



Instruction manual

4181i - 1

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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 immediately 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 permanent 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 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 tread-ing, 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 the machine must be disconnected from the compressed air supply system. 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.



It is absolutely necessary to respect the safety instructions marked by these signs.
Danger of bodily injuries !
Please note also the general safety instructions.

IMPORTANT WARNING!

To the feeding network cord, it is necessary to connect the respective network plug which has been approved in the country of utilizing the machine. This operation should be performed by a worker acquainted with the electric safety rules being in force in the given country. The supplier is not responsible for any damages caused by defective plug or owing to incorrect assembly of the plug.

In spite of all safety measures made on the machines, inappropriate actions of the operator may lead to dangerous situations. In industrial sewing machines, attention should be paid to the following still remaining possible sources of injury:

1. Moving sewing needle
 - risk of injury when sewing with raised pressure foot or top roller, because the finger guard is then positioned too high.
2. Moving thread take-up lever
 - risk of injury when inadvertently or intentionally inserting the finger(s) between the thread take-up lever and its guard.
3. Moving pressure member
 - risk of injury when holding sewn work in immediate vicinity of the pressure member and beginning to insert under the pressure member a considerably thicker sewn work portion,
 - risk of injury when sinking the pressure member.
4. Moving trimming knife
 - risk of injury when sewing and trimming with lifted presser element (roller, foot), because the finger guard is high
 - risk of injury when inadvertently threading down of the motor treadle.
5. When switched off, the clutch motor slows down by inertia but would be reactivated by an accidental tread-ing down of the motor treadle. To avoid such risk, it is advised to hold the handwheel by hand and slightly to depress the motor treadle.

Part A - Instruction manual

1. Proper use of the machine

The machine can be used in the shoe uppers production for sewing with simultaneous trimming of the lining edge. The machine is also used for setting together shoe parts and for decorative stitching. The combined feed provides for uniform slip-free feed of all sewn work layers. The machine also can be used for similar operations in the fancy goods industry. It is used for upper leather and similar materials, natural or man-made leather, also in combination with textile materials. The trimming system used is intended for a relatively stiff material, not for a soft or textile one. The knife is driven by an auxiliary motor and ensures top-grade trimming of the lining material, in particular in inner and outer arches and in sharp angles.

The machine sews with two-thread lockstitch. It is standardly equipped with needles of the 134 KCLR system which are suitable for sewing leather. When sewing textile materials it is necessary to install needles of the 134 system. Only a dry material up to 6 mm thick when depressed by top roller can be used. The material cannot contain any hard subjects, otherwise the use of an eye-protective shield is imperative. Such a shield is not yet available to delivery. Synthetic, cotton, or core threads up to labelled number 20 should be used. The use of other special threads is at the risk of the user who should take appropriate safety measures, as the case may be.

For joining very hard or compact materials, the sewing speed must be reduced substantially below the value given in Table 1.

These special machines may be installed and operated only in dry and kept up rooms.

We as industrial sewing machine producers expect that our products are operated by trained workers so that all usual operation steps and their possible risks can be considered known to them.

Machine noise level

The machine noise level has been measured in accordance with the standards ISO 3746, ISO 11204 at the top sewing speed.

L_{aeq} = equivalent noise level of the machine proper on its working place, converted to the % of machine operating time (dB) - see the Table.

Type of the machine	Noisiness dB	% machine employment
4181i-1XX-100	82	20
4181i-1XX-200	79	20
4181i-1XX-300	73	20

2. Machine description

It is a single-needle post bed sewing machine with two-step upper feed and lower wheel feed, with needle feed during the first feeding step. The principal mechanisms are seated in antifriction bearings, rocking shafts and pins, in plain bearings. The feed is transmitted from the stitch length regulation mechanism via friction clutch to the lower feed shaft, and from it by a roller chain to the feed wheel. The drive of the roller presser foot is derived from the bottom feeding shaft through an indented belt on the top feeding shaft through a bevel gearing on an articulated vertical shaft. The needle feed is derived from the same mechanism as the top roller/feed wheel feed. The stitch length can be adjusted by a dial situated on the machine arm.



Caution!

Sewing speed prescribed as top limit speed for a given operation must not be exceeded under the risk of damage to the feeding mechanism.

The reverse stitching is controlled by a hand lever or by a microswitch. A sewing set with interchangeable throat plate inlays corresponding to the chosen needle size and distance between the needle axis and the work trimmer is mounted on the machine. Top rollers with $\varnothing 25$, $\varnothing 35$ or $\varnothing 45$ mm are available. The vertical hook is fitted with positive bobbin case opening and is secured by overload release clutch with adjustable release moment. The machine uses a wick lubrication system with central oil supply. The machine is fitted with standard vertical hook situated to the right of the needle, with friction-type bobbin winder. The machine can be fitted with thread trimmer, electromagnetically actuated top roller lifting and reverse stitching, accessory lighting with halogen lamp and, as the case may be, with further equipment. In machines without electromagnetically actuated top roller lifting, the lifting is actuated by a knee lever or, for deliveries to Czech customers, by left-side treadle.

The machine stand is fitted with a wedge and, depending on the top roller lifting version, with one or two treadles. The lower horizontal work trimmer, spring-biased both upwards, serves to trim the lining edge in inner and outer arches as well as in acute angles. The trimmer knife is driven by a lever system from a separate motor situated under the bed plate. When switched out by a press-button, it automatically takes up its inoperative position, and automatically switches on again when returned by the lower lever to its operative position. The trimming motion length is adjustable. Various trimmer knives and a tilting sewn work guide can be ordered with the machine.

Notice:

In the manufacturing factory, an extension (mounting) on the double-needle post-bed sewing machine with horizontal work trimmer (4281i-2) as an accessory according to the given specification can be ordered - see pages 9,10.

3. Machine sub-classes and sewing categories

3.1 Sub-class

Table 1

Type of the machine	Top roller lift				Reverse stitching		Thread trimmer
Class-subclass -sewing category	Via knee lever	Treadle	Via electro-mag. + knee lever	Via electro-mag. + treadle	Via hand lever	Via electro-mag. + hand lever	
4181i-111-XXX	•				•		
4181i-121-XXX*		•			•		
4181i-147-XXX			•			•	•
4181i-157-XXX*				•		•	•

*for only Czech republic

3.2 Sewing categories

This code indication includes the equipment assembled on the machine head, both necessary equipment and optional equipment. The standard configuration of the equipment has been preset, according to the under mentioned table, in the factory which includes only necessary equipment. If the buyer demands a different configuration then the factory allocates a new code indication.

Table 2

Standard configuration - the numbers in brackets stand for ordering Nos. when ordering separately the Equipment in question (needles - delivered in 10 pcs pack).

Type	Needle size	Top roller	Wheel feeder	Throat plate insert Width of hole/distance between the needle axis and the work trimmer line	Throat plate
Class-sub-class -sewing category	0.01mm	Diameter mm	Pitch of teeth mm	mm	-
4181i-1XX-100	80 (S548 134013)	35 (M 173)	0.4 (M 060)	1.2/0.8 (M 144)	(M 143)
4181i-1XX-200	100 (S548 134001)	35 (M 173)	0.4 (M 060)	1.5/1.2 (M 145)	
4181i-1XX-300	130	35	0.6	2.0/1.5	
	(S548 000311)	(M 173)	(M 059)	(M 146)	

4. Survey of equipment

This survey does not include the equipment assembled on the stand.

4.1 Equipments (at least one of each from the following group of equipment is assembled)

4.1.1 Needles

M 020 - needle 134 LR size 80
M 023 - needle 134 LR size 100
M 021 - needle 134 LR size 130

4.1.2 Wheel feeders

M 060 - wheel feeder with pitch of teeth 0.4 mm
M 059 - wheel feeder with pitch of teeth 0.6 mm
M 058 - wheel feeder with pitch of teeth 1.2 mm

4.1.3 Top roller holders

M 156 - holder for the top roller $\varnothing$ 25 mm
M 157 - holder for the top roller $\varnothing$ 35 mm
M 295 - holder for the top roller $\varnothing$ 45 mm

4.1.4 Top rollers

M 172 - top roller $\varnothing$ 25 mm
M 173 - top roller $\varnothing$ 35 mm
M 174 - rubberized top roller $\varnothing$ 25 mm
M 175 - rubberized top roller $\varnothing$ 35 mm
M 310 - smooth top roller $\varnothing$ 25 mm
M 311 - smooth top roller $\varnothing$ 35 mm
M 296 - top roller $\varnothing$ 45 mm - width 3.8 mm
M 297 - top roller $\varnothing$ 45 mm - width 2.0 mm

4.1.5 Throat plate

M 143 - throat plate

4.1.6 Throat plate inserts

M 144 - insert for throat plate (for needle 60-80; trimmed edge 0.8)

M 145 - insert for throat plate (for needle 80-110; trimmed edge 1.2)

M 146 - insert for throat plate (for needle 110-140; trimmed edge 1.5)

4.1.7 Trimmer knife

M 171 - trimmer knife 11165 x 2.7

4.1.8 Guide

M 018 - sewn work guide

4.1.9 Connecting cables of the head to the drive

M 163 - connecting cable to the drive EFKA DC 1600/DA82GA; EFKA VD 552/6F82FA and EFKA VD 554/6F82FA

M 055 - connecting cable without any specified drive (with free cable end)

Note: For the machine provided with a minimotor, the cable is component part of the drive thereof.

