SERVICE MANUAL
ADVENTURER PRO BALANCES
and
ADVENTURER SL BALANCES

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SERVICE MANUAL

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1.1 INTRODUCTION

This service manual contains the information needed to perform routine maintenance and service on the Adventurer *Pro* ™ (AV Models) and Adventurer SL (AS Models) Balances. The contents of this manual is contained in five chapters, three appendixes and are listed as follows:

Chapter 1 Introduction - Contains information regarding service facilities, tools, test equipment, calibration masses and specifications.

Chapter 2 Diagnosis - Contains a diagnostic guide for troubleshooting problems and an error code table.

Chapter 3 Repair Procedures - Contains disassembly/assembly and replacement procedures.

Chapter 4 Testing - Contains an operational test, segment display tests and performance tests.

Chapter 5 Drawings and Parts Lists - Contains exploded view drawings and parts list for each model.

Appendix A Calibration - Contains span and linearity calibration procedures.

Appendix B Service Calibration - Contains service calibration procedures.

Appendix C Adventurer Pro Service Tool Instructions - Used to update software, restore EEPROM data and when loadcells are changed.

Before servicing the balance, you should be familiar with the Instruction Manual which is packed with every balance. The procedures in this manual assumes the technician performing them has a working knowledge of the use of standard hand tools and the repair of precision instruments.

1.2 SERVICE FACILITIES

To service a balance, the service area should meet the following requirements:

- Should be temperature controlled and meet the balance specifications for temperature environmental requirements. See specifications for temperature ranges of the various models.
- Must be free of vibrations such as fork lift trucks close by, large motors, etc.
- Must be free of air currents or drafts from air conditioning/heating ducts, open windows, people walking by, fans, etc.
- Area must be clean and air must not contain excessive dust particles.
- Work surface must be stable and level.
- Work surface must not be exposed to direct sunlight or radiating heat sources.
- Use an approved ESD protection device.

1.3 TOOLS AND TEST EQUIPMENT REQUIRED

In order to properly service the Adventurer *Pro* or Adventurer SL balances, certain Ohaus special tools and test items are required in addition to standard electronic tool kits. These items are listed as follows:

1.3.1 Special Tools and Test Equipment List

1. Alternate voltage Power Adapter if local power requirements do not match Balance Adapter voltage ratings.

2. A PC running Microsoft Windows NT 4.0 or later, or Microsoft Windows 98 or later.

3. Adventurer *Pro* instruction manual.

4. Adventurer *Pro* Tools.zip.

5. Set of Feeler gauges ranging from 0.40mm/0.16in. to 0.65mm/0.026in.

6. Torque wrenches

7. RS232 Communication Board required for AS Model testing, P/N 12103902

8. RS232 Connecting Cable Set required for AS Model testing, P/N 12103910

9. MFR Service Tool, P/N 80250383

10. RS232 Cable - Balance to PC P/N 80500525

1.3.2 Standard Tools and Test Equipment List

1. Standard Electronics Tool Kit.

2. Digital Voltmeter (DVM) Input impedance of at least 10 megohms in the 1 Volt dc position.

3. Masses totaling up to 8000 grams are required. Ohaus makes various calibration sets available. Please contact your nearest Ohaus dealer for further details.

1.4 TEST MASSES REQUIRED

The masses required to test the Adventurer AV Models and Adventurer AS Models balances must meet or exceed the requirements of ASTM / OIML Class specified. The calibration points for the Adventurer AV Models are listed in Table 1-1 and the calibration points for the Adventurer AS Models are listed in Table 1-2. Use the minimum number of masses to total the calibration point value. Bolded values are default settings.

TABLE 1-1. ADVENTURER AV MODELS CALIBRATION POINTS

WEIGHT CLASS		MODEL	CAPACITY	SPAN	LINEARITY	ALT SPAN
ASTM	OIML			CAL POINTS (g)	CAL POINTS (g)	CAL POINT (g)
2	F1	AV53	51g	30, 40, **50**	25 / 50	30, 40
1	E2	AV64 & C	65g	40, **50**, 60	20 / 50	40, 60
1	E2	AV114 & C	110g	50,**100**	50 / 100	50
1	E2	AV264 & C	260g	150, **250**	150 / 250	150
1	E2	AV213 & C	210g	100, **200**	100 / 200	100
1	E2	AV313 & C	310g	150, 200, 250, **300**	150 / 300	150, 200, 250
1	E2	AV413 & C	410g	200, 300, **400**	200 / 400	200, 300
2	F1	AV212 & C	210g	50, 100, 150, **200**	100 / 200	50, 100, 150
2	F1	AV412 & C	410g	100, 200, 300, **400**	200 / 400	100, 300, 400
2	F1	AV812 & C	810g	200, 300, 400, 500 600, 700, **800**	400 / 800	200, 300, 400, 600, 700, 800
1	E2	AV2102 & C	2100g	1000, **2000**	1000 / 2000	1000
1	E2	AV3102 & C	3100g	1000, 2000, **3000**	1500 / 3000	1000, 2000
1	E2	AV4102 & C	4100g	2000, 3000, **4000**	2000 / 4000	2000, 3000
2	F1	AV2101 & C	2100g	500, 1000, 1500, **2000**	1000 / 2000	500, 1000, 1500
2	F1	AV4101 & C	4100g	1000, 2000, 3000, **4000**	2000 / 4000	1000, 3000, 4000
2	F1	AV8101 & C	8100g	2000, 3000, 4000, 5000, 6000, 7000, **8000**	4000 / 8000	2000,3000,4000, 6000, 7000, 8000

TABLE 1-2. ADVENTURER AS MODELS CALIBRATION POINTS

WEIGHT CLASS		MODEL	CAPACITY	SPAN	LINEARITY
ASTM	OIML			CAL POINTS (g)	CAL POINTS (g)
1	E2	AS64	65g	40, **50** or 60	25 and 50
2	F1	AS153	150g	100 or **150**	100 and 150
1	E2	AS214	210	100 or **200**	100 and 200
2	F1	AS312	310	150, 200, 250, or **300**	150 and 300
1	E2	AS313	310	150, 200, 250, or **300**	150 and 300
2	F1	AS612	610	300, 400, 500, or **600**	300 and 600
4	F2	AS811	810	200, 300, 400, **500**, 600, 700, or 800	400 and 800
2	F1	AS1502	1500	1000 or **1500**	1000 and 1500
2	F1	AS3101	3100	1500, 2000, 2500, or **3000**	1500 and 3000
2	E2	AS3102	3100	1000, 2000, or **3000**	2000 and 3000
2	F1	AS6101	6100	3000, 4000, 5000, or **6000**	3000 and 6000
4	F2	AS8100	8100	2000, 3000, 4000, **5000**, 6000, 7000 or 8000	4000 and 8000

1.5 SPECIFICATIONS

Specifications for the Adventurer AV Model balances are listed in Table 1-3. Table 1-4 contains the specifications for the Adventurer AS Model balances. When a balance has been serviced, it must meet the specifications listed in the tables. Before servicing the balance, determine what specifications are not met.

TABLE 1-3. ADVENTURER AV MODEL SPECIFICATIONS

Item Number	AV53*	AV 64 AV 64C**	AV114 AV114C**	AV264 AV264C**	AV213 AV213C**	AV313 AV313C**	AV413 AV413C**	AV212*	AV412*
Capacity (g)	51	65	110	260	210	310	410	210	410
Readability (g)	0.001	0.0001			0.001			0.01	
Repeatability (Std.dev.)(g)	0.001	0.0001			0.001			0.01	
Linearity (g	± 0.002	± 0.0002		± 0.0003	± 0.002			± 0.02	
Off Center Load 1/2 cap, 1/2 distance	0.004g	0.2mg	0.2mg	0.3mg	2mg	2mg	3mg	0.03g	0.02g
Weighing Units	Milligram, Gram, Kilogram, Ounce, Pound, Carat, Pennyweight, Ounce Troy, Grain, Newton, Hong Kong Tael, Singapore Tael, Taiwan Tael, Momme, Tical, Baht, Mesghal, Tola, Custom								
Application Modes	Weighing, Parts Counting, Percent Weighing, Check Weighing, Animal Weighing, Display Hold, Totalize								
Tare Range	To Capacity by Subtraction								
Stabilization Time (s)	2.5	3						2	
Draft Shield Height Over Platform	2.75 / 7	8.6 / 22			4.5 / 11.5			--	
Power Requirements	AC Adapter (Included)								
Calibration	Digital with External Weight								
Display Type	2-Line LCD w/Backlight								
Display Size (in/cm)	4 x 1 / 10 x 2.5								
Platform Size (in/cm)	3.9 / 10	3.5 / 9 dia.			4.7 / 12 dia.				5.8 x 6.3/14.9 x 16.2
Dimensions W x H x D (in/cm)	7.6 x 5.7 x 10 / 19.3 X 14.5 X 25.4	8.7 x 12 x 11.8 / 22 x 30 x 30			8.7 x 7.5 11.8 / 22 x 19 x 30			7.6 x 2.8 x 10 / 19.3 x 7.2 x 25.4	
Net Weight (lb/kg)	3.1 / 1.4	8.7 / 4.0			7.3 / 3.3			2.6 / 1.2	3.3 / 1.5
Net Weight (with (InCal) (lb/kg)	--	9.6 / 4.4			8.2 /3.7			--	--

Item Number	AV812*	AV212C**	AV412C**	AV812C**	AV2102 AV2102C**	AV3102 AV3102C**	AV4102 AV4102C**	AV2101*	AV4101*
Capacity (g)	810	210	410	810	2100	3100	4100	2100	4100
Readability (g)	0.01							0.1	
Repeatability (Std.dev.)(g)	0.01							0.1	
Linearity (g	± 0.02							± 0.2	
Off Center Load 1/2 cap, 1/2 distance	0.03g	0.03g	0.02g	0.03g	20mg	20mg	30mg	0.1g	0.2g
Weighing Units	Milligram, Gram, Kilogram, Ounce, Pound, Carat, Pennyweight, Ounce Troy, Grain, Newton, Hong Kong Tael, Singapore Tael, Taiwan Tael, Momme, Tical, Baht, Mesghal, Tola, Custom								
Application Modes	Weighing, Parts Counting, Percent Weighing, Check Weighing, Animal Weighing, Display Hold, Totalize								
Tare Range	To Capacity by Subtraction								
Stabilization Time (s)	2				3			2	
Power Requirements	AC Adapter (Included)								
Calibration	Digital with External Weight								
Display Type	2-Line LCD w/Backlight								
Display Size (in/cm)	4 x 1 / 10 x 2.5								
Platform Size (in/cm)	5.8 X 6.3 X / 14.9 X 16.2	4.7/ 12 dia.	6.6 x 7.1 / 16.8 x 18		6.6 x 7.1 / 16.8 x 18 non InCal model without draft ring			5.8 X 6.3 X / 14.9 X 16.2	
Dimensions W x H x D (in/cm)	7.6 x 2.8 x 10 / 19.3 X 7.2 X 25.4	8.7 x 3.3 x 11.8 / 22 x 8.5 x 30						7.6 x 2.8 x 10 / 19.3 x 7.2 x 25.4	
Net Weight (lb/kg)	3.3 / 1.5	--			6.1 / 2.8			3.5 / 1.6	
Net Weight (with (InCal) (lb/kg)	--	5.7 / 2.6	7.5 / 3.4		6.9 / 3.2			--	

* Also operates on 4 AA batteries (not included)
** Internal calibration option avaiable (C) models.

TABLE 1-3. ADVENTURER AV MODEL SPECIFICATIONS (Cont.)

Item Number	AV8100*	AV2101C**	AV4101C**	AV8101C**
Capacity (g)	8100	2100	4100	8100
Readability (g)	0.1			
Repeatability (Std.dev.)(g)	0.1			
Linearity (g)	± 0.2			
Off Center Load 1/2 cap, 1/2 distance	2g	0.1g	0.2g	0.3g
Weighing Units	Milligram, Gram, Kilogram, Ounce, Pound, Carat, Pennyweight, Ounce Troy, Grain, Newton, Hong Kong Tael, Singapore Tael, Taiwan Tael, Momme, Tical, Baht, Mesghal, Tola, Custom			
Application Modes	Weighing, Parts Counting, Percent Weighing, Check Weighing, Animal Weighing, Display Hold, Totalize			
Tare Range	To Capacity by Subtraction			
Stabilization Time (s)	2			
Power Requirements	AC Adapter (Included)			
Calibration	Digital with External Weight	Internal calibration		
Display Type	2-Line LCD w/Backlight			
Display Size (in/cm)	4 x 1 / 10 x 2.5			
Platform Size (in/cm)	5.8 x 6.3 / 14.9 x 16.2	6.6 x 7.1 / 16.8 x 18		
Dimensions W x H x D (in/cm)	7.6 x 2.8 x 10 / 19.3 x 7.2 x 25.4	8.7 x 3.3 x 11.8 / 22 x 8.5 x 30		
Net Weight (lb/kg)	3.5 / 1.6	--		
Net Weight (with (InCal) (lb/kg)	--	7.7 / 3.5		

* Also operates on 4 AA batteries (not included)
** Internal calibration option avaiable (C) models.

TABLE 1-4. ADVENTURER AS MODEL SPECIFICATIONS

	AS64	AS214	AS153	AS313	AS312	AS612	AS811	AS1502	AS3101	AS3102	AS6101	AS8100
Capacity (g)	65	210	150	310	310	610	810	1500	3100	3100	6100	8100
Readability (g)	0.0001		0.001		0.01		0.1	0.01	0.1	0.01	0.1	1
Repeatability (Std Dev) (g)	0.0001		0.001		0.01		0.1	0.01	0.1	0.01	0.1	1
Linearity (g)	±0.0002		±0.002		±0.02		±0.2	±0.02	0.2	0.02	0.2	±2
Off Center Load 1/2 cap, 1/2 distance	0.3mg		3mg		30mg		200mg	30mg	200mg	30mg	200mg	2g
Weighing Units	Milligram (mg), Gram (g), Kilogram (kg), Ounce (oz), Pound (lb), Carat (ct), Pennywieght (dwt), Ounce Troy (ozt), Grain (GN), Newton(N), Hong Kong Tael (t), SiTael, Singapore Tael (t), Taiwan Tael (t), Tical (t), Tola (t), Momme (m), Mesghal (m), Baht (B), Custom (C)											
Application Modes	Simple Weighing (Weigh), Pieces Counting (Count), Percent Weighing (Percent)											
Tare Range	To capacity by subtraction											
Stabilization time (seconds)	3		2.5		3		1	3	2	3	2	1
Battery Operation	No		Yes	No	Yes					No	Yes	
Power Requirements	AC Adapter (included)		AC Adapter (included), or 4 AA batteries (not included)	AC Adapter (included)	AC Adapter(included), or 4 AA batteries (not included)					AC Adapter (included)	AC Adapter (included), or 4 AA batteries (not included)	
Calibration	Digital with External Weight											
Display Type	Single Line LCD											
Display Size (in / cm)	4 x 1 / 10 x 2.5											
Pan Size (in / cm)	3.5 / 9 dia.		3.9 / 10 dia.	4.7 / 12 dia.	5.8 x 6.3 / 14.9 x 16.2					6.6 x 7.1 / 16.8 x 18	5.8 x 6.3 / 14.9 x 16.2	
Balance Dimensions WxHxD (in/cm)	8.7 x 12 x 11.8 / 22 x 30.5 x 30		7.6 x 5.7 x 10 / 19.3 x 14.5 x 25.4	8.7 x 7.5 x 11.8 / 22 x 19 x 30	7.6 x 2.8 x 10 / 19.3 x 7.2 x 25.4					8.7 x 3.3 x 11.8 / 22 x 8.5 x 30	7.6 x 2.8 x 10 / 19.3 x 7.2 x 25.4	
Net Weight (lb / kg)	10.1 / 4.6		3.1 / 1.4	10 / 4.5	3.5 / 1.6					6.8 / 3.1	3.5 / 1.6	

CHAPTER 2 DIAGNOSIS

2.1 TROUBLESHOOTING

This section of the manual contains troubleshooting information. Information is contained to isolate specific problems using Table 2-1, Diagnostic Guide, and Table 2-2, Error Codes. Follow all directions step by step. Make certain that the work area is clean and use care when handling components of the balance. Use appropriate ESD device.

NOTE: Repair procedures for small frame balances are described in Section 3.1. repair procedures for large frame balances are covered in section 3.2.

2.2 DIAGNOSTIC GUIDE

Table 2-1 is a diagnostic guide designed to help locate the problem area quickly and easily. To use the table, first locate the symptom that you are observing. Follow the symptom column and review the probable cause column and remedy column. The probable causes are listed with the most common cause first. If the first remedy does not fix the problem, proceed on to the next remedy. Before attempting to repair the Balance, read all chapters of this manual to familiarize yourself with the balance components and operation. Do not attempt repairs unless you fully understand the operation of the balance. Small frame balances measure (W x D) (in/cm) 7.6 x 10 / 19.3 x 25.4, large frame balances measure 8.7 x 11.8 / 22 x 30.

2.2.1 Diagnosis

1. Isolate and identify the symptom.

2. Refer to Table 2-1 Diagnostic guide and locate the symptom.

3. Follow the suggested remedies in the order that they appear.

4. Perform the indicated checks, or see the appropriate section of the manual.

5. Repair or replace the defective section of the balance.

NOTE:

If more than one symptom is observed, it is necessary to approach one area at a time, and also remember, that the symptoms may be interrelated.

In the event that erratic or fluctuating weight readings are observed, it is necessary to isolate the problem to either the mechanical area or the electronic area of the balance. The repeatability test will quickly point out whether the Load Cell is operating properly or whether the problem is due to an electronic malfunction.

If a problem arises that is not covered in this manual, contact Ohaus Corporation for further information.

TABLE 2-1 BALANCE WILL NOT TURN ON WITH AC ADAPTER (ALL MODELS).

SYMPTOM	PROBABLE CAUSE	REMEDY
Balance will not turn on with AC adapter supplied.	Main power source is off.	Check the main power source outlet for proper voltage.
	Adapter defective.	Check the ac adapter voltage output. The ac adapter output voltage should match the specified voltage on the adapter. If voltage is low or nonexistent, replace the ac adapter. If OK, proceed.
	Input connector at rear of balance is defective.	Refer to section 3.1.1 or 3.1.2 and open the balance. Leave the cable connected to the top housing. Reconnect the ac adapter to the balance. Check ac voltage at the input connector terminals. Should read 12 Volts ac. If voltage is not present, replace the Input connector. If OK, proceed.
	On/Zero Off switch defective or actuating fingers on top housing defective.	See Table 2-3.
	Main PC Board is defective.	If the balance fails to turn on and On/Zero Off switch is OK, the Main PC Board is defective and should be replaced. -> Repair Procedures 3.1.3 or 3.2.3

TABLE 2-2 BALANCE WILL NOT TURN ON USING BATTERIES. (See Note)

SYMPTOM	PROBABLE CAUSE	REMEDY
Balance will not turn on with new batteries installed.	Incorrect battery installation.	Check position of batteries.
	Wiring harness defective or battery clips connection broken.	Refer to section 3.1.1 and open the balance. Leave the cable connected to the top housing. Check dc voltage at the battery box connector. Voltage should read approximately 6 Volts dc. If voltage is not present at the connector, examine battery connectors for corrosion and wiring harness for breaks. Clean any corrosion on the battery connectors. Repair breaks to wiring harness. If OK, proceed.
	On/Zero Off switch defective or actuating fingers on top housing defective.	See Table 2-3.
	Main PC Board is defective.	If the scale fails to turn on, the Main PC Board is defective and should be replaced. -> Repair Procedures 3.1.3.

NOTE: Battery operation is included only on certain models, refer to specification Tables 1-3 and 1-4 for listing of models.

TABLE 2-3 BALANCE DOES NOT RESPOND TO FRONT PANEL CONTROLS.

SYMPTOM	PROBABLE CAUSE	REMEDY
Balance does not respond to front panel controls with ac adapter connected.		**CAUTION:** For the following procedure, disconnect the ac adapter and remove power and or batteries from the balance to prevent damage to the Ohmmeter.
	PC board switch or actuating fingers on top housing are defective.	Refer to section 3.1.1 or 3.1.2 and open the balance. Using an Ohmmeter, measure the resistance between the pins on the ON/Zero Off switch it should be open, then press the switch through the top housing and check that the resistance is zero. Check each switch in a similiar manner. If continuity is not present on a particular switch, replace the affected switch or actuator. **NOTE**: Actuators are part of the top housing. To replace an actuator, the top housing must be replaced. -> Repair Procedures 3.1 or 3.2
	Main PC Board is defective.	If the switches and actuators are OK, replace the Main PC Board. -> Repair Procedures 3.1.3 or 3.2.3

TABLE 2-4 NO DISPLAY OR PARTIAL DISPLAY.

SYMPTOM	PROBABLE CAUSE	REMEDY
Display is not on or partial characters are displayed.	Display PC Board is defective.	The Display PC Board is replaced as a whole assembly. Check procedures in Table 2-1 first and verify that other problems do not exist. Replace Display PC Board. -> Repair Procedures 3.1.2 or 3.2.2

TABLE 2-5 BALANCE CANNOT CALIBRATE MANUALLY

SYMPTOM	PROBABLE CAUSE	REMEDY
Balance can be turned on but will not calibrate manually.	Incorrect weights.	Verify that proper weights are used.
	Balance is set for legal for trade operation. (AV Models only)	Check that LFT lock switch is set to unlocked position. Set the Setup Menu Legal for Trade setting to Off. Set the Lockout Menu CAL to Off position. Calibrate the balance using procedure in Appendix A Calibration, perform both Linearity and Span calibrations. If the balance fails to calibrate properly, enter the service mode Appendix B and perform a Linearity and Span calibration again. If this fails either the load cell is defective and will require replacement or the load cell adjustment stops have loosened and have to be reset. Perform ->Repair Procedures 3.1.1or 3.2.1 and open the balance.
	Load cell assembly stops out of adjustment (strain gauge only).	Remove the cover from the load cell. Check the up-down stops in accordance with section 4.4 and refer to table 4-5. Measure the gap settings, if OK, the load cell is defective. Perform ->Repair Procedures 3.1.5 or 3.2.5
	Load Cell assembly defective.	If the up stop and down stop adjustments were set incorrectly, perform procedures in section 4.2.1 or 4.3.1 and reassemble and calibrate the balance. if the balance fails to calibrate, the load cell is defective. Perform ->Repair Procedures 3.1.5 or 3.2.5

TABLE 2-6 BALANCE CANNOT CALIBRATE INTERNALLY- AV MODELS ONLY.

SYMPTOM	PROBABLE CAUSE	REMEDY
Balance can be turned on but will not calibrate using internal calibration.	Main PC Board is defective.	Verify that all other functions are operational. If fuctions are OK, continue with the procedure. If certain functions fail or cannot be set, the Main PC board is defective. Perform ->Repair Procedures 3.1.3 or 3.2.3
	Load cell motor assembly inoperative (strain gauge only).	Remove the cover from the load cell. Check the operation if any of the Internal drive motor. The cover has to be connected to the base housing and power applied. Notice if any obstructions or belt drive is properly set in place. Cycle the internal calibration on and off several times, if the motor drive fails to respond, it is defective and must be replaced. Perform ->Repair Procedures 3.2.6 . After replacement of motor drive, test the unit for proper functions and calibration.
	Load cell motor assembly inoperative (MFR only).	Remove the cover from the load cell. Check the operation if any of the Internal drive motor. The cover has to be connected to the base housing and power applied. Cycle the internal calibration on and off several times, if the motor drive fails to respond, it is defective and must be replaced. Perform ->Repair Procedures 3.2.8 . After replacement of motor drive, test the unit for proper functions and calibration.

2.3 ERROR CODES FOR ALL MODELS

Adventurer AV and AS balances are equipped with software which will display an error condition when it occurs. Table 2-7 Error Codes, describes the various error codes which can appear on the display and specifies the probable reason.

TABLE 2-7. ERROR CODES

ERROR CODE	PROBABLE CAUSE	REMEDY
Error 2.0	Unstable reference weight. This error code will only appear when using Parts Counting or Percent Weighing. This is the same as error 7.	Eliminate vibration and drafts.
Error 3.0	Incorrect calibration weight.	Incorrect or no calibration mass used when performing calibration procedure.
Errror 3.1	Internal calibration error.	Zero not repeating from start to end of calibration.
Error 3.2	Internal calibration error.	Unstable zero.
Error 3.3	Internal calibration error.	Incal Weight readings not re peating.
Error 3.4	Internal calibration error.	Incal weight readings not in correct range.
Error 3.5	Internal calibration error.	Incal weight readings unstable.
Error 7.0	Unstable weight reading when defining the reference weight, zero or tare.	Eliminate vibration and drafts.
Error 7.2	Custom units set outside the limits of the balance.	Use correct factors.
Error 8.0 or 8.2	Weight reading below power On Zero limit.	Place platform on balance.
Error 8.1 Overload	Weight reading exceeds Power On Zero limit. Overload on power up.	Clear the pan. Check up/down stops, repair or replace load cell.
Error 8.3 Overload	Weight reading exceeds overload limit after power up.	Balance is overloaded, remove excess weight.
Error 8.4 Underload	Weight reading below underload limit after power up.	Put platform on balance.
Error 9.0	Internal fault.	See Appendix C to restore data.
Error 9.1	Hardware error.	Cycle power if fault continues, replace main PC board.
Error 9.2	See error 9.1	
Error 9.3	See error 9.1	
Error 9.4	See error 9.1	
Error 9.5	Requires service calibration.	Perform service calibration in Appendix B.
Error 9.6	See error 9.1	
Error 9.8	User calibration missing. (Required for LFT ON only)	Perform calibrations in Appendix A.

2.3 ERROR CODES FOR ALL MODELS (Cont.)

TABLE 2-7. ERROR CODES (Cont.)

ERROR CODE	PROBABLE CAUSE	REMEDY
Error 9.9	Internal calibration error.	InCal motor running longer than normal (check motor and mechanism, replace main PC board.
Error 53 Error IDNR	EEPROM checksum error. IDNR checksum error	Cycle power on, off. If error continues, see Appendix C to restore EEPROM data.
LOW rEF	Average piece weight too small. (Warning)	Increase sample size. Add additional samples or continue to weigh with less accurate results.
LOW REF WT	Average piece weight too small. (Warning)	Increase sample size. Add additional samples or continue to weigh with less accurate results.
REF WT Err	Reference weight too small. The weight on the platform is too small to define a valid reference weight % and parts.	Increase sample size.
REF Err	Reference weight too low for accurate parts counting or percent weighing.	Increase sample size.
Error Config Set	EEPROM Checksum error.	See error 53.
Error LFT Set	No user calibration is stored.	Turn off LFT perform user calibration.
Error NVMEM x	MFR load cell is new or EEPROM is corrupt.	Cycle power on, off. If error continues, see Appendix C to restore EEPROM data.
Display Indication _ _ _ _ _	Busy (tare, zero, printing) Unstable	Wait until completion. Eliminate vibration and drafts. Check load cell.

3.1 REPAIR PROCEDURES SMALL FRAME AS and AV MODELS

This section of the manual contains detailed disassembly procedures of the AV and AS model balances. There are two physical sizes of balances for the AV and AS models (large and small). This section deals only with the small frame models. Housing measures 7.6 x 10 / 19.3 x 25.4 in/cm.

Section 5 of this manual contains exploded views and associated parts lists for all models. Refer to Section 5 drawings before disassembling the balance. It should be noted that components inside of the balance are delicate and need to be handled with care. The small frame AS and AV models contain strain gauge load cells. It is imperative that the Load Cell should never be subjected to any excessive torque, stress, or abrasion as damage may result. Once the balance has been disassembled, any small scratch or abrasion made to any of the Individual Strain Gauges will render the entire Load Cell unusable. The Main Printed Circuit Board, RS232 Interface Printed Circuit Board (on some models) and the LCD and Backlight Board contain integrated circuits which employ CMOS technology, therefore, caution must be exercised so as not to subject any of these components to static electricity discharge. When servicing, a wrist Ground Strap with a 10 Megohm series resistor to earth ground is highly recommended. The Printed Circuit Boards should be handled by grasping the edges only and never placing fingers on any of the runs or traces.

3.1.1 Opening the Balance

To disassemble the balance, refer to Figure 3-1 on the next page that illustrates all of the Adventurer Pro and Adventurer SL models. Components shown on top of the balances must be removed before gaining access to the inside of the balance.proceed as follows:

Always use an antistatic kit!

1. Turn the balance off and if using an AC Adapter, disconnect it from the balance.
2. On balances containing a draft shield, remove the draft shield.
3. Remove the Pan from the balance. Pan sizes and shapes vary.
4. Remove the Pan Support from the balance.
5. Remove the Wind Ring on round pans and Adapter ring on square pans.
6. Remove the 2 screws from the top of the balance, then remove the EMC Plate.

7. If a battery is being used, hold the balance on its side without touching the Load Cell Cone. Remove the Battery Compartment Cover as shown in Figure 3-2. Remove the 4 AA batteries from inside the battery compartment and replace the Battery Compartment Cover.
8. Remove the 4 Feet by unscrewing each counter-clockwise.
9. Remove the 4 cover screws. The screws are in deep recessed holes. See Figure 3-2.

10. Turn the balance over in an upright position and carefully lift the Top Cover from the balance Bottom Housing. Be careful as the Top Cover is connected by a cable to the Main Board Assembly.
10. Unplug the cable from the Main Board Assembly. Set the Top Cover aside.
11. After repairs and or adjustments have been made, reassemble the balance in the reverse order.

3.1.1 Opening the Balance (Cont.)

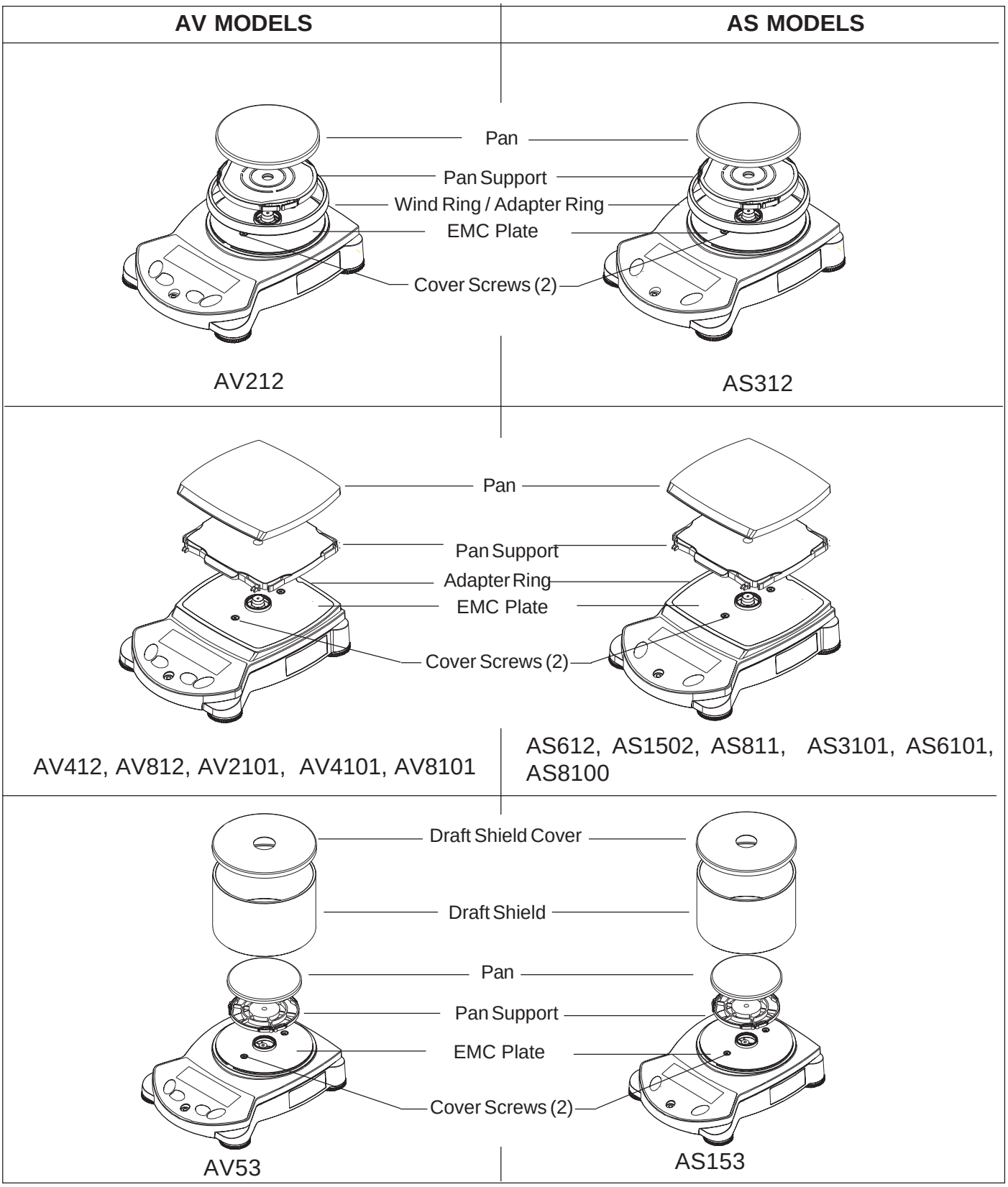


Figure 3-1. Top of Balances.

