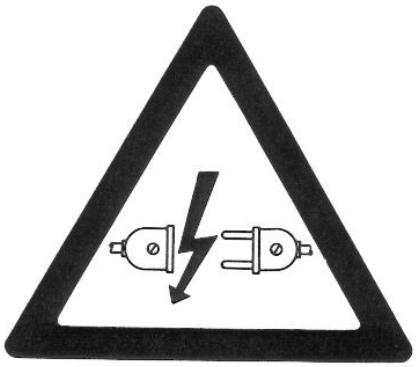
BERNINA®

Service manual

BERNINA 1530

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 The mains plug must be withdrawn before making any adjustments to the machine.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).

Impressum
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Contents

(Supplement to service manual 1130/20)

Important:

A comparison of the models 1530 and 1130/1230 is not made, as from a technical point of view, they are identical.

All gauges, instruments, adjustments etc, which are applicable to model 1130/1230 are also valid here. BERNINA has only changed the test programme which also simplifies things for you.

Operating the machine is new, and is controlled over a track-ball and an L.C.D. (Liquid Crystal Display) Screen.

The service-programme is more or less the same as for model 1230/1090.

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

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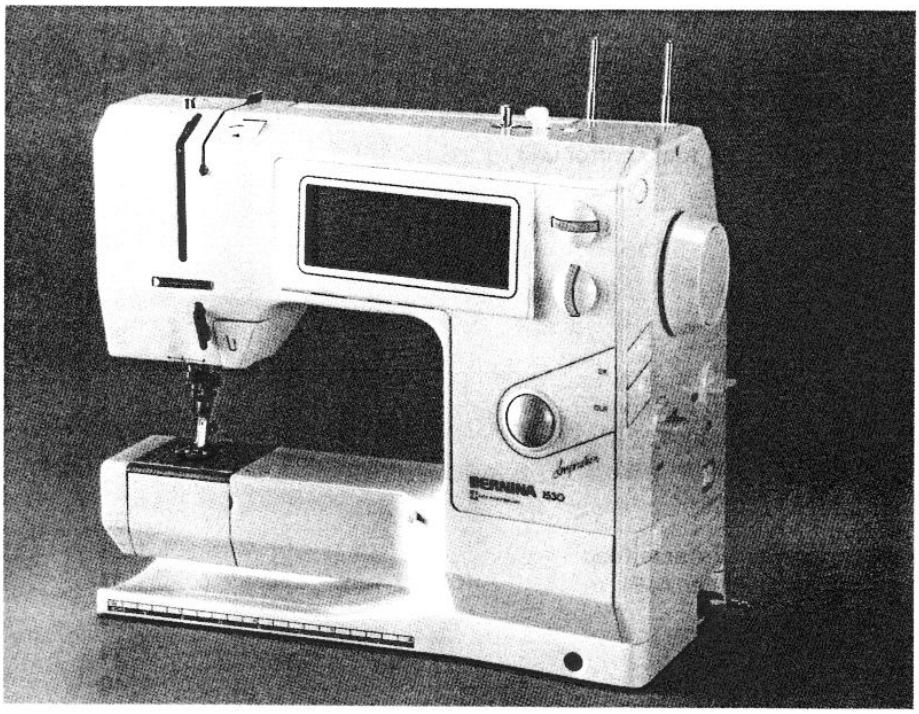


Technical data BERNINA model 1530

Stitch length max. forward 5mm
max. reverse 5mm
Increment 0-1 0,05mm
1-3 0,1 mm
3-5 0,2 mm
Max. stitch width 5,5mm
Increment 0,1mm
Needle system 130/705 H
Adjusting needle 130/705 H/TCN
Hook system BERNINA CB-Central bobbin
Presser foot height = 7,5mm
Darning foot height 0,5mm

Automatic long stitch 10mm/2:1
Basting device 20mm/4:1
Working space 105x195mm
Overall length 375mm
Overall width 184mm
Overall height 50mm
Motor 90 W
No. of stitches per/min. min.-max.120-1050/min
reduced min.-max. 120-600/min
Sewing light: bulb 2x6 V/4 W
Weight 10,5 kg

Features and functions

L.C.D. display (Liquid Crystal Display) with background lighting (adjustable)

Twin needle limiter 2-3-4mm
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
Longstitch device
Basting stitch device
Balance for forward and reverse feed
Clear button
Single pattern
Bobbin winder with seperate motor

Stitch pattern extention 2, 3, 4, and 5-times extention
Needle positions 11
Menu orientated stitch selection
18 practical stitches without reverse feed
13 parctical stitches with reverse feed
15 decorative stitches without reverse feed
86 decorative stitches with reverse feed
236 Stitch patterns
Permanent reverse sewing
Eyelett sewing programme
Sewing on a button programme
Cord reel for mains/foot control
Alphabett 2x
Number 0-9
Memory capacity 630 units
(Can be called-up even after mains failure/ interuption)

Description

Description of electronic part

The electronic part of the model 1530 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 moutned 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 may 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

