



CONTROL

AB600A5010



Operating manual

With parameter list

- Putting into Service
- Settings
- Functional Description
- Connection Diagrams
- Timing Diagrams

No. 402447 English

Important Notes

The particulars used in various figures and tables, such as type, program number, speed, etc., serve as examples. They may differ from those in your display.

For current versions of the Instructions for Use and Lists of Parameters, necessary for operating EFKA drives in accordance with regulations, please refer to the EFKA web site www.efka.net, page “**Downloads**”.

On our web site, you will also find the following supplementary instructions for this control:

- ✗ General instructions for use and programming
- ✗ Use with USB Memory Stick
- ✗ Adapter cords

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1 Range of Applications

The drive is suitable for lockstitch, chainstitch and overlock machines of various manufacturers. The functions backtacking and stitch compression, are unsupported.

1.1 Use in Accordance with Regulations

The drive is not an independent functional machine. It has been designed for integration into other machines by trained specialists.

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:

IEC/EN 60204-31 Electrical equipment of industrial machines:

Particular requirements for industrial sewing machines, sewing units and sewing systems.

Operate the drive only in dry areas.



ATTENTION

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

Standard Scope of Supply		
1	Direct current motor	DC1200 optional DC1250
1	Electronic control	AB600A5010
1	Actuator	EB401
1	Set of accessories (standard)	B156
	consisting of:	Plastic bag for B156 + documentation
and		
1	Set of accessories	Z74
	consisting of:	Plastic bag with connector housing 8 pol. Molex Minifit and contacts, potential equalization cord
Option 1		
1	Actuator	EB401
and		
1	Set of accessories	Z73
	consisting of:	Plastic bag with connector housing 8 pol. Molex Minifit and contacts, pitman rod with 2. ball socket, potential equalization cord
Zusätzliche Optionen		
	Undertable mounting kit	Z71 AB6..-DC12.. Undertable mounting
	Pulse encoder IPG001	Z72 AB6..-DC12.. IPG

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

The special accessories available ex works allow the augmentation and enhancement of functions, operating, connecting, and mounting options. Since the range of available components is continually expanded, we kindly ask you to contact us in case of need.

Designation	Material No.
Reflection light barrier module LSM002	6100031
Hall sensor module HSM001	6100032
Pulse encoder IPG001	6100033
Extension cable approx. 1000 mm long for commutation transmitter DC12.. + DC15..	1113151
Extension cable approx. 1000 mm long for Netz DC12.. line + DC15..	1113150
Potential equalization cord 700 mm long, LIY 2.5 mm ² , gray, with spades on both sides	1100313
Foot control type FB302B with three pedals for standing operation, with approx. 1400 mm connecting cable and plug	4170025
Fitting piece for position transmitter	0300019
Adapter set for DC12. + DC15.. on PEGASUS model W600	1113125
Adapter set for DC12. + DC15.. on PEGASUS Ex/Ext	1113126
Adapter set for DC12. + DC15.. on PEGASUS model W1500N, W1600	1113647
Undertable mounting kit for DC1200/DC1250	1113956
Undertable mounting kit for DC1500/DC1550	1113235
Undertable mounting kit for DC1500/DC1550	1113427
9-contact SubminD male connector	0504135
9-contact SubminD female connector	0504136
Half-shell housing for 9-contact SubminD	0101471
Adapter set direct drives DC1210 & DC1230	
Mounting kit for DC1210 on JUKI M067, M069	1114085
Mounting kit for DC1210 on JUKI M068	1114093
Mounting kit for DC1210 on PEGASUS EX	1114082
Mounting kit for DC1210 on PEGASUS M900	1114088
Mounting kit for DC1210 on YAMATO AZ, CZ	1114084
Mounting kit for DC1230 on PEGASUS chainstitch	1114119
Mounting kit for DC1230 on YAMATO VC, VE, VF, VG	1114102

3 Putting into Service

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

- Selection of motor type using parameter **467**
- 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 keys (inputs) using parameters **240...246**
- The setting of the transmission ratio between motor shaft and machine shaft using parameter **272**
- The setting of the type of position sensor using parameter **270**
- If necessary, the adjustment of the positions using parameter **171**
if necessary, the setting of the positions using parameter **171** (possible with all settings of parameter **270**)
- 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
- Begin sewing in order to save the set values
-

4 Setting and Putting into Service with the Aid of the Fast Installation Routine (SIR)

Function	Parameters
Call-up of the Fast Installation Routine SIR	(Sir) 500

The Fast Installation Routine (SIR) passes through all parameters necessary for programming the functional sequence and the positions.

With SIR you can do the most important settings for initial operation with menu prompting.
For safety reasons, the menu must be executed point by point. This ensures correct setting of all important parameters.

Input of the code number for the fitting level.



Parameter **500** is displayed.



Parameter **290** for functional sequence of the cutting procedures.



Parameter **467** for selection of motor.



Parameter **111** for the maximum speed.



Parameter **161** for direction of motor rotation.



Parameter **270** for type of position sensor.



Parameter **272** for transmission ratio.



Important! The transmission ratio should be determined and indicated as precisely as possible.

If parameter **270 = 0 or 5**, continue with input of **451**.



Check the transmission ratio.

Move pedal forwards. Let the drive run until ready (rdy) is displayed.



Press pedal to position 0. The check is complete.

if parameter **270 = 6**, set the reference position.



Turn hand wheel until symbol **o** display goes off.



Set reference position (e.g. height of the stitch plate, lower dead point).

Parameter **451** for position 1.



Parameter **453** for position 2.



To repeat the cycle from parameter **290**, push button **E**.

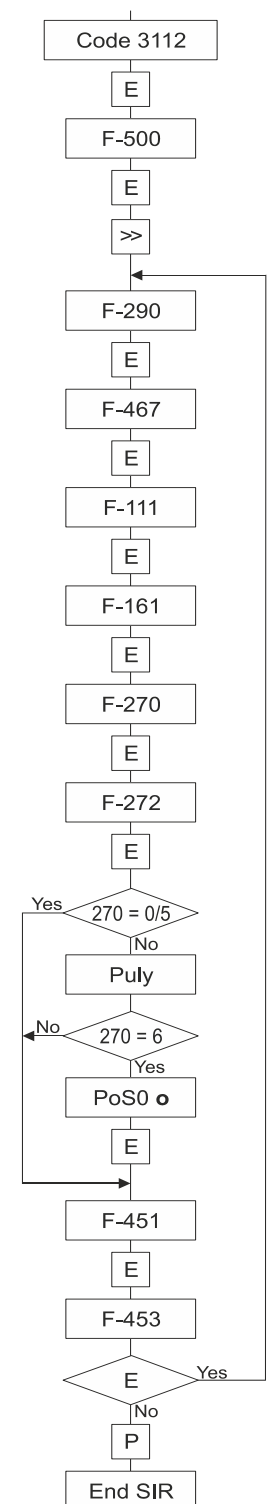


Or end with button **P** (2x).



The values can be varied by pressing key +/-.

The input of the code number is described in the general operating manual!



KL2438f

Setting on the operating part of the controls (onboard)

1	Input code number 3112!	
2	Press the E key	→ Parameter 5.0.0. displayed
3	Press the E key	→ Sir displayed. The 2 lower segments of the right 7 segment display flash.
4	Press the >> key	→ Parameter 2.9.0. appears (Functional cycle cutting processes)
5	Press the E key	→ Parameter value e.g. 05 appears.
6	Press the +/- key	→ The parameter value can be changed.
7	Press the E key	→ Parameter 4.6.7. appears (Selection of motor)
8	Press the E key	→ Parameter value e.g. 3 appears.
9	Press the +/- key	→ The parameter value can be changed.
10	Press the E key	→ Parameter 1.1.1. appears (Maximum speed)
11	Press the E key	→ Value of the set speed appears.
12	Press the +/- key	→ The parameter value can be changed.
13	Press the E key	→ Parameter 1.6.1. appears (Direction of motor rotation)
14	Press the E key	→ Parameter value e.g. 1 appears.
15	Press the +/- key	→ The parameter value can be changed.
16	Press the E key	→ Parameter 2.7.0. appears (Type of position sensor)
17	Press the E key	→ Parameter value e.g. 0 appears.
18	Press the +/- key	→ The parameter value can be changed.
19	Press the E key	→ Parameter 2.7.2. appears (Transmission Ratio)
20	Press the E key	→ Parameter value e.g. 1000 appears.
21	Press the +/- key	→ The parameter value can be changed.
22		If parameter 270 = 0 or 5 , or the check of the transmission ratio is already done, continue with Point 30.
23	Press the E key	→ PULY is displayed. (Check the transmission ratio)
24	Move pedal forwards	Let the drive run until ready (rdy) is displayed. For a maximum speed that is too high, an error message A12 is generated. Push button E as often as needed until parameter 111 (Point 12) is reached again to set the permitted maximum speed.
25	Press pedal to position 0 (neutral)	The check is complete.
26		When parameter 270 ≠ 6 , continue with Point 31.
27		P0 o is displayed (o in red). (Setting the reference position)
28	Rotate the hand wheel in the running direction until o extinguishes *. Set reference position (e.g. height of the stitch plate, lower dead point).	
29	Press the E key	→ Parameter 4.5.1. appears (Position 1 leading edge, position 1 trailing edge is automatically set 60° higher)
30	Press the E key	→ Angle from position 1 is displayed.
31	Turn the hand wheel	→ Set position 1 (at least 1 rotation *).
32	Or press the +/- key	→ The parameter value can be changed.
33	Press the E key	→ Parameter 4.5.3. appears (Position 2 leading edge, position 2 trailing edge is automatically set 60° higher)
34	Press the E key	→ Angle from position 2 is displayed.
35	Turn the hand wheel	→ Set position 2 (at least 1 rotation *).
36	Or press the +/- key	→ The parameter value can be changed.
37	Upon pressing the E key once more the program returns to parameter 2.9.0.!	
38	Press the P key twice	→ The system exits the SIR routine.

*) All operations carried out by turning the hand wheel must always be carried out in the direction of rotation set up on the machine. Under no circumstances should you turn against the machine direction.

5 Setting the Basic Functions

5.1 Direction of motor rotation

Function		Parameters
Direction of motor rotation	(drE)	161

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

161 =1 Counterclockwise motor rotation

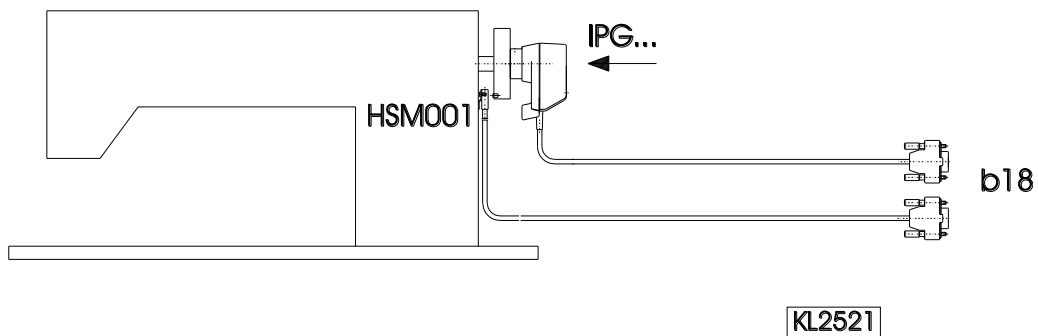


ATTENTION

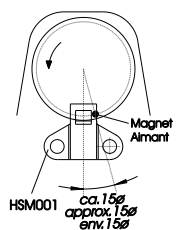
If the motor is mounted differently, e. g. at a different angle or with gear, make sure that the value set using parameter **161** corresponds to the direction of rotation.

5.2 Use of a HSM001 Hall Sensor Module or IPG... Pulse Encoder

Representation and installation of a HSM001 Hall sensor module or IPG... pulse encoder !

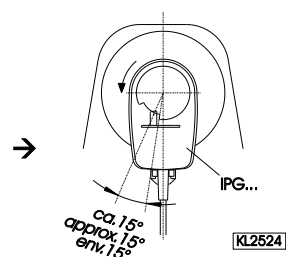


Operation with HSM001 Hall sensor module



- ←
- Get machine to the needle-up position.
- Position bore for magnet such that the magnet is located approx. 15° after the sensor in the sense of rotation.
- Get machine to the needle-up position.
- Turn disk in the pulse encoder such that the leading edge will be located approx. 15° after the sensor on the board in the sense of rotation.

Operation with IPG... pulse encoder



5.3 Transmission Ratio

NOTE

The transmission ratio must always be input if no transmission ratio of 1:1 exists, because only motors with integrated incremental transmitters will be used. **The transmission ratio should be determined and set as precisely as possible!**

The transmission ratio between motor shaft and shaft of the sewing machine head must be input, so that the set speeds of parameters **110...117** correspond to the sewing speeds.

Function		Parameters
Transmission ratio between motor shaft and machine shaft	(trr)	272

The transmission ratio can be selected within a range of 150...40000 using parameter **272**.

Example: With a motor pulley diameter of 40 mm and a sewing machine head pulley diameter of 80 mm the value 500 can be calculated using the formula below. If the value 2000 has been selected in parameter 272, it follows that the motor pulley is double the size of the sewing machine head pulley.

$$\text{Value of parameter } \mathbf{272} = \frac{\text{Motor pulley diameter}}{\text{Machine pulley diameter}} \times 1000$$

5.4 Selection of Functional Sequences (Thread Trimming Operations)

This drive is suitable for different lockstitch, chainstitch and overlock machines. The mode for the functional sequence required on the respective machine can be selected using parameter **290**.



ATTENTION

Before switching the functional sequences, you must disconnect input and output plug-and-socket connections between control and machine. Please ensure that the functional sequence (mode) suitable for the respective machine is selected.

Settings with parameter 290 are possible only after the power is turned On.

You will find a summary of the modes that can be set and the corresponding machines and adapter cords, to include available output signals in the List of Parameters chapter: Table of adapter cords.

Further information see chapter "Timing Diagrams" for the various modes.

The possible functions are listed in the section "Parameter list".

5.5 Positioning speed

Function with or without control panel		Parameters
Positioning speed	(n1)	110

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

5.6 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)".

5.7 Maximum speed

Function		Parameters
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.

5.8 Positions

Function with or without control panel		Parameters
Mode for the position sensor	(PGm)	270
Setting the needle positions	(Sr2)	171
Transmission ratio between motor shaft and machine shaft	(trr)	272

A sensor can be used as a position sensor, e.g. Efka Hall sensor module (HSM1) or pulse generator (IPG) with either NC or NO functionality.

It is connected to socket B18/7.

Parameter **270** is used to select the mode to be selected depending on the type and mounting of the sensor used (see section Parameter List under parameter **270** for a description and flow chart).

After configuration of parameter **270** to "**1, 2, 3 o 4**", parameter **171** must be used to set the angle for positions 1 and/or 2, incoming and outgoing.

Alternatively, the positions can be configured using the fast-installation routine.

The transmission ratio must already have been input using parameter **272**.

5.8.1 Setting the reference position (Parameter 170)

The angular positions necessary on the machine e.g. "needle down position" or "thread lever up position" are stored in the control. A reference position is needed in order to establish a relationship between position transmitter information and actual mechanical position.

The reference position must be set:

- For initial operation
- After replacing the motor

Setting the reference position on the control

- Input code number and select parameter **170!**
- Press the **E** key → Display **Sr1_**
- Press the **>>** key → Display **P o u** (character "o" rotating) *¹
- Turn hand wheel until rotating character **o** goes off on the display. → Display **P o**
- By turning the hand wheel, set the needle to the bottom dead center or the needle point to the height of the needle plate in the direction of rotation of the motor shaft, while needle is moving downward. → Configuration of the zero point of the machine
- Press the **P** key once → Actual parameter number 170 is displayed *²
- or
- Press the **P** key twice → Exit programming at the technician level.

5.8.2 Setting the positions (Parameter 270 = 0 or 6)

Do these settings whenever the encoder incorporated in the motor is used (Parameter **270 =0**), or a position transmitter mounted on the machine head (e.g. IPG pulse encoder or HSM Hall sensor) (Parameter **270 =6**), whose preset values must be adapted.

