REV NO.

P3K-AL-0451-A01

CONT ON SHEET 2 SH NO. 1

TITLE

TEST INSTRUCTIONS FOR MAIN STOP VALVE AMPLIFIER 1L1-F005
(ASSEMBLY DRAWING 125D3618 G1)
FIRST MADE FOR EHC MARK II

REVISIONS

I. SCOPE

This instruction outlines the test specifications for circuit board 1L1-F005 (Ref. Drawing 125D3618 G1-Schematic 125D2008)

II. CIRCUIT DESCRIPTION

The purpose of the main stop valve amplifier circuit is to produce a flow reference signal for the number two valve position unit.

This version of the MSVA circuit is to be used on those turbines that have starting and loading on the control valves and use the number two main stop valve bypass valve for warming.

A speed error signal is summed with a warming rate signal at the input of an IC Op-Amp. The speed signal serves to control an overspeed condition only during rotor-shell warming.

This circuit does not have an emitter follower power amplifier due to the small load requirement.

The output has a "maximum flow reference" limit circuit that determines the maximum positive signal that can be obtained. A plus and minus 15.7 volt zenered power supply furnishes the IC with necessary voltages.

During rotor-shell warming the speed error signal is connected to the Op-Amp input by opening the connection between pins 26 and 27.

The warming rate signal is connected to the Op-Amp input by opening the connection between pins 24 and 25 during both the Rotor Shell and Chest Warming modes.

When the chest warming mode is selected the speed error signal is shorted to ground by connecting pin 26 to pin 27.

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III. CIRCUIT SPECIFICATIONS

A. POWER SUPPLY REQUIREMENTS

1. Power Supply 1: ±22.000 ± 0.002 VDC
   (Pin 37) at 260 MA (approx.)

2. Power Supply 2: -22.000 ± 0.002 VDC
   (Pin 41) at 150 MA (approx.)

B. OPERATING SIGNAL LEVELS

1. Input 1 (Speed Error Signal): ± 10 VDC (0 volts, 1 volt/1% speed error)

2. Input 2 (Warming Rate Signal): +0.5 to -10 VDC
   (+0.5 volts closed valve, -10 volts maximum rate) (cnntrolled by warming rate pot)

C. OUTPUT LOADS

1. Load 1: * 50K Ohms ± 1% (Max Load)
   (Pin 10)

D. INDIVIDUAL STAGE PERFORMANCE SPECIFICATIONS

1. Power Supply (CR1, 2, 3, and 4, R1 and 2)

   a. TP1: +15.7 ± 1.0 VDC
   b. TP2: -15.7 ± 1.0 VDC

2. Main Stop Valve Amplifier (IC1) *

   a. Acceptable offset at TP4
   (zero input): ± 1.0m VDC
   (Adjustable through VR50 - adjustment point should be at least two turns away from either pot ends)

   b. Transfer function for Speed Error Signal
   (R7, R8, R9, R14, C2)

$$\frac{TP4}{TP8} = \frac{-G1}{1 + T_1 S}$$

   Where: Gain (G1) = -2.000 ± .040 volts/volt
   Noise Suppression Lag Time Constant (T1) = 1.49 ± .09 msec.
   Noise Suppression Breakpoint (F1) = 107 ± 6 HZ

   c. Transfer Function for Warming Rate Signal
   (R21, R22, R23, R14, C4)

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III. CIRCUIT SPECIFICATIONS (continued)

D. (continued)

2. c. (continued)

$$\frac{TP4}{TP7} = \frac{-G1}{1 + T_3 S}$$

Where: Gain (G4) = 1.000 ± .020 volts/volt
Noise Suppression Lag Time Constant (T4) = 1.61 ± .18 msec.
Noise Suppression Breakpoint (F3) = 100 ± 11 HZ-

d. Saturation Limits (TP5)

± 13 VDC (minimum)

3. Voltage Divider Network for Rotor Warming Potentiometer (5K connected from pin 21 to pin 22).

VR4 POSITION	VR5 POSITION	VOLTATE AT PIN 21
CCW	CCW	+2.487 ± 1.354 VDC
CW	CCW	+10.691 ± 0.634 VDC
CCW	CW	-3.814 ± 1.082 VDC
CW	CW	+5.218 ± 0.539 VDC

4. Voltage Divider for Max. Flow Ref.
*(50K 1% load connected to pin 10). IC1 driven into positive saturation.

VR2 POSITION	VOLTAGE AT TP4
CCW	* 6.450 ± 0.352 VDC
CW	* 11.688 ± 0.110 VDC

IV. SET POINTS

A. Adjustment of VR50

With zero input to IC1 VR50 should be adjusted so that TP4 voltage is ± 1.0 mV.

B. Adjustment of VR4, VR5

With warming rate potentiometer (5K) connected between pins 21, 22 and wiper connected to pin 23, VR4, VR5 should be adjusted so that the range of TP7 voltage is -10.000 VDC to +0.500 VDC.

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TEST INSTRUCTIONS FOR MAIN STOP VALVE AMPLIFIER 1L1-F005
(ASSEMBLY DRAWING 125D3618 G-1)

FIRST MADE FOR EHC MARK II

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C. Adjustment of VR2

With 1C1 in saturation, adjust VR2 for +10.000 VDC at TP4.

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APPROVALS

Steam Turbine DIV OR DEPT.

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REVISIONS

PREPARED BY M J Sindoni DATE 4/18/75
M.J. Sindoni
EHC DESIGN ENGINEERING

APPROVED BY P C Callan DATE 9-12-77
P.C. Callan - MANAGER
EHC DESIGN ENGINEERING

TEST PROCEDURE
REVIEWED BY R. W. Debertolis DATE 9-9-77
R. Debertolis
EHC TEST ENGINEER

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