Efka variostop modular

CONTROL

2D72AV2053

INSTRUCTION MANUAL

No. 402093   english

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1. Important Safety Instructions

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

- Read all instructions thoroughly before using this drive.

- Drive and accompanying appliances should be mounted and put into operation by qualified personnel in accordance with the guidelines provided in the instruction manual.

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

- Use this drive only for its intended use as described in the instruction manual.

- Use only attachments recommended by the manufacturer or as contained in the instruction manual.

- Do not operate without corresponding protective devices.

- Never operate this drive if one or more parts (e.g. cables, plugs) are damaged, if it is not working properly, if any damages can be identified or are to be suspected (e.g. after it has been dropped). Only qualified personnel are authorized to make adjustments, eliminate faults and complete repair work.

- Never operate the drive with the air openings blocked. Keep ventilation openings of the drive free from the accumulation of lint, dust and loose cloth.

- Never drop or insert any object into any opening.

- Do not use drive outdoors.

- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.

- To disconnect, turn off main switch, then remove plug from outlet.

- Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.

- Keep fingers away from all moving machine parts. Special care is required e.g. around the sewing machine needle and the V-belt.

- Before mounting and adjusting accompanying appliances, i.e. postioner, reversing device, light barrier, etc., disconnect drive from mains (turn off main switch, remove mains plug from outlet [DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1]).

- Always switch off (0) machine and remove plug from outlet, when removing covers, mounting accompanying appliances, position transmitter especially, light barrier, etc., or any other devices mentioned in the instruction manual.

- Only qualified personnel are authorized to work on the electrical components.

- Work on high voltage circuit areas is forbidden, except as stated in the respective regulations, e.g. DIN VDE 0105 part 1.

- Only specially trained personnel are authorized to complete repair work.

- Cables to be wired must be protected against expectable strain and fastened adequately.

- Cables near moving machine parts (e.g. V-belts) must be wired at a minimum distance of 25 mm (see DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1).

- For safety it is preferred to wire the cables separately from each other.

- Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the motor rating plate and on the nameplate of the power pack.

- Connect this drive to a properly grounded outlet only. See Grounding Instructions.

- Electric accompanying appliances and accessories must only be connected to safety low voltage.

- EFKA DC drives are protected according to overvoltage class 2 (DIN VDE 0160 § 5.3.1).

- Observe all safety guidelines before undertaking conversions or modifications.

- For repair and maintenance use only original replacement parts.

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

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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	Series
Altin	8516

2.1 Use in Accordance with Regulations

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

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

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

The drive can only be operated:

• on thread processing machines
• in dry areas

3. Complete Drive Unit Consisting of

1	Induction motor with electromagentic clutch	V....
1	Control	variostop modular 2D72AV2053
	- Power pack	N71 (optional N73)
1	Control panel Variocontrol	V730.003
1	Position transmitter	P6-1
1	Reflection light barrier Variolux	LS-001-004
1	Set of standard	
	accessories	B131
	consisting of:	belt guard complete
		set of hardware
		motor foot
		bracket 1 and 2, short
		documentation
1	Pulley	

3.1 Special Accessories

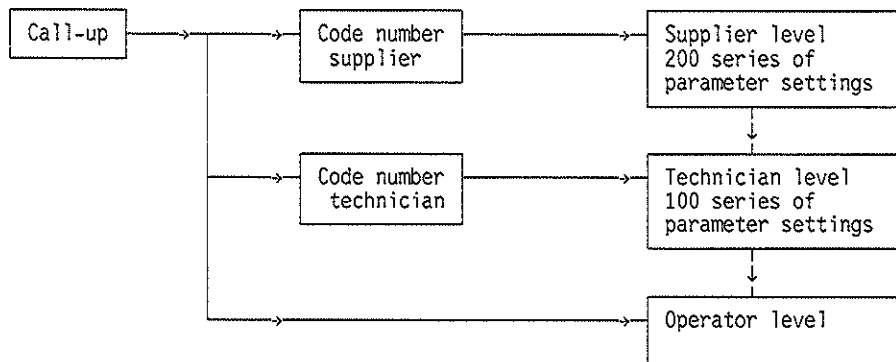|	
Storage unit Memory Box MB001	- part no. 7900052
Storage card Memory Card MC001	- part no. 1111602
5-pin plug with slide index for the connection of another external control	- part no. 0501278
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4160018
Potential equalization cord 700 mm long, LIY 2.5 mm², grey, with forked cable brackets on both sides	- part no. 1100313
Extension cable for position transmitter P6-.., approx. 1100 mm long, complete with plug and socket connector	- part no. 1100409
Sewing light transformer	- please indicate line voltage and sewing light voltage (6.3V or 12V)
10-pin plug (Hirschmann Mes100)	- part no. 0500357

4. Operation

4.1 Access to Programming on Command Input

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

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

```
                         ┌──────────────┐           ┌──────────────────────┐
┌─────────┐          ┌──>│ Code number  │──────────>│ Supplier level       │
│ Call-up │──>───────┤   │ supplier     │           │ 200 series of        │
└─────────┘          │   └──────────────┘           │ parameter settings   │
                     │                               └──────────────────────┘
                     │                                          ↓
                     │   ┌──────────────┐           ┌──────────────────────┐
                     ├──>│ Code number  │──────────>│ Technician level     │
                     │   │ technician   │           │ 100 series of        │
                     │   └──────────────┘           │ parameter settings   │
                     │                               └──────────────────────┘
                     │                                          ↓
                     │                               ┌──────────────────────┐
                     └──>──────────────────────────>│ Operator level       │
                                                     └──────────────────────┘
```

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`
             repeat input !   `Error 0`

         => 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 presser foot lifting                                          I  ┌─┐
- Automatic presser foot lifting        top LED8 lights up               │8│
                                                                     O  └─┘

                                                                     O  ┌─┐
Push button 8 briefly                   bottom LED8 lights up             │8│
- Manual presser foot lifting                                        I  └─┘
```

4.4 Input by Parameters on the Operator Level

