Efka vario dc

CONTROL   MS80A4104

INSTRUCTION MANUAL

WITH PARAMETER LIST

No. 402079   english

Contents

1. Important Safety Instructions

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

- Read all instructions thoroughly before using this drive.

- Drive and accompanying appliances should be mounted and put into operation by qualified personnel in accordance with the guidelines provided in the instruction manual.

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

- Use this drive only for its intended use as described in the instruction manual.

- Use only attachments recommended by the manufacturer or as contained in the instruction manual.

- Do not operate without corresponding protective devices.

- Never operate this drive if one or more parts (e.g. cables, plugs) are damaged, if it is not working properly, if any damages can be identified or are to be suspected (e.g. after it has been dropped). Only qualified personnel are authorized to make adjustments, eliminate faults and complete repair work.

- Never operate the drive with the air openings blocked. Keep ventilation openings of the drive free from the accumulation of lint, dust and loose cloth.

- Never drop or insert any object into any opening.

- Do not use drive outdoors.

- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.

- To disconnect, turn off main switch, then remove plug from outlet.

- Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.

- Keep fingers away from all moving machine parts. Special care is required e.g. around the sewing machine needle and the V-belt.

- Before mounting and adjusting accompanying appliances, i.e. postioner, reversing device, light barrier, etc., disconnect drive from mains (turn off main switch, remove mains plug from outlet [DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1]).

- Always switch off (0) machine and remove plug from outlet, when removing covers, mounting accompanying appliances, positioner especially, light barrier, etc., or any other devices mentioned in the instruction manual.

- Only qualified personnel are authorized to work on the electrical components.

- Work on high voltage circuit areas is forbidden, except as stated in the respective regulations, e.g. DIN VDE 0105 part 1.

- Only specially trained personnel are authorized to complete repair work.

- Cables to be wired must be protected against expectable strain and fastened adequately.

- Cables near moving machine parts (e.g. V-belts) must be wired at a minimum distance of 25 mm (see DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1).

- For safety it is preferred to wire the cables separately from each other.

- Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the motor rating plate and on the nameplate of the power pack.

- Connect this drive to a properly grounded outlet only. See Grounding Instructions.

- Electric accompanying appliances and accessories must only be connected to safety low voltage.

- EFKA DC drives are protected according to overvoltage class 2 (DIN VDE 0160 § 5.3.1).

- Observe all safety guidelines before undertaking conversions or modifications.

- For repair and maintenance use only original replacement parts.

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

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

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

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

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for embroidery machines:

Brand	Series
MSI	GT 216/GT 226

2.1 Use in Accordance with Regulations

The drive is not an independently operating machine, but it is designed for being built into other machines. It can only be put into operation after it has been certified that the machine to which it will be attached meets the specifications of the EC Directive (Appendix II, paragraph B of the Directive 89/392//392/EWG and supplement 91/368/EWG).

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

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

The drive can only be operated:

• on thread processing machines
• in dry areas

3. Complete Drive Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc MS80A4104
	- Power pack	N152 (optional N153, N155)
1	Positioner	P6-1
1	Set of standard accessories consisting of:	B131 belt guard complete set of hardware motor foot bracket 1 and 2, short documentation
1	Pulley	

3.1 Special Accessories

External actuator type EB301, complete with connecting
cable and plug

- part no. 41.0011

Potential equalization cord 700 mm long, LIY 2.5 mm^2, grey, with forked
cable brackets on both sides

- part no. 1100313

Sewing light transformer

- please indicate line voltage and
  sewing light voltage (6.3V or 12V)

6-pin plug (Mas 6100) with slide index
8-pin plug (Mas 8100S) with slide index

- part no. 0500703
- part no. 0502865

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4. Operation

4.1 Access to Programming on Command Input

In order to prevent the unintentional modification of preset functions the input commands are distributed at two
levels.

The following persons have access: - the operator to the first level
                                             - the technician to both levels

4.2 The Operator Level

On this level simple functions which have to be changed frequently during operation can easily be switched on or off
and/or changed by the operator.
For example, basic position needle up/down, Softstart on/off.
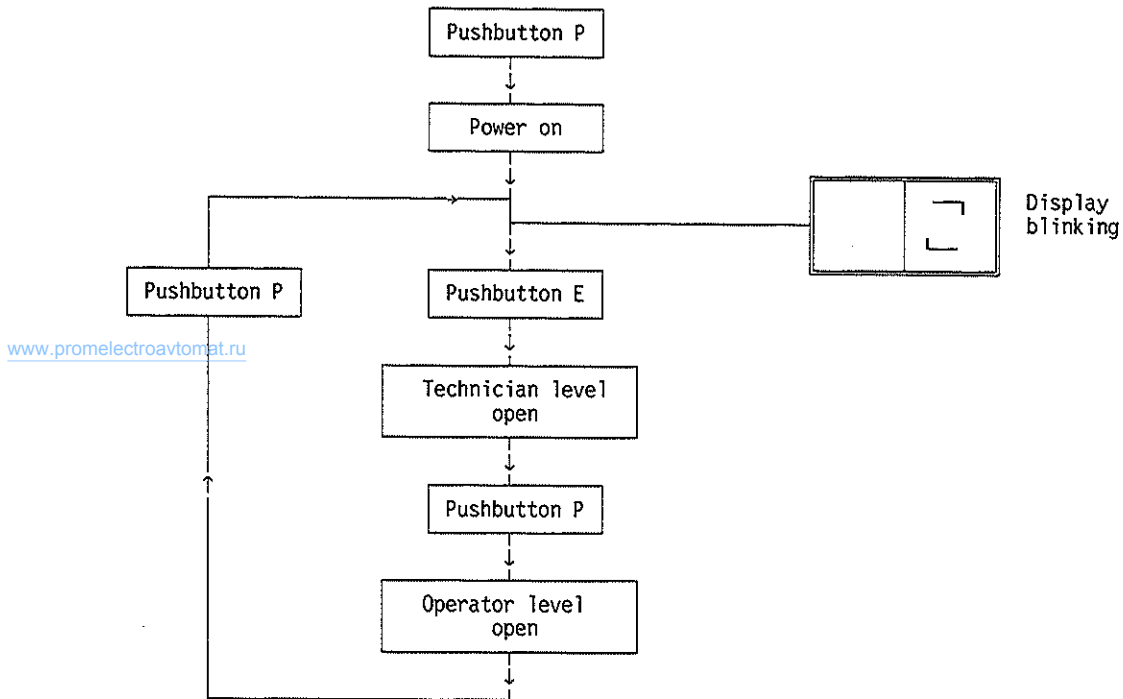This level is always accessible when power is on, unless the technician level is open.

