



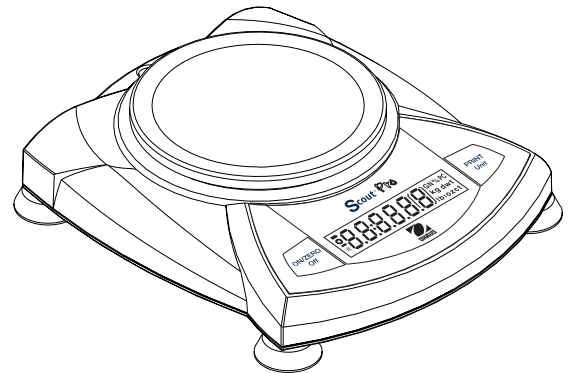
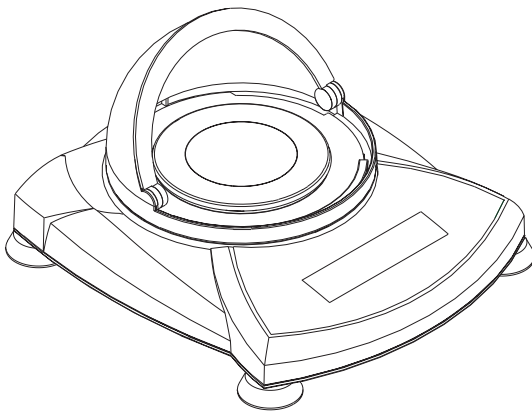
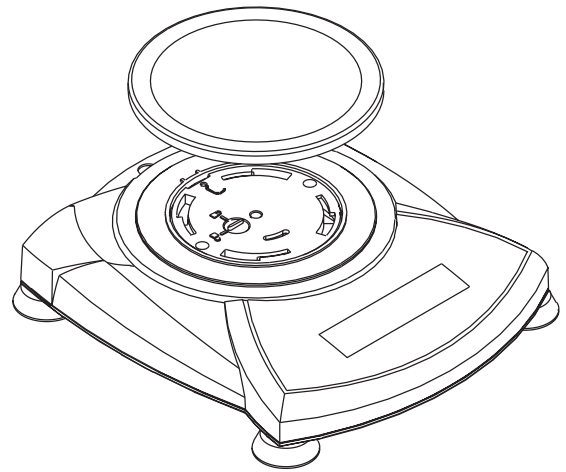
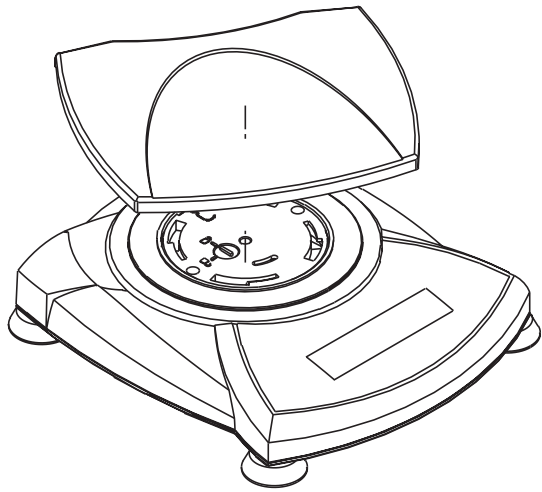
SERVICE MANUAL

SCOUT[®] *PRO* BALANCES



SERVICE MANUAL

SCOUT® PRO BALANCES



The information contained in this manual is believed to be accurate at the time of publication, but Ohaus Corporation assumes no liability arising from the use or misuse of this material. Reproduction of this material is strictly prohibited.

Material in this manual is subject to change.

© Copyright 2003 Ohaus Corporation, all rights reserved.

® Registered trademark of Ohaus Corporation.

TABLE OF CONTENTS

	Page No.
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1-1
1.2 Service Facilities	1-1
1.3 Tools and Test Equipment Required.....	1-2
1.3.1 Special Tools and Test Equipment List	1-2
1.3.2 Standard Tools and Test Equipment List	1-2
1.4 Test Masses Required	1-2
1.5 Specifications	1-3
CHAPTER 2 DIAGNOSIS	
2.1 Troubleshooting	2-1
2.2 Diagnostic Guide.....	2-1
2.2.1 Diagnosis.....	2-1
2.3 Error Codes	2-4
CHAPTER 3 REPAIR PROCEDURES	
3.1 Repair Procedures	3-1
3.1.1 Cover Removal	3-1
3.1.2 Printed Circuit Board Replacement	3-2
3.1.3 Transducer Replacement	3-4
CHAPTER 4 TESTING	
4.1 Testing	4-1
4.1.1 Operation Test	4-1
4.1.2 Segment Display Test.....	4-1
4.2 Performance Tests	4-1
4.2.1 Repeatability Test	4-2
4.2.2 Off-Center Load Test.....	4-3
4.2.3 Linearity Test	4-3
4.3 Down Stop Adjustment.....	4-4
CHAPTER 5 DRAWINGS AND PARTS LISTS	
5.1 Drawings	5-1
5.2 Parts Lists.....	5-3
APPENDIX A SERVICE TOOL INSTRUCTIONS	
A. Service Tools Instructions	A-1
A.1 Requirements for Scout Pro Tools	A-1
A.2 Software Installation	A-1
A.3 Hardware Installation	A-1
A.4 Special Instructions for USB Interface	A-2
A.5 Using Configtool.Exe	A-3
A.6 Final Service Calibration	A-5

APPENDIX B FACTORY CALIBRATIONS

	Page No.
B. Factory Calibrations	B-1
B.1 Service Calibration	B-1
B.2 Factory Calibration	B-3

LIST OF TABLES

TABLE NO.	TITLE	Page No.
1-1	Calibration Points	1-2
1-2	Specifications	1-3
2-1	Diagnostic Guide	2-2
2-2	Error Codes	2-4
4-1	Types of Performance Tests	4-1
4-2	Test Masses	4-3
4-3	Test Mass Values	4-5
4-4	Transducer Adjustment Tolerances	4-5
5-1	Replacement Parts List	5-3

LIST OF ILLUSTRATIONS

FIGURE	TITLE	Page No.
3-1	Shipping Lock	3-1
3-2	Bottom of Balance	3-1
3-3	Printed Circuit Board removal	3-2
3-4	Transducer Removal	3-4
4-1	LCD Full Display	4-1
4-2	Transducer Front View - Down Stop Adjustment	4-4
5-1	Scout Pro Exploded View	5-2
A-1	Screw and Housing Removal	A-2
A-2	Connector J3 Location	A-2
A-3	Connector J3 Shorted	A-2
A-4	Screen 1	A-3
A-5	Screen 2	A-4
A-6	Screen 3	A-4
A-7	Screen 4	A-5
B-1	IC U9 Connections	B-2

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

This service manual contains the information needed to perform routine maintenance and service on the Ohaus Scout® *Pro* Balances. The contents of this manual is contained in five chapters 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 error code tables.

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

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

Chapter 5 Drawings and Parts Lists - Contains an exploded view drawing and a parts list.

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 the Scout® *Pro* balances, 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.

