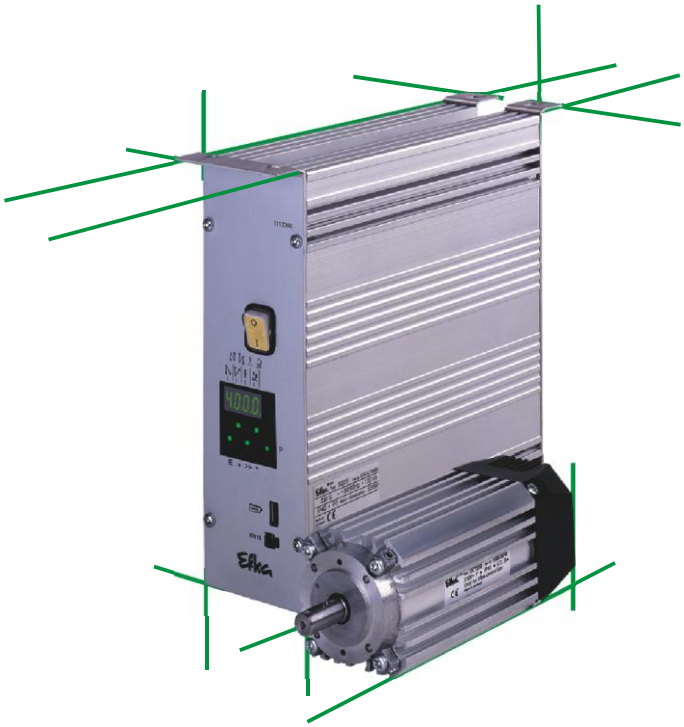
Efka dc1550

CONTROL PF321A6012



Instruction Manual

- Putting into Service
- Settings
- Functional Description

No. 402337 English

Efka
FRANKL & KIRCHNER GMBH & CO KG

Efka
EFKA OF AMERICA INC.

Efka
EFKA ELECTRONIC MOTORS SINGAPORE PTE. LTD.

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
- Use of the C200 compiler
- Adapter cords

CONTENTS **Page**

1 Range of Applications

The drive is suitable for PFAFF Powerline lockstitch machines models 2235 Premium, 2545 and 2546.
It can be operated with or without control panel.
The easy-to use V810, V820 or V850 control panels extend the range of functions.
Further control functions can be programmed using the Efka Compiler C200 software and the user-friendly V900 touchscreen panel.
When using optionally available SM210A controllers, stepping motor operation is also possible. See also connection scheme in the separate instruction manual “General Operation “)

1.1 Use in Accordance with Regulations

The drive is not an independently operating machine, but is designed to be incorporated into other machinery by specially trained personnel.
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 for AB221/AB222 etc.	**DC1550**
1	Electronic control/Power supply unit	**PF321A6012/N206A**
1	Variocontrol	**V820**
1	Adapter plate for V8.. for Pfaff model 2545	
1	B18 adapter control on Pfaff PD handwheel sensor	
1	Actuator	**EB301A**
1	Set of accessories (standard)	**B161**
	consisting of:	Plastic bag for B159, documentation and motor mounting parts, Undertable mounting reinforced
1	Set of accessories	**Z65**
	consisting of:	Pitman rod 400...700mm long, potential equalization cord, bracket for fastening EB... and screws in a plastic bag.
1	Pulley A 80-L DC15	

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.
Control panel Variocontrol V810	5970153
Control panel Variocontrol V820	5970154
Control panel Variocontrol V850	5990159
Control panel Variocontrol V900 (only in conjunction with compiler programming)	5990161
Reflection light barrier module LSM002	6100031
Hall sensor module HSM001	6100032
Pulse encoder IPG001	6100033
EFKANET Interface IF232-USB	7900081
Adapter cord for the connection of light barrier module and/or Hall sensor module HSM001 and/or pulse encoder IPG001 and/or EFKANET	1113229
Compiler C200 for programming additional functions	1113262
Adapter cord for the connection of sockets B18 each on the SM210A stepping motor control and on the control described here (see connection scheme in the separate instruction manual “General Operation “)	1113172
Actuating solenoid type EM1.. (for e. g. sewing foot lifting, backtacking, etc.)	Ask for available models
Extension cable approx. 1000 mm long for commutation transmitter DC15..	1113151
Extension cable approx. 1000 mm long for Netz DC15.. line	1113150
Potential equalization cord 700 mm long, LIY 2.5 mm^2, gray, with spades on both sides	1100313
Actuator (analog) type EB401	4170028
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
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	5870013
Knee switch type KN19 (pushbutton) with cord of approx. 450 mm length without plug	5870021
Undertable mounting kit for DC15..	1113235
Undertable mounting kit (reinforced) for DC15..	1113427
Sewing light transformer	please indicate line voltage and sewing light voltage (6.3V or 12V)
9-contact SubminD male connector	0504135
9-contact SubminD female connector	0504136
Half-shell housing for 9-contact SubminD	0101523
37-contact SubminD male connector, complete	1112900
Single pins for 37-contact SubminD with strand of 50 mm length	1112899

3 Putting into Service

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

- The correct installation of the drive, position transmitter and accompanying devices, if necessary
- The correct selection of the trimming operation using parameter 290
- If necessary, the correct adjustment of the direction of motor rotation using parameter 161
- The correct selection of the functions of keys (inputs) using parameters 240...249
- 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 setting of the number of angular degrees after the sensor position using parameter 271
- 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

WARNING - DANGER OF SHORT CIRCUIT

When using the Pfaff PD handwheel sensor integrated into the machine, the adapter included in the delivery must always be connected to connector B18.

4 Top part detection

In machines equipped with a top part detection module (OTE module), all parameters needed for the sewing process are set according to the values stored in the module.
Whether an OTE module is present and, if so, which module, is tested each time the power is turned on. Depending on the result of the test, different messages appear on the display of the control panel, and different operations are possible and/or required:

	Detection status	Display on the control panel	Further sequence / options
1	The PF321A control type is correctly detected	3500 PF321A	Sewing process released with the parameter read out of the OTE module
2	No OTE module connected	no IdEnt	Sewing process released with the parameters set in the control
3	SP74D control type detected	id wrong (2 sec.) ote format 0	0 = do not format iLL idEnt . All functions remain disabled 1 = format with the parameters read out of the control. Continue with # 7
4	No valid control type detected	iLL IdEnt	All functions remain disabled
5	Invalid OTE frames	SizE Error	All functions remain disabled
6	Checksum incorrect	crc bAd (2 sec.) nEw IdEnt	After **P** or **E** key, continue with # 7
7	New version detected	sEt cLass 01	Select machine class. After automatic setting of the parameters in question, it is necessary to determine the transmission ratio Pully ***1)***.
8	Program ID of control more recent than that of the OTE module	nEw ProgId (2 sec.) otE updAtE	0 = do not overwrite OTE 1 = overwrite OTE with the parameters read out of the control.
9	Program ID of control older than that of the OTE module	oLd ProgId (2 sec.) otE updAtE	0 = do not overwrite OTE 1 = overwrite OTE with the parameters read out of the control.

*The possible options (e.g. **0** or **1**) are selected by pressing the **+ / -** keys on the control panel. Confirmation with the **P** or **E** key.*

	Detection status	Display on the control panel	Further sequence / options
7	New version detected	sEt cLass 01	Select machine class. After automatic setting of the parameters in question, it is necessary to determine the transmission ratio Pully *1).
8	Program ID of control more recent than that of the OTE module	nEw ProgId (2 sec.) otE updAtE	0 = do not overwrite OTE 1 = overwrite OTE with the parameters read out of the control.
9	Program ID of control older than that of the OTE module	oLd ProgId (2 sec.) otE updAtE	0 = do not overwrite OTE 1 = overwrite OTE with the parameters read out of the control.

*1) *To determine the transmission ratio, the pedal must be pushed fully forwards. The drive runs at a reduced speed until the transmission ratio has been determined, then releases the pedal controlled speed. The display* Pulley *goes out.*

It is also possible to format a top part detection module using parameter 850.

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

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

Input parameter 500 ➔

Parameter for functional sequence “thread trimming operations” ➔

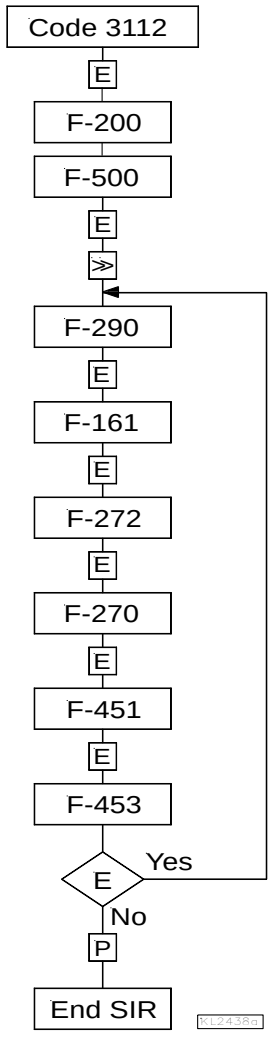
Parameter for direction of motor rotation ➔

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

Parameter for type of position sensor ➔

Parameter for position 1 ➔

Parameter for position 2 ➔



The values can be varied by pressing key +/-. When the parameter is displayed on the V810 control panel, press the E key once more for the value to be displayed.

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. The setting of other parameters is not affected.

Functions		Parameter
Call-up of the Fast Installation Routine SIR	(Sir)	**500**

Setting on the V810 control panel:

Input code number **3112**!			
▪ Press the **E** key	➔	The lowest parameter **2.0.0.** of this level appears	
▪ select **500**	➔	Parameter **5.0.0.** displayed	
▪ Press the **E** key	➔	The character **[o]** appears and flashes	
▪ Press the >> key	➔	Parameter **2.9.0.** appears	**(functional sequence "thread trimming operations")**
▪ Press the **E** key	➔	Parameter value **05** appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **1.6.1.** appears	**(direction of motor rotation)**
▪ Press the **E** key	➔	Parameter value **1** appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **2.7.2.** appears	**(transmission ratio)**
▪ Press the **E** key	➔	Parameter value **100** appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **2.7.0.** appears	**(type of position sensor)**
▪ Press the **E** key	➔	Parameter value **0** appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **4.5.1.** appears	**(position 1 leading edge, position 1 trailing edge is automatically set at 60°)**
▪ Press the **E** key	➔	Parameter value appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ or turn handwheel	➔	Set position for at least 1 rotation.	
▪ Press the **E** key	➔	Parameter **4.5.3.** appears	**(position 2 leading edge, position 2 trailing edge is automatically set at 60°)**
▪ Press the **E** key	➔	Parameter value appears	
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ or turn handwheel	➔	Set position for at least 1 rotation.	
▪ Upon pressing the **E** key once more the program returns to parameter 290!			
▪ Press the **P** key twice	➔	The system exits the SIR routine	

Setting on the V820/V850 control panel:

Input code number **3112**!			
▪ Press the **E** key	➔	The lowest parameter **200** of this level appears	
▪ select **500**	➔	Parameter **500** displayed	
▪ Press the **E** key	➔	The character **[o]** appears and flashes	
▪ Press the **>>** key	➔	Parameter **290 FAm 05** appears	**(functional sequence "thread trimming operations")**
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **161 drE 1** appears	**(direction of motor rotation)**
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **272 trr 100** appears	**(transmission ratio)**
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **270 PGm 0** appears	**(type of position sensor)**
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ Press the **E** key	➔	Parameter **451** appears	**(position 1 leading edge, position 1 trailing edge is automatically set at 60°)**
▪ Press the **+/-** key	➔	The parameter value can be changed.	
▪ or turn handwheel	➔	Set position for at least 1 rotation.	
▪ Press the **E** key	➔	Parameter **453** appears	**(position 2 leading edge, position 2 trailing edge is automatically set at 60°)**
▪ Press the **+/-** key	➔	The parameter value can be changed	
▪ or turn handwheel	➔	Set position for at least 1 rotation.	
▪ Upon pressing the **E** key once more the program returns to parameter 290!			
▪ Press the **P** key twice	➔	The system exits the SIR routine	

6 Setting the Basic Functions

6.1 Direction of motor rotation

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

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

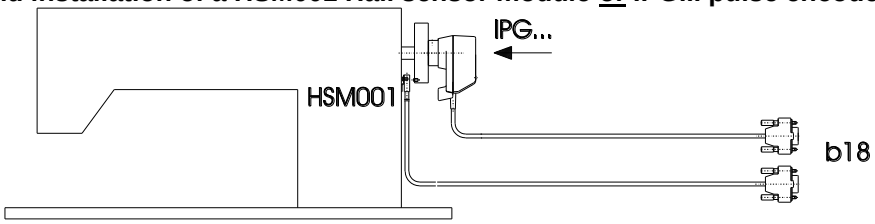
ATTENTION
If the motor is mounted differently, e. g. at a different angle or with gear, make sure that the value set using parameter 161 corresponds to the direction of rotation.

