Efka vario dc

CONTROL **DA82AV3207**

INSTRUCTION MANUAL

No. 0402067 **english**

Efka
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GMBH & CO KG

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EFKA OF AMERICA INC.

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EFKA ELECTRONIC MOTORS
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Operating elements of the Variocontrol see table on the last page

Parameter list - see separate brochure

1. Important Safety Instructions

When using an EFKA drive and accompanying appliances (e.g. for sewing machines), basic safety precautions should always be followed, including the following:

- Read all instructions thoroughly before using this drive.
- Drive and accompanying appliances should be mounted and put into operation by qualified personnel in accordance with the guidelines provided in the instruction manual.

To reduce the risk of burns, fire, electric shock, or personal injury:

- Use this drive only for its intended use as described in the instruction manual.
- Use only attachments recommended by the manufacturer or as contained in the instruction manual.
- Do not operate without corresponding protective devices.
- Never operate this drive if one or more parts (e.g. cables, plugs) are damaged, if it is not working properly, if any damages can be identified or are to be suspected (e.g. after it has been dropped). Only qualified personnel are authorized to make adjustments, eliminate faults and complete repair work.
- Never operate the drive with the air openings blocked. Keep ventilation openings of the drive free from the accumulation of lint, dust and loose cloth.
- Never drop or insert any object into any opening.
- Do not use drive outdoors.
- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
- To disconnect, turn off main switch, then remove plug from outlet.
- Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
- Keep fingers away from all moving machine parts. Special care is required e.g. around the sewing machine needle and the V-belt.
- Before mounting and adjusting accompanying appliances, i.e. postioner, reversing device, light barrier, etc., disconnect drive from mains (turn off main switch, remove mains plug from outlet [DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1]).
- Always switch off (0) machine and remove plug from outlet, when removing covers, mounting accompanying appliances, positioner especially, light barrier, etc., or any other devices mentioned in the instruction manual.
- Only qualified personnel are authorized to work on the electrical components.
- Work on high voltage circuit areas is forbidden, except as stated in the respective regulations, e.g. DIN VDE 0105 part 1.
- Only specially trained personnel are authorized to complete repair work.
- Cables to be wired must be protected against expectable strain and fastened adequately.
- Cables near moving machine parts (e.g. V-belts) must be wired at a minimum distance of 25 mm (see DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1).
- For safety it is preferred to wire the cables separately from each other.
- Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the motor rating plate and on the nameplate of the power pack.
- Connect this drive to a properly grounded outlet only. See Grounding Instructions.
- Electric accompanying appliances and accessories must only be connected to safety low voltage.
- EFKA DC drives are protected according to overvoltage class 2 (DIN VDE 0160 § 5.3.1).
- Observe all safety guidelines before undertaking conversions or modifications.
- For repair and maintenance use only original replacement parts.

Warnings in the instruction manual which point out particular risks of personal injury or risk to the machine are marked with this symbol wherever applicable.

This symbol is a warning on the control and in the instruction manual. It indicates hazardous voltage.

CAUTION - In the case of failure this area can be current-carrying even after having turned the power off (non discharged capacitors).

- The drive is not an independently operating unit, but is designed to be incorporated into other machinery. It must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Directive.

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	Series
Dürkopp-Adler	291

2.1 Use in Accordance with Regulations

The drive is not an independently operative machine, but it is designed for being built into other machines. It can only be put into operation after it has been certified that the machine to which it will be attached meets the specifications of the EC Directive (Appendix II, paragraph B of the Directive 89/392//392/EWG and supplement 91/368/EWG).

The drive has been developed and manufactured in accordance with the respective EC standards:

EN 60204-3-1: 1990 Electric equipment of industrial machines:
Special requirements for industrial sewing machines,
sewing units and sewing systems.

The drive can only be operated:

- on thread processing machines
- in dry areas

3. Complete Drive Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc DA82AV3207
	- Power pack	N152 (optional N153, N155)
	- Speed controller	EB301
1	Control panel Variocontrol	V720, V730 oder V740 *1)
1	Positioner	P6-1
1	Mains switch	NS105
1	Set of standard accessories consisting of:	B131 belt guard complete set of hardware motor foot bracket 1 and 2, short documentation
1	Pulley	

*1) Light barrier control possible by using:
V720 - Reflection light barrier module LSM001
V730 - Reflection light barrier LS-001-006 or reflection light barrier module LSM001
V740 - Transmitted light barrier Varioply or reflection light barrier module LSM001

3.1 Special Accessories

Storage unit Memory Box MB001	- part no. 7900052
Storage card Memory Card MC001	- part no. 1111602
Reflection light barrier module Variolux LSM001	- part no. 6100028
Reflection light barrier Variolux LS-001-006	- part no. 6100005
Transmitted light barrier Varioply - transmitter DLS-001	- part no. 6100027
- receiver DLL-...	- available versions see specification Varioply
Solenoid type EM1..(for e.g. presser foot lift, backtacking, etc.)	- available versions see specification solenoids
Extension cable for external speed controller, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external speed controller, approx. 1500 mm long, complete with plug and socket connector	- part no. 1111787
5-pin plug with slide index for the connection of another external control	- part no. 0501278
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4160018
Extension cable for positioner, approx. 1100 mm long, complete with plug and socket connector	- part no. 1100409
Extension cable for commutation transmitter, approx. 315 mm long, complete with plug and socket connector	- part no. 1112248
Extension cable for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector	- part no. 1111584
Extension cable for motor connection, approx. 400 mm long	- part no. 1111858
Extension cable for motor connection, approx. 1500 mm long	- part no. 1111857
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	- part no. 58.0013 *1)
Sewing light transformer	- please indicate line voltage and sewing light voltage (6.3V or 12V)
3-pin plug with slide index	- part no. 0500402
7-pin plug with slide index	- part no. 0502474
8-pin plug with slide index	- part no. 0502865
10-pin plug (Hirschmann Mes100)	- part no. 0500357

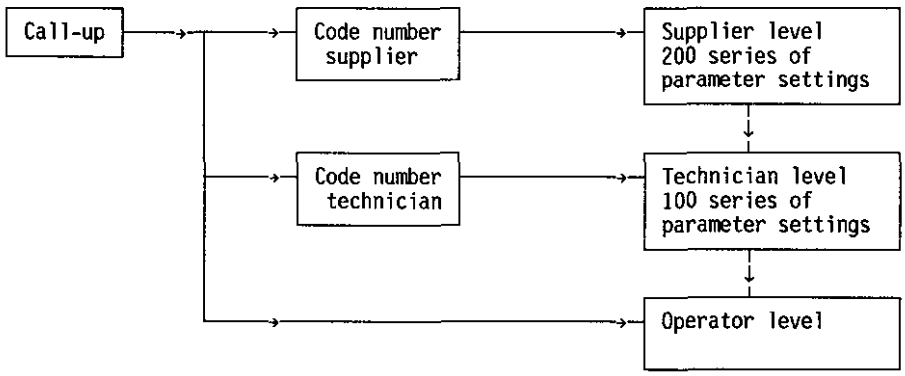
*1) Available colors on inquiry

4. Operation

4.1 Access to Programming on Command Input

In order to prevent the unintentional modification of preset functions the input commands are distributed at various levels.

The following persons have access:
- the supplier to the highest and all subordinate levels by a code number
- the technician to the next lower and all subordinate levels by a code number
- the operator to the lowest level without code number



4.2 Code Number Input

1. TURN POWER OFF

2. -> [P] + TURN POWER ON ==> C-0000

3. -> [1] -> [2] -> [3] ->.. Input CODE NUMBER !
   (Example)

4. -> [E] -> If CODE NUMBER wrong ==> C-0000 InFo F1
   repeat input !

   -> If CODE NUMBER correct ==> F-XXX

F-XXX = first parameter number in the recalled level

4.3 Direct Operation

By pushing the numeral buttons and some symbol buttons on the Variocontrol it is possible to turn functions on or off.

Example initial backtack:
- Double initial backtack is on — top LED7 lights up — I 0 [7]

Push button 7 briefly
- Initial backtack is off — both LED7 off — 0 0 [7]

Push button 7 briefly
- Single initial backtack is on — bottom LED7 lights up — 0 I [7]

4.4 Input by Parameters on the Operator Level

>> ONLY If CODE NUMBER WAS NOT INPUT <<

1. -> [P] ==> LED pushbutton P blinks ! ==> [ ]

2. -> [E] -> Display of the first parameter ==> [aaa bbb]
   parameter no. does not appear !

aaa = abbreviation of the parameter
bbb = value of the parameter

3. -> [+] -> [-] -> Change parameter value !

4. -> [E] -> PARAMETER VALUE is entered ==> [aaa bbb]
   Display steps to next PARAMETER

OR

-> [P] -> PARAMETER VALUE is entered !

==> [EXIT PROGRAMMING !]

4.5 Input by Parameters on the Technician and Supplier Level

-> After input of the CODE NUMBER ==> [F-XXX]
   Display of the first PARAMETER NO.

-> On with step 3 ! <-
-> Call-up after termination of a seam !

1. -> [P] ==> The most significant digit ==> [F-XXX]
   on the display blinks!

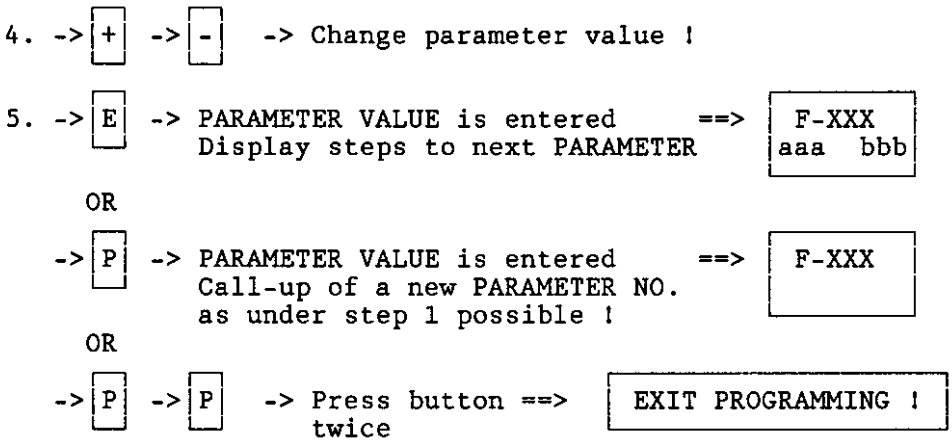
2. -> [1] -> [2] -> [3] ->.. Input desired PARAMETER NO.

(Example)

3. -> [E] -> If PARAMETER NUMBER wrong ==> [F-XXX / InFo F1]
   repeat input !

-> If PARAMETER NUMBER correct ==> [F-XXX / aaa bbb]

F-XXX = recalled parameter number
aaa = abbreviation of the parameter
bbb = value of the parameter



5. Operating the Motor

5.1 General Instructions

When putting the control into operation, the programming is changed in the following manner:

Adjust the sense of rotation of the motor, parameter F-161
If necessary, adjust the reference position, parameter F-170
If necessary, adjust the positions, parameter F-171
If necessary, adjust the speeds, parameters F-110...F-118
If necessary, adjust the remaining relevant paramenters
Start sewing in order to save the adjusted values
If the power was turned off the adjustments made before starting to sew get lost.

Note:
If the sense of rotation of the motor is changed the positions must be reprogrammed.

5.2 Initial Operation (New Motor)

The instructions for initial operation are valid under the following conditions only:

- The positions must not have been reprogrammed.
- The sense of rotation of the motor shaft must be set to "anticlockwise rotation".

Before mounting the positioner the sewing machine shaft is to be set to the reference position.

Note:
Reference position = needle point at the height of the needle plate, from downward movement of the needle in the sense of rotation of the motor shaft.

Markings on the positioner shaft and on the positioner housing have to be aligned, then mount the positioner on the sewing machine shaft.
If necessary, adjust the speeds, parameter F-110...F-118.
If necessary, adjust the remaining relevant parameters.
Start sewing in order to save the adjusted values.
If the power was turned off the adjustments made before starting to sew get lost.

6. Aids for Putting into Operation and for Setting

6.1 Fast Installation Routine (SIR)

SIR offers the possibility to set the most important settings for initial operation by using the menu.
For safety reasons, all selections on the menu must be addrEssed. Only then, correct setting of all parameters is guaranteed!
The normal parameter settings are not affected.

6.1.1 Putting into Operation by Using SIR

Example:

1. -> [P] + TURN POWER ON ==> | C-0000 |

2. -> [+] -> Call-up of the possible languages (actual language blinks) ==> | dEU USA / ESP FrA |

3. -> [+] -> Select the desired language ==> | dEU USA / ESP FrA |

4. -> [E] -> Adjust the reference position. Turn positioner at least until the marker ([ ) has disappeared. ==> | PoSition / 0 [|

Note:
Reference position = needle point at the height of the needle plate, from downward movement of the needle in the sense of rotation of the motor shaft.

5. Adjust position 1 (lower needle position, switch-on position of thread trimmer)

-> [E] -> Turn positioner to the desired position. ==> | PoSition / 1 168 |

Adjust positions by turning the handwheel until the desired position is reached, but at least until the action has been completed on the display.

or

-> [+] -> [-] -> Set the increments (2 increments correspond to approx. 1.4 °)

6. Adjust position 2 (switch-off position of the thread trimming solenoid)

-> [E] -> Turn positioner to the desired position. ==> | PoSition / 2 420 |

or

-> [+] -> [-] -> Set the increments

7. Adjust position 1A

-> [E] -> Turn positioner to the desired position. ==> PoSition 1A 230

or

-> [+] -> [-] -> Set the increments

8.

