Ohaus Corporation
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ANALYTICAL *Standard*
Electronic Balances
AS Series

Instruction Manual

NOTE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE INTERFERENCE-CAUSING EQUIPMENT STANDARD ENTITLED “DIGITAL APPARATUS”, ICES-003 OF THE DEPARTMENT OF COMMUNICATIONS.

CET APPAREIL NUMERIQUE RESPECTE LES LIMITES DE BRUITS RADIOELECTRIQUES APPLICABLES AUX APPAREILS NUMERIQUES DE CLASSE A PRESCRITES DANS LA NORME SUR LE MATERIEL BROUILLEUR : “APPAREILS NUMERIQUES”, NMB-003 EDICTEE PAR LE MINISTRE DES COMMUNICATIONS.

Unauthorized changes or modifications to this equipment are not permitted.

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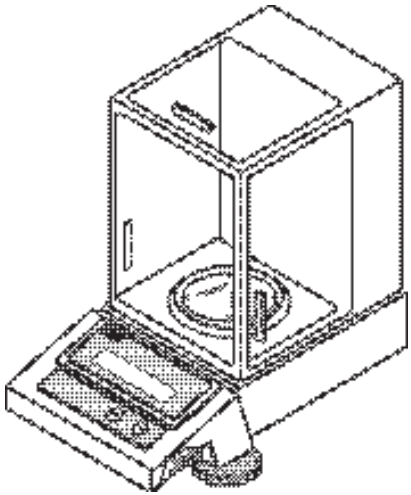
INTRODUCTION

This manual covers installation, operation and troubleshooting for the Ohaus Analytical Standard balances, Models AS60, AS120, AS200 and AS260D. Type approved Analytical Standard balances, Models AS60E, AS120E and AS200E are setup to conform to OIML, EC and U.S. regulations. To insure proper operation of the balance, please read this manual completely.

DESCRIPTION

Ohaus Analytical Standard series balances are precision weighing instruments, designed to provide years of service with virtually no maintenance. The Analytical Standard series is constructed using a die-cast aluminum base finished with a durable epoxy powder paint which is resistant to commonly used acids, contains a one piece solid-state precision electronics PC board and a seven digit LCD display which is 0.6 inches in height. All Analytical Standard series electronic balances are factory set to measure in grams. To prevent measurements from being affected by air currents, a draft shield is mounted to the balance. A stainless-steel spill ring is removable for cleaning in the event of accidental spills. Power is supplied through an AC Adapter which is available in five configurations for world-wide usage. Accessories include: an RS232 interface kit which allows printing of results through an external computer, an RS232 interface cable with a print switch, a security device and calibration weights.



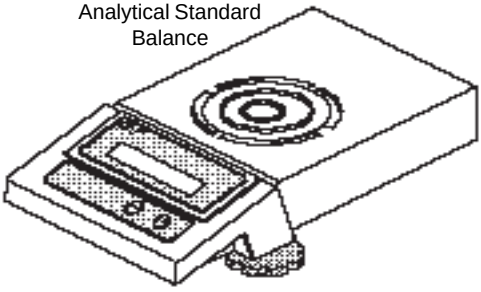
ANALYTICAL *STANDARD* Balance

UNPACKING

Your Analytical Standard balance was shipped with the following items:

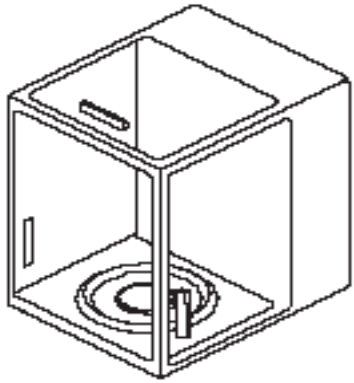
- a pan
- an AC power adapter
- a draft shield and spill ring
- this instruction manual
- your warranty card

It is recommended to save the carton and packing material for storing, transporting the balance or returning it for service.



AC Adapter

Pan



Draft Shield and
Spill Ring

INSTALLATION

Environment

The balance should always be used in an environment which is free from excessive air currents, corrosives, vibration, and temperature or humidity extremes. These factors will affect displayed weight readings.

DO NOT install the balance:

- Next to open windows or doors causing drafts or rapid temperature changes.
- Near air conditioning or heat vents.
- Near vibrating, rotating or reciprocating equipment.
- Near magnetic fields or equipment that generates magnetic fields.
- On an unlevel work surface.

Draft Shield and Spill Ring

To install the draft shield and spill ring:

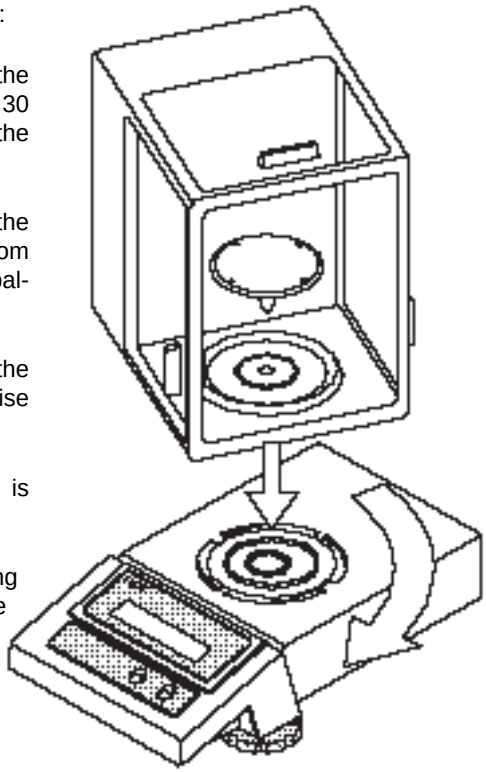
1. Position the draft shield on top of the balance as shown (approximately 30 degrees counterclockwise from the base of the balance).

2. Looking down through the top of the shield, line up the hole in the bottom of the shield with the hole in the balance weighing mechanism.

3. Put the draft shield down, fitting the holes, and turn the shield clockwise until it locks into place.

4. Make sure that the draft shield is firmly locked in place.

5. Install the stainless steel spill ring inside of the draft shield with the raised surface facing up and correctly oriented.

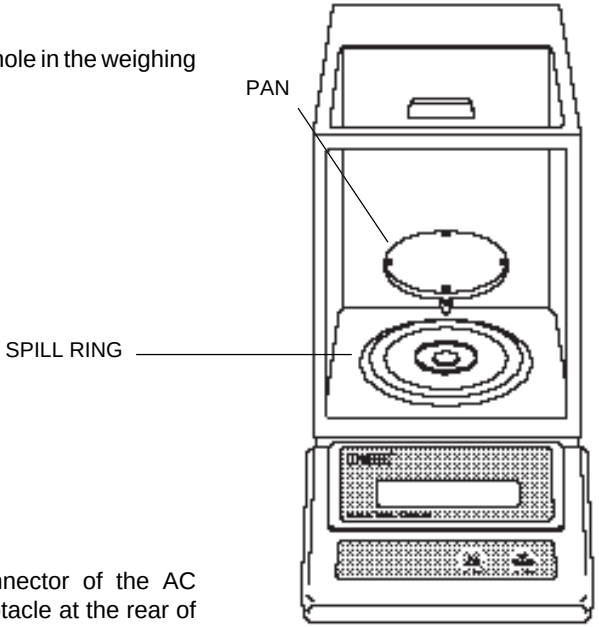


CAUTION:

Never remove the draft shield with the pan in place.

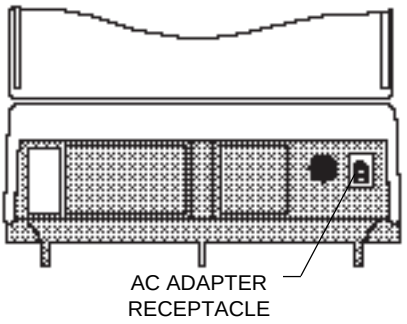
Pan

Place the pan into the hole in the weighing mechanism.



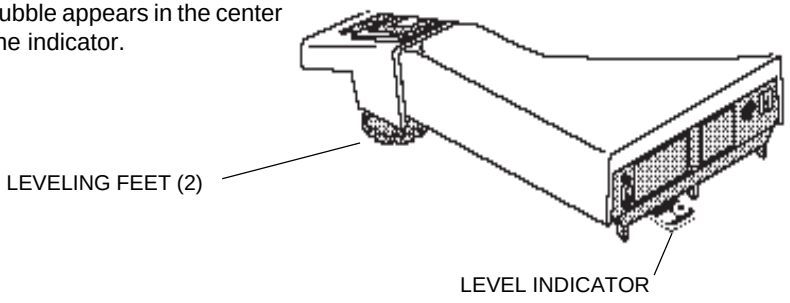
AC Adapter

Plug the molded connector of the AC Adapter into the receptacle at the rear of the balance. Plug the AC Adapter into a convenient ac outlet. When power is applied to the balance, it will begin a 60 second self test cycle. During this time, if the balance is turned ON, the display will count down from 60 and display the word CHEC.



Leveling the Balance

The balance is equipped with a level indicator on the rear and two adjustable leveling feet. Adjust the leveling feet until the bubble appears in the center circle of the indicator.



OPERATION

Turning the Balance ON

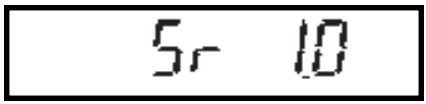
With no load on the pan, switch the balance ON by pressing 

. When first switched ON, all segments of the display should be on as shown in the illustration.

This display check will be displayed briefly, then the model number of the balance followed by a software revision number.

Warm Up

Before initally using the balance, allow time for it to adjust to changes in environment. The balance need only be plugged in to warm up. Recommended warm up period is 30 minutes.



Moveable FineRange™ Model (AS260D)

The AS260D offers both a fine range (lower capacity/higher readability) and a coarse range (higher capacity/lower readability). When first turned on, the balance is in the fine range. It remains in this range until the weight on the pan exceeds the fine range capacity. When weight on the pan is greater than the fine range capacity, the balance switches to the coarse range.

For balance with Moveable FineRange™, please note:

If the weight of the object on the platform exceeds the limit of the Moveable FineRange™, the balance will automatically change to the coarse range until either:

1. The load (excluding tare) is reduced to below the limit of the fine range.

-OR-

2. 

is momentarily pressed, which tares the balance and reactivates the fine range.

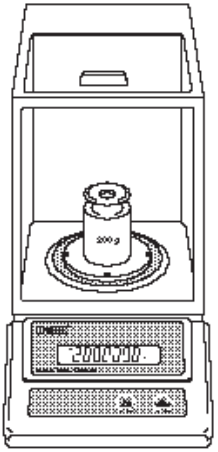
Checking Calibration

Before using the balance, it should be calibrated. The balance has been calibrated before shipment, however, calibration is influenced by factors such as:

- Variations in the earths gravitational field at different latitudes of the world.
- Rough handling.
- Changes in work location.
- Height above sea level.
- Environmental conditions.

To check the balance's calibration, place a known mass on the center of the pan and read the displayed weight.

If the displayed weight differs from the known mass by more than acceptable limits, refer to the Calibration Menu and the Specifications at the rear of the manual.



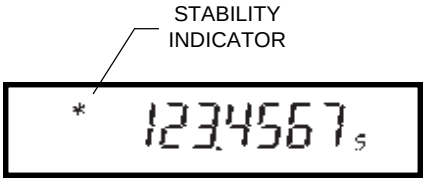
Weighing

1. Press 

to zero the display.

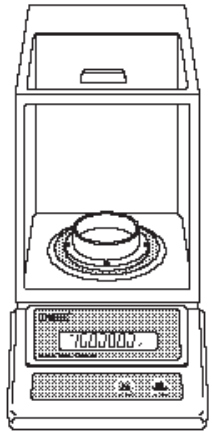
2. Place the object(s) or material to be weighed on the pan.

3. Wait for the stability indicator to appear before reading the weight.



Zero/Tare 

When weighing material or objects that must be held in a container, O/T enables you to store the container weight in the balance's memory, separate from the weight of the material in the container.



1. Place an empty container on the pan. Its weight will be displayed.

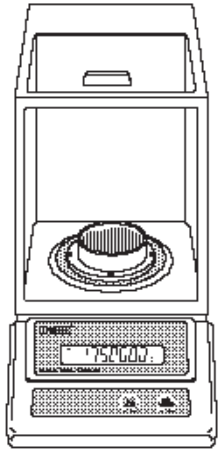
2. Press 

.