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

NOTE
Pfaff Powerline sewing machines are generally equipped with a PD handwheel sensor integrated into the machine. The installation of a hall sensor or pulse encoder as described below is thus not required.

WARNING - DANGER OF SHORT CIRCUIT
When using the Pfaff PD handwheel sensor integrated into the machine, the adapter included in the delivery must always be connected to connector B18.

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



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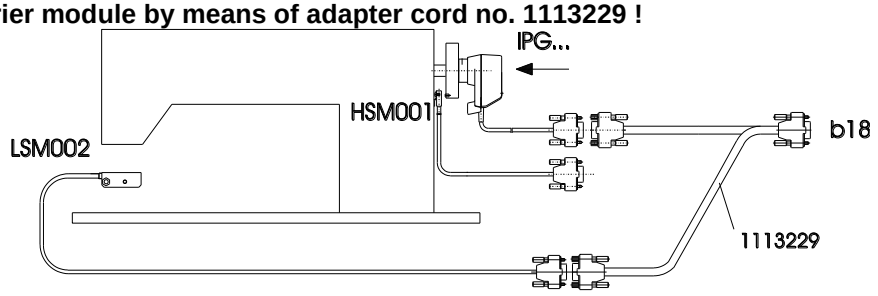
Representation and installation of a HSM001 Hall sensor module or PG... pulse encoder together with a LSM002 light barrier module by means of adapter cord no. 1113229 !



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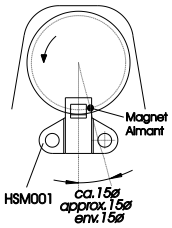
Operation with HSM001 Hall sensor module



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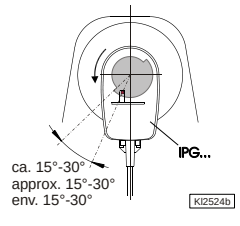
← - Get machine to the needle-up position.
- Position bore for magnet such that the magnet is located approx. 15° after the sensor in the sense of rotation.

Operation with IPG... pulse encoder

- 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.

→



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6.3 Transmission Ratio

NOTE

The transmission ratio must always be input, because only motors with integrated incremental transmitter 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 **with** or **without** control panel		Parameter
Transmission ratio between motor shaft and machine shaft	(trr)	**272**

The transmission ratio can be selected within a range of 020...9999 using parameter 272.

Example: With a motor pulley diameter of 40mm and a sewing machine head pulley diameter of 80mm the value 50 can be calculated using the formula below. If the value 200 has been selected in parameter 272, it follows that the motor pulley is double the size of the sewing machine head pulley.

$$\text{Value of parameter 272} = \frac{\text{Motor pulley diameter}}{\text{Machine pulley diameter}} \times 100$$

6.4 Selection of Functional Sequences (Thread Trimming Operations)

This drive is suitable for different lockstitch 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 in List of Parameters chapter “Table of Adapter Cords” a summary of the modes that can be set and the corresponding machines and adapter cords, to include available output signals.

Mode 0	**Lockstitch machine** (Pfaff model Powerline 2235 Premium)
Thread tension release from trailing edge of slot position 2 after delay (FSE) during ON period (FSA)	
Thread wiper for a programmable time (t6)	
Sewing foot lifting (see chapter "Sewing Foot Lifting")	
Backtacking (see chapter "Start Backtack" and "End Backtack")	
Signal "machine running"	
High lift for walking foot/flip-flop at limited speed after pressing the key	
Mode 1	**Lockstitch Machines with Thread Trimming System** (Pfaff Powerline models 2545, 2546)
Thread tension release from trailing edge of slot position 2 after delay (FSE) during ON period (FSA)	
Thread wiper for a programmable time (t6)	
Sewing foot lifting (see chapter "Sewing Foot Lifting")	
Backtacking (see chapter "Start Backtack" and "End Backtack")	
Signal "machine running"	
High lift for walking foot/flip-flop at limited speed after pressing the key	

6.5 Functions of the Keys Inputs in1...i10

Function **with** or **without** control panel					Parameter
Input 1	selectable input functions		0... 98	(in1)	240
Input 2	“	“	0... 98	(in2)	241
Input 3	“	“	0... 98	(in3)	242
Input 4	“	“	0... 98	(in4)	243
Input 5	“	“	0... 98	(in5)	244
Input 6	“	“	0... 98	(in6)	245
Input 7	“	“	0... 98	(in7)	246
Input 8	“	“	0... 98	(in8)	247
Input 9	“	“	0... 98	(in9)	248
Input 10	“	“	0... 98	(i10)	249

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

6.6 Positioning speed

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

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

6.7 Maximum Speed Compatible with the Sewing Machine

The maximum speed of the machine is determined by the selected pulley and by the following settings:

- Set the maximum speed using parameter 111 (n2)
- Set the maximum speed limitation to the specific level according to the application as described in chapter "Direct Input of Maximum Speed Limitation (DED)".

6.8 Maximum speed

Function **with** or **without** control panel		Parameter
Maximum speed	(n2)	**111**

NOTE

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

NOTE

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

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

6.9 Positions

Function **with** or **without** control panel		Parameter
Setting the needle positions	(Sr2)	**171**
Selection according to position sensor	(PGm)	**270**
Transmission ratio between motor shaft and machine shaft	(trr)	**272**

After setting parameter 270 at “1, 2, 3 or 4“, an angular degree must be selected using parameter 171, which determines the stop in position 2 or 1 after the sensor position. The angles are preset in modes 31 and 32, parameter 270 = 6. The transmission ratio must already have been input using parameter 272.

Connection of a sensor as a position transmitter (N.O. function) e. g. light barrier to socket B18/7.

The following settings must be made using **parameter 270**:

270 = 0 - The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171.

270 = 1
- Setting the sensor to position 2.
- Position 1 is set according to the angular degree setting by means of parameter 171.
- Start measuring from leading edge position 2.
- 0V at input B18/7 (inside of the window)
- +5V at input B18/7 (outside of the window)

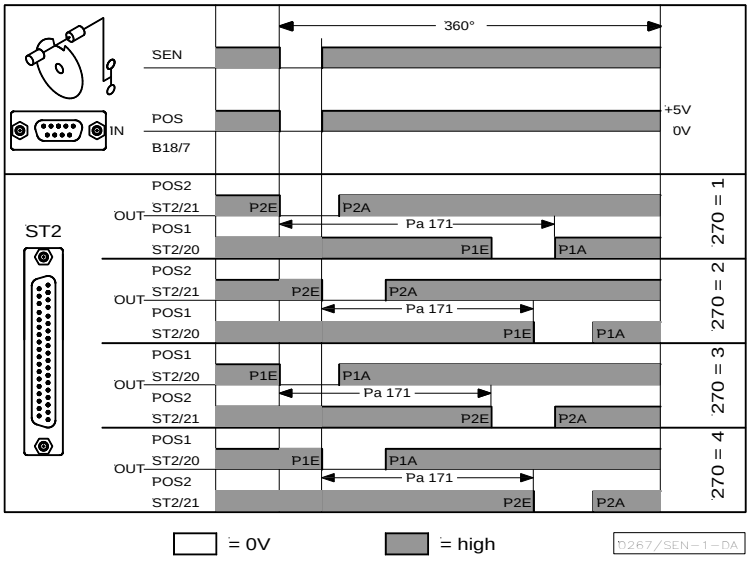
270 = 2
- Setting the sensor to position 2.
- Position 1 is set according to the angular degree setting by means of parameter 171.
- Start measuring from trailing edge position 2.
- Input and output level as with setting "1"

270 = 3
- Setting the sensor to position 1.
- Position 2 is set according to the angular degree setting by means of parameter 171.
- Start measuring from leading edge position 1.
- Input and output level as with setting "1"

270 = 4
- Setting the sensor to position 1.
- Position 2 is set according to the angular degree setting by means of parameter 171.
- Start measuring from trailing edge position 1.
- Input and output level as with setting "1"

270 = 5 - No position sensor available. The drive stops unpositioned. The thread trimmer function is suppressed with this setting.

270 = 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”.



Connection of a sensor as a position transmitter (N.C. function) e. g. light barrier or proximity switch to socket B18/7.

The following settings must be made using **parameter 270**:

270 = 0 - The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171.

270 = 1
- Setting the sensor to position 2.
- Position 1 is set according to the angular degree setting by means of parameter 171.
- Start measuring from trailing edge position 2.
- 0V at input B18/7 (inside of the window)
- +5V at input B18/7 (outside of the window)

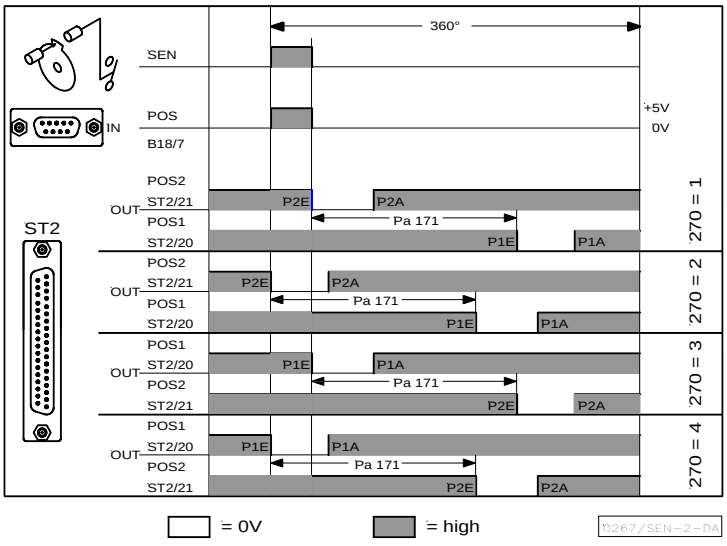
270 = 2
- Setting the sensor to position 2.
- Position 1 is set according to the angular degree setting by means of parameter 171.
- Start measuring from leading edge position 2.
- Input and output level as with setting "1"

270 = 3
- Setting the sensor to position 1.
- Position 2 is set according to the angular degree setting by means of parameter 171.
- Start measuring from trailing edge position 1.
- Input and output level as with setting "1"

270 = 4
- Setting the sensor to position 1.
- Position 2 is set according to the angular degree setting by means of parameter 171.
- Start measuring from leading edge position 1.
- Input and output level as with setting "1"

270 = 5 - No position sensor available. The drive stops unpositioned. The thread trimmer function is suppressed with this setting.

270 = 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”.



