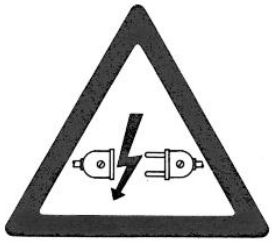
BERNINA®

Service manual

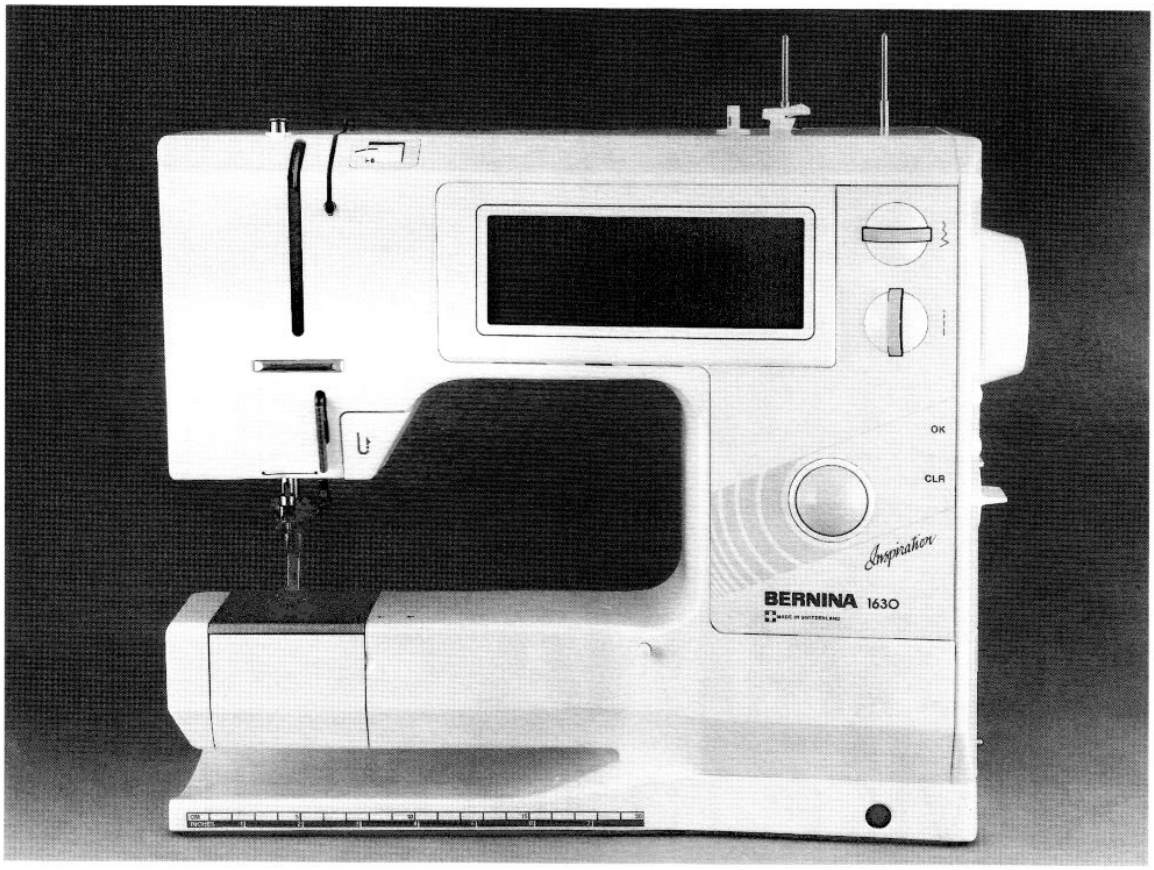
BERNINA 1630

Safety Regulations



Attention

All electrical and electronic components operate at dangerous voltages. The mains plug must be withdrawn before making any adjustments to the machine. Wait at least 30 seconds afterwards (capacitor discharge).



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Contents (Mechanic)

Contents (Electronic)

1 Adjustment of model 1630

The adjustment instruction are intended to help with small repairs and adjustments. The instructions lay no claim to completeness. They are not suitable for a complete assembly or disassembly procedure.

Important: To enable the work described to be performed, the sewing machine must be in good mechanical and electrical condition! (Running smoothly, properly oiled and all plugs in position). When the adjustments are done in the correct order, the machine is guaranted to sew impeccably.

Removal of covers

Warning: The electronic components operate with dangerous voltages. The mains plug must be withdrawn before making any adjustments to the machine. Wait at least 30 seconds afterwards (capacitor discharge).

2 Technical data BERNINA model 1630

Stitch length max. forward 5 mm
max. reverse 5 mm

Increment 0–1 mm 0,05 mm
1–3 mm 0,1 mm
3–5 mm 0,2 mm

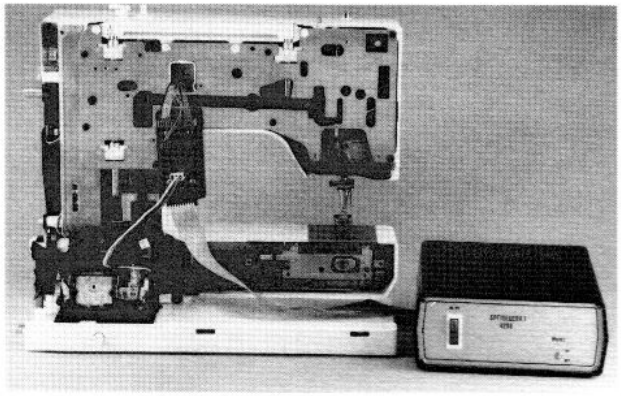
Max. stitch width 9mm
Increment 0,1mm
Sideways feed
Needle system 130/705 H
Adjusting needle 130/705 H/TCN
Hook system BERNINA
Presser foot height 7,3mm
Darning foot height 0,5mm
Automatic long stitch 10mm/2:1
Basting device 20mm/4:1
Working space 105 x 195 mm
Overall length 375mm
Overall width 184mm
Overall height 50mm
Motor 90W
No. of stitches per min.min.–max. 120–105 U/min.
Motor speed 1/3, 2/3, 3/3
Sewing light: bulb 2 x 6 V/4W
Weight 10,5 kg

Features and functions

L.C.D. display (Liquid Crystal Display) with background lighting (adjustable)
Needle positions 11
Zig-zag and stitch length (infinately variable)
Sideways motion feed
Twin needle limitation 2, 3, 4 mm
Automatic basic adjustments
Basic marking blinker
Presser foot display
Upper needle stop (general), lower needle stop
Needle positioning upper/lower with foot control
Main switch
Pattern start
Manual stitch size adjustment, memorized
Long stitch device
Basting stitch device
Balance for forward and reverse feed
Clear button
Single pattern
Seperate light switch
Bobbin winder with seperate motor
Stitch pattern extention 2, 3, 4 and 5-times extention
Menu orientated stitch selection
10 practical stitches without reverse feed
13 practical stitches with reverse feed
7 practical stitches with sideways motion
16 decorative stitches without reverse feed
102 decorative stitches with reverse feed
72 sideways motion patterns
409 total stitch patterns
Permanent reverse sewing
Eyelett sewing programme
Sewing on a button programme
Cord reel for mains/foot control
5 Various alphabetts
Number 0–9 (3 variations)
Memory capacity 630 units
(Can be called-up even after mains failure/interruption)
External memory function (Data-Key)
Built in service-programme

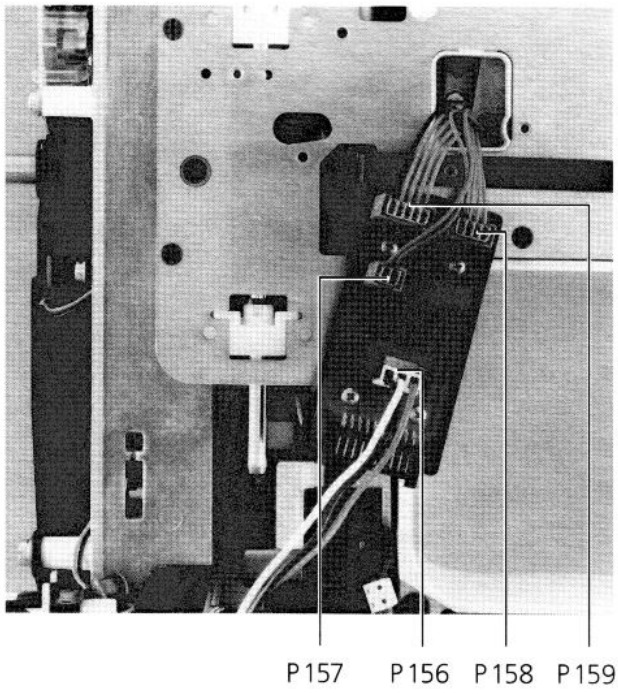
3 Special D.C. mains adapter for model 1630

This adapter allows the machine to run with a direct current of 30V, so that you will not come into contact with dangerous voltages while working on it.

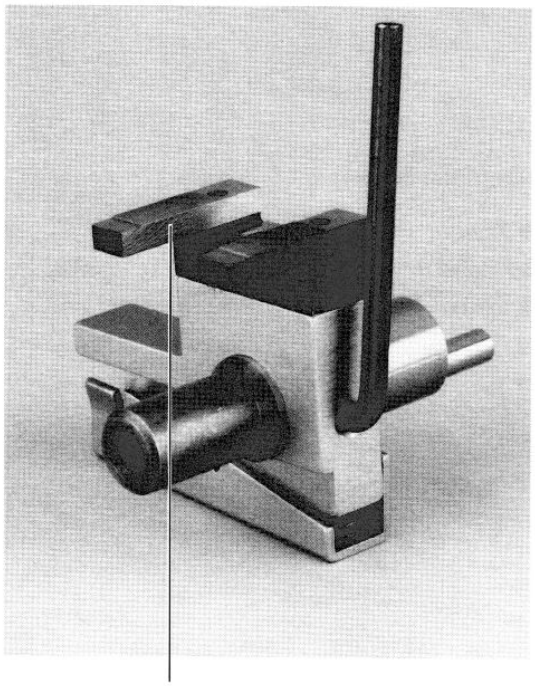


Use of the adapter

- Remove chassis cover (section 6).
- Completely remove chassis with L-print (section 8).
- Connect P156/P157/P158/P159 to appropriate PCB.
- Plug in the adapter to the mains.
- You can check that the motor is being powered via this adapter, as there is only a current of 30V the max. speed of the machine should be approx. 120 U/min.



4 Use of the special gauge (4) for the basic adjustment of the carrier

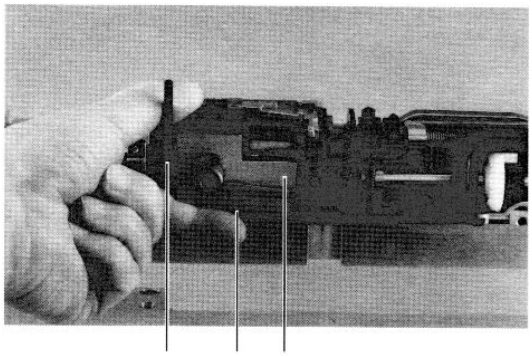


The following positions can be adjusted using gauge (4):

1. Lateral positioning of the feed-dog
2. Feed-dog height
3. Feed-dog lift and advance (in relation to the feed-dog height)

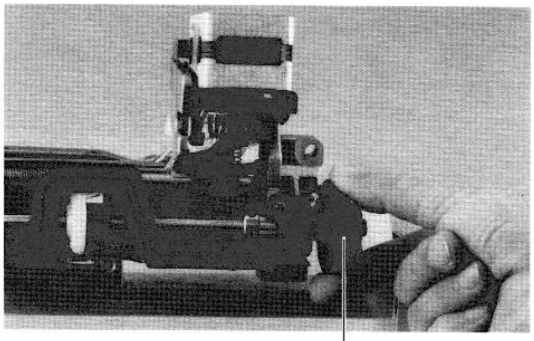
Setting the gauge

Squeeze gauge together at points (5) and (6), and palce over the drive shaft. Care must be taken on the right hand side of the gauge that the angled part of base shaft (8) is in position. At the same time the bevel gear should be turned un-til the flat on the base shaft (8) leans against the gauge (4). Release points (5) and (6) (the gauge is secured). It should not be possible to turn base shaft (8) anymore.



Sideways positioning of the feed-dog

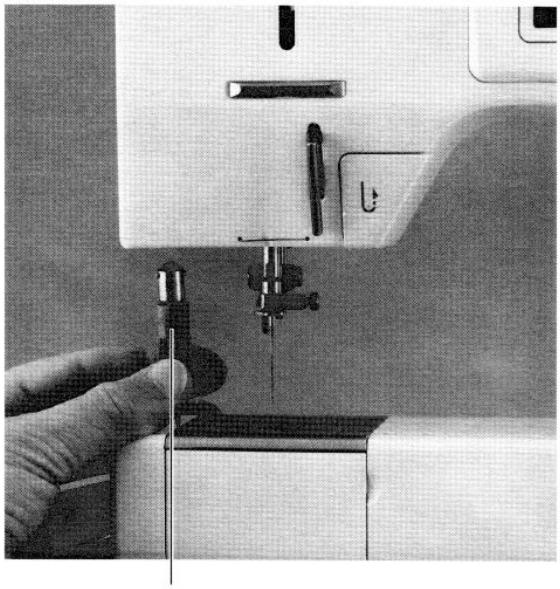
- Loosen fixing screws (11) of the feed-dog lifter fork (12) and feed-dog (10).
- To position the feed-dog and thrust fork, place eccentric (13) on the left-hand side of the feed-dog.
- Tighten screws (11).
- Loosen eccentric (13).
- Check the movement of the feed-dog support.



Feed-dog height:

Check or adjust as described in section (23).

5 Changing the bulb



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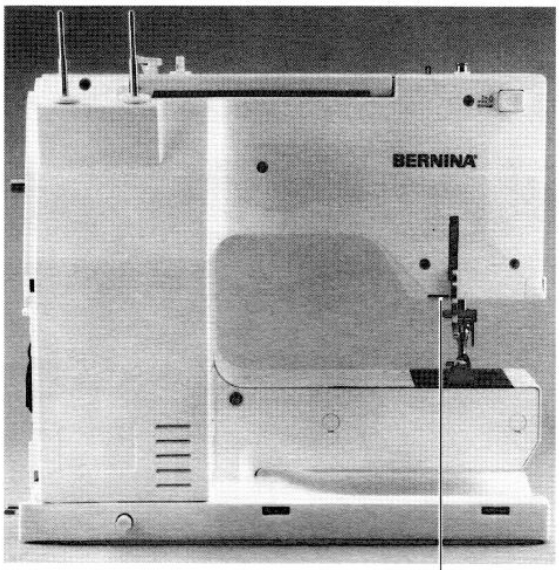

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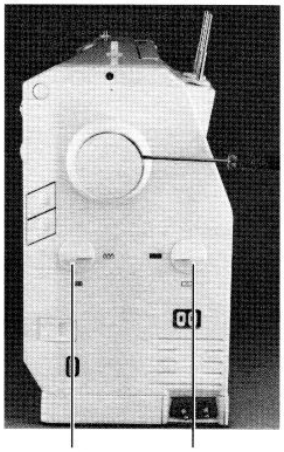
There are two low voltage lamps both 6V, 4W.

One bulb is situa-ted at the front, left, the other behind the presser bar, right.

To change the bulbs use special tool (15) (bayonet socket).

To change the bulb at the rear, remove diffuser (16).

6 Removing belt cover



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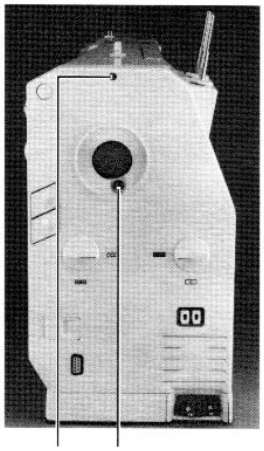
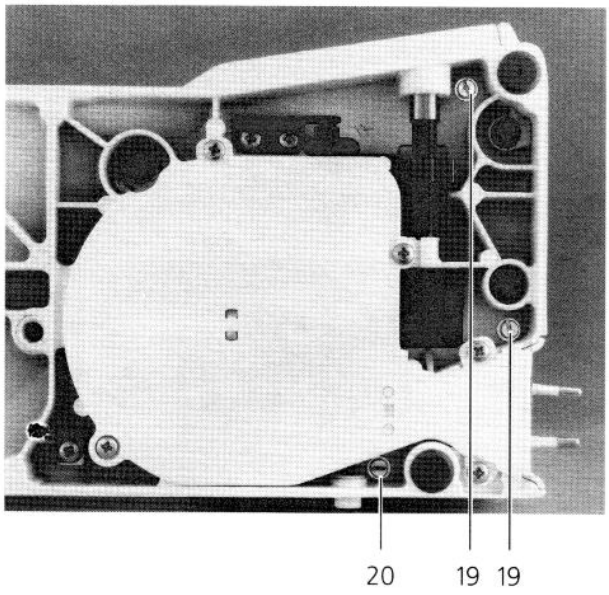


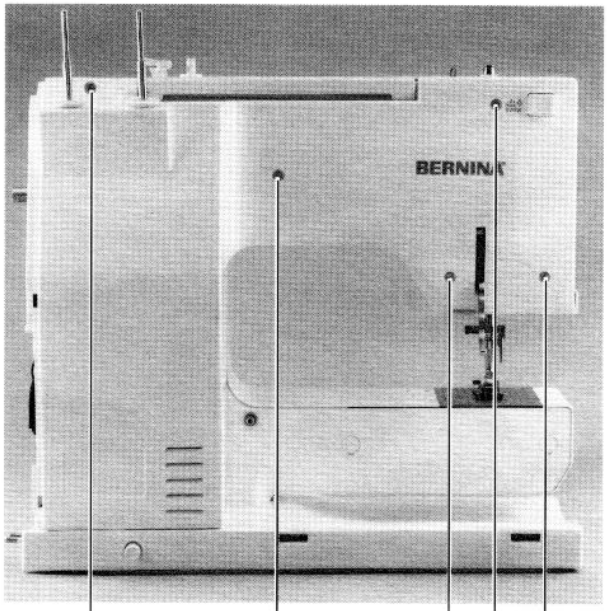
19 19

- Remove cover plate on handwheel with small screw-driver.
- Release handwheel screw and remove handweel.
- Remove sewing/darning knob (17) and remove the main switch (18).
- Loosen and remove four screws (19).
- Remove the belt cover.

Removing chassis cover

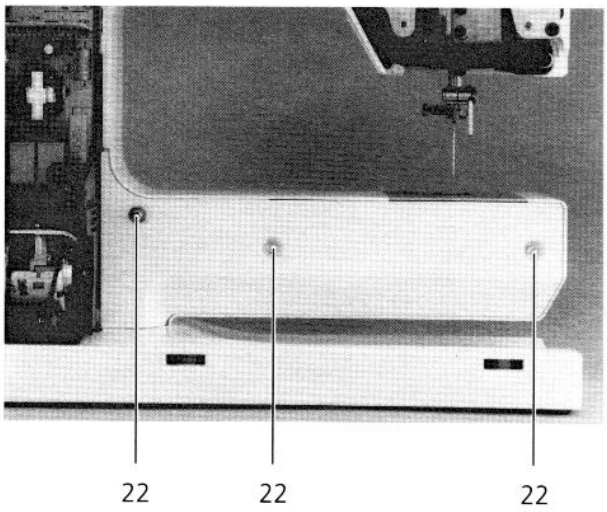
- Remove six screws (20).
- Place the lifting lever in upward position and remove chassis cover.

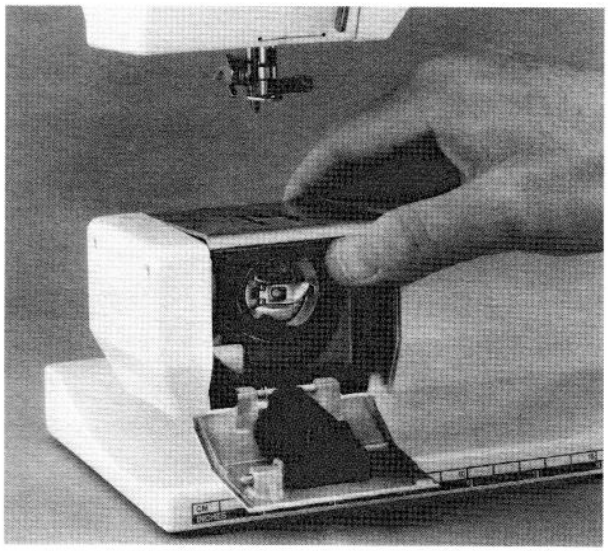




7 Removing base cover

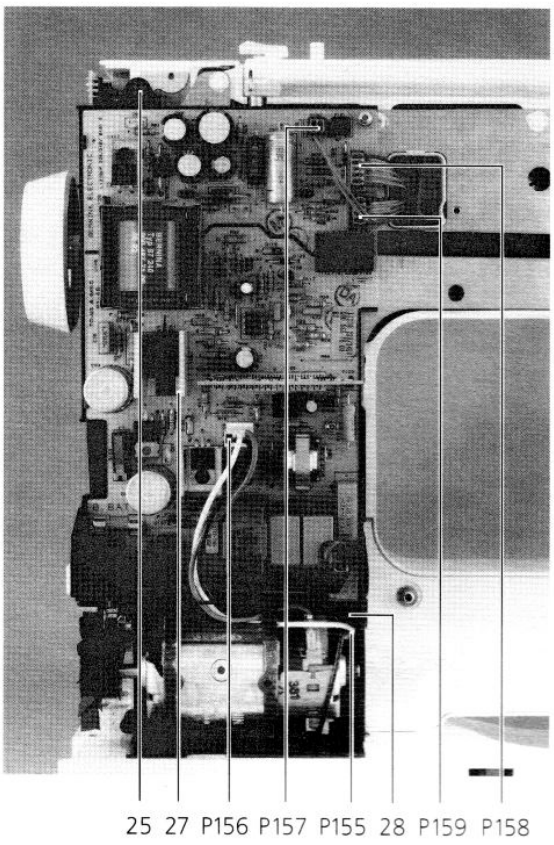
- Remove cap covers (21).
- Remove three screws (22) and base cover. Removing needle plate.