Setting the positions on the control

- Input code number and select parameter **171!**
- Press the **E** key → **[o]** is displayed
- Press the **>>** key → **P1E** is displayed; set "position 1 On" on the hand wheel
- Press the **E** key → **P2E** is displayed; set "position 2 On" on the hand wheel
- Press the **E** key → **P1A** is displayed; set "position 1 Off" on the hand wheel
- Press the **E** key → **P2A** is displayed; set "position 2 Off" on the hand wheel
- Press the **P** key twice → Exit programming at the technician level.

*¹) If **P 0** or **Pos 0** is displayed, the reference position is already set. To repeat the setting the power must be switched off and the code number reentered.

*²) The next parameter to be set can be selected.

*³) The button **>>(F2)** is the farthest button to the right on the control part.

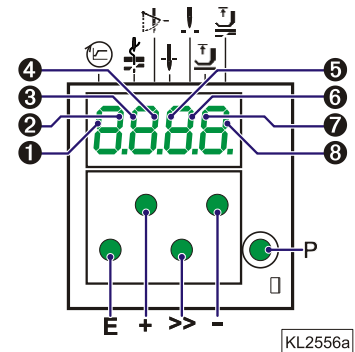
If error message A3 (reference position not set) appears, repeat the above setting sequence.

5.9 Control display of signal position and stop position

Function		Parameter
Display of position 1 and 2	(Sr3)	172

Control display

- Segment **5** is turned on corresponds to position 1 On
- Segment **5** is turned off corresponds to position 1 Off
- Segment **6** is turned on corresponds to position 2 On
- Segment **6** is turned off corresponds to position 2 Off



5.10 Positioning shift

Function		Parameters
Positioning shift	(PSv)	269

Determine by means of parameter **269** whether the drive is to stop exactly on the position (Parameter **269** =0) or some increments after the position.

5.11 Braking Characteristics

Function		Parameters
Braking ramp running	(br1)	207
Braking ramp stop	(br2)	208
Braking ramp for $n < 350^{min^{-1}}/ms$ when drive stopped	(br3)	219

- Parameter **207** regulates the braking effect between speed stages
- Parameter **208** influences the braking effect for the stop
- Parameter **219** influences the braking effect before the stop

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

5.12 Braking Power at Standstill

Function		Parameters
Braking Power at Standstill	(brt)	153

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

- 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

5.13 Starting Characteristics

Function		Parameters
Starting edge	(ALF)	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.

5.14 Operating hours counter

Function		Parameters
Acoustic signal (operating part)	(AkS)	127
Service routine for total operating hours	(Sr6)	176
Service routine for operating hours before service	(Sr7)	177
Input of operating hours before service	(Sr)	217

The integrated operating hours counter records the time of motor operation. Downtimes are not recorded. Time recording accuracy is 1ms. There are two ways of operating hours counting.

1. Basic operating hours counting:

217 =0 Operational mode: Operating hours counting

2. Service Hours Monitoring:

217 =>0 Operational mode: Number of operating hours before the next service.

Input of operating hours before the next service.

This value is compared to the operating hours counter.

The input of hours is done in steps of 10. i. e. the lowest display of 001 corresponds to 10 hours (e. g. 055 = 550 hours).

When the set number of operating hours are reached, the message "C1" will show on the display after each trimming operation. In addition, the speed indicator blinks on the during operation or after drive standstill..

176 In this service routine, the total operating hours can be read out according to the procedure example described below for parameter **177**.

177 Display of operating hours since the **last** service.

Display example of operating hours or hours since the last service and operating hours counter reset.

Display on the control:

- Select parameter **177**
- Press the **E** key → **Sr7**
- Press the **>>** key → **h t** (hours /thousands letter symbol)
- Press the **E** key → **000** (hours /thousands display)
- Press the **E** key → **h h** (hours / hundreds letter symbol)
- Press the **E** key → **000** (hours / hundreds display)
- Press the **E** key → **Min** (minutes letter symbol)
- Press the **E** key → **00** (minutes display)
- Press the **E** key → **SEc** (seconds letter symbol)
- Press the **E** key → **00** (seconds display)
- Press the **E** key → **MS** (milliseconds letter symbol)
- Press the **E** key → **000** (milliseconds display)
- Press the **E** key → **rES** See chapter "Set and Reset Operating Hours Counter"
- Press the **E** key → The process will be repeated from the hours display.
- Press the **P** key twice → e.g. **400** (sewing process can be started)

5.14.1 Set and Reset Operating Hours Counter

The number of hours has been reached (service necessary):

- Press the >> key once → The operating hours counter is set to "0" and restarted.

The number of hours has not yet been reached:

- Press the >> key three times → The operating hours counter is set also to "0" and restarted.

A value in parameter 177 has been changed:

- After displaying **rES** ..., when the **E** key is pressed again, **SEt** will then be displayed.
- If the changed value is to be saved, press the >> key 3 times.

5.14.2 Total Operating Hours Display

In this service routine enabled using parameter **176**, the total number of operating hours is displayed.

The sequence of displayed values is as with parameter **177**.

The values can only be displayed, not varied. Therefore, letter symbols "rES" for "reset" and "SEt" for "set" will not appear.

6 Functions

6.1 Softstart

Function	Parameters
Softstart On/Off (SSt)	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. Stitch count)
- Stitch counting synchronized to position 1
- Suspension with pedal in position 0 (neutral)
- Interruption by full heelback (position -2)

6.1.1 Softstart speed

Function	Parameters
Softstart speed (n6)	115

6.1.2 Softstart stitches

Function	Parameters
Number of softstart stitches (SSc)	100

6.2 Sewing foot lifting

Function	Control
Automatic in the seam	Segment 7 on
Automatic after thread trimming	Segment 8 on

Function	Parameters
Automatic sewing foot with pedal forward at the seam end if light barrier or stitch counting is On	(AFL) 023
Switch-on delay with pedal in position -1	(t2) 201
Start delay after disabling the sewing foot lifting signal	(t3) 202
Time of full power of sewing foot lifting	(t4) 203
Delay after thread wiping until sewing foot lifting	(t7) 206
Delay after thread trimming without thread wiper until sewing foot lifting	(tFL) 211

Sewing foot is lifted:

- in the seam
 - by heelback (position -1)
 - or automatically (using the - S4 key on the control, segment 7 lights up)
- after thread trimming
 - by pressing a key depending on the pre-selection of parameters **240...246**
 - by heelback (position -1 or -2)
 - or automatically (using the - S4 key on the control, segment 8 lights up)
 - by pressing a key depending on the pre-selection of parameters **240...246**
 - automatically by light barrier when pedal forwards, according to the setting of parameter **023**
 - automatically by stitch counting when pedal forwards, 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**.

Sewing foot lowers:

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

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

6.3 Reverse motor rotation

Function	Parameter
Positioning speed	(n1) 110
Reversing angle	(ird) 180
Switch-on delay of reverse motor rotation	(drd) 181
Reverse motor rotation On/Off	(Frd) 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 according to the set degrees.

6.4 Unlocking the Chain (Mode 5/6/7)

Function		Parameters
Number of run-out stitches when unlocking the chain	(c6)	184
Function "unlock the chain" in modes 5, 6 and 7	(mEk)	190

Upon unlocking the chain at the seam end, the functions **thread trimming** and tape cutter/fast scissors are automatically suppressed. When setting parameter **190 = 3**, the function **tape cutter/fast scissors** is however possible. After pressing the key "unlocking the chain" and with pedal in position 0 (neutral), the drive always stops in position 1.

Settings necessary for the operation "unlocking the chain":

- Set "unlock the chain" using parameter **190 = 1 / 2 / 3 / 4** (**190 = 0** "unlock the chain" off)
- Set **switch-on delay** using parameter **181** and **reversing angle** using parameter **180**
- Determine the **function of the key "unlock the chain"** using one of the parameters **240...246**
- If parameter **290** is set at

190 = 0 Unchaining switched off

190 = 1 Sequence with pedal in position -2 from machine run or from position 2:

- Press key "unlock 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

190 = 1 Sequence with pedal in position -2 from standstill in position 1:

- Press key "unlock 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

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 "unlock 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

190 = 3 Automatic sequence with light barrier on the seam end with tape cutter and run-out stitches (Only possible in mode 7 and if parameter 018 = 0)

- Press key "unlock the chain"
- After light barrier detection, sequence of the compensation stitches and end count up to tape cutting
- Run-out stitches up to unlocking the chain, adjustable with parameter 184
- Sequence of reversing angle at positioning speed after a switch-on delay that can be set

190 = 4 Sequence with pedal in position -2 / no unlocking of the chain if seam end with light barrier, cutting and run-out stitches is set:

- Press the pedal to position -2
- Run at positioning speed to position 1
- Sequence of reversing angle at positioning speed after a switch-on delay that can be set
- No unlocking of the chain at the seam end with light barrier
- Reverse motor rotation is suppressed when the drive stops. The signals "blow fabric onto stack", M2 and "sewing foot lift" will be issued.

6.5 Machine run blockage



ATTENTION

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 B3, depending on the pre-selection of parameter **240**

Display after enabling machine run blockage without control panel:

Control display



	A	2
--	----------	----------

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 lifting is possible

New start after machine run blockage

Function	Parameter
New start after machine run blockage (Pdo)	234

Parameter 234 determines how a new start is possible after closing and/or opening the switch.

234 = 0 New start after disabling machine run blockage without influence by the pedal. This setting is applicable, for example, to automats.

234 = 1 New start after disabling machine run blockage only if the pedal is in position 0 (neutral).

6.6 Thread trimming operation

Function	Parameters
Thread trimmer On/Off	FA 013
Thread wiper On/Off	FW 014

6.6.1 Thread Trimmer/Thread Wiper (Lockstitch Modes)

Function	Parameters
Thread wiper time	(t6) 205
Thread wiper switch-on delay	(dFw) 209
Stop time for thread trimmer	(tFA) 253

Thread trimming in the lockstitch modes is performed at trimming speed.

When the thread trimmer is off, the drive stops in position 2 at the seam end; it stops in position 1 at the end of programmed seams.

The thread wiper ON period can be set depending on the selected trimming mode (see chapter "Timing Diagrams" in the List of Parameters). The delay time (t7) (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.

6.6.2 Trimming speed

Function	Parameters
Trimming speed	(n7) 116

6.6.3 Chainstitch thread cutter (var. modes)

Thread trimming in the chainstitch modes is performed at machine standstill in position 2.

The signal sequence of M1...M4 and sewing foot lifting at the seam end can be set as desired using parameters **280...288** (Parallel or sequential).

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

6.6.4 Chainstitch Machine Trimming Signal Times

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

See chapter 8 »Setting the Basic Functions, Selection of Functional Sequences« in this manual for further information on chain stitch seam end variants and chapter »Timing Diagrams« in the List of Parameters.

Function		Parameters
Delay time output M1	(kd1)	280
ON period output M1	(kt1)	281
Delay time output M2	(kd2)	282
ON period output M2	(kt2)	283
Delay time until sewing foot On	(kdF)	288

6.7 Overlock Machine Functions (Mode 7)

Function		Parameter
Stop when tape cutting at the seam end On/Off	(SAb)	017
Sequence overlock mode with or without stop	(UoS)	018
Braking curve in overlock mode On/Off	(bdO)	235
Start count cancellation and seam end initiation by light barrier uncovered On/Off	(Abc)	267

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

- 018 =0** Sequence with stop.
- 018 =1** Sequence without automatic stop at the seam end. When the command "run" is given, the drive runs at the pre-selected speed. The program switches to the next start of a seam without issuing signals M1/M2, when the pedal is in pos. 0 (neutral) or the light barrier is covered.
- 018 =2** Sequence as with setting 1. But with pedal in pos. 0 signals M1/M2 will be issued, and the program switches to the next start of a seam.
- 018 =3** Sequence as with setting 1. But with pedal -2 signals M1/M2 will be issued, and the program switches to the next start of a seam. Intermediate stop and sewing foot lifting with pedal in pedal - 1 is possible.
- 018 =4** If the light barrier is covered during the end count for chain suction, the program switches immediately to the next start of a seam. If the end count has been completed and the light barrier remains uncovered, the drive stops immediately.
- 018 =5** Tape cutting at the start of the seam with stop.
- 267 =0** Start count cancellation by light barrier uncovered impossible.
- 267 =1** Start count cancellation by light barrier uncovered.
Chain suction or tape cutting at the start of the seam are cancelled whenever the light barrier senses "uncovered", and the seam end will be initiated.

6.7.1 Start and End Counts

Function		Parameter
Count (c3) tape cutter at the start of the seam	(c3)	002
End count (c4) for tape cutter at the seam end	(c4)	003

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

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

Function	Parameters
Tape cutter at the seam end On/Off	014

6.8.1 Tape Cutter/Fast Scissors in 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**".

Function	Control
Tape cutter/Fast scissors at the start of the seam On	LED-segment 3 On
Tape cutter/Fast scissors at the seam end On	LED-segment 4 On
Tape cutter/Fast scissors at the start and at the end of the seam On	LED-segment 3 and 4 On
Tape cutter/Fast scissors at the start and at the end of the seam Off	LED-segment 3 and 4 Off

Output and Times for Tape Cutter

Function	Parameter
Delay time for output M1 (B3/6) tape cutter AH (kd1)	280
ON period for output M1 (B3/6) tape cutter AH (kt1)	281

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

Output and Times for Fast Scissors

Function	Parameter
Delay time for output M1 (B3/6) fast scissors AH1 (kd1)	280
ON period for output M1 (B3/6) fast scissors AH1 (kt1)	281
Delay time for output M2 (B3/7) fast scissors AH2 (kd2)	282
ON period for output M2 (B3/7) fast scissors AH2 (kt2)	283

- Parameter **232** must be set at "**1**" (fast scissors function).
- The delay times for "fast scissors" are usually set at "**0**".

6.9 Manual Tape Cutter/Fast Scissors

Upon pressing an external key depending on the pre-selection of parameters **240...246**, the **tape cutter** or **fast scissors** can be enabled anywhere in the seam or at standstill.

See also chapter "Connection Diagram" in the List of Parameters!

6.10 Seam with Stitch Counting

Function	Parameters
Stitch counting On/Off (n7)	015

6.10.1 Number of Stitches for a Seam with Stitch Counting

Function	Parameters
Number of stitches for the seam with stitch counting (Stc)	007

The number of stitches for stitch counting can be set directly on the control with parameter **007**.

6.10.2 Stitch Counting Speed

Function		Parameters
Positioning speed	(n1)	110
Stitch Counting Speed	(n12)	118
Speed mode for a seam with stitch counting	(SGn)	141

A certain speed behavior for the stitch counting can be selected using **parameter 141**.

- 141 =0** Execution at pedal controlled speed
141 =1 Execution at fixed speed n12, when pressing the pedal forward (position >1)
141 =2 Execution at limited speed n12, when pressing the pedal forward (position >1)
141 =3 Automatic execution at fixed speed after having pressed the pedal once. The procedure can be interrupted by "heelback (-2)"
141 =4 Automatic execution at fixed speed n1 after having pressed the pedal once. The procedure can be interrupted by "heelback (-2)"

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.

6.10.3 Seam with Stitch Counting When Light Barrier Is On

Function		Parameters
Light barrier On/Off	LS	009
Stitch counting On/Off	(StS)	015

When "stitch counting and light barrier function" is set, the number of stitches will be executed first, then the light barrier will be activated.

6.11 Free Seam and Seam with Light Barrier

Function		Parameters
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	(n2_)	121
Speed mode free seam	(SFn)	142

Speed control for the free seam and the seam with stitch counting can be selected using the speed mode.

- 142 =0** Execution at pedal controlled speed
142 =1 Execution at fixed speed n12, when pressing the pedal forward (position >1)
142 =2 Execution at limited speed n12, when pressing the pedal forward (position >1)
142 =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**.

6.12 Light barrier

Function	Parameters
Light barrier On/Off	009

The light barrier function at the input of socket B18/8 is active only if parameter value **239 = 0**.

6.12.1 Speed after Light Barrier Sensing

Function	Parameters
Speed after Light Barrier Sensing (n5)	114

6.12.2 General Light Barrier Functions

Function	Parameters
Light barrier compensating stitches	LS 004
Number of light barrier seams	(LSn) 006
Light barrier sensing uncovered/covered	(LSd) 131
Start of sewing blocked/unblocked with light barrier uncovered	LSS 132
Light barrier seam end with thread trimming On/Off	(LSE) 133
Speed of the light barrier compensating stitches	PLS 192

- After sensing the seam end, the compensating stitches are counted at light barrier speed.
- 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**. 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**.
- Speed selection pedal controlled / n5 during the light barrier compensating stitches using parameter **192**.

