Efka vario dc

CONTROL AC62AV1462

INSTRUCTION MANUAL

No. 402150 english

Efka
FRANKL & KIRCHNER
GMBH & CO KG

Efka
EFKA OF AMERICA INC.

Efka
EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

Contents Page

1. Important Safety Instructions

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

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

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

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

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

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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines:

Brand	
Union-Special	Chainstitch machine cl. 34700 with stitch lock

2.1 Use in Accordance with Regulations

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

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

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

The drive can only be operated:

- on thread processing machines
- in dry areas

3. Complete Drive Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc AC62AV1462
	- Power pack	N153 (optional N155)
	- External actuator	EB301 (optional EB302, reduced actuating force)
1	Positioner	P5-2
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	Set of accessories consisting of:	Z39 retention pin with 2 hexagon nuts 10-pin plug (Mes 100)
1	Pulley	

3.1 Special Accessories

Control panel VARIOCONTROL type V62K	- part no. 5900144
Control panel VARIOCONTROL type V62LK	- part no. 5900149
Reflection light barrier module Variolux LSM001	- part no. 6100028
Solenoid type EM1..(for e.g. presser foot lifting, stitch condensing, etc.)	- available versions see specification "solenoids"
Extension cable for external actuator, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external actuator, approx. 1500 mm long, complete with plug and socket connector	- part no. 1111787
5-pin plug (Mas 5100W) with slide index for the connection of another external control	- part no. 0501278
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4160018
Potential equalization cord 700 mm long, LIY 2.5 mm², grey, with forked cable brackets on both sides	- part no. 1100313
Fitting piece for position transmitter on Juki machines	- part no. 0300019
Extension cable for positioner P4-.. and P5-.., as well as for commutation transmitter, approx. 315 mm long, complete with plug and socket connector	- part no. 1111229
Extension cable for positioner P4-.. and P5-.., as well as for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector	- part no. 1111584
Set of adapter cords for the connection to Union-Special cl. 34700 with stitch lock	- part no. 1112474
Extension cable for motor connection, approx. 1500 mm long	- part no. 1111857
Pulley 40 mm ϕ with special belt intake and slip-off protection (use SPZ belt)	- part no. 1112223
Pulley 50 mm ϕ with special belt intake and slip-off protection (use SPZ belt)	- part no. 1112224
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	- part no. 58.0013
Sewing light transformer	- please indicate line voltage and sewing light voltage (6.3V or 12V)
3-pin plug with slide index (Mas 3100)	- part no. 0500402
5-pin plug with slide index (Mas 5100S)	- part no. 0501431
6-pin plug with slide index (Mas 6100)	- part no. 0500703
10-pin plug (Mes 100)	- part no. 0500357

4. Starting Service

Before putting the control into operation, the following must be ensured, checked and/or adjusted:

- **The correct installation of the drive, the positioner and accompanying appliances, if necessary**
- **The correct adjustment of the direction of rotation of the motor**
- **The setting of the positions**
- **The signal sequence of the trimming operation**

The setting and/or checking procedure will be described in chapter "Functions and Settings on the Technician Level".

5. Operation

5.1 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 operator to the first level (with service flap closed)

- the technician to both levels

5.2 The Operator Level

On this level, simple functions which have to be changed frequently during operation can easily be switched on or off and/or changed by the operator, e.g. basic position needle up/down, presser foot lifting at stop in the seam or stored at seam end, thread trimming on/off, maximum speed reduction, etc.
The operating elements (switches, potentiometers) for this level are directly accessible outside on the control or on the Variocontrol. Any setting changed by these operating elements is immediately effective.

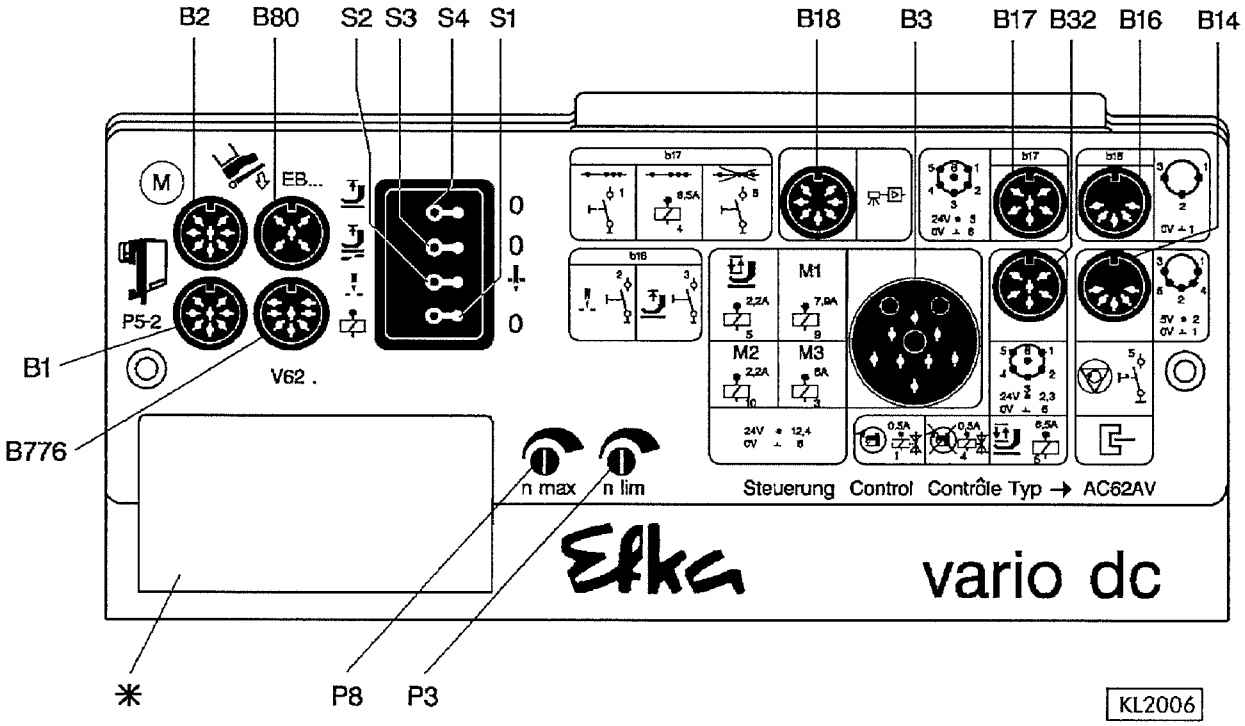


Fig. 1:

B1	- Position transmitter	B17	- Solenoids and switches
B2	- Commutation transmitter for d.c. motor	B18	- Light barrier module
B3	- Solenoids	B32	- Solenoids / solenoid valves
B14	- Switch / sensor	B80	- Actuator
B16	- Pushbuttons	B776	- Control panel
*	- Service flap		

Switch	Function	left	right
S1	Thread trimming	on	off
S2	Needle position at stop in the seam	up	down
S3	Presser foot up after thread trimming	on	off
S4	Presser foot up at each stop in the seam	on	off

Potentiometer	Function	Turn to the left	Turn to the right
P3	Stitch counting speed	1/8 of the maximum speed	maximum speed
P8	Maximum speed reduction	1/4 of the maximum speed	maximum speed

5.3 The Technician Level

The less frequently used switches and potentiometers needed for the basic setting are located under the service flap, e.g. Softstart on/off, stitch condensing on/off.
Basic settings for the adaptation to the type of machine are additionally protected by a programming mode.

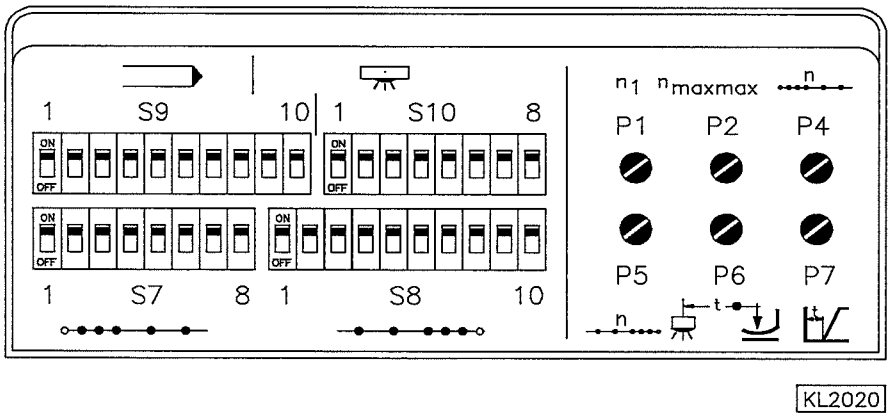


Fig. 2:

DIL/DIP Switches	Functions
S7/1-8	Stitches for start stitch condensing
S8/1-8	Stitches for end stitch condensing
S8/9-10	Long stitches after end stitch condensing
S9/1	Programming mode on / off
S9/2	Blocking of machine run activated with opened / closed connection
S9/3	Softstart on / off
S9/4	Stitch condensing at the start of the seam on / off
S9/5	Stitch condensing at the seam end on / off
S9/6	Direction of rotation of the motor shaft right / left
S9/7	Switching of the solenoid outputs parallel / sequential
S9/8	Speed class 10000 RPM / 5000 RPM
S9/9-10	Light barrier compensating stitches
S10/1-2	Light barrier compensating stitches
S10/3	Sewing start blocked with light barrier uncovered on / off
S10/4	Automatic light barrier start on / off
S10/5	Light barrier sensing inverted on / off
S10/6-8	Filter stitches for knitted fabrics

Potentiometer	Functions
P1	Positioning speed
P2	Maximum speed of the sewing machine
P4	Stitch condensing speed at the start
P5	Light barrier and stitch condensing speed at the end
P6	Start delay in the case of automatic start of the light barrier until presser foot off (t3)
P7	Delay time until presser foot up with pedal in pos. -1 (t2)

Potentiometer	Programmable times in the programming mode
P3	Reversing angle when unlocking the chain
	Braking power at standstill
	Operating time M1
	Operating time M2
	Operating time M3
	Start delay from presser foot up
P8	Activation delay of reversion
	Delay until M1
	Delay until M2
	Delay until M3
	Delay of presser foot at the seam end

Note:

If Variocontrol is connected start and end stitch condensing are switched on and off by slide switches on the control panel (see instruction manuals V62K and/or V62LK).

6. Functions and Settings on the Operator Level

6.1 Trimmming Operation

This control has sockets for a chain stitch thread trimmer. The trimming is done at machine standstill.

- **S1 = left Thread trimmer on**
- **S1 = right Thread trimmer off**

The signal sequence (M1, M2, FW [thread wiper], FL [presser foot lifting]) of the thread trimming function can be operated parallel (time overlappings are possible) or sequentially (successively, time overlappings are impossible). The setting is only possible on the technician level. See chapter "Signal Sequence of the Trimming Operation".

6.2 Basic Position

The needle position at stop in the seam is set by flip switch S2.

- **S2 = left Stop position needle up**
- **S2 = right Stop position needle down**

6.3 Presser Foot Lifting

The control is suitable for the connection of magnetic or pneumatic presser foot lifting.

- **S3 = left Presser foot lifting stored at the seam end on**
- **S3 = right Presser foot lifting stored at the seam end off**

- **S4 = left Presser foot lifting stored at stop in the seam blocked**
- **S4 = right Presser foot lifting stored at stop in the seam unblocked**

The presser foot is lifted:

- in the seam	- by heelback (position -1); if S4 = left, presser foot is blocked - by pushbutton on socket B16/1-3; if S4 = left, presser foot is blocked
- after thread trimming	- by heelback (position -1 or -2) or automatically (S3 = left) - by light barrier, automatically - by stitch counting, automatically - activation delay after thread trimming (t7)

Unintentional foot lifting before thread trimming, when changing from pedal position 0 (neutral) to position -2, can be prevented by setting an activation delay (t2).
The start delay (t3) from lifted presser foot can be set on the technician level.
After activation of presser foot lifting the solenoid is fully powered. The on/off ratio is pulsed at 1:1.
The functioning of the control during operation is shown in the timing diagrams.

