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Preface and General Safety Information

Part 1: Operating Instructions Cl. 743-221

1. Product Description

1.1 Proper Use

The **743-221** is a sewing unit which can properly be used for the sewing of light to medium weight material.
Such material is, as a rule, material made up of textile fibers or of leather. These materials are used in the garment, furniture and automobile upholstry industries. Further, it may also be possible to execute so-called technical seams with this sewing unit. Here, however, the operator must in any case (Dürkopp Adler will be glad to help) make an evaluation of the possible dangers since such applications are, on the one hand, relatively seldom and, on the other, the variety is immense. Dependent on the results of this evaluation, it may be necessary to take suitable safety precautions.

Generally, only dry material may be worked with this sewing unit. The material may not be thicker than 3 mm. The material may contain no hard objects.

The seam is generally made with textile fibers of dimensions up to 40/NeB (cotton yarns), 65/2 (synthetic yarns) or 65/2 Nm (covering twists). Those wanting to use other threads must first evaluate the dangers arising therefrom and, if necessary, take appropriate safety measures.

This sewing unit may only be installed and operated in dry and clean premises. If the sewing unit is used on other premises which are not dry and clean, further measures, which are to be agreed upon, may be necessary (see EN 60204-3-1:1990).

We, as a manufacturer of industrial sewing machines, assume that at least semi-skilled operating personnel will be working on our products so that all normal operations and, where applicable, their dangers are presumed to be known.

Noise Level Value Lc

Workstation-specific emmission value to DIN 45635-48-B-1

Number of stitches:	4.800 min^{-1}
Stitch length:	2,2 mm
Seam length:	70 mm
Sewing cycle:	2,5 s ON and 1,0 s OFF
Material:	G1 DIN 23328 2-play

Measuring point to DIN 4895 Part 1

X = 0 mm Y = -400 mm Z = 300 mm

Lc = 82 dB (A)

1.2 Short Description

The **DÜRKOPP 743-221** is a sewing unit for the automated sewing **single-point darts** with straight or curved seam form and for the sewing of **pleats**.

- The unit is equipped with a machine head in lockstitch execution.
- A form set appropriate to the seam form holds and guides the material.
- The seam length control occurs, as desired, via a light barrier or through programming.
- Seam securing at the seam beginning and seam end through bar tacking or stitch condensation in the material
- Thread trimmming system: Controlled chain shears
- Transport carriage drive via step motor.
- The complete control of the sewing unit occurs via a microcomputer. It assumes the control functions, monitors the sewing process and signals operating errors and malfunctions.
- Electronic thread monitor prevents a restarting of the sewing sequence by thread breakage or used-up threads.

1.3 Technical Data

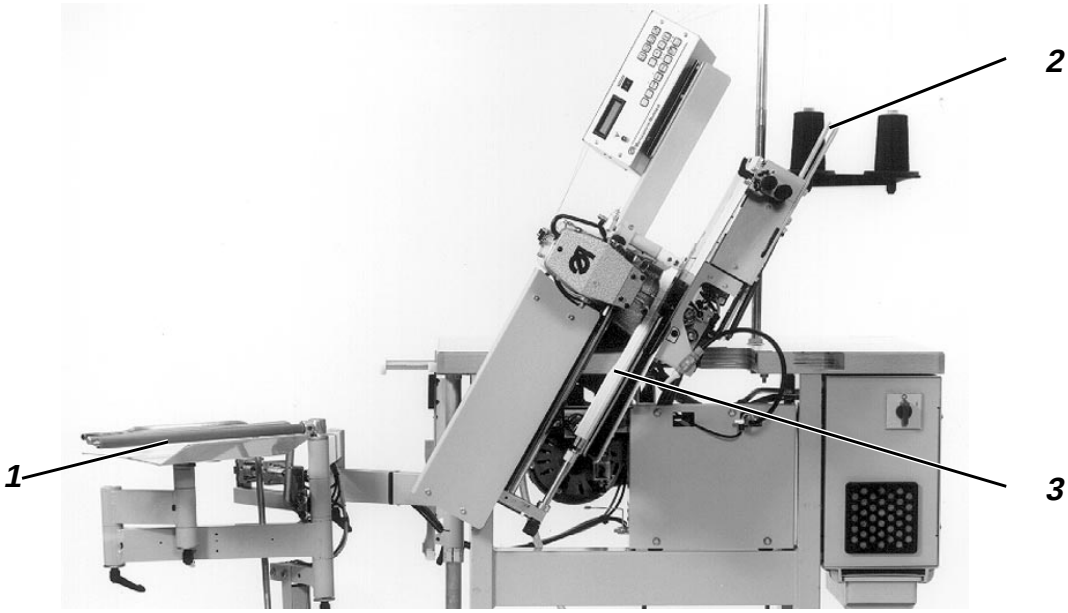
Machine head:	Class 935 - 271 - 710
Needle system: Needle thickness: Yarns:	134 Serv 7 80 - 100 40 NeB, 65/2 Nm
Stitch type:	Single-needle lockstitch
Number of stitches:	Sewing: 3.800; 3.900; 4.000 - 4.800 / min Bar tacking: 1 000 - 3 000 / min Advance: 3 000 - 4 000 / min Thread chain: 1 000 / min
Stitch length:	Advance: 1,9; 2,2; 2,5; 2,8 mm Normal seam: 1,9 - 2,8 mm Seam tacking: 2,2 mm Stitch condensation: 0,5; 0,8; 1,1; a. 1,4 mm
Sewing length: Folding table:	45 - 150 mm 0 - 10°, adjustable
Operating pressure: Air consumption per work cycle:	6 bar approx. 2 NL no blow cycle approx. 12 NL with short blow cycle
Nominal voltage:	**9880 743002** 3 ~ 380 - 400 V + N, 50 Hz **9880 743003** 3 ~ 220 - 240 V, 50 Hz **9880 743004** 3 ~ 220 - 240 V, 60 Hz The sewing unit is delivered with **one** of the listed **voltage sets** appropriate to the nominal voltage.

1.4 Optional Equipment

0794 013222	Bundle clamp with slewing arm and holding pipe.
0794 000091	Placement table (small). (only in conjunction with the bundle clamp)
0794 000332	Smoother device for smoothing the blown-out sewing pieces. (only in conjunction with the bundle clamp)
0794 013333	Blower pipe from above or from the right.
0794 013444	Placement table (when using in-house bundle clamp carriages)
0797 003031	Compressed air connection hose, coupling plug, coupling socket and hose nozzle.

2. Operating the Sewing Unit

2.1 Tilting the Machine Head Up



The machine head can be tilted up for maintenance work.

Caution Risk of Injury !

