# dc15xx

## CONTROL AB610A5020


## Instruction Manual

**with list of parameters**

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

**No. 402440 English**

**Note**

For initial operation after software updating or maintenance procedures, make sure to set parameter 467 for the specific motor to be used.
**DC1500, F-467 = 1 / DC1550, F-467 = 2**


Efka
FRANKL & KIRCHNER GMBH & CO KG

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## 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

**CONTENTS** **Page**

# 1 Range of Applications

The drive is suitable for lockstitch, chainstitch and overlock machines of various manufacturers.

## 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 | **DC1500 optional DC1550** |
| 1 | Electronic control/Power supply unit | **AB610A5020/N215** |
| 1 | Actuator | **EB401** |
| 1 | Set of accessories (standard) | **B156** |
| | consisting of: | Plastic bag for B156 + documentation |
| and | | |
| 1 | Set of accessories | **Z68** |
| | consisting of: | Pitman rod, potential equalization cord |
| | | |
| **Option 1** | | |
| 1 | Set of standard accessories | **B159** |
| | consisting of: | Undertable mounting kit,<br>Plastic bag for B159 + documentation |
| and | | |
| 1 | Set of accessories | **Z68** |
| | consisting of: | Pitman rod, potential equalization cord |
| | | |

**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. |
|---|---|
| **Hall sensor module** HSM001 | 6100032 |
| **Pulse encoder** IPG001 | 6100033 |
| **Extension cable** approx. 1000 mm long for commutation transmitter DC15.. | 1113151 |
| **Extension cable** approx. 1000 mm long for DC15.. line | 1113150 |
| **Potential equalization cord** 700 mm long, LIY 2.5 $mm^2$, gray, with spades on both sides | 1100313 |
| **Fitting piece** for position transmitter | 0300019 |
| **Undertable mounting kit** for DC15.. | 1113235 |
| **Undertable mounting kit** (reinforced) for DC15.. | 1113427 |
| **9-contact SubminD** male connector | 0504135 |
| **9-contact SubminD** female connector | 0504136 |
| **Half-shell housing** for 9-contact SubminD | 0101471 |

# 3 Putting into Service

**NOTE**

When using of the drive to compensate for a coupling motor without positioning, configuration of the parameters is not required when GREP. The associated parameters have no effects.

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

- Auswahl des Motortyps DC1500 oder DC1550 (Parameter 467)
- The correct installation of the drive, position transmitter and accompanying devices, if necessary
- If necessary, the correct adjustment of the direction of motor rotation using parameter 161
- 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 positions using parameter 171
  (possible with all settings of parameter 270)
- The correct positioning speed using parameter 110
- The correct maximum speed compatible with the sewing machine using parameter 111
- The setting of the remaining relevant parameters
- Begin sewing in order to save the set values

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

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

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

Input parameter 500 ➔

Parameter for selection of motor ➔
(1=DC1500, 2=DC1550)

Parameter for direction of motor rotation ➔

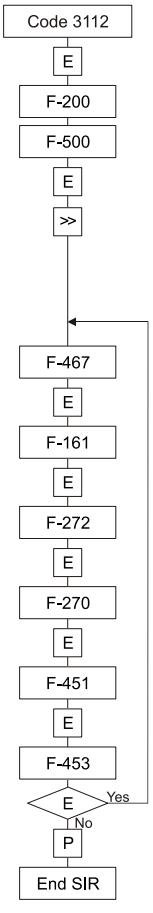
Parameter for transmission ratio ➔

**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 keys +/-.**

With SIR you can do the most important settings for initial operation with menu prompting.
For safety reasons, the menu must be executed point by point. This ensures correct setting of all important parameters. The setting of other parameters is not affected.

