TECHNICAL BULLETIN

ALIGNMENT PROCEDURE
FOR
FLEXIBLE ENGINE DIAGNOSTIC/TEST SYSTEM
A/E37T-33
(PART NUMBER 20090500-1 & -9)

***THIS MANUAL SUPERSEDES TB 1-4920-443-35, DATED 14 JULY 2006.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
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WASHINGTON, D.C., 9 September 2008

Alignment Procedure
For
Flexible Engine Diagnostic/Test System
A/E37T-33
(Part Number 20090500-1, & -9)

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also send in your comments electronically to our E-mail address: 2028@redstone.army.mil or by fax 256-842-6456/DSN 788-6546. For the World Wide Web use: https://amcom2028.redstone.army.mil. Instructions for sending an electronic 2028 can be found at the back of this manual.

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CHAPTER 1

IDENTIFICATION AND DESCRIPTION

1.1 Test Instrument Identification

a. Purpose. This Bulletin provides instruction for the alignment of Flexible Engine Diagnostic/Test System (FEDS), Model A/E37T-33, Part Number (P/N) 20090500-1 & 9 or Air Force P/N: 93D111-1. Technical Manual (TM) 1-4920-443-10 was used as the prime data source in compiling these instructions. The equipment being aligned (FEDS) will be referred to as TI (Test Instrument) throughout this bulletin.

b. Model Variations. None

c. Time and Technique. The time required for this alignment is approximately 40 hours, using various techniques including the DC/Low Frequency Techniques. The alignment interval for the FEDS is 180 days.

1.2 Forms, Records, and Reports

a. Forms, records, and reports required for alignment personnel at all levels are prescribed by Technical Bulletin (TB) 750-25.

b. Adjustments to be reported are designated by "®" at the end of the sentence in which they appear. When adjustments are listed in a table, "®" follows the designated adjustment. Report only those adjustments made and designated with "®".

1.3 List of Abbreviations/Acronyms

Refer to the following listing for abbreviations and acronyms used in this document.

ABS	
AC	Alternating Current
ACC	
AEDATS	Automatic Engine Data Acquisition Test System
aft	
Amp	Amplifier
Assy	Assembly
Auto	Automatic
Aux	Auxiliary
Avg	Average
B Sump Scav	
B/M	
Baro	Barometric
BIT	
Bot	Bottom
B-sump	
CAL ADJ	Calibration Adjustment
Calc	Calculation
CB	Control Board
CC Hz	
CC PPH	
CDP	
CEC	
cm	Centimeter
DC	Direct Current
DDM	
Dec	

1.3 List of Abbreviations/Acronyms - Continued

DECU	
DIGI	
DORIC	
Dyno	Dynamometer
ECL	
EODP	
EODT	
EPU	
ETQ	
F	Fahrenheit
FADEC	
FEDS	Flexible Engine Diagnostic/Test System
Flt Hrns	
FLTS	Flight Line Test Set
Freq	Frequency
fw	Forward
Hg	
HP	
Hz	Hertz
In	Inches
In/lbs	Inch-pounds
IPRI	
Iron-Const.	
LCTC	
LDS	Load Demand Spindle
mAvg	
mm	Millimeter
mV	Millivolts
mVac	Millivolts Alternating Current
N/A	
ORBT	
PAS	Power Available Spindle
PC/rms	
PFI	
PPH	
psi	Pounds Per Square Inch
Psid	Pounds Per Square Inch Differential
Psig	Fwd
R-Cal	
Rdg	
RDPS	
rpm	Revolutions Per Minute
RPM	
RTD	
Sc	
Sec	Seconds
SENS	Sensitivity
SG	
SHP	
Sig Gen	Signal Generator
Sw	Switch
T/C	

1.3 List of Abbreviations/Acronyms - Continued

TB	Technical Bulletin
T/C	Thermocouple
TCIP	
Temp	Temperature
TI	
TM	Technical Manual
TMDE	Test Measurement and Diagnostic Equipment
TQ	
Vac	Volts Alternating Current
VC	
Vdc	Volts Direct Current
VIB	
VPRI	
vs	Versus
VT	
VX	
WFhz	
WFi	
WP	Work Package
Xducer	Transducer

1.4 Alignment Description

TI parameters and performance specifications which pertain to this alignment are listed in Table 1.1.

Table 1.1 Alignment Description

Parameter	Range	Tolerance	Test Method
Dyno Shroud Position (T700)	0 to 100% 0 to 16 Vdc	Analog: ±1.0% Digital: ±0.5%	Precision Calibrator dcV
Inlet Guide Vane Position (T700)	-10 to 90% 0 to 8 Vdc	Analog: ±1.0% Digital: ±0.5%	Precision Calibrator dcV
Load Demand Spindle (LDS)(T700)	-45 to -105º 0 to 12 Vdc	Analog: ±1.0º Digital: ±0.5º	Precision Calibrator dcV
Power Available Spindle (T700)	0 to 150º 0 to 10 Vdc	Analog: ±1.0º Digital: ±0.5º	Precision Calibrator dcV
Engine Torque Electrical (T700)	0 to 1000 ft/lbs 0 to 10 Vdc	Analog: ±1 ft/lb Digital: ±6.0 in/lbs	Precision Calibrator dcV
Temperature RTD (T700)	32-392º F 90.4-177.0 ohms	Digital: ±2.0 ºF	Decade Resistance Box
Pressure Transducers Pressure Switches	-5.0-1000 psi	Vertical Scale: ±2.0 psi Digital: ±1.0 psi	High Pressure Standard
Temperature Measurement System	J: 0 to 1300º F K: 0 to 2000º F	Digital ± 1.0 º F Analog ± 2.0 º F	Precision Calibrator Temperature
Limit Control Panel Temp (T700)	J: 0 to 300º F	Digital ± 1.0 º F	Precision Calibrator Temperature

1.4 Alignment Description - Continued

Table 1.1 Alignment Description - Continued

Parameter	Range	Tolerance	Test Method
Vibration System	116-583 mV (avg) 16.3-407 Pc/rms	Digital: ±0.1 in/sec Vert. Scale: ±0.1 Pc/mV	Precision Signal Source Amplitude vs Frequency
Accelerometers	See Test Report	Various Models	Outside Calibration
Flow	240-1200 Hz	Digital: ± 1.0 Hz	Precision Signal Source
Speed	133-1333 Hz	Analog: ±0.3% Digital: ±5.0%	Precision Signal Source
Limit Control Panel Speed	133-1333 Hz	Digital: ±0.3%	Precision Signal Source
Torque (T700)	0-7200 in/lbs	Digital: ±6.0 in/lbs Daytronics: ±2.0 ft/lbs	Torque Arm and Weights
RPM (T700)	20,900 rpm	± 10 rpm	Precision Signal Source
Speed (T53/T55/T63)	0 to 100% 7 to 70 Hz	Analog: ±0.3 % Digital: ±0.1 Hz	Precision Signal Source
Limit Control Panel (T53/T55/T63)	3333 Hz	Analog: ±0.3 %	Precision Signal Source
Performance Monitor Torque (T53/T55/T63)	9.497 Vdc 18994 (712) 22793 (714)	± 0.020 Vdc ±4.0 in/lbs ±4.0 in/lbs	DDM
Performance Monitor HP (T53/T55/T63)	181.4 to 907.0 Hz	HP = TQ X RPM / 63024	Precision Signal Source
Performance Monitor RTD (T53/T55/T63)	32 to 222º F 100 to 140 ohms	Goodrich: ± 8º F	Decade Resistance Box
Flow (T53/T55/T63)	0 to 1400 Hz	Digital: ± 1.0 Hz	Precision Signal Source
Temperature RTD (T53/T55/T63)	32 to 222º F 100 to 140 ohms	Digital: ±8.0º F	Decade Resistance Box
Electric Torque System (T55)	0 to 100% 0 to 430 mVdc	Analog: ±1.0% Digital: ±0.5%	Precision Calibrator dcV
TA Position Indicator (T53/T55/T63)	0 to 150º 0 to 10 Vdc	Analog: ±1.0º Digital: ±0.5º	Precision Calibrator dcV
Torque (714)	0 to 2000 ft/lbs 0 to 7.245 Vdc	Digital: ±0.5 ft/lbs	Precision Calibrator Flight Line Test Set
Rollback Activation (714)	2942 Hz	± 2.0 Hz	Precision Signal Source
Rollback Solenoid (714)	1400 to 1700 º F	± 2.0 ºF	Precision Calibrator Temperature
ECL Lever Position (714)	30.0º	30º = 0.000 ±2.5 mVac	DDM

1.5 AEDATS III/IV Program

a. Preliminary

(1) Using Windows™ Explorer, located under Start/Program/Test Cell Instrumentation Package (TCIP), double click the TCIP folder.

(2) Start the program by double-clicking the file named Executive.exe. A startup splash screen, displaying the program version and licensing agreement, will be displayed for a moment. Refer to Figure 1.1.

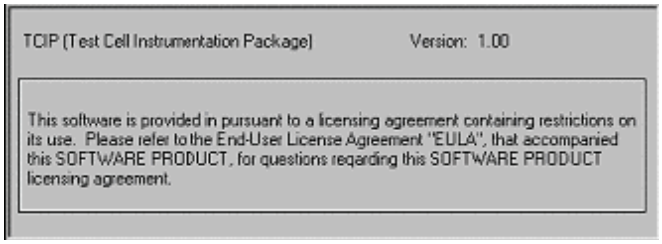

Figure 1.1 Typical TCIP License Screen

(3) If the calibration of a test cell transducer is due, TCIP will display a Calibration Required screen, similar to Figure 1.2, until acknowledged by the operator.

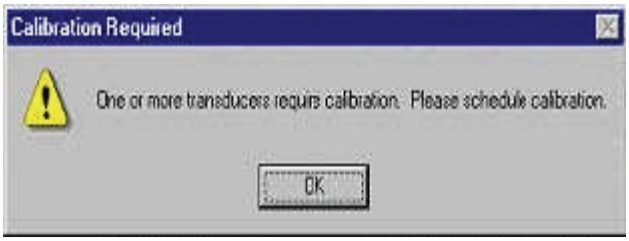

Figure 1.2 Transducers Require Calibration

(4) Following acknowledgement of the Calibration Required screen, the TCIP Executive window is displayed, Figure 1.3.

1.5 AEDATS III/IV Program - Continued

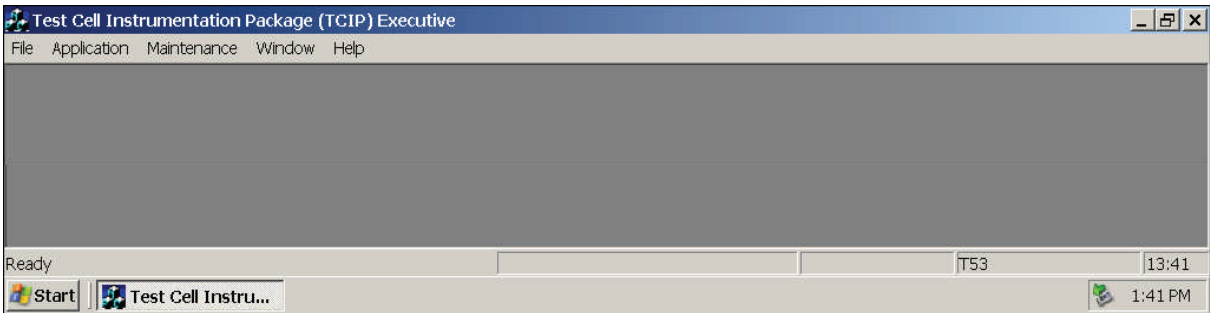

Figure 1.3 TCIP Executive Screen

(5) From the menu bar at the top of the window, select Maintenance | Calibration | Channel Calibration. The Authorization Required dialog box, Figure 1.4, will appear.

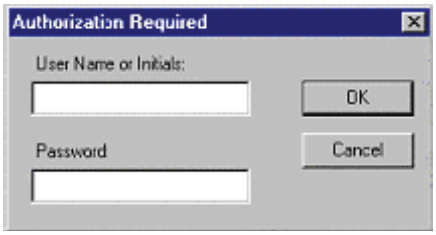

Figure 1.4 Authorization Required Dialogue Box

(6) Enter an operator name or initials. This entry is required.

(7) Enter the password and click OK. The Select Application screen, similar to Figure 1.5, will appear.

1.5 AEDATS III/IV Program - Continued

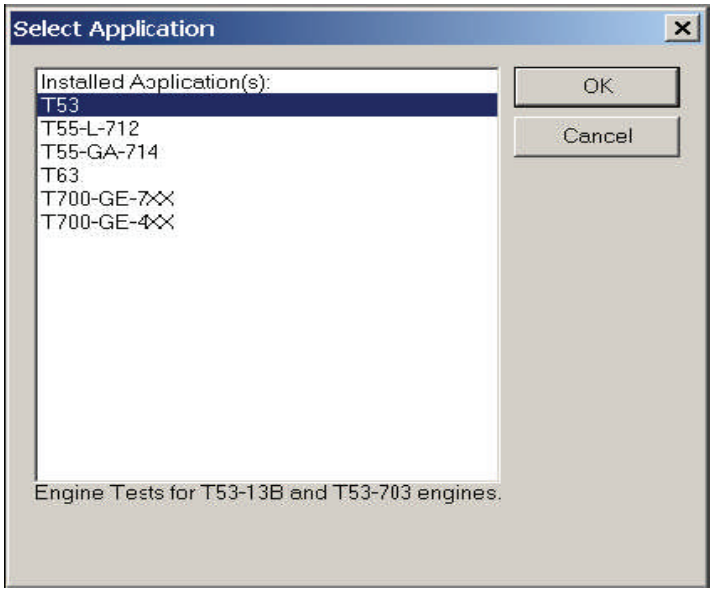

Figure 1.5 Select Application Choice Box

(8) Click the desired application and OK. The Calibration screen shown at Figure 1.6 will appear.

b. TWO-POINT Alignment

Note

Perform the applicable calibration setup for the channel to be calibrated prior to conducting the procedure listed below. Refer to Step 1.4 a.

(1) Select the channel to be calibrated and double click. The operator will be prompted to enter the first point (low value) as shown in Figure 1.6.

1.5 AEDATS III/IV Program - Continued

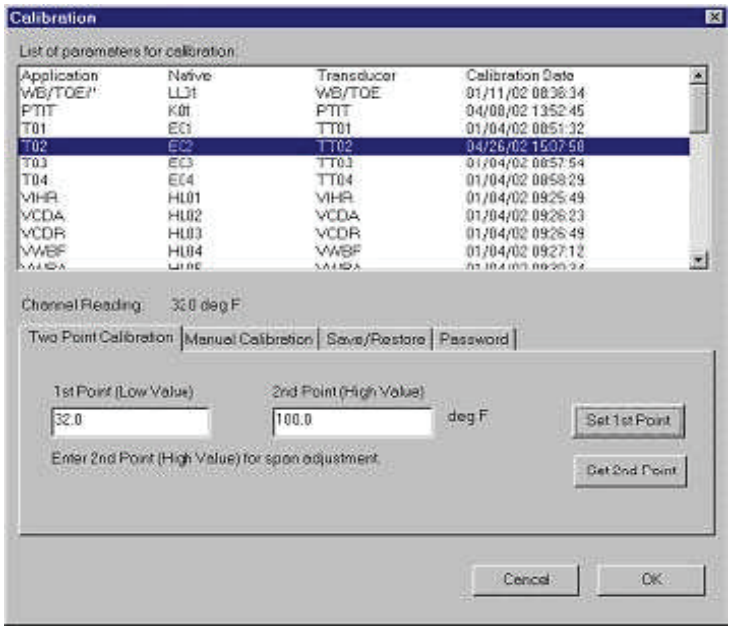

Figure 1.6 Calibration Set-Point Screen

(2) Set the signal source to First Point (Low Value) and then select the Set First Point button.

(3) Set the signal source to 2nd Point (High Value) and then select the Set Second Point button. The Two-Point Calibration tab will display "Two-Point Calibration complete on T_nnnnn.", where T_nnnnn is the name of the transducer.

(4) Click OK and the following Confirmation screen will be displayed as shown in Figure 1.7.

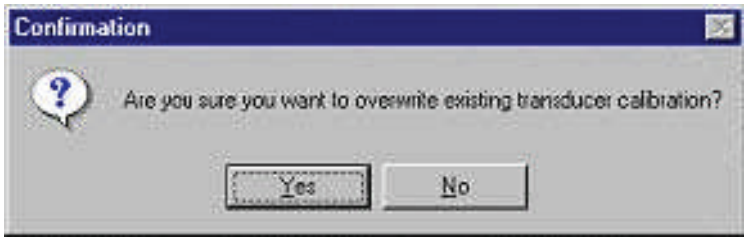

Figure 1.7 Set-Point Overwrite Confirmation Screen

1.5 AEDATS III/IV Program - Continued

(5) Select Yes to overwrite the existing transducer calibration and return to the TCIP Executive window. Select No to prevent overwriting the existing transducer calibration and return to the Calibration screen.

c. Manual Alignment

Manual calibration consists of entering known gain and offset values for a channel.

(1) Bring up the AEDATS screen and select the proper engine application per Step 1.4 a.

(2) Select the channel to be calibrated and double click.

(3) Select the Manual Calibration tab.

(4) Enter gain value (slope) and offset value (intercept) as shown in Figure 1.8.

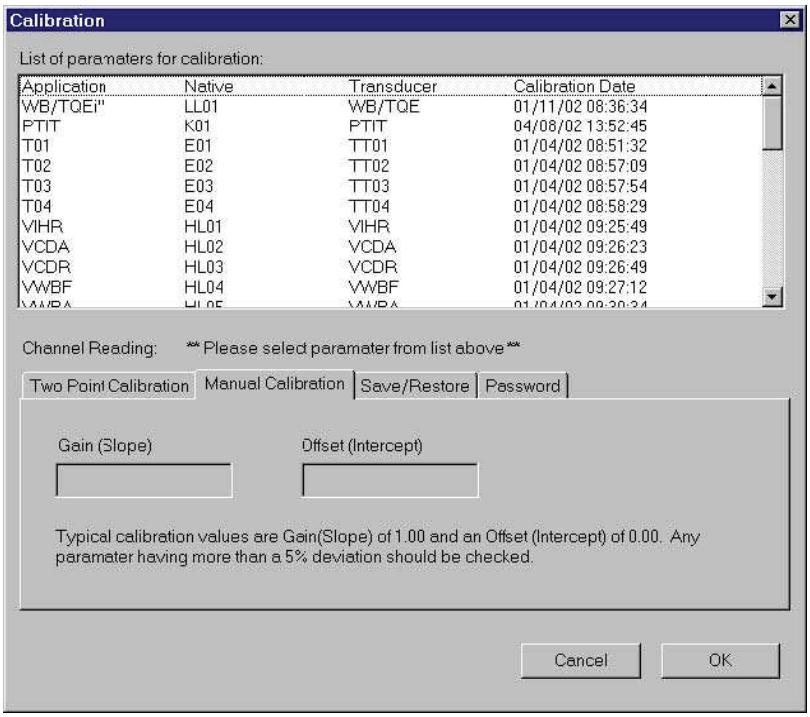

Figure 1.8 Typical Manual Calibration Screen

1.5 AEDATS III/IV Program - Continued

(5) Select OK and the following Confirmation screen will be displayed as shown in Figure 1.9.

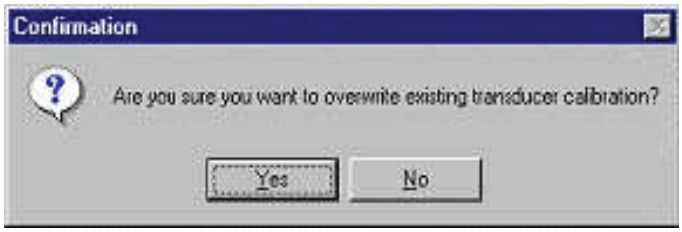

Figure 1.9 Set-Point Overwrite Confirmation Box

(6) Select Yes to overwrite the existing transducer calibration and return to the TCIP Executive window. Select No to keep the existing transducer calibration and return to the Calibration screen.

d. SAVE/RESTORE Alignment

(1) This function allows you to save or restore a calibration.

(a) Bring up the AEDATS screen and select the proper engine application per Step 1.4 a.

(b) Select the channel to be calibrated and double click.

(c) Select the Manual Calibration tab.

(d) To save a calibration, select the Backup/Restore tab of the calibration screen. The screen will appear similar to Figure 1.10.

(e) Select the Save button. The Save As dialog box will appear. Assign a file name to the calibration file. The .cal extension will be entered automatically.

1.5 AEDATS III/IV Program - Continued

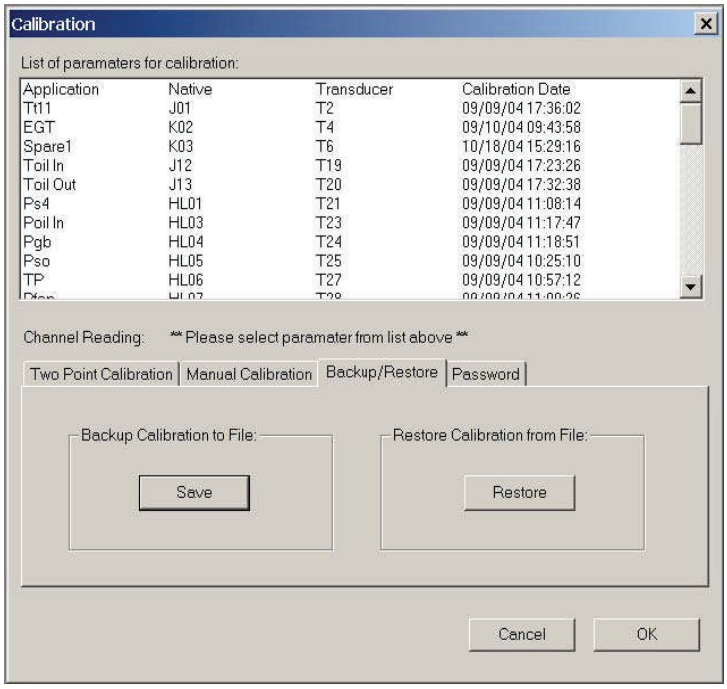

Figure 1.10 Calibration Save/Restore

(2) Restore a Calibration

(a) To restore a calibration, click Restore. The Open dialog box will appear.

(b) Select the applicable file folder and/or file name and click Open. The Overwrite Warning, Figure 1.11, will appear.

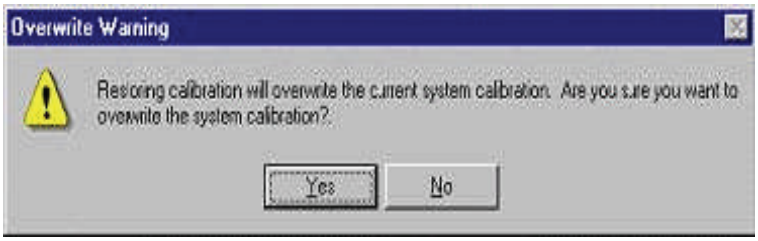

Figure 1.11 Overwrite Warning

e. Entering NEW PASSWORD

(1) Bring up the AEDATS screen and select the proper engine application per Step 1.4 a.

(2) Select the channel to be calibrated and double click.

(3) Select the Manual Calibration tab.

1.5 AEDATS III/IV Program - Continued

(4) Select the Password tab of the Calibration screen. The screen will appear similar to Figure 1.12.