6.12.3 Reflection Light Barrier LSM002

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.

6.12.4 Automatic Start Controlled by Light Barrier

This function is not possible when parameter F-290 =8 or 9 (modes 8 and 9)!

Function		Parameters
Delay of automatic start	(ASd)	128
Automatic start On/Off	(ALS)	129
Light barrier sensing uncovered	(LSd)	131
Start of sewing blocked with light barrier uncovered	LSS	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 = 1** Light barrier On
- Parameter **129 = 1** Automatic start On
- Parameter **131 = 1** Light barrier sensing uncovered
- Parameter **132 = 1** 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. Then press the pedal forward. This function is disabled when the pedal is no longer pressed forward after the seam end.

6.12.5 Light barrier filter for knitted fabrics

Function		Parameters
Number of stitches of the light barrier filter	(LSF)	005
Light barrier filter On/Off	(LSF)	130
Light barrier sensing uncovered or covered	(LSd)	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 = 0**.
 - Covered → uncovered, if parameter **131 = 1**.

6.12.6 Functional Variations of the Light Barrier Input

Function	Parameters
Selection of the input function on socket B18/8	239

If the light barrier function is not used, a switching function can be assigned to the input on socket B18/8 as well as to inputs in1...in7.

The following input functions are possible with parameter **239**

239 =0 **Light barrier function:** The input is prepared for a light barrier function.

239 =>0 **All other input functions are identical, as described in the next section "Inputs for switches and keys".**

6.13 Switching Functions of Inputs in1...i13

Function	Parameters
Selection of the input function	(in1...in7) (in11-LSM) 240 239

The functions of the keys/switches connected to socket connectors ST2, B18 and B22 can be selected for inputs in1...in13 using parameters **240 and 239 (LSM)**,

240 and 239 (LSM) =

- 0 Input function blocked**
- 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 pre-selected basic position.
- 2 Needle up:** Upon pressing the key, the drive runs from position 1 to position 2.
- 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.
- 4 Full stitch:** Upon pressing the key, the drive performs a full rotation depending on the set stop position.
- 5 Needle to position 2:** If the drive is not in position 2, it runs to position 2 upon pressing the key. After power On the drive runs until it has been synchronized.
- 6 Machine run blockage effective with open contact:** Upon opening the switch, the drive stops in the pre-selected basic position.
- 7 Machine run blockage effective with closed contact:** Upon closing the switch, the drive stops in the pre-selected basic position.
- 8 Machine run blockage effective with open contact (unpositioned):** Upon opening the switch, the drive stops immediately unpositioned.
- 9 Machine run blockage effective with closed contact (unpositioned):** Upon closing the switch, the drive stops immediately unpositioned.
- 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.)
- 11 Run at limited speed (n12):** Upon pressing the key, the drive runs at limited speed. The pedal must be pressed forward.
- 12 Sewing foot lifting with pedal in position 0 (neutral)**
- 15 Tape cutter or fast scissors (mode 6/7):** Upon pressing the key, the tape cutter will be enabled for a preset time.
- 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.
- 24 Needle to position 2:** Upon pressing the key, the drive runs from position 1 to position 2, and the sewing foot is lifted. The start is blocked after that. Upon pressing the key again, the sewing foot is lowered, and the start is possible again.
- 27 Unlocking the chain:** Upon pressing the key, the function "unlock the chain" will be performed without using the pedal.
- 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.
- 33 Speed n9:** Below this speed, operation can be pedal controlled.
- 34 Automatic speed n9:** The speed can be suspended by pressing the pedal to position 0.
- 37 Speed n12 with break contact:** Below this speed, operation can be pedal controlled.
- 38 Automatic speed n12 with break contact:** Not influenced by the pedal.
- 41 Tape cutting only at machine standstill.**

6.14 Software Debouncing of All Inputs

Function	Parameters
Software debouncing of all inputs	(EnP) 238

- 238 =0** No debouncing
- 238 =1** Debouncing

6.15 Special pedal function Single stitch / Full stitch

Function		Parameters
Special pedal function Single stitch / Full stitch	(EzP)	041
Pedal travel forwards for detection of the special pedal function	(GrP)	042
Time for detection of the special pedal function	(dPd)	051
Speed for single stitch / full stitch	(n9)	122

With the single stitch / full stitch function, it is possible to enable the execution of a stitch though pedal forwards actuation. For this it is necessary to move the pedal forward only far enough so that the percentage portion (e.g., 40%) of the maximum possible pedal travel (100%) set by the parameter **042**, is not exceeded.

The execution is done as single stitch (Parameter **041 = 1**) or full stitch (Parameter **041 = 2**)

If the travel set with parameter **042** is exceeded within the time set with parameter **051**, the drive runs with the speed specified by the respective pedal setting, even when under the threshold.

First after pedal 0-position can the special pedal function be actuated again.

The single/full stitch is executed in the speed set with parameter **122**. To ensure that only a single stitch is executed, the setting 300 rpm must not be exceeded.

041 =0 Special pedal function Off

041 =1 Single stitch:

The performs one rotation from position 1 to position 1. If it is standing in position 2, it runs to position 1 the first time and then each time from position 1 to position 1.

041 =2 Full stitch:

The drive executes a complete rotation corresponding to its starting position.

6.16 Signal "Machine Running"

Function		Parameters
Mode "machine running"	(LSG)	155
Switch-off delay for signal "machine running"	(t05)	156

Set activation of signal "machine running" using parameters 155/156 .

155 =0 Signal "machine running" Off.

155 =1 Signal "machine running" will be issued whenever the drive is running.

155 =2 The signal "machine running" will be issued whenever the speed is higher than 3000 RPM

155 =3 Signal "machine running" will be issued whenever the pedal is not in position 0 or neutral.

155 =4 Signal "machine running" will be issued only after motor synchronization (one rotation at positioning speed after power On).

156 Delay of switch-off time.

6.17 Signal Output Position 2

- Logic level output
- 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 B19/9

6.18 Signal Output 512 Impulses per Rotation (G1 or G2)

- Logic level output
- Signal whenever a generator slot of the position transmitter is sensed
- 512 impulses per rotation of the handwheel, if transmission 1:1 (F272 = 100)
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e. g. for the connection of a counter
- A signal (G1) is issued at socket B18+B19/1+6

6.19 Actuator

6.19.1 Analog actuator

Function		Parameter
Selectable pedal functions	(-Pd)	019
Characteristic of the "analog pedal" EB401	(APd)	026
Area for position +1/2 of "analog pedal" in percent	(plu)	027
Speed- step distrinution	(nSt)	119

The effect of pedal actuation on the drive functions can be set using parameter 019:

- 019 = 0** Pedal in pos. -1 blocked in the seam. But with pedal in pos. -2 sewing foot lifting is possible in the seam (function active whenever the light barrier is On).
- 019 = 1** With pedal in pos. -1 sewing foot lifting is blocked in the seam.
- 019 = 2** With pedal in pos. -2 thread trimming is blocked (function active whenever the light barrier is On).
- 019 = 3** The functions "pedal in pos. -1" and "pedal in pos. -2" are active.
- 019 = 4** The functions "pedal in pos. -1" and "pedal in pos. -2" are blocked in the seam (function active whenever the light barrier is On).
- 019 = 5** Start seam end by placing the portal at -1 (slightly back)

The characteristic of the "analog pedal" can be set using parameter **026**:

- 026 = 0** Analog function off
- 026 = 1** 12-level selected, like prior pedal function of the digital actuator.
- 026 = 2** Continuously variable (specially for external potentiometer, without thread trimming function)
- 026 = 3** 24-level
- 026 = 4** 60-level
- 026 = 5** 48-level
- 026 = 6** 40-level, for SOP (standing operation)
- 119 = 1** Speed- step distrinution linear
- 119 = 2** Speed- step distrinution low progressiv
- 119 = 3** Speed- step distrinution high progressiv

7 Signal Test

Function		Parameters
Input and output test	(Sr4)	173

Function test of external inputs, multiple-function key bar and transistor power outputs with connected actuators (e.g. solenoids and solenoid valves).

7.1 Inputs to the control

- Select parameter **173** (OFF is displayed).
- **Operator control panel:** By actuating the key or switche connected to input in1 to in7, the number of the input actuated appears on the display (**i01**).
- **Note:** Checking of positions is described in chapter "Displaying the signal and stop positions". The inputs LSM, HSM and IPG are not checked.

7.1.1 Outputs of control

- Select parameter **173** (OFF is displayed).
- Select the desired output using the **+/-** keys.
- On the built-in keypad in the control, the **>>** key is used to turn on the associated output, if it is connected and working.

Zuordnung der Ausgänge	
Anzeige	an Buchse B3
M 1	6
M 2	7
M 3	8

8 Table of Machine Functions and Adapter Cords



ATTENTION

Before switching functional sequences, detach cables from the inputs and outputs! It must be absolutely certain that for the functional sequence to be changed the machine provided has been installed! Then proceed with the setting using parameter 290!

Setting the functional sequence using parameter 290

			Functions / Outputs						
		Power transistors →	M1	M2	FL				
Mode	Function / Machine		B3/6	B3/7	B3/8				
0	Lockstitch		FA1+2	ML	FL				
5	Chainstitch: parallel sequence		AH	ML	FL				
6	Chainstitch: tape cutter/fast scissors		AH1	AH2	FL				
7	Overlock		M1	M2	FL				

Explanation of letter symbols of the above table and chapter "Timing Diagrams"

Ausgänge		Ausgänge	
AH	Tape cutter	FL	Sewing foot lifting
AH1/AH2	Fast scissors	ML	Machine running
FA1+2	Thread trimmer pos. 1...2		

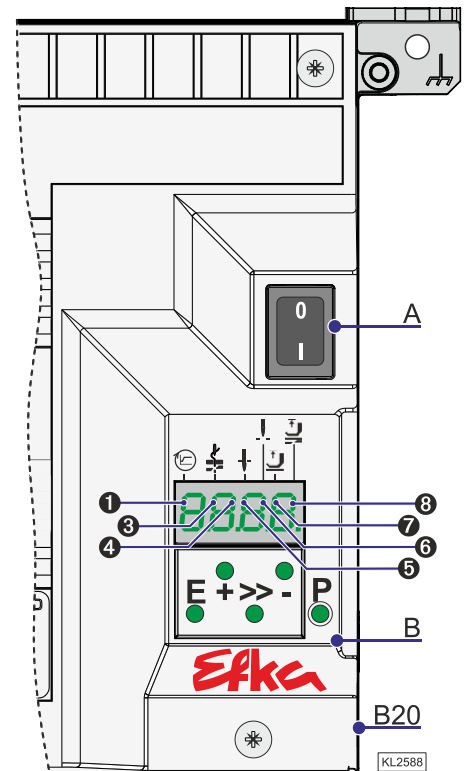
Note: The outputs M1, M2 and M3 can be used with other functions by changing the settings of parameters 382, 383 and 385, depending on the signal sequence or signal duration required for each machine.

*) The signal issued at this output is inverted!

9 Operating Elements and Socket Connectors

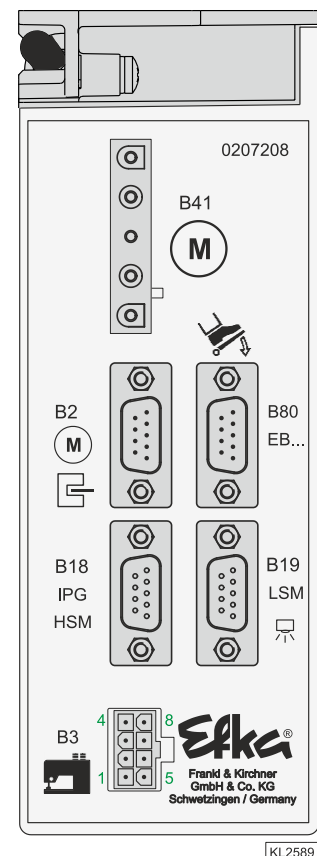
9.1 Positions of the Front Side

A	Power switch
B	Network control lights
C	Control panel (onboard module) + Display (4-digit 7-segment display)
Key	
P	Call or exit programming mode
E	Start backtack single / double / off Enter key for modifications in the programming mode
+	End backtack single / double / off In the programming mode - increase of the value indicated
>>	Basic position 1 or 2 In programming mode as shift key
-	Automatic sewing foot lifting at stop in the seam On/Off Automatic sewing foot lifting after thread trimming On/Off In the programming mode - decrease of the value indicated
The upper vertical segments of the 4 digit 7 -segment display indicate the switching states of foot lifting and basic position.	
1	Single start backtack
2	Double start backtack
3	Single end backtack Tape cutter at the start of the seam ON/OFF (mode 7)
4	Double end backtack Tape cutter at the seam end ON/OFF (mode 7)
5	Basic position "needle position 1"
6	Basic position "needle position 2"
7	Automatic sewing foot lifting at stop in the seam
8	Automatic sewing foot lifting after the thread trimming operation
Connector	
B20	USB Memory Stick



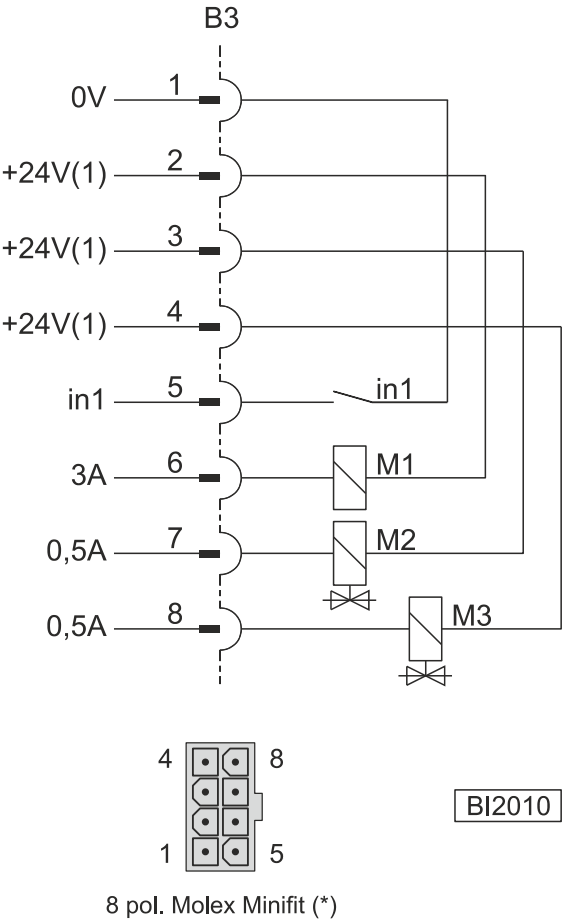
9.2 Positions of the rear side

Connector	
B2	Commutation transmitter
B3	Socket for inputs and outputs e. g. solenoid valves, displays, keys and switches
B18	Hall sensor module HSM001 Pulse encoder IPG001 (Adapter cord 1113229 in case of multiple assignment)
B19	Light barrier module LSM002
B41	Motor power supply
B80	Actuator



9.3 Connection Diagrams

Inputs switched to 0V



ATTENTION

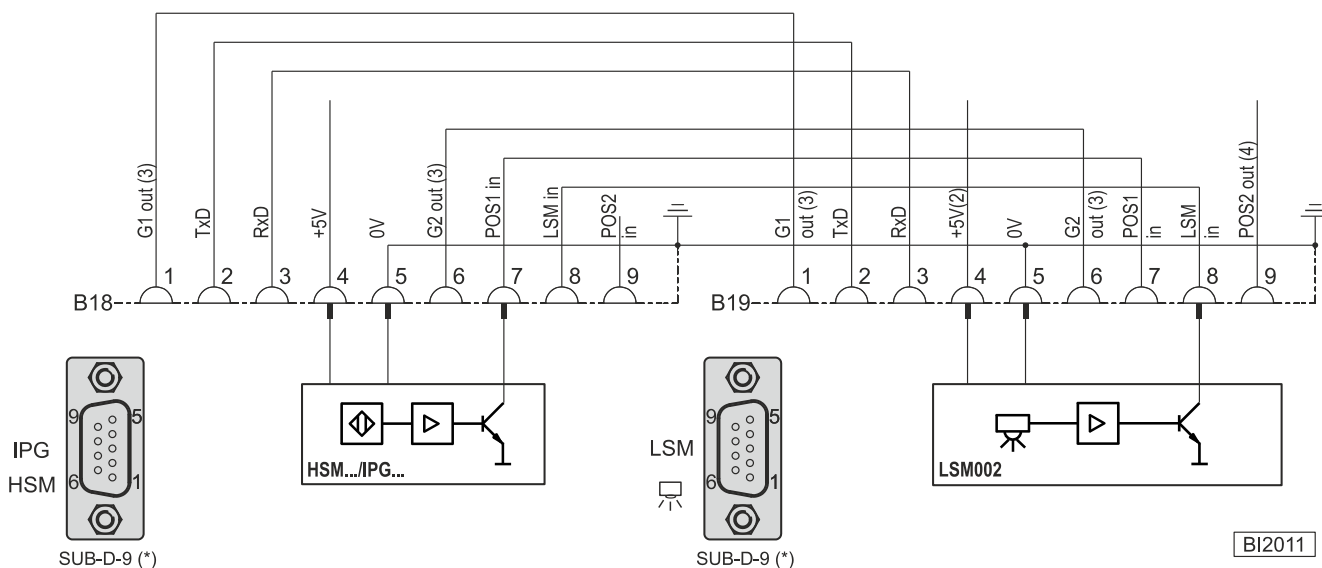
When connecting the outputs, ensure that a total power of 96VA constant load will not be exceeded!

