Efka vario dc

CONTROL DA820V3233

INSTRUCTION MANUAL

No. 402151 english

Efka
FRANKL & KIRCHNER
GMBH & CO KG

Efka
EFKA OF AMERICA INC.

Efka
EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

Contents 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, position transmitter 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	467 / 767 / 221

2.1 Use in Accordance with Regulations

The drive is not an independently operating machine, 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 (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 60204-3-1990 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 DA820V3233
	- Power pack	N153 (optional N155)
	- Actuator	EB301
1	Control panel Variocontrol	V720, V730 or V740 *1)
1	Position transmitter	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) 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

Pitman rod for actuation	- available version on inquiry
Pulley *1) (available sizes: B58-L, B63-L, B67-L, B71-L, B-75-L, B80-L, B85-L, B90-L, B-95-L)	
Pulley 40 mm ϕ with special belt intake and slip-off protection	- part no. 1112223
Pulley 50 mm ϕ with special belt intake and slip-off protection	- part no. 1112224
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	- available versions see specification Variolux
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 actuator, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external actuator, 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
Potential equalization cord 700 mm long, LIY 2.5 mm², grey, with forked cable brackets on both sides	- part no. 1100313
Extension cable for position transmitter P6-...,, 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. 1111229
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 - other versions see specification "knee switch"
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
16-pin plug with rectangular casing (Hirschmann RSW15-Ag)	- part no. 0111806

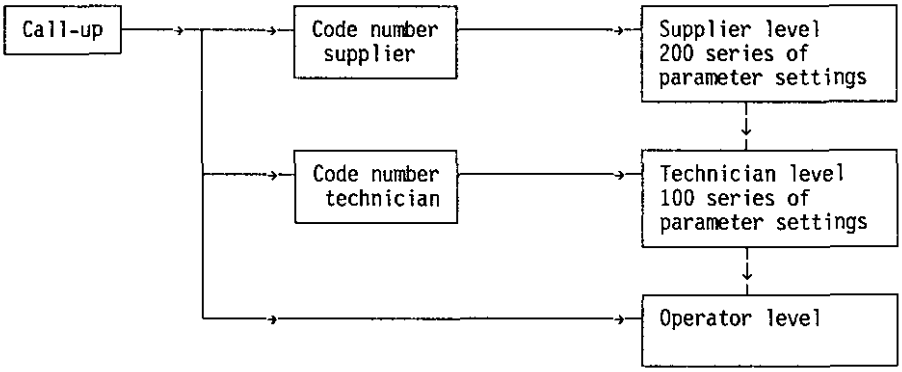
*1) Select the pulley such that the motor runs at approx. 4000 RPM with max. number of stitches.

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 word
- the technician to the next lower and all subordinate levels by a code word
- the operator to the lowest level without code word



4.2 Code Number Input

1. TURN POWER OFF

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

3. => [1] => [2] => [3] =>.. Input CODE NO. !

(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 start backtack:

- Double start backtack is on	top LED7 lights up	I [7] 0
Push button 7 briefly - Start backtack is off	both LED7 off	0 [7] 0
Push button 7 briefly - Single start backtack is on	bottom LED7 lights up	0 [7] I

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 completion 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

4. => [+] => [-] => Change parameter value !

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

OR

=> [P] => PARAMETER VALUE is entered ==> [F-XXX]
Call-up of a new PARAMETER NO.
as under step 1 possible !

OR

=> [P] => [P] => Press button ==> [EXIT PROGRAMMING !]
twice

5. Starting Service

5.1 General Instructions

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

Adjust the direction of rotation of the motor, parameter F-161
If necessary, set the reference position, parameter F-170
If necessary, set the positions, parameter F-171
If necessary, set the speeds, parameters F-110...F-118
If necessary, set the remaining relevant paramenters
Start sewing in order to save the set values

If the power was turned off the adjustments made before starting to sew get lost.

Note:
If the direction 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 direction of rotation of the motor shaft must be set to "counterclockwise rotation".

Before mounting the position transmitter 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 direction of rotation of the motor shaft. 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.

Markings on the position transmitter shaft and on the position transmitter housing have to be aligned, then mount the position transmitter on the sewing machine shaft.
If necessary, set the speeds, parameter F-110...F-118.
If necessary, set the remaining relevant parameters.
Start sewing in order to save the set values.

If the power was turned off the adjustments made before starting to sew get lost.

6. Putting into Operation and Setting Aids

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

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

6.1.2 Language Selection of the Multilingual Display

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

=> [+] => Select the desired language ==> [dEU USA / ESP FrA]

6.1.3 Reference Position

=> [E] => Set the reference position. Turn position transmitter 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 direction of rotation of the motor shaft.

6.1.4 Position 1

=> [E] => Turn position transmitter to the desired position. ==> [PoSition / 1 046]

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 °)

6.1.5 Position 2

Set position 2 (switch-off position of the thread trimmer (select 2))

=> [E] => Turn position transmitter to the desired position. ==> [PoSition / 2 306]

or

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

6.1.6 Position 1A

Set position 1A (switch-on position of the thread tension release (select 1), upper needle position (select 2))

=> [E] => Turn position transmitter to the desired position. ==> PoSition 1A 124

or

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

6.1.7 Position 2A

Set position 2A (upper needle position (select 1))

=> [E] => Turn position transmitter to the desired position. ==> PoSition 2A 466

or

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

6.1.8 Positioning Speed

=> [E] => Set the positioning speed ==> Lo SPEEd n1 0160

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

6.1.9 Maximum Speed

=> [E] => Set the maximum speed ==> hi SPEEd n2^ 3300

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

6.1.10 Direction of Rotation

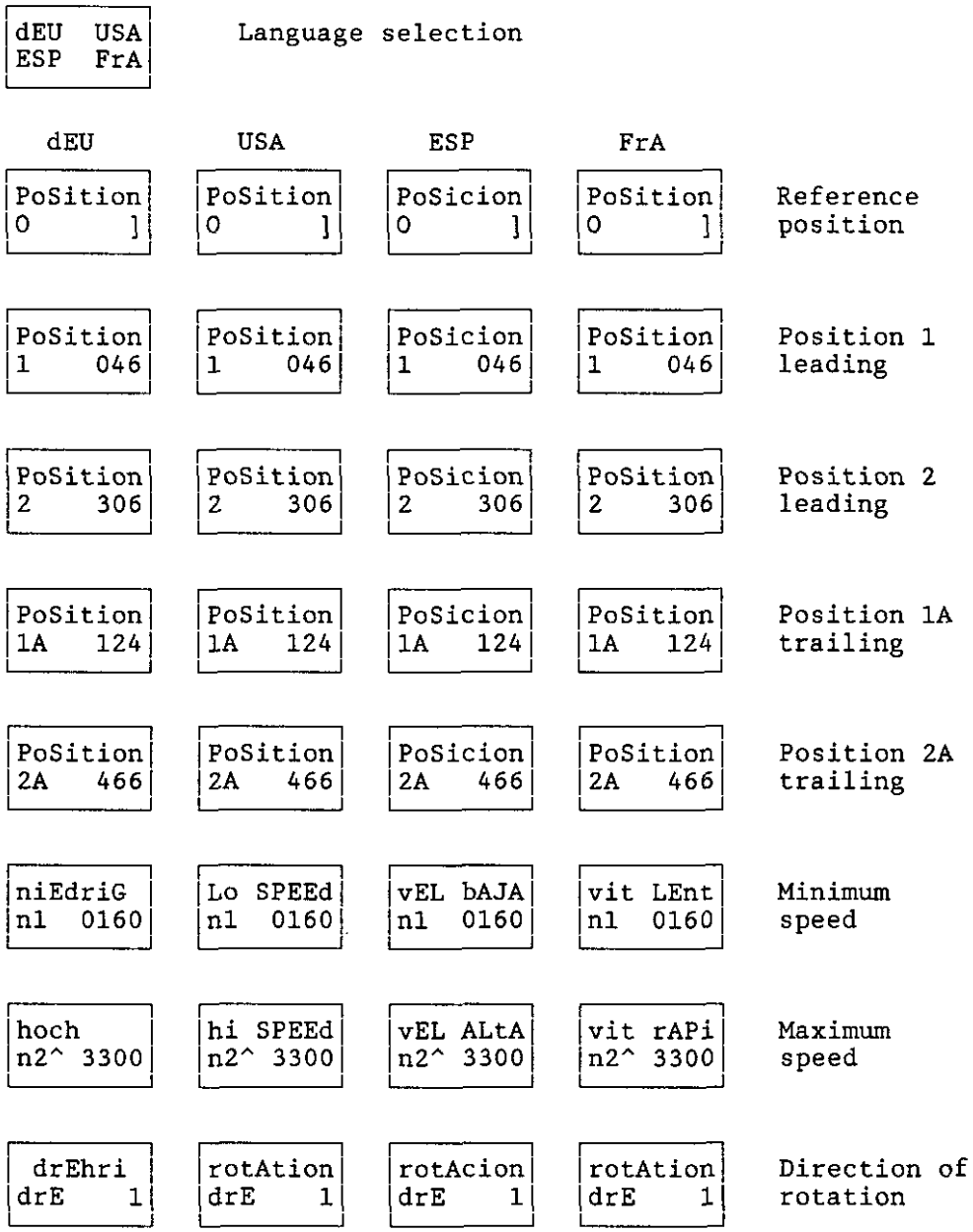
=> [E] => Set the direction of rotation ==> rotAtion drE 1

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

6.1.11 Complete the Fast Installation Routine

=> [E] => Entry into normal operation after POWER ON. ==> 3300 DA820V

6.1.12 Multilingual Display



6.2 Direct Input of Maximum Speed Limitation (DED)

Upper limit of the maximum speed (nmaxmax)	==> F-111
Lower limit of the maximum speed (nmaxmax)	==> F-121

The maximum speed of the machine can be limited to the specific level according to the application directly by using pushbuttons +/- on the Variocontrol after each seam end. After power on, this is only possible if the bobbin thread monitor function is deactivated.
The actual value is shown on the display.
The setting range is between the speeds programmed by F-111 (upper limit) and F-121 (lower limit).

Actual value on the display in the direct mode:

```
| 3300 |   ==> Display of speed nmax
| xx82xV |  ==> Type of control

=> [+] => [-]   ==> Change value
```

New value on the display after pressing e.g. pushbutton "-" 8 times

```
| 2500 |   ==> Display of speed nmax
| xx82xV |  ==> Type of control
```

Note
After power on and if the bobbin thread monitor is on, the number of stitches of the bobbin thread monitor stitch counting can be inputted directly instead of the maximum speed.

Note
Modifying the setting of the maximum speed limitation also affects the start backtack, end backtack and stitch counting speeds.

6.3 Pushbuttons for Background Information (HIT)

(setting of the pushbuttons see figure 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 actuating 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 actuated somewhat longer. The function will thus be disconnected and/or commutated. Subsequently, the function with the respective value is shown on the display again.

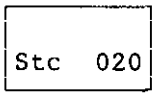
Note
If the bobbin thread monitor is on, the "HIT" pushbuttons function only if the sewing has been started after power on.

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.

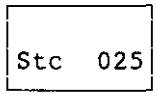
```
| 3300 |    Display after power on:
| DA820V |  -> Maximum speed
           -> Type designation

[1]        Press pushbutton 1 briefly.
           LED beside pushbutton 1 lights up,
           stitch counting is turned on.
```



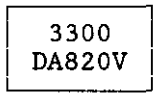
Display:
20 stitches are set

3 seconds.

Press pushbutton +,
number of stitches increases.

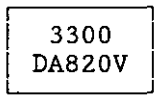


Display:
25 stitches are set
Changes are automatically entered after
3 seconds.



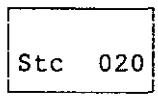
Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

If stitch counting (pushbutton 1) was turned on.



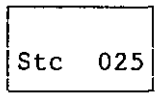
Display after power on:
-> Maximum speed
-> Type designation

Actuate pushbutton 1 for at least 1 second,
LED beside pushbutton 1 goes off
momentarily, function stitch counting
remains on.

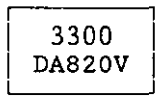


Display:
20 stitches are set

Press pushbutton +,
number of stitches increases.



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



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. Snh Needle cooling ON/OFF
2. hH High lift for walking foot ON/OFF
3. SrS Ornamental backtack ON/OFF
4. SSt Softstart ON/OFF

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

3300 DA820V	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- 1	Display: Actual status (needle cooling ON/OFF)
+	Press pushbutton +. (+ increases, - decreases the display value)
-F- 4	Display: New status (Softstart ON/OFF)
P	Press pushbutton P.
3300 DA820V	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).

3	Press pushbutton 3 briefly. LED beside pushbutton 3 lights up, function Softstart is turned on.
SSc 001	Display: 1 stitch is set
+	Press pushbutton +, number of stitches increases.
SSc 003	Display: 3 stitches are set Changes are automatically entered after 3 seconds.
3300 DA820V	Display after approx. 3 seconds: -> Maximum speed -> Type designation

If Softstart (pushbutton 3) was turned on.

F	Press pushbutton **F** at least for 1 second, LED beside pushbutton **F** goes off momentarily, function Softstart remains on.
SSc 001	Display: 1 stitch is set
+	Press pushbutton +, number of stitches increases.
SSc 003	Display: 3 stitches are set
3300 DA820V	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 no. was input after switching on!
- The functions start backtack, end 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 YY ZZZ LS SSS	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 ==> [aaa bbb]

3 => [2] ==> LED pushbutton 2 blinks Entry into pattern and seam programming! ==> [1 01 ---]

4 => [2] ==> Changing the pattern number! ==> [2 01 ---]

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

6.4.1.1 Seam with Stitch Counting

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

6.4.1.2 Backward Seam with Stitch Counting

=> [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.

6.4.1.3 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 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 completed by pushbutton P, otherwise it gets lost.