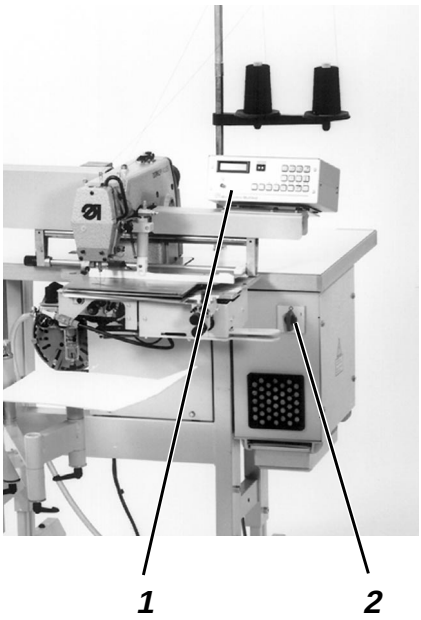
Turn the main switch off.
Tilt the machine head up only with the sewing unit turned off.

- Swing the placement table 1, bundle clamp and smoother to the side.
- Bring the form set 3 into the left end position.
- Carefully tilt the machine head up at the lever 2.
  The machine head is held in this position through the location of the center of gravity.

2.2 Turning On - Quick Stop - Restarting

Caution Risk of Injury !

Do not reach into the area of moving machine parts.



Turning on

– Turn the main switch 2 on.
  The controls are initialized.
  The sewing unit requests a reference run.
– Press the " Σ " key.
  The reference run is conducted.
  The sewing unit is operational.

Turning off

– Turn the main switch 2 off.
  The sewing unit is separated from the power supply.
  It is **not** operational.

Quick stop

To immediately stop the sewing unit by operating errors, needle breakage, thread breakage, etc. the " **STOP** " key on the controls 1 must be pressed.

– Press the " **STOP** " key.
  All running procedures of the sewing unit are immediately stopped!
  The sewing unit is returned to the same status which it is in after being turned on.

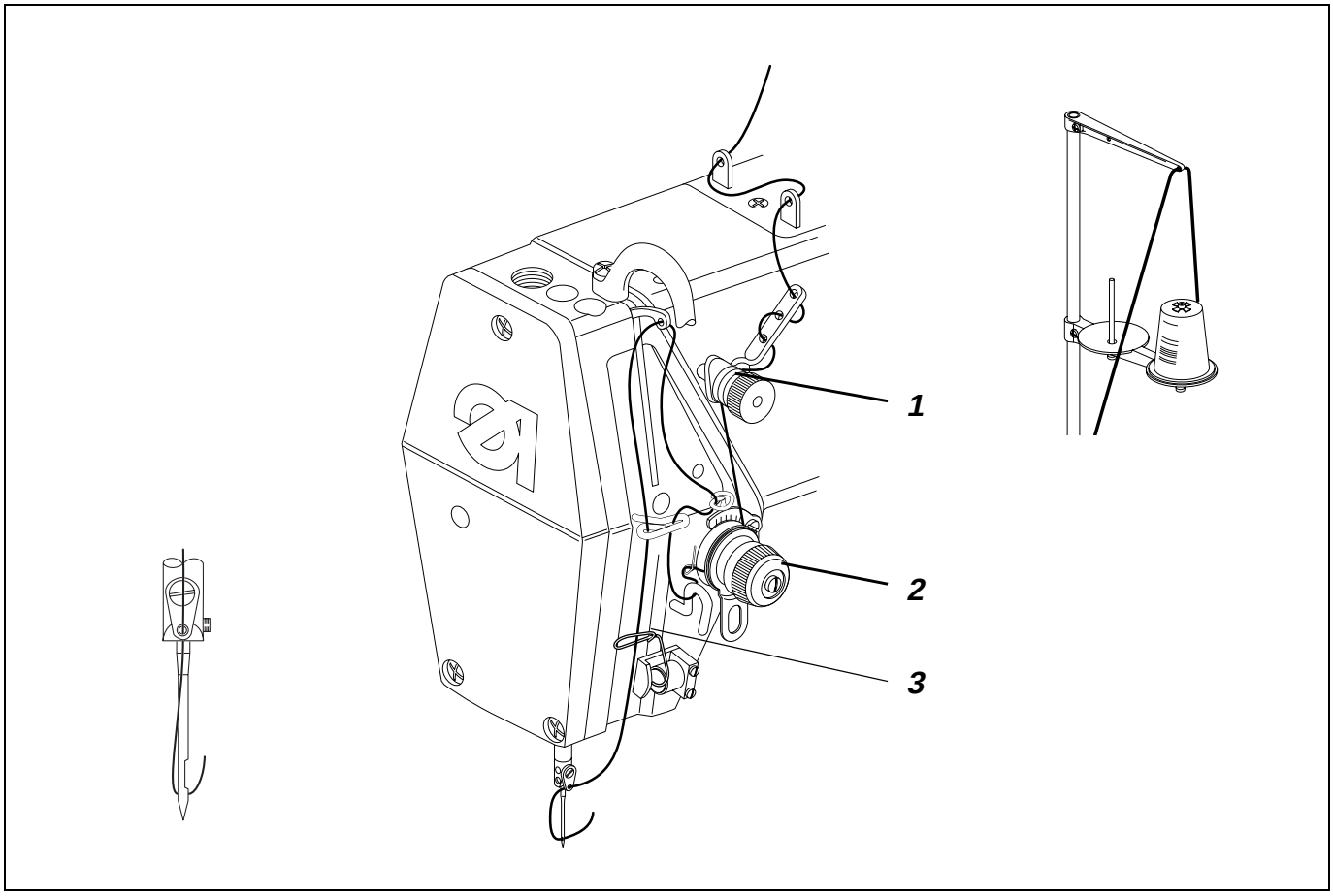
Restarting

ATTENTION !

The restarting of the sewing unit after a quick stop may only occur after the corresponding malfunction has been corrected.

– Turn main switch 2 off.
– Correct the malfunction.
– Turn main switch 2 on.
  The sewing unit is ready to start again.

2.3 Threading the Needle Thread



Caution Risk of Injury !

Turn the main switch off.
Thread the needle thread only with the sewing unit turned off.

– Thread the needle thread as shown in the illustration.

2.4 Setting the Needle Thread Tension

Pre-tensioning 1

If the sewing unit is on, than the maintension is open. For the save function of the needle thread monitor a residual tension of the needle thread is necessary.

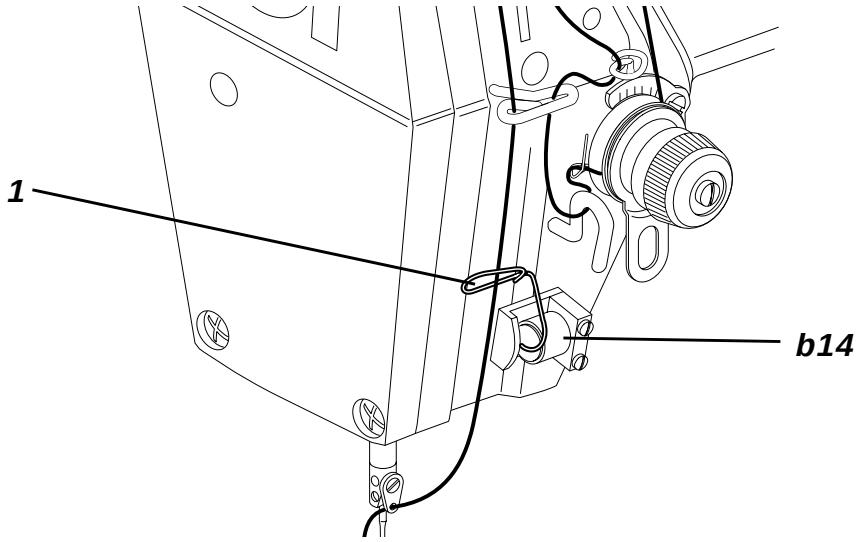
– Set pre-tensioning 1.
  If the needle thread is fixed by the thread trimmer than the thread clamp 3 should be hold in its highest position by the pre-tensioning.

