Efka vario dc

CONTROL   **JU82AV3204**

INSTRUCTION MANUAL

Nr. 0402004   english

Contents   Page

1. Safety Instructions

1.   Motor, accessories and auxiliary devices can be mounted and put into operation only by an expert after taking note of the instruction manual.

2.   Motor, accessories and auxiliary devices must be used only in conformity with their designed function.

3.   Operation without corresponding protective devices is forbidden.

4.   Motor must be completely mounted before electric connection.

5.   Only skilled labour is allowed to work on the electric appliances.

6.   Only especially trained staff is allowed to complete repair work.

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

8.   Cables near moving machine parts (e.g. pulleys) must be wired at a minimum distance of 25 mm. (EN 60204-3-1; DIN VDE 0113)

9.   For a safe separation it is preferred to wire the cables separately from each other. (DIN VDE 0160)

10.   Connect the sewing light to the mains independently of the motor power supply.

11.   Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the control nameplate.

12.   Machine and motor must be connected through a potential equalization conductor.

13.   Before mounting and adjusting auxiliary devices and accessories, especially position transmitter, reversing device, light barrier, etc., disconnect the motor (disconnect the main switch, pull off mains plug [EN 60204-3-1; DIN VDE 0113]).

14.   Electric auxiliary devices and accessories must only be connected to protective low voltage.

15.   Disconnect the motor for any repair and maintenance work. (disconnect the main switch, pull off mains plug [EN 60204-3-1; DIN VDE 0113]).

16.   The motor resists overvoltage according to overvoltage class 2. (DIN VDE 0160)

17.   Working on parts and devices under voltage is forbidden.
      - Exceptions are regulated by DIN VDE 0105

18.   Observe all safety instructions before undertaking conversions and modifications.

19.   For repair and maintenance use only original parts from the manufacturer.

20.   Warning indications in the instruction manual point out particular risks of personal injury or risk for the machine and are marked with the symbol below wherever applicable.
      Observe and follow these instructions as well as the generally valid safety instructions!

2. Range of Applications

The motor is suitable for sewing machines: General: lock stitch and chain stitch machines
                                                    Yamato: chain stitch machines

Brand	Series	
Juki	DOL5550-4-.,	DLD432-4-.,
	DLD436-4-.,	DLN5410-4-.,
	DLU450-4-.,	LH1152-4-.,
	MH481-4-.,	MH484-4-.

2.1 Use in Accordance with Regulations

The motor 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 motor 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 motor can only be operated:

• on thread processing machines
• in dry areas

3. Complete Motor Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc JU82AV3204
	- Power pack	N152 (optional N153, N155)
	- Speed controller	EB301
1	Control panel Variocontrol	V720, V730 oder V740 *1)
1	Position transmitter	P6-1
1	Mains switch	NS105
1	Set of standard accessories consisting of:	B131 belt guard complete set of hardware motor foot bracket 1 and 2, short documentation
1	Pulley	

*1) Light barrier control possible by using:
     V720 - Reflection light barrier module LSM001
     V730 - Reflection light barrier LS-001-006 or reflection light
            barrier module LSM001
     V740 - Transmitted light barrier Varioply or reflection light
            barrier module LSM001

3.1 Special Accessories

Storage unit Memory Box MB001	- part no. 7900052
Storage card Memory Card MC001	- part no. 1111602
Reflection light barrier module Variolux LSM001	- part no. 6100028
Reflection light barrier Variolux LS-001-006	- part no. 6100005
Transmitted light barrier Varioply - transmitter DLS-001	- part no. 6100027
- receiver DLL-...	- available versions see specification Varioply
Solenoid type EM1..(for e.g. presser foot lift, backtacking, etc.)	- available versions see specification solenoids
Extension cable for external 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
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)
3-pin plug with slide index	- part no. 0500402
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

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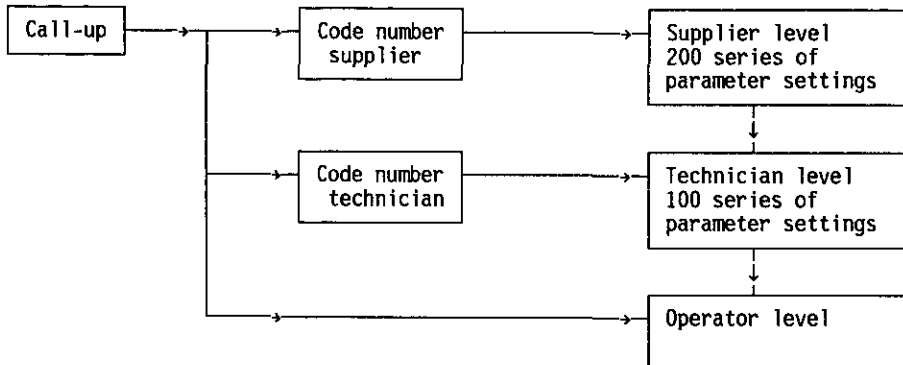
4.2 Code Number Input

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 !   │ InFo F1│

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

                                    F-XXX = first parameter number in the recalled
                                    level

4.3 Direct Operation

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

```
Example initial backtack:
- Double initial backtack is on        top LED7 lights up

Push button 7 briefly                   both LED7 off
- Initial backtack is off

Push button 7 briefly                   bottom LED7 lights up
- Single initial backtack is on
```

```
I ⌐7⌐
O └─┘

O ⌐7⌐
O └─┘

O ⌐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 !

   ==>   ┌─────────────────────────┐
         │ PROGRAMMING TERMINATED ! │
         └─────────────────────────┘
```

4.5 Input by Parameters on the Technician and Supplier Level

```
-> After input of the CODE NUMBER      ==>    ┌──────────┐
   Display of the first PARAMETER NO.         │ F-XXX    │
                                              │          │
                                              └──────────┘

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

```
1. -> ┌─┐    ==>   The most significant digit ==>   ┌──────────┐
      │P│          on the display blinks!           │ F-XXX    │
      └─┘                                            │          │
                                                     └──────────┘
```

```
2. -> ┌─┐  -> ┌─┐  -> ┌─┐ ->.. Input desired PARAMETER NO.
      │1│     │2│     │3│
      └─┘     └─┘     └─┘
      (Example)
```

```
3. -> ┌─┐  -> If PARAMETER NUMBER wrong       ==>    ┌──────────┐
      │E│        repeat input !                      │ F-XXX    │
      └─┘                                            │ InFo  Fl │
                                                     └──────────┘

        -> If PARAMETER NUMBER correct        ==>    ┌──────────┐
                                                     │ F-XXX    │
                                                     │ aaa  bbb │
                                                     └──────────┘
```

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

```
4. -> ┌─┐  -> ┌─┐  -> Change parameter value !
      │+│     │-│
      └─┘     └─┘
```

```
5. -> ┌─┐  -> PARAMETER VALUE is entered        ==>   ┌──────────┐
      │E│        Display steps to next PARAMETER       │ F-XXX    │
      └─┘                                              │ aaa  bbb │
                                                       └──────────┘
      OR

   -> ┌─┐  -> PARAMETER VALUE is entered        ==>   ┌──────────┐
      │P│        Call-up of a new PARAMETER NO.        │ F-XXX    │
      └─┘        as under step 1 possible !            │          │
                                                       └──────────┘
      OR

   -> ┌─┐  -> ┌─┐  -> Press button ==>   ┌──────────────────────────┐
      │P│     │P│        twice           │ PROGRAMMING TERMINATED !  │
      └─┘     └─┘                        └──────────────────────────┘
```

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 "anticlockwise rotation".

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

```
1. -> |P|  + TURN POWER ON                    ==>    | C-0000 |


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


3. -> |+| -> Select the desired language       ==>    |dEU  USA|
                                                      |ESP  FrA|


             Adjust the reference position.
4. -> |E| -> Turn position transmitter at      ==>    |PoSition|
             least until the marker ( [ )              |1      [|
             has disappeared.
```

5. Adjust position 2

-> |E| -> Turn position transmitter   ==> | PoSition |
            to the desired position. | 2   254 |

     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 the positioning speed   ==> | Lo SPEEd |
                                                    | n1   0180 |

-> |+| -> |-| -> Change value

7. -> |E| -> Adjust the initial back-   ==> | bt SPEEd |
             tacking speed | n3   1500 |

-> |+| -> |-| -> Change value

8. -> |E| -> Adjust the final backtacking   ==> | bt SPEEd |
             speed | n4   1500 |

-> |+| -> |-| -> Change value

9. -> |E| -> Adjust the maximum speed   ==> | hi SPEEd |
                                              | n2⁻ 5000 |

-> |+| -> |-| -> Change value

10. -> |E| -> Selection lock/chain stitch   ==> | SELEct |
                                              | StP   on |

-> |+| -> |-| -> Change value

11. -> |E| -> Adjust the sense of rotation   ==> | rotAtion |
                                              | Mot   1 |

-> |+| -> |-| -> Change value

6.1.2 Multilingual Display

```
|dEU   USA|      Language selection
|ESP   FrA|
```

dEU	USA	ESP	FrA	
`PoSition` `1        ]`	`PoSition` `1        ]`	`PoSicion` `1        ]`	`PoSition` `1        ]`	Reference position and leading pos.1
`PoSition` `2     306`	`PoSition` `2     306`	`PoSicion` `2     306`	`PoSition` `2     306`	Leading position 2
`niEdriG` `n1   0180`	`Lo SPEEd` `n1   0180`	`vEL bAJA` `n1   0180`	`vit LEnt` `2A   0180`	Positioning speed
`Ar drEHZ` `n3   1500`	`bt SPEEd` `n3   1500`	`v rEMini` `n3   1500`	`brid ini` `n3   1500`	Initial back- tacking speed
`Er drEHZ` `n3   1500`	`bt SPEEd` `n3   1500`	`v rEMFin` `n3   1500`	`brid Fin` `n3   1500`	Final back- tacking speed
`hoch` `n2^ 5000`	`hi SPEEd` `n2^ 5000`	`vEL ALtA` `n2^ 5000`	`vit rAPi` `n2^ 5000`	Maximum speed
`-SELEct-` `StP   on`	`-SELEct-` `StP   on`	`-SELEct-` `StP   on`	`-SELEct-` `StP   on`	Lock stitch/ Chain stitch
`drEhri` `Mot    1`	`rotAtion` `Mot    1`	`rotAcion` `Mot    1`	`rotAtion` `Mot    1`	Sense of rotation

6.2 Direct Input of Speed (DED)

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

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

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

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

6.3 Pushbuttons for Background Information (HIT)

(see table on the last page)

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

```
| 5000   |     Display after power on:
| JU82AV |     -> Maximum speed
                -> Type designation
```

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

```
| Stc  020 |   Display:
                20 stitches are set

                3 seconds.
```

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

```
| Stc  025 |   Display:
                25 stitches are set
                Changes are automatically entered after
                3 seconds.
```

```
| 5000   |     Display after approx. 3 seconds:
| JU82AV |     -> Maximum speed
                -> Type designation
```

If stitch counting (pushbutton 1) was turned on.

