



Ranger 7000[®] Scale Service Manual



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1 GETTING STARTED

1.1 INTRODUCTION

This service manual contains the information needed to perform routine maintenance and service on the Ohaus Ranger 7000[®] Series scales. Familiarity with the scale's Instruction Manual is assumed. The contents of this manual are contained in five chapters:

Chapter 1 - Getting Started – Contains information on service facilities, tools, specifications, and the mechanical and electronic functions of the scale.

Chapter 2 - Troubleshooting – Contains a diagnostic guide and error code table.

Chapter 3 - Maintenance Procedures – Contains preventive maintenance procedures and disassembly, repair and replacement procedures.

Chapter 4 - Testing – Contains a list of required test masses, an operational test, segment display test, performance tests and adjustments.

Chapter 5 - Drawings and Parts Lists – Contains exploded views of Ranger 7000[®] scales identifying all serviceable components.

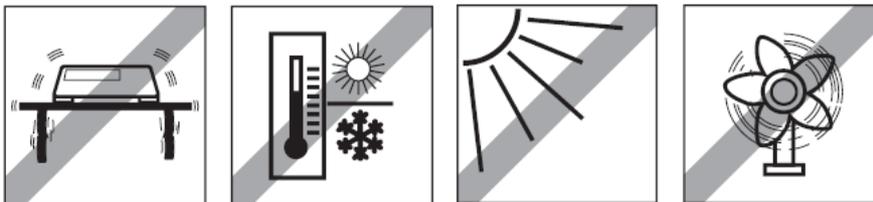
Chapter 6 – Entering to Service Menu- Explains method to enter to Service Menu.

Appendix A - Communication – Explains the scale communication information.

1.2 SERVICE FACILITIES

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

- Should be temperature controlled and meet scale specifications for temperature environmental requirements.
- Must be free of vibrations such as fork lift trucks close by, large motors, air currents or drafts from air conditioning/heating ducts, open windows, people walking by, fans, etc.
- Area must be clean and free of excessive dust.
- Work surface must be stable and level.
- Scale must not be exposed to direct sunlight or radiating heat sources.
- Handle all electronic assemblies with appropriate Electro-Static protection.



1.3 TOOLS AND TEST EQUIPMENT REQUIRED

- Common hand tools are sufficient to disassemble the Ranger 7000[®] scales.
- A PC running Microsoft Windows XP or later.
- Ranger 7000[®] Software Service Tool, PN 83032124
- RS232 Cable – Scale to PC PN 80500525
- Digital voltmeter (DVM) with an input impedance of at least 10 meg-ohms at 1 volt DC.
- Masses as shown in Table 4-1.

1.4 SPECIFICATIONS

Specifications for the Ohaus Ranger 7000[®] Scales are listed in Table 1-1. When a scale has been serviced, it must meet the specifications listed in the table. Before servicing the scale, determine what specifications are not met.

Special Note regarding Approved scales:

The specifications for the approved scales below are only for initial testing. These scales must be tested according to the requirements of the local Weights and Measures authority. Before returning the scale to service an approved representative of the local Weights and Measures authority must certify the scale.

Ambient conditions

Indoor use only

Altitude: Up to 2000 m

Specified Temperature range: 10 °C to 30 °C (R71MH D3/6/15/35 models)

-10 °C to 40 °C (R71MD3/6/15/35 models)

Humidity: maximum relative humidity 80 % for temperatures up to 30 °C

decreasing linearly to 50 % relative humidity at 40 °C

Mains supply voltage fluctuations: up to ± 10 % of the nominal voltage

Installation category II

Pollution degree: 2

Operability is assured at ambient temperatures between 5 °C to 40 °C.

Materials

Base Housing; die-cast Aluminum, Painted

Terminal housing: die-cast Aluminum, Painted

Weighing Pan: 304 Stainless Steel

TABLE 1-1 SPECIFICATIONS

MODEL	R71MHD3	R71MHD6	R71MHD15	R71MHD35
Capacity	3000 g	6000 g	15000 g	35000 g
Readability d	0.01 g	0.02 g	0.1 g	0.1 g
Approved Readability e	0.1 g	0.2 g	1 g	1 g
Repeatability (std. dev.)	0.01 g	0.02 g	0.1 g	0.1 g
Linearity	± 0.02 g	± 0.04 g	± 0.2 g	± 0.2 g
Span Calibration Points	500 g, 1500 g, 2000 g, 3000 g	1000 g, 2000 g, 4000 g, 6000 g	5000 g, 10000 g, 15000 g	10000 g, 20000 g, 30000 g, 35000 g,
Weighing units	gram, kilogram, ounce, pound, pound:ounce, ton			
Applications	Weighing, Parts Counting, Percent Weighing, Check Weighing, Dynamic Weighing, Filling, Formulation, Differential Weighing, Density			
Stabilization time (typical)	Within 1 second			
Display	TFT Graphic LCD			
Display size	4.3 in			
Backlight	White LED			
Communication	RS-422, USB			
Power supply	Power Input: 100-240 V~ 0.5 A 50/60 Hz			
Platform size	240 x 240 mm 9.4 x 9.4 inch		377 x 311 mm 14.8 x 12.2 inch	
Terminal Housing dimensions (W x D x H)	267 x 118 x 72 mm 10.5 x 4.6 x 2.8 in			
Base Housing dimensions (W x D x H)	280 x 280 x 114 mm 11 x 11 x 4.5 inch		377 x 311 x 128 mm 14.9 x 12.2 x 5 inch	
Assembled dimensions (W x D x H)	280 x 420 x 114 mm 11 x 11 x 4.5 inch		377 x 467 x 128 mm 14.9 x 18.4 x 5 inch	
Net weight	7.2 kg / 16 lb		10.9 kg / 24 lb	
Shipping weight	9.2 kg / 20.3 lb		14.4 kg / 31.7 lb	

MODEL	R71MD3	R71MD6	R71MD15	R71MD35
Capacity	3000 g	6000 g	15000 g	35000 g
Readability d	0.05 g	0.1 g	0.2 g	0.5 g
Approved Readability e	0.5 g	1 g	2 g	5 g
Repeatability (std. dev.)	0.05 g	0.1 g	0.2 g	0.5 g
Linearity	± 0.1 g	± 0.2 g	± 0.4 g	± 1 g
Span Calibration Points	500 g, 1500 g, 2000 g, 3000 g	1000 g, 2000 g, 4000 g, 6000 g	5000 g, 10000 g, 15000 g	10000 g, 20000 g, 30000 g, 35000 g
Weighing units	gram, kilogram, ounce, pound, pound:ounce, ton			
Applications	Weighing, Parts Counting, Percent Weighing, Check Weighing, Dynamic Weighing, Filling, Formulation, Differential Weighing, Density			
Stabilization time (typical)	Within 1 second			
Display	TFT Graphic LCD			
Display size	4.3 in			
Backlight	White LED			
Communication	RS-232, USB			
Power supply	Power Input: 100-240 V~ 0.5 A 50/60 Hz			
Platform size	280 x 280 mm 11 x 11 inch		377 x 311 mm 14.8 x 12.2 inch	
Terminal Housing dimensions (W x D x H)	267 x 118 x 72 mm 10.5 x 4.6 x 2.8 in			
Base Housing dimensions (W x D x H)	280 x 280 x 114 mm 9.4 x 9.4 x 4.5 inch		377 x 311 x 128 mm 14.9 x 12.2 x 5 inch	
Assembled dimensions (W x D x H)	240 x 420 x 114 mm 17.4 x 16.5 x 4.5 inch		377 x 467 x 128 mm 14.9 x 18.4 x 5 inch	
Net weight	6.8 kg / 15 lb		9.9 kg / 21.8 lb	
Shipping weight	8.5 kg / 18.7 lb		13.4 kg / 29.5 lb	

1.5 OPERATION

1.5.1 Overview of the Controls



Button	Action
	Enter/Exit the library menu
	Switch between available application modes
	Send the measurement data to available communications ports according to current settings.
	Display information about Application Mode, Library, User and Menu
	Enter/Exit the User menu
	Switch the main weighing unit between the available units
	 Short Press: Input '2'-'9' To Enter 'A' press 2 times. For lower case 'Z', press 5 times.
	 Short Press: Input '0' Long Press: Go to User Login screen
	 Short Press: Input '1' Long Press: Switch platform between scale 1 and scale 2
	 Short Press: Clear character/string when editing string If no input is active, clear the current active library When there is no value added, pressing this button will switch the value sign between positive and negative.
	 Short Press: Input '.', space, '_' To Enter '_' press 3 times.
	Perform Zero operation
	Perform Tare operation When entering the value first and then pressing this button the number input will be set to preset Tare value.



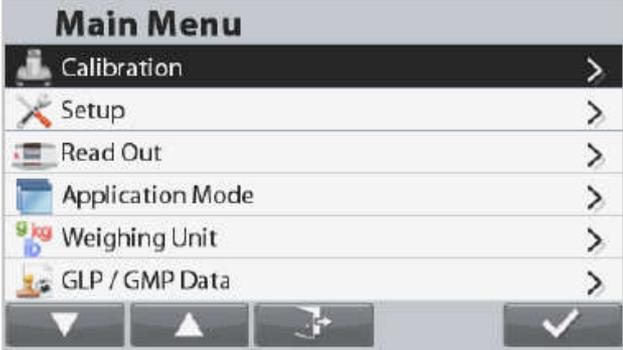
1.5.2 Principle Functions and Main Menu.

1-2 Menu and Screen Navigation

Press the **Menu**  button to open the menu list.

Press the button below  and  to move down and up the list respectively.

To select the highlighted menu item, press . Press  to move back to previous screen.

	Calibration: Select to view calibration options.		
	Setup: Select to view user preferences.		
	Read Out: Select to view scale settings.		
	Application Modes: Select to view application modes.		
	Weighing Units: Select to view weighing units.		
	GLP and GMP Data: Insert user data for traceability.		Alibi Memory: Select to view Alibi Memory settings. Note: This menu is only displayed when the Alibi option is installed.
	Communication: Select to view communication settings.		Maintenance: Select to view Maintenance settings.
	User Profile: Select to view User Profile settings.		Event Counter: Select to view Maintenance settings.

2 DIAGNOSTIC GUIDE

This section of the manual contains troubleshooting information. Information is contained to isolate specific problems using Table 2-1, Diagnostic Guide. Follow all directions step by step. Make certain that the work area is clean. Handle scale components with care. Use appropriate electro-static protection devices to prevent damage to the sensitive electronic components.

2.1 TROUBLESHOOTING

General procedures for Troubleshooting:

1. Do the most obvious, user-level remedies.
2. Visual Check:
 - Check that the internal parts are clean and free from debris.
 - Examine the scale for damage or signs of abuse, replace any damaged items.
3. Use the error code table for solutions for specific codes.
4. Use the Diagnostic Guide; locate the symptom then follow the suggested remedies in order.



Note: Allow equipment to warm up for 60 minutes on precision models for optimal weighing performance. Allow 4 hours for analytical models to stabilize.

2.2 SOFTWARE

In most cases understanding the customer's problem with the scale is easy. Physical damage, displayed error code, failure to power up and obvious poor performance can usually be repaired by following the instructions in the following sections.

Some scale issues may be software related. New releases of the software may correct these issues. The Ranger 7000[®] Scale has upgradeable software in the Terminal and the Base modules. The software revision in the scale can be seen when the scale is in standby mode or during the power up sequence. The software version is displayed in the lower right hand corner of the screen. The screen will show:

Model number	for example:	Ranger 7000 [®] R71MD3
Capacity and readability		3000g x 0.05g
Software Revision "Terminal" / "Base"		Version 1.00 / 0.14

The scale software can also be retrieved by sending a "PV" command via the RS232 or other interface.

2.3 DIAGNOSTIC GUIDE

2.1 Diagnostic Guide

Error Code	Description	Cause
EEP Error	EEPROM Checksum Error	Corrupted EEPROM data
Power on Overload	Power On Error	Weight reading exceeds Power On Zero limit.
Power on Underload	Power On Error	Weight reading below Power On Zero limit.
Overload	Over Range Error	Weight reading exceeds Overload limit.
Underload	Under Range Error	Weight reading below Underload limit.
Tare Error	Tare out of range Error	Tared at one unit but after switching to another unit the tare value exceeds the maximum.
Display Overflow	Display Overflow	Weight exceeds 6 digits.
No Calibration	Calibration data error	Calibration data does not exist.
-----	Busy message	Displayed during tare setting, zero setting, printing
--NO--	Action not allowed message	Function not executed.
Calibration Error	Calibration Error	Calibration value outside allowable limits
Low Reference	Low reference weight warning message	Average Piece Weight too small. (Warning)
Reference Error	Unacceptable reference weight message	Reference Weight too small. The weight on the pan is too small to define a valid reference weight.

Diagnosis:

1. Isolate and identify the symptom.
2. Refer to Troubleshooting tables and locate the symptom.
3. Follow the suggested remedies in the order they appear.
4. Perform the indicated checks, or see the appropriate section of the manual.
5. Repair or replace the defective section of the scale.

NOTE:

If more than one symptom is observed, approach one area at a time, and remember that the symptoms may be interrelated. If a problem arises that is not covered in this manual, contact Ohaus Corporation for further information.

3 MAINTENANCE / REPAIR PROCEDURES

3.1 PREVENTIVE MAINTENANCE

Ohaus scales are precision instruments and should be carefully handled, stored in a clean, dry, dust-free area, and cleaned periodically. Follow these precautionary steps:

- When a scale has had chemicals or liquids spilled on it, all exterior surfaces should be cleaned as soon as possible with warm water on a damp cloth.
- Do not leave a mass on the scale when the scale is not in use.
- Allow time for the scale to stabilize after moving it from an area which is at a different temperature than the area where it is to be operated. Allow one hour for each 5°F (2.7°C) temperature change before using the scale. After temperature stabilization, allow an additional 60 minutes after turning the scale on, for the scale electronics to stabilize.

Preventive Maintenance Checklist

The scale should be inspected and checked regularly, as follows:

1. Remove the Pan and Sub Pan to inspect and clean the area beneath the Pan.
2. Clean the outside of the scale using a damp cloth with warm water.
3. Check the Power Cord for broken or damaged insulation.
4. Make a visual inspection for faulty connectors, wiring, and loose hardware.



CAUTION

DO NOT USE CHEMICAL CLEANERS OR SOLVENTS OF ANY TYPE.
SOME CLEANERS ARE ABRASIVE AND MAY AFFECT THE SCALE'S FINISH.

3.2 OPENING THE SCALE

Opening the Ranger 7000[®] scale varies slightly according to the specific model, as detailed below. Use these procedures in order to replace the Load Cell, the Printed Circuit Board or other components.

Common hand tools are sufficient to disassemble the Ranger 7000[®] scale s.

3.2.1 Preparation for Opening Ranger 7000[®] Models

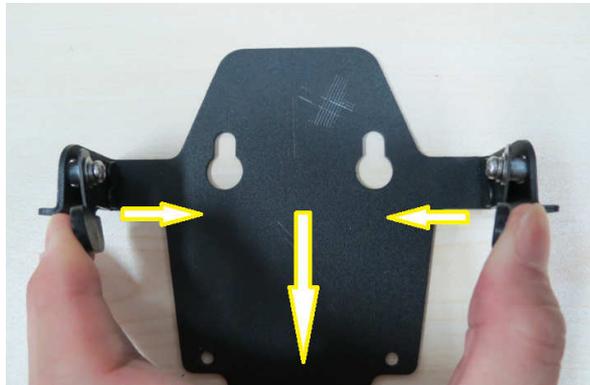
1. Turn the scale off and unplug the power cord before you begin.
2. Disconnect any communication or other option cables.

3.3 OPENING THE TERMINAL MODULE

*Below show a Ranger7000 MFR small housing model R71MHD6.

3.3.1 Detaching the Terminal from the base.

1. Switch off and disconnect the scale from main power supply.
2. Detach the display terminal from the base by pressing both release buttons at the same time as show below picture. After that pull the Terminal towards you (outward) until the Terminal is detached from the base as show below.



3.3.2 Detaching the base RS422 cable from the Terminal.

1. Dismantle the base RS422 cable from the Terminal.

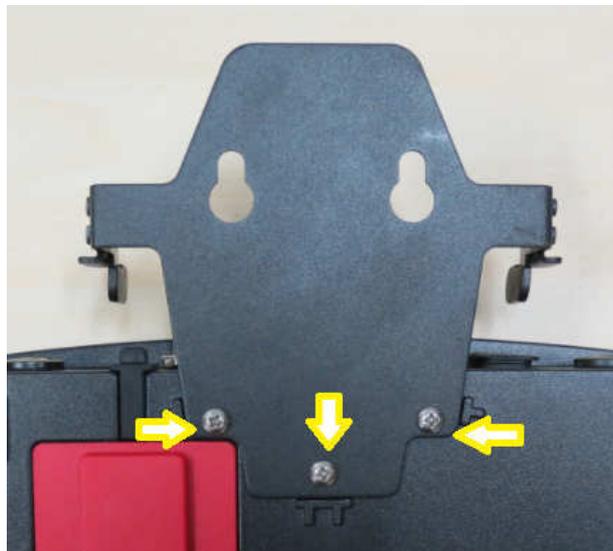


2. Removing the docking bracket from the Terminal.





3. Flip the Terminal around locate the 3 screws as shown and remove the screws which are mounting the bracket to the Terminal as shown below and separate the docking bracket from the Terminal.

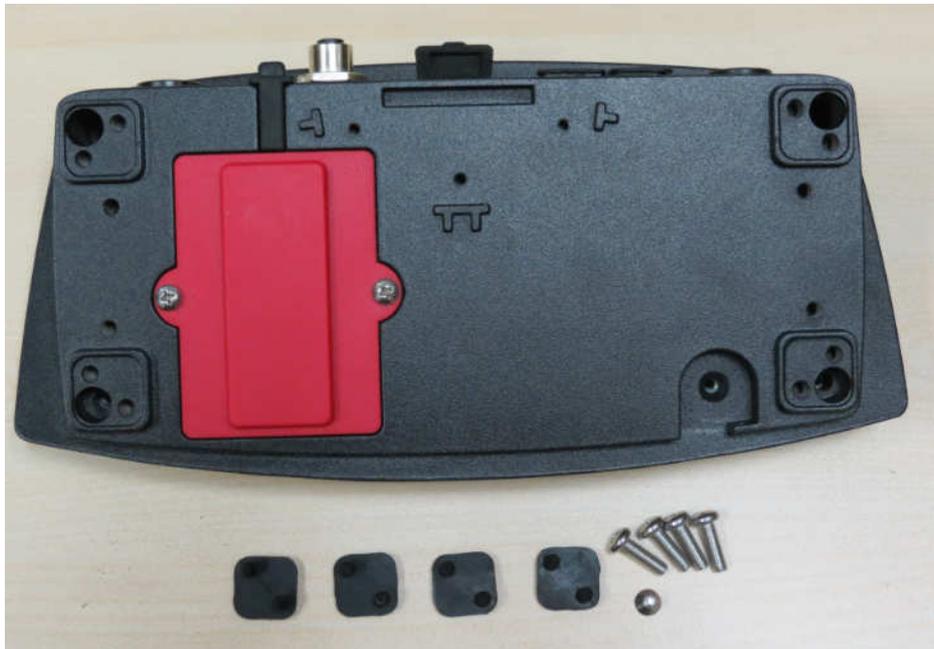




3.3.3 Dismantling the Terminal housing.

1. Remove the 5 screws securing the housing.
 - 4 screws are located underneath the rubber cover at 4 corners of the bottom housing. Remove the rubber cover and you will be able to locate and remove the 4 hidden screws.

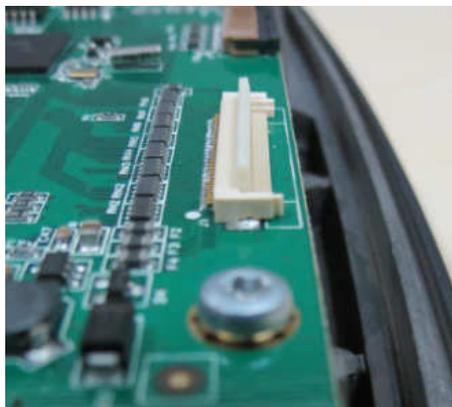




2. After removing the screws which are securing the bottom housing with the top housing turn the terminal module over. After that carefully lift up the top housing, **DO NOT** remove the top housing completely away from the bottom housing because the Terminal keypad overlay ribbon cable and TFT display ribbon cable are still attached with the Terminal main PCBA.

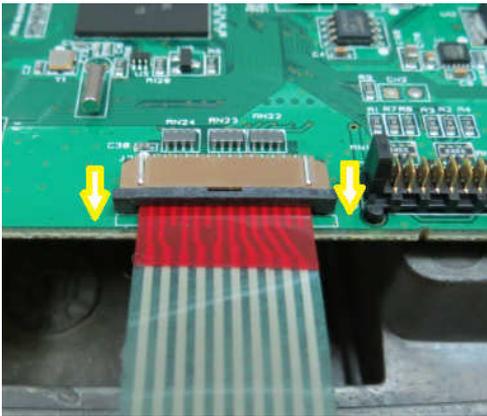


3. Disconnect the ribbon cable connecting the TFT with Terminal PCBA by using a thin screw driver blade radiated the back cable-lock on the connector 90° so that it is perpendicular to the cable as show in below pictures.