# 5 Setting the Basic Functions

## 5.1 Direction of Motor Rotation

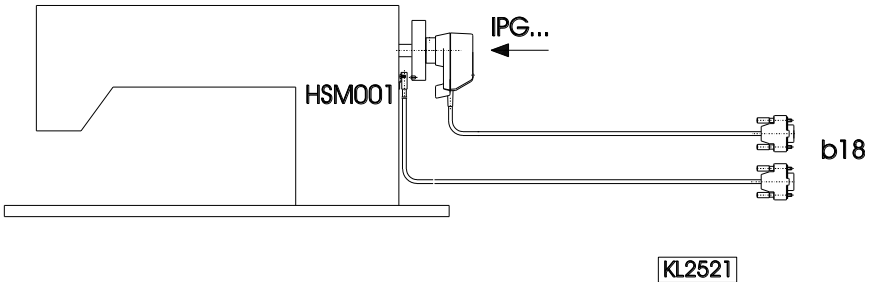
| Function | | Parameter |
|---|---|---|
| Direction of motor rotation | (drE) | **161** |

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

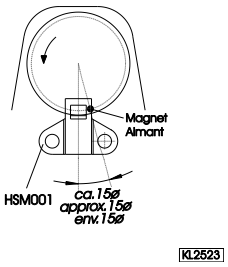
**ATTENTION**
If the motor is mounted differently, e. g. at a different angle or with gear, make sure that the value set using parameter 161 corresponds to the direction of rotation.

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

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



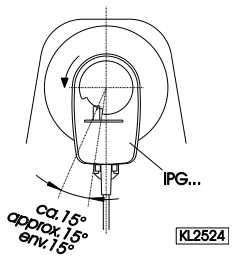

**Operation with HSM001 Hall sensor module**




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

**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.



## 5.3 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 | | 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 500 can be calculated using the formula below.
If the value 2000 has been selected in parameter 272, it follows that the motor pulley is double the size of the sewing machine head pulley.

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

## 5.4 Positioning Speed

| Function | | Parameter |
|---|---|---|
| Positioning speed | (n1) | **110** |

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

## 5.5 Maximum Speed Compatible with the Sewing Machine

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

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

## 5.6 Maximum Speed

| Function | | 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.

## 5.7 Positions

| Function | | Parameter |
|---|---|---|
| Modus of a position sensor<br>Setting the needle positions<br>Transmission ratio between motor shaft and machine shaft | (PGm)<br>(PGr)<br>(trr) | **270**<br>**171**<br>**272** |

A sensor can be used as a position sensor, e.g. a light barrier or proximity switch with either NC or NO functionality.
It is connected to socket B18/7.
Parameter 270 is used to select the mode to be selected depending on the type and mounting of the sensor used (see section Parameter List under parameter 270 for a description and flow chart).
After configuration of parameter 270 to "1, 2, 3, or 4", parameter 171 must be used to set the angle for positions 1 and/or 2, incoming and outgoing.
Alternatively, the positions can be configured using the fast-installation routine.
The transmission ratio must already have been input using parameter 272.

### 5.7.1 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

**Setting the reference position:**
- Input code number and select parameter **170**.
- Press the **E** key ➔ Display **Sr1**
- Press 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. ➔ Set machine reference point
- Press the **P** key once ➔ Actual parameter number is displayed
- Press the **P** key twice ➔ Exit programming at the technician level

### 5.7.2 Setting the Positions (Parameter 270 = 0 or 6)

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

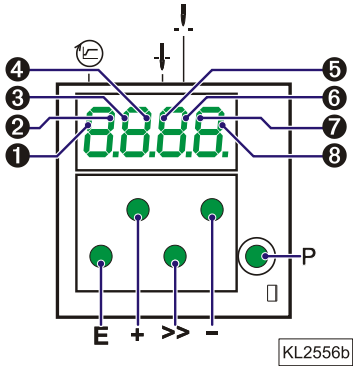
- Nach Eingabe der Code-Nummer Parameter **171** wählen!
- Press the **E** key ➔ **[o]** is displayed
- Press key **>>** ➔ **P1E** is displayed; set “position 1 On“ on the handwheel
- Press the **E** key ➔ **P2E** is displayed; set “position 2 On“ on the handwheel
- Press the **E** key ➔ **P1A** is displayed; 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

## 5.8 Display of the Signal and Stop Positions

| Function | | 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**

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

## 5.9 Positioning Shift

| Function | | 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.

## 5.10 Braking Characteristics

| Function | | Parameter |
|---|---|---|
| Braking effect when varying the preset value ≤ 4 stages<br>Braking effect when varying the preset value ≥ 5 stages | (br1)<br>(br2) | **207**<br>**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!

## 5.11 Braking Power at Standstill

| Function | | 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

## 5.12 Starting Characteristics

| Function | | 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.

## 5.13 Operating Hours Counter

| Function | | 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** |

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 seam end.