   The display will show zero and the container's weight will be stored in memory.

3. Add material to the container. As material is added, its net weight will be displayed.

4. Removing the container and material from the pan will cause the balance to display the container's weight as a negative number.



The weight remains in balance memory until 

is pressed again.

USING MENUS TO CONFIGURE THE BALANCE

Analytical Standard balances contain four display menus which enable you to calibrate and configure the balance for your specific operating requirements.

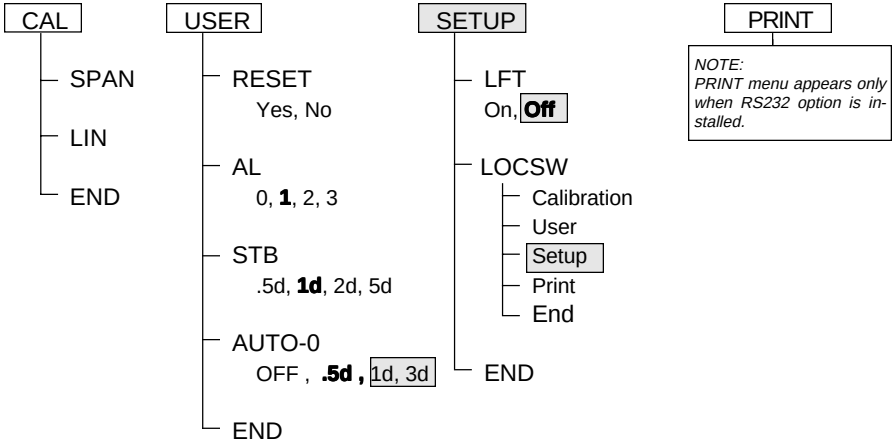
Calibration Menu: Used to calibrate the balance for span or linearity.

User Menu: Used to adapt the balance to environmental conditions.

Setup Menu: Used to enable or disable different balance features.

Print Menu: Used to configure the RS232 Interface.

Functions not allowed on verified balances have shaded backgrounds.



To access a menu, press and hold ON →0/T← until desired menu appears, then release it.

Original factory default settings are shown in boldface type.

Use these buttons to step through menus and select submenus:

OFF MODE next selection

ON →0/T← select displayed item

CALIBRATION MENU

Analytical Standard balances can be calibrated in two ways: Span calibration or Linearity calibration. Span calibration resets the balance's weighing range using two weight values: zero and a weight value at or near the balance's capacity. Linearity calibration minimizes deviation between actual and displayed weights within the balance's weighing range. Three weight values are used: zero, a weight value within the balances weighing range, and a weight value at or near the balance's specified capacity. The following table shows the sequence in which submenus appear on the Calibration menu.

CALIBRATION MENU TABLE

	Selects span calibration.
	Selects linearity calibration.
	Used to exit the Calibration menu.

Calibration Menu Protection

Calibration may be locked out to prevent unauthorized personnel from changing calibration. To lock out calibration menu, refer to the section titled Menu Lock-Out Protection.

NOTE: If calibration has been locked out, you will not be able to access it.

Calibration Masses

Before beginning calibration, make sure masses are on hand. If you begin calibration and realize masses are not available, either turn the balance off, or go through the procedure without masses. The balance will use previously stored calibration data. Calibration should be performed as necessary to ensure accurate weighing. Masses required to perform the procedures are listed in the adjacent table.

CALIBRATION MASSES

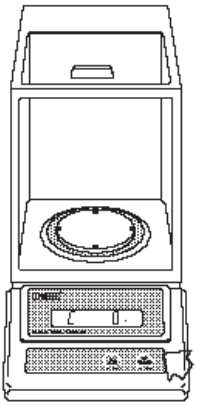
MODEL	LINEARITY MASSES	SPAN ONLY MASS
AS60	20g, 50g	50g
AS120	50g, 100g	100g
AS260D	100g, 200g	200g
AS200	100g, 200g	200g

Masses must meet or exceed ASTM Class 1 Tolerance. Calibration masses are available as accessories.

Span Calibration

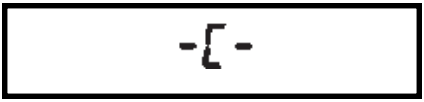
1. Press and hold ON →0/T← until CAL is displayed, then release it. Balance will display SPAN.

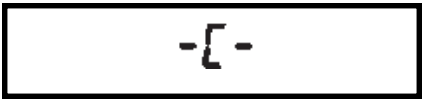
2. Press ON →0/T← to start the Span calibration procedure.



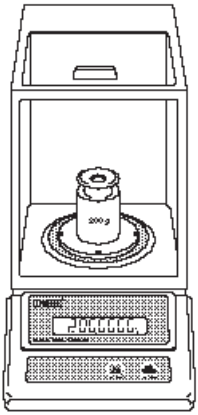
3. When ON →0/T← is released, C 0g will be displayed indicating that no weight should be on the pan.

4. Press ON →0/T← . The display will show -C- momentarily, followed by the value of the weight which must be placed on the pan. Do not disturb the balance when -C- is displayed. Disturbances will result in improper calibration.





5. Place the required weight on the pan and press ON →0/T← . The display will show -C- momentarily while the balance recalibrates.



6. When the weight on the pan is displayed along with the current unit indicator, the balance is recalibrated.

Linearity Calibration

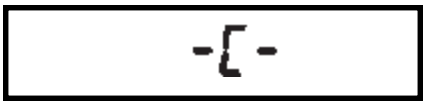
1. Press and hold ON →0/T← until CAL is displayed, then release it. Balance will display SPAN.

2. Press OFF MODE and the display will show LIN.

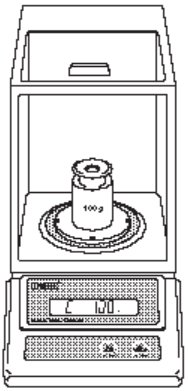
3. Press ON →0/T← to start the Linearity Calibration Procedure.

4. When ON →0/T← is released, C 0g will be displayed, indicating that no weight should be in the pan.

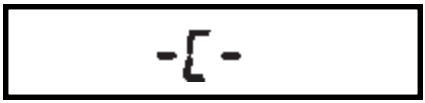
5. Press ON →0/T←. The display will show -C- momentarily, followed by the value of the weight which must be placed on the pan. Do not disturb the balance when -C- is displayed. Disturbances will result in improper calibration.



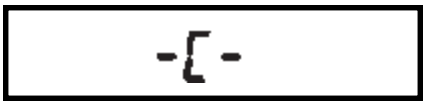
6. Place the required weight on the pan.



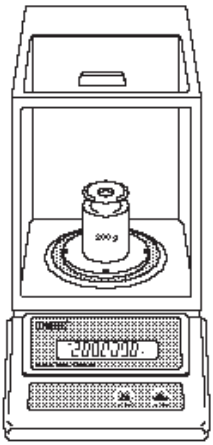
7. Press ON →0/T← . The display will show -C- momentarily, then C followed by the next weight to be placed on the pan.



8. Place the required weight on the pan, then press ON →0/T← . The display will show -C- momentarily, while the balance recalibrates.



9. When the weight on the pan is displayed along with the current indicator, the balance is recalibrated.



End

If you have entered the Calibration menu and do not wish to calibrate the balance, use END to return to normal weighing operations.

Repeately press OFF MODE until End is displayed.

Press ON →0/T← , when released, the balance will returned to normal weighing operations.

USER MENU

The User menu is used to adapt the balance to environmental conditions. It contains submenus which enable you to reset the balance to factory default settings or to select specific range settings. Access to the User menu can be disabled using the Lock out switch. The following table shows the sequence in which submenus appear on the User menu.

USER MENU TABLE

rESEt	Sets all submenus below to original factory default settings. Reset does not appear if menu has been locked out.
AL	Specifies the averaging level.
Stb	Specifies the desired stability range.
Auto-0	Sets Auto-Zero threshold.
End	Used to exit the Setup menu and store your selections.

User Menu Protection

The User menu may be locked out to prevent unauthorized personnel from changing the settings. To lock out the User menu, refer to the section titled Menu Lock-Out Protection.

NOTE: If -SAFE- is displayed, the User menu has been locked out. Settings may be viewed but not changed. See the Menu Lock-Out Protection section to enable it for making changes.

To access the User menu, press and hold

until USER is displayed, then release it.

To access a submenu:

1. Repeatedly press OFF MODE until the desired submenu is displayed.

2. Press ON →0/T← to select the displayed submenu.

NOTE: You must use END to store any changes you make to the User menu.

The following sections describe each item on the User menu in detail.

Reset to Factory Defaults

This submenu enables you to reset all User menu selections to the factory default settings outlined in the adjacent table.

To reset to factory defaults:

1. Access the RESET submenu.

2. Press OFF MODE to change the setting.

3. Select YES to reset settings or, no to leave current settings.

4. Press ON →0/T← to accept the displayed setting.

USER MENU FACTORY DEFAULTS	
Averaging Level	AL 1
Stability Range	1d
Auto-Zero Tracking	.5d

Averaging Level

Averaging level compensates for vibration or excessive air currents. During operation, the balance continually takes weight readings from the weighing cell. Successive readings are then digitally processed to achieve a stabilized display. Use this submenu to specify how much processing you need to obtain stable results.

NOTE: Averaging level does not affect balance accuracy.

Select one of four averaging levels using the adjacent table as a guide.

To view or change the averaging level:

1. Access the AL submenu to display the current setting.
2. Press OFF MODE to change the setting.
3. Press ON →0/T← to accept the displayed setting.
4. When ON →0/T← is released, AL will be displayed again and the Setup menu will be returned.

AVERAGING LEVEL	
AL	0 reduced stability, fastest stabilization time
AL	**1 normal stability, normal stabilization time**
AL	2 more stability, slow stabilization time
AL	3 maximum stability, slowest stabilization time

Stability Range

The stability range specifies how much a displayed weight may change while the stability indicator remains ON. When displayed weight changes beyond the allowable range, the stability indicator turns OFF indicating an unstable condition. Analytical Standard balances permit you to select one of four stability ranges (in divisions) as shown in the table.

STABILITY RANGE	
.5d	smallest range: stability indicator is ON only when displayed weight is within .5 divisions
1d	**reduced range**
2d	normal range
5d	largest range: stability indicator is ON even though displayed weight changes slightly

When the RS232 interface is configured to print stable data only, the stability range also governs data output. Displayed data will only be output if it is within the selected stability range.

To view or change the stability range:

1. Access the Stb submenu to display the current setting.

2. Press 

to change the setting.

3. Press 

to accept the displayed setting.

4. When 

is released, Stb will be displayed again and the Setup menu will be returned.

Auto-Zero

Auto-Zero minimizes the effects of temperature changes and shift on the zero reading. By defining a threshold level in divisions, the balance maintains the zero display until the threshold is exceeded. This submenu permits you to select one of three threshold levels, or turn the feature OFF. Auto-Zero only functions when the display reads zero.

To view or change the Auto-Zero setting:

1. Access the Auto-0 submenu to display the current setting.

2. Press OFF MODE to change the setting.

AUTO ZERO	
OFF	turns Auto-Zero OFF
.5d	**sets threshold to .5 divisions**
1d	sets threshold to 1 division
3d	sets threshold to 3 divisions

3. Press ON →0/T← to accept the displayed setting.

4. When ON →0/T← is released, Auto-0 will be displayed again and the User menu will be returned.

End

You must use END to exit the User menu. **Changes you make in the User menu are only stored in memory if you use END.**

1. To exit the User menu and store your settings, press ON →0/T← when End is displayed.

2. When ON →0/T← is released, the balance will be returned to normal weighing operations.

SETUP MENU

The Setup menu enables you to retain program balance parameters once they have been set. Access to the Setup menu can be disabled using the Lock out switch. The following table shows the sequence in which submenus appear on the Setup menu.

SETUP MENU TABLE

LFt	Sets balance for type approved operation.
LOCSUJ	Enables individual or all menus to be locked out.
End	Used to exit the Setup menu and store your selections.

Setup Menu Protection

The Setup menu may be locked out to prevent unauthorized personnel from changing settings. To lock out the Setup menu, refer to the section titled Menu Lock-Out Protection.

NOTE: If -SAFE- is displayed, the Setup menu has been locked out. Settings may be viewed but not changed. See the Menu Lock-Out Protection section to enable it for making changes.

