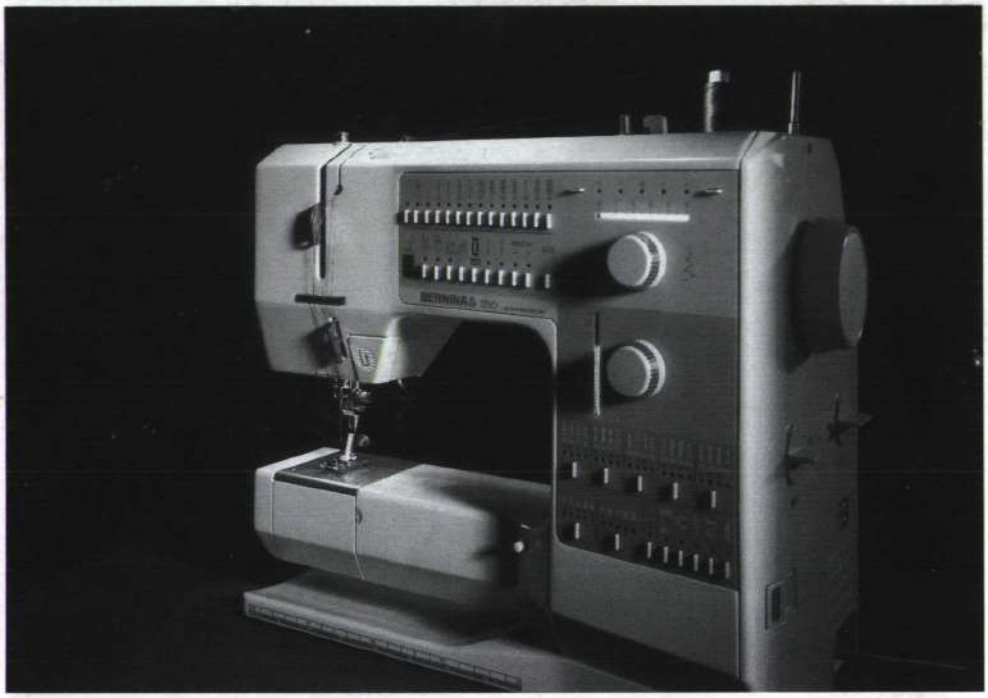

BERNINA®

Service manual 1230

(Supplement to service manual 1130/20)

FRITZ GEGAUF LTD.
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Contents

Important:

A comparison ot the models 1230 and 1130 is not made as from a technical point of view. They are identical.

All gauges, instruments, adjustments etc, which are applicable to model 1130 are also valid here. BERNINA has only changed the test programme which also simplifies things for you.

These instructions are to be used in conjunction with the service manual cl. 1130.

FRITZ GEGAUF LTD.,
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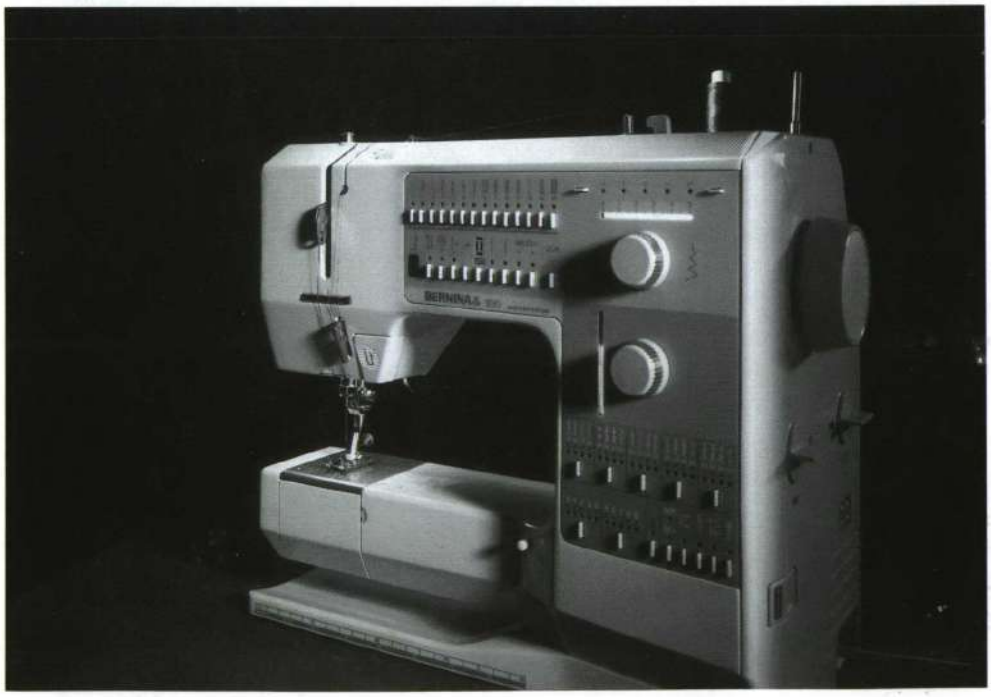
Steckborn (TG) Switzerland



Technical data BERNINA model 1230

Stitch lenght max. forward 5 mm
max. reverse 5 mm
Increment 0–1 0,05 mm
1–3 0,1 mm
3–5 0,2 mm
Max. stitch width 5,5 mm
Increment 0,1 mm
Needle system 130/705 H
Adjusting needle 130/705 H/TCN
Hook system BERNINA CB = Central bobbin
Lowest point of needle bar = 0 degree
Presser foot height = 7,5 mm
Darning foot heigth = 0,5 mm

Automatic long stitch 10 mm/2:1
Basting device 30 mm/6:1
Working space 105×195 mm
Overall length 375 mm
Overall width 184 mm
Overall heigth 350 mm
Motor 90 W
No of stitches per/min. min.-max. 120–1050/min
reduced min.-max. 120–600/min
Sewing light: bulb 2×6 V/4 W
Weight 10,5 kg

Features and functions

Needle position 5
Light beam
Zig-zag and stitch lenght (freely adjustable)
Automatic basis adjustments
Basic marking Blinker
LED display for presser foot
Upper needle stop (general)
Lower needle stop (general)
Needle positioning upper/lower with foot pedal
Permanent reverse sewing
Pattern start
Fully automatic buttenhole
Buttonhole 3 step
Keyhole buttonhole
Automatic long stitch
Basting device
Balance for forward and reverse feed
Clear switch
Single pattern
Mirror image

Stitch pattern extended, stitch density
remains constant
2 needle limiter
Memory
7 practical stitches without reverse motion
5 practical stitches with reverse motion
12 decorative stitches with reverse motion
32 number of stitch patterns
LED control for programmed pattern
Manual stitch size adjustment, memorized
Main switch
Separate light switch
Speed control using the foot control
Letters A to Z
Numbers 0 to 9
Characters 4 (– · ø ?)
Memory capacity 50 units (can be called up even
after mains failure/interruption)

Description

The electronics of the model 1230 sewing machine is essentially located on three large printed circuit boards; the power print L-4200, the control print S-1230 and the display print A-1230 (compare to the block schematic diagram). The tasks of the 3 units correspond to the known functions of L-4200, S-4200 and A-4200 prints from the model 1130.

