

EFKA vario dc

CONTROL

DA82CV3232

INSTRUCTION MANUAL

No. 402104

english

EFKA
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GMBH & CO KG

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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, position transmitter especially, light barrier, etc., or any other devices mentioned in the instruction manual.
- Only qualified personnel are authorized to work on the electrical components.

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



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



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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	Series
Dürkopp-Adler	Chain stitch machines 170 with thread trimmer / 170 with chain cutter / 170 with tape cutter 190 with thread trimmer

2.1 Use in Accordance with Regulations

The drive is not an independently operating machine, but is designed to be incorporated into other machinery. It must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Directive. (Appendix II, paragraph B of the Directive 89/392//392/EWG and supplement 91/368/EWG).

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

EN 60204-3-1: 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 DA82CV3232
	- Power pack	N153 (optional N155)
	- Actuator	EB301
1	Control panel Variocontrol	V720, V730 oder V740 *1)
1	Position transmitter	P6-1
1	Mains switch	NS105
1	Set of standard accessories	B131
	consisting of:	set of hardware motor mounting 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

Storage unit Memory Box MB001

- part no. 7900052

Storage card Memory Card MC001

- part no. 1111602

Reflection light barrier module Variolux LSM001

- part no. 6100028

Reflection light barrier Variolux LS-001-006

- part no. 6100005

Transmitted light barrier Varioply - transmitter DLS-001

- part no. 6100027

- receiver DLL-...

- available versions see specification Varioply

Solenoid type EM1..(for e.g. presser foot lift, backtacking, etc.)

- available versions see specification "solenoids"

Extension cable for external actuator, approx. 750 mm long, complete with plug and socket connector

- part no. 1111845

Extension cable for external actuator, approx. 1500 mm long, complete with plug and socket connector

- part no. 1111787

5-pin plug with slide index for the connection of another external control

- part no. 0501278

Extension cable for commutation transmitter, approx. 315 mm long, complete with plug and socket connector

- part no. 1111229

Extension cable for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector

- part no. 1111584

Extension cable for motor connection, approx. 400 mm long

- part no. 1111858

Extension cable for motor connection, approx. 1500 mm long

- part no. 1111857

Pulley 40 mm ϕ with special belt intake and slip-off protection (use SPZ belt)

- part no. 1112223

Pulley 50 mm ϕ with special belt intake and slip-off protection (use SPZ belt)

- part no. 1112224

Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug

- part no. 58.0013

Sewing light transformer

- please indicate line voltage and sewing light voltage (6.3V or 12V)

3-pin plug with slide index

- part no. 0500402

6-pin plug with slide index

- part no. 0500703

7-pin plug with slide index

- part no. 0502474

10-pin plug (Hirschmann Mes100)- part no. 0500357

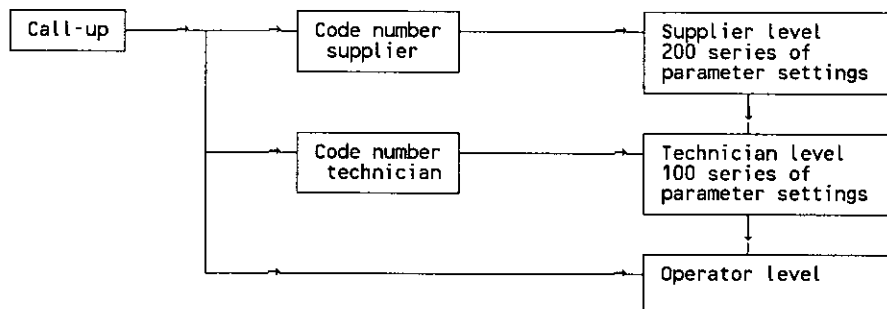
4. Operation

4.1 Access to Programming on Command Input

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

The following persons have access:

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



4.2 Code Number Input

1. TURN POWER OFF

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

3. => **1** => **2** => **3** ==>.. Input CODE NUMBER !
(Example)

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

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

F-XXX = first parameter number in the recalled level

4.3 Direct Operation

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

Example thread trimmer

- Thread trimmer On

top LED9 lights up

I **9**
0

Push button 9 briefly

- Thread trimmer Off

both LED9 off

0 **9**
0

Push button 9 briefly

- Thread trimmer and thread wiper On

both LED9 light up

0 **9**
I

4.4 Input by Parameters on the Operator Level

>> ONLY If CODE NUMBER HAS NOT BEEN INPUTTED <<

1. => ==> LED pushbutton P blinks ! ==>

2. => ==> Display of the first parameter ==>
parameter no. does not appear !

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

3. => => ==> Change parameter value !

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

OR

=> ==> 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.

=> On with step 3 ! <=

=> Call-up after completion of a seam !

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

2. => => => ==>.. Input desired PARAMETER NO.
(Example)

3. => ==> If PARAMETER NUMBER wrong ==>
repeat input !

=> If PARAMETER NUMBER correct ==>

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

4. => => ==> Change parameter value !

5. => ==> PARAMETER VALUE is entered ==>
Display steps to next PARAMETER

OR

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

OR

=> => ==> Press button twice ==>

EXIT PROGRAMMING !

5. Starting Service

5.1 General Instructions

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

Set 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 is 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.

Note:

When putting the control into operation, be sure to remove the jumper "autoselect", if provided in the distributor on the sewing machine head! The machine cannot reach full speed if the jumper is provided.

5.2 Initial Operation (New Motor)

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

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

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

Note:

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

Markings on the position transmitter shaft and on the position transmitter housing have to be aligned, then mount the position transmitter on the sewing machine shaft.

If necessary, set the speeds, parameter F-110...F-118.

If necessary, set the remaining relevant parameters.

Start sewing in order to save the set values.

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

6. Aids for Putting into Operation and for Setting

6.1 Fast Installation Routine (SIR)

SIR offers the possibility to set the most important settings for initial operation by using the menu.

For safety reasons, all selections on the menu must be addressed. Only then, correct setting of all parameters is guaranteed!

The normal parameter settings are not affected.

6.1.1 Putting into Operation by Using SIR

Example:

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

6.1.2 Language Selection of the Multilingual Display

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

=> + ==> Select the desired language ==> dEU USA
ESP FrA

6.1.3 Reference Position

=> E ==> Set the reference position.
Turn position transmitter at least until the marker ([) has disappeared. ==> PoSition
0 [

Note:

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

6.1.4 Position 1

=> E ==> Set position 1.
Turn position transmitter to the desired position. ==> PoSition
1 076

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 the increments
(2 increments correspond to approx. 1.4 °)

6.1.5 Position 2

Set position 2 (switch-off position of the thread trimming solenoid (lockstitch), switch-off position of the thread trimming solenoid (chainstitch))

=> E ==> Turn position transmitter to the desired position. ==> PoSition
2 456

or

=> + ==> - ==> Set the increments

6.1.6 Position 1A

=> E => Set position 1A.
 Turn position transmitter to the desired position. ==> PoSition
1A 126

or

=> + => - => Set the increments

6.1.7 Positioning Speed

=> E => Set the positioning speed ==> Lo SPEEd
n1 0150

or

=> + => - => Change value

6.1.8 Maximum Speed

=> E => Set the maximum speed ==> hi SPEEd
n2^ 3000

=> + => - => Change value

6.1.9 Direction of Rotation

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

=> + => - => Change value

6.1.10 Complete the Fast Installation Routine

=> E => Entry into normal operation after POWER ON. ==> 3000
DA82CV

6.1.11 Multilingual Display

dEU USA ESP FrA		Language selection		
dEU	USA	ESP	FrA	
PoSition 0]	PoSition 0]	PoSicion 0]	PoSition 0]	Reference position
PoSition 1 076	PoSition 1 076	PoSicion 1 076	PoSition 1 076	Position 1
PoSition 2 456	PoSition 2 456	PoSicion 2 456	PoSition 2 456	Position 2
PoSition 1A 126	PoSition 1A 126	PoSicion 1A 126	PoSition 1A 126	Position 1A
niEdriG n1 0150	Lo SPEED n1 0150	vEL bAJA n1 0150	vit rAPi 2A 466	Positioning speed
hoch n2^ 3000	hi SPEED n2^ 3000	vEL ALtA n2^ 3000	vit rAPi n2^ 3000	Maximum speed
drEhri drE 1	rotAtion drE 1	rotAcion drE 1	rotAtion drE 1	Direction of rotation

6.2 Direct Input of Speed (DED)

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

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

Display in the direct mode:

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

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

6.3 Pushbuttons for Background Information (HIT)

(see table on the last page)

For fast operator information the values of the functions are indicated on the display of the Variocontrol for approx. 3 seconds by pressing the pushbuttons 1, 3 7, 8 and 0, when switching on. During this time the respective value can be changed immediately by pushbuttons + and -. The display remains the same during set-up.

If the value of an activated function is to be changed the respective function key must be pressed somewhat longer. The function will thus be turned off and/or switched briefly. Subsequently, the function with the respective value is shown on the display again.

6.3.1 Examples for HIT

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

If stitch counting (pushbutton 1) was turned off.

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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.
Changes are automatically entered after
3 seconds.

+

Press pushbutton +,
number of stitches increases.

Stc 025

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

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

If stitch counting (pushbutton 1) was turned on.

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

1

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

Stc 020

Display:
20 stitches are set.

+

Press pushbutton +,
number of stitches increases.

Stc 025

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

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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. hPr High lift for walking speed operation mode stored/not stored
3. Sht Full stitch with pushbutton needle up-down ON/OFF
4. LSS Sewing start blocked by light barrier uncovered ON/OFF

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

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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- 3

Display:
Actual status (full stitch / needle up-down
ON/OFF)

-

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

-F- 1

Display:
New status (Softstart ON/OFF)

P

Press pushbutton P.

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Setting is completed, 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.

3000
DA82CV

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.

3000
DA82CV

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

With the sewing start the new value is saved.

6.4 Programming Seams (Teach-in)

- A maximum of 8 patterns with a total of 40 seams can be established.
- Programming is possible only if no code number is inputted after switching on!
- Stitch condensing by activating the stitch regulator is programmable in the teach-in mode.
- The functions start stitch condensing, end stitch condensing, stitch counting, thread trimming and presser foot lifting can be assigned individually to each seam.

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

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

6.4.1 Teach-in Mode

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

Display configuration:

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

Programming:

1 =>	P	==> LED pushbutton P blinks	==>	
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 ---

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

6.4.1.1 Seam with Stitch Counting

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

6.4.1.2 Stitch Counting with Stitch Condensing

=> 1 ==> Turning on sewing with stitch ==> 2 01-004
 condensing (display "-" in
 front of the number of stitches).
 Switch to normal stitch length by
 pressing the pushbutton again.

The functions "light barrier seam" and "seam with stitch condensing" block each other, i.e. the light barrier cannot be switched on when the seam with stitch condensing is selected, and vice versa, a seam with stitch condensing is impossible when the light barrier is switched on.

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

6.4.1.3 Stitch Counting and/or Light Barrier

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

Only with V740!

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

Only with V740!

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

With V720/V730/V740!