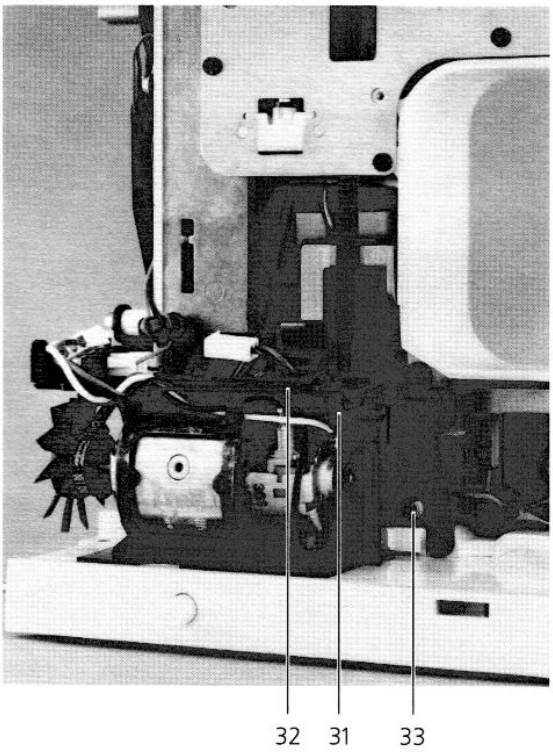


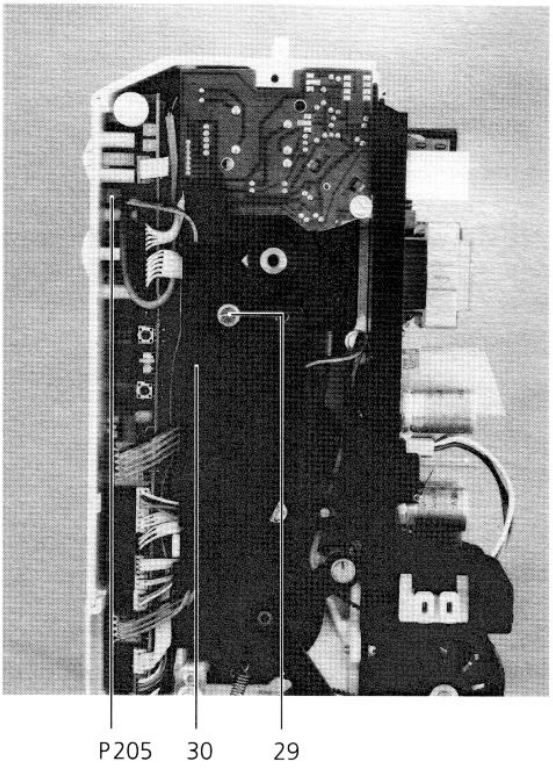
- Lower feed-dog.
- Open hinged cover.
- Lightly lift front of the needle plate and remove by sliding away from you.

8 Complete removal of chassis with L-Print



- Disconnect wires to L-Print (P158/P159/P160/P162/P163).
- Remove screw (25).
- Press lightly with a screw-driver on the snapaction lock situated on the chassis (27), and at the same time tilt the chassis in the direction indicated by the arrow.
- Press the right-hand hinge (28) slightly outwards and remove chassis (27).



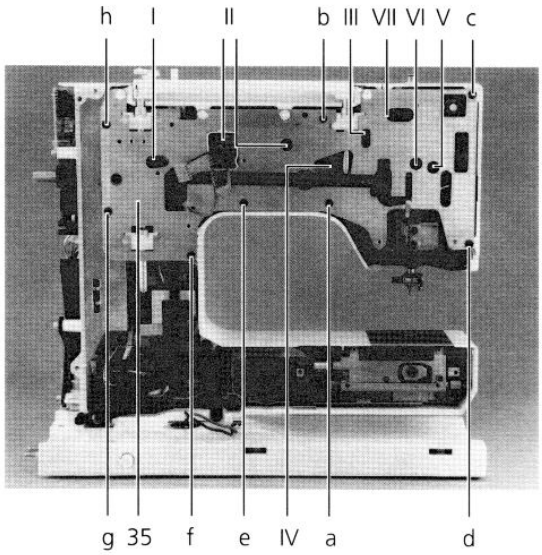


Dismantling motor support

- Remove screw (29).
- Remove cable covering (30).
- Disconnect foot pedal cable P205 from A/S PCB
- Remove cover from cable channel (31). This is to the right of the motor support (32) and is removed by pushing to the right.
- Remove screws (33) from motor support.
- Release the drive belt.
- Remove motor support.

To assemble reverse the procedure.

9 At the points marked the following adjustments can be made with the rigidity plate



I. Even winding.
II. Stitch distribution ZZ.
III. Pinning position of needle drive and swivel piece.
IV. Fixing screws to top of head frame.
V. Instant of decoupling (Basting device and automatic long stitch).
VI. Height of presser foot bar.
VII. Darning lever adjustment.

Screws a – h of rigidity plate

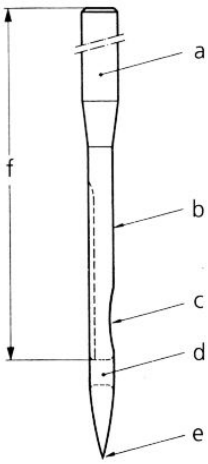
10 The needle

The needle is one of the most important items of sewing equipement. Its function is to pierce the material and take the upper thread to the hook for linking with the lower thread and to form the loop for acceptance by the hook.
The loop is formed after the needle has pierced the material and reached its lowest point. The thread is drawn tight and lies in a long groove at the front. At the rear the thread lies in a short groove which is higher up between the needle stem and the hole pierced in the fabric. When the needle rises slightly, the socalled «loop lift», the loop is produced at the eye of the needle on the short groove side, which the tip of the hook can enter, as a result of the friction between the work and the needle stem where the thread is retarded.

Bernina uses the 130/705 H needle system with scarf for model 1630.
The needle size is measured in millimeters. Needle size «100» means a needle stem thickness = 1mm or Nm 80 (Needle mm) = 0,8 mm dia.
The needle must be firmly secured with the knurled screw on the needle holder. Tighten this screw with the special screw-driver.

Basically, the sewing machine needle has the following features:

a) The shaft for securing the needle in the needle bar,
b) the stem with a long groove for guiding the thread and forming the loop,
c) the scarf,
d) the eye of the needle,
e) the point of the needle,
f) the needle length.



Important! Always use an «Nm 80» TCN needle for all adjust-ments unless otherwise stated. Check the needle before every adjustment to the machine. It must be absolutely straight.

11 Tensioning of the belt (carrier shaft)

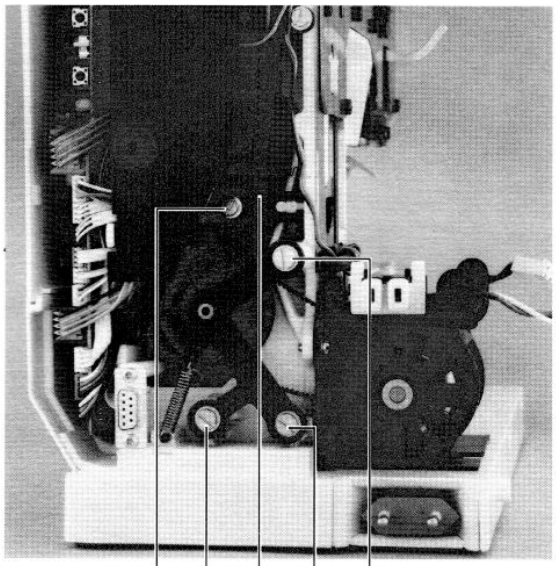
The belt tension is achieved automatically between the tension roller and the tension spring.

- Slightly loosen the screw (36) from the tension roller holder (37).
- Turn the handwheel forwards and backwards.
- Tighten the screw (36).

12 Tensioning of the drive belt

The drive belt is automatically tensioned by means of a tensioning spring.

- Slightly loosen fixing screws (38) and (39). Turn the handwheel forwards and backwards.
- Tighten screws (38) and (39).

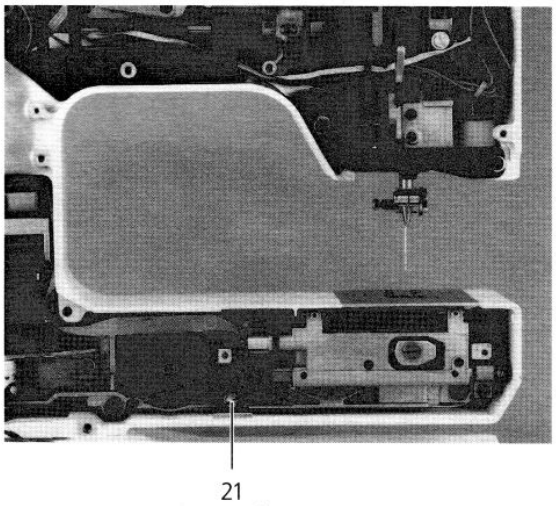


13 Tensioning of the belt (hook drive)

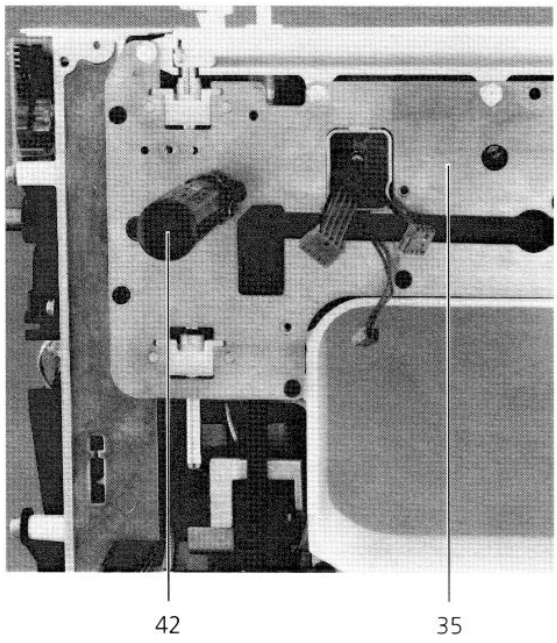
The belt tension is achieved automatically between the tension roller and the tension spring.

- Slightly loosen the screw (21) from the tension roller holder.
- Turn the handwheel forwards and backwards.
- Retighten the screw (21).

Important:
Control loop lift (section 25).



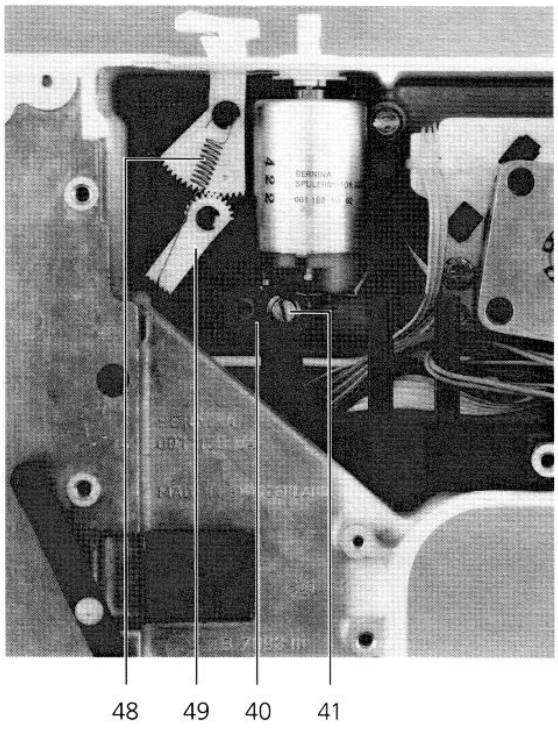
14 Checking the bobbin winding device



The device should be wound evenly with pretension, the bobbin should be correctly filled.

Correction for one-sided winding

- Connect the machine to the special D.C. adapter (see section 3). Removal of rigidity plate (35) is not necessary.
- Slightly loosen fixing screw (41) of support (40).
- With eccentric key (42) adjust the support plate (40) accordingly left or right.
- Tighten fixing screw (41).



Correction when filling the bobbin

Bobbin insufficiently filled

- Move tensioning spring (48) to the right on toggle lever (49).

Bobbin too full

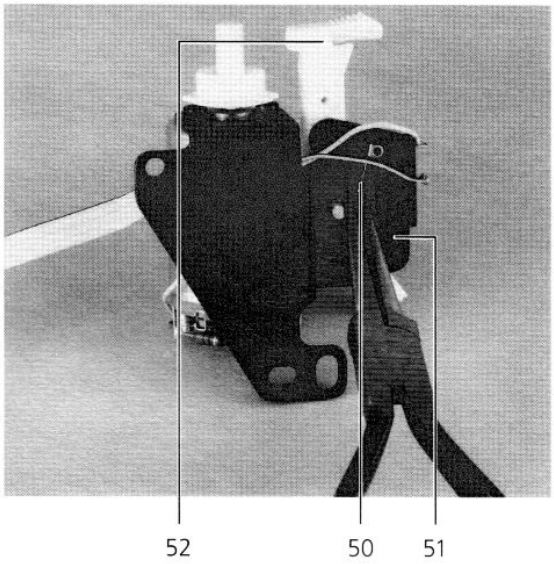
- Move tensioning spring (48) to the left on toggle lever (49).

15 Checking the switching off of motor to bobbin winding device

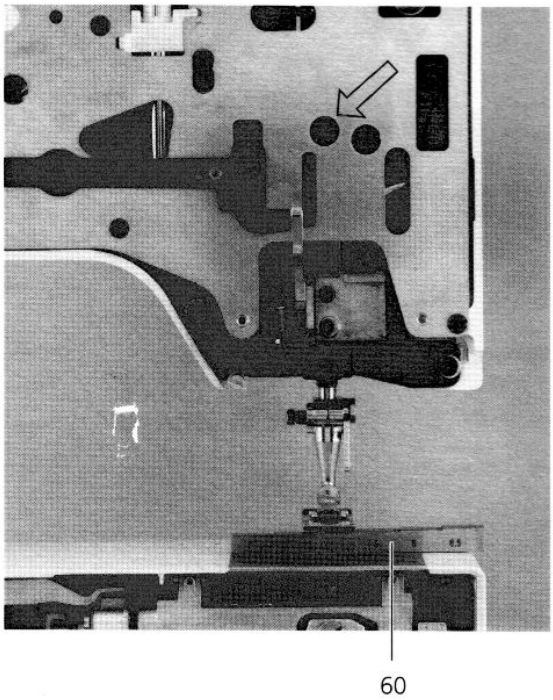
The motor should only switch off when release lever (52) springs back.

Correction (in the case of an exchange)

Bend contact element (50) on switch (51) accordingly. For this operation the bobbin winding device has to be removed (see sketch).



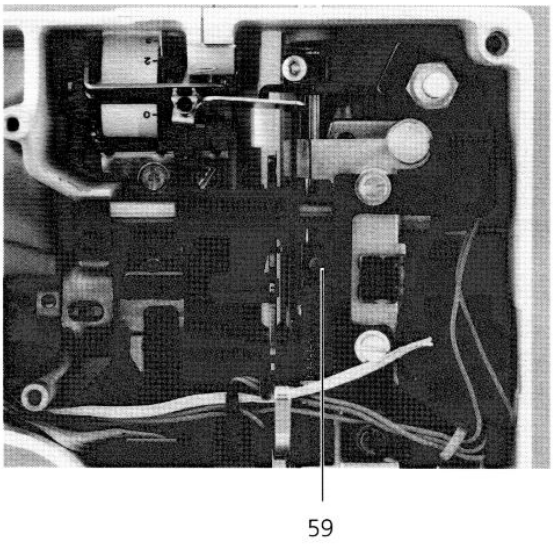
16 Checking the presser foot height



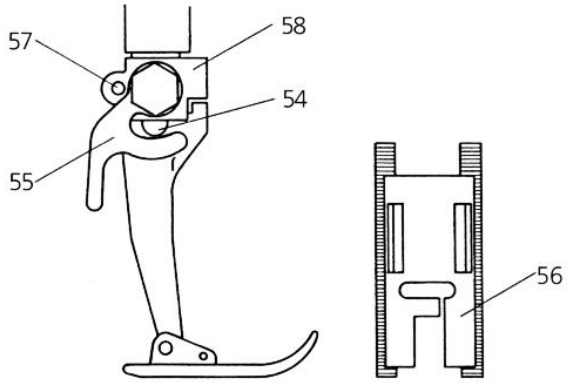
- Lower feed-dog.
- Raise lifter lever.
- Using gauge (60) 7,3 mm check the height.

Correction

- Loosen screw (59) on the presser foot bar guide.
- Using the cone on the presser foot, place this on the gauge (60) 7,3 mm (Note that it is parallel to the marked line).
- Press down the presser foot bar by hand (Note darning lever position).
- Tighten screw (59)



17 Checking presser foot fixation and its height

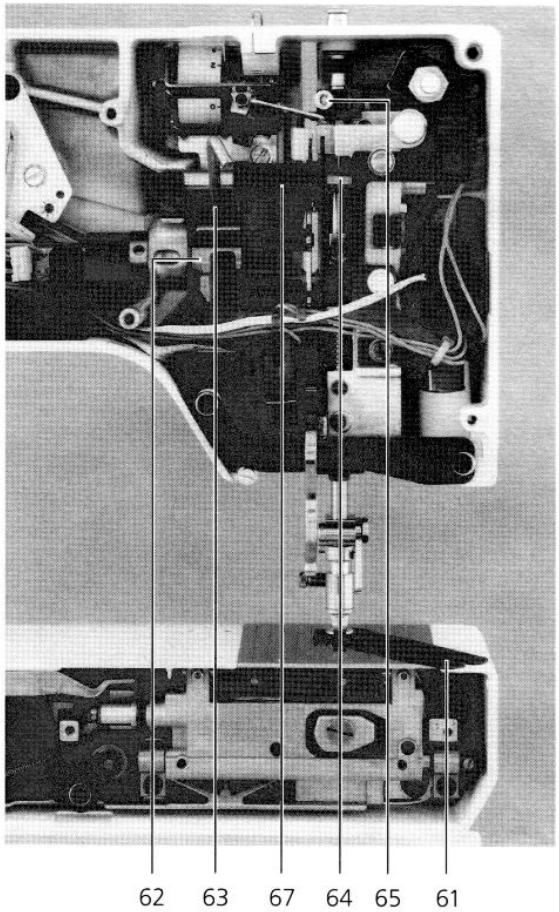


- Tension pin (54) should be one third to half the way up tension lever (55). The presser foot sole must {56) be parallel with the markings on the needle plate.

Correction

- Loosen screw (57) on clamp (58).
- Adjust the height of clamp (58) until the correct tension position is reached. Align the presser foot sole with the markings on the stitch plate.
- Tighten screw (57).

18 Checking the darning foot height



- Remove presser foot.
- Fit darning foot.
- Lower feed-dog.
- Turn the handwheel until the presser foot bar has reached its lowest position.
- Using feeler gauge (61) 0,5 mm check the distance between the needle plate and the darning foot sole.

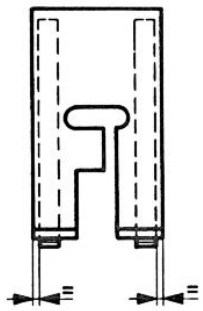
Correction

- Position balance piece (62), by using a 4 mm pin (63) placed against the head frame shaft.
- Loosen screw (65) of the presser foot bar carrier.
- Position the presser foot bar to the prescribed height.
- Press the presser foot bar carrier (66) on the eccentric (67) (Note its working position).
- Tighten screw (65).

19 Presser foot crosswise to sewing direction

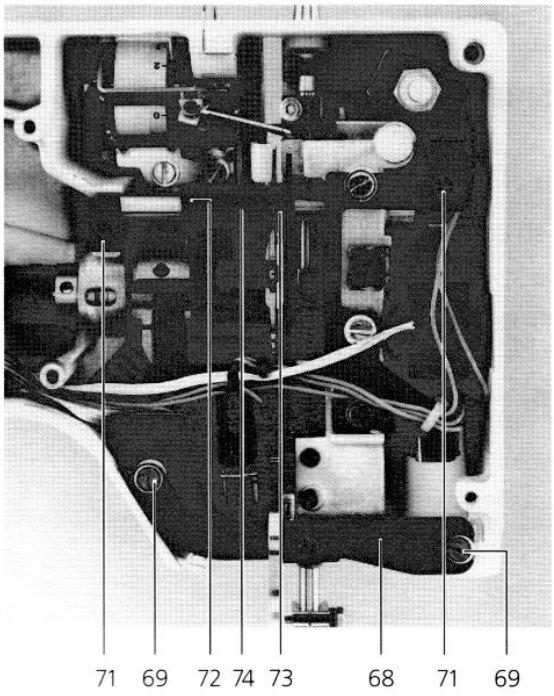
Checking the position of presser foot crosswise to sewing direction.

The presser foot sole must be evenly distributed sideways of the feed-dog slit.



Correction

- Remove rigidity plate.
- Release setting collars (72) and (73) from thread guide (74).
- Loosen both screws (69) from securing strap (68), on head frame.
- Slightly loosen screws (71) of the two clamps, enough to allow the head frame to slide freely. Also ensure that shaft (64) is well guided in the prism.



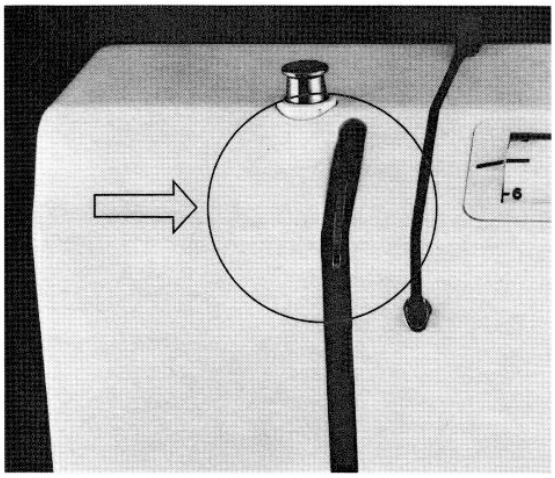
- Slide the head frame into the prescribed position.
- Tighten screws (71) of the clamps.
- Tighten screws (69) of securing strap (68).

20 Adjustment of the thread take-up lever

Correction

- Place thread take-up lever and guide (74) against the crank.
- Position securing collars (72) and (73).
- Tighten screws.

Note: Check smoothness of running.



Checking

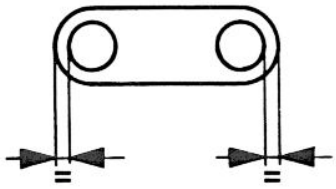
After this adjustment has been done, the position of the thread take-up lever in the frame slit should be 0,4 mm from the centre to the right.

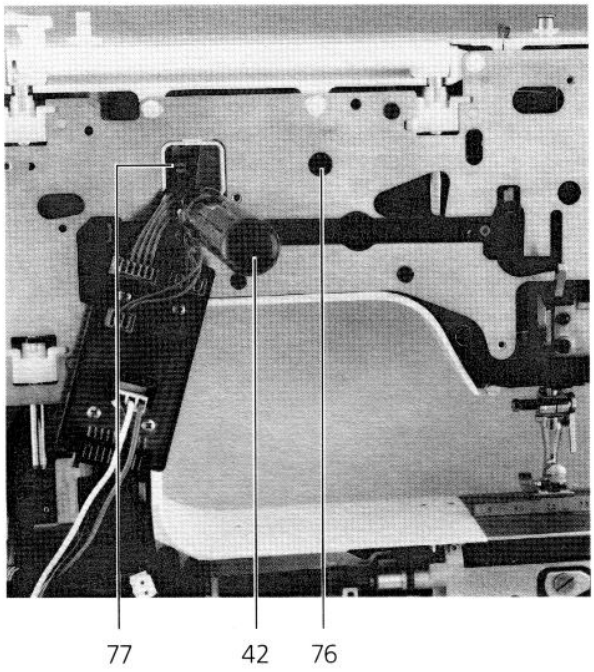
21 Stitch distribution zig-zag

Checking the stitch position with the zig-zag stitch

(Only to be undertaken with the rigidity plate fitted.)