Maintension 2

The recommended needle thread tension (app. 60 - 80 g) is the result of pre-tensioning 1 and maintension 2.

– Turn knurled nut 1 appropriately.
  Increase tension = Turn knurled nut 1 clockwise
  Decrease tension = Turn knurled nut 1 counterclockwise

2.5 Thread Monitor for the Needle Thread



The switch **b14** monitors the needle thread.

Function

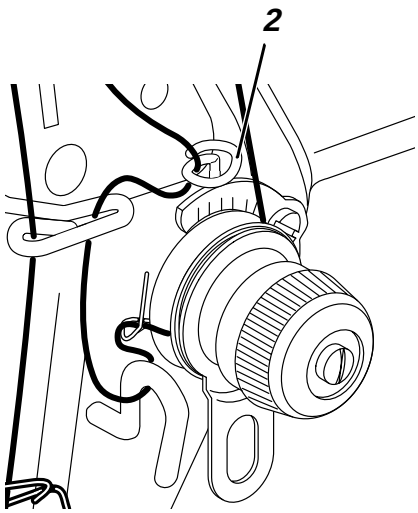
- After a breaking of the needle thread the thread guide 1 drops down.
  The switch **b14** remains unoperated.
- The machine head positions in position 2 (needle up).
  The display of the control unit shows the symbol "**-x-**" (needle thread break).

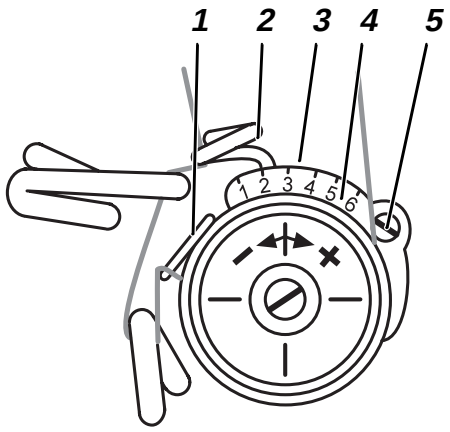
Caution Risk of Injury !

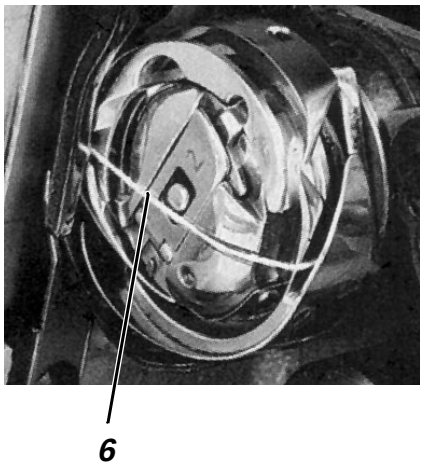
Before threading the needle thread turn the main switch off.
Renewed starting is only possible after turning the main switch off and on again.

- Thread the needle thread again and lead it through the thread clamp.
- Turn the main switch on.
- Start a new sewing sequence.

2.6 Setting the Thread Regulator







The needle thread quantity required for stitch formation is regulated with the thread regulator 2.
Only a precisely set thread regulator guarantees an optimal sewing result.

The setting of the thread regulator is dependent on the following factors:

- Stitch length
- Material thickness
- Characteristics of the sewing yarn used

With a correct setting, the needle thread loop 6 should glide over the hook without excess and with a little tension.

Caution Risk of Injury !

Turn the main switch off.
Set the thread regulator only with the sewing unit turned off.

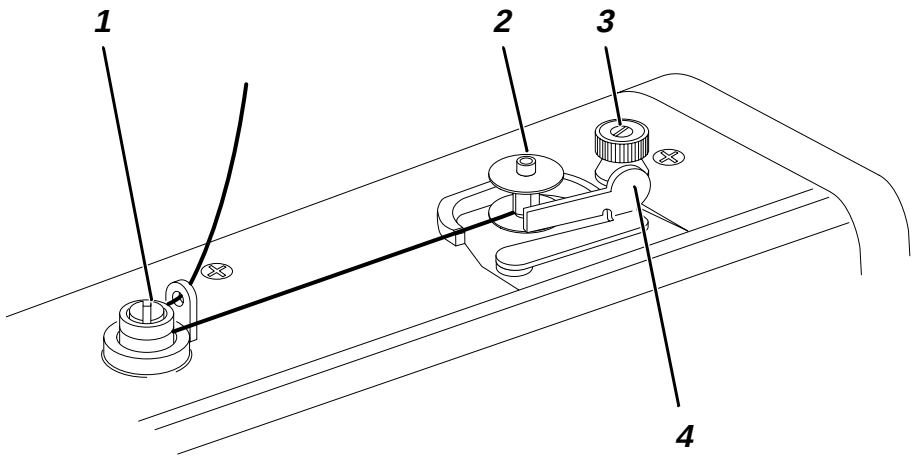
- Loosen screw 5.
- Set thread regulator 2.
  The vertical wire 3 in conjunction with scale 4 serves as a setting aid (Guideline value: 2.5).
- Tighten screw 5.

Setting note:

With a correct setting of the thread regulator the following must apply:

- When the thread loop 6 passes the maximum girth of the hook, the thread controller spring 1 must be pulled approx. 1 mm downward out of its upper end position.
  The 1 mm dimension is a guideline. Dependent on the tension of the thread controller spring, it can be greater or smaller.