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

6.4.1.4 Detailed Example

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

Display before programming ==> [xxxx / XY82ZV]

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 start 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 set		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 set		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 set		4 03 --- LS 005
17.	=> [8]	LED top pushbutton 8 lights up ==> Single end 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 Changing to the next seam is entered	==>	4 04 ---
20.	=> [P]	==> Programming completed, 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
   - Push button E several times until desired seam number is displayed => [E] ==> `2 05 ZZZ`

■ The pattern can now be started by actuating 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 motor runs at positioning speed (n1) for one rotation from pos. 1 to pos. 1, independent of the pedal position and set start backtacking speed if parameter Sn1 is on.

7.2 Selection of the Machine Series

Functions	Abbreviation on the Display	Parameter
Display machine select	SEL	F-280

The machine class is selected depending on a resistor connected to socket connector B4. This way, important preselections for the respective class, e.g. positions, speeds, times, thread trimming etc., are activated.

Valid resistor values:	100 Ohm --> class 467/767	F-280 = 1
	220 Ohm --> class 221	F-280 = 2

7.2.1 Emergency Run Function When Select Resistor Is Invalid

If the control cannot identify an admissible value for the machine select resistor only emergency run functions are possible.
Display:

INFO A5	==> Emergency run function because of invalid machine select

Available emergency run functions

- Speed is limited to 1000 RPM
- Blocking of machine run
- Needle cooling
- Presser foot lifting when heeling the pedal back (-1, -2)

7.3 Program Identification

Functions	Abbreviation on the display	Parameter
Display program number 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
```

7.4 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 - Needle cooling ON/OFF
F-008 = 2 - High lift for walking foot, counting ON/OFF
F-008 = 3 - Ornamental backtack ON/OFF
F-008 = 4 - Softstart ON/OFF

7.5 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

```
2350
```

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

```
3300
XY82ZV
```

At stop in the seam:
- the stop indication

```
StoP
```

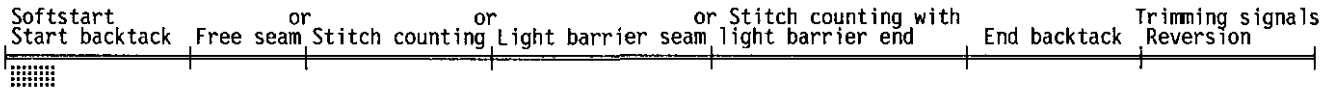
7.6 Direction of Rotation of the Motor

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

Look at the motor shaft: F-161 = 0 - clockwise rotation
F-161 = 1 - counterclockwise 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 direction of rotation.

7.7 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

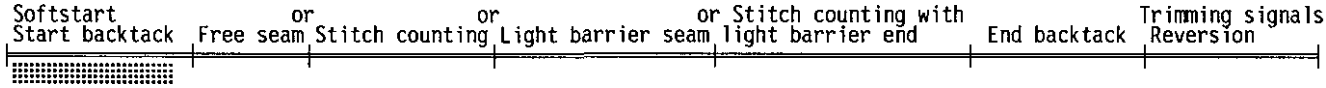
Function:

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

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Softstart on/off	-F-	F-008 = 4

7.8 Start 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
Start backtack speed	n3	F-112
Intermediate stop in the backtack on/off (see chapter)	StP	F-122
Backtack synchronization time	tns	F-123
Backtack synchronization speed	nrs	F-124
Run-out time	t1	F-200
Start delay from lifted foot	t3	F-202
Stitch correction time	t8	F-150

The start backtack starts by actuating the pedal forward at the beginning of the seam. The backtack is delayed by the time t3 from lifted foot (start delay from lifted foot).
The backtack is executed automatically at start 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 start backtacking speed, will be turned off. Then pedal control is returned.

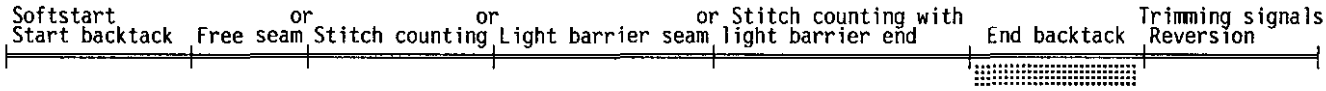
7.8.1 Double Start Backtack

The forward section will be sewn for a number of stitches that can be set. Then, the signal for the stitch regulator will be emitted, and the backward section will be executed. For both sections the number of stitches can be set separately. With slow backtack mechanisms, for the double start backtack, the stitch regulator can be delayed with a time-lag of t8 (start backtack stitch correction), which prolongs the backward section.

7.8.2 Single Start Backtack

The backtacking signal will be emitted for a number of stitches that can be set, and the backward section will be sewn.

7.9 End 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
End backtacking speed	n4	F-113
Intermediate stop in the backtack on/off (see chapter)	StP	F-122
Backtack synchronization time	tns	F-123
Backtack synchronization speed	nrs	F-124
Last stitch backward on/off	FAr	F-136
Stitch correction time	t9	F-151
Start delay from lifted foot	t3	F-202

The end 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 end backtacking speed and the synchronization to position 2. The end backtack will be performed automatically. An interruption is not possible.

7.9.1 Double End Backtack

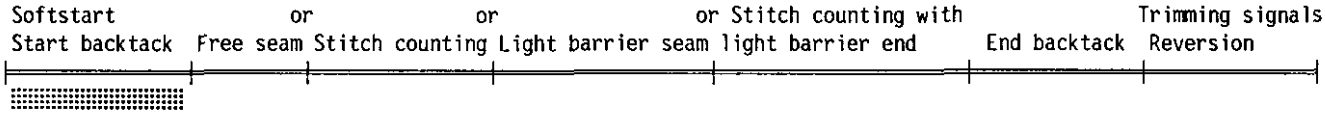
The backward section will be sewn for a number of stitches. Then, the stitch regulator will be turned off, and the forward section will be executed. For both sections the number of stitches can be set separately.
After the execution of the forward section, the trimming function will be initiated. During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

7.9.2 Single End Backtack

The single end backtack will be executed at end backtacking speed. During the last stitch the speed is reduced to positioning speed. Dependent 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

7.10 Start 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
Start 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

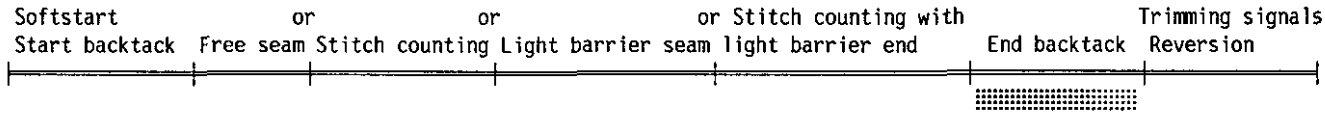
Differences from the standard start backtack:

- The drive stops for the switching of the stitch regulator
- The stop time can be set
- 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 = 3

7.11 End 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	SEv	F-083
End backtacking speed	n3	F-113
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 final backtack:

- The drive stops for the switching of the stitch regulator
- The stop time can be set

Direct access by function key pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 3

7.12 Intermediate Stop in the Backtack

Functions	Abbreviation on the display	Parameter
Intermediate stop in the backtack on/off	StP	F-122

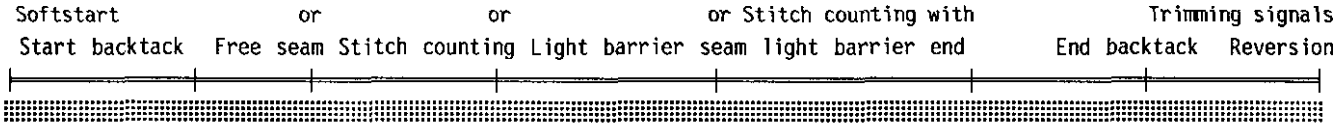
With parameter F-122 = ON an intermediate stop is possible in the start and end backtack, including ornamental backtack. The backtack function is interrupted with pedal in position 0 (neutral) and is continued when the pedal is pushed again.

7.13 Backtack Synchronization

Functions	Abbreviation on the display	Parameter
Backtack synchronization time Backtack synchronization speed	tnS nrS	F-123 F-124

One stitch before switching on the backtack solenoid the sewing speed will limited to the backtack synchronization speed for the duration of the backtack synchronization time.

7.14 Intermediate Backtack



The backtack solenoid can be switched on anywhere in the seam by the external pushbutton. When the ornamental backtack is switched on, the speed is limited at the same time.

Functions	Abbreviation on the display	Parameter
Speed limitation for intermediate ornamental backtack	n9	F-293

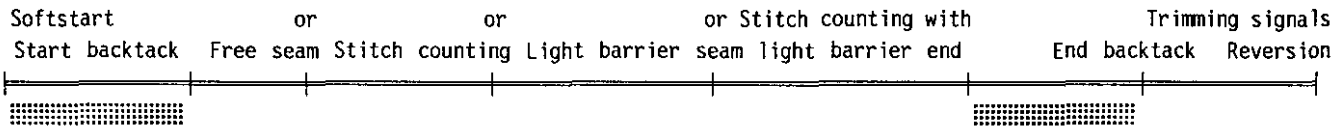
- Firing of the backtack solenoid is also possible at machine standstill.
- If sewing has not been started within 20 seconds after switching on, the backtack solenoid switches off automatically.

Direct access by function key pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 3

7.15 Suppression/Recall of Backtack

■ Effective in standard and ornamental backtack



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

When actuating	Start back-tack On	Start back-tack Off	End back-tack On	End 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.

7.16 Activation of the Backtack Solenoid

Functions	Abbreviation on the display	Parameter
Time of full power	t10	F-212
Holding current of backtacking	t11	F-213

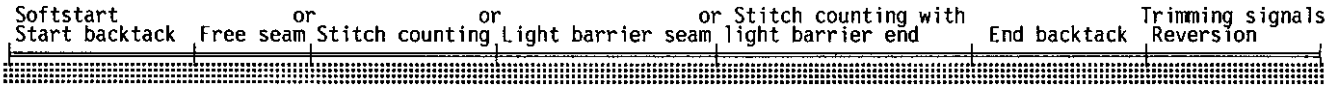
The backtack solenoid is quickly activated by full power.
Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.
The duration of full power is set by F-212, the holding power at partial power by F-213.

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

7.17 High Lift For Walking Foot



Functions	Abbreviation on the display	Parameter
High lift walking speed	n10	F-117
High lift walking speed run-out time	thP	F-152
Minimum number of stitches	chP	F-185
High lift walking stitches on/off	ShP	F-187

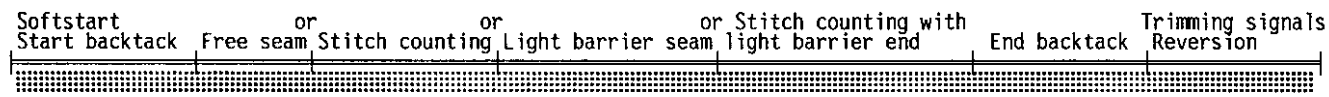
When pressing the pushbutton "high lift for walking foot" at machine standstill the output "high lift for walking foot" will be activated. If the input "high lift for walking foot stored" is activated, the solenoid valve remains activated until the pushbutton "high lift for walking foot" is pressed again, or the input "high lift for walking foot stored" is deactivated.
If the pushbutton is activated during machine run and if the actual speed is lower than the high lift walking speed the solenoid valve will be activated immediately. The pedal control will be limited to high lift walking speed. If the actual speed is higher than the high lift walking speed the drive slows down to high lift walking speed first, then the solenoid valve will be activated. The solenoid valve remains activated until the pushbutton is released or until a minimum number of stitches has been executed. After the release of the solenoid valve the high lift walking speed remains limited for the run-out time. Speed limitation will be terminated after the run-out time.
The run-out time will always be executed, independent of the status of the input "high lift for walking foot stored". On the contrary, the function "minimum number of stitches" is only effective in the operating mode not stored.

Direct access by function key (pushbutton 3)

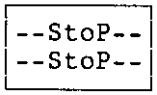
Functions	Abbreviation on the display	Parameter
High lift for walking foot on/off	-F-	F-008 = 2

7.18 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
New start by pedal in position 0 (neutral) on/off	-	F-281
Blocking of machine run as break (N.C.) or make contact (N.O.)	-	F-282

Symbol 

blinking alternately !

If the blocking of machine run becomes active at machine standstill before the start of the seam the machine start is blocked.
- Needle up/down is not possible

- Presser foot lift is possible

If the blocking of machine run becomes active in the seam, also in start and end backtack, seam with stitch counting and during light barrier compensating stitches counting, the drive stops in the basic position.
- Needle up/down is not possible