-> [E] -> Adjust the positioning speed ==> Lo SPEEd n1 0150

or

-> [+] -> [-] -> Change value

9. -> [E] -> Adjust the maximum speed ==> hi SPEEd n2^ 3000

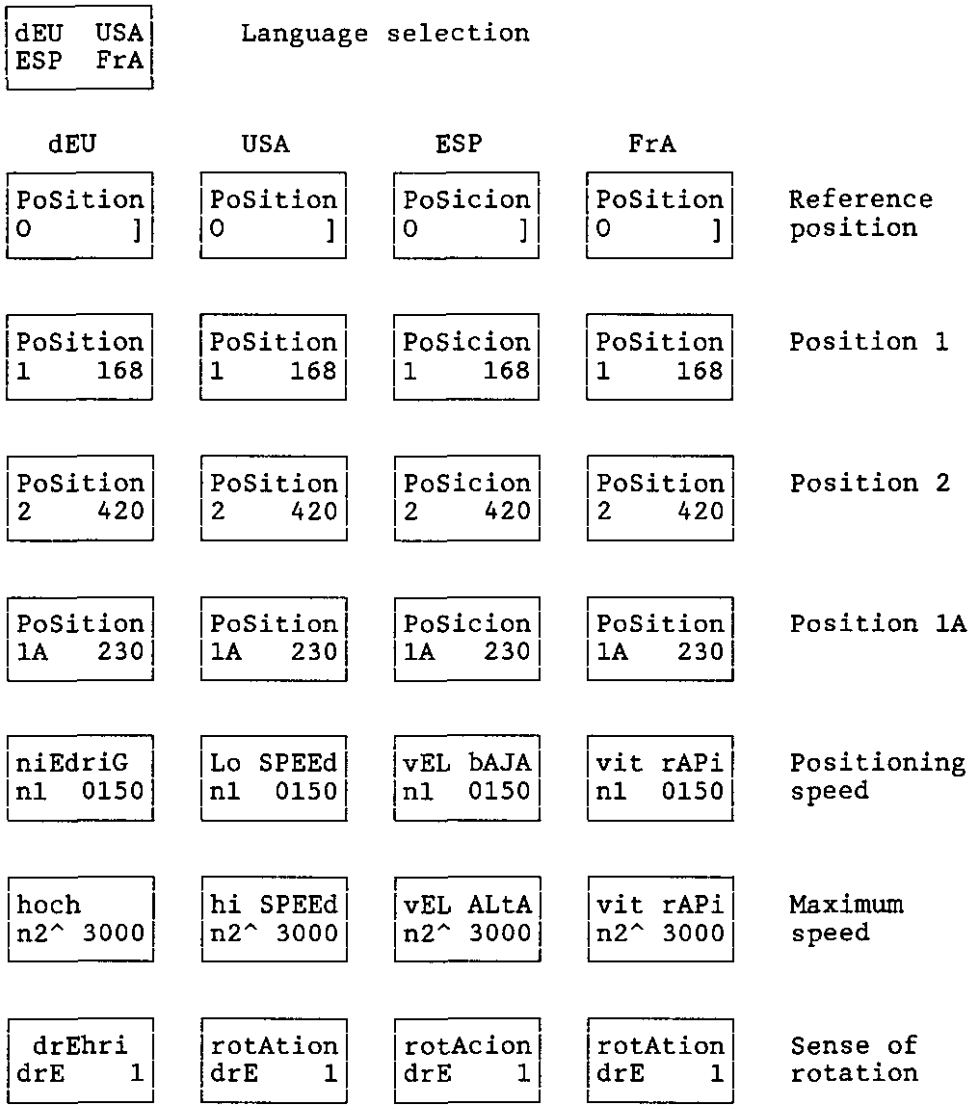
-> [+] -> [-] -> Change value

10.-> [E] -> Adjust the sense of rotation ==> rotAtion drE 1

-> [+] -> [-] -> Change value

11.-> [E] -> Entry into normal operation after POWER ON. ==> 3000 DA82AV

6.1.2 Multilingual Display



6.2 Direct Input of Speed (DED)

```
Maximum speed (upper limit of the function DED)  --> F-111
Lower limit of the function DED                  --> F-121
```

With the help of this function, the maximum speed can be changed easily from the Variocontrol without going into programming mode.

Display in the direct mode:

```
 4300     ==> Display of speed n-max
xx82xV    ==> Type of control
```

The maximum speed n-max can be changed directly by pushbuttons +/- on the front of the Variocontrol outside of the sewing cycle. The speed will be indicated on the display. The upper limit of n-max is determined by parameter F-111 in the programming mode. The lower limit is determined by parameter F-121.
As usual, saving the value is done by the next sewing start.

6.3 Pushbuttons for Background Information (HIT)

(see table on the last page)

For fast operator information the values of the functions are indicated on the display of the Variocontrol for approx. 3 seconds by pressing the pushbuttons 1, 3 7, 8 and 0, when switching on. During this time the respective value can be changed immediately by the pushbuttons + and -. The display remains the same during set-up.
If the value of an activated function is to be changed the respective function key must be pressed somewhat longer. The function will thus be turned off and/or commutated briefly. Subsequently, the function with the respective value is shown on the display again.

6.3.1 Examples for HIT

Increase stitch-count seam section from 20 stitches to 25 stitches.

If stitch counting (pushbutton 1) was turned off.

3000 DA82AV	Display after power on: -> Maximum speed -> Type designation
1	Press pushbutton 1 briefly. LED beside pushbutton 1 lights up, stitch counting is turned on.
Stc 020	Display: 20 stitches are set
	3 seconds.
+	Press pushbutton +, number of stitches increases.
Stc 025	Display: 25 stitches are set Changes are automatically entered after 3 seconds.
3000 DA82AV	Display after approx. 3 seconds: -> Maximum speed -> Type designation

If stitch counting (pushbutton 1) was turned on.

3000 DA82AV	Display after power on: -> Maximum speed -> Type designation
1	Press pushbutton 1 for at least 1 second, LED beside pushbutton 1 goes off momentarily, function stitch counting remains on.
Stc 020	Display: 20 stitches are set

[+]	Press pushbutton +, number of stitches increases.
Stc 025	Display: 25 stitches are set Changes are automatically entered after 3 seconds.
3000 DA82AV	Display after approx. 3 seconds: -> Maximum speed -> Type designation

With the sewing start the new value is saved.

Function key F

By the function key (pushbutton 3) various parameters, also from a higher level, can be switched on or off. This pushbutton can be set to the following functions:

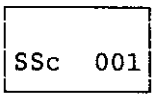
1. SSt Softstart ON/OFF
2. SrS Ornamental backtack ON/OFF
3. hPr High lift walking operating mode stored ON/OFF
4. Sht Full stitch with pushbutton needle up/down ON/OFF
5. LSS Sewing start blocked by light barrier uncovered ON/OFF
6. Frd Reversion ON/OFF

The setting of the F pushbutton can be changed as follows:

3000 DA82AV	Display after power on. -> Maximum speed -> Type designation
[P]	Press pushbutton P.
[E]	Press pushbutton E.
[3]	Press pushbutton 3 (function key F), corresponding LED blinks.
-F- 2	Display: Actual status (ornamental backtack ON/OFF)
[-]	Press pushbutton -. (+ increases, - decreases the display value)
-F- 1	Display: New status (Softstart ON/OFF)
[P]	Press pushbutton P.
3000 DA82AV	Setting is terminated, display: -> Maximum speed -> Type designation

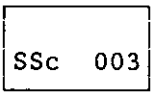
The number of Softstart stitches can be changed as follows:
Example: change number of stitches from 1 to 3 (function Softstart (pushbutton 3) was turned off).

Press pushbutton 3 briefly.
LED beside pushbutton 3 lights up,
function Softstart is turned on.

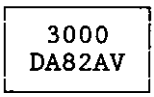


Display:
1 stitch is set

Press pushbutton +,
number of stitches increases.



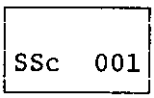
Display:
3 stitches are set
Changes are automatically entered after
3 seconds.



Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

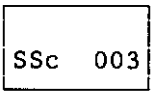
If Softstart (pushbutton 3) was turned on.

Press pushbutton F at least for 1 second,
LED beside pushbutton F goes off
momentarily, function Softstart remains
on.

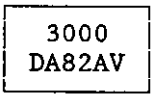


Display:
1 stitch is set

Press pushbutton +,
number of stitches increases.



Display:
3 stitches are set



Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

With the sewing start the new value is saved.

6.4 Programming Seams (Teach-in)

- A maximum of 8 patterns with a total of 40 seams can be established.
- Programming is possible only if no code number was input after switching on!
- The functions initial backtack, final backtack, stitch counting, thread trimming and presser foot lifting can be assigned individually to each seam.
- Backward sewing by reversing the feeding direction can only be programmed in the teach-in mode.

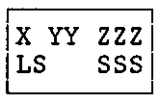
Example 1:	Pattern 1	40 seams
	Pattern 2-8	0 seams
Example 2:	Pattern 1	4 seams
	Pattern 2	5 seams
	Pattern 3	6 seams
	Pattern 4	25 seams
	Pattern 5-8	0 seams
Example 3:	Pattern 1	10 seams
	Pattern 2	15 seams
	Pattern 3-8	0 seams

Examples 1 and 2 show that optimal utilization of the storage capacity is possible.

6.4.1 Teach-in Mode

- Each seam pattern is programmed and stored separately.
- After input of the pattern the teach-in mode must be exited.
- Saving is done by sewing start.

Display configuration:

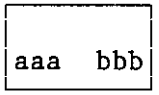


X Pattern number (1...8)
YY Seam number (0...40)
ZZZ Stitches for the seam with stitch counting (0...254)
LS appears when light barrier function on
SSS Stitches after light barrier sensing (0...254)

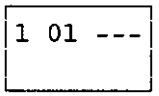
Programming:

1 -> P ==> LED pushbutton P blinks on the operator level ==>

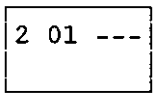
2 -> E ==> Display of a parameter ==>



3 -> 2 ==> LED pushbutton 2 blinks
Entry into pattern and seam programming! ==>



4 -> 2 ==> Changing the pattern number! ==>



By the pushbuttons on the Variocontrol the seam functions can be programmed (e.g. presser foot lifting, initial backtack, etc.)

Example: seam with stitch counting:

-> [1] ==> Turning on the stitch counting; display of the actual stitches. ==> [2 01 004]

-> [1] ==> Turning on backward sewing (display "-" in front of the number of stitches). Switching to forward sewing by pressing the pushbutton again. ==> [2 01-004]

Backward sewing, including backtack, is performed in reversed feeding direction. The functions "light barrier seam" and "backward seam" block each other, i.e. the light barrier cannot be switched on when the backward seam is selected, and vice versa, a backward seam is impossible when the light barrier is switched on.

-> [+] -> [-] Changing the stitches by pushbuttons +/- or sewing the seam by using the pedal.

Example stitch counting and/or light barrier:

-> [0] ==> Turning on the light barrier; display of the actual number of compensating stitches. ==> [2 01 004 / LS 007]

Only with V740!

-> [0] ==> Turning on the transmitted light barrier; display of the sensitivity level in the bottom line. ==> [2 01 004 / LS 3 007]

Only with V740!

-> [L] ==> Select the desired sensitivity level. ==> [2 01 004 / LS 4 007]

With V720/V730/V740!

-> [+] -> [-] Modification of the number of light barrier compensating stitches

If stitch counting **and** light barrier are turned on at the same time the stitches for stitch counting have to be programmed before the light barrier compensating stitches.

After programming of the function ==>

-> [E] ==> Enter the seam. Display of the next seam. ==> [2 02 ---]

-> The seam is entered by pressing the pushbutton E or by heeling the pedal back.

-> [P] ==> Exit of programming! Display of the first seam section to be executed in the selected pattern. ==> [2 01 004 / LS 007]

After all seams have been programmed, each seam can be recalled individually by pushbutton E for checking.

Note:
Several seam patterns cannot successively be programmed without interruption. Each pattern must be terminated by pushbutton P, otherwise it gets lost.

Note:
The patterns are permanently saved only after the sewing start.

Detailed Example:

A seam 1 with stitch counting and initial backtack, a seam 2 with stitch counting and a seam 3 with light barrier seam and final backtack are to be programmed under the pattern number 4.

	Display before programming	==>	xxxx XY822V
1. -> [P]	==> LED pushbutton P blinks	==>	
2. -> [E]	==> Display of a parameter on the operator level	==>	aaa bbb
3. -> [2]	LED pushbutton 2 blinks ==> Pattern 1, seam 1	==>	1 01 ---
4. -> [2]	LED pushbutton 2 blinks ==> Pattern 2, seam 1	==>	2 01 ---
5. -> [2]	LED pushbutton 2 blinks ==> Pattern 3, seam 1	==>	3 01 ---
6. -> [2]	LED pushbutton 2 blinks ==> **Pattern 4, seam 1**	==>	4 01 ---
7. -> [7]	LED bottom pushbutton 7 lights up ==> Single initial backtack is on	==>	4 01 ---
8. -> [6]	LED pushbutton 6 lights up ==> Foot lifting at the seam end is on	==>	4 01 ---
9. -> [1]	==> Stitch counting is on	==>	4 01 000
10. -> [+] -> [-]	Changing the number of stitches by pushbuttons or by using the pedal ==> Seam length of 17 stitches is adjusted		4 01 017
11. -> [E]	==> **Pattern 4, seam 2**	==>	4 02 ---

12. -> [1] ==> Stitch counting is on ==> 4 02 000

13. -> [+] -> [-] Changing the number of stitches by pushbuttons or by using the pedal
==> Seam with 8 stitches is adjusted
4 02 008

14. -> [E] ==> **Pattern 4, seam 3**
Free seam is selected
==> 4 03 ---

15. -> [0] ==> Light barrier is activated ==> 4 03 ---
LS 000

16. -> [+] -> [-] Changing the stitches by pushbuttons
5 compensating stitches are adjusted
4 03 ---
LS 005

17. -> [8] LED top pushbutton 8 lights up
==> Single final backtack is on ==> 4 03 ---
LS 005

18. -> [9] LED bottom pushbutton 9 lights up
==> Thread trimmer is on ==> 4 03 ---
LS 005

19. -> [E] ==> **Pattern 4, seam 4**
By changing to the next seam the settings of the preceding seams are automatically entered.
==> 4 04 ---

20. -> [P] ==> Programming terminated, first seam can be executed ==> 4 01 017

6.4.2 Max. Number of Seams Exceeded

If the total number of 40 seams is exceeded by inputting a program, for the time being, the teach-in mode cannot be terminated by pushbutton P. A further sewing start is impaired.
The display shows the warning below.
Pressing pushbutton P again causes the deletion of the pattern indicated on the display. The teach-in mode is exited if the total number of 40 seams is not exceeded. Otherwise a new warning will be indicated.

Display:

DELETE X YY NN	X: Last input and/or recalled pattern number (1...8) YY Number of programmed seams of the recalled pattern (0...40) NN: Total number of input seams

The operator must now decide which pattern is to be deleted!

-> [2] ==> Call-up of the pattern to be deleted

DELEtE X YY NN

X: Pattern number
YY: Number of seams of this pattern
NN: Total number of input seams

-> [P] ==> Deletion of the pattern

DELEtE X YY NN

X: Pattern number of the deleted pattern
YY: 00 = no more seam is programmed
NN: Total number of input seams if more than 40

When 40 seams are exceeded, the teach-in mode is exited, and the last input seam will be indicated.

6.4.3 Execution (Pattern) Mode

1. Switch on mode by pushbutton 2
   (LED lights up) -> [2] ==> [X 01 ZZZ]

2. Select pattern 1...8
   - Seam number 01 is displayed -> [+] -> [-] ==> [X 01 030]

3. If one should not start with seam 1
   select different seam number -> [E] ==> [2 05 ZZZ]
   - Push button E several times
     until desired seam number is displayed

■ The pattern can now be started by pushing the pedal.

Exit the execution (pattern) mode
- Switch off by pushbutton 2 -> [2]

7. Functions and Settings

7.1 First Stitch after Power On

Functions	Abbreviation on the display	Parameter
1 stitch in npos after POWER ON Positioning speed	Sn1 n1	F-231 F-110

At the first start after power on, the drive runs at positioning speed (n1) for one rotation from pos. 1 to pos. 1, independent from the pedal position and set initial backtacking speed if parameter Sn1 is on.

7.2 Program Identification

Functions	Abbreviation on the display	Parameter
Display program no. and date		F-179

The program number with index is shown in the top line on the display, and an 8-digit identification number in the bottom line .

Display example parameter 179:

```
PrG3212A   <-- Program number: 3212  /  Index: A
92031211   <-- Identification number:  92031211
```

7.3 Function Key (Pushbutton 3)

Functions	Abbreviation on the display	Parameter
Determine function for pushbutton 3	-F-	F-008

By the function key (pushbutton 3) a preprogrammed function can be switched on or off directly.