```
>>  ONLY If CODE NUMBER WAS NOT INPUTTED  <<
```

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

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

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

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

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

    OR

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

    => [EXIT PROGRAMMING !]

4.5 Input by Parameters on the Technician and Supplier Level

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

    => On with step 3 !

    => Call-up after termination of a seam !

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

2. => [1] => [2] => [3] =>.. Input desired PARAMETER NO.
    (Example)

3. => [E]   => If PARAMETER NUMBER wrong   ==> [F-XXX   ]
                  repeat input !   [Error 0]

            => 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

---
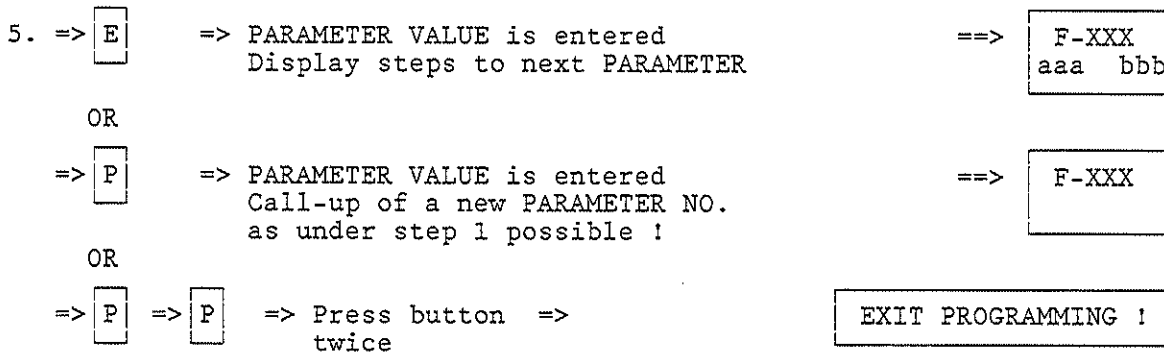
5. Operating the Motor

5.1 General Instructions

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

If necessary, set the reference position, parameter F-170
If necessary, set the positions, parameter F-171
If necessary, set the speeds, parameters F-110...F-118
If necessary, set the remaining relevant parameters
Start sewing in order to save the set values
If the power was turned off the adjustments made before starting to sew get lost.

| **Note:** |
| If the direction of rotation of the motor is changed the positions must be reprogrammed. |

5.2 Initial Operation (New Motor)

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

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

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

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

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

6. Aids for Putting into Operation and for Setting

6.1 Pushbuttons for Background Information (HIT)

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, 4, 5 and 6, when switching on. During this time the respective value can be changed immediately by the pushbuttons + and -.

6.1.1 Examples for HIT

Call up counter by pushbutton 4.

```
┌──────────┐
│  7500    │
│  2D72AV  │
└──────────┘
```

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

```
┌──┐
│4│
└──┘
```

```
Press pushbutton 4 briefly.
Function "number of stitches until
thread chain positioning device ON".
```

```
┌──────────┐
│          │
│c2    015 │
└──────────┘
```

```
Display:
15 stitches are set
```

```
┌──┐
│+│
└──┘
```

```
Press pushbutton +,
number of stitches increases.
```

```
┌──────────┐
│          │
│c2    020 │
└──────────┘
```

```
Display:
20 stitches are set
```

```
┌──────────┐
│  7500    │
│  2D72AV  │
└──────────┘
```

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

At the first start after power on, the drive runs at positioning speed (n1) for one rotation from position 1 to position 1, independently from the pedal position 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 Display Actual Speed

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

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

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