2.7 Winding the Underthread

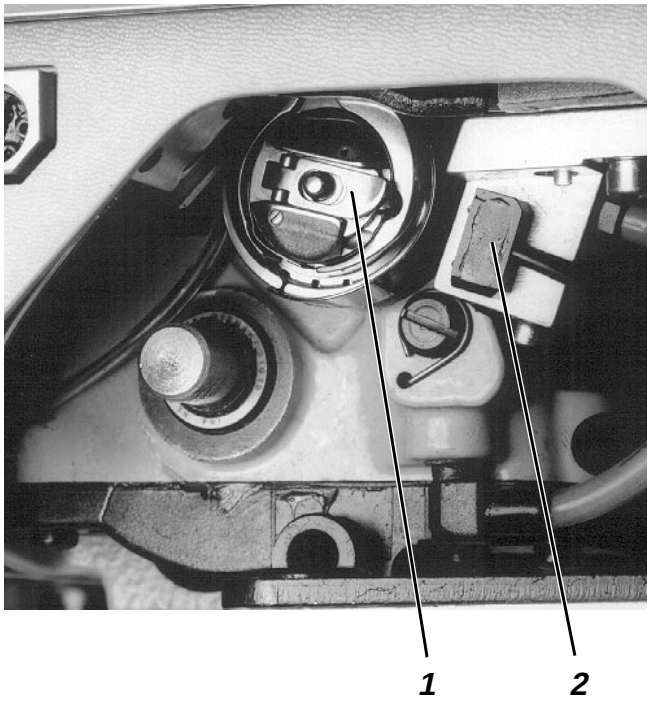


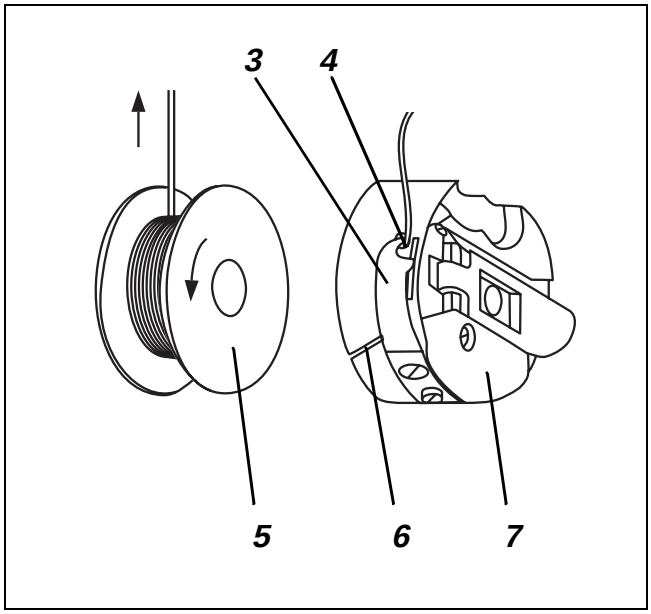
Caution Risk of Injury !

Turn the main switch off.
Thread the underthread for winding only with the sewing unit turned off.

- For a secure functioning of the remaining thread monitor remove thread residue from the bobbin hub before winding.
- Thread the underthread as shown in the illustrations.
- Wind the underthread clockwise in the reserve groove 6 of the bobbin hub.
- Place the bobbin on the bobbin winder shaft 2.
- Pull the thread end through the cutting clamp 3 and cut off.
- Swing the bobbin winder flap 4 against the bobbin.
- Set the bobbin thread tension 1.
  The underthread should be wound with the least possible tension.
- Turn the main switch on.
- Start the sewing sequence.
- The bobbin winder turns itself off after reaching the set bobbin fill capacity.
  For setting the bobbin fill capacity see the Service Instructions.

2.8 Changing the Bobbin





Caution Risk of Injury !

Turn the main switch off.
Change the underthread bobbin only with the sewing unit turned off.

Removing the empty bobbin

- Lift bobbin case flap 1.
- Take out the bobbin case top 7 with bobbin.
- Remove empty bobbin from the bobbin case top 7.

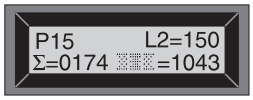
Inserting a full bobbin

- Insert the full bobbin in the bobbin case top 7.
- Pull the underthread through slit 6 under the tension spring 3 until in the drilled hole 4.
- Pull the underthread approx. 5 cm out of the bobbin case top 7. The bobbin 5 must turn in the direction of the arrow when the thread is pulled off.
- Insert the bobbin case top 7 again.
- Close the bobbin case flap 1.
- Turn the main switch on.
- Start a new sewing sequence.

ATTENTION !

For a sure functioning of the remaining thread monitor clean the lenses of the reflecting light barrier 2 with a **soft** cloth at every bobbin change.

2.8.1 Counter for Control of the Underthread Reserve



The decrementer, which can be preset in program **P41,** monitors the underthread reserve.
It is decreased by the value 1 after every 10 stitches.

The height of the initial value to be selected depends

- on the thickness of the underthread used
- on the amount of thread wound onto the bobbin.

Example:

With an 100/2 underthread 18 000 stitches can be sewn with one bobbin filling.
The initial value to be set thus results from:

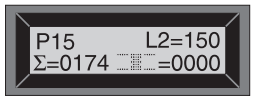
18 000 stitches : 10 = 1 800 stitches

The exact initial value to be set can best be arrived at during operation:

- Insert a full bobbin.
- Preset the initial value in program **P41**.
  See Short Description Microcontrol.

ATTENTION !

The underthread monitoring through the counter is turned off by setting the initial value to **0000**.



- Start the sewing sequence.
- If, when the counter reaches **0000,** there is still a large quantity of thread remaining on the the bobbin, then the set initial value can be increased.
- When the counter reaches **0000** the already begun seam is still securely sewn to the end.
  The display shows the symbol (bobbin empty).

  The sewing unit can not be started.
- Turn the main switch off.

Caution Risk of Injury !

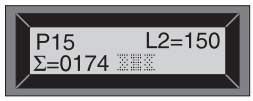
Turn the main switch off.
Change the bobbin only with the sewing unit turned off.

In order to start a new sewing sequence after a bobbin change, it is essential that the main switch be turned off.

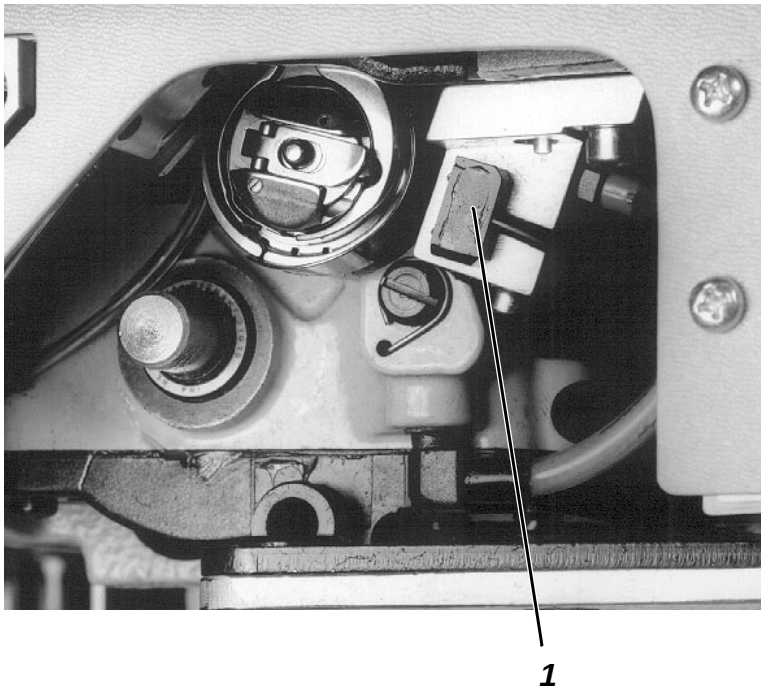
- Change the bobbin.
- Turn the main switch on.
  When the unit is turned on the initial value of the counter is automatically loaded.

