Efka vario dc

CONTROL AM82MV3205

INSTRUCTION MANUAL

No. 402060 **english**

Efka
FRANKL & KIRCHNER
GMBH & CO KG

Efka
EFKA OF AMERICA INC.

Efka
EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

Contents Page

1. Important Safety Instructions

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

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

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

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

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

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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	Series
Union-Special	Overlock machines and flat seam machines classes 39500 and 36200

2.1 Use in Accordance with Regulations

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

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

EN 60204-3-1 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 AM82MV3205
	- Power pack	N152 (optional N153, N155)
	- Speed controller	EB301
1	Control panel Variocontrol	V736 *1)
1	Positioner	P6-1
1	Mains switch	NS105
1	Set of standard accessories consisting of:	B131 belt guard complete set of hardware motor foot bracket 1 and 2, short documentation
1	Pulley	

*1) Light barrier control possible by using:
V736 - Reflection light barrier LS-001-006

3.1 Special Accessories

Storage unit Memory Box MB001	- part no. 7900052
Storage card Memory Card MC001	- part no. 1111602
Reflection light barrier Variolux LS-001-006	- part no. 6100005
Solenoid type EM1..(for e.g. presser foot lift, backtacking, etc.)	- available versions see specification solenoids
Extension cable for external speed controller, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external speed controller, approx. 1500 mm long, complete with plug and socket connector	- part no. 1111787
5-pin plug with slide index for the connection of another external control	- part no. 0501278
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4160018
Extension cable for positioner, approx. 1100 mm long, complete with plug and socket connector	- part no. 1100409
Extension cable for commutation transmitter, approx. 315 mm long, complete with plug and socket connector	- part no. 1111229
Extension cable for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector	- part no. 1111584
Extension cable for motor connection, approx. 400 mm long	- part no. 1111858
Extension cable for motor connection, approx. 1500 mm long	- part no. 1111857
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	- part no. 58.0013 *1)
Sewing light transformer	- please indicate line voltage and sewing light voltage (6.3V or 12V)
6-pin plug with slide index	- part no. 0500703
7-pin plug with slide index	- part no. 0502474
8-pin plug with slide index	- part no. 0502865
6-pin plug (Hirschmann Mes60	- part no. 0500457
10-pin plug (Hirschmann Mes100)	- part no. 0500357

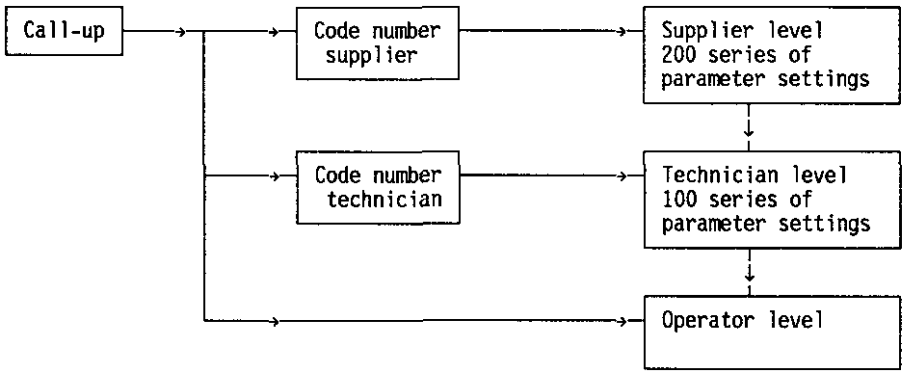
*1) Available colors on inquiry

4. Operation

4.1 Access to Programming on Command Input

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

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



4.2 Code Number Input

1. TURN POWER OFF

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

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

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

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

F-XXX = first parameter number in the recalled level

4.3 Direct Operation

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

Example initial backtack: - Double initial backtack is on	top LED7 lights up	I [7] 0
Push button 7 briefly - Initial backtack is off	both LED7 off	0 [7] 0
Push button 7 briefly - Single initial 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 ==> [F-XXX]
Display of the first PARAMETER NO.

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

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

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

(Example)

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

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

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

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

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

   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, the programming is changed in the following manner:

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

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

5.2 Initial Operation (New Motor)

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

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

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

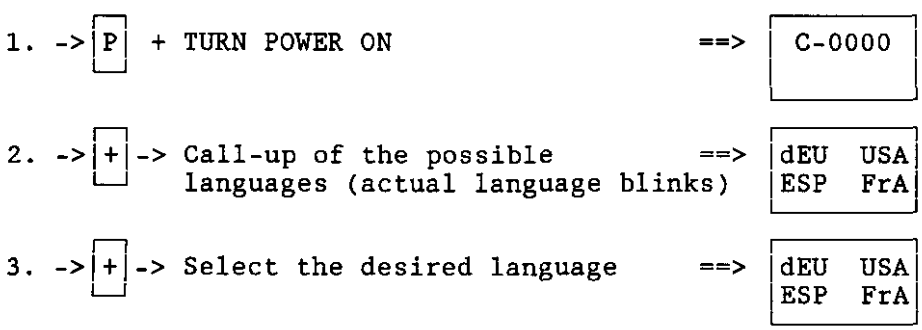
6. Aids for Putting into Operation and for Setting

6.1 Fast Installation Routine (SIR)

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

6.1.1 Putting into Operation by Using SIR

Example:



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

5. -> [E] -> Adjust position 1. Turn positioner to the desired position. ==> PoSition 1 328

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

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

6. -> [E] -> Adjust position 2. Turn positioner to the desired position. ==> PoSition 2 400

7. -> [E] -> Adjust the positioning speed ==> Lo SPEEd n1 0180

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

8. -> [E] -> Adjust the initial counting speed ==> b SPEEd n3 3000

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

9. -> [E] -> Adjust the final counting speed ==> E SPEEd n4 3000

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

10. -> [E] -> Adjust the maximum speed ==> hi SPEEd n2^ 3800

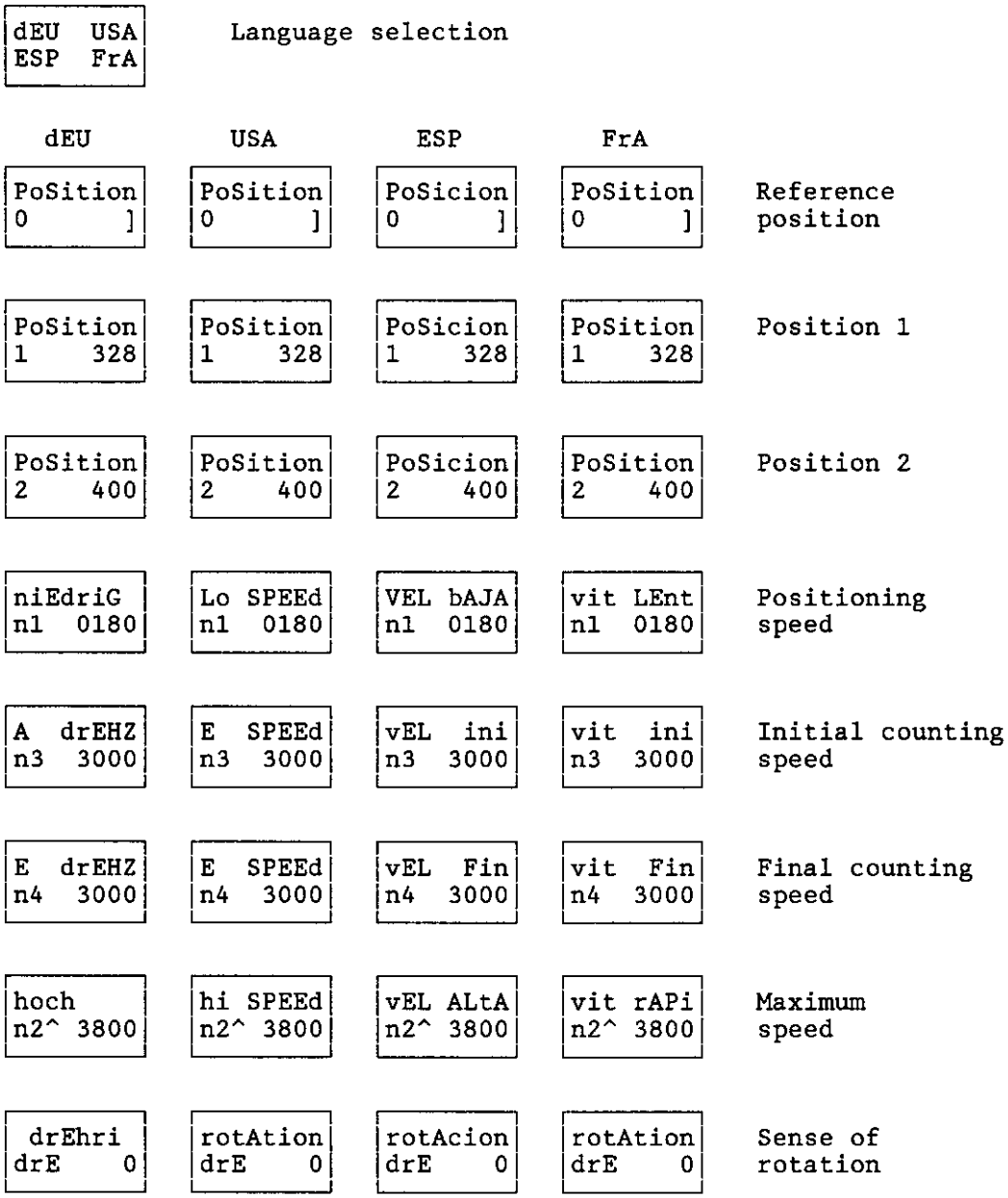
-> [+] -> [-] -> Change value

11. -> [E] -> Adjust the sense of rotation ==> rotAtion drE 0

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

12. -> [E] -> Entry into normal operation after POWER ON. ==> 3800 AM82MV

6.1.2 Multilingual Display

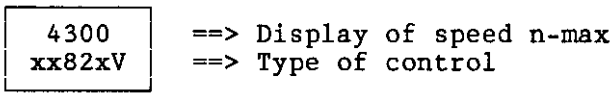


6.2 Direct Input of Speed (DED)

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

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:



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 the positioning speed with parameter F-110.
As usual, saving the value is done by the next sewing start.

6.3 Pushbuttons for Background Information (HIT)

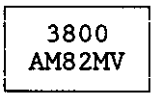
(see table on the last page)

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

6.3.1 Examples for HIT

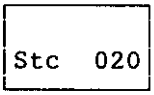
Increase stitch-count seam section from 20 stitches to 25 stitches.

If stitch counting (pushbutton 1) was turned off.



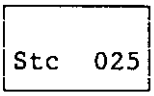
Display after power on:
-> Maximum speed
-> Type designation

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

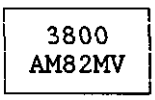


Display:
20 stitches are set.

Press pushbutton +,
number of stitches increases.

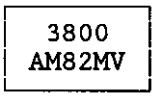


Display:
25 stitches are set.
Changes are automatically entered after
3 seconds.



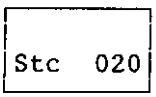
Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

If stitch counting (pushbutton 1) was turned on.



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

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



Display:
20 stitches are set.

[+]	Press pushbutton +, number of stitches increases.
Stc 025	Display: 25 stitches are set. Changes are automatically entered after 3 seconds.
3800 AM82MV	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:

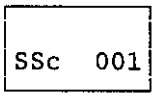
1 LSS Sewing start blocked with light barrier uncovered ON/OFF
2 SSt Softstart ON/OFF
3 SLS Chain suction Light barrier section at the start of the seam ON/OFF
4 Sht Full stitch with pushbutton needle up/down ON/OFF
5 S1h Signal M1 ON/OFF
6 S2h Signal M2 ON/OFF
7 S3h Signal M3 ON/OFF
8 S4h Signal M4 ON/OFF
9 Frd Reversion ON/OFF
10 Ent Unlocking the chain ON/OFF

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

3800 AM82MV	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 (chain suction light barrier section ON/OFF)
[-]	Press pushbutton -. (+ increases, - decreases the display value)
-F- 2	Display: New status (Softstart ON/OFF)
[P]	Press pushbutton P.
3800 AM82MV	Setting is terminated, display: -> Maximum speed -> Type designation

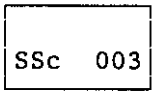
The number of Softstart stitches can be changed as follows:
Example: change number of stitches from 1 to 3 (function Softstart (pushbutton 3) was turned off).

