DÜRKOPP ADLER AG

531

CNC Knopfannähautomat
CNC Automat for Button Sewing

Bedienanleitung / Operating Instructions

Aufstellanleitung / Installation Instructions

~~Serviceanleitung / Service Instructions~~

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Foreword

This instruction manual is intended to help the user to become familiar with the machine and take advantage of its application possibilities in accordance with the recommendations.

The instruction manual contains important information on how to operate the machine securely, properly and economically. Observation of the instructions eliminates danger, reduces costs for repair and down-times, and increases the reliability and life of the machine.

The instruction manual is intended to complement existing national accident prevention and environment protection regulations.

The instruction manual must always be available at the machine/sewing unit.

The instruction manual must be read and applied by any person that is authorized to work on the machine/sewing unit. This means:

– Operation, including equipping, troubleshooting during the work cycle, removing of fabric waste,
– Service (maintenance, inspection, repair) and/or
– Transport.

The user also has to assure that only authorized personnel work on the machine.

The user is obliged to check the machine at least once per shift for apparent damages and to immediatly report any changes (including the performance in service), which impair the safety.

The user company must ensure that the machine is only operated in perfect working order.

Never remove or disable any safety devices.

If safety devices need to be removed for equipping, repairing or maintaining, the safety devices must be remounted directly after completion of the maintenance and repair work.

Unauthorized modification of the machine rules out liability of the manufacturer for damage resulting from this.

Observe all safety and danger recommendations on the machine/unit! The yellow-and-black striped surfaces designate permanend danger areas, eg danger of squashing, cutting, shearing or collision.

Besides the recommendations in this instruction manual also observe the general safety and accident prevention regulations!

General safety instructions

The non-observance of the following safety instructions can cause bodily injuries or damages to the machine.

1. The machine must only be commissioned in full knowledge of the instruction book and operated by persons with appropriate training.

2. Before putting into service also read the safety rules and instructions of the motor supplier.

3. The machine must be used only for the purpose intended. Use of the machine without the safety devices is not permitted. Observe all the relevant safety regulations.

4. When gauge parts are exchanged (e.g. needle, presser foot, needle plate, feed dog and bobbin) when threading, when the workplace is left, and during service work, the machine must be disconnected from the mains by switching off the master switch or disconnecting the mains plug.

5. Daily servicing work must be carried out only by appropriately trained persons.

6. Repairs, conversion and special maintenance work must only be carried out by technicians or persons with appropriate training.

7. For service or repair work on pneumatic systems, disconnect the machine from the compressed air supply system (max. 7-10 bar). Before disconnecting, reduce the pressure of the maintenance unit. Exceptions to this are only adjustments and functions checks made by appropriately trained technicians.

8. Work on the electrical equipment must be carried out only by electricians or appropriately trained persons.

9. Work on parts and systems under electric current is not permitted, except as specified in regulations DIN VDE 0105.

10. Conversion or changes to the machine must be authorized by us and made only in adherence to all safety regulations.

11. For repairs, only replacement parts approved by us must be used.

12. Commissioning of the sewing head is prohibited until such time as the entire sewing unit is found to comply with EC directives.

13. The line cord should be equipped with a country-specific mains plug. This work must be carried out by appropriately trained technicians (see paragraph 8).

It is absolutely necessary to respect the safety instructions marked by these signs.

Danger of bodily injuries !

Please note also the general safety instructions.

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1 Product description

The **Dürkopp Adler 531** is a CNC lockstitch button sewer. The existing button patterns are scalable and can be saved in this modified form. In addition it is possible to enter “free” stitch patterns (programming). The button sewer is fitted with an automatic sewing foot elevator, a thread cutter, a thread wiper, an electromagnetic thread tensioner and an integral DC direct drive.

Technical features:

- The sewing attachment is driven by an integral positioning drive. A DAC control unit controls not only the sewing drive but also two step motors for the X and Y movement to create the stitch geometry.
- The maximum size of the sewing area is 40 mm in the X direction and 20 mm in the Y direction.
- The thread is tensioned electromagnetically. It can be freely configured in specific areas of the stitch pattern.
- The wick is lubricated centrally for the top part and hook. Two separate oil reservoirs are available for this that are both supplied by the top container. There is only one refilling point.
- A maximum of 50 standard button patterns are available. These standard patterns can be modified temporarily (changing the overall length, width, speed). When the machine is switched off the modified values of the last used bar tack are retained when it is switched on again.
- 40 modified standard patterns can also be stored.
- There is also a maximum of 9 free stitch contours with a total of 3000 dynamically managed stitches available. Thus, for example, free button patterns can be sewn. The co-ordinates of the free stitch contours are entered on the operating panel. No other machine is required.
- 25 sewing pattern sequence programs each with up to 20 sewing patterns can be created and saved.
- The accuracy of the co-ordinate entry is 0.1 mm.
- It is possible to block special button and/or button sequence programs and/ or modifications so that unauthorized use or modification can be stopped from the technician level.
- It is possible to perform an intermediate cut without raising the button clamp so that a connection thread can be avoided.
- The control unit can respond to external signals (input) and can also output signals itself (output).
- There is a hook thread counter and a daily piece counter.
- The arm shaft on the button sewer is driven directly by a brushless direct current motor.
- Speeds of 0 min (manual operation with full functionality of the X and Y drives) up to 2700 min can be reached in 100 min steps.
- Service and maintenance work is supported by extensive test programs with which the individual functions can be tested separately.

2 Intended Use

The Class **531** is a button sewer that can be used as intended to sew light to medium weight material. Such material is normally material made out of textile fibers or leather. Such sewing materials are used in the clothing, domestic upholstery and automobile upholstery industry.

In addition it is possible that even so-called technical seams can be done with this button sewer. However, here the operator (in co-operation with **DÜRKOPP ADLER AG**) must assess the possible risks because such applications are on the one hand comparatively rare and on the other hand there is an enormous variety. Depending on the results of this assessment suitable precautions may need to be taken.

Normally only dry material must be processed with this button sewer. The material must not be thicker than 9 mm if it is to be compressed through the lowered sewing feet. The material must not contain any hard objects. The button sewer must not be operated without an eye guard.

The seam is normally created with sewing threads made of textile fibers (cotton thread, synthetic thread or braided yarns) with the following dimensions:
Class 531-211 50/3 - 120/3 thread thickness
If you want to use other threads you must also the assess risks arising from this and if necessary take precautions.

This button sewer must only be installed and operated in dry, tidy premises. If the button sewer is used in other rooms that are not dry and tidy other measures will be required that will have to be agreed (see EN 60204-31: 1999).

As a manufacturer of industrial sewing machines we assume that at least skilled operating personnel work on our product so that all the normal conditions and if necessary their risks can be assumed to be known.

3 Subclasses

Cl. 531-211

Single needle lockstitch button sewer with automatic sewing foot elevation, thread cutter and thread wiper and electromagnetic thread tensioner.
Fitted with a special button clamp for:
- laundry = button sizes of ∅ 7 - ∅ 18 mm
- DOB & HAKA = button sizes of ∅ 11 - ∅ 40 mm together with optional button shank shaper unit.

The machine has a shank button rest.

4 Additional equipment

The following additional equipment is available for the button sewer 531:

Order no.	Additional accessories
9822 51 002 6	Sewing light
9822 51 002 7	Table clamp
9870 00 102 1	K lead (socket adapter set for sewing light)
0511 59 001 4	Laser marking (3 lights)
0510 59 003 4	Additional laser light
0511 59 003 4	Manual switch
0531 36 064 4	Button shank shaper unit inc. clamping feet

5 Frame

The following supporting frame is available for the button sewer 531.

MG55 40 029 4

Frame package
Table plate size 600 x 1060 mm
Frame height 1160 to 1,305 mm

6 Technical Data

Noises: Lc = 78 dB (A)

Work place-related emission value in accordance with DIN 45635-48-A-1-KL-2
Speed: 2,700 min^{-1}
Material: G1 DIN 23328 2 layers

6.1 Technical data for the sub classes

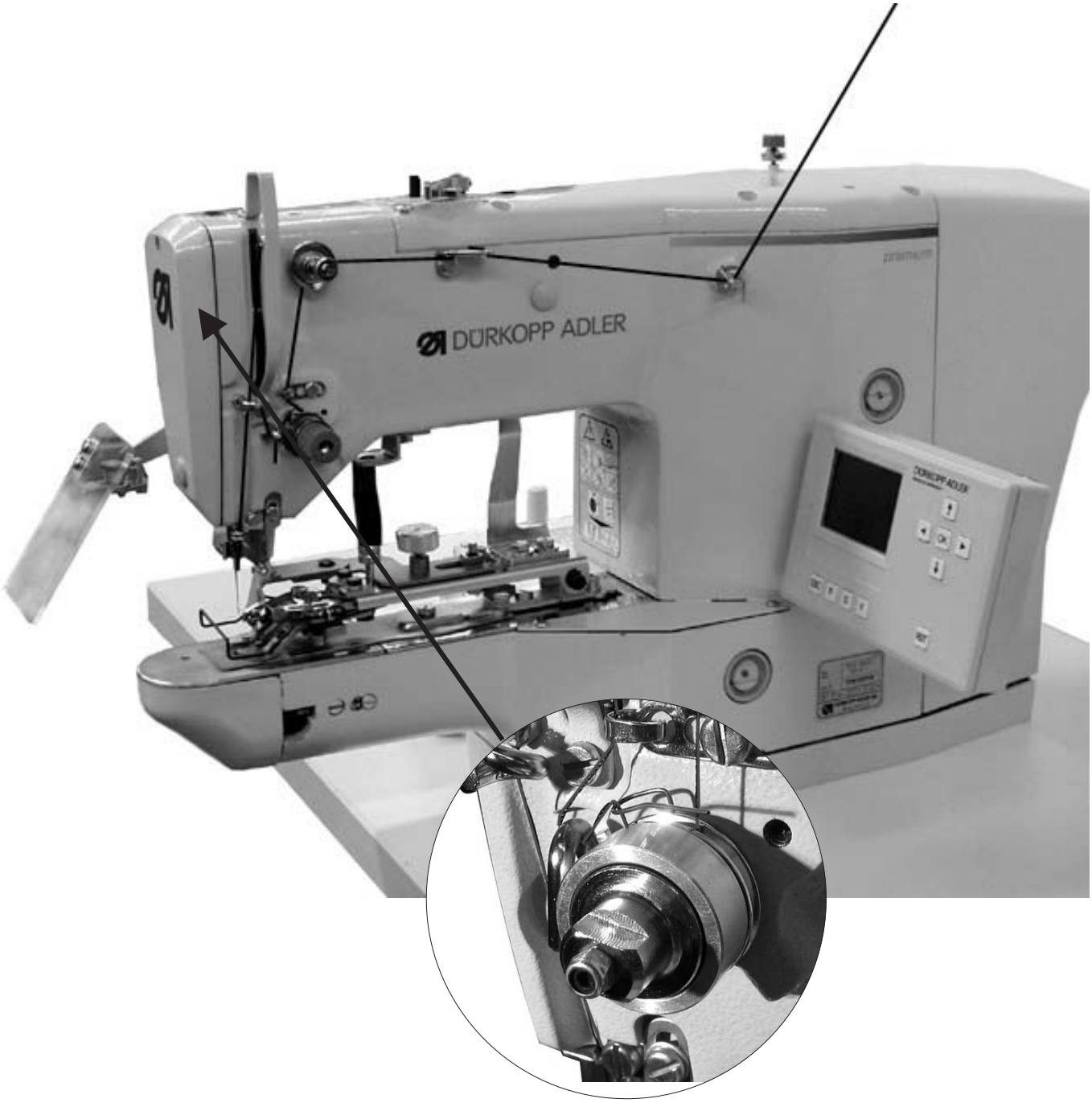
Subclass:	**211**
Sewing stitch type:	301
Hook type:	Oscillating hooks
Needle system:	DPx17 (135x17)
Needle thickness: [Nm]	80 - 110
Needle thickness standard: [Nm]	90
Thread thickness:	50/3 - 120/3
Stitch length: [mm]	Depending on seam construction
Max. speed [min]	2700
Clamp elevation [mm] On delivery maximum	9 13
Sewing area [mm] max. in X direction: max. in Y direction:	 40 20
Number of standard button patterns	50
Number of patterns that can be saved and/or modified	40
Number of sewing pattern sequence programs	25
Number of sewing patterns per sewing pattern sequence program	20
Number of free max. seam contours	9
Soft start	can be switched on and off
Sewing drive:	DC motor
Rated voltage: [V]	1 ~ 230V/ 50/60 Hz
Power rating: [kW]	0.45

7 Operation

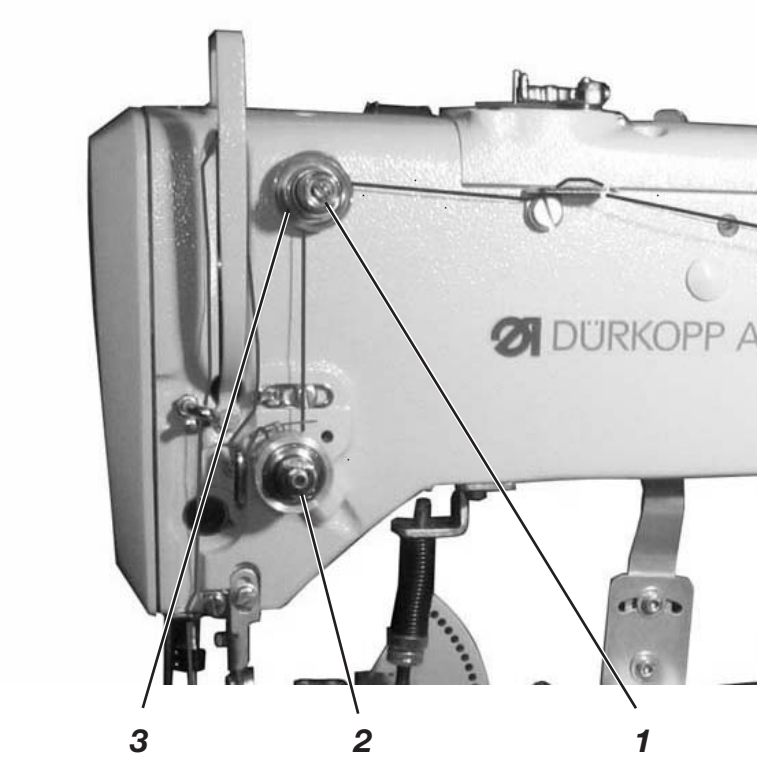
7.1 Threading needle threads

Caution, danger of injury!
Switch the main switch off.
Only thread needle threads when the button sewer is switched off.

– Put reels of thread onto the thread stand and run the needle and hook threads through the feed arm.
The feed arm must be vertically above the thread reels.
– Thread needle threads as shown in the following illustration
.



7.2 Adjusting needle thread tension



Pre-tensioning 3

When the main tensioner 2 is open a slight residual tension on the needle thread is required. The residual tension is created by the pre-tensioner 3.

At the same time the pre-tensioner 3 affects the length of the cut needle thread end (starting thread for the next seam).

– Shorter starting thread:
  Turn the knurled nut 1 clockwise.
– Longer starting thread:
  Turn the knurled nut 1 anti-clockwise.

Main tensioner 2

The main tensioner 2 must be set as low as possible.

The threads should intertwine in the middle of the material.
If the thread tensions are too great this could lead to unwanted crimping and thread tearing with thin material.

– Adjust the main tensioner 2 so that an even stitch pattern is achieved.

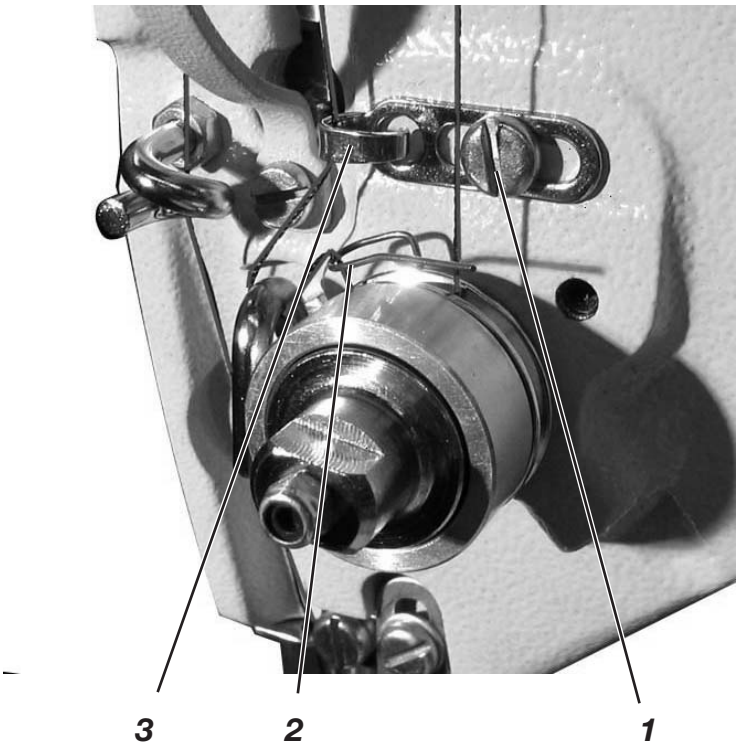
To increase tension	=	turn the knurled nut clockwise
To reduce tension	=	turn the knurled nut anti-clockwise

7.3 Opening needle thread tensioner

Automatic

The needle thread tension opens automatically when the thread is cut and when the material clamping feet are raised.

7.4 Adjusting thread regulator



Caution, danger of injury!

Switch the main switch off.

Only adjust the thread regulator when the button sewer is switched off.

The thread regulator 3 adjusts the amount of needle thread required to form the stitch.
Only a precisely adjusted thread regulator guarantees optimum sewing results.

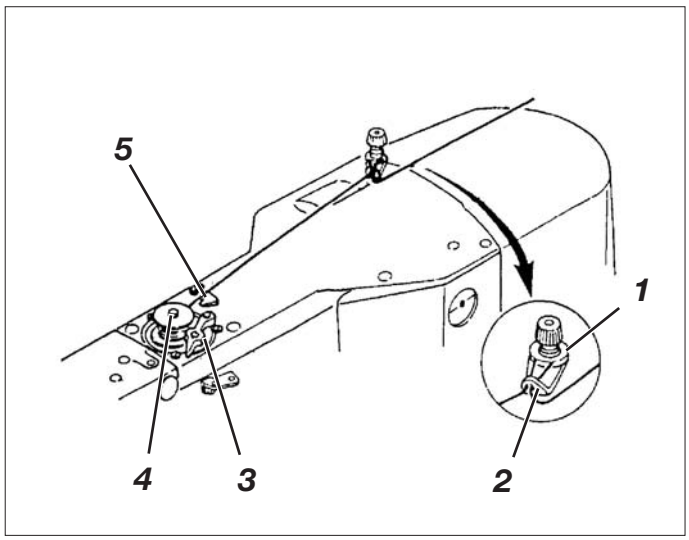
If the adjustment is correct the needle thread loop must slide over the thickest part of the hook with slight tension.

