

EFKA vario dc

CONTROL

DA82GV3209

INSTRUCTION MANUAL

No. 0402069

english

EFKA
FRANKL & KIRCHNER
GMBH & CO KG

EFKA
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EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

Contents	Page
1. Important Safety Instructions	1
2. Range of Applications	2
2.1 Use in Accordance with Regulations	2
3. Complete Drive Unit Consisting of	2
3.1 Special Accessories	3
4. Operation	4
4.1 Access to Programming on Command Input	4
4.2 Code Number Input	4
4.3 Direct Operation	5
4.4 Input by Parameters on the Operator Level	5
4.5 Input by Parameters on the Technician and Supplier Level	5
5. Operating the Motor	6
5.1 General Instructions	6
5.2 Initial Operation (New Motor)	7
6. Putting into Operation and Setting Aids	7
6.1 Fast Installation Routine (SIR)	7
6.1.1 Putting into Operation by Using SIR	7
6.1.2 Language Selection of the Multilingual Display	7
6.1.3 Reference Position	8
6.1.4 Position 1	8
6.1.5 Position 2	8
6.1.6 Position 1A	8
6.1.7 Position 2A	8
6.1.8 Positioning Speed	9
6.1.9 Maximum Speed	9
6.1.10 Direction of Rotation	9
6.1.11 Exit the Fast Installation Routine	9
6.1.12 Multilingual Display	10
6.2 Maximum Speed Limitation by Direct Input (DED)	11
6.3 Pushbuttons for Background Information (HIT)	11
6.3.1 Examples for HIT	12
6.4 Programming Seams (Teach-in)	15
6.4.1 Teach-in Mode	15
6.4.2 Max. Number of Seams Exceeded	18
6.4.3 Execution (Pattern) Mode	19
7. Functions and Settings	20
7.1 First Stitch after Power On	20
7.2 Selection of the Machine Series	20
7.2.1 Emergency Run Function When Machine Select Is Invalid	20
7.3 Program Identification	20
7.4 Function Key (Pushbutton 3)	21
7.5 Display Actual Speed	21
7.6 Direction of Rotation of the Motor	21
7.7 Softstart	22
7.8 Start Backtrack	22
7.8.1 Double Start Backtrack	23
7.8.2 Single Start Backtrack	23
7.9 End Backtrack	23
7.9.1 Double End Backtrack	23
7.9.2 Single End Backtrack	24
7.10 Start Ornamental Backtrack	24
7.11 End Ornamental Backtrack	25

7.12 Suppression/Recall of Backtack	25
7.13 Intermediate Backtack	26
7.14 Activation of the Backtack Solenoid	26
7.15 Seam with Stitch Counting	27
7.16 Free Seam and Seam with Light Barrier	27
7.17 Light Barrier	28
7.17.1 General Light Barrier Functions (V720, V730, V740)	28
7.17.2 Reflection Light Barrier (V720, V730)	28
7.17.3 Transmitted Light Barrier (V740)	29
7.17.4 Automatic Start by Light Barrier (V730, V740)	29
7.17.5 Light Barrier Filter for Knitted Fabrics	30
7.18 Thread Trimmer/Thread Tension Release	30
7.19 Reversion	31
7.20 Bobbin Thread Monitor	31
7.20.1 Adjustment of the Bobbin Thread Monitor	32
7.20.2 Bobbin Empty - No Stop	32
7.20.3 Bobbin Empty - With Stop	32
7.21 Presser Foot Lifting	33
7.22 Reduction of the Presser Foot Pressure	34
7.23 Reduction of the Thread Tension	34
7.24 Blocking of Machine Run (Safety Switch)	35
7.24.1 Variants of the Function Blocking of Machine Run	35
7.25 Needle Up/Down; Single Stitch	36
7.26 Needle Cooling/Under-Edge Trimmer	37
7.26.1 Needle Cooling	37
7.26.2 Under-Edge Trimmer	37
7.27 High Lift Walking	38
7.28 Speed Limitation Depending on High Lift	39
7.29 Speed Limitation DB2000/DB3000 (Depending on Stitch Length and/or High Lift)	39
7.30 Stitch Length Reduction	40
7.31 Signal Output POS2	40
7.32 Signal Output Impulses (G1)	40
7.33 Actuator EB301 and EB302	41
8. Machine Functions	42
8.1 Braking Behavior	42
8.2 Braking Power at Standstill	42
8.3 Start Behavior	42
8.4 Setting of the Positions	43
8.4.1 Reference Position	43
8.4.2 Signal and Stop Positions	44
8.4.3 Display of the Signal and Stop Positions	45
9. Memory Box	45
9.1 Preparation for Memory Box Operation	45
9.2 Formatting of the Memory Card	45
9.3 Operating the Memory Box	46
10. Error Messages	48
11. Signal Test	49
12. Socket Connectors	51
12.1 Position in the Control	51
12.2 Connection Diagram	52
13. Function Diagrams	55
14. Operating Elements of the Variocontrol	65

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. positioner, reversing device, light barrier, etc., disconnect drive from mains (turn off main switch, remove mains plug from outlet [DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1]).
- Always switch off (0) machine and remove plug from outlet, when removing covers, mounting accompanying appliances, positioner especially, light barrier, etc., or any other devices mentioned in the instruction manual.
- Only qualified personnel are authorized to work on the electrical components.

- Work on high voltage circuit areas is forbidden, except as stated in the respective regulations, e.g. DIN VDE 0105 part 1.
- Only specially trained personnel are authorized to complete repair work.
- Cables to be wired must be protected against expectable strain and fastened adequately.
- Cables near moving machine parts (e.g. V-belts) must be wired at a minimum distance of 25 mm (see DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1).
- For safety it is preferred to wire the cables separately from each other.
- Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the motor rating plate and on the nameplate of the power pack.
- Connect this drive to a properly grounded outlet only. See Grounding Instructions.
- Electric accompanying appliances and accessories must only be connected to safety low voltage.
- EFKA DC drives are protected according to overvoltage class 2 (DIN VDE 0160 § 5.3.1).
- Observe all safety guidelines before undertaking conversions or modifications.
- For repair and maintenance use only original replacement parts.



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



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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	Series
Dürkopp-Adler	N291

2.1 Use in Accordance with Regulations

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

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

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

The drive can only be operated:

- on thread processing machines
- in dry areas

3. Complete Drive Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc DA82GV3209
	- Power pack	N152 (optional N153, N155)
	- Actuator	EB301 (optional EB302, softer springs)
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 versions on inquiry
Pulley *1) (available sizes: B58-L, B63-L, B67-L, B71-L, B75-L, B80-L, B85-L, B90-L, B95-L)	- part no. 1112223
Pulley 40 mm ϕ with special belt intake and slip-off protection	- part no. 1112224
Pulley 50 mm ϕ with special belt intake and slip-off protection	- part no. 7900052
Storage unit Memory Box MB001	- part no. 1111602
Storage card Memory Card MC001	- part no. 6100028
Reflection light barrier module Variolux LSM001	- available versions see specification Variolux
Reflection light barrier Variolux LS-001	- part no. 6100027
Transmitted light barrier Varioply - transmitter DLS-001	- available versions see specification Varioply
- receiver DLL-...	- available versions see specification solenoids
Solenoid type EM1..(for e.g. presser foot lift, backtacking, etc.)	- part no. 1111845
Extension cable for external actuator, approx. 750 mm long, complete with plug and socket connector	- part no. 1111787
Extension cable for external actuator, approx. 1500 mm long, complete with plug and socket connector	- part no. 0501278
5-pin plug with slide index for the connection of another external control	- part no. 4160018
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 1100313
Potential equalization cord 700 mm long, LIY 2.5mm ² , grey, with forked cable brackets on both sides	- part no. 1100409
Extension cable for position transmitter P6-., approx. 1100 mm long, complete with plug and socket connector	- part no. 1111229
Extension cable for commutation transmitter, approx. 315 mm long, complete with plug and socket connector	- part no. 1111584
Extension cable for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector	- part no. 1111858
Extension cable for motor connection, approx. 400 mm long	- part no. 1111857
Extension cable for motor connection, approx. 1500 mm long	- part no. 58.0013
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	- please indicate line voltage and sewing light voltage (6.3V or 12V)
Sewing light transformer	- part no. 0502865
8-pin plug with slide index (Mas 8100S)	- part no. 0501279
8-pin plug with slide index (Mas 8100SN)	- part no. 0503700
15 pole SubminD connector	- part no. 0101534
Semimonocoque casing for 15 pole SubminD	- part no. 0504280
37 pole SubminD connector	- part no. 0101533
Semimonocoque casing for 37 pole SubminD	

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

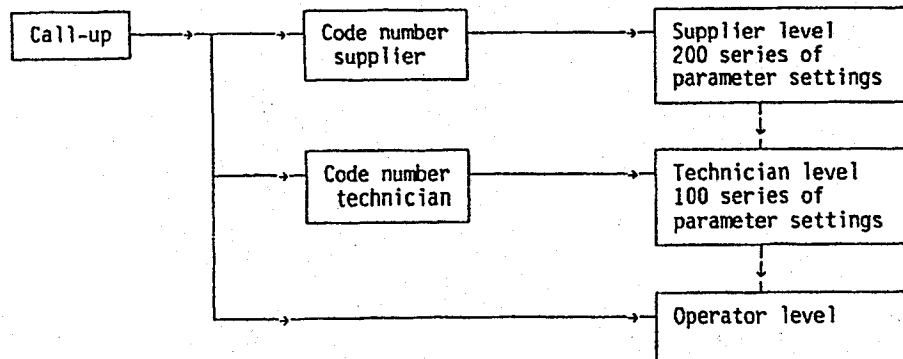
4. Operation

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



4.2 Code Number Input

1. TURN POWER OFF

2. -> [P] + TURN POWER ON

==> C-0000

3. -> [1] -> [2] -> [3] ->... Input CODE NO. !
(Example)

4. -> [E] -> If CODE NUMBER wrong
repeat input !

==> C-0000
InFo F1

-> If CODE NUMBER correct

==> F-XXX

F-XXX = first parameter number on 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! ==>
Parameter no. does not appear !

aaa bbb

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

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

4. -> E -> PARAMETER VALUE is entered ==>
Display steps to next PARAMETER

aaa bbb

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
Display of the first PARAMETER NO.

==> F-XXX

-> On with step 3 ! <-

-> Call-up after termination of a seam !

1. -> P ==> The most significant digit
on the display blinks! ==>

F-XXX

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

(Example)

3. -> E -> If PARAMETER NUMBER wrong repeat input ! ==> F-XXX
InFo Fl
- > 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. Operating the Motor

5.1 General Instructions

When putting the control into operation, ensure the following programming sequence:

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 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.

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 = Thread lever just before the bottom dead center, in the direction of rotation of the motor shaft. Corresponds to position D on the handwheel.

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, parameters 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 -> Turn position transmitter at least until the marker ([) has disappeared. ==> PoSition
0 [

Note

Reference position = Thread lever just before the bottom dead center, in the direction of rotation of the motor shaft. Corresponds to position D on the handwheel.

6.1.4 Position 1

-> E -> Turn position transmitter to the desired position. ==> PoSition
1 046

Set 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 number of increments
(2 increments correspond to approx. 1.4 °)

6.1.5 Position 2

-> E -> Turn position transmitter to the desired position. ==> PoSition
2 270

or

-> + -> - -> Set number of increments
(2 increments correspond to approx. 1.4 °)

6.1.6 Position 1A

-> E -> Turn position transmitter to the desired position. ==> PoSition
1A 086

or

-> + -> - -> Set number of increments
(2 increments correspond to approx. 1.4 °)

6.1.7 Position 2A

-> E -> Turn position transmitter to the desired position. ==> PoSition
2A 460

or

-> + -> - -> Set number of increments
(2 increments correspond to approx. 1.4 °)

6.1.8 Positioning Speed

-> E -> Set the positioning speed

==>

Lo SPEED
n1 0170

-> + -> - -> Change value

6.1.9 Maximum Speed

-> E -> Set the maximum speed

==>

hi SPEED
n2^ 3500

-> + -> - -> Change value

6.1.10 Direction of Rotation

-> E -> Adjust the sense of rotation

==>

rotAtion
drE 1

-> + -> - -> Change value

6.1.11 Exit the Fast Installation Routine

-> E -> Entry into normal operation
after POWER ON.