CHAPTER 1 INTRODUCTION

1.3 TOOLS AND TEST EQUIPMENT REQUIRED

In order to properly service the Scout *Pro* 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. Scout *Pro* RS232 option PN 71147376.
3. A PC running Microsoft Windows NT 4.0 or later, or Microsoft Windows 98 or later.
3. Scout *Pro* instruction manual.
4. Scout *Pro* Tools.zip.
5. Set of Feeler gauges ranging from 0.40mm/0.16in. to 0.65mm/0.026in.
6. Micro sized alligator clip.

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 6000 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 Scout *Pro* balances must meet or exceed the requirements of ASTM Class 4 Tolerance. The calibration points are listed in Table 1-1.

TABLE 1-1. CALIBRATION POINTS

CAPACITY	SPAN CAL POINT	LINEARITY CAL POINTS
200g	200g	100g, 200g
400g	200g	200g, 400g
600g	300g	300g, 600g
2000g	2000g	1000g, 2000g
4000g	4000g	2000g, 4000g
6000g	6000g	3000g, 6000g

CHAPTER 1 INTRODUCTION

1.5 SPECIFICATIONS

Specifications for the Scout *Pro* balances are listed in Table 1-2. When a balance has been serviced, it must meet the specifications listed in the table. Before servicing the balance, determine what specifications are not met.

TABLE 1-2. SPECIFICATIONS

Capacity (g)	200	400	400	600	2000	4000	6000
Readability (g)	0.01		0.1				1.0
Repeatability (Std. Dev.) (g)	0.01		0.1				1.0
Off Center Loading (g)	±0.01		±0.1				±1.0
Linearity (g)	±0.01		±0.1				±1.0
Tare range	To capacity by subtraction						
Over Range Capacity	Capacity + 90d						
Stabilization Time	3 seconds						
Operating Temp. Range	50° to 104° F/10° to 40° C						
Power Requirements	AC Adapter (included) 4 AA Batteries (not included)						
Item Numbers	SPx202	SPx402	SPx401	SPx601	SPx2001	SPx4001	SPx6000

2.1 TROUBLESHOOTING

This section of the manual specifies problem areas of the balance which can occur. 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.

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.

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 Transducer (8) 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.

CHAPTER 2 DIAGNOSIS

TABLE 2-1. DIAGNOSTIC GUIDE

SYMPTOM	PROBABLE CAUSE	REMEDY
No display.	<ol style="list-style-type: none"> 1. No power. 2. Power Jack defective. 3. Weak battery. 4. Battery connector - poor contact. 5. PC Board defective. 	<ol style="list-style-type: none"> 1. Check AC Adapter. 2. Replace Power Jack. 3. Replace. 4. Clean or replace. 5. Replace PC Board.
Low BAT displayed.	<ol style="list-style-type: none"> 1. Weak battery. 2. AC Adapter defective or wrong type being used. 3. PC Board defective. 	<ol style="list-style-type: none"> 1. Replace battery. 2. Replace AC Adapter. 3. Replace PC Board.
Stays in segment check.	<ol style="list-style-type: none"> 1. Weak battery. 2. PC Board defective. 	<ol style="list-style-type: none"> 1. Replace battery. 2. Replace PC Board.
Always displays zero.	<ol style="list-style-type: none"> 1. Possible power surge. 2. Down stop improperly set. 3. Transducer not connected. 4. Defective Transducer. 5. PC Board defective. 	<ol style="list-style-type: none"> 1. Perform linearity calibration. 2. Set per specifications. 3. Plug in Transducer. 4. Replace Transducer. 5. Replace PC Board.
Cannot calibrate.	<ol style="list-style-type: none"> 1. Incorrect calibration masses. 2. Transducer not connected. 3. Defective Transducer. 4. PC Board defective. 	<ol style="list-style-type: none"> 1. Use correct masses. 2. Plug in Transducer. 3. Replace Transducer. 4. Replace PC Board.
Displays (Err2)	<ol style="list-style-type: none"> 1. Missing Pan. 2. Down Stop improperly set. 3. Transducer zero has shifted. 	<ol style="list-style-type: none"> 1. Put pan on balance 2. Check stops and reset if necessary. 3. Perform factory calibration B.1 or B.2

TABLE 2-1. DIAGNOSTIC GUIDE (Cont.)

SYMPTOM	PROBABLE CAUSE	REMEDY
Displays (Err2) (Cont.).	4. Defective Transducer. 5. PC board defective.	4. Replace Transducer. 5. Replace PCB.
Exceeds off center load limit.	1. Defective Transducer.	1. Replace Transducer.
Inaccurate readings.	1. Improper calibration (Span or Linearity). 2. Not zeroed before weighing. 3. Defective Transducer. 4. PC Board defective.	1. Perform linearity calibration. 2. Press Zero On with no weight on the Pan, then weigh. 3. Replace Transducer. 4. Replace PC Board.
Fluctuating readings.	1. Unstable environment. 2. Debris in balance. 3. PC Board defective. 4. Defective transducer. 5. Transducer Lock engaged or misaligned.	1. Check area for vibrations, leveling and drafts. 2. Disassemble and clean if necessary. 3. Replace PC Board. 4. Replace Transducer. 5. Unlock or realign.
Drifting display.	1. Balance not warmed up. 2. Defective Transducer. 3. PC Board defective.	1. Allow balance to stabilize. 2. Replace Transducer. 3. Replace PC Board.
Error code (Err#) on display.	1. Balance has detected an error condition. 2. Defective Transducer. 3. PC Board defective.	1. See Table 2-2, Error Codes. 2. Replace Transducer. 3. Replace PC Board.

CHAPTER 2 DIAGNOSIS

TABLE 2-1. DIAGNOSTIC GUIDE (Cont.)

SYMPTOM	PROBABLE CAUSE	REMEDY
RS232 Not functioning. (On models equipped with RS232).	1. Improper Print Menu settings.	1. Check all settings. (Menu item Power must be set to ON .)
	2. RS232 not turned on.	2. Turn the option on. (See instruction manual).
	3. RS232 does not stay on.	3. If batteries are being used, the RS232 turns off when the unit is turned off. Either turn the option on or use the ac adapter.
	4. Loose or disconnected RS232 option.	4. Check connection.
	5. RS232 option defective.	5. Replace RS232 option.

2.3 ERROR CODES

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

TABLE 2-2. ERROR CODES

DISPLAY	REASON	ACTION
Err 1	Invalid checksum data	<ol style="list-style-type: none"> 1. Perform factory calibration. 2. Restore data file. 3. Check transducer. 4. Check PCB.
Err 2	Overload or Underload	<ol style="list-style-type: none"> 1. Make sure the right pan is on the balance. 2. Perform service LIN calibration per B.1. 3. Check transducer. 4. Check PCB.
Err 4	Incorrect calibration mass	<ol style="list-style-type: none"> 1. Calibrate using correct mass.
Err 5	Parts counting error	<ol style="list-style-type: none"> 1. Sample is less than 1d. Change sample quantity or increase sample.
Err 8	RS232 buffer is full	<ol style="list-style-type: none"> 1. Check printing device.
Err 9	Internal data error	<ol style="list-style-type: none"> 1. Restore data file. 2. Check PCB. 3. Check transducer.

3.1 REPAIR PROCEDURES

This section of the manual contains detailed disassembly procedures of the balance. Refer to Figure 5-1. Before disassembling the balance, it should be noted that components inside of the balance are delicate and need to be handled with care. It is imperative that the Transducer (8) 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 Transducer (8) unusable. The Printed Circuit Board (9) contains 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 Board (9) should be handled by grasping the edges only and never placing fingers on any of the runs or traces.