**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.**

**Control display:**

- 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 → z. B. **400** (sewing process can be started)

### 5.13.1 Set and Reset Operating Hours Counter

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

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

**The number of hours has not yet been reached:**

- Press the >> key 3 times ➔ The operating hours counter is set to “0“ and restarted.

**A value in parameter 177 has been changed:**

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

### 5.13.2 Total Operating Hours Display

In this service routine enabled using parameter 176, the total number of operating hours is displayed.
The sequence of displayed values is as with parameter 177.
The values can only be displayed, not varied. Therefore, letter symbols “rES“ for “reset” and “SEt“ for “set” will not appear.

# 6 Functions

## 6.1 First Stitch after Power On

| Function | | 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.

## 6.2 Softstart

| Function | | 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. stitch counting)
- stitch counting synchronized to position 1
- suspension with pedal in position 0 (neutral)
- interruption by full heelback (position -2)

### 6.2.1 Softstart speed

| Function | | Parameter |
|---|---|---|
| Softstart speed | (n6) | **115** |

### 6.2.2 Softstart stitches

| Function | | Parameter |
|---|---|---|
| Number of softstart stitches | (SSc) | **100** |

## 6.3 Special pedal function Single stitch / Full stitch

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

With the single stitch / full stitch, it is possible to enable the execution of a stitch though pedal forwards actuation. For this it is necessary to move the pedal forward only far enough so that the percentage portion (e.g., 40%) of the maximum possible pedal travel (100%) set by the parameter **042**, is not exceeded.
The execution is done as single stitch (parameter **041 = 1**) or full stitch (parameter **041 = 2**)
If the travel set with parameter **042** is exceeded within the time set with parameter **051**, the drive runs with the speed specified by the respective pedal setting, even when under the threshold.
First after pedal 0-position can the special pedal function be actuated again.
The single/full stitch is executed in the speed set with parameter **122**. To ensure that only a single stitch is executed, the setting 300 rpm must not be exceeded.

**041 = 0** Special pedal function Off
**041 = 1** Single stitch:
The performs one rotation from position 1 to position 1. If it is standing in position 2, it runs to position 1 the first time and then each time from position 1 to position 1.
**041 = 2** Full stitch:
The drive executes a complete rotation corresponding to its starting position.

## 6.4 Actuator

### 6.4.1 Analog actuator

| Function | | Parameter |
|---|---|---|
| Characteristic of the "analog pedal" EB401 | (APd) | **026** |

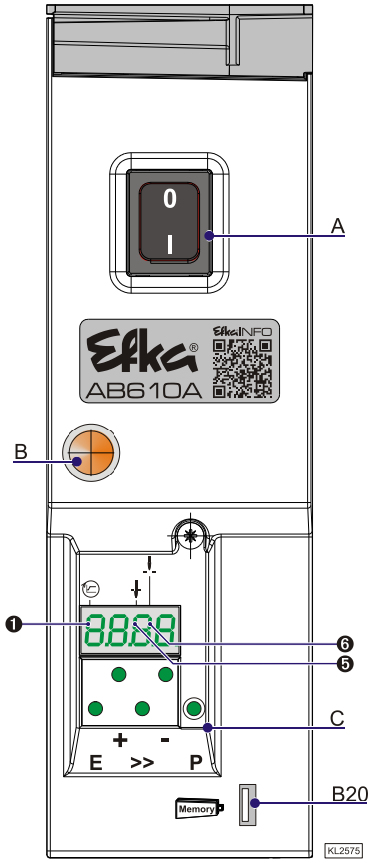
The characteristic of the "analog pedal" can be set using parameter **026**:

**026 = 0** Analog function off
**026 = 1** 12-level selected, like prior pedal function of the digital actuator.
**026 = 2** continuously variable
**026 = 3** 24-level
**026 = 4** 60-level (progressive)