3.1.1 Opening the Balance (Cont.)

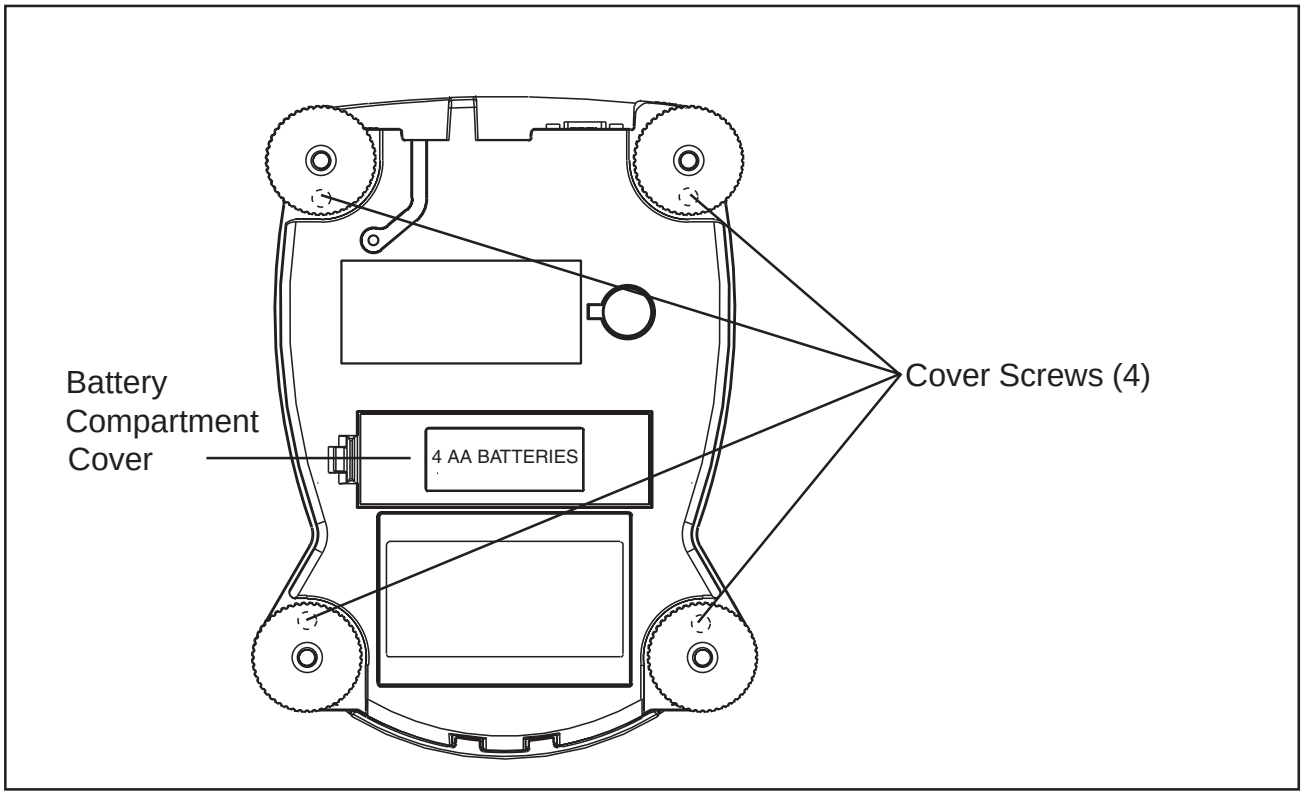


Figure 3-2. Bottom of Balance.

3.1.2 Display Circuit Board Repair or Replacement

It is suggested that if the Display Circuit Board is suspected of being faulty, it should be replaced rather than repaired. The switches can be easily replaced. They are available as a set of 4. The LCD and Backlight are difficult to replace.

To replace the Display Circuit Board, proceed as follows:

1. Remove the balance cover, refer to section 3.1.1.

CAUTION

WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. The Display Circuit Board is secured with 4 or 6 screws. Remove the screws. See Figure 3-3.

3.1.2 Display Circuit Board Repair or Replacement (Cont.)

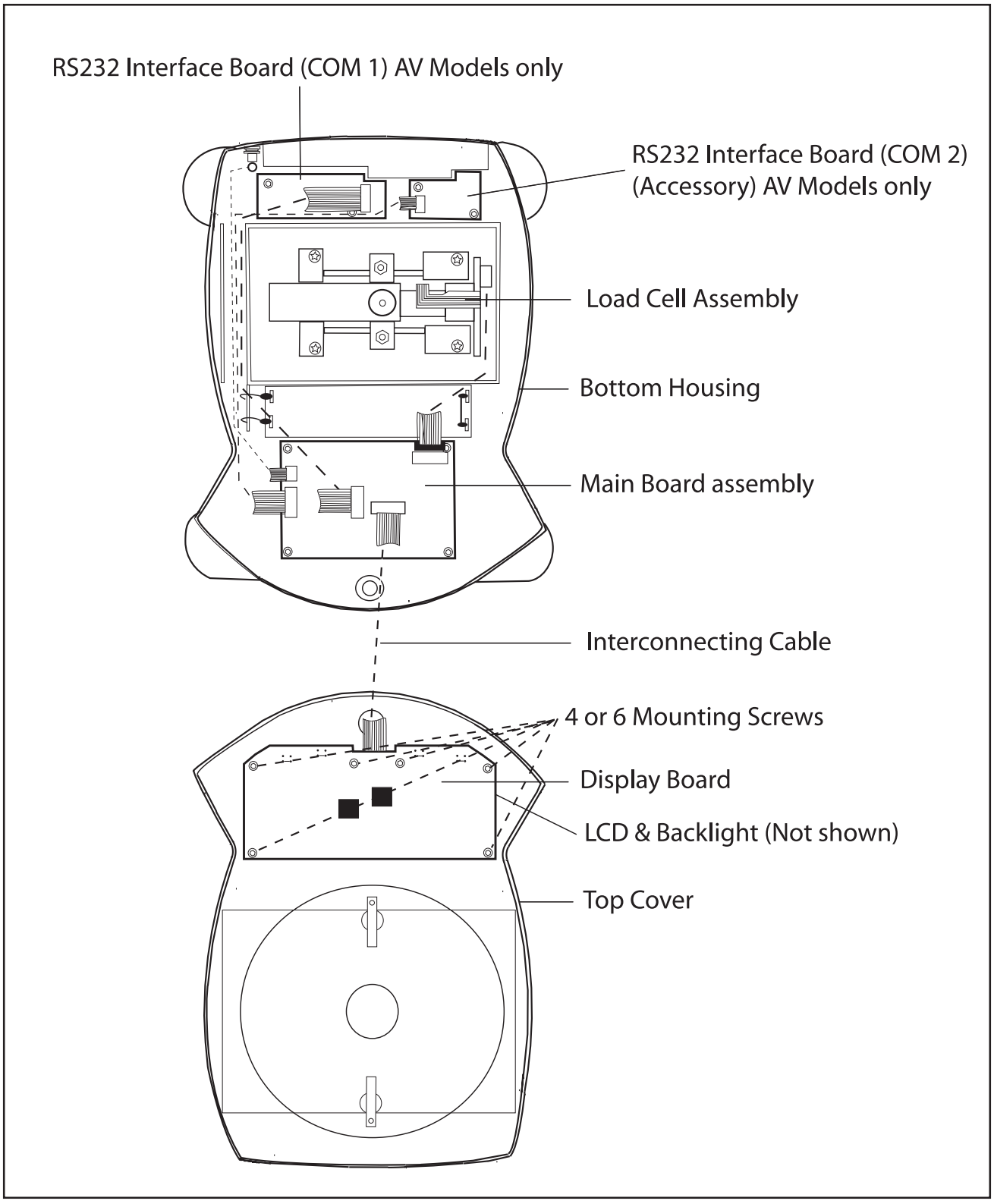


Figure 3-3. Balance Opened.

3.1.2 Display Circuit Board Repair or Replacement (Cont.)

3. Disconnect the interconnecting cable from the Display Printed Circuit Board.
4. Connect the interconnecting cable to the replacement Display Printed Circuit Board.
5. Install the new Display Printed Circuit Board into position on the top Cover.
6. Replace the mounting screws.
7. Reassemble the Balance.
8. Replace the batteries if previously removed.
9. Check the performance of the Balance and perform Linearity Calibration A.2.

3.1.3 Main Printed Circuit Board Replacement

It is suggested that if the Main Printed Circuit Board is suspected of being faulty, it should be replaced.

To replace the Main Printed Circuit Board, proceed as follows:

1. Remove the balance cover, refer to section 3.1.1.

CAUTION
WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. Disconnect the cables from the Main Board assembly. See Figure 3-4.

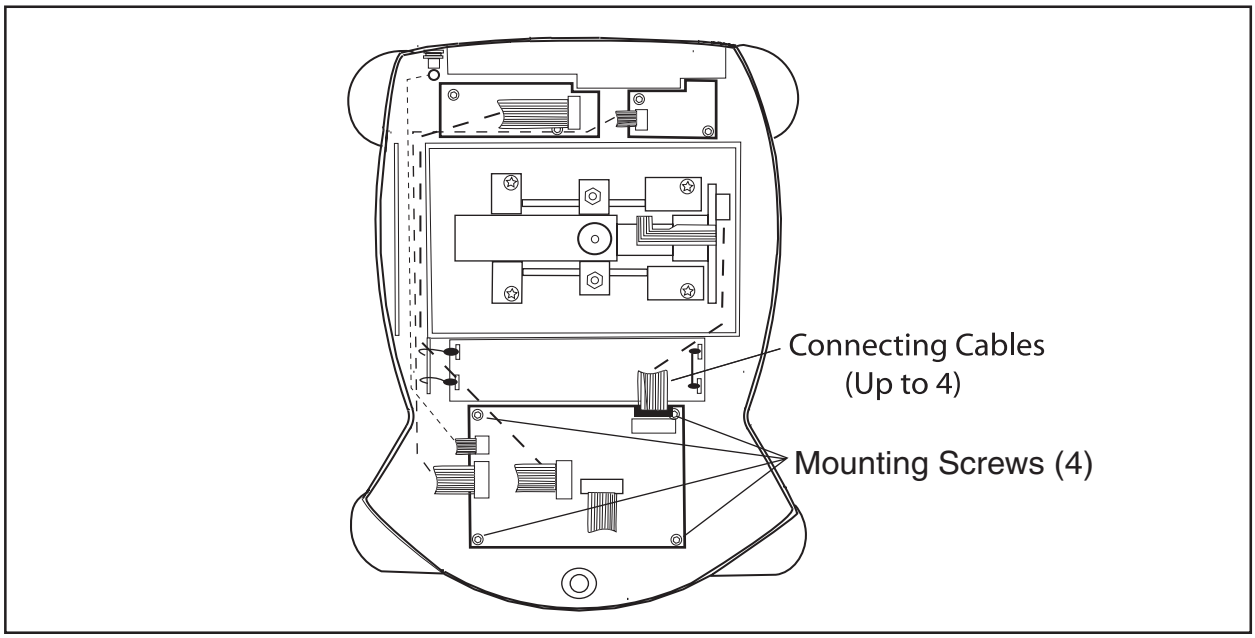


Figure 3-4. Removing Main PC Board.

3.1.3 Main Printed Circuit Board Replacement (Cont.)

3. The Main Printed Circuit Board is fastened in place by 4 screws located on top of the board. Remove the screws and the Printed Circuit Board.

4. Install the replacement Printed Circuit board using the 4 screws previously removed.

5. Connect all of the cables back to the replacement board. The connectors are all different and cannot be connected improperly. Make sure all cables are secured properly.

6. Reassemble the Balance.

7. Replace the batteries if previously removed.

8. Check the performance of the Balance and perform Linearity Calibration In Appendix A.2.

3.1.4 RS232 Interface Printed Circuit Board Replacement (AV Models only)

To replace the RS232 Interface Printed Circuit Board, proceed as follows:

1. Remove the balance cover, refer to section 3.1.1.

CAUTION
WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. Disconnect the cable from theRS232 Interface printed Circuit Board assembly. See Figure 3-5.

3. The RS232 Interface Printed Circuit Board is fastened in place by 2 screws located on top of the board. Remove the screws and the Printed Circuit Board.

4. Install the replacement Printed Circuit board using the 2 screws previously removed.

5. Connect the cable to the replacement board.

6. Reassemble the Balance.

7. Replace the batteries if previously removed.

8. Check the performance of the Balance and perform Linearity Calibration A.2.

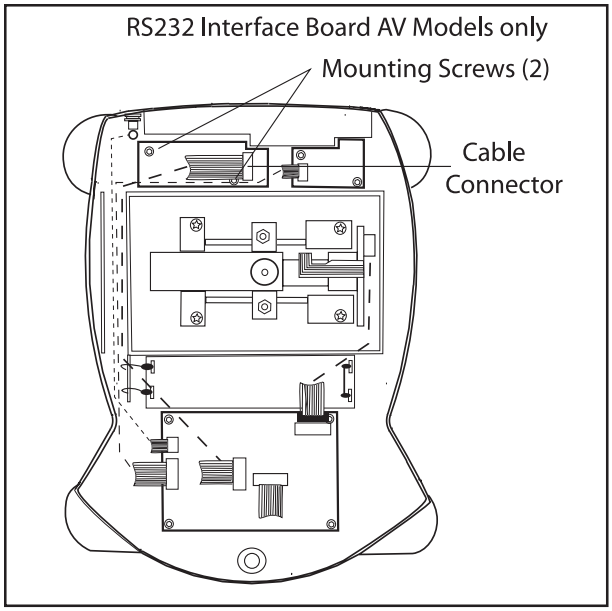


Figure 3-5. Removing RS232 PC Board.

3.1.5 Strain Gauge Load Cell Replacement

Load Cell Kits are available for replacement purposes for all AV and AS model balances. Each Kit is fully assembled and consists of metal base plate, a Load Cell mounted to the base plate and a package of labels. All adjustments such up stop and down stop (limits travel of the Load Cell to safe limits) have been factory set. Check the Label of the balance and verify the capacity and model before ordering a new load cell kit. Figure 3-6 illustrates an AV Model with RS board.

CAUTION

Extreme care must be exercised so as not to twist or deform the Load Cell in any way. Do not drop or hit the Load cell. Any damage to the Load Cell can render it inoperative.

1. Remove the balance cover in accordance with the procedures in paragraph 3.1.1.
2. To remove the Load Cell Shield, grasp by sides and pull upwards.
3. Remove the 4 screws and washers that secure Load Cell to the Bottom Housing. The screws are located at the corners of the Load Cell base. See figure 3-6. Remove the Load Cell.
4. Disconnect the cable from the Load Cell.
5. Refer to paragraph 4.3 and check and adjust if necessary the up and down stops.

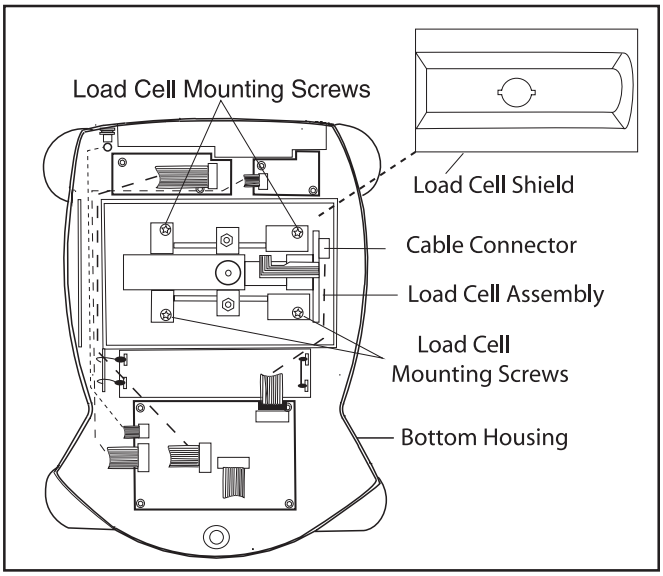


Figure 3-6. Removing Load Cell.

6. Install the replacement Load Cell using the 4 screws previously removed and connect the flexible cable.
7. Replace the Load Cell Shield over the Load Cell. The right-hand side of the Load Cell Shield should be placed on the outside of the Load Cell enclosure.
8. On AS models, connect an external RS232 communication board and cable to the Main PC board.
9. Temporarily reassemble the balance.
10. See Appendix C, Adventurer Pro Service Tools and follow instructions for replacing Load Cell.
11. Open the balance remove the RS232 board and cable from the balance and assemble.
12. Recalibrate the balance in accordance with instructions in Appendix A, Linearity Calibration A.2
13. Check the performance of the balance using tests in section 4.2.

CHAPTER 3 REPAIR PROCEDURES

3.2 REPAIR PROCEDURES LARGE FRAME AS and AV MODELS

This section of the manual contains detailed disassembly procedures of the AV and AS model balances. There are two physical sizes of balances for the AV and AS models (large and small). This section deals only with the larger frame models. Housing measures 8.7 x 11.8 / 22 x 30 in/cm.

Section 5 of this manual contains exploded views and associated parts lists for all models. Refer to Section 5 drawings before disassembling the balance. It should be noted that components inside of the balance are delicate and need to be handled with care. There are two types of Load Cells used in the balances, strain gauge and MFR (Magnetic Force Restoration). It is imperative that the Load Cell should never be subjected to any excessive torque, stress, or abrasion as damage may result. Once the balance has been disassembled, any small scratch or abrasion made to any of the Individual Strain Gauges will render the entire Load Cell unusable. The Main Printed Circuit Board, RS232 Interface Printed Circuit Board (on AV models) and the LCD and Backlight Board contain integrated circuits which employ CMOS technology, therefore, caution must be exercised so as not to subject any of these components to static electricity discharge. When servicing, a wrist Ground Strap with a 10 Megohm series resistor to earth ground is required The Printed Circuit Boards should be handled by grasping the edges only and never placing fingers on any of the runs or traces.

3.2.1 Opening the Balance

To disassemble the balance, refer to Figures 3-7 and 3-8 that illustrates all of the Adventurer AV and Adventurer AS models. Components shown on top of the balances must be removed before gaining access to the inside of the balance.proceed as follows:

Always use an antistatic ground strap.

1. Turn the balance off and if using an AC Adapter, disconnect it from the balance.

2. On balances containing a draft shield, remove the draft shield glass panels.

3. Remove the Pan from the balance. Pan sizes and shapes vary.

4. Remove the Pan Support from the balance.

5. Remove the Wind Ring if supplied.

6. Remove the 2 screws from the top of the balance, then remove the Antistatic Plate.

7. Remove the 2 screws from the top of the balance located at the rear, these are long threaded bolts. These are covered by the anti EMC Plate. See Figures 3-7 and 3-8.

8. Carefully lift the Top Cover from the balance Bottom Housing. There are 4 plasic locating pins, one in each corner of the cover. Be careful when removing the cover as the pins will fall free. These pins are used to locate the Wind Ring. Use caution when lifting the Top Cover as it is connected by a cable to the Main Board Assembly.

9. Unplug the cable from the Main PC Board Assembly. Set the Top Cover aside.

10. After repairs and or adjustments have been made, reassemble the balance in the reverse order.

3.2.1 Opening the Balance (Cont.)

AV MODELS

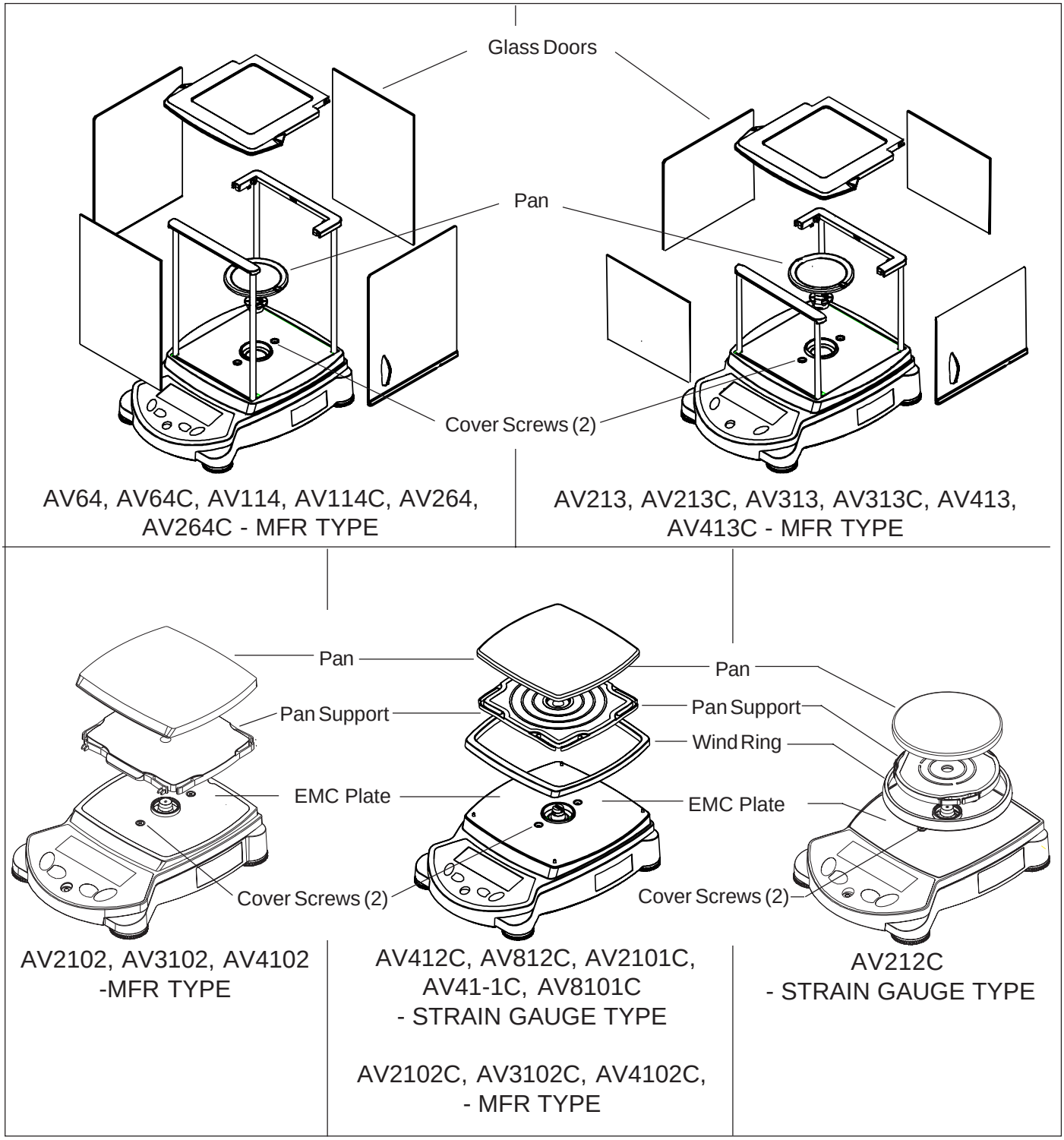


Figure 3-7. Top of AV Balances.

3.2.1 Opening the Balance (Cont.)

AS MODELS

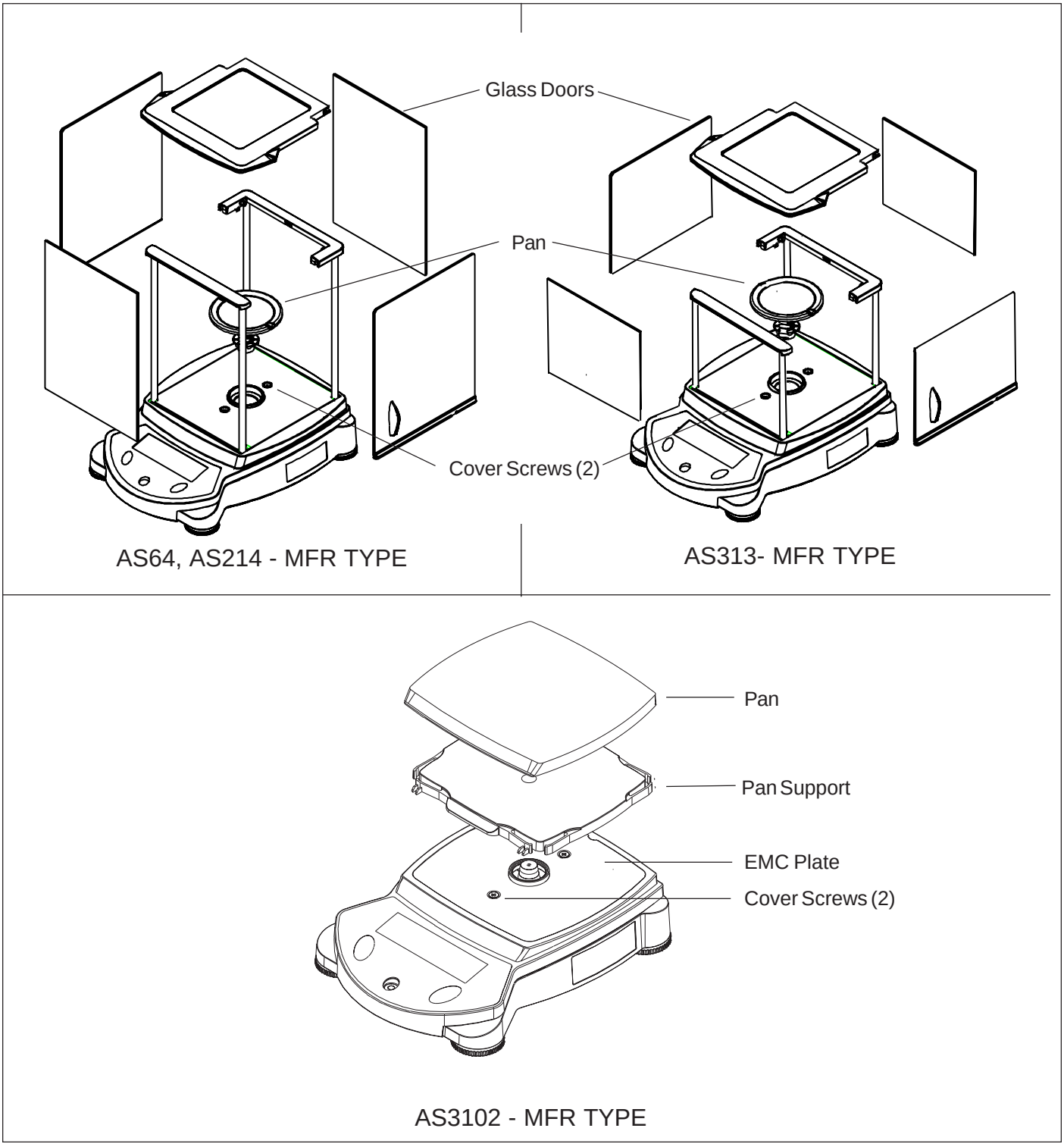


Figure 3-8. Top of AS Balances.

3.2.2 Display Circuit Board Repair or Replacement

It is suggested that if the Display Circuit Board is suspected of being faulty, it should be replaced rather than repaired. The switches can be easily replaced. They are available as a set of 4. The LCD and Backlight are difficult to replace. The AS and AV models are available with strain gauges and MFR type load cells. Figure 3-9 illustrates both types of load cells with Internal calibration motor drives.

To replace the Display Circuit Board, proceed as follows:

1. Remove the balance cover, refer to section 3.2.1.

CAUTION

WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. The Display Circuit Board is secured with 4 screws. Remove the screws. See Figure 3-9.

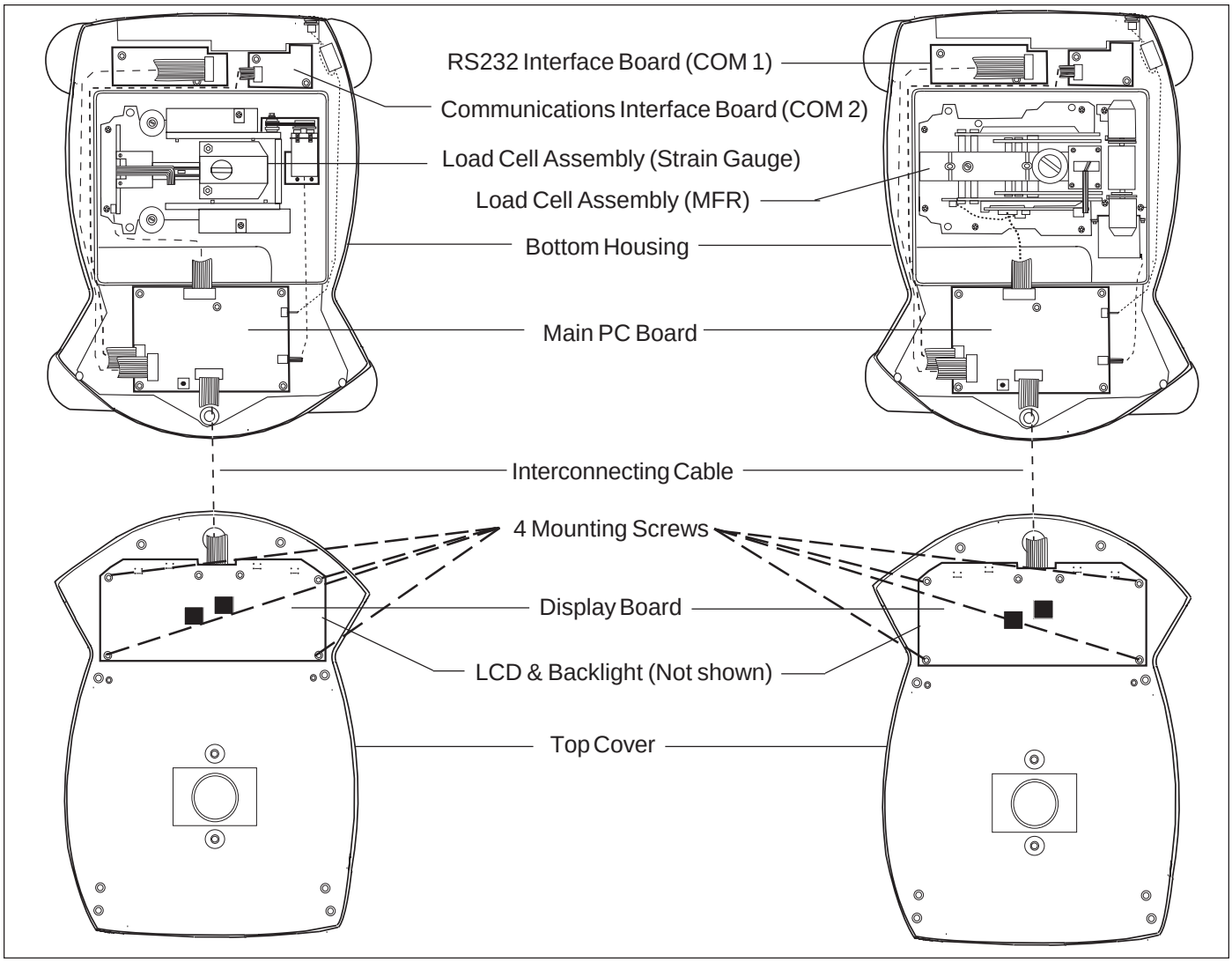


Figure 3-9. Large Frame Balance Opened.