6.4 Maximum Speed Limitation

Maximum speed limitation to the most common level is done by P8 (nmax).
It can be set while the drive is running.

- **Turn P8 to the left Speed is reduced (left stop = 1/4 nmaxmax).**
- **Turn P8 to the right Speed is increased (right stop = nmaxmax).**

6.5 Setting the Stitch Counting Speed

The stitch counting speed can be set with potentiometer P3. It is controlled by the pedal and limited.

- **Turn P3 to the left** **Speed is reduced (left stop = 1/8 nmaxmax).**
- **Turn P3 to the right** **Speed is increased (right stop = nmaxmax).**

Note:
Stitch counting and stitch counting speed only in connection with control panel V62LK and/or V62K.

6.6 Intermediate Stitch Condensing

By pressing the pushbutton (knee switch) connected to B17/1-6 stitch condensing can be performed anywhere during sewing.

6.7 Pushbutton "Needle Up/Down"

By pressing the pushbutton (knee switch) for needle up/down connected to socket B16/1-2 the drive performs a change of positions.

When using the control panels V62K and/or V62LK this function can also be performed with the corresponding pushbutton.

If the presser foot is lifted it is lowered before machine start.

Note:
If the drive is outside of position 1 or 2 it does not move for safety reasons.

6.8 Unlocking the Chain

When the function "unlocking the chain" at the seam end is on, thread trimming is automatically suppressed.

Switch on socket B17/2-6	Function
Switch closed Switch open	Unlocking the chain On Unlocking the chain Off

Sequence with heelback from machine run or from position 2:

- Run to position 1
- Activation delay of unlocking the chain according to setting (drd)
- Reversing angle of unlocking the chain according to setting (ird)

Sequence with heelback from machine standstill in position 1:

- Reversing angle of unlocking the chain according to setting (ird)

The functioning of the control during operation is shown in the timing diagrams.

7. Functions and Settings on the Technician Level

Note:
Especially for initial operation of the drive it is recommended to follow the sequence of the chapters below.

Note:
The operating elements for the settings discribed in the following are located under the service flap, with the exception of P3 and P8.

Note:
Please compare the definitions so that the same description can be used for controls with DIL slide switches and DIL rocker switches:
Switch on (on) - up = push and/or press upwards
Switch off (off) - down = push and/or press downwards.

7.1 Switch Programming Mode On and Off

In order to prevent unintentional modifications of important settings they can only be accessed after switching on the programming mode.
The programming mode can only be switched on after power on and/or after a seam has been completed.

- S9/1 = up — Programming mode on (acoustic signal depending upon the position of flip switches S1 - S4)
- S9/1 = down — Programming mode off (no acoustic signal)

The following functions can only be modified when the programming mode is on:

- Direction of rotation of the motor
- Speed class
- Braking power at standstill
- Reversion
- Delay until M1
- Operating time of M1
- Delay until M2
- Operating time of M2
- Delay until thread wiper
- Operating time of thread wiper
- Delay of presser foot at seam end
- Start delay after lifted presser foot

Attention
Switch programming mode on and off only when the drive is at standstill with power on.

Note:
Potentiometer settings that have to be modified in the programming mode will only be allowed for if the potentiometer is moved by more than ± 5°.

Attention
If settings of P3 or P8 are modified when the programming mode is on switch off programming mode and reset the stitch counting speed (P3) and the maximum speed limitation (P8).

7.2 Direction of Rotation of the Motor

- S9/1 = on — Switch on programming mode (acoustic signal depending upon the position of the flip switches S1 - S4)
- S9/6 = on — Clockwise rotation (look at the motor shaft)
- S9/6 = aus — Anticlockwise rotation
- S9/1 = aus — Switch off programming mode (no acoustic signal) or continue settings in the programming mode

Attention
If the motor is mounted differently, e.g at a different angle or with gear, make sure that the switch position is assigned correctly to the direction of rotation.

7.3 Speed Settings

7.3.1 Speed Class

The maximum speed of the machine is determined by the speed ratio between motor and machine.
The speed class determines the maximum speed even if the speed ratio would allow a higher speed.
In order to protect the machine from speeds that are too high and in order to optimize the setting range of the speed potentiometers, the desired speed class must be switched.

- S9/1 = on — Switch on programming mode (acoustic signal depending upon the position of the flip switches S1 - S4)
- S9/8 = off — Maximum speed 5000 RPM
- S9/8 = on — Maximum speed 10000 RPM
- S9/1 = off — Switch off programming mode (no acoustic signal) or continue settings in the programming mode

7.3.2 Maximum Speed

The setting range for potentiometer P2 (n_{maxmax}) is:

Note
Set the speed ratio between sewing machine shaft and motor shaft such that the motor runs at a maximum speed of approx. 4000 RPM.

- 625 - 5000 RPM with speed class up to 5000 RPM
- 4000 - 10000 RPM with speed class up to 10000 RPM

Setting the maximum speed

- Turn P2 completely to the left
- Turn P8 completely to the right (no maximum speed limitation)
- Turn P2 to the right up to the desired speed while drive is running and pedal is pushed completely forward

Note
Modifications of the maximum speed setting also influences the start and end stitch condensing speed and the stitch counting speed.

Maximum speed limitation to the most common level is possible on the operator level.

7.3.3 Positioning Speed = Thread Trimming Speed

The positioning and/or thread trimming speed can be set with potentiometer P1 (npos) within a range of approx. 60 - 440 RPM.
Drive must be running with pedal pushed forward (first step).

7.4 Setting the Positions

Attention!
Turn power off before adjusting the positioner discs.

Attention!
Be very careful when adjusting the positioner discs.
Risk of injury.
Please ensure that positioner discs and generator disc (inner disc) are not damaged.

How to set the positions

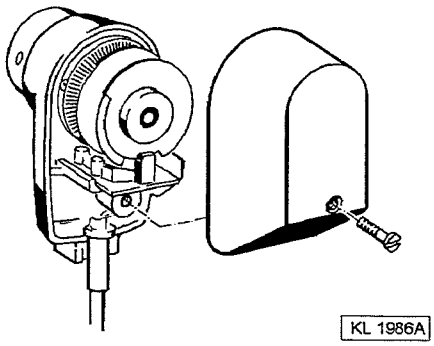
- Remove positioner cover after loosening the screw

- Set flip switch S2 to the right, basic position needle down
- Start sewing briefly
- Adjust central disc for position 1 in the desired direction

- Set flip switch S2 to the left, basic position needle up
- Start sewing briefly
- Adjust outer disc for position 2 in the desired direction

- Repeat procedure if necessary

- Put cover on again and tighten srew



Note:
For functional sequences that are controlled by the slot width, set slot width if necessary according to the above. The desired functional sequence is to be activated in order to check the setting. The opening angle of position transmitters with adjustable slot width must not be below 20°.

7.5 Further Speed Settings

7.5.1 Stitch Condensing Speed at the Start of the Seam

The stitch condensing speed at the start of the seam can be set with potentiometer P4 (n.av).

- Turn P4 to the left — Speed is reduced (left stop = 1/8 nmaxmax)
- Turn P4 to the right — Speed is increased (right stop = nmaxmax)

7.5.2 Stitch Condensing Speed at Seam End and Light Barrier Speed

The stitch condensing speed at seam end can be set with potentiometer P5 (n.ev). After light barrier sensing the motor runs at this speed.

- Turn P5 to the left — Speed is reduced (left stop = 1/8 nmaxmax)
- Turn P5 to the right — Speed is increased (right stop = nmaxmax)

7.6 Braking Power at Standstill

This function prevents unintentional "wandering" of the needle at standstill.
After the first start of sewing, the effect can be tested by turning the handwheel.

- S9/1 = on — Switch on programming mode
  (acoustic signal depending upon the position of the flip switches S1 - S4)

- S1 - S4 = on — Switch to the left
  (acoustic signal • 5 sec •)

- Turn P3 to the left — Braking power becomes weaker
- Turn P3 to the right — Braking power becomes stronger

- S9/1 = off — Switch off programming mode (no acoustic signal) or continue settings in the programming mode

- Reset S1 - S4 at the desired position

Attention
If settings of P3 or P8 are modified when the programming mode is on switch off programming mode and reset the stitch counting speed (P3) and the maximum speed limitation (P8).

7.7 Reversion when Unlocking the Chain

Reversion is only performed in connection with the function unlocking the chain. The reversing angle (0 - 380°) and the delay until the reversion starts (0 - 1000ms) can be set.

- S9/1 = on — Switch on programming mode (acoustic signal depending upon the position of the flip switches S1 - S4)

- Close B17/2-6 — Unlocking the chain On

- S1 - S4 = on — Switch to the right (acoustic signal • • 5 sec • •)

Setting the reversing angle (ird)

- Turn P3 to the left — Reversing angle becomes smaller
- Turn P3 to the right — Reversing angle becomes wider

Setting the delay until reversion (drd)

- Turn P8 to the left — Delay becomes shorter
- Turn P8 to the right — Delay becomes longer

- S9/1 = off — Switch off programming mode (no acoustic signal) or continue settings in the programming mode

- Reset S1 - S4 at the desired position

Attention
If settings of P3 or P8 are modified when the programming mode is on switch off programming mode and reset the stitch counting speed (P3) and the maximum speed limitation (P8).

7.8 Blocking of Machine Run (Safety Switch) / Thread Monitor

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

The blocking of machine run is activated by a switch connected to socket B14/1-5. Whether or not to use a make (N.O.) or break (N.C.) contact can be selected with DIL switch S9/2.

- S9/2 = off Blocking of machine run with switch opened
- S9/2 = on Blocking of machine run with switch closed

The thread monitor is activated by a switch (make contact [N.O.]) connected to socket B17/5-6. The function cannot be influenced by switch S9/2.

If the blocking of machine run and/or thread monitor is activated at standstill the machine start is blocked.
- Presser foot lifting is possible

If the blocking of machine run / thread monitor is activated during sewing the drive stops in the basic position.
- Presser foot lifting is possible

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

7.9 Softstart

When the function "Softstart" is on, the preset Softstart stitches at the start of the seam are performed at limited preset speed controlled by the pedal.

- S9/3 = off Softstart switched off
- S9/3 = on Softstart switched on

7.10 First Slow Stitch after Power On

For the protection of the sewing machine, the first stitch after power on is executed at positioning speed.

Note:
This function cannot be turned off.