# 7 Operating Elements and Socket Connectors

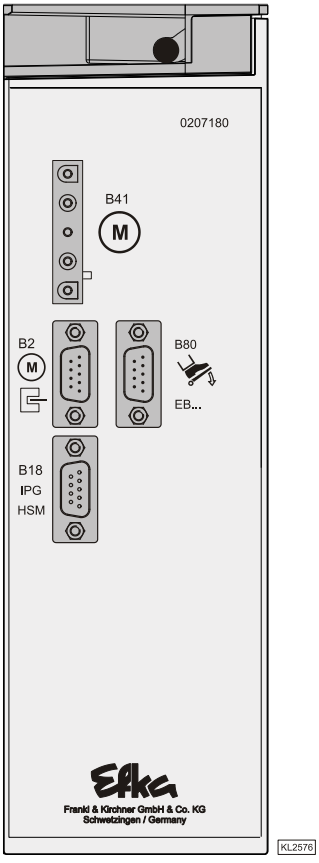
## 7.1 Positions of the Front Side

| | |
|---|---|
| A | **Power switch** |
| B | **Mains pilot lamp** |
| C | **Control panel** (onboard module)<br>**+ Display** (4 digit 7 segment display) |
| Key | |
| P | Call or exit programming mode |
| E | Softstart On/Off<br>Enter key for modifications in the programming mode |
| + | In the programming mode - increase of the value indicated |
| >> | Basic position 1 or 2<br>Shift key in the programming mode |
| – | In the programming mode – decrease of the value indicated |
| The upper vertical segments of the 4 digit 7 segment display indicate the switching states of foot lifting and basic position. | |
| 1 | Softstart On/Off |
| 5 | Basic position “needle position 1“ |
| 6 | Basic position “needle position 2“ |
| Connector | |
| B20 | USB Memory Stick |



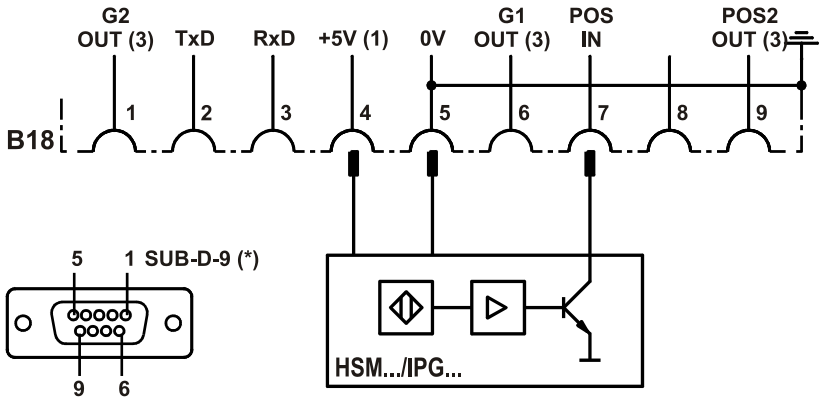

## 7.2 Positions of the Rear Side

| | |
|---|---|
| Steckverbinder | |
| B2 | Commutation transmitter |
| B18 | - Hall sensor module HSM001<br>- Pulse encoder IPG001 |
| B41 | Motor power supply |
| B80 | Actuator |



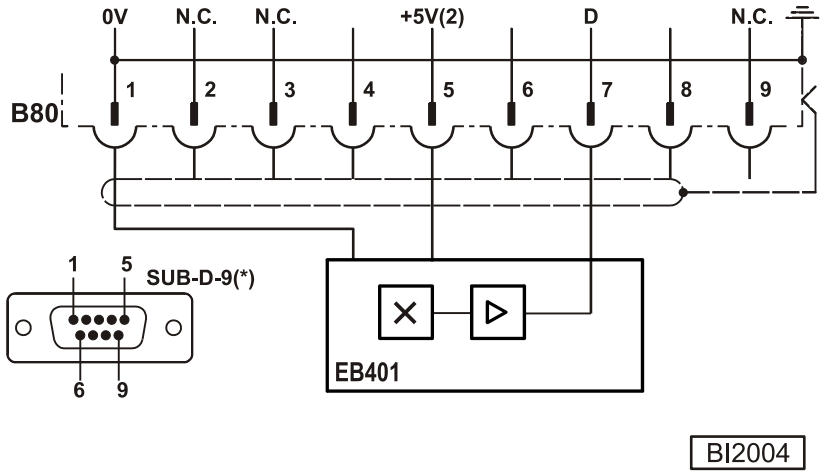
## 7.3 Connection Diagrams

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




| | | | |
|---|---|---|---|
| POS2 OUT | Output for position 2 | TXD/RXD | Serial transmission lines |
| POS IN | Input for positions (e. g. connection of a sensor) | HSM001 | Hall sensor module |
| G1/G2 OUT | Output of generator impulses | IPG... | Pulse encoder |