OUT (position window) = npn transistor (emitter to 0V) is conductive. The width of position window cannot be adjusted.

6.9.1 Setting the Reference Position (Parameter 270 = 0 or 6)

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
- after replacing the microprocessor

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** (character o rotating)
  Turn handwheel until rotating character **o** goes off on the display. ➔ Display **P**
- By turning the handwheel, 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 is displayed
- Press the **P** key twice ➔ Exit programming at the technician level.

Setting the reference position on the V810 control panel
- Input code number and select parameter 170!
- Press the **E** key ➔ Display **Sr [o]**
- Press the **>>** key ➔ Display **PoS0 o** (character o rotating)
  Turn handwheel until rotating character **o** goes off on the display. ➔ Display **PoS0**
- Set the needle to the bottom dead center by turning the handwheel. ➔ Configuration of the zero point of the machine
- Press the **P** key once ➔ actual parameter number is displayed
- Press the **P** key twice ➔ Exit programming at the technician level.

Setting the reference position on the V820/850 control panel
- Input code number and select parameter **170**!
- Press the **E** key ➔ Display **F-170 Sr1 [o]**
- Press the **>>** key ➔ Display **PoS0 o** (character o rotating)
  Turn handwheel until rotating character **o** goes off on the display. ➔ Display **PoS0**
- Set the needle to the bottom dead center by turning the handwheel. ➔ Configuration of the zero point of the machine
- Press the **P** key once ➔ actual parameter number is displayed
- Press the **P** key twice ➔ Exit programming at the technician level.

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

6.9.2 Setting the Positions on the Control (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.

- 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 handwheel
- Press the **E** key ➔ **P2E** is displayed; set "position 2 On" on the handwheel
- Press the **E** key ➔ **P1A** is displayed; set "position 1 Off" on the handwheel
- Press the **E** key ➔ **P2A** is displayed; set "position 2 Off" on the handwheel
- Press the **P** key twice ➔ Exit programming at the technician level.

6.9.3 Setting the Positions on the V810 Control Panel (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.

		Select parameter **171** !	➔	F – 1 7 1
E		Press the **E** key.	➔	[o]
>>		Press key **>>** (B key). Display of the 1st parameter value of position 1	➔	P 1 E 1 4 0
+	-	If necessary, change parameter value by pressing key **>>** or **+/-** or by turning the handwheel (> 1 rotation)	➔	P 1 E X X X
E		Parameter value of position 2 appears on the display	➔	P 2 E 2 6 0
+	-	If necessary, change parameter value by pressing key **>>** or **+/-** or by turning the handwheel (> 1 rotation)	➔	P 2 E X X X
E		Parameter value of position 1A appears on the display	➔	P 1 A 0 8 0
+	-	If necessary, change parameter value by pressing key **>>** or **+/-** or by turning the handwheel (> 1 rotation)	➔	P 1 A X X X
E		Parameter value of position 2A appears on the display	➔	P 2 A 4 0 0
+	-	Parameter value of position 2A appears on the display	➔	P 2 A X X X
P	P	Press the P key twice! Settings are completed, exit programming!	➔	P F 3 2 1

These values are saved when you begin sewing. They remain in effect even after turning the machine off!

6.9.4 Setting the Positions on the V820/850 Control Panel (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.

			Display before programming!	➔	3500 PF321A
P			A parameter number blinks on the display	➔	F-XXX
1	7	1	Input parameter number **171**!	➔	F-171
E			The abbreviation of the parameter appears on the display	➔	F-171 Sr2 [o]

»			Display of the 1st parameter value of position 1 (B key)	➔	P1E 140
0	···	9	Display of the 1st parameter value of position 1 (B key)	➔	P1E XXX
E			Parameter value of position 2 appears on the display	➔	P2E 460
0	···	9	If necessary, change parameter value by pressing keys +/- or 0...9 or by turning the handwheel (> 1 rotation).	➔	P2E XXX
E			Parameter value of position 1A appears on the display	➔	P1A 080
0	···	9	If necessary, change parameter value by pressing keys +/- or 0...9 or by turning the handwheel (> 1 rotation).	➔	P1A XXX
E			Parameter value of position 2A appears on the display	➔	P2A 400
0	···	9	If necessary, change parameter value by pressing keys +/- or 0...9 or by turning the handwheel (> 1 rotation).	➔	P1A XXX
P	P		Settings are completed, exit programming!	➔	3500 PF321A

NOTE
When setting the positions by turning the handwheel, make sure that the displayed numerical value changes.

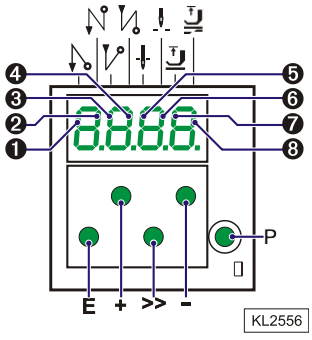
- The display unit of the set position values is "degrees".

6.10 Display of the Signal and Stop Positions

Function **with** or **without** control panel		Parameter
Display of positions 1 and 2	(Sr3)	**172**

The position settings can easily be checked by means of parameter 172.

- Select parameter 172
- The control panel display shows "Sr3"
- Turn handwheel according to the direction of motor rotation



Control display (control panel not connected)

- Segment ❺ is turned on corresponds to position 1
- Segment ❺ is turned off corresponds to position 1A
- Segment ❻ is turned on corresponds to position 2
- Segment ❻ is turned off corresponds to position 2A

V810/V820/V850 control panel display

- Arrow above symbol "position 1" on key 4 (V810) / on key 7 (V820/V850) is displayed corresponds to position 1
- Arrow above symbol "position 1" on key 4 (V810) / on key 7 (V820/V850) is displayed corresponds to position 1A

- Arrow above symbol "position 2" on key 4 (V810) / on key 7 (V820/V850) is displayed corresponds to position 2
- Arrow above symbol "position 2" on key 4 (V810) / on key 7 (V820/V850) is displayed corresponds to position 2A

If the V810, V820 or V850 control panel is connected, the positions will be displayed only on the control panel!

6.11 Positioning shift

Function **with** or **without** control panel		Parameter
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.

6.12 Braking Characteristics

Function **with** or **without** control panel		Parameter
Braking effect when varying the preset value ≤ 4 stages Braking effect when varying the preset value ≥ 5 stages	(br1) (br2)	**207** **208**

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

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

6.13 Braking Power at Standstill

Function **with** or **without** control panel		Parameter
Braking Power at Standstill	(brt)	**153**

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

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

6.14 Starting Characteristics

Function **with** or **without** control panel		Parameter
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.

6.15 Actual Speed Display

Function **with** or **without** control panel		Parameter
Actual speed display	(nIS)	**139**

If parameter 139 = 1, the V810/820/850 display shows the following information:

		V810	V820/V850
During operation: The actual speed ▪ **Example:** 2350 revolutions per minute	➔	**2350**	**2350**
At stop in the seam: ▪ The stop indication	➔	**StoP**	**StoP**
At standstill after trimming: ▪ On the V810, indication of the type of control ▪ On the V820/V850, indication of the set maximum speed and the type of control **Example:** 3300 revolutions per minute and type of control PF321A	➔	**PF321A**	**3300 PF321A**

6.16 Operating Hours Counter

Function **with** or **without** control panel		Parameter
Acoustic Signal	(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**
Functions of signal M11	(m11)	**297**

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 hours are programmed 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 control or on the V820/V850 control panel during operation or after drive standstill.
Moreover, an acoustic signal is emitted when using a V810/V820/V850 control panel if parameter 127 = 1.
If parameter 297 = 7, output M11 (socket ST2/31) is prepared for displaying the reached number of pre-selected operating hours. Upon reaching the operating hours, a connected indicator lamp blinks continuously until the counter is reset.

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)

Display on the V810 control panel:

- Select parameter 177.
- Press the **E** key ➔ **Sr7 [°]**
- Press the **>>** key ➔ **hoUr** (hours letter symbol)
- Press the **E** key ➔ **000000** (hours 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 ➔ **MSEc** (milliseconds letter symbol)
- Press the **E** key ➔ **000** (milliseconds display)
- Press the **E** key ➔ **rES F2** 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. **PF321A** (sewing process can be started)

Display on the V820/V850 control panel:

- Select parameter 177.
- Press the **E** key ➔ **F-177** **Sr7** [°]
- Press the **>>** key ➔ **hoUr** **000000** (hours display)
- Press the **E** key ➔ **Min** **00** (minutes display)
- Press the **E** key ➔ **Sec** **00** (seconds display)
- Press the **E** key ➔ **MSEc** **000** (milliseconds display)
- Press the **E** key ➔ **rES** **F2** see chapter “Set and Reset Operating Hours Counter “
- Press the **P** key twice ➔ e. g. **3500** **PF321A** (sewing process can be started)

6.16.1 Set and Reset Operating Hours Counter

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

- Press the **>>** key or **F2** once ➔ The operating hours counter is set to "0" and restarted.

The number of hours has not yet been reached:

- Press the **>>** or **F2** key 3 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 **>>** or **F2** key 3 times.

6.16.2 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.

7 Functions with or without Control Panel

7.1 First Stitch after Power On

Function **with** or **without** control panel		Parameter
1 stitch at positioning speed after power On	(Sn1)	**231**

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

7.2 Softstart

Function **with** or **without** control panel		Parameter
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. start backtack, stitch counting)
- stitch counting synchronized to position 1
- suspension with pedal in position 0 (neutral)
- interruption by full heelback (position -2)

When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Softstart On/Off	(-F-)	**008 = 1**

7.2.1 Softstart speed

Function **with** or **without** control panel		Parameter
Softstart speed	(n6)	**115**

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

7.2.2 Softstart stitches

Function **with** or **without** control panel		Parameter
Number of softstart stitches	(SSc)	**100**

7.3 Sewing foot lifting

Function **without** control panel		Control
Automatic in the seam Automatic after thread trimming	LED-segment 7 On LED-segment 8 On	Key **–** (S4)

Function **with** control panel		V810	V820/V850
Automatic in the seam	Left-hand arrow above key On	Key 3	Key 6
Automatic after thread trimming	Right-hand arrow above key On	Key 3	Key 6
If parameter 290 = 16, with slide-in strip "7"	Left-hand arrow above key On		Key 9

Function **with** or **without** control panel		Parameter
Automatic sewing foot with pedal forward at the seam end if light barrier or stitch counting is On	(AFL)	**023**
Coupled thread tension release and sewing foot lifting. The function can be activated only with a thread trimmer that depends on the angle.	(FSP)	**024**
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**
Duty ratio (ED) with pulsing	(t5)	**204**
Delay after thread wiping until sewing foot lifting	(t7)	**206**
Delay after thread trimming without thread wiper until sewing foot lifting	(tFL)	**211**
Upper limit ON period of sewing foot lifting 1...100	(EF-)	**254**

Sewing foot is lifted:

- in the seam
  - by heelback (position -1)
  - or automatically (using the **S4** key on the control, segment 7 lights up)
  - or automatically (using key **3** on the V810 control panel)
  - or automatically (using key **6** on the V820/V850 control panel)
  - by pressing a key depending on the pre-selection of parameters **240...249**
- after thread trimming
  - by heelback (position -1 or -2)
  - or automatically (using the **S4** key on the control, segment 8 lights up)
  - or automatically (using key **3** on the V810 control panel)
  - or automatically (using key **6** on the V820/V850 control panel)
  - by pressing a key depending on the pre-selection of parameters **240...249**
  - 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**.

Holding power of the lifted foot:
The sewing foot is lifted by full power. Then the system switches automatically to partial power in order to reduce the load for the control and the connected solenoid.
Set the duration of full power using parameter **203** and the partial holding power using parameter **204**.