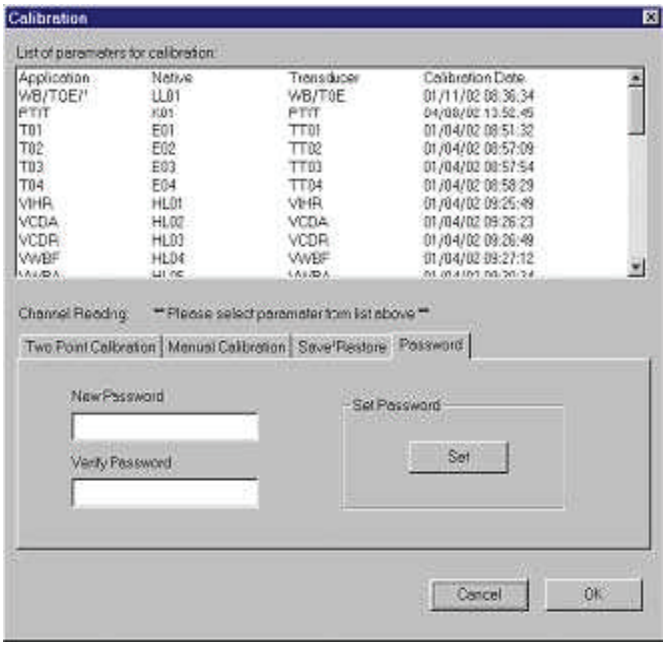

Figure 1.12 Password Screen

(5) Enter the new password in the New Password box and verify it by entering it again in the Verify Password box.

(6) Select the Set button. The Password Accepted screen will appear similar to Figure 1.13.

(7) Select OK.

Figure 1.13 Password Accepted

1.5 AEDATS III/IV Program - Continued

f. VIEW/PRINT Alignment Data

From the menu bar at the top of the TCIP executive window, select Maintenance | Calibration View/Print Calibration. The Cell/System Calibration will appear similar to Figure 1.14.

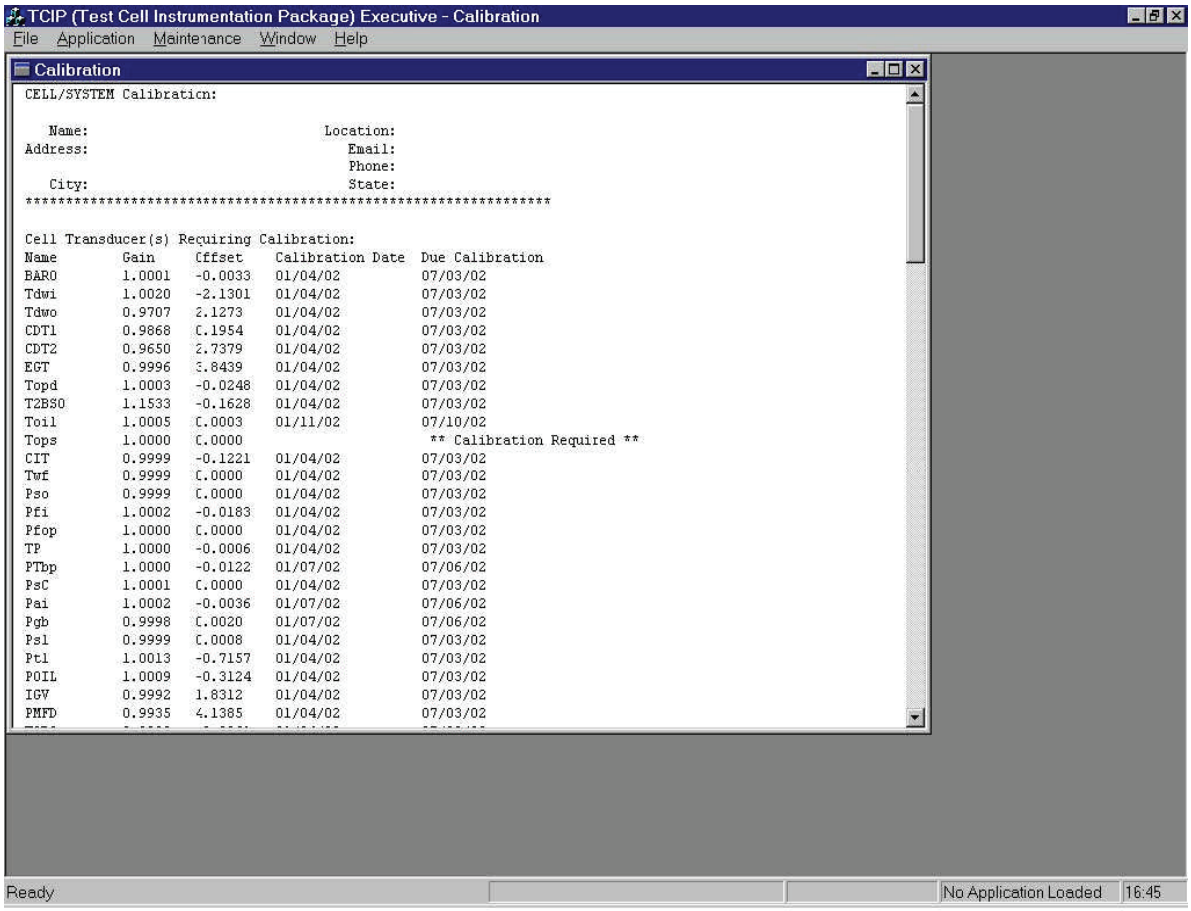

Figure 1.14 View Calibration

CHAPTER 2

EQUIPMENT REQUIREMENTS

2.1 Equipment Required

Table 2.1 identifies the specific Test Measurement and Diagnostic Equipment (TMDE) to be used in this alignment procedure. Instruments used in this procedure are contained in the FEDS Calibration Kit, P/N: 20090845. Alternate equipment may be used at the discretion of the using activity, provided that the substitute equipment is of equal or better precision than that contained in the calibration kit. All TMDE should bear evidence of current calibration. The accuracies listed in Table 1.1 provide a four-to-one ratio between the standard and TI. Where the four-to-one ratio cannot be met, the true accuracy of the TMDE selected is shown in parenthesis. Refer to the commercial operator's manuals supplied with the calibration kit for operating instructions of the equipment.

2.2 Accessories Required

The accessories required for this alignment are common usage accessories, issued as indicated in paragraph 2.1 above, and are not listed in the alignment procedure.

Table 2.1 Equipment Required

Part Number	Nomenclature/Description	Where Used
3928-1-0-1/USA	Eurotron 2000+ Precision Calibrator	DC Voltage Temperature J/K Type
318	Weight Hanger	T700 Torque System
4238P	Vacuum Pump	Pressure System
44-1322-2081-005	Pressure Regulator	Pressure System
50190-0804	Goodrich Box	T53/T55/T63 Torque System
5SE00491-2	Wire, K Type	Temperature System
5SE01412	Torque Arm	T700 Torque System
6076P	Pressure Calibrator 200/500/1000 PSI (±0.05%)	(High) Pressure Systems
6803T	Thermocouple (TC) Calibrator, Analogic DIGI-Cal II (±0.03%)	Temperature System
7095P	Digital Electro-Pneumatic Calibrator (±0.1%)	(Low) Pressure System
7929E	Voltage Source (±0.05%)	Vertical Scale
7975E-B/4213E	Digital Multimeter (DMM) (±0.5 to 1.0%)	Various Systems
8142B	Decade Box 0 to 999.9 ohms (±0.025%)	RTD Systems
8422E 2700-0001	Source Charge Frequency	Flow, Speed, and Vibration
9100	Weights 50 lbs (300 lbs total)	T700 Torque System

2.2 Accessories Required - Continued

Table 2.1 Equipment Required - Continued

Part Number	Nomenclature/Description	Where Used
CEC 2700	Precision Frequency Source	Flow, Speed, and Vibration
NCA-11-FCS/3A	Tachometer Generator Test Set (±0.02%)	Speed System
MIL-C-22491	Nitrogen Cylinder (1200 psi)	Pressure System
5SE00491-1	Wire, J Type	Temperature System
LTCT 29089-03	Test Set, Flight Line	714 Torque System
0368937-001	CEC Vibe Extender Card	Vibration System
9778124	Extender Card	T53/T55/T63 Torque Measurement System Limit Control Panel

CHAPTER 3

ALIGNMENT PROCESS

3.1 Preliminary Instructions

a. The instructions outlined in Steps 3.6 through 3.10 below are preparatory to the alignment process. Personnel should become familiar with the entire bulletin before beginning the alignment.

b. This procedure assumes the alignment of complete FEDS will be performed. If Partial or Limited Alignments of the FEDS are performed, it must be noted on an Alignment Certificate. All required Preliminary Checks and Equipment/ Control Cab setups must be properly preformed before proceeding with the alignment.

c. TMDE used in this bulletin is referenced within the text by common name as listed in Table 2.1.

d. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the alignment. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacture's manual for the TI.

e. Unless otherwise specified, refer to the TI for all controls and control settings.

f. Unless otherwise specified, Tables for recording indications are in Appendix A.

3.2 Equipment Setup

a. If necessary, zero-set all meters by turning the slotted disk below the meter face until the meter pointer indicates zero.

b. See TM 1-4920-443-10, FEDS Operator's Manual for the Control Cab cable connections and instrumentation installation requirements. Table 3.1 lists the Work Package for Control Cab setup.

Table 3.1 Engine Setup Work Package (WP)

Engine/Trailer	Work Package TM 1-4920-443-10
T700/Small Trailer	WP 0018-00-1
T53/Large Trailer	WP 0009-00-1
T55/Large Trailer	WP 0012-00-1
T63/Large Trailer	WP 0016-00-1
714A/Large Trailer	WP 0014-00-1

c. Remove TI protective covers as required for adjustments.

d. Activate the Power switch and allow at least 15 minutes (unless otherwise noted) for the equipment to warm-up and stabilize.

3.3 Energizing Control Cab Performance Check

a. Ensure that the **CB301 (**Cab Main) and **CB302** (60 Hz Control Voltage) are activated.

NOTE

The following steps should be performed at the Motor Starter Panel (Cabinet #4) and in the order specified.

b. Depress the **60 Hz Power** button to activate 60 Hz, 120V ac power.

c. Depress the #**1 28 Vdc** button to activate 28 Vdc power supply #1.

d. Depress the **#2 28 Vdc** button to activate 28 Vdc power supply #2 located on the Motor Start Panel (Cabinet #4).

e. Energize the Limit Control Panel (Cabinet #4), the Calculating Counter, the Torque Processing System (Goodrich and/or Daytronics), and the AEDATS System.

3.4 Shutting Down Control Cab Performance Check

a. Exit the AEDATS Software and shutdown the AEDATS processor, de-energize the AEDATS Chassis, then the UPS chassis.

b. De-energize the Torque processing System, the Limit Control Cabinet, and the Calculating Counter.

c. **In order,** depress the **#2 28 Vdc**, **#1 28 Vdc**, then the **60 Hz Power b**uttons.

NOTE

This completes power down requirements.

3.5 DC Voltmeter (0 to 50 Vdc) Performance Check

a. Ensure the power is off at the **TI** Meter Panel Assembly.

b. Verify the DC Voltmeter indicates zero. If not, adjust the mechanical zero on meter face.

c. Energize Power Supply #1 and #2 (**CB304** and **CB305**) located on the circuit breaker panel and set the DC Voltmeter Power Supply Selector Switch to Power Supply #1.

d. Access Power Supply #1 and #2 in Cabinets #6 and #8, respectively. Place the **positive (+)** lead of the DMM to the (+) 28 Vdc output stud of Power Supply #1 and the **negative (-)** lead to the (-) 28 Vdc output stud of power supply #1.

e. Verify the Meter Panel Assembly's DC Voltmeter matches the Digital Voltmeter.

f. Set the DC Voltmeter Power Supply Selector Switch to Power Supply #2, and repeat Steps 3.4 and 3.5 for power Supply #2.

g. For the 714 power Supply 24 Vdc, perform Step 3.4 using 24 Vdc.

h. Record all zero indication readings at Appendix A, Table A.1.

3.6 AC Voltmeter Performance Check

a. De-energize the power to the Meter Panel Assembly via the circuit breaker panel.

b. Verify the AC Voltmeter indicates zero. If not, adjust the mechanical zero on meter face.

3.6 AC Voltmeter Performance Check - Continued

c. Energize the power to the Meter Panel Assembly.

d. Access the rear of CB301 (Main Circuit Breaker) on the circuit breaker panel.

WARNING

Hazardous shock potential present on all exposed terminals. Extreme care must be exercised to prevent injury or death.

e. Set the DMM to read Vac and measure the voltage between **(L1-L2)** the phase selected with the voltage selector switch. Record the reading at Appendix A, Table A.3, and repeat Step 3.5 for **(L2–L3)** and **(L1 and Grd)**. Record the readings at Appendix A, Table A.1.

3.7 AC Ammeter Function Test

Note AC Current reading for each Phase and record results at Appendix A, Table A.1,

3.8 DC Ammeter Function Test

Note DC Current reading for each Phase and record results at Appendix A, Table A.1.

3.9 Frequency Meter Functional Test

Note Frequency Meter reading and record results at Appendix A, Table A.1.

3.10 Press-to-Check Test Functional Test

Verify all TI Press-to-Check indicators are operational and record results at Appendix A, Table A.2.

CHAPTER 4

T700 Alignment

NOTE

All Tables for Data Recording used in AEDATS Alignment procedures are located in Appendix A. AEDATS III/IV will utilize the Two-Point Alignment Technique.

4.1 Dyno Shroud Position Indicator Alignment (Dyno Shrd) (T700) Functional Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the T76 Transducer (Dyno Shrd) to set zero and span Set -Points.

c. Disconnect TI Plug P91 and connect Voltage Calibrator (Eurocal 2000) to **P91** pins **F (+)** and **H (-)**. Apply 0.00 Vdc, observing polarity.

d. With **0.00 Vdc** applied, select the First Set-Point **(0º)** and adjust the Vertical Scale (Bot Row 3) for 0%, if required.

e. Apply **16.00 Vdc** and select the Second Set-Point **(100º)**. Adjust the Vertical Scale for 100%, if required. Repeat Steps 4.1 d. and 4.1e. until no adjustment is required.

f. Set the Voltage Calibrator to values listed in Appendix A, Table A.3. Verify readings are within the tolerance listed and record readings in Appendix A, Table A.3.

g. Set the Voltage Calibrator to minimum output and disconnect.

4.2 Inlet Guide Vane Position (IGV) (T700) Functional Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the T83 Transducer (IGV) to set zero and span Set-Points.

c. Disconnect TI Plug P53 (IGV) and connect Voltage Calibrator (Eurocal 2000) to **P53** pins **A (+)** and **B (-)**. Apply 0.00 Vdc, observing polarity.

d. With **0.00 Vdc** applied, select the First Set-Point **(-10%)**. Adjust the Vertical Scale (Bot Row 4) for -10%, if required.

e. Apply **16.00 Vdc** and select the Second Set-Point **(90%)**. Adjust the Vertical Scale for 100%, if required. Repeat Steps 4.2 d. and 4.2 e. until no adjustment is required.

f. Set the Voltage Calibrator to values listed in Appendix A, Table A.3. Verify readings are within tolerance listed and record readings in Appendix A, Table A.3.

g. Set the Voltage Calibrator to minimum output and disconnect.

4.3 Load Demand Spindle Position (LDS) (T700) Functional Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the **T82** Transducer (**LDS**) to set zero and span Set-Points.

4.3 Load Demand Spindle (LDS) Position (T700) Functional Test - Continued

c. Disconnect TI Plug P51 (**LDS**) and connect Voltage Calibrator (Eurocal 2000) to **P51** pins **A (+)** and **B (-)**. Apply 0.00 Vdc**,** observing polarity.

d. With **0.00** Vdc applied, select the First Set-Point **(-45º)** and adjust the Vertical Scale (Bot Row 2) for -45º, if required.

e. Apply 12.00 Vdc and select the Second Set Point **(105º)**. **A**djust the Vertical Scale for 105º, if required. Repeat Steps 4.3 d. and 4.3 e. until no adjustment is required.

f. Set the Voltage Calibrator to values listed in Appendix A, Table A.3. Verify readings are within tolerance listed and record readings in Appendix A, Table A.3.

g. Set the Voltage Calibrator to minimum output and disconnect**.**

4.4 Power Available Spindle (PAS) Position (T700) Functional Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the **T78** Transducer (**PAS**) to set zero and span Set-Points.

c. Disconnect TI Plug P50 (**PAS**) and connect Voltage Calibrator (Eurocal 2000) to **P51** pins **A (+)** and **B (-)**. Apply 0.00 Vdc**,** observing polarity.

d. With 0.00 Vdc applied, select the First Set-Point **(0º)**. Adjust the Vertical Scale (Bot Row 1) for 0º, if required.

e. Apply 12.00 Vdc and select the Second Set-Point **(150º)**. Adjust the Vertical Scale for 150º, if required. Repeat Steps 4.4 d. and 4.4 e. until no adjustment is required.

f. Set the Voltage Calibrator to values listed in Appendix A, Table A.3. Verify readings are within tolerance listed and record readings in Appendix A, Table A.3.

g. Set the Voltage Calibrator to minimum output and disconnect**.**

4.5 Engine Torque (Qeng) (T700) Function Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the **T109** Transducer (**Qeng**) to set zero and span Set-Points.

c. Disconnect TI Plug E1 (Qeng) from engine and connect Voltage Calibrator (Eurocal 2000) to **E1** pins **10 (+)** and **11 (-)**. Apply 0.00 ±0.01 Vdc**,** observing polarity.

d. With **0.00 Vdc** applied, select the First Set-Point **(0 ft/lbs)**. Adjust the Vertical Scale (Bot Row 10) for 0º, if required.

e. Apply 8.00 ±0.01 Vdc and select the Second Set-Point **(800 ft/lbs)**. Adjust the Vertical Scale for 800 ft/lbs, if required. Repeat Steps 4.5 d. and 4.5 e. until no adjustment is required.

f. Set the Voltage Calibrator to values listed in Appendix A, Table A.3. Verify readings are within tolerance listed and record readings in Appendix A, Table A.3.

g. Set the Voltage Calibrator to minimum output and disconnect**.**

4.6 Engine Oil Inlet Temperature Gauge (ORBT) Function Test

a. Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

b. Select the **T87** Transducer (**ORBT**) to set zero and span Set-Points.

c. Disconnect cable 981AS623-1 from engine and connect the Decade Resistor to connector **E3** pins **9** and **10.**

4.6 Engine Oil Inlet Temperature Gauge (ORBT) Function Test - Continued

d. Set the decade resistor for **90.4** ohms and select the First Set-Point (**32º F**) on AEDATS.

e. Set Decade Resistor to **177.9** ohms and select the Second Set-Point (**392º F**) on AEDATS.

f. Set the Voltage Decade Resistor to values listed in Appendix A, Table A.3. Verify readings are within tolerance listed and record readings in Appendix A, Table A.3.

g. Disconnect the Decade Resistor and reconnect E3 to engine.

4.7 T700 Pressure Checks

a. B-sump Delta Pressure (T700) EODP

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

(2) Select the **T26** Transducer (**EODP**) to set zero and span Set-Points.

(3) Connect the High Pressure Standard to **MT17A Tee** and vent **MT17B**. With MT17A vented, select the First Set-Point on AEDATS and zero Vertical Scale (Top Row 5), if required.

(4) Apply 150 psi to MT17A and select Second Set-Point on AEDATS. Adjust the Vertical Scale for 150 psi indication, if required. Repeat Steps 4.7 a. (3) and 4.7 a. (4) until no adjustment is required.

(5) Set the Pressure Calibrator to values listed in Appendix A, Table A.5. Verify readings are within tolerance listed and record readings in Appendix A, Table A.5.

(6) Press the **R-Cal** button on Vertical Scale and record results on Appendix A, Table A.5.

(7) Vent High Pressure Standard.

b. 3PS Alarm Engine Low Oil Pressure (T700)

(1) Ensure the Low Oil Pressure Indicator in the Engine section of the Fault Light Panel is illuminated with no pressure applied to **3PS** through tee connector at MT17A.

(2) Slowly apply a pressure of 30 psi and verify the Low Oil Pressure Indicator in the Engine Section of the Fault Light Panel is extinguished.

(3) Slowly decrease pressure and note the psi reading when indicator illuminates (Alarms) (25 ±2 psi). Record reading in Appendix A, Table A.5.

(4) Vent the High Pressure Standard.

c. B-sump Delta Pressure (T701C) PsumpD

(1) Ensure the AEDATS Calibration Program is in the T701C Engine Mode.

(2) Select the **T86** Transducer (**PsumpD**) to set zero and span Set-Points.

(3) Connect the High Pressure Standard to **MT17A Tee** and vent **MT17B**. With MT17A vented, select the First Set-Point on AEDATS and zero Vertical Scale (Top Row 5), if required.

(4) Apply 150 psi to MT17A and select Second Set-Point on AEDATS and adjust the Vertical Scale for 150 psi indication, if required. Repeat Steps 4.7 c. (3) and 4.7 c. (4) until no adjustment is required.

(5) Set the High Pressure Calibrator to values listed in Appendix A, Table A.5. Verify the AEDATS and Vertical Scale read the proper pressure applied correctly and record indications in Appendix A, Table A.5.

(6) Press the **R-Cal** button on the Vertical Scale and record results in Appendix A, Table A.5.

(7) Vent and disconnect High Pressure Standard and reconnect MT17A and MT17B.

4.7 T700 Pressure Checks - Continued

d. Fuel Inlet Pressure (PFI) (T700)

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

(2) Select the **T30** Transducer (**PFI**) to set zero and span Set-Points.

(3) Connect the High Pressure Standard to **MT15**, with MT15 vented. Select the First Set-Point on AEDATS and zero Vertical Scale (Top Row 9), if required.

(4) Apply 100 psi to MT15, select Second Set-Point on AEDATS and adjust the Vertical Scale for 100 psi indication, if required. Repeat Steps 4.7 d. (3) and 4.7 d. (4) until no adjustment is required.

(5) Set the High Pressure Calibrator to values listed in Appendix A, Table A.5. Verify the AEDATS and Vertical Scale read the proper pressure applied correctly and record indications in Appendix A, Table A.5.

(6) Press the **R-Cal** button on the Vertical Scale and record on results on Appendix A, Table A.5.

(7) Vent and disconnect High Pressure Standard and reconnect MT15.

e. Dyno Lube Inlet Pressure (Pdyn_Sup) (T700)

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

(2) Select the **T34** Transducer (**Pdyn_Sup**) to set zero and span Set-Points.

(3) Connect the High Pressure Standard to **MT16**, with MT16 vented. Select the First Set-Point on AEDATS and zero Vertical Scale (Bot Row 11), if required.

(4) Apply 50 psi to MT16, select Second Set-Point on AEDATS and adjust the Vertical Scale for 50 psi indication, if required. Repeat Steps 4.7 e. (3) and 4.7 e. (4) until no adjustment is required.

(5) Set the High Pressure Calibrator to values listed in Appendix A, Table A.5, verify the AEDATS and Vertical Scale read the proper pressure applied correctly and record indications.

(6) Press the **R-Cal** button on Vertical Scale and record results in Appendix A, Table A.5.

(7) Vent High Pressure Standard.

f. 5PS Alarm Dyno Low Oil Pressure Forward

(1) Ensure the Low Oil Pressure Indicator in the Engine section of the Fault Light Panel is illuminated with no pressure applied to **5PS** through tee connector at MT16.

(2) Slowly apply a pressure of 15 psi and verify the Low Oil Pressure Indicator in the Engine Section of the Fault Light Panel is extinguished.

(3) Slowly decrease pressure and note the psi reading when indicator illuminates (Alarms) (10 ±0.5 psi). Record reading in Appendix A, Table A.5.

(4) Vent and disconnect the High Pressure Standard and reconnect MT16.

4.7 T700 Pressure Checks - Continued

g. Scavenge Pressure (BSUMP) (B Sump Scav) (T700)

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

CAUTION

To prevent equipment damage, make sure that the E3 cable is connected to the engine.

(2) Connect engine oil transducer (P/N: 418-10054) to the **GREEN** Cable Connector at engine (top front).

(3) Connect the High Pressure Calibrator directly to the engine oil transducer.

(4) On the touch screen, turn-on the 400 Hz power.