L-4200 power print

The L-4200 power print is mounted above the motor on the rear side of sewing machine. The circuit components on the L-4200 have the following functions:

- *Motor control:*
  The main motor control operates with the mains voltage. The main motor is a DC motor with pulse-width modulated speed control. The closed loop control circuit on the small R-4200 print is located on the power print.
  All circuit components for the motor control operate at dangerous voltage levels.
  The safety regulations must be adhered to.

- *Power supply:*
  Generates the following D.C. voltages:
  - 30V for the step motors
  - 5V for the logic circuitry on the S-1230 and A-1230 prints
  - 6V for the sewing light
  - 30V for the bobbin winder motor

  Components are protected from overload, in the case of faults, by three fuses F150, F151 and F152. If a fuse blows only original replacement fuses, with the correct rating may be used.

A-1230 display print

The display section is mounted directly behind the operating control panel. The display and operating control elements are soldered onto the L-shaped printed circuit.

A time multiplex control allows the numerous LEDs and control elements to be connected to the open loop control on the S-1230 control print using only 16 connection lines.

S-1230 control print

The complete sewing machine control is located on the S-1230 control print. The S-1230 control print is located on the A-1230 print from the rear.

The most important control elements are the microcomputer, and the power drive for the step motors. A new feature over model 1130 is that the bobbin winder motor is also controlled by the microprocessor. The bobbin winder motor speed can now be controlled from the foot control.

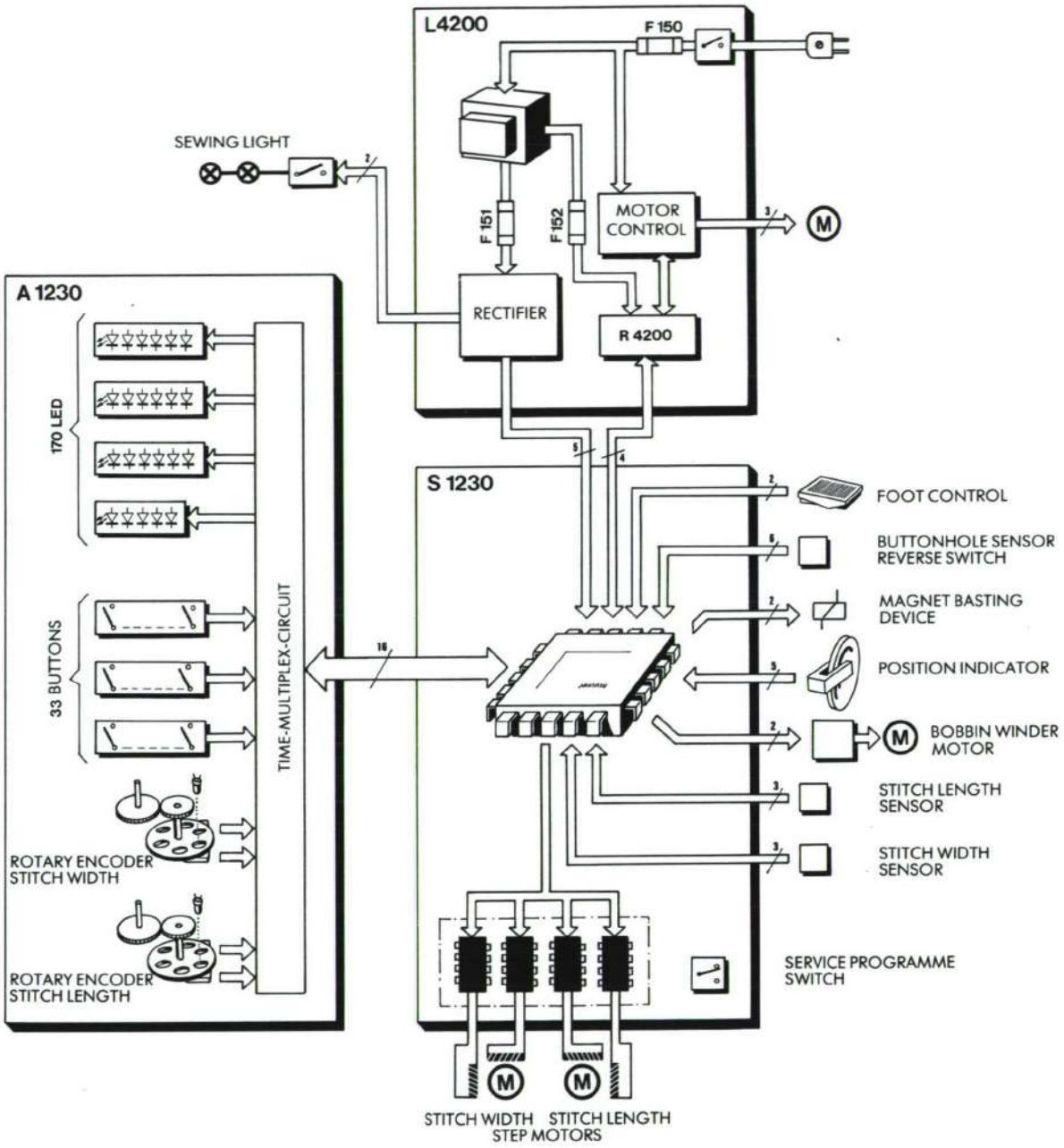
The S220 service switch on print S-1230 is a service aid. This switch has two positions: normal sewing operation, and service position. In the service position, several buttons and diodes on the display panel are assigned other functions. This allows the service technician to execute necessary adjustment and testing functions using the display panel (refer to the special section service programme). The service switch must always be set into the sewing position for normal sewing operations.

