TITLE
CIRCUIT BOARD SPECIFICATIONS
VALVE POSITION DRIVER 169C4773, 1F1-F3
VALVE POSITION DRIVER - AMS 186C8105, 1F1-F4
FIRST MADE FOR EHC MARK II

P3K-AL-0656-A01

CONT ON SHEET 4 SH NO. 3

REVISIONS

1 CHANGE MAY 16 1983
CHG. THIS SHT.

F. 3 KHZ OSCILLATOR (continued)

2. Distortion

a. FET (2N3822) Distortion

Adjusting VR50 too far CW will cause the output TP12 to distort. Check distortion by centering the signal on both the amplitude and sweep coordinates as shown in Figure 3. Distortion occurs when $|T_1 - T_2| > 10$ usec. and can be eliminated by backing down on VR50 (TP50).

b. Saturation Distortion

Saturation will occur when $|V_{peak\ TP12}| > V_{TP1}$ or V_{TP2} and is eliminated by decreasing VR51.

3. V_{Gate} (V_{TP50}) Setting

Adjust VR50 so that the oscillator runs at the upper limit of linearity ($|T_1 - T_2| \approx 10$ usec); i.e:

$$|V_{GATE}| \approx |V_{GATE\ FET\ DIST}| - .010$$

Operation around this point gives maximum temperature and load change stability. A sampling of 25 FET's has shown the upper limit to be:

$$-2.6 < V_{GATE} < -1.0$$

adjust VR ~~50~~ 50 for ~~-2.0~~ -2.5 VDC at TP ~~51~~ 100. ③ with VR 51 ccw

4. Amplitude Setting

Adjust VR51 for V_{TP} ~~2~~ 3 = 6.000 ± .010 VRMS.

5. Frequency

$3000 < f < 3400$ Hz

6. Regeneration

The oscillator must restart in all of the following situations:

a. Simultaneously interrup the +22 VDC and the -22 VDC power. Reconnect.

b. Interrupt the +22 VDC power. Reconnect.

set VR50 for 2.5 VDC at TP50
set VR51 for 6 VRMS at TP3

PRINTS

REV NO. 1

P3K-AL-0656-A01

CONT ON SHEET 5 SH NO. 4

TITLE
CIRCUIT BOARD SPECIFICATIONS
VALVE POSITION DRIVER 169C4773, 1F1-F3
VALVE POSITION DRIVER - AMS 186C8105, 1F1-F4
FIRST MADE FOR EHC MARK II

REVISION

MAY 16 1983

NO CHG THIS SHT

F. 3 KHZ OSCILLATOR (continued)

6. Regeneration (continued)

c. Interrupt the -22 VDC power. Reconnect.

d. Withdraw and insert the Valve Position Driver Board.

7. Temperature Stability

This test may be conducted with oscillator unloaded.

With V_G set as in Step 3 at ambient temperature (T_A) then:

$|\Delta V_{TP12}| \leq .060$ VRMS $(T_A \leq T \leq 130^\circ F)$

A small change in V_G may be necessary to meet this spec. If $\Delta V_{TP12} > +.060$ for $T_A \leq T \leq 130^\circ F$, decrease V_{GATE}. If $\Delta V_{TP12} > -.060$, increase V_{GATE}.

8. Load Variance

No transducer position should change V_{TP12} more than .15 mv RMS.

$\Delta V_{TP12} \leq .015$ VRMS

9. Envelope Modulation

Envelope modulation should not exceed .015V ptp.

G. DEMODULATOR

V_{TP12} = 6 VRMS

1. Fully extend the transducer to its linear limit (as in valves wide open position) and adjust VR3 so that:

V_{TP8} = 0.000 ± 0.010 VDC

a. Verify V_{TP7} by Figure 4.

b. Verify V_{TP52} by Figure 5.

P3K-AL-0394-A01
CONT ON SHEET 2 SH NO. 1

REVISIONS
① PAUL OCT 27 1981 no chg. this sht

A. BOARD CONTENTS

The board assembly contains:

1. 3 KHz oscillator
2. 4 ea. regulated power supplies
3. 4 ea. rectifier demodulator circuits with adjustments in both meter zeroing and range.
4. Connections to accomodate 4 position transducers and their corresponding panel meters.

B. TEST SETUP

See Figure 1.