3.1.1 Cover Removal

To disassemble the balance, proceed as follows:

1. Turn the balance off and if using an AC Adapter, disconnect it from the balance.
2. Remove the Pan (1, 2 or 3) from the balance. Pan sizes and shapes vary.
3. Place the Shipping Lock in the locked position. See Figure 3-1. This will help protect the Transducer.

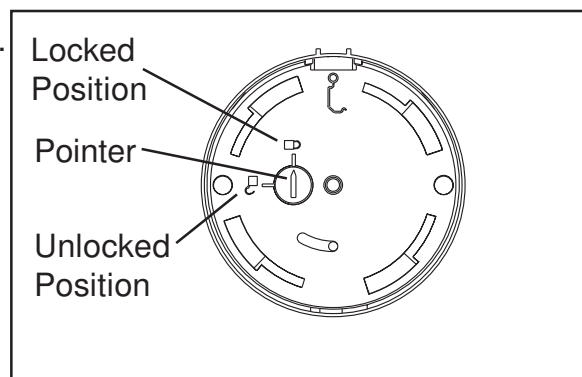


Figure 3-1. Shipping Lock.

4. If a battery is being used, turn the balance over and remove the Battery Compartment Cover (12) as shown in Figure 3-2.

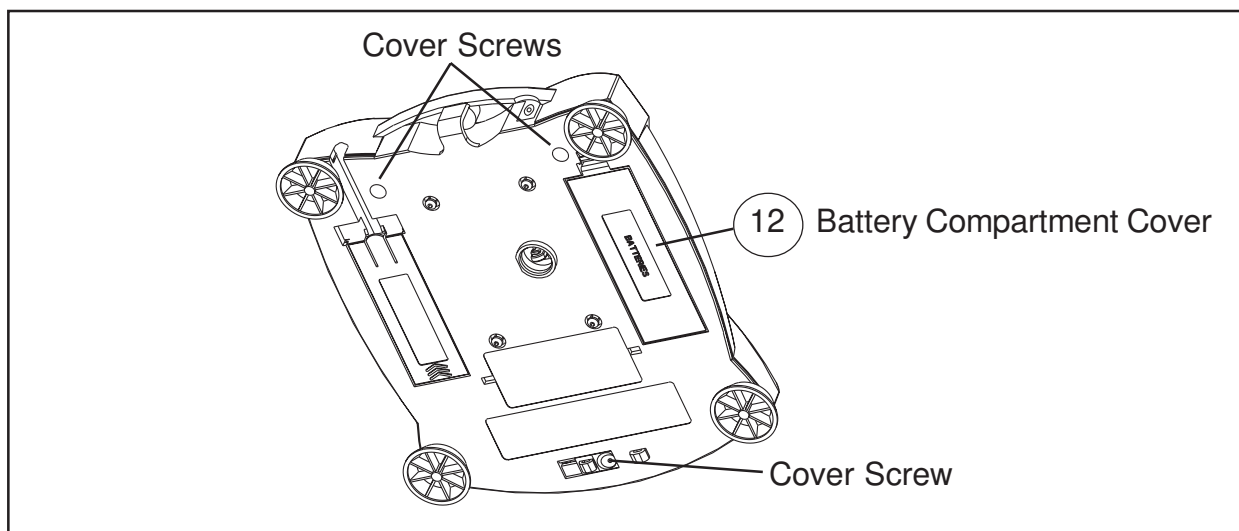


Figure 3-2. Bottom of Balance.

CHAPTER 3 REPAIR PROCEDURES

3.1.1 Cover Removal (Cont.)

5. Remove the 4 AA batteries from inside the battery compartment and replace the Battery Compartment Cover (12).
6. Slide the Lockswitch to the unlocked position to gain access to one of the cover screws. Remove the 3 Cover Screws as shown in Figure 3-2.
7. Turn the balance over in an upright position and carefully lift the Top Cover (6) from the balance Base (10).
8. After repairs and or adjustments have been made, reassemble the balance in the reverse order.

3.1.2 Printed Circuit Board (9) Replacement

In an effort to keep service costs down, it is suggested that if the Printed Circuit Board (9) is suspected of being faulty, it should be replaced rather than repaired.

To replace the Printed Circuit Board (9) , proceed as follows:

1. Remove the balance cover, refer to paragraph 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 Printed Circuit Board (9) is fastened in place by 2 clips which are part of the Base (10) and 2 screws located on top of the Printed Circuit Board. In addition, a Calibration Lock (15)(small plastic piece) is positioned at the front of the Printed Circuit Board. See Figure 3-3.

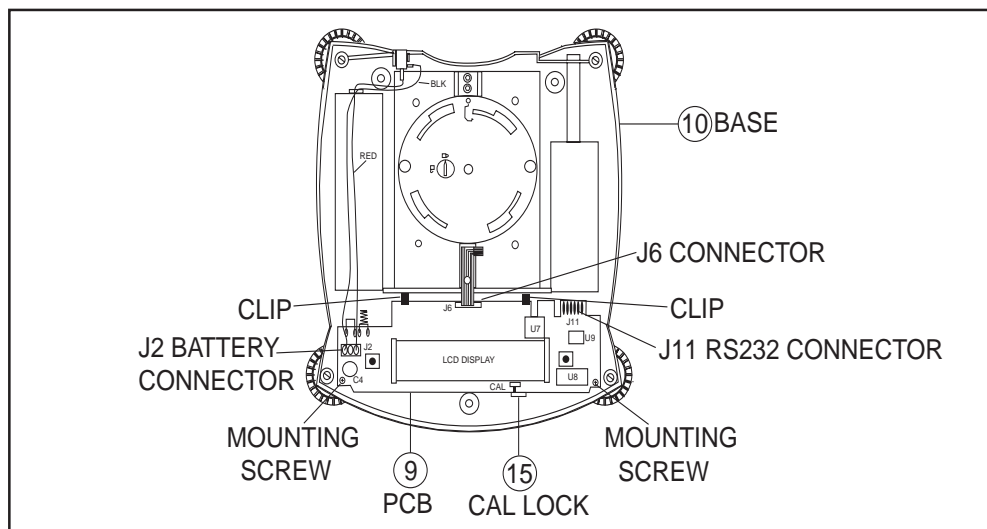


Figure 3-3. Printed Circuit Board Removal.

3.1.2 Printed Circuit Board (9) Replacement (Cont.)

3. When an RS232 option is installed, remove the RS232 Connector from J11 on the Printed Circuit Board (9).
4. Disconnect the Transducer cable from Connector J6 on the Printed Circuit Board (9).
5. Disconnect the battery cable from Connector J2 on the Printed Circuit Board (9).
6. Remove the 2 mounting screws on top of the Printed Circuit Board (9).
7. Push the Printed Circuit Board towards the back as far as it will go and apply a small forward pressure to the Cal Lock (15). Lift up on the front of the Printed Circuit Board (9) to remove it.
8. Install the new Printed Circuit Board (9). Make sure that the Printed Circuit Board is positioned under the 2 clips on the Base (10).
9. Connect the flexible cable from the Transducer to Connector J6 on the Printed Circuit Board (9).
10. Connect the RS232 to Connector J11 on the Printed Circuit Board (9) if the RS232 is installed.
11. Connect the battery cable to connector J2 on the Printed Circuit Board (9).
12. Replace the 2 mounting screws on top of the Printed Circuit Board (9), make sure the board is positioned as far forward as possible to ensure the calibration lock switch will operate properly.
13. Reassemble the Balance.
14. Replace the batteries if previously removed.
15. See Appendix A Service Tools Instructions and load temperature compensation data.
16. Check the performance of the Balance and perform Factory Calibration B.2.