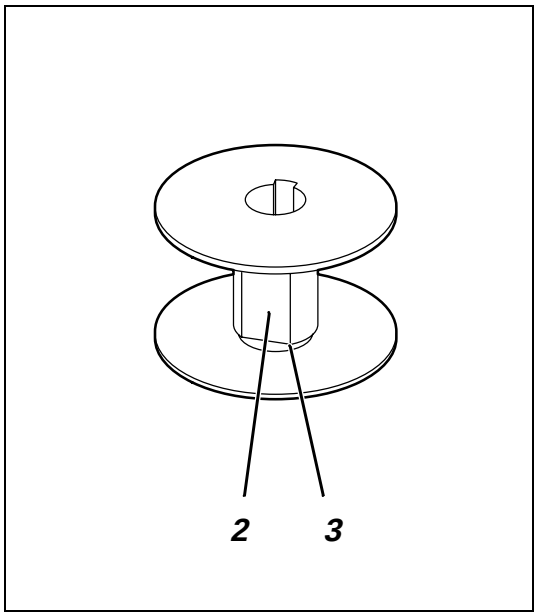
Display of the counter for the underthread reserve

The monitoring of the underthread counter is turned on or off by program 44.



2.9 Remaining Thread Monitor





The remaining thread monitor monitors the thread reserve on the the underthread bobbin with the infrared reflecting light barrier 1.

Function

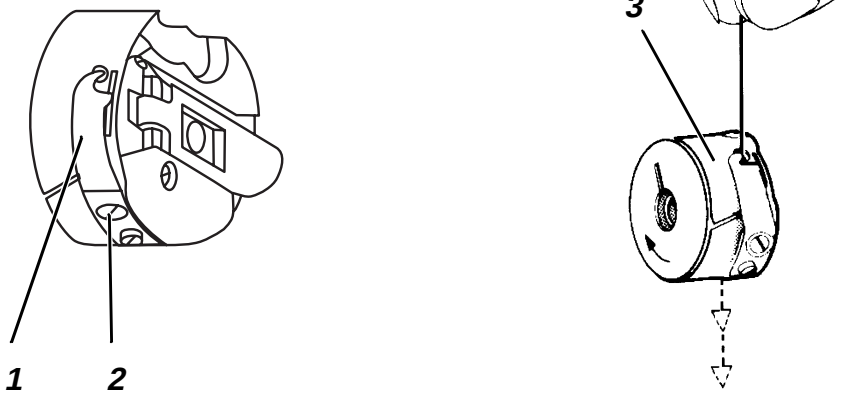
- After a certain number of seams the underthread reserve on the bobbin is used up.
- The light beam transmitted from light barrier 1 is reflected by the exposed reflecting surface 2 on the bobbin hub.
- The display of the controls shows the message " Bobbin Empty ".
- The seam is securely ended with the thread reserve found in the reserve groove.

Caution Risk of Injury !

Turn the main switch off.
Change the underthread bobbin only with the sewing unit turned off.

- Turn the main switch off.
- Change the bobbin.
- At every bobbin change clean the lenses of the light barrier with a **soft** cloth.
- Turn the main switch on.
- Start a new sewing sequence.

2.10 Setting the Underthread Tension



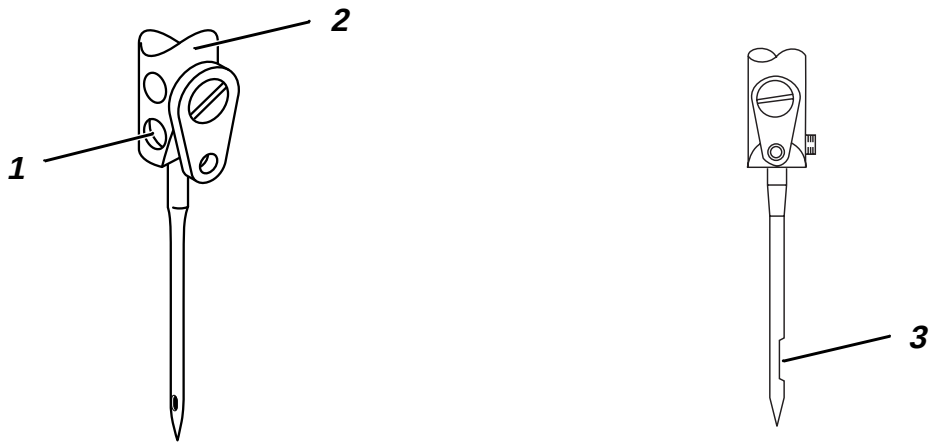
The necessary underthread tension should be created by the tension spring 1.

Caution Risk of Injury !

Turn the main switch off.
Set the brake spring 1 and the tension spring 3 only with the sewing unit turned off.

- Place the bobbin in bobbin case top 1 and thread the underthread.
- Set the tension spring 1 at adjusting screw 2.
  The underthread tension should be 20 - 30g.
  The bobbin case 6 should slowly lower under its own weight (see right illustration).

2.11 Changing the Needle



Caution Risk of Injury !

Turn the main switch off.
Change the needle only with the sewing unit turned off.

- Loosen screw 1 and remove the needle.
- Push the new needle into the drilled hole of the needle bar 2 up to the stop.
  Attention!
  Viewed from the operator side of the sewing unit the furrow 3 of the needle must show to the right, that is, to the hook point (see sketch).
- Tighten screw 1.

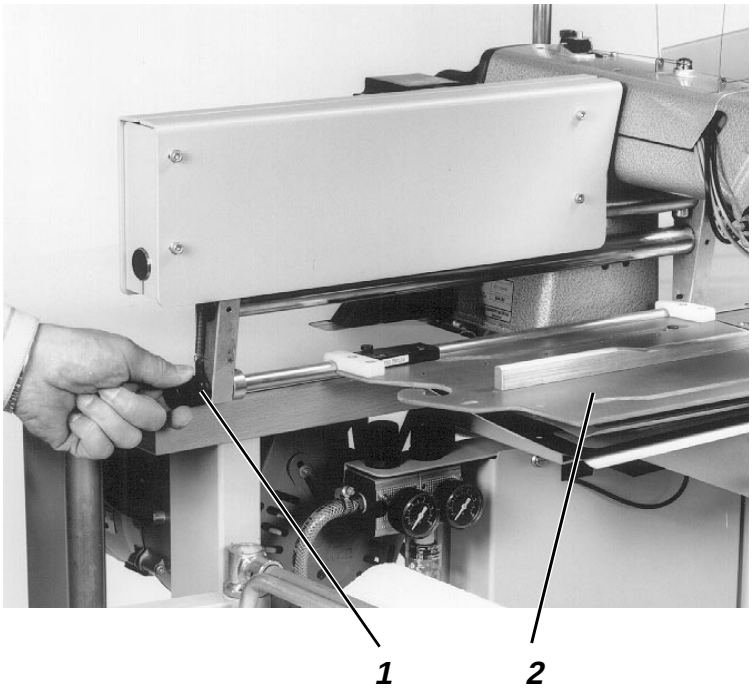
ATTENTION !