7.11 Programming of the Power Transistors

- S9/1 = on Switch on programming mode
  (acoustic signal depending upon the position of the flip switches S1 - S4)

Power transistor M1	acoustic signal: • • • 5 sec • • •
Power transistor M2	acoustic signal: • • • • 5 sec • • • •
Power transistor FW	acoustic signal: • • • • • 5 sec • • • • •
Power transistor FL	acoustic signal: • • • • • • 5 sec • • • • • •

Power transistor	S4	S3	S2	S1	Potentiometer P8	Potentiometer P3
M1	right	left	left	left	delay until M1 t16	M1-operating time t8
M2	left	right	left	left	delay until M2 t10	M2-operating time t9
FW	left	left	right	left	delay until thread wiping t11	Thread wiper operating time t6
FL	left	left	left	right	delay presser foot lifting at the seam end t7	Start delay after presser foot lifting t3

Setting range			
t2 = 0...310 ms (P7) t3.. = 0...510 ms t4 = fixed t5 = fixed	t6 = 0...2.5 s t7 = 0...2.5 s t8 = 0...600 ms t9 = 0...510 ms	t10 = 0...510 ms t11 = 0...2.5 s t12 = fixed t13 = 0...2.5 s (P6)	t16 = 0...510 ms

- Turn P3 / P8 to the left — Delay and/or operating time becomes shorter
- Turn P3 / P8 to the right — Delay and/or operating time becomes longer

Check setting:

- Start short seam by pushing the pedal forward (programming mode remains on)
- Initiate seam end by full heelback (-2)
  - A complete thread trimming sequence is performed
    (thread trimming, thread wiping and presser foot lifting)

- If necessry, correct delay and/or operating time with P3 / P8

- S9/1 = off — Switch off programming mode
  (no acoustic signal)
  or continue settings in the programming mode

- Reset S1 - S4 at the desired position

Attention

If settings of P3 or P8 are modified when the programming mode is on switch off programming mode and reset the stitch counting speed (P3) and the maximum speed limitation (P8).

7.12 Signal Sequence of the Trimming Operation

The signal sequence (M1, M2, FW, FL) of the thread trimming function can be set parallel (time overlappings are possible) or sequentially (successively, time overlappings are impossible).

- S9/7 = on Parallel signal sequence
- S9/7 = off Sequential signal sequence

The functioning of the control during operation is shown in the timing diagrams.

7.13 Stitch Condensing

Note:
If Variocontrol is connected start and end stitch condensing are switched on and off by slide switches on the control panel (see instruction manuals V62K and/or V62LK).

7.13.1 Stitch Condensing at the Start of the Seam

The function stitch condensing at the start of the seam is activated on the control panel or with opened service flap by switch S9/4.

- S9/4 = on Stitch condensing at the start of the seam ON
- S9/4 = off Stitch condensing at the start of the seam OFF

Stitch condensing at the start of the seam is performed at the speed (n.ar) and can be interrupted.
If the stitch condensing at the start of the seam is interrupted by heelback, the seam will be restarted when pushing the pedal forward.

The number of stitches for the stitch condensing section at the start of the seam can be set by switches S7/1-8.

- S7/1 1 stitch for start stitch condensing
- S7/2 2 stitches for start stitch condensing
- S7/3 4 stitches for start stitch condensing
- S7/4 8 stitches for start stitch condensing
- S7/5 16 stitches for start stitch condensing
- S7/6 32 stitches for start stitch condensing
- S7/7 64 stitches for start stitch condensing
- S7/8 128 stitches for start stitch condensing

Example: Switch S7/2 = on and S7/4 = on = = > 10 stitches for start stitch condensing.

7.13.2 Stitch Condensing at the Seam End

The function stitch condensing at the seam end is activated on the control panel or with opened service flap by switch S9/5.

- S9/5 = on Stitch condensing at the seam end ON
- S9/5 = off Stitch condensing at the seam end OFF

Stitch condensing at the seam end is performed at the speed (n.er).

The number of stitches for the stitch condensing section at the seam end is set by the switches S8/1-8.

- S8/1 1 stitch for end stitch condensing
- S8/2 2 stitches for end stitch condensing
- S8/3 4 stitches for end stitch condensing
- S8/4 8 stitches for end stitch condensing
- S8/5 16 stitches for end stitch condensing
- S8/6 32 stitches for end stitch condensing
- S8/7 64 stitches for end stitch condensing
- S8/8 128 stitches for end stitch condensing

Example: Switch S8/2 = ON and S8/5 = ON = = > 18 stitches for end stitch condensing.

After the end stitch condensing, normal stitches can be set by switches S8/9 and S8/10.

- S8/9 1 normal stitch after end stitch condensing
- S8/10 2 normal stitches after end stitch condensing

7.14 Light Barrier

Operation of the control with light barrier is possible by using the light barrier module EFKA-LSM001. The light barrier module is connected to socket B18 of the control.

When using a control panel Variocontrol V62K and/or V62LK, sewing patterns with special light barrier operations are available. For more details see chapter "Functions When Control Panels V62K and/or V62LK Are Connected".

The following settings for the light barrier function are possible:

- S9/9 1 light barrier compensating stitch
- S9/10 2 light barrier compensating stitches
- S10/1 4 light barrier compensating stitches
- S10/2 8 light barrier compensating stitches

- S10/3 = OFF Sewing start with light barrier uncovered
- S10/3 = ON Sewing start with light barrier uncovered not possible

- S10/4 = OFF Automatic start at the beginning of the seam by light barrier inactive
- S10/4 = ON Automatic start at the beginning of the seam by light barrier active

- S10/5 = OFF Light barrier sensing uncovered at the output 0V (e.g. reflection light barrier)
- S10/5 = ON Light barrier sensing inverted (e.g. light sensor)

Note:
If **no** compensating stitches are set the light barrier function is suppressed.

- S10/6 1 filter stitch for knitted fabrics
- S10/7 2 filter stitches for knitted fabrics
- S10/8 4 filter stitches for knitted fabrics

The light barrier filter for knitted fabrics is activated by setting the number of filter stitches to > 0 with switches S10/6...S10/8.

7.15 Automatic Start by Light Barrier

The function of the automatic light barrier start at the beginning of the seam is to start sewing by sensing the insertion of fabric. When the light barrier is covered by inserting the fabric, the presser foot lowers after a delay time (t13), which can be set by potentiometer P6. The drive starts after a delay (t3).

The following conditions must be met:

- Automatic start at the beginning of the seam by light barrier S10/4 = ON
- Sewing start blocked with light barrier uncovered S10/3 = ON
- Light barrier sensing covered-uncovered S10/5 = OFF
- Delay automatic start light barrier t13

- One seam must be executed the normal way, i.e.:
  - Pedal in neutral position
  - Cover light barrier
  - Push pedal forward
  - Seam end by light barrier uncovered
  - Keep pedal pushed forward

When the light barrier is covered again with pedal pushed forward, the "automatic start" is activated.
This function is interrupted, when the pedal is put back to neutral position after the seam end.

7.16 Signal Output Position 1

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

7.17 Signal Output 120 Impulses/Rotation

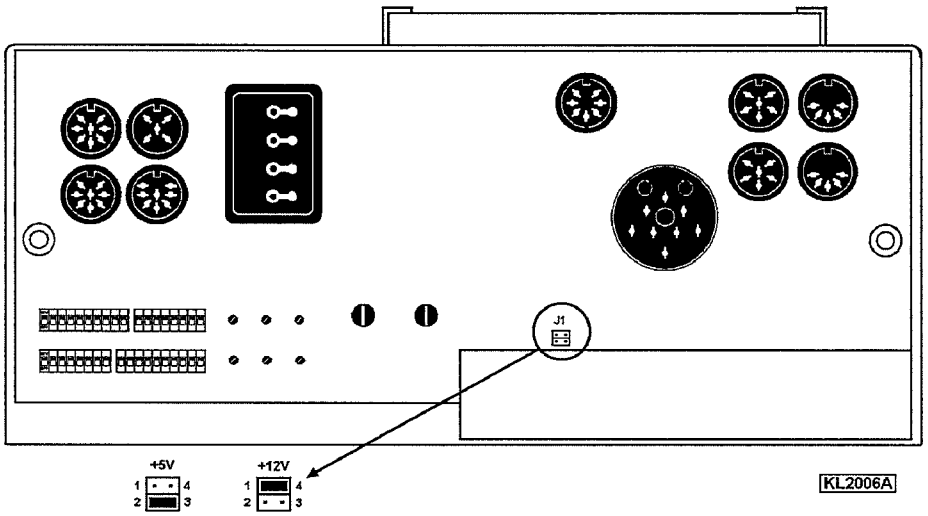
- Transistor output with open collector
- Switches whenever a slot on the positioning track of the position transmitter disc is sensed (512 times per rotation)
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g. for the connection of a counter

7.18 Supply Voltage 12V and/or 5V

For external devices there is a supply voltage of +12V on socket B14/2. After opening the cover, this voltage can be changed to +5V by moving a jumper on the printed circuit board to a different position.

Attention!
Before opening the cover turn power off and remove mains plug from outlet!

+12V = Connect top pins 1 and 4 with jumper (factory setting)
+5V = Connect bottom pins 2 and 3 with jumper



7.19 External Actuator EB301 and EB302

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

The external actuator EB302 has softer springs than EB301. This means that a lower actuating force is needed.

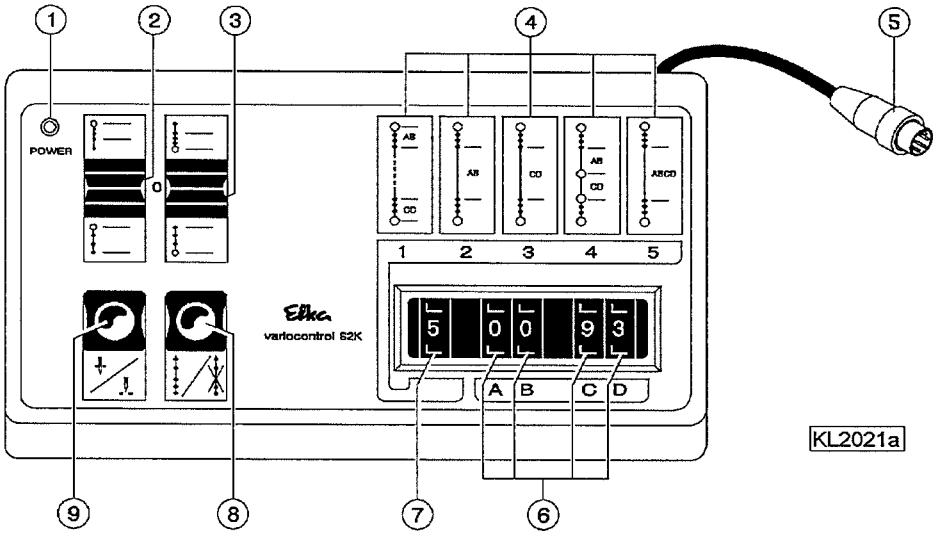
Table: Coding of the pedal steps

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

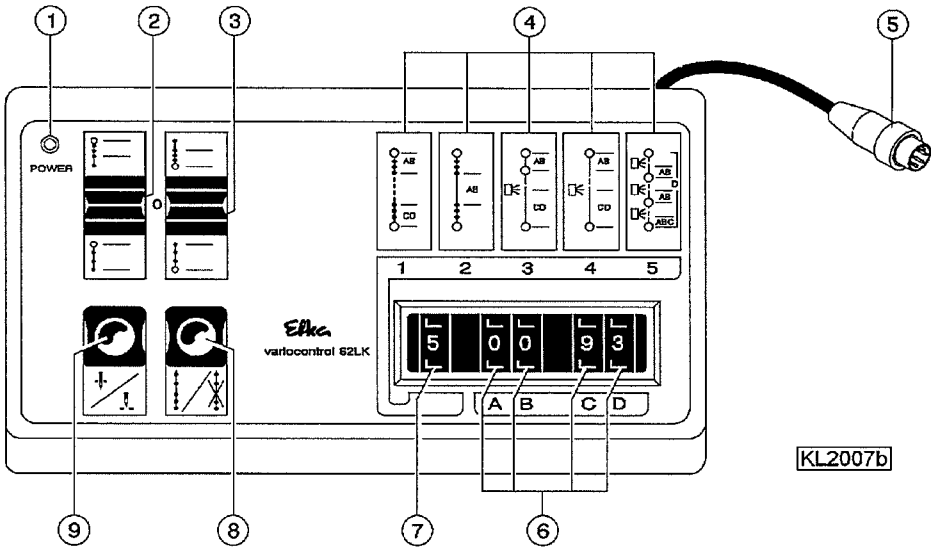
L = switch contact closed, H = switch contact open

8. Functions When Control Panels V62K and/or V62LK Are Connected

Control panel V62K



Control panel V62LK



1	Pilot lamp	- Lights up when the mains voltage is connected and when the connection between Variocontrol and control is correct.
2	Slide switch	- For selecting the start stitch condensing function.
3	Slide switch	- For selecting the end stitch condensing function.
4	Symbols for patterns	- Symbolize the seam execution when selecting the patterns 1...5.
6	Preselectors for number of stitches	- Function dependent on selected pattern.
7	Program selector	- For selecting the patterns 0...5.
8	Pushbutton	- **Attention!**
9	Pushbutton	- For needle up/down.

