

**FP 6000/6200/12K**

**INDUSTRIAL BALANCES**

**INSTRUCTION MANUAL**

Instruction-FP-Series-v.1.c 92.06.12.OGA

**HIGH RESOLUTION INDUSTRIAL BALANCE**



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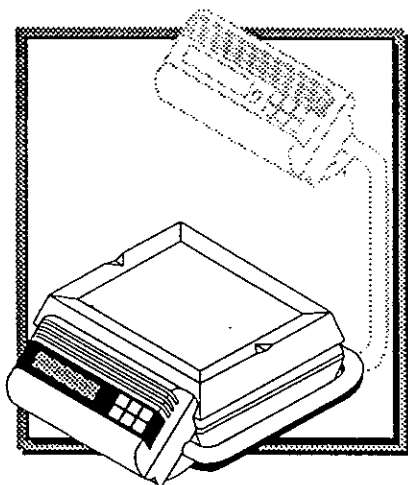
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## FCC Rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when equipment is operated in a commercial environment. If this unit is operated in a residential area it might cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.

(FCC = Federal Communications Commission in the U.S.A.)



# FP Series • Section A


## Set-Up

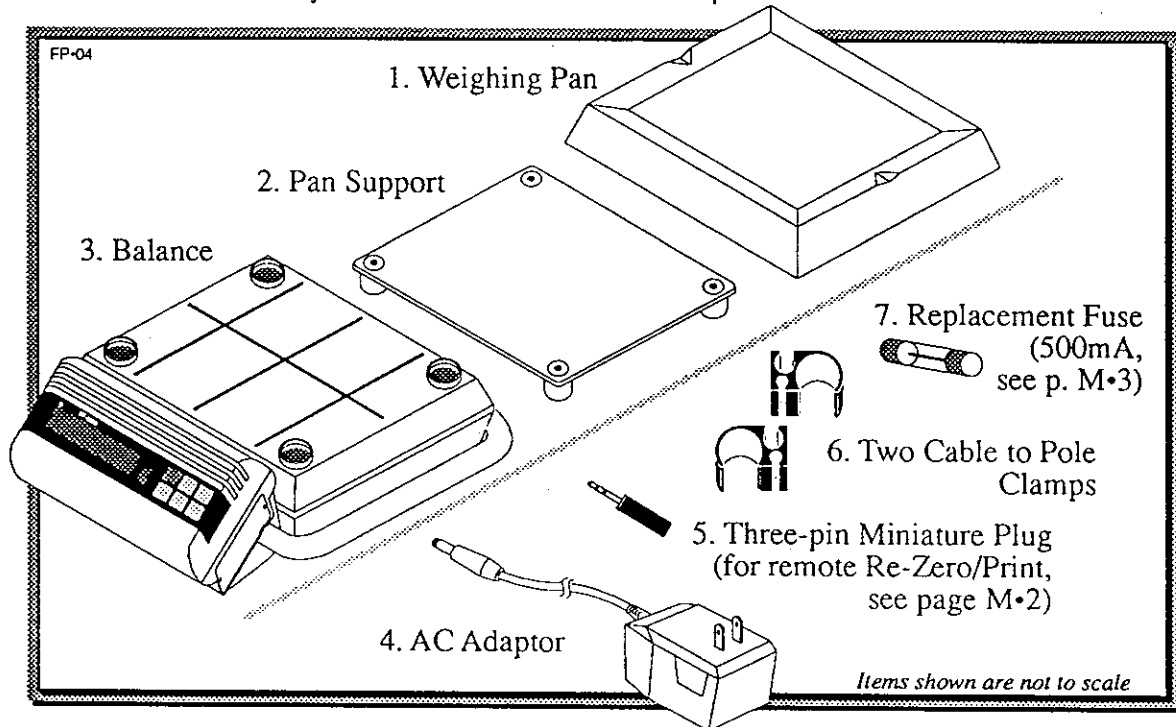


## Unpacking & Setting-Up Your FP



Unpack the balance carefully and keep the packing material if you are likely to transport the balance again in the future:

 In the carton you should find this manual plus:



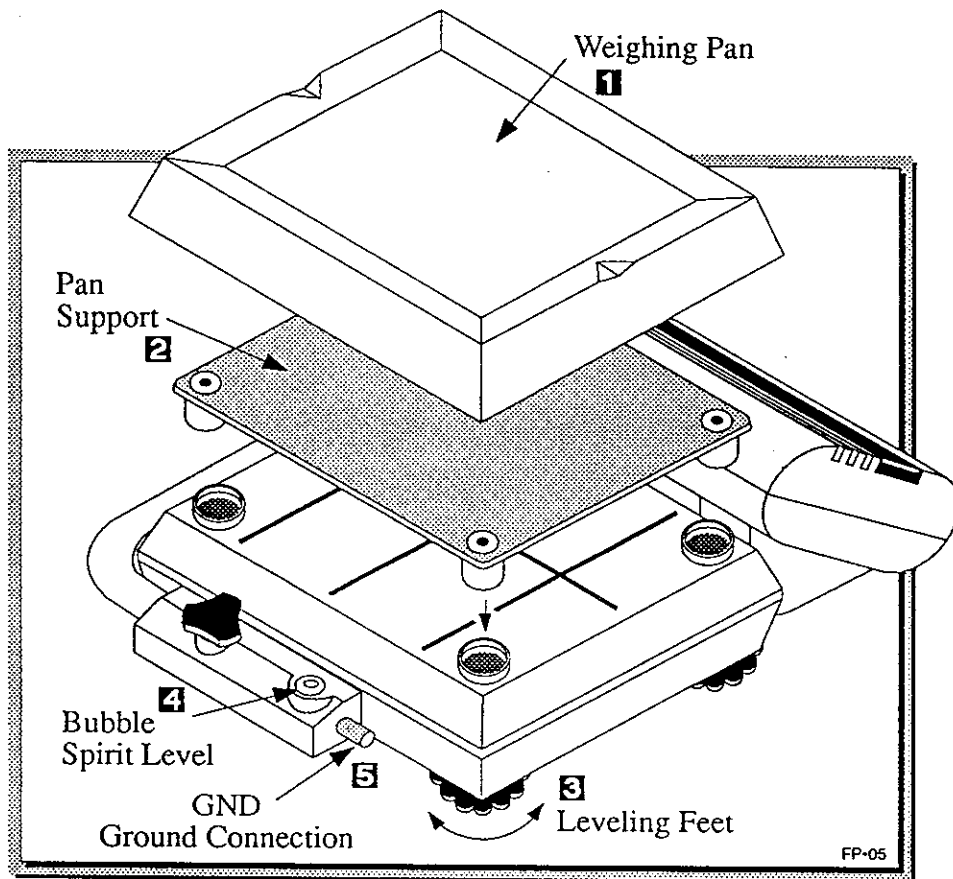
## Best Conditions For Weighing



To keep your balance accurate and get the most from its features, please try to meet the following 'Best Conditions' as close as possible:

- The Balance must be level (check the spirit level on the Balance).
- Best temperature is about 20°C/68°F at about 50% Relative Humidity.
- The weighing room should be kept clean and dry.
- The weighing table must be of a solid construction.
- Corners of rooms are best as they are less prone to vibrations.
- Don't install the balance near heaters or air conditioners.
- Don't install the balance in direct sunshine.
- Try to ensure a stable AC power supply when using an adaptor.
- Keep equipment containing magnets away from the balance.
- Warm-up the balance before use or leave it on standby overnight.
- Earth the balance chassis for electrostatic discharge if the weighing conditions warrant.

# Assembly

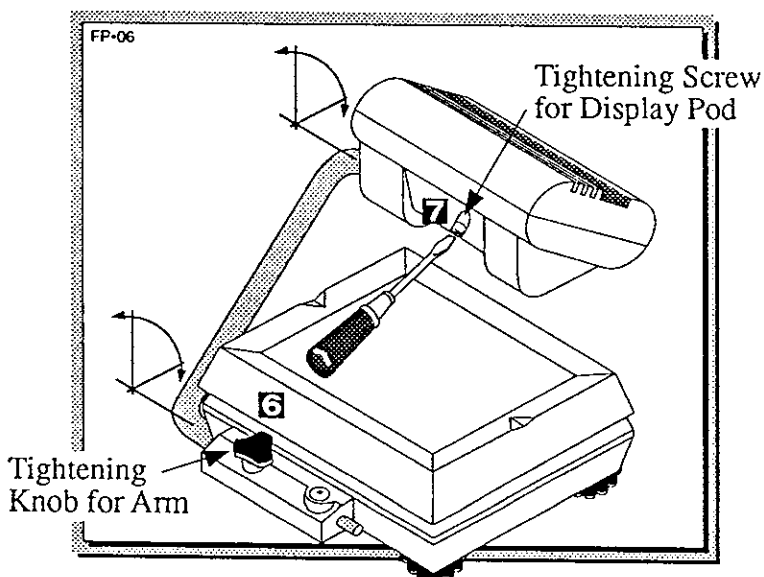


**1** Place the Weighing Pan **1** over the Pan Support **2** and lower them onto the balance as shown above.

**2** After you have selected your weighing area and positioned your balance: adjust the four leveling feet **3** until the bubble in the spirit level indicates the balance is level **4** (do this every time the balance is moved).



Please earth the chassis if you think static electricity may be a problem. There is a GND ground connection at the back of the balance **5** (see drawing above).



**3** If you would like the Display Pod at a different viewing angle: loosen the Swing Arm tightening knob **6** and the Display Pod tightening screw **7**.

Adjust both until desired viewing angle is obtained and then tighten screw and knob.

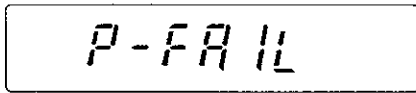
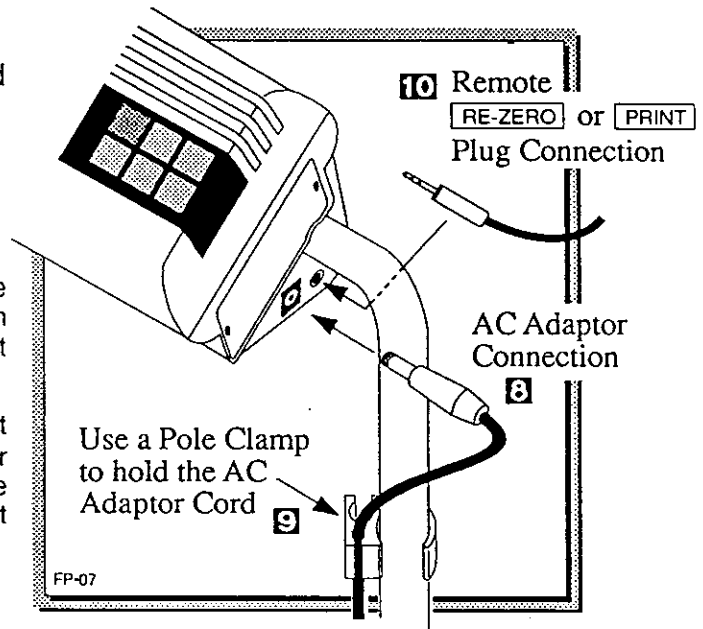
**4** Connect the AC adaptor **3**.

Use a Pole Clamp provided to hold the AC Adaptor Cord if desired **9**.

⚠ Also shown (if used): Remote **RE-ZERO** or **PRINT** Plug Connection **10**.

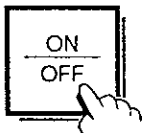
⚠ The adaptor's DC output should be about 12 Volts (please note that an alternative 12V DC power supply might not be stable enough for this balance).

⚠ If outside North America: the AC input requirements could be 100, 120, 220 or 240 Volts (50/60Hz) depending on the area in the world, so please check that the adaptor is correct.



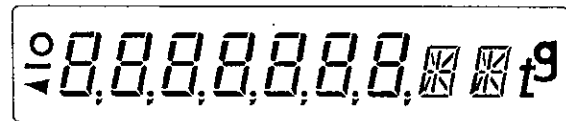
"P-FAIL" power failure is displayed if power was interrupted during weighing the last time the balance was used. Go on to Step 5.

**5**

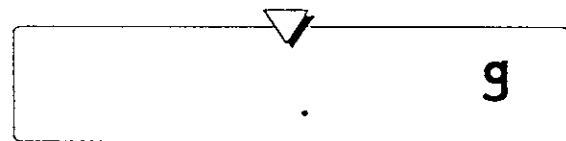


▶ Press the **ON/OFF** key.

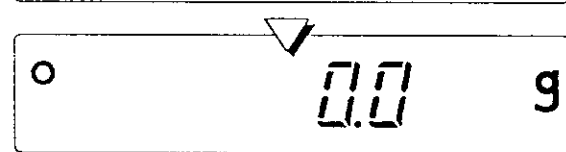
○ The display will come ON with all segments lit;



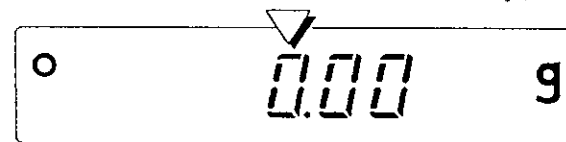
○ The display will blank for a moment;



○ Moments later, the stability indicator will come on and zero will be displayed.



▲ FP-12K ▼ FP-6200/6000 also see p. D-4



**6**

At this stage any weight reading will not be very accurate because the balance has not been "calibrated". You should calibrate the balance next: but first, the balance must be supplied with AC Adaptor power to "warm-up" for at least one hour before moving to calibration.

Please take the time to read the following section while your balance is warming-up, it explains several important features of the FP. **V**

## Display ON & Power Errors



The balance does a self check when you connect the AC adaptor, or press the **ON/OFF** key. If there is a problem, you will get an error display:

### Power Failure Error:

**P-FAIL**

"P-FAIL" power failure is displayed if power was interrupted during weighing the last time the balance was used.

▶ Press the **ON/OFF** key.

### Stability Error:

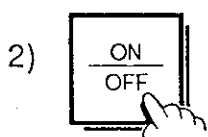
**Error 1**

'Error 1' will be displayed if the balance takes more than thirty seconds while attempting to ZERO.

- ▶ Make sure that nothing is touching the weighing pan. If there is: press the **ON/OFF** key to clear.
- ▶ If there is nothing touching the weighing pan or interfering with the balance, then it is an 'environment' error.
  - First see that all of the BEST CONDITIONS FOR WEIGHING (page A•2) have been met, especially avoiding drafts and vibrations.
  - Then try changing C-Parameter CO•Environment '*Cond*':



Press the **RE-ZERO** key and the display will show near ZERO.



Press the **ON/OFF** key and read pages G•3-4 on CHANGING THE PARAMETERS. Group 'CO•ENVIRONMENT' deals with the balance's response to environmental conditions (see pages B•3, G•5).

- 3) Try changing "*FLT-b*": to "*FLT-b 3CD*" (G•6). If that doesn't work, try altering the other CO•Environment parameters. If the error persists, call your dealer for service.

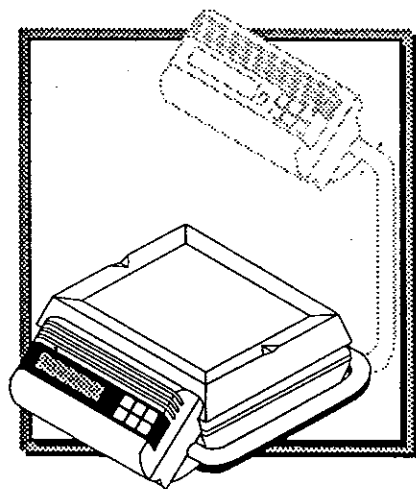
### Memory Error:

**Error 6**

**Error 7**

'Error 6' or 'Error 7' will be displayed if the balance has a memory problem.

▶ Disconnect and connect AC power and try again. If error persists, call for service.



## FP Series • Section B

# Introduction



## Welcome!

Thank You for Your **AND** Purchase!

This is an *INSTRUCTION MANUAL* for the *FP Series of Electronic Balances*. The *FP balance* is the product of years of design, development, and in-field testing. Every care has been taken during the manufacturing process of this balance; and each balance is subjected to several levels of quality control before it leaves the factory to ensure that it will perform accurately and reliably for many years.



This section introduces you to some of the major features of your FP. Please take a moment to familiarize yourself with these items as they could be helpful for proper operation.



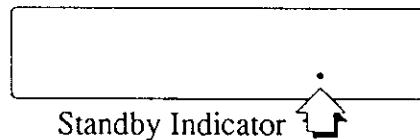
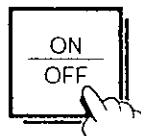
## Standby and Operating Modes



The balance is always warmed-up and ready-to-use as long as the AC adaptor is connected. This is the normal state and does no harm to the balance. Please warm-up the balance for one hour before use.

**WARM-UP  
YOUR  
BALANCE  
BEFORE USE!**

- Use the **ON/OFF** key to turn the display ON or OFF. When the balance is in Standby mode, a period appears in the Display as an indicator that power is connected.



Standby Indicator



The FP balance has two main modes: *Standby Mode* and *Operating Mode*. In day-to-day operation, Standby Mode is normal when the balance is not in use. This keeps the weighing mechanism warmed-up for good accuracy. If the balance is not going to be used for a long period of time, then it may be appropriate to disconnect the main power. *The things to remember are:*

- The **ON/OFF** key switches the display ON & OFF. The display can also be turned ON & OFF via the AD-1652 Wireless Remote Keyboard, or using a computer via the Serial Interface OP-03.
- Standby Mode** is: when the balance display is OFF, but power is supplied via the AC Adaptor. The last decimal stays lit as an indicator.



## C-Parameters

Your FP balance has a number of software parameters that enable you to select the best weighing features for your needs. These settings control how the balance responds to various commands, operations and options. C-Parameters are listed on page G•2 and can be set using the method as shown in the section CHANGING C-PARAMETERS, page G•3. The individual settings for each group are detailed in the following section THE C-PARAMETERS, page G•5.



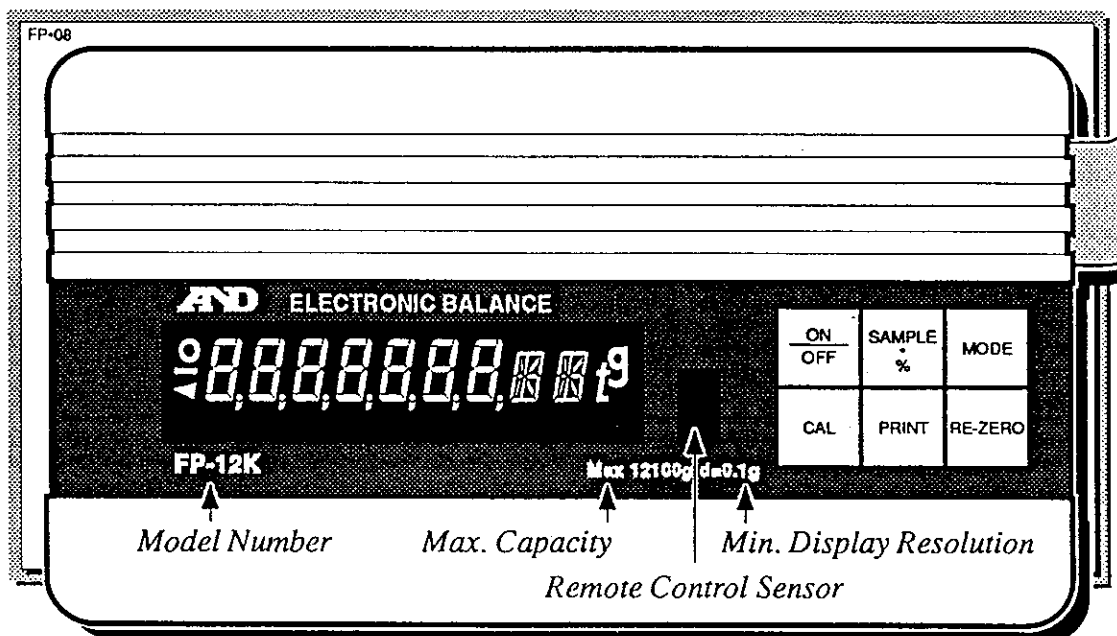
## ACAI Automatic Counting Accuracy Improvement

The ACAI™ (Automatic Counting Accuracy Improvement) function is an exclusive A&D software advancement that re-calculates the unit weight as more pieces are added, to improve count accuracy. This is a very useful function when counting light items, especially when there is a large number to be counted.

When the balance calculates unit weight from sample pieces, the more sample pieces that are used, the greater the accuracy. For example: let's say that you use 10 pieces as your sample and the unit weight calculated by the balance from your sample is 1g. Using the ACAI feature, after loading on 200 pieces, the balance determines that the average unit weight is really 0.98g instead of 1g. This is improved accuracy and could make a big difference when you are counting thousands of pieces.

To get highly accurate counting results, you need to stay within the ACAI counting range as you add more pieces (see page E•4). But this is easy to do and only needs to be done once, up to 200 pieces. After that, the ACAI remembers the most accurate unit weight.

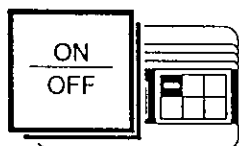
# The Display Pod



The Display Pod is the 'brain' of your FP balance.



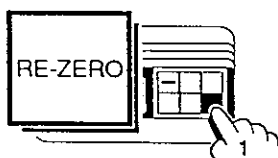
- Please take care that the Display Pod is not in a position where it could be hit or damaged.
- Care should be taken not to scratch or break the display and Remote Keyboard Sensor windows.
- Press on the middle of the keys to activate them, firmly but not forcefully. You will hear a faint 'beep' when the key has been activated.



## The ON/OFF Key

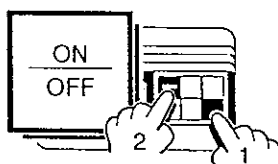
The **ON/OFF** key switches the display ON and OFF but does not cut the power to the balance - so the balance will remain on standby (warmed-up) while the AC adaptor remains connected (See POWER SUPPLY NOTES section). The FP series uses a cobalt blue fluorescent display. You can make sure that all the display segments are working properly by:

**1**



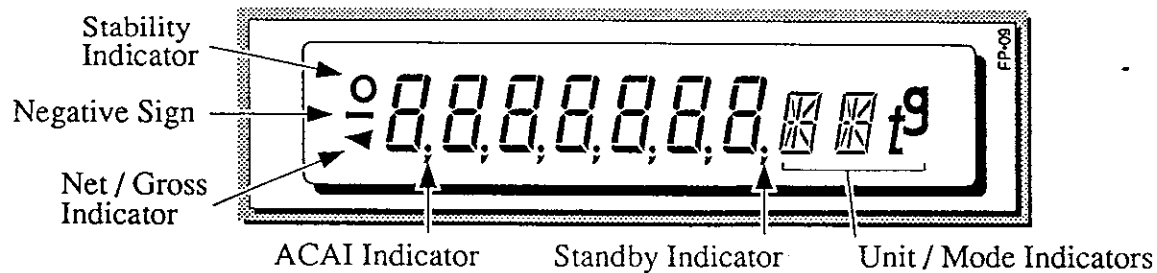
- With the display OFF, press and hold the **RE-ZERO** key.

**2**

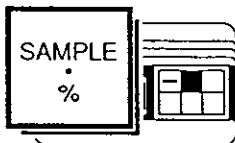


- While holding the **RE-ZERO** key, press the **ON/OFF** key. All the display segments will come ON (Press the **ON/OFF** key again when finished).



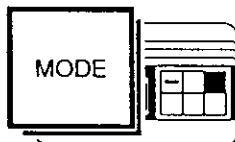


- Starting at the left end of the display you will see a 'O' circular stability indicator, a minus weight display symbol and the '◀' triangular NET/GROSS symbol. Next you can see the display '8.8.8.8.8.8.8.' used to display the weight, the first decimal point acts as the ACAI indicator (see page E•4.) and the final decimal point acts as a standby indicator and remains on when power is connected.
- The final three character spaces are made up of two 14 segment displays which can display any letter in the alphabet and one two segment display which can display "g" or "t". These three character spaces are used to note which weighing mode the balance is in.



### *The SAMPLE•% Key*

The **SAMPLE•%** key can be used to register a sample count (eg: 10 units) in counting "cnt" mode or register 100% in percentage "Pct" mode.



### *The MODE Key*

- Press the **MODE** key to rotate through the balance weighing modes:
- The weighing units are **g** gram; **OZ** ounce (avoir); **OZt** troy ounce; **dwt** pennyweight; **ct** carat; **mm** momme; **GN** grain; **t** tola; and **TL** tael (see the WEIGHING UNITS AND THEIR CONVERSIONS section (page B•8) for more information concerning the different weighing unit). There is also a percentage mode **Pct**, and counting mode **cnt**.
- Unused weighing units may be disabled by the procedure on page B•7.
- The **MODE** key changes the units in the following sequence:



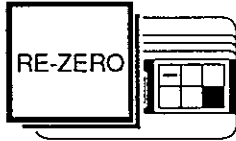
### *The CAL Key*

The **CAL** key starts the calibration process. From the normal weighing mode, with nothing on the weighing pan and the balance level, press the **CAL** key and follow the calibration procedure outlined on page C•3.



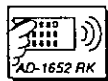
## The PRINT Key

The **PRINT** key can be used to transmit data to the AD-8117 printer, or to a computer, via option OP-03 or OP-04, please see Section J.



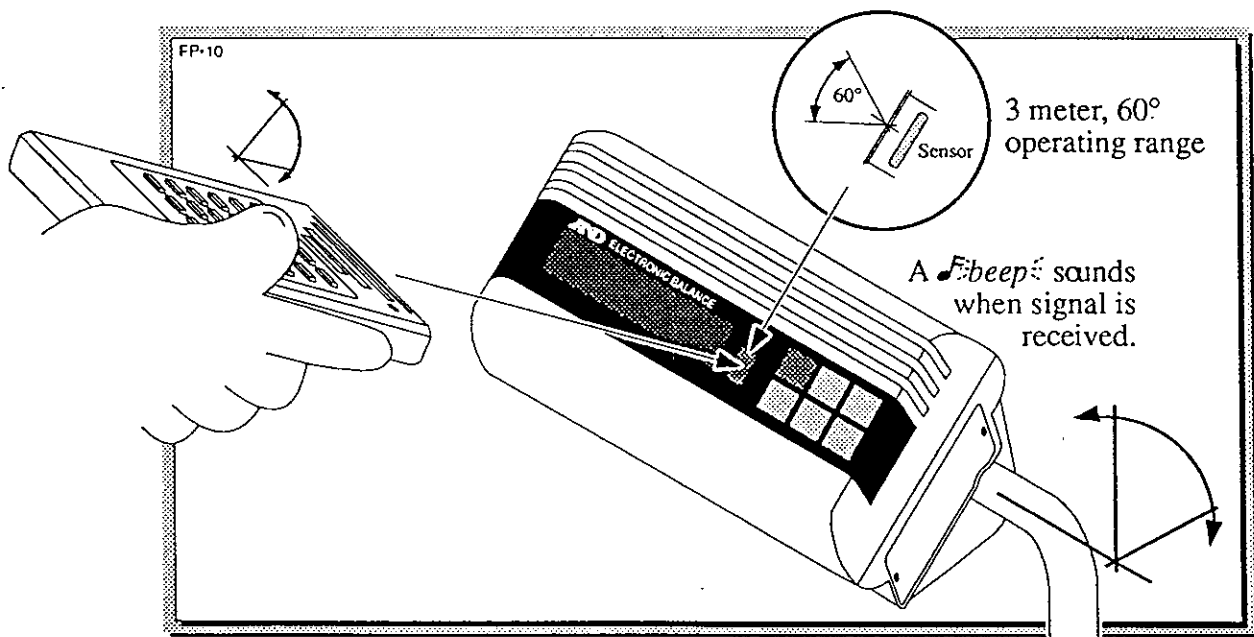
## The RE-ZERO Key

- ❑ The **RE-ZERO** key returns the balance to the center of ZERO when the weighing pan is empty, and can also TARE total weight (sample and container), RE-ZEROing the display up to the maximum capacity of the balance.
- ❑ When the display shows a small deviation from ZERO and the weighing pan is empty (and TARE is not being used), then press the **RE-ZERO** key to return the display to ZERO.
- ❑ Please see page D•8 for more information concerning NET and GROSS weighing.



If you are using an AD-1652 Wireless Remote Keyboard, remember that the balance sensor has a 3-meter, 60° operating range. Please keep this in mind when adjust the Display Pod, or when using the Remote Keyboard. See Section H for more AD-1652 information

- ⚠ You will hear a faint *beep* if the key has been successfully received.



# Selecting Weighing Units



The FP series balances are multi-function instruments where switching between the weighing units contained in the balance software is done by pressing the **MODE** key.