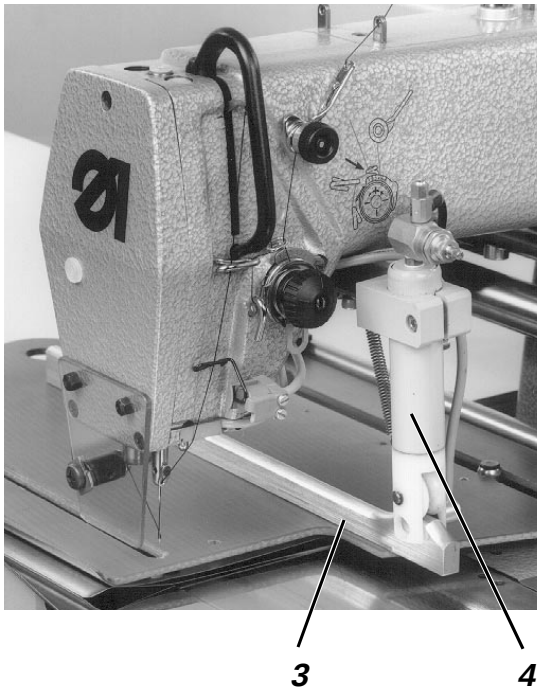
After a change to another needle thickness the clearance of the hook to the needle must be corrected (see Service Instructions).

The non-observance of the above correction can lead to following faults:

- Change to a thinner needle:
  - Missing stitches
  - Damage to the thread
- Change to a thicker needle:
  - Damage to the hook point
  - Damage to the needle

2.12 Changing the Form Set





A form set corresponding to the desired seam form must be inserted.

Form set 0793 078001 =	Straight seam
Form set 0793 078002 =	Curved seam
Form set 0793 078034 =	Curved seam for pleats
Form set 0793 078xxx =	Customer-specific version

Caution Risk of Injury !

Turn the main switch off.
The form set may only be changed with the sewing unit turned off.

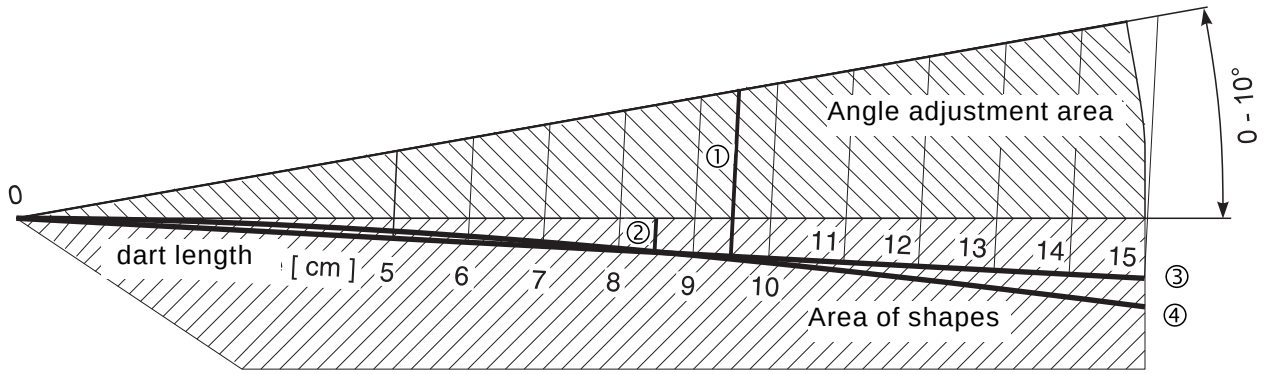
Taking the form set out

- Turn the handwheel until the needle lies in the 2nd position **(OT)**.
- Push the form set into the left end position.
- Turn handle 1 approx. 90° counterclockwise.
- Lift the form set 2 on the left side and carefully loosen from the transport carriage.
- Remove the form set.

Inserting the form set

- Turn the handwheel until the needle lies in the 2nd position **(OT)**.
- Push the transport carriage into the left end position.
- Carefully place the right side of form set 2 onto the transport carriage.
- Turn handle 1 approx. 90° counterclockwise and place the form set completely on the the transport carriage.
- Turn handle 1 back.
  The form set is locked and sits firmly on the transport carriage.
- Position the press-on cylinder 4 with the guide roller on the guide curve 3.
- Push the form set to the right stop.

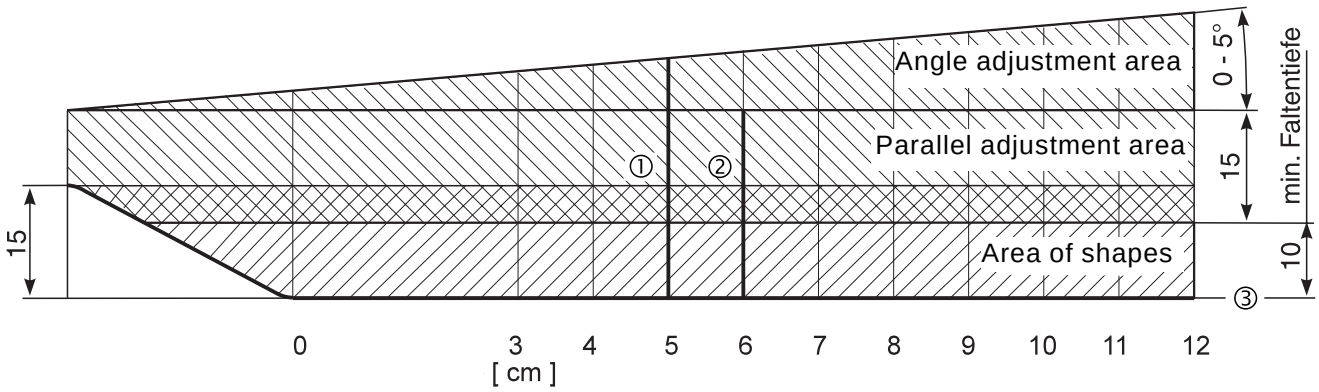
Work Area for Darts



Example for form set 0793 078001

1 Dart depth max. 2.1 cm at 10°, length 9.5 cm
2 Dart depth max. 0.4 cm at 0°, length 8.5 cm
3 Form set 0793 078001
4 Form set 0793 078002