Connector lock with ribbon cable attaches Connector open with TFT ribbon cable remove.

4. Disconnect the keypad overlay ribbon cable from the Terminal PCBA by unfasten the connector as shown in below pictures.



Shift the connector outward

Connector open and keypad overlay cable remove

5. Both bottom and top Terminal housing are now separated.



3.4 Opening the Base Module

3.4.1 Opening R71 large housing model (R71MD15, R71MD35, R71MHD15,R71MHD35) (A R71MD15 is used in below).

1. Prepare the bases as mention above.
2. Remove the weighing Pan from the base.

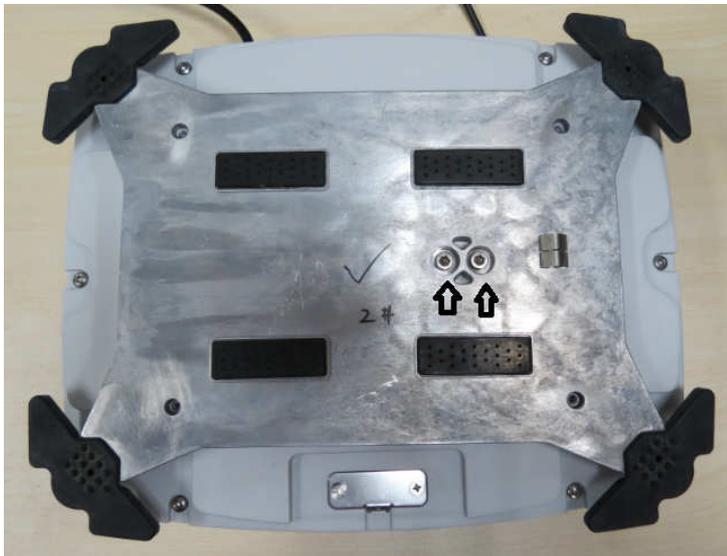


Complete set of Large Housing base



Weighing pan removed

3. Remove the 2 screws securing the Spider to the top housing.

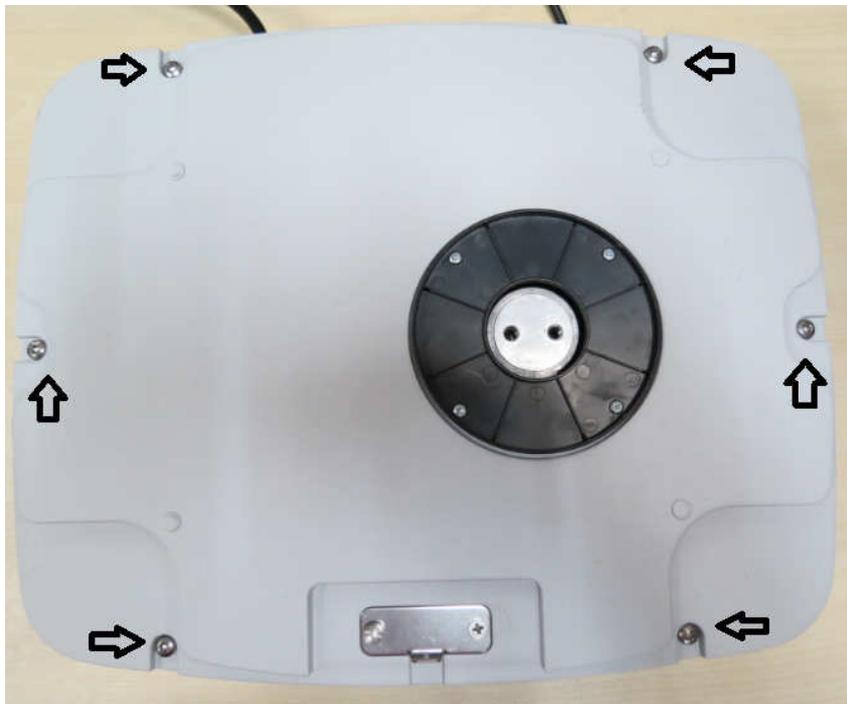


Location of 2 screws securing the Spider with base top housing.



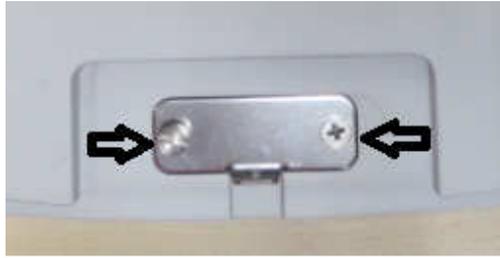
Spider removed from base top housing.

4. Remove 6 screws securing the base top housing and bottom housing.



Location of the first 6 screws.

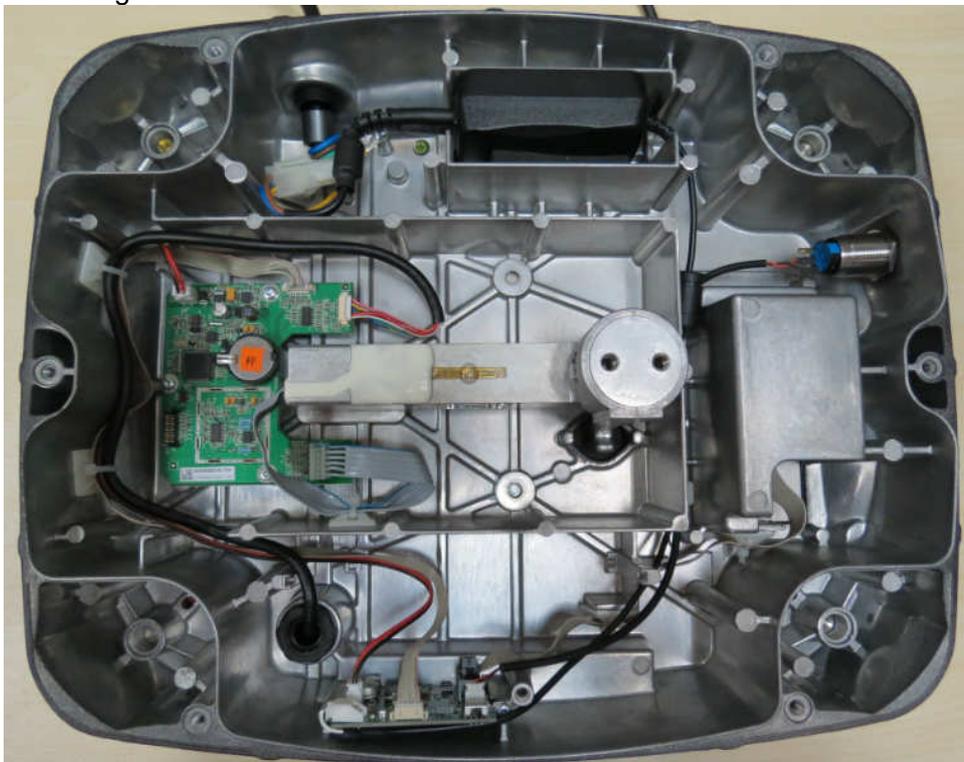
-
5. The 7th screw is underneath the LFT cover.



Remove the 2 screws securing the LFT cover.



7th screw expose, by removing this screw you will be able to dismantle the base top housing from the base bottom housing.



R71 SG Base top housing removed.

3.4.2 Opening R71 small housing model (R71MHD6 is used in below).

6. Prepare the bases as mention above.
7. Remove the weighing Pan and Wind Ring from the base.



Complete set of MFR base



Weighing pan removed



Wind Ring removed.

8. Remove the 2 screws securing the Spider to the top housing.



Location of 2 screws securing the Spider with base top housing.



Spider removed from base top housing.

9. Remove 5 screws securing the base top housing and bottom housing.



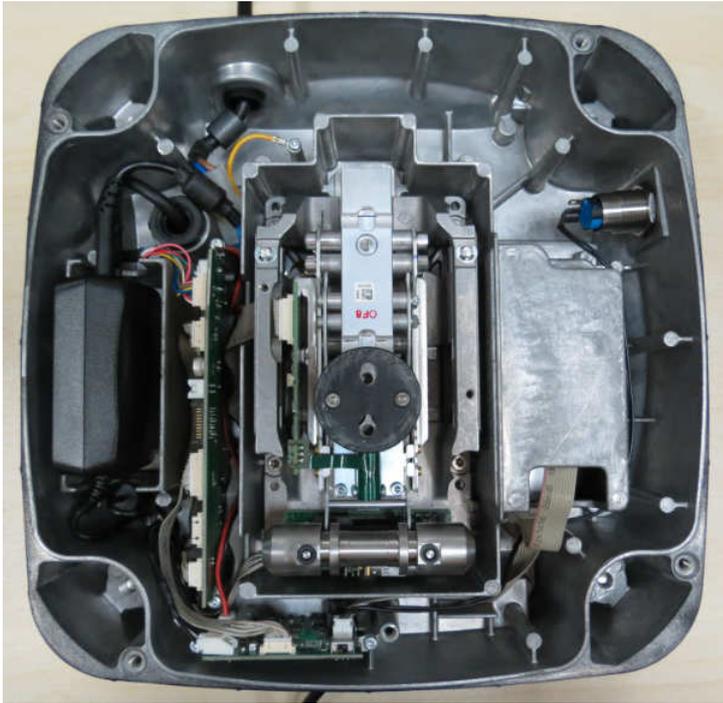
10. The 5th screw is underneath the LFT cover.



Remove the 2 screws securing the LFT cover.



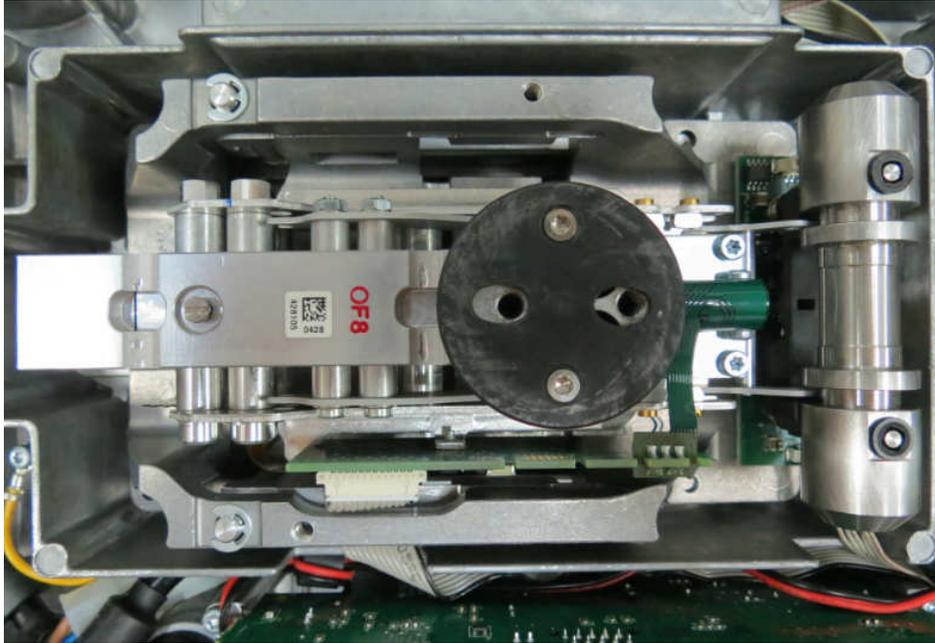
5th screw expose, by removing this screw you will be able to dismantle the base top housing from the base bottom housing.



3.5 Replacing MFR Load cell, R71.

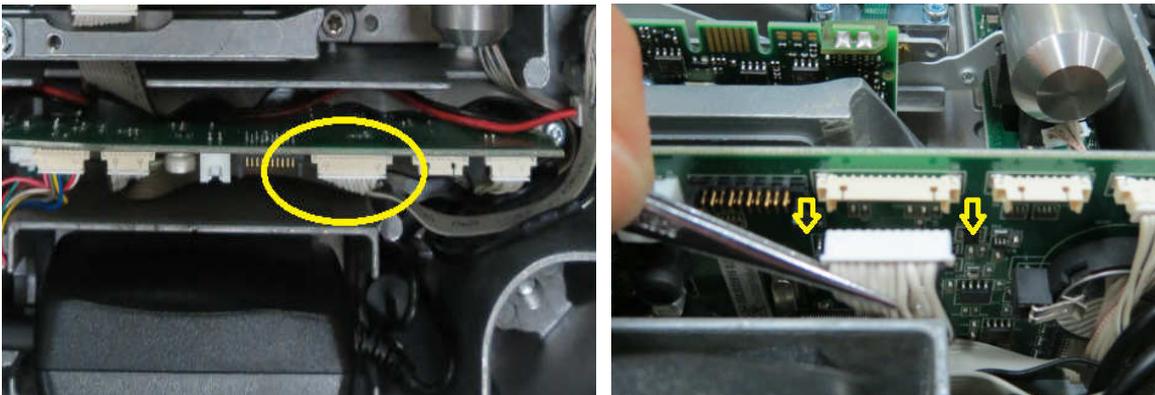
Model R71MHD6 is shown below.

1. Locate the 4 screws securing the MFR load cell with the base bottom housing.

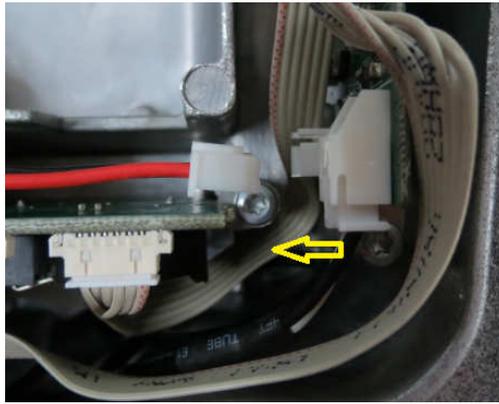
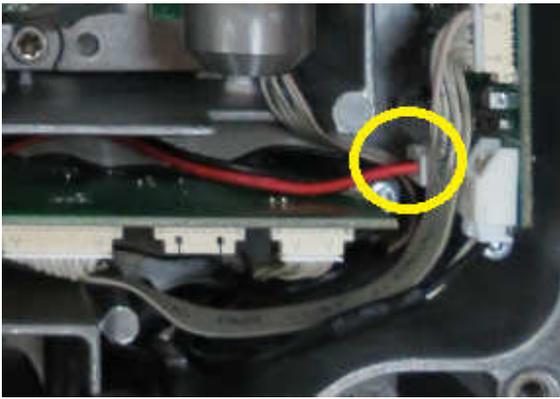


R71 load cell type MFR.

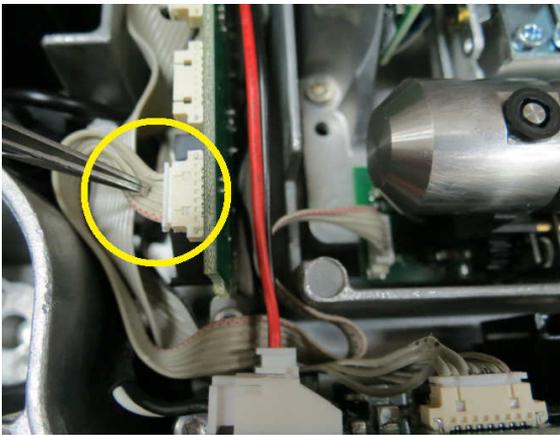
3. Remove the cable connecting the Base PCBA with MFR load cell as shown below.



4. Remove the Red and White cable connecting the base PCBA with LFT PCBA.

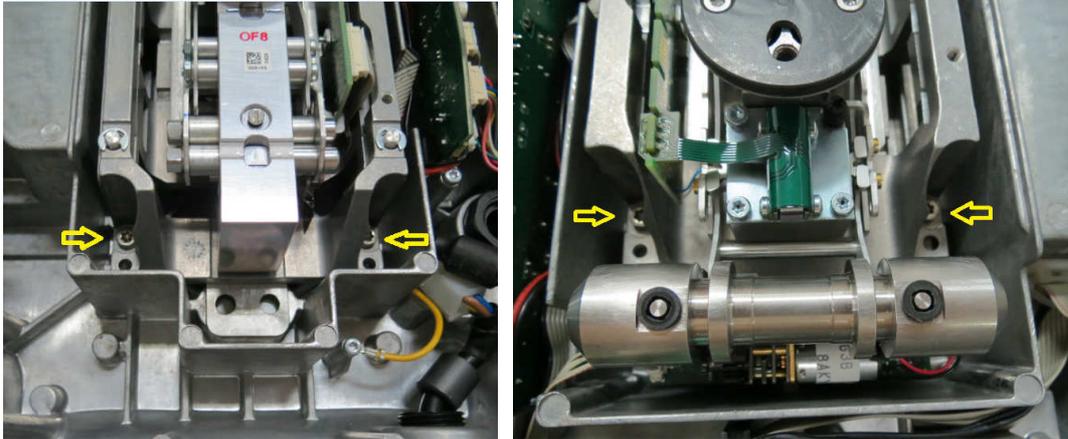


5. Remove the cable connected from the load cell Auto Calibration motor PCBA to the main PCBA as shown below.



6. After removing the 3 cables mention above the next step would be removing the 4 screws which are securing the MFR load cell from the base bottom housing.

Once these 4 screws are removed you can securely remove the cell from the base.



Location of the screws securing the MFR cell from the base bottom housing.

Re-Assembly:

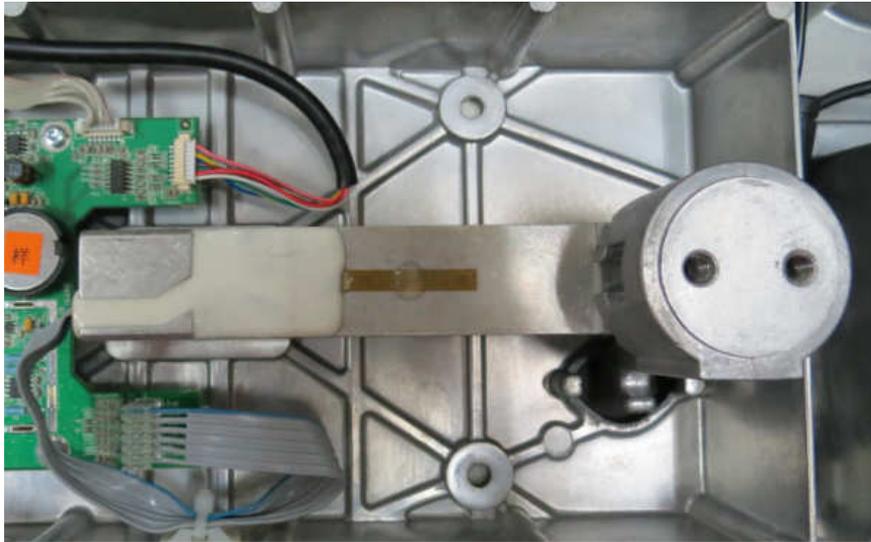
Reverse the disassembly procedure to assemble the scale. Ensure that there is no foreign material between the Base mounting surfaces and the Load cell.

Take special care to route the wires and cables according to their original positions. Proper routing is important for RFI/ESD performance. Ensure that the wires or cables are not pinched during re-assembly.

3.6 Replacing SG Load cell, R71.

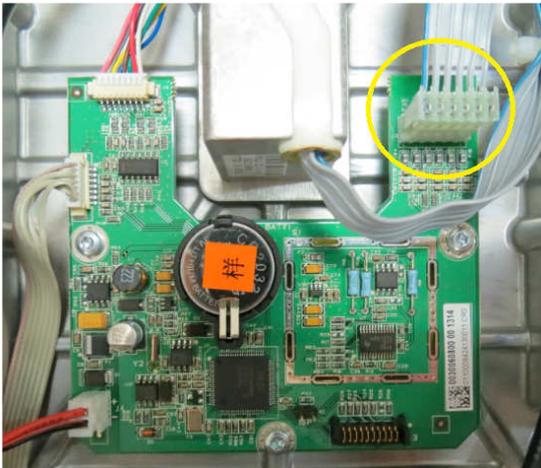
Model R71MD15 is shown below.

1. Locate the 2 screws securing the SG load cell with the base bottom housing.

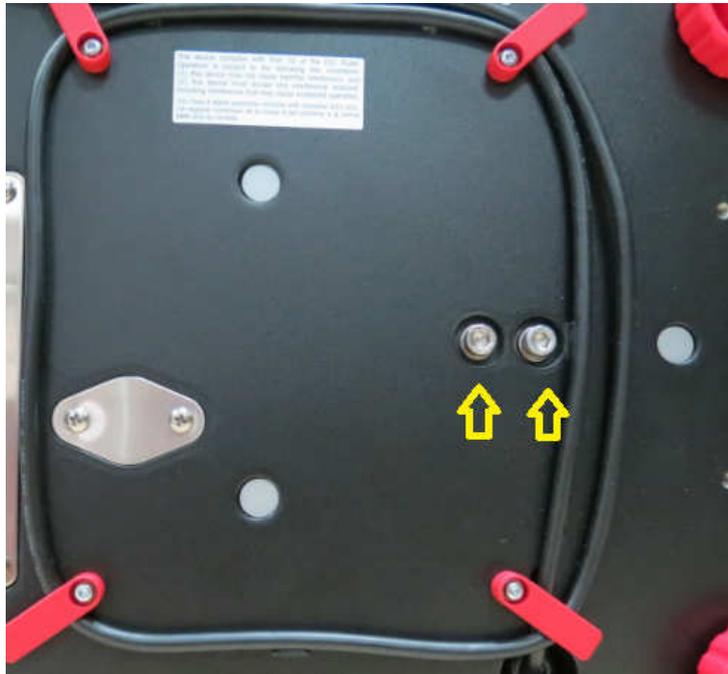


R71 load cell type SG.

