

# ENGINEERING CHANGE NOTICE

1. ECN No **620620**

Page 1 of 2

Proj.  
ECN

<b>2. ECN Category (mark one)</b>  Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	<b>3. Originator's Name, Organization, MSIN, and Telephone No.</b> GA Barnes/CED/H5-09 376-2241	<b>3a. USQ Required?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>4. Date</b> 5/1/95
<b>5. Project Title/No./Work Order No.</b> W71130/N3064		<b>6. Bldg./Sys./Fac. No.</b> NA	<b>7. Approval Designator</b> Q
<b>8. Document Numbers Changed by this ECN (includes sheet no. and rev.)</b> WHC-SD-WM-ATP-077, REV 2		<b>9. Related ECN No(s).</b> NA	<b>10. Related PO No.</b> NA
<b>11a. Modification Work</b>  <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	<b>11b. Work Package No.</b> NA	<b>11c. Modification Work Complete</b>  NA  _____ Cog. Engineer Signature & Date	<b>11d. Restored to Original Condition (Temp. or Standby ECN only)</b>  NA  _____ Cog. Engineer Signature & Date

**12. Description of Change**  
 ETN-94-0036 - Replace Rev 2 of WHC-SD-WM-ATP-077, with Rev 3 (attached).

**13a. Justification (mark one)**

Criteria Change <input type="checkbox"/>	Design Improvement <input checked="" type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facility Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

**13b. Justification Details**  
 This ATP is being revised to make it non-tank specific.

**14. Distribution (include name, MSIN, and no. of copies)**

GA Barnes	H5-09	DC Board	S5-57
JH Huber	R1-49	Central Files	L8-04(2)
FM Jones	L7-06	OSTI	L8-07(2)
MW Wheat	T4-07		
JD Thorne	S5-10		

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BY WHC

DATE **MAY 08 1995**

*Sta. 21*

# ENGINEERING CHANGE NOTICE

<b>15. Design Verification Required</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>16. Cost Impact</b> <table style="width: 100%; text-align: center;"> <tr> <th style="width: 50%;">ENGINEERING</th> <th style="width: 50%;">CONSTRUCTION</th> </tr> <tr> <td>Additional <input type="checkbox"/> \$</td> <td>Additional <input type="checkbox"/> \$</td> </tr> <tr> <td>Savings <input type="checkbox"/> \$NA</td> <td>Savings <input type="checkbox"/> \$NA</td> </tr> </table>	ENGINEERING	CONSTRUCTION	Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$	Savings <input type="checkbox"/> \$NA	Savings <input type="checkbox"/> \$NA	<b>17. Schedule Impact (days)</b> Improvement <input type="checkbox"/> Delay <input type="checkbox"/> NA
ENGINEERING	CONSTRUCTION							
Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$							
Savings <input type="checkbox"/> \$NA	Savings <input type="checkbox"/> \$NA							

**18. Change Impact Review:** Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD <input type="checkbox"/>	Seismic/Stress Analysis <input type="checkbox"/>	Tank Calibration Manual <input type="checkbox"/>
Functional Design Criteria <input type="checkbox"/>	Stress/Design Report <input type="checkbox"/>	Health Physics Procedure <input type="checkbox"/>
Operating Specification <input type="checkbox"/>	Interface Control Drawing <input type="checkbox"/>	Spares Multiple Unit Listing <input type="checkbox"/>
Criticality Specification <input type="checkbox"/>	Calibration Procedure <input type="checkbox"/>	Test Procedures/Specification <input type="checkbox"/>
Conceptual Design Report <input type="checkbox"/>	Installation Procedure <input type="checkbox"/>	Component Index <input type="checkbox"/>
Equipment Spec. <input type="checkbox"/>	Maintenance Procedure <input type="checkbox"/>	ASME Coded Item <input type="checkbox"/>
Const. Spec. <input type="checkbox"/>	Engineering Procedure <input type="checkbox"/>	Human Factor Consideration <input type="checkbox"/>
Procurement Spec. <input type="checkbox"/>	Operating Instruction <input type="checkbox"/>	Computer Software <input type="checkbox"/>
Vendor Information <input type="checkbox"/>	Operating Procedure <input type="checkbox"/>	Electric Circuit Schedule <input type="checkbox"/>
OM Manual <input type="checkbox"/>	Operational Safety Requirement <input type="checkbox"/>	ICRS Procedure <input type="checkbox"/>
FSAR/SAR <input type="checkbox"/>	IEFD Drawing <input type="checkbox"/>	Process Control Manual/Plan <input type="checkbox"/>
Safety Equipment List <input type="checkbox"/>	Cell Arrangement Drawing <input type="checkbox"/>	Process Flow Chart <input type="checkbox"/>
Radiation Work Permit <input type="checkbox"/>	Essential Material Specification <input type="checkbox"/>	Purchase Requisition <input type="checkbox"/>
Environmental Impact Statement <input type="checkbox"/>	Fac. Proc. Samp. Schedule <input type="checkbox"/>	Tickler File <input type="checkbox"/>
Environmental Report <input type="checkbox"/>	Inspection Plan <input type="checkbox"/>	
Environmental Permit <input type="checkbox"/>	Inventory Adjustment Request <input type="checkbox"/>	