(5) Apply pressures listed in Appendix A, Table A.5. Verify the readings are within limits and record readings in Appendix A, Table A.5.

(6) Vent and disconnect the High Pressure Standard and engine oil transducer then reconnect the GREEN cable.

NOTE

If no engine is connected, the E3 Connector must be jumpered following Step 4.7 g. (7) below.

(7) With the E3 connector, jumper pins 1 to 7, 2 to 6 and 3 to 5.

(8) After E3 is jumpered, perform Steps 4.7 g. (5) above.

NOTE

Refer to the Manufacturer's Manual of Panel Meter for adjustments.

(9) Vent and disconnect the High Pressure Standard and engine oil transducer.

(10) Reconnect the GREEN cable.

h. CDP 0-600 in/hg abs Pressure (T700)

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

NOTE

Obtain the absolute barometric pressure presently at the site (Calibrated Standard or Air Field Tower).

(2) Select the **T41** Transducer (**CDP**) to set zero and span Set-Points.

4.7 T700 Pressure Checks - Continued

Table 4.1 Pressure Unit Conversion Constants

Pressure Unit Conversion Constants							
	PSI	**In. H_2O**	**In. Hg**	**K Pascal**	**milli bar**	**cm H_2O**	**mm Hg**
PSI	1.000	27.680	2.036	6.8947	68.947	70.308	51.715
In. H_2O	3.6127×10^{-2}	1.000	7.3554×10^{-2}	0.2491	2.491	2.5400	1.8683
In. Hg	0.4912	13.596	1.000	3.3864	33.864	34.532	25.400

(3) Connect the High Pressure Standard with ABS selected with the ABS/Gauge switch to the CDP transducer located in Cabinet #11.

(4) With the transducer vented, type in the present barometric pressure from calibrated source for First Set-Point Value, then select the First Set Point (baro) on AEDATS and adjust the Vertical Scale (Bot Row 7) to read the same value as entered as the First Set-Point, if required.

(5) Apply 294.7 psia to CDP Transducer and select Second Set-Point on AEDATS and adjust the Vertical Scale for 600 in/hg abs indication, if required.

(6) Repeat Steps 4.7 h. (3) and 4.7 h. (4) until no adjustment is required.

(7) Set the High Pressure Calibrator to values listed in Appendix A, Table A.5. Verify the AEDATS and Vertical Scale read the proper pressure applied correctly and record indications, in Appendix A, Table A.5.

(8) Press the **R-Cal** button on Vertical Scale and record on Appendix A, Table A.5.

(9) Vent High Pressure Standard.

4.8 Audio/Illuminated Fault Alarms (T700)

a. 3PS Engine Low Oil Pressure Switch

Preformed during the (EODP) B-sump Delta Pressure Check (Step 4.7 a.).

b. 5PS Dyno Low Oil Pressure Fwd

Preformed during the (Pdyn_Sup) Dyno Lube Inlet Pressure Check (4.7 e.).

c. 6PS Dyno Low Oil Pressure Aft

(1) Connect the High Pressure Standard to 6PS Transducer located on the J-Box. Verify that the Low Oil Pressure indicator in the Engine section of the Fault Light Panel is illuminated with no pressure applied to **6PS**.

(2) Slowly apply a pressure of 15 psi and verify the Low Oil Pressure Indicator in the Engine Section of the Fault Light Panel is extinguished.

(3) Slowly decrease pressure and note the psi reading when the indicator illuminates (Alarms) (10 ±0.5 psi). Record the reading in Appendix A, Table A.6.

(4) Vent and disconnect the High Pressure Standard and reconnect **6PS**.

4.8 Audio/Illuminated Fault Alarms (T700) - Continued

d. 11PS Fuel Boost

(1) Locate the 11PS Pressure Switch inside of the Fuel Skid (T700 Fuel Flowmeter Line).

(2) Disconnect the T700 Fuel Flowmeter Line and connect the High Pressure Calibrator to the **11PS** Pressure Switch.

(3) Slowly increase pressure (from zero) and note the psi reading when the indicator extinguishes (15.0 ± 1.0 psi). Record the reading in Appendix A, Table A.6.

(4) Vent and disconnect the High Pressure Standard and reconnect **11PS**.

e. 3PS Low Fuel Level

NOTE

The Low Fuel Level indicator located in the Engine section of the Fault Light Panel should light when the Fuel Skid Tank drops below 15%. This can be noted when the fuel level is low.

(1) Access the Fuel Skid junction box.

(2) Jumper TB206 pins 12 and 11.

NOTE

Ensure that the Low Fuel Level indicator is lit. This verifies everything except for the Low Level Sensor.

f. Fuel Filter Bypass

NOTE

The following procedure simulates proper functioning of the Skid Fuel Filter Bypass. The Skid Fuel Filter Bypass Indicator will light to indicate proper functioning of the equipment.

(1) Access the Fuel Skid J-Box and jumper TB207 1 and 2.

Note

The Skid Fuel Filter Bypass Indicator should light.

(2) Note proper operation in Appendix A, Table A.6.

g. Fuel Valve

(1) Ensure the AEDATS Calibration Program is in the T700 Engine Mode.

(2) Activate the fuel pump.

NOTE

The Valve Select indicator should light when the fuel pump is activated.

(3) De-activate the fuel pump.

(4) Note proper operation in Appendix A, Table A.6.

4.8 Audio/Illuminated Fault Alarms (T700) - Continued

h. Skid Main Fuel Valve

NOTE

The Main Valve Indicator should be lit.

(1) Activate the Fuel Pump.

NOTE

The Main Fuel Closed Indicator should extinguish.

(2) De-activate the fuel pump.

(3) Note proper operation in Appendix A, Table A.6.

i. Dyno Lube Filter Bypass

NOTE

The Dyno Lube Filter delta-P switch is factory set by the Air Dynamometer manufacturer.

(1) To simulate a Dyno Lube Filter Bypass condition, jumper pins L and K on connector J73 of cable 981AS615-1.

NOTE

The Lube Filter Bypass indicator in the Air Dyno section of the Fault Light panel should light indicating proper functioning of the equipment.

(2) Note proper operation in Appendix A, Table A.6.

j. Dyno Lube Tank Low Level

NOTE

The Low Oil Level indicator will light when the Dyno Lube Tank is low on oil. This can be observed when changing the oil on the Dyno Lube System.

(1) To simulate that the Dyno Lube Tank is low on oil, jumper pins M and N of connector J73 of cable 981AS615-1.

(2) Note proper operation in Appendix A, Table A.6.

k. Engine Lube Filter Bypass

(1) Locate connector E3 of the Flight Harness, 981AS623-1 and jumper pins 13 and 14.

NOTE

The Lube Filter Bypass indicator in the Engine section of the Fault Light panel should light to indicate proper functioning of the equipment.

(2) Note proper operation in Appendix A, Table A.6.

4.8 Audio/Illuminated Fault Alarms (T700) - Continued

l. Engine Fuel Filter Bypass

(1) Locate connector E3 of the Flight Harness, 981AS623-1 and jumper pins 15 and 16.

NOTE

The Engine Fuel Filter Bypass fault indicator should light to indicate proper functioning of the equipment.

(2) Note proper operation in Appendix A, Table A.6.

m. Chip Detector

(1) Locate connector E3 of the Flight Harness 981AS623-1 and jumper pins 11 and 12.

NOTE

The Chip Detector indicator should light indicating proper functioning of the equipment.

(2) Note proper operation in Appendix A, Table A.6.

n. Low Fuel Pressure

(1) Locate connector E3 of the Flight Harness, 981AS623-1 and jumper pins 23 and 24.

NOTE

The Low Fuel Press indicator in the Engine section of the Fault Light panel should light indicating proper functioning of the equipment.

(2) Note proper operation in Appendix A, Table A.6.

4.9 Temperature Measurement System (T700)

a. Doric Performance Check

(Digital Temperature Indicator, Type-J (Iron-Const.) Thermocouple Channels)

NOTE

The Limit Control Panel, Temperature and Speed Limit Control may be calibrated in conjunction with the digital temperatures indicator. Refer to Appendix A, Table A.7.

(1) Connect the TC Calibrator to the **P56** Engine Lube Discharge, cable 20090787-1 using a Type J TC Wire.

NOTE

The P56 Engine Lube Discharge, cable 20090787-1, is connected to the T700 side of the J-box.

4.9 Temperature Measurement System (T700) - Continued

NOTE

Step 4.9 a. (2) is not required if Eurotron 2000T is being used.

(2) Turn on the Thermocouple Calibrator and allow a 30 minute warm-up period.

(3) Depress Channel 1 on the Doric Type J thermocouple switch.

(4) Adjust the thermocouple calibrator for Type J, 32° F temperature output.

NOTE

To gain access to the TI Temperature Indicator alignment controls, remove the two screws from the sides of the front panel and remove the panel. The two potentiometers are visible at the upper left of the display. Potentiometer R44 (Front Panel Zero) controls the ice point indication and R45 (Span) controls the positive (+) full scale indication. R44 and R45 may interact with each other.

(5) Verify that the Temperature Indicator indication is between 31 and 33° F. Adjust the Temperature Indicator ice point reference potentiometer (R44) as necessary.

(6) Adjust the TC Calibrator controls for 1000º F.

(7) Verify the Temperature indicator reads between 999º F and 1001º F. Adjust the indicator positive (+) full-scale adjustment (R45), if required. Repeat Steps 4.9 a. (4) through 4.9 a. (7), as required.

(8) Adjust the thermocouple calibrator controls to obtain the temperature values listed for **P56 (Bsump/EODT)** in Appendix A, Table A.7 corresponding to the channel being verified.

(9) At each temperature setting, record TI Indication and verify the reading is within stated tolerance limits.

NOTE

Do not calibrate AEDATS Bsump/EODT at this time, as it will be calibrated in the next section.

4.9 Temperature Measurement System (T700) - Continued

b. J-Type Thermocouple (TC) Alignment (T700) Performance Check

NOTE

Channel name, location, and range of the Type-J thermocouple channels requiring alignment for the T700 engine tests are listed in Table 4.2.

Table 4.2 J-Type Thermocouple (TC) Channels

Channel Name	Connector Label	DORIC Channel	AEDATS Channel	Temperature Range
Engine Lube Discharge Temp	P56	1	Bsump	0-300º F
Engine Oil Scavenge Temp	P57	2	J02	0-300º F
Inlet Air Temperature	P58	3	T21	0-120º F
Inlet Air Temperature	P59	4	T22	0-120º F
Inlet Air Temperature	P68	5	T23	0-120º F
Inlet Air Temperature	P92	6	T24	0-120º F
Inlet Air Temperature	P101	27	T25	0-120º F
Inlet Air Temperature	P102	28	T26	0-120º F
Inlet Air Temperature	P103	29	T27	0-120º F
Inlet Air Temperature	P104	30	T28	0-120º F
Dyno Lube Tank temperature	J20 of Dyno	7	Tdyn_tnk	0-300º F
Dyno Lube Out Fwd	J21 of Dyno	8	Tdyn_fwd	0-300º F
Dyno Lube Out Aft	J22 of Dyno	9	Tdyn_aft	0-300º F
TDyno F/A	J20,J23 &J24	none	Tdyn_FA	0-300º F

NOTE

AEDATS Channel alignment utilizes a Two-Point Calibration technique. The First Set-Point is 32º F. The Second Set-Point is the Highest Test Point verified per Appendix A, Table A.7, unless otherwise indicated.

(1) Record the indicated temperature at each setting listed in Appendix A, Table A.7.

(2) Verify all readings are within given tolerance limits.

4.9 Temperature Measurement System (T700) - Continued

NOTE

Cable 20090787-1 and 20090767-1 contain the Thermocouple connectors.

As a preliminary check during alignment and for better stability, ensure that thermocouples or shorting plugs are installed to all TC channels not being aligned.

4.10 Temperature Limit Control Engine Oil Inlet Temperature (0-300º F) (T700) Performance Check

a. Ensure that plugs 1 through 4 on the Thermocouple Jack Panel (Cabinet #4) are in the T700 position and the system is in the T700 Engine Mode.

b. Connect the thermocouple calibrator to P56 of cable 20090787-1 using Type J thermocouple wire.

c. Set all TI Limit Control Thumbwheel to 0 and energize the TI Limit Control Panel.

d. Perform the TI Limit Control function test by depressing and releasing the TI Limit Control LAMP TEST switch.

e. Verify that all green, red and yellow indicator lamps light, an audible over temperature warning sounds, and all Digital Displays indicate 8888.

f. Depress and release the TI RESET switch to clear the memory circuit. Allow a 3 minute period for the software program to cycle twice.

NOTE

TI Limit Control temperature indications below 90% of the values preset by Thumbwheel Switches are blanked out. Depress and release the DISPLAY switch, as required, to obtain temperature indications.

g. Adjust the thermocouple calibrator output for 32° F.

h. Verify that the TI Limit Control indication is between 29° F and 35° F. Adjust potentiometer R-33 (within Limit Control Panel), as necessary.

i. Set the TI Limit Control ENGINE OIL INLET TEMPERATURE Thumbwheel Switches to 300.

j. Adjust the thermocouple calibrator to each temperature setting listed in Appendix A, Table A.7, **P56** (Engine Oil Inlet Temperature).

k. Record the TI reading at each calibrator setting and verify that the readings are within tolerance in Appendix A, Table A.7.

l. Ensure the correct Control Panel Indicator is lit (In Limits, 90% Alert, or 100% Alarm) and an Audio Alarm sounds at 100%.

m. Note observation in Appendix A, Table A.7.

4.11 Temperature Limit Control Engine Oil Delta Temperature Performance Check

a. Ensure that plugs 1 through 4 on the Thermocouple Jack Panel are in the T700 Position and the system is in the T700 Engine Mode.

b. Connect the Thermocouple Calibrator to **P57** of cable 20090787-1 using Type J thermocouple wire.

c. Connect a Thermocouple to **P56**.

d. Set the TI Limit Control ENGINE OIL Delta TEMPERATURE Thumbwheel Switches to 150.

e. Adjust the thermocouple calibrator output for Ambient (P56 Temperature Reading) + 135° F.

f. Verify and record in Appendix A, Table A.7, that the **90% Alert** Control Panel Indicator is illuminated and there is no Audio Alarm sound.

g. Adjust the thermocouple calibrator output for Ambient (P56 Temperature Reading) + 150° F.

h. Verify and record in Appendix A, Table A.7, that the **100% Warning** Control Panel Indicator is illuminated and there is an Audio Alarm sound.

4.12 Temperature Limit Control Dynamometer Lube Inlet Temperature (0-200º F) (T700) Performance Check

a. Ensure that plugs 1 through 4 on the Thermocouple Jack Panel (P/N 20090794-1) are in the T700 Position (Cabinet #4) and the system is in the T700 Engine Mode.

b. Connect the Thermocouple Calibrator to **J20** using Type J thermocouple wire.

c. Adjust the thermocouple calibrator output for 32 °F.

d. Verify that the TI Limit Control indication is between 29° F and 35 °F. Adjust potentiometer R-33 (within Limit Control Panel), as necessary.

e. Set the TI Limit Control ENGINE OIL Delta TEMPERATURE Thumbwheel Switches to 200.

f. Adjust the thermocouple calibrator to each temperature setting listed in Appendix A, Table A.7, **J20** (Dynamometer Lube Inlet Temperature).

g. Record the TI reading at each calibrator setting and verify that the readings are within tolerance, the correct Control Panel Indicator is illuminated (In Limits, 90% Alert, or 100% Audio Alarm), and with 200º F applied, there is an Audio Alarm as listed in Appendix A, Table A.7.

4.13 Temperature Limit Control Dynamometer Lube Delta Temperature (T700) Performance Check

a. Ensure that plugs 1 through 4 on the Thermocouple Jack Panel (P/N 20090794-1) are in the T700 Position (Cabinet #4) and the system is in the T700 Engine Mode.

b. Connect the Thermocouple Calibrator to **J23** of cable 20090787-1, using Type J thermocouple wire.

c. Connect a Thermocouple to **J20** to obtain an ambient temperature reading.

d. Set the TI Limit Control Dynamometer Lube Delta TEMPERATURE Thumbwheel Switches to 080.

e. Adjust the thermocouple calibrator output for Ambient (J20 Temperature Reading) + 74° F. Verify and record in Appendix A, Table A.7, that the **90% Alert** Control Panel Indicator is illuminated and there is no Audio Alarm sound.

f. Adjust the thermocouple calibrator output for Ambient (P56 Temperature Reading) + 80° F. Verify and record in Appendix A, Table A.7, that the **100% Warning** Control Panel Indicator is illuminated and there is an Audio Alarm sound.

4.14 Digital Temperature Indicator Alignment (K Type) (T700) Performance Check

a. Connect the TC Calibrator to pins 17 (+) and 16 (-) of connector E1 of the T700 Engine Control Cable, P/N 981AS622-1 or 1003705, using a K Type TC wire.

NOTE

The T700 Engine Control Cable (P/N 981AS622-1 or 1003705) runs from the J-box to the T700 engine.

b. Set thermocouple calibrator for Type K Output.

c. Select Doric Channel 1 on the Type K thermocouple selector switch.

d. Adjust the thermocouple calibrator for 400 °F.

e. Verify that the Type R Temperature Indicator is between 398 and 402° F. Adjust the ice point potentiometer (R44) as necessary.

f. Click AEDATS First Set-Point.

NOTE

To gain access to the TI Temperature Indicator alignment controls, remove the two screws from the sides of the front panel and remove the panel. The two potentiometers are visible at the upper left of the display. R44 (Front Panel Zero) potentiometer controls the ice point indication. R45 (Span) potentiometer controls the positive (+) full scale indication. Interaction between R44 and R45 may occur.

g. Adjust the thermocouple calibrator for 2000° F output.

h. Verify that the TI indicator indication is between 1998 and 2002° F. Adjust the indicator positive (+) full-scale potentiometer (R45), as necessary.

i. Select the AEDATS Second Set-Point.

j. Adjust the thermocouple calibrator to obtain the temperature values listed in Appendix A, Table A.8.

k. Record the result of the TI Indication at each temperature setting, in Appendix A, Table A.8 and verify the reading is within state tolerance limits.

4.15 Vibration Measurement System (T700)

a. Preliminary Setup

(1) Energize TI CB316 60 Hz Instrument circuit breaker and ensure that the system is in the T700 mode.

(2) Set the Tracking Filter Assembly to OUT position and all Channels to position 1.

4.15 Vibration Measurement System (T700) - Continued

b. Sensitivity Adjustment

NOTE

This procedure adjusts the sensitivity of the CEC 2047 amplifiers to match the output level of the transducer being used.

(1) Set the TI Vibration Meter Amplifier controls on all channels as follows:

- **(a)** Filter Switch to CAL
- **(b)** Range Switch to **150**
- **(c)** Xducer Switch to **ACC**
- **(d)** Mode Switch to **VEL**
- **(e)** Output Switch to **AVG**

(2) Adjust the **CAL** pot to (105) on the Digital Display on all channels.

(3) Obtain and note the appropriate vibration transducer sensitivity for each channel.

NOTE

Nominal sensitivity values of standard transducers are given in Table 4.3. Transducer sensitivity may also be determined by referring to the Calibration Test Report supplied with the transducer.

Table 4.3 Vibration Transducer Sensitivity

Manufacturer	Transducer P/N	Nominal Sensitivity (mV/in/sec)
CEC	4-106-0001	122
CEC	4-106-0002	122
CEC	4-125-0006	105
CEC	4-118-0002	105
CEC	4-128-0001	60.5
CEC	6222-M20	10
CEC	6233	50

(4) Adjust TI CHAN 1 **CAL ADJ** Control to obtain a TI digital indication equal to the respective channel transducer sensitivity (**normally 105**).

(5) Set the TI CHAN 1 **FILTER** Switch to **SENS** and adjust TI CHAN 1 **SENS ADJ** control for (**150**) full scale digital meter indication.

(6) Set the TI CHAN 1 Vibration Meter Amplifier controls as follows:

- **(a)** Filter Switch to **OUT**
- **(b)** Range Switch to **5.0**
- **(c)** Xducer Switch to **VEL**
- **(d)** Mode Switch to **VEL**
- **(e)** Output Switch to **AVG**

(7) Repeat **Steps 4.15 a. (1)** through **4.15 a. (6)** for the remaining Channels 2, 3, 4 and 5.

4.15 Vibration Measurement System (T700) - Continued

c. Digital Bar Graph Zero Alignment (T700)

CAUTION

Always remove the 115 Vac power from the Vibration System before connecting or disconnecting P25 with J25 (Charge Amp) Box). This is done by unplugging the CEC 4000 AC power cord. Failure to remove power may result in damage to Charge Amps.

(1) Remove the 115 Vac power to the CEC 4000-2047 Rack and remove vibration connectors P25 and P91.

(2) Reconnect the 115 Vac supply to CEC 4000-2047 Rack.

(3) Connect a jumper between TI Plug P25 pins C and L (cable from Control Cab to engine/charge Amp Box).

(4) Verify Chan 1 Bar Graph and Digital Display indicates **Zero**. Adjust Digital Bar Graph Indicator Zero Control (**R4**) for a **zero** indication, if required.

(5) Repeat **Steps 4.15 b. (1)** through **4.15 b. (3)** for the remaining Channels 2, 3, 4 and 5 using the connector and pins listed in Table 4.4.

Table 4.4 TI Chan Connections

Channel	Plug	Jumper Pins
1	P25	C, L
2	P25	E, B
3	P25	G, M
4	P91	N, G
5	P91	B, M

(6) After zeroing indicators, return to **Step 4.15 b.** and recheck **CAL** and **SENS**.

NOTE

Since Vibration Meter Amplifier controls are already setup for Channels 4 and 5, ensure that they are aligned first.

d. Performance Check Channel 4 and 5 (T700)

(1) Connect J2 pins A (+) and B (-) of CEC 2700 Charge Amp Calibrator to **P91** pins **N** (+) and **G** (-).

(2) Apply a 100 Hz signal at 116.5 mVavg to P91.

(a) Set First Set-Point on AEDATS.

(b) Verify Vertical Scale reads 1.0 ±0.1 in/sec.

4.15 Vibration Measurement System (T700) - Continued

(3) Apply a 100 Hz signal at 583.0 mVavg and set Second Set-Point on AEDATS.

(a) Set Second Set-Point on AEDATS and verify Vertical Scale reads 5.0 ±0.1 in/sec.
(b) If Vertical Scale is out-of-tolerance at 5.0 in/sec, place the module on the extender card to gain access to R120 and adjust for 5.0 in/sec indication on the Vertical Scale.

(4) Apply 100 Hz signal at amplitudes listed in Appendix A, Table A.10 and verify Channel 4 Vertical Scale and AEDATS readings are within tolerance listed.

(5) Record all reading in Appendix A, Table A.10.

NOTE

If TI fails performance check, repeat Sensitivity, Zero, and Performance Checks until TI is within tolerance and no adjustments are required.

(6) Repeat 4.15 c. (1) through 4.15 c. (4) above for Channel 5 using Table 4.4 for connection location (P91 pins B and M).

e. Performance Check Channel 1, 2, and 3 (T700)

(1) Connect J1 using Red Cable (CEC-619566-120) to the T700 engine side accelerometer cable (J26/V1).

(2) Set the TI controls for Channels 1, 2, and 3 as follows:

(a) Filter Switch to **CAL**
(b) Range Switch to **150**
(c) Xducer Switch to **ACC**
(d) Mode Switch to **VEL**
(e) Output Switch to **RMS**

(3) Adjust the **Cal** potentiometer for a reading of **50** in/sec for **Channel 2** and **10** in/sec for **Channels 1** and **3**.

(4) Set the Filter Switch to **SENS**.

(5) Adjust the **SENS** pot for a reading of **150/75** in/sec on the Digital Display of Channels 1, 2, and 3.

NOTE

75 in/sec applies to sites with Endevco 2777A Converters installed.

