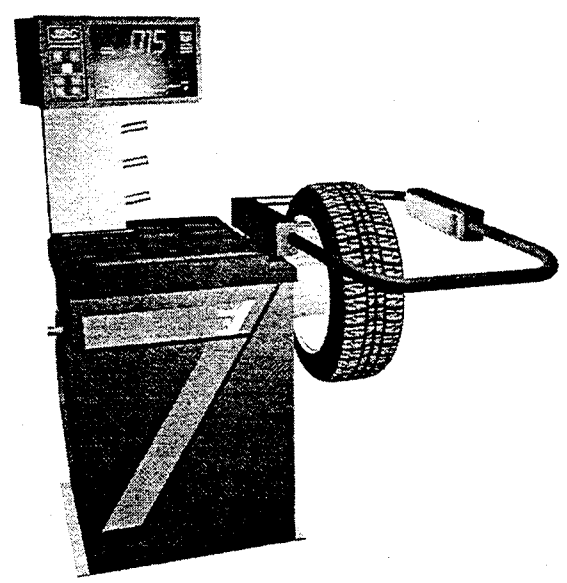




5 Parts Replacement & Service

- 5.1 Modular Service Replacement
- 5.2 Measuring Head Assembly
- 5.3 Motor Drive Assembly
- 5.4 PCB Door Assembly
- 5.5 Measuring Frame Assembly
- 5.6 Display Housing Assembly
- 5.7 Hood Assembly (*optional*)



5.1 MODULAR SERVICE REPLACEMENT

The Wheel Balancer contains several key assemblies, described in the following table together with the corresponding part numbers.

ITEM Number	Part
Display Assembly	8197-02(PCB)
PCB Door Assembly	8045
Measuring Frame Assembly	8187-04
Motor Drive Assembly (110V)	8217-04
Frame Encoder Assembly	8053
Measuring Head Assembly	7305-04
Measuring Frame Cable Kit	8685

Tools & Equipment Required

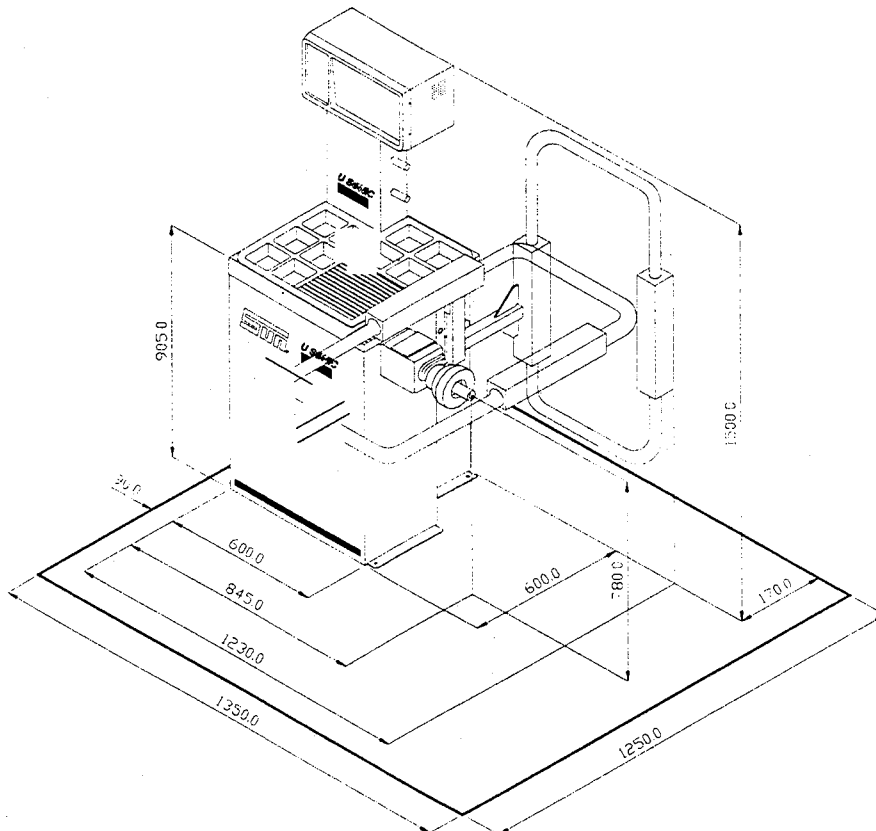
The following tools are required to service and repair SUN balancers.

- (½")spanner for the motor drive,measuring head and frame assembly.
- 0.394" socket for the display assembly and the back panel assembly.
- 0.433 spanner for the ball socket nut on the gas spring of the measuring frame.
- Posi-drive cross-head screwdriver No 2. For all the cross head screws on the balancer.
- Medium flat screwdriver No 2. For the slotted screws on the balancer solid state relay.
- A long nose pliers for the standoffs on the display PCB.
- An 0.06" Allen key for the drive wheel on the pivot tube of the balancer.

The Following table outlines the spare parts req
for :

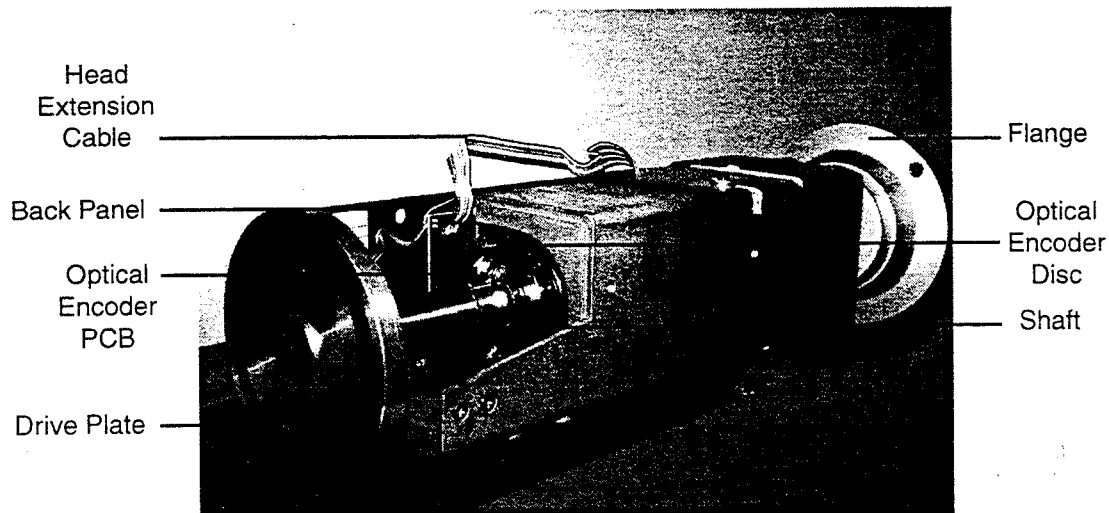
- a: Assembly Head
- b: Motor Drive
- c: PCB Door
- d: Measuring Frame

Key	Description	Part Number	Key	Description	Part Number
1	Hex Screw ($\frac{5}{16}$ -18 x $\frac{3}{4}$)	0102-3118-12	21	Nyloc Nut ($\frac{5}{16}$ -18)	0302-3118
2	Washer ($\frac{5}{16}$)	0205-0032	21	Ultrasonic Frame Assembly	8187-04
3	Drive Wheel (Red)	1155-01	22	U-Type Clip (small)	3700-0002
4	Motor Dr.Assembly (110v)	8217-04	23	Rubber Buffer	4500-0139
5	Washer ($\frac{5}{16}$)	0205-0031	24	PCB Door Assembly	8045
6	Spring Washer (M8)	0252-0080	25	Screw Hex ($\frac{5}{16}$ 16-18)	0102-3118-10
7	Drive Wheel	7638	26	Bearing, Plastic	8274
8	Back Panel Assembly	7673-05	27	Reflector, Ultrasonic	7691
9	Weight Tray	8657	28	Transducer PCB	8199
10	Self Tap Screw (\varnothing 4.2 x 16)	0974-0042-16	29	Timing Disk	1264
11	Floating Assembly	7666-08	30	Motor, 110 Volt	8216-01
12	Tray Support	8698-01	31	Timing Belt	3307-0001
13	Measuring Head Assembly	7305-01	32	Solenoid Assembly	8242
14	Gas Spring Kit (Frame)	4500-0121	33	Back Panel	1533-03
15	Bearing	3001-0015	34	Cover Scale	1581
16	Frame Encoder Assembly	8053	35	Tie Wrap (Balck)	4500-0029
17	Frame Encoder Belt	3307-0003	36	Offset Scale Assembly	8405-05
18	Pivot Tube	8017-02	37	Drive Pulley	3306-0007
19	Frame Cable Kit	8685	38	Cotter Pin $\frac{3}{16}$ x2"	0718-2000
20	Ultrasonic Hou.Assembly	8186-04	39	Hood Shim 1.5mm	7816-02
			40	Set Screw M3x12	0453-0030-12



5

5.2 MEASURING HEAD ASSEMBLY

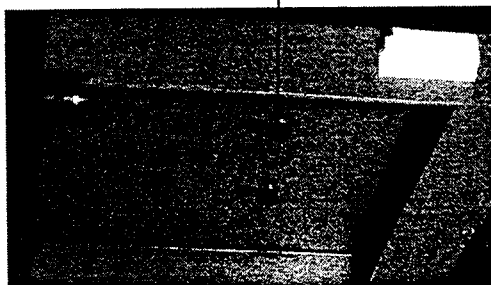


Replacing the Measuring Head

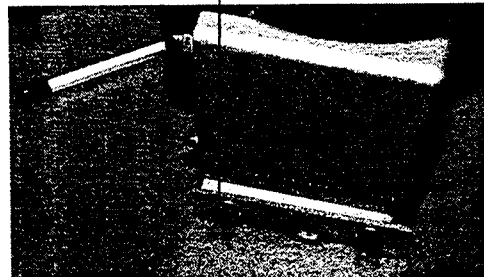
Removal of Measuring Head

1. Switch off the power and remove the power cord.
2. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the flange. Lift the *weight tray* off the Velcro strips on the top edges of the base of the balancer.
3. There are 4 bolts which secure the *measuring head* to the base of the balancer. First remove the 2 bolts and washers on the front (flange end) of the *measuring head assembly*. The bolts are accessible on the outside of the base, behind the *flange*, underneath the *measuring head*.
4. Loosen the 2 bolts under the rear of the *measuring head*. These bolts are accessed by reaching in underneath the support plate within the base of the balancer. Do not remove these bolts completely.
5. Disconnect the 20-way *head extension cable*.
6. Carefully slide the *measuring head assembly* forward, pulling the *flange*, until the rear bolts which are passed through a keyhole slot in the support plate prevent any further movement. Lift the entire assembly up and out of the base.

Rear Fixing Bolts



Front Fixing Bolts



Installation of Measuring Head

1. Switch off the power and remove the power cord.
2. Insert the 2 rear bolts and washers into the underside of the *measuring head* but leave them loosened.
3. Lower the *measuring head assembly* onto the support plate within the base, ensuring that the 2 rear bolts and washers drop through the 2 keyhole slots in the support plate. Take care that the *measuring head* does not scrape off the opening in the base at the flange end.
4. Slide the *measuring head assembly* carefully backwards as far as the rear bolts in the keyhole slots will allow.
5. Insert the front 2 bolts and washers on the underside of the *measuring head assembly* and tighten them.
6. Tighten the 2 rear bolts to a torque of 100-120 lbins (11.3-13.6 Nm).
7. Connect the 20-way *head extension cable*. Ensure that the *head extension cable* is not put under tension and is free from any obstruction.
8. Position the weight tray on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the measuring head.
9. Connect the power cord. Switch on the power.