==>

3500
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6.1.12 Multilingual Display

dEU USA ESP FrA		Language selection			
dEU	USA	ESP	FrA		
PoSition 0]	PoSition 0]	PoSicion 0]	PoSition 0]	Reference position	
PoSition 1 046	PoSition 1 046	PoSicion 1 046	PoSition 1 046	Position 1 leading	
PoSition 2 270	PoSition 2 270	PoSicion 2 270	PoSition 2 270	Position 2 leading	
PoSition 1A 086	PoSition 1A 086	PoSicion 1A 086	PoSition 1A 086	Position 1A trailing	
PoSition 2A 460	PoSition 2A 460	PoSicion 2A 460	PoSition 2A 460	Position 2A trailing	
niEdriG n1 0170	Lo SPEED n1 0170	vEL bAJA n1 0170	vit LEnt n1 0170	Positioning speed	
hoch n2^ 3500	hi SPEED n2^ 3500	vEL ALtA n2^ 3500	vit rAPi n2^ 3500	Maximum speed	
drEhri drE 1	rotAtion drE 1	rotAcion drE 1	rotAtion drE 1	Direction of rotation	

6.2 Maximum Speed Limitation by Direct Input (DED)

Upper limit of the maximum speed (n_{maxmax})	--> F-111
Lower limit of the maximum speed (n_{maxmin})	--> F-121

In order to limit the maximum speed of the machine to the specific level of the application, settings on the direct functional level are possible.

Modifying the settings is possible after each seam end by pushing the +/- buttons; after power on, however, it is possible only if the bobbin thread monitor function is switched off.

The actual value is shown on the display.

The setting range is between the speeds programmed with F-111 (upper limit) and F-121 (lower limit).

Actual value on the display, in the direct mode:

4300	==> Display of speed n_{max}
XY82xV	==> Type of control

->

+

 ->

-

 --> Change value

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

3500	==> Display of speed n_{max}
xx82xV	==> Type of control

Note

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, after power on.

Note

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

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

When 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.

3500
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Display after power on:
-> Maximum speed
-> Type designation

1

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

Stc 020

Display:
20 stitches are set

+

Press pushbutton +,
number of stitches increases.

Stc 025

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

3500
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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

If stitch counting (pushbutton 1) was turned on.

3500
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Display after power on:
-> Maximum speed
-> Type designation

1

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

Stc 020

Display:
20 stitches are set

+

Press pushbutton +,
number of stitches increases.

Stc 025

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

3500
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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

With the sewing start the new value is saved.

Function key F

By the function key (pushbutton 3) various parameters, also from a higher level, can be switched on or off.

This pushbutton can be set to the following functions:

1. SSt Softstart ON/OFF
2. SrS Ornamental backtack ON/OFF
3. hH High lift walking operation mode stored = ON/operation mode not stored = OFF
4. Snh Needle cooling ON/OFF
5. Frd Reversion ON/OFF

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

3500
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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- 5

Display:
Actual status (reversion ON/OFF)

-

Press pushbutton -.
(+ increases, - decreases the display value)

-F- 1

Display:
New status (Softstart ON/OFF)

P

Press pushbutton P.

3500
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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.

3500
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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

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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 initial backtack, final backtack, stitch counting, thread trimming and presser foot lifting can be assigned individually to each seam.
- Backward sewing by reversing the feeding direction can only be programmed in the teach-in mode.

Example 1: Pattern 1 40 seams
 Pattern 2-8 0 seams

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

Example 3: Pattern 1 10 seams
 Pattern 2 15 seams
 Pattern 3-8 0 seams

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

6.4.1 Teach-in Mode

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

Display configuration:

X	YY	ZZZ	X	Pattern number (1...8)
LS	SSS		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	==>	
2 ->	E	==>	Display of a parameter on the operator level	==>	aaa bbb
3 ->	2	==>	LED pushbutton 2 blinks Entry into pattern and seam programming	==>	1 01 ---
4 ->	2	==>	Changing the pattern number	==>	2 01 ---

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

Example: seam with stitch counting:

- > 1 ==> Turning on the stitch counting; display of the actual stitches. ==> 2 01 004
- > 1 ==> Turning on backward sewing ("-" 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 number of stitches by pushbuttons +/- or sewing the seam by using the pedal.

Example stitch counting and/or light barrier:

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

Only with V740!

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

Only with V740!

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

With V720/V730/V740!

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

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

After programming the function ==>

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

-> The seam is entered by pressing 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 terminated by pushbutton P, otherwise it gets lost.

Note

The patterns are permanently saved only after the sewing start.

Detailed Example:

A seam 1 with stitch counting and 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 XY822V
1. -> [P]	==> LED pushbutton P blinks	==>	
2. -> [E]	==> Display of a parameter on the operator level	==>	aaa bbb
3. -> [2]	LED pushbutton 2 blinks ==> Pattern 1, seam 1	==>	1 01 ---
4. -> [2]	LED pushbutton 2 blinks ==> Pattern 2, seam 1	==>	2 01 ---
5. -> [2]	LED pushbutton 2 blinks ==> Pattern 3, seam 1	==>	3 01 ---
6. -> [2]	LED pushbutton 2 blinks ==> Pattern 4, seam 1	==>	4 01 ---
7. -> [7]	LED bottom pushbutton 7 lights up ==> Single 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 sewing the seam by using the pedal.		4 01 017
--> Seam length of 17 stitches is set			
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 sewing the seam by using the pedal	4 02 008
				==> Seam with 8 stitches is set	
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			==> Exit programming, 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 pattern, for the time being, it is impossible to exit the teach-in mode by pressing 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:

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!

-> ==> Call-up of the pattern to be deleted

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 at npos after POWER ON Positioning speed	Sn1 n1	F-231 F-110

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

7.2 Selection of the Machine Series

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

Basic machine series N291 F-28B0 = 1 (RSEL = 100R $\pm$ 5%).

7.2.1 Emergency Run Function When Machine Select 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
92031211

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

7.4 Function Key (Pushbutton 3)

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

A preprogrammed function can be switched on or off directly by pressing the function key (pushbutton 3).

Programmable functions:

- F-008 = 1 - Softstart ON/OFF
- F-008 = 2 - Ornamental backtack ON/OFF
- F-008 = 3 - High lift walking operation mode stored = ON/operation mode not stored = OFF
- F-008 = 4 - Needle cooling ON/OFF
- F-008 = 5 - Reversion 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

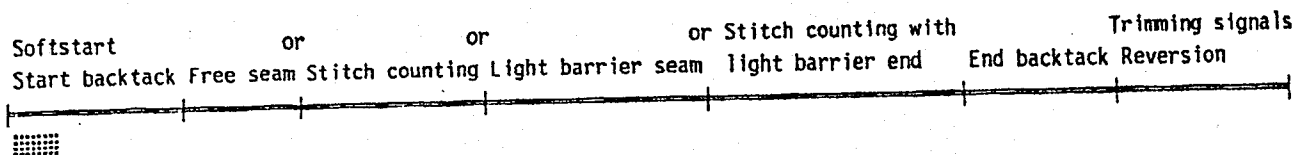
- Look at the motor shaft:
- F-161 = 0 - clockwise rotation
 - F-161 = 1 - counterclockwise rotation



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

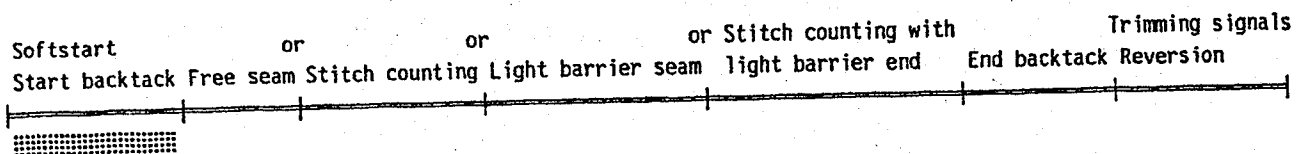
Function:

- after power on
- at the beginning of a new seam
- speed limited (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)
- stop by full heelback (position -2)

Direct access by function key (pushbutton 3)

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

7.8 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
Run-out time	t1	F-200
Start delay from lifted foot	t3	F-202
Stitch correction time	t8	F-150

The start backtack begins by pushing the pedal forward at the start 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 backtack 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 backtack speed, will be turned off. Then pedal control is returned.

7.8.1 Double Start Backtack

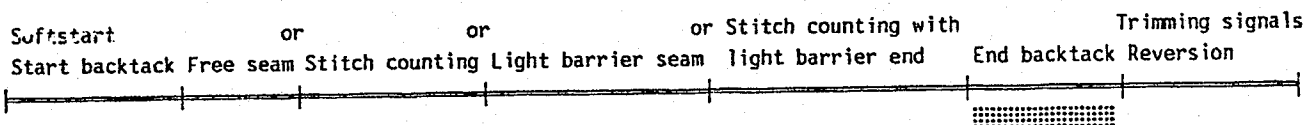
The forward section will be sewn for an adjustable number of stitches. Then, the signal for the stitch regulator will be emitted, and the backward section will be executed. For both sections the number of stitches can be set separately.

With slow backtack mechanisms, for the double start backtack, the stitch regulator can be delayed with a time-lag of t_8 (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 backtack speed	n4	F-113
Last stitch backward on/off	FAr	F-136
Stitch correction time	t9	F-151
Start delay from lifted foot	t3	F-202

The end backtack starts either by heelback, in 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 of the signal is delayed by the time t_3 (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 backtack 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 backtack speed, with the exception of the last stitch, which will be executed at positioning speed n_1 .

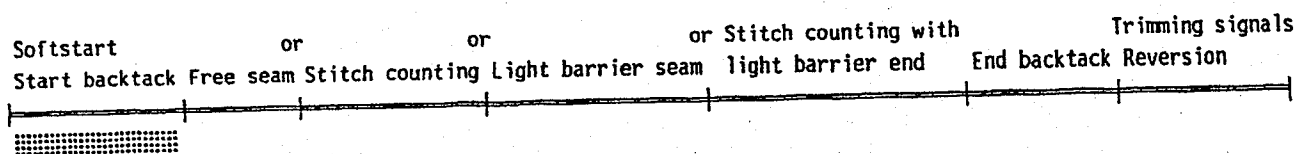
With slow backtack mechanisms, for the double end backtack, the stitch regulator can be delayed with a time-lag of t_9 (end backtack stitch correction).

7.9.2 Single End Backtack

The single end backtack will be executed at end backtack 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 backtack stitches forward	SAv	F-080
Number of ornamental backtack stitches backward	SAr	F-081
Start backtack 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

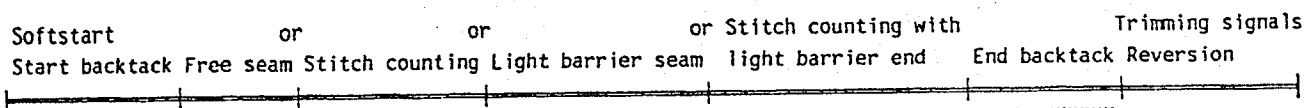
Differences from the standard start backtack:

- 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 = 2

7.11 End Ornamental Backtack



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

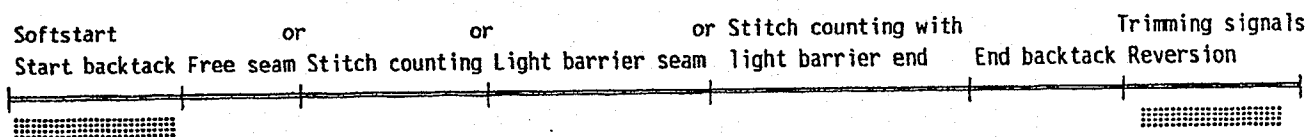
The process corresponds to the normal end backtack. Between the various seam sections the drive stops in position 1 for the ornamental backtack stop time (tSr). The number of stitches of the forward and backward section can be set separately.

Direct access by function key pushbutton 3)

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

7.12 Suppression/Recall of Backtack

■ Effective in standard and ornamental backtack



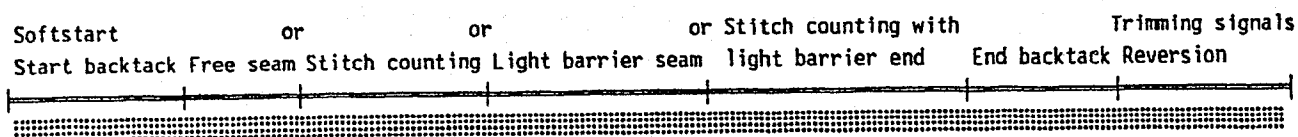
The subsequent backtacking operation can be suppressed or recalled once by pressing the external pushbutton.