(6) Set the TI controls for Channels 1, 2, and 3 as follows:

(a) Filter Switch to **CAL**
(b) Range Switch to **5**
(c) Xducer Switch to **VEL**
(d) Mode Switch to **VEL**
(e) Output Switch to **RMS**

4.15 Vibration Measurement System (T700) - Continued

(7) Apply a 100 Hz signal with a **16.3** mVavg to **J26** (**V1**).

(a) Set First Set-Point on AEDATS.

(b) Verify Vertical Scale reads 1.0 ±0.1 in/sec.

(8) Apply a 100 Hz signal at **81.4** mVavg and set the Second Set-Point on AEDATS.

(a) Set Second Set-Point on AEDATS and verify Vertical Scale reads 5.0 ±0.1 in/sec.

(b) If Vertical Scale is out-of-tolerance at 5.0 in/sec, place the module on the extender card to gain access to R120 and adjust for 5.0 in/sec TI indication.

(9) Apply a 100 Hz signal from the CEC 2700 JI connector to the [CH1 J26 (V1)] at the amplitudes listed in Appendix A, Table A.11 (Acceleration). Record and verify TI indications are within tolerance.

(10) Repeat Steps 4.15 e. (7) through 4.15 e. (9) for Channel 3 (except use **J38/V2** connector)].

(11) Apply a 100 Hz signal with an **81.4** mVavg to **J38** (**V2**).

(a) Set First Set-Point on AEDATS.

(b) Verify Vertical Scale reads 1.0 ±0.1 in/sec.

(12) Apply a 100 Hz signal at **407.0** mVavg and set Second Set-Point on AEDATS.

(a) Set Second Set-Point on AEDATS and verify Vertical Scale reads 5.0 ±0.1 in/sec.

(b) If Vertical Scale is out-of-tolerance at 5.0 in/sec, place the module on the extender card to gain access to R120 and adjust for 5.0 in/sec TI indication.

(13) Apply a 100 Hz signal from the CEC 2700 JI connector to the [CH2 **J38** (**V2**)] at the amplitudes listed in Appendix A, Table A.11 (Acceleration). Record and verify TI indications are within tolerance.

4.16 Calculating Counter Test (T700) Self Test

a. Set the TI Calculating Counter controls as follows:

(1)	All Dec Switches to	**6**
(2)	All C Switches to	**11111**
(3)	All Auto Buttons	**Depressed**
(4)	Channel (1) Button	**Depressed**
(5)	Remote Button	**Depressed**
(6)	Sample Rate (fast)	**Depressed**
(7)	All X10 Buttons	**Released**
(8)	Test Button	**Depressed**
(9)	Power Button	**Depressed**

b. Verify the Calculating Counter Display reads **011111**.

c. Depress the **Calc Counter CH1 X 10** Selector to the **IN** position and verify the display reads **111110**.

d. Release the **CH1 X 10** to the **OUT** position.

e. Repeat Steps 4.16 b. and 4.16 c. for the remaining CH1 switch settings of **22222** through **99999** and **00000**.

4.16 Calculating Counter Test (T700) Self Test - Continued

f. Repeat Steps 4.16 a. through 4.16 d. for the Calc Counter **CH2 through CH4**.

g. Release the Calc Counter Test Selector to the **OUT** position.

4.17 Flow Measurement System (T700) Flow Check

NOTE

Enter the Specific Gravity, Temperature, and Average K Factor from the Flowmeter Calibration Report into the AEDATS. Follow instructions listed in the AEDATS, Automated Engine Data Acquisition Test System Manual, H355-7, Test Cell Instrumentation Package (TCIP), Appendix A, Pages A7-A22.

a. Ensure the FEDS is in the T700 Mode and set the AEDATS to Engine Run Screen.

b. Set Calculating Counter Controls (Channel 4) as follows:

(a) All Dec Switches to **6**
(b) All C Switches to **01000**
(c) All Auto Buttons **Depressed**
(d) 10n **0**
(e) Sample Rate (fast) **1**
(f) All X10 Buttons **Depressed**
(g) Test Button **Released**

c. At the Fuel Trailer, disconnect the cable from the T700 flowmeter, **MT206**.

d. Connect the CEC 2700 to pins A(+) and B(-) of the cannon plug.

e. Apply a signal of greater than 500 mV p-p and set the frequency to each step listed in Appendix A, Table A.12.

f. At each point, verify the tolerances listed in Appendix A, Table A.12 (FLOW), are met and record the frequency indication of the Calc Counter and AEDATS in the space provided.

4.18 Speed Measurement System (T700)

a. NP (N2) Speed

(1) Ensure the FEDS is in the T700 Mode and set the AEDATS to Engine Run Screen.

(2) Connect the CEC to E1 pins 8 and 9 and set the Calc Counter controls as follows.

(a) CH2 Dec Switch **4**
(b) CH2 C Switch **07502 (T700/T701/T701C) (07179 for 401/401C)**
(c) All 10N Period **0**
(d) CH2 Auto **Depressed**
(e) CH2 X10 Buttons **Depressed**
(f) Sample Rate (fast) **1**
(g) Test Button **Released**

(3) At each point, input a 1.5 Vac signal at frequencies listed in Appendix A, Table A.13, and verify the tolerances (NP Speed) are met.

(4) Record the frequency indication of the Calc Counter and AEDATS in the space provided in Appendix A, Table A.13.

4.18 Speed Measurement System (T700) - Continued

b. Speed limit Control - Over Speed Section #1

(1) Energize the Limit Control Panel, depress the RESET Button and allow a 3 minute period for the software program to cycle twice.

(2) Set the Limit Control Panel OVERSPEED POWER SECTION #1 Thumbwheel Switches to 1333.

NOTE

Overspeed Section #2 is not connected.

(3) At each point listed in Appendix A, Table A.13, apply a >1.0Vac signal at frequencies listed for each test point.

(4) Verify the proper indication is illuminated and frequencies are indicated on the Limit Control Panel.

(5) Record indications in Appendix A, Table A.13.

(6) Disconnect CEC and reconnect the E1 cable.

c. NG (N1) Speed

(1) Ensure the FEDS is in the T700 Mode and set the AEDATS to Engine Run Screen.

(2) Connect the CEC to E3 pins 20 and 21 and set the Calc Counter controls as follows.

(a) CH2 Dec Switch **4**
(b) CH2 C Switch **04682**
(c) All 10N Period **0**
(d) CH2 Auto **Depressed**
(e) CH2 X10 Buttons **Depressed**
(f) Sample Rate (fast) **1**
(g) Test Button **Released**

(3) At each point, input a 1.5 Vac signal at frequencies listed and verify the tolerances listed in Appendix A, Table A.14 (FLOW) are met.

(4) Record the frequency indication of the Calc Counter and AEDATS in Appendix A, Table A.14.

(5) Disconnect the CEC and reconnect the E3 cable.

4.19 Torque, Horsepower, and Speed Indicator (Daytronics 9530A)

a. Torque Check

(1) Zero and Span Daytronics and set First and Second Setup for AEDATS.

(2) Install Torque Arm/Pan.

(3) Exercise the engine torque by pulling up and releasing and down and releasing the torque arm.

(4) Adjust the Daytronics for a zero indication and set AEDATS First Set-Point.

(5) Note the old R-Cal Value and record results for reference in Appendix A, Table A.15.

4.19 Torque, Horsepower, and Speed Indicator (Daytronics 9530A)

(6) Hang 100 lbs of weight on arm (2 foot arm x 100 lbs = 200 ft lb) and continue adding weight for a total of 300 lbs (600 ft/lbs).

(7) Adjust span coarse and fine controls for a 600 ft/lb indication on Daytronics and set AEDATS Second Set -Point.

(8) Repeat Steps 4.19 a. (1) through 4.19 a. (7) above a minimum of three times.

(9) Verify the 0 and 600 ft/lbs of torque reads within ± 2 ft/lbs Daytronics and ± 10 in/lbs AEDATS. If not, repeat 4.19 a. (8) and 4.19 a. (9).

(10) Apply the weight listed in Appendix A, Table A.14. Record readings for each test point listed and verify indications are within the tolerances listed.

(11) Press and hold the R-Cal button and record new R-Cal value in Appendix A, Table A.15.

(12) Remove weights and torque arm from engine and re-adjust balance pot on Daytronics to read zero.

b. RPM

(1) Ensure Daytronics is in the RPM Mode.

(2) Adjust balance control for a zero indication ± 1 Hz.

(3) Input a 1393.3 Hz signal into connector **E1** pins **8** and **9** and adjust span control for an indication of 20,900 rpm ±10 rpm.

c. SHP

(1) Ensure Daytronics is in the SHP Mode.

(2) Set zero.

(3) Push **SHP Cal** and **– Cal** (torque) buttons to the **IN** position and verify the indication is the product of the values of the R-Cal noted in Step 4.19 a. (11) divided by 5252.

(4) If the displayed value is not correct, adjust the span control to obtain the value attained mathematically in Step 4.19 c. (3) above **(SHP)**.

CHAPTER 5

T53/T55/T63 Alignment

5.1 Speed Measurement System (T53/T55/T63)

NOTE

All Data Recording Tables for AEDATS Alignment are located in Appendix A

NOTE

The cab must be set up for running large trailer before beginning alignment of T53/T55/T63 Engines. See Paragraph 5.7 of this procedure, Equipment Setup for instructions.

NOTE

The following procedure is not required if a self test was performed for small trailer. (Refer to the T700 procedure if Calculating Counter self-test is required).

NOTE

Flight/Engine Harness Pin Locations and AEDATS Transducer/Channel are listed in Table 5.1 below:

Table 5.1 Flight/Engine Harness Pin Locator

Engine Flight Harness	N1 Pins	N1 Xducer/Channel	N2 Pins	N2 Xducer/Channel
T53	G,H	T43/N1/RPM1	E,F	T48/N2/RPM3
T55	G,H	T44/N1/RPM1	D,E	T49/N2/RPM3
T63	A,B	T45/N1/RPM1	A,B	T50/N2/RPM3
Engine Harness				
T53			A,B	T48/N2/RPM3

5.1 Speed Measurement System (T53/T55/T63) - Continued

a. Power Turbine (N1) Speed Indicator

(1) Connect the Tachometer Generator Test Set to the **N1 Engine Harness** pins **A** and **B**. **Refer Table 5.1**.

(2) Set the TI Calculating Counter controls (Channel 1 or 2) as follows:

(a)	All Dec Switches to	**5**
(b)	All C Switches to	**14286**
(c)	10n	**0**
(d)	All Auto Buttons	**Depressed**
(e)	All X10 Buttons	**Released**
(f)	Channel (1) Button	**Depressed or Channel (2)**
(g)	Sample Rate (fast)	**1**
(h)	Test Button	**Released**
(i)	Power Button	**Depressed**

(3) Set the Tachometer Tester controls as follows:

(a)	Motor Direction	**Stop**
(b)	Set RPM	**10%**
(c)	Power	**On**
(d)	Motor Direction Switch	**Forward**

(4) Ensure AEDATS is in the correct engine mode and that the proper channel/transducer is selected.

(5) Verify the TI Calculating Counter and the TI N1 Indicator indicate between 9.7% and 10.3%. If not, adjust the TI N1 Indicator Low (Zero) potentiometer as necessary (R18 for digital and R20 for analog low adjustment).

(6) Set the Tachometer Tester RPM selector to 100%.

(7) Verify the TI Calculating Counter and the TI N1 Indicator indicate between 99.7% and 100.3%. If not, adjust the TI N1 Indicator High (Span) potentiometer as necessary (R23 for digital and R29 for analog High adjustment).

NOTE

Interaction of adjustment may occur between High and Low indications. Repeat Zero and Span adjustments until no further adjustment is required.

NOTE

Ground E on TB810 terminal #17 if engine is not mounted (Disconnect E3 Cable).

(8) With the Tachometer Tester, Set RPM Selector to speeds listed in Appendix A, **Table A.20**.

(9) At each Tachometer Tester speed, verify that the TI Calculating Counter, TI indicator and AEDATS indicators read within the tolerance limits listed and record results in Appendix A, Table A.20.

(10) Set the Tachometer Tester to 10%, the motor direction switch to STOP, and the power switch to OFF.

5.1 Speed Measurement System (T53/T55/T63) - Continued

b. Power Turbine (N2) Speed Indicator

(1) Connect the Tachometer Generator Test Set to the **N2 Engine Harness** pins **A** and **B**.

(2) Repeat 5.1 a. (1) through 5.1 a. (10), **(Power Turbine N1 Speed Indicator)**, except use CH 2 instead of CH 1.

c. Speed Limit Control – Overspeed Power Section No. 1 (T53/T55/T63)

(1) Ensure the System is in the T53/T55/T63 Mode with the Indicator Panel (20090829-1) installed.

(2) Turn on the power to the T53/T55/T63 Performance Monitoring System.

NOTE

Ensure that the Test Mode Switch has been set to the 3333 Hz Mode.

(3) After performing the Bit Test, press Mode Switch three times. Verify the TI Limit Control Indicator reads 3333 ±3 Hz and the frequency on back panel (Pins 1 and 2) is 3333 ± 3 Hz.

(4) Adjust the thumbwheel setting to 3333.

(5) Verify the 100% alarm activates and record results in Appendix A, Table A.20.

(6) Adjust the thumbwheel setting to 3700.

(7) Verify the 90% alarm activates and record results in Appendix A, Table A.20.

(8) Adjust the thumbwheel setting to 3800.

(9) Verify all alarms are off and record results in Appendix A, Table A.20.

NOTE

If TI fails this check, no adjustments can be made. The Limit Control Panel should be turned in for repair.

5.2 Goodrich Performance Monitoring System (T53/T55/T63)

a. Torque Measurement

(1) Set the Modulus Code to match the Modulus Code of the torque shaft that is installed in the dynamometer. See Appendix B this procedure.

(2) Set the AEDATS Channel 23 (**Torq**) for T53/T55/T63 Engine Mode.

(3) Set the EPU Performance Monitor to the First Mode Display after Bit Test.

(a) Verify that the EPU display reads 512 Hz, 0 Volt

(b) Verify TB609 pins 1 (+) and 2 (-) are with tolerance listed in Appendix A, Table A.21and record results in the space provided. If required, set First Set-Point on AEDATS.

(4) Set the EPU (Goodrich) to the Second Mode Display.

(a) Verify the EPU display reads CAL: V = 9.497, I = 19.601.

(b) Verify the display reads 9.497 V.

(c) Verify TB609 pins 1 (+) and 2 (-) are with tolerance listed in Appendix A, Table A.21 and record results in the space provided.

5.2 Goodrich Performance Monitoring System (T53/T55/T63) - Continued

(5) Verify 18944 (for 712 Engine) or 22793 (for 714 Engine) ± 4 in/lbs torque indication on the AEDATS and record results in Appendix A, Table A.21. If required, set Second Set Point on AEDATS.

b. Performance Verification HP, RPM, and TQ

(1) Energize the T53/T55/T63 Performance Monitoring System and ensure that the system passes BIT Test.

(2) Set Mode Switch to **NORMAL** Run. The Display should indicate **HP, RPM**, and **TQ**.

(3) Disconnect the Torque Sensor Cable (20090761-1) and connect the CEC 2700 Oscillator to Pins **A** and **B**.

(4) Apply a 1.5 Vac amplitude signal at frequencies listed in Appendix A, Table A.21.

(5) Verify each reading is within tolerance listed and record the results in Appendix A, Table A.21.

(6) Calculate the HP using the formula **[HP = TQ x RPM / 63024]** and verify the HP indication on the TI Display approximately equals the calculated value.

NOTE

The Army's TQ is measured in in/lbs (63024), but since the Air Force uses ft/lbs, the denominator in formula would be 5252 (63024/12 = 5252).

c. RTD Temperature Alignment

(1) Energize the T53/T55/T63 Performance Monitoring System and ensure that the system passes BIT Test.

(2) Set the Mode Switch on the Performance Monitor to indicate **TEMPERATURE**.

(3) Disconnect the Torque Sensor Cable (20090761-1) and connect the Decade Resistor to Pins **I** and **J**.

(4) Apply resistances listed in Appendix A, Table A.21.

(5) Verify each reading is within tolerance listed and record the results in Appendix A, Table A.21.

NOTE

If any Performance Monitoring System indication is out of tolerance, return the unit to the depot for repair.

5.3 Flow Measurement System (T53/T55/T63)

a. Fuel Flow Performance Check (T53/T55)

(1) Ensure the FEDS is in the proper Engine Mode with the correct Flight Harness connected at J-Box.

(2) Set the AEDATS to the Engine Run Screen and, if required, initialize WF/WFhz on the AEDATS screen.

5.3 Flow Measurement System (T53/T55/T63) - Continued

(3) At the Fuel Skid, disconnect the cable from the flowmeter, **MT207,** and connect the **CEC 2700 J2** to pins **A** (+) and **B** (-) of the cannon plug.

(4) To read Frequency on the Calculating counter Channel 4, enter the number 4-10000-0 on the Thumbwheel Switches.

(5) Set the CEC 2700 output at an amplitude greater than 500mV pk-pk and at frequencies listed in Appendix A, Table A.22.

(6) At each point listed in Appendix A, Table A.22, record the frequency indication and verify all points are within tolerances.

(7) To read frequencies on the Calculating counter Channel 4, enter the number 4-10000-0 on the Thumbwheel Switches.

(8) Disconnect the test equipment and reconnect the cable to flowmeter.

b. Oil Flow Performance Check (T53/T63)

(1) Ensure the FEDS is in the proper Engine Mode with correct Flight Harness connected at J-Box.

(2) Set the AEDATS to Engine Run Screen and, if required, initialize WF2/Woil Hz/Oilflow on the AEDATS screen.

(3) At the large Engine Test Trailer, disconnect the cable from the T53/T63 Oil Flowmeter and connect the CEC **2700 J2** connector to pins **A** (+) and **B** (-) of the cable.

(4) Using the CEC 2700 output at an amplitude greater than 500mV pk-pk, apply test signals at frequencies listed in Appendix A, Table A.23.

(5) At each point list in Appendix A, Table A.23, record the frequency indication and verify all points are within tolerances.

(6) To read frequencies on the Calculating counter Channel 3, enter the number 4-10000-0 on the Thumbwheel Switches.

c. Fuel Flow Performance Check (T63)

NOTE

All Turbine Flowmeters should be calibrated by a qualified laboratory every twelve months.

(1) Ensure the FEDS is in the proper Engine Mode with correct Flight Harness connected at J-Box.

(2) Set the AEDATS to Engine Run Screen and, if required, initialize WF/WFhz on the AEDATS screen.

(3) To read frequencies on the Calculating counter Channel 4, enter the number 4-10000-0 on the Thumbwheel Switches.

(4) At the Fuel Skid, open the cover to the Flow Linearizer (LN-5-C-V1B6) mounted next to the J-Box. Connect the CEC 2700 J2 connector to TB201 pins 1(+) and 2 (-).

(5) Set the CEC 2700 output at amplitude of greater than 500mV pk-pk and at frequencies listed in Appendix A, Table A.22.

5.3 Flow Measurement System (T53/T55/T63) - Continued

(6) At each point listed Appendix A, Table A.22, record the frequency indication and verify all points are with-in tolerances.

(7) Disconnect the test equipment and install the cover to the Flow Linearizer.

d. Fuel Flow Linearizer Program (T63)

(1) Load program "**Linkhost**" onto Laptop.

NOTE

The laptop must be compatible with Windows 98 or older.

(2) Open the shortcut to Linear Link.

(3) Enter the following Data from Calibration Sheet.

(a) **EDIT:** Go to Link Setup. (Enter Data from Cal Sheet)
- **1.** 0-10 V Out
- **2.** RF Input
- **3.** Top Flow
- **4.** Top Frequency

(b) **EDIT:** Header Fields. (Enter Data from Cal Sheet)

(c) **VIEW:** Mechanical Data **(Enter)**

(d) **Edit:** Data Fields **(Enter)**
Enter the 20 Calibration Points **(Enter)**

(e) Connect the interface cable to Laptop and Linearizer

(f) **Program:** Establish communications

(g) **View:** Open K Factor Plot **(Enter)**

(h) Verify that the table generation was successful **(OK)**

(i) **Program:** Program Link **(OK)**

(j) Will Download Data Loaded from Calibration Sheet

(k) **Enter:** Low Reading on Voltage Out [Record on Table A.24, App A]

(l) **Enter:** High Readings on Voltage Out [Record on Table A.24, App A]

(m) **Verify:** Analog Reading on Voltage Out [Record on Table A.24, App A]

(n) **Reads:** Sending Data

(o) **Reads:** Calibration Performed Successful

e. Pounds Per Hour (PPH) Verification

NOTE

PPH Verification is NOT REQUIRED if Calculating Counter Frequency indications read with-in tolerance limits.

NOTE

ENTER C = 01000 into Calculating Counter to read Frequency
PPH = Pulses per second (Hz) x 3600 x SG x 8.347 / PPH (K Factor)

5.3 Flow Measurement System (T53/T55/T63) - Continued

(1) Enter Specific Gravity (SG) into AEDATS under initialization [Fuel Correction Factor] for PPH Verification.

(2) ENTER the Fuel Flow Correction or Linearizer Conversion Factor into the calculating counter CH4 (Fuel Flow) or CH3 (Oil Flow) C Switches. ENTER this value with the five Thumbwheel Switches marked "C".

(3) Setup of Calculating Counter for PPH Count verification is as follows:

(a) Set Calculating Counter controls as follows:

1.	DEC	**6**
2.	C	*** see (b) below**
3.	10n	**0**
4.	Auto	**depressed**
5.	X10	**released**
6.	Sample Rate (fast)	**1**
7.	Test	**released**

(b) Determine the C setting for CH4 [CH4 C = [3600 x 8.337 x SG (specific gravity)] divided by the turbine flow meter K-factor (average from Test Report).

1. 3600 = number of seconds in one hour
2. 8.337 = weight in pounds of one gallon of H_2O at 60ºF
3. Specific Gravity = specific gravity of fluid in flowmeter

(c) Enter the calculated value on CH4 **C** Thumbwheel Switches.

(d) Monitor the signal with a counter if not using CEC 2700.

(e) Enter SG (specific Gravity), K Factor, and Temp into AEDATS to read the PPH from the flowmeter Test Report sheet.

NOTE

The "C" calculated Value will be entered in the Calculating Counter's CH (X) C Thumbwheel Switches with the five switch positions marked "C". The "C" factor must be calculated for each flowmeter being used.

(4) Perform the test using Appendix A, Table A.22.

(5) AEDATS and the Calculating Counter PPH reading should match ±0.1 Hz.

5.4 Vibration Measurement System (T53/T55/T63) Performance Check

a. Ensure the FEDS is in the proper Engine Mode with correct Flight Harness connected at J-Box.

b. Initialize AEDATS to the Engine Run Screen.

NOTE

This procedure adjusts the sensitivity of the CEC 2047 Amplifiers to match the output level of the transducer being used.

5.4 Vibration Measurement System (T53/T55/T63) Performance Check - Continued

c. Set the TI Vibration Meter Amplifier controls on all channels as follows:

(1) Filter Switch to **CAL**

(2) Range Switch to **150**

(3) Xducer Switch to **ACC**

(4) Mode Switch to **VEL**

(5) Output Switch to **AVG**

d. Adjust **CAL** pot to (105) on the Digital Display on all channels.

e. Obtain and note the appropriate vibration transducer sensitivity for each channel.

NOTE

Nominal sensitivity values of standard transducers are given in Table 5.2. Transducer sensitivity may also be determined by referring to the Calibration Test Report supplied with the transducer.