```
| 5000   |     Display after power on:
| JU82AV |     -> Maximum speed
                -> Type designation
```

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

```
| Stc  020 |   Display:
                20 stitches are set
```

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

```
┌─────────┐
│         │    Display:
│ Stc 025 │    25 stitches are set
│         │    Changes are automatically entered after
└─────────┘    3 seconds.
```

```
┌─────────┐
│  5000   │    Display after approx. 3 seconds:
│ JU82AV  │    -> Maximum speed
│         │    -> Type designation
└─────────┘
```

With the sewing start the new value is saved.

Function key F

By the function key (pushbutton 3) various parameters, also from a higher level, can be switched on or off. This pushbutton can be set to the following functions:

1. SSt Softstart ON/OFF
2. SrS Ornamental backtack ON/OFF
3. hP High lift walking ON/OFF
4. Sht Single stitch with pushbutton for needle up/down ON/OFF
5. LSS Sewing start blocked with light barrier uncovered ON/OFF
6. rd Reversion ON/OFF

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

```
┌─────────┐
│  5000   │    Display after power on.
│ JU82AV  │    -> Maximum speed
│         │    -> Type designation
└─────────┘
```

```
┌───┐
│ P │          Press pushbutton P.
└───┘
```

```
┌───┐
│ E │          Press pushbutton E.
└───┘
```

```
┌───┐
│ 3 │          Press pushbutton 3 (function key F),
└───┘          corresponding LED blinks.
```

```
┌─────────┐
│         │    Display:
│ -F-   6 │    Actual status (reversion ON/OFF)
│         │
└─────────┘
```

```
┌───┐
│ - │          Press pushbutton -.
└───┘          (+ increases, - decreases the display value)
```

```
┌─────────┐
│         │    Display:
│ -F-   1 │    New status (Softstart ON/OFF)
│         │
└─────────┘
```

```
┌───┐
│ P │          Press pushbutton P.
└───┘
```

```
┌─────────┐    Setting is terminated, display:
│  5000   │    -> Maximum speed
│ JU82AV  │    -> Type designation
└─────────┘
```

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

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

| SSc   001 | Display: 1 stitch is set |

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

| SSc   003 | Display: 3 stitches are set Changes are automatically entered after 3 seconds. |

| 5000 JU82AV | Display after approx. 3 seconds: -> Maximum speed -> Type designation |

If Softstart (pushbutton 3) was turned on.

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

| SSc   001 | Display: 1 stitch is set |

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

| SSc   003 | Display: 3 stitches are set |

| 5000 JU82AV | Display after approx. 3 seconds: -> Maximum speed -> Type designation |

With the sewing start the new value is saved.

6.4 Programming Seams (Teach-in)

• A maximum of 8 patterns with a total of 40 seams can be established.
• Programming is possible only if no code number was input after switching on!
• The functions initial backtack, final backtack, stitch counting, thread trimming and presser foot lifting can be assigned individually to each seam.

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

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

6.4.1 Teach-in Mode

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

Display configuration:

```
┌──────────┐   X     Pattern number  (1...8)
│ X YY ZZZ │   YY    Seam number     (0...40)
│ LS   SSS │   ZZZ   Stitches for the seam with stitch counting (0...254)
└──────────┘   LS    appears when light barrier function on
               SSS   Stitches after light barrier sensing (0...254)
```

Programming:

1 -> |P| ==> LED pushbutton P blinks   ==>   [   ]

2 -> |E| ==> Display of a parameter   ==>   [   ]
               on the operator level   [aaa   bbb]

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

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

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

Example: seam with stitch counting:

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

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

Example stitch counting and/or light barrier:

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

Only with V740!

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

Only with V740!

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

With V720/V730/V740!

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

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

After programming of the function ==>

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

-> The seam is entered by pressing the pushbutton E or by heeling the pedal back.

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

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

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

Attention!
The patterns are permanently saved only after the sewing start

---

Detailed Example:

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

```
                Display before programming        ==>  | xxxx   |
                                                       | XY82ZV |

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

 2. -> |E|   ==> Display of a parameter           ==>  |        |
                     on the operator level             | aaa bbb|

                     LED pushbutton 2 blinks
 3. -> |2|   ==> Pattern 1, seam 1                 ==>  | 1 01 ---|

                     LED pushbutton 2 blinks
 4. -> |2|   ==> Pattern 2, seam 1                 ==>  | 2 01 ---|

                     LED pushbutton 2 blinks
 5. -> |2|   ==> Pattern 3, seam 1                 ==>  | 3 01 ---|

                     LED pushbutton 2 blinks
 6. -> |2|   ==> Pattern 4, seam 1                 ==>  | 4 01 ---|

                     LED bottom pushbutton 7 lights up
 7. -> |7|   ==> Single initial backtack is on    ==>  | 4 01 ---|

                     LED pushbutton 6 lights up
 8. -> |6|   ==> Foot lifting at the seam end     ==>  | 4 01 ---|
                     is on

 9. -> |1|   ==> Stitch counting is on            ==>  | 4 01 000|

10. -> |+| -> |-| Changing the number of stitches      | 4 01 017|
                  by pushbuttons or by using the
                  pedal

             ==> Seam length of 17 stitches is
                 adjusted

11. -> |E|   ==> Pattern 4, seam 2                 ==>  | 4 02 ---|

12. -> |1|   ==> Stitch counting is on            ==>  | 4 02 000|

13. -> |+| -> |-| Changing the number of stitches      | 4 02 008|
                  by pushbuttons or by using the
                  pedal

             ==> Seam with 8 stitches is adjusted
```

14. -> |E| ==> **Pattern 4, seam 3**   ==> | 4 03 --- |
                Free seam is selected

15. -> |0| ==> Light barrier is activated   ==> | 4 03 --- |
                                                   | LS   000 |

16. -> |+| -> |-| Changing the stitches by | 4 03 --- |
                   pushbuttons | LS   005 |
                   5 compensating stitches
                   are adjusted

                   LED top pushbutton 8 lights up
17. -> |8| ==> Single final backtack is on   ==> | 4 03 --- |
                                                    | LS   005 |

                   LED bottom pushbutton 9 lights up
18. -> |9| ==> Thread trimmer is on   ==> | 4 03 --- |
                                                    | LS   005 |

19. -> |E| ==> Pattern 4, seam 4   ==> | 4 04 --- |
                By changing to the next seam
                the settings of the preceding
                seams are automatically entered.

20. -> |P| ==> Programming terminated,   ==> | 4 01 017 |
                first seam can be executed

6.4.2 Max. Number of Seams Exceeded

If the total number of 40 seams is exceeded by inputting a program, for the time being, the teach-in mode cannot be terminated by pushbutton P.
A further sewing start is impaired.
The display shows the warning below.
Pressing pushbutton P again causes the deletion of the pattern indicated on the display. The teach-in mode is exited if the total number of 40 seams is not exceeded. Otherwise a new warning will be indicated.

Display:

| DELETE |
| X YY NN |

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

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

-> |2| ==> Call-up of the pattern to be deleted | DELEtE |
                                                        | X YY NN |

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

-> |P| ==> Deletion of the pattern | DELEtE |
                                                        | X YY NN |

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

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

6.4.3 Execution (Pattern) Mode

1. Switch on mode by pushbutton 2
   (LED lights up)   -> | 2 | ==> | X 01 ZZZ |

2. Select pattern 1...8
   - Seam number 01 is displayed   -> | + | -> | - | ==> | X 01 030 |

3. If one should not start with seam 1
   select different seam number   -> | E | ==> | 2 05 ZZZ |
   - Push button E several times
     until desired seam number is displayed

■ The pattern can now be started by pushing the pedal.

Exit the execution (pattern) mode
   - Switch off by pushbutton 2   -> | 2 |

7. Functions and Settings

7.1 First Stitch after Power On

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

At the first start after power on, the motor runs at positioning speed (n1) for one rotation from pos. 1 to pos. 1, independent from the pedal position and set initial backtacking 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.

Functions that can be programmed:
> F-008 = 1 - Softstart on/off
> F-008 = 2 - Ornamental backtack on/off
> F-008 = 3 - High lift walking on/off
> F-008 = 4 - Single stitch with pushbutton needle up on/off
> F-008 = 5 - Sewing start blocked with light barrier uncovered on/off
> F-008 = 6 - Reversion 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

```
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
```

7.5 Sense of Rotation of the Motor

Functions	Abbreviation on the display	Parameter
Sense of rotation of the motor	Mot	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

```
Softstart              or            or            or Stitch counting with              Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
```

Functions	Abbreviation on the Display	Parameter
Sofstart number of stitches Softstart speed Softstart on/off	SSc n6 SSt	F-100 F-115 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 backtack, 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 = 1

7.7 Initial Backtack