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

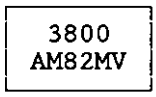


Display:
1 stitch is set

Press pushbutton +,
number of stitches increases.



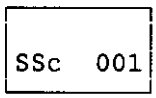
Display:
3 stitches are set
Changes are automatically entered after
3 seconds.



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

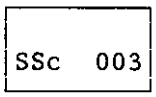
If Softstart (pushbutton 3) was turned on.

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

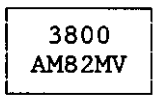


Display:
1 stitch is set

Press pushbutton +,
number of stitches increases.



Display:
3 stitches are set



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

With the sewing start the new value is saved.

7. Functions and Settings

7.1 First Stitch after Power On

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

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

7.2 Program Identification

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

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

Display example parameter 179:

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

7.3 Function Key (Pushbutton 3)

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

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

Programmable functions:

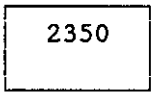
F-008 = 1 - Sewing start blocked with light barrier uncovered ON/OFF
F-008 = 2 - Softstart ON/OFF
F-008 = 3 - Chain suction light barrier section at the start of the seam ON/OFF
F-008 = 4 - Full stitch with pushbutton needle up/down ON/OFFon/off
F-008 = 5 - Signal M1 ON/OFF
F-008 = 6 - Signal M2 ON/OFF
F-008 = 7 - Signal M3 ON/OFF
F-008 = 8 - Signal M4 ON/OFF
F-008 = 9 - Reversion ON/OFF
F-008 = 10 - Unlocking the chain ON/OFF

7.4 Display Actual Speed

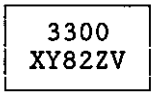
Functions	Abbreviation on the display	Parameter
Display actual speed	nIS	F-139

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

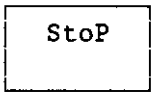
During machine run:
- the actual speed
Example: 2350 rotations per minute



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



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



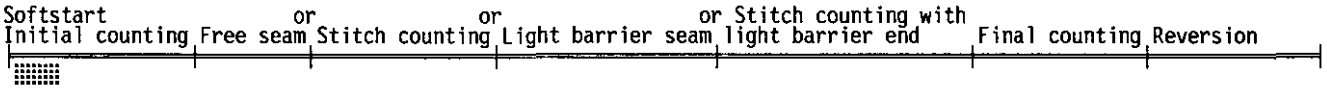
7.5 Sense of Rotation of the Motor

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

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

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

7.6 Softstart



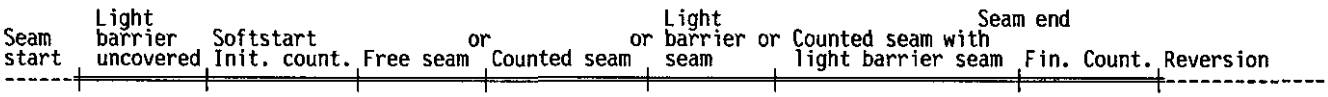
Functions	Abbreviation on the Display	Parameter
Softstart number of stitches	SSc	F-100
Softstart speed	n6	F-115
Softstart on/off	SSt	F-134

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

Direct access by function key (pushbutton 3)

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

7.7 Description of the Seam Sections



Functions	Abbreviation on the display	Parameter
Sewing start blocked with light barrier uncovered	LSS	F-132

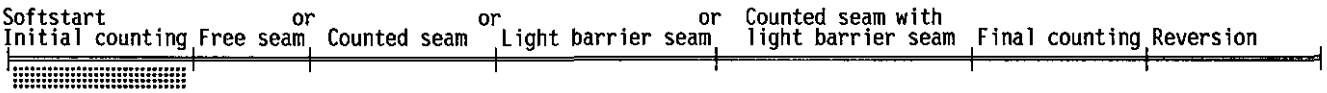
7.7.1 Seam Start

The drive is at standstill, no running command is given by the pedal. If parameter F-132 = ON sewing can only be started with light barrier covered.

7.7.2 Light Barrier Uncovered

This seam section is active if the light barrier is "uncovered" and the drive is running. If parameter F-132 = ON this seam section is skipped.

7.7.3 Initial Counting 1, Initial Counting 2



Functions	Abbreviation on the display	Parameter
Chain suction Start / end / off Chain cutter Start / end / off		Pushbutton 7 Pushbutton 9
Initial counting 1 Initial counting 2 Stitches until chain cutter On Activation time chain cutter	c01 c03 AbS t01	F-000 F-002 F-052 F-124
Chain suction at the start Thread tension release at the start Chain cutter at the start	above display above display above display	Pushbutton 7 Pushbutton 8 Pushbutton 9

The initial countings are activated if more than 0 stitches are set by the parameters and chain suction or chain cutter are switched on. The initial countings are executed according to the "mode initial counting speed".

The signal "chain suction" can be activated on the Variocontrol by pushbutton 7 for the duration of initial counting 1; the signal "thread tension release" can be activated on the Variocontrol by pushbutton 8 for the duration of initial counting 2. The seam section "initial countings" is finished by the end of initial counting 1. i.e. both signals "chain suction" and "thread tension release" are switched off. Then, the signal chain cutter is activated for the time t01, delayed by the stitches AbS.

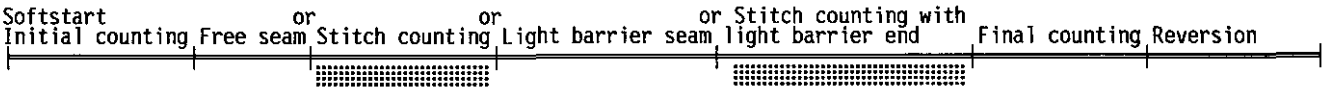
7.7.4 Mode Initial Counting Speed

Functions	Abbreviation on the display	Parameter
Mode initial counting speed Fixed speed initial counting Limited speed initial counting	SnA n3 n9	F-040 F-112 F-116

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

Mode 0: Execution at pedal speed.
Mode 1: Execution at fixed speed, as long as pedal is actuated.
Mode 2: Execution at limited speed n9, as long as pedal is actuated.
Mode 3: Automatic execution at fixed speed n3, as soon as the pedal has been actuated once. Termination by "heeling the pedal back (-2)".

7.7.5 Seam with Stitch Counting



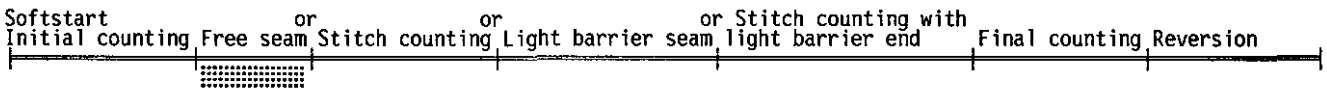
Functions	Abbreviation on the display	Parameter
Stitch counting on/off		Pushbutton-1
Number of stitches	Stc	F-007
Speed mode for a seam with stitch counting	SGn	F-041
Stitch counting speed	n12	F-118

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

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

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

7.7.6 Free Seam



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
Speed mode Free seam	SFn	F-042

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

Mode 0: Execution at pedal 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 actuated once.
The seam end is initiated by the light barrier.
Termination by heeling the pedal back (-2) is possible.

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

The maximum speed is shown on the display after power on and after seam end and can be changed directly by pushbuttons +/- on the Variocontrol. The setting range is limited by the set values of parameters F-110 and F-111.

7.8 Needle Up/Down

Functions	Abbreviation on the display	Parameter
Mode for pushbutton needle up/down or full stitch	Sht	F-140

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

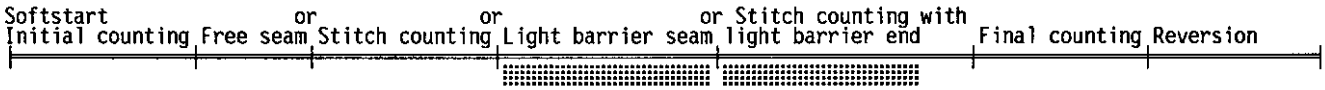
Needle up/down: F-140 = OFF
When the pushbutton is pressed, the drive only runs from position 1 to position 2 and/or from position 2 to position 1. If the drive is outside of position 1 it runs to the next possible position.

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

Direct access by function key (pushbutton 3)

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

7.9 Light Barrier



7.9.1 General Light Barrier Functions (V736)

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 (inversion)	LSd	F-131
Sewing start blocked with light barrier uncovered	LSS	F-132
Light barrier seam end with thread trimming	LSE	F-133

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

7.9.2 Reflection Light Barrier

Functions	Abbreviation on the display	Parameter
Light barrier on/off Sensitivity adjustment when using LS001		Pushbutton 0 Potentiometer on the V736
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

Mechanical Orientation:

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

7.9.3 Automatic Start by Light Barrier

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.

7.9.4 Light Barrier Filter for Knitted Fabrics

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

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

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

7.10 Outline of Parameters for Light Barrier Functions

7.10.1 Operator Level

F-004 LS 007	Number of stitches from light barrier UNCOVERED to the beginning of final counting for chain suction. (Here 7 stitches are set).
F-005 LSF 002	Number of filter stitches when sewing knitted fabrics. (Here 2 stitches are set).
F-006 LSn 003	Number of light barrier sections until execution of the seam end. (Here 3 sections are set).
F-023 FLE OFF	Suppression of automatic foot lifting at the light barrier seam end with pedal > 1. (Only effective if parameters F-133 or F-147 are set to ON).

7.10.2 Technician Level

F-128 ASd 0200	Time delay for automatic start with light barrier. (Here 200 milliseconds are set).
F-129 ALS OFF	Automatic start with light barrier On/Off. (Only effective if parameters F-132 or F-133 are set to ON).
F-130 LSF ON	Light barrier filter stitches On/Off.
F-131 LSd ON	ON = Light barrier sensing from covered to uncovered. OFF = Light barrier sensing from uncovered to covered.
F-132 LSS ON	ON = Sewing start only possible with light barrier covered. OFF = Sewing start possible with light barrier uncovered.
F-133 StP ON	Light barrier stop after final counting for chain suction and chain cutter On/Off.
F-148 LSA OFF	Start of initial counting chain suction with light barrier uncovered On/Off. ON = Start of initial counting immediately on the command "run", no matter whether the light barrier senses uncovered or covered. OFF = Start of initial counting only possible, when light barrier is covered.
F-149 LSU OFF	Suppression of the light barrier stitches in the last light barrier seam.

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 = 1

7.10.3 Supplier Level

F-224
LSh OFF

Light barrier control during initial counting for chain suction and chain cutter.
ON = If the light barrier is uncovered during initial counting the latter is interrupted and the chain cutter is suppressed. A new seam begins.
OFF = Control is switched off.

7.11 Chain Suction

The signal chain suction can be selected separately for initial and final counting by pushbutton 7 on the control panel. If chain suction and chain cutter are switched off the respective counting is not done.

7.12 Outline of Parameters for Chain Suction

7.12.1 Operator Level

F-000
c01 005

Initial counting!
Number of stitches for the duration of activation of the signal chain suction, or stitches until signal chain cutter, respectively.
Start of counting on command "run" and light barrier covered.

F-001
c02 004

Final counting!
Number of stitches for the duration of activation of the signal chain suction, or stitches until signal chain cutter after final counting.
Start of counting after light barrier sensing and light barrier compensating stitches (according to F-004 and F-149).