3.2.2 Display Circuit Board Repair or Replacement (Cont.)

3. Disconnect the interconnecting cable from the Display Printed Circuit Board.

4. Connect the interconnecting cable to the replacement Display Printed Circuit Board.

5. Install the new Display Printed Circuit Board into position on the top Cover.

6. Replace the 4 mounting screws.

7. Reassemble the Balance.

8. Check the performance of the Balance.

3.2.3 Main Printed Circuit Board Replacement

It is suggested that if the Main Printed Circuit Board is suspected of being faulty, it should be replaced.

To replace the Main Printed Circuit Board, proceed as follows:

1. Remove the balance cover, refer to section 3.2.1.

CAUTION

WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. Disconnect the cables from the Main Board assembly. COM 1 is present on AV models only, COM 2 is optional on AV models. See Figure 3-10.

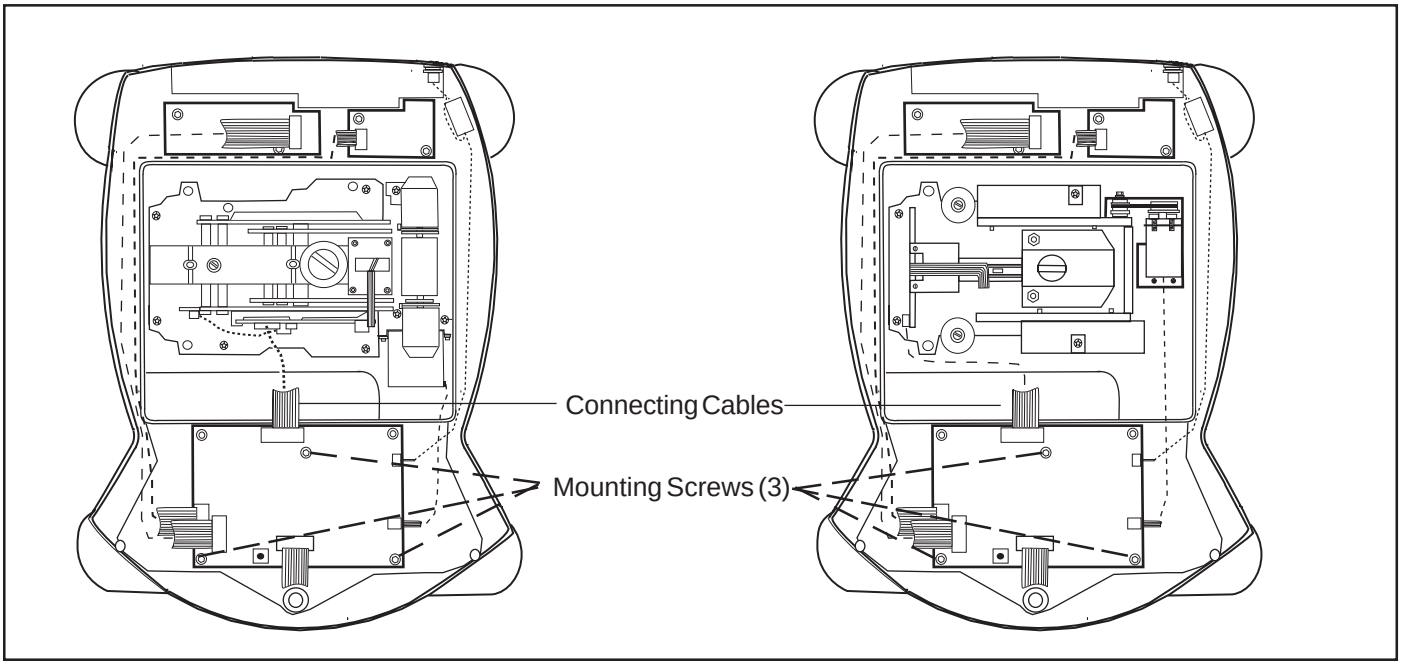


Figure 3-10. Removing Main PC Board.

3.2.3 Main Printed Circuit Board Replacement (Cont.)

3. The Main Printed Circuit Board is fastened in place by 3 screws located on top of the board. Remove the screws and the Printed Circuit Board.

4. Install the replacement Printed Circuit board using the 3 screws previously removed.

5. Connect all of the cables to the replacement board. The connectors are all different and cannot be connected improperly. Make sure all cables are secured properly.

6. Reassemble the Balance.

7. Check the performance of the Balance and perform Linearity Calibration In Appendix A.2.

3.2.4 RS232 Interface COM 1 or (COM 2 RS or USB) Printed Circuit Board Replacement

To replace the RS232 Interface Printed Circuit Board COM 1 or COM 2, proceed as follows:
NOTE: AS models do not have communications. COM 2 board is optional on AV models.

1. Remove the balance cover, refer to section 3.2.1.

CAUTION

WHEN HANDLING THE PRINTED CIRCUIT BOARD, HANDLE BY EDGES ONLY! DO NOT TOUCH FOIL SIDE OF BOARD. STATIC DISCHARGE MAY DAMAGE SOME COMPONENTS.

2. Disconnect the cable from the RS232 Interface printed Circuit Board assembly. See Figure 3-11.

3. The RS232 Interface Printed Circuit Board and the optional COM 2 board are both fastened with 2 screws located on top of the board. Remove the screws and the Printed Circuit Board to be changed.

4. Install the replacement Printed Circuit board using the 2 screws previously removed.

5. Connect the cable back to the replacement board.

6. Reassemble the Balance.

7. Check the performance of the Balance.

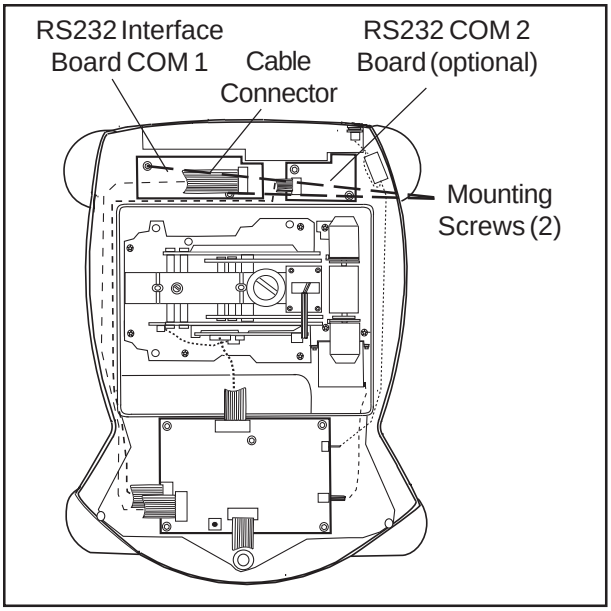


Figure 3-11. Removing RS232 PC Board.

3.2.5 Strain Gauge Load Cell Replacement with InCal

Load Cell Kits are available for replacement purposes for all AV model balances. Each Kit is fully assembled and consists of metal base plate, a Load Cell mounted to the base plate and a package of labels. All adjustments such up stop and down stop (limits travel of the Load Cell to safe limits) have been factory set. Check the label on the balance and verify the capacity and model before ordering a new load cell kit. Figure 3-12 illustrates a typical strain gauge location.

NOTE: Strain gauge load cells are supplied with calibration weights and drive mechanism. The calibration drive mechanism is also available separately.

Load Cell Removal

CAUTION

Extreme care must be exercised so as not to twist or deform the Load Cell in any way. Do not drop or hit the Load cell. Any damage to the Load Cell can render it inoperative.

1. Remove the balance cover in accordance with the procedures in paragraph 3.2.1.
2. Remove the Load Cell Shield by grasping the sides and pulling upwards.
3. Remove the 4 screws and washers that secure Load Cell to the Bottom Housing. See Figure 3-12. Remove the Load Cell.
4. Disconnect the cable(s) from the Load Cell.

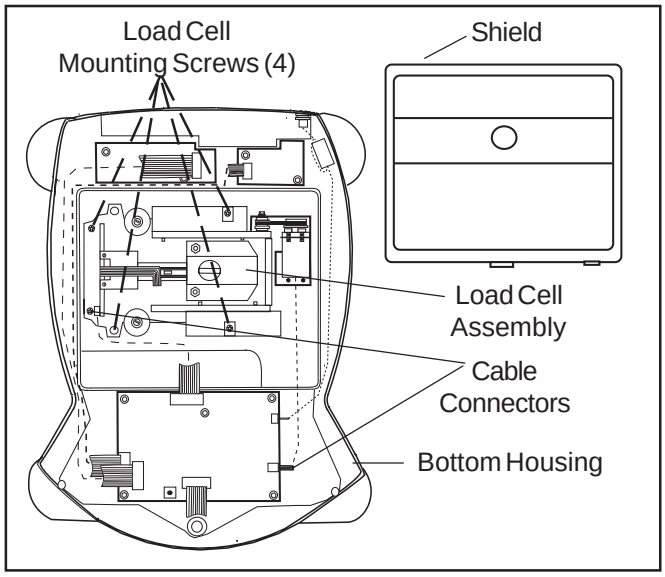


Figure 3-12. Removing Strain Gauge Load Cell.

Load Cell Installation

1. Refer to paragraph 4.4 and check and adjust if necessary the up and down stops.
2. Install the replacement Load Cell using the 4 screws previously removed and connect the flexible cables. **NOTE**: Load cells with internal calibration contain a power cable to the calibration motor drive mechanism.
3. Replace the Load Cell Shield over the Load Cell. Press firmly into place.
4. Reassemble the balance.
5. See Appendix C, Adventurer Pro Service Tools and follow instructions for replacing Load Cell.

3.2.6 Strain Gauge Calibration InCal Mechanism Removal/Replacement

This procedure describes how to remove the calibration motor and the calibration mechanism from the load cell. There can be several reasons why the internal calibration does not function including, a broken or jammed timing belt, defective motor or defective main PC.

InCal Mechanism Removal

To remove the InCal Mechanism, proceed as follows:

1. Remove the balance cover in accordance with procedures in paragraph 3.2.1
2. Perform procedure as described in paragraph 3.2.5 and remove the Strain gauge.
3. Remove the screws from the InCal Mechanism as shown in Figure 3-13.

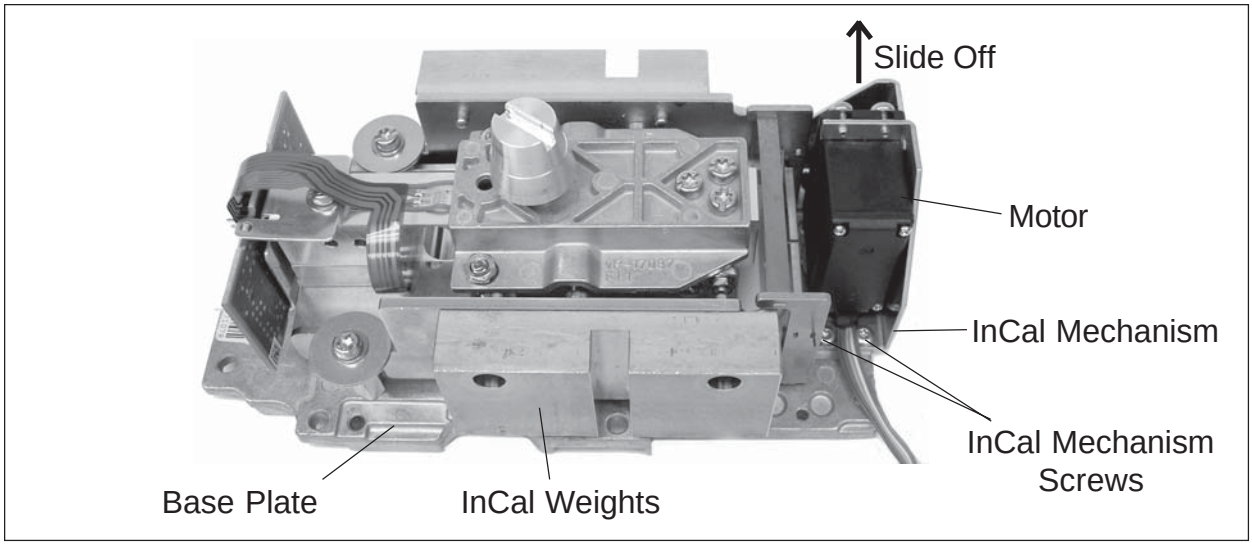


Figure 3-13. InCal Mechanism Identification.

4. Slide the InCal mechanism off as shown in figure 3-13.

Motor Removal

Before attempting motor removal, the InCal mechanism must be removed.

1. Refer to Figure 3-14 and remove the 4 motor mounting screws.

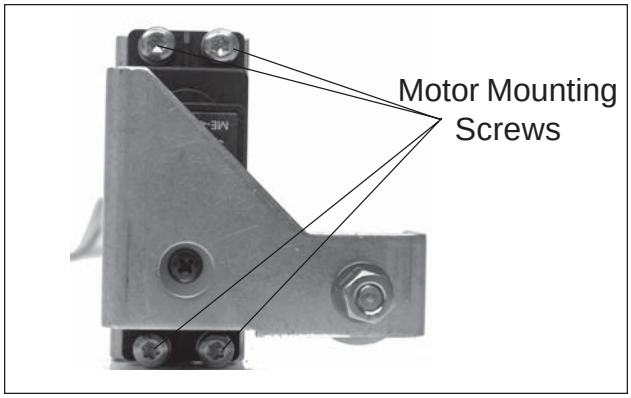


Figure 3-14. Motor Mounting Screws Location.

3.2.6 Strain Gauge Calibration InCal Mechanism Removal/Replacement (Cont.)

Motor Removal (Cont.)

2. Refer to Figure 3-15 and lift the Motor up from the InCal Mechanism just enough to disengauge the Timing Belt.

3. Refer to Figure 3-16 and slide the Timing Belt off of the Top Gear and remove the Top Gear.

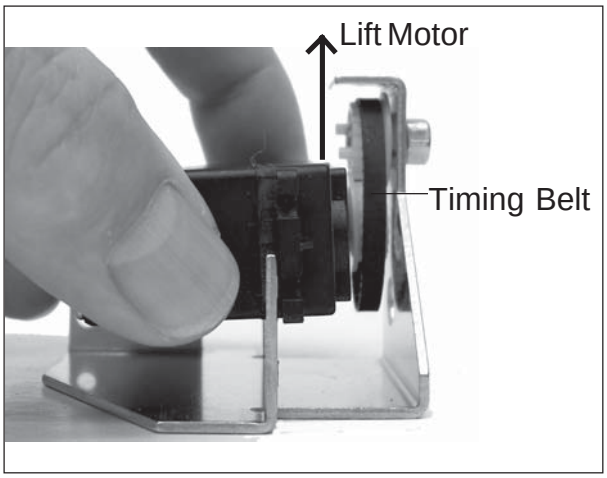


Figure 3-15. Disengauge Timing Belt.

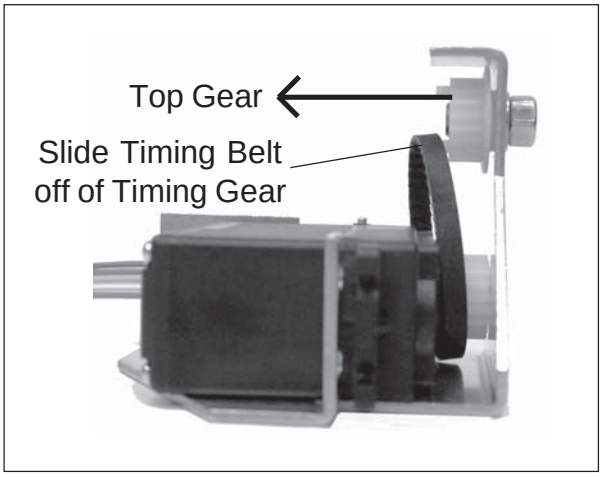


Figure 3-16. Removing Top Gear.

4. Refer to Figure 3-17 which illustrates the top Gear removed, the Motor can now be removed from the InCal Mechanism.

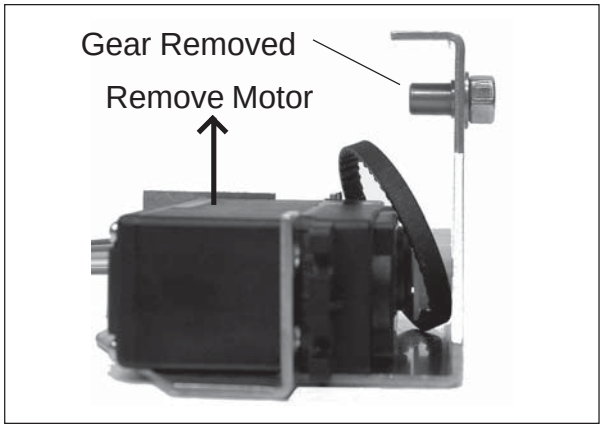


Figure 3-17. Top Gear Removed.

Motor Installation

1. Install the replacement Motor into position with the Timing Belt as shown in Figure 3-17.

2. Slide on the Top Gear as shown in Figure 3-16.

3. Refer to Figure 3-15, lift the Motor slightly and position the Timing Belt on the Top Gear as shown.

4. Refer to Figure 3-18, rotate the Top Gear until it is in the position as shown while holding the Motor in place.

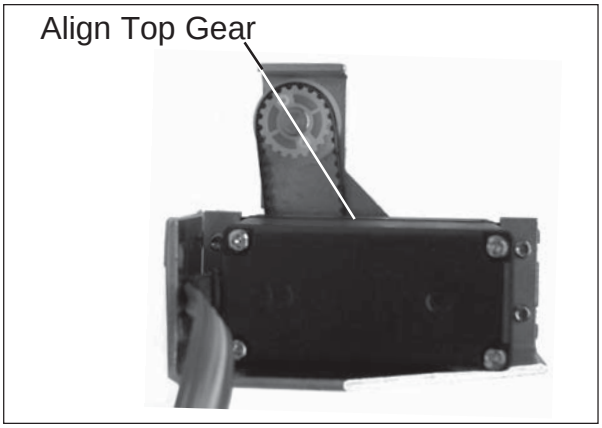


Figure 3-18. Top Gear Alignment.

3.2.6 Strain Gauge Calibration InCal Mechanism Removal/Replacement (Cont.)

Motor Installation (Cont.)

5. Refer to Figure 3-19, hold the Motor down and install and tighten the 4 Motor screws.

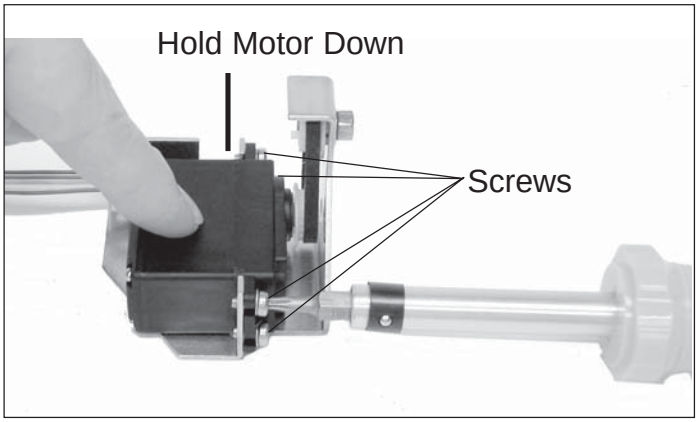


Figure 3-19. Motor Installation.

6. Refer to Figure 3-18 and recheck the Top Gear alignment. The Gear must be turned fully counter-clockwise. This is necessary to engage the InCal mechanism properly.

InCal Mechanism Installation

1. Remove the Motor Coupler as shown in Figure 3-20.

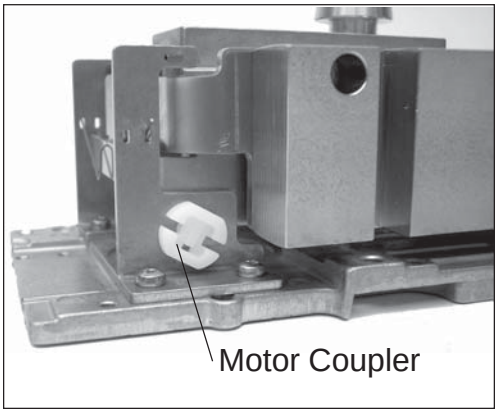


Figure 3-20. Motor Coupler Position.

2. Refer to Figure 3-21 and rotate the shaft clockwise and counter-clockwise to ensure the operation is smooth. if not, replace the entire Load cell.

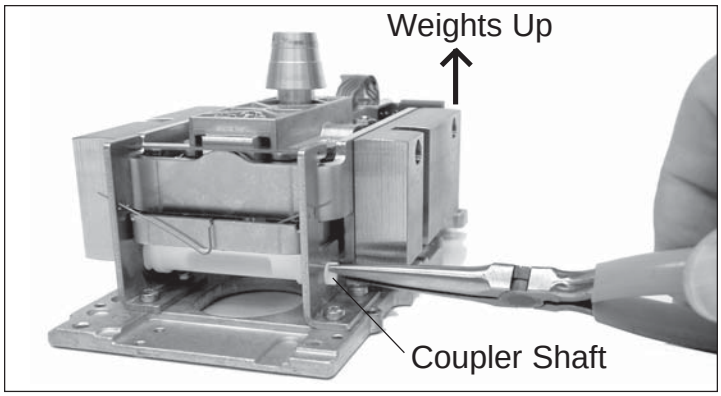


Figure 3-21. Coupler Shaft Rotation.

3. With the weights in the upper position, reinstall the Motor Coupler as shown in Figure 3-20.

4. Refer to Figure 3-18 and make sure the Top Gear is properly aligned when the Gear is turned fully counter-clockwise.

5. Refer to Figure 3-13 and slide the InCal Mechanism into position on the Load Cell and install the InCal Mechanism screws.

3.2.7 Load Cell (MFR) Replacement

Figure 3-22 illustrates a typical MFR Load Cell shown with an InCal Mechanism installed. The Load Cell illustration may vary from actual load cells. Major components are shown.

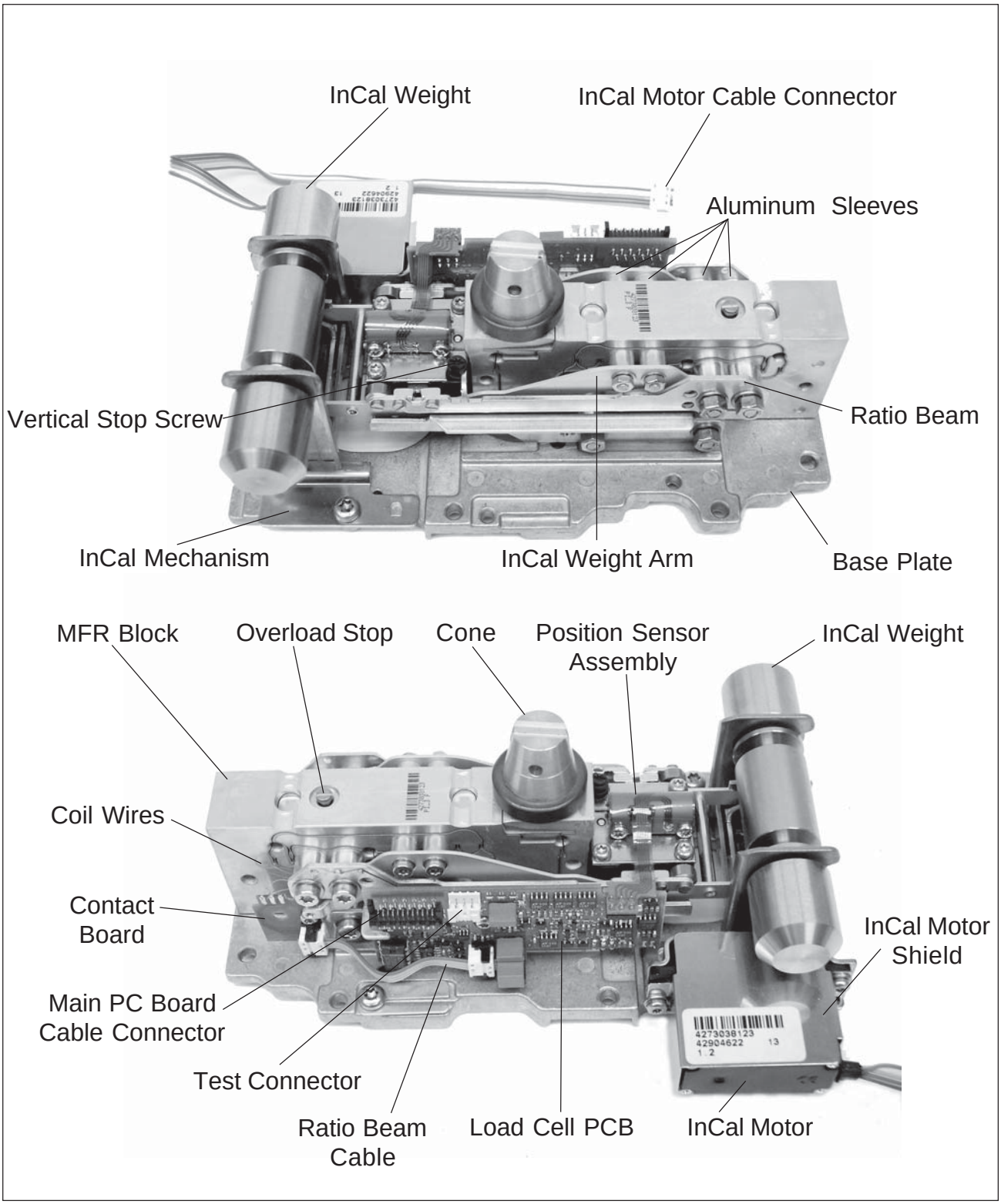


Figure 3-22. MFR Load Cell Components.

3.2.7 Load Cell (MFR) Replacement (Cont.)

Load Cell Kits are available for replacement purposes for all AV and AS model balances. Each Kit is assembled and consists of metal base plate, a Load Cell mounted to the base plate and a package of labels. Check the label on the balance and verify the capacity and model before ordering a new load cell kit. Figure 3-23 illustrates a typical MFR load cell location.

NOTE: Replacement MFR Load Cells are not supplied with InCal mechanisms. When replacing some InCal Load Cells, it is necessary to remove the InCal weight arm from the old Load Cell and install it on the new Load Cell.

The following procedures describe the disassembly of the MFR load cells in a progressive manner. When the part that has been determined to be defective is reached, it may be replaced according to the procedure it is described in. The procedures are not stand- alone, you must start from the beginning.

CAUTION

Extreme care must be exercised so as not to twist or deform the Load Cell in any way. Do not drop or hit the Load cell. Any damage to the Load Cell can render it inoperative.

1. Remove the Top Housing in accordance with the procedures in paragraph 3.2.1.
2. Remove the Load Cell Shield by grasping the sides and pulling upwards.
3. Remove the 4 screws and washers that secure Load Cell to the Bottom Housing. See Figure 3-23. Remove the Load Cell.
4. Disconnect the cable(s).
5. Install the replacement Load Cell using the 4 screws previously removed and connect the flexible cables.

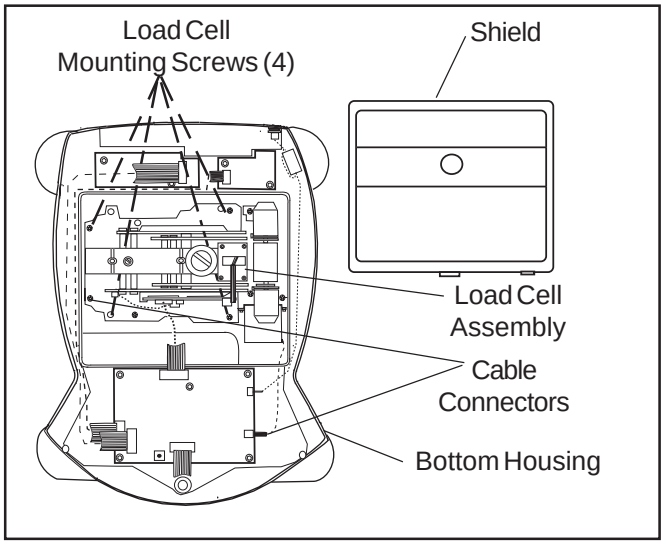


Figure 3-23. Removing MFR Load Cell.

NOTE: Load cells with internal calibration contain a power cable to the InCal motor drive mechanism.

6. Replace the Load Cell Shield over the Load Cell. Press firmly into place.
7. On AS Models, temporarily connect an external RS232 communication board and cable to the Main PC board.
8. Temporarily reassemble the balance.

3.2.7 Load Cell (MFR) Replacement (Cont.)

9. See Appendix C, Adventurer Pro Service Tools and follow instructions for replacing Load Cell.

10. Remove the RS232 board and cable from the balance and assemble.

11. Recalibrate the balance in accordance with instructions in Appendix A, Linearity Calibration A.2

12. Check the performance of the balance using tests in section 4.2.

3.2.8 InCal Motor Removal/Replacement

This procedure describes how to remove the calibration motor from a MFR load cell. There can be several reasons why the internal calibration does not function including, broken or jammed InCal Mechanism, defective InCal Motor, defective Main PC board. To remove the InCal motor, proceed as follows:

InCal Motor Removal

1. Remove the Top Housing in accordance with procedures in paragraph 3.2.1

2. Perform procedure as described in paragraph 3.2.7 and remove the MFR load cell.

3. Refer to Figure 3-24 for InCal Motor location.

4. Remove the 2 screws holding the InCal Motor and InCal Motor shield in place from the InCal mechanism. See Figure 3-25.

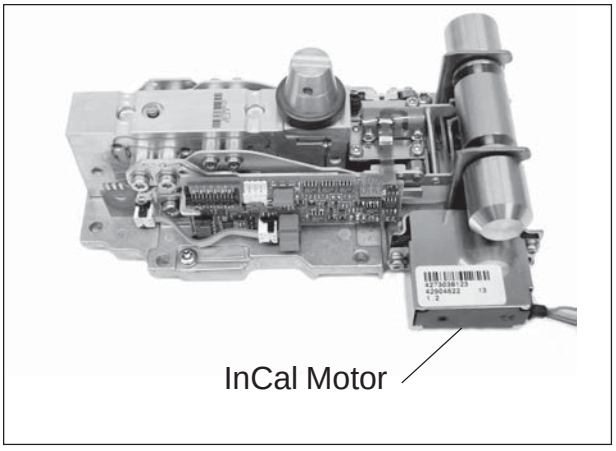


Figure 3-24. InCal Motor Location.

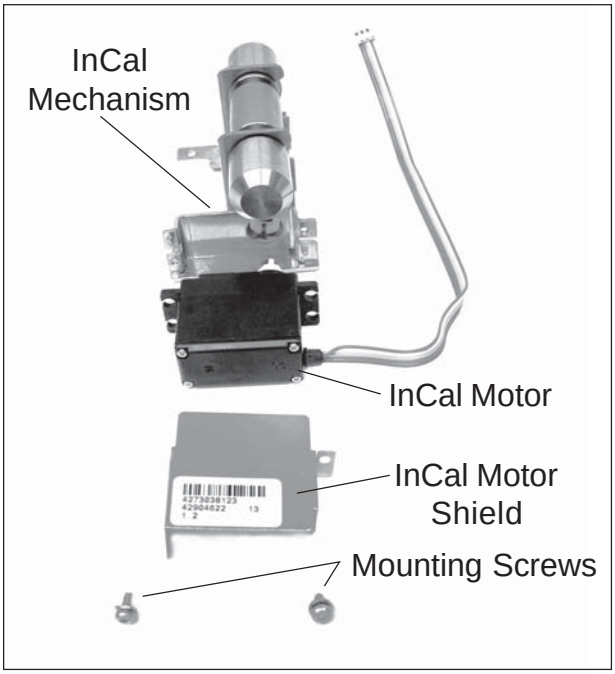


Figure 3-25. InCal Motor Removal.