To access the Setup menu, press and hold 

until SETUP is displayed, then release it.

To access a submenu:

1. Repeatedly press OFF MODE until the desired submenu is displayed.

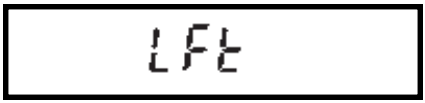
2. Press ON →0/T← to select the displayed submenu.

NOTE: You must use END to store any changes you make to the Setup menu.

The following sections describe each item on the Setup menu in detail.

Type Approved Balance

This parameter can be set to ON or OFF. Selecting ON automatically sets certain parameters for type approved requirements.



1. Access the LFT submenu.

2. The display will show the current status (ON/OFF). If ON is selected, Auto-Zero Tracking will be limited to 0.5d or OFF and Lock switch default becomes Setup.

3. Press OFF MODE to change the status.

4. Press ON →0/T← to accept the status.

5. When ON →0/T← is released, the display will show LFT.

Lockswitch

Lockswitch enables you to lock out one or more menu selections. Each menu can be individually locked YES, or unlocked NO. Set the appropriate balance functions, and then decide which functions of the balance are to be locked. The Calibration, User, and Setup menus can be individually locked by selecting YES for the appropriate menu, and then locked by the switch located under the right hand side of the control panel.

1. Access the LOCSW submenu. When ON →O/T← is released, the LOCSW submenu is displayed.

2. To access one or more menus, press ON →O/T← to select the calibration menu, -CAL- is displayed.

   NOTE: Pressing OFF MODE changes the selection to the other menus.

3. To select a YES or NO, press OFF MODE.

   NOTE: The OFF MODE switch acts as a toggle and can select either YES or NO.

4. To confirm your selection, press ON →O/T← again. The display indicates the last menu you were in.

5. To lock out the other menus, press 

and repeat the procedure in steps 3 and 4.

End

You must use END to exit the Setup menu. **Changes you make in the Setup menu are only stored in memory if you use END.**

1. To exit the Setup menu and store your settings, press 

when END is displayed.

2. When 

is released, the balance will be returned to normal weighing operations.

MENU LOCK-OUT PROTECTION

Access to the Calibration, User, and Setup menus, can be disabled using the lock out switch located under the right side of the balance, near the display.

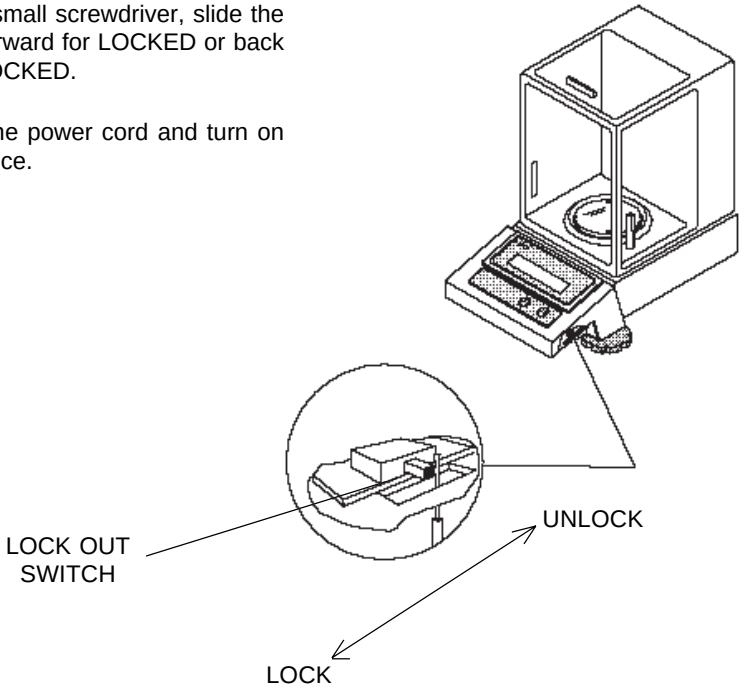
1. Turn the display off and unplug the power cord.

2. Slide the balance toward you, with the front over the edge of a table. (You can also turn the balance on its left side, but if you do, you MUST remove the pan and spill ring first!)

3. Locate hole under display where switch is located.

4. Using a small screwdriver, slide the switch forward for LOCKED or back for UNLOCKED.

5. Plug in the power cord and turn on the balance.



TYPE APPROVED BALANCE SEALING

Analytical Standard Balances, Models AS60E, AS120E and AS200E may be sealed for type approved applications. Factory sealed balances include a bracket, lead seal and wire and security screw as shown in the figure below.

Type approved balances are Class I devices, consult local Weights and Measures officials to determine scaling requirements. If the balance needs to be sealed in the field, a wrench has been provided.

After the balance has been set up properly and the menus are locked out (LFT menu selection set ON), proceed as follows to seal the balance:

1. Turn OFF and unplug the balance. Remove the Draft Shield, Spill Ring and Pan.

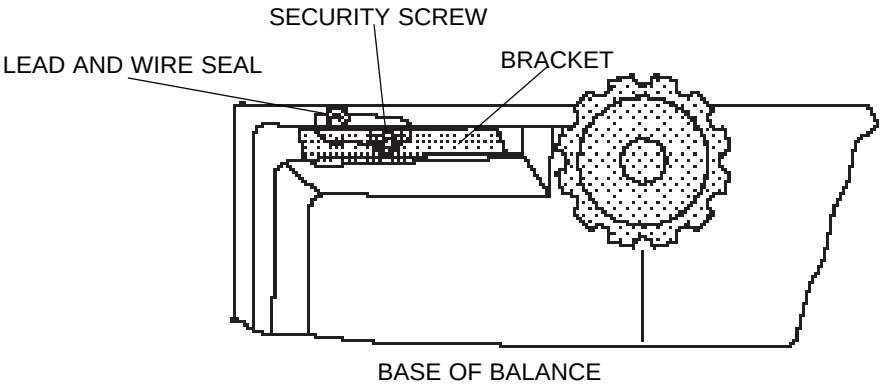
2. Turn the balance over and locate the access hole to the lock out switch.

3. Remove the existing screw next to the access hole and discard.

4. Place the Bracket supplied over the access hole and secure with the Security Screw supplied. Tighten with the Wrench supplied.

5. Obtain the Lead Seal and wire. Pass the wire through the Security Screw and the eyelet on the Bracket as shown in the illustration.

6. Crimp the lead seal tightly. Turn the balance over and reinstall items removed.



CARE AND MAINTENANCE

To keep the balance operating properly, the housing, spill pan and pan should be kept clean and free from foreign material. If necessary, a cloth dampened with a mild detergent may be used. Keep calibration weights in a safe dry place.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE(S)	REMEDY
Unit will not turn on.	Power adapter not plugged in or properly connected to balance.	Check power adapter connections.
Incorrect weight reading.	Balance was not zeroed before weighing. Balance not properly calibrated.	Press  with no weight on the pan, then weigh item. Recalibrate correctly.
Unable to store menu settings/ changes.	END not being used to exit menus.	You MUST use END to exit menus and save settings.
RS232 interface not working (when installed).	Print menu settings not properly set up. Cable connections.	Verify interface settings in Print menu correspond to those of peripheral device. Check cable connections.
Random segments displayed or display locks up.	Microprocessor lock-up.	Unplug the power cord, then replug again. If condition persists, unit must be serviced.
Unable to change settings.	Lock switch set ON. LFT set ON.	Set Lock switch to OFF. Set LFT OFF, in LFT applications, seal will be broken. Breaking the seal will nullify the legal application.
Unstable readings.	Vibration on table surface.	Place balance on a stable surface or change averaging level.
Error message display.	———————	See Error Codes Table.

Error Codes

The following list describes the various error codes and which can appear on the display and the suggested remedy.

Data Errors

0.0 Transient error (hardware error, probably static discharge). If error persists, the balance must be serviced.

Zero/Tare Errors

2.0 Balance is unable to stabilize within time limit after zero/taring. Environment is too hostile or balance needs recalibration.

Calibration Errors

3.0 Incorrect or no calibration weight used for calibration. Recalibrate with correct weights.

RS232 Errors

4.0 Bad RS232 frame. Check RS232 menu parameters and correct.

4.4 RS232 buffer is full (if installed). May occur if no printer or computer is connected to the interface. To clear buffer, turn balance off or enter Print menu and select END.

4.5 Function is disabled by the Lock switch.

User Errors

7.2 Number outside of display capacity.

Over-Under Load Errors

8.0 Hardware error causing an internal weight signal which is too low. Check if pan or pan support is off. If not, the balance must be serviced.

8.1 Hardware error caused by an internal weight signal which is too high. Check load on the platform which may be excessive. If error persists, the balance must be serviced.

8.2 Power-on load out of specification: Balance was turned on with load on pan or pan off balance. No load may be on pan when turned on and pan must be in place.

8.3 Rated capacity exceeded. Remove excessive weight from pan.

8.4 Underload condition on balance. Check that the proper pan and pan support are installed.

Error Codes (Cont.)

CheckSum Errors

9.0 Bad factory checksum. If error persists, have the balance serviced.

9.5 Bad factory calibration checksum. If error persists, have the balance serviced.

9.6 Bad mode checksum. Turn the balance off using the front panel controls. If the error persists, have the balance serviced.

9.7 Invalid setup data checksum. Check Setup, User and Print menu (when RS232 is installed) settings. If possible, try to enter menus and exit using END to restore menu settings. May be caused by a faulty component, or in rare cases, a severe static charge. If error persists, balance must be serviced.

9.8 Hardware error causing invalid calibration data checksum. Balance may need recalibration - particularly linearity calibration. If error persists, balance must be serviced.

9.9 Invalid temperature compensation checksum. Balance will work with default temperature compensation data, however, error will occur each time balance is turned on. Have balance serviced.

SERVICE INFORMATION

If the Troubleshooting section does not resolve or describe your problem, you will need to contact an authorized Ohaus Service Agent. For Service assistance in the United States, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Service Specialist will be available to help you.

SPECIFICATIONS

MODEL	AS60	AS120	AS260D	AS200
Capacity (g)	62	122	62/202	202
Readability (mg)	0.1	0.1	0.1/1	0.1
Weighing mode	grams			
Repeatabilty (std. dev.) (mg)	0.1	0.1	0.1	0.1
Linearity (mg)	± 0.2	± 0.2	± 0.2	± 0.2
Tare range	To capacity by subtraction			
Stabilization time	4 seconds			
Sensitivity Drift (10° to 30°C)	2ppm/ °C			
Operating temperature	41° to 104°F/5 ° to 40°C (Non type approved) 64° to 73°F/17.5 ° to 22.5°C (Type approved)			
Calibration	Auto-calibration			
Display (in/cm)	LCD (0.6/1.5 high)			
Power requirements	AC Adapter - 100, 120, 220, 240 V ac, 50/60 Hz			
Platform size (in/cm)	3.5/9.0 diameter			
Free height above Platform (in/cm)	9.3/23.6			
Dimensions (WxHxD) (in/cm)	8.3 x 14.5 x 14.5/21.1 x 36.8 x 36.8			
Net Weight (lb/kg)	15/6.8			
Shipping weight (lb/kg)	25/11.4			

NOTE: Models AS60E, AS120E and AS200E are type approved. The **E** designation after the model number signifies type approved.

PARTS INFORMATION

If you require replacement parts or would like to purchase accessories, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Parts Specialist will be available to help you.

REPLACEMENT PARTS

Description	OHAUS Part No.
AC Adapters:	
100 V ac	90524-11
120 V ac	90524-10
220 V ac	90524-13
240 V ac	90524-14
240 V ac Australia	90524-15
Platform - 3.5” dia.	77495-01
Draft Shield	77537-01

ACCESSORIES

Description	OHAUS Part No.
RS232 Interface Kit	77018-01
Cable for RS232 Interface with 9 pin balance connector	AS017-20
Cable for RS232 Interface with PRINT switch and 9 pin balance connector	AS017-25
Security Device	76288-00
Dust Cover	78121-01
Calibration Masses - ASTM Class 1 Tolerance:	
20g	49024-11
50g	49054-11
100g	49015-11
200g	49025-11

LIMITED WARRANTY

Ohaus products are warranted against defects in materials and workmanship from the date of delivery through the duration of the warranty period. During the warranty period Ohaus will repair, or, at its option, replace any component(s) that proves to be defective at no charge, provided that the product is returned, freight prepaid, to Ohaus.