Table 5.2 Vibration Transducer Sensitivity

Manufacturer	Transducer P/N	Sensitivity (mV/in/sec)
CEC	4-118-0002	105
CEC	4-128-0001	60.5

f. Adjust TI CHAN 1 **CAL ADJ** Control to obtain a TI digital indication equal to the respective channel transducer sensitivity (**normally 105**).

g. Set the TI CHAN 1 **FILTER** Switch to **SENS** and adjust TI CHAN 1 **SENS ADJ** control for (**150**) full scale digital meter indication.

h. Set the TI CHAN 1 Vibration Meter Amplifier controls as follows:

(1) Filter Switch to **OUT**

(2) Range Switch to **5.0**

(3) Xducer Switch to **VEL**

(4) Mode Switch to **VEL**

(5) Output Switch to **AVG**

i. Repeat **Steps 5.4 a.** through **5.4 g.** above for the remaining Channels 2, 3, 4 and 5.

j. Connect a jumper between VIB 1 pins A and B (cable 20090778-1).

k. Verify CHAN 1 Bar Graph and Digital Display indicates **zero**. Adjust Digital Bar Graph Indicator Zero Control (**R4**) for a **zero** indication, if required. Disconnect jumper.

5.4 Vibration Measurement System (T53/T55/T63) Performance Check - Continued

l. Repeat **Steps 5.4 j.** through **5.4 k.** for the remaining Channels 2, 3, 4 and 5 using the connector and pins listed in Table 5.3 below.

Table 5.3 TI Chan Connections

Channel	Plug	Jumper Pins
1	VIB 1	A,B
2	VIB 2	A,B
3	VIB 3	A,B
4	Cable 1464D297, 40J	A,B
5	Cable 1464D297, 41J	A,B

m. Set the **TI FILTER** Switch to **CAL** and adjust **CAL ADJ** control to **105** on Digital Display. Repeat this step for all channels.

n. Set the **TI FILTER** Switch to **SENS** position for all channels and adjust each channel **SENS ADJ** control for an indication of **150** on each display.

o. Set all channel's **TI MODE** Switches to **VEL**, **RANGE** to **5.0** and **FILTER** Switch to **OUT**.

p. Connect the CEC 2700 Signal Source J2 to VIB1 using cable CEC-619688-0120.

NOTE

Use pins A (+) and B (-) of CEC to connect to VIB1 connector at engine, if no cable is available.

q. Ensure the CEC 2700 signal source is set to AVG.

r. Apply 116.5 mVac at 100Hz to VIB1 Channel and verify TI's Vertical and Digital scale reads 1.0 ± 0.1 and the AEDATS reads 1.0 ± 0.1.

s. Set the First Set-Point.

t. Apply 583.0 mVac at 100Hz to VIB1 Channel and verify TI's Vertical and Digital scale reads 5.0 ± 0.1 and the AEDATS reads 5.0 ± 0.1.

u. Set the Second Set-Point.

v. Repeat Steps 5.4 r. through 5.4 u., if required.

5.4 Vibration Measurement System (T53/T55/T63) Performance Check - Continued

NOTE

Maintain the CEC 2700 Signal Source at a constant Frequency of 100 Hz while changing the output amplitude to millivolts readings listed in Appendix A, Table A.24.

w. At each output level, record and verify the TI Vibration Meter and the AEDATS readings are within tolerance limits listed in Appendix A, Table A.24.

x. Repeat this process, Steps 5.4 m. through 5.4 w. for Channel 2 through 5.

5.5 Engine Oil Inlet Temperature ORBT (T53/T55) Performance Check

a. Ensure the AEDATS Calibration Program is in the T53/55 Engine Mode.

b. Select the **T87** Transducer (**ORBT**) to set zero and span Set-Points.

c. Connect the Decade Resistor to the Flight Harness Cable pins (N and P) for T53 or pins (K and N) for the T55 Engine.

d. Set the decade resistor for **90.4** ohms and select the First Set-Point (**32º F**) on AEDATS.

e. Set Decade Resistor to **177.9** ohms and select Second Set-Point (**392º F**) on AEDATS.

f. Set the Voltage Decade Resistor to values listed in Appendix A, Table A.26.

g. Record and verify readings are within tolerance in Appendix A, Table A.26.

h. Disconnect the Decade Resistor from engine Flight Harness.

5.6 Hydraulic Pressure Measurement System (T53/T55T63) Performance Check

a. Ensure the System is in the proper engine Mode (T53/T55/T63).

b. Align (Zero and Span) the AEDATS concurrently with the Vertical Scale Indicators.

c. Verify the transducer, Pressure Range, connection location, AEDATS Channel, and Vertical Scale location using Appendix A, Table A.28.

d. Connect the High Pressure Standard to transducer connection as listed in Appendix A, Table A.28.

e. Vent and then apply full range pressure to Zero and Span Vertical Scale.

f. Set the First and Second Set-Point on the AEDATS.

g. Record each AEDATS and Vertical Scale reading noted for each Alignment Check Point listed in Appendix A, Table A.28. Verify the readings are within tolerance.

h. Vent, disconnect pressure standard, press R-Cal and record vertical scale indication in the space provided in Appendix A, Table A.28.

i. Reconnect pressure line to the transducer.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary

a. Preliminary Setup

Ensure the System is in the proper engine Mode (T53/T55/T63).

NOTE

All references to the Dyno in the T53/T55/T63 Mode are to the large trailer.

b. 17PS Dyno Low Oil Pressure Forward

NOTE

The Low Oil Pressure Fwd 5PS/17PS Indicator should be illuminated.

(1) Disconnect the hose from the 17PS connector at the J-Box and connect the High Pressure Standard.

(2) Apply 15 psig.

NOTE

The Low Press Fwd 5PS/17PS Indicator should extinguish.

(3) Slowly decrease the pressure, at 10.5 ±0.5 psig, on a decreasing pressure.

NOTE

The Low Press Fwd 5PS/17PS Indicator should illuminate.

(4) Record results Appendix A, Table A.29.

(5) Disconnect the pressure standard and reconnect the hose removed in Step 5.7 b. (1). Leak check this connection.

c. Low Fuel Pressure 18PS

NOTE

The Low Fuel Pressure Indicator should be lit.

(1) Disconnect the hose from the 18PS connector at the J-Box and connect the High Pressure Standard.

(2) Apply 12 psig.

NOTE

The Low Fuel Pressure Indicator should go out.

(3) Slowly decrease the pressure, at 8.0 ±1.0 psig, on a decreasing pressure.

NOTE

The Low Fuel Pressure Indicator should light.

(4) Record noted indication in Appendix A, Table A.29.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary - Continued

(5) Disconnect pressure standard and reconnect hose removed in Step 5.7 c. (1). Leak check this connection.

d. Low Oil Pressure 15PS

NOTE

The Low Oil Pressure Indicator should be lit.

(1) Disconnect the hose from the 15PS connector at the J-Box and connect the High Pressure Standard.

(2) Apply 30 psig.

NOTE

The Low Oil Pressure Indicator should go out.

(3) Slowly decrease the pressure, at 25.0 ±1.0 psig, on a decreasing pressure.

NOTE

The Low Oil Pressure Indicator should light.

(4) Record noted indication in Appendix, Table A.29.

(5) Disconnect pressure standard and reconnect hose removed in Step 5.7 d. (1). Leak check this connection.

e. Dyno Low Oil Pressure Aft 16PS

NOTE

The Dyno Low Oil Pressure Indicator should be lit.

(1) Disconnect the hose from the 16PS connector at the J-Box and connect the High Pressure Standard.

(2) Apply 15 psig.

NOTE

The Dyno Low Oil Pressure Aft 6PS/16PS Indicator should extinguish.

(3) Slowly decrease the pressure, at 10.5 ±0.5 psig, on a decreasing pressure.

NOTE

The Dyno Low Oil Pressure Aft Indicator should illuminate.

(4) Record noted indication in Appendix A, Table A.29.

(5) Disconnect pressure standard and reconnect hose removed in Step 5.7 e. (1). Leak check this connection.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary Setup - Continued

f. Anti-Icing Pressure 13PS

NOTE

The Anti-icing Pressure Indicator should be extinguished.

(1) Disconnect the hose from the 13PS connector at the J-Box and connect the High Pressure Standard.

(2) Slowly increase the pressure. At 4.0 ±0.5 psig, on an increasing pressure the Anti-icing Pressure Indicator should illuminate.

(3) Record noted indication in Appendix A, Table A.29.

(4) Disconnect pressure standard and reconnect hose removed in Step 5.7 f. (1). Leak check this connection.

g. Dyno Supply Low Pressure 19PS

NOTE

The Dyno Supply Low Pressure Indicator should be illuminated.

(1) Disconnect the hose from the 19PS connector at the J-Box and connect the High Pressure Standard.

(2) Apply pressure gradually from 0 to15 psig. At 10.0 ±1.0 psig, on an increasing pressure the Dyno Supply Low Pressure Indicator should extinguish.

(3) Record noted indication in Appendix A, Table A.29.

(4) Disconnect pressure standard and reconnect hose removed in Step 5.7 g. (1) above. Leak check this connection

h. Dyno Lube Filter Delta Pressure 18PS

NOTE

The Dyno Lube Filter Bypass Indicator should be extinguished.

(1) Disconnect the existing hose from the 18PS pressure switch on the test trailer and connect the High Pressure Standard.

(2) Slowly increase the pressure. At 10.0 ±1.0 psig, on an increasing pressure the Lube Filter Bypass Indicator should illuminate.

(3) Record noted indication in Appendix A, Table A.29.

(4) Disconnect pressure standard and reconnect hose removed in Step 5.7 h. (1). Leak check this connection.

i. Fuel Boost Pressure 2PS

(1) Locate the 2PS pressure switch in the Fuel Skid, T53/T55 Fuel Flow lines.

(2) Disconnect the line and connect the high pressure calibrator to the pressure switch.

(3) Apply pressure slowly to the 2PS Pressure Switch (fuel skid) transducer.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary Setup - Continued

NOTE

At 15 ±1.0 psig on an increasing pressure the Fuel Boost Indicator on the Fault Light panel should extinguish for the ARMY Fuel Boost.

(4) Record noted indication in Appendix A, Table A.29.

NOTE

If the Indicator does not activate, adjust the pressure switch to extinguish the ARMY Fuel Boost Indicator (Fault Light Panel) at 15 ± 1.0 psig on the increase.

(5) Disconnect high pressure calibrator and reconnect line removed in Step 5.7 i. (2).

(6) Activate the Fuel Pump and leak check all connections.

(7) De-activate the Fuel Pump.

j. Oil Filter Delta Pressure 10PS

(1) Locate the differential 10PS pressure switch mounted on the Engine Oil Tank in the Fuel Skid. This pressure switch has a fixed set-point in the 2 to 13 psi range with a dead band of 1.5 psi.

(2) Disconnect the lines running to the low and high pressure ports.

(3) Connect the high pressure calibrator to the high side and vent the low side.

NOTE

The Lube Filter Bypass Indicator should be extinguished.

(4) Slowly increase the pressure. At 7.0 ±1.0 psig, on an increasing pressure the Lube Filter Bypass Indicator should illuminate.

(5) Record noted indication in Appendix A, Table A.29.

k. Chip Detector

(1) Short the Clip Detector lead to ground.

NOTE

The Chip Detector Indicator should illuminate and alarm.

(2) Record noted indication in Appendix A, Table A.29.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary Setup - Continued

Table 5.4 Chip Detector Flight Harness Cable

T53	20090775-1	T55	20090776-1	T63	20009777-1

l. Dyno Lube Tank Low Level

NOTE

The LOW Oil Level Indicator will light and alarm when the Dyno Lube Tank is low on oil. This can be observed when draining the oil on the Dyno Lube System.

(1) Jumper pins F and G of the J103 located on the auxiliary J-Box (20090707-1) of the large trailer.

(2) Record noted indication in Appendix A, Table A.29.

m. Low Oil Level (T55)

(1) Ensure the T55 Flight Harness (20090776-1) is connected to the J-Box (J655).

NOTE

The LOW Oil Level Indicator should be extinguished.

(2) Locate the engine mating connector of the Flight Harness and jumper pin A to ground.

NOTE

The LOW Oil Level Indicator should illuminate.

(3) Record noted indication in Appendix A, Table A.29.

n. Low Oil Level (T53/T63)

(1) Ensure the T53 (20090775-1) or T63 Flight (20090777-1) Flight Harness is connected to the J-Box (J655).

NOTE

The LOW Oil Level Indicator should be extinguished.

NOTE

The LOW Oil Level Indicator will light when the Engine Oil Tank is low on oil. This can be observed when draining the oil on the Fuel Skid oil tank.

(2) Jumper pins 5 and 6 of TB206 located on the Fuel Skid J-Box to simulate low oil level condition of Engine Oil Tank.

(3) Record noted indication in Appendix A, Table A.29.

5.7 Fault Light Panel (Alarms) (T53/T55T63) Preliminary Setup - Continued

o. Main Fuel Valve Closed and Fuel Valve Select

(1) Close CB305 and energize Fuel Pump Switch.

NOTE

The Main Valve Closed Indicator should extinguish and the Fuel Valve Select should illuminate ARMY.

(2) Record noted indication in Appendix A, Table A.29.

5.8 Cab Pressure Checks

a. PT101 Barometer

(1) Locate PT101 Barometer Transducer in Cabinet #10 inside Control Cab.

(2) Disconnect pressure line and connect the Low Pressure Calibrator directly to the transducer.

(3) Determine the Barometric Pressure, ensure the transducer is vented and adjust the Vertical Meter for this indication.

(4) Record in Appendix A, Table A.30.

(5) Add and subtract 3.0 in-Hg to the barometric pressure determined in Step 5.8 a. (3).

NOTE

BP – 3.0 Hg will be entered for the First Set-Point for the AEDATS and BP + 3.0 Hg will be entered for the Second Set-Point {example: 29.94 + 3.0 = 32.94 (Second) and 29.94 – 3.0 = 26.94 (First)}.

(6) Align (Zero and Span) the AEDATS concurrently with the Vertical Scale (Bot Row 9).

(7) Set up pressure calibrator to read In-Hg, zero pressure calibrator then reduce pressure to a -3.0 indication on the calibrator.

(8) Enter the First Set-Point value determined in Step 5.8 a. (5).

(9) Select the First Set-Point on AEDATS and ensure Vertical Scale is within tolerance listed in Appendix A, Table A.30.

(10) Increase pressure to a +3.0 indication on the calibrator.

(11) Enter Second Set-Point value determined in Step 5.8 a. (5).

(12) Select the Second Set-Point on AEDATS and ensure Vertical Scale is within tolerance listed in Appendix A, Table A.30.

(13) Record AEDATS and Vertical Scale indications in Appendix A, Table A.30.

b. PT102 – PT104 B/M Static #1, #2, and Total Pressure

(1) Locate the Pressure Transducer in Cabinet #10 inside Control Cab.

(2) Disconnect the pressure line and connect the Low Pressure Calibrator directly to the transducer.

(3) Align (Zero and Span) the AEDATS concurrently with the Vertical Scale.

(4) Disconnect the pressure line and connect the Low Pressure Calibrator directly to the transducer.

5.8 Cab Pressure Checks – Continued

(5) Set up the pressure calibrator to read In-H_2O and apply pressures as listed in Appendix A, Table A.30 to the transducer being checked.

(6) Record each AEDATS and Vertical Scale Alignment Check Point listed in Appendix A, Table A.30 and verify the readings are within tolerance.

(7) Vent and disconnect the pressure calibrator.

(8) Press **R-Cal** and record the vertical scale indication in the space provided in Appendix A, Table A.28.

(9) Reconnect pressure line to transducer.

5.9 J-Type Thermocouple Alignment (T53/T55/T63) Performance

NOTE

Channel name, location, and range of the Type-J thermocouple channels requiring alignment for the T53/T55/T63 engine tests are listed in Table 5.5.

Table 5.5 J-Type Thermocouple (TC) Channels

Channel Name	Connector Label	DORIC Channel	AEDATS Channel	Temperature Range
Engine Oil Inlet Temp	P801	11	Toil_in	32-300º F
Engine Oil Out Temp	P802	12	Toil_out	32-300º F
Bellmouth Temp #1	P803	13	T22	32-120º F
Bellmouth Temp #2	P804	14	Tt22	32-120º F
Compressor Discharge Temp	P805	15	CDT	32-800º F
Bellmouth Temp #3	P806	16	Twf	32-120º F
Compressor Discharge Temp	P807	17	T32	32-800º F
P.T. Bearing Scavenge	P808	18	Tptso	32-800º F
#2 Bearing Scavenge	P809	19	T2bso	32-800º F
Dyno Lube Inlet *	J20 of Dyno	21	Tdyn_tnk	32-300º F
Dyno Lube Forward *	J21 of Dyno	22	Tdyn_fwd	32-300º F
Dyno Lube Aft *	J22 of Dyno	23	Tdyn_aft	32-300º F
Dyno Lube Fwd/Aft Avg *	J20,J23	None	Tdyn_FA	32-300º F
Oil Tank Temp	TC209	25	ToilT	32-300º F
Fuel Tank Temp	TC208	26	TfuelT	32-300º F

NOTE

The Limit Control Panel may be aligned in conjunction with the channels marked by '*'

5.9 J-Type Thermocouple Alignment (T53/T55/T63) Performance - Continued

NOTE

AEDATS Channel alignment utilizes a Two-Point Calibration technique. The First Set-Point is 32º F and the Second Set-Point is the Highest Test Point verified per Appendix A, Table A.31, unless otherwise indicated.

a. Record the indicated temperature at each point listed in Appendix A, Table A.31, and verify all readings are within the given tolerance limits.

b. To align the Dyno Lube Delta Temp (above), disconnect J24, install T/C at J20, and connect the Calibrator to J23.

c. Record observed temperature readings in Appendix A, Table A.31.

d. Install the Calibrator to J24 and open J23 (leave T/C at J20), and the output should be the same as recorded above.

NOTE

If adjustment on the DORIC is needed, remove the two screws from the side of the front panel to remove the panel and access the controls. The two potentiometers are visible at the upper left of display. R44 (Front Panel Zero) potentiometer controls the 32º references and R45 (Span) potentiometer controls the positive (+) full scale (1000º).

e. Adjust the thermocouple Calibrator to 300º and the DORIC display should be 300º ± 1º. If not, repeat the adjustment.

NOTE

As a preliminary check during alignment and for better stability, install thermocouples or shorting plugs to all TC channels not being aligned.

5.10 Temperature Limit Control Panel

a. Preliminary Check

(1) Ensure that plugs 1 through 4 on the Thermocouple Jack Panel are in the T53 position and the AEDATS is in the proper engine mode.

(2) Set all TI Limit Control Thumbwheel to 0 and energize the TI Limit Control Panel.

(3) Perform a function test by depressing and releasing the TI Limit Control LAMP TEST switch.

NOTE

Verify the following conditions are met: all green, yellow, and indicator lamps light, audible over temperature warning sounds, and all Digital Displays indicate 8888.

(4) Depress and release the TI RESET switch to clear the memory circuit.

NOTE

Allow a 3 minute period for the software program to cycle twice.

5.10 Temperature Limit Control Panel - Continued

b. Engine Oil Inlet Temperature Check

(1) Connect the thermocouple calibrator to **P801** of cable 20090768-1, using Type J thermocouple wire.

(2) Set all TI Limit Control Thumbwheel to **300** and energize the TI Limit Control Panel.

(3) Adjust the thermocouple calibrator output for temperature test points listed in Appendix A, Table A.31.

(4) Record the indicated temperature at each point listed in Appendix A, Table A.31 and verify all readings are within given tolerance limits.

c. Engine Oil Delta Temperature Check

(1) Connect the Thermocouple Calibrator to **P802** using Type J thermocouple wire.

(2) Connect a Thermocouple to **P801**.

(3) Set the TI Limit Control ENGINE OIL Delta TEMPERATURE Thumbwheel Switches to 150.

(4) Adjust the thermocouple calibrator output for Ambient temperature + 135° F. Verify and record in Appendix A, Table A.31 that the **90% Alert** Control Panel Indicator is illuminated and there is no audio sound.

(5) Adjust the thermocouple calibrator output for Ambient Temperature + 150° F.

(6) Verify and record in Appendix A, Table A.31, that the 100% Warning Control Panel Indicator is illuminated and there is an audio sound.

d. Dyno Lube Inlet Temperature

(1) Connect the Thermocouple Calibrator to **J20** using Type J thermocouple wire.

(2) Adjust the thermocouple calibrator output for 32 °F.

(3) Verify that the TI Limit Control indication is between 29 °F and 35 °F. Adjust potentiometer R-33 (within Limit Control Panel) as necessary.

(4) Set the TI Limit Control Dyno Lube Inlet Temperature Thumbwheel Switches to 200.

(5) Adjust the thermocouple calibrator output for temperature test points listed in Appendix A, Table A.31.

(6) Record the indicated temperature at each point listed in Appendix A, Table A.31, and verify all readings are within given tolerance limits.

e. Dyno Lube Delta Temperature

(1) Connect the Thermocouple Calibrator to **J23** using a Type J thermocouple wire.

(2) Connect a Thermocouple to **J20** to obtain an ambient temperature reading.

(3) Set the TI Limit Control Dynamometer Lube Delta TEMPERATURE Thumbwheel Switches to 080.

(4) Adjust the thermocouple calibrator output for Ambient (J20 Temperature Reading) + 74° F.

(5) Verify and record in Appendix A, Table A.31, that the **90% Alert** Control Panel Indicator is illuminated and there is no audio sound.

(6) Adjust the thermocouple calibrator output for Ambient (J20 Temperature Reading) + 80° F

(7) Verify and record in Appendix A, Table A.31, that the **100% Warning** Control Panel Indicator is illuminated and there is an audio sound.

5.11 EGT Check

a. Ensure that the system is in the T53 Mode.

b. Set the Doric K-Type Thermocouple Switch to Channel 2.

c. Using K Type Thermocouple wire, connect the temperature calibrator to pins A (+) and B (-) of the EGT Cable (20090770-1).

NOTE

The T55 cable is Cable 20090770-2 and the T63 cable is Cable 20090770-3.

d. Adjust the thermocouple calibrator output for temperature test points listed in Appendix A, Table A.31.

e. Record the indicated temperature at each point listed in Appendix A, Table A.31, and verify all readings are within given tolerance limits.

5.12 T55 Electric Torque System

a. Performance Check

(1) Connect the T55 Flight Harness (Cable 20090776-1) to connector J655 of the J-Box.

NOTE

Ensure that the T55 engine is installed before performing the Torque Meter Zero Procedure.

(2) Remove the engine cable from the engine torque meter on the engine and install the shorting cable.

(3) Turn 400 Hz power on, remove the Analogic gauge and adjust zero with the potentiometer on the rear of the gauge.

(4) Turn 400 Hz power off, remove the shorting cable and reconnect the engine cable to torque the meter on the engine.

b. Torque Meter Indicator Check

(1) Access the Engine Harness connector that mates to the engine on Cable 20090776-1.

(2) Jumper pins **Z** and **a** together and connect to the negative terminal of the millivolts source.

(3) Ensure the Torque Power switch on the T55 indicator panel is off.

(4) Connect pin **Y** of the Engine Harness cable (Cable 20090776-1) to the positive terminal of the millivolts source.

(5) Adjust the millivolt calibrator output to points listed in Appendix A, Table A.32.

(6) Record the TI indication at each point listed and verify all readings are within given tolerance limits listed in Appendix A, Table A.32 limits.

CHAPTER 6

Alignment Process for T55-GA-714A (AEDATS III/IV)

6.1 ETQ

a. Turn the power to the **RDPS** to off (**CB313**).

b. Disconnect **P2** cable (LTC31471-01) and connect the Voltage Calibrator (Eurotron) to pins **E** (+) and **F** (-).

c. Ensure the AEDATS is set up for the 714 engine and in the calibration mode.

d. Select the ETQ channel and input the voltages listed in Appendix A, Table A.33.

e. Verify each test point is within tolerance and record AEDATS readings in Appendix A, Table A.33.