F-020
SLS ON

Chain suction at the start of the seam, when light barrier senses uncovered.
ON = Chain suction on
OFF = Chain suction off

F-021
SPO OFF

Chain suction at the seam end until pedal is back in position 0 (neutral).
ON = Chain suction on until pedal is in position 0 (neutral)
OFF = Chain suction after final counting off

F-022
t04 0000

Switch-off delay of the signal chain suction at stop at the seam end in milliseconds.
(Only effective if F-021 = OFF)

F-025
KSS OFF

ON = The signal chain suction is activated for the duration of stitch counting.
OFF = The signal chain suction is not activated for the duration of stitch counting.

7.12.2 Technician Level

F-147 SAc OFF

Stop after initial counting
ON = The drive stops at the end of initial counting. After the pedal was in position 0 (neutral), the seam can be continued with stitch counting or as free seam.
OFF = The stitch counting and/or free seam is continued immediately at the end of initial counting.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Chain suction light barrier section On/Off	-F-	F-008 = 3

7.13 Chain Removal by Suction

Functions	Abbreviation on the display	Parameter
Chain removal by suction at the start and at the end on/off		Pushbutton 8
Stitches initial counting	c01	F-000
Stitches stitch counting	Stc	F-007
Stitches final counting	c02	F-001
Stitches final counting until start chain removal by suction	c04	F-003
Initial counting speed	n3	F-112
Final counting speed	n4	F-113

The signal CHAIN REMOVAL BY SUCTION can be selected separately for initial and final counting by pushbutton 8 on the Variocontrol. Activation at the start is done by initial counting (c01) and can be prolonged by stitch counting (Stc). During initial counting until the end of signal CHAIN CUTTER the speed is limited to initial counting speed. Activation at the end is done by final counting (c02) and is effective until the stop. If final counting is activated the signal CHAIN REMOVAL BY SUCTION is only activated by the number of stitches after light barrier UNCOVERED. During the final countings final counting speed is effective (n4).

7.14 Outline of Parameters for Chain Removal by Suction

7.14.1 Operator Level

F-000 c01 010

Initial counting!
Number of stitches for the duration of activation of the signal chain removal by suction.
Start of counting on command "run" and light barrier covered.

F-001 c02 004

Final counting!
Number of stitches for the duration of activation of signal chain removal by suction and/or stitches until signal chain cutter after final counting. Start of counting after light barrier sensing and after the light barrier compensating stitches (according to F-004 and F-149).

F-003 c04 000	Final counting! Number of stitches until start of chain removal by suction. Start of counting when light barrier uncovered.
F-007 Stc 000	Stitch counting for chain removal by suction! Start with the signal chain cutter at the start of the seam.

7.14.2 Technician Level

F-120 FnA ON	Chain removal by suction at the start of the seam if drive is at standstill on/off.
F-121 FLS ON	Chain removal by suction at the start of the seam if drive is running and the light barrier is "uncovered" on/off.
F-122 FSt OFF	Chain removal by suction during the counted seam on/off.
F-123 FnE ON	Chain removal by suction at the seam end on/off.

7.15 Chain Cutter

Functions	Abbreviation on the display	Parameter
Chain cutter Start / End / off		Pushbutton 9
Stitches until chain cutter on Time until chain cutter on Chain cutter final counting or seam end	AbS tdA AbE	F-052 F-053 F-125

7.15.1 Automatic Chain Cutter Control

The chain cutter is switched on by pushbutton 9 on the Variocontrol.

Chain cutter after initial counting:

The chain cutter is activated after initial counting (F-000) and execution of the delay stitches (F-052).

Chain cutter after final counting and/or at the seam end:

Chain cutter after final counting or chain cutter at standstill at the seam end can be selected by parameter F-125.

F-125 AbE OFF	ON = The chain cutter is activated at the seam end only at standstill after the delay time. OFF = The chain cutter is activated after final counting, after the delay time.

7.15.2 Chain Cutter Recall / Suppression

The next "automatic chain cutter activation" can be suppressed once at the socket b12/6 by the external pushbutton. If, for example, the pushbutton is pressed in the seam the "chain cutter at the end" is suppressed.

If the "chain cutter at the start" or the "chain cutter at the end" is switched off by pushbutton 9 on the Variocontrol the next "automatic chain cutter activation" is initiated after pressing the external pushbutton.

7.15.3 Manual Chain Cutter

The chain cutter can be activated any time at b3/4 by the external pushbutton, even if the function is switched off by pushbutton 9 on the control panel.

7.16 Outline of Parameters for Chain Cutter

7.16.1 Operator Level

F-050 c05 000	Number of stitches for the duration of activation of the chain cutter at the seam end in order to jam the chain. (Parameter F-050 is only effective if parameters F-125 and F-126 are set at ON)
F-052 AbS 000	Number of stitches until the chain cutter is switched on at the start of the seam. The counting begins when initial counting chain suction is finished.
F-053 tdA 000	Time until the chain cutter is switched on at the seam end. The time starts when the final counting chain suction is finished. See also F-125.

7.16.2 Technician Level

F-124 t01 080	Activation time chain cutter
F-125 AbE OFF	ON = The chain cutter is activated at the seam end after the delay time. OFF = The chain cutter is activated after final counting, after the delay time.
F-126 Abk OFF	Use of the chain cutter signal for jamming the chain.

7.17 Chain Cutter Systems

Various chain cutter systems can be addressed by parameter F-222.

F-222 FAb 1	The chain cutter is activated after initial and final counting of the signal chain suction for the time t01 (F-124). The chain cutter signal is emitted at the socket b3/10.

F-222
FAb 2

The chain cutter is activated after initial and final counting of the signal chain suction for the time t01 (F-124).
The chain cutter signal is emitted at the socket b3/10 (AH1) and b3/8 (AH2). The function chain suction is here no longer active.

F-222
FAb 3

The chain cutter is switched as a continuous signal. After POWER ON the chain cutter signal is not active. After initial counting and final counting, respectively, the chain cutter signal is inverted.

7.18 Blow Fabric on Stacker

Functions	Abbreviation on the display	Parameter
Blow fabric on stacker on/off		Pushbutton 2
Number of seam ends until blowing fabric on stacker	ckb	F-024
Blow fabric on stacker automatically at the seam end	kbA	F-144
Activation delay for blowing fabric on stacker	t02	F-145
Operating time for blowing fabric on stacker	t03	F-146

The signal BLOW FABRIC ON STACKER can be switched on and/or off by pushbutton 2 on the Variocontrol. It is used as a stacker signal.

The following 4 parameters are only effective if parameter F-222 is not set at 2.

7.19 Outline of Parameters for BLOWING FABRIC ON STACKER

7.19.1 Operator Level

F-024
ckb 001

The parameter determines the number of seam ends until the signal "blow fabric on stacker" is activated. If the parameter is modified the counting of the seam ends starts anew.
Parameter F-024 is only effective if parameter F-144 is set at ON.

7.19.2 Technician Level

F-144
kbA OFF

Automatic "blow fabric on stacker" at the seam end.
ON = The signal is emitted at each automatic stop at the seam end. It cannot be activated in the seam.
OFF = The signal can be activated by pedal in position -2.

F-145
t02 050

Activation delay for the signal "blow fabric on stacker".

F-146
t03 0100

Operating time of the signal "blow fabric on stacker".

7.20 Mode Running Signal

Functions	Abbreviation on the display	Parameter
Mode running signal	LSG	F-155
Switch-off delay of running signal	t05	F-156

The function of the running signal can be modified by parameter F-155.

F-155 LSG 1	When the drive is running, the signal is active. When the drive stops, the signal remains active for the duration of the switch-off delay.
F-155 LSG 2	When the drive runs faster than 3000 rotations per minute, the signal is active. The signal is switched off, when the drive runs slowlier than 3000 rotations per minute and the activation delay is finished.
F-155 LSG 3	The signal is active, when the pedal is not in position 0 (neutral).
F-155 LSG 4	The signal is active, when the pedal is in position 0 (neutral).
F-156 t05 000	Activation delay for the running signal. It is ineffective, when F-133 is set to 3 or 4.

7.21 Signal M1

7.21.1 Summary of Parameters M1

Functions	Abbreviation on the display	Parameter
Activation delay M1	*4	F-080
Activation M1	*4	F-081
Function M1	FS1	F-280
Aktivation of signal sequence	*4	F-281
Activation of M1 at intermediate stop	S1h	F-290

*4 The displayed parameter abbreviations can differ according to functional setting.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Signal M1 On/Off	-F-	F-008 = 5

The signal M1 can be activated in various seam sections and its effect can vary according to the programmed function.

7.21.2 Description of the Functions M1

The function of the signal M1 can be set by parameter F-280.

Function 1 Static activation

F-280 FS1 001	Signal M1 is statically activated in the seam sections, as preselected by F-281.

Hence it follows:

F-080 d11 FESt	Here the activation delay is 0 and cannot be changed.
F-081 S1 ON	The activation of M1 can be switched on and/or off by the +/- pushbuttons.

Function 2 Activation delay and signal activation determined by time

F-280 FS1 002	Signal M1 is switched on with a time lapse and remains activated for a preselected time.

Hence it follows:

F-080 t06 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-081 t07 0200	The activation time M1 (here 200 ms) can be changed by the +/- pushbuttons.

Function 3 Activation delay determined by stitches, activation determined by stitches

F-280 FS1 003	Signal M1 is switched on with a time delay for a number of stitches and remains activated for a preselected number of stitches.

Hence it follows:

F-080 c06 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.
F-081 c07 010	Here the signal M1 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 4 Activation delay determined by time, activation determined by stitches

F-280 FS1 004	Signal M1 is switched on with a time lapse and remains activated for a preselected number of stitches.

Hence it follows:

F-080 t06 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-081 c07 010	Here the signal M1 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 5 Activation delay determined by stitches, activation determined by time

F-280 FS1 005	Signal M1 is switched on with a time delay for a number of stitches and remains activated for a preselected time.

Hence it follows:

F-080 c06 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- pushbuttons.
F-081 t07 0200	The activation time M1 (here 200 ms) can be changed by the +/- pushbuttons.

7.21.3 Activation of Signal M1 in the Seam Sections

The seam is divided into 8 seam sections. The seam sections can be switched on and/or off by pushbuttons 1-8.

Pushbutton / seam section

1 = Start of the seam, drive at standstill, pedal not actuated.
2 = Start of the seam, light barrier uncovered, drive is running.
3 = Start of the seam, light barrier covered, CHAIN SUCTION at the start of the seam, drive is running.
4 = Stitch counting, light barrier covered.
5 = Free seam, light barrier covered.
6 = Light barrier compensating stitches, light barrier uncovered.
7 = Seam end, light barrier uncovered, CHAIN SUCTION at the seam end.
8 = Seam end, when motor at standstill.

The signal starts, when the seam section in parameter F-281 was activated by pressing the corresponding pushbutton.

Examples:

```
  F-281
--------
```

Signal M1 does not start in any seam section.

```
  F-281
--1-----
```

Call-up of the seam section by pressing the corresponding pushbutton.
Pressing pushbutton 3: signal M1 starts with initial counting chain suction (light barrier covered).
Display: 1 in seam section 3.
Pressing pushbutton 3 erases the call-up.

```
  F-281
--1----1
```

Call-up of the seam sections by pressing the corresponding pushbuttons.
Pressing pushbutton 3: signal M1 starts with initial counting chain suction (light barrier covered).
Pressing pushbutton 8: signal M1 starts again at the seam end.
Pressing pushbuttons 3 and/or 8 again erases the call-up.

7.21.4 Activation at Intermediate Stop

```
  F-290
S1h  ON
```

ON -> The signal M1 can be switched on and/or off at intermediate stop by the +/- pushbuttons.
OFF -> The signal M1 cannot be switched on at intermediate stop.

7.22 Signal M2

7.22.1 Summary of Parameters M2

Functions	Abbreviation on the display	Parameter
Activation delay M2	*4	F-082
Activation M2	*4	F-083
Function M2	FS2	F-282
Aktivation of signal sequence	*4	F-283
Activation of M2 at intermediate stop	S2h	F-291

*4 The displayed parameter abbreviations can differ according to functional setting.