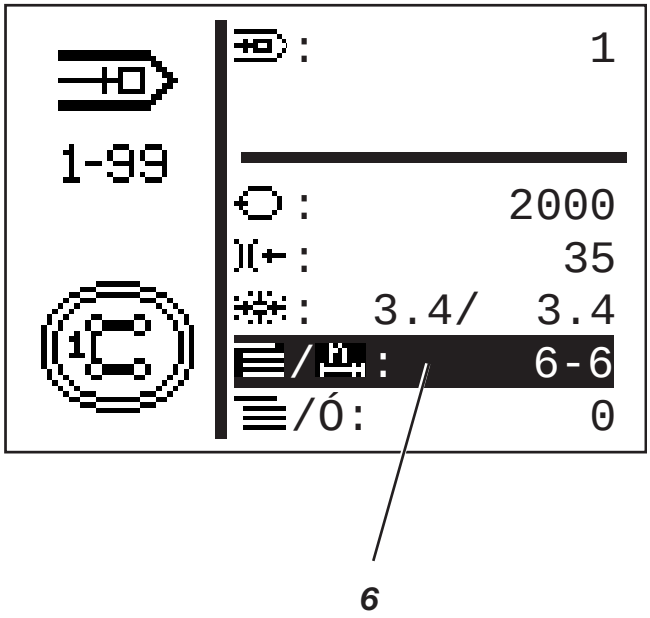
- Undo screw 1.
- Change the position of the thread regulator 3.
  Thread regulator to the left = greater needle thread quantity
  Thread regulator to the right = smaller needle thread quantity.
- Screw up screw 1.

Adjustment note:

If the greatest amount of thread is required the thread take up spring 2 must be pulled down about 0.5 mm from its final upper position. This is the case if the needle thread loop passes the maximum hook diameter.

7.5 Winding hook threads

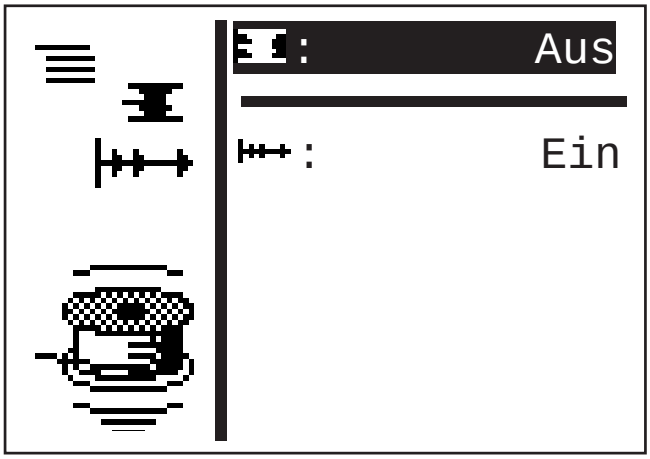




- Put the bobbin on the bobbin winder 4.
- Pull the thread through the guide 2 and round the tensioner 1 .
- Wind the thread anti-clockwise about 5 times round the coil bobbin.
- Push the bobbin lever 3 onto the bobbin.
- Sew
  The bobbin lever ends the procedure as soon as the bobbin is full.
- After winding break the thread on the thread clamp 5.

Note!

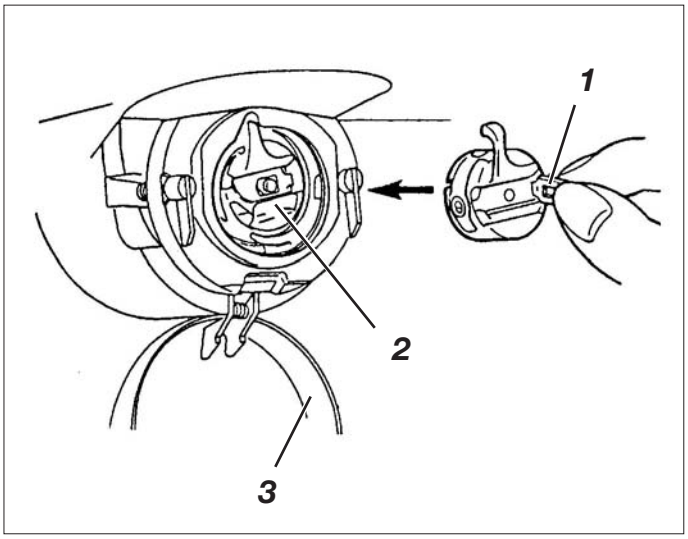
Should the thread be wound without sewing
the thread winding mode can be switched to in the “Special functions” sub menu.

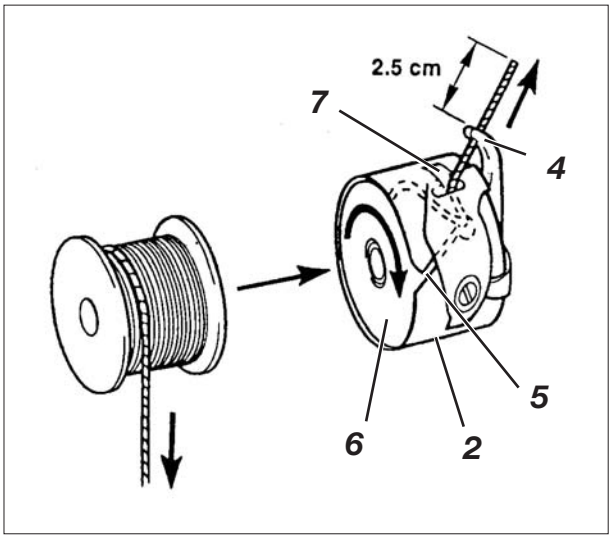


When the thread winding mode is switched on the sewing motor can be started with the pedal or the manual switch regardless of the sewing area drive (here unthread threads on the thread lever).

For settings see Section 8.5.1 “Thread winding mode”.

7.6 Changing hook thread bobbin





Caution, danger of injury!

Switch the main switch off.

Only change the hook thread bobbin when the button sewer is switched off.

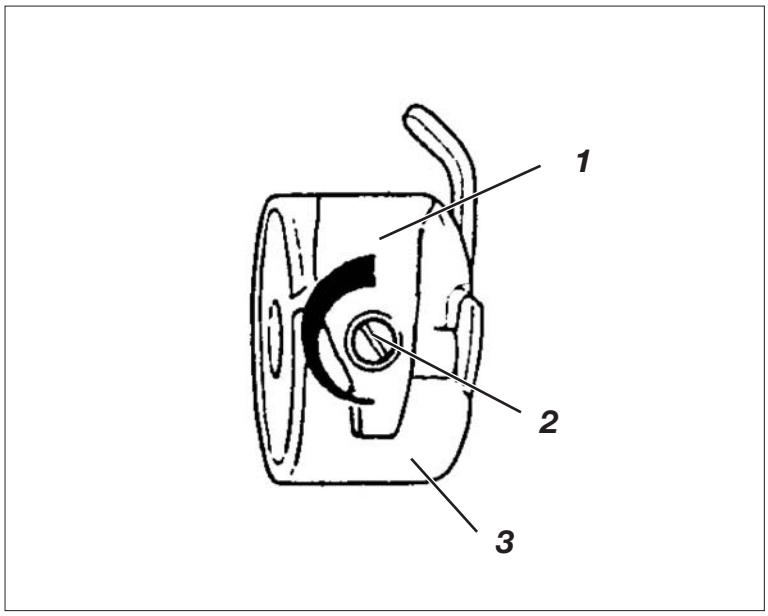
Removing the empty bobbin

- Pull the hook cover 3 downwards.
- Lift up the bobbin case latch 1.
- Remove bobbin case 2 with bobbin 6.
- Take the empty bobbin out of the bobbin case 2.

To insert a full bobbin

- Insert a full bobbin into the bobbin case 2.
- Thread the hook thread through slit 5 under the tensioning spring 7 into the hole 4.
- Pull about 2.5 cm of hook thread out of the bobbin housing. The bobbin must turn in the direction of the arrow when the thread is being pulled out.
- Replace the bobbin case 2.
- Close the bobbin case latch 3.

7.7 Adjusting hook thread tension



Caution, danger of injury!

Switch the main switch off.

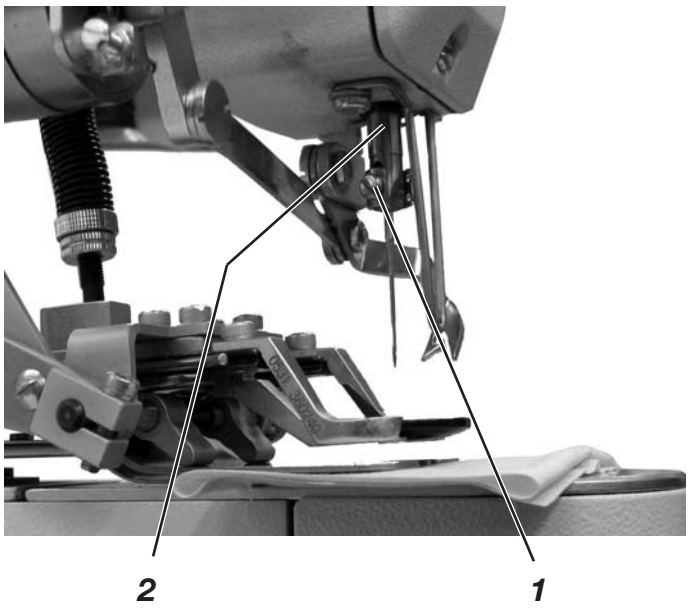
Only adjust the hook thread tension when the button sewer is switched off.

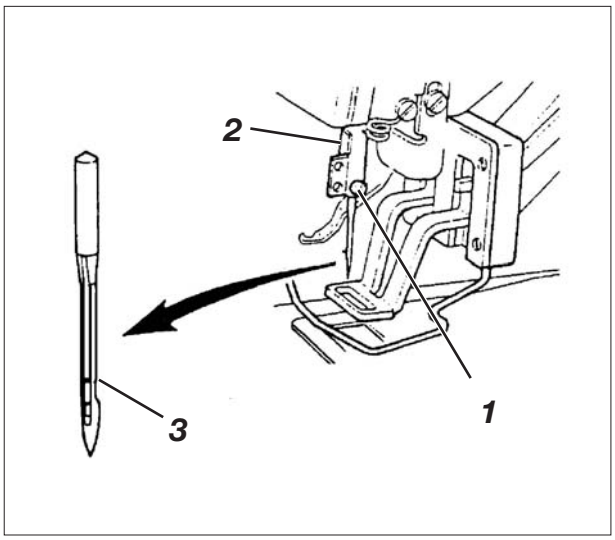
The required hook thread tension should be created by the tensioning spring 1. The bobbin case 3 should drop slowly under its own weight if the threaded hook thread is to be held fast.

Adjusting the tensioning spring

- Remove the bobbin case 3 and the bobbin.
- Change the tensioning spring 1 with the adjustment screw 2 until the required tension is reached.
- Replace the bobbin case.

7.8 Changing the needle





Caution, danger of injury!

Switch the main switch off.

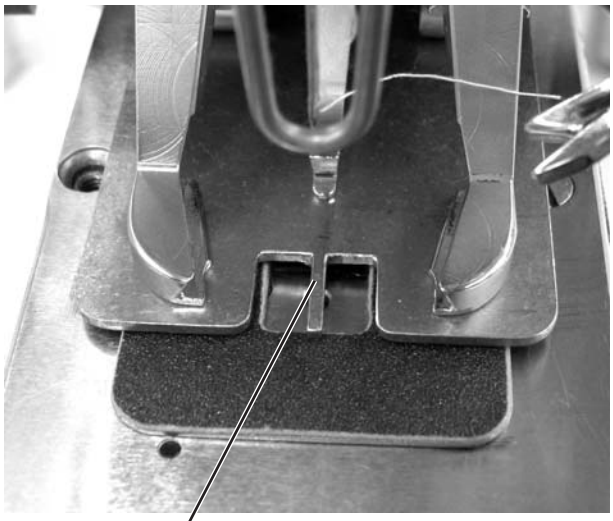
Only change the needle when the button sewer is switched off.

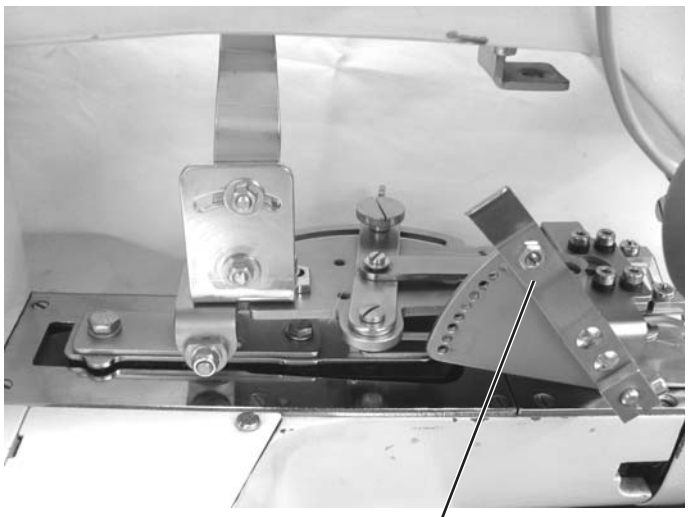
– Undo screw 1.
– Push the new needle into the hole in the needle bar 2 until it can go no further.
  CAUTION!
  The hollow channel 3 on the needle must point towards the hook.
– Screw up screw 1.

CAUTION!

After changing to a different needle thickness the distance between the hook and the needle must be adjusted (see Service instructions).

7.9 Button shank shaper (optional)





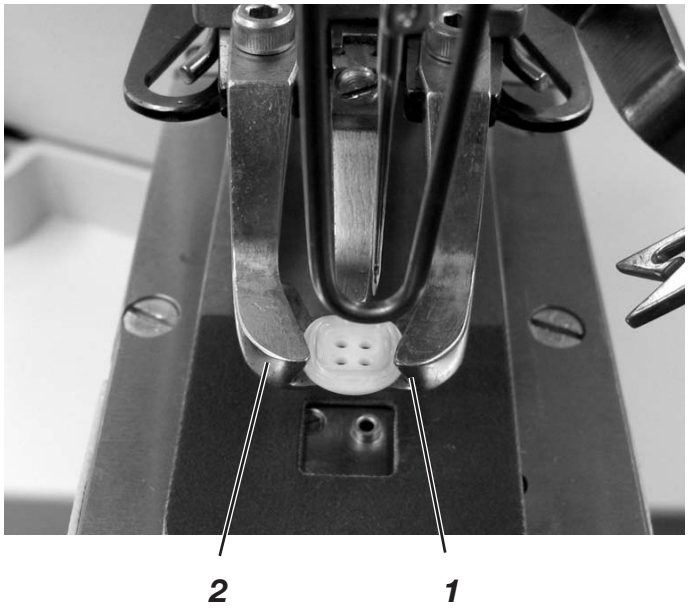
The button clamp on the button sewer is fitted with a button shank shaper 1.

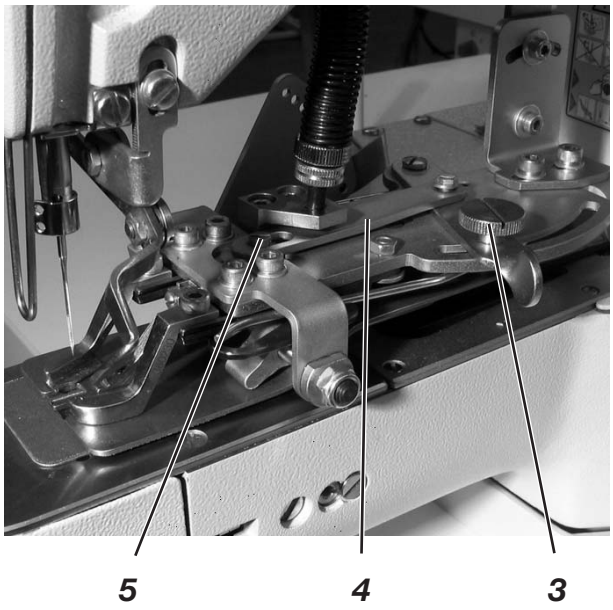
Setting the shank length

– To change the setting of the button shank shaper 2:

  downwards = shank becomes shorter
  upwards = shank becomes longer.

7.10 Adjusting the button clamp hook feet





Caution, danger of injury!

Take great care when adjusting the button clamp when the button sewer is switched on.

The button should be pushed as lightly as possible between the hook feet on the button clamp and can be aligned.

But the button must be securely clamped so that it cannot turn when it is inserted into the material.

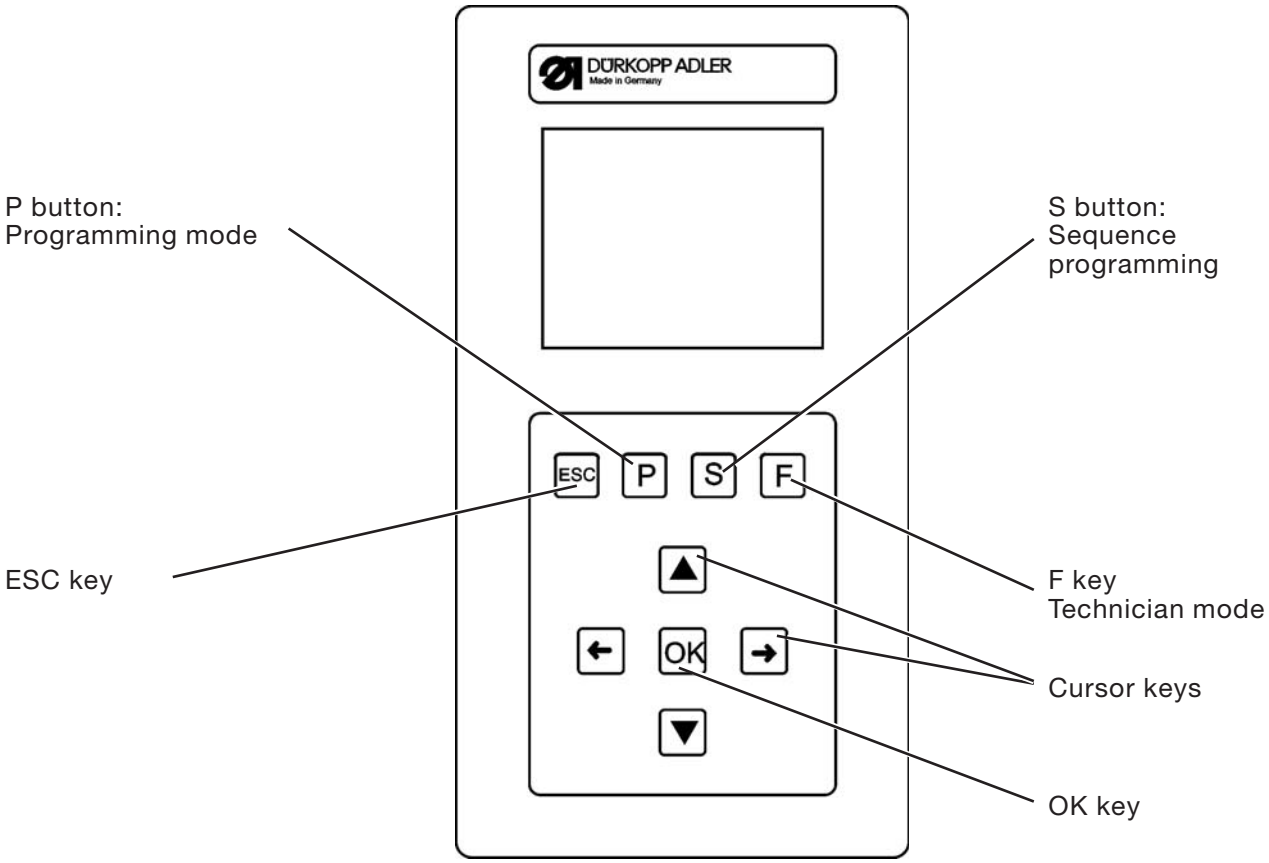
Stop 4 adjusts the amount the hook feet open.

- Switch the button sewer on.
  The button clamp lifts up.
- Put the button to be sewn on between hook feet 1 and 2.
- Undo knurled nut 3.
- Move the stop towards the screw 5.
- Tighten knurled nut 3.
- Check whether the button can be inserted easily and aligned.