Programmable functions:

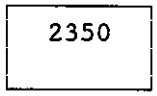
F-008 = 1 - Softstart on/off
F-008 = 2 - Ornamental backtack on/off
F-008 = 3 - High lift walking operating mode stored on/off
F-008 = 4 - Full stitch with pushbutton for needle up/down on/off
F-008 = 5 - Sewing start blocked with light barrier uncovered on/off
F-008 = 6 - Reversion on/off

7.4 Display Actual Speed

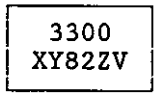
Functions	Abbreviation on the display	Parameter
Display actual speed	nIS	F-139

If parameter F-139 is switched ON the following information is shown on the display:

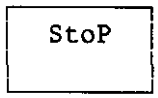
During machine run:
- the actual speed
Example: 2350 rotations per minute



At machine standstill:
- the adjusted maximum speed and the type of control
Example: 3300 rotations per minute and control type XY82ZV



At stop in the seam:
- the stop indication
Example:



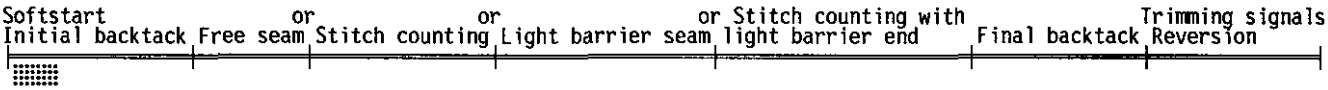
7.5 Sense of Rotation of the Motor

Functions	Abbreviation on the display	Parameter
Sense of rotation of the motor	drE	F-161

Look at the motor shaft: F-161 = 0 - clockwise rotation
F-161 = 1 - anticlockwise rotation

Attention!
If the motor is mounted differently, e.g at a different angle or with gear, make sure that the parameter value is assigned correctly to the sense of rotation.

7.6 Softstart



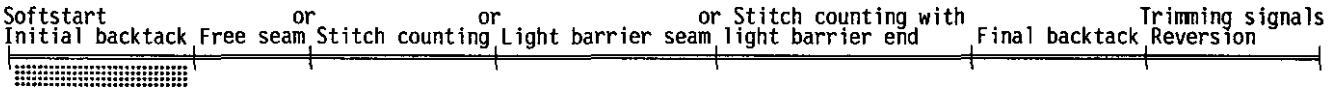
Functions	Abbreviation on the Display	Parameter
Softstart number of stitches	SSc	F-100
Softstart speed	n6	F-115
Softstart on/off	SSt	F-134

Function:
- after power on
- at the beginning of a new seam
- speed limited (n6), pedal controlled
- lower speed of a function running parallel predominates (e.g. initial backtack, stitch counting)
- stitch counting synchronized to position 1
- interruption with pedal in position 0 (neutral)
- full heelback (position 2)

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Softstart on/off	-F-	F-008 = 1

7.7 Initial Backtack



Functions	Abbreviation on the display	Parameter
Single/double off		Pushbutton 7
Number of stitches forward	Arv	F-000
Number of stitches backward	Arr	F-001
Speed n3	n3	F-112
Run-out time	t1	F-200
Start delay from lifted foot	F-202	
Stitch correction time	t8	F-150

The initial backtack starts by pushing the pedal forward at the beginning of the seam. The backtack is delayed by the time t3 from lifted foot (starting delay from lifted foot).
The backtack is executed automatically at initial backtacking speed. It cannot be interrupted. With softstart running parallel, the respective lower speed predominates.
The counting as well as the switching of the stitch regulator is synchronized to position 1.
After the execution of the backward seam, the backtacking signal, and, after a delay time t1, the initial backtacking speed, will be turned off. Then pedal control is returned.

7.7.1 Double Initial Backtack

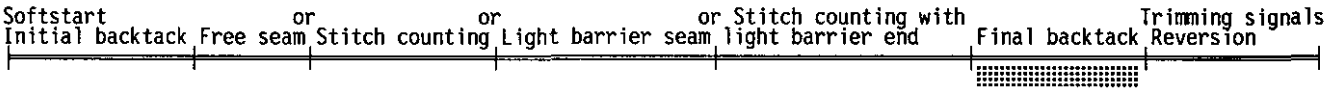
The forward section will be sewn for an adjustable number of stitches. Then, the signal for the stitch regulator will be emitted, and the backward section will be executed. For both sections the number of stitches is separately adjustable.

With slow backtack mechanisms, for the double initial backtack, the stitch regulator can be delayed with a time-lag of t8 (initial backtack stitch correction), which prolongs the backward section.

7.7.2 Single Initial Backtack

The backtacking signal will be emitted for an adjustable number of stitches, and the backward section will be sewn.

7.8 Final Backtack



Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 8
Number of stitches backward	Err	F-002
Number of stitches forward	Erv	F-003
Final backtacking speed	n4	F-113
Last stitch backward on/off	FAr	F-136
Stitch correction time	t9	F-151
Start delay from lifted foot	t3	F-202

The final backtack starts either by heeling the pedal back, with seams with stitch counting at the end of the counting, or from the light barrier seam at the end of the light barrier compensating stitches. From machine standstill, the stitch regulator will be turned on immediately. From lifted foot, the switch-on point is delayed by the time t3 (start delay from lifted foot). The first leading position 1 is counted as 0 stitch, whenever the function is started outside of position 1. The counting and the turning off of the stitch regulator is synchronized to position 1.

From full machine run, the signal will be turned on only after reaching the final backtacking speed and the synchronization to position 2. The final backtack will be performed automatically. An interruption is not possible.

7.8.1 Double Final Backtack

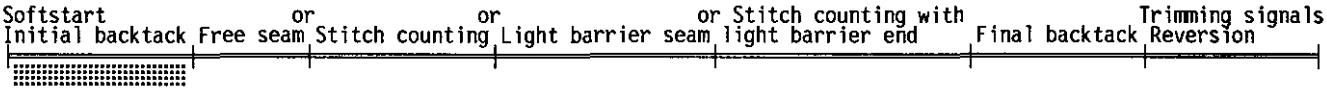
The backward section will be sewn for a number of stitches. Then, the stitch regulator will be turned off, and the forward section will be executed. For both sections the number of stitches is seperately adjustable.
After the execution of the forward section, the trimming function will be initiated. During the entire operation the sewing speed is reduced to final backtacking speed, with the exception of the last stitch, which will be executed at postioning speed n1.
With slow backtack mechanisms, for the double final backtack, the stitch regulator can be delayed with a time lag of t9 (final backtack stitch correction).

7.8.2 Single Final Backtack

The single final backtack will be executed at final backtacking speed. During the last stitch the speed is reduced to positioning speed. Depending on parameter F-136 (Far) the stitch regulator remains on or is turned off.

- Parameter F-136 = ON last stitch backward
  Parameter F-136 = OFF last stitch forward

7.9 Initial Ornamental Backtack



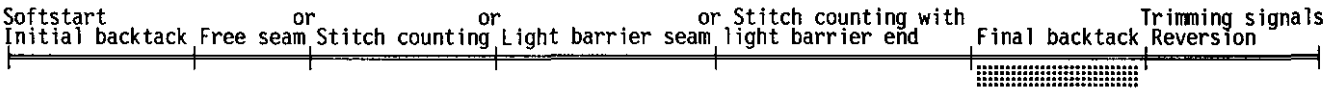
Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 7
Number of ornamental backtacking stitches forward	SAv	F-080
Number of ornamental backtacking stitches backward	SAr	F-081
Initial backtacking speed	n3	F-112
Ornamental backtack on/off	SrS	F-135
Start delay from lifted foot	t3	F-202
Ornamental backtack stop time	tSr	F-210

Differences from the standard initial backtack:
- The drive stops for the switching of the stitch regulator
- The stop time can be adjusted
- After the backtacking section backward follows a backtacking section forward with the same number of stitches as the backward section

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 2

7.10 Final Ornamental Backtack



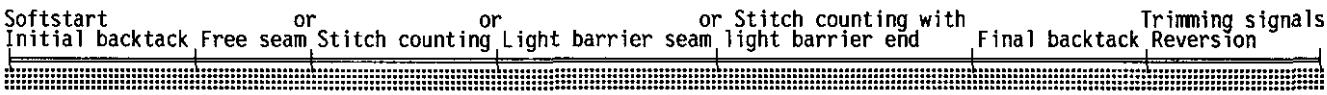
Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 8
Number of ornamental backtacking stitches backward Number of ornamental backtacking stitches forward Final backtacking speed Ornamental backtack on/off Start delay from lifted foot Ornamental backtack stop time	 SEv n3 SrS t3 tSr	 F-083 F-113 F-135 F-202 F-210

It corresponds to the normal final backtack. Between the various seam sections the drive stops in position 1 for the ornamental backtack stop time (tSr). The number of stitches of the forward and backward section can be set separately.

Direct access by function key pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 2

7.11 Intermediate Backtack



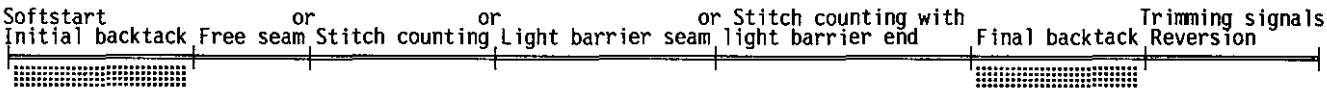
The backtack solenoid can be switched on anywhere in the seam by the external pushbutton.

Note:
The external switch has a double function
- During machine run intermediate backtack
- At machine standstill needle up/down

Firing of the backtack solenoid at machine standstill is not possible.

7.12 Suppression/Recall of Backtack

■ Effective in standard and ornamental backtack



The subsequent backtacking operation can be suppressed or recalled once by the external pushbutton.

When pressing	Initial back-tack On	Initial back-tack Off	Final back-tack On	Final back-tack Off
Before start of seam	no backtack	backtack	---	---
In the seam	---	---	no backtack	backtack

The double backtack is performed in the above cases.

7.13 Holding Power of Backtacking

Functions	Abbreviation on the display	Parameter
Time of full power	t10	F-212
Operating time stage with pulsing	t11	F-213

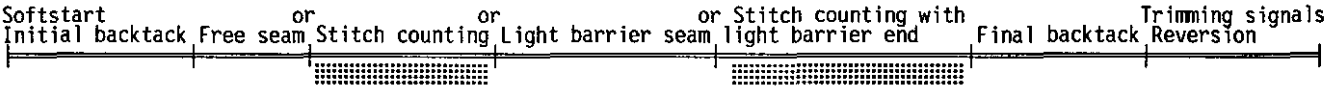
The backtack solenoid is released by full power. Then the solenoid is automatically switched to partial power in order to reduce the load for the control and for the connected solenoid.
The duration of full power is set by F-212, the holding power at partial power by F-213.

Caution!

If the holding power is set too high the solenoid and the control may be permanently damaged. Please observe the allowed operating time of the solenoid and set the appropriate value according to the table below.

Stage	Operating time	Effect
1	12.5 %	low holding power
2	25 %	
3	37.5 %	
4	50 %	
5	62.5 %	
6	75 %	
7	87.5 %	high holding power
0	100 %	full power

7.14 Seam with Stitch Counting



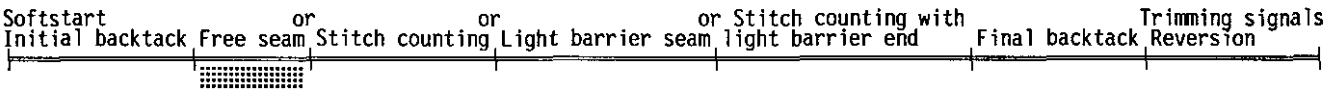
Functions	Abbreviation on the display	Parameter
Stitch counting on/off		Pushbutton 1
Number of stitches	Stc	F-007
Stitch counting speed	n12	F-118
Speed mode for a seam with stitch counting	SGn	F-141

Speed control for the stitch counting can be selected by the speed mode.

Mode 0: Execution at pedal controlled speed.
Mode 1: Execution at fixed speed n12 as long as pedal is pushed.
Mode 2: Execution at limited speed n12 as long as pedal is pushed.
Mode 3: Automatic execution at fixed speed as soon as the pedal has been pushed once. Termination is possible by "heeling the pedal back (-2)".

The sewing speed is reduced in each stitch depending on the actual speed (max. 11 stitches before the end of the stitch counting) in order to be able to stop exactly at the end of the stitch counting. When the light barrier is switched on, free sewing will be performed after the stitch counting.

7.15 Free Seam and Seam with Light Barrier



Functions	Abbreviation on the display	Parameter
Positioning speed	n1	F-110
Upper limit of the maximum speed	n2‾	F-111
Maximum speed		see display
Lower limit of the maximum speed	n2_	F-121
Limited speed	n12	F-118
Speed mode Free seam	SFn	F-142

Speed control for the free seam can be selected by the speed mode.

Mode 0: Execution at pedal controlled speed from n1 to n2.
Mode 1: Execution at fixed speed n12, when pedal is forward (position > =1).
Mode 2: Execution at limited speed n12, when pedal is forward (position > =1)
Mode 3: Only for the seam with light barrier:
Automatic execution at fixed speed as soon as the pedal has been pushed once. The seam end is initiated by the light barrier. Termination by heeling the pedal back (-2) is possible.

If the light barrier is not active the speed is pedal controlled up to nmax corresponding to the adjustment of parameter F-111.

The maximum speed is shown on the display after power on and after thread trimming and can be changed directly by pushbuttons +/- on the Variocontrol. The setting range is limited by the set values of parameters F-111 and F-121.

7.16 Needle Up/Down

Functions	Abbreviation on the display	Parameter
Mode for pushbutton needle up/down	Mht	F-140

With the help of this parameter the function "needle up/down" can be switched.

Needle up/down: F-140 = 0
When the pushbutton is pressed, the drive only runs from position 1 to position 2 and/or from position 2 to position 1. If the drive is outside of position 1 it runs to the next possible position.

Full stitch: F-140 = 1
When the pushbutton is pressed, the machine performs on rotation according to the selected basic position. If the drive is outside of the stop position it runs to the selected basic position.

Needle up: F-140 = 2
When the pushbutton is pressed, the drive runs from position 1 to position 2. If the drive is outside of position 1 it does not move for safety reasons.

Full stitch (stop in pos.1): F-140 = 3
When the pushbutton is pressed, the machine performs on rotation from position 1 to position 1. If the motor is in position 2 it runs to position 1, when pressing the pushbutton. It runs from position 1 to position 1 on each subsequent actuation of the pushbutton. If the motor is outside of the stop position it runs to the selected basic position.

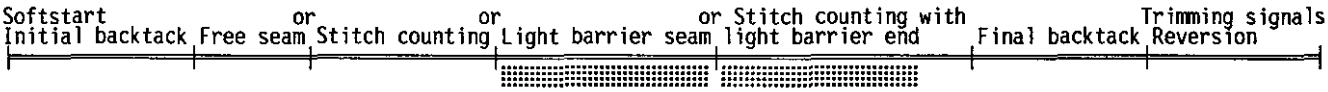
Function off: F-140 = 4
When pressing the pushbutton at stop there will be no change of position.
The function manual backtacking activated by this pushbutton during machine run is not affected.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Single stitch on/off	-F-	F-008 = 3

For safety reasons this direct access is only possible when parameter F-140 is set at 2 or 3.

7.17 Light Barrier



7.17.1 General Light Barrier Functions (V720, V730, V740)

Functions	Abbreviation on the display	Parameter
Light barrier compensating stitches	LS	F-004
Number of light barrier seams	LSn	F-006
Speed after light barrier sensing	n5	F-114
Light barrier sensing uncovered	LSd	F-131
Sewing start blocked with light barrier uncovered	LSS	F-132
Light barrier seam end with thread trimming	LSE	F-133

- After sensing the seam end, counting of the compensating stitches at light barrier speed is performed.
- Interruption of the sequence, when pedal is in position 0 (neutral).
- Disabling of the thread trimming operation by parameter F-133, independent of pushbutton 9 on the Variocontrol. Stop in the basic position.
- Programming of up to 15 light barrier seams with stop in the basic position. After the last light barrier seam, a thread trimming operation will be performed.
- Light barrier sensing end (uncovered) or beginning of fabric (covered), can be selected by parameter F-131.
- Blocking of machine start, when light barrier is uncovered, programmable with parameter F-132.