```
2350
```

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

```
3300
XY82ZV
```

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

```
StoP
```

7.4 Basic Position

Functions	Abbreviation on the display	Parameter
Basic position 1 and/or 2	PoS	F-080

The basic position in the seam can be preselected on the **operator level** by parameter F-080.

F-080 = 1   =>   Basic position 1
F-080 = 2   =>   Basic position 2

=> ☐P☐   =>   LED pushbutton P blinks !   =>   ☐

=> ☐E☐ . . . . .   =>   The first parameter will be indica-   =>   ☐ PoS   1 ☐
ted. Press pushbutton "E" several
times until "PoS" appears on the
display!

=> ☐+☐ =>☐-☐   =>   Modify basic position 1 and/or 2

7.5 Softstart

Functions	Abbreviation on the Display	Parameter
Number of Softstart 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
- interruption with pedal in position 0 (neutral)
- interruption by full heelback (position -2)

7.6 Free Seam

Functions	Abbreviation on the Display	Parameter
Speed pedal controlled or fixed		Pushbutton 3
Positioning speed	n1	F-110
Upper limit of the maximum speed	n2‾	F-111
Fixed speed (automatic speed)	n12	F-118

If no pedal controlled speed has been selected, the speed set by parameter F-118 will be reached with the first pedal step.
After sensing the end of the sewing material, the speed will be limited step by step to the positioning speed, when the light barrier is activated.

7.7 Light Barrier

7.7.1 Light Barrier Functions

Functions	Abbreviation on the display	Parameter
Light barrier compensating stitches at the seam end Sewing start blocked with light barrier uncovered	c3 LSS	F-002 / pushbutton 6 F-132

After sensing the seam end, the counting of the compensating stitches is performed, and the speed is reduced step by step and depending on the number of stitches to positioning speed.

Modify the light barrier compensating stitches as follows:

»   By call-up of parameters according to chapter "Operation"

or

»   = >   6   = >   Press briefly ! The compensating stitches at the seam end will be indicated on the display   = >   c3   040

»   = >   +   =>   -   = >   Change value

If the values are no longer changed, the display automatically switches to its original status.

7.7.2 Reflection Light Barrier

Functions	Abbreviation on the display	Parameter
Sensitivity adjustment when using LS001		Potentiometer on the V730.003
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 Adjustment:

-       LS001   - Call up 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.

7.7.3 Automatic Start by Light Barrier

Functions	Abbreviation on the display	Parameter
Delay of automatic start Automatic start on/off	ASd	F-128 Pushbutton 2

The sewing can be started automatically by this function 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).
- Pushbutton 2 on the Variocontrol = ON (automatic start on).
- 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 push pedal forward.
This safety function is reset, when the pedal does not remain pushed forward after the end of the seam.

7.7.4 Light Barrier Filter for Knitted Fabrics

Functions	Abbreviation on the display	Parameter
Number of filter stitches Light barrier filter on/off	LSF LSF	F-004 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.

7.8 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic at the seam end on/off		Pushbutton 8
Activation delay when pedal is in position -1, half heelback Start delay from lifted foot	t2 t3	F-201 F-202

Presser foot is lifted:

- in the seam   - by heelback (position -1 or -2)
- at the seam end   - according to selection by pushbutton 8 on the control panel
                         manually   = > by pedal in position -1 or -2 (bottom LED lights up)
                         automatically   = > the presser foot is lifted automatically at the seam end,
                                            independently of the pedal position and the function
                                            (top LED lights up)

Foot lowers:

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

The start is delayed until the foot has securely lowered.
- delay time adjustable F-201

7.9 Call Up Counters c1, c2, c3 and c4

Functions	Abbreviation on the display	Parameter
Counting start of seam to signal A3 ON	c1	F-000 / pushbutton 4
Counting light barrier uncovered to signal A4 ON	c2	F-001 / pushbutton 5
Counting signal A4 ON to seam end	c3	F-002 / pushbutton 6
Counting at the start of the seam to signal A3 ON	c4	F-003 / pushbutton 1

The number of stitches of the countings can be modified by parameter or by briefly pressing the corresponding pushbuttons +/-.

7.10 Manual Chain Backtacking

Activation manual chain backtacking	Pushbutton 0 on the control panel

Manual chain backtacking can be performed in two operation modes.

Operation mode seam start backlatching:

If the pedal is in position 0 (neutral) at the start of the seam, LED 0 will light up after pressing pushbutton 0 on the control panel to indicate preparation for manual backtacking. When pushing the pedal forward, manual backtacking will be performed.
LED 0 remains on until manual backtacking is finished.

Operation mode seam backlatching by heelback:

In this operation mode two sequences are possible for manual chain backtacking:

-        If pushbutton 0 is pressed before the start, manual chain backtacking is performed after the pedal has
         been pushed > 1, without subsequent preparation of the seam start backlatching.

-        If pushbutton 0 is pressed after the seam start backlatching has been prepared for the next seam by
         full heelback, manual backtacking with subsequent preparation of the seam start backlatching is
         performed after the pedal has been pushed > 1.

7.11 Operation Modes

7.11.1 Operation Mode Seam Backlatching by Heelback

Can be selected by pushbutton 9 on the control panel (top LED lights up).

Before the start, the signal **thread tension release** (A4) is switched on and off respectively, depending on the stitches (c5) selected by parameter F-187.

$$F\text{-}187 = 0 \quad ==> \quad \text{Signal A4} = \text{Off}$$
$$F\text{-}187 = \geq 1 \quad ==> \quad \text{Signal A4} = \text{On}$$

$$F\text{-}188 = \text{OFF} \quad ==> \quad \text{Function "pull thread chain two times"} = \text{Off}$$
$$F\text{-}188 = \text{ON} \quad ==> \quad \text{Function "pull thread chain two times"} = \text{On}$$

$$F\text{-}190 = \text{OFF} \quad ==> \quad \text{During final counting c3 pedal controlled speed}$$
$$F\text{-}190 = \text{ON} \quad ==> \quad \text{During final counting c3 automatic speed (n12)}$$

Sequence:

- When the pedal is pushed forward, the signal **thread chain cutter** (A1) will be emitted, the signal **thread tension release** (A4) goes off, and the drive runs after a delay time (ti6), set by parameter F-185, at the corresponding preselected speed (pushbutton 3 on the control panel).

- After the preselected stitches (c4) set by parameter F-003 have been performed, the signal **thread chain cutter** (A1) goes off, and the signal **thread chain positioning device** (A3) will be emitted.

- If the number of stitches (c1) set by parameter F-000 is lower than the number of stitches (c4) set by parameter F-003, the signal **thread chain positioning device** (A3) will be emitted after the counter (c1).