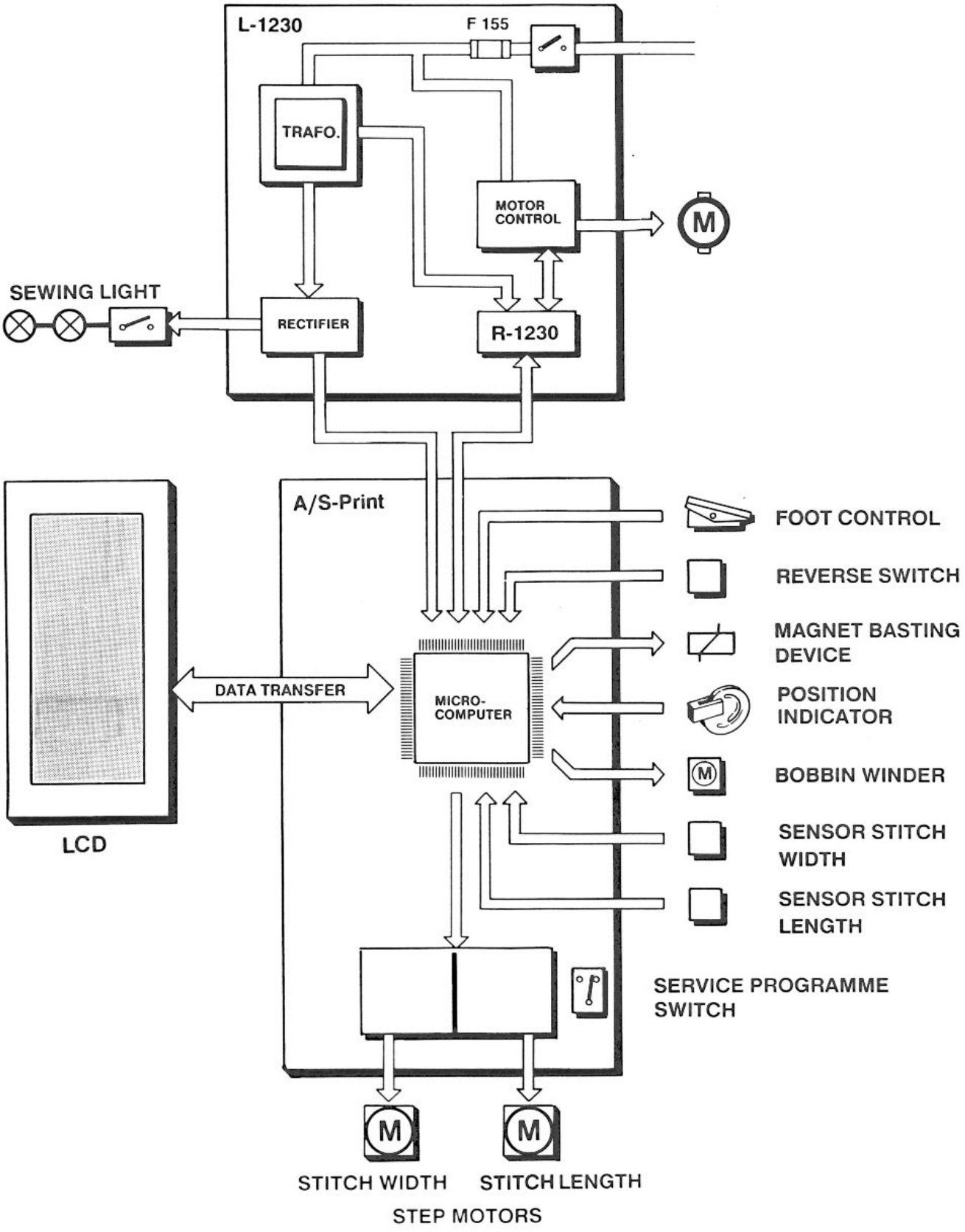
The L.C.D. (240 x 80 dot) is mounted directly behind the operationg panel, and is connected to the A/S-print with a 18-pole flat-band cable. On the L.C.D. all the stitch selection menus are displayed. By means of the track-ball which can be moved over the display, the stitches and the functions can be 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.