When pressing	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.

7.13 Intermediate Backtack

- Works in the standard backtack (F-291) and in the ornamental backtack (F-290).



Functions	Abbreviation on the display	Parameter
Speed limitation for manual ornamental backtack	n9	F-290
Speed limitation for manual backtack	n11	F-291

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

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

7.14 Activation of the Backtack Solenoid

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

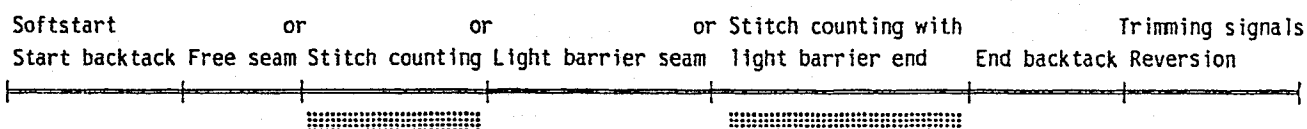


Caution!

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

7.15 Seam with Stitch Counting



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

Speed control for the stitch counting can be selected by the speed mode (F-141).

Mode 0: Execution at pedal controlled speed from n1 to nmax

Mode 1: Execution at fixed speed n12 as long as pedal is pushed forward (stage > = 1)

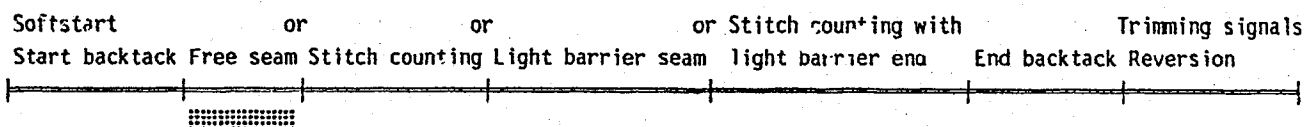
Mode 2: Execution at limited speed n12 as long as pedal is pushed forward (stage > = 1)

Mode 3: Automatic execution at fixed speed as soon as the pedal has been pushed once.

Stop is possible by heelback (-2).

The sewing speed is reduced in each rotation 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.

7.16 Free Seam and Seam with Light Barrier



Functions	Abbreviation on the display	Parameter
Positioning speed	n1	F-110
Upper limit of the maximum speed (nmaxmax)	n2 ⁺	F-111
Limitation of the maximum speed	direct display	setting with DED
Lower limit of the maximum speed (nmaxmin)	n2 ₋	F-121
Automatic/stitch counting speed	n12	F-118
Speed mode Free seam / Seam with light barrier	SFn	F-142

Speed control for the free seam can be selected by the speed mode (F-142).

Mode 0: Execution at pedal controlled speed from n1 to nmax

Mode 1: Execution at fixed speed n12 as long as pedal is pushed forward (stage > = 1)

Mode 2: Execution at limited speed n12 as long as pedal is pushed forward (stage > = 1)

Mode 3: Only for the seam with light barrier:

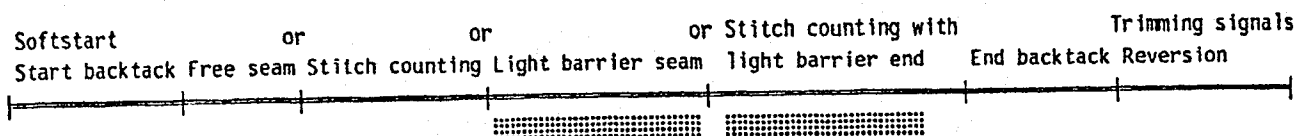
Automatic execution at fixed speed as soon as the pedal has been pushed once.

The seam end is initiated by the light barrier. Stop is possible by heelback (-2).

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 (not if bobbin thread monitor function is on) and after thread trimming (not after power on) and can be changed directly by pushbuttons +/- on the Variocontrol. The setting range is limited by the set values of the parameters F-111 and F-121.

7.17 Light Barrier



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

Functions	Abbreviation on the display	Parameter
Light barrier compensating stitches	LS	F-004
Light barrier compensating stitches with stitch length reduction	LS	F-010
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. If stitch length reduction is switched on the compensating stitch counting is performed with the number of stitches set by parameter F-010.
- Interruption of the process with pedal in position 0 (neutral).
- Disabling of the thread trimming operation by parameter F-133, independent of pushbutton 9 on the Variocontrol. Stop in the basic position.
- Programming of up to 15 light barrier seams with stop in the basic position. After the last light barrier seam, a thread trimming operation will be performed.
- Light barrier sensing end (uncovered) or beginning of fabric (covered), can be selected by parameter F-131.
- Blocking of machine start, when light barrier is uncovered, can be programmed with parameter F-132.

7.17.2 Reflection Light Barrier (V720, V730)

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

Adjustments

Sensitivity:

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 - Address parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
 - By orienting the light barrier over the reflection area the highest possible bargraph level must be reached, then fix light barrier in this position.
- LSM001 - The orientation is facilitated through a visible light spot on the reflection area.

7.17.3 Transmitted Light Barrier (V740)

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

Sensitivity adjustment:

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

Select the sensitivity level:

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

»  ==> When pressing pushbutton "L" once, the adjusted sensitivity level and the adjusted sensitivity will be indicated. Select the next sensitivity level by pressing the pushbutton again.

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

Note

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

Mechanical adjustment of the light barrier sensor

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

7.17.4 Automatic Start by Light Barrier (V730, V740)

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

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

The following conditions must be met:

- Parameter F-132 = on (no sewing start, when light barrier uncovered).
- Parameter F-129 = on (automatic start on).
- Light barrier switched on at the Variocontrol (pushbutton 0).
- The pedal must remain 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 push pedal forward. This safety function is reset, when the pedal does not remain forward after the seam end.

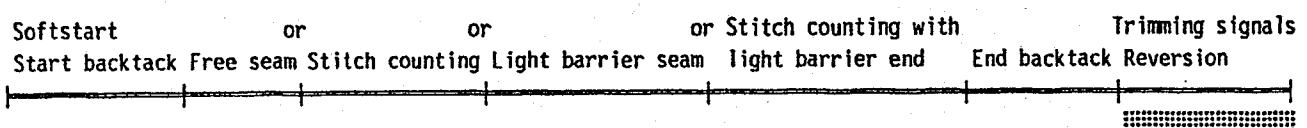
7.17.5 Light Barrier Filter for Knitted Fabrics

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

The filter prevents premature triggering of the light barrier function, when sewing knitted fabrics.

- The filter can be switched on or off by parameter F-130.
- The mesh will be adapted by changing the number of filter stitches.

7.18 Thread Trimmer/Thread Tension Release



Functions	Abbreviation on the display	Parameter
Thread trimmer on/off		Pushbutton-9
Trimming stitch backward	FAr	F-136
Stop time for the thread trimmer	tFA	F-086
Activation angle of the thread trimmer	iFA	F-190
Switch-off delay of the thread tension release	FSA	F-191
Activation delay of the thread tension release	FSE	F-192

The function "thread trimming" can be switched on by pushbutton 9 on the Variocontrol.

If the function "trimming stitch backward" (F-136 = on) is switched on the backtack solenoid for the single final backtack remains connected until the machine stops in position 2.

7.19 Reversion

Softstart or or or Stitch counting with Trimming signals
Start backtack Free seam Stitch counting Light barrier seam light barrier end End backtack Reversion

Functions	Abbreviation on the display	Parameter
Reversion on/off		Pushbutton 9
Positioning speed	n1	F-110
Number of reversion increments	InP	F-183
Activation delay of reversion	drd	F-181
Reversion on/off	Frd	F-182

The function "reversion" is performed after trimming.

When the stop position is reached, the drive stops for as long as the activation of reversion is delayed (F-182).

Then it reverses at positioning speed for a number of increments that can be set.

1 increment corresponds to approx. 0.7°.

7.20 Bobbin Thread Monitor

Softstart or or or Stitch counting with Trimming signals
Start backtack Free seam Stitch counting Light barrier seam light barrier end End backtack Reversion

Functions	Abbreviation on the display	Parameter
Number of stitches of the bobbin thread monitor stitch counting	cFW	F-084
Stop after the bobbin thread monitor stitch counting	SFW	F-085
Bobbin thread monitor on/off	rFW	F-195

If the function bobbin thread monitor is on (F-195 = on) the type of control and the set maximum speed is shown on the display for 1 sec. after power on.

4300 DA82GV	==> Speed n _{max} ==> Type of control
----------------	---

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

0250 -- --	==> Number of stitches of the bobbin thread monitor stitch counting (e.g. 250) ==> Status display
----------------	--

At that time (after power on), the number stitches can be set in increments of 10 by the +/- pushbuttons. The functions DED and HIT become available only after the first sewing start and/or trimming.

7.20.1 Adjustment of the Bobbin Thread Monitor

Adjustment of the bobbin thread monitor is possible after power on.

Left bobbin:

A signal at the bobbin thread monitor input of the control with a frequency of $\leq 3\text{Hz}$ signalizes that the left bobbin is empty. The left horizontal bar of the symbol on the display blinks.

Right bobbin:

A signal at the bobbin thread monitor input of the control with a frequency of $\geq 3.5\text{Hz} \leq 6\text{Hz}$ signalizes that the right bobbin is empty. The right horizontal bar of the symbol on the display blinks.

Left and right bobbin:

A signal at the bobbin thread monitor input of the control with a frequency of $> 6\text{Hz} < 12\text{Hz}$ signalizes that both bobbins are empty. Both horizontal bars of the symbol on the display blink.

During 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 switched on for 1 ms, and the sensitivity is switched to 100 %.

7.20.2 Bobbin Empty - No Stop

F-085 = off

A signal at the bobbin thread monitor input of the control causes the symbol of the bobbin and the corresponding LEDs (left, right or both) to blink on the display.

The display remains even if the input signal is no longer emitted.

Sewing is possible without restrictions.

After trimming, also when controlled by light barrier, the presser foot will only be lifted after the pedal has been in position 0 (neutral).

This is an indication for the operator to replace the bobbin.

The displays go off when restarting to sew after trimming and replacing the bobbin.

7.20.3 Bobbin Empty - With Stop

F-085 = on

A signal at the bobbin thread monitor input of the control starts the bobbin thread monitor stitch counting and causes the symbol of the bobbin and the corresponding LEDs (left, right or both) to blink on the display.

The display remains even if the input signal is no longer emitted.

The start backtack will be completed before the drive stops.

The end backtack will be completed, and the seam end will be executed.

The seam with stitch counting or light barrier seam are interrupted, but can be completed or stopped by pedal control.

The presser foot cannot be lifted unless the pedal has been in position 0 (neutral).

This is a further indication for the operator to replace the bobbin.

The displays go off when restarting to sew after trimming and replacing the bobbin.

7.21 Presser Foot Lifting

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

Presser foot is lifted:

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

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

Holding power of the lifted foot:

The presser foot is lifted by full power. Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.

The duration of full power is set by F-203, the holding power at partial power by F-204.



Caution!

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

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

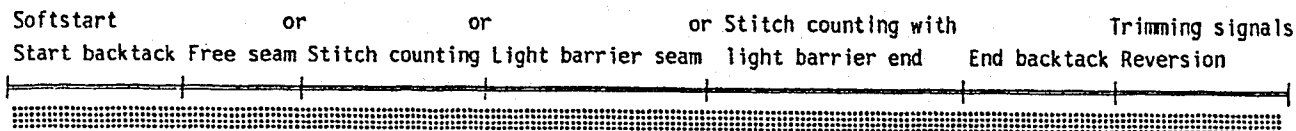
Foot lowers:

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

The start is delayed until the foot has securely lowered.

- delay time adjustable F-202

7.22 Reduction of the Presser Foot Pressure



Functions	Abbreviation on the display	Parameter
Reduction of the presser foot pressure with speed limitation 1 = DB2000 2 = DB3000	Mfd	F-146

The presser foot pressure consists of a basic value generated by spring power and a value generated pneumatically.