- When the light barrier senses the sewing material edge, the signal **thread chain cutter** (A1) will be emitted. At the same time, the stitches (c2) preselected by paramter F-001 are performed, and the signal **thread tension release** (A4) is emitted again.

- After having switched on the **thread tension release** (A4), further stitches (c3) preselected by parameter F-002 are performed until the signal **nozzle** (A8) is emitted. This seam section can be performed at pedal controlled or automatic speed depending on the setting of parameter F-190.

- After the stop of the drive, the signals **thread chain positioning device** (A3), **thread chain cutter** (A1) and **nozzle** (A8) will go off after a delay time (ti7) set by parameter F-186.

- At full heelback, the signals **lift jamming device** (A7) and **suction current in the jamming device** (A2) will be emitted for the time ti2 and ti3 respectively, until the emission of the signal **thread chain cutter** (A5).

- After the time (ti4), the signal **nozzle in the thread chain cutter channel** (A5), and after the time (ti5), the signal **suction current in the jamming device** (A2) goes off.

- F-188 = OFF   After the signal **suction current in the jamming device** (A2) goes off, the **presser foot** (A6) is lowered.

- F-188 = ON   After the signal **suction current in the jamming device** (A2) goes off, the signal **lift jamming device** (A7) is emitted for the time (ti4). After the time (ti5), the **presser foot** (A6) is lowered.

See also chapter "Timing Diagrams"!

7.11.2 Operation Mode Seam Start Backlatching

Can be selected by pushbutton 9 on the control panel (bottom LED lights up).

Before the start, the signal **thread tension release** (A4) is switched on and off respectively, depending on the stitches (c5) selected by parameter F-187.

$$F\text{-}187 = 0 \qquad = = > \text{Signal A4} = \text{Off}$$
$$F\text{-}187 = \geq 1 \qquad = = > \text{Signal A4} = \text{On}$$

$$F\text{-}188 = \text{OFF} \quad = = > \text{Function "pull thread chain two times"} = \text{Off}$$
$$F\text{-}188 = \text{ON} \quad = = > \text{Function "pull thread chain two times"} = \text{On}$$

$$F\text{-}190 = \text{OFF} \quad = = > \text{During final counting c3 pedal controlled speed}$$
$$F\text{-}190 = \text{ON} \quad = = > \text{During final counting c3 automatic speed (n12)}$$

Sequence:

- When the pedal is pushed forward, the drive runs at the corresponding preselected speed (pushbutton 3 on the control panel).

- After the preselected stitches (c5) set by parameter F-187 have been performed, the signal **thread tension release** (A4) goes off.

- After further stitches (c1) preselected by parameter F-000 have been performed, the signal **thread chain positioning device** (A3) will be emitted.

- When the light barrier senses the sewing material edge, the signal **thread chain cutter** (A1) will be emitted. At the same time, the stitches (c2) preselected by paramter F-001 are performed until the emission of the signal **thread tension release** (A4).

- After having switched on the **thread tension release** (A4), further stitches (c3) preselected by parameter F-002 are performed until the signal **nozzle** (A8) is emitted. This seam section can be performed at pedal controlled or automatic speed depending on the setting of parameter F-190.

- After the stop of the drive, the signals **thread chain positioning device** (A3) will go off.

- After the delay time (ti1) set by parameter F-180, the signals **lift jamming device** (A7) and **suction current in the jamming device** (A2) will be emitted, and the signals **thread chain cutter** (A1) and **nozzle** (A8) go off for the time (ti2) set by parameter F-181, until the **presser foot** (A6) is lifted.

- After the **presser foot** (A6) has been lifted, the signal **thread chain cutter** (A5) will be emitted for the time (ti4) set by parameter F-183, after a delay time (ti3) set by parameter F-182.

- After the time (ti4), the signal **nozzle in the thread chain cutter channel** (A5), and after the time (ti5), the signal **suction current in the jamming device** (A2) goes off.

- F-188 = OFF   After the signal **suction current in the jamming device** (A2) goes off, the **presser foot** (A6) is lowered.

- F-188 = ON   After the signal **suction current in the jamming device** (A2) goes off, the signal **lift jamming device** (A7) is emitted for the time (ti4). After the time (ti5), the **presser foot** (A6) is lowered.

See also chapter "Timing Diagrams"!

7.12 Preparation of the Seam Start Backlatching

In the operation modes seam start backlatching and seam backlatching by heelback the seam start backlatching can be prepared at the beginning of the seam for the following seam by full heelback.

7.13 Selection Thread Chain Cutter / Signal "Run"

Functions	Abbreviation on the display	Parameter
Thread chain cutter / signal "run"	KEt	F-189

-    F-189 = OFF   Thread chain cutter
  The signal SSLKT (A1) functions as thread chain cutter in this setting (see timing diagrams).
-    F-189 = ON   Signal "run"
  The signal SSLKT (A1) is emitted during machine run and goes off at standstill.

7.14 Reset

Reset On -> Press pushbutton 7 on the control panel for 2 seconds	Pushbutton 7 on the control panel

The sewing process can be interrupted by pushbutton 7 on the control panel. The control process is reset to the start of the seam, and the sewing process can be started again.
The reset function only works at machine standstill and with pedal in position 0 (neutral).
After pressing pushbutton 7, the top LED blinks. After 1 second, the bottom LED blinks, too. After 2 seconds, the reset is activated, and both LEDs go off.

7.15 External Actuator

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

Table: Coding of the pedal steps

Pedal step:	D	C	B	A
-2	H	H	L	L
-1	H	H	H	L
0	H	H	H	H
½	H	H	L	H
1	H	L	L	H
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

Full heelback   (e.g. initiating the seam end)
Slight heelback   (e.g. presser foot lifting)
Pedal in position 0 (neutral)
Pedal slightly forward   (e.g. presser foot lowering)
Speed stage 1 (n_{pos})
·
·
·
·
·
·
·
·
·
·
·
Speed stage 12 (n_{max})
(Pedal fully forward)

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

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

Possible characteristic curves: - linear
                                             - progressive
                                             - highly progressive

8. Machine Functions

8.1 Braking Behavior

Functions	Abbreviation on the display	Parameter
Braking effect when modifying the preset value ≤ 4 stages Braking effect when modifying the preset value ≥ 5 stages	br1 br2	F-207 F-208

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

8.2 Braking Power at Standstill

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

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

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

8.3 Start Behavior

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

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

- High setting = high acceleration

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

8.4 Setting the Positions

Functions	Abbreviation on the display	Parameter
Setting the reference position (position 0) (neutral)	Sr1	F-170
Setting the signal and stop positions	SR2	F-171
Display of the signal and stop positions	SR3	F-172

8.4.1 Reference Position

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