This warranty does not apply if the product has been damaged by accident or misuse, exposed to radioactive or corrosive materials, has foreign material penetrating to the inside of the product, or as a result of service or modification by other than Ohaus. In lieu of a properly returned warranty registration card, the warranty period shall begin on the date of shipment to the authorized dealer. No other express or implied warranty is given by Ohaus Corporation. Ohaus Corporation shall not be liable for any consequential damages.

As warranty legislation differs from state to state and country to country, please contact Ohaus or your local Ohaus dealer for further details.

Ohaus Corporation
29 Hanover Road,
Florham Park, NJ 07932, USA
Tel: (973) 377-9000,
Fax: (973) 593-0359

With offices worldwide.

P/N 77810-02 R1295

Ohaus Corporation
29 Hanover Road
Florham Park NJ
07932-0900

ANALYTICAL *Standard*
Electronic Balance
Model AS60C

Instruction Manual

NOTE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE INTERFERENCE-CAUSING EQUIPMENT STANDARD ENTITLED "DIGITAL APPARATUS", ICES-003 OF THE DEPARTMENT OF COMMUNICATIONS.

CET APPAREIL NUMÉRIQUE RESPECTE LES LIMITES DE BRUITS RADIOÉLECTRIQUES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE A PRESCRITES DANS LA NORMA SUR LE MATÉRIAL BROUILLEUR : "APPAREILS NUMÉRIQUES", NMB-003 ÉDICTÉE PAR LE MINISTRE DES COMMUNICATIONS.

Unauthorized changes or modifications to this equipment are not permitted.

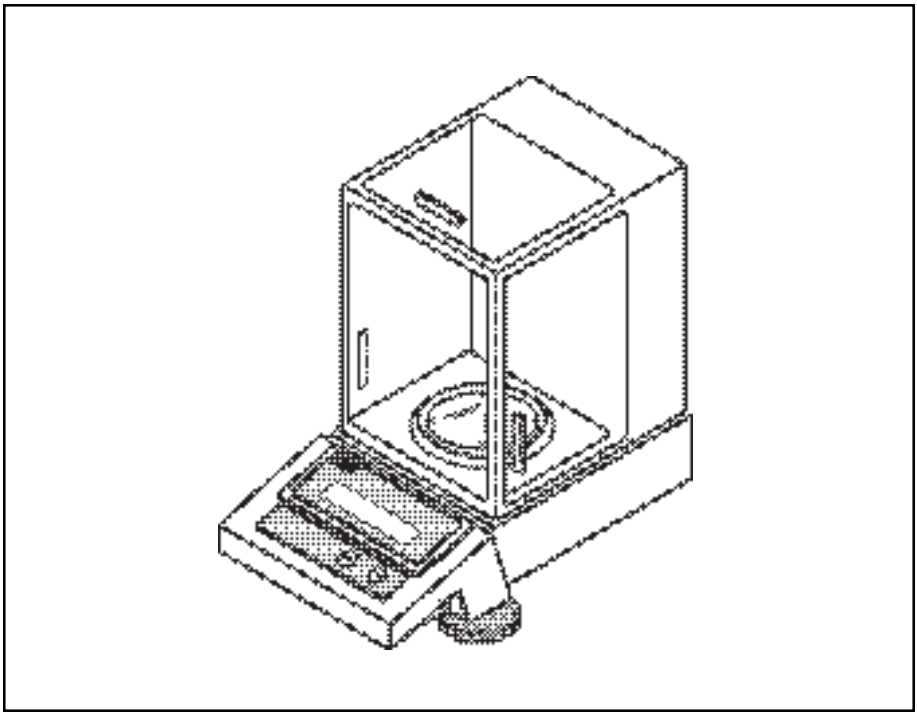
TABLE OF CONTENTS

INTRODUCTION

This manual covers installation, operation and troubleshooting for the Ohaus Analytical Standard balance Model AS60C. The type approved Analytical Standard balance is setup to conform to OIML, EC and U.S. regulations. To insure proper operation of the balance, please read this manual completely.

DESCRIPTION

The Ohaus Analytical Standard Model AS60C balance is a precision weighing instrument, designed to provide years of service with virtually no maintenance. The Analytical Standard is constructed using a die-cast aluminum base finished with a durable epoxy powder paint which is resistant to commonly used acids, contains a one piece solid-state precision electronics PC board and a seven digit LCD display which is 0.6 inches in height. The Analytical Standard electronic balance is factory set to measure in grams or carats. A software menu allows measurements in grams (g), troy ounces (oz t), pennyweight (dwt), mommes (:), carats (ct), and taels for Hong Kong, Singapore and Taiwan. To prevent measurements from being affected by air currents, a draft shield is mounted to the balance. A stainless-steel spill ring is removable for cleaning in the event of accidental spills. Power is supplied through an AC adapter which is available in five voltages for world-wide usage. Accessories include: an RS232 interface kit which allows printing of results through an external computer, an RS232 interface cable with a print switch, a security device and calibration weights.



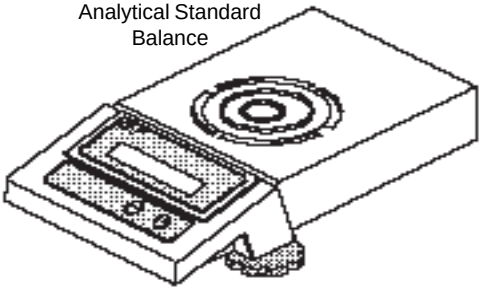
ANALYTICAL *STANDARD* Balance

UNPACKING

The Analytical Standard balance is shipped with the following items:

- a pan
- an AC power adapter
- a draft shield and spill ring
- a scoop
- an instruction manual
- a warranty card

It is recommended to save the carton and packing material for storing, transporting the balance or returning it for service.

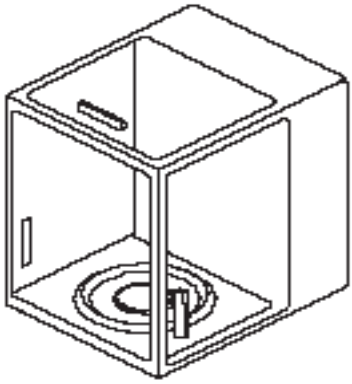


Analytical Standard Balance

AC Adapter

Pan

Scoop



Draft Shield and Spill Ring

INSTALLATION

Environment

The balance should always be used in an environment which is free from excessive air currents, corrosives, vibration, and temperature or humidity extremes. These factors will affect displayed weight readings.

DO NOT install the balance:

- Next to open windows or doors causing drafts or rapid temperature changes.
- Near air conditioning or heat vents.
- Near vibrating, rotating or reciprocating equipment.
- Near magnetic fields or equipment that generates magnetic fields.
- On an unlevel work surface.

Draft Shield and Spill Ring

To install the draft shield and spill ring:

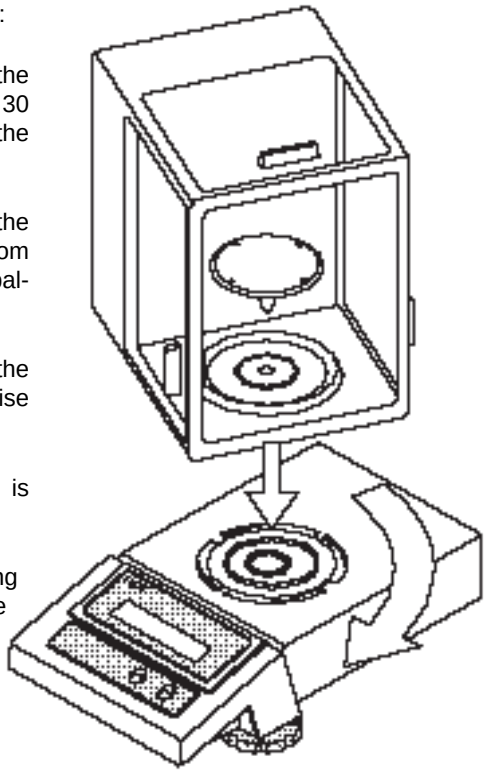
1. Position the draft shield on top of the balance as shown (approximately 30 degrees counterclockwise from the base of the balance).

2. Looking down through the top of the shield, line up the hole in the bottom of the shield with the hole in the balance weighing mechanism.

3. Put the draft shield down, fitting the holes, and turn the shield clockwise until it locks into place.

4. Make sure that the draft shield is firmly locked in place.

5. Install the stainless steel spill ring inside of the draft shield with the raised surface facing up and correctly oriented.

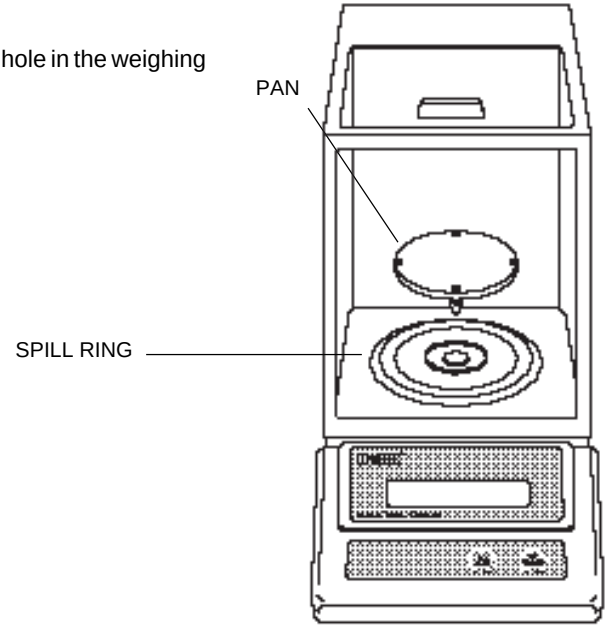


CAUTION:

Never remove the draft shield with the pan in place.

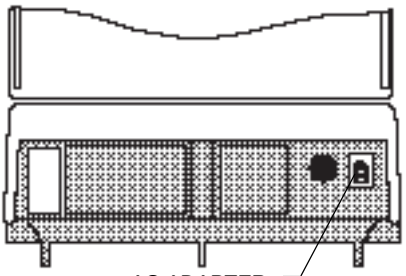
Pan

Place the pan into the hole in the weighing mechanism.



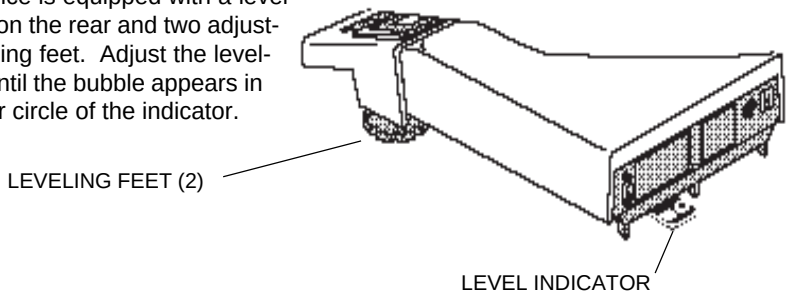
AC Adapter

Plug the molded connector of the AC Adapter into the receptacle at the rear of the balance. Plug the AC Adapter into a convenient ac outlet. When power is applied to the balance, it will begin a 60 second self test cycle. During this time, if the balance is turned ON, the display will count down from 60 and display the word CHEC.



Leveling the Balance

The balance is equipped with a level indicator on the rear and two adjustable leveling feet. Adjust the leveling feet until the bubble appears in the center circle of the indicator.



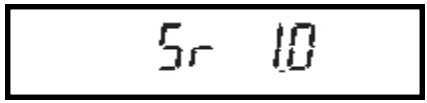
OPERATION

Turning the Balance ON

With no load on the pan, switch the balance ON by pressing 

. When first switched ON, all segments of the display should be on as shown in the illustration.

This display check will be displayed briefly, then the model number of the balance followed by a software revision number.



Warm Up

Before initally using the balance, allow time for it to adjust to changes in environment. The balance need only be plugged in to warm up. Recommended warm up period is 30 minutes.