2. Remove the cable connecting the Base PCBA with SG load cell as shown below.



3. By holding the load cell in one hand unscrew the 2 screws which securing the SG load cell located at the bottom of the base housing.



Re-Assembly:

Reverse the disassembly procedure to assemble the scale. Ensure that there is no foreign material between the Base mounting surfaces and the Load cell.

Take special care to route the wires and cables according to their original positions. Proper routing is important for RFI/ESD performance. Ensure that the wires or cables are not pinched during re-assembly.

3.7 REPLACING THE PRINTED CIRCUIT BOARD ASSEMBLIES (PCBA)

Before working with the exposed PCBAs appropriate ESD protection must be taken to prevent damage to the sensitive electronic components. It is recommended that a conductive mat with wrist straps be used when working with electronic components.

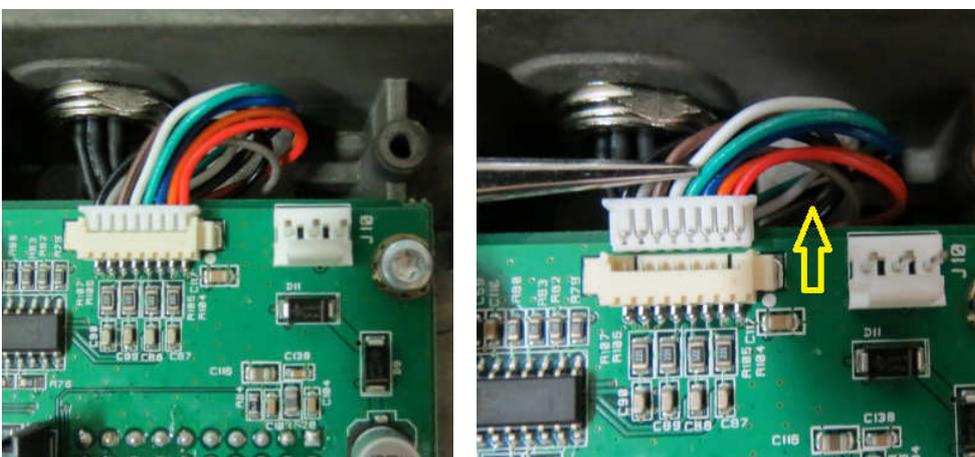
3.7.1 Terminal

- A) Separate the Terminal PCBA from the bottom housing by removing 4 screws, one 8PIN connector on top of the PCBA and another 2 screws securing the RS232 port to the bottom housing. (Located at the back of the Terminal)



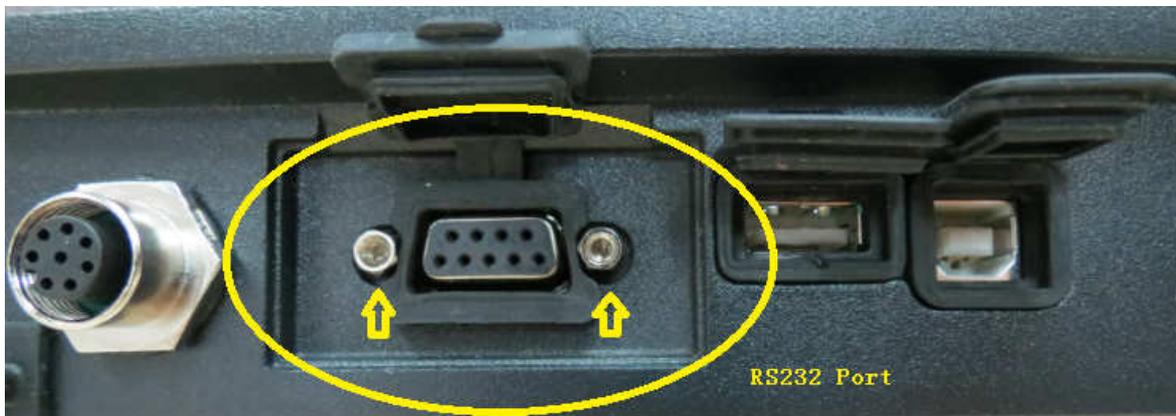
Location of the 4 screws and 8PIN connector on the Terminal PCBA.

- B) Remove the 8PIN connector by gently pulling up the connector.



Showing 8PIN Connector attached and detached from Terminal PCBA.

C) Removing the 2 screws securing the RS232 Port to the bottom housing.



R71 RS232 port located behind the Terminal.



2 screws securing the RS232 port against the Terminal housing removed.
(Remember to place back these 2 screws after repairing)



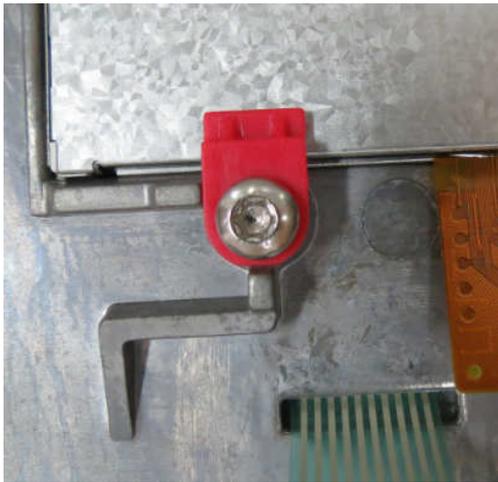
Terminal PCBA taken out from Terminal bottom housing.

3.7.2 Remove the TFT PCB

A) Remove the two screws holding the TFT in place as shown below.



Location of the 2 screws holding the TFT in place against the Terminal Top housing. (Note the position of the two RED holders)



Correct RED holder position



Wrong RED holder position



2 screws and Red Holder removed.

B) Gently remove the TFT from the top housing and place in a secure area.

***When re-installing the TFT PCB make sure the surface on the TFT PCB and Top housing is clean and free from dust and debris.**



TFT PCB removed from Terminal Top housing.



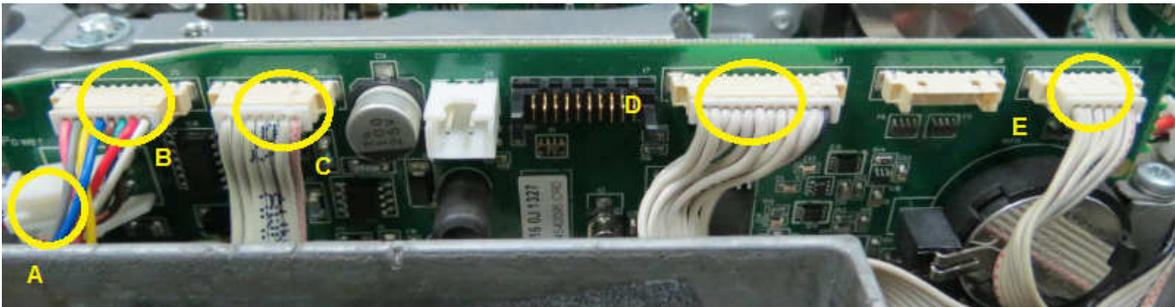
R71, 4.3" TFT Display PCB P/N: 30095940

3.7.3 Removing MFR Main PCBA, R71. (R71MHD3, R71MHD6, R71MHD15 & R71MHD35)

Below show model R71MHD6.

- 1) Remove 5 cables from the main PCBA.
- 2) Loosen the 2 screws securing the main PCBA with the base bottom housing.

1. Remove the below cables from the main PCBA.



Location of the 5 cables on the main PCBA.

A Cable, Red/Black Cable from main PCBA to LFT PCBA

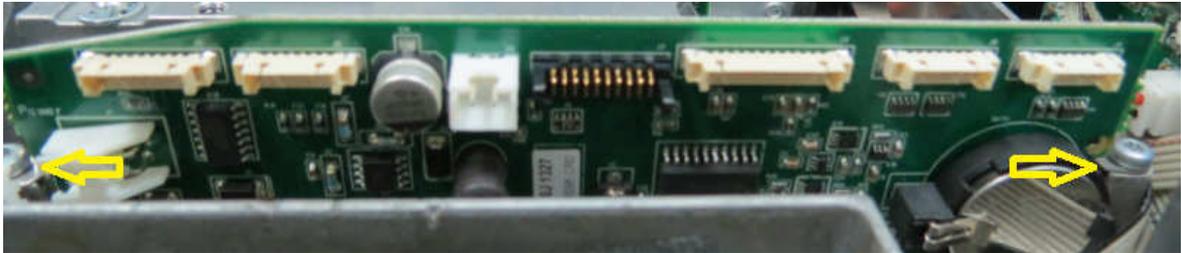
B Cable, RS422 Cable from main PCBA to R71 Display Terminal.

C Cable, Cable from main PCBA to LFT PCBA.

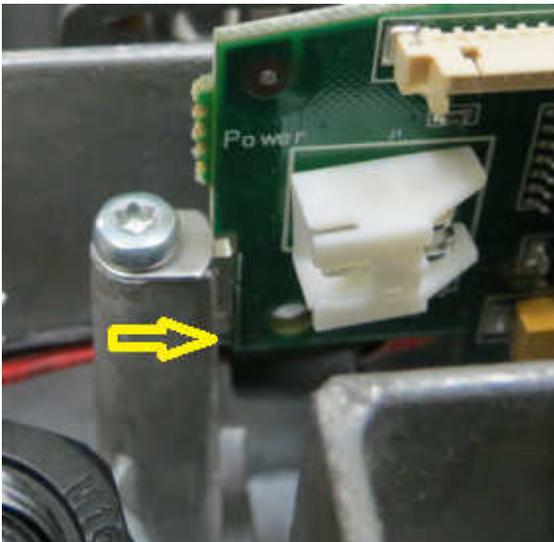
D Cable, Cable from MFR cell to main PCBA.

E Cable, Cable from AutoCal motor PCBA to main PCBA.

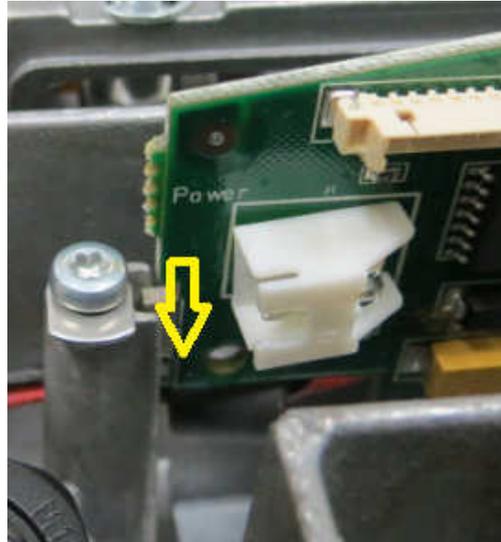
2. After removing the above 5 cables now locate and loosen 2 screws which securing the LFT PCBA to the bottom housing.



Location of the 2 screws securing the main PCBA to the bottom housing.



Screw at Lock position



Screw at Un-Lock position

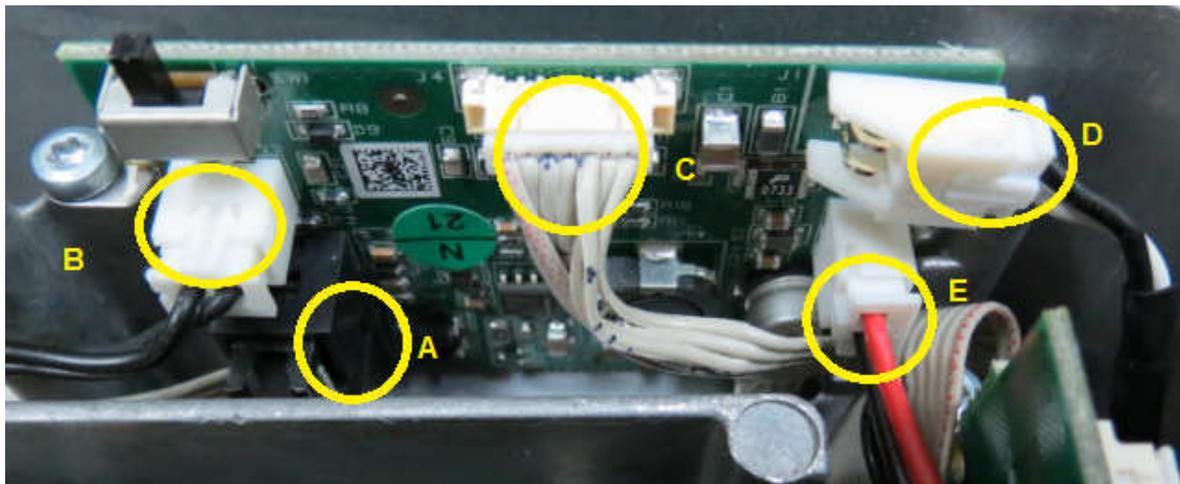
Once you set the two screws in Un-Lock position you will be able to remove the Main PCBA from the bottom housing.

3.7.4 Removing MFR LFT PCBA, R71. (R71MHD3, R71MHD6, R71MHD15 & R71MHD35)

Model R71MHD6 is shown below.

1. Remove the 5 cables from the LFT PCBA.
2. Loosen the 2 screws securing the LFT PCBA with the base bottom housing.

1. Remove the below 5 cables from the LFT PCBA.



Location for the 5 cables.

A Cable, Cable link from LFT PCBA to optional rechargeable battery.

B Cable, Cable link from LFT PCBA to ON OFF Switch.

C Cable, Cable link from LFT PCBA to Main PCBA.

D Cable, Black/White cable link from LFT PCBA to AC Adapter.

E Cable, Red/White Cable from LFT PCBA to Main PCBA.

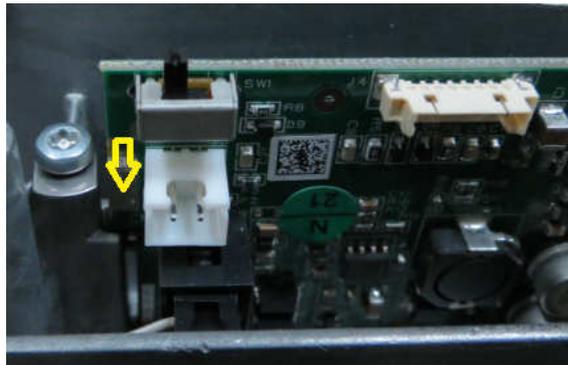
2. After removing the above 5 cables now locate and loosen 2 screws which securing the LFT PCBA to the bottom housing.



Picture shows 5 cables removed, location of the 2 screws.



Screw at Lock position



Screw at Un-Lock position

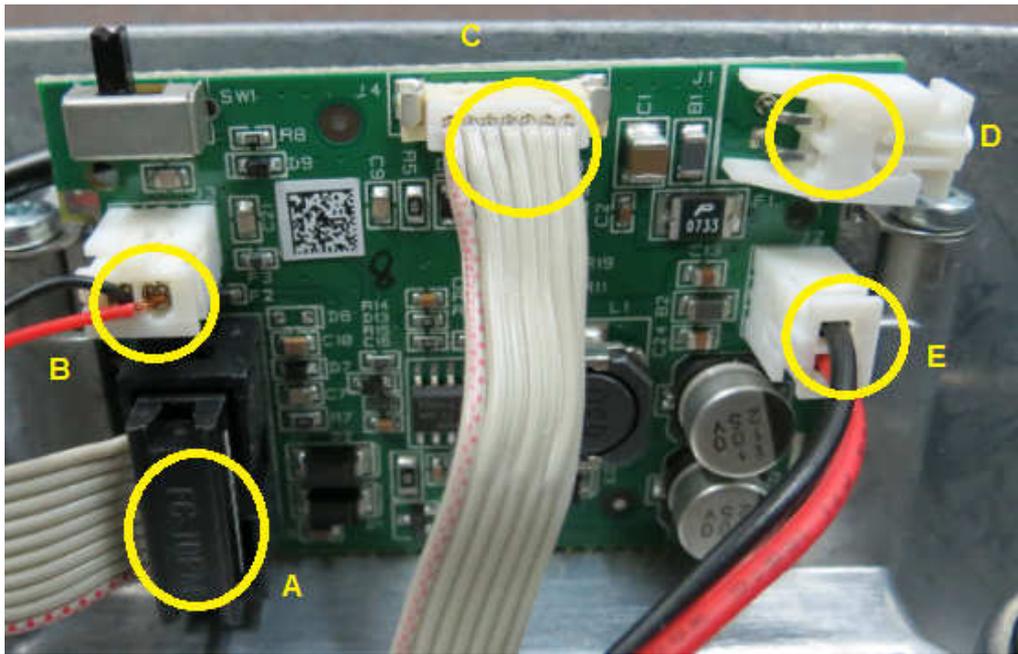
Once you set the two screws in Un-Lock position you will be able to remove the LFT PCBA from the bottom housing.

3.7.5 Replacing SG LFT PCBA, R71. (R71MD3, R71MD6, R71MD15 & R71MD35)

Model R71MD6 is shown below.

1. Remove 5 cables from the LFT PCBA.
2. Loosen the 2 screws securing the LFT PCBA with the base bottom housing.

1. Remove the below 5 cables from the LFT PCBA.



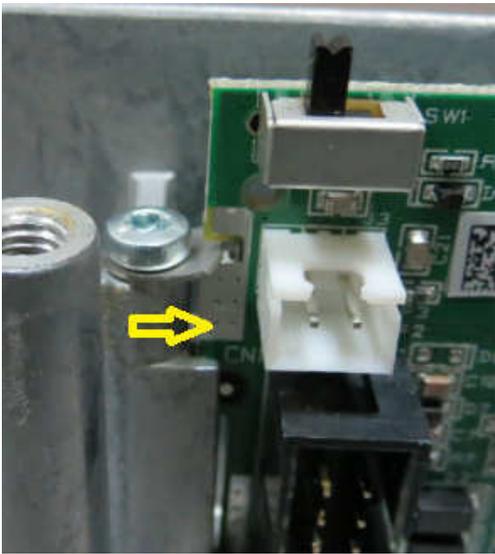
Location for the 5 cables.

- A** Cable, Cable link from LFT PCBA to optional rechargeable battery.
- B** Cable, Cable link from LFT PCBA to ON OFF Switch.
- C** Cable, Cable link from LFT PCBA to Main PCBA.
- D** Cable, Black/White cable link from LFT PCBA to AC Adapter.
- E** Cable, Red/Black Cable from LFT PCBA to Main PCBA.

2. After removing the above 5 cables now locate and loosen 2 screws which securing the LFT PCBA to the bottom housing.



Picture shows 5 cables removed, location of the 2 screws.



Screw at Lock position



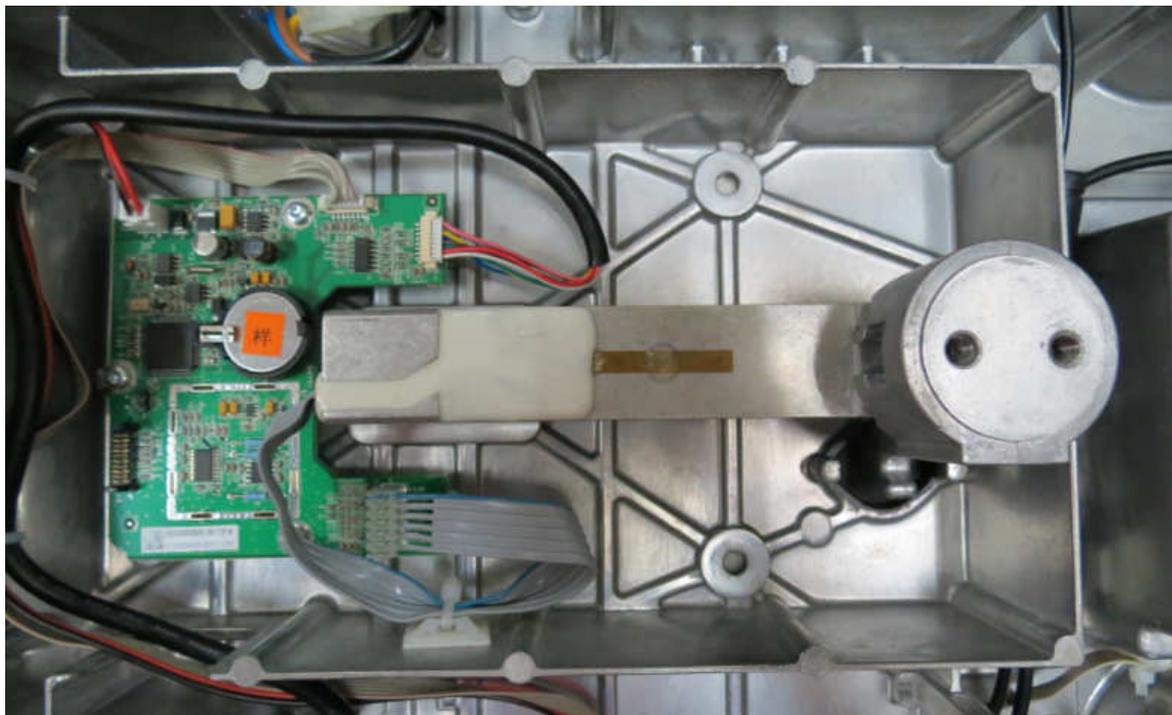
Screw at Un-Lock position

Once you set the two screws in Un-Lock position you will be able to remove the LFT PCBA from the bottom housing.