4.2 Optional equipment

M 010 - built-in lighting (including transformer 230/12V)

M 242 - setting gauge

4181 111001V - high mortality spare parts kit in plastic box for sub-class without thread trimmer

4181 147001V - high mortality spare parts kit in plastic box for sub-class with thread trimmer

S794 222012 - halogen lighting (12 V, 20 W - contains transformer)

5. Technical data

Table 3

Sewing category	Sewn material		Distance between the needle axis and the work trimmer line	Stitch length		Labelled number of polyester thread		Number of needle		Sewing speed		Hook
	Standard		Standard	Standard	Maximum	Standard	Range	Standard	Range	Standard	Maximum	
	Thickness of one layer	Number of layers										
	mm	-	mm	mm	mm	-	-	0,01mm	0,01mm	SPM	SPM	
-100 -light	0.8	2	0.8	2	3	70	80-60	80	60-80	2500	3500	R 816
-200 -medium	1	2	1.2	2.5	5	40	50-30	100	80-110	2500	3000	R 816
-300 - medium heavy	1.5	2	1.5	3	5	20	30-20	130	110-140	2000	2000	R 816

Stitch type

Stitch length

Top roller stroke

Hook

Needle

Trimmer knife

Driving unit

Double thread lock-stitch

max. 5 mm $\pm$ 10%

5.5 $\pm$ 0.5 mm - via hand lever

12.5 $\pm$ 1 mm via knee lever, treadle, electromagnet

R 816 - vertical small

System 134 LR; 134 KKLR; 134

11165 x 2.7 (in table No. 4 indicated *)

Lever clutch 4 poles change motor min. 0.4 kW, lever clutch

2 poles change motor min. 0.4 kW

Stopmotor min. 0.4 kW

max. 52 kg (58 kg head with minimotor)

max. 60 kg (38 kg for head with minimotor)

173 mm

270 x 298 mm

178 x 518 mm

fine leather, boxcalf, goat leather, box patent leather, split leather, lining, leathers, artificial leather, etc.,

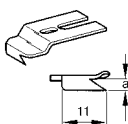
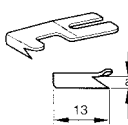
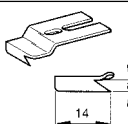
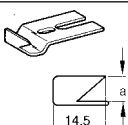
medium-weight leathers, textile materials, also in combination with artificial leathers

Trimmed material	lining of relatively stiff materials - max. 2.5 mm
Distance between the needle axis and the work trimmer line	0.8 - 1.5 mm (according to sewing category)
Power output of the work trimmer motor	25 W
Stroke frequency of the work trimmer knife	3300 strokes/min (constant)
Stroke range of the work trimmer knife	1,2 - 4,3 mm (adjustable)
Length of trimmed thread ends	8 - 11 mm
Input machine with clutch motor	Max. 700 W
Input machine with stop motor	Max. 800 W (600 W with minimotor)
Equivalent accoustic presser level of the sole machine at work place by 20% use of the machine during a shift under standard sewing conditions	82 dB/A
Layout dimensions of the machine (including the stand)	1060 x 550 mm
Height of the machine (including the stand)	1680 mm

Applicable knives

Table 4

The upper No. in the column - Ordering No. - applies to orders placed with the company Maier, the lower one for those placed with Minerva.

Ordering No.	Side of trimmer (mm)	Height of trimmer (a) (mm)	Illustrations	Features	Applications
11165 x 2,7 * S425 311020	13	2,7		Tooling steel, flat version, long cutting edge, front end turned up	For normal lining material with cross-sections
11165 x 3,0 ●	13	3,0			
11165 x 3,5 ○ S425 311026	13	3,5			
11165 x 2,7 HSS ●	13	2,7			
11165 x 3,5 HSS ●	13	3,5			
11165 x 4,0 HSS ●	13	4,0		High-speed steel, flat version, long cutting edge, front end turned up	For very soft or synthetic linings material with cross-sections
11233 x 2,7 ○ S425 311030	11	2,7		Tooling steel, elbowed version with short cutting edge, front end turned up	For normal lining material with cross-sections and tight curves
11233 x 2,7 HSS ●	11	2,7		High-speed steel, elbowed version with short cutting edge, front end turned up	For very soft or synthetic lining material with cross-sections and tight curves
11166 x 2,7 ○ S425 311032	13	3,5		Tooling steel, flat version with cutout for sewing corners, long cutting edge	For normal lining material
11166 x 3,1 ●	13	2,7			
11166 x 3,5 ○ S425 311034	13	3,5			
11166 x 4,0 ●	13	4,0			
11233 x 2,7 BX lang = 11178 x 2,7 S425 311036	14	2,7		Tooling steel, low-elbowed with long cutting edge, front end turned up	For normal lining material with cross-sections
040188 x 7,0 S425 311037	14,5	7,0		Tooling steel, elbowed, upward-cutting	For trimming outer edges of thick material

* supplied as standard ○ can be ordered with Minerva as well

● to be ordered with the company Maier

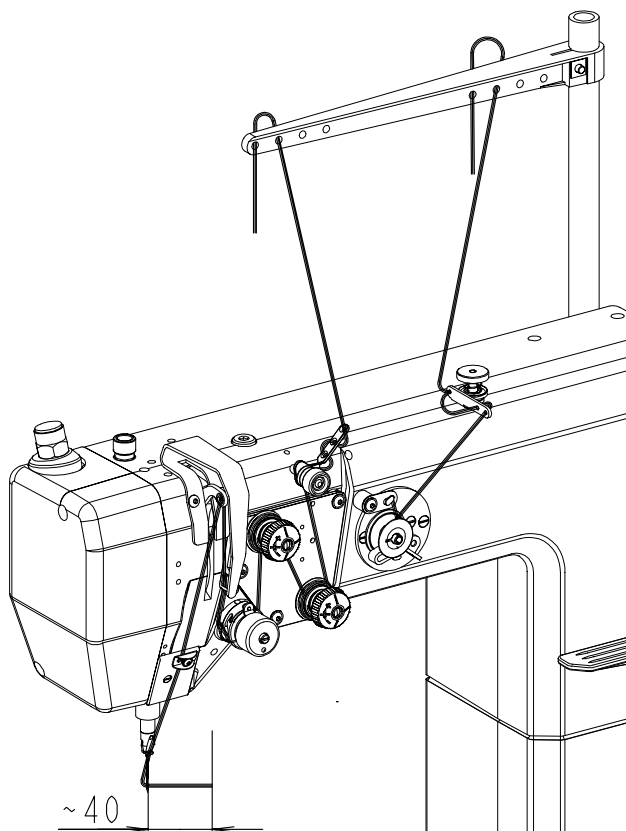
Grinding the work trimmer knife

To obtain due quality of trimming, the knife should be ground on special grinding machines at short intervals (of about 2 to 5 hours) corresponding to the durability of the knife trimmer edge. The special grinding machines are produced by the following companies:

FORTUNA WIEN GmbH, A-1151 WIEN-Pelzgasse 13, Postfach 91

MAIER UNITAS GmbH, NÜRTINGER Strasse 19, D-7316, KÖNGEN, Postfach 1130

www.primotecnautomat.ru



6. Operation of the machine

6.1 Threading a thread



Caution! Risk of injury!