If the law in your area permits, you may use all of the units, or at this software level *you can disable the weighing units you don't regularly use*. Also, some dealers may initially turn OFF units which are not regularly used, but you may want to turn them back ON. The complete weighing mode cycle is as follows (if some are missing please refer to your dealer):



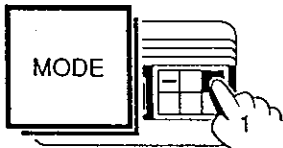
## To Turn Weighing Units OFF or ON



In this procedure, *all available weighing units are initially turned OFF* – you will have to select all the units you want to use! You can escape at any time by pressing the **ON/OFF** key.



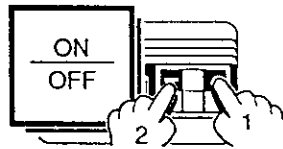
**1**



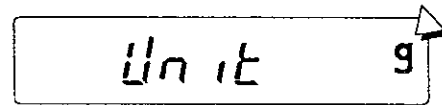
- ▶ With the display OFF: Press and hold the **MODE** key.



**2**

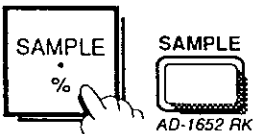


- ▶ While holding **MODE** key, press the **ON/OFF** key.
- "Unit g" will be displayed.

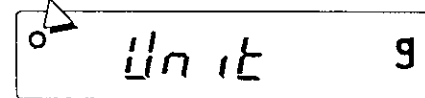


If you want only gram for your weighing mode, press the **RE-ZERO** (**ZERO** on the AD-1652 Remote) key - only "g" will be enabled and you will exit to the weighing mode.

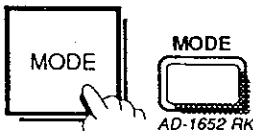
**3**



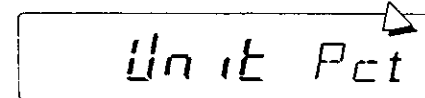
- ▶ If you wish to keep "g" as a mode, then press the **SAMPLE-%** key.
- The "O" stability indicator will come ON, indicating that the unit is enabled.



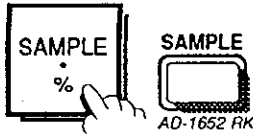
**4**



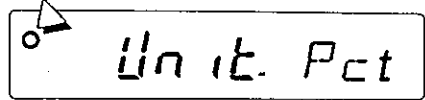
- ▶ Press the **MODE** key to move to the next unit.
- "Unit Pct" will be displayed.



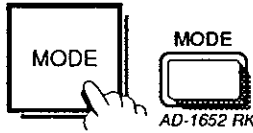
**5**



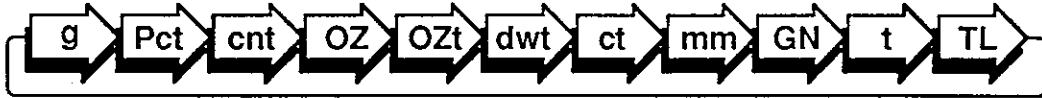
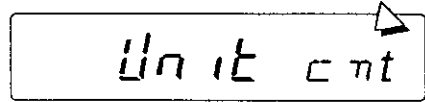
- ▶ If you wish to keep "Pct" as a mode, then press the **[SAMPLE·%]** key.
- The "O" will come ON, the unit is enabled.



— or —



- ▶ If you want to skip "Pct" as a mode, then press the **[MODE]** key instead, to move to the next unit.

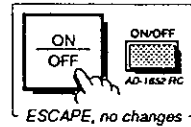


⚠ The weighing units/modes are **g** gram; **Pct** percentage mode; **cnt** counting mode; **OZ** ounce (avoir); **OZt** troy ounce; **dwt** pennyweight; **ct** carat; **mm** momme; **GN** grain; **t** tola; and **TL** tael.

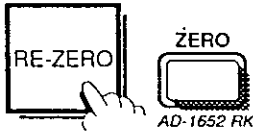
**6**

Continue enabling the modes using the the **[MODE]** and **[SAMPLE·%]** keys until you have all weighing units desired.

⚠ Remember: *all available weighing units are turned OFF at this point – you will have to select all the units you want to use!*

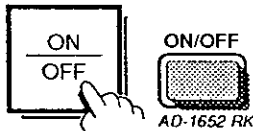


**7**



- ▶ When you have the units you want, press the **[RE-ZERO]** (**[ZERO]** on the AD-1652 Remote) key to save any changes and exit to the weighing mode.

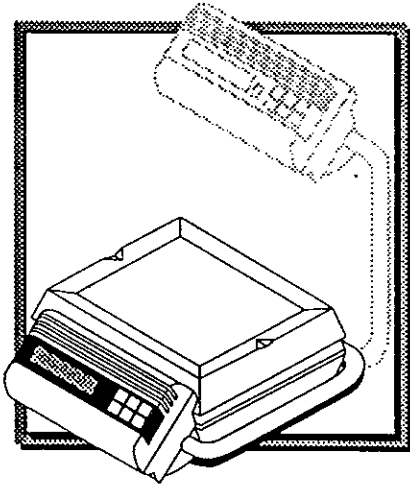
— or —



- ▶ Or, if you want to exit without saving any changes: press the **[ON/OFF]** key to exit without saving and go to display OFF state.

## Weighing Units and Their Conversions

Abbrev.	Name In Full	Conversion
OZ	Ounce (Avoir)	28.349 523 125g
OZt	Troy Ounce	31.103 476 8g
dwt	Pennyweight	1.555 173 84g
ct	Metric Carat	0.2g (5 = 1 gram)
mm	Momme (Japan)	3.75g (10 = 1 Tael)
GN	Grain (UK)	0.064 798 91g
t	Tola (India)	11.663 803 8g
TL	Tael (Taiwan)	37.5g
TL	Tael (Sing.)	37.793g
TL	Tael (HK)	37.437g
TL	Tael (China)	31.25g



**FP Series • Section C**

Calibration



# About Calibration



Calibration of the FP is required when it is initially installed; if it is moved often; or if it is moved a substantial distance. Calibration is also necessary in regular balance maintenance due to normal mechanical wear-and-tear, changes in seasonal temperature, humidity, air pressure, etc.



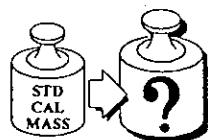
The FP must be warmed up (plugged in) for at least 1 hour before starting calibration.

During calibration, the weighing system must be kept stable for accurate adjustment



Calibration is a very important to the accuracy of your FP balance. Just as a musician must have one true *tone* to tune his instrument, the FP balance needs a true *weight* to tune itself. This calibration is done by giving it a base point (ZERO) – and establishing what its full capacity (SPAN) weight should feel like. Since SPAN is normally the balance's maximum capacity, the balance now has two precise extreme points: zero and full capacity. It can now accurately calculate all amounts in-between. If you know the exact weight of your calibration mass, within  $\pm 0.15\text{g}$  (FP-6000/62000) or  $\pm 1.5\text{g}$  (FP-12K), you may enter it into memory by following the procedure on page C•4

• CALIBRATION MASS WEIGHTS •			
	FP-6000 FP-6200		5kg
	FP-12K		10kg




☐ If you wish to use a calibrating mass different then listed above, please use a mass as close to the scale's maximum capacity as possible. The closer to maximum capacity, the more accurate the calibration. You may increase or decrease the size by 1kg and adjust to  $\pm 0.15\text{g}$  (FP-6000/62000) or  $\pm 1.5\text{g}$  (FP-12K) by following the procedure on page C•4.

• CALIBRATION MASS WEIGHT MAY BE CHANGED TO: •			
FP-6000 FP-6200		to	by 1kg
FP-12K		to	by 1kg

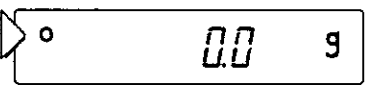
# Calibration Procedure

START

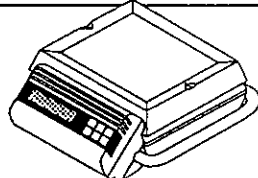
 The balance should be ON for 1 hour before starting!

**1**

- Start with the display ON and stable.



- Make sure that there is nothing on the weighing pan, or touching it for ZERO Calibration



**2**

zero calibration

- Press the **CAL** key
- 'CAL 0' is displayed for a few moments while the balance stabilizes
- When the balance has stabilized, the '◀' mark will come ON for a few moments, indicating that zero is being registered
- When the balance has registered zero, the display will show the current calibration mass for span calibration

**CAL**


**CAL 0**

**CAL 0**

**500000** FP-6000  
FP-6200

or

**100000** FP-12K

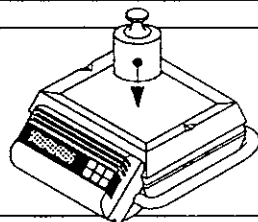
 If you want to exit now: press the **RE-ZERO** key and the display returns to normal

*from next page* **A**

**3**

span calibration

- Place the CAL mass (same weight as display shows) on the middle of the weighing pan
- When the balance has stabilized, the '◀' mark will come ON for a few moments,
- When the balance has registered span, the display will show 'CAL End'

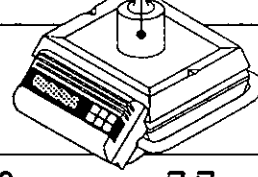


**CAL F**

**CAL End**

**4**

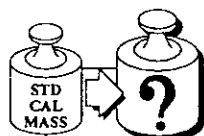
- Remove the CAL mass
- The display will blank for a few moments, then return to normal weighing



**0.00 g**

END

# To Change the Calibration Mass Value



See page C-2

If you want to: • Enter the exact CAL mass value or  
• Change the set CAL mass value calibration

START

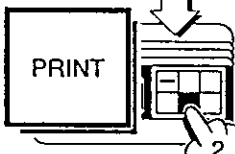
1

▶ Press the **CAL** key, and then immediately press the **PRINT** key

○ The currently set CAL mass value will be displayed, in this example: '10,000.0g'



CAL 0

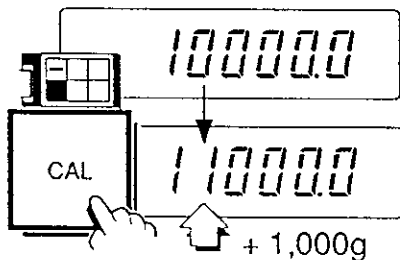


100000

\*10,000g is shown for a FP-12K

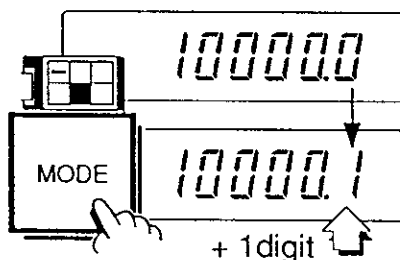
2

▶ Press the **CAL** key to increase value by 1,000g



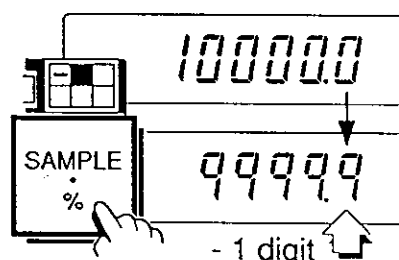
+ 1,000g

▶ Press the **MODE** key to increase the value by 1 digit\*



+ 1digit

▶ Press the **SAMPLE-%** key to decrease value by 1 digit\*



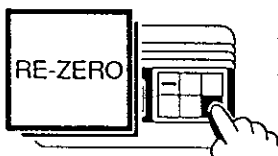
- 1 digit

⚠ Use the **ON/OFF** key to exit at any time without saving changes

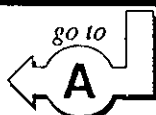
\*The **MODE** and **SAMPLE-%** keys change the value by 1 digit: •0.1g for the FP-12K or •0.01g for the FP-6000 and FP62000

3

▶ Press the **RE-ZERO** key to save the changes. The value is kept in memory and does not have to be set again.



CAL 0

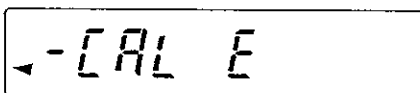


on the previous page



## Calibration Errors

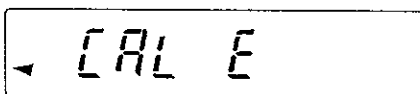
### CAL Mass Error:



'-CAL E' will be displayed if the calibration mass is too light.

- Check the mass weight, look for something touching the weighing pan.

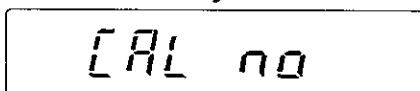
### CAL Mass Error:



'CAL E' will be displayed if the calibration mass is too heavy.

- Check the mass weight, look for something touching the weighing pan.

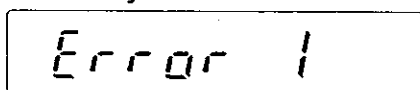
### CAL Stability Error:



'CAL no' will be displayed if the balance can not become stable while weighing the calibration mass.

- Check for excessive vibrations or drafts. Press the **[RE-ZERO]** key and see BEST CONDITIONS FOR WEIGHING, p. A•2.

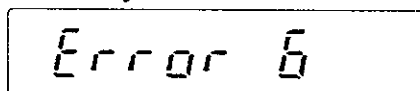
### Stability Error:



'Error 1' will be displayed if the balance can not become stable while calibrating.

- Check for excessive vibrations or drafts. Press the **[RE-ZERO]** key and see BEST CONDITIONS FOR WEIGHING, p. A•2.

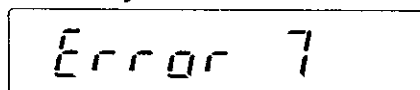
### Memory Error:



'Error 6' will be displayed if the balance has a memory problem.

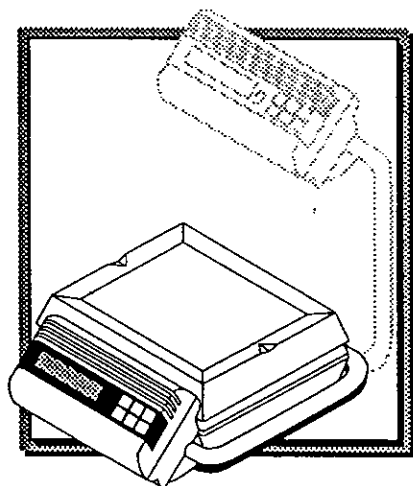
- Disconnect and connect AC power and try again. If error persists, call for service.

### Memory Error:



'Error 7' will be displayed if the balance has a memory problem.

- Disconnect and connect AC power and try again. If error persists, call for service.



**FP Series • Section D**

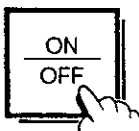
Weighing Mode

# Simple Weighing



For accurate weighing, please warm-up the balance for an hour before using (see page B•2) and try to meet the BEST CONDITIONS FOR WEIGHING (see page B•2).

1



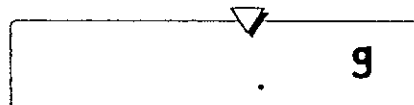
▶ Press the **ON/OFF** key.



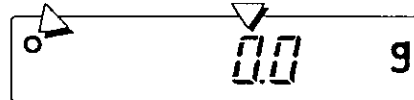
○ The display will come ON with all segments lit;



○ The display will blank for a moment while the balance zero's;



○ Moments later, '0' is displayed, and the 'o' stability indicator will come ON.

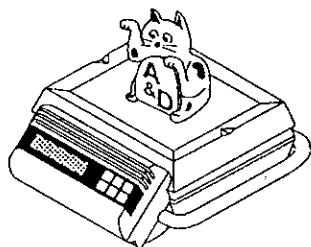
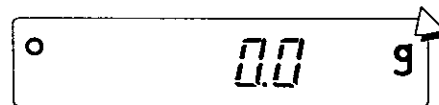


2

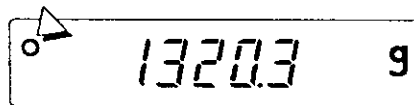


▶ Press the **MODE** key to select a unit if desired.

○ For this example we will leave it at grams.



▶ Place any item(s) on the pan, wait for the round stability indicator to come ON and read the weight.



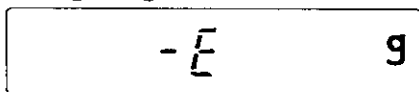
*Wait for Stability!*

## Weighing Errors



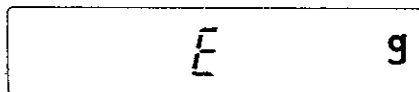
If there are stability problems, the environmental parameters can be adjusted to meet different conditions, please see the C0-Environment parameter group (see page G•5).

□ Weighing Pan Error:

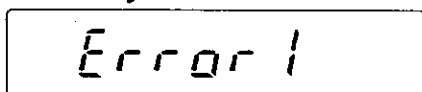


○ '-E' will be displayed if the the weighing pan or pan support are not mounted.

□ Overload Error:

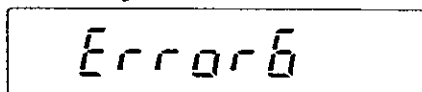


○ 'E' will be displayed if the weight is beyond the balance capacity.

**Stability Error:**A rectangular box representing a digital display with the text "Error 1" in a seven-segment font.

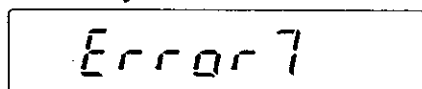
'Error 1' will be displayed if the balance can not become stable while weighing.

- ▶ Check for excessive vibrations or drafts. Press the **[RE-ZERO]** key and see BEST CONDITIONS FOR WEIGHING, p. A-2.

 **Memory Error:**A rectangular box representing a digital display with the text "Error 6" in a seven-segment font.

'Error 6' will be displayed if the balance has a memory problem.

- ▶ Disconnect and connect AC power and try again. If error persists, call for service.

 **Memory Error:**A rectangular box representing a digital display with the text "Error 7" in a seven-segment font.

'Error 7' will be displayed if the balance has a memory problem.

- ▶ Disconnect and connect AC power and try again. If error persists, call for service.

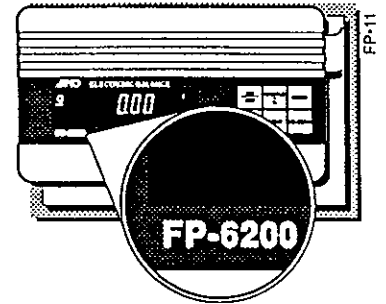


# To FP-6200 Owners:



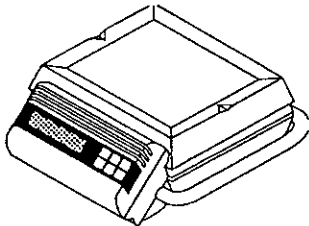
The FP-6200 is a dual range balance. What this means is that: if you are weighing an object under 1kg (2.2 lb) the balance has the capacity for two-place decimal display '0.00'. When you are weighing objects over 1kg (2.2 lb) the balance goes to one-place decimal display '0.0'.

The catch is that: once you have gone over 1kg (2.2 lb) and the balance has gone to one-place decimal display '0.0', the display will stay that way until you press the **RE-ZERO** key.

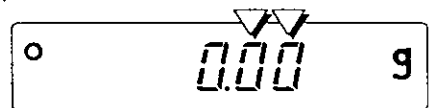


## Example:

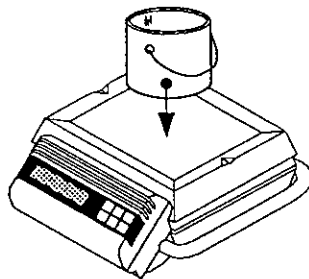
1



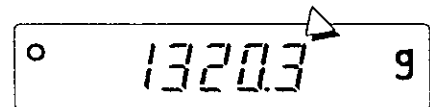
- When the balance comes ON, the display is two decimal places.



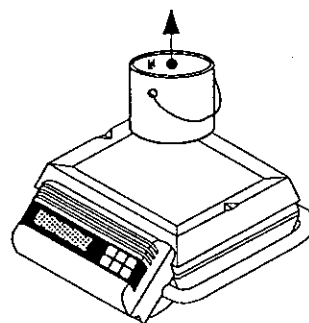
2



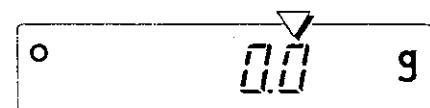
- ▣ Place something on the balance that weighs over 1kg (2.2 lb).
- The display will change to one decimal place.



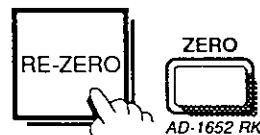
3



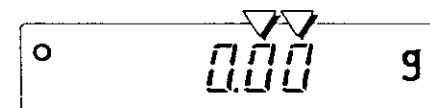
- ▣ Remove the object and the display stays at one decimal place.



4



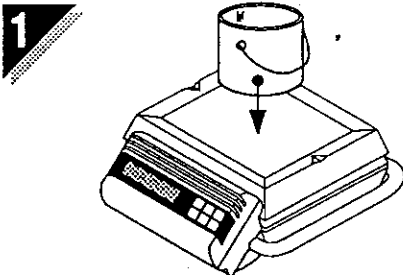
- ▣ With the weighing pan empty, press the **RE-ZERO** (**ZERO** on the AD-1652 Remote) key to move the display back to two decimal places.



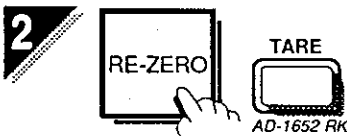
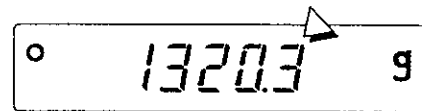
- The display will stay this way until you weigh something again that is over 1kg (2.2 lb). ▣

# Using RE-ZERO to Tare (or TARE key on RK)

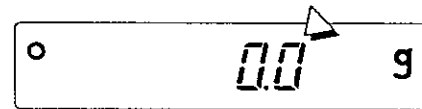
## Weighing into a Container



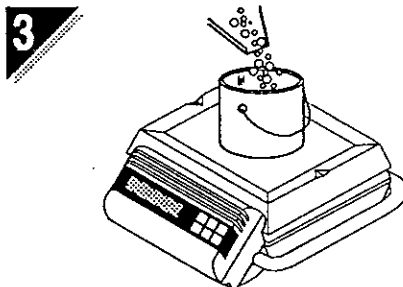
- ▶ Place a container on the weighing pan.
- The display will show the container weight.



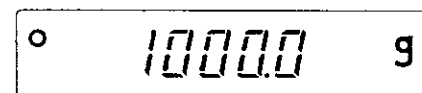
- ▶ Press the **RE-ZERO** (**TARE** on the AD-1652 Remote) to cancel the weight.
- The display goes to zero.



- ⚠ When using the AD-1652 Remote Control **TARE** key, the Net/Gross Indicator will come ON.



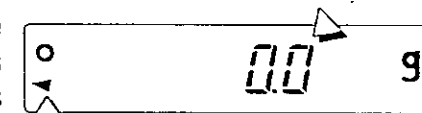
- ▶ Fill the container until the target weight is reached. •When adding more than one ingredient to the container, press the **RE-ZERO** key after each.



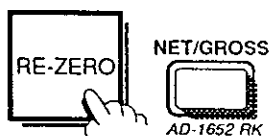
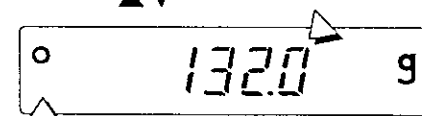
## When Using the AD-1652 RK TARE key...



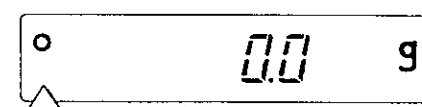
- ⚠ When using the AD-1652 Remote Control **TARE** key, the Net/Gross Indicator will come ON when weight is canceled.



- ⚠ The **NET/GROSS** key switches the display between Net and Gross mode.

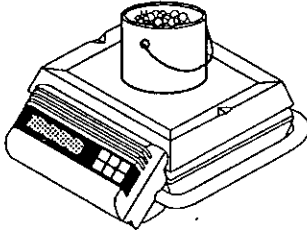


- ⚠ To clear the tare, press the **RE-ZERO** or the **NET/GROSS** key when the weighing pan is empty.

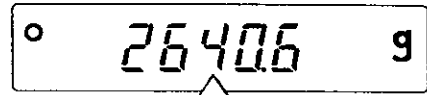


## Weighing Out of a Container

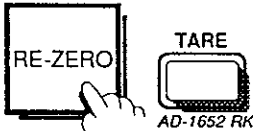
**1**



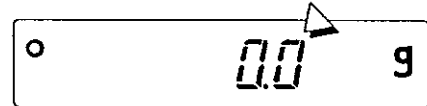
- ▶ Place a full container on the weighing pan.
- The display will show the weight of the container and its contents.



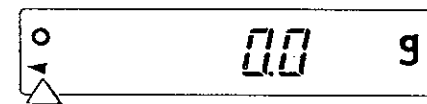
**2**



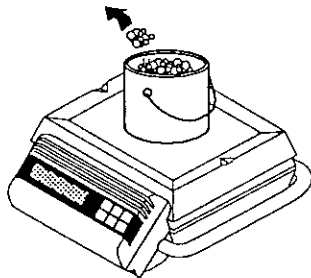
- ▶ Press the **RE-ZERO** (**TARE** on the AD-1652 Remote) to cancel the weight.
- The display goes to zero.



- ⚠ When using the AD-1652 Remote Control **TARE** key, the Net/Gross Indicator will come ON.



**3**

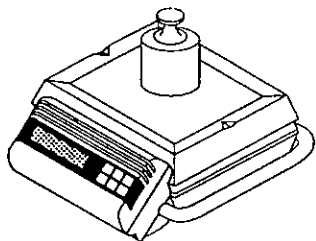


- ▶ Remove the amount shown by the negative display until the target weight is reached.
- When subtracting more than one ingredient to the container, press the **RE-ZERO** key after each.



## Deviational Weighing (Difference from an Ideal)

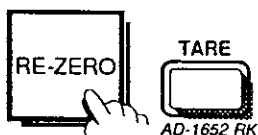
1



- ▶ Place a reference object (an ideal) on the weighing pan.
- In this case, an object that will be weighed next should ideally weigh 500g.

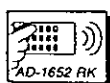
○ 500.0 g

2



- ▶ Press the **RE-ZERO** (**TARE**) on the AD-1652 Remote to cancel the weight.
- The display goes to zero.

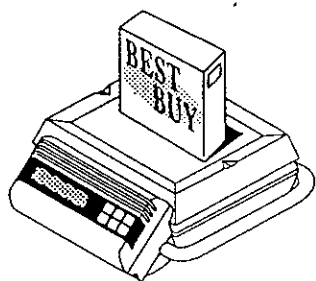
○ 0.0 g



- ⚠ When using the AD-1652 Remote Control **TARE** key, the Net/Gross Indicator will come ON.

○ 0.0 g

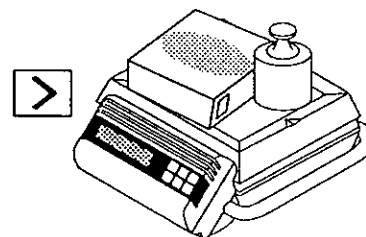
3



- ▶ Comparative objects will now show their deviation from the reference weight (zero) by a plus or minus weight.
- The box is -0.8g under the ideal weight of 500g.

○ -0.8 g

- ⚠ If you want to cancel the weight of the box, you would also put an empty box on the weighing pan in Step 1).







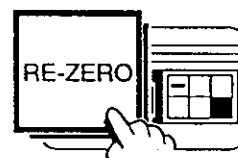
# NET and GROSS Weight Notes


 **NET Weight = GROSS Weight – TARE Weight.**

## RE-ZERO:

 RE-ZEROing returns the balance to ZERO and then goes to GROSS mode up to the maximum capacity of the balance.


 The **RE-ZERO** key on the FP balance front panel serves the double purpose of ZEROing the balance, and allowing you to TARE up to the capacity of the balance. In effect, serving as both **ZERO**<sup>R</sup> and **TARE**<sup>R</sup> key on the Remote Keyboard.




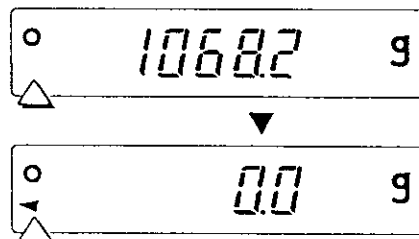
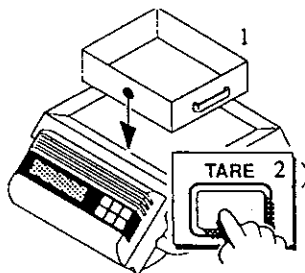
 You may also RE-ZERO by transmitting the 'R' RE-ZERO command via the RS-232C.




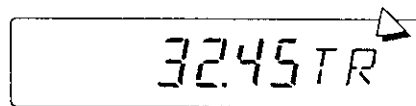
## TARE:


 TAREing returns the display to "0" and then goes to NET mode, up to the maximum capacity of the balance. The **TARE**<sup>R</sup> key (or command) is ignored if the TARE would be less than then ZERO.

 TARE by pressing the AD-1652 Remote Keyboard **TARE**<sup>R</sup> key while an object is on the weighing pan. See page H•5.






