FG SERIES

BENCH & PLATFORM SCALES

MAINTENANCE MANUAL

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BENCH & PLATFORM SCALES

MODELS

FG-150KA FG-60KA FG-30KA
FG-150KB FG-60KB FG-30KB

A&D Company, Limited

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Compliance with 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.)

Introduction to the FG

The FG series platform scales are the product of years of research, design, development and in-field testing. They incorporate the latest advances in electronic and mechanical engineering and offer increased features and increased functions all at a reduced cost. Every care has been taken during the manufacturing process of this scale to ensure that it will perform accurately and reliably for many years.

Electronic Platform Scales are in one sense extremely simple products, that is they are very easy to use. In another sense they are rather complex in that they are high technology products.

There are two versions, an American (decimal pound / kilogram) version with units conversion and tare function, and an International (kg only) version with a full range zero function.

The FG scale is designed to be operated with an AC adapter, but may be operated on six AM3 ('AA' type) 1.5V dry batteries. Continuous operation will be possible for between 50 to 100 hours on one set of batteries at 20°C/68°F (dependent on the type of batteries used).

The FG scales use a sharp, 22mm high LCD display. The A/D converter is highly accurate and there is complete RFI shielding for the analog section. The weighing platform is of a rugged stainless steel type. The Display Pod can be mounted on the side or end of the weighing platform, removed and used with option 01 as a wall mounted weighing indicator or placed on an optional display column (OP-02). Optional RS-232C (OP-03) and current loop (OP-05) interfaces are available. Option 04 provides a platform for mounting the AD-8121 printer next to the display pod. Option 06 provides the FG series scales with a carrying handle.

Specifications

Mode	FG 150K	FG 60K	FG 30K
Capacity and resolution kg	150kg x 50g	60kg x 20g	31kg x 10g
Capacity and resolution lb	300 x 0.1 lb	150 x 0.05 lb	60 x 0.02 lb
Calibration weight kg	Adjustable from 0.1 to 150	Adjustable from 0.1 to 60	Adjustable from 0.1 to 30
Calibration weight lb	Adjustable from 1.0 to 300	Adjustable from 0.1 to 150	Adjustable from 0.1 to 60
Pan size mm	300 x 380		
Pan size inches	11.8 x 15.4		
Weight	8.5kg Standard version		
Power	9V DC from an AC adapter or 6 x AM3 'AA' size batteries		
Battery life	Approx. 50 hours with manganese type cells/100 hours with alkaline, at 20°C/68°F		
Operating temperature	-5°C~35°C/23°F~95°F		

Specifications subject to change for improvement without notice.

Principles of Operation

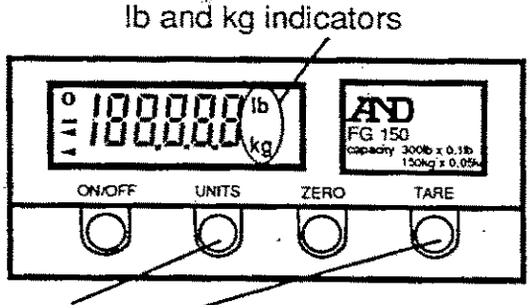
The FG series scales are composed of an indicator containing the main board and the display and a base containing a load cell. Options may be added to this for data communications, mounting the head seperately from the base, mounting an AD-8121 printer at the side of the pod and a carrying handle for use where the scale must be moved often.

There are two versions of the FG, decemal pound or kilograms and a kilogram only version. There are three capacity ranges, 30kg / 60lb, 60kg / 150lb and 150kg / 300lb. All variations are the same except for the load cells, programming, key sheet and capacity label.

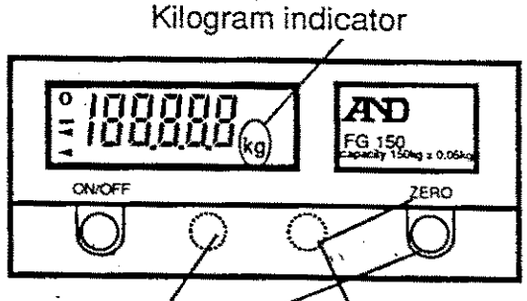
As the temperature sensor is mounted on the load cell, a given load cell and main board are a set. Using a temperature controled room, any FG type load cell can be matched to a main board.

The differences in the key sheet are pointed out in the diagram below.

Decimal pound version



Kilogram only version



The main board (PZ:2610) includes the central processing unit (CPU), analog to digital converter (A/D), power regulator, memory and display. The key board consists of 4 switches mounted on the back of the main board with the display.

1. The A/D converter is mounted in an aluminum container for RFI protection and is normally replaced as a unit. It employs a dual slope integrating converter that outputs a variable pulse width dependent upon the input voltage.
2. The CPU is a mask programmed large scale integrated circuit that measures the width of the pulse output by the A/D converter. In the calibration process, values for zero and full capacity are stored in an EEPROM (memory). During normal operation the CPU compares the weight measured to the values stored for zero and span to determine the actual weight in kilograms. This is converted, using a formula, to decimal pounds. Communications data is converted by the CPU into serial data for the RS-232C and current loop options. The CPU reads switch closures from the keys and directly drives the liquid crystal display.
3. All function information such as version, range and control is stored in the EEPROM.
4. The main program is stored in the CPU and can not be altered.

5. The power input regulator consists of a control IC and a transistor to supply all of the circuits on the main board with 5 volts.

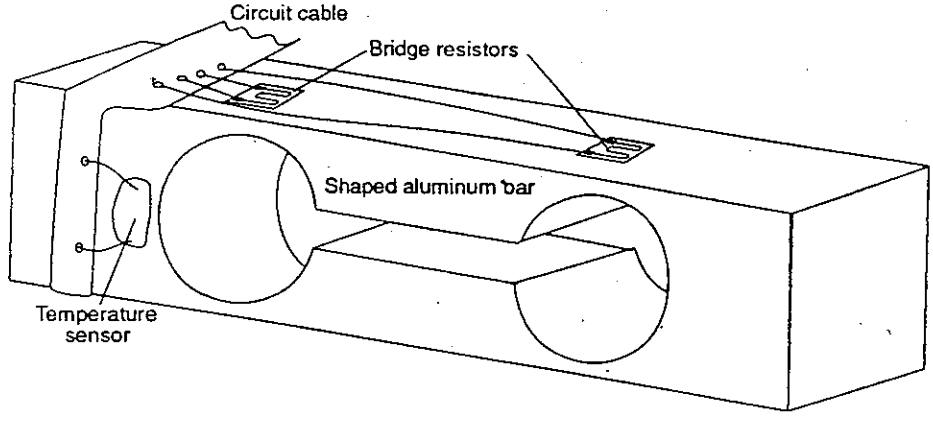
The second section of the scale is the base with it's associated load cell. The strength of the load cell determines it's range. Below is a drawing and circuit diagram for a load cell similar to the one used in the FG series (components of the cell have been moved to clarify it's operation).