```
|  POSITION 0  |
```

The reference position must be set:

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

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

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

Programming:

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

2.)   Press pushbutton 3 briefly   =>

```
┌──────────────┐
│ PoSition     │
│ 0          ] │
└──────────────┘
```

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

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

5.) If the reference position was not stored
    there will be an error message on the display.

```
┌──────────┐
│ Error 4  │
│ ═══════  │
└──────────┘
```

6.) Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

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

Programming:

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

2.   Press pushbutton 3   =>
      Set position 1
```
┌──────────────┐
│ Position     │
│ 1      xxx   │
└──────────────┘
```
Value xxx can be modi-
fied by pushbutton +/-
or by turning the handwheel!

3.   Press pushbutton E   =>
      Set position 1A
```
┌──────────────┐
│ Position     │
│ 1A    xxx    │
└──────────────┘
```

4.   Press pushbutton E   =>
      Set position 2
```
┌──────────────┐
│ Position     │
│ 2     xxx    │
└──────────────┘
```

5.   Press pushbutton E   =>
      Set position 2A
```
┌──────────────┐
│ Position     │
│ 2A    xxx    │
└──────────────┘
```

6.   Press pushbutton E   =>
      Position does not have
      to be set !
```
┌──────────────┐
│ Position     │
│ 3     000    │
└──────────────┘
```

7.   Press pushbutton E   =>
      Position does not have
      to be adjusted !
```
┌──────────────┐
│ Position     │
│ 3A    000    │
└──────────────┘
```

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

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

<table>
<tr><td colspan="2">Note:
When adjusting the positions by the handwheel, make sure that the numerical value indicated on the display changes.</td></tr>
</table>

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

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

8.4.3 Display of the Signal and Stop Positions

The position settings can easily be tested by parameter F-172.

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

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

8.5 Memory Box

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

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

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

8.5.1 Preparation for Memory Box Operation

⚠️

Caution!
Turn power off

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

8.5.2 Formatting of the Memory Card

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

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

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

8.5.3 Operating the Memory Box

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

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

3. » Save data

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

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

SAvE
0--9

- Input any address between 0 and 9 for the data record.

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

SAvE
I I I I I I

- In case a data record already exists under the selected
  reference number, it will be overwritten.

- Display after the storing

7500
2D72AV

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

Possibility no. 1:

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

```
| rEAd   |
| 0--9   |
```

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

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

Possibility no. 2:

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

```
| SAvE   |
| 0--9   |
```

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

```
| rEAd   |
| 0--9   |
```

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

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

```
| rEAd      |
| | | | | | |
```

- Display after saving the program

```
| 7500    |
| 2D72AV  |
```

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

---

5. » Operation without Variocontrol

- Writing and reading is done by pushing the pedal as described in step 3 and 4.
- 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.