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

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

After programming of the function ==>

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

=> The seam is entered by pressing the pushbutton E or by heelback.

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

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

Note:

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

Note:

The patterns are permanently saved only after the sewing start.

Detailed Example:

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

Display before programming		==>	XXXX XY82ZV
1. =>	P	==> LED pushbutton P blinks	==>
2. =>	E	==> Display of a parameter on the operator level	==> aaa bbb
3. =>	2	LED pushbutton 2 blinks ==> Pattern 1, seam 1	==> 1 01 ---
4. =>	2	LED pushbutton 2 blinks ==> Pattern 2, seam 1	==> 2 01 ---
5. =>	2	LED pushbutton 2 blinks ==> Pattern 3, seam 1	==> 3 01 ---
6. =>	2	LED pushbutton 2 blinks ==> Pattern 4, seam 1	==> 4 01 ---
7. =>	7	LED bottom pushbutton 7 lights up. Stitch condensing at the start of the seam is switched on.	==> 4 01 ---
8. =>	6	LED pushbutton 6 lights up. Foot lifting at the seam end is switched on.	==> 4 01 ---
9. =>	1	==> Stitch counting is on	==> 4 01 000
10. =>	+ -	Changing the number of stitches by pushbuttons or by using the pedal	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 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 bottom pushbutton 8 lights up. Stitch condensing at the seam end is switched on.	==> 4 03 --- LS 005
18. => 9	* Both LEDs pushbutton 9 light up. Thread trimmer and thread wiper are switched on.	==> 4 03 --- LS 005
19. => E	==> Pattern 4, seam 4 By changing to the next seam the settings of the preceding seams are automatically entered.	==> 4 04 ---
20. => P	==> Programming completed, first seam can be executed.	==> 4 01 017

6.4.2 Max. Number of Seams Exceeded

If the total number of 40 seams is exceeded by inputting a program, for the time being, the teach-in mode cannot be completed by pushbutton P.

A further sewing start is impaired.

The display shows the warning below.

Pressing pushbutton P again causes the deletion of the pattern indicated on the display. The teach-in mode is exited if the total number of 40 seams is not exceeded. Otherwise a new warning will be indicated.

Display:

DELETE
X YY NN

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

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

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

DELETE
X YY NN

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

=> P ==> Deletion of the pattern

DELETE
X YY NN

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

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

6.4.3 Execution (Pattern) Mode

1. Switch on mode by pushbutton 2
(LED lights up)

=> 2

==> X 01 ZZZ

 2. Select pattern 1...8
- Seam number 01 is displayed

=> +

=> -

==> X 01 030

 3. If one should not start with seam 1
select different seam number
- Push button E several times
until desired seam number is displayed

=> E

==> 2 05 ZZZ
- The pattern can now be started by pushing the pedal.
- Exit the execution (pattern) mode
- Switch off by pushbutton 2

=> 2

7. Functions and Settings

7.1 First Stitch after Power On

Functions	Abbreviation on the display	Parameter
1 stitch 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 position 1 to position 1, independently of the pedal position and set start stitch condensing speed if parameter Sn1 is on.

7.2 Program Identification

Functions	Parameter
Display program no., modification index and identification no.	F-179

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

Display example parameter 179:

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

7.3 Function Key (Pushbutton 3)

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

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

Programmable functions:

F-008 = 1 - Softstart on/off

F-008 = 2 - High lift for walking foot operation mode stored = on/operation mode not stored = off

F-008 = 3 - Full stitch with pushbutton for needle up/down on/off

F-008 = 4 - Sewing start blocked with light barrier uncovered on/off

7.4 Display Actual Speed

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

During machine run:

- 2350

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

3300
XY82ZV

- the stop indication
- Example:

Stop

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



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.

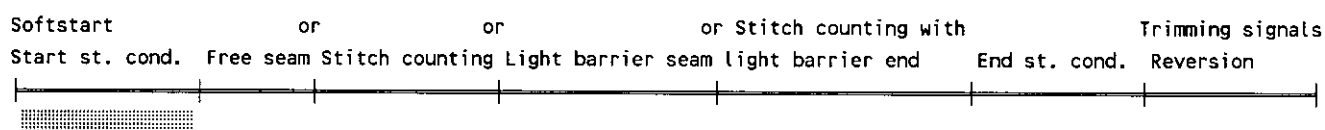
[illegible]

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

- 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 stitch condensing, stitch counting)
- stitch counting synchronized to position 1
- interruption with pedal in position 0 (neutral)
- cessation by full heelback (position -2)

Direct access by function key (pushbutton 3)

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

7.7 Start Stitch Condensing

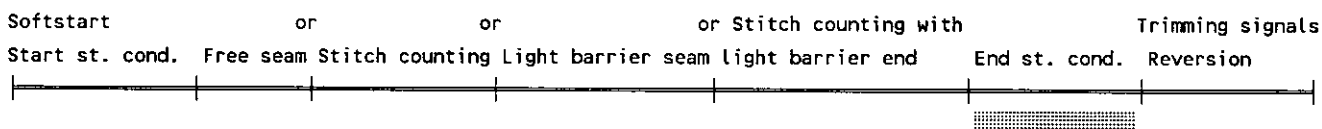
Functions	Abbreviation on the display	Parameter
Start stitch condensing On/Off		Pushbutton 7
Number of stitches	Arr	F-001
Stitch condensing speed at the start of the seam	n3	F-112
Run-out time	t1	F-200
Start delay from lifted foot	t3	F-202

The start stitch condensing starts by pushing the pedal forward at the beginning of the seam. The start is delayed by the time t3 from lifted foot (start delay from lifted foot).

The stitch condensing is executed automatically at stitch condensing 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 number of stitches, the stitch condensing signal, and, after a delay time t1, the stitch condensing speed, will be turned off. Then pedal control is returned.

7.8 End Stitch Condensing

Functions	Abbreviation on the display	Parameter
End stitch condensing On/Off		Pushbutton 8
Number of stitches of stitch condensing at the seam end (stitch length reduction)	Err	F-002
Number of stitches of stitch condensing at the seam end (normal stitch length)	Erv	F-003
Stitch condensing speed at the seam end	n4	F-113
Stitch condensing until stop at the seam end On/Off	FAr	F-136
Stitch correction time	t9	F-151
Speed limitation of the last 2 stitches in end stitch condensing	ErS	F-194
Start delay from lifted foot	t3	F-202

The end stitch condensing 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 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.

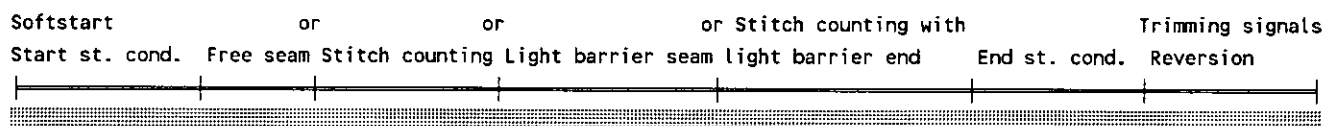
From full machine run, the signal will be turned on immediately. The end stitch condensing will be performed automatically. An interruption is not possible. The last 2 stitches of the end stitch condensing will be performed at a reduced fixed stitch condensing speed (F-194).

Moreover, the stitch regulator can be switched off with a time lag t_9 . The number of normal stitches can be inputted by parameter F-003. They will be performed after the stitch condensing and can be activated by pushbutton 8.

Depending on parameter F-136 (FAR) the stitch regulator remains on or is turned off, unless the number of stitches by parameter F-003 (Erv) is activated.

- Parameter F-136 = ON last stitch when stitch condensing is on
- Parameter F-136 = OFF last stitch when stitch condensing is off

7.9 Intermediate Stitch Condensing



The stitch regulator can be switched on anywhere in the seam by the external pushbutton.



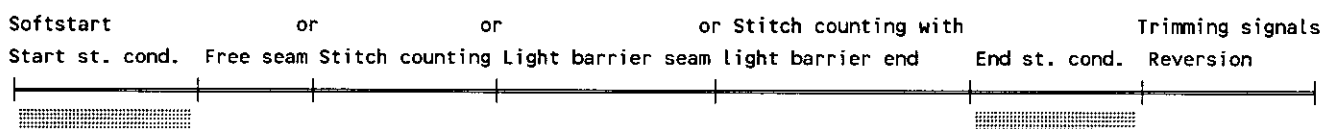
Attention!

During machine run: intermediate stitch condensing - at machine standstill: needle up/down.

Note:

The stitch regulator cannot be switched on at machine standstill.

7.10 Suppression/Recall of Stitch Condensing



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

When pressing	Stitch condensing at the start of the seam On	Stitch condensing at the start of the seam Off	Stitch condensing at the seam end On	Stitch condensing at the seam end Off
Before start of seam	no stitch condensing	stitch condensing	---	---
In the seam	---	---	no stitch condensing	stitch condensing

7.11 Holding Power of Stitch Condensing

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

The stitch regulator 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.

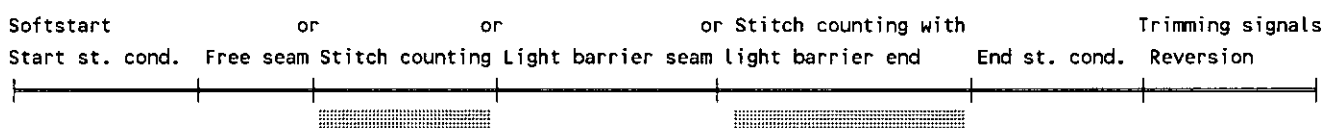


Attention!

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

7.12 Seam with Stitch Counting



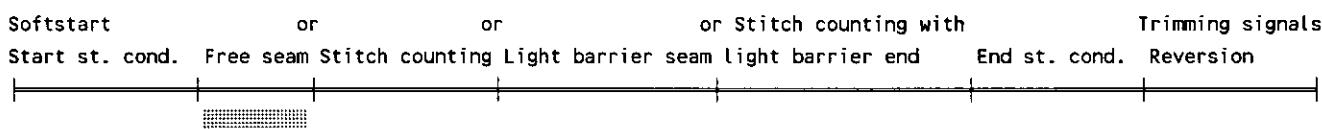
Functions	Abbreviation on the display	Parameter
Stitch counting on/off		Pushbutton 1
Number of stitches	Stc	F-007
Stitch counting speed	n12	F-118
Speed mode for a seam with stitch counting	SGn	F-141

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

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

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

7.13 Free Seam and Seam with Light Barrier



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

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

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

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

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

7.14 Needle Up/Down

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

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

Needle up: F-140 = 1

When the pushbutton is pressed, the drive only runs from position 1 to position 2. If the drive is outside of position 1 it does not move for safety reasons.

Change of position: F-140 = 2

When the pushbutton is pressed, the drive runs from position 1 to position 2 and/or from position 2 to position 1. If the drive is outside of the stop position it runs to the next possible position.

Single stitch: F-140 = 3

When the pushbutton is pressed, the machine performs on rotation from position 1 to position 1. If the drive is in position 2 it runs to position 1, when pressing the pushbutton. It runs from position 1 to position 1 on each subsequent actuation of the pushbutton. If the drive is outside of the stop position it runs to the preselected basic position.