3.7.6 Replacing SG Main PCBA, R71. (R71MD3, R71MD6, R71MD15 & R71MD35)

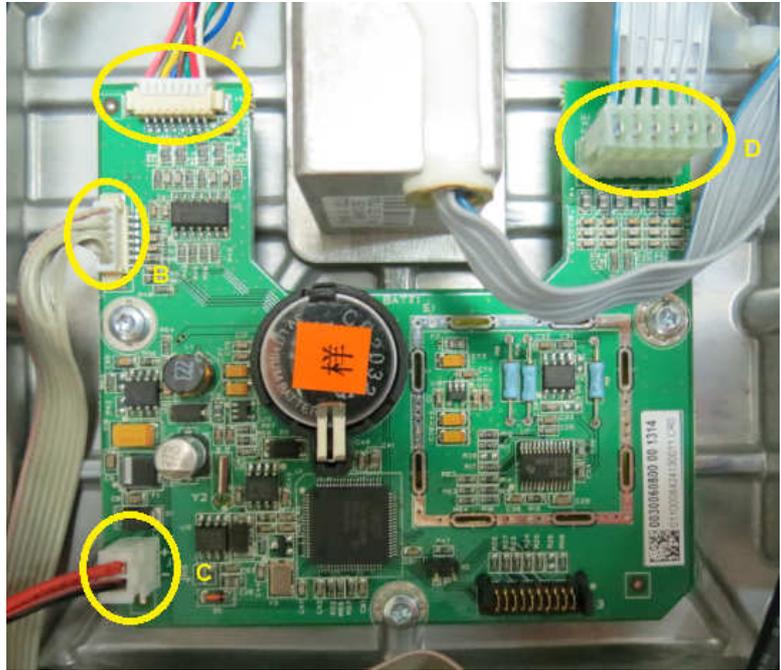
Model R71MD15 is shown below.

1. Remove 4 cables from the main PCBA.
2. Remove the 3 screws securing the main PCBA with the base bottom housing.



R71 load cell type SG.

1. Remove the below cables from the main PCBA.



Location for the 4 cables.

A Cable, RS422 cable from main PCBA to R71 Display Terminal.

B Cable, Cable link from main PCBA to LFT PCBA.

C Cable, Red White Cable link from main PCBA to LFT PCBA.

D Cable, Load Cell cable.

2. After removing the above 4 cables now locate and remove 3 screws which securing the main PCBA to the bottom housing.



4 TESTING

Before and after servicing a Ranger 7000[®] scale, an operational test and various performance tests should be made to confirm if the scale meets specifications. Turn the scale on and allow it to warm up for at least one hour before performing these tests. The Analytical models need up to 4 hours to stabilize.



NOTE:

Make sure the test area is free from drafts and that the scale rests on a level and vibration-free surface. The Analytical models especially need a solid platform, such as a stone table.

4.1 TEST MASSES REQUIRED

The masses required to test the Ohaus Ranger 7000[®] scales must meet the requirements of the ASTM or OIML Tolerances listed in the table. Poor quality calibration masses be the can cause of frustrating diagnostics.

TABLE 4-1 CALIBRATION MASS VALUES

Model	Linearity Calibration Points	Weight Class	
R71MHD3	0 kg, 1.5 kg, 3 kg	ASTM Class 2	OIML F1
R71MHD6	0 kg, 3 kg, 6 kg	ASTM Class 2	OIML F1
R71MHD15	0 kg, 10 kg, 15 kg	ASTM Class 2	OIML F1
R71MHD35	0 kg, 20 kg, 35 kg	ASTM Class 2	OIML F1
R71MD3	0 kg, 1.5 kg, 3 kg	ASTM Class 5	OIML M1
R71MD6	0 kg, 3 kg, 6 kg	ASTM Class 5	OIML M1
R71MD15	0 kg, 10 kg, 15 kg	ASTM Class 5	OIML M1
R71MD35	0 kg, 20 kg, 35 kg	ASTM Class 5	OIML M1

4.1.1 OPERATIONAL TEST

1. Connect a functioning Power Adapter to the scale.
2. Plug the Power Cord into a suitable power source.
3. Verify that the scale start up sequence occurs properly. Note any error codes.

4.2 LOAD CELL TEST USING RAMP

To test the Load Cell using RAMP, see **Chapter 6.3**.

4.3 PERFORMANCE TESTS

Accurate performance of the Ranger 7000[®] scale is determined by a series of four performance tests. The displayed readings are compared with the tolerances listed in Tables 1-1. Tolerance values are expressed in counts. A one-count difference is shown in the last digit on the scale display.

The following performance tests are used to evaluate scale operation before and after repairs. The scale must meet the requirements specified in each test as well as the specifications listed in Table 1-1. Before proceeding with the following tests, the scale should be warmed up (60 minutes) and calibrated. (See **Appendix A**).

4.3.1 Precision Test

The Precision Test is a quick test that measures the deviation of a limited number of weight readings. If the scale passes the precision test then the following tests should be performed.

Note: This is a reference test for approved models (OIML and NTEP). It is not a required test but it can be used to determine if the scale is working properly.

1. The reading on the display should be 0g.
2. Select a mass weighing near the maximum capacity of the scale, and place it on the center of the Pan. Observe and record the reading.
3. Remove the mass. The reading should return to $0g \pm 1d$.
4. Repeat this test three times. The readings should be within $\pm 1d$. If so, the scale passes the Precision Test.

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

- Check for mechanical obstructions. Any foreign object pressing any part of the moving assemblies will cause a scale to fail the Precision Test. Inspect and correct as necessary.
- If the scale does not meet specifications, move it to a suitable location, ensure that it is level, and try again. If it still does not meet specifications, perform a service calibration, and try again. (See **Appendix B** for Service Calibration)
- If the scale does not pass this test, the Load Cell may need to be replaced.

4.3.2 Repeatability Test (non-approved models)

The repeatability specification is defined as the Standard Deviation value derived from a set of weight readings. This test uses more weight data than the Precision Test and will allow for occasional weight deviations due to testing variations.

Note: The required method for approved models (OIML and NTEP) is shown in the following section.

Requirements:

- To perform this test a single mass must be used for all readings.
- The test mass should be approximately $\frac{1}{2}$ of the capacity of the instrument.
- Wear gloves when handling the mass.

Set Up:

Before starting a repeatability test, set up the instrument as follows.

Enter the service menu (see **Chapter 6**) and adjust and record the following settings:

- Set the Stability setting to 0.5d (its lowest setting).
- Set the Filter level to "Middle".
- Set the AZT (Auto Zero Tracking) to .5d (its lowest setting). Do not turn it off.

Enter the User Menu (see 1.8.1) and adjust the following settings:

- Set the instrument to display the same units as the performance specifications. (Usually kg, g, or mg)

Record Test Parameters:

- Stability Setting = _____
- Filter Level Setting = _____
- Auto Zero Tracking Setting = _____
- Displayed Units = _____
- Mass Used = _____

Test Procedure:

1. Zero the instrument.
2. Using a test mass approximately half the capacity of the instrument, place the mass on the center of platform. Record the reading on the worksheet provided.
3. Remove the mass from the platform.
4. Repeat this test starting at Step 1 until you record a total of ten readings.

Fill in the worksheet with the ten (10) readings.

TABLE 4-2: REPEATABILITY WORKSHEET

n	Reading	Delta = Reading – Mean	Delta x Delta
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

n = number of Reading
Mean = Sum of readings / 10
Delta = Reading – Mean
Standard Deviation = Square Root of (sum of (Delta x Delta) / 9)

5. Add the ten readings and divide the total by 10 to find the Mean (average).
 Mean = (Reading 1 + Reading 2 + Reading 3 + Reading 4 + Reading 5+ Reading 6 + Reading 7+ Reading 8 + Reading 9 + Reading 10) / 10
Mean = _____
6. Calculate the Delta for each reading and record in the work sheet.
Delta = Reading – Mean
7. Calculate the Delta x Delta for each reading and record in worksheet.
8. Add the ten Delta x Delta values and divide by 9
9. Calculate the Standard Deviation by applying the square root of the result from step 8.
Standard Deviation = _____

Note: If the scale does not meet specifications, check environmental conditions, ensure that the scale is level, and try again. If it still does not meet specifications, perform a service calibration, and try again. (See **Appendix B** for Service Calibration).

Repeatability Test – Approved models

This test is a variation of the test above. Rather than determining acceptance based on the standard deviation of the errors, MPE is used. The other variation is that 2 series of weighings are used, one near 50% of max and the other near 100% of maximum capacity.

1. See Table 1-1 to determine the two weight values that must be used.
2. Record 10 reading using each weight value. Zero the scale between each reading if necessary.
3. The difference between the results of the 10 readings must be less than the absolute value of the Maximum Permissible Error (MPE) for the load. The MPE for each load in grams is given in Table 1-1.

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.

This is a reference test for approved scale s as there is no linearity specification. The approved models should be able to pass this test so it is still valid to determine scale performance.

NOTE:



The scale must pass the Precision and Repeatability Tests, and be calibrated before the Linearity Test is performed.

TABLE 4-3 LINEARITY TEST - REFERENCE AND LOAD MASSES

Model	Load 1	Load 2	Load 3
R71MHD3	0kg	1.5kg	3kg
R71MHD6	0kg	3kg	6kg
R71MHD15	0kg	10kg	15kg
R71MHD35	0kg	20kg	35kg
R71MD3	0kg	1.5kg	3kg
R71MD6	0kg	3kg	6kg
R71MD15	0kg	10kg	15kg
R71MD35	0kg	20kg	35kg

NOTE: All masses are nominal values. Be certain to use the same reference mass throughout the procedure.

1. Place the Reference Mass on the scale, record the weight and remove.
2. Place Load 1 on the scale and press TARE.
3. Place the test mass on the scale, record the weight and remove.
4. Place Load 2 on the scale and press TARE.
5. Place the test mass on the scale, record the weight and remove.
6. Place Load 3 on the scale and press TARE.
7. Place the test mass on the scale and record the weight.
8. The difference in the weights of the test mass should be within the tolerance in Table 4-2. If the differences are out of tolerance, verify the test conditions and repeat the test.
9. If the scale remains out of tolerance, the Load Cell may need to be replaced.

4.3.4 Off-Center Load Test

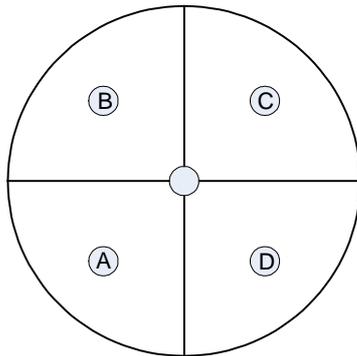
The Off-Center Load Test is used to determine whether displayed weight values are affected by moving the sample to different areas of the Pan. OCL test may also be referred to as a Shift Test (NTEP) or an Eccentricity Test (OIML).

The test weight used in this test 1/3 the capacity of the scale. See table for the test weight values.

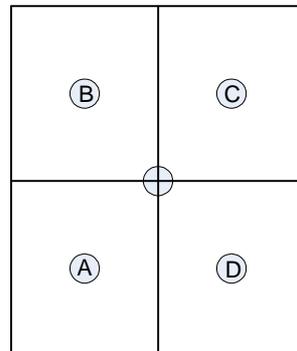
TABLE 4-4 OFF CENTER LOAD MASS VALUES

Model	OCL Mass Value	Notes
R71MHD3	0 kg, 1.5 kg, 3 kg	1. The class of test weight to be use during OCL is not critical. 2. Use large weights where possible. Smaller weights can be stacked on the larger but a stability problem may occur if many smaller weights are used. If weights cannot be stacked they must be placed uniformly over the segment.
R71MHD6	0 kg, 3 kg, 6 kg	
R71MHD15	0 kg, 10 kg, 15 kg	
R71MHD35	0 kg, 20 kg, 35 kg	
R71MD3	0 kg, 1.5 kg, 3 kg	
R71MD6	0 kg, 3 kg, 6 kg	
R71MD15	0 kg, 10 kg, 15 kg	
R71MD35	0 kg, 20 kg, 35 kg	

The test positions (A-D) must be centrally located in each segment.



Round Pan



Rectangular Pan

Procedure:

1. Set AZT (Auto Zero Tracking) to off. This setting is located in Menu - Scale Setup - AZT menu.
2. Place the test weight in the center of the Weighing Pan.
3. Tare the scale.
4. Move the weight to location **A** and record the reading (when stability indicator comes on).
5. Move the weight to location **B** and record the reading.
6. Move the weight to location **C** and record the reading.
7. Move the weight to location **D** and record the reading.
8. Maximum allowable change in displayed weight readings for each of the four positions can be found in Specifications Tables (Chapter 1). If this maximum is exceeded verify the test conditions and retest the scale. If there is no improvement the load-cell must be replaced.

Note: In high resolution scales (Class I) it may be necessary to zero or tare between each location.

5 PARTS LISTS & DIAGRAMS

This section of the manual contains parts lists and exploded views for the Ranger 7000[®] scale s. These are designed to identify the parts which can be serviced on the scale in the field. The parts list and exploded views are separated into separate sections for the Terminal and the Base.

To order spare parts, identify the required item in the exploded views and parts list, then use the Spare Parts List to obtain the current part number for this item.

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

If further technical information is needed, please contact your local Ohaus office, or www.ohaus.com.

5.1 TERMINAL SPARE PARTS

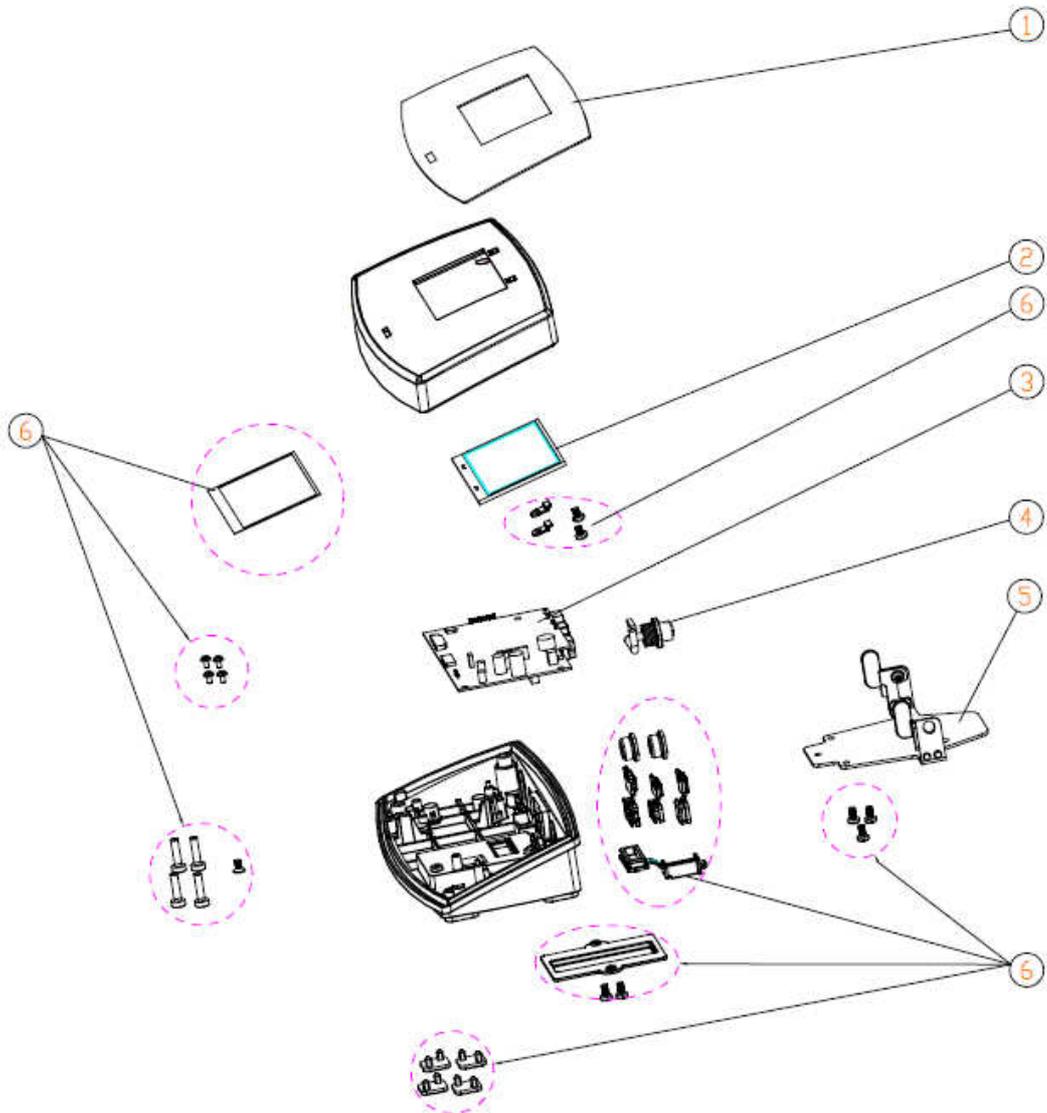


TABLE 5-1 TERMINAL SPARE PARTS

<u>Drawing Item</u>	<u>Part Number</u>	<u>Description</u>
1	30095939	SP Overlay R71 Terminal
2	30095940	SP 4.3" TFT Display R71 Terminal
3	30095930	SP PCBA, Terminal R71
4	30103748	SP 8PIN Connector Terminal, R71
5	30095941	SP Bracket, Docking, R71
6	30095907	SP Hardware Kit, R71

5.2 BASE SPARE PARTS (R71MD3 and R71MD6)

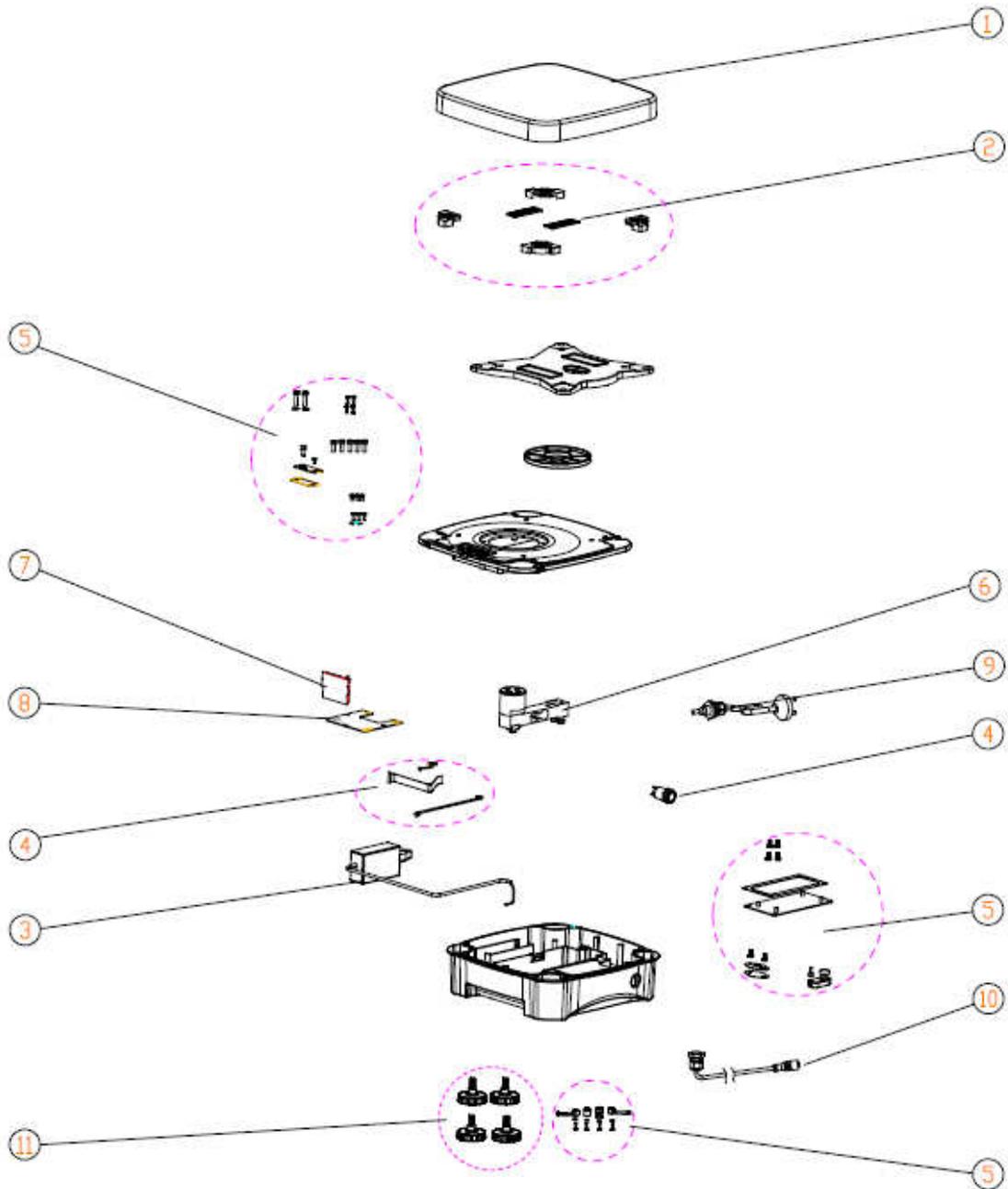


TABLE 5-2 BASE SPARE PARTS (R71MD3 AND R71MD6)