8.1 Start and End Stitch Condensing

Note
The switches for start and end stitch condensing in the control must be switched on.

8.1.1 Start Stitch Condensing

The start stitch condensing can be selected with slide switch (2).

The following functions can be switched:

Slide switch (2)	Functions
up	Start stitch condensing at start stitch condensing speed
center	Off
down	Sewing at stitch counting speed at the start of the seam (without stitch condensing)

8.1.2 End Stitch Condensing

The end stitch condensing can be selected with slide switch (3).

The following functions can be switched:

Slide switch (3)	Functions
up	End stitch condensing at end stitch condensing speed
center	Off
down	Sewing at stitch counting speed at the seam end (without stitch condensing)

8.2 Needle Up/Down

When pressing pushbutton (9), the needle changes positions. When stopping in position 1 (needle down), the needle moves to position 2, and when stopping in position 2, the needle moves to position 1.

If the presser foot is lifted it will be lowered before each start.

Note
If the drive is outside of position 1 or 2 it does not move for safety reasons.

8.3 Patterns

It is possible to select 6 different sewing patterns 0...5 by using control panels V62K and/or V62LK.

The patterns are selected by selector (7), and the stitches for countings are preselected by preselectors (6).

By pressing down once or several times the "+" pushbutton at the bottom, the value of the digit shown in the window of the preselector is increased.

By pressing down the "-" pushbutton at the top, the value is decreased.

On program selector (7) the final positions are mechanically limited, i.e. the lowest digit that can be set is "0", the highest "5".

The preselectors (6) for numbers of stitches do not have a final stop. This means moving to "0", when increasing the setting from "9" and/or moving to "9", when decreasing the setting from "0".

8.3.1 Pattern 0 (V62K / V62LK)

- Set sewing pattern at "0" by selector (7).
- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).
- The preselectors (6) do not have a function.
- Free sewing at pedal controlled speed is possible between start and end stitch condensing.
- The seam end with trimming is initiated by full heelback (position -2) or by light barrier.
- The presser foot is lifted according to the switch position on the control or by pedal -1 (half heelback) and/or -2 (full heelback).

8.3.2 Pattern 1 (V62K / V62LK)

- Set sewing pattern at "1" by selector (7).
- Switch on start stitch condensing with slide switch (2).
- Set the number of stitches for start stitch condensing with preselectors (6) **A** and **B** on the control panel (max. 99 stitches).
- Free sewing at pedal controlled speed is possible between start and end stitch condensing.
- Switch on end stitch condensing with slide switch (3).
- Set the number of stitches for end stitch condensing with preselectors (6) **C** and **D** on the control panel (max. 99 stitches).
- The seam end with trimming is initiated by full heelback (position -2).
- The presser foot is lifted according to the switch position on the control or by pedal -1 (half heelback) and/or -2 (full heelback).

Example for setting the preselectors (6) of the seam sections **A** and **B**.

A Tens	B Units	AB Number of stitches
0	6	6
2	5	25

8.3.3 Pattern 2 (V62K / V62LK)

- Set sewing pattern at "2" by selector (7).
- Switch on initial and final stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).
- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible between start and end stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A** and **B**.
- At the end of counting, trimming is automatically initiated.
- The presser foot is automatically lifted, when the pedal is pushed forward.
- The preselectors (6) of the sections **C** and **D** do not have a function.

Example for setting the preselectors (6) of the seam sections **A** and **B**.

A Tens	B Units	AB Number of stitches
1	6	16
2	9	99

8.3.4 Pattern 3 (V62K)

- Set sewing pattern at "3" by selector (7).
- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).
- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible between start and end stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **C** and **D**.
- At the end of counting, trimming is automatically initiated.
- The presser foot is automatically lifted, when the pedal is pushed forward.
- The preselectors (6) of the sections **A** and **B** do not have a function.

Example for setting the preselectors (6) of the seam sections **C** and **D**:.

C Tens	D Units	CD Number of stitches
1	6	16
9	7	97

8.3.5 Pattern 3 (V62LK)

- Set sewing pattern at "3" by selector (7).
- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).
- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible after the start stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A** and **B**.
- After the completion of the set number of stitches, the machine stops.
- Then free sewing at a speed depending on the pedal is performed.
- After light barrier sensing, stitch counting (light barrier compensating stitches max. 99 stitches) is performed at a fixed speed that can be set. The number of stitches can be set with the preselectors (6) of the seam sections **C** and **D**.
- At the end of counting, the end stitch condensing, if switched on, and trimming are automatically initiated.
- The presser foot is automatically lifted, when the pedal is pushed forward.
- The preselectors (6) of the sections **A** and **B** do not have a function.

Example for setting the preselectors (6) of the seam sections **C** and **D**:.

A Tens	B Units	AB Number of stitches	C Tens	D Units	CD Number of stitches
0	6	6	1	6	16
2	5	25	9	7	97

8.3.6 Pattern 4 (V62K)

- Set sewing pattern at "4" by selector (7).
- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).
- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible after the start stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A** and **B**.
- After the completion of the set number of stitches, the machine stops.
- After pushing the pedal again a stitch counting according to the set seam sections **C** and **D** is performed. This seam section can be repeated at choice.
- At full heelback, the end stitch condensing, if switched on, and trimming are initiated.

8.3.7 Pattern 4 (V62LK)

- Set sewing pattern at "4" by selector (7).
- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).

- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible after the start stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A** and **B**.

- After the completion of the set number of stitches, free sewing at a speed depending on the pedal is performed.

- After light barrier sensing, stitch counting (light barrier compensating stitches max. 99 stitches) is performed at a fixed speed that can be set. The number of stitches can be set with the preselectors (6) of the seam sections **C** and **D**.

- At the end of counting, the end stitch condensing, if switched on, and trimming are automatically initiated.

- The presser foot is automatically lifted, when the pedal is pushed forward.

8.3.8 Pattern 5 (V62K)

- Set sewing pattern at "5" by selector (7).

- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).

- A seam section with stitch counting (max. 9999 stitches) at pedal controlled limited speed is possible between start and end stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A, B, C** and **D**.

- At the end of counting, trimming is automatically performed.

- The presser foot is automatically lifted, when the pedal is pushed forward.

Example for setting the preselectors (6) of the seam sections **A, B, C** and **D**:.

A Thousands	B Hundreds	C Tens	D Units	ABCD Number of stitches
0	6	6	1	661
2	5	5	9	2559

8.3.9 Pattern 5 (V62LK)

With this pattern, up to 9 light barrier seams can be performed according to the setting of preselector (6) "D". The drive stops automatically after each light barrier seam. After the last seam, the final stitch condensing and trimming is performed.

- Set sewing pattern at "5" by selector (7).

- Switch on start and end stitch condensing with slide switches (2) and (3). Set the number of stitches in the control (max. 255 stitches).

- After the start stitch condensing, free sewing at a speed depending on the pedal is performed.

- A seam section with stitch counting (max. 99 stitches) at pedal controlled limited speed is possible after the start stitch condensing. The number of stitches can be set with the preselectors (6) of the seam sections **A** and **B**.

- After the light barrier compensating stitches, the machine stops.

- Then, more light barrier seams are performed if several seams have been selected with preselector (6) **D**.

- The number of stitches set with preselector (6) **C** is added to the number of stitches set with preselectors (6) **A** and **B**, whenever only one seam is set, or the last seam is performed.

A Tens	B Units	AB Number of stitches	C Units	AB + C Number of stitches
0	6	6	1	7
2	5	25	9	34

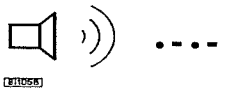
- At the end of countingof the last seam, the end stitch condensing, if switched on, and trimming are automatically performed.

- The presser foot is automatically lifted, when the pedal is pushed forward.

9. Acoustic Error Signals

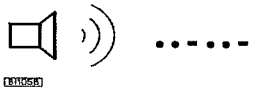
Note:
Whenever an error signal is emitted, the drive is made to stop. The error signal can be heard until the drive is turned off.

ERROR 1: Position transmitter error



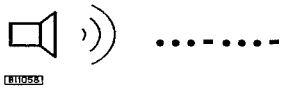
- Position transmitter defective or not connected
- Connections for position transmitter and commutation transmitter were changed by mistake
- Position transmitter not mounted on the sewing machine shaft

ERROR 2: Blocking control



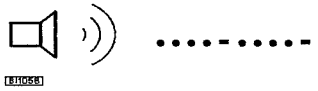
- Sewing machine shaft does not move despite motor activation
- Set speed is not reached

ERROR 3: Commutation transmitter error



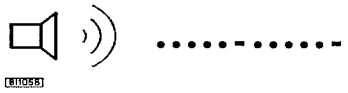
- Commutation transmitter defective or not connected

ERROR 4: Processor breakdown (illegal opcode)



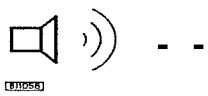
- Microprocessor does not work properly
  - Disturbances from outside (e.g. sewing machine head not grounded, line voltage disturbed)
  - Hardware malfunction on the computer printed circuit board

ERROR 5: Blocking of machine run and/or thread monitor



- Blocking of machine run and/or thread monitor is activated

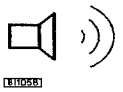
ERROR 88: Mains interruption



- Brief interruption of the mains supply (up to approx. 2 sec.)
- Loading relay is not switched

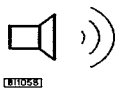
10. Acoustic Signals for Settings

Braking power at standstill



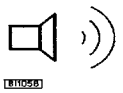
- S9/1 = on
- Set braking power at standstill with P8

Reversion when unlocking the chain



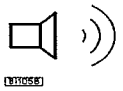
- S9/1 = on
- Set reversing angle with P3
- Set delay until reversion with P8

Power transistor M1



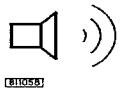
- S9/1 = on
- Set operating time M1 with P3
- Set delay until M1 with P8

Power transistor M2



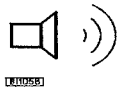
- S9/1 = on
- Set operating time M2 with P3
- Set delay until M2 with P8

Power transistor thread wiper



- S9/1 = on
- Set operating time thread wiper with P3
- Set delay until thread wiping with P8

Power transistor presser foot lifting



- S9/1 = on
- Set start delay after presser foot lifting with P3
- Set delay presser foot lifting at seam end with P8

11. Factory Control Settings

Programming of running pattern		
Switch	Position	Signification
S9/1	off	Programming mode OFF
S9/2	on	Blocking of machine run active with closed connection
S9/3	off	Softstart OFF
S9/4	off	Stitch condensing at the start of the seam OFF
S9/5	off	Stitch condensing at the seam end OFF
S9/6	off	Direction of rotation of the motor shaft LEFT
S9/7	off	Sequential signal sequence M1...M4
S9/8	off	Speed class 5000 RPM