- Presser foot lifting, thread trimming without previous end backtacking and reversion are possible
- Stop position after thread trimming according to the set machine select

New start after blocking of machine run

It is possible to select the pedal dependency for the new start.

F-281 = OFF	Machine start immediately after deactivation of the blocking of machine run
F-281 = ON	Machine start only if the pedal was in position 0 (neutral)

7.18.1 Differences in Deactivating Various Seam Sections

In the start backtack:

- If thread was trimmed a new seam with start backtack can be started
- If thread was not trimmed a correction seam is possible

In the free seam:
- The started seam will be continued

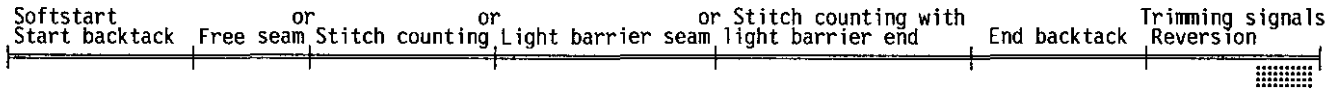
Seam with stitch counting:
- The interrupted seam can be completed uncounted, pedal controlled

Light barrier seam:
- If thread was trimmed a correction seam is possible
- If thread was not trimmed the compensating stitch counting will be continued

In the end backtack:
- A correction seam is possible

Correction seam
- Pedal controlled seam without start backtacking
- Seam end with end backtack, thread trimming and reversion according to the functions set on the Variocontrol

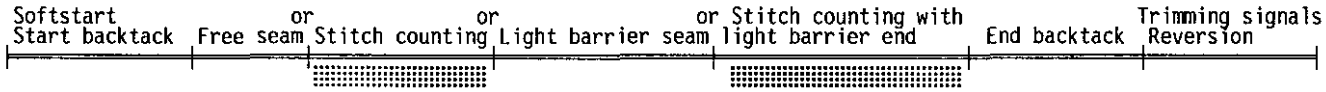
7.19 Reversion



Functions	Abbreviation on the display	Parameter
Reversion on/off		Pushbutton-9
Positioning speed Number of reversion increments	n1 F-183	F-110

The function "reversion" is performed after trimming.
When the stop position is reached, the drive stops for 50 ms. Then it reverses at positioning speed for an adjustable number of increments.
1 increment corresponds to approx. 0.7°.
The reversion can only be activated together with trimming. During reversion the presser foot lift functions are preserved.

7.20 Seam with Stitch Counting



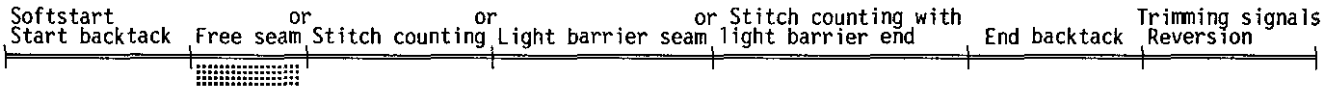
Functions	Abbreviation on the display	Parameter
Stitch counting on/off		Pushbutton-1
Number of stitches Stitch counting speed Speed mode for a seam with stitch counting	Stc n12 SGn	F-007 F-118 F-141

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 actuated.
Mode 2: Execution at limited speed n12 as long as pedal is actuated.
Mode 3: Automatic execution at fixed speed as soon as the pedal has been actuated once. Interruption 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.

7.21 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 nmax.
Mode 1: Execution at fixed speed n12, when pedal is pushed forward (position > =1).
Mode 2: Execution at limited speed n12, when pedal is pushed forward (position > =1).
Mode 3: Only for the seam with light barrier:
Automatic execution at fixed speed as soon as the pedal has been actuated once. The seam end is initiated by the light barrier. Interruption by heelback (-2) is possible.

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

The maximum speed will be indicated on the display after power on 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.

7.22 Needle Up/Down

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

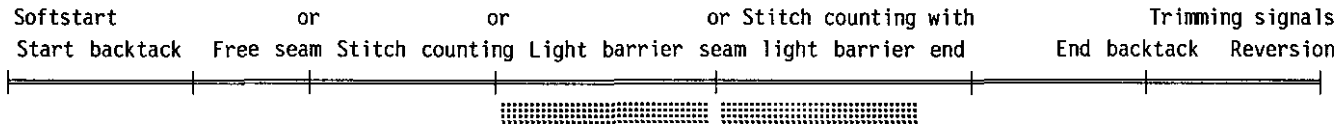
With the help of this parameter the function "needle up/down" can be switched.

Needle up: F-140 =1
When the pushbutton is actuated, the motor only runs from position 1 to position 2 or 2A and/or reverse position (dependent on machine select). If the motor is outside of position 1 it does not move for safety reasons.

Change of position: F-140 = 2
When the pushbutton is actuated, the motor runs from position 1 to position 2 or 2A and/or reverse position (dependent on machine select) and/or from position 2 or 2A to position 1. If the motor is outside of the stop position it runs to the next possible position.

Single stitch: F-140 = 3
When the pushbutton is actuated, the machine performs on rotation from position 1 to position 1. If the motor is in position 2 (2A) it runs to position 1, when actuating 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 preselected basic position.

7.23 Light Barrier



7.23.1 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.
- Stop of the motor with pedal in position -0 is possible.
- 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.

7.23.2 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:

Dependent 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 Adjustment:

- LS001 - Select 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.

7.21.3 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 can be set by pushbuttons +/-.
- Bargraph and valency indication on the display.

Select the sensitivity level:

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

» [L] ==> When actuating 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

- Select 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 actuating the pushbutton "L" such that the bar is in central position. The above adjustment can then be continued.

7.23.3 Automatic Start by Light Barrier (V730, V740)

Functions	Abbreviation on the display	Parameter
Delay of automatic start Automatic start on/off Sewing start blocked with light barrier uncovered	ASd ALS LSS	F-128 F-129 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 actuated forward at the seam end.

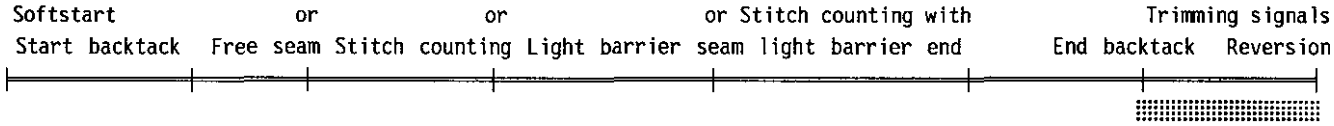
For safety reasons, this function becomes active only after a normal sewing start in the first seam. The light barrier must be covered, when the pedal is in neutral position; then pedal forward.
This safety function is reset, when the pedal does not remain actuated forward after the end of the seam.

7.23.4 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.

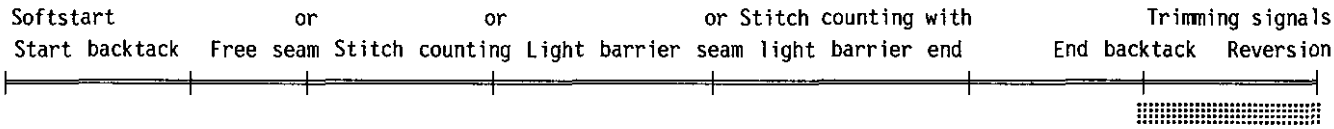
7.24 Thread Trimmer, Thread Tension Release with Machine Select 1



Functions	Abbreviation on the display	Parameter
Thread trimmer on/off		Pushbutton-9
Last stitch backward	FAr	F-136
Stop time for the thread trimmer	tFA	F-290
Additional time of thread tension release	tFS	F-291

- The thread trimmer can be switched on or off by pushbutton 9.
- If parameter F-136 is on, the backtack solenoid for the single end backtack remains connected until machine standstill.
- The thread trimmer will be switched on with position 1 and switched off with position 1A.
- After switching on the thread trimmer, the drive stops for the time tFA.
- The thread tension release will be switched on with position 2 and switched off with position 2A.
- Switching off the thread tension release can be delayed by the time tFS.
- The stop position after trimming is position 2A and/or reverse position, if reversion has been selected by pushbutton 9.

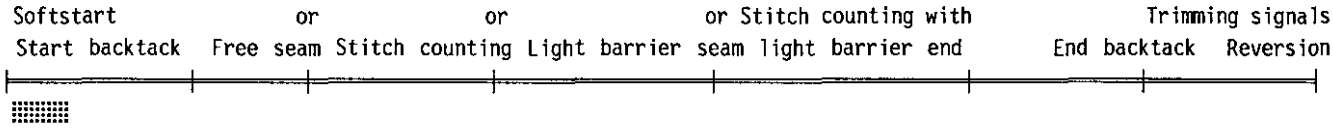
7.25 Thread Trimmer, Thread Tension Release with Machine Select 2



Functions	Abbreviation im display	Parameter
Thread trimmer on / off		Taste-9
Last stitch backward Additional time of thread tension release	FAr tFS	F-136 F-291

- The thread trimmer can be switched on or off by pushbutton-9.
- If parameter F-136 is on, the backtack solenoid for the single end backtack remains connected until machine standstill.
- The thread trimmer and thread tension release will be switched on with position 1 and switched off after stop in position 2A and after the time tFS.
- The stop position after trimming is position 2A and/or reverse position, if reversion has been selected by pushbutton 9.

7.26 Thread Pull-in Device



Functions	Abbreviation on the display	Parameter
Thread pull-in select	FES	F-090

The functions thread clamp and pneumatic presser foot pressure are activated once or twice during the first stitch of a seam.
They are dependent on the angle and are synchronized to the reference position of the position transmitter.
The possible angles are programmed and can be selected by parameters.

The corresponding values are increments of the position transmitter:

- 512 increments correspond to one rotation
- Reference position = Needle point at the same level with needle plate

7.26.1 Thread Clamp

The function thread clamp is activated:

- class 221 - after power on for approx. 260 ms
- class 467, 767 - parallel to presser foot lift at the beginning and end of the seam
- all - parallel to the function reversion
- all - with the second sewing start dependent on the angle, see table

Table: Increment values for thread clamp:

Parameter F-090	Class 467, 767 from	to	Class 221 from	to	from	to
0	-	-	372	484	-	-
1	302	344	372	442	130	188
2	274	316	372	428	116	172
3	246	288	372	428	116	202
4	100	198	-	-	-	-
5	070	156	-	-	-	-
6	-	-	-	-	-	-

7.26.2 Pneumatic Presser Foot Pressure

The pneumatic presser foot pressure will be switched off:

- whenever presser foot is lifted
- with the second sewing start dependent on angle, see table

Table: Increment values for switching off the pneumatic presser foot pressure:

Parameter F-090	Class 467, 767 from	to	Class 221 from	to	from	to
0	-	-	-	-	-	-
1	472	344	372	188	-	-
2	472	316	372	428	116	172
3	472	288	116	202	-	-
4	056	272	-	-	-	-
5	042	226	-	-	-	-
6	-	-	-	-	-	-

7.27 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic in the seam Automatic after trimmming	Pushbutton-5	 Pushbutton-6
Activation delay when pedal is in position -1, half heelback Start delay from lifted foot Time of full power Pulse width for chopping	t2 t3 t4 t5	F-201 F-202 F-203 F-204

Presser foot is lifted:

- in the seam
  - by heelback (position -1) or automatically (pushbutton 5)
- after trimming
  - by heelback (position -1 or -2) or automatically (pushbutton 6)
  - by light barrier, automatically
  - by stitch counting, automatically

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.

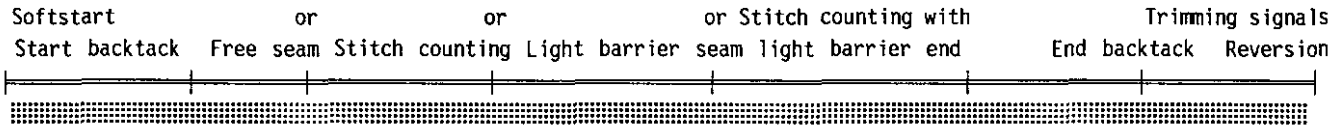
Stage	Operating time	Effect
1	12.5 %	low holding power
2	25 %	
3	37.5 %	
4	50 %	
5	62.5 %	
6	75 %	
7	87.5 %	high holding power
0	100 %	full power

Foot lowers:

- from manual foot lifting, when pedal is in position 0 (neutral) (position ≥ 0)
- from automatic foot lifting, when pedal pushed forward (position > 0)

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

7.28 Needle Cooling



Functions	Abbreviation on the display	Parameter
Prolongation of needle cooling after stop	dnh	F-184
Needle cooling on/off	Snh	F-186

The function needle cooling is active during the entire sewing operation.
After each stop the signal remains active for the time "prolongation of needle cooling after stop", which can be set by parameter F-184.

Direct access by function key (pushbutton 3)

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

7.29 Bobbin Thread Monitor

Functions	Abbreviation on the display	Parameter
Number of stitches after activation of the bobbin thread monitor	cFw	F-085
Function of the bobbin thread monitor	rFw	F-195

If one of the 4 functions of the bobbin thread monitor is selected, the type of control and the set maximum speed are shown on the display for 1 sec. after power on.