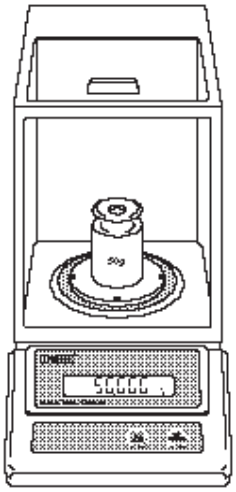
Checking Calibration

Before using the balance, it should be calibrated. The balance has been calibrated before shipment, however, calibration is influenced by factors such as:

- Variations in the earths gravitational field at different latitudes of the world.
- Rough handling.
- Changes in work location.
- Height above sea level.
- Environmental conditions.

To check the balance's calibration, place a known mass on the center of the pan and read the displayed weight.

If the displayed weight differs from the known mass by more than acceptable limits, refer to the Calibration Menu and the Specifications at the rear of the manual.



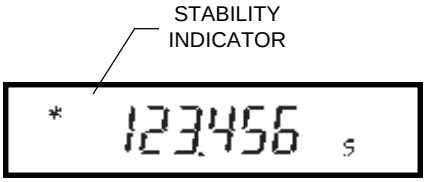
Weighing

1. Press 

to zero the display.

2. Place the object(s) or material to be weighed on the pan.

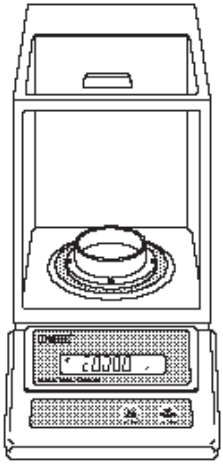
3. Wait for the stability indicator to appear before reading the weight.



Zero/Tare 

When weighing material or objects that must be held in a container, O/T enables you to store the container weight in the balance's memory, separate from the weight of the material in the container.

1. Place an empty container on the pan. Its weight will be displayed.



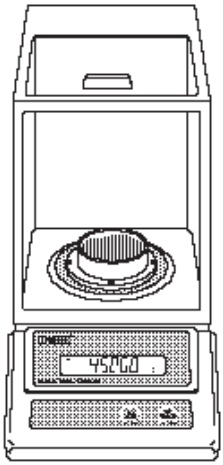
2. Press 

.

   The display will show zero and the container's weight will be stored in memory.

3. Add material to the container. As material is added, its net weight will be displayed.

4. Removing the container and material from the pan will cause the balance to display the container's weight as a negative number.



The weight remains in balance memory until 

is pressed again.

USING MENUS TO CONFIGURE THE BALANCE

The Model AS60C Analytical Standard balance contains four display menus which enable you to calibrate and configure the balance for your specific operating requirements.

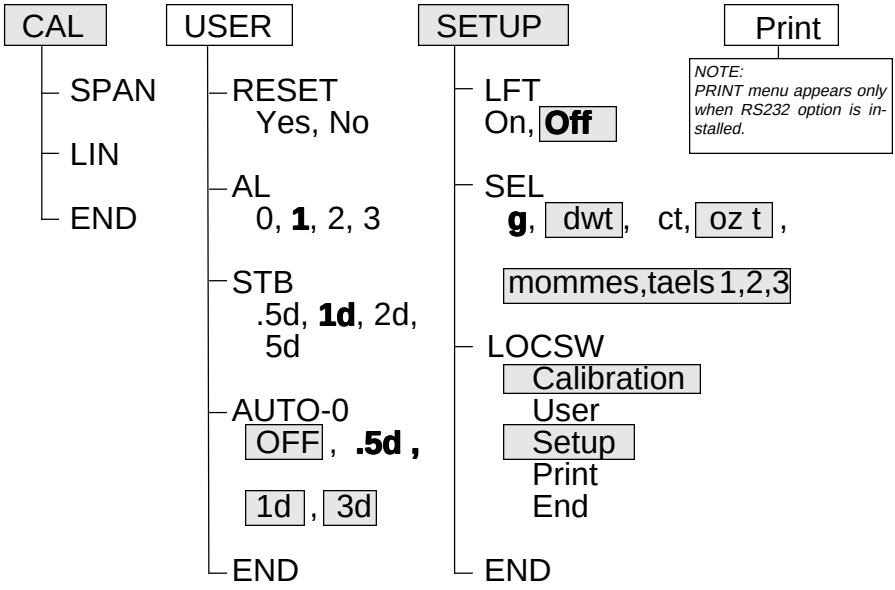
Calibration Menu: Used to calibrate the balance for span or linearity.

User Menu: Used to adapt the balance to environmental conditions.

Setup Menu: Used to enable or disable different balance features.

Print Menu: Used to configure the RS232 Interface.

Functions not allowed on verified balances have shaded backgrounds.



To access a menu, press and hold ON/O/T← until desired menu appears, then release it.

Original factory default settings are shown in plain boldface type.

Use these buttons to step through menus and select submenus:

next selection

select
displayed item

CALIBRATION MENU

The Model AS60C Analytical Standard balance can be calibrated in two ways: Span calibration or Linearity calibration. Span calibration resets the balance's weighing range using two weight values: zero and a weight value at or near the balance's capacity. Linearity calibration minimizes deviation between actual and displayed weights within the balance's weighing range. Three weight values are used: zero, a weight value within the balances weighing range, and a weight value at or near the balance's specified capacity. The following table shows the sequence in which submenus appear on the Calibration menu.

CALIBRATION MENU TABLE

SPAn	Selects span calibration.
L in	Selects linearity calibration.
End	Used to exit the Calibration menu.

Calibration Menu Protection

Calibration may be locked out to prevent unauthorized personnel from changing calibration. To lock out calibration menu, refer to the section titled Menu Lock-Out Protection.

NOTE: If calibration has been locked out, you will not be able to access it.

Calibration Masses

Before beginning calibration, make sure masses are on hand. If you begin calibration and realize masses are not available, either turn the balance off, or go through the procedure without masses. The balance will use previously stored calibration data. Calibration should be performed as necessary to ensure accurate weighing. Masses required to perform the procedures are listed in the adjacent table.

CALIBRATION MASSES

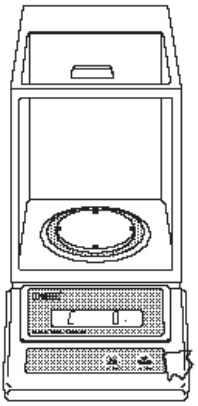
MODEL	LINEARITY MASS	SPAN ONLY MASS
AS60C	20g, 50g	50g

Masses must meet or exceed ASTM Class 1 Tolerance. Calibration masses are available as accessories.

Span Calibration

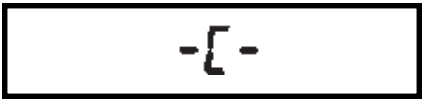
1. Press and hold ON/O/T until CAL is displayed, then release it. Balance will display SPAN.

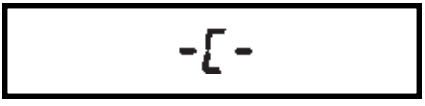
2. Press ON/O/T to start the Span Calibration Procedure.



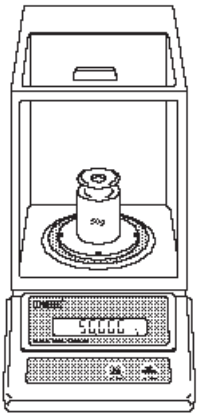
3. When ON/O/T is released C 0g will be displayed indicating that no weight should be on the pan.

4. Press ON/O/T . The display will show -C- momentarily, followed by the value of the weight which must be placed on the pan. Do not disturb the balance when -C- is displayed. Disturbances will result in improper calibration.





5. Place the required weight on the pan and press ON/O/T . The display will show -C- momentarily while the balance recalibrates.



6. When the weight on the pan is displayed along with the current unit indicator, the balance is recalibrated.

Linearity Calibration

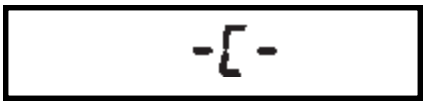
1. Press and hold ON →0/T← until CAL is displayed, then release it. Balance will display SPAN.

2. Press OFF MODE and the display will show LIN.

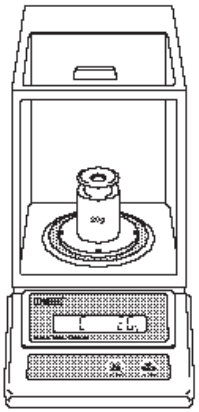
3. Press ON →0/T← to start the Linearity Calibration Procedure.

4. When ON →0/T← is released, C 0g will be displayed, indicating that no weight should be on the pan.

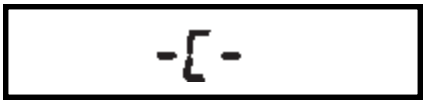
5. Press ON →0/T← . The display will show -C- momentarily, followed by the value of the weight which must be placed on the pan. Do not disturb the balance when -C- is displayed. Disturbances will result in improper calibration.



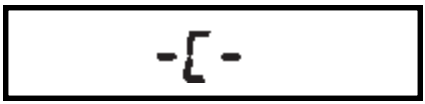
6. Place the required weight on the pan.



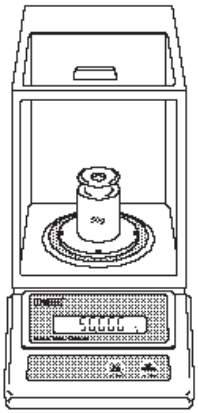
7. Press ON →0/T← . The display will show -C- momentarily, then C followed by the next weight to be placed on the pan.



8. Place the required weight on the pan, then press ON →0/T← . The display will show -C- momentarily, while the balance recalibrates.



9. When the weight on the pan is displayed along with the current indicator, the balance is recalibrated.



End

If you have entered the Calibration menu and do not wish to calibrate the balance, use END to return to normal weighing operations.

Repeately press OFF MODE until End is displayed.

Press ON →0/T← , when released, the balance will returned to normal weighing operations.

USER MENU

The User menu is used to adapt the balance to environmental condtions. It contains submenus which enable you to reset the balance to factory default settings or to select specific range settings. Access to the User menu can be disabled using the Lock out switch. The following table shows the sequence in which submenus appear on the User menu.

USER MENU TABLE

rESEt	Sets all submenus below to original factory default settings. Reset does not appear if menu has been locked out.
AL	Specifies the averaging level.
Stb	Specifies the desired stability range.
Auto-0	Sets Auto-Zero threshold.
End	Used to exit the Setup menu and store your selections.

User Menu Protection

The User menu may be locked out to prevent unauthorized personnel from changing the settings. To lock out the User menu, refer to the section titled Menu Lock-Out Protection.

NOTE: If -SAFE- is displayed, the User menu has been locked out. Settings may be viewed but not changed. See the Menu Lock-Out Protection section to enable it for making changes.

To access the User menu press and hold

until USER is displayed, then release it.

To access a submenu:

1. Repeatedly press OFF MODE until the desired submenu is displayed.

2. Press ON →0/T← to select the displayed submenu.

NOTE: You must use END to store any changes you make to the User menu.

The following sections describe each item on the User menu in detail.

Reset to Factory Defaults

This submenu enables you to reset all User menu selections to the factory default settings outlined in the adjacent table.

To reset to factory defaults:

1. Access the RESET submenu.

2. Press OFF MODE to change the setting.

3. Select YES to reset settings or, no to leave current settings.

4. Press ON →0/T← to accept the displayed setting.

USER MENU FACTORY DEFAULTS	
Averaging Level	AL 1
Stability Range	1d
Auto-Zero Tracking	.5d

Averaging Level

Averaging level compensates for vibration or excessive air currents. During operation, the balance continually takes weight readings from the weighing cell. Successive readings are then digitally processed to achieve a stabilized display. Use this submenu to specify how much processing you need to obtain stable results.

NOTE: Averaging level does not affect balance accuracy.

Select one of four averaging levels using the adjacent table as a guide.

To view or change the averaging level:

1. Access the AL submenu to display the current setting.
2. Press OFF MODE to change the setting.
3. Press ON →0/T← to accept the displayed setting.
4. When ON →0/T← is released, AL will be displayed again and the Setup menu will be returned.

AVERAGING LEVEL	
AL	0 reduced stability, fastest stabilization time
AL	**1 normal stability, normal stabilization time**
AL	2 more stability, slow stabilization time
AL	3 maximum stability, slowest stabilization time

Stability Range

The stability range specifies how much a displayed weight may change while the stability indicator remains ON. When displayed weight changes beyond the allowable range, the stability indicator turns OFF indicating an unstable condition. The Model AS60C Analytical Standard balance allows the selection of one of four stability ranges (in divisions) as shown in the table.