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

Value	Duty ratio (ED)	Effect
1	1 %	low holding power
100	100 %	high holding power (full power)

Sewing foot lowers:

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

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

7.4 Backtacking

7.4.1 Backtack disabling of all automatic backtacking

All automatic backtacks are disabled when the function was turned on using a key programmed for the function. (For input function, see parameter **240 = 96** (for S5 e.g. parameter **844 = 96**).

7.4.2 Stitch length in the automatic backtacks

Function **with** or **without** control panel		Parameter
Stitch length in the automatic backtacks	(Slu)	**138**

138 = 0 The backtack is implemented using a switch stitch length described by an input function as in parameter **240 = 77**, in normal or short stitch length.
138 = 1 The backtack is always implemented using a short stitch length. The input function described in parameter **240 = 77** is ineffective.

7.4.3 Start Backtack/Start Stitch Condensing

Function **without** control panel		Control
Single start backtack Double start backtack Start backtack Off	LED-segment 1 On LED-segment 2 On Both segments Off	Key **E** (S2)
Start stitch condensing On; number of stitches with stitch regulator (parameter **001**) Start stitch condensing On; number of stitches without stitch regulator (Parameter **000**) after that number of stitches with stitch regulator (Parameter **001**) Start stitch condensing Off	LED-segment 1 On LED-segment 2 On Both segments Off	Key **E** (S2)

Function **with** control panel		**V810/V820/V850**
Single start backtack Double start backtack Start backtack Off	Left-hand arrow above key On Right-hand arrow above key On Both arrows Off	Key 1
Start stitch condensing On; number of stitches with stitch regulator (parameter **001**) Start stitch condensing On; number of stitches without stitch regulator (Parameter **000**) after that number of stitches with stitch regulator (Parameter **001**) Start stitch condensing Off	Left-hand arrow above key On Right-hand arrow above key On Both arrows Off	Key S2

The start backtack/start stitch condensing starts by pressing the pedal forward at the beginning of the seam. From lifted sewing foot the backtack is delayed by the time t3 (start delay after switching off the sewing foot lifting signal). Start backtack as well as start stitch condensing are executed automatically at speed n3. They cannot be interrupted. If softstart is running parallel, the respective lower speed is prevailing. The stitch regulator will be switched off after completion of the stitch count (parameter **001**) and the speed n3 after a delay time t1. Then pedal control is returned. The stitch regulator and counter are synchronized to position 1.

7.4.3.1 Speed n3 at the Start of the Seam

Function **with** or **without** control panel		Parameter
Start backtack/start stitch condensing speed	(n3)	**112**
Start backtack/start stitch condensing speed can be interrupted by pedal in pos. 0 (neutral)	(n2A)	**162**
Start and end backtack or stitch condensing can be interrupted by pedal in pos. 0 (neutral) On/Off	(StP)	**164**

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

7.4.3.2 Stitch Counting for Start Backtack/Start Stitch Condensing

Function **with** or **without** control panel		Parameter
Number of stitches forward or without stitch regulator	(c2)	**000**
Number of stitches backward or with stitch regulator	(c1)	**001**
Double start backtack repetition	(war)	**090**
Backtack repetition On/Off	(Fwr)	**092**

The start backtack/start stitch condensing stitches with or without stitch regulator can be programmed and varied using the above parameters directly on the control or on a connected V810/V820/V850 control panel.
For fast operator information (HIT) when using the V820/V850 control panel, the value of the function switched on using key **1** can be displayed for approx. 3 seconds. During this time, the value can be varied directly by pressing key **+** or **-**.

7.4.3.3 Stitch Correction and Speed Release

Function **with** or **without** control panel		Parameter
Stitch correction time	(t8)	**150**
Delay until speed release after start backtack	(t1)	**200**

Speed release after single and double backtack can be influenced by parameter **200**.
In the case of slow backtack mechanisms it is possible to delay disabling of the stitch regulator in the single and double start backtack by the time t8 (start backtack stitch correction) and thereby prolong the backward section. This time-lag can be selected by means of parameter **150**.

7.4.3.4 Double start backtack

The forward section will be sewn for a number of stitches that can be set. Then the stitch regulator signal will be issued and the backward section will be executed. The number of stitches for the two sections can be set separately.

7.4.3.5 Single Start Backtack / Start Stitch Condensing

The stitch regulator signal will be issued and the backward section and/or start stitch condensing will be executed for a number of stitches that can be set.

7.4.4 End Backtack / End Stitch Condensing

Function **without** control panel		Control
Single end backtack Double end backtack End backtack Off	LED-segment 3 On LED-segment 4 On Both segments Off	Key **+** (S3)
End stitch condensing On; number of stitches with stitch regulator (parameter **002**) End stitch condensing On; number of stitches with stitch regulator (parameter **002**) after that number of stitches with stitch regulator (Parameter **003**) End stitch condensing Off	LED-segment 3 On LED-segment 4 On Both segments Off	Key **+** (S3)

Function **with** control panel		V810	V820/V850
Single end backtack Double end backtack End backtack Off	Left-hand arrow above key On Right-hand arrow above key On Both arrows Off	Key 2	Key 4
End stitch condensing On; number of stitches with stitch regulator (parameter **002**) End stitch condensing On; number of stitches with stitch regulator (parameter **002**) after that number of stitches with stitch regulator (Parameter **003**) End stitch condensing Off	Left-hand arrow above key On Right-hand arrow above key On Both arrows Off	Key 2	Key 4

The end backtack/end stitch condensing in a seam with stitch counting starts by heelback at the end of counting, or, from the light barrier seam at the end of the light barrier compensating stitches. The stitch regulator is immediately enabled from machine standstill. After lowering the sewing foot, the switch-on point of the stitch regulator is delayed by the time t3 (start delay after switching off the sewing foot lifting signal). The first leading edge of position 1 counts as 0 stitch whenever the function is not started in position 1. The stitch regulator is synchronized to position 1. End backtack as well as end stitch condensing are executed automatically at speed

n4. They cannot be interrupted. From full machine run, end backtack / end stitch condensing will be switched in only after having reached the speed n4 and synchronization to position 2.

7.4.4.1 Speed n4 at the Seam End

Function **with** or **without** control panel		Parameter
End backtack/end stitch condensing speed	(n4)	**113**
End backtack/end stitch condensing speed can be interrupted by pedal in pos. 0 (neutral)	(n2E)	**163**
Start and end backtack or stitch condensing can be interrupted by pedal in pos. 0 (neutral) On/Off	(StP)	**164**

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

7.4.4.2 Stitch Counting for End Backtack/End Stitch Condensing

Function **with** or **without** control panel		Parameter
Number of stitches forward or without stitch regulator	(c3)	**002**
Number of stitches backward or with stitch regulator	(c4)	**003**
Double end backtack repetition	(wer)	**091**
Backtack repetition On/Off	(Fwr)	**092**

The end backtack/end stitch condensing stitches with or without stitch regulator can be programmed and varied using the above parameters directly on the control or on a connected V810/V820/V850 control panel.
For fast operator information (HIT) when using the V820/V850 control panel, the value of the function switched on using key **4** can be displayed for approx. 3 seconds. During this time, the value can be varied directly by pressing key **+** or **-**.

7.4.4.3 Stitch Correction and Last Stitch Backward

Function **with** or **without** control panel		Parameter
Last stitch backward On/Off	(FAr)	**136**
Stitch correction time	(t9)	**151**

The backtack solenoid can be delayed in the double end backtack by selecting a stitch correction time (t9) using parameter **151**.
For some sewing procedures it is desirable that the backtack solenoid in the single end backtack is disabled only after trimming. This function can be selected using **parameter 136**.

136 = 0 Trimming stitch backward Off
136 = 1 Trimming stitch backward On with single end backtack
136 = 2 Trimming stitch or positioning stitch always backward at the seam end

7.4.4.4 Double End Backtack/End Stitch Condensing

The backward section and/or end stitch condensing will be executed for a number of stitches that can be set. Then the stitch regulator will be disabled and the forward section and/or normal stitch condensing stitches will be executed. The number of stitches for the two sections can be set separately.
After stitch counting (parameter **003**) the trimming function will be initiated. During the entire operation the sewing speed is reduced to speed n4,. with the exception of the last stitch, which will be performed at positioning speed n1.
In the case of slow backtack mechanisms it is possible to delay disabling of the stitch regulator in the single and double end backtack by the time t9 (end backtack stitch correction).

7.4.4.5 Single End Backtack / End Stitch Condensing

The stitch regulator signal will be issued and the backward section and/or end stitch condensing will be executed for a number of stitches that can be set. During the last stitch the speed is reduced to positioning speed.

When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Backtack repetition On/Off	(-F-)	**008 = 8**

7.4.5 Start Ornamental Backtack/Stitch Condensing

Function **without** control panel		Control
Function "ornamental backtack" On/Off	(SrS)	**135**
Ornamental backtack stop time	(tSr)	**210**
Single start ornamental backtack	LED-segment 1 On	Key E (S2)
Double start ornamental backtack	LED-segment 2 On	
Start ornamental backtack Off	Both segments Off	

Function **with** control panel		**V810/V820/V850**
Function "ornamental backtack" On/Off	(SrS)	**135**
Ornamental backtack stop time	(tSr)	**210**
Single start ornamental backtack	Left-hand arrow above key On	Key S1
Double start ornamental backtack	Right-hand arrow above key On	
Start ornamental backtack Off	Both arrows Off	

The parameters of the start backtack speed and the backtack stitches forward and backward are identical with the standard start backtack.

Difference from the standard start backtack:
- The drive stops for stitch regulator switching
- The stop time can be set

When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Ornamental backtack On/Off	(-F-)	**008 = 2**

7.4.6 End Ornamental Backtack/Stitch Condensing

Function **without** control panel		Control
Function "ornamental backtack" On/Off	(SrS)	**135**
Ornamental backtack stop time	(tSr)	**210**
Single end backtack	LED-segment 3 On	Key **+** (S3)
Double end backtack	LED-segment 4 On	
End backtack Off	Both segments Off	

Function **with** control panel		V810	V820/V850
Function "ornamental backtack" On/Off	(SrS)	**135**	**135**
Ornamental backtack stop time	(tSr)	**210**	**210**
Single end backtack	Left-hand arrow above key On	Key 2	Key 4
Double end backtack	Right-hand arrow above key On		
End backtack Off	Both arrows Off		

The parameters of the end backtack speed and the backtack stitches forward / backward are identical with the standard end backtack.

Difference from the standard end backtack:
- The drive stops for stitch regulator switching
- The stop time can be set

When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Ornamental backtack On/Off	(-F-)	**008 = 2**

7.4.6.1 Stitch counting for ornamental backtack

Function **with** or **without** control panel		Parameter
number of stitches for initial ornamental backtack forwards	(SAv)	**080**
number of stitches for initial ornamental backtack backwards	(SAr)	**081**
number of stitches for final ornamental backtack backwards	(SEr)	**082**
number of stitches for final ornamental backtack forwards	(SEv)	**083**

The number of stitches for start and end ornamental backtack can be programmed and varied using the above parameters directly on the control or on a connected V810/V820/V850 control panel.
For fast operator information (HIT) when using the V820/V850 control panel, the value of the function switched on using key **1** can be displayed for approx. 3 seconds. During this time, the value can be varied directly by pressing key **+** or **-**.

In the programmed seam, the stitch counts set up for the initial and final backtack stitch counting are used **(parameter 000-003)**.

7.4.7 Intermediate Backtack

Upon pressing an external key according to the pre-selection of parameters **240...249**, the backtack solenoid can be switched on anywhere in the seam and at standstill.