 Or, input digitally by using the **FUNC**<sup>R</sup> **TARE WT.** 10-key sequence on the AD-1652 Remote. See page H•5.



 Transmitting the proper TARE, or TARE WT. code through the RS-232C (OP-03).



-  When the display is in percentage or counting mode, the tare weight is set in grams. In other units, the TARE weight is set in which ever unit is on the display.
-  After you enter the TARE in one weight unit and then change the weighing unit, the TARE weight will be converted into the new unit. For example: TARE weight of 10.0g is displayed as 50.0ct in carat mode.
-  You cannot set the TARE weight over the capacity, or negatively.

## ZERO:



- ❑ In the GROSS mode, ZEROing returns the balance to the center of ZERO when the weighing pan is empty and within  $\pm 2\%$  of balance capacity.
- ❑ In the NET mode, ZEROing will display the Tare weight as a negative display.



ZERO by using the AD-1652 Remote **ZERO** key. See page H-6.



*Balance won't ZERO?* ▶ Calibrate your balance: see Section C.



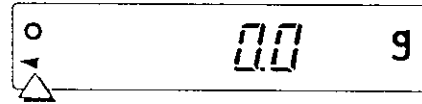
You may also ZERO by transmitting the 'Z' ZERO command via the RS-232C.



## When a TARE Weight has been entered:



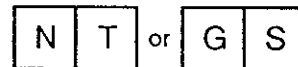
When using the **TARE** key, the Net/Gross Indicator will come ON when weight is cancelled.

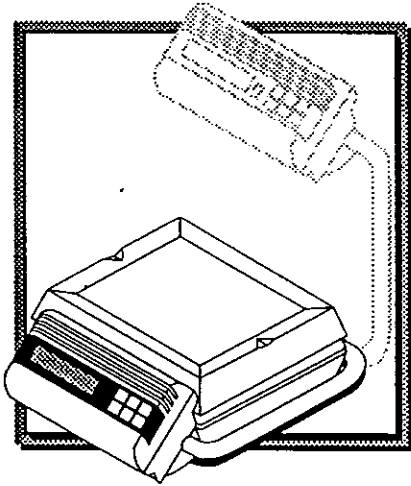


The **NET/GROSS** key switches the display between Net and Gross mode.



Send a 'NT' command (NET) or a 'GS' command (GROSS) via the RS-232C.





## FP Series • Section E

# Counting Mode

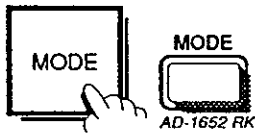
# 'cnt' Counting Mode



The FP balance counts by calculating the average weight of one piece-weight called the **unit weight**, then applying it to the total weight of what you are trying to count. A&D has added exclusive software called **ACAI™ Automatic Counting Accuracy Improvement** that constantly updates the unit weight. It is explained on page E-5.

**1**

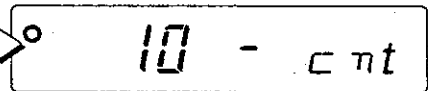
▶ Select "cnt" with the **MODE** key.



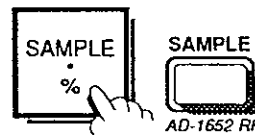
a) If you see this display, then a previous count weight has been entered, continue to Step 2.



b) If you see this display: continue from Step 3.



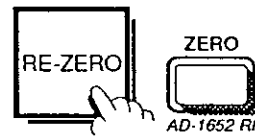
**2**



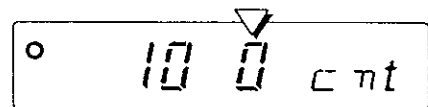
▶ Press the **SAMPLE%** key (also see step 1b).  
 ○ "10 0 cnt" will be displayed.



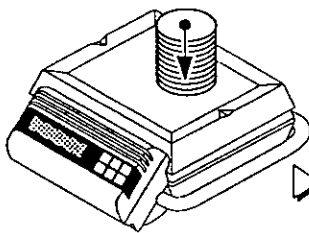
**3**



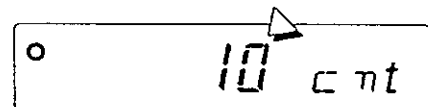
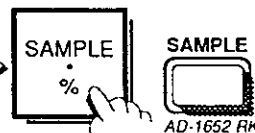
▶ Press the **RE-ZERO** key to ZERO the display.



**4**



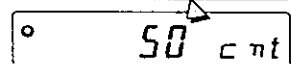
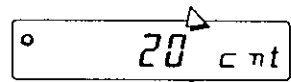
▶ Place 10 units on the pan: and press the **SAMPLE%** key.



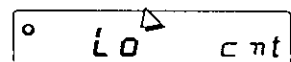
○ "10 cnt" will be displayed indicating the samples you have on the pan.




If 20, 50 or 100 is displayed, the balance has decided that 10 units are not enough for accurate counting (see following **Weight Table**). If so, you must hand count the sample number called for, onto the pan.

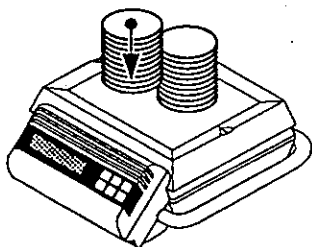


○ 'Lo cnt' will be displayed if the unit weight is too small: less than 0.1g for the FP-60/6200 or 1.0 for the FP-12K. the display will return to the "10 - cnt" display.



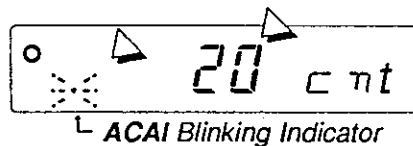
	Sample Size Display	Minimum Sample Weight Range	
		FP-60/6200	FP-12K
	20	1.0g to 0.6g	10.0g to 6.0g
	50	0.6g to 0.4g	6.0g to 4.0g
	100	0.4g to 0.1g	4.0g to 1.0g
	Lo	1.0g and under	10.0g and under

5



- Now, to activate the **ACAI**, you will need to *approximately* double the sample. The number you add can be an estimate, but must be between 3 and 16 additional units (see following **ACAI Table** just below ).
- ▣ For this example we will add 10 more units (double the sample).

- "20 cnt" will be displayed and the **ACAI** indicator (the first ".") should blink three times (then stay OFF) meaning count was within the **ACAI** range.



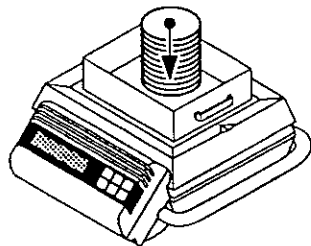
6

At this point please refer to the **ACAI Table** above, or the following section: **ACAI OPERATION** (p. E-4), concerning the number of sample pieces that need to be added to satisfy **ACAI**. A rule of thumb is to approximately double the previous count until you reach your target. Make sure that the **ACAI** indicator blinks as you build. When you have reached your target, use the balance to count.

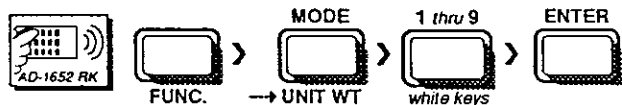
**ACAI Table** The table below shows that with an approximate number of sample unit "Pcs" on the weighing pan - to keep **ACAI** working, you add more units within the **ACAI** Addition Range shown, you don't have to be exact.

Pcs On the Weighing Pan	ACAI Addition Range	
10	13 → 26	60..... 63 → 108
20	23 → 47	70..... 73 → 118
30	33 → 65	80..... 83 → 128
40	43 → 81	90..... 93 → 128
50	53 → 95	100..... 103 → 148
		over 100..... 104 → ...

## Counting Mode Notes

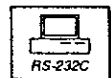



If you want to use a tared container: Load the container before pressing the **RE-ZERO** key in Step 3 (you may also use the **ZERO**<sup>®</sup> or **TARE**<sup>®</sup> key on the AD-1652 Remote Key-board).



**Example:** 123.4g as unit weight

⚠ unit weight can only be set in grams, and ACAI does not operate.

- 
  - The Unit weight can also be set digitally using the optional Serial Interface OP-03, described on page K-12. *Unit weight can only be set in grams and the ACAI will not operate.*
- 
  - The unit weight memory is non-volatile, even though the AC adaptor is disconnected, so unit weight is remembered (except: if you turn weighing units OFF or ON as described on page B-4). **TV**

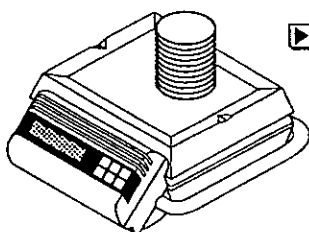
# Using ACAI



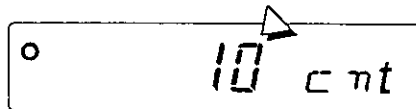
⚠ Do not take any pieces off until the end of the **ACAI** procedure. If you do, **ACAI** will stop operating and you will have to start again to use the **ACAI**. If you are unfamiliar with **ACAI**, please read the next section before you start, page E-5

⚠ You don't have to count out the pieces when you add, just stay within the **ACAI** range.

**1**

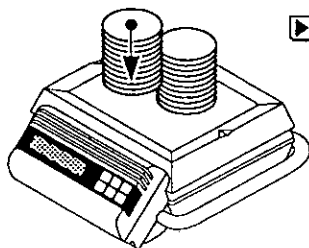


▶ To start **ACAI** operation, unit weight must be registered and the sample still on the weighing pan.

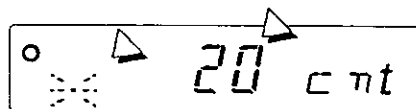


⚠ We are at the same place as Step 5 on page E-2.

**2**

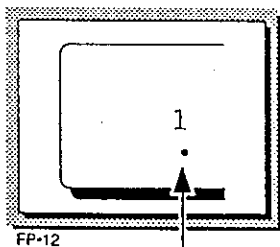


▶ Add pieces within the nearest **ACAI** range (see table). A good rule of thumb is to *approximately* double the amount on the weighing pan.

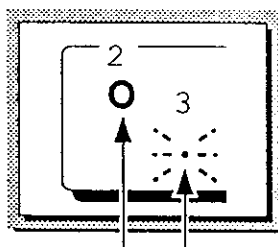


⚠ ACAI Blinking Indicator

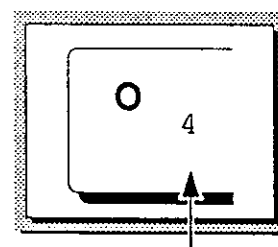
Pcs On the Weighing Pan	ACAI Addition Range	
10	13 → 26	60..... 63 → 108
20	23 → 47	70..... 73 → 118
30	33 → 65	80..... 83 → 128
40	43 → 81	90..... 93 → 128
50	53 → 95	100..... 103 → 148
		over 100..... 104 → ...



As you add, the **ACAI** indicator will be ON 1 as long as you are in range.



When you stop adding, 2 the stable indicator comes ON, 3 the **ACAI** indicator will blink.



After the new unit weight is calculated, the **ACAI** indicator will disappear 4 until you add more.

**3**

▶ Continue adding pieces within the **ACAI** range until you have reached a sample size as large as the largest number of pieces that you will be counting. For example, if you are going to be counting up to 300 bolts, follow the **ACAI** procedure until you have over 300 pieces on the weighing pan.

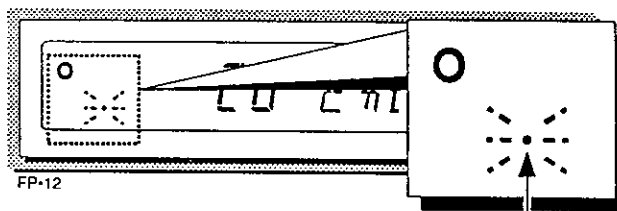
▶ When you have added the maximum number of pieces required, remove the sample pieces and start your counting job.



## ACAI Automatic Counting Accuracy Improvement



The **ACAI™** (Automatic Counting Accuracy Improvement) function re-calculates the unit weight as more pieces are added, to improve count accuracy.



ACAI Indicator

When the balance calculates unit weight from sample pieces, the more sample pieces that are used, the higher the accuracy. For example: let's say that you use 10 pieces as your sample and the unit weight calculated by the balance from your sample is 1g. Using the **ACAI** feature, after loading on 200 pieces, the balance determines that the average unit weight is really 0.98g instead of 1g. This is improved accuracy and could make a big difference when you are counting thousands of pieces.

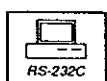
You need to stay within the **ACAI** counting range as you add more pieces. But this is easy to do and only needs to be done once, up to 500 pieces. After that, the **ACAI** remembers the most accurate unit weight.

If you set the unit weight digitally, by using the optional AD-1652 Remote Keyboard or by computer via the serial interface, the **ACAI** function will not operate.



## ACAI Notes

- You must do the **ACAI** procedure just after you set the unit weight. *Samples must be still on the weighing pan.*
- Do not take the samples off until the end of the **ACAI** procedure.
- You don't have to count out the pieces when you add, just stay within the **ACAI** range.
- Continue the **ACAI** procedure to reach the largest amount that you will be counting (or 500 pieces).
- If you want the most precise counting results every time you count different batches of the same item, use **ACAI** every time you start counting the next batch (in other words, if you are counting to 100, start with approximately 10 pieces and then when you add, approximately double the amount until you get to 100).



⚠ *The **ACAI** function DOES NOT work when the unit weight is set digitally by the optional AD-1652 Remote Keyboard, or using a computer via the Serial Interface OP-03.*

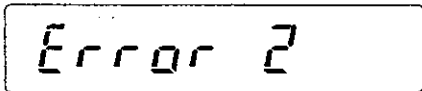
## Counting Errors

- Count Sample too light:** 'Lo cnt' will be displayed if the unit weight is too small. The display will show 'Lo' and returns to the "10 - cnt" display.



- Unit weight is less than 0.1g for the FP-6000/6200 or 1.0g for the FP-12K.

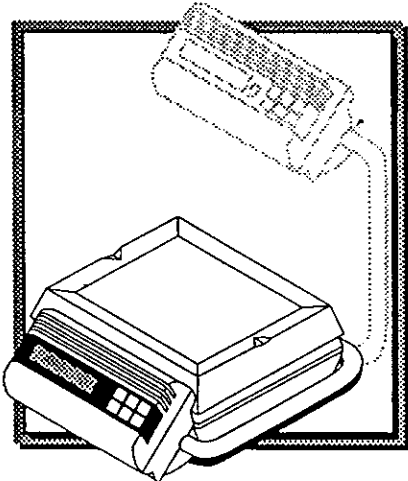
- Stability Error:**



'Error 2' will be displayed if the balance can not become stable while registering the unit weight.

- Check for excessive vibrations or drafts. Press the **RE-ZERO** key and see BEST CONDITIONS FOR WEIGHING, p. A•2.





**FP Series • Section F**

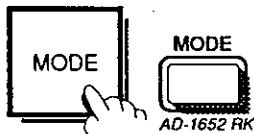
Percent Mode

# 'Pct' Percentage Mode

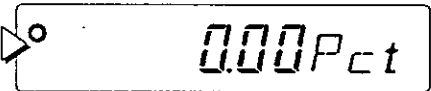


The FP balance contains a percentage mode which will tell you what percentage an item being weighed differs from an ideal weight. This ideal weight is called a '100%' weight. For example: if you have a box of mix that should weigh 500g, you simply register 500g as 100% weight - then when you weigh subsequent boxes, the balance will display what percentage of the 100% weight they are (100% = 500g).

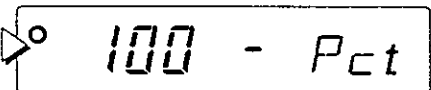
**1** Select "Pct" with the **MODE** key.



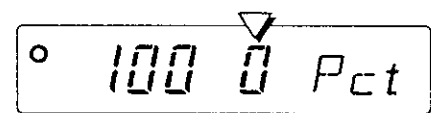
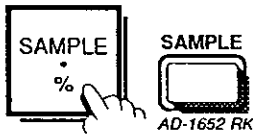
a) If you see this display, then a previous percentage weight has been entered, continue to Step 2.



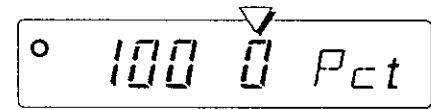
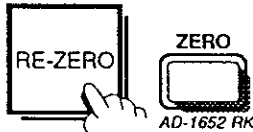
b) If you see this display: continue from Step 3.



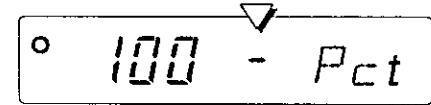
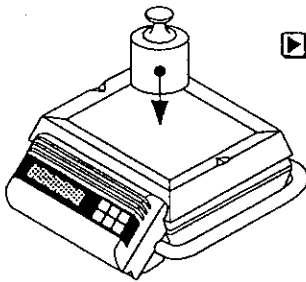
**2** Press the **SAMPLE-%** key (also see step 1b).  
 "100 0 cnt" will be displayed.



**3** Press the **RE-ZERO** key to ZERO the display.

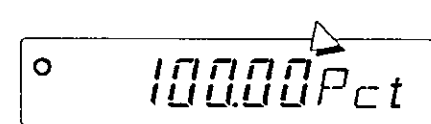
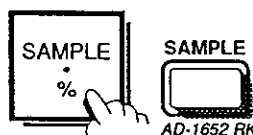



**4** Load the ideal 100% sample.  
 ⚠ 100% weight must be more than 1g for the FP-60/6200 or 10g for the FP-12K.

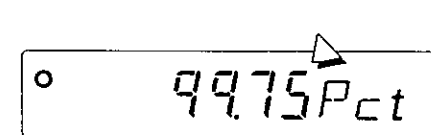
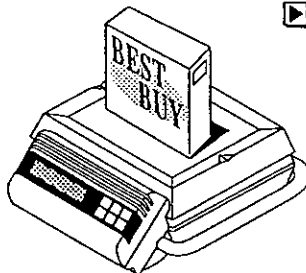


The '0' will go to a '-' to indicate that a sample has been loaded.

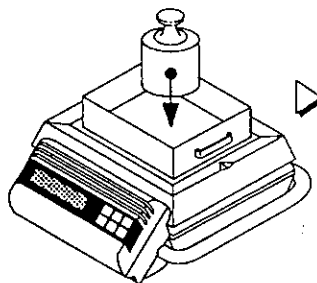
**6** Press the **SAMPLE-%** key.  
 "100 pct" will be displayed when the ideal weight has been registered.



**7** Items will now show their deviation from the ideal weight.  
 In this example the box of mix is 99.75% of the ideal, or 0.25% under weight. 

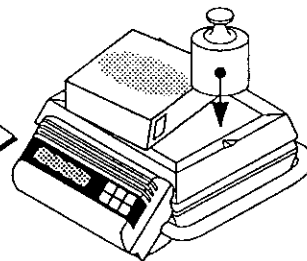


## Percentage Mode Notes

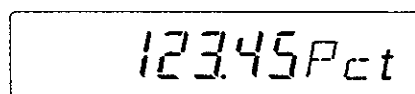


If you want to use a tared container: Load the container before pressing the **RE-ZERO** key in Step 3 (you may also use the **ZERO** or **TARE** key on the AD-1652 Remote Keyboard).

In the box of mix example, load an empty box and zero it in Step 3: So, you are only looking at the content weight.



**Example:**  
123.45g\*  
as 100% weight



⚠ 100% weight can only be entered in grams.

\* The FP-60/6200 allows two-place 123.45g, the FP-12K allows only 1. Any digits beyond that will be drop



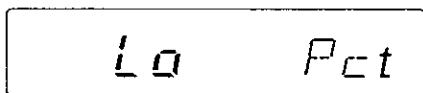
- ❑ The 100% weight can also be set digitally using the optional Serial Interface OP-03, described on page K•12. 100% weight can only be set in grams.



- ❑ The 100% weight memory is non-volatile, even though the AC adaptor is disconnected, so unit weight is remembered (except: if you turn weighing units OFF or ON as described on page B•4).

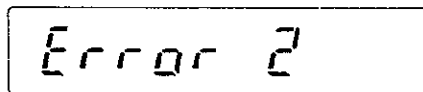
## Percentage Mode Errors

- ❑ Count Sample too light: 'Lo Pct' will be displayed if the unit weight is too small. The display will show 'Lo' and returns to the "100 - Pct" display.



- 100% weight is less than 1g for the FP-6000/6200 or 10g for the FP-12K.

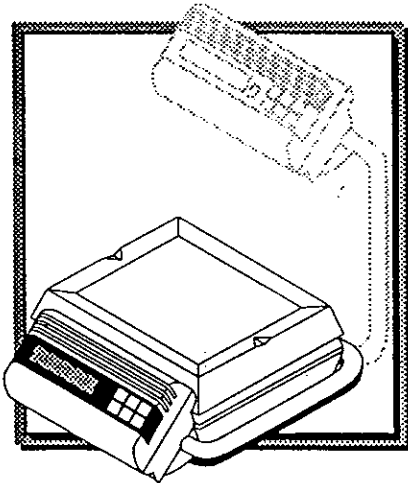
- ❑ Stability Error:



'Error 2' will be displayed if the balance can not become stable while registering the 100% weight.

- Check for excessive vibrations or drafts. Press the **RE-ZERO** key and see BEST CONDITIONS FOR WEIGHING, p. A•2.





## FP Series • Section G

# Internal C-Parameter Settings



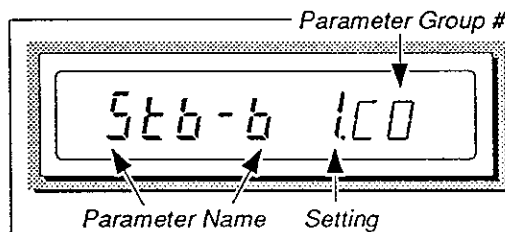
# Internal Parameter C-Functions



Your FP balance has a number of internal software parameters that enable you to select the best weighing features for your needs. These settings control how you want the balance to respond to its environment, various commands, operations and options. An overall C-Parameters table is shown below.

All of the C-Parameters have initial settings from the factory, or possibly from your dealer. You may change these settings easily as you need them, or conditions vary.

C-Parameters can be set using the method as explained in the section CHANGING C-PARAMETERS, page G•3. The individual settings for each group are detailed in the following section THE C-PARAMETERS, page G•5.



○ When you are in the CHANGING C-PARAMETERS mode, the parameter name, its present setting, and the group number is displayed. At that point, you may change the setting, or move to another parameter.

pages:

G•5-6

G•7

G•8-9

G•10

G•11

G•11

G•12

G•13

G•13

	C0 Environment	5t6-b Stability Band Width	5t6-t Stability Dec. Time	FLt-b Ave. Band Width	C0nd Response/Environ.	trc Zero Tracking	
	C1 Display	d1SP Blanking Digit	P0int Decimal Display	P-on Auto Start Func			
	C2 Data Output	Pr int Data Out Mode	AP-P Auto Print Polarity	AP-b Auto Print Band	C0de Send Code No.	PAUSE Data Pause	FEED Paper Feed
	C3 Serial Interface	bPS Baud Rate	Cr-LF Terminator	tYPE Data Format	t-UP Receive Time	E-C0d Error Code	
	C4 Auto Re-Zero	Ar-0 Auto Function	Ar-b Band Width	Ar-t Command Interrupt	Ar-d Auto Data Transmil		
	C5 Calibration	CAL CAL Inhibition					
	C6 Comparator Out	CP Comparison Mode	CP-0 Comp. Near Zero	bEEP- Buzzer LO	bEEP- Buzzer GO	bEEP- Buzzer HI	
	C7 AD-1652 RK ID	id Remote Keybd. ID					
	C8 Param. Protect	PF Parameters Protect					

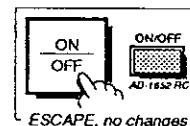
FP-13

# Changing C-Parameter Settings

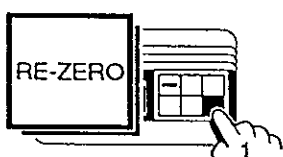


❑ The C-Parameters can't be changed when the memory is protected by "PF" C8 group, page G•13. If this parameter is set to 'protect', PF 1CB, change to PF 2CB.

❑ You can escape without saving any changes, at any time, by pressing the o key.



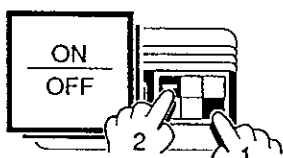
1



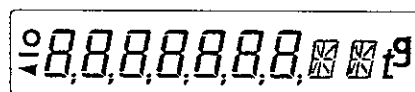
▶ With the display OFF: Press and hold the r key.



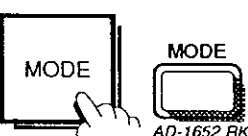
2



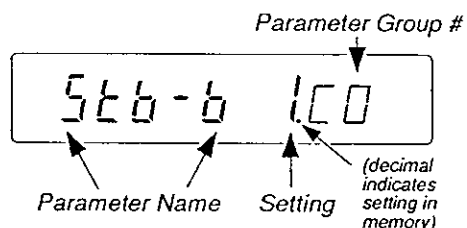
▶ While holding r, press the o key.  
 ○ All display segments will come ON.



3

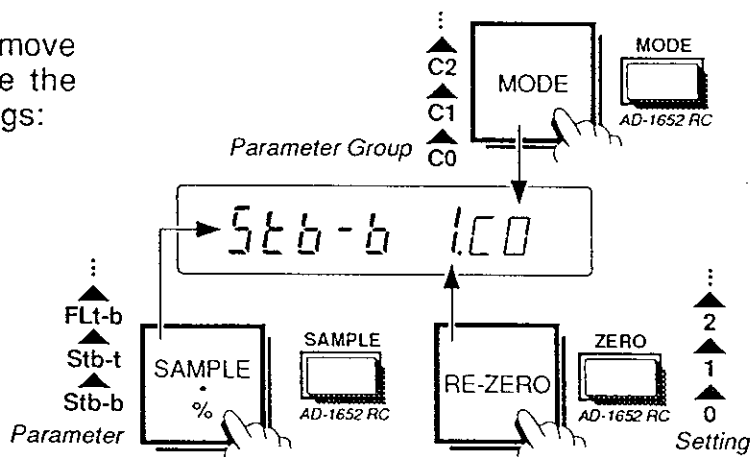


▶ Press the m key to move to C-Parameter Settings mode (see p. G•2 for listings).  
 ○ The software version number will be displayed briefly, then the first **Parameter Name, Setting and Group Number** will be displayed.



4

▶ Use these keys to move through, or change the C-Parameter settings:

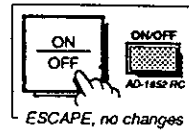


⚠ The decimal point appears to indicate the value that is presently stored in memory.

⚠ **Parameter Names, Settings and Group Numbers** will loop. So if you miss a setting by pressing once too much, keep going until it comes around again.



□ Remember that you can escape at any time *without saving any changes*, by pressing the o key.



5



▣ When you have finished: Press the p key to save the changes and exit to the weighing mode.

# The C-Parameter Settings

Parameter Abbreviation  
(As seen on Balance Display)

Parameter Name

<input type="checkbox"/> Stb-b	X c0	Stability Band Width	
*.* Indicates Factory Setting	0.	± 0.5 digits	FC00:0
	1	± 1 digits	FC00:1

Parameter Group Number      Parameter Setting      Parameter Setting Definition      RS-232C FC Number

## C0 • Environment

<input type="checkbox"/> Stb-b	X c0	Stability Band Width
NOTE: The Stability Indicator turns ON when display deviation is within the range set by "Stb-b" and that continues for the time set by "Stb-t". These choices will also affect the judgement for the Auto-Print timing.		

Stb-b

0.	Stable when within ± 0.5 digits	FC00:0
1	Stable when within ± 1 digit	FC00:1
2	Stable when within ± 2 digits	FC00:2
3	Stable when within ± 3 digits	FC00:3

<input type="checkbox"/> Stb-t	X c0	Stability Detection Time
NOTE: The Stability Indicator turns ON when display deviation is within the range set by "Stb-b" and that continues for the time set by "Stb-t". These choices will also affect the judgement for the Auto-Print timing.		