8 Operating the control unit 531

8.1 The operating terminal

An operating terminal with an LCD display and function buttons is used for entering and outputting data.



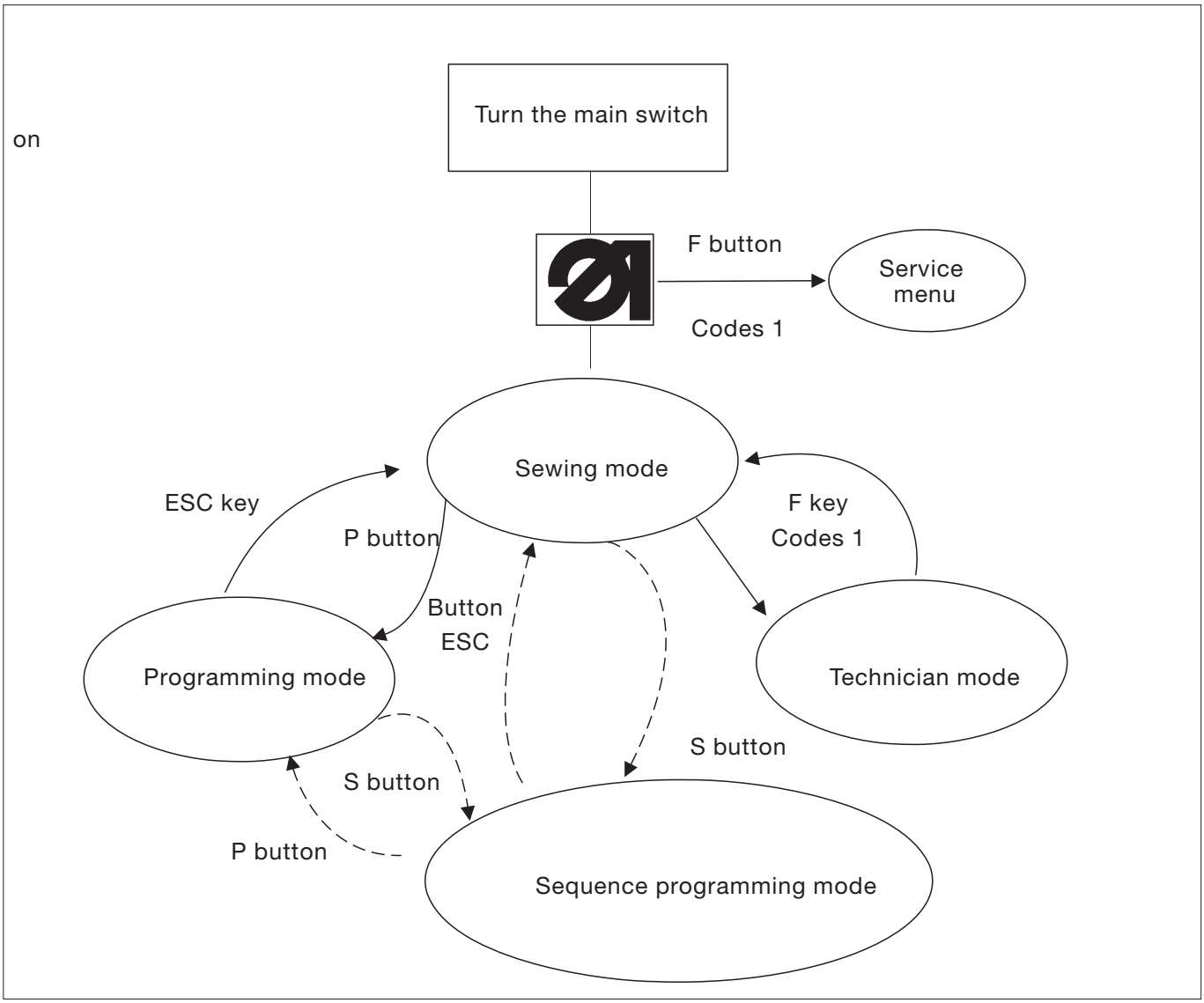
8.1.1 The buttons

Function button	Function
Cursor keys 	**If no input field is selected:** Press "⇦" to get back to a sub menu in the higher menu. **If an input field is selected:** Switch between the positions (not when selecting the sewing pattern or sequences). **In sewing mode with sequence mode**: Switch to the next or previous sewing pattern.

Function button	Function
	**If no input box is selected:** Switch between the rows in the menus. The selected line is shown inversely. **If an input field is selected:** Increase or reduce the value of the relevant position by one or with functions with several alternative options switch between the parameters.
OK button 	**If no input field is selected:** Select the input field. The value can be changed with the "⇧ " and "⇩ " keys. **If an input field is selected:** The set value will be applied. **If the clamping foot has been lowered by pressing OK + F:** The test sequence starts.
ESC button 	**If the test functions have started (Multitest / 180° disc):** You go back to the selection menu. **If an input box has been selected:** An entry is cancelled. The previous value is retained. A**t technician, programming level** The control unit switches to sewing mode. **In sewing mode** raise clamping foot and cancel sewing procedure.
P button 	The control unit switches from sewing mode to programming mode. In this mode changed stitch patterns can be saved under a new program number.
S button 	The control unit switches from sewing mode or sewing pattern programming mode to the sequence programming mode. In this mode new sequences can be created or existing ones modified.
F button 	The control unit switches from sewing mode to technician mode. This mode can only be selected by entering a code. In this operating mode basic machine parameters can be set and diagnosis and setting programs can be called up.

8.2 User interface

8.2.1 Menu structure



Calling up the service menu

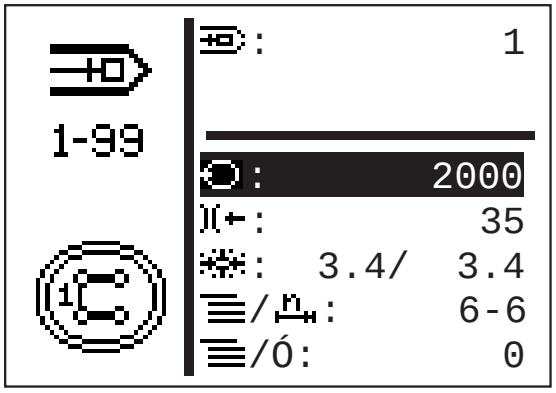
- Press F and hold it down.
- Turn the main switch on.
  The control unit is initialized.
  After a short time the window to enter the number code appears.
- Enter the number code (Code 1 see Section 8.6.4).
  The display changes to the service menu (see Section 8.6.4.3).

Calling up technician mode

– Switch the main switch on.
  The control unit is initialized.
  The sewing menu appears on the screen.
– Press “**F**” .
– Enter **Code 1** (see Section 8.6.4).
– Press “**OK**” .
  The display changes to technician mode.

8.3 Changing number and parameter values, alternative selection

8.3.1 Changing number values



– Select the required row by pressing “⇧” or “⇩”.
– “Press **OK** .
  The selected number value is indicated by a flashing cursor.
– Press “⇦” or “⇨” to toggle between the places.
  Press “⇧” or “⇩” to increase or reduce the value of the selected position.
– “Press **OK**.
  The value currently set is applied

or

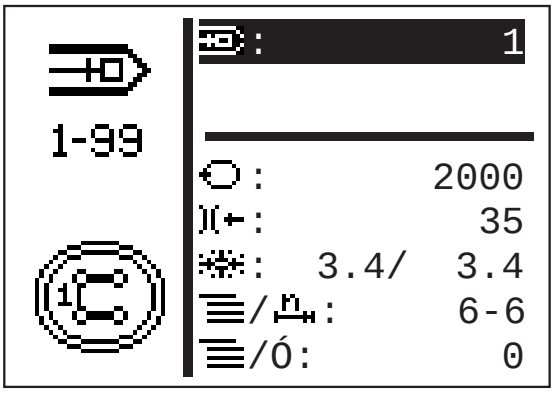
– “Press **ESC**.
  The original value is retained.

Note

All values can only be changed within the minimum and maximum values.

8.3.2 Selecting a parameter

With some parameters it is possible to select settings that cannot be modified.



– Select the required row with the parameters to be changed by pressing “⇧” or “⇩”.
– Press **OK**.
– Press “⇧“ or “⇩” to switch between the specified options.
  Example:
  Sewing pattern number.

– Press **OK**.
  The parameter currently set is applied.

or

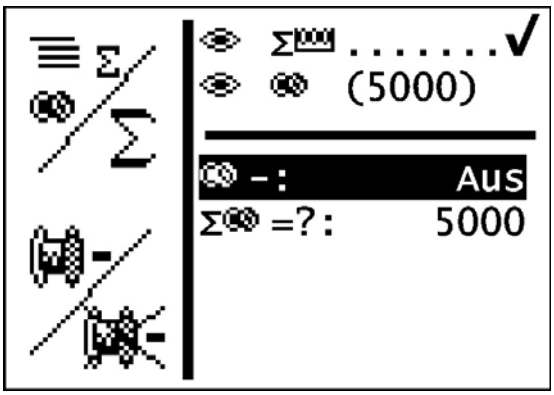
– “Press **ESC**.
  The original parameter is retained.

8.3.3 Alternative selection

Some menu items can be selected as an alternative to each other. The current selection is indicated by a tick (...✓).

When selecting another alternative the mark on the current selection is cancelled and the new menu item is indicated.

Items that can be selected as an alternative are visually separated from the other menu items by a dividing line.



8.4 Sewing pattern

There are three different sewing pattern types available for the button sewer 531.

- Fixed standard sewing pattern (type 1) (See section 11)

  The length, width and sewing speed parameters can be changed in sewing mode. The laser marking lights can be switched on and off. The changes are saved.
  After selecting another sewing pattern the changes are lost, however.
  Sewing pattern numbers 1 - 50 are available for this sewing pattern that cannot be deleted or overwritten.

- Programmable sewing pattern (type 2)

  Fixed standard sewing patterns can be changed at programming level (length, width, sewing speed, laser light 1 - 8) and saved under a new program number.
  Sewing pattern numbers 51 - 90 are available for this sewing pattern that can be changed or overwritten.

- Free seam contours (type 3)

  Sewing pattern numbers 91 - 99 are available for these seam contours. How to create free seam contours is described in Section 8.6.5.4.
  The length, width and sewing speed parameters can be changed in sewing mode. The laser marking lights can be switched on and off. The changes are saved.
  When another sewing pattern is selected the changes are lost, however.

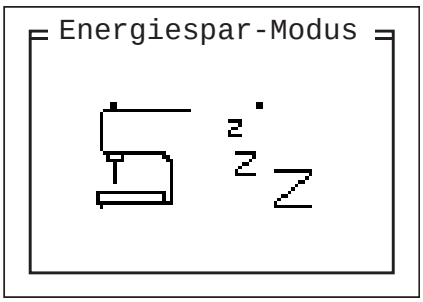
- 25 sewing pattern sequence programs each with up to 20 sewing patterns for each sewing pattern sequence program can be created and saved.

8.5. Energy saving mode

The energy saving mode is selected after a time that can be set (1 - 60 minutes) or switched off completely (0 minutes) by using t5 in the *Machine configuration/times*menu.

When this is selected the clamping foot is lowered to save energy and thus reduce the amount of heat developed too.

The set time expires if no user entries are made via the control panel, pedal or manual switch.



Before selecting the energy saving mode the message flashes twice as an indication that the clamping foot will be lowered immediately. Then the message stays on the screen.

Normal mode is enabled again. The clamping foot is raised and the message deleted if the user makes an entry using the control panel, pedal or manual switch.

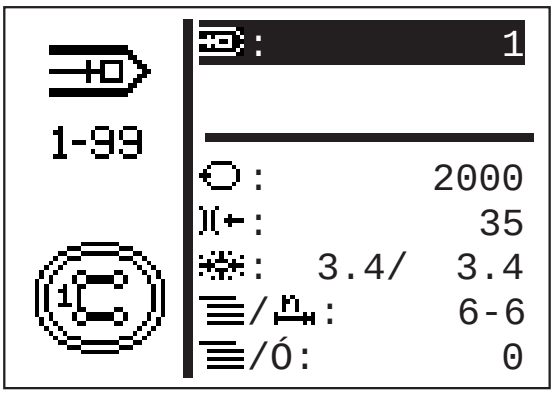
The machine is now ready for operation immediately.

8.6 Main menu

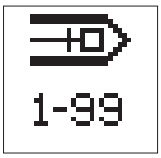
8.6.1 Sewing pattern mode

The parameters for the individual sewing patterns are arranged in the main menu.

The sewing patterns can be changed with these parameters.

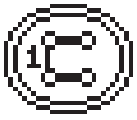


– Switch the main switch on.
  The control unit is initialized.
  The main menu appears.
– Select the required parameters by pressing “⇧” or “⇩”.
  The symbol for the selected parameters is shown inversely.
– Change the selected parameters as described in Section 8.3.



Menu item

The symbol at the top left of the screen describes the currently selected menu item.



Button image

The symbol at the bottom left of the screen shows the current button pattern.

Sewing pattern

The sewing pattern to be sewn is selected with these parameters.

Selection: 1 .. 51 (52 - 99 if available)

Speed

The required speed is set with these parameters.

Enter: 0 - 2700 rpm

Overstitch thread tension (see Table 1)

The thread tension for overstitches is set with this menu item.

Enter: 0 ... 100 0 = lowest thread tension
100 = highest thread tension

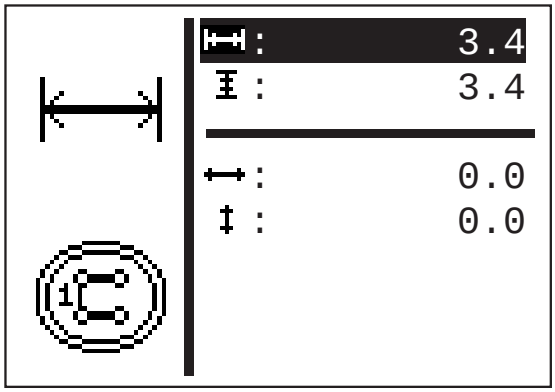
The thread tension magnet sets the thread tension in accordance with the current value so that this can be checked.

If the fixing stitches are active (only with sewing pattern programs), the thread tension values in all other areas (see Table 1) of the sewing pattern is changed too depending on the difference from the previous value.

With standard sewing patterns (1 - 50) the thread tension in the different areas is not set separately. If this is necessary a sewing pattern program must be created.

Sewing pattern size/ sewing pattern offset sub menu

Switch to this sub menu to set the sewing pattern size of the sewing pattern offset. The current sewing pattern size is shown in the X and Y direction.



Sewing pattern width
Setting the sewing pattern width
Enter: 0.1 ... 40 mm

Sewing pattern length
Setting the sewing pattern length
Enter: 0.1 ... 20 mm

Sewing pattern offset in X direction
To set the sewing pattern offset in the X direction
Enter: -20.0 ... +20.0 mm

Sewing pattern offset in Y direction
To set the sewing pattern offset in the Y direction
Enter: -10.0 ... +10.0 mm

Sub-menu

There is a sub menu behind this symbol.

Number of stitches

With standard sewing patterns this menu line displays the overstitch distribution with the standard sewing patterns and the total number of stitches with the free contours (cannot be changed).

Selecting the line by pressing "**OK**" takes you to the "Special functions" sub menu.

Daily unit counter or capacity counter sub menu.

Selecting the line by pressing "**OK**" takes you to the "Daily piece counter or the capacity counter" sub menu.

Resetting the daily piece counter

– Press "⇧" or "⇩" to switch to the menu item.
– Hold "**OK**" down for 3 seconds until the number displayed goes back to 0.

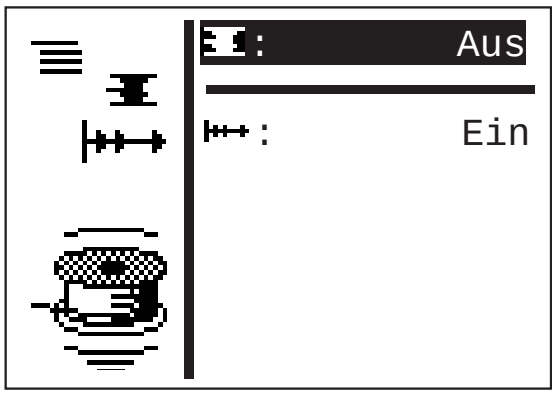
The daily piece counter can also be reset in this way if the capacity level is displayed. However, the value does not go back to 0.

or

Capacity counter

Selecting the line by pressing "**OK**" takes you to the "Daily piece counter or the capacity counter" sub menu.

Special function and soft start status sub menu



Thread winding mode

The hook thread winder can be operated separately.
The sewing motor can be started with the pedal or manual switch regardless of the step motors if ON is set.

Enter: ON / OFF

Winding hook thread bobbins:

With the pedal

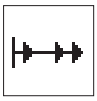
– Move the pedal forwards (position 2).
  The sewing motor starts.
– Move the pedal back.
  The sewing motor stops.

Using the control panel

– Press “**F**”.
  The sewing motor starts.
– Press “**ESC**”.
  The sewing motor stops.

With manual switch (optional)

– Press switch 2.
  The sewing motor starts.
– Press switch 1.
  The sewing motor stops.

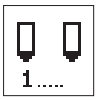


Soft start

The soft start can be switched on or off with this parameter.

Enter: ON / OFF

Laser marking lights sub menu (optional)



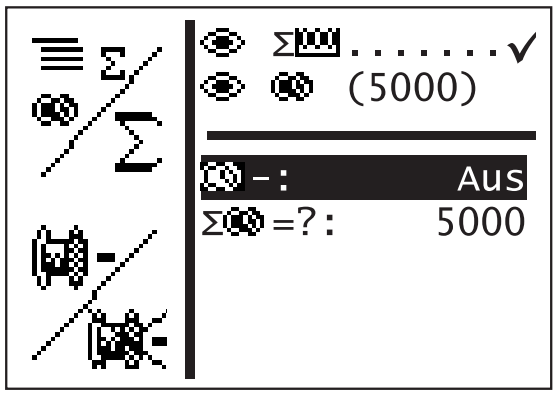
This menu item is only displayed if the laser light option is switched on in the Fittings menu (see Section).

Laser lights 1 ...3

Switching the laser marking lights 1 - 3 on or off

Enter: ON / OFF

Daily piece counter or capacity counter sub menu.



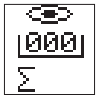
Alternative display of daily piece counter or capacity counter.

Both counters work in parallel.
The counter that is to be displayed in the main menu can be selected.

- The daily piece counter counts the number of sewing patterns sewn
  Display: 0 ... 65000
- The hook thread counter works backwards.
  When the value 0 is reached and a sewing procedure starts a message appears.
  Display: 9999 ... 0

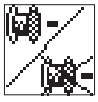
– "Press **ESC** .
  This switches back to the main menu.

If the daily piece counter is set the following appears:



Daily piece counter display in sewing mode
Enter: Select by pressing OK.

Capacity counter display in sewing mode
Enter: Select by pressing OK.



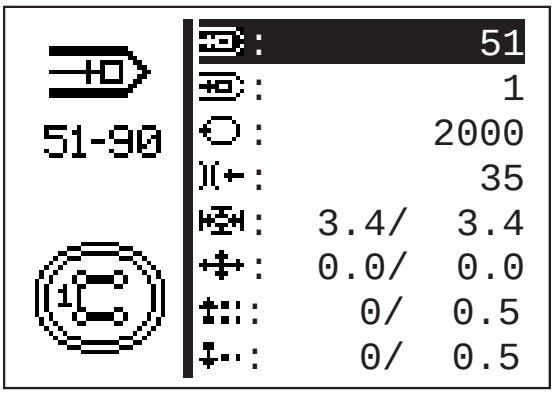
Capacity counter on/off
Enter: ON / OFF

Initial capacity counter value
Enter: 0 ... 9999

8.6.2 Programming mode

The parameters for programming sewing patterns are arranged under this menu item.