Function **with** or **without** control panel		Parameter
Counted manual backtack On/Off	(chr)	**087**
Speed of manual backtack	(n13)	**109**
Ornamental backtack On/Off	(SrS)	**135**
Manual ornamental backtack speed	(n9)	**122**
Speed status for manual backtack	(Shv)	**145**

The speed function for the manual backtack can be set using **parameter 145**.

145 = 0 Speed controllable by the pedal up to the set maximum speed (parameter **111**)
145 = 1 Fixed speed (parameter **109**) without influence by the pedal (machine stop by pressing the pedal to the basic position)
145 = 2 Limited speed controllable by the pedal up to the set limit (parameter **109**)

Intermediate backtack (parameter 135 = 0):
Backward sewing with speed limitation according to the setting of parameter 109 is performed when the key is held down.
Intermediate ornamental backtack (parameter 135 = 1):
By pressing the key in the seam, the drive stops and the backtack solenoid is activated. The speed limitation n9 according to the setting of parameter 122 is effective during the entire intermediate backtack operation. Backward sewing is performed when the key is held down and the stitches are counted. When the key is released, the drive stops, the backtack solenoid is switched off and a forward seam is performed according to the counted stitches after the ornamental backtack stop time. After that the speed limitation is released.

Moreover, the number of stitches for each type of backtack can be selected using **Parameter 087**.

087 = 0 Stitches Normal manual backtack
087 = 1...255 Stitches Manual backtack with counted backtack

Intermediate backtack (parameter 135 = 0) with counted backtack section (parameter 087 = >0):
During manual backtack the speed is n13 (parameter 109). According to the setting of parameter 145 it is pedal controlled, fixed or limited.

Intermediate ornamental backtack (parameter 135 = 1) with counted backtack section (parameter 087 = >0):
After pressing the appropriate key, the drive stops in position 1. The backtack solenoid is enabled. After the ornamental backtack stop time (parameter 210) has elapsed and the pedal has been pressed forward, the drive runs until counting (parameter 087) has been completed. The drive stops again in position 1. The backtack solenoid is disabled, and the time set using parameter 210 elapses. Then the seam section forward is repeated. The sequence is performed at speed n9 (parameter 122).

7.4.8 Multiple backtack

Function **with** or **without** control panel		Parameter
number of stitches for initial ornamental backtack forwards	(SAv)	**070**
number of stitches for initial ornamental backtack backwards	(SAr)	**071**
number of stitches for final ornamental backtack backwards	(SEr)	**072**
number of stitches for final ornamental backtack forwards	(SEv)	**073**
Execution type of start multiple backtack	(ArP)	**074**
Execution type of end multiple backtack	(ErP)	**075**
Repetition of the initial/ multiple backtack	(wAr)	**090**
Repetition of the final/ multiple backtack	(wEr)	**091**

In this type of backtack, the parameters **070...073** are used to enter unequal numbers of forward and backward stitches (e.g. forward 3, backward 2).
In addition, parameters **090 and 091** are used to enter the number of repetitions of the forward and backward sections (e.g. 3).
The first backward section of the start multiple backtack is carried out with the same number of stitches as the forward section.
The last forward section of the end multiple backtack is carried out with the same number of stitches as the backward section.

074 = 1 Execution type of start multiple backtack as flying backtack
074 = 2 Execution type of start multiple backtack as ornamental backtack
075 = 1 Execution type of end multiple backtack as flying backtack
075 = 2 Execution type of end multiple backtack as ornamental backtack

The multiple backtack function is enabled by pressing a key assigned to the input function described in parameter **240 = 95** (e.g. parameter **842 =95)**.

7.4.9 Stitch lock at the seam end

Function **with** or **without** control panel		Parameter
Number of stitch locks	(KSt)	**093**
Start delay in stitch locks	(tKS)	**094**

The stitch lock function at the end of the seam is enabled with parameter **093**. It is carried out on the end of the seam after the start delay (parameter **094**) completes.

093 = 0 Function Off
093 = >0 Function on. The configured value corresponds to the number of stitch locks

7.4.10 Stitch Regulator Suppression/Recall

Effective in standard and ornamental backtack

The next backtack and/or stitch condensing operation can be suppressed or recalled once by pressing an external key according to the pre-selection of parameters **240...249**.

Upon pressing the key,	Start Backtack/ Stitch condensing On	Start Backtack/ Stitch condensing Off	End backtack / Stitch condensing On	End Backtack/ Stitch condensing Off
Before the start of the seam	No backtack / stitch condensing	Backtack/Stitch Condensing	------	------
in the seam	------	------	No backtack / stitch condensing	Backtack/Stitch Condensing

The double backtack is performed in the above cases.

7.4.11 Holding Power of the Stitch Regulator Solenoid

Function **with** or **without** control panel		Parameter
Time of full power	(t10)	**212**
Holding Power of the Stitch Regulator Solenoid	(t11)	**213**
Upper limit stitch regulator ON period	(EV-)	**255**

The stitch regulator solenoid is engaged by full power. Then the system switches automatically to partial power in order to reduce the load for the control and the connected stitch regulator solenoid. Set the duration of full power using parameter **212** and the partial holding power using parameter **213**.

ATTENTION

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

Value	Duty ratio (ED)	Effect
1	1 %	low holding power
100	100 %	high holding power (full power)

7.5 Reverse motor rotation

Function **with** or **without** control panel		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.

7.6 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 ST2, depending on the pre-selection of parameters **240...249**. When using a V810 / V820 / V850 control panel, an acoustic signal can be switched on and/or off by means of parameter **127**.

Display after enabling machine run blockage without control panel:
Control display ➔ **A 2**

Display and signal after enabling machine run blockage with control panel:
Display on the V810 control panel! ➔ **-S t o P-**
(symbol blinks and acoustic signal if parameter **127 = 1**)

Display on the V820/V850 control panel!
(symbol blinks and acoustic signal if parameter **127 = 1**) ➔ 

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

Machine run blockage in the start backtack / start stitch condensing:
The start backtack / start stitch condensing is interrupted by opening and/or closing the switch.
- Stop in the basic position
- Needle up is not possible
- Sewing foot lifting is possible
- After disabling of the machine run blockage, the seam will be continued with the section following the start backtack / start stitch condensing

Machine run blockage in the end backtack / end stitch condensing:
The end backtack / end stitch condensing is interrupted, and the seam is completed by opening and/or closing the switch.
- Sewing foot lifting is possible

New start after machine run blockage

Function **with** or **without** control panel		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).

7.7 Stop function

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

For this function, the red key S8 is provided in the multiple-function key bar on the machine head (parameter **847=24**). However, any other input may also be programmed with this function.
When the key is pressed while the machine is running, the drive stops in position 2. If it is in position 1, it runs to position 2. If it is already in position 2, it remains there.
No thread trimming is carried out. The thread clamp, thread tension release, and sewing foot lifting signals are turned on. The machine run blockage is activated and the red LED above S8 turned on.
The machine run blockage is released after the **"E"** key is pressed on the control panel. The sewing foot is lowered or remains lifted regardless of the setting/programming selected. The seam may be continued at the previously uninterrupted point.

7.8 High lift for walking foot

Function **with** or **without** control panel		Parameter
High lift for walking foot function activated/deactivated	(hP)	**137**
Speed Limitation Depending on High Lift activated/deactivated	(Pot)	**503**
Maximum speed (corresponding to the speed at minimum lift)	(n2)	**111**
High lift for walking speed limitation (corresponding to speed at maximum lift)	(n10)	**117**
Minimum number of stitches for high lift for walking	(chP)	**185**
High Lift Walking Speed Run-Out Time	(thP)	**152**
High lift for walking foot - measurement value of potentiometer for minimum lift		**501**
High lift for walking foot - measurement value of potentiometer for maximum lift		**502**

7.8.1 High lift for walking foot signal output M16 (flip flop 1)

The high lift for walking foot function can only be executed if it has been activate (parameter **137 = 1**).
The function is triggered by a key assigned to which input function **13** or **14** has been assigned.
If the high lift for walking foot function is deactivated (parameter **137 = 0**) the "Machine idle" signal appears on output M16.

7.8.2 High lift for walking foot operational mode not stored

The high lift for walking foot function is in operational mode Not Stored if input function 13 has been programmed for the corresponding key.
Pressing the key turns on high lift for walking foot speed limitation. High lift for walking foot is turned on when the speed falls below the limit.
When the key is released, high lift for walking foot is turned on.
The minimum number of stitches and run-out time influence the process.

7.8.3 High lift for walking foot operational mode stored (flip flop 1)

The high lift for walking foot function is a ratchet effect if input function **14** has been programmed for the corresponding key.
On the first actuation of the key, the high lift for walking foot function is turned on with the same operation as described in the section "High lift for walking foot operational mode not stored", and turned off on the second actuation.
Any minimum number of stitches is not taken into consideration, but the run-out time is.

7.8.4 Minimum number of stitches for high lift for walking

The high lift for walking minimum number of stitches only applies if the function "High lift for walking foot operational mode not stored" is programmed.
After high lift for walking foot is turned on, the magnet stays turned on until the number of stitches programmed in parameter **185** is reached.
This is particularly useful, since if the key is pressed for a short time the high lift for walking foot remains in effect for a minimum number of stitches,

7.8.5 High Lift Walking Speed Run-Out Time

If high lift for walking foot is turned off, the speed remains limited for the time configured with parameter **152**.

7.8.6 Speed Limitation Depending on High Lift

Speed limitation depending on high lift depends on the setting of the handwheel on the machine arm. It may be activated or deactivated using parameter **503**.

503 = 0 Deactivated. The speed limitation n10 set with parameter **117** is in effect.
503 = 1 Activated. The speed limitation corresponds to a value dependent on the lift height configured.

7.8.6.1 Setting the Speed Limitation Depending on High Lift

NOTE

The setting of the speed limitation depending on high lift is necessary compelling by application of a new or a new formatted top part detection module (OTE module).
Otherwise the machine speed limitation depending on high lift set with parameter **117** is in effect.
Besides, in the display of the operating device the tip is indicated [– Poti –] .
Every mechanical change of the potentiometer likewise requires this setting.

Parameter **501** is used to program the value for the minimum lift, and **502** for the maximum lift.
Proceed as follows:

Set the handwheel for a high lift for walking foot of 0 (minimum lift)

		Select parameter 501! Set the handwheel for a high lift for walking foot of 0 (minimum lift)		
1x	E	Potentiometer value currently 112, with 110 stored	➔	F-501 112 110
1x	+	Potentiometer value 112 taken	➔	F-501 112 112
		Set the handwheel for a high lift for walking foot of 5 (maximum lift)		
1x	E	Next parameter displayed: potentiometer value currently 120, with 118 stored	➔	F-502 120 118
1x	+	Potentiometer value 120 taken	➔	F-502 120 120
1x	E	Next parameter is displayed. Speed limitation depending on High Lift (0 = deactivated, 1 = activated)	➔	F-503 Pot 1
or				
2x	P P	End of programming	➔	3500 PF321A

7.9 Speed Limitation n9

Function **with** or **without** control panel		Parameter
Speed Limitation n9	(n9)	**122**

When a key is pushed to which input function **33** is assigned, speed limitation n9 is activated. The speed is controlled by the pedal up to the limit.

7.10 Speed Limitation n11 with Signal Output M10 / flip flop 2)

Function **with** or **without** control panel		Parameter
Speed limitation n11	(n11)	**123**
Disabling of flip-flop functions at the seam end On/Off	(FFm)	**183**
Function "speed limitation n11" inverted/non-inverted	(FFi)	**186**
Function of signal M10 on socket ST2/29 after “power on”	(FFo)	**187**

The speed limitation can be switched on by pressing a key on any of the inputs in1...i10 and switched off by pressing the key again. A signal output which can be programmed individually (inverted/non-inverted) is provided for the speed limitation. Furthermore, the function of signal output M10 can be determined after "power on".

