# Efka dc15xx

| CONTROL | dc1500 | MC221A5800 |
|---------|--------|------------|
|         | dc1550 | MC321A5810 |
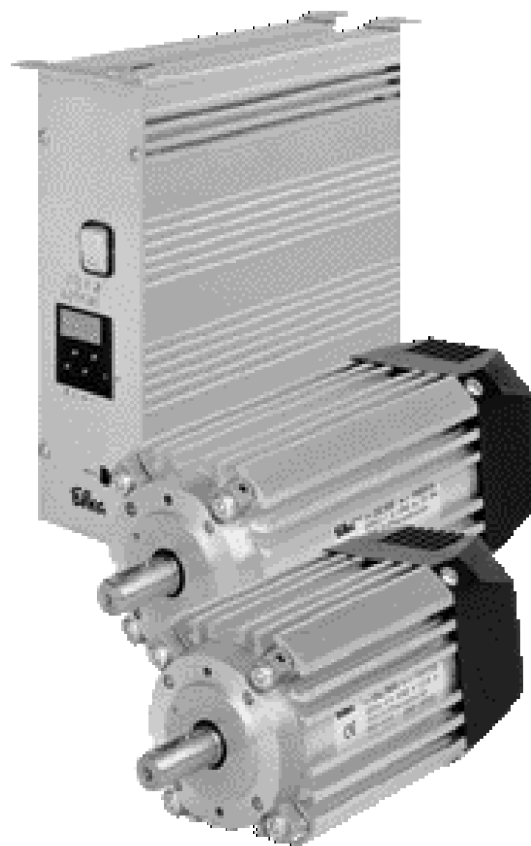
## INSTRUCTION MANUAL

WITH LIST OF PARAMETERS

**No. 402312**     **English**

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## CONTENTS                                                         Page

# 1   Use in Accordance with Regulations

The drive is not an independently operating machine, but is designed to be incorporated into other machinery. It must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Directive (Appendix II, paragraph B of the Directive 89/392/EEC and supplement 91/368/EEC).

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

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

Operate the drive only in dry areas.

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

# 2   Scope of Supply

| | | |
|---|---|---|
| 1 | Direct current motor for **MC221A** | **DC1500** |
| 1 | Direct current motor for **MC321A** | **DC1550** |
| 1 | Electronic control/frequency converter/power supply unit | **MC221A5800** or **MC321A5810** |

| | | |
|---|---|---|
| 1 | Set of accessories consisting of: | 37-pin SubminD plug |
| | | Potential equalization cord |

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**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!

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## 2.1   Special Accessories

| | |
|---|---|
| **Control panel** Variocontrol V810 | - part no. 5970153 |
| **Control panel** Variocontrol V820 | - part no. 5970154 |
| **Control panel** Variocontrol V850 | - part no. 5970158 |
| **Reflection light barrier module** LSM002 | - part no. 6100031 |
| **Hall sensor module** HSM001 | - part no. 6100032 |
| **EFKANET interface** IF232-3, complete | - part no. 7900071 |
| **Adapter cord** for the connection of light barrier module and Hall sensor module HSM001 or EFKANET | - part no. 1113229 |
| **Compiler** C200 for the MC221A.../MC321A... controls | - part no. 1113262 |
| **Adapter cord** for the connection of sockets B18 each on the SM210 stepping motor control and on the above control (see chapter "Connection Scheme of SM210A Stepping Motor Control") | - part no. 1113172 |
| **Extension cable** approx. 1000 mm long for commutation transmitter DC15.. | - part no. 1113151 |
| **Extension cable** approx. 1000 mm long for DC15.. line | - part no. 1113150 |
| **9-contact SubminD** male connector | - part no. 0504135 |
| **9-contact SubminD** female connector | - part no. 0504136 |
| **Half-shell housing** for 9-contact SubminD | - part no. 0101523 |
| **37-pin SubminD** male connector, complete | - part no. 1112900 |
| **Single pins for 37-pin SubminD** with strand of 5cm length | - part no. 1112899 |