The shape, length, width and speed etc. of the sewing pattern are entered using the parameters.



– Switch the main switch on.
  The control unit is initialized.
  The main menu appears.
– When the main menu appears press **P**.
  The display switches to the programming mode display.
– Select the required parameters by pressing "⇧" or "⇩".
  The symbol for the selected parameters is shown inversely.
– Change the selected parameters as described in Section 8.3.

Sewing pattern number

The sewing pattern number that is to be created or changed is selected using this parameter.

When creating a new program an asterisk (*) is displayed before the number.

Enter: 51 ... 90

– Select the required sewing pattern program by pressing "⇧" or "⇩".
– "Press **OK**.
  The program is selected.

Basic sewing pattern

A default sewing pattern can be selected with this parameter. The new sewing pattern is to be created based on this.

Enter: 1 ... 50 or
91 ... 99 if available.

Sewing speed

The required sewing speed is set with this parameter.

Enter: 0...2700 rpm

Thread tension sub menu

Switch to this sub menu to set the thread tension.
The values displayed correspond to the thread tension in area 2 (overstitches).

Securing stitch sub menu

Switch to this sub menu to change the parameters for the securing stitches. The current values are displayed (number/ distance between the stitches).

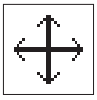
Interloop stitch sub menu

Switch to this sub menu to change the parameters for the interloop stitches. The current values are displayed (number/ distance between the stitches).

Distance between button holes sub menu

Switch to this sub menu to set the distance between button holes in the X and Y direction see Page 25).

Display: current distance between button holes X/Y



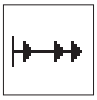
Sewing pattern offset sub menu

Switch to this sub menu to move the sewing pattern in the X and Y direction (see Page 25).

Display: current X offset/ Y offset

Stitch distribution/ number of stitches

Displays the overstitch distribution (with standard sewing patterns) or total number of stitches (with free contours).

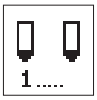


Soft start

The soft start can be switched on or off with this parameter.

Enter: ON / OFF

Laser marking lights sub menu (optional)



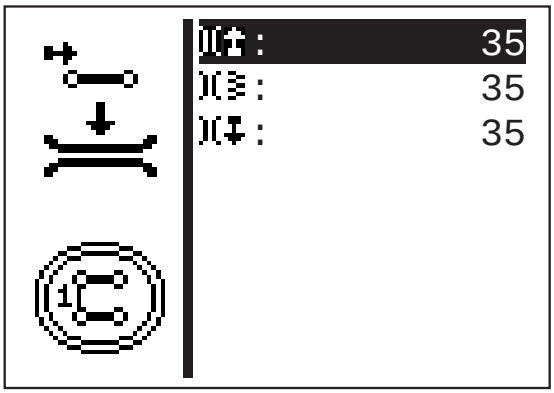
This menu item is only displayed if the laser light option is switched on in the Fittings menu.

Laser lights 1 ...3

Switching the laser marking lights 1 - 3 on or off

Enter: ON / OFF

Thread tension sub menu



Thread tension for securing stitches

The thread tension for securing stitches is set with this menu item. This menu item is only displayed if 0 is not set for the number of securing stitches.

Overstitch thread tension

The thread tension for overstitches is set with this menu item.

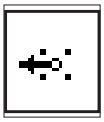
Interlooped stitch thread tension

The thread tension for interlooped stitches is set with this menu item. This menu item is only displayed if 0 is not set for the number of interlooped stitches.

Thread tension area 2 ... 4

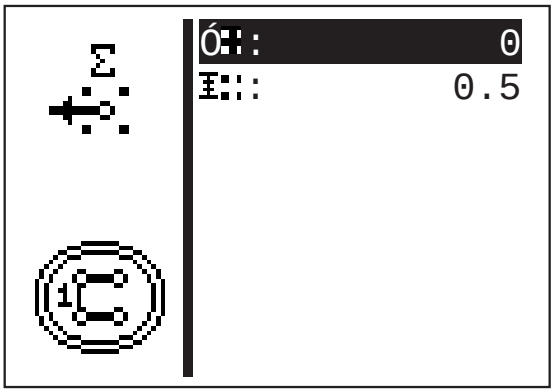
With sewing pattern programs with a free seam contour as the basic sewing pattern these menu items are displayed if they have been programmed as stitch operations in the free seam contour.

Enter: 0 ... 100 0 = lowest thread tension
100 = highest thread tension



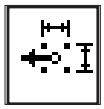
Securing stitch sub menu

The number and distance between the securing stitches at the start of the seam can be set. The distance between the securing stitches remains at the set amount even if the sewing pattern is scaled.



Number of securing stitches

The number of securing stitches at the start of the seam can be set here.
Enter: 0 ... 3 (0 = no securing stitches)



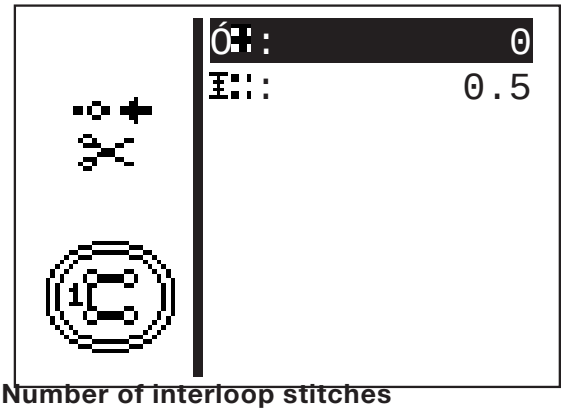
Distance between securing stitches

The distance between the securing stitches in the X and Y direction can be set here.
Enter: 0 ... 1.0 mm

When sewing a sewing pattern without securing stitches it is possible that, because of a very small number of stitches, the specified speed will not be reached particularly with sewing patterns with interim cutting. If necessary the soft start function can be switched of or the soft start speed adjusted to achieve an increase in speed.

Interloop stitch sub menu

The number and distance between the interloop stitches at the start of the seam can be set. The distance between the interloop stitches remains at the set amount even if the sewing pattern is scaled.



Number of interloop stitches

The number of interloop stitches at the start of the seam can be set here.
Enter: 0 ... 3 (0 = no interloop stitches)

Distance between interloop stitches

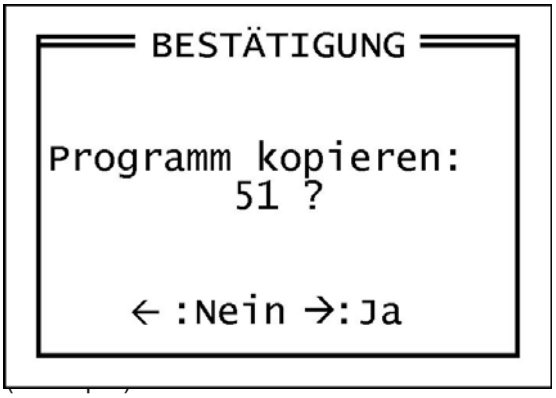
The distance between interloop stitches at the end of the seam can be set here.
Enter: 0 ... 1.0 mm

When sewing a sewing pattern without interloop stitches it is possible that, because of a very small number of stitches, the specified speed will not be reached particularly with sewing patterns with interim cutting. If necessary the soft start function can be switched of or the soft start speed adjusted to achieve an increase in speed.

8.6.3 Copying function for sewing pattern programs

Any number of sewing patterns can be copied at programming level:

– Press **P** to switch from the main screen to the sewing pattern programming mode.
– Press **OK** to select the sewing pattern program to be copied with the “⇧” and “⇩” cursor keys. Then confirm by pressing **OK**.
– Press **P** to start the copying process. A dialogue box appears to confirm:



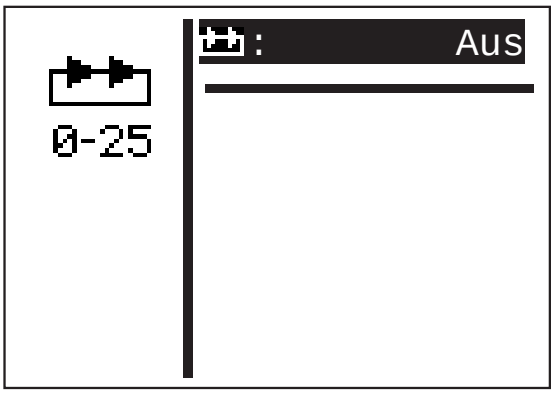
– Press “⇨” (Yes) to start the copying procedure. A copy of the selected sewing pattern is attached to the existing ones and selected as the current one.
– Press “⇦” (No) to cancel the copying procedure.

8.6.4 Sewing pattern sequence (sequences)

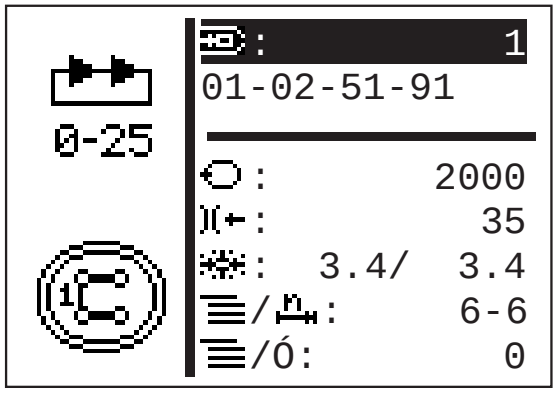
8.6.4.1 Switching sewing pattern sequence operation on and off

Switching from sewing pattern mode to sewing pattern sequence mode

– With the main menu displayed press S to go to the sequence programming mode.



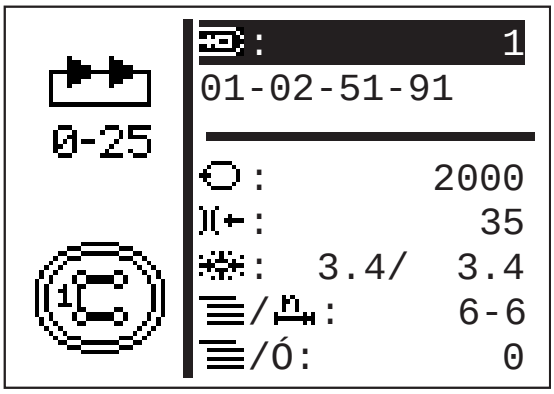
– Press **OK** to start editing the sequence numbers.
– Press ⇧ to select any sequence (1-25)
– Press **OK** to confirm the selection.
The sewing pattern sequence mode is switched on.
– Press **ESC** or "⇦".
The main menu for the sewing pattern sequence mode appears.



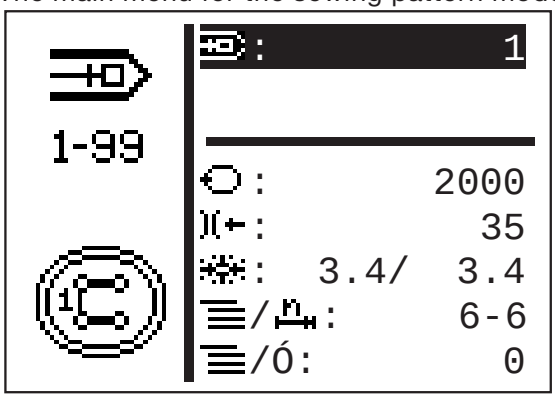
The sequence number and sequence menu items in the main menu are described at the end of this section.

Switching from sewing pattern sequence mode to sewing pattern mode

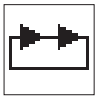
– With the main menu displayed press **S** to go to the sequence programming mode.



– Press **OK** to start editing the sequence numbers.
– Press "⇩" to select sequence number 0.
– Press **OK** to confirm the selection.
The sewing pattern sequence mode is switched off.
– Press **ESC** or "⇦".
The main menu for the sewing pattern mode appears.



Menu items in the main menu in sewing pattern mode



Sequence

Selecting the sewing pattern sequence.

Enter: 1 (2 - 25, if available)

01-02-51-91

Sequence

Displaying the sequence.

The current sewing pattern number is indicated with a bar (underlined).
The display scrolls if there are more than five numbers.

– More sewing patterns to the right: 01-02-51-91-

More sewing patterns to the left: ...51-91-01-02

More sewing patterns to the left and r...02-51-91-01-...

01→02→51→91

Automatic mode

After sewing a sewing pattern the control unit automatically switches to the next sewing pattern.
After sewing the last sewing pattern the control unit switches back to the first sewing pattern in the sequence.
The current sewing pattern is indicated by a bar under the number.
The design of the selected sewing pattern is displayed in the left half of the display.

Manual operation

The control unit does not switch automatically between sewing patterns.

– Press "⇦" or "⇨" to display the next sewing pattern.
The design of the selected sewing pattern is displayed in the left half of the display.

Switching between automatic and manual mode

– Press "⇧" or "⇩" to select the second menu line (sequences).
– Press **OK**.
– Press "⇧" or "⇩" to select the operating mode.
An arrow will be displayed between the sewing patterns in automatic mode.

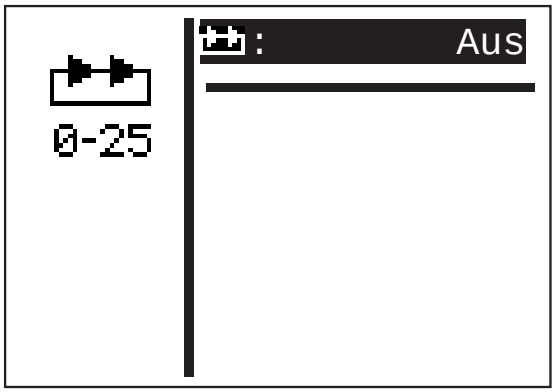
01→02→51→91 Automatic mode

01-02-51-91 Manual mode

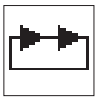
8.6.4.2 Sequence programming mode

This menu item combines the individual sewing patterns for the sewing pattern sequences that can be called up.
There is a total of 25 independent sewing pattern sequences available. Each sewing pattern sequence can be made up of 20 sewing patterns in any order.

The sewing pattern sequence mode can also be switched on in this menu.



– Switch the main switch on.
  The control unit is initialized.
  The main menu appears.
– When the main menu appears press **S**.
  The display switches to the sequence programming mode.
– Select the required menu item by pressing “⇧” or “⇩”.
  The menu line shown inversely.
– “Press **ESC** or ⇦.
  This switches back to the main menu.



Sequence number/ sewing pattern sequence mode

Selecting the sequence to be created or changed.
When creating a new program an asterisk (*) will be displayed before the number.

Enter: 0 ... 25

– Select the required sequence number by pressing “⇧” or “⇩”.
  Should sewing pattern sequence mode be switched off select sequence number 0.
  The sequence number is shown inversely.
– “Press **OK**.
  The program is selected.

Sewing pattern number (1 .. 20)

This menu item is used to select the sewing pattern number that is to be included in the current sequence.

Enter: 1 ... 51 (52 - 99 if available)

8.6.5 Technician mode

The following menus are included in technician mode:

Machine configuration

Machine-specific settings are configured in this menu.

User configurations

Operation-specific settings are configured in this menu.

Service functions

Service functions enable a rapid check of all hardware components.

Free contours

Up to nine freely defined seam contours can be created and sewn with the button sewer 531. The co-ordinates are entered directly on the control panel.

Memory dongle

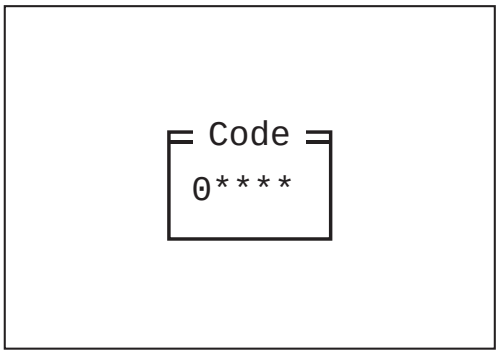
Data can be transferred from the machine to the dongle or loaded from there onto the machine using the memory dongle support.

Cycle time

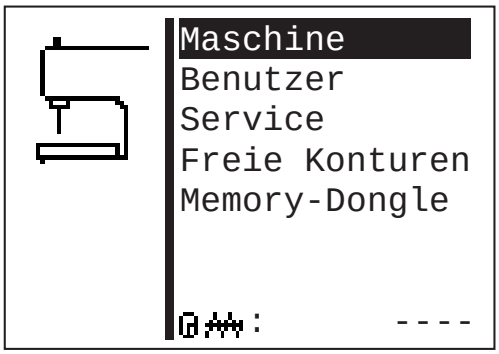
Displays the cycle time of the last sewn sewing pattern.
(Time from start to end of sewing).

Calling up technician mode

– Switch the main switch on.
  The control unit is initialized.
  The main menu appears.
– When the main menu appears press **F**.
  The display switches to the code query menu.

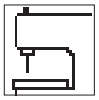


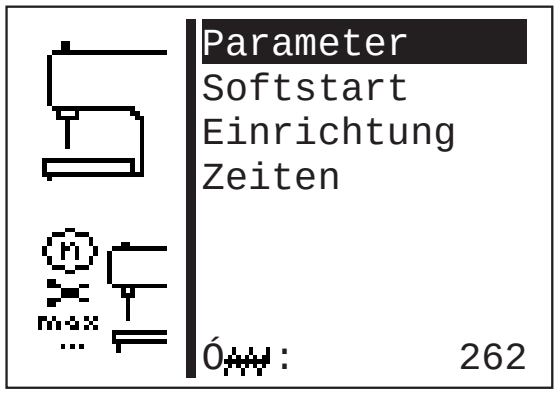
– Enter code number “**25483**” (Code 1).
  The display switches to technician mode when the right code number has been entered.
– Press “**OK**” to confirm.
  The following menu appears:



– Select the required sub menu by pressing “✍” or “✍”.
– Press “**OK**” to switch to the selected sub menu.

8.6.5.1 Machine configuration





Parameters

Various machine parameters can be set using this sub menu.

Soft start

The speeds for the soft start ramp can be set in this sub menu.

Equipment

The parameters for the sewing equipment and optional units can be set in this sub menu.

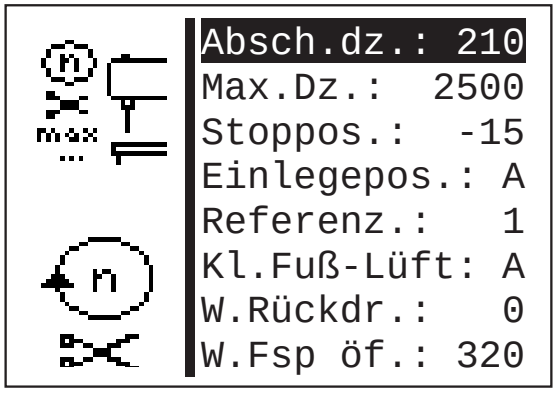
Times

The different times can be set in this sub menu.

Machine cycles

The total number of sewn cycles is displayed.

Machine parameters



– Select the required parameters by pressing "✍" or "✍".
  The symbol for the selected parameters is shown inversely.
– Start the selected parameters by pressing **OK** or switch to the sub menu.

Cut off speed

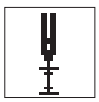
Enter the sewing motor speed in the last three stitches.

Enter: 200 ... 300 [rpm]

Maximum sewing speed

Enter the maximum sewing speed that can be set

Enter: 200 ... 2700 [rpm]

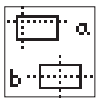


Stop position

The positioning of the sewing motor or needle bar can be changed using the stop position.

Enter: 0 = Thread lever is at the upper dead center
(needle bar is lower)

-15 = Thread lever is 15° off the upper dead center
(Needle bar is higher)



Feed position

Selecting the feed position for the material.

