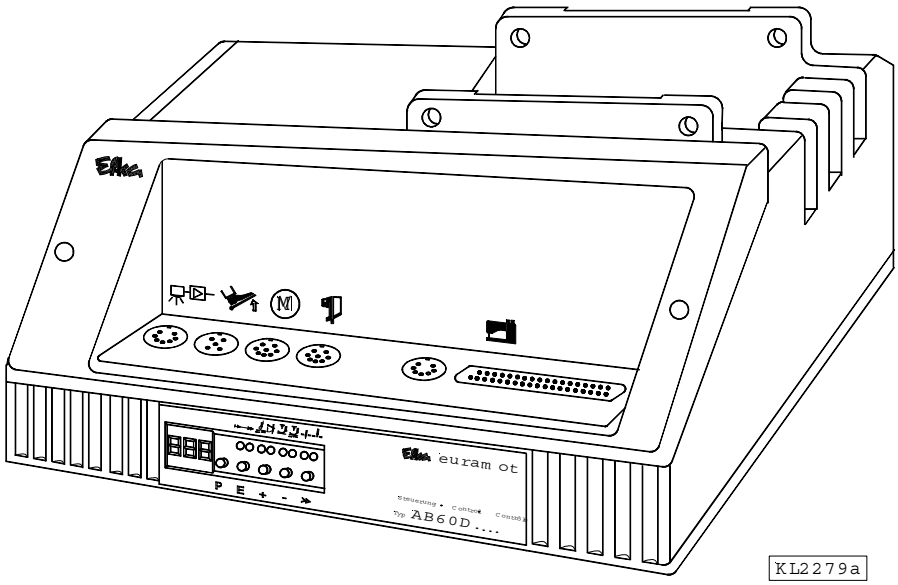
Efka euramot

CONTROL AB60D1472



INSTRUCTION MANUAL

No. 402289 **English**

Efka
FRANKL & KIRCHNER
GMBH & CO KG

Efka
EFKA OF AMERICA INC.

Efka
EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

CONTENTS **Page**

CONTENTS **Page**

1 Range of Applications

The drive is suitable for lockstitch, chainstitch and overlock machines of various manufacturers. Furthermore, stepping motor operation is possible with the SM210A control. See chapter “Connection Scheme of SM210A Stepping Motor Control”.
With the help of adapter cords (adapter cords see Special Accessories), the drive can be used with the following controls replacing previous models:

Machine manufacturer	**Replacing**	**Machine**	**Model**	**Thread trimming mode**	**Adapter cord**
Aisin	AB62AV	Lockstitch	AD3XX,AD158 3310,EK1	0	1112815
Brother	AB62AV	Lockstitch	737-113,737-913	0	1112814
Brother	AC62AV	Chainstitch	FD3 B257	5	1112822
Dürkopp Adler	DA62AV	Lockstitch	210,270	0	1112845
Global		Chainstitch	CB2803-56	5	1112866
Juki	AB62AV	Lockstitch	5550-6	14	1112816
Juki	AB62AV	Lockstitch	5550-7	14	1113132
Juki	LU1510-7	Lockstitch		20	1113200
Kansai	AC62AV	Chainstitch	RX 9803	5	1113130
Pegasus	AC62AV	Chainstitch	W500/UT	5	1112821
Pegasus	AB60C	Backlatch		8	1113234
Pfaff	PF62AV	Lockstitch	563,953,1050, 1180	0	1112841
Pfaff		Lockstitch	1425	13	1113324
Rimoldi		Chainstitch	F27	5	1113096
Singer	SN62AV	Lockstitch	591, 211U, 212 U / 212 UTT	1/2	1112824
Union Special	US80A	Lockstitch	63900AMZ	10	1113199
Union Special	US80A	Chainstitch	34000, 36200	4	1112865
Union Special	US80A	Chainstitch	CS100, FS100	4	1112905
Yamato	AC62AV	Chainstitch	VC series	5	1112818
Yamato		Chainstitch	VG series	5	1113178
Yamato	AB60C	Backlatch	ABT3	9	1112826
Yamato		Backlatch	ABT13, ABT17	9	1113205

1.1 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/EEC and supplement 91/368/EEC).

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

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

Operate the drive only in dry areas.

CAUTION
When selecting the installation site and the layout of the connecting cable, the Safety Instructions must be followed with no exceptions.
Particular attention should be paid to maintaining the proper distance from moving parts!

2 Scope of Supply

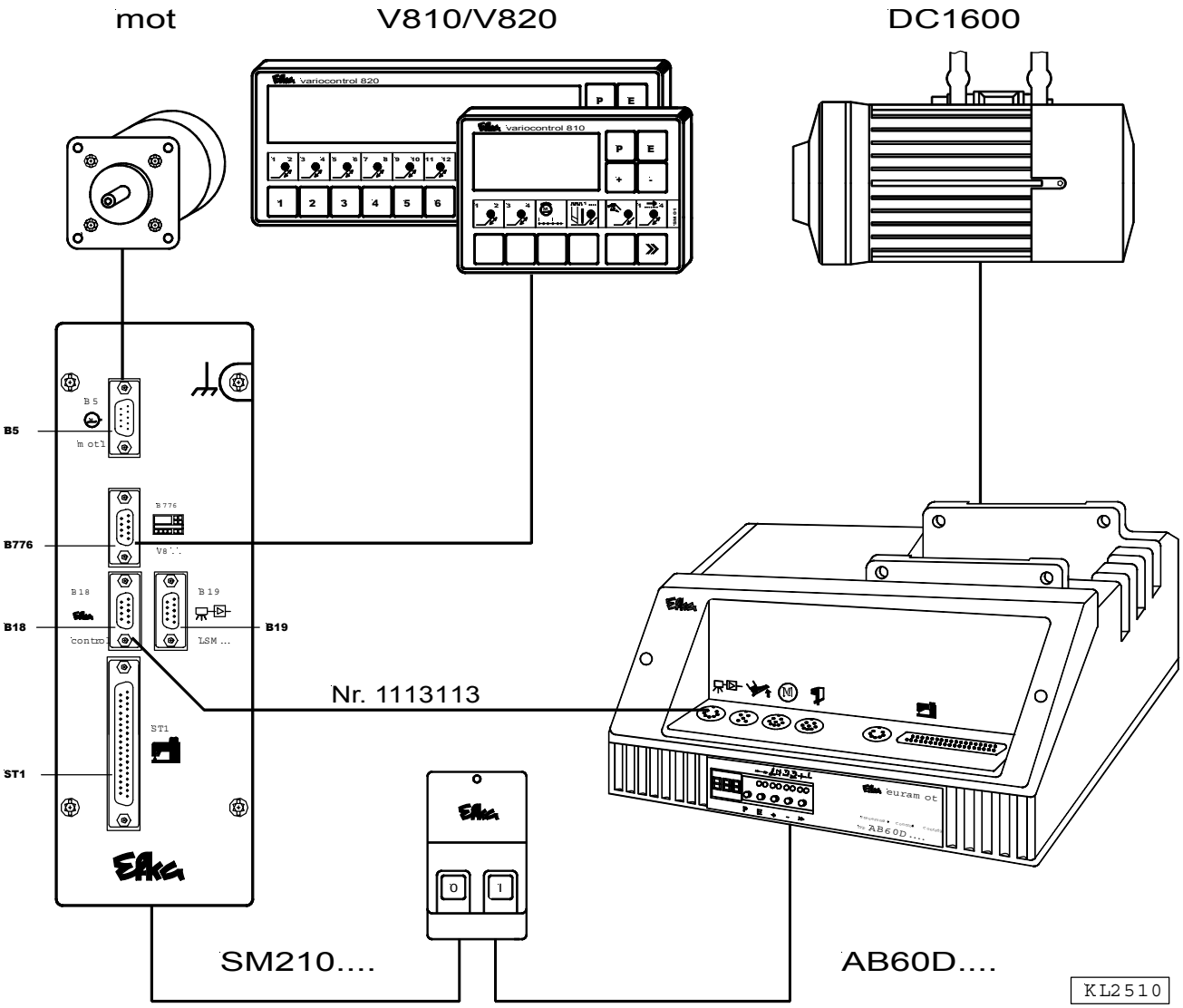
1	Direct current motor	DC1600
1	Electronic control	euramot AB60D1472
	- Power pack	N156A for 230V (optional N159 for 110V)
	- Actuator	EB301 (optional WB302, softer spring)
1	Position transmitter	P5-2 in general P5-4 Singer models 211, 212, 591
1	Mains switch	NS106 (optional NS106d) or NS108 (optional NS108d)
1	Adapter cord according to the intended type of machine	
1	Set of standard accessories consisting of:	B131 belt guard, complete set of hardware motor mounting foot bracket 1 and 2, short potential equalization cord documentation
1	Set of accessories consisting of:	Z3 pitman rod
1	Pulley	

Note
If there is no metallical contact between drive (motor) and machine head, the potential equalization cord supplied with the unit is to be wired from the machine head to the terminal provided on the control box!

2.1 Special Accessories

Reflection light barrier module LSM001A	- part no. 6100028
EFKANET interface IF232-2, complete	- part no. 7900068
Adapter cord for the connection of socket B18 on the SM210 stepping motor control and the above control (see chapter "Connection Scheme of SM210A Stepping Motor Control")	- part no. 1113113
Actuating solenoid type EM1.. (e. g. for sewing foot lifting)	- available models see specification "solenoids"
Extension cable for position transmitter P5-..., approx. 1100 mm long, complete with plug and socket connector	- part no. 1112247
Extension cable for motor connection, approx. 1500 mm long	- part no. 1111857
Extension cable for external actuator, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external actuator, approx. 1500 mm long, complete with plug and socket connector	- part no. 1111787
5-pin plug with locking screw, for the connection of another external actuator	- part no. 0501278
External actuator type EB302 (softer spring) with approx. 250 mm connecting cable and 5-pin plug with locking screw	- part no. 4170012
Foot control type FB301 with one pedal for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4170013
Foot control type FB302 with three pedals for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4170018
Fitting piece for position transmitter	- part no. 0300019
Pulley 40 mm Ø with special belt intake and slip-off protection (use SPZ belt)	- part no. 1112223
Pulley 50 mm Ø 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. 5870013
Adapter cord for the connection to AISIN high-speed seamer AD3XX, AD158, 3310 and **o**verlock machine EK1	- part no. 1112815
Adapter cord for the connection to BROTHER models 737-113, 737-913	- part no. 1112814
Adapter cord for the connection to BROTHER chainstitch machine model FD3 B257	- part no. 1112822
Adapter cord for the connection to DÜRKOPP ADLER models 210 and 270	- part no. 1112845
Adapter cord for the connection to GLOBAL model CB2803-56	- part no. 1112866
Adapter cord for the connection to JUKI high-speed seamer with index -6	- part no. 1112816
Adapter cord for the connection to JUKI high-speed seamer with index -7	- part no. 1113132
Adapter cord for the connection to JUKI high-speed seamer model LU1510-7	- part no. 1113200
Adapter cord for the connection to KANSAI machine model RX 9803	- part no. 1113130
Adapter cord for the connection to PEGASUS models W500/UT	- part no. 1112821
Adapter cord for the connection to PEGASUS backlatch machine	- part no. 1113234
Adapter cord for the connection to PFAFF models 563, 953, 1050, 1180	- part no. 1112841
Adapter cord for the connection to PFAFF model 1425	- part no. 1113324
Adapter cord for the connection to RIMOLDI model F27	- part no. 1113096
Adapter cord for the connection to SINGER models 211, 212U, 212UTT and 591	- part no. 1112824
Adapter cord for the connection to UNION SPECIAL lockstitch machine model 63900AMZ (as a replacement for the US80A)	- part no. 1113199
Adapter cord for the connection to UNION SPECIAL models 34000 and 36200 (as a replacement for the US80A)	- part no. 1112865
Adapter cord for the connection to UNION SPECIAL models CS100 and FS100	- part no. 1112905
Adapter cord for the connection to YAMATO VC series chainstitch machines	- part no. 1112818
Adapter cord for the connection to YAMATO VG series chainstitch machines	- part no. 1113178
Adapter cord for the connection to YAMATO backlatch machine ABT3	- part no. 1112826
Adapter cord for the connection to YAMATO backlatch machines ABT13, ABT17	- part no. 1113205
Sewing light transformer	- please indicate line voltage and sewing light voltage (6,3V or 12V)
7-pin plug with locking screw (MAS 7100S) in plastic bag	- part no. 1110805
37-pin SubminD male connector with half-shell housing	- part no. 1112900
Single pins for 37-pin SubminD with strand of 5cm length	- part no. 1112899

3 Connection Scheme of SM210A Stepping Motor Control



The AB60D.... control (B18) and the SM210A....stepping motor control (B18) are connected by means of adapter cord no. 1113113.