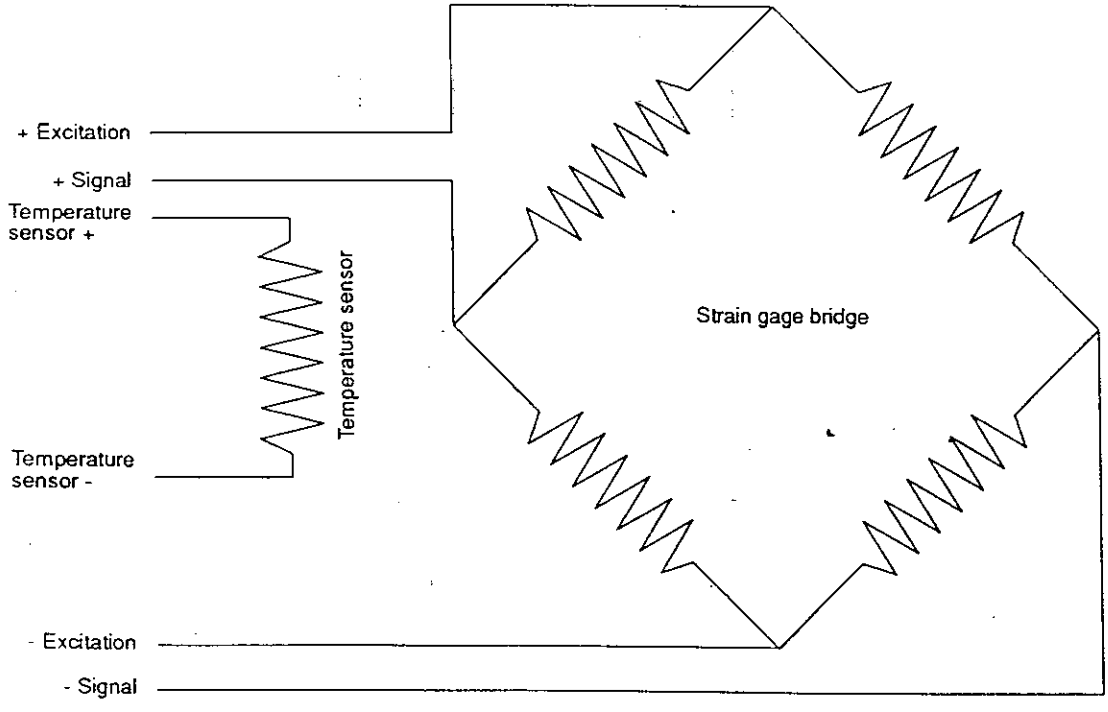
This is not a standard load cell, as it has a temperature sensor mounted on the surface of the aluminum bar. The temperature sensor is used to cancel any drift in the strain gages caused by changes in the local ambient temperature.

This load cell can not be replaced by a standard load cell, as there will be no temperature sensor. Without the temperature sensor input, the main board will not function properly.

The base or load cell can not be used with another head or indicator that has no input for the temperature sensor. Used without the temperature sensor, the indicator will drift with a change in load cell temperature.

The main board and load cell are a set that were matched together during manufacture. A procedure is included in this manual to match the main board to a load cell.





Problems & Solutions

The FG series scales seldom experience problems in normal operation, so the exception will be dealt with here.

1. The scale will not power up, no display or display is "Lb".
   a) Check the AC adapter to verify that it is the correct type. Check the output of the AC adapter, it should be between 16 and 21 volts when not connected to the scale. The ratings on the label should be 9.5V at 50mA. The output polarity must be positive on the outer ring and negative on the center pin. This is reversed to many of the AC adapters sold by appliance stores.
   b) Check the power connection to the AC adapter to verify that the correct line voltage is present.
   c) Check the connection to the scale, verify that the connector is fully inserted.
   d) Check the cable connections at the main board going to the base to verify that all of the wires are connected and not twisted causing a short circuit.
2. If using the scale on battery power and it will not power up, no display or display is "Lb".
   a) Check the batteries by replacing them with a new set.
   b) Verify that the batteries are installed correctly.
   c) Check the cable connections at the main board going to the base to verify that all of the wires are connected and not twisted causing a short circuit.
3. The scale powers up and does a self test (- 88888) but will not zero.
   a) Check the cable connections at the main board going to the base to verify that all of the wires are connected.
   b) Check for cuts in the cable going to the load cell.
4. The scale has been wet and is drifting.
   a) Remove the weighing pan from the base and carefully dry the load cell. Do not use compressed air as it may cause the strain gages to peel off. Use caution when drying around the strain gages. Use cotton swabs to remove the large droplets. Use absorbent tissue to dry the aluminum bar. Place the base in a warm dry room and allow it to completely dry. Remove the feet and dry the threads of the screws and frame. Place a light film of grease on the threads to prevent corrosion. If the main board has been wet, remove it and dry using tissue to remove as much water as possible. Use a hair drier set on low (not to hot or the display will be damaged) to dry the board. The A/D converter can not be taken apart, but the chance of water getting into it is small. Shake the board to free up any water that may be under the A/D converter. Place the board in a warm area and allow it to dry. Do not place the board in direct sunlight, the display will be damaged.

Main Board Check Mode

In check mode, the LCD segments, key switches, display pattern, internal count value, and A/D count can be checked. For the FG-KAEG and FG-KBEG, see the section "Main Board Adjustment"

Check Mode Operation

1. Verify that the power is turned OFF. Connect a load cell (base) to the input.
2. While holding [SW2] and [SW3] down, turn the power ON by pressing [SW1].
3. Check that all of the LCD segments function.

3.1 Serial input/output ports

(1) Remain in the LCD check mode.

(2) Tie the CPU SI port (34 pin) to 0V (GND), then check that "E" is displayed in the fifth digit (See illustration).

(3) Tie the CPU SO port (35 pin) to 0V (GND), then check that "II" is displayed in the fifth digit (See illustration).

(4) Tie the CPU SCK port (36 pin) to 0V (GND), then check that "3" is displayed

in the fifth digit (See illustration).

3.3 *Key switches*

(1) Remain in the LCD check mode.

(2) Press and hold [SW5]+ and check that "1" is displayed in the third digit (See illustration).

(3) Press and hold [SW4] and check that "1" is displayed in the first digit (See illustration).

(4) Press and hold [SW3] and check that "1" is displayed in the second digit. (See illustration).

(5) Press [SW2] and verify that the scale enters the next check mode.

4. Display pattern

(1) Press [SW2] to enter the display pattern check mode.

(2) In the display pattern check mode, verify that the display alternates as follows in one second intervals

→ [▼ ▼ . , .] → [E E E E E] → [d d d d d] → [C C C C C]

→ [b b b b b] → [A A A A A] → [9 9 9 9 9] → [8 8 8 8 8]

→ [7 7 7 7 7] → [6 6 6 6 6] → [5 5 5 5 5] → [4 4 4 4 4]

→ [3 3 3 3 3] → [2 2 2 2 2] → [1 1 1 1 1] → [0 0 0 0 0]

(3) Repeat step (2).

5. Internal count

The measured data is displayed times eight (data x 8).

(1) Press [SW2] and the scale exits the display pattern check mode and enters the internal count check mode.

(2) Press [SW4] and check that a re-zero is performed.

The relationship between the displayed data and the internal count is as follows:

Plus indication:

$$(+ \text{ displated data}) = \frac{(\text{internal count})}{8} \text{ X (minimum indication)}$$

Minus indication:

$$(- \text{ displated data}) = \frac{(\text{internal count} + 1)}{8} \text{ X (minimum indication)}$$

The first decimal number should be rounded to the nearest whole number.

Note: If the internal count is displayed soon after entering the check mode, it will take about 25 seconds to become stable, since the offset and temperature A/D values are not stable. Wait for five seconds or more after entering the check mode before displaying the internal count, stability will be achieved in a shorter time.

6. A/D Count

(1) Press [SW2] to enter the A/D count check mode.

(2) The zero data of the internal count check mode will be cleared.

(3) Press [SW4] to re-zero the display.

(4) Press [SW3] several times and check that the display alternates from weight (6.1), offset (6.2), and temperature (6.3) A/D count whenever [SW3] is pressed.

6.1 Weight A/D

The A/D value is input from the Load Cell.

"OK" is displayed (on the far right side) to indicate that the weight A/D count is currently displayed.

6.2 Offset A/D

The offset value input in the A/D circuit.

"-" is displayed (on the far right side) to indicate that the offset A/D count is currently displayed.

6.3 Temperature A/D

The A/D value input from the temperature sensitive gauge

"+" is displayed (on the far right side) to indicate that the temperature A/D count is currently displayed.

7. RS-232C. Outputs the same value displayed in steps 5 and 6.
8. Low battery. "Lb" is displayed when the CPU KEO port (24 pin) is tied to 0V (GND) in steps 5 and 6.
9. Pressing [SW2] alternates the check modes between 5 and 6 and the zero data is reset each time.
10. Press [SW1] to turn the power OFF and end the check mode.

FG-KAEG/KBEG BOARD ADJUSTMENT

1. Initialization

(1) Connect the PZ2610 to a dummy load cell (AD-4376).

(2) Perform the initialization. (See "INITIALIZATION.")

(3) Verify that "CF1 0" is displayed.

(4) Press [SW5] and check that "CAL T" is displayed.