Stb-t

0.	0.5 seconds	FC01:0
1	1 second	FC01:1
2	2 seconds	FC01:2
3	3 seconds	FC01:3



<input type="checkbox"/> FLt-b	Xco	Average Band Width	
FLt-b	0	Narrow Band / Good Environment	FC02:0
	1	Mid-Narrow	FC02:1
	2	Normal	FC02:2
	3	Wide Band / Bad Environment	FC02:3

<input type="checkbox"/> Cond	Xco	Response / Environment	
Cond	0	Fast Response / Good Environment	FC03:0
	1	Mid-Fast Response	FC03:1
	2	Normal	FC03:2
	3	Slow Response / Bad Environment	FC03:3

<input type="checkbox"/> trc	Xco	Zero Tracking Detection Time	
trc		NOTE: The balance traces a zero-drift caused by the change of temperature, humidity, air pressure, etc., and stabilizes the ZERO point. Display continues ZERO if the drift is less than 1 digit (0.1/0.01g) per time decided by 'trc' parameter. If weighing very light samples, select a smaller number.	
	0	ZERO tracking OFF	FC04:0
	1	Long (Weak Tracking)	FC04:1
	2	Normal	FC04:2
	3	Short (Strong Tracking)	FC04:3

## C1 • Display

<input type="checkbox"/> dISP	Xc1	<b>Blanking Digit</b> NOTE: You can blank the last digit if it is never used.
-------------------------------	-----	--

*dISP*

0	Normal (no blanking)	FC11:0
1	Always blank the last digit	FC11:1
2	Last digit blanks if unstable	FC11:2

<input type="checkbox"/> Point	Xc1	<b>Decimal Point Display</b>
--------------------------------	-----	------------------------------

*Point*

0	Point (.)	FC12:0
1	Comma (,)	FC12:1

<input type="checkbox"/> P-on	Xc1	<b>Auto Start Function</b>
-------------------------------	-----	----------------------------

*P-on*

0	No Auto start	FC13:0
1	Auto Start (You don't have to press the ON/OFF key to start weighing, the display will come ON when power is supplied)	FC13:1

## C2 • Data Output

These parameters are used with the options OP-03, or OP-04. Please Sections J and K for more information.

<input type="checkbox"/> Print	Xc2	Data Out Mode	
<b>Print</b>	0	p Key A Mode: p key sends weighing data <i>only</i> if the display is stable. Display will blink when data is transmitted.	FC20:0
	1	p Key B Mode: p key sends weighing data <i>as soon as the display becomes stable</i> . The display will blink when data is transmitted.	FC20:1
	2	Auto Print A mode: Data output if display is over the 'Auto Print Band' " <b>AP-b c2</b> " setting and stable. Polarity by " <b>AP-P c2</b> "	FC20:2
	3	Auto Print B mode: Data output when the difference between the display and the last transmitted data is over the 'Auto Print Band' " <b>AP-b c2</b> " setting and stable. Polarity by " <b>AP-P c2</b> "	FC20:3
	4	Stream Mode: Data output continuously.	FC20:4
	5	Command Mode: Data output is initiated by a request from an external computer or device.	FC20:5

<input type="checkbox"/> AP-P	Xc2	Polarity at Auto Print Mode	
<b>AP-P</b>	0	Send only positive data.	FC21:0
	1	<ul style="list-style-type: none"> <li>• At Auto Print A Mode: both positive and negative data sent.</li> <li>• At Auto Print B Mode: Negative data only</li> </ul>	FC21:1

<input type="checkbox"/> AP-b	Xc2	Auto Print Band	
<b>AP-b</b>	0	10 digits	FC22:0
	1	100 digits	FC22:1
	2	1,000 digits	FC22:2

<input type="checkbox"/> CODE Xc2		Send Code Number	
<b>CODE</b>	0.	No Code Number.	FC23:0
	1	Send Code Number before the weighing result and the code number is increased by 1.	FC23:1

<input type="checkbox"/> PAUSE Xc2		Pause Between Data	
<b>PAUSE</b>	0.	No Pause.	FC24:0
	1	Pause 1 second (NOTE: When AD-8117A compact printer is connected with the FP, set 'PAUSE' to 1 so that printer can print the continuous data).	FC24:1

<input type="checkbox"/> FEED Xc2		Paper Feed	
<b>FEED</b>	0.	No Paper Feed.	FC28:0
	1	Paper Feed, 1 line, after data is sent (NOTE: When AD-8117(A) compact printer is connected with the FP, <CR> and <LF> are sent one second after data, except in stream or command mode).	FC28:1

## C3 • Serial Interface OP-03

These parameters are used with the optional OP-03 RS-232C Serial Interface and Current Loop. Please see Section K.

<input type="checkbox"/> bPS	Xc3	Baud Rate	
bPS	0	600 bps	FC30:0
	1	1200 bps	FC30:1
	2	2400 bps (for AD-8117 & AD-8117A)	FC30:2
	3	4800 bps	FC30:3
	4	9600 bps	FC30:4


<input type="checkbox"/> Cr-LF	Xc3	Terminator	
NOTE: This parameter is applied to both transmitted or received data.			
Cr-LF	0	<CR> <LF>	FC31:0
	1	<CR>	FC31:1

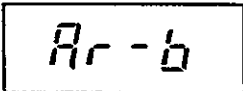
<input type="checkbox"/> tYPE	Xc3	Data Format	
NOTE: Weighing result format can be changed by this parameter. For further information, see DATA FORMAT section (K•7).			
tYPE	0	A&D Standard	FC32:0
	1	AD-8117A format	FC32:1

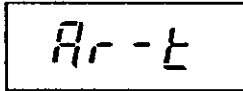
<input type="checkbox"/> t-Up	Xc3	Operation following Command Interruption	
t-Up	0	Received commands are not valid	FC33:0
	1	Waits until terminator is received	FC33:1

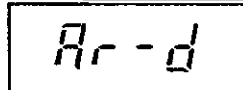
<input type="checkbox"/> E-Cod	Xc3	Error Code at Command Mode	
E-Cod	0	No Error Code	FC34:0
	1	Transmit Error Code (NOTE: The balance transmits Error Code at Command Mode)	FC34:1

## C4 • Auto Re-ZERO Function


<input type="checkbox"/> Ar-0	Xc4	Auto Re-ZERO function near ZERO	
	0	No Auto Re-ZERO	FC40:0
	1	Auto Re-ZERO (NOTE: If display is ZERO $\pm 5$ digits for the time set by "Ar-t Xc3" parameter, re-ZERO will be executed automatically)	FC40:1

<input type="checkbox"/> Ar-t	Xc4	Auto Re-ZERO Band Width	
	0	ZERO when within 5 digits	FC41:0
	1	ZERO when within 10 digit	FC41:1
	2	ZERO when within 50 digits	FC41:2
	3	ZERO when within 100 digits	FC41:3

<input type="checkbox"/> Ar-t	Xc4	Detecting Time for near ZERO	
	0	0.5 seconds	FC42:0
	1	1 second	FC42:1
	2	2 seconds	FC42:2
	3	3 seconds	FC42:3

<input type="checkbox"/> Ar-d	Xc4	Auto Re-ZERO after Weighing Data Transmission	
NOTE: This Auto Re-ZERO is executed only at Key A/B mode, or at Auto Print A/B mode (Print 1 thru 4c2).			
	0	No Auto Re-ZERO after output	FC43:0
	1	Auto Re-ZERO after output	FC43:1

## C5 • Calibration

<input type="checkbox"/> CAL	Xc5	Calibration Enable/Disable	
	0	Calibration is enabled	FC50:0
	1	Calibration is disabled	FC50:1

**C6 • Comparator Output (Requires OP-04)**

<input type="checkbox"/> CP	Xc6	Comparison Mode	
CP	0	Comparator OFF	FC60:0
	1	Compare all Data	FC60:1
	2	Compare Stable or Overload Data	FC60:2

<input type="checkbox"/> CP-0	Xc6	Comparison Nearby ZERO	
CP-0	0	No Compare near ZERO	FC61:0
	1	Compare near ZERO	FC61:1

<input type="checkbox"/> bBEEP_	Xc6	Beeper for LO Limit	
bBEEP-	0	No beep at, or under, LO limit	FC62:0
	1	Beep at , or under,LO limit	FC62:1

<input type="checkbox"/> bBEEP-	Xc6	Beeper for GO Range	
bBEEP-	0	No beep for GO range	FC63:0
	1	Beep for GO range	FC63:1


<input type="checkbox"/> bBEEP-	Xc6	Beeper for HI Limit	
bBEEP-	0	No beep at, or over, HI limit	FC64:0
	1	Beep at, or over, HI limit	FC64:1

## C7 • AD-1652 Remote Keyboard

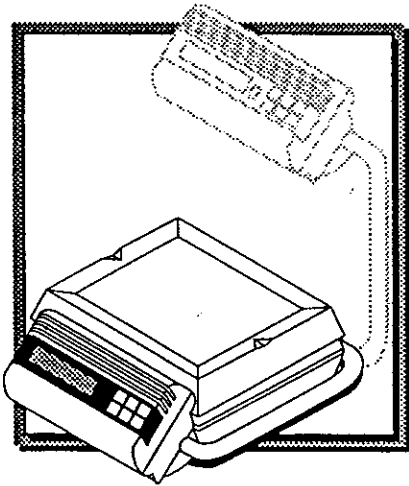
<input type="checkbox"/> id	Xc7	ID Code for Remote Keyboard AD-1652	
id	0	Ignore Remote Keyboard	FC70:0
	1	ID Code Number "1"	FC70:1
	2	ID Code Number "2"	FC70:2
	3	ID Code Number "3"	FC70:3
	4	ID Code Number "4"	FC70:4
	5	ID Code Number "5"	FC70:5
	6	ID Code Number "6"	FC70:6
	7	ID Code Number "7"	FC70:7

## C8 • Others

<input type="checkbox"/> PF	Xc8	Protect the set Parameters	
PF	NOTE: Even when 'PF' is set at "1", you can enter the Parameter Change mode and change the display, but the memories will keep the same value.		
	0	Parameters can be changed	FC80:0
	1	Parameters cannot be changed	FC80:1

Example from page J-11 

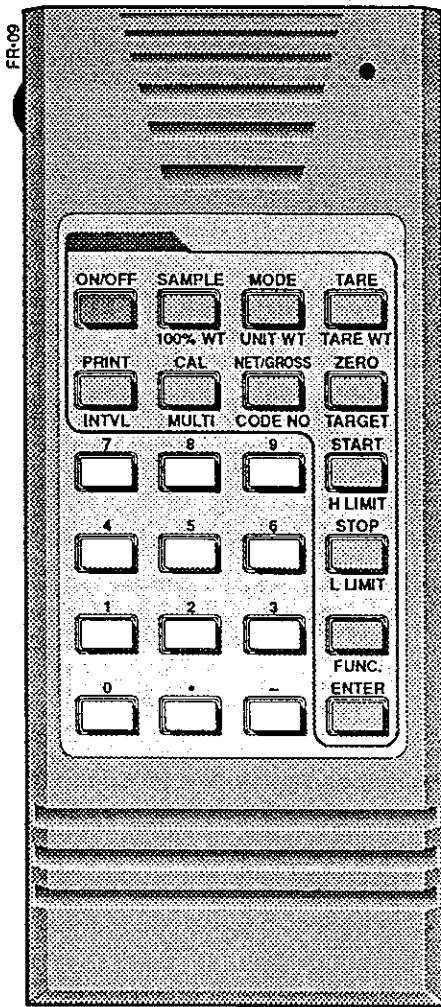




## FP Series • Section H

# AD-1652 Wireless Remote Keyboard

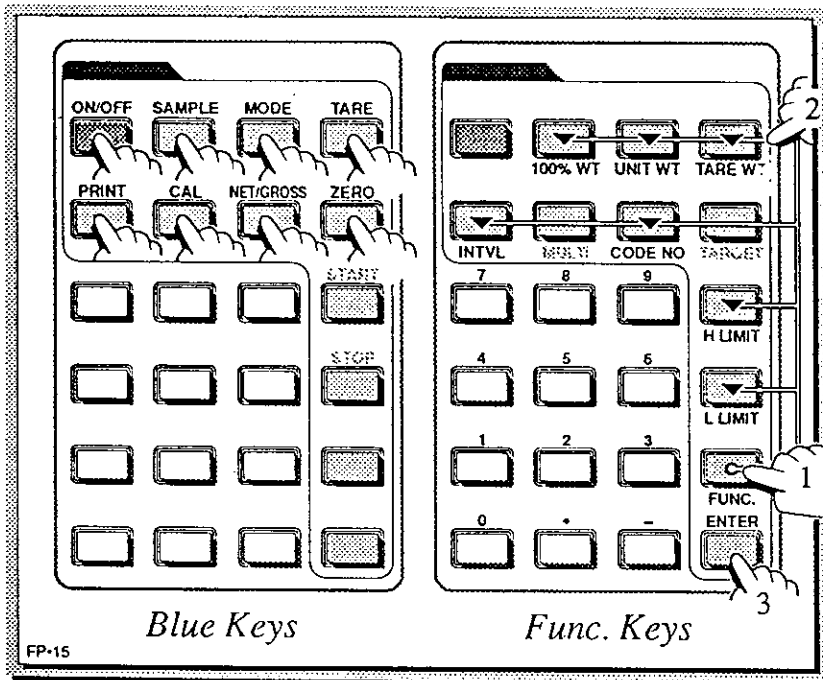
# AD-1652 Remote Keyboard



## AD-1652 WIRELESS REMOTE KEYBOARD Accessory

By using the Wireless Remote Keyboard AD-1652 Accessory, the FP Series Scale can be controlled with a 3m, 60° operating range. You never have to touch the scale itself, avoiding unnecessary vibrations.

Since many scale feature can be controlled by the AD-1652 Remote Keyboard, and digital data can also be entered through the 10-key keys, you greatly simplify the more complicated scale functions.



□ The **Blue-keys** have two modes:

1. When pressed by themselves, the scale does what is printed in black above the key.
2. When the **FUNC** key is pressed first, you may then enter a value for what is printed in blue below the key. In this section, these keys will be described as "F-keys". See the next page.

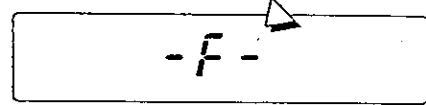
□ The white 10-key pad keys are used to enter number values. In this section, these keys will be shown as: **1 2 3 . 5** keys, or 123.5.

# Entering Values with FUNC. Keys

1



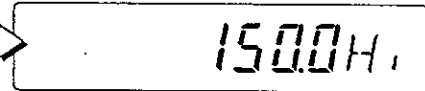
- ▶ Press the **[FUNC]** key.
- "-F-" will be displayed.
- ⚠ Press the **[FUNC]** key again anytime to exit, without saving any changes.



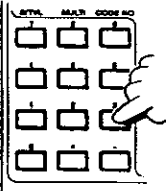
2



- ▶ Press the F-key desired, in this example: the **[H.LIMIT]** key.
- Any previously set value will be displayed, in this example: 150g.



3



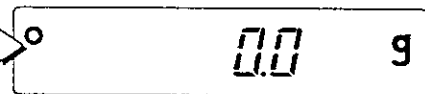
- ▶ Use the 10-key pad to display value to enter.
- In this example: **[2][2][5][0]** keys, high limit 2,250g.



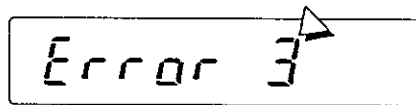
4



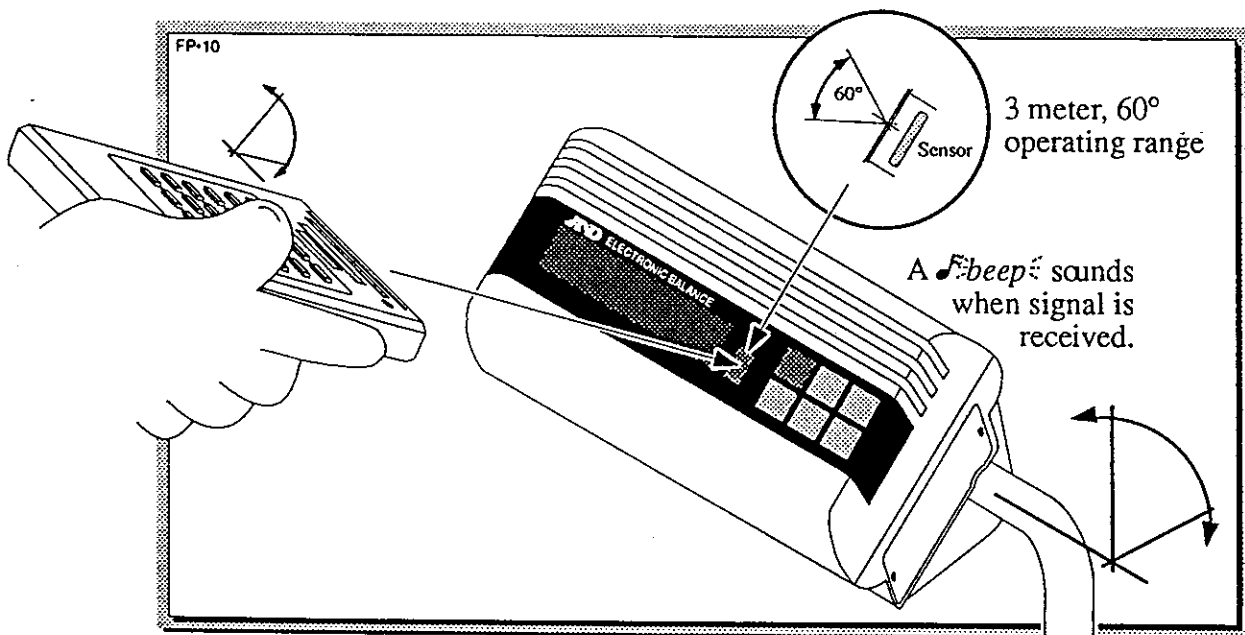
- ▶ Press the **[ENTER]** key to enter the value.
- The display will return to where you left it.



"Error 3" will be displayed if the value entered is out of the range permitted for the function. To return to weighing mode, press any key.

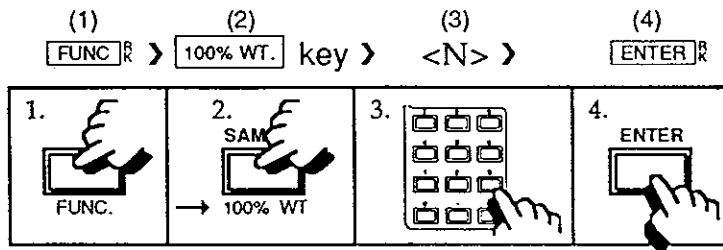


- ⚠ When using the AD-1652 Wireless Remote Keyboard, remember that the scale sensor has a 3-meter, 60° operating range. You will hear a faint *beep* if the key signal has been successfully received.






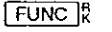
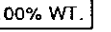

# AD-1652 Keyboard Operation

- ❖ The "□" sections are descriptions of the blue-keys performing the operations printed in black above the keys.
- ❖ The "○" sections are descriptions of the F- key operations printed in blue below the keys. The ">" represents 'next', and <N> represents any number entered onto the display using the 10-key pad. For example:


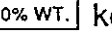



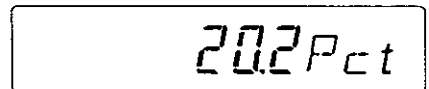
## SAMPLE / 100% WT. Key

→  100% WT. □ The  key can be used to register a sample count (eg: 10 units) in counting "cnt" mode or register 100% in percentage "Pct" mode (when the 100 Pct sample is on the weighing pan).



→  100% WT. □ The  >  key > <N> >  key combination digitally sets the 100 Pct in grams. There will be an error if the entered value is negative.





- ☑ FP-6000, 6200: 1g to 6,100g by 0.01g (*FP-6200 users setting over 1,000g should use 0.1 resolution*)
- ☑ FP-12K: 10g to 12,100g by 0.1g

Example:  >  key > 2 0 . 2 >   
 the scale will enter 20.2g as the 100% weight (if "g" unit weight is being used).

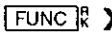
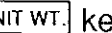



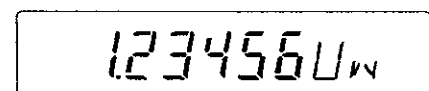
## MODE / UNIT WT. Key

→  UNIT WT. □ The  key switches between the scale weighing modes: g, OZ, OZt, dwt, ct, mm, GN, t, and TL. There is also a percentage mode "Pct", and counting mode "cnt".


→  UNIT WT. □ The  >  key > <N> >  key combination digitally sets the unit weight in grams. There will be an error if the entered value is negative.

- ☑ FP-6000, 6200: 0.010000g to 6,100.00g
- ☑ FP-12K: 0.100000g to 12,100.00g

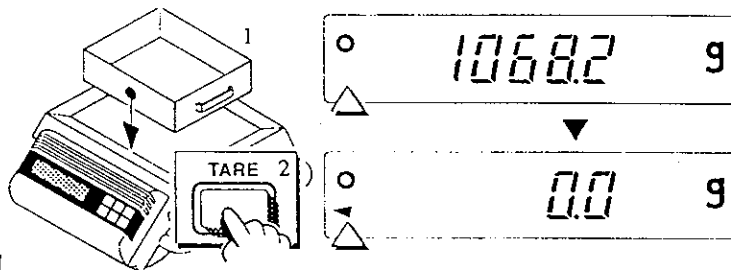
Example:  >  key > 1 . 2 3 4 5 6 >   
 the scale will enter 1.23456g as the unit weight.




## TARE / TARE WT. Key

→  TARE WT.

▶ The **TARE** key re-ZERO's the display up to the maximum capacity of the scale, places the scale in NET mode (NET indicator will come ON), and should not be confused with the **ZERO** key (see H•6) which returns the scale to the center of ZERO when the weighing pan is empty. The TARE weight (container weight) subtracts from the range of the scale.



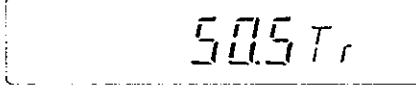
→  TARE WT.

□ The **FUNC** > **TARE WT.** key > <N> > **ENTER** combination digitally sets the TARE weight. There will be an error if the entered value is negative or the number is greater than scale capacity.


- FP-6000, 6200: 1g to 6,100g by 0.01g (FP-6200 users setting over 1,000g should use 0.1 resolution)
- FP-12K: 10g to 12,100g by 0.1g

Example: **FUNC** > **TARE WT.** key > **5** **0** **.** **5** > **ENTER**


the scale will enter 50.5g as the TARE weight (if "g" unit weight is being used).



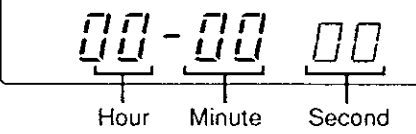
## PRINT / INTVL. Key

→  INTVL.

□ The **PRINT** key can be used to transmit data to the AD-8117(A) printer, or to a computer, via the optional RS-232C/CL interface.

→  INTVL.

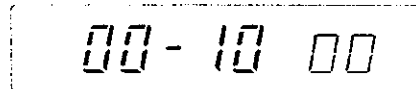
□ The **FUNC** > **INTVL.** key > <N> > **ENTER** combination digitally sets the data send interval time. As the time is being entered, the digit being set will flash, and move right when a 10-key is pressed.



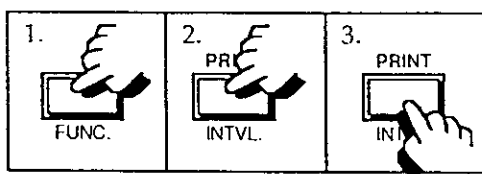
Interval OFF is "00:00:00".  
An error will be displayed if it is set over "24:00:00".

Example: **FUNC** > **INTVL.** key > **0** **0** **:** **1** **0** **:** **0** **0** > **ENTER**

the scale will enter 10 minutes as the data send interval time.

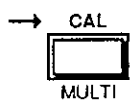


**Interval Start:** \_\_\_\_\_



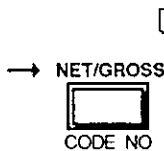
To start interval data output, press the **FUNC** key then the **INTVL.** key and then again, as the **PRINT** key.

## CAL Key

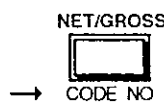
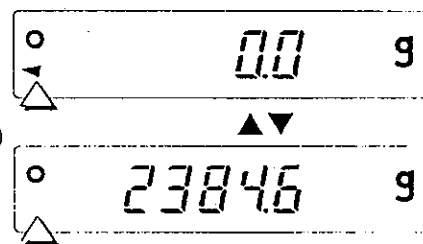
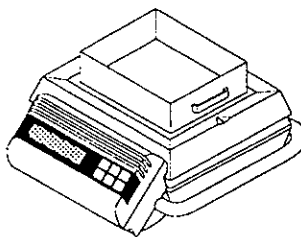


- The **[CAL]** key starts the calibration process. From the normal weighing mode, with nothing on the weighing pan and the scale level, press the **[CAL]** key and follow the calibration procedure outlined on page C-3.

## NET/GROSS / CODE NO. Key

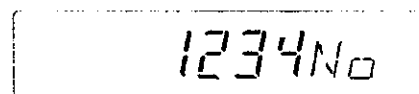


- ▣ The **[NET/GROSS]** key alternates the display between the NET and GROSS modes. The NET/GROSS indicator will come ON while the scale is in NET mode.

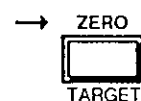


- The **[FUNC]** > **[CODE NO.]** key > <N> > **[ENTER]** key combination digitally sets the code number that will be transmitted (via RS-232C) or printed (AD-8117A only, see p. J-12) at the next data-out operation. 10-key numbers are entered to the left up to 6 digits. The maximum number allowed is 999,999. Please see Parameter setting "Code c2" page G-9.

Example: **[FUNC]** > **[CODE NO.]** key > 1 2 3 4 > **[ENTER]**  
the scale will enter code number '001234'.



## ZERO Key



- The **[ZERO]** key returns the scale to the center of ZERO when the weighing pan is empty and within  $\pm 2\%$  of scale capacity. It should not be confused with the **[TARE]** key which re-ZERO's the display and places the scale in NET mode.

- ⚠ When the display shows a small deviation from ZERO ( $\pm 2\%$  of scale capacity) and the weighing pan is empty (and the tare function is not being used), then press the **[ZERO]** key to return the display to "0.0000". If there is a large deviation from ZERO, than there may be something else wrong, like something touching the weighing pan.

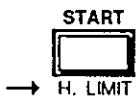
- ⚠ If the **[ZERO]** key will not set the display to ZERO, then you should carry out CALIBRATION.



The scale keyboard does not have a **[ZERO]** key, it has a **[RE-ZERO]** key which can also be used to perform TARE operations (see p. D-7). These two keys should not be confused as they perform different functions.



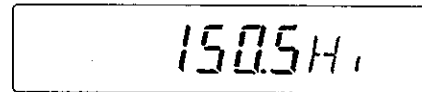
## H. LIMIT Key



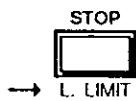
- The **FUNC** key > **H. LIMIT** key > <N> > **ENTER** key combination digitally sets the comparator higher limit. A negative number is permitted and the acceptable range for the FP-6000/6200 is from -6100 to +6100 (*FP-6200 users setting over 1,000g should use 0.1 resolution*), and the range for the FP-6000/6200 is from -12100 to +12100. In case of error, the display shows "999...".

Example: **FUNC** key > **H. LIMIT** key > 1 5 0 . 5 > **ENTER**

the scale will enter 150.5g as the comparator's high limit (if "g" unit weight is being used).



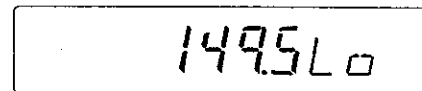
## L. LIMIT Key



- The **FUNC** key > **L. LIMIT** key > <N> > **ENTER** key combination digitally sets the comparator lower limit. A negative number is permitted and the acceptable range for the FP-6000/6200 is from -6100 to +6100 (*FP-6200 users setting over 1,000g should use 0.1 resolution*), and the range for the FP-6000/6200 is from -12100 to +12100. In case of error, the display shows "-999...".

Example: **FUNC** key > **L. LIMIT** key > 1 4 9 . 5 > **ENTER**

the scale will enter 149.5g as the comparator's lower limit (if "g" unit weight is being used).



## FUNC. Key



- When the **FUNC** key is pressed before another blue-key, the scale will set what is printed in blue below the key - after waiting for you to enter a number via the 10-key, and then press the **ENTER** key.