Settings necessary for speed limitation n11
Assign the function "speed limitation n11" to the key using one of the parameters **240...249 =22**. This function has a flip-flop effect.

Determine using **parameter 186** whether signal M10 for speed limitation n11 shall be inverted or non inverted.
186 = 0 Speed limitation n11 On/Signal M10 On or Speed limitation n11 Off/Signal M10 Off.
186 = 1 Speed limitation n11 Off/Signal M10 On or Speed limitation n11 On/Signal M10 Off.

Determine using **parameter 187** whether signal M10 is issued at socket ST2/29 after "power on".
187 = 0 Signal M10 not active after "power on"; speed limitation n11 according to setting of parameter **186** (inverted/non-inverted)
187 = 1 Signal M10 active after "power on"; speed limitation n11 according to setting of parameter **186** (inverted/non-inverted)

7.11 Disabling of flip-flop functions at the seam end

Function **with** or **without** control panel		Parameter
Disabling of flip-flop functions at the seam end On/Off	(FFm)	**183**

Determine using **parameter 183** whether signals M6 and/or M10 shall be switched off at the seam end. If **183 = 0**, the signals can be switched off only using the appropriate keys.
183 = 0 Signal M6 (flip-flop 1) and signal M10 (flip-flop 2) are not switched off at the seam end.
183 = 1 Signal M6 (flip-flop 1) disabled at the seam end.
183 = 2 Signal M10 (flip-flop 2) disabled at the seam end.
183 = 3 Signal M6 (flip-flop 1) and signal M10 (flip-flop 2) are switched off at the seam end.

7.12 Bobbin thread monitor

7.12.1 Bobbin thread monitoring with sensors

Function **with** or **without** control panel		Parameter
Mode of bobbin thread monitoring via sensor	(PFw)	**835**
Number of stitches for the bobbin thread stitch count	(cPF)	**836**

Bobbin thread monitoring can be programmed for 1 or 2 sensors., The mode is selected using parameter **835**.

Connecting the sensors:
Sensor 1 to ST2/13 (In9), parameter 248 = 57.
Sensor 2 to ST2/5 (In5), parameter 248 = 56.

If one of the sensors detects that the bobbin thread amount has been reached, the bobbin thread monitoring process is initiated. The LED in the multifunction key on the machine head starts to flash and thread stitch counting is started.
When the stitch counting end is reached, the LED lights with a steady light. The further process is determined by the setting selected by parameter **835**.

835 = 1 The drive stops. After the pedal is released and pressed again, the seam can be run to the end.
835 = 2 The drive does not stop, and the seam can run to the end.
835 = 3 Like mode 1, but for two bobbin thread monitoring sensors.
835 = 4 Like mode 2, but for two bobbin thread monitoring sensors.

In either case, after the thread is trimmed, restart is blocked until the bobbin replacement is confirmed by pressing the 8 key on the control panel. The LED is turned off and the reset sequence for the sensor emitted. Acknowledgement is also possible using the F1/F2 key if the parameter **293/294** has been programmed to 19.

If parameter 835 > 0 when power is turned on, or if it is changed later (to a value other than 0), a reset sequence for the sensor is output on M7 (ST2/21).

7.12.2 Bobbin thread monitoring using stitch counting

Function **with** or **without** control panel		Parameter
Bobbin thread monitor On/Off	(rFw)	**030**
Number of bobbin thread monitor stitches	(cFw)	**031**

For bobbin thread monitor operation a number of stitches depending on the length of the bobbin thread has been preset using parameter **031**. After the execution of these stitches the drive stops and a visual signal appears on the display. If a control panel is connected, an acoustic signal is also issued if parameter **127**is set accordingly. This signals that the bobbin thread will run out. After pressing the pedal again, the seam can be continued and the thread can be trimmed. After inserting a full bobbin and pressing the enter key, a new sewing operation can be started.

Enable bobbin thread monitor:
Select parameter 030 = **1...3**.

- Input the desired maximum number of stitches in parameter **031** (input value x 100 = number of stitches, e. g. 80 x 100 = 8000).
- For starting the counter set the A or B key at ""**19**" using parameter **293** or .**294**.

When using a control panel, an acoustic signal can also be enabled using parameter **127**.
Start the sewing operation.

Bobbin thread monitor in operation:

030 = 0 Bobbin thread monitor is off.

030 = 1 The drive stops after the stitch counter has run out. The message "**A7**" appears on the control, and the bobbin thread monitor symbol blinks on the V810/V820/V850 control panel, respectively. There will be an acoustic signal if a V820/V850 control panel is connected and parameter **127** is set at "**1**".

030 = 2 The drive stops after the stitch counter has run out. The message "**A7**" appears on the control, and the bobbin thread monitor symbol blinks without stopping automatically on the V810/V820/V850 control panel, respectively. There will be an acoustic signal if a V820/V850 control panel is connected.

030 = 3 The drive stops after the stitch counter has run out. Thread trimming is possible with pedal in pos. –2. Then the start is blocked. The message "**A7**" appears on the control, and the bobbin thread monitor symbol blinks on the V810/V820/V850 control panel, respectively. There will be an acoustic signal if a V820/V850 control panel is connected and parameter **127** is set at "**1**".

030 = 4 Function as with parameter **030 = 1**, but remaining stitches will be displayed.

030 = 5 Function as with parameter **030 = 2**, but remaining stitches will be displayed.

030 = 6 Function as with parameter **030 = 3**, but remaining stitches will be displayed.

Getting the bobbin thread monitor ready for operation:

- Insert the full bobbin.
- Press the selected external key, or the appropriate key on the connected control panel (key 8 on the V820/V850).
  Set counting to the value determined by parameter**031**.
  The symbol stops blinking, and the message "**A7**" on the control will be switched off after trimming.

7.13 Thread Trimming Operation

Function **with** or **without** control panel		Parameter
Thread trimmer On/Off	(FA)	**013**
Thread wiper On/Off	(FW)	**014**

Function **with** control panel	V820/V850
Thread trimmer or thread wiper On/Off	Key 5

When a V820/V850 control panel is connected, the functions can also be switched on and off using key **5**.

7.13.1 Thread Trimmer/Thread Wiper

Function **with** or **without** control panel		Parameter
Thread wiper time	(t6)	**205**
Thread wiper switch-on delay	(dFw)	**209**
Holding power output M1 of the thread trimmer backward	(t11)	**213**
Thread trimmer activation angle	(iFA)	**250**
Switch-off delay of thread tension release	(FSA)	**251**
Thread tension release switch-on delay	(FSE)	**252**
Upper limit ON period of thread trimmer backward	(EV-)	**255**
Switch-on delay angle of the thread trimmer	(FAE)	**259**

Thread trimming takes place 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.

7.13.2 Trimming speed

Function **with** or **without** control panel		Parameter
Trimming speed	(n7)	**116**

7.14 Seam with Stitch Counting

Function **without** control panel	Parameter
Stitch counting On/Off	**015**

Function **with** control panel	V820/V850
Stitch counting On/Off	Key 2

7.14.1 Number of Stitches for a Seam with Stitch Counting

Function **with** or **without** control panel		Parameter
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**or on a connected V810/V820/V850 control panel.
For fast operator information (HIT) when using the V820/V850 control panel, the value of the function switched on using key **2** can be displayed for approx. 3 seconds. During this time, the value can be varied directly by pressing key**+/-**.

7.14.2 Stitch Counting Speed

Function **with** or **without** control panel		Parameter
Positioning speed	(n1)	**110**
Stitch Counting Speed	(n12)	**118**
Speed mode for a seam with stitch counting	(SGn)	**141**
Activation of speed n12 when key is open/closed	(inr)	**266**

Speed control for 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)".
266 = 0 Speed n12 is activated when key is closed.
266 = 1 Speed n12 is activated when key is open.

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

7.14.3 Seam with Stitch Counting When Light Barrier Is On

Function **with** or **without** control panel		Parameter
Light barrier On/Off Stitch counting On/Off	(LS) (StS)	**009** **015**
Function **with** control panel		V820/V850
Light barrier On/Off Stitch counting On/Off		Key 3 Key 2

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

7.15 Free Seam and Seam with Light Barrier

Function **with** or **without** control panel		Parameter
Positioning speed	(n1)	**110**
Upper limit of maximum speed	(n2)	**111**
Limited speed according to setting of parameter **142**	(n12)	**118**
Lower limit of maximum speed	(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**.

When using a control panel, the maximum speed is displayed after power on and thread trimming and can be varied directly using the **+/-** keys on the control panel. The setting range lies between the values of parameters **111** and **121**.

7.16 Light barrier

Function **with** or **without** control panel	Parameter
Light barrier On/Off	**009**

Function **with** control panel		V820/V850
Light barrier covered/uncovered On	right-hand arrow above key On	Key 3
Light barrier uncovered/covered On	left-hand arrow above key On	
Light barrier Off	both arrows Off	

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

7.16.1 Speed after Light Barrier Sensing

Function **with** or **without** control panel		Parameter
Speed after Light Barrier Sensing	(n5)	**114**

7.16.2 General Light Barrier Functions

Function **with** or **without** control panel		Parameter
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**, regardless of the setting of key **5** on the V820/V850 control panel. 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**.

The light barrier compensating stitches can be programmed and varied using the above parameters directly on the control or on a connected V810/V820/V850 control panel.
For fast operator information (HIT) when using the V820/V850 control panel, the value of the function switched on using key **3** can be displayed for approx. 3 seconds. During this time, the value can be varied directly by pressing key **+** or **-**.
When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Start of sewing blocked with light barrier uncovered On/Off	(-F-)	**008 = 3**

7.16.3 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.

7.16.4 Automatic Start Controlled by Light Barrier

Function **with** or **without** control panel		Parameter
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 (neutral). Then press the pedal forward. This function is disabled when the pedal is no longer pressed forward after the seam end.

7.16.5 Light barrier filter for knitted fabrics

Function **with** or **without** control panel		Parameter
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**.

7.16.6 Functional Variations of the Light Barrier Input

Function **with** or **without** control panel	Parameter
Selection of the input function on socket B18/5	**239**

If the light barrier function is not used, a switching function can be assigned to the input on socket B18/8 as well as to inputs in1...i10.
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".**

7.17 Inputs for switches and keys

7.17.1 Switching Functions of Inputs in1...i13

Function **with** or **without** control panel		Parameter
Selection of the input function	(in1...in10) (in11-LSM) (in12...in13)	**240...249** **239** **550...551**

The functions of the keys/switches connected to socket connectors ST2, B18 and B22 can be selected for inputs in1...in13 using parameters **240...249, 239 (LSM), 550, 551**.

240...249, 239 (LSM), 550, 551 =

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 (function of the key according to setting of parameter **266**). The pedal must be pressed forward.

12 Sewing foot lifting with pedal in position 0 (neutral)

13 High lift for walking foot operational mode not stored: The signal “high lift for walking foot” is issued as long as the key is held down, and the drive runs with speed limitation (n10). Set parameter 137 to On.

14 High lift for walking foot operational mode stored (flip flop 1): The signal “high lift for walking foot” is issued upon briefly pressing the key, and the drive runs with speed limitation (n10). The operation is disabled upon pressing the key again. Set parameter 137 to On.

15 No function

16 Intermediate backtack / intermediate stitch condensing: Upon pressing the key, the backtack or stitch condensing will be enabled anywhere in the seam and at standstill of the drive.

17 Stitch Regulator Suppression/Recall: Upon pressing the key, the backtack or stitch condensing operation will be suppressed or recalled once.

18 No function

19 Reset bobbin thread monitor: After inserting a full bobbin, the stitch counter is set to the value determined by means of parameter **031**.

20 Move to target position in direction of rotation: Upon pressing the key, the drive runs in the direction of rotation according to the setting of parameter **161**.