```
Softstart              or            or            or Stitch counting with              Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
```

Functions	Abbreviation on the display	Parameter
Single/double off		Pushbutton 7
Number of stitches forward Number of stitches backward Initial backtacking speed Run-out time Start delay from lifted foot Stitch correction time	Arv Arr n3 t1 t3 t8	F-000 F-001 F-112 F-200 F-202 F-150

The initial backtack starts by pushing the pedal forward at the beginning of the seam. The backtack is delayed by the time t3 from lifted foot (start delay from lifted foot).
The backtack is executed automatically at initial backtacking speed. It cannot be interrupted. With softstart running parallel, the respective lower speed predominates.
The counting as well as the switching of the stitch regulator is synchronized to position 1.
After the execution of the backward seam, the backtacking signal, and, after a delay time t1, the initial backtacking speed, will be turned off. Then pedal control is returned.

7.7.1 Double Initial Backtack

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

7.7.2 Single Initial Backtack

The backtacking signal will be emitted for an adjustable number of stitches, and the backward section will be sewn.

7.7.3 Speed Control Initial Backtack

Functions	Abbreviation on the display	Parameter
Speed mode for intial backtack	SAr	F-143

The speed control of the initial backtack can be determined by this parameter depending on the pedal position.

F-143 = 0

Initial backtacking speed is pedal controlled up to the maximum speed.

Pedal = 0   -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1   -- > Initial backtack is sewn at pedal controlled speed, and the next seam section is selected.
Pedal = -1 -- > Presser foot is lifted.
Pedal = -2   -- > Initial backtack is interrupted, presser foot is lifted, motor is at the beginning of the next seam
                  section.

F-143 = 1

Fixed initial backtacking speed n3

Pedal = 0   -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1   -- > Intial backtack is completed at fixed speed n3, and the next seam section is selected.
Pedal = -1 -- > Presser foot is lifted.
Pedal = -2   -- > Initial backtack is interrupted. presser foot is lifted, motor is at the beginning of the next seam
                  section.

F-143 = 2

Initial backtacking speed pedal controlled, limited to n3.

Pedal = 0 -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1 -- > Initial backtack is completed pedal controlled (speed limited to n3), and the next seam section is selected.
Pedal = -1 -- > Presser foot is lifted.
Pedal = -2 -- > Initial backtack is interrupted, presser foot is lifted, motor is at the beginning of the next seam section.

F-143 = 3

Fixed initial backtacking speed n3, intermediate stop not possible.

Pedal > 1 -- > activates the initial backtack; then the initial backtack is completed at fixed speed n3 independent of the pedal, and the next seam section is selected.

7.8 Final Backtack
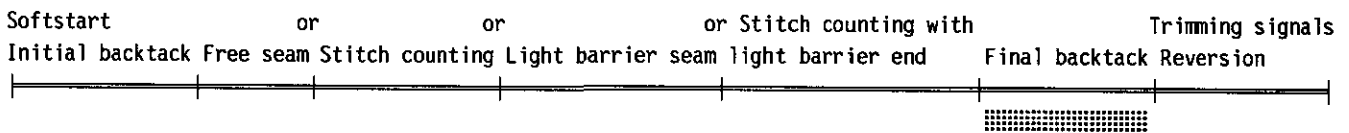
```
Softstart              or            or              or Stitch counting with           Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion
├─────────────┼───────┼──────────────┼──────────────────┼──────────────────┼─────────────┼──────────┤
```

Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 8
Number of stitches backward	Err	F-002
Number of stitches forward	Erv	F-003
Final backtacking speed	n4	F-113
Last stitch backward on/off	FAr	F-136
Stitch correction time	t9	F-151
Start delay from lifted foot	t3	F-202

The final backtack starts either by heeling the pedal back, in the case of seams with stitch counting at the end of the counting, or from the light barrier seam at the end of the light barrier compensating stitches. From machine standstill, the stitch regulator will be turned on immediately. From lifted foot, the switch-on point is delayed by the time t3 (start delay from lifted foot). The first leading position 1 is counted as 0 stitch, whenever the function is started outside of position 1. The counting and the turning off of the stitch regulator is synchronized to position 1.
From full machine run, the signal will be turned on only after reaching the final backtacking speed and the synchronization to position 2. The final backtack will be performed automatically. An interruption is not possible.

7.8.1 Double Final Backtack

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

7.8.2 Single Final Backtack

The single final backtack is sewn at final backtacking speed. During the last stitch the speed is reduced to positioning speed. Depending on parameter F-136 (Far) the stitch regulator remains on or turns off.

-         Parameter F-136 = ON last stitch backward
          Parameter F-136 = OFF last stitch forward

7.8.3 Speed Control Final Backtack

Functions	Abbreviation on the display	Parameter
Speed mode for final backtack	SEr	F-144

The speed control of the final backtack can be determined by this parameter depending on the pedal position. The final backtack is selected from the free seam by pedal -2.

F-144 = 0

Final backtacking speed is pedal controlled up to the maximum speed.

Pedal = 0   -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1   -- > Final backtack is sewn at pedal controlled speed and then trimmed. The motor is at the beginning of the seam again.
Pedal = -1   -- > Presser foot is lifted.
Pedal = -2   -- > Final backtack is interrupted and then trimmed. The motor is at the beginning of the seam again.

F-144 = 1

Fixed final backtacking speed n4

Pedal = 0   -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1   -- > Final backtack is completed at fixed speed n4 and then trimmed. The motor is at the beginning of the seam again.
Pedal = -1   -- > Presser foot is lifted.
Pedal = -2   -- > Final backtack is interrupted and then trimmed. The motor is at the beginning of the seam again.

F-144 = 2

Final backtacking speed pedal controlled, limited to n4.

Pedal = 0   -- > Intermediate stop.
Pedal = +1 -- > Presser foot lowers.
Pedal > 1   -- > Final backtack is completed pedal controlled (speed limited to n4) and then trimmed. The motor is
              at the beginning of the seam again.
Pedal = -1 -- > Presser foot lowers.
Pedal = -2 -- > Final backtack is interrupted and then trimmed. The motor is at the beginning of the seam again.

F-144 = 3

Fixed final backtacking speed n4, intermediate stop is not possible.

7.9 Intermediate Backtack
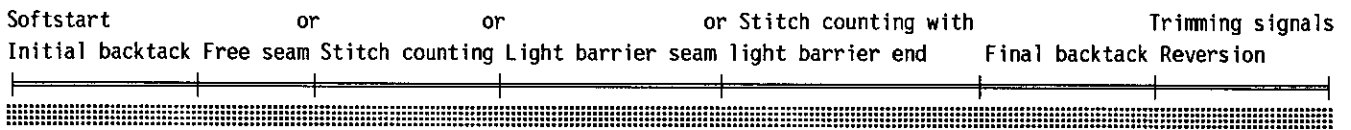
```
Softstart                      or            or            or Stitch counting with              Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end      Final backtack Reversion
```

Functions	Abbreviation on the display	Parameter
Switching between needle up/down and manual backtack	Ent	F-186 = OFF

The backtack solenoid can be switched on anywhere in the seam by the external pushbutton.
-    Firing of the backtack solenoid at machine standstill is not possible.

7.10 Initial Ornamental Backtack

```
Softstart                    or            or           or Stitch counting with          Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
├────────────────┼──────────┼──────────────┼─────────────────┼───────────────────┼──────────────┼──────────┤
  ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
```

Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 7
Number of ornamental backtacking stitches forward	SAv	F-080
Number of ornamental backtacking stitches backward	SAr	F-081
Initial backtacking speed	n3	F-112
Ornamental backtack on/off	SrS	F-135
Start delay from lifted foot	t3	F-202
Ornamental backtack stop time	tSr	F-210

Differences from the standard initial backtack:
- The motor stops for the switching of the stitch regulator
  - The stop time can be adjusted
- After the backtacking section backward follows a backtacking section forward with the same number of stitches as the backward section

Direct access by function key (pushbutton 3)

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

7.11 Final Ornamental Backtack

```
Softstart                    or            or           or Stitch counting with          Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
├────────────────┼──────────┼──────────────┼─────────────────┼───────────────────┼──────────────┼──────────┤
                                                                                     ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
```

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

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

Direct access by function key (pushbutton 3)

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

7.12 Backtack Stop Functions

Functions	Abbreviation on the display	Parameter
Function inital backtack Function final backtack	ArF ErF	F-280 F-281

Using the parameters it is possible to introduce automatic stops at 3 different points on the backtack.

These 3 points are::
-- > Beginning of backtack
-- > Switching point forward and backward section
-- > End of backtack

In the case of an automatic stop the motor stops for an adjustable time, independent from the set speed mode. The ornamental backtack stop time F-210 is used.
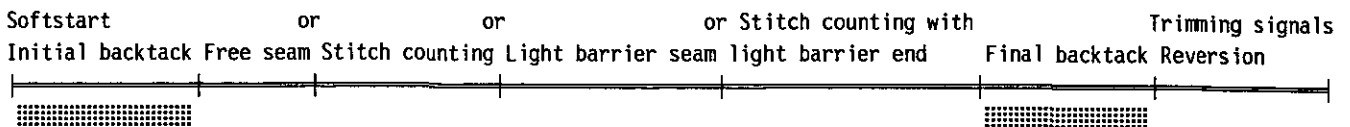
For both parameters the following is valid:

Mode 0 -- >   Backtack is executed without automatic stop.
Mode 1 -- >   The automatic stop occurs before the corresponding backward section. If a backward section is at the beginning the stop time works like a start delay. During the stop time the backtack solenoid is fired.
Mode 2 -- >   An automatic stop occurs before and after each backtacking section (ornamental backtack).
Mode 3 -- >   If the backtack is activated from machine standstill and the first section to be sewn is the backward section an automatic stop occurs. This automatic stop works like a start delay. During the stop the backtack solenoid is fired.

7.13 Suppression/Recall of Backtack

■ Effective in standard and ornamental backtack

```
Softstart               or          or              or Stitch counting with          Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion
├─────────────────┼─────────┼─────────────────┼──────────────────────────┼─────────────────┼──────────────┤
▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓                                                          ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
```

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

When pressing	Initial back-tack On	Initial back-tack Off	Final back-tack On	Final back-tack Off
Before start of seam In the seam	no backtack ---	backtack ---	--- no backtack	--- backtack

The double backtack is performed in the above cases.

7.14 Pulsing Backtack Solenoid
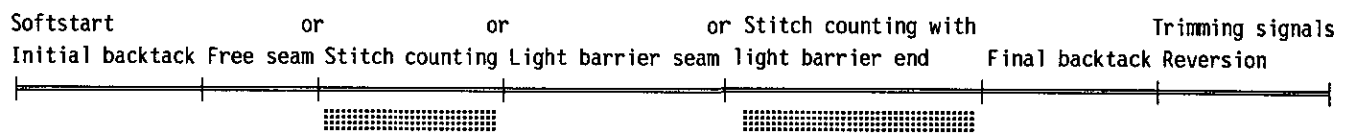
Functions	Abbreviation on the display	Parameter
Time of full power Pulsing	t10 t11	F-212 F-213

The backtack solenoid can be activated automatically or manually. In order to make the backtack solenoid engage fast, it is fully activated over the programmed time.

Then, the solenoid must be pulsed. the pulsing of the solenoid functions in the following manner:

Adjusted value:	Effect:
0 1 2 3 4 5 6 7	Full power, pulsing off very low pulsing (holding power) low holding power medium holding power . . . very high holding power

7.15 Seam with Stitch Counting

```
Softstart              or           or          or Stitch counting with        Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion
|————————————|————|——————————|————————|——————————|———————————|———————|
```

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

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

```
Mode    0: Execution at pedal controlled speed.
Mode    1: Execution at fixed speed n12 as long as pedal is pushed.
Mode    2: Execution at limited speed n12 as long as pedal is pushed.
Mode    3: Automatic execution at fixed speed as soon as the pedal has
           been pushed once. 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.