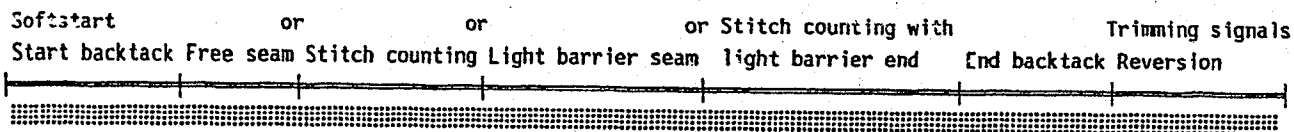
After power on, the presser foot always works with full pressure.

The presser foot pressure can be reduced by pressing a pushbutton. The output presser foot pressure is switched off. It is switched on, when pressing the pushbutton again.

The reduced presser foot pressure is indicated by a light emitting diode.

When the presser foot pressure is reduced, the speed is limited depending on parameter F-146.

7.23 Reduction of the Thread Tension



Functions	Abbreviation on the display	Parameter
Function of the pushbutton on B3/3 1 = reduction of the thread tension 2 = backtack suppression/recall	Fc3	F-147
Function of the pushbutton on B3/6 1 = high lift walking 2 = reduction of the thread tension	Fc6	F-149

The thread tension can be reduced by pressing a pushbutton connected to B3/3 or to B3/6 depending on how parameters F-147 and F-149 are programmed.

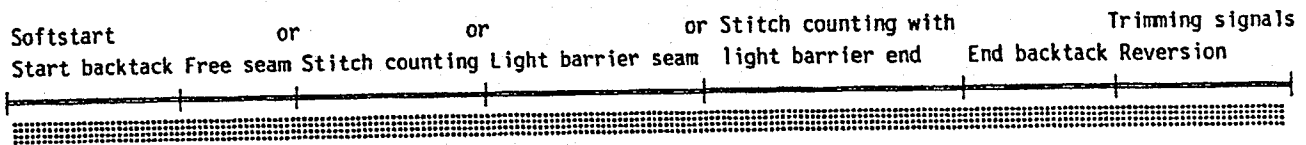
The reduction of the thread tension is indicated by a light emitting diode.

7.24 Blocking of Machine Run (Safety Switch)



Caution!

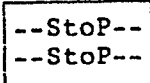
This is not a safety function.
The line voltage must still be switched off during maintenance and repair work.



Functions	Abbreviation on the display	Parameter
Restarting to sew after blocking of machine run on = only if pedal is in neutral position off = immediate start	Pd0	F-281
Functioning of the switch for blocking of machine run 0 = make contact (N.O.) 1 = break contact (N.C.)	LOS	F-282
Function blocking of machine run 0 = function off 1 = blockage 1, without positioning 2 = blockage 2, with positioning	LSP	F-283

Display after activating the blocking of machine run:

Symbol



blinking alternately !

7.24.1 Variants of the Function Blocking of Machine Run

In all variants of the function blocking of machine run presser foot lifting is possible, needle up/down (and/or its variants), however, is not.

Blocking of machine start

If the input blocking of machine run is activated at machine standstill the run of the drive is blocked despite pushing the pedal. Machine start is only possible after deactivating the input.

Blockage 1 and 2

	Blockage 1	Blockage 2
In the start backtack	- Stop unpositioned - Trimming not possible - Continue or complete seam after deactivation	- Trimming with activated blocking of machine run possible, also with backtack - New start of the seam after deactivation - Correction seam - if the thread has not been trimmed

In the free seam	- Stop unpositioned - Trimming not possible - Continue or complete seam after deactivation	- Trimming with activated blocking of machine run possible, also with backtack - New start of the seam after deactivation - Correction seam - if the thread has not been trimmed
In stitch counting	- Stop unpositioned - Trimming not possible - Continue or complete stitch counting with seam end after deactivation	- Trimming with activated blocking of machine run possible, also with backtack - New start of the seam after deactivation - Correction seam - if the thread has not been trimmed
In the light barrier compensating stitch counting	- Stop unpositioned - Trimming not possible - Continue or complete light barrier compensating stitch counting with seam end after deactivation	- Trimming with activated blocking of machine run possible, also with backtack - New start of the seam after deactivation - Continue compensating stitch counting with seam end - if the thread has not been trimmed
In the end backtack	- Stop unpositioned - Trimming not possible - New start of the seam after deactivation	- The seam end is performed completely

7.25 Needle Up/Down; Single Stitch

The function needle up/down and/or single stitch can be activated by pushbuttons on two different inputs. The modes for both inputs can be programmed separately.

Mode for the pushbutton connected to connector ST2/6

Functions	Abbreviation on the display	Parameter
Needle up / down; single stitch 1 = Needle up 2 = Needle up/down 3 = Single stitch 4 = Single stitch with stitch length reduction	nh1	F-140

Mode for the pushbutton connected to connector B3/2

Functions	Abbreviation on the display	Parameter
Needle up / down; single stitch 1 = Needle up 2 = Needle up/down 3 = Single stitch 4 = Single stitch with stitch length reduction	nh2	F-144

Needle up: F-140/144 = 1

When the pushbutton is pressed, the drive runs from position 1 to position 2.

If the drive is outside of the slot between the two positions it does not move for safety reasons.

This function is blocked after power on.

Needle up/down: F-140/144 = 2

When the pushbutton is pressed, the drive runs from position 1 to position 2 and/or from position 2 to position 1.

If it is outside of the slot between position 1 and 1A and/or position 2 and 2A it runs to the next possible position.

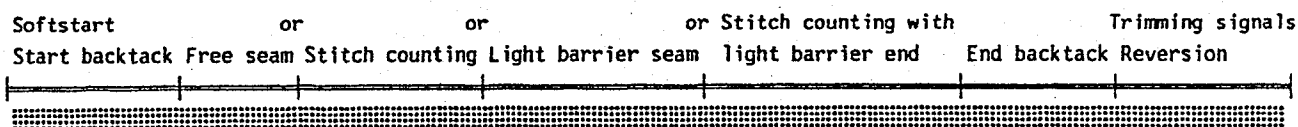
This function is blocked after power on.

Single stitch: F-140/144 = 3

When the pushbutton is pressed, the machine performs one rotation from position 1 to position 1.

Single stitch with stitch length reduction: F-140/144 = 4

When the pushbutton is pressed, the machine performs one rotation from position 1 to position 1. The output for stitch length reduction and the corresponding light emitting diode are switched on at the same time.

7.26 Needle Cooling/Under-Edge Trimmer

Functions	Abbreviation on the display	Parameter
Switch-off delay of needle cooling after stop	dnk	F-184
Needle cooling/under-edge trimmer	Fnk	F-185

Whether the available output will be used for the function needle cooling or under-edge trimmer can be selected by parameter F-185.

7.26.1 Needle Cooling

Needle cooling is switched on during the entire sewing operation. Switching off after the stop can be delayed by the time "prolongation of needle cooling after stop".

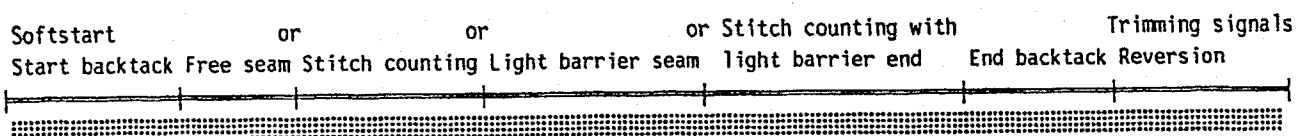
Direct access by function key (pushbutton 3)

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

7.26.2 Under-Edge Trimmer

The under-edge trimmer is switched on during the entire sewing operation.

7.27 High Lift Walking



Functions	Abbreviation on the display	Parameter
High lift walking speed	n10	F-117
High lift walking operation mode stored = on/not stored = off	hPr	F-138
Function of the pushbutton on B3/6	Fc6	F-149
1 = High lift walking		
2 = Reduction of thread tension		
Run-out time of the high lift walking speed after switching off high lift walking	thP	F-152
Minimum number of stitches in high lift walking	chP	F-184

3 operation modes are possible for the function high lift walking: not stored, stored and not stored with minimum number of stitches.

High lift walking operation mode not stored (F-138=off, F-184=0)

When pressing the pushbutton "high lift walking", the output "high lift walking" is switched on depending on the actual speed until the pushbutton is released again. The output is switched off, when pressing the pushbutton again.

High lift walking operation mode stored (F-138=on)

When pressing the pushbutton "high lift walking", the output "high lift walking" is switched on depending on the actual speed until the pushbutton is released again. The output is switched off, when pressing the pushbutton again.

This function is independent of the set minimum number of stitches (F-184).

High lift walking operation mode not stored with minimum number of stitches (F-138=off, F-184=>0)

When pressing the pushbutton "high lift walking", the output "high lift walking" is switched on depending on the actual speed until the pushbutton is released again or until the number of stitches set by parameter F-184 has been executed.

When pressing the pushbutton at machine standstill, high lift walking is switched on and remains on after starting to sew at least for the set minimum number of stitches. Prolongation of the operating time is possible if the pushbutton remains pressed after stitch counting.

When pressing the pushbutton again before starting to sew, the function is switched off. This process can be repeated.

High lift walking dependent on speed

When pressing the pushbutton at machine standstill or during machine run at a lower speed than high lift walking speed, the output is switched on immediately. The maximum speed is 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 before the output is switched on.

After switching off the high lift walking, the speed limitation is cancelled after the run-out time.

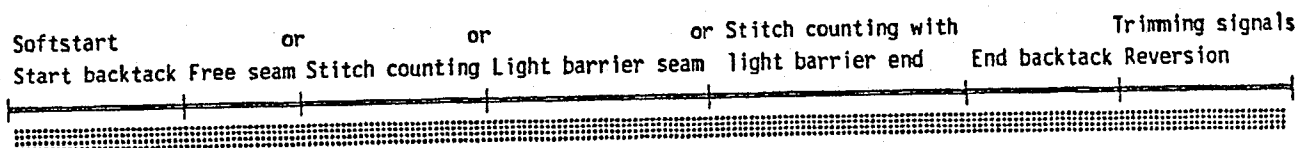
Note

If several speed limitations are activated at the same time the maximum speed is limited to the lower value.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
High lift walking operation mode stored = on/not stored = off	-F-	F-008 = 3

7.28 Speed Limitation Depending on High Lift



Functions	Abbreviation on the display	Parameter
Positioning speed	n1	F-110
Maximum speed	n2	F-111

The maximum speed can be limited depending on the set high lift of the presser foot.

The analog input (ST2/3) is supplied with the voltage resulting from the high lift set by potentiometer (R-N-HP) which functions as voltage divider.

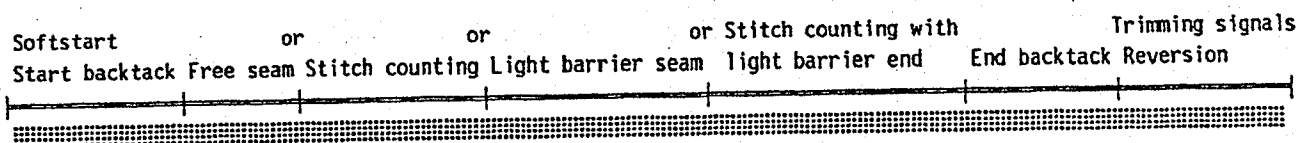
The following speed limitation results from this:

- Minimum high lift = maximum speed (n2)
- Maximum high lift = minimum speed (n1)

Note

If several speed limitations are activated at the same time the maximum speed is limited to the lower value.

7.29 Speed Limitation DB2000/DB3000 (Depending on Stitch Length and/or High Lift)



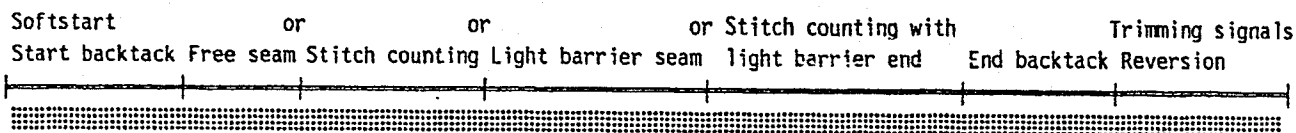
Functions	Abbreviation in display	Parameter
High lift walking speed (DB2000)	n10	F-117
Mode pushbutton speed limitation (DB2000), pushbutton on ST2/9	MnF	F-143
1 = Speed n10 limited		
2 = Speed n10 fixed		
Speed limitation (DB3000)	n11	F-291

The control inputs on ST2/9 (DB2000) and ST2/10 (DB3000) serve for the speed limitation by contacts which are switched mechanically by the high lift and/or the stitch length.
When changing the switching state, the respective speed limitation is delayed by approx. 50 ms and/or is cancelled.
Parameter F-143 determines whether the speed limitation switched on with control input ST2/9 (DB2000) is to function as limited or fixed speed.