If a light barrier is required for the sewing process, it must be connected to socket B9 on the stepping motor control. The light barrier signal is transmitted via the connecting cable from the SM210A to the sewing drive.

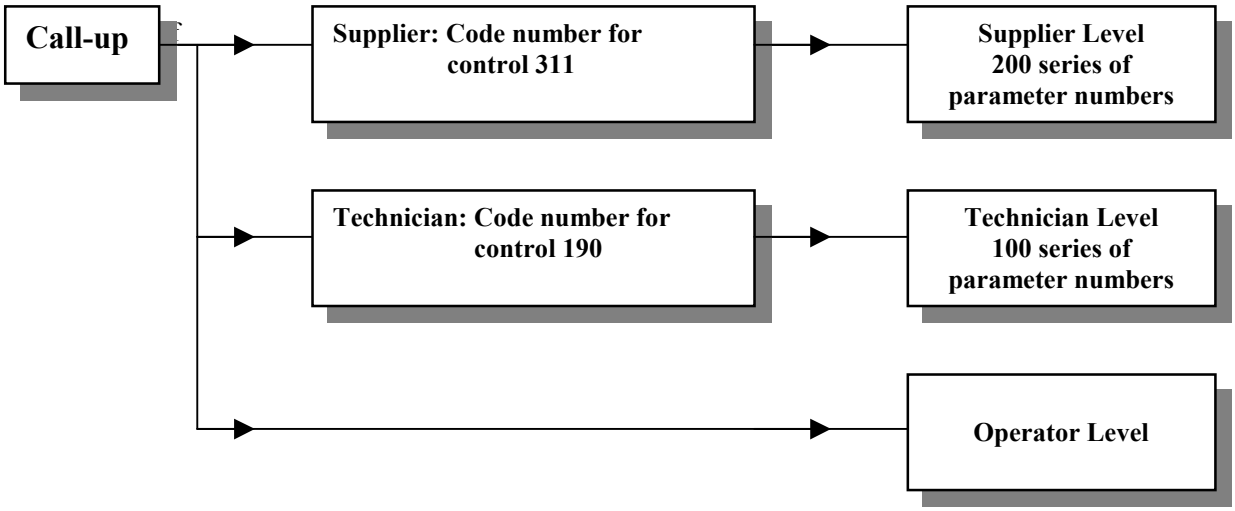
4 Control Operation

4.1 Access Authorization upon Command Input

In order to prevent unintentional changes of preset functions the command input is distributed at various levels.

The following persons have access:

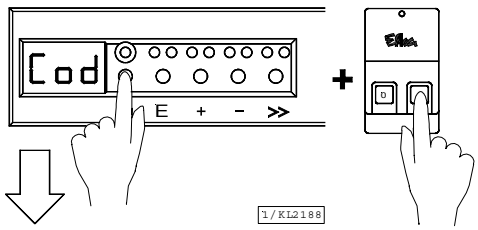
- the supplier to the highest and all subordinate levels using a code number
- the technician to the next lower and all subordinate levels using a code number
- the operator to the lowest level without a code number



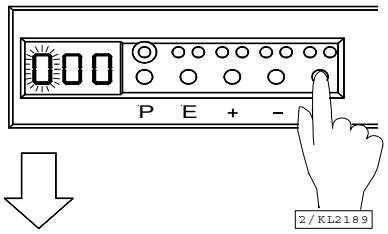
4.2 Programming the Code Number

Note
The parameter numbers in the illustrations below serve as examples and may not be available in all program versions. In this case, the display shows the next higher parameter number. See List of Parameters.

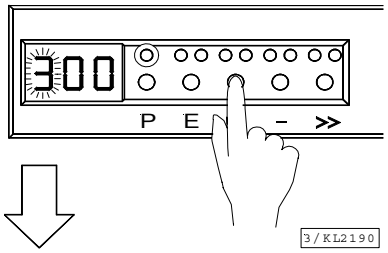
1. Press the **P** key and turn power on



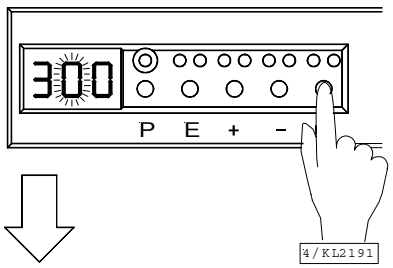
2. Press the >> key (first digit blinks)



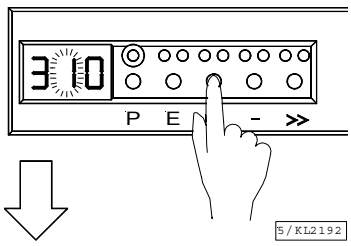
3. Press the + or – key to select the first digit
Technician level ==> Code no. 190
Supplier level ==> Code no. 311



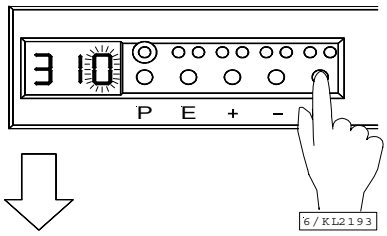
4. Press the >> key (second digit blinks)



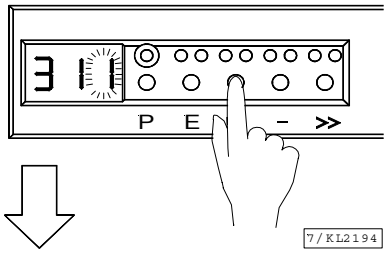
5. Press the + or – key to select the second digit



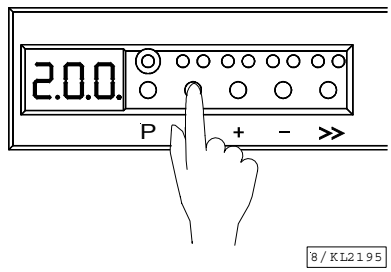
6. Press the >> key (third digit blinks)



7. Press the + or – key to select the third digit



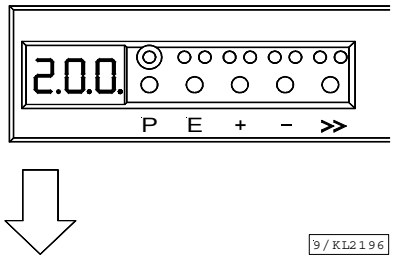
8. Press the **E** key; the parameter number is displayed, which is indicated by points between the digits.



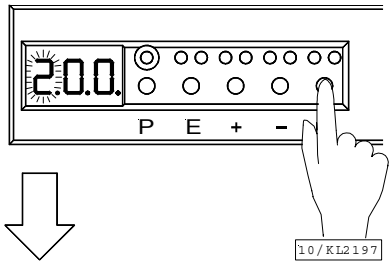
4.3 Parameter Selection

4.3.1 Direct Selection

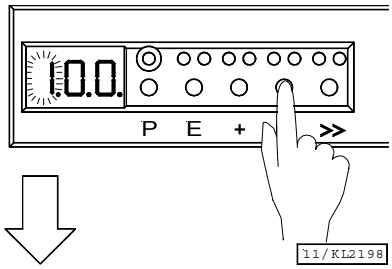
1. After code number input at the programming level



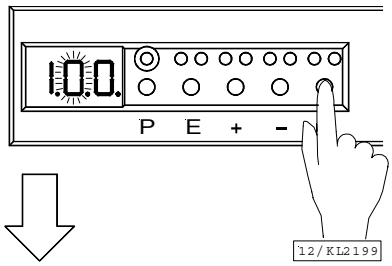
2. Press the >> key (first digit blinks)



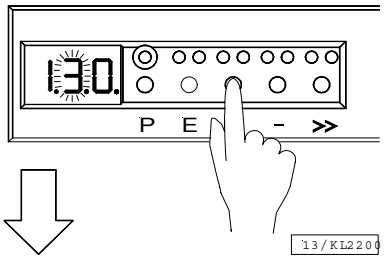
3. Press the + or – key to select the first digit



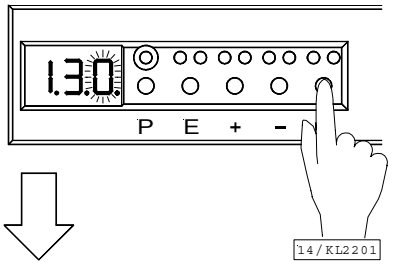
4. Press the >> key (second digit blinks)



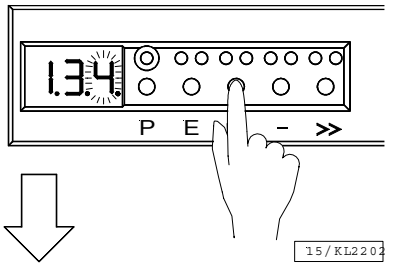
5. Press the + or – key to select the second digit



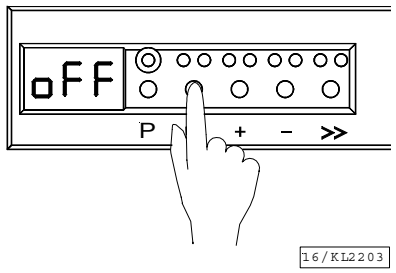
6. Press the >> key (third digit blinks)



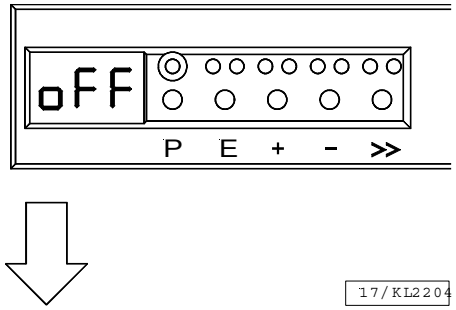
7. Press the + or – key to select the third digit



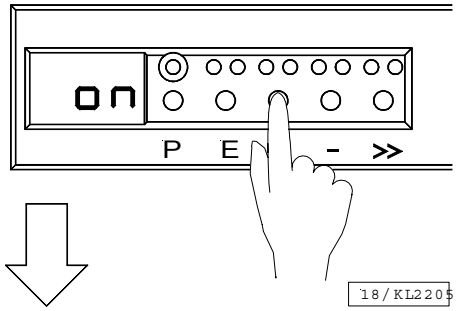
8. Press the **E** key; the parameter value is displayed. There are no points between the digits.



4.3.2 Changing Parameter Values



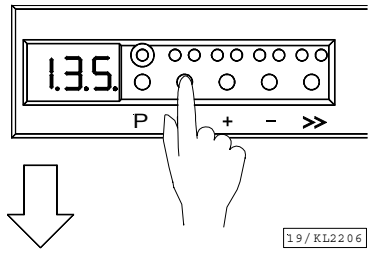
Display after parameter value selection



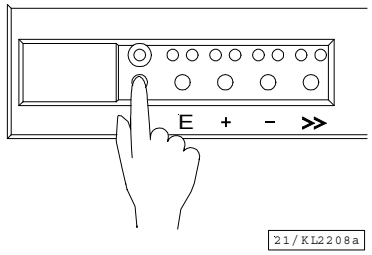
Change the parameter value by pressing the + or – key

Option 1:

Press the **E** key. The next parameter number is displayed.

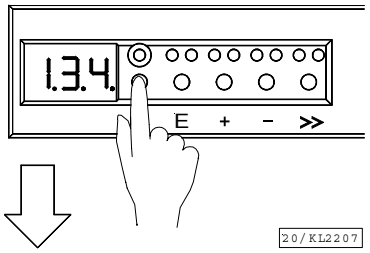


Press the **P** key. Exit programming.
The changed parameter values will be saved when you start sewing again!

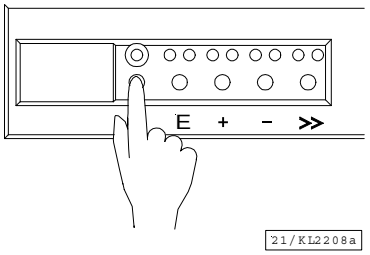


Option 2:

Press the **P** key. The same parameter number is displayed.

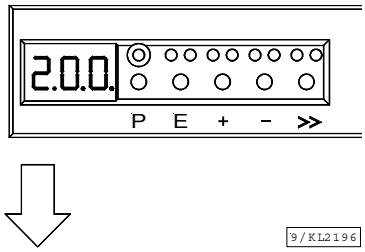


Press the **P** key. Exit programming.
The changed parameter values will be saved when you start sewing again!