**NA9. Other Affected Documents:** (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
NA		

**20. Approvals**

Signature	Date		Signature	Date
<b>OPERATIONS AND ENGINEERING</b>			<b>ARCHITECT-ENGINEER</b>	
Cog. Eng. GA Barnes <i>J Barnes</i>	<u>5-5-95</u>	PE		_____
Cog. Mgr. TL Moore <i>J Moore</i>	<u>5-8-95</u>	QA		_____
QA DC Board <i>JAB PER TELECON</i>	<u>5-5-95</u>	Safety		_____
Safety	_____	Design		_____
Environ.	_____	Environ.		_____
Other Informal Review	_____	Other		_____
JH Huber <i>JAB PER TELECON</i>	<u>5-5-95</u>			_____
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**DEPARTMENT OF ENERGY**  
Signature or a Control Number that tracks the Approval Signature

**ADDITIONAL**

## **DISCLAIMER**

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**RELEASE AUTHORIZATION****Document Number:** WHC-SD-WM-ATP-077, Rev. 3**Document Title:** ENRAF Series 854 Advanced Technology Gauge (ATG)  
Acceptance Test Procedure**Release Date:** 5/8/95

**This document was reviewed following the  
procedures described in WHC-CM-3-4 and is:**

**APPROVED FOR PUBLIC RELEASE**

**WHC Information Release Administration Specialist:**

V. L. Birkland  
V.L. Birkland

5/8/95

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**SUPPORTING DOCUMENT**

1. Total Pages *22*

2. Title

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG)  
ACCEPTANCE TEST PROCEDURE

3. Number

WHC-SD-WM-ATP-077

4. Rev No.

3

5. Key Words

ENRAF, ATG, Series 854

6. Author

Name: GA Barnes

Signature *GA Barnes*

Organization/Charge Code 71130/N3064

7. Abstract

This Acceptance Test Procedure was written to test the ENRAF series 854 ATG prior to installation in the Tank Farms. The procedure sets various parameters and verifies that the gauge is functional.

8. RELEASE STAMP

OFFICIAL RELEASE **(21)**  
BY WRC  
DATE MAY 08 1995  
*Sta. 21*

RECORD OF REVISION		(1) Document Number	
		WHC-SD-WM-ATP-077	
(2) Title		KN Page 21	
ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG) ACCEPTANCE TEST PROCEDURE			
CHANGE CONTROL RECORD			
(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT 141624, 2/18/94	GA Barnes	TL Moore
0-A	Add Record of Revision page i Replaces pages 2 of 14 and 14 of 14. ECN 602579, 4/15/94		
0-B	Replaces Record of Revision page i Replaces pages 10 of 14 and 14 of 14 ECN 602580, 5/3/94		
0-C	Replace Record of Revision page i Replaces pages 4, 6, 9, 12, and 14 Add Appendix A ECN 608122, 5/24/94		
1	Replace Rev 0-C with Rev 1 *ECN 608123, ECN 613180, 7/20/94		
2	Replace Rev 1 with Rev 2 Rev 2 is a complete rewrite ECN 613319, 1/24/95		
RS 3	Replace Rev 2 with Rev 3 Rev 3 is a complete rewrite ECN 620620, 5/5/95	<i>Muffe</i>	<i>JIMore</i> 5-8-95

WHC-SD-WM-ATP-077  
REV 3

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG)  
ACCEPTANCE TEST PROCEDURE

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ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG)  
ACCEPTANCE TEST PROCEDURE

1.0 INSTRUCTIONS

1.1 PURPOSE

This procedure checks that the shipment of the gauge received at Hanford is completely functional and has received no shipping damage. This procedure does not certify the gauge operation; that is done by the manufacturer.

