g GE Industrial Systems	Test and Operating Procedure	
	DATE : 06/07/02	PAGE 1 OF 21
	QUALITY REP: Robert Dunell	
TITLE: Test Procedure for an Analog Siltron	PROCEDURE: LOU-GED-Analog Siltron-B	

1. INTRODUCTORY DESCRIPTION

A. This procedure establishes the methods for testing a Analog Siltron Motor Drive
B. Environmental ranges: 70 +/- 10 Deg. F. with 20-75% R.H.
C. Unit warm-up/stabilization period requirement:
D. Personnel using this procedure are expected to have a high degree of confidence and expertise in related testing and calibration procedures.
E. Procedures not explained here are considered to be understood as common practice.

2. TEST EQUIPMENT VERIFICATION

A. Verify the accuracy of the standard(s) used in the repair/calibration process by evidence of recent calibration labeling affixed to the test equipment.
B. All measurement standards used in this procedure shall be traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (N.I.S.T.) and shall have the accuracy, stability, range and resolution required for the intended use.
C. Unless otherwise specified, the collective uncertainty of the Measurement Standard(s) shall not exceed twenty five percent of the acceptable tolerance for each characteristic being calibrated.
D. All deviations shall be documented.

3. EQUIPMENT CLEANING

A. All equipment clean will be performed as instructed in the GEES SOP Sec. 14.0

4. EQUIPMENT INSPECTION

A. The following criteria should be used as a guideline or basis for the inspection process of the this unit:
    1. Wires broken or cracked.
    2. Terminal strips / connectors broken or cracked.
    3. Loose wires.
    4. Components visually damaged.
    5. Capacitors leaking.
    6. Solder joint, cold.
    7. Circuit board discolored or burned.
    8. Printed wire runs burned or damaged.

5. REVISION HISTORY

Revision	Date	Initials	Reason for Revision
A	01/10/97	JDS	Initial Procedure – After Verification
B	06/07/02	RKD	Added section 5 & 6, Changed procedure number
C			
D			
E			
F			
G			
H			
I			
J			
K			

6. REFERENCE DOCUMENTATION

- Reference: GEK
- Factory Procedure #

7. THEORY OF OPERATION

This unit is used to control the forward and reverse movement of a DC motor.

8. TEST EQUIPMENT TO BE USED

Analog Siltron Test Fixture # H033662

Inductive Load

Digital Multimeter

480 V 3-Phase supply

9. SETUP PROCESS

Note: All measurements are taken with respect to ACOM

- Verify Setup of the drive per the following:

DS3800DEMA

R1E	45	R8E	60	J1E	IN	J9E	IN	J18E	OUT
R2E	10	R9E	50	J2E	IN	J10E	IN	J20E	
R3E	80	R10E	50	J3E	IN	J11E	IN	J21E	

R4E	65	R11E	35	J4E	IN	J12E	IN	J23E	
R5E	15	R12E	40	J5E		J13E	IN		
R6E	0	R13E	50	J7E	IN	J14E			
R7E	45	R14E	30	J8E	IN	J15E	IN	R202	26K

DS3800NEMA

R9	70	R20	85	R290	50

DS3800DSQD

J1S	IN	ALL OTHERS OUT

DS3800NFCD

NEG - +/-	+/-
2732 - 2716	2716
SS - RUN	RUN
DIAG - FIRE	FIRE

DS3800DFCD

R1	0	JF1	IN	J5F	
R2	65	J3F	REV	J65	
R3	70				

DS3800DGRA

R68	1K	R70	39K	R111	475K	R157	3.6K
R69	37K	R74	82.5K	R112	150	R158	3.6K
C5	2uF	C40	1uF	C29	Jumper	C42	1uF
J1R	IN	J12R	IN	J24R	IN	J38R	OUT
J40R	IN	J45R	IN	J17R	IN	J39R	OUT
J26R	IN	J33R	IN	J25R	IN	J10R	IN

J36R	IN	J35R	IN	J23R	IN	J44R	IN
J28R	OUT	J18R	OUT	J6R	IN	J42R	IN
J29R	OUT	J15R	IN	J4R	IN		
R1	0	R9	50	R17	25	R25	25
R2	45	R10	50	R18	35	R26	40
R3	100	R11	100	R19	35	R27	65
R4	0	R12	100	R20	25	R28	0
R5	20	R13	25	R21	*	R29	100
R6	50	R14	20	R22	0		
R7	25	R15	100	R23	40		
R8	50	R16	40	R24	25		

DS3800DGRA (CONT.)