```
 _ _ _ _ _ _ _ _
|InFo  Cxx|
```

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

INFO-No.	Display
C01	Memory Card not inserted
C02	Memory Card cannot be written on
C03	Memory Card formatting
C04	Memory Card 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.

```
|dEU   USA|
|ESP   FrA|
```

9. Error Messages

Serious Situation

Display	Signification
Error 0	Wrong code or parameter number
Error 1	Position transmitter defective or undervoltage identified
Error 2	Varioselect wrong
Error 3	Pedal not in position 0 (neutral) after power on
Error 4	Reference point missing

Memory Card Information

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

10. Signal Test

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

Outputs:

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

**Table: Allocation of the pushbuttons for the outputs**

Pushbutton	Output
1	Lift jamming device (A7)
2	Presser foot lifting (A6)
3	----
4	Thread chain cutter (A1)
5	Suction current in the jamming device (A2)
6	Nozzle (A8)
7	Nozzle in the thread chain cutter channel (A5)
8	Thread chain positioning device (A3)
9	Thread tension release (A4)
0	----

Inputs:

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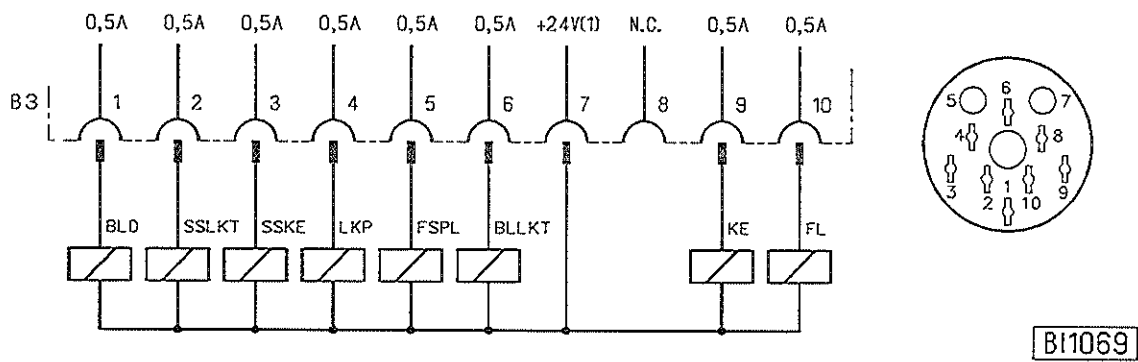- Several switches must not be closed at the same time.

11. Socket Connectors

11.1 Position in the Control
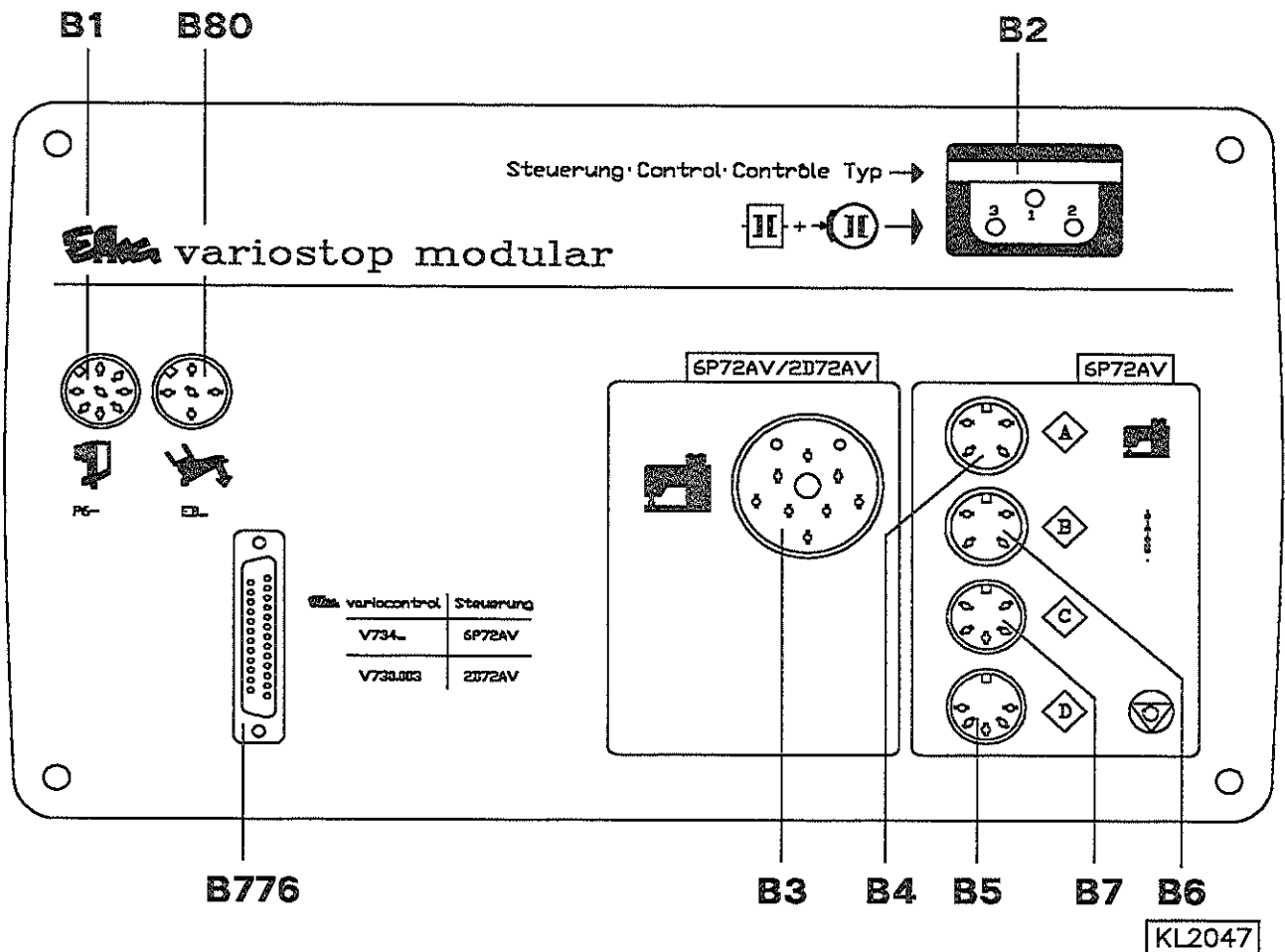