Direct access by function key (pushbutton 3)

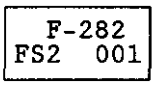
Functions	Abbreviation on the display	Parameter
Signal M2 On/Off	-F-	F-008 = 6

The signal M2 can be activated in various seam sections and its effect can vary according to the programmed function.

7.22.2 Description of the Functions M2

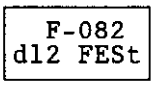
The function of the signal M2 can be set by parameter F-282.

Function 1 Static activation

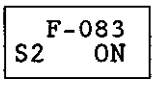


Signal M2 is statically activated in the seam sections, as preselected by F-283.

Hence it follows:

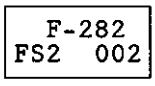


Here the activation delay is 0 and cannot be changed.



The activation of M2 can be switched on and/or off by the +/- pushbuttons.

Function 2 Activation delay and signal activation determined by time



Signal M2 is switched on with a time lapse and remains activated for a preselected time.

Hence it follows:

F-082 t08 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-083 t09 0200	The activation time M2 (here 200 ms) can be changed by the +/- pushbuttons.

Function 3 Activation delay determined by stitches, activation determined by stitches

F-282 FS2 003	Signal M2 is switched on with a time delay for a number of stitches and remains activated for a preselected number of stitches.

Hence it follows:

F-082 c08 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.
F-083 c09 010	Here the signal M2 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 4 Activation delay determined by time, activation determined by stitches

F-282 FS2 004	Signal M2 is switched on with a time lapse and remains activated for a preselected number of stitches.

Hence it follows:

F-082 t08 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-083 c09 010	Here the signal M2 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 5 Activation delay determined by stitches, activation determined by time

F-282 FS2 005	Signal M2 is switched on with a time delay for a number of stitches and remains activated for a preselected time.

Hence it follows:

F-082 c08 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.
F-083 t09 0200	The activation time M2 (here 200 ms) can be changed by the +/- pushbuttons.

7.22.3 Activation of Signal M2 in the Seam Sections

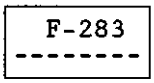
The seam is divided into 8 seam sections. The seam sections can be switched on and/or off by pushbuttons 1-8.

Pushbutton / seam section

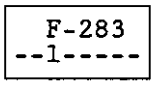
1 = Start of the seam, drive at standstill, pedal not actuated.
2 = Start of the seam, light barrier uncovered, drive is running.
3 = Start of the seam, light barrier covered, CHAIN SUCTION at the start of the seam, drive is running.
4 = Stitch counting, light barrier covered.
5 = Free seam, light barrier covered.
6 = Light barrier compensating stitches, light barrier uncovered.
7 = Seam end, light barrier uncovered, CHAIN SUCTION at the seam end.
8 = Seam end, when motor at standstill.

The signal starts, when the seam section in parameter F-281 was activated by pressing the corresponding pushbutton.

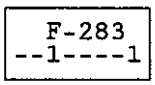
Examples:



Signal M2 does not start in any seam section.

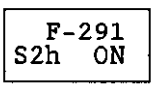


Call-up of the seam section by pressing the corresponding pushbutton.
Pressing pushbutton 3: signal M2 starts with initial counting chain suction (light barrier covered).
Display: 1 in seam section 3.
Pressing pushbutton 3 erases the call-up.



Call-up of the seam sections by pressing the corresponding pushbuttons.
Pressing pushbutton 3: signal M2 starts with initial counting chain suction (light barrier covered).
Pressing pushbutton 8: signal M2 starts again at the seam end.
Pressing pushbuttons 3 and/or 8 again erases the call-up.

7.22.4 Activation at Intermediate Stop



ON -> The signal M2 can be switched on and/or off at intermediate stop by the +/- pushbuttons.
OFF -> The signal M2 cannot be switched on at intermediate stop.

7.23 Signal M3

7.23.1 Summary of Parameters M3

Functions	Abbreviation on the display	Parameter
Activation delay M3	*4	F-084
Activation M3	*4	F-085
Function M3	FS3	F-284
Aktivation of signal sequence	*4	F-285
Activation of M3 at intermediate stop	S3h	F-292

*4 The displayed parameter abbreviations can differ according to functional setting.

Direct access by function key (pushbutton 3)

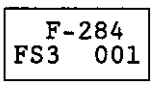
Functions	Abbreviation on the display	Parameter
Signal M3 On/Off	-F-	F-008 = 7

The signal M3 can be activated in various seam sections and its effect can vary according to the programmed function.

7.23.2 Description of the Functions M3

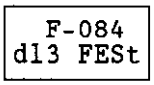
The function of the signal M3 can be set by parameter F-284.

Function 1 Static activation

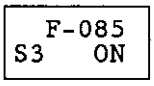


Signal M3 is statically activated in the seam sections, as preselected by F-285.

Hence it follows:

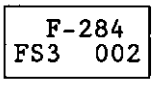


Here the activation delay is 0 and cannot be changed.



The activation of M3 can be switched on and/or off by the +/- pushbuttons.

Function 2 Activation delay and signal activation determined by time



Signal M3 is switched on with a time lapse and remains activated for a preselected time.

Hence it follows:

F-084 t10 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-085 t11 0200	The activation time M3 (here 200 ms) can be changed by the +/- pushbuttons.

Function 3 Activation delay determined by stitches, activation determined by stitches

F-284 FS3 003	Signal M3 is switched on with a time delay for a number of stitches and remains activated for a preselected number of stitches.

Hence it follows:

F-084 c10 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.
F-085 c11 010	Here the signal M3 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 4 Activation delay determined by time, activation determined by stitches

F-284 FS3 004	Signal M3 is switched on with a time lapse and remains activated for a preselected number of stitches.

Hence it follows:

F-084 t10 0080	Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.
F-085 c11 010	Here the signal M3 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 5 Activation delay determined by stitches, activation determined by time

F-284 FS3 005	Signal M3 is switched on with a time delay for a number of stitches and remains activated for a preselected time.

Hence it follows:

F-084 c10 010	Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.
F-085 t11 0200	The activation time M3 (here 200 ms) can be changed by the +/- pushbuttons.

7.23.3 Activation of Signal M3 in the Seam Sections

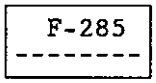
The seam is divided into 8 seam sections. The seam sections can be switched on and/or off by pushbuttons 1-8.

Pushbutton / seam section

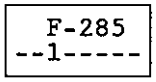
1 = Start of the seam, drive at standstill, pedal not actuated.
2 = Start of the seam, light barrier uncovered, drive is running.
3 = Start of the seam, light barrier covered, CHAIN SUCTION at the start of the seam, drive is running.
4 = Stitch counting, light barrier covered.
5 = Free seam, light barrier covered.
6 = Light barrier compensating stitches, light barrier uncovered.
7 = Seam end, light barrier uncovered, CHAIN SUCTION at the seam end.
8 = Seam end, when motor at standstill.

The signal starts, when the seam section in parameter F-281 was activated by pressing the corresponding pushbutton.

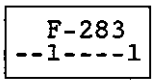
Examples:



Signal M3 does not start in any seam section.

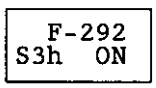


Call-up of the seam section by pressing the corresponding pushbutton.
Pressing pushbutton 3: signal M3 starts with initial counting chain suction (light barrier covered).
Display: 1 in seam section 3.
Pressing pushbutton 3 erases the call-up.



Call-up of the seam sections by pressing the corresponding pushbuttons.
Pressing pushbutton 3: signal M3 starts with initial counting chain suction (light barrier covered).
Pressing pushbutton 8: signal M3 starts again at the seam end.
Pressing pushbuttons 3 and/or 8 again erases the call-up.

7.23.4 Activation at Intermediate Stop



ON -> The signal M3 can be switched on and/or off at intermediate stop by the +/- pushbuttons.
OFF -> The signal M3 cannot be switched on at intermediate stop.

7.24 Signal M4

7.24.1 Summary of Parameters M4

Functions	Abbreviation on the display	Parameter
Activation delay M4	*4	F-086
Activation M4	*4	F-087
Function M4	FS4	F-286
Aktivation of signal sequence	*4	F-287
Activation of M4 at intermediate stop	S4h	F-293

*4 The displayed parameter abbreviations can differ according to functional setting.

Direct access by function key (pushbutton 3)

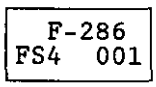
Functions	Abbreviation on the display	Parameter
Signal M4 On/Off	-F-	F-008 = 8

The signal M4 can be activated in various seam sections and its effect can vary according to the programmed function.

7.24.2 Description of the Functions M4

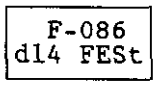
The function of the signal M4 can be set by parameter F-286.

Function 1 Static activation

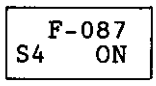


Signal M4 is statically activated in the seam sections, as preselected by F-287.

Hence it follows:

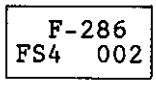


Here the activation delay is 0 and cannot be changed.



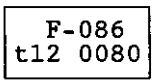
The activation of M4 can be switched on and/or off by the +/- pushbuttons.

Function 2 Activation delay and signal activation determined by time

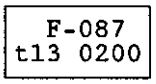


Signal M4 is switched on with a time lapse and remains activated for a preselected time.

Hence it follows:

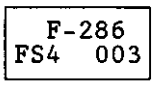


Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.



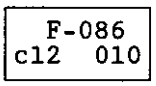
The activation time M4 (here 200 ms) can be changed by the +/- pushbuttons.

Function 3 Activation delay determined by stitches, activation determined by stitches

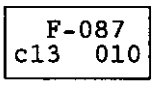


Signal M4 is switched on with a time delay for a number of stitches and remains activated for a preselected number of stitches.

Hence it follows:

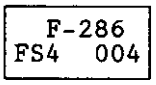


Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.



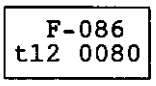
Here the signal M4 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 4 Activation delay determined by time, activation determined by stitches

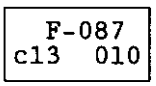


Signal M4 is switched on with a time lapse and remains activated for a preselected number of stitches.

Hence it follows:

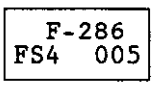


Here the activation delay is 80 ms and can be changed by the +/- pushbuttons.



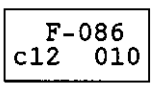
Here the signal M4 is switched on for the duration of 10 stitches. The setting can be changed by the +/- pushbuttons.

Function 5 Activation delay determined by stitches, activation determined by time

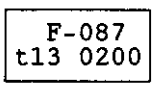


Signal M4 is switched on with a time delay for a number of stitches and remains activated for a preselected time.

Hence it follows:



Here 10 stitches are set as activation delay. The setting can be changed by the +/- push-buttons.



The activation time M4 (here 200 ms) can be changed by the +/- pushbuttons.

7.24.3 Activation of Signal M4 in the Seam Sections

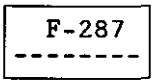
The seam is divided into 8 seam sections. The seam sections can be switched on and/or off by pushbuttons 1-8.

Pushbutton / seam section

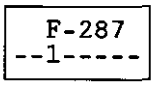
1 = Start of the seam, drive at standstill, pedal not actuated.
2 = Start of the seam, light barrier uncovered, drive is running.
3 = Start of the seam, light barrier covered, CHAIN SUCTION at the start of the seam, drive is running.
4 = Stitch counting, light barrier covered.
5 = Free seam, light barrier covered.
6 = Light barrier compensating stitches, light barrier uncovered.
7 = Seam end, light barrier uncovered, CHAIN SUCTION at the seam end.
8 = Seam end, when motor at standstill.

The signal starts, when the seam section in parameter F-281 was activated by pressing the corresponding pushbutton.

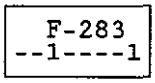
Examples:



Signal M4 does not start in any seam section.