3.2.8 InCal Motor Removal/Replacement (Cont.)

InCal Motor Replacement

1. Refer to Figure 3-26 and gently rotate the InCal Mechanism to lower the InCal Weight and rotate in the opposite direction to raise the InCal Weight. If the operation is not smooth, replace the entire InCal Mechanism.

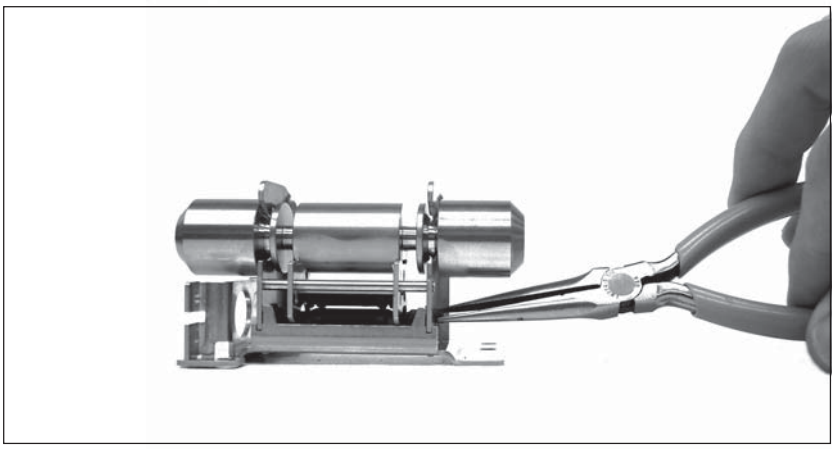


Figure 3-26. Checking Shaft Rotation on InCal Mechanism.

2. See Figure 3-27, with Incal Weight in upper most (high) position, the Motor Coupler should be in the position as shown.

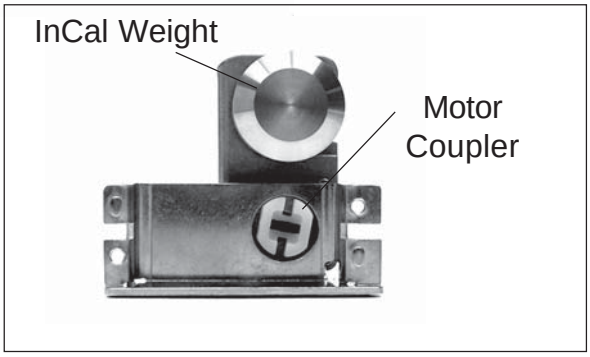


Figure 3-27. Motor Coupler.

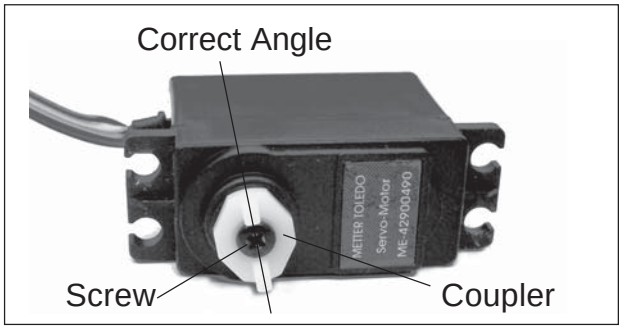


Figure 3-28. Motor Shaft in CCW Position.

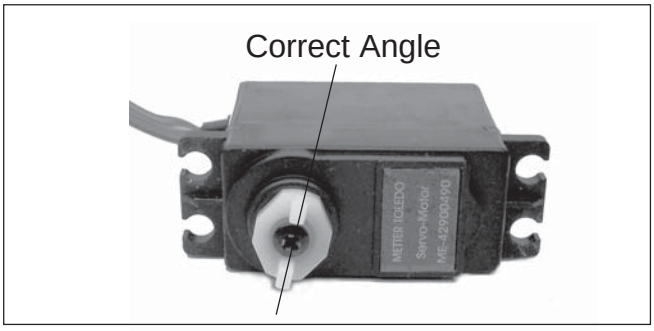


Figure 3-29. Motor Shaft in CW Position.

3. Remove the screw and Coupler from the old InCal Motor.

4. On the replacement Motor, install the screw and Coupler, then rotate the Motor shaft by hand until the shaft is in a fully counter-clockwise position as shown in Figure 3-28. The Coupler should be in the position as shown, if not, remove the screw and coupler. Reposition as shown in Figure 3-28, tighten the screw on the Motor shaft. Rotate the Motor shaft in a full clockwise position. The Motor shaft should be positioned as shown in figure 3-29. If the positions are not correct, remove and reposition the Coupler again.

3.2.8 InCal Motor Removal/Replacement (Cont.)
InCal Motor Replacement (Cont.)

5. Install the InCal Motor to the InCal Mechanism, the motor shaft must be in the position as shown in Figure 3-28. The InCal Motor shaft must be in the fully counter-clockwise position.

6. Secure the InCal Motor and InCal Motor Shield to the InCal Mechanism with the screws previously removed.

7. Replace the MFR Load Cell, refer to paragraph 3.2.7.

3.2.9 InCal Mechanism Removal/Replacement
InCal Mechanism Removal

NOTE: Replacement InCal Mechanism's are supplied assembled with the InCal Motor installed.

1. See Figure 3-30 and remove the 3 screws as shown from the InCal Mechanism.

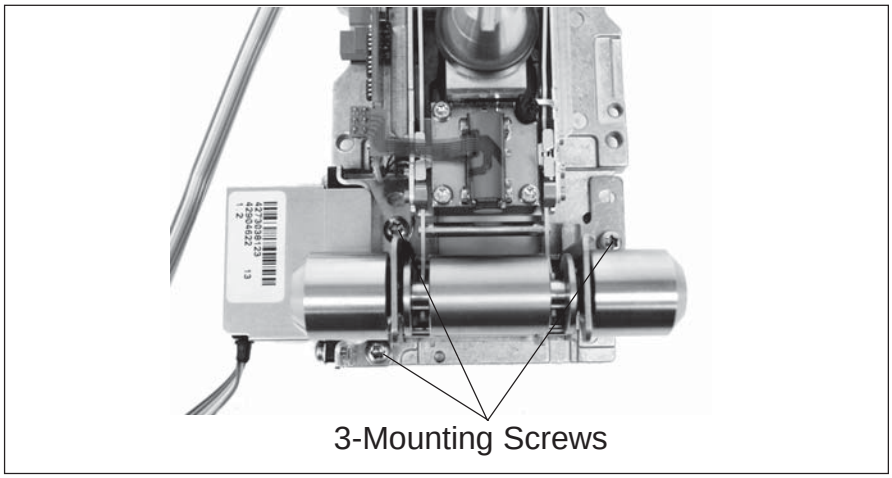


Figure 3-30. InCal Mechanism Mounting Screws.

2. See Figure 3-24 and slide the InCal Mechanism to the right to remove

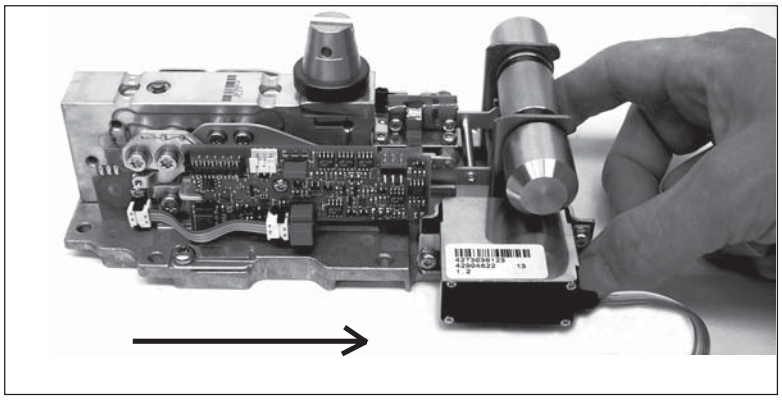


Figure 3-31. Removing the InCal Mechanism.

3. See Figure 3-26. Rotate shaft until weight is lowered, then remove the weight.

3.2.9 InCal Mechanism Removal/Replacement (Cont.)

InCal Mechanism Replacement

1. Rotate shaft of the InCal Mechanism to it's lowest position and slide in the weight.

2. Rotate the shaft until weight is in the top position.

3. Slide the new InCal Mechanism into position. Fasten with the 3 screws previously removed, do not fully tighten at this time.

4. Position the InCal Mechanism so that the spacing is between the InCal Weight and the InCal Weight Arms even on both sides as shown in Figure 3-32.

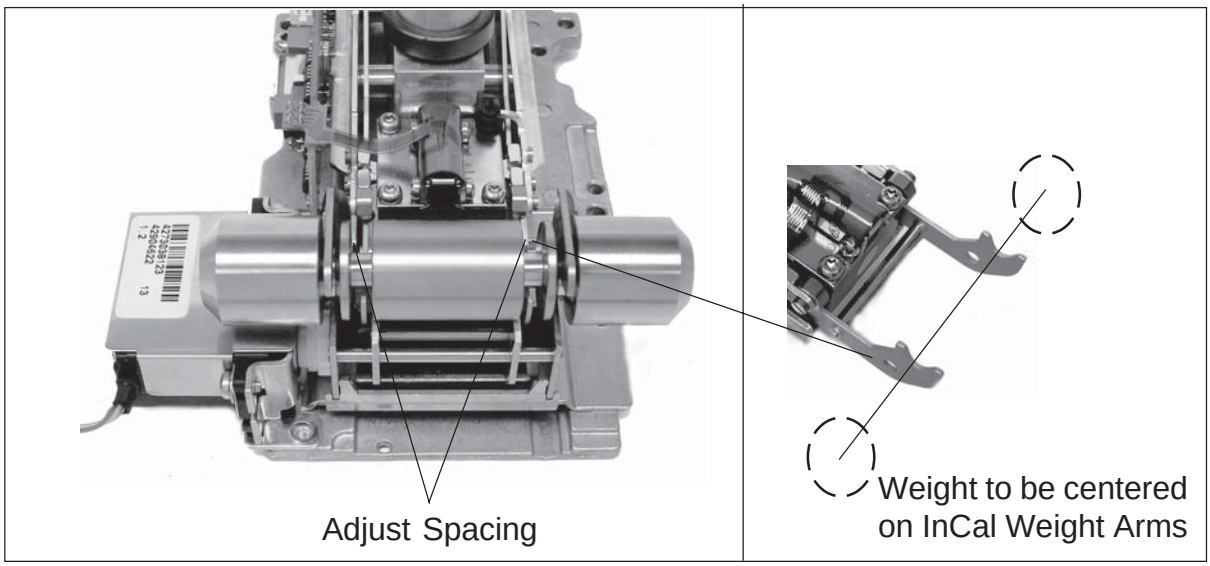


Figure 3-32. InCal Mechanism Alignment.

5. See Figure 3-33 and make sure the InCal Weight is lined up properly as shown on the InCal Weight Arm. The Weight must be centered in the slots of the InCal Weight Arm.

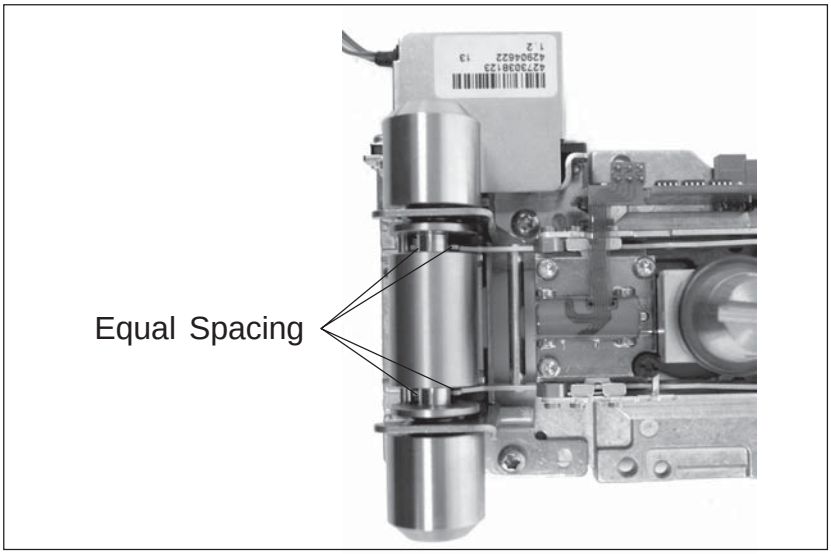


Figure 3-33. Centering InCal Weight.

6. Tighten the 3 screws when properly aligned and recheck alignment.

3.2.10 Position Sensor Assembly Removal/Installation

Position Sensor Removal

1. Unscrew the three fastener screws of the Position Sensor Assembly.

2. Raise the Position Sensor Assembly, which is held by the magnetic field.

3. If the Position Sensor Assembly has to be changed: unsolder Flexible Board , see Figure 3-34.

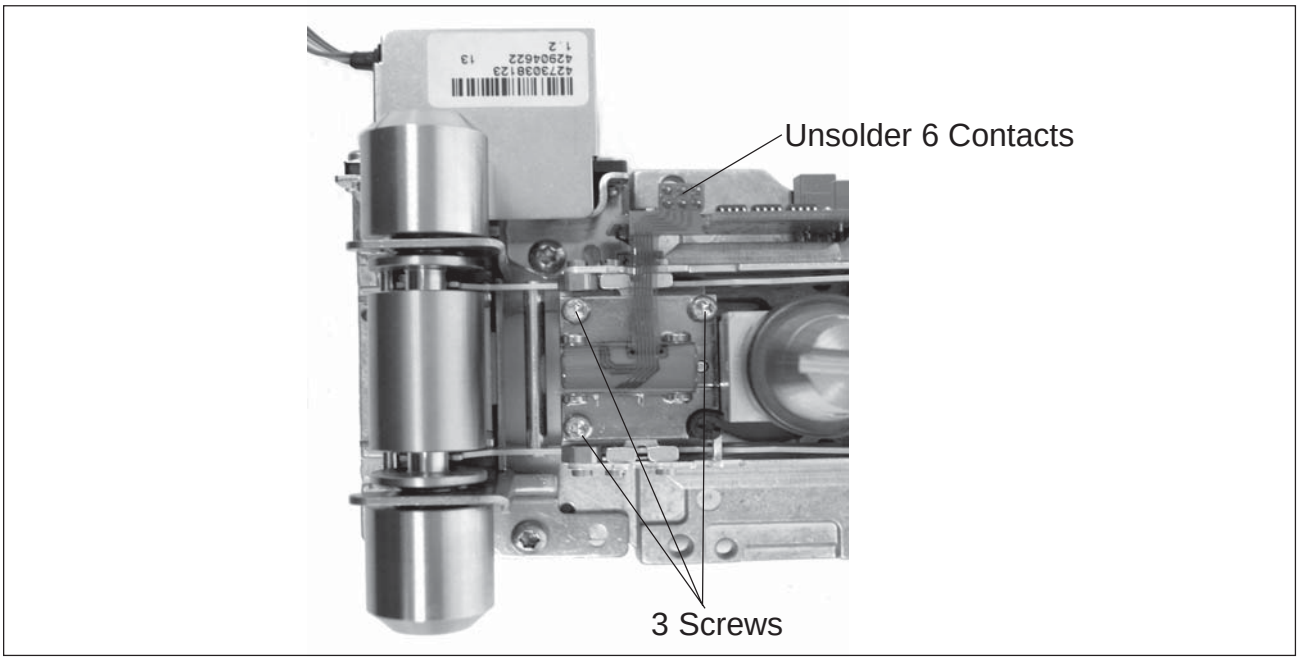


Figure 3-34. Removing Position Sensor Assembly.

Position Sensor Installation

1. Mount Position Sensor Assembly, align centrally on the Ratio Beam Pin, see Figure 3-35 and fasten with the three screws.

Please note: The flange of the Position Sensor Assembly is <u>prebent</u> to ensure its precise positioning after it screwing on. Please **do not** attempt to bend it straight!

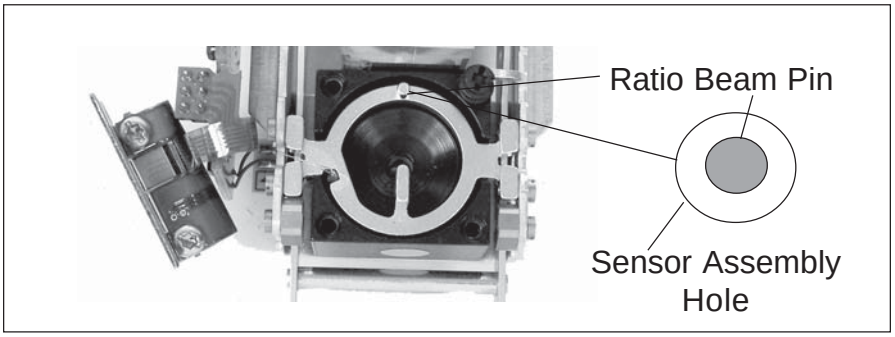


Figure 3-35. Ratio Beam Pin Alignment.

4. Solder the Flexible Board connections

3.2.11 Unmounting the Load Cell from the Base Plate

This procedure is necessary before proceeding with other repairs to the Load Cell.

Base Plate Removal

1. Refer to Figure 3-36 and remove the Weigh Below Hook and screw.

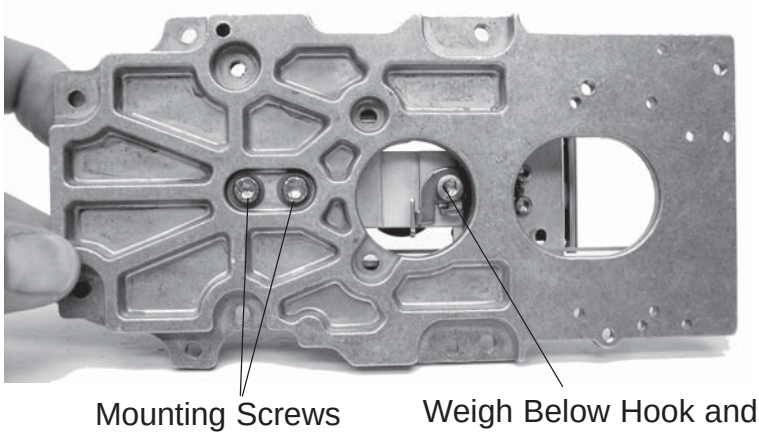


Figure 3-36. Base Plate Removal.

2. Hold the MFR Load Cell and remove the 2 Load Cell Mounting Screws. Figure 3-37 illustrates the components.

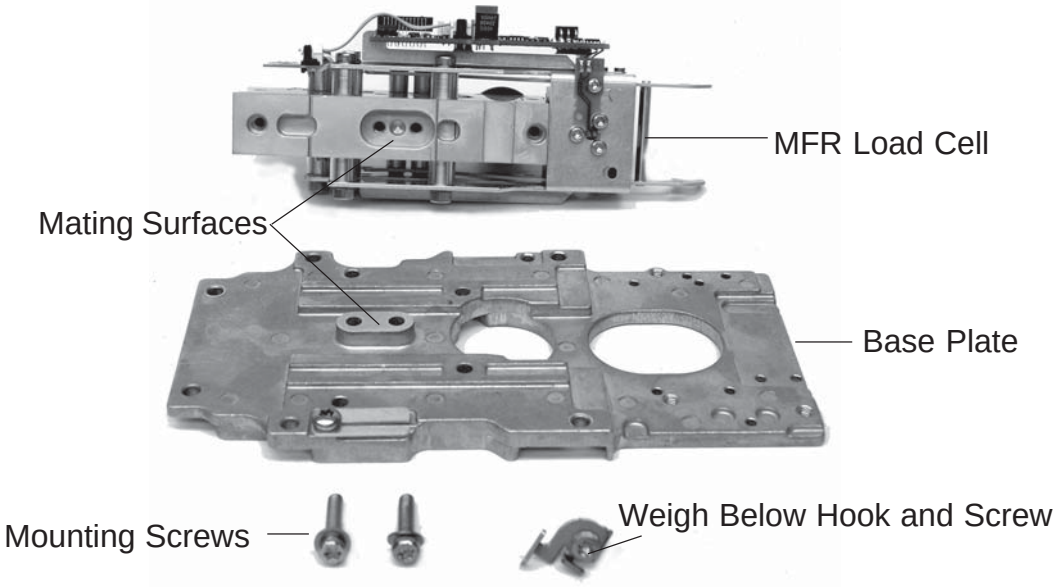


Figure 3-37. Load Cell Mounting Components.

Note: At this point, other repairs may be made to the Load Cell.

3.2.11 Unmounting the Load Cell from the Base Plate (Cont.)
Base Plate Installation

1. Make sure the mating surfaces on the Base plate and the Load Cell as shown in Figure 3-37 are clean.

2. Position the Load Cell on the base and install the 2 mounting screws. Do not tighten fully.

3. Looking down at the top of the load Cell, align it with the Base Plate as shown in Figure 3-38. Now carefully tighten the 2 mounting screws and recheck alignment.

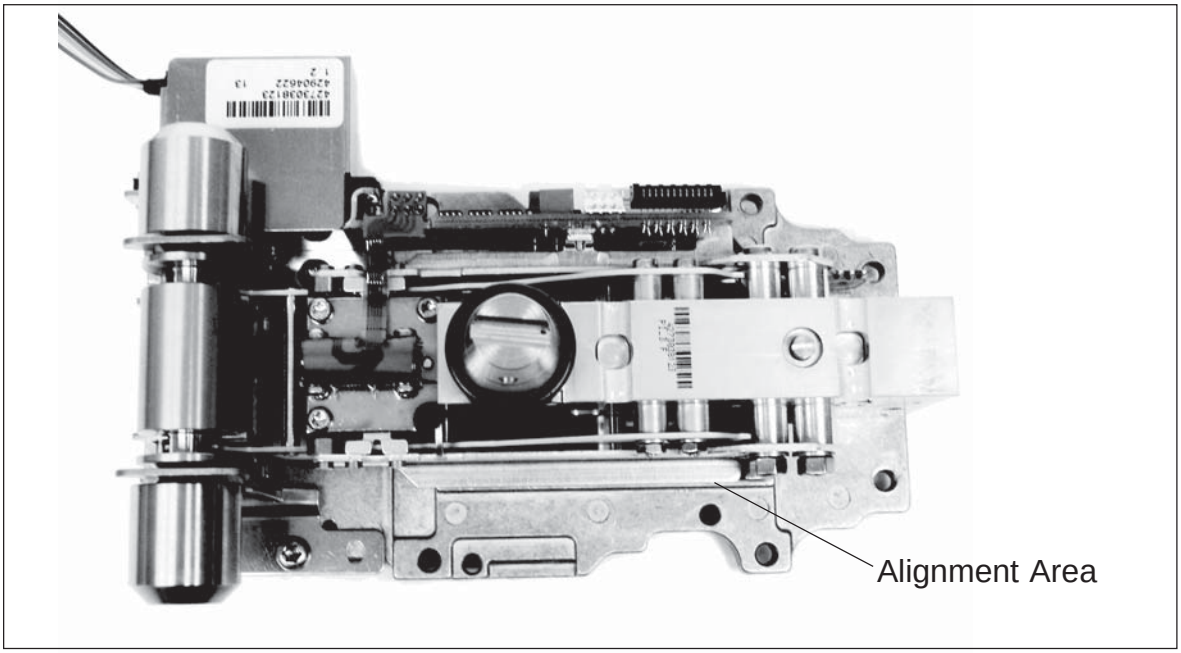


Figure 3-38. Load Cell Alignment to Base Plate.

4. Install the Weigh Below Hook and screw at the bottom of the Base Plate.

3.2.12 Changing the Load Cell PC Board

1. Remove Load Cell from Mounting Plate, refer to paragraph 3.2.11.

2. Unsolder Temperature Sensor board cable, see Figure 3-39.

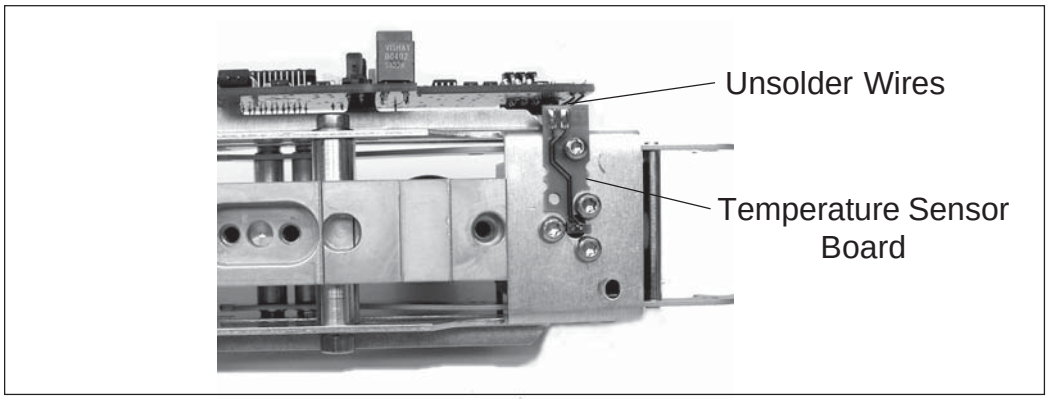


Figure 3-39. Temperature Sensor Board Unsoldering Location.

3.2.12 Changing the Load Cell Board (Cont.)

3. Unsolder Position Sensor Assembly from Load Cell PC board.

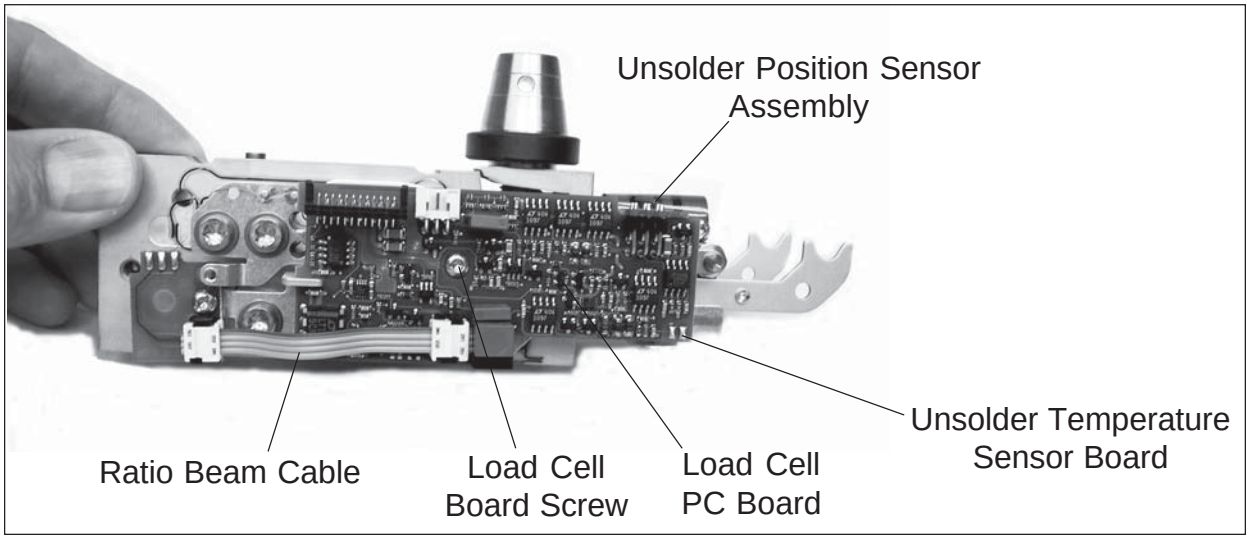


Figure 3-40. Load Cell PC Board Item Locations.

4. Disconnect the Ratio beam cable connector.

5. Remove Load Cell Board screw and change board.

6. If servicing an AS balance, temporarily install RS232 PC board and cable.

CAUTION: When screwing in, first turn the self-tapping cell board screw in a counterclockwise direction until the first screw thread engages and then tighten it.

7. Refer to appendix C and follow instructions to restore EEPROM.

8. Remove RS232 PC board and cable.

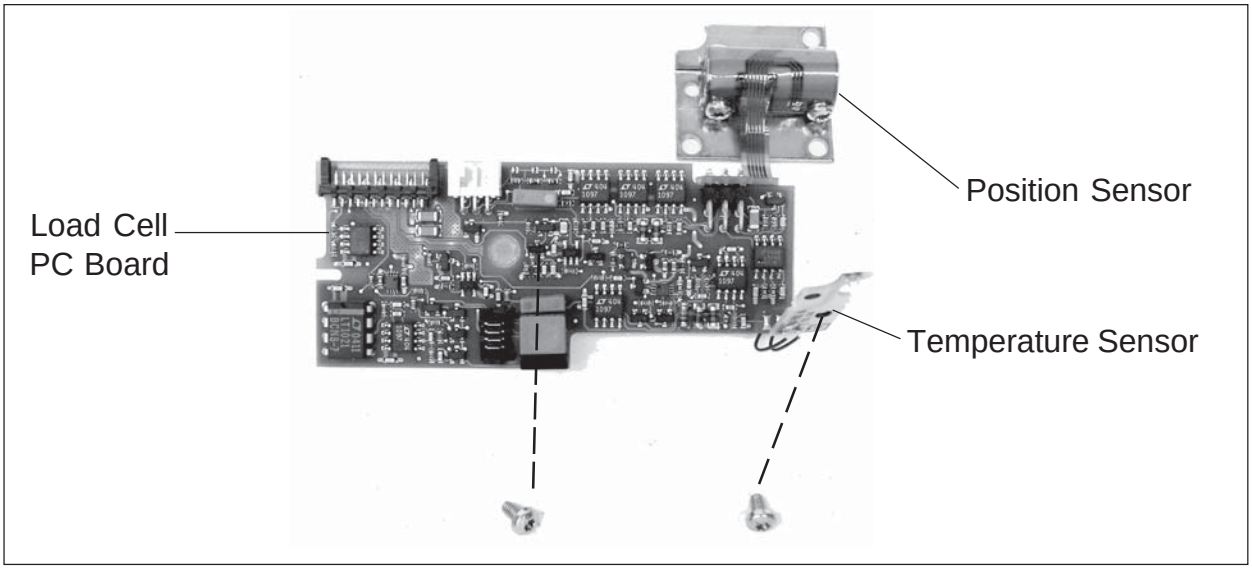


Figure 3-41. Load Cell PC Board Removed from Load Cell.

3.2.13 Removing the Ratio Beam

Note: Perform procedures in paragraphs 3.2.7, 3.2.8, 3.2.10, 3.2.11, 3.2.12 first.