Note

If several speed limitations are activated at the same time the maximum speed is limited to the lower value.

7.30 Stitch Length Reduction



Functions	Abbreviation in display	Parameter
Number of light barrier compensating stitches with stitch length reduction	clS	F-010
High lift walking speed (DB2000)	n10	F-117
Stitch length reduction with speed limitation (Pushbutton on ST2/8 and B3/2)	StL	F-145
1 = without speed limitation		
2 = with DB2000		
3 = with DB3000		
Speed limitation (DB3000)	n11	F-291

The stitch length reduction is performed without speed limitation, with DB2000 or DB3000, depending on the setting of parameter F-145.

On the operator level, a different number of compensating stitches is set by F-010 for light barrier seams in order to adapt the different stitch length.

7.31 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

7.32 Signal Output Impulses (G1)

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

7.33 Actuator EB301 and EB302

With the help of the actuator connected with the pedal the commands for the sewing operation are inputted. Instead of the external actuator connected to the socket connector B80 (see chapter "Socket Connectors") another external actuator can be connected.

The actuator EB302 has softer springs than the EB301. This means that a lower actuating force will be needed.

Table: Coding of the pedal steps

Pedal step	D	C	B	A	
-2	H	H	L	L	Full heelback
-1	H	H	H	L	Slight heelback
0	H	H	H	H	Pedal in position 0 (neutral)
$\frac{1}{2}$	H	H	L	H	Pedal slightly forward
1	H	L	L	H	Speed stage 1
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)

(e.g. initiating the seam end)

(e.g. presser foot lifting)

(e.g. presser foot lowering)

(n_{pos})

(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 modified by using this parameter.

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	br1	F-207
Braking effect when modifying the preset value ≥ 5 stages	br2	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 is 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.

8.4 Setting of 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 = Thread lever just before the bottom dead center, in the direction of rotation of the motor shaft. Corresponds to position D on the handwheel.

Note:

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

Programming:

- 1.) Address F-170. ==> LED pushbutton 3 blinks
- 2.) Press pushbutton 3 briefly ==>

PoSition
0]
- 3.) Turn handwheel until desired 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:

INFO A3

- Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (needle behind bottom dead center, initiate trimming)	Pos1
Position 2 (thread lever before upper dead center, end of trimming)	Pos2
Position 1A (internal switching point (within the program))	Pos1A
Position 2A (internal switching point (within the program))	Pos2A
Position 3 (not used)	Pos3
Position 3A (not used)	Pos3A

Programming:

1. Address F-171 ==> LED pushbutton 3 blinks!
2. Press pushbutton 3
Set position 1 ==>

Position	1	xxx
----------	---	-----

 Value xxx can be modified by pushbutton +/- or by turning the handwheel!
3. Press pushbutton E
Set position 1A ==>

Position	1A	xxx
----------	----	-----
4. Press pushbutton E
Set position 2 ==>

Position	2	xxx
----------	---	-----
5. Press pushbutton E
Set position 2A ==>

Position	2A	xxx
----------	----	-----
6. Press pushbutton E
Position does not have to be set ! ==>

Position	3	000
----------	---	-----
7. Press pushbutton E
Position does not have to be set ! ==>

Position	3A	000
----------	----	-----
8. Press pushbutton E ==> Back to step 2!
9. Press 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 corresponds 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.

- Address parameter F-172
- Turn handwheel corresponding to the direction of rotation of the motor
 - LED Taste-1 on - corresponds to position 1
 - LED Taste-1 turns off - corresponds to position 1A
 - LED Taste-2 on - corresponds to position 2
 - LED Taste-2 turns off - corresponds to position 2A

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

9. 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 Scams - Teach-in")

9.1 Preparation for Memory Box Operation



Caution! - Turn power off

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

9.2 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 completed.
 - The formatting can also be used to erase all data on the Memory Card.

9.3 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 Scams (Teach-in)" off == > pushbutton 2
3. » Save data

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

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

SAvE
0--9

- 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.

SAvE
|||||

- Display after the storing is terminated

3500
DA82GV

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

Possibility no. 1:

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

rEAd
0--9

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

Attention:

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

Possibility no. 2:

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

SAvE
0--9

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

rEAd
0--9

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

- The yellow BUSY-LED on the Memory Box lights up.

rEAd
|||||

- Display after saving the program.

3500
DA82GV

Attention:

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.
- Program 1 is always automatically selected.
- Reading-in is only possible if power is turned on with pedal fully forward.
- Alternating between saving and reading:
 - Heel pedal back twice in short intervals = saving
 - 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.

InFo Cxx

"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 saving 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.

dEU USA
ESP FrA

10. 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
Info A6	Stitches light barrier control have been executed

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 saving or reading error
Info C05	Connection interrupted
Info C06	Cannot find data on Memory Card
Info C07	Storage space on Memory Card occupied

11. Signal Test

Functions	Abbreviation on the display	Parameter
Test of inputs and outputs	SR4 4_1 4_2 4_3	F-173

Test of 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 the outputs

Pushbutton	Output SR4
1	Backtacking
2	Presser foot lifting
3	Thread trimmer
4	Thread wiper
5	Stitch length reduction
6	Thread tension release
7	Reduction of thread tension
8	Needle cooling/under-edge trimmer
9	not used
0	Switch to 4_1 to check further outputs

Pushbutton	Output 4_1
1	Motor running
2	High lift walking
3	-(ST2/22)
4	LED-single stitch with stitch length reduction
5	LED-stitch length reduction with speed limitation
6	-(ST2/18)
7	LED-high lift limitation
8	LED-bobbin thread monitor right
9	not used
0	Switch to 4_2 to check further outputs

Pushbutton	Output 4_2
1	LED-reduction of presser foot pressure
2	LED-reduction of thread tension / backtack suppression/recall
3	Reduction of presser foot pressure
4	LED-bobbin thread monitor left
5	Flip-flop
6	LED-high lift limitation / reduction of thread tension
7	LED-backtack suppression/recall
8	LED-speed limitation 3000 / intermediate backtack
9	not used
0	Switch to 4_3 to check further outputs

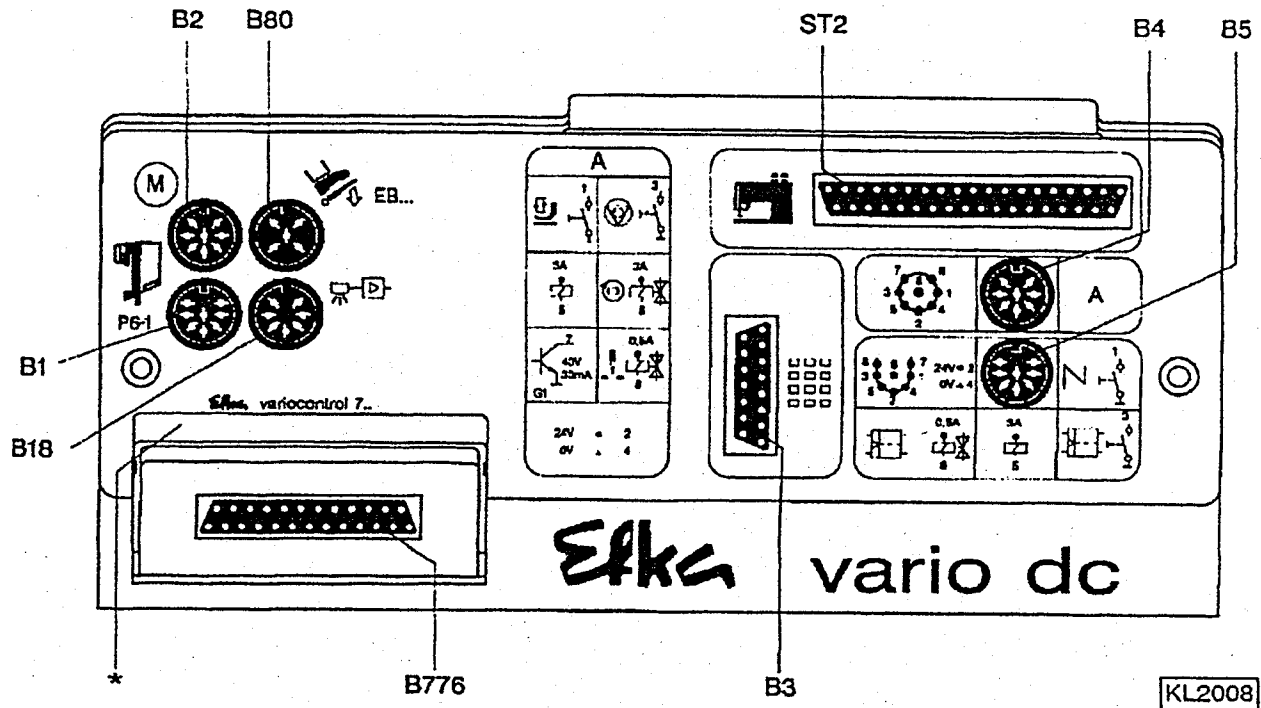
Pushbutton	Output 4_3
1	LED-stitch length reduction
2	-(ST2/17)
3	-(ST2/16)
4	-(ST2/15)
5	not used
6	not used
7	not used
8	not used
9	not used
0	Switch to SR4 to check further outputs

Test of inputs:

- The 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.

12. Socket Connectors

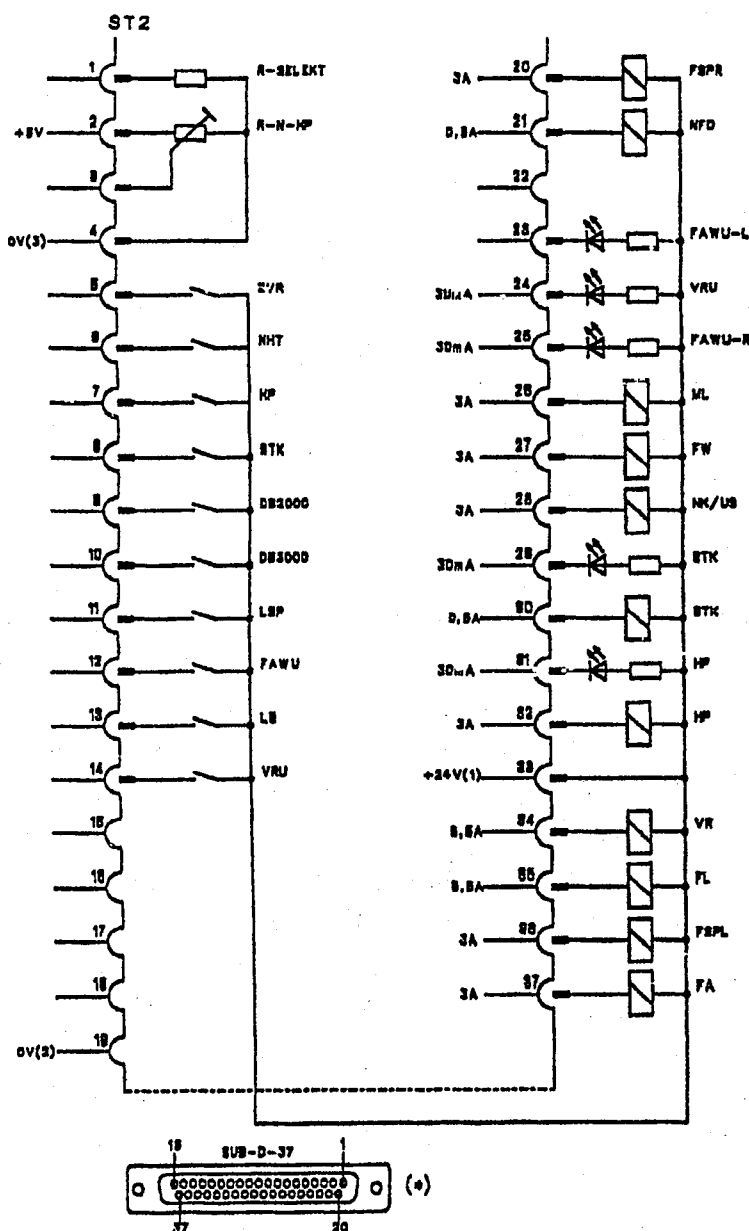
12.1 Position in the Control



- B1 - Positions transmitter
- B2 - Commutation transmitter for DC motor
- B3 - Pushbuttons and light emitting diodes
- B4 - Inputs and outputs
- B5 - Inputs and outputs
- B18 - Light barrier module
- B80 - External actuator
- B776 - Control panel Variocontrol
- ST2 - Inputs and outputs