**Connection of an analog actuator EB401**




*1) Nominal voltage +5 V, $I_{max}$ 100 mA*
*2) Nominal voltage +5 V, $I_{max}$ 20 mA*
*3) Logic level output +5 V, $I_{max}$ 5 mA*
**) Front view of the control (component side) / rear view of the outgoing connecting cable*

# 8 List of Parameters

## 8.1 Operator Level

### Operator Level

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 026 APd | Characteristic of the "analog pedal" EB401<br>0 = Analog function off<br>1 = 12-level, like previous pedal function<br>2 = continuously variable<br>3 = 24-level<br>4 = 60-level (progressive) | | 4 | 0 | 4 | |
| 041 EZP | Special pedal function Single stitch / Full stitch<br>0 = Function off<br>1 = Single stitch<br>2 = Full stitch | | 2 | 0 | 0 | C |
| 042 GrP | Pedal travel forwards for detection of the special pedal function | % | 100 | 0 | 40 | C |
| 051 dPd | Time for detection of the special pedal function | ms | 2550 | 0 | 100 | C |

## 8.2 Technician Level

**Code no. 1907**

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 100 SSc | Number of softstart stitches | stitches | 254 | 0 | 2 | |
| 110 n1 | Positioning speed | RPM | 390 | 70 | 200 | |
| 111 n2 | Upper limit setting range of the maximum speed | RPM | 9900 | n2_ | 5000 | |
| 121 n2 | Lower limit setting range of the maximum speed | RPM | n2_ | 200 | 400 | |
| 134 SSt | Softstart On/Off | | 1 | 0 | 0 | |
| 161 drE | Direction of motor rotation<br>0 = Clockwise rotation<br>1 = Counterclockwise rotation | | 1 | 0 | 0 | |
| 170 Sr1 | Setting the reference position:<br>- Press the **E** key<br>- Press the **>>** key.<br>- Turn handwheel until symbol on display goes off. Then set the handwheel to the reference position.<br>- Press the **P** key twice | | | | | |
| 171 Sr2 | Setting the needle positions:<br>1E = Start position 1<br>2E = Start position 2<br>1A = End position 1<br>2A = End position 2 | degrees | 359 | 0 | <br>26<br>319<br>200<br>355 | |
| 172 Sr3 | Display on the control:<br>Pos. 1 bis 1A (LED-segment 5 lights up)<br>Pos. 2 bis 2A (LED-segment 6 lights up) | | | | | |
| 176 Sr6 | Service routine for total operating hours display.<br>The process is as with display example of parameter 177. | | | | | |

## Technician Level

**Code no. 1907**

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 177 Sr7 | Service routine for display of hours since the last service.<br><br>**Display example for the operator control panel:**<br>Press the E key ➔ Display Sr7=<br>Press the >> key ➔ Display h t<br>Press the E key ➔ Display 0000<br>Press the >> key ➔ Display h h<br>Press the E key ➔ Display 0000<br>Press the E key ➔ Display Min<br>Press the E key ➔ Display 00<br>Press the E key ➔ Display SEc<br>Press the E key ➔ Display 00<br>Press the E key ➔ Display MS<br>Press the E key ➔ Display 000<br>Press the E key ➔ Display rES<br>Press the E key again to restart routine, or<br>press the P key twice to return to operational status | | | | | |
| 179 Sr5 | Display of control program number with index and more identification numbers. The data is displayed in sequence by keystroke.<br><br>**Display example for the operator control panel:**<br>Press the E key ➔ Display Sr5=<br>Press the >> key ➔ Display e.g. 5020 (prog. no)<br>Press the E key ➔ Display e.g. A (Index)<br>Press the E key ➔ Display e.g. 06 (Year)<br>Press the E key ➔ Display e.g. 10 (Month)<br>Press the E key ➔ Display e.g. 24 (Day)<br>Press the E key ➔ Display e.g. 16 (Hour)<br>Press the E key ➔ Display e.g. --<br>Press the E key ➔ Display e.g. ----<br>Press the E key again to restart routine, or<br>press the P key twice to return to operational status | | | | | |