in1	Input 1	M2	Output 2
M1	Output 1	M3	Output 3

1) Nominal voltage +24V, no-load voltage max. +30V momentarily after power on
*) Front view of the control (component side) and/or rear view of the outgoing connecting cable

Connection of a HSM001 Hall sensor module or an IPG001 pulse encoder

Connection of a light barrier module LSM002

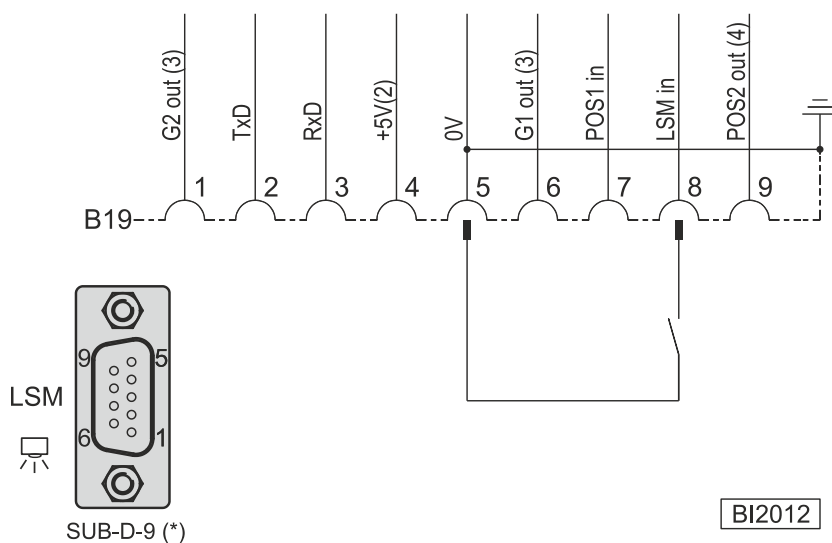


BI2011

Adapter cord 1113229 in case of multiple assignment of socket B18!

POS2 OUT	Output for position 2	LSM IN	Possibility of connecting a light barrier module
POS1 IN	Input for position 1 (e. g. connection of a sensor)	LSM002	Reflection light barrier module
POS2 IN	Input for position 2 (e. g. connection of a sensor)	HSM001	Hall sensor module
G1/G2 OUT	Output of generator impulses	IPG...	Pulse encoder
TXD/RXD	Serial transmission lines		

If parameter 239 is set to >0, it is possible to operate a key at the input of the B19/8 connector.



BI2012

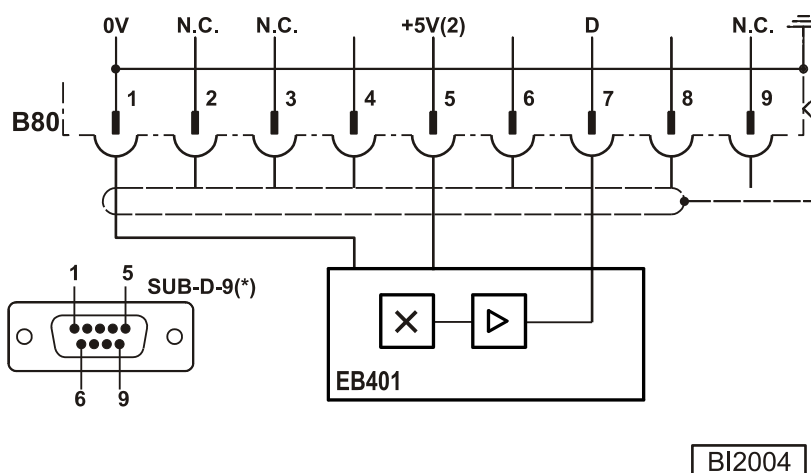
There is a supply voltage of +5V on the B18/4 socket for external devices. This voltage can be switched to +15V using parameter 362.

2) Nominal voltage +5 V, I_{max} 100 mA (switchable to +15 V, 100 mA)

3) Logic level output +5 V, I_{max} 5 mA

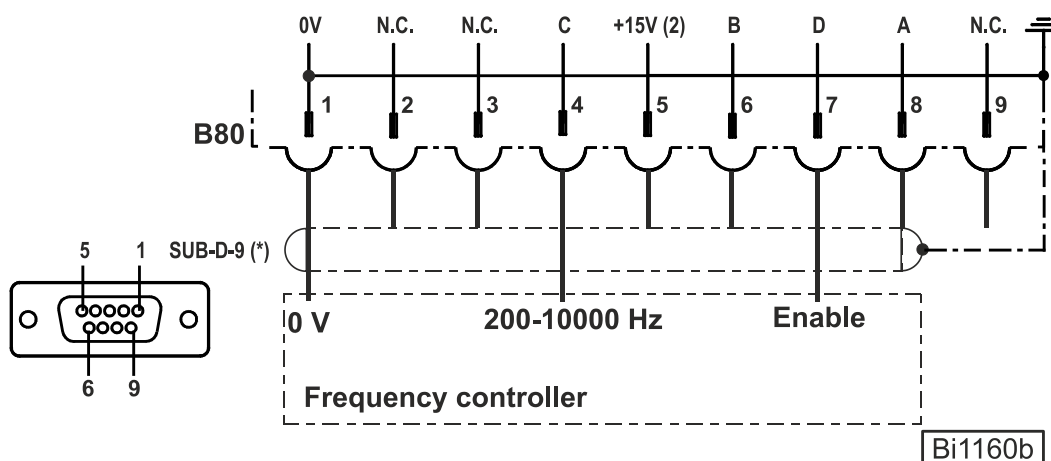
*) Front view of the control (component side) / rear view of the outgoing connecting cable

Connecting the analogous actuator EB401



EB.. = Actuator

Connection for frequency run



Connections:

0 V on Pin 1
Frequency output on Pin 4
Frequency controller output on Pin 7

In order to introduce motor running 0V must be applied to pin 7

Frequency rates: 0-5 V / 200-10000 Hz
Min. speed 50 min⁻¹
Max. speed F-111

Parameter F-396 =0
F-396 =1

Frequency Off
Frequency On

Plug B80 input signal

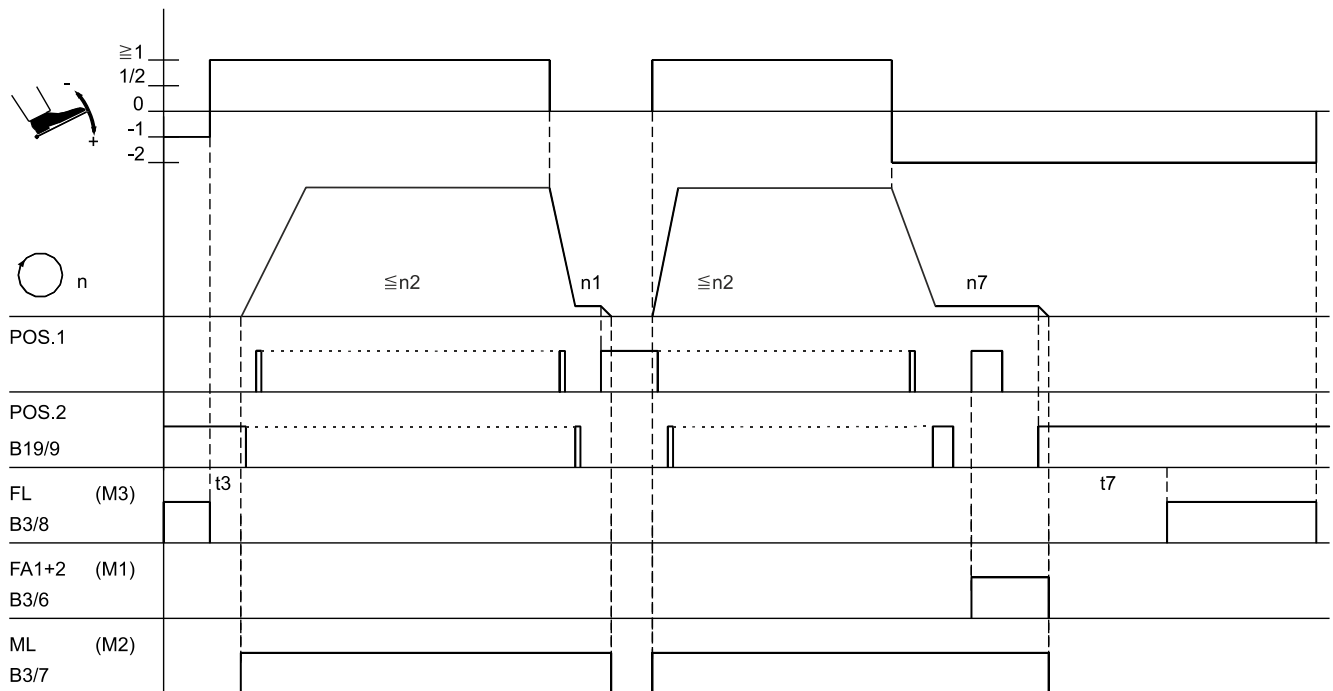
Pin8 "A"	Pin6 "B"	Pin4 "C"	Pin5 "D"	Motor state
X	X	X	Deactivated.	Stop
X	X	Frequency < 60 Hz	Activated (0V)	Stop
X	X	Frequency > 60 Hz	Activated (0V)	Running
X	X	Frequency > 60 Hz	Deactivated.	Stop
0 V	0 V	X	Deactivated.	Trimmer

2) Nominal voltage +5 V, I_{max} 20 mA

*) View: Front view of the control (component side) and/or rear view of the outgoing connecting cable

10 Timing Diagrams

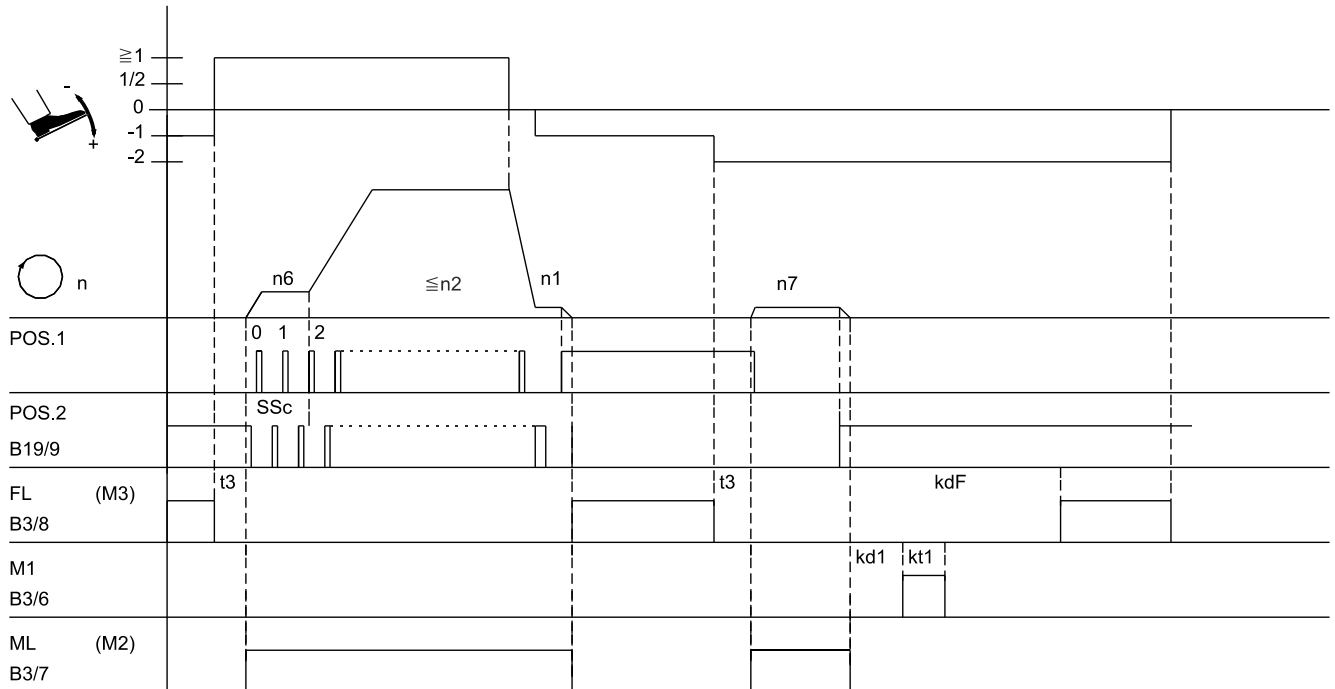
Mode 0 (lockstitch)



0334/MODE-00

Mark	Function	Parameter	Control		
FAm	Mode 0	290 = 0			
n1	Positioning speed	110			
n2	Maximum speed	111			
n7	Trimming speed	116			
t3	Start delay from lifted sewing foot	202			
t7	Sewing foot lifting switch-on delay after thread wiper	206			

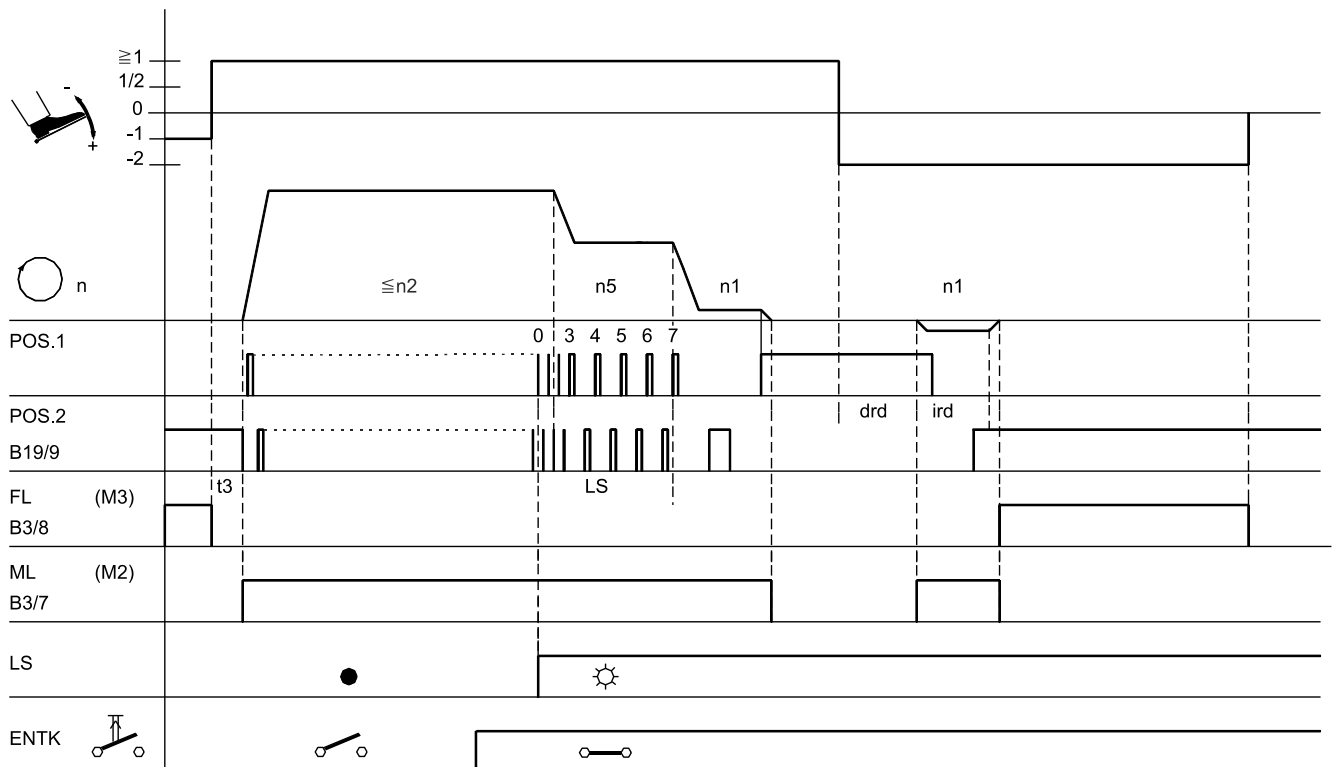
Mode 5 (chainstitch)