*) Type designation

12.2 Connection Diagram



B1077

DB2000
DB3000
FA
FAWU-L
FAWU-R
FL
FSPL
FSPR
FW
HP
LS
LSP

- Speed limitation 2000 RPM
- Speed limitation 3000 RPM
- Thread trimmer
- Bobbin thread monitor bottom left
- Bobbin thread monitor bottom right
- Presser foot lifting
- Thread tension release
- Reduction of thread tension
- Thread wiper
- High lift limitation
- Light barrier
- Blocking of machine run

ML
NFD
NHT
NK/US
R-N-HP

R-SELEKT
STK
VR
VRU
ZVR

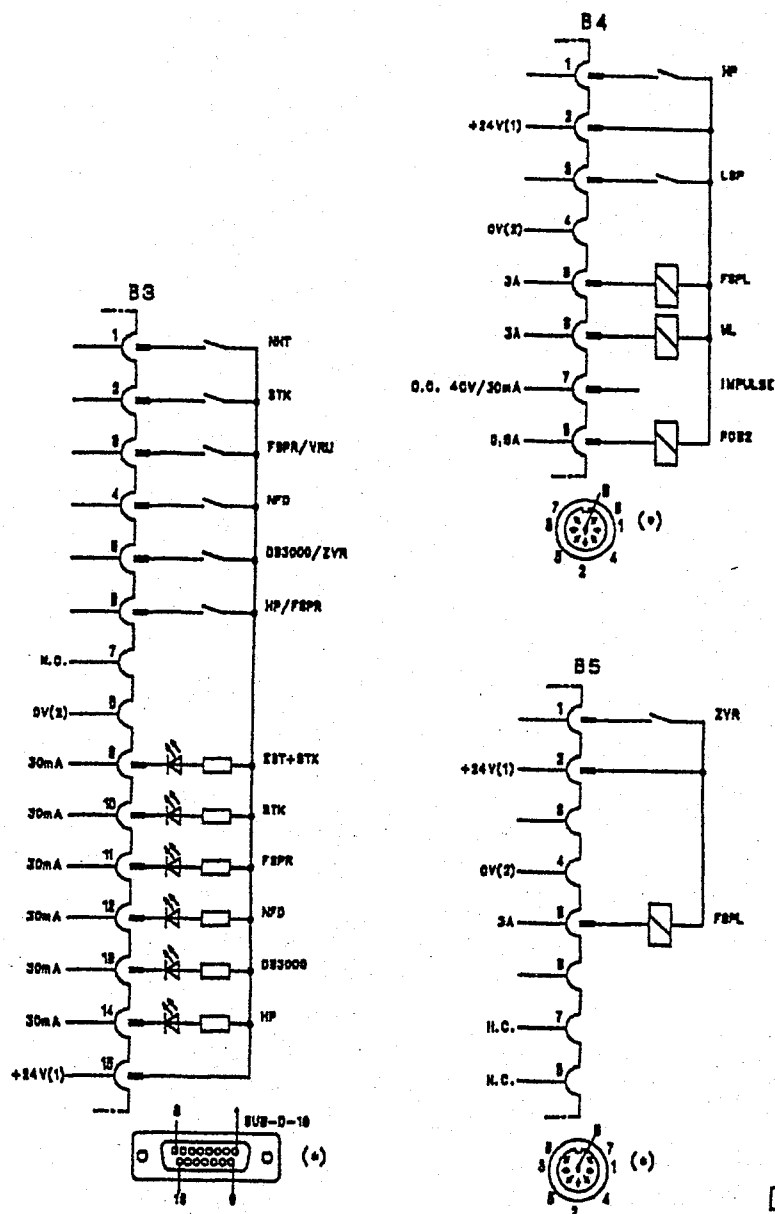
- Motor running
- Presser foot pressure
- Needle up/down
- Needle cooling / under-edge trimmer
- Set value potentiometer for speed limitation depending on high lift
- Resistor for machine select
- Stitch length reduction
- Backtacking
- Backtack suppression/recall
- Intermediate backtack

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

2) 0V connection of the load electric circuit

3) 0V connection of the logical electric circuit

*) Front view of the socket and/or rear view of the plug



DB3000
EST + STK

- Speed limitation 3000 RPM
- Single stitch with stitch length reduction

FSPL
FSPR

- Thread tension release
- Reduction of thread tension

HP
IMPULSE

- High lift limitation
- Speedometer impulses (512/rotation)

LSP

- Blocking of machine run

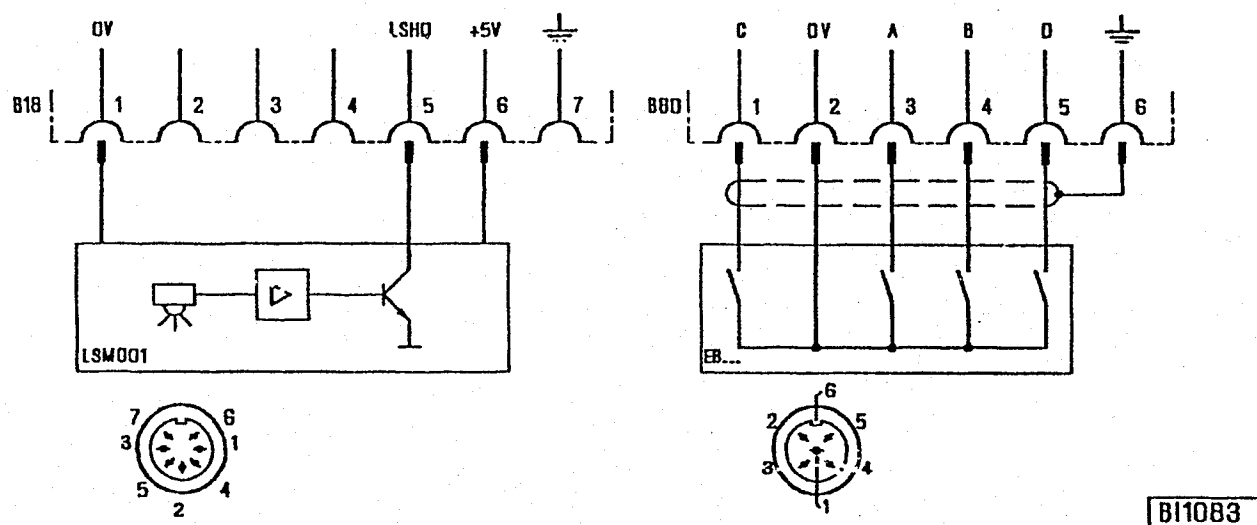
ML
NFD
NHT
POS2
STK
VR
VRU
ZVR

- Motor running
- Presser foot pressure
- Needle up/down
- Position 2
- Stitch length reduction
- Backtacking
- Backtack suppression/recall
- Intermediate backtack

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

2) 0V connection of the load electric circuit

*) Front view of the socket and/or rear view of the plug

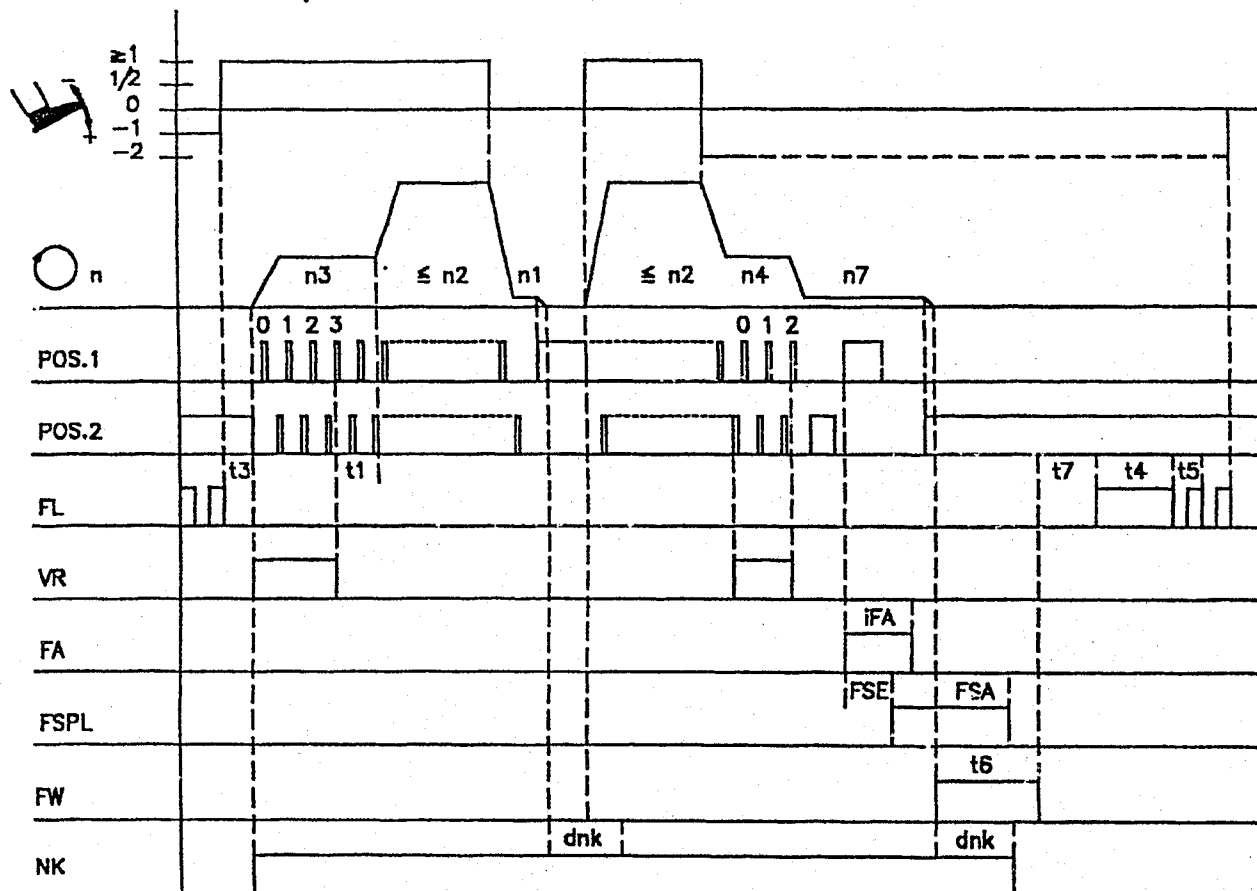


LSHQ - Light barrier command (identified if switched to 0V)