21 Move to target position against direction of rotation: Upon pressing the key, the drive runs in the opposite direction of rotation according to the setting of parameter **161**.

22 Speed limitation n11 (flip flop 2): Upon pressing the key in the seam, the speed limitation n11 is enabled, and a signal is issued at the output ST2/29. The speed limitation will be disabled upon pressing the key again, and the signal at the output is no longer issued.

23 No function

24 Stop function: For this function, the red key S8 is provided in the multiple-function key bar on the machine head. However, any other input may also be programmed with this function. (see chapter Stop function)

25 Speed limitation with external potentiometer: Upon pressing the key, the external speed limitation becomes effective. Parameter **126** must be set at 2.

26 No function

27 No function

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.

29 No function

30 **High lift for walking foot: Upon pressing the key, high lift for walking foot is enabled if the sewing foot is On.**
31 **Function "speed limitation bit0":** Upon pressing the key, the speed n11 will be enabled. Upon simultaneously pressing the keys “bit0” and “bit1”, speed n9 will be enabled.
32 **Function "speed limitation bit1":** Upon pressing the key, speed n10 will be enabled. Upon simultaneously pressing the keys “bit0” and “bit1”, speed n9 will be enabled.
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.
35 **Automatic speed n9:** The speed can be interrupted by pressing the pedal to position -2.
36 **Automatic speed n9:** Not influenced by the pedal.
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.
39 **Switch to the next pattern in TEACH IN:** Upon pressing the key, the program switches to the next pattern.
40 **Switch back to the previous pattern TEACH IN:** Upon pressing the key, the program switches to the previous pattern.
41 **No function**
42 **No function**
43 **No function**
44 **Function like pressing the pedal to pos. –2**: Upon pressing the key, the seam end is initiated. If the functions “end backtack“ and “trimming operation” are activated, they will be completed. The drive stops in position 2.
45...47 **No function**
48 **Signal A1 is issued:** Upon pressing the key, signal A1 is issued immediately.
49 **Signal A1 switchable as flip-flop:**Upon pressing the key, signal A1 is activated and deactivated when pressing the key again.
50 **No function**
51 **Signal A2 is issued:** Upon pressing the key, signal A2 is issued immediately.
52 **Signal A2 switchable as flip-flop:**Upon pressing the key, signal A2 is activated and deactivated when pressing the key again.
53 **No function**
54 **Function like pressing the pedal to step 12:** If start backtack or softstart is enabled, it will be performed.
55 **Reversal of the direction of rotation**
56 **No function**
57 **Sensor for bobbin thread monitoring** (see F-835)
58..65 **No function**
66 **Thread trimming is suppressed**
67 **Thread trimming and backtacking are suppressed**
68 **Interruption of seam in TEACH IN and switch to next seam.**
69 **Interruption of seam in TEACH IN and switch to preceding seam.**
70 **No function**
71 **No function**
72 **Switching of basic position** (see F-329)
73..76 **No function**
77 **Switch stitch length:** flip-flop function
78..83 **No function**
84 **Move toward reference point**
85 **Reference point reached**
86..89 **No function**
90 **Sensor for zig-zag position** (see F-040)
91 **No function**
92 **No function**
93 **Threading in**
94 **Multifunction keys** (programmable)
95 **Multiple backtack**
96 **Backtack disabling of all automatic backtacking**
97 **Single stitch backwards**
98 **Edge trimmer On/Off**

7.17.2 Multiple-function key bar in machine head

Function **with** or **without** control panel		Parameter
Selection of the input function	(S1...S8)	**840...847**

The functions of the multiple-function key bar can be programmed using parameters **840...847** for inputs S1 ... S8. Any function from the list may be selected, as described under parameter **240**.
See also the previous section "Switching functions of inputs in1...in13"
The LEDs located above the keys signal the switching state (LED on = function on).

7.17.3 Multiple-function key

Using the programmable multifunction key (S1) on the multiple-function key bar on the machine head, a function important for the sewing process can be placed within easy reach of the operator.
Quick programming is possible by pressing and holding a key already assigned to the desired function, then pushing the multifunction key for about three seconds.
If a key (S2...S7) on the multiple-function key bar is used for this purpose, the LED integrated into the key is turned on. Any integrated LED previously turned on is turned off.

7.17.4 Software Debouncing of All Inputs

Function **with** or **without** control panel		Parameter
Software debouncing of all inputs	(EnP)	**238**

238 = 0 No debouncing
238 = 1 Debouncing

7.18 F1/F2 Function Key Assignment on the V810/V820/V850 Control Panels

Functions		Parameter
Selection of input function on the (A) "F1" key on the V810/V820/V850 control panels	(tF1)	**293**
Selection of input function on the (B) "F2" key on the V810/V820/V850 control panels	(tF2)	**294**

The function of the keys F1 (A) and F2 (B) can be selected on the control panels using parameters **293 and 294**.

293/294 =
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 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...12 No function
13 High lift for walking foot operational mode not stored: The signal “high lift for walking foot” is issued as long as the key is held down, and the drive runs with speed limitation (n10).
14 High lift for walking foot operational mode stored (flip flop 1): The signal “high lift for walking foot” is issued upon briefly pressing the key, and the drive runs with speed limitation (n10). The operation is disabled upon pressing the key again.
15 No function
16 Intermediate Backtack: Upon pressing the key, the backtack will be enabled anywhere in the seam and at standstill of the drive.
17 Backtack suppression / recall: Upon pressing the key, the backtack will be suppressed or recalled once.
18 No function
19 Reset bobbin thread monitor: After inserting a full bobbin, the stitch counter is set to the value determined by means of parameter **031**.
20...68 No function
69 TEACH IN: Return to last seam

70 No function
71 No function
73...74 No function
99 Reset part counter
100 Day counter/Total counter display

7.19 Parts counter

Function **with** control panel		V810/V820/V850
Parts counter function	(tEi)	**027**
Reset the parts counter with the F1 key		**294 = 99**
Display the count on the parts counter with the F2 key		**294 = 100**

Parameter **027** can be used to turn on the parts counter function.

027 = 0 Parts counter function off
027 = 1 Day counter display, always On
027 = 2 Total counter display, always On
027 = 3 Day counter display, retrievable with F1 key (3 sec.)
027 = 4 Total counter display, retrievable with F1 key (3 sec.)
027 = 5 Day counter on seam end display (3 sec)
027 = 6 Total counter at seam end display (3 sec)

Parameter **294 = 99** is used to assign the parts counter reset function to the F1 key on the control panel.
Parameter **294 = 100** is used to assign the parts counter display function to the F2 key on the control panel.

7.20 Target stitching function/move to needle function by key

Function **with** or **without** control panel		Parameter
Target stitching function/move to needle function by key	(PSt)	**062**
Target stitch position	(P8E)	**061**
Number of steps (increments) for position change for each key press	(ihr)	**260**
Speed during target stitch/needle position move by key	(nhr)	**261**
Delay time with key held until continuous change in position	(dhr)	**262**

This function permits a key to be pressed in order to move to a target stitch position or an arbitrary needle position. The keys used for this function can be connected to any programmable input on the control (in1...in13), or a key (S1...S8) on the keypad module on the machine head (parameter **840...847**) can be assigned.

Move toward needle-up position
The needle position can be changed by pushing a key.
The input used for this function (in1...in13) and the rotational direction are selected using parameters **240...249, 239, 550, 551**, or a key (S1...S8) on the keypad module on the machine head (parameter **840...847**).
When the key is pressed **briefly** , i.e. no longer than the time set using parameter **262** , the handwheel rotates by the steps set using parameter **260** .
When the key is **held down**, the handwheel rotates continuously until the key is released.
The handwheel rotates at the speed set using parameter **261**

Move to target stitch position
The target stitch position can be triggered according to the approach of the needle position, but only when a key whose **parameter value** has been set to **20**.
On the first push, the needle moves to the position set in parameter **061**.

240...249, 239, 550, 551 = 20 Direction of rotation corresponds to that of the machine
or **840...847**
240...249, 239, 550, 551 = 21 Direction of rotation is opposite to that of the machine
or **840...847**

260 Number of steps (increments) for position change for each key press
261 Speed during target stitch/needle position move by key
262 Delay time with key held until continuous change in position

7.21 Speed Limitation by means of External Potentiometer

Function **with** or **without** control panel		Parameter
Speed limitation by means of external potentiometer (maximum value)	(toP)	**124**
Speed limitation using ext. potentiometer (minimum value)	(bot)	**125**
Function “speed limitation using external potentiometer”	(Pot)	**126**

The functioning of the speed limitation when using an external potentiometer can be selected using parameter **126**.
The desired limitation speed is set using a potentiometer connected to socket ST2/2-4. The maximum/minimum value of speed limitation is set using parameters **124/125**.

124 Maximum value for speed limitation with external potentiometer
125 Minimum value for speed limitation with external potentiometer
126 = 0 Function "external potentiometer" Off.
126 = 1 The external potentiometer is active whenever the pedal is pressed forward.. The drive always runs with the set speed limitation.
126 = 2 The external potentiometer is active only if an input is set at "**25**" by means of parameters **240...249**. If the selected input is enabled and the pedal pressed forward, the drive runs at limited speed. The speed limitation can be enabled and disabled anywhere in the seam using the key.
126 = 3 Speed depending on high lift by means of potentiometer e. g. Juki (LU-2210/2260).
126 = 4 Speed depending on high lift by means of potentiometer e. g. Dürkopp Adler (767).

7.22 Signals A1 and A2

When using the V820/V850 control panel, direct access by means of the function key (key 9) is possible.

Function **with** control panel		Parameter
Signal A1 and/or A2 On/Off with slide-in strip 1...4 (left-hand arrow = A1, right-hand arrow = A2)	(-F-)	**008 = 5**

Function **with** control panel		V820/V850
Signal A1 On	left-hand arrow above key On	Key 8
Signal A2 On	right-hand arrow above key On	
Signals A1 and A2 On	both arrows above key On	
Signals A1 and A2 Off	both arrows above key Off	

Parameters 300-309, 330, 331 for A1 and 310-319, 335, 336 for A2 determine when and how long the **signals** are enabled or disabled, or other conditions take effect.
When a V820/V850 control panel is used, signals A1/A2 can be assigned to a seam using key **8** (slide-in strips 6, 8, 9 and 10).

Using parameter **300/310** it is possible to set which output (M1-M11 or VR) can be switched by A1/A2.

Using parameter **301/311** it is possible to select if signal A1/A2 is effective until the seam end, stop at the seam end, over time or during stitch counting.
301/311 0 to end of seam (parameter **320**)
1 Over time (parameter **304/305/314/315**)
2 Until stop at the seam end
3 During stitch counting (parameter **308/309/318/319**)
4 Puller function (parameter **309/319**)

Using parameter **302/312** it is possible to select if the signal A1/A2 shall be effective at the start of the seam, after light barrier sensing or at the seam end.
302/312 0 Signal at the beginning of the seam
1 Signal after light barrier sensing
2 Start of the signal when the drive stops at the seam end
3 Signal from light barrier covered at the start of the seam
4 Signal switchable only manually

Using parameter **303/313** it is possible to select if the signals shall be activated with or without delay.
303/313 0 Without delay time
1 After a delay time (parameter **308/318**)
2 After a stitch count (parameter **309/319**)

The delay time can be selected using parameter **304/314**.

The ON period can be selected using parameter **305**/**315**.

The speed mode can be set using parameter**306/316**. The speed limitation is effective only when the signal is On.

306/316 **0** Pedal controlled speed
1 Limitation to speed n9 (parameter 288)
2 Limitation to speed n11 (parameter 289)

The function for A1/A2 can be enabled or disabled separately using parameter **307/317**.