Programming of the light barrier		
Switch	Position	Signification
S9/9	on	┐
S9/10	off	│ 5 light barrier compensating stitches
S10/1	on	│
S10/2	off	┘
S10/3	off	Sewing start blocked with light barrier uncovered
S10/4	off	Automatic start at the beginning of the seam with light barrier inactive
S10/5	off	Light barrier sensing uncovered
S10/6	off	┐
S10/7	off	│ 0 filter stitches for knitted fabrics
S10/8	off	┘
S11	open	Control behavior for normal sewing machines

Programming of the stitch condensing sections		
Switch	Position	Signification
S7/1	off	┐
S7/2	off	│
S7/3	off	│
S7/4	off	│ 0 Stitch condensing stitches at the start of the seam
S7/5	off	│
S7/6	off	│
S7/7	off	│
S7/8	off	┘
S8/1	off	┐
S8/2	off	│
S8/3	off	│
S8/4	off	│ 0 Stitch condensing stitches at the seam end
S8/5	off	│
S8/6	off	│
S8/7	off	│
S8/8	off	┘
S8/9	off	┐ 0 Number of long stitches after stitch condensing
S8/10	off	┘

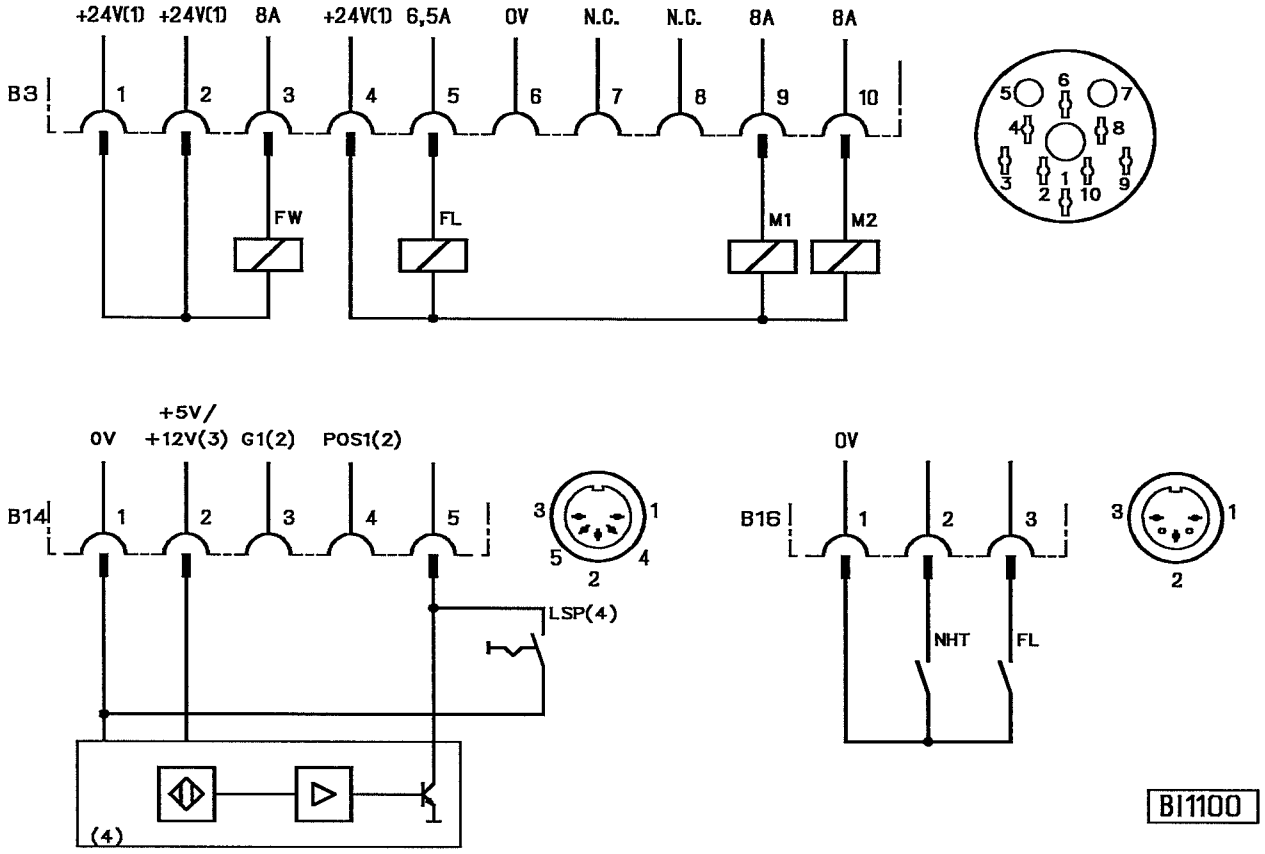
Switches accessible from outside		
Switch	Position	Signification
S1	left	Trimming signals M1...M3 on
S2	left	Needle position at stop in the seam needle up
S3	left	Presser foot lifting after thread trimming on
S4	right	Presser foot lifting at stop in the seam off

Potentiometer settings		
Potentiometer	Position	Signification
P1	180 RPM	Positioning speed (n.pos)
P2	3000 RPM	Maximum speed (n.maxmax)
P3	left stop	Stitch condensing speed (n.stich)
P4	left stop	Stitch condensing speed at the start (n.ar)
P5	left stop	Stitch condensing speed at the end (n.er)
P6	80 ms	Start delay light barrier active until presser foot lifting off (t13)
P7	50 ms	Time delay presser foot lifting with pedal -1 (t2)
P8	3000 RPM	Maximum speed reduction (n.max)
	(+/-10 ms)	Time tolerance

Other preset functions (in the programming mode)		
	Values	Signification
	off	Braking power at standstill
	0 ms	Reversion delay when unlocking the chain (drd)
	0 °	Reversing angle when unlocking the chain (ird)
	60 ms	Start delay from lifted presser foot (t3)
	100 ms	Thread wiper operating time (t6)
	380 ms	Delay of presser foot at the seam end (t7)
	100 ms	M1 operating time (t8)
	100 ms	M2 operating time (t9)
	100 ms	Delay until M2 (t10)
	100 ms	Delay until thread wiper (t11)
	0 ms	Delay until M1 (t16)
	(+/-10 ms)	Time tolerance

Other preset values (which cannot be changed)		
	Values	Signification
	400 ms	Full power of presser foot lifting (t4)
	15 kHz	Clock frequency of presser foot lifting (t5)
	1:1	Clock ratio of presser foot lifting
	300 ms	Start delay after thread trimming (t12)
	400 ms	Full power of stitch condensing (t14)
	15 kHz	Clock frequency of stitch condensing (t15)
	1:1	Clock ratio of stitch condensing
	500 RPM	Softstart speed
	2	Softstart stitches
	(+/-10 ms)	Time tolerance

12. Connection Diagrams

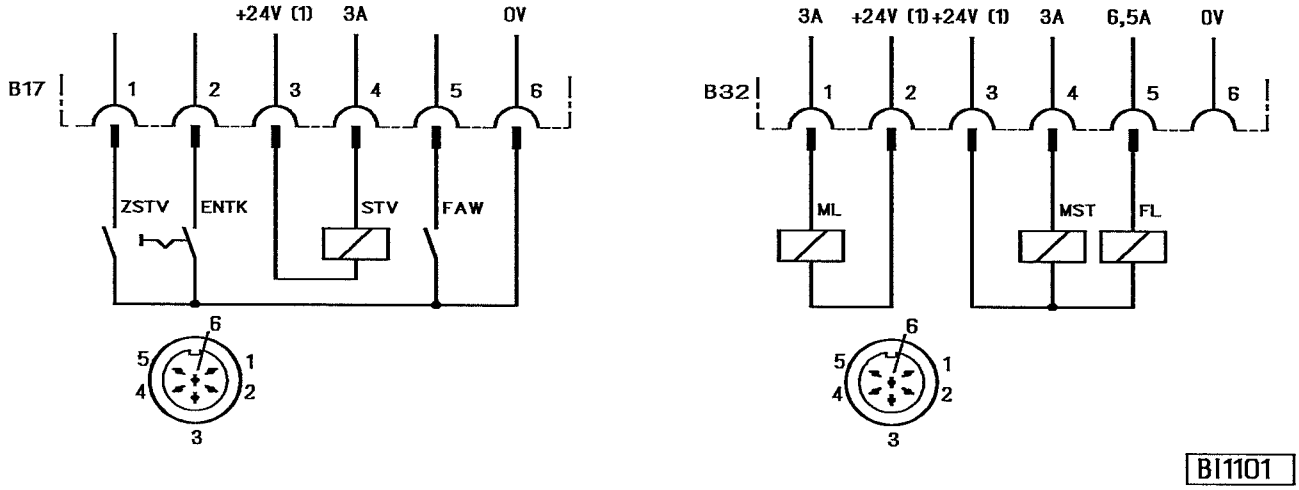


Attention!
When connecting the outputs, ensure that a total power of 96VA constant load will not be exceeded !

M1 - Thread trimmer/thread catcher
M2 - Thread trimmer/thread tension release
FW - Thread wiper
FL - Presser foot lifting
G1 - Signal output for generator impulses
POS.1 - Signal output for position 1

LSP - Blocking of machine run
NHT - Needle up/down

1) Nominal voltage 24V, no-load voltage max. 36V
2) Transistor output with open collector (max. 40V, 30mA)
3) Nominal voltage +12V (can be changed to 5V, 250 mA after opening the cover)
4) Sensor for blocking of machine run or alternative connection of a switch possible

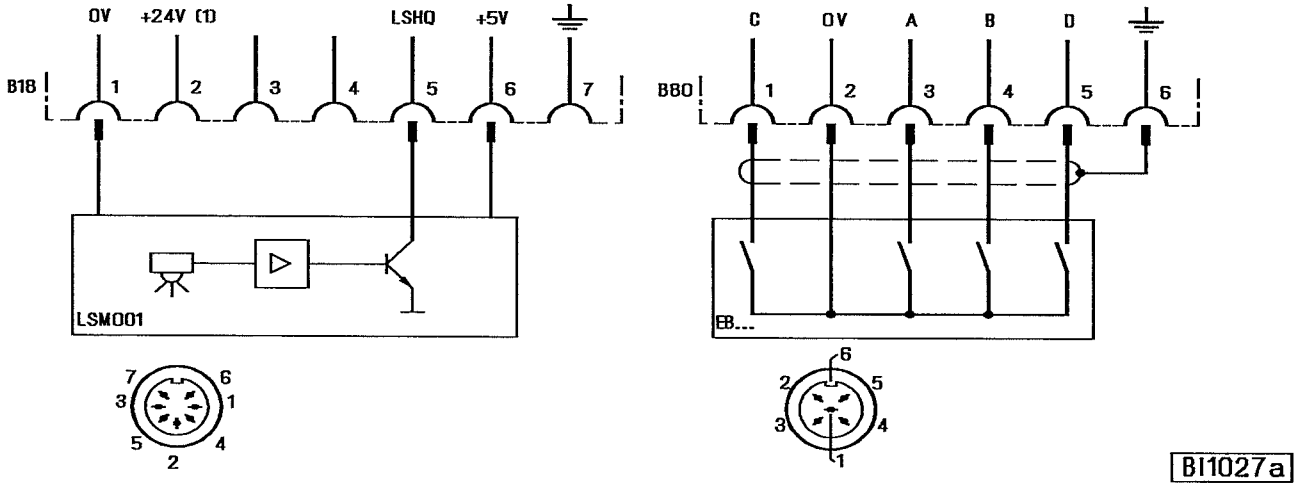


Attention!

When connecting the outputs, ensure that a total power of 96VA constant load will not be exceeded !