## 8.3 Supplier Level

**Code no. 3112**

| Parameter | | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|---|
| 207 | br1 | Delay from end of thread wiper until sewing foot lifting On | | 55 | 1 | 15 | |
| 208 | br2 | Braking effect when varying the preset value ≤ 4 stages (indicated values only with transmission ratio 1:1) | | 55 | 1 | 20 | |
| 217 | Sr | Number of operating hours before service in steps of 10 (operating hours recording enabled if set at “0”). | hours | 99900 ***) | 00000 | 00000 | |
| 219 | br3 | Braking power at stop of the drive | | | 1 | 4 | |
| 220 | ALF | Accelerating power of the drive (indicated values only with transmission ratio 1:1) | | | 1 | 35 | |
| 221 | dGn | Speed gate 1 | RPM | 990 | 50 | 100 | |
| 222 | tGn | Speed gate damping period | ms | 990 | 0 | 20 | |
| 231 | Sn1 | Execution of the first stitch after Power On at positioning speed | | 1 | 0 | 0 | |

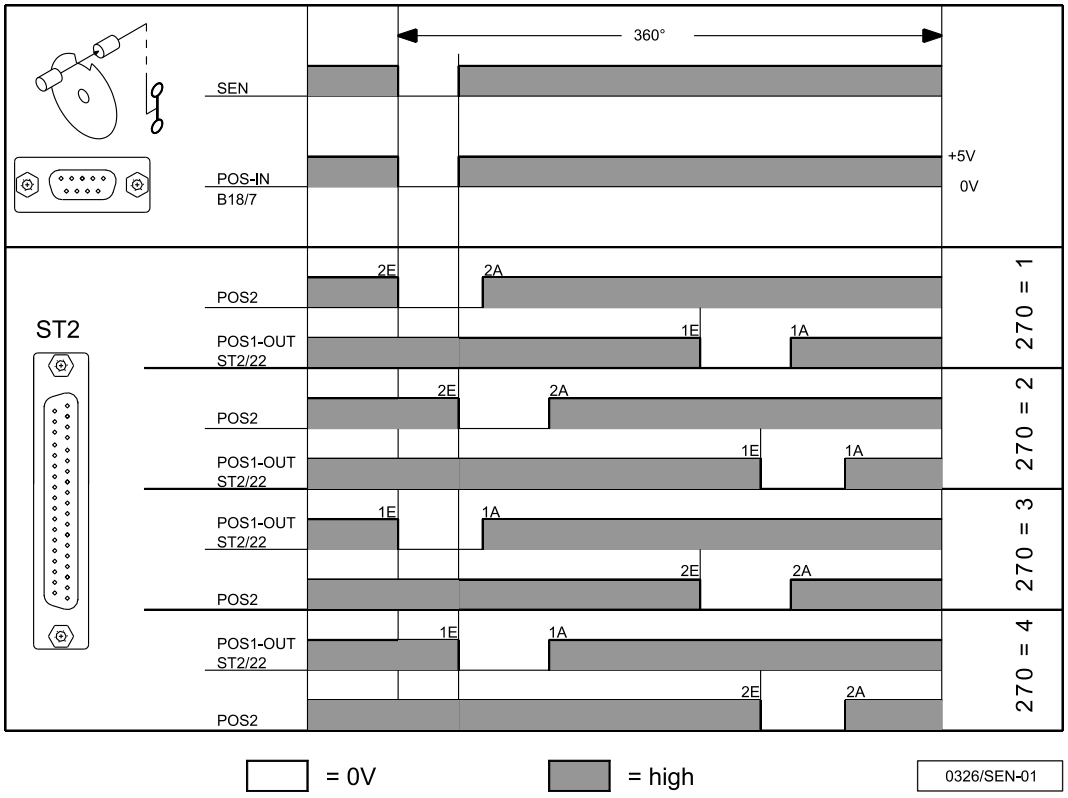
***) *The 4-digit value displayed must be multiplied by 10.*

## Supplier Level

### Code no. 3112

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 270 PGm | Modus of a position sensor with **normally open function** (N.O.) | | 6 | 0 | 0 | |

0 = The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171 *).
1 = Setting the sensor to position 2.
Set position 1 using parameter 171 *), starting from trailing edge position 2.
2 = Setting the sensor to position 2.
Set position 1 using parameter 171 *), starting from leading edge position 2.
3 = Setting the sensor to position 1.
Set position 2 using parameter 171 *), starting from trailing edge position 1.
4 = Setting the sensor to position 1.
Set position 2 using parameter 171 *), starting from leading edge position 1.
5 = No position sensor available. The drive stops unpositioned.
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 for positions 1 and 2 to be correct. If necessary, the preset values can be adapted as described in chapters “Setting the Positions”.