*** = 4 VDC Measured from COM to TP 14R**

- Connect 41Ω inductive load to FTB1 & FTB2.
- Verify that CB1 is off and connect unit to 480V source.
- Turn on CB1 and wait for IMOK LED on DS3800DSQD indicator card to illuminate.
- Press {RESET} and verify that the Ready to Run lamp on the operator panel illuminates.

10. FINAL TEST AND OPERATION PROCESS

_____

R2R

- Monitor TP8R and move J36R to J37R (E40) turn R1 to 0 and R2 to 100 and adjust R2 for 0V +/- ____V.

R1R

- Monitor TP8R and turn R1R to 0
- Turn R1R toward 100 and verify that the output of TP8R increases to 9V +/- ___V.
- Move J37R to J36R and return R1R to 0

R24 & R25

- Turn Speed reference to full CW
- Start Drive by pressing the {START} button on the operator panel.
- Observe reading on M2 Armature Volt Meter.
- Turn R24R Full CCW and verify that M2 reads approximately 10V.
- Turn R24R CW until M2 reads 150V (Approximately 25 on pot).
- Turn {Speed Reference} pot on operator panel Full CCW
- Observe reading on M2 Armature Volt Meter.
- Turn R25R Full CCW and verify that M2 reads approximately 10V.
- Turn R25R CW until M2 reads 150V (Approximately 25 on pot).
- Stop drive by pressing {STOP} on operator panel.

R7R & R17R

- Turn R7R and R17R to 25
- Press {JOG FWD} on operator panel and verify that M2 reads +50V.
- Press {JOG REV} on operator panel and verify that M2 reads -50V.
- Reset drive by pressing {RESET} on operator panel.

R6R & R15R

- Adjust R6R to 50 and R15R to 100.
- Place Test Clip on TP18R
- Monitor TP18R with DMM
- Turn R6R to 0 then to 100 verifying that DMM display swings between -7 and +7 V.
- Adjust R6R to 100
- Push SW1 on **DGRA** card and verify that DMM reads approximately 14V.
- Adjust R15R to 0
- Push SW1 on DGRA and verify that DMM stays at approximately +7 V.
- Return test clip to TP1.

R4R

- Monitor TP10 With DMM
- Start Drive by pressing the {START} button on the operator panel.
- Turn R4R from 0 to 100 and verify that the DMM swings between -15 and +15 Volts +/- 3 Volts.
- Stop drive by pressing {STOP} on operator panel.

R5R & R14R

- Monitor TP11 with DMM
- Turn R5R and R14R to 0
- Start Drive by pressing the {START} button on the operator panel.

- Verify that the DMM reads approximately 0 V.
- Turn {Speed Reference} pot on operator panel Full CCW
- Adjust R14R until DMM reads 4V
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R5R until DMM reads 4V
- Stop drive by pressing {STOP} on operator panel.

R27R

- Start Drive by pressing the {START} button on the operator panel.
- Turn R27R toward 0 and verify that M2 reading decreases.
- Return R27R to 75.
- Stop drive by pressing {STOP} on operator panel.
- Press {RESET} and verify that the Ready to Run lamp on the operator panel illuminates.

R11R

- Turn {Speed Reference} pot on operator panel Full CCW
- Monitor TP5 with DMM and verify reading of +5V +/- ___ V.
- Turn R11R to 100
- Push {RESET} on operator panel and verify that DMM reading decreases to +4 V +/- ___ V
- Turn R11R to 0

- Push {RESET} on operator panel and verify that DMM reading increases to +5 V +/- ___ V

R3R & R12R

- Turn R3R and R12R to 100.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CCW
- Switch {ACC/DEC} switch on operator panel to DEC then back to ACC and NOTICE the time it takes to reach full speed (Time should be < 5 sec).
- Turn R3R and R12R to 0.
- Switch {ACC/DEC} switch on operator panel to DEC then back to ACC and NOTICE the time it takes to reach full speed (Time should be > 5 sec).
- Return R3R and R12R to 100.
- Stop drive by pressing {STOP} on operator panel.