1. Hold Contact Board to ensure the fine coil wires cannot tear off, then remove screw as shown in Figure 3-42.

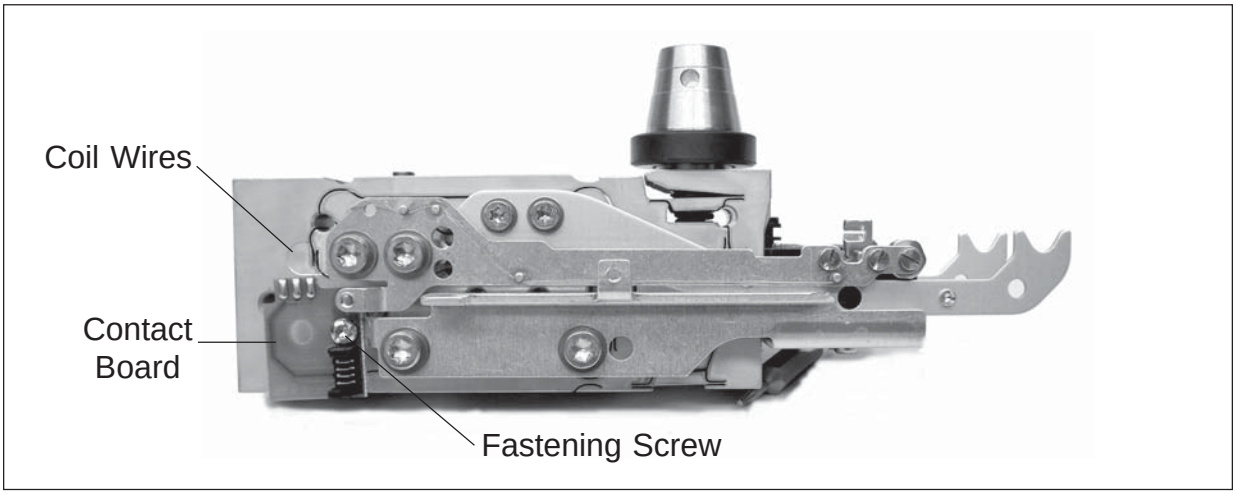


Figure 3-42. Contact Board Location.

2. Remove Contact Board from holder and screw onto the ratio Beam, see Figure 3-43. This is the hole directly above.

3. Insert the centering pins from the service tool set in the holes provided. See Figures 3-44 and 3-45.

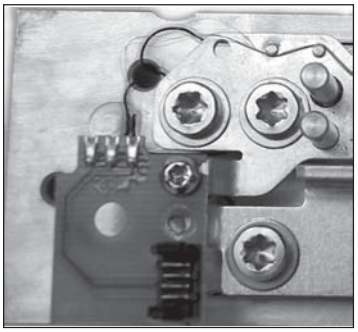


Figure 3-43. Close-Up of Mounting.

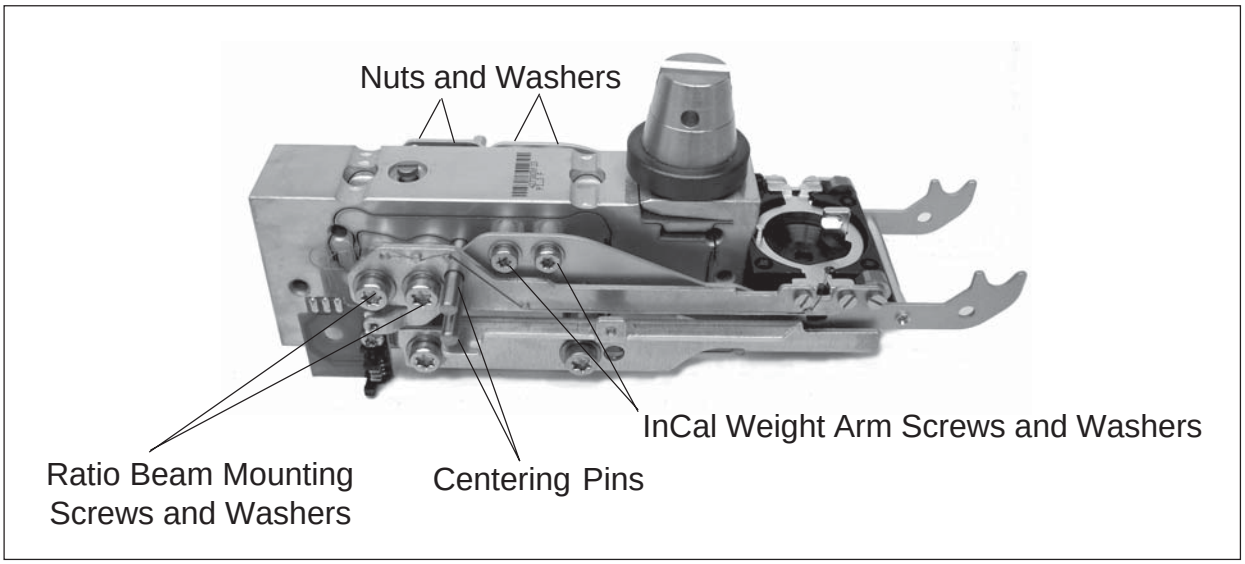


Figure 3-44. Ratio Beam and Weight Arm Components.

3.2.13 Removing the Ratio Beam (Cont.)

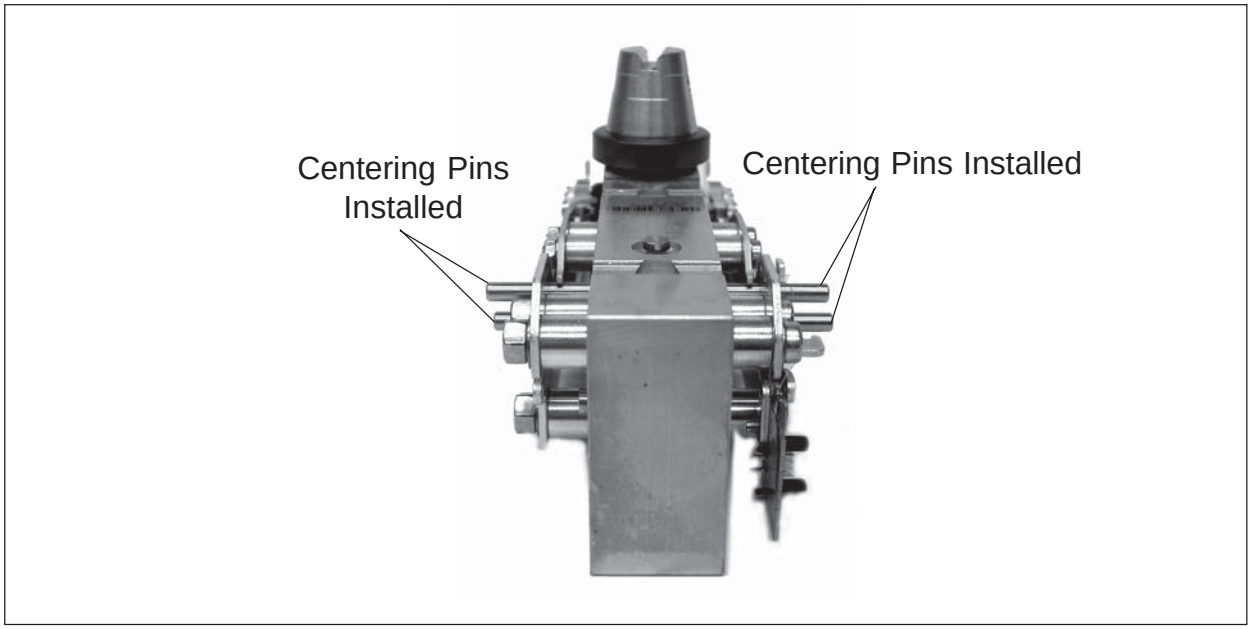


Figure 3-45. Centering Pins Installation.

4. Refer to Figures 3-44 and 3-45 and carefully loosen and remove the nuts on the Ratio Beam while holding the screw heads to prevent movement. This is very important!

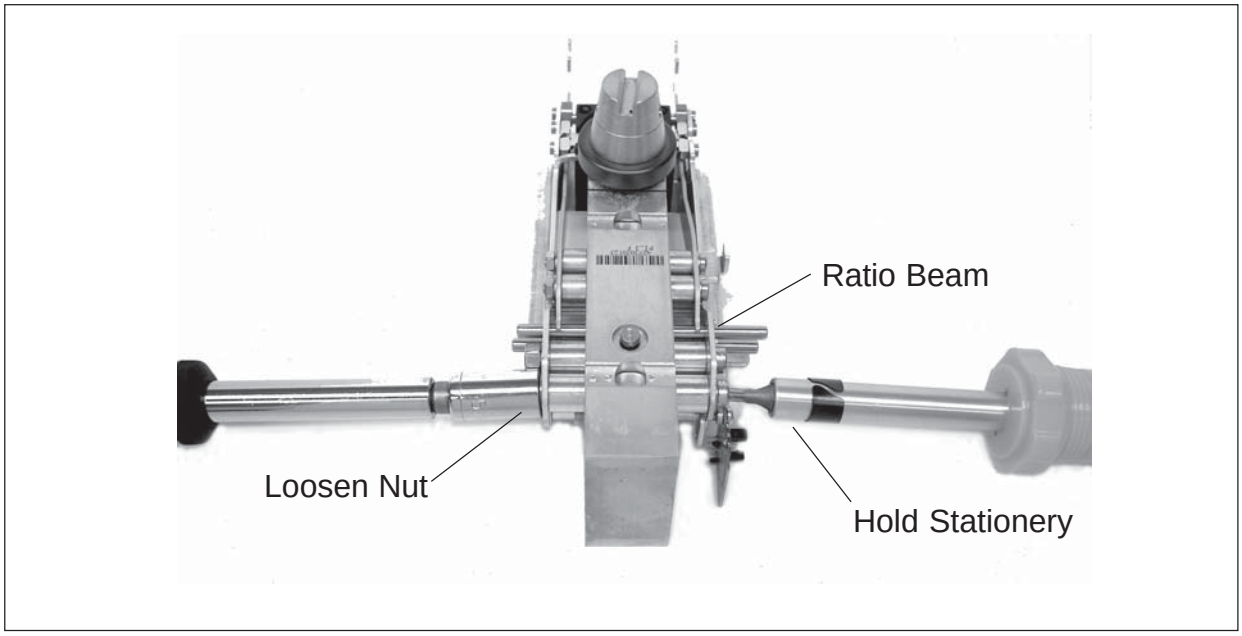


Figure 3-46. Loosening Ratio Beam Nuts.

3.2.13 Removing the Ratio Beam (Cont.)

5. Remove the screws and washers as shown in Figure 3-47.

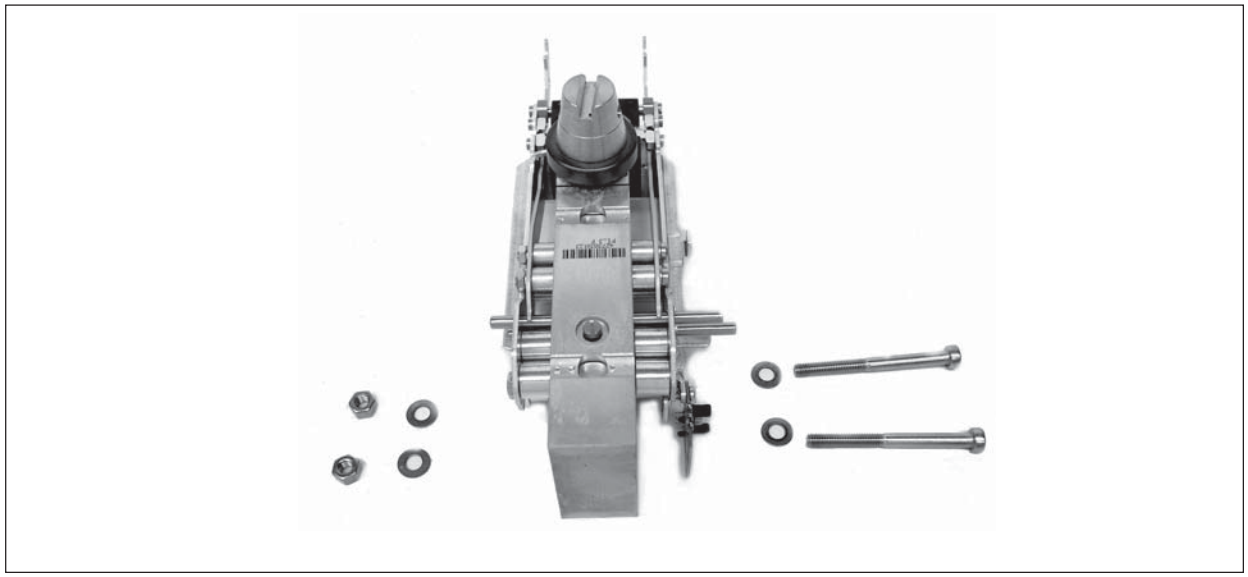


Figure 3-47. Ratio Beam Screws and Washers Removed.

6. Refer to Figures 3-44 and 3-48 and carefully loosen and remove the nuts on the InCal Weight Arm while holding the screw head to prevent movement. This is very important.

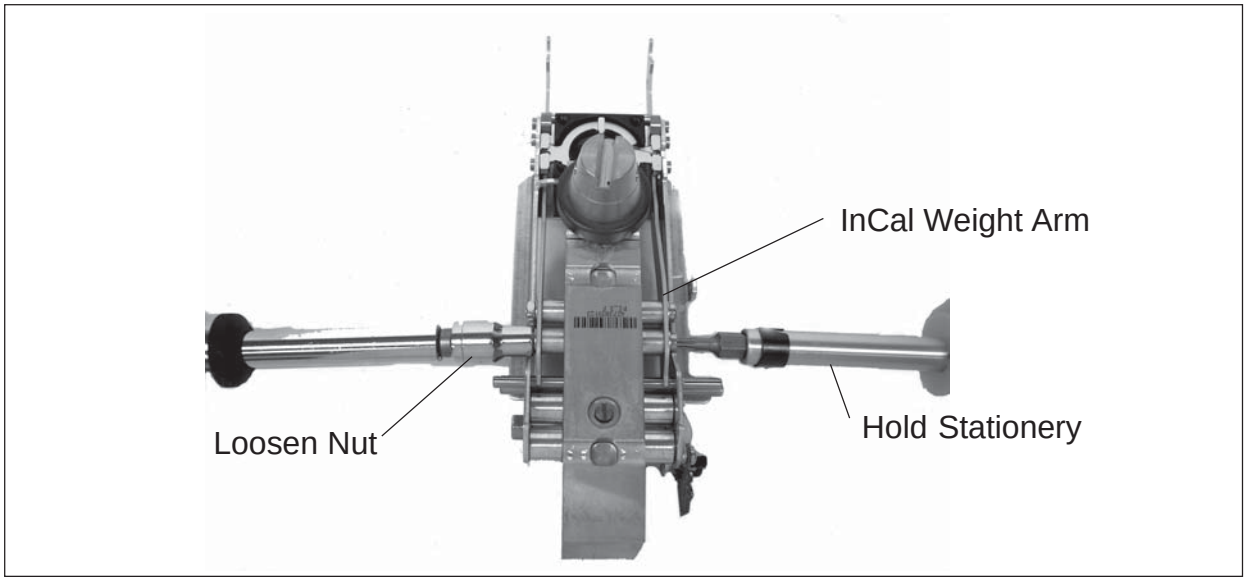


Figure 3-48. Loosening InCal Weight Arm Nuts.

3.2.13 Removing the Ratio Beam (Cont.)

7. Remove the screws and washers as shown in Figure 3-49.

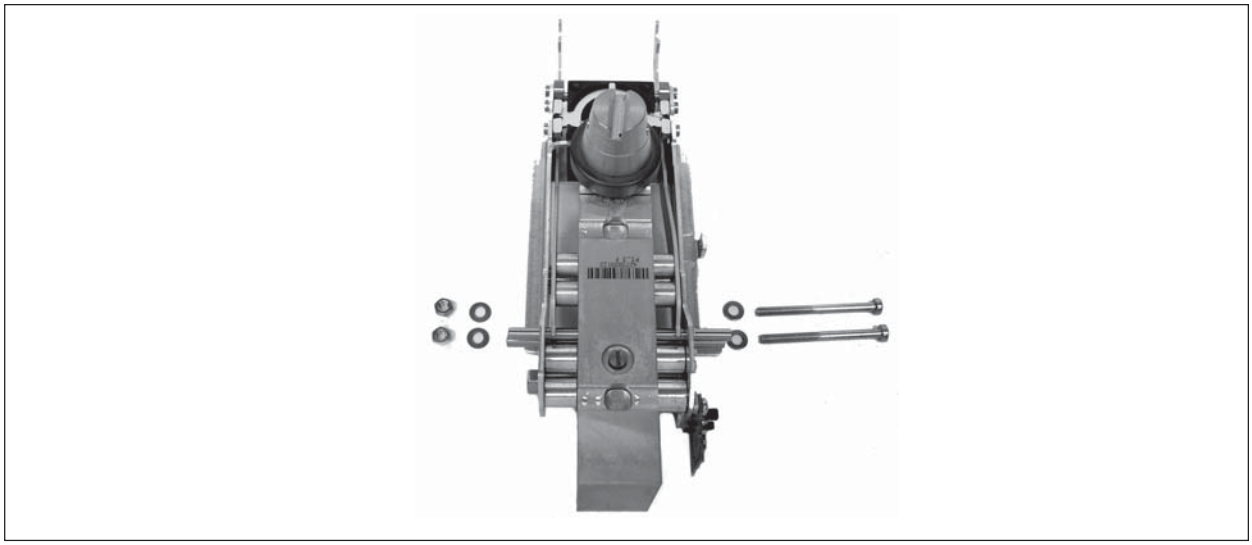


Figure 3-49. InCal Weight Arm Screws and Washers Removed.

8. Carefully slide the InCal Weight Arm as shown in Figure 3-50. Figure 3-51 illustrates the InCal Weight Arm removed.

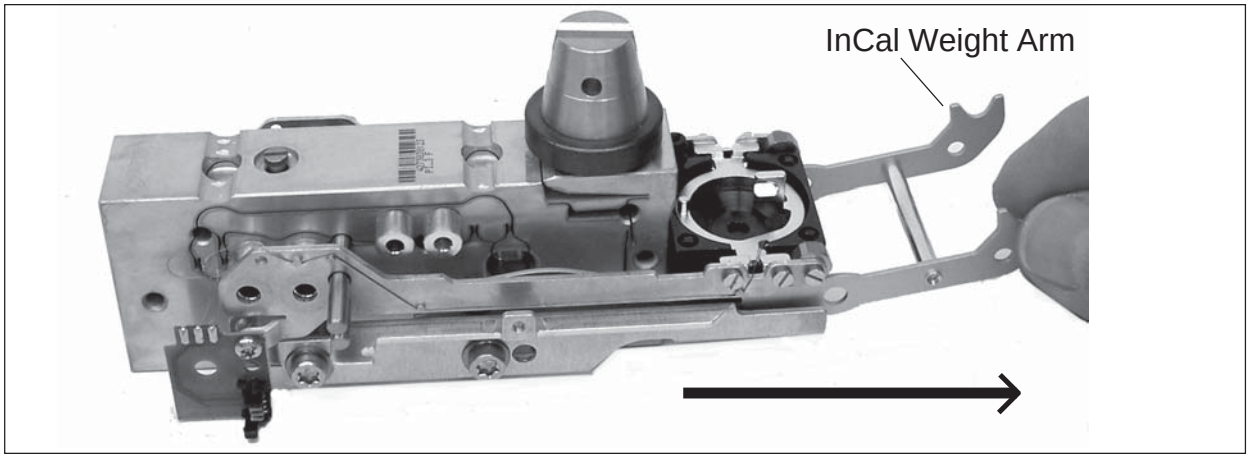


Figure 3-50. InCal Weight Arm Removal.

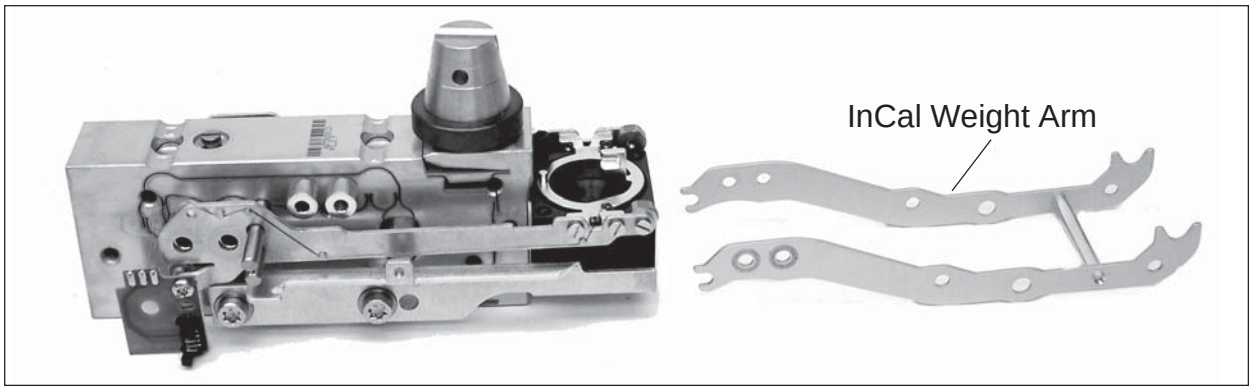


Figure 3-51. InCal Weight Arm Removed.

3.2.13 Removing the Ratio Beam (Cont.)

9. Refer to Figure 3-52 and remove the alumnum sleeves as shown.

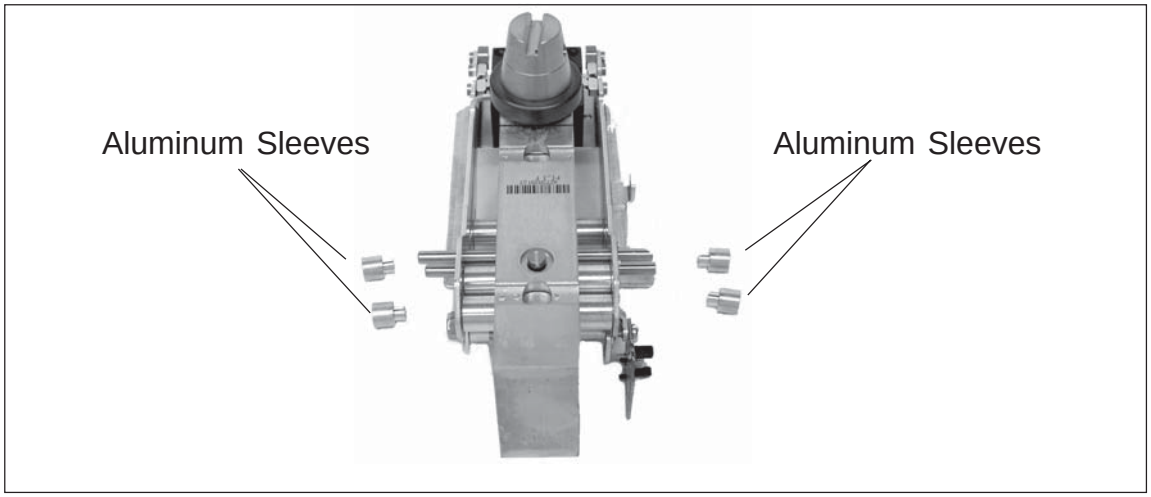


Figure 3-52. Aluminum Sleeves Removed.

10. Refer to Figure 3-53 and remove the centering pins as shown.

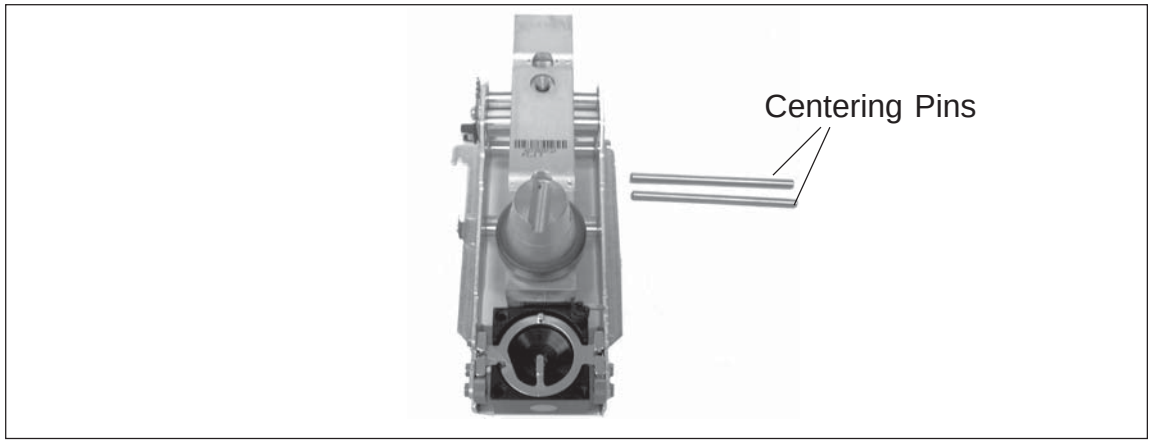


Figure 3-53. Centering Pins Removed.

11. Note the position of the Vertical Adjustment Screw. Turn the Vertical Adjustment Screw so that the Ratio Beam can be removed.

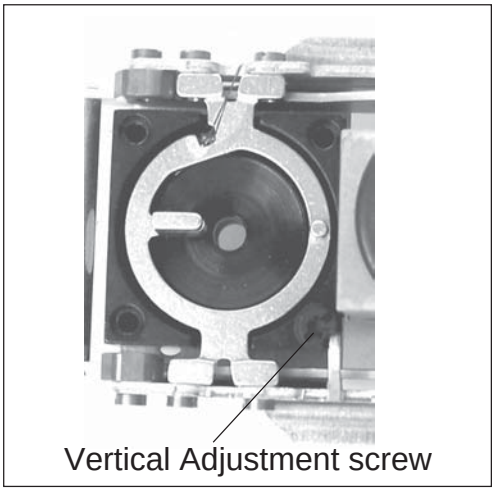


Figure 3-54. Vertical Adjustment Screw Positioning.

3.2.13 Removing the Ratio Beam (Cont.)

12. Carefully lift out the Ratio Beam as shown in Figure 3-55

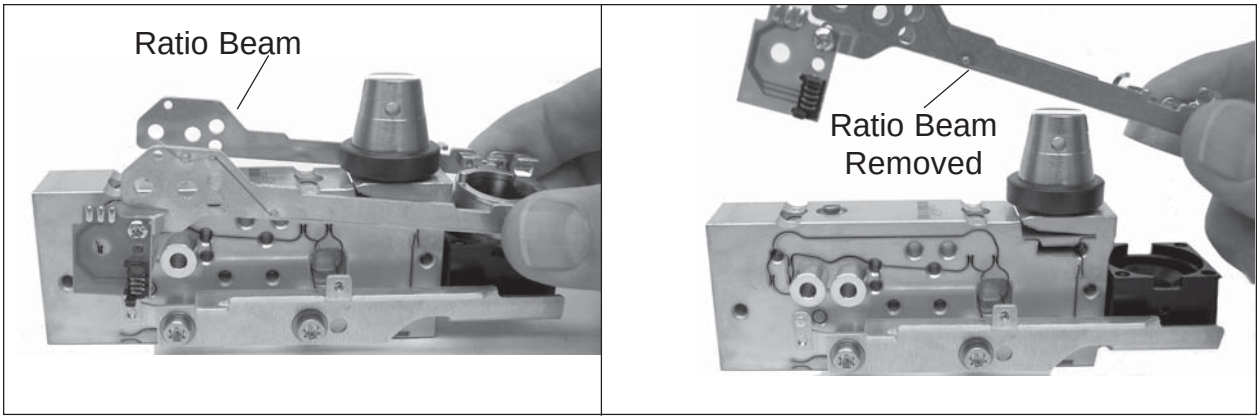


Figure 3-55. Removing the Ratio Beam.

12. Remove the Aluminum Sleeves, see Figure 3-56. This completes the disassembly.

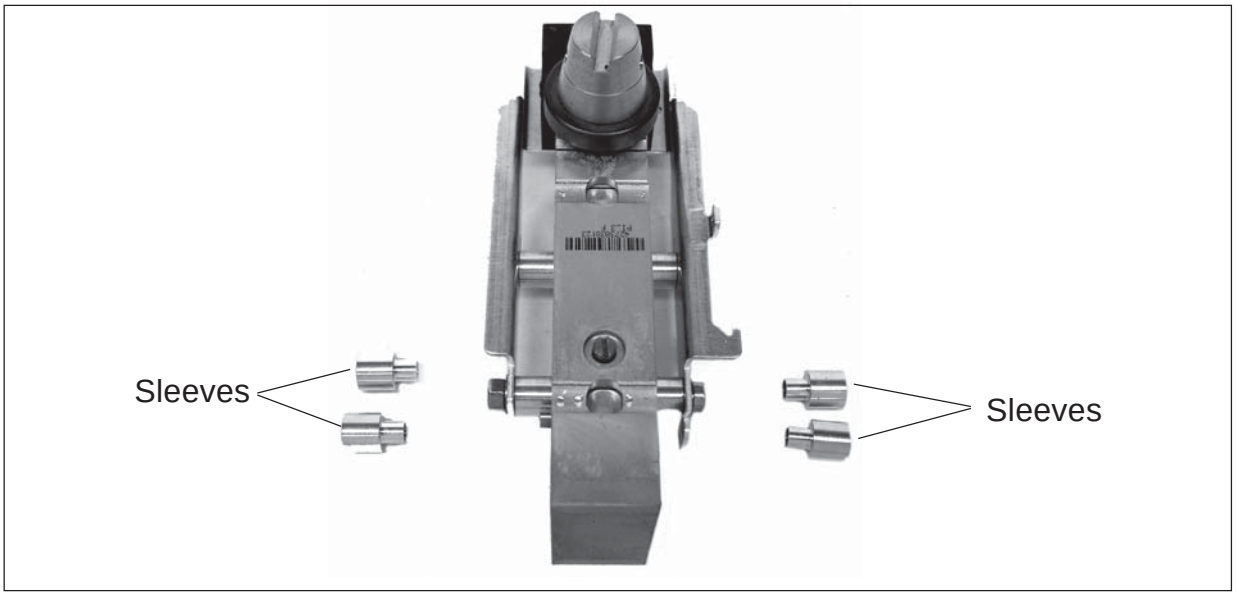


Figure 3-56. Removing the Aluminum Sleeves.

3.2.14 Installing the Ratio Beam

1. If a new Ratio Beam is being installed, remove the existing weights from the old Ratio Beam and install on the replacement Ratio Beam. See Figure 3-57.

Note: Some Load Cells do not require weights.

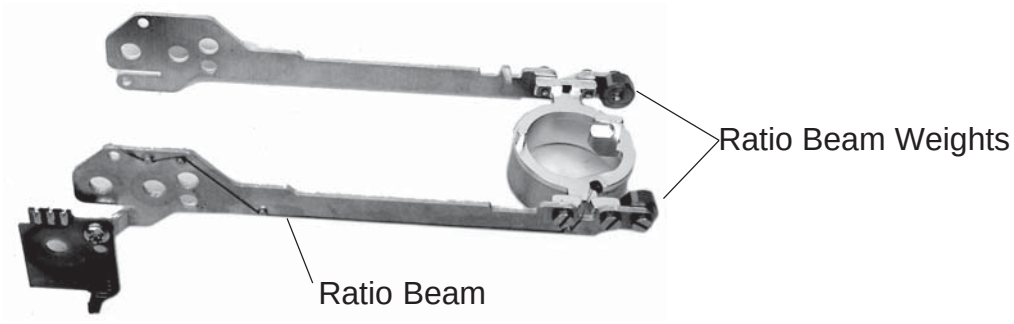


Figure 3-57. Ratio Beam Weight Removal.

2. Refer to Figure 3-58 and examine the load Cell slotted areas and make sure all areas are clean and free of debris. Hold the Load Cell up to the light to see into the slotted areas. If dust or dirt appears in any slotted area, use canned pressurized clean air that is normally used for cameras and gently blow out any dirt. Use extreme care. Critical area is shown in Figure 3-58.

CAUTION:
DO NOT USE COMPRESSED OR SHOP AIR AS CONTAMINANTS AND MOISTURE ARE PRESENT AND WILL DAMAGE THE LOAD CELL.