STABILITY RANGE	
.5d	smallest range: stability indicator is ON only when displayed weight is within .5 divisions
1d	**reduced range**
2d	normal range
5d	largest range: stability indicator is ON even though displayed weight changes slightly

When the RS232 interface is configured to print stable data only, the stability range also governs data output. Displayed data will only be output if it is within the selected stability range.

To view or change the stability range:

1. Access the Stb submenu to display the current setting.

2. Press 

to change the setting.

3. Press 

to accept the displayed setting.

4. When 

is released, Stb will be displayed again and the Setup menu will be returned.

Auto-Zero

Auto-Zero minimizes the effects of temperature changes and shift on the zero reading. By defining a threshold level in divisions, the balance maintains the zero display until the threshold is exceeded. This submenu permits you to select one of three threshold levels, or turn the feature OFF. Auto-Zero only functions when the display reads zero.

To view or change the Auto-Zero setting:

1. Access the Auto-0 submenu to display the current setting.

2. Press OFF MODE to change the setting.

AUTO ZERO	
OFF	turns Auto-Zero OFF
.5d	**sets threshold to .5 divisions**
1d	sets threshold to 1 division
3d	sets threshold to 3 divisions

3. Press ON →0/T← to accept the displayed setting.

4. When ON →0/T← is released, Auto-0 will be displayed again and the User menu will be returned.

End

You must use END to exit the User menu. **Changes you make in the User menu are only stored in memory if you use END.**

1. To exit the User menu and store your settings, press ON →0/T← when End is displayed.

2. When ON →0/T← is released, the balance will be returned to normal weighing operations.

SETUP MENU

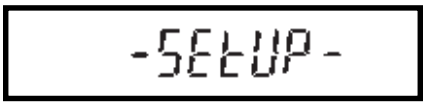
The Setup menu enables you to retain program balance parameters once they have been set. Access to the Setup menu can be disabled using the Lock out switch. The following table shows the sequence in which submenus appear on the Setup menu.

SETUP MENU TABLE

LFt	Sets balance for type approved operation.
SEL	Specifies which weighing units and operating modes will be available for operation.
LOCSUU	Enables individual or all menus to be locked out.
End	Used to exit the Setup menu and store your selections.

Setup Menu Protection

The Setup menu may be locked out to prevent unauthorized personnel from changing settings. To lock out the Setup menu, refer to the section titled Menu Lock-Out Protection.



NOTE: If -SAFE- is displayed, the Setup menu has been locked out. Settings may be viewed but not changed. See the Menu Lock-Out Protection section to enable it for making changes.

To access the Setup menu, press and hold 

until SETUP is displayed, then release it.

To access a submenu:

1. Repeatedly press OFF MODE until the desired submenu is displayed.

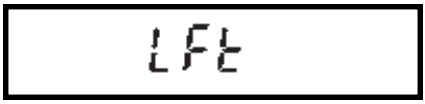
2. Press ON →0/T← to select the displayed submenu.

NOTE: You must use END to store any changes you make to the Setup menu.

The following sections describe each item on the Setup menu in detail.

Type Approved Balance

This parameter can be set to ON or OFF. Selecting ON automatically sets certain parameters for type approved requirements. Before setting LFT ON, the balance must be calibrated. See Calibration Menu for details. For sealing method, refer to Type Approved Balance Sealing section.



1. Access the LFT submenu.

2. The display will show the current status (ON/OFF). If ON is selected, Auto-Zero Tracking will be locked on to 0.5d. and Lock Switch default becomes Setup.

3. Press OFF MODE to change the status.

4. Press ON →0/T← to accept the status.

5. When ON →0/T← is released, the display will show LFT.

Unit Selection

Unit selection permits you to specify which weighing units will be enabled for use during operation. The adjacent table lists the units available.

To enable or disable the various weighing units, use the following procedure:

Weighing Units	
g grams	: mommes
dwt pennyweight	ct carats
oz t troy ounces	t taels

1. Access the SEL menu.

2. The display will show the grams unit indicator (g) along with the current status (ON/OFF).

3. Press OFF MODE to change the status.

4. Press ON →0/T← to accept the displayed status. When ON →0/T← is released, the display will show the next unit indicator with the current status.

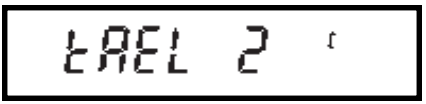
5. Set each unit ON or OFF as in step 3.

Taels

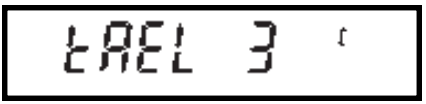
If taels are enabled, you will be required to choose one of three different taels: Hong Kong, Singapore, or Taiwan.

When the display shows TAEL 1, press OFF MODE to change to another tael, press ON →0/T← to accept the displayed tael.

(Hong Kong)



(Singapore)



(Taiwan)

When the last weighing unit has been set, the display will show SEL again and the Setup menu will be returned.

Lock Switch

Lock switch enables you to lock out one or more menu selections. Each menu can be individually locked YES, or unlocked NO.Set the appropriate balance functions, and then decide which functions of the balance are to be locked. The Calibration, User, and Setup menus can be individually locked by selecting YES for the appropriate menu, and then locked by the switch located under the right hand side of the control panel.

1. Access the LOCSW submenu. When ON →0/T← is released, the LOCSW submenu is displayed.

2. To access one or more menus, press ON →0/T← to select the calibration menu, -CAL- is displayed.

   NOTE: Pressing OFF MODE changes the selection to the other menus.

3. To select a YES or NO, press OFF MODE

   NOTE: The OFF MODE switch acts as a toggle and can select either YES or NO.

4. To confirm your selection, press ON →0/T← again. The display indicates the last menu you were in.

5. To lock out the other menus, press 

and repeat the procedure in steps 3 and 4.

End

You must use END to exit the Setup menu. **Changes you make in the Setup menu are only stored in memory if you use END.**

To exit the Setup menu and store your settings, press 

when END is displayed.

When 

is released, the balance will be returned to normal weighing operations.

MENU LOCK-OUT PROTECTION

Access to the Calibration, User, and Setup menus, can be disabled using the lock out switch located under the right side of the balance, near the display.

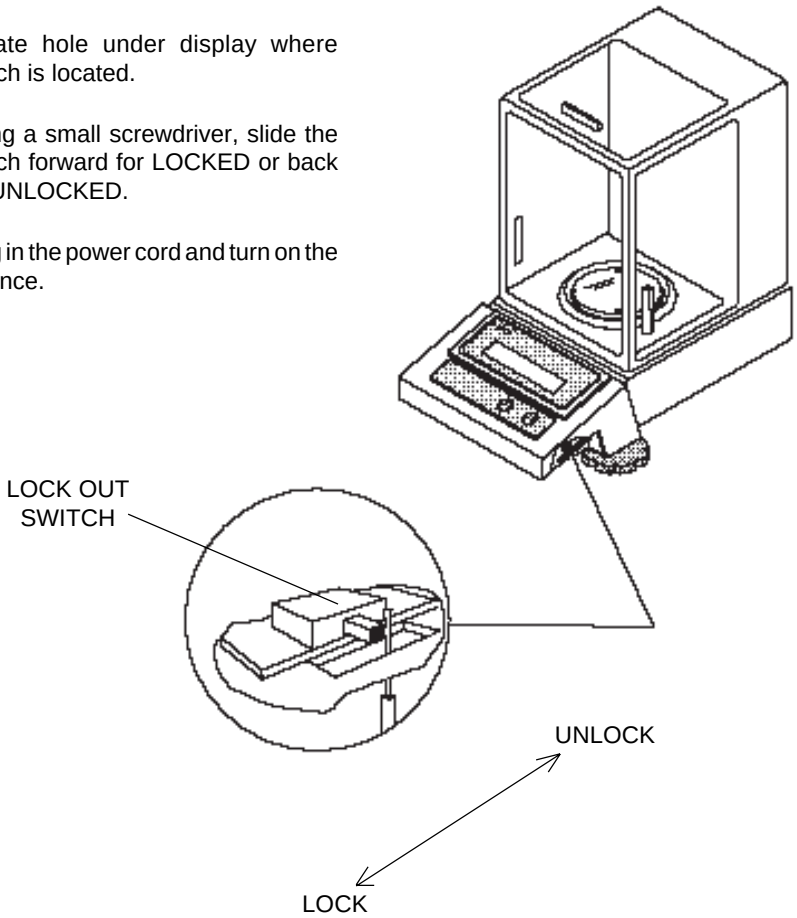
1. Turn the display off and unplug the power cord.

2. Slide the balance toward you, with the front over the edge of a table. (You can also turn the balance on its left side, but if you do, you MUST remove the pan and spill ring first!)

3. Locate hole under display where switch is located.

4. Using a small screwdriver, slide the switch forward for LOCKED or back for UNLOCKED.

5. Plug in the power cord and turn on the balance.



TYPE APPROVED BALANCE SEALING

The AS60C balance contains parts used by local Weights and Measures officials for type approved sealing. Parts include a bracket, lead seal and wire, wrench and a security screw.

After the balance has been set up properly and the menus are locked out (LFT menu selection set ON), proceed as follows to seal the balance:

1. Turn OFF and unplug the balance. Remove the Draft Shield, Spill Ring and Pan.

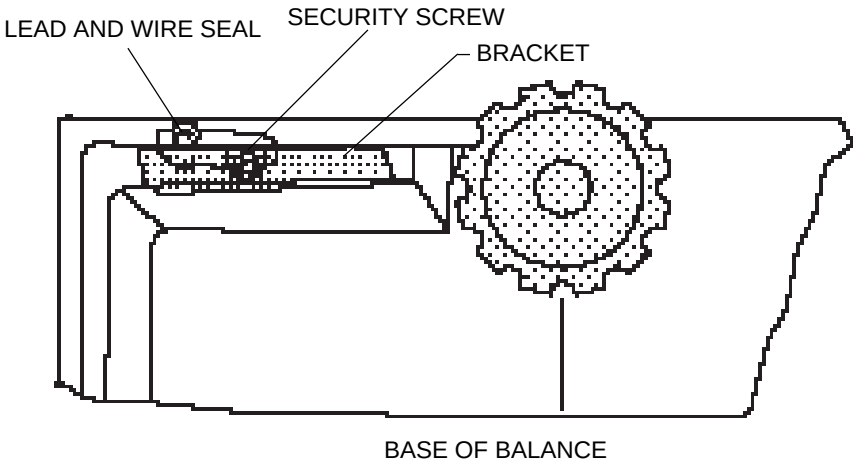
2. Turn the balance over and locate the access hole to the lock out switch.

3. Remove the existing screw next to the access hole and discard.

4. Place the Bracket supplied over the access hole and secure with the Security Screw supplied. Tighten with the Wrench supplied.

5. Obtain the Lead Seal and wire. Pass the wire through the Security Screw and the eyelet on the Bracket as shown in the illustration.

6. Crimp the lead seal tightly. Turn the balance over and reinstall items removed.



CARE AND MAINTENANCE

To keep the balance operating properly, the housing, spill pan and pan should be kept clean and free from foreign material. If necessary, a cloth dampened with a mild detergent may be used. Keep calibration weights in a safe dry place.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE(S)	REMEDY
Unit will not turn on.	Power adapter not plugged in or properly connected to balance.	Check power adapter connections.
Incorrect weight reading.	Balance was not zeroed before weighing. Balance not properly calibrated.	Press  with no weight on the pan, then weigh item. Recalibrate correctly.
Unable to store menu settings/ changes.	END not being used to exit menus.	You MUST use END to exit menus and save settings.
RS232 interface not working (when installed).	Print menu settings not properly set up. Cable connections.	Verify interface settings in Print menu correspond to those of peripheral device. Check cable connections.
Random segments displayed or display locks up.	Microprocessor lock-up.	Unplug the power cord, then replug again. If condition persists, unit must be serviced.
Unable to change settings.	Lock switch set ON. LFT set ON.	Set Lock switch to OFF. Set LFT OFF, in LFT applications, seal will be broken. Breaking the seal will nullify the legal application.
Unstable readings.	Vibration on table surface.	Place balance on a stable surface or change averaging level.
Error message display.	———————	See Error Codes Table.

Error Codes

The following list describes the various error codes and which can appear on the display and the suggested remedy.