7.17.2 Reflection Light Barrier (V720, V730)

Functions	Abbreviation on the display	Parameter
Light barrier on/off Sensitivity adjustment when using LS001		Pushbutton 0 Potentiometer on the V730
Mechanical adjustment of the light barrier LS001	SR5	F-174

Adjustments

Sensitivity:

Depending on the distance of the light barrier to the reflection area, adjust sensitivity to a minimum.
(Turn potentiometer as far as possible to the left).

- LS001 - Potentiometer on the Variocontrol
- LSM001 - Potentiometer directly on the light barrier module

Mechanical Orientation:

- LS001 - Addressing of parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
  - By orienting the light barrier over the reflection area the highest possible bargraph level must be reached, then fix light barrier in this position.

  LSM001 - The orientation is facilitated through a visible light spot on the reflection area.

7.17.3 Transmitted Light Barrier (V740)

Functions	Abbreviation on the display	Parameter
Light barrier on/off Switch between fabric ply/end sensing Select sensitivity levels Sensitivity adjustment		Pushbutton 0 Pushbutton 0 Pushbutton L Pushbuttons + and -
Sensitivity adjustment Mechanical adjustment	LSI SR5	F-009 F-174

Sensitivity adjustment:

- 8 levels with parameter F-009 and pushbutton "L" programmable.
- Each level from 0-255 adjustable with pushbuttons +/-.
- Bargraph and valency indication on the display.

Select the sensitivity level:

- Level 1 - 7, when sewing with fabric ply sensing. Select by pushbutton "L" possible before each seam.
- Level 8 , when sewing with seam end sensing. Automatic selection by the control.

» [L] ==> When pressing pushbutton "L" once, the adjusted sensitivity level and the adjusted sensitivity will be indicated. Select the next sensitivity level with each actuation of the pushbutton.

» [+] » [-] The sensitivity can then be changed immediately. If there is no more change of values the display changes back to the initial status. Sewing is possible again

Note:
Sensitivity level 8 can only be adjusted on the technician or supplier level.

Mechanical adjustment of the light barrier sensor

- Address parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
- The transmitted light barrier sender is to be oriented such that the highest possible bargraph level is reached.
- When the upper and/or lower limit of the bargraph is exceeded, the sensititvity is adjusted automatically by pressing the pushbutton "L" such that the bar is in central position. The above adjustment can then be continued.

7.17.4 Automatic Start by Light Barrier (V730, V740)

Functions	Abbreviation on the display	Parameter
Delay of automatic start	ASd	F-128
Automatic start on/off	ALS	F-129
Sewing start blocked with light barrier uncovered	LSS	F-132

The function allows the automatic start of sewing as soon as the light barrier has sensed the insertion of fabric.

The following conditions must be met:

- Parameter F-132 = on (no sewing start, when light barrier uncovered).
- Parameter F-129 = on (Automatic start on).
- Light barrier switched on at the Variocontrol (pushbutton 0).
- The pedal must remain pushed forward at the seam end.

For safety reasons, this function becomes active only after a normal sewing start in the first seam. The light barrier must be covered, when the pedal is in neutral position; then pedal forward.

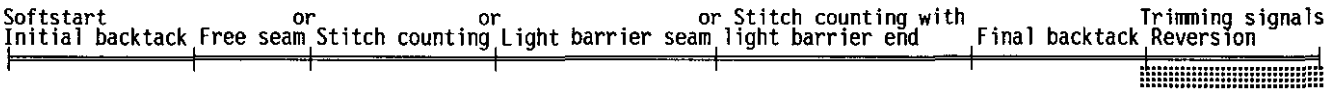
This safety function is reset, when the pedal does not remain pushed forward after the end of the seam.

7.17.5 Light Barrier Filter for Knitted Fabrics

Functions	Abbreviation on the display	Parameter
Number of filter stitches	LSF	F-005
Light barrier filter on/off	LSF	F-130

The filter prevents premature triggering of the light barrier function, when sewing knitted fabrics.
- By parameter F-130 the filter can be switched on or off.
- By changing the number of filter stitches the mesh will be adapted.

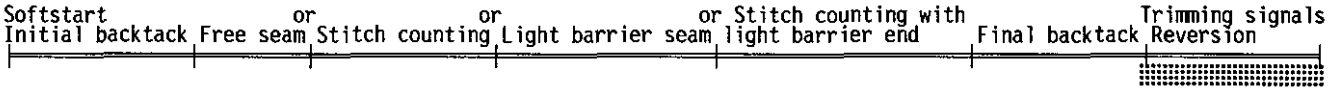
7.18 Thread Trimmer



Functions	Abbreviation on the display	Parameter
Thread trimmer on/off		Pushbutton 9
Trimming speed	n7	F-116
Trimming stitch backward	FAr	F-136

- Thread trimming at seam end can be switched on or off by pushbutton 9.
- Thread trimming is performed at trimming speed.
- When thread trimming is switched off, the drive stops in position 2 at seam end; at the end of programmed seams it stops in position 1.
- If parameter F-136 is ON the backtack solenoid for single final backtack remains on until the stop position is reached.

7.19 Thread Wiper



Functions	Abbreviation on the display	Parameter
Thread wiper on/off		Pushbutton 9
Thread wiper activation time Thread wiper return time	t6 t7	F-205 F-206

- The thread wiper can only be switched on if the thread trimmer is switched on at the same time.
- The activation time (t6) is set by parameter F-205.
- The return time (t7, F-206) prevents presser foot lifting before the thread wiper is in its original position.

7.20 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic in the seam Automatic after trimming		Pushbutton 5 Pushbutton 6
Actitvation delay when pedal is in position -1, half heelback Start delay from lifted foot Time of full power Operating time stage with pulsing Delay after thread wiping until presser foot lifting Delay after thread trimming without thread wiping until presser foot lifting	t2 t3 t4 t5 t7 tFL	F-201 F-202 F-203 F-204 F-206 F-211

Presser foot is lifted:

- in the seam	- by heeling the pedal back (position -1) or automatically (pushbutton 5)
- after trimming	- by heeling the pedal back (position -1 or -2) or automatically (pushbutton 6) - by light barrier, automatically - by stitch counting, automatically - activation delay after thread wiping (t7) - activation delay without thread wiping (tFL)

Unintentional foot lifting before thread trimming, when changing from pedal position 0 (neutral) to position -2, can be prevented by setting an activation delay (F-201).

Holding power of the lifted foot:

The presser foot is lifted by full power. Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.
The duration of full power is set by F-203, the holding power at partial power by F-204.

Caution!
If the holding power is set too high the solenoid and the control may be permanently damaged. Please observe the allowed operating time of the solenoid and set the appropriate value according to the table below.

Stage	Operating time	Effect
1	12.5 %	low holding power
2	25 %	
3	37.5 %	
4	50 %	
5	62.5 %	
6	75 %	
7	87.5 %	high holding power
0	100 %	full power

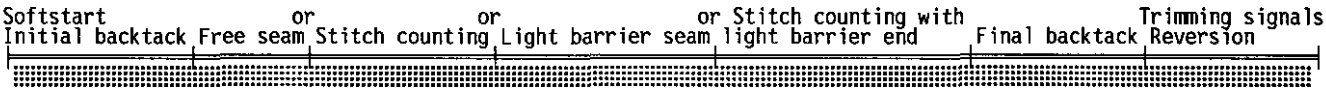
Foot lowers:

- from manual foot lifting, when pedal is in position 0 (neutral) (position $\geq$ 0)
- from automatic foot lifting, when pedal heeled forward (position $>$ 0)

The start is delayed until the foot has securely lowered.
- delay time adjustable F-202

7.21 Blocking of Machine Run (Safety Switch)

Caution!
This is not a safety function.
The line voltage must still be switched off during maintenance and repair work.



Functions	Abbreviation on the display	Parameter
Blocking of machine run on/off	LSP	F-290

Display after activation of the blocking of machine run:

Symbol | --StoP-- / --StoP-- | blinking alternately !

Blocking of machine run in the free seam, in the seam with sitch counting and in the light barrier seam:

The seam is interrupted by opening the switch.
- Stop in the basic position
- Needle up is not possible
- Presser foot lifting is possible

Blocking of machine run in the initial backtack:

The initial backtack is interrupted by opening the switch.
- Stop in the basic position
- Needle up is not possible
- Presser foot lifting is possible
- After unblocking the machine run, the seam is continued with the seam section following the initial backtack

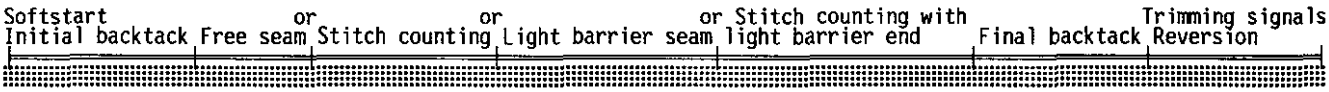
Blocking of machine run in the final backtack:

The final backtack is interrupted by opening the switch and the seam is terminated.
- Presser foot lifting is possible

New start after blocking of machine run:

A new start after closing the switch is only possible if the pedal was in position 0 (neutral).

7.22 High Lift Walking



Functions	Abbreviation on the display	Parameter
High lift walking speed	nlO	F-117
High lift walking ON/OFF	hP	F-137
High lift walking stored	hPr	F-138
High lift walking speed run-out time	thP	F-152
Minimum number of stitches	chP	F-185

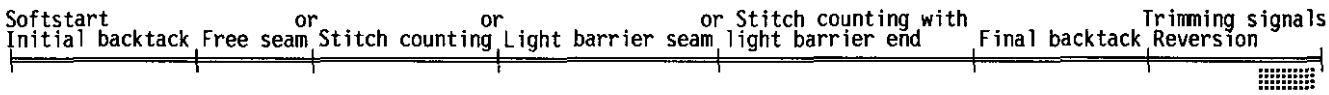
Limitation to high lift walking speed is caused by pressing the external pushbutton.
The high lift walking solenoid is switched on, when the speed ≤ high lift walking speed.

When function high lift walking stored is activated, high lift walking remains on until the pushbutton is pressed again. When it is not activated, high lift walking is effective only while the pushbutton is pressed.
Run-out stitches can be programmed by parameter F-185. This way, high lift walking remains on until the stitch counting is finished.
After switching off the high lift walking solenoid, the speed limitation remains effective during the run-out time (thP).

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
High lift walking operating mode stored on/off	-F-	F-008 = 3

7.23 Reversion



Functions	Abbreviation on the display	Parameter
Reversion on/off		Pushbutton 9
Positioning speed	nl	F-110
Number of reversion increments	InP	F-183
Activation delay of reversion	drd	F-181
Reversion on/off	Frd	F-182

The function "reversion" is performed after trimming.
When the stop position is reached, the drive stops for the time of the activation delay of reversion (F-182).
Then it reverses at positioning speed for an adjustable number of increments.
1 increment corresponds to approx. 0.7°.

7.24 Flip-Flop Functions (FF)

Functions			Abbreviation on the display	Parameter
Limited speed for flip-flop function			n9	F-183
Flip-flop mode			FFF	F-190
Speed limitation n9 with	mode 1,9	ON/OFF	Fn9	F-191
Inversion of FF1 signal with	mode 1,5	ON/OFF	MF1	F-192
Automatic reset at seam end	mode 2,3	ON/OFF	FFr	F-193
Backtacking suppression on pushbutton FF1	mode 9,10	ON/OFF	Fvr	F-194

Depending on the mode selected by F-190 various operations are triggered by an external pushbutton. Output FF1 and FF2, display LED FF1 and FF2, seam execution, backtacking and speed limitation etc. are affected.

FF-Mode 1

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	ON	OFF	ON	OFF	-	-
1. Pressing pushbutton FF1	OFF	ON	-	-	Speed limitation 2	IB+FB suppressed
2. Pressing pushbutton FF1	ON	OFF	-	-	-	-
1. Pressing pushbutton FF2	-	-	OFF	ON	-	-
2. Pressing pushbutton FF2	-	-	ON	OFF	-	-
Additional Information	At the seam end the FF-1 function is reset. The FF-1 signal can be inverted by parameter F-192, (F-192=OFF signal normal / F-192=ON signal inverted) Activation of speed limitation can be suppressed by parameter F-191, (F-191=ON -> speed limitation= on / F-191=OFF -> speed limitation = off					

FF-Mode 2

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	OFF	OFF	OFF	OFF	-	-
1. Pressing pushbutton FF1	ON*	ON	-	-	-	Final backtack** Manual backtack***
2. Pressing pushbutton FF1	OFF	OFF	-	-	-	-
1. Pressing pushbutton FF2	-	-	ON	ON	-	-
2. Pressing pushbutton FF2	-	-	OFF	OFF	-	-
Additional Information	* : The FF1 signal is switched to reset while initial and final backtack are active; manual backtacking is blocked in this position ** : Stop before switching on backtacking *** : Manual backtack is blocked At the seam end (FA) FF1 is automatically reset. Automatic reset can be switched off by parameter F-193, (F-193=ON -> automatic reset ON / F-193=OFF -> automatic reset OFF)					

Abbreviations: IB = Initial backtack
FB = Final backtack
FA = Thread trimmer

FF-Mode 3

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	ON	OFF	OFF	OFF	-	-
1. Pushbutton FF1 or FF2	OFF*	ON	ON*	OFF	-	Final backtack**
2. Pushbutton FF1 or Ff2	OFF*	OFF	OFF*	ON	-	Final backtack**
3. Pushbutton FF1 or FF2 or FA active	OFF	OFF	OFF	OFF	-	-
Additional Information	* : The FF1 and FF2 signal are switched to reset while initial and final backtack are active. ** : Stop before switching on backtacking. Manual backtack is blocked. Automatic reset at the seam end (FA). Automatic reset can be switched off by parameter F-193, (F-193=ON -> automatic reset ON / F-193=OFF -> automatic reset OFF) Manual backtacking is blocked in this FF mode.					

FF-Mode 4

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	ON	OFF	OFF	OFF	-	-
1. Pushbutton FF1 or FF2	OFF*	ON	ON*	OFF	-	Final backtack**
2. Pushbutton FF1 or Ff2	OFF*	OFF	OFF*	ON	-	Final backtack**
3. Pushbutton FF1 or FF2	ON	OFF	OFF	OFF	-	-
Additional Information	* : The FF1 and FF2 signal are switched to reset while initial and final backtack are active; manual backtacking is blocked in this position. ** : Stop before switching on backtacking. Manual backtack is blocked.					

FF-Mode 5

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	ON	OFF	OFF	OFF	-	-
1. Pressing pushbutton FF1	OFF	ON	-	-	Speed limitation 1	IB+FB suppressed
2. Pressing pushbutton FF1 or FA active	ON	OFF	-	-	-	-
Pressing pushbutton FF2	By pressing pushbutton FF2 a partial stitch is performed.					
Additional Information	Signal FF2 is partial stitch signal. The FF1 signal can be inverted by parameter F-192, (F-192=OFF signal normal / F-192=ON signal inverted) Automatic reset at the seam end.					