C. POWER SUPPLIES (INITIAL CHECK)

1. VTP1: 15.7 ± 1.0 VDC
2. VTP2: -15.7 ± 1.0 VDC
3. VTP51: 15.0 ± 0.75 VDC @ T_{room}, < 16.5 VDC, hot
4. VTP52: -15.0 ± 0.75 VDC @ T_{room}, > -16.5 VDC, hot

USE

D. 3 KHZ OSCILLATOR → See P3K-AL-0656-A01 marked up & DO.

see Mark

All tests, except that for temperature sensitivity, are to be done with the oscillator normally loaded.

1. Initial Starting

Adjust VR50 to mid range and observe TP3 with a scope (2 volt/div amplitude, 50 us/div sweep). If necessary readjust for a non-distorted sine wave.

2. Distortion

a. FET (2N3822) Distortion

Adjusting VR50 too far CW will cause the output TP3 to distort. Check distortion by centering the signal on both the amplitude and sweep coordinates as shown in Figure 2. Distortion occurs when $|T_1 - T_2| > 10$ usec and can be eliminated by backing down on VR50 (TP50).

b. Saturation Distortion

Saturation will occur when Vpeak TP3 > Vzener and is eliminated by decreasing VR51.

273-2
273-12
273-71
273-138
273-221
273-221

PRINTS TO

REVISIONS
① PAulis OCT 27 1981
* Clar. made

D. 3 KHZ OSCILLATOR (continued)

3. VGATE (VTP50) Setting

Adjust VR50 so that the oscillator runs at the upper limit of linearity ($|T_1 - T_2| \leq$ 10 usec); ie:

$$|V_{GATE}| \approx |V_{GATE\ FET\ DIST}| - .010$$

Operation around this point give maximum temperature and load change stability. A sampling of 25 FET's has shown the upper limit to be:

$$-2.6 < V_{GATE} < -1.0$$

4. Amplitude Setting

Adjust VR51 for $V_{TP3} = 6.000 \pm .010$V RMS.

* 5. Frequency

$$3000 < f < 3400 \text{ Hz}$$

6. Regeneration

The oscillator must restart in all of the following situations:

a. Simultaneously interrupt the +22 VDC and the -22 VDC power. Reconnect.

b. Interrupt the +22 VDC power. Reconnect.

c. -22 VDC power. Reconnect.

d. Withdraw and insert the Valve Pos. Demodulator board.

7. Temperature Stability

This test may be conducted with oscillator unloaded. With V_G set as in Step 3 at ambient temperature (T_A) then:

$$\Delta V_{TP3} \leq .060 \text{ VRMS } (T_A \leq T \leq 130\,^{o}F)$$

A small change in V_G may be necessary to meet this spec. If $\Delta V_{TP3} >$ +.060 for $T_A \leq T \leq 130^oF$, decrease V GATE. If $\Delta V_{TP3} >$ -.060, increase VGATE.

8. Load Variance

No combination of transducer positions should change V_{TP3} more than 10 mv RMS. $\Delta V_{TP3} \leq .010$ V RMS

REVISION

OCT 27 1981
No chg. this sht

D. 3 KHZ OSCILLATOR (continued)

9. Envelope Modulation

Envelope modulation should not exceed .015V ptp.

E. POWER SUPPLIES

With the oscillator loaded at 6V RMS:

1. Steady State

With Ammeters on pins 37 and 41:

a. +22 VDC: $I_{board} \approx 170 \pm 25$ ma

b. -22 VDC: $I_{board} \approx -140 \pm 25$ ma

2. Transients

To check the presence and value of C5 and C7, connect the +22 and -22 VDC. In both at TP51 and TP52:

$$t_{rise} > 0.5 \text{ m sec.}$$

F. DEMODULATORS

With $V_{TP3} = 6.000 \pm .010$V RMS.
Check the minimum and maximum sensitivity of each circuit, where:

$$\text{Sensitivity} = \frac{\text{\% meter movement}}{\text{1" xducer displacement}}$$

In both cases, zero the meter when the transducer rod is inserted (valves closed position).