```
3300     ==> Speed indication nmax
DA820V   ==> Type of control
```

Then the bobbin thread monitor status is shown on the display.

```
0250     ==> No. of stitches (F-086) of the b.t.m.(*) stitch counting (e.g. 250)
--¦¦--   ==> Status indication
```

At that moment (after power on), the number of stitches can be set by pushbuttons +/- in steps of ten.
The functions DED and HIT are available only after the first sewing start and/or trimming.

7.29.1 Adjustment of the Bobbin Thread Monitor

(Necessary only in modes 1...3)

It is possible to adjust the bobbin thread monitor after power on.

Left bobbin:

A signal on the bobbin thread monitor input of the control with a frequency of ≤3Hz indicates that the left bobbin is empty. The left horizontal bar of the symbol on the display blinks.

Right bobbin:

A signal on the bobbin thread monitor input of the control with a frequency of ≥3Hz ≤6Hz indicates that the right bobbin is empty. The right horizontal bar of the symbol on the display blinks.

Left and right bobbin:

A signal on the bobbin thread monitor input of the control with a frequency of ≥6Hz ≤12Hz indicates that both bobbins are empty. Both horizontal bars of the symbol on the display blink.

During the adjustment the sensitivity of the bobbin thread monitor is reduced to 30 %. When starting to sew after power on, the output for the thread trimmer is activated for 1 ms. The sensitivity ia again switched to 100 %.

7.29.2 Functions of the Bobbin Thread Monitor

Parameter F-195 = 0

Function of the bobbin thread monitor is switched off.

Parameter F-195 = 1

After receiving an input signal the bobbin thread monitor is activated. After the counting F-085 (max. 2500 stitches) the bobbin thread monitor indication blinks on the display (right, left or both).
The indications remain on the display even if the bobbin thread monitor signal is no longer emitted.
The indications go off if input signals are no longer emitted within 14 stitches after the thread trimming and the next sewing start.

Parameter F-195 = 2

After receiving an input signal the bobbin thread monitor is activated. After the counting F-085 (max. 2500 stitches) the bobbin thread monitor indication blinks on the display (right, left or both), and the drive stops.
After the pedal has been pushed to position 0 (neutral), the seam can be completed.
The indications remain on the display even if the bobbin thread monitor signal is no longer emitted.
The indications go off if input signals are no longer emitted within 14 stitches after the thread trimming and the next sewing start.

Parameter F-195 = 3

After receiving an input signal the bobbin thread monitor is activated. After the counting F-085 (max. 2500 stitches) the bobbin thread monitor indication blinks on the display (right, left or both), and after the first thread trimming the presser foot lifting is blocked. Only after the pedal has been in position 0 (neutral), then in position -1 and/or -2, presser foot lifting is possible again. The indications remain on the display even if the bobbin thread monitor signal is no longer emitted.
The indications go off if input signals are no longer emitted within 14 stitches after the thread trimming and the next sewing start.

Parameter F-195 = 4 (simple bobbin thread monitor control)

When a pushbutton is connected to socket B4/B3-A1, simple bobbin thread monitor control is possible.

When pressing the pushbutton on the input, the stitch counting F-085 (max. 5000 stitches) is activated. The remaining number of stitches is indicated at each intermediate stop. After the counting the bobbin thread monitor indication blinks on the display (right and left), as well as the previously set stitches. The drive stops at the same time. Even automatic seam section will be interrupted (exception start and end backtack). The seam can be continued when pressing the pushbutton again after the pedal has been pushed to position 0 (neutral).
The number of stitches is to be set such that the bobbin will not be completely empty after sewing these stitches. After changing the bobbin the pushbutton must be pressed in order to reset and reactivate the counter.
If the drive is turned off during the bobbin thread monitor counting, the count is saved, and the counting will be continued after power On. If the pushbutton is pressed for more than one second, the counting will always be reset.

7.30 +1 Stitch (Basting Stitch)

Functions	Abbreviation on the display	Parameter
Function +1 stitch On/Off	ESt	F-189

When pressing the pushbuttons connected to sockets B3/A1-D5 and/or B4/A1-C5, a basting stitch will be executed at the start of the seam. The needle moves from position 2 to position 1 or from position 1 to position 1. The presser foot lowers each time. This function is effective immediately after power On.

7.31 Flip-Flop Functions (FF)

Functions	Abbreviation on the display	Parameter
Flip-flop functions	FFM	F-190
Flip-flop selection, if F-190 = 2	AF2	F-191
Flip-flop speed	n11	F-192

Depending on the setting of parameters F-190 and F-191 various flip-flop functions are activated by the pushbutton connected to socket B11/2-3.

Parameter F-190 = 1

= >	Power On	= > Output FF Off	LED FF Off
= >	Press button 1st time	= > Output FF On	LED FF On
= >	Press button 2nd time	= > Output FF Off	LED FF Off
= >	Press button 3rd time	= > Output FF On	LED FF On
= >	etc.		

Parameter F-190 = 2

With this setting the selection of parameter F-191 is activated!

Parameter F-191 = 1

= >	Power On	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 1st time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	Press button 2nd time	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 3rd time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	etc.			

Parameter F-191 = 2

= >	Power On	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 1st time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	Press button 2nd time	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 3rd time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	etc.			
= >	Trimming	= > Output FF Off	LED FF Off	Speed limitation n11 On

Parameter F-191 = 3

= >	Power On	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 1st time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	Press button 2nd time	= > Output FF On	LED FF On	Speed limitation n11 Off
= >	Press button 3rd time	= > Output FF Off	LED FF Off	Speed limitation n11 On
= >	etc.			
= >	Trimming	= > Output FF On	LED FF On	Speed limitation n11 Off

7.32 Signal Output - POS2

- Transistor output with open collector
- Switches whenever the needle is in the slot between position 2 and 2A
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g. for the connection of a counter

7.33 Signal Output - 512 Impulses/Rotation

- Transistor output with open collector
- Switches whenever a generator slot of the position transmitter is scanned
- 512 impulses per rotation of the handwheel
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g for connection of a counter

7.34 Speedomat

Functions	Abbreviation on the display	Parameter
Maximum speed	n2	F-111
Minimum high lift walking speed	n10	F-117
Speedomat display		F-182

The function Speedomat allows speed limitation dependent on the adjusted stage of the presser foot high lift.

- The assignment of the speed stages to the 21 Speedomat stages is programmable.
- Minimum high lift limitation = maximum speed (n2)
- Maximum high lift limitation = minimum speed (n10)

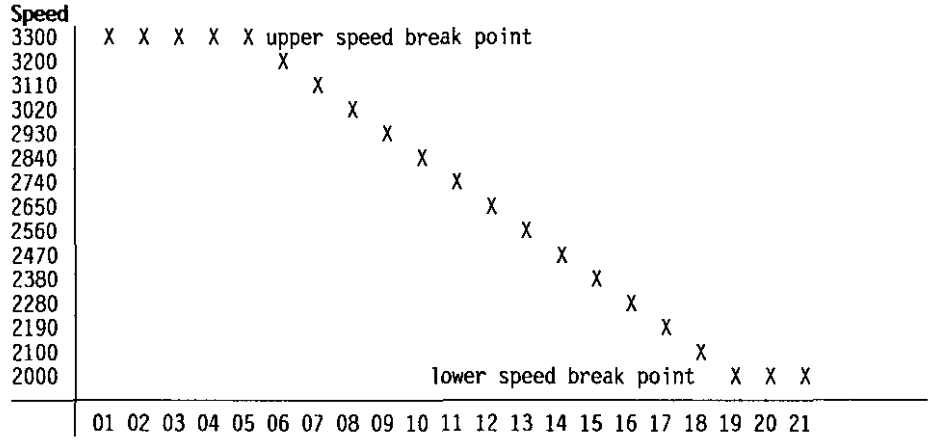
Display example parameter F-182:

```
05 10 19
  2840
```

Signification:

05 -> upper speed break point n_{max} (minimum high lift for walking foot)
= high lift walking stage from which the maximum speed is reached
10 -> adjusted stage
19 -> lower speed break point n_{hp} (maximum high lift for walking foot)
= high lift walking stage from which the minimum speed is reached
2840 -> speed corresponding to actual potentiometer setting

The following staging would result from the above example:



Programming:

Fix maximum speed by F-111
Fix high lift walking speed by F-117

Recall F-182, enter by pushbutton E = = > | XX AB YY / ZZZZ |

XX= lower break point
YY= upper break point
AB= corresponding stage
ZZZZ= speed

Set high lift for walking foot to the stage up to which full speed is to be held (upper break point)
Enter by pushbutton E = = > Value of AB is read into XX
Set high lift for walking foot to the stage from which the minimum high lift walking speed is to be effective (lower break point)
Enter by pushbutton E = = > New value of AB is read into YY
Exit progamming by pushbutton P

7.35 External Actuator EB301 and EB302

With the help of the external actuator connected with the pedal the commands for the sewing operation are inputted. Instead of the external actuator connected to the socket connector B80 another external actuator can be connected.

The external actuator EB302 differs from EB301 by softer springs. Lower actuating forces are thus needed.

Table: Coding of the pedal steps

Pedal step	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
Braking effect when modifying the preset value ≤ 4 stages Braking effect when modifying the preset value ≥ 5 stages	br1 br2	F-207 F-208

The braking effect of the drive can be set.
The following applies to all setting 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 can be set
- The higher the set 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 setting value = high acceleration

With a high starting edge setting 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 settings.

Incorrect setting 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.

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8.4 Setting the Positions

Functions	Abbreviation on the display	Parameter
Setting the reference position (position 0) (neutral)	F-170	
Setting 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 position transmitter information and actual mechanical position a reference position is needed.

POSITION 0

The reference position must be set:

- for initial operation
- after changing the position transmitter
- 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 direction 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 (position 1 and position 2) preset by the manufacturer are no longer valid and **must** be reset.

Programming:

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

2. Press pushbutton 3 briefly ==>

PoSition 0]

3. Turn handwheel until desired reference 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:

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- 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 and thread tension release (SEL2)	Pos1
Position 2	(switch-on position for thread tension release (SEL1), upper needle position (SEL2))	Pos2
Position 1A	(switch-off position for thread trimming solenoid (SEL1))	Pos1A
Position 2A	(upper needle position (SEL1))	Pos2A
Position 3		Pos3
Position 3A		Pos3A

Programming:

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

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

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

- The display unit of the set 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 setting of the positions can easily be tested by parameter F-172.

- Select parameter F-172
- Turn handwheel corresponding to the direction of rotation of the motor