(5) Proceed to "2. CALIBRATION."

2. Calibration

Refer to "CALIBRATION."

(1) Set the temperature A/D offset.

(2) Verify that the temperature coefficient of the temperature sensitive gauge is 6000.

(3) Verify that the temperature coefficient of the load cell is 600.

(4) Set the temperature setting to 0.

(5) Take the temperature A/D.

(6) Verify that the gravity value is 9.798.

(7) Set the dummy cell output to 0.5 mV/V then perform the zero calibration.

(8) Set the dummy cell output to 1.5 mV/V then perform the span calibration.

(9) End the calibration.

(10) Check the operation by following steps 3-1 to 3-6, after connecting the PZ2610 to the dummy cell.

3. Operation Check

Enter the check mode by referring to "CHECK MODE OPERATION" and check the following items:

3.1 LCD segments

(1) Verify that the LCD segments are uniform and that none are missing.

3.2 Input/output port and key switches

(1) Verify that the serial input/output port functions normally.

(2) Verify that the key switches function normally.

3.3 Display pattern

(1) Enter the display pattern checking mode.

(2) Verify that the segments are displayed normally.

3.4 A/D operation

(1) Enter the A/D count checking mode.

(2) Verify that the A/D offset value is within the range 90,000 +_ 40,000 counts.

(3) Set the A/D offset value to 0 by pressing [SW4].

(4) Verify that the temperature A/D value is within the range 70,000 +_ 15,000 counts.

(5) Set the dummy cell to 1.0 mV/V, then verify that the A/D gravity value is within the range 100,000 +_ 3,000 counts.

3.5 Calibration and linearity

(1) Enter the internal count checking mode.

(2) Set the dummy cell to 0.5 mV/V, then verify that the internal counts are within the range 0 +_ 20 counts.

(3) Set the dummy cell to 1.0 mV/V, then verify that the internal count is within the range 12,000 +_ 10 counts.

(4) Set the dummy cell to 1.5 mV/V, then verify that the internal count is within the range 24,000 +_ 10 counts.

3.6 Low battery

(1) Set the low battery check terminal to 0V, then verify that "Lb" is displayed.

4. End

Turn the power OFF.

Product Adjustment

1. Internal Setting

1.1 Internal setting for FG-KA/KB

(1) Enter the internal setting mode and set the following items, by referring to "INTERNAL SETTING":

(1) CF1 = 0

(2) CF2 = 2

(3) CF3 = 2

(4) CF4 = 2 FG-30K
3 FG-60K
4 FG-150K

(5)F1 = 1

(6)F2 = 0

1.2 Internal setting for FG-KAEG/KBEG

(1) Enter the internal setting mode and set the following items, by referring to "INTERNAL SETTING":

(1) CF1 = 1

(2) CF2 = 1

(3) CF3 = 2

(4) CF4 = 2 FG-30KAEG/KBEG
3 FG-60KAEG/KBEG
4 FG-150KAEG/KBEG

(5)F1 = 1

(6)F2 = 0

2. Calibration

(1) Enter the calibration mode by referring to "CALIBRATION."

2.1 CAL T

(1) Proceed to the next setting procedure (CAL A) by pressing [SW5] or [SW2].

2.2 CAL A

(1) Verify that the weight is 6000.

(2) Proceed to the next setting procedure (CAL b) by pressing [SW5] or [SW2].

2.3 CAL b

(1) Verify that the weight is 600.

(2) Proceed to the next setting procedure (CAL C) by pressing [SW5] or [SW2].

2.4 CAL C

(1) Measure the Load Cell temperature and enter that value.

2.5 CAL t

(1) Enter the temperature A/D value.

2.6 Gravity value

(1) Enter the gravity value for the current location.

2.7 CAL 0

(1) Perform the zero calibration.

2.8 CAL 1

(1) Perform the span calibration with the maximum weight calibration mass.

Note: The maximum weights for the FG series scales are:

FG30K = 30 kg

FG60K = 60 kg

FG150K = 150 kg.

2.9 End of calibration.

3. Operation Check

Press [SW2] and [SW3] simultaneously to enter the check mode.

Refer to "CHECK MODE OPERATION" and check the following items:

3.1 LCD segments

(1) Verify that the LCD segments are uniform and that none are missing.

3.2 Key switches

(1) Verify that the display alters whenever [SW5], [SW4], or [SW3] are pressed.

3.3 Display pattern

(1) Verify that the segments are correctly displayed.

3.4 Zero point

(1) Enter the internal count display mode.

(2) Verify that the count is within the range 0 +_ 20 when the weighing platform is empty.

3.5 Half the maximum weight

(1) Verify that the count is within the range 12000 +_ 4 when the calibration mass with 1/2 of the maximum weight is placed on the weighing platform.

Note: Half the maximum weight for the FG series scales are:

FG30K = 15 kg

FG60K = 30 kg

FG150K = 75 kg.

3.6 Maximum weight

(1) Verify that the count is within the range 24000 +_ 4 when the maximum weight calibration mass is placed on the weighing platform.

Note: The maximum weights for the FG series scales are:

FG30K = 30 kg

FG60K = 60 kg

FG150K = 150 kg.

3.7 Corner load

(1) The count when a calibration mass equal to one third the maximum weight is placed at each of four corners is within +_ 8 compared with the one when placed at center of the weighing platform.

Note: One third the maximum weight for the FG series scales are:

FG30K = 10kg

FG60K = 20 kg

FG150K = 50 kg.

3.8 End

Turn the power OFF.

Initialization

This section describes the initialization procedure for the data mentioned below. As there are some differences between versions, Refer to the section for the FG KA and KB prior to starting initialization.

(1) CF1 = 0 : Selects 3-key type with [ON/OFF], [UNIT], and [ZERO]

(2) CF2 = 2 : Selects metric or OIML standard

(3) CF3 = 2 : 2 digits in decimal (0.00)

(4) CF4 = 2 : Set the scale type to FG30K (31.00 kg x 0.01 kg)

(5) F1 = 1 : Selects automatic power off

(6) F2 = 0 : Selects STREAM mode for serial communication

(7) F3 = 1 : Selects the displayed value to be confirmed

(8) CAL A = 6000 ppm : Sets the temperature coefficient of the temperature sensitive gauge

(9) CAL b = 600 ppm : Sets the temperature coefficient of the Load Cell

(10) Acceleration of gravity : 9.798 m/s^2

Operation

1. Verify that the power is turned OFF.
2. Turn the power ON by pressing [SW1] while holding [SW2], [SW3], and [SW5] down.
3. Verify that "CF1" is displayed after "init" is displayed.
4. Enter the internal setting mode, by referring to the "INTERNAL SETTING".
5. Error message

   (1) Err 8: The set data is not correctly stored in the memory.

   Turn the power OFF, then retry the setting.

Internal Settings

This section describes the internal setting for different scale types, displays and functions.

Functions of key switches used for the internal setting are as follows:

(1) [SW2] : Subtracts 1 from the displayed value (changes the set value).

(2) [SW3] : Adds 1 to the displayed value (changes the set value).

(3) [SW4] : Stores currently displayed data as the newly set data (memory), then proceeds to the next setting procedure.

(4) [SW5] : Proceeds to the next setting procedure with the data unchanged (proceeds without changing).

Operation

1. Enter the internal setting mode as follows:
   (1) Verify that the power is turned OFF.
   (2) Turn the power ON by pressing [SW1] while holding [SW4] and [SW5] down.
   (3) Verify that the scale enters the internal setting mode with "CF1 x" displayed.
2. Setting the display type (CF1)

   Set the display type as follows:
   (1) Verify that the current setting is displayed.
   (2) To proceed to the next setting procedure without changing the current setting, press [SW5].
   (3) To change the current setting, select from 0 to 3 by using [SW2] and [SW3].

   0 = Basic type

   3-key type with [ON/OFF], [UNIT], and [ZERO]

   1 = Standard type

   4-key type with [ON/OFF], [UNIT], [ZERO], and [TARE]

   2 = Body weight type

   Displayed value is confirmed after the weight gets stable.