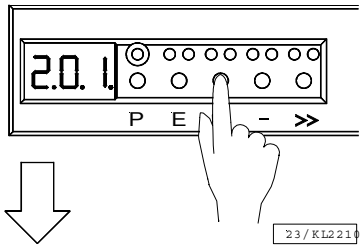


4.3.3 Parameter Selection with the +/- Keys

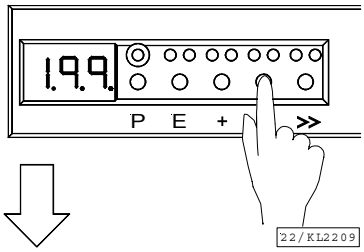
1. After code number input at the programming level



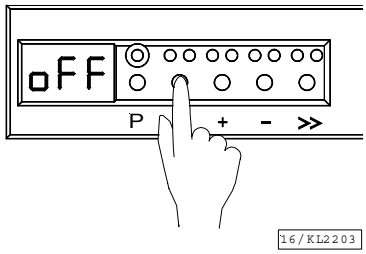
2. Select the next parameter by pressing the + key



3. Select the previous parameter by pressing the - key



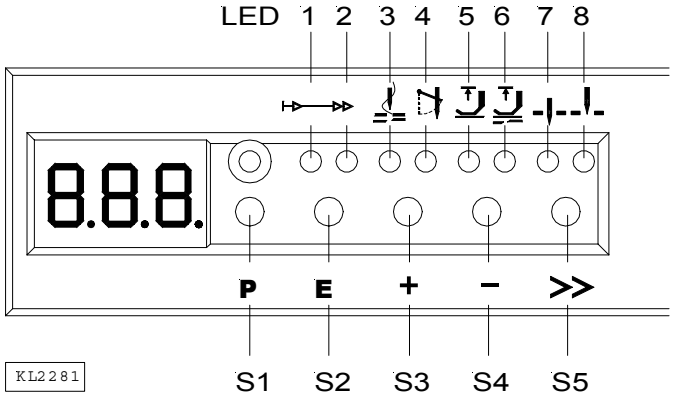
4. After pressing the **E** key, the parameter value is displayed



4.4 Changing All Parameter Values at the Operator Level

All parameter values at the operator level can be changed without code number input (see List of Parameters).

- Press the **P** key ➔ The first parameter number will be displayed.
- Press the **E** key ➔ The parameter value will be displayed.
- Press the +/- keys ➔ The parameter value will be changed.
- Press the **E** key ➔ The next parameter will be displayed.
- Press the **E** key ➔ The parameter value will be displayed.
- Press the +/- keys ➔ The parameter value will be changed.
  etc.
- Press the **P** key twice ➔ Exit programming at the operator level



4.5 Function Switchover

Switchable functions can be changed by pressing the appropriate key. The switching state is indicated by light emitting diodes (LED). See above illustration!

Table: Assignment of functions to keys and LEDs

Function	Key		LED number	
Softstart On	**E**	(S2)	1 = on	2 = off
Softstart Off	**E**		1 = off	2 = off
Thread trimmer On (in all modes except mode 7, 11 and 12)	**+**	(S3)	3 = on	4 = off
Thread trimmer On	**+**		3 = off	4 = on
Thread trimmer and thread wiper On	**+**		3 = on	4 = on
Thread trimmer and thread wiper Off	**+**		3 = off	4 = off
Tape cutter at the start of the seam (mode 7)	**+**	(S3)	3 = on	4 = off
Tape cutter at the seam end On	**+**		3 = off	4 = on
Tape cutter at the start of the seam and at the seam end On	**+**		3 = on	4 = on
Tape cutter at the start of the seam and at the seam end Off	**+**		3 = off	4 = off
Sewing foot lift at stop in the seam (automatic)	**-**	(S4)	5 = on	6 = off
Sewing foot lift at the seam end (automatic)	**-**		5 = off	6 = on
Sewing foot lift at stop in the seam and at the seam end (automatic)	**-**		5 = on	6 = on
Sewing foot lift (automatic) Off	**-**		5 = off	6 = off
Basic position down (position 1)	**>>**	(S5)	7 = on	8 = off
Basic position up (position 2)	**>>**		7 = off	8 = on

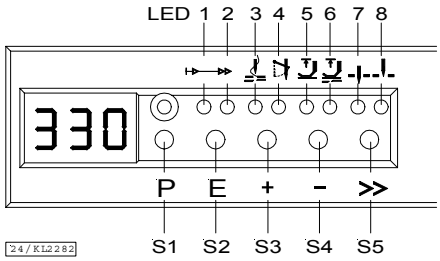
4.6 Direct Input of Maximum Speed Limitation

The maximum speed of the machine must be limited to the specific level according to the application. Do the setting at the operator level on the control using the +/- keys during operation or at intermediate machine stop. This function is blocked at the start of the seam or after the seam end. The actual value shown on the display must be multiplied by 10.

Example:

The value 330 on the control display corresponds to a speed of 3300 RPM.

Important! If the speed is changed, it is saved only after trimming and when you start sewing again.



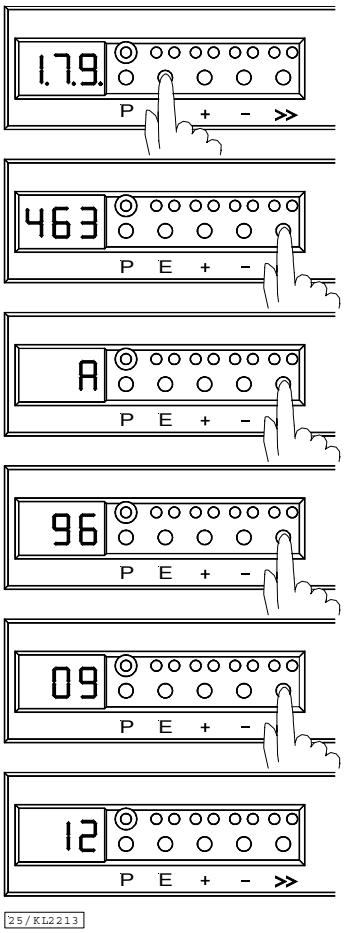
4.7 Program Identification on the Control

Functions	Parameter
Program number, modification index and identification number display	**179**

After having selected parameter 179 **(example)**, the following information is displayed in succession:

Example:

- Select parameter **179** and press the **E** key!
- The display shows the program number (1463) shortened by one digit! Continue by pressing the >> key!
- The display shows the program modification index (A)! Continue by pressing the >> key!
- Identification number digit 1 and 2! Continue by pressing the >> key!
- Identification number digit 3 and 4! Continue by pressing the >> key!
- Identification number digit 5 and 6!



The routine is repeated after pressing the **E** key. Exit the routine after pressing the **P** key once. The next parameter number is displayed. Exit programming after pressing the **P** key. The drive is again ready for sewing.

5 Putting into Service

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

- **The correct installation of the drive, position transmitter and accompanying devices, if necessary**
- **The correct selection of the trimming operation using parameter 290**
- **If necessary, the correct adjustment of the direction of motor rotation using parameter 161**
- **The correct selection of the functions of the keys (inputs) using parameters 240/242/243**
- **The correct positioning speed using parameter 110**
- **The correct maximum speed compatible with the sewing machine using parameter 111**
- **The setting of the remaining relevant parameters**
- **Start sewing in order to save the set values**

6 Setting the Basic Functions

6.1 Direction of Motor Rotation

Function **with** or **without** control panel		Parameter
Direction of motor rotation	(drE)	**161**

Parameter 161 = 0 Clockwise motor rotation (look at the motor shaft)
Parameter 161 = 1 Counterclockwise motor rotation

ATTENTION
If the motor is mounted differently, e. g. at a different angle or with gear, make sure that the value set by means of parameter 161 corresponds to the direction of rotation.

6.2 Selection of Functional Sequences (Thread Trimming Operations)

Lockstitch, chainstitch and overlock machines with different functional sequences can be operated using this control. The functional sequences can be selected using parameter 290.

ATTENTION
Before switching functional sequences, detach cables from the inputs and outputs! Please ensure that the machine installed provides the functional sequence to be set!
Settings with parameter 290 only after power On!

Setting the functional sequence using parameter 290										
Mode	**Designation**	**Adapter**	**Outputs**					**Inputs**		
	Power transistors ➔		**FL** ST2/35	**M1** ST2/37	**M2** ST2/28	**M3** ST2/27	**ML** ST2/32	**in1** ST2/7	**in3** ST2/6	**in4** ST2/8
0	**Lockstitch; e. g.**									
	Brother (737-113, 737-913)	1112814	FL	FA1 +	FA2	FW	-	-	NHT	-
	Aisin (AD3XX, AD158, 3310; EK1)	1112815	FL	FA1 +	FA2	FW	-	-	NHT	-
	Pfaff (563, 953, 1050, 1180)	1112841	FL	FA1	FA2	FW	ML	-	-	FLEX
	Dürkopp Adler (210, 270)	1112845	FL	FA1 +	FA2	FW	-	-	NHT	EST
1	**Lockstitch; e. g.** Singer (591, 211U, 212U)	1112824	FL	-	FA2	FW	-	NHT	-	-
2	**Lockstitch; e. g.** Singer (212 UTT)	1112824	FL	-	FA	FSPL	-	NHT	-	-
3	**Lockstitch;** e. g. Dürkopp Adler (467)		FL	FA	FSPL	FW	ML	NHT	-	-
4	**Chainstitch;** Union Special									
	(34000 and 36200 replacement for US80A)	1112865	FL	-	FA-V	FW	ML	LSP	LSP	ENTK
	(CS100 and FS100)	1112905	FL	-	FA-V	FW	ML	LSP	LSP	-
5	**Chainstitch; parallel sequence**									
	Yamato (VC series)	1112818	FL	FA	-	FW	-	LSP	-	-
	Yamato (VG series)	1113178	FL	FA	-	FW	-	LSP	-	-
	Kansai (RX 9803)	1113130	FL	FA	-	FW	ML	LSP	-	-
	Pegasus (W500/UT)	1112821	FL	FA	FA	FW	-	LSP	-	-
	Brother (FD3-B257)	1112822	FL	FA	FA	FW	-	LSP	ENTK	-
	Global (CB2803-56)	1112866	FL	-	-	FA	-	LSP	-	-
	Rimoldi (F27)	1113096	FL	FW	FAO	FAU	ML	-	-	-
6	**Chainstitch;** tape cutter/fast scissors		FL	M1	AH1	AH2	ML	-	-	-
7	**Overlock**		FL	M1	M2	AH	ML	-	-	-
8	**Backlatch;** Pegasus	1113234	-	PD≤-1	PD≥1	-	-	LSP	N.AUTO	-
9	**Backlatch;**Yamato (ABT3)	1112826	-	PD≤-1	PD≥1	-	-	LSP	N.AUTO	-
	Backlatch;Yamato (ABT13, ABT17)	1113205	-	PD≤-1	PD≥1	-	-	LSP	N12.AU	N9.AU
10	**Lockstitch; e. g.** Union Special (63900AMZ replacement for US80A)	1113199	FL	-	FA-V	FW	ML	-	-	-
11	**Reversal of motor rotation with pedal in pos.–2**		FL	DR-UK	PD=-2	ML	ML	N.POS	-	-
12	**Reversal of motor rotation with input in3**		FL	DR-UK	PD=0	ML	ML	N.POS	DR-UK	-
13	**Lockstitch;** Pfaff (1425)	1113324	FL	FA	FSPL	FW	ML	NH	POS2	DB
14	**Lockstitch; e. g.**									
	Juki (5550-6)	1112816	FL	FA1+2	-	FW	-	-	-	-
	Juki (5550-7)	1113132	FL	FA1+2	FZ	FW	-	-	-	-
17	**Chainstitch;** Pegasus		FL	M1	M2	M3	ML	-	-	-
18	**Overlock;** Bottoms		FL	M1	AH	M3	ML	-	-	-
19	**Lockstitch;** Macofrey		FL	FA-R	FA-V	FW	ML	-	-	-
20	**Lockstitch;** Juki (LU1510-7)	1113200	FL	FA	FSPL	-	-	-	BIT0	BIT1
22	**Lockstitch;** Brother (B-891)		FL	FA	FSPL	FW	ML	-	-	-

See the following page for letter symbols of the solenoid outputs!

Explanation of letter symbols of the previous page!