Enter: A = Seam starting point

B = Machine zero point

Note

The following advantages or disadvantages arise depending on the feed position:

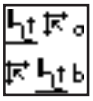
Feed point A = low cycle time

Feed point B = easier feed for larger sewing patterns, longer cycle time.

Referencing

The behavior for referencing the step motors after a sewing procedure can be configured using this menu item.

Enter: 0 = no referencing
1 = reference each time
2 – 10 = after every 2nd - 10th sewing procedure.



Raising the clamping foot

Setting whether the clamping foot is to be raised after referencing the step motors.

Enter: A = the clamping foot is raised before referencing.
B = the clamping foot is raised after referencing.

Sewing motor reverse rotation angle

After the end of the sewing procedure it is possible to rotate the sewing motor backwards so that the needle can reach a higher position. Before the next sewing procedure the needle position is moved once more to the sewing motor stop position. The angle that the sewing motor is to be back rotated can be set.

Enter: 0 ... 70° (0° = back rotation switched off)
(70° = highest needle position)

Opening the thread tension angle

Setting the angle to open the thread tension in the last stitch.

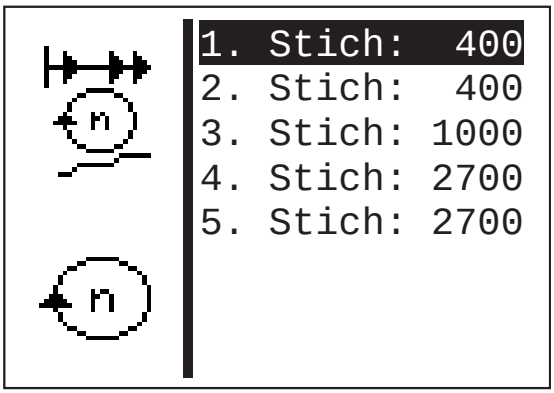
Enter: 200° ... 355°

The thread tension is opened before reaching the thread cut off position. Thus only the mechanical pre-tensioning works in the cutting procedure.

All angles are given from the sewing motor reference position.

Soft start

The speed parameters for the soft start can be set in this sub menu.



Speed of 1st stitch

Enter the speed for the first stitch.

Enter: 400...900 [rpm]

Speed of 2nd stitch

Enter the speed for the second stitch.

Enter: 400 ... 2700 [rpm]

Speed of 3rd stitch

Enter the speed for the third stitch.

Enter: 400 ... 2700 [rpm]

Speed of 4th stitch

Enter the speed for the fourth stitch.

Enter: 400 ... 2700 [rpm]

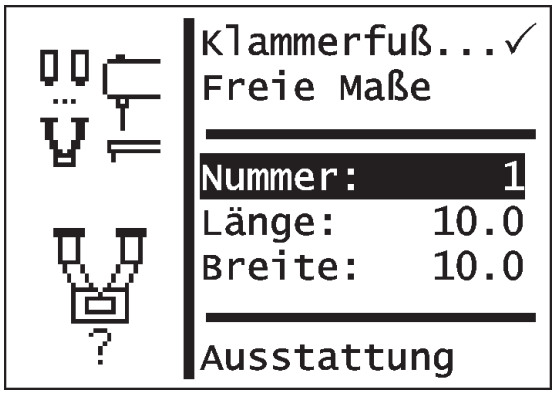
Speed of 5th stitch

Enter the speed for the fifth stitch.

Enter: 400 ... 2700 [rpm]

Equipment

The parameters for the sewing equipment can be set in this sub menu.



Note

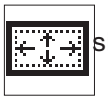
Entering the clamping foot number automatically checks whether the sewing pattern currently to be sewn is in the material support plate opening.

If there are no specified clamping feet free dimensions can also be defined.

Clamping foot

Selecting a fixed clamping foot as a device.

Enter: Alternative:



Free dimensions

Selecting a clamping foot with free sewing field sions.

Enter: Alternative:

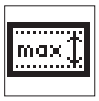
Number

Selecting a DA clamping foot number.

Enter: 1

Clamping foot number	Material support plate opening dimensions X x Y (mm)	Description
1	10 x 10	button clamps

For technical reasons and to provide a safety margin the sewing field is smaller than the material support plate opening.



Length

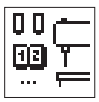
Entering a freely selectable sewing field length.
Entry only possible if “free clamping measurement” has been selected. Otherwise the length/ width of the selected clamps are displayed (cannot be changed).

Enter: 0.5 ... 20.0

Width

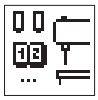
Entering a freely selectable sewing field width.
Entry only possible if “free clamping measurement” has been selected. Otherwise the length/ width of the selected clamps are displayed (cannot be changed).

Enter: 0.5 ... 40.0

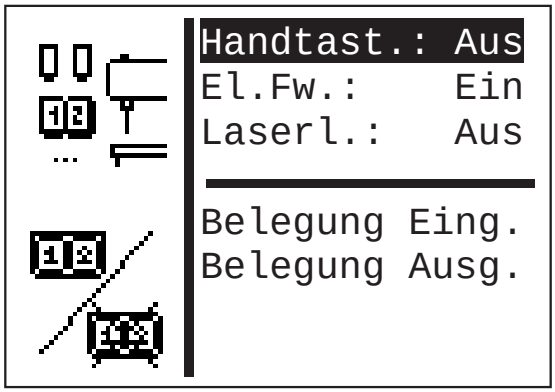


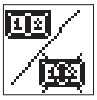
Equipment

Optional units can be activated using this sub menu.



Fittings sub menu





Manual switch

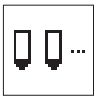
Activating the optional manual switch. If this option has been selected a menu item to select the operating mode appears in the “User configuration” menu.

Enter: ON / OFF

Electrical thread wiper

Switching the electrical thread wiper on/off.

Enter: ON/OFF



Laser lights

Activating the 3 optional laser lights.

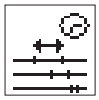
Enter: ON / OFF

Assigning the inputs

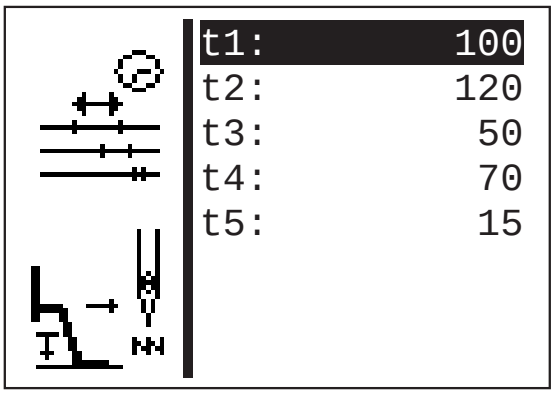
This menu item gives an overview of the assignment of the inputs with (optional) units.

Assigning the 24V outputs

This menu item gives an overview of the assignment of the 24v outputs with (optional) units.



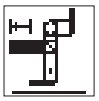
Times sub menu



Waiting time between pedal position 1 (lower clamping foot) and start of sewing (t1).

Time only relevant with rapid start using the pedal or the hand switch (optional).

Enter: 50 ...300 ms
Default value: 150 ms



Switch on time for thread wiper magnet (t2)

This menu item is only displayed if the electrical thread wiper option is switched on in the Fittings menu.

Enter: 30 ...100 ms

Default value: 40 ms

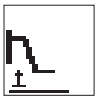
Time when thread wiper magnet off - clamping foot magnet on (t3)

Waiting time between the thread wiper magnets being switched off and the clamping foot magnets being switched on.

This menu item is only displayed if the electrical thread wiper option is switched on in the Fittings menu.

Enter: 0 ...300 ms

Default value: 50 ms



Waiting time between clamping foot magnet coming on and the reference run (t4).

Waiting time between the clamping foot magnets being switched on and the step motors being referenced.

Enter: 0 ...300 ms

Default value: 70 ms

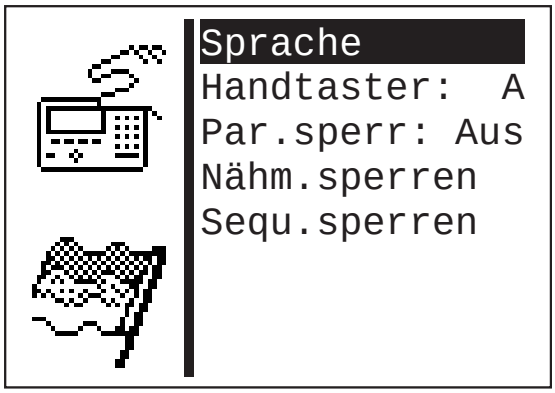
Time for activating energy saving mode (t5)

Waiting time between any operating component being operated (control panel, pedal, manual switch) until energy saving mode is activated.

Enter: 0 ... 60 min 0 = energy saving mode switched off

8.6.5.2 User configuration

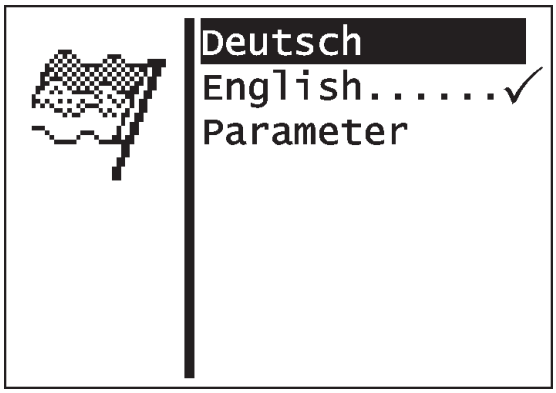
Operation-specific settings are configured in this menu.



– Select the required parameters/ sub menu by pressing "✍" or "✍". The selected parameters/sub menu are shown inversely.
– Start the selected parameters by pressing **OK** or switch to the sub menu.

Language

The language can be selected in this sub menu.



Selects German for the technician level.

English

Selects English for the technician level.

Parameters

Selects the numbering of the menu items for technician level.

Manual switch operating mode (optional)

Selecting the manual switch mode.
This menu item is only available if the “manual switch” option is activated in the Fittings menu.

Enter: A = Rapid start
B = Normal

In the “NORMAL” manual switch mode the switches have the following functions:

Switch 1:Raising and lowering the clamping foot.
Stopping the sewing procedure.
Cancelling the sewing procedure when it has been stopped.

Switch 2:Start sewing when the clamping foot is lowered.
Stopping the sewing procedure.
Continuing the sewing procedure when it has been stopped.

In the “RAPID START” manual switch mode the switches have the following functions:

Switch 1:Raising and lowering the clamping foot.
Stopping the sewing procedure.
Cancelling the sewing procedure when it has been stopped.

Switch 2:Start sewing.
If the clamping foot is ***not*** lowered it is lowered.
Stopping the sewing procedure.
Continuing the sewing procedure when it has been stopped.

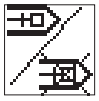
Parameter blocking

Switching the ability of parameters to be changed on or off in sewing and programming modes.

Enter: ON / OFF

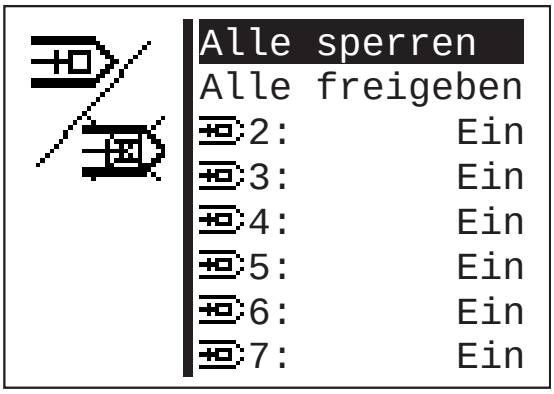
Note

If the parameter block is switched on no parameter changes are possible any more in sewing and programming modes.



Blocking sewing patterns

Individual sewing patterns can be released for selection or blocked in this sub menu.



The following restrictions normally apply:

1. Sewing pattern mode

- The sewing pattern currently selected in sewing mode cannot be blocked.
- Blocked sewing patterns cannot be selected from the selection list in sewing mode.
  Blocked sewing patterns are indicated by “#”.

2. Sewing pattern sequence mode

- A blocked sewing pattern can be selected in a sequence. At the start of the sewing sequence (when the clamping foot is lowered, an error message appears, however. The sewing sequence cannot be started.
- The last selected sewing pattern in sewing mode cannot be blocked.

Block all

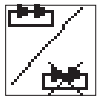
All sewing patterns are blocked with the aforementioned restrictions. The status of the sewing pattern numbers displayed switches to “OFF”.

Activate all

All sewing patterns are activated.
The status of the sewing pattern numbers displayed switches to “ON”.

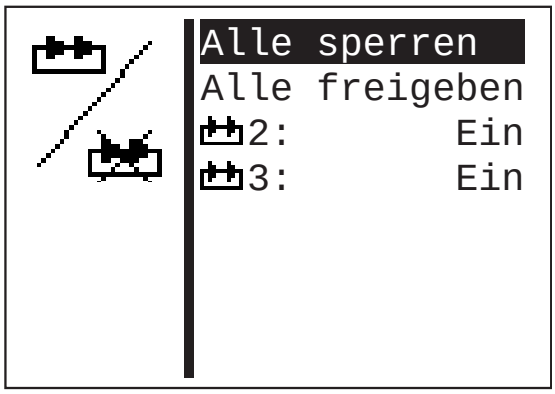
Blocking/ activating individual sewing patterns

Enter: ON / OFF



Blocking sequences

Individual sequences can be released for selection or blocked in this sub menu.



The following restrictions normally apply:

1. Sewing pattern mode:

- The last selected sequence in sequence mode cannot be blocked.

2. Sewing pattern sequence mode:

- The sequence currently selected in sewing mode cannot be blocked.
- Blocked sequences cannot be selected from the selection list in sewing mode.
  Blocked sequences are indicated by “#”.

Block all

All sequences are blocked with the aforementioned restrictions.
The status of the sequence numbers displayed switches to “OFF”.

Activate all

All sequences are activated.
The status of the sequence numbers displayed switches to “ON”.

Blocking/ activating individual sequences

Enter: ON / OFF

8.6.5.3 Service functions

Service functions enable a rapid check of all hardware components.

Note

The service menu can be reached directly when switching the machine on (see Section 8.2.1).

Multi-test

All hardware components can be checked in the Multi-test menu.

180° disc

This menu item makes a function available to set the referencing of the sewing motor (180° disc) correctly (see Service instructions).

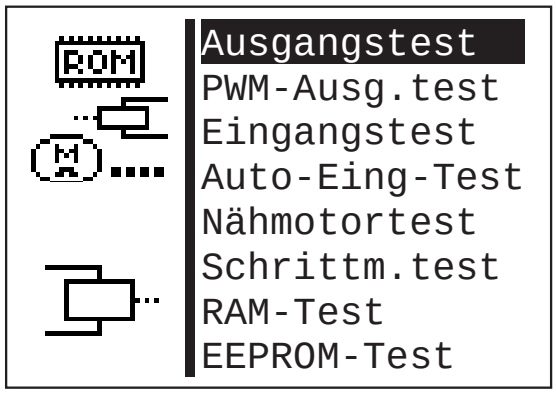
Events

Initialization

Using this menu the events memory and the permanent data can be reset to factory settings.

Multi-test

Selecting the Multi-test sub menu



Caution, danger of injury!

Do not put your hands into the running machine during the function check of the output components.

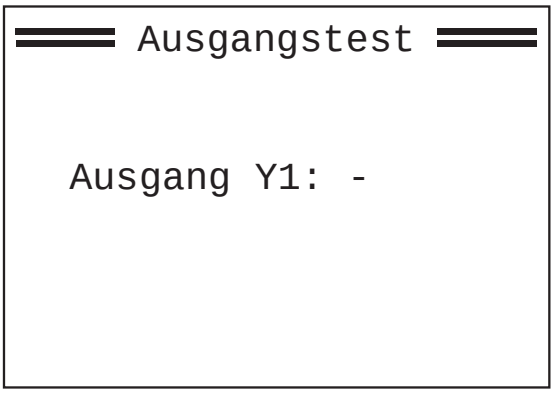
Risk of breaking!

When testing individual output components first of all check whether collisions may occur when the machine moves.

Output test

The function of the output components is checked with this test function.

- Start the test function by pressing **OK**.
- Select the required output component by pressing "✍" or "✍".
- Switch the selected output component on or off by pressing **OK**.



- To exit the test function press **ESC**.

Caution, danger of injury!

Do not put your hands into the running machine during the function check of the output components.

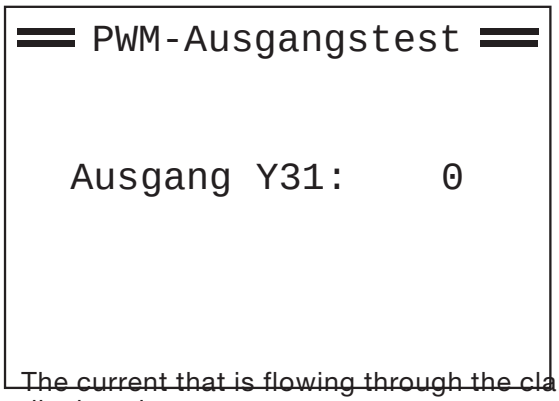
Output component	Function
Y1	Thread wiper magnet
Y4	Thread tension magnet
Y21	Laser marking light 1, if option is activated
Y22	Laser marking light 2, if option is activated
Y23	Laser marking light 3, if option is activated

Cf. also paragraph 8.7 Distributor circuit board

PWM output test

The function of the magnets is checked with this test function.

- Start the test function by pressing **OK**.
- Select the required output component by pressing "✍" or "✍".
- Switch the selected output component on or off by pressing **OK**.



- The current that is flowing through the clamping foot magnet is displayed.
- To exit the test function press **ESC**.

1

Caution, danger of injury!

Do not put your hands into the running machine during the function check of the output components.

Output component	Function
Y31	Clamping foot magnet

Cf. also paragraph 8.7 Distributor circuit board

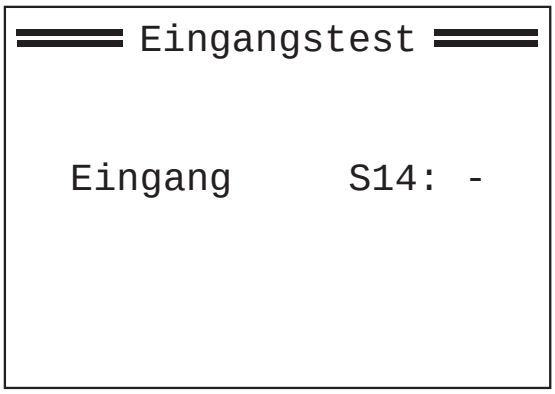
Input test

The input components to be tested are selected with this test function.

CAUTION!

The input components are set carefully at the factor.
Configuring and correcting them must only be done by trained service personnel.

– Start the test function by pressing **OK**.
– Select the required input component by pressing "✍" or "✍".
The switching status of the input component is displayed.



– To exit the test function press **ESC**.
The Multi-test menu appears.

Input component	Function
S1	Manual switch 1, if the option is activated
S2	Manual switch 2, if the option is activated
S14	Pedal A
S15	Pedal B
S16.	Pedal C
S17	Pedal D
N ref.	Sewing motor reference switch
X ref.	X reference switch
Y ref.	Y reference switch

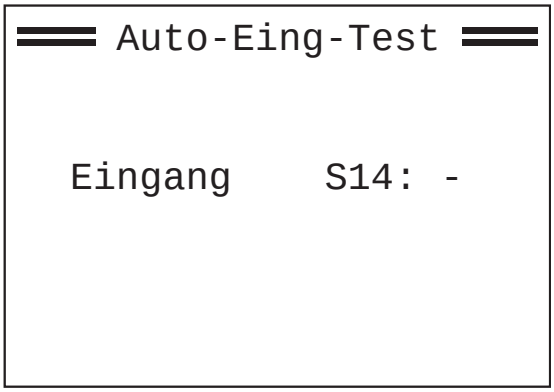
The current assignment of the inputs is specified in the Fittings menu in the "Assignment of inputs" sub menu.