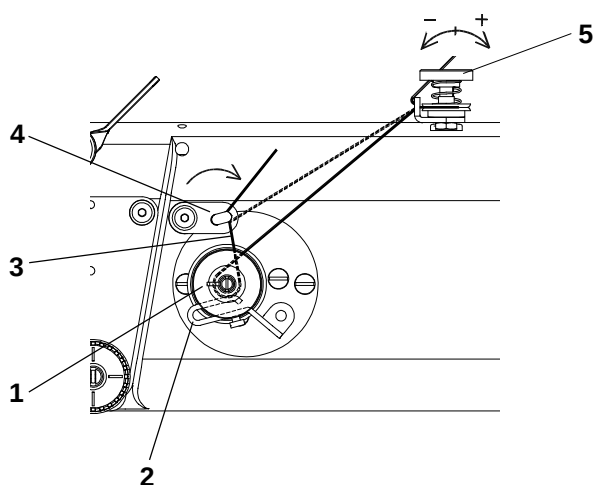
Before threading a thread, turn the main switch off and wait until the machine stops!

Thread the threads as it is shown in picture.



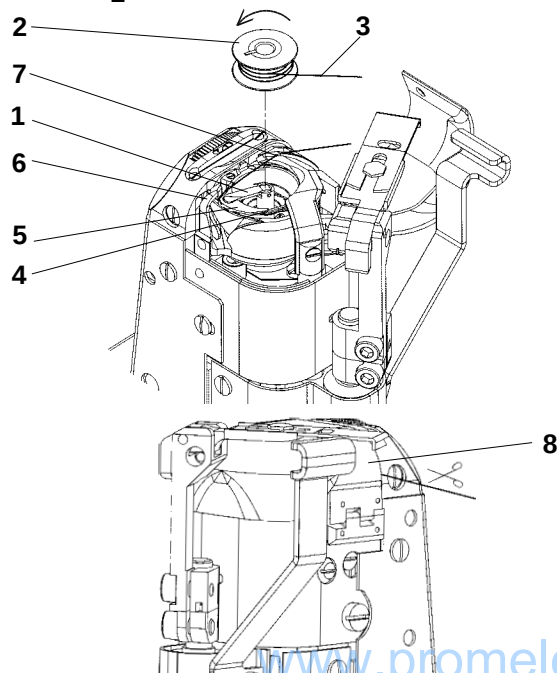
Caution!

Not following the correct method of threading a thread may cause serious damage to the function of the machine.



6.2 Bobbin thread winding

- Insert the bobbin (1).
- Spool counter-clockwise manually onto the bobbin, minimum six threads of the lower thread (3).
- Insert the thread ends into the equipment (4) and cut off the ends.
- Press the lever (2) until it reaches its limit.
- Switch on the machine.
- The winder will automatically switch off after winding.
- Take off the hook bobbin and cut off the end in the equipment (4).
- The nut (5) is instrumental to thread tension control for winding. Turning clockwise sense the thread tension is increased and the single threads are more firmly fixed on the bobbin.
- The tension cannot be so extensive as far as slipping of the winder friction drive has occurred.



6.3 Inserting the bobbin and threading the lower thread

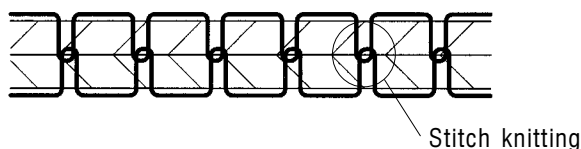


Caution! Risk of injury!

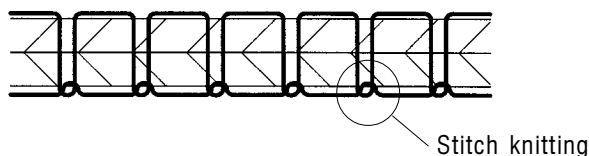
Turn the main switch off and wait until the motor stops!

- Tilt the shutter (1) up.
- Insert the bobbin (2) with thread end (3) in the direction as shown in the picture.
- Pass the thread through the notch (4) and then through the gap between the part (5) and the hook (6) into the notch (7), as shown in illustration.
- Close the hook cover (8) and cut with scissors the thread end close at the cover.

Fitting seam



Decorative seam



6.4 Regulating the thread tension

The thread tension must conform to the thickness of the sewn threads, thickness and hardness of sewn material (thin and soft material will fold with high tension) and the kind of seam. An ordinary fitting seam should be formed with stitches knitted in the middle of the sewn material.

A decorative seam is mostly used with rough threads (20) on thin material and it has tied up threads on the reverse side of the material for achieving a decorative appearance.

Thread tension adjustment is by standard sewing (par. 5, table 3) conditions in accordance with table No. 4.

If achieving of a decorative seam with stitch knitting on the underside is wished, it is necessary to decrease the upper thread tension, it is carried out by turning of nuts (1), in the counter-clockwise sense.

Thread tension

Table 4

Sewing category	Kind of seam	Identified value upper thread tension	Maximum tension of lower thread
		N	N
1	-	3	1
2	-	4.5	1.5
3	Fitting	8	2
	Decorative	5	



If the maximum lower thread tension exceeds the values given in table No. 4, it may cause problems in the beginning of sewing after the previous thread trim.

Measurement of tension is done by dynamometer.

Warning:

The upper thread tensioner has been loosened automatically after every trimming and top roller lifting. In these cases the thread tension cannot be measured.

Regulating the thread tension



Caution! Risk of injury!

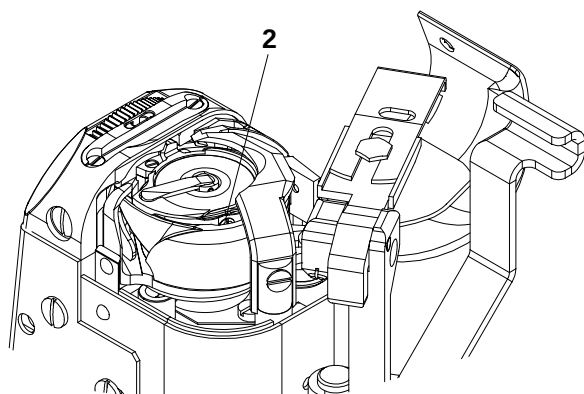
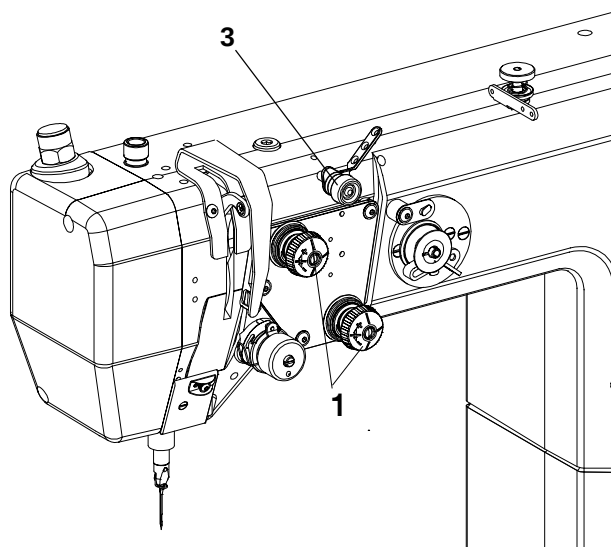
Before regulating the lower thread tension, turn the main switch off and wait until the motor stops.

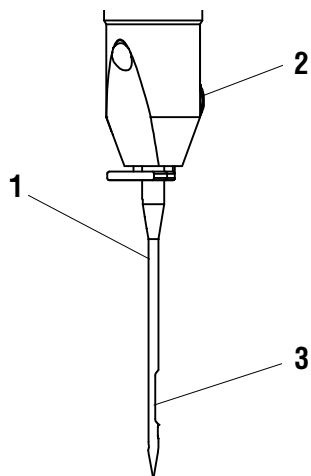
The upper thread tension is adjusted with nuts (1). Its clockwise turning increases the tension.

The tension of the auxiliary tensioner (3) should be as low as possible but it should be on a level so that the upper thread would not pull out of the tensioner when the work is being removed.

The lower thread tension is adjusted with a screw (2). Its clockwise turning increases the tension.

Tension correlation rate defines the depth of the seam tied through. The result of raising the upper tension will be the decreasing depth of tie through. The opposite will apply with the lower thread.