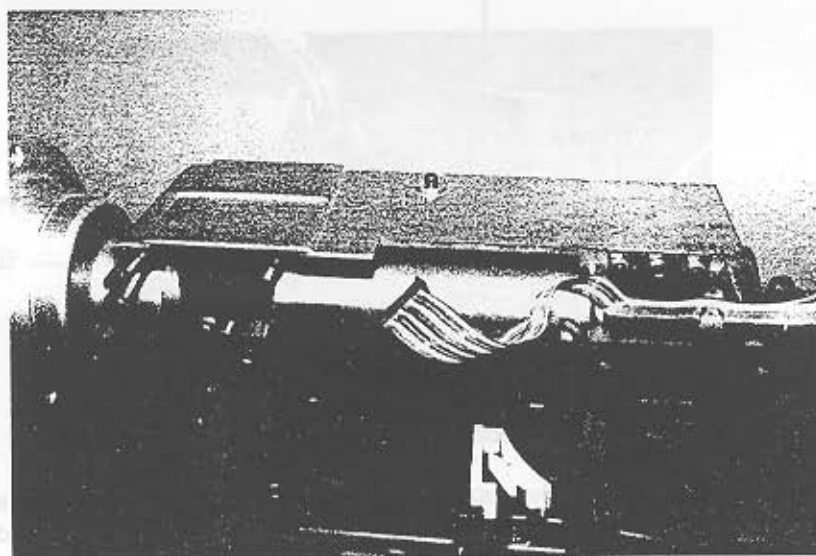
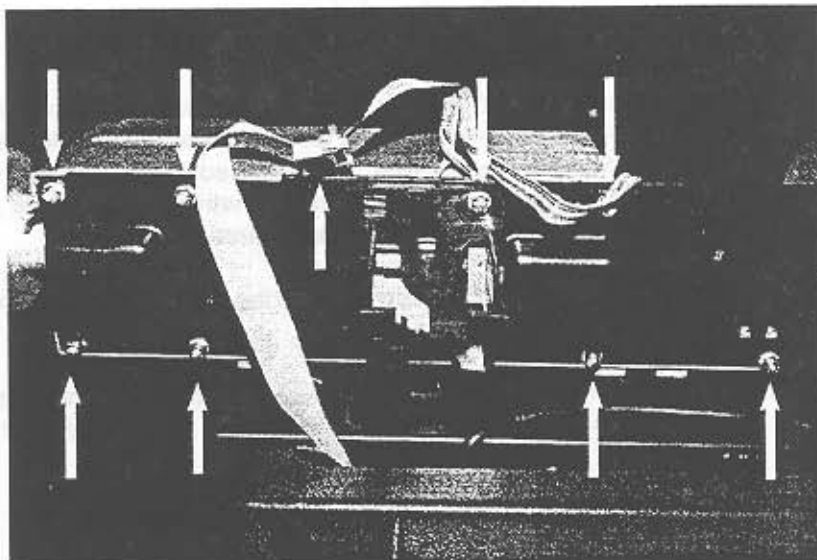
Replacing the Back Panel Assembly

Removal of Back Panel Assembly

1. Switch off the power and remove the power cord.
2. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the flange. Lift the *weight tray* off the Velcro strips on the top edges of the base of the balancer.
3. Disconnect the 20-way *head extension cable* from the socket of the ribbon cable connected to *back panel assembly*.

Note: The 20-way *head extension cable* connects to the J4 connector on the *balancer processor PCB* on the *PCB door*.

4. Use a 10 mm (3/8") hex socket to remove the 9 hex nuts and washers which fix the *back panel assembly* to the *measuring head*.
5. Slip the *back panel assembly* off the threaded studs on the *measuring head* and lift it clear.



Installation of Back Panel Assembly

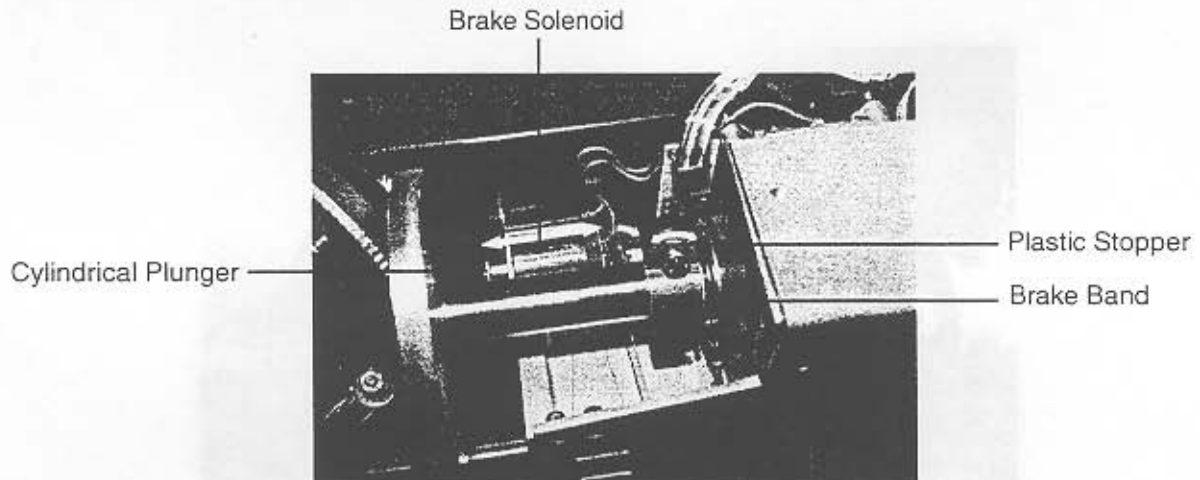
1. Locate the *back panel assembly* so that the 9 threaded studs on the back of the *measuring head* mate with the slots in the plastic panel.
2. Install the 9 hex nuts and washers on to the 9 threaded studs of the *measuring head* housing using a 10 mm (3/8") hex socket.

Notes: The *back panel* contains the sensors for detecting wheel imbalance - it is critical that this assembly cannot move. Ensure the plunger cir-clip of the brake solenoid clears the plastic stopper when installing the back panel. Move the solenoid plunger with your finger to ensure free movement. Ensure that none of the wires of the *back panel assembly* is sandwiched between the *housing* and the back panel.

3. Connect the 20-way *head extension cable* to the connector on the ribbon cable of the *back panel assembly*, securing the side-grips of the connector properly.
4. Position the *weight tray* on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the *measuring head*.
5. Connect the power cord. Switch on the power.
6. Perform the Weight Calibration Procedure described in the Calibration Section.

Adjusting the Brake

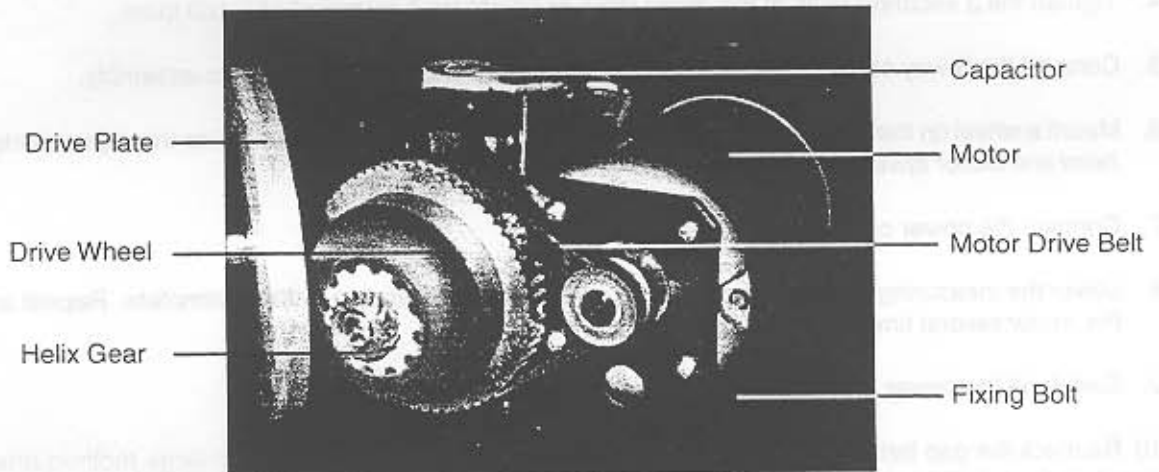
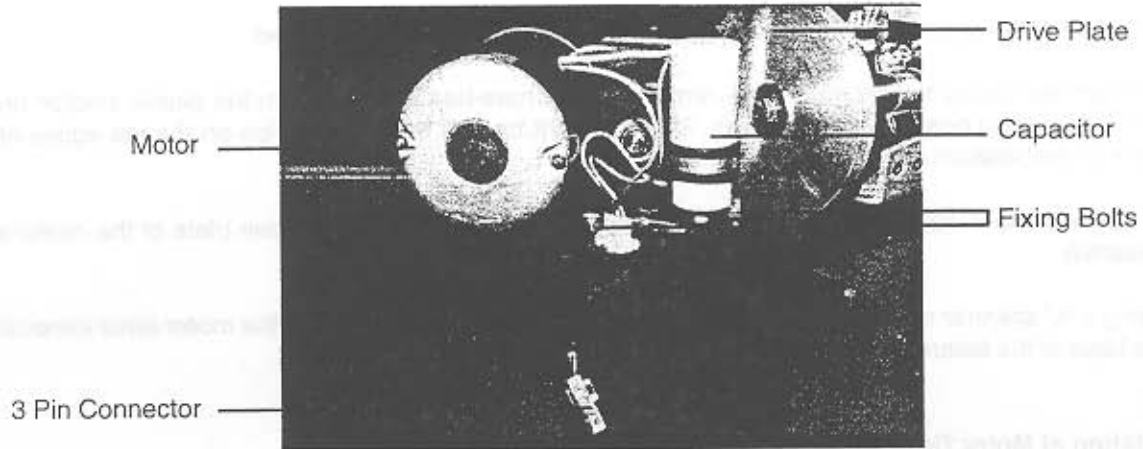
If the *brake mechanism* is too tight, the brake will grip the *shaft* too hard when applied. The whole balancer may shudder. If the brake mechanism is not set tightly enough, then the brake will be largely ineffective. It will not slow the rotating wheel to a stop in a reasonable time.



Note that the brake is a friction brake. When applied, the friction between the *brake pad* and the rotating *shaft* keeps the brake applied. The brake only releases the *shaft* when this friction is reduced to almost zero, that is, when the *shaft* has almost come to a complete standstill.

When the brake is applied, it should slow a 14 inch diameter wheel to a complete stop after 1.5 revolutions of the wheel.