$$8.6 < \text{Sensitivity min} < 9.5$$

$$28 < \text{Sensitivity max} < 35$$

PRINTS TO

REV NO. 01

P3K-AL-0394-A01
CONT ON SHEET 5 SH NO. 4

TITLE
SPECIFICATIONS AND TEST INSTRUCTIONS
VALVE POSITION DEMODULATOR CKT. BD. ASM. DWG. 115D2248

FIRST MADE FOR EHC MARK II

REVISIONS
① C.P.Allis OCT 27 1981 no chg. this sht

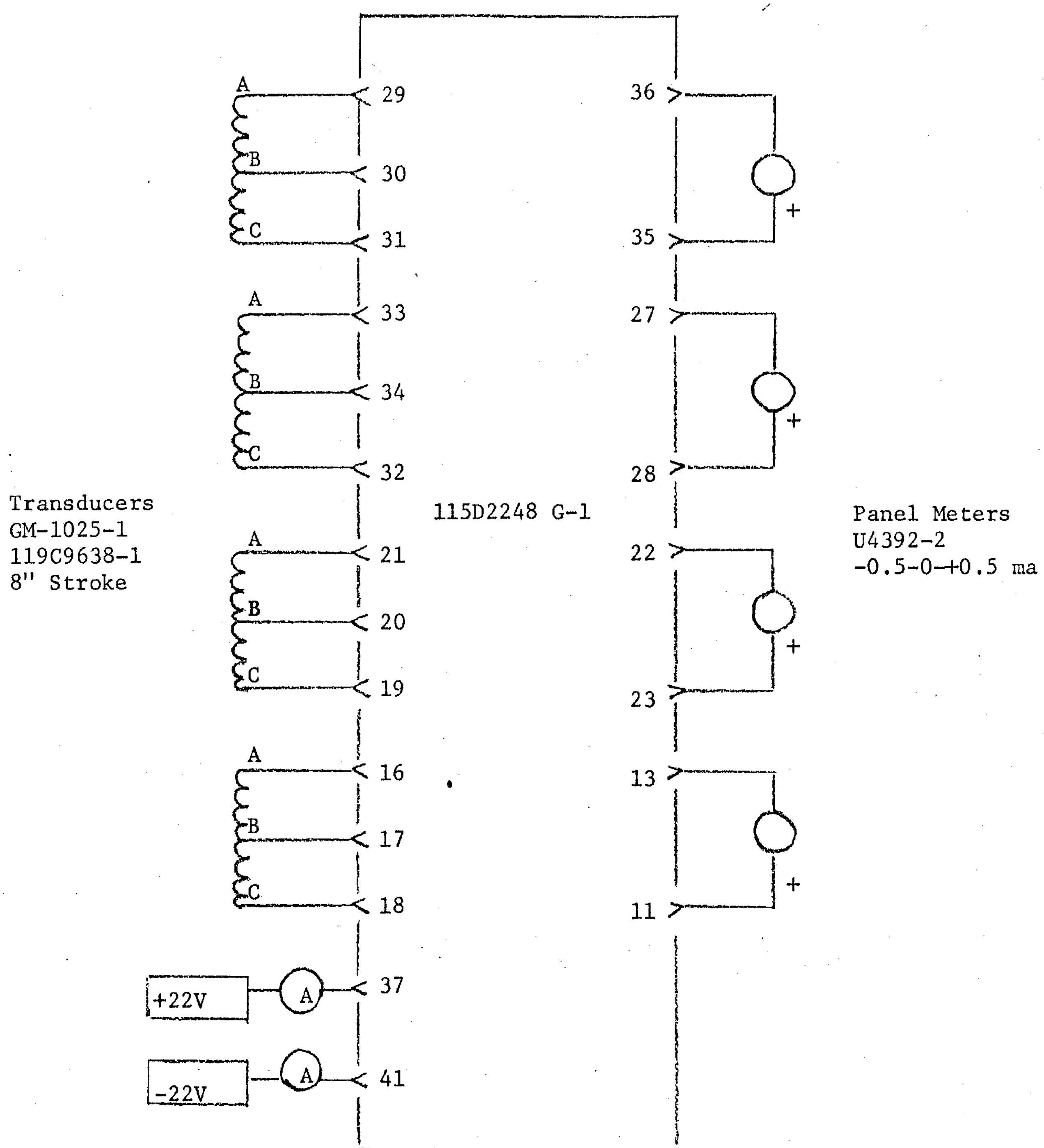

FIGURE 1: TEST SETUP

PRINTS T

MADE BY	APPROVALS		
J. Polacek Sept. 15, 1977		Steam Turbine — DIV OR DEPT.	P3K-AL-0394-A01
ISSUED SEP 20 1977		Schenectady, N.Y. — LOCATION	CONT ON SHEET 5 SH NO. 4