STV	- Stitch condensing
ML	- Machine running
MST	- Machine at standstill
FL	- Presser foot lifting
ZSTV	- Intermediate stitch condensing
FAW	- Input for thread wiper
ENTK	- Unlocking the chain

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

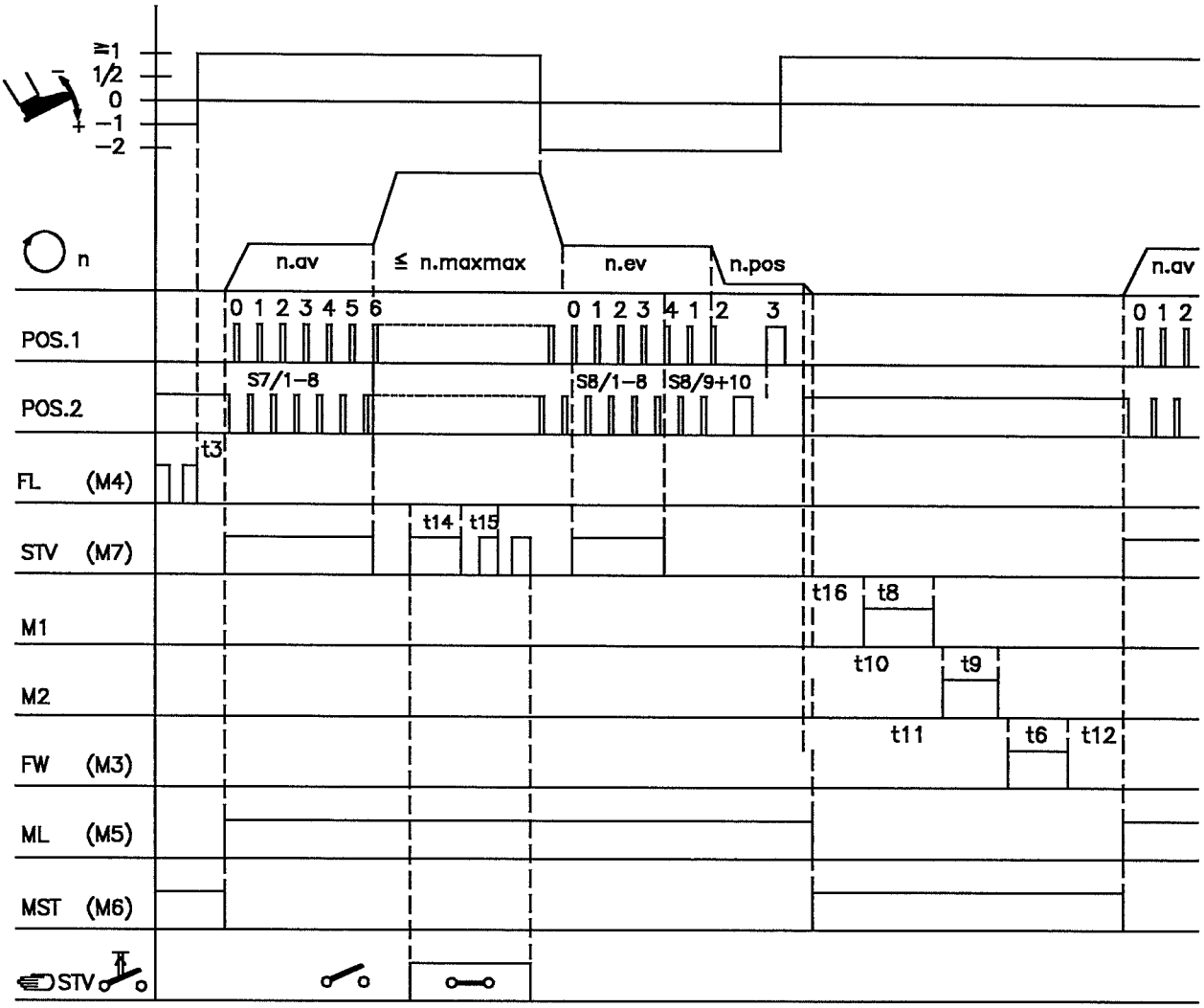


LSHQ	- Light barrier command (identified when switched to 0V)
LSM001	- Reflection light barrier module
EB...	- External actuator

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

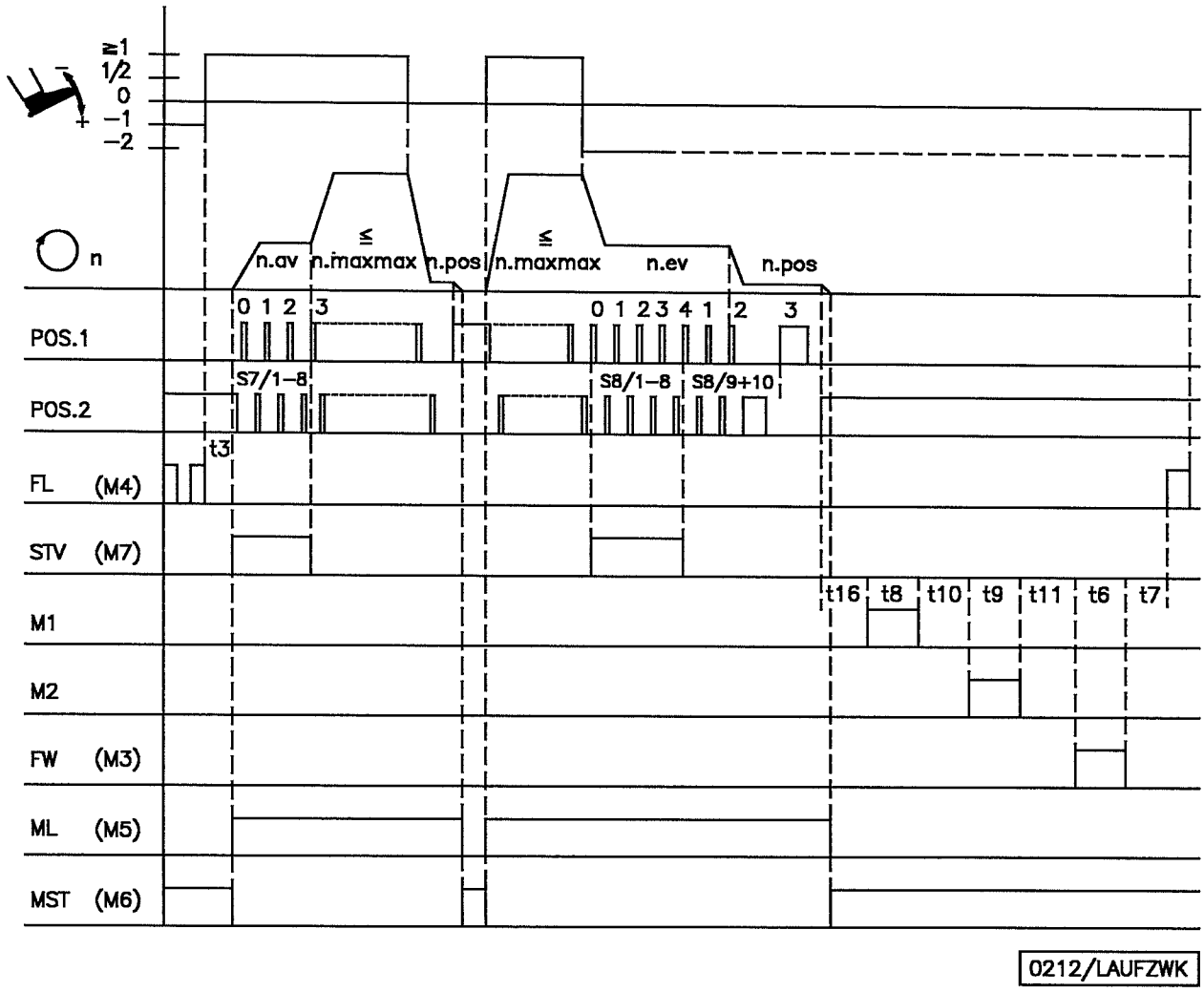
13. Timing Diagrams

Trimming from full run



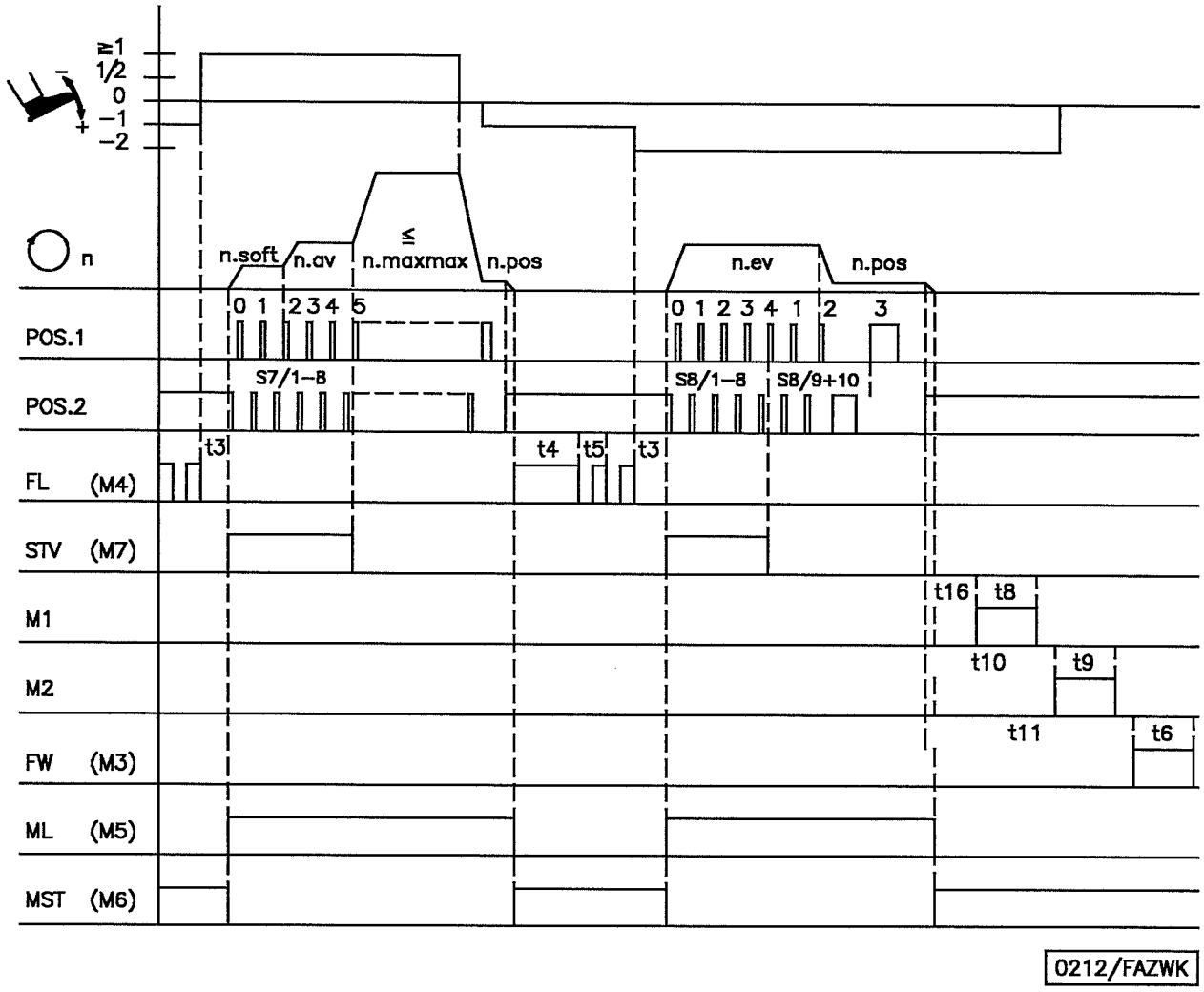
Abbreviation	Function		Switch / Potentiometer
	Initial stitch condensing	on	S9/4
	Final stitch condensing	on	S9/5
	M1...M4 parallel	off	S9/7
n.pos	Trimming speed		P1
n.maxmax	Maximum speed		P2
n.av	Start stitch condensing speed		P4
n.ev	End stitch condensing speed		P5
t3	Start delay from lifted foot		P3 (see instruction)
t6	Thread wiper time		P3 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
t12	Start delay after thread trimming		fixed
t14	Full power of stitch condensing		fixed
t15	Pulsing of stitch condensing		fixed
t16	Delay for M1		P8 (see instruction)