## ENTER Key

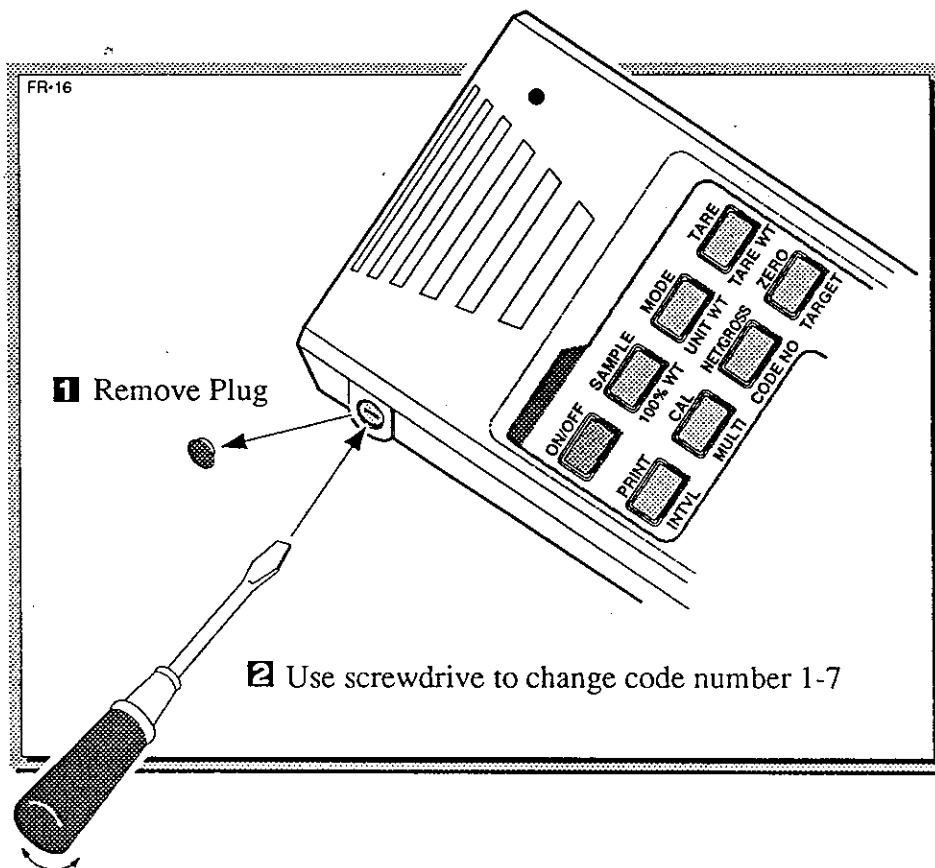


- The **ENTER** key tells the scale to accept the number that has been entered via the 10-key, or to start an action.

# AD-1652 Remote Code Number



The AD-1652 Remote Keyboard can be reset to a different code number if more than one balance is being used, or for what ever reason. If the number is changed on the AD-1652 Remote Keyboard, the C-Function "id 1c8" (see p. G•13) must also be changed.

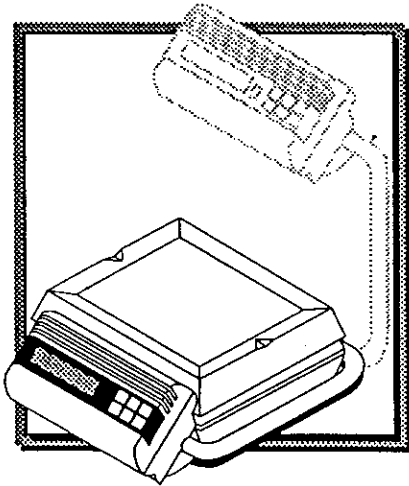


## C8 • Others (from page G•13)

<input type="checkbox"/> id	Xc8	ID Code for Remote Keyboard AD-1652	
id	0	Ignore Remote Keyboard	FC80:0
	1	ID Code Number "1"	FC80:1
	2	ID Code Number "2"	FC80:2
	3	ID Code Number "3"	FC80:3
	4	ID Code Number "4"	FC80:4
	5	ID Code Number "5"	FC80:5
	6	ID Code Number "6"	FC80:6
	7	ID Code Number "7"	FC80:7

The factory setting is "1", ID Code Number 1





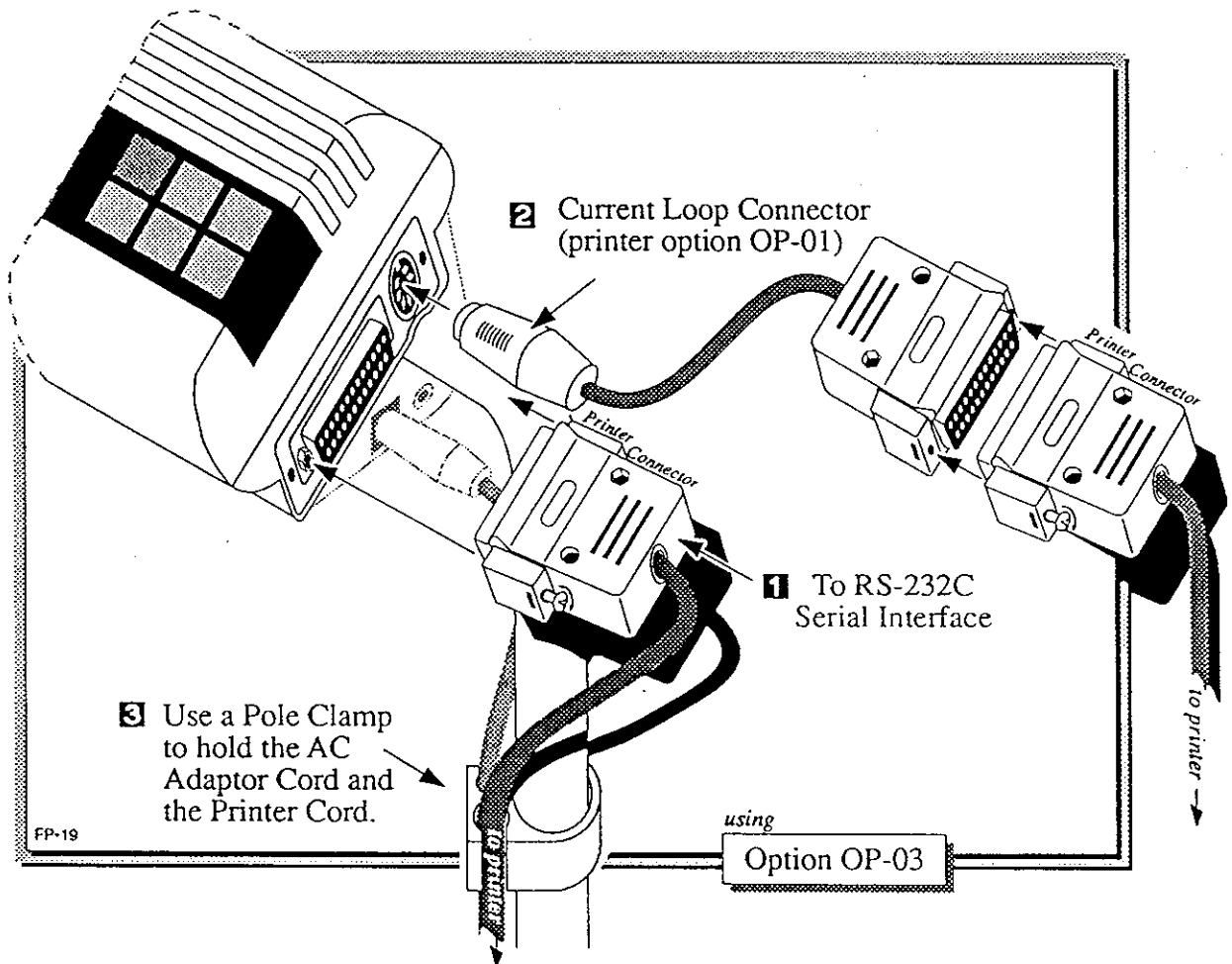
## FP Series • Section J

# Printing

# Connecting a Printer



Printing is easy with A&D's printers AD-8117 or AD-8117A and option OP-03 or OP-04. Please see Section K for installation of OP-03 or Section L for more OP-04 information. The following pages contain information on the balance settings and procedures for proper printer use. For information not found in this section, please see the printer's Instruction Manual for further details.



- 1**  Disconnect the AC Adaptor from the balance (also, whenever connecting, or disconnecting peripherals).

---

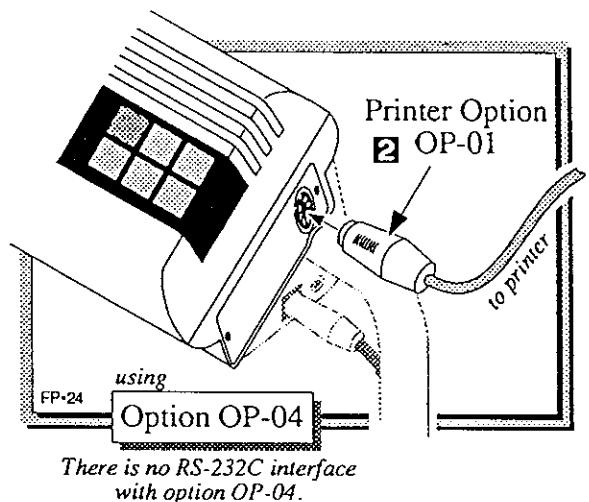
- 2A** Attach the printer's connector to OP-03's RS-232C interface **1** and tighten the connector screws.

-or-

- 2B** Attach the printer's connector to OP-03's or OP-04's Current Loop interface **2** using the printer option OP-01 connector.

---

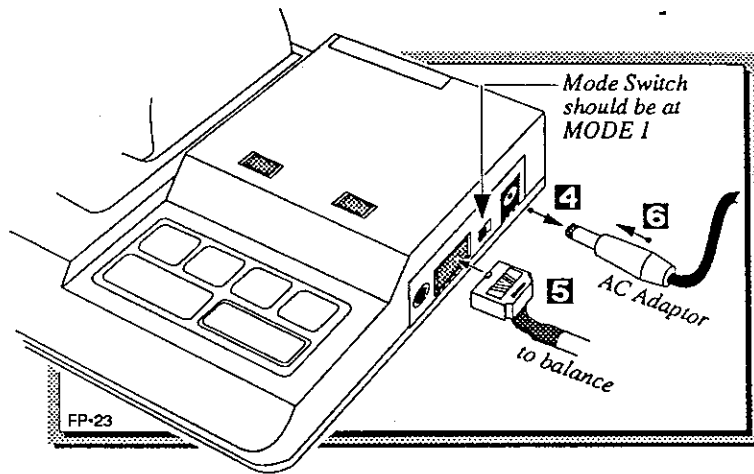
- 3**  Use the Pole Clamp **3** to hold the AC Adaptor Cord and the Printer Cord. Re-connect the AC Adaptor.



**4** Disconnect the printer's AC Adaptor **4** (also, whenever connecting, or disconnecting balance cable to balance).

**5** Attach the balance connector **5**, making sure that the connection is good.

**6** Re-connect the AC Adaptor **6**.



## Balance C-Parameter Settings



The FP balance contains a number of internal software parameters that must be properly set for printer communication. You will find parameter groups **C2** & **C3** on pages G-8 through G-10, and how to change settings on page G-3.



### When Using the AD-8117

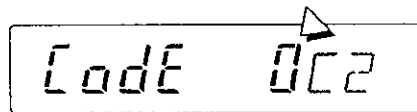


The balance C-Parameter software is set at the factory for AD-8117 use, normally no setting changes are necessary.

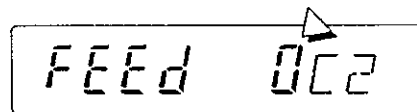
#### Parameter Group C2 • DATA OUTPUT



**Code** – Send Code Number: Setting must be “0”, No Code Number. *Factory setting is “0”.*



**FEED** – Paper Feed: Setting may be “0” No Paper Feed, or “1” Feed 1 Line. *Factory setting is “0” see pages G-9.*



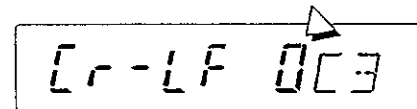
#### Parameter Group C3 • SERIAL INTERFACE OP-03



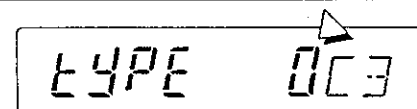
**bPS** – Baud Rate: Setting must be “2”, Baud Rate 2400 bps. *Factory setting is “2”.*



**Cr-LF** – Terminator: Setting must be “0”, <CR><LF>. *Factory setting is “0”.*



**TYPE** – Setting must be “0”, A&D Standard. *Factory setting is “0”.*



## When Using the AD-8117A

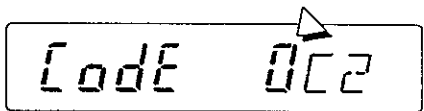


A number of balance C-Parameter software must be changed for AD-8117A use from the initial factory settings. Your dealer may have changed the C-Parameters if you also purchased an AD-8117A. If the printer does not work correctly, please verify proper C-Parameter settings. You will find parameter groups **C2** & **C3** on pages G-8 through G-10, and how to change settings on page G-3.

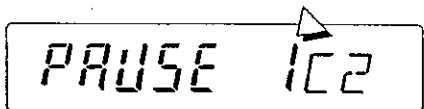
### Parameter Group C2 • DATA OUTPUT



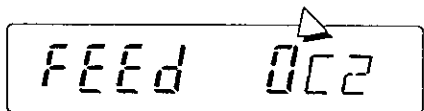
**Code** – Send Code Number: Setting may be “0” No Code Number, or “1” Send Code. *Factory setting is “0” see pages G-8, J-12 for more info.*



**PAUSE** – Pause Between Data: Setting must be “1” Pause 1 Second. *Factory setting is “0”.*



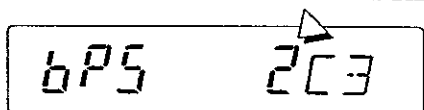
**FEED** – Paper Feed: Setting may be “0” No Paper Feed, or “1” Feed 1 Line. *Factory setting is “0” see pages G-9.*



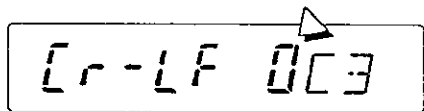
### Parameter Group C3 • SERIAL INTERFACE OP-03



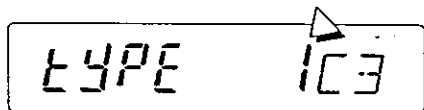
**bPS** – Baud Rate: Setting must be “2”, Baud Rate 2400 bps. *Factory setting is “2”.*



**Cr-LF** – Terminator: Setting must be “0”, <CR><LF>. *Factory setting is “0”.*








**TYPE** – Setting must be “1”, A&D Standard. *Factory setting is “0”.*



## Weighing Data Output



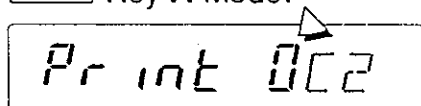
You will find parameter group **C2, DATA OUTPUT**, on pages G•8 & 9, and how to change settings on page G•3. There are five modes to handle the transmission of weighing data, they are:

-  **PRINT** Key A or B Mode. Sends Data when panel (or AD-1652 remote) **PRINT** key is pressed.
-  Auto Print A or B Mode. Data is automatically sent when the display become stable, and other user set conditions are met.
-  Stream Mode. Data is sent continuously with display refreshing (user set).
-  Command Mode. Data output is initiated by a request from an external computer or device (not available for Current Loop).
-  Interval Mode. Data is sent at user set time intervals.



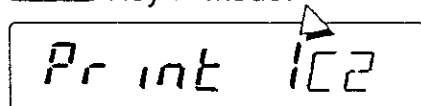
### **PRINT** Key Mode (when **PRINT** key is pressed)

-  **PRINT** Key A Mode:



**PRINT** key sends weighing data *only* if the display is stable. The display will blink when data is transmitted. *Factory Setting. Example on page J•7.*

-  **PRINT** Key B Mode:

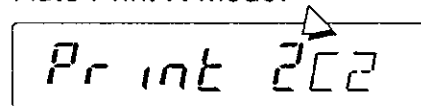


**PRINT** key sends weighing data *as soon as the display becomes stable*. The display will blink when data is transmitted. *Example on page J•7.*



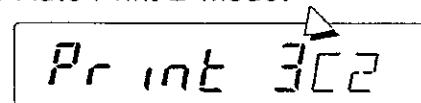
### Auto Print Mode

-  Auto Print A Mode:



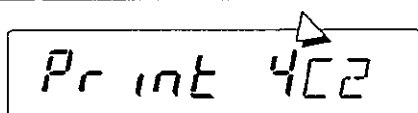
Data is sent if display is over the 'Auto Print Band "AP-b c2" (p. G•8) setting and stable, data is output once. Polarity is set by "AP-P c2" (p. G•8). •Next transmission is done after the display falls below the selected band. *Example on page J•8.*

-  Auto Print B Mode:



Data is sent when the difference between the display and the last transmitted data is over the 'Auto Print Band' "AP-b c2" (p. G•8) setting and stable, data is output once. Polarity is set by "AP-P c2" (p. G•8). •Next transmission is done after the display falls below the selected band. *Example on page J•9.*

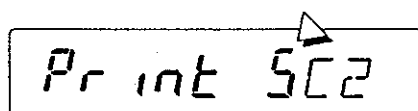
## Stream Mode



Stream Mode: Data output is continuous.  
*Example on page J•10.*

- In this mode weighing data is transmitted continuously. The display does not blink when data is output, and the **[PRINT]** key is ignored.
- Transmission can be stopped by the CTS control switch (p. K•3) on the OP-03 board.

## Command Mode



Command Mode: Data output is initiated by a request from an external computer or similarly equipped device. Please see section K for more information.

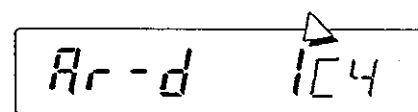
## Timed Mode (Interval Data Output)



Weighing data can be printed out at an interval of specified time, but the optional AD-1652 Remote Keyboard is required to set, start and stop interval printing (please see p. J•13):

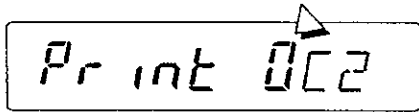
- The interval output can be started only in the **[PRINT]** Key modes ("Print 0c2 or 1c2"). When not using the interval output, the **[PRINT]** Key modes work normally.
- The balance also transmits data one time when the interval timer is started and stopped.
- While the interval timer is ON, the decimal point will flash. In the case of the counting mode, the power indicator flashes.
- The display will blink when the data is transmitted.
- The interval timer stops if you move from the weighing mode to other mode - including display OFF or the calibration mode.
- To stop the interval timer, press the **[PRINT]** key on the front panel, or the AD-1652 Remote Keyboard (user cannot stop via the serial interface).

## Auto RE-ZERO after Printing



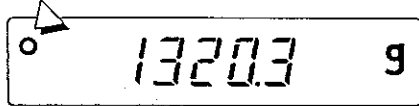
Auto RE-ZERO after Weighing Data Transmission, **Ar-d c4**, (works with **Print 1→4c2**): Setting this parameter to "1" RE-ZERO's the display after printing. *Factory setting is "0". Example on bottom, page J•9.*

## Example: **PRINT** Key A Mode



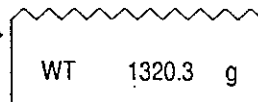
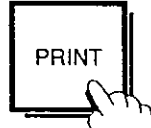
**PRINT** key sends weighing data *only* if the display is stable. The display will blink when data is transmitted. *Factory Setting.*

Example -----



**1** Only when the display is stable...

**⚠** If the display is not stable, nothing is printed.

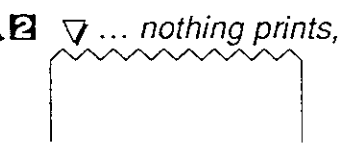
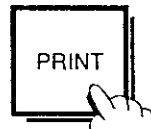
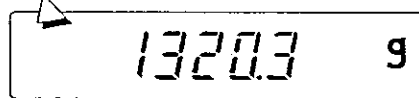


**2** Press the **PRINT** key.

**3** ▽ Display blinks when sent.

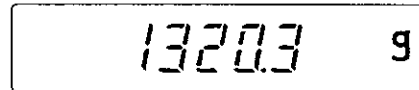


**⚠** If the display is not stable, nothing is printed.

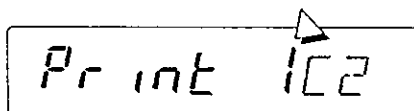


**2** Press the **PRINT** key.

**3** ▽ display does NOT blink.

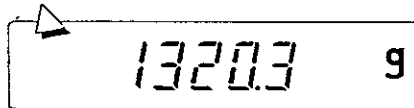


## Example: **PRINT** Key B Mode

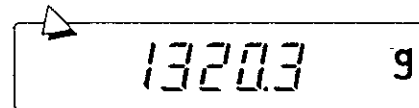
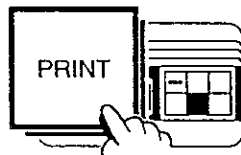


**PRINT** key sends weighing data as soon as the display becomes stable. The display will blink when data is transmitted.

Example -----

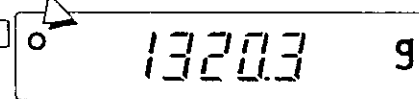


**1** If the display is stable, data is sent immediately when the **PRINT** key is pressed, HOWEVER: If the display is not stable...

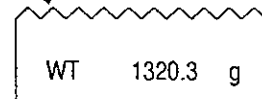


**2** Press the key.

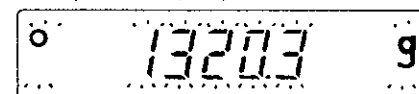
**3** ▽ Balance waits for stability...



**4** ▽ ... then sends

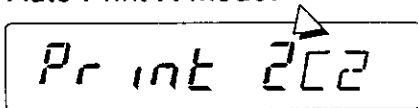


**5** ▽ ... display blinks when sent



## Example: Auto Print A Mode (positive polarity)

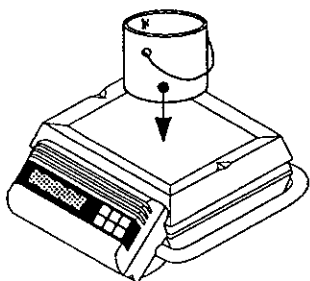
 Auto Print A Mode:



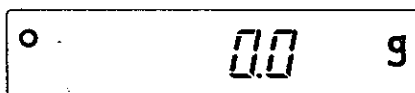
Data is sent if display is over the 'Auto Print Band' "AP-b c2" (p. G•8) setting and stable, data is output once. Polarity is set by "AP-P c2" (p. G•8). •Next transmission is done after the display falls below the selected band.

Example -----

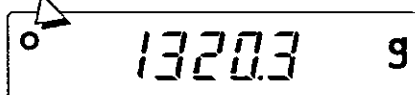
**a**



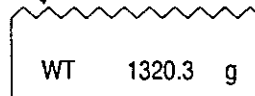
**1** Place an object on the balance.



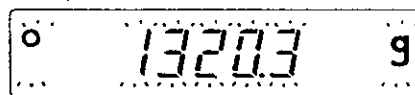
**2** Balance waits for stability...



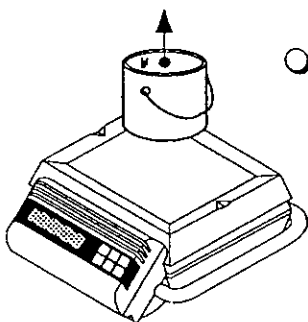
**3** ▾ ... then sends



**4** ▾ ... display blinks when sen

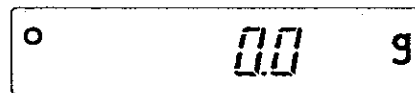


**b**

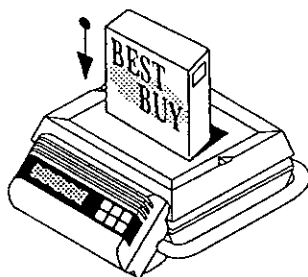


**5** Remove the object.

○ The display must return to "0" (or within the 'Auto Print Band' "AP-b c2" if set) for printing to occur again.

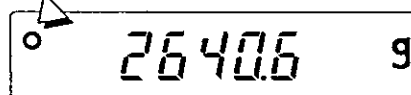


**c**

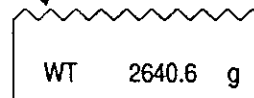


**6** Place another object on the balance.

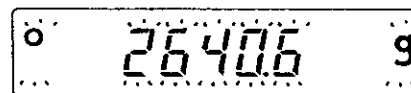
**7** Balance waits for stability...



**8** ▾ ... then sends

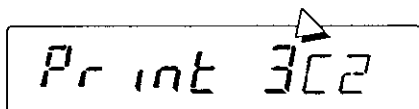


**9** ▾ ... display blinks when sent





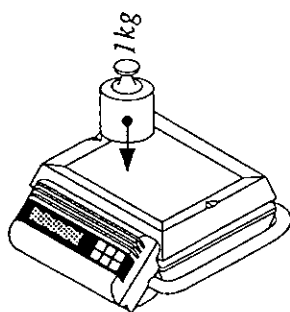
## Example: Auto Print B Mode (positive polarity)



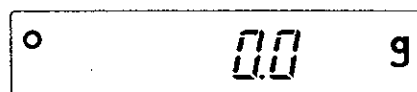
Data is sent when the difference between the display and the last transmitted data is over the 'Auto Print Band' "AP-b c2" (p. G•8) setting and stable, data is output once. Polarity is set by "AP-P c2" (p. G•8). •Next transmission is done after the display falls below the selected band.

Example

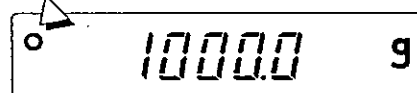
**a**



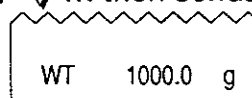
**1** Place an object on the balance.



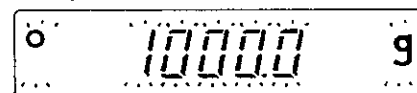
**2** Balance waits for stability...



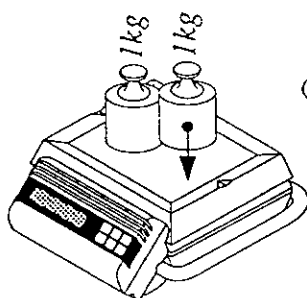
**3** ... then sends



**4** ... display blinks when sent



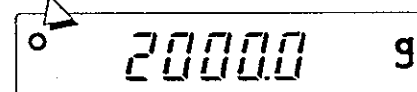
**b**



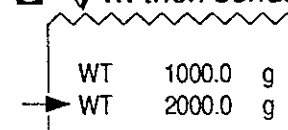
**5** Place another object on the balance.

○ The display doesn't have to return to "0" for printing to occur again, but be over the 'Auto Print Band' "AP-b c2".

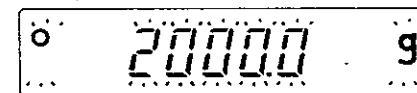
**7** Balance waits for stability...



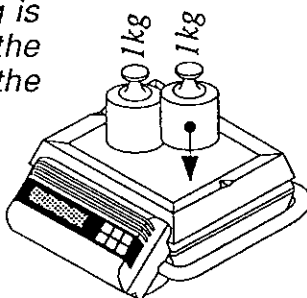
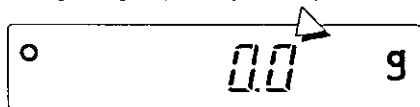
**8** ... then sends



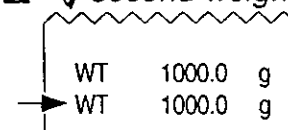
**9** ... display blinks when sent



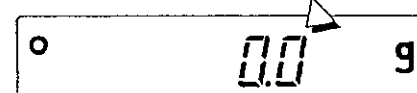
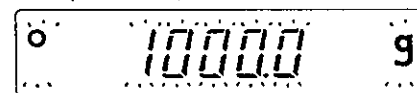
If Auto RE-ZERO after Printing is set to Ar-d 1c4: in 'b' above, the display would zero between the weighings (see p. J•6).



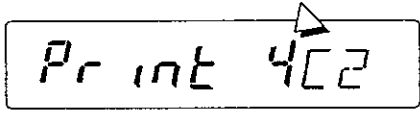
**1** ... second weight prints...



**3** ... display blinks, and zeros.



## Example: Stream Mode

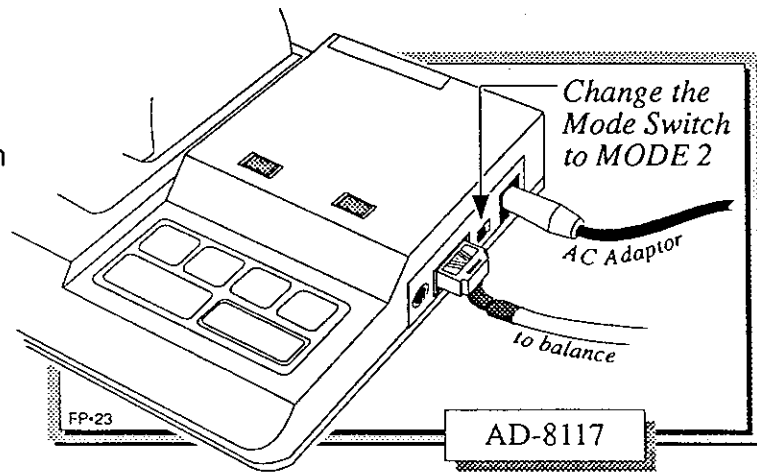


Stream Mode: Data output is continuous.

- In this mode weighing data is transmitted continuously. The display does not blink when data is output, and the **PRINT** key is ignored.
- Transmission can be stopped by the CTS control switch (p. K-3) on the OP-03 board.

Example -----

**a** **AD-8117:** Select MODE 2 on the printer.



**b** **AD-8117:** Pressing the **DATA** key starts data printing.  
**AD-8117A:** Starts printing automatically.



# Printing with the AD-8117A



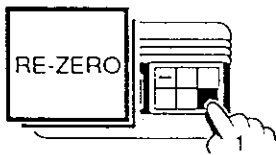
The AD-8117A printer has two additional printing features. One is 1) A listing of the C-Parameter settings (see Section G), and the other is: 2) If you have the optional AD-1652 Remote Keyboard, you can enter a Code Number that will be printed with the next printout.