Work Area for Pleats



Example for form set 0793 078034

1 Pleat depth max. 3.2 cm at 5°, length 5 cm
2 Pleat depth max. 2.5 cm at 0°, length 6 cm
3 Form set 0793 078034

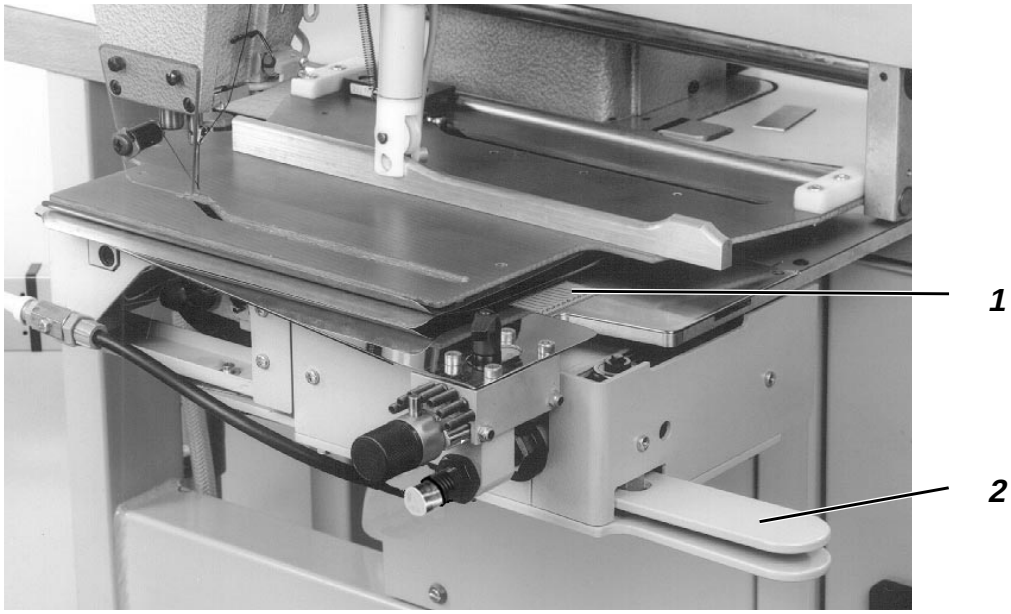
2.13 Work Area, Angle and Length

The **dart depth** is dependent on:

- the form set used
- the dart length
- the setting of the folding table

The folding table is continuously adjustable between 0 - 10°.

The dart depths for other angles and lengths can be found in the diagrams.
The curve for the form set **0793 078002** is also listed.



Caution Risk of Injury !

Turn the main switch off.
The angle may only be set with the sewing unit turned off.

Setting the angle

- Press handle 2 together and set the folding table according to the scale 1.
- Release the handle.
  The angle is set.

Setting the length

Maximum **dart length** 150 mm.

- The seam length control occurs via programming (keys L1, L2, L3) or via the light barrier.

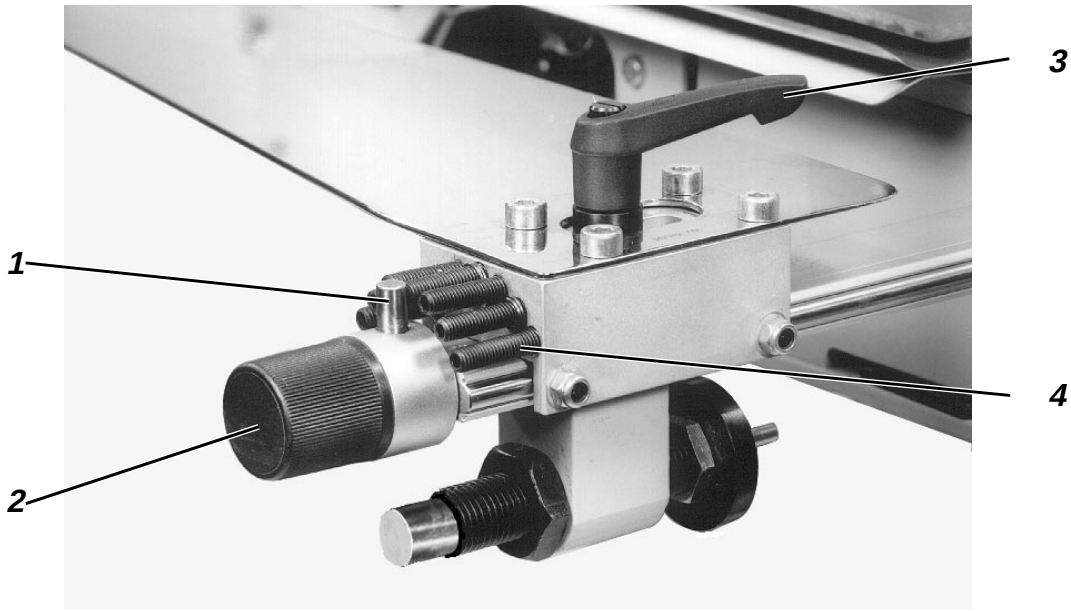
  The programmed seam length control is recommended for diaphanous material.

2.14 Setting the Insertion Depth of the Folding Table

The first stitch of the needle into the material should occur as close as possible to the front edge.

In order to achieve a uniformly slim dart point with differing material thicknesses, the machine is equipped with a fine adjustment.

7 different insertion depths can be set with the stops 4.



Caution Risk of Injury !

Turn the main switch off.
The insertion depth may only be set or changed with the sewing unit turned off.

Setting the insertion depth

- Release lever 3.
- Push the folding table a bit forward on the guide.
- Set one adjusting screw 4 (7-off) to the desired insertion depth.
- Turn setting knob 2 to the desired insertion depth (stop).
- Push the folding table to the back on the guide again.
  The adjusting screw 4 must firmly touch the stop 1.
- Tighten lever 3 again.

Changing the insertion depth

- Release lever 3.
- Push the folding table a bit forward on the guide.
- Turn setting knob 2 to the desired insertion depth (stop).
- Push the folding table to the back on the guide again.
  The adjusting screw 4 must firmly touch the stop 1.
- Tighten lever 3 again.

3. Setting the Controls

The setting of the controls is explained in detail in Part 4:
Short Description Microcontrol !

Here only those settings required for the sewing sequence are listed.

Caution Risk of Injury !

Turn the main switch on !

The programming of the controls occurs with the main switch turned on!
The machine should not be started unintentionally.

– Set the **" Program "** switch to 10 to 29.
The sewing program is selected.

10 - 29 = Sewing program for darts and pleats

–

– Press the **" STOP "** key.
The sewing program is activated.
The sewing unit requests a reference run.

– Press the " Σ " key.
The reference run is conducted.

– **Only for program writing or program alteration !**

Press the " **P** " key for 3 seconds.
The controls change to the **programming mode**.
Previously set values can be overwritten.

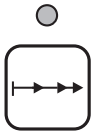
A comprehensive description is to be found in Part 4:
Short Description Microcontrol.

Press the " **P** " key.
The programming mode is exited; the sewing unit is operational.

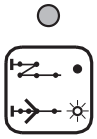
– Setting the seam length.
Press the **" L1 "**or **" L2 "** or **" L3 " key**.
Set the desired value with the **" + "** or **" - "** keys.

Establishing the seam length via the transmitted light barrier.
Press the key.

– Press the " Σ " key.
The piece counter is reset to **0000**.

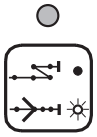


– Activating the Softstart.
Press the key.
The LED is lit when the function is selected.