CHAPTER 3 REPAIR PROCEDURES

3.1.3 Transducer (8) Replacement

There are 8 Transducer Kits that are available for replacement purposes. Each Kit is fully assembled and consists of metal base plate, a transducer mounted to the base plate and a subplatform mounted to the transducer. All adjustments such up stop and down stop (limits travel of the transducer to safe limits) have been factory set. Transducer kits are available in the following ranges: 120g, 200g, 400g, 600g, 1200g, 2000g, 4000g and 6000g. Check the bottom of the balance and verify the capacity before ordering a new transducer kit.

CAUTION

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

1. Remove the cover in accordance with the procedures in paragraph 3.1.1.
2. Remove the 4 screws that secure the Transducer (8) to the Base (10). The screws are accessible at the bottom of the balance. See Figure 3-4.

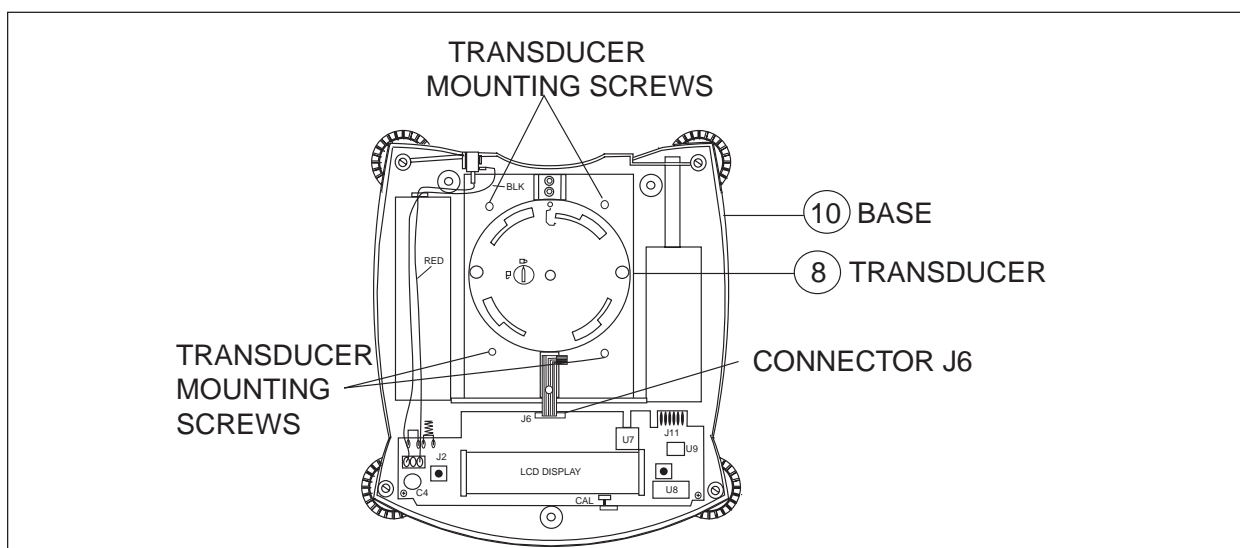


Figure 3-4. Transducer Removal.

3. Disconnect Connector J6 coming from Transducer (8).
4. Install the replacement Transducer using the 4 screws previously removed and connect the Transducer flexible cable to connector J6 on the Printed Circuit Board.
5. Reassemble the balance.
6. See Appendix A Service Tools Instructions and load temperature compensation data.
7. Recalibrate the balance in accordance with instructions in Appendix B, Factory Calibration B.2
8. Check the performance of the balance.

4.1 TESTING

Before 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 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.

4.2 PERFORMANCE TESTS

Accurate performance of a Scout *Pro* balance is determined by a series of three performance tests. The displayed readings are compared with the tolerances listed in Table 4-1. Tolerance values are expressed in counts. A one count change is equal to the last digit shown on the balance display.

TABLE 4-1. TYPES OF PERFORMANCE TESTS

PERFORMANCE TEST	TOLERANCE
Repeatability	±1 Count
Off Center Load	±2 Count
Linearity	±1 Count

CHAPTER 4 TESTING

4.2 PERFORMANCE TESTS (CONT.)

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. Tolerance values are expressed in counts. A balance which passes each of these three tests meets the manufacturing specifications.

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 (1). Observe and record the reading.
3. Remove the mass. Reading should return to 0g \pm 1 count.
4. Repeat this test for ten readings. If the standard deviation of the readings is less than \pm 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 \pm 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 (1) and the Top Cover (6) 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 (6).

Test

1. Place 1/2 of the balance capacity in the **center** of the Pan (1).
2. Note the reading.
3. Move the mass halfway (between the center and the edge) to the front of the Pan (1). 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 ± 2 count for each of the four positions. If this reading is exceeded, it usually indicates a defective Transducer (8).

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 must be adjusted to ASTM Class 4 Tolerance, or better.

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 4-2. TEST MASSES

Capacity	Test mass	Load 1	Load 2	Load 3	Load 4
200g	1g	50g	100g	150g	190g
400g x 0.01	1g	100g	200g	300g	390g
400g x 0.1	5g	100g	200g	300g	400g
600g	5g	150g	300g	450g	600g
2000g	5g	500g	1000g	1500g	2000g
4000g	5g	1000g	2000g	3000g	4000g
6000g	10g	1500g	3000g	4500g	6000g

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

CHAPTER 4 TESTING

4.2.3 Linearity Test (Cont.)

Test (Cont.)

5. Place the test mass on the balance, record the weight and then remove.
6. Place Load 3 on the balance and press the **ON/ZERO/Off** button.
7. Place the test mass on the balance, record the weight and then remove.
8. Place Load 4 on the balance and press the **ON/ZERO/Off** button.
9. Place the test mass on the balance, record the weight and then remove.
10. The difference in the weights of the test mass should be within the tolerance in table 4.1. If not, perform a linearity calibration, see Appendix B and do the test again.

4.3 Down Stop Adjustment

When the balance fails the Off-Center Load test and or the Linearity test, the Transducer may require checking and adjusting of the down stop. To make adjustments, the Transducer must be removed from the balance. Perform procedures 3.1.1 and 3.1.3 and remove the Transducer from the balance.

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

Checking and adjusting the down stop.

1. Place masses equaling mass 1 as indicated in Table 4-3 on the platform. You should still be able to feel some movement with a slight downward push.
2. Place masses equaling mass 2 as indicated in Table 4-3 on the platform. You should feel no movement with a slight downward push.
3. If the above conditions **are not met**, adjust the screws on the base plate using the data in Table 4-4. See Figure 4-2 for location of adjustment screws.