7.16 Free Seam and Seam with Light Barrier
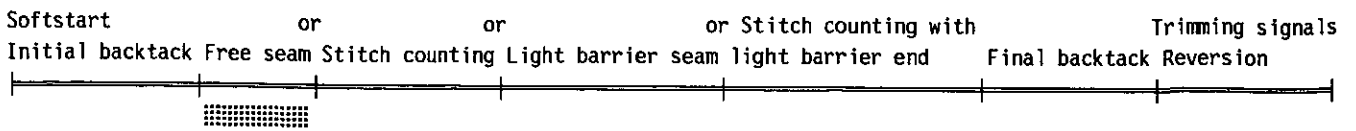
```
Softstart              or            or          or Stitch counting with        Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion
├───────────┼───────┼───────────┼───────────┼──────────────┼────────────┼───────┤
                ▓▓▓▓▓▓▓▓▓▓
```

Functions	Abbreviation on the display	Parameter
Positioning speed Upper limit of the maximum speed Maximum speed Lower limit of the maximum speed Limited speed Speed mode Free seam	n1 n2⁻ n2_ n12 SFn	F-110 F-111 see display F-121 F-118 F-142

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

```
Mode    0:  Execution at pedal controlled speed from n1 to nmax.
Mode    1:  Execution at fixed speed n12, when pedal is forward (position >=1).
Mode    2:  Execution at limited speed n12, when pedal is forward (position >=1)
Mode    3:  Only for the seam with light barrier:
            Automatic execution at fixed speed as soon as the pedal has
            been pushed once. The seam end is initiated by the light
            barrier. 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 adjustment of parameter F-111.

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

7.16.1 Needle up / Single Stitch

Functions	Abbreviation on the display	Parameter
Switching between needle up/down and manual backtack Full stitch ON/OFF	Ent Sht	F-186 = ON F-140

Needle up/down
When pressing the pushbutton, the motor runs from position 1 to position 2 and/or from position 2 to position 1.
If the motor is outside of the slot between both positions it will not move for safety reasons.

Single stitch
When pressing the pushbutton, the machine performs one rotation from position 1 to position 1.
If the motor is in position 2 it runs to position 1, when pressing the pushbutton, and from position 1 to position 1 each time when pressing the pushbutton again.
If the motor is outside of the stop position it runs to the preselected basic position.

Direct access by function key (pushbutton 3)

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

7.17 Light Barrier

Softstart	or	or	or Stitch counting with	Trimming signals
Initial backtack	Free seam	Stitch counting	Light barrier seam	light barrier end	Final backtack	Reversion

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

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

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

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Sewing start with light barrier uncovered ON/OFF	-F-	F-008 = 5

7.17.2 Reflection Light Barrier (V720, V730)

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

Adjustments

Sensitivity:

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

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

Mechanical Adjustment:

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

7.17.3 Transmitted Light Barrier (V740)

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

Sensitivity adjustment:

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

Select the sensitivity level:

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

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

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

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

Mechanical adjustment of the light barrier sensor

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

7.17.4 Automatic Start by Light Barrier (V730, V740)

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

The 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).
- 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.

7.17.5 Light Barrier Filter for Knitted Fabrics

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

The filter prevents premature triggering of the light barrier function, when sewing knitted fabrics.
-      By parameter F-130 the filter can be switched on or off.
-      By changing the number of filter stitches the mesh will be adapted.

7.17.6 Special Light Barrier Functions

Functions	Abbreviation on the display	Parameter
Interruption of initial backtack by light barrier	LSA	F-124

The initial backtack is interrupted, when the motor stops and the light barrier senses "uncovered". When starting to sew again, the new seam begins with the complete initial backtack. The function is active only if an intermediate stop in the initial backtack has been made possible by the speed mode inital backtack (SAr).

Functions	Abbreviation on the display	Parameter
Light barrier always ON	LSo	F-125

If this parameter is set at ON the light barrier cannot be switched off by pushbutton 0 (neutral) on the Variocontrol.

Functions	Abbreviation on the display	Parameter
Interruption of seam by pedal -2 ON/OFF	ntb	F-126

Interruption of the seam by pedal -2 can be suppressed by this parameter. This applies only to automatic operation as e.g. stitch counting of light barrier seam.

Functions	Abbreviation on the display	Parameter
Stitches light barrier control	LSC	F-127

The light barrier is controlled by a stitch counting operation in the background. If the light barrier status does not change within the range of the adjusted stitches (uncovered -- > covered or covered -- > uncovered) the motor stops and the display shows the following information:

```
┌─────────┐
│InFO  A6 │
│   LS    │
└─────────┘
```

After pedal position 0 (neutral) and and changing the light barrier status, the error message disappears and the counting starts again.
If 0 stitches are set the function is switched off.

7.18 Lock Stitch Thread Trimmer

Softstart	or	or	or Stitch counting with		Trimming signals
Initial backtack	Free seam Stitch counting	Light barrier seam	light barrier end	Final backtack	Reversion

Functions	Abbreviation on the display	Parameter
Thread trimmer on/off		Pushbutton 9
Trimming speed	n7	F-116
Trimming stitch backward	FAr	F-136
Chain/lock stitch trimmer	StP	F-190 = ON

It is possible to switch thread trimming at the seam end on or off by pushbutton 9.
The thread is trimmed at trimming speed.
The motor stops in position 2 at the seam end, when thread trimming is off; it stops in position 1 at the end of programmed seams.

7.19 Thread Wiper

```
Softstart                or              or                   or Stitch counting with              Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end     Final backtack Reversion
```

Functions	Abbreviation on the display	Parameter
Thread wiper on/off		Pushbutton 9
Activation time of thread wiper Return time of thread wiper	t6 t7	F-205 F-206

The thread wiper can only be switched on if the thread trimmer is on as well.
The operating time (t6) is set by parameter F-205.
The return time (t7, F-206) prevents presser foot lifting before the thread wiper is in its basic position.

7.20 Chain Stitch Thread Trimmer

```
Softstart                or              or                   or Stitch counting with              Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end     Final backtack Reversion
```

Functions	Abbreviation on the display	Parameter
Thread trimmer on/off		Pushbutton 9
Trimming speed Trimming stitch backward Chain/lock stitch trimmer Operating time trimmer	n7 FAr StP kt1	F-116 F-136 F-190 = OFF F-183

It is possible to switch on the trimmer or the trimmer with the catcher by pushbutton 9.
If parameter F-136 is set at ON the backtack solenoid remains on during the final backtack until the stop position is reached.
The output thread trimming is activated at machine standstill for the time Kt1. Then, activation of the thread wiper is delayed and the output thread wiping is switched on for the time Kt2 (operating time catcher).

It is possible to switch thread trimming at the seam end on or off by pushbutton 9.
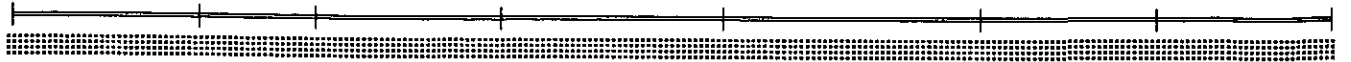The thread is trimmed at trimming speed.
The motor stops in position 2 at the seam end, when thread trimming is off; it stops in position 1 at the end of programmed seams.

7.21 Thread Catcher

Softstart   or   or   or Stitch counting with   Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion

Functions	Abbreviation on the display	Parameter
Thread catcher on/off		Pushbutton 9
Activation time of thread catcher Activation delay of thread catcher Return time of thread wiper	kt2 dFw t7	F-184 F-187 F-206

After the operating time of the catcher, the time t7 is effective in order to make sure that the catcher is back in its basic position before the presser foot is lifted.

Seam end without stop:

If the light barrier is covered again during the final stitch condensation (final backtack) the final stitch condensation is interrupted and the initial stitch condensation (initial backtack) is started immediately. The trimming and the stop at seam end are suppressed.

Conditions to be met for activating the function:

1. Switch on the chain stitch mode (F-190)
2. Switch on the light barrier (control panel pushbutton 0)
3. Switch on the automatic start of the light barrier (F-129)
4. Change from light barrier covered -- > uncovered during final stitch condensation

7.22 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic in the seam Automatic after trimming		Pushbutton 5 Pushbutton 6
Actitvation delay when pedal is in position -1, half heelback Start delay from lifted foot Time of full power Operating time stage with chopping Delay after thread wiping until presser foot lifting Delay after thread trimming without thread wiping until presser foot lifting	t2 t3 t4 t5 t7 tFL	F-201 F-202 F-203 F-204 F-206 F-211

Presser foot is lifted:

- in the seam
- after trimming

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

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

Holding power of the lifted foot:

The presser foot is lifted by full power. Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.
The duration of full power is set by F-203, the holding power at partial power by F-204.

⚠

Caution!

If the holding power is set too high the solenoid and the control may be permanently damaged. Please observe the allowed operating time of the solenoid and set the appropriate value according to the tabel 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 $\geq$ 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-202

7.23 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.

```
Softstart              or          or          or Stitch counting with         Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end   Final backtack Reversion
|—————————————|————|——————————|————|——————————|—————————|————————|——————————|
```

Functions	Abbreviation on the display	Parameter
Blocking of machine run (safety switch) on/off	LSP	F-185

Display after activation of the blocking of machine run:

Symbol | --StoP-- | blinking alternately !
                | --StoP-- |

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

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

Blocking of machine run in the initial backtack:

By opening the switch the initial backtack is interrupted.
- Stop in the basic position
- Needle up is not possible
- Presser foot lifting is possible
- After deactivation of the blocking of machine run the seam will be continued with the seam section following the initial backtack

Blocking of machine run in the final backtack:

By opening the switch the final backtack is interrupted and the seam is finished.
- 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).

Attention: Pressing the pushbutton activates the function presser foot lifting, when the function blocking of machine run is off (F-280 = off).

7.24 High Lift Walking

```
Softstart              or              or              or Stitch counting with           Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
├───────────────┼───────┼─────────────┼─────────────────┼───────────────────────┼──────────┼──────────┤
▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
```

Functions	Abbreviation on the display	Parameter
High lift walking ON/OFF	hP	F-137
High lift walking stored ON/OFF	hPr	F-138
High lift walking speed	nl0	F-117
High lift walking speed run-out time	thP	F-152
Minimum number of stitches	chP	F-182

Limitation to high lift walking speed is caused by pressing the external pushbutton.
The high lift walking solenoid is switched on, when the speed ≤ high lift walking speed.

When function high lift walking stored is activated, high lift walking remains on until the pushbutton is pressed again.
When it is not activated, high lift walking is effective only while the pushbutton is pressed.
Run-out stitches can be programmed by parameter F-185. This way, high lift walking remains on until the stitch counting is finished.
After switching off the high lift walking solenoid, the speed limitation remains effective during the run-out time (thP).

Attention: if the function "single stitch with blocking solenoid" is on (F-186 = 2) high lift walking has no function.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
High lift walking on/off	-F-	F-008 = 3

7.25 Reversion

```
Softstart              or              or              or Stitch counting with           Trimming signals
Initial backtack Free seam Stitch counting Light barrier seam light barrier end    Final backtack Reversion
├───────────────┼───────┼─────────────┼─────────────────┼───────────────────────┼──────────┼──────────┤
                                                                                              ▓▓▓▓▓▓▓▓
```
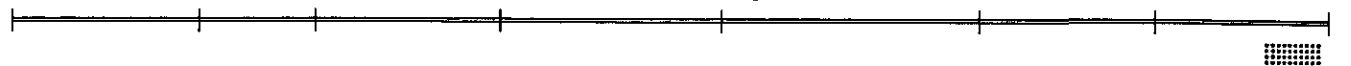
Functions	Abbreviation on the display	Parameter
Positioning speed	nl	F-110
Number of reversion increments	InP	F-180
Activation delay of reversion	drd	F-181

The function "reversion" is performed after trimming.
When the stop position is reached, the motor 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 = 6

7.26 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

Pedal stage	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 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}	br1	F-207
Speed reduction	> 400 min^{-1}	br2	F-208

The braking effect of the motor 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 motor 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 motor to lock or not to reach the set speed. In this case, the motor 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)	Sr1	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 position transmitter information and actual mechanical position a reference position is needed.