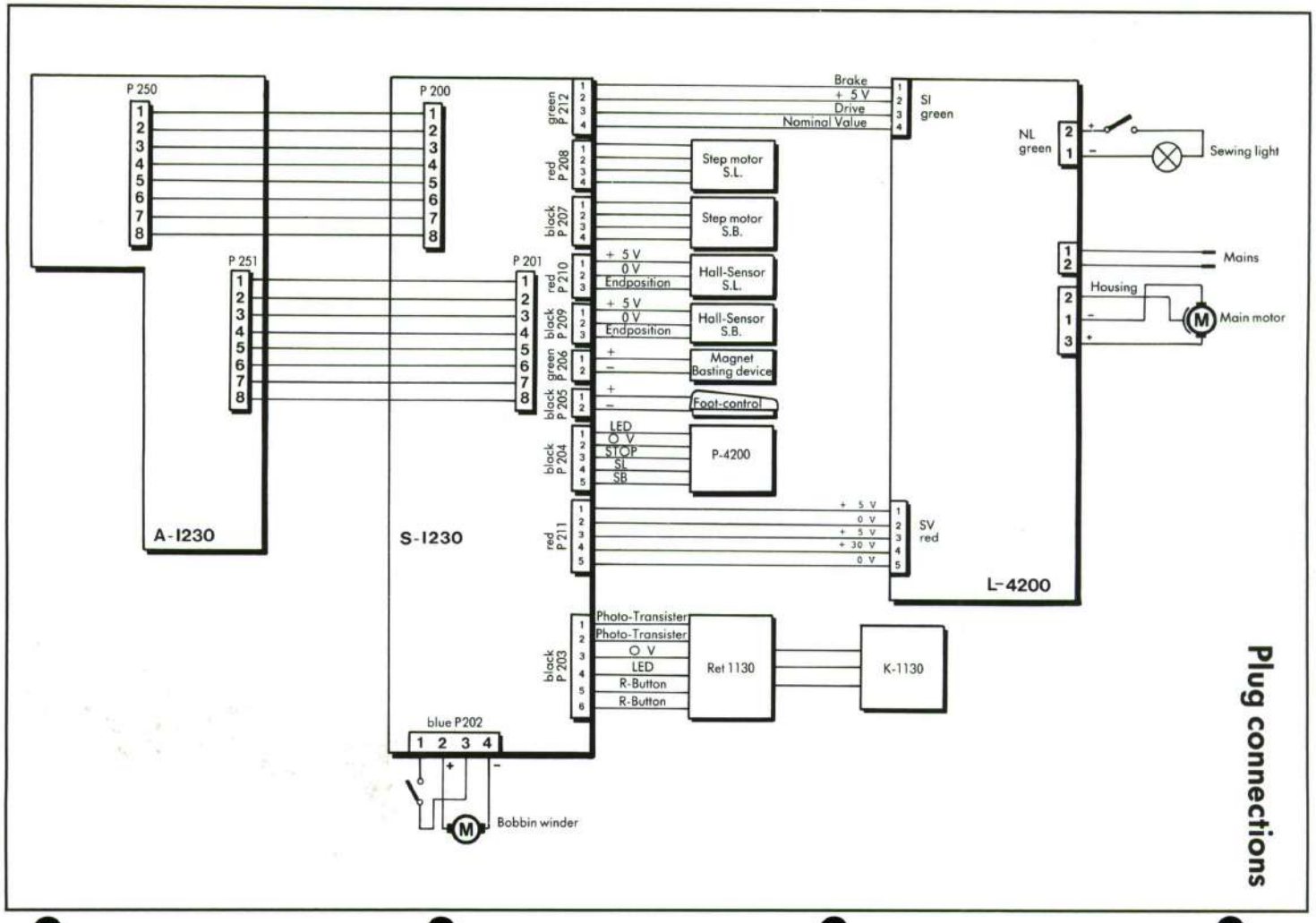
The microcomputer on print S-1230 receives an analog signal from the foot control, which it then converts into a digital signal and transmits to print R-4200 as setpoint for the motor speed. The R-4200 print controls the motor speed to the speed specified by the S-print, using a setpoint – actual value comparison. When the foot control is released, the setpoint goes to zero, the brake is actuated from the microcomputer on the S-print via the R-4200 print, and the motor is rapidly braked.

Signal transfer between the S-1230 and R-4200 print is realised using a 4-pole cable. Signal transfer is realised through an opto-coupler providing electrical isolation and thus eliminating dangerous voltage levels from the foot control and the S-1230 control print.

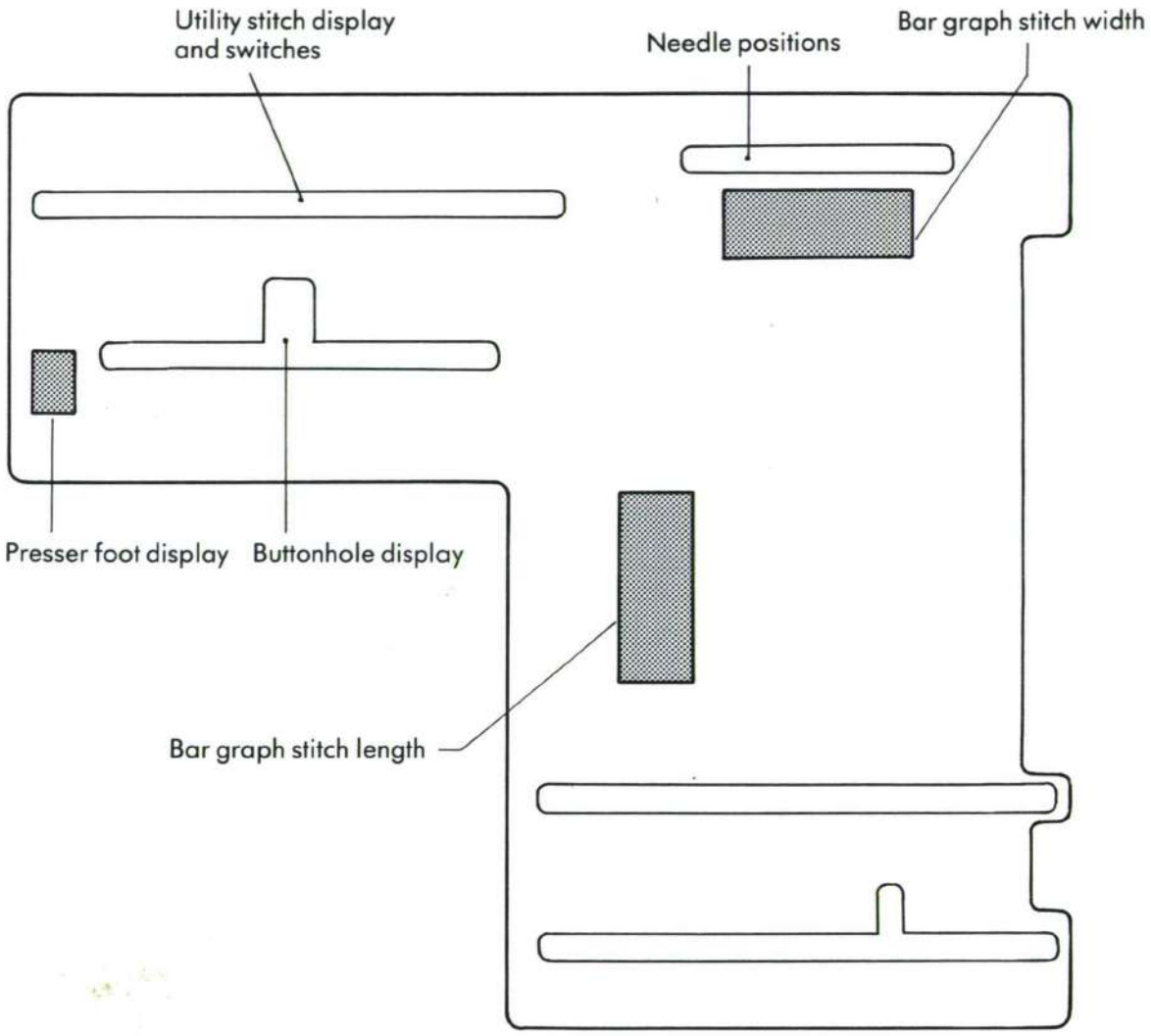
The step motors are in random positions when sewing machine is switched on. Random values can also be in the microcomputer control memory. In order to have a defined state, the step motors are rotated into their calibrated position by a microcomputer command, and the position value is set to zero in the microcomputer memory. This starting state allows the selection and sewing of any stitch programme.