Note:
A changed (switched) function will only be permanently saved by a new sewing start before turning power off.

4.3 The Technician Level

On this level fundamental functions can be programmed.
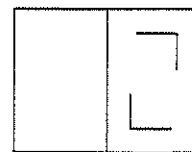
4.3.1 Access to the Technician Level

```
                    ┌──────────────────┐
                    │  Pushbutton P    │
                    └──────────────────┘
                             ↓
                    ┌──────────────────┐
                    │   Power  on      │
                    └──────────────────┘
                             ↓                           ┌─────────────┐  Display
    ┌────────────────────────┼───────────────────────── │   ┐        │  blinking
    │                        │                           │   └        │
    │    ┌──────────────┐    │    ┌──────────────┐       └─────────────┘
    │    │ Pushbutton P │    │    │ Pushbutton E │
    │    └──────────────┘    │    └──────────────┘
    │                        │             ↓
    │                        │    ┌──────────────────┐
    │                        │    │ Technician level │
    │                        │    │      open        │
    │                        │    └──────────────────┘
    │                        │             ↓
    │                        │    ┌──────────────────┐
    │                        │    │  Pushbutton P    │
    │                        │    └──────────────────┘
    │                        │             ↓
    │                        │    ┌──────────────────┐
    │                        │    │ Operator level   │
    │                        │    │     open         │
    │                        │    └──────────────────┘
    │                        │             ↓
    └────────────────────────┘
```

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4.3.2 Programming a Parameter

1. Open technician level

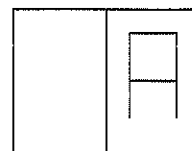Press ⎡P⎤ + TURN POWER ON

            Display blinks   ==>

2. Set parameters

⎡E⎤

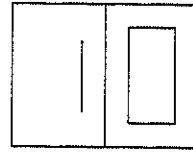   Parameter A   ==>

The desired parameter can be selected by pressing pushbutton E repeatedly.
The respective abbreviation appears on the display. See also chapter -Parameter List-

3. Change parameter value
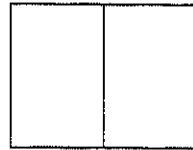
+   Displayed value ==>
    e.g. 10

The displayed value can be changed by pushbuttons + or -.

4. Close technician level

P   Display goes off ==>

5. Saving a changed value

A changed setting is permanently saved only after the sewing start before turning power off.

Note:
A new entry into the technician level is now possible by pressing pushbutton P again. The display shows the blinking programming mark. By pressing pushbutton E the last parameter programmed appears on the display.

5. Operating the Motor

5.1 General Instructions

When putting the control into operation, programming has to be done in the following manner:

- Adjust the direction of rotation of the motor (parameter "S")
- If necessary, set the reference position (parameter "A")
- If necessary, set the positions (parameters "B...I")
- If necessary, set the speeds (parameters "J", "K", "L", "M")
- If necessary, set the remaining relevant paramenters
- Start sewing in order to save the set values

Note:
If the power is turned off the adjustments made before starting to sew get lost.

5.2 Initial Operation

The instructions for initial operation are valid under the following conditions only:

- The positions must not have been reprogrammed.
- Program the direction of rotation "**anticlockwise rotation**" (parameter "N" = 01).
- Set the reference position (parameter "A").

> **Note:**
> Reference position = position of thread lever where change from one needle to another takes place (see also MSI instruction manual)

- Set positions (parameter "B...I").
- If necessary, set the speeds (parameters "J", "K", "L", "M").
- If necessary, set the remaining relevant parameters.
- **Start sewing in order to save the set values.**

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5.3 Fast Installation by Preset Values

Fast setting of the functions at values preprogrammed in the factory is possible by using this function. (see parameter list)

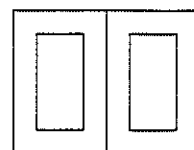**Exception:** direction of rotation and positions

1. Turn power off

2.   Press |P| + TURN POWER ON
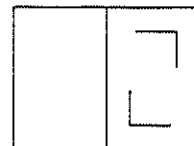
                                    Display blinks   ==>

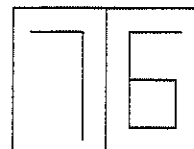3.   Press |-| for about 5 seconds
                    until 00 appears on the display   ==>

4.   Press |+| or |-| several times
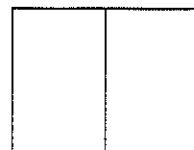   until 76 appears on the display   ==>

5.   Press |P| briefly (< 2sec.)

                                        Display goes off   ==>

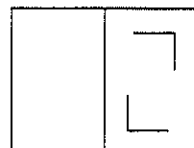   **The drive is ready for operation on the
      operator level**

6.   Press |P| longer (> 2sec.)

                                    Display blinks   ==>

      **The technician level is open for
      further programming**

6. Functions and Settings

6.1 Functions and Settings on the Operator Level

6.1.1 Switchable Functions

Switchable functions can be changed by pushbutton. The switching state is indicated by corresponding light emitting diodes (LED).