Function off: F-140 = 4

When pressing the pushbutton at stop there will be no change of position.

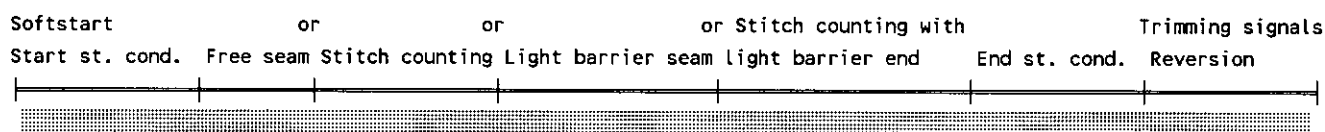
The function manual stitch condensing activated by this pushbutton during machine run is not affected.

Direct access by function key (pushbutton 3)

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

**Attention!**

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

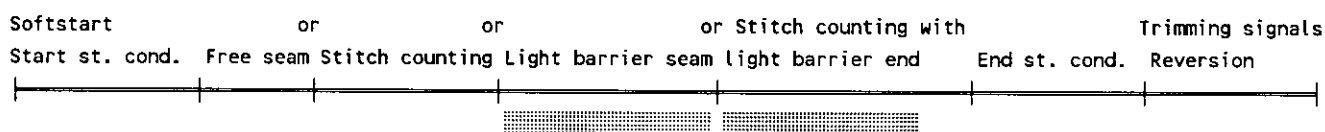
7.15 Partial Stitch

Functions	Abbreviation on the display	Parameter
Single stitch with stitch length reduction	ESu	F-183
Start delay until switching on the stitch condensing	tzr	F-210

When pressing the pushbutton connected to socket B4/3, a stitch with reduced stitch length will be performed. The start is delayed (F-210) until the stitch regulator has securely switched. Then the drive performs one rotation.

- If the drive is in position 1 it returns to position 1 after pressing the pushbutton.
- If the drive is in position 2 it returns to position 2 after pressing the pushbutton.
- If the drive is outside of both positions it runs to the preselected basic position.

7.16 Light Barrier



7.16.1 General Light Barrier Functions (V720/V730/V740)

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

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

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Sewing start blocked with light barrier uncovered on/off	-F-	F-008 = 4

7.16.2 Reflection Light Barrier (V720/V730)

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

Adjustments

Sensitivity:

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

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

Mechanical Adjustment:

- LS001 - Addressing of parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
- By orienting the light barrier over the reflection area the highest possible bargraph level must be reached, then fix light barrier in this position.
- LSM001- The orientation is facilitated through a visible light spot on the reflection area.

7.16.3 Transmitted Light Barrier (V740)

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

Sensitivity adjustment:

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

Select the sensitivity level:

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

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

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

Note:

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

Mechanical adjustment of the light barrier sensor

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

7.16.4 Automatic Start by Light Barrier (V730, V740)

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

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

The following conditions must be met:

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

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

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

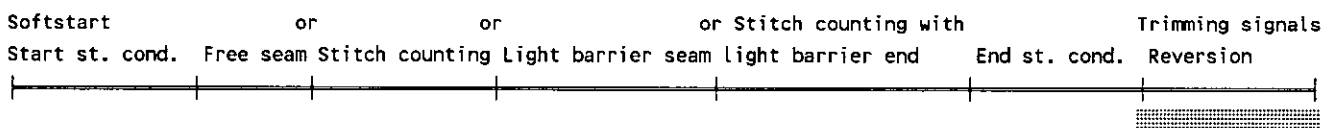
7.16.5 Light Barrier Filter for Knitted Fabrics

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

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

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

7.17 Chain Stitch Trimming Modes



Functions	Abbreviation on the display	Parameter
Chain stitch trimming modes	KEt	F-185
Activation delay for chain stitch trimmer	dFA	F-186
Activation time for chain stitch trimmer	KFA	F-187
Activation delay for chain stitch catcher	dFW	F-188
Activation time for chain stitch catcher	KFW	F-189
Stitches until tape cutter at the start of the seam	SFA	F-192
Activation of tape cutter if F-185 = 3	MAB	F-193

By selecting the mode it is possible to operate the same control on machines with different chain stitch trimming systems.

F-185 = 0	Series 190 with thread trimmer	(mode 0)
F-185 = 1	Series 170 with thread trimmer	(mode 1)
F-185 = 2	Series 170 with chain cutter	(mode 2)
F-185 = 3	Series 170 with tape cutter	(mode 3)

Mode 0

- Stitch condensing at the start and at the end of the seam
- Thread trimmer activation time (F-187) delayed with a time lag of (F-186)
- Thread wiper activation time (F-189) delayed with a time lag of (F-188)
- Presser foot lifting delayed with a time lag of (F-206) after thread wiping

Mode 1

- Stitch condensing at the start and at the end of the seam (signal inverted)
- Thread trimmer activation time (F-187) delayed with a time lag of (F-186)
- Catcher activation time (F-189) delayed with a time lag of (F-188)
- Presser foot lifting delayed with a time lag of (F-206) after the catcher

Mode 2

- Stitch condensing at the start and at the end of the seam (signal inverted)
- Chain cutter function with fixed stitches and times
- Presser foot lifting delayed with a time lag of (F-211) after stop of the drive

Mode 3

Tape cutter functions:

F-193 = 1	Tape cutter at the start and at the end of the seam On
F-193 = 2	Tape cutter at the start of the seam On
F-193 = 3	Tape cutter at the seam end On

- Stitch condensing at the start and at the end of the seam (signal inverted)
- Tape cutter at the start of the seam (F-187) delayed by the stitches (F-192)
- Tape cutter at the seam end (F-187) delayed with a time lag of (F-186)
- Thread clamp delayed for a number of preset stitches until stop of the drive
- Presser foot lifting delayed with a time lag of (F-206) after the end of the tape cutter

See chapter "Timing Diagrams"!

7.18 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	t2	F-201
Start delay from lifted foot	t3	F-202
Time of full power	t4	F-203
Operating time with pulsing	t5	F-204
Delay after thread wiping until presser foot lifting	t7	F-206
Delay after thread trimming without thread wiper until presser foot lifting	tFL	F-211

Presser foot is lifted:

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



Attention!

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 %	high holding power
6	75 %	
7	87.5 %	
0	100 %	
		full power

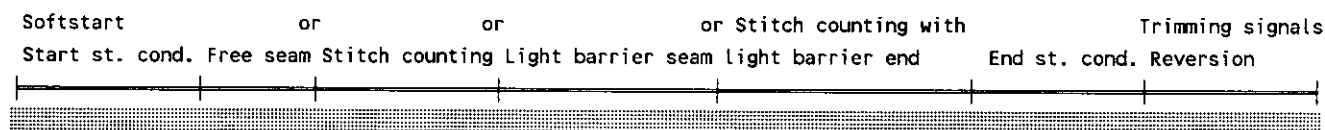
Foot lowers:

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

The start is delayed until the foot has securely lowered.

- delay time adjustable F-202

7.19 High Lift For Walking Foot



Functions	Abbreviation on the display	Parameter
High lift walking speed	n10	F-117
High lift walking speed operation mode stored = On/ operation mode not stored = Off	hPr	F-138
Run-out time of the high lift walking speed after switching off the high lift for walking foot	thP	F-152
Minimum number of stitches for high lift walking	chP	F-184

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

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

When pressing the pushbutton "high lift for walking foot", the output "high lift for walking foot" will be activated depending upon the actual speed until the pushbutton is released again.

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

When pressing the pushbutton "high lift for walking foot", the output "high lift for walking foot" will be activated depending upon the actual speed. When pressing the pushbutton again, the output is deactivated. This function is independent of the set minimum number of stitches (F-184).

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

When pressing the pushbutton "high lift for walking foot", the output "high lift for walking foot" will be activated depending upon the actual speed until the pushbutton is released again or at least until the number of stitches set by parameter F-184 has been performed.

When pressing the pushbutton at machine standstill, the high lift for walking foot is activated and remains activated at least for the set minimum number of stitches after the sewing start. The operating time can be prolonged by keeping the pushbutton pressed until after the end of stitch counting.

If the pushbutton is pressed again before the sewing start, the function is deactivated. This process can be repeated.

High lift for walking foot depending upon the speed

When pressing the pushbutton at machine standstill or during machine run at a speed that is lower than the high lift walking speed, the output will be activated immediately. The maximum speed will be limited to high lift walking speed.

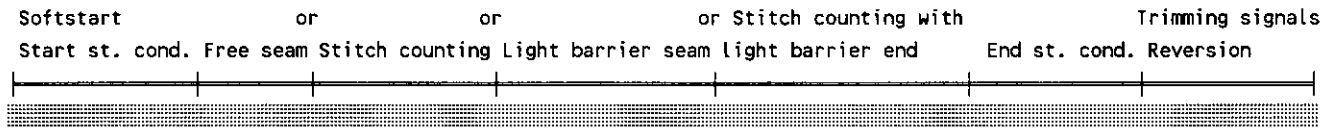
If the actual speed is higher than the high lift walking speed, the drives slows down to high lift walking speed and then activates the output.

After deactivating the high lift for walking foot the speed limitation will be canceled after the run-out time.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
High lift walking speed operation mode stored = On/ operation mode not stored = Off	-F-	F-008 = 2

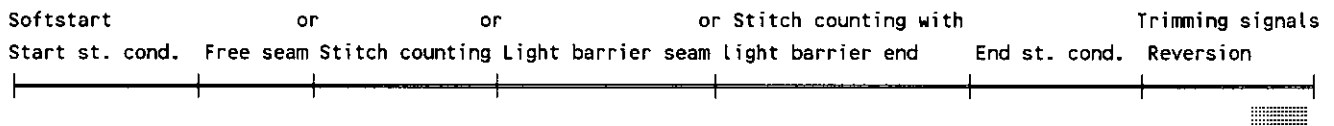
7.20 Reduced Speed



Functions	Abbreviation on the display	Parameter
High lift walking speed (reduced speed)	n10	F-117

If the pushbutton connected to socket B3/4 is pressed, the sewing speed will be limited to the high lift walking speed.

7.21 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 the time of the activation delay of reversion (F-181).

Then it reverses at positioning speed for an adjustable number of increments.

1 increment corresponds to approx. 0.7°.

7.22 Flip-Flop Functions (FF)

Functions	Abbreviation on the display	Parameter
Flip-flop functions	n1	F-190
Number of stitches until FF1 off (not if F-190 = 3)	cF1	F-191

7.22.1 Flip-Flop Function (F-190 = 1)

Puller program for functioning "chain at the seam end"

- After POWER ON the puller is lowered (FF1 signal Off).
- The external pushbutton only works after start stitch condensing until the beginning of end stitch condensing.
- After the start stitch condensing the puller can be lifted and/or lowered by the external pushbutton FF1.