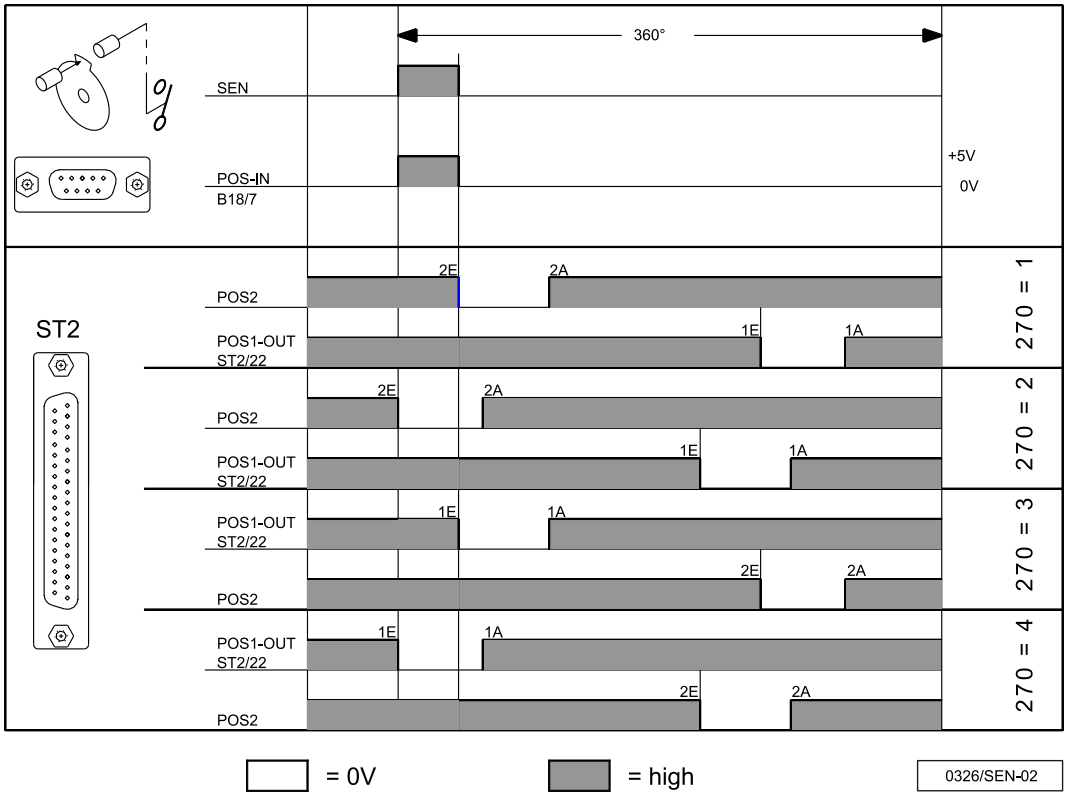



The angles between positions 1 and 2, incoming and outgoing, can be configured using Parameter 171.
*) Alternatively, the positions can be configured using the fast-installation routine.

## Supplier Level

**Code no. 3112**

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 270 PGm | Modus of a position sensor with **normally closed function** (N.C.)<br><br>0 = The positions are generated using the transmitter incorporated in the motor and can be set using parameter 171 *).<br>1 = Setting the sensor to position 2.<br>Set position 1 using parameter 171 *), starting from trailing edge position 2.<br>2 = Setting the sensor to position 2.<br>Set position 1 using parameter 171 *), starting from leading edge position 2.<br>3 = Setting the sensor to position 1.<br>Set position 2 using parameter 171 *), starting from trailing edge position 1.<br>4 = Setting the sensor to position 1.<br>Set position 2 using parameter 171 *), starting from leading edge position 1.<br>5 = No position sensor available. The drive stops unpositioned.<br>6 = The positions are determined by preset values.<br>The reference position must be correctly set for this purpose.<br>In machines with position sensors incorporated in the handwheel the reference position is determined by mechanical adjustment.<br>In all other cases the reference position must be set (see chapter “Setting the Reference Position”) in order for the angles preset for positions 1 and 2 to be correct. If necessary, the preset values can be adapted as described in chapters “Setting the Positions”. | | 6 | 0 | 0 | |




The angles between positions 1 and 2, incoming and outgoing, can be configured using Parameter 171.
*) Alternatively, the positions can be configured using the fast-installation routine.