Using parameter **308/318** it is possible to select if the signals shall be activated with or without delay stitch count.

308/318 **0** Without delay stitches
1 with delay stitches

Separate stitch counts can be selected using parameter **309/319**.

The switch-off moment can be set using parameter **320**.

320 **0** Signals effective until seam end
1 Signals effective until pedal has been pressed to pos. 0 (neutral)

Using parameter **330** for signal A1 and parameter **335** for signal A2, it is possible to select if these signals and sewing foot lifting shall be coupled or these signals and backtacking shall be coupled.

330/335 **0** Coupling off
1 Coupling with sewing foot lifting
2 Coupling with backtacking
3 Coupling with sewing foot lifting and backtacking

Signals A1/A2 can be inverted using parameter **331/336**.

Signals A1/A2 can be switched using the "**F**" key on the V820/V850 control panel if parameter **008** is set accordingly.

7.22.1 Puller Function Using Signal A1 and/or A2

Puller operation is possible using signals A1/A2. Use the following parameters:

- **300/310** Selection of power transistor for the puller solenoid.
- **301/311=4** Signals A1/A2 enable the puller function.
- Select the input for triggering the puller function using parameters **240...249**=**49/52**. This way, the puller can be lifted and lowered manually.
- **302** + **303/312 + 313=0** The puller will be lifted at the start of the seam without delay.
- **309/319** Number of stitches until the puller is lowered at the start of the seam.
- **330/335** Coupling of the puller and sewing foot lifting or coupling of the puller and backtacking.
- **307/317** Puller function On (puller up)/Off (puller down).
- If parameter **008**=**6/7** , the puller (signals A1/A2) can be lifted or lowered by pressing key 9 on the V820/V850 control panel.

7.22.2 Edge trimmer with signal A1

Signal A1 can be used for the edge trimming function. Use the following parameters:

- **246**=**49** Input in7 for initiation of the edge trimming function. For example, a knee switch could be connected here.
- **844**=**98** Key S5 on the multiple-function key bar can be used for turning the edge trimmer on and off.
- **300=5** Selection of end stage M5 (ST2/32) for the edge trimmer.
- **301=4** Signal A1 initiates the edge trimming function.
- **302...306=0** The edge trimmer is turned on at the start of the seam, without delay.
- **307=1** Edge trimmer On.
- **308=0** No delay until activation of the edge trimmer.
- **309=0** Stitch counting Off
- **330=3** Coupling of the edge trimmer with sewing foot lifting and backtacking.

- **331=1** Coupling of the edge trimmer with sewing foot lifting and backtacking.
- If the parameter **008**=**6** is set, pressing the 9 key on the V820/V850 control panel can turn the edge trimmer on or off.

7.23 Signal “Machine Running“

Function **with** or **without** control panel		Parameter
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 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.

7.24 Signal Output Position 2

- Logic level output +5V, I_{max} 10mA
- Signal activated when 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 B18/9.

7.25 Signal Output G1/G2, 512 Impulses per Rotation

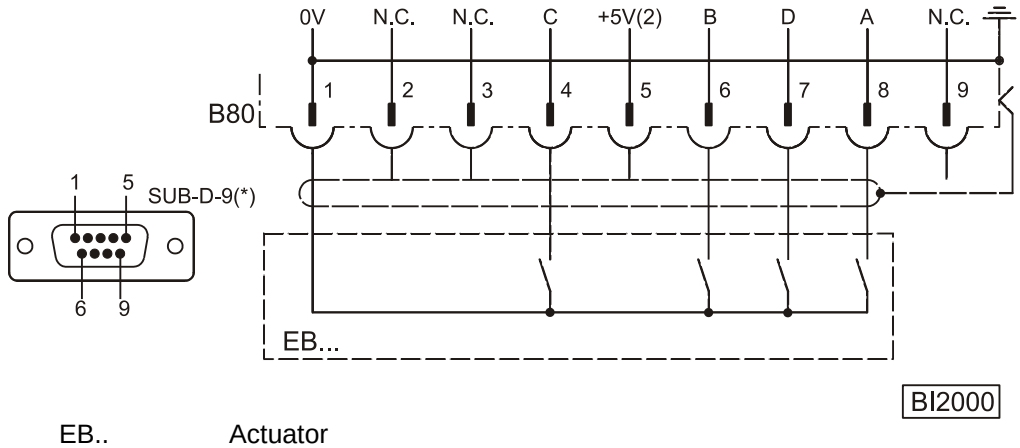
- Logic level output +5V, I_{max} 10mA
- Signal activated when a generator slot of the position transmitter is sensed
- 512 impulses per rotation of the handwheel
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e. g. for the connection of a counter
- A signal is issued at socket B18/1+6

7.26 Actuator

The commands for the sewing process are inputted using the actuator which is connected to the pedal. EFKA offers two different functional variants.
1. Digital – works only in steps (e.g. EB301A).
2. Analog – Characteristic programmable, continuously variable, 12, 24, or 60 steps (e.g. EB401).

Which actuator type is connected is automatically detected by the control.
Instead of the built-on actuator another actuator can also be connected to socket B80.

7.26.1 Digital actuator



EB.. Actuator

Table: Coding of the Pedal Steps

Pedal step	D	C	B	A		
-2	H	H	L	L	Full heelback	(e. g. initiating the seam end)
-1	H	H	H	L	Slight heelback	(e. g. sewing foot lifting)
0	H	H	H	H	Pedal in pos. 0 (neutral)	
½	H	H	L	H	Pedal slightly forward	(e. g. sewing foot lowering)
1	H	L	L	H	Speed stage 1	(n1)
2	H	L	L	L	Speed stage 2	
3	H	L	H	L	Speed stage 3	
4	H	L	H	H	Speed stage 4	
5	L	L	H	H	Speed stage 5	
6	L	L	H	L	Speed stage 6	
7	L	L	L	L	Speed stage 7	
8	L	L	L	H	Speed stage 8	
9	L	H	L	H	Speed stage 9	
10	L	H	L	L	Speed stage 10	
11	L	H	H	L	Speed stage 11	
12	L	H	H	H	Speed stage 12	(n2) Pedal completely

Function **with** or **without** control panel		Parameter
Selectable pedal functions	(-Pd)	**019**

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).

Function **with** or **without** control panel		Parameter
Speed stage graduation	(nSt)	**119**

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

Possible characteristic curves:
- linear
- progressive
- highly progressive

7.26.2 Analog actuator

Function **with** or **without** control panel		Parameter
Characteristic of the "analog pedal"	(APd)	**026**

The effect of pedal actuation on the drive functions 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
026 = 3 24-level
026 = 4 60-level (progressive)
026 = 5 60-level (progressive)

7.27 Acoustic Signal

Function **with** control panel		Parameter
Acoustic signal On/Off	(AkS)	**127**

An acoustic signal which sounds in the following cases can be enabled by means of parameter **127**:

- When the bobbin thread monitor is On, after completion of the stitch count.
- When the machine run blockage is On.
- During service hours monitoring

8 Signal Test

Function **with** or **without** control panel		Parameter
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).

8.1 Signal Test Using the Incorporated Control Panel or the V810/V820/V850

8.1.1 Inputs to the control

- Select parameter **173**.
- **Operator control panel:** By actuating the keys or switches connected to inputs in1 to in10, the number of the input actuated appears on the display, e.g.**i06**. More than one switch and/or key may not be actuated at the same time.
  If more than one key or switch is activated at once, the number of the lowest-numbered input is displayed. If, for example, **in3, in5, in6, in7** are actuated, **i03** is displayed.
  Note: Checking of positions is described in chapter "Displaying the signal and stop positions".
- **V810 control panel:** The numbers of the inputs in1...in10, in11 (LSM), in12, and in13 appear individually on the LCD display. Here, too, several switches and/or keys may not be actuated at the same time.
  The signals "Light barrier, sensor (IPG... or HSM...), generator pulses 1 and 2, position 1 and 2" can be checked directly for functionality. The display is carried out using the arrows assigned to keys 2 to 4.

Display example for input 03 on the V810 control panel: ➔ **in i03**

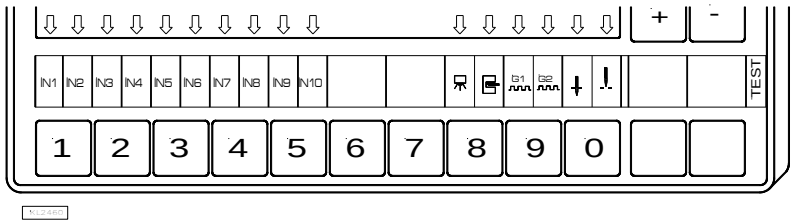
- **V820 control panel:** The numbers of the inputs in1...in10, in11 (LSM), in12, and in13 appear individually on the LCD display. In addition, the active inputs are displayed by arrows over keys 1 through 6, even if multiple inputs are actuated at once.
- If more than one key or switch is activated at once, the number of the lowest-numbered input is displayed. If, for example, **in3, in5, in6, in7** are actuated, **03** is displayed.
  The signals "Light barrier, positions, etc." are displayed by arrows above keys 8, 9, 0.

Display example for input 03 on the V820 control panel: ➔ **2-06 in 03**

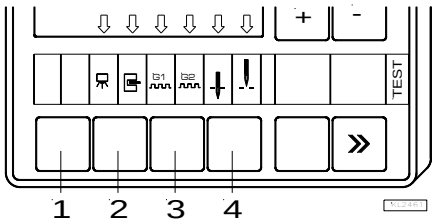
- **V850 control panel:** Like V820, but with somewhat more detailed display

Display example for input 03 on the V850 control panel: ➔ **ST2/06 : IN03 = ON**

V820/V850 Control Panel



V810 Control Panel



NOTE
If an input is active with open contact, the corresponding arrow lights up when the contact is open. If an input is active with closed contact, the corresponding arrow lights up when the contact is closed!

8.1.2 Keys on the multiple-function key bar on the machine head

Upon pressing one of the keys S1...S8, its number appears in the display. On the V810/820/850 also in## and on.

Display example for input S7 on the V820/V850 control panel: ➔ **in S7 on**

8.1.3 Outputs of control

- Select parameter **173**.
- Select the desired output using the **+/-** keys.
- On the V810 control panel or on the built-in keypad in the control, the **>>** key is used to turn on the associated output, if it is connected and working.
- On the V820 control panel, instead of the **>>** key the key (lower right, at the outer edge) must be pressed.

Display example for backtacking output on the V810 control panel: ➔ **2-34 oUt vr**

Display example for backtacking output on the V820 control panel: ➔ **2-34 oUt vr**

Display example for backtacking output on the V850 control panel: ➔ **ST2/34 OUT: VR**

Assignment of outputs		
Display	**Function / Output**	**On socket A (ST2)**
OUT VR	Backtacking	34
OUT FL	Sewing foot lifting	35
OUT 1	M1	37
OUT 2	M2	28
OUT 3	M3	27
OUT 4	M4	36
OUT 5	M5	32
OUT 6	M6	30
OUT 7	M7	23
OUT 8	M8	24
OUT 9	M9	25
OUT 10	M10	29
OUT 11	M11	31

8.1.4 LEDs of the multiple-function key bar on the machine head

The procedure is exactly as described in the previous section.
If the **>>** or **F2** key is pressed, the associated LED lights up.

Display example for LED 01 on the V820/V850 control panel: ➔ **LED 01**

LED	In / over key
01	in S1 (thread monitor)
02	in S1 (oil sensor)
03	above S2
04	above S3
05	above S4
06	above S5
07	above S6
08	above S7
09	above S8
10	in S2
11	in S3
12	in S4
13	in S5
14	in S6
15	in S7

For your notes:

For your notes:

For your notes:

For your notes:

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