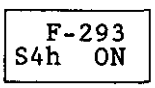


Call-up of the seam section by pressing the corresponding pushbutton.
Pressing pushbutton 3: signal M4 starts with initial counting chain suction (light barrier covered).
Display: 1 in seam section 3.
Pressing pushbutton 3 erases the call-up.



Call-up of the seam sections by pressing the corresponding pushbuttons.
Pressing pushbutton 3: signal M4 starts with initial counting chain suction (light barrier covered).
Pressing pushbutton 8: signal M4 starts again at the seam end.
Pressing pushbuttons 3 and/or 8 again erases the call-up.

7.24.4 Activation at Intermediate Stop



ON -> The signal M4 can be switched on and/or off at intermediate stop by the +/- pushbuttons.
OFF -> The signal M4 cannot be switched on at intermediate stop.

7.25 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic in the seam Automatic after seam end		Pushbutton 5 Pushbutton 6
Actitvation delay when stopping automatically at the seam end Actitvation delay when pedal is in position -1, half heelback Start delay from lifted foot Time of full power Operating time stage with pulsing	t6 t2 t3 t4 t5	F-154 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

Unintentional foot lifting can be prevented by setting an activation delay (F-201).
In the case of an automatic stop at the seam end switching on the presser foot can be delayed by F-154.

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

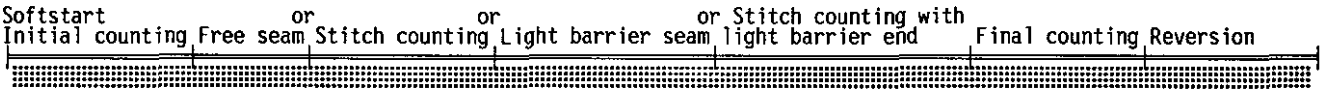
Foot lowers:

- 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

7.26 Blocking of Machine Run (Safety Switch)

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



Functions	Abbreviation on the display	Parameter
Blocking of machine run on/off	LSP	F-221

Display after activation of the blocking of machine run:

Symbol `--StoP--` / `--StoP--` blinking alternately !

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

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

Blocking of machine run during initial counting:

Initial counting is interrupted by opening the switch.
- Stop in the basic position
- Needle up is not possible
- Presser foot lifting is possible
- After unblocking the machine run, the seam is continued where it was interrupted during initial counting

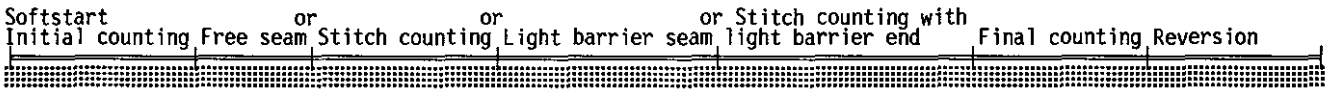
Blocking of machine run during final counting:

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

New start after blocking of machine run:

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

7.27 Signal during Speed Limitation



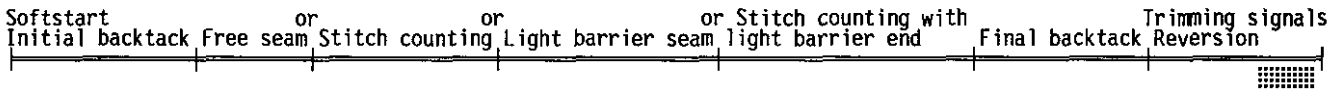
Functions	Abbreviation on the display	Parameter
Limited speed on signal MV1	n10	F-117
Signal MV1 on/off	hP	F-137
Signal MV1 stored	hPr	F-138
Speed run-out time after signal MV1	thP	F-152
Minimum number of stitches	chP	F-185

If the pushbutton "signal during speed limitation" is pressed at standstill the signal is emitted until the pushbutton is released again. If the parameter "signal during speed limitation stored" is active the solenoid valve remains activated until the pushbutton is pressed again or the parameter "signal during speed limitation stored" is deactivated.

If the pushbutton is pressed during machine run and the speed is lower than the limited speed n10 the solenoid is immediately activated. The pedal control is limited to speed n10. If the speed is higher than the speed n10 the drive activates the solenoid valve only after having slowed down to speed n10. The solenoid valve remains activated until the pushbutton is released or until a minimum number of stitches is executed. After switching off the solenoid valve the limited speed is maintained for the run-out time. Pedal control is again possible after the run-out time.

The run-out time is always executed, independently from the state of parameter "signal during speed limitation stored". The function "minimum number of stitches", however, is only effective, when operating mode is not stored.

7.28 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-182).
Then it reverses at positioning speed for an adjustable number of increments.
1 increment corresponds to approx. 0.7°.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Reversion on/off	-F-	F-008 = 9

7.29 Unlocking the Chain

Functions	Abbreviation on the display	Parameter
Positioning speed	nl	F-110
Number of reversion increments	Ird	F-180
Unlocking the chain on/off	Ent	F-183

Description of the function "unlocking the chain"

If the function is activated by the function key (pushbutton 3) the functions previously selected by the Variocontrol are blocked, and the display diodes are switched off.

After pushing the pedal forward the "free seam" is initiated with the following marginal conditions:

Pedal > 1 --> Run of the drive (pedal controlled speed)
Pedal + ½ --> Lower presser foot

Pedal 0 --> Intermediate stop (position 1)

Pedal - 1 --> Lower presser foot
Pedal - 2 --> Lower presser foot and reversion to the position selected by parameter F-180. Then lift presser foot again.

After the end of reversion operation of the Variocontrol is again possible. After switching off the function key (pushbutton 3) the previous functions are reactivated, and the corresponding display diodes on the Variocontrol are switched on again.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Unlocking the chain on/off	-F-	F-008 = 10

7.30 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

7.31 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 - 512 Impulses/Rotation

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

7.33 External Speed Controller

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

Table: Coding of the pedal stages

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

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

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

Possible characteristic curves:
- linear
- progressive
- highly progressive

8. Machine Functions

8.1 Braking Behavior

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

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

8.2 Braking Power at Standstill

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

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

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

8.3 Start Behavior

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

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

- High adjustment value = high acceleration

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

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

INFO E3

8.4 Adjustment of the Positions

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

8.4.1 Reference Position

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

POSITION 0

The reference position must be adjusted:

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

Correct adjustment of the reference position:

- Needle point at the same level of the needle plate

- Bottom dead center of the needle bar

Programming:

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

PoSition 0]

3.) Turn handwheel until desired refernce position is reached
Note: Turn at least until marker ( ]) has disappeared
4.) Press pushbutton E ==> Position 0 (neutral) is read by the control

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

INFO A3

-Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (lower needle position)	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
Adjust position 1
Value xxx can be modified by pushbutton +/- or by turning the handwheel!

3 Press pushbutton E ==> Position 2 xxx
Adjust position 2

4 Press pushbutton E ==> Position 1A xxx
Adjust position 1A

5 Press pushbutton E ==> Position 2A xxx
Adjust position 2A

6 Press pushbutton E ==> Position 3 000
Position does not have to be adjusted !

7 Press pushbutton E ==> Position 3A 000
Position does not have to be adjusted !

8 Press pushbutton E ==> Back to step 2!

9 Press pushbutton P ==> Positions will be read by the control

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

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

The display unit of the adjusted positions is increments.
One rotation of the handwheel 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 adjustment of the positions can easily be tested by parameter F-172.

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

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

8.5 Memory Box

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

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

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

8.5.1 Preparation for Memory Box Operation

Caution! - Turn power off

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

8.5.2 Formatting of the Memory Card

The Memory Card is the storage medium for the programs.
Before using each Memory Card for the first time it must be prepared for receiving data by "formatting".
Note: Original EFKA Memory Cards, with EFKA label, have been formatted and tested in the factory.

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

8.5.3 Operating the Memory Box

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

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

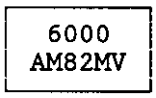
3. » Save data

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

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

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

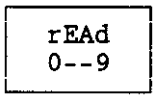
- Display after the storing is terminated



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

Possibility:

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

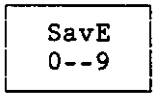


- Input address under which the desired data record is stored.

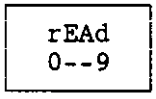
Attention: For storing data permanently start sewing once before turning the power off!

Possibility:

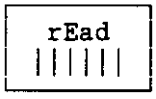
- Push pedal twice in short intervals, after end of seam.



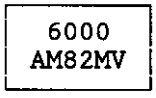
- Push pedal fully forward and put back to position 0 (neutral)



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



- Display after saving the program.



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

5. » Operation without Variocontrol

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

6. » Exit

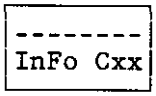
- **Interruption:**
  - Press one of the green pushbuttons (P E + -) on the Variocontrol
  - The Variocontrol display shows the values of normal operation

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

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

7. » Error messages

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

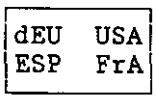


"xx" stands for a number in the following table:

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

Language selection:

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



9. Error Messages

General Information

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

Programming of Functions and Values (Parameters)

Display	Signification
Info F1	Wrong code number or parameter number input

Serious Situation

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

Hardware Disturbance

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

Memory Card Information

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

10. Signal Test

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

Outputs:

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

Table: Assignment of the pushbuttons to the outputs

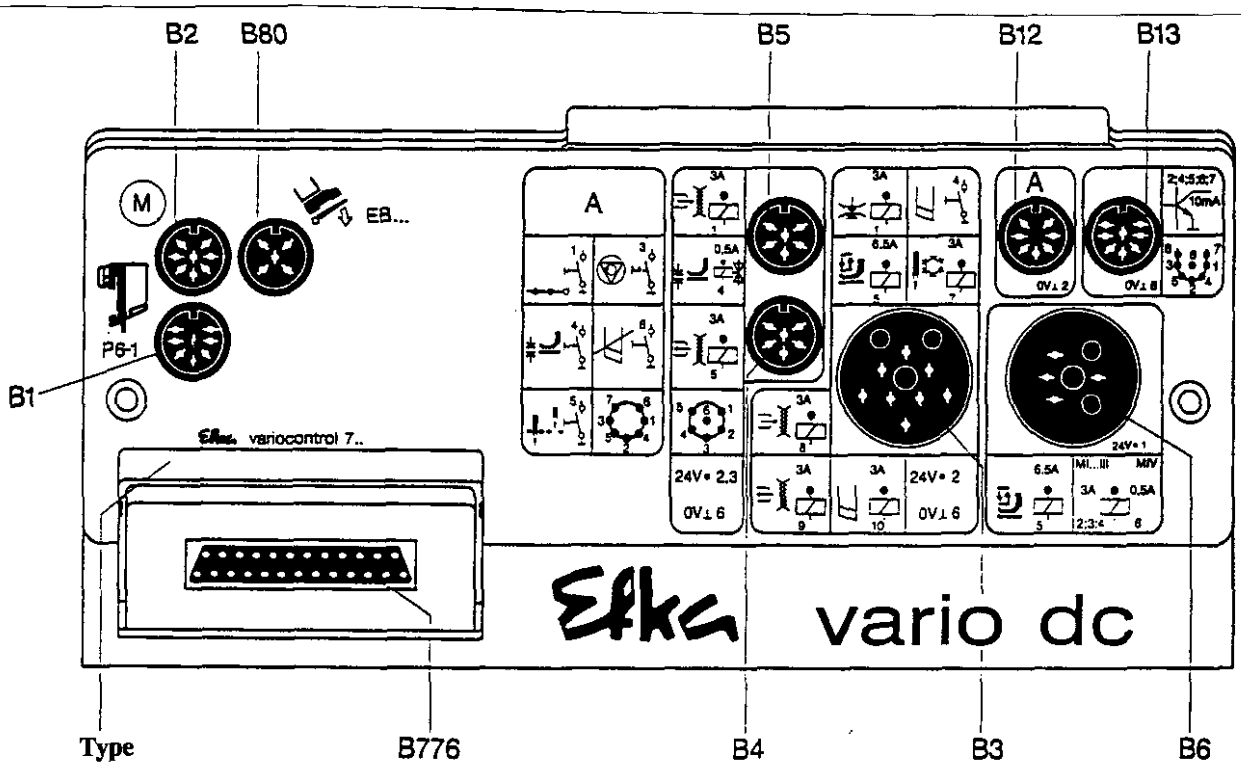
Pushbutton	Output
1	Chain suction
2	Presser foot lifting
3	Chain removal by suction
4	Needle cooling
5	Blow fabric on stacker
6	Chain cutter
7	Signal M1
8	Signal M2
9	Signal M3
0	Signal during speed limitation MV1
-	Signal M4