- At the beginning of the end stitch condensing or the thread trimmer the puller is lowered (FF1 signal Off).
- The puller is lifted whenever the presser foot is lifted in the seam.
- After lowering the presser foot the puller remains lifted for a number of stitches that can be set (F-191) (FF1 signal On). Then the puller is automatically lowered, unless this has been done by the external pushbutton.
- The LED for FF1 is switched on whenever the FF1 signal is switched on.

7.22.2 Flip-Flop Function (F-190 = 2)

Puller program for functioning "seam end with thread trimmer"

Functioning if stitch counter = 0:

- The FF1 signal is switched off after power on.
- The FF1 signal can be switched on and/or off by the external pushbutton FF1.
- The FF1 signal is switched on for the time of the presser foot lifting.
- The FF1 signal is switched off again after lowering of the presser foot.

Functioning if stitch counter > 0:

- The FF1 signal is switched on after power on.
- The FF1 signal can be switched off and/or on by the external pushbutton FF1.
- At the start of the seam (machine start) the puller is lowered after the stitch counting (F-191), unless this has been done by the external pushbutton.
- If the puller is already lowered at the start of the seam (motor at standstill), it remains lowered at machine start, and stitch counting will not be activated.
- The puller is lifted whenever the presser foot is lifted.
- After lowering the presser foot the puller remains lifted for a number of stitches that can be set (F-191) (FF1 signal On). Then the puller is automatically lowered, unless this has been done by the external pushbutton.
- The LED is switched on whenever the FF1 signal is switched on.

7.22.3 Flip-Flop Function (F-190 = 3)

- The FF1 signal is used here as a machine run signal. At machine standstill the machine run signal can be switched on by the external pushbutton.
The machine run signal will be switched off at the beginning of the end stitch condensing or the thread trimmer.

7.23 Signal Output - POS1

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

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

Table: Coding of the pedal steps

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

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

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

Possible characteristic curves:

- linear
- progressive
- highly progressive

8. Machine Functions

8.1 Braking Behavior

Functions	Abbreviation on the display	Parameter
Braking effect when modifying the preset value ≤ 4 stages	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 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 the Positions

Functions	Abbreviation on the display	Parameter
Setting the reference position (position 0) (neutral)	SR1	F-170
Setting the signal and stop positions	SR2	F-171
Display of the signal and stop positions	SR3	F-172

8.4.1 Reference Position

The angular positions necessary on the machine, e.g. for needle down position or thread lever up position are stored in the control as numerical or angular values.

In order to establish a relationship between the electric position transmitter information and actual mechanical position a reference position is needed.

POSITION 0

The reference position must be set:

- for initial operation
- after changing the position transmitter
- after changing the EPROM or the microprocessor

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

Note:

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

Programming:

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

PoSition
0]

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

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

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

INFO A3

- Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (lower needle position)	Pos1
Position 2 (upper needle position)	Pos2
Position 1A	Pos1A
Position 2A	Pos2A
Position 3	Pos3
Position 3A	Pos3A

Programming:

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

Position
1 xxx

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

Position
2 xxx

 Set position 2
4. Press pushbutton E ==>

Position
1A xxx

 Set position 1A
5. Press pushbutton E ==>

Position
2A xxx

 Set position 2A
6. Press pushbutton E ==>

Position
3 000

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

Position
3A 000

 Position does not have to be set !
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 double increments.

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 pushbutton 1 on - corresponds to position 1
 - LED pushbutton 1 turns off - corresponds to position 1A
 - LED pushbutton 2 on - corresponds to position 2
 - LED pushbutton 2 turns off - corresponds to position 2A

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

8.5 Memory Box

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

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

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

8.5.1 Preparation for Memory Box Operation



Attention! - Turn power off

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

8.5.2 Formatting of the Memory Card

The Memory Card is the storage medium for the programs.

Before using each Memory Card for the first time it must be prepared for receiving data by "formatting".

Note:

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

- Insert Memory Card with the labelled side up into the slot of the Memory Box.
- If the Memory Card is correctly inserted the green LED on the Memory Box lights up.
If LED does not light up repeat operation or use different card.
- Switch parameter F-198 on.
- Press pushbutton P or E.
 - The display on the Variocontrol shows a growing series of lines from left to right.
When the series reaches its full length, the formatting is finished.
 - The formatting can also be used to erase **all** data on the Memory Card.

8.5.3 Operating the Memory Box

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

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

3. » Save data

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

- Push pedal 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 completed

3000
DA82CV

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.

Note:

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

Possibility no. 2:

- Push pedal 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.

3000
DA82CV

Note:

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

5. » Exit

- **Interruption:**

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

- **If data are not to be saved:**

- Turn power off and on again

- **If data are to be saved:**

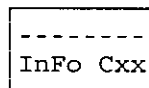
- For storing data permanently start sewing once before turning the power off!

6. » Operation without Variocontrol

- Saving and reading is done by pushing the pedal as described in step 3 and 4.
- Data record 1 is always automatically selected.
- Reading-in is only possible if power is turned on with pedal fully forward.

7. » Error messages

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

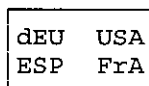


"xx" stands for a number in the following table:

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

Language selection:

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



9. Error Messages

General Information

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

Programming of Functions and Values (Parameters)

Display	Signification
Info F1	Wrong code number or parameter number input

Serious Situation

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

Hardware Disturbance

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

Memory Card Information

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

10. Signal Test

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

Outputs:

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

Table: Allocation of the pushbuttons for the outputs

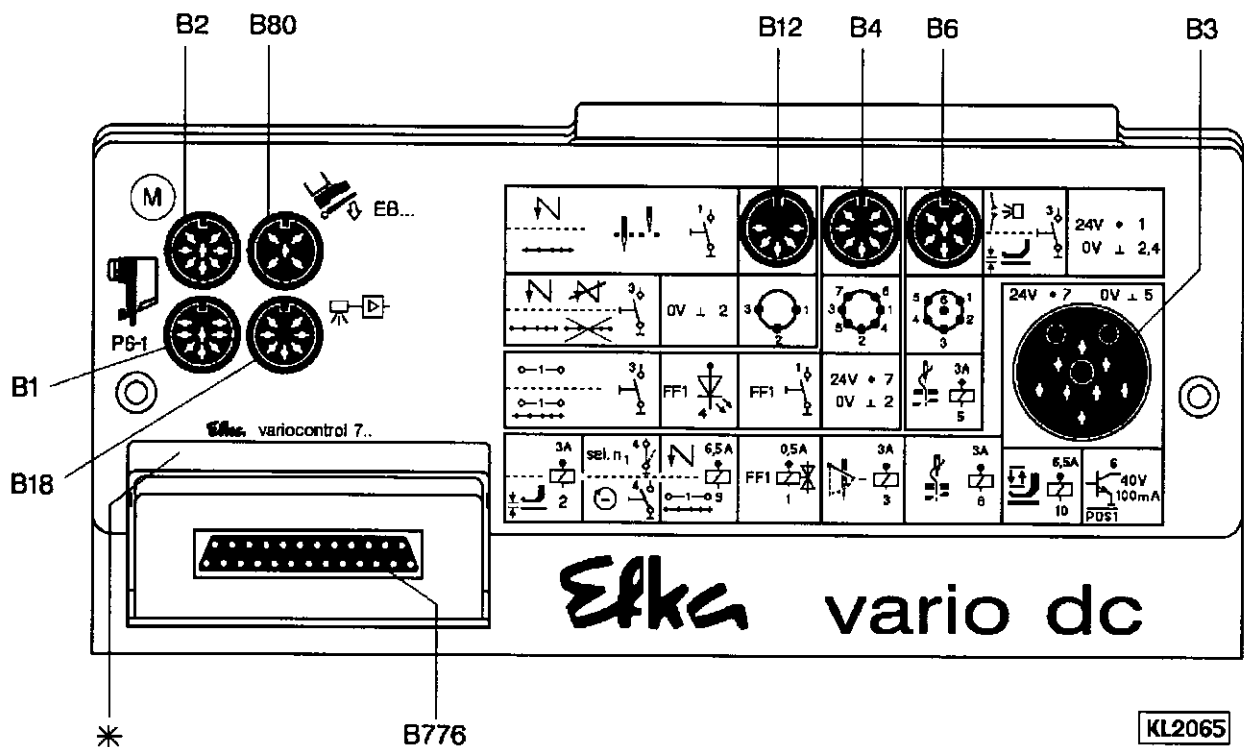
Pushbutton	Output
1	Stitch condensing
2	Presser foot lifting
3	Output M1
4	Output M2
5	Flip-flop signal
6	free
7	free
8	free
9	free
0	free
-	free

Inputs:

- Actuation of the external switches or pushbuttons will be indicated by alternating the switching state (on/off) on the display.
- Several switches must not be closed at the same time.

11. Socket Connectors

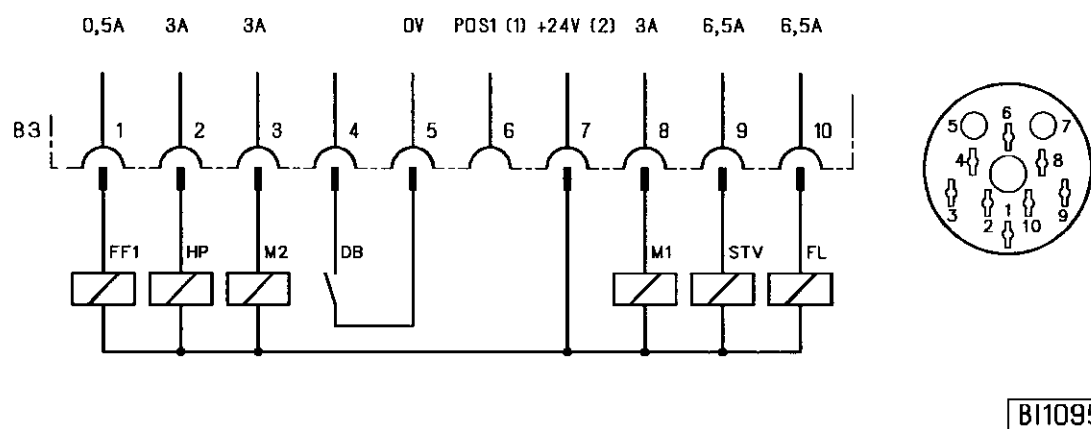
11.1 Position in the Control



- B1 - Positions transmitter
- B2 - Commutation transmitter for d.c. motor
- B3 - Machine
- B4 - Pushbuttons and display
- B6 - Machine
- B12 - Pushbuttons
- B18 - Light barrier module
- B80 - External actuator
- B776 - Control panel Variocontrol