R9R

- Turn R9R to 50
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel CW until Reading on M2 is 100 V.
- Push STV on operator panel and verify that M2 goes to 150 V.
- Stop drive by pressing {STOP} on operator panel.

R22R & R13R

- Turn R22R and R13R to 0.
- Turn {Speed Reference} pot on operator panel Full CW
- Monitor TP9R with DMM.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust R13R until DMM reads -7V +/- ___ V. (Approximately 25)
- Adjust R22R until DMM reads -5V +/- ___ V. (Approximately 10)
- Stop drive by pressing {STOP} on operator panel.

R18R & R19R

- Temporarily remove J36R (E30) and turn R29R to 100
- Turn {Speed Reference} pot on operator panel Full CCW
- Monitor TP20R with DMM.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust R19R until DMM reads -8.2V +/- ___ V. (Approximately ___)
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R18R until DMM reads +8.2V +/- ___ V. (Approximately ___)
- Stop drive by pressing {STOP} on operator panel.
- Reinstall J36R (E30).

R29R

- Start Drive by pressing the {START} button on the operator panel.
- Monitor TP20R with DMM.

- Adjust R29R toward 0 and verify that DMM reading decreases to - 1.5V +/- .5V.
- Return R29R to 100 and verify that DMM reading goes to -7 V +/- ___ V.
- Stop drive by pressing {STOP} on operator panel.

R28R

- Start Drive by pressing the {START} button on the operator panel.
- Turn R28R to 0.
- Monitor TP20R with DMM and verify reading of -7 V +/- ___V.
- Switch {ACC/DEC} switch on operator panel to DEC and verify that DMM reading decreases to 0 then returns to its previous value.
- Turn R28R to 100.
- Switch {ACC/DEC} switch on operator panel to ACC and verify that DMM reading of -7 V +/- ___V.
- Switch {ACC/DEC} switch on operator panel to DEC and verify that DMM reading changes to -2.5 V +/- ___V.
- Stop drive by pressing {STOP} on operator panel.

R16R

- Adjust R16R to 0
- Turn {Speed Reference} pot on operator panel Full CW
- Monitor TP12R with DMM.
- Adjust R16R until DMM reading goes to +4.6 V +/- ___ V. (Approximately ___)

R26R

- Adjust R26R to 0
- Turn {Speed Reference} pot on operator panel Full CCW
- Monitor TP12R with DMM.
- Adjust R26R until DMM reading goes to -4.6 V +/- ___ V. (Approximately ___)

R23R

- Adjust R23R to 0.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust R23R until M2 reads 150.
- Stop drive by pressing {STOP} on operator panel.

R20R

- Adjust R20R to 20.
- Press {N-STOP} on operator panel.
- Press {RESET} on operator panel.
- Press {THD/SLO} on operator panel.
- Adjust R20R to 0 then to 100 and verify that M2 goes from 0 to 150.
- Readjust R20R to 20.
- Stop drive by pressing {STOP} on operator panel.

R8R

- Adjust R8R to 50.
- Start Drive by pressing the {START} button on the operator panel.

- Adjust {Speed Reference} pot on operator panel until M2 reads 100 V.
- Adjust R8R to 0 and verify that M2 reading decreases by 10 %.
- Adjust R8R to 100 and verify that M2 reading increases by 10 %.
- Readjust R8R to 50
- Stop drive by pressing {STOP} on operator panel.

SW2

- Connect DMM to top post of SW2 (post closest to TP3).
- Verify meter reading of +5V
- Verify that **CR13** (TREF) and **CR38** (RAMP REL) on **DSQD** card are **OFF**.
- Push SW2 down
- Verify meter reading of 0V
- Verify that **CR13** (TREF) and **CR38** (RAMP REL) on **DSQD** card are **ON**
- Return SW2 to the up position.

R10R

- Monitor TP14R with DMM.
- Adjust R10R for a reading of 0V on DMM.

R21R

- Turn {Speed Reference} pot on operator panel Full CW
- Monitor TP14R with DMM.
- Start Drive by pressing the {START} button on the operator panel.

- Adjust R21R until DMM reading goes to +4.0 V +/- ___ V. (Approximately ___)
- Stop drive by pressing {STOP} on operator panel.