  - 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

Attention!
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

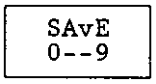
1. » Insert Memory Card with the labelled side up into the slot of the Memory Box.
   If the Memory Card is correctly inserted the green LED on the Memory Box lights up.

2. » Turn "Programming Seams (Teach-in)" off = = > pushbutton 2

3. » Save data

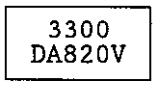
   Remark: All adjustable parameters and sewing data are stored with the exception of the sense of rotation and the needle positions.

- Actuate 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.

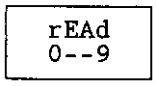
- Display after the storing is completed



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

Possibility no. 1:

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

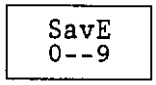


- Input address under which the desired data record is stored.

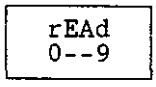
Note:
For storing data permanently start sewing once before turning the power off!

Possibility no. 2:

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

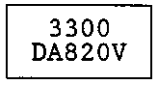


- Actuate pedal fully forward and put back to position 0 (neutral)



- 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

- Saving and reading is done by actuating 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 saving and reading:
  - Pedal backward twice in short intervals = writing
  - Pedal fully forward and POWER ON = reading

6. » Exit

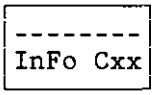
- **Interruption:**
  - Actuate one of the green pushbuttons (P E + -) on the Variocontrol
  - The Variocontrol display shows the values of normal operation

- **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
Info A5	Emergency run, identification of a non-valid machine select

Programming of Functions and Values (Parameters)

Display	Signification
Info F1	Wrong code number or parameter number input
Info F2	Input not activated because function not active
Info F3	Access level according to code number always open (stored after sewing start)

Serious Situation

Display	Signification
Info E1	Position transmitter 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: Allocation of the pushbuttons for the outputs

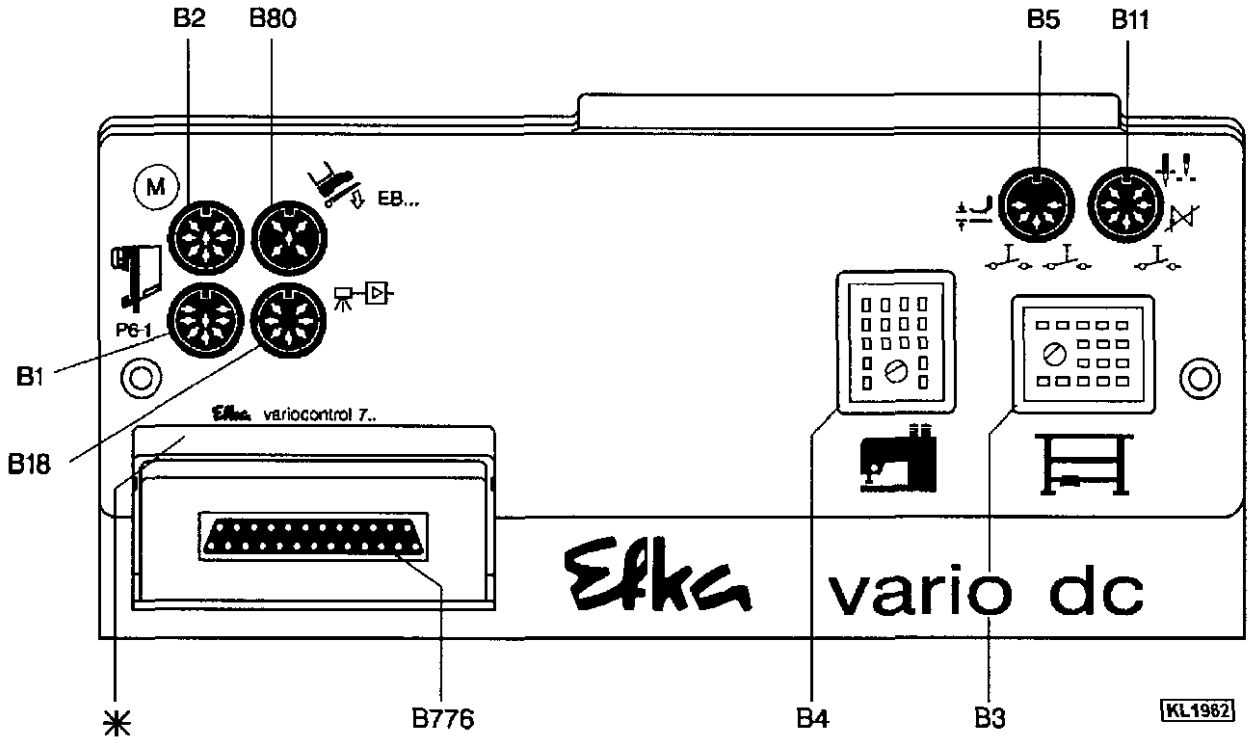
Pushbutton	Output
1	Backtacking
2	Presser foot lifting
3	Pneumatic presser foot pressure
4	Thread tension release
5	not used
6	High lift for walking foot
7	Thread clamp
8	Needle cooling
9	Thread trimmer
0	free

Inputs:

- Each actuation of the external switches or pushbuttons will be indicated by alternating the switching state (on/off) on the display.
- Only one out of several switches may be closed.

11. Socket Connectors

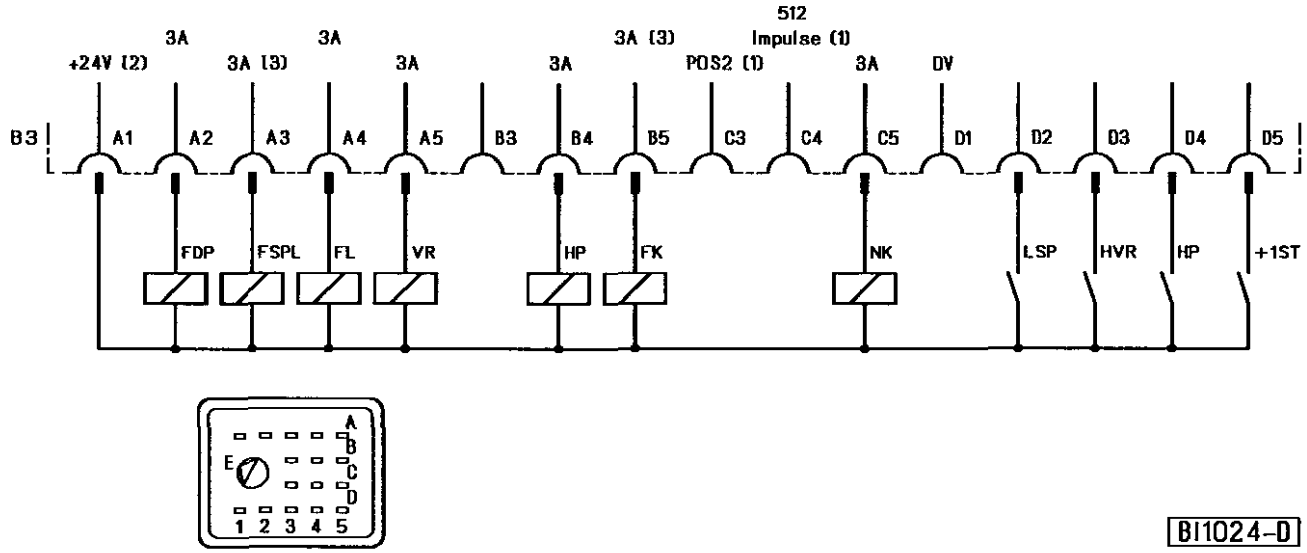
11.1 Position in the Control



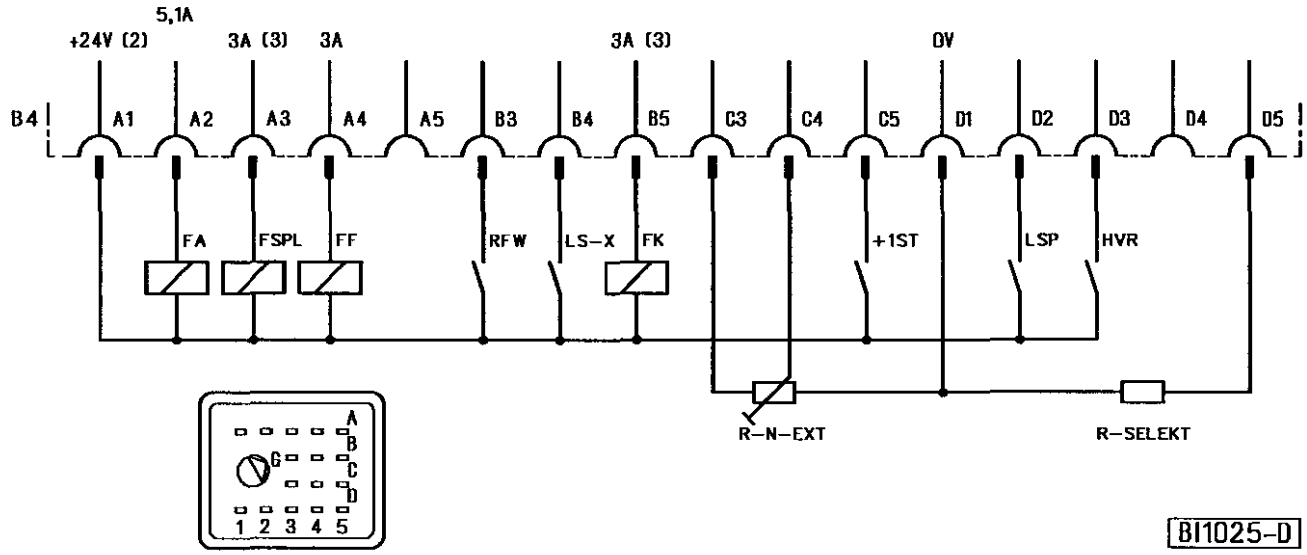
B1 - Positions transmitter
B2 - Commutation transmitter for d.c. motor
B3 - Machine
B4 - Machine
B5 - Pushbuttons and switches
B11 - Pushbuttons and displays
B18 - Light barrier module
B80 - External actuator
B776 - Control panel Variocontrol

* - Type designation

11.2 Connection Diagram



BI1024-D



BI1025-D

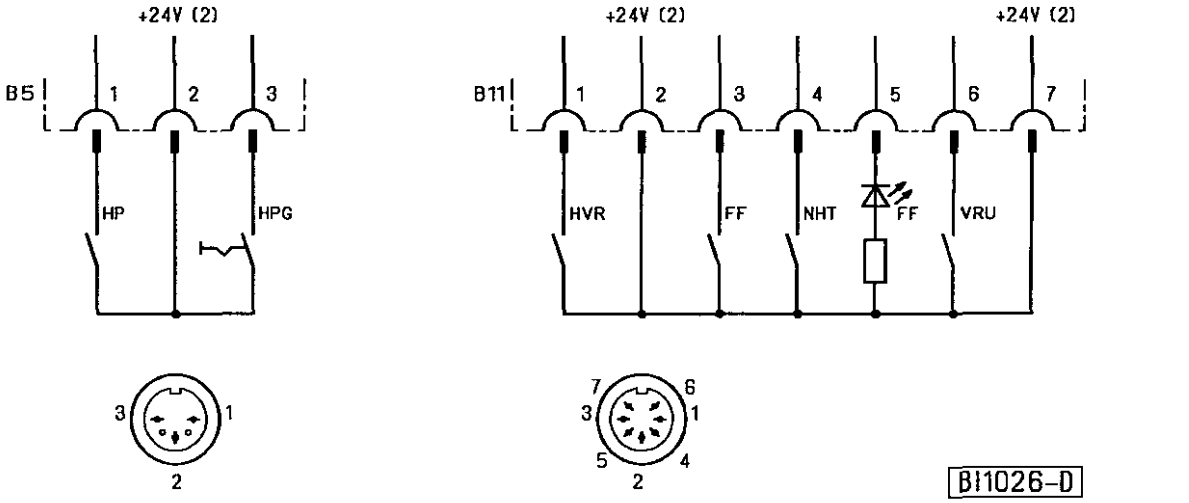
Attention!
When connecting the outputs, ensure that a total power of 96VA constant load will not be exceeded !

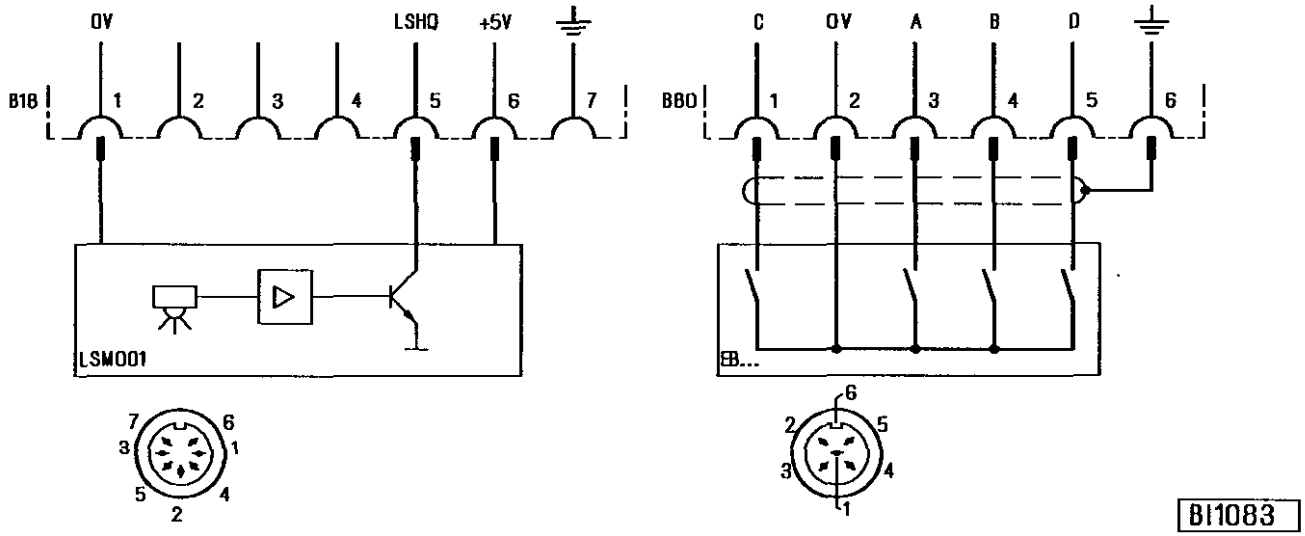
FA - Thread trimmer
FDP - Pneumatic presser foot pressure
FK - Thread clamp
FL - Presser foot lifting
FSPL - Thread tension release
HP - High lift for walking foot
NK - Needle cooling
VR - Backtacking (stitch condensing)
FF - Flip-flop

HP - High lift walking
HVR - Intermediate backtack (intermediate stitch condensing)
LSP - Blocking of machine run (safety switch)