   4-key type with [ON/OFF], [UNIT], [RANGE], and [ZERO]

   3 = Basic type with PCS function

   The simple count function is added to the "0" basic type.

   4-key type with [ON/OFF], [UNIT], [SET], and [ZERO]

   (4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].
   (5) Verify that "CF2" is displayed.

3. Selecting the weighing unit according to countries

(1) Verify that the current setting is displayed.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select from 0 to 6 by using [SW2] and [SW3].

0 = Metric (kg)
Zero and tare operations are for the original specifications.

1 = Non-metric (lb and kg)
lb can also be used for the weighing unit.

Zero and tare operations are the same as for the "0" type.

2 = Metric with OIML standard (kg)
Zero and tare operations comply with the OIML standard.

3 = Metric (kg)
Zero and tare operations are for the New Zealand specifications.

4 = Metric (kg)
Zero and tare operations are for the Dutch specifications.

5 = Metric (g)
Same as "2" type except for the weight unit (g).

6 = Metric (t)
Same as "2" type except for the weight unit (t).

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "CF3" is displayed.

4. Setting the decimal notation (CF3)

(1) Display the current setting.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select from 0 to 3 or 8 to b by using [SW2] and [SW3].

0 = No decimals (0)
1 = 1 decimal digit (0.0)
2 = 2 decimal digits (0.00)
3 = 3 decimal digits (0.000)
8 = No digits after the comma (0)
9 = 1 digit after the comma (0, 0)
A = 2 digits after the comma (0, 00)
b = 3 digits after the comma (0, 000)

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "CF4" is displayed.

5. Setting maximum weight and minimum display (CF4)

Set the combination of the maximum weight and minimum display as follows:

(1) Verify that the current setting is displayed.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select from 0 to E by using [SW2] and [SW3].

0 =	2000kg	x 1kg		(2000kg	x 5kg)
	4000lb	x 2lb		(4000lb	x 10lb)
1 =	3000kg	x 1kg		(3000kg	x 5kg)
	6000lb	x 2lb		(6000lb	x 10lb)
2 =	3100kg	x 1kg		(3100kg	x 5kg)
	6000lb	x 2lb		(6000lb	x 10lb)
3 =	6000kg	x 2kg		(6000kg	x 10kg)
	15000lb	x 5lb		(15000lb	x 10lb)
4 =	15000kg	x 5kg		(15000kg	x 10kg)
	3000lb	x 1lb		(3000lb	x 5lb)
5 =	20000kg	x 5kg		(20000kg	x 10kg)
	4000lb	x 1lb		(4000lb	x 5lb)
6 =	30000kg	x 5kg		(30000kg	x 10kg)
	6000lb	x 1lb		(6000lb	x 5lb)
7 =	31000kg	x 5kg		(31000kg	x 10kg)
	6000lb	x 1lb		(6000lb	x 5lb)
8 =	6000kg	x 1kg		(6000kg	x 5kg)
	15000lb	x 2lb		(15000lb	x 10lb)
9 =	15000kg	x 2kg		(15000kg	x 10kg)
	30000lb	x 5lb		(30000lb	x 10lb)
A =	20000kg	x 10kg	/ 10000kg	x 5kg	
	4000lb	x 2lb	/ 2000lb	x 1lb	
b =	30000kg	x 10kg	/ 15000kg	x 5kg	
	6000lb	x 2lb	/ 3000lb	x 1lb	
C =	31000kg	x 10kg	/ 15000kg	x 5kg	
	6000lb	x 2lb	/ 3000lb	x 1lb	
d =	6000kg	x2kg	/ 3000kg	x 1kg	
	15000lb	x 5lb	/ 6000lb	x 2lb	
E =	15000kg	x 5kg	/ 6000kg	x 2kg	
	30000lb	x 10lb	/ 15000lb	x 5lb	

Note: Values in parentheses are large range values of the body weight type (CF1 = 2).

(4) Store the newly set data and proceed to the next setting procedure by pressing the [SW4].

(5) Verify that "F1" is displayed.

6. Setting the Automatic Power-Off function (F1)

Selects the Automatic Power-Off function, which turns off the power if zero is displayed for 5 minutes or longer as follows:

(1) Verify that the current setting is displayed.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select 0 or 1 by using [SW2] and [SW3].

0 = Automatic Power-Off enabled

1 = Automatic Power-Off disabled

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "F2" is displayed.

7. Setting the serial data communication type (F2)

Set the serial data communication type as follows:

(1) Verify that the current setting is displayed.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select from 0 to 2 by using [SW2] and [SW3].

0 = STREAM mode

Outputs the weight data at every sampling.
Sampling speed is approximately 5/sec.

1 = COMMAND mode

Outputs the weight data upon receiving the request command.

2 = AUTOMATIC PRINT mode

Outputs the weight data only once after the display is confirmed.
Effective only for the body weight type (CF1 = 2).

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "F3" is displayed.

8. Selecting the display confirming function (F3)

Select the display function which confirms the displayed value after the weight is stable as follows [effective only for the body weight type (CF1 = 2)]:

(1) Verify that the current setting is displayed.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, select from 0 to 2 by using [SW2] and [SW3].

0 = Displayed value is not confirmed.
1 = Displayed value is confirmed.
2 = Displayed value is confirmed for 7 seconds even if the display confirming function is canceled.

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "CAL T" is displayed.

9. Error message

If the following error message is displayed, follow the procedure mentioned below.

(1) Err 8 : The set data is not correctly stored in the memory.

Turn the power OFF, then retry the setting.

Calibration

Functions of key switches used for the calibration are as follows:

(1) [SW2] : Moves the prompt 1 digit to the right (selecting the digit), or proceeds to the next setting procedure without changing the current setting.

(2) [SW3] : Adds 1 to the prompted value (changing the set value).

(3) [SW4] : Stores currently displayed data as the newly set data (memory), then proceeds to the next setting procedure.

(4) [SW5] : Proceeds on to the next setting procedure with the current setting unchanged.

Operation

1. To enter the calibration mode.

   (1) Verify that the power is OFF.

   (2) While holding [SW4] and [SW5] down, turn the power ON by pressing [SW1].

   (3) Verify that the scale enters the internal setting mode with "CF1" displayed.

   (4) Press [SW5] (to proceed without changing) and check that "CAL T" is displayed.

2. Setting the temperature A/D offset value (CAL T)

   This operation removes the electrical error of the temperature A/D circuit.

   (1) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

   (2) To change the current setting, short the temperature sensitive gauge.

   (3) When the circular stability indicator goes on, press [SW4] to store the offset value data and proceed to the next setting procedure.

   (4) Verify that "CAL A" is displayed.

3. Temperature coefficient of the temperature sensitive gauge

3.1 CAL A

   When "CAL A" is displayed, enter the setting mode for the temperature coefficient of the temperature sensitive gauge:

   (1) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

   (2) To change the current setting, press [SW4] to enter the setting mode.

   (3) Verify that the current setting is displayed.

3.2 Setting the temperature coefficient of the temperature sensitive gauge

   Enter the value for the temperature coefficient (ppm) of the temperature sensitive gauge as follows:

   (1) To proceed to the next setting procedure without changing the current setting, press [SW5].

(2) To change the current setting, set the value by using [SW2] and [SW3].

(3) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(4) Verify that "CAL b" is displayed.

4. Temperature coefficient of the Load Cell

4.1 CAL b

When "CAL b" is displayed, enter the setting mode of the temperature coefficient of the Load Cell as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

(2) To change the current setting, press [SW4] to enter the setting mode.

(3) The current setting is displayed.

4.2 Setting the temperature coefficient of the Load Cell

Enter the value for the temperature coefficient (ppm) of the Load Cell as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5].

(2) To change the current setting, set the value by using [SW2] and [SW3].

(3) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(4) Verify that "CAL C" is displayed.

5. Temperature of the Load Cell

Note: Be sure to perform the setting of "5. Temperature of the Load Cell" and "6. Temperature A/D" at the same time.

5.1 CAL C

When "CAL C" is displayed, enter the setting mode of the temperature of the Load Cell as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

(2) To change the current setting, press [SW4] to enter the setting mode.

(3) Verify that the current setting is displayed.