6.5 Needle replacement



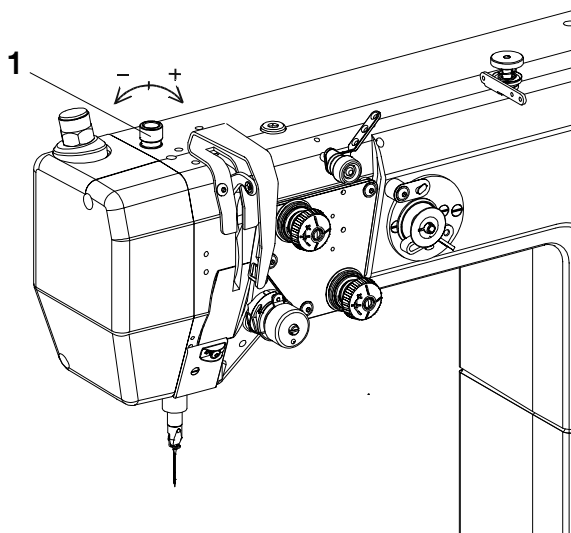
Caution! Risk of injury!

Before removing and inserting the needle turn the main switch off and wait until the motor stops!

- Turn with the hand wheel as far as the top needle (1) position has been reached.
- Loosen the screw (2) and take the needle out.
- When inserting a new needle, care is to be taken that groove (3) above the needle's eye was in the same direction as the hook.
- Tighten the screw (2).



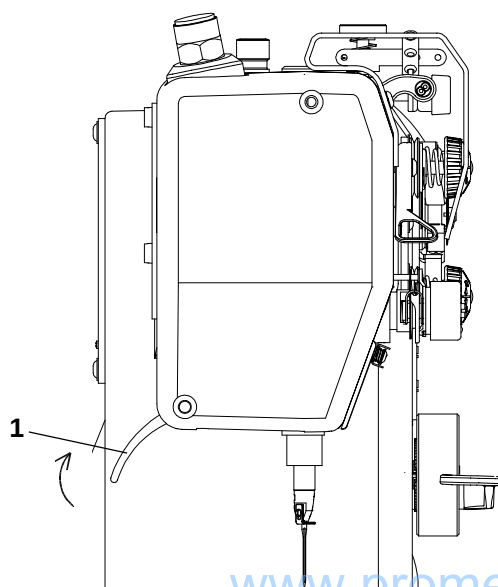
The inserted needle must respond to the sewing category according to paragraph No. 5, table 3. Otherwise it will cause damage to sewing, or eventually the machine could be broken.



6.6 Regulation of pressing the top roller

The pressing of the top roller should be as low as possible but on a level so that the top roller would not fly over when needle comes off the material and that the feeding power got over the thread pull by stitch tightening.

By turning of the screw (1) clockwise pressing of the top roller has been increased, by counter-clockwise turning pressing of the top roller has been decreased.

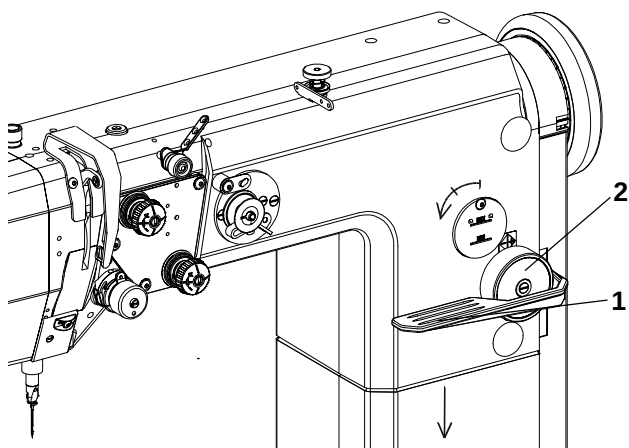


6.7 Lifting the top roller up

Mechanical lifting of the top roller is enabled by means of the hand lever (1), which contemporarily, after it has been lifted in the arrow direction, is locking the top roller in its top position and turning (adjustment) of the machine is possible. The top roller can be lifted via knee lever or left treadle - depending on the machine sub-class. Automatical lifting by means of electromagnet is described in the paragraph No. 7.



When lifting top roller via knee lever or the treadle or electromagnet, the needle must be in the upper position and the machine has to come to a full stop.

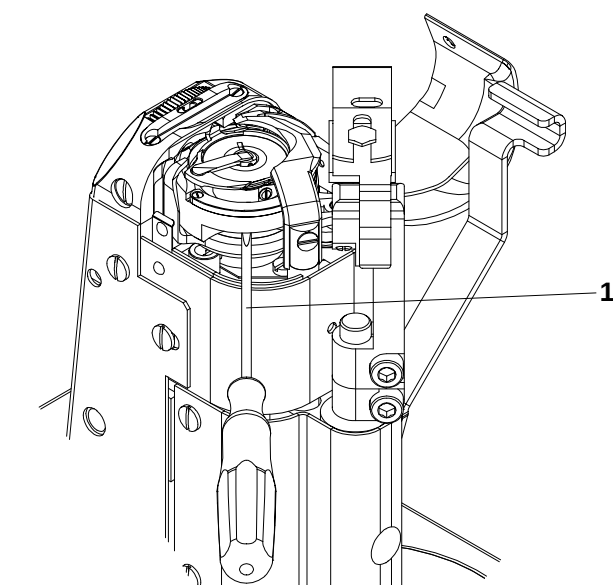


6.8 Reverse stitching

The change of direction of sewn work can be mechanically controlled via a reverse stitching lever (1) by its depression in the arrow direction (down). The sub-class defines whether the machine has electromagnetic reverse stitching – see paragraph No. 7.

6.9 Stitch length adjustment

Stitch length adjustment is by dial (2) by its turning. Turning clockwise stitch length is decreased, turning counter-clockwise stitch is length increased.



6.10 Safety clutch

The machine is provided with a safety clutch which disengages the driving unit, when the hook is blocked. Reconnection must be done in the following way:



Caution! Risk of injury!

Before assembly turn the main switch off and wait until the motor stops!

- Turn the manually operated wheel as far as you can reach the suitable point for inserting a screwdriver into the space(1).
- Continue turning the manually operated wheel in direction of the arrow located on it, until you feel the drop in of the safety clutch.

6.11 To exchange and set the trimmer knife



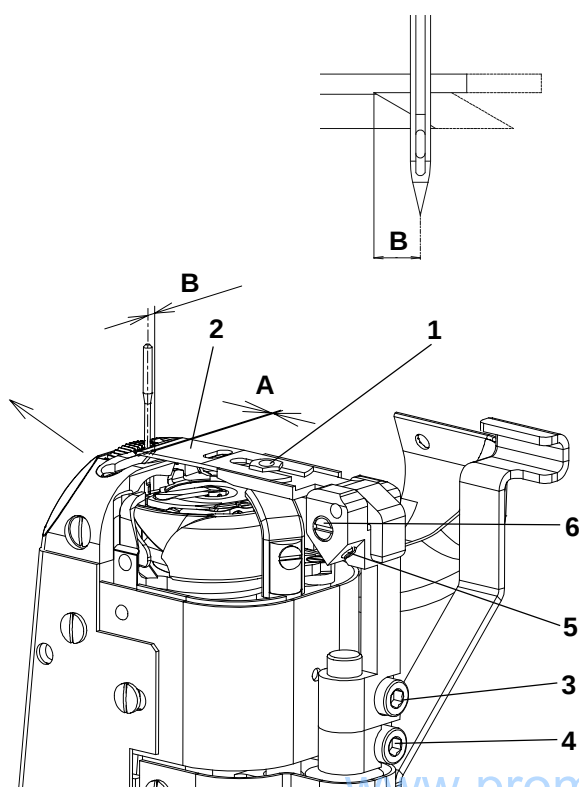
Caution! Risk of injury!

Before assembly turn the main switch off and wait until the motor stops!

- Loosen the nut (1).
- Move the trimmer knife (2) in the direction of the arrow out.
- Set an angle of 180° on the handwheel (the needle is at its bottom dead point).
- Insert a new trimmer knife (2) and set its trimmer surface in relation to the edge of the inlay of the throat plate (A) just permitting the trimmer knife movement.
- Tilt the machine head and rotate by hand the drive shaft of the work trimmer so as to set the trimmer knife to its rear end position. Set the needle to its lower dead point, i.e., to the angle of 180° of the handwheel. Loosen screws (3, 4) and adjust the angular position of the whole knife holder so as to obtain the distance between trimmer edge and needle axis „B“ = 1...1.5 mm.
- Retighten the screws (3, 4) as well as the nut (1).

The height of the trimmer knife (trimmer edge) is standard set to trim a 0.8 - 1 mm thick material. The height can be adjusted in relation to the edge of the throat plate inlay if another trimmer knife (with a different trimmer height) is to be used:

- To do so, loosen the screw (5) and set the correct height with the eccentric (6), or also correct the distance between the trimmer edges A; B as described above. Retighten the screw (5).