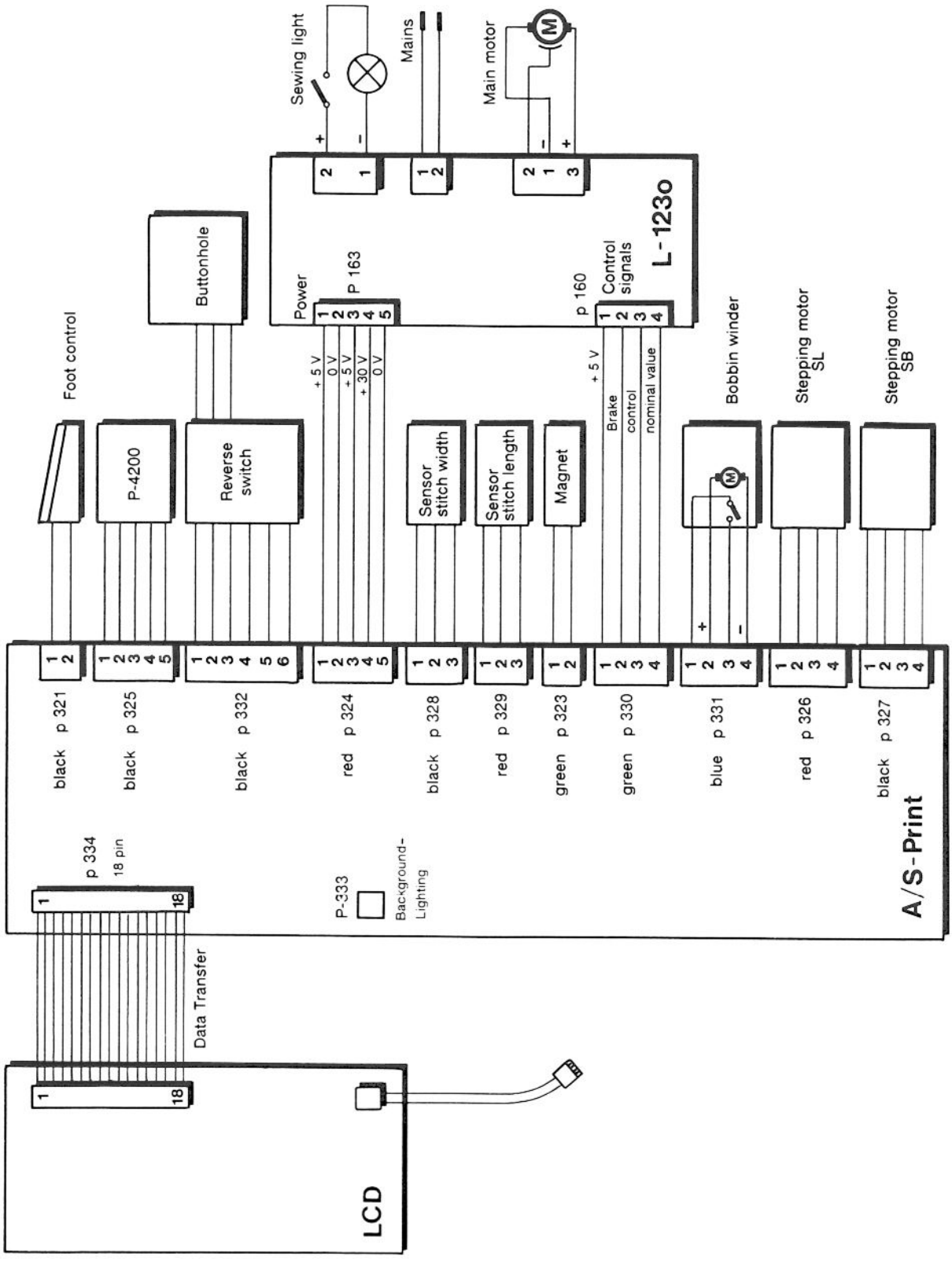
A/S-Print

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 cannot 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: Noraml 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 micro computer switches on the electric brake (by means of the R-print), and the motor is stopped very quickliy in the requried 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 micro-computer 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.