Outputs:

FL	= Sewing foot lifting
FA1	= Thread trimmer pos. 1...1A
FA2	= Thread trimmer pos. 1A...2
FA1+2	= Thread trimmer pos. 1...2
FSPL	= Thread tension release
FA-R/FA-V	= Thread trimmer backward/forward
ML	= Machine running
FW	= Thread wiper
AH/AH1/AH2	= Tape cutter / Tape cutter 1/ Tape cutter 2
DR-UK	= Reversal of motor rotation
PD=0	= Pedal step 0
PD-2	= Pedal step -2
FAO	= Needle thread trimmer
FAU	= Bobbin thread trimmer
FZ	= Thread puller
PD≥1	= Pedal steps 1...12
PD≤-1	= Pedal steps –1 / -2

Inputs:

NHT	= Needle up/down
EST	= Single stitch
FLEX	= External sewing foot lifting
N.POS	= Positioning speed
N.AUTO	= Automatic speed
N9.AU	= Automatic speed n9
N12.AU	= Automatic speed n12
LSP	= Machine run blockage
DR-UK	= Reversal of motor rotation
NH	= Needle up
POS2	= Run to position 2
DB	= Speed limitation n12
ENTK	= Unlocking the chain
BIT0	= Speed limitation bit 0
BIT1	= Speed limitation bit 1

Mode 0 Lockstitch Machines
- Thread trimmer from leading to trailing edge of slot position 1
- Thread trimmer from trailing edge of slot position 1 to leading edge of slot position 2
- Thread wiper for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”
- High lift for walking foot/flip-flop at limited speed after pressing the key

Mode 1 Lockstitch Machines (Singer 591, 211U, 212U)
- Thread trimmer from trailing edge of slot position 1 to leading edge of slot position 2
- Drive stops at the trailing edge of slot position 2
- Thread wiper for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 2 Lockstitch Machines (Singer 212 UTT)
- Thread trimmer for a programmable time (kt2) after intermediate stop in position 1
- Thread trimmer from leading edge of slot position 1 to leading edge of slot position 2
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 3 Lockstitch Machines with Thread Trimming System (e. g. Dürkopp Adler)
- Thread trimmer for a programmable time (tFA) and for programmable increments (iFA) after intermediate stop in position 1
- Thread tension release from start in position 1 after delay (FSE) during ON period (FSA)
- Thread wiper for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 4 Chainstitch Machines (Union Special)
- Thread trimmer forward after stop in position 2 after delay (kd2) during ON period (kt2)
- Thread trimmer backward after stop in position 2 after delay (kd1) during ON period (kt1)
- Thread wiper after stop in position 2 after delay (kd3) during ON period (kt3)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 5 Chainstitch Machines In General
- Signal “machine running”

196 = 0 Signal M1 after stop in position 2 after delay (kd1) during ON period (kt1)
- Signal M2 after stop in position 2 after delay (kd2) during ON period (kt2)
- Signal M3 after stop in position 2 after delay (kd3) during ON period (kt3)
- Time-delayed (kdF) sewing foot lifting after standstill in position 2 (see chapter "Sewing Foot Lifting")

196 = 1 Signal M1 after seam end in position 2 after delay (kd1) during ON period (kt1)
- Signal M2 after seam end in position 2 after delay (kd2) during ON period (kt2)
- Signal M3 after seam end in position 2 after delay (kd3) during ON period (kt3) and one more machine rotation. After that the M3 signal turns off (see timing diagram).
- Time-delayed (kdF) sewing foot lifting after the last signal has turned off

273 = ON Signal M1 after stop in position 2 after delay (kd1) during ON period (kt1)
- Signal M2 after stop in position 2 after delay (Ad2) during ON period (At2) and after stop in position 2 after delay (kd2) during ON period (kt2)
- Signal M3 at the start of the seam after delay (Ad1) during ON period (At1)
- Signal M5 (ML) at the start of the seam after delay (Ad3) during ON period (At3). No machine running signal (see timing diagrams)
- Time-delayed (kdF) sewing foot lifting after standstill in position 2 (see chapter "Sewing Foot Lifting")

Mode 6 Chainstitch Machines with Tape Cutter or Fast Scissors
- Signal M1 after stop in position 2 after delay (kd1) during ON period (kt1)
- Signal M2 after stop in position 2 after delay (kd2) during ON period (kt2) or if parameter 232 = ON, as **fast scissors** alternating with M3.
- Signal M3 after stop in position 2 after delay (kd3) during ON period (kt3) or if parameter 232 = ON, as **fast scissors** alternating with M2.
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 7 Overlock Machines
- Signal M1 after stop in position 2 after delay (kd1) during ON period (kt1)
- Signal M2 after stop in position 2 after delay (kd2) during ON period (kt2) or if parameter 232=ON, as **fast scissors** alternating with M3 **(parameter 282=0)**
- Tape cutter at the start of the seam after stitch count (c3) and at the seam end after stitch count (c4)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 8 Backlatch Machines (Pegasus)
- Signal M1 with pedal in positions -1 and –2
- Signal M2 with pedal in positions 1-12
- Inverted signal M3 with pedal in positions 1-12
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”
- Machine run blockage effective with open contact **(input in1 / parameter 240=6)** Automatic speed has priority over machine run blockage
- Key for operation at automatic speed **(input in3 / parameter 242=10)**

Mode 9 Backlatch Machines (Yamato)
- Signal M1 with pedal in positions -1 and –2
- Signal M2 with pedal in positions 1-12
- Inverted signal M3 with pedal in positions 1-12
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”
- Key for operation at automatic speed n12 **(input in3 / parameter 242=10)**
- Machine run blockage effective with open contact **(input in1 / parameter 240=6)**
- Machine run blockage has priority over automatic speed n12
- Key for operation at automatic speed n9 **(input in4 / parameter 243=34)**
- Automatic speed n9 has priority over machine run blockage

Mode 10 Lockstitch Machines (Refrey Trimmer)
- Thread trimmer forward from trailing edge of slot position 1 to leading edge of slot position 2
- Thread trimmer backward with full power for the time (kt1) ; after that the signal is pulsed.
- Thread wiper (M3) after stop in position 2 after delay (kd3) during ON period (kt3)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 11 Reversal of motor rotation with pedal in pos. -2
- Signal M1 direction of rotation
- Signal M2 pedal = -2
- Signal “machine running”
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Key for operation at positioning speed **(input in1 / parameter 240=20)**

Mode 12 Reversal of motor rotation with input in3
- Signal M1 direction of rotation
- Signal M2 pedal = 0
- Signal “machine running”

- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Key for operation at positioning speed **(input in1 / parameter 240=20)**
- Key for reversal of motor rotation **(input in3 / parameter 240=21)**

Mode 13 Lockstitch Machines with Thread Trimming System (Pfaff 1425)
- Thread trimmer for programmable increments (iFA) after intermediate stop in position 1
- Thread tension release from leading edge of slot position 1 after delay (FSE) during ON period (FSA)
- Thread wiper for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”
- Key for function "needle up" **(input in1 / parameter 240=2)**
- Key for run to position 2 **(input in3 / parameter 242=24)**
- Key for speed limitation (n12) **(input in4 / parameter 243=11)**

Mode 14 Lockstitch Machines (Juki 5550-6, 5550-7)
- Thread trimmer (M1) from trailing edge of slot position 1 to leading edge of slot position 2
- Signal (M2) after stop in position 2 after delay (kd4) during ON period (kt4)
- Thread wiper (M3) for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 17 Chainstitch Machines (Pegasus Stitch Lock)
- Thread trimmer (FA) after stop depending on angle after delay (kd2) during ON period (kt2)
- Stitch lock signal (STS) after intermediate stop in position 2 after delay (kd3) during ON period (kt3) and after stop depending on angle
- Top cover thread cutter (LFA) after stop depending on angle after delay (kd1) during ON period (kt1)
- Time-delayed (kdF) sewing foot lifting after standstill in position 2 (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 18 Overlock Machines (Bottoms Overlock)
- Tape cutter during stitch count (c1) at the start of the seam and during stitch count (c2) at the seam end
- Signal M1 after light barrier compensating stitches and during stitch count(c4)
- Signal M3 after light barrier covered
- Time-delayed (kdF) sewing foot lifting
- Signal “machine running”

Mode 19 Lockstitch Machines (Macofrey) Functions as in mode 10!

Mode 20 Lockstitch Machines (Juki LU1510-7)
- Thread trimmer (FA) for programmable increments (iFA) from position 1 onwards
- Thread tension release from leading edge of slot position 1 after delay (FSE) during ON period (FSA)
- Thread wiper from stop in position 2 onwards after delay (kd3) during ON period (kt3)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

Mode 22 Lockstitch Machines (Brother B-891)
- Thread trimmer for programmable increments (iFA) after intermediate stop in position 1
- Thread tension release from trailing edge of slot position 2 after delay (FSE) during ON period (FSA)
- Thread wiper for a programmable time (t6)
- Sewing foot lifting (see chapter "Sewing Foot Lifting")
- Signal “machine running”

See List of Parameters chapter "Timing Diagrams" for the various modes!

6.3 Functions of the Keys Inputs in1, in3 and in4

Functions				Parameter
Input 1	selectable input functions	0...44	in1	**240**
Input 3	“ “	0...44	in3	**242**
Input 4	“ “	0...44	in4	**243**
Software debouncing of all inputs On/Off				**238**

See List of Parameters for possible input functions of the keys.

6.4 Positioning Speed

Functions		Parameter
Positioning speed	n1	**110**

The positioning speed can be set using parameter 110 on the control within a range of 70...390 RPM.

6.5 Maximum Speed Compatible with the Sewing Machine

The maximum speed of the machine is determined by the selected pulley and by the following settings:
- Set the maximum speed using parameter 111 (n2)
- Set the maximum speed limitation to the specific level according to the application as described in chapter "Direct Input of Maximum Speed Limitation (DED)".

6.6 Maximum Speed

Functions		Parameter
Maximum speed	n2	**111**

Note
See instruction manual of the sewing machine manufacturer for the maximum speed of the sewing machine.

Note
Select the pulley such that the motor runs at approx. 4000 RPM with max. number of stitches.

When programming 3-digit or 4-digit parameter values on the control (without control panel), the 2-digit or 3-digit values displayed must be multiplied by 10.

6.7 Positions

Before setting the position transmitter ensure that the direction of motor shaft rotation is set correctly!

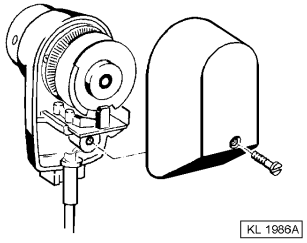
CAUTION!
If the motor is mounted differently, e. g. at a different angle or with gear, make sure that the direction of rotation is correct. Reset the positions if necessary.

CAUTION!
Turn power off before adjusting the positioning discs.

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

The positions are set as follows:

- Remove position transmitter cover after loosening the screw.
- Select basic position **needle down** (LED 7 on the control lights up) using key S5.
- Adjust central disc for position 1 to the desired direction.
- Press the pedal briefly forward.
- Check the stop position.
- Heelback (trimming).
- Select basic position **needle up** (LED 8 on the control lights up) using key S5.
- Adjust outer disc for position 2 to the desired direction.
- Press the pedal briefly forward.
- Check the stop position.
- Repeat procedure if necessary.
- Select the desired basic position using key S5.
- Put cover on again and tighten screw.



Note

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

Note

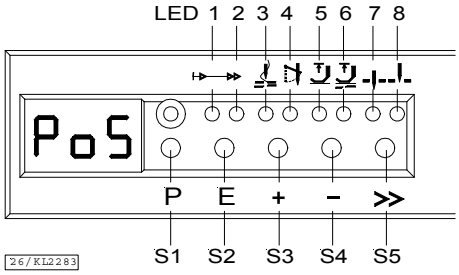
To ensure a correct trimming operation the positions 1 and 2 must not overlap.

6.8 Display of the Signal and Stop Positions

Functions	Parameter
Display of positions 1 and 2	1**72**

The position settings can easily be checked using parameter 172.

- Select parameter 172
- The control display shows "PoS"
- Turn handwheel according to the direction of motor rotation



Control display

- LED 7 on corresponds to position 1
- LED 7 turns off corresponds to position 1A
- LED 8 on corresponds to position 2
- LED 8 turns off corresponds to position 2A

6.9 Braking Characteristics

Functions	Parameter
Braking effect when varying the preset value ≤ 4 stages Braking effect when varying the preset value ≥ 5 stages	**207** **208**

- Parameter 207 regulates the braking effect between speed stages
- Parameter 208 influences the braking effect for the stop

The following applies to all setting values:
The higher the value, the stronger the braking reaction!

6.10 Braking Power at Standstill

Functions	Parameter
Braking power at standstill	**153**

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

- The braking power is effective at standstill
  - at stop in the seam
  – after the seam end
- The effect can be set
- The higher the set value, the stronger the braking power

6.11 Starting Characteristics

Functions	Parameter
Starting edge	**220**

The drive acceleration dynamics can be adapted to the sewing machine characteristic (light/heavy).
- High setting value = high acceleration

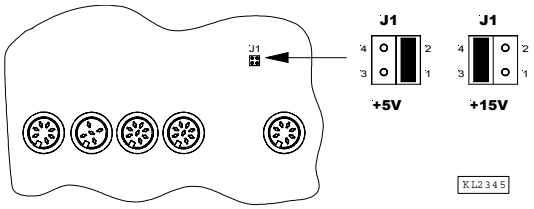
With a high starting edge setting and, in addition, possibly high braking parameter values on a light machine, the characteristic may appear coarse. In this case, one should try to optimize the settings.