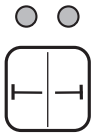
– **Preselecting end securing** at the seam beginning.
Press the key.

LED on: End securing through stitch condensation
LED off: End securing through seam tacking



– **Preselecting end securing** on the seam end.
Press the key.

LED on: End securing through stitch condensation
LED off: End securing through seam tacking



– **Activating end securing** at the seam beginning or at the seam end.

Press the key.
Depending on which LEDs are lit, the end securing is active.

End securing through stitch condensation or bar tacking:

☼ ☼	Seam beginning with	Seam end with
● ☼	Seam beginning without	Seam end with
☼ ●	Seam beginning with	Seam end without
● ●	Seam beginning without	Seam end without

– Activating the smoother.
Press the key.
The LED is lit when the function is selected.

– Activating the blower from above / from the right.
Press the key.

☼ ●	Blower from above
● ☼	Blower from the right
● ●	Blower off

The controls are completely set.

4. Sewing

After the main switch is turned on or the **" STOP "** key is pressed, the microcomputer checks the base setting of the sewing unit.

Caution Risk of Injury !

Turn the main switch off !
Mark the dart length only with the sewing unit turned off.

- Mark the dart length with smooth and thinnest possible tape on the folding plate 1.

- Turn the main switch on.
- Set the **" Program "** switch.
- Press the **" STOP "** key.
  The selected program is active.
- Press the " Σ " key.
  The reference run is conducted.
  The sewing unit is operational.

- Place the sewing piece over the edge of the folding plate with both hands.
- Place the raw edges together evenly with the right hand.
- Align the punched mark for the dart length precisely to the rear edge of the folding plate.
- Hold the material with the right hand at the front edge and push in the folding plate.
  The material is held by the form set.
  The folding plate runs back.
  The sewing sequence is conducted.

ATTENTION !

Do not insert the folding table without material !
The friction surfaces of the form set could be damaged.

5. Maintenance of the Sewing Unit

Caution Risk of Injury !

Turn the main switch off.
The maintenance of the sewing unit may only be conducted when it is turned off.

5.1 Cleaning

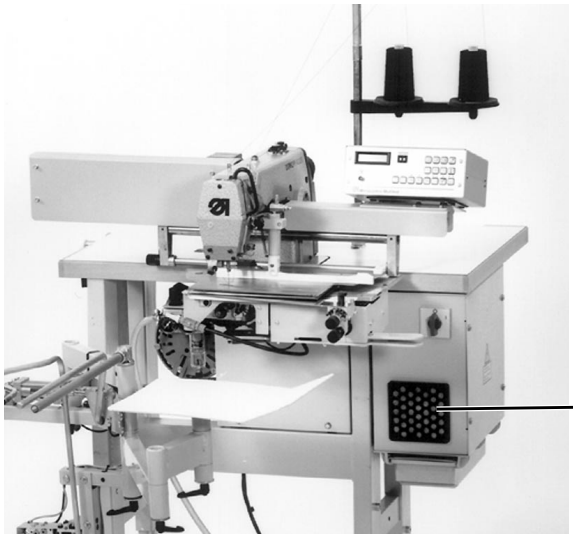
A clean machine protects against malfunctions !

Daily cleaning:

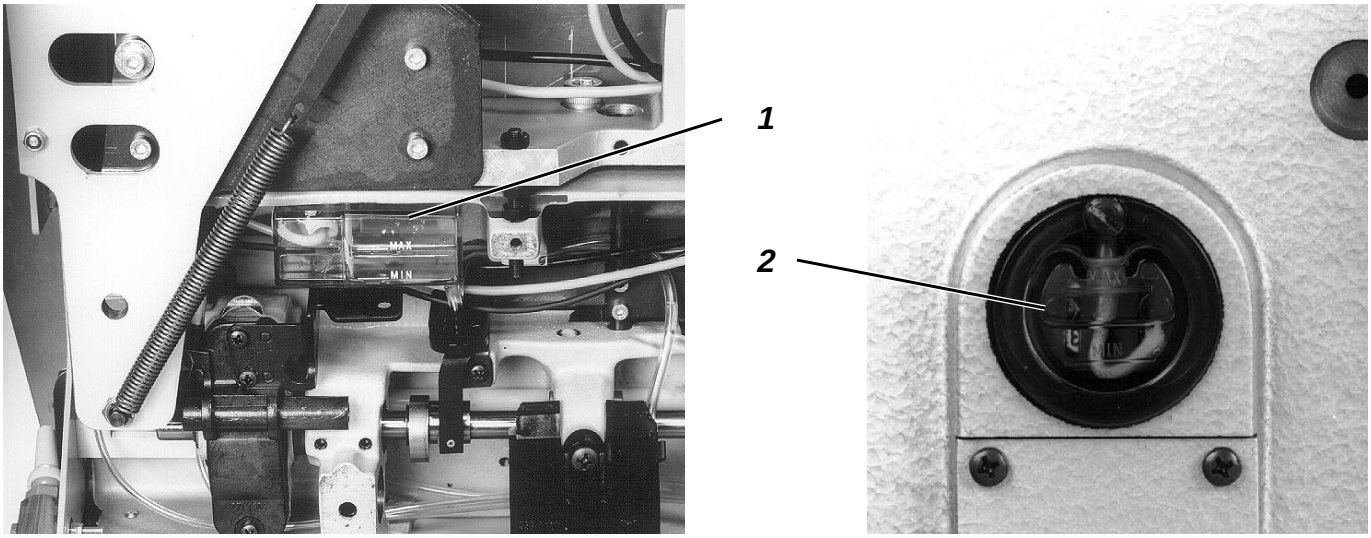
- Remove all lint accumulations.
- Clean the light barrier with a soft cloth.
- Check the water level in the pressure regulator.
  The water level should not climb to the filter insert.
  After screwing in the drain screw 1 blow off the water under pressure.

Dependent on the amount of dust:

- Clean the motor ventilator sieve.
- Clean the filter 2 for the drive of the step motor.



5.2 Oil Lubrication



For lubrication of the special sewing machine, use only **ESSO SP-NK 10** lubricating oil or an equivalent oil with the following specification:

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

ESSO SP-NK 10 lubricating oil can be obtained from the **DÜRKOPP ADLER AG** sales offices:

2 liter container	0570 001699
5 liter container	0990 470058

Caution Risk of Injury !

Oil can cause skin rashes.
Avoid longer skin contact.
Wash yourself thoroughly after contact.

ATTENTION !

The handling and disposal of mineral oils are subject to legal constraints.
Deliver used oil to an authorized reception point.
Protect your environment.
Take care not to spill any oil.

Hook lubrication

- Tilt the machine head up as per Chapter 2.1.
- Fill the oil reservoir 1 with oil up to the "Max" mark.
- The oil feed required is set at the factory.
  Increase or decrease the oil feed only in special cases.

Machine head lubrication

- The oil level in reservoir 2 should not drop below the "Min" mark.
- If necessary, fill oil through the drilled holes in the viewing glass up to the "Max" mark.