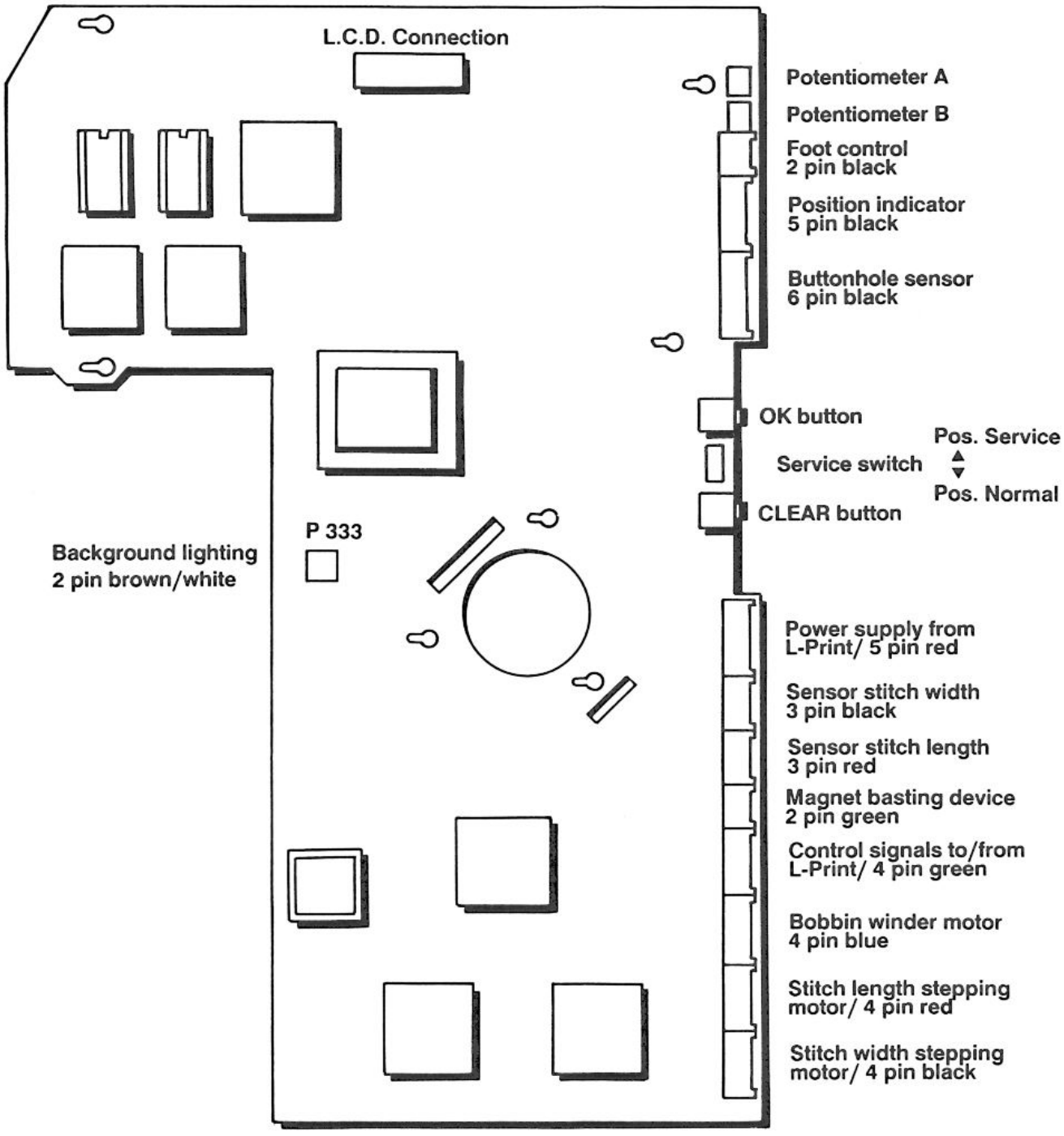
BLOCK DIAGRAM MODEL 1530



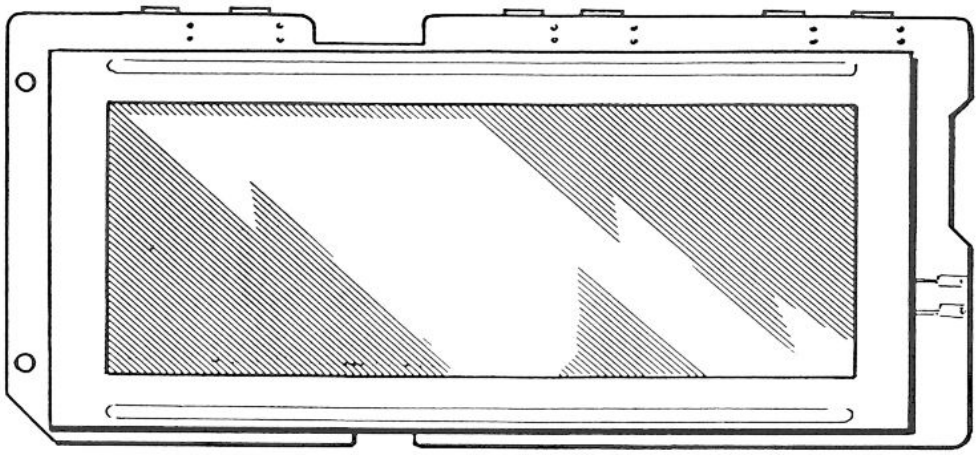
Plug connections



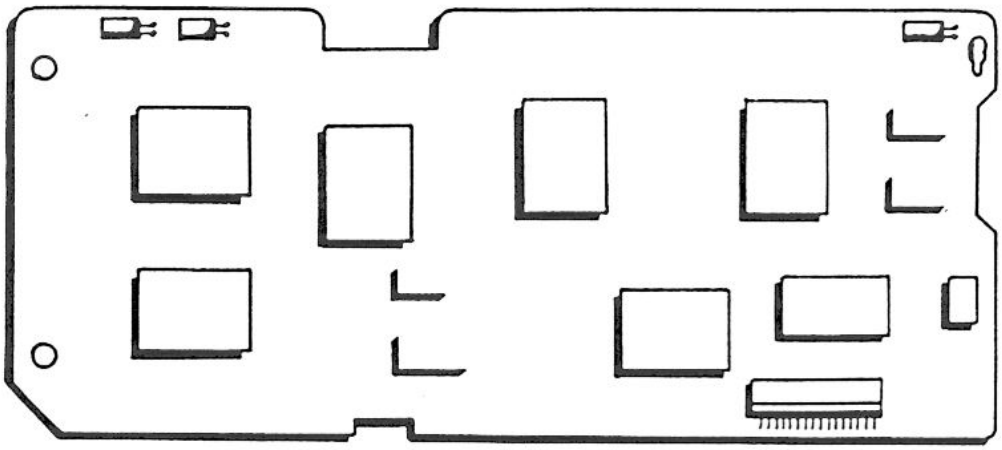
A/S-PRINT


L.C.D. Connection
Potentiometer A
Potentiometer B
Foot control
2 pin black
Position indicator
5 pin black
Buttonhole sensor
6 pin black
OK button
Pos. Service
Service switch
Pos. Normal
CLEAR button
P 333
Background lighting
2 pin brown/white
Power supply from
L-Print/ 5 pin red
Sensor stitch width
3 pin black
Sensor stitch length
3 pin red
Magnet basting device
2 pin green
Control signals to/from
L-Print/ 4 pin green
Bobbin winder motor
4 pin blue
Stitch length stepping
motor/ 4 pin red
Stitch width stepping
motor/ 4 pin black