```
|                     |
|    POSITION 0       |
|                     |
```

The reference position must be adjusted:

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

Correct adjustment of the reference position:

-       Needle point at the same level as 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 reference position is reached
      Note: Turn at least until marker ( ]) has disappeared
4.)   Press pushbutton E   ==>   Position 0 (neutral) is read by
                                                       the control

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

```
|                  |
|     INFO A3      |
|                  |
```

-       Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (lower needle position, switch-on position for thread trimmer (lock stitch)	Pos1
Position 2 (upper needle position, switch-off position of thread trimmer (lock stitch), switch-on position of thread trimmer (chain stitch)	Pos2
Position 1A Trailing edge pos. 1	Pos1A
Position 2A	Pos2A
Position 3	Pos3
Position 3A	Pos3A

Programming:

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

2.   Press pushbutton 3   ==>
       Adjust position 1

Position
1   xxx

Value xxx can be modi-
fied by pushbutton +/-
or by turning the handwheel!

4.   Press pushbutton E   ==>
       Adjust position 2

Position
2   xxx

3.   Press pushbutton E   ==>
       Adjust position 1A

Position
1A   xxx

5.   Press pushbutton E   ==>
       Adjust position 2A

Position
2A   xxx

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

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

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

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

8.5 Memory Box

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

```
┌──────────┐
│ 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     │
│ ||||||   │
└──────────┘
```

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

- Display after the storing is terminated

```
┌──────────┐
│ 5000     │
│ JU82AV   │
└──────────┘
```

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

    Possibility no. 1:

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

```
┌──────────┐
│ rEAd     │
│ 0--9     │
└──────────┘
```

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

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

    Possibility no. 2:

- 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.

```
┌──────────┐
│ 5000     │
│ JU82AV   │
└──────────┘
```

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.

```
┌─────────┐
│─ ─ ─ ─ ─│
│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 ca be selected by parameter F-178. All additional information is then shown in the corresponding language.

```
┌─────────┐
│dEU  USA │
│ESP  FrA │
└─────────┘
```

9. Error Messages

General Information

Display	Signification
Info A1	Pedal not in neutral position, when switching the machine on
Info A2	Blocking of machine run (safety switch)
Info A3	The reference position (position 0) has not been stored
Info A4	Control panel not clearly selected
Info A6	Stitches light barrier control executed

Programming of Functions and Values (Parameters)

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

Serious Situation

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

Hardware Disturbance

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

Memory Card Information

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

10. Signal Test

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

Outputs:

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

Table: Assignment of the pushbuttons to the outputs

Pushbutton	Output
1	Backtacking
2	Presser foot lifting
3	Pedal not in position 0 (neutral)
4	Motor running
5	Thread trimmer
6	Thread wiper
7	High lift walking
8	free
9	free
0	free

Inputs:

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

11. Socket Connectors

11.1 Position in the Control
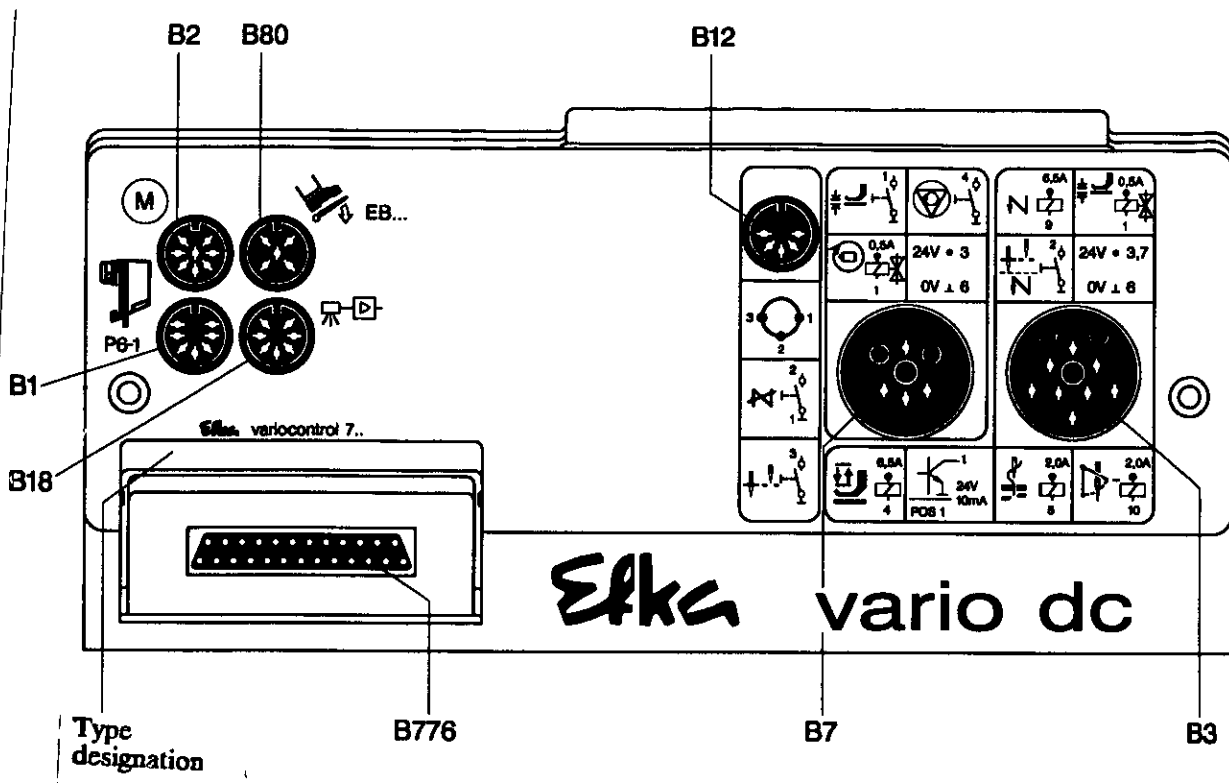
B1	– Position transmitter
B2	– Commutation transmitter for DC motor
B3	– Machine
B7	– Machine
B12	– Pushbuttons
B18	– Light barrier module
B80	– External speed controller
B776	– Control panel Variocontrol

11.2 Connection Diagram
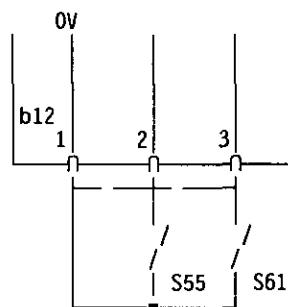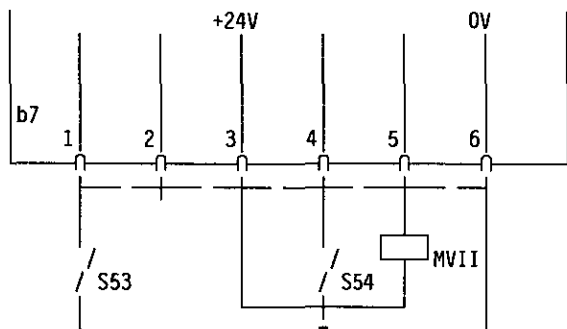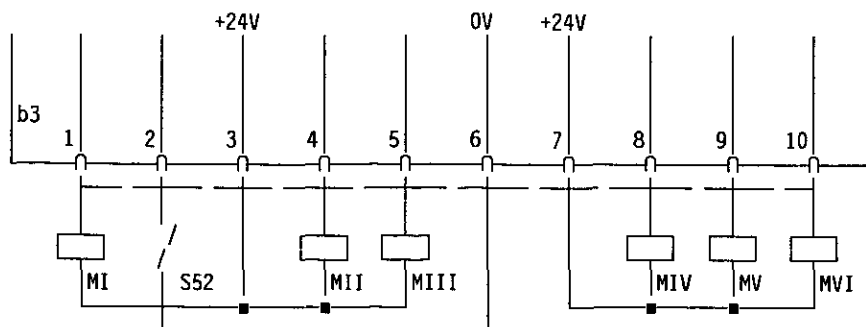
MI	Solenoid valve	Pedal not 0	0.5A
MII	Solenoid	Presser foot lifting	6.5A
MIII	Solenoid	Thread trimmer	2.0A
MIV	Solenoid	Thread wiper	2.0A
MV	Solenoid	Backtacking	6.5A
MVI	Magnetventil	High lift walking	0.5A
MVII	Magnetventil	Machine running	0.5A

S52	Pushbutton	Half stitch, full stitch/manual backtack
S53	Pushbutton	High lift walking
S54	Pushbutton	Blocking of machine run
S55	Pushbutton	Suppression/recall of backtack
S61	Pushbutton	Half stitch/full stitch

| OV | +24V (2) | | | LSHQ | +5V | ⏚ | | C | OV | A | B | D | ⏚ |

LSM001

EB...