1.2 SCOPE

This procedure provides acceptance testing for Enraf Series 854 level gauges used to monitor levels in Hanford Waste Storage Tanks. The test will verify that the gauge functions according to the manufacturer's instructions and specifications and is properly setup prior to being delivered to the tank farm area.

1.3 REFERENCES

- Instruction Manual Series 854 ATG Level Gauge, Enraf Inc., Part No. 4416.220, Version 2.2 (See CV-31560, vendor information file).

1.4 RESPONSIBILITIES

- 1.4.1 The Person In Charge (PIC) is responsible for coordinating the level gauge testing.
- 1.4.2 Maintenance (Instrument Craft) is responsible for performing the testing and recording the test results.
- 1.4.3 Quality Assurance is responsible for witnessing the tests, signing the data sheets when testing is completed and placing a "green tag" on the gauge after successful completion of the test.

### 1.5 DESCRIPTION OF THE SYSTEM

Enraf-Nonius Series 854 level gauges are certified by Factory Mutual (FM) for National Fire Protectional Association (NFPA 70) hazardous Class I, Division 1, Groups B, C, and D Locations. Its measuring principle is based on the detection of variations in the weight of a displacer suspended in the process fluid. The displacer is connected to a wire wound on a precision measuring drum. A level change causes a change in the weight of the displacer which will be detected by the force transducer. Electronics within the gauge cause a servo motor to adjust the position of the displacer and compute the tank level based on the new position of the displacer drum. The gauge displays the level in decimal inches. An analog output signal transmits the level data for remote data processing.

### 1.6 TEST CONDITIONS AND EQUIPMENT REQUIRED

The equipment listed below is required to perform this procedure.

- Portable Enraf Terminal (PET) Model No. 847
- Enraf Test Weights (Enraf PN 1854-061)
- Reamer (Enraf PN 4563.030) or #31 drill
- Enraf Extraction Tool (optional)

## 2.0 TEST EXECUTION SECTION

### NOTE:

The commands typed on the PET or computer are shown in square brackets "[]" (The square brackets are NOT to be typed as part of the command). Included is any additional information the command requires. After typing the text within the square brackets, press the ENTER key. If an error is made during the typing of the command, use the backspace (BS) key to delete the error.

After entering a command, the PET or computer will give one of two responses: The first response will show the entered command with an "&" character at the end (i.e. "TG&"). This response tells the user that the gauge accepted the command. The second response will show the two digit command (i.e. TG) followed by a "!" and a three digit error code (i.e. "TG!053"). This command tells the user that the gauge did not accept the command. For a list of error codes, see the Enraf 854 ATG Level Gauge Instruction Manual, section 12.4.

### PROCEDURE NOTE

In the following steps, if values are requested, the values shall be recorded in the Test Execution Data Sheet (located at the end of this procedure) for the appropriate step number in the Value column. If verification is requested, write accept in the accept/reject column in the Test Execution Data Sheet for the appropriate step number.

If an error occurs in any step, an exception will be entered in the Exceptions Data Sheet listing the step where the error occurred, and a general description of the error. Corrective actions shall be in accordance with section 3.0.

## 2.1 INITIALIZING THE GAUGE

### INFORMATION

This section prepares the gauge for testing. It connects power and unlocks the servo motor.