0334/MODE-05

Mark	Function	Parameter	Control		
FAm SSt	Mode 5 Softstart	290 = 5 134 = 1			
n1 n2 n6 n7	Positioning speed Maximum speed Softstart speed Trimming speed	110 111 115 116			
SSc t3 kdF kd1 kt1	Softstart stitches Start delay from lifted sewing foot Switch-on delay of sewing foot lifting Delay times of output M1 ON periods of output M1	100 202 288 280 281			

Mode 5, 6 or 7 (function “unlocking the chain” with light barrier)

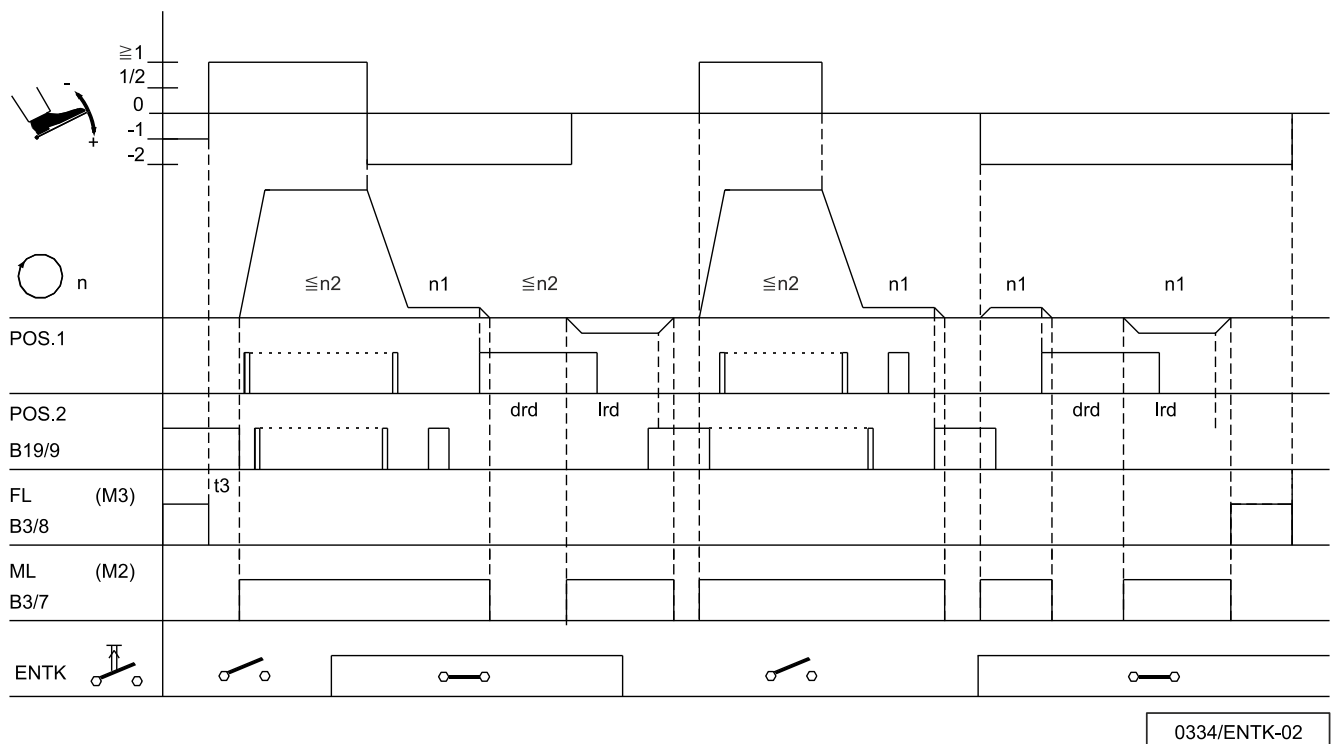


0334/ENTK-01

Mark	Function	Parameter	Control		
FAm drE Frd	Mode 5 Direction of motor rotation Reverse motor rotation Basic position 2 Thread trimmer *)	290 = 5 161 = 0 182 = 1	Clockwise On On	Key >>	
LS mEk in1	Light barrier Unlock the chain automatically with light barrier Assign the function “unlocking the chain” to input in1	009 = 1 190 = 2 240			
n1 n2 n5	Positioning speed Maximum speed Speed after light barrier sensing	110 111 114			
LS ird drd t3	Light barrier compensating stitches Number of reversing increments Switch-on delay of reverse motor rotation Start delay from lifted sewing foot	004 180 181 202			

*) When unlocking the chain, the function “thread trimmer” is suppressed!

Mode 5, 6 or 7 (function “unlocking the chain”)



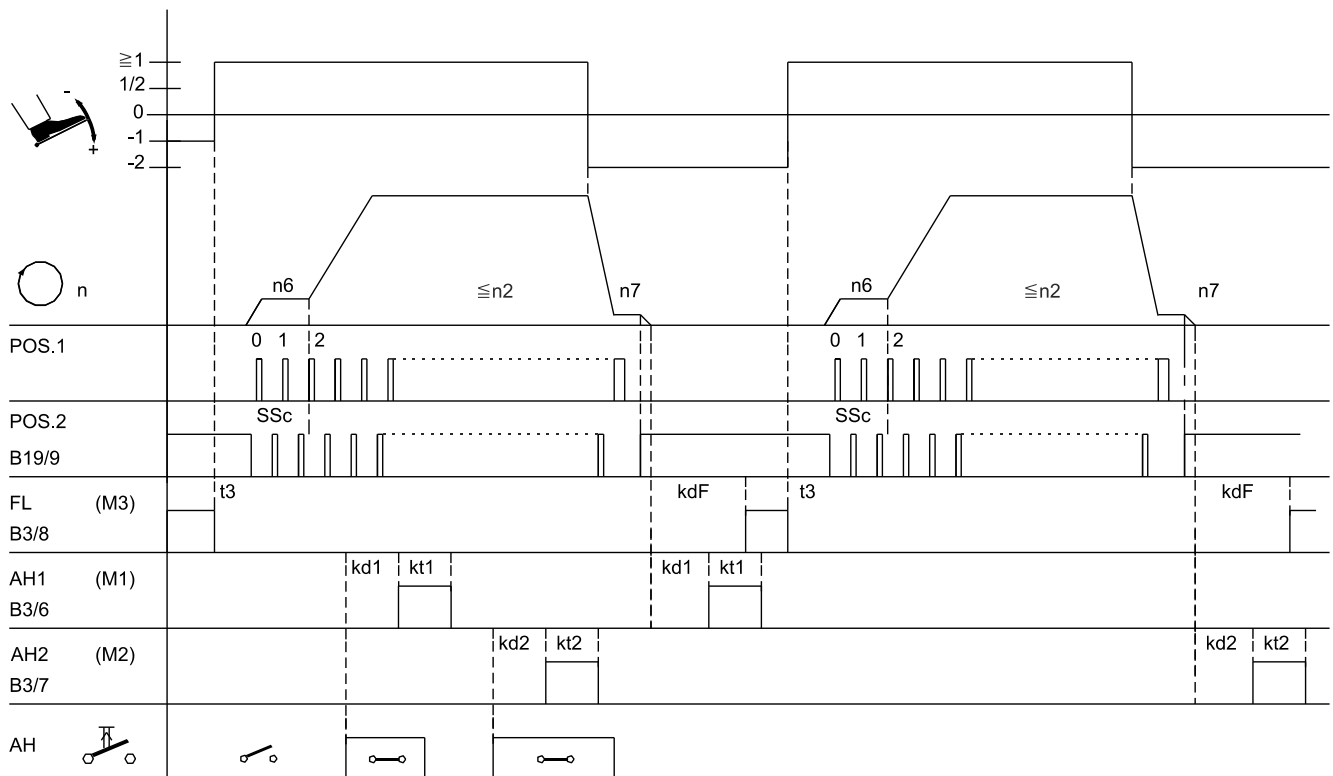
0334/ENTK-02

Mark	Function	Parameter	Control		
FAm	Mode 5	290 = 5	Key >>		
drE	Direction of motor rotation	161 = 0			
Frd	Reverse motor rotation	182 = 1			
	Basic position 2				
in1	Thread trimmer *)	On			
	Assign the function “unlocking the chain” to input in1	240			
n1	Positioning speed	110			
n2	Maximum speed	111			
ird	Number of reversing increments	180			
drd	Switch-on delay of reverse motor rotation	181			
t3	Start delay from lifted sewing foot	202			

*) When unlocking the chain, the function “thread trimmer” is suppressed!

*) When unlocking the chain, the functions “stitch condensing” and “thread trimmer” are suppressed!

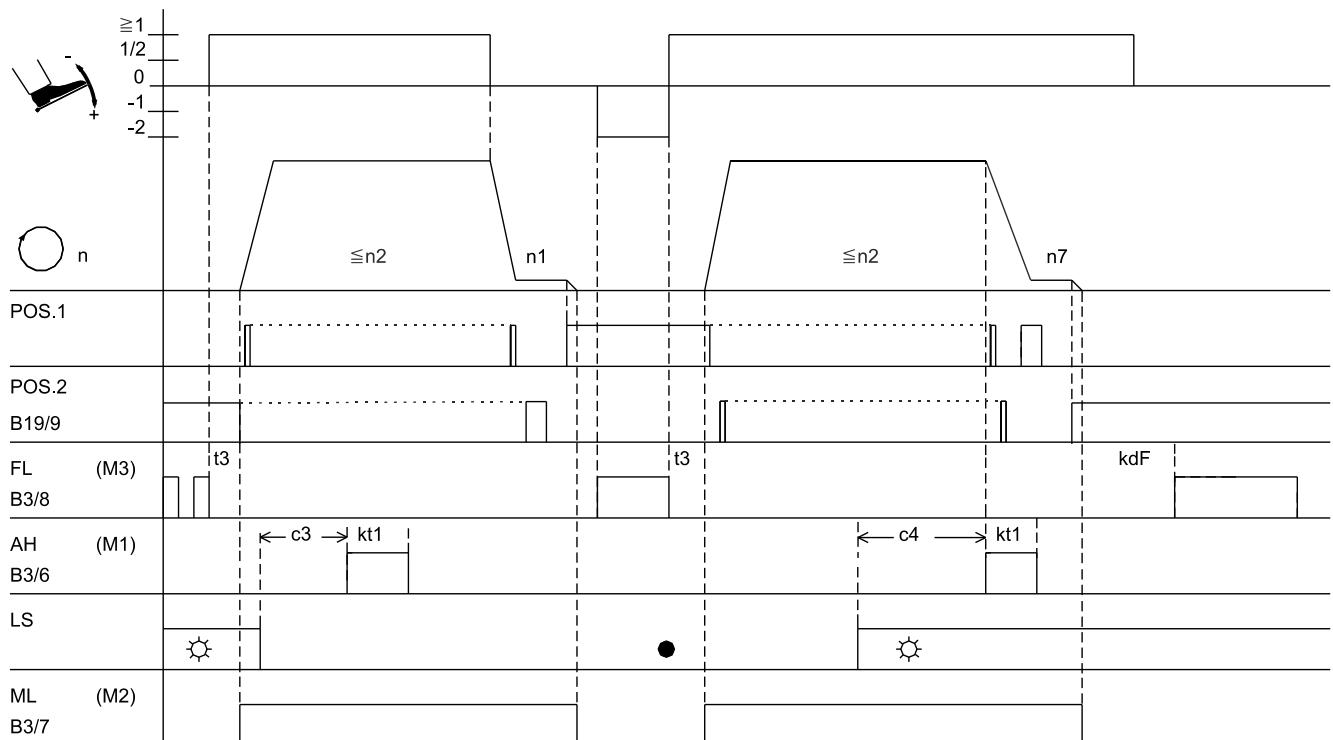
Mode 6 (chainstitch with fast scissors) parameter 232 = 1



0334/MODE-06

Mark	Function	Parameter	Control		
FAm SSSt USS	Mode 6 Softstart Chainstitch with fast scissors M1/M2	290 = 6 134 = 1 232 = 1			
n2 n6 n7	Maximum speed Softstart speed Trimming speed	111 115 116			
SSc t3 kd1/kd2 kt1/kt2 kdF	Softstart stitches Start delay from lifted sewing foot Delay times of outputs M1/M2 (AH1/AH2) ON periods of outputs M1/M2 (AH1/AH2) Switch-on delay of sewing foot lifting	100 202 280 / 282 281 / 283 288			

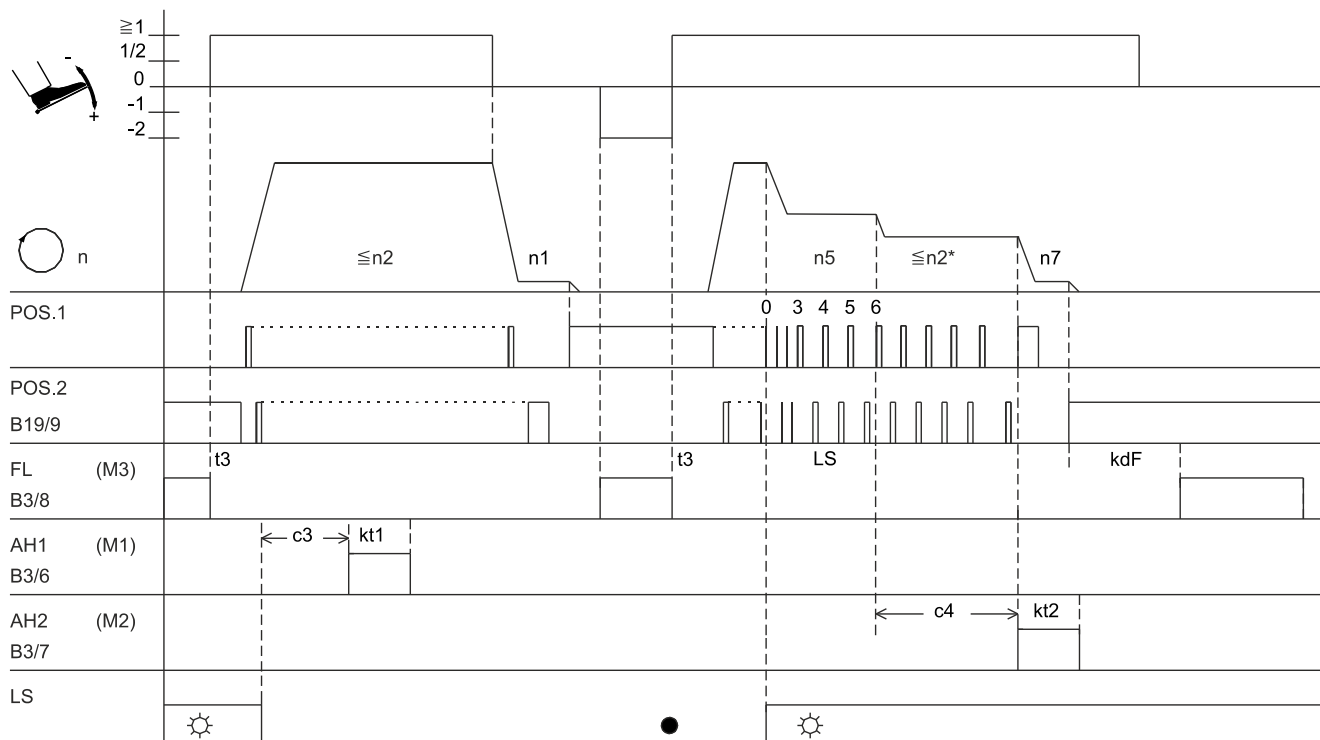
Mode 7 (overlock) parameter 232 = 0 (tape cutter) / parameter 018 = 0 (seam end with stop)