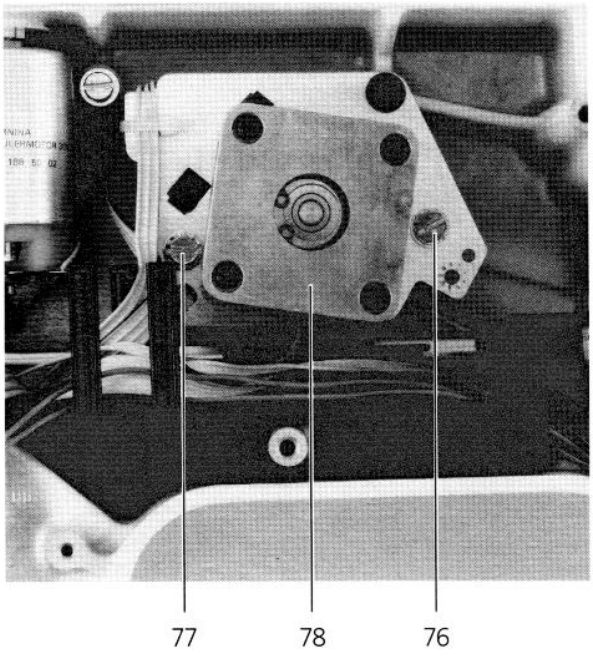
- Insert needle No.90. As seen in the direction of the material feed the needle should be in the centre of the stitch hole.
- Switch on the machine.
- Service-programme (test 3)
- Set to maximum stitch width (9 mm).
- Turn the handwheel and observe that the lateral spacing from the edge of the stitch hole is the same to the left and right. (This is also valid for needle position L-C-R.)





Correction

- Slightly loosen lower fixing screws (76) and (77) of the zig-zag stepping-motor support (78).
- Using eccentric key (42) adjust the motor support until the prescribed needle position in the stitch hole is obtained.
- Tighten screw (76) first, then remove the eccentric key. Tighten screw (77).



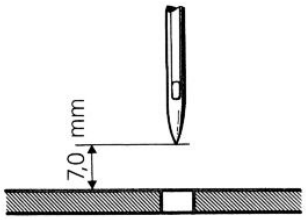
22 Checking the position of the synchronization disc

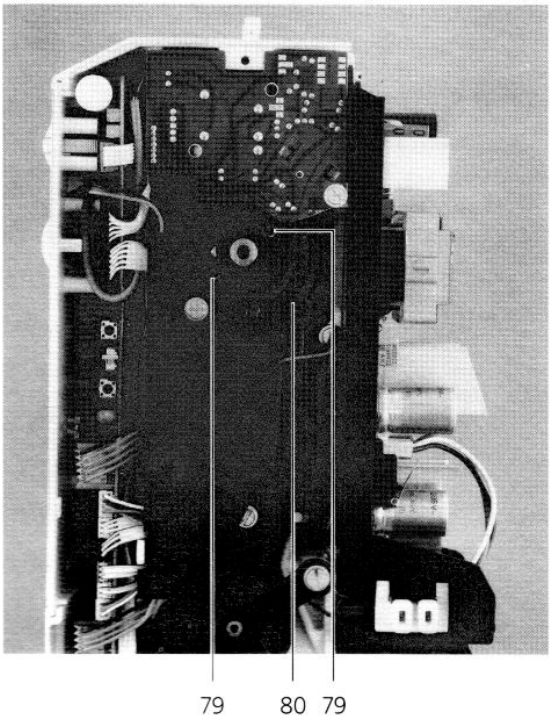
Warning: Position indicator reacts to light. Avoid direct light (e.g. table lamp).

- Remove belt cover and fit hand-wheel.
- Switch machine on (service-programme).
- Turn the handwheel in the direction of rotation until fields 1, 2 and 3 are active (dark). The point of the needle should now be 7,0 mm above the needle plate.

Correction

- Loosen fixing screw (79) of the synchronization disc (80).
- By turning the handwheel in the direction of rotation, bring the point of the needle 7,0 mm above the needle plate.
- Turn synchronization disc (80) (in direction of rotation) until fields 1, 2 and 3
- become active Tighten screw (79).





23 Adjustment of feed-dog in the machine

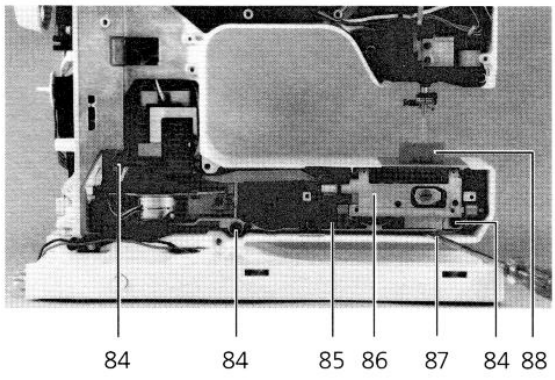
Checking the feed-dog position in the needle plate

- The feed-dog must be equidistant from each side of the needle plate.

Correction

It is assumed that for this adjustment, the basic adjustment for the feed-dog height and sideways position has been done with the special gauge.

- Pin sideways motion stepping motor
- Loosen carrier fixing screws (84) until the carrier can be moved sideways.
- Position carrier (85) in the correct place.
- Lightly tighten carrier fixing screws (84).



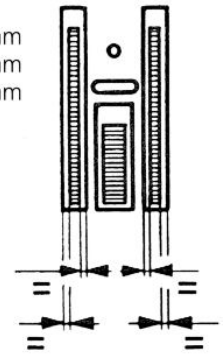
Warning: Sideways adjustment to the feed-dog position should not be attempted with the feed-dog advance fork (86).

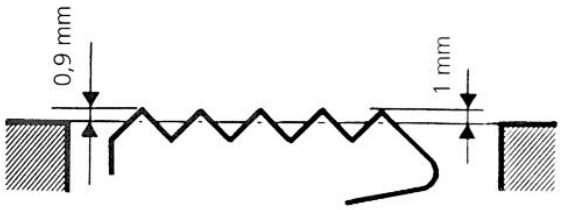
24 Checking the feed-dog height and synchronisation

At their highest point, the tips of the feed-dog teeth at the front should be 0,5mm higher than at the front.

Example:

Front 0,95 mm; rear 0,90 mm
Front 1,00 mm; rear 0,90 mm
Front 1,00 mm; rear 0,95 mm





Correction

- Slightly loosen carrier fixing screw (84).
- Using the end of a screw driver at point (87) move the carrier until the height 0,9–1,00 mm is attained (watch that it stays parallel).
- Tighten screw (84).

Note: When adjusting it is necessary to make a feed motion.

After this adjustment is made it is important to check the distance between needle and hook (section 30).

Synchronisation

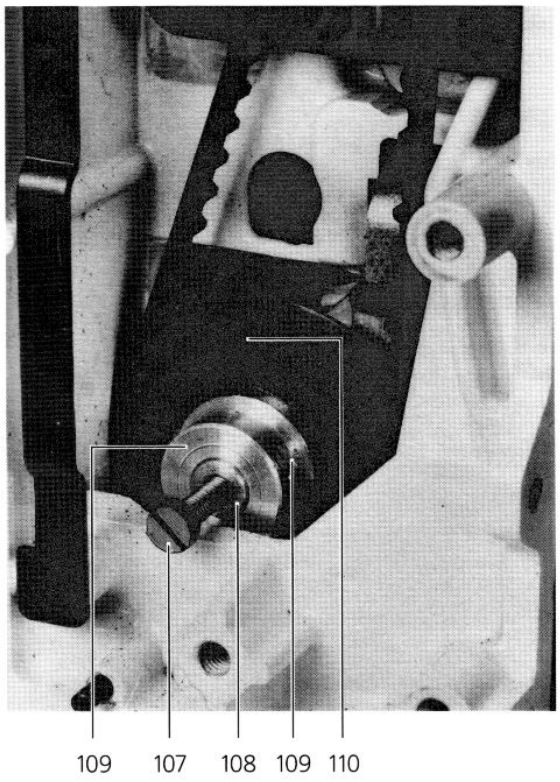
Checking:

- Set stitch length to max. 5,5 mm
- Turn the handwheel in the direction of rotation until the rear teeth of the feed-dog are level with the upper edge of the throat plate.
- The point of the needle should now also be level with the upper edge of the throat plate.

Correction:

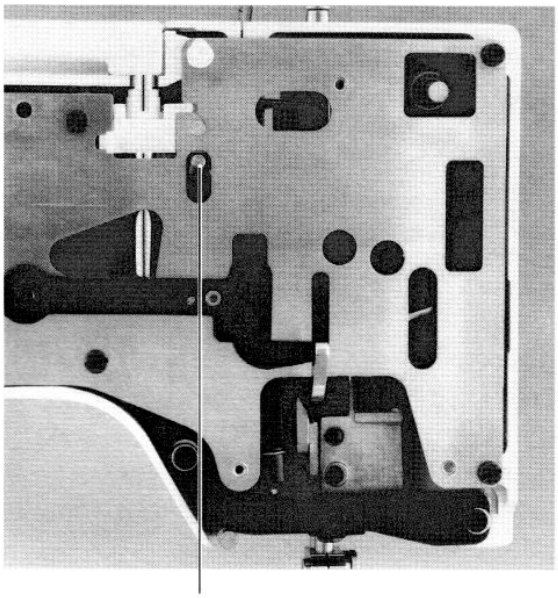
- Remove the stepped pulley (95).
- Tighten a 4 mm screw (107) into the tapped blind hole of the base shaft (108). Loosen the 2 screws (109) of the gear (110).
- Turn the base shaft clockwise or anti-clockwise.
- Pull out the base shaft with screw (107).
- Set the gear against the stop position and retighten the 2 screws.
- Check the axial clearance of the base shaft.
- Remove screw (107).

Note: By turning the base shaft anti-clockwise, the feed-dog will drop earlier.



25 Checking the hook adjustment-loop lift

- Select service-programme 3.
- Set L.C.R. to the left.
- Remove the stitchplate.
- After pinning the balance piece 93, turn the handwheel in the direction of rotation, until the stop position is reached.
- In this position, the hook point should now be flush with the left side of the needle.

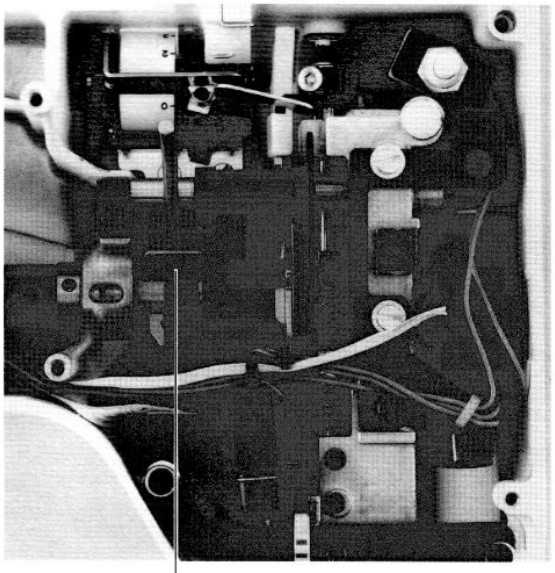


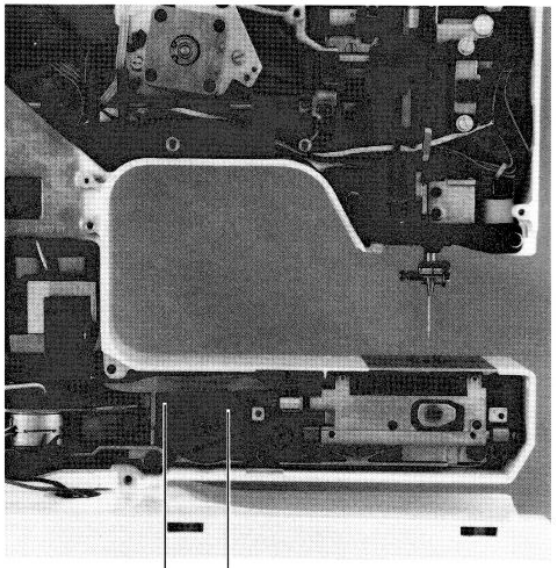
Correction

- Loosen the 2 screws on the bevel gear (220) by at least 2 turns (pull the bevel gear to the left out of mesh).
- Set the L.C.R. knob to the left.
- Pin the balance piece (93) of the needle drive and turn with the handwheel until stop is reached.

Note: So that the bevel gear can be pulled sufficiently out of the mesh, the feed-dog should not be lowered.

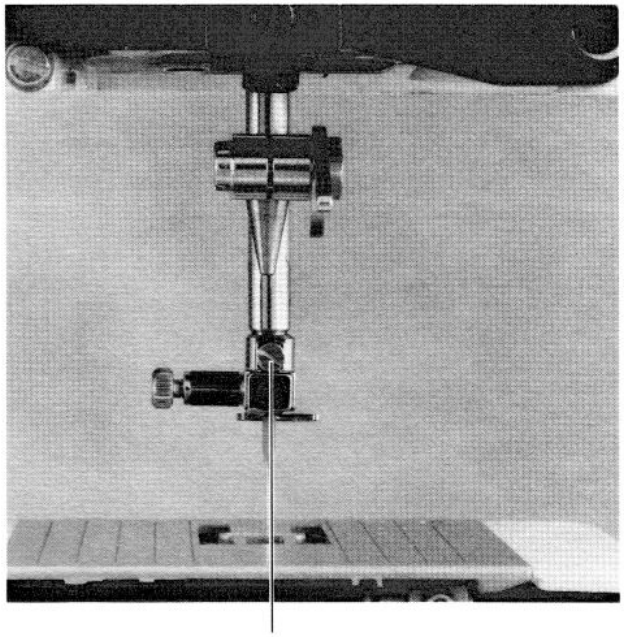
- Turn the hook drive pulley (221) until the hook tip is flush with the left-hand side of the needle.
- Slide the bevel gear to the right into the hook drive gear (set without play).
- Tighten screw.





26 Checking the needle height

- Position the needle to the left.
- Position the hook tip flush with the left-hand side of the needle.
- The lower edge of the hook tip should now be 0,2 mm above the upper edge of the needle eye.



Correction

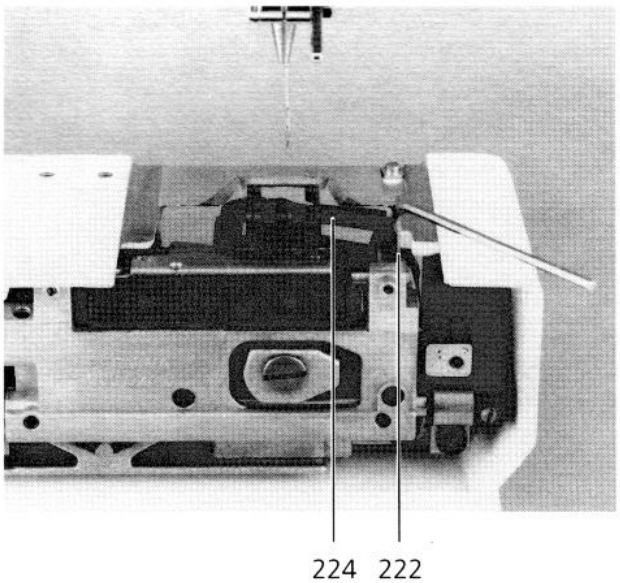
The stop-screw (99) must be replaced when necessary.

Part.No.	
006 361 50 04 screw	2,85 mm
006 361 50 03	2,50 mm
006 361 50 02	2,15 mm
006 361 50 01	1,80 mm
006 361 50 00	1,45 mm

27 Checking bobbin case stopper position

min. 0,3 mm clearance normally flush with the cut-out upper edge of bobbin stopper nose flush with max. bobbin carrier radius.

See illustration.



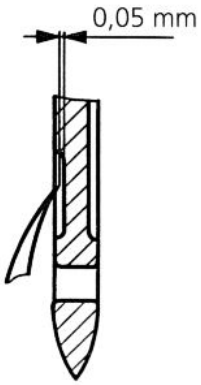
Correction

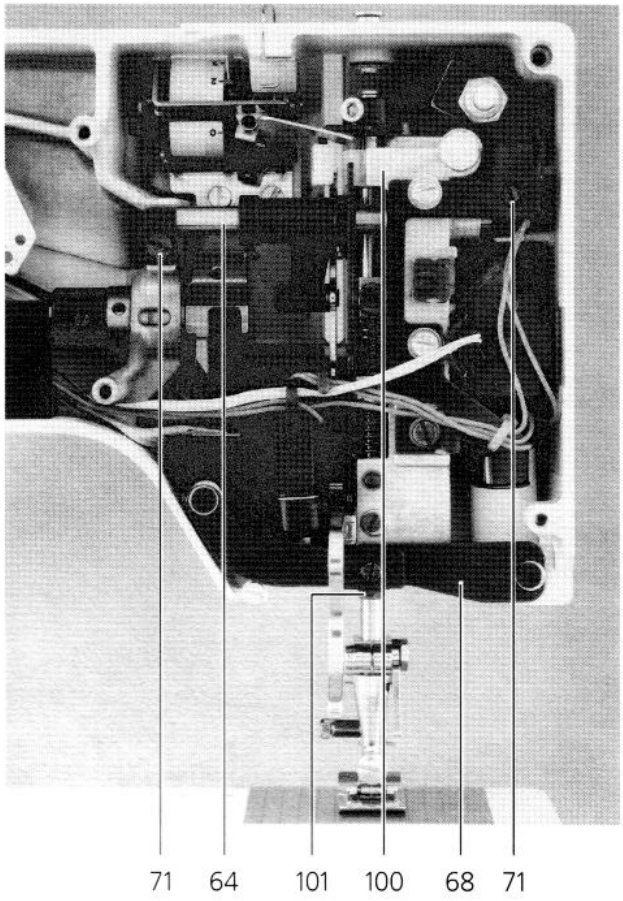
- Loosen allen screw (222).
- Move the bobbin stopper (224) axially and radially as required.
- Tighten allen screw (222).

Note: With the needle in the centre position, the left edge of the bobbin stopper should be in line with the left side of the needle groove. See sketch for tolerance.

28 Checking the needle-hook distance without needle plate

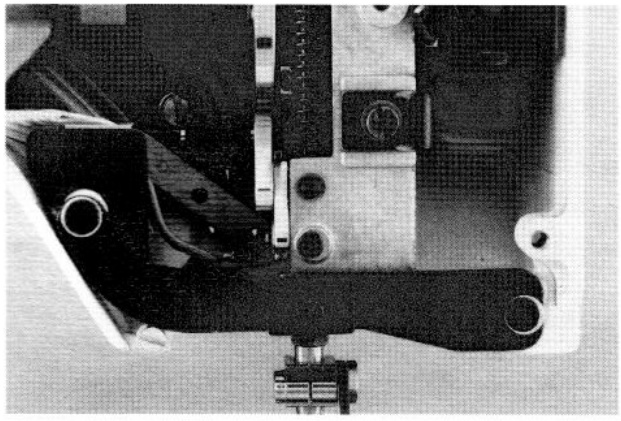
- Only adjust and check when the needle is positioned in the middle.
- The lateral distance between the needle and hook in the scarf should be 0,01–0,05 mm.
- A greater distance can lead to skipped stitches. A lesser distance could damage the hook tip.





Correction without needle plate

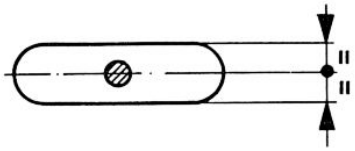
- Very slightly loosen clamps (71) of the head frame (100) so that it can be moved, but the shaft (64) in the prism is still well guided.
- Lightly loosen hexagon head screw 6 mm (101) on the securing strap (68).
- Set needle to the hook tip at 0,01–0,05 mm.
- Tighten screw (101) and clamp securing screws (71).



29 Needle plate adjustment

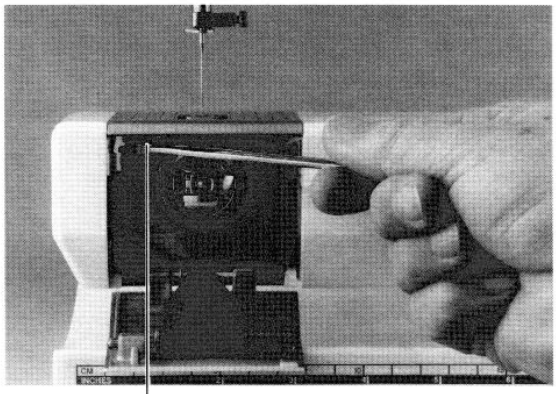
Checking the needle plate position

- Insert needle Nm (90).
- The needle must penetrate at the centre of the stitch hole as seen in the direction of the material feed.



Correction

- Loosen the nut of lock-bolt (104) (underneath the needle plate).
- Place the needle plate in the prescribed position.
- Tighten nut (104).



104

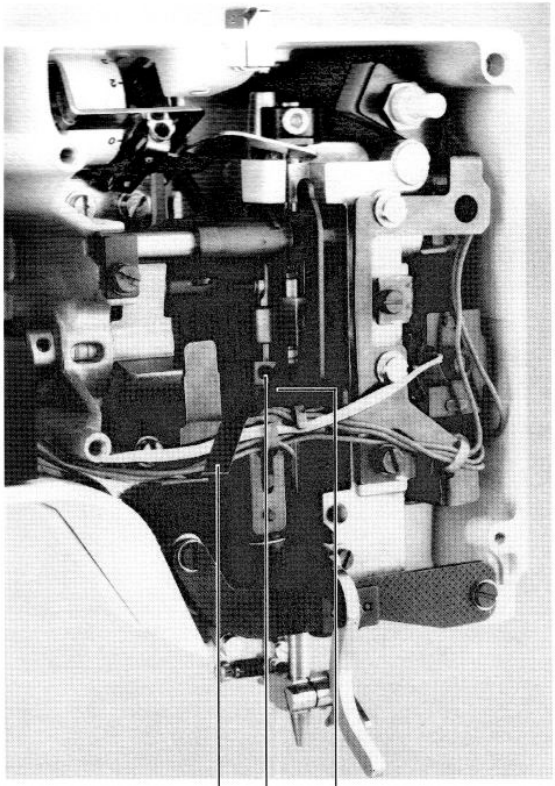
30 Basting and automatic long stitch device

Checking the needle bar guide

Uncouple the needle bar by hand. By turning the needle bar to the right and left establish the amount of guide play, and whether the coupling pin can latch in smoothly.

Correction

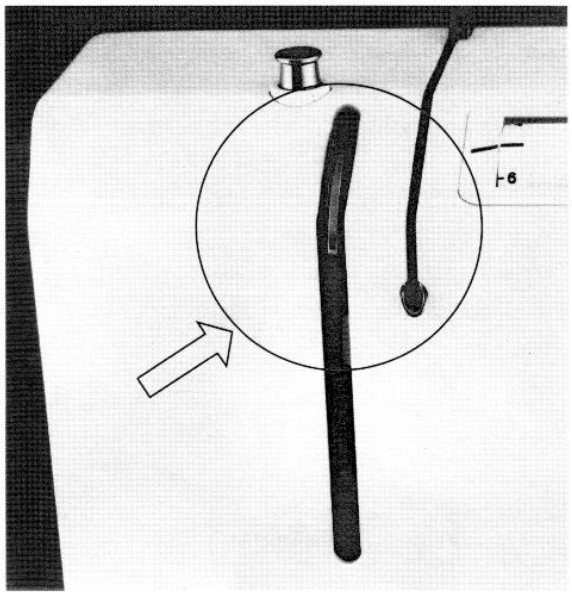
- Remove rigidity plate
- Place needle bar to its top dead centre.
- There should be a play of 0,5 mm between the needle bar guide (105) and the carrier (106).
- Loosen needle bar guide (105).
- Engage needle bar in coupling pin.
- Middle out any play from the needle bar inside the coupling pin.
- Place distance gauge (108) between needle bar carrier (106) and needle bar guide (105).
- Using a screwdriver press the needle bar guide against the gauge.
- Tighten screw of the needle bar guide (observe the distance 0,5 mm).
- Check that it functions.(The latch for uncoupling is visible through the slit for the thread take-up lever.)