- 2.1.1 Mount the gauge per the 854 ATG Level gauge Instruction Manual. Provide electrical connections to the gauge per the 854 ATG Level Gauge Instruction Manual, the National Fire Protection Association (NFPA 70) and the National Electrical Code.
- 2.1.2 Install the drum and displacer per the Enraf Series 854 ATG Level Gauge Instruction Manual, Section 8.4.
- 2.1.3 Unlock the servo motor prior to connecting power per the 854 ATG Level Gauge Instruction Manual, Section 8.5.
- 2.1.4 Connect the PET to the optical port located on the side of the gauge housing or connect a computer to the gauge using the RS-232C pigtail, PET and bi-phase mark connector (see appendix A for guidance).
- 2.1.5 Connect the gauge to a 120 Vac (+/- 5 Vac) power source, per the 854 ATG Level Gauge Instruction Manual, Section 4.3.1. The display screen on the gauge will show one dark line. After approximately 20 seconds, the display will show the gauge initializing.
- 2.1.6 If the gauge is not setup to measure level in inches, reconfigure the gauge per appendix A (changing level dimensions).

## 2.2 CHECKING FOR ERROR CODES

### INFORMATION

Record any errors on the data sheet. Correct the errors, or enter it as an exception. For a list of error codes, see the Enraf 854 ATG Level Gauge Instruction Manual.

2.2.1 Enter Command [EP] = "XPU error code". Verify that EP000 is displayed. Record verification in the data sheet.

2.2.2 Enter Command [ES] = "SPU error code". Verify that ES0000 is displayed. Record verification in the data sheet.

### 2.3 TESTING THE LEVEL GAUGE OPERABILITY

#### INFORMATION

This section enters data into the memory of the level gauge. These values tailor the gauge for the specific tank.

2.3.1 Enter Command [UN]. This command unlocks the gauge and allows the displacer to move downward to the floor or other hard surface.

#### NOTE:

If the displacer does not move downward, check to make sure that the drum moves freely on the bearings. If the drum does not move freely, perform the drum bearing removal/reconditioning procedure in Appendix B. If the drum does move freely, re-calibrate the force transducer using the procedure in Appendix C. After drum bearing reconditioning or force transducer re-calibration, perform step 2.3.1 again. Document the drum bearing reconditioning or force transducer re-calibration as an exception.

2.3.2 Enter Command [W2=ENRAF2]. This command enters protection level 2.

2.3.3 Enter the following parameters into the gauge (Verify proper parameter entry and record the verification in the Data Sheet):

- [TT=+00900.00] ("TANK TOP" parameter)
- [UR=+00900.00] ("UPPER REFERENCE" parameter)
- [MH=+00890.00] ("MOTOR HIGH" parameter)
- [MZ=+00880.00] ("LOCK TEST LIMIT" parameter)
- [HH=+00870.00] ("HIGH HIGH ALARM" parameter)
- [HA=+00860.00] ("HIGH ALARM" parameter)
- [LA=+00006.00] ("LOW ALARM" parameter)

- [LL=+00003.00] ("LOW LOW ALARM" parameter)
- [ML=+00001.00] ("MOTOR LIMIT SWITCH LOW" parameter)
- [RL=+00850.00] ("REFERENCE LEVEL" parameter)

2.3.4 Enter command [AR]. This command directs the gauge to accept the current value for "RL".

2.3.5 Enter command [EX].

**NOTE:**

Prior to executing step 2.3.6, verify that the opening to the gauge flange is blocked so that the displacer cannot be raised up into the drum housing.

2.3.6 Enter Command [CA]. This command raises the displacer. Verify that the displacer raises up to the gauge flange and stops. Record the verification in the data sheet.

2.3.7 Enter Command [UN].

2.3.8 After the gauge stabilizes, verify that the level reading in the gauge LCD display is reading within 0.10 inches of the RL value programmed in step 2.3.3. Record the verification in the data sheet.

2.3.9 Enter command [TG]. This commands tests the gauge.

2.3.10 Verify that the displacer rises a couple of inches and then goes back down to the RL. Record the verification in the data sheet.

## 2.4 DRUM CIRCUMFERENCE VERIFICATION

2.4.1 Enter Command [DC]. This command displays the preprogrammed drum circumference.

2.4.2 Verify that the drum circumference value displayed (DC) is the same as the value for the Drum circumference found engraved on the wire drum. Record the value in the data sheet. If the Drum Circumference value engraved on the wire drum does not exactly match the preprogrammed Drum Circumference (DC) value, perform steps 2.4.3 through 2.4.5, otherwise go to step 2.5

**NOTE:**

This value is displayed in scientific notation.