```
B1       - Position transmitter
B2       - Brake / clutch
B3       - Machine
B4 -B7   - These sockets are not used for this type of machine
B80      - External actuator
B776     - Control panel Variocontrol
```
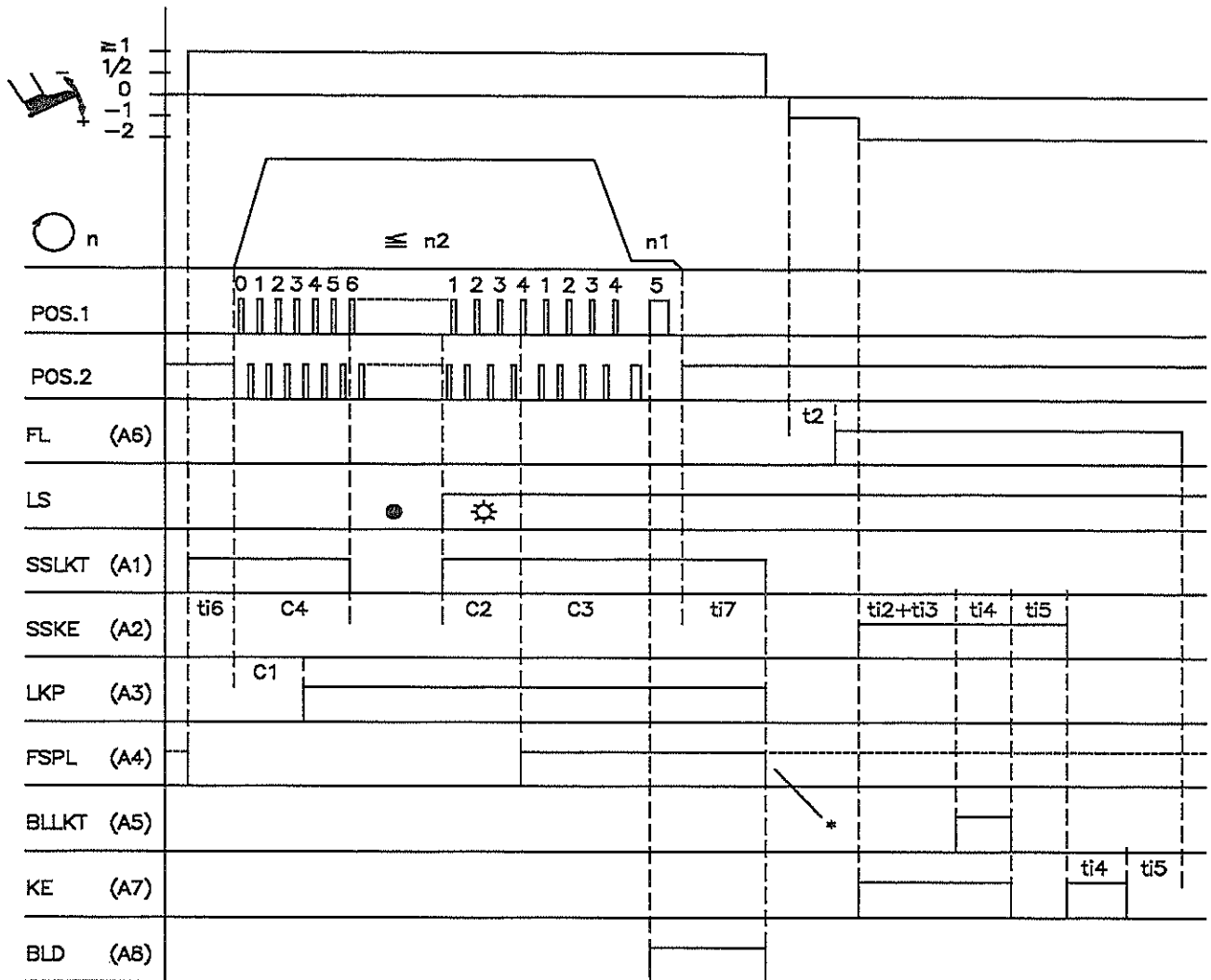
11.2 Connection Diagram

BI1069

BLD	- Nozzle
SSLKT	- Thread chain cutter
SSKE	- Suction current in the jamming device
LKP	- Thread chain positioning device
FSPL	- Thread tension release
BLLKT	- Nozzle in the thread chain cutter channel
KE	- Lift jamming device
FL	- Presser foot lifting

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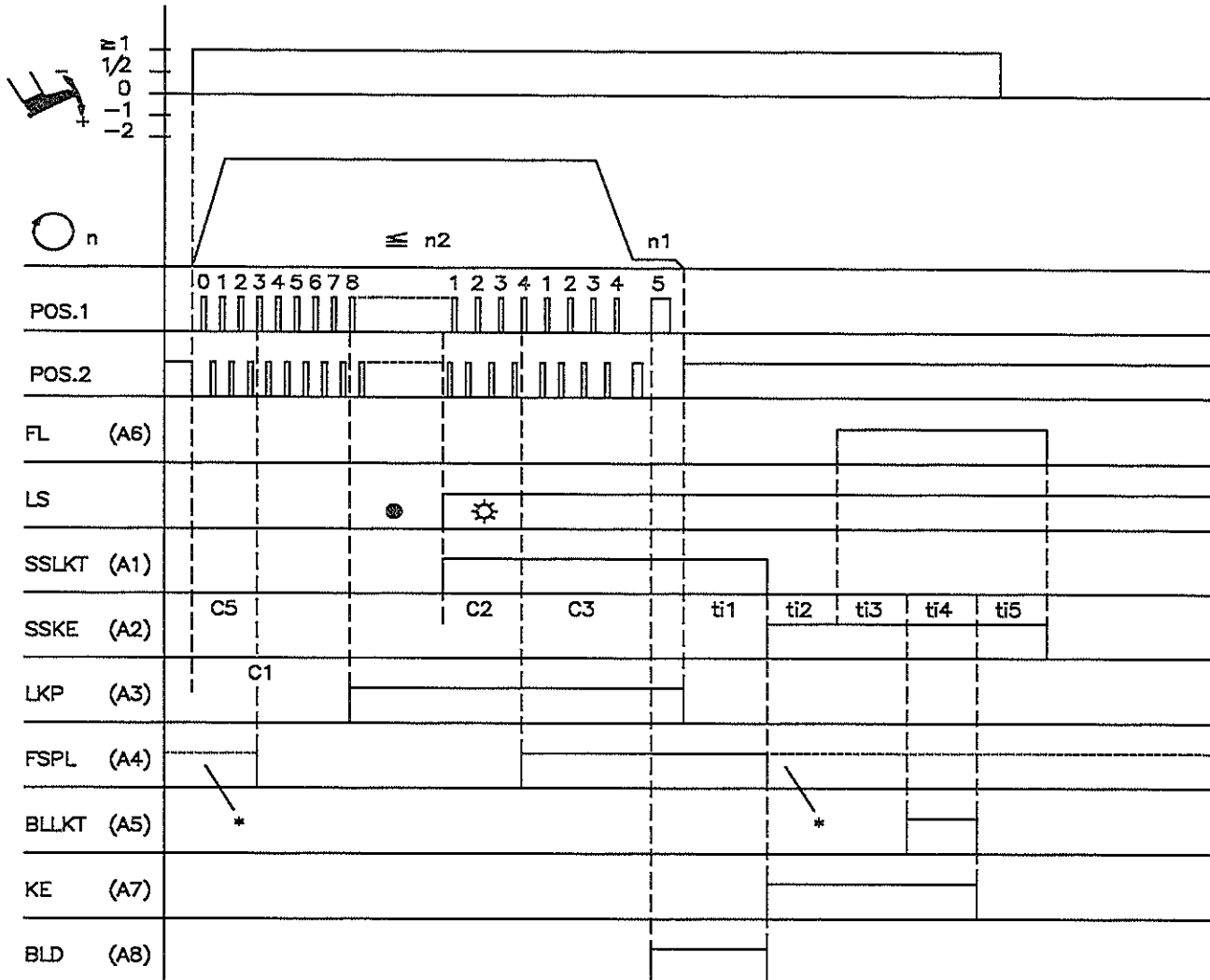
12. Timing Diagrams

Operation mode: seam backlatching by full heelback

2116/2D72AV—1

Above abbreviations see chapter **Connection Diagram** (previous page)!

Abbreviation	Function		Parameter/Pushbutton
	Operation mode "seam backlatching by heelback" (top LED 9 lights up) Pull thread chain two times	on on	Pushbutton 9 F-188 = ON
n1 n2	Positioning speed Maximum speed		F-110 F-111
c1 c2 c3 c4 ti6 ti7	Counting start of seam to signal A3 ON Counting light barrier uncovered to signal A4 ON Counting signal A4 On to seam end Counting at the start of the seam to signal A3 ON Start delay at the beginning of the seam in operation mode seam backlatching by full heelback Switch-off delay thread chain cutter at the seam end in operation mode seam backlatching by full heelback		F-000 F-001 F-002 F-003 F-185 F-186

$*$　　　$c5 = 0$　　　　　**Thread tension release is switched off after the time ti7**

　　　　　$c5 = \geq 1$　　　**Thread tension release remains on at machine standstill**
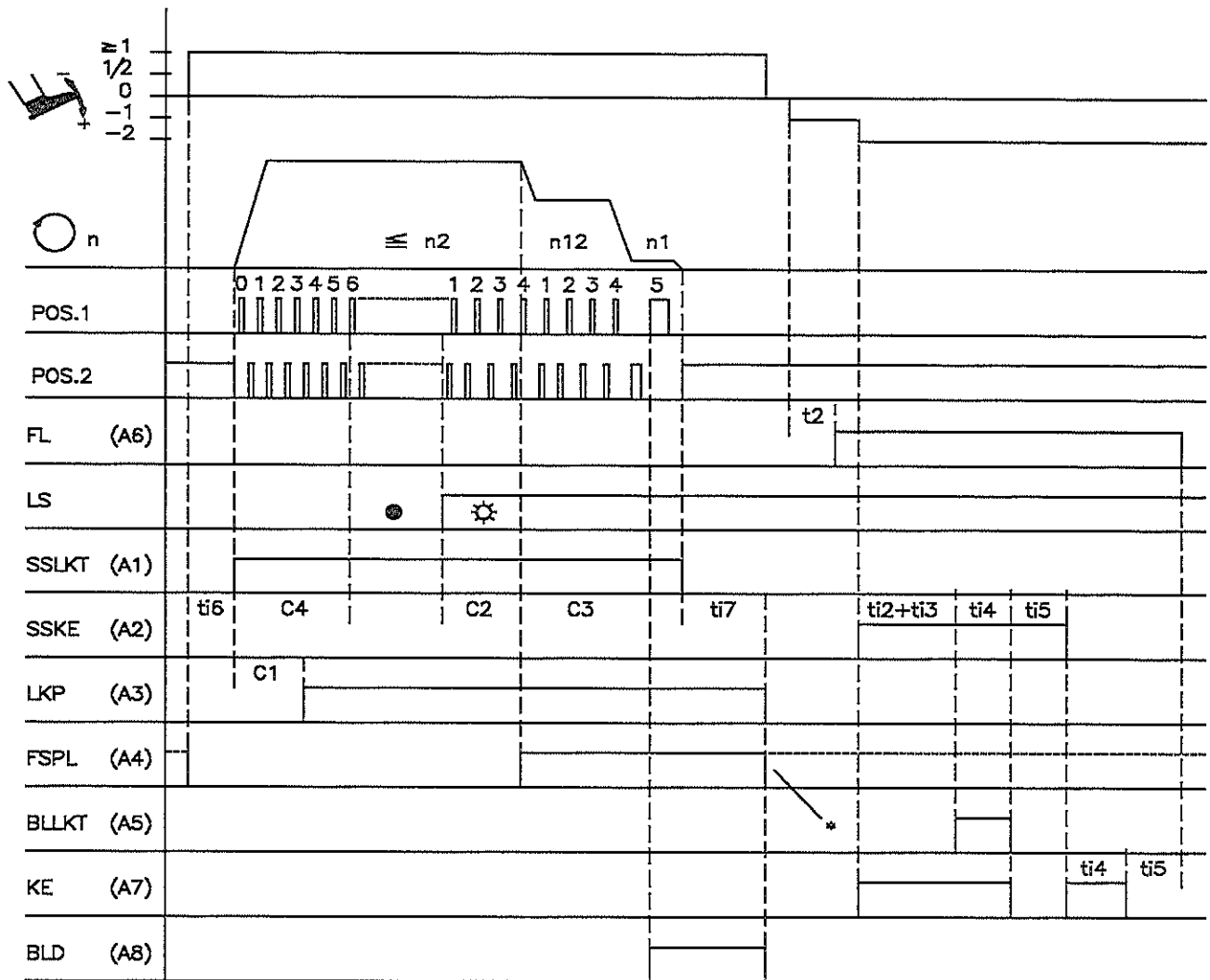
Operation mode: seam start backlatching

2116/2D72AV—2

Above abbreviations see chapter **Connection Diagram** (previous page)!

Abbreviation	Function		Parameter/Pushbutton
	Operation mode "seam start backlatching" (bottom LED 9 lights up)	on	Pushbutton 9
	Pull thread chain two times	off	F-188 = OFF
n1	Positioning speed		F-110
n2	Maximum speed		F-111
c1	Counting start of seam to signal A3 ON		F-000
c2	Counting light barrier uncovered to signal A4 ON		F-001
c3	Counting signal A4 On to seam end		F-002
c5	Counting at the start of the seam with released thread tension		F-187
ti1	Activation delay "lift jamming device" and "suction current On at the seam end		F-180
ti2	Activation delay presser foot up at the seam end		F-181
ti3	Activation delay nozzle in the thread chain cutter channel at the seam end		F-182
ti4	Operating time nozzle in the thread chain cutter channel at the seam end		F-183
ti5	Switch-off delay suction current in the jamming device at the seam end		F-184