APPENDIX -

applies for the double-needle post-bed sewing machine with trimmer 4281i-2

(the following chapters substitute the chapters on pages 2 -7, the other ones are the same)

4.1 Equipments (at least one of each from the following group of equipment is assembled)

4.1.1 Needles

M 132 - needle 134 KKLR size 80 Schmetz

M 133 - needle 134 KKLR size 90 Schmetz

4.1.5 Throat plates

M 207 - throat plate for needle distance of 1.2 mm - work trimmer

M 208 - throat plate for needle distance of 1.6 mm - work trimmer

4.1.6 Throat plate inserts

M 217 - insert for throat plate (for needle 60-80; needle distance of 1.2 mm; trimmed edge 0.8 mm)

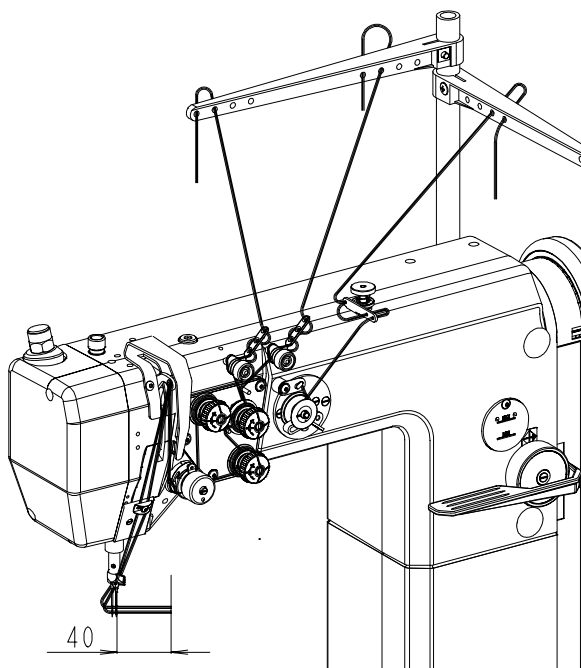
M 210 - insert for throat plate (for needle 80-110; needle distance of 1.6 mm; trimmed edge 1.2 mm)

M 209 - insert for throat plate (for needle 60-80; needle distance of 1.6 mm; trimmed edge 0.8 mm)

5. Technical data

Table 3

Sewing category	Needle distance	Distance between the needle axis and the work trimmer line	Stitch length		Labelled number of polyester thread		Number of needle		Sewing speed		Hook
			Standard	Maximum	Standard	Range	Standard	Range	Standard	Maximum	
	mm	mm	mm	mm	-	-	0,01mm	0,01mm	SPM	SPM	
-100 -light	1,2	0,8	2	3	70	80-60	80	60-80	2500	3000	R 816
-200 -medium	1,6	1,2	2,5	5	40	50-30	90	80-110	2000	2500	R 816



6. Operation of the machine

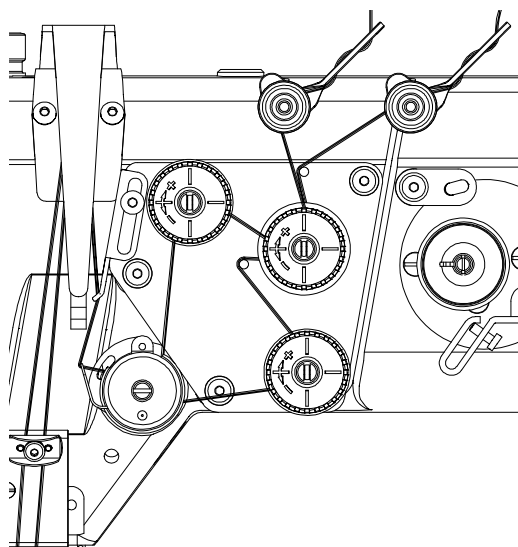
6.1 Threading a thread



Caution! Risk of injury!

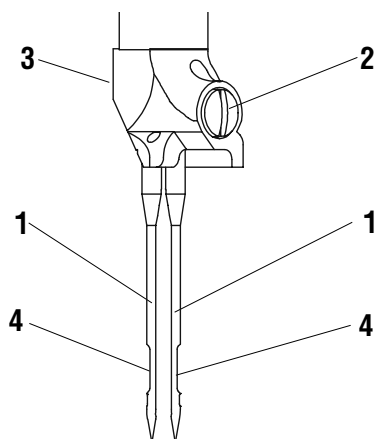
Before threading a thread, turn the main switch off and wait until the machine stops!

Thread the threads as it is shown in picture.



Caution!

Not following the correct method of threading a thread may cause serious damage to the function of the machine.



6.5 Needle replacement



Caution! Risk of injury!

Before removing and inserting the needle turn the main switch off and wait until the motor stops!

- Turn with the hand wheel as far as the top needle (1) position has been reached.
- Loosen the screw (2), (3) and remove the required needle.
- When inserting a new needle, care is to be taken that groove (4) above the needle's eye was in the same direction as the hook.
- Tighten the screw (2), (3).



The inserted needle must respond to the sewing category according to paragraph No. 5, table 3. Otherwise it will cause damage to sewing, or eventually the machine could be broken.

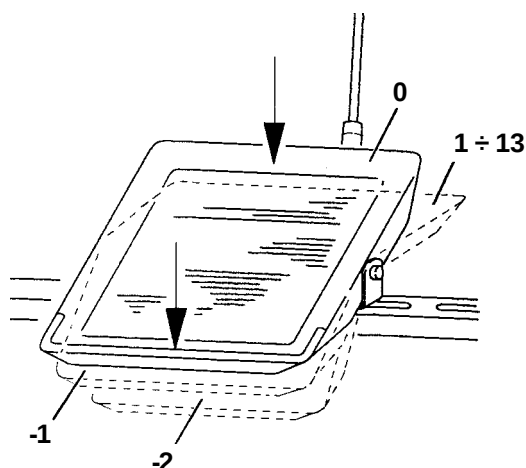
7. Electronic control of the machine

(it is valid for sub-classes equipped with stop motor)

7.1 Control of sewing by means of control elements

7.1.1 Via treadle (treadle positions and function possibilities)

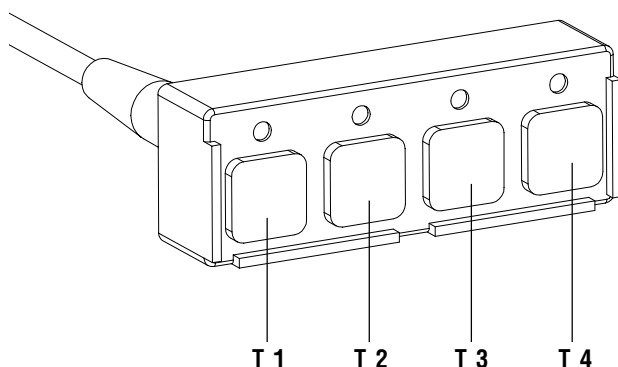
The position of the treadle is read by the reader, which can recognise 16 levels. Its meaning is shown on the table.



Treadle position	Treadle	Meaning
-2	Foot full backwards	Command for thread trimming (seam finishing)
-1	Foot slightly	Command lifting the top roller up
0	Neutral position	Note
1	Slightly forwards	Command releasing top roller
2	Continually forwards	Sewing at minimum speed (1. gear)
3	Continually forwards	Sewing at second speed level
:	:	:
13	Fully forwards	Sewing at maximum speed (12. gear)

Note: It is possible to pre-adjust the needle position (up/down) and foot position (up/down) by stopping in seam (introducing the treadle in neutral position). Foot position (up/down) after seam finishing (pressing the treadle by foot fully backwards).

