Use Mark III servo amp tester kit H0339
+ Transducer H188540

1302J86
MCV SERVO AMPLIFIER
p1302J86 GE13

MARK III
PC BOARD TEST

REV. D
SHEET 1 of 3

UNIT _____
PO# _____

ASSEMBLY DRAWING
4161J28G1,G2,G3,G4,G5

PC BOARD DRAWING
4116J16-3,4

SERIAL # _____
DATE TESTED _____
TESTER _____

SCHEMATIC DRAWING
879E622

TEST KIT
Mk III Servo Amp Test Kit

1.0   INSPECTION

.1 IDENTIFICATION ____   .3 SOLDER/WIRE ____   .5 KEY SLOT ____

.2 COMP./ CONN. ____   .4 TEMP CYCLE ____   .6 _____

.7 _____

REMARKS: REV. D CHANGES REFER TO M.I. 1057, 1058. ALSO LUO CHANGE REQUEST 470 AND D.O. NOTE
84-L-14. J.A.W. 8/9/84.

2.0   SET UP

Check The Value of R41 To See If Its The Right Value For to Cur Group You Are Testing.

2.1   APPLY +15 VDC, -15 VDC, AND POWER SUPPLY COMMONS TO TEST KIT.
2.2   APPLY 3KHZ 6 VRMS TO SERVO BOARD TEST KIT. *Use RMS meter.* _____
2.3   CONNECT 15 INCH TRANSDUCER TO TRANSDUCER INPUT CABLE. *GM5005 15 inch* _____
2.4   SET S1 TO 40 MA FOR G1, G2, G4 AND G5, 80 MA FOR G3. _____
2.5   SET S2 TO MCV. _____
2.6   SET S3 TO MCV. *} DEPENDS ON TRANSDUCER*
2.7   SET M2, DISCONNECT SWITCH TO OUT POSITION.
2.8   PLUG P.C. BOARD INTO TEST KIT.
2.9   CONNECT JUMPER PIN 2 TO PIN 30. _____

3.0   POWER SUPPLY CHECKS

3.1   READ TP2 VOLTAGE +15 VDC. _____ VDC
3.2   READ TP2 VOLTAGE (LESS THAN 20 MVPP) _____ MVPP
3.3   READ TP1 VOLTAGE -15 VDC. _____ VDC
3.4   READ TP1 VOLTAGE (LESS THAN 20 MVPP). _____ MVPP

4.0   TRANSDUCER NULL ADJUSTMENTS

4.1   SET POSITION TRANSDUCER TO TOP SYNC. *3.1in FROM BODY (see Mk III sheet)*
4.2   ADJUST (7) ~~R68~~ AND (6) ~~R68~~ FOR LESS THAN 0.02 VRMS AT TP10.
4.3   READ TP9, 0.0 ±0.05 VDC. *.002* _____ VDC
      R68   R68

5.0   GAIN CHECK

5.1   SET TRANSDUCER FOR 0.0 ±0.01 VDC AT TP9 TO TP11.
5.2   SET R86 FOR +12.00 VDC AT R85 L. READ TP6 TO TP11, -12.0 ±.2 VDC. *-11.93* _____ VDC
5.3   SET R85 FULL CW, READ TP6 TO TP11, 0.0 ±.05 VDC. _____ VDC
5.4   SET TRANSDUCER TO BOT. SYNC. *-1.606* _____ VDC
5.5   SET R67 CCW, READ TP9 TO TP11 (-1.66 ±0.2 VDC)(-2.83 ± 0.2 VDC FOR G4,G5) *2.5* _____ VDC
5.6   SET R67 CW, READ TP9 TO TP11 (-4.44 ±0.4 VDC)(-5.52 ±0.4 VDC FOR G4,G5) _____ VDC
5.7   ADJUST R67 FOR -3.00 +0.01 VDC AT TP9 TO TP11, READ TP6 TO TP11
      (+9.0 ±0.3 VDC). *8.99* _____ VDC