6.12 Supply Voltage 5V or 15V

CAUTION!
Turn power off before opening the control box!

There is a supply voltage of +5V on socket B18/6 for external devices. After opening the cover, this voltage can be changed to +15V by replugging a multipole connector J1 on the printed circuit board.

+5V = Connect righthand pins 1 and 2 with jumper (factory setting)
+15V = Connect lefthand pins 3 and 4 with jumper



7 Functions

7.1 First Stitch after Power On

Functions	Parameter
1 stitch at positioning speed after power on	**231**

If parameter 231 is on, the first stitch after power on will be performed at position speed for the protection of the sewing machine. This is independent of the pedal position and the softstart function.

7.2 Softstart

Functions	Parameter
Softstart On/Off	**134**

Functions:
- after power on
- at the beginning of a new seam
- speed pedal controlled and limited to (n6)
- lower speed of a parallel function prevailing (e. g. start backtack, stitch counting)
- stitch counting synchronized to position 1
- suspension with pedal in position 0 (neutral)
- interruption by full heelback (position -2)

7.2.1 Softstart Speed

Functions		Parameter
Softstart speed	n6	**115**

When programming 3-digit or 4-digit parameter values on the control, the 2-digit or 3-digit values displayed must be multiplied by 10.

7.2.2 Softstart Stitches

Functions		Parameter
Number of softstart stitches	SSc	**100**

7.3 Sewing Foot Lifting

Functions		Control
Automatic in the seam	lefthand LED above key On	Key S4
Automatic after thread trimming	righthand LED above key On	Key S4

Functions		Parameter
Automatic sewing foot with pedal forward at the seam end if light barrier or stitch counting is on		**023**
Thread tension release with sewing foot at the seam end or at intermediate stop and at the seam end (effective only in mode 13)		**024**
Switch-on delay with pedal in position –1 (half heelback)	t2	**201**
Start delay after switching off the sewing foot lift signal	t3	**202**
Time of full power	t4	**203**
Duty ratio (ED) with pulsing	t5	**204**
Delay after thread wiping until sewing foot lifting	t7	**206**
Delay after thread trimming without thread wiper until sewing foot lifting	tFL	**211**
Selection of the sewing foot lift function		**236**

Sewing foot is lifted:

- in the seam
  - by half heelback (position -1)
  - or automatically (using key **S4** key on the control, lefthand LED lights up)
  - by pressing a key depending on the preselection of parameters 240/242/243
- after thread trimming
  - by heelback (position -1 or -2)
  - or automatically (using key **S4** on the control, righthand LED lights up)
  - by pressing a key depending on the preselection of parameters 240/242/243
  - automatically by light barrier with pedal forward according to the setting of parameter 023
  - automatically by stitch counting with pedal forward according to the setting of parameter 023
  - switch-on delay after thread wiper (t7)
  - switch-on delay without thread wiper (tFL)

It is possible to prevent unintentional foot lifting before thread trimming when changing from pedal position 0 (neutral) to position -2 by setting a switch-on delay (t2) using parameter 201.

Holding power of the lifted foot:

The sewing foot is lifted by full power. Then the system switches automatically to partial power in order to reduce the load for the control and the connected solenoid.

Set the duration of full power using parameter 203 and the partial holding power using parameter 204.

CAUTION!

If the holding power is set too high, the solenoid and the control may be permanently damaged. Please observe the permissible duty ratio (ED) of the solenoid, and set the appropriate value according to the table below.

Stage	Duty ratio (ED)	Effect
1	12.5 %	low holding power
2	25.0 %	
3	37.5%	
4	50.0%	
5	62.5%	
6	75.0%	
7	87.5%	
0	100.0%	high holding power (full power)

Sewing foot lowers:

- Press pedal to position 0 (neutral)
- Press pedal to position ½ (slightly forward)
- Release key for manual sewing foot lift

Upon pressing the pedal forward from lifted sewing foot, the start delay (t3) that can be set using parameter 202 becomes effective.

The following settings are possible with parameter 236:

Parameter 236 = 0 Sewing foot lifting is possible from all positions.

Parameter 236 = 1 Sewing foot lifting is possible only from position 2.

Parameter 236 = 2 Sewing foot lifting is stored in pedal position –1 or –2. The storing can be undone by pressing the pedal slightly forward.

See List of Parameters chapter **"Timing Diagrams"!**

7.4 Intermediate Backtack

Functions	Parameter
Backtacking signal at output M1, M2 or M3 On/Off	**148**

148 = 0 Backtacking signal Off
148 = 1 Backtacking signal effective at output M1.
148 = 2 Backtacking signal effective at output M2
148 = 3 Backtacking signal effective at output M3. If parameter 148 is set to "3", parameter 297 is automatically set to "0". If this setting is changed to "1...4", parameter 148 is also automatically set to "0". The function of the parameter that was last changed is taken into account.

A **backtacking** signal can be programmed to one of the three outputs M1, M2 or M3 using parameter 148. It can be activated anywhere in the seam or at standstill by pressing the key assigned to the function according to the selection of one of the parameters 240/242/243.
If parameter 148 is set to "0", the relevant output is reset to the function provided in the selected mode. See List of Parameters chapter "Connection Diagram"!

ATTENTION!
Before changing this parameter, please ensure that the machine installed provides the set function. Otherwise the machine may be permanently damaged!

7.5 Signal "Machine Running"

Functions		Parameter
Machine running signal at output M1, M2 or M3 On/Off		**147**
Mode **machine running**	(LSG)	**155**
Switch-off delay for **machine running** signal	(t05)	**156**

147 = 0 **Machine running** signal Off
147 = 1 **Machine running** signal effective at output M1.
147 = 2 **Machine running** signal effective at output M2
147= 3 **Machine running** signal effective at output M3. If parameter 147 is set to "3", parameter 297 is automatically set to "0". If this setting is changed to "1...4", parameter 147 is also automatically set to "0". The function of the parameter that was last changed is taken into account.

A **machine running** signal can be programmed to one of the three outputs M1, M2 or M3 using parameter 147. The original function of the relevant output is suppressed. If parameter 147 is set to "0", the output is reset to the function provided in the selected mode.
Furthermore, the **machine running** signal is permanently activated on socket ST2/32, except if parameter **290 = 5 and 273 = ON or 297 = 4**. In this case the output is assigned for different signals.

Parameter 155 = 0 **Machine running** signal Off.
Parameter 155 = 1 **Machine running** signal will be issued whenever the drive is running.
Parameter 155 = 2 **Machine running** signal will be issued whenever the speed is higher than 3000 RPM.
Parameter 155 = 3 **Machine running** signal will be issued whenever the pedal is not in position 0 (neutral).

The signal switch-off time can be delayed using parameter 156.

See List of Parameters chapter Connection Diagram!

ATTENTION!
Before changing this parameter, please ensure that the machine installed provides the set function. Otherwise the machine may be permanently damaged!

7.6 Reverse Motor Rotation

Functions		Parameter
Positioning speed	n1	**110**
Number of reversing increments	ird	**180**
Switch-on delay of reverse motor rotation	drd	**181**
Reverse motor rotation On/Off		**182**

The function **reverse motor rotation** is performed after trimming. When the stop position is reached, the drive stops for the duration of the switch-on delay of reverse motor rotation. Then it runs in reverse direction at positioning speed for a number of increments that can be set. 1 increment corresponds to approx. 3°.

7.7 Unlocking the Chain (Mode 4/5/6/7/)

Functions		Parameter
Number of run-out stitches when unlocking the chain (effective only if parameter 190 = 3)	c6	**184**
Function “unlock the chain” in modes 4, 5, 6 and 7		**190**

Upon unlocking the chain at the seam end, the functions **thread trimming** and **tape cutter/fast scissors** are automatically suppressed. The drive stops in position 1 if parameter 180 = >0. If parameter 180 = 0, the drive stops in the selected basic position. With this setting (only mode 7), reverse motor rotation is blocked and the function **tape cutter/fast scissors** is possible if parameter 190 is set to “3”. Moreover, the run-out stitches (parameter 184) and the function “blow fabric onto stack” are performed on output M1.

Settings necessary for the operation “unlocking the chain”:
- Set “unlocking the chain” using parameter 190 = 1 / 2 / 3 (190 = 0 “unlocking the chain” off)
- Enable the reverse motor rotation using parameter 182.
- Set **switch-on delay** using parameter 181 and **reversing angle** using parameter 180
- Determine the **function of the key “unlocking the chain”** by setting one of the parameters 240, 242 or 243 to “18”.

Parameter 190 = 0: Unlocking the chain Off

Parameter 190 = 1: Sequence with pedal in position -2 from machine run or from position 2:
- Press key "unlocking the chain"
- Run at positioning speed to position 1
- Sequence of reversing angle at positioning speed after a switch-on delay that can be set

Parameter190 = 1: Sequence with pedal in position -2 from standstill in position 1:
- Press key "unlocking the chain"
- Sequence of reversing angle at positioning speed after a switch-on delay that can be set

Parameter 190 = 2: Automatic sequence with light barrier at the seam end without tape cutting / pedal in position -2 according to the setting of parameter 019:
- Press key "unlocking the chain"
- Run to position 1 after light barrier sensing
- Sequence of reversing angle at positioning speed after a switch-on delay that can be set

Parameter 190 = 3 Automatic sequence with light barrier at the seam end with tape cutting and run-out stitches (only possible in mode 7):
- Press key "unlocking the chain"
- After light barrier sensing, execution of compensating stitches and end counting until tape cutting
- Run-out stitches until unlocking the chain can be set using parameter 184
- After the machine has stopped, the motor does not run in reverse direction, but the signal M1 “blow fabric onto stack” will be issued, unless parameters 146, 147, 148 have not been set differently.

Furthermore, one of parameters 240, 242 or 243 can be set to “27“. This way, “**unlocking the chain**” can be performed in any seam section whenever the external key is pressed. But the process cannot be repeated in the same seam section.

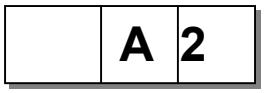
See timing diagrams in the List of Parameters for operation characteristics of the control.

7.8 Machine Run Blockage (Safety Switch)

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

The function “machine run blockage” is enabled by connecting a switch to socket ST2 or B4, depending on the preselection of parameters 240/242/243.

Display after enabling machine run blockage:

Control display ➔ 

Machine run blockage in the free seam, seam with stitch counting and light barrier seam:
The seam is suspended by opening and/or closing the switch.
- Stop in the basic position
- Needle up is not possible
- Sewing foot lift is possible

New start after machine run blockage

Functions	Parameter
New start after machine run blockage	**234**

Parameter 234 determines how a new start is possible after closing and/or opening the switch.
Parameter 234 = OFF New start after disabling machine run blockage without influence by the pedal. This setting is applicable, for example, to automats.
Parameter 234 = ON New start after disabling machine run blockage only if the pedal is in position 0 (neutral).

7.9 High Lift for Walking Foot / Flip-Flop 1

Functions	Parameter
High lift for walking foot On/Off Signal “high lift for walking foot” is issued with closed or open contact	**137** **263**

7.9.1 Signal “High Lift for Walking Foot”

Functions	Parameter
Signal **high lift for walking foot** at output M1, M2 or M3 On/Off	**146**

146 = 0 Signal **high lift for walking foot** Off
146 = 1 Signal **high lift for walking foot** effective at output M1.
146 = 2 Signal **high lift for walking foot** effective at output M2
146 = 3 Signal **high lift for walking foot** effective at output M3. If parameter 146 is set to “3“, parameter 297 is automatically set to “0“. If this setting is changed to “1...4“, parameter 146 is also automatically set to “0“. The function of the parameter that was last changed is taken into account.

A signal **high lift for walking foot** can be programmed to one of the three outputs M1, M2 or M3 using parameter 146. It can be activated anywhere in the seam by pressing the key assigned to the function according to the selection of one of the parameters 240/242/243.
If parameter 146 is set to “0“, the relevant output is reset to the function provided in the selected mode. See List of Parameters chapter “Connection Diagram”!

ATTENTION!
Before changing this parameter, please ensure that the machine installed provides the set function. Otherwise the machine may be permanently damaged!