6.2 Torque System Check

NOTE

This Torque System is done using the Flight Line Test Set (FLTS), Model LTCT29089-03. Before checking the torque system, perform the FLTS Health Check as outlined in Section 5E of the FLTS Manual (SE-876-01-1006).

a. Ensure the FLTS Power and Aircraft Selector Switches and **CB 313** are de-energized.

b. Turn the FLTS Function Selection switch to Aircraft RDPS.

c. Access the rear of the Torque Switch Assembly, (LTCT31473-01), and remove cable LTCT31482-01 (28 Vdc) from the Torque Switch Assembly (J2).

d. Connect cable LTCT31577-1 to the Torque Switch Assembly (J2).

e. Connect P2 of cable LTCT31482-01 to the FLTS J4.

f. Remove cable LTCT31470-01 from the Torque Switch Assembly (J7) and connect plug P14B of cable (LCTC31578-01) to the Torque Switch Assembly (J7) and Diagnostic Cable #2, LCTC29351-01 to the FLTS (J2).

NOTE

Ensure that P14A is not connected.

g. Remove cable LTCT31471-01 from P1 and P2 from the RDPS.

h. Connect FLTS cable LTCT30572-01 to FLTS (J3) and P1 and P2 to the RDPS J1 and J2.

i. Energize CB313 and the FLTS Power and Aircraft Select Switches, and allow the equipment to warm up for 60 minutes.

6.3 Simulated Torque V_{01}

a. Set the FLTS Parameter Selector Switch to V_{01} and adjust the Position Simulator Adjust until V_{01} = 1.000 ±0.005 Vdc.

b. Set the Parameter Selector Switch to setting listed in Appendix A, Table, A.34, and measure selected system values using the FLTS Parameter Selector. Record and verify all FLTS readings are within tolerance.

6.3 Simulated Torque V_{01} - Continued

c. Set the FLTS Parameter Selector to V_{01} and rotate the Simulated Torque Adjust until V_{01} = 5.063 ±0.005 Vdc.

d. Set the Parameter Selector Switch to setting listed in Appendix A, Table A.34, and measure selected system values using the FLTS Parameter Selector.

e. Verify all FLTS readings are within tolerance and record readings in Appendix A, Table A.34.

f. Calculate the following ratio: Voltage Ratio (VR) = V_X / (2 V_C + V_X).

g. Record calculated value in Appendix A, Table A.35, and verify Ratio is between 0.012869 and 0.013064. If not, replace RDPS.

h. Rotate the Simulated Torque Adjust to achieve V_{01} as listed in Appendix A, Table A.35.

i. Verify all AEDATS readings are within tolerance listed and record readings in Appendix A, Table A.35.

j. Replace the RDPS if the I_{PRI}, V_{PRI}, V_T, V_X, V_{02}, or V_{03} tolerances recorded in Step 6.3 f. cannot be met.

k. De-energize CB313 and FLTS.

l. Remove all cables and return the test cell to the original configuration.

6.4 ORBT Alignment

a. Disconnect **J25** from engine and connect Decade Resistor to pins **M** & **N**.

b. Adjust the decade box to the resistances listed in Appendix A, Table A.36.

c. Record the TI indication at each point listed in Appendix A, Table A.36, and verify all readings are within the given tolerance limits.

6.5 N2A Alignment and N2 Speed

a. Connect CEC 2700 (Sig Gen) to cable LTCT28918-03 **(J17),** pins **R-** and **S+**.

b. Disconnect rollback solenoid valve and connect voltmeter to pins **A** and **B.**

c. Input a frequency of 2816 Hz and increase to 2942 ±3.0 Hz (3 V AC pk-pk max).

NOTE

Voltage at pins A and B should remain at zero indicating that the rollback Solenoid has not activated.

d. If rollback solenoid actuates properly (at 2942 ±3.0 Hz) go to Step 57. h. Record observation in Table A.37 Appendix A.

e. If voltage is read on pins **A** and **B** before 2942 ±3.0 Hz is applied, perform rollback solenoid adjustment in Steps **6.5 e. (1)** through **6.5 e. (6)** below.

(1) Set function generator to 0 Hz and adjust zero trimmer on front panel of the 18-116 signal conditioner until 0.0 ±0.01 Vdc is achieved.

(2) Set function generator to 5000 Hz and adjust span trimmer on front panel of the 18-116 signal conditioner until 10.0 ±0.01 Vdc is achieved.

(3) Repeat Steps B and C until zero and span output voltages are within limits.

(4) Adjust the CEC 2700 to 2900 Hz.

6.5 N2A Alignment and N2 Speed - Continued

NOTE

The alarm contact should be open (no 24 Vdc present).

(5) Adjust the CEC 2700 to 2942 ± 3 Hz.

NOTE

The alarm contact should close (24 Vdc present). If the alarm contact does not meet requirements, adjust the N2A Signal Conditioner Module A1, Alarm trip potentiometer on the front of the conditioner. Adjust the set-point to activate the rollback solenoid valve, pins A and B, at 2942 ± 3 Hz (24 Vdc present).

f. Turn 115 Vac power switch on the torque Switch Assembly to OFF.

g. Remove the function generator and reconnect to **J18** pins **U** and **V**.

h. With the AEDATS in Calibration Mode for N2 Speed, input the frequencies listed in Appendix A, Table A.38.

i. Record the TI indication at each point listed in Appendix A, Table A.38, and verify all readings are within the given tolerance limits.

6.6 N1 Speed

a. Remove connector J25 (cable LTCT28921-02) from the engine and connect the function generator to pins **A** (+) and **B** (-).

b. With the AEDATS in calibration mode for N1 Speed, input the frequencies (1 Vac pk to pk) listed in Appendix A, Table A.39 and record the TI indication at each point listed.

c. Verify all readings are within the given tolerance limits.

6.7 T4.5 Temperature Alignment (K Type)

a. Set Thermocouple Calibrator (Eurocal 2000) for K Type TC output and connect to cable LTCT28919-03, **J19** pins **A +** and **B -**.

b. Energize the Torque Switch Assembly, if it is not ON.

c. Apply the temperatures listed in Appendix A, Table A.40, record indications and verify all test points are within tolerances.

d. Set the TC Calibrator to 1600º F.

e. **Slowly** increase the TC Calibrator setting to 1650º F and verify the voltage at P1, pins A and B, remain at approximately 28 Vdc below 1650º F and drops to 0 Vdc at 1650º F ± 2 ºF (Alarm Set-Point).

6.7 Temperature Alignment (K Type) - Continued

f. Record observed temperature reading in Appendix A, Table A.39.

NOTE

If the Alarm Set-Point does not meet the requirements of Steps 6.7 c., remove the Torque Switch Assembly from cabinet and adjust A1 Alarm Trip potentiometer on the TC Signal Conditioner. Then, perform Step 6.7 c. to recheck test points. (1650º F).

6.8 Rollback Solenoid Valve Check

NOTE

NG has to be reading greater than 50% for software to trigger Rollback.

NOTE

Refer to Honeywell Technical Manual, Publication No. SE-876-01-1060, Section 3-3.3A, when performing the following procedure.

a. Turn DC power to the DECU at the FADEC control Chassis (LTCT28915-03) and remove cable LTCT28914-03 from P3 at the DECU.

b. Set the TC Calibrator (Eurocal 2000) for K Type TC output and connect to cable LTCT28919-03**, J19** pins **A + (Chromel)** and **B – (Alumel)**.

c. Apply power to the Torque Switch Assembly, LTCT31473-01. Verify the Red LED on the front panel is illuminated.

d. Connect a DMM to cable LTCT31478-01, P1 pins **A+** and **B-** and verify there is 0 Vdc.

e. Set the TC Calibrator to 1400º F and verify there is no voltage at P1 pins A+ and B-.

f. Depress the Reset Button on the front panel of the Torque Switch Assembly and verify the Red LED on the front panel is not illuminated and there is 28 Vdc at P1 pins A+ and B-.

g. Increase the TC Calibrator temperature to 1660º F.

h. Verify that the Front Panel LED is illuminated and that there is approximately 0 Vdc at P1, pins A+ and B-, and the front panel LED does not illuminate.

i. Increase the TC Calibrator to 1700º F and verify the Touch Screen Rollback Valve Indicator activates.

6.9 Collective Pitch (FADEC Control Chassis)

a. Connect a DMM set to Vac to the FADEC Control Chassis TB2-1 (High) and TB2-2 (Low). Measure and record the Excitation Voltage (E_x) supplied to the DECU.

b. Connect a DMM set to Vac to the FADEC Control Chassis TB2-3 (High) and TB2-4 (Low).

c. Turn the Collective Pitch Dial located on the front panel of the FADEC Control Chassis until a reading of 6.95% of E_x is attained. Record the dial position as the value represents 0.0% Collective Pitch.

d. Turn the Collective Pitch Dial until a reading of 58.16% of E_x is attained. Record the dial position as the value represents 73.75% Collective Pitch.

6.9 Collective Pitch (FADEC Control Chassis) - Continued

e. Turn the Collective Pitch Dial until a reading of 67.03% of Ex is attained. Record the dial position as the value represents 85.0% Collective Pitch.

6.10 N2 SET

a. Connect Cable (LTCT31480-02) to the Test Cell Laptop.

b. Start the FADEC Diagnostic Software (LTCT29332-02) and display the Gauge N2 Set.

c. Remove the FADEC Control Chassis from the Test Cell Console without removing any connections and remove the cover.

NOTE

The Zero and Span Potentiometers are located on the Printed Circuit board, which is mounted in a vertical position and secured to the front panel. These potentiometers are positioned on the top of the board.

d. Rotate the N2 Set Dial fully counter-clockwise and adjust the **zero** Potentiometer (R10) for an indication of 97% on the N2 Set Gauge**.**

e. Rotate the N2 Set Dial fully clockwise and adjust the **span** potentiometer (R11) for an indication of 103% on the N2 Set Gauge.

f. Repeat **Steps 6.10 d**. and **6.10 e**. until no further adjustments are required.

6.11 Throttle Quadrant Mechanism

NOTE

Refer to Honeywell Technical Manual, Publication No. SE-876-01-1060, Section 3-3.

NOTE

Setup of the Throttle Quadrant may be easier if removed from the table top.

a. Start the FADEC Diagnostic Software LTCT29332-02 and display the ECL Gauge.

b. Place the Lever in the 30% (or Ground Idle) position.

c. Remove the FADEC Control Chassis LTCT28915-03 from the Test Cell Console without removing connections and remove the top cover.

d. Using a DMM set for Vac, measure the voltage at TB2-5 (High) and TB2-6 (Low).

e. Verify the voltage is 0.000 Vac ± 2.5 mVac.

f. If the voltage is not within limits, loosen the clamp on the ECL Lever, and rotate the shaft until the voltage is correct.

g. Tighten the clamp on the ECL Lever.

6.11 Throttle Quadrant Mechanism - Continued

Note

When performing the Step 6.11 g. below, the angle on the ECL Gauge should smoothly go from 0º to 60º without generating DECU faults.

h. Move the ECL Lever back and forth while watching the ECL Gauge.

NOTE

The Quad Switch CAY-561-2, which is the component closest to the printed circuit board, should open slightly above 30º or Ground Idle.

The opening and closing of the Quad Switch CAY-561-2 can be monitored with an Ohmmeter in the FADEC Control Chassis at TB2-12 and TB2-13.

i. If DECU faults are being generated, remove the side cover on the ECL Gauge opposite the lever, loosen the three cleats that secure the Quad Switch CAY-561-2 and rotate the Quad Switch slightly.

j. Tighten the three cleats, reset the DECU and repeat Steps 6.11 g. through 6.11 h., as required.

k. Move the ECL Lever to the 0º (Cutoff) position.

NOTE

The ECL Gauge should read 0º.

l. Set First Set-Point on AEDATS.

m. If the ECL Gauge does not read **0º**, remove the side cover on the ECL Gauge opposite the lever.

n. Verify that the resistor is to the left of the two trim potentiometers on the small printed circuit board inside the ECL Gauge.

o. Adjust the lower trim potentiometer until the ECL Gauge displays **0º**.

p. Move the ECL Lever until the Gauge reads **60º**.

q. Slide and secure the end-stop to read **60º**, as required. Set Second Set-Point on AEDATS.

Appendix A AEDATS IV

FEDS ALIGNMENT WORKSHEET
AEDATS IV

T700-GE-700/701/701C Engine Applications
T700-GE-401/401C Engine Applications
T53-L-13B/703 Engine Applications
T55-GA-714A Engine Applications
T55-L-712 Engine Applications
T63-A-720 Engine Applications

CERTIFICATION OFFICAL

NAME _____

DATE _____

LOCATION _____

SERIAL # _____

A.1 AEDATS IV CAB Alignment Worksheet Preliminary Checks

FEDs Power-Up Checks

a. Power Supply Function Checks

Table A.1 Preliminary Checks

DC Volt Meter Check 0-50 Volts DC		Nominal Reading	Tolerance	Actual Reading
De-energized		0	Mech Zero	
Energized	PS1	28	27.5 – 28.5	
Energized	PS1	28	27.5 – 28.5	
Energized	PS714	24	23.5 – 24.5	
DC Amp Meter Function Check	PS1			
Function Check	PS2			
AC Volt Meter Check		**Nominal Reading**	**Tolerance**	**Actual Reading**
De-energized		0	Mech Zero	
Energized	L1 – L2	208 Vac	200 - 216	
Energized	L2 – L3	208 Vac	200 - 216	
Energized	L1 – Grd	120 Vac	112 - 128	
AC Ammeter				
Functional Check	L1			
Functional Check	L2			
Functional Check	L3			

b. Indicator Checks

Press to check indicators are operational.

Table A.2 Indicator Checks

Press to Check Indicators	Operational	
	Yes	No

A.2 AEDATS IV T700 Alignment Worksheet

Table A.3 DC Voltage Inputs T700

Channel Name	AEDATS Channel	Connector	Applied Voltage	Reading	Vertical Scale	AEDATS 3
Dyno Shroud Position	**Dyno Shrd** **Dyno Shrd** **Bot Row 3** **T76/HL34**	**P91** F (+) H (-)	**(DC)**	**Percent**	**±1.0%**	**±0.5%**
			0	**0%**		
			4	**25%**		
			8	**50%**		
			12	**75%**		
			16	**100%**		
Inlet Guide Vane Position	**IGV** **VGi** **Bot Row 4** **T83/HL37**	**IGV** **@ Engine** A (+) B (-) A (+) C (-)	**(DC)**	**Percent**	**±1.0%**	**±0.5%**
			0	**-10%**		
			2	**15%**		
			4	**40%**		
			6	**65%**		
			8	**90%**		
Load Demand Spindle Position	**LDS** **Bot Row 2** **T82/HL36**	**P51** **@ Engine** A (+) B (-)	**(DC)**	**Degrees**	**±1.0º**	**±0.5º**
			0	**-45º**		
			4	**05º**		
			8	**55º**		
			12	**105º**		
Power Available Spindle Position	**PAS** **Bot Row 1** **T78/HL35**	**P50** A (+) B (-)	**(DC)**	**Degrees**	**±1.0º**	**±0.5º**
			0	**0º**		
			4	**50º**		
			8	**100º**		
			12	**150º**		
Engine Torque Calibration Span @ 800 ft/lbs 9600 in/lbs	**Qeng** **Bot Row 10** **T109/HL38**	**E1** 10(+) 11(-)	**(DC)**	**Ft/lbs**	**±1 ft/lbs**	**±6 in/lbs**
			0	**0**		
			2	**200**		
			4	**400**		
			6	**600**		
			****8****	**800**		
			10	**1000**		

A.2 AEDATS IV T700 Alignment Worksheet - Continued

Table A.4 Ohm Inputs T700

Channel Name	AEDATS Channel	Connector	Ohms	Degrees	AEDATS 3 ±2.0º
Engine Oil Inlet Temperature Gauge	ORBT	E3 9(+) 10(-)	90.4	32	
			97.3	68	
			104.6	104	
			112.3	140	
			120.4	176	
			128.8	212	
			142.4	266	
	T87/LL04		151.9	302	
			177.9	392	

Table A.5 Pressure T700 (High Pressure Standard)

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0psi	AEDATS 3 ±1.0psi	AEDATS 4 ±1.0psi
B-sump Delta Pressure (0-150 psid) T700 Engine	EODP T86/HL06 Top Row 5	MT17A and Vent MT17B J Box	0	Vented			
			30				
			60				
		R-cal	90				
			120				
			150				
PS3 Alarm (connected to Tee @ MT17A)		MT 17A J Box	Fault Simulation		Nominal	Reading ± 2.0 psi	Alarm YES = (X)
			>25 psi Decreasing (Audio/Illuminates)		25 psi		( )
B-sump Delta Pressure (0-150 psid) Initialize T701C Engine	PBsumpD T111/HL06 Top Row 5	MT17A and Vent MT17B J Box	0	Vented			
			30				
			60				
		R-cal	90				
			120				
			150				
Fuel Inlet Pressure (0-100 psig)	PFI T30/HL09 Top Row 9	MT15	0	Vented			
			20				
			40				
		R-cal	60				
			80				
			100				

A.2 AEDATS IV T700 Alignment Worksheet - Continued

Table A.5. Pressure T700 (High Pressure Standard) - Continued

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0psi	AEDATS 3 ±1.0psi	AEDATS 4 ±1.0psi
Dyno Lube Inlet Pressure (0-50 psig)	**Pdyn_Sup** **T34/HL13 Bot Row 11**	**MT16**	**0**	Vented			
			10				
			20				
		R-cal	**30**				
			40				
			50				
5PS Alarm (connected to Tee @ MT16)		**MT16 J Box**	**Fault Simulation**		Nominal	Reading ±0 .5 psi	Alarm YES = (X)
			>10.5 psi Decreasing (Audio/Illuminates)		10.5 psi		( )
Scavenge (BSUMP) Pressure Indicator (B Sump Scav) Use Pressure Transducer (PT) P/N: 418-10054 Use Alt Conn if no Engine Available		**PT to E3 @ Engine**	**Reading**	**Applied**	**Panel Mtr ±10.0 psi**		
		Alt Conn	0	Vented			
		PT E3	50				
		1 7	100				
		2 6	150				
		3 5	200				
CDP (0-600 **in Hg (ABS)**	**CDP** **T41/HL22 Bot Row 7**	**CDP Transducer Cabinet #11**	**Reading** In Hg abs	**Applied** (PSIA)	**Vertical Sc** ±0.3 in hg	**AEDATS 3** ±0.3 in hg	
			150	**73.7**			
			300	**147.0**			
		R-Cal	**450**	**221.0**			
			600	**294.7**			

A.2 AEDATS IV T700 Alignment Worksheet - Continued

Table A.6 Audio/Illuminated Fault Alarms

Channel Name	Connection	Fault Simulation	Nominal	Reading	Alarm YES = (X)
6PS Alarm Dyno Low Press AFT	**6PS J-Box**	**<10.5 psi** Decreasing (Audio/Illuminates)	10.5 psi ±0.5 psi		( )
11PS Alarm Fuel Boost	**11PS Fuel Skid**	**<15 psi** Increasing (Illuminates)	15.0 psi ± 2.0 psi		
Alarm Fault Name	**Location**	**Fault Simulation**		**Illuminated** YES = X	**Audio** YES = X
Low Fuel Pressure	**Fuel Skid**	Jumper Pins 11 & 12 TB206		( )	( )
Fuel Filter Bypass	**Fuel Skid**	Jumper Pins 1 & 2 TB207		( )	( )
Fuel Valve	**Fuel Skid**	Close CB305 & Energize Fuel Pump		( )	
Main Fuel Valve	**Fuel Skid**	Close CB305 & Energize Fuel Pump		( )	
Dyno Lube Filter Bypass	**Test Trailer**	J73 Jumper pins L & K		( )	( )
Dyno Lube Tank Low Bypass	**Test Trailer**	J73 Jumper pins M & N		( )	( )
Engine Lube Filter Bypass	**Test Trailer**	E3 Jumper pins 13 & 14		( )	( )
Engine Fuel Filter Bypass	**Test Trailer**	E3 Jumper pins 15 & 16		( )	( )
Chip Detector	**Test Trailer**	E3 Jumper pins 11 & 12		( )	( )
Low Fuel Pressure	**Test Trailer**	E3 Jumper pins 23 & 24		( )	( )

Table A.7 (J Type TC) (Eurocal 2000)

Channel Name	AEDATS Channel	DORIC Channel	Connection	Applied Temp	DORIC ±º 1 F	AEDATS 3 ±º 1 F	AEDATS 4 ±º 1 F
Engine Oil Discharge Temp	**EODT**	**1**	**P56**	32			
				100			
				200			
	T10/J02			300			

Limit Control Panel Test P56 Engine Oil Inlet Temperature		**Applied Temp**	**Reading**	**Control Panel Indicator**	**Alarm Yes = (X)**	
					LIT	**Audio**
Thumbwheel Setting	300	32		In Limits	( )	
		100		In Limits	( )	
		200		In Limits	( )	
		270		90% Alert	( )	
		300		100% Warn	( )	

A.2 AEDATS IV T700 Alignment Worksheet - Continued

A.7 (J Type TC) (Eurocal 2000) - Continued

Channel Name	AEDATS Channel	DORIC Channel	Connection	Reading	DORIC ±º 1 F	AEDATS 3 ±º 1 F	
Engine Oil Scavenge Temp	Bsump T113/J03	2	P57	32			
				100			
				200			
				300			

Limit Control Panel Test Engine Oil Delta Temperature	P57	Applied Temp	Reading	Control Panel Indicator	Alarm Yes = (X) LIT	Audio
Thumbwheel Setting Jumper P56	150					
		AMB+135		90% Alert	( )	
		AMB+150		100% Warn	( )	( )

Inlet Air Temp	T21 T11/J04	3	P58	32			
				70			
				100			
				120			
Inlet Air Temp	T22 T12/J05	4	P59	32			
				70			
				100			
				120			
Inlet Air Temp	T23 T13/J06	5	P68	32			
				70			
				100			
				120			
Inlet Air Temp	T24 T14/J07	6	P92	32			
				70			
				100			
				120			

A.2 AEDATS IV T700 Alignment Worksheet - Continued

A.7 (J Type TC) (Eurocal 2000) - Continued

Channel Name	AEDATS Channel	DORIC Channel	Connection	Applied Temp ºF	DORIC ±º 1 F	AEDATS 3 ±º 1 F	
Inlet Air Temp	T25	27	P101	32			
				70			
				100			
	T67/J27			120			
Inlet Air Temp	T26	28	P102	32			
				70			
				100			
	T68/J28			120			
Inlet Air Temp	T27	29	P103	32			
				70			
				100			
	T69/J29			120			
Inlet Air Temp	T28	30	P104	32			
				70			
				100			
	T54/J17			120			
Dyno Oil Tank	Tdyn_tnk	7	J20	32			
				100			
				200			
	T15/J08			300			

Limit Control Panel Test J20 Dyno Lube Inlet Temperature	Applied Temp	Applied Temp	Control Panel Indication	Alarm Y = X LIT	Alarm Y = X Audio
Thumbwheel Setting 200	32		In Limits	( )	
	100		In Limits	( )	
	150		In Limits	( )	
	180		90% Alert	( )	
	200		100% Warn	( )	

Dyno Lube Delta Temperature							
	Tdyno_FA		J23 Jumper J20 Disconnect J24	32			
				100			
				200			
	T18/J11			300			

Limit Control Panel Test J23 Dyno Lube Delta Temperature	Applied Temp	Reading	Control Panel Indicator	Alarm Yes = (X) LIT	Alarm Yes = (X) Audio
Thumbwheel Setting 80 Jumper J20					
	AMB+74		90% Alert	( )	
	AMB+80		100% Warn	( )	( )

A.2 AEDATS IV T700 Alignment Worksheet - Continued

A.7 (J Type TC) (Eurocal 2000) - Continued

Channel Name	AEDATS Channel	DORIC Channel	Connection	Applied Temp		AEDATS 3 ±º 1 F	
Dyno Oil Forward Temperature	Tdyno_Fwd T16/J09	8	J21 Line R/S Dyno	32			
				100			
				200			
				300			
Dyno Oil Aft Temperature	Tdyno_aft T17/J10	9	J22 Line R/S Dyno	32			
				100			
				200			
				300			

Table A.8 (K Type TC) (Eurocal 2000)

Channel Name	AEDATS Channel	DORIC Channel	Connection	Applied Temp	DORIC ±º 1 F	Digital ±º 1 F	Analog ±º 2 F	AEDATS 3 ±º 1 F
TGT	TGT T3/K01	K Type CH 1	E1 Pins 17 (+) 16 (-)	400				
				800				
				1200				
				1650				
				2000				
NOTE: TGT Gauge adjustments		R6 for Digital at 100º F R12 for Analog at 100º F			R15 for Digital at 1000º F R21 for Analog at 1000º F			

a. Vibration System (CEC 2700)

NOTE

Channels 1, 2, and 3 do not require testing during Test #1, but the initial setup [Steps A.2 a. (1) (a.) through A.2 a. (g.)] is still required. Channels 1, 2, and 3 are checked during Vibration Test #2.