Model 1230 block schematic

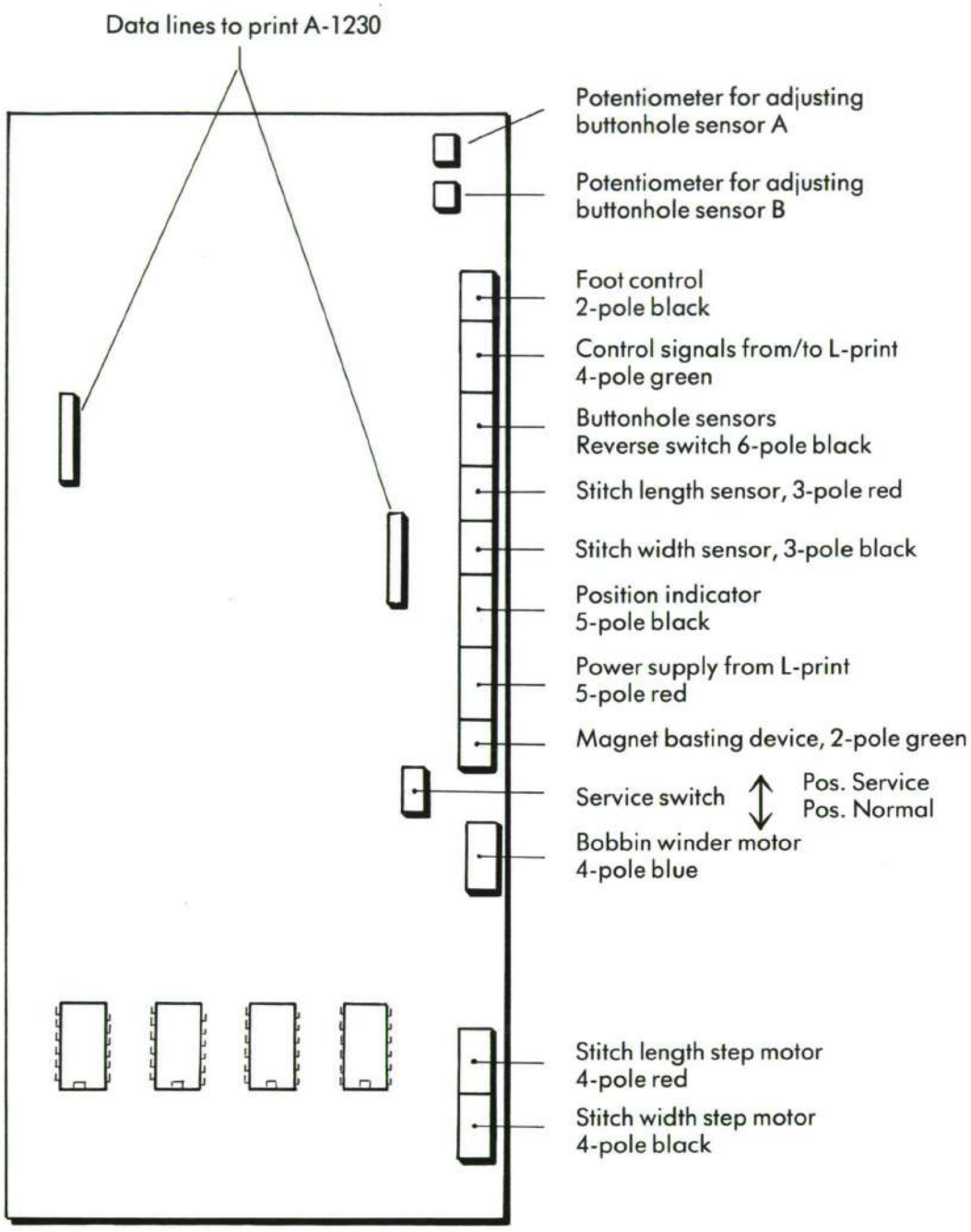




Print A-1230

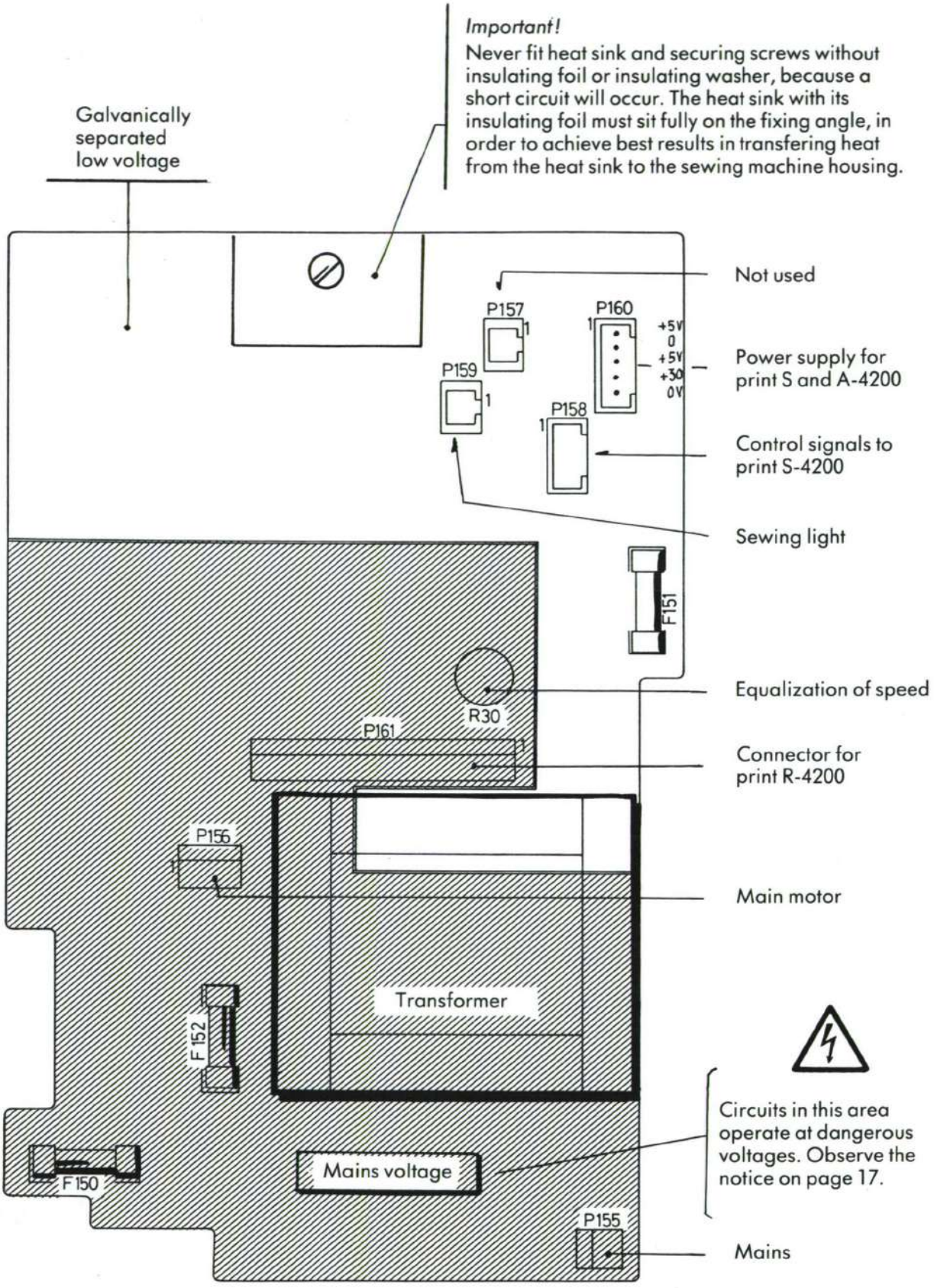


S-1230 Print



Warning!
If print S-1230 has to be replaced, then buttonhole adjustment and forward/reverse feed equalization must be carried out.