* = Type designation

11.2 Connection Diagram

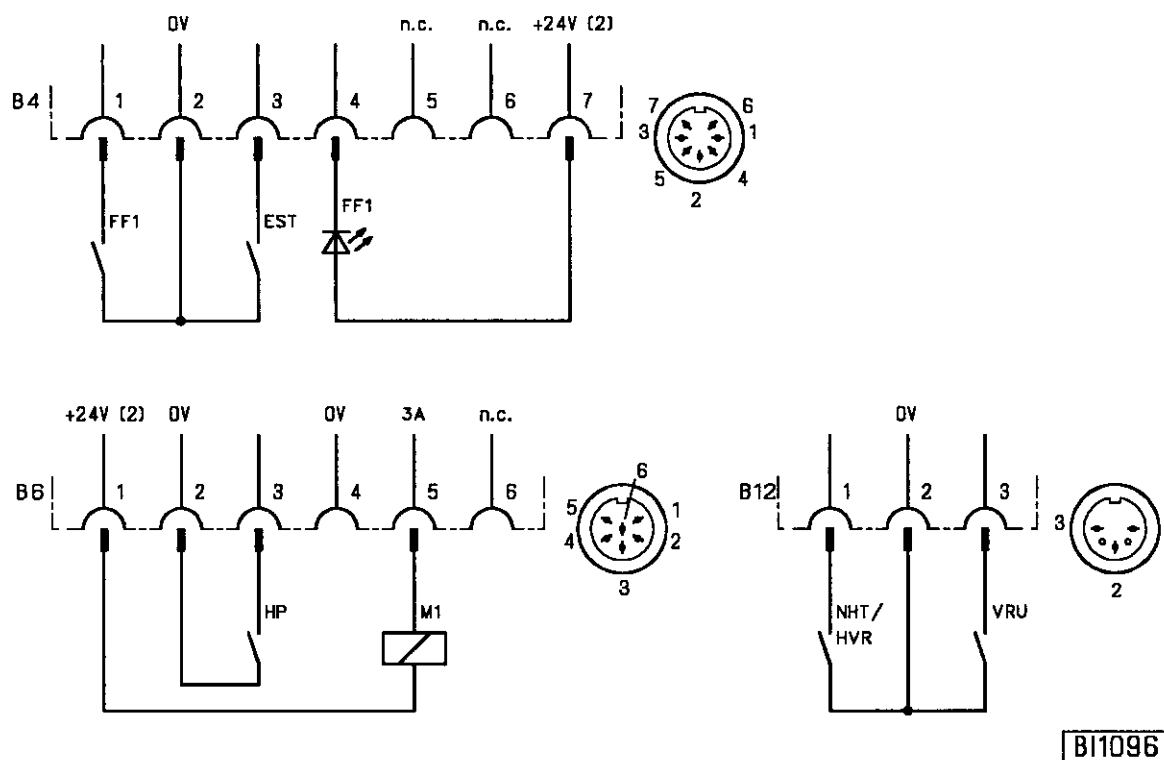


Note:

When putting the control into operation, be sure to remove the jumper "autoselect", if provided in the distributor on the sewing machine head! The machine cannot reach full speed if the jumper is provided on the connectors on socket B3/4-5.

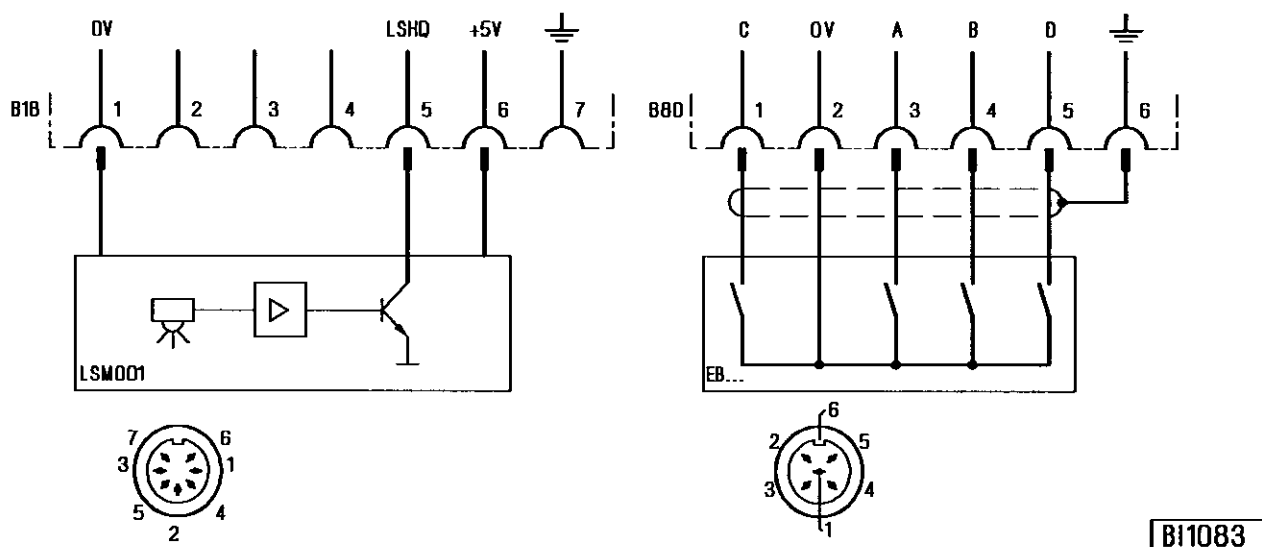
- M1 - Output according to mode setting
- M2 - Output according to mode setting
- STV - Stitch condensing
- FL - Presser foot lifting
- HP - High lift for walking foot
- FF1 - Flip-flop signal
- DB - Speed limitation

- 1) Transistor output with open collector (max. 40V, 30mA)
- 2) Nominal voltage 24V, no-load voltage max. 36V



- M1 - Output according to mode setting
- FF1 - Pushbutton for flip-flop function
- EST - Pushbutton for single stitch
- NHT - Pushbutton for needle up/down
- HVR - Pushbutton for intermediate stitch condensing
- VR - Pushbutton for suppression/recall of stitch condensing

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



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

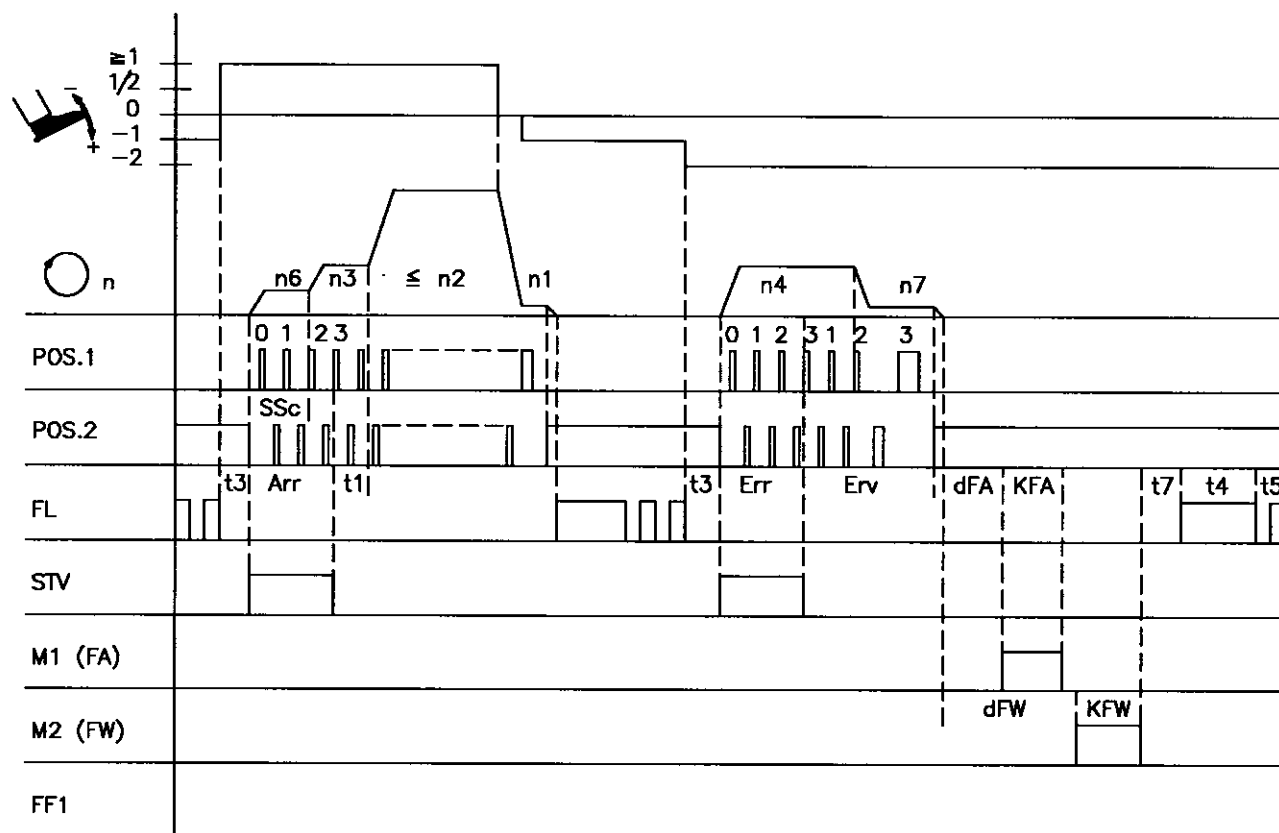
LSM001 - Reflection light barrier module

EB... - Actuator

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

12. Timing Diagrams

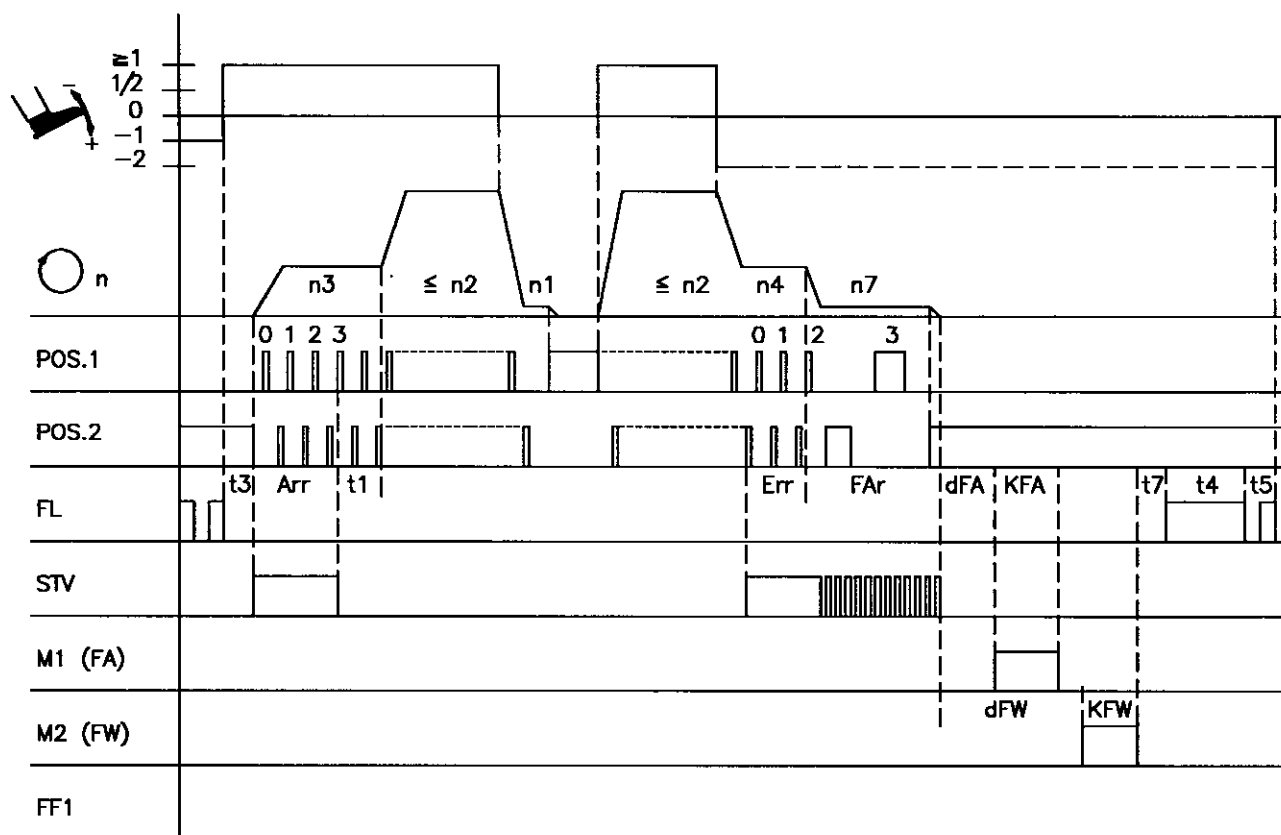
Chainstitch mode 0: trimming from intermediate stop