0334/MODE-07a

Mark	Function	Parameter	Control		
FAm	Mode 7	290 = 7	Key -		
LS	Sewing foot lifting at the seam end	On			
UoS	Light barrier	009 = 1			
-Pd	Sequence "overlock mode with stop"	018 = 0			
tFS	Function "pedal in pos. -2" blocked	019 = 2			
LSS	Beginning of thread tension release at the start of the seam	025 = 0			
PLS	Start blockage with light barrier uncovered	132 = 0			
USS	Speed n5 after light barrier sensing	192 = 0			
	Tape cutter function	232 = 0			
n1	Positioning speed	110			
n2	Maximum speed	111			
n5	Speed after light barrier sensing	114			
n7	Trimming speed	116			
c3	End counting for chain suction	002			
c4	Start counting for chain suction	003			
LS	Start counting for tape cutter	004			
kt1	ON period of tape cutter	281			
kdF	Switch-on delay of sewing foot lifting	288			

Mode 7 (overlock) parameter 232 = 1 (fast scissors) / parameter 018 = 0 (seam end with stop)



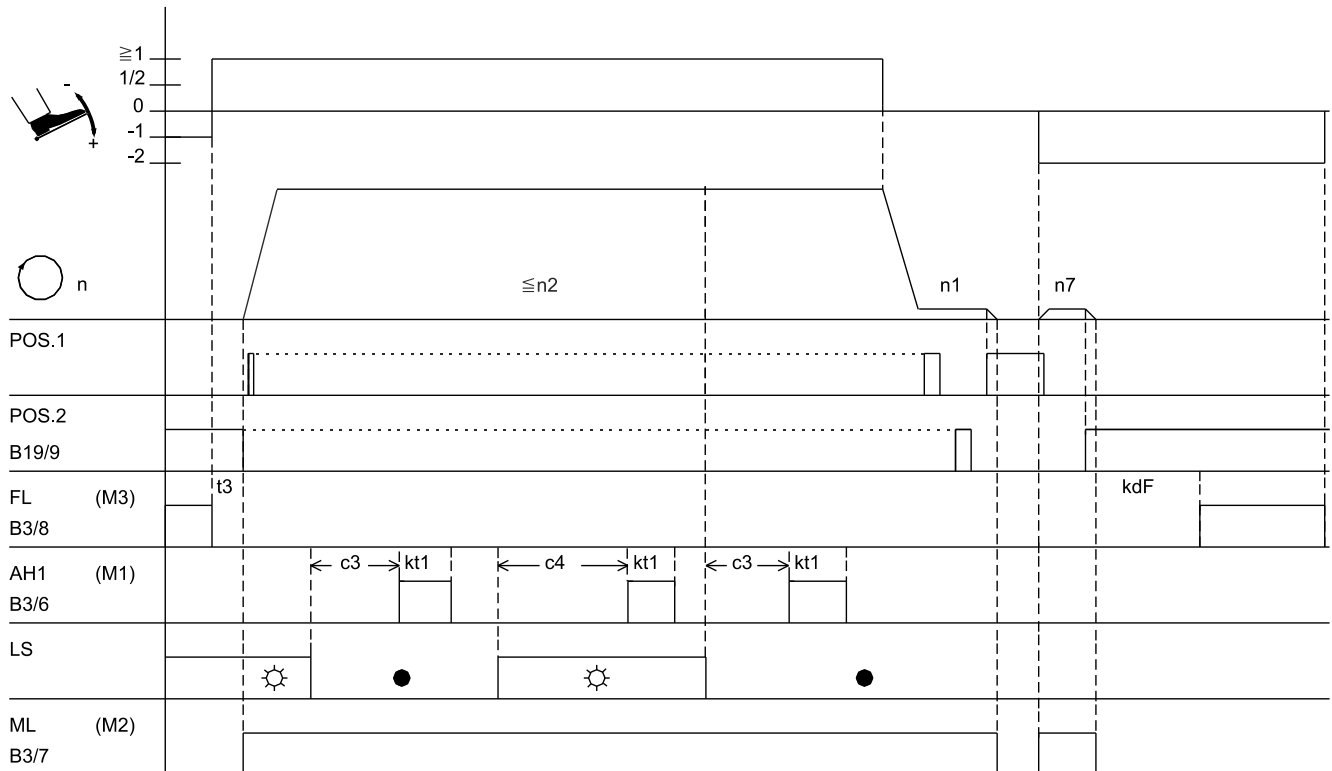
0334/MODE-07c

Mark	Function	Parameter	Control		
FAm	Mode 7	290 = 7	Key -		
LS	Sewing foot lifting at the seam end	009 = 1			
UoS	Light barrier	018 = 0			
-Pd	Sequence "overlock mode with stop"	019 = 2			
LSS	Function "pedal in pos. -2" blocked	132 = 0			
PLS	Start blockage with light barrier uncovered	192 = 0			
USS	Chain suction On after light barrier compensating stitches	232 = 1			
n1	Function "fast scissors"				
n2	Positioning speed	110			
n5	Maximum speed	111			
n7	Speed after light barrier sensing	114			
	Trimming speed	116			
c3	Start counting for tape cutter 1	002			
c4	End counting for tape cutter 2	003			
LS	Light barrier compensating stitches	004			
kt1	ON period of tape cutter 1 (M1)	281			
kt2	ON period of tape cutter 2 (M2)	283			
kdF	Switch-on delay of sewing foot lifting	288			

$\leq n2^*$) When the light barrier compensating stitch count at speed $n5$ ends, the final count for the cutter ($c4$) is controlled by the pedal.

If the stitch count for the cutter is set to 0 and the light barrier compensating stitch count is set to when the cutting begins, the count is carried out at speed $n5$ independently of the pedal.

Mode 7 (overlock) parameter 232 = 0 (tape cutter) / parameter 018 = 1 (seam end without stop)

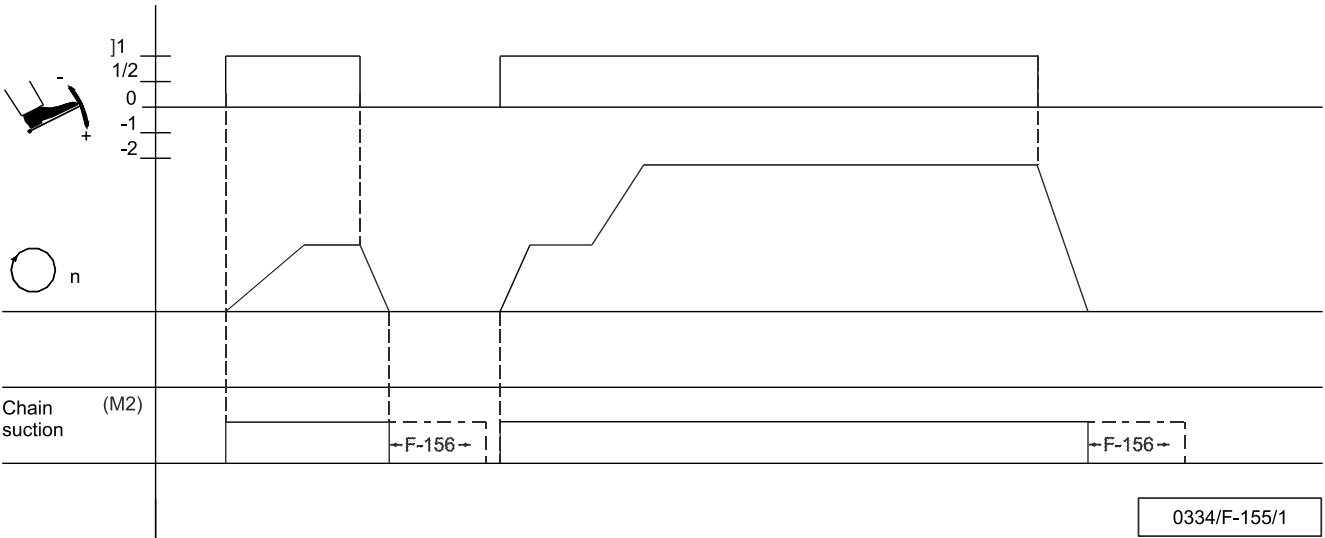


0334/MODE-07b

Mark	Function	Parameter	Control		
FAm	Mode 7	290 = 7			
LS	Light barrier compensating stitches	004 = 0			
LS	Light barrier	009 = 1			
UoS	Sequence "overlock mode at the seam end without stop"	018 = 1			
-Pd	Function "pedal in pos. -1/-2" activated in the seam	019 = 3			
USS	Tape cutter function	232 = 0			
n1	Positioning speed	110			
n2	Maximum speed	111			
n7	Trimming speed	116			
c3	Start counting for tape cutter	002			
c4	End counting for tape cutter	003			
t3	Start delay from lifted sewing foot	202			
kt1	ON periods of outputs M1	281			
kdF	Switch-on delay of sewing foot lifting	288			

Mode 7 (overlock) chain suction permanent signal

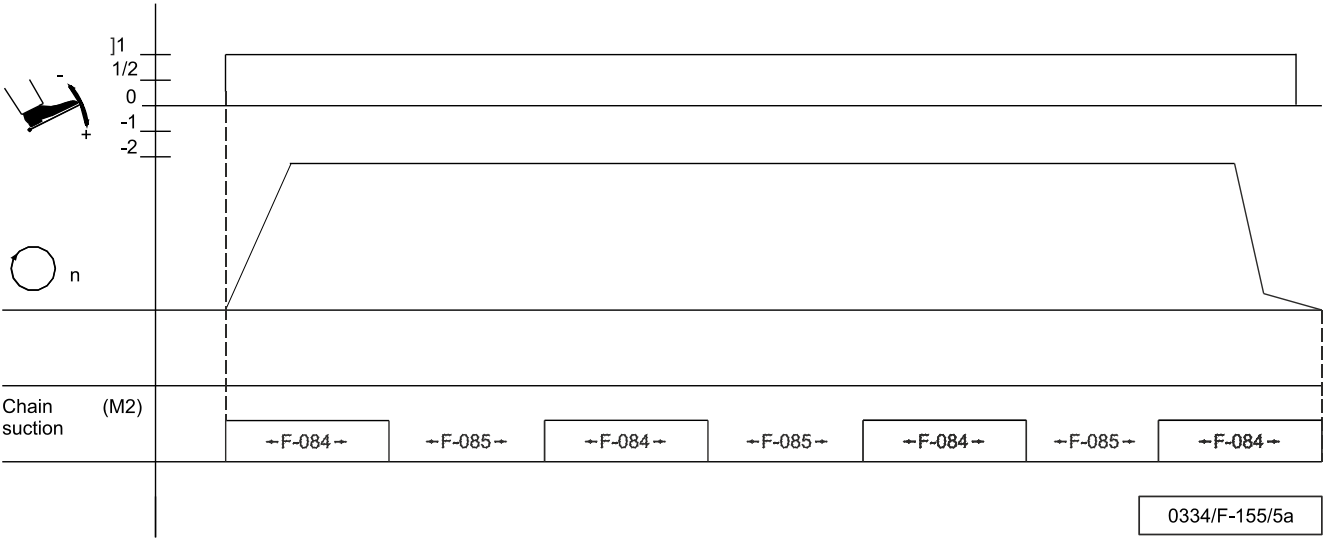
Parameter F-155= 1
Parameter F-156= 200 ms
Suction always On if motor running signal



Mark	Function	Parameters			
M2	Chain suction	155 = 1			
n	Speed	156 = 200ms			
F-156	Switch-off delay for M2				

Mode 7 (overlock) chain suction via stitch count (Ecco)

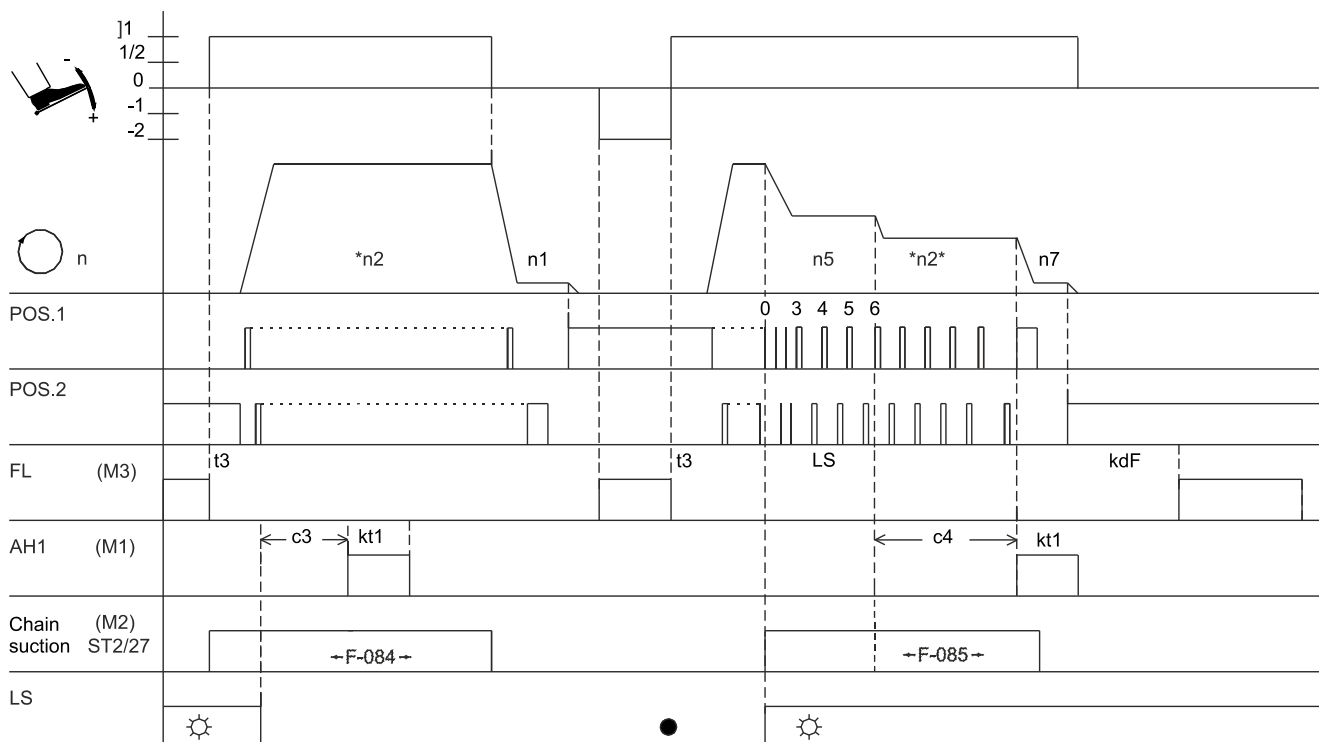
Parameter F-155= 5
Parameter F-084= 5
Parameter F-085= 4



Mark	Function	Parameters
M2	Chain suction	155 = 5
n	Speed	
Mle	Stitches for motor run Ecco On	084 = 5
Mla	Stitches for motor run Ecco Off	085 = 4