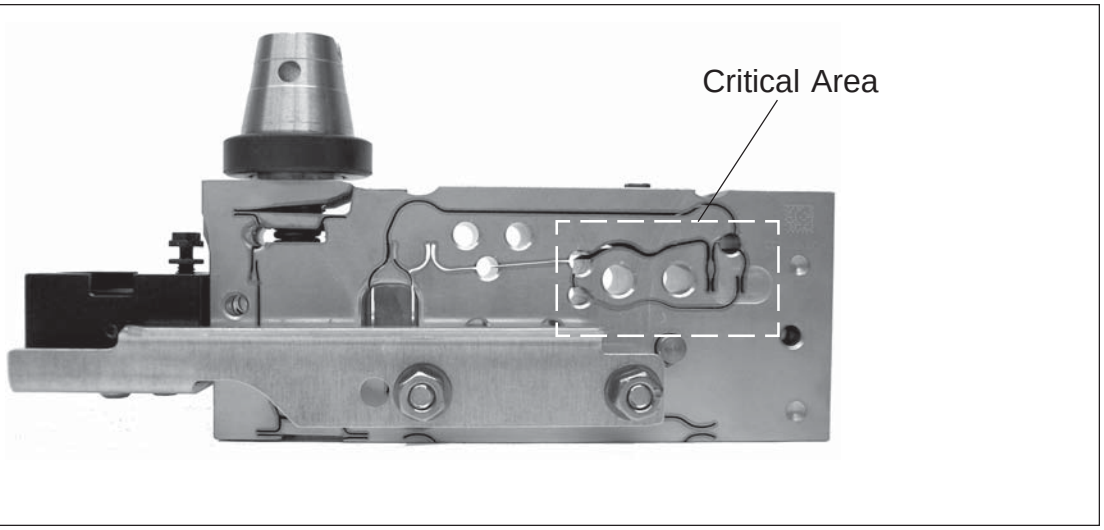


Figure 3-58. Load Cell Critical Area.

3.2.14 Installing the Ratio Beam (Cont.)

3. Refer to Figure 3-59 and check and clean the Magnet area. To clean, use a small wooden stick with double-sided tape to remove any debris.

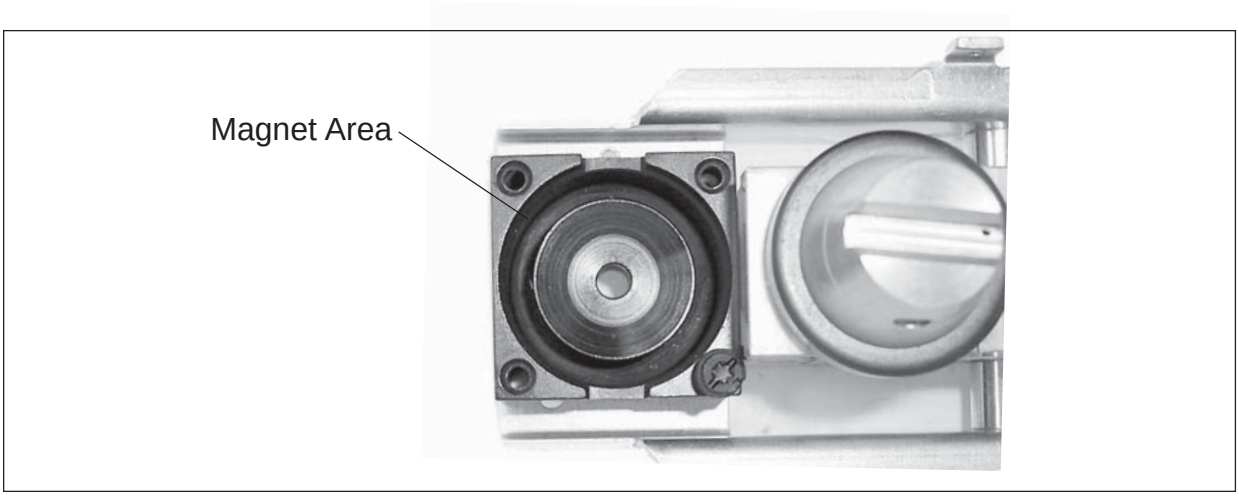


Figure 3-59. Load Cell Magnet Area.

4. Refer to Figure 3-56 and replace the Aluminum Sleeves.

5. Refer to figure 3-60 and inspect the slotted area on the Ratio Beam and clean if necessary.

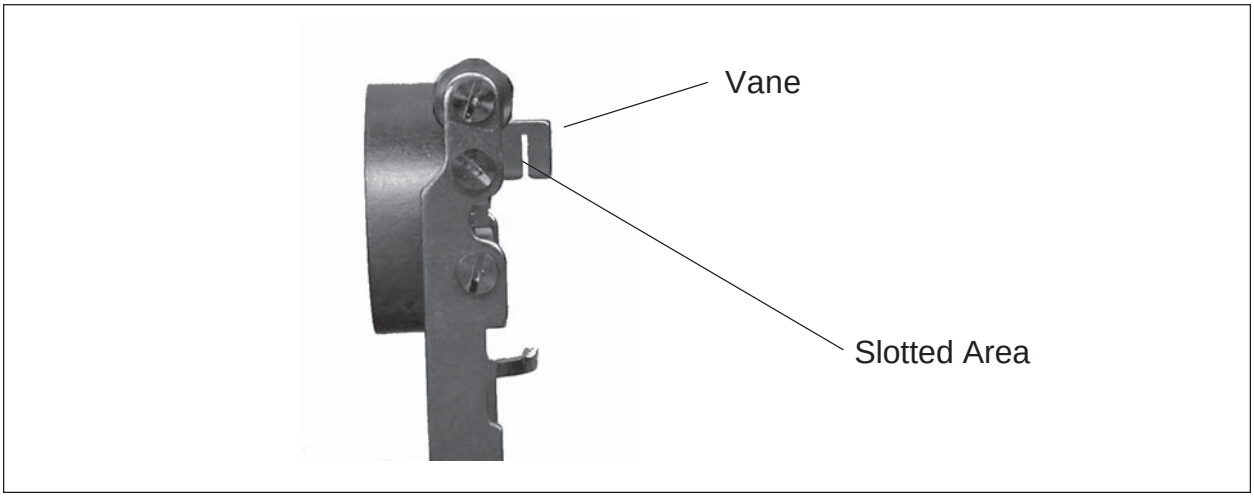


Figure 3-60. Ratio Beam Vane Slotted Area.

6. Refer to Figure 3-55 and carefully place the Ratio Beam into postion in the Load Cell.

7. Refer to Figure 3-52 and replace the Aluminum Sleeves.

8. Carefully slide the InCal Weight Arm into position, see Figure 3-50.

9. ***Do not use tools in this step.*** Install the screws, washers and nuts for the Ratio Beam Arm and the InCal Weight Arm.

3.2.14 Installing the Ratio Beam (Cont.)

10. Insert the Centering Pins. See Figures 3-44 and 3-45.

11. Refer to Figure 3-48 and hold the screw head while tightening the nuts for InCal Weight Arm.

12. Refer to Figure 3-46 while holding the screws, tighten the nuts on the Ratio Beam Arm.

13. Refer to Figure 3-61 and turn the adjusting screw to it's original position, approximately 45 degrees.

14. Refer to Figure 3-53 and remove the centering pins.

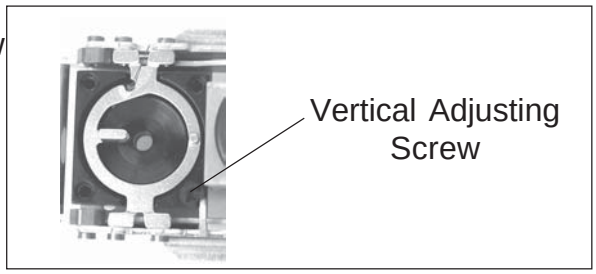


Figure 3-61. Adjusting Screw Alignment.

15. Refer to figure 3-53 and make sure that the ratio Beam coil is centered in the Magnet assembly. If the coil is not centered, inspect the centering ring, loosen the Ratio beam nuts and repeat from step 12.

16. Refer to Figure 3-62 and remove the contact board screw (**a**) and place as shown in **(b**). ***Be very careful not to break the fine contact wires on the board***.

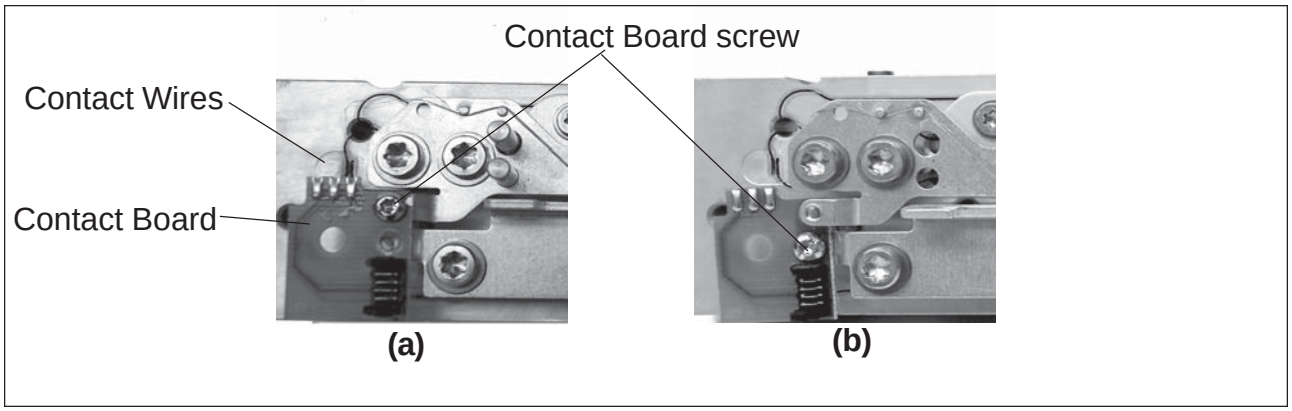


Figure 3-62. Repositioning the Contact Board and Screw.

3.2.15 Vertical Stop Adjustment

This procedure is required when the Ratio Beam or the Sensor Board has been replaced.

Note:

The vertical stop setting is the reference for the Ratio Beam height (horizontal position).

1. The Load Cell should be installed in the balance housing.
2. The ribbon cable from the Load Cell is plugged into the Main PC board.
3. Disconnect cable from the Load Cell to Ratio Beam (important step).
4. Attach voltmeter (DC range) to pins on Load Cell PCB test connector.
5. Apply power to the balance.

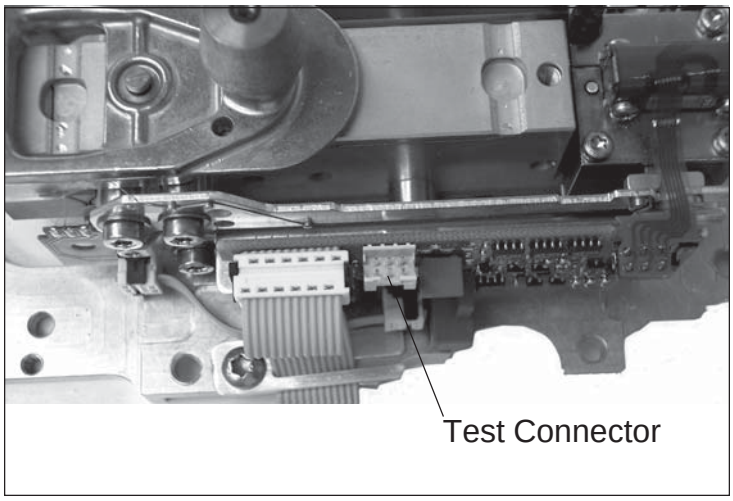


Figure 3-63. Test Connector Location.

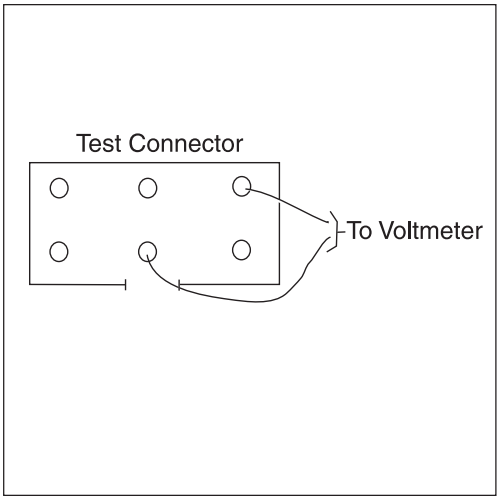


Figure 3-64. Area of Detail.

Setting Vertical Stop

1. Refer to Figure 3-63. Attach a Digital Voltmeter to the pins indicated on the test connector shown in Figure 3-64.
2. Measure the voltage when the Ratio Beam is at the **bottom** of the vertical stop.
3. Measure the voltage when the Ratio Beam is carefully lifted with thumb and forefinger until it is at the top of the vertical stop.
4. If the two voltage values and are not the same, (+ or - 1.5 ...3.5V, difference max. 0.1V), the vertical stop must be adjusted.
5. To adjust the vertical stop, refer to Figure 3-22, turn the vertical adjustment screw and repeat steps 2 and 3 until the readings are within specifications (step 4).

4.1 TESTING

After servicing the balance, an operational test and various performance tests should be made to ascertain whether or not the balance meets specifications. Turn the balance on and allow it warm up for at least five minutes before performing these tests. Make sure the test area is free from drafts and that the balance rests on a level and vibration free surface. The masses used for final calibration must be adjusted to ASTM Class 4 tolerance or better.

4.1.1 Operational Test

1. Connect a functioning AC Adapter to the balance Power Jack located at the rear of the balance.

2. Plug the AC Adapter into a suitable power source. If the AC Adapter supplied with the balance is rated for a different voltage, use an appropriate adapter to match the supply voltage.

4.1.2 AV Models Segment Display Test

1. Turn the balance on by pressing **ON/ZERO *Off***, all segments are enabled and displayed briefly, then followed by a software revision number. See Figure 4-1 for full display.

2. Tare the balance. The display should indicate a zero weight.

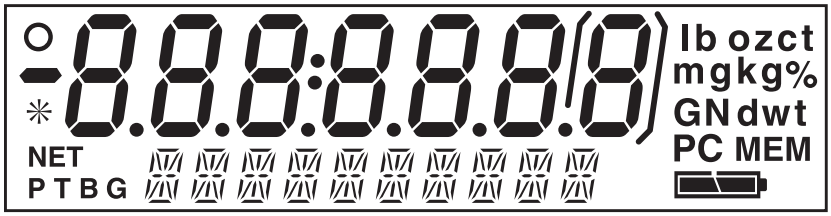


Figure 4-1. LCD Full Display for Models AV.

4.1.3 AS Models Segment Display Test

1. Turn the balance on by pressing **ON/ZERO *Off***, all segments are enabled and displayed briefly, then followed by a software revision number. See Figure 4-2 for full display.

2. Tare the balance. The display should indicate a zero weight.

Figure 4-2. LCD Full Display for Models AS.

CHAPTER 4 TESTING

4.2 AV AND AS MODELS STRAIN GAUGE PERFORMANCE TESTS

The following performance tests are used to evaluate the balance operation before and after repairs. Each balance tested must meet the requirements specified in each test as well as the specifications listed in Table 1-2 and Tables 4-1and 4-2. Tolerance values are expressed in counts. A balance which passes each of these three tests meets the manufacturing specifications.

TABLE 4-1. AV PERFORMANCE TEST TOLERANCES

Model	AV53	AV212	AV412	AV812	AV2101
Repeatability (Std Dev)	0.001	0.01	0.01	0.1	0.1
Off Center Load (g)	+/- 0.004	+/- 0.03	+/- 0.02	+/- 0.03	+/- 0.1
Linearity (g)	+/- 0.002	+/- 0.02	+/- 0.01	+/- 0/02	+/- 0.2
Model	AV4101	AV8101			
Repeatability (Std Dev)	0.1	0.1			
Off Center Load (g)	+/- 0.2	+/- 0.3			
Linearity (g)	+/- 0.2	+/- 0.2			

TABLE 4-2. AS PERFORMANCE TEST TOLERANCES

Model	AS64	AS214	AS153	AS313	AS312
Repeatability (Std Dev)	0.0001	0.0001	0.001	0.001	0.010
Off Center Load (g)	+/- 0.0003	+/- 0.0003	+/- 0.003	+/- 0.003	+/- 0.080
Linearity (g)	+/- 0.0002	+/- 0.0002	+/- 0.002	+/- 0.002	+/- 0.020
Model	AS612	AS1502	AS3102	AS811	AS3101
Repeatability (Std Dev)	0.010	0.010	0.010	0.10	0.10
Off Center Load (g)	+/- 0.030	+/- 0.030	+/- 0.030	+/- 0.20	+/- 0.20
Linearity (g)	+/- 0.020	+/- 0.020	+/- 0.020	+/- 0.20	+/- 0.20
Model	AS6101	AS8100			
Repeatability (Std Dev)	0.10	1			
Off Center Load (g)	+/- 0.20	+/- 2			
Linearity (g)	+/- 0.20	+/- 2			

4.2.1 Repeatability Test

Repeatability is a word used in balance specifications meaning the Standard Deviation of a set of similar weight readings. To determine whether a balance meets the calculated Standard Deviation value in the Specification Table 1-2, perform the following test:

Test

1. Tare the balance. The reading on the display should be 0g.

2. Select a mass weighing near the maximum capacity of the balance and place the mass on the ***center*** of the Pan. Observe and record the reading.

3. Remove the mass. Reading should return to 0g ±1 count.

4. Repeat this test for ten readings. If the standard deviation of the readings is less than ±1 count, the balance passes the Repeatability Test.

Adjustment

If the deviation for any set of readings (using the same mass placed on the center of the Pan) is greater than ±1 count, the balance does not meet the Repeatability Test specification. Inspect and correct the following areas:

1. Check for mechanical obstructions. Any foreign object touching any part of the moving Pan can cause a balance to fail the Repeatability Test. Inspect and correct as necessary.

2. An error in the Off-Center Load Test can affect the results of the Repeatability Test. Inspect and correct if necessary. See Off-Center Load Test.

3. Foreign material or debris located in the balance between the Pan, Pan Support and the Top Cover can cause the balance to fail the test.

4. Environmental influences such as vibrations, drafts or a non-level surface can also cause failures.

5. If the balance fails the test, refer to table 2-1 Diagnostic Guide for assistance.

4.2.2 Off-Center Load Test

The Off-Center Load Test is used to determine whether displayed weight values are affected by moving the sample to different areas of the Pan.

Test

1. Place 1/2 of the balance capacity in the ***center*** of the Pan.

2. Note the reading.

3. Move the mass halfway (between the center and the edge) to the front of the Pan. Note any differences in the displayed weight reading.

4. Repeat this test for the back, left, and right positions of the Pan.

5. Maximum allowable change in displayed weight readings is ± 1 count for each of the four positions. If this reading is exceeded, it usually indicates a defective Load Cell.

4.2.3 Linearity Test

This test is used to determine the linearity of the unit throughout its operating range. The masses used to perform this test can be utility masses.

NOTE:

The balance must pass the Off-Center Load Test and Repeatability Test before the Linearity Test may be performed.

Test

Loads do not have to be test weights. They can be anything that totals the load value. The test mass can be anything that weighs near the test mass value

TABLE 4-3. AV MODELS TEST MASSES

Capacity	Test mass	Load 1	Load 2	Load 3	Load 4	Model
51g	1g	10g	25g	35g	51g	AV53
210g	1g	50g	100g	150g	200g	AV212
410g	1g	100g	200g	300g	400g	AV412
810g	1g	200g	400g	600g	800g	AV812
2100g	1g	500g	1000g	1500g	2000g	AV2101
4100g	1g	1000g	2000g	3000g	4000g	AV4101
8100g	1g	2000g	4000g	6000g	8000g	AV8101

TABLE 4-4. AS MODELS TEST MASSES

Capacity	Test mass	Load 1	Load 2	Load 3	Load 4	Model
65	1g	15g	30g	45g	60g	AS64
151	1g	40g	80g	120g	151g	AS153
210	1g	50g	100g	150g	200g	AS214
310	1g	75g	150g	225g	300g	AS312
310	1g	80g	150g	240g	310g	AS313
610	1g	150g	300g	480g	610g	AS612
810	1g	200g	400g	600g	810g	AS811
1510	1g	380g	750g	1150g	1510g	AS1502
3100	1g	780g	1500g	2300g	3100g	AS3101
3100	1g	780g	1500g	2300g	3100g	AS3102
6100	1g	1500g	3000g	4500g	6100g	AS6101
8100	1g	2000g	4000g	6000g	8000g	AS8100

1. Place the test mass on the balance and record the weight.
2. Place Load 1 on the balance and press the **ON/ZERO/*Off*** button.
3. Place the test load on the balance and record the weight.
4. Place Load 2 on the balance and press the **ON/ZERO/*Off*** button.

4.2.3 Linearity Test (Cont.)

Test (Cont.)

5. Place the test load on the balance and record the weight.

6. Place Load 3 on the balance and press the **ON/ZERO/*Off*** button.

7. Place the test load on the balance and record the weight.

8. Place Load 4 on the balance and press the **ON/ZERO/*Off*** button.

9. Place the test load on the balance and record the weight.

10. The difference in the weights of the test mass should be within the tolerance in table 4.1 or 4-2. If not, perform a linearity calibration, see Appendix A and do the test again.

4.2.4 Load Cell Adjustments (Strain Gauge Models Only)

When the balance fails the Off-Center Load test and or the Linearity test, the Load Cell may require checking and adjusting of the down stop and up stop. To make adjustments, the Load Cell Assembly must be removed from the balance. Perform procedures 3.1.1, 3.1.5 for AV models and 3.2.1, 3.2.5 for AS models and remove the Load Cell Assembly from the balance.

NOTE: These procedures will require feeler gauges ranging from 0.40mm/0.16in. to 0.65mm/0.026in.

Down Stop Adjustment

Checking and adjusting the down stop.

1. Place masses equaling mass 1 as indicated in Table 4-5 or 4-6 on the pan. You should still be able to feel some movement with a slight downward push.

2. Place masses equaling mass 2 as indicated in Table 4-5 or 4-6 on the pan. You should feel no movement with a slight downward push.

3. If the above conditions **are not met** , adjust the nuts and locktite when complete. See Figure 4-3.

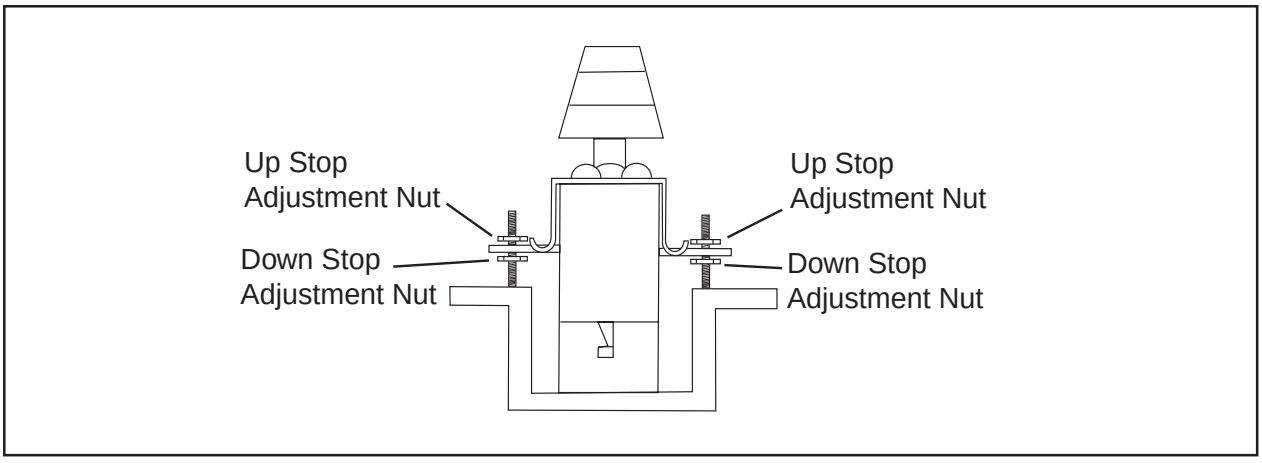


Figure 4-3. Load Cell End View - Adjustments

4.2.4 Load Cell Adjustments (Strain Gauge Models Only) (Cont.)

Up Stop Adjustment

Checking and adjusting the up stop.

CAUTION

DO NOT PULL UP ON THE LOAD CELL AS DAMAGE MAY OCCUR. USE FEELER GAUGES TO CHECK CLEARANCES.

1. Using a feeler gauge, check the clearance of the up stops. See Tables 4-6 or 4-8.

2. If the clearance is excessive, adjust the nuts using the data in Tables 4-7 or 4-8. See Figure 4-3. The screw with the nuts should be held fast while adjusting the nuts. Locktite the nuts when completed. Do not pull up on the Load Cell.

TABLE 4-5. AV MODELS TEST MASS VALUES

Balance Capacity	Mass 1	Mass 2
AV53	220	230
AV212	450	470
AV412	1300	1400
AV812	1300	1400
AV2101	13kg	14kg
AV4101	13kg	14kg
AV8101	13kg	14kg

TABLE 4-6. AS MODELS TEST MASS VALUES

Balance Capacity	Mass 1	Mass 2
AS153	220	230
AS312	450	470
AS612	1300	1400
AS811	1300	1400
AS1502	2.2kg	2.5kg
AS3101	13kg	14kg
AS6100	13kg	14kg
AS8100	13kg	14kg

4.2.4 Load Cell Adjustments (Strain Gauge Models Only) (Cont.)
Up Stop Adjustment (Cont.)

TABLE 4-7. AV MODELS LOAD CELL UP STOP ADJUSTMENT TOLERANCES

Capacity of Load Cell	Min(mm/in)	Max(mm/in)
51g	0.40/0.016	0.45/0/018
210g	0.60/0.024	0.70/0.028
410g	0.50/0/020	0.60/0.024
810g	0.65/0.026	0.75/0.030
2100g	0.75/0.030	0.90/0.035
4100g	0.75/0.030	0.90/0.035
8100g	0.75/0.030	0.90/0.035

After the transducer has been adjusted, assemble the balance retest and recalibrate.

TABLE 4-8. AS MODELS LOAD CELL UP STOP ADJUSTMENT TOLERANCES

Capacity of Load Cell	Min(mm/in)	Max(mm/in)
151g	0.40/0.16	0.45/0.018
310g	0.60/0.024	0.70/0.028
610g	0.65/0.026	0.75/0.030
810g	0.65/0.026	0/75/0.030
1510g	0.65/0.026	0.75/0.030
3100g	0.75/0.030	0.90/0.035
6100g	0.75/0.030	0.90/0.035
8100g	0.75/0.030	0.90/0.035

After the transducer has been adjusted, assemble the balance retest and recalibrate.

CHAPTER 4 TESTING

4.3 MFR LOAD CELL PERFORMANCE TESTS

4.3.1 Repeatability Test

Repeatability is a word used in balance specifications meaning the Standard Deviation of a set of similar weight readings. To determine whether a balance meets the calculated Standard Deviation value in the Specification Table 1-3, perform the following test:

Test

1. Tare the balance. The reading on the display should be 0g.

2. Select a mass weighing near the maximum capacity of the balance and place the mass on the ***center*** of the Pan. Observe and record the reading.

3. Remove the mass. Reading should return to 0g ±1 count.

4. Repeat this test for ten readings. If the standard deviation of the readings is less than ±1 count, the balance passes the Repeatability Test.

Adjustment

If the deviation for any set of readings (using the same mass placed on the center of the Pan) is greater than ±1 count, the balance does not meet the Repeatability Test specification. Inspect and correct the following areas:

1. Check for mechanical obstructions. Any foreign object touching any part of the moving Pan can cause a balance to fail the Repeatability Test. Inspect and correct as necessary.

2. An error in the Off-Center Load Test can affect the results of the Repeatability Test. Inspect and correct if necessary. See Off-Center Load Test.

3. Foreign material or debris located in the balance between the Pan, Pan Support and the Top Cover can cause the balance to fail the test.

4. Environmental influences such as vibrations, drafts or a non-level surface can also cause failures.

5. If the balance fails the test, refer to table 2-1 for assistance.

4.3.2 Checking the Off-Center Load

1. Level the balance.

2. Place test weight in the middle of the weighing pan and tare.

3. Move test weight half way to the weighing pan edge and note down the print out display values which differ from zero with sign (see examples).

4. Maximum allowable change in displayed weight readings is ± 1 count for each of the four positions. If this reading is exceeded, it usually indicates a defective Load Cell.

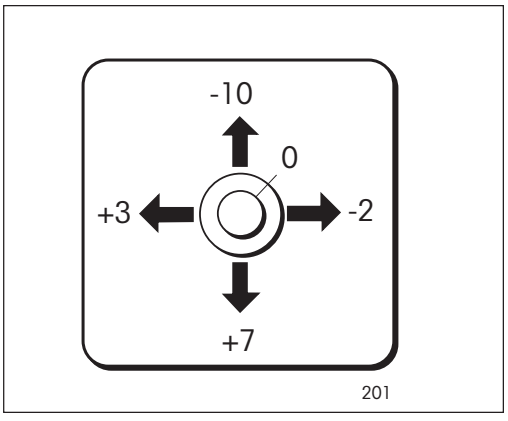


Figure 4-4. Off-Center Load.

4.3.3 Linearity Test

This test is used to determine the linearity of the unit throughout its operating range. The masses used to perform this test can be utility masses.

NOTE:

The balance must pass the Off-Center Load Test and Repeatability Test before the Linearity Test may be performed.

Test

Loads do not have to be test weights. They can be anything that totals the load value. The test mass can be anything that weighs near the test mass value

TABLE 4-9. AV MODELS TEST MASSES

Capacity	Test mass	Load 1	Load 2	Load 3	Load 4	Model
65g	1g	15g	30g	45g	60g	AV64
110g	1g	25g	50g	75g	100g	AV114
210g	1g	50g	100g	150g	200g	AV213
260g	1g	70g	140g	210g	260g	AV264
310g	1g	75g	150g	225g	300g	AV313
410g	1g	100g	200g	300g	400g	AV413
2100g	1g	500g	1000g	1500g	2000g	AV2102
3100g	1g	750g	1500g	1250g	3000g	AV3102
4100g	1g	1000g	2000g	3000g	4000g	AV4102

1. Place the test mass on the balance and record the weight.
2. Place Load 1 on the balance and press the **ON/ZERO/*Off*** button.
3. Place the test load on the balance and record the weight.
4. Place Load 2 on the balance and press the **ON/ZERO/*Off*** button.

4.3.4 Adjusting the MFR Load Cell Off-Center Load

The MFR Load Cell **is not adjusted** by means of cornerload screws, but by removing material from its top.

This is achieved by a few strokes with a nibler file exerting slight pressure as you pull the file towards you.

CAUTION:

- Do not attempt to adjust if more than 5 counts out.
- File only in positions shown in Figure 4-5.
- On completion of the adjustments, clean filing sites by removing residue with adhesive tape.

4.3.4 Adjusting the MFR Load Cell Off-Center Load (Cont.)

1. With Top Housing and Load Cell Shield removed, and power removed, install Pan Support, and weighing Pan then apply power.
2. Perform off center load test and determine error.
3. Remove Pan and Pan Support.
4. Determine associated filing position per Figure 4-5. Perform adjustment as required.
5. Repeat above steps until balance is within tolerance as per Table 4-3.
6. Turn the balance OFF and remove power
7. Remove the Pan and Pan Support.
8. Install the load Cell Shield on the balance.
9. Replace the Top Housing and and secure with two Screws.