LSX - External light barrier command

R-N-EXT - Potentiometer for external speed limitation
R-SELEKT - Resistor for machine select

1) Transistor output with open collector (max. 40V, 30mA)
2) Nominal voltage 24V, no-load voltage max. 36V
3) Total max. load for both outputs 3A



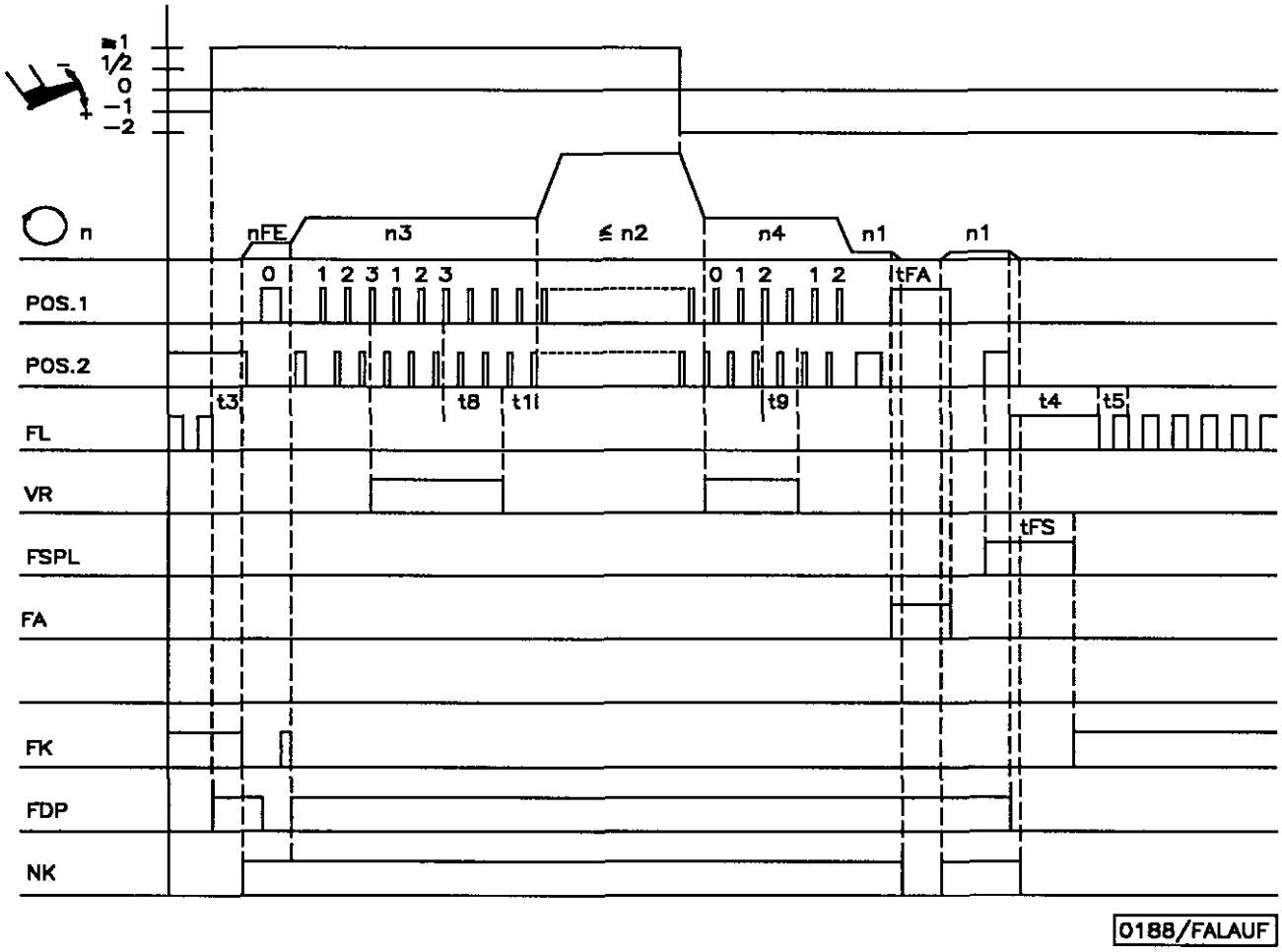


LED FF	- Indicator for flip-flop function
HP	- High lift for walking foot
HPG	- High lift for walking foot stored
FF	- Flip-flop
HVR	- Intermediate backtack (intermediate stitch condensing)
LSHQ	- Light barrier command (identified if switched to 0V)
NHT	- Needle up/down
VRU	- Suppression/recall of backtack or stitch condensing
LSM001	- Reflection light barrier module
EB...	- Actuator

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

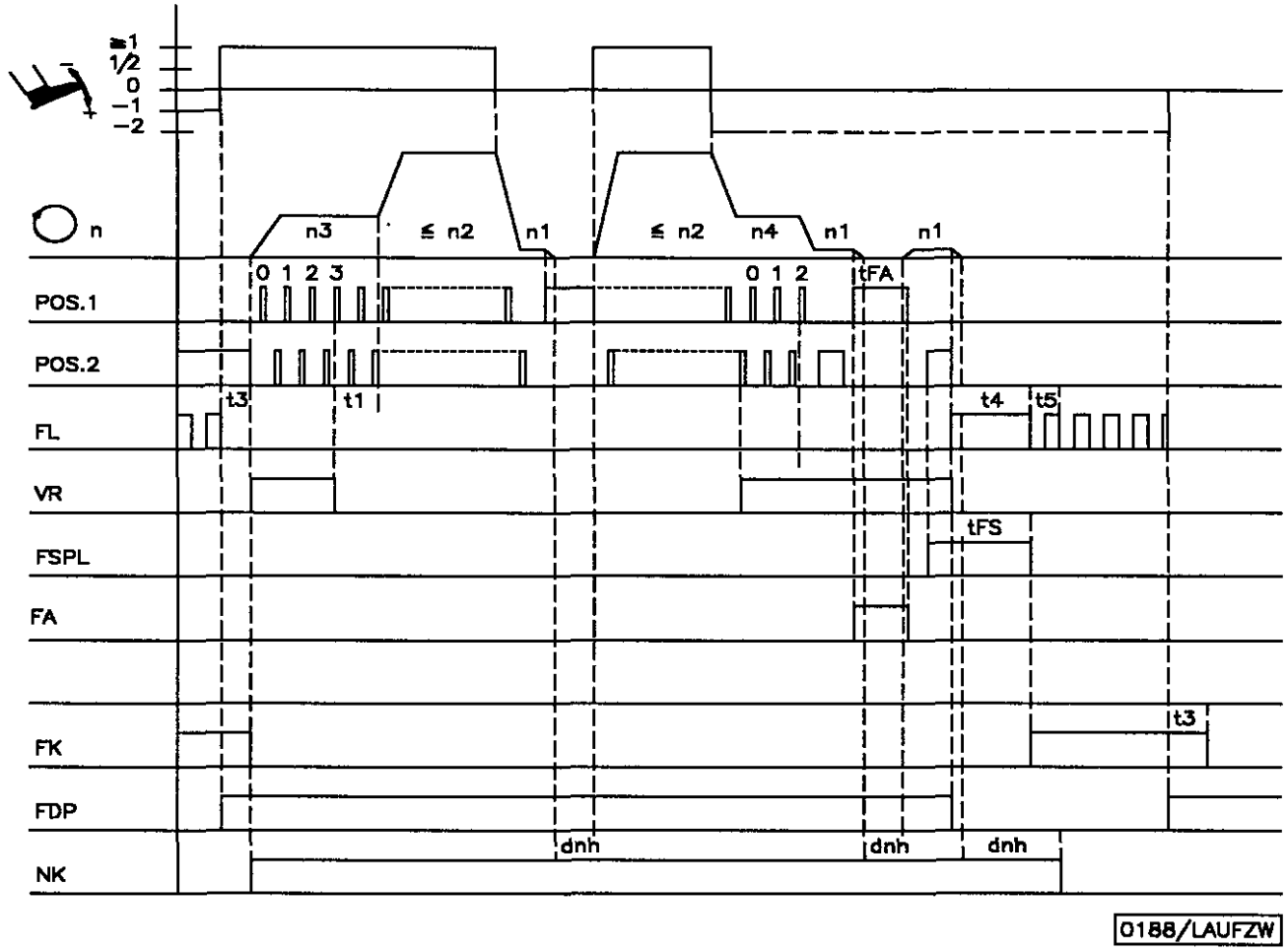
12. Function Diagrams

Trimming from full run (machine select 1)



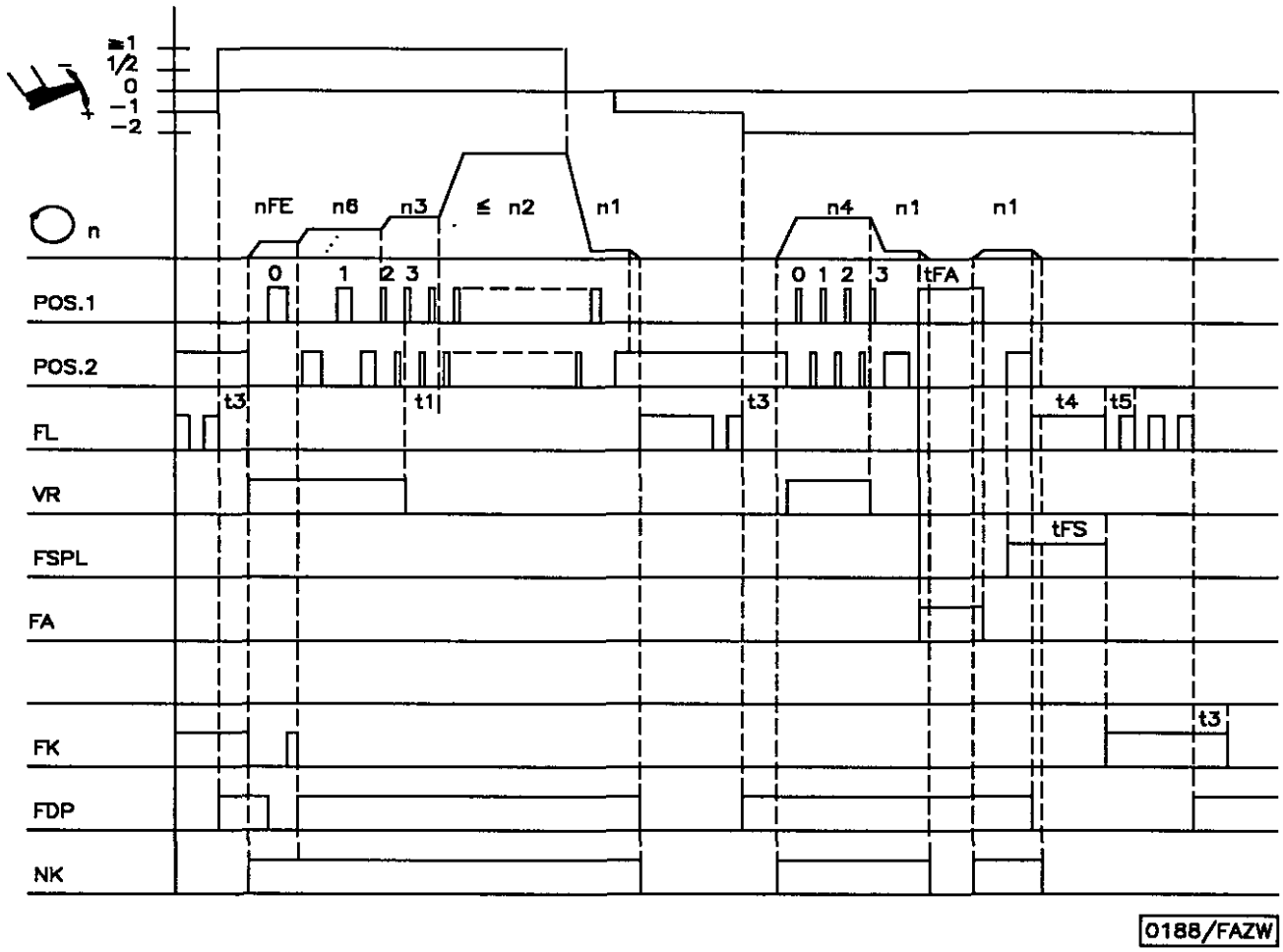
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Double start backtack with stitch correction	on	Pushbutton 7
	Double end backtack with stitch correction	on	Pushbutton 8
FES	Thread pull-in select	1	F-090
InP	Increments of reversion = 0		F-183
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
nFE	Thread pull-in speed		fixed
t1	Delay from end of start 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
t8	Start backtack stitch correction		F-150
t9	End backtack stitch correction		F-151
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291

Run with intermediate stop (machine select 1)



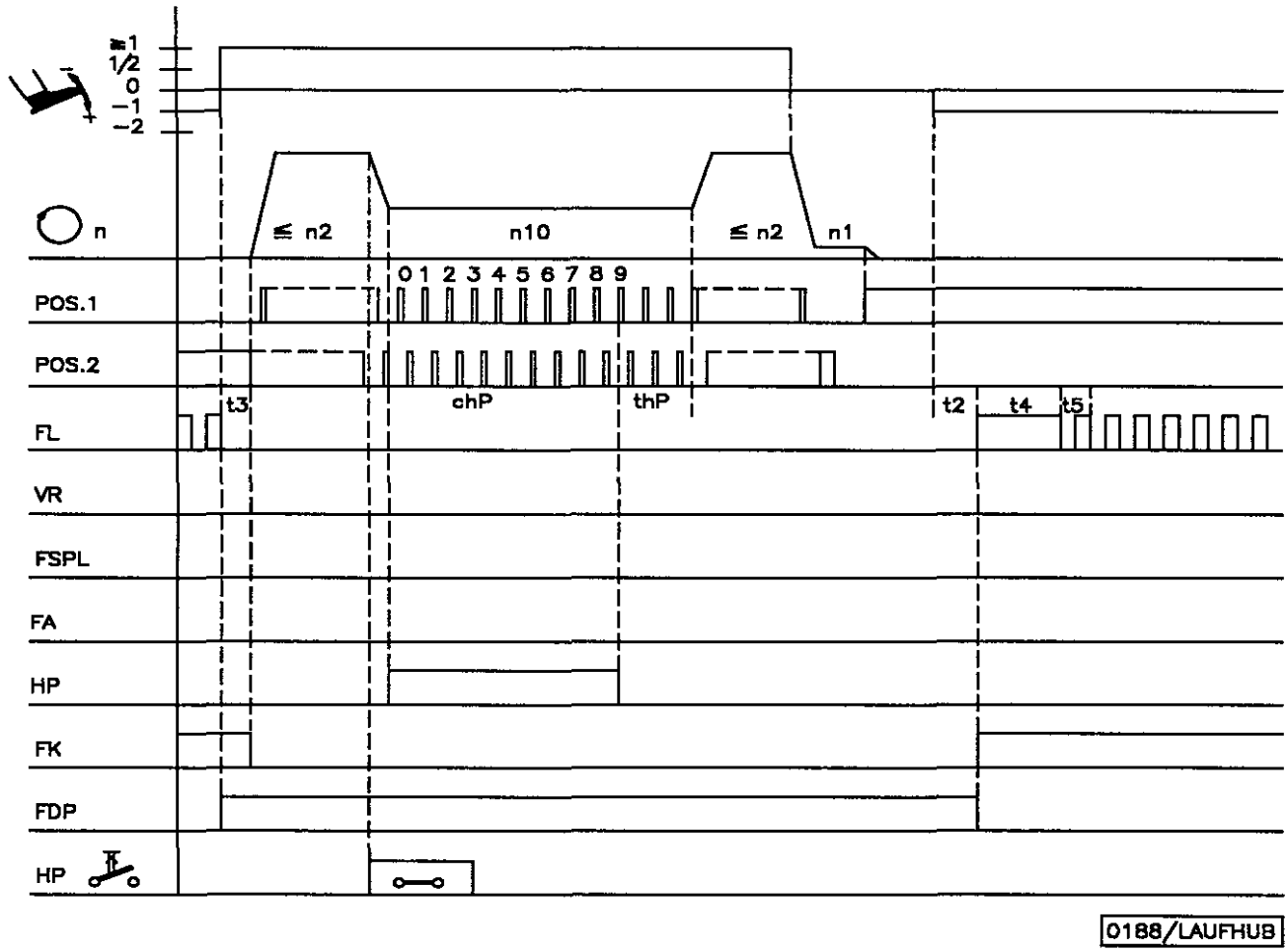
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Single start backtack	on	Pushbutton 7
	Double end backtack	on	Pushbutton 8
	Basic position 1	on	Pushbutton 4
FES	Thread pull-in select	0	F-090
FAr	Last stitch backward	on	F-136
InP	Increments of reversion		F-183
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
t1	Delay from end of start 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
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291
dnh	Prolongation of needle cooling after stop		F-184

Trimming from intermediate stop (machine select 1)



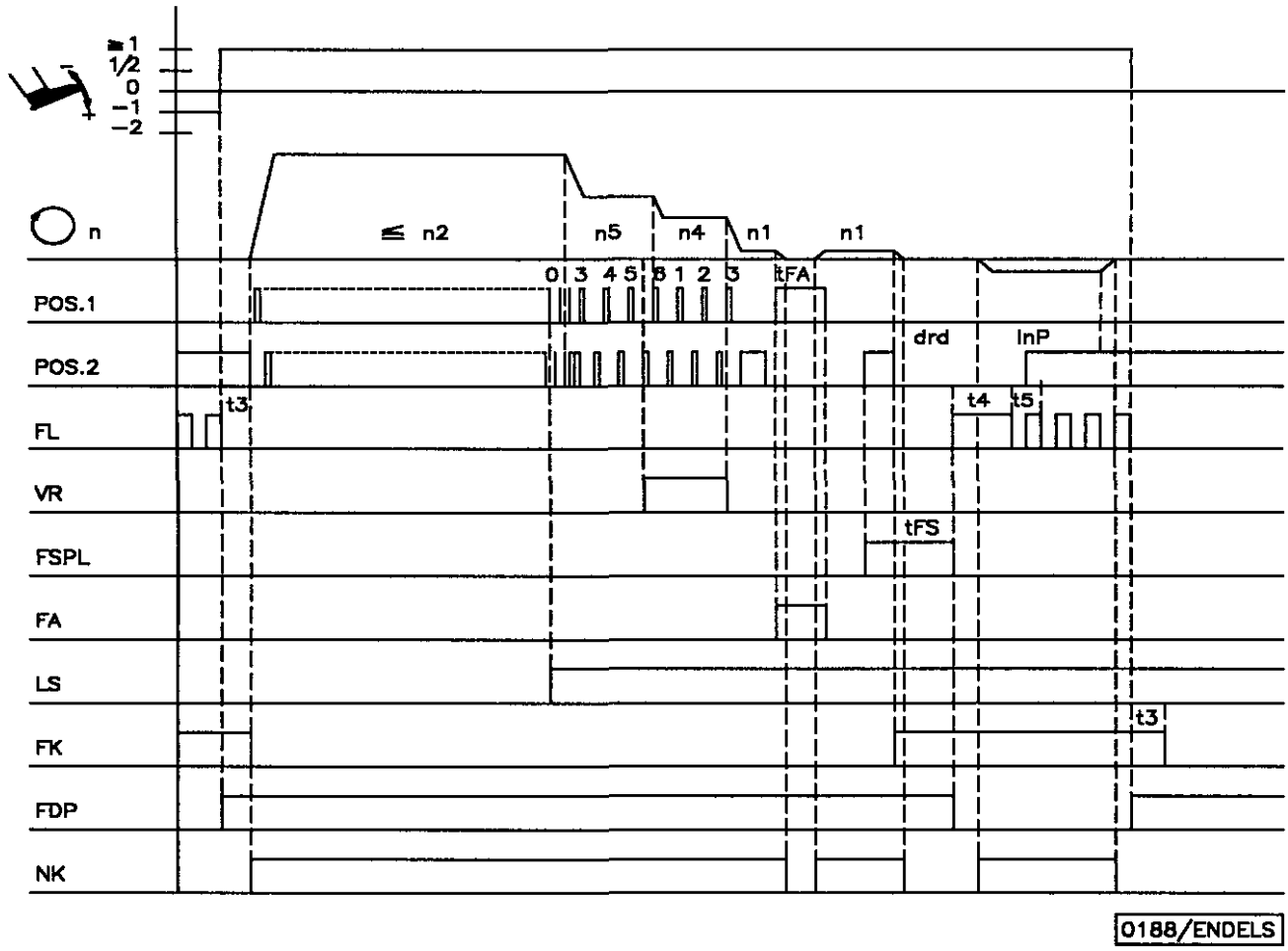
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Softstart	on	F-134
	Basic position 2 (at intermediate stop "reverse position"	on	Pushbutton 4
	Single start backtack	on	Pushbutton 7
	Single end backtack	on	Pushbutton 8
	Reversion	off	Pushbutton 9
FES	Thread pull-in select	0	F-090
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
n6	Softstart speed		F-115
nFE	Thread pull-in speed		fixed
t1	Delay from end of start backtack to speed release		F-200
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
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291

Run with high lift walking (machine select 1 or 2)



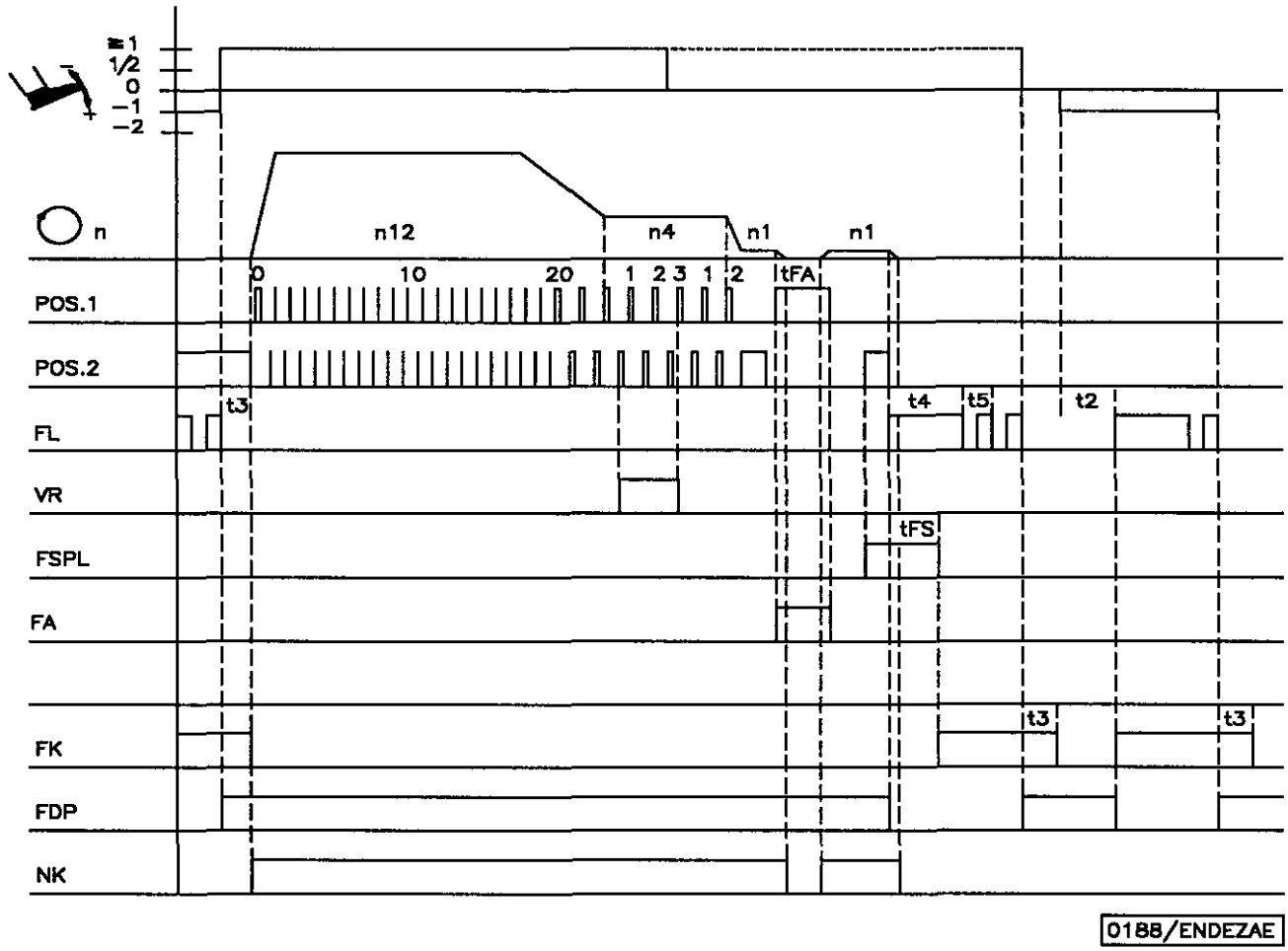
Abbreviation	Function		Parameter/Pushbutton
	Start backtack	off	Pushbutton 7
	End backtack	off	Pushbutton 8
FES	Thread pull-in select	0	F-090
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n10	High lift walking speed		F-112
t2	Delay of presser foot lifting with pedal in position -1		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
thp	Run-out high lift walking speed		F-152
chp	Minimum number of stitches for high lift walking		F-185

Seam end by light barrier (machine select 1)



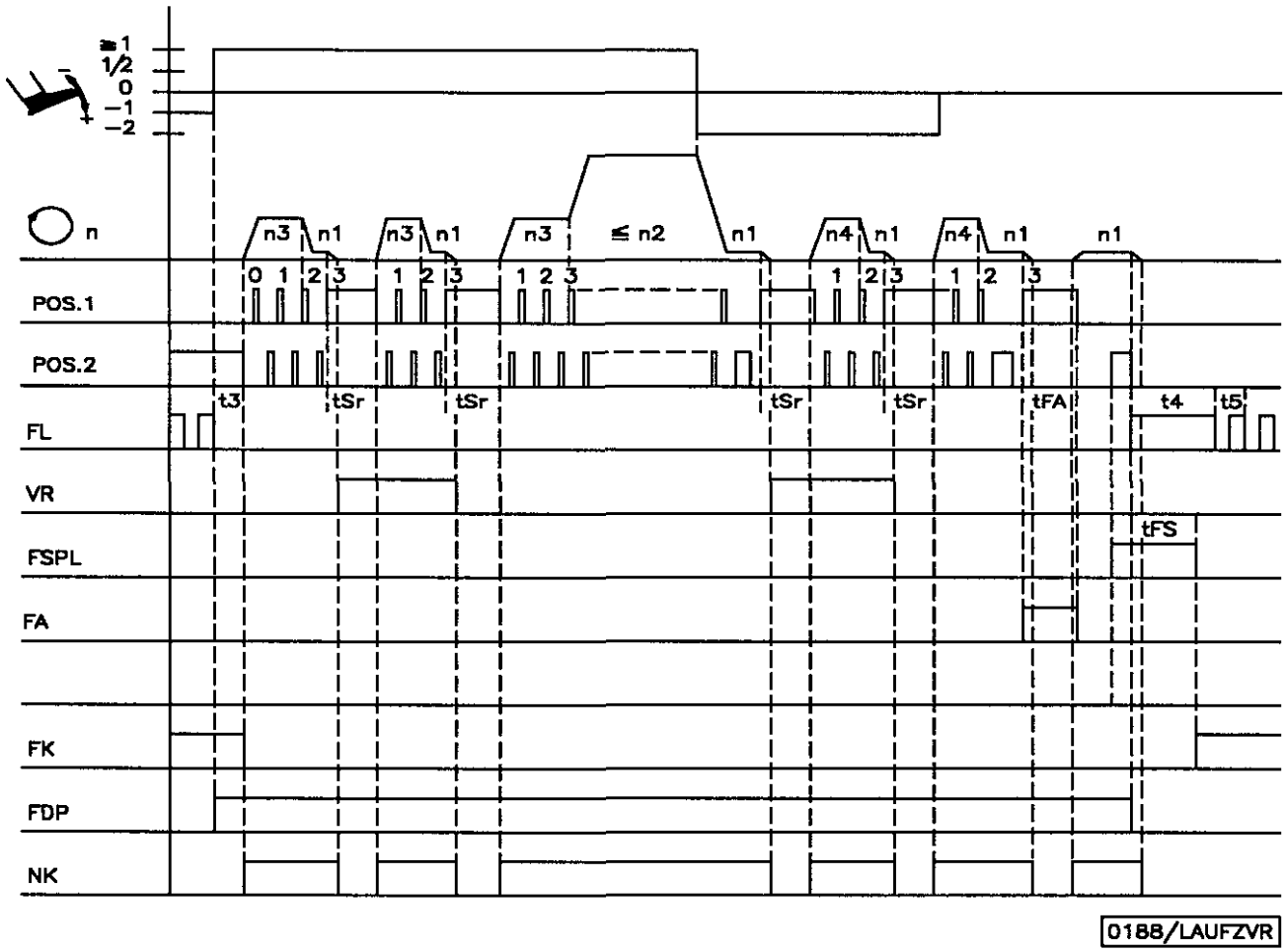
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Start backtack	off	Pushbutton 7
	Single end backtack	on	Pushbutton 8
	Reversion	on	Pushbutton 9
	Light barrier covered/uncovered	on	F-131
FES	Thread pull-in select	0	F-090
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n4	End backtacking speed		F-113
n5	Speed after light barrier sensing		F-114
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291
drd	Delay of reversion		fixed
