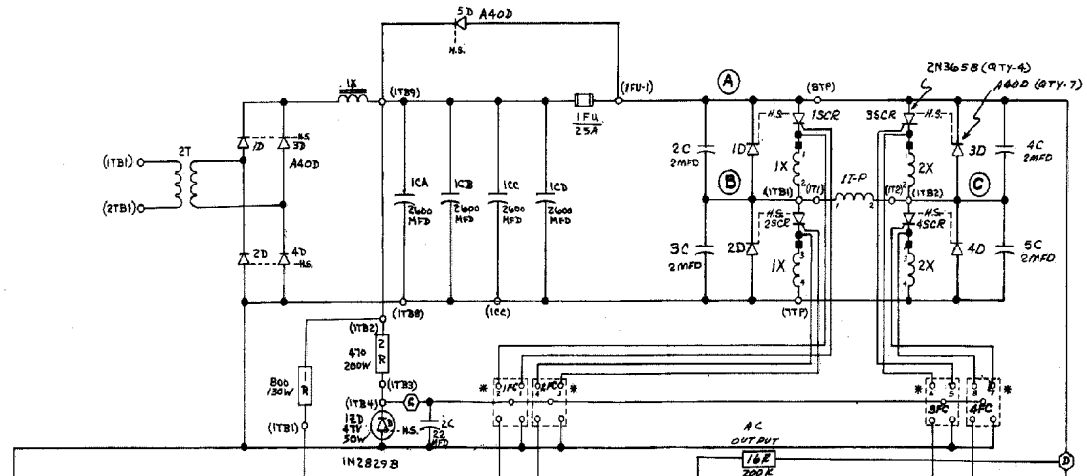
E.K. Templeton JUN 11 1968
AUG 12 1968
SPECIALTY CONTROL WAYNESBORO, VA
44D300969 SH NO 2

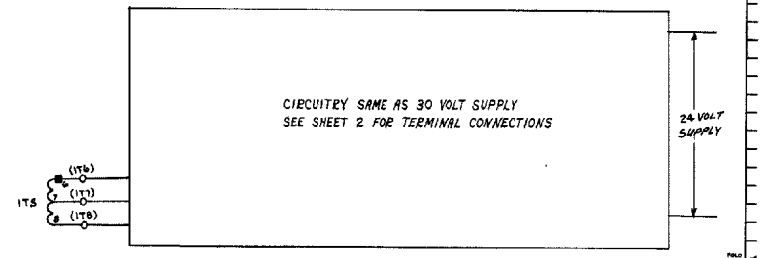
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ± | REV NO. 2 | 44D300970 CONT ON SHEET 2 SH NO 1

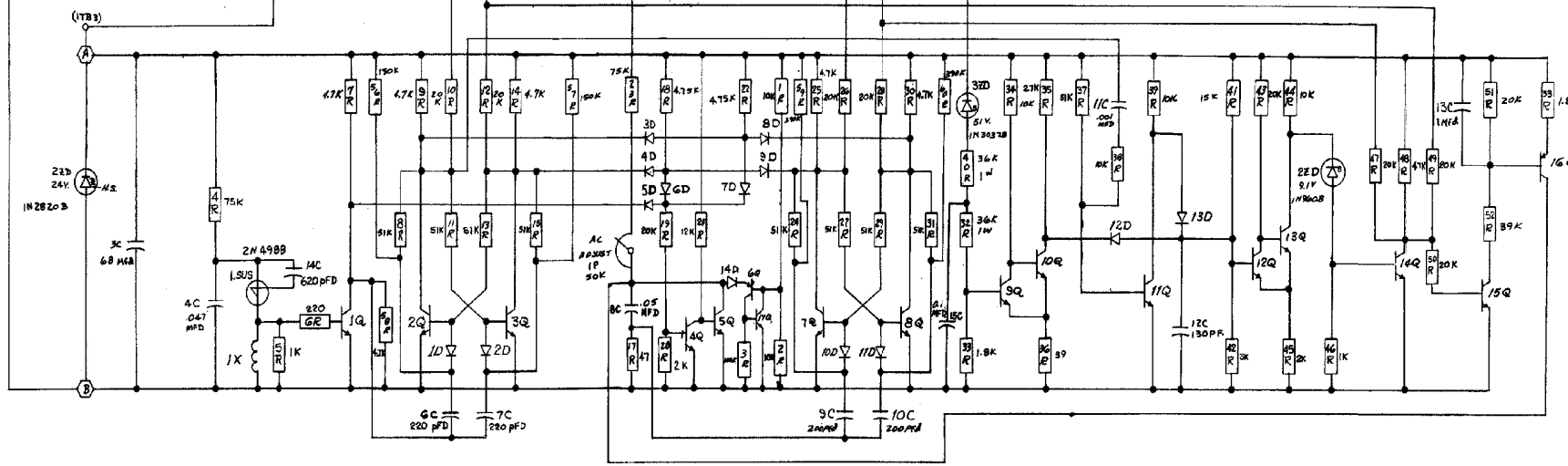
TITLE: POWER SUPPLY (LINE)
FIRST MADE FOR 8375E37C300
ELEMENTARY