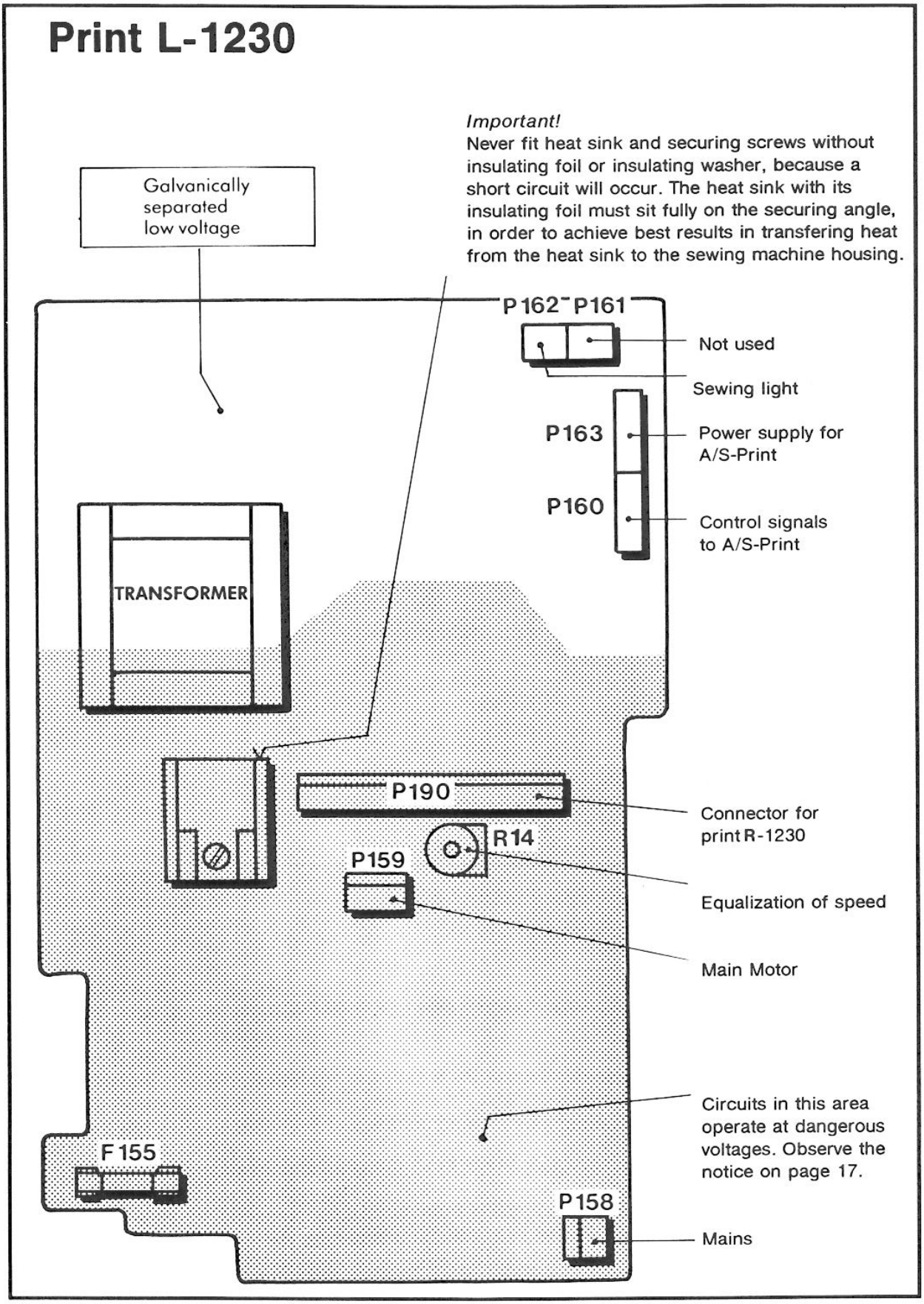
L.C.D. DISPLAY (LIQUID CRYSTAL DISPLAY)



PRINTED CIRCUIT FOR L.C.D. DISPLAY



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 the heat sink to the sewing machine housing.
Galvanically separated low voltage
P162
P161
Not used
Sewing light
P163
Power supply for A/S-Print
P160
Control signals to A/S-Print
TRANSFORMER
P190
Connector for print R-1230
R14
P159
Equalization of speed
Main Motor
Circuits in this area operate at dangerous voltages. Observe the notice on page 17.
F 155
P158
Mains

Diagnostic instructions

- As opposed to model 1130, the 1530 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-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 (40 V or less). With the exception of the power print L-1230, the main motor and the calbe 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.**

Test adaptor 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 adaptor.

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

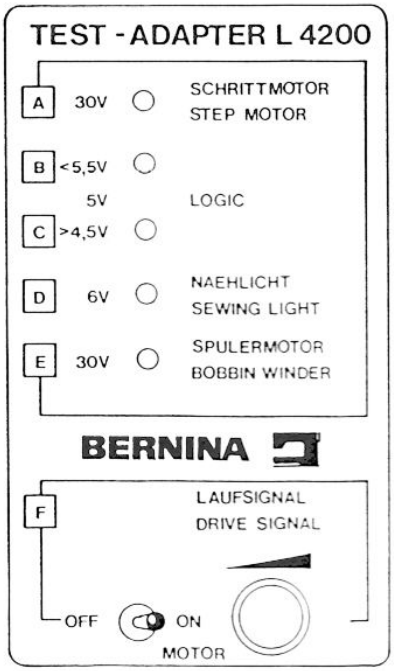
  is correct. Bobbin winder motor, LED E, *cannot* be tested.

- If only LED B doesn't light up, then the voltage for the logic is too high (more than 5,5V).

- If only LED C doesn't light up, then the voltage for the logic 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.

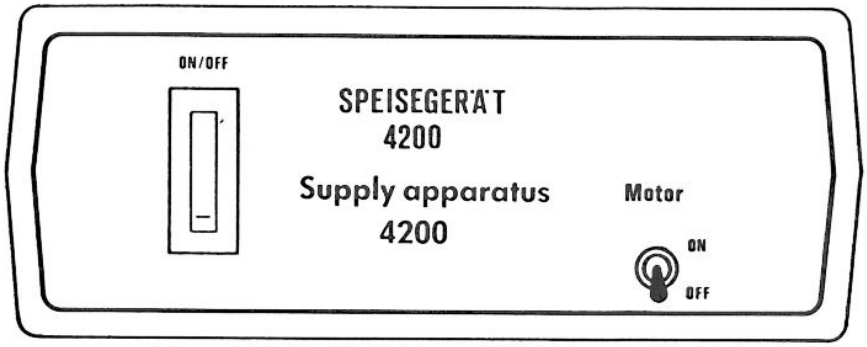
- When the motor switch is placed in the "off" position the signal returns to zero, and the electric brake should engage. The motor slows down to a stop. LED F *must* go out.



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.