(1) Vibration Test (Test #1)

(a) Set variable filter channel switches to 1, and the filter selector switch to out.

(b) Set Vibration Meter Amplifier Controls as follows:

1. Filter Switch to **CAL**
2. Range Switch to **150**
3. Xducer Switch to **ACC**
4. Mode Switch to **VEL**
5. Output Switch to **AVG**

A.2 AEDATS IV T700 Alignment Worksheet - Continued

(c) Adjust **CAL** pot to (105) on Digital Display on all channels.

(d) Set Filter Switch to **Sensitivity** and adjust **SENS** pot for an indication of 150 on all channels.

(e) Reset:

1.	Filter Switch to	**OUT**
2.	Range Switch to	**5.0**
3.	Xducer Switch to	**VEL**
4.	Mode Switch to	**VEL**
5.	Output Switch to	**AVG**

(f) Jumper across pins as listed on Step J and adjust **R4** for zero (CEC 4000-1010).

(g) After zeroing indicators, return to Step A.2 a. (1) (b.) through A.2 a. (1) e and recheck **CAL** and **SENS**.

(h) Test #1 connection:

(i) Using J2 Connector of CEC 2700 for AC millivolts.

Table A.9 Connections

Plug	Pins	Ground	Channel
P-25	L-C	C	1
P-25	B-E	E	2
P-25	M-G	G	3
P-91	N-G	G	4
P-91	B-M	M	5

Table A.10 Vibration (CEC 2700)

Channel Name	Connection	Frequency	CEC Output mAvg	Tolerance	Vert Scale	AEDATS 3	AEDATS 4
CH 4	P91 N (+) G (-)	**100 Hz**	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
		100 Hz	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			
Channel Name	**Connection**	**Frequency**	**CEC Output mAvg**	**Tolerance**	**Vert Scale**	**AEDATS 3**	**AEDATS 4**
CH 5	P91 B (+) M (-)	**100 Hz**	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
		100 Hz	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			

A.2 AEDATS IV T700 Alignment Worksheet - Continued

(2) Vibration Test (Test #2)

NOTE

The 2700 Calibration Box has an internal switch; it must be in the ON position. The Calibration lab may leave it in the OFF position.

(a) Use J1 with Red Cable (CEC-619566-120) and T700 engine vibration cable to drive the charge amps.

(b) Connect the test box CEC 2700 (J1) to the inputs of the vibration cables.

(c) Set Channels 1, 2, and 3 meters as follows:

1.	Filter Switch to	**CAL**
2.	Range Switch to	**150**
3.	Xducer Switch to	**ACC**
4.	Mode Switch to	**VEL**
5.	Output Switch to	**RMS**
6.	Variable Filter	**OUT**

7. Adjust **Cal** pot for a reading of **50** on CH 2, and **10** on CH 1 and 3.

8.	Set Filter switch to	**SENS**

9. Adjust **SENS** pot for a reading of **150/75** on the Digital Display of CH 1, 2, and 3.

NOTE

In the Digital Display reading, 150/75, the number 75 applies only to sites with the Endevco Systems installed.

10.	Set Xducer switch to	**VEL**
11.	Set OUTPUT Switch to	**RMS**
12.	Range	**5**
13.	Filter	**OUT**

(d) **Channel 1** Connector J26 (V1) on Charge Amp Box.

A.2 AEDATS IV T700 Alignment Worksheet - Continued

Table A.11 Acceleration (CEC 2700)

Channel Name	Connection	Frequency	CEC Output mAvg	Tolerance	Vert Scale	AEDATS 3	AEDATS 4
CH 1	J26 (V1) Charge Amp Box	100 Hz	16.3	0.9 – 1.1			
		100 Hz	32.5	1.9 – 2.1			
		100 Hz	48.8	2.9 – 3.1			
		100 Hz	65.1	3.9 – 4.1			
		100 Hz	81.4	4.9 – 5.1			
CH 2	J38 (V2) Charge Amp Box	100 Hz	81.4	0.9 – 1.1			
		100 Hz	163.0	1.9 – 2.1			
		100 Hz	244.0	2.9 – 3.1			
		100 Hz	326.0	3.9 – 4.1			
		100 Hz	407.0	4.9 – 5.1			
CH 3	J37 (V3) Charge Amp Box	100 Hz	16.3	0.9 – 1.1			
		100 Hz	32.5	1.9 – 2.1			
		100 Hz	48.8	2.9 – 3.1			
		100 Hz	65.1	3.9 – 4.1			
		100 Hz	81.4	4.9 – 5.1			

b. T 700 Flow Measurement System (CEC 2700/Func Gen)

Fuel Flow Measurement

(1) Set Calculating Counter Controls as follows: (Channel 4)

(a)	DEC	**6**
(b)	C	**01000**
(c)	10n	**0**
(d)	Auto	**depressed**
(e)	X10	**depressed**
(f)	Sample Rate (fast)	**1**
(g)	Test	**released**

(2) At the Fuel Trailer, disconnect **MT-206** from the flowmeter and connect the CEC to pins **A (+)** and **B (-)**.

(3) Apply the frequencies listed in Table A.12 (monitor with counter when using function generator) with ≥500 mV amplitude.

A.2 AEDATS IV T700 Alignment Worksheet - Continued

Table A.12 Flow (CEC 2700)

Channel Name	Connection	Frequency (Hz)	CC PPH ± 0.5%	AEDATS 4 WFi (PPH)	CC Hz ± 1 Hz	AEDATS 3 ± 1 Hz
WFi (PPH) WFhz (Hz) T53/F05	MT206 A(+) B(-)	240				
		480				
		720				
		960				
		1200				
Frequency X C = PPH					CH4 = 3600 X 8.337 X SG/K	

c. Speed Measurement System (CEC 2700/Func Gen)

(1) N2 (NP) Power Turbine Speed (T700/T701/T701C)

(a) Set Calculating Counter Controls as Follows: (Channel 2)

1.	DEC	**4**
2.	C	**07502 (07179 for T401/T401C)**
3.	10n	**0**
4.	Auto	**depressed**
5.	X10	**depressed**
6.	Sample Rate (fast)	**1**
7.	Test	**released**

(b) Input the frequencies listed in Table A.13 into connector **E1** pins **8** and **9**.

Table A.13 NP Speed (CEC 2700)

Channel Name	Connection	Frequency (Hz)/(%)	Calc Counter ±0.3%	Analog Gauge ± 5 %	Digital Gauge ±0.3%	AEDATS 3 (NP) ±0.3%	AEDATS 4 (NP) ±0.3%
Power Turbine Speed NP (N2) RPM4 T51/F04	E1 8(+) 9(-)	133 / 10					
		533 / 40					
		800 / 60					
		1200 / 90					
		1333 / 100					
Frequency X C = PPH					CH4 = 3600 X 8.337 X SG/K		

Limit Control Panel Overspeed Test	Frequency (Hz)/(%)	Limit Control ± 0.3Hz	Control Panel Indicator	Alarm Yes = (X)	
				LIT	Audio
NP Thumbwheel Setting 1333	133 / 10		In Limits	( )	
	533 / 40		In Limits	( )	
	800 / 60		In Limits	( )	
	1200 / 90		90% Alert	( )	
	1333 / 100		100% Warn	( )	( )

A.2 AEDATS IV T700 Alignment Worksheet - Continued

(2) Power Turbine Speed (NG) Speed Indicator

(a) Set Calculating Counter controls as follows: (Channel 1)

1.	DEC	**4**
2.	C	**04682**
3.	10n	**0**
4.	Auto	**depressed**
5.	X10	**released**
6.	Sample Rate (fast)	**1**
7.	Test	**released**

(b) Set CEC Amplitude level between 500mV and 1.5 V.

(c) Input the frequencies listed in Table A.14 into **E3** pins **20** and **21**.

NOTE

No alignment is required; however, frequencies must be verified. The NG must display on AEDATS to be verified.

Table A.14 NG Speed (CEC 2700)

Channel Name	Connection	Frequency (Hz)/(%)	Calc Counter ±0.3%	Analog Gauge ±5%	Digital Gauge ±0.3%	AEDATS 3 (NG) ±0.3%	AEDATS 4 (NG) ±0.3%
Power Turbine Speed NG T51/F04	**E3 20(+) 21(-)**	214 / 10					
		854 / 40					
		1282 / 60					
		1709 / 80					
		2136 / 100					

d. Torque, Horsepower, and Speed Indicator (Daytronics 9530A)

(1) Performance Check

(a) Zero and Span Daytronics and AEDATS IV

1. Install the Torque Arm/Pan.

2. Exercise the engine torque by pulling up and releasing and down and releasing the torque arm.

3. Adjust the Daytronics/AEDATS to zero.

4. Note the old R-Cal Value and record results in Table A.15 for reference.

Table A.15 OLD R-Cal Value

OLD R-Cal

A.2 AEDATS IV T700 Alignment Worksheet - Continued

5. Hang 100 lbs of weight on the torque arm. (2 foot armx100 lbs=200 ft lb)
6. Continue adding weight for a total of 300 lbs (600 ft/lbs).
7. Adjust the span coarse and fine controls for a 600 ft/lb indication on Daytronics and Span AEDATS IV.
8. Repeat Steps A.2 d. (1) (a.) 1 through A.2 d. (1) (a.) 6 above a minimum of three times and where the 0 and 600 ft/lbs of torque reads within ± 2 ft/lbs Daytronics and ± 10 in/lbs AEDATS IV.

(2) Performance Test (Weights)

(a) Torque Tracking

1. Apply the following weight and record indications:

Table A.16 Torque (Weights)

Applied Weight	Torque ft/lbs	Daytronics Indication ± 2 ft/lb	Torque Indication in/lbs	AEDATS 3 (Qdyno) ± 10 in/lbs
0	0		0	
100	200		2400	
200	400		4800	
300	600		7200	
Transducer: T01			Hardware Name: LL01	

2. Press and hold the R-Cal button and record the new R-Cal value in Table A.17.

Table A.17 NEW R-Cal Value

NEW R-Cal

3. Remove the weights and Torque arm from the engine and readjust the balance pot on Daytronics to read zero.

Note

The AEDAT is spanned during each Engine initialization.

e. RPM Performance Check

(a) Ensure Daytronics is in the RPM Mode.

(b) Adjust balance control for a zero indication ± 1 Hz.

(c) Input a 1393.3 Hz signal into Connector E1, pins 8 and 9, and adjust the span control for an indication of 20,900 RPM ±10 RPM.

Table A.18 RPM

Zero	Span	RPM R-cal

A.2 AEDATS IV T700 Alignment Worksheet - Continued

f. SHP (Shaft Horsepower) Performance Check

(1) Ensure Daytronics is in the SHP Mode.

(2) Set zero.

(3) Push the **SHP Cal** and **– Cal** (torque) buttons and verify the indication is the product of the values of the R-Cal noted in Table A.18 divided by 5252.

Table A.19 SHP

Torque R-Cal	RPM R-Cal	**SHP**
Torque R-Cal x RPM R-Cal divided by 5252		

(4) If the displayed value is not correct, adjust the span control to obtain the value attained mathematically in Table A.19 above **(SHP)**.

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet

a. Speed Measurement System (Tachometer Generator Test Set)

(1) Gas Producer (GP/N1)/Power Turbine (PT/N2) Speed Indicator (N2)

(a) Set Calculating Counter controls as follows: (**N1 CH 1 and N2 CH2**)

1.	DEC	**5**
2.	C	**14286**
3.	10n	**0**
4.	Auto	**depressed**
5.	X10	**released**
6.	Sample Rate (fast)	**1**
7.	Test	**released**

(b) Input the frequencies in Table A.20 into the engine/flight harness connector:

NOTE

Refer to Table A.20 for Pin Connections. Ground E on TB810 terminal #17 if the engine is not mounted (or will not read speeds).

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

(c) Set the Tachometer Generator controls as follows:

1.	Motor Direction	**Stop**
2.	Set RPM	**10%**
3.	Power	**On**
4.	Motor Direction Switch	**Forward**

NOTE

No alignment is required; however, the frequencies listed in Table A.20 must be verified.

Table A.20 (Speed) (CEC 2700)

Channel Name	Connection	Tachometer Tester (Hz)/(%)	Calc Counter ±0.3%	Analog Gauge ±0.3%	Digital Gauge ±0.3%	AEDATS 3 (RPM1) ±0.01 Hz	AEDATS 4 (N1) ±0.01 Hz
Gas Producer Indication (GP) N1 RPM1 T53: T43/F01 T55: T44/F02 T63: T55/F03	Engine/Flight Harness T53: (FH) G,H T55: (FH) G,H	7 / 10					
		28 / 40					
		42 / 60					
		56 / 80					
		70 / 100					
Channel Name	**Connection**	**Tachometer Tester (Hz)/(%)**	**Calc Counter ±0.3%**	**Analog Gauge ±0.3%**	**Digital Gauge ±0.3%**	**AEDATS 3 (RPM3) ±0.01 Hz**	**AEDATS 4 (N2) ±0.01 Hz**
Power Turbine Speed N2 T53: T48/F03 T55: T49/F03 T63: T50/F03	Engine/Flight Harness T53: (FH) E,F T55: (FH) D,E T63: (FH) A,B	7 / 10					
		28 / 40					
		42 / 60					
		56 / 90					
		70 / 100					

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.20 (Speed) (CEC 2700) - Continued

Channel Name	Connection	Tachometer Tester (Hz)/(%)	Calc Counter ±0.3%	Analog Gauge ±0.3%	Digital Gauge ±0.3%	AEDATS 3 (RPM1) ±0.01 Hz	AEDATS 4 (N1) ±0.01 Hz
Frequency X C = PPH						**CH4 = 3600 X 8.337 X SG/K**	
Limit Control Panel Overspeed Power (T53) Section #1		**Thumbwheel #2 Setting**		**Limit Control** ± 0.3 Hz	**Control Panel Indicator**	**Alarm Yes = (X)** LIT	Audio
1) Overspeed Power Section #2 is not Connected. 2)BF Goodrich EPU Set to Second Mode: **Cal: 9.497 I = 19.601 J2 CONN = 3333 Hz**		**3800**			**In Limits**	( )	
		3700			**90%**	( )	
		3333			**100%**	( )	( )

Table A.21 Goodrich System (DMM)

Channel Name	Connection	BF Goodrich Mode	AEDATS Zero/Span	Goodrich Volt Reading Nominal	DMM Reading ±20 mv	AEDATS 4 ± 4 in/lbs
T53 **Dyno T75/HL33**	DMM	2nd Mode	Enter: **0**	0.0		
T55 **QDyno T75/HL32**	TB609	3rd Mode	Enter: **22793 (714)**	9.497		
T63 **QDyno T75/HL31**	1 (+), 2(-)	3rd Mode	Enter: **18994 (712)**	9.497		

Channel Name	Connection	Frequency Hz / RPM	HP	RPM	TQ	Calculated HP
None Specified	Connect CEC to Cable **(200990761-1)** Torq Sensor **Pins: A, B**	181.4 / 780				
		272.1 / 1170				
		453.5 / 1940				
		725.6 / 3100				
HP = TQ X RPM / 63024		907.0 / 3880				

Channel Name	Connection	Applied Resistance	Temperature ºF	Goodrich Rdg ± 8º F
RTD Function Reference 53C Press Mode Switch one time to Monitor Temperature on Goodrich	Connect Decade Box to Cable **(200990761-1)** Torq Sensor **Pins: I, J**	100	32	
		110	79	
		120	126	
		130	173	
		140	222	

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

b. Fuel Flow Measurement System (T53/T55/T63) (CEC 2700)

NOTE

Ensure the System is in the correct Engine Mode and the correct cables are connected at the J-Box.

NOTE

No alignment is required; however the frequencies listed in Table A.22 must be verified.

NOTE

To read frequencies on the Calculating Counter Channel 4, set 4-10000-0 on the Thumbwheel Switches. To read a signal on AEDATS, select the correct transducer/channel.

Table A.22 Skid Fuel Flow (CEC 2700)

Channel Name	Connection	Frequency (Hz)			CC Hz ± 1 Hz	AEDATS 3 ± 1 Hz
T53/T55 WF (PPH) WFhz (Hz) **T53/F05**	**MT207 A(+) B(-)** Fuel Skid Lower Flowmeter	250				
		500				
		750				
		1000				
		1250				
Channel Name	**Connection**	**Frequency (Hz)**			**CC Hz ± 1 Hz**	**AEDATS 3 ± 1 Hz**
T63 WF **T53/F05**	**TB201** Pins **1(+) 2(-)** Fuel Skid	0				
		600				
		800				
		1000				
		1200				
		1400				
Frequency X C = PPH		**CF = 78 X 8.337 X SG / 2000**			**CH4C = 3600 X 8.337 X SG/K**	

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

c. T53/T63 Oil Flow Measurement System (CEC 2700/Func Gen)

(1) Ensure System is in the T53/T63 Test Mode with correct flight harness at J-Box.

(2) Set Calculating Counter Controls as follows: (Channel 3)

(a)	DEC	**6**
(b)	C	**01000**
(c)	10n	**0**
(d)	Auto	**depressed**
(e)	X10	**released**
(f)	Sample Rate (fast)	**1**
(g)	Test	**released**

(3) At the Large Trailer, disconnect the cable from the T53/T63 Oil Flowmeter and connect the CEC 2700 to pins **A** and **B** of the cable connector.

NOTE

Apply the frequencies listed in Table A.23 with ≥500 mV amplitude (monitor with counter when using function generator).

NOTE

No alignment is required; however the frequencies listed in Table A.23 must be verified.

Table A.23 Oil Flow (CEC 2700)

Channel Name	Connection	Frequency (Hz)			CC Hz ± 1 Hz	AEDATS 3 ± 1 Hz
T53 Woil Hz T63 Oilflow WF2 T53/F06	Large Trailer Flowmeter Connector A(+) B(-)	300				
		600				
		900				
		1300				
Frequency X C = PPH						

d. Flow Linearizer Program (Site Laptop/Flow Kit)

(1) Load program “Linkhost” onto Laptop.

NOTE

The laptop must be compatible with Windows 98 or older.

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

(2) Enter Data from Calibration Sheet.

(a) Open shortcut to **Linear Link**.

(b) **EDIT:** Go to Link Setup. (Enter Data from Cal Sheet)

1. 0-10 V Out
2. RF Input
3. Top Flow
4. Top Frequency

(c) **EDIT:** Header Fields (Enter Data from Cal Sheet)

(d) **VIEW:** Mechanical Data **(Enter)**

(e) **Edit:** Data Fields **(Enter)**

Enter the 20 Calibration Points **(Enter)**

Table A.24 Linearizer Program

Low Rdg:		**(Enter)**
High Rdg:		**(Enter)**
Analog Rdg:		**(Enter)**

(f) Connect the interface cable to the Laptop and Linearizer

(g) **Program:** Establish communications

(h) **View:** Open K Factor Plot **(Enter)**

(i) Verify table generation was successful **(OK)**

(j) **Program:** Program Link **(OK)**

(k) Will Download Data Loaded from Calibration Sheet

(l) **Enter:** Low Reading on Voltage **Out**

(m) **Enter:** High Readings on Voltage **Out**

(n) **Verify:** Analog Reading on Voltage **Out**

(o) **Reads:** Sending Data

(p) **Reads:** Calibration Performed Successful

e. Vibration System T53/T55/T63 (CEC 2700)

Vibration System Setup

(1) Set variable filter channel switches to 1, filter selector switch to out and power switch to **ON**.

(2) Set variable filter gauge adjustments as follows:

(a) Filter Switch to **CAL**
(b) Range Switch to **150**
(c) Xducer Switch to **ACC**
(d) 4Mode Switch to **VEL**
(e) Output Switch to **AVG**

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

(3) Adjust **CAL** pot to (105) on the Digital Display on all channels.

(4) Set Filter Switch to **Sensitivity** and adjust **SENS** pot for an indication of 150 on all channels.