Inputs:

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

11. Socket Connectors

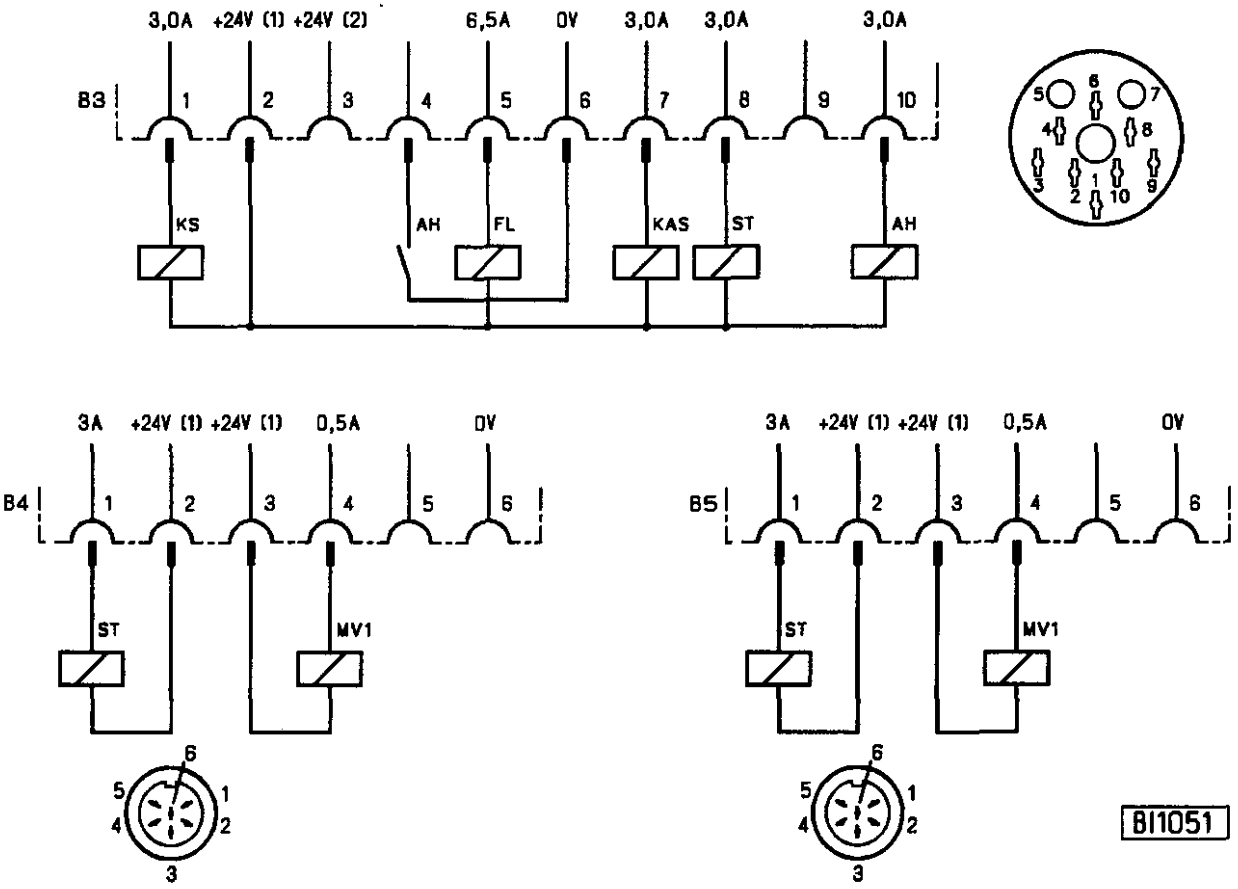
11.1 Position in the Control



KL 1972

B1 - Positioner
B2 - Commutation transmitter for DC drive
B3 - Machine
B4 - Machine
B5 - Machine
B6 - Machine
B12 - Pushbuttons
B13 - Machine
B80 - External speed controller
B776 - Control panel Variocontrol

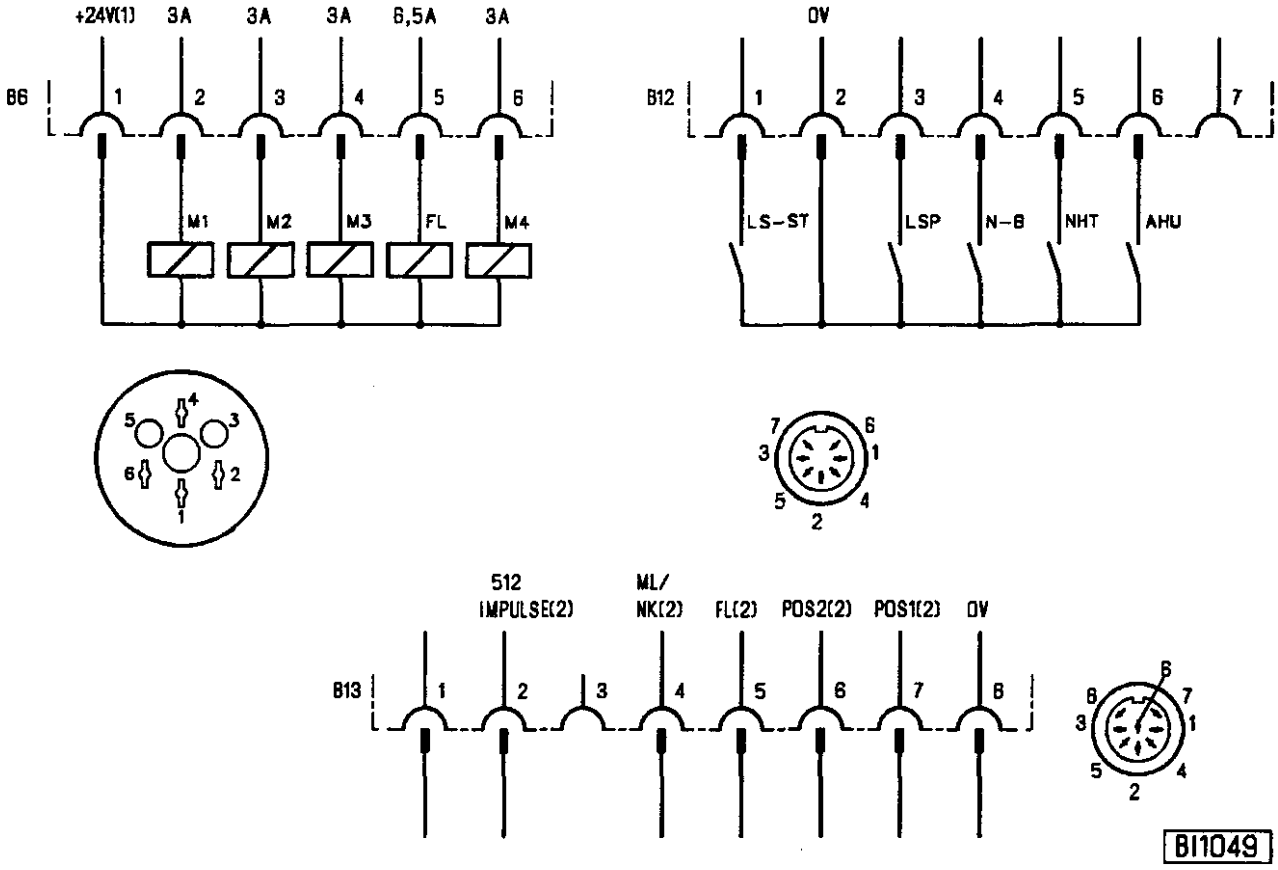
11.2 Connection Diagram



KS - Chain removal by suction
FL - Presser foot lifting
KAS - Disposal of chain cuttings by suction
ST - Blow fabric on stacker
AH - Chain cutter
MV1 - Signal during speed limitation (e.g. high lift walking)

1) Nominal voltage 24V, no-load voltage max. 36V
2) Limited voltage 24V (max. 500 mA)

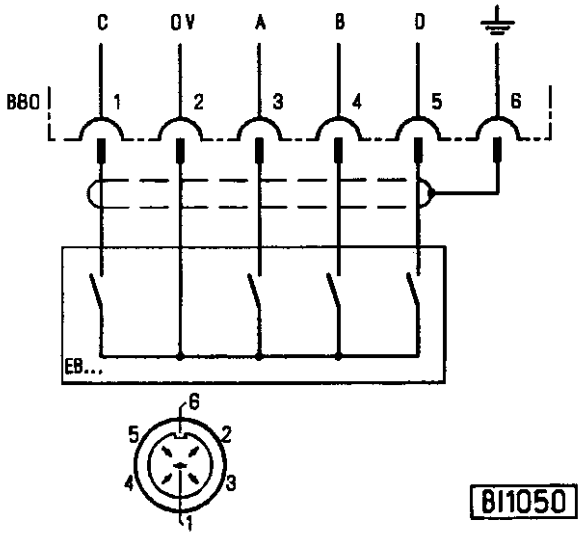
11.3 Connection Diagram



M1	- Signal M1
M2	- Signal M2
M3	- Signal M3
M4	- Signal M4
FL	- Presser foot lifting
ML/NK	- Signal output for motor running 2)
POS1	- Signal output for position 1 2)
POS2	- Signal output for position 2 2)

LS-ST	- Light barrier stop
LSP	- Blocking of machine run
N-B	- Speed limitation with signal output (e.g. high lift walking)
NHT	- Needle up/down
AHU	- Chain cutter suppression/recall

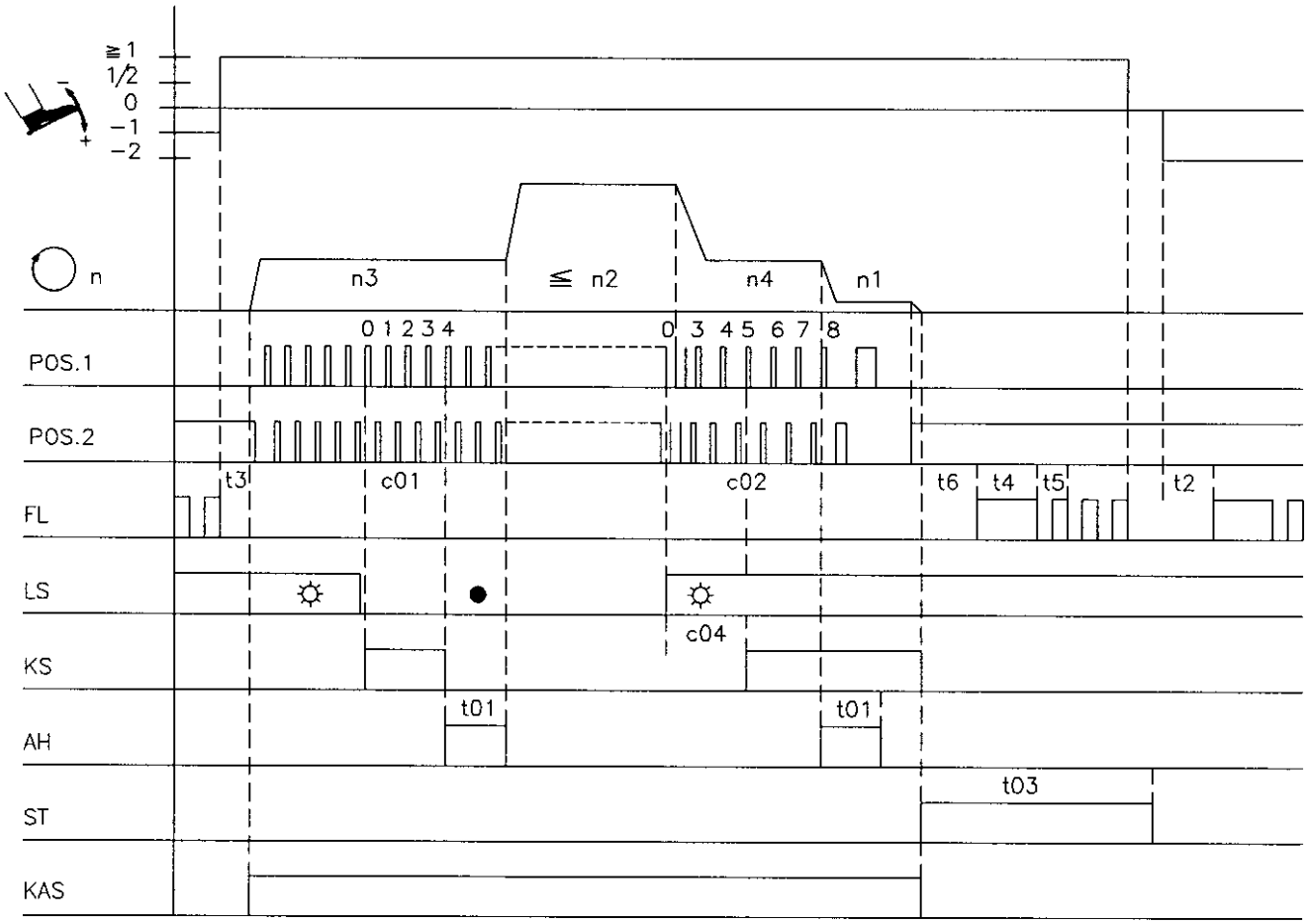
1) Nominal voltage 24V, no-load voltage max. 36V
2) Transistor output with open collector (max. 40V, 30 mA)