HIOA TEST

- Follow setup procedure outlined in section 7.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust {Speed Reference} pot on operator panel until M2 reads 50 V.
- Press {RUN PERM} on operator panel and verify that drive stops.
- Press and hold {STR PERM} on operator panel and verify that the Ready To Run lamp goes out.
- Start Drive by pressing the {START} button on the operator panel.
- Press {E-STOP} on the operator panel and verify that the drive stops.
- Start Drive by pressing the {START} button on the operator panel.
- Press {N-STOP} on the operator panel and verify that the drive stops.
- Start Drive by pressing the {START} button on the operator panel.
- Press {FLT-STOP} on the operator panel and verify that the drive stops and the Fault Lamp on the operator panel illuminates.
- Press {RESET} on the operator panel.
- Press {JOG REV} on the operator panel and verify that the drive runs in the NEGATIVE direction.
- Press {JOG FWD} on the operator panel and verify that the drive runs in the POSITIVE direction.

- Monitor TP10E with DMM and verify reading above ____ V
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Press {FLT PST} on the operator panel and verify that the DMM reading goes to 0V.
- Stop drive by pressing {STOP} on operator panel.
- Press and **HOLD** {FLT MASK} on the operator panel.
- Adjust R2E on **DEMA** to 100 and verify that the Ready To Run lamp on the operator panel is illuminated.
- Release {FLT MASK} on the operator panel and verify that the Fault lamp on the operator panel flashes.
- Press {RESET} on the operator panel.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust {Speed Reference} pot on operator panel until M2 reads 50 V.
- Press {STU} on the operator panel and verify that M2 reading increases to 150V.
- Stop drive by pressing {STOP} on operator panel.
- Move J36R to J37R on DGRA card.
- Start Drive by pressing the {START} button on the operator panel.
- Press {CURR MODE} on the operator panel.
- Verify that M2 reading decreases to 0 V

- Move J37R to J36R on DGRA card.
- Press {THD/SLO} on the operator panel.
- Verify that M2 reading increases to 50 V
- Press {COAST-STOP} on the operator panel.
- Press {RESET} on the operator panel.
- Press {FWD/REV} on the operator panel and verify that the meter on the inductive load goes to 0.

HIOA Test Complete

Field TEST

- Follow setup procedure outlined in section 7.
- Start Drive by pressing the {START} button on the operator panel.
- Adjust R1E fully CW
- Adjust R3E until M1 (Field Percent Meter) reads 100% and needle on meter is steady. (Approximately 80 on pot)
- Adjust R1E CCW until the meter on the inductive load reads 2.5 Amps.
- Adjust R3E CCW and R2E CCW.
- Adjust R2E CW until drive faults.
- Adjust R3E until M1 reads 100%. (Approximately 80 on pot)
- Press {RESET} on the operator panel.
- Adjust R12E CCW
- Press {RESET} on the operator panel.
- Monitor TP11E (DMEA)with DMM.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R12E until DMM reads -2V +/- ___V.
- Monitor TP2E (DMEA)with DMM.
- Start Drive by pressing the {START} button on the operator panel.

- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R5E full CCW
- Adjust R10E until DMM reads -5V +/- ___V.
- Adjust R5E until DMM reads -4V +/- ___V.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Monitor TP11E (DMEA)with DMM.
- Adjust R12E until DMM reads +2.5V +/- ___V.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust 11E full CW
- Adjust 11E CCW **slowly** until drive faults.
- Adjust 11E slightly CW.
- Press {RESET} on the operator panel.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust 14E full CW
- Adjust 14E CCW **slowly** until drive faults.
- Adjust 14E CW **slowly** until drive fault is removed.

- Press {RESET} on the operator panel.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R4E until M3 (Armature Amp Percent Meter) reads 100%.
- Stop drive by pressing {STOP} on operator panel.
- Adjust 13E full CW
- Adjust 13E CCW **slowly** CCW and verify that LED CR99 (Moving) illuminates.
- Adjust 13E CCW **slowly** CW and verify that LED CR99 (Moving) goes out.
- Start Drive by pressing the {START} button on the operator panel.
- Turn {Speed Reference} pot on operator panel Full CW
- Adjust R7E until M3 moves from 100%.
- Readjust R7E until M3 returns to 100%.
- Push [RESET] on DEMA card and verify that the drive faults.
- Press {RESET} on the operator panel.

Field Test Complete

11. SPECIAL INFORMATION

TEST WRITTEN BY: David Smith **DATE:** 01/10/97

TEST VERIFIED BY: _____ **DATE:** _____