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 272 trr | Transmission ratio between motor shaft and machine shaft (calculation formula see instruction manual!)<br>**The transmission ratio should be determined and indicated as precisely as possible!** | | 9999 | 150 | 1000 | |

## Supplier Level

**Code no. 3112**

| Parameter | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|
| 401 EEP | Immediate storage of all changed data<br>- Input code number 3112 after power On<br>- Press the E key<br>- Input parameter 401<br>- Press the E key<br>- Set display from 0 to 1<br>- Press the E or P key<br>- All data are stored | | 1 | 0 | 0 | |
| 467 MOT | Selection of motor<br>1 = DC1500<br>2 = DC1550 | | 2 | 1 | 1 | |
| 500 Sir | Recall of Fast Installation Routine (SIR) (see chapter "Fast Installation Routine (SIR)" | | | | | |
| 510 | Transfer parameter settings from control to Memory Stick | | | | | |
| 511 | Transfer parameter settings from Memory Stick to control | | | | | |
| 512 | Compare control and Memory Stick parameter settings | | | | | |
| 513 | Delete parameter setting file from Memory Stick | | | | | |
| 526 | Transfer control software from control to Memory Stick | | | | | |
| 527 | Transfer control software from Memory Stick to control | | | | | |
| 528 | Compare control and Memory Stick control software | | | | | |
| 529 | Delete control software file from Memory Stick | | | | | |

# 9 Error Displays

| On the control | Signification |
|---|---|
| **General Information** | |
| A1 | Pedal not in neutral position when turning the machine on |
| A3 | Reference position is not set |
| A11 | The maximum speed configured cannot be reached at this transmission ratio |
| A500 | Max. number of files (99) on Memory Stick exceeded |
| A501 | File not found on Memory Stick |
| A503 | Data on Memory Stick and in the control is not equal |
| | |
| | |
| C1 | Operating hours counter has reached or exceeded the service time |
| C2 | Fatal exception error |
| C3 | Program error |
| | |
| **Programming Functions and Values (Parameters)** | |
| Springt zurück auf 0000 bzw. auf letzte Parameter- Nummer | Wrong code or parameter number input |
| | |
| **Serious Condition** | |
| E1 | The external pulse encoder e.g. IPG... is defective or not connected. |
| E2 | Line voltage too low, or time between power Off and power On too short |
| E3 | Machine blocked or does not reach the desired speed.<br>Wrong motor selected (param. 467) |
| E4 | Control disturbed by deficient grounding or loose contact |
| E8 | Too much data for the EEPROM or flash memory |
| E9 | EEPROM or flash memory defective. |
| E14 | Power voltage too high: The power voltage is greater than 290V eff.<br>(The DC motor cannot be started; if running, the motor is stopped without positioning. The motor is passively braked (runs down)! |
| E15 | Internal communications error with intermediate circuit |
| E16 | Power voltage too low: The power feed voltage was less than 120V eff.<br>(The DC motor cannot be started, and the 24V is turned off.) |

| | |
|---|---|
| E17 | Charging PTC too warm. The intermediate circuit could not be charged to the voltage needed.<br>Possible cause: Switching the controller on/off to many times within a short time.<br>Correction: Turn off controller and allow it to cool. (The duration of the cooling off phase depends on the ambient conditions and can take several minutes). |
| E18 | Intermediate circuit voltage greater than 450 V, braking resistance possibly failed |
| E19 | No motor connected, inverter defective, motor phase failed |
| E20 | Motor speed too high |
| | |
| **Programming and Data Transfer** | |
| F1 | Parameter unavaliable; wrong code number |
| F7 | RS232 timeout |
| F8 | RS232, error in data transfer, NAK received |
| | |
| **Hardware Disturbance** | |
| H1 | Commutation transmitter cord or frequency converter disturbed |
| H2 | Processor disturbed |
| | |

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