Abbreviations: IB = Initial backtack
FB = Final backtack
FA = Thread trimmer

FF-Mode 6

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	OFF	OFF	OFF	OFF	-	-
1. Pressing pushbutton FF1	ON*	ON	-	-	-	Final backtack** Manual backtack***
2. Pressing pushbutton FF1 or FA active	OFF	OFF	-	-	-	Final backtack**
Pressing pushbutton FF2	By pressing pushbutton FF2 a partial stitch is performed.					
Additional Information	Signal FF2 is partial stitch signal. Automatic reset at the seam end (FA). * : The FF1 function is switched to reset while initial and final backtack are active ** : Stop before switching on backtacking *** : Manual backtack is blocked					

FF-Mode 7

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	OFF	OFF	OFF	OFF	-	-
FF1 function	The FF1 signal is emitted as machine run signal. LED1 does not light up. When motor at standstill, the FF1 signal is switched on by pressing the the pushbutton, as long as the pushbutton is pressed down.					
1. Pressing pushbutton FF2			ON*	ON	-	Final backtack** Manual backtack***
2. Pressing pushbutton FF2 or FA active			OFF	OFF	-	Final backtack**
Additional Information	Signal FF2 is partial stitch signal. Automatic reset at the seam end (FA). * : The FF1 function is switched to reset while initial and final backtack are active ** : Stop before switching on backtacking *** : Manual backtack is blocked					

FF-Mode 8

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	OFF	OFF	OFF	OFF	-	-
FF1 function	The FF1 signal is emitted as machine run signal. LED1 does not light up. When motor at standstill, the FF1 signal is switched on by pressing the the pushbutton, as long as the pushbutton is pressed down.					
FF2 function	When pressing the pushbutton from motor at standstill, a partial stitch is performed, the signals FF1 and FF2 are switched on. As long as the pushbutton is pressed down and the machine is started, or the pushbutton is pressed during machine run, the signals FF1 and FF2 and the LED2 are switched on. When thread trimming starts, the FF2 signal and the LED2 are switched off again.					

Abbreviations: FA = Thread trimmer

FF-Mode 9

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Function: Stitch counting Teach-in
Power On / Reset	ON	OFF	OFF	OFF	Free sewing
1. Pressing pushbutton FF1 or power ON	ON	ON	OFF	OFF	Short seam A - Stitch counting Pushbutton FF2 is blocked
2. Pressing pushbutton FF1	ON	OFF	OFF	ON	Short seam B - Teach-in Pushbutton FF1 is blocked
3. Pressing pushbutton FF1	ON	OFF	OFF	OFF	Free sewing with small stitch Pushbutton FF1 is unblocked
1. Pressing pushbutton FF2	OFF	ON	OFF	ON	Free sewing with large stitch Speed limitation 2 ON
2. Pressing pushbutton FF2	ON	OFF	OFF	OFF	Free sewing with small stitch
Additional Information	Activation of speed limitation can be suppressed by parameter F-191, (F-191=ON -> speed limitation = on / F-191=OFF -> speed limitation = off) The pushbutton FF1 can be set with the function backtack suppression by parameter F-194. F-194=OFF function FF1 = see above F-194=ON function FF1 = backtack suppression (if F-194 is switched free sewing with small stitch is automatically turned on)				

FF-Mode 10

Inputs/Outputs	Signal FF1	LED FF1	Signal FF2	LED FF2	Speed Machine	Backtack Function
Power On / Reset	ON	ON	OFF	OFF	Stitch counting = ON	
1. Pressing pushbutton FF1 or power ON	ON	OFF	OFF	ON	Short seam A - Teach-in	
2. Pressing pushbutton FF1	ON	OFF	OFF	ON	Short seam B - Stitch counting	
Pressing pushbutton FF2	OFF	OFF	OFF	OFF	Free sewing with large stitch	
Additional information	The pushbutton FF1 can be set with the function backtack suppression by parameter F-194. F-194=OFF function FF1 = see above F-194=ON function FF1 = backtack suppression					

7.25 Speed Limitation 1 and 2

Functions	Abbreviation on the display	Parameter
Speed limitation 1 Speed limitation 2	n10 n9	F-117 F-183

When pressing pushbutton speed limitation 1, the sewing speed is limited to speed n10; when pressing pushbutton speed limitation 2 the sewing speed is limited to speed n9.

7.26 Signal Output - POS1

- Transistor output with open collector
- Switches whenever the needle is in the slot between position 1 and 1A
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g. for the connection of a counter

7.27 External Speed Controller

With the help of the external speed controller connected with the pedal the commands for the sewing operation are inputted.
Instead of the external speed controller connected to the socket connector B80 (table 2) another external controller can be connected.

Table: Coding of the pedal stages

Speed stage	D	C	B	A		
-2	H	H	L	L	Full heelback	(e.g. initiating the seam end)
-1	H	H	H	L	Slight heelback	(e.g. presser foot lifting)
0	H	H	H	H	Pedal in position 0 (neutral)	
½	H	H	L	H	Pedal slightly forward	(e.g. presser foot lowering)
1	H	L	L	H	Speed stage 1	(n_{pos})
2	H	L	L	L	.	
3	H	L	H	L	.	
4	H	L	H	H	.	
5	L	L	H	H	.	
6	L	L	H	L	.	
7	L	L	L	L	.	
8	L	L	L	H	.	
9	L	H	L	H	.	
10	L	H	L	L	.	
11	L	H	H	L	.	
12	L	H	H	H	Speed stage 12 (Pedal fully forward)	(n_{max})

Functions	Abbreviation on the display	Parameter
Speed stage distribution	nSt	F-119

The characteristic curves of the pedal (speed change from stage to stage) can be adjusted.

Possible characteristic curves:
- linear
- progressive
- highly progressive

8. Machine Functions

8.1 Braking Behavior

Functions	Abbreviation on the display	Parameter
Speed reduction < 400 min^{-1} Speed reduction > 400 min^{-1}	br1 br2	F-207 F-208

The braking effect of the drive can be adjusted.
The following applies to all adjustment values:
The higher the value the more aggressive the braking reaction!

8.2 Braking Power at Standstill

Functions	Abbreviation on the display	Parameter
Braking power at standstill	brt	F-153

This function prevents unintentional "wandering" of the needle at standstill.
The effect can be tested by turning the handwheel.

- The braking power works at standstill
  - at stop in the seam
  - after trimming
- The effect is adjustable
- The higher the adjusted value, the higher the braking power
- It does not work after power on, unless sewing has not been started

8.3 Start Behavior

Functions	Abbreviation on the display	Parameter
Starting edge	ALF	F-220

The drive accelerating dynamics can be adapted to the characteristic of the sewing machine (light, heavy).

- High adjustment value = high acceleration

With a high starting edge adjustment value and, in addition, possibly high braking parameter values on a light machine, the behavior may appear coarse. In this case, one should try to optimize the adjustments.

Incorrect adjustment can cause the drive to lock or not to reach the set speed. In this case, the drive stops and the display shows an error message.

INFO E3

8.4 Adjustment of the Positions

Functions	Abbreviation on the display	Parameter
Adjustment of the reference position (position 0) (neutral)	F-170	
Adjustment of the signal and stop positions	SR2	F-171
Display of the signal and stop positions	SR3	F-172

8.4.1 Reference Position

The angular positions necessary on the machine, e.g. for needle down position or thread lever up position are stored in the control as numerical or angular values.
In order to establish a relationship between the electric positioner information and actual mechanical position a reference position is needed.

POSITION 0

The reference position must be adjusted:

- for initial operation
- after changing the positioner
- after changing the EPROM or the microprocessor

Reference position =- Needle point at the height of the needle plate, from downward movement of the needle in the sense of rotation of the motor shaft.

Note:
If another needle position (other than reference position) is adjusted the values of the signal and stop positions (pos 1 and pos 2) preset by the manufacturer are no longer valid and must be reset.

Programming:

1. Address F-170. ==> LED pushbutton-3 blinks

2. Press pushbutton 3 briefly ==>

PoSition 0]

3. Turn handwheel until desired refernce position is reached
   Note: Turn at least until marker ( ]) has disappeared

4. Press pushbutton E ==> Position 0 (neutral) is read by the control

If the reference position was not stored there will be an error message on the display:

INFO A3

-Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (lower needle position, switch-on position for thread trimmer (lock stitch))	Pos1
Position 2 (upper needle position, switch-off position of thread trimming solenoid (lock stitch),	Pos2
Position 1A	Pos1A
Position 2A	Pos2A
Position 3	Pos3
Position 3A	Pos3A

Programming:

1. Address F-171 ==> LED pushbutton 3 blinks!
2. Press pushbutton 3 ==> Position 1 xxx
   Adjust position 1
   Value xxx can be modified by pushbutton +/- or by turning the handwheel!
4. Press pushbutton E ==> Position 2 xxx
   Adjust position 2
3. Press pushbutton E ==> Position 1A xxx
   Adjust position 1A
5. Press pushbutton E ==> Position 2A xxx
   Adjust position 2A
6. Press pushbutton E ==> Position 3 000
   Position does not have to be adjusted !
7. Press pushbutton E ==> Position 3A 000
   Position does not have to be adjusted !
8. Press pushbutton E ==> Back to step 2!
9. Press pushbutton P ==> Positions will be read by the control

Note:
When adjusting the positions by the handwheel, make sure that the numerical value indicated on the display changes.

The adjustment values are programmed in the factory. After adjusting the reference position the machine is ready for use. The adjustments only need to be changed on non-standard machines and/or for fine tuning.

The display unit of the adjusted positions is increments.
One rotation of the handwheel corrresponds to 512 increments.
The change on the display is shown in increments of 2.
A change from one to the next value thus corresponds to approx. 1.4 angular degrees.

8.4.3 Display of the Signal and Stop Positions

The adjustment of the positions can easily be tested by parameter F-172.

- Address parameter F-172
- Turn handwheel corresponding to the sense of rotation of the drive
  - LED pushbutton 1 on - corresponds to position 1
  - LED pushbutton 1 turns off - corresponds to position 1A
  - LED pushbutton 2 on - corresponds to position 2
  - LED pushbutton 2 turns off - corresponds to position 2A

Position 3, 3A and the reference position are not displayed.

8.5 Memory Box

Functions	Abbreviation on the display	Parameter
Language selection		F-178
Memory Box operation on/off	FMb	F-197
Memory Card formatting on/off	Foc	F-198

With the help of the Memory Box available as a special accessory it is possible to permanently store programs inputted on the Variocontrol with a Memory Card and to recall them whenever necessary.
This avoids having to reprogram for recurring sewing operations.

■ A maximum of 10 different programs (data records) can be stored, each with the total program contents of the control (see chapter Programming Seams - Teach-in)

8.5.1 Preparation for Memory Box Operation

Caution! - Turn power off

- Unplug Variocontrol from the control
- Plug Memory Box into control
- Plug Variocontrol into Memory Box
- Turn power on
- Activate Memory Box by parameter F-197

8.5.2 Formatting of the Memory Card

The Memory Card is the storage medium for the programs.
Before using each Memory Card for the first time it must be prepared for receiving data by "formatting".

Note:
Original EFKA Memory Cards, with EFKA label, have been formatted and tested in the factory.

- Insert Memory Card with the labelled side up into the slot of the Memory Box.
  - If the Memory Card is correctly inserted the green LED on the Memory Box lights up.
    If LED does not light up repeat operation or use different card.
- Switch parameter F-198 on.
- Press pushbutton -P or -E.

- The display on the Variocontrol shows a growing series of lines from left to right. When the series reaches its full length, the formatting is finished.
- The formatting can also be used to erase **all** data on the Memory Card.

8.5.3 Operating the Memory Box

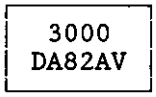
1. » Insert Memory Card with the labelled side up into the slot of the Memory Box. If the Memory Card is correctly inserted the green LED on the Memory Box lights up.
2. » Turn "Programming Seams (Teach-in)" off = = > pushbutton 2
3. » Save data

Remark: All adjustable parameters and sewing data are stored with the exception of the sense of rotation and the needle positions.

- Push pedal twice in short intervals, after end of seam, and put back to position 0 (neutral)

- Input any address between 0 and 9 for the data record.
  - The yellow BUSY-LED on the Memory Box lights up.
  - In case a data record already exists under the selected reference number, it will be overwritten.

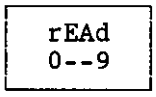
- Display after the storing is terminated



4. » Reading data from the Memory Card into the control (2 possibilities)

Possibility:

- Push pedal forward (stage 12), then turn power on

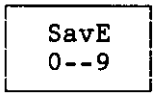


- Input address under which the desired data record is stored.

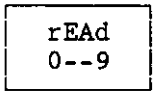
Note: For storing data permanently start sewing once before turning the power off!

Possibility:

- Push pedal twice in short intervals, after end of seam.

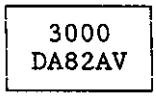


- Push pedal fully forward and put back to position 0 (neutral)



- Input address under which the desired data record is stored.
  - The yellow BUSY-LED on the Memory Box lights up.

- Display after saving the program.



Note: For storing data permanently start sewing once before turning the power off!

5. » Operation without Variocontrol

- Writing and reading is done by pushing the pedal as described in step 3 and 4.
- Data record 1 is always automatically selected.
- Reading-in is only possible if power is turned on with pedal fully forward.
- Alternating between writing and reading:
  - Pedal backward twice in short intervals = writing
  - Pedal fully forward and POWER ON = reading

6. » Exit

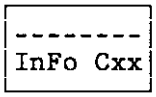
- **Interruption:**
  - Press one of the green pushbuttons (P E + -) on the Variocontrol
  - The Variocontrol display shows the values of normal operation

- **If data are not to be saved:**
  - Turn power off and on again

- **If data are to be saved:**
  - For storing data permanently start sewing once before turning the power off!

7. » Error messages

An error message is shown on the display, when the disturbances indicated below occur.
The red LED on the Memory Box signals disturbances.

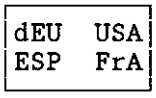


"xx" stands for a number in the following table:

INFO-No.	Display
C01	Memory Card not inserted
C02	Memory Card cannot be written on
C03	Memory Card formatting
C04	Memory Card writing or reading error
C05	Connection interrupted
C06	Data are not found
C07	No more space for data

Language selection:

- A language can be selected by parameter F-178. All additional information is then shown in the corresponding language.