The value will look like "DC=+.33000000E+00".

2.4.3 Enter Command [W2=ENRAF2].

2.4.4 Enter Command [DC=+.XXXXXXXXXE+00]. The value for XXXXXXXX is the Drum Circumference value engraved on the wire drum. Record the value in the data sheet.

2.4.5 Enter command [EX].

**2.5 DISPLACER WEIGHT VERIFICATION**

2.5.1 Enter command [CA].

2.5.2 After the displacer rises a few inches, enter command [FR]. This command stops the displacer.

2.5.3 Enter command [MF]. This command measures the motor frequency.

2.5.4 After "FR" appears in the gauge's LCD display, PET display or computer display, enter command [WQ]. This command measures the weight of the displacer. Record the WQ value in the data sheet.

**NOTE:**

This value is displayed in scientific notation.

The value will look like "WQ=+.22300000E+03".

2.5.5 Verify that the WQ value is within 3 grams of the weight engraved on the displacer. Record the verification in the data sheet.

**NOTE:**

If the value for WQ is not within 3 grams (.00300000E+03) of the weight engraved on the displacer, calibrate the force transducer per the force transducer calibration procedure found in Appendix C. Document this calibration as an exception. After force transducer calibration, perform steps 2.5.3-2.5.5 again.

**2.6 TRANSPORTING THE LEVEL GAUGE**

**CAUTION**

This section prepares the gauge for transport. The motor must be locked to prevent possible damage to the force transducer.

u

- 2.6.1 If the level gauge display is not in FORMAT B (see the 854 ATG Level Gauge Instruction Manual, Figure 7.3), enter command [W1=ENRAF1]. Once in Protection Level 1, enter command [DF=B] (this command switches the gauge to display format B). Enter command [EX].
- 2.6.2 If using a computer for the testing, log the gauge data onto the computer (see Appendix A).
- 2.6.3 Disconnect the gauge from the power source.
- 2.6.4 "Lock" the servo motor, per the 854 ATG Level Gauge Instruction Manual, Section 8.5, prior to transporting the gauge.
- 2.6.5 Remove the drum and displacer, per the 854 ATG Level Gauge Instruction Manual, Section 8.4, prior to transporting the gauge.

**2.7 DATA**

- 2.7.1 Mail a copy of the completed data sheets, vender information, and hardcopy of the logfile to G. A. Barnes at MSIN H5-09 or J. H. Huber at R1-67.



### 3.0 EXCEPTIONS TO ACCEPTANCE TEST

Exceptions to the test are dispositioned and agreed to by all witnesses. Actions taken regarding disposition are noted on the "Exception to Acceptance Test" sheet. Typical dispositions are:

- Test approved with exception (i.e., rerun of the acceptance test unnecessary).
- Entire acceptance test to be repeated after the discrepancy has been corrected.
- ATP step(s) affected to be repeated after the discrepancy has been corrected.

### 4.0 TEST DATA MANAGEMENT

The test data shall be entered on the attached data sheets. Witness signatures at the bottom of the data sheet indicates that the witness agrees to the accuracy of the data recorded and comparisons made.

Upon successful completion of testing activities, the master copy of the DATA SHEETS will be signed by the Test Witnesses. An appropriate "Acceptance Test Report" shall be generated to publish the results of testing activities.

#### 4.1 ACCEPTANCE TEST REPORT GUIDANCE

The data sheets which are completed during the testing activities will be included in the Acceptance Test Report. If additional gauges are tested using this procedure, a different data sheet will be used for each gauge and added to the ATR as a revision.

TEST EXECUTION DATA SHEET

Date: \_\_\_\_\_

Gauge serial number: \_\_\_\_\_ Tank Number: \_\_\_\_\_

Test Performed by: \_\_\_\_\_

Reference Sequence	Attribute	Accept/Reject	Value	Comment
2.2.1	EP			
2.2.2	ES			
2.3.3	PARAMETERS			
2.3.6	CA			
2.3.8	RL			
2.3.10	RL			
2.4.2	DC			
2.4.4	DC			
2.5.4	WQ			
2.5.5	WQ			
2.6.3	MOTOR LOCK			

Test Witnesses:

PIC \_\_\_\_\_ Date \_\_\_\_\_

Quality Assurance \_\_\_\_\_ Date \_\_\_\_\_

Maintenance \_\_\_\_\_ Date \_\_\_\_\_

**EXCEPTIONS DATA SHEET**

Gauge Serial Number: \_\_\_\_\_

Paragraph No.	Description/Disposition								
<table border="1"><thead><tr><th data-bbox="224 1377 873 1430"><b>TEST APPROVED - NO EXCEPTIONS:</b></th><th data-bbox="873 1377 1448 1430"><b>TEST APPROVED - WITH EXCEPTIONS:</b></th></tr></thead><tbody><tr><td data-bbox="224 1430 873 1520">PIC _____ Date _____</td><td data-bbox="873 1430 1448 1520">PIC _____ Date _____</td></tr><tr><td data-bbox="224 1520 873 1610">Quality Assurance _____ Date _____</td><td data-bbox="873 1520 1448 1610">Quality Assurance _____ Date _____</td></tr><tr><td data-bbox="224 1610 873 1740">Maintenance _____ Date _____</td><td data-bbox="873 1610 1448 1740">Maintenance _____ Date _____</td></tr></tbody></table>		<b>TEST APPROVED - NO EXCEPTIONS:</b>	<b>TEST APPROVED - WITH EXCEPTIONS:</b>	PIC _____ Date _____	PIC _____ Date _____	Quality Assurance _____ Date _____	Quality Assurance _____ Date _____	Maintenance _____ Date _____	Maintenance _____ Date _____
<b>TEST APPROVED - NO EXCEPTIONS:</b>	<b>TEST APPROVED - WITH EXCEPTIONS:</b>								
PIC _____ Date _____	PIC _____ Date _____								
Quality Assurance _____ Date _____	Quality Assurance _____ Date _____								
Maintenance _____ Date _____	Maintenance _____ Date _____								

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG)  
ACCEPTANCE TEST PROCEDURE

APPENDIX A

COMPUTER SETUP GUIDANCE:

1. Connect the infrared connector from the PET to the ENRAF gauge.
2. Enter the TA command, note the gauge address displayed in the PET display, (i.e. TA05).
3. Disconnect the infrared connector, and connect the computer and PET to the gauge per Figure A-1.
4. Place the PET in SETUP MODE by pressing keys control-esc at the same time.
5. Press the down arrow (↓) on the PET keyboard until MODE is displayed at the top of the PET display.
6. Press the right arrow (→) until the cursor is underneath RS232.
7. Press the down arrow (↓) until the display on the PET reads "RS-232 Baudrate".
8. Verify (and if necessary correct) the cursor is underneath 1200.
9. Press the down arrow until the PET display reads SETUP MODE, and then press, control-esc at the same time.
10. Turn on the computer, respond no to accessing network resources, push any key to continue.
11. At the c:\> prompt on the computer display, access the logger directory by typing, cd\logger
12. Start the logger program by typing, LOGV17
13. Use the computer arrow keys and highlight item #1, "Setup system", then press the enter key.

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG)  
ACCEPTANCE TEST PROCEDURE

14. Highlight item #4, "Gauge address" and press enter.
15. Enter the gauge address noted from step #2 (note the flashing cursor), then press enter.
16. Verify that the other parameters shown in the "SETUP MENU" display match the parameters shown below. If the parameters don't match, change them using the procedure in steps 14 and 15.

SETUP MENU

1 ) RS232C port & Baudrate	(port 1 @ 1200 Baud.)
2 ) Add header to every file	(N)
3 ) Ciu address	( )
*4 ) Gauge Address	(XX)
5 ) Max. number of records in file LOGV17.CYC	(100)
6 ) Name cyclusfile	(LOGV17.CYC)
7 ) Max. number of retries per CIU request	(3)
8 ) Timeout CIU	(.9 sec.)
9 ) Turn around delay	(0 sec.)
A ) ITEM directory	(C:\LOGGER\ITEMS\)
B ) CYC file directory	(C:\LOGGER\CYC\)
C ) LOG file directory	(C:\LOGGER\LOG\)
D ) file to Field file directory	(C:\LOGGER\FTF\)
E ) Library directory	(C:\LOGGER\LIB\)
F ) RAM disk	(\)
G ) Return to main menu	