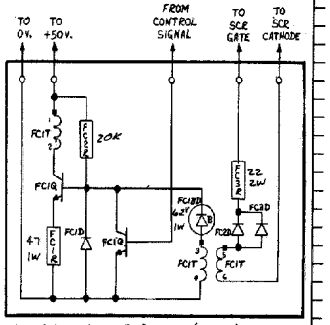












* FIRING CIRCUIT P.C. BOARD (QTY. 4)

NOTE: 1. SEE SHEET 2 FOR CIRCUITS VS. SUB-PANEL & P.C. BOARD BREAKDOWN.

REVISIONS		PRINTS TO
1	AUG 2 1963	12A-DFB 11
2	AUG 2 1965	FG-W
3	DEC 3 1965	

DRAWN J. MUMPERSLEY AUG. 6, 1968 AUG 12 1968 | APPROVALS H&C | LOCATION Waynesboro, Va. | 44D300970 REVISION SHEET 2 REV NO. 1

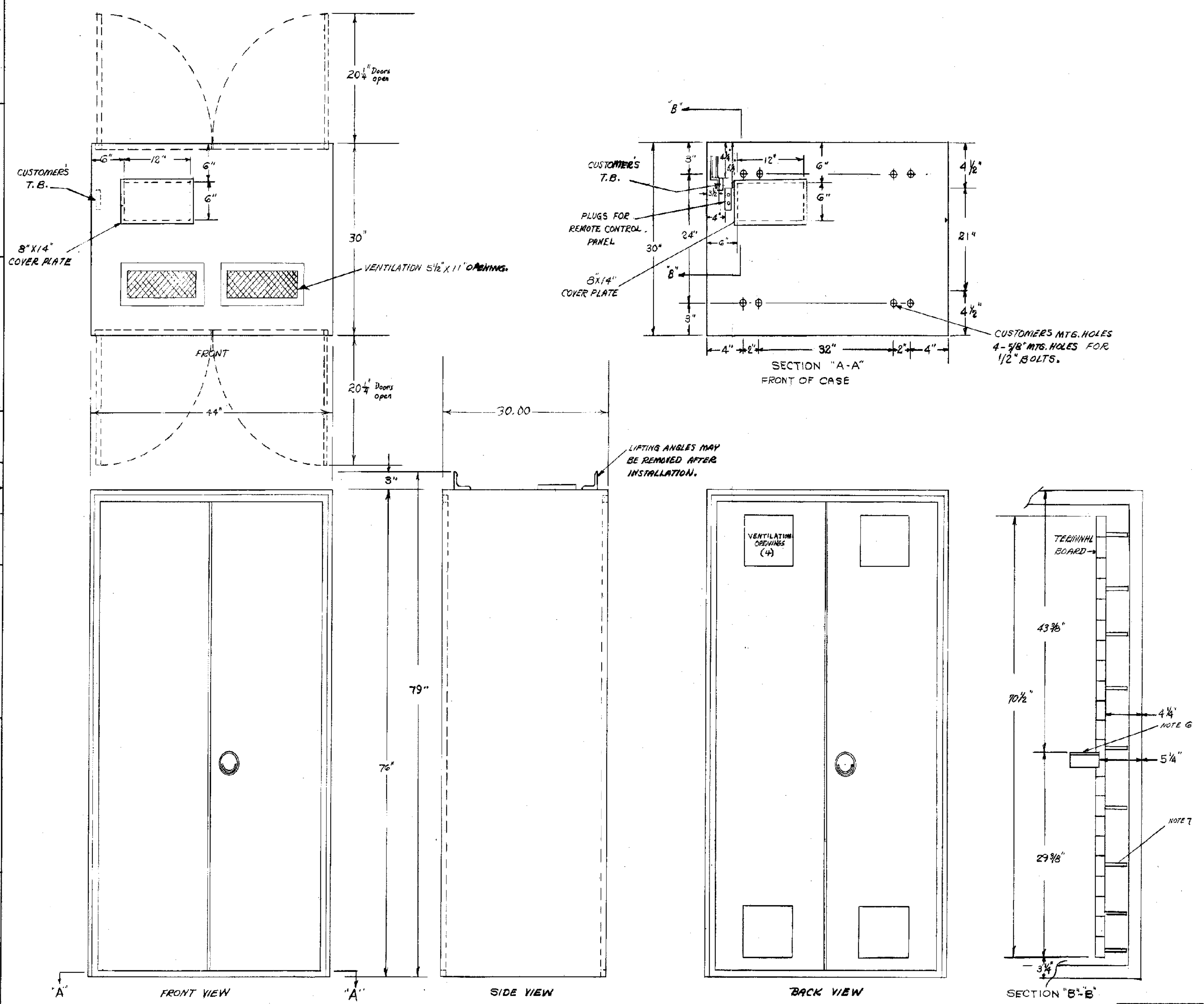
GENERAL ELECTRIC 44D300043

ELECTRONIC FEEDPUMP TURBINE CONTROL

FIRST MADE FOR 3S7513TC300R2

CABINET OUTLINE

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS



NOTES:

1. ONE CABINET REQUIRED FOR EACH BOILER FEED PUMP TURBINE.
2. ESTIMATED WT. 1500 LBS.
3. MAXIMUM AMBIENT TEMP. 40°C
4. FINISH OUTSIDE: ASA49 GRAY
   INSIDE: GLOSS WHITE LACQUER
   DOORS: BLUE AIR DRY LACQUER
5. CABINET HAS LOOSE PIN REMOVABLE HINGED DOORS.
6. DISCONNECTION OF CABINET/REMOTE CONTROL CABLE ENTRANCE EITHER FROM TOP ☐ OR BOTTOM ☐ AS CUSTOMER DESIRES. (CUSTOMER TO CHECK ONE BLOCK.)
7. CUSTOMER'S PROVISIONS FOR STRAPPING CABLE RUN NEXT TO CUSTOMER'S TERMINAL BOARDS.

REVISIONS | PRINTS TO

MADE BY C. Fischer — ISSUED NOV 21 1967 — APPROVALS R.R.N.