9. Error Messages

General Information

Display	Signification
Info A1	Pedal not in neutral position, when switching the machine on
Info A2	Blocking of machine run (safety switch)
Info A3	The reference position (position 0) has not been stored
Info A4	Control panel not clearly selected

Programming of Functions and Values (Parameters)

Display	Signification
Info F1	Wrong code number or parameter number input

Serious Situation

Display	Signification
Info E1	Positioner not connected or defective
Info E2	Line voltage too low, or time between power off and power on too short
Info E3	Machine locks, or does not reach the desired speed
Info E4	Control disturbed by deficient grounding or loose contact

Hardware Disturbance

Display	Signification
Info H1	Commutation transmitter cord or frequency converter disturbed
Info H2	Processor disturbed

Memory Card Information

Display	Signification
Info C01	Memory Card not inserted
Info C02	Memory Card cannot be written on
Info C03	Memory Card formatting
Info C04	Memory Card writing or reading error
Info C05	Connection interrupted
Info C06	Cannot find data on Memory Card
Info C07	Storage space on Memory Card occupied

10. Signal Test

Functions	Abbreviation on the display	Parameter
Test of inputs and outputs	SR4	F-173

Outputs:

- Function test of the transistor power outputs and actuators connected to them (e.g. solenoids and solenoid valves)
- Test is initiated by pressing pushbuttons 0...9 on the Variocontrol

Table: Assignment of the pushbuttons to the outputs

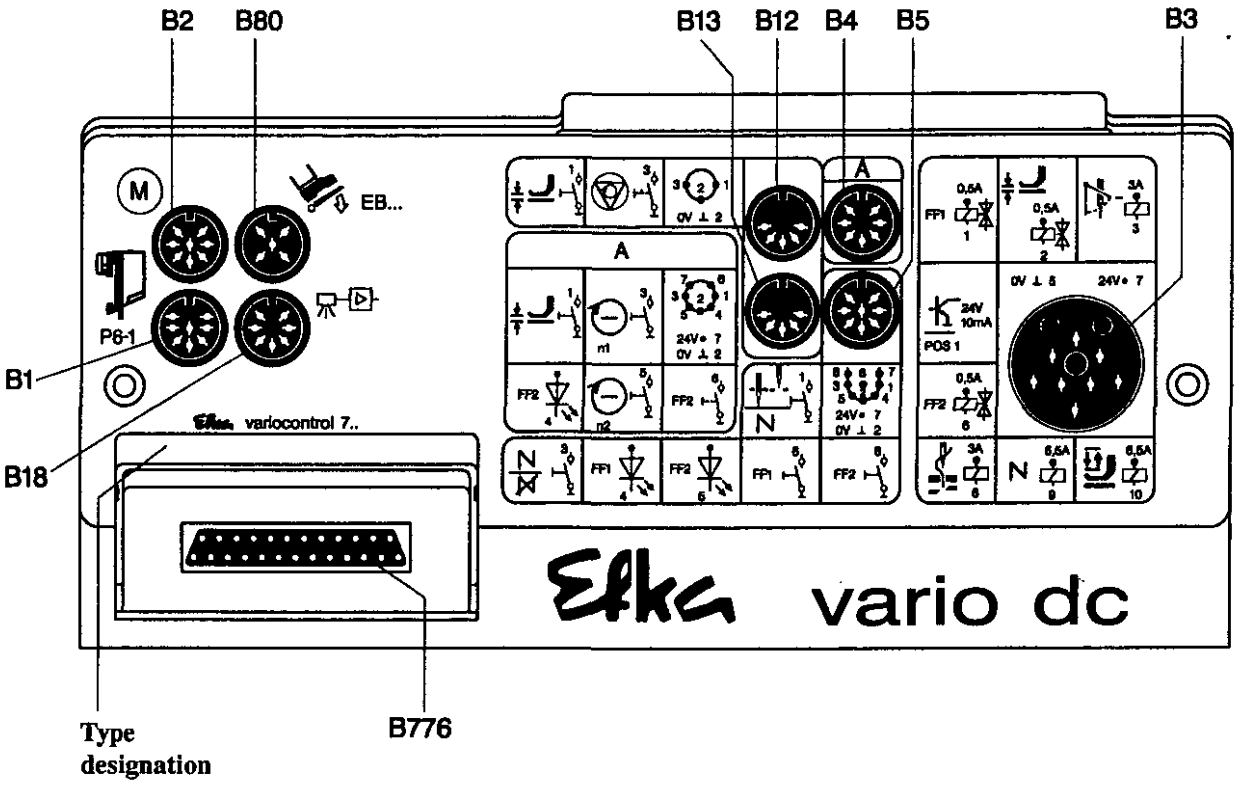
Pushbutton	Output
1	Backtacking
2	Presser foot lifting
3	Thread trimmer
4	High lift walking
5	Thread wiper
6	Flip-Flop signal 1
7	Flip-Flop signal 2
8	LED FF1
9	LED FF2
0	free

Inputs:

- Actuation of the external switches or pushbuttons will be indicated by alternating the switching state (on/off) on the display.
- Several switches must not be closed at the same time.
- Please note: switch for blocking of machine run (safety switch) must not be closed during the test.

11. Socket Connectors

11.1 Position in the Control



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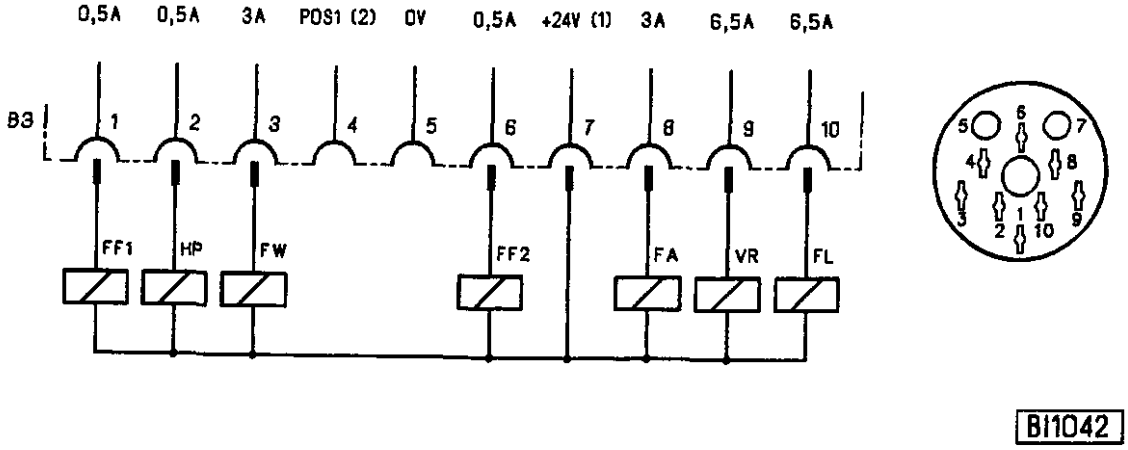
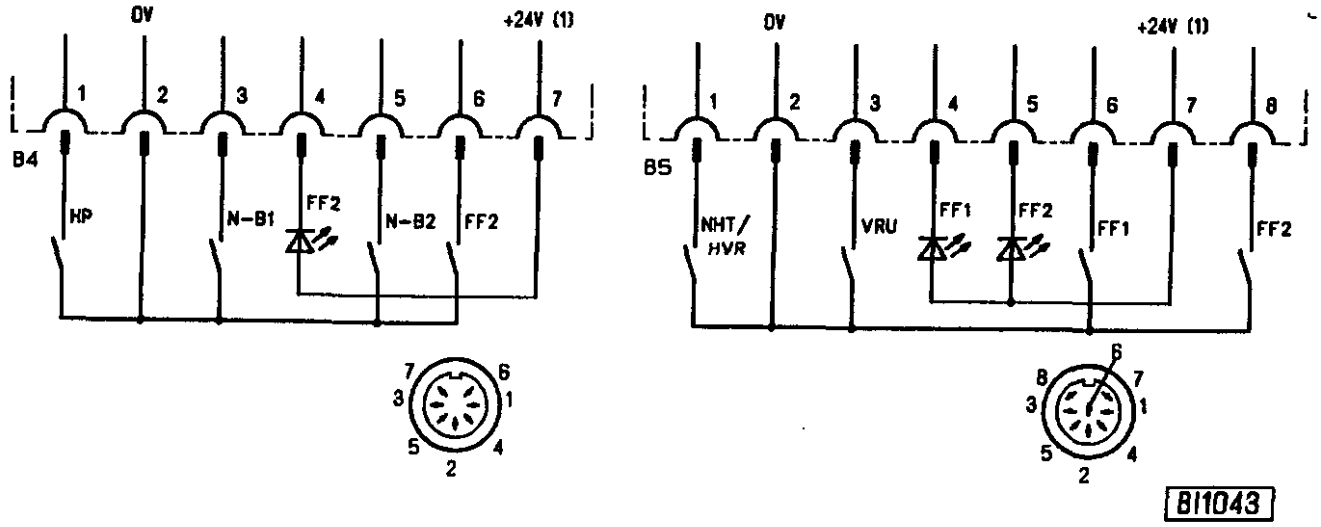
B1	- Positioner
B2	- Commutation transmitter for DC drive
B3	- Machine
B4	- Pushbuttons and display
B5	- Pushbuttons and display
B12	- Pushbuttons
B13	- Pushbuttons
B18	- *Light barrier module*
B80	- External speed controller
B776	- Control panel Variocontrol

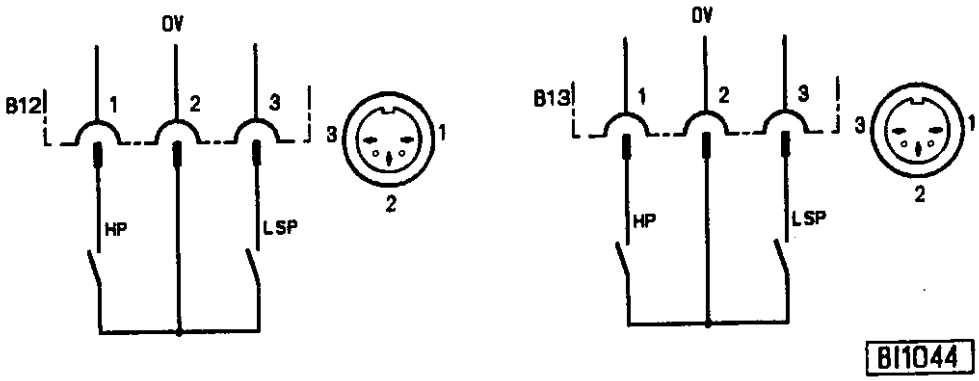
11.2 Connection Diagram

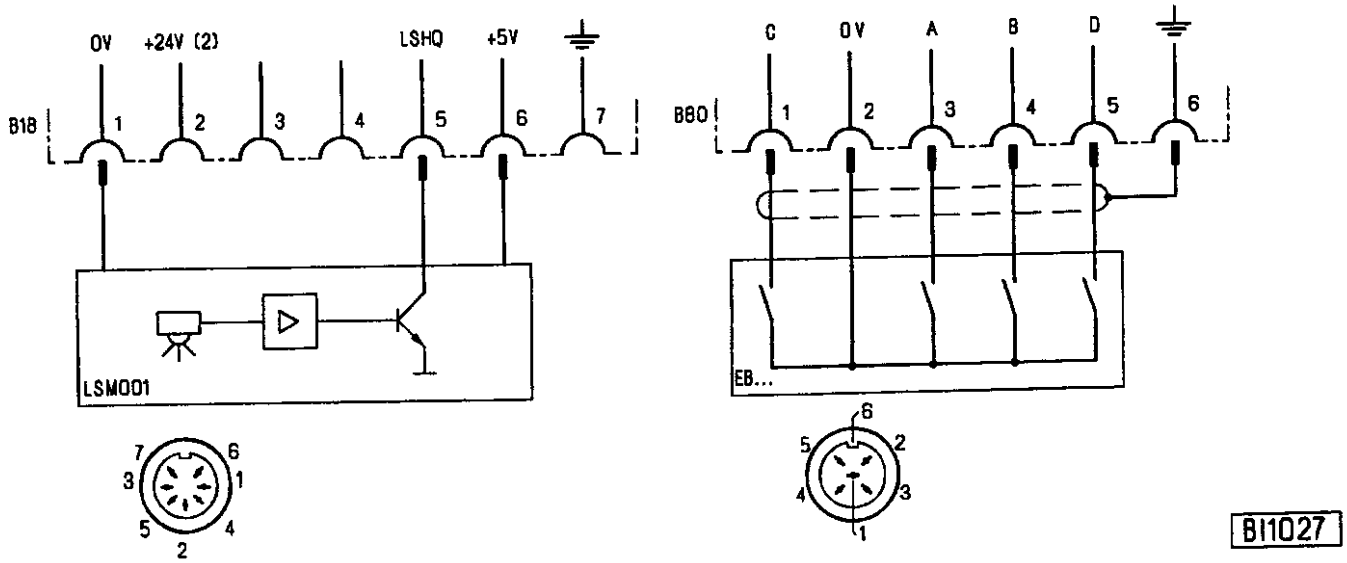




FA	- Thread trimmer
FF1	- Flip-flop function
FF2	- Flip-flop function
FL	- Presser foot lifting
FW	- Thread wiper
HP	- High lift walking
POS1	- Signal output for position 1 (2)
VR	- Backtacking (stitch condensation)
EST	- Single stitch
HVR	- Intermediate backtack (intermediate stitch condensation)
NHT	- Needle up/down
N-B1	- Speed limitation 1
N-B2	- Speed limitation 2
VRU	- Suppression/recall of backtack or stitch condensation

1) Nominal voltage 24V, no-load voltage max. 36V
2) Transistor output with open collector (max. 40V, 500mA)





HP - High lift walking
LSP - Blocking of machine run (safety switch)

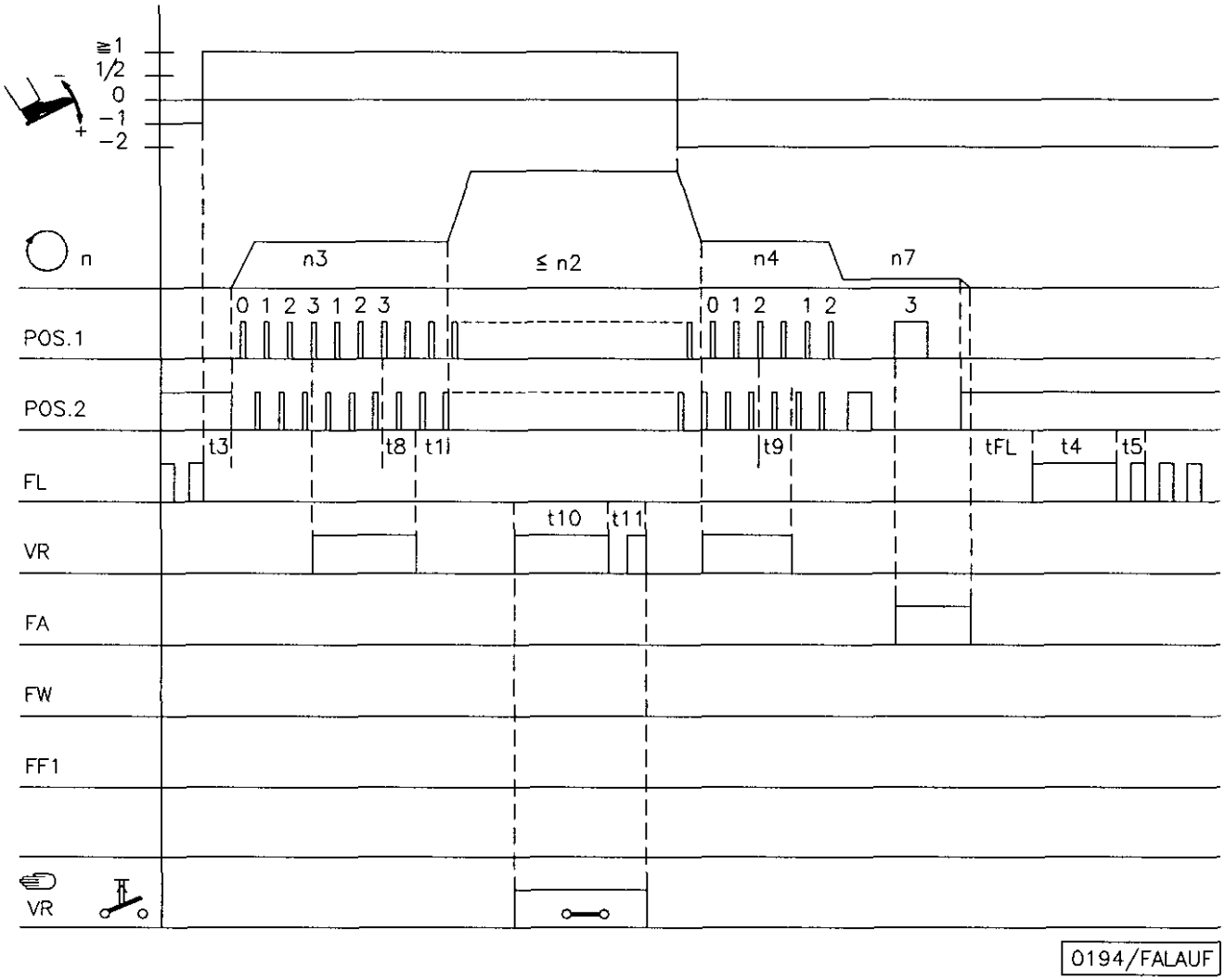
LSHQ - Light barrier command (identified if switched to 0V)