7.1.2 Via pushbutton panel



There are four built-in pushbuttons in the panel with fixed adjustable functions:

- T1 - bar operation (by pressing this pushbutton during sewing the sewn work is feed back)
- T2 - needle up/down (each press of the pushbutton changes the needle position)
- T3 - temporary cancelling (recalling) bar (in case) the bar is pre programmed at the start and end of the seam, by pressing the pushbutton down will uniformly switch off; if it is not chosen it will switch on by pressing the pushbutton
- T4 - revolutions limitation (valid for motor Efka DA82GA)
 - reduction of pressure of the presser foot for Mini-stop EFKA DA320 (see The instructions for assembling with Mini-stop, par. 5.2.4)

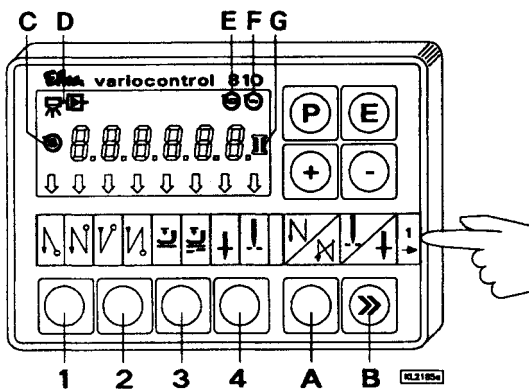
7.1.3 Via control panel Efka V 810/V 820

These functions are standardly assigned to the pushbuttons A, B:

- A - cancelling (recalling) the bar (the same function as T3 of the pushbutton panel)
- B - needle up/down (the same function as T2 of the pushbutton panel)

Note: function of the A, B pushbuttons can be changed by different adjustment of parameters 293, 294 (see the parameters list of driving unit Efka DA82GA).

7.2 Adjustment of automatic functions via control panel for stop motor



7.2.1 By using stop motor Efka with panel V 810

Functioning pushbuttons engagement:

Pushbutton P	Recalling and program mode termination
Pushbutton E	Confirmation of program mode changes
Pushbutton +	Increase of value displayed in program mode
Pushbutton -	Decreasing value displayed in program mode
Pushbutton 1	Start bar SINGLE/DOUBLE/OFF
Pushbutton 2	End bar SINGLE/DOUBLE/OFF
Pushbutton 3	Automatic top roller lifting after stopping at the seam ON/OFF
	Automatic top roller lifting after thread trimming (end of seam) ON/OFF
	Automatic presser foot lifting after thread trimming (end of seam) ON/OFF
	Automatic reduction of pressure of the presser foot ON/OFF (only for DC 1550/DA320; see The instructions for assembling with Mini-stop, par. 5.2.4)
Pushbutton 4	Basic position of needle UP/DOWN
Pushbutton A	For cancelling respectively recalling the bar
Pushbutton B	For switch over the needle position UP/DOWN respective shift pushbutton in program mode
Symbol C	Connection of automatic revolutions
Symbol D	Connection of lighting barrier
Symbol E	The machine is running
Symbol F	The revolutions limitation switch on
Symbol G	Connection of lower thread controller, flashing light indicator symbol when the threads supply on the bobbin is running out

The arrows on the display indicate switching the functions which are displayed by symbols above the pushbuttons on.

7.2.1.1 Adjustment by means of buttons with fixed setting function

Note: It is important to finish the seam in order to reach effective button pressing (press the treadle fully backwards down).

Setting start bar:

Drive enables sewing start bar automatically. It is necessary to choose the type (single, double, off) and number of stitches which will be sewn forwards and backwards.

The arrow above its symbol shows the type of bar (chosen by gradually pressing pushbutton 1). It will be displayed following after pressing pushbutton 1.

Arv (SAv) XXX - number of stitches of start (fancy) bar forwards or

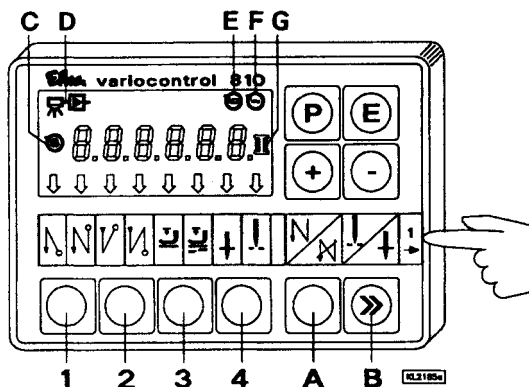
Arr (SAr) XXX - number of stitches of start (fancy) bar backwards) for about 3 sec.

At this time you can change the number of stitches by gradually pressing the pushbutton + or -.

By setting the treadle to its zero position during the sewing of the start bar (par. 215 - OFF), you stop the machine at the completion of the start bar. You can then switch on the sewn work cutter.

Setting end bar:

The same applies to the start bar (setting by the means of pushbutton 2):



Erv (SEv) XXX - end (fancy) bar number of stitches forwards
 Err (SEr) XXX - end (fancy) bar number of stitches backwards
Note: The last section of end bar must have at least 3 stitches.
Foot position adjustment by stopping at the seam (by neutral position of treadle) and after finishing seam (by neutral position of treadle):
 Setting is by means of pushbutton 3, arrow indication above the corresponding symbol.

Needle position adjustment by stopping at the seam:
 Setting is by means of pushbutton 4.

7.2.1.2 Setting by means of parameters

Drive memory contains the parameters which enables sewing system tuning. These parameters have exact meaning and they are divided into 3 levels. Further parameters which are available only for operation will be quoted. Each parameter has its (sequence) number and value.

General procedure by changing parameters of operation level:

- switch the main switch on or finish the seam by pressing the treadle fully backwards down
- press pushbutton P on the panel V 810
- it will be displayed on the display F 000 (000 it is the number of parameter)
- by several times pressing + (or -) set the requested number of parameter
- push pushbutton E down and it will be shown the value of parameter on the display
- you can change the value by means of pushbutton + or -
- by pushing pushbutton E down you will change the sequence to the following number of parameter
- by pushing pushbutton P down you will leave the mode of changing parameters

- Note:*
1. For permanent memory storing of changed parameter, it is necessary to press treadle forwards down after changing of parameters.
 2. Mode of changing parameters is possible only after finishing of the seam.

Number of stitches in bars:

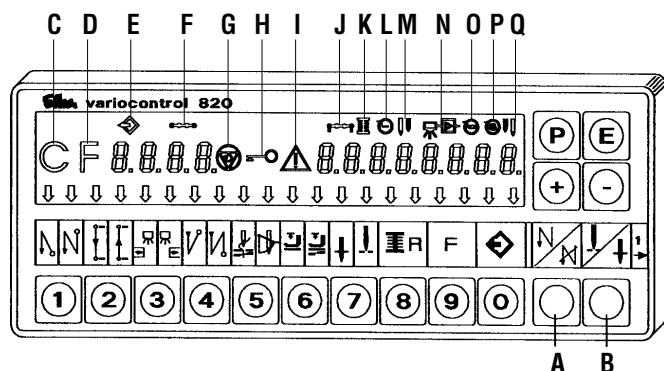
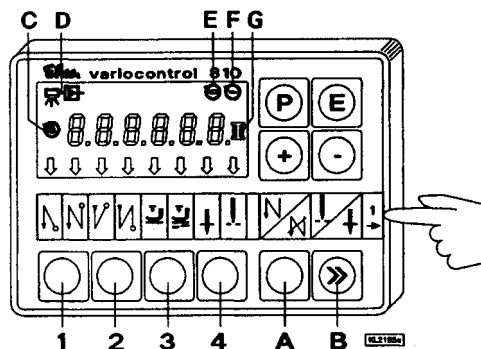
Number of stitches is stored in parameter's number.

No. of parameter	Value range of parameter	Description of parameters
000(080)	0-254	Number of stitches of start (fancy) bar forwards
001(081)	0-254	Number of stitches of start (fancy)bar backwards
002(082)	0-254	Number of stitches of end (fancy) bar backwards
003(083)	0-254	Number of stitches of end (fancy)bar forwards

Sewing according to sewing program:

Drive with panel V810 automatically enables sewing of 1 seam with setting number of stitches. It is necessary to set in corresponding number of stitches, and initialisation of sewing program.