EB... - External speed controller

12. Function Diagrams

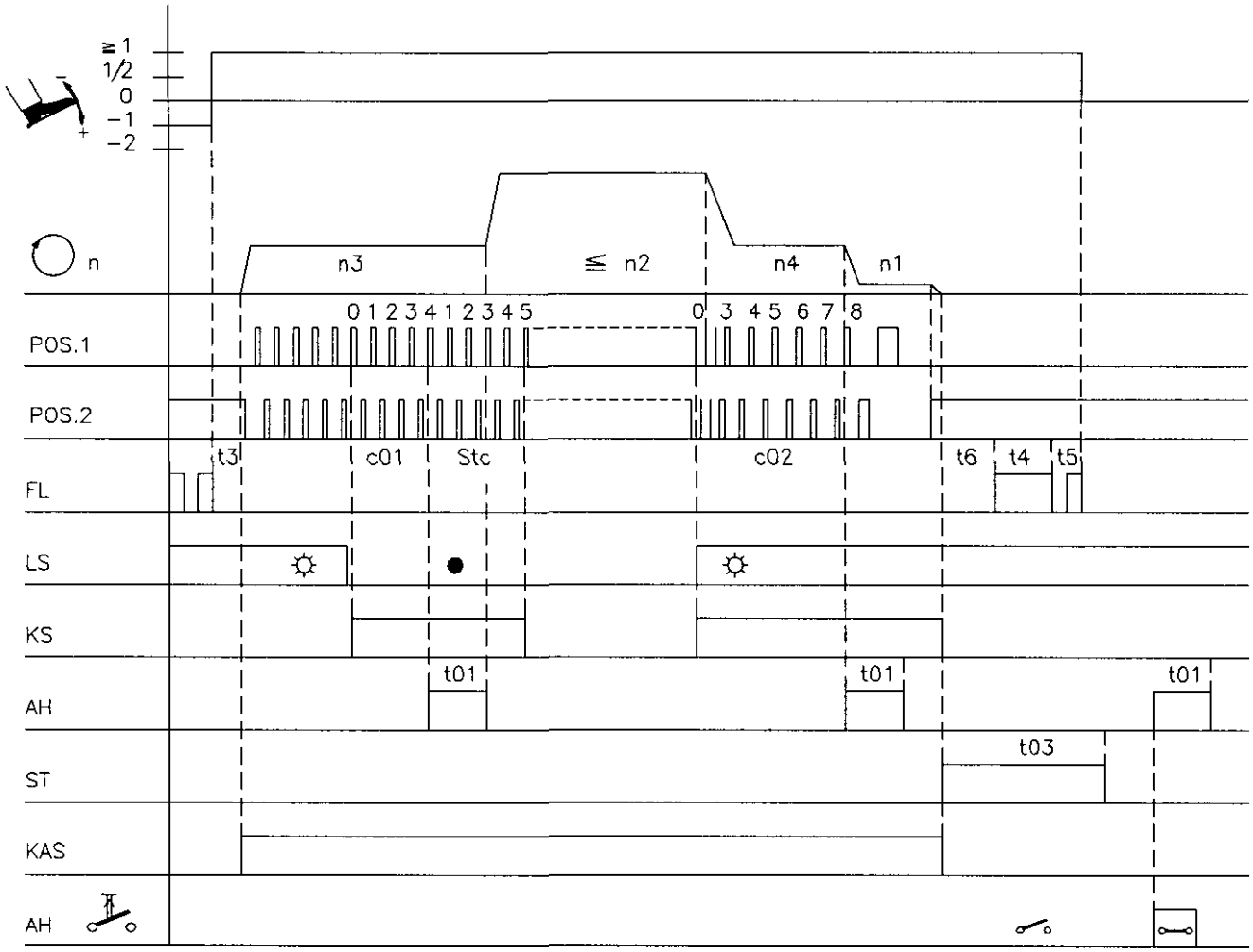
Functional sequence without stitch counting



0199/AM82MV1/S1

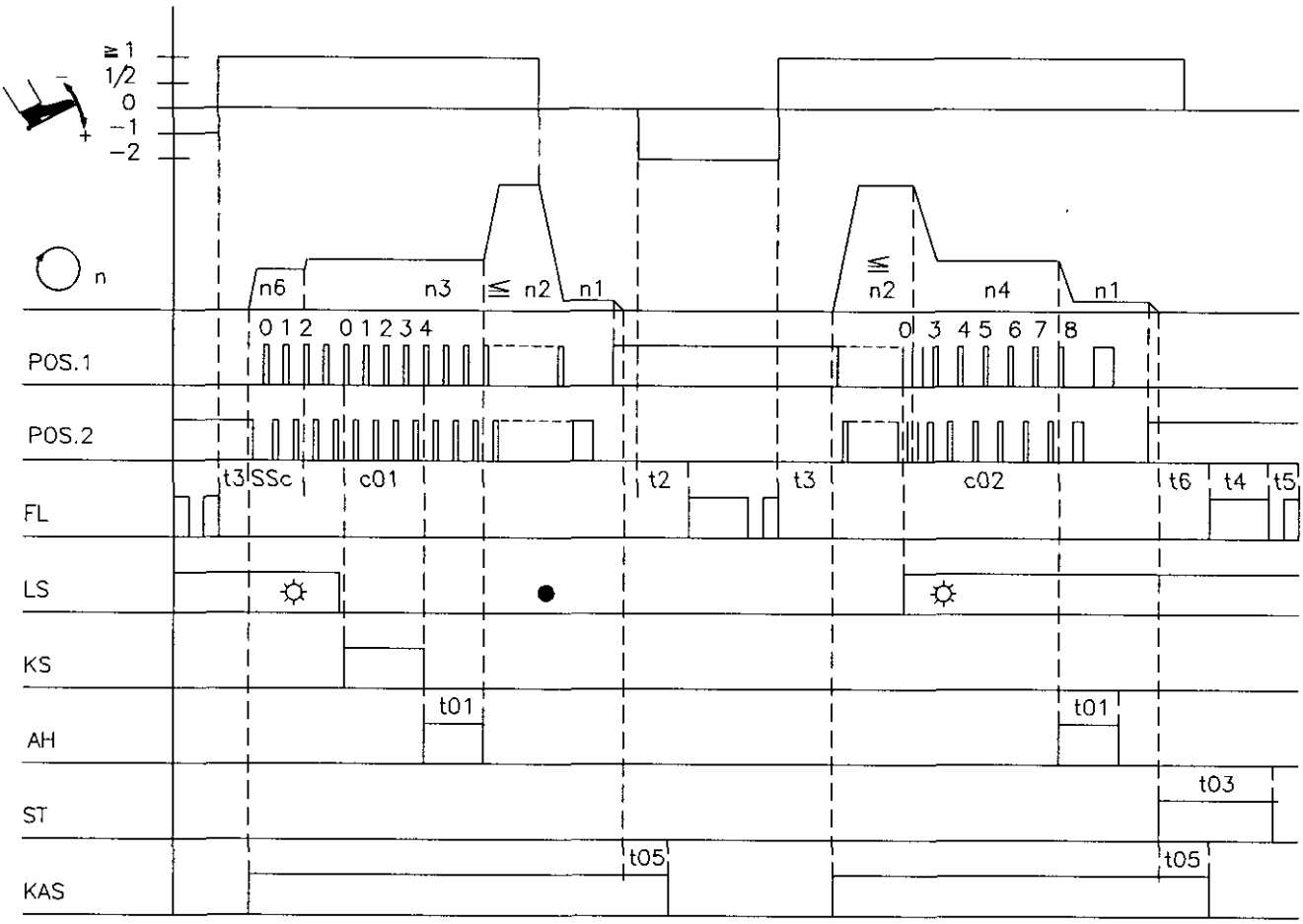
Abbreviation	Function		Parameter/Pushbutton
	Blow fabric on stacker	on	Pushbutton 2
	Chain removal by suction at the start / end of the seam	on	Pushbutton 8
	Chain cutter at the start / end of the seam	on	Pushbutton 9
FnA	Chain suction at the start of the seam, when motor at standstill	off	F-120
FnE	Chain suction at the seam end, when motor at standstill	off	F-123
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial counting speed		F-112, when F-040 = 1
n4	Final counting speed		F-113, when F-043 = 1
t2	Delay of presser foot lifting on half heelback		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting (FL)		F-203
t5	Pulse width of presser foot lift pulsing		F-204
t6	Activation delay for presser foot lifting at seam end		F-154
t01	Time for chain cutter (AH)		F-124
t03	Time for blowing fabric on stacker (ST)		F-146
c01	Initial counting until chain cutter		F-000
c02	Final counting until chain cutter		F-001
c04	Final counting until chain removal by suction		F-003