LSM001 - Reflection light barrier module
EB... - External speed controller

2) Nominal voltage 24V, no-load voltage max. 36V

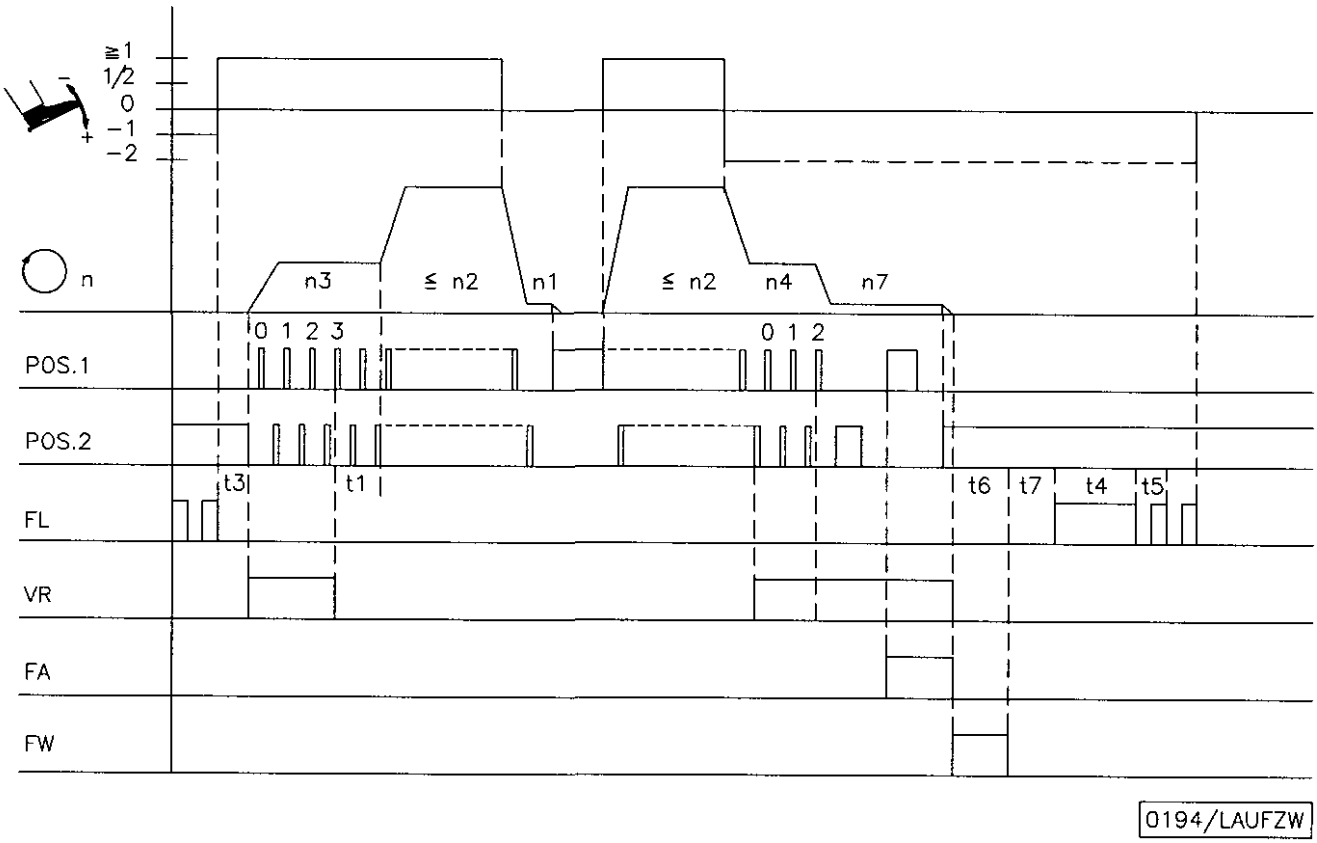
12. Function Diagrams

Trimming from full run



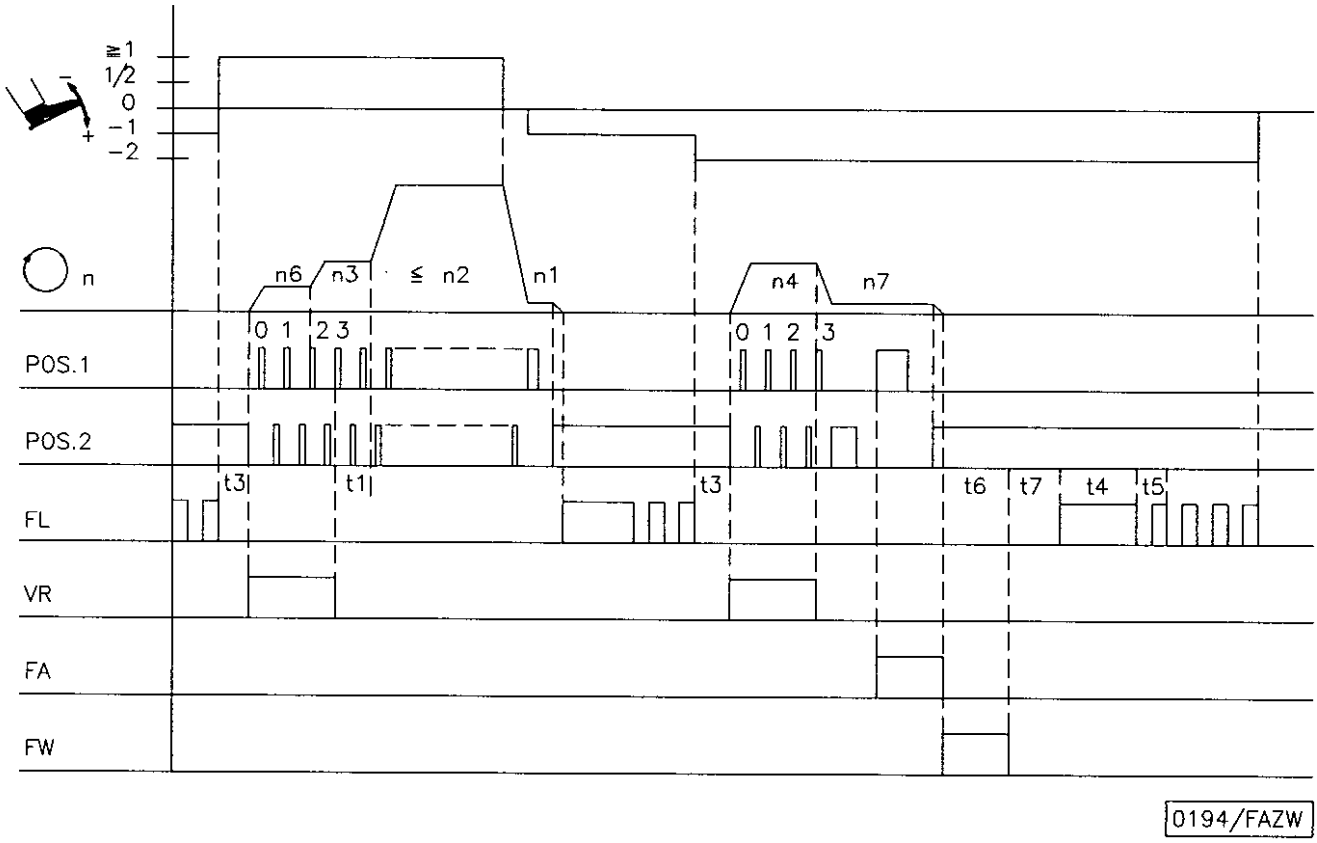
Abbreviation	Function		Parameter/Pushbutton
	Double initial backtack with stitch correction	on	Pushbutton 7
	Double final backtack with stitch correction	on	Pushbutton 8
	Thread wiper	off	Pushbutton 9
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay from end of initial backtack to speed release		F-200
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
tFL	Delay time of presser foot lifting, when thread wiper off		F-211
t8	Initial backtack stitch correction		F-150
t9	Final backtack stitch correction		F-151
t10	Full power of backtacking		F-212
t11	Pulsing of backtacking		F-213

Run with intermediate stop



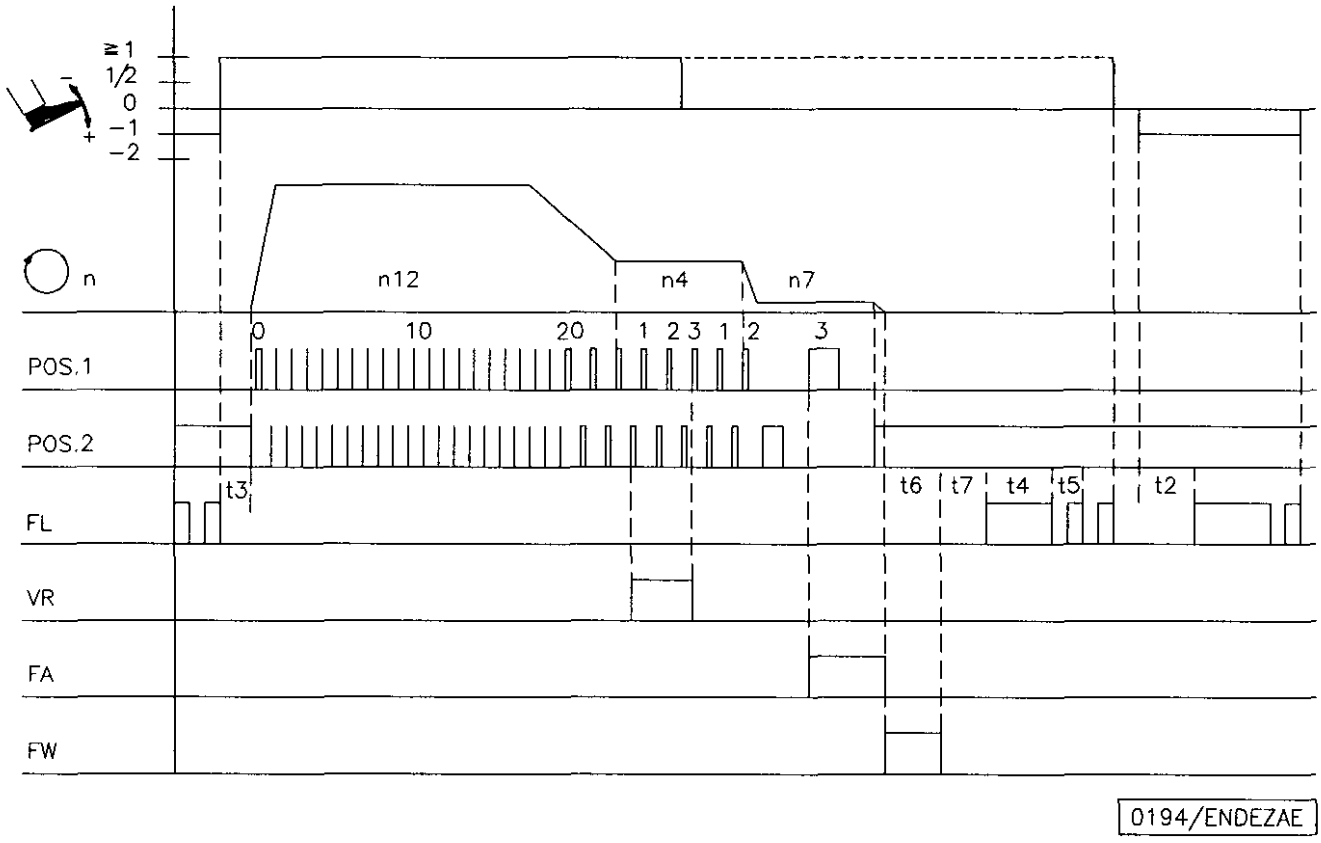
Abbreviation	Function		Parameter/Pushbutton
	Single initial backtack	on	Pushbutton 7
	Single final backtack	on	Pushbutton 8
	Basic position needle down	on	Pushbutton 4
FAr	Last stitch backward	on	F-136
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay from end of initial backtack to speed release		F-200
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206

Trimming from intermediate stop



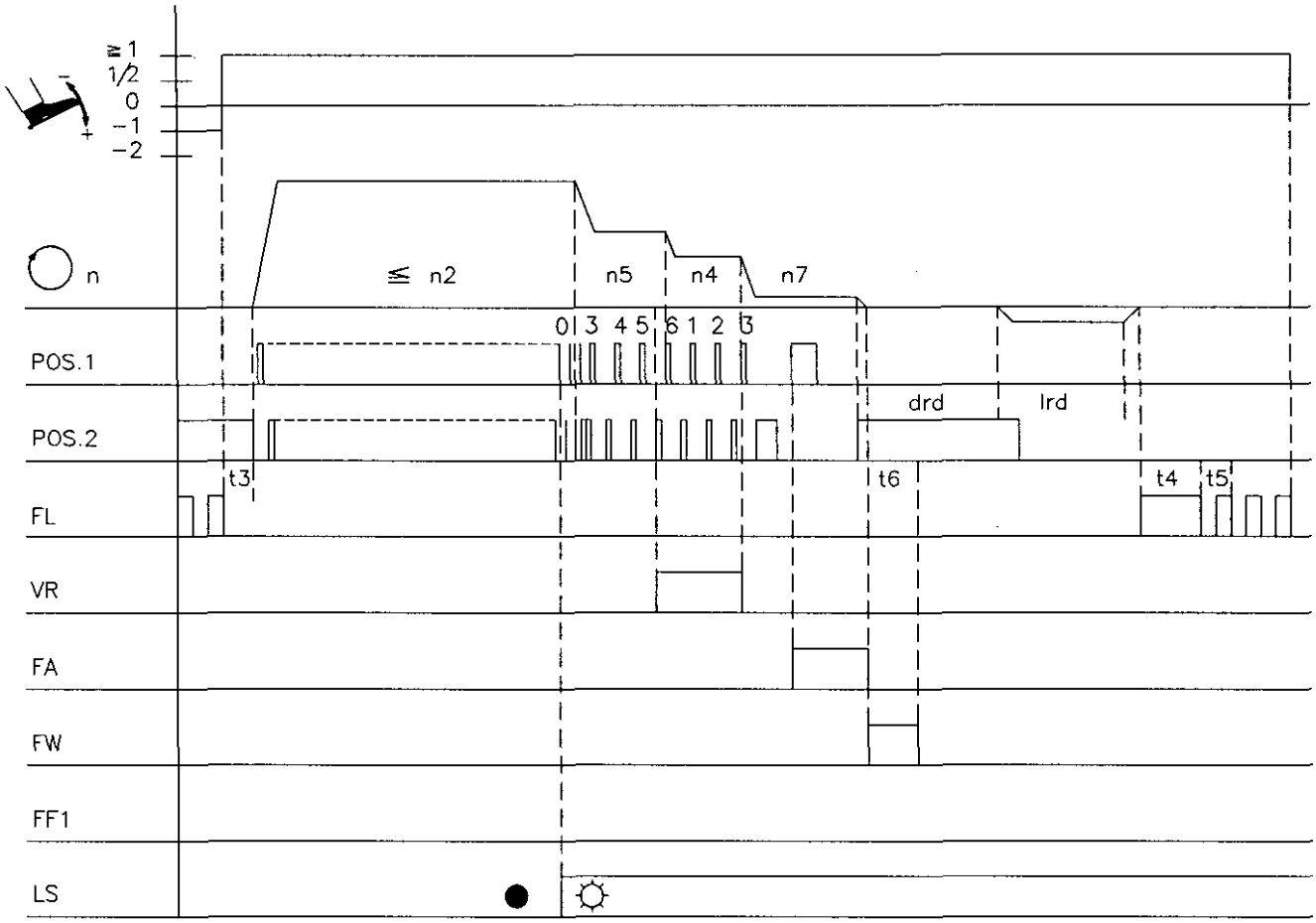
Abbreviation	Function		Parameter/Pushbutton
	Single initial backtack	on	Pushbutton 7
	Single final backtack	on	Pushbutton 8
	Basic position needle up	on	Pushbutton 4
FAr	Last stitch backward	on	F-136
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay from end of initial backtack to speed release		F-200
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206