Cf. also paragraph 8.7 Distributor circuit board

Auto input test

The function of the input components is checked with this test function.

– Start the test function by pressing **OK**.
– Operate the required input component.
  The switching status and number of the input component operated are displayed.



– To exit the test function press **ESC**.
  The Multi-test menu appears.

To assign input components see the Input test table.

Sewing motor test

The sewing motor can be checked with this test function.

– Start the test function by pressing **OK**.
– Start the motor by pressing ⇧.
– Change the speed by pressing "✍" or "✍".
  The speed is displayed.

– Press **ESC**.
  The test finishes and the motor stops.
  The sewing motor control unit performs a reference run and the clamping foot is raised.
  The Multi-test menu appears on the display.

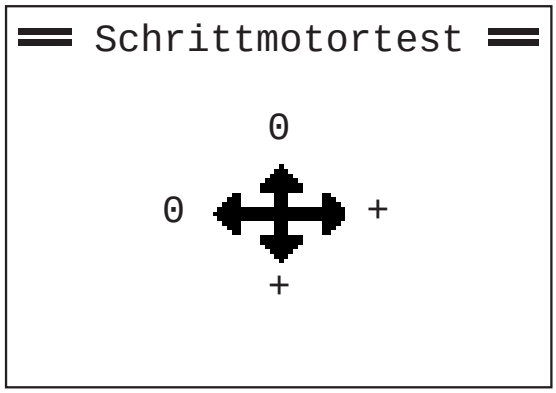
Step motor test

The step motors and the associated reference switches can be checked with this test function.

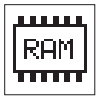
CAUTION Risk of breaking!

Move the needle upwards with the hand wheel before the test.

– Start the test function by pressing **OK**.
– Check the step motor for transverse movement (X axis).
  Move the step motor by pressing "⇦" or "⇨".
  The number of steps moved is shown by the arrow on the left.
  The status of the reference switch is modified by the reference setting.
– Check the step motor for lengthwise movement (Y axis).
  Move the step motor by pressing "⇧" or "⇩".
  The number of steps traveled is shown above the arrow.
  The status of the reference switch is modified by the reference setting.



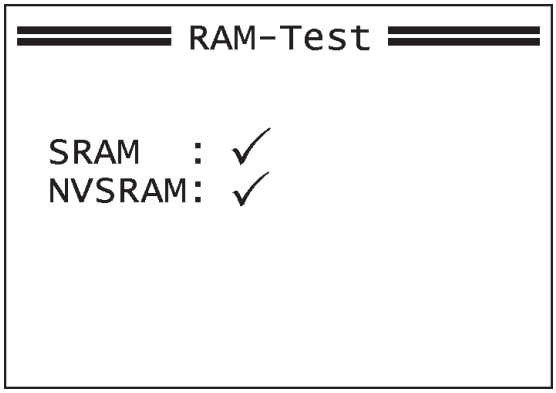
– Press **ESC**.
  The test finishes.
  The Multi-test menu appears on the display.



RAM test

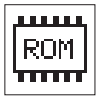
The memory (SRAM and program data memory) is checked with this test function.

– Start the test function by pressing **OK**.
  The test results are displayed.



Display	Explanation
SRAM OK	The memory is working properly
SRAM ERROR	Error in the memory
NV-RAM OK	Program data memory is OK
NV-RAM ERROR	Error in program data memory

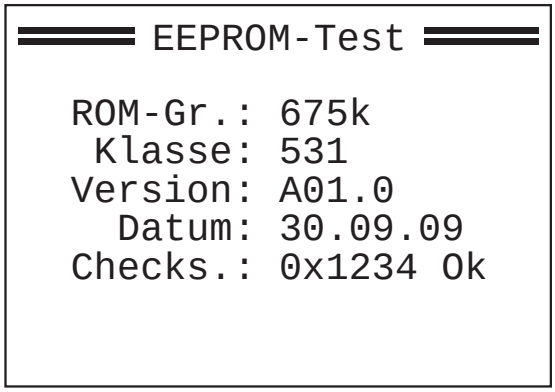
– Press **ESC**.
  The test finishes.
  The Multi-test menu appears on the display.



EEPROM test

This test function checks the microprocessor's programmable read only memory (ROM).

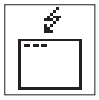
– Start the test function by pressing **OK**.
The display shows the following rest results:
- ROM size
- Machine class
- Software version
- Software date
- checksum and status



Note:

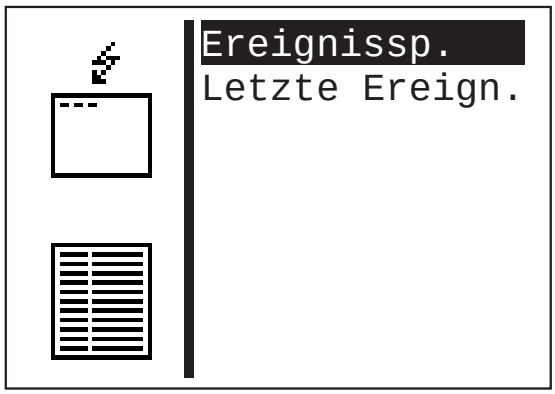
The details change depending on the software version.

– Press **ESC**.
The test finishes.
The Multi-test menu appears on the display.

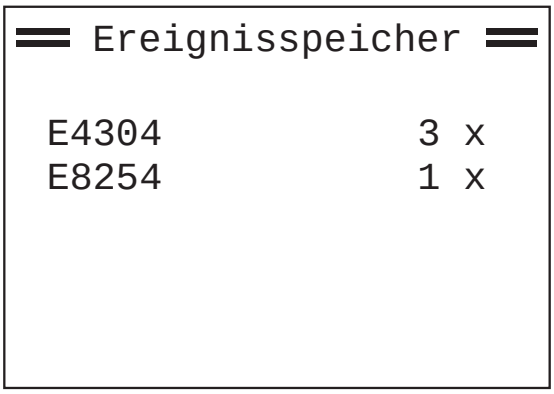


Events

In the event of a malfunction the menu can give important information on the cause of the malfunction.



Event memory

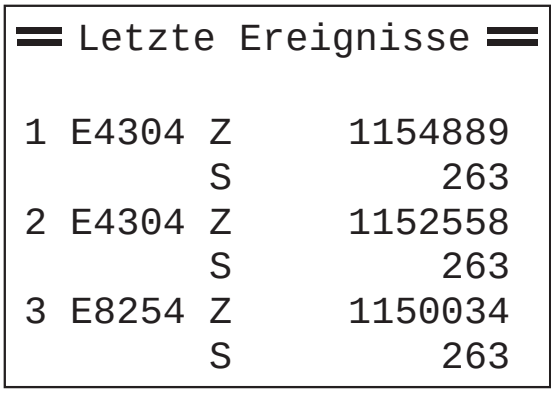


(Example)

All events that have occurred are displayed in this menu item.

– Exit the menu item by pressing **ESC**.
– Display again by pressing ⇩.

Latest events



(Example)

The latest events that have occurred are displayed in this menu item.

Z = milliseconds after switching the machine on

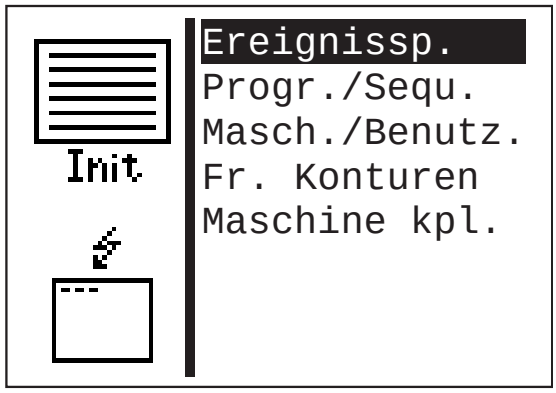
S = Machine unit counter

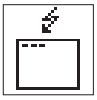
E = Event/ error number

– Exit the menu item by pressing **ESC**.
– Display again by pressing ✍.

Initializing (Init)

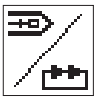
Selecting the sub menu to initialize the event memory and permanent data.





Event memory

The event memory can be reset using this menu item.



Sewing pattern programs (variations) and sequences

Sewing pattern programs and sequences can be deleted using this menu item.

Machine parameters

Machine parameters, soft start speeds, times, user configuration, hook thread counter data and options can be reset to factory settings using this menu item.

Free seam contours

All free seam contours can be reset (deleted) using this menu item.

Note

By resetting sewing pattern programs and sequences are also deleted and the numbers of subsequent programs and sequences modified.

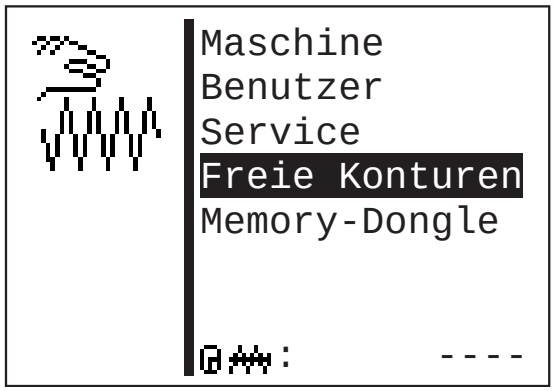
Whole machine

All permanent data can be reset using this menu item. After resetting the machine is restarted automatically.

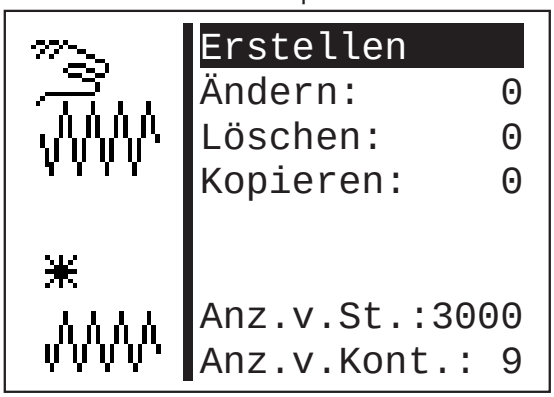
Note

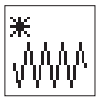
After the machine has been restarted the clamp number and fittings must be selected again (see installation instructions Section 9).

8.6.5.4 Free contours



Up to nine freely defined seam contours can be created and sewn with the button sewer 531. The co-ordinates of the seam contour are entered on the control panel.





Create

A new seam contour can be created with this menu item.

Note

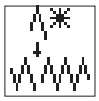
The seam contour number is allocated automatically.

Modify

After selecting the seam contour to be modified you go to the sub menu for changing the seam contour.

Delete

A selected seam contour can be deleted with this menu item.



Copy

Any basic sewing pattern number of free seam contour can be copied and modified. After selecting the sewing pattern number you go to the “Change seam contour” sub menu.

– Select the required standard sewing pattern by pressing “⇧” or “⇩”.
– Select the standard sewing pattern by pressing **OK**.

Note

The seam contour number is allocated automatically.

Number of available stitches:

The number of stitches still available is displayed (max. 3000).

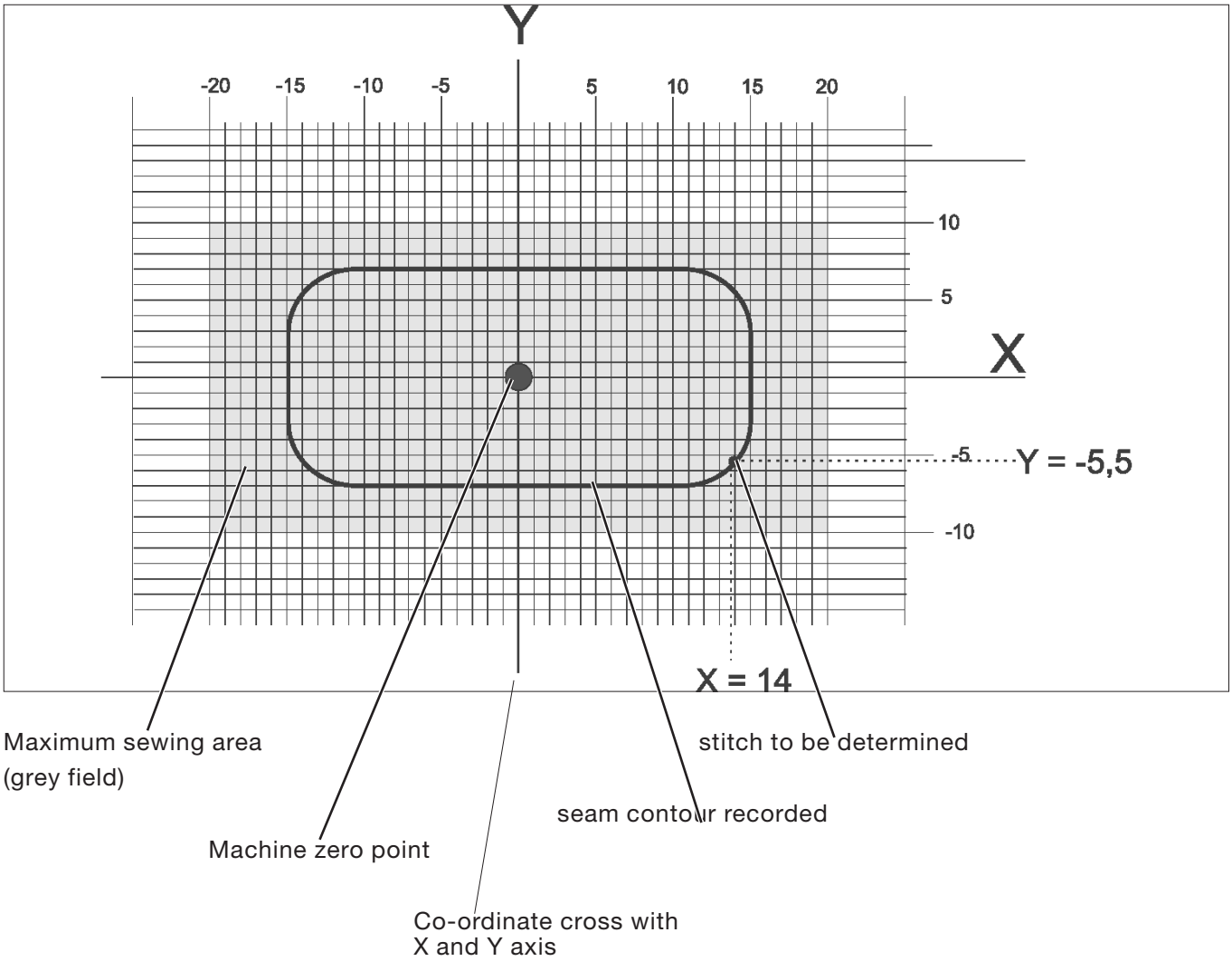
Number of available contours:

The number of contours still available is displayed (max. 9).

Determining contour co-ordinates

When creating a seam contour each individual stitch with details of the position on the co-ordinate cross (S and Y axis) must be entered into the control unit. The individual co-ordinate points must therefore be determined in advance.

The co-ordinate points can be determined using millimeter paper.



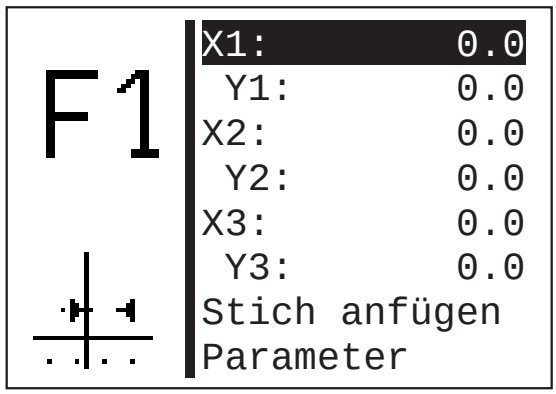
Note

The seam contour should be created so that the machine zero point is in the middle of the contour as far as possible.

- Draw the maximum sewing field size on the millimeter paper (X = max. 40 mm, Y = max. 20 mm).
- Put the co-ordinate cross in the middle of the sewing area.
- Plot the seam contour.
- Determine the X and Y co-ordinates for each required stitch.
- Enter the X and Y co-ordinates into the control unit (see next page).

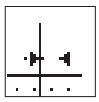
Creating the contour

The X and Y co-ordinates for each individual stitch are entered in this menu.



Note:

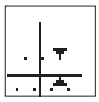
To enter stitch operations (e.g. interim cutting) first of all complete the contour (enter co-ordinates) and then insert into the Change contour menu by editing the stitch operation.



X1

Entering the X co-ordinates for stitch 1

Enter: -20.0 ... +20.0



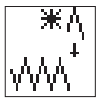
Y1

Entering the Y co-ordinates for stitch 1

Enter: -10.0 ...+10.0

Note:

The value X1 can be changed as shown in Section 8.3.1.
After confirming the value of X1 by pressing **OK** select menu item Y1 by pressing "⇩".
The values for Y1, X2, Y2, X3 and Y3 can be changed as described for value X1.
After confirming the entry of Y3 by pressing **OK** select "**Add stitch**" by pressing ⇩.
After selecting this line by pressing **OK** the next co-ordinates Xn1 +1 and Yn+1 are specified in the top two menu lines (here: X4 and Y4).
The selection bar switches automatically to the line Xn+1 (here: X4).
The values Xn+1 and Yn+1 can be changed if necessary as described above. This procedure can be repeated until all the stitch co-ordinates have been entered.



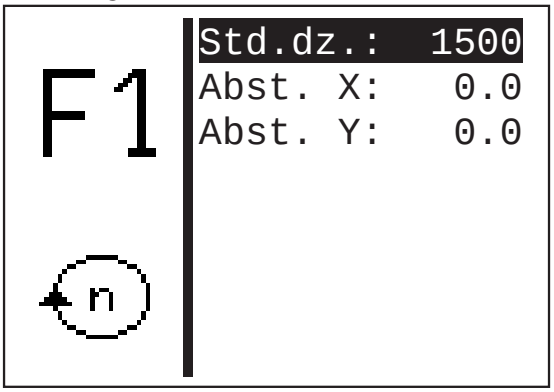
Adding a stitch

Function to add a stitch.

The co-ordinates for the first three stitches (here: X1/Y1, X2/Y2 and X3/Y3) are moved upwards and Xn+1/Yn+1 (here: X4/Y4) appears on the display.

Parameter sub menu

Selecting the sub menu to enter the contour parameters



Default speed:

Default speed

Enter: 100...2700 rpm

Distance X:

Distance from the hole in the X direction

Enter: 0 ...40.0 mm

Distance Y:

Distance from the hole in the Y direction

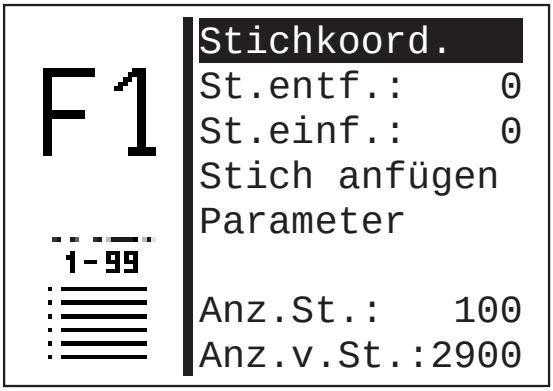
Enter: 0...20.0 mm

Default values = external stitches in X and Y direction

Values must be changed depending on the distance between the button and the hole (refers to correct scaling in the main menu).