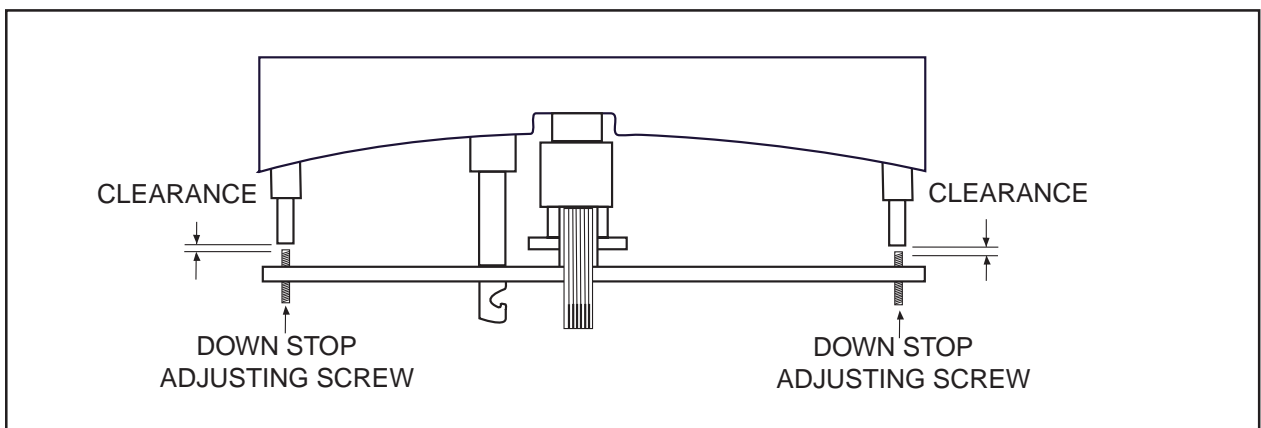


Figure 4-2. Transducer Front View - Down Stop Adjustment Screws

4.3 Down Stop Adjustment (Cont.)

TABLE 4-3. TEST MASS VALUES

Model	Mass 1	Mass 2
SPx202	250	350
SPx402	500	700
SPx401	500	900
SPx601	700	900
SPx2001	3000	7000
SPx4001	5000	7000
SPx6000	7000	9000

TABLE 4-4. TRANSDUCER ADJUSTMENT TOLERANCES

Model	Min(mm/in)	Max(mm/in)
SPx123	0.40/0.016	0.45/0/018
SPx202	0.60/0.024	0.70/0.028
SPx402	0.50/0/020	0.60/0.024
SPx401	0.75/0.030	0.90/0.035
SPx601	0.65/0.026	0.75/0.030
SPx2001	0.65/0.026	0.90/0.035
SPx4001	0.60/0.024	0.70/0.028
SPx6000	0.50/0/020	0.60/0.024

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

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

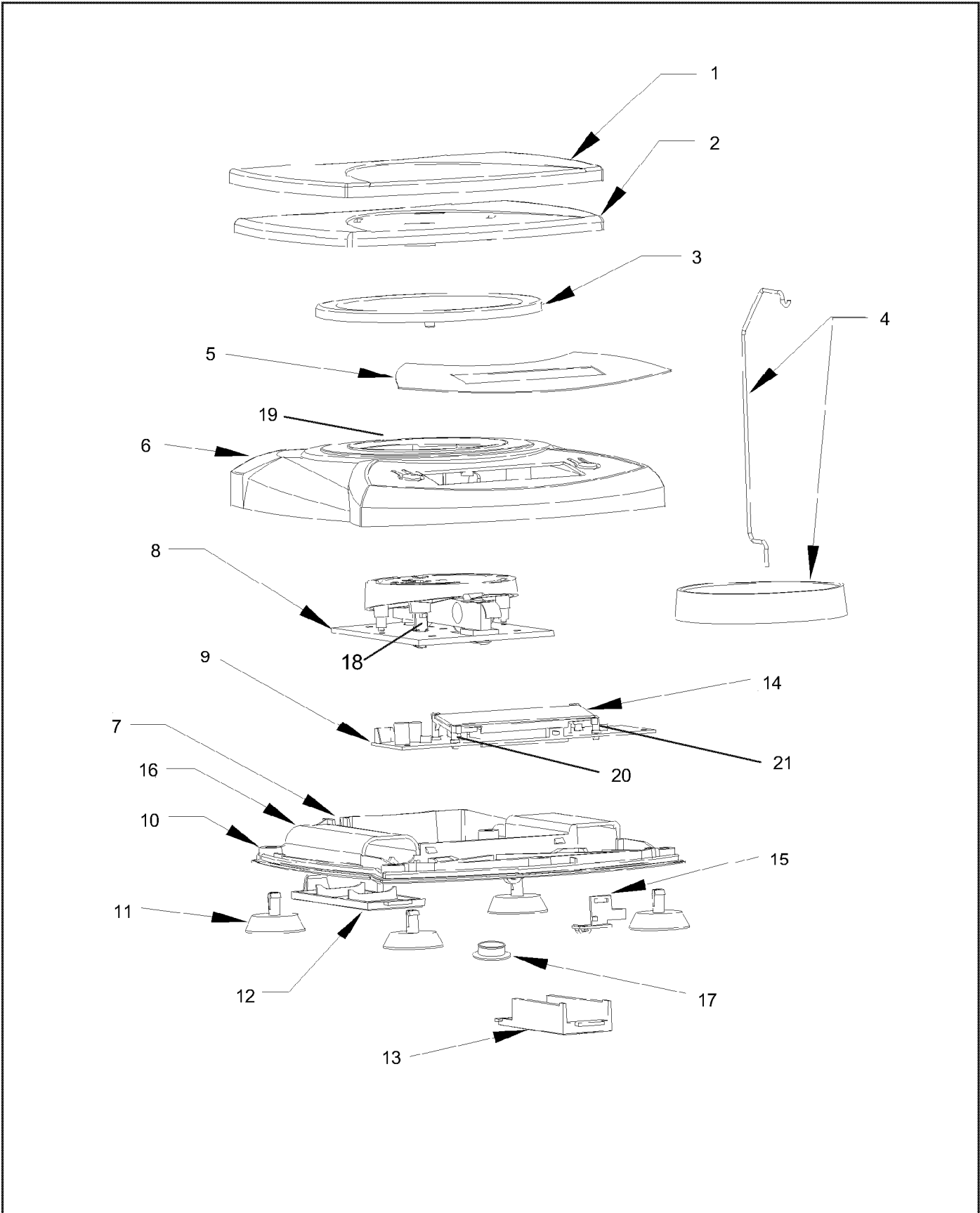


Figure 5-1. Scout Pro Exploded View.

5.2 PARTS LISTS

This section of the manual contains the replaceable parts for the Scout Pro Balances.