inp	Increments of reversion		F-183

Seam end by stitch counting (machine select 1)



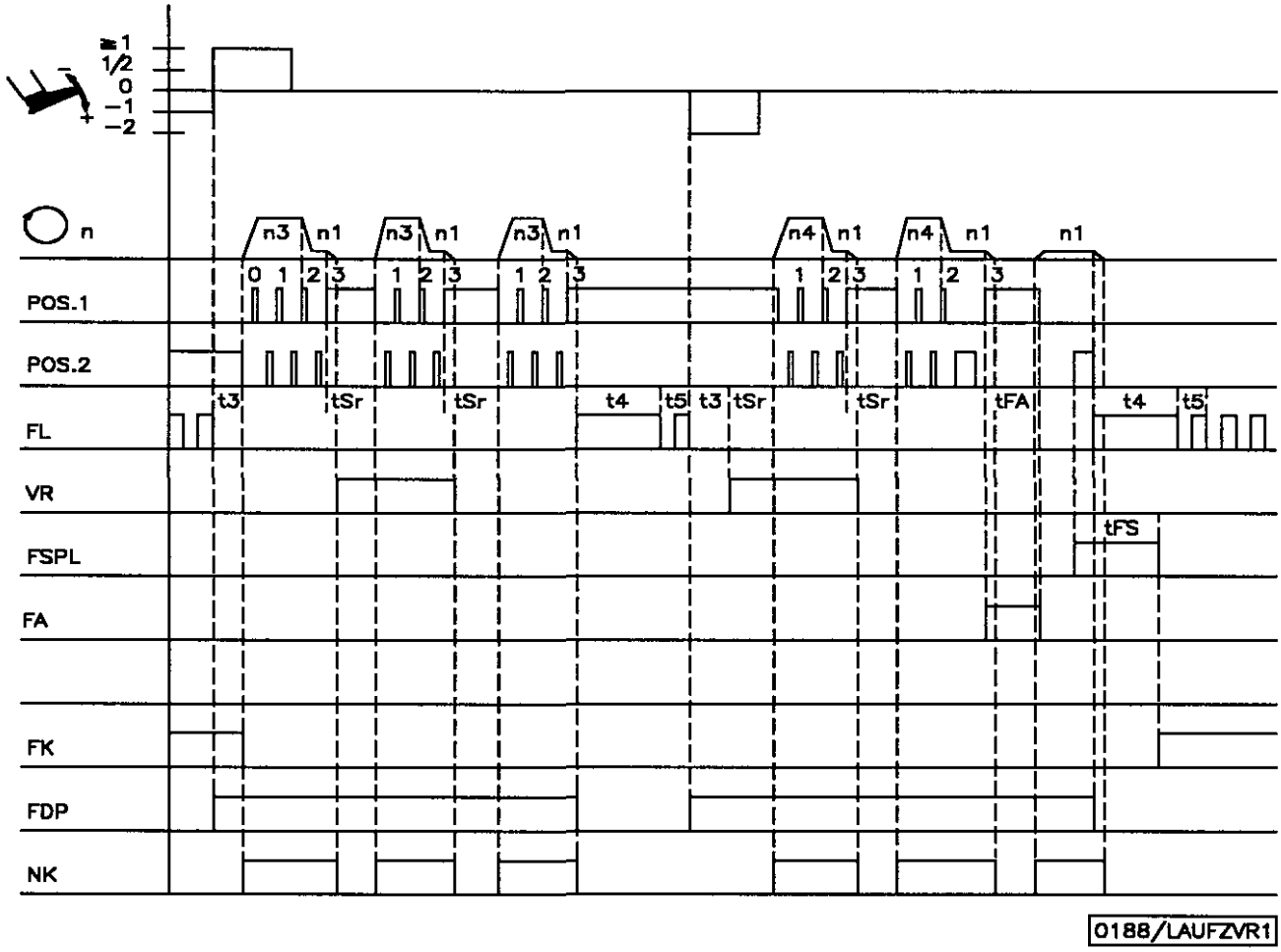
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Start backtack	off	Pushbutton 7
	Stitch counting	on	Pushbutton 1
	Double end backtack	on	Pushbutton 8
FES	Thread pull-in select	0	F-090
InP	Increments of reversion = 0		F-183
n1	Positioning speed		F-110
n4	End backtacking speed		F-113
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
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291

Run with ornamental backtack (machine select 1)



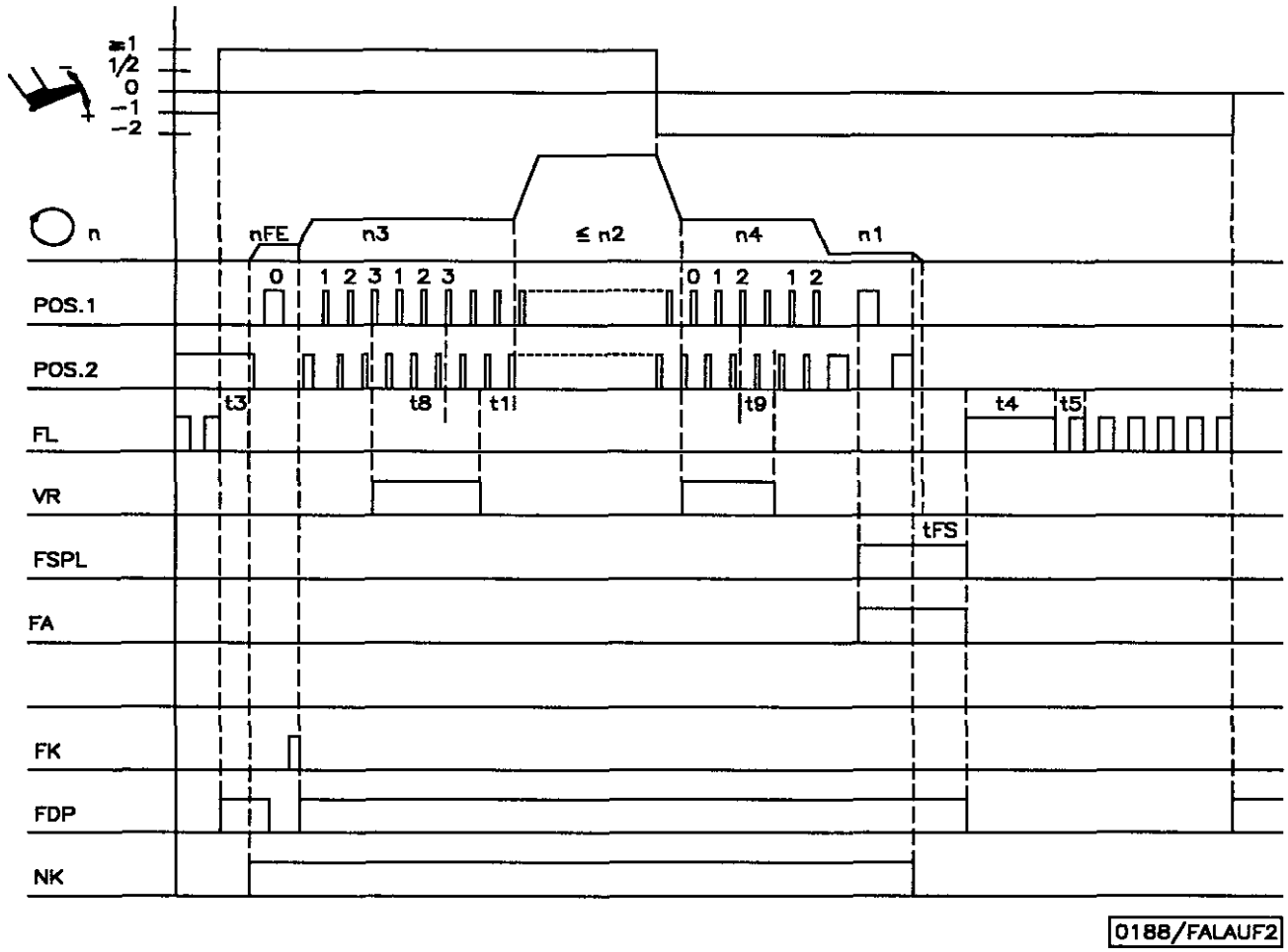
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Ornamental backtack	on	F-135
	Presser foot lifting saved after trimming	on	Pushbutton 6
FES	Thread pull-in select	0	F-090
InP	Increments of reversion		F-183
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
tSr	Stop time for ornamental backtack		F-210
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291

Short run with ornamental backtack (machine select 1)



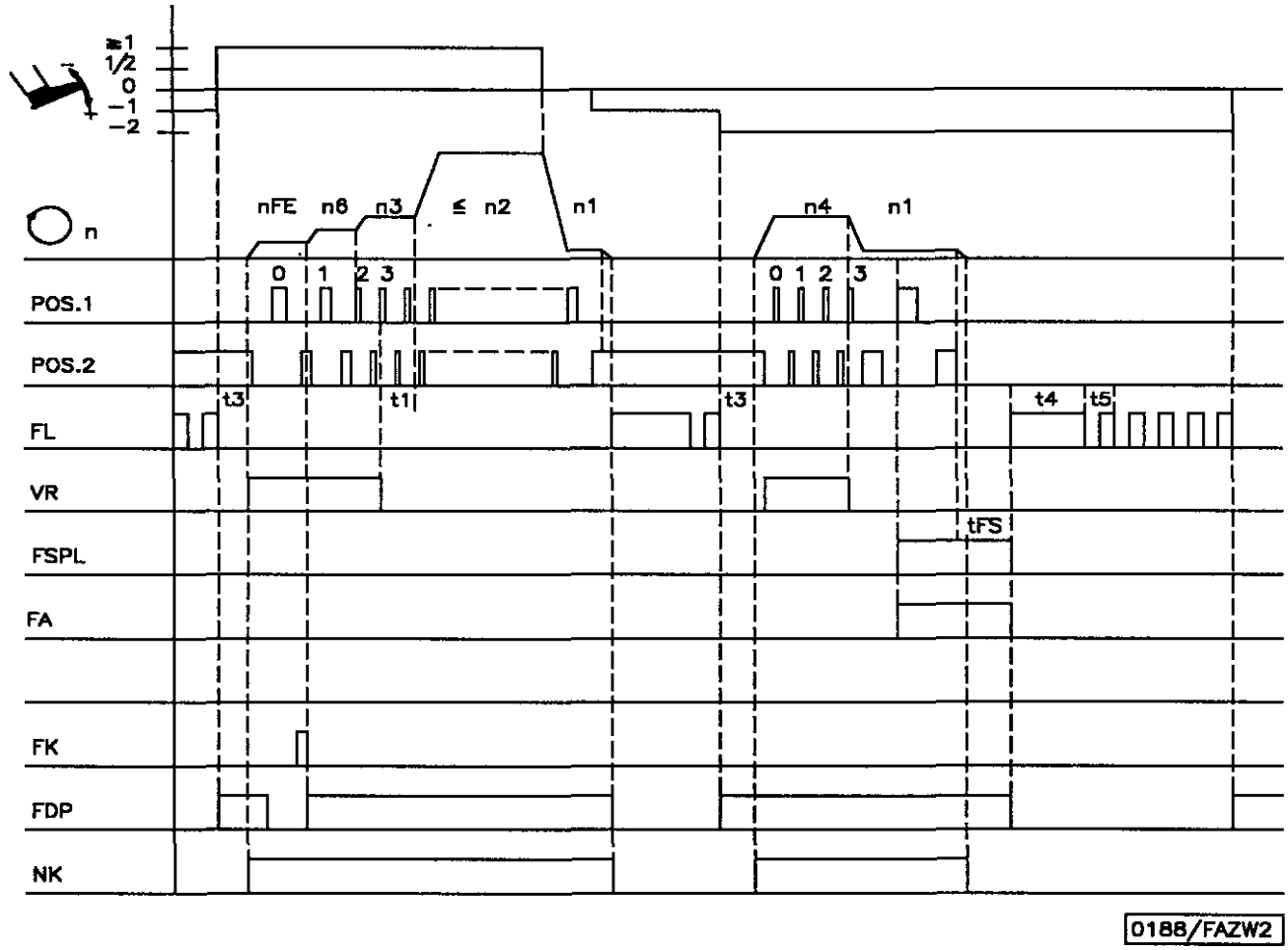
Abbreviation	Function		Parameter/Pushbutton
	Machine select	1	F-280
	Ornamental backtack	on	F-135
	Presser foot lifting saved after thread trimming	on	Pushbutton 6
	Presser foot lifting saved at stop in the seam	on	Pushbutton 5
FES	Thread pull-in select	0	F-090
InP	Increments of reversion		F-183
n1	Positioning speed		F-110
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
tSr	Stop time for ornamental backtack		F-210
tFA	Stop time for thread trimmer		F-290
tFS	Delay of thread tension release		F-291

Trimming from full run (machine select 2)



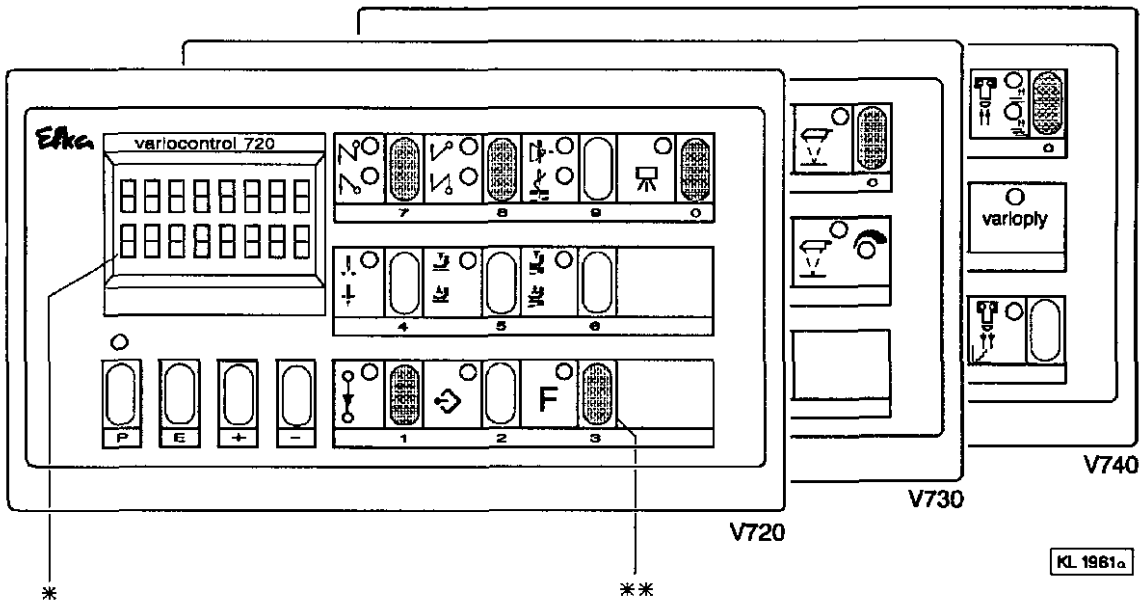
Abbreviation	Function		Parameter/Pushbutton
	Machine select	2	F-280
	Double start backtack with stitch correction	on	Pushbutton 7
	Double end backtack with stitch correction	on	Pudhbutton 8
FES	Thread pull-in select	1	F-090
InP	Increments of reversion = 0		F-183
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
nFE	Thread pull-in speed		fixed
t1	Delay from end of start 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
t8	Start backtack stitch correction		F-150
t9	End backtack stitch correction		F-151
tFS	Delay of thread tension release		F-291

Trimming from intermediate stop (machine select 2)



Abbreviation	Function		Parameter/Pushbutton
	Machine select	2	F-280
	Softstart	on	F-134
	Basic position 2 (at intermediate stop "reverse position")	on	Pushbutton 4
	Single start backtack	on	Pushbutton 7
	Single end backtack	on	Pushbutton 8
	Reversion	off	Pushbutton 9
FES	Thread pull-in select	1	F-090
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Start backtacking speed		F-112
n4	End backtacking speed		F-113
n6	Softstart speed		F-115
nFE	Thread pull-in speed		fixed
t1	Delay from end of start backtack to speed release		F-200
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
tFS	Delay of thread tension release		F-291

13. Operating Elements of the Variocontrol



*) Display
**) Pushbuttons with hatching: special setting for HIT

Functional Setting of the Pushbuttons

Pushbutton P = Recall or exit 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 2A
Pushbutton 5 = Automatic foot lift at stop in the seam ON / OFF
Pushbutton 6 = Automatic foot lift after thread trimming ON / OFF
Pushbutton 7 = Start backtack SINGLE / DOUBLE / OFF
Pushbutton 8 = End backtack SINGLE / DOUBLE / OFF
Pushbutton 9 = THREAD TRIMMER / THREAD TRIMMER + REVERSION / 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

Pushbutton P = Recall or exit 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 3 = Function key - programmable
Pushbutton 7 = Start backtack SINGLE / DOUBLE / OFF
Pushbutton 8 = End backtack SINGLE / DOUBLE / OFF
Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING / OFF

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