5.3 MOTOR DRIVE ASSEMBLY



Replacing the Motor Drive Assembly

Removal of Motor Drive Assembly

1. Ensure that the power is switched off and that the power cord is disconnected.
2. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the *flange*. Then, lift the weight tray off the Velcro strips on the top edges of the base of the balancer.
3. Disconnect the 3-way cable from the socket fixed to the underside of the base plate of the *motor drive assembly*.
4. Using a ½" spanner remove the 3 sets of nut, bolt and washer which secure the *motor drive assembly* to the base of the balancer. All 3 bolts are accessed from the top.

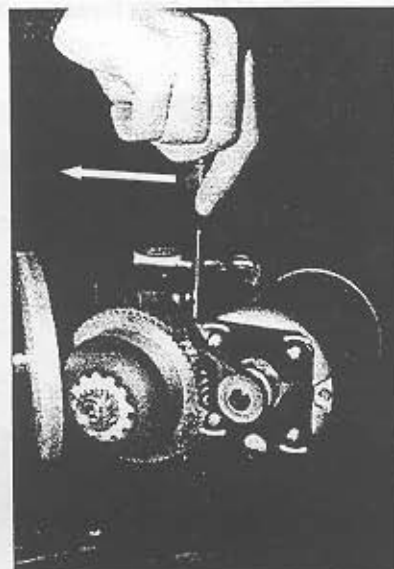
Installation of Motor Drive Assembly

1. Locate the *motor drive assembly* in the base of the balancer by inserting the 3 nuts, bolts and washers. Do not tighten the bolts fully at this point.
2. Turn the red plastic *drivewheel* such that it moves outwards along the *helical* gear until its front face engages fully with the *driveplate* on the end of the shaft of the *measuring head*.
3. Measure the gap between the back face of the *drivewheel* and the toothed *drive wheel*. This gap is required to be 0.06" with the front face of the *drivewheel* engaged on the *driveplate*.
4. Tighten the 3 securing bolts of the *motor drive assembly* to a torque of 110-130 lbsins.
5. Connect the 3-way cable to the socket under the base plate of the *motor drive assembly*.
6. Mount a wheel on the *shaft* and tighten. Lay the *weight tray* down in place to cover the exposed *measuring head* and *motor drive* assemblies.
7. Connect the power cord. Switch on the power.
8. Lower the *measuring frame* to start the *motor*. Wait for the balancing cycle to complete. Repeat activating the *motor* several times to settle the *motor drive assembly*.
9. Switch off the power and disconnect the power cord. Lift off the weight tray.
10. Recheck the gap between the back face of the red plastic *drivewheel* and the large toothed *drive wheel* when the drivewheel is contacting the *driveplate* of the *shaft*, as described in step 3. If the gap is not 0.06", loosen the 3 securing bolts of the *motor drive assembly* again and repeat steps 6-9.
11. Position the *weight tray* on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the *measuring head*.
12. Connect the power cord. Switch on the power.

Replacing the Motor Drive Belt

Removal of Motor Drive Belt

1. Switch off the power and disconnect the power cord.
2. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the flange. Then, lift the weight tray off the Velcro strips on the top edges of the base of the balancer.
3. The *motor drive assembly* is accessible at the end of the *shaft* away from the wheel.
4. Loosen the 4 cross-head screws which fix the *motor* to the metal bracket of the *motor drive assembly* until the *motor* has enough movement to allow the *drive belt* to be removed.



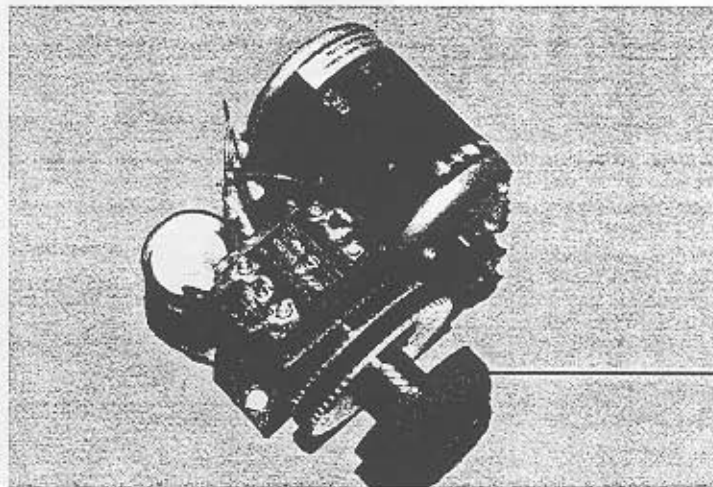
Installation of Motor Drive Belt

1. Switch off the power and disconnect the power cord.
2. Loosen the 4 cross-head screws which fix the *motor* to the metal bracket of the motor drive assembly until the *drive belt* can be placed over both toothed *drive wheels*.
3. To set the correct tension on the *belt* it may be necessary to insert a screwdriver between the metal bracket and the *motor*. Apply enough force to draw the *belt* tight. Tighten the 4 cross-head screws so that the tension on the *belt* allows 0.39"-0.12" movement when pressed by hand.
4. Connect the power cord. Switch on the power.
5. With a wheel mounted, lower the *measuring frame* to start the *motor* and perform a balancing cycle. Perform several cycles to ensure that the *belt* is correctly installed. If it is not, switch off the power and disconnect the power cord, then return to step 3.
6. Position the *weight tray* on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the *measuring head*.
7. The wheel balancer is now ready for use.

Replacing the Drivewheel

Removal of Drivewheel

1. Switch off the power and disconnect the power cord.
2. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the *flange*. Then, lift the *weight tray* off the Velcro strips on the top edges of the base of the balancer.
3. Remove the 3 bolts from the *motor drive assembly* and push the assembly back in the balancer base.
4. Remove the red plastic *drivewheel* by turning it by hand in an anti-clockwise direction to twist it off the *helix thread*.
5. Clean the surface of the *helix thread* and remove any grease or oil that may have collected.



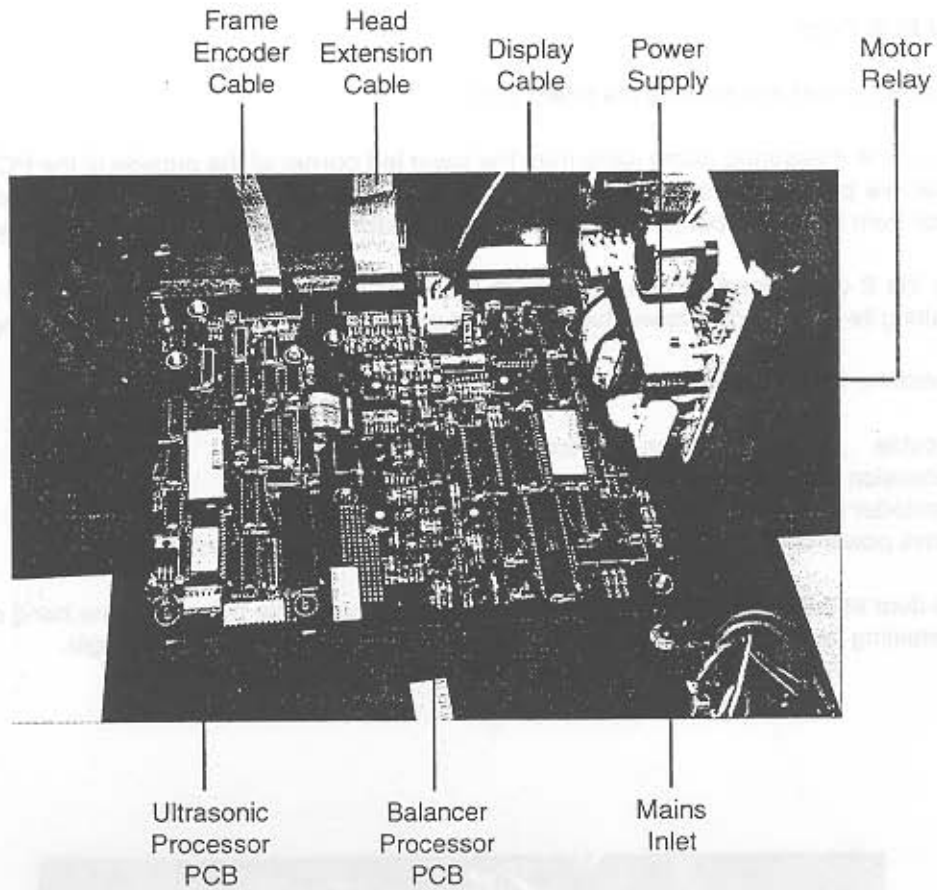
To Remove Drivewheel
(Rotate anti-clockwise)

To Install Drivewheel
(Rotate clockwise)

Installation of Drivewheel

1. Switch off the power and disconnect the power cord.
2. Ensure that there are no grease, oil or other deposits on the *helix thread* or on the *drive assembly*.
3. Turn the red plastic *drivewheel* in a clockwise direction to install the *doughnut* on to the *helix thread*.
4. Follow the Installation procedure in REPLACING THE MOTOR DRIVE ASSEMBLY above to correctly set up the *motor drive*.
5. Position the *weight tray* on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the *measuring head*.
6. Connect the power cord. Switch on the power.

5.4 PCB DOOR ASSEMBLY



CAUTION: Main electricity is present at the mains inlet of the PCB Door!



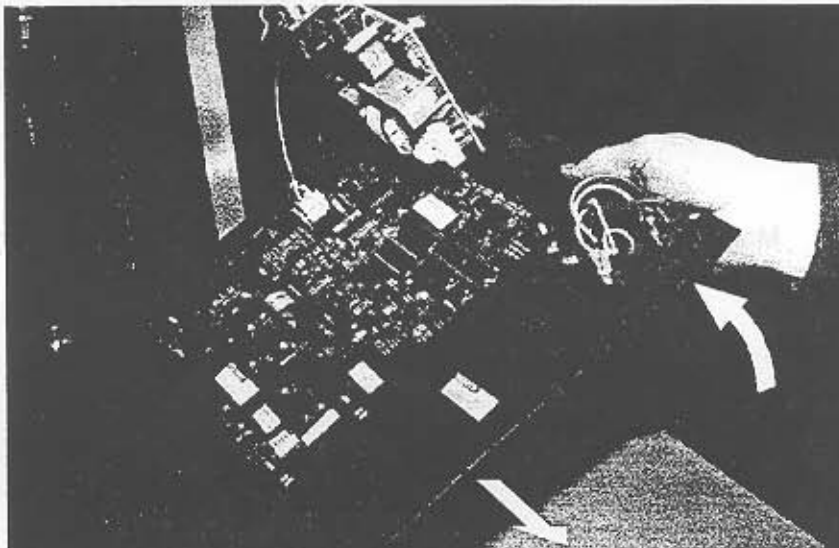
Replacing the PCB Door

It is recommended that the *PCB door assembly* is replaced as a complete unit.

Removal of PCB Door

1. Switch off the power and remove the power cord.
2. Disconnect the *measuring frame cable* from the lower left corner of the outside of the PCB door. Take off the protective bracket by removing the 2 cross-head screws. Then, unplug the 9-way square AMP connector from the *PCB door* (it is connected to the underside of the *ultrasonics processor PCB*).
3. Remove the 2 cross-head screws which hold the *PCB door* in place. The *PCB door* opens outward, hinged along its bottom edge; lower the top of the door gently until the door rests in the horizontal position.
4. Disconnect the following cables:

Display cable	from balancer processor PCB-J6
Head extension cable	from balancer processor PCB-J4
Frame encoder cable	from ultrasonics processor PCB-J1
Motor drive power cable	from power supply bracket (3-way connector)
5. Hold the door at each side edge. Tilt the door at a sideways angle by raising one hand only, until the door's retaining lip on that side is freed. Slide the entire door outwards at an angle.