67 67

5.8   ADJUST ~~R57~~ FOR +10.00 ±0.01 VDC AT TP6 TO TP11.

5.9   READ TP6 TO TP11, LESS THAN 50 MV P-P.

.10   SET TRANSDUCER FOR 0.0 ±0.01 VDC AT TP6 TO TP11.   VPP

5.11   SET INPUT AT PIN 7 TO 0.00 VDC.   READ PIN 30, 0.0 ±0.02 VDC.

5.12   SET ~~R58~~ FOR 0.0 ±0.01 VDC AT TP8 TO TP11.   VDC

5.13   APPLY +10.00 VDC AT PIN 7.   VDC

5.14   SET ~~R59~~ FULL CW, READ PIN 30 +12.04 ±0.2 VDC. 12.46

5.15   CONNECT PIN 7 TO PIN 8, TP5 SHOULD BE +9.9 TO +10.1 VDC. 9.98   VDC

5.16   DISCONNECT PIN 7 FROM PIN 8.

5.17   REMOVE +10V FROM PIN 7 AND CONNECT TO PIN 6. TP3 MUST BE -9.9 TO -10.1 VDC. -9.96

5.18   TP5 MUST BE -.4 TO -.7 VDC. -.563

5.19   DISCONNECT +10V FROM PIN 6 AND CONNECT TO PIN 7.

5.20   SET ~~R59~~ FULL CCW, READ PIN 30 +8.03 ±0.2 VDC. 8.19

5.21   SET ~~R59~~ FOR +10.00 VDC AT PIN 30.   VDC

5.22   APPLY +1.00 VDC TO PIN 7. READ PIN 30, +1.0 ±0.02 VDC. .991   VDC

    READ TP8:

        G1 - 5.93 ±0.4 VDC. -5.95

        G2 - -11.60 ±0.5 VDC.   VDC

        G3 - 5.00 ±0.35 VDC.   VDC

        G4 & G5 - 2.06 ±0.3 VDC   VDC

5.23   SET INPUT AT PIN 7 TO 0.00 VDC.

5.24   SET TRANSDUCER FOR +1.00 ±0.01 VDC AT TP6 TO TP11.

    READ TP8 TO TP11:

        G1 - 5.93 ±0.4 VDC. -5.85

        G2 - -11.60 ±0.5 VDC.   VDC

        G3 - 5.00 ±0.35 VDC.   VDC

        G4 - 0.83 ±0.2 VDC.   VDC

        G5 - 2.06 ±0.3 VDC

6.0 GAIN CHECK START 11-17-90

6.1   SET TRANSDUCER FOR 0.00 ±0.01 VDC AT TP8 TO TP11, REMOVE JUMPER PIN 2 TO 30.

6.2   NOTE M1 READS 0.0 ±1 MA.   VDC

6.3   SET TRANSDUCER FOR 0.0 ±0.01 VDC AT TP6 TO TP11.   MA

6.4   SET INPUT AT "VP CMND D PLUS" (PIN 30) TO 0.00 VDC.

6.5   SET ~~R58~~ FULL CW, READ TP8 TO TP11:

        G1 + 2.67 ±0.1 VDC. 2.695

        G2 + 5.22 ±0.15 VDC.   VDC

        G3 + 2.25 ±0.07 VDC.   VDC

        G4 & G5 +0.93 ±0.1 VDC   VDC

6.6   SET ~~R58~~ FULL CCW, READ TP8 TO TP11:

        G1 - 2.67 ±0.1 VDC. -2.659

        G2 - 5.22 ±0.15 VDC.   VDC

        G3 - 2.25 ±0.07 VDC.   VDC

        G4 & G5 -0.93 ± 0.1 VDC   VDC

6.7   SET ~~R58~~ FOR 0.00 ±0.01 VDC AT TP8 TO TP11.

6.8   APPLY +1.00 VDC TO "VP CMND D PLUS" (PIN 30).

    READ TP8 TO TP11:

        G1 - 5.93 ±0.15 VDC. -5.94

        G2 - 11.60 ±0.35 VDC.   VDC

        G3 - 5.00 ±0.15 VDC.   VDC

        G4 & G5 -2.06 ± 0.3 VDC   VDC

6.9   SET INPUT AT "VP CMND D PLUS" (PIN 30) TO 0.00 VDC.   VDC

6.10 G4 only, apply -1.00 VDC at pin 32. Read TP8 to TP11, +6.19 ±0.2 VDC. _____ VDC
Remove -1.00 VDC from pin 32.

6.11 SET TRANSDUCER FOR +1.00 ±0.01 VDC AT TP6 TO TP11. *Remove lv from*
READ TP8 TO TP11:   *Pin 30*
     G1 - 5.91 ±0.15 VDC. *-5.95*
     G2 - 11.56 ±0.35 VDC.   _____ VDC
     G3 - 4.98 ±0.15 VDC.   _____ VDC
     G4 - 0.83 ±0.2 VDC.   _____ VDC
     G5 - 2.06 ±0.3 VDC.

6.12 REMOVE INPUT AT PIN 30. RECONNECT JUMPER PIN 2 TO 30.   _____

7.0 FINAL ADJUSTMENT

7.1 SET TRANSDUCER AT TOP STOP. SET INPUT AT PIN 7 FOR +10.00 ±0.01 VDC. _____
7.2 G4 ONLY, APPLY -2 VDC AT PIN 32
7.3 ADJUST R56 CCW FOR 0.0 MA ON M1. *OV. AT TP8* *SEVERAL TURNS BY VOLTS CHANGES DOW*
7.4 SET TRANSDUCER AT BOT. STOP, SET INPUT AT PIN 7 TO 0.00 VDC.   _____
7.5 G4 ONLY, APPLY 0.0 VDC AT PIN 32
7.6 ADJUST R67 FOR 0.0 MA ON M1. *OV. AT TP8*   _____
     R67

8.0 VALVE POSITION CIRCUIT ADJUSTMENTS

NOTE: THE ORIGINAL VALUE OF R84 WAS 5K, R84 WAS CHANGED TO 10K AS OF 3/84. THE VALUE
OF R84 ON BOARDS BUILT PRIOR TO THIS DATE SHOULD REMAIN 5K.