5.2 Setting the temperature of the Load Cell

Enter the value for the current temperature (oC) of the Load Cell as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5].

(2) To change the current setting, set the value by using [SW2] and [SW3].

(3) Store the newly set data and proceed to the next setting procedure by pressing the [SW4].

(4) Verify that "CAL t" is displayed.

6. Temperature A/D (CAL t)

Store the temperature A/D counts equivalent to the temperature set in step 5-2 as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

(2) To change the current setting, connect the temperature sensitive gauge.

(3) When the circular stability indicator goes on, store the newly set data and proceed to the next setting procedure by pressing [SW4].

(4) Verify that the scale is in the gravity compensation mode.

7. Setting the value of "g"

Set the gravity value according to the calibrating location.

(1) Look up the gravity value of the calibrating location from the table "Gravity Values at Various Locations."

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) To change the current setting, set the value by using [SW2] and [SW3].

(4) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(5) Verify that "CAL 0" is displayed.

8. Zero calibration (CAL 0)

(1) Verify that the weighing pan is empty.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5] or [SW2].

(3) When the circular stability indicator goes on, press [SW4] to store the new zero point data and proceed to the next setting procedure.

(4) Verify that "CAL 1" is displayed.

9. Span calibration

9.1 Selecting the weighing unit (CAL 1/CAL 2)

Select the weighing unit to be used for the span calibration as follows:

(1) To proceed to the next setting procedure without changing the current setting, press [SW5].

(2) Select the weighing unit from "CAL 1" and "CAL 2" by using [SW2] or [SW3].

CAL 1 : The weighing unit "kg" is used for the span calibration.

CAL 2 : The weighing unit "lb*" is used for the span calibration.

* The weighing unit "lb" can only be used for the scale with the non-metric specifications (CFS = 1).

(3) Store the newly set data and proceed to the next setting procedure by pressing [SW4].

(4) Verify that the weight is displayed.

9.2 Setting the span weight used in the calibration

Enter the span weight used in the calibration as follows:

(1) Verify that the span weight to be calibrated with is displayed with the weighing unit selected in the previous step.

(2) To proceed to the next setting procedure without changing the current setting, press [SW5].

(3) Change the span weight by using [SW2] and [SW3].

(4) Place the calibration mass of the weight specified in step (3).

(5) When the circular stability indicator goes on, store the newly set data and proceed to the next setting procedure by pressing [SW4].

(6) Verify that "End" is displayed.

10. End

End the calibration as follows:

(1) Press [SW5] to return to the normal weighing operation.

11. Error messages

(1) Err 8 : The set data is not correctly stored in the memory.
Turn the power OFF, then retry the setting.

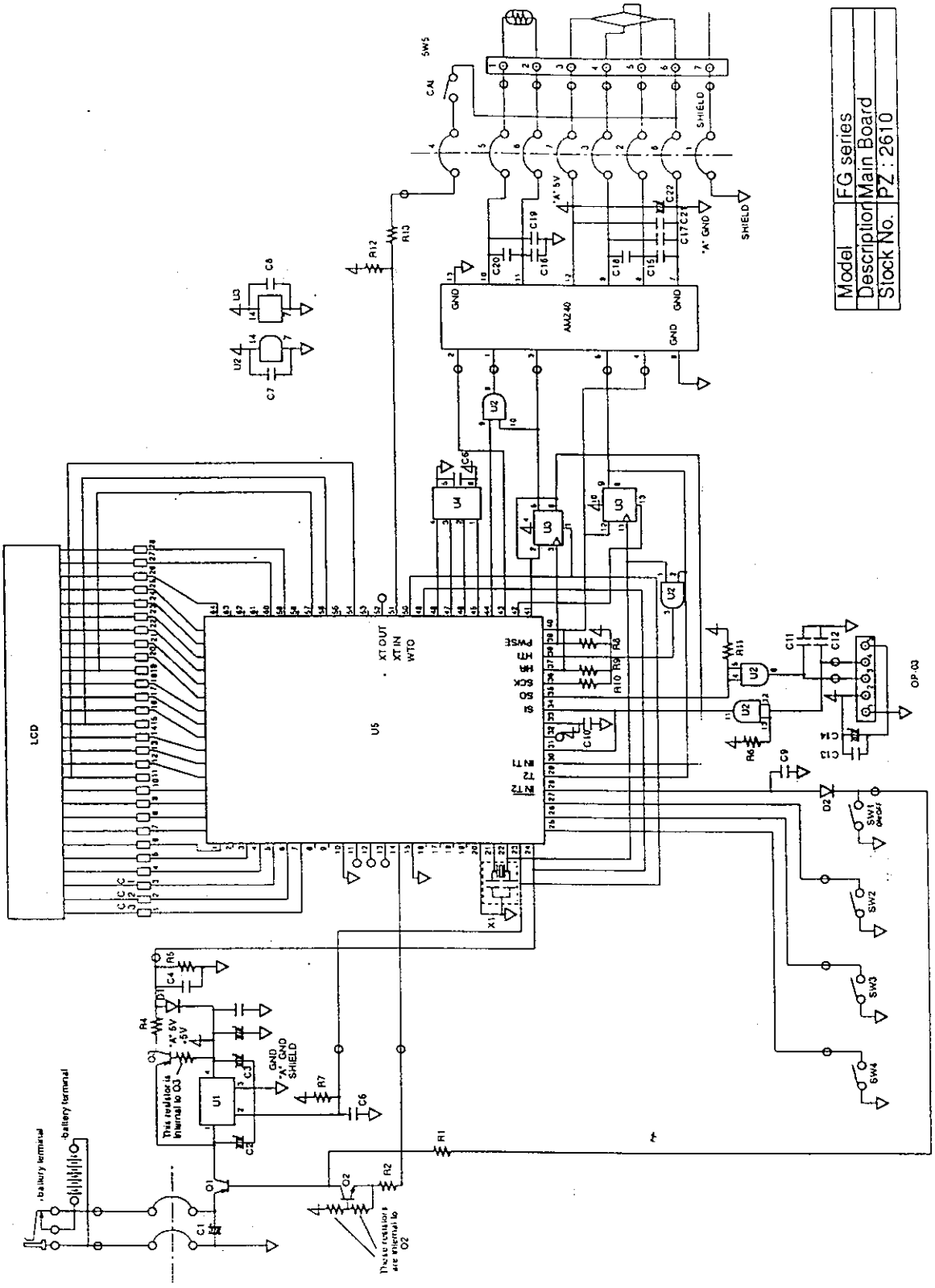
(2) CAL E : "CAL E" or "-CAL E" may blink in 3 second intervals. Input from the temperature sensitive gauge is incorrect.
Is the temperature gauge still shorted?
Is the temperature gauge not connected?

(3) CAL E : The value input from the Load Cell is too big.

(4) -CAL E : The value input from the Load Cell is too small.