Installation of PCB Door

1. Hold the door at each side edge, and with the power supply bracket facing up and nearest to the opening at the rear of the machine. Tilt the door sideways by raising one hand only and slide the door at an angle into the opening. Return the door to the horizontal position such that the two locating lips are behind the sides of the opening. The door will rest in the horizontal position at the bottom of the opening.
2. Attach the following cables:

Display cable	to balancer processor PCB-J6
Head extension cable	to balancer processor PCB-J4
Frame encoder cable	to ultrasonics processor PCB-J1
Motor drive power cable	to power supply bracket (3-way connector)
3. Close the PCB Door and insert the 2 cross-head retaining screws.
4. Insert the 9-way connector in the connector at the back of the PCB door assembly.
5. Attach the cable protection bracket and install the 2 cross-head screws.
6. Connect the power cord. Switch on the power.

Replacing the Motor Relay

Removal of Motor Relay

1. Switch off the power and remove the power cord.
2. Remove the 2 cross-head screws holding the *PCB door* in place. Open the door while holding it firmly and lower the top until the entire door is resting horizontally.
3. The *motor relay* is attached to the power supply bracket of the *PCB door assembly* by 2 cross head screws.
4. Disconnect the 4 wires from the motor relay.
5. Remove the 2 cross-head screws which fix the *motor relay* in place and lift off the *motor relay*.

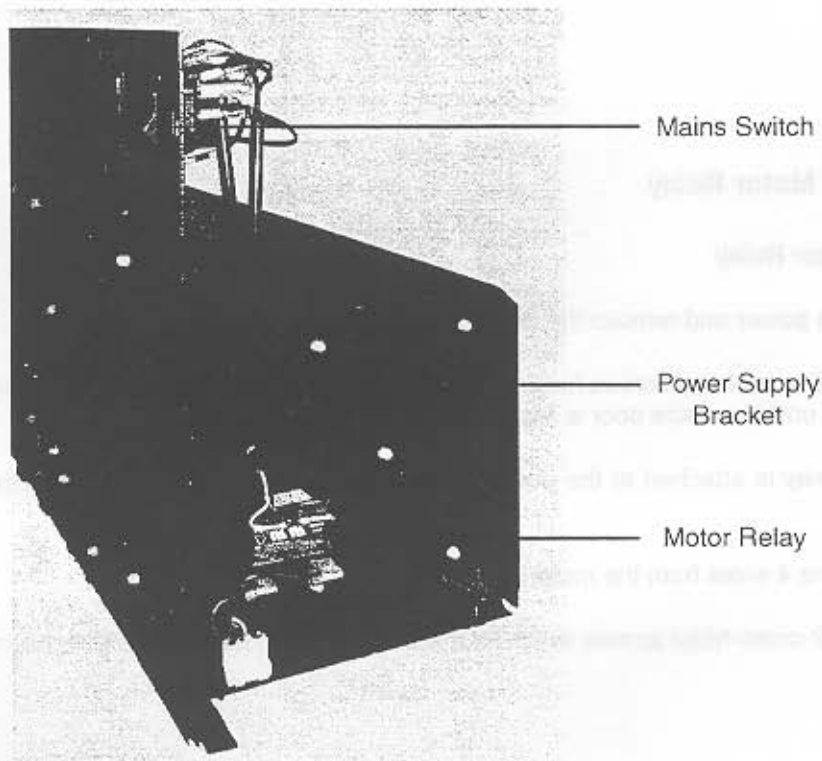
Installation of Motor Relay

1. Switch off the power and remove the power cord.
2. Fix the *motor relay* to the power supply bracket of the *PCB door assembly* using 2 cross-head screws.
3. Wire the *motor relay* as follows:

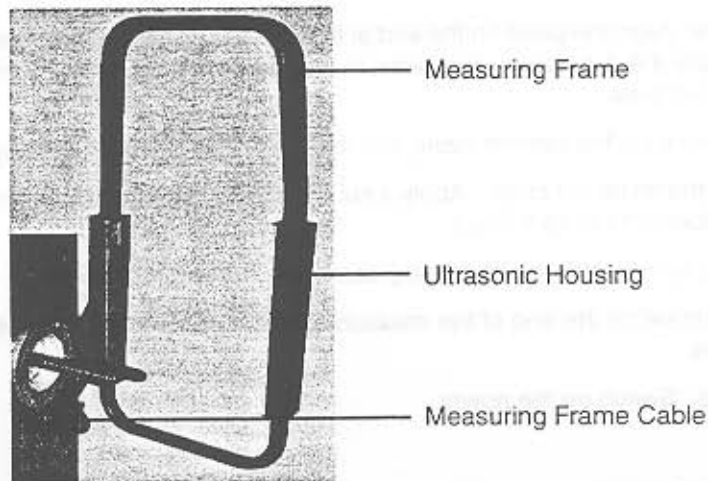
Brown wire	from motor drive assembly	to Position 1 on relay
Brown wire	from mains inlet	to Position 2 on relay
Black wire	from balancer processor J3	to Position 3 on relay
Black/white wire	from balancer processor J3	to Position 4 on relay

4. Close the *PCB door assembly* and insert the 2 cross-head retaining screws.

Connect the power cord. Switch on the power.



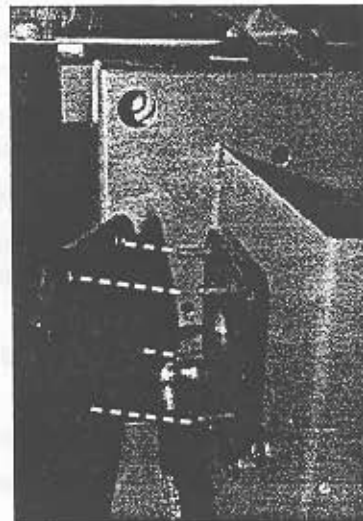
5.5 MEASURING FRAME ASSEMBLY



Replacing the Measuring Frame

Removal of Measuring Frame

1. Ensure that the power is switched off and that the power cord is disconnected.
2. Disconnect the *measuring frame cable* from the lower left corner of the outside of the *PCB door*. First, remove the protecting bracket by removing the 2 cross-head screws. Then, unplug the 9-way square AMP connector from the *PCB door* (it is connected to the underside of the *ultrasonics processor PCB*).
3. Remove the 4 nuts and washers which secure the plate on the support bar of the *measuring frame* to the *receiving plate* on the *pivot tube*.
4. Lift the *measuring frame* carefully away from the receiving plate of the *pivot tube*.



Installation of Measuring Frame

1. Lift the *measuring frame*. Align the plate on the end of the support bar of the frame on the receiving plate of the *pivot tube*. Locate the 4 holes on the plate of the support bar on the 4 threaded studs on the receiving plate of the *pivot tube*.
2. Check that the *frame* moves in the correct plane and that there is no excessive play on the *gas spring*.
3. Apply the 4 washers to the threaded studs. Apply a nut to each of the threaded studs and tighten the nut to a torque of 100-130 lbsins. (11.3-13.6 Nm.)
4. Connect the *measuring frame cable* into the 9-way connector on the outside of the *PCB door*.
5. Attach the protective bracket on the end of the *measuring frame cable* to the rear of the *PCB door* using the 2 cross-head screws.
6. Connect the power cord. Switch on the power.

Replacing an Ultrasonic Housing

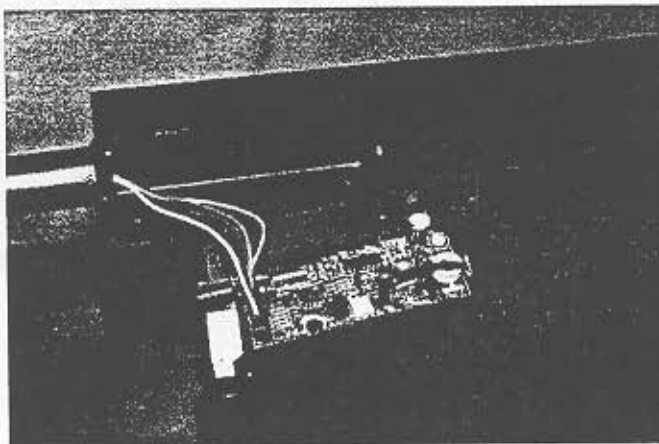
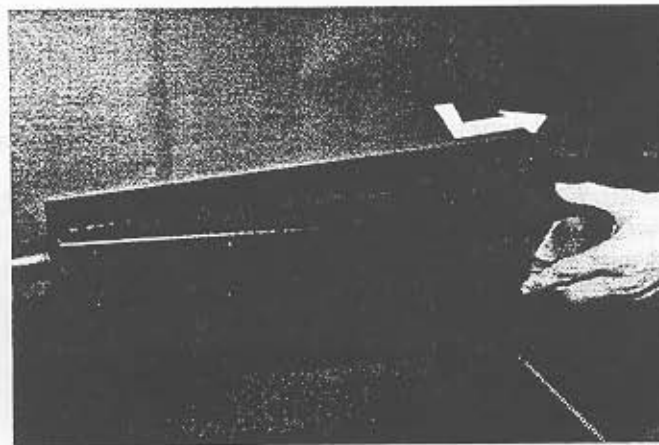
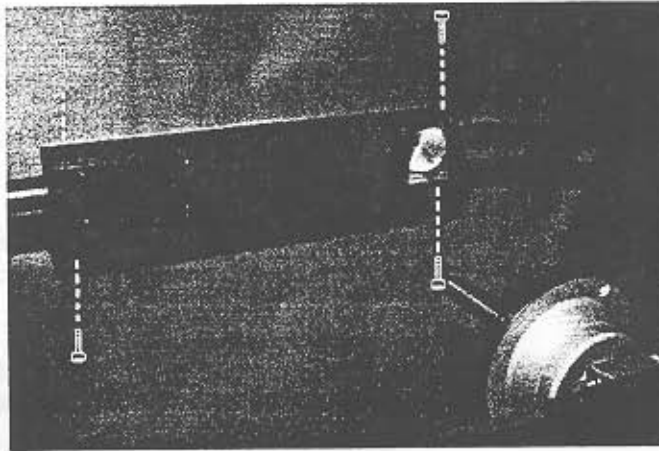
There are 2 *ultrasonic housings* on the *measuring frame*, one in each box on the arms of the *frame*.

Removal of a Ultrasonic Housing

1. Switch the power off and remove the power cord.
2. The *ultrasonic housing* is secured within the box on the arm of the *measuring frame* by 4 cross-head screws. Remove these 4 screws.
3. The *ultrasonic housing* is a push-fit in the box on the arm of the frame. To remove the *housing*, gently lever out the *reflector* end (the end to the front of the *measuring frame*) and then slide the *housing* out far enough to expose the cable connected to the PCB at the back end of the housing.
4. Disconnect the cable from the 4-way connector on the PCB. This cable is part of the *measuring frame cable*.
5. Remove the *ultrasonic housing* from the *measuring frame*.