No. of parameter	Value range of parameter	Description of parameters
007	0-254	Number of stitches
015	ON/OFF	ON/OFF sewing under sewing program



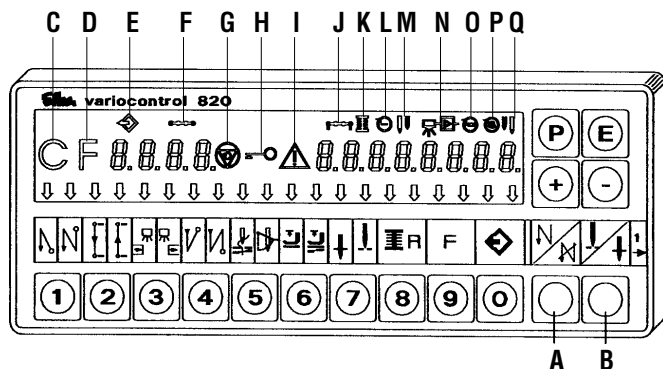
ON/OFF thread trimmer:

No. of parameter	Value range of parameter	Description of parameters
013	ON/OFF	Thread trimmer ON/OFF

7.2.2 By using stopmotor Efka with panel V 820

Functioning pushbuttons engagement:

Pushbutton P	Call and termination of programming mode
Pushbutton E	Confirmation when changing programming mode
Pushbutton +	Increasing the value displayed in programming mode
Pushbutton -	Reducing the value displayed in programming mode
Pushbutton 1	Start bar SINGLE/DOUBLE/OFF
Pushbutton 2	Stitch counting FORWARD/BACK/OFF
Pushbutton 3	Light barrier function LIGHT-DARK/DARK-LIGHT/OFF
Pushbutton 4	End bar SINGLE/DOUBLE/OFF
Pushbutton 5	Function TRIMMING/TRIMMING+EJECTOR/OFF
Pushbutton 6	Automatic top roller lifting after having stopped inside the seam ON/OFF Automatic top roller lifting after trimming ON/OFF Automatic presser foot lifting after thread trimming (end of seam) ON/OFF Automatic reduction of pressure of the presser foot ON/OFF (only for DC 1550/DA320; see The instructions for assembling with Mini-stop, par. 5.2.4)
Pushbutton 7	Basic needle position UP/DOWN
Pushbutton 8	Lower thread waste controlling ON/OFF
Pushbutton 9	Operation pushbutton - programmable
Pushbutton 0	Programming/processing of 40 possible sewing sections (seams)
Pushbutton A	For cancelling or calling the bar
Pushbutton B	For switching needle position UP/DOWN, resp. shifting pushbutton in the programming mode
Symbol C	Designating symbol C for code number
Symbol D	Designating symbol F for parameter number
Symbol E	Programme number in TEACH IN mode
Symbol F	Seam number in TEACH IN mode
Symbol G	Run blocking ON
Symbol H	Blocked insertion by pushbutton
Symbol I	Fault reporting
Symbol J	Insertion of stitch number in TEACH IN mode
Symbol K	Connected lower thread controller, flashing symbol when running out thread reserve on bobbin
Symbol L	Limitation of revolutions ON
Symbol M	Right needle disconnected
symbol N	Evening stitches for light barrier in the TEACH IN mode
Symbol O	Machine is running



Symbol P
Symbol Q

Automatic revolutions ON
Left needle disconnected

The arrows on the display indicate switching the functions which are displayed by symbols above the pushbuttons on.

7.2.2.1 Adjustment by means of buttons with fixed setting function

Note: It is important to finish the seam in order to reach effective button pressing (press the treadle fully backwards down).

Setting start bar:

Drive enables sewing start bar automatically. It is necessary to choose the type (single, double, off) and number of stitches which will be sewn forwards and backwards.

The arrow above its symbol shows the type of bar (chosen by gradually pressing pushbutton 1). It will be displayed following after pressing pushbutton 1.

Arv (SAv) XXX - number of stitches of start (fancy) bar forwards or

Arr (SAr) XXX - number of stitches of start (fancy) bar backwards for about 3 sec.

At this time you can change the number of stitches by gradually pressing the pushbutton + or -.

By setting the treadle to its zero position during the sewing of the start bar (par. 215 - OFF), you stop the machine at the completion of the start bar. You can then switch on the sewn work cutter.

Setting end bar:

The same applies to the start bar (setting by the means of pushbutton 4).

Erv (SEv) XXX - end (fancy) bar number of stitches forwards

Err (SEr) XXX - end (fancy) bar number of stitches backwards

Note: The last section of end bar must have at least 3 stitches.

Foot position adjustment by stopping at the seam (by neutral position of treadle) and after finishing seam (by neutral position of treadle):

Setting is by means of pushbutton 6, arrow indication above the corresponding symbol.

Needle position adjustment by stopping at the seam:

Setting is by means of pushbutton 7.

Trimming switched ON/OFF:

To be set using pushbutton 5.

Sewing programme ON:

To be switched on using pushbutton 0.

Switching ON/OFF the function of the pushbutton F:

The pushbutton F on panel can have assigned one of the following functions: Sst - softstart

SrS - fancy bar

Frd - reverse angle after trimming

7.2.2.2 Setting by means of parameters

Drive memory contains the parameters which enables sewing system tuning. These parameters have exact meaning and they are divided into 3 levels. Further parameters which are available only for operation will be quoted. Each parameter has its (sequence) number and value.

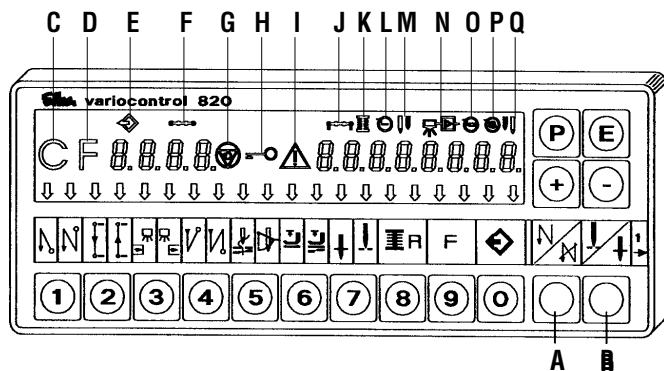
General procedure by changing parameters of operation level:
- switch the main switch on or finish the seam by pressing the treadle fully backwards down

- press pushbutton P on the panel V 820

- on the display there is no data shown

- by depressing the pushbutton E several times, set the required parameter (without having displayed the parameter number)

- you can change the value using pushbuttons + or -



- by depressing the pushbutton E you will pass in the given sequence to the following parameter
- by depressing the pushbutton P down you will leave the mode of changing parameters

Note: 1. For permanent memory storing of changed parameter, it is necessary to press treadle forwards down after changing of parameters.
2. Mode of changing parameters is possible only after finishing of the seam.

Number of stitches in bars:

Number of stitches is stored in parameter's number.

No. of parameter	Value range of parameter	Description of parameters
000(080)	0-254	Number of stitches of start (fancy) bar forwards
001(081)	0-254	Number of stitches of start (fancy) bar backwards
002(082)	0-254	Number of stitches of end (fancy) bar backwards
003(083)	0-254	Number of stitches of end (fancy) bar forwards

The drive with the panel V 820 enables sewing automatically up to 40 seams distributed up into eight programmes with the given stitch numbers and sewing direction (forwards/rearwards). For more detailed information see the original driving instructions.

8. Maintenance



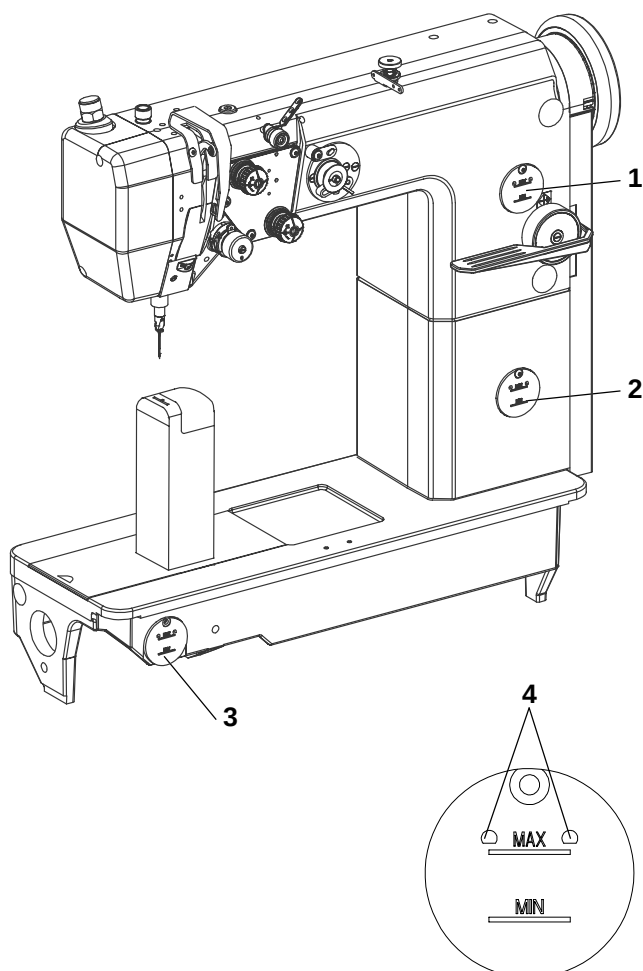
Caution! Risk of injury!

Maintenance work can only be carried out when the machine is off and the motor stops.

Maintenance work which must be carried out and the intervals between them and set out in the following table.