TITLE
SPECIFICATIONS AND TEST INSTRUCTIONS
VALVE POSITION DEMODULATOR CKT. BD. ASM. DWG. 115D2248
FIRST MADE FOR EHC MARK II

REVISIONS
① OCT 27 1981 no chg. this sht

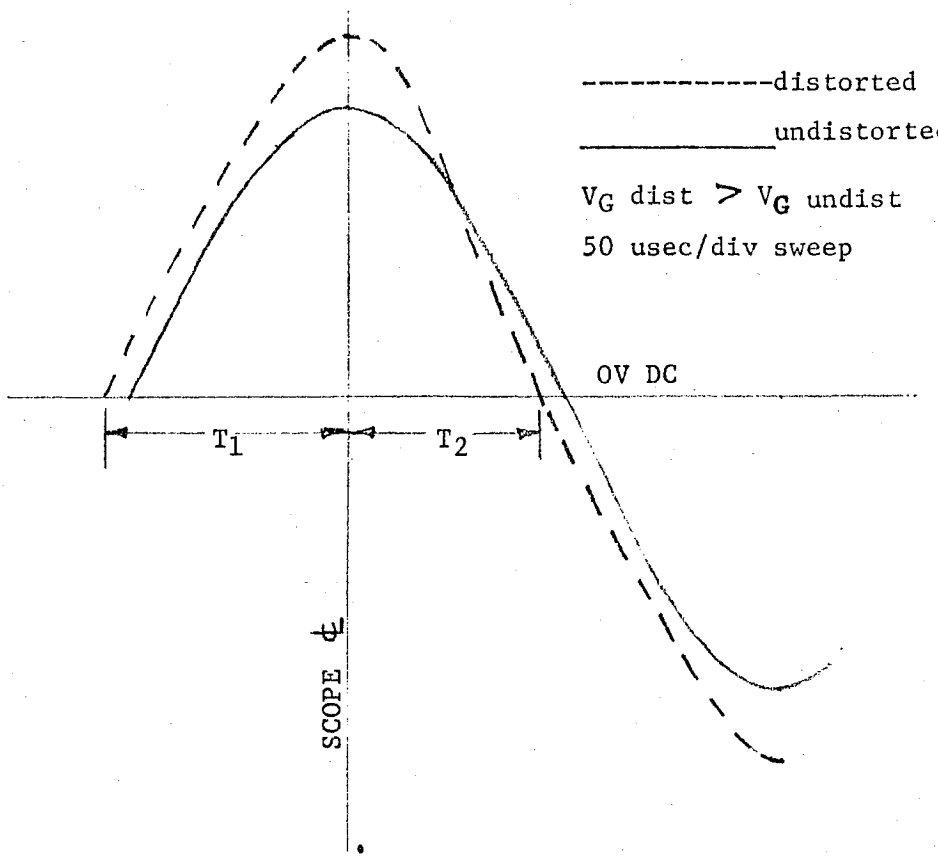

FIGURE 2 FET DISTORTION - $|T_1 - T_2| > 10$usec

PRINTS T

GENERAL ELECTRIC

P3K-AL-0394-A01
CONT ON SHEET SH NO. 6

REV NO. Ø1

P3K-AL-0394-A01
CONT ON SHEET SH NO. 6

TITLE
SPECIFICATIONS AND TEST INSTRUCTIONS
VALVE POSITION DEMODULATOR CKT. BD. ASM. DWG. 115D2248
FIRST MADE FOR EHC MARK II

REVISIONS
① OCT 27 1981 [illegible] no chg. this sht

PREPARED BY S S Abelson DATE 2/27/74
S.S. Abelson SSA 9/24/81
EHC DESIGN ENGINEERING

APPROVED BY P C Callan DATE 9-6-77
P.C. Callan - MANAGER
EHC DESIGN ENGINEERING

TEST PROCEDURE
REVIEWED BY DATE
R. Debertolis
EHC TEST ENGINEER

PRINTS TO

MADE BY J. Polacek Sept. 15, 1977
ISSUED SEP 20 1977
APPROVALS
Steam Turbine DIV OR DEPT.
Schenectady, N.Y. LOCATION
P3K-AL-0394-A01
CONT ON SHEET SH NO. 6
CODE IDENT N

FP-803-WA (4-73)
PRINTED IN U.S.A.