Mode 7 (overlock) Chain suction controlled via light barrier

Parameter F-155= 6

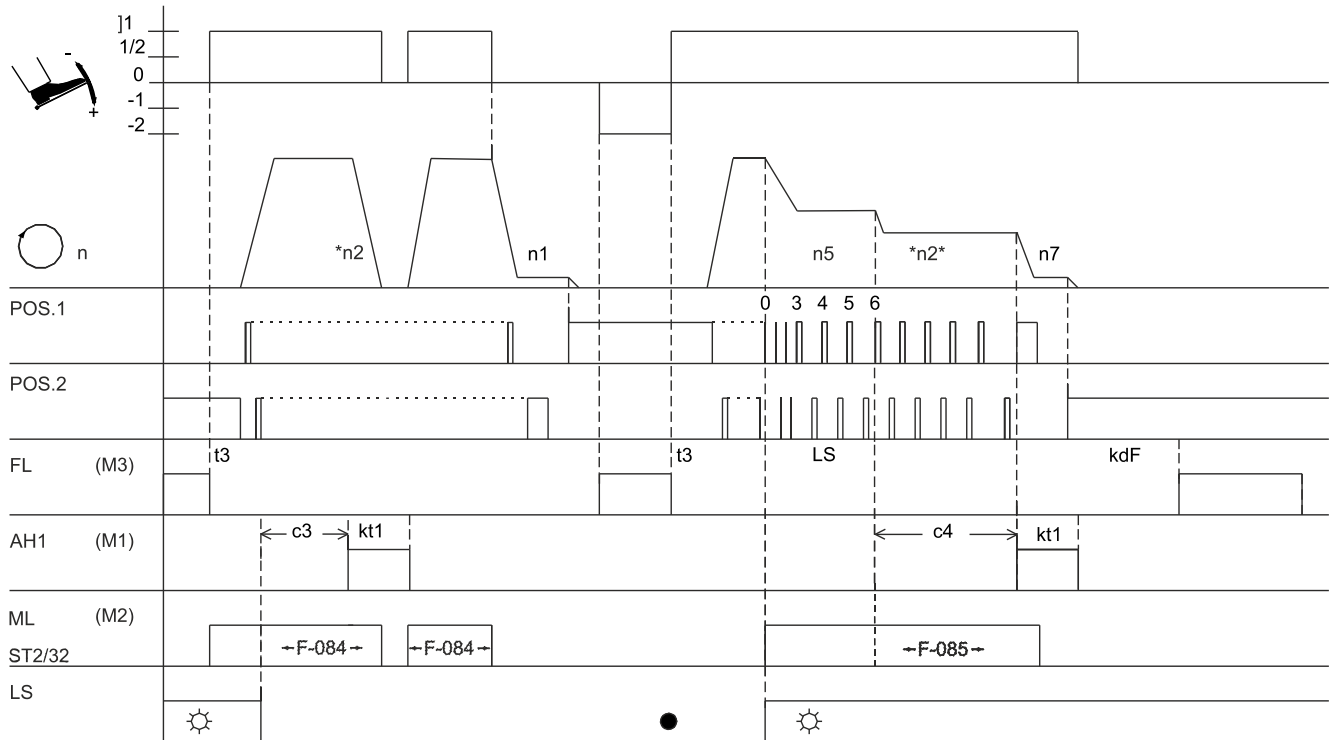


0334/F-155/6a

Mark	Function	Parameters	Control		
LS	Sewing foot lifting at the seam end	On			
UoS	Light barrier	009 =1	Key -		
-Pd	Sequence "overlock mode with stop"	018 =0			
LSS	Function "pedal in pos. -2" blocked	019 =2			
PLS	Start blockage with light barrier uncovered	192 =0			
USS	Speed n5 after light barrier sensing	232 =0			
	Tape cutter function				
n1	Positioning speed	110			
n2	Maximum speed	111			
n5	Speed after light barrier sensing	114			
n7	Trimming speed	116			
c3	Start counting for tape cutter	002			
c4	End counting for tape cutter	003			
LS	Light barrier compensating stitches	004			
kt1	ON period of tape cutter	281			
kdF	Switch-on delay of sewing foot lifting	288			
Mle	Run-out stitch chain suction on seam start	084			
Mla	Run-out stitch chain suction on seam end	085			

Mode 7 (overlock) chain suction controlled via light barrier and chain suction signal interrupted during stop

Parameter F-155= 7



0334/F-155/7a

Mark	Function	Parameters	Control		
LS	Sewing foot lifting at the seam end	On			
UoS	Light barrier	009 =1	Key -		
-Pd	Sequence "overlock mode with stop"	018 =0			
LSS	Function "pedal in pos. -2" blocked	019 =2			
PLS	Start blockage with light barrier uncovered	192 =0			
USS	Speed n5 after light barrier sensing	232 =0			
	Tape cutter function				
n1	Positioning speed	110			
n2	Maximum speed	111			
n5	Speed after light barrier sensing	114			
n7	Trimming speed	116			
c3	Start counting for tape cutter	002			
c4	End counting for tape cutter	003			
LS	Light barrier compensating stitches	004			
kt1	ON period of tape cutter	281			
kdF	Switch-on delay of sewing foot lifting	288			
Mle	Run-out stitch chain suction on seam start	084			
Mla	Run-out stitch chain suction on seam end	085			

11 Parameterlist

11.1 Operator Level

The preset values indicated apply to mode 0 (Parameter 290 = 0).
For preset values applicable to other modes see table in chapter 11.1 »Preset Values Depending on Mode«.

Parameters	Designation	Unit	Max	Min	Preset	Ind.
002 c3	Number of stitches of end backtack backward - Number of stitches of end stitch condensing with stitch regulator - Number of stitches of tape cutter at the start of the seam	Stitches	254	0	2	
003 c4	- Number of stitches of end backtack forward - Number of stitches of end stitch condensing without stitch regulator - Number of stitches of tape cutter at the seam end	Stitches	254	0	2	
004 LS	Light barrier compensating stitches	Stitches	254	0	7	
005 LSF	Number of stitches of the light barrier filter for knitted fabrics	Stitches	254	0	1	
006 LSn	Number of light barrier seams		15	1	1	
007 Stc	Number of stitches for the seam with stitch counting	Stitches	999	0	20	
009 LS	Light barrier On/Off		1	0	0	
013 FA	Thread trimmer On/Off		1	0	0	
014 Fw	Thread wiper On/Off		1	0	0	
015 StS	Stitch counting On/Off		1	0	0	
017 SAb	Stop for tape cutting at the seam end On/Off (Function only when overlock mode is active).		1	0	0	
018 UoS	0 = Sequence "overlock mode with stop" 1 = Sequence "overlock mode without automatic stop. When the command "run" is given, the drive runs at the pre-selected speed. With pedal in pos. 0 or light barrier covered , the program switches to the next start of a seam without issuing signals M1/M2. 2 = As with setting "1". But with pedal in pos. 0 signals M1/M2 will be issued, and the program switches to the next start of a seam. 3 = As with setting "1". But with pedal -2 signals M1/M2 will be issued, and the program switches to the next start of a seam. Intermediate stop and sewing foot lifting with pedal in pedal -1 is possible. 4 = If the light barrier is covered during the end count for chain suction, the program switches immediately to the next start of a seam. If the end count has been completed and the light barrier remains uncovered, the drive stops. 5 = Tape cutting at the start of the seam with stop		5	0	0	

Parameters	Designation	Unit	Max	Min	Preset	Ind.
019 -Pd	0 = Pedal in pos. -1 blocked in the seam. But with pedal in pos. -2 sewing foot lifting is possible in the seam (function active whenever the light barrier is On) 1 = With pedal in pos. -1 sewing foot lifting is blocked in the seam. 2 = Pedal in pos. -2, thread trimming disabled. (Function only if parameter 009 = 1) 3 = Pedal in pos. -1 and -2 enabled in the seam. 4 = Pedal -1 and -2 locked in the seam (function only when parameter 009 =1) 5 = Start seam end by with pedal -1		5	0	3	
023 AFL	Automatic sewing foot lifting with pedal forward at the seam end, if light barrier or stitch counting is On. 0 = Automatic foot lifting off 1 = Automatic foot lifting On		1	0	1	
025 tFS	Start counting (pa. 157) for thread tension release at the start of the seam 0 = Start counting at the start of the seam 1 = Start counting when the light barrier is covered		1	0	1	
026 APd	Characteristic of the "analog pedal" 0 = Analog function off 1 = 12-level, like previous pedal function 2 = continuously variable 3 = 24-level 4 = 60-level 5 = 48-level 6 = 48 level / standing operation (SOP; foot control 304)i		6	0	4	
027 plu	Area for setting + 1/2 of the analog pedal in percent		80	10	30	
028 epd	0 = Function Off 1 = Pedal 2 release only from Pos. 1		0	1	0	

Parameters	Designation	Unit	Max	Min	Preset	Ind.
041 EZP	Special pedal function Single stitch / Full stitch 0 = Function Off 1 = Single stitch (assuming needle up to needle down). Afterwards as a complete hand wheel rotation in speed n9) 2 = Full stitch (a complete hand wheel rotation in speed n9) 3 = Speed limitation up to F-042		2	0	0	
042 GrP	Pedal travel forwards for detection of the special pedal function	%	100	0	40	
051 dPd	Time for detection of the special pedal function	ms	2550	0	100	
084 Mle	Stitches for motor ECO On	Stitches	254	0	5	
085 Mla	Stitches for motor ECO runs down	Stitches	254	0	5	
086 vct	Counted forward section in manual ornamental backtack On/Off		1	0	1	
087 chr	0 = Manual backtack at speed n13 (Parameter 109) 1..255 = Manual ornamental backtack at speed n9 (Parameter 122)	Stitches	255	0	0	
088 kla	Stitches for clamping the seam start (mode 68)	Stitches	20	0	3	
090 wAr	Repetition of the start/ multiple backtack		255	0	3	
091 wEr	Repetition of the final/multiple backtack		255	0	3	
092 Fwr	1 = Backtack repetition On/Off 2 = Repetition of the start backtack with automatic cutting. No end backtack is done.		2	0	0	

11.2 Technical level (Code no. 1907)

Parameters	Designation	Unit	Max	Min	Preset	Ind.
100 SSc	Number of softstart stitches	Stitches	254	0	2	
110 n1	Positioning speed for threading (mode 66)	RPM	390	70	200	
111 n2	Upper limit setting range of the maximum speed	RPM	990 0	n2_	5000	
114 n5	Speed after light barrier sensing	RPM	990 0	200	1200	
115 n6	Softstart speed	RPM	990 0	70	500	
116 n7	Trimming speed	RPM	700	70	200	
118 n12	Automatic speed for stitch counting	RPM	990 0	400	3500	
119 nSt	Speed stage graduation 1 = Linear 2 = Slightly progressive 3 = Highly progressive		3	1		
121 n2	Lower limit setting range of the maximum speed	RPM	n2_	200	400	
122 n9	Limited speed n9	RPM	990 0	200	2000	
128 ASd	Start delay, when command "start" is given by covering the light barrier (see parameter 129)	ms	200 0	0	0	
129 ALS	Machine start by covering the light barrier (only in conjunction with parameter 132 = 1) 0 = Function Off 1 = Light barrier covered → pedal forward (>1) → machine run pedal controlled. 2 = Pedal forward (>1) → light barrier covered machine run → pedal controlled. 3 = Light barrier covered → machine run at automatic speed n12 (without pedal) 4 = Pedal forward (>1) → light barrier covered machine run → pedal controlled. 5 = Light barrier covered → machine run at automatic speed n12 (without pedal) Attention! If 129 = 3, the machine starts immediately after covering the light barrier without influence by the pedal! It can be stopped only by uncovering the light barrier or by machine run blockage! If machine run blockage is disabled, the machine starts immediately even if the light barrier is still covered! 6 = The same as 3, run without pedal when covering the light curtain, however start up only when FI is lowered.		3	0	0	
130 LSF	Light barrier filter for knitted fabrics		1	0	0	
131 LSd	0 = Light barrier sensing "covered" 1 = Light barrier sensing uncovered		1	0	1	
132 LSS	0 = Machine start possible with light barrier uncovered or covered. 1 = Machine start blocked with light barrier uncovered if parameter 131 = 1. Machine start blocked with light barrier covered,		1	0	1	
133 LSE	Thread trimming operation, when completing the seam after light barrier sensing On/Off		1	0	1	
134 SSt	Softstart On/Off		1	0	0	

Parameters	Designation	Unit	Max	Min	Preset	Ind.
140 dnE	Delay of seam end with pedal in pos. -2	ms	2550	0	0	
141 SGn	Speed status for the seam with stitch counting 0 = Speed controllable by the pedal up to the set maximum speed (Parameter 111) 1 = Fixed speed (Parameter 118) without influence by the pedal (machine stop by pressing the pedal to the basic position) 2 = Limited speed controllable by the pedal up to the set limit (Parameter 118) 3 = At fixed speed (Parameter 118) can be interrupted by full heelback -2 4 = At fixed speed (Parameter 110) can be interrupted by full heelback -2		4	0	0	
142 SFn	Speed status for the free seam and for the seam with light barrier 0 = Speed controllable by the pedal up to the set maximum speed (Parameter 111)		3	0	0	

		1 = Fixed speed (Parameter 118) without influence by the pedal (machine stop by pressing the pedal to the basic position) 2 = Limited speed controllable by the pedal up to the set limit (Parameter 118) 3 = At fixed speed (Parameter 118) can be interrupted by full heelback (only for seams with light barrier).				
153	brt	Braking power at machine standstill	50	0	15	

Parameters	Designation	Unit	Max	Min	Preset	Ind.								
155 LSG	Mode signal run 0 = Signal Off. 1 = Signal run On. 2 = Signal “run” enabled when the speed is >3000 RPM. 3 = Signal with pedal <> 0. 4 = Signal enabled only after motor synchronization (one rotation at positioning speed after power On). 5 = Motor runs Eco with setting F-84 and F-85 6 = Motor runs the same as chain suction at the seam start / end with counter F-084 and F-085 7 = The same as 6, however chain suction at the start of the seam can be interrupted and with switch-off delay F-156		7	0	1									
156 t05	Switch-off delay for the signal “run” or signal with pedal in pos. 0 (neutral)	ms	2550	0	0									
161 drE	Direction of motor rotation 0 = Clockwise rotation 1 = Counterclockwise rotation		1	0	1									
170 Sr1	Setting the reference position: - Press the E key - Press the >> key. - Turn handwheel until symbol on display goes off. Then set the handwheel to the reference position. - Press the P key twice													
171 Sr2	Setting the needle positions: 1E = Start position 1 2E = Start position 2 1A = End position 1 2A = End position 2	Degrees	359	0	26 319 200 355									
172 Sr3	Display on the control: Pos. 1 to 1A (LED segment 5 lights up) Pos. 2 to 2A (LED segment 6 lights up)													
173 Sr4	Testing of signal inputs and outputs				OFF									
Inputs By actuating the switches connected to the control, the function of these switches is checked and displayed on the control. With the switch open, OFF appears (only in the control panel of the control) and with the switch closed, the corresponding input in1...in7 , i11 (LSM) , i12 , i13 appears.														
Outputs - Select the desired output using the +/- keys. - With the button >> the corresponding output is switched on, as long as it is connected and functional.														
<table><tr><th>Output</th><th>Socket</th></tr><tr><td>M1</td><td>B3/6</td></tr><tr><td>M2</td><td>B3/7</td></tr><tr><td>M3</td><td>B3/8</td></tr></table>							Output	Socket	M1	B3/6	M2	B3/7	M3	B3/8
Output	Socket													
M1	B3/6													
M2	B3/7													
M3	B3/8													

Parameters	Designation	Unit	Max	Min	Preset	Ind.
176 Sr6	Service routine for total operating hours display. The process is as with display example of parameter 177.					
177 Sr7	Service routine for display of hours since the last service. Display example for the operator control panel: Press the E key → Display Sr7= Press the >> key → Display h t Press the E key → Display 0000 Press the >> key → Display h h Press the E key → Display 0000 Press the E key → Display Min Press the E key → Display 00 Press the E key → Display SEc Press the E key → Display 00 Press the E key → Display MS Press the E key → Display 000 Press the E key → Display rES Press the E key again to restart routine, or press the P key twice to return to operational status					
179 Sr5	Display of control program number with index and more identification numbers. The data is displayed in sequence by keystroke. Display example for the operator control panel: Press the E key → Display Sr5= Press the >> key → Display e.g. 5030 (Prog. No.) Press the E key → Display e.g. A (Index) Press the E key → Display e.g. 06 (Year) Press the E key → Display e.g. 10 (Month) Press the E key → Display e.g. 24 (Day) Press the E key → Display e.g. 16 (Hour) Press the E key → Display e.g. -- Press the E key → Display e.g. ---- Press the E key again to restart routine, or press the P key twice to return to operational status					