0192/FAZW-0

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the start of the seam Stitch condensing at the seam end Softstart Chain stitch mode 0	on Pushbutton 7 on Pushbutton 8 on Pushbutton 3 F-185
n1 n2 n3 n4 n6 n7	Positioning speed Maximum speed Stitch condensing speed at the start of the seam Stitch condensing speed at the seam end Softstart speed Trimming speed	F-110 F-111 F-112 F-113 F-116 F-116
t1 t3 t4 t5 t7 dFA KFA dFW KFW	Delay from end of stitch condensing to speed release Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Delay from end of thread wiper to presser foot lifting Delay time of thread trimmer Activation time thread trimmer Delay time of thread wiper Activation time thread wiper	F-200 F-202 F-203 F-204 F-206 F-186 F-187 F-188 F-189
SSc Arr Err Erv	Number of softstart stitches Number of start stitch condensing stitches Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length)	F-100 F-001 F-002 F-003

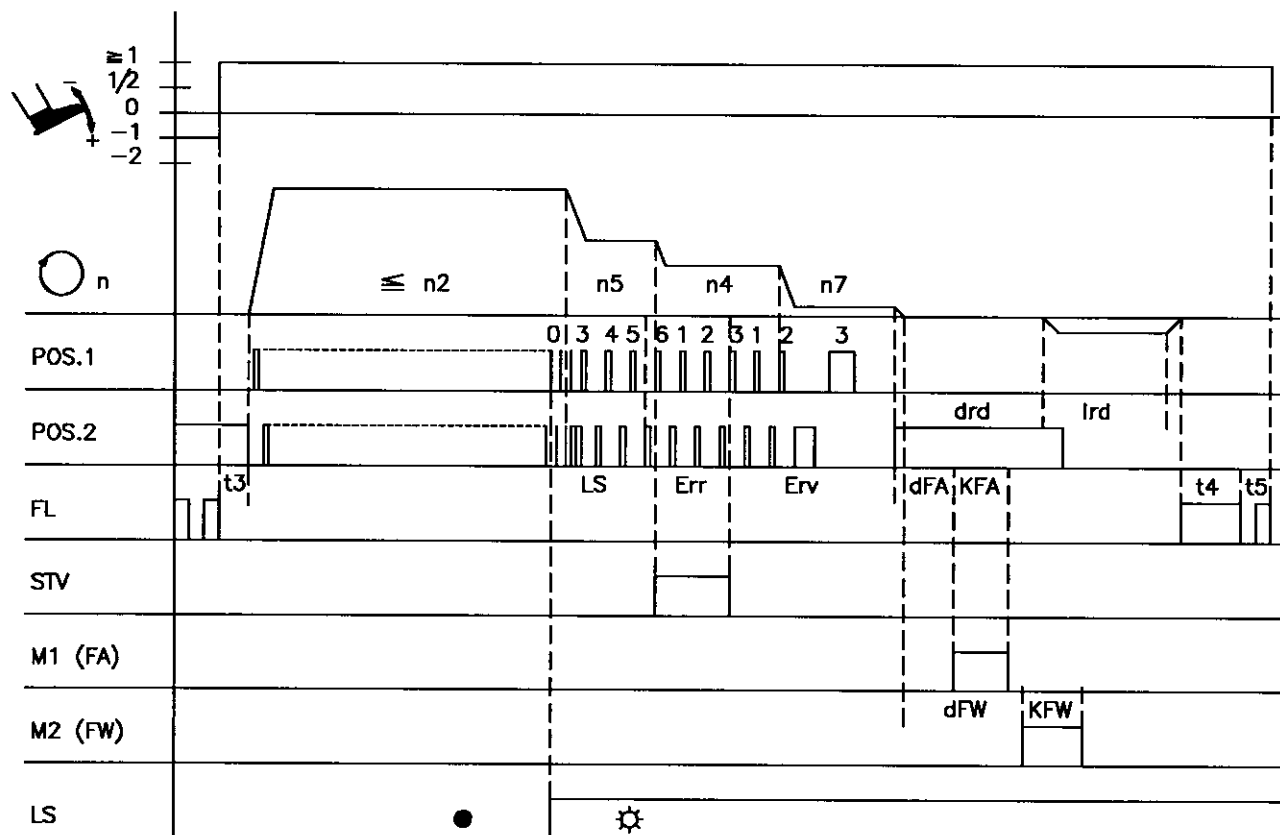
Chainstitch mode 0: run with intermediate stop



0192/LAUFZW-0

Abbreviation	Function	Parameter/Pushbutton
KEt FAr	Stitch condensing at the start of the seam Stitch condensing at the seam end Chain stitch mode 0 Stitch condensing until stop at the seam end	on on Pushbutton 7 Pushbutton 8 F-185 F-136
n2 n4 n5 n7	Maximum speed Stitch condensing speed at the seam end Speed after light barrier sensing Trimming speed	F-111 F-113 F-114 F-116
t3 t4 t5 Ird drd dFA KFA dFW KFW Err Erv LS	Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Reversion increments Delay time of reversion Delay time of thread trimmer Activation time thread trimmer Delay time of thread wiper Activation time thread wiper Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length) Light barrier compensating stitches	F-202 F-203 F-204 F-180 F-181 F-186 F-187 F-188 F-189 F-002 F-003 F-004

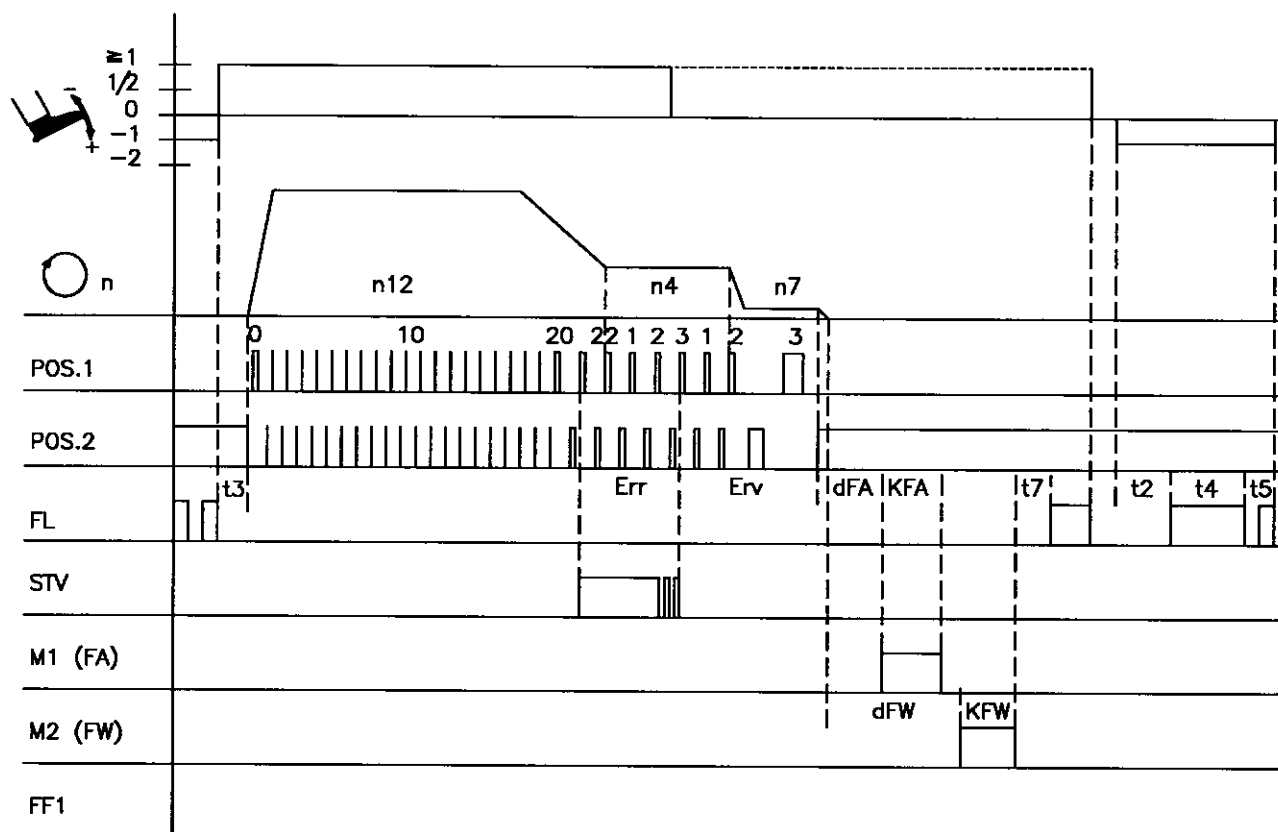
Chainstitch mode 0: seam end by light barrier



0192/ENEELS-0

Abbreviation	Function	Parameter/Pushbutton
Frd LSd KEt	Stitch condensing at the seam end Light barrier Reversion Light barrier covered/uncovered Chain stitch mode 0	on on on on on Pushbutton 8 Pushbutton 0 F-182 F-131 F-185
n2 n4 n5 n7	Maximum speed Stitch condensing speed at the seam end Speed after light barrier sensing Trimming speed	F-111 F-113 F-114 F-116
t3 t4 t5 lrd drd dFA KFA dFW KFW Err Erv LS	Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Reversion increments Delay time of reversion Delay time of thread trimmer Activation time thread trimmer Delay time of thread wiper Activation time thread wiper Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length) Light barrier compensating stitches	F-202 F-203 F-204 F-180 F-181 F-186 F-187 F-188 F-189 F-002 F-003 F-004