BI1027
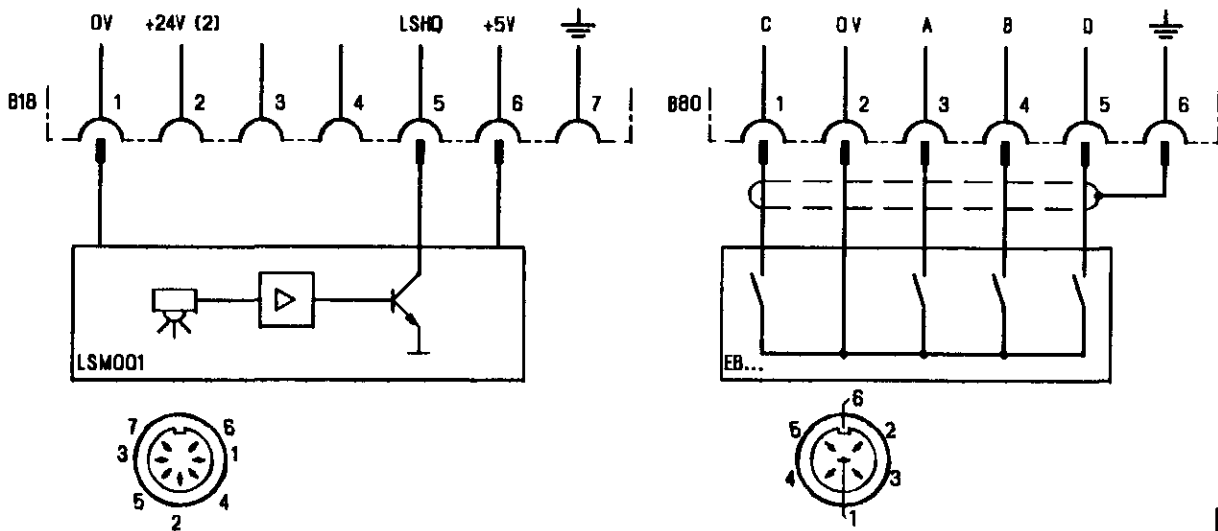
LSHQ   - Light barrier command (identified when switched to 0V)

LSM001   - Reflection light barrier module
EB...   - External speed controller

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

12. Function Diagrams

Lock stitch

Trimming from full run

0195/FALAUF

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Double initital backtack	on	Pushbutton 7
	Double final backtack	on	Pushbutton 8
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay of speed release after initial backtack		F-200
t3	Start delay from lifted foot		F-202
t6	Time of thread wiper		F-205
t8	Initial backtack stitch correction		F-150
t9	Final backtack stitch correction		F-151
t10	Full power of backtacking		F-212
t11	Pulsing of backtacking		F-213
t12	Start delay after thread trimming		fixed

Run with intermediate stop

Lock stitch
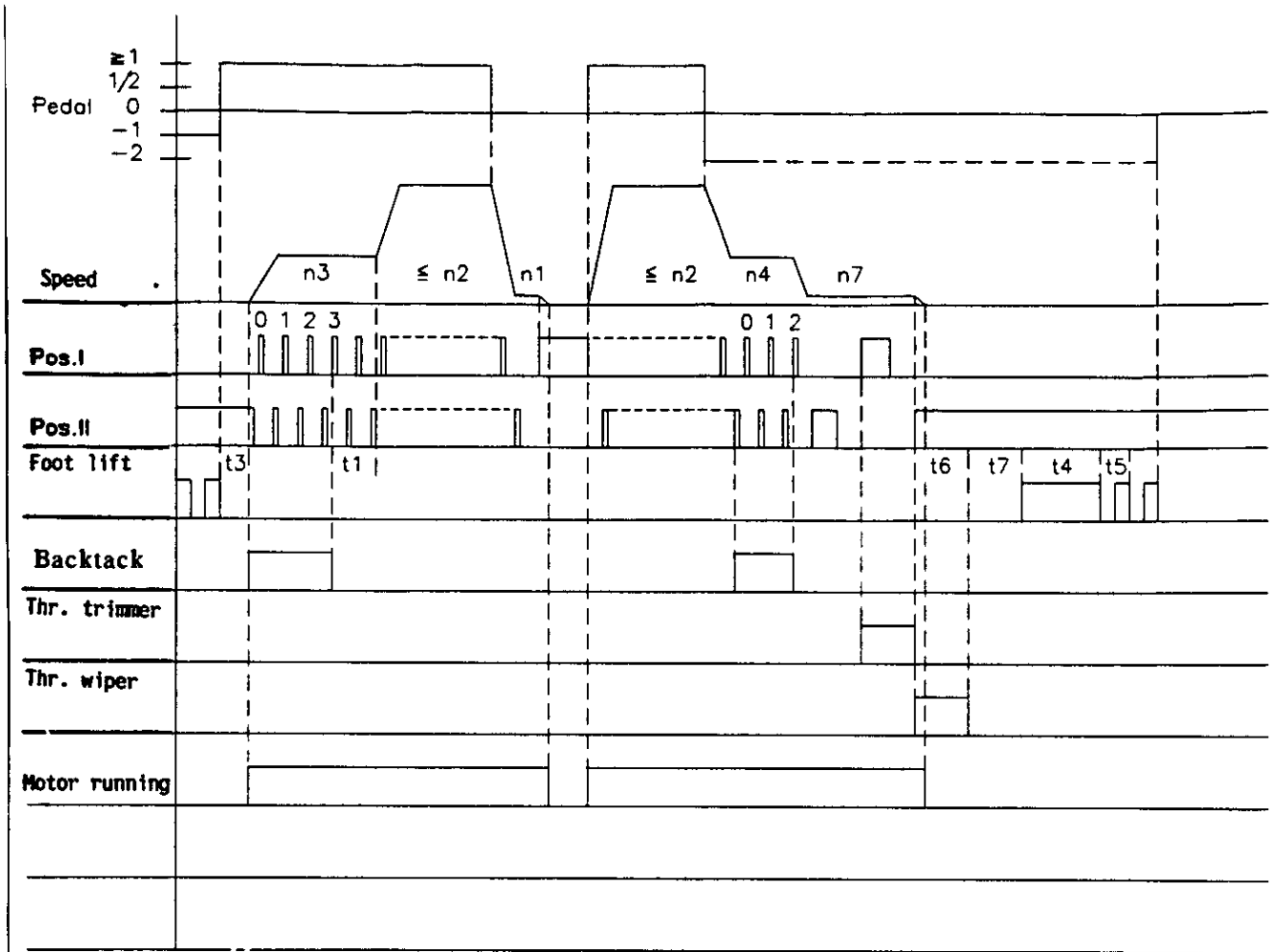
0195/LAUFZW

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Single intitial backtack	on	Pushbutton 7
	Single final backtack	on	Pushbutton 8
	Basic position 2	on	Pushbutton 4
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay of speed release after initial backtack		F-200
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting when thread wiper is off		F-206

Trimming from intermediate stop

<u>Lock stitch</u>


```
0195/FAZW
```

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Softstart	on	F-134
	Single initial backtack	on	Pushbutton 7
	Single final backtack	on	Pushbutton 8
	Basic position 2	on	Pushbutton 4
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n6	Softstart speed		F-115
n7	Trimming speed		F-116
t1	Delay of speed release after initial backtack		F-200
t2	Delay of presser foot lifting with pedal in position -1		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206

Machine run with high lift walking

Lock stitch

Pedal ≥1 1/2 0 −1 −2

Speed ≤ n2 n10 ≤ n2 n1

Pos.I 1 2 3 4

Pos.II

Foot lift t3 chP tHP t2 t4 t5

Backtack

Thr. trimmer

Thr. wiper

Motor running

High lift walking

Pushbutton High lift walking open closed
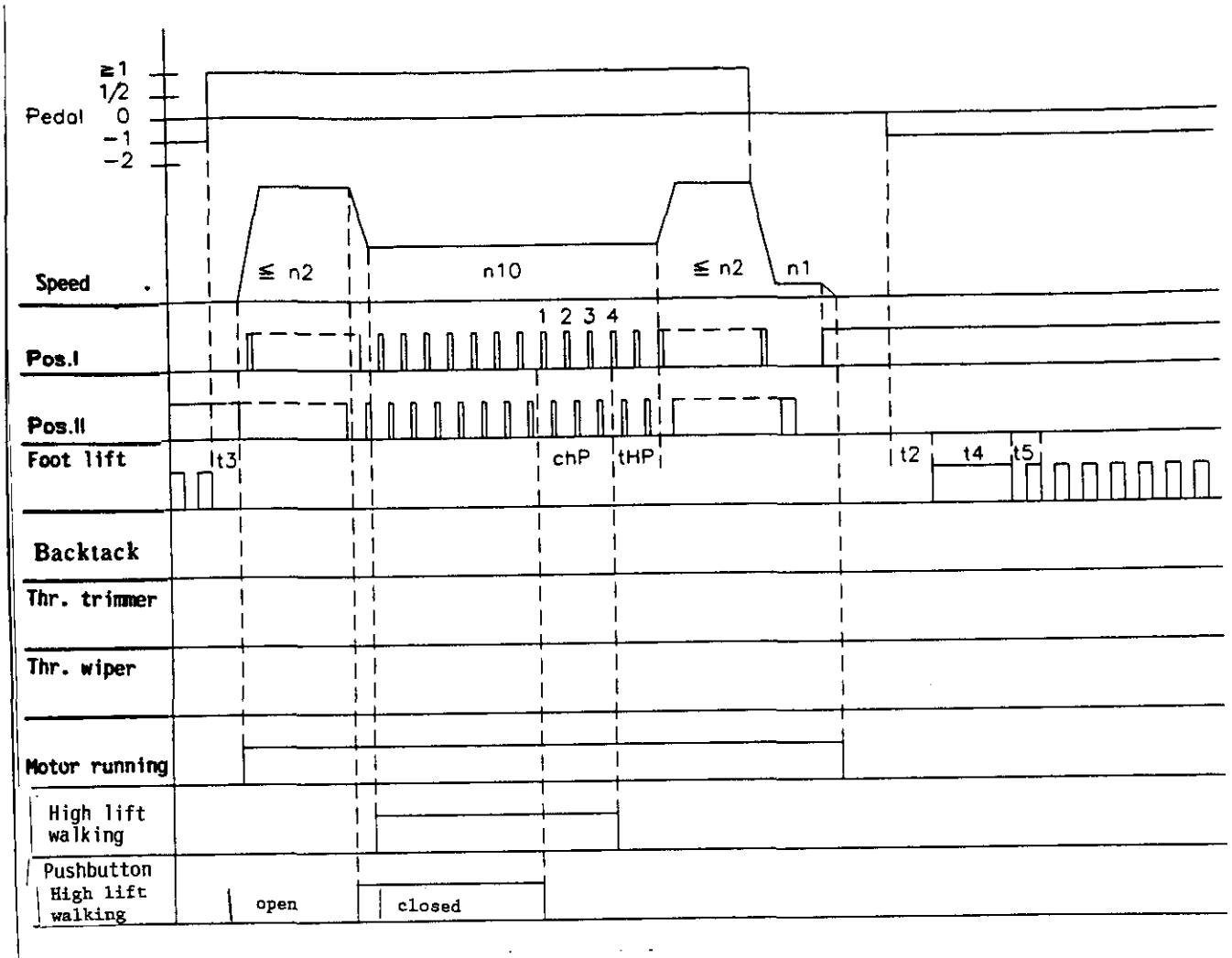
```
0195/LAUFHUB
```