Table: Allocation of functions to the pushbuttons and LEDs

Function	Pushbutton	LED No. on	LED No. off
Softstart	E	3 = on	3 = off
Thread trimmer, thread wiper	+	5 = on	5 = off
Basic position (at stop in the seam)	-	7 = POS2 (Needle up)	7 = POS1 (Needle down)

6.1.2 Limitation of the Maximum Speed

By pressing the pushbuttons + or -, or while the motor is running, a speed limitation is possible.
A limitation to approx. 50% of the programmed maximum speed is possible.
The activated speed limitation is shown on the display.

| - | 1 | Limitation approx. 10%

| - | 5 | Limitation approx. 50%

Note:
The changed setting is permanently saved only after trimming and a new sewing start.

6.2 Functions and Settings on the Technician Level

6.2.1 First Slow Stitch After Power On

After power on, the drive performs on rotation from position 1 to position 1 at positioning speed, independently of the actuator setting. This function is not disengageable.

6.2.2 Softstart

Functions	Parameter
Softstart on/off	Pushbutton E
Number of Softstart stitches Softstart speed	N M

Function:
- after power on
- at the beginning of a new seam
- speed limited (adjustable by parameters)
- stitch counting is synchronized to position 1
- interruption by actuator stage 0
- exit by actuator stage -2

6.2.3 Thread Trimmer, Thread Wiper

Functions	Parameter
Thread trimmer, thread wiper	Pushbutton +
Operating time of the thread wiper	O

- The thread trimmer is switched on in position 4 and is switched off after reaching a fixed angle.
- The thread trimmer can be switched on or off by pushbutton +.
- The thread wiper can only be switched on or off jointly with the thread trimmer.
- The function of the thread trimming and thread wiping signal is described in chapter "Function Diagrams".

6.2.4 Thread Tension Release

Functions	Parameter
Thread tension release	Pushbutton +
Activation delay of the thread tension release Operating time of the thread tension release	U V

- The thread tension release can be switched on and/or off by pushbutton +, jointly with the thread trimmer and the thread wiper.
- The function of the thread tension release is described in chapter "Function Diagrams".

6.2.5 Thread Tension Release at Machine Standstill

Functions	Parameter
Thread tension release	B13/4-8

- The thread tension release can be switched on and/or off at machine standstill by an external pushbutton.
- The thread tension release is automatically switched off, when the drive starts.
- The function of the thread tension release at standstill of the drive is described in chapter "Function Diagrams".

6.2.6 Presser Foot Lifting

Functions	Parameter
Activation delay of presser foot lifting	P
Start delay from lifted foot	W

- Transistor output with open collector.

Foot is lifted:

- in the seam by stage -1
  after thread trimming by stage -1 or -2

Foot lowers:

- in the seam and after thread trimming at stage ≥ 0

6.2.7 Reversion

Functions	Parameter
Number of reversion increments	Q
Activation delay of reversion	R
Positioning speed	J

- The function "reversion" is performed after trimming.
- When the stop position is reached, the drive stops for a time that can be set (parameter R). Then it reverses at positioning speed for an adjustable number of increments (param. Q).
- 1 increment corresponds to approx 0.7°.

6.2.8 Signal Output Position 1

- Transistor output with open collector.
- Switches whenever the needle is in the slot between position 1 and 1A.
- Independent of sewing, thus also when turning the handwheel manually.
- The movement of the frame on the above mentioned embroidery machine is possible.
- Suitable e.g. for the connection of a counter.
- The function is described in chapter "Function Diagrams".

6.2.9 Signal Output Position 2

- Transistor output with open collector.
- Switches whenever the needle is in the slot between position 2 and 2A.
- Independent of sewing, thus also when turning the handwheel manually.
- The function is described in chapter "Function Diagrams".

6.2.10 Signal Output Position 3

- Transistor output with open collector.
- Switches whenever the needle is in the slot between position 3 and 3A.
- Independent of sewing, thus also when turning the handwheel manually.
- In this position a jump stitch is performed on the above mentioned embroidery machine.
- The function is described in chapter "Function Diagrams".

6.2.11 Signal Output G1

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

6.2.12 Signal Output Synchronous Thread Trimmer

- Transistor output with open collector.
- Switches whenever trimming has been initiated by stage -2 of the actuator and the speed is below a set value.
- The signal is switched off after the last output signal of the trimming sequence.

6.3 Machine Functions

6.3.1 Direction of Rotation of the Motor

Functions	Parameter
Direction of rotation of the motor	S

Look at the motor shaft: Parameter "S" = 00 - clockwise rotation
Parameter "S" = 01 - anticlockwise rotation

Attention!
If the motor is mounted differently, e.g at a different angle or with gear, ensure that the parameter value is correctly assigned to the direction of rotation.

6.3.2 Start Behavior

Functions	Parameter
Starting edge	PD

The drive accelerating dynamics can be adapted to the characteristic of the sewing machine (light, heavy).

- High setting value = high acceleration

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

Incorrect setting can cause the drive to lock or not to reach the set speed. In this case, the drive stops and the display shows an error message.

6.3.3 Braking Behavior

Functions	Parameter
Braking parameter 1	PE
Braking parameter 2	PF

The braking effect of the drive can be set.