Run with intermediate stop



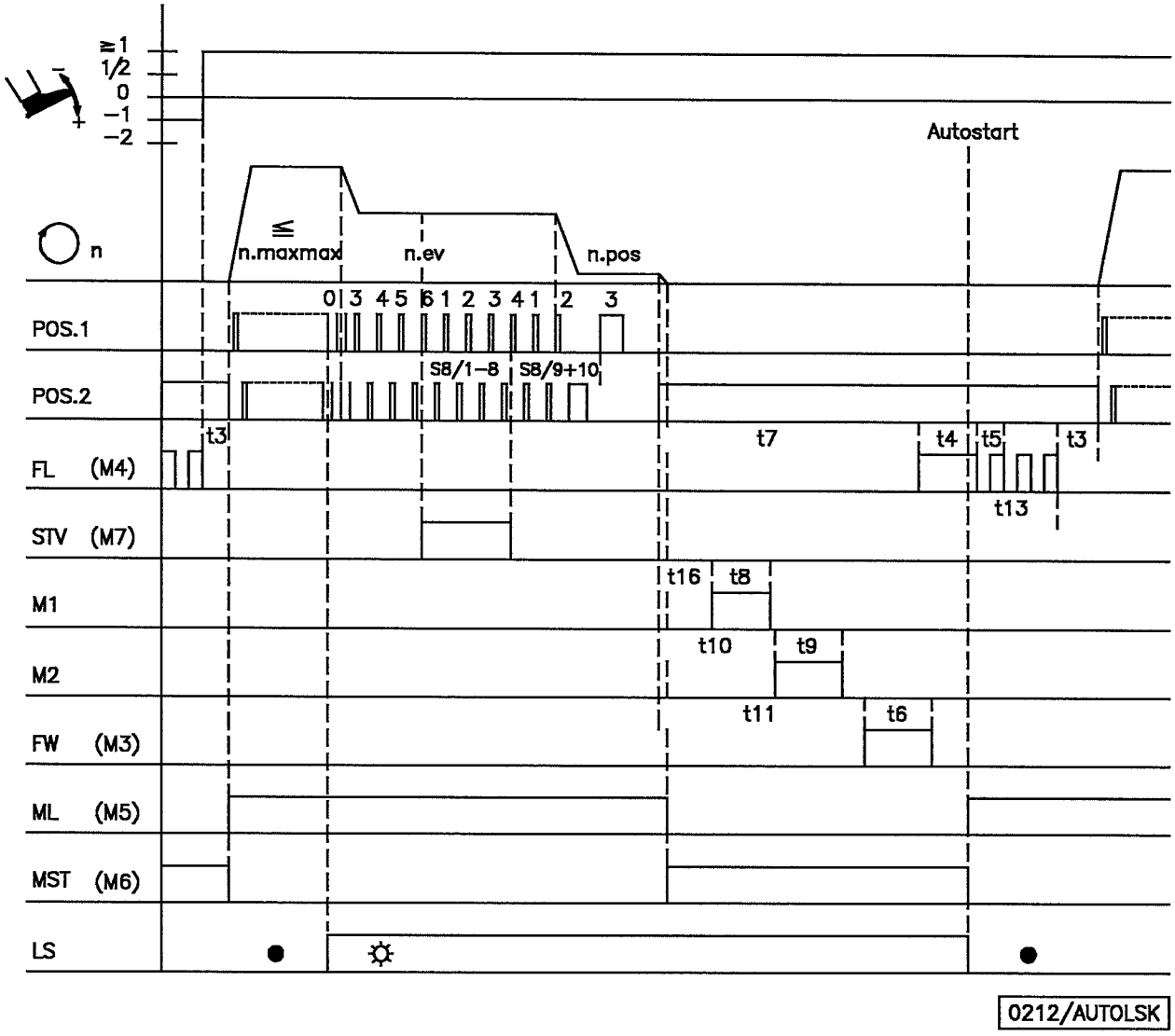
Abbreviation	Function		Switch / Potentiometer
	Start stitch condensing	on	S9/4
	End stitch condensing	on	S9/5
	M1...M4 sequential	on	S9/7
n.pos	Trimming speed		P1
n.maxmax	Maximum speed		P2
n.av	Start stitch condensing speed		P4
n.ev	End stitch condensing speed		P5
t3	Start delay from lifted foot		P3 (see instruction)
t6	Thread wiper time		P3 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
t16	Delay for M1		P8 (see instruction)

Trimming from intermediate stop



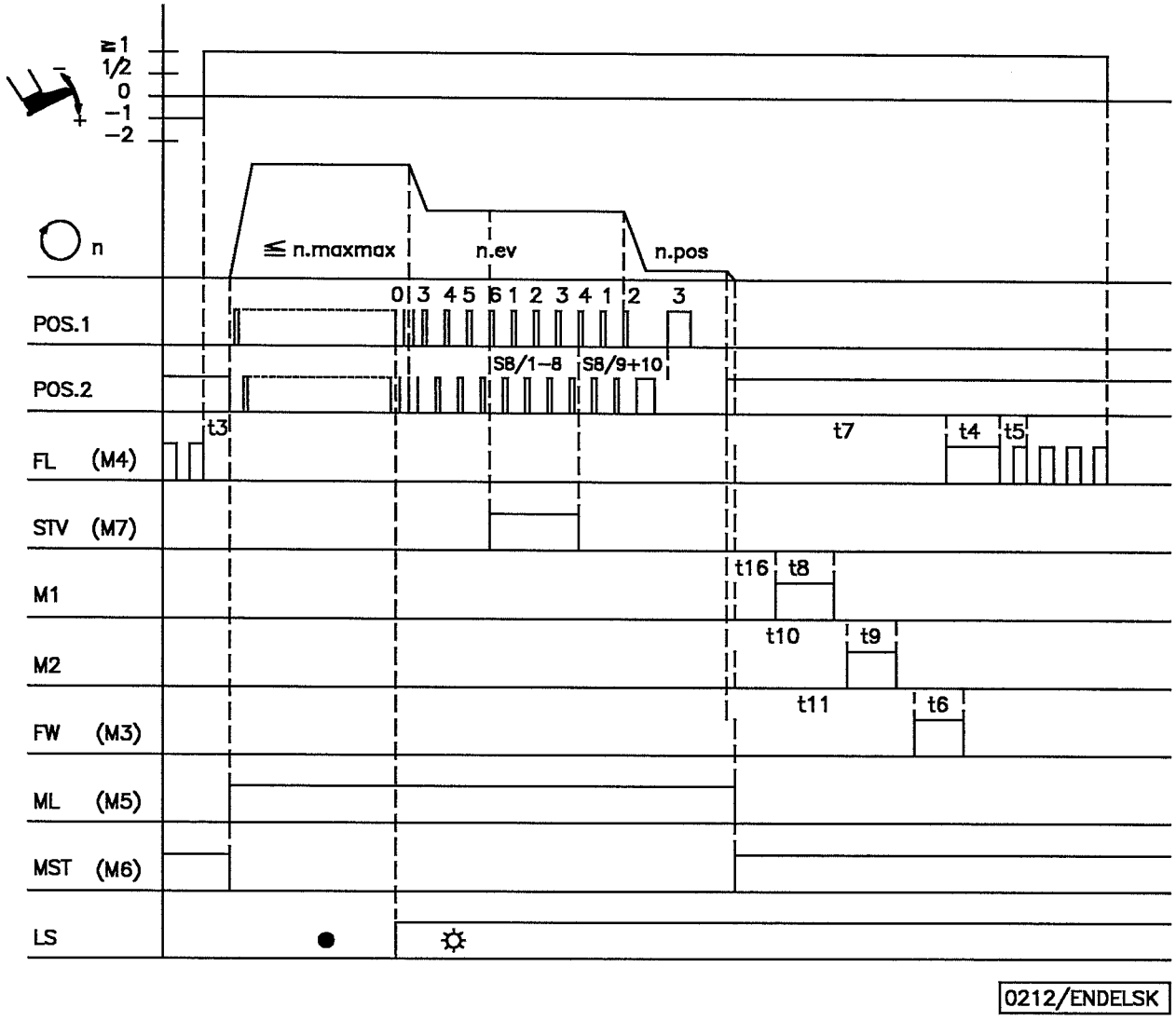
Abbreviation	Function		Switch / Potentiometer
	Basic position 2	on	S2
	Softstart	on	S9/3
	Start stitch condensing	on	S9/4
	End stitch condensing	on	S9/5
	M1...M4 parallel	off	S9/7
n.pos	Trimming speed		P1
n.soft	Softstart speed		fixed
n.maxmax	Maximum speed		P2
n.av	Start stitch condensing speed		P4
n.ev	End stitch condensing speed		P5
t3	Start delay from lifted foot		P3 (see instruction)
t4	Full power of presser foot lifting		fixed
t5	Pulsing presser foot		fixed
t6	Thread wiper time		P3 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
t16	Delay for M1		P8 (see instruction)