<u>Drawing Item</u>	<u>Part Number</u>	<u>Description</u>
1	30095934	SP Pan, SM, SG, R71
2	30113444	SP Rubber Parts Kit, Small base, R71
3	30041419	SP Adapter, with-cable, EX HiCap, R71
4	30095908	SP Cables Kit, R71
5	30095907	SP Hardware Kit, R71
6	30095937	SP SG Loadcell, 5kg, R71
7	30076250	SP PCBA, LFT, EX HiCap, R71
8	30095909	SP PCBA, Base, SG, R71
9	30041267	SP Power-Cord US EX HiCap, R71
	30041462	SP Power-Cord EU EX HiCap, R71
	30041463	SP Power-Cord CN EX HiCap, R71
	30041464	SP Power-Cord UK EX HiCap, R71
	30041465	SP Power-Cord AU EX HiCap, R71
	30041466	SP Power-Cord JP EX HiCap, R71
	30041469	SP Power-Cord KR EX HiCap, R71
10	30095936	SP RS422 Cable Base R71
11	30035606	SP Feet Kit R21, R31, V71, V22, V41, R71
	30095932	SP Packaging Assembly,SM,R71
	30095933	SP Packaging Assembly,LA,SG,R71
	30078209	Box,SM,R71

5.3 BASE SPARE PARTS (R71MD15 and R71MD35)

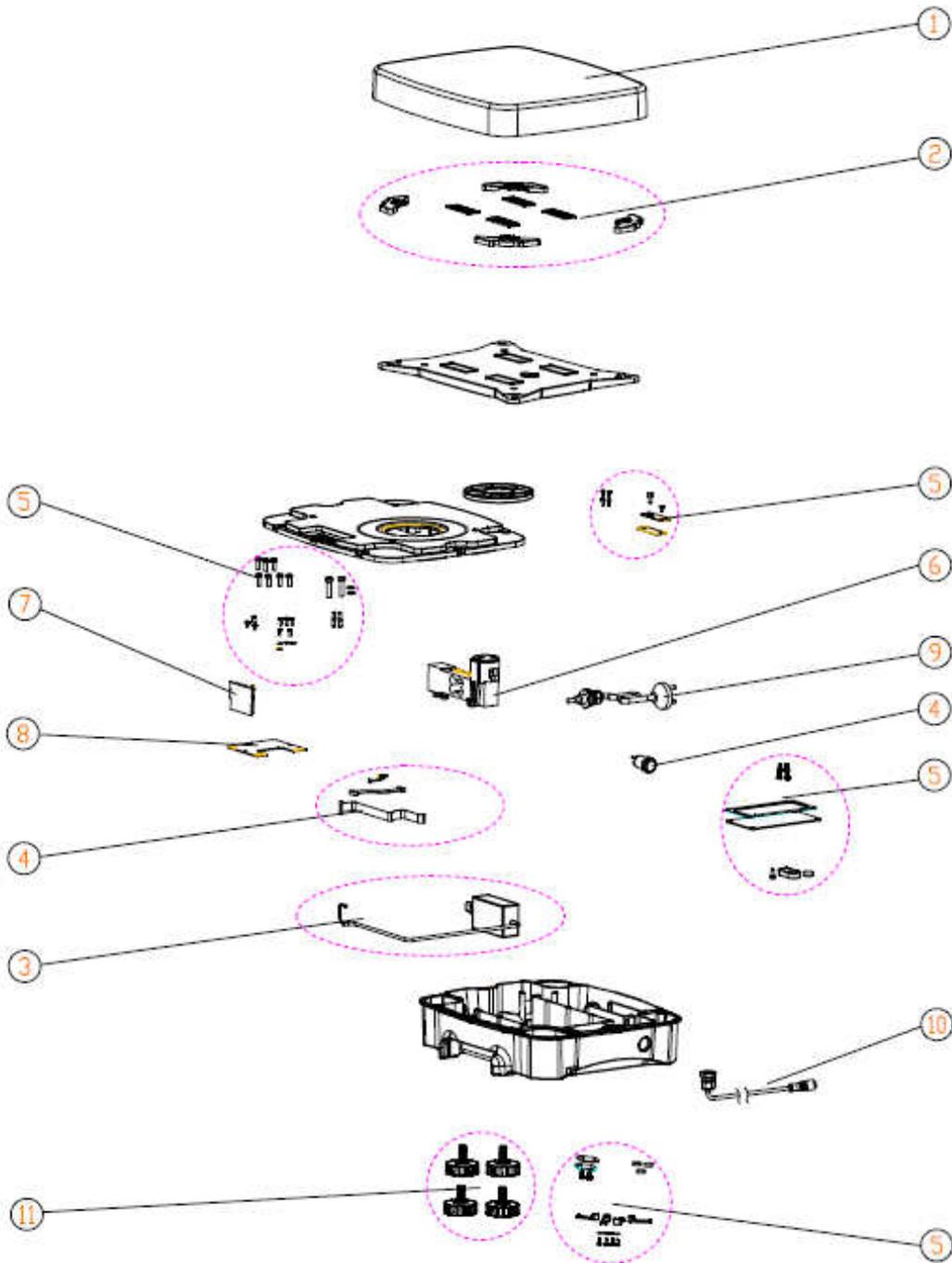


TABLE 5-3 BASE SPARE PARTS (R71MD15 AND R71MD35)

<u>Drawing Item</u>	<u>Part Number</u>	<u>Description</u>
1	30095934	SP Pan, SM, SG, R71
2	30113444	SP Rubber Parts Kit, Small base, R71
3	30041419	SP Adapter, with-cable, EX HiCap, R71
4	30095908	SP Cables Kit, R71
5	30095907	SP Hardware Kit, R71
6	30095937	SP SG Loadcell, 5kg, R71
7	30076250	SP PCBA, LFT, EX HiCap, R71
8	30095909	SP PCBA, Base, SG, R71
9	30041267	SP Power-Cord US EX HiCap, R71
	30041462	SP Power-Cord EU EX HiCap, R71
	30041463	SP Power-Cord CN EX HiCap, R71
	30041464	SP Power-Cord UK EX HiCap, R71
	30041465	SP Power-Cord AU EX HiCap, R71
	30041466	SP Power-Cord JP EX HiCap, R71
	30041469	SP Power-Cord KR EX HiCap, R71
10	30095936	SP RS422 Cable Base R71
11	30035606	SP Feet Kit R21, R31, V71, V22, V41, R71
	30095932	SP Packaging Assembly,SM,R71
	30095933	SP Packaging Assembly,LA,SG,R71
	30078209	Box,SM,R71

5.4 BASE SPARE PARTS (R71MHD3 and R71MHD6)

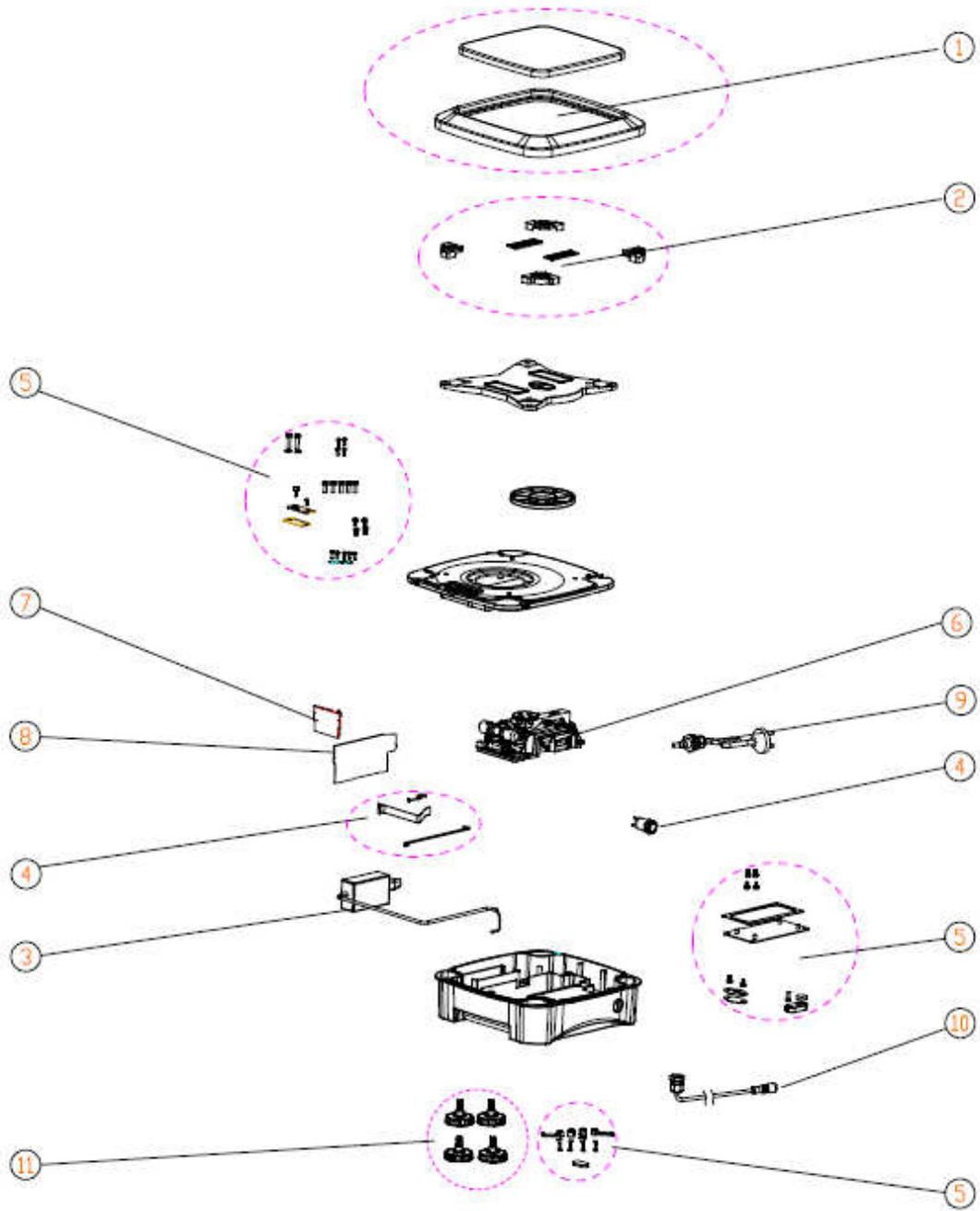


TABLE 5-4 BASE SPARE PARTS (R71MHD6 AND R71MHD6)

<u>Drawing Item</u>	<u>Part Number</u>	<u>Description</u>
1	30095935	SP Pan,SM ,MFR, R71
2	30113444	SP Rubber Parts Kit, Small base, R71
3	30041419	SP Adapter, with-cable, Ex HiCap, R71
4	30095908	SP Cables Kit, R71
5	30095907	SP Hardware Kit, R71
6	30095903	SP MFR Loadcell 4kg, R71
7	30076250	SP PCBA,LFT,EX HiCap, R71
8	30111916	SP PCBA, Base, MFR,R71
9	30041267	SP Power-Cord US EX HiCap, R71
	30041462	SP Power-Cord EU EX HiCap, R71
	30041463	SP Power-Cord CN EX HiCap, R71
	30041464	SP Power-Cord UK EX HiCap, R71
	30041465	SP Power-Cord AU EX HiCap, R71
	30041466	SP Power-Cord JP EX HiCap, R71
	30041469	SP Power-Cord KR EX HiCap, R71
10	30095936	SP RS422 Cable Base R71
11	30035606	SP Feet Kit R21, R31, V71, V22, V41, R71
	30095932	SP Packaging Assembly,SM,R71
	30095933	SP Packaging Assembly,LA,SG,R71
	30078209	Box,SM,R71

5.5 BASE SPARE PARTS (R71MHD15 and R71MHD35)

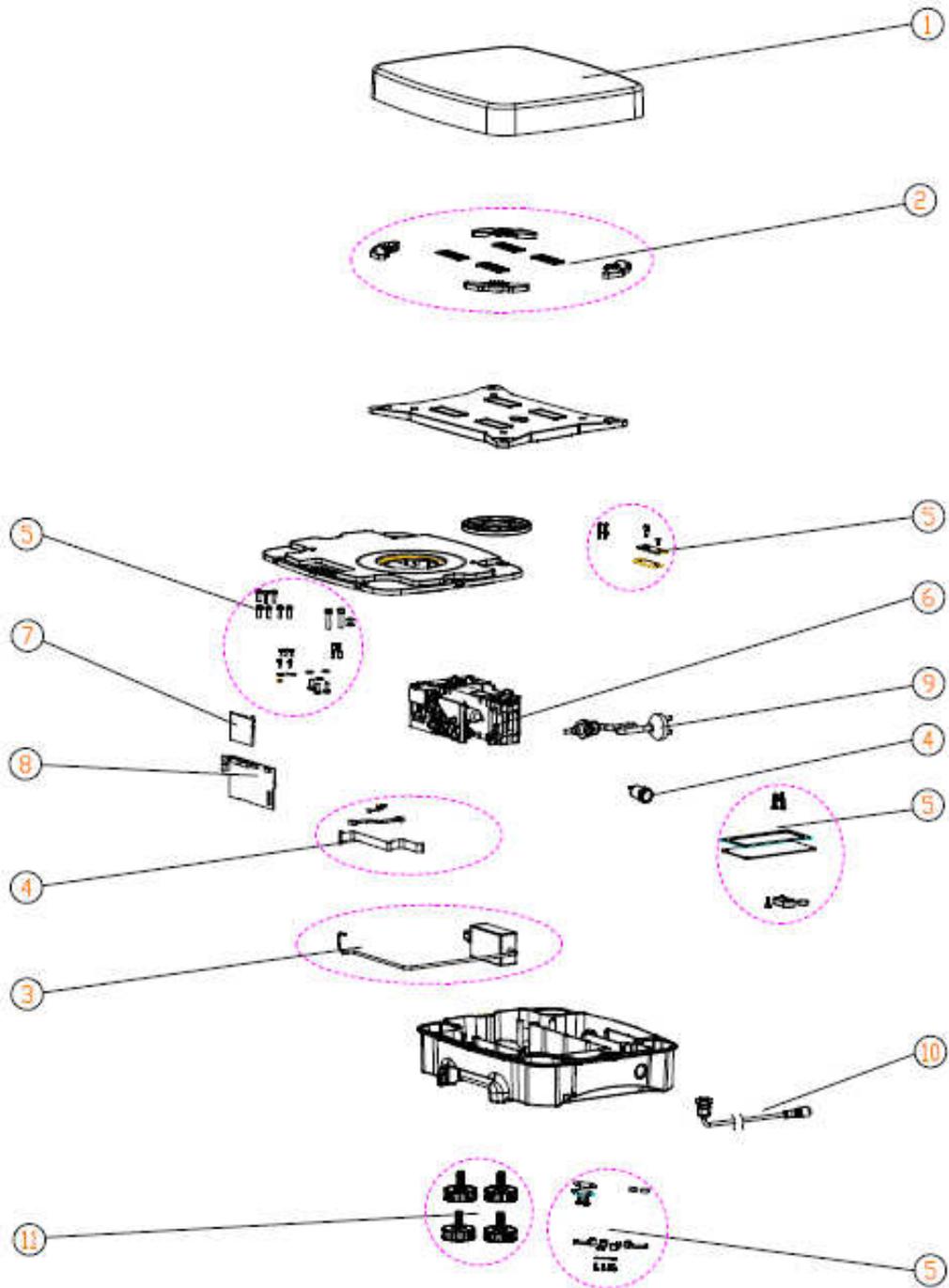


TABLE 5-5 BASE SPARE PARTS (R71MHD15 and R71MHD35)

<u>Drawing Item</u>	<u>Part Number</u>	<u>Description</u>
1	30095935	SP Pan,SM ,MFR, R71
2	30113444	SP Rubber Parts Kit, Small base, R71
3	30041419	SP Adapter, with-cable, Ex HiCap, R71
4	30095908	SP Cables Kit, R71
5	30095907	SP Hardware Kit, R71
6	30095903	SP MFR Loadcell 4kg, R71
7	30076250	SP PCBA,LFT,EX HiCap, R71
8	30111916	SP PCBA, Base, MFR,R71
9	30041267	SP Power-Cord US EX HiCap, R71
	30041462	SP Power-Cord EU EX HiCap, R71
	30041463	SP Power-Cord CN EX HiCap, R71
	30041464	SP Power-Cord UK EX HiCap, R71
	30041465	SP Power-Cord AU EX HiCap, R71
	30041466	SP Power-Cord JP EX HiCap, R71
	30041469	SP Power-Cord KR EX HiCap, R71
10	30095936	SP RS422 Cable Base R71
11	30035606	SP Feet Kit R21, R31, V71, V22, V41, R71
	30095932	SP Packaging Assembly,SM,R71
	30095933	SP Packaging Assembly,LA,SG,R71
	30078209	Box,SM,R71

6 ACCESSING THE SERVICE MENU.

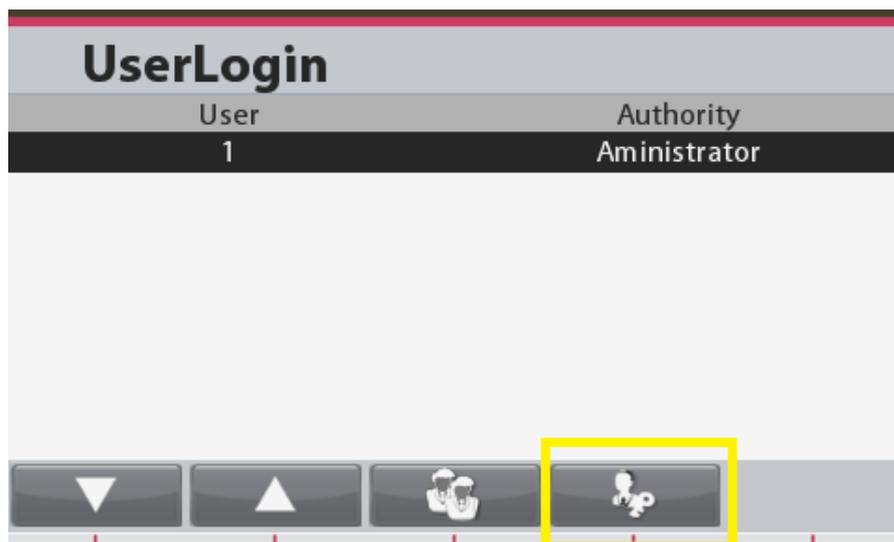
6.1 Accessing the Service Menu (Super Password).

With any User you created in 'User Profiles' by pressing and holding the '0/User' key during weighing mode you will be able to select the pre-set User Profiles. By keying the Super Password 'OHR71' you will be able to see 'Service Menu' under 'Maintenance' – 'Diagnosis' as shown below.

1. Press and hold '0/User' button, you will see the preset User Profiles.



2. By selecting the far right button you will come to the below window screen.



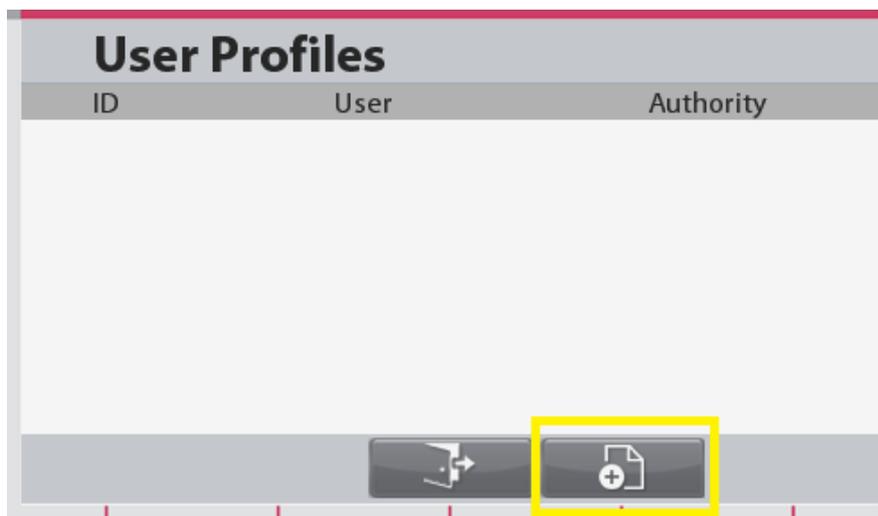
3. Key in Super Password 'OHR71' you will be able to gain access into 'Service Menu'.

6.2 Creating UserLogin.

1. If you are unable to see the above 'User Login' after you long press '0/User) key this mean there is no user profile database been created and you need to create the user profile.
2. Proceed to 'Menu' and select 'User Profile'.