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	High lift walking operating mode not stored	on	F-137
	Initial backtack	off	Pushbutton 7
	Final backtack	off	Pushbutton 8
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n10	High lift walking speed		F-117
t2	Delay of presser foot lifting with pedal in position -1		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
thP	Run-out time of high lift walking speed		F-152
chP	Number of stitches high lift walking		F-185

Seam end by light barrier

Lock stitch


```
0195/ENDELS
```

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Initial backtack	off	Pushbutton 7
	Single final backtack	on	Pushbutton 8
	Reversion	on	Pushbutton 3
	Light barrier	on	Pushbutton 0
	Light barrier covered/uncovered	on	F-131
n2	Maximum speed		F-111
n4	Final backtacking speed		F-113
n5	Speed after light barrier sensing		F-010
n7	Trimming speed		F-116
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
drd	Delay of reversion		F-181
Ird	Increments of reversion		F-180

Seam end by stitch counting

Lock stitch
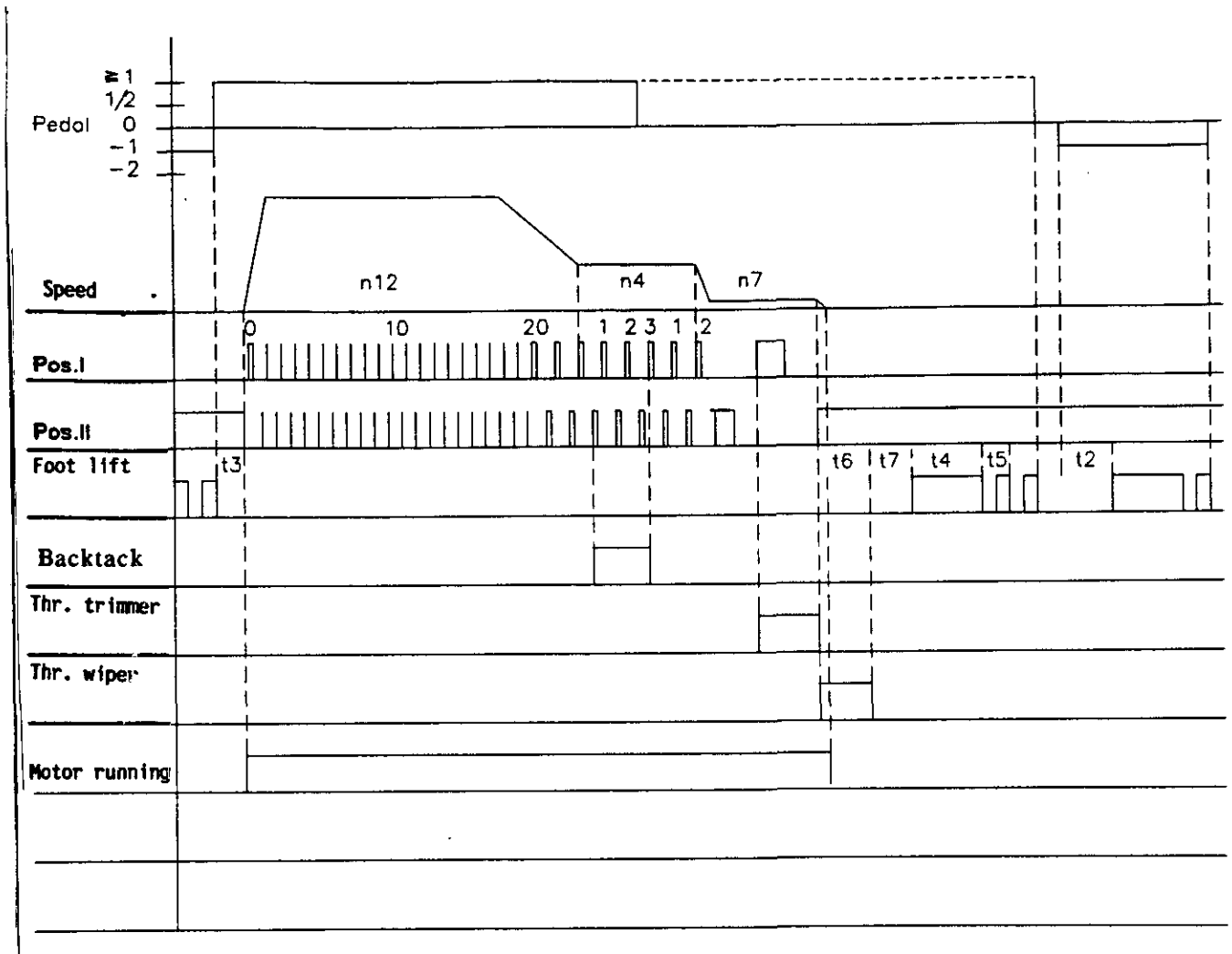
0195/ENDEZAE

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Initial backtack	off	Pushbutton 7
	Double final backtack	on	Pushbutton 8
	Stitch counting	on	Pushbutton 1
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
n12	Stitch counting speed		F-011
t2	Delay of presser foot lifting with pedal in position -1/-2		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
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206

Run with ornamental backtack

Lock stitch

Pedal: ≥ 1, 1/2, 0, −1, −2

Speed: n3 \ n1 / n3 \ n1 / ≤ n2 \ n1 / n4 \ n1 / n4 \ n7

Pos.I: 0 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3

Pos.II

Foot lift: t3 | tSr | tSr | tSr | tSr | t6 | t7 | t4 | t5

Backtack

Thr. trimmer

Thr. wiper

Motor running
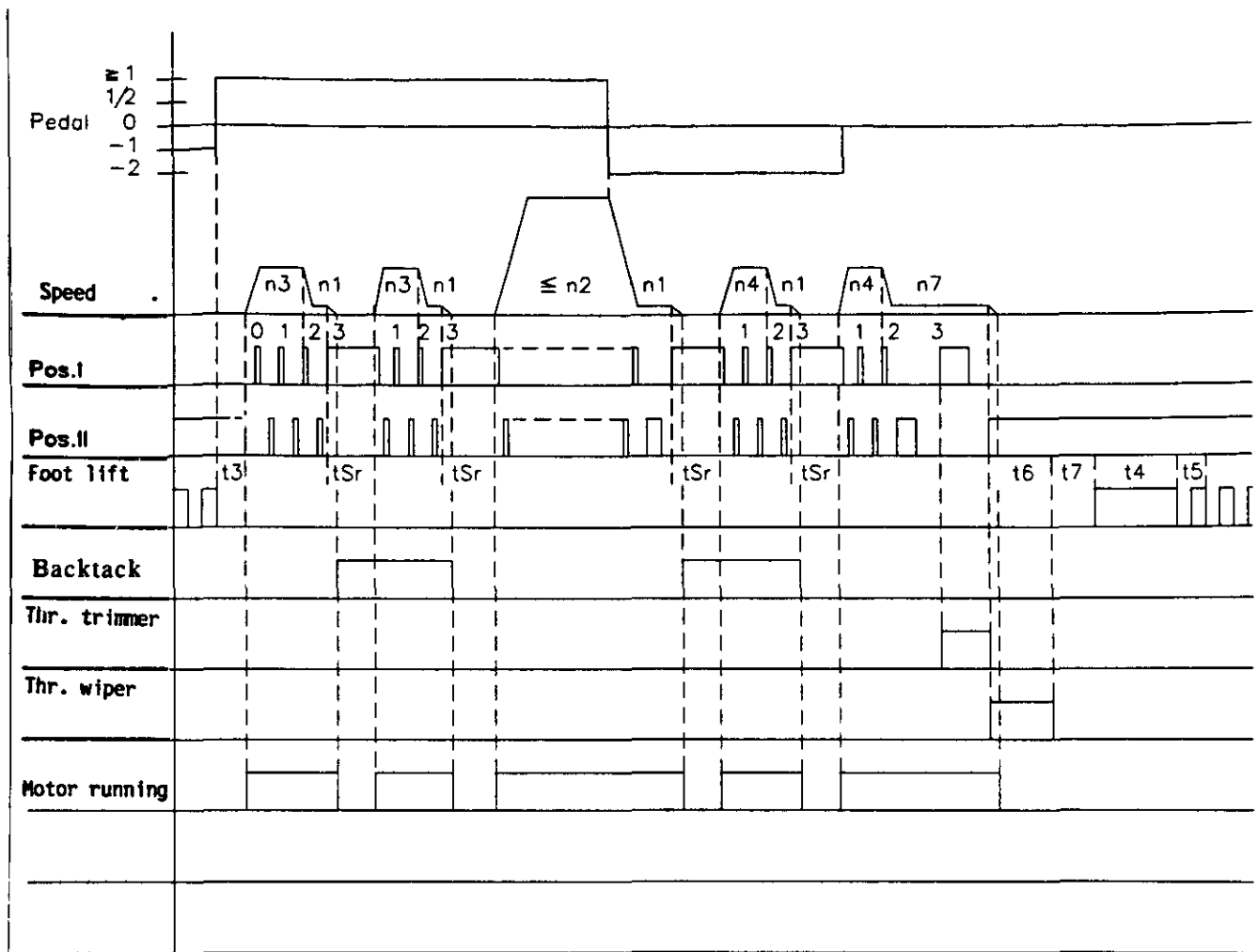
0195/LAUFZVR

Abbreviation	Function		Parameter/Pushbutton
	Lock stitch trimmer	on	F-190
	Ornamental backtack	on	F-135
	Presser foot lifting saved after trimming	on	Pushbutton 6
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting after thread wiping		F-206
tSr	Stop time for ornamental backtack		F-210