The following applies to all setting values:
The higher the value the more aggressive the braking reaction!

Parameter PE influences the slowing down, when a slight change of the speed is desired (changing the actuator by less than 5 stages, e.g. from stage 10 to stage 6).

Parameter PF influences the slowing down, when a major change of the speed is desired (changing the actuator by more than 4 stages, e.g. for positioning from stage 12 to stage 0).

6.3.4 Braking Power at Standstill

Functions	Parameter
Braking power at standstill	T

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

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- The braking power works at standstill
    - at stop in the seam
    - after trimming
- The effect can be set
- The higher the set value, the higher the braking power
- It does not work after power on, unless sewing has not been started

6.3.5 Setting the Positions

Functions	Parameter
Reference position	A
Position 1 (movement of the frame is possible)	B
Position 1A	C
Position 2 (stop position)	D
Position 2A	E
Position 3 (jump stitch)	F
Position 3A	G
Position 4 (thread trimming)	H
Position 4A	I

6.3.5.1 Reference Position

The angular positions necessary on the machine, e.g. for needle down position or thread lever up position are stored in the control as numerical or angular values.
In order to establish a relationship between the electric positioner information and actual mechanical position a reference position is needed.

The reference position must be set:

- for initial operation

- after changing the positioner

- after changing the microprocessor

Programming:

1. Open the technician level

```
Press  P    + TURN POWER ON

                            Display blinks   ==>
```

2. Address parameter

```
Press  E              Parameter A is displayed    ==>
                      = Setting the reference point
```
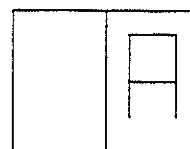
3. Prepare setting

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```
Press  +              Display 0 blinking   ==>
```
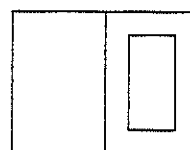
4. Setting

```
  - Turn handwheel until display 0 is constant.
  - Turn handwheel in the direction of rotation to a value indicated by the
    sewing machine manufacturer.
```

> **Note:**
> Reference position = position of thread lever where change from one needle to another takes place (see also MSI instruction manual)

5. Enter setting

```
Press  E              Display changes to next      ==>
                      parameter, here from A to B.
```
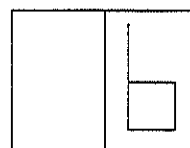
6. Exit programming