Installation of Ultrasonic Housing

1. Bring the *ultrasonic housing* close to the box in the arm of the *measuring frame* with the PCB towards the back of the *measuring frame* and the *reflector* towards the front.
2. Insert the connector on the cable emerging from the back-end tubing of the *measuring frame* into the 4-way connector on the PCB within the *ultrasonic housing*.
3. Ensure that the damping tape is located at the *reflector* end of the box in the *measuring frame*.
4. Gently push the PCB end of the *ultrasonic housing* into the box of the *frame* and then slide the reflector end into position. Ensure that the holes for the securing screws on the box of the *frame* are aligned with those of the housings.
5. Ensure that the *housing* fits snugly and that neither the housing nor the enclosing box are twisted or bent in any way.
6. Insert the 4 cross-head screws to secure the *ultrasonic housing* in position.
7. Connect the power cord. Switch on the power.



Replacing the Measuring Frame Cable

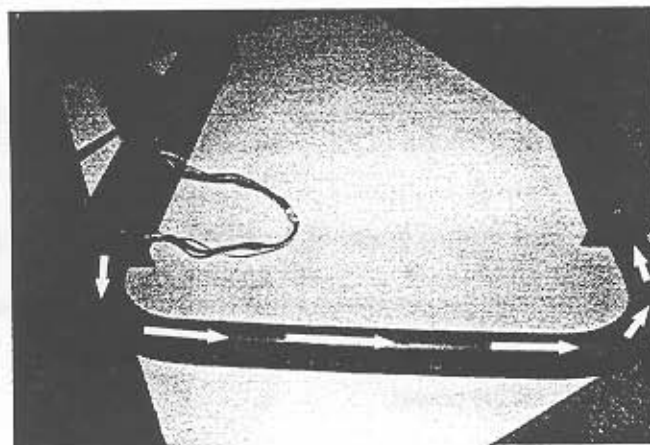
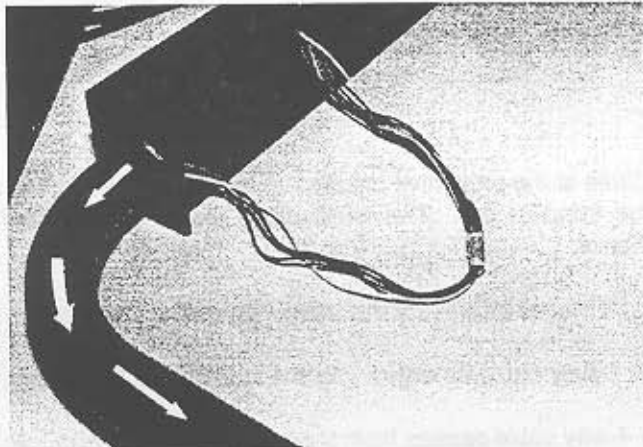
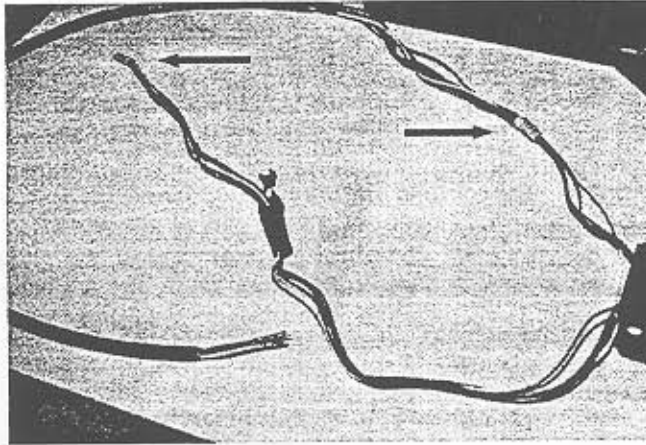
Removal of Measuring Frame Cable

1. Ensure that the power is switched off and that the power cord is disconnected.
2. Remove the *measuring frame* from the wheel balancer as described above in REPLACING THE MEASURING FRAME.
3. Remove both *ultrasonic housings* from the boxes in the arms of the *measuring frame* as described above as described in REPLACING THE ULTRASONIC HOUSING. Ensure that the cable in the *measuring frame* is disconnected from the 4-way connectors on the PCB in each housing.
4. Cut all 8 wires in the cable at the edge of the 9-way square AMP connector. Pull off the strain relief fixing it to the protection bracket. Remove the strain relief which grips the cable at the hole in the support bar of the *measuring frame*.
5. Cut all 4 wires in the cables at each of the 4-way connectors in the boxes on the arms of the and remove the connectors completely. The *measuring frame cable* can now be pulled from the support bar of the *frame*. With the connectors removed, the cable will pass through the internal grommets without difficulty.

Installation of Measuring Frame Cable

1. The *measuring frame cable* kit (P/N 8685) comprises of wires, strain reliefs and connectors.
2. There are 8 wires in the *measuring frame cable*. The 4 shorter wires are coloured BLACK, BROWN, RED and YELLOW; these shorter wires go to the inner arm's box (the side of the *frame* which has the support bar). The 4 longer wires go to the box on the outer arm of the frame. The 4 longer wires are coloured WHITE, BLUE, GREEN and PURPLE. Wrap 3 small pieces of tape around the connectors and wires of the cable at the following points (this will prevent the wires spreading when the cable is being routed within the frame):
 - i. Around the connector ends of the 4 longer wires
 - ii. Around the connector ends of the 4 shorter wires
 - iii. At the point of the top of the shorter cable section to the mid-point of the longer cable section.
3. Pass the strain relief through the cable to a point 23 inches (580 mm) from where the 8 connectors are attached together. Feed in the taped end first, through the entry hole near the square plate on the outside of the *frame's* support bar, until the cable emerges in the box on the inner arm. Continue feeding the longer taped section through the rear tubing of the *measuring frame* until it reaches the outer arm's box. Remove the tape from both sets of 4 wires.
4. Add a 4-way connector to the set of 4 wires emerging into the box on each arm. A terminal is crimped onto each wire for this purpose. A standard push-in contact is made with the connector.

Warning: Ensure the polarity of the connector is correct before pushing the wires home.



5. The connector plugs for both inner and outer *housings* are identical and have numbers moulded onto the top at each contact. They are connected as follows:

INNER PLUG

Black - 1
 Red - 2
 Yellow - 3
 Brown - 4

OUTER PLUG

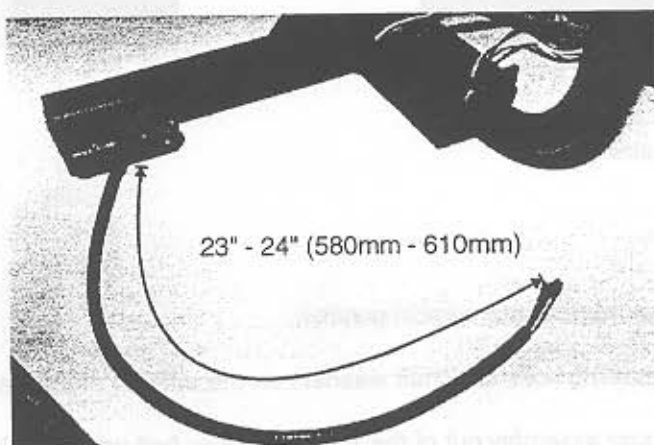
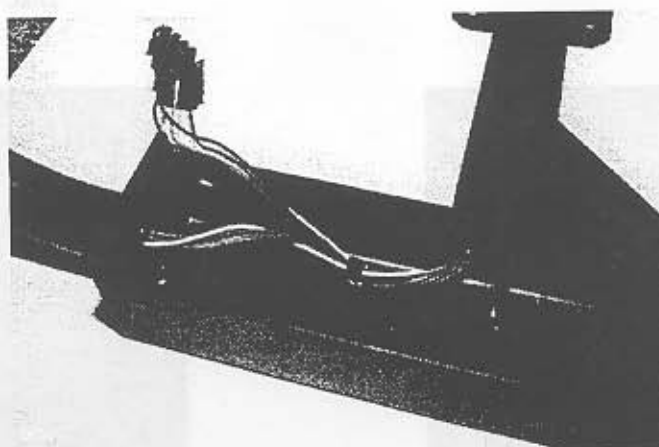
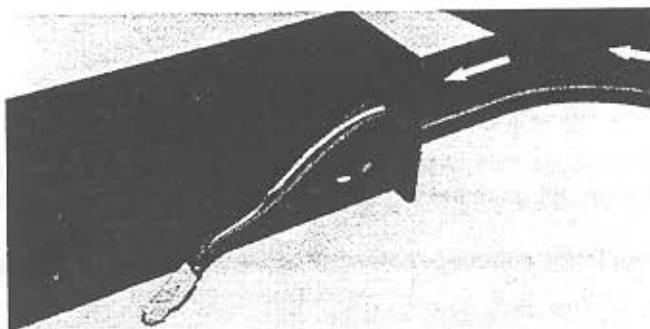
White - 1
 Blue - 2
 Green - 3
 Purple - 4

6. Slide the protective bracket over the other end of the cable and attach the 9-way connector. The same method of connecting and identification is applied as before. The wires are connected as follows:

CABLE PLUG

Black - 1
 Brown - 2
 Red - 3
 Yellow - 4
 {Not Used} - 5
 Green - 6
 Blue - 7
 Purple - 8
 White - 9