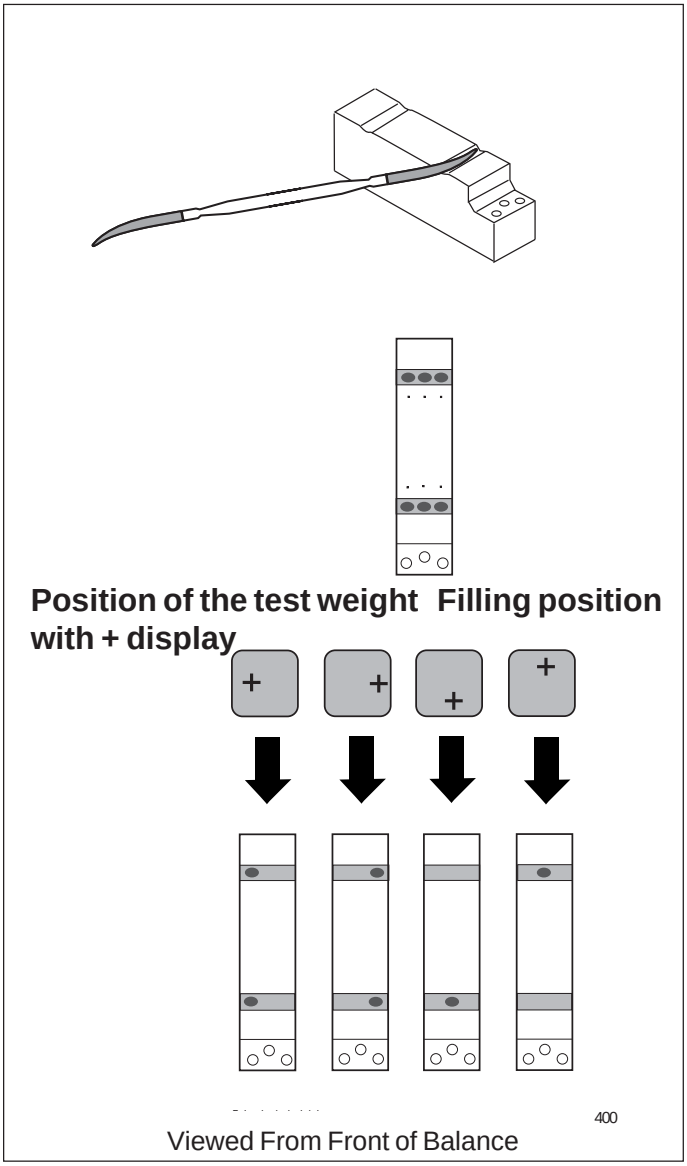


Figure 4-5. MFR Adjustments.

4.4 RS232 Interface Test AV Models Only

The RS232 Interface can have its performance monitored using an external printer or computer connected to the balance.

The RS232 Interface is a bi-directional interface which enables the balance to communicate with a printer or computer equipped with an RS232 serial port. An RS232 menu is in the balance. This menu enables various parameters such as Baud rate, Data bits, Stop Bits and Parity to be set in the balance.

The RS232 menu provides communication parameters which can be set to accommodate external printers or computers. It contains three submenus: **Baud** rate, **Parity, Data, Handshake and End** which enable you to program balance parameters and to lock the settings.

Procedure

1. Set the RS232 baud rate, parity and Handshake as required on the balance.

2. Set the communication parameters on the computer to the same settings as the balance.

3. Connect an interconnecting RS cable to the balance from the computer.

Baud Rate

This submenu is used to select the desired baud rate. B aud rates are available from: 600 to 19,200. The default setting is **2400**.

Parity

Parity can be set to 7 Odd, 7 Even, 7 No Parity or 8 No Parity. The default setting is **7 No Parity**.

Handshake

can be set to: Off, XONXOFF, Hardware. The default setting is **XONXOFF.**

4.4.1 Connecting the RS232 Interface

When the interface is connected to a computer, two way communication between the computer and balance is possible using the commands outlined in the RS232 Command Table 4-10.

Connection Data

The balance will not output any data unless pin 5 (CTS) is held in an ON state (+3 to +15 V dc). Interfaces not utilizing the CTS handshake may tie pin 5 to pin 6 to defeat it.

RS232 Commands

All communication is accomplished using standard ASCII format. Only the characters shown in the RS232 Command Table 4-10 are acknowledged by the balance. Invalid command response "ES" error indicates the balance has not recogonized the command. Commands sent to the balance must be terminated with a carriage return (CR) or carriage return-line line feed (CRLF). Data output by the Balance is always terminated with a carriage return - line feed (CRLF).

4.4.1 Connecting the RS232 Interface (Cont.)

Refer to Figure 4-6 for RS232 connector and Table 4-10 for a description of the pin functions.

RS232 Interface

On the rear of the balance, the 9-pin female subminiature “D” connector COM 1, is provided for interfacing to other devices. The pin connections are shown in the illustration below.

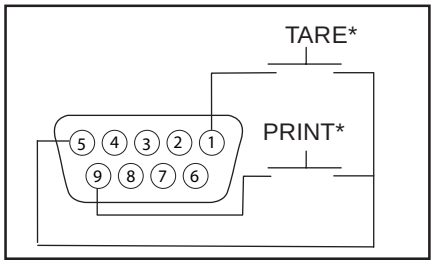


Figure 4-6. COM 1 Connector

Table 4-10. COM 1 INTERFACE PIN CONNECTIONS.

COM1 Pin Connections
1 – Remote Tare
2 – TxD
3 – RxD
4 – DSR
5 – Ground
6 – DTR
7 – CTS
8 – RTS
9 – Remote Print

* External PRINT and/or TARE switches may be installed as shown in the diagram. Momentary contact switches must be used. To enable this feature, contact your local Ohaus office.

A 6-pin Mini DIN connector is provided when the optional second RS232 interface is installed.

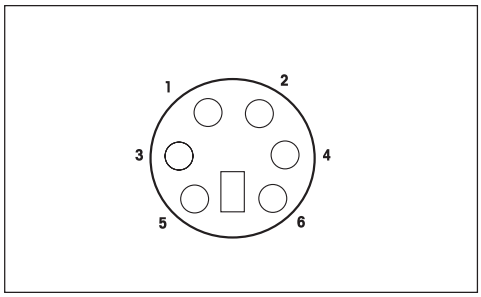


Figure 4-7. COM 2 MINI DIN Connector

Table 4-11. COM 2 INTERFACE PIN CONNECTIONS.

COM2 Pin Connections
1 – TxD
2 – RxD
3 – Ground
4 – Vout
5 – reserved for future use
6 – No connection

USB Interface

A USB Type B connector is provided when the optional USB interface is installed.

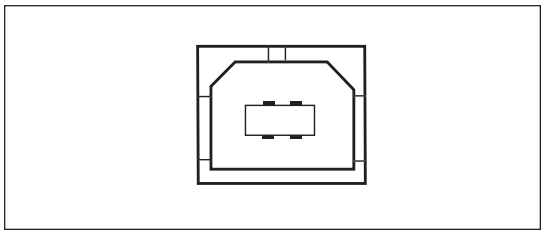


Figure 4-8. COM 2 USB Type B Connector

4.4.2 Communication

The balance is equipped with an RS232 interface (COM1). Some models are also equipped with a second RS232 interface (COM2). Connecting the balance to a computer enables you to send commands from the computer and receive data such as displayed weight from the balance.

4.4.3 Commands

Commands listed in the following table will be acknowledged by the balance. The balance will return "ES" for invalid commands.

TABLE 4-12. RS232 COMMAND TABLE

Command	Function
IP	Immediate Print of displayed weight (stable or unstable).
P	Print displayed weight (stable or unstable).
CP	Continuous Print. 0P ends Continous Print.
SP	Print displayed stable weight.
SLP	Auto Print stable non-zero displayed weight.
SLZP	Auto Print stable non-zero weight and stable zero reading.
xP	Interval Print x = Print Interval (1-3600 seconds) 0P ends Interval Print.
H	Enter Print Header Lines
Z	Same as pressing Zero Key
T	Same as pressing Tare Key.
xT	Establish a preset Tare value in grams. x= preset tare value in grams.
PT	Prints Tare weight stored in memory.
PM	Print current mode (weighing mode).
M	Scroll to the next enabled mode.
PU	Print current weighing unit.
U	Scroll to the next enabled unit.
OFF	Turns balance OFF.
ON	Turns balance on.

4.4.3 Commands (Cont.)

TABLE 4-12. RS232 COMMAND TABLE (Cont.)

Command	Function
PSN	Print Serial Number.
PV	Print Version: name, software revision and LFT ON (if LFT is set ON).
x#	Set PC reference weight (x) in grams. (Must have an APW stored.)
P#	Print PC reference weight.
x%	Set % reference weight (x) in grams. (Must have reference weight stored.)
P%	Print percent reference weight.
xAW	Set Animal Weigh Level to x. (x = 3, 7, 10, 13 seconds)
PAW	Print Animal Weigh Level.
BAW	Begin Animal cycle. (Manual Mode)
CW	Clear locked weight (weight < threshold) in Manual and Semi-Auto modes.
xCO	Set Checkweighing Over Limit in grams. (x = weight in grams)
xCU	Set Checkweighing Under Limit in grams. (x = weight in grams)
PCO	Print Checkweighing Over Limit.
PCU	Print Checkweighing Under Limit.
PTIME	Print current time.
PDATE	Print current date.
xAW	Set AW Mode, x=A (Automatic), x=S (Semi-Automatic), x= M (Manual)

4.5 Print Test

Printing data to an external computer or printer requires that the communication parameters in the RS232-1 and/or RS232-2 submenus be set to match external device communication parameters.

1. Remove all weight from the Pan.
2. Tare the balance, 0.0g should be displayed.
3. Place a calibrated mass on the Pan.
4. Press **Print** button, the computer and or a printer should indicate the mass value.

4.6 TESTING THE AC ADAPTER

The AC Adapters are available with different input voltages. Before testing the Adapter, make sure the Adapter rating agrees with the power source being used. All Adapters are rated with an output of 12 V ac at 500mA. Adapters can fail by having shorted internal windings producing low voltage output or no output at all.

1. Plug the AC Adapter in a suitable power source and measure the open circuit voltage on connector it should be 7 V dc to 17 V ac.

2. Perform procedure Section 3.1.1 or 3.2.1 and remove Top Housing. Plug the AC Adapter into the scale and measure the voltage at the AC input connector. The output voltage should be 6 Volts ac minimum, and 14 Volts ac maximum. If the voltage is above this range, replace the Adapter. If the voltage is below this range, either the Adapter is defective or the balance is drawing too much current.

4.7 INCAL MOTOR TESTING

This procedure describes how to test the calibration motor.

The InCal Motor receives power from the Main PC board when internal calibration is called for. The Motor runs on 5 Volts dc and contains an internal potentiometer that is used to determine the motor position. Figure 4-9 illustrates the wiring diagram of the motor.

To remove the calibration motor, proceed as follows:

1. Remove the balance cover in accordance with procedures in paragraph 3.2.1

2. Disconnect the motor cable from the Main PC board.

3. Refer to Figure 4-9 and apply +5 Volts dc to pin 1 (Brown wire) and -5 Volts dc to pin 2 (Orange wire) for about 10 seconds and note if the motor turns clockwise until it reaches it's internal stop. Reverse the polarity on pins 1 and 2 and apply 5 Volts dc again for 10 seconds. The motor should run in the opposite direction until the stop is reached. Observe the calibration mechanism to see if any binding or restrictions occurs. If the motor does not run, continue with the next step.

CAUTION

DO NOT APPLY POWER TO THE MOTOR LONGER THAN 10 SECONDS AS DAMAGE CAN BE CAUSED TO A GOOD MOTOR.

4. Perform procedure as described in paragraph 3.2.7 and remove the load Cell.

5. If the motor failed to run, remove the motor and repeat step 3. If the motor runs when free of the rest of the calibration mechanism, the mechanism might be jammed and requires replacement or the internal potentiometer in the motor may be defective.
   If the motor failed to run in both cases, the motor is defective and should be replaced.

4.7 INCAL MOTOR TESTING (CONT.)

6. Check the potentiometer in the motor by measuring the resistance across pins 3 and 5 it should be 5K Ohms nominal. Then measure across pins 4 to 3 and rotate the motor shaft by hand to one stop and then the other stop. The resistance should change uniformly throughout the range of movement. Measure across pins 4 and 5 and again rotate the motor shaft in one direction and then the other. The resistance should change uniformly. If there is a short or open winding, the motor must be replaced. The potentiometer determines the shaft position by circuitry on the Main PC board.

7. If the motor appears to be good after all tests, examine the lifting mechanism and belt drive.

Note: If the Motor and InCal Mechanism funtion properly during this test procedure, the Main PC board may be defective.

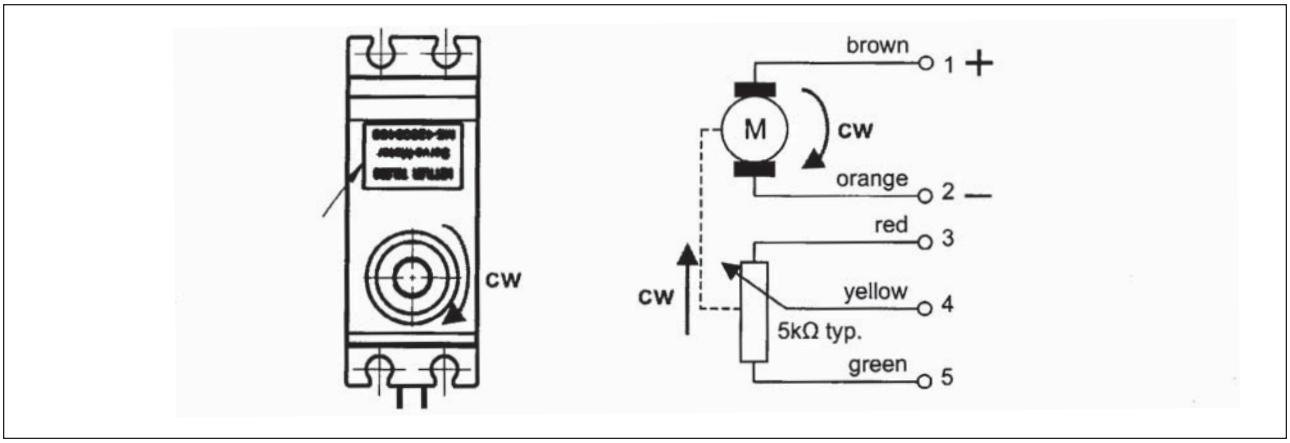


Figure 4-9. Motor Wiring Diagram.

5.1 DRAWINGS

This section of the manual contains an exploded view and parts lists. The exploded view drawing is designed to identify the parts which can be serviced on the balance in the field.

NOTE:

In all cases where a part is replaced, the balance must be thoroughly checked after the replacement is made. The balance **MUST** meet the parameters of all applicable specifications in this manual.

If further technical information is needed, in the United States call Ohaus Aftermarket toll-free 1-800-526-0659 between 8.00 a.m. and 4.00 p.m. EST. An Ohaus factory service technician will be available to provide assistance. Outside the U.S.A., please contact:

Ohaus Corporation
19 Chapin Road
Pine Brook, NJ 07058, USA
www.ohaus.com
Tel: (973) 377-9000,
Fax: (973) 593-0359

MODEL DESIGNATIONS:

The following table explains the various model designations, capacities, readabilty and approvals used with the Adventurer Pro (AV models) and the Adventurer Pro (SL models).

XXX-XXXX-XXX

- MODEL=AV or AS
- G=GRAMS ONLY
- CAPACITY IN GRAMS
- READABILITY
  - 0 = 1 g
  - 1 = 0.1 g
  - 2 = 0.01 g
  - 3 = 0.001 g
  - 4 = 0.0001 g
- TYPE
  - C = Internal Calibration (InCal)
  - D = Dual Range
  - N = NTEP Approval
  - M = OIML Approval
  - R = 2nd RS232 installed
  - U = USB equipped

Example: **AVG-2101-NR**

This is a model Adventurer Pro (AV) with a 2100 gram capacity, grams only, with a readability of 0.1g, NTEP approved and contains a second RS232 port.

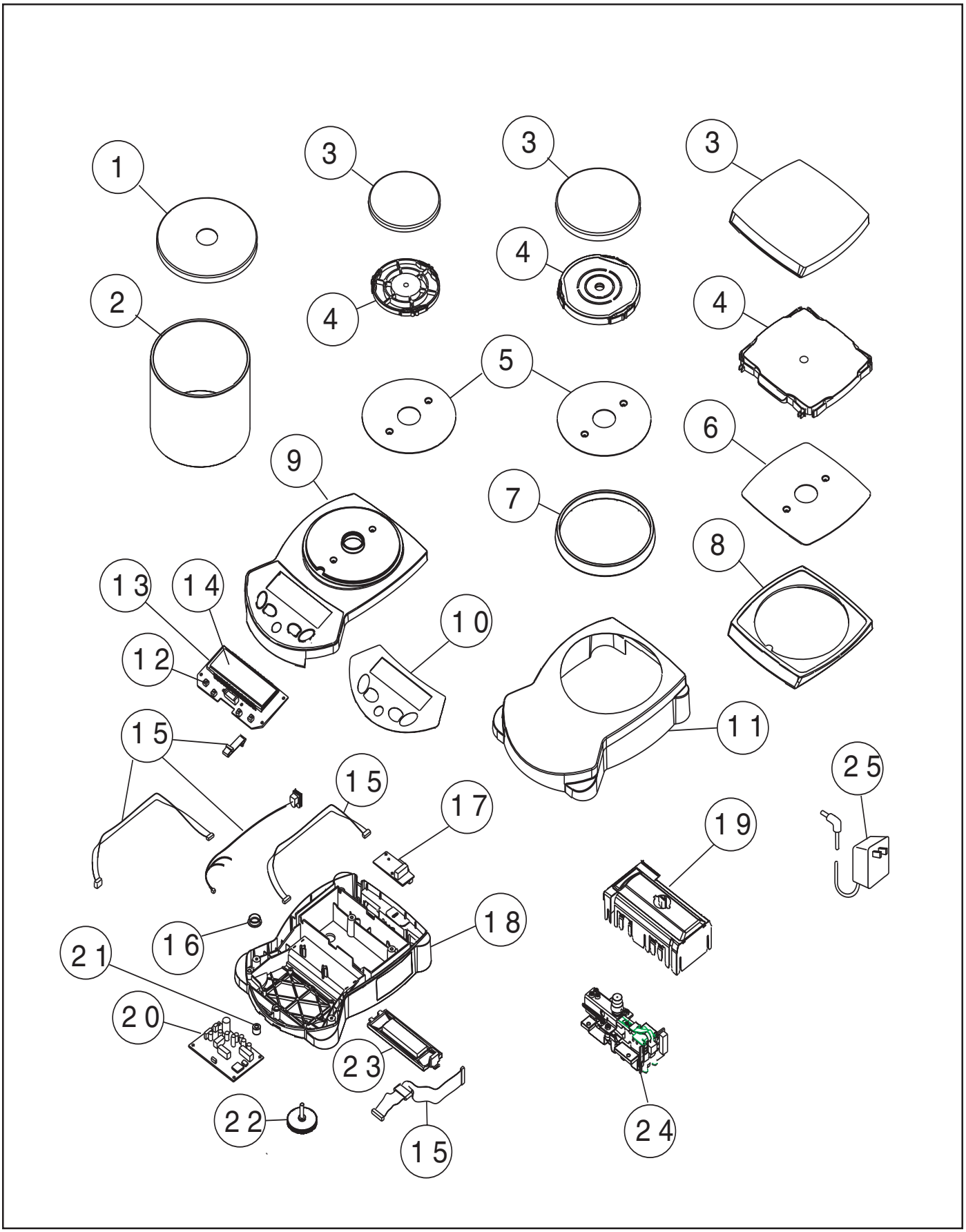


Figure 5-1. Adventurer AS and AV Models, Small Frames, Exploded View.

5.2 PARTS LISTS

This section of the manual contains the replaceable parts for the Adventurer AS and AV Balances.

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS

KEY NO.	PART NO.	DESCRIPTION
1	12102937	Draft Shield Top, AV53, M, N, NR, NU, R, U, AS153, ASG153 AVG53, R, U.
2	12102938	Draft Shield Body, AV53, M, N, NR, NU, R, U, AS153, ASG153 AVG53, R, U.
3	12103941	Pan, 5.8" x 6.3", 149mm x 162mm, AV412, R, U, DM, DMR, DMU, N, NR, NU AVG412, R, U, AV811, R, AVG811, R, AV812, R, U, M, MR, MU, N, NR, NU AVG812, R, U, AV2101, R, U, DM, DMR, DMU, N, NR, NU AVG2101, R, U, AV4101, R, U, DM, DMR, DMU, N, NR, NU AVG4101, R,U, AV8100, R, AVG8100, R, AV8101, R, U, M, MR, MU, N, NR, NU AVG8101, R, U, AS612; ASG612; AS811; ASG811; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100; ASG8100.
3	12102940	Weighing Pan, 4.7 dia, 120mm dia, AV212, R, U, DM, DMR, DMU, N, NR, NU AVG212, R, U, AS312, ASG312.
3	12102939	Weighing Pan, 3.9" dia, 100mm dia, AV53, R, U, N, NR, NU, M AVG53, R, U, AS153, ASG153.
4	12103944	Pan Support, 5.8" x 6.3", 149mm x 162mm, AV412, R, U, DM, DMR, DMU, N, NR, NU AVG412, R, U, AV811, R, AVG811, R, AV812, R, U, M, MR, MU, N, NR, NU,

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
4	12103944	Pan Support, 5.8" x 6.3", 149mm x 162mm (Cont.) AVG812, R, U, AV2101, R, U, DM, DMR, DMU, N, NR, NU AVG2101, R, U, AV4101, R, U, DM, DMR, DMU, N, NR, NU AVG4101, R,U, AV8100, R, AVG8100, R, AV8101, R, U, M, MR, MU, N, NR, NU AVG8101, R, U, AS612; ASG612; AS811; ASG811; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100; ASG8100.
4	12102943	Pan Support, 4.7" dia, 120mm dia, AV212, R, U, DM, DMR, DMU, N, NR, NU AVG212, R, U, AS312, ASG312.
4	12102942	Pan Support, 3.9" dia, 100mm dia, AV53, R, U, N, NR, NU, M AVG53, R, U, AS153, ASG153.
5	12102947	EMC Plate, round, AV53, R, U, N, NR, NU, M AVG53, R, U, AV212, R, U, DM, DMR, DMU, N, NR, NU AVG212, R, U, AS153, ASG153 AS312, ASG312.
6	12103948	EMC Plate square, AV412, R, U, DM, DMR, DMU, N, NR, NU AVG412, R, U, AV812, R, U, M, MR, MU, N, NR, NU AVG812, R, U, AV2101, R, U, DM, DMR, DMU, N, NR, NU AVG2101, R, U, AV4101, R, U, DM, DMR, DMU, N, NR, NU AVG4101, R,U, AV8101, R, U, DM, DMR, DMU, N, NR, NU AVG8101, R, U, AS612; ASG612; AS811; ASG81; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100; ASG8100.

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
7	12103945	Windring, AV212, R, U, DM, DMR, DMU, N, NR, NU AVG212, R, U AS312, ASG312.
8	12103946	Adapter Ring, square, AV412, R, U, DM, DMR, DMU, N, NR, NU AVG412, R, U AV812, R, U, M, MR, MU, N, NR, NU AVG812, R, U AV2101, R, U, DM, DMR, DMU, N, NR, NU AVG2101, R, U AV4101, R, U, DM, DMR, DMU, N, NR, NU AVG4101, R,U AV8101, R, U, DM, DMR, DMU, N, NR, NU AVG8101, R, U AS612; ASG612; AS811; ASG811; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100; ASG8100.
9	12103854	Top Housing, (See Note 1)
10	12103929	Function Label, AV, (See Note 2)
10	12103853	Function Label, AS, (See Note 3)
11	12103980	In-use Cover, (See Note 1)
12	12103905	Switch, Set of 4, (See Note 1)
13	12103901	Display Board Assembly Complete, AV, (See Note 2)
13	12103850	Display Board Assembly Complete, AS, (See Note 3)
14	12103904	LCD & backlight, AV, (See Note 2)

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
14	12103851	LCD, AS, (See Note 3)
15	12103910	Cables, Set of 5 (See Note 1)
16	12103925	Weigh Below Cover (See Note 1)
17	12103902	RS232 Interface Board Assembly, AV (See Note 2)
18	12103920	Bottom Housing, (See Note 1)
19	12103927	Load Cell Shield with tape (See Note 1)
20	12103900	Main Board Assembly, AV (See Note 2)
20	12103881	Main Board Assembly, AS (See Note 3)
21	12103936	Level, (See Note 1)
22	12103923	Feet, Set of 4, (See Note 1)
23	12103926	Battery Compartment Cover (See Note 1)
24	42904570	Kit, Load Cell replacement, AV53, R, U, N, NR, NU, M AVG53, R, U, AS153, ASG153.
24	42904571	Kit, Load Cell replacement, AV212, R, U, AVG212, R, U AS312, ASG312.

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
24	42904572	Kit, Load Cell replacement, AV212DM , DMR, DMU, N, NR, NU.
24	42904573	Kit, Load Cell replacement, AV412, R, U, DM, DMR, DMU, N, NR, NU AVG412, R, U AV812, R, U, M, MR, MU, N, NR, NU AVG812, R, U, AS612, ASG612.
24	42904574	Kit, Load Cell replacement, AV811, R, AVG811, AVG811R AS811, ASG811.
24	42904575	Kit, Load Cell replacement, AS1502.
24	42904576	Kit, Load Cell replacement, AV2101, R, U, DM, DMR, DMU, N, NR, NU AVG2101, R, U AV4101, R, U, DM, DMR, DMU, N, NR, NU AVG4101, R,U AV8101, R, U, N, M, MR, MU, NR, NU AVG8101, R, U AS3101, ASG3101 AS6101, ASG6101.
24	42904577	Kit, Load Cell replacement, AV8100, R, AVG8100, AVG8100R, AS8100, ASG8100.
25	12102323	Adapter, 230V/AU
25	12102322	Adapter, 240V/GB
25	12102321	Adapter, 230V/EU
25	12102320	Adapter, 120V/US
999	12103928	Hardware kit (See Note 1)

TABLE 5-1. REPLACEMENT PARTS LIST FOR AV AND AS SMALL FRAME MODELS (Cont.)

NOTES:

1. All Models:
   AV53, R, U, N, NR, NU, M,
   AVG53, R, U,
   AV212, R, U, DM, DMR, DMU, N, NR, NU,
   AVG212, R, U,
   AV412, R, U, DM, DMR, DMU, N, NR, NU,
   AVG412, R, U,
   AV811, R,
   AVG811, R,
   AV812, R, U, M, MR, MU, N, NR, NU,
   AVG812, R, U,
   AV2101, R, U, DM, DMR, DMU, N, NR, NU,
   AVG2101, R, U,
   AV4101, R, U, DM, DMR, DMU, N, NR, NU,
   AVG4101, R,U,
   AV8100, R,
   AVG8100, R,
   AV8101, R, U, M, MR, MU, N, NR, NU,
   AVG8101, R, U,
   AS153, ASG153,
   AS312; ASG312; AS612; ASG612; AS811; ASG811; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100, ASG8100.

2. All AV Models:
   AV53, R, U, N, NR, NU, M,
   AVG53, R, U,
   AV212, R, U, DM, DMR, DMU, N, NR, NU,
   AVG212, R, U,
   AV412, R, U, DM, DMR, DMU, N, NR, NU,
   AVG412, R, U,
   AV811, R,
   AVG811, R,
   AV812, R, U, M, MR, MU, N, NR, NU,
   AVG812, R, U,
   AV2101, R, U, DM, DMR, DMU, N, NR, NU,
   AVG2101, R, U ,
   AV4101, R, U, DM, DMR, DMU, N, NR, NU,
   AVG4101, R,U,
   AV8100, R,
   AVG8100, R,
   AV8101, R, U, M, MR, MU, N, NR, NU
   AVG8101, R, U.

3. All AS Models:
   AS153, ASG153,
   AS312; ASG312; AS612; ASG612; AS811; ASG811; AS1502; AS3101; ASG3101; AS6101; ASG6101; AS8100; ASG8100.