108 105 106

31 Checking basic adjustment of release pin of the latch

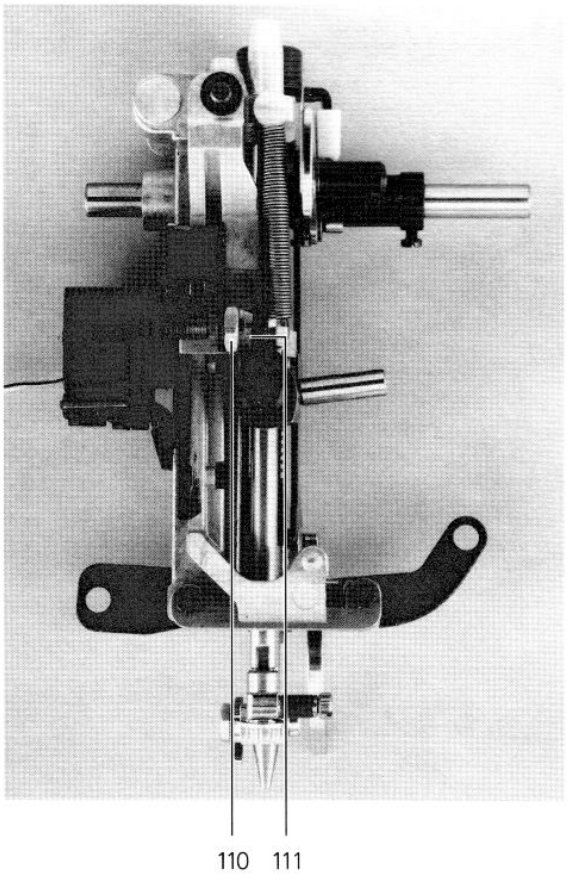
- Position the needle to the left.
- Press the button for automatic long stitch.
- Turn the handwheel until the release pin (110) is on the left.
- There should now be a distance of approx. 0,3mm between the release pin (110) and the left-hand edge of the latch (111). (Visible through the thread take-up lever slit.)

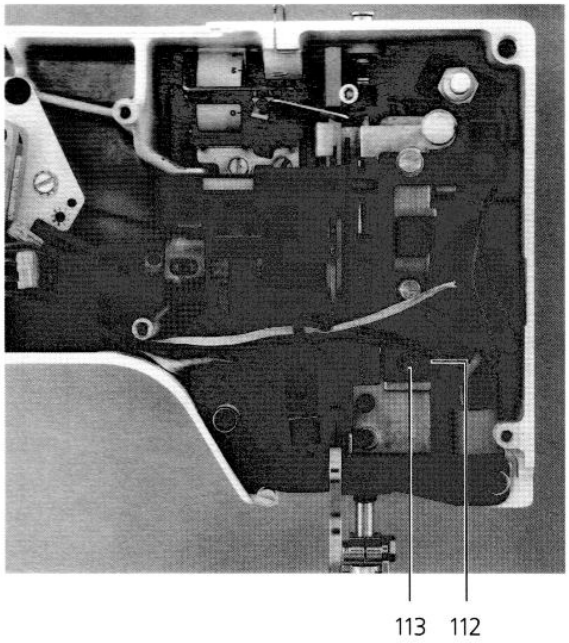


Correction

- Loosen screw (113) of the magnet support (112).
- Move magnet support (112) accordingly left or right.
- Tighten screw (113).

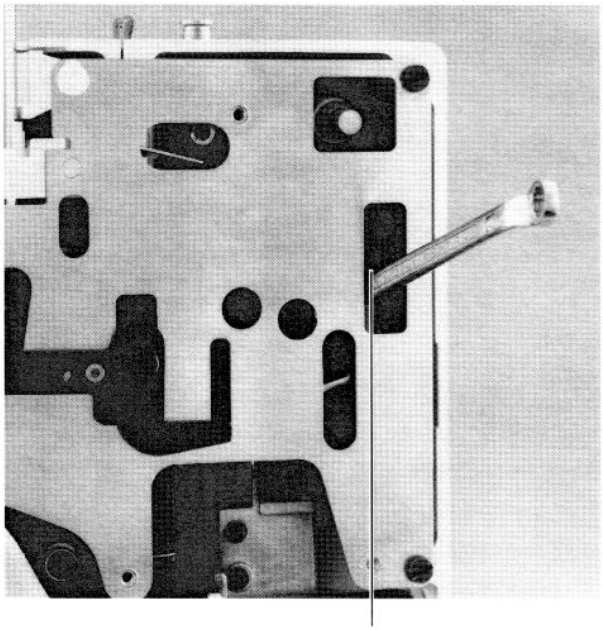
Check correct operation.



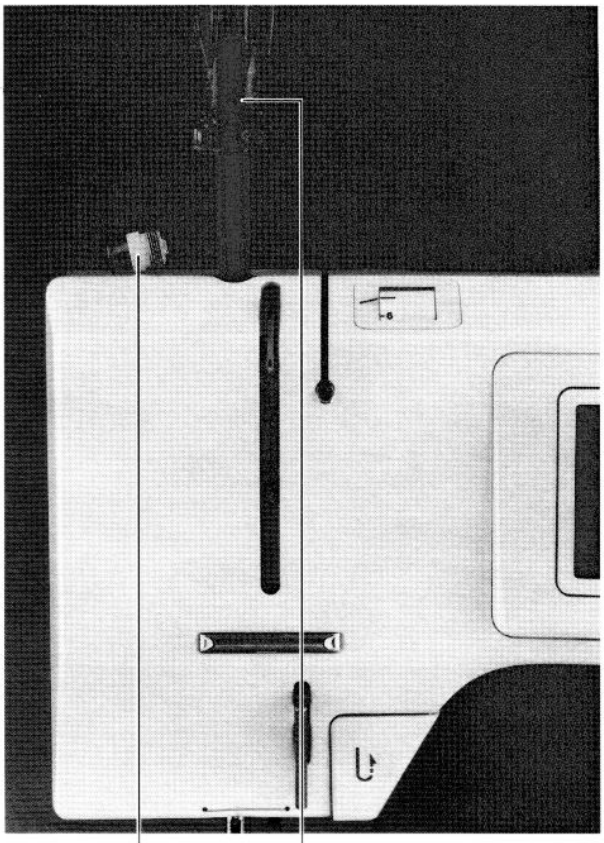


32 Checking the instant of decoupling

- Position needle to the left.
- Press the button for automatic long stitch.
- Now the needle bar should only decouple approx. 12 degrees before reaching top dead centre.

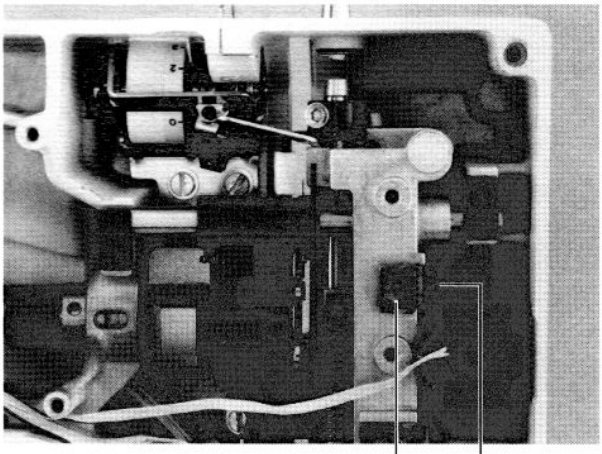


116



114 115

After every change or adjustment of the automatic long stitch, the puffer sleeve should be checked and set.



117 116

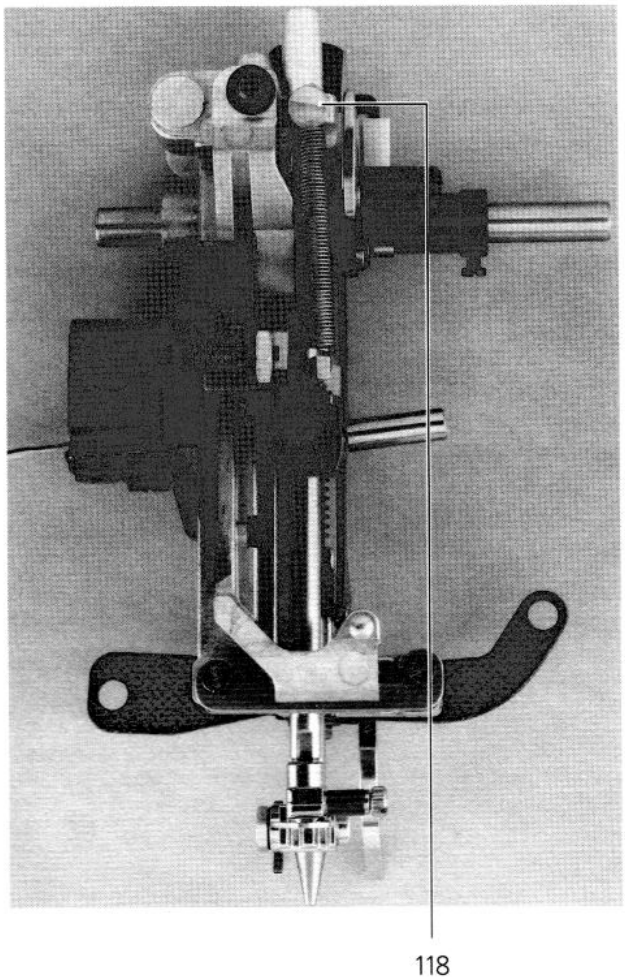
Correction

- Screw out the bobbin winding pretensioner (114).
- Using socket wrench (115) screw out the puffer by three revolutions.
- Loosen hexagon head screw (116) in the head frame.
- Turn adjusting screw (117) accordingly. (The release pin is hereby adjusted.)
- Tighten screw (116).

Note: Turning anti-clockwise the coupling point will be earlier.

33 Checking the puffer position

- Position the needle to the right.
- Press the button for automatic long stitch.
- Uncouple needle bar and push it twice by hand into the puffer.
- Run the machine with a max. speed of 1050 U/min. After a few turns the needle bar should become engaged.



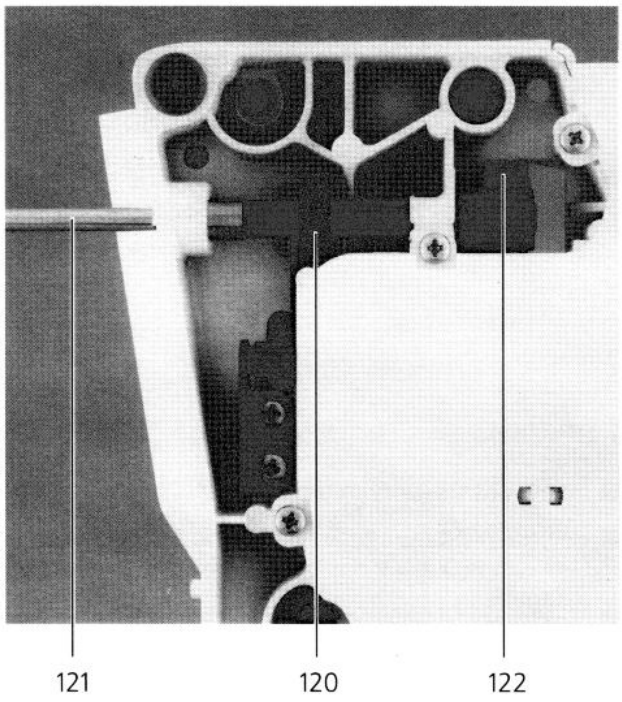
Correction

- Screw out the bobbin pretensioner (114).
- Loosen plastic screw (118). Using socket wrench (115) screw out the puffer (119) by three revolutions (to the left).
- Position the needle to the left (straight stitch).
- Press button for automatic long stitch and run the machine slowly. Using socket wrench (115) slowly screw down (to the right) puffer (119), until the needle bar is able once again to couple.
- Tighten plastic screw (118).
- Fit bobbin pre-tensioner (114).

Checking
See checking!

34 Basic adjustment to the knee lifter lever

The end of the knee lifter lever should be vertical under the edge of the free arm end.



Knee lifter lever adjustment

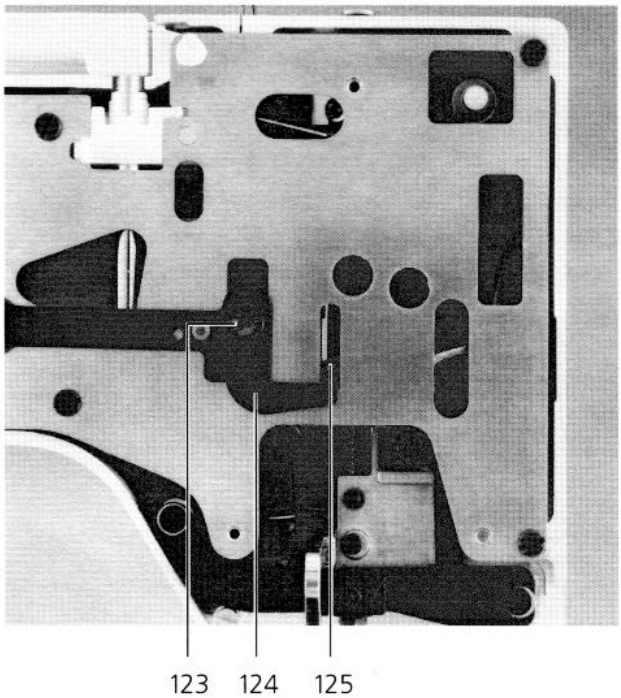
The knee lifter lever can be adapted to suit each individual customer.

Correction of knee lifter position

- Loosen screw (120) to the feed-dog drop unit.
- Insert knee lifter lever (121).
- Loosen hexagon head screw (122) of the clamp.
- Bring the knee lifter lever to the convenient position.
- Tighten hexagon head screw (122).

Adjustment of the lifter lever release mechanism
(without chassis cover)

- Lower presser foot.
- Loosen screw (123).
- Move stop (124) until it is about 1 mm off the thread tension release catch (125).
- Tighten screw (123).

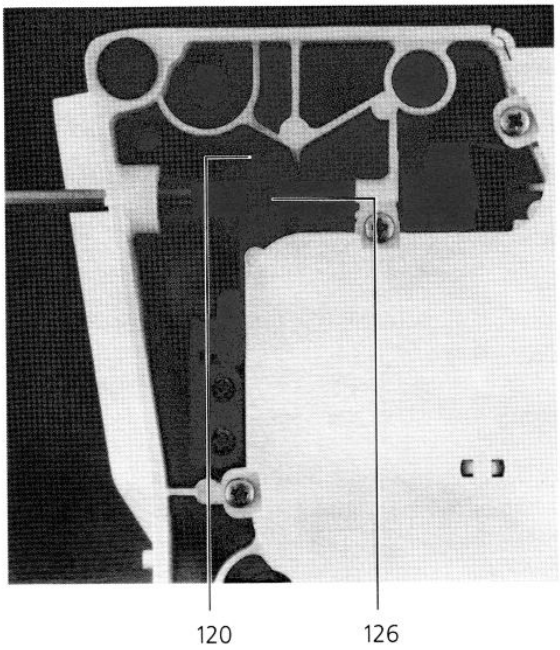


35 Checking the lowering of the feed-dog

- Turn the handwheel until the feed-dog is in its highest position.
- Operate the knee lifter lever.
- After raising the presser foot (approx. 4 mm above the needle plate) the feed-dog should lower.

Correction

- Turn the handwheel until the feed-dog is in its highest position.
- Tighten securing piece (126) of the disengaging lever in the direction of the arrow.
- Tighten screw (120).



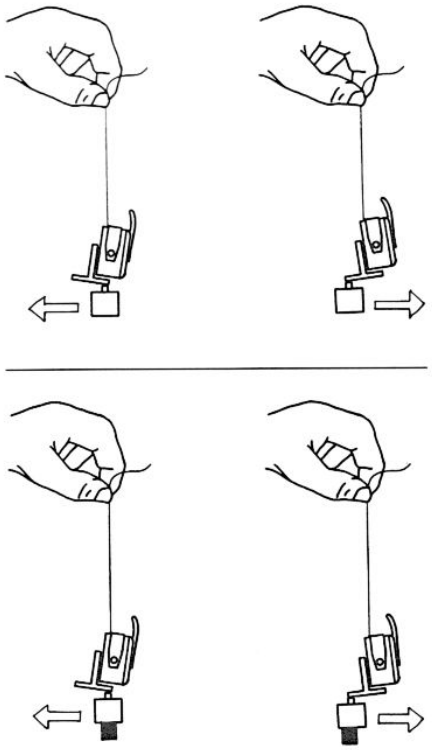
36 Lower thread tension

For testing use synthetic thread No. 100/3 ply, white, left twist. This thread is contained in the bobbin case of every new machine. The lower thread tension is checked with the movable setting weight No. 006 543 7000. The bobbin case is placed in the weight gauge just as in the hook.

Checking

Hold the free end of the thread and suspend the bobbin case with the setting weight (without any additional weight). The bobbin case must not move downwards. After attaching an additional weight (5 grammes) the thread should move downwards (speed 1 m/2–4 sec.). If you test with darning thread the speed should be 1 m/25 sec. Regulation of the lower thread tension is made with the bobbin case adjusting screw and a small screw-driver.

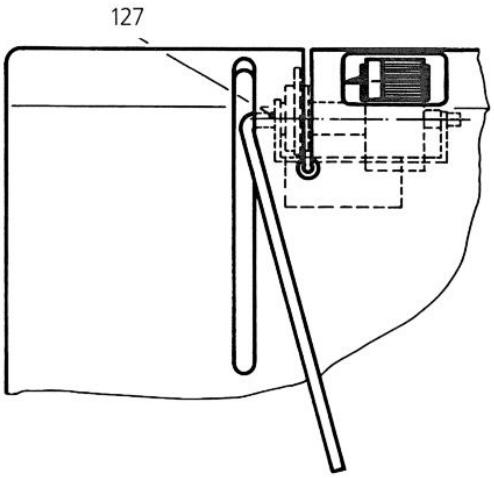
Turning left = weaker
Turning right = stronger



37 Basic adjustment of the upper thread tension

Checking

- Use synthetic thread No. 100/3 ply above and below.
- Test bobbin case with prescribed weight.
- Line up the red mark on the adjusting dial with the mark on the housing
- Trial run with the desired stitch.

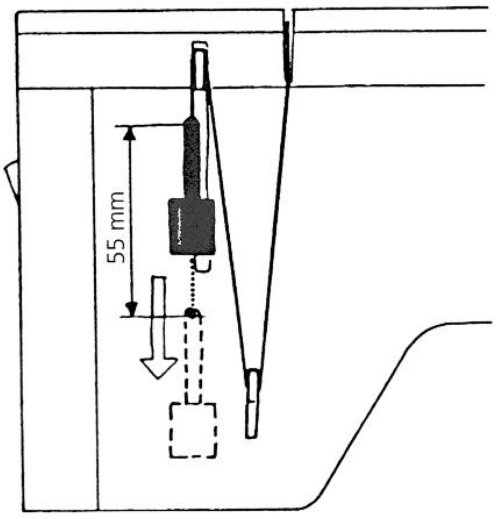


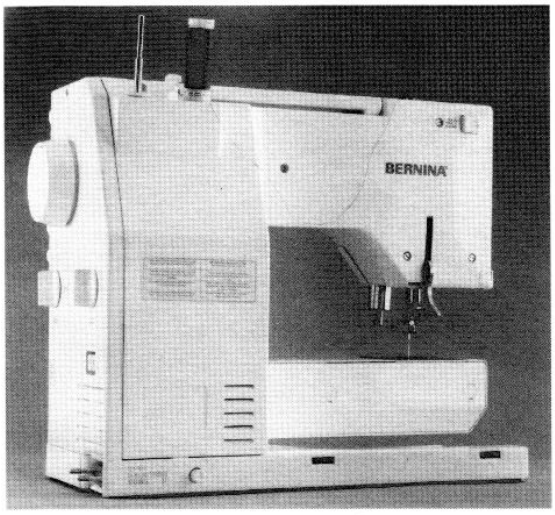
Correction

- By turning the thread tensioning spindle (127) the basic adjustment can be made.
- Using 1,5 mm allen key (shortened) through the thread take-up lever slit, turn thread tensioning spindle accordingly.
- (Turn anti-clockwise for less, turn clockwise for more tension.)

Adjustment of the upper thread tension with a weight

- Test thread 120/2 ply.
- Thread machine up including thread take-up lever.
- Position the thread take-up lever with needle bar at its highest point.
- Lower presser foot.
- Line up the red mark on the adjusting dial with the mark on the housing.
- Attach the upper thread tension weight of 85 grammes.
- Draw approx. 30 cm of thread of the bobbin.
- The thread tension weight should hang and not move.
- Only when an additional weight of 5 grammes is attached should the thread be drawn very slowly.



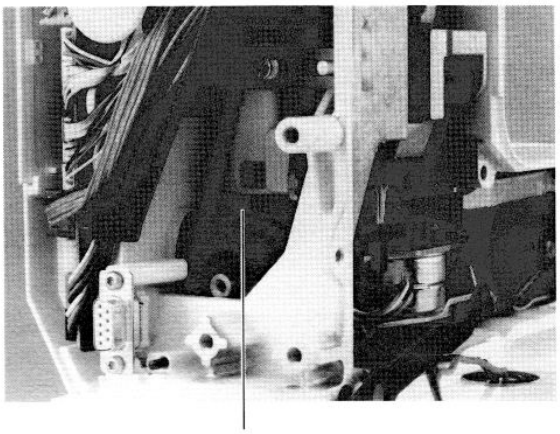


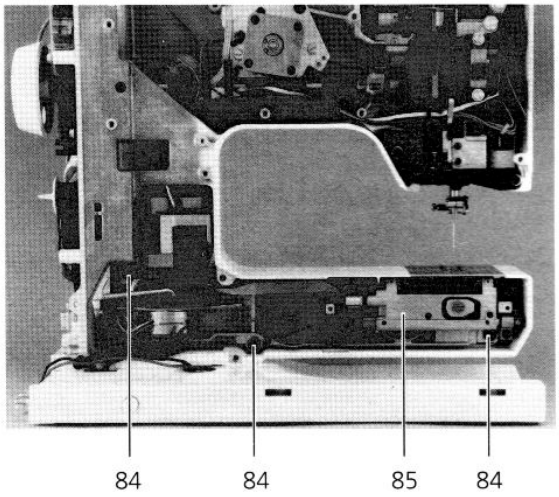
Correction

- Adjustment is made by turning the thread tensioning spindle (127)
- Using 2,5 mm allen key (shortened) through the thread take-up lever slit, turn thread tensioning spindle accordingly.
- Turn anti-clockwise for less, turn clockwise for more tension.