## 3   Motor Specifications

| Bemessungsdaten | Rating | DC1500 | DC1550 |
|---|---|---|---|
| Leistung | Power | 400 W | 600 W |
| Drehzahl | Speed | 6000 min$^{-1}$ / RPM | 3000 min$^{-1}$ / RPM |
| Drehmoment | Torque | 0.64 Nm | 1.9 Nm |

| Grenzwerte | Limit Values | DC1500 | DC1550 |
|---|---|---|---|
| Drehzahl | Speed | 9000 min$^{-1}$ / RPM | 5000 min$^{-1}$ / RPM |
| Drehmoment (Beschleunigung) | Torque (acceleration) | 3.2 Nm | 8 Nm |
| Leistung (kurzzeitig) | Power (momentarily) | 1000W | 1800 W |

| Technische Daten | Technical Data | DC1500 | DC1550 |
|---|---|---|---|
| Rotorträgheitsmoment (Jrot) | Moment of inertia (Jrot) | 0.5 kg cm$^2$ | 0.9 kg cm$^2$ |
| Schutzart | Protection class | IP40 | IP40 |
| Isolationsklasse | Insulation class | B | B |
| Gewicht | Weight | 2.125 kg | 3.125 kg |
| Flanschmaß | Flange dimensions | 80x75 mm | 80x75 mm |
| Wellenende (zylindrisch) | Shaft end (cylindrical) | | |
| mit Keilnut | with keyway | Ø 14K6 | Ø 14K6 |
| Inkrementalgeber integriert | Incremental encoder, integrated | 512 pulses/revolution | 512 PPR |



DC1500 / DC1550 Kennlinie Drehzahl / Drehmoment
DC1500 / DC1550 speed / torque characteristic
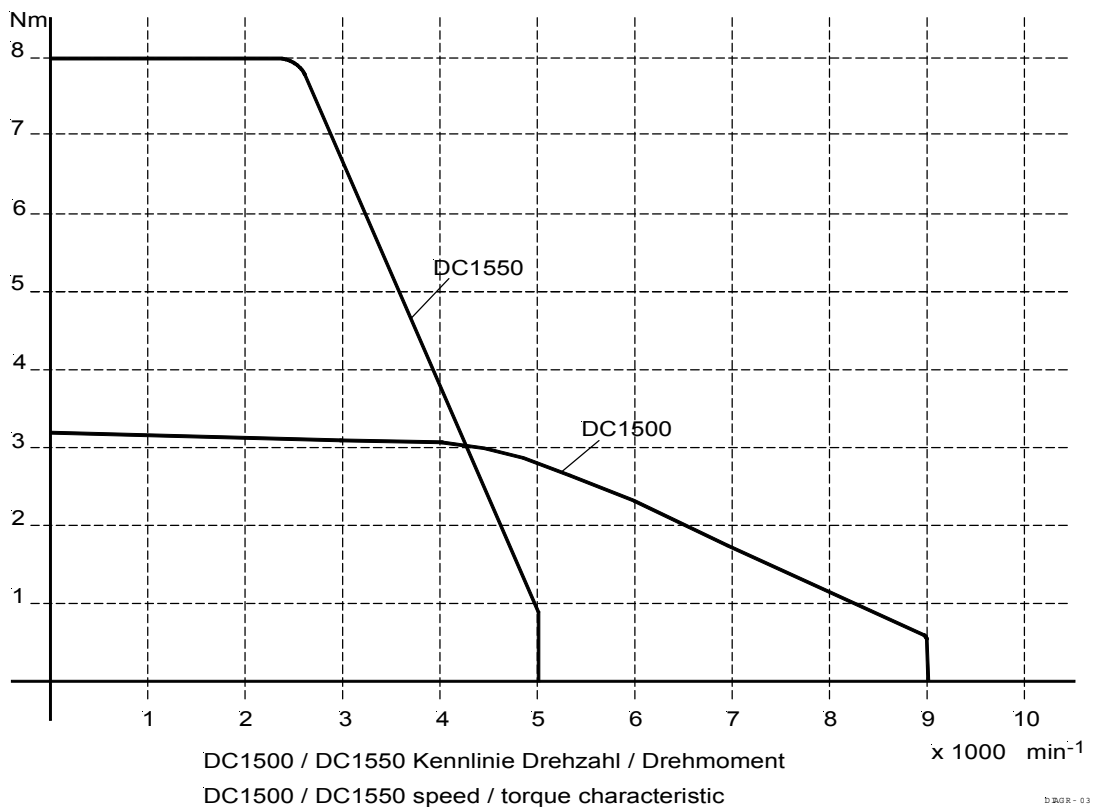
# 4   Operating Elements and Socket Connectors