Notes

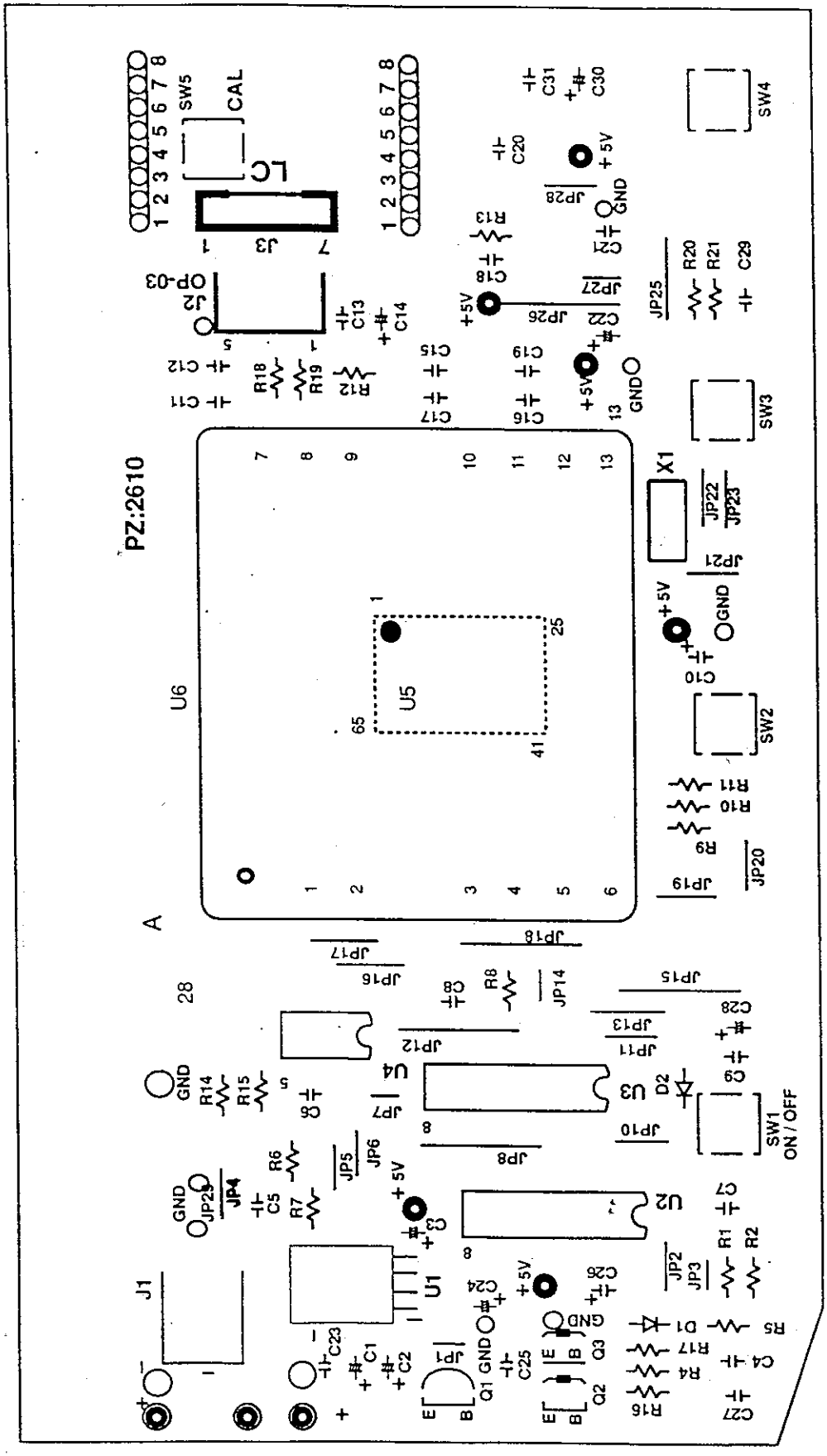
Circuit Diagram



Electronic Parts List

Circuit Symbol	Part Name	Description	Q'ty
	PZ:2610	Complete main board	1
C7, 8, 9	CC:0.01UT	Capacitor 0.01μF	3
C4, 5, 6, 10, 13, 15 17, 18, 26	CC:0.1U25VT	Capacitor 0.1μF 25V	9
C1, 2, 3, 22	CT:1V010T	Tantalum Capacitor 1.0μF 35v	4
D1, 2	DI:1SS270T	Diode	2
	EJ:0470-01-230	Connector	1
	JI:5P-S2L2-EF	Connector	1
	JI:7P-S2T2-EF	Connector	1
	KB:126006BK77	Cable	2
	KB:126006GN77	Cable	8
	KB:126006RD77	Cable	2
	KB:126015RD77	Cable	1
	PC:2610C	Printed circuit board	1
Q1	QT:A1015YT	Transistor	1
Q2	QT:BA1A4PT	Transistor	1
Q3	QT:BN1F4ZT	Transistor	1
R11	RC:NAT10KJT	Resistor carbon 10KΩ 1/4W	1
R4	RC:NAT22KJT	Resistor carbon 22KΩ 1/4W	1
R1, 2, 8	RC:NAT4.7KJT	Resistor carbon 4.7KΩ 1/4W	3
R5, 6, 9, 10, 12	RC:NAT56KJT	Resistor carbon 56KΩ 1/4W	5
R14, 15	RC:NAT100JT	Resistor carbon 100Ω 1/4W	2
R13	Not Used		0
R16, 17, 18, 19	Wire Jumpers		4
	SK:SKHHAK	Switch	1
U2	UC:HC08	CMOS IC	1
U3	UC:HC74	CMOS IC	1
U4	UC:RP93C46	EEPROM	1
U1	UR:C2255H	Regulator	1
X1	XT:KBR4.91MKSTF	Resonator 4.91MHZ	1
	00:C40082	Battery terminal +	1
	00:C40083	Battery terminal -	1

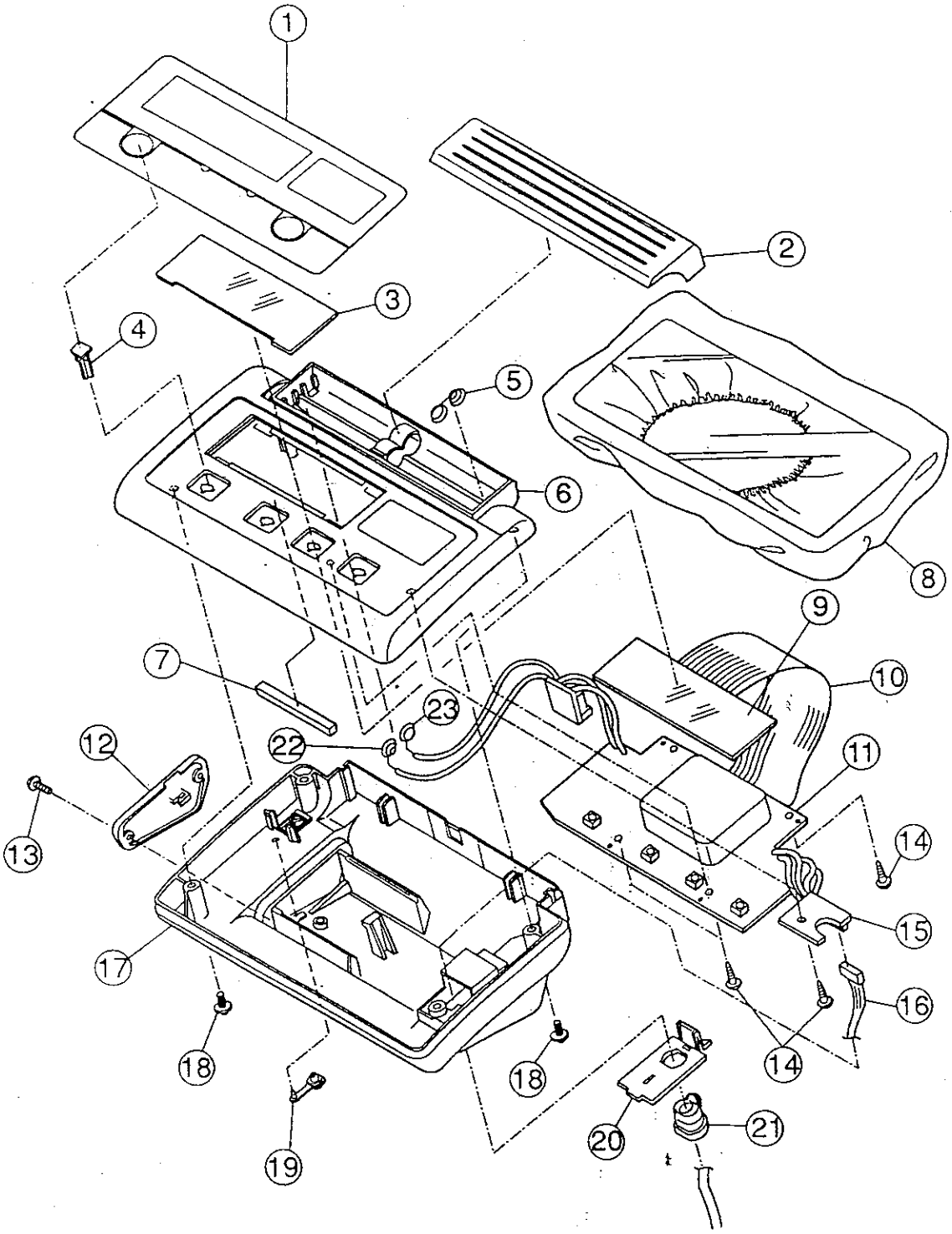
Component Location



Indicator Assembly Parts List

No.	Part Number	Description
1	01:B0075	Keysheet
2	07:A39714	Battery cover
3	07:A49741	Filter
4	07:B49688	Key top
5	00:C40884	Battery terminal
6	07:A10202	Upper case
7	06:C40296	LCD support rubber
8	00:C40698	Water-resistant
9	ED:DLC4946	LCD
10	KO:1000	Flat cable
11	PZ:2610	Main board
12	07:B30010	Blank cover
13		Binding head screw M3x4
14		Tapping screw M3x8
15		Load cell connection p/o PZ:2610
16	KO:999	Load cell cable
17	07:A10203	Lower case
18		Pan head w/spring & plain washer M3x6
19	06:B49742	Adapter jack cap
20	07:B49691	Cal switch cover
21	ET:SR-6P-4	Cable clamp
22	00:C40082	Battery terminal +
23	00:C40083	Battery terminal -