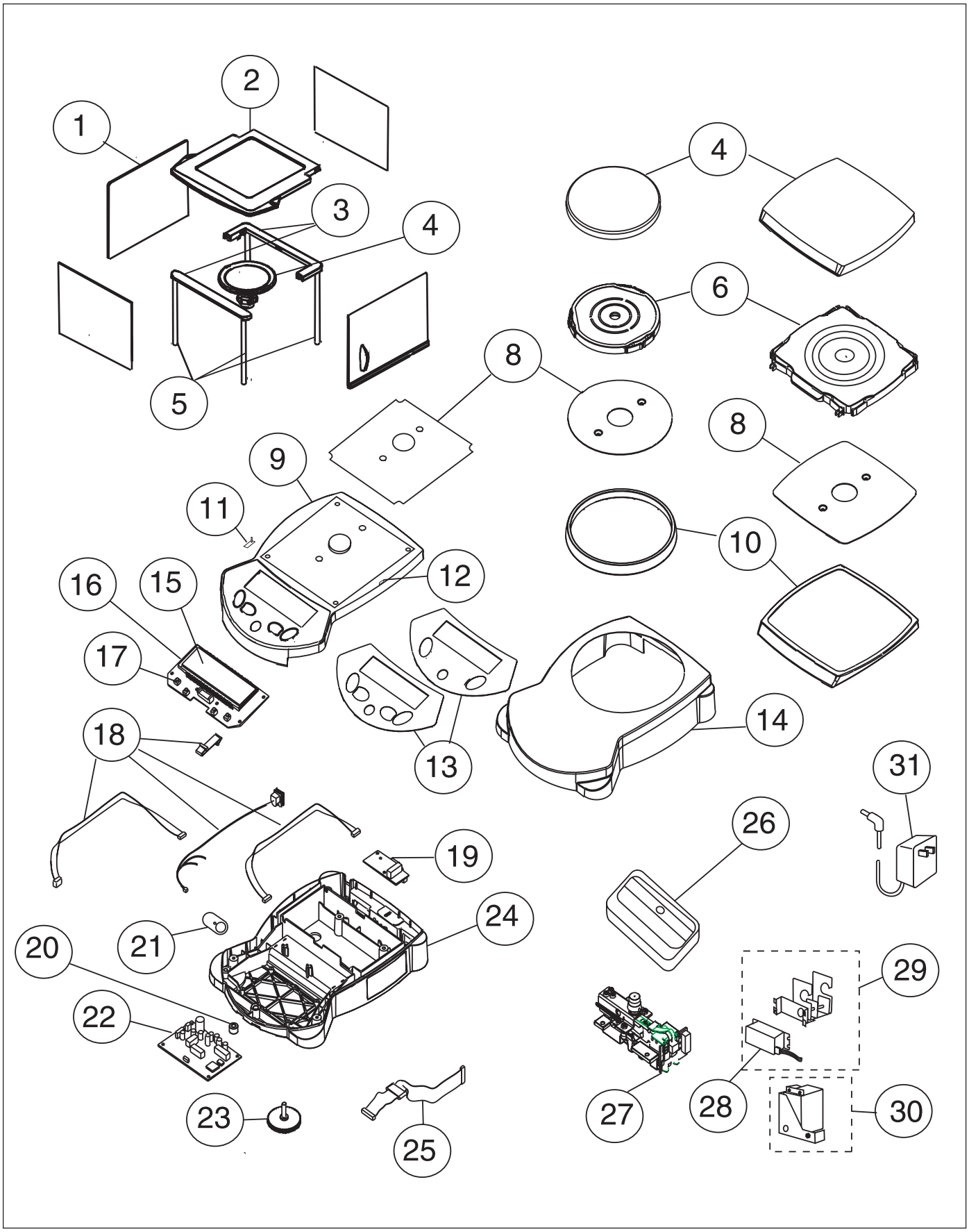


Figure 5-2. Adventurer AS and AV Models, Large Frames, Exploded View.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS

KEY NO.	PART NO.	DESCRIPTION
1	12103875	Draft Shield Glass 4 sides (tall)
2	12103873	Draft Shield Top
3	12103874	Draft Shield Frame Set
5	12103885	Draft Shield Posts (set of 4 tall) AV64, R, U, C, CR, CU, CN, CNR, CNU, AVG64R, U, C, CR, AV114, R, U, CR, CU, CM, CMR, CMU, CNR, CNU, C, AVG114, R, U, C, CR, CU, AV214, C, CR, CU, R, U, AV264, R. U, C, CR, CU, CM, CMR, CMU, CNU, CN, CNR, AVG264, R, U, C, CR, CU, AS64, ASG64, AS214, ASG214.
1	12103876	Draft Shield Glass 4 sides (short),
2	12103873	Draft Shield Top,
3	12103874	Draft Shield Frame Set
5	12103886	Draft Shield Posts (set of 4 short) AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG213C, CR, CU, AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG313, R, U, C, CR, CU AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG413, R, U, C, CR, CU, AS313, ASG313.
4	12103856	Weighing Pan, 3.5" dia., 90mm dia. AV64, R, U, C, CR, CU, CN, CNR, CNU, AVG64, R, U, C, CR, CU, AV114, R, U, CR, CU, CM, CMR, CMU, CNR, CNU, C, AVG114, R, U, C, CR, CU, AV214, C, CR, CU, R, U, AV264, R. U, C, CR, CU, CM, CMR, CMU, CNU, CN, CNR, AVG264, R, U, C, CR, CU, AS64, ASG64, AS214, ASG214.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
6	12102943	Pan Support, 4.7" x 120 mm AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG212C, CR, CU, AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG213C, CR, CU, AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG313, R, U, C, CR, CU, AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG413, R, U, C, CR, CU, AS313, ASG313.
8	12103887	EMC Plate, Square, Draft Shield Balances AV64, R, U, C, CR, CU, CN, CNR, CNU, AVG64R, U, C, CR, CU, AV114, R, U, CR, CU, CM, CMR, CMU, CNR, CNU, C, AVG114, R, U, C, CR, CU, AV264, R, U, C, CR, CU, CM, CMR, CMU, CNU, CNR, CN, AVG264, R, U, C, CR, CU, AS64, ASG64, AS214, ASG214, AS313, ASG313, AVG213, C, CR, CU, R, U, AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG313, R, U, C, CR, CU, AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG413, R, U, C, CR, CU AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AV214, C, R, CR, U, CU.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
8	12103861	EMC Plate, Square - InCal Balances AV2101C, R, U, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG2101C, R, U, AV2102C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG2102C, CR, CU, AV3102C, CR, CU, CN, CNR, CNU, AVG3102C, CR, CU, AV4101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG4101C, CU, AV4102C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG4102C, CR, CU, AV412C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG412C, CR, CU, AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG8101C, CR, CU, AV812C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG812C, CR, CU.
8	12103883	EMC Plate, Square - Non InCal Balances AV2102, R, U, N, NR, NU, AVG2102, R, U, AV3102, R, U, N, NR, NU, AVG3102, R, U, AV4102, R, U, N, NR, NU, AVG4102, R, U, AS3102, ASG3102.
8	12103860	EMC Plate - For Round Wind ring AV212C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG212C, CR, CU.
9	12103852	Top Housing (See Note 1)
10	12103859	Wind Ring, Square, AV412C, CR, CU, CN, CNR, CNU, CDM, CDMR, CDMU, AVG412C, CR, CU, AV812C, CR, CU, CM, CN, CMR, CMU, CNR, CNU, AVG812C, CR, CU, AV2101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG2101C, CU, CR, AV2102C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG2102C, CR, CU, AV3102C, CR, CU, CN, CNR, CNU,

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
10	12103859	Wind Ring, Square (Cont.) AVG3102C, CR, CU, AV4101C, CU, CR, CN, CNR, CNU, CDM, CDMR, CDMU, AVG4101C, CU, AV4102C, CU, CM, CMR, CMU, CN, CNR, CNU, CR, AVG4102C, CR, CU, AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG8101C, CR, CU.
10	12103945	Windring, Round AV212C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG212C, CR, CU.
11	12103877	Positioning Pin, Included in Hardware Kit
12	12103877	Door Guide, Included in Hardware Kit
13	12103929	Function Label, AV (See Note 2)
13	12103853	Function Label, AS (See Note 3)
14	12103879	In-use Cover, (See Note 1)
15	12103904	LCD, AV (See Note 2)
15	12103851	LCD, AS (See Note 3)
16	12103901	Display Board Assembly Complete, AV, (See Note 2)
16	12103850	Display Board Assembly Complete, AS, (See Note 3)
17	12103905	Switch, Set of 4, (See Note 1)

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
18	12103862	Cables, Set of 4 (See Note 1)
19	12103902	RS232 Interface Board Assembly, AV (See Note 2)
20	12103863	Level, (See Note 1)
21	12103864	Weigh Below Cover, (See Note 1)
22	12103866	Main PC Board Assembly, AV, MFR (See Note 2)
22	12103882	Main PC Board Assembly AS (See Note 3)
22	12103865	Main PC Board Assembly, AV, SG
23	12103923	Feet, Set of 4, (See Note 1)
24	12103855	Bottom Housing, (See Note 1)
25	42904907	Load Cell Cable, Strain Gauge AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG212C, CR, CU, AV412C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG412C, CR, CU, AV812C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG812C, CR, CU, AV2101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG2101C, CR, CU, AV4101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG4101C, CU, AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG8101C, CR, CU.
25	42904902	Load Cell Cable, (MFR Load Cells over 410g) AS3102, ASG3102, AV2102, C, CM, CMR, CMU, CN, CNR, CR, CU, N, NR, NU, R, U, AVG2102, C, CR, CU, R, U, AV3102, C, CN, CNR, CNU, CR, CU, N, NR, NU, R, U, AVG3102, C, CR, CU, R, U, AV4102, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U, AVG4102, C, CR, CU, R, U.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
25	42904903	Load Cell Cable, (MFR Load Cells up to 410g) AS64, ASG64, AS214, ASG214, AS313, ASG313, AV64,C, CN, CNR, CNU, CR, CU, R, U, AVG64C, CR, CU, R, U, AV114, C, CM, CMR, CMU, CNR, CNU, CR, CU, R, U, AVG114, C, CR, CU, R, U, AV213, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U, AVG213C, CR, CU, R, U, AV214, C, CR, CU, R, U, AV264, C, CM, CMR, CMU, CN, CNR, CR, CU, R, U, CNU, AVG264, C, CR, CU, R, U, AV313, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U, AVG313, C, CR, CU, R, U, AV413, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U, AVG413, C, CR, CU, R, U.
26	12103884	Load Cell Shield (See Note 1)
27	42904505	Kit, Load Cell Replacement, MFR AV64, R, U, C, CR, CU, CN, CNR, CNU, AVG64C, R, U, CR, CU AV114, C, R, U, CR, CU, CM, CMR, CMU, CNR, CNU, AVG114, R, U, C, CR, CU, AV214, C, CR, CU, R, U, AV264, R. U, C, CR, CU, CM, CN, CNR, CMR, CMU, CNU, AVG264, R, U, C, CR, CU, AS64, ASG64, AS214, ASG214.
27	42904515	Kit, Load Cell Replacement, MFR AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG213C, CR, CU, R, U AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
27	42904515	Kit, Load Cell Replacement, MFR (Cont.) AVG313, R, U, C, CR, CU, AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG413, R, U, C, CR, CU, AS313, ASG313.
27	42904525	Kit, Load Cell Replacement, MFR AS3102, ASG3102, AV2102, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, CN, CNR, N, NR, NU, AVG2102, C, CR, CU, R, U AV3102, C, CR, CU, CN, CNR, CNU, N, NR, NU, R, U, AVG3102, C, CR, CU, R, U AV4102, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, N, NR, NU,R, U AVG4102, C, CR, CU, R, U.
27	42904560	Kit, Load Cell Replacement, SG AV2101C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG2101C, CR, CU, AV4101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG4101C, CU, AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG8101C, CR, CU.
27	42904561	Kit, Load Cell Replacement, SG AV412C, CR, CU, CDM, CDMR, CDMU, CN,CNR, CNU, AVG412C, CR, CU, AV812C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, AVG812C, CR, CU.
27	42904562	Kit, Load Cell Replacement, SG AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG212C, CR, CU.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
28	42904906	InCal Motor AV64C, CR, CU, CN, CNR, CNU, AVG64C, CR, CU AV114C, CR, CU, CM, CMR, CMU, CNR, CNU, AVG114C, CR, CU, AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU, AVG212C, CR, CU, AV213C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG213C, CR, CU, AV214C, CR, CU, AV264C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG264C, CR, CU, AV313C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG313C, CR, CU, AV412C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG412C, CR, CU, AV413C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG413C, CR, CU, AV812C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG812C, CR, CU, AV2101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG2101C, CR, CU, AV2102C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG2102C, CR, CU, AV3102C, CR, CU, CN, CNR, CNU, AVG3102C, CR, CU, AV4101C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG4101C, CU, AV4102C, CR, CU, CDM, CDMR, CDMU, CN, CNR, CNU, AVG4102C, CR, CU, AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG8101C, CR, CU.
29	42904900	InCal Assembly, Magnetic Force Restoration (MFR) AV64C, CR, CU, CN, CNR, CNU, AVG64C, CR, CU, AV114C, CR, CU, CM, CMR, CMU, CNR, CNU, AVG114C, CR, CU, AV213C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG213C, CR, CU, AV264C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG264C, CR, CU, AV313C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, AVG313C, CR, CU,

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

KEY NO.	PART NO.	DESCRIPTION
29	42904900	InCal Assembly, Magnetic Force Restoration (MFR)
30	42904901	InCal Assembly, Strain Gauge (SG)
31	12102323	Adapter, 230V/AU,
31	12102322	Adapter, 240V/GB,
31	12102321	Adapter, 230V/EU,
31	12102320	Adapter, 120V/US,
999	12103928	Hardware kit, (See Note 1)

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

NOTES:

1. All Models:
   AV64, R, U, C, CR, CU, CN, CNR, CNU,
   AVG64, C, CR, CU, R, U,
   AV114, C, R, U, CR, CU, CM, CMR, CMU, CNR, CNU,
   AVG114, R, U, C, CR, CU,
   AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG212C, CR, CU,
   AV264, R. U, C, CR, CU, CN, CNR, CMR, CMU, CNU, CM,
   AVG264, C, R, U, CR, CU,
   AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG213C, CR, CU, R, U,
   AV214, C, U, R, CU, CR,
   AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG313, R, U, C, CR, CU,
   AV412C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG412C, CR, CU,
   AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG413, R, U, C, CR, CU,
   AV812C, CM, CMR, CMU, CN, CNR, CNU, CR, CU,
   AVG812C, CR, CU,
   AV2101C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG2101C, CR, CU,
   AV2102, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U,
   AVG2102, C, CR, CU, R, U,
   AV3102, C, CN, CNR, CNU, CR, CU, N, NR, NU, R, U,
   AVG3102, C, CR, CU, R, U,
   AV4101C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG4101C, CU,
   AV4102, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, N, NR, R, U, NU,
   AVG4102, C, CR, CU, R, U,
   AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG8101C, CR, CU,
   AS64, ASG64;
   AS214; ASG214;
   AS313; ASG313;
   AS3102; ASG3102.

TABLE 5-2. REPLACEMENT PARTS LIST FOR AV AND AS LARGE FRAME MODELS (Cont.)

NOTES (Cont.):

2. All AV Models:
   AV64, R, U, C, CR, CU, CN, CNR, CNU,
   AVG64, C, CR, CU, R, U,
   AV114, C, R, U, CR, CU, CM, CMR, CMU, CNR, CNU,
   AVG114, R, U, C, CR, CU,
   AV212C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG212C, CR, CU,
   AV264, R. U, C, CR, CU, CN, CNR, CMR, CMU, CNU, CM,
   AVG264, C, R, U, CR, CU,
   AV213, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG213C, CR, CU, R, U,
   AV214, C, U, R, CU, CR,
   AV313, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG313, R, U, C, CR, CU,
   AV412C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG412C, CR, CU,
   AV413, R, U, N, NR, NU, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG413, R, U, C, CR, CU,
   AV812C, CM, CMR, CMU, CN, CNR, CNU, CR, CU,
   AVG812C, CR, CU,
   AV2101C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG2101C, CR, CU,
   AV2102, C, CM, CMR, CMU, CN, CNR, CNU, CR, CU, N, NR, NU, R, U,
   AVG2102, C, CR, CU, R, U,
   AV3102, C, CN, CNR, CNU, CR, CU, N, NR, NU, R, U,
   AVG3102, C, CR, CU, R, U,
   AV4101C, CDM, CDMR, CDMU, CN, CNR, CNU, CR, CU,
   AVG4101C, CU,
   AV4102, C, CR, CU, CM, CMR, CMU, CN, CNR, CNU, N, NR, R, U, NU,
   AVG4102, C, CR, CU, R, U,
   AV8101C, CR, CU, CM, CMR, CMU, CN, CNR, CNU,
   AVG8101C, CR, CU,

3. All AS Models:
   AS64, ASG64
   AS214, ASG214 ,
   AS313, ASG313,
   AS3102, ASG3102

A. STANDARD CALIBRATION

Adventurer Pro balances can be calibrated in two ways: Span calibration or Linearity calibration. Span calibration resets the balance's weighing range using two weight values: zero and a weight value between 25% and 100% of the balance's capacity. Linearity calibration minimizes deviation between actual and displayed weights within the balance's weighing range. Three weight values are used: zero, a weight value at or near the midpoint of the balance's weighing range and a weight at or near the balance's specified capacity. Calibration should be performed when the Load Cell and or the Main PC board is replaced. Table 1-1 in Chapter 1 specifies span, linearity and alternate span calibration points.

A.1 Span Calibration

When the balance is repaired, it must be calibrated to ensure accurate weighing results. Be sure to have the appropriate calibration weights available before beginning calibration.

1. Press and hold the ***Menu-Cal*** button until MENU is displayed, then release the button. CALIBRATE (blinking) is displayed.

2. Press the **Yes** button to enter calibration menu.

3. Press the **Yes** button to initiate span calibration. Press the Exit button at any time to abort calibration.

4. First the zero reading is taken. Next the primary display shows the default span calibration weight value. Press **No** to change to an alternate calibration weight. Press Yes when the desired calibration weight is displayed.

5. Place the specified calibration weight on the platform. After calibration, remove the weight from the pan.

A.2 Linearity Calibration

When the balance has been repaired, perform linearity calibration.

1. Select LINEARITY from the CAL sub-menu.

2. Press the Yes button and follow screen instructions. Use the weight values shown on the primary display.

3. After calibration, remove the weight from the pan.

B. SERVICE CALIBRATION

This section describes the Service Menu and sub-menus, which allows authorized service personnel to perform factory Span and Linearity calibrations. Please refer to the Menu Structure diagram. The Service Menu cannot be entered while LFT is ON.

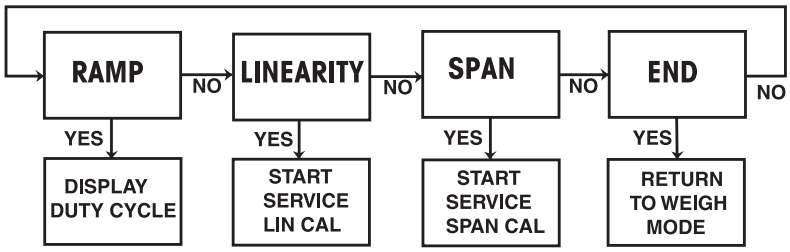


Figure B.1 Service Mode Menu.

B.1 Navigation

In general, a blinking item in the primary or secondary display indicates a choice is required. In the case of a blinking sub-menu on the primary display, pressing **Yes** (**On/Zero *Off***) button selects the displayed sub-menu (stop blinking) and the first available menu item in the sub-menu is shown on the secondary display (blinking), while pressing the **No** (**Print *Unit***) button causes the next (or previous) sub-menu to be shown on the primary display (blinking).

B.2 Entering Service Menu

1. Turn the balance off.

2. The Service Menu is entered by pressing and holding the **On/Zero *Off*** and **Tare** buttons until the balance turns on, this can take up to 10 seconds. As the balance powers up, the display advances through several screens. MENU is displayed with RAMP flashing.

B.3 Ramp

The first sub-menu in the Service Menu is Ramp. The ramp display shows the percentage of use of the A to D circuit. The normal range for the ramp value is 25-75%. The value is not as important as how it changes. It should increase as the weight on the balance is increased. The ramp display should remain constant without fluctuations. It is ok for the last digit to fluctuate as long as it stabilizes with the addition of a small mass.

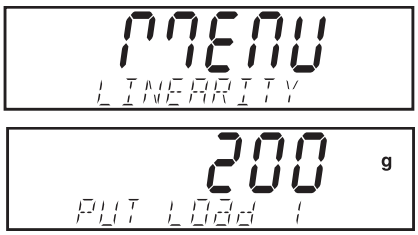
1. To view the Ramp value, press the **Yes** button. A number will appear on the upper portion of the display and should be constant. Place different value masses on the balance from minimum to maximum capacity. The reading will increase but should not fluctuate. Example at the right is with no weight on the pan. Reading will vary with other balances.

2. To exit or skip the ramp function, press the **No** button. The balance advances to the Linearity calibration menu.

APPENDIX B SERVICE CALIBRATION

B.4 Linearity Calibration

1. Press the **Yes** button, to enter the Service Linearity Calibration function. The display indicates the calibration weight on the first line and 'PUT LOAD 1" on the second line. The examples shown are for a 400g balance. Press the **No** button to skip.



2. Place the indicated mass on the balance. After a short period, the bottom line of the display indicates "ADD LOAD 2". The example shown is for a 400g balance.

3. Add the indicated mass shown on the first line. After a short period of time, the second line of the display indicates "OFF LOAD 1" .

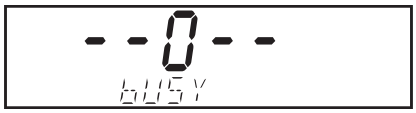
4. Remove the first mass from the balance. After a short period of time, the second line of the display indicates "OFF LOAD 2" .

5. Remove the second mass from the balance. The display now breifly indicates "LINEAR" on the first line "DONE" on the second line. The balance automatically advances to span calibration.

B.5 Span Calibration

When in span calibration, the display "MENU" is on the first line, "SPAN" is shown on the second line.

1. Press the **Yes** button to enter span calibration, the display might briefly show "--0--" on the first line and "BUSY" on the second line. The display then changes indicating the required calibration mass on the first line with instructions "PUT WEIGHT"on the second line. Press the **No** button to skip.



2. Place the required mass on the pan. After a few seconds, the display indicates "0g" on the first line with instructions to "CLEAR PAN" on the second line.

3. Remove masses from the pan. After a short time, the display will indicate "SPAN" on the first line and "DONE" on the second line. It will then display "MENU" on the first line and "END" on the second line.

4. Press the **Yes** button, the balance exits the service menu and returns to a weighing mode.

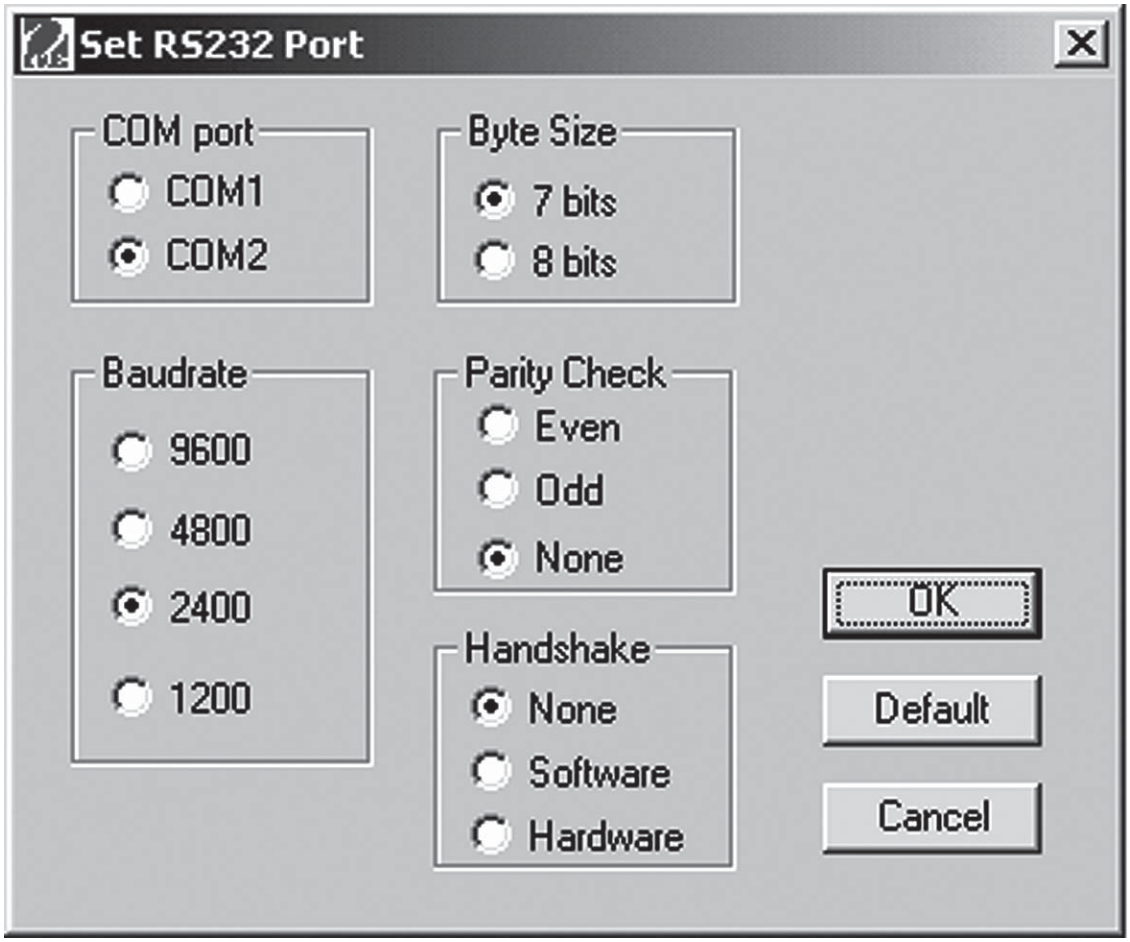
C. SOFTWARE SERVICE TOOL INSTRUCTIONS

This tool is used for three purposes:

1. To restore EEPROM data.
2. Install a new load cell.
3. Update the software in the balance.

To install the software, run Setup.exe

After installation, run the program Adventurer Pro Service tool. The program will have 3 tabs across the top of the screen. Click on the tab for the function you wish to perform. If the default settings for communication have been changed, click on settings and change the settings in the software to match.



APPENDIX C ADVENTURER PRO SOFTWARE SERVICE TOOL INSTRUCTIONS

C.1 To Restore the EEPROM data:

1. Record the following information from the balance to be repaired:
   a. Serial Number from the label on the side of the balance.
   b. Model Number from the label on the side of the balance.
   c. All the information from the label inside the battery compartment.

2. Contact Ohaus Corporation in Pine Brook NJ, and request the data file to down load. The information recorded above will need to be provided with your request.

3. After receiving the data file from Ohaus, remove the batteries from the balance and power it from an AC adapter.

4. Connect the balance to your computer and start the Adventurer Pro Service Tool Software.

5. Click on the tab labeled Restore EEPROM.

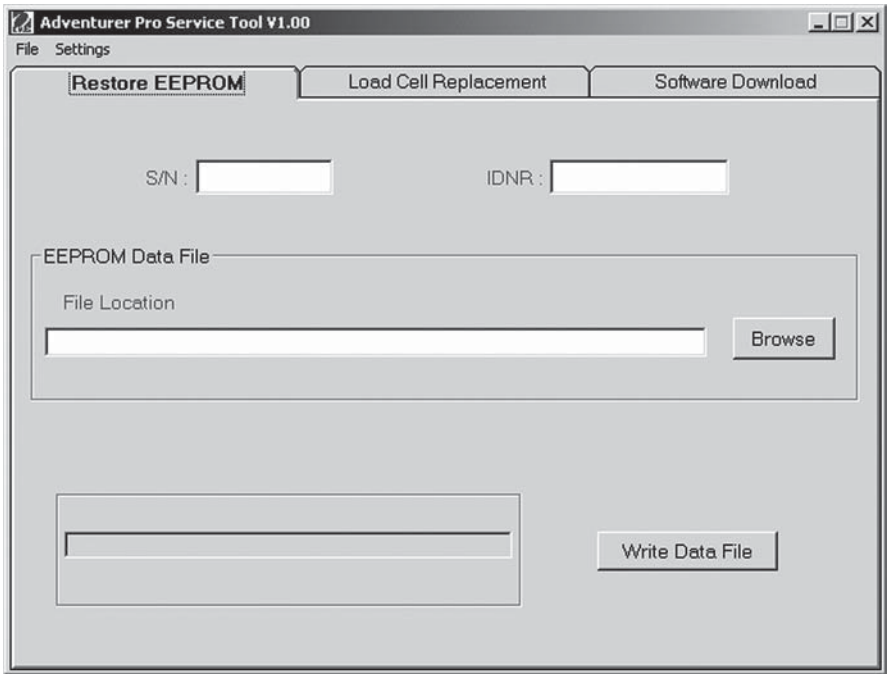
6. Enter the S/N of the balance and the IDNR number from the battery compartment (xxx.xx.xx.xxxx).

7. Enter the path to the location of the data file, or click the browse button to locate the file.

8. Click on the Write Data File button.

9. The software will indicate the download progress. When complete, the balance power should be cycled.

10. Perform Service Linearity and Span calibrations, see Appendix B. Test balance.



C.2 To Replace a Load Cell:

1. Follow the steps in section 3.1.5 to replace the defective load cell.

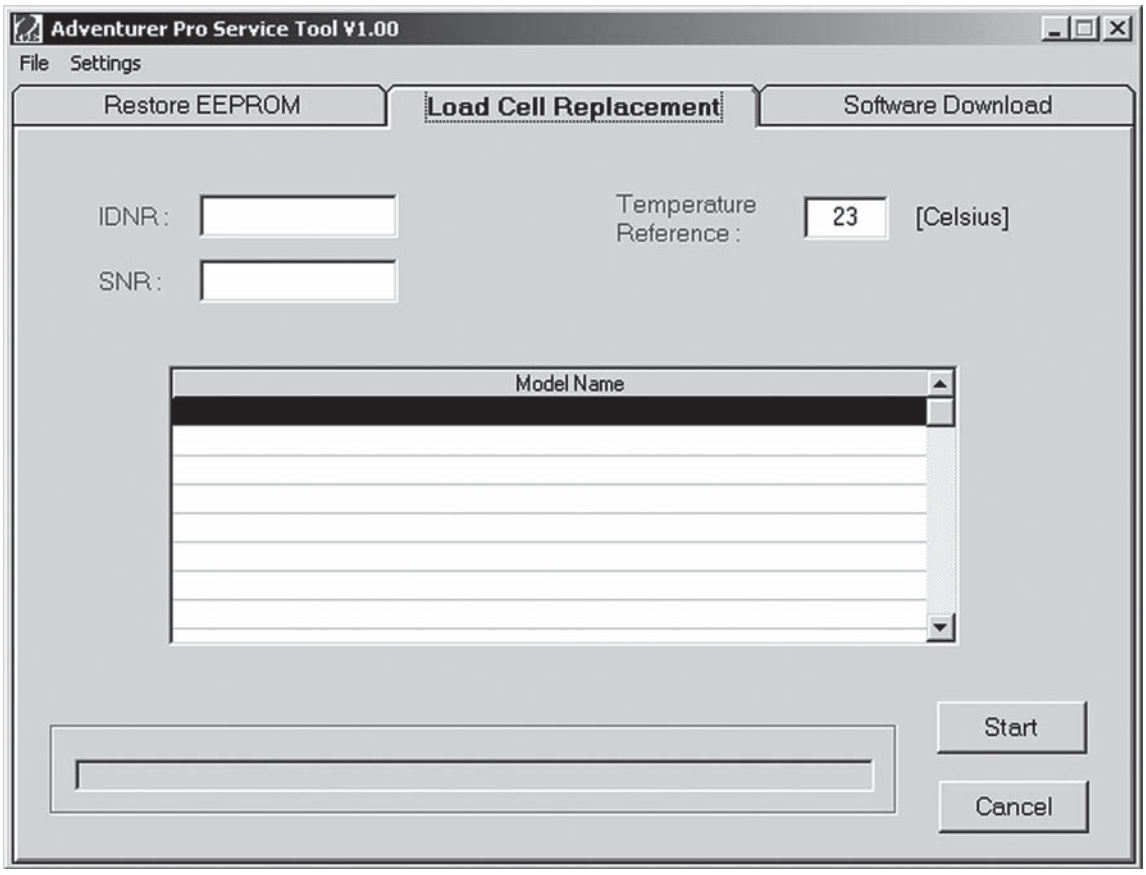
2. Open the packet containing labels that was supplied with the replacement load cell. These labels each contain a model number followed by the IDNR number. Carefully select the label that matches exactly the model number of the balance.

3. Remove the batteries from the balance. Install the new label in the battery compartment replacing the old label. Do not reinstall the batteries.

4. Power the balance from an AC adapter.

5. Connect the balance to your computer.

6. Start the Adventurer Pro Service Tool Software.



C.2 To Replace a Load Cell: (Cont.)

7. Click on the tab labeled Load Cell Replacement.

8. Enter the IDNR number (xxx.xx.xx.xxxx) from the label supplied with the replacement load cell and the Serial Number from the label on the side of the balance.

9. Enter the current ambient temperature in degrees Celsius.

10. Click on the Start button.

11. The fields for Model Name will then be filled with models where the Load Cell can be used. Click on the Model Name of the balance in which you are installing the load cell.

12. Click on the start button.

13. The software will indicate the download progress. When complete, the balance power should be cycled.

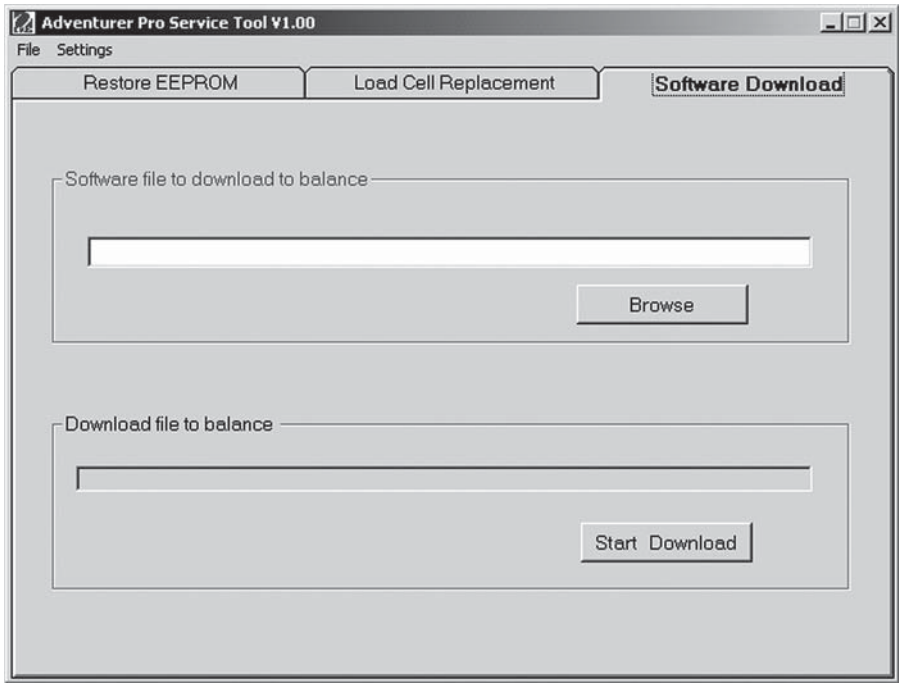
14. Perform Service Linearity and Span calibrations see Appendix B. Test balance.

C.3 To Update the Software in the Balance:

1. Remove the batteries from the balance and power it from an AC adapter.

2. Connect the balance to your computer.

3. Start the Adventurer Pro Service Tool Software.



C.3 To Update the Software in the Balance:(Cont.)

4. Click on the tab labeled Software Download.

5. Enter the path to the location of the file to download, or click the browse button to locate the file.

6. Click on the Start Download button.

7. Cycle power to the balance when prompted.

8. The software will indicate the download process. When complete, the balance power should be cycled again.

9. Perform Service Linearity and Span calibrations see Appendix B. Test balance.

P/N 80250994 A SERVICE MANUAL ADVENTURER AV and AS MODEL BALANCES