3. Start keying in your user profile information by selecting the 'add record' button.



4. Key in the 'User' name, 'Password' and 'ConfirmPassword', below show example User (1), Password (123) and ConfirmPassword (123).

New User

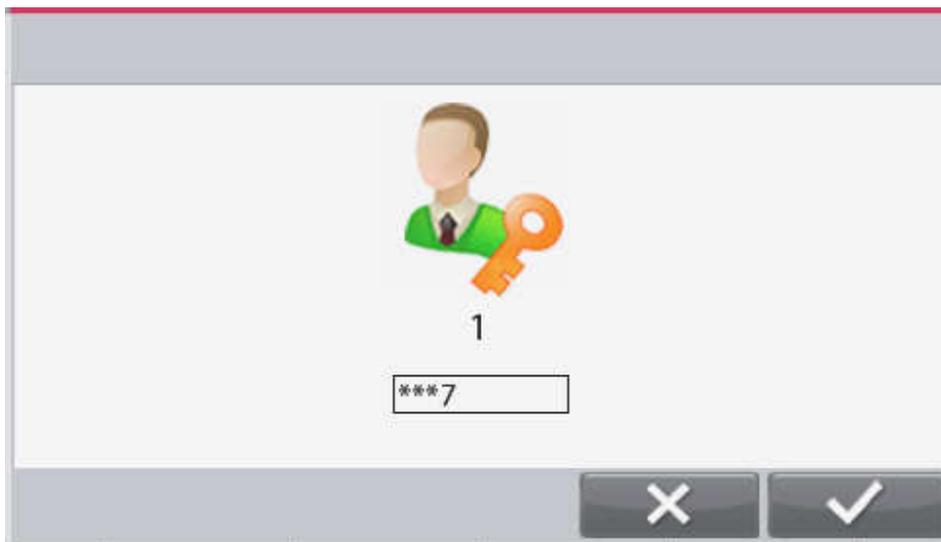
User:	1
Password:	***
ConfirmPassword:	**3
<input type="button" value="X"/> <input type="button" value="✓"/>	

After saving the information you will be able to see the User under 'User Profiles'. Now by following step 1 to 3 you will be able to gain access into 'Service Menu'.

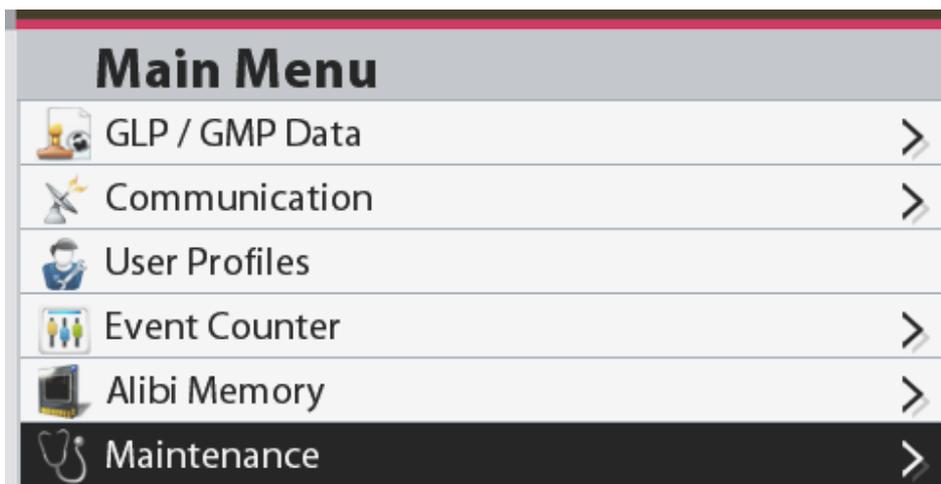
User Profiles

ID	User	Authority
01	1	Aministrator

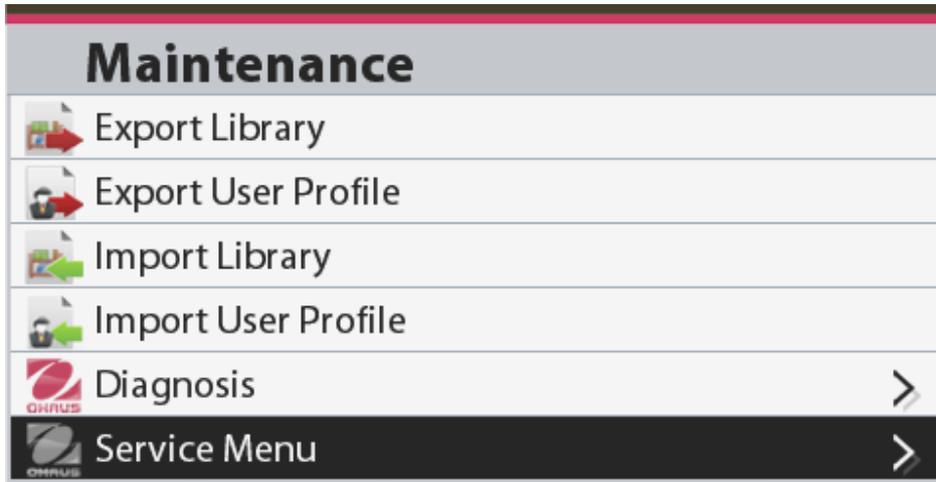
- Key in the Super password 'OHR71' and press Enter key you will return back to normal weighing mode.



6. Proceed to 'Main Menu' and select 'Maintenance'.



7. Now you will be able to see the 'Service Menu'



6.3 Under Service Menu.

1. Under 'Service Menu' you will have the below options.



- 'RAMP' value- typical value range from 50-80% (varies depends on models) and value should not be 0 or 100%.
- Expand – For R and D usage.
- Factory Linear Cal – Using external weights to perform linearity calibration, follow screen instruction.

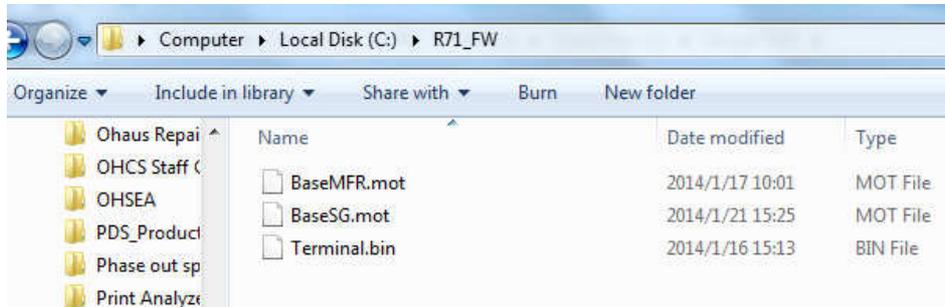


- Firmware Update – updating base and terminal firmware.

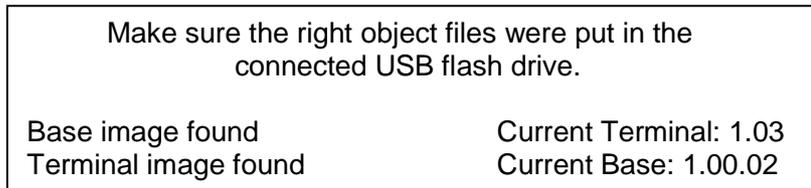


Note: When downloading Terminal Software using Ohaus Repair and Service Tool the file is type *.mot. If downloading via the USB host is type *.bin. The software need to be put in the "R71_FW" folder under the root folder of the flash driver otherwise the terminal will not be able to locate the *.bin file.

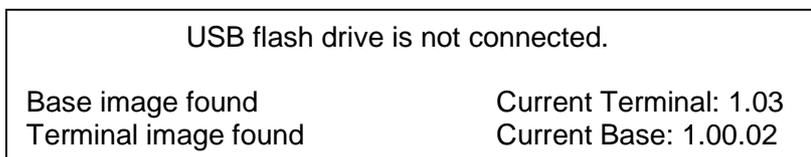
1. Create a "R71_FW" folder at the root folder of a flash driver.
Put following files into the folder



- When you plug in the USB flash drive into the R71 terminal with the respective bin file in it you will be able to see the below example information once you select the Firmware Update option.



If the USB Flash drive is not plug in you will see the below message.

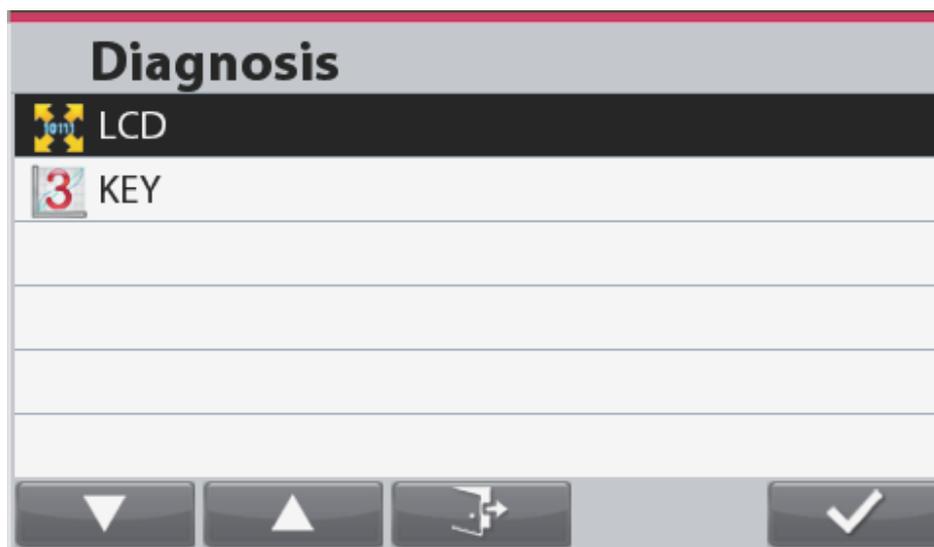


- Format Alibi Memory – Formatting/Erasing Alibi memory.



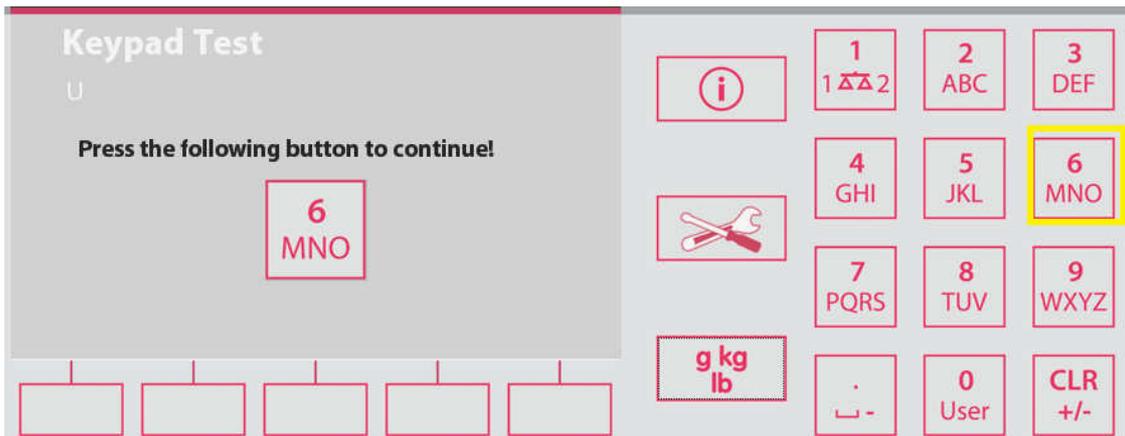
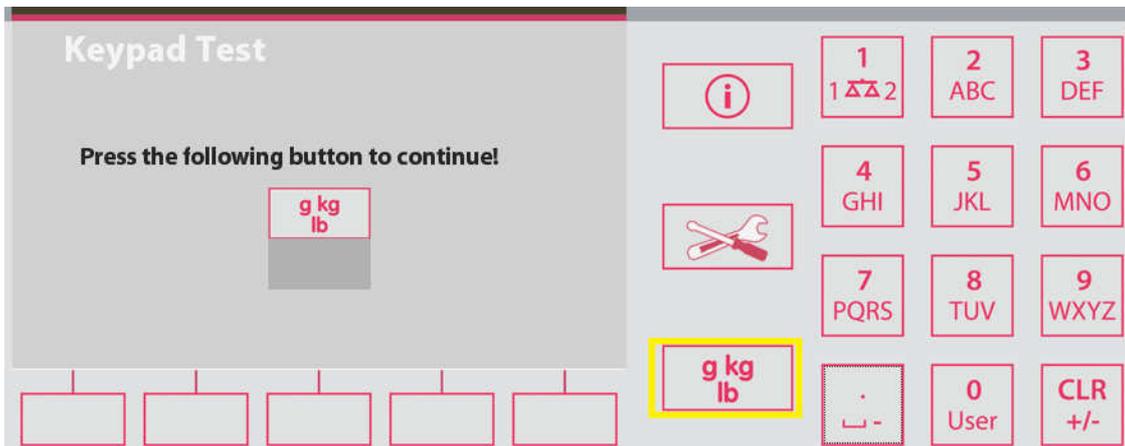
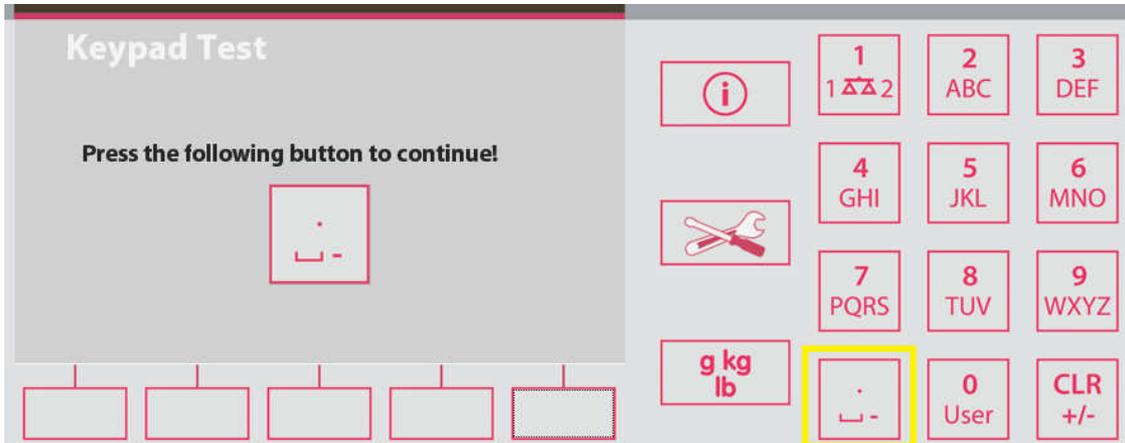
6.4 Maintenance (Diagnostic).

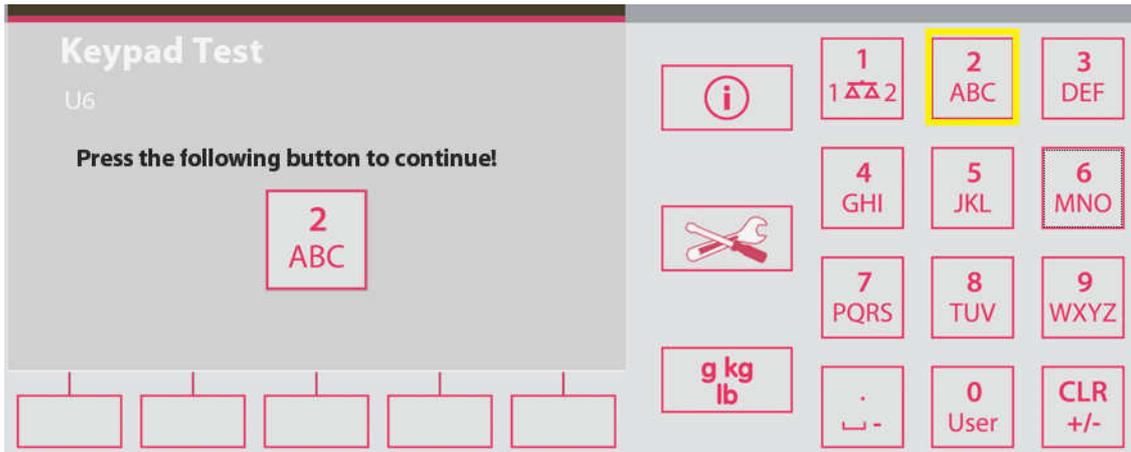
1. Under 'Diagnostic' you will have the below options.



- LCD diagnostic – 4 diagnostic test will be perform on the color LCD screen for RED, Green, Blue color test and BackLight Test.

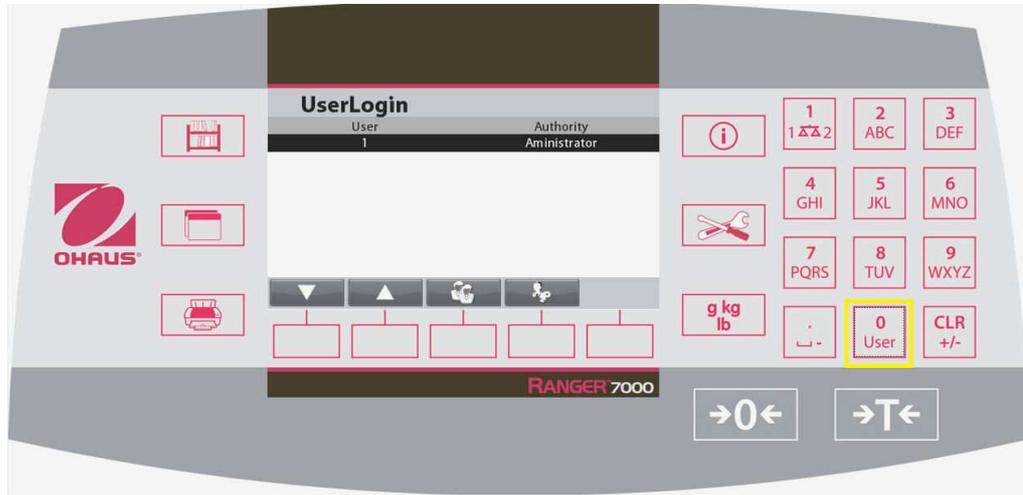
- 4 key tests- testing the functionality of the keypad membrane, the below 4 keys will be tested during this diagnostic.



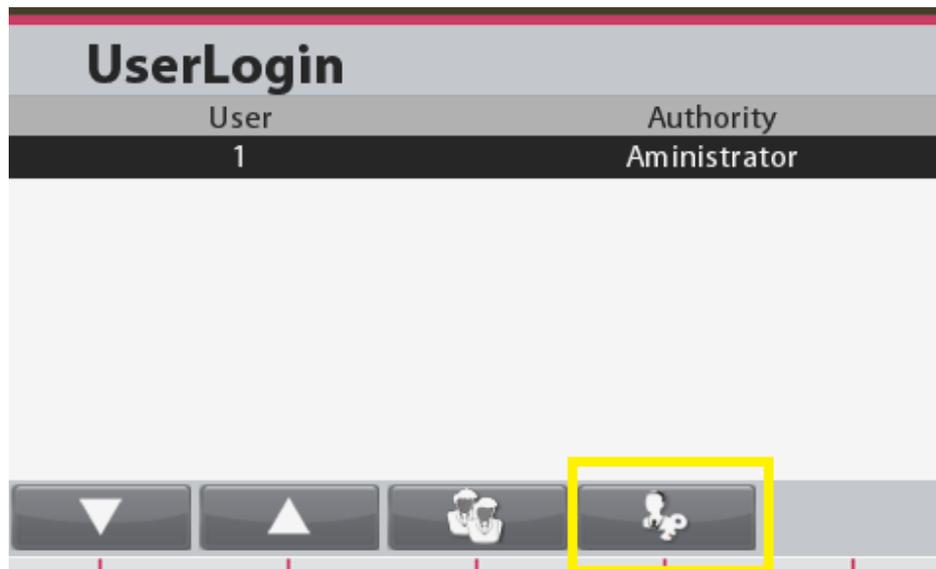


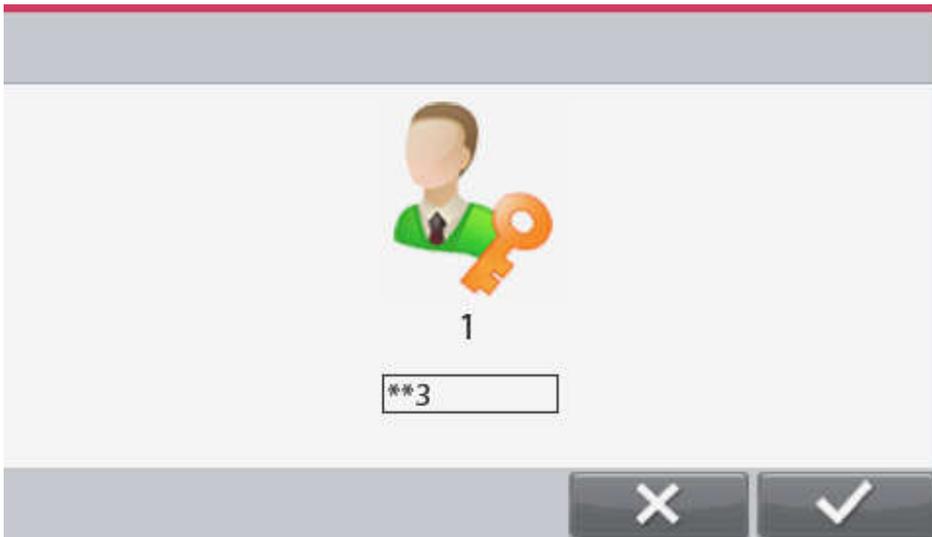
6.5 Disable 'Service Menu'.