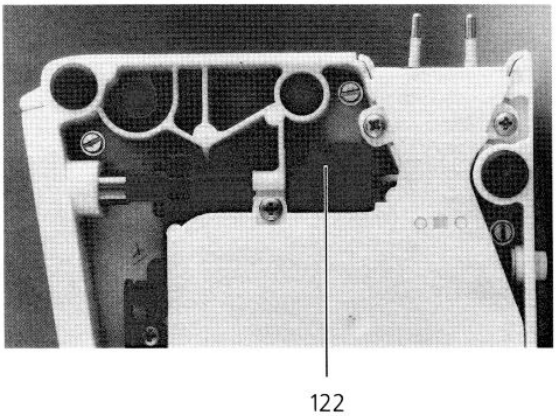
38 Removing the carrier, to check outside of the machine

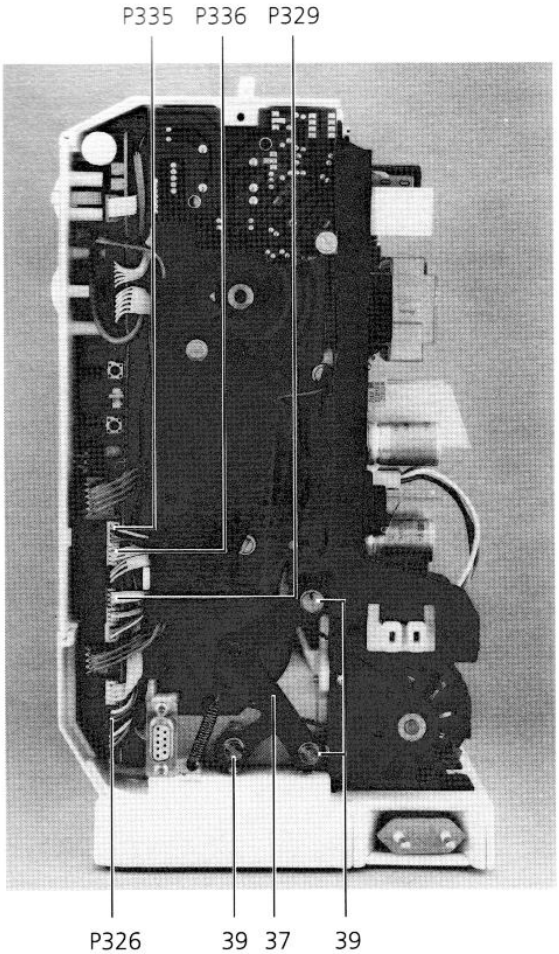
- Remove belt and chassis covers, free-arm cover, complete chassis, securing strap, disconnect knee lifter lever (circlip), rigidity plate (35), strengthening plate (132) and needle plate.
- Loosen hexagon head screw (122) of the clamping piece (knee lifter pin) and slide out lever.
- Lower feed-dog.
- Remove stepped pulley (39) (3 screws).
- Loosen belt tensioner (37).
- Disengage latch (133) of feed-dog lowerer (also set sewing/darning knob to sewing).
- Remove 3 allen screws (84).





- Unplug motors and Hall sensors (P326/P329/P335/P336).
- Remove the complete carrier (85) (uncouple belt).





39 Reassemble in the reverse order

Notes on reassembling:

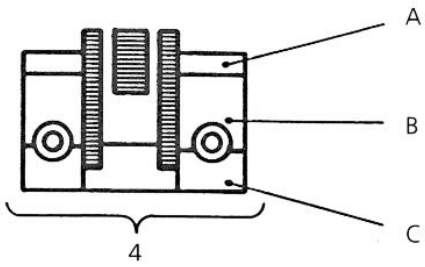
1. Position the balance piece of the needle drive and using the handwheel turn to the stop position (head frame shaft).
2. Pin stepping motor sideways motion (feed-dog centre position).
3. Replace carrier (without hook).
4. Fit toothed belt.
5. Remount 3 securing screws (84) of carrier (85).
6. Engage connecting straps of feed-dog drop unit into latch (133).
7. Fit needle plate.
8. Lateral position of the support in the needle plate (section 22) (stepping motor sideways motion must be pinned).
9. Feed-dog height and synchronisation (section 23)
10. Belt tension roller (section 11)
11. Fit stepped pulley (engage short and long drive belts).
12. Fit strengtening plate (132).
13. Fit rigidity plate (35).
14. Hook position-loop lift (section 29 see under correction).

40 Checking the feed-dog

- Slide special gauge (4) onto the drive spindle and turn gear (9) (base shaft) until the flat is positioned into the gauge.

Now the feed-dog is guided in the gauge, and the sideways position of the advance fork is given (possibly needs correcting). The feed-dog height is correct when the feed-dog tips correspond with the check point on the gauge (see sketch).

A = Feed-dog teeth min. 0,95 mm higher than the gauge
B = Feed-dog teeth flush with the gauge
C = Feed-dog teeth should be just felt.

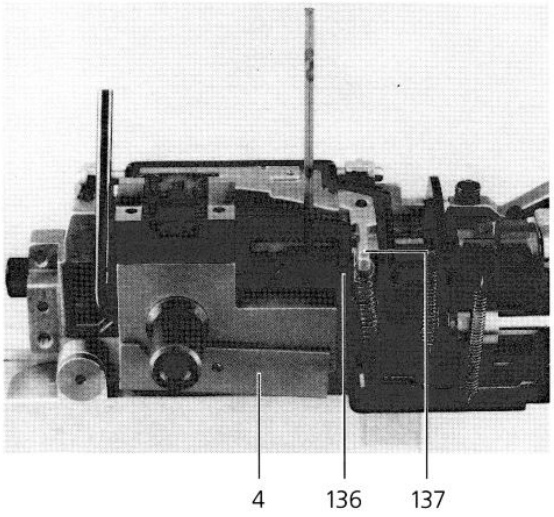


Correction of the feed-dog height

- Loosen screw (136).
- Move adjusting plate (137) of the feed-dog support accordingly.
- Tighten screw (136).

Note:

- If the rear feed-dog tips lie too low or too high the feed-dog height must be leveled with shims.
- Remove gauge (4).

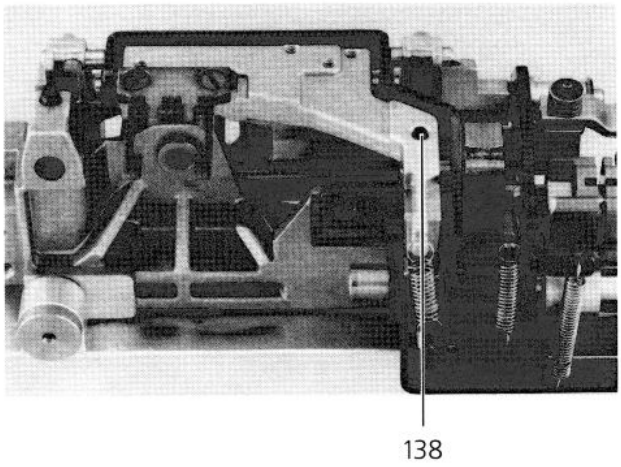


41 Checking depth limit stop

- Place feed-dog to its lowest position.
- Actuate the feed-dog drop unit. The feed-dog should now sink a further 0,1–0,2 mm.

Correction

- Adjustment to the prescribed depth is done by turning screw (138) in the feed-dog support. Check for correct operation.

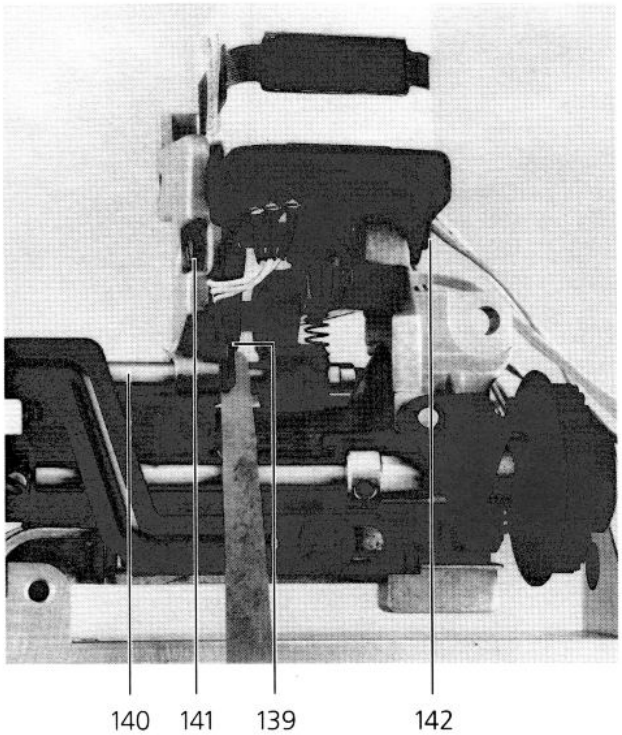


42 Checking motor support position to crank shaft

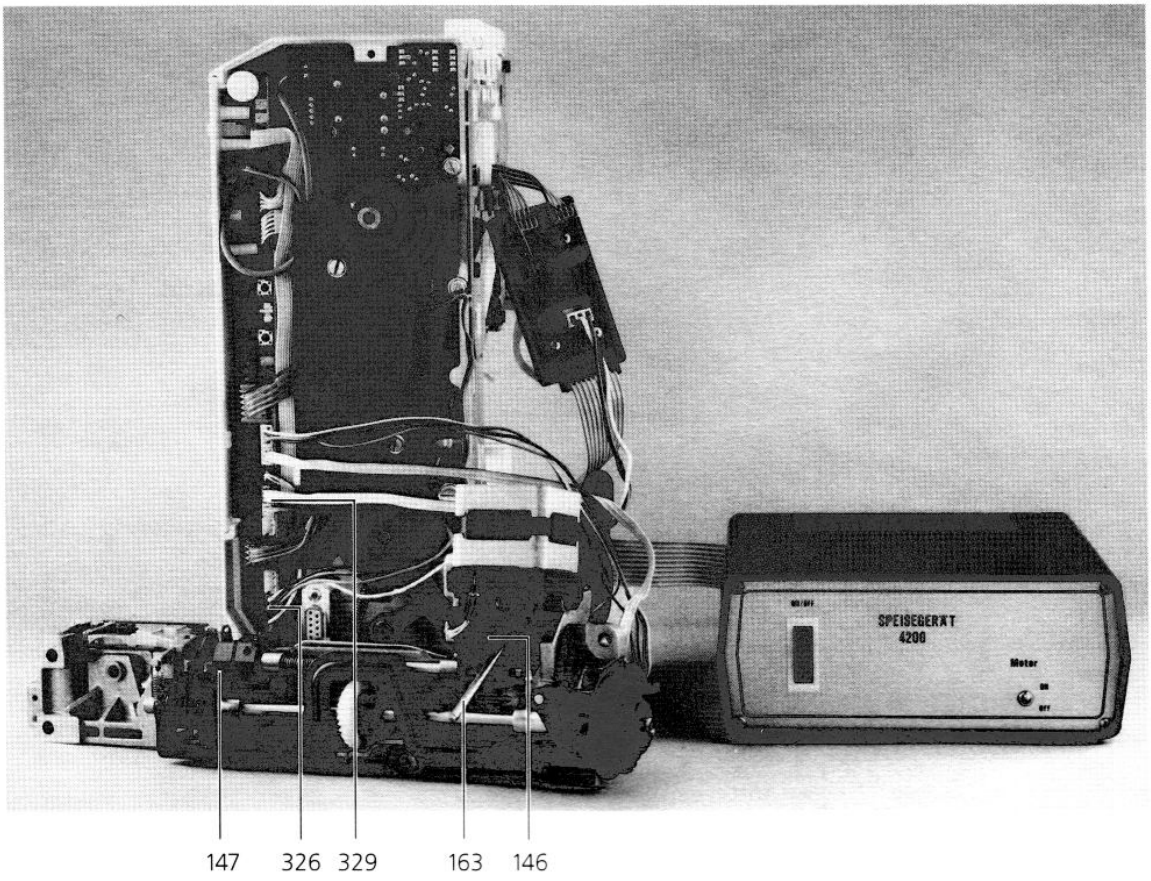
- Place feeler gauge 0,15 mm between motor support (139) and crank shaft (140). The gauge should be tight fitting but still able to move.

Correction

- Loosen 2 screws (141) and (142) of motor support (139).
- Place feeler gauge 0,15 mm between motor support and crank shaft (140).
- Press the support (139) against the gauge.
- First tighten screw (141) and then (142).



43 Adjustment of motor for stitch length



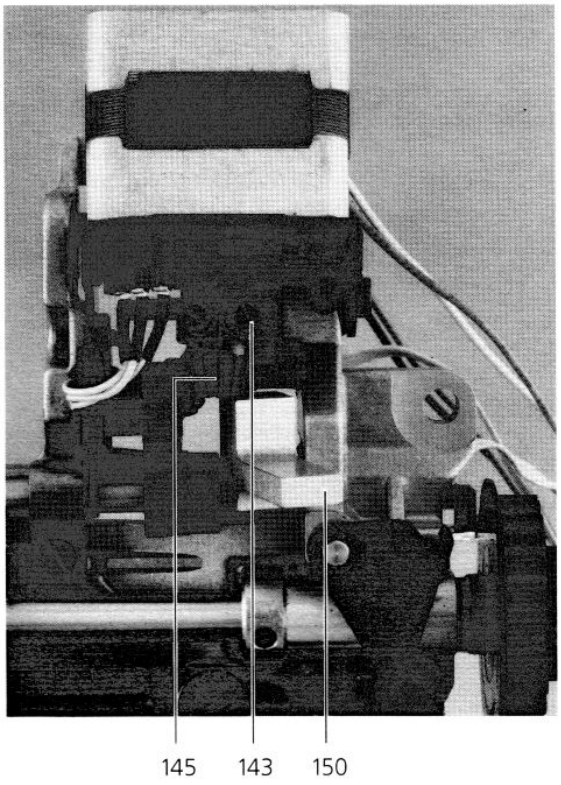
Check the motor position (transport) and the positions of the toothed pulley, toothed segment, magnet support and crank shaft.

Preparation for checking

- Connect the motor plug to pos. P208.
- Connect the Hall sensor to pos. P210.
- Switch on machine (service-programme)
- Press CLR-button
- Turn the handwheel one revolution (all stepping motors are initialised).
- Pin the zero position of the stitch setting link (147) on the toothed segment (146).
- Select testprogramme 8.
- Remove pin (163) (segment position (146) should now not be changed).
- The pinned position on toothed segment should correspond, check.
- Switch off machine.

Correction

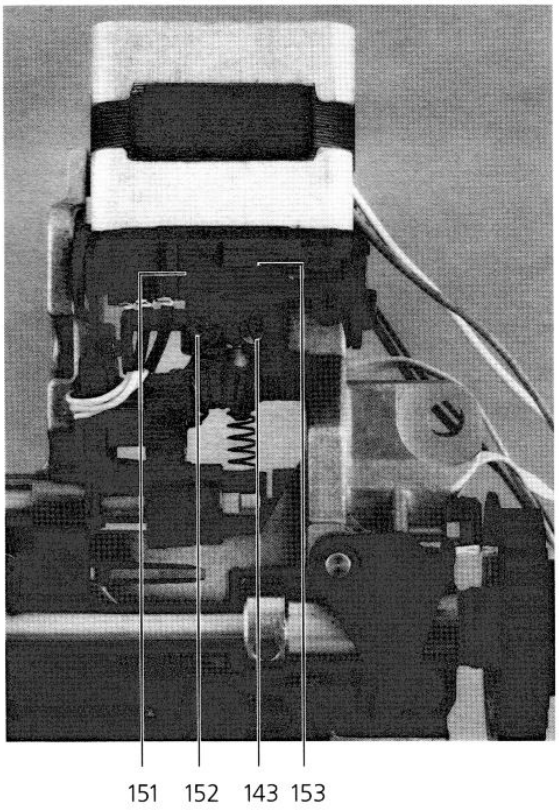
- Loosen 2 screws (143) of toothed segment (145).
- Pin toothed segment.
- Switch on machine (service-programme).
- Press CLR-button.
- Turn the handwheel one revolution (all stepping motors are initialised).
- Select test-programme 8.
- Place distance gauge (150) 13 mm. (This will push the connecting shaft which is held by a spring, to the left.)



Important

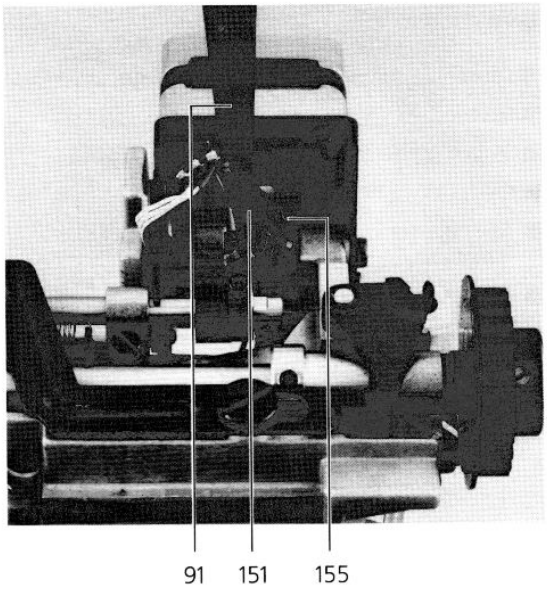
After this adjustment the edge of the magnet support (151), that lies between screw (152) and grub screw (143), must correspond with the edge of the sensor support (153) (see figure). If this is not the case, then readjust the meshing of the teeth accordingly.

- Switch off machine.
- Remove pin (63).
- Tighten 2 screws (143) of toothed pulley.



44 Checking distance of 0,3mm between magnet support and Hall sensor

- Turn the magnet support (151) into such a position, that the distance gauge 0,3 can be placed.



Correction

- Locate distance gauge (91) 0,3 mm.
- Loosen screw (155).
- Lightly press the magnet support onto distance gauge (91).
- Tighten screw (155).

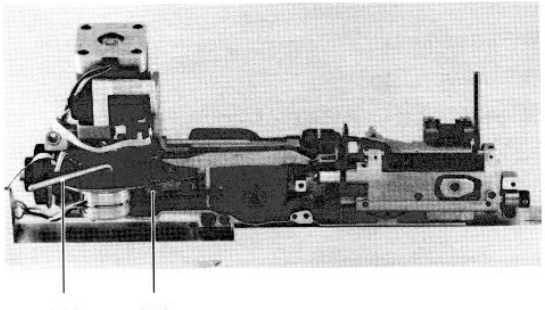
Checking

- Switch on special D.C. adapter (service-programme 3)
- Turn the stitch length to «0» with the stitch length adjustment knob.
- Hall sensor and motor must be connected with the machine.
- Turn the handwheel until the motor is positioned, now the bores (toothed segment) must correspond.
- In this position there must be a distance of 0,3 mm between the magnet support, and Hall-sensor.
- Switch off special D.C. adapter.

45 Adjustment for stepping motor (sideways motion)

Checking

- Connect stepping motor and Hall sensor to A/S-Print P335 and P336
- Switch on machine (service-programme).
- Press CLR-button.
- Turn the handwheel one revolution (all three stepping motors are initialised).
- Select test-programme 8.
- The magnet support can now be pinned with pin (163).



Correction

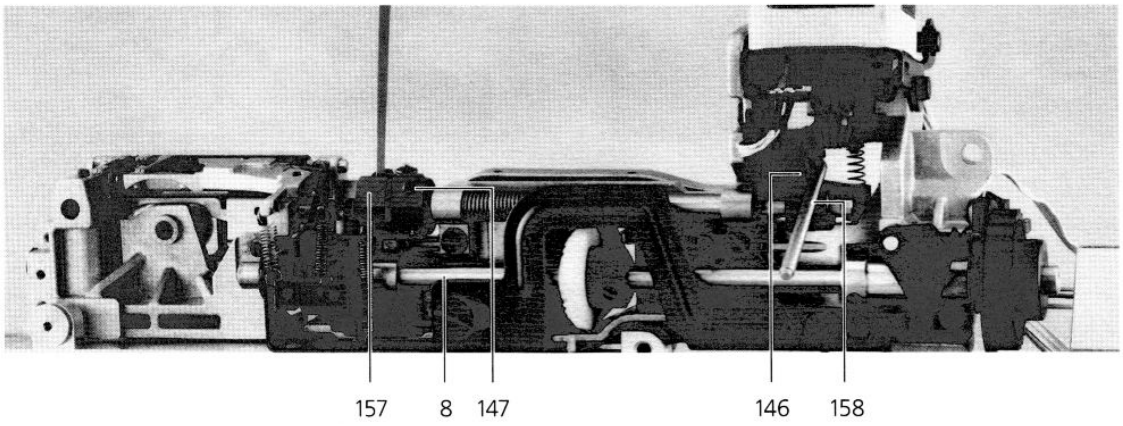
- Loosen screws (160).
- Turn the stepping motor until the support can be pinned to the support plate.
- Retighten screws (160).

46 Checking the axial play in the stich length crank and axial pressure on the toothed segment

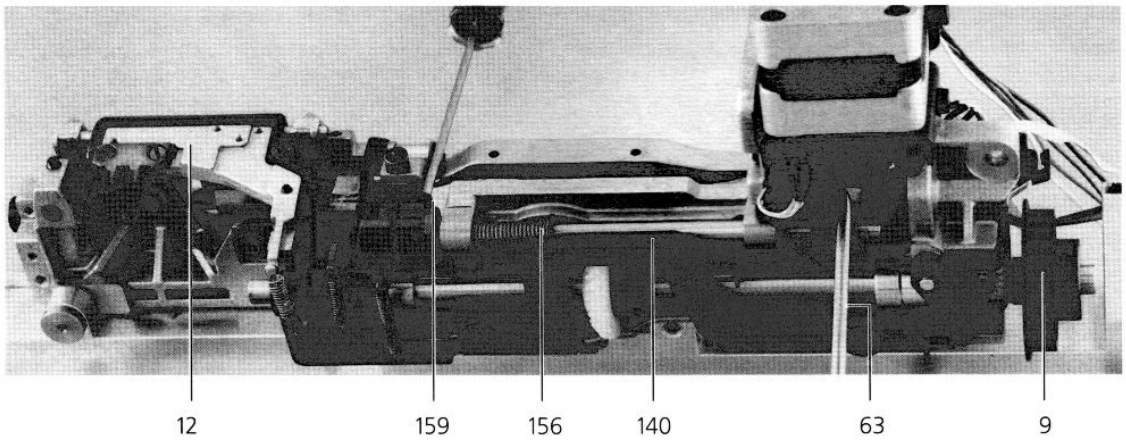
- Place feeler gauge 0,15 mm between crank (147) and crank block (157). The gauge should be able to slide.

Correction

- Pin toothed segment (146).
- Remove circlip (156) from the crank shaft (140).
- Locate gauge 0,15 mm between crank (147) and crank block (157).
- Loosen screw (158) of the toothed segment.
- Push the crank shaft (140) left up to the stop, at the same time pressing the toothed segment (146) into the pinion ensuring no play.
- Tighten screw (158) onto the flat of the crank shaft.
- Remove feeler gauge 0,15mm and pin (63).
- Place tension spring to the left and relocate the circlip.



47 Checking the zero position of the stitch length crank



- Pin toothed segment (146).
- When turning base shaft (8), the advance fork (12) should make no feed motion.

Correction

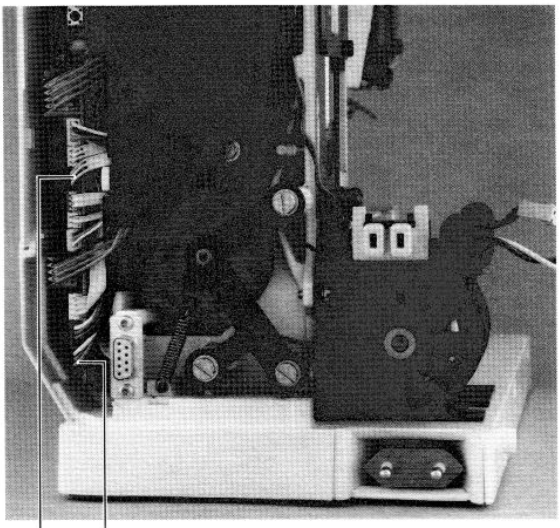
- Loosen allen screw (159) 2,5mm.
- Press the crank (147) to the right against the stop.
- Turn gear (9) by hand and adjust the crank (147) so that the advance fork (12) does not move anymore.
- Tighten allen screw (159).
- Remove pin (63).