Parameters	Designation	Unit	Max	Min	Preset	Ind.
180 rd	Reversing angle	Degrees	359	0	175	
181 drd	Switch-on delay of reverse motor rotation	ms	990	0	10	
182 Frd	Reverse motor rotation On/Off		1	0	0	
184 c6	Number of run-out stitches when unlocking the chain	Stitches	254	0	20	
190 mEk	Function "unlock the chain" in modes 5, 6 and 7 (Parameter 290) 0 = Unlocking off 1 = Unlocking the chain manually (with pedal in pos. -2 without cutting at the seam end) 2 = Unlocking the chain automatically - By means of light barrier or - pedal in pos.-2 (Parameter 019) without cutting at the seam end 3 = Unlocking the chain automatically - By means of light barrier or - Pedal in pos. -2 (Parameter 019) with cutting and run-out stitches (Parameter 184) at the seam end, then unlocking the chain (only if parameter 290 = 7) 4 = Unlocking only with pedal 2 No unlocking the chain at the seam end by means of light barrier, cutting and run-out stitches.		4	0	1	
192 PLS	Speed of the light barrier compensating stitches 0 = Speed n5 after light barrier sensing 1 = Speed pedal controlled		1	0	0	
198 Bag	Functions with chainstitch machines e. g. bag sewing machine (Parameter 290 = 37) 0 = Function "thread trimming" or "hot thread chain cutting" and sewing foot lift using the pedal. 1 = Function "thread trimming" or "hot thread chain cutting" using		2	0	0	

		the knee switch, and sewing foot lift using the pedal. 2 = Function "thread trimming" or "hot thread chain cutting" using the pedal and sewing foot lift using the knee switch.				
199	FSn	Thread tension release at the seam end On/Off. 0 = Thread tension release Off at the seam end for pedal in pos. 0. 1 = Thread tension release On at the seam end for pedal in pos. 0. 2 = Thread tension release at the seam end and after power on and pedal in position 0 On.	2	0	0	

11.3 Supplier level (Code No. 3112)

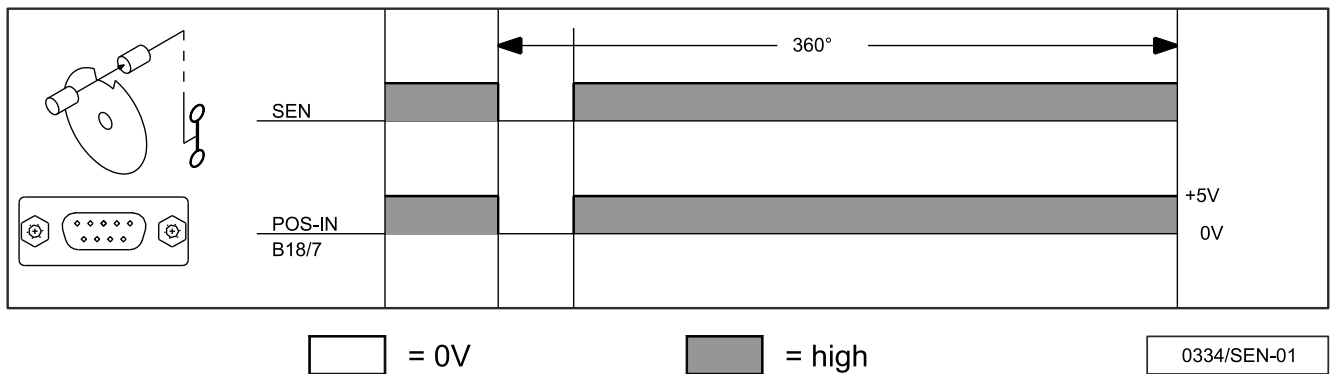
Parameters	Designation	Unit	Max	Min	Preset	Ind.	
201	t2	Sewing foot switch-on delay after thread wiper with half heelback	ms	2550	20	80	
202	t3	Start delay after disabling the sewing foot lifting signal	ms	500	0	50	
203	t4	Time of full power of sewing foot lifting	ms	600	0	500	
205	t6	Thread wiper time	ms	2550	0	120	
206	t7	Delay from end of thread wiper until sewing foot lifting On	ms	800	0	40	
207	br1	Braking effect when varying the preset value ≤ 4 stages (indicated values only with transmission ratio 1:1)		55	1	15	
208	br2	Braking effect when varying the preset value ≥ 5 stages (indicated values only with transmission ratio 1:1)		55	1	20	
209	dFw	Thread wiper switch-on delay	ms	2550	0	0	
211	tFL	Sewing foot lifting switch-on delay with thread wiper off	ms	500	0	60	
217	Sr	Number of operating hours before service in steps of 10 (operating hours recording enabled if set at “0”).	Std	99900 ***)	00000	00000	
218	SKL	Select custom machines 0 = No custom machine 1 = Model 204 2 = Big Bag		2	0	0	
219	br3	Braking ramp for $n < 350 \text{ min}^{-1}/_{ms}$ when drive stopped		55	1	4	
220	ALF	Accelerating power of the drive (indicated values only with transmission ratio 1:1)		55	1	35	
221	dGn	Speed gate 1	RPM	990	50	100	
222	tGn	Speed gate damping period	ms	990	0	20	
225	br4	Setting the braking curve for the light barrier and machine run blockage (values only with transmission ratio 1:1)		55	1	20	
229	dP2	Delay of heelback (-2)	ms	2000	0	0	
232	USS	Overlock with fast scissors On/Off		1	0	0	
233	c	Thread tension release switch-on delay	Stitches	254	0	0	
234	pdo	Restart after machine run blockage via pedal 0 position		1	0	1	B
236	FLP	0 = FI always permitted 1 = FI only permitted in position 2 2 = FI after cutting stored pedal plus ½ lifts storing, pedal minus 1 switches stored FI on. 3 = Storage for standing actuation FBxxx 4 = FI generally deactivated 5 = Stored foot lifting at the seam end can be deactivated with pedal plus ½ and pedal minus 1.		5	0	0	B
238	EnP	Software debouncing for all inputs: 0 = No debouncing 1 = Debouncing		1	0	1	
239	FEL	Selection of the input function on socket B18/8 0 = Light barrier function, if 009 =1 All other functions as with parameter 240.		112	0	0	

***) The 4-digit value displayed must be multiplied by 10.

Supplier level (Code No. 3112)

Parameters	Designation	Unit	Max	Min	Preset	Ind.
240 in1	Selection of input function on socket ST2/7 for input 1 0 = No function 1 = Needle up/down 2 = Needle up 3 = Single stitch (basting stitch) 4 = Full stitch 5 = Needle to position 2 6 = Machine run blockage effective with open contact 7 = Machine run blockage effective with closed contact 8 = Machine run blockage unpositioned effective with open contact 9 = Machine run blockage unpositioned effective with closed contact 10 = Automatic speed n12 without pedal (N.O. contact) 11 = Limited speed n12 pedal controlled 12 = Sewing foot lifting with pedal in position 0 (neutral) 15 = Tape cutter / fast scissors, function only in chainstitch and overlock mode 18 = Unlocking the chain, can be activated by keystroke, but will be executed only at the seam end 23 = No function 24 = Needle to position 2 (see instruction manual) 27 = Unlocking the chain, function is performed upon pressing the key 28 = External light barrier (according to setting of parameter 131) 33 = Speed n9 pedal controlled 34 = Automatic speed n9 can be suspended by pressing the pedal to pos. 0 (neutral) 37 = Speed n12 pedal controlled (break contact) 38 = Automatic speed n12 without pedal (break contact [N.C.]) Tape cutting only at machine standstill		112	0	0	
250 iFA	Thread trimmer activation angle	Degrees	359	0	180	
251 FSA	Switch-off delay of thread tension release	ms	990	0	50	
252 FSE	Switch-on delay angle of thread tension release	Degrees	359	0	0	
253 tFA	Stopping time for thread trimming	ms	500	0	70	
259 FAE	Activation delay angle of the thread trimmer	Degrees	359	0	0	

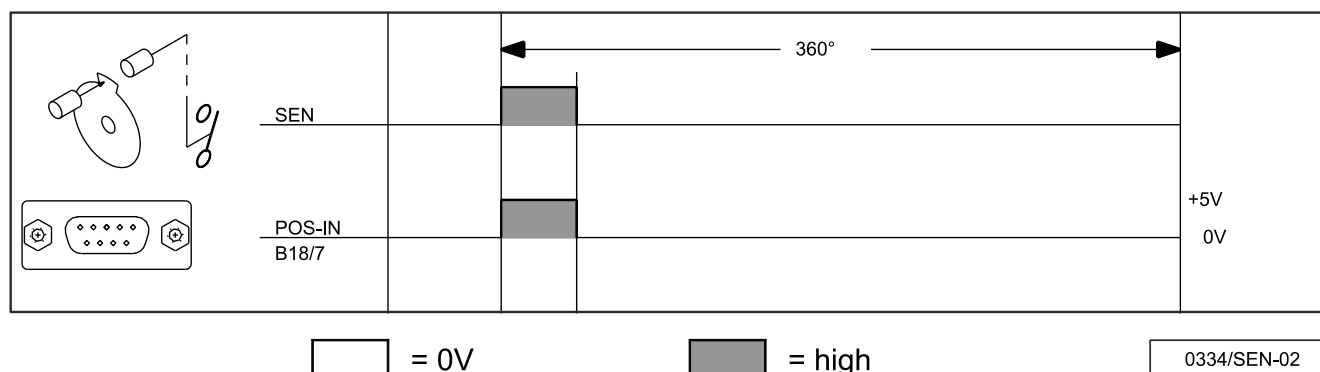
Parameters	Designation	Unit	Max	Min	Preset	Ind.
267	Abc	Overlock mode: Interrupt the start count And seam end initiation by light barrier uncovered	1	0	0	
269	PSv	Positioning shift	Incr.	100	0	10
270	PGm	Mode of a position sensor with normally open function (N.O.). 0 = The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171 *) 1 = Setting the sensor to position 2. Set position 1 with parameter 171 *) Measured from leading edge position 2. 2 = Setting the sensor to position 2. Set position 1 with parameter 171 *) Measured from trailing edge position 2. 3 = Setting the sensor to position 1. Set position 2 with parameter 171 *) Measured from leading edge position 1. 4 = Setting the sensor to position 1. Set position 2 with parameter 171 *) Measured from trailing edge position 1. 5 = No position sensor available. The drive stops unpositioned. The thread trimmer function is suppressed with this setting. 6 = The positions are determined by preset values. The reference position must be correctly set for this purpose. In machines with position sensors incorporated in the handwheel the reference position is determined by mechanical adjustment. In all other cases the reference position must be set (see chapter "Setting the Reference Position") in order for the angles preset by machine select for positions 1 and 2 to be correct. If necessary, the preset values can be adapted as described in chapters "Setting the Positions".	6	0	0	



The angles between positions 1 and 2, incoming and outgoing, can be configured using Parameter 171.

*) Alternatively, the positions can be configured using the fast-installation routine.

Parameters	Designation	Unit	Max	Min	Preset	Ind.
270 PGm	Mode of a position sensor with a normally closed function (N.C.). 0 = The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171 *) 1 = Setting the sensor to position 2. Set position 1 with parameter 171 *) Measured from trailing edge position 2. 2 = Setting the sensor to position 2. Set position 1 with parameter 171 *) Measured from leading edge position 2. 3 = Setting the sensor to position 1. Set position 2 with parameter 171 *) Measured from trailing edge position 1. 4 = Setting the sensor to position 1. Set position 2 with parameter 171 *) Measured from leading edge position 1. 5 = No position sensor available. The drive stops unpositioned. The thread trimmer function is suppressed with this setting. 6 = The positions are determined by preset values. The reference position must be correctly set for this purpose. In machines with position sensors incorporated in the handwheel the reference position is determined by mechanical adjustment. In all other cases the reference position must be set (see chapter "Setting the Reference Position") in order for the angles preset by machine select for positions 1 and 2 to be correct. If necessary, the preset values can be adapted as described in chapters "Setting the Positions".		6	0	0	



The angles between positions 1 and 2, incoming and outgoing, can be configured using Parameter 171.

*) Alternatively, the positions can be configured using the fast-installation routine.

Parameters	Designation	Unit	Max	Min	Preset	Ind.
272 trr	Transmission ratio between motor shaft and machine shaft (calculation formula see instruction manual!) The transmission ratio should be determined and indicated as precisely as possible!		40000	150	1000	

Parameters	Designation	Unit	Max	Min	Preset	Ind.
280 kd1	Delay time output M1	ms	5000	0	0	
281 kt1	ON period output M1	ms	5000	0	100	
282 kd2	Delay time output M2	ms	5000	0	100	
283 kt2	ON period output M2	ms	5000	0	100	
288 kdF	Delay time until sewing foot On	ms	5000	0	380	
290 FAm	Selection of machine specific mode 0 = Lockstitch: (FA1, FA2, FA3, FA1+FA2): e.g. BrotherDürkopp Adler, Mitsubishi, Pfaff, Toyota 5 = Chainstitch general: M1, M2, M3 and M4 parallel sequence 6 = Chainstitch with tape cutter and Fast scissors and M1 / M2 at the seam end 7 = Overlook		14	0	5	
328 ob	Changing function keys on the control panel 0 = All keys are locked 1 = All keys are released, key E + start backtack, key + end backtack (except mode 7) 2 = All keys are released, button E affects chain suction, button + impacts tape cutter (only in mode 7) 3 = Button E and button + no function 4 = 4 = Button E, + and – no function 5 = Button E affects soft start, button + impacts tape cutter and wiper 6 = Button E affects soft start, button + impacts tape cutter seat start /end		6	0	1	
340 1L	Lower switching threshold of input IN1	%	100	0	30	
341 1L	Upper switching threshold of input IN1	%	100	0	80	
360 11L	Lower switching threshold of input LSM	%	100	0	50	
361 11h	Upper switching threshold of input LSM	%	100	0	70	
362 15V	Switch +5V/+15V on B18 0 = +5V 1 = +15V	1	0	0		
370 n2	Direct input of maximum speed	RPM	F-111	F-121	Display	
374 nrd	Reset speed	rpm	390	70	100	B
377 tFl	Time monitoring foot lifting	sec	250	0	0	B
400 rSt	Reset to mode 5 if <> 93	255		93	B	400 rSt
401 EEP	Immediate storage of all changed data - Input code number 3112 after power On - Press the E key - -Input parameter 401 - Press the E key - Set display from 0 to 1 - Press the E or P key - All data are stored		1	0	0	
467 MOT	Selection of motor 1 = DC1500 2 = DC1550 3 = DC1200 4 = DC1250 9 = DC1210 10 = DC1230		2	1	1	
500 Sir	Recall of Fast Installation Routine (SIR) (see chapter "Fast Installation Routine (SIR)"					
510	Transfer parameter settings from control to Memory Stick					
511	Transfer parameter settings from Memory Stick to control					
527	Transfer control software from Memory Stick to control					

12 Error Displays

On the control	Signification
General Information	
A1	Pedal not in neutral position when turning the machine on
A2	Machine run blockage
A3	Reference position is not set
A9	No thread trimming mode available in parameter 290
A11	High lift foot for walking - measurement of the potis not permitted
A500	Max. number of files (99) on Memory Stick exceeded
A501	File not found on Memory Stick
A503	Data on Memory Stick and in the control is not equal
C1	Operating hours counter has reached or exceeded the service time
USB error	
D1	USB Info
Programming Functions and Values (Parameters)	
Returns to 0000 or to last parameter number	Wrong code or parameter number input
Serious Condition	
E1	The external pulse encoder e.g. IPG... is defective or not connected
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
E5	Motor end level over-temperature
E7	24 V power supply unit overload
E8	Too much data for the EEPROM or flash memory
E9	EEPROM or flash memory defective.
E10	End phase transistor short circuit(Output FL, VR, M1, M2, M3, oder M4)
E11	Thermal overload of output stage transistor
E13	Thread trimmer does not reach the end position
E14	Power voltage too high: The power voltage is greater than 290 V eff. (The DC motor cannot be started; if running, the motor is stopped without positioning. The motor is passively braked (runs down)!
E15	Internal communications error with intermediate circuit
E16	Power voltage too low: The power feed voltage was less than 120 V eff. (The DC motor cannot be started, and the 24 V is turned off.)
E17	Charging PTC too warm. The intermediate circuit could not be charged to the voltage needed. Possible cause: Switching the controller on/off to many times within a short time. Correction: Turn off controller and allow it to cool. (The duration of the cooling off phase depends on the ambient conditions and can take several minutes).
E18	Intermediate circuit voltage greater than 450 V, braking resistance possibly failed
E19	No motor connected, inverter defective, motor phase failed
E20	Speed too high
E21	Error in the 5 V power supply
E22	EB401: Analog value outside the range

Programming and Data Transfer	
F1	Parameter unavailable; wrong code number
F7	RS232 Time out
F8	RS232, error in data transfer, NAK received
Hardware Disturbance	
H1	Commutation transmitter cord or frequency converter disturbed
H2	Processor disturbed

For your notes:



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