## 4.1   Position of Operating Elements and Displays

**S1**      **Key P**
           Call or exit programming mode

**S2**      **Key E**
           Enter key for modifications in the programming mode

**S3**      **Key +**
           Increase of the value indicated in the programming mode

**S4**      **Key –**
           Decrease of the value indicated in the programming mode

**S5**      **Key >>**
           Shift key in the programming mode

**Display**  4 digits
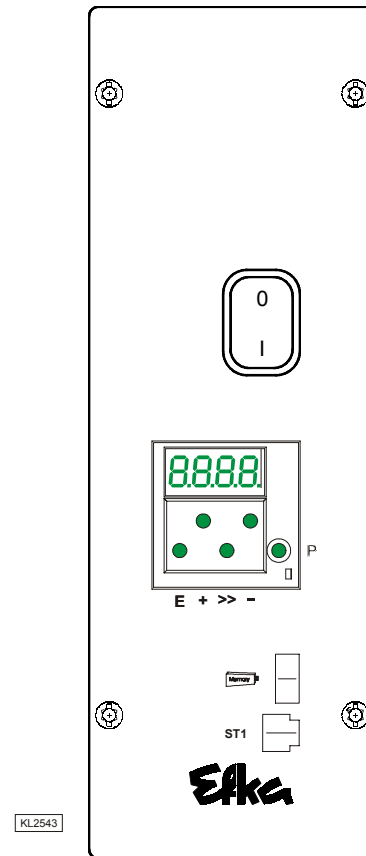
## 4.2   Position of the Socket Connectors

**B2**        Socket for commutation transmitter

**B18**       Socket for      - Light barrier module LSM002
                             - Hall sensor module HSM001
             (Adapter cord 1113229 in case of multiple assignment)