Print L-4200



Diagnostic instructions

- As opposed to model 1130, model 1230 is equipped with a service programme. The service programme is essentially designed for test and adjustment tasks.
- The diagnostic instructions should be adhered to for repair work. Reference should be made to the service programme for adjustment and equalization tasks.

Warning of dangerous voltage levels

Mains voltage (refer to print L-4200)

Circuit components on the L-4200 power print, the main motor and the cable drum, carry dangerous voltage levels. For your own safety, print L-4200 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-4200 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-4200)

Several circuit components on the L-4200 print operate with electrically isolated low voltages (40 V or less). With the exception of the power print L-4200, the main motor and the cable drum, the other modules also 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 S-1230 print, and briefly switching off the mains voltage.
- The following adjustments should be made each time a S-1230 print is replaced:

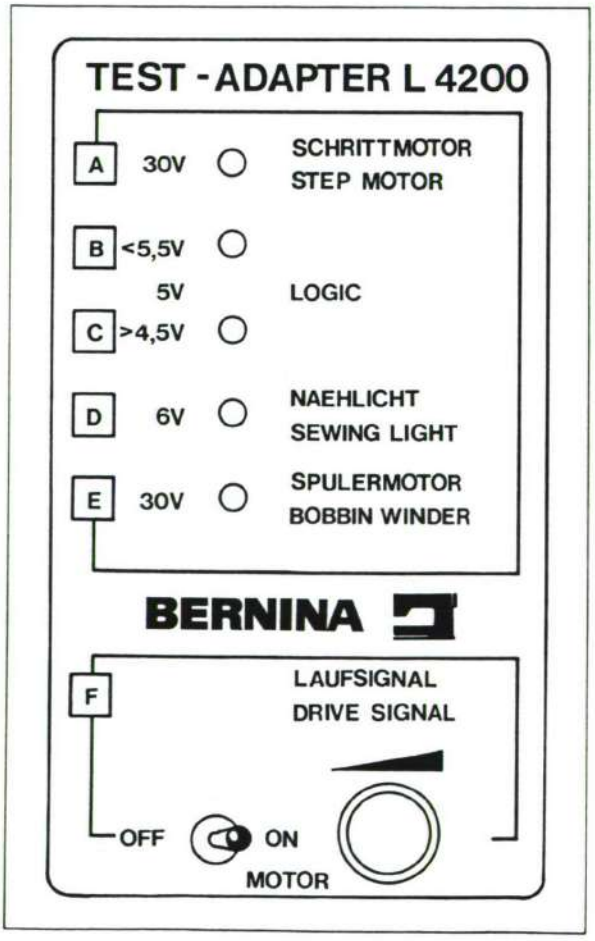
  Forward/reverse feed: test programme O
  Buttonholer: test programme P
- Switch off the mains voltage before touching and replacing the R-print.

Test adaptor L-4200

The power supply for electrical parts which are connected to print L-4200 and the main motor control are checked with the aid of the test adaptor.

- When all LEDs A to E ligth up, then the power supply for:
  - the step motors
  - the logic circuit
  - the sewing light

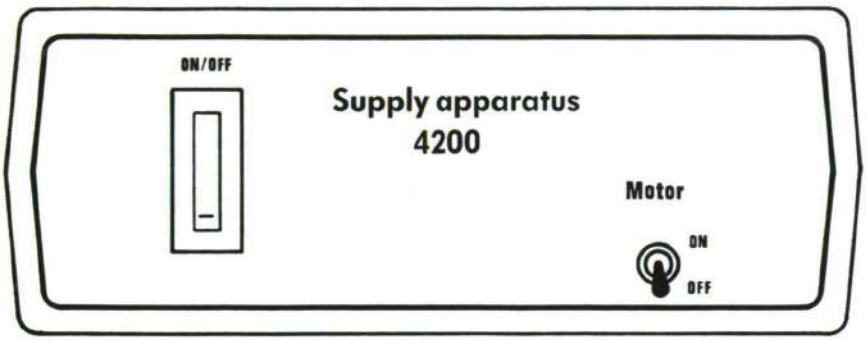
  is correct. Bobbin winder motor, LED E, *cannot* be tested.
- If only LED B doesn't light up, then the voltage for the logic is too high (more than 5,5 V).
- If only LED C doesn't light up, then voltage for the logic is too low (less than 4,5 V).
- When the motor switch is in the «on» position, the electric 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 print A-1230 and print S-1230, the step motors, the sewing light. So that the whole machine can work with a safe low voltage, the main motor receives 30 V for safety reasons.

The power supply is useful when a mechanical adjustment is to be made, for which the rigidity plate with print L-4200 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.

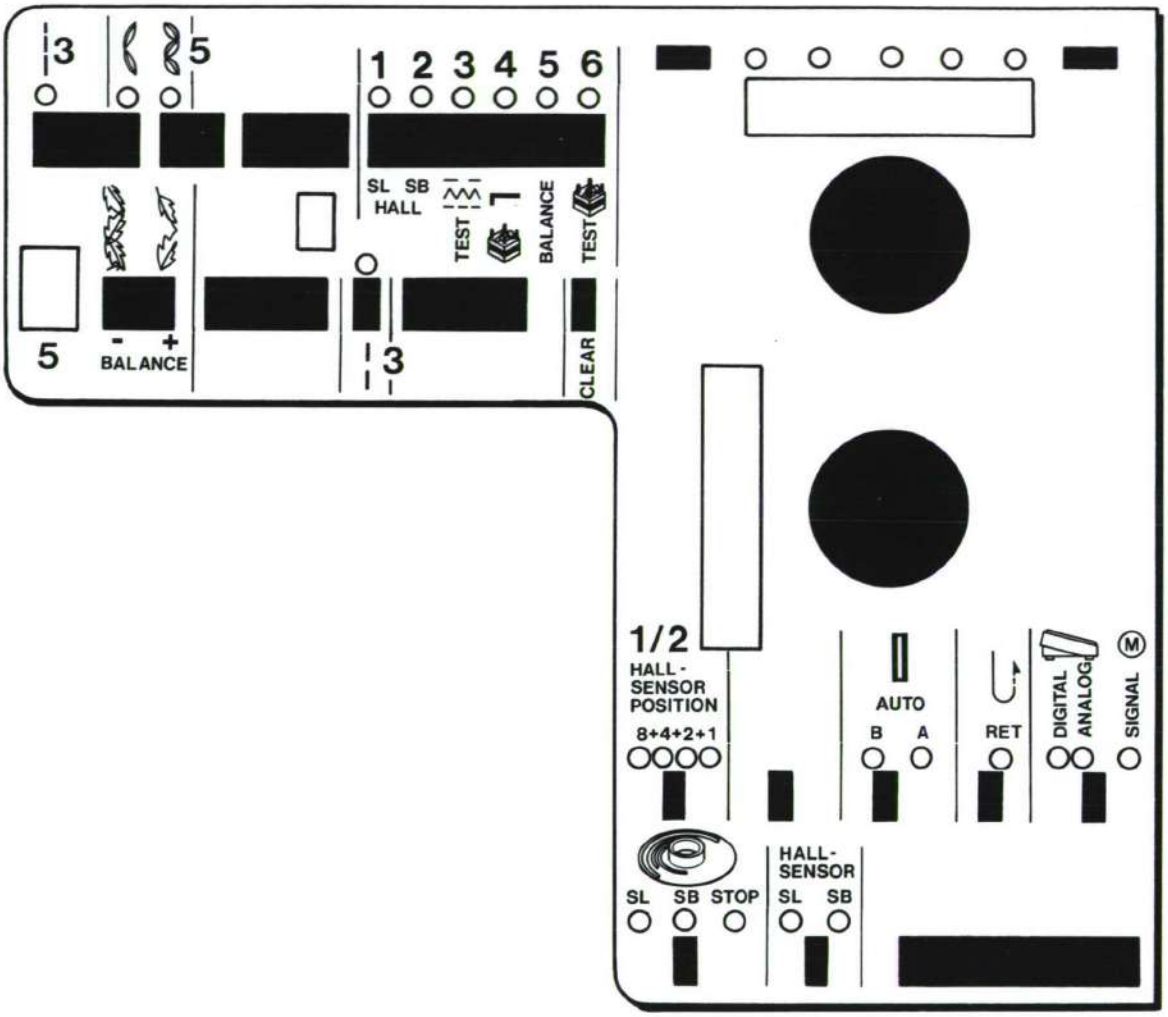
Motor switch «on», the main motor will rotate slowly.