If the free seam contour is currently selected in the main display and if one or both of the X/Y distances have been changed, the value for the length or width or both must be changed accordingly in the main menu.

Change contour



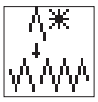
Stitch co-ordinates

Selecting the sub menu to change the stitch co-ordinates.

Removing a stitch:

Delete stitch.

Enter: stitch number to be deleted



Inserting a stitch:

Insert stitch.

Enter: Stitch number before which a stitch is to be inserted.

The sub menu to change the stitch co-ordinates appears.

Adding a stitch (at the end)

The sub menu to change the stitch co-ordinates appears.

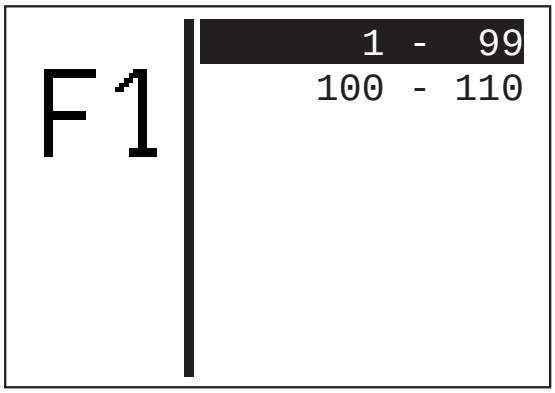
Parameters

Selecting the sub menu to change the contour parameters

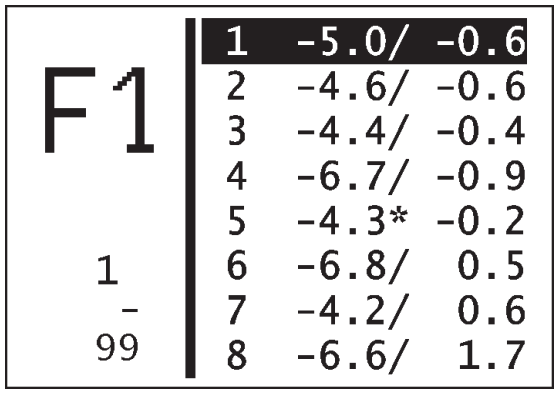
Stitch co-ordinates sub menu

The sub menu appears immediately if the contour to be changed has 99 stitches or fewer.

The following menu appears if the contour to be changed has more than 99 stitches:



– Select the required stitch area by pressing "✍" or "✍".
– Select the stitch area by pressing **OK**.
The "**Stitch co-ordinates**" sub menu appears.

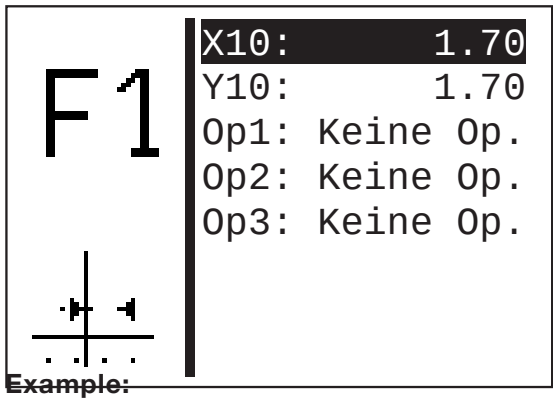


– Select the required stitch by pressing "✍" or "✍".
– Select the stitch by pressing **OK**.
  The sub menu to change a stitch co-ordinate appears.

If a stitch operation is allocated to a stitch this will be marked by an asterisk (*) instead of a forward slash (/).

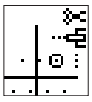
Changing the stitch co-ordinates sub menu

This sub menu appears when selecting a stitch co-ordinate from the "Stitch co-ordinates" menu after inserting or changing a stitch.



Example:

Op 1

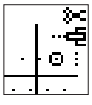


Changing the traveling operation of stitch 10.
Enter: see Table on page 70

Op 2

Changing the thread tensioning operation of stitch 10.
Enter: see Table on page 70

Op 3



Changing the speed operation of stitch 10.
Enter: see Table on page 70

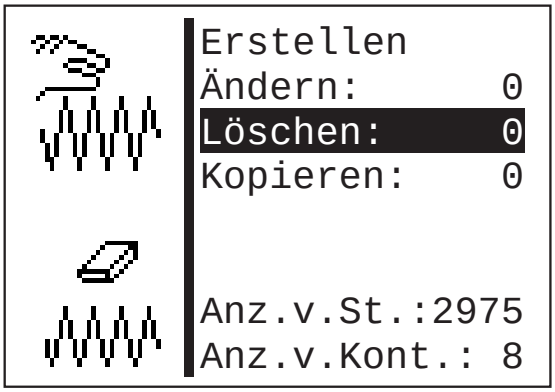
Note:

The stitch operation entered is performed **after** the stitch.

Type of operation	Operation	Description
Traveling operation (Op 1)	Intermediate cutting	Intermediate cutting can be programmed in a contour up to 10 times. There must be at least 3 stitches between 2 intermediate cutting procedures.
Thread tension operation (Op 2)	Thread tension 1	Thread tension area 1
	Thread tension 2	Thread tension area 2
	Thread tension 3	Thread tension area 3
	Thread tension 4	Thread tension area 4
	Thread tension 5	Thread tension area 5
Speed operation (Op 3)	Speed 200	Speed reduction to 200 1/min
	Speed 400	Speed reduction to 400 1/min
	Speed 600	Speed reduction to 600 1/min
	Speed 800	Speed reduction to 800 1/min
	Speed 1000	Speed reduction to 1000 1/min
	Speed 1200	Speed reduction to 1200 1/min
	Speed 1400	Speed reduction to 1400 1/min
	Speed 1600	Speed reduction to 1600 1/min
	Speed 1800	Speed reduction to 1800 1/min
	Speed 2000	Speed reduction to 2000 1/min
	Speed 2200	Speed reduction to 2200 1/min
	Speed 2400	Speed reduction to 2400 1/min
	Speed 2600	Speed reduction to 2600 1/min
	Default speed	Set to default speed

If “No operation” is selected the corresponding stitch operation is switched off.

Deleting a contour



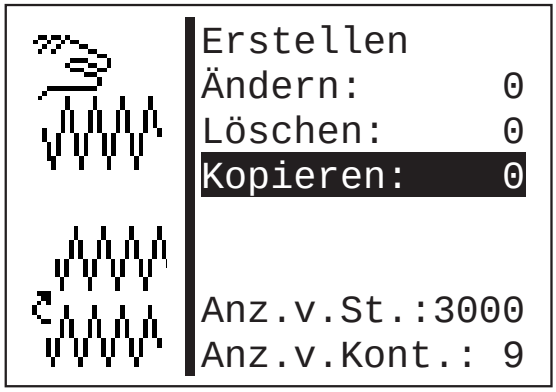
- Select **Delete** by pressing ⇧ or ⇩.
- “Press **OK**.
- Select the required contour number by pressing “✍” or “✍”.
- Confirm the selection by pressing **OK**.
  The contour is deleted.

1

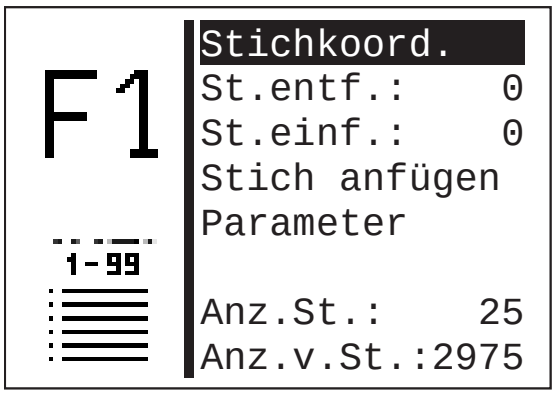
CAUTION!

By deleting a free seam contour the numbering of sewing pattern programs and/or sequences may change as these may be deleted too.

Copying a contour



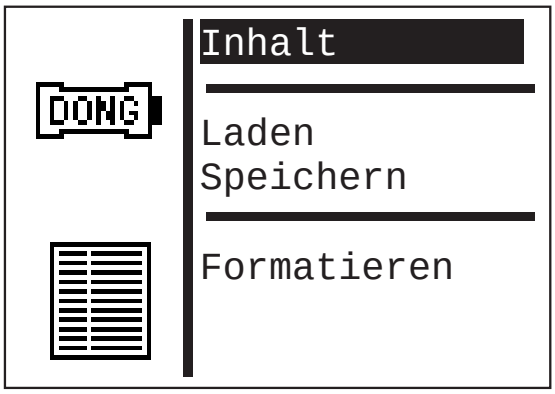
- Select **Copy** by pressing ✍ or ✍.
- „Press **OK**.
- Select the required sewing pattern number (1-50,91-99) by pressing "✍" or "✍".
- Confirm the selection by pressing **OK**.
  The contour is copied and the "Change contour" menu is displayed.



The contour is changed by following the "**Change contour**" section on Page 68.

8.6.5.5 Memory dongle

Using the functions of this sub menu data from the machine can be saved on a dongle or data from a dongle can be loaded onto the machine.



Dongle content

Using this menu item the content of a memory dongle inserted into the control unit can be displayed.

Load

Using this menu item program data (sewing pattern programs and sequences) and machine parameters as well as free seam contours can be uploaded from the dongle to the machine.

Save

Using this menu item program data (sewing pattern programs and sequences) and machine parameters as well as free seam contours can be saved on a data dongle.

Format

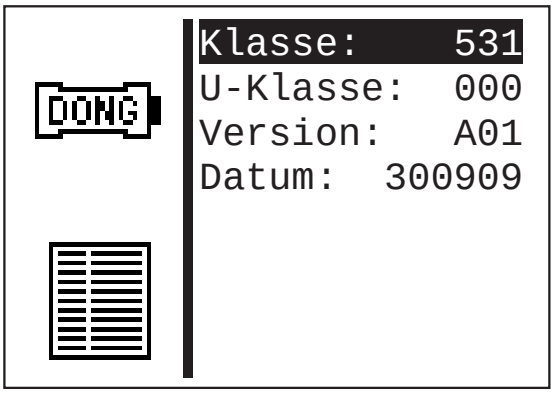
A dongle must be formatted as a data dongle to save data.

The dongle must be inserted into the control unit in the pin connection marked Dongle (X110).

Display dongle content

Boot dongle

If a boot dongle is inserted information about the machine program is output.



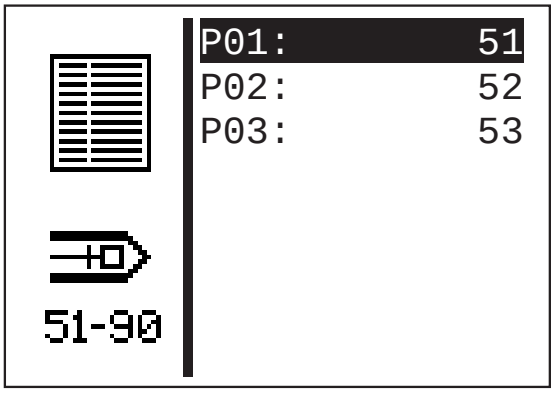
(Example)

A boot dongle with a machine program for any machine class can be inserted in order to display the dongle information.

Data dongle

If a data dongle is inserted that has been formatted for machine class 531 the saved sewing pattern programs or free seam contours are displayed.

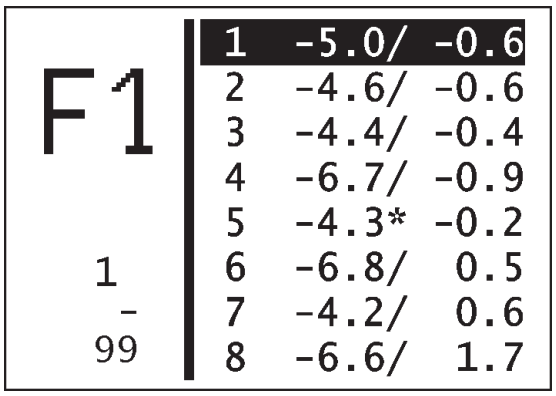
Reading out the saved sewing pattern programs



(Example)

Press ⇨ to switch between the saved sewing pattern programs display and the free seam contours display.

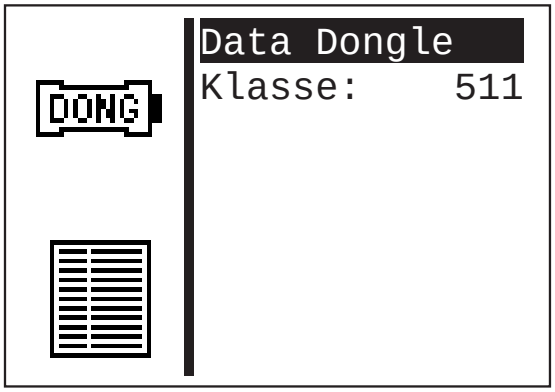
Reading out the saved free seam contours



(Example)

Data from a different machine class dongle

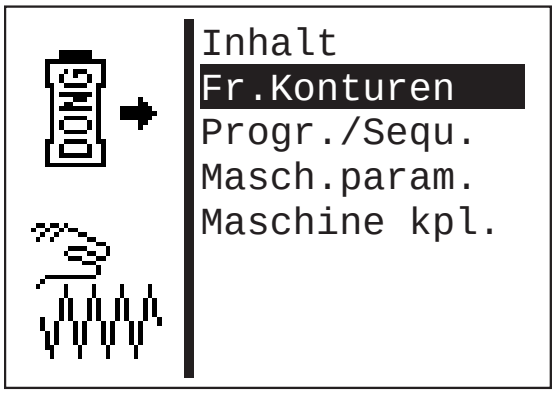
The following display appears if a dongle for a different machine class is inserted.



(Example)

Loading data from the dongle to the machine

Using this menu item program data (sewing pattern programs and sequences) and machine parameters or all free seam contours can be loaded from the dongle to the machine.



(Example)

Content

Using this menu item the content of a memory dongle inserted into the control unit can be displayed.

Before loading the following four data areas a window appears for each of them to confirm the selection.

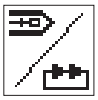
– Press
  ⇦ (No) to cancel the procedure or
  ⇨ (Yes) to perform the procedure.

The time required to load the data depends on the number of sewing pattern programs and free seam contours.

Free seam contours

This menu item starts loading all free seam contours.

All free seam contours on the machine are deleted when loading the dongle.



Sewing pattern programs and sequences

This menu item starts loading all sewing pattern programs and sequences.

All sewing machine programs and sequences on the machine are overwritten when loading the memory dongle.

If sewing machine programs or sequences relate to free seam contours that are not available these are deleted again after loading. In this case the free seam contours should be loaded first or the whole machine.

Machine parameters

This menu item starts loading the machine parameters.

The following data is loaded from the memory dongle:

Cutting speed, number of referencing procedures, feed position, maximum sewing speed, stop position, the current sewing pattern number and standard sewing pattern data if the equipment matches.

The machine parameters on the machine are overwritten when loading the memory dongle.

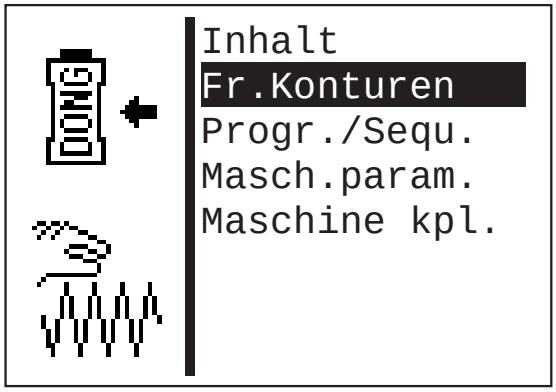
Whole machine

This menu item starts loading all the aforementioned data areas.

The data on the machine is deleted when loading the memory dongle.

Saving data on the dongle

Here program data (sewing pattern programs and sequences) and machine parameters or all free seam contours from the machine can be saved on the dongle.



Content

Using this menu item the content of a memory dongle inserted into the control unit can be displayed.

Before saving the following four data areas a window appears for each of them to confirm the selection.

– Press
  ✍ (No) to cancel the procedure or
  ✍ (Yes) to perform the procedure.

The time required to save the data depends on the number of free seam contours on the machine.

All free seam contours

This menu item starts saving all free seam contours.

All free seam contours on the dongle are deleted during the save procedure.

Sewing pattern programs and sequences

This menu item starts saving all sewing pattern programs and sequences.

All sewing pattern programs and sequences on the memory dongle are overwritten during the save procedure.

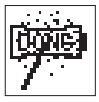
A window to confirm the selection appears.

– Press
  ✍ (No) to cancel the procedure or
  ✍ (Yes) to perform the procedure.

The program data and machine parameters on the dongle are deleted during the save procedure.

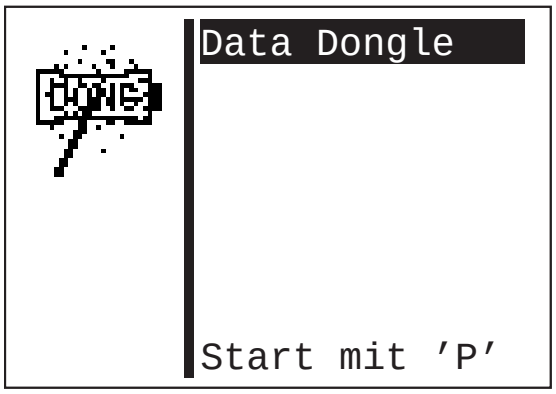
Note

The time required to save the data depends on the number of sewing pattern programs on the machine.



Formatting the dongle

Before a dongle can be used to save data it must be formatted as a data dongle.



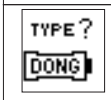
Data dongle

Formatting the dongle can be started using this menu item.

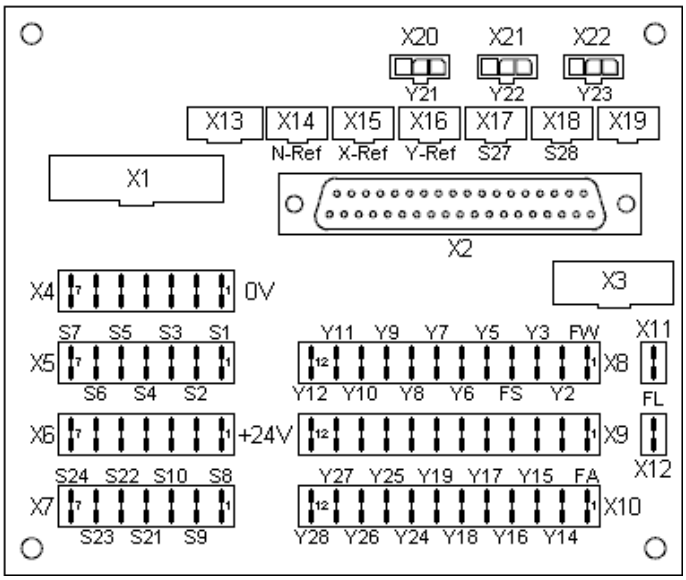
– To start press **P**.
  A window appears to confirm the selection.
– Press
  ✍ (No) to cancel the procedure or
  ✍ (Yes) to perform the procedure.

When the dongle is formatted any data stored on it is lost.