Maintenance work	Interval
Removing throat plate and its cleaning. Cleaning of circular feed dog, hook and space around feeding wheel of material and thread residues. To clean it, use brush. It is prohibited to use compressed air for cleaning without protective guards preventing injury of persons with flying impurities. Hook lubrication - (one drop of oil).	1 day
Checking the oil level in the hook lubrication oil tank.	1 week
Checking the oil level in the oil tanks of the central distribution.	1 month

For the lubrication of this machine Esso SP-NK 10, DA 10 or an equivalent quality lubricating oil is recommended (viscosity at 40° C: 10 mm²/s; flash point: 150°C).
The oil tanks (1, 2, 3) of the central distribution is to be filled the hole (4) up to the mark max.



Operating instructions for eventual trouble shooting

Meaning of abbreviations: NP - Instruction manual
SK - Instructions for service

Note: When the machine is driven by a stop motor, it is indispensable to check up, before starting its repair, the setting of its parameters according to NP, part B, par. 5.

Trouble	Cause	Method of troubleshooting
1. Upper thread breaking.	1.1 Incorrect threading of the upper thread.	Thread the upper thread according to NP, par. 6.1.
	1.2 Excessive thread tension.	Set the tension according to NP, par. 6.4.
	1.3 Needle incorrectly inserted or damaged.	Replace needle according to NP, par. 6.5.
	1.4 Needle thickness does not suit to that of thread or sewn material.	Use a thicker needle.
	1.5 Hook point sticks the thread.	Set distance between hook and needle according to SK, par. 3.1.3 and 3.1.5.
	1.6 Needle thread excessively elastic.	Increase the hook timing and set the needle bar height according to SK, par. 3.2.3.
	1.7 Low quality thread.	Replace thread.
	1.8 Needle thickness unsuitable for the hole in the throat plate insert.	Replace insert.
	1.9 Damaged throat plate insert.	Replace insert.
	1.10 Incorrect setting of opening bobbin case lifter (little opening).	Set according to SK, par. 3.1.6.
2. Lower thread breaking.	2.1 Incorrect threading.	Thread according to NP, par. 6.3.
	2.2 Damaged bobbin.	Replace bobbin.
3. Skipped stitches at the seam beginning after previous thread trimming.	3.1 Short thread end in needle after trimming (thread too tensioned in the moment of trimming).	Thread upper thread according to NP, par. 6.1. Reduce tension of pretension unit according to NP, par. 6.4. Accelerate slightly OFF position of main tensioner according to SK, par. 4.9; NP, part B, par. 5.2.2, 5.3.2; Mini-stop, par. 5.2.5 - parameter 192.
	3.2 Excessive thread tension.	Set thread tension according to NP, par. 6.4.
	3.3 Upper thread not squeezed, at the first needle piercing, between sewn material and rear edge of piercing hole.	Set needle feeding in such a way, so that, with the maximum stitch length, the needle almost touches the rear edge of throat plate insert according to SK, par. 3.2.5. Reduce height of wheel feeder according to SK, par. 3.5.3.2.1. Put nearer top roller to needle and shift it rearwards according to SK, par. 3.6.6.2.
	3.4 Upper thread incorrectly caught by movable trimming knife. Lumps of thread remaining in hook space.	Set correctly hook opening according to SK, par. 3.1.6 and adjust setting of trimming cam according to SK, par. 4.3.

	3.5 Needle too thick with regard to thickness of thread and sewn material.	Use thinner needle.
4. Stitch skipping.	4.1 Needle incorrectly inserted.	Insert needle according to NP, par. 6.5.
	4.2 Too big distance between needle and hook point.	Set according to SK, par. 3.1.3 and 3.1.5.
	4.3 Incorrectly set needle hook timing or needle height.	Set according to SK, par. 3.1.4 and 3.2.3.
	4.4 Excessively elastic material or excessively elastic thread.	Increase timing as needed and set the needle bar height according to SK, par. 3.2.3.
	4.5 Damaged hook point.	Replace hook.
5. Incorrect stitch locking. Threads are locked on top side of sewn material.	5.1 Lower thread tension.	Set according to NP, par. 6.4.
	5.2 Incorrect threading and tension setting of upper thread.	Thread according to NP, par. 6.1 set according to NP, par. 6.4.
6. Incorrect stitch locking. Threads are locked on bottom side of sewn material and increasing of tension is of upper thread no help.	6.1 Upper thread out of tensioning dishes.	Thread correctly according to NP par. 6.1.
	6.2 Opening bobbin case lifter incorrectly set (it opens too little).	Set according to SK, par. 3.1.6.
	6.3 Wheel feeder too low - difficult passage of thread between sewn material and throat plate.	Set wheel feeder height according to SK, par. 3.5.3.2.1.
	6.4 Upper thread insufficiently tensioned when passing through hook.	Shift thread limiter to the right and to the top according to SK, par. 3.4.5 or by more than the value quoted there.
7. Stitches insufficiently tightened and with irregular positioning. Thread unravelled.	7.1 Low tension of upper and lower threads.	Set tension according to NP, par. 6.4.
	7.2 Upper thread insufficiently tensioned when passing through hook.	Shift thread limiter to the top and to the right according to SK, par. 3.4.5 or more than the value quoted there.
	7.3 Thin needle with regard to thread thickness.	Use a thicker needle.
8. Sewn material wavy in seam.	8.1 Thread tension too high for sewn material.	Reduce tension of both threads.
9. Machine does not feed or is feeding slowly or in reverse sense.	9.1 Overrun safety clutch against hook overload.	Engage correctly clutch according to NP, par. 6.10.
10. Difficult and irregular machine feed.	10.1 Wheel feeder too low (especially when sewing soft and thick materials).	Raise feeder more from throat plate according to SK, par. 3.5.3.2.1.
	10.2 Feeder teeth unsuitable (too fine) for sewn material.	Use feeder with 0.6 mm teeth pitch. Replace according to SK, par. 3.5.3.2.2.
	10.3 Wheel feeder driving chain too tensioned - blocked feeding.	Set chain tension according to SK, par. 3.5.3.2.1.
11. Hook blocked.	11.1 Incorrect lower thread threading when replacing hook bobbin - lower thread caught by hook point.	Thread lower thread according to NP, par. 6.3.

	11.2 Upper thread out of tensioning dishes and 2x caught by hook point.	Thread upper thread according to NP, par. 6.1.
	11.3 Insufficient gap between needle and piercing hole from hook side.	Set side position of the throat plate post according to SK par. 3.3.3.
12. No upper thread trimming.	12.1 Incorrectly threaded thread.	Thread the thread according to NP, par. 6.1.
	12.2 Upper thread excessively braked when moving upwards due to thin needle, thick elastic material, low feeder position, low thread tension.	Insert thicker needle according to NP, par. 6.5. Lift wheel feeder according to SK, par. 3.5.3.2.1.
	12.3 Tensioner electromagnet cuts soon main tensioner during trimming.	Delay position of cutting the main tensioner according to SK, par. 4.9 and according NP, part B, par. 5.2.2, 5.3.2; Mini-stop, par. 5.2.5 - parameter 192.
	12.4 Fixed trimming knife does not fit with all its width against movable knife.	Set knives according to SK, par. 4.7.
	12.5 Movable knife does not run over movable knife edge.	Set knife according to SK, par. 4.5.
	12.6 During trimming cycle, safety clutch against hook overload gets disengaged.	Increase clutch disengaging moment according SK, par. 3.9.2.
13. No lower thread trimming.	13.1 Incorrect movable knife path setting.	Set knife according to SK, par. 4.5.
	13.2 Short movable knife path.	Increase path by correct fork setting according to SK, par. 4.4.
	13.3 Incorrect cam setting.	Set cam according to SK, par. 4.3.
	13.4 Incorrect trimming knife height setting.	Set height according to SK, par. 4.6.
14. Second and third stitches incorrectly locked at the beginning of sewing after previous trimming.	14.1 Incorrect setting of lower hook thread retaining spring.	Set spring according to SK, par. 4.8.
15. Insufficient quality of trimming.	15.1 Incorrect setting of the cutting surface (cutting edge) against the edge of the throat plate insert. Incorrect setting of the cutting surface (cutting edge) against the needle. Knife (cutting edge) height incorrectly set - according too the trimmed material.	Set the knife for material trimming according to SK par. 5.3.
	15.2 Excessive blunting of the knife cutting edge.	Sharpen the trimming knife according to SK, par. 5.7. A correctly sharpened knife trims the material by pulling.