TABLE 5-1. REPLACEMENT PARTS LIST

KEY NO.	PART NO.	DESCRIPTION
1	71160314	Square Pan, 6.5" x 5.5" SS, Scout Pro, SPx01, SPxx01, SPxx00, SPXx01, SPXxx01, SPXxx00
2	71160308	Pan Support, 6.5" x 5.5" Square, Scout Pro, SPx01, SPxx01, SPxx00, SPXx01, SPXxx01, SPXxx00
3	71154611	Round pan Assy, 4.7" (120mm) dia. SS, Scout Pro, SPx02, SPXx02
4	71147378	Specific Gravity Kit, Scout Pro, SPExxx
5	71160395	Function Label, Scout Pro, SPExxx
5	71160346	Function Label, Scout Pro, All but SPExxx
6	71160302	Top Cover, Scout Pro, All
7	71160347	Wire Assembly, Power, Scout Pro, All
8	71160477	Kit, Transducer replacement, 2000g, Scout Pro, SP2001, SPX2001
8	71160408	Kit, Transducer replacement, 6000g, Scout Pro, SP6001, SPX6001
8	71160407	Kit, Transducer replacement, 4000g, Scout Pro, SP4001, SPX4001
8	71160406	Kit, Transducer replacement, 1200g, Scout Pro
8	71160405	Kit, Transducer replacement, 600g, Scout Pro, SPx01, SPXx01
8	71160404	Kit, Transducer replacement, 400g, Scout Pro, SP402, SPX402
8	71160403	Kit, Transducer replacement, 200g, Scout Pro, SP202, SPX202
8	71160402	Kit, Transducer replacement, 120g, Scout Pro, SP123, SPX123
9	71160411	Kit, PCB w/LCD replacement, Full Bridge Hi, Scout Pro, For 120g, 400g, 4000g, SP123, SPX123, SP402, SPX402, SP401, SPX401
9	71160410	Kit, PCB w/LCD replacement, Half Bridge, Scout Pro, For 600g, 6000g, SPx01, SPXx01, SP6000, SPX6000
9	71160409	Kit, PCB w/LCD replacement, Full Bridge Lo, Scout Pro, For 200g, 1200g, 2000g, SP202, SPX202, JS1200, SP2001, SPX2001

CHAPTER 5 DRAWINGS AND PARTS LISTS

TABLE 5-1. REPLACEMENT PARTS LIST (Cont.)

10	71164070	Base w/threaded inserts, Scout Pro, SPGxxx, SPSxxx, SPxxxN
10	71160301	Base, Scout Pro, All with fixed feet
11	71160412	Adjustable feet, with rubber pad, Scout Pro, SPGxxx, SPSxxx, SPxxxN
11	71160305	Foot, Non adjustable, Scout Pro, All
12	71160303	Battery cover, Scout Pro, All
13	71160304	Interface cover, Scout Pro, All
14	71147994	LCD, Scout Pro, All
15	71160313	Cal Lock, Scout Pro, All
16	71160323	Connector, Battery, Scout Pro, All
17	12102033	Weigh Below cover, Scout Pro, All
18	71160309	Lock, sub platform, Scout Pro, All
19	71160413	Level, Scout Pro, SPGxxx, SPSxxx, SPxxxN
20	71160311	LCD support (Left), Scout Pro, All
21	71160312	LCD support (Right), Scout Pro, All
	12102323	Adapter, 230V/AU, Scout Pro, All
	12102322	Adapter, 240V/UK, Scout Pro, All
	12102321	Adapter, 230V/EU, Scout Pro, All
	12102320	Adapter, 100-120V/US, Scout Pro All

A. SERVICE TOOLS INSTRUCTIONS

This tool is required when either a main PC board or a transducer is replaced in a Scout Pro balance. It is used to re-configure the balance to it's old parameters in the case of a board replacement or new parameters in the case of a transducer replacement.

A.1 REQUIREMENTS FOR SCOUT PRO TOOLS

- VGA 640x480 or higher resolution screen
- Microsoft Windows NT 4.0 or later, or Microsoft Windows 98 or later
- Scout Pro RS232 Interface Kit or USB interface Kit
- Scout Pro instruction manual
- Scout Pro Tools.zip

A.2 SOFTWARE INSTALLATION

1. If you need the software it can be downloaded at the following URL. [HTTP://fileshare.ohaus.com/docushare/](http://fileshare.ohaus.com/docushare/).
 - a. Click on Login.
 - b. Login = ServiceA
Password = aservice
Both are case sensitive
 - c. Click on the Xerox logo at the upper left.
 - d. Click on Technical Support.
 - e. Click on Service Notes.
 - f. Click on Authorized Service Centers.
 - g. Click on Scout Pro Tools.
 - h. Download all 3 files.
2. Create a folder in the C:\ drive and name it **ScoutPro**. If you choose another directory you will have to open the file **toledo.ini** and modify the path to the **service.txt** file to agree with the folder name and path you have chosen.
3. Copy the file **ScoutPro Tools.zip** into C:\ScoutPro.
4. Extract the files in **ScoutPro Tools.zip** into C:\ScoutPro.
5. Copy the file **service.txt** into the C:\ScoutPro, if required.
6. You may want to put a shortcut on your desktop for easier access.

APPENDIX A SERVICE TOOL INSTRUCTIONS

A.3 HARDWARE INSTALLATION

NOTE: The optional interface must be modified so that the EEPROM may be written to.

1. Remove the screw and the housing as shown in Figure A-1.

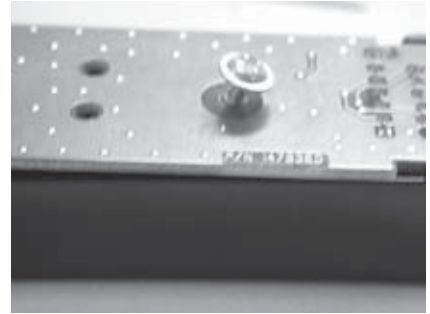


Figure A-1. Screw and Housing Removal.

2. Locate J3 on the interface board. See Figure A-2.

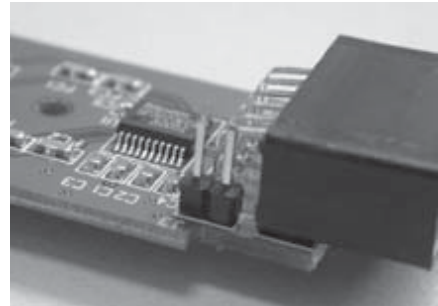


Figure A-2. Connector J3 Location.

3. Short the two pins of J3, see Figure A-3.
4. Replace the interface housing.
5. Install the modified RS232 / USB module in the balance being repaired.

NOTE: If using the customer's interface, do not forget to remove the modification after the repair is complete.

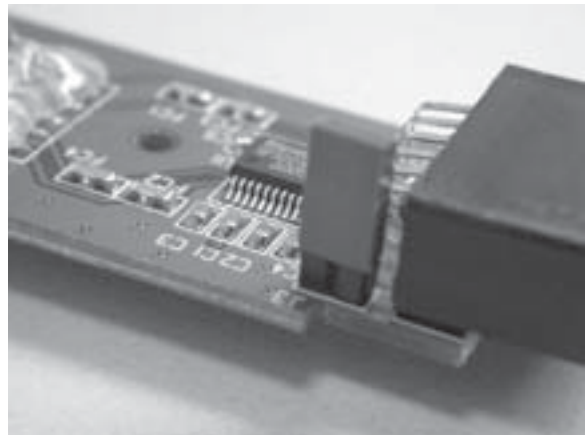


Figure A-3. Connector J3 Shorted.

6. Plug the interface cable into the PC.
7. Make sure the communications parameters match. The parameters in the tools are:
 - Baud = 2400
 - Parity = 7-None
 - Handshake = None
8. Make sure the balance **A-off** feature, under the **.S.E.T.U.P.** menu, is set to **OFF**, if this setting is left **ON**, the balance will shut off during the re-configuration.