48 Checking the zig-zag stepping motor, zero equalization

Removal of motor

- Disconnect plugs P207/P209 from A/S-Print.
- Disconnect all plug connections on the A/S-Print.
- Slide the control panel to the right an remove it.
- Lift up the protective foil.
- Remove securing washer.
- Remove screws (161, 76, 77).
- Connect motor (165) and Hall sensor to A/S-print P227/P228.
- Switch on machine (service-programme).
- Turn the handwheel one revolution (all stepping motors are initialised)
- Select test-programme 8.

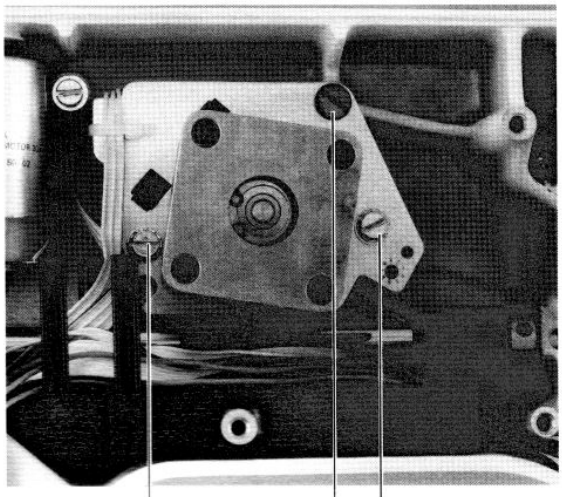
Check that the magnet support has been positioned by pin (63).



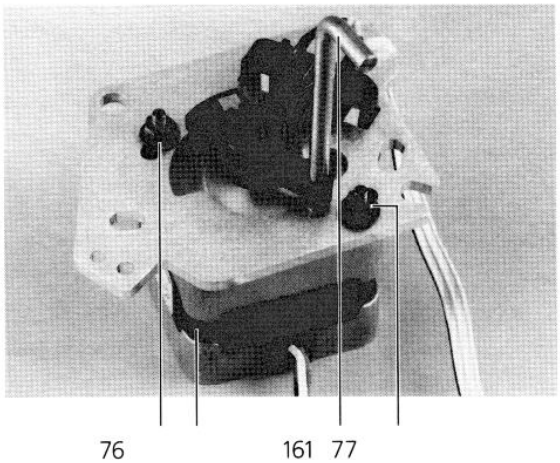
P328 P327

Correction

- Loosen 2 lock nuts (166) 5,5mm.
- Pin magnet support with support plate.
- Tighten nuts (166).
- Remove pin (63)
- Select test-programme 9.
- The magnet support must not touch the left or the right movement limiter.
- Switch off machine.
- Fit zig-zag stepping motor (165).
- Replace protective foil.
- Replace all plug connections.
- Reset needle distribution (chapter 21).
- Adjust stich distribution (section 21).



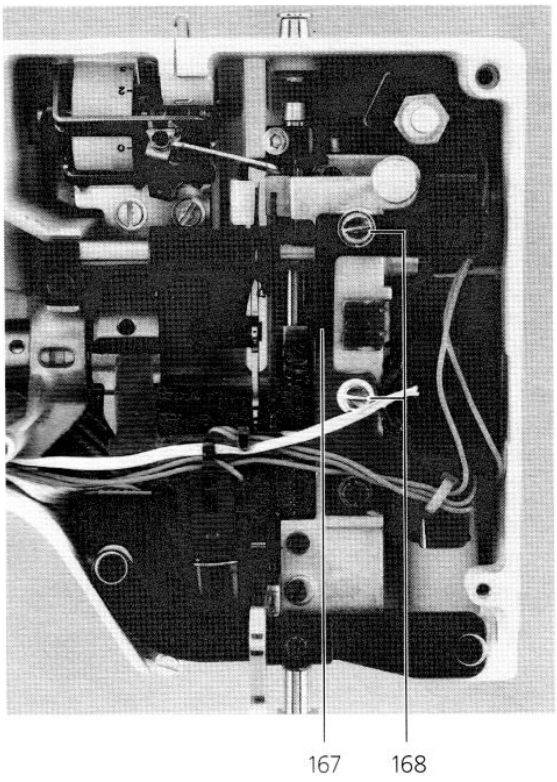
76 161 77



76 161 77

49 Removal of head frame

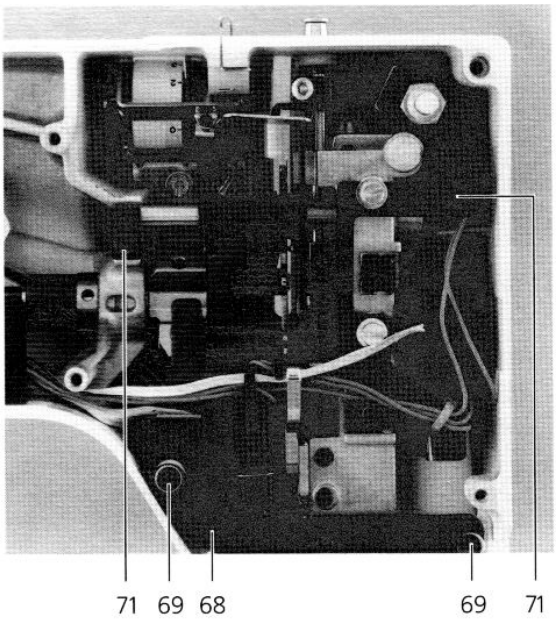
- Remove presser foot and needle.
- Remove rigidity plate.
- Release plug P323 from A/S-print and disconnect the cable from the lamp holder.
- Remove 2 screws (168).
- Remove complete lamp support (167).
- Loosen screw (169) of the buttonhole sensor (170) and remove by tilting upwards.
- Remove screw (171) from return print (172).
- Completely remove return print (172) and buttonhole sensor (170) with cable.

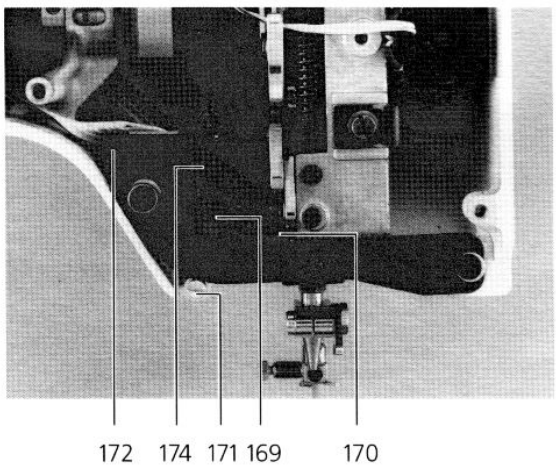


Separate connecting strap from needle bar support.

- Using a screwdriver turn the flat spring (174) at the back of the connecting (173) strap until the connection is separated (ball and socket joint).
- Raise connecting strap (173), but be careful of the ball falling out.
- Remove both screw (69) from strengthening strap (68) on head frame.
- Remove fixing screws (71) with both clamps.
- By means of turning the handwheel position the needle bar link in a horizontal position.
- Move head frame to the rear and take out to the right.

To reassemble the head frame follow the reverse order to what is described above. The now necessary adjustment of the thread take-up lever position, lateral hook distance and presser foot position are described in section (51).





50 Notes on reassembling

1. Turn handwheel and crank (175) to the rear (horizontal).
2. Lower presser foot bar.
3. Replace needle bar carrier and thread take-up lever.
4. Place the complete head frame in the V-grooves provided.
5. a) Fit 2 screws (71) with clamps (provisionaly tighten);
   b) Insert 2 screws (69) in strengthening plate (prov. tighten).
6. Replace ball and close connecting strap connection.
7. Assemble the return print (172) and buttonhole sensor (170) completely.
8. Assemble lamp support (167) completely.
9. Make adjustments (sections 57).

51 Adjustments that must be made after removal and reinstallation of certain parts

Rigidity plate

1. Needle-hook distance (section 28).
2. Needle plate position (section 29).

Head frame

1. Check presser foot fixation and height (sections 17).
2. Height of darning foot (section 18).
3. Position of presser foot crosswise to sewing direction (section 19).
4. Lateral distribution of the thread take-up lever (section 20).
5. Assemble the rigidity plate.
6. Stitch position by zig-zag stitch (section 21).
7. Needle-hook distance (section 28).
8. Needle plate position (section 29).
9. Lifter lever release (section 34).

Carrier

1. Position of feed-dog sideways in the needle plate (section 23).
2. Height of feed-dog (section 24).
3. Belt tension-hook drive (section 11, 12, 13).
4. Hook adjustment-loop lift (section 25).
5. Adjustment of synchronization disc (section 22).
6. Check stitch distribution (section 21).
7. Height of needle (section 26).
8. Needle-hook distance (section 28).
9. Needle plate adjustment (section 29).

Description

Description of electronic part

The electronic part of the model 1630 sewing machine, is basically contained in three main modules (printed circuits), namely: Power print L-1230, Control print A/S-print, and the L.C.D.-print for the display (see block diagramme). The functions of the three prints are similar to the functions already known in the models 1130/1230 through print L-1230/L-4200, S-4200 /S-1230, and A-4200/A-1230.

Power Print L-1230

The print L-1230 is mounted at the rear of the sewing machine, above the motor. The circuits of the L-1230 perform the following functions:

Power supply: generation the following D.C. voltages:

- 30V for the stepping motors, bobbin winder motor, and the L.C.D. background lighting.
- 5V for the logic on the A/S-print, and the L.C.D. display.
- 6V for the sewing light.

In case of malfunction, a fuse F-155 protect the parts against overload. If a fuse blows, only an original replacement with the correct ratings must be used.

Motor control

The motor control for the main motor, which is a D.C. motor, operates with mains voltage. The speed is controlled by a pulse width modulation. The regulating circuits are on the small R-1230 print which is plugged into the L-1230. All circuits for the motor control operate at dangerous voltages. Safety regulations must be observed.

L.C.D. Display

The L.C.D. (240 x 80 dot) is mounted directly behind the operating panel, and is connected to the A/S-print with a 18-pole flatband cable. On the L.C.D. all the stitch selection menus are displayed. By means of the track-ball which can be moved over the display, the stitches and the functions can be selected. The L.C.D. is lighted by means of a special foil. This background lighting will switch off automatically after 3 minutes, if no action is taken on the sewing machine. The contrast of the display can be altered by means of a thumb screw.

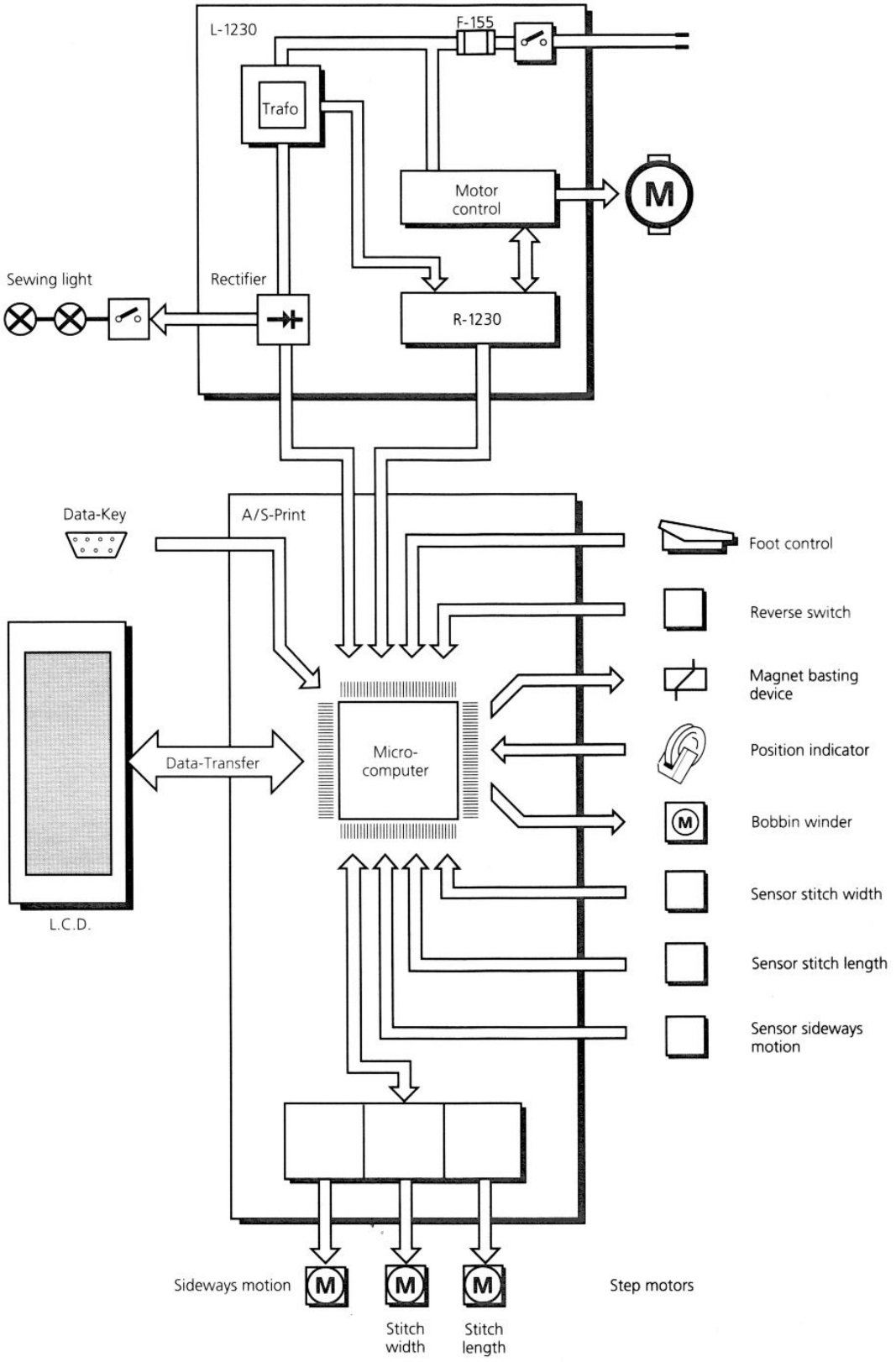
A/S-Print

The A/S-print is constructed in two main functions. The upper-print part which by means of the track-ball is responsible for the menus, and all displays on the L.C.D., also for the control of the track-ball, and the selection of stitch width and stitch length.
The lower part of the A/S-print is more or less the same as the S-print 1230. The A/S-print is in the main assembled with the latest technology of S.M.D. (Surface Mounted Device).

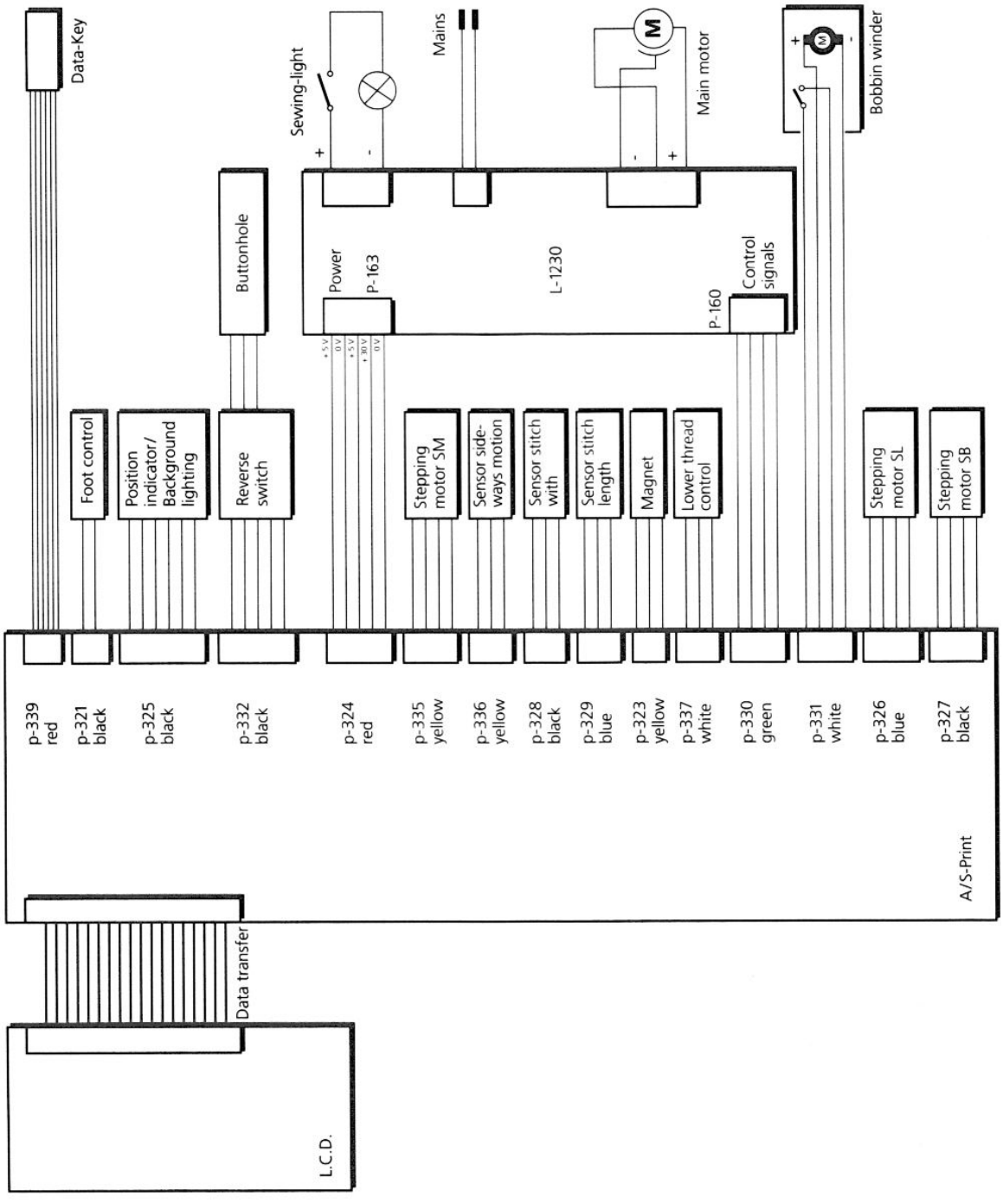
S.M.D. components allow a very compact type of circuitry. *S.M.D. types of circuits can not be repaired by using conventional tools!* A service help is the switch S-315 (service-switch) on the A/S-print. This switch has two positions: Normal sewing and service position. In the service position, a special service-menu appears on the L.C.D. This allows the service mechanic to carry out any tests or operations using the track-ball and the L.C.D. display (see special part on test-programmes). For normal service operation, the switch *must* be in the normal position. The lower micro-computer on the A/S-print receives from the foot control unit an analog signal, which is converted into a digital signal, and given as a nominal value to the R-1230-print. The R-1230-print controls the motor speed through a nominal/actual value comparison of the required value. When the foot control unit is released (nominal value zero), the microcomputer switches on the electric brake (by means of the R-print), and the motor is stopped very quickly in the required needle position.

The signal exchange between the A/S-print and the R-1230 is done by means of a 4-pole cable. So that the whole of the operating side is free of high voltage. The signal exchange is done by means of an optical coupler.
When the sewing machine is switched on, the stepping motors are in any given position. In the memory of the microcomputer there can also be any given value. So that a defined basis is achieved, the stepping motors are positioned by means of a signal from the micro-computer. This position is then registered, and in the memory of the micro-computer set at zero. From this zero position, it is then possible to select and sew any given stitch.