8.1 SET POSITION TRANSDUCER FOR 0.0 VDC AT TP6 (BOTTOM STOP).   _____
8.2 TURN R84 FULL CCW.
8.3 ADJUST (8) R84 FULL CW. VOLTAGE AT PIN 35 (-4.32 TO -4.72 VDC), CCW
     R84 = 5K. ████████ (R84 = 10K.) *-5.14 TO -6.38*   _____ VDC
8.4 91 TURN R84 CCW. VOLTAGE AT PIN 35 (+4.32 TO +4.72 VDC), R84 = 5K CW
     ████████ (R84 = 10K) *+5.14 TO +6.38*   _____ VDC
8.5 R71 ADJUST (3) R84 FOR 0.00 VDC AT PIN 35.   _____
8.6 SET POSITION TRANSDUCER FOR -5.00 VDC AT TP6.   _____
8.7 SET R84 FULLY CCW.
8.8 READ VOLTAGE AT PIN 35 (+7.25 TO +7.75 VDC), R84 = 5K.
     ████████ R84 = 10K. ————→ *+9.57 TO +10.5 10.40*   _____ VDC
8.9 SET (4) R84 FULLY CW. SET POSITION TRANSDUCER FOR -10.00 VDC AT TP6.
8.10 READ VOLTAGE AT PIN 35 (+9.8 TO +10.2 VDC). *10:09*   _____ VDC
8.11 REMOVE JUMPER PIN 2 TO 30.   _____

9.0 OUTPUT CURRENT CHECK *125 ohm load Pin 24 to Pin 28 w/Test Rig.*

9.1 SET TRANSDUCER FOR 0.00 ±0.01 VDC AT TP8 TO TP11.   _____
9.2 NOTE M1 READS 0.0 ±1 MA.   _____
9.3 SET INPUT AT PIN 30 FOR +10.00 ±0.01 VDC AT TP8 TO TP11. *TP30 = -1.68* _____
9.4 READ PIN 28 TO TP11, -1.4 ±0.1 VDC. *-1.413*   _____ VDC
9.5 READ PIN 24 TO TP11, -6.2 ±0.2 VDC. *→ G3 = -10.0 VDC -6.23*   _____ VDC
9.6 NOTE M1 READS -37 ±1 MA (G1, G2, G4, G5), -74 ±2MA (G3)   _____ MA
9.7 READ PIN 24 TO TP11, LESS THAN 20 MV P-P.   _____ VP-P
9.8 SET INPUT AT PIN 30 FOR -10.00 ±0.01 VDC AT TP8 TO TP11. *TP30 = +1.68* _____
9.9 READ PIN 28 TO TP11, +1.4 ±0.1 VDC. *1.413*   _____
9.10 READ PIN 24 TO TP11, +6.2 ±0.2 VDC. *→ G3 = +10.0 VDC +6.29*   _____ VDC
9.11 NOTE M1 READS +37 ±1 MA (G1,G2,G4,G5), +74 ±2MA (G3)   _____ MA
9.12 READ PIN 24 TO TP11, LESS THAN 20 MV P-P.   _____ VP-P

MCV

TOP STOP
open end

BOTTOM STOP
Closed end

Rod - Travel
A.

3.125"

1.0"

FEED-BACK
TRANSDUCER
436253 P3

0.625 "

A.

4.125"

(A.1)

Open Sync.
TOP SYNC

Close Sync
BOTTOM SYNC

16.0" Trans.
14.0" Travel
1.4 inches/volt

(A.2) 15.0" Trans.
13.0" Travel
1.3 inches/volt

MSV

TOP STOP
open end

8.5"

BOTTOM STOP + SYNC
Closed end + Syn

2.5"

751C749
P1

6.0"

2.50"

8.0" Trans.
6.0" Travel
0.6 inches/volt

ICV

BOTTOM STOP
Closed end

TOP STOP
open end

788E145 TRA
FOR 14" INTERCEPT
VALUE'S ONLY.

A.
13.0

1.0"

3.625"
OR.
3.125"

436C568
P1 of 2

threads

10'

A.
13.00

(A.1) ICV'R BD
788E143
15.0 Trans.

Close sync
BOTTOM SYNC

OPE
TOP SYNC

1.2 inches/volt

NULL
POINT

(A.2) 13.0 Trans.
9.5 Travel
0.95 inches/volt