Data Errors

0.0 Transient error (hardware error, probably static discharge). If error persists, the balance must be serviced.

Zero/Tare Errors

2.0 Balance is unable to stabilize within time limit after zero/taring. Environment is too hostile or balance needs recalibration.

Calibration Errors

3.0 Incorrect or no calibration weight used for calibration. Recalibrate with correct weights.

RS232 Errors

4.0 Bad RS232 frame. Check RS232 menu parameters and correct.

4.4 RS232 buffer is full (if installed). May occur if no printer or computer is connected to the interface. To clear buffer, turn balance off or enter Print menu and select END.

4.5 Function is disabled by the Lock switch.

User Errors

7.2 Number outside of display capacity.

Over-Under Load Errors

8.0 Hardware error causing an internal weight signal which is too low. Check if pan or pan support is off. If not, the balance must be serviced.

8.1 Hardware error caused by an internal weight signal which is too high. Check load on the platform which may be excessive. If error persists, the balance must be serviced.

8.2 Power-on load out of specification: Balance was turned on with load on pan or pan off balance. No load may be on pan when turned on and pan must be in place.

8.3 Rated capacity exceeded. Remove excessive weight from pan.

8.4 Underload condition on balance. Check that the proper pan and pan support are installed.

Error Codes (Cont.)

CheckSum Errors

9.0 Bad factory checksum. If error persists, have the balance serviced.

9.5 Bad factory calibration checksum. If error persists, have the balance serviced.

9.6 Bad mode checksum. Turn the balance off using the front panel controls. If the error persists, have the balance serviced.

9.7 Invalid setup data checksum. Check Setup, User and Print menu (when RS232 is installed) settings. If possible, try to enter menus and exit using END to restore menu settings. May be caused by a faulty component, or in rare cases, a severe static charge. If error persists, balance must be serviced.

9.8 Hardware error causing invalid calibration data checksum. Balance may need recalibration - particularly linearity calibration. If error persists, balance must be serviced.

9.9 Invalid temperature compensation checksum. Balance will work with default temperature compensation data, however, error will occur each time balance is turned on. Have balance serviced.

SERVICE INFORMATION

If the Troubleshooting section does not resolve or describe your problem, you will need to contact an authorized Ohaus Service Agent. For Service assistance in the United States, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Service Specialist will be available to help you.

SPECIFICATIONS

MODEL	AS60C
Capacity	62 g 310 ct 2 oz t 39.8 dwt 16.53 mommes (:) 1.66 t Hong Kong 1.65 t Taiwan 1.64 t Singapore
Readability	1 mg 0.001 ct 0.00001 oz t 0.0001 dwt 0.0001 mommes (:) 0.00001 t
Weighing modes	g, ct, oz t, dwt, :, t
Repeatabilty (std. dev.) (mg)	0.1
Linearity	± 1 mg/0.002 ct
Tare range	To capacity by subtraction
Stabilization time	4 seconds
Sensitivity drift (10 ° to 30°C)	2ppm/ °C
Operating temperature	41° to 104°F/5° to 40°C (Non type approved) 59° to 86F° /15° to 30°C (Type approved)
Calibration	Auto-calibration
Display (in/cm)	LCD (0.6/1.5 high)
Power requirements	AC Adapter - 100, 120, 220, 240 V ac, 50/60 Hz
Platform size (in/cm)	3.5/9.0 diameter
Free height above Platform (in/cm)	9.3/23.6
Dimensions (WxHxD) (in/cm)	8.3 x 14.5 x 14.5/21.1 x 36.8 x 36.8
Net Weight (lb/kg)	15/6.8
Shipping weight (lb/kg)	25/11.4

PARTS INFORMATION

If you require replacement parts or would like to purchase accessories, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Parts Specialist will be available to help you.

REPLACEMENT PARTS

Description	OHAUS Part No.
AC Adapters:	
100 V ac	90524-11
120 V ac	90524-10
220 V ac	90524-13
240 V ac	90524-14
240 V ac Australia	90524-15
Platform - 3.5” dia.	77495-01
Draft Shield	77537-01

ACCESSORIES

Description	OHAUS Part No.
RS232 Interface Kit	77018-01
Cable for RS232 Interface	AS017-20
Cable for RS232 Interface with PRINT switch	AS017-25
Dust Cover	78121-01
Security Device	76288-00
Calibration Masses - ASTM Class 1 Tolerance:	
20g	49024-11
50g	49054-11

LIMITED WARRANTY

Ohaus products are warranted against defects in materials and workmanship from the date of delivery through the duration of the warranty period. During the warranty period Ohaus will repair, or, at its option, replace any component(s) that proves to be defective at no charge, provided that the product is returned, freight prepaid, to Ohaus.

This warranty does not apply if the product has been damaged by accident or misuse, exposed to radioactive or corrosive materials, has foreign material penetrating to the inside of the product, or as a result of service or modification by other than Ohaus. In lieu of a properly returned warranty registration card, the warranty period shall begin on the date of shipment to the authorized dealer. No other express or implied warranty is given by Ohaus Corporation. Ohaus Corporation shall not be liable for any consequential damages.

As warranty legislation differs from state to state and country to country, please contact Ohaus or your local Ohaus dealer for further details.

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29 Hanover Road,
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Tel: (201) 377-9000,
Fax: (201) 593-0359

With offices worldwide.

P/N 77811-01 R0496

Ohaus Corporation
29 Hanover Road
Florham Park NJ
07932-0900

RS232 INTERFACE ACCESSORY
Part Number 77018-01
For
ANALYTICAL *Standard* Series
and
PRECISION *Standard* Balance Series

Instruction Manual

NOTICE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE INTERFERENCE-CAUSING EQUIPMENT STANDARD ENTITLED “DIGITAL APPARATUS”, ICES-003 OF THE DEPARTMENT OF COMMUNICATIONS.

CET APPAREIL NUMERIQUE RESPECTE LES LIMITES DE BRUITS RADIOELECTRIQUES APPLICABLES AUX APPAREILS NUMERIQUES DE CLASSE A PRESCRITES DANS LA NORME SUR LE MATERIEL BROUILLEUR : “APPAREILS NUMERIQUES”, NMB-003 EDICTEE PAR LE MINISTRE DES COMMUNICATIONS.

Unauthorized changes or modifications to this equipment are not permitted.

TABLE OF CONTENTS

INTRODUCTION

The RS232 Interface Accessory is a bidirectional interface which enables either a Precision Standard or an Analytical Standard balance to communicate with a printer or computer equipped with an RS232 serial port. The interface assembly is easily installed in the balance and communication parameters are configured through the balance's front panel.

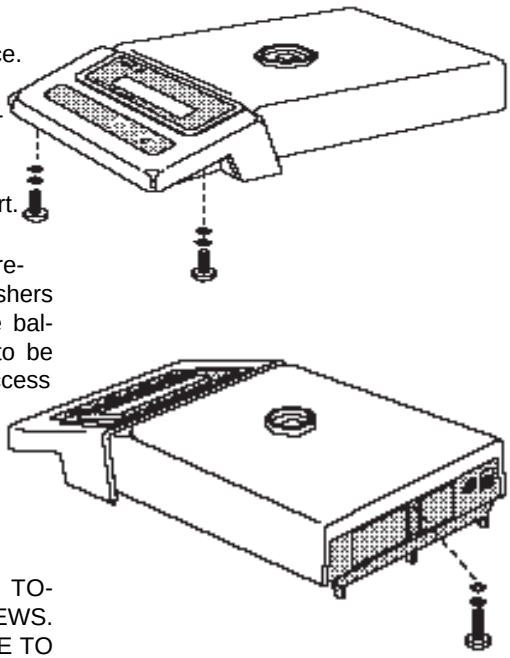
INSTALLATION

Use the following procedure to install the RS232 Interface accessory.

CAUTION

TO PREVENT DAMAGE TO THE BALANCE, BE CERTAIN THAT POWER IS DISCONNECTED BEFORE REMOVING THE COVER.

1. Disconnect power to the balance.
2. Remove the draft shield (if installed).
3. Remove the pan and pan support.
4. Using a philips screwdriver, remove the three screws and washers which secure the cover to the balance. The balance will have to be turned over or on its side to access the screws as they are located on the bottom; two under the front panel and one on the rear.



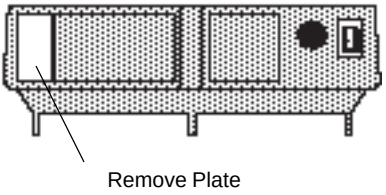
CAUTION

HOLD THE COVER AND BASE TOGETHER WHILE REMOVING SCREWS. DO NOT ALLOW COVER OR BASE TO FALL.

5. Remove the cover.

6. On the rear of the balance, a protective thin plate covers the hole for the 9-pin RS232 connector.

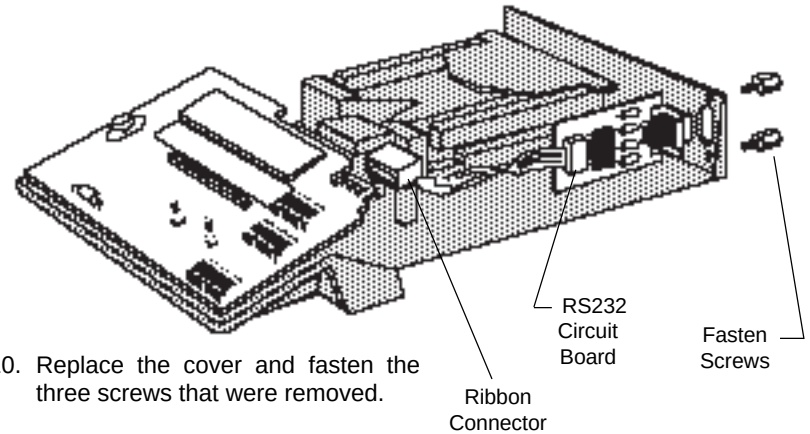
   Peel off the plate to expose the hole.



7. Place the circuit board and connector assembly in the balance so that the 9-pin connector fits through the hole.

8. Fasten the assembly using the two screws provided.

9. Slide the ribbon connector onto the edge connector of the main circuit board.



10. Replace the cover and fasten the three screws that were removed.

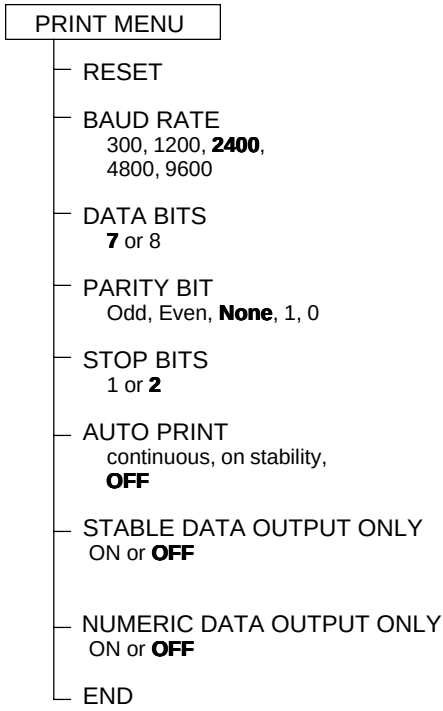
11. Replace the draft shield.

12. Replace the pan and pan support.

13. Reconnect power to the balance.

USING MENUS TO CONFIGURE THE BALANCE

The Analytical Standard and Precision Standard balances both contain four display menus which enable you to calibrate and configure the balance for your specific operating requirements. The print menu shown below is used to configure the RS232 interface.



PRINT MENU

When the interface is installed, the Print menu is used to configure the RS232 interface parameters and customize the balance's print functions for your requirements. The following table shows the sequence in which submenus appear on the Print menu.

PRINT MENU TABLE

*rESEt	Sets all submenus below to original factory default settings.
bAud	Specifies baud rate.
dAtA	Specifies number of data bits.
PAr itY	Specifies parity type, if any.
StoP	Specifies number of stop bits.
AutoP	Enables/disables Auto print feature.
StAbLE	Enables/disables printing stable-data-only feature.
nu	Specifies numeric-only or full display data for output.
End	Used to exit the Print menu and store your selections.

* Does not appear in menu if menu is locked out.

Print Menu Protection

The Print menu may be locked out to prevent unauthorized personnel from changing settings. To lock out the print menu, refer to the section titled Menu Lock-Out-Protection.

To access the Print menu press and hold ON TARE until PRINT is displayed, then release it.