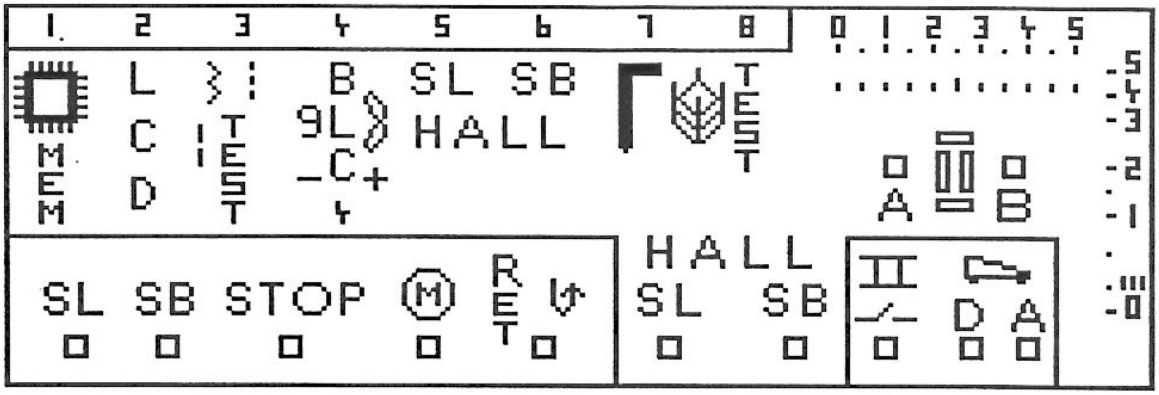
Motor switch "on", the main motor will rotate slowly.

Adaptor print with cord is pluggable.

There is a 400 MA fuse at the rear.

Important cl.1530:
The connection for the bobbin winder motor is not used.

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. 1530 Inspiration

What is to be tested		Manual 1530 page	See also service-manual 1130
1.	Memory microcomputer	20	
2.	L.C.D. Display	21	
3.	Sewing-off (straight stitch, zig-zag, longstitch).	40	
4.	Foreward/reverse feed equalization	36	Section 41, Pages 32 + 33, also BERNINA-Info No 96 and 96A.
	Buttonhole potentiometer equalization	37	Pages 69 + 70
5.	Position of Hall sensor stitch length	30	See BERNINA-Info No 78 supplement for page 64
6.	Position of Hall sensor stitch width	30	
7.	Pinning position for stepping motors SL and SB	31	Section 49, page 37 and Section 53, page 41
8.	Stepping motors/Hall sensors	29	Page 64

9.	Position indicator P-print	27	Page 62
10.	Motor drive signals	23	Page 58
11.	RET-button	35	
12.	Bobbin winder motor-switch	39	
13.	Foot control analog/digital	32	

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 1530 (service operation)

1. **Test-programme start:**
- Switch the sewing machine/D.C. adapter off
- Remove belt cover (service instructions model 1130, section6).
- Set service switch on the A/S-print into service position (lower position) refer to A/S-print, page 10.
- Switch-on sewing machine/D.C. mains adaptor unit. The sewing machine is now in service programme no. 8 (step motors), move to and from 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 8 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 (test 5 model 1130).
- Foot control digital and analog.
- Drive signal (partially covered in test 1, test adaptor model 1130).
- Ret button.
- Switch bobbin winder motor.
- Buttonhole signals A + B.
- Hall sensor SL and SB.

Termination of test programme
- Switch off the sewing machine/D.C. mains adaptor.
- Bring the service switch on the A/S-print into position "normal". The sewing machine can now be operated normally.

Attention:
When changing from normal operation-Service operation-normal operation.
- Switch machine/adapter off.
- Bring the service switch into the desired position.
- Switch machine/adapter on again.

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 - R-4123 print	- Test C, resp. N - Replace R-1230 print after switching off mains voltage
	- A/S-print	- Replace A/S-Print
	- Foot control	- Test M Test L
	- Connection between A/S-print and L-1230 print	- Test E
	- Connection between A/S-print and foot control	- Test G
	- Main motor	- Check motor cable and plug - Replace motor
Bobbin winder motor does not function, other functions OK	- A/S-print	- Test R resp. exchange switch
	- Switch bobbin winder	- Replace A/S-print
	- Bobbin winder motor	- Replace complete bobbin winder
Sewing light does not function	- Lamps	- Replace lamps
	- Lamp holder	- Test I
	- Print L-1230	- Test C
Step motors do not position	- Step motor complete	- Test $J_1 + J_2$
	- A/S-print	- Test J_1
	- Connection between A/S-print and L-1230	- Test E
L.C.D. does not illuminate	- L.C.D. complete	- Test B - L.C.D. replace

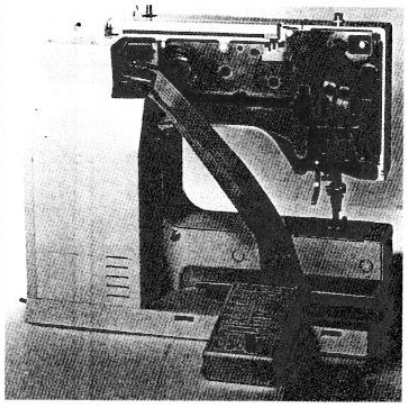
Fault	Possible fault on	Repair instructions
Automatic buttonhole not working	- Buttonhole foot - A/S-print - Potentiometer setting - RET-1230	- Test $Q_1 + Q_2$ - Test Q_1 - Q_1 - Possibly test O
Long basting stitch device does not function	- A/S-print - Long basting stitch device magnet	- Replace A/S-print - Replace magnet and adjust
Reverse button does not function	- Print RET-1230 - A/S-print	- Test O - Replace A/S-print
Irregular stitch width or 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 connections of cable - Replace cable
Stitch pattern "9" is to short or to long	- Feed equalization	- Test P

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 it's initial state. (memory of microcomputer OK).
Repair instructions: When the field "microcomputer" blinks (memory of the microcomputer defective), the A/S-print has to be replaced.		