Adaptor print with cord ist pluggable.

There is a 400 mA fuse at the rear.

Important cl. 1230:
The connection for the bobbin winder motor is not used.

Test-Panel 1230



Test-Programmes with Service-Panel

		What is to be tested	Manual 1230 page	See also service manual 1130
↑ Test-Programmes ↓	1	Hall sensor position for stitch length	28	Page 64 a (see also BERNINA Information No. 78)
	2	Hall sensor position for stitch width	28	
	3	Sewing-off (straight stitch, zigzag, long stitch and basting stitch)	37	
	4	Pinning position for step motors SL and SB	29	Section 49, resp. 53 pages 37 + 41
	5	Forward-reverse feed equalization	34	Section 41, pages 32 + 33
	6	Step motor/Hall sensors	27	Page 64
	7	Position indicator/ P-print	25	Page 62
	8	Digital / analog foot control	31	
	9	Drive signal	21	Page 58
	10	Ret button	33	
	11	Buttonholer potentiometer equalization	35	Pages 69 + 70

Buttons 1–6 Service-Programmes

Danger high level voltage!

Mains voltage (see print L-4200)

Circuits on the power print L-4200, 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-4200.

Test-programm model 1230 (service operation)

1. Test-programme start

- Remove belt cover (service instructions model 1130, section 6).
- Set service switch on the S-print into service position (refer to Fig. S-1230, page 10).
- Switch-on sewing machine / D.C. mains adaptor unit. The sewing machine is now in service programme no. 6 (step motors), move to and from with an acustical noise.
- Push clear button (min. 2 sec.).
- Mount service panel.

  The sewing machine is now in the initial state of the service operation. The individual test programmes 1 to 6 can be selected from this state. The initial state can always be selected by depressing the clear button.

The following sensor signals can now be checked:

- Position indicator / P-print (test 5 model 1130).
- Foot control digital and analog (new).
- Drive signal (partially covered in test 1, test adaptor model 1130).
- Ret button (new).
- Adjust buttonholer potentiometer (partially section 42 model 1130).

Termination of the test-programme

- Switch off the sewing machine / D.C. mains adapter.
- Bring the service switch on the S-print into the normal position.

  The sewing machine can now be operated normally.

Attention:

When changeing from normal operation – Service operation – normal operation.

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

Fault	Possible fault on	Repair instructions
Display panel and sewing light not illuminated Main motor not running Machine «dead»	– L-4200 print – Mains cable	– Test A, resp. M – Test D
Main motor does not rotate other functions OK	– L-4200 print – R-4200 print – S-1230 print – Foot control – Connection between S-1230 and L-4200 prints – Connection between S-1230 print and foot control – Main motor	– Test A, resp. M – Replace R-4200 print after switching off mains voltage – Replace S-1230 print – Check control, replace bobbin winder motor foot control, if nec. test K, L – Test C – Test E – Check motor cable and plug Replace motor
Bobbin winder motor does not function, other functions OK	– S-1230 print – Bobbin winder	– Replace print S-1230 – Replace complete bobbin winder
Sewing light does not function	– Lamps – Lamp holder – Print L-4200	– Replace lamps – Test G – Test A
Step motors do not position	– Step motor print S-1230 – Connection between S-1230 and L-4200 prints	– Test H_1, H_2 – Test C
Front panel LED does not illuminate, however selected function is executed when button depressed	Print A-1230	– Replace print A-1230

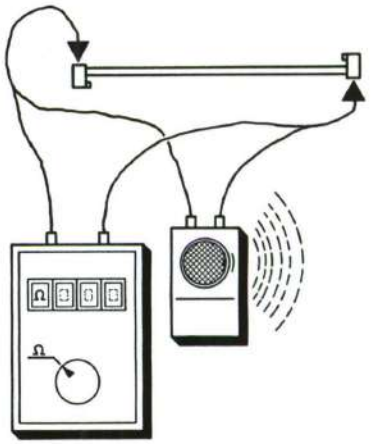
Fault	Possible fault on	Repair instructions
Selected functions not executed when button depressed	– Print A-1230	– Replace print A-1230, if malfunction still occurs, replace print S-1230. Test with new S-1230, print and old A-1230 print.
Automatic buttonholing does not function	– Buttonhole foot – Print S-1230 – Print Ret-1230	– Test P_1, P_2
Basting device does not function	– Print S-1230 – Basting device magnet	– Replace print S-1230 – Replace magnet and adjust
Reverse button does not function	– Print S-1230 – Print Ret-1230	– Start service test programme, depress reverse button, LED RET must illuminate, if not: replace print S-1230 or if nec. Ret print.
Irregular stitch width or length	– Step motor	– Test H_1, H_2
Bar graphs do not react to stitch adjustments	– Operating chassis – Print A-1230	– Check mechnical and optical parts of the rotary encoder – Replace print A-1230
Main motor stops after 5 seconds	– Print P-4200 – Print S-1230	– Test F – Replace print S-1230
No needle stop	– Print P-4200 – Print S-1230 – Print L-4200	– Test F – Replace print S-1230 – Test A
Stitch pattern no. 32 is to short or to long	– Feed equalization	– Test O

What is to be tested	What to adjust	Normal condition
Print L-4200 See also directive in Test M	Switch off mains supply – Fit safety cover – Connect test adaptor L-4200 instead of the sewing light (2-pole, green), connect connecting cable to print S-4200 (4-pole green, control signals) and connecting cable to print S-4200 (5-pole red, supply). – Set the switch on the «off» position. Switch on mains supply – Motor switch to «on» position (see also test B) – Motor switch to «off» position	 – LEDs A to D illuminate – Motor rotates. LED F illuminated. Speed can be controlled by the potentiometer. – Motor brakes. LED F no longer illuminated