7.9.2 High Lift Walking Speed

Functions		Parameter
High lift walking speed	n10	**117**

7.9.3 High Lift Walking Speed Run-Out Time

Functions		Parameter
High lift walking speed run-out time	thP	**152**

7.9.4 High Lift Walking Stitches

Functions		Parameter
Number of high lift walking stitches	chP	**185**

Upon pressing the external key “high lift for walking foot” depending on the setting of parameters 240/242/243 and whether parameter 137 = ON, the speed is limited to high lift walking speed. The solenoid for high lift for walking foot is switched on if the speed ≤ high lift walking speed. It is possible to program run-out stitches using parameter 185. This way, high lift for walking foot remains on until stitch counting has been completed. The speed limitation remains effective during run-out time after the solenoid for high lift for walking foot has been switched off.

7.9.5 High Lift for Walking Foot Operational Mode Not Stored (Parameters 240/242/243 = 13)

The following function is performed if "0" run-out stitches have been programmed using parameter 185:
- Press key “high lift for walking foot”; signal “high lift for walking foot” is On.
- Release key“ high lift for walking foot”; signal “high lift for walking foot” turns off.

The following function is performed if ">0" run-out stitches have been programmed using parameter 185:
- When pressing key “high lift for walking foot” at drive standstill, signal “high lift for walking foot” is On and remains On after releasing the key.
- When pressing key “high lift for walking foot” again at drive standstill, signal “high lift for walking foot” turns off immediately.

If the signal “high lift for walking foot” is On when starting the drive, the speed will be limited. The signal turns off after the run-out stitches have been executed, and the speed limitation will be disabled after the run-out time (parameter 152).
If the key remains pressed down until after the count, high lift for walking foot remains on. If the key is pressed briefly, counting has priority.

While the drive is running, if ">0" run-out stitches have been programmed using parameter 185:
- Press key “high lift for walking foot” while drive is running; signal “high lift for walking foot” and high lift walking speed are On.
- Release key “high lift for walking foot” while drive is running; signal “high lift for walking foot” turns off, and the speed limitation will be disabled after the run-out time (parameter 152).

7.9.6 High Lift for Walking Foot Operational Mode Stored /Flip-Flop 1 (Parameters 240/242/243 = 14)

- When pressing key “high lift for walking foot” while drive is running, signal “high lift for walking foot” and high lift walking speed are On.
- When pressing key “high lift for walking foot” again while drive is running, signal “high lift for walking foot” turns off immediately, and the speed limitation will be disabled after the run-out time (parameter 152).

7.10 Speed Limitation n9

Functions		Parameter
Speed limitation n9	n9	**122**

If parameters 240/242/243 = 23, a speed limitation n9 will be switched on upon pressing an external key.

7.11 Disabling of Flip-Flop Functions at the Seam End

Functions	Parameter
Disabling of flip-flop functions at the seam end On/Off	**183**

Determine using parameter 183 whether the flip-flop signal shall be disabled at the seam end. If 183 = 0, the signal can be disabled only by means of the appropriate keys.
Parameter 183 = 0 The flip-flop 1 signal is not disabled at the seam end.
Parameter 183 = 1 The flip-flop 1 signal is disabled at the seam end.

7.12 Bobbin Thread Monitor

Functions	Parameter
Bobbin thread monitor 0 = Off / 1 = with stop / 2 = without stop / 3 = with stop and start blockage after thread trimming	**030**
Number of bobbin thread monitor stitches	**031**

For bobbin thread monitor operation a number of stitches depending on the length of the bobbin thread is preset using parameter 031. After the execution of these stitches the drive stops and a visual signal appears on the display. This means that the bobbin thread will run out. After pressing the pedal again, the seam can be continued and the thread can be trimmed. After inserting a full bobbin and pressing the ENTER key, a new sewing operation can be started.

Enable bobbin thread monitor:
- Set parameter 030 to "1...3".
- Input the desired maximum number of stitches in parameter 031 (input value x 100 = number of stitches, e. g. 80 x 100 = 8000).
- Determine an input for the functions of the key “start counter”.
- Start the sewing operation.

Bobbin thread monitor in operation:
- **Parameter 030 = 0:** Bobbin thread monitor is off.
- **Parameter 030 = 1:** The drive stops after the stitch counter has run out. The message "A7" appears on the control.
- **Parameter 030 = 2:** After the stitch counter has run out, the message "A7" appears on the control.
- **Parameter 030 = 3:** The drive stops after the stitch counter has run out. Thread trimming is possible with pedal in pos. –2. The start is blocked. The message "A7" appears on the control

Getting the bobbin thread monitor ready for operation:
- Insert a full bobbin.
- Press the selected external key.
- Set counting to the value determined by parameter 031 and start it.
- If the bobbin is changed before a message, the appropriate key must be pressed for at least 1 second in order to set the stitch counter to the default value.

7.13 Thread Trimming Operation

Functions	Parameter
Thread trimmer On/Off Thread wiper On/Off	**013** **014**

When thread trimming is off, the drive stops in position 2 at the seam end.

7.13.1 Thread Trimmer/Thread Wiper (Modes 0, 1, 2, 3, 10, 13, 14, 19, 20 and 22)

Functions		Parameter
Thread tension release with sewing foot lifting at the seam end or at intermediate stop and at the seam end (only in mode 13)		**024**
Switch signal M1 thread trimmer pos1...pos1A/pos1...pos2 (only in mode 0)		**145**
Thread trimming stop depending on angle (only in mode 20)	dr°	**197**
Thread wiper time	t6	**205**
Thread trimmer activation angle	iFA	**250**
Thread tension release switch-off delay	FSA	**251**
Thread tension release switch-on delay	FSE	**252**
Stop time for thread trimmer	tFA	**253**
Holding power output M1 of the thread trimmer backward	tAM	**254**

Thread trimming on lockstitch machines (modes 0...3, 10, 13, 14, 19, 20 and 22) is performed at trimming speed.
When thread trimming is off, the drive stops in position 2 at the seam end; it stops in position 1 at the end of programmed seams.
On lockstitch machines, the thread wiper ON period can be set depending on the selected trimming mode (see chapter "Timing Diagrams" in the List of Parameters). The return rime (t7) that can be set using parameter 206 prevents sewing foot lifting before the thread wiper is in its initial position. If the thread wiper is not connected, there will be a delay time (tFL) after thread trimming until sewing foot lifting.

The thread trimming signal M1 (only in mode 0) can be altered using parameter 145.
Parameter 145 = OFF Thread trimming signal M1 from position 1 to position 1A.
Parameter 145 = ON Thread trimming signal M1 from position 1 to position 2.

Thread tension release with sewing foot lifting, if parameter 290 = 13 and the thread trimmer is off.
Parameter 024 = 0 Thread tension release with sewing foot lifting only at the seam end.
Parameter 024 = 1 Thread tension release with sewing foot lifting at intermediate stop and at the seam end.

7.13.2 Trimming Speed

Functions		Parameter
Trimming speed	n7	**116**

7.13.3 Chainstitch Thread Trimmer (Modes 4, 5, 6 and 17)

Thread trimming on chainstitch machines (modes 4, 5, 6 and 17) is performed at machine standstill in position 2. When thread trimming is off, the drive stops in position 2 at the seam end.
The signal sequence of the thread trimmers and of the sewing foot can be set as desired using parameters 280...288 (parallel or sequential).

See timing diagrams in the List of Parameters for operation characteristics of the control. See also chapter "Selection of Functional Sequences (Thread Trimming Operations)".

7.13.4 Chainstitch Machine Trimming Signal Times

Signal delay times and ON periods can be set with the help of the following parameters.

Function **with** or **without** control panel		Parameter
Thread trimming stop depending on angle (only mode 17)	dr°	**197**
Delay time	kd1	**280**
ON period	kt1	**281**
Delay time	kd2	**282**
ON period	kt2	**283**
Delay time	kd3	**284**
ON period	kt3	**285**
Delay time	kd4	**286**
ON period	kt4	**287**
Delay time until sewing foot On	kdF	**288**

7.13.5 Chainstitch for Pegasus (Mode 5)

Functions	Parameter
Selection of the chainstitch trimmer only in mode 5 **in general/Pegasus**	**196**

Parameter 196 = 0 Chainstitch trimmer in general (mode 5).
Parameter 196 = 1 Chainstitch trimmer Pegasus

If parameter 290 = 5 and 196 = 1, the chainstitch trimmer for Pegasus machines will be activated. When pressing the pedal to position –2 after stop in position 2, signal M3 will be activated for the time kt3 after the delay time kd3. Then the drive performs one rotation from position 2 to position 2 with signal M3 being activated. When position 2 is reached, signal M3 turns off, and signal M1 or M2 is activated after the delay time kd1 or kd2. After the time kt1 or kt2 has elapsed, the corresponding signal turns off, and the sewing foot can be lifted with time delay t7.
If the pedal is pressed to pos. –2 after stop in position 1, the drive runs first to position 2 and then the functional sequence described above will be performed.

See List of Parameters chapter "Timing Diagrams"!

7.13.6 Trimming Function at the Start of the Seam (Mode 5)

Functions		Parameter
Trimming function at the start of the seam (only in mode 5) On/Off		**273**
Delay time for signal M3 at the start of the seam	Ad1	**274**
ON period for signal M3 at the start of the seam	At1	**275**
Delay time for signal M2 at the start of the seam	Ad2	**276**
ON period for signal M2 at the start of the seam	At2	**277**
Delay time for signal M5 at the start of the seam	Ad3	**278**
ON period for signal M5 at the start of the seam	At3	**279**

Three different signals (M2, M3, M5) for various applications can be programmed at the start of the seam. They can be enabled and disabled using parameter 273. The delay times and ON periods can be selected using parameters 274...279.

7.14 Overlock Machine Functions (Mode 7)

7.14.1 Chain Suction Signal

The chain suction signal can be preselected for start and end counting, respectively, using key **S2** on the control. If chain suction and tape cutter are switched off at the start of the seam, the respective counts will be suppressed. But they will be performed at the seam end.

Function		Control
Chain suction at the start of the seam On **Chain suction** at the seam end On	LED 1 On LED 2 On	Key S2

Functions		Parameter
Sequence overlock mode (modes 7) with or without stop		**018**
Chain suction signal at the seam end until end of count c2 or until pedal in pos.0 (neutral)		**022**
Stitch counting speed at the start of the seam	n3	**112**
Stitch counting speed at the seam end	n4	**113**
Speed status during stitch counting at the start of the seam		**143**
Speed status during stitch counting at the seam end		**144**
Chain suction signal at output M1 (possible only in mode 7)		**148 = 1**
Enable chain suction signal at the seam end		**193**

There are various setting possibilities with the following parameters in the overlock mode (mode 7).

Parameter 018 = OFF Sequence with stop.
Parameter 018 = ON Sequence without automatic stop at the seam end. Parameter 022 must be set at ON.
Parameter 022 = OFF The chain suction signal at the seam end is disabled after count c2.
Parameter 022 = ON The chain suction signal at the seam end remains on until pedal in pos. 0 (neutral).
Parameter 193 = OFF Chain suction after the light barrier compensating stitches.
Parameter 193 = ON Chain suction from light barrier uncovered onwards.

It is possible to select the speed function during stitch counting at the start of the seam and at the seam end using the following parameters.

Parameter 143 = 0 Speed controllable by the pedal up to the set maximum speed (parameter 111).
Parameter 143 = 1 Fixed speed (parameter 112) without influence by the pedal. Stop with pedal in pos. 0 (neutral).
Parameter 143 = 2 Limited speed (parameter 112) controllable by the pedal up to the set limit.
Parameter 143 = 3 At fixed speed (parameter 112), can be suspended or interrupted depending on the setting of parameter 019.
Parameter 143 = 4 Limited speed (parameter 112) controllable by the pedal up to light barrier covered. Then fixed speed (parameter 112). Stop with pedal in pos. 0 (neutral).
Parameter 144 = 0 Speed controllable by the pedal up to the set maximum speed (parameter 111).
Parameter 144 = 1 Fixed speed (parameter 113) without influence by the pedal. Stop with pedal in pos. 0 (neutral).
Parameter 144 = 2 Limited speed (parameter 113) controllable by the pedal up to the set limit.
Parameter 144 = 3 At fixed speed (parameter 113), can be suspended or interrupted depending on the setting of parameter 019.
Parameter 144 = 4 At the seam end at light barrier speed without influence by the pedal. Stop with pedal in pos. 0 (neutral). Chain suction at fixed speed (parameter 113) without influence by the pedal is performed at the seam end with pedal in pos. –2 until stop.