Trimming from full run

Chain stitch
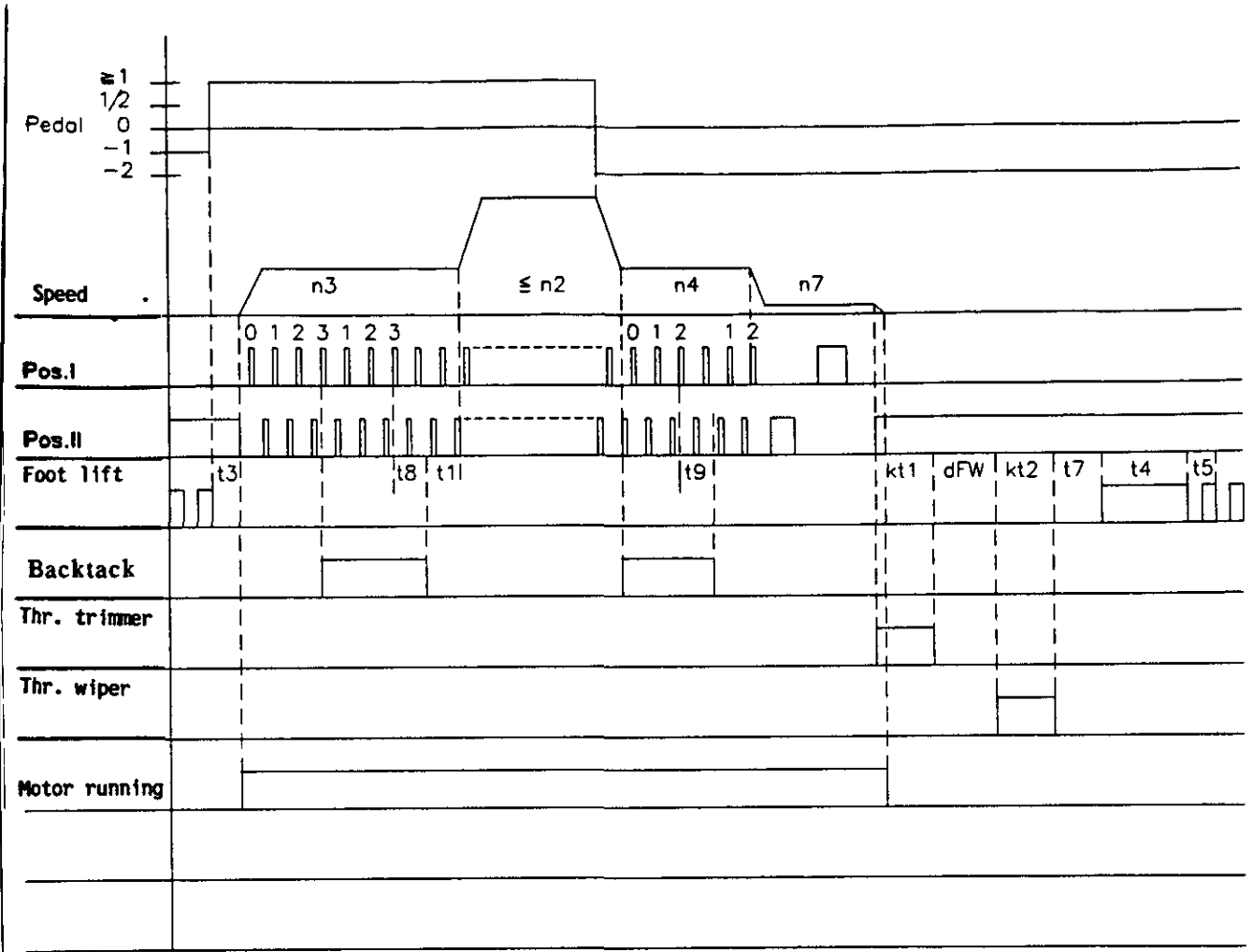
0195/FALAUF

Abbreviation	Function		Parameter/Pushbutton
	Chain stitch trimmer	on	F-190
	Double initial backtack with stitch correction	on	Pushbutton 7
	Double fibnal backtack with stitch correction	on	Pushbutton 8
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n7	Trimming speed		F-116
t1	Delay of speed release after initial backtack		F-200
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t6	Time of thread wiper		F-205
t7	Delay time of presser foot lifting		
	after thread wiping		F-206
t8	Initial backtack stitch correction		F-150
t9	Final backtack stitch correction		F-151
kt1	Activation time chain stitch thread trimmer		F-183
dFW	Delay of chain stitch thread wiper		F-187
kt2	Activation time chain stitch thread wiper		F-184

Run with intermediate stop

Chain stitch

0195/FAZW

Abbreviation	Function		Parameter/Pushbutton
	Chain stitch trimmer	on	F-190
	Softstart	on	F-134
	Single initial backtack	on	Pushbutton 7
	Double final backtack with stitch correction	on	Pushbutton 8
	Basic position 2	on	Pushbutton 4
n1	Positioning speed		F-110
n2	Maximum speed		F-111
n3	Initial backtacking speed		F-112
n4	Final backtacking speed		F-113
n6	Softstart speed		F-115
n7	Trimming speed		F-116
t1	Delay of speed release after initial backtack		F-200
t2	Delay of presser foot lifting with pedal in position -1		F-201
t3	Start delay from lifted foot		F-202
t4	Full power of presser foot lifting		F-203
t5	Presser foot lift pulsing		F-204
t7	Delay time of presser foot lifting after thread catching		F-206
kt1	Activation time chain stitch thread trimmer		F-183
dFW	Delay of chain stitch thread wiper		F-187
kt2	Activation time chain stitch thread wiper		F-184

top   bottom

LED · LED

Efka   variocontrol 720

Display

top
LED   Pushbutton

V720

V730

V740

Pushbutton with additional
special settings - HIT
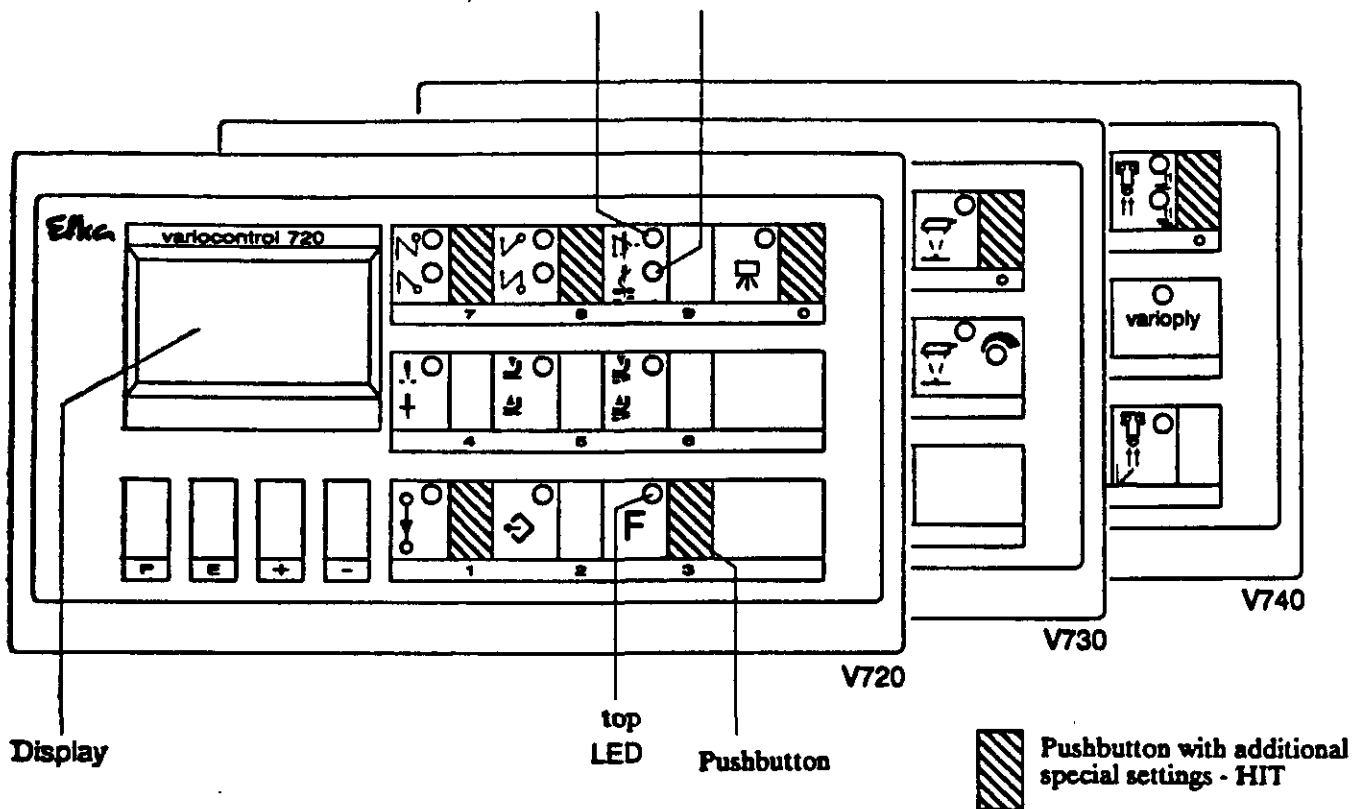
Functional Setting of the Pushbuttons

KL 1961

Pushbutton P = Recall or exit of programming mode
Pushbutton E = Enter button for modifications in the
programming mode
Pushbutton + = Increase of the value indicated in the
programming mode
Pushbutton - = Decrease of the value indicated in the
programming mode
Pushbutton 1 = Stitch counting ON / OFF
Pushbutton 2 = Teach-in / execution of 40 possible
seam sections
Pushbutton 3 = Function key - can be programmed
Pushbutton 4 = Basic position of the needle
(bottom/upper dead center) POSITION 1 /
POSITION 2
Pushbutton 5 = Automatic foot lift at stop in the seam
ON / OFF
Pushbutton 6 = Automatic foot lift after thread
trimming ON / OFF
Pushbutton 7 = Initial backtack SINGLE / DOUBLE / OFF
Pushbutton 8 = Final backtack SINGLE / DOUBLE / OFF
Pushbutton 9 = THREAD TRIMMER / THREAD TRIMMER +
REVERSION / OFF
Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING
/OFF
Pushbutton L = Sensitivity adjustment for fabric ply
sensing (see chapter "Light Barrier")

Special Setting of the Pushbuttons for HIT

Pushbutton P = Recall or exit of programming mode
Pushbutton E = Enter button for modifications in the
programming mode
Pushbutton + = Increase of the value indicated in the
programming mode
Pushbutton - = Decrease of the value indicated in the
programming mode
Pushbutton 1 = Stitch counting ON / OFF
Pushbutton 3 = Function key - can be programmed
Pushbutton 7 = Initial backtack SINGLE / DOUBLE / OFF
Pushbutton 8 = Final backtack SINGLE / DOUBLE / OFF
Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING
/OFF