SPECIALTY CONTROL DEPT. WAYNESBORO, VA. 44D300043 SH. NO. 1

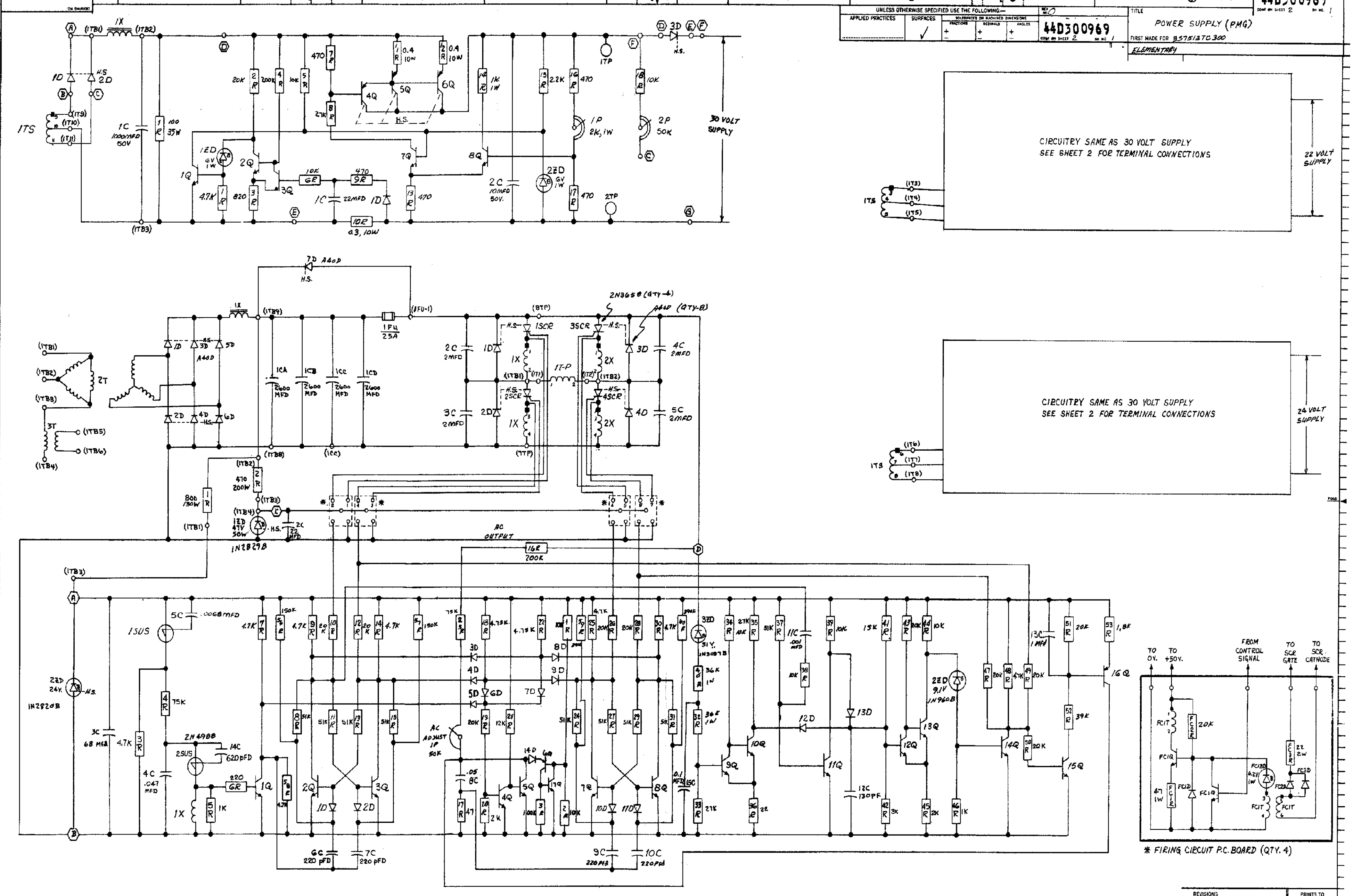
GENERAL ELECTRIC 44D300969 CONT ON SHEET 2 SH NO. 1

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± | DECIMALS ± | ANGLES ±

TITLE: POWER SUPPLY (PMG)

FIRST MADE FOR 3S75I37C300

ELEMENTARY



* FIRING CIRCUIT P.C. BOARD (QTY. 4)

NOTE: 1. SEE SHEET 2 FOR CIRCUITS VS. SUB-PANEL & P.C. BOARD BREAKDOWN.

REVISIONS | PRINTS TO

44D300969 CONT ON SHEET 2 SH NO. 1

COMMUNICATION AND CONTROL DEVICES DEPARTMENT

GENERAL ELECTRIC

WAYNESBORO, VA.

6-70(500)