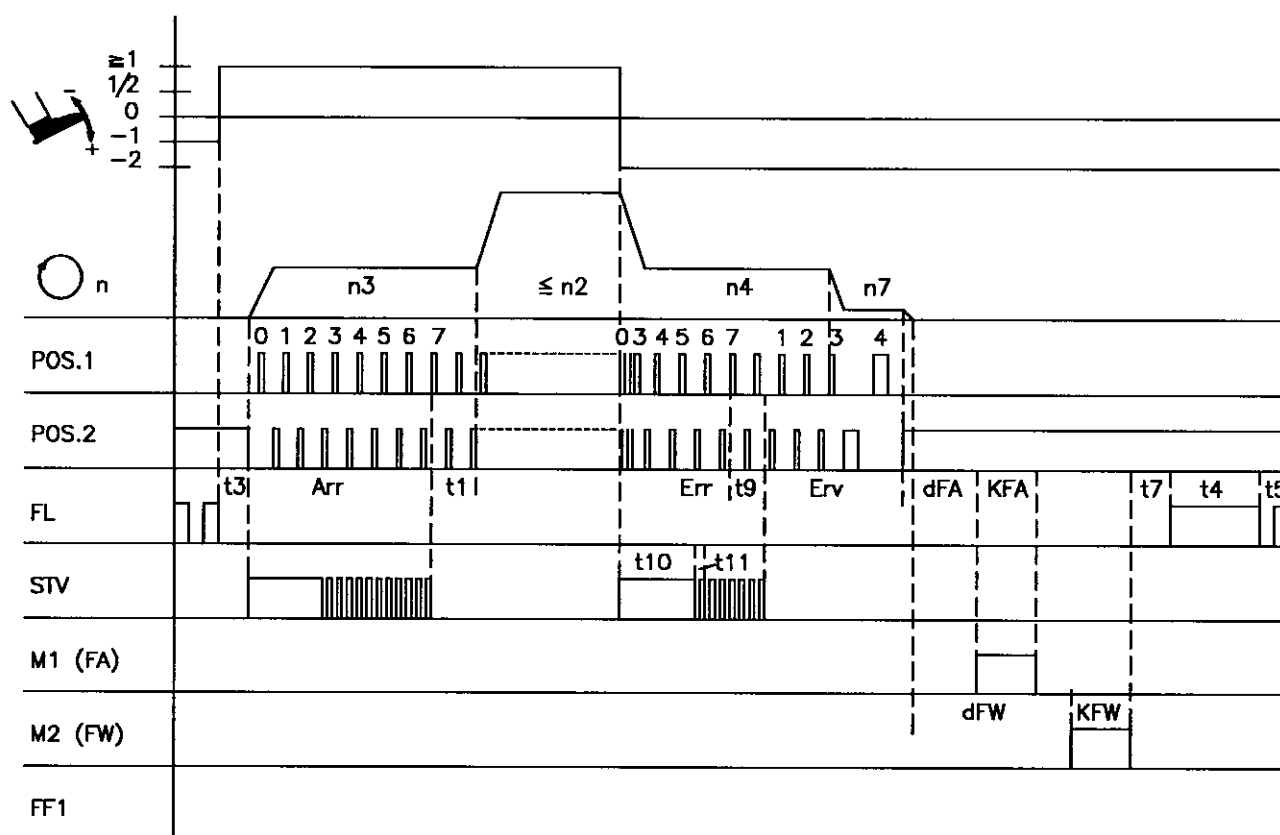
Chainstitch mode 0: seam end by stitch counting



0192/ENDEZA-0

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the seam end Stitch counting Chain stitch mode 0	on on Pushbutton 8 Pushbutton 1 F-185
n2 n4 n7 n12	Maximum speed Stitch condensing speed at the seam end Trimming speed Automatic speed for stitch counting	F-111 F-113 F-116 F-118
t2 t3 t4 t5 dFA KFA dFW KFW Err Erv	Activation delay of presser foot lifting with pedal in pos. -2 Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Delay time of thread trimmer Activation time thread trimmer Delay time of thread wiper Activation time thread wiper Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length)	F-201 F-202 F-203 F-204 F-186 F-187 F-188 F-189 F-002 F-003

Chainstitch mode 0: trimming from full run



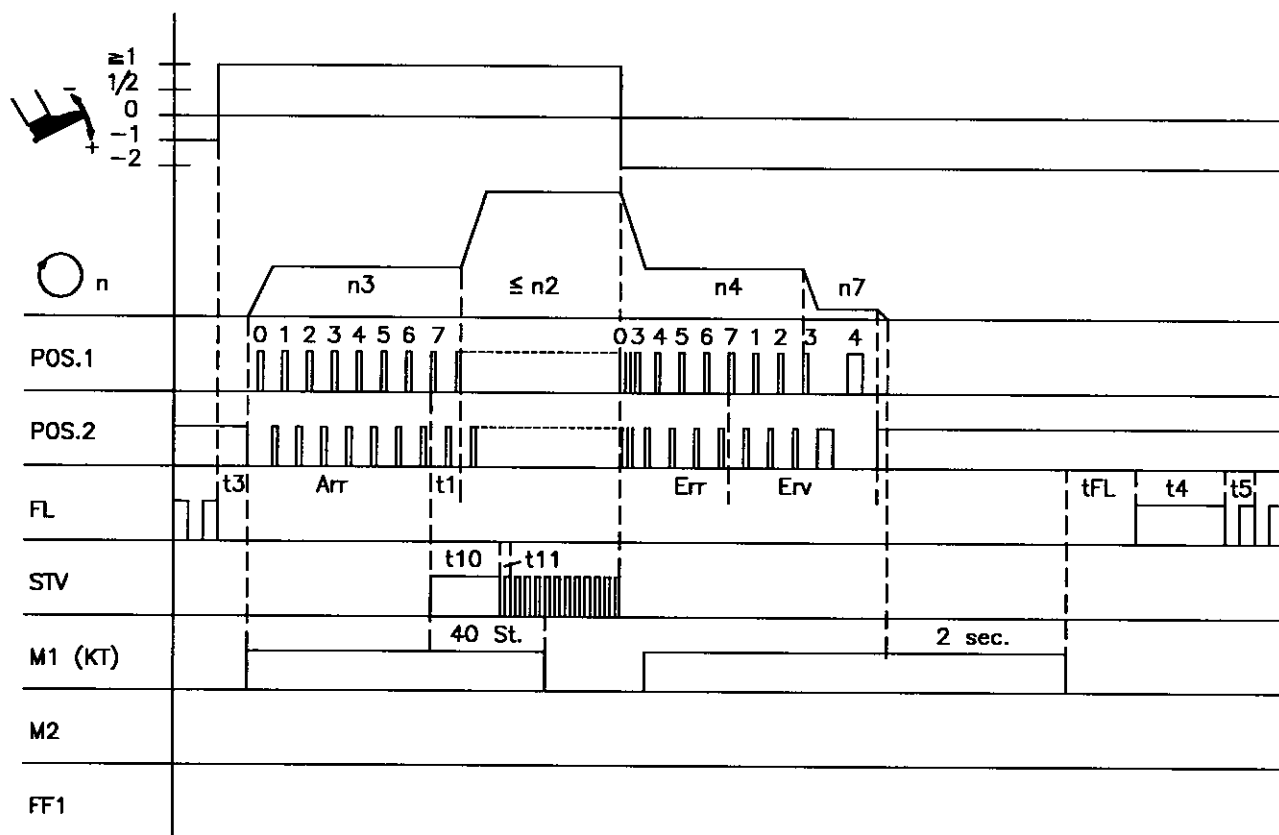
0192/FALAUF-0

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the start of the seam Stitch condensing at the seam end Chain stitch mode 0	on on Pushbutton 7 Pushbutton 8 F-185
n2 n3 n4 n7	Maximum speed Stitch condensing speed at the start of the seam Stitch condensing speed at the seam end Trimming speed	F-111 F-112 F-113 F-116
t1 t3 t4 t5 t7 t10 t11 dFA KFA dFW KFW Arr Err Erv	Delay from end of stitch condensing to speed release Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Delay from end of thread wiper to presser foot lifting Full power of stitch condensing Pulsing of stitch condensing Delay time of thread trimmer Activation time thread trimmer Delay time of thread wiper Activation time thread wiper Start stitch condensing speed Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length)	F-200 F-202 F-203 F-204 F-206 F-212 F-213 F-186 F-187 F-188 F-189 F-001 F-002 F-003

FL	=	Presser foot lifting
STV	=	Stitch condensing
M1 (FA)	=	Thread trimmer
M2 (FZ)	=	Thread catcher
FF1	=	Flip-flop signal

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the start of the seam Stitch condensing at the seam end Chain stitch mode 1	on on Pushbutton 7 Pushbutton 8 F-185
n2	Maximum speed	F-111
n3	Stitch condensing speed at the start of the seam	F-112
n4	Stitch condensing speed at the seam end	F-113
n7	Trimming speed	F-116
t1	Delay from end of stitch condensing to speed release	F-200
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Presser foot lift pulsing	F-204
t7	Delay from end of thread wiper to presser foot lifting	F-206
t10	Full power of stitch condensing	F-212
t11	Pulsing of stitch condensing	F-213
dFA	Delay time of thread trimmer	F-186
KFA	Activation time thread trimmer	F-187
dFW	Delay time of thread catcher	F-188
KFW	Activation time thread catcher	F-189
Arr	Start stitch condensing speed	F-001
Err	Number of end stitch condensing stitches (reduced stitch length)	F-002
Erv	Number of end stitch condensing stitches (normal stitch length)	F-003