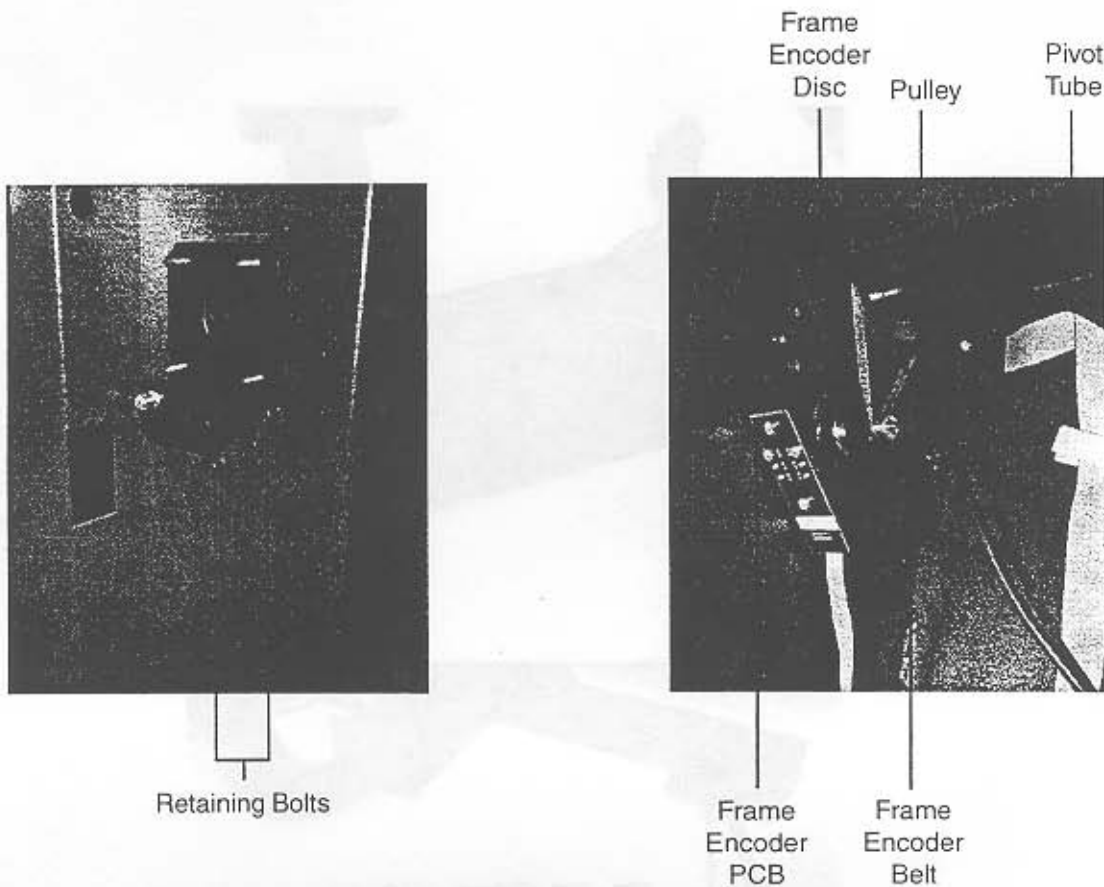
7. Fix a strain relief for the cable at the protective bracket. Similarly, fix the flexible strain relief mentioned in step 3 to the hole in the support bar. The *measuring frame cable* should extend 23-24 inches (580-610 mm) from the *frame*.
8. Grommets are required at 3 places to prevent the cable from being damaged:
- At the point where the 8-way cable emerges into the box on the inner arm of the *frame* from the support bar
 - At the point where the 4-way cable passes from the box on the inner arm into the tubing at the back end of the *frame* (to be routed to the box in the outer arm)
 - At the point where the same 4-way cable passes into the box on the outer arm of the *frame*. These grommets should only be replaced if damaged.
9. Use a single tie-wrap to hold the 4 wires together in the box on the outer arm.
10. Install both *ultrasonic housings* - see REPLACING THE ULTRASONIC HOUSING. Ensure that the 4-way cables in the boxes are connected to the PCBs in the *housings*, and that the *housings* are properly fixed to the *measuring frame*.
11. Connect the *measuring frame cable* into the 9-way connector on the outside of the *PCB door*.
12. Attach the protective bracket on the end of the *measuring frame cable* to the rear of the *PCB door* using the 2 cross-head screws.
13. Connect the power cord. Switch on the power.



Replacing the Frame Encoder

Removal of Frame Encoder

1. Switch off the power and remove the power cord.
2. Remove the 2 cross-head screws which hold the *PCB door* in place. The *PCB door* opens outward, hinged along its bottom edge; lower the top of the door gently until the door rests in the horizontal position.
3. Disconnect the 10-way *frame encoder cable* from connector J1 on the *ultrasonics processor PCB* located on the *PCB door*.
4. The *frame encoder assembly* is located on the inside wall of the base of the balancer beside the *frame pivot tube*. It is secured by two 0.5" (13 mm) bolts on the outside of the base, beside the receiving plate of the *frame pivot tube*.



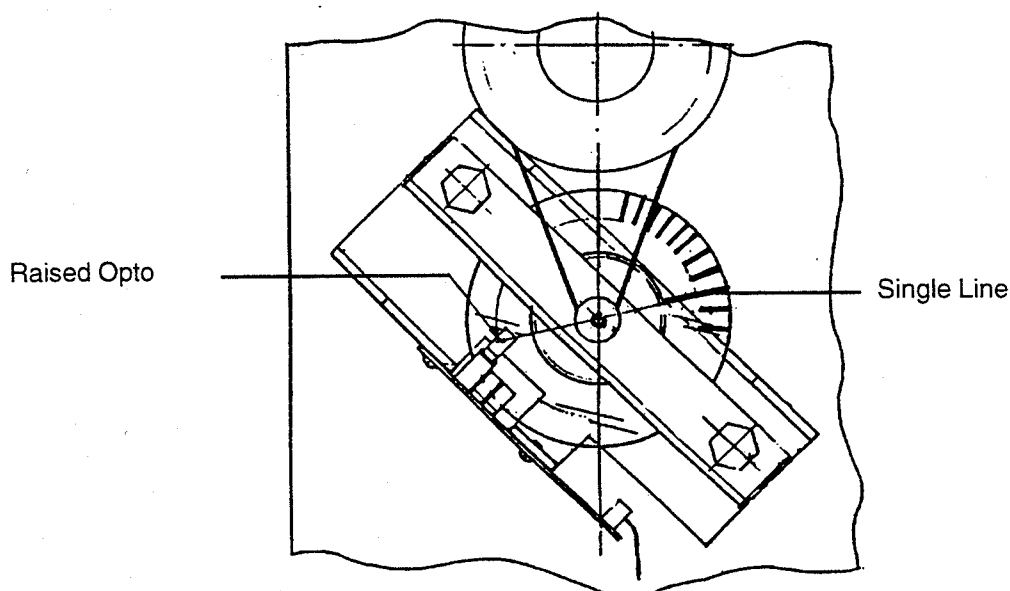
5. Raise the *measuring frame* to the vertical position.
6. Remove both the retaining bolts and their washers on the outside of the base.
7. Slip the *frame encoder assembly* out of the *frame encoder belt* on the inside of the base and remove it completely.

Installation of Frame Encoder

1. Lower the *measuring frame* to the horizontal position.
2. Bring the *frame encoder assembly* into position on the inside wall of the base of the balancer. Insert one bolt with washer through from the outside and tighten it sufficiently to hold the *frame encoder assembly* to the base.
3. Manoeuvre the *frame encoder assembly* such that the *encoder belt* sits onto the small toothed wheel on the spindle of the *frame encoder*.
4. Gently rotate the plastic *encoder disc* such that the single long black line on the disc is aligned with the tallest of the three optical encoder devices on the *frame encoder PCB* (the *frame* must be in the horizontal position).
5. Insert the second bolt with washer from the outside to secure the *frame encoder assembly*. Check that the *encoder belt* moves only slightly under finger pressure 17.7lbs.

- Notes:
- The *encoder belt* must not be over-tightened as this may distort the shaft of the *frame encoder*.
 - If the *encoder belt* is too loose, it may slip when the frame is moved. One result may be that the motor is not activated to start a measuring cycle when the *frame* is lowered.
 - When the *encoder belt* is set correctly, pressing firmly without undue force on the belt between the toothed pulleys should cause a deflection of no more than 0.10 inches (3 mm)

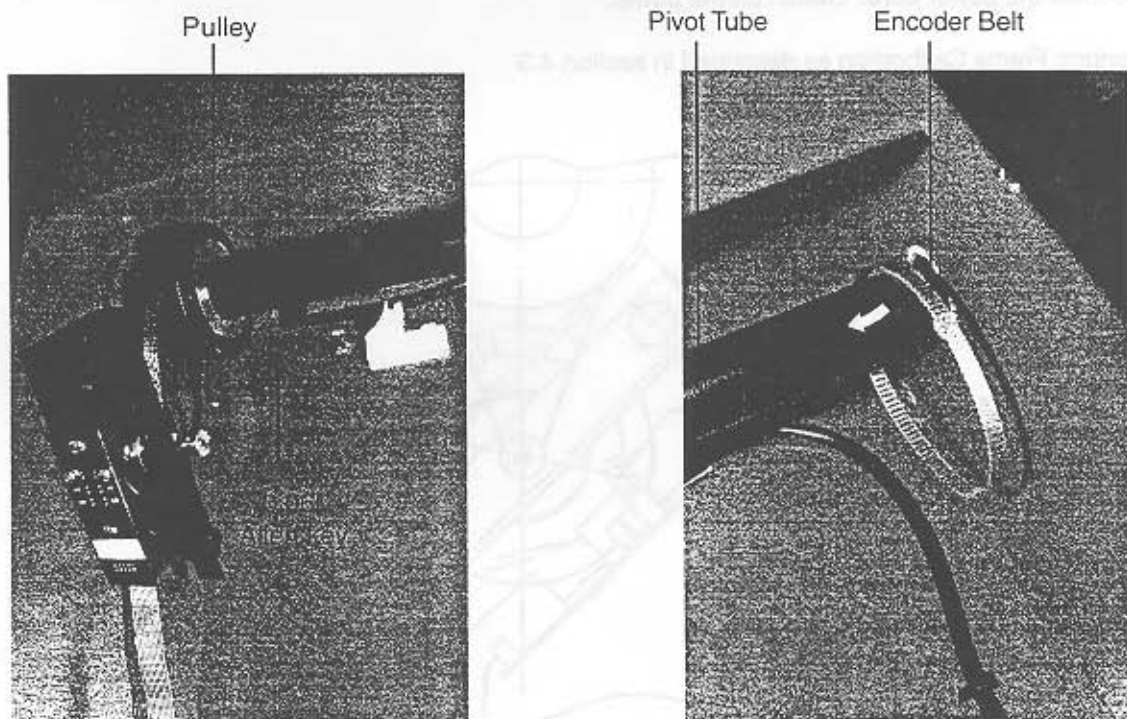
6. Connect the 10-way *frame encoder* cable to connector J1 on the *ultrasonics processor PCB* located on the *PCB door*.
7. Close the *PCB door* and insert the 2 cross-head retaining screws.
8. Connect the power cord. Switch on the power.
9. Perform Frame Calibration as described in section 4.3



Replacing the Frame Encoder Belt

Removal of Frame Encoder Belt

1. Switch off the power and remove the power cord.
2. Remove the 2 cross-head screws which hold the *PCB door* in place. The *PCB door* opens outward, hinged along its bottom edge; lower the top of the door gently until the door rests in the horizontal position.
3. Examine the *encoder belt* first. If it is stretched, excessively loose or damaged, it needs to be replaced.
4. Remove the *frame encoder assembly* - see REPLACING THE FRAME ENCODER above.
5. Remove the *measuring frame* - see REPLACING THE MEASURING FRAME above.
6. Remove the plastic *weight tray*. First, remove the 2 cross-head screws from the plastic section on the *measuring head* near the *flange*. Then, lift the *weight tray* off the Velcro strips on the top edges of the base of the balancer.
7. Remove the *gas spring* - see REPLACING THE GAS SPRING below.
8. Slip the *frame encoder belt* off the pulley on the *pivot tube*. Using a 0.06" Allen key, loosen the set-screw which fixes the pulley to the *pivot tube* until the pulley is free to move and slide the pulley along the tube towards the internal end.
9. Remove the *split pin* which holds the internal end of the *pivot tube* in place in the base of the balancer. Use a pliers to help remove the pin.
10. Slowly pull the *pivot tube* out through the bearing at the measuring frame side until the internal end of the pivot tube is free of its bushing support. Remove the *encoder belt* from the *pivot tube* at the internal end.