If SAFE is displayed, the Print menu has been locked-out. Settings may be viewed but not changed. See the Menu Lock-Out Protection section to enable it for making changes.

To access a submenu:

1. Repeatedly press OFF MODE until the desired submenu is displayed.

2. Press ON TARE to select the displayed submenu.

NOTE: You must use END to store any changes you make to the Print menu.

The following sections describe each item on the Print menu in detail.

Reset to Factory Defaults

This submenu enables you to reset all RS232 menu selections to the original factory default settings outlined in the adjacent table.

To reset to factory defaults:

1. Access the Reset submenu to view the current setting.

2. Press OFF MODE to change the setting.

   (Select YES to reset settings or, NO to leave current settings.)

   Press ON TARE to accept the displayed setting.

PRINT MENU FACTORY DEFAULTS	
Baud rate	br 2400
Data Bits	7 data
Parity	None
Stop Bits	2 stop
Auto Print	OFF
Stable Data Only	OFF
Numeric Data Only	OFF

Baud Rate

This submenu is used to select the desired baud rate. There are five available baud rates to choose from: 300, 1200, 2400, 4800 and 9600.

To view or change the baud rate:

1. Access the Baud submenu to display the current setting.

2. Press OFF MODE to change the setting.

   Press ON TARE to accept the displayed setting.

When ON TARE is released, BAUD will be displayed again and the Print menu will be returned.

Data Bits

The total number of bits for Data, Parity and Stop must equal 9 or 10. (see examples). The balance will not permit you to select a combination that does not equal 9 or 10.

EXAMPLES	
8 Data + 2 Stop + No Parity	= 10
8 Data + 1 Stop + Odd Parity	= 10
7 Data + 1 Stop + Odd Parity	= 9

To set the number of data bits to 7 or 8:

1. Access the Data submenu to display the current setting.

2. Press OFF MODE to change the setting.

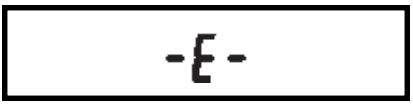
   Press ON TARE to accept the displayed setting. When ON TARE is released, DATA will be displayed again and the Print menu will be returned.

Parity

Parity can be set to Odd, Even, None, or a marker of 0 or 1 as follows:

1. Access the Parity submenu to display the current setting.
2. Press MODE to change the setting.

   Press ON TARE to accept the displayed setting.



NOTE: If all selections do not appear, total number of data, parity and stop bits is currently < 8 or > 10. Data or stop bits must be changed.

When ON TARE is released, PARITY will be displayed again and the Print menu will be returned.

Stop Bits

The number of stop bits can be set to 1 or 2 as follows:

1. Access the Stop submenu to display the current setting.
2. Press MODE to change the setting.
3. Press ON TARE to accept the displayed setting.

NOTE: If all selections do not appear, total number of data, parity and stop bits is currently < 8 or > 10. Data or parity bits must be changed.

When ON TARE is released, STOP will be displayed again and the Print menu will be returned.

Auto Print Feature

When enabled, the Auto Print feature causes the balance to automatically output display data in one of two ways: continuously, or upon stability.

To select one of these Auto Print methods, or to turn the feature off:

1. Access the AutoP submenu to display the current setting.

2. Press OFF MODE to change the setting.

Press ON TARE to accept the displayed setting.

When ON TARE is released, AUTOP will be displayed again and the Print menu will be returned.

Print Stable Data Only

When enabled, this feature permits only stable display data to be output. To set the feature ON or OFF:

1. Access the Stable submenu to display the current status.

2. Press OFF MODE to change the status.

Press ON TARE to accept the displayed status.

When ON TARE is released, STABLE will be displayed again and the Print menu will be returned.

Print Numeric Data Only

This submenu is used to select numeric data only, or full display data for RS232 output. Set this feature ON to output numeric display data only, or OFF to output full display data as follows:

1. Access the Nu submenu to display the current status.

2. Press OFF MODE to change the status.

   Press ON TARE to accept the displayed status.

When ON TARE is released, NU will be displayed again and the Print menu will be returned.

End

You must use END to exit the Print menu. **Changes you make in the Print menu are only stored in memory if you use End.**

To exit the Print menu and store your selections, press ON TARE when END is displayed. The balance will be returned to normal weighing operations.

MENU LOCK-OUT PROTECTION

Access to the Print Menu can be disabled using the lock-out switch located under the right side of the balance, near the display.

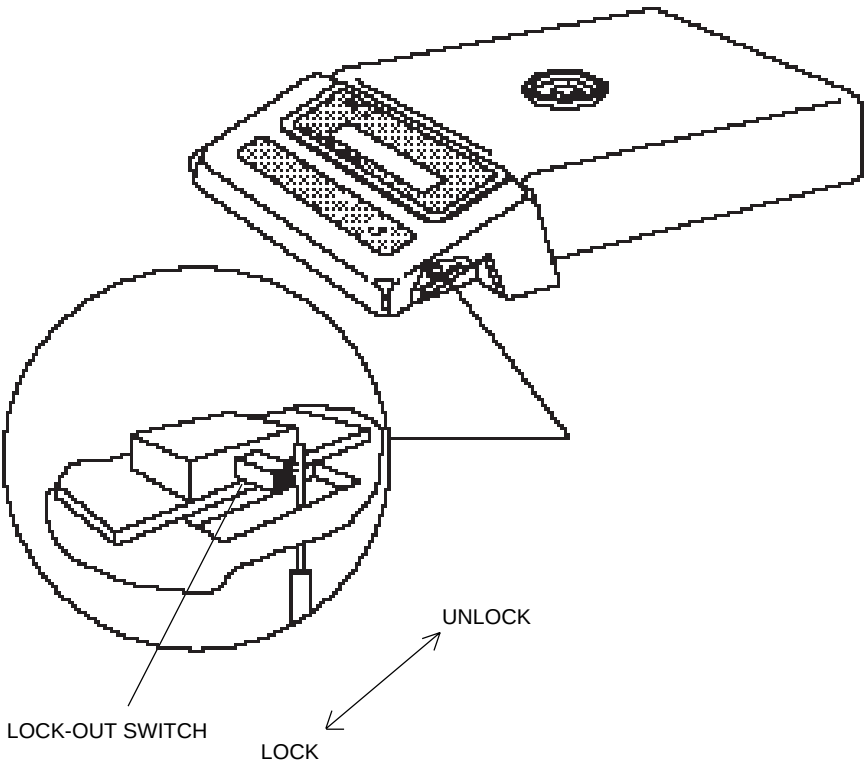
1. Turn display off and unplug the power cord.

2. Slide the balance toward you, with the front over the edge of a table. (You can also turn the balance on its left side, but if you do, you MUST remove the draft shield, pan and pan support first!)

3. Locate hole under display where switch is located.

4. Using a small screwdriver, slide the switch forward for LOCKED or back for UNLOCKED.

5. Plug in the power cord and turn on the balance.



USING THE INTERFACE

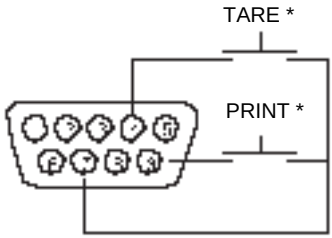
When the interface is installed, a short press on the OFF MODE switch will initiate a print command. Data output is in the format shown under the P command in the RS232 Command Table.

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

Hardware

The balance can be interfaced with other equipment utilizing the 9-pin subminiature "D" connector. The pinout and pin connections are shown in the adjacent illustration.

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



1	5VDC (50 mA max.)
2	Data Out (TXD)
3	Data In (RXD)
4*	Tare (External signal)
5	Clear To Send (CTS)
6	Data Terminal Ready (DTR)
7	Ground
8	Request To Send (RTS)
9*	Print (External signal)

* External PRINT and/or TARE switches may be installed as shown in the diagram. Momentary contact switches must be used.

RS232 Commands

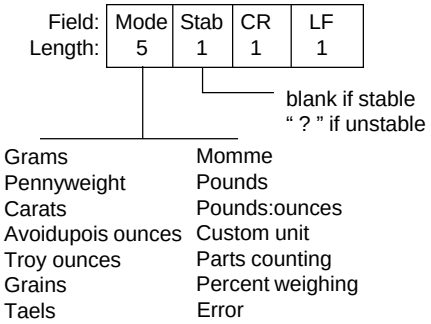
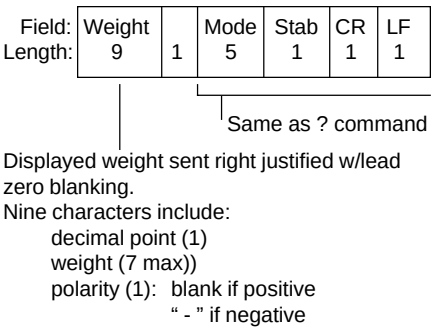
All communication is accomplished using standard ASCII format. Only the characters shown in the following table are acknowledged by the balance. Any other commands, control characters or spaces are ignored.

Commands sent to the balance must be terminated with a carriage return (CR) or carriage return-line line feed (CRLF). For example, a tare command should appear as shown in the adjacent diagram. Data output by the balance is always terminated with a carriage return - line feed (CRLF).

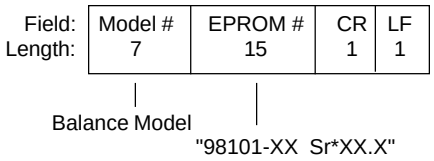
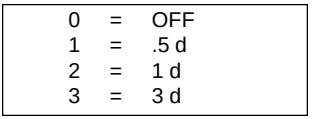
TARE COMMAND

Field:	T	CR	LF
Length:	1	1	1

RS232 COMMAND TABLE

Command Character	Description
?	Print current mode 
nnnA	Set Auto Print feature to "n" (see table). n = 0 Turns feature OFF n = S Output on stability n = C Output is continuous
C	Begin span calibration
xD	Set 1 second print delay (set x = 0 for OFF, or x = 1 for ON)
xI	Set Averaging Level to "x", where x = 0 to 3 (see table). 0 = minimum level 1 = 2 = 3 = maximum level
L	Begin linearity calibration
P	Print display data When "numeric only" display data is selected for output in the RS232 menu, the Mode field is not output. 

RS232 COMMAND TABLE (Cont.)

Command Character	Description
xS	Set stable data only printing (set x = 0 for OFF, or x = 1 for ON).
T	Same effect as pressing tare button
V	Print EPROM version 
xZ	Set Auto Zero to “x”, where x = 0 to 3 (see table). 
Esc L	Prints listing of Setup and Print menu settings.
Esc R	Resets Setup and Print menus to factory defaults. CAUTION: This will reset RS232 configuration.
Esc S	Save current settings.

CARE AND MAINTENANCE

The RS232 Interface Accessory once installed does not require maintenance.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE(S)	REMEDY
RS232 interface not working.	Print menu settings not properly set up.	Verify interface settings in Print menu correspond to those of peripheral device.
	Cable connections.	Check cable connections.

Error Codes

When the RS232 interface is installed in Precision Standard and Analytical Standard balances, the following error codes are added to the standard list of error codes:

4.0 Bad RS232 frame. Check RS232 menu parameters and correct.

4.4 RS232 buffer is full. May occur if no printer or computer is connected to the interface. To clear buffer turn balance off, or enter and exit Print menu and select END.

4.5 Function is disabled by the Lockswitch.

SERVICE INFORMATION

If the Troubleshooting section does not resolve or describe your problem, you will need to contact an authorized Ohaus Service Agent. For Service assistance in the United States, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Service Specialist will be available to help you.

LIMITED WARRANTY

Ohaus products are warranted against defects in materials and workmanship from the date of delivery through the duration of the warranty period. During the warranty period Ohaus will repair, or, at its option, replace any component(s) that proves to be defective at no charge, provided that the product is returned, freight prepaid, to Ohaus.

This warranty does not apply if the product has been damaged by accident or misuse, exposed to radioactive or corrosive materials, has foreign material penetrating to the inside of the product, or as a result of service or modification by other than Ohaus. In lieu of a properly returned warranty registration card, the warranty period shall begin on the date of shipment to the authorized dealer. No other express or implied warranty is given by Ohaus Corporation. Ohaus Corporation shall not be liable for any consequential damages.

As warranty legislation differs from state to state and country to country, please contact Ohaus or your local Ohaus dealer for further details.

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P/N 77017-01 R0296