```
Press  P              Display goes off  ==>

(Technician level closed)
```
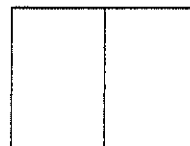
7. Save programmed settings

A changed setting is saved only after the sewing start before turning power off.

> **Note:**
> A new entry into the technician level is now possible by pressing pushbutton P again.
> The display shows the blinking programming mark. By pressing pushbutton E the last parameter programmed appears on the display.

> The values of the signal and stop positions are factory set. After setting the reference position, the machine is ready for operation. Settings only need to be changed on non-standard machines and/or for fine tuning.

6.3.5.2 Signal and Stop Positions

If necessary, the signal and stop positions can be set as described in chapter "Reference Positions" from step 3 onwards.

In this case pushbutton E must be pressed several times after opening the technician level until the parameter for the desired position appears on the display.

6.3.6 External Actuator

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

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Table: Coding of the stages

Stages:	D	C	B	A		
-2	H	H	L	L	Initiating the seam end	
-1	H	H	H	L	Presser foot lifting	
0	H	H	H	H	Position 0	
½	H	H	L	H	Presser foot lowering	
1	H	L	L	H	Speed stage 1	(n_{pos})
2	H	L	L	L	.	
3	H	L	H	L	.	
4	H	L	H	H	.	
5	L	L	H	H	.	
6	L	L	H	L	.	
7	L	L	L	L	.	
8	L	L	L	H	.	
9	L	H	L	H	.	
10	L	H	L	L	.	
11	L	H	H	L	.	
12	L	H	H	H	Speed stage 12	(n_{max})

L = switch contact closed, H = switch contact open

7. Error Messages

General Information

Display	Signification
A1	Pedal not in neutral position, when switching the machine on

Serious Situation

Display	Signification
E1	Positioner not connected or defective
E2	Line voltage too low, or time between power off and power on too short
E3	Machine locks, or does not reach the desired speed
E4	Control disturbed by deficient grounding or loose contact

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Hardware Disturbance

Display	Signification
H1	Commutation transmitter cord or frequency converter disturbed
H2	Processor disturbed

8. Signal Test

8.1 Positioner and Output Tests

Functions	Parameter
Test function positioner and outputs	PH

The functions of the positioner and of the outputs can be tested by a routine that can be activated with arameter PH.

8.1.1 Positioner Test

The functions are indicated by light emitting diodes on the control panel.

The positioner test is only possible if sewing has been started.

- Address parameter PH
- Press pushbutton +
- Turn handwheel
    - when reaching a position, the light emitting diodes are switched on
    - when leaving a position, the light emitting diodes are switched off

- LED 5 = on   - angular position between position 1 and 1A
- LED 7 = on   - angular position between position 2 and 2A