1. Press and hold '0/User' button, you will see the preset User Profiles.



2. By selecting the far right button you will come to the below window screen.





3. Key in previously set User password example '123' you will disable the 'Service Menu' as shown below.



APPENDIX A – COMMUNICATION

The Software Service Tool (Part Number 83032124) is required when a main PC Board is replaced in a Ranger 7000® scale. It is used to re-configure the scale to its original parameters in the case of a PCB replacement. The tool can also be used to communicate with the scale using commands that are listed at the end of the appendix.

The latest software service tool and support files are available on the Ohaus DMX site.

Please read the Service Tool Instruction Manual (Part Number 30032352) which is also available on Ohaus DMX site.

A.1 Scale Commands.

The scale commands are used to send instructions to the scale. Commands listed in the following table will be acknowledged by the scale. The scale will return “ES” for invalid commands.

TABLE A-1 INTERFACE COMMAND LIST

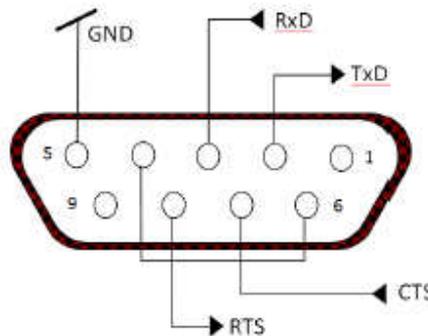
Command	Function
IP	Immediate Print of displayed weight (stable or unstable).
P	Print displayed weight (stable or unstable).
CP	Continuous
SP	Print on Stability.
xS	0S: Turn off “Stable Only” menu item and allow unstable print. 1S: Turn on “Stable Only” menu item and only print stable print.
xP	Interval Print x = Print Interval (1-3600 sec), 0P turns auto print OFF
Z	Same as pressing Zero Key.
T	Same as pressing Tare Key.
xT	Download Tare value in grams (positive values only). Sending 0T clears tare (if allowed).
PU	Print current unit: g, kg, lb, oz, lb:oz, t
xU	Set scale to unit x: 1=g, 2=kg, 3=lb, 4=oz, 5=lb:oz, 6=t
xM	Set scale to mode x. 1=Weighing, 2=Counting, 3=Check, 4=Formulation, 5=Percent, 6=Filling, 7=Dynamic, 8=Density, 9=Differential. M will scroll to next enabled mode.
PV	Version: print name, software revision and LFT ON (if LFT is set ON).
H x y “text”	Enter Header line, where x = print template number 1 to 5, y = line number 1 to 5, “text” = header text up to 40 alphanumeric characters
F x y “text”	Enter Footer line, where x = print template number 1 to 5, y = line number 1 to 2 “text” = footer text up to 40 alphanumeric characters.
\EscR	Global reset to reset all menu settings to the original factory defaults.
SNS x	Switch the platform: x = 1, 2
Notes:	The second commands listed are “legacy” commands, which maintain compatibility with older products.

General Notes:

- Commands sent to the indicator must be terminated by a carriage return (CR) or a carriage return-line feed (CRLF).
- Alternate command characters may be defined by the user.
- Data output is always terminated with a carriage return-line feed (CRLF).
- There is 40-second timeout control for print under stable requirement. If the unstable condition continues over 40 seconds, scale will respond "ES".

A.2 RS232 (DB9) Pin Connections**RS232 (DB9) Pin Connections:**

- Pin 2: Scale transmit line (TxD)
- Pin 3: Scale receive line (RxD)
- Pin 5: Ground signal (GND)
- Pin 7: Clear to send (hardware handshake) (CTS)
- Pin 8: Request to send (hardware handshake) (RTS)



Use the built-in RS-232 Port to connect either to a computer or a printer.

A.3 USB Host

The USB Host can be used to connect a barcode scanner and USB flash drive to the Ranger 7000.

A.3.1 Printout Format**A.3.2 Printout string for g, kg, lb, oz units:**

Field	Weight	Space	Unit	Space	Stability	Space	G/N	Space	Message	Term.Char(s)
Length	9	1	3	1	1	1	1	1	5	2

- The printout string has a fixed length of 23 characters.
- Each Space field is a delimiting space used to separate the other fields.
- The Weight field is 9 right justified characters. If the value is negative, the '-' character is printed at the immediate left of the most significant digit.
- The Unit/Mode field is 3 left justified characters.
- The Stability field is 1 character.
- The G/N field is 1 character. 'G' is printed for a gross weight. 'N' is printed for a net weight.
- The Message field is 5 left justified characters.

Note: The Termination Characters Carriage Return and Line Feed are appended to the printout.

A.3.3 Printout string for the lb:oz unit

Field	Weight1	Space	Unit1	Space	Weight2	Space	Unit2	Space	Stability	Space	G/N	Space	Message	Term.Char(s)
Length	4	1	2	1	7	1	2	1	1	1	1	1	5	2

- The printout string has a fixed length of 28 characters.
- Each Space field is a delimiting space used to separate the other fields.
- The Weight1 field is 4 right justified characters. If the value is negative, the ' - ' character is located at the immediate left of the most significant digit.
- The Unit1 field is 2 left justified characters.
- The Weight2 field is 7 right justified characters.
- The Unit2 field is 2 left justified characters.
- The Stability field is 1 character. A space is printed if the weight value is stable. A '?' is printed if the weight value is not stable.
- The G/N field is 1 character. 'G' is printed for a gross weight. 'N' is printed for a net weight.
- The Message field is 5 left justified characters.

Note: The Termination Characters Carriage Return and Line Feed are appended to the printout.

APPENDIX B. SOFTWARE SERVICE & REPAIR TOOL INSTRUCTIONS

Note: Make sure OHAUS Service & Repair Tools is version V2.1.1.1 or later which is available for down load in DMX under 'Service Software' folder.

B.1 Software Installation and Software Selection:

The OHAUS Software Service & Repair Tool is used for 5 purposes:

1. To restore EEPROM data, if there is any possible data corruption.
2. To install a new Load Cell.
3. To install a new Main Printed Circuit Board (PCB).
4. To update the software in the scale.
5. For diagnostics.

Install the software on a Personal Computer running Microsoft Windows NT 4.0 or later, or Microsoft Windows 98 or later. Insert the CD and run Setup.exe.

After installation, run the program Service & Repair Tools. The program has 2 selections, select 'Repair Tools' when performing scale repair and click 'Next'.

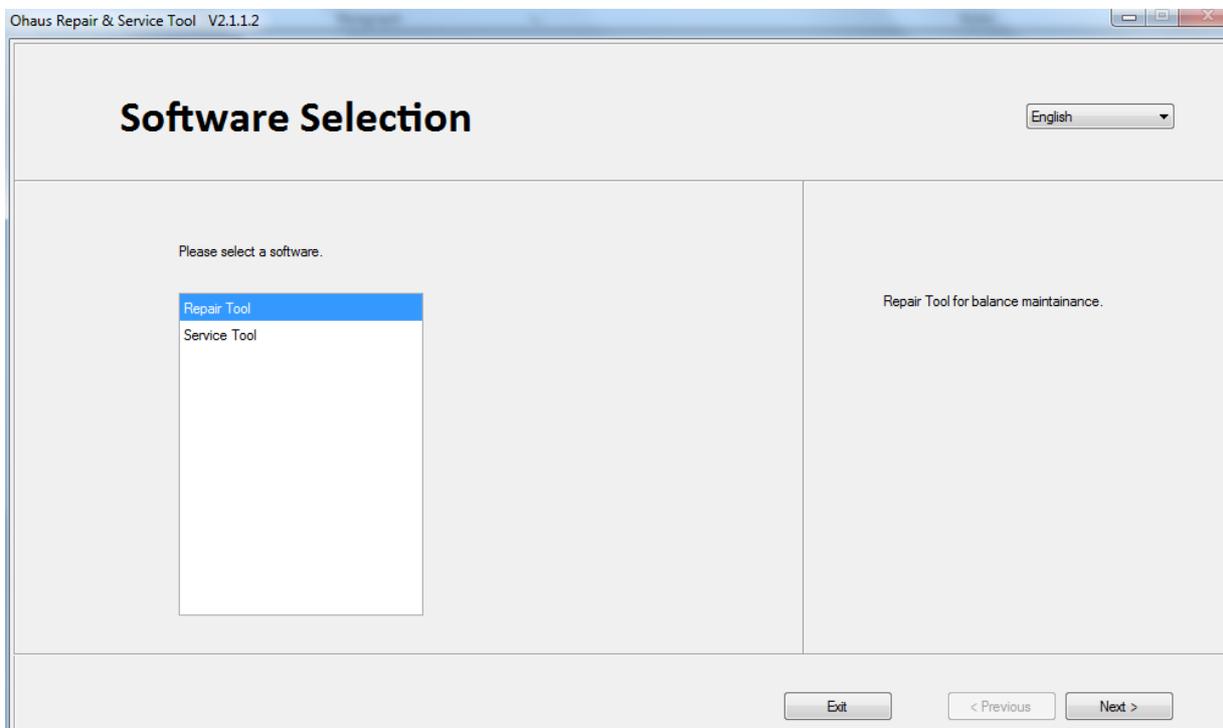


Figure B-1. Software Selection

B.2 Product Selection:

Select the appropriate product that you wish to service and click 'Next'.

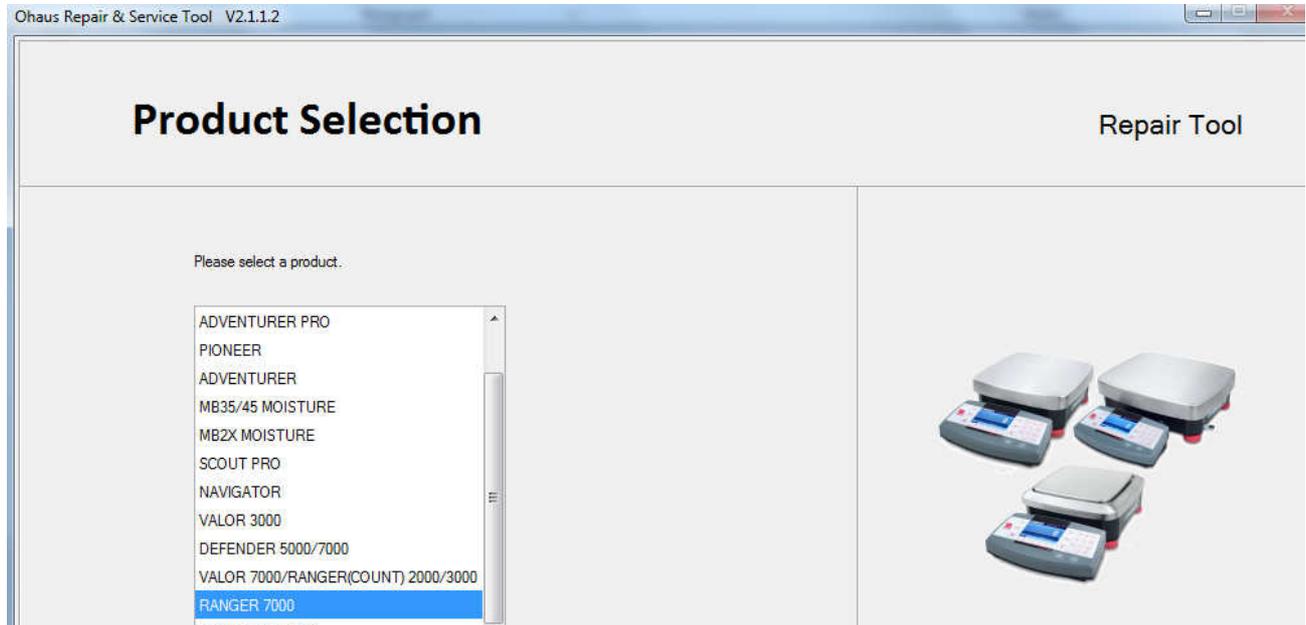


Figure B-2. Product Selection.

B.3 To Restore the EEPROM data:

1. Record the following information from the **scale** to be repaired:
 - a. Serial Number from the label on the back of the scale.
 - b. Model Number from the label on the back of the scale.
 - c. IDNR Number, just above the label on the back of the scale.
 - d. The load cell serial number (you need to open the scale and record this information on the load cell.)
2. Contact Ohaus Corporation in Pine Brook NJ, and request the data file to download. Provide the information recorded above.
3. After receiving the data file from Ohaus, continue with the following steps.
4. Connect the scale to the PC and start the OHAUS Software Service Tool.
5. Click the tab labeled **Restore EEPROM** and select **Write Image File** and click 'Next'.

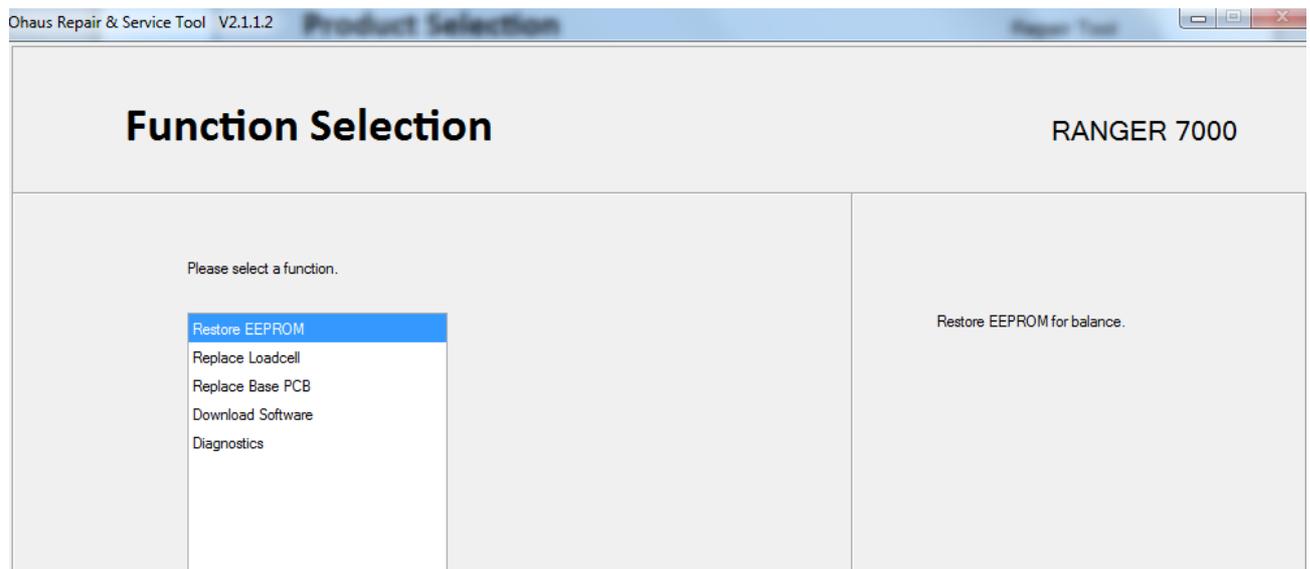


Figure B-3. Restore EEPROM.

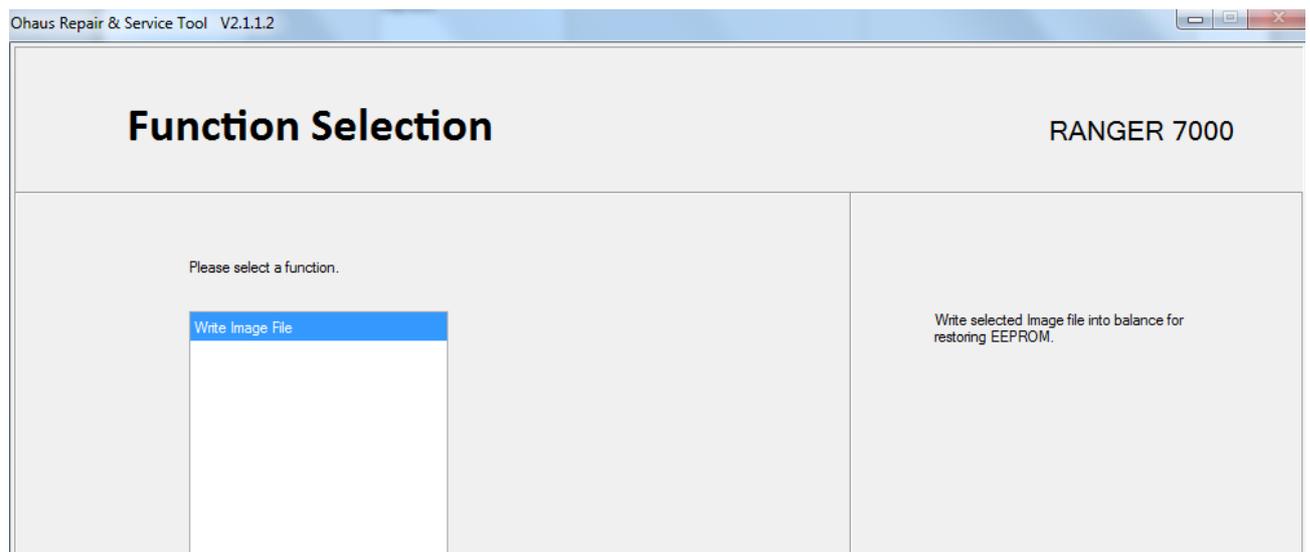


Figure B-4. Write Image File.

B.4 COM Port Configuration.

1. Configure the software Com port configuration to match with the scale and click 'Next'.

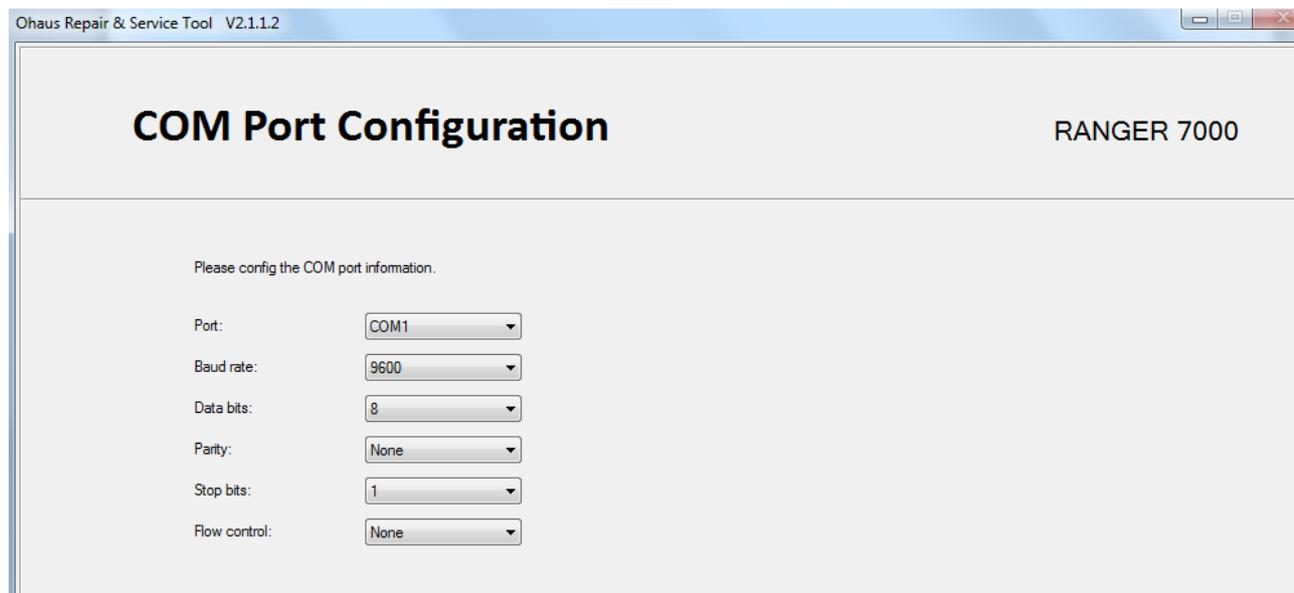


Figure B-5. COM Port Configuration.

Note: Make sure there is no lose connection from R71 RS232 Port during the communication process.

2. Enter the scale's Serial Number and IDNR number.
3. Enter the path to the image file, or click the **Browse** button to locate the file.
4. Click the **Next** button.
5. The software will indicate the download progress. When complete, disconnect the power from the back of the scale, then re-connect.
6. Perform Service Calibrations (see Chapter 6). Test the scale.