Seam end by stitch counting



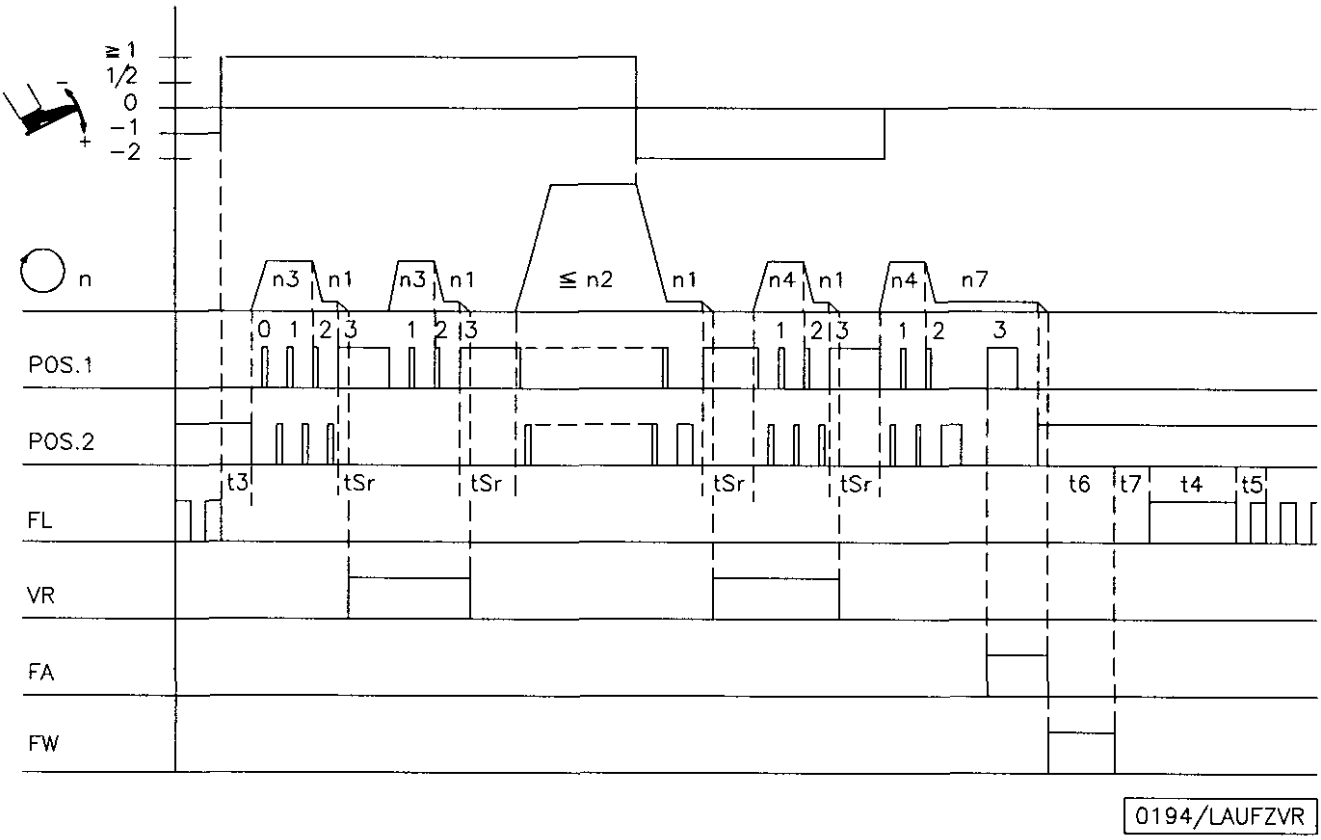
Abbreviation	Function		Parameter/Pushbutton
	Initial backtack	off	Pushbutton 7
	Stitch counting	on	Pushbutton 1
	Double final backtack	on	Pushbutton 8
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
n12	Stitch counting speed		F-118
t2	Delay of presser foot lifting with pedal in position -1		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206

Seam end by light barrier



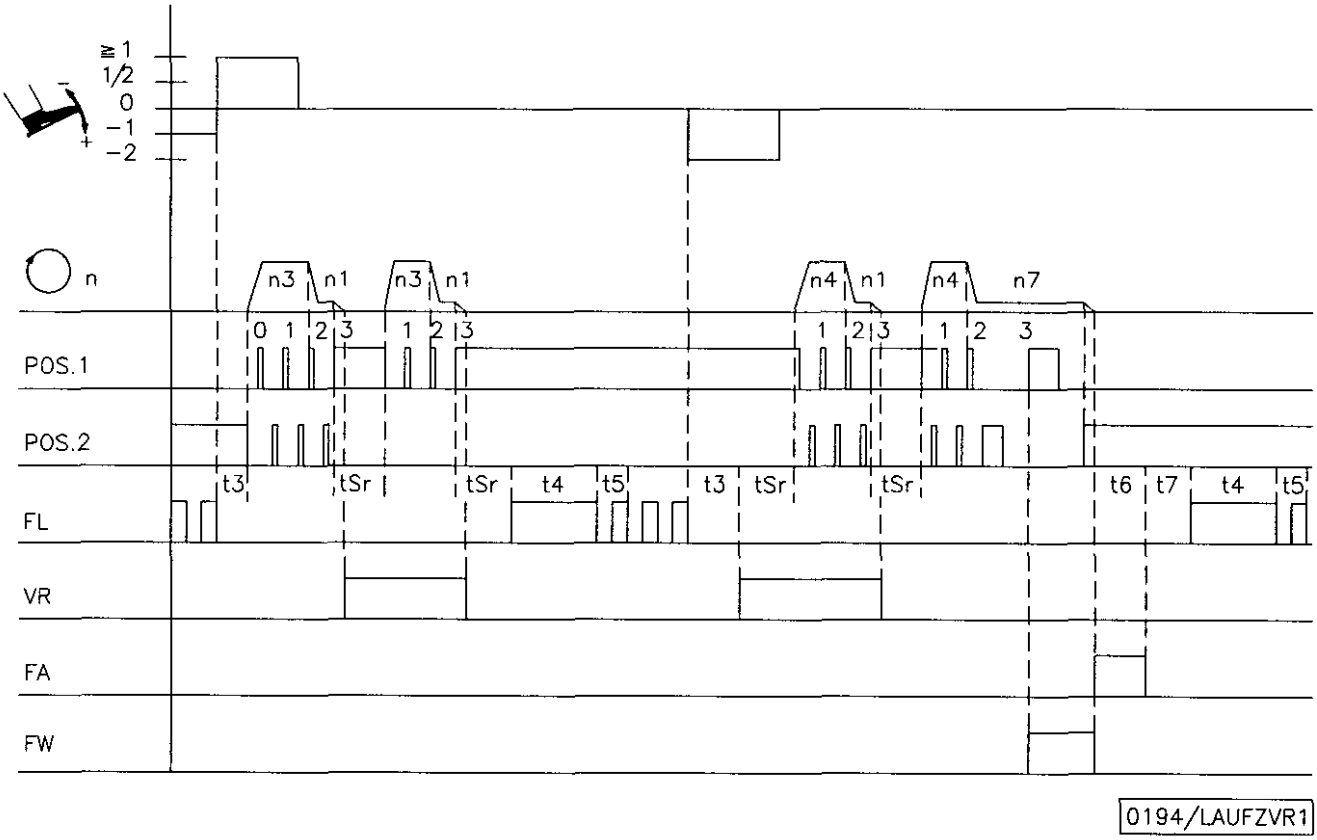
Abbreviation	Function		Parameter/Pushbutton
	Initial backtack	off	Pushbutton 7
	Light barrier covered/uncovered	on	F-131
	Single final backtack	on	Pushbutton 8
	Reversion	on	Pushbutton 9
	Light barrier	on	Pushbutton 0
n2	Maximum speed		F-111
n4	Final backtacking speed		F-113
n5	Speed after light barrier sensing		F-114
n7	Trimming speed		F-116
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
drd	Delay of reversion		F-181
Ird	Increments of reversion		F-180

Run with ornamental backtack

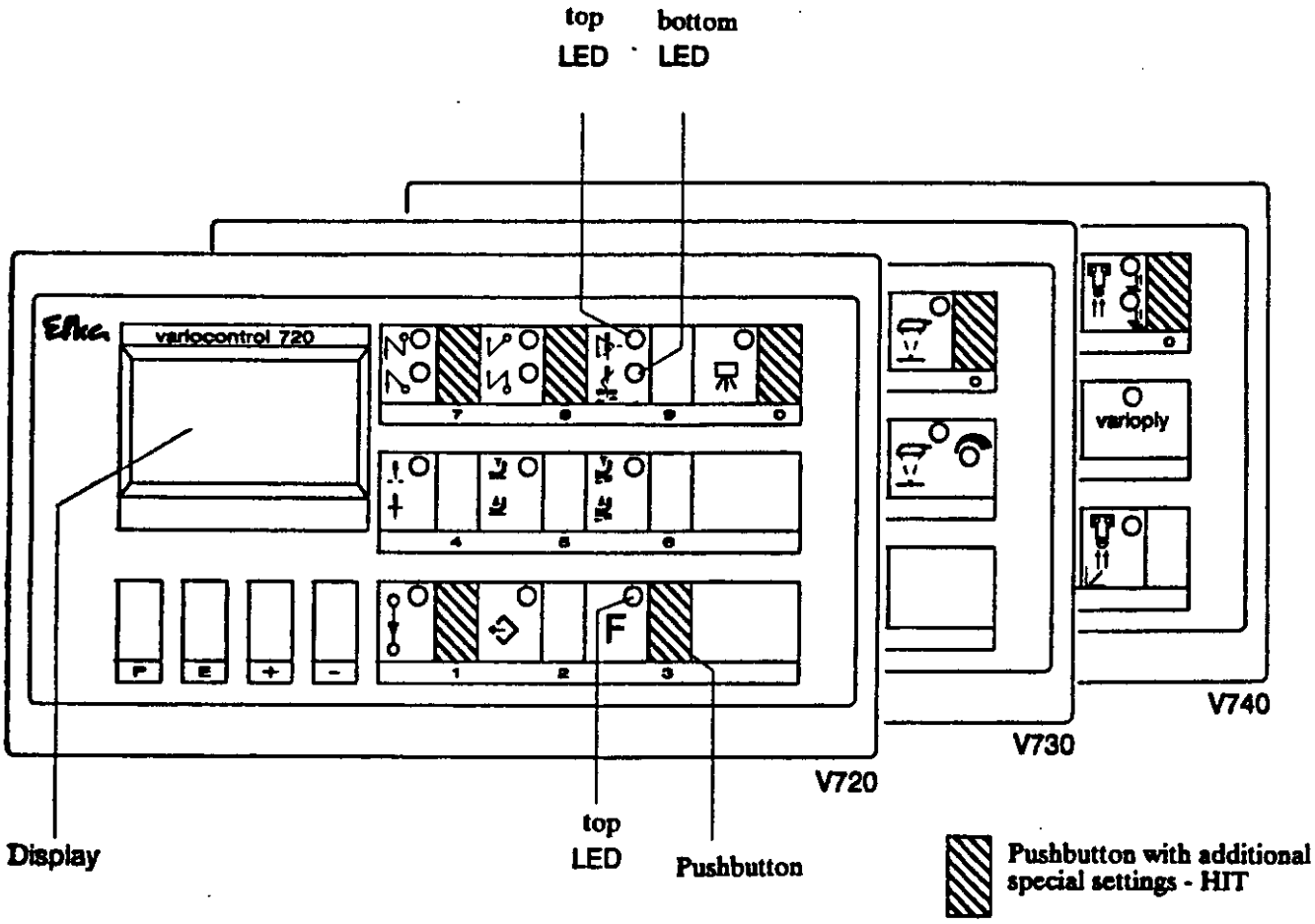


Abbreviation	Function		Parameter/Pushbutton
	Ornamental backtack	on	F-135
	Presser foot lifting saved after trimming	on	Pushbutton 6
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206
tSr	Stop time for ornamental backtack		F-210

Short run with ornamental backtack



Abbreviation	Function		Parameter/Pushbutton
	Ornamental backtack	on	F-135
	Presser foot lifting saved after thread trimming	on	Pushbutton 6
	Presser foot lifting saved at stop in the seam	on	Pushbutton 5
n1	Positioning speed		F-110
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206
tSr	Stop time for ornamental backtack		F-210



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Functional Setting of the Pushbuttons

Pushbutton P = Recall or exit of programming mode
Pushbutton E = Enter button for modifications in the programming mode
Pushbutton + = Increase of the value indicated in the programming mode
Pushbutton - = Decrease of the value indicated in the programming mode
Pushbutton 1 = Stitch counting ON / OFF
Pushbutton 2 = Teach-in / execution of 40 possible seam sections
Pushbutton 3 = Function key - programmable
Pushbutton 4 = Basic position of the needle (bottom/upper dead center) POSITION 1 / POSITION 2
Pushbutton 5 = Automatic foot lift at stop in the seam ON / OFF
Pushbutton 6 = Automatic foot lift after thread trimming ON / OFF
Pushbutton 7 = Initial backtack SINGLE / DOUBLE / OFF
Pushbutton 8 = Final backtack SINGLE / DOUBLE / OFF
Pushbutton 9 = THREAD TRIMMER / THREAD TRIMMER + THREAD WIPER / OFF
Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING /OFF
Pushbutton L = Sensitivity adjustment for fabric ply sensing (see chapter "Light Barrier")

Special Setting of the Pushbuttons for HIT

After pressing the pushbuttons 1, 3, 7, 8 or 0 the following can be changed by pressing the pushbuttons +/-:

Pushbutton 1 = Number of stitches of the seam with stitch counting
Pushbutton 3 = Number of stitches or switching on/off the programmed function
Pushbutton 7 = Number of stitches of the selected initial backtacking section
Pushbutton 8 = Number of stitches of the selected final backtacking section
Pushbutton 0 = Number of light barrier compensating stitches

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