Test A (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 - OK button can now be pressed four times, afterwards you are automatically brought back to the initial state of the service-programme	- Vertical stripes appear 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 be replaced, possibly maybe also the L.C.D. complete.		

Test B (Test-programme)

What is to be tested	What to adjust	Normal condition
Print L-1230 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 A/S-print (4-pole green, control signals) and 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.

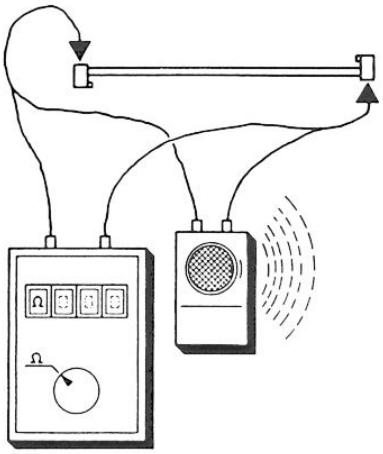
Important:

- 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.

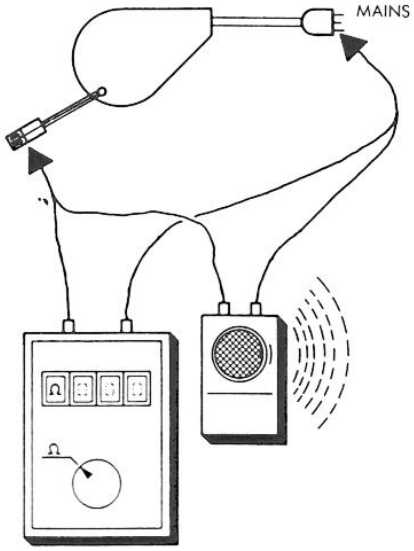
Test C

What is to be tested	What to adjust	Normal condition
Print-L-1230/R-1230	- Inital state of service operation - Select test 3 (sewing-off) - Depress foot control - Depress foot control	- The indicater under the field "M" is active, - 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 D (Service-programme)

What is to be tested	What to adjust	Normal condition
Connection of A/S-print to print L-1230.· Flat cord 5 pole, red connectors Flat cord 4 pole, green connectors	- Take out mains plug. a) Disconnect connectors from print L-1230 and A/S-print. 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 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.		

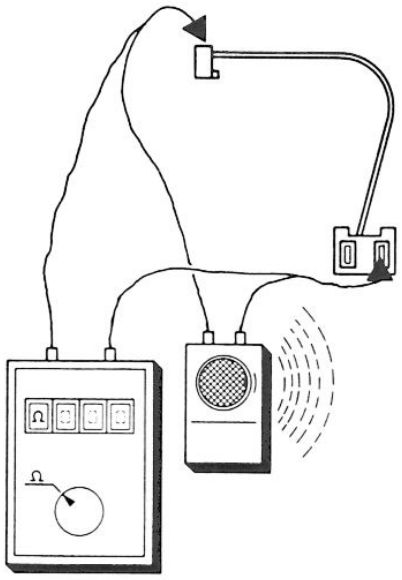
Test E

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 piched 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 F

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.

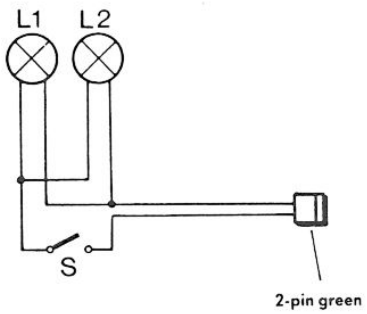
Important:

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 G

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. *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).	- SL, SB and STOP fields are active. SL / SB / STOP on / on / off on / on / on on / off / on off / off / on off / off / off □ = off (not active) ■ = on (acitve)

Test H (Service-programme)

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

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 tested for continuity on the plug openings. Faulty parts must be exchanged.

Test I

What is to be tested	What to adjust	Normal condition
Step motors, A/S-print	- Inital 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	- Inital 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 on the service 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 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).		

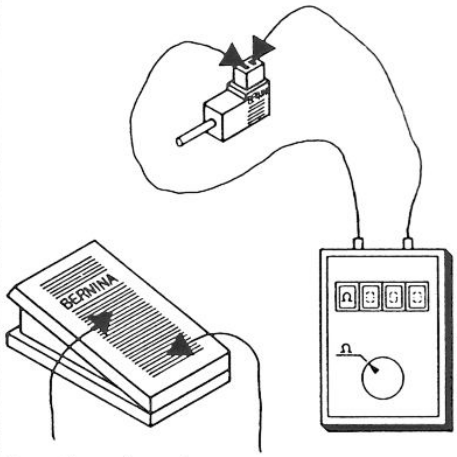
Test J_1 (Service-programme)

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

Test J_2 (Service-programme)

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). Note: Can only be used when the step motors are taken out of the machine.	- Initial state of service operation - Select service test programme 7	- The step motors are activated to the step position for pinning.

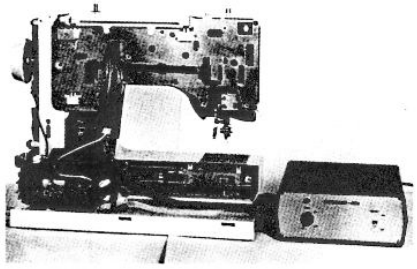
Test K (Service-programme)

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 (needle stop down). c) Depress the foot control slowly at the front.	- Reading 10 k ohm - Reading varies rom 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.		