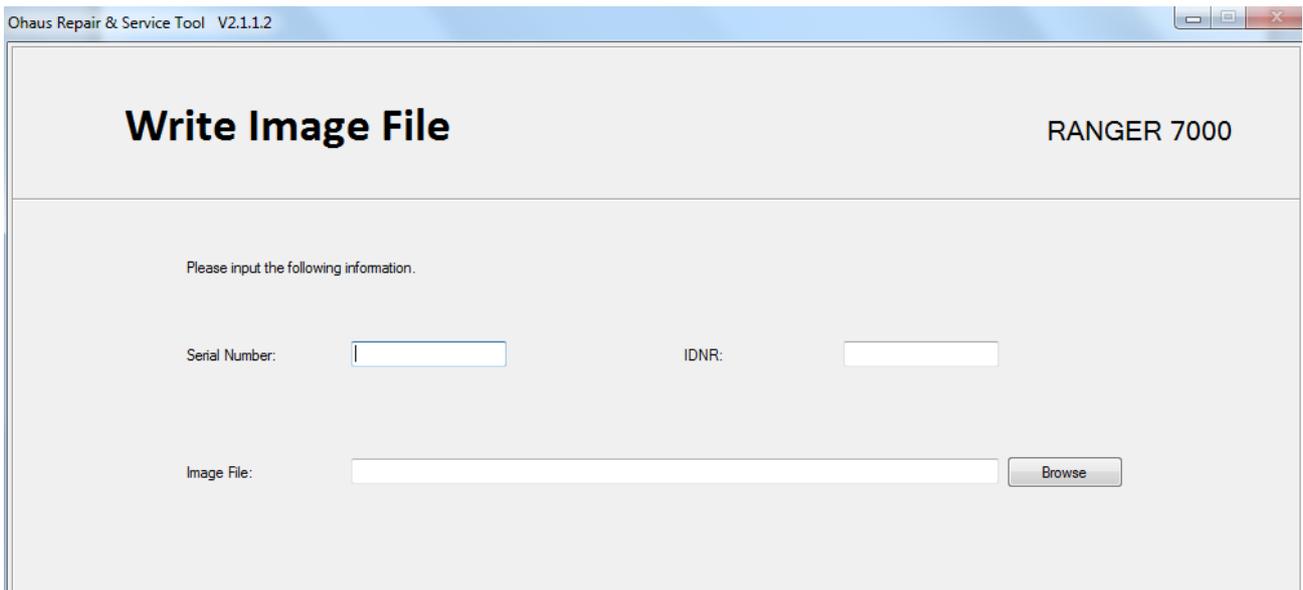


Figure B-6. Write Image File.

B.5 To Replace a Load Cell:

7. Follow the steps in Section 3.5 and 3.6 to replace the defective load cell.
8. 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 scale.
9. Get the scale Image File from OHAUS by providing the scale model and serial number.
10. Put the new label on the scale.
11. Power the scale from an AC adapter.
12. Connect the scale to your computer.
13. Start the OHAUS Service Tool Software.
14. Click on the tab labeled **Replace Loadcell**.

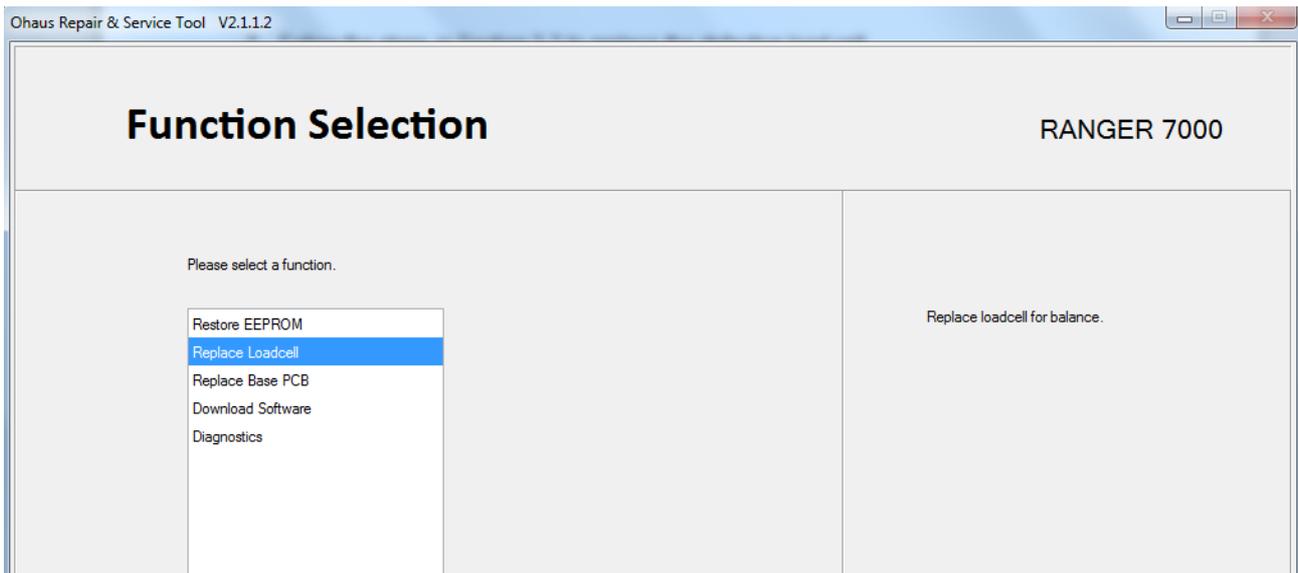


Figure B-7. Replace Loadcell Tab.

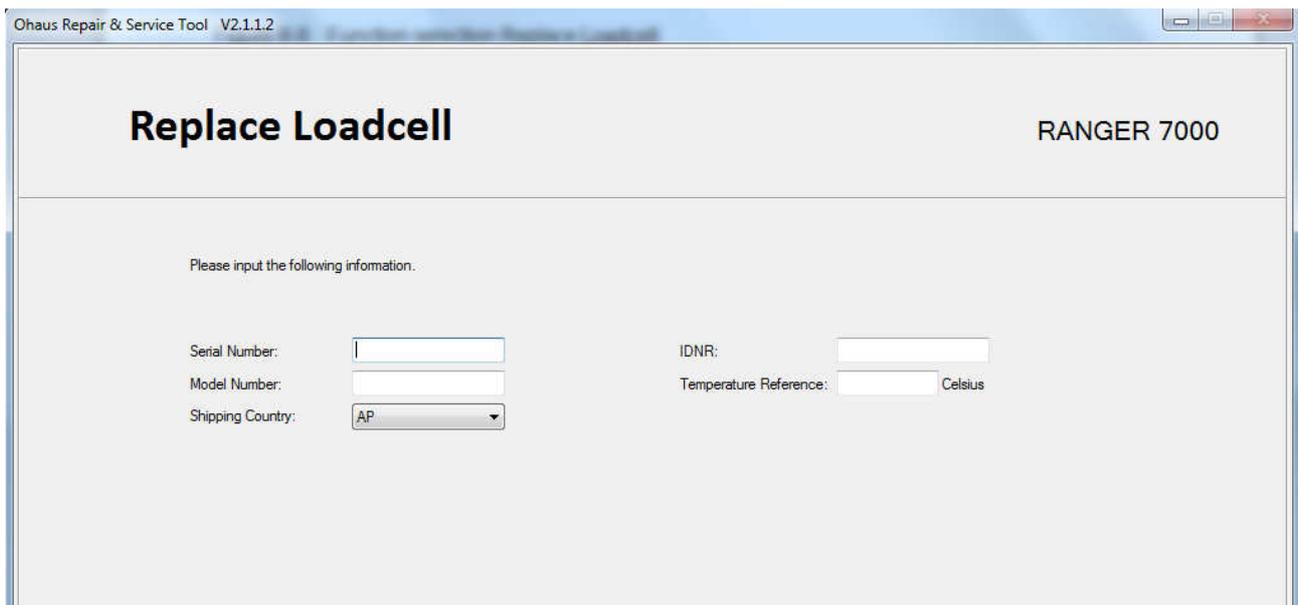


Figure B-8. Function selection Replace Loadcell.

15. Configure the Com Port Configuration (B.2) and click 'Next'.
16. Key in the scale serial number, Model number, Temperature Reference in Celsius and select your region (AP, EU/GB or US).
17. Enter the IDNR number (xxx.xx.xx.xxxx) from the label on the back of the scale or from the packet label of the new load cell.
18. Click the **Start** button.

-
19. The software will indicate the download progress. When complete, disconnect the power from the back of the scale, then re-connect.
 20. Perform Service Calibrations (see Appendix B). Test the scale.

B.6 Install New Main Printed Circuit Board (PCBA).

1. Follow steps in Sections 3.7.3 and 3.7.6 to replace the PCBA. Then connect the scale to your computer.
2. Start the OHAUS Service and Repair Tool Software.
3. Click on the tab labeled **Replace Main PCBA**.

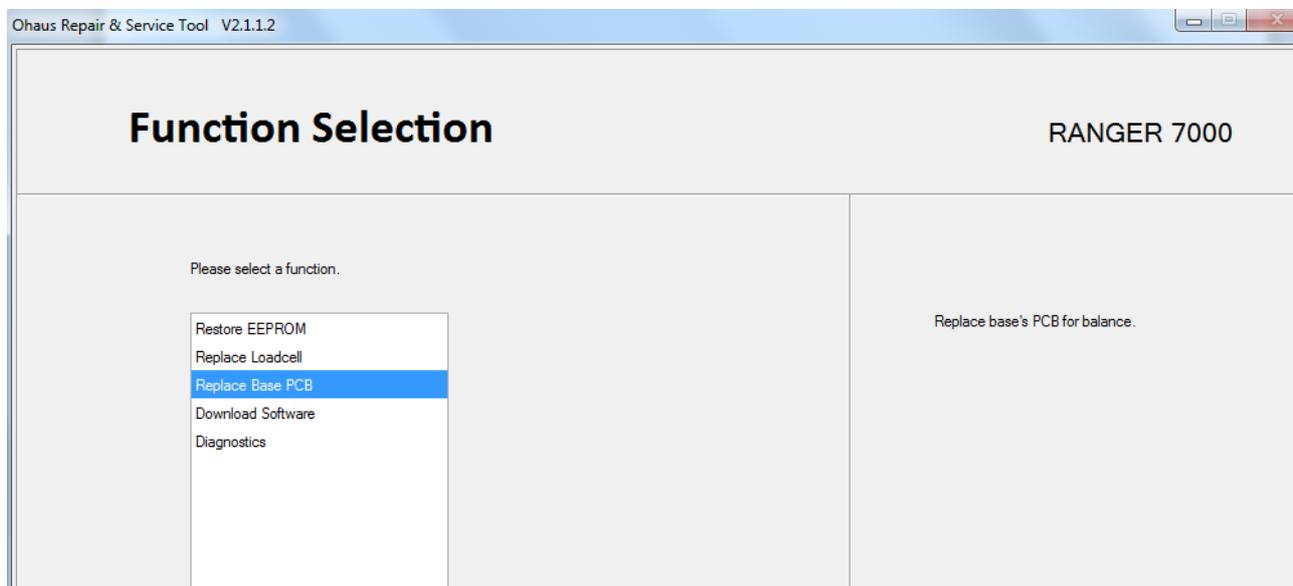


Figure B-9. Replace Main PCBA Tab.

Ohaus Repair & Service Tool V2.1.1.2

Replace Base PCB

RANGER 7000

Please input the following information.

Serial Number:

Model Number:

IDNR:

Shipping Country:

Figure B-10. Function Selection Replace Main PCB.

4. Enter the Serial Number from the label on the side of the scale.
5. Enter the IDNR number (xxx.xx.xx.xxxx) from the label on the back of the scale
6. Key in the Model number and Shipping Country (AP, EU/GB or US)
7. Click the **Start** button
8. The software will indicate the download progress. When complete, disconnect the power from the back of the scale, then re-connect.
9. Perform Service Calibrations (see Chapter 6). Test the scale (Chapter 4).

B.7 Update the Software in the Scale:

1. Connect the Scale to your computer.
2. Start the OHAUS Service Tool Software.
3. Click on the tab labeled **Download Software**.

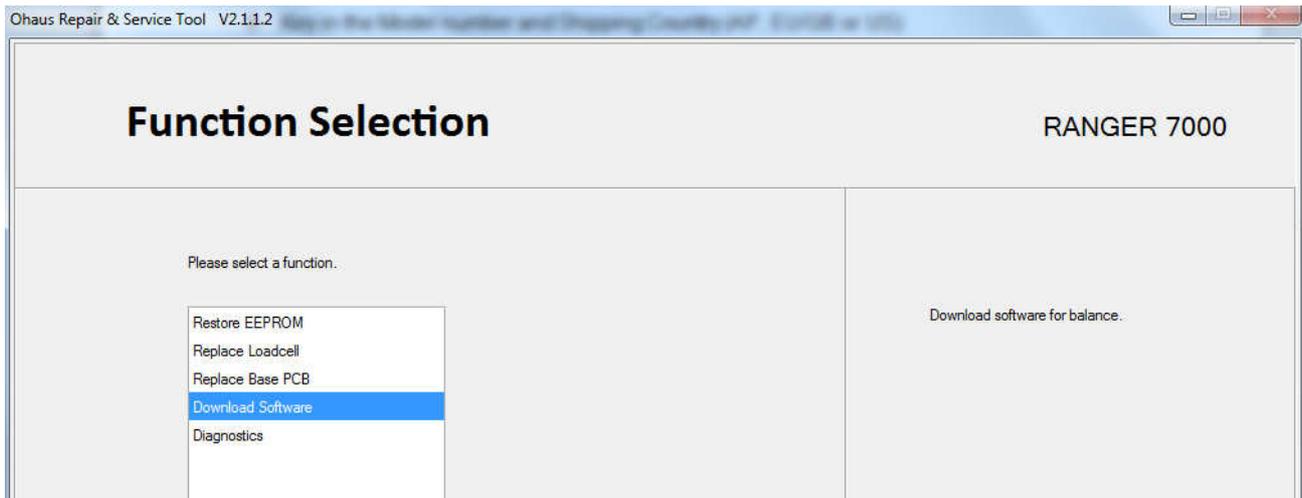
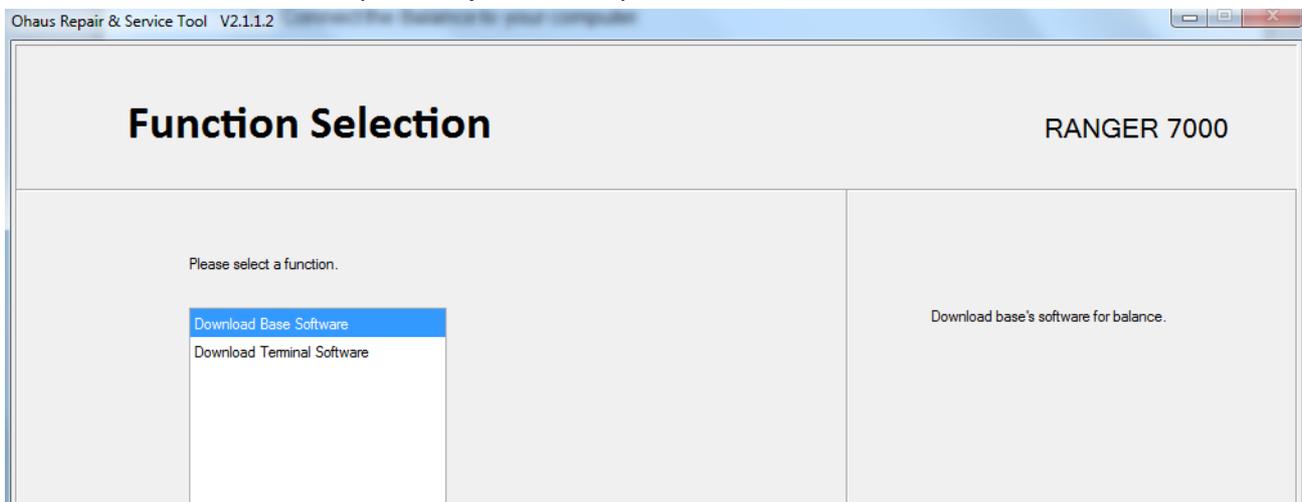


Figure B-11. Download Software Tab.

4. You will have two options to choose Download Base Software and Download Terminal Software, select the process you wish to perform.



B-12. Download Base Software and Download Terminal Software tab.

Note: When downloading Terminal Software using Ohaus Repair and Service Tool the file is type *.mot. If downloading via the USB host is type *.bin.

5. After making the selections enter the path to the file to download, or click the **Browse** button to locate the file.
6. Click on the **Start Download** button.
7. When prompted, disconnect the power from the back of the scale, then re-connect.
8. The software will indicate the download process. When complete, disconnect the power from the back of the scale, then re-connect.
9. Perform Service Calibrations (see Chapter 6). Test the scale.

B.8 Diagnostics

1. Connect the scale to your computer.
2. Start the OHAUS Software Service Tool.
3. Click on the tab labeled “**Diagnostics.**”

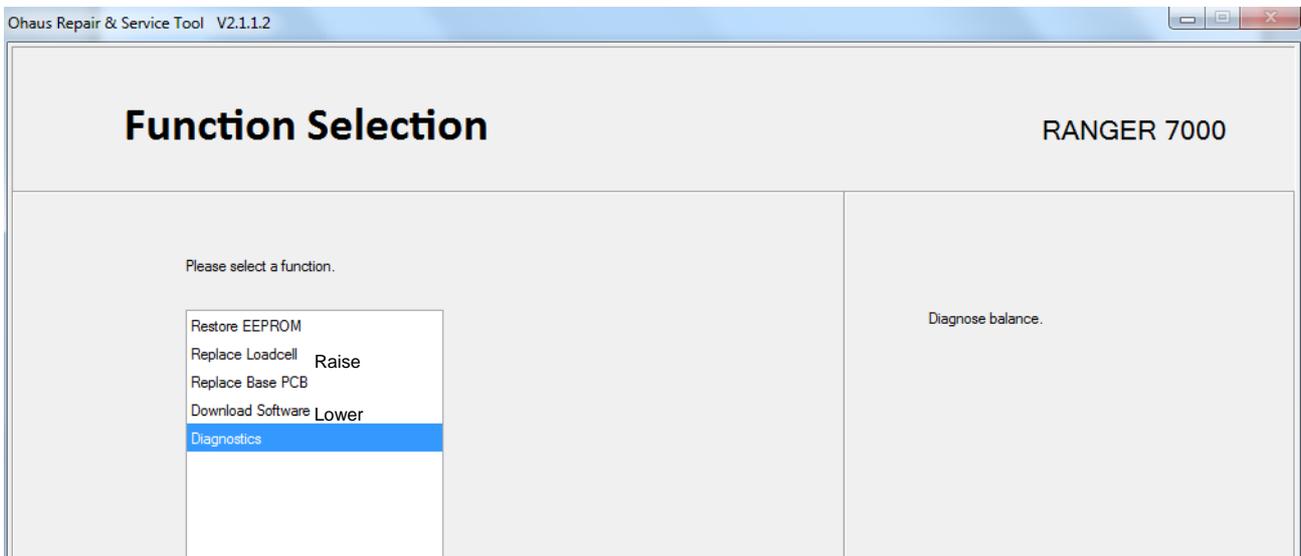


Figure B-12. Diagnostics Tab.

4. To test communications, click the Print button, or enter an RS232 Command String (from Table 1-6) and USB Input (1-7) and click the **Send** button. The scale will response will be shown in the box on the right.

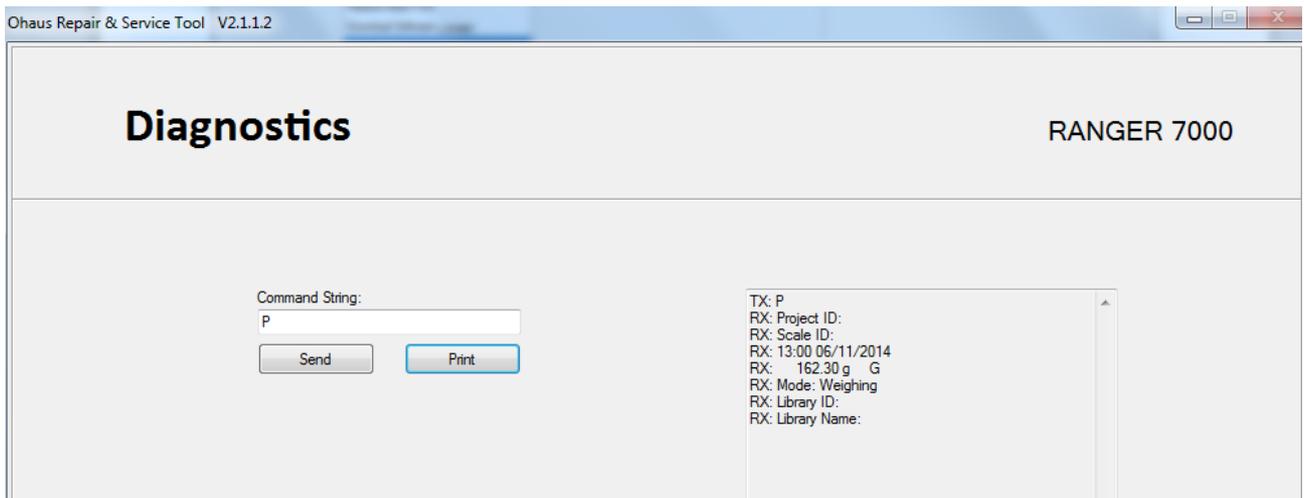


Figure B-13. Diagnostics Command Testing.



Ohaus Corporation

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