## 1) Printing C-Parameters List (AD-8117A ONLY)



Listing will not print if C-Parameter "Print c2" (p. G•8) is set at '5', Command Mode.

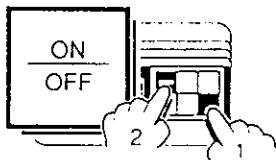
1



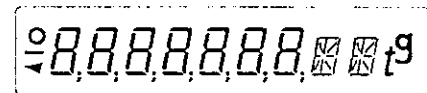
▶ With the display OFF: Press and hold the **RE-ZERO** key.



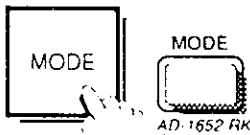
2



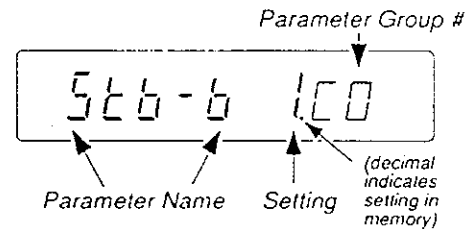
▶ While holding **RE-ZERO**, press the **ON/OFF** key.  
 ○ All display segments will come ON.



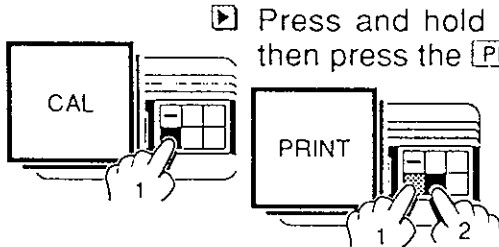
3



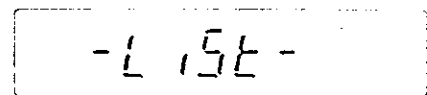
▶ Press the **MODE** key to move to C-Parameter Settings mode (see p. G•2 for listings).  
 ○ The software version number will be displayed briefly, then the first Parameter Name, Setting and Group Number will be displayed.



4



▶ Press and hold the **CAL** key, then press the **PRINT** key.



△ 'List' is displayed while the printer is working

○ See the <FC><nm>:<v>, the parameter section and parameter number, and setting for this example on page G•13 – Group "C8, PF, FC80:1" Parameters cannot be changed.

- (n) = the parameter group number C0→8.
- (m) = the parameter number.
- (v) = parameter setting value

C64	0
C70	1
C80	1
(n)	(v)
(m)	

## 2) Printing a Code Number (AD-8117A ONLY)

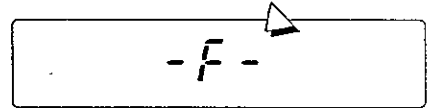


The **FUNC** > **CODE NO.** key > <N> > **ENTER** key combination digitally sets the code number that will be printed with the next printout. 10-key numbers are entered to the left up to 6 digits. The maximum number allowed is 999,999. Please see Parameter setting "Code c2" page G-9.

1



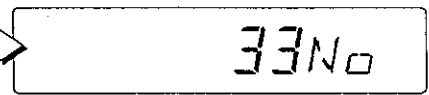
- Press the **FUNC** key.
- "-F-" will be displayed.
- Press the **FUNC** key again to exit.



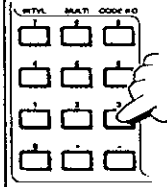
2



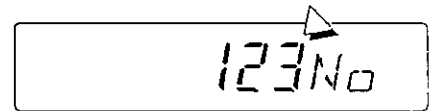
- Press the **CODE NO.** key.
- Any previously set Code Number is displayed, in this example: 33.



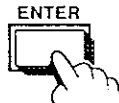
3



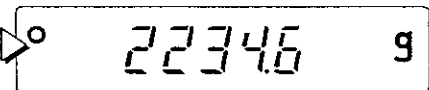
- Use the 10-key pad to display Code Number to enter.
- In this example: **1****2****3** keys, or Code No. 123.



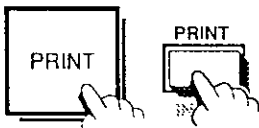
4



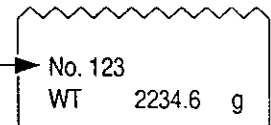
- Press the **ENTER** key to enter the number.
- The display will return to where you left it (in this example, an object weighing 2,234.6g).



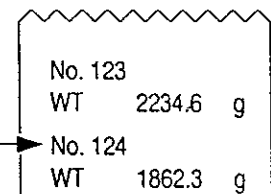
5



- Press the **PRINT** key.
- The Code number and weighing data will be printed.



- Press the **PRINT** key again at the next weighing event and the Code number will increase by 1.



# Interval Printing Requires AD-1652 Remote Keyboard



Weighing data can be printed out at an interval of specified time, but the optional AD-1652 Remote Keyboard is required to set, start and stop interval printing.

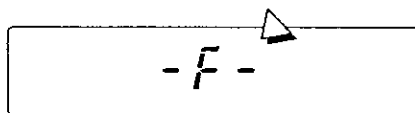
- The interval output can be started only in the **PRINT** Key modes ("Print 0c2 or 1c2"). When not using the interval output, the **PRINT** Key modes work normally.
- The balance also transmits data one time when the interval timer is started and stopped.
- While the interval timer is ON, the decimal point will flash. In the case of the counting mode, the power indicator flashes.
- The display will blink when the data is transmitted.
- The interval timer stops if you turn the display OFF.
- To stop the interval timer, press the **PRINT** key on the front panel, or the AD-1652 Remote Keyboard (user cannot stop via the serial interface).

## To Set the Interval Time

1



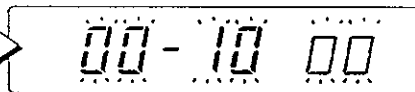
- Press the **FUNC** key.
- "-F-" will be displayed.
- Press the **FUNC** key again to exit.



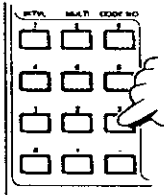
2



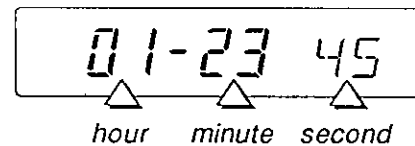
- Press the **INTVL** key.
- Any previously set interval will be displayed and flash, in this example: 10 min.



3



- Use the 10-key pad to display Code Number to enter.
- In this example: **1 2 3 4 5** keys – 1 hour, 23 minutes, 45 seconds.

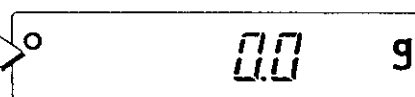


**!** Interval OFF is "00:00:00" setting. An error will be displayed if it is set over "24:00:00".



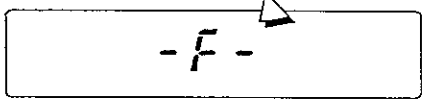
4



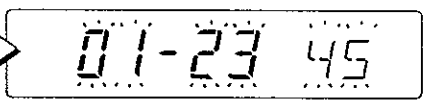


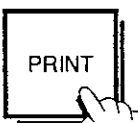

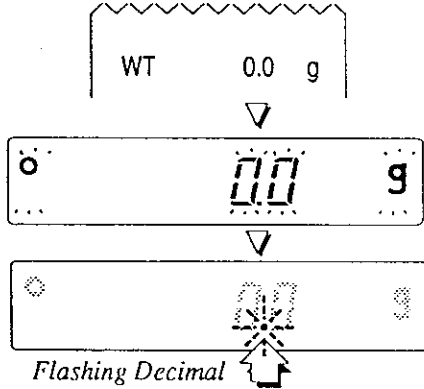
- Press the **ENTER** key to enter the number.
- The display will return to where you left it.



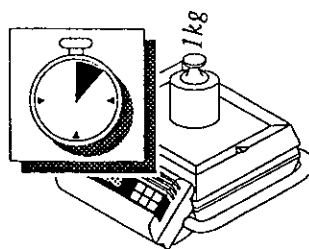
## To START Interval Printing

**1**    Press the **[FUNC]** key.  
 "-F-" will be displayed.   
 Press the **[FUNC]** key again to exit.

**2**    Press the **[INTVL]** key .  
 The set interval will be displayed and flash, in this example: 1 hour, 23 minutes, 45 seconds. 

**3**    Press the **[PRINT]** key to start the interval printing.  
 The display will be printed, flash, and then the decimal point will flash while interval printing is active.   
 WT 0.0 g  
 00 g  
 Flashing Decimal

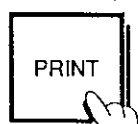

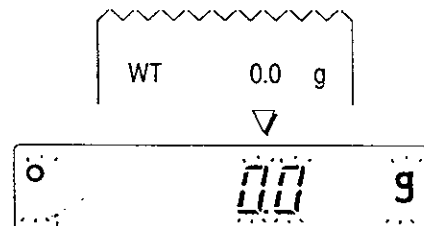
- When the time has passed until the next interval, the weighing data will be printed and the display will flash.



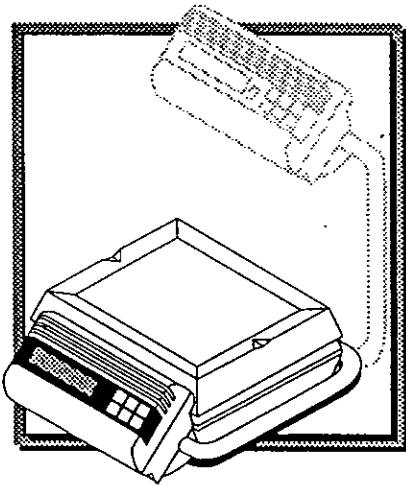
WT 0.0 g  
 WT 1000.0 g  
 10000 g

## To STOP Interval Printing

- The interval timer stops if you move from the weighing mode to other mode - including display OFF or the calibration mode.
- To stop the interval timer, press the **[PRINT]** key on the front panel, or the AD-1652 Remote Keyboard (user cannot stop via the serial interface).

**1**    Press the **[PRINT]** key to stop the interval printing.  
 The display will be printed, flash, and then the decimal point will no longer flash.   
 WT 0.0 g  
 00 g

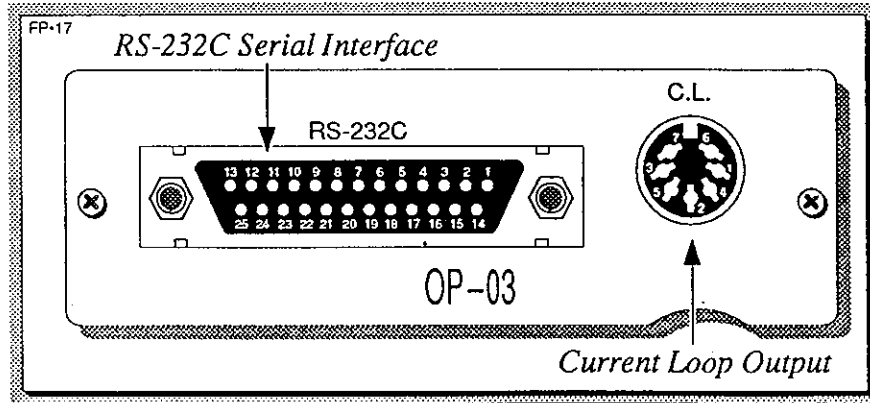




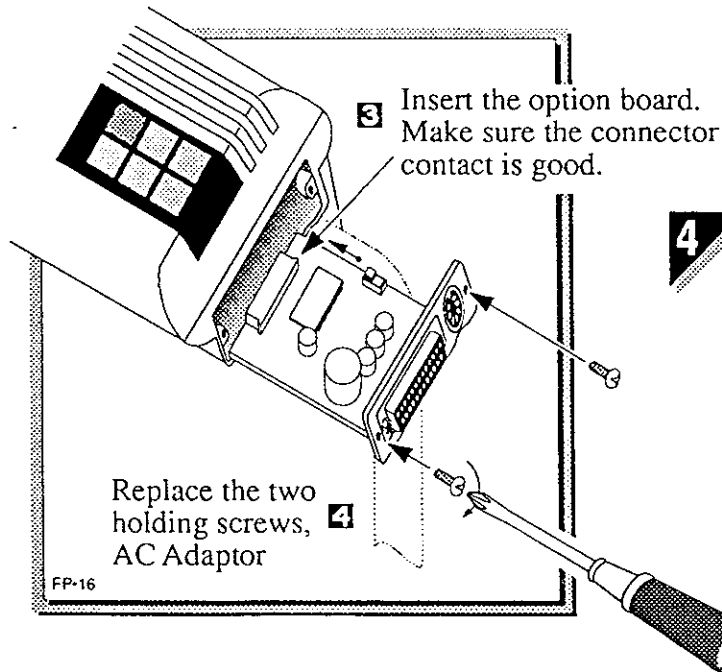
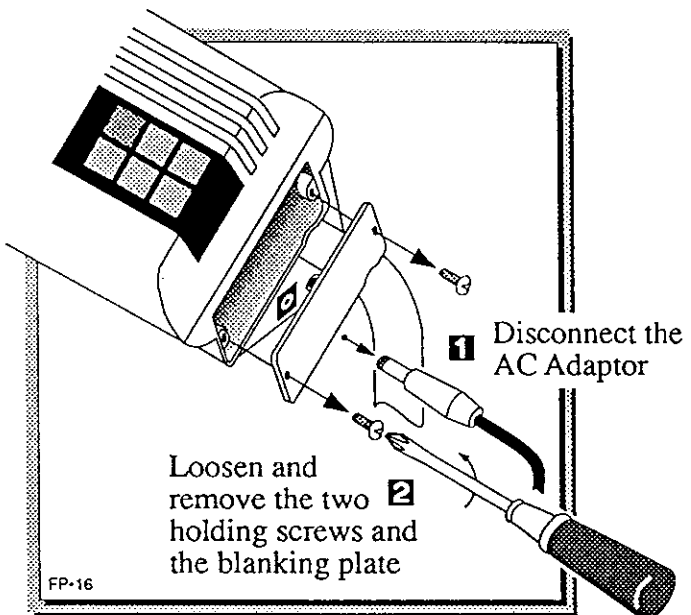
## FP Series • Section K

# OP-03 RS-232C Serial Interface & Current Loop

# OP-03 Installation



- 1**  Disconnect the AC Adaptor from the balance. Remove the two screws and blanking plate covering the option slot.
- 2**  Check the "CTS CONTROL SWITCH" on the OP-03 card. In general, you would set this switch to 'CTRL'. For more information please see the CTS CONTROL SWITCH section, page K•3.
- 3**  Insert the option board, making sure that it makes a good connection with the connector in the balance.



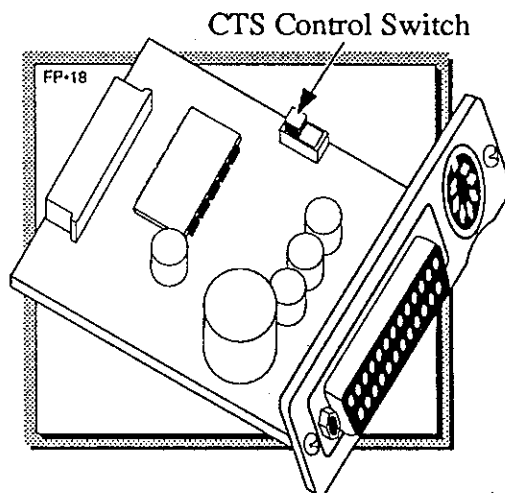
- 4**  Replace the two holding screws. Connect the AC Adaptor from the balance. *Earth the chassis if you think static electricity may be a problem.*



## CTS Control Switch



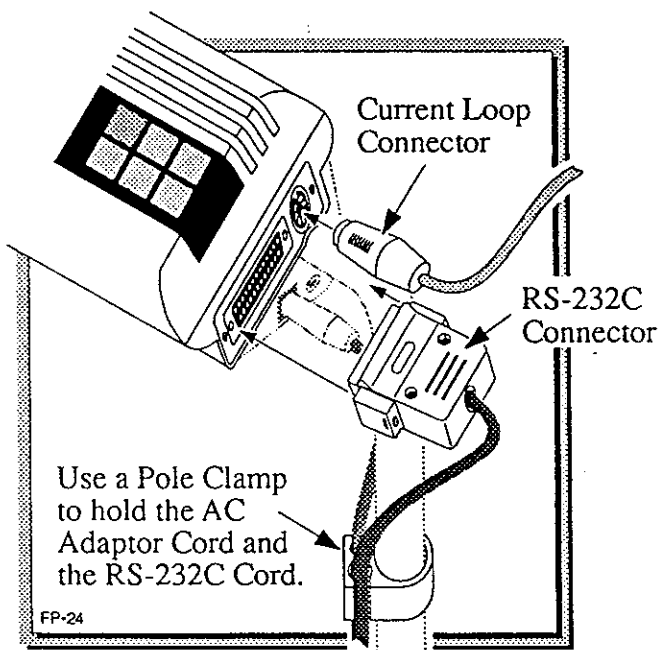
In general, you would set this switch to 'CTRL'. The CONTROL switch on the PCB permits shorting RTS and CTS lines, or for the balance to send the Clear to Send signal.



- Switched to 'LOOP'     RTS input and CTS output is shorted.
- Switched to 'CTRL'     The balance sets the CTS at minus level when the command can not be received.
- 'LOOP' or 'CTRL'     The balance transmits data independently of how this switch is set.

## Computer Connection

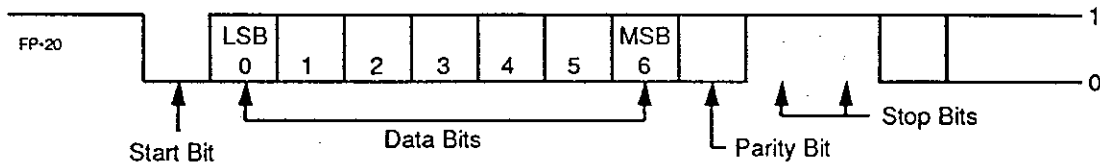
- The FP is designated as DCE (Data Communication Equipment).
- The Current Loop is passive. An external power supply is required.
- The Current Loop transmits the same data as the RS-232C.
- Please confirm that proper conditions have been met before connecting equipment. Refer to connection equipment's manual.
- The connecting cable should be of a high quality. For example: NEC PC-8895, Epson cable set #705, #724.



## Specifications

**Type** EIA-RS-232C 20mA Current Loop (passive)  
**Method** Half-duplex, Asynchronous Transmission, Bi-directional.  
**Format** Baud rate: 600, 1200, 2400, 4800 and 9,600 baud. Rates user selectable, see page G•10.  
**Data bit** 7 bit.  
**Parity** Even.  
**Stop bit** 2 bit.  
**Code** ASCII.

RS-232C	20mA Cur. Loop
1 = -5V → -15V	20mA
0 = +5V → +15V	0mA



## C-Function Parameter Settings



The FP balance contains a number of internal software parameters that must be properly set for computer communication. You will find a listing on page G•2; how to change settings on page G•3; and parameter groups C2 & C3 dealing with the serial interface on pages G•8 through G•10. The following must be set as shown:

### Parameter Group C2 • Data Output

**Print** – Data Out Mode: Must be set to “5” Command Mode: Data output initiated by a request from an external computer or device. *Factory setting is “0”.*

Print 5C2

**Code** – Send Code Number: Setting must be “0” No Code Number. *Factory setting is “0”.*

Code 0C2

**FEED** – Paper Feed: Setting must be “0” No Paper Feed. *Factory setting is “0”.*

FEED 0C2

### Parameter Group C3 • Serial Interface OP-03

**bps** – Baud Rate: Select Baud Rate 600→9600 bps. *Factory setting is “2”, 2400 bps. See page G•10 for other settings.*

bps 2C3

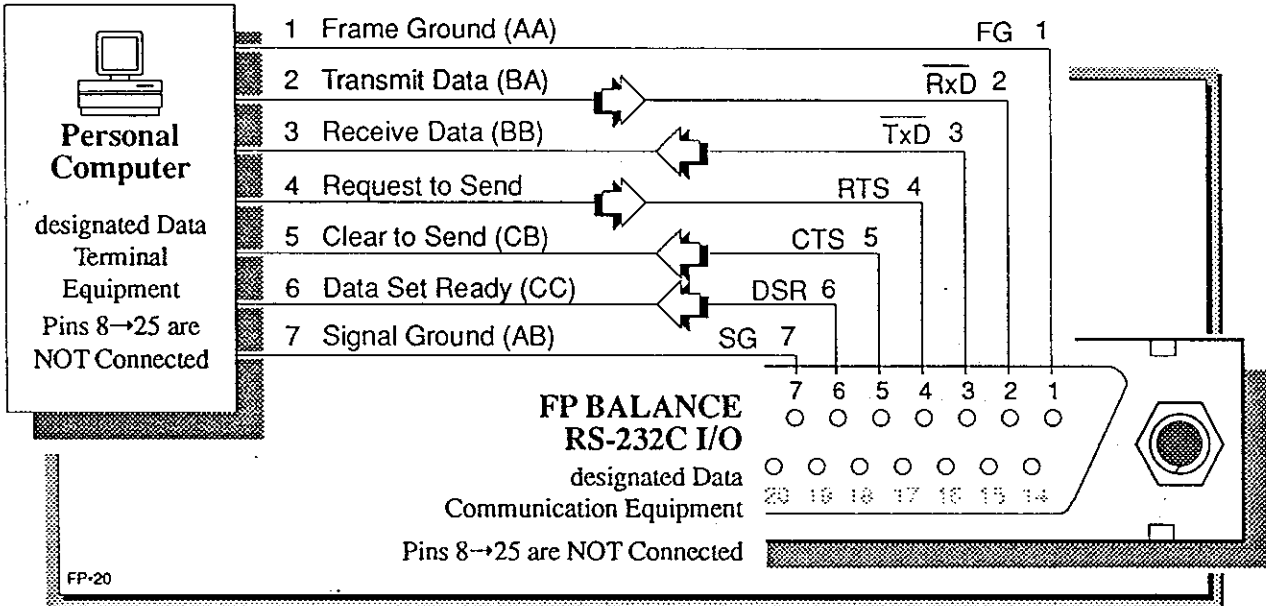
**Cr-LF** – Terminator: Select either “0” <CR><LF>, or “1” <CR>. *Factory setting is “0” <CR><LF>.*

Cr-LF 0C3

**TYPE** – Select either “0” A&D Standard, or “1” AD-8117A Format. *Factory setting is “0” A&D Standard, see page K•7 for more info.*

TYPE 0C3

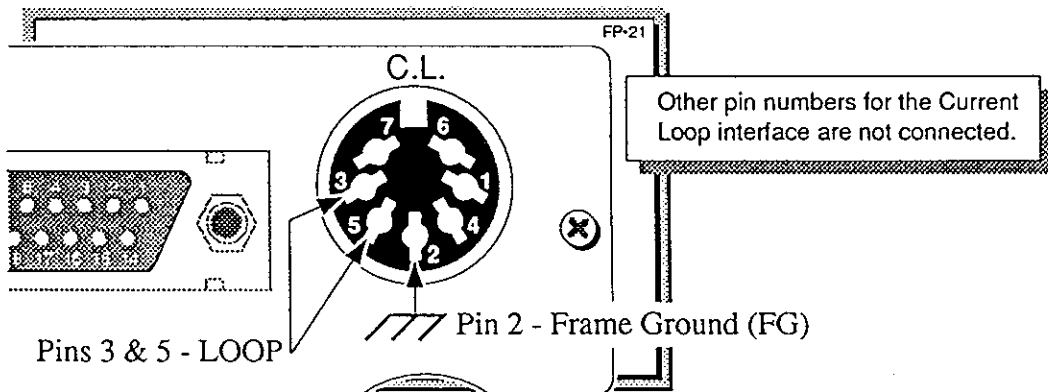
## RS-232C Pin Connection



- A 25-pin RS-232C male connector and cover (HDB-25P & HDB-CTF) are not provided with this option.
- Use a high quality modem type cable between the computer and balance.
- AD-8117 is supplied with a cable for connection to the balance.

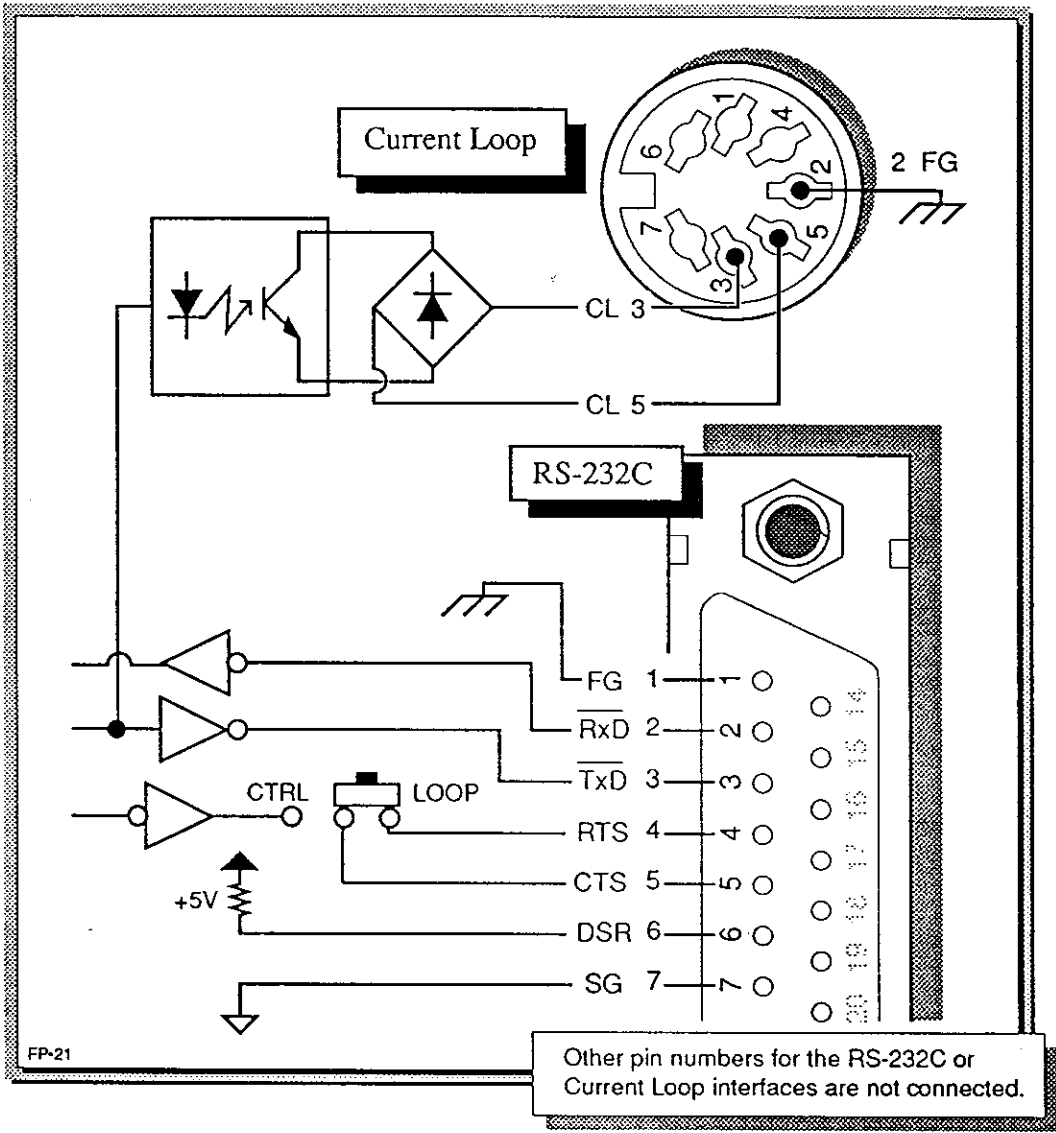
## Current Loop Pin Connection

A 7-pin DIN male Current Loop connector (TCP 0576) is provided for the passive Current Loop interface.



- AD-8117/A** to connect the balance with the AD-8117/A via the current loop, please order the AD-8117 OP-01 option cable.

# OP-03 Circuit Diagram



FP-21

Other pin numbers for the RS-232C or Current Loop interfaces are not connected.

# Weighing Data Formats

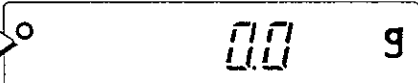


Some weighing data output is formatted according to how 'tYPE c3' (see page G•3) is set. This parameter allows for two types of data formats:

- 1) **A&D Standard Format** Adapted for peripheral instruments made by A&D, such as the AD-8117 compact printer (tYPE 0c3).
- 2) **AD-8117A Format** Adapted for A&D's AD-8117A compact printer (tYPE 1c3).