Automatic start of light barrier at the beginning of the seam



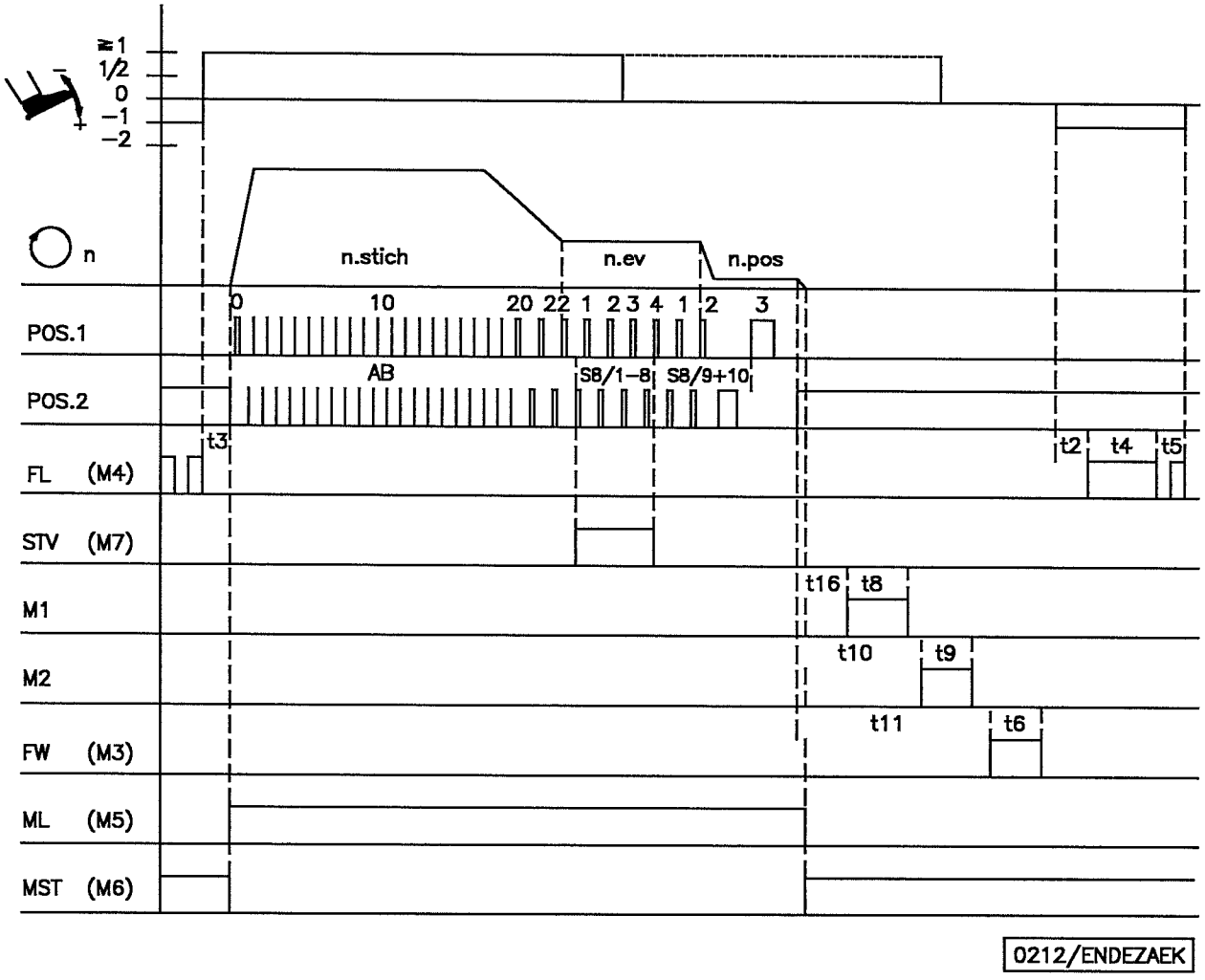
Abbreviation	Function		Switch / Potentiometer
	Light barrier	on	S2
	Start stitch condensing	off	S9/4
	End stitch condensing	on	S9/5
	M1...M4 parallel	off	S9/7
	Automatic light barrier start	on	S10/4
	Light barrier uncovered / covered	on	S10/5
n.pos	Trimming speed		P1
n.maxmax	Maximum speed		P2
n.ev	End stitch condensing speed		P5
t3	Start delay from lifted foot		P3 (see instruction)
t4	Full power of presser foot		fixed
t5	Pulsing presser foot		fixed
t6	Thread wiper time		P3 (see instruction)
t7	Delay presser foot lifting at the seam end		P8 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
t13	Delay light barrier active until presser foot lifting off		P6
t16	Delay for M1		P8 (see instruction)

Seam end by light barrier with unlocking the chain



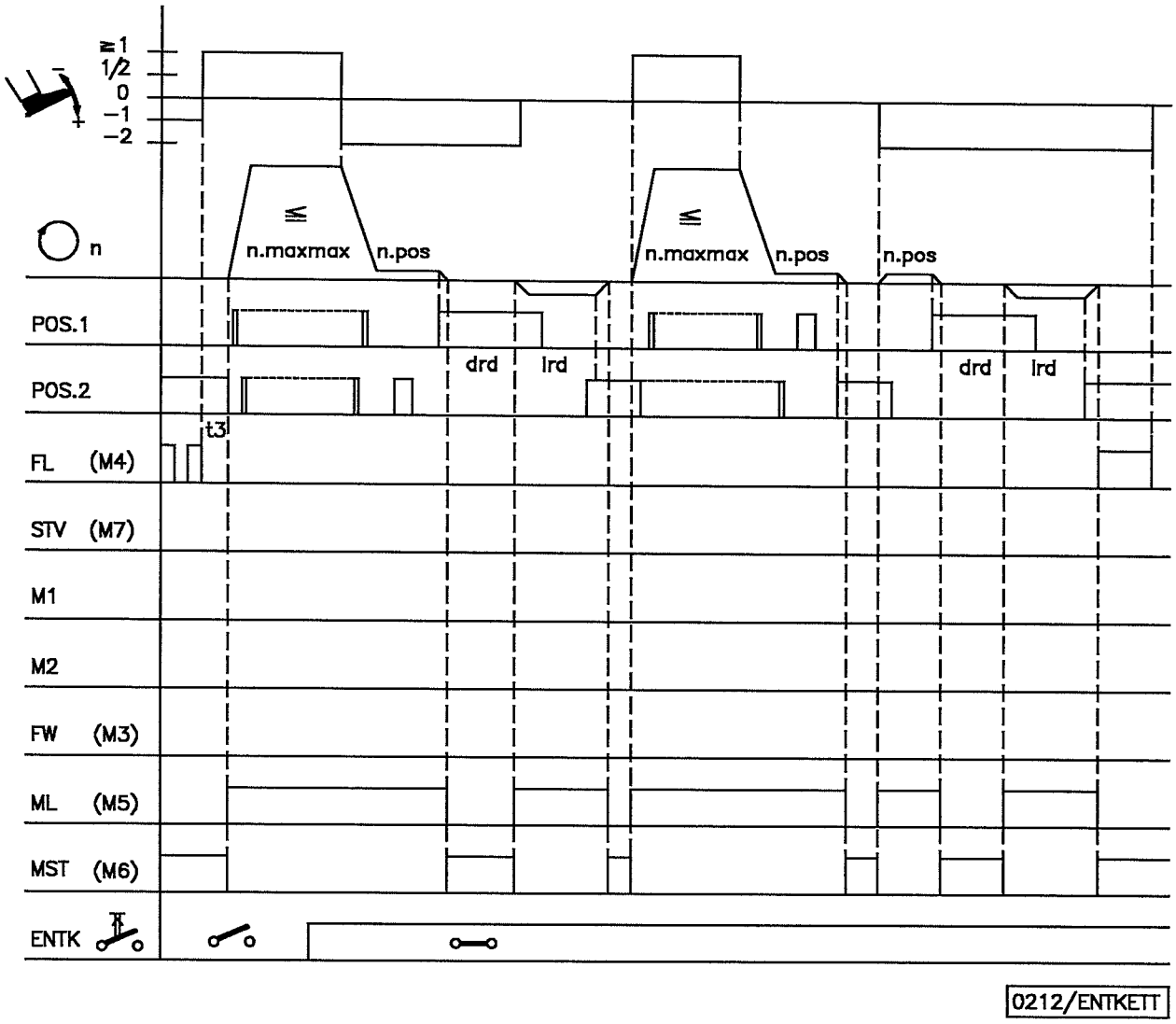
Abbreviation	Function		Switch / Potentiometer
	Light barrier	on	S2
	Unlocking the chain	on	B17/2-6 closed
	Start stitch condensing	off	S9/4
	End stitch condensing	on	S9/5
	M1...M4 parallel	off	S9/7
	Light barrier uncovered / covered	off	S10/5
n.pos	Trimming speed		P1
n.maxmax	Maximum speed		P2
n.ev	End stitch condensing speed		P5
t3	Start delay from lifted foot		P3 (see instruction)
t4	Full power of presser foot		fixed
t5	Pulsing presser foot		fixed
t6	Thread wiper time		P3 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
drd	Delay reversion		P8 (see instruction)
Ird	Reversion increments		P3 (see instruction)
t16	Delay for M1		P8 (see instruction)

Seam end by stitch counting with V62K and/or V62LK



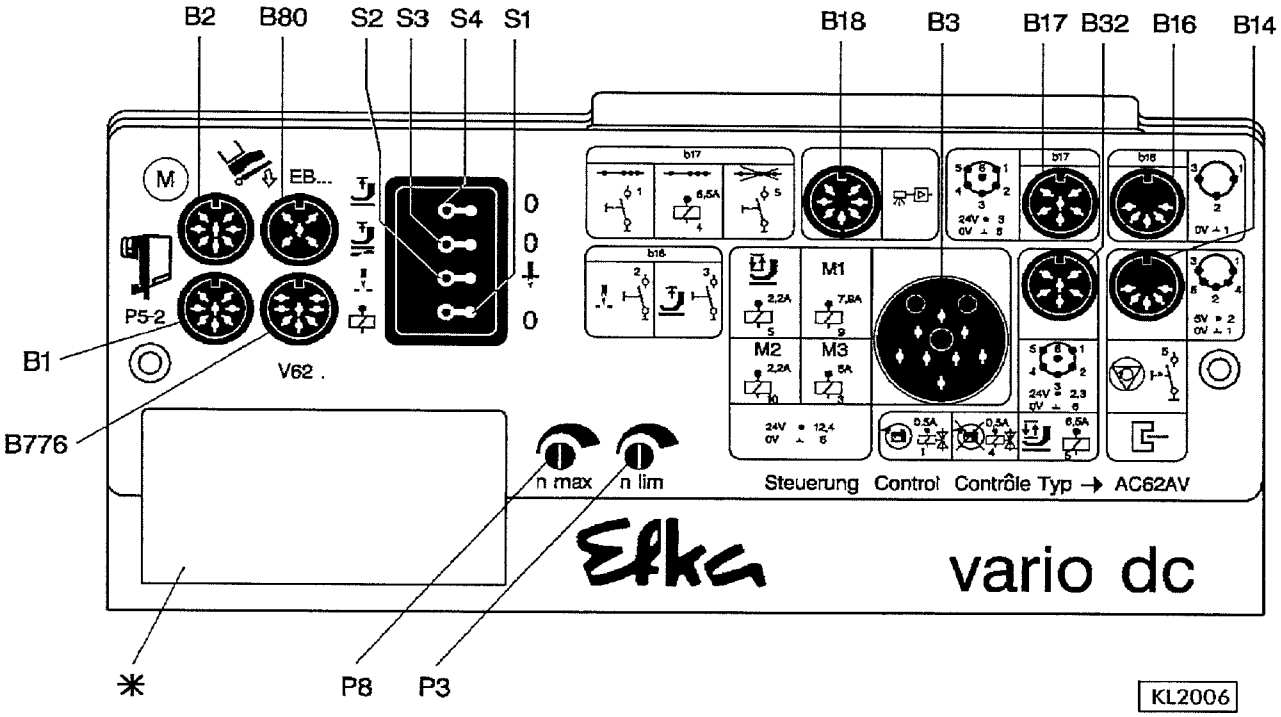
Abbreviation	Function		Switch / Potentiometer
	Stitch counting on control panel V62LK and/or V62K	on	Section AB = 22
	Start stitch condensing on the control panel	off	Pushbutton 2
	End stitch condensing	on	Pushbutton 3
	M1...M4 parallel	off	S9/7
n.pos	Trimming speed		P1
n.maxmax	Maximum speed		P2
n.stich	Stitch counting speed		P3
n.ev	End stitch condensing speed		P5
t2	Delay presser foot lifting with pedal -1/-2		P7
t3	Start delay from lifted foot		P3 (see instruction)
t4	Full power of presser foot		fixed
t5	Pulsing presser foot		fixed
t6	Thread wiper time		P3 (see instruction)
t8	Activation time for M1		P3 (see instruction)
t9	Activation time for M2		P3 (see instruction)
t10	Delay for M2		P8 (see instruction)
t11	Delay for thread wiper		P8 (see instruction)
t16	Delay for M1		P8 (see instruction)

Sewing operation with unlocking the chain



Abbreviation	Function		Switch / Potentiometer
	Unlocking the chain	on	B17/2-6 closed
n.pos n.maxmax	Trimming speed Maximum speed		P1 P2
drd Ird	Delay reversion when unlocking the chain Reversion increments when unlocking the chain		P8 (see instruction) P3 (see instruction)

14. Operating Elements and Socket Connectors



B1 - Position transmitter
B2 - Commutation transmitter for d.c. motor
B3 - Solenoid
B14 - Switch / Sensor
B16 - Pushbuttons
B17 - Solenoids and switches
B18 - Light barrier module
B32 - Solenoids / Solenoid valves
B80 - External actuator
B776 - Control panel

* - Service flap

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