Indicator Exploded View

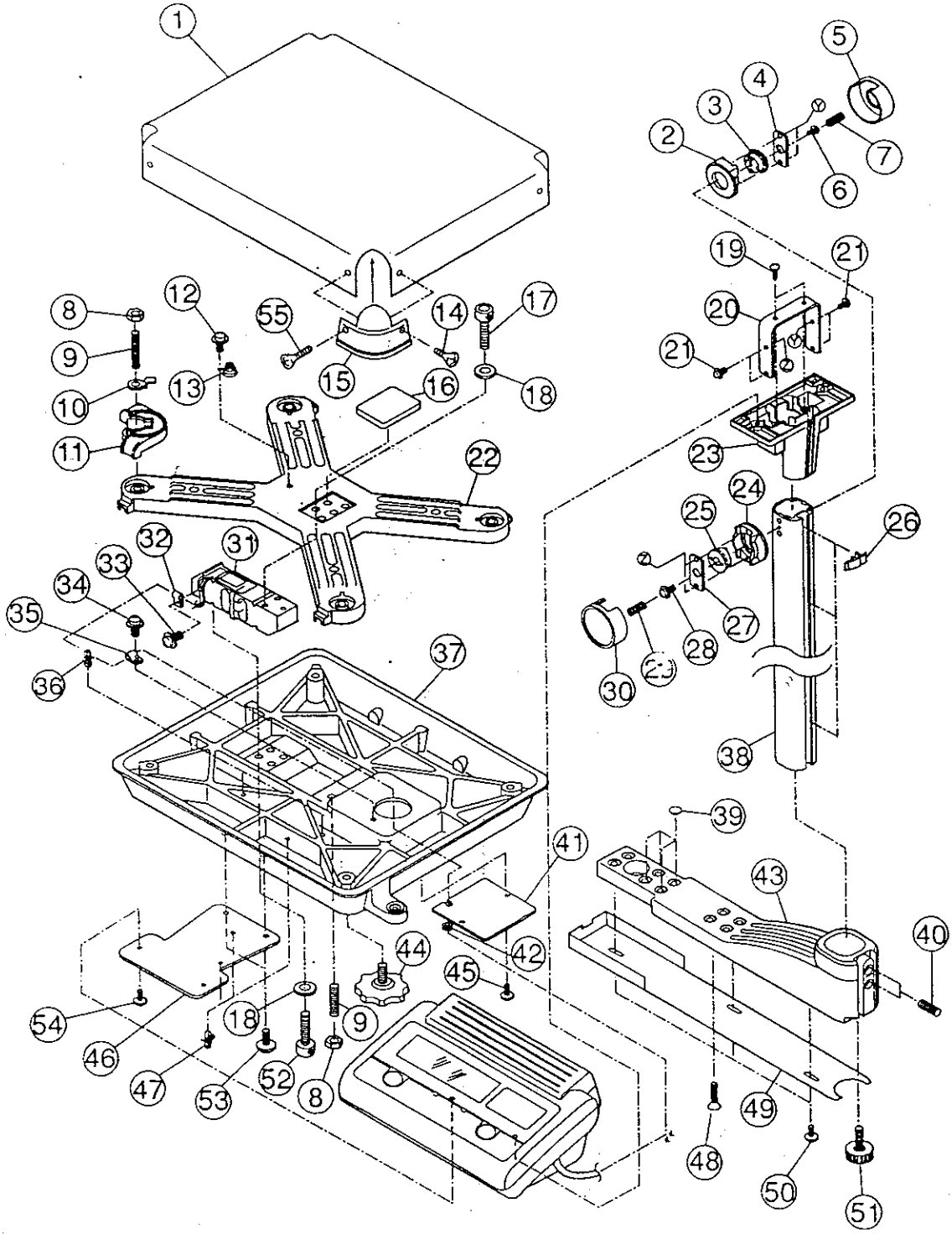


Base Assembly Parts List

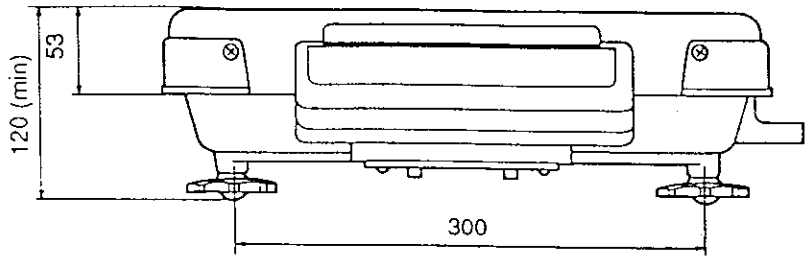
No.	Part Number	Description
1	05:A39980	Weighing pan
2	10:A46048	Angle setting grip 1
3	10:A46049	Angle setting grip 2
4	04:A47455	Angle lock spacer
5	10:A46050-2	Cap
6		Pan head w/spring & plain washer M3x8
7	05:A46051	Cap spring
8		Nut M8
9		Allen screw M8x45
10	04:C40651	Holding washer
11	06:A39663	Corner cushion rubber
12		Pan head w/spring & plain washer M4x8
13	00:C40145	Contact spring
14		Flat fillister head screw M4x6
15	06:A39960	Corner piece
16	06:B49565	Center cushion rubber
17		Allen head screw M6x40
18		Flat washer M6
19		Binding head screw M4x10
20	04:A47309B	Angle setting plate
21		Pan head w/spring & plain washer M4x8
22	03:A21451	Pan support arm
23	07:A21456	Indicator support
24	10:A46048	Angle setting grip 1
25	10:A46049	Angle setting grip 2
26	07:C40510	Pole cable clamp
27	04:A47455	Angle lock spacer
28		Pan head w/spring & plain washer M3x8
29	05:A46051	Cap spring
30	10:A46059-2	Cap
31	LC:115-30K-FG	Load cell for 30kg
31	LC:115-60K-FG	Load cell for 60kg
31	LC:115-150K-FG	Load cell for 150kg
32	10:NK-2N	Cable clamp
33		Pan head w/spring & plain washer M3x8
34		Pan head w/spring & plain washer M4x8

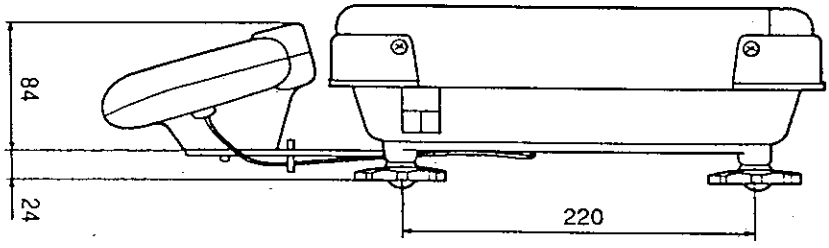
No.	Part Number	Description
35	10:NK-2N	Cable clamp
36	07:C40250	Base cable clamp
37	03:A10204-1	Base
38	05:C40100	Pole
39	07:C40527	Screw hole cover
40		Allen screw M8x20
41	04:B49823	Cable setting plate
42	10:NG-79-A	Rubber grommet
43	03:A10215-1	Pole base
44	07:B49929	Levering foot
45		Pan head w/spring & plain washer M3x8
46	02:B49954	Indicator blanket
47	07:C40250	Base cable clamp
48		Recessed allen head M6x25
49	04:B30184	Pole handle cover
50		Pan head w/spring & plain washer M3x6
51	10:H71F27-SUS	Pole foot
52		Allen head screw M6x30
53		Pan head w/spring & plain washer M6x12
54		Pan head w/spring & plain washer M4x8
55		Flat fillister head screw M4x16