Error messages

Pictogram	Designation	Possible cause	Elimination
	Dongle missing	no dongle inserted	Insert dongle into the control unit
	Dongle empty	no data stored on the dongle	save data on the dongle
	wrong type of dongle	Dongle has the **wrong format** for the required function.	• **use another dongle** • **Format the dongle**
	wrong machine class	Data dongle is not **formatted** for Class 531.	• **use another dongle** • **Format the dongle**
	Format ID error	• Dongle not correctly formatted • Dongle defective	• Format the dongle again • use another dongle
	unknown dongle type	• Dongle not correctly formatted • Dongle faulty	• Format the dongle again • Use another dongle

8.7 Distributor circuit board



The distributor circuit board is at the back of the machine under the clamping foot magnet. All the inputs and outputs of the control unit are accessible here. To get to the terminals you must remove the back protective cover.

Description of the outputs

Output number	Output	assignment
Y1 (FW)	24V / 4 A	Thread wiper magnet
Y2	24V / 0.5 A	-
Y3	24V / 3 A	-
Y4 (FS)	24V / 4 A*	Thread tension magnet
Y5	24V / 0.5 A	-
Y13 (FA)	24V / 3 A*	thread cutter magnet
Y14 - Y17	24V / 0.5 A	-
Y18 - Y19	24V / 6.5 A*	-
Y21 - Y23	24V / 0.2A	Option: Laser marking lights 1 - 3
Y24 - Y28	24V / 0.2A	-
Y31(X11/ X12: FL)	60V / 8A(2A)	Clamping foot magnet

*: Output is PWM-enabled

Magnets and magnetic valves are connected between +24V (X9) and the corresponding output (X8, X10).

Description of inputs

Input number	Input	Assignment
S1	24V	Option: Manual switch 1
S2	24V	Option: Manual switch 2
S3 - S10	24V	-
S12 (N ref.)	24V	Sewing motor reference switch
S14	24V	Pedal A
S15	24V	Pedal B
S16.	24V	Pedal C
S17	24V	Pedal D
S21 - S24	24V	-
S25 (X ref.)	TTL	Step motor X axis reference switch
S26 (Y ref.)	TTL	Step motor Y axis reference switch
S27 - S28	TTL	-

S1 - S17: The bottom switching threshold is 7.2V, the top one 16.8 V
S21 - S24 The switching threshold is 1.5V.

8.8 Error messages

If an error occurs in the control system or in the sewing pattern program the display shows a corresponding symbol and an error number.

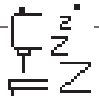
Using the following table the cause of the error can be determined and help obtained.

8.8.1 Error categories

No.	Pictogram	Name	Description
1		Serious error	The emergency stop switch is activated. The locking unit must be switched off and on again.
2 Error		Work can only continue after the user has acknowledged the error.	
3		Warning	Work can only continue after the user has acknowledged the warning.

8.8.2 Application messages

Pictogram	Description	Category	Reaction/ troubleshooting
	Capacity counter is zero	Note	· Clamping foot can only be lowered after pressing OK . · The message disappears when it has been confirmed. · When the message has been confirmed the capacity counter is reset to its initial value.
	Hand wheel turned manually	Warning	After the sewing procedure is interrupted: · no further sewing is possible · Cancel the sewing procedure by moving the pedal backwards, confirm with manual switch 1 (clamps) or press ESC on the control panel.
 	Contour exceeds the internal clamping foot frame in the -X or +X direction.	Warning	· no further sewing is possible . select another clamping foot · select another sewing pattern · Reduce the X offset in the appropriate direction .
  	Contour exceeds the internal clamping foot frame in the -X or +X and Y direction.	Warning	· no further sewing is possible . select another clamping foot . select another sewing pattern · Reduce the X offset in the appropriate direction. Reduce the sewing pattern in the Y direction.
 	Contour exceeds the internal clamping foot frame in the -X and -Y and +Y direction.	Warning	· no further sewing is possible . select another clamping foot . select another sewing pattern . Reduce X offset . Reduce the X offset in the appropriate direction.
 	Contour exceeds the internal clamping foot frame in the +X and -Y or +Y direction.	Warning	· no further sewing is possible . select another clamping foot . select another sewing pattern . Reduce X offset . Reduce the Y offset in the appropriate direction.
 	Contour exceeds the internal clamping foot frame in the X and -Y or +Y direction.	Warning	· no further sewing is possible . select another clamping foot . select another sewing pattern . Reduce the sewing pattern in the X direction . Reduce the Y offset in the appropriate direction.
	Contour exceeds the internal clamping foot frame in the -Y or +Y direction.	Warning	· no further sewing is possible . select another clamping foot . select another sewing pattern . Reduce the Y offset in the appropriate direction.

Pictogram	Description	Category	Reaction/ troubleshooting
	Contour exceeds the clamping foot material support opening in the X direction	Warning	· Sewing cannot start · select another clamping foot . select another sewing pattern . Reduce the sewing pattern in the X direction.
	Contour exceeds the clamping foot material support opening in the Y direction	Warning	. Sewing cannot start . select another clamping foot . select another sewing pattern . Reduce the sewing pattern in the Y direction.
	Contour exceeds the clamping foot material support opening in the X and Y direction	Warning	. Sewing cannot start . select another clamping foot . select another sewing pattern . Reduce the sewing pattern in the X and Y direction
	Sewing pattern blocked	Note	. Sewing cannot start . select another sewing pattern . Activate sewing pattern
	Excessive thread tension magnet temperature	Warning	· Flow adjuster (thread tension) is switched off
	Time expired without operating input		· Clamping foot is lowered

8.8.3 Machine error

Error code	Description	Possible cause	Troubleshooting
1051	Sewing motor time out	- Cable to sewing motor reference switch faulty - Sewing motor faulty - Machinery not running smoothly	- Check cable Check reference switch - Check sewing motor - Check mechanics
1055	Sewing motor overload	- Sewing motor blocked /not running smoothly - Sewing motor faulty - Control unit faulty - Cable for sewing motor not plugged in or faulty - Cable for incremental encoder not plugged in/ faulty.	- Eliminate the blockage/ stiffness - Check sewing motor - Check control unit - Connect or check sewing motor cable - Connect or check incremental encoder cable
1342 – 1343	Sewing motor error	Internal error	- Switch machine off and on again - Update software - Inform DA service
2101	X axis step motor time out referencing	- Reference switch cable faulty - Reference switch faulty - Step motor faulty Machinery not running smoothly	- Check cable Check reference switch - Check step motor - Check mechanics
2103	Step loss test: Step losses on X axis	Stitch length in the contour in the X direction too great	- Reduce speed - Scale contour smaller in X direction - Reduce stitch length in the contour in the X direction
2165 – 2167	Step motor data - X axis	Internal error	- Switch machine off and on again - Update software - Inform DA service
2201	Y axis step motor time out referencing	- Reference switch cable faulty - Reference switch faulty - Step motor faulty - Machinery not running smoothly	- Check cable Check reference switch - Check step motor- Check mechanics
2203	Step loss test: Step losses on Y axis	Stitch length in the contour in the Y direction too great	- Reduce speed - Scale contour smaller in Y direction - Reduce stitch length in the contour in the Y direction
2265 – 2267	Step motor data - X axis	Internal Error	- Switch machine off and on again - Update software - Inform DA service
2911 2914	Step motor error	Internal error	- Switch machine off and on again - Update software - Inform DA service
3100	Machine control voltage	Temporary power failure	Check mains voltage
3101	Machine power voltage	Temporary power failure	Check mains voltage

Error code	Description	Possible cause	Troubleshooting
3104	24V switching power supply: overload	- Overload 24V output - Short circuit on the distributor circuit board outputs - Cable connection to distributor circuit board damaged	- Check output component and if necessary switch to another output - Check connections, eliminate short circuit - Check cable connections
3301 3320 - 3322 3330 - 3332 3340 3341 3350 - 3351 3353 3360 3361 3400 3401 3403	Error procedure control / Test procedure/ Step motor test procedure/ Switch on procedure/ sewing procedure/ winding procedure/ adjustment aid procedure	Internal error	- Switch the machine off and on again . Update software - Contact DA Service
3358	Sewing procedure: Hand wheel turned while machine stopped	Hand wheel turned while machine stopped	Cancel sewing procedure: Push pedal back
3500 - 3506 3520 - 3530 3540 3721 3722	Command interpreter/ motor synchronisation error	Internal error	- Switch the machine off and on again. -Update software - Contact DA Service
3830	Additional circuit board program: Update error	- Malfunction - Additional circuit board faulty	- Switch the machine off and on again. - Change control unit
3840	Additional circuit board does not respond after update attempt	- Malfunction - Additional circuit board faulty	- Switch the machine off and on again. - Change control unit
4301	Dongle missing	No dongle inserted	Insert dongle into the control unit
4302	Dongle empty	- No data stored on the dongle	- Save data on the dongle
4304	Wrong type of dongle	Dongle has the wrong format for the required function.	- Use another dongle - Format the dongle
4307	Wrong machine class	Data dongle is not formatted for Class 531.	- use another dongle - Format the dongle
4311	Format ID error	- Dongle not correctly formatted - Dongle faulty	- Format the dongle again - Use another dongle

Error code	Description	Possible cause	Troubleshooting
4312	Unknown dongle type	- Dongle not correctly formatted - Dongle faulty	- Format the dongle again - Use another dongle
4530 - 4537 4900	Menu system error/ user error message	Internal error	- Switch machine off and on again - Update software - Inform DA service
5101	NV RAM empty	Control unit is new. No data available Control unit for a different machine class, data incompatible	Data is reset to factory settings
5104	NV RAM checksum error	NV SRAM faulty Malfunction	- Check with Multi-test, check control unit - Switch the machine off and on again - Data is reset to factory settings
5804	Free contours: Checksum incorrect	- NV SRAM faulty - Malfunction	- Check with Multi-test, check control unit - Switch machine off and on again. Data is reset to factory settings
5808	Error - free seam contour stitch number cannot be determined	Internal error	- Switch the machine off and on again - Update software - Contact DA Service
5809	Free contours: Maximum number of partial contours	Maximum number of partial contours (interim cutting) exceeded	Delete the interim cutting operations in the free contours
5810	Free contours: Minimum number of stitches per partial contour	Minimum number of stitches per partial contour not adhered to	Move interim cutting operations in the free seam contours.
5900	Sequence error - Impermissible sequence number	Internal error	- Switch the machine off and on again. -Update software - Contact DA Service
6152 - 6154 6204	Input/ output error	Internal error	- Switch the machine off and on again - Update software - Contact DA Service
6351 - 6354	Error I^2C	Control unit faulty	Check control unit
6551 6554 6651 6751 - 6759	Upper part position error/ AD converter/ processor error/ step motor driver	Internal error	- Switch the machine off and on again. -Update software - Contact DA Service
7460	Test interface communication	- Cable fault - Test interface cable faulty - Internal error	- Switch off source of interference - Check cable - Switch the machine off and on again

Error code	Description	Possible cause	Troubleshooting
7551 - 7559	Operating panel interface communication	Internal error	- Switch the machine off and on again - Update software - Contact DA Service
7556 7557	Operating panel interface communication	- Cable fault - Operating panel interface cable faulty	- Switch off source of interference - Check cable -
7700	Protocol: Max. number of repeats	- Cable fault - Test interface cable faulty	- Switch off source of interference - Check cable -
7701	Error log	Internal error	- Switch the machine off and on again - Update software - Contact DA Service
8351 8700 8702 8800 - 8806 8890 8891	Test pin error/ key simulation/ signal/ event processing/ memory wrapper/ function list	Internal error	- Switch the machine off and on again - Update software - Contact DA Service
9100 - 9105 9200 9201 9900 9902 9903 9905	Sewing pattern management error/ Sewing pattern program/ Sewing pattern activation/ Setting up/ Pressing keys/ Memory message output	Internal error	- Switch the machine off and on again - Update software - Contact DA Service If error 9110 occurs repeatedly. Reset the sewing pattern programs and sequences using the Initialization menu (see Page 60).

If an error occurs the corresponding unit can be checked to ensure it is working properly using the Service/ Multi-test menu (see Page 49). The Service menu can be accessed at technician level and when switching the machine on by pressing F when the DA logo appears (Enter code 25483).

9. Sewing

Operating and function sequence when sewing:

Sewing procedure	Operation/ Explanation
Before starting sewing Initial position Insert material	 - Pedal idle Locking unit idle Needle up, material clamps up.
Sewing	**- Push pedal forward to position 1.** **The clamps come down.** - Release pedal. The clamps go up again. The material can be repositioned. - Push pedal completely forward. The locking unit sews at the set speed.
In the sewing cycle Stop sewing procedure- To continue the sewing procedure	 - Push pedal back. The locking unit stops. The clamps stay at the bottom. - Push the pedal all the way forward.

10 Maintenance

10.1 Cleaning and checking

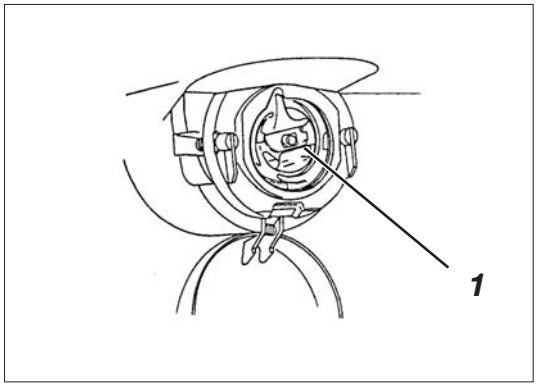
Caution, danger of injury!

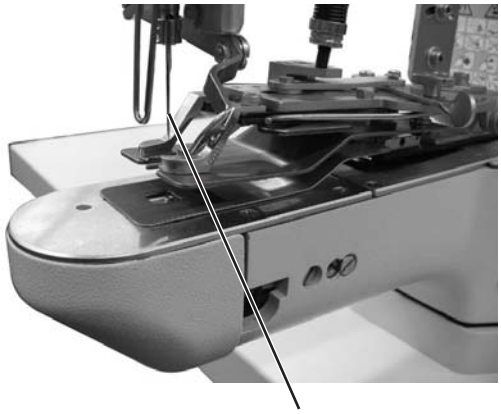
Switch the main switch off.
The locking unit must only be maintained when it is switched off.

Maintenance work must be done no later than the maintenance intervals specified in the tables (see “Operating hours” column).

When dealing with very fluffy materials shorter maintenance intervals may be necessary.

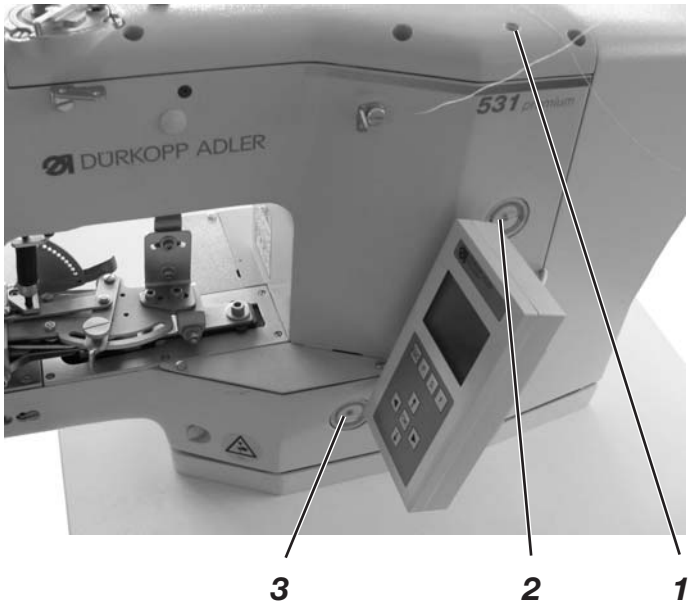
A clean locking unit protects against malfunctions.





Maintenance work to be carried out	Explanation	Operating hours
Top of machine		8
- Remove sewing dust and loose threads. (e.g. with compressed air gun)	Places to be cleaned particularly: - Underside of stitch plate - Area under the hook 1 - Bobbin housing - Thread cutter - Area under the needle 2	
Control box	- Keep ventilation filters clear	8

10.2 Oil lubrication



Caution, danger of injury!

Oil can cause skin rashes.
Avoid excessive contact with the skin.
Wash thoroughly after contact.

CAUTION!

Handling and disposing of mineral oils is subject to statutory regulations.
Take used oil to an authorised receiving center.
Protect the environment.
Ensure that you do not spill any oil.

Only use lubrication oil **DA 10** or a similar oil with the following specifications to lubricate the locking unit:

– Viscosity at 40°C: 10 mm²/s
– Flash point: 150°C

DA 10 can be obtained from **DÜRKOPP ADLER AG** sales centers under the following part numbers:

20 ml container:	9047 000011
1 litre container:	9047 000012
2 litre container:	9047 000013
5 litre container:	9047 000014

Maintenance work to be carried out	Explanation	Operating hours
Lubricating the button sewing attachment	The button sewer is fitted with a central oil wick lubrication system. The bearing points are supplied from oil reservoirs 2 and 3. - The oil level must not go below the red line on the two oil reservoirs . - Top up with oil through hole 1 up to the red line.	8

11. Standard sewing patterns

No.	Stitch pattern	Stitch distribution	number of Connecting threads	standard size x direction (mm)	Standard size Y direction (mm)
1		5 - 6	1	3.4	3.4
2		7 - 8	1	3.4	3.4
3		7 - 8	3	3.4	3.4
4		9 - 10	1	3.4	3.4
5		11 - 12	1	3.4	3.4
6		5 - 5	0	3.4	3.4
7		7 - 7	0	3.4	3.4
8		9 - 9	0	3.4	3.4
9		11 - 11	0	3.4	3.4
10		5 - 5	1	3.4	3.4
11		7 - 7	1	3.4	3.4
12		9 - 9	1	3.4	3.4
13		5 - 6	1	3.4	3.4
14		7 - 8	1	3.4	3.4
15		9 - 10	1	3.4	3.4
16		11 - 12	1	3.4	3.4
17		5 - 5	0	3.4	3.4
18		7 - 7	0	3.4	3.4
19		9 - 9	0	3.4	3.4
20		5 - 5	1	3.4	3.4
21		7 - 7	1	3.4	3.4

No.	Stitch pattern distribution	Stitch Connecting threads x direction (mm)	number of Y direction (mm)	standard size	Standard size
22		9 - 9	1	3.4	3.4
23		11 - 11	1	3.4	3.4
24		5	-	3.4	
25		7	-	3.4	
26		9	-	3.4	
27		11	-	3.4	
28		15	-	3.4	
29		19	-	3.4	
30		6	-	-	3.4
31		10	-	-	3.4
32		12	-	-	3.4
33		5 - 6	1	3.4	3.4
34		9 - 10	1	3.4	3.4
35		5 - 5	0	3.4	3.4
36		9 - 9	0	3.4	3.4
37		5 - 5 - 4	-	2.9	2.5
38		8 - 8 - 7	-	2.9	2.5
39		5 - 5 - 4	-	2.9	2.5
40		8 - 8 - 7	-	2.9	2.5
41		6 x 4	-	3.5	4.0
42		6 x 6	-	3.5	4.0
43		5 - 5 5 - 5	-	3.5	4.0

No.	Stitch pattern distribution	Stitch Connecting threads x direction (mm)	number of	standard size Y direction (mm)	Standard size
44		7 - 7 7 - 7	-	3.5	4.0
45		3 - 4 - 4	-	3.4	3.4
46		4 - 4 - 3	-	3.4	3.4
47		3 - 4 - 3	-	3.4	3.4
48		3 - 4 - 3	-	3.4	3.4
49		6 - 6 - 6 - 5	-	3.4	3.4
50		8 - 8 - 8 - 7	-	3.4	3.4

12. Clamping feet

Clamping foot number	Dimensions X x Y [mm] Material support plate opening	Rectangular inner frame	Standard sewing pattern number parameter	permissible standard sewing patterns	Description	
1	10 x 10	yes	1	all	button clamps	

- For technical reasons and to provide a safety margin the sewing field is smaller than the material support plate opening.

13 Repair

When the machine is damaged or parts are worn please contact:

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