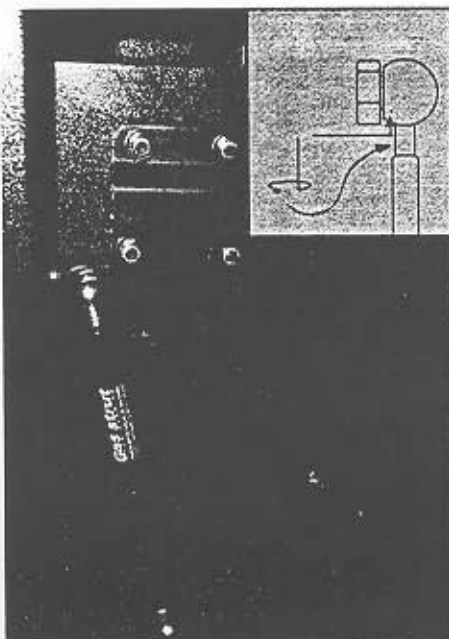
Installation of Encoder Belt

1. First follow all the steps in REPLACING THE FRAME ENCODER BELT as described above.
2. Slip the new *encoder belt* over the free internal end of the *pivot tube*.
3. Slowly push the *pivot tube* back through the internal end's bushing. Replace the *split pin* to keep the tube in place.
4. Bring the *pivot tube pulley* to the point on the tube where the countersunk hole for pulley's locating set-screw is positioned. Tighten the set-screw, ensuring it locates fully in the hole in the tube.
5. Loop the *encoder belt* over the pulley on the pivot tube.
6. Replace the *gas spring* - see REPLACING THE GAS SPRING below.
7. Replace the *frame encoder* - see REPLACING THE FRAME ENCODER above. With the *pivot tube* rotated to rest against the rubber stop (the *frame* would be in the vertical position), check the *frame encoder* to ensure that the single line from the centre of the plastic disc is at approximately 180° (directly opposite) to the tallest of the three *optical encoder* devices on the *frame encoder PCB*.
8. Replace the *measuring frame* and reconnect the *measuring frame cable* - see REPLACING THE MEASURING FRAME above.
9. Position the *weight tray* on the Velcro strips on the top edges of the base and press firmly around the edges. Insert the 2 cross-head screws in the plastic section on the *measuring head*.
10. Close the *PCB door* and insert the 2 cross-head retaining screws.
11. Connect the power cord. Switch on the power.
12. Perform the Frame Calibration Procedure described in the Calibration Section.

Replacing the Gas Spring

Removal of Gas Spring

1. Ensure that the power is switched off and that the power cord is disconnected.
2. Raise the *measuring frame* to the fully upright (vertical) position.
3. Unclip the 2 ball-retainer clips, one on each ball at the ends of the *gas spring*.
4. Remove the *gas spring* by pulling the socket ends off the ball joints. One ball joint is fixed to the receiving plate of the *pivot tube*; the other ball joint is fixed to the base of the balancer.



Installation of Gas Spring

1. Unclip the two ball-retainer clips on the ball sockets of the *gas spring*.
2. Push the two socket ends of the gas spring on to the ball joints on the plate of the *frame pivot tube* and on the base of the balancer.

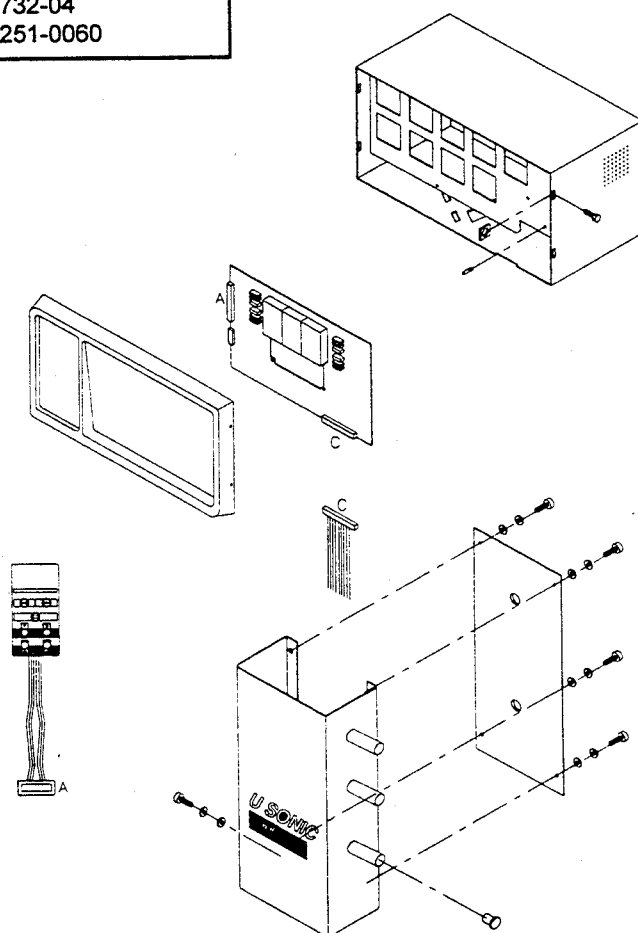
Note: The piston-rod end of the gas spring must be attached to the base of the machine; the cylinder end must attach to the measuring frame plate. This arrangement ensures that oil is continuously around the seal of the cylinder, thus preventing it from leaking.

3. Install the ball-retainer clips on both socket ends of the *gas spring*.
4. Connect the power cord. Switch on the power.

5.6 DISPLAY HOUSING ASSEMBLY

The Following table outlines the spare parts required for Display Assembly:

Key	Description	Part Number
1	Keypad Overlay	9080
2	Display Bezel	8514
3	Display Cable Assembly	8081-02
4	PCB Display Assembly	8197-02
5	Display Weldment	8669-02
6	Screw ST (6-18 x 1/2)	0925-0618-08
7	U-Clip (small)	3700-0002
8	PCB Stand-offs	3800-0033
9	Spring Washer (M6)	0252-0060
10	Hex Screw (M6 x 16)	0152-0060-16
11	Display Upr-Back Panel	8733-04
12	Blanking Plug	3900-0019
13	Usonic Label	8814
14	Display Upright	8732-04
15	Washer (M6)	0251-0060

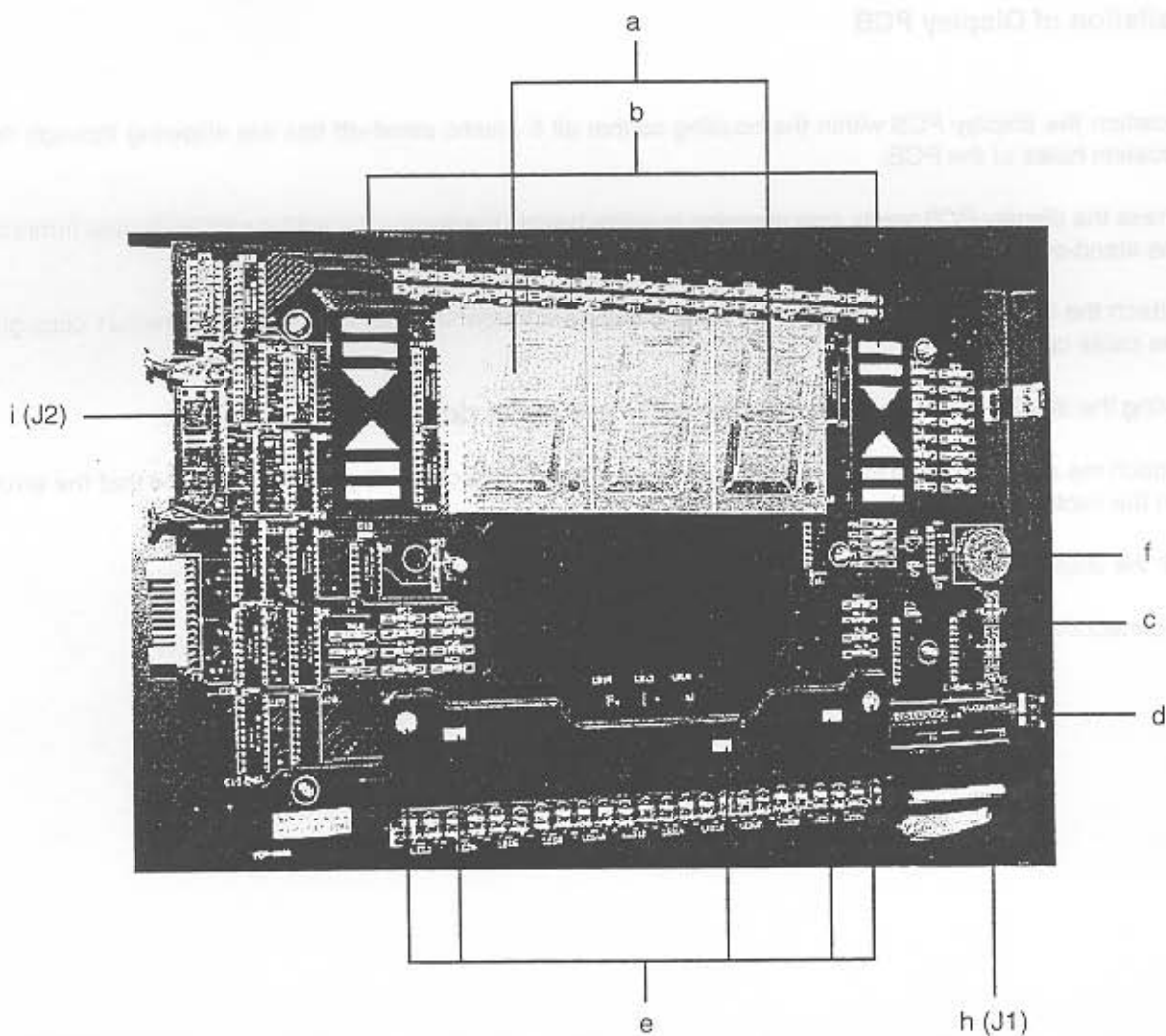
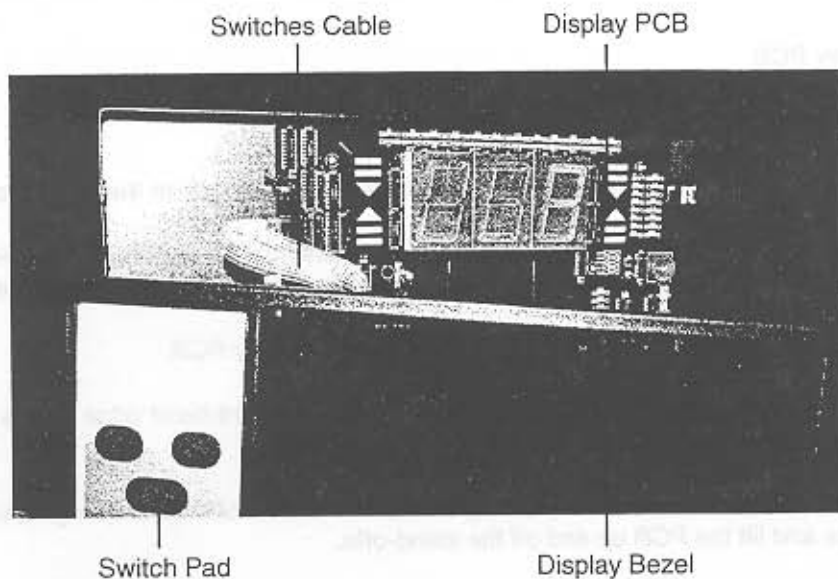


The *display assembly* contains the operator input and display components of the wheel balancer. It is located over the weight storage pockets and includes the following:

- Display PCB
- Switch pad assembly
- Display cable
- Display bezel

The display PCB contains:

- a) 3 7-segment numeric displays 2.25"/57mm for weight values, calibration indicators and error codes display.
- b) 6 red LED light bars for inner weight position indication and another 6 red LED light bars for outer weight position indication (located to either side of the 7-segment displays and covered with a mask).
- c) 3 LED light bars for Mode indication (FINE, AUTO, MATCHING), covered with a mask inscribed with the legend indicating their meaning.
- d) The Rim Profile, a specially designed and shaped perspex panel edge-illuminated by 24 yellow LEDs; these LEDs are always lit when power is applied to the wheel balancer.
- e) 5 LED light bars for Weight Mode indication (Normal, ALU, Static), located along the Rim Profile.
- f) A piezo-electric buzzer for aural indication and warning.
- g) Electronic circuitry to control, drive and interface the display components and the switches.
- h) A 34-way connector J1 for the *display cable* situated at the bottom right-hand corner of the component side of the PCB.
- i) A 10-way connector J2 for the *switches cable* situated at the left-hand edge of the component side of the PCB. **NOTE:** The arrows on the *switch cable* connector and the J2 connector should line up.