<input type="checkbox"/> tYPE	x c3	Data Format	
<b>tYPE</b>	0	A&D Standard	FC32:0
	1	AD-8117A format	FC32:1

This C-Function Parameter is factory set at "0" for A&D Standard. If you are using A&D's AD-8117A compact printer, you will need to change the parameter setting to "1" – see page G•3 for instruction on changing C-Parameters. You may also use the AD-8117A format with the computer if you would like the "+" polarity symbol and zero's-suppressed by a space.

Example: display = "0.0g": 

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	S	T	,	+	0	0	0	0	0	0	.	0	(20H)	(20H)	g	crJ	
AD-8117A	W	T	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	0	.	0	(20H)	(20H)	g	crJ


## A&D Standard Format

- Adapted for peripheral instruments made by A&D, such as the AD-8117 compact printer.
  - Header of two characters indicate the status.
  - Data with a polarity symbol, including the zero character of upper plates.
  - Unit code of three characters.
  - One data set consists of fifteen characters (excluding terminator).

## AD-8117A Format

- Adapted for A&D's AD-8117A compact printer.
  - Header of two characters indicate the status if not overloaded.
  - Data with a polarity symbol, but omitted if data is zero.
  - Zero-suppressed by a space.
  - One data set consists of sixteen characters (excluding terminator).

# Weighing Data Format Examples

 Space code is noted as (20H) in the following examples.

## Header Weight/Count Data List

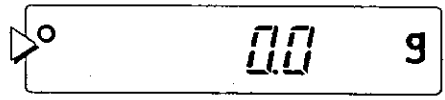
	A&D Standard	AD-8117A
Stable Data	S T	W T
Unstable Data	U S	U S
Count Stable Data (only)	Q T	Q T
Underload Data	O L	
Overload Data	O L	

## Unit Code List

	Display Abbreviation	A&D Standard & AD-8117A		
Gram	(g)	(20H)	(20H)	g
Percent	(pct)	(20H)	(20H)	%
Count	(cnt)	(20H)	P	C
Decimal Ounce	(oz)	(20H)	o	z
Troy Ounce	(OZt)	o	z	t
Pennyweight	(dwt)	d	w	t
Carat	(ct)	(20H)	c	t
Momme	(mm)	m	o	m
Grain Unit	(GN)	(20H)	G	N
Tola	(t)	(20H)	(20H)	t
Tael	(TL)	(20H)	T	L

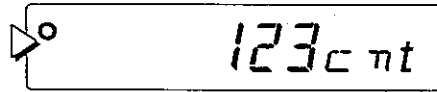
## Stable Data Examples

 Example: display = "0.0g":



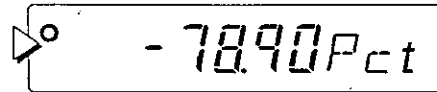
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	S	T	,	+	0	0	0	0	0	0	.	0	(20H)	(20H)	g	cr	
AD-8117A	W	T	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	0	.	0	(20H)	(20H)	g	cr

Example: display = "123 cnt":



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	Q	T	,	+	0	0	0	0	0	1	2	3	(20H)	P	C	cr	
AD-8117A	Q	T	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	+	1	2	3	(20H)	P	C	cr

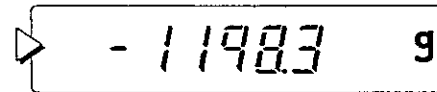
Example: display = "-78.90 Pct":



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	Q	T	,	-	0	0	0	7	8	.	9	0	(20H)	(20H)	%	cr	
AD-8117A	Q	T	(20H)	(20H)	(20H)	(20H)	(20H)	-	7	8	.	9	0	(20H)	(20H)	%	cr

### Unstable Data Example

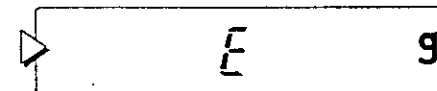
Example: display = "-1,198.3g":



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	U	S	,	-	0	0	1	1	9	8	.	3	(20H)	(20H)	g	cr	
AD-8117A	U	S	(20H)	(20H)	(20H)	(20H)	-	1	1	9	8	.	3	(20H)	(20H)	g	cr

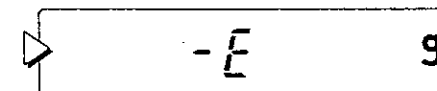
### Overload Data Examples

Example: display = "E g":



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	O	L	,	+	9	9	9	9	9	9	9	E	+	1	9	cr	
AD-8117A	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	E	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	cr

Example: display = "-E g":



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A&D Std.	O	L	,	+	9	9	9	9	9	9	9	E	+	1	9	cr	
AD-8117A	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	-	E	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	(20H)	cr



## Commands for the RS-232C Serial Interface



Please note that there needs to be a delay time between a balance acknowledgement <AK>, and the transmission of the next command to the balance (see notes B and C below). The FOR~NEXT loop times depend on your computer's operating clock and performance. Make the FOR~NEXT longer if the program does not work correctly.

For an example, using a BASIC program:

```

1..
123 LINE INPUT #1, AK$           Receive <AK>
124 FOR I=1 TO 100:NEXT I       Delay
125 PRINT #1, "Q"              TX: 'Q' command
1..
    
```

**NOTE A:** If the OPERATION FOLLOWING COMMAND INTERRUPTION parameter is set at '0' (t-UP 0c3, p. G•10), then when a command is interrupted before the terminator, all commands are cancelled. Set at '1' to prevent canceling. *Factory setting is "0".*

**NOTE B:** If the ERROR CODE AT COMMAND MODE parameter is set at '0' (E-Cod 0c3, p. G•10), then the balance transmits no error codes nor acknowledgement code <AK> (ASCII 06H). *Factory setting.*

**NOTE C:** If the ERROR CODE AT COMMAND MODE parameter is set at '1' (E-Cod 1c3, p. G•10), then when the following commands are accepted by the balance: 'P', 'ON', 'R', 'T', 'Z', 'CAL', or 'SMP', the FP transmits the acknowledgement code <AK> (ASCII 06H). *It will send not only after the command is received, but also after the command is executed. If the command can't be executed, then the FP sends the various codes to inform the host computer.*

⚠ Space code is noted as (20H) in the following examples.



## Requesting Information from the Balance

1) 

?	%
---	---

 Request the 100% Weight

- The reply is always in grams (g), independent of the unit being displayed on the balance.

Send	?	%	↵												
Reply	%	W	,	+	1	2	3	4	5	.	6	(20H)	(20H)	g	↵

2) 

?	@
---	---

 Request the Unit Weight

- The reply is always in grams (g), independent of the unit being displayed on the balance.

Send	?	@	↵												
Reply	U	W	,	+	1	2	.	3	4	5	6	(20H)	(20H)	g	↵

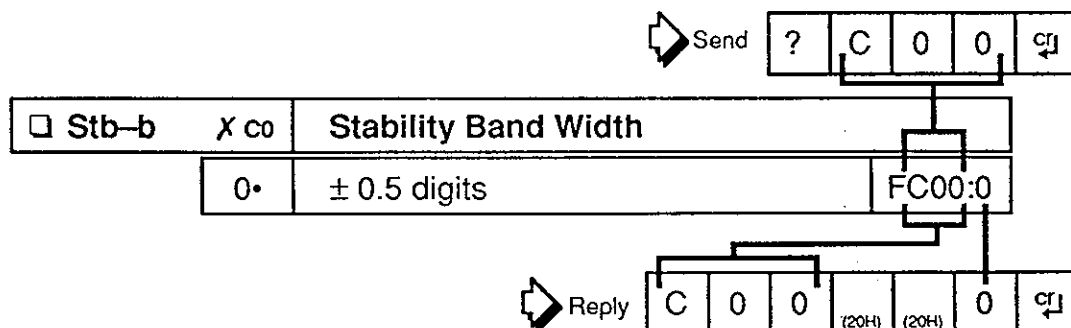


3) 

?	C	(n)	(m)
---	---	-----	-----

 Request a Parameter Setting

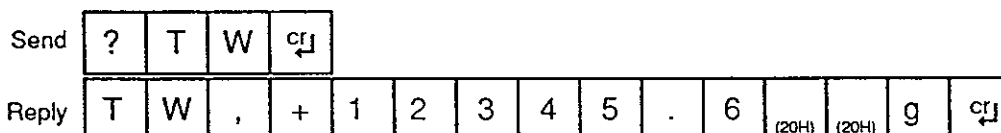
You must specify the parameter group number (n) and parameter number (m). See PARAMETER SETTING, p. K-13.



4) 

?	T	W
---	---	---

 Request the TARE Weight



## Requesting Weighing Data from the Balance

See pages K-8 and K-9 for examples of the weighing data formats which will be replied from the balance (headers and unit codes).

1) 

Q
---

 Send Weighing Data (Question)  Balance will send the weighing data immediately, whether data is stable or not.

2) 

S
---

 Send Stable Weighing Data  Balance will send only stable weighing data. Display will blink when data is transmitted.

3) 

S	I	R
---	---	---

 Send the Weighing Data Immediately & Repeat

Balance will send the weighing data (whether data is stable or not) immediately with continuous transmission (like a stream mode) until the 'C' command is received.

4) 

C
---

 Release the SIR  Stops the SIR command above.

## 📄 Commands to Set Data in the balance

### 1) [%] Set the 100% Weight

- ☐ Gram (g) is assumed for all 100% weight entry. Six digits are allowed and any digits under resolution will be dropped (ie. 12.345→12.34).
- The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is less than:

☐ FP-6000, 6200: 1g to 6,100g by 0.01g *(FP-6200 users setting over 1,000g should use 0.1 resolution)*

☐ FP-12K: 10g to 12,100g by 0.1g

Example: Send [%] 1 0 6 9 . 5 ⏏ balance assumes 'g'.

### 2) [@] Set the Unit Weight

- ☐ Gram (g) is assumed for all unit weight entry. Six digits are allowed.
- The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is less than:

☐ FP-6000, 6200: 0.01000g to 6,100.00g

☐ FP-12K: 0.10000g to 12,100.0g

Example: Send [@] 1 . 2 3 4 5 6 ⏏ balance assumes 'g'.

### 3) [T][W] Set the TARE Weight

- ☐ Gram (g) is assumed for all 100% weight entry. Six digits are allowed and any digits under resolution will be dropped (ie. 12.345→12.34).
- The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is outside the range:

☐ FP-6000, 6200: 1g to 6,100g by 0.01g *(FP-6200 users setting over 1,000g should use 0.1 resolution)*

☐ FP-12K: 10g to 12,100g by 0.1g

Example: Send [T][W] 1 2 3 4 . 5 ⏏ balance assumes 'g'.

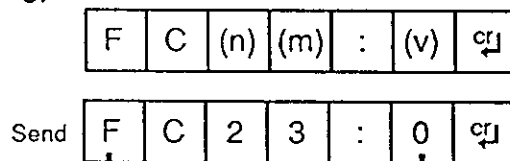
### 4) [F][C] To change a Parameter Setting ☐ Send <FC><nm>:<v>, the parameter section and parameter number, and setting.

(n) = the parameter group number 0→8.

(m) = the parameter number.

(v) = parameter setting value

- ☐ Example, parameter 'Code' is set at '0', No Code Number:



<input type="checkbox"/> Code	X c2	Send Code Number	
	0•	No Code Number	FC23:0

## Commands to Control the Balance

- 1) 

O	N
---	---

**Go to Display ON mode**  No change if already in Display ON mode. *AK(06H) is also sent when start-up Re-Zeroing is finished.*

---

- 2) 

O	F	F
---	---	---

**Go to Display OFF mode**  No change if already in Display OFF mode.

---

- 3) 

P
---

**Display ON/OFF**  The same as pressing the 

ON/OFF
--------

 key. *AK(06H) is also sent when start-up Re-Zeroing is finished with Display ON.*

---

- 4) 

S	M	P
---	---	---

**SAMPLE**  The same as pressing the 

SAMPLE%
---------

 key. *AK(06H) is also sent when Unit Weight or 100% weight is entered.*

---

- 5) 

U
---

**Change the Weighing Unit**  The same as pressing the 

MODE
------

 key.

---

- 6) 

C	A	L
---	---	---

**Perform Calibration**  Same as pressing the 

CAL
-----

 key.

---

- 7) 

P	R	T
---	---	---

**Print**  The same as pressing the 

PRINT
-------

 key.

---

- 8) 

R
---

**RE-ZERO**  The same as pressing the 

RE-ZERO
---------

 key. *AK(06H) is also sent when Zero is entered.*

---

- 9) 

Z
---

**ZERO**  Set the GROSS weight to ZERO.  The same as pressing the AD-1652 

ZERO
------

 key. *AK(06H) is also sent when Zero is entered.*

---

- 10) 

T
---

**TARE the balance**  Same as pressing the AD-1652 

TARE
------

 key. *AK(06H) is also sent when Tare is entered.*

---

- 11) 

G	S
---	---

**To change the display to GROSS Mode**  No change if already in GROSS mode.

---

- 12) 

N	T
---	---

**To change the display to NET Mode**  No change if already in NET mode.

# Commands Summary List

1) **? %** Request the 100% Weight

- The reply is always in grams (g), independent of the unit being displayed on the balance.

Send **? % ↵**

Reply **% W , + 1 2 3 4 5 . 6 (20H) (20H) g ↵**

2) **? @** Request the Unit Weight

- The reply is always in grams (g), independent of the unit being displayed on the balance.

Send **? @ ↵**

Reply **U W , + 1 2 . 3 4 5 6 (20H) (20H) g ↵**

3) **? C (n) (m)** Request a Parameter Setting

- You must specify the parameter group number (n) and parameter number (m). See PARAMETER SETTING.

Send **? C 0 0 ↵**

<input type="checkbox"/> Stb-b	X co	Stability Band Width
	0•	± 0.5 digits
		FC00:0

Reply **C 0 0 (20H) (20H) 0 ↵**

4) **? T W** Request the TARE Weight

Send **? T W ↵**

Reply **T W , + 1 2 3 4 5 . 6 (20H) (20H) g ↵**

6) **%** Set the 100% Weight

- Gram (g) is assumed for all 100% weight entry. Six digits are allowed and any digits under resolution will be dropped (ie. 12.345 → 12.34).
- The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is less than:

- ☐ FP-6000, 6200: 1g to 6,100g by 0.01g (FP-6200 users setting over 1,000g should use 0.1 resolution)
- ☐ FP-12K: 10g to 12,100g by 0.1g

Example: Send 

%	1	0	6	9	.	5	↵
---	---	---	---	---	---	---	---

 balance assumes 'g'.

7) **@** Set the Unit Weight

- Gram (g) is assumed for all unit weight entry. Six digits are allowed.
- The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is less than:

- ☐ FP-6000, 6200: 0.01000g to 6,100.00g
- ☐ FP-12K: 0.10000g to 12,100.0g

Example: Send 

@	1	.	2	3	4	5	6	↵
---	---	---	---	---	---	---	---	---

 balance assumes 'g'.

8) **C** Release the SIR □ Stops the SIR command above.

9) **C A L** Perform Calibration □ Same as pressing the **CAL** key.

10) **F C** To change a Parameter Setting □ Send <FC><nm>:<v>, the parameter section and parameter number, and setting.

- (n) = the parameter group number 0→8.
- (m) = the parameter number.
- (v) = parameter setting value

F	C	(n)	(m)	:	(v)	↵
---	---	-----	-----	---	-----	---

- Example, parameter 'CodE' is set at '0', No Code Number:

Send 

F	C	2	3	:	0	↵
---	---	---	---	---	---	---

☐ CodE	X c2	Send Code Number
	0•	No Code Number <span style="float: right;">FC23:0</span>

11) **G S** To change the display to GROSS Mode □ No change if already in GROSS mode.

12) **N T** To change the display to NET Mode □ No change if already in NET mode.

13) **O F F** Go to Display OFF mode □ No change if already in Display OFF mode.

14) 

O	N
---	---

**Go to Display ON mode**  No change if already in Display ON mode. *AK(06H) is also sent when start-up Re-Zeroing is finished.*

15) 

P
---

**Display ON/OFF**  The same as pressing the 

ON	OFF
----	-----

 key. *AK(06H) is also sent when start-up Re-Zeroing is finished with Display ON.*

16) 

P	R	T
---	---	---

**Print**  The same as pressing the 

PRINT
-------

 key.

17) 

Q
---

**Send Weighing Data (Question)**  Balance will send the weighing data immediately, whether data is stable or not.

18) 

R
---

**RE-ZERO**  The same as pressing the 

RE-ZERO
---------

 key. *AK(06H) is also sent when Re-Zeroing is finished.*

19) 

S
---

**Send Stable Weighing Data**  Balance will send only stable weighing data. Display will blink when data is transmitted.

20) 

S	I	R
---	---	---

**Send the Weighing Data Immediately & Repeat**  
 Balance will send the weighing data (whether data is stable or not) immediately with continuous transmission (like a stream mode) until the 'C' command is received.

21) 

S	M	P
---	---	---

**SAMPLE**  The same as pressing the 

SAMPLE-%
----------

 key. *AK(06H) is also sent when Unit Weight or 100% weight has been entered.*

22) 

T
---

**TARE the balance**  Same as pressing the AD-1652 

TARE
------

 key. *AK(06H) is also sent when Tare has been entered.*

23) 

T	W
---	---

**Set the TARE Weight**  
 Gram (g) is assumed for all 100% weight entry. Six digits are allowed and any digits under resolution will be dropped (ie. 12.345 → 12.34).  
 •The balance will error if: 1) The value is over the capacity; 2) The value is negative; 3) A weighing unit is sent; 4) The value is outside the range:  
     ☐ FP-6000, 6200: 1g to 6,100g by 0.01g (*FP-6200 users setting over 1,000g should use 0.1 resolution*)  
     ☐ FP-12K: 10g to 12,100g by 0.1g

*Example:* Send 

T	W	1	2	3	4	.	5	␣
---	---	---	---	---	---	---	---	---

 balance assumes 'g'.

24) 

U
---

**Change the Weighing Unit**  The same as pressing the 

MODE
------

 key.

25) 

Z
---

**ZERO**  Set the GROSS weight to ZERO.  The same as pressing the AD-1652 

ZERO
------

 key. *AK(06H) is also sent when Re-Zeroing is finished.*

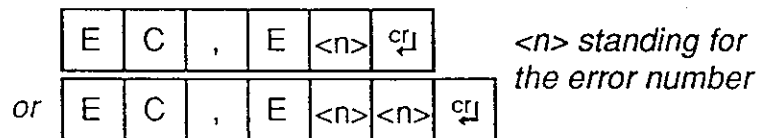
␣
---

# Error Codes for the Serial Interface



In the Command mode, the computer may receive an error code from the balance if the software parameter 'E-Cod c3' is set at '1' (p. G-10). Also:

- In the case the Command requests the weighing data, ex: the 'Q' command: then:
  - 1) If there is no error, then the balance sends the data; or
  - 2) If there is an error, then the balance sends the error code.
- In the case the Command is not a request, ex: 'TW' command: then:
  - 1) If there is no error, then the balance sends <AK> (06H) code; or
  - 2) If there is an error, then the balance sends the error code.
- To raise the reliance of the RS-232C communication, the balance replies to all commands.
- The format of the error codes is:



## E0 Communication Error

- Parity error, framing error, etc.

## E1 Undefined Command Error

- Example: Send 

?	t	w	crJ
---	---	---	-----

*Commands must up in Upper-Case letters.*

## E2 Balance not ready Error

- If the display is OFF, then only 'P' and 'ON' commands accepted.
- Data request commands (such as 'Q', 'S' commands) cannot be accepted if the balance is not in the weighing mode.

## E3 Time Over Error

- The balance couldn't receive the next character in 1 second after the last character was received (t-UP 0c3 set at '0').

## E4 Too Many Characters Error

- Example, command contains more than 18 characters.

## E5 Terminator Error

- The command contains an illegal terminator.

## E6 Format Error

- Example: If the command contains a weighing unit ('g' gram is always assumed).

## E7 Out of Range Error Example:

T	W	2	2	3	4	5	.	6	g
---	---	---	---	---	---	---	---	---	---

 - must be within balance capacity

## E11 Stability Error

- Balance display shows *Error 1*

- The balance takes more than 30 seconds to ZERO (see p. A•5).

## E12 Stability Error

- Balance display shows *Error 2*

- Please follow the same recommendations as **Error 1** on p. A•5.

## E16→17

### Internal Error

- Balance display shows *Error 6→7*

- Disconnect the AC adaptor, wait a few seconds and try again. If the error persists, call your dealer for service.

## E20

### Calibration Error

- Balance display shows *[RL E*

- Calibration weight is too heavy (see page C•5).

## E21

### Calibration Error

- Balance display shows *- [RL E*

- Calibration weight is too light (see page C•5).

## E22

### Calibration Error

- Balance display shows *[RL no*

- Balance unstable during calibration (see page C•5).

## E30

### Sample Too Light Error

- Balance display shows *° 20 -*

- Sample too light, load 20 samples (see pages E•2→5).

## E31

### Sample Too Light Error

- Balance display shows *° 50 -*

- Sample too light, load 50 samples (see pages E•2→5).

## E32

### Sample Too Light Error

- Balance display shows *° 100 -*

- Sample too light, load 100 samples (see pages E•2→5).



---

**E33 Sample Too Light Error**  Balance display shows  $L \square$

Individual sample weight too light (see pages E•2→5).

---

**E42 TARE Error**  TARE cannot be executed (see p. D•8).

---

**E43 “ $\xi$ ” Error**  RE-ZERO, ZERO, TARE and CAL are not available:  
“R”, “Z”, “T” and “CAL” commands were received  
when “E” was on the display.

---

**E44 “- $\xi$ ” Error**  RE-ZERO, ZERO, TARE and CAL are not available:  
“R”, “Z”, “T” and “CAL” commands were received  
when “-E” was on the display.

---



# Sample Computer Programs



## IBM PC-AT (STREAM Mode)

□ Balance parameters set to:

Print	4.c2	(STREAM Mode)
Code	0.c2	(no code number)
PAUSE	0.c2	(no pause)
bPS	3.c3	(4800 bps)
Cr-LF	0.c3	(terminator <CR><LF>)
tYPE	0.c3	(A&D Standard Format)

```

10 OPEN "COM1:4800,,,,,CS" AS #1
20 LINE INPUT #1,DT$
30 INPUT #1,HD$,DT$
40 IF HD$<>"OL" THEN GOTO 60
50 DT$=" "+LEFT$(DT$,1)+"E":GOTO 80
60 IF HD$<>"US" THEN GOTO 80
70 DT$=LEFT$(DT$,9)
80 PRINT HD$,DT$
90 GOTO 30
100 END

```



## IBM PC-AT (COMMAND Mode)

□ Balance parameters set to:

Print	5.c2	(COMMAND Mode)
bPS	3.c3	(4800 bps)
Cr-LF	1.c3	(terminator <CR>)
tYPE	0.c3	(A&D Standard Format)
t-UP	0.c3	(timer ON)
E-Cod	1.c3	(transmit error code)

```

10 OPEN "COM1:4800" AS #1
20 PRINT #1,"R"+CHR$(6)
30 LINE INPUT #1,AK$ {Reply to "R" command}
40 IF AK$<>CHR$(6) THEN GOTO 130
50 LINE INPUT #1,AK$ {End of REZERO}
60 IF AK$="EC,E0" THEN GOTO 140
70 IF AK$="EC,E11" THEN GOTO 150
80 FOR I=1 TO 1000: NEXT I
90 PRINT #1,"Q"+CHR$(13)
100 INPUT #1,HD$,DT$
110 PRINT HD$,DT$
120 GOTO 80
130 PRINT "BALANCE NOT READY!":CLOSE:END
140 PRINT "COMMUNICATION ERROR!":CLOSE:END
150 PRINT "ERROR 1...BALANCE NOT STABLE!":CLOSE:END

```



□ Balance parameters set to:

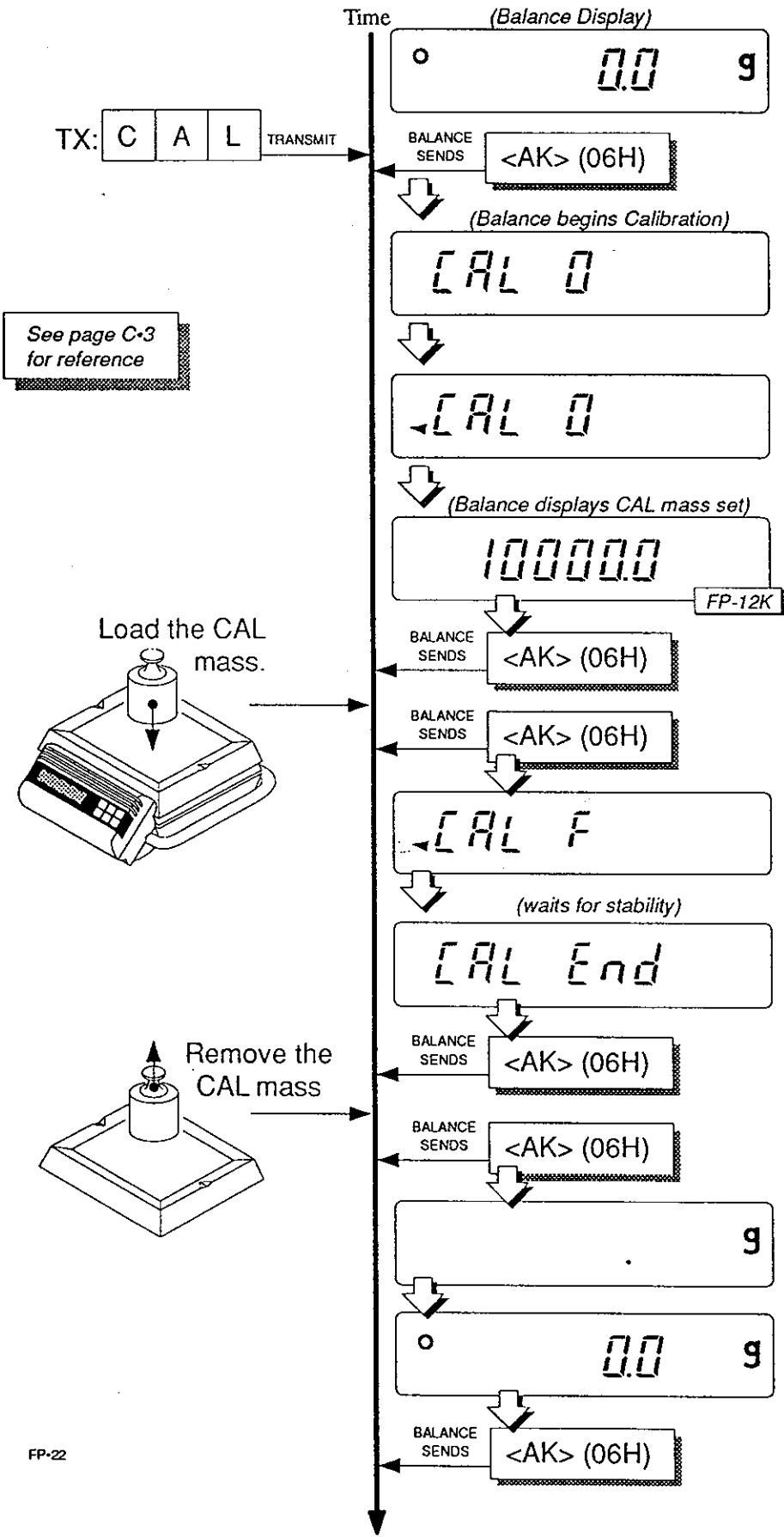
Print	5.c2	(COMMAND Mode)
bPS	3.c3	(4800 bps)
Cr-LF	0.c3	(terminator <CR><LF>)
tYPE	0.c3	(A&D Standard Format)
t-UP	0.c3	(timer ON)
E-Cod	1.c3	(transmit error code)

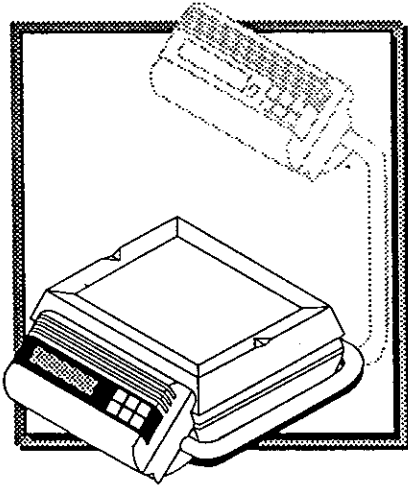
```

1Ø OPEN "COM:E71NN" AS #1 {NN=PC-9801 BASIC dialect}
2Ø PRINT #1, "R" {RE-ZERO the balance}
3Ø LINE INPUT #1, AK$ {Return <AK>}
4Ø IF AK$<>CHR$(6) THEN *ERROR {If ERROR, "EC,EXX" is received}
5Ø LINE INPUT #1, AK$ {End of REZERO}
6Ø IF AK$<>CHR$(6) THEN *ERROR
7Ø FOR I=1 TO 1ØØØ: NEXT I {Delay after <AK> received}
8Ø PRINT #1, "Q" {Question the balance}
9Ø INPUT #1, HD$, DT$ {Receive the data strings}
1ØØ PRINT HD$, DT$ {Display the data strings}
11Ø CLOSE
12Ø END {Stop}
13Ø *ERROR
14Ø PRINT "ERROR HAS OCCURRED"
15Ø CLOSE
16Ø END

```

# CAL Command Illustrated





## FP Series • Section L

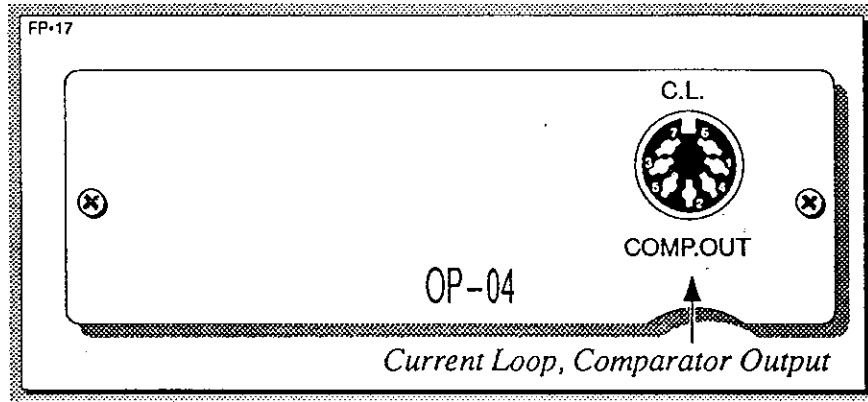
Comparator  
(requires AD-1652  
Remote Keyboard)



# Comparator



To use the comparator function the AD-1652 Remote Keyboard is required. For comparator output, option OP-04 is required. For OP-04 installation, please see page K-2 and follow OP-03 installation steps, ignoring Step 2.