Block Diagram



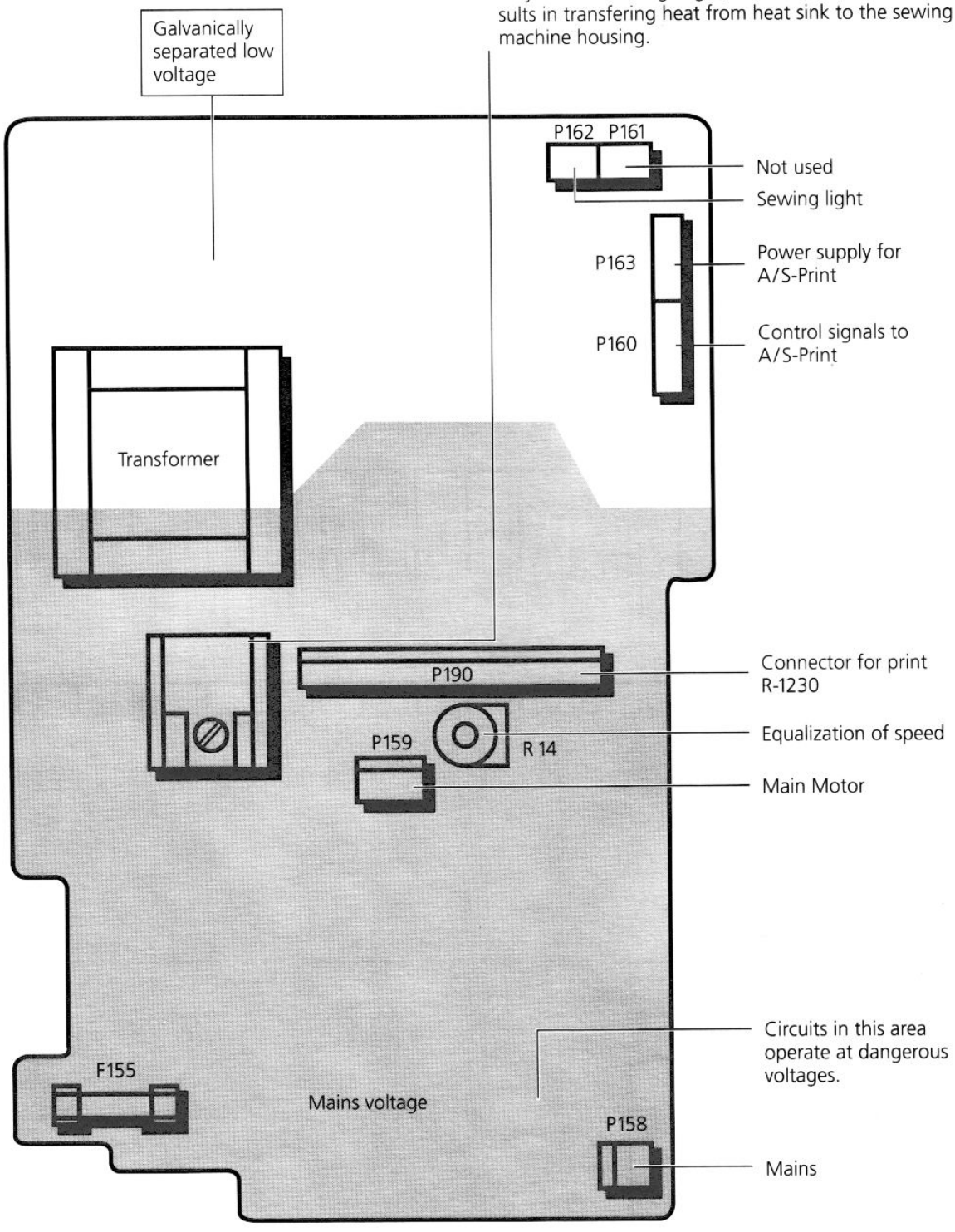
Plug connections



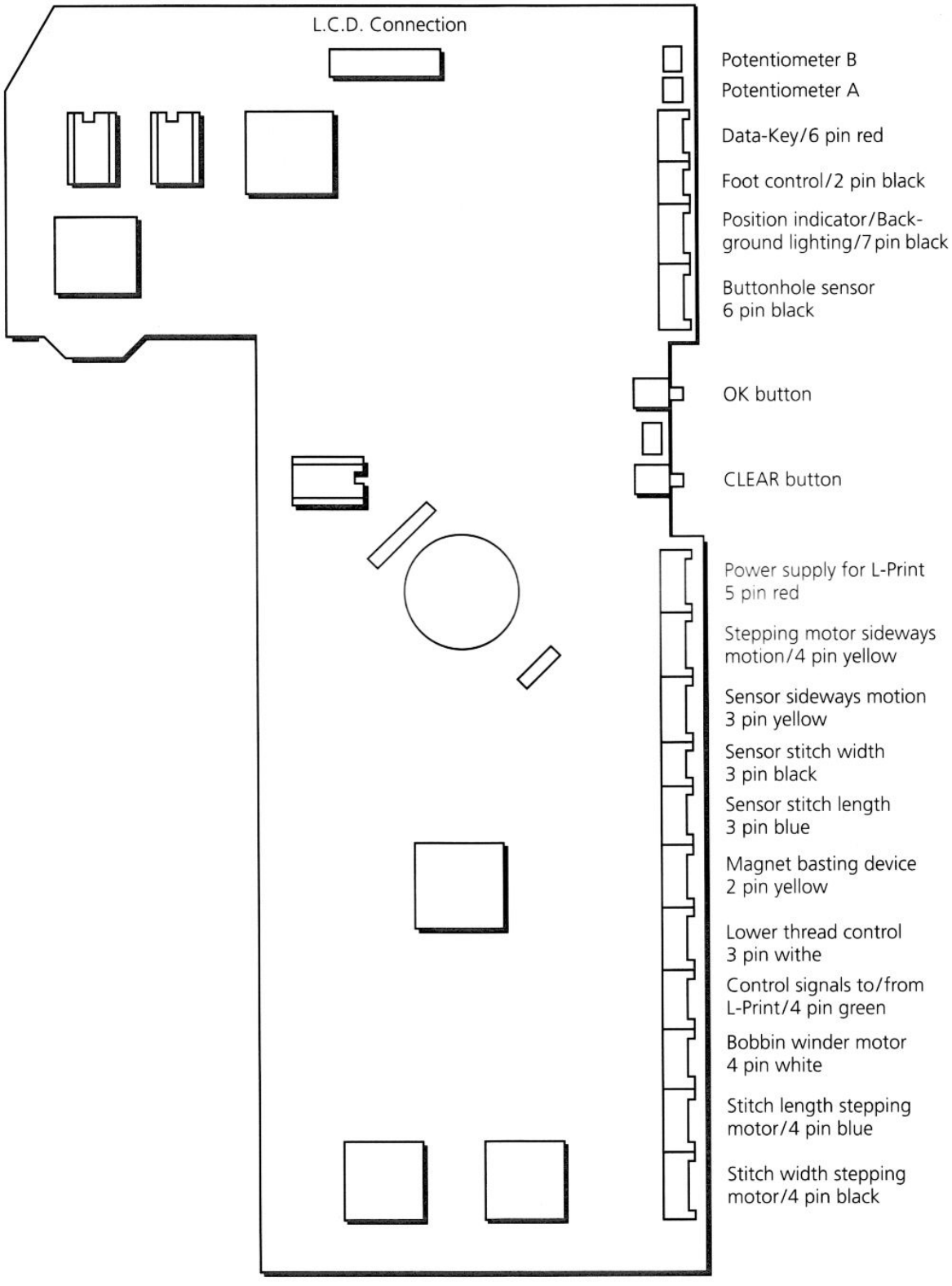
Print L 1230

Important!

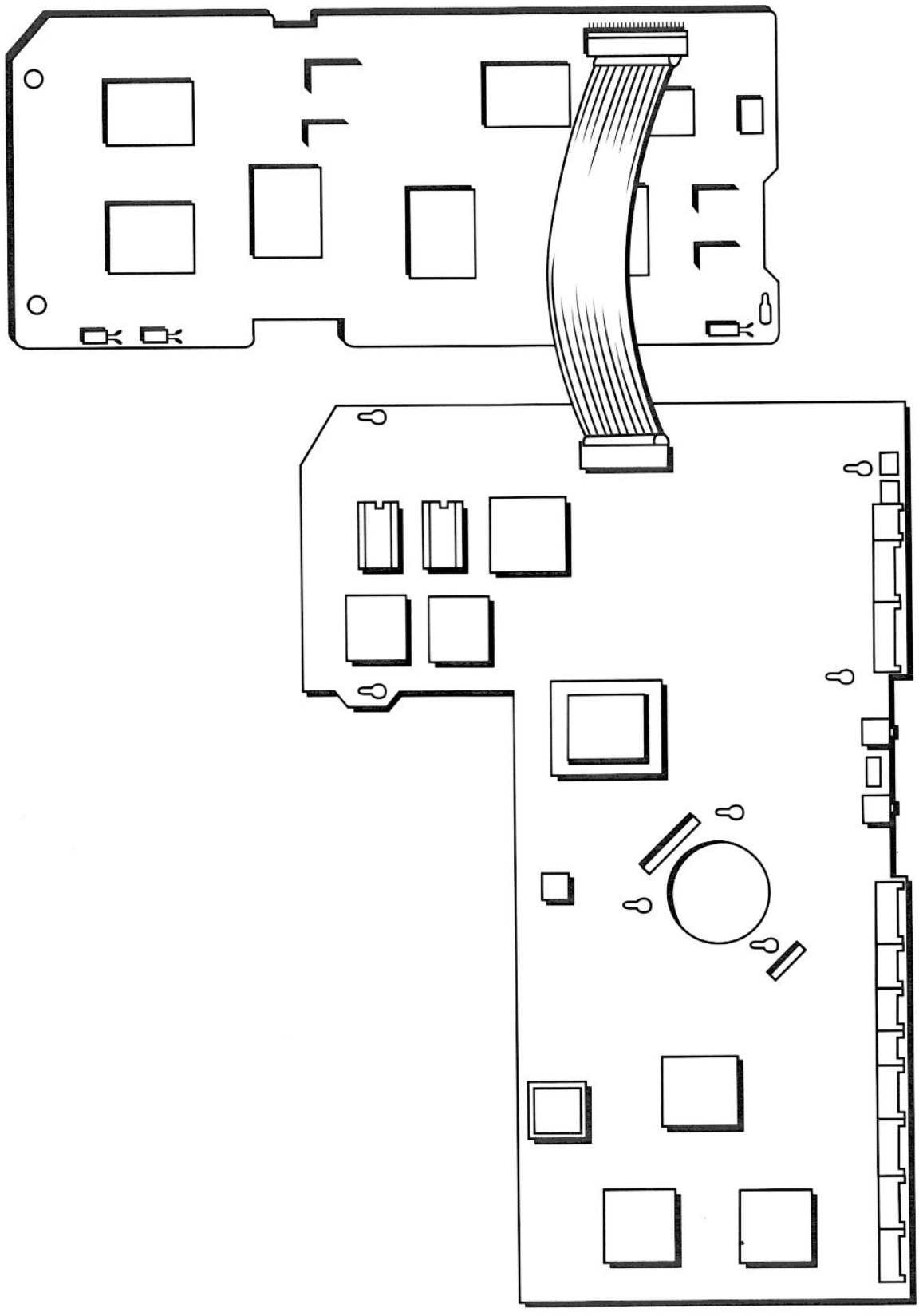
Never fit heat sink and securing screws without insulating foil or insulating washer, because a short circuit will occur. The heat sink with its insulating foil must sit fully on the securing angle, in order to achieve best results in transfering heat from heat sink to the sewing machine housing.



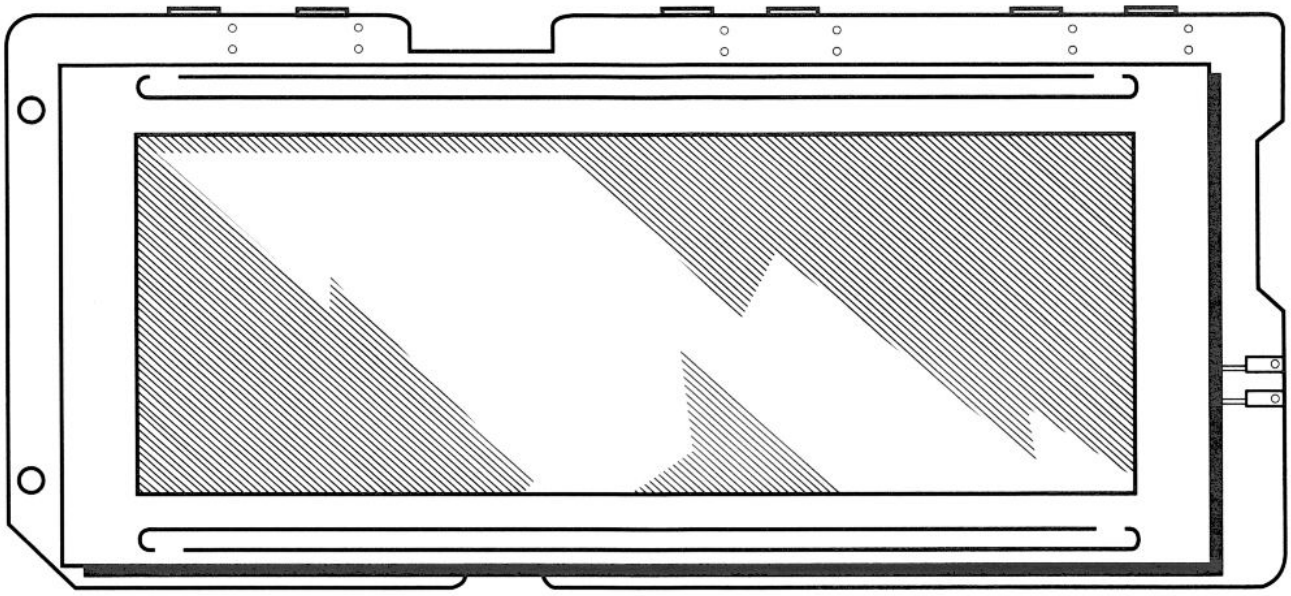
A/S-Print

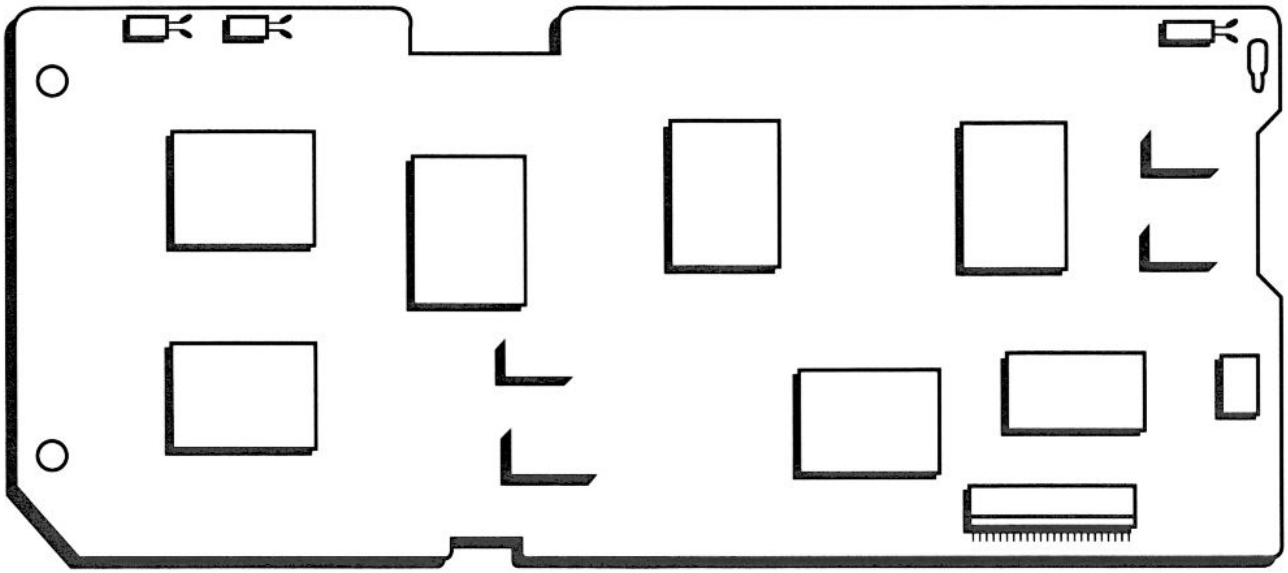

L.C.D. Connection
Potentiometer B
Potentiometer A
Data-Key/6 pin red
Foot control/2 pin black
Position indicator/Back-ground lighting/7 pin black
Buttonhole sensor 6 pin black
OK button
CLEAR button
Power supply for L-Print 5 pin red
Stepping motor sideways motion/4 pin yellow
Sensor sideways motion 3 pin yellow
Sensor stitch width 3 pin black
Sensor stitch length 3 pin blue
Magnet basting device 2 pin yellow
Lower thread control 3 pin withe
Control signals to/from L-Print/4 pin green
Bobbin winder motor 4 pin white
Stitch length stepping motor/4 pin blue
Stitch width stepping motor/4 pin black

Connection A/S-print – L.C.D. display



L.C.D. Display (Liquid Crystal Display)
Printed circuit for L.C.D. Display





Diagnostic instructions

Warning of dangerous voltage levels
Mains voltage (refer to print L-1230)

Circuit components on the L-1230 power print, the main motor and the cable drum, carry dangerous voltage levels. For your own safety, print L-1230 should only be touched after about 30 seconds after the mains voltage has been switched off, which is the time required by the capacitors to discharge after the mains plug has been removed.

Warning

The sewing machine may only be connected to the mains supply when the chassis cover or the auxiliary cover is mounted. Work may only be carried out on the L-1230 print, main motor and cable drum when the mains plug has been withdrawn from the mains supply.

Electrically isolated low voltages
(refer to print L-1230)

Several circuit components on the L-1230 print operate with electrically isolated low voltages (40V or less).

With the exception of the power print L-1230, the main motor and the cable drum, the other modules operate with electrically isolated low voltages!

There is no danger involved in touching these components during operation.

Warning!

The following should be additionally observed when carrying out repair and adjustment work:

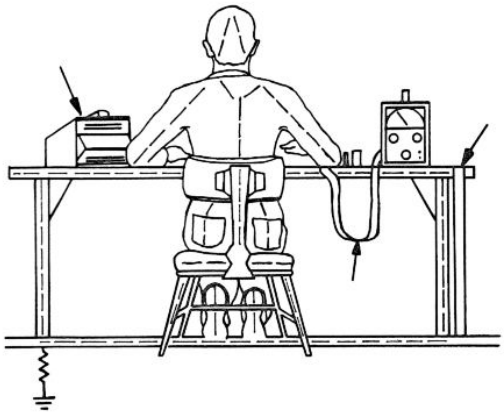
- *Changing from the service programme to normal operation, and vice versa is only possible after changing the position of the service switch on the A/S-print, and briefly switching off the mains voltage.*
- *The following adjustments should be made each time an A/S-print replaced: Forward/reverse feed/buttonhole (Service programme 4).*
- *Switch off the mains voltage before touching and replacing the R-print.*

Protection of electrical components against electrostatic discharges

If two insulation materials (e.g. shoe sole and floor) rub together there can be a build -up of static electricity. Should this be dicharged through electronic components these can be seriously damaged. One of ten most effective ways of conductiong these charges away is by earthing, and this can be guaranteed by using purpose-built work places fitted with appropriate protective equipment.

1. A bench suitable for working with components in today's eletronic industry has a surface that does not allow the build-up of static electricity. On the one hand the surface should be conductive so that electrostatic charges can be conducted away, but on the other hand it should have enough resistance to prevent short-circuiting and earthing of parts laid out on the bench.

2. By wearing a wristband that is connected to the bench surface, static electricity can be conducted away from service personnel. For safety reasons a resistance of approx. 1 M ohm has to be connected in series with the conductive wristband.

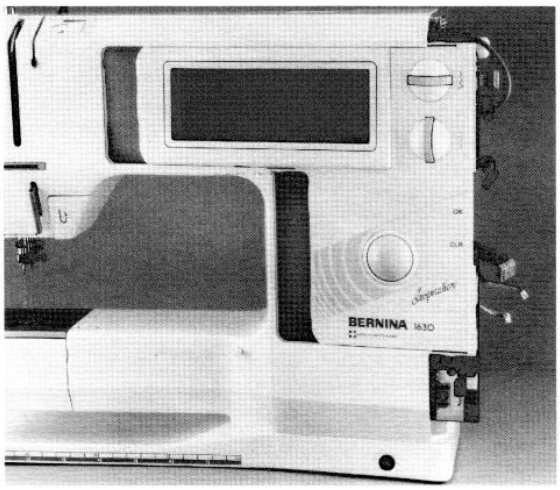


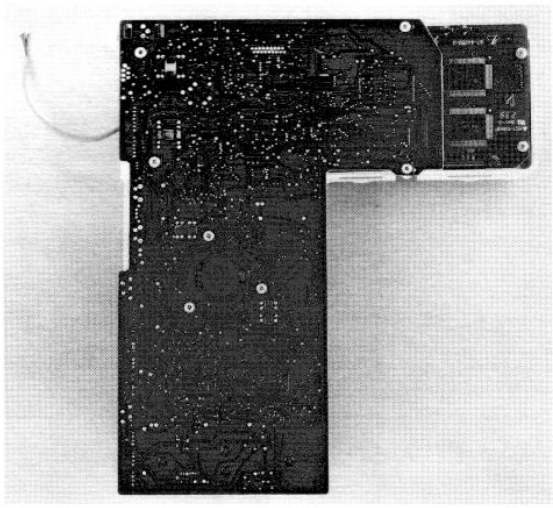
3. Electronic parts may only be dispatched in their original packaging.

Replacement of the A/S-print-L.C.D.

A/S-print:

- Remove belt cover (section 10/11).
- Remove cable cover (section 12/13).
- Remove all cable plugs on the A/S-print.
- Remove the background lighting plug from the P-print.
- Remove the control panel.
- Remove the 7 securing screws of the A/S-print.
- Carefully lift the A/S-print a little from the L.C.D. Remove the connecting cable (background-lighting) from P 333, and lay the A/S-print flat.
- Loosen the clips on plug P 334 on the A/S-print, and remove the flat-band cable.
- Exchange the A/S-print (evtl. replace also the control knobs and track-ball).





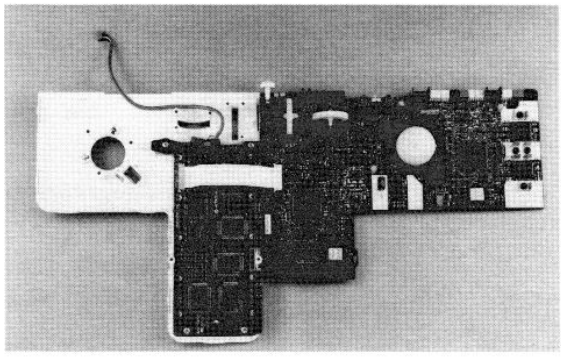
L.C.D.:

- Remove 4 securing screws.
- Remove the complete L.C.D. (only the L.C.D. complete with the print can be exchanged).

Note:

Assembly is done in the opposite way.

The window of the control panel must be clean before assembly (This can be achieved using a dry, fluff-free cloth, possibly using compressed air to blow off).



Attention:

Never use alcohol, petrol, spirits or any other acid type of liquid.

Test adapter L-4200

The power supply for electrical parts which are connected to print L-1230 and the main motor control are checked with the aid of the test adapter.

When all LEDs A to E light up, then the power supply for:

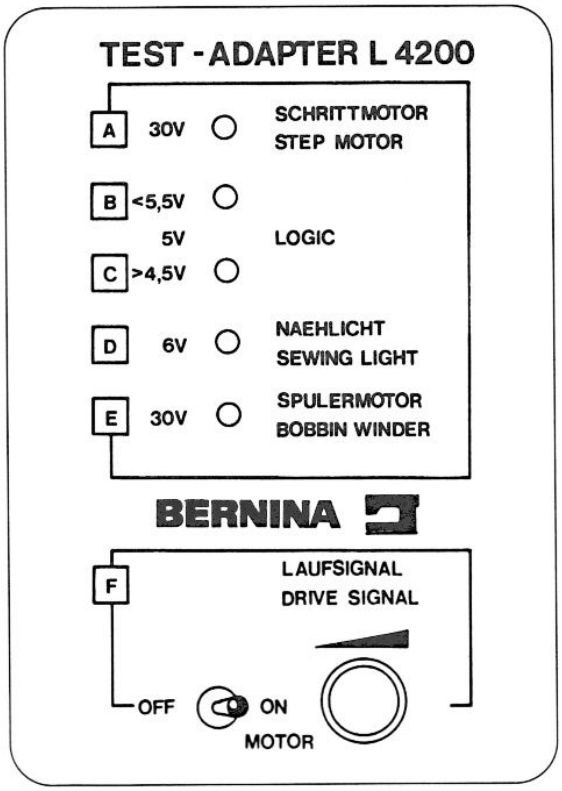
- the step motors
- the logic circuit
- the sewing light is correct. Bobbin winder motor, LED E, can not be tested.

If only LED B does not light up, then the voltage for the logic is too high (more than 5,5V)

If only LED C does not light up, then the voltage is too low (less than 4,5V)

When the motor switch is in the «on» position, the electric brake is released, the motor receives the desired value and will run at the set speed. LED F for the drive signal must be lit. Speed regulation is made by turning the potentiometer.

When the motor switch is placed in the «off» position the signal returns to zero, and the electric brake should engage. The motor slows down to a stop. LED F must go out.



Power-supply 4200

The power-supply 4200 delivers current for the logic of the A/S-print, the step motors, and the sewing light. So that the whole machine work with a safe low voltage, the main motor receives only 30V.

The power supply is useful when a mechanical adjustment has to be made, for which the rigidity plate with print L-1230 has to be removed.

When the mains switch is «on» the light indicates that the appliance is working. With the switch in the «off» position, the appliance is turned off.

Motor switch «on», the main motor will rotate slowly.

Adapter print with cord is pluggable.

There is a 400 MA fuse at the rear.

Important cl. 1630

The connection for the bobbin winder motor is not used.

Danger high level voltage!

Mains voltage
(see print L-1230)

Circuits on the power print L-1230, the main motor and the cord drum operate at dangerous voltages. As some capacitors discharge approx. 30 seconds after pulling out the mains plug, you should wait this long before touching print L-1230.

Test-programme model 1630 (service operation)

Test-programme start

- Simultaniously press the OK and CLR buttons and at the same time switch on sewing machine/D.C. adapter unit. The sewing machine is now in service programme no. 9 (step motors), move to andfrom with an acustical noise.
- Push clear button (min. 2 sec.).

The sewing machine is now in the initial state of the service operation. By means of the track-ball, the individual test programmes 1 to 9 can be selected, and confirmed by pressing the OK button. By pressing the CLEAR button the initial state of the service programme can be selected.

The following sensor signals can also be checked:

- Position indicator/P-print
- Foot control digital and analog.
- Drive signal (adapter model 1130)
- Ret-button
- Switch bobbin winder motor.
- Buttonhole signals A+B.
- Hall sensor SL, SB and SM.

Termination of test-programme

- Switch off the sewing machine/D.C. mains adapter.
- Switch on the sewing machine/D.C. mains adapter.
- The sewing machine can now be operated normally.