- LED 3 = on   - angular position between position 3 and 3A

- Press pushbutton P or E to exit the test mode
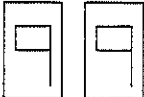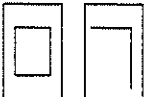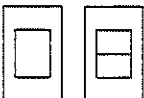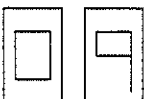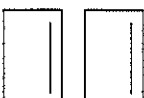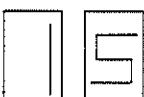
8.1.2 Output Test

The function is indicated on the display.

For testing, the outputs below are briefly activated.

- Address parameter PH
- Press pushbutton +; the following messages are shown on the display:

OK   All outputs o.k.

99   Error localization not possible

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07   Error on B7/1-6   Thread trimmer

08   Error on B7/3-6   Thread tension release

09   Error on B7/4-6   Thread wiper

11   Error on B7/5   Presser foot lifting

15   Error on B7/2   Synchronous thread trimmer

18   Error on B13/5   Position 3 (jump stitch)

If several output errors are identified they are displayed one after the other, alternating automatically.

Exit output test: Press pushbutton P or E
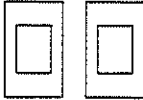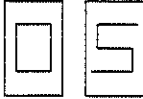
8.2 Input Test

Functions	Parameter
Test function inputs	PI

The input function can be tested by a routine that can be activated with parameter PI.
When the test function is activated, the actual switching state of the connected pushbuttons and switches is read and and is shown on the display by the message 00.
If the switching state of a switch changes this is indicated by a code allocated to the input.
Only one switch at a time may switch its switching state.

Test sequence

- Address parameter PI
- Press pushbutton + and the display shows the following messages:

00   No change of the switching state

05   Input B13/3 was switched
            Error reset

07   Input B13/4 was switched
            Thread tension release

Exit input test: Press pushbutton P or E

9. Connection Diagrams

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B7

1,5A	SYN.FA(2)	1,2A	4A	FL(2)	+24V(1)
1	2	3	4	5	6

FA   FSPL FW

B13

+24V(1)	G1(2)	F-RES	POS3(2)	POS2(2)		POS1(2)	0V
1	2	3	4	5	6	7	8
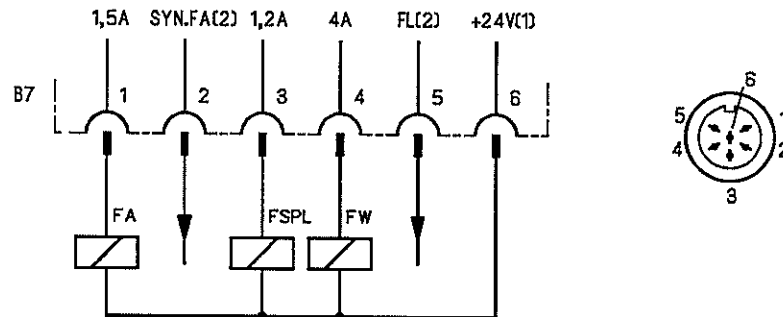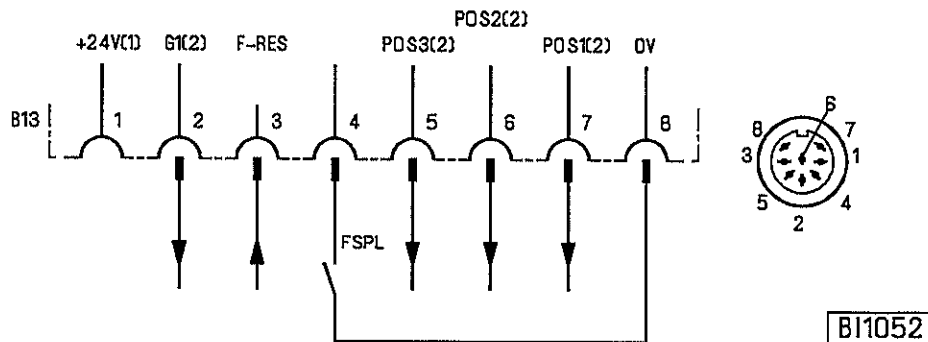
FSPL

BI1052

FA	- Thread trimmer
SYN-FA	- Transistor output synchronous thread trimmer
FSPL	- Thread tension release
FW	- Thread wiper
FL	- Transistor output presser foot lifting
G1	- Transistor output generator impulses
F-RES	- Error reset
POS.1	- Transistor output position 1 (1/rotation)
POS.2	- Transistor output position 2 (1/rotation)
POS.3	- Transistor output position 3 (1/rotation)

1) Nominal voltage 24V, no-load voltage max. 36V.
2) Transistor ouput with open collector (max. 40V, 30mA).

C   O V   A   B   D   ⏚

BBO   1   2   3   4   5   6

EB...

6
2   5
3   4
1