LSM001 - Reflection light barrier module

EB... - External actuator

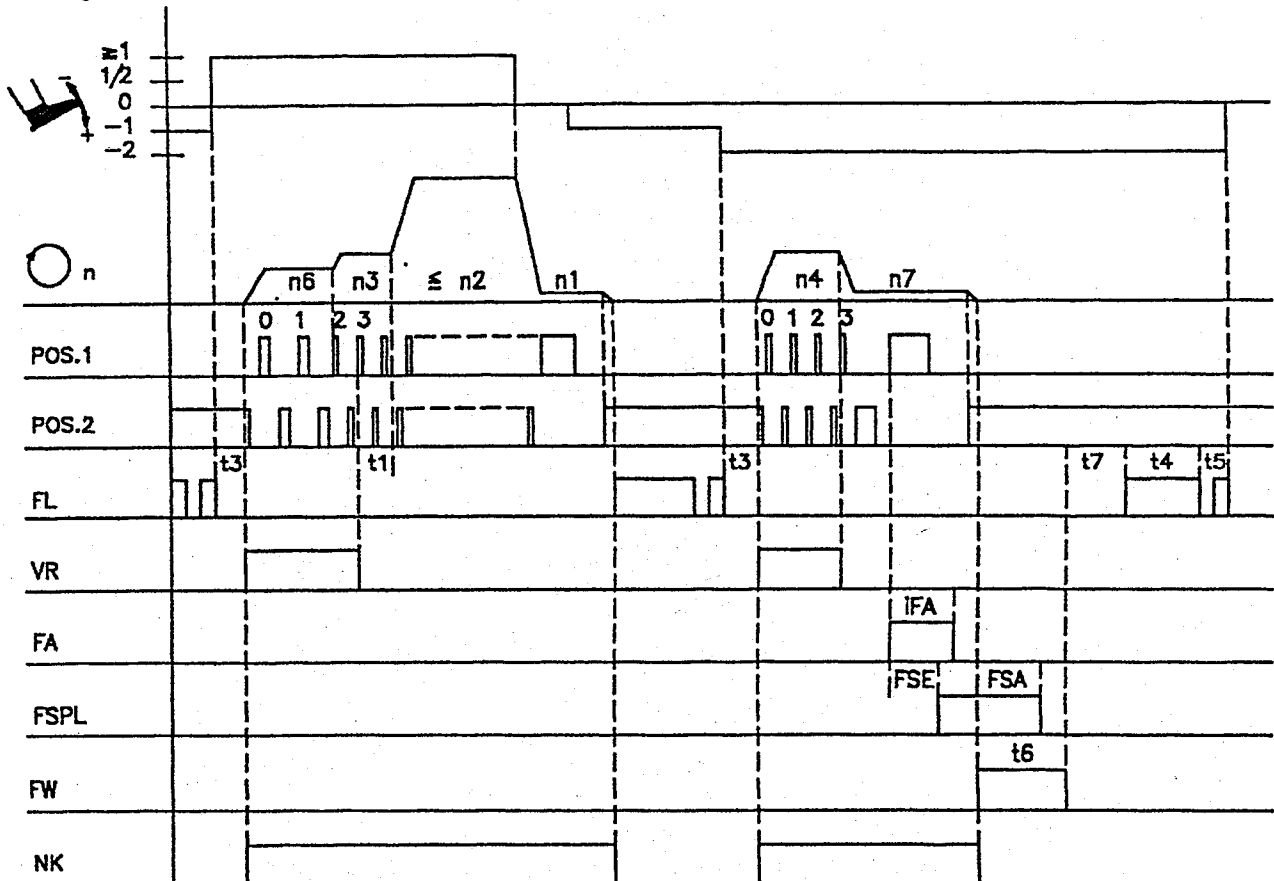
Run with intermediate stop



0214/LAUFZW

Abbreviation	Function	Parameter/Pushbutton
	Single start backtack Single end backtack	on Pushbutton 7 on Pushbutton 8
n1 n2 n3 n4 n7	Positioning speed Maximum speed Start backtack speed End backtack speed Trimming speed	F-110 F-111 F-112 F-113 F-116
dnk iFA FSA FSE t1 t3 t4 t5 t6 t7	Switch-off delay needle cooling after stop Activation angle thread trimmer Switch-off delay thread tension release Activation delay thread tension release Delay speed release after start backtack Start delay from lifted foot Full power of presser foot lifting Holding power of presser foot lifting Operating time thread wiper Delay time of presser foot lifting after thread wiping	F-183 F-190 F-191 F-192 F-200 F-202 F-203 F-204 F-205 F-206

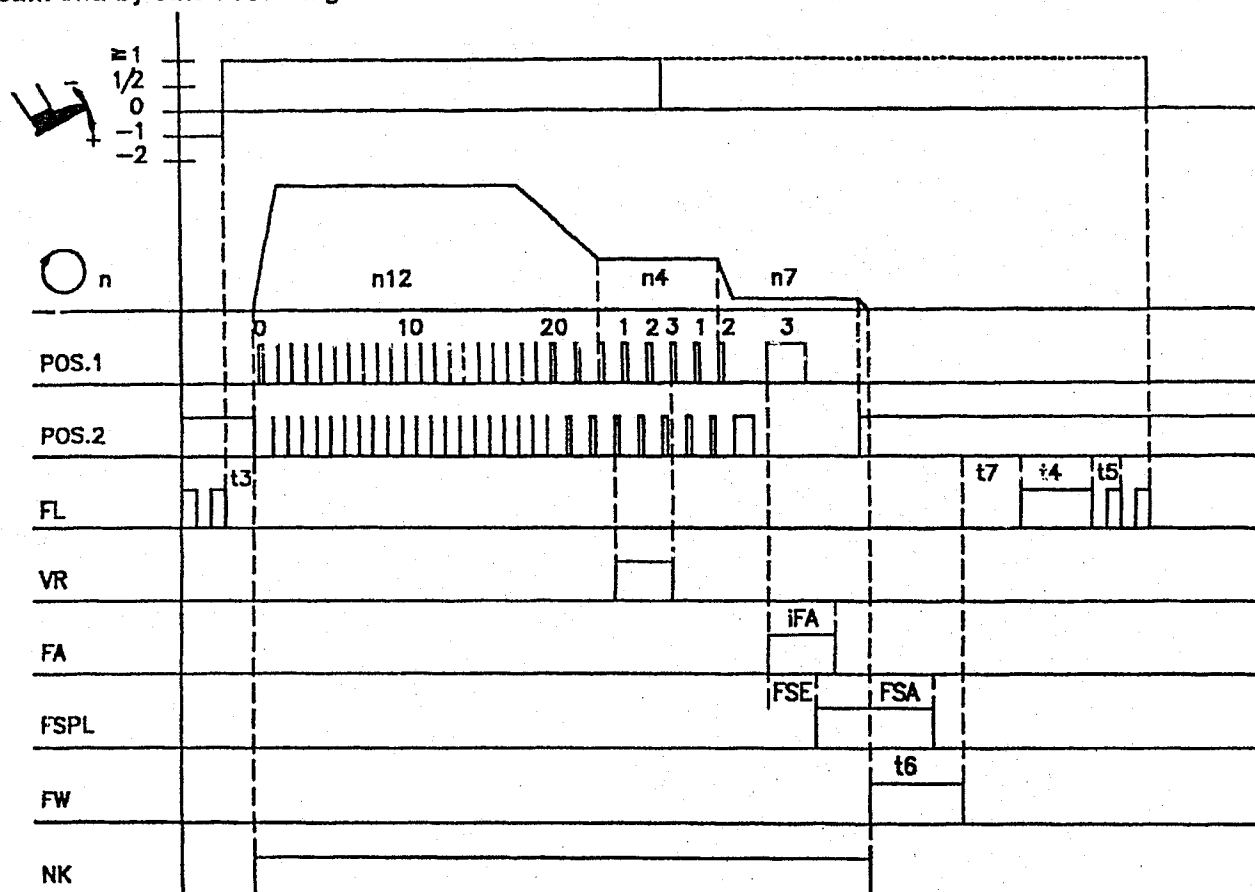
Trimming from intermediate stop



0214/FAZW

Abbreviation	Function	Parameter/Pushbutton
	Softstart Basic position 2 Single start backtack Single end backtack	on on on on F-134 Pushbutton 4 Pushbutton 7 Pushbutton 8
n1	Positioning speed	F-110
n2	Maximum speed	F-111
n3	Start backtack speed	F-112
n4	End backtack speed	F-113
n6	Softstart speed	F-115
n7	Trimming speed	F-116
IFA	Activation angle thread trimmer	F-190
FSA	Switch-off delay thread tension release	F-191
FSE	Activation delay thread tension release	F-192
t1	Delay speed release after start backtack	F-200
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Holding power of presser foot lifting	F-204
t6	Operating time thread wiper	F-205
t7	Delay time of presser foot lifting after thread wiping	F-206

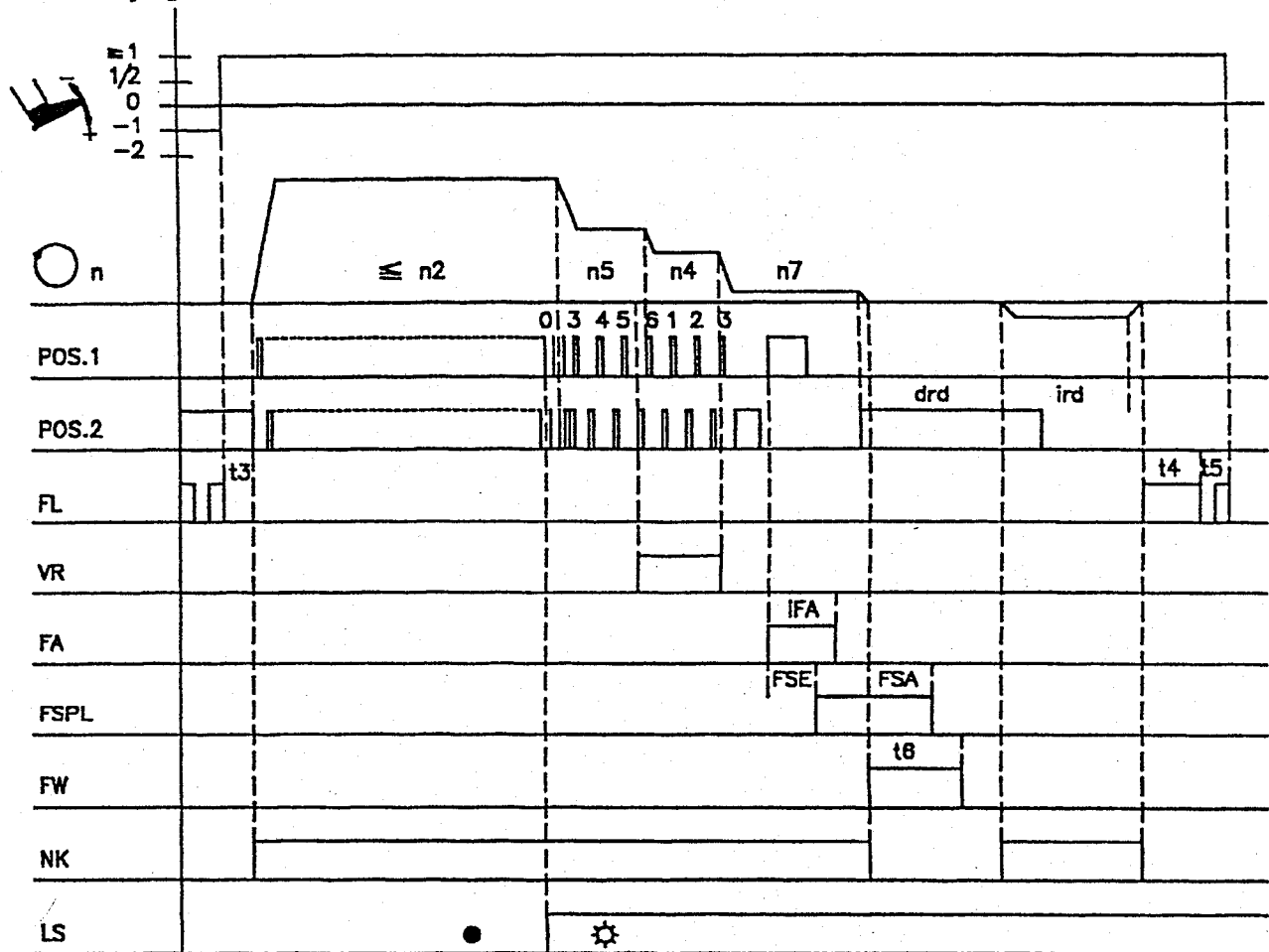
Seam end by stitch counting



0214/ENDEZAE

Abbreviation	Function	Parameter/Pushbutton
	Stitch counting Double end backtack	on on Pushbutton 1 Pushbutton 8
n4 n7 n12	End backtack speed Trimming speed Stitch counting speed	F-113 F-116 F-118
iFA FSA FSE t1 t3 t4 t5 t6 t7	Activation angle thread trimmer Switch-off delay thread tension release Activation delay thread tension release Delay speed release after start backtack Start delay from lifted foot Full power of presser foot lifting Holding power of presser foot lifting Operating time thread wiper Delay time of presser foot lifting after thread wiping	F-190 F-191 F-192 F-200 F-202 F-203 F-204 F-205 F-206