7.14.2 Start and End Counts

Functions		Parameter
End count (c2) at limited speed n4 until stop	c2	**000**
Start count (c1) at limited speed n3 for chain suction	c1	**001**
Count (c3) tape cutter at the start of the seam	c3	**002**
End count (c4) for tape cutter at the seam end	c4	**003**
Seam end in mode 7 through end count (c2) or (c4)	MHE	**191**

The following settings are possible for determining the seam end using parameter 191:

Parameter 191 = 0 Seam end after count c4 (tape cutter)
Parameter 191 = 1 Seam end after count c2 (chain suction)

7.15 Function of Output Signal M3

Functions	Parameter
Functions of signal M3	**297**

The following settings are possible using parameter 297:
Parameter 297 = 0 Function according to setting of parameter 290
Parameter 297 = 1 Signal M3 is On whenever the light barrier is uncovered.
Parameter 297 = 2 Signal M3 is On whenever the light barrier is covered.
Parameter 297 = 3 Signal M3 is On only after light barrier uncovered or covered until seam end.
Parameter 297 = 4 Signal M3 is On as with setting 3. Signal ML (machine running), however, is Off while signal M3 is On.

If one of parameters 146, 147, 148 is set to “3“, parameter 297 is automatically set to “0“. If this setting is changed to “1...4“, parameters 146, 147, 148 are also automatically set to “0“. The function of the parameter that was last changed is performed.

7.16 Tape Cutter/Fast Scissors (Modes 6/7)

7.16.1 Functions for Mode 6

The signal **tape cutter/fast scissors** is issued only at the seam end. A manual tape cutter/fast scissors can also be set. See also chapter "**Manual Tape Cutter/Fast Scissors** ".

Functions	Parameter
Signal M1/M2 at the seam end On/Off **Tape cutter** at the seam end On/Off	**013** **014**

Functions		Control
Signal M1/M2 at the seam end On	LED 3 On	Key S3
Tape cutter/Fast scissors at the seam end On	LED 4 On	
Signal M1/M2 and **tape cutter/fast scissors** at the seam end On	LED 3 and 4 On	
Signal M1/M2 and **tape cutter/fast scissors** at the seam end Off	LED 3 and 4 Off	

Output and Times for Tape Cutter

Functions		Parameter
Delay time for output M3 (ST2/27) **tape cutter** AH	kd3	**284**
ON period for output M3 (ST2/27) **tape cutter** AH	kt3	**285**

- Parameter **232** must be set at "**OFF**".
- The delay time for the tape cutter is usually set at "0".

Output and Times for Fast Scissors

Functions		Parameter
Delay time for output M2 (ST2/28) **fast scissors** AH1	kd2	**282**
ON period for output M2 (ST2/28) **fast scissors** AH1	kt2	**283**
Delay time for output M3 (ST2/27) **fast scissors** AH2	kd3	**284**
ON period for output M3 (ST2/27) **fast scissors** AH2	kt3	**285**

- Parameter **232** must be set at "**ON**".
- The delay times for "fast scissors" are usually set at "0".

7.16.2 Functions for Mode 7

The signal **tape cutter/fast scissors** can be set separately for start and end counting. See also chapter "**Manual Tape Cutter/Fast Scissors** ".

Functions	Parameter
Signal M1/M2 at the seam end On/Off **Tape cutter** at the start and at the end of the seam On/Off	**013** **014**

Functions		Control
Signal M1/M2 at the seam end On **Tape cutter/Fast scissors** at the start or at the end of the seam On **Signal M1/M2** at the seam end On and **tape cutter/fast scissors** at the start and at the end of the seam On **Signal M1/M2** at the seam end On and **tape cutter/fast scissors** at the start and at the end of the seam Off	LED 3 On LED 4 On LED 3 and 4 On LED 3 and 4 Off	Key S3

The tape cutter signal can be influenced by parameter 020 in such a way that the signal remains on at the seam end and is off when you start sewing again after some run-out stitches, which can be set using parameter 021. This action serves as clamp.

Functions		Parameter
Clamp at the seam end (output ST2/27) On/Off (mode 7) Run-out stitches (ckL) of the clamp at the start of the seam (mode 7)	kLm ckL	**020** **021**

Output and Times for Tape Cutter

Functions		Parameter
Delay time for output M3 (ST2/27) **tape cutter** AH ON period for output M3 (ST2/27) **tape cutter** AH	(kd3) (kt3)	**284** **285**

- Parameter **232** must be set at "**OFF**".
- The delay time for the tape cutter is usually set at "0".

Output and Times for Fast Scissors

Functions		Parameter
Delay time for output M2 (ST2/28) **fast scissors** AH1 ON period for output M2 (ST2/28) **fast scissors** AH1 Delay time for output M3 (ST2/27) **fast scissors** AH2 ON period for output M3 (ST2/27) **fast scissors** AH2	kd2 kt2 kd3 kt3	**282** **283** **284** **285**

- Parameter **232** must be set at "**ON**".
- The delay times for "fast scissors" are usually set at "0".

7.17 Manual Tape Cutter/Fast Scissors

Upon pressing an external key depending on the preselection of parameters 240/242/243, the **tape cutter** or **fast scissors** can be enabled anywhere in the seam or at standstill.
See chapter **"Connection Diagram"** in the List of Parameters!

7.18 Backlatch Machine Functions (Modes 8/9)

See timing diagrams in the List of Parameters for backlatch machine functions in the two modes. An additional function is provided especially for mode 9 (parameter 290 = 9).

Whether or not a light barrier is connected or any changes have occurred at the light barrier input is automatically sensed after power on or having switched on mode 9. By briefly pressing the key during sewing, input in3 is prepared for enabling the automatic speed (n-auto) after light barrier sensing and for making the machine stop by means of the safety switch. When the machine is restarted, it will run at pedal controlled speed. The light barrier will be reactivated only by briefly pressing the key at output in3.
The Pegasus backlatch machine stop (mode 8) can be switched using the following parameters:
Parameter 026 = 0 Stop in position 2 after the backlatch cycle and speed n12.
Parameter 026 = 1 Stop always in position 1.

7.19 Seam with Stitch Counting

Functions	Parameter
Stitch counting On/Off	**015**

7.19.1 Stitches for Stitch Counting

Functions		Parameter
Number of stitches for a seam with stitch counting	Stc	**007**

The stitch counting stitches can be varied directly on the control using the above parameter.

7.19.2 Stitch Counting Speed

Functions		Parameter
Stitch counting speed Speed mode for a seam with stitch counting Speed n12 inverted/not inverted	n12	**118** **141** **266**

Speed control for stitch counting can be selected using parameter 141.
Parameter 141 = 0 Execution at pedal controlled speed
Parameter 141 = 1 Execution at fixed speed n12, when pressing the pedal forward (position >1)
Parameter 141 = 2 Execution at limited speed n12, when pressing the pedal forward (position >1)
Parameter 141 = 3 Automatic execution at fixed speed after having pressed the pedal once. The procedure can be interrupted by “heelback (-2)".
Parameter 266 = 0 Speed n12 is enabled when key is closed.
Parameter 266 = 1 Speed n12 is enabled when key is open.

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

7.19.3 Seam with Stitch Counting When Light Barrier Is On

Functions	Parameter
Light barrier On/Off Stitch counting On/Off	**009** **015**

If the "stitch counting with light barrier” function is set, the number of stitches will be executed before the light barrier is activated.

7.20 Free Seam and Seam with Light Barrier

Functions		Parameter
Positioning speed	n1	**110**
Upper limit of maximum speed	n2	**111**
Limited speed according to setting of parameter 142	n12	**118**
Lower limit of maximum speed		**121**
Speed mode free seam		**142**

Speed control for the free seam and the seam with light barrier can be selected using the speed mode.

Parameter 142 = 0 Execution at pedal controlled speed

Parameter 142 = 1 Execution at fixed speed n12, when pressing the pedal forward (position >1)

Parameter 142 = 2 Execution at limited speed n12, when pressing the pedal forward (position >1)

Parameter 141 = 3 Only for the seam with light barrier:
- Automatic execution at fixed speed after having pressed the pedal once.
- The seam end is initiated by light barrier.
- The procedure can be interrupted by heelback (-2).
- If the light barrier is not on, speed as with parameter setting 142 = 0.

7.21 Light Barrier

Functions	Parameter
Light barrier On/Off	009

The light barrier function at the input of socket B18/5 is active only if parameter 239 = 0.

7.21.1 Speed after Light Barrier Sensing

Functions		Parameter
Speed after light barrier sensing	n5	**114**

7.21.2 General Light Barrier Functions

Functions	Parameter
Light barrier compensating stitches	**004**
Number of light barrier seams	**006**
Light barrier sensing uncovered/covered	**131**
Start of sewing blocked/unblocked with light barrier uncovered	**132**
Light barrier seam end with thread trimming On/Off	**133**
Speed of the light barrier compensating stitches	**192**

- After sensing the seam end, the compensating stitches are counted at light barrier speed.
- Parameter 192 = OFF (speed n5 after light barrier sensing)
  Parameter 192 = ON (speed pedal controlled)
- Suspension of the procedure with pedal in pos. 0 (neutral). Interruption of the procedure with pedal in pos. -2.
- The thread trimming operation can be disabled using parameter 133, regardless of the setting of key **S5** on the control. Stop in the basic position.
- Programming of max. 15 light barrier seams depending on the setting of parameter 006 with stop in the basic position. Thread trimming after the last light barrier seam.
- Light barrier sensing uncovered or covered at the seam end can be selected using parameter 131.
- Start blockage with light barrier uncovered programmable using parameter 132.
- The light barrier compensating stitches can be programmed and varied directly on the control using the above parameter.

7.21.3 Reflection Light Barrier LSM001A

Sensitivity setting:
Set minimum sensitivity depending on the distance between light barrier and reflection area (turn potentiometer as far as possible to the left).
- Potentiometer directly on the light barrier module

Mechanical orientation:
Orientation is facilitated by a visible light spot on the reflection area.

7.21.4 Light Barrier Monitoring

Functions	Parameter
Stitches for light barrier monitoring	**195**

In order to check the optical and electrical function it is possible to select a number of stitches using parameter 195. While these stitches are performed, the light barrier must be activated at least once. When the count is completed and the light barrier has not been activated, the drive stops and the message A6 appears.
- Select a number of stitches that is larger than necessary for the seam.
- The function is off if the number of stitches is "0".

7.21.5 Automatic Start Controlled by Light Barrier

Functions	Parameter
Delay of automatic start Automatic start On/Off Light barrier sensing uncovered Start of sewing blocked with light barrier uncovered	**128** **129** **131** **132**

This function enables an automatic start of the sewing operation as soon as the light barrier senses the insertion of fabric.

Prerequisites for the operation:
- Parameter 009 = ON (light barrier On).
- Parameter 129 = ON (automatic start On).
- Parameter 131 = ON (light barrier sensing uncovered).
- Parameter 132 = ON (no start of sewing with light barrier uncovered).
- The pedal must be kept pressed forward at the seam end.

For safety reasons this function is enabled only after a normal start of sewing. The light barrier must be covered as long as the pedal is in position 0 (neutral). Then press the pedal forward. This function is disabled when the pedal is no longer pressed forward after the seam end.

7.21.6 Light Barrier Filter for Knitted Fabrics

Functions	Parameter
Number of stitches of the light barrier filter Light barrier filter On/Off Light barrier sensing uncovered or covered	**005** **130** **131**

The filter prevents premature enabling of the light barrier function when sewing knitted fabrics.
- Enabling/Disabling of the filter using parameter 130
- The filter is not active if parameter 005 = 0
- Adaptation to the mesh is possible by varying the number of filter stitches.
- Knitted fabric sensing with light barrier uncovered ➔ covered, if parameter 131 = OFF
  Knitted fabric sensing with light barrier covered ➔ uncovered, of parameter 131 = ON

7.21.7 Functional Variations of the Light Barrier Input

Functions	Parameter
Selection of the input function on socket B18/5	**239**

If the light barrier function is not used, a switching function can be assigned to the input on socket B18/5 as well as to inputs in1, in3 and in4.

The following input functions are possible with parameter 239:
Parameter 239 = 0 **Light barrier function:** The input is prepared for a light barrier function.
Parameter 239 = 1...44 **All other input functions are identical with those described for parameter 240 below.**

7.22 Switching Functions of Inputs in1, in3 and in4

Functions		Parameter
Software debouncing of all inputs On/Off		**238**
Selection of the input function	in1/in3/in4	**240/242/243**

A variety of functions can be selected for each input on sockets ST2 and B4.