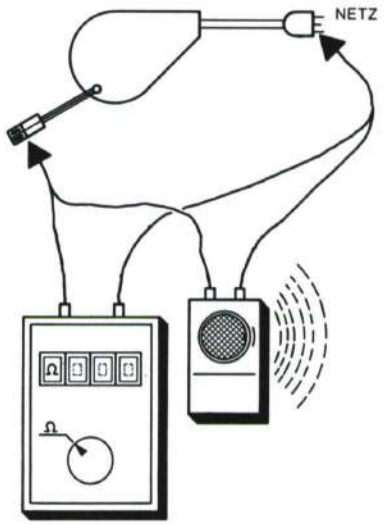
Important:
- When no lights A–D illuminate carry ont test D mains cord.
- Replace print L-4200 if one or several of the LEDs A to D do not illuminate. Before going further, test the new L-print using test 9 to determine whether the L-print failure was subsequent to failure of the S-1230 or A-1230 prints. If this is the case, then these faults should first be eliminated.
- Replace print R-4200 if the voltages A–D are available but the motor still does not run. Subsequently replace print L-4200 if the motor still does not run.

What is to be tested	What to adjust	Normal condition
Print L-4200/R-4200	– Initial state of service operation (page 17) – Select test 3 (sewing trial) – Depress foot control	– The LED «signal» is lluminated, the motor rotates.

Repair instructions: – If the LED «signal» M is not illuminated:
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 S-print, and if necessary check the cable connection L-/S-print (refer to test C, page 22).

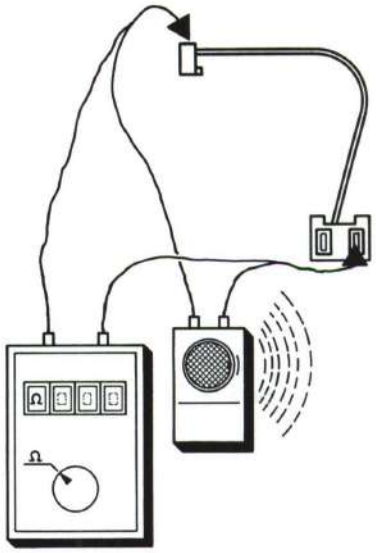
What is to be tested	What to adjust	Normal condition
Connection of print S-1230 to print 1230 to print 1230 Flat cord 5 pol, red connectors Flat cord 4 pol, green connectors	– Take out mains plug. a) Disconnect connectors from print L- and S-4200 b) Check on the upper side of the connectors with a circuit tester or ohmmeter that each wire is continuous. c) Test every wire as described in b).	 – High pitched tone! Cord ok. – Ohmmeter shows a small resitance, 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.

What is to be tested	What to adjust	Normal condition
Mains cord (cord reel)	– Take out mains plug. a) Disconnect ina plug at P155 on print L-4200. b) Connect one end of the tester to the plug, then test every wire to check that a circuit can be made.	 – Hith pitched tone! Cord ok. – Ohmmeter shows a small resistance, cord ok!

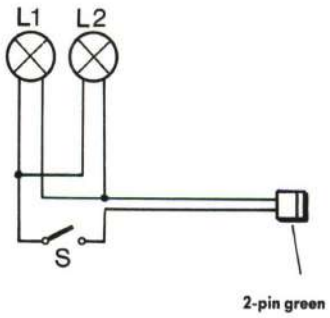
Important: If there is no high pitched tone, or the display of the ohmmeter wavers of shows infinite resitance, then the cord is defective. Replace cord reel.

Test D

What is to be tested	What to adjust	Normal condition
Connection of print S-1230 to foot control plug.	– Take out mains plug. a) Remove 2 pin black, foot control plug from print S-1230. b) On the upper connection side of the print check with the circuit maker or ohmmeter that a circuit can be made between these and the foot control plug. c) Both connections on foot control plug have to be tested as described above.	 – Hith 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.

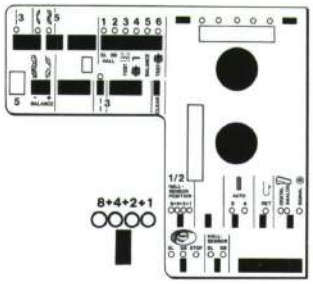
What is to be tested	What to adjust	Normal condition
Print P-4200	– Initial state of service operation (page 17) a) Using the handwheel bring needle to its zero position (lowest pos.) b) Rotate handwheel forwards and check table to the right *Important:* If the print does not function as required per the table, then repeat tests a) and b) using a new print. If there are still discrepancies then refit the old print, replace print S-1230, and repeat tests a) and b).	– LEDs SL, SB and stop not illuminated on the service panel LED SL | LED SB | LED STOP on | on | off on | on | on on | off | on off | off | on off | off | off

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

Important: If the sewing light doesn't 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 ohmmeter.
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 testes for continuity on the plug openings. Faulty parts must be exchanged.

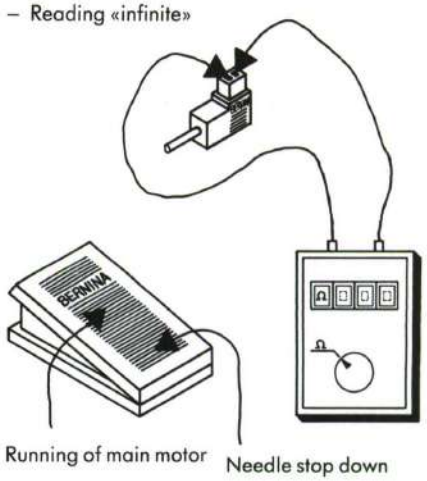
What is to be tested	What to adjust	Normal condition
Step motors, print S-1230	– Initials tate of service operation (page 17) – Select service test programme 6	– Step motors rotate back and forth, feed dog and needle bar must move
If a step motor does not rotate, then the fault can either lie with the step motor, or print S-1230. The faulty components can be identified by swapping the connections (plug P208 with P207, step motors.		
Hall sensors	– Initial state of service operation (page 17) Select service test programme 6 – Select service test programme 1 SB and 2 SL for Hall sensor position check (test H2 page 28).	– LEDs for the Hall sensors on the service panel should flash at the same frequency as the stepping motor motion
If the check LED of the Hall sensors does 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 35 to 41).		
	– Connect the removed motor and Hall sensor to print S-1230 and energize with the 4200 supply unit. – Manually slide magnet over the Hall sensor. – Select service test programme 1 for SB step motor. – Select service test programme 2 for SL step motor SL.	– LED SB must illuminate – LED SL must illuminate
If the LED does not illuminate, replace the Hall sensor and adjust the step motor to its zero position (service test programme 5, see test O).		