A.4 SPECIAL INSTRUCTIONS FOR USB INTERFACE

After installing the interface using the instructions that come with the kit, the COM port will have to be changed. The interface uses COM 5 as a default. Config Tool only recognizes COM 1 to COM 4.

1. Enter the Windows Control Panel and click on the **System** icon.
2. Click on the **Hardware** tab.
3. Click on the **Device Manager** button.
4. Expand **Ports (COM & LPT)**.
5. Right Click on **USB Serial Port (COM5)** and choose **Properties**.
6. Click on the **Port Settings** tab.
7. Click on the **Advanced** button.
8. Change the COM port number to an unused port.
9. Click on **OK** twice.
9. Close the **System Properties** box.
10. Close the **Control Panel** Window.
11. The virtual port will now be the com port you selected.

A.5 USING CONFIGTOOL.EXE.

1. Open ConfigTool.exe, you will see the screen shown in Figure A-4 after the communications parameters have been checked. If the communications parameters are not matched, or, there is no balance connected, error messages will appear. If a balance is connected, it will be read automatically and the data will appear.

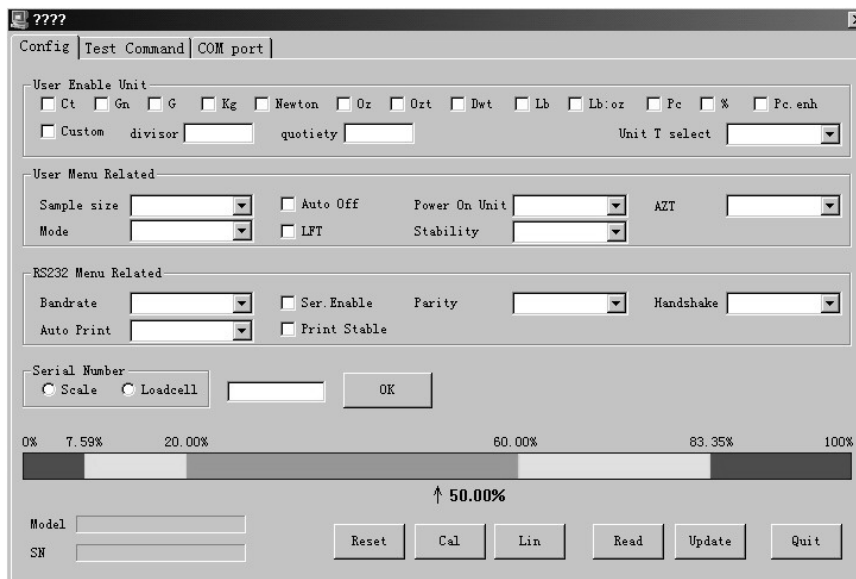


Figure A-4.
A-3

APPENDIX A SERVICE TOOL INSTRUCTIONS

A.5 USING CONFIGTOOL.EXE. (CONT.)

2. If the communications parameters have to be set, click on the **Com Port** tab and the screen shown in Figure A-5 will appear. Adjust the parameters as required to match the balance.

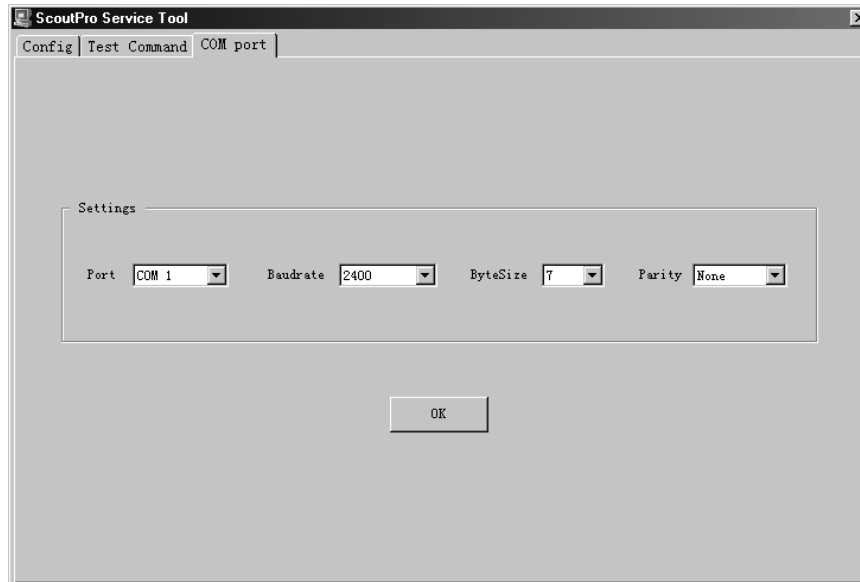


Figure A-5.

3. When the communications parameters are matched click on the **Test Command** tab and test the communications.
4. In this example, see figure A-6, the “P” command resulted in the **0.02g** being written in the lower screen. The “V” command resulted in **Sr: 1.10** being written. The **T** command had the effect of zeroing the balance, and the last **P** command resulted in the **0.00g** being written. If the balance does not reliably communicate the problem must be fixed before continuing.



Figure A-6.

A.5 USING CONFIGTOOL.EXE. (CONT.)

5. When communications are reliable return to the **Config** tab. Press the read button (A) and the data will be read from the balance. See Figure A-7.

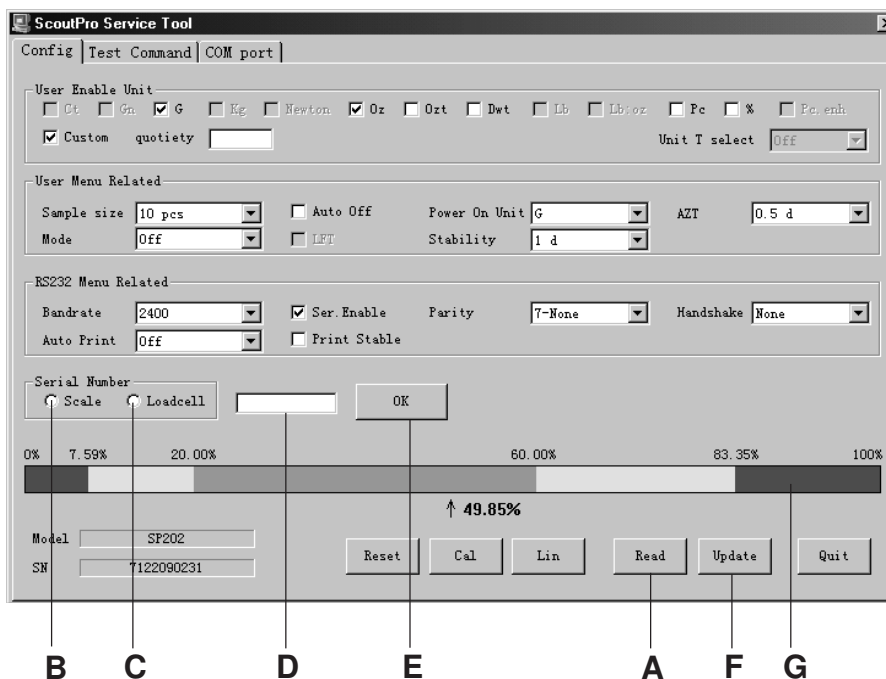


Figure A-7.