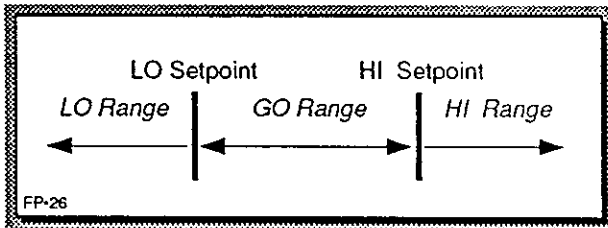


## Setting the Comparator



Along with setting the **HI** and **LO** limits, there are a number of C-Parameters that can and need to be set. These include Comparison Mode, Comparator Output, Buzzer, etc. They are listed on the next couple of pages. Here are some additional notes:


- You must set or view the HI/LO limits using the AD-1652 Remote controller and in limits must be set in grams 'g'.




The comparator function checks the amount on the weighing pan against set acceptable weight setpoints so that: **LO** ≤ **GO** ≤ **HI**

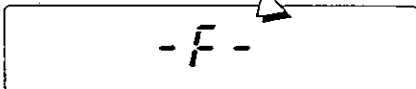
- If the weighing unit is changed, the **HI/LO** limits are converted to the unit displayed. For example: if the HI limit is 10g, if the unit is changed to carats, then then HI limit will be displayed as 50ct.
- If the unit weight or 100% weight is not registered in cnt/Pct mode, then the HI/LO limits will show zero. But after registration, the **HI/LO** limits are converted into each consecutive unit.
- The maximum HI/LO limits are limited to seven digits, -9999999 to +9999999.


## To Set LO Limit

 The **FUNC**  $\blacktriangleright$  **L.LIMIT** key  $\blacktriangleright$   $\langle N \rangle$   $\blacktriangleright$  **ENTER** key combination digitally sets the comparator lower limit. A negative number is permitted and the acceptable range is From -9999999 to +9999999.

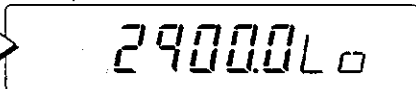
**1**  **FUNC**

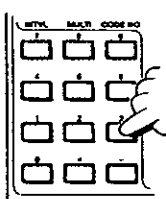
- Press the **FUNC** key.
- "-F-" will be displayed.
- Press the **FUNC** key again to exit.



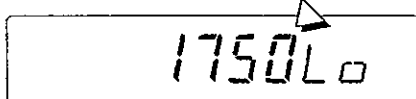
**2**  **L.LIMIT**

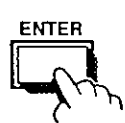
- Press the **L.LIMIT** key.
- Any previously set low limit will be displayed, in this example: 2,000.0g.



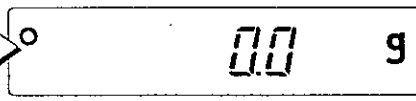
**3** 

- Use the 10-key pad to display low limit to enter.
- In this example: **1750** keys, low limit of 1,750g.

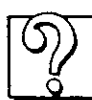



**4**  **ENTER**

- Press the **ENTER** key to enter it.
- The display will return to where you left it.

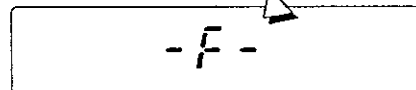



## To Set HI Limit

 The **FUNC**  $\blacktriangleright$  **H.LIMIT** key  $\blacktriangleright$   $\langle N \rangle$   $\blacktriangleright$  **ENTER** key combination digitally sets the comparator higher limit. A negative number is permitted and the acceptable range is From -9999999 to +9999999.

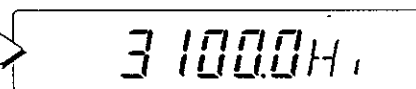
**1**  **FUNC**

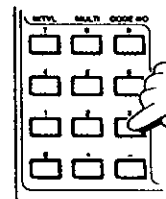
- Press the **FUNC** key.
- "-F-" will be displayed.
- Press the **FUNC** key again to exit.



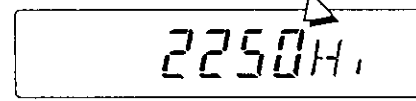
**2**  **H.LIMIT**

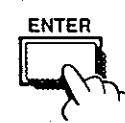
- Press the **H.LIMIT** key.
- Any previously set high limit will be displayed, in this example: 3,100.0g.




**3** 

- Use the 10-key pad to display high limit to enter.
- In this example: **2250** keys, high limit 2,250g.





**4**  **ENTER**

- Press the **ENTER** key to enter it.
- The display will return to where you left it.





## Select Comparator Mode

 The balance C-Parameter software is set at the factory for Comparator OFF "CP 0c6" (p. G•12). Select setting "1" or "2", setting instructions are on page G•3.


<input type="checkbox"/> CP	Xc6	Comparison Mode	
	0	Comparator OFF, <i>Factory Setting</i>	FC60:0
	1	Compare all Data	FC60:1
	2	Compare Stable or Overload Data	FC60:2


## Comparison Nearby ZERO


 The balance C-Parameter software is set at the factory so that the Comparator doesn't work when it's near ZERO. This is particularly useful when you have the LO limit beeper ON, it will not beep when the weighing pan is empty. Select setting "1" if you would like comparison near ZERO, setting instructions are on page G•3.


<input type="checkbox"/> CP-0	Xc6	Comparison Nearby ZERO	
	0	No Compare near ZERO, <i>Factory Setting</i>	FC61:0
	1	Compare near ZERO	FC61:1

## Comparator Beeper

 The balance C-Parameter software is set at the factory so that the Comparator doesn't beep. But unless you are using an external indicator (via OP-04), you will need a *beep* to indicate a comparator reading. Select setting "1" if you would like a *beep* in the **Lo**, **GO** or **HI** range, setting instructions are on page G•3.

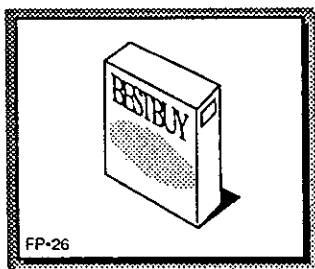
<input type="checkbox"/> bEEP-	Xc6	Beeper for LO Limit	
	0	No beep at, or under, LO limit	FC62:0
	1	Beep at , or under,LO limit	FC62:1

<input type="checkbox"/> bEEP-	Xc6	Beeper for GO Range	
	0	No beep for GO range	FC63:0
	1	Beep for GO range	FC63:1

<input type="checkbox"/> bEEP-	Xc6	Beeper for HI Limit	
	0	No beep at, or over, HI limit	FC64:0
	1	Beep at, or over, HI limit	FC64:1



# Comparator Use Example



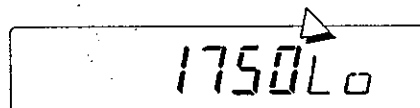
## Boxes of Mix

Let's say a box of mix has an ideal weight of 2,000g. When weighing, you wish to reject any box that contains less than 1,750g of mix or more than 2,250g:

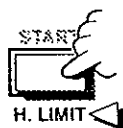
**1**



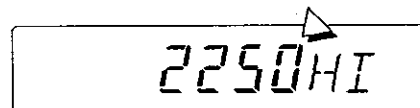
- ▶ Set the Low Limit at 1,750g (see L.4).
- Any weight of 1,750g or below is underweight.



**2**

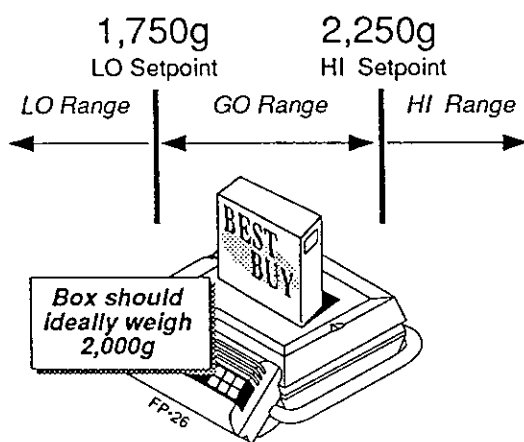
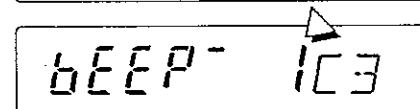
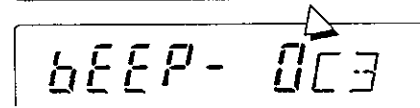
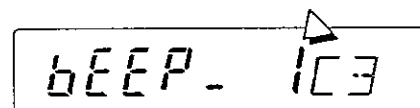


- ▶ Set the High Limit at 2,250g.
- Any weight of 2,250g or above is overweight.



**3**

- ▶ Set the Beeper so it sounds at **LO** limit and below – and at the **HI** limit and above (see L.5).
- Beeper *will not* sound if box is within the **GO** range,  $1,750g \leq \mathbf{GO} \leq 2,250g$  (bEEP- **0C6**).



The balance has now been set so:

- When a box of mix containing 1,750g or less is placed on the weighing pan, the display will show the weight and the balance will beep.
- If a box contains 1,750g or more, the display will show the weight and the balance will beep.
- For every box within the correct range, the beeper *will not* sound.

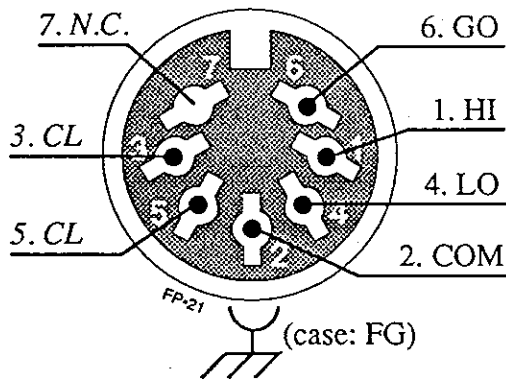
$$\mathbf{LO} \leq \mathbf{GO} \leq \mathbf{HI}$$

$$1,750g \leq \mathbf{GO} \leq 2,250g$$

$$\mathbf{LO} < 1,750g$$

$$2,250g < \mathbf{HI}$$

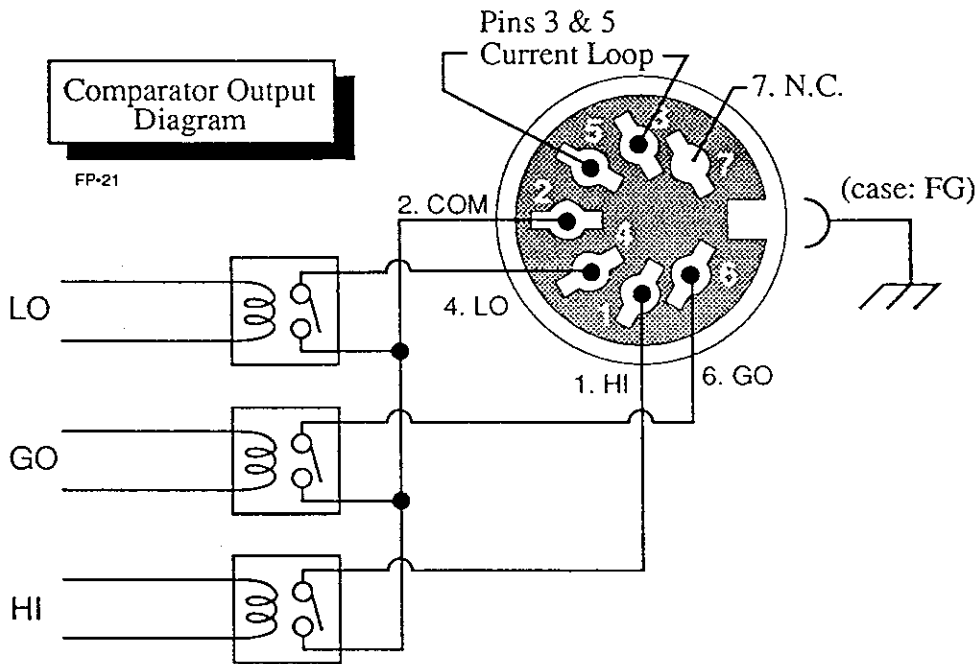
# Pin Connection and Specifications

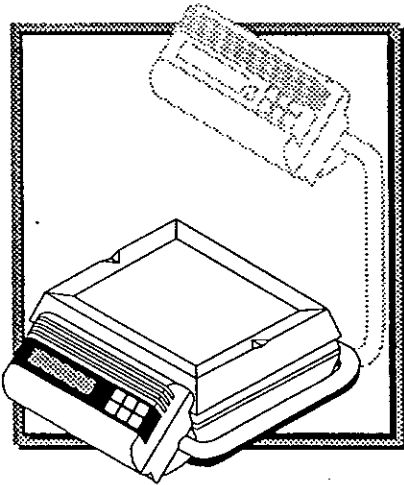


- Pin 1 - **HI**
- Pin 2 - Common
- Pin 3 - Current Loop
- Pin 4 - **LO**
- Pin 5 - Current Loop
- Pin 6 - **GO**
- Pin 7 - No Connection

Specifications:

Max. Voltage 50V DC  
 Max. Current 200 mA  
 See page K-6 for Current Loop diagram (same as OP-03)





**FP Series • Section M**

Miscellaneous



## Animal Weighing



Since animals move around, their measured weight changes considerably. Reading it in the normal mode is difficult. The animal weighing mode averages and displays the varying weight value.

This program averages the weight value within a specific variation range and time and displays the result together with the stable mark.

If a weight value changes considerably during an averaging, that averaging is cleared and averaging is started again. Therefore, widely separated data is not fetched.

Tare subtraction is also possible after display hold. Several animals can be weighed one after another without removing them from the scale.



## Animal Weighing Procedure

1

Press the **MODE** key and select units **R - g**.

2

When there is a tare, place it on the tray and press the **RE-ZERO** key to set the display to zero.

0.00 R - g

3

Place the animal on the scale. After the stable mark lights, read the display.

○ 832.54 R - g

4

When the animal is taken off the scale, the scale is automatically re-zero and is ready for the next weighing.

○ . R - g → 0.00 R - g

## Animal Weighing Start Conditions

Animal weighing is started when the weight value is equal to or greater than the value shown in the table below.

Model	FP 6000 / 6200	FP 12K
Weight value	10.00 g	20.0 g

## Animal Weighing Internal Settings

The vibration width, which starts averaging, is set at  $FLt-b$   $[0]$  and whether accuracy or work time has priority is set at  $Stb-b$   $[0]$ .

Parameter Group	Parameter Name	Setting	Contents
$[0]$	$Stb-b$	$0$	Work efficiency priority
		$1^*$	$\triangle$
		$2$	$\nabla$
		$3$	Accuracy priority
	$FLt-b$	$0$	Vibration width small
		$1$	$\triangle$
		$2^*$	$\nabla$
$3$		Vibration width large	

"\*" indicates factory settings.

## Rezeroing After Animal Weighing

When the animal is removed after display hold, the scale is automatically re-zeroed.

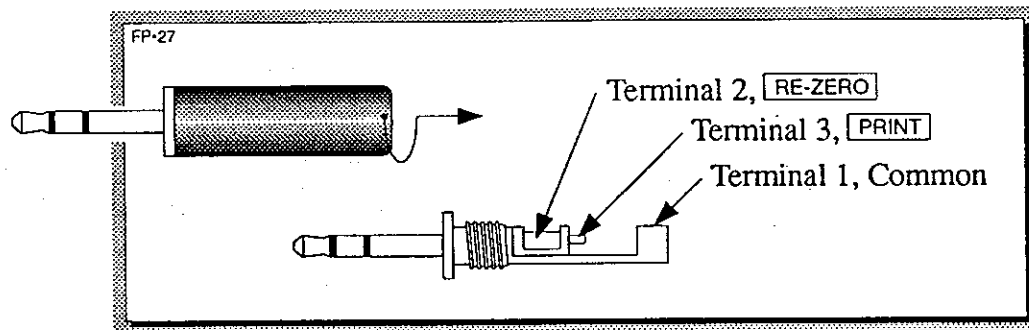
When the **RE-ZERO** key is pressed after display hold, zeroing is performed with fixed data.

When a weight over the variation width set at  $FLt-b$   $[0]$  is applied, the display is reset and animal weighing is restarted.

## Remote RE-ZERO or PRINT Switch



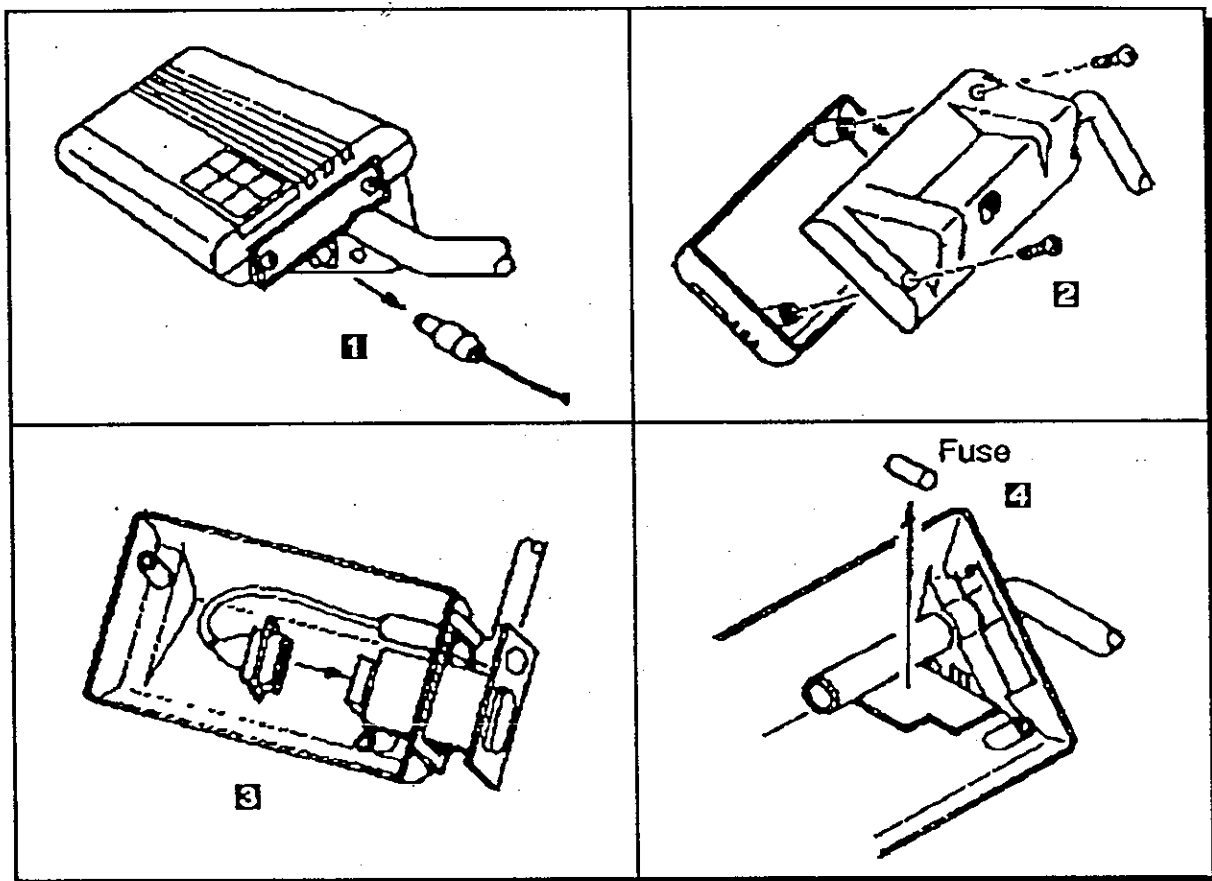
You can execute RE-ZERO (same as r key) or PRINT (same as p key) using a remote switch (when the circuit is shorted to common the balance responds as if the appropriate panel switch was pressed once) by using the 3-channel pin included with your balance.



## Trouble?

- ❑ What if the weighing result is not stable? Check that the weighing table is stable. Check that there are no drafts. Check that the breeze break (if any) is installed correctly. Check that the power supply voltage is stable.
- ❑ What if the weight displayed is obviously incorrect? Check that the balance is level. Check that it has been accurately calibrated. Check that the display started from zero before the mass was placed on the pan. Check that the mass is not overhanging and touching something else, like the sides of the breeze break or the top cover of the balance.
- ❑ What if "Lo" is displayed in "cnt" or "Pct" mode after I press the s key? The weight of the sample was too low. In counting mode you will be prompted to increase the sample size from 10 units to 20, 50 or 100 units but remember that the minimum unit weight cannot be less than the resolution of the balance. In percentage mode you can place a sample on the pan which is only 100 times the basic resolution but you will not be able to weigh to a percentage resolution of 0.01% until you use a sample which is 10,000 times the basic resolution (100.00% is 10,000 counts).
- ❑ What if the standby decimal point is not on when the adaptor is plugged in, and the display doesn't switch on when I press the o key? Check external fuses and if they have not blown check the internal fuse. Open the balance carefully as shown in the diagrams below. If the internal fuse has not blown, check that the adaptor is working. If the internal fuse has blown and blows again immediately, have the balance repaired.

## Changing the Fuse



**1** ▶ Remove the AC adaptor **1**.

**2** ▶ Remove the two screws that hold the pod face-plate and remove the face-plate **2**.

**3** ▶ Disconnect and remove any option board **3**.

**4** ▶ Locate and replace the fuse **4**. Please be careful not to disturb any other circuitry. If the fuse blows again, please contact your nearest A&D dealer for service. **VI**



# Specifications

Measuring Unit	Capacity x Resolution		
	FP-6000	FP-6200	FP-12K
Gram	6100.1 x 0.01	6100.1 x 0.1 / 1000.1 x 0.01	12101 x 0.1
Decimal Ounce	215.175 x 0.0005	215.175 x 0.005 / 35.2775 x 0.0005	426.85 x 0.005
Decimal Pound	13.4484 x 0.00005	13.448 x 0.0005 / 2.2048 x 0.00005	26.678 x 0.0005
Pound/Ounce (x 0.01oz.)	13lb 7.17oz.	13lb 7.17oz. / 2lb 3.28oz.	26lb 10.85oz.
Carat	30500.5 x 0.05	30500.5 x 0.5 / 5000.5 x 0.05	60505 x 0.5
Pennyweight	3922.46 x 0.01	3922.5 x 0.1 / 643.08 x 0.01	7781.1 x 0.1
Troy Ounce	196.123 x 0.0005	196.123 x 0.005 / 32.154 x 0.0005	389.055 x 0.005
Grain	94139 x 0.2	94140 x 2 / 15434 x 0.2	186746 x 2
Momme	1626.695 x 0.005	1626.7 x 0.05 / 266.705 x 0.005	3226.95 x 0.05
Tola	522.994 x 0.001	522.99 x 0.01 / 85.744 x 0.001	1037.48 x 0.01
* Tael (H.K.)	161.381 x 0.0005	161.38 x 0.005 / 26.458 x 0.0005	320.135 x 0.005
* Tael (H.K. Jewelry)	162.978 x 0.0005	162.98 x 0.005 / 26.72 x 0.0005	323.305 x 0.005
* Tael (Singapore)	161.408 x 0.0005	161.41 x 0.005 / 26.4625 x 0.0005	320.19 x 0.005
* Tael (Tiawan)	162.6695 x 0.0005	162.67 x 0.005 / 26.6695 x 0.0005	322.695 x 0.005
* Tael (China)	195.203 x 0.0005	195.205 x 0.005 / 32.003 x 0.0005	387.23 x 0.005
Messghal	1301.355 x 0.005	1301.35 x 0.05 / 213.355 x 0.005	2581.55 x 0.05
Percentage Min. Division	0.01%		
Repeatability/Std. Dev.	0.02g	0.05 / 0.02g	0.1g
Linearity	±0.03g	±0.1 / ±0.02g	±0.2g
Sens Drift (10°C - 30°C)	±3 ppm/°C	±8 ppm/°C	±5 ppm/°C
Stabilization time (approx.)	4 sec.	3.5 sec.	3.5 sec.
Pan size (mm)	210 x 245 mm		
Pan size (inches)	8.27" x 9.65"		
Net Weight (approx.)	8.5kg (18.72lb)		





## Errors

### ❑ Power Failure Error:

P-FAIL

"P-FAIL" power failure is displayed if power was interrupted during weighing the last time the balance was used.

▶ Press the o key, see p. A•4.

### ❑ Stability Error:

Error 1

'Error 1' will be displayed if the balance can not become stable while zeroing, or weighing.

▶ Check for excessive vibrations or drafts. Press the r key and see BEST CONDITIONS FOR WEIGHING, p. A•2.

### ❑ Stability Error:

Error 2

'Error 2' will be displayed if the balance can not become stable while registering the unit weight.

▶ Check for excessive vibrations or drafts. Press the r key and see BEST CONDITIONS FOR WEIGHING, p. A•2.

### ❑ Value Error:

Error 3

'Error 3' will be displayed if the value entered is out of the range permitted for the function.

▶ To return to weighing mode, press any key, p. H•3.

### ❑ Memory Error:

Error 6

'Error 6' will be displayed if the balance has a memory problem.

▶ Disconnect and connect AC power and try again. If error persists, call for service.

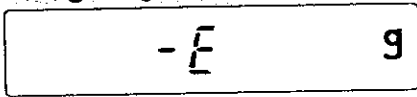
### ❑ Memory Error:

Error 7

'Error 7' will be displayed if the balance has a memory problem.

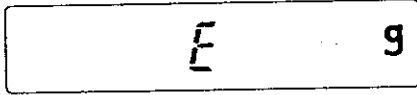
▶ Disconnect and connect AC power and try again. If error persists, call for service.

Weighing Pan Error:



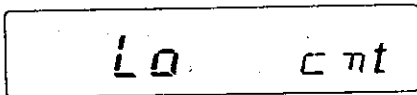
'-E' will be displayed if the the weighing pan or pan support are not mounted, p. D•2.

Overload Error:



'E' will be displayed if the weight is beyond the balance capacity, p. D•2.

Count Sample too light:



'Lo cnt' will be displayed if the unit weight is too small. The display will show 'Lo' and returns to the "10 - cnt" display.

Unit weight is less than 0.1g for the FP-6000/6200 or 1.0g for the FP-12K.

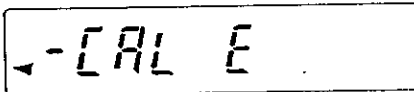
100% Sample too light:



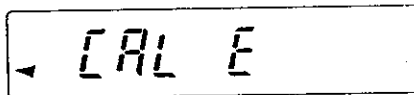
'Lo Pct' will be displayed if the 100% weight is too small. The display will show 'Lo' and returns to the "100 - pct" display.

100% weight is less than 1g for the FP-6000/6200 or 10g for the FP-12K.

CAL Errors:

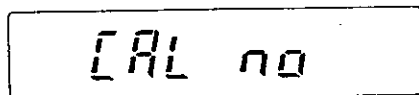


'-CAL E' will be displayed if the calibration mass is too light (varies by more than 10g of set weight).



'CAL E' will be displayed if the calibration mass is too heavy (varies by more than 10g of set weight).

Check the mass weight, look for something touching the weighing pan. Press the r key, then the c key before trying again.



'CAL no' will be displayed if the balance can not become stable while weighing the calibration mass.

Check for excessive vibrations or drafts. Press the r key and see BEST CONDITIONS FOR WEIGHING, p. A•2.