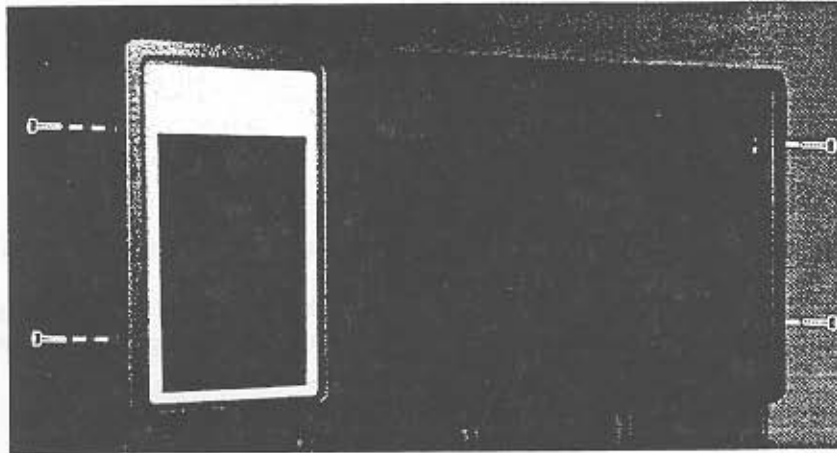
Replacing the Display PCB

Removal of Display PCB

1. Switch off the power and remove the power cord.
2. Remove the 4 cross-head screws which secure the plastic *display bezel* to the metal housing.
3. Lift the plastic *display bezel* a few inches away from the housing. The *switch pad* on the front left of the *display bezel* is connected by the short *switches cable* to the display PCB within the housing.
4. Disconnect the *switches cable* from the J2 connector on the *display PCB*.
5. Disconnect the *display cable* from connector J1 on the bottom right-hand edge of the *display PCB* by pushing apart the two side-clips on J1.
6. The *display PCB* is mounted within the housing on 5 plastic stand-offs. Use a long-nose pliers to pinch the stand-off tips and lift the PCB up and off the stand-offs.

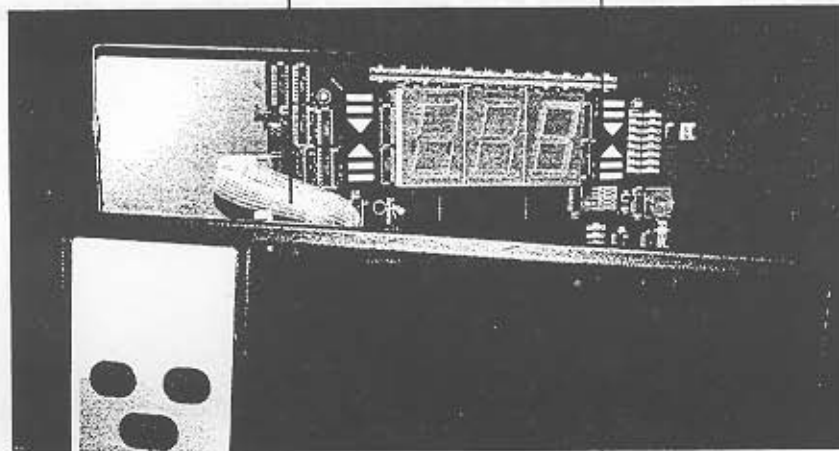
Installation of Display PCB

1. Position the *display PCB* within the housing so that all 5 plastic stand-off tips are showing through the location holes of the PCB.
2. Press the *display PCB* gently, only pressing at points beside the stand-offs, until the PCB locates firmly on the stand-offs.
3. Attach the *display cable* to connector J1 at the bottom right-hand edge; ensure that the two J1 clips grip the cable connector.
4. Bring the *display bezel* which contains the switch pad and its cable close to the housing.
5. Attach the *switches cable* to connector J2 at the left-hand edge of the *display PCB*; ensure that the arrow on the cable connector aligns with the arrow on J2.
6. Fit the *display bezel* on the housing and insert the 4 cross-head screws to retain it in place.
7. Connect the power cord. Switch on the power.



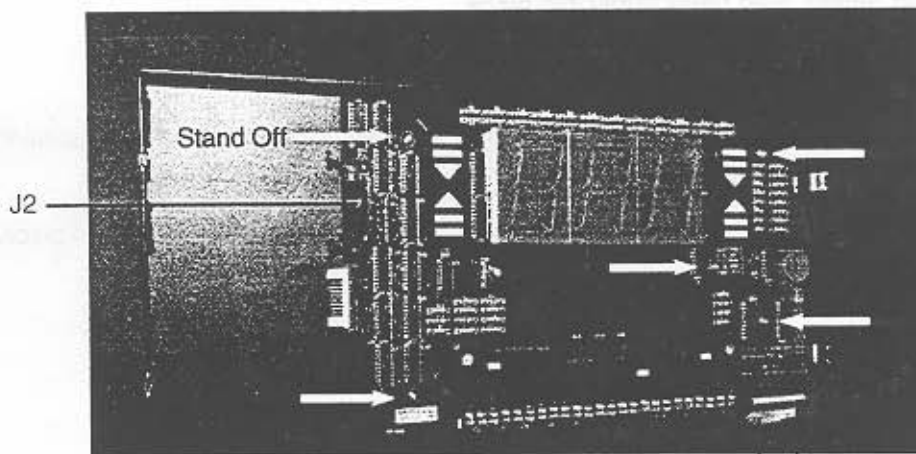
Switches Cable

Display PCB



Switch Pad

Display Bezel



J2

Stand Off

J1
Display Cable



Replacing the Switch Pad

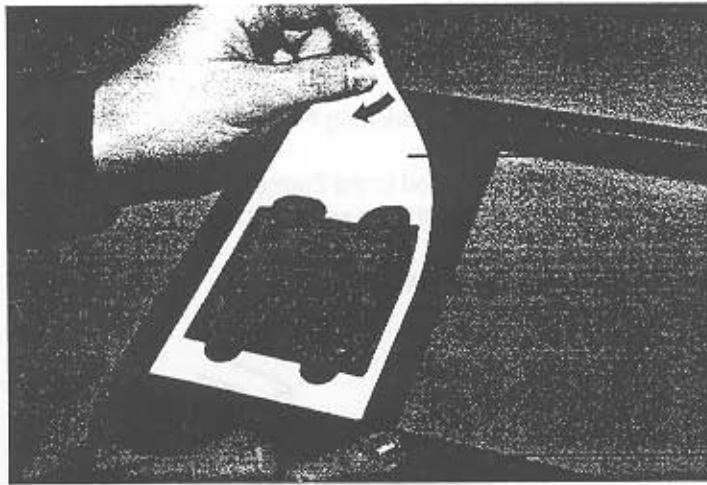
Removal of Switch Pad

1. Switch off the power and remove the power cord.
2. Remove the 4 cross-head screws which secure the plastic *display bezel* to the metal housing.
3. Gently lift the plastic *display bezel* a few inches away from the housing. The *switch pad* on the front left of the *display bezel* is connected by the short *switches cable* to the *display PCB* within the housing.
4. Disconnect the *switches cable* from the J2 connector on the *display PCB*.
5. An adhesive backing holds the *switch pad* in place on the front of the *display bezel*. Use the tip of a flat-head screwdriver to lift one corner of the *switch pad*, then gently peel the entire *switch pad* away from the plastic bezel.
6. The flat *switches cable*, an integral part of the *switch pad*, passes through a slot in the plastic bezel. Pull the cable through the slot to completely remove the *switch pad*.

Installation of Switch Pad

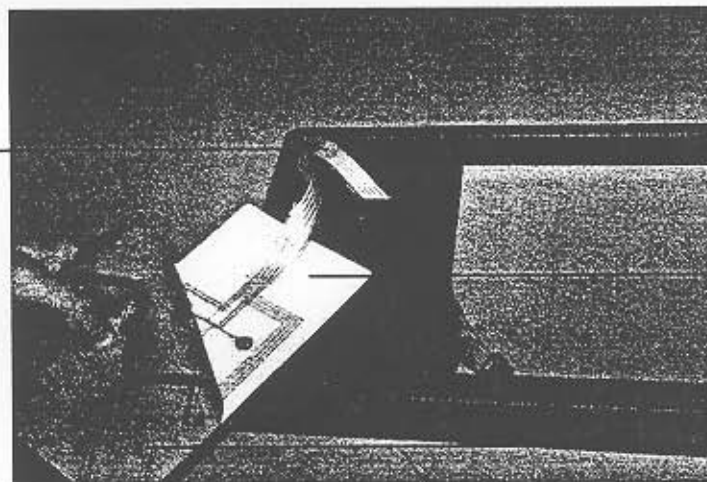
1. Place the *switch pad* within the rectangular recess on the front left side of the *display bezel*.
2. Pass the connector of the flat *switches cable*, an integral part of the *switch pad*, through the slot in the rear of the recess.
3. Remove the cover of the self-adhesive backing on the back of the *switch pad*. Align the *switch pad* within the rectangular recess, then press firmly into place.
4. Bring the *display bezel* with the switch pad and its cable close to the housing.
5. Attach the *switches cable* to connector J2 at the left-hand edge of the *display PCB*; ensure that the arrow on the cable connector aligns with the arrow on J2.
6. Fit the *display bezel* on the housing and insert the 4 cross-head screws to retain it in place.
7. Connect the power cord. Switch on the power.

FLY HOOD ASSEMBLY (OPTIONAL)



Switch Pad

Display Bezel



Switches Cable
(passed through
slot on display
bezel)

Display Bezel

Switch Pad

Self-adhesive
Backing



5.7 HOOD ASSEMBLY (OPTIONAL)

A plastic hood for the front portion of the measuring frame is available as an option. It prevents the person operating the equipment from interfering with the balance cycle.

The optional hood assembly - P/N 7707 - is fitted as follows:

1. Fit the plastic Hood to the front tubing of the Measuring Frame.
2. Using the plastic tie-wraps provided, fix the Hood to the Frame by routing the tie-wraps around the tubing and through the pre-drilled holes, then pulling the tie-wrap taut.
3. Cut off any excess tie-wrap after securely tightening.