**B41**       Socket for motor power supply

**B776**      Socket for V810/V820/V850 control panel

**ST1**       Socket for sensors

**ST2**       Socket for actuators and sensors

**ST3**       Socket for sensors
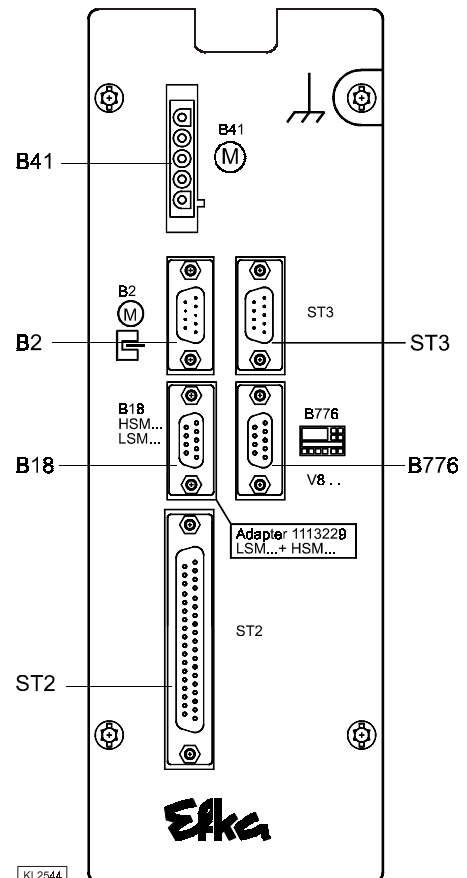
## 4.3 Connection Diagram

### 4.3.1 Socket ST2

**Inputs switched to 0V**
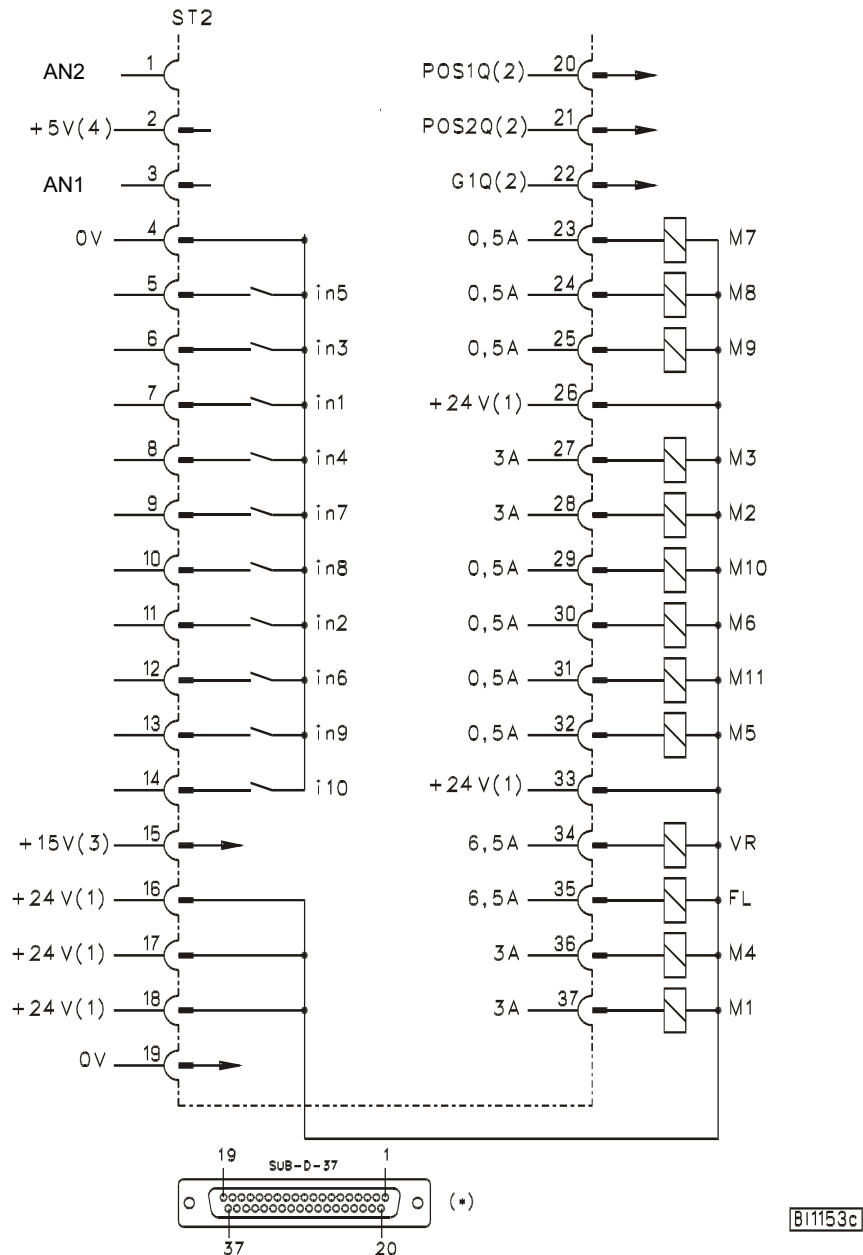


|  |  |  |  |
| --- | --- | --- | --- |
| ST2 | | | |
| AN2 — 1 | | POS1Q(2) — 20 → | |
| +5V(4) — 2 | | POS2Q(2) — 21 → | |
| AN1 — 3 | | G1Q(2) — 22 → | |
| 0V — 4 | | 0,5A — 23 | M7 |
| 5 | in5 | 0,5A — 24 | M8 |
| 6 | in3 | 0,5A — 25 | M9 |
| 7 | in1 | +24V(1) — 26 | |
| 8 | in4 | 3A — 27 | M3 |
| 9 | in7 | 3A — 28 | M2 |
| 10 | in8 | 0,5A — 29 | M10 |
| 11 | in2 | 0,5A — 30 | M6 |
| 12 | in6 | 0,5A — 31 | M11 |
| 13 | in9 | 0,5A — 32 | M5 |
| 14 | i10 | +24V(1) — 33 | |
| +15V(3) — 15 → | | 6,5A — 34 | VR |
| +24V(1) — 16 | | 6,5A — 35 | FL |
| +24V(1) — 17 | | 3A — 36 | M4 |
| +24V(1) — 18 | | 3A — 37 | M1 |
| 0V — 19 → | | | |

SUB-D-37  19 ... 1 / 37 ... 20  (*)