Functional sequence with stitch counting



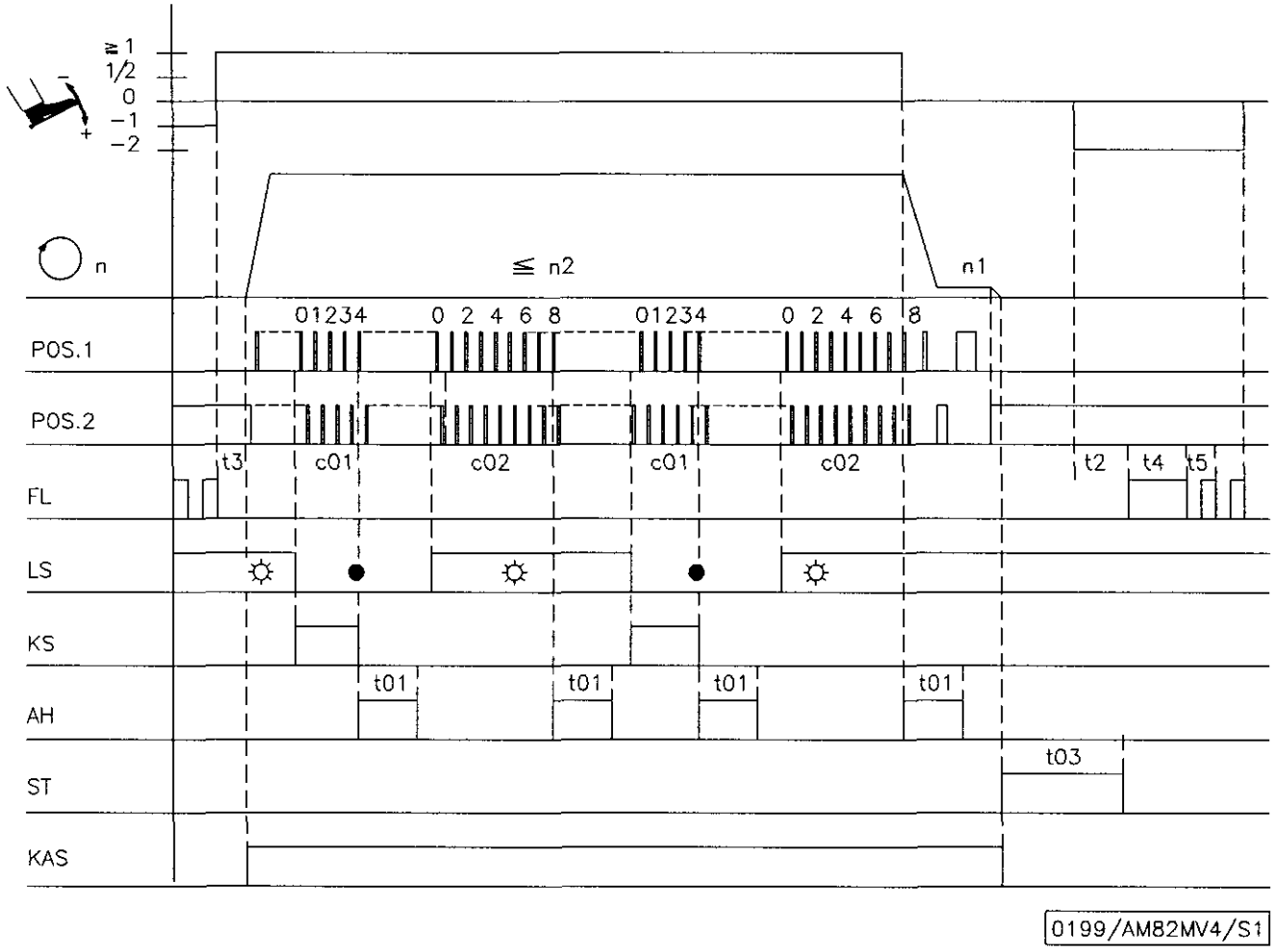
Abbreviation	Function		Parameter/Pushbutton
	Stitch counting for chain removal by suction	on	Pushbutton 1
	Blow fabric on stacker	on	Pushbutton 2
	Chain removal by suction at the start / end of the seam	on	Pushbutton 8
	Chain cutter at the start / end of the seam	on	Pushbutton 9
FnA	Chain suction at the start of the seam, when motor at standstill	off	F-120
FnE	Chain suction at the seam end, when motor at standstill	off	F-123
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial counting speed		F-112, when F-040 = 1
n4	Final counting speed		F-113, when F-043 = 1
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting (FL)		F-203
t5	Pulse width of presser foot lift pulsing		F-204
t6	Activation delay for presser foot lifting		F-154
t01	Time for chain cutter (AH)		F-124
t05	Switch-off delay for disposal of chain cuttings by suction (KAS)		F-156
c01	Initial counting until chain cutter		F-000
c02	Final counting until chain cutter		F-001
Stc	Stitch counting for chain removal by suction (KS)		F-007

Run with intermediate stop



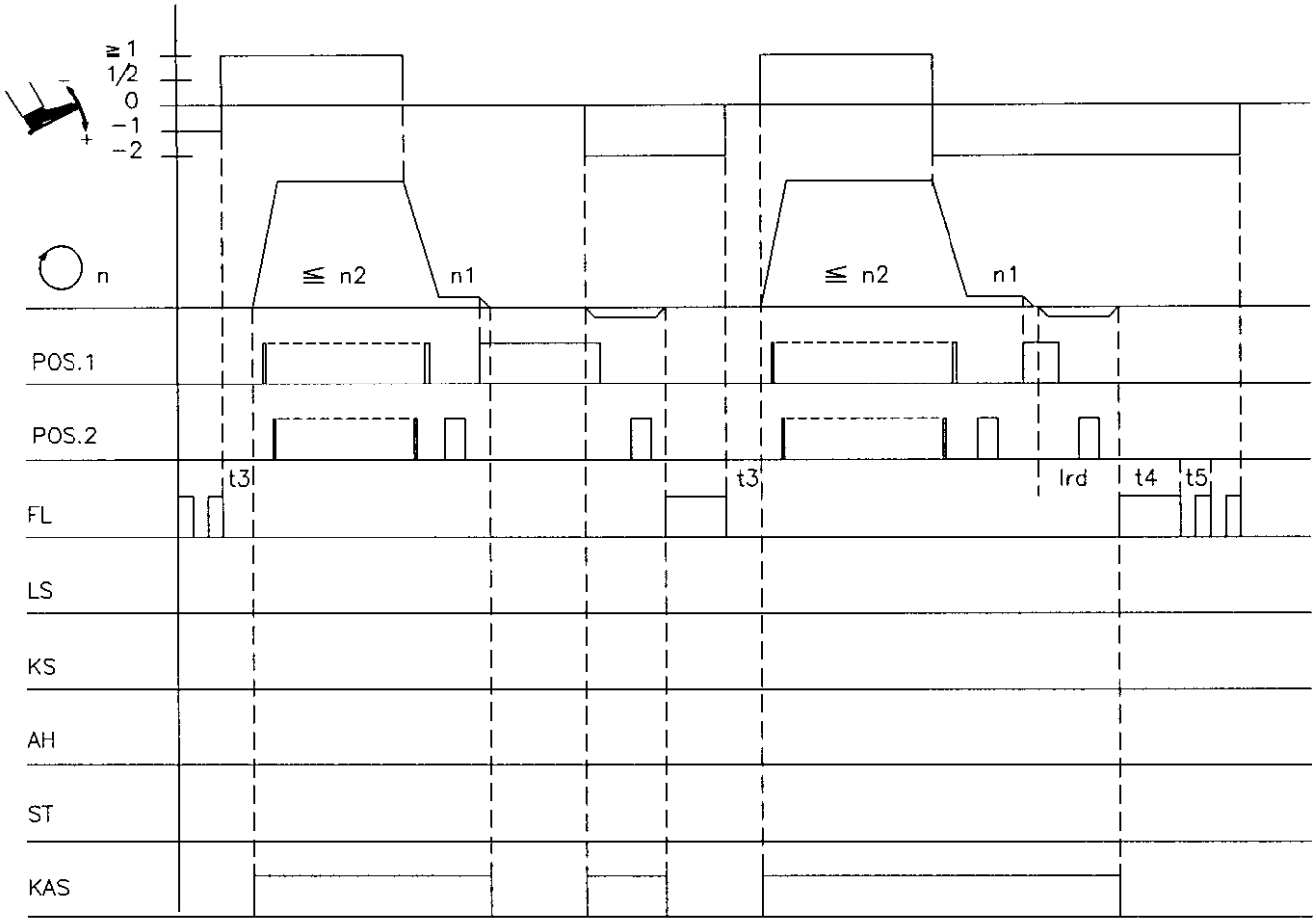
Abbreviation	Function		Parameter/Pushbutton
	Blow fabric on stacker	on	Pushbutton 2
	Presser foot stored after seam end	on	Pushbutton 6
	Chain removal by suction at the start / end of the seam	on	Pushbutton 8
	Chain cutter at the start / end of the seam	on	Pushbutton 9
SSt	Softstart	on	F-134
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial counting speed		F-112, when F-040 = 1
n4	Final counting speed		F-113, when F-043 = 1
n6	Softstart speed		F-115
t2	Delay of presser foot lifting on half heelback		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting (FL)		F-203
t5	Presser foot lift pulsing		F-204
t6	Activation delay for presser foot lifting		F-154
t01	Time for chain cutter (AH)		F-124
t05	Switch-off delay for chain removal by suction (KAS)		F-156
c01	Initial counting for chain suction (KS) and chain cutter		F-000
c02	Final counting for chain suction and chain cutter		F-001
SSc	Softstart stitches		F-100

Run without automatic stop



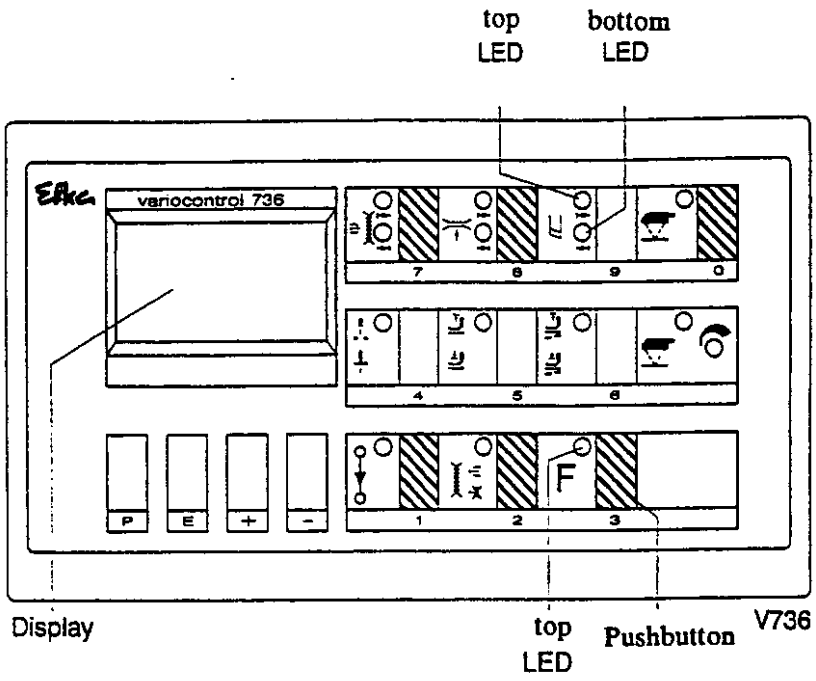
Abbreviation	Function		Parameter/Pushbutton
	Blow fabric on stacker	on	Pushbutton 2
	Chain removal by suction at the start / end of the seam	on	Pushbutton 8
	Chain cutter at the start / end of the seam	on	Pushbutton 9
StP	Light barrier stop after final counting	off	F-133
n1	Positioning speed		F-110
n2	Maximum speed		F-111
t2	Delay of presser foot lifting on half heelback		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t01	Time for chain cutter (AH)		F-124
t03	Time for blowing fabric on stacker (ST)		F-146
c01	Initial counting for chain suction (KS) and chain cutter		F-000
c02	Final counting for chain suction and chain cutter		F-001

Function "unlocking the chain"



0199/AM82MV5/S1

Abbreviation	Function		Parameter/Pushbutton
	Unlocking the chain	off	F-008 / Pushbutton 3
n1 n2	Positioning speed Maximum speed		F-110 F-111
t3 t4 t5 Ird	Start delay from lifted foot Full power of presser foot lifting Impulse width of presser foot lift pulsing Number of reversion increments		F-202 F-203 F-204 F-180



Pushbutton with additional special settings - HIT

KL 1992

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 = Blow fabric on stacker ON / OFF
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 SEAM END ON / OFF
Pushbutton 7 = Chain suction start ON / OFF
Chain suction end ON / OFF
Pushbutton 8 = Chain removal by suction at the start ON / OFF
Chain removal by suction at the end ON / OFF
Pushbutton 9 = Chain cutter at the start ON / OFF
Chain cutter at the end ON / 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 2 = Time for chain blowing
Pushbutton 3 = Number of stitches or switching on/off the programmed function
Pushbutton 7 = Number of stitches for chain suction at the start or at the end
Pushbutton 8 = Number of stitches for chain removal by suction
Pushbutton 0 = Number of light barrier compensating stitches

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