6. If the PC Board has been replaced, refer to A.6.
7. If the load cell was replaced, follow the same procedure as above except enter the load cell serial number and click on Load cell (C) in the serial number box.
8. The bar (G) is a graphical indication of the portion of the transducer output that is being used.

A.6 USING CONFIG TOOL AFTER REPLACING THE MAIN PC BOARD

1. Using ConfigTool after a new Main PC board has been installed, make sure the balance lockout switch is in the unlocked position.
2. Install an RS232 option with the factory jumper (J2 on the RS232 option) in the balance.
3. The AC adapter must be used
4. Turn the balance on.

APPENDIX A SERVICE TOOL INSTRUCTIONS

A.6 USING CONFIG TOOL AFTER REPLACING THE MAIN PC BOARD (CONT.)

5. The balance displays **Err 9**.
6. Start the ConfigTool software, see A.5
7. An error message will be displayed “**User Enable Units & User Variable Check Sum Verify Error**”, click on **OK**.
8. Set RS232 to the correct com port, Baudrate = 2400, ByteSize = 7, Parity = None.
9. The balance will respond to the “V” command but not the others.
10. The bar graph will respond to pressure on the platform.
11. Enter the balance serial number.
12. Click on **OK**.
13. Click on **READ**.
14. The balance should read the correct model and serial number.
15. Perform the factory calibration. See B.2
16. The unit is finished. Remove the RS232 option or the jumper on the customers RS232 option.

B. FACTORY LINEARITY CALIBRATIONS

The Scout Pro service and factory linearity calibrations use three calibration points; zero, mid-scale and full scale.

B.1 SERVICE CALIBRATION

This calibration is used when an error 2 has been displayed by the balance. The calibration is performed with no error checking and is saved as a user calibration. It is not a factory calibration because no data is written to the EEPROM.

1. Start with the unit off.
2. Press and hold both the **ON/ZERO Off** and the **PRINT Unit** buttons until the display reads **rAMP**.
3. Press and release the **PRINT Unit** button. The display will show **Lin**.
4. Press and release the **On/Zero Off** button. The display will show **-C-** blinking and then the first mass value.
5. Place masses totaling this value on the balance and press the **On/Zero Off** button.
6. Press and release the **On/Zero Off** button. The display will show **-C-** blinking and then the second mass value.
7. Place masses totaling this value on the balance and press the **On/Zero Off** button.
8. Press and release the **On/Zero Off** button. The display will show **-C-** blinking and then **donE** followed by **Lin**.
9. Repeatedly press and release the **PRINT Unit** button until the display shows **END**.
10. Press and release the **On/Zero Off** button. The balance will return to the weighing mode.

B.2 FACTORY CALIBRATION

This calibration must be used when either a PC board or a transducer is replaced.

1. Remove power from the balance.
2. Install an RS232 option with the pins shorted. See Appendix A.3. If the RS232 option is not available, pins 2 and 7 of IC9 may be shorted using a micro alligator clip. See Figure B-1.

CAUTIONS

1. Be very careful that no other pins are shorted, this could destroy the IC.
2. Do not attempt to solder the jumper.

APPENDIX B FACTORY CALIBRATIONS

B.2 FACTORY CALIBRATION (CONT.)

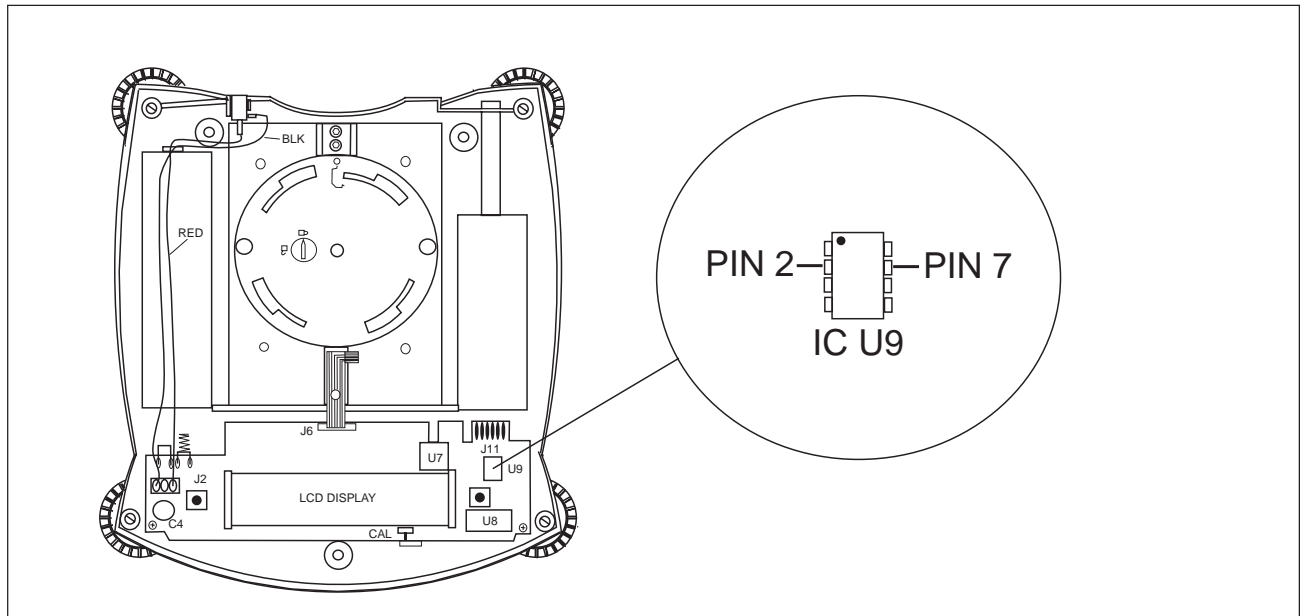


Figure B-1. IC U9 Connections.

3. You may need to use some kind of draft shield since the top cover has to be left off.
4. Apply power to the balance.
5. Start with the unit off.
6. Press and hold both the **ON/ZERO Off** and the **PRINT Unit** buttons until the display reads **rAMP**.
7. Press and release the **PRINT Unit** button. The display will show **Lin**.
8. Press and release the **ON/ZERO Off** button. The display will show **-C-** blinking and then the first mass value.
9. Place masses totaling this value on the balance and press the **ON/ZERO Off** button.
10. Press and release the **ON/ZERO Off** button. The display will show **-C-** blinking and then the second mass value.
11. Place masses totaling this value on the balance and press the **ON/ZERO Off** button.
12. Press and release the **ON/ZERO Off** button. The display will show **-C-** blinking and then **donE** followed by **Lin**.

B.2 FACTORY CALIBRATION (CONT.)

13. Repeatedly press and release the **PRINT *Unit*** button until the display shows **END**.
14. Press and release the **ON/ZERO *Off*** button. The balance will return to the weighing mode.
15. Press and hold the **ON/ZERO *Off*** button until the display shows **OFF**.
16. Remove power from the balance
17. Remove either the short on U9 or the short on the RS232 option.
18. Replace the cover.

APPENDIX B FACTORY CALIBRATIONS



P/N 80250973 SERVICE MANUAL SCOUT *PRO* ELECTRONIC BALANCES