\*XX is obtained from gauge parameter [TA]

17. Highlight item #G, "Return to main menu", press enter key.
18. A prompt will ask, "Save new setup on disk (y,n)?, type, y for a yes response.
19. Highlight item #2, "Send items", press enter key.
20. Return to section 2.2

CHANGING LEVEL DIMENSIONS:

1. From LOGGER'S "MAIN MENU", enter the "SPECIAL MENU".

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2. Enter the "CHANGE DIMENSIONS" menu.
3. Enter the gauge's "TRANSMISSION ADDRESS" (TA).
4. Enter "1) LEVEL DIMENSION (XXXXXX)"
5. Enter "TO INCHES"
6. Return to the "MAIN MENU"
7. Return to "SEND ITEMS"

LOGGING GAUGE DATA ONTO COMPUTER:

1. From LOGGER'S "MAIN MENU", enter the "SPECIAL MENU".
2. Enter "1) GAUGE LOGGING TO DISK".
3. Enter the gauge's "TRANSMISSION ADDRESS" (TA).

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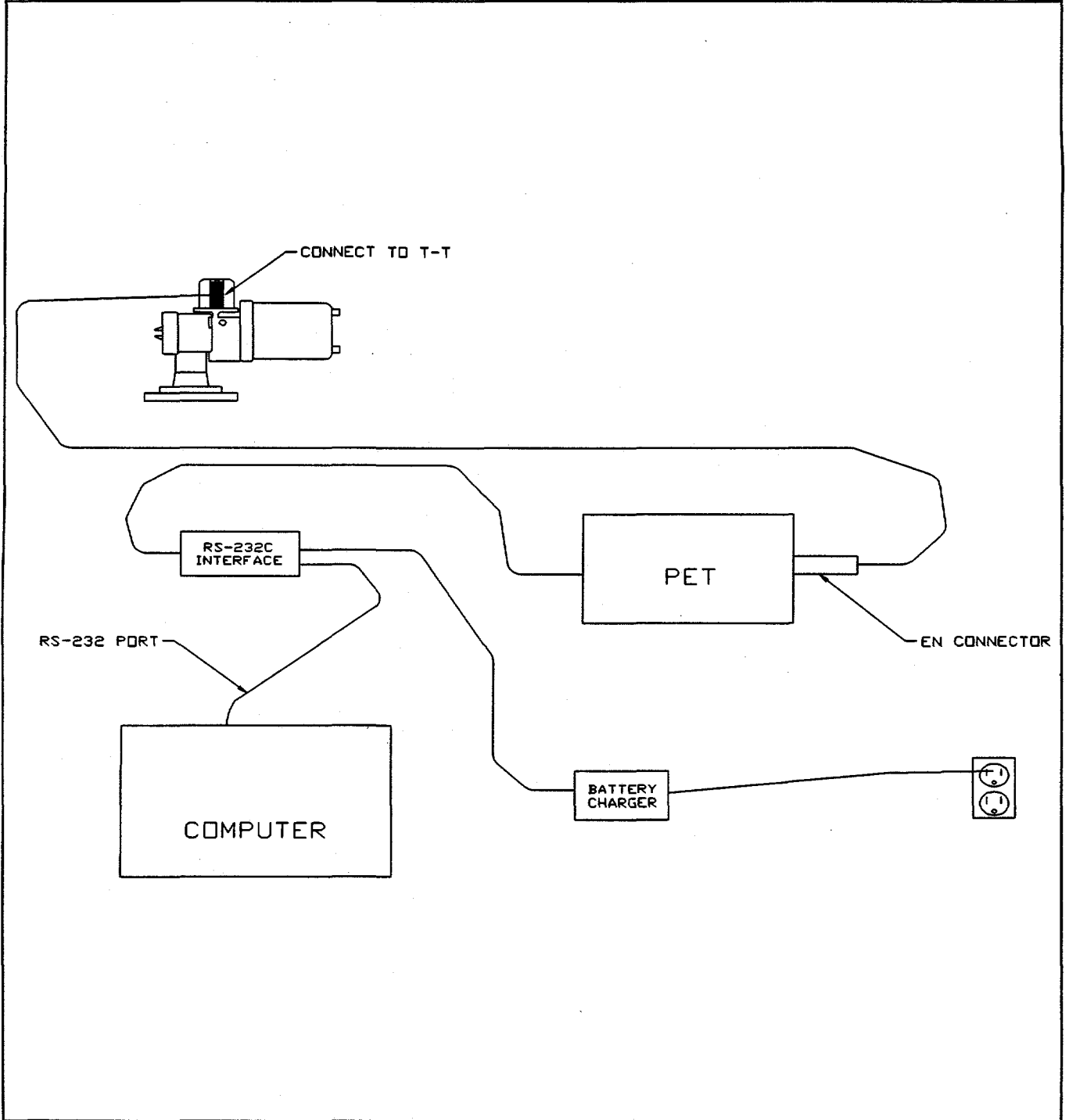