Chainstitch mode 2: trimming from full run

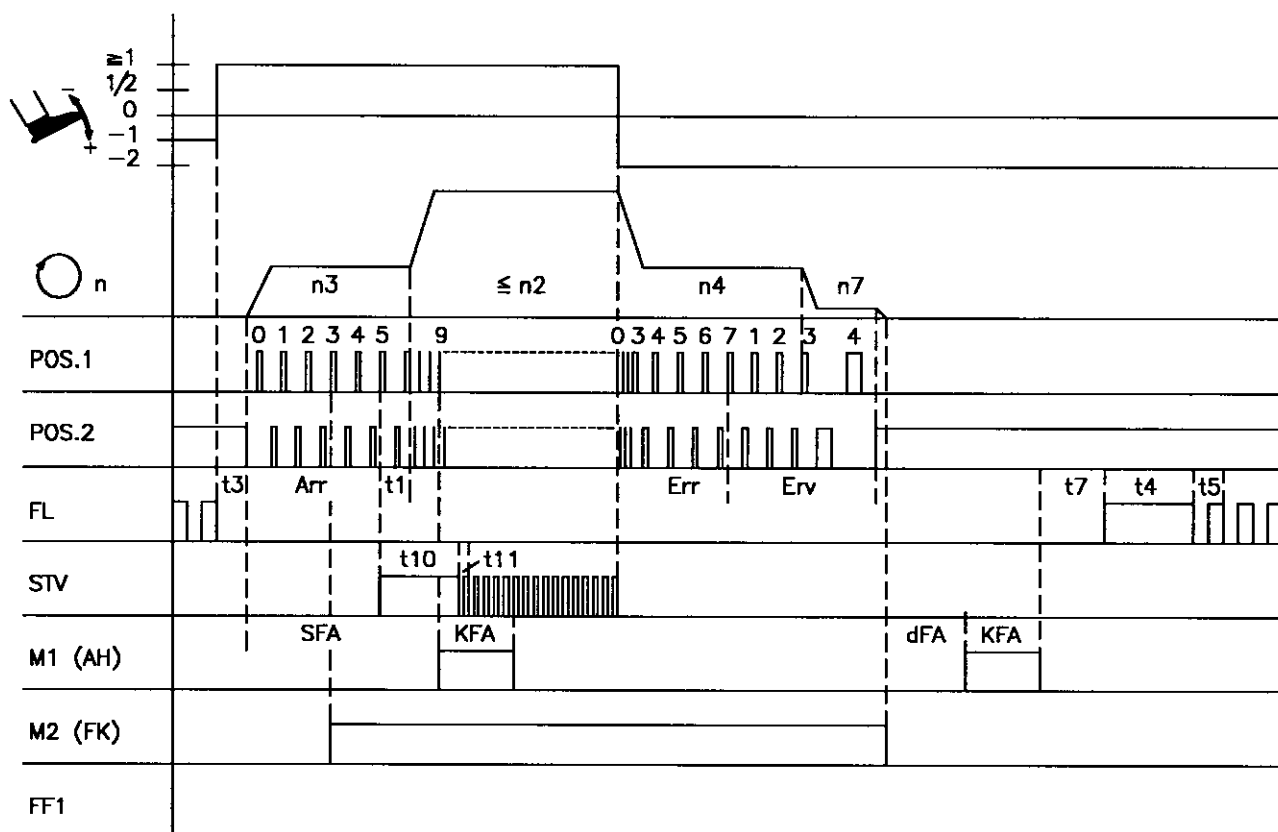


0192/FALAUF-2

FL = Presser foot lifting
 STV = Stitch condensing
 M1 (KT) = Chain cutter

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the start of the seam Stitch condensing at the seam end Chain stitch mode 2	on on Pushbutton 7 Pushbutton 8 F-185
n2 n3 n4 n7	Maximum speed Stitch condensing speed at the start of the seam Stitch condensing speed at the seam end Trimming speed	F-111 F-112 F-113 F-116
t1 t3 t4 t5 t10 t11 tFL Arr Err Erv	Delay from end of stitch condensing to speed release Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Full power of stitch condensing Pulsing of stitch condensing Activation delay time until presser foot after chain cutter Start stitch condensing speed Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length)	F-200 F-202 F-203 F-204 F-212 F-213 F-206 F-001 F-002 F-003

Chainstitch mode 3: trimming from full run

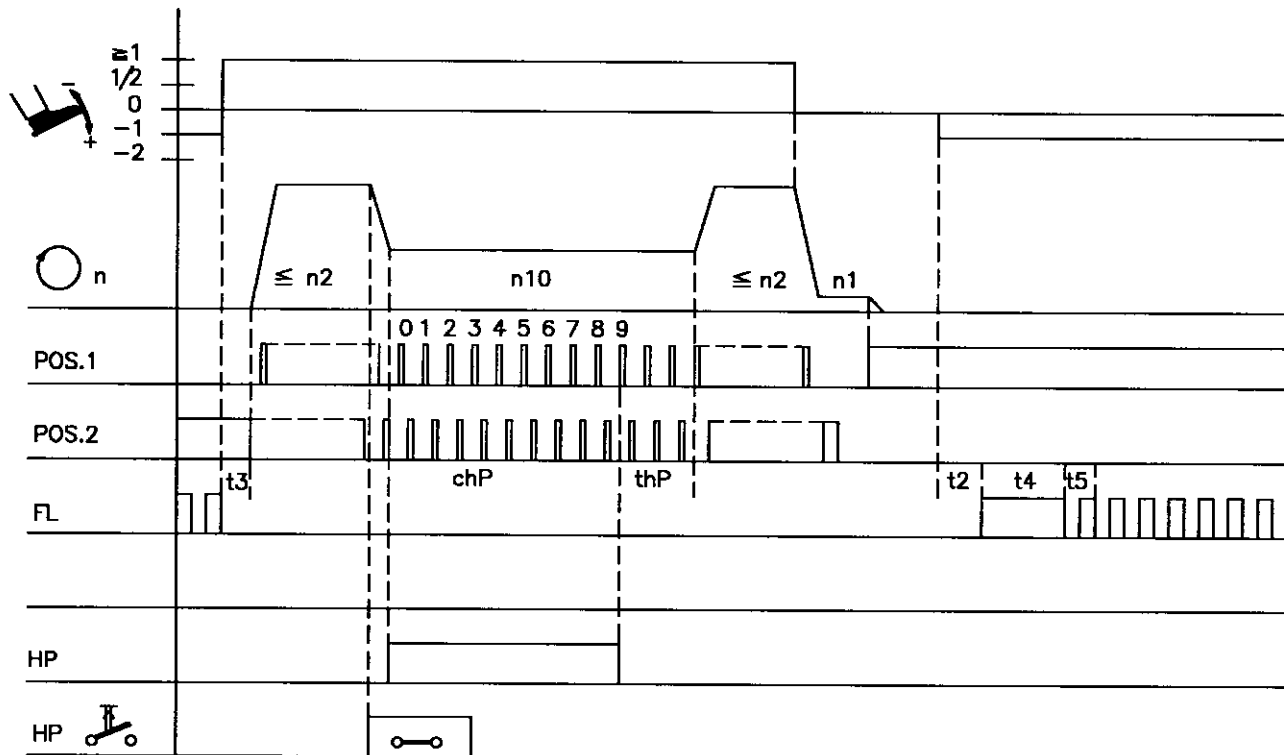


0192/FALAUF-3

FL	=	Presser foot lifting
STV	=	Stitch condensing
M1 (AH)	=	Tape cutter
M1 (FK)	=	Thread clamp

Abbreviation	Function	Parameter/Pushbutton
KEt	Stitch condensing at the start of the seam Stitch condensing at the seam end Chain stitch mode 3	on on Pushbutton 7 Pushbutton 8 F-185
n2 n3 n4 n7	Maximum speed Stitch condensing speed at the start of the seam Stitch condensing speed at the seam end Trimming speed	F-111 F-112 F-113 F-116
t1 t3 t4 t5 t7 t10 t11 SFA KFA dFW Arr Err Erv	Delay from end of stitch condensing to speed release Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Delay from end of thread wiper to presser foot lifting Full power of stitch condensing Pulsing of stitch condensing Stitches until tape cutter at the start of the seam Activation time tape cutter Delay time tape cutter at the seam end Start stitch condensing speed Number of end stitch condensing stitches (reduced stitch length) Number of end stitch condensing stitches (normal stitch length)	F-200 F-202 F-203 F-204 F-206 F-212 F-213 F-192 F-187 F-188 F-001 F-002 F-003

Machine run with high lift for walking foot



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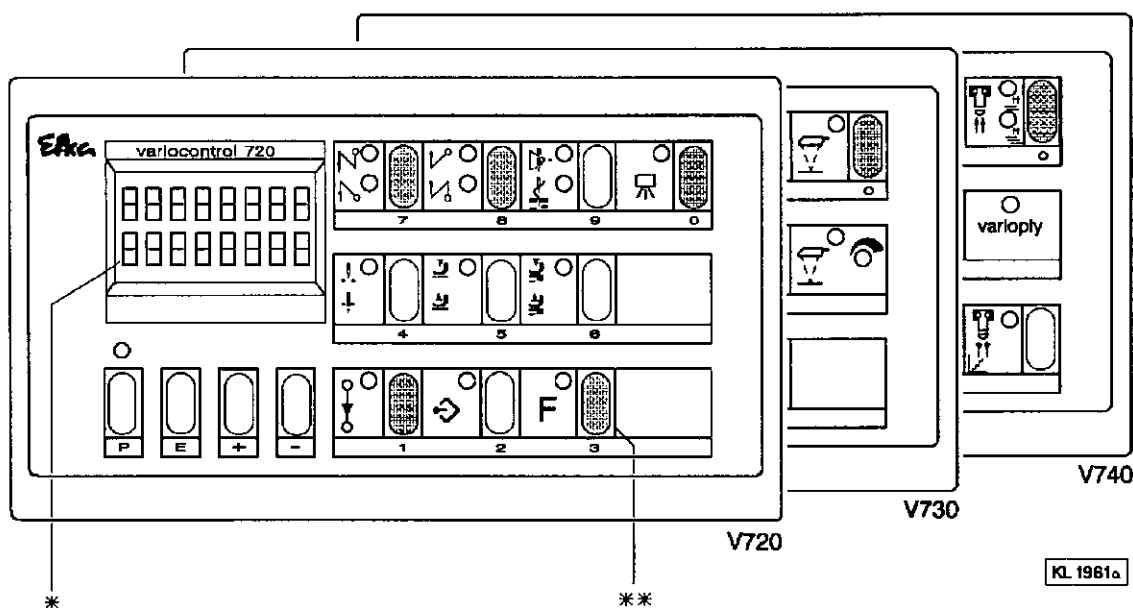
FL = Presser foot lifting
HP = High lift for walking foot

Abbreviation	Function	Parameter/Pushbutton
hP MhP	High lift for walking foot High lift for walking foot stored	on 2 F-137 F-186
n1 n2 n10	Positioning speed Maximum speed High lift walking speed	F-110 F-111 F-117
thP t2 t3 t4 t5	Run-out time of the high lift walking speed Delay of presser foot lifting with pedal in pos. -1 Start delay from lifted foot Full power of presser foot lifting Holding power of presser foot lifting	F-152 F-201 F-202 F-203 F-204

For your notes:

For your notes:

13. Operating Elements of the Variocontrol



*) Display

**) Pushbuttons with hatching: special setting for HIT

Functional Setting of the Pushbuttons

Pushbutton P =	Recall or exit programming mode
Pushbutton E =	Enter button for modifications in the programming mode
Pushbutton + =	Increase of the value indicated in the programming mode
Pushbutton - =	Decrease of the value indicated in the programming mode
Pushbutton 1 =	Stitch counting ON / OFF
Pushbutton 2 =	Teach-in / execution of 40 possible seam sections
Pushbutton 3 =	Function key - programmable
Pushbutton 4 =	Basic position of the needle (bottom/upper dead center) POSITION 1 / POSITION 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 =	Stitch condensing at the start of the seam ON / OFF
Pushbutton 8 =	Stitch condensing at the seam end ON / OFF
Pushbutton 9 =	THREAD TRIMMER / THREAD TRIMMER + THREAD WIPER / OFF
Pushbutton 0 =	Light barrier function ON / OFF

Special Setting of the Pushbuttons for HIT

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

Pushbutton 1 =	Number of stitches of the seam with stitch counting
Pushbutton 3 =	Number of stitches or switching on/off the programmed function
Pushbutton 7 =	Number of stitches of the selected start stitch condensing
Pushbutton 8 =	Number of stitches of the selected end stitch condensing
Pushbutton 0 =	Number of light barrier compensating stitches

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