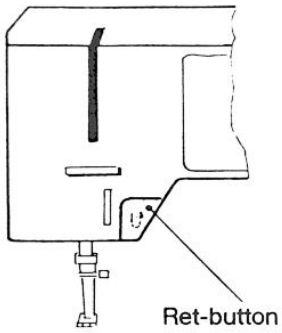
Test L

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 M (Service-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.
	- Initial state of service-programme. Select service-programme no. 8	- Step motors rotate back and forth. Fields SL and SB flash at the same frequency as stepping motor motion.
	- Press clear button	
	- Motor switch "on"	- 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.C.D. if faults occur on the display. 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.

Test N(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:

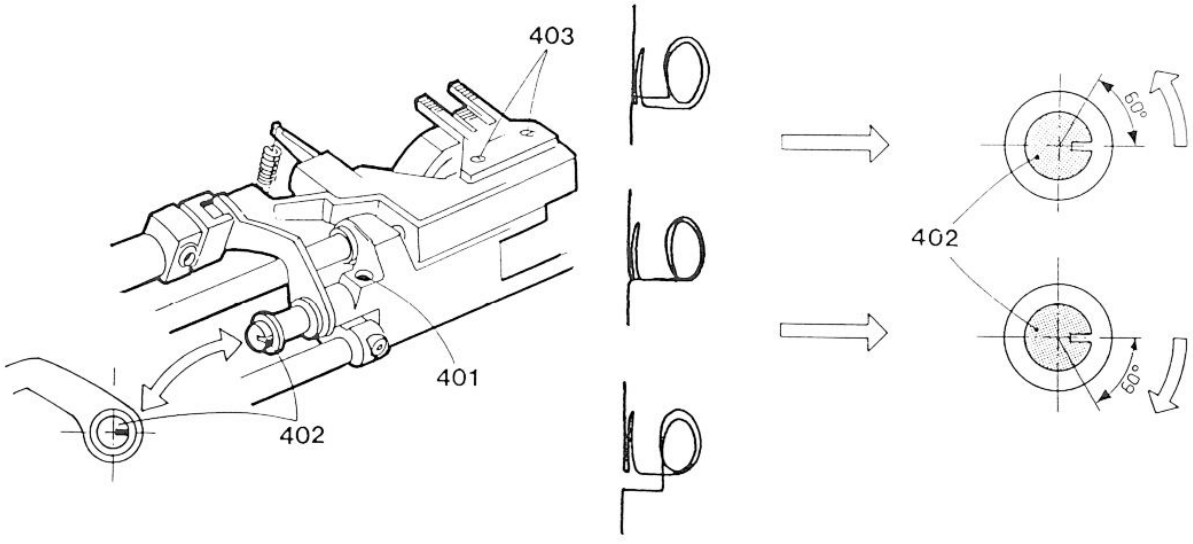
- Field "Ret" is not active:
- A check should first be made as to whether the switch is being actuated. If this is not the case, then the switch activater should be machanically adjusted (travel increased) until the switch is actuated. The following procedure should be followed if the field "Ret" is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

- Connect new Ret-print.

- Manually actuate the switch, field "Ret" is active. Replace Ret-print.

Test O (Service-programme)

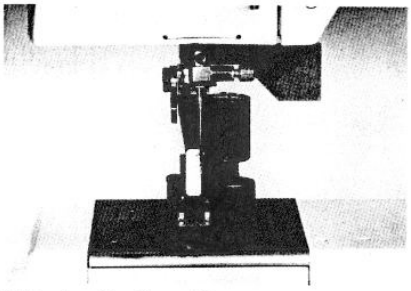
What is to be tested	What to adjust	Normal condition
Forward and reverse feed compensation.	- Select test-programme no. 4 - Set coding number to 4 - Loosen allen screw 401 slightly. - Turn the excentric pin 402 until the groove is horizontal. - Place a 2ply piece of cotton under the presser foot. - If necessary the eccentric pin 402 can be turned until the number "9" is correct.	- 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 it's centre position, and reset the feed-dog zero setting (see chapter 52 cl. 1130).

Test P (Test-programme)

What is to be tested	What to adjust	Normal condition
- Automatic buttonholer - A/S-print - Print Ret-1230 - Buttonhole foot	a) Testing and adjustment - Initial state of service operation - Select service-programme 4 - 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 a similar fashion using field "B".	- Sewing light burns.  Fitted adjusting filter.

Note:

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

Test Q_1 (Test-programme)

What is to be tested	What to adjust	Normal condition
b) 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-button	- Sews keyhole and Ist bead
		- Automatic foreward (straight stitch).
		- Automatic 2nd. bead
	- If the keyhole part is not round, then the foreward/reverse feed equalization should be checked. In sewing off without the service-programme the balance + and - can also be used.	
		- Automatic 2nd. bartack

Test Q_2 (Service-programme)

What is to be tested	What to adjuust	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 R (Test-Programme)

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

Test S (Service-programme)

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

Function-tests electronic

What to adjust	Normal condition
Rotary encoder Adjust the stitch width and stitch length knobs:	Bar graph on the display adjusts accordingly
To check the elctrical transport equalization, sew using stitch pattern "9"	Sewn pattern must be correct at all speeds
Automatic buttonholing (keyhole buttonhole)	The key hole part of the buttonhole is round

Appendix

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

A/S-print:

- Remove belt cover (section 6 cl. 1130)
- Remove cable cover (section 8 cl. 1130)
- Remove all cable plugs on the A/S-print (analog cl. 1130/1230)
- Remove the control panel (analog cl. 1130/1230)
- Remove the 7 secureing 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 secureing 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.

CONNECTION A/S-PRINT-L.C.D. DISPLAY