Figure A-1

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APPENDIX B

DRUM BEARING REMOVAL/RECONDITIONING

1. Disconnect the gauge from the power source. Use a PLD to lock out power.
2. "Lock" the servo motor, per the 854 ATG Level Gauge Instruction Manual, Section 8.5.
3. Remove the drum and displacer per the 854 ATG Level Gauge Instruction Manual, Section 8.4.
4. Remove the drum shaft bushing from the gauge per the 854 ATG Level Gauge Instruction Manual, Figure 9.3.
5. Remove the bearings (2 black disks on each end of the bushing) from the drum shaft bushing per the 854 ATG Level Gauge Instruction Manual, Figure 9.3.
6. Use the reamer or the #31 drill to ream out both bearings.
7. Reinstall the reconditioned drum bearings into the drum shaft bushing.
8. Reinstall the drum shaft bushing into the gauge.
9. Reinstall the drum and displacer, per the 854 ATG Level Gauge Instruction Manual, Section 8.4.
10. "Unlock" the servo motor, per the 854 ATG Level Gauge Instruction Manual, Section 8.5.
11. Connect the gauge to the power source.



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APPENDIX C

FORCE TRANSDUCER CALIBRATION

1. Raise the displacer to approximately 6" below the gauge flange by entering command [CA]. To stop the displacer, enter command [FR].
2. Enter command [W2=ENRAF2].
3. Enter command [WT=DDD]. This command disables the "wire-rupture" protection.
4. Remove the displacer and the snap from the measuring wire.
5. Attached the 25 gram weight to the measuring wire loop. The 25 gram weight is the smallest of weights in the set and has two hooks.
6. Enter command [BT]. This command activates a BALANCE TEST. The BALANCE TEST will take approximately five minutes to complete.
7. After "FR" appears in the gauge's LCD display, PET display or computer display, enter command [BF]. This command will display the frequency measured during the BALANCE TEST. Record this frequency (F0) below:  
F0=\_\_\_\_\_
8. Attach the 75 gram weight to the 25 gram weight. The 75 gram weight is the third smallest in the set. Note: If there is insufficient room for the test weights to move downward (approximately 12"), perform step 1 to raise the test weights.
9. Repeat steps 6 and 7. Record the frequency (F1) below:  
F1=\_\_\_\_\_
10. Remove the 75 gram weight and attach the 150 gram weight to the 25 gram weight. The 150 gram weight is the second largest weight in the set. Note: If there is insufficient room for the test weights to move downward (approximately 12"), perform step 1 to raise the test weights.
11. Repeat steps 6 and 7. Record the frequency (F2) below:  
F2=\_\_\_\_\_
12. Remove the 150 gram weight and attach the 225 gram weight to the 25 gram weight. The 225 gram weight is the largest weight in the set. Note: If there is

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insufficient room for the test weights to move downward (approximately 12"), perform step 1 to raise the test weights.

13. Repeat steps 6 and 7. Record the frequency (F3) below:

F3=\_\_\_\_\_

14. Enter command [W2=ENRAF2].
15. Enter command [F0=+.XXXXXXXXXE+XX]. This command re-programs frequency 0. The value of F0 is the value obtained in step 7.
16. Repeat step 15 for frequencies F1, F2 and F3. The values for F1, F2 and F3 are the values obtained in steps 9, 11 and 13 respectively.
17. Enter command [WT=EDE]. This command enables the "wire-rupture" protection.
18. Enter command [EX].