What is to be tested	What to adjust	Normal condition
Position Hall sensor S.L.	Initial state of service operation (page 17) Service programme no. 1	The Hall sensor position for stitch length is displayed as a binary number in the «Hall sensor position» field. The value must lie between 2 min. and 14 max. 1. Example: 8 + 4 + 2 + 1 ● ○ ● ○ ☀ ○ ☀ ○ illuminated 8 + 2 = 10 OK 2. Example: 8 + 4 + 2 + 1 ● ● ● ● ☀☀☀☀ illuminated 8 + 4 + 2 + 1 = 15 not OK
Position Hall sensor S.B.	Service programme no. 2	Same procedure as above, the value must lie between 1 min. and 7 max.



Repair guide: If the values cannot e reached then the pinion and the magnet support must be replaced. (The freeness of movement in the mechanics must be checked.)

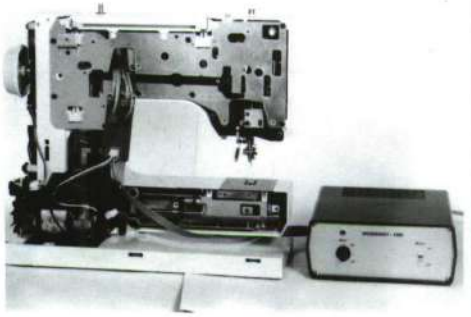
What is to be tested	What to adjust	Normal condition
Pinning position of step motors: refer to section 49, or 53 model 1130 (pages 41 and 37).	– Initial state of service operation (page 17) – Select service test programme 4	– The step motors are activated to the step position for pinning.

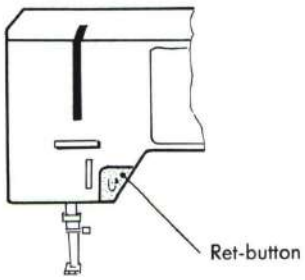
What is to be tested	What to adjust	Normal condition
Foot control	When a fault in the foot control is suspected, first carry out test L. Connect the multimeter to the foot control, and switch to the range ohms. a) Foot control not depressed.	– Reading «infinite»  Running of main motor Needle stop down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

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.

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.	– LEDs «analog and digital» are illuminated.

Repair instructions: – The s-print should be replaced if only the «analog or digital» LED is illuminated.
– The foot control is defective if neither of the LEDs is illuminated (regulater or cable).

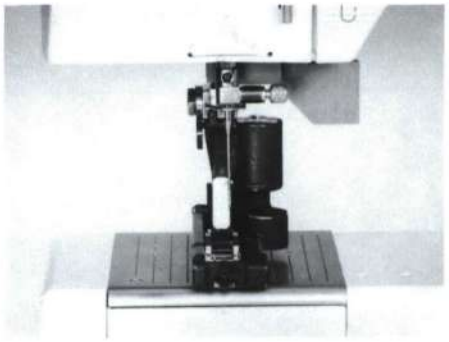
What is to be tested	What to adjust	Normal condition
Print A-4200 Print S-4200	Switch mains supply off – Connect up the 4200 supply unit to the sewing light, main motor, connecting cable to print S-1230 (4-pole green, control signals), the connecting cable to print S-1230 (5-pole red, supply). – Switch-on supply unit.	
	– Check display panel	– Bar graphs can be adjusted. For each button depressed, the associated LED illuminates.
	– Start service programme (page 17). Select service test programme 6.	– Step motors rotate back and forth. Check LEDs SL and SB flash at the same frequency as stepping motor motion.
	– Motor switch «on»	– Motor runs
Important: Print S-1230 must be replaced, and the test repeated if the display panel is not illuminated, or if step motors do not rotate. Replace print A-1230 if faults occur on the display panel. – If the motor doesn't 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.

What is to be tested	What to adjust	Normal condition
Ret-Button (Reverse button)	– Initial state of service operation (page 17) – Depress ret-button  	– LED «Ret» is illuminated

Repair instructions:

- LED «Ret» is not illuminated:
- A check should first be made as to whether the switch is being actuated. If this is not the case, then the switch activater should be mechanically adjusted (travel increased) until the switch is actuated. The following procedure shold be followed if the LED «Ret» is still not illuminated.
- Remove the P 203 6-pole black plug connection at the S-print.
- Connect new Ret-print.
- Manually actuate the switch, LED «Ret» illuminates.
- Replace Ret-print.
- Re-adjust buttonholer/potentiometer.

What is to be tested	What to adjust	Normal condition
Equalization of the forward/reverse feed. *Directive:* First of all the zero pos. of the stitch length crank must be checked (see chapter 2, page 40 Service-Manual cl. 1130).	– The stitch programmes no. 28 or no. 32 and the buttonhole are active in this programme. The forward/ reverse feed can now be equalized with the + and – buttons during sewing, and at full speed. The current selected value appears in the presser foot display (between 0 and 8). Lower values: return feed greater Higher values: forward feed greater – The neutral position is at value 4. The selected value is only then stored, when the clear button is actuated. (Normal value lies between 2 and 6).	– The stitch pattern must be correct at all speeds.

What is to be tested	What to adjust	Normal condition
– Automatic buttonholer – Print S-1230 – Print Ret-1130 – Buttonhole foot	a) Testing and adjustment – Initial state of service operation (page 17). – Select service-programme 5. – Press button for buttonholing. – 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» on print S 1230 clockwise to its endstop (LED A does not illuminate). Slowly rotate the potentiometer in the opposite direction, simultaneously sliding the carriage of the buttonhole foot until LED A just starts to flash. – Potentiometer «auto B» can now be adjusted in a similar fashion using LED B.	 Fitted adjusting filter. Attention: New filter no. 000.354.70.01

Note:
In order to allow the foot carriage to be moved easily, two smooth pieces of material should beplaced between the needle plate and the foot cariage. (Alternatively use knee lever or lifter lever to weaken the pressure of the material presser bar.)

What is to be tested	What to adjust	Normal condition
	a) Sewing a buttonhole – Press button for required buttonholer (button 13, or 14) – Depress foot control – As soon as the first bead has reached the correct length, press button for automatic buttonholer.	lights-up  – sews the first bead  lights-up – sews the first bar tack, then the second bead. – LED changes to  lights-up
	– If the two beads have been sewn with differing densities then check forward/reserve equalization using service programme 5. In normal operation a correction is possible with the balance buttons +.	– sews the second bar tack, casts over and then stops sewing. – Machine returns to initial position.

Important:
The following components should be replaced if equalization faults occur after setting potentiometer A + B, when sewing automatic buttonholes. Buttonhole foot – S-1230 print – Ret-print. Please do not forget to execute new equalization.

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

Note:
If the normal condition is not achieved then test M must be carried out first.

What to adjust	Normal condition
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 sixth stitch is sewn
Sew using automatic long stitch	Every second stitch is sewn
Sew using automatic buttonholer	Forward bead is the same length as the return bead LED «AUTO» lights up 
Stitch 1, depress foot control for a short time	Upper needle stop
Stitch 1, press lower needle stop button	LED lights up
	
Depress foot control for a short time	Lower needle stop

What to adjust	Normal condition
Rotary encoder Adjust the stitch width and stitch length with the knobs	
Turn to the right	Bar graph on the display increase
Turn to the left	Bar graph on the display decrease
To check the electrical transport equalization, sew using stitch 28	Sewn patterns must be closed
Press all function buttons and check LEDs	All LEDs should light up
Press all stitch selection buttons one after the other.	The respective LED should light up.