(5) Reset:

- **(a)** Filter Switch to **OUT**
- **(b)** Range Switch to **5.0**
- **(c)** Xducer Switch to **VEL**
- **(d)** Mode Switch to **VEL**
- **(e)** Output Switch to **AVG**

Table A.25 Vibration (CEC 2700)

Channel Name	Connection	Frequency	CEC Output mAvg	Tolerance	Vert Scale	AEDATS 3	AEDATS 4
V1 CH 1	**Vib 1 A(+), B(-)**	**100 Hz**	**Shorted**				
		100 Hz	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
T70/HL27		**100 Hz**	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			
V2 CH 2	**Vib 2 A(+), B(-)**	**100 Hz**	**Shorted**				
		100 Hz	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
T71/HL28		**100 Hz**	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			
V3 CH 3	**Vib 3 A(+), B(-)**	**100 Hz**	**Shorted**				
		100 Hz	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
T72/HL29		**100 Hz**	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			
V4 CH 4	**P91 G(+), N(-)**	**100 Hz**	**Shorted**				
		100 Hz	**116.5**	0.9 – 1.1			
		100 Hz	**233.0**	1.9 – 2.1			
		100 Hz	**350.0**	2.9 – 3.1			
T73/HL30		**100 Hz**	**466.0**	3.9 – 4.1			
		100 Hz	**583.0**	4.9 – 5.1			

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.25 Vibration (CEC 2700) - Continued

Channel Name	Connection	Frequency	CEC Output mAvg	Tolerance	Vert Scale	AEDATS 3	AEDATS 4
V5	P91 B(+), M(-)	100 Hz	Shorted				
CH 5		100 Hz	116.5	0.9 – 1.1			
		100 Hz	233.0	1.9 – 2.1			
		100 Hz	350.0	2.9 – 3.1			
T74/HL31		100 Hz	466.0	3.9 – 4.1			
		100 Hz	583.0	4.9 – 5.1			

Table A.26 ORBT Engine Oil Inlet Temperature (Decade Box)

Channel Name	AEDATS Channel	Connection	Ohms	Degrees		AEDATS 3 ±2.0º	
T53 T55 Engine Oil Inlet Temperature Gauge	ORBT T87/LL04	Flight Harness Cable T53 Pins N, P T55 Pins K, N	90.4	32			
			97.3	68			
			104.6	104			
			112.3	140			
			120.4	176			
			128.8	212			
			142.4	266			
			151.9	302			
			177.9	392			

Table A.27 Pressure Unit Conversion Constants

Pressure Unit Conversion Constants							
	PSI	In. H_2O	In. Hg	K Pascal	milli bar	cm H_2O	mm Hg
PSI	1.000	27.680	2.036	6.8947	68.947	70.308	51.715
In. H_2O	3.6127×10^{-2}	1.000	7.3554×10^{-2}	0.2491	2.491	2.5400	1.8683
In. Hg	0.4912	13.596	1.000	3.3864	33.864	34.532	25.400

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.28 Pressure Hydraulic Pressure Checks (High Pressure Standard)

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0psi	AEDATS 3 ±1.0psi	
Fuel Manifold Pressure (0-1000 psig)	T53 pmfd T55 pfcd L714 pfpo T31/HL10 Top Row 10	MT10	0	Vented			
			200				
			400				
		R-cal	600				
			800				
			1000				
Fuel Pump #1 Pressure (0-1000 psig)	T53 pfp1 T55 pfp1 L714 pfp1 T32/HL11 Top Row 11	MT11	0	Vented			
			200				
			400				
		R-cal	600				
			800				
			1000				
Fuel Pump #2 Pressure (0-1000 psig) (T53 ONLY)	T53 pfp2 T33/HL12 Bot Row 5	MT12	0	Vented			
			200				
			400				
		R-cal	600				
			800				
			1000				
Combustor Static Diffuser (0-300 psig)	T55 PDO L714 PT3 T22/HL02 Top Row 2	MT2	0	Vented			
			100				
			150				
		R-cal	200				
			250				
			300				

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.28 Pressure Hydraulic Pressure Checks (High Pressure Standard) - Continued

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0 psi	AEDATS 3 ±1.0 psi	
Oil Scavenge Pressure (0-200 psig)	T53 pso T63 Eop_ret T25/HL06 Top Row 7	MT5	0	Vented			
			40				
			80				
		R-cal	120				
			160				
			200				
Torque Meter Pressure (0-200 psig)	T53 TP T55 p2b T63 Torqpsi L714 P2b T27/HL06 Top Row 5	MT6	0	Vented			
			40				
			80				
		R-cal	120				
			160				
			200				
Main Oil Filter Pressure (0-200 psig)	T53 pfop T55 PODO T63 Eop L714 PODO T28/HL07 Top Row 6	MT7	0	Vented			
			40				
			80				
		R-cal	120				
			160				
			200				
Torq Boost Pressure (0-200 psig) (T53 ONLY)	T53 Ptbp T29/HL08 Top Row 8	MT8	0	Vented			
			40				
			80				
		R-cal	120				
			160				
			200				

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.28 Pressure Hydraulic Pressure Checks - (High Pressure Standard) - Continued

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0psi	AEDATS 3 ±1.0psi	
Combustor Static Pressure (0-100 psig)	T53 pfi T55 pfi L714 pfi T21/HL0 Top Row 1	MT1	0	Vented			
			20				
			40				
		R-cal	60				
			80				
			100				
Fuel Inlet Pressure (0-100 psig)	T53 ps4 T55 ps3 L714 ps4 PFI T30/HL09 Top Row 9	MT9	0	Vented			
			20				
			40				
		R-cal	60				
			80				
			100				
Oil In Pressure (0-50 psig) T53 T55 T63 L714	poil_in pgb Sup_Eop ACCGB T23/HL03 Top Row 3	MT3	0	Vented			
			10				
			20				
		R-cal	30				
			40				
			50				
Gearbox Pressure (0-50 psig)	T53 pgb T24/HL04 Top Row 4	MT4	0	Vented			
			10				
			20				
		R-cal	30				
			40				
			50				

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.28 Pressure Hydraulic Pressure Checks - (High Pressure Standard) - Continued

Channel Name	AEDATS Channel	Connection	Reading	Applied Pressure	Vertical Sc ±2.0psi	AEDATS 3 ±1.0psi	
Dyno Inlet Pressure (0-50 psig) T53 T55 T63 L714	pdyn_sup pdyn_sup pdyn_sup pdyn_sup T34/HL13 Bot Row 11	MT13	0	Vented			
			10				
			20				
		R-cal	30				
			40				
			50				
P1 Air Pressure (0-50 in H_2O)	T53 p1air	MT20	Reading in H_2O	Applied Pressure	P1 Panel Mtr ±2.0 in H_2O	AEDATS 3 ±1.0 in H_2O	
			0	Vented			
			10				
			20				
			30				
	T36/HL17 Top Row 6		40				
			50				

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.29 Audio/Illumined Fault Alarms (High Pressure Calibrator)

Channel Name	Connection	Fault Simulation	Nominal	Reading	Alarm YES = (X)
17PS Dyno Low Oil Pressure Fwd Alarm	**17PS J Box**	**>10.5 psi** Decreasing (Audio/Illuminates)	10.5 psi ± 0.5 psi		( )
18PS Fuel Pressure Alarm	**18PS J Box**	**>8 psi** Decreasing (Audio/Illuminates)	8.0 psi ± 1.0 psi		( )
15PS Low Oil Pressure Alarm (T53)	**15PS J Box**	**>25 psi** Decreasing (Audio/Illuminates)	25 psi ± 1.0 psi		( )
16PS Dyno Low Oil Pressure Aft Alarm	**16PS J Box**	**>10.5 psi** Decreasing (Audio/Illuminates)	10.5 psi ± 0.5 psi		( )
13PS Anti-icing Pressure Alarm	**13PS J Box**	**<4 psi** Increasing (Audio/Illuminates)	4.0 psi ± 0.5 psi		( )
19PS Dyno Supply Low Pressure Alarm	**19PS Trailer**	**>10 psi** Decreasing (Audio/Illuminates)	10.0 psi ± 1.0 psi		( )
18PS Dyno Lube Filter Delta Pressure Alarm (Bypass)	**18PS Trailer**	**<10 psi** Increasing (Audio/Illuminates)	10.0 psi ± 1.0 psi		( )
2PS Fuel Boost Pressure Alarm	**2PS Fuel Skid**	**<15 psi** Increasing (Audio/Illuminates)	15.0 psi ± 1.0 psi		( )
10PS Oil Filter Delta Pressure Alarm (T53/T63) (Bypass)	**10PS HS LS Vented Fuel Skid**	**<7 psi** Increasing (Audio/Illuminates)	7.0 psi ± 1.0 psi		( )

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.29 Audio/Illumined Fault Alarms – (High Pressure Calibrator) - Continued

Alarm Fault Name	Location	Fault Simulation	Illuminated YES = X	Audio YES = X
Chip Detector	**Trailer**	Ground Chip Detector Lead	( )	( )
Dyno Lube Tank Low Level	**Trailer**	Jumper Pins F & G J103 Auxiliary (Aux) J Box	( )	( )
Low Oil Level (T55)	**Trailer**	Jumper Pins A to Grd T55 Flt Hrns	( )	
Low Oil Level (T53/T63)	**Fuel Skid**	TB206 Jumper pins 5 & 6	( )	
Main Fuel Valve Closed	**Fuel Skid**	Close CB305, Press Fuel Pump Sw	( )	( )
Fuel Valve Select	**Fuel Skid**	Close CB305, Press Fuel Pump Sw	( )	( )

Table A.30 Cab Pressure Checks (Low Pressure Standard)

Channel Name	AEDATS Channel	Connection	Reading in H_g	Applied Pressure	Vertical Sc ±0.25 in H_g	AEDATS 3 ±1.0 in H_g	
PT101 Barometer (0-50 in $H_{g\ ABS}$)	**T53 Baro T55 Baro T63 Baro L714 Baro T40/HL21 Bot Row 9**	**PT101 Cab #10**	**-3**				
		R-cal	**0**	**Vented**			
			+3				
PT102 B/M Static #1 Pressure (0-50 in H_2O)	**T53 Ps11 T55 Ps11 T63 Ps11 714PSBM1 T37/HL18 Bot Row 6**	**PT102 Cab #10**	**Reading in H_2O**	**Applied Pressure**	**Vertical Sc ±2.0 in H_2O**	**AEDATS 3 ±1.0 in H_2O**	
			0	**Vented**			
			10				
			20				
		R-cal	**30**				
			40				
			50				

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

Table A.30 Cab Pressure Checks (Low Pressure Standard) - Continued

Channel Name	AEDATS Channel	Connection	Reading in H_g	Applied Pressure	Vertical Sc ±0.25 in H_g	AEDATS 3 ±1.0 in H_g	
PT103 B/M Static #2 Pressure (0-50 in H_2O)	T53 Ps12 T55 Ps12 T63 Ps12 714PSBM2	PT103 Cab #10	Reading in H_2O	Applied Pressure	Vertical Sc ±2.0 in H_2O	AEDATS 3 ±1.0 in H_2O	
			0	Vented			
			10				
			20				
		R-cal	30				
			40				
	T38/HL19 Bot Row 7		50				
PT104 B/M Total Pressure (0-50 in H_2O)	T53 Pt1 T55 Pt1 T63 Pt1 L714 PTBM	PT104 Cab #10	Reading in H_2O	Applied Pressure	Vertical Sc ±2.0 in H_2O	AEDATS 3 ±1.0 in H_2O	
			0	Vented			
			10				
			20				
		R-cal	30				
			40				
	T39/HL20 Bot Row 8		50				

f. Low Temperature Measurement System (Eurocal 2000/J Type)

(1) To align the Dyno Lube Delta Temp (above), disconnect J24 and install T/C at J20.

(2) Connect the Calibrator to J23.

(3) Record observed temperature readings.

NOTE

Ensure that the T/C installed at J20 remains installed.

(4) Install the Calibrator to J24 and open J23.

NOTE

The output readings should be the same as recorded in Table A.30.

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

NOTE

If adjustment on the DORIC is needed, remove the two screws from the side of the front panel and remove the panel. The two potentiometers are visible at the upper left of display. The R44 (Front Panel Zero) potentiometer controls the 32º references, and the R45 (Span) potentiometer controls the positive (+) full scale (1000º).

(5) Adjust the thermocouple Calibrator to 300º and the DORIC display should be 300º ± 1º. If not, repeat the adjustment.

NOTE

Connect shorting plugs to all channels not being calibrated to obtain ambient Temperature readings and improve the stability of AEDATS measurements.

Table A.31 Temperature Measurement System (Eurocal 2000/J Type)

Channel Name	Connector	DORIC Channel	AEDATS Channel	Applied Temp ºF	DORIC ±º 1 F	AEDATS ±º 1 F
Eng Oil Inlet Temp T53/T63/T64 **Limit Control Panel**	**P801** **T19/J12**	**11**	T53/T63 **Toilin** T55/T64 **Toil_in**	32		
				100		
				200		
				300		
Limit Control Panel Test Engine Oil Inlet Temperature		**Applied Temp**	**Reading**	**Control Panel Indicator**		**Illuminated Yes = (X)**
Thumbwheel Setting	300	32		In Limits		( )
		100		In Limits		( )
		200		In Limits		( )
		270		90% Alert		( )
		300		100% Warn		( )
Channel Name	**Connector**	**DORIC Channel**	**AEDATS Channel**	**Applied Temp ºF**	**DORIC ±º 1 F**	**AEDATS ±º 1 F**
Eng Oil Outlet Temp T53/T63/T64 **Limit Control Panel**	**P802** **T20/J13**	**12**	**Toil_out**	32		
				100		
				200		
				300		

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.31 Temperature Measurement System (Eurocal 2000/J Type) - Continued

Limit Control Panel Test Engine Oil Delta Temperature		Applied Temp	Reading	Control Panel Indicator	Alarm Yes = (X)	
Thumbwheel Setting 150 Jumper P801		32				
		100				
		200			LIT	Audio
		AMB+135		90% Alert	( )	
		AMB+150		100% Warn	( )	( )

Channel Name	Connector	DORIC Channel	AEDATS Channel	Applied Temp ºF	DORIC ±º 1F	AEDATS ±º 1 F
Bell Mouth Temp #1 T53/T55/T63	**P803** **T2/J01**	**13**	**Tt11** T64 **T21** L714 **T01**	32		
				70		
				100		
				120		
Bell Mouth Temp #2 T53/T55/T63	**P804** **T55/J15**	**14**	**Tt12** T64 **T22** L714 **T02**	32		
				70		
				100		
				120		
T64 Bell Mouth #3 Combustor Discharge	**P805** **T56/J16**	**15**	T53 **T31** T55 **CDT** T63 **TA11** L714 **T04**	32		
				200		
				400		
				600		
				800		
T64 Bell Mouth #4 T53/T55 Bell Mouth Temp #3 T63 TWFFuel T Thermo	**P806** **T57/J17**	**16**	**Twf** L714 **T03**	32		
				70		
				100		
				120		

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.31 Temperature Measurement System (Eurocal 2000/J Type) - Continued

Channel Name	Connector	DORIC Channel	AEDATS Channel	Applied Temp ºF	DORIC ±º 1 F	AEDATS ±º 1 F
Combustor Discharge Temperature	**P807** **T58/J18**	**17**	T53 **T32** T55 **TPTSO** T63 **TA12** 714 **TPTSO**	32 200 400 600 800		
P.T. Bearing Scavenge T53/T55 T2BSO T63 TRef1	**P808** **T59/J19**	**18**	T53 **TPTSO** T55 **Tptso** T63 **TREF1** 714 **TOIL**	32 200 400 600 800		
#2 Bearing Scavenge T53/T63 TRef2 T64 Oil Tnk T55 Comb. Static	**P809** **T60/J20**	**19**	T53 **T2bso** T63 **TREF2** T64 **Toil_tnk**	32 200 400 600 800		
Dyno Lube Inlet Temp T53/T63/T64 **Limit Control Panel**	**J20 Dyno** **T61/J21**	**21**	**Tdyn_tnk**	32 100 200 300		

Limit Control Panel Test Dyno Lube Inlet Temperature		**Temp Setup**	**Applied Temp**	**Control Panel Indication**	**Alarm Yes = (X)**
Thumbwheel Setting	200	AMB + 74			
		AMB + 80			

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.31 Temperature Measurement System (Eurocal 2000/J Type) - Continued

Channel Name	Connector	DORIC Channel	AEDATS Channel	Applied Temp ºF	DORIC ±º 1 F	AEDATS ±º 1 F
Dyno Lube Fwd Temp T53/T63/T64	**J21 Dyno T62/J22**	**22**	**Tdyn_fwd**	32		
				100		
				200		
				300		
Dyno Lube Aft Temp T53/T63/T64	**J22 Dyno T63/J23**	**23**	**Tdyn_aft**	32		
				100		
				200		
				300		
Channel Name	**Connector**	**DORIC Channel**	**AEDATS Channel**	**Applied Temp ºF**		**AEDATS ±º 1 F**
Dyno Lube Temp Fwd/Aft Average **Limit Control Panel Step 38**	**J20/J23 Dyno See Note Below T64/J24**	**None**	**Tdyn_FA**	32		
				100		
				200		
				300		

Limit Control Panel Test Dyno Lube Delta Temperature	Applied Temp	Reading	Control Panel Indicator	Alarm (X)	
				LIT	Audio
Thumbwheel Setting 080 Jumper J20	AMB +74		90% Alert	( )	
	AMB +80		100% Warning	( )	( )

Channel Name	Connection	Applied º F	DORIC ± 2.0º F	AEDATS 3 ± 1.0º F	AEDATS 4 ± 1.0º F	Analog ± 2.0º F	Digital ± 2.0º F
EGT K Type ºF DORIC TC Switch to Channel 2 T4/K02	EGT Cable Pins D (+) A (-) A (+) B (-)	400					
		800					
		1200					
		1600					
		1800					

A.3 AEDATS IV T53/T55/T63 Alignment Worksheet - Continued

A.31 Temperature Measurement System (Eurocal 2000/J Type) - Continued

Channel Name	Connector	DORIC Channel	AEDATS Channel	Applied Temp ºF	DORIC ±º 1 F	AEDATS ±º 1 F
ENG OIL Tank T53/T63/T64	**SKID TC-209**	**25**	**ToilT T65/J25**	32		
				100		
				200		
				300		
Fuel Tank T53/T63/T64	**SKID TC-208**	**26**	**TfuelT T66/J26**	32		
				100		
				200		
				300		

Table A.32 DC Voltage Checks (Eurocal 2000)

Channel Name	AEDATS Channel	Connection	Applied Volt (DC)	Vertical Scale ±1.0% or º	AEDATS 4 ± 0.5º % or º
T55 Electric Torque System	**Qeng T93/LL06**	Flight Harness Jumper Z & a to (-) Y to (+) DC Source	230mV / 50%		
			325mV / 70%		
			430mV / 100%		
Dyno Shroud Position Indicator T53/T55/T63	**Dyno Shrd Bot 3 T77/HL34**	P91 Connector Pins F (+), H (-)	0V / 0%		
			4V / 25%		
			8V / 50%		
			12V / 75%		
			16V / 100%		
TA Position Indicator T53 T55 T63	**TA (Bot 1) T79/HL34 T80/HL35 T81/HL35**	N1 POS Connector Pins B (+), C (-) A (+), B (-)	0V / 0º		
			4V / 50º		
			8V / 100º		
			12V / 150º		
Inlet Guide Vane Position (T53 ONLY)	**IGV Bot 4 T84/HL37**	T53 IGV Connector Pins B (+), C (-) A (+), B (-)	0V / -10º		
			2V / 15º		
			4V / 40º		
			8V / 90º		

A.4 AEDATS IV T55-GA-714 Alignment Worksheet

Table A.33 ETQ (Eurotron)

ETQ	Connection	Applied Voltage	Simulated Torque	AEDATS ±0.5 ft/lbs
Span AEDATS	**P2 Pins E (+) F (-)**	**1.000 Vdc**	**0.0 ft/lbs**	
		2.000 Vdc	**320.0 ft/lbs**	
		4.000 Vdc	**961.0 ft/lbs**	
		6.000 Vdc	**1601.0 ft/lbs**	
		7.245 Vdc	**2000.0 ft/lbs**	

Table A.34 Simulated Torq V_{01} = 1.000 Vdc Flight Line Test Set (FLTS)

Connections	Parameter	Limits	FLTS Reading
Torq Switch Assembly (Assy) (Rear) Remove Cable LTCT31482 -01 from **J2** and connect Cable LCTC31577-1 to Torq Switch Assy **J2** and **J4** of the FLTS. Remove Cable LCTC31470-01 from **J7** (Torq Sw Assy) and connect Cable LCTC31578-1 to **J7** (Torq Sw Assy) and FLTS Diagnostic Cable #2 LCTC29351-01 Plug **P14B (P14A is not connected)** connect other end of Cable LCTC29351-01 **FLTS J2**. Remove Cable LCTC31471-01 (**P1 and P2**) from RDPS. Connect FLTS Diagnostic Cable #2 (LCTC30572-01) to FLTS **J3,** LCTC31471-01 (**P1 and P2**) and RDPS **J1 and J2**.	VPRI	85 to 105 Vac	
	IPRI	0.450 to 0.470 Vac	
	VT	15.00 to 19.00 Vdc	
	VC	15.00 to 19.00 Vdc	
	VX	-0.0020 to +0.0020 Vdc	
	V01	0.995 to 1.005 Vdc	
	V02	V01 ±0.010 Vdc	
	V03	V01 ±0.010 Vdc	
	Simulated Torq V01 = 5.063 Vdc		
	Parameter	**Limits**	**FLTS Reading**
	VT	15.00 to 19.00 Vdc	
	VC	15.00 to 19.00 Vdc	
	VX	0.400 to 0.500 Vdc	
	Calculation	**Limit**	**Actual VR Value**
	VX / (2 VC + VX)	**0.012869 to 0.013064**	

Table A.35 Simulated Torque (V_{01}) (FLTS)

Applied Voltage	Simulated Torque	AEDATS ±0.5 ft/lbs
1.000 Vdc	**0.0 ft/lbs**	
2.000 Vdc	**320.0 ft/lbs**	
4.000 Vdc	**961.0 ft/lbs**	
6.000 Vdc	**1601.0 ft/lbs**	
7.245 Vdc	**2000.0 ft/lbs**	

A.4 AEDATS IV T55-GA-714A Alignment Works - Continued

Table A.36 ORBT (Decade Box)

Channel Name	AEDATS Channel	Connector	Ohms	Degrees	AEDATS 3 ±2.0º
Engine Oil Inlet Temperature Gauge	ORBT	J25 M(+) N(-)	90.4	32	
			97.3	68	
			104.6	104	
			112.3	140	
			120.4	176	
			128.8	212	
			142.4	266	
	T87/LL04		151.9	302	
			177.9	392	

Table A.37 N2A Roll Back Activation (CEC 2700)

Connection	Applied Freq	Volt Present ?	Roll Back Trip @ Freq (Hz)
J17 R (-) S (+)	2916 Hz	No ( )	
	2942 Hz ± 3 Hz	Yes ( )	

Table A.38 N2 Speed (CEC 2700)

Connection	Applied Freq Hz / %	Calc Counter ±0.3%	Analog Gauge ±0.3%	Digital Gauge ±0.3%	AEDATS NPT ±0.01 Hz
J18 U (+) V (-)	704 Hz / 25%				
	1408 Hz / 50%				
	2112 Hz / 75%				
	2816 Hz / 100%				

A.4 AEDATS IV T55-GA-714A Alignment Works - Continued

Table A.39 N1 Speed (CEC 2700)

Connection	Applied Freq Hz/ %	Calc Counter ±0.3%	Analog Gauge ±0.3%	Digital Gauge ±0.3%	AEDATS **NG** ±0.01 Hz
J25 A (+) B (-)	700 Hz / 25%				
	1400 Hz / 50%				
	2100 Hz / 75%				
	2800 Hz / 100%				

Table A.40 T4.5 Engine Check (Eurotron)

Connection	**Applied Temp ºF**	**DORIC ± 2.0º F**	**Digital Gauge ± 3.0º F**	**Analog Gauge ± 3.0º F**	**T4.5 Gauge ± 1.0º F**
J19 A (+) B (-)	**400**				
	800				
	1200				
	1600				
	1650				
	2000				
	Rollback Tripped at		**1650 ± 2.0 ºF**		

Table A.41 Collective Pitch (DMM)

Collective Pitch	**Ex (TB2 pin1&2)=**	**Dial Indication**	**TB2 Pins 3 and 4 (Vac)**
0.00%	**6.95% of Ex =**		
73.75%	**58.16% of Ex =**		
85.00%	**67.03% of Ex =**		

Table A.42 Rollback Solenoid Valve Check (Eurotron/DMM)

Test Function	**Temp Applied J19 Pins A (+) and B (-)**	**Red LED LIT? Torq Sw Assy**	**Voltage at P1 Pins A and B**
Torq Switch Assy Power Up	**1400º F**	**Yes ( )**	**0.0 Vdc ( )**
Reset Button Depressed	**1400º F**	**No ( )**	**24-28 Vdc ( )**
Increase Temperature	**1670º F**	**Yes ( )**	**0.0 Vdc ( )**
Increase Temperature	**1700º F**	**Did Rollback Activate?**	

A.4 AEDATS IV T55-GA-714A Alignment Works - Continued

Table A.43 N2 Set FADEC (Laptop)

N2 Set Dial	N2 Set Gauge	Verified
Counter-Clockwise	97%	( )
Clockwise	103%	( )

Table A.44 Throttle Quadrant Mechanism (Laptop/DMM)

ECL Lever Position	Voltage @ TB2-(5) & (6) 0.000 ±2.5 mVac @ 30º	AEDATS º	ECL Gauge º
30º			
0º	N/A		
60º	N/A		
ECL Lever Shifted back and forth (0º to 60º) with no errors		( )	Yes

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
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To: 2028@redstone.army.mil

Subject: DA Form 2028

1 ***From: Joe Smith***
2 *Unit: home*
3 ***Address: 4300 Park***
4 ***City***: Hometown
5 ***St: MO***
6 ***Zip: 77777***
7 ***Date Sent***: 19--OCT--93
8 ***Pub no***: 55--2840--229--23
9 ***Pub Title: TM***
10 ***Publication Date***: 04--JUL--85
11 *Change Number*: 7
12 *Submitter Rank*: MSG
13 ***Submitter FName***: Joe
14 *Submitter MName*: T
15 ***Submitter LName***: Smith
16 ***Submitter Phone***: 123--123--1234
17 ***Problem: 1***
18 *Page: 2*
19 *Paragraph: 3*
20 *Line: 4*
21 *NSN: 5*
22 *Reference: 6*
23 *Figure: 7*
24 *Table: 8*
25 *Item: 9*
26 *Total: 123*

27 ***Text***:
This is the text for the problem below line 27.