The following input functions are possible with parameters 240, 242 and 243:

240 = 0 **Input function blocked**
240 = 1 **Needle up/down:** Upon pressing the key, the drive runs from position 1 to position 2 or from position 2 to position 1. If the drive is not in the stop position, it runs to the preselected basic position.
240 = 2 **Needle up:** Upon pressing the key, the drive runs from position 1 to position 2. If the drive is not in position 1, it cannot be started.
240 = 3 **Single stitch (basting stitch):** Upon pressing the key, the drive performs one rotation from position 1 to position 1. If the drive is in position 2, it runs to position 1 upon pressing the key and from position 1 to position 1 each time the key is pressed again.
240 = 4 **Full stitch:** Upon pressing the key, the drive performs a full rotation depending on the set stop position. If the drive is not in a position, it runs to the basic position.
240 = 5 **Needle to position 2:** If the drive is not in position 2, it runs to position 2 upon pressing the key.
240 = 6 **Machine run blockage effective with open contact:** Upon opening the switch, the drive stops in the preselected basic position.
240 = 7 **Machine run blockage effective with closed contact:** Upon closing the switch, the drive stops in the preselected basic position.
240 = 8 **Machine run blockage effective with open contact (unpositioned):** Upon opening the switch, the drive stops immediately unpositioned.
240 = 9 **Machine run blockage effective with closed contact (unpositioned):** Upon closing the switch, the drive stops immediately unpositioned.
240 = 10 **Run at automatic speed (n12):** Upon pressing the key, the drive runs at automatic speed. The pedal is not used. (This input function is inverted in mode 9.)
240 = 11 **Run at limited speed (n12):** Upon pressing the key, the drive runs at limited speed (function of the key according to setting of parameter 266). The pedal must be pressed forward.
240 = 12 **Sewing foot lifting with pedal in position 0 (neutral)**
240 = 13 **High lift for walking foot operational mode not stored:** The signal “high lift for walking foot” is issued as long as the key is pressed down, and the drive runs with speed limitation (n10). Parameter 137 must be set to ON.
240 = 14 **High lift for walking foot operational mode stored /flip-flop 1:** The signal “high lift for walking foot” is issued upon briefly pressing the key, and the drive runs with speed limitation (n10). The operation is disabled upon pressing the key again.
240 = 15 **Tape cutter or fast scissors (mode 6/7):** Upon pressing the key, the tape cutter will be enabled for a preset time.
240 = 16 **Intermediate backtack / Intermediate stitch condensing:** Upon pressing the key, the backtack or stitch condensing will be enabled anywhere in the seam and at standstill of the drive.
240 = 17 **No function**
240 = 18 **Unlocking the chain:** Upon pressing the key, the motor performs a reverse rotation at the seam end. Moreover, backtacking and thread trimmer will be suppressed.

240 = 19 **Reset bobbin thread monitor:** After inserting a full bobbin, the stitch counter is set to the value determined by means of parameter 031.
240 = 20 **Positioning speed n1:** The function is independent of the pedal position.
240 = 21 **Reversal of motor rotation:** Change of the direction of motor rotation upon pressing the appropriate key in mode 12.
240 = 22 **No function**
240 = 23 **Speed limitation n9:** Enabled as long as the appropriate key remains pressed down in the seam.
240 = 24 **Drive runs from position 1 to position 2 (flip-flop 3):** Upon pressing the key, the sewing foot is immediately lifted, and the drive runs from position 1 to position 2. Machine run blockage is also enabled, but will be disabled by pressing the key again. If the needle is not in position 1, the start is blocked for safety reasons, and the sewing foot is immediately lifted.
240 = 25 **Speed limitation with external potentiometer:** Upon pressing the key, the external speed limitation becomes effective. Parameter 126 must be set at "2".
240 = 26 **No function**
240 = 27 **Unlocking the chain:** Upon pressing the key, the function "unlock the chain" will be performed without using the pedal.
240 = 28 **External light barrier:** In this mode it is possible to initiate the seam end using a key, not the light barrier. But the light barrier function must be On.
240 = 29 **No function**
240 = 30 **No function**
240 = 31 **Function "speed limitation bit0":** Upon pressing key bit0, speed n11 will be enabled. Upon simultaneously pressing keys bit0 and bit1, speed n9 will be enabled.
240 = 32 **Function "speed limitation bit1":** Upon pressing key bit1, speed n10 will be enabled. Upon simultaneously pressing keys bit0 and bit1, speed n9 will be enabled.
240 = 33 **Speed n9:** Below this speed operation can be pedal controlled.
240 = 34 **Automatic speed n9:** The speed can be suspended by pressing the pedal to position 0.
240 = 35 **Automatic speed n9:** The speed can be interrupted by pressing the pedal to position -2.
240 = 36 **Automatic speed n9:** No influence by the pedal.
240 = 37 **No function**
240 = 38 **No function**
240 = 39 **No function**
240 = 40 **No function**
240 = 41 **No function**
240 = 42 **No function**
240 = 43 **Needle up with subsequent sewing foot lifting with pedal in pos. 0 (neutral)**
240 = 44 **Seam end as with pedal in pos. -2**

Input functions of parameters 242 and 243 are identical with those described for parameter 240.

7.23 Speed Limitation by means of External Potentiometer

Functions	Parameter
Speed limitation by means of external potentiometer (maximum value)	**124**
Speed limitation by means of external potentiometer (minimum value)	**125**
Function "speed limitation by means of external potentiometer"	**126**

A speed limitation can be set by means of external potentiometer using parameters 124 and 125. The external potentiometer can be connected to sockets ST2/2, ST2/3 and ST2/4.
Parameter 124: Maximum value for speed limitation with external potentiometer
Parameter 125: Minimum value for speed limitation with external potentiometer

The following functions for speed limitation are possible by means of external potentiometer using parameter 126:
Parameter 126 = 0 Function "external potentiometer" Off.
Parameter 126 = 1 The external potentiometer is active whenever the pedal is pressed forward. The drive always runs with the set speed limitation.
Parameter 126 = 2 The external potentiometer is active only if an input is set at "25" using one of parameters 240, 242 and 243. If the selected input is enabled and the pedal pressed forward, the drive runs at limited speed. The speed limitation can be enabled and disabled anywhere in the seam using the key.

7.24 "Machine Running" Signal

Functions		Parameter
"Machine running" mode		**155**
Switch-off delay for "machine running" signal	t05	**156**

Parameter 155 = 0 **Machine running** signal Off.
Parameter 155 = 1 **Machine running** signal will be issued whenever the drive is running.
Parameter 155 = 2 **Machine running** signal will be issued whenever the speed is higher than 3000 RPM.
Parameter 155 = 3 **Machine running** signal will be issued whenever the pedal is not in position 0 (neutral).

The signal switch-off time can be delayed using parameter 156.

7.25 Function "Error Message A1" On/Off

Functions	Parameter
Error message A1 On/Off	**233**

Error message A1 can be disabled using parameter 233 if the pedal is not in position 0 (neutral) when switching the machine on.

Parameter 233 = OFF Error message A1 is suppressed. Then normal function (e. g. with automats).
Parameter 233 = ON Error message A1 is displayed. No function is possible.

7.26 Signal Output Position 1

- Transistor output with open collector
- Signal 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
- An inverted signal is issued at socket ST2/20

7.27 Signal Output Position 2

- Transistor output with open collector
- Signal whenever the needle is in the slot between position 2 and 2A
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e. g. for the connection of a counter
- An inverted signal is issued at socket ST2/21

7.28 Signal Output 120 Impulses per Rotation

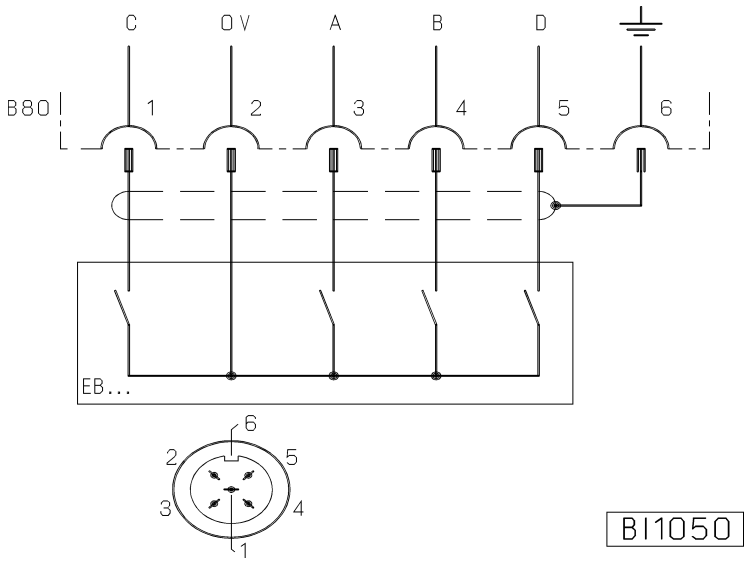
- Transistor output with open collector
- Signal whenever a generator slot of the position transmitter is sensed
- 120 impulses per rotation of the handwheel
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e. g. for the connection of a counter
- An inverted signal is issued at socket ST2/22

7.29 Actuator

The commands for the sewing operation are input by means of the actuator, which is connected to the pedal. Instead of the built-on actuator another actuator can also be connected to socket B80.

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. sewing foot lifting)
0	H	H	H	H	Pedal in pos. 0 (neutral)	
½	H	H	L	H	Pedal slightly forward	(e. g. sewing foot lowering)
1	H	L	L	H	Speed stage 1	(n1)
2	H	L	L	L	Speed stage 2	
3	H	L	H	L	Speed stage 3	
4	H	L	H	H	Speed stage 4	
5	L	L	H	H	Speed stage 5	
6	L	L	H	L	Speed stage 6	
7	L	L	L	L	Speed stage 7	
8	L	L	L	H	Speed stage 8	
9	L	H	L	H	Speed stage 9	
10	L	H	L	L	Speed stage 10	
11	L	H	H	L	Speed stage 11	
12	L	H	H	H	Speed stage 12	(n2) Pedal fully forward



EB.. Actuator

Functions	Parameter
Speed stage graduation	**119**

The pedal characteristics (speed change from stage to stage) can be varied.

Possible characteristic curves:
- linear
- progressive
- highly progressive

Functions	Parameter
Selectable pedal functions	**019**

Parameter 019 = 0 Pedal in pos. -1 blocked in the seam. But with pedal in pos. -2 sewing foot lifting is possible in the seam. (This function is possible only if the light barrier is On).

Parameter 019 = 1 With pedal in pos. -1 sewing foot lifting is blocked in the seam.

Parameter 019 = 2 With pedal in pos. -2 thread trimming is blocked.
(This function is possible only if the light barrier is On).

Parameter 019 = 3 With pedal in pos. -1 and -2 all functions are enabled.

Parameter 019 = 4 Pedal in pos. -1 and -2 is blocked in the seam. (Function only if parameter 009 = 1).

7.30 Master Reset

Recovery of factory settings.

- Press the "**P**" key and turn power on
- Input code number "**190**"
- Press the "**E**" key
- Parameter 100 appears on the display
- Press the "**E**" key
- The parameter value is shown on the display
- Set to "**170**" using the **"+"** key
- Press the "**P**" key twice
- Turn power off
- Turn power on. All parameters have been reset to their factory settings.

8 Signal Test

Functions	Parameter
Input and output test	**173**

Function test of external inputs and transistor power outputs with connected actuators (e.g. solenoids and solenoid valves).

8.1 Signal Test Using the Incorporated Control Panel

Output test:

- Select parameter 173
- Select the desired output using the +/- keys
- Enable the selected output using the >> key on the incorporated control panel

Display	Assignment of the outputs	
ON/OFF	Input test	
01	Free	on socket ST2/34
02	Sewing foot lift	on socket ST2/35
03	Output M1	on socket ST2/37
04	Output M3	on socket ST2/27
05	Output M2	on socket ST2/28
06	Free	on socket ST2/36
07	Output ML or M5	on socket ST2/32

Input test:

- Press the – key several times until "OFF" or "ON" appears on the control display.
- Actuation of external switches is displayed by the switching state ON/OFF.
- Several switches must not be closed at the same time.

9 Error Displays

General Information	
On the control	**Signification**
A1	Pedal not in neutral position, when turning the machine on (according to setting of parameter 233)
A2	Machine run blockage
A6	Light barrier monitoring
A7	Bobbin thread monitor

Programming Functions and Values (Parameters)	
On the control	**Signification**
Returns to 1st digit	Wrong code number or parameter number

Serious Condition	
On the control	**Signification**
E1	After power On, position transmitter or commutation transmitter defective, or connecting cables have been changed by mistake. During operation or after a sewing cycle, only position transmitter defects can be identified.
E2	Line voltage too low, or time between power off and power on too short.
E3	Machine blocked or does not reach the desired speed.
E4	Control disturbed by deficient grounding or loose contact.

Hardware Disturbance	
On the control	**Signification**
H1	Commutation transmitter cord or frequency converter disturbed.
H2	Processor disturbed

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