LVDT Test

Date completed: _____

Performed by: _____

Specifications Tested

Engineering Spec Tested	Description	Critical Value	Nominal Value
ES5	Supply voltage for LVDT	30 V	24 V
ES10	LVDT output	±10 V	15V Swing

Revision History

Revision	Description	Date
1	Document Created	2/3/2012

Equipment

_____ Linear Variable Differential Transformer (LVDT)
_____ Demodulation Card (AD598) Circuitry including designated passive components.
_____ 24V LVDT Power Supply
_____ dSPACE terminal with MATLAB Simulink

Sections

- Part I: Mount LVDT
- Part II: Power LVDT
- Part III: Initialize dSPACE
- Part IV: Measurements and Calibration

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Part I: Mount LVDT

_____ 1. Design supports for the LVDT.
_____ 2. Install the LVDT base in a fixed position (Do not fix the rod).
_____ 3. Verify that the LVDT base is stable.

Sign off on section completion before continuing: _____

Part III: Power LVDT

_____ 1. Connect the LVDT to the AD598 circuit board.
_____ 2. Link the AD598 circuit board to dSPACE.
_____ 3. Connect the power supply to the AD598 circuit board.

Sign off on section completion before continuing: _____

Part II: Set-up dSPACE

_____ 1. Power on dSPACE.
_____ 2. Open experiment and run file on dSPACE cpu.
_____ 3. Animate experiment in dSPACE.

Sign off on section completion before continuing: _____

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Part IV: Measurements and Calibration

_____ 1. Actuate LVDT rod to the 0" position (all the way in).
_____ 2. Use LVDT Distance/Voltage Table below to record voltage measured in dSPACE.
_____ 3. Actuate LVDT rod to the 1" position.
_____ 4. Use LVDT Distance/Voltage Table below to record voltage measured in dSPACE.
_____ 5. Repeat steps 3 and 4 for 2-5".
_____ 6. Actuate LVDT to 0-position of EMA and install rod end.
_____ 7. Record voltage of LVDT when EMA is at 0-position and rod end installed.
_____ 8. Use completed LVDT Distance/Voltage Conversion Equation (below) to calibrate LVDT in dSPACE.
_____ 9. Verify that dSPACE plot accurately shows displacement versus time.

LVDT Distance/Voltage Table

LVDT Displacement	Voltage	Slope and Intercept Calculation
0"		$Slope = \frac{5"}{V_{5"} - V_{0"}}$ $\quad Intercept = V_{EMA\ 0-position}$
1"		
2"		
3"		
4"		
5"		
EMA 0-position		

LVDT Distance/Voltage Conversion Equation

$$D_{out} = V_{in} * Slope - Intercept$$

Sign off on section completion before continuing: _____

Components used in LVDT Circuit Design								
	R1(k Ω)	**R2(k Ω)**	**R5(k Ω)**	**R6(k Ω)**	**C1(n F)**	**C2=C3=C4 (µF)**	**C5 (µF)**	**D (inch)**
Theoretical	8	19.	94.95	145.053	19.44	5.56	1	3.65
Implemented	7.8	33	100	147	20	5	1	5.7