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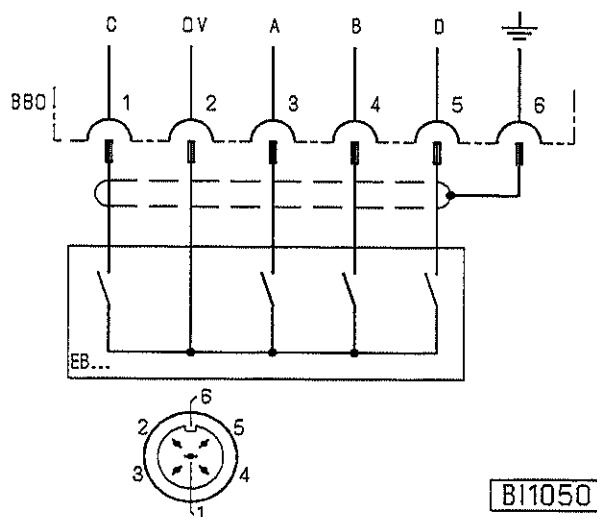
EB   - External actuator

1) Nominal voltage 24V, no-load voltage max. 36V.
2) Transistor ouput with open collector (max. 40V, 30mA).

10. Function Diagrams

10.1 Trimming from Full Machine Run

0217/FALAUF
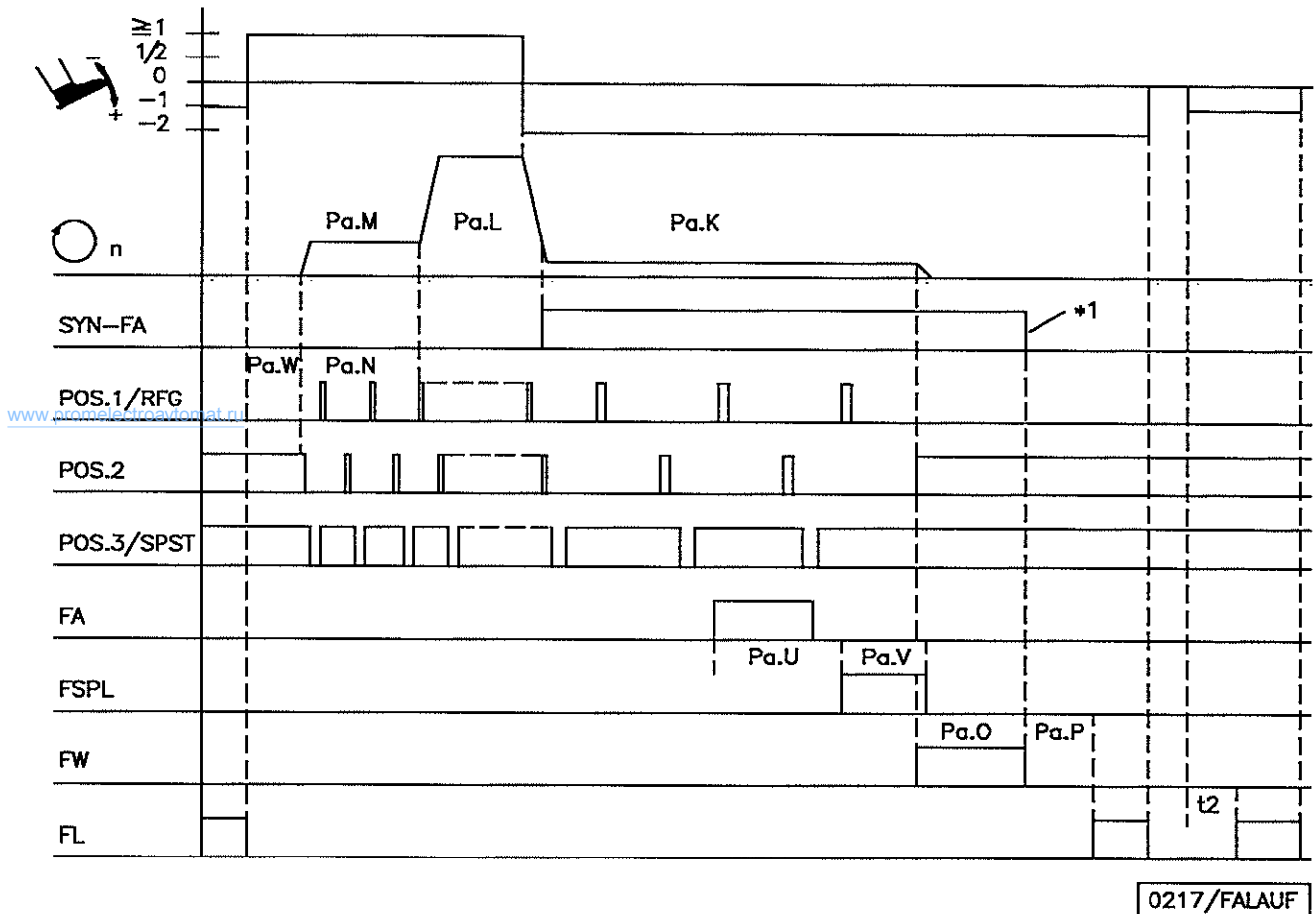
Parameter/Pushbutton	Function	
Pushbutton "E"	Softstart	on
Pushbutton "+"	Thread trimmer	on
Pushbutton "-"	Basic position	up
K	Thread trimming speed	
L	Maximum speed	
M	Softstart speed	
U	Activation delay thread tension release	
V	Operating time thread tension release	
O	Operating time thread wiper	
P	Activation delay of presser foot lifting after thread wiper	
W	Start delay from lifted foot	
t2	Delay of presser foot lifting at stage -1 /-2	fixed
N	Number of Softstart stitches	

Abbreviations:	FL	= Presser foot lifting
	FA	= Thread trimmer
	FSPL	= Thread tension release
	FW	= Thread wiper
	POS.1/RFG	= Position 1/ frame movement possible
	POS.2	= Position 2
	POS.3/SPST	= Position 3 / jump stitch
	SYN-FA	= Synchronous thread trimmer

Pa. = Parameter
*1 = The signal remains until the activation of thread wiper and/or thread tension release is completed !

10.2 Trimming from Intermediate Stop

0217/FAZW

Parameter/Pushbutton	Function	
Pushbutton "E"	Softstart	off
Pushbutton "+"	Thread trimmer	on
Pushbutton "-"	Basic position	up
J	Positioning speed	
K	Thread trimming speed	
L	Maximum speed	
U	Activation delay thread tension release	
V	Operating time thread tension release	
O	Operating time thread wiper	
P	Activation delay of presser foot lifting after thread wiper	
W	Start delay from lifted foot	

Abbreviations:
FL	=	Presser foot lifting
FA	=	Thread trimmer
FSPL	=	Thread tension release
FW	=	Thread wiper
POS.1/RFG	=	Position 1/ frame movement possible
POS.2	=	Position 2
POS.3/SPST	=	Position 3 / jump stitch
SYN-FA	=	Synchronous thread trimmer

Pa. = Parameter
*1 = The signal remains until the activation of thread wiper and/or thread tension release is completed !

10.3 Run with Intermediate Stop without Thread Trimmer
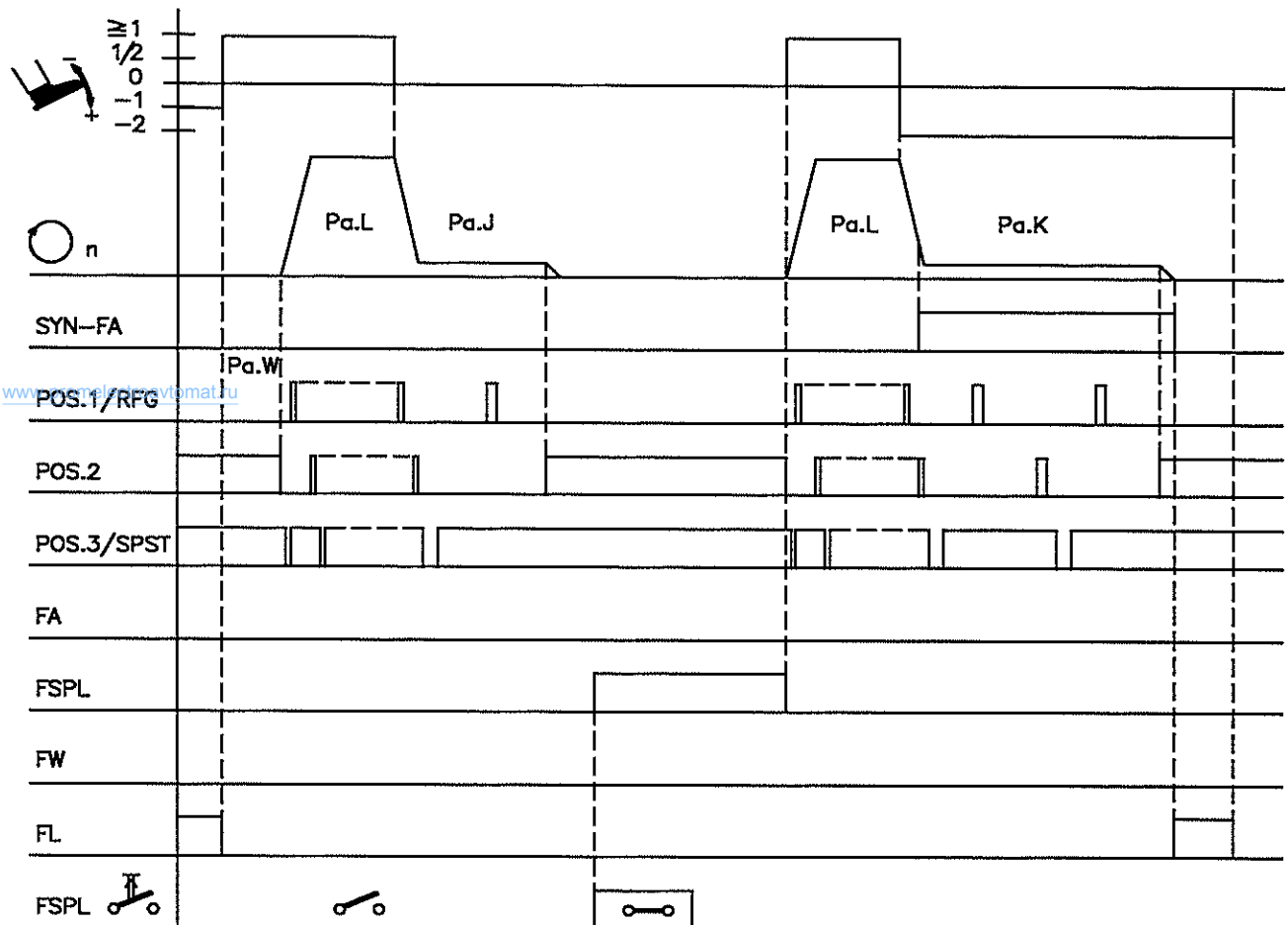
0217/LAUFZW

Parameter/Pushbutton	Function	
Pushbutton "E"	Softstart	off
Pushbutton "+"	Thread trimmer	off
Pushbutton "-"	Basic position	up
J	Positioning speed	
K	Thread trimming speed	
L	Maximum speed	
U	Activation delay thread tension release	
V	Operating time thread tension release	
O	Operating time thread wiper	
P	Activation delay of presser foot lifting after thread wiper	
W	Start delay from lifted foot	

Abbreviations: FL = Presser foot lifting
FA = Thread trimmer
FSPL = Thread tension release
FW = Thread wiper
POS.1/RFG = Position 1/ frame movement possible
POS.2 = Position 2
POS.3/SPST = Position 3 / jump stitch
SYN-FA = Synchronous thread trimmer

Pa. = Parameter

11. Parameter List