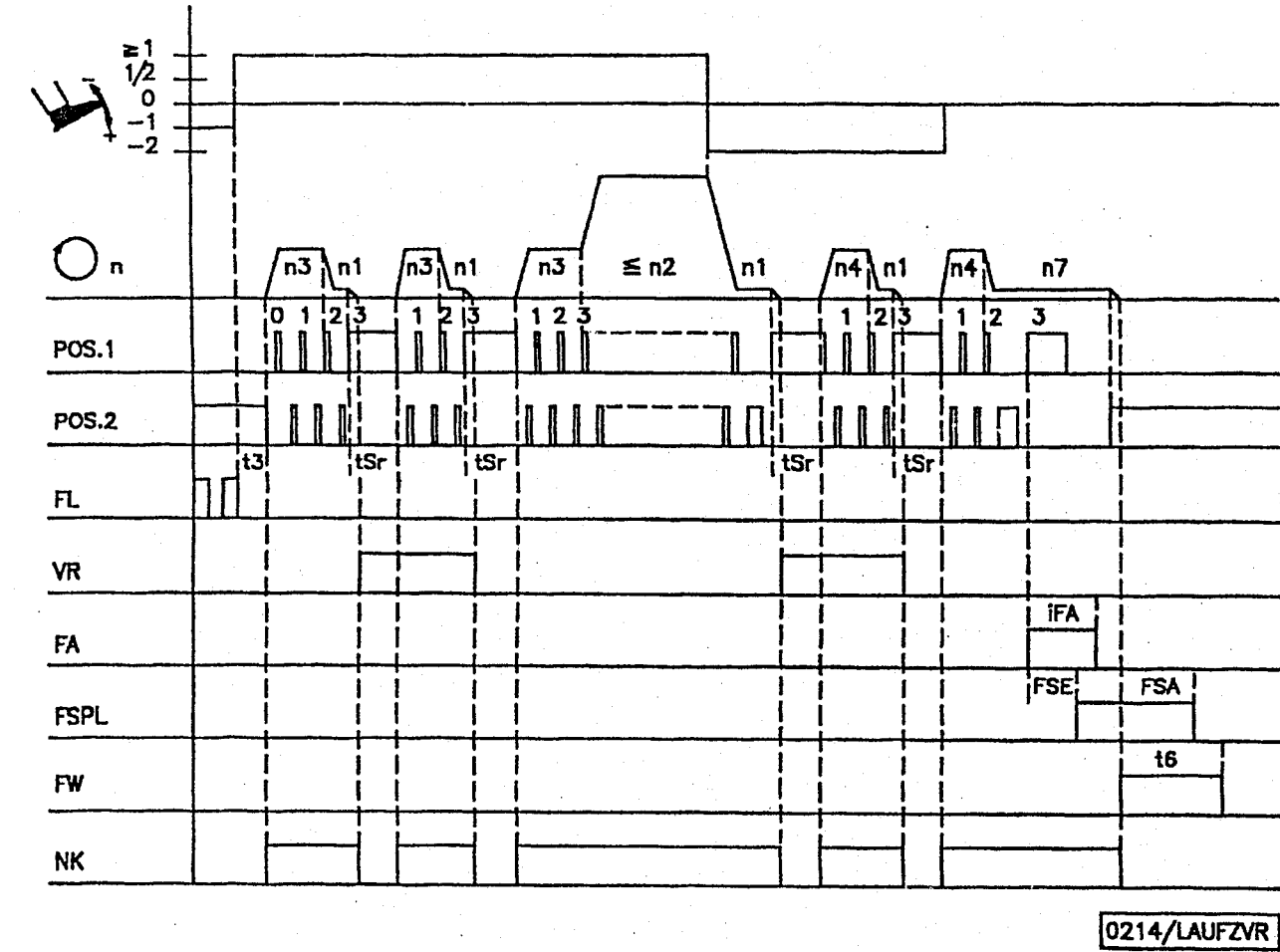
Seam end by light barrier



0214/ENEELS

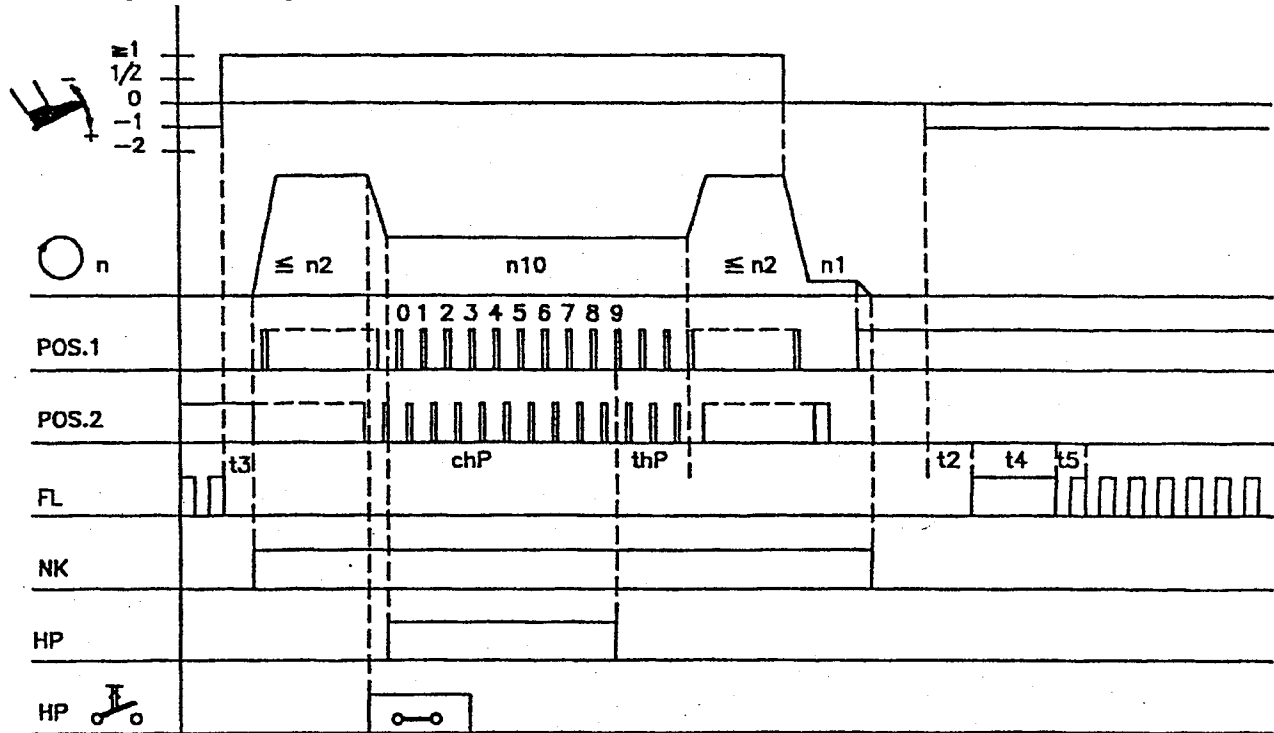
Abbreviation	Function	Parameter/Pushbutton
Frd	Single end backtick	on Pushbutton 8
	Light barrier covered/uncovered	on F-131
	Reversion	on F-182
n2	Maximum speed	F-111
n4	End backtick speed	F-113
n5	Speed after light barrier end sensing	F-114
n7	Trimming speed	F-116
ird	Number of reversion increments	F-180
drd	Activation delay reversion	F-181
iFA	Activation angle thread trimmer	F-190
FSA	Switch-off delay thread tension release	F-191
FSE	Activation delay thread tension release	F-192
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Holding power of presser foot lifting	F-204
t6	Operating time thread wiper	F-205

Run with ornamental backtack



Abbreviation	Function	Parameter/Pushbutton
SrS	Ornamental backtack Presser foot lifting stored after thread trimming	on on F-135 Pushbutton 6
n1 n2 n3 n4 n7	Positioning speed Maximum speed Start backtack speed End backtack speed Trimming speed	F-110 F-111 F-112 F-113 F-116
iFA FSA FSE t3 t6 tSr	Activation angle thread trimmer Switch-off delay thread tension release Activation delay thread tension release Start delay from lifted foot Operating time thread wiper Stop time for ornamental backtack	F-190 F-191 F-192 F-202 F-205 F-210

Run with high lift walking



0214/LAUFHUB

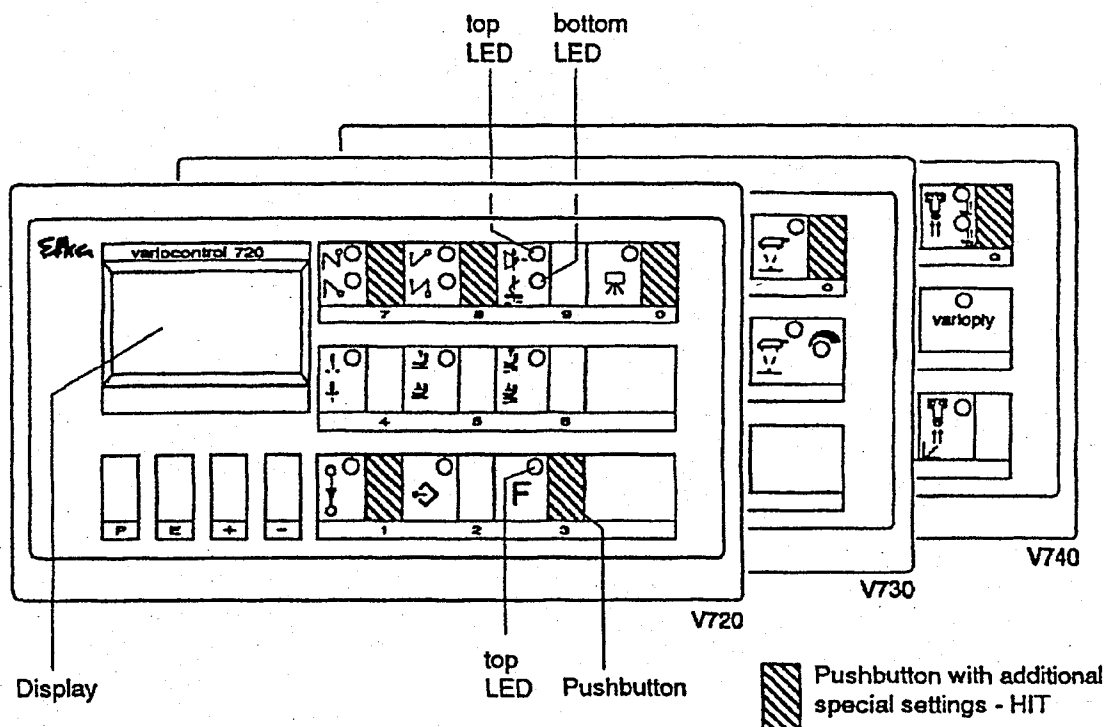
Abbreviation	Function	Parameter/Pushbutton
hP	High lift walking	on
MhP	High lift walking stored	2
n1	Positioning speed	F-110
n2	Maximum speed	F-111
n10	High lift walking speed	F-117
thP	Run-out time high lift walking speed	F-152
t2	Delay presser foot lifting with pedal in position -1	F-201
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Holding power of presser foot lifting	F-204

For your notes:

For your notes:

For your notes:

14. Operating Elements of the Variocontrol



KL1961GB

Functional Setting of the Pushbuttons

- Pushbutton P = Recall or exit of programming mode
- Pushbutton E = Enter button for modifications in the programming mode
- Pushbutton + = Increase of the value indicated in the programming mode
- Pushbutton - = Decrease of the value indicated in the programming mode
- Pushbutton 1 = Stitch counting ON / OFF
- Pushbutton 2 = Teach-in / execution of 40 possible seam sections
- Pushbutton 3 = Function key - programmable
- Pushbutton 4 = Basic position of the needle (bottom/upper dead center) POSITION 1 / POSITION 2
- Pushbutton 5 = Automatic foot lift at stop in the seam ON / OFF
- Pushbutton 6 = Automatic foot lift after thread trimming ON / OFF
- Pushbutton 7 = 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 of programming mode
- Pushbutton E = Enter button for modifications in the programming mode
- Pushbutton + = Increase of the value indicated in the programming mode
- Pushbutton - = Decrease of the value indicated in the programming mode
- Pushbutton 1 = Stitch counting ON / OFF
- Pushbutton 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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