* $c5 = 0$ Thread tension release is switched off after the time ti1
      $c5 = \geq 1$ Thread tension release remains on at machine standstill and for the set number of stitches (c5)

For both operation modes: signal "run" ON (F-189) and automatic speed during final counting ON (F-190)
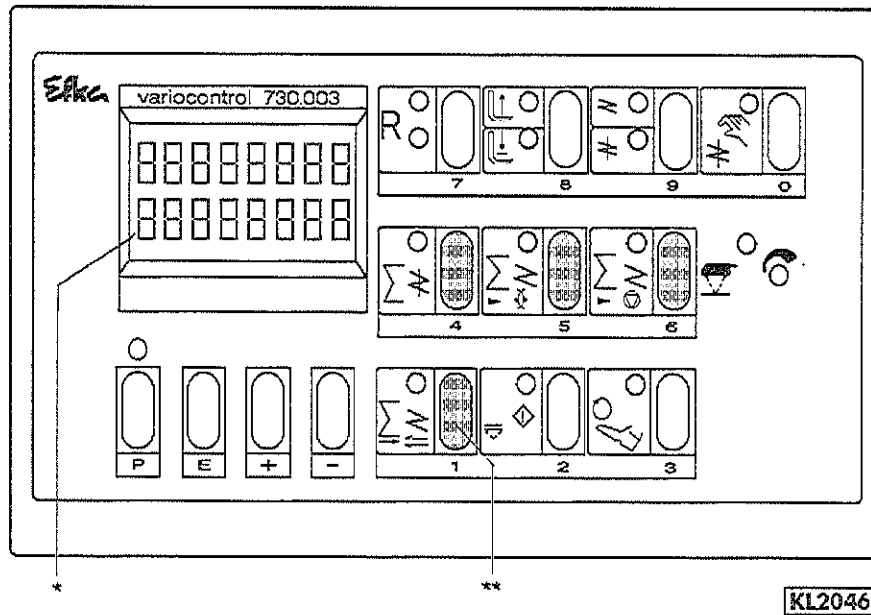
The timing diagram shows signals: n, POS.1, POS.2, FL (A6), LS, SSLKT (A1), SSKE (A2), LKP (A3), FSPL (A4), BLLKT (A5), KE (A7), BLD (A8), with timing markers ti6, C4, C2, C3, ti7, ti2+ti3, ti4, ti5, C1, t2, and speed levels n2, n12, n1. Diagram reference: 2116/2D72AV-3

Above abbreviations see chapter **Connection Diagram** (previous page)!

Abbreviation	Function		Parameter/Pushbutton
	Operation mode "seam backlatching by heelback" (top LED 9 lights up)	on	Pushbutton 9
	Pull thread chain two times	on	F-188 = ON
	Signal "run"	on	F-189 = ON
	Automatic speed	on	F-190 = ON
n1	Positioning speed		F-110
n2	Maximum speed		F-111
c1	Counting start of seam to signal A3 ON		F-000
c2	Counting light barrier uncovered to signal A4 ON		F-001
c3	Counting signal A4 On to seam end		F-002
c4	Counting at the start of the seam to signal A3 ON		F-003
ti6	Start delay at the beginning of the seam in operation mode seam backlatching by full heelback		F-185
ti7	Switch-off delay thread chain cutter at the seam end in operation mode seam backlatching by full heelback		F-186

* $c_5 = 0$ **Thread tension release is switched off after the time ti7**

         $c_5 = \geq 1$ **Thread tension release remains on at machine standstill**

KL2046

 *   =   Display

**   =   Pushbuttons with hatching: special settings for HIT
(see chapter "Aids for Putting into Operation and for Setting")

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 =   Call up counter "stitches until thread chain cutter (A1)
                 at the start of the seam OFF
Pushbutton 2 =   Automatic start by light barrier ON/OFF
Pushbutton 3 =   Switching between pedal controlled and fixed speed
Pushbutton 4 =   Call up counter "stitches until thread chain positioning device" (A3)
Pushbutton 5 =   Call up counter "stitches until thread tension (A4) released"
Pushbutton 6 =   Call up counter "stitches until machine stop after thread chain formation"
Pushbutton 7 =   Reset sewing cycle -> press pushbutton ≥ 2 seconds
Pushbutton 8 =   Switching between MANUAL and AUTOMATIC presser foot
Pushbutton 9 =   Switching between operation mode "seam start backlatching after full heelback" and
                 "seam start backlatching in each seam"
Pushbutton 0 =   Thread chain formation and jamming in operation mode "seam start backlatching"
                 (only in conjunction with pedal actuation)