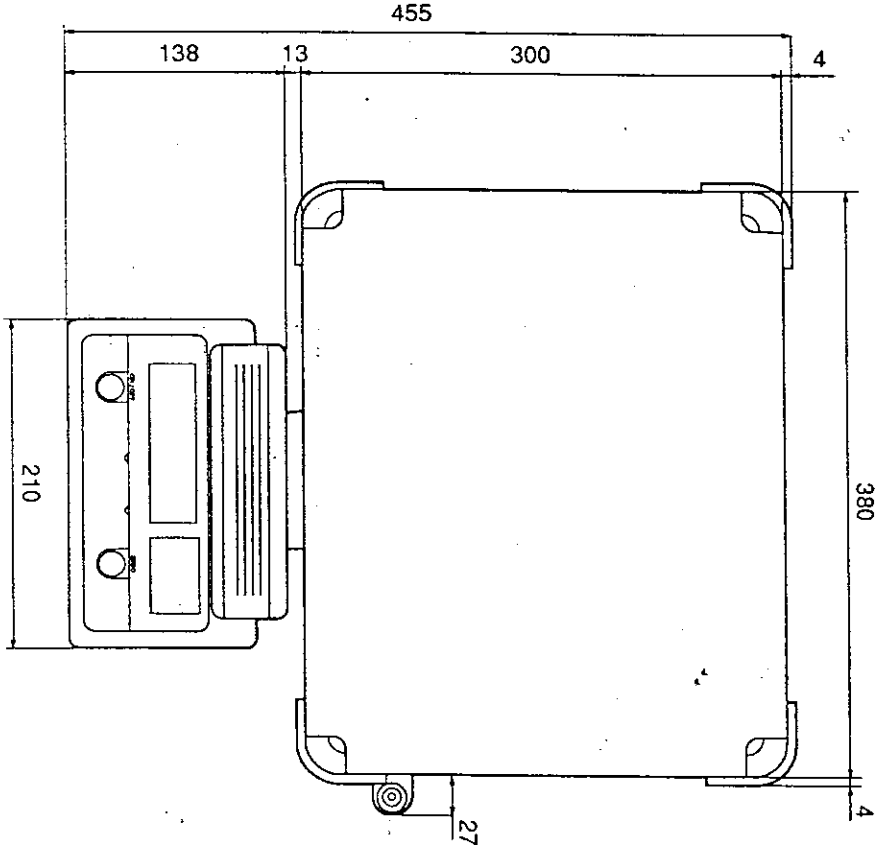
Base Exploded View

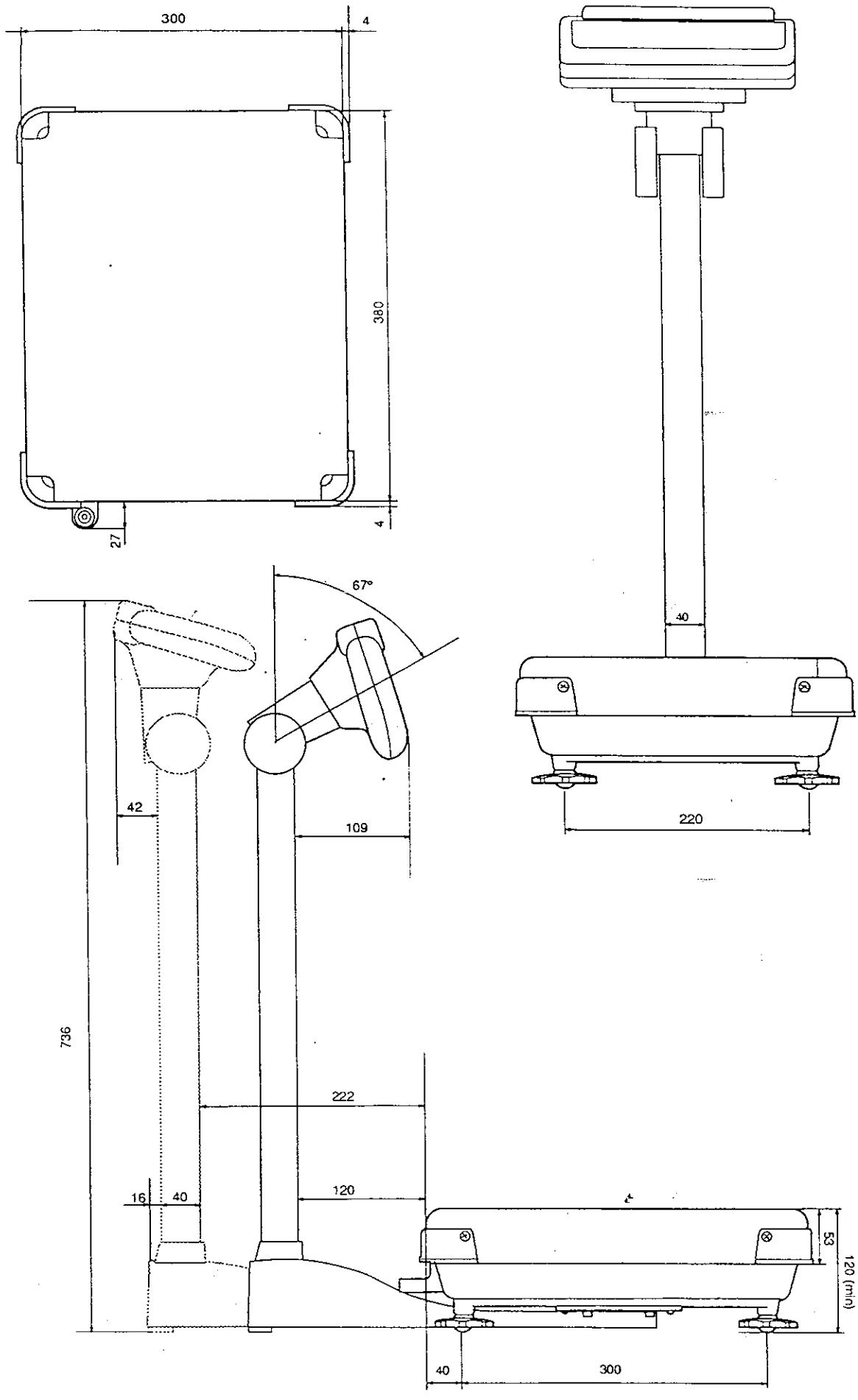


Physical Dimensions





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MEMORANDA

A&D Company, Limited
3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170 JAPAN
Telephone: [81] (03) 5391-6132 Fax: [81] (03) 5391-6148

A&D ENGINEERING, INC.
1555 McCandless Drive, Milpitas, CA. 95035 U.S.A.
Telephone: [1] (408) 263-5333 Fax: [1] (408) 263-0119

A&D INSTRUMENTS LTD.
Abingdon Science Park, Abingdon, Oxford OX14 3YS ENGLAND
Telephone: [44] (0235) 550420 Fax: [44] (0235) 550485

(German Sales Office)
Genfer Straße 6, Niedereschbach 6000 Frankfurt 50 GERMANY
Telephone: [49] (069) 507 1017 Fax: [49] (069) 507 2054

A&D MERCURY PTY. LTD.
32 Dew Street, Thebarton, South Australia 5031 AUSTRALIA
Telephone: [61] (08) 352-3033 Fax: [61] (08) 352-7409

A&D KOREA Limited
Seongmi Building 2/3F, 740-18 Panpo-1dong, Seocho-ku, Seoul, KOREA
Telephone: [82] (02) 517-4101 Fax: [82] (02) 546-4264