| Para-meter	Display	Function	Unit	Max	Min	Preset
A		Setting the reference position				
B		Setting position 1 (movement of frame possible)				
C		Setting position 1A (movement of frame possible)				
D		Setting position 2 (stop position)				
E		Setting position 2A (stop position)				
F		Setting position 3 (jump stitch)				
G		Setting position 3A (jump stitch)				
H		Setting position 4 (thread trimmer)				
I		Setting position 4A (thread trimmer)				
J		Positioning speed (first stage)	x 10 RPM	39	06	16
K		Trimming speed	x 10 RPM	39	06	16
L		Maximum speed	x 100 RPM	15	4.0	7.5
M		Softstart speed	x 10 RPM	99	06	30
N		Softstart stitches (look at the motor shaft)	right = 00	09	00	03
O		Thread wiper operating time	x 10 ms	60	00	25
P		Activation delay of presser foot lifting after thread wiper	x 10 ms	99	00	50

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Para-meter	Display	Function	Unit	Max	Min	Preset
Q		Number of reversion increments	x 10 incr.	50	00	00
R		Activation delay of reversion	x 10 ms	99	00	00
S		Direction of rotation of the motor (look at the motor shaft)	left = 01 right = 00	01	00	01
T		Braking power at standstill		30	00	00
U		Activation delay of thread tension after reaching position 4	x 10 ms	99	00	15
V		Deactivation delay of thread tension after reaching position 4	x 10 ms	99	00	10
W		Start delay after presser foot lifting	x 10 ms	99	00	08
PD		Starting edge		60	01	32
PE		Braking edge 1		60	01	10
PF		Braking edge 2		60	01	32
PH		Test function for the outputs and the positioner				
PI		Test function for the inputs				

12. Operating Elements and Socket Connectors
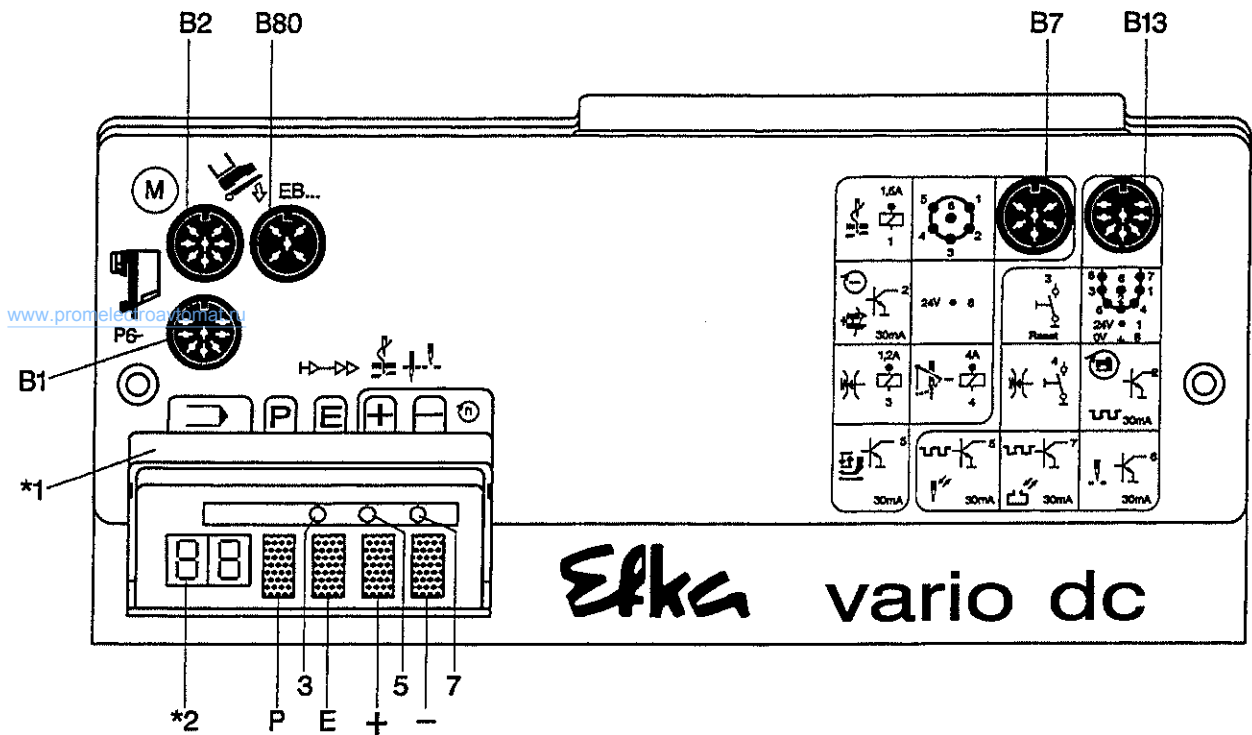
B1 - Positioner
B2 - Commutation transmitter for DC motor
B7 - Solenoids and output signals
B13 - Solenoids, output and input signals
B80 - Actuator

Pushbutton P = Recall or exit of programming mode
Pushbutton E = Programming mode: enter button for modifications
             Operator mode: Softstart on/off
Pushbutton + = Programming mode: increase of the indicated value
             Operator mode: thread trimmer on/off
Pushbutton - = Programming mode: decrease of the indicated value
             Operator mode: basic position up/down
LED 3 = Softstart (LED on = on)
LED 5 = Thread trimmer (LED on = on)
LED 7 = Basic position (LED on = up)

*1 - Type designation
*2 - Display (2-digit seven segment display)

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FRANKL & KIRCHNER GMBH & CO KG

SCHEFFELSTRASSE 73 - 68723 SCHWETZINGEN
TEL.: (06202)2020 - TELEFAX: (06202)202115 - TELEX: 466314

Efka

OF AMERICA INC.

3715 NORTHCREST ROAD - SUITE 10 - ATLANTA - GEORGIA 30340
PHONE: (404)457-7006 - TELEFAX: (404)458-3899 - TELEX: EFKA AMERICA 804494

Efka

ELECTRONIC MOTORS SINGAPORE PTE. LTD.

67, AYER RAJAH CRESCENT 05-03 - SINGAPORE 0513
PHONE: 7772459 or 7789836 - TELEFAX: 7771048

1(1)-270695-A(402148EN)