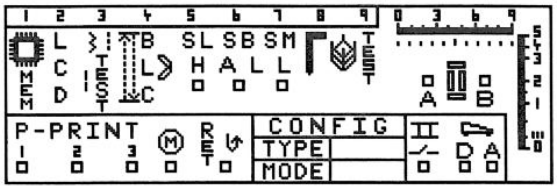
Attention

When changing form normal operation – service opration – normal operation.

- Switch machine/adapter off.
- Bring the service switch into the desired position.
- Switch machine/adapter on aganin.

Display

By means of the track-ball, bring the cursor over the required number or field, and select by pressing the OK button. By pressing the CLEAR button, you will always return to the basic menu of the service-programme, with the exception of the MEM-test and the LCD-test, which return automatically.



Test-programmes cl. 1630 inspiration

Diagnosis

Fault	Possible fault on	Repair instructions
L.C.D. and sewing light not illuminated. Main motor not running, machine «dead»	L-1230 print Mains cable	Test C, resp. N Test F
Main motor does not rotate, other functions OK	L-1230 print	Test C, resp. N
	R-4123 print	Replace R-1230 print after switching off mains voltage.
	A/S print	Replace A/S print
	Foot control	Test M Test L
	Connection A/S print and L-1230 print	Test E
	Connection A/S print and foot control	Test G
	Main motor	Check motor cable and plug Replace motor

Diagnosis

Fault	Possible fault on	Repair instructions
Bobbin winder motor does not function, other function OK	A/S print Switch bobbin winder Bobbin winder motor	Replace A/S print Test R resp. exchange switch Replace complete bobbin winder
Sewing light does not function	Lamps Lamp holder Print L-1230	Replace lamps Test I Test C
Step motors do not position	Step motor A/S print Connection A/S print and L-1230 print	Test $J_1 + J_2$ Test J_1 Test E
L.C.D. does not illuminate	L.C.D. complete	Test B L.C.D. replace
Automatic buttonhole not working	Buttonhole foot A/S-print Potentiometer setting RET-1230	Test $Q_1 + Q_2$ Test Q_1 Test Q_1 Possibly test O
Long basting stitch device does not function	A/S-print Long basting stitch device magnet	Replace A/S-print Replace magnet and adjust
Reverse button does not function	Print RET-1230 A/S-print	Test O Replace A/S-print
Irregular stitch width and length	Step motor	Test $J_1 + J_2$
Main motor stops after 5 seconds	Print P-4200 A/S-print	Test H Replace A/S-print
No needle stop	Print P-4200 A/S-print	Test H A/S-print
Cursor movement is limited when moving to the left or right	Connection cable L.C.D/A/S-print	Test connection of cable Replace cable
Stitch pattern «9» is too short or too long	Feed equalization	Test P

Test A (Test-programme)

What is to be tested	What to adjust	Normal condition
Memory of microcomputer	Initial state of service operation	
	Test-programme no. 1	Test 1 through 8 are now deleted
		After ca. 10 sec. the display returns to its initial state memory of micro-computer OK).

Repair instructions:

When the field «microcomputer» blinks (memory of the micro-computer defective), the A/S-print has to be replaced.

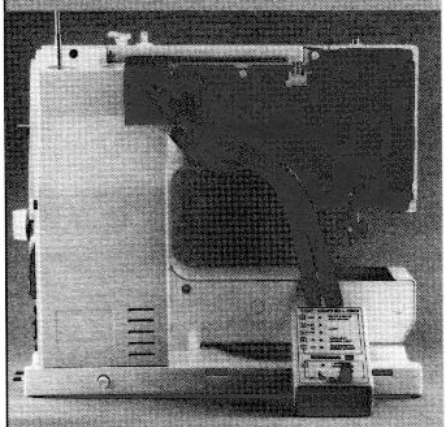
Test B (Test-programme)

What is to be tested	What to adjust	Normal condition
L.C.D. (Liquid Crystal Display)	Initial state of service programme	
	Select test-programme no. 2	Vertical stripes appear
	OK button can now be pressed four times, afterwards you are automatically brought back to the initial state of the service programme	The stripes move each time, the width of themselves.
		Over the whole display no field fall-outs should occur.

Repair instructions:

When field fall-outs are apparent, then the whole L.C.D. complete has to be replaced. If the whole display does not illuminate, then the A/S-print will have to replaced, possibly maybe also the L.C.D. complete.

Test C

What is to be tested	What to adjust	Normal condition
Print L-1230	Switch off mains supply	
See also directive in Test M	Fit safety cover	
	Connect test adapter L-4200 instead of the sewing light (2-pole,green), connect connecting cable to print A/S print (5-pole red, supply)	
	Switch on mains supply	LEDs A to D illuminate
	Motor switch to «on» position	Motor rotates, LED F illuminated. Speed can be controlled by the potentiometer.
	Motor switch to «off» position	Motor brakes. LED F no longer illuminated.

Important:

When no lights A-D illuminate carry on test D mains cord.

Replace print L-1230 if one or several of the LEDs A to D do not illuminate. Before going further, test the new L-print using test D to determine whether the L-print failure was subsequent to failure of the A/S-print. If this is the case, then these faults should first be eliminated.

Replace print R-1230 if the voltages A-D are available but the motor still does not run. Subsequently replace print L-1230 if the motor still does not run.

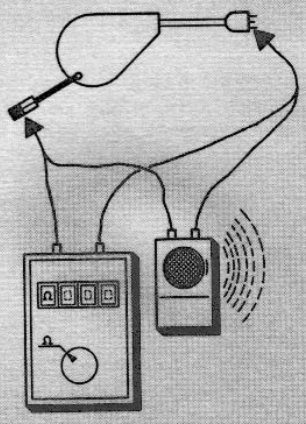
Test D (Service-programme)

What is to be tested	What to adjust	Normal condition
Print L-1230/R-1230	Initial state of service operation	
	Select test 3 (sewing-off).	
	Depress foot control.	The indicator under the field «M» is active.
	Depress foot control.	The motor rotates.

Repair instructions:

If indicator is not active: A test should be conducted with a new R-print and the old L-print. If still faulty, then replace L-print and repeat test. If still faulty, replace A/S-print, and if necessary check the cable connection L-1230/A/S-print (refer to test E).

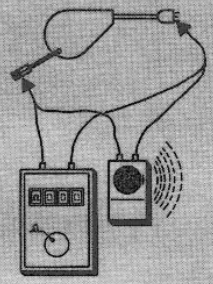
Test E

What is to be tested	What to adjust	Normal condition
Connection of A/S-print to print L-1230	Take out mains plug.	
	a) Disconnect connectors from print L-1230 and A/S-print.	
Flat cord 5 pole, red connectors Flat cord 4 pole, green connectors		
	b) Check on the upper side of the connectors with a circuit tester or ohmmeter that each wire is contionuous.	
	c) Test every wire as described in b.	High pitched tone! Cord OK. Ohmmeter shows a small resistance, cord OK.

Important:

If there is no high pitched tone, or the display of the ohmmeter wavers or shows infinite resistance, then the cord is defective. Replace connection.

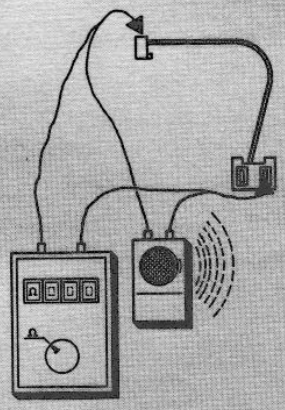
Test F

What is to be tested	What to adjust	Normal condition
Mains cord (cord reel)	Take out mains plug. a) Disconnect plug P155 on print L-1230. b) Connect one end of the tester to the plug, then test every wire to check that a circuit can be made.	 High pitched tone! Cord OK. Ohmmeter shows a small resistance, cord OK.

Important:

If there is no high pitched tone, or the display of the ohmmeter wavers of shows infinite resistance, then the cord is defective. Replace cord reel.

Test G

What is to be tested	What to adjust	Normal condition
Connection of A/S-print to foot control plug.	Take out mains plug. a) Remove 2 pin black foot control plug from A/S-print. b) On the upper connection side of the plug check with a circuit maker or ohmmeter that a circuit can be made between this and the foot control plug. c) Both connections on foot control plug have to be tested as described above.	 High pitched tone! Cord OK. Ohmmeter shows a small resistance, cord OK.

Important:

If there is no high pitched tone, or the display of the ohmmeter wavers or shows infinite resistance, then the cord is defective. Replace cord.

Test H (Service-programme)

What is to be tested	What to adjust	Normal condition
Print P-4200	Initial state of service operation a) Using the handwheel bring needle to lowest position. b) Rotate handwheel forwards and check table to the right.	SL, SB and STOP fields are active. 1 / 2 / 3 off off off on off off on on off off on off off on on on on on on off on off off on off off off □ = off (not active) ■ = on (active)

Important:

If the print does not function as required per the table, then repeat tests a) and b) using a new print. If there are still discrepancies then refit the old print, replace A/S-print and repeat tests a) and b).

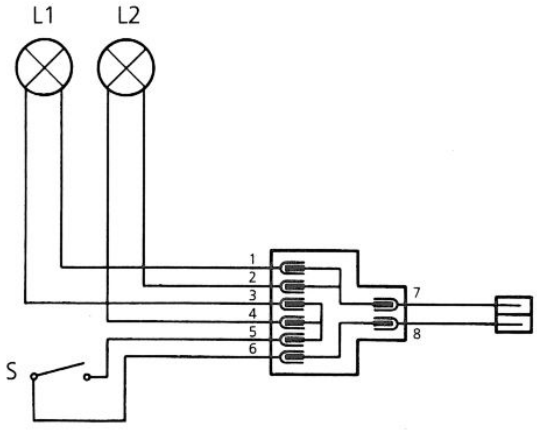
Test I

What is to be tested	What to adjust	Normal condition
Lamp holder	Mains switch on. a) Switch on sewing	Sewing light works

Important:

If the sewing light does not function and both bulbs are intact, then the connections from L1, L2 and S to the plug can be checked with the circuit tester or ohm-meter.

The switch S can be tested by putting the test probes in the plug openings, and by switching on and off there must be continuity and blockage in the circuit. To be sure, the same test must be made with the 2-pin green plug. L1 and L2 can be tested for continuity on the plug openings. Faulty parts must be exchanged.



Test J_1 (Service-programme)

What is to be tested	What to adjust	Normal condition
Step motors, A/S-print	Initial state of service operation Select service test programme 8.	Step motors rotate back and forth, feed dog and needle bar must move to and fro.

If a step motor does not rotate, then the fault can lie either with the step motor, or A/S-print. The faulty components can be identified by swapping the connections of the step motors.

Hall sensors	Initial state of service operation Select service test programme 8. Select service test programme 5 SL and 6 SB for Hall sensor position check, see test J_2.	LEDs for the Hall sensors panel should flash at the same frequency as the stepping motor motion.

If the LED of the Hall sensors do not flash, then the fault can lie in the Hall sensor, the mechanical part or the step motor. Replace defective step motor (see manual 1130, pages 34 to 42).

	Connect the removed motor and and Hall sensor to A/S-print and energize with the power supply-4200. Manually slide magnet over the Hall sensor. Select service test programme 5 for SL step motor. Select service test programme 6 for SB step motor.	Field SL must be active. Field SB must be active.

If the fields are not active, replace the Hall sensor and adjust the step motor to its zero position (service test programme 4, see test P).

Test J_2 (Service-programme)

What is to be tested	What to adjust	Normal condition
Position Hall sensor S.L.	Initial state of service operation Service programme no. 5	The Hall sensor position for stitch length is displayed as a number in the «Hall sensor» field. The value must lie between 2 and 14 max.
Position Hall sensor S.B.	Service programme no. 6	Same procedure as above, the value must lie between 1 min. and 7 max.
Position Hall sensor S.M.	Service programme no. 7	Same procedure as for Hall sensor S.L. The value must lie between 1 min. and 7 max.

Repair guide:

If the value can not be reached then the pinion and the magnet support must be replaced. (The freeness of movement in the mechanics must be checked).

Test K (Service-programme)

What is to be tested	What to adjust	Normal condition
Pinning position of step motors.	Initial state of service operation Select service test programme 7	The step motors are activated to the step position for pinning.

Note:

Can only be used when the step motors are taken out of the machine.

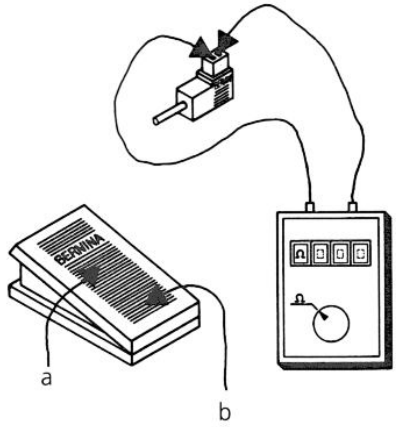
Test L

What is to be tested	What to adjust	Normal condition
Foot control	When a fault in the foot control is suspected, first carry out test L. Connect the multimeter to the foot control, and switch to the range ohms. a) Foot control not depressed. b) Depress the foot control at the rear (needle stop down). c) Depress the foot control slowly at the front.	Reading «infinite» Reading 10 k ohm Reading varies form 4 to 0 k ohm

Important:

If the foot control is defective, open the foot control cover. Carry out tests a, b and c on both contacts. If these give correct readings, replace the cord reel. If a fault persists, then change the regulater housing.

a) Running of main motor
v) Needle stop down



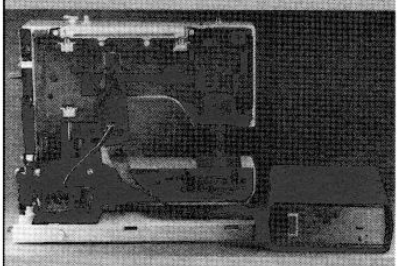
Test M (Service-programme)

What is to be tested	What to adjust	Normal condition
Foot control digital/analog:	Start service-programme Connect foot control to the machine. Depress slowly forwards.	 Fields D = Digital and A = Analog are active.

Repair instructions:

The A/S-print should be replaced if only the «analog or digital» field is active.
The foot control is defective if neither of the fields are active (regulator or cable).

Test N (Test-programme)

What is to be tested	What to adjust	Normal condition
A/S-print L.C.D. Display	Switch mains supply off Connect up the 4200 supply unit to the sewing light, main motor, connecting cable to A/S-print (4-pole green, control signals), the connecting cable to A/S-print (5-pole red, supply). Switch on supply unit. Check L.C.D. display Initial state of service programme Select service programme no. 8. Press clear button. Motor switch «on».	 Initial state of service programme. Step motors rotate back and forth. Fields SL and SB flash at the same frequency as stepping motor motion. Motor runs.

Important:

A/S-print must be replaced, and the test repeated if the display is not illuminated, or if step motors do not rotate. Replace L.D.C. if faults occur on the display. If the motor does not run, exchange the motor.

Directive:

If the above tests all function with the mains device, then the fault can only be in the L-print. See test A.

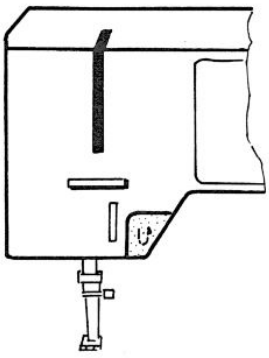
Test O (Test-programme)

What is to be tested	What to adjust	Normal condition
Ret-Button (Reverse button)	Initial state of service operation Depress Ret-button	 Field «Ret» is active.

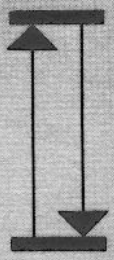
Repair instructions:

Field «Ret» is not active: A check should first be made as to whether the switch is being actuated. If this is not the case, then the switch activator should be mechanically adjusted (travel increased) until the switch is actuated. The following procedure should be followed if the field «Ret» is still not active.

Connect new Ret-print. Manually actuate the switch, field «Ret»is active. Replace Ret-print.

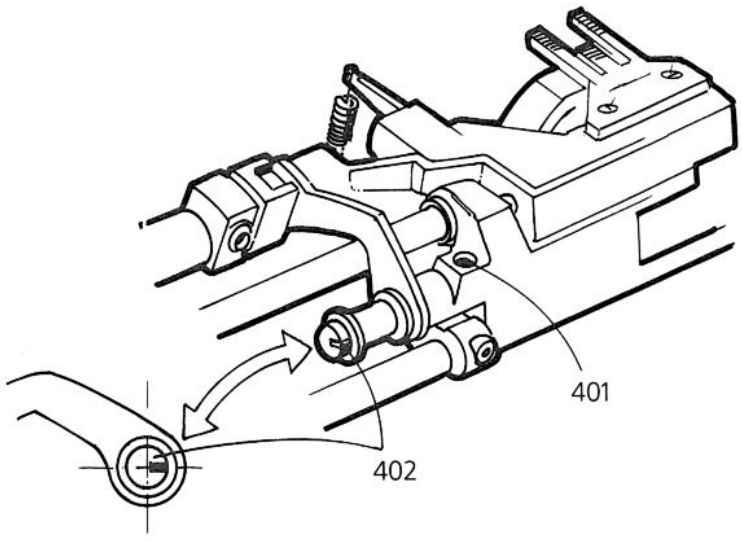


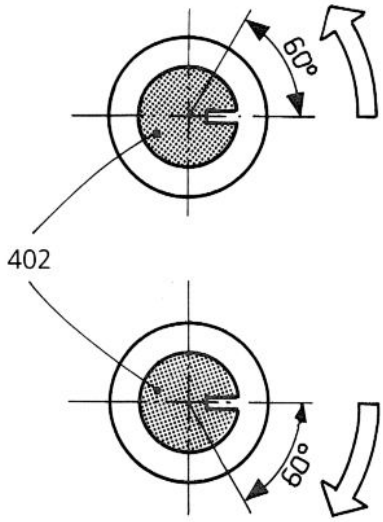
Test P (Test-programme)

What is to be tested	What to adjust	Normal condition
Forward and reverse feed compensation	Select test programme no. 4 Set coding number to 4 Loosen allen screw 401 slightly. Turn the excentric pin 402 until the groove is horizontal. Place a 2 ply piece cotton under the presser foot. If necessary the eccentric pin 402 can be turned until the forward and reverse feed are the same length.	Move the cursor to the symbol - or +, and through pressing the OK button, move to the required number.  The stitch pattern should be correct over the whole speed range.

Attention:

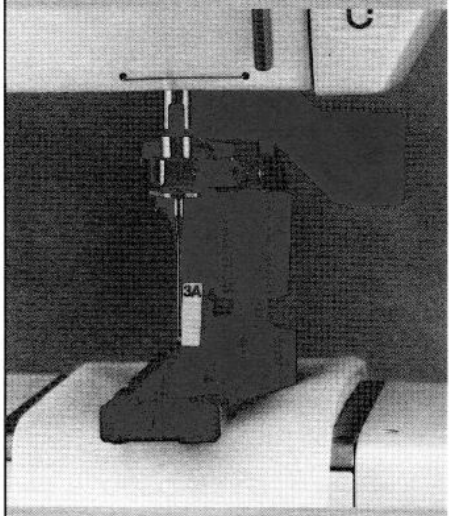
If the correction angle (max. 60° per side) is not enough, then move the eccentric pin to its centre position, and reset the feed-dog zero setting.





Test Q_1 (Test-programme)

What is to be tested	What to adjust	Normal condition
Automatic buttonholer	Testing/Adjustment	Sewing light burns.
A/S-print	Initiale state of service operation	
Print Ret-1230	Select service programme 4	
Buttonhole foot	Mount buttonhole foot.	
	Lower feed-dog.	
	Lower presser-foot lifter lever.	
	Clip the adjusting filter on the presser foot bar from the right-hand side. Slide it to its highest position until it audibly clicks into place.	
	With a small screwdriver rotate potentiometer «auto A» (higher one) on A/S-print anti clockwise to its endstop (Field A is not active). Slowly rotate the potentiometer in the opposite direction, simultaneously sliding slowly the carriage of the buttonhole foot until field A just starts to flash. Potentiometer «auto B» (lower one) can now be adjusted in similar fashion using field «B».	



Note:

In order to allow the foot carriage to be moved easily, two smoothpieces of material should be placed between the needle plate and the foot carriage. (Alternatively use knee lever or lifterlever to weaken the pressure of the material presser bar.)

Test Q_2 (Service-programme)

What is to be tested	What to adjust	Normal condition
Sewing-off a buttonhole (Keyhole buttonhole)	Test-programme 4	
	Move cursor to buttonhole symbol.	
	Press OK button.	
	Press foot control	Sews straight stitch
	Press RET-control.	Sews keyhole and lst bead
		Automatic forward (straight stitch).
		Automatic 2nd bead
	If the keyhole part is not round, then the forward/reverse feed equalization should be checked. In sewing off without the service-programme the balance + and - can also be used.	
		Automatic 2nd bartack

Test R (Test-programme)

What is to be tested	What to adjust	Normal condition
Switch winder motor	Select service programme 3	
	Switch on motor	Field «Bobbin/Switch is active.
Control of motor	Press foot control	The speed can be adjusted with the foot control unit.

Test S (Test-programme)

What is to be tested	What to adjust	Normal condition
Configuration of the machine	Initial service programme	
	Select field «TYPE»	The machine type appears as a number in the next field. No. «0» = Type 1630
	Place the cursor over the - or + sign, and by pressing the OK button, the number can be changed, by pressing the CLR button the number will be memorized.	
	Select field «MODE»	The machine mode appears as a number in the next field. No. «0» = Worldwide without Japan No. «1» = Japan (Japanese alphabet)

Test T (Service-programme)

What is to be tested	What to adjust	Normal condition
Sewing off: service operation	Initial state of be sewn-off.	The machine can now service operation
The stitch length, width, LMR and the automatic long stitch (not the basting stitch).	Select service programme 3	L.C.R. Straight stitch Stitch length and stitch width can be adjusted Long stitch

Note:

If the normal conditions not achieved then test N must be carried out first.

Functions-Test Electronic

What to adjust	Normal condition
Switch machine on	L.C.D. display Illuminates (basic menu)
Switch on bobbin winder	Bobbin winder runs
Switch off bobbin winder	Bobbin winder stops
Switch on sewing light	Sewing light comes on
Switch off sewing light	Sewing light goes out
Main motor	
Fully depress foot control	Speed of sewing machine 1050 rpm
Stop from fastest speed	Motor brakes, thread take-up lever is in its highest position
Press foot control backwards	Machine positions in lower needle position
Reverse button	
Sew forwards	Transport forward
Press reverse button	Transport reverse
Release reverse button	Transport forward
Basting device magnet	
Sew using basting device	Every fourth stitch is sewn
Sew using automatic long stitch	Every second stitch is sewn
Stitch 1, depress foot control for a short time	Upper needle stop
Stitch 1, select needle down position	
Depress foot control for a short time	Lower needle stop
Rotary encoder	
Adjust the stitch width and length knobs	Bar graph on the display adjusts accordingly
To check the electrical transport equalization, sew using stitch pattern «9»	Sewn pattern must be correct at all speeds
Automatic buttonholing (keyhole buttonhole)	The keyhole part of the button-hole is round

Appendix

Demonstration with two machines coupled together:

1 Using the cable shown in the sketch, connect the slave machine with the master machine.

2 Switch on the slave machine in service-programme an set in the field «MODE» the number 9.

3 Place the cursor in the field «MODE» and press the CLR button.

4 Switch on the master machine.

Now the slave machine works together with the master machine.