BI1153c

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

| | | | | | |
| --- | --- | --- | --- | --- | --- |
| in1 | - Input 1 | i10 | - Input 10 | M9 | - Output 9 |
| in2 | - Input 2 | M1 | - Output 1 | M10 | - Output 10 |
| in3 | - Input 3 | M2 | - Output 2 | M11 | - Output 11 |
| in4 | - Input 4 | M3 | - Output 3 | FL | - Output FL 6.5 A pulsed |
| in5 | - Input 5 | M4 | - Output 4 | VR | - Output VR 6.5 A pulsed |
| in6 | - Input 6 | M5 | - Output 5 | POS1 | - Position 1 |
| in7 | - Input 7 | M6 | - Output 6 | POS2 | - Position 2 |
| in8 | - Input 8 | M7 | - Output 7 | GEN | - 512 generator impulses |
| in9 | - Input 9 | M8 | - Output 8 | AN1 | - Analog input 1 |
| | | | | AN2 | - Analog input 2 |

**Inputs switched to +24V**
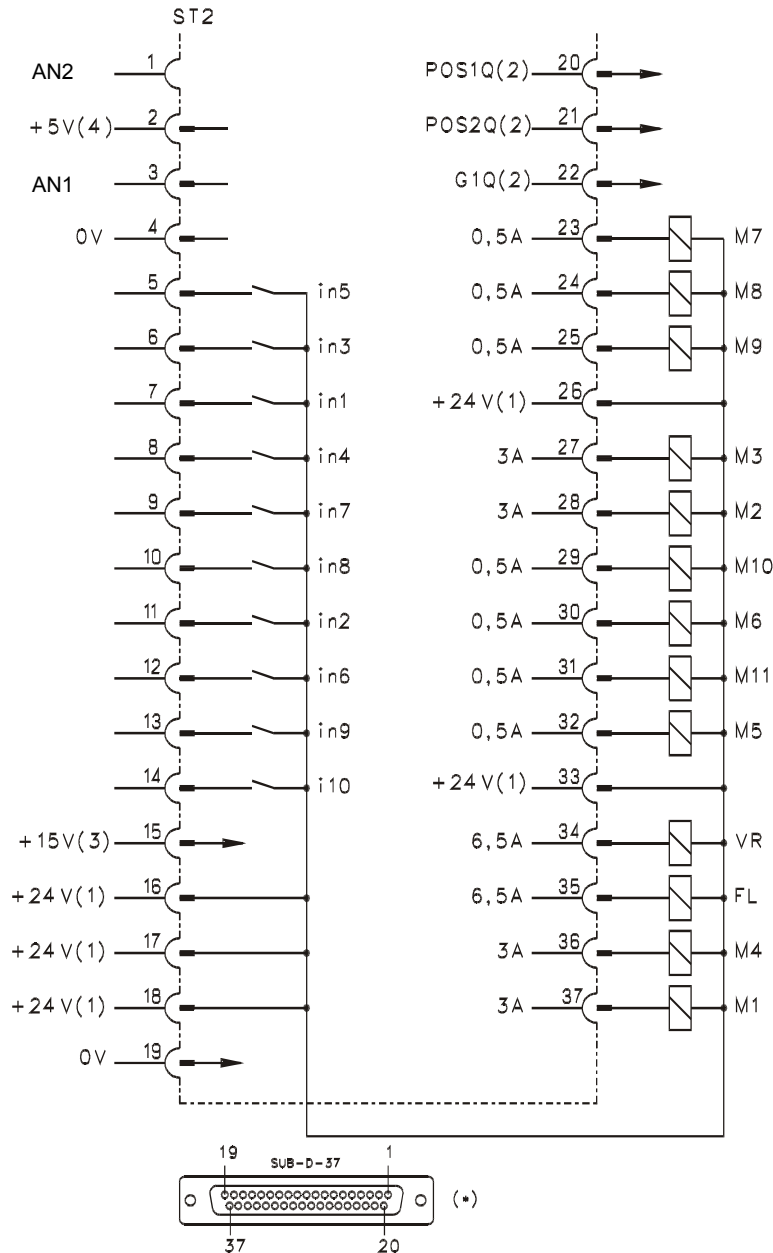
ST2

| | | | | | |
|---|---|---|---|---|---|
| AN2 | 1 | | POS1Q(2) | 20 | |
| +5V(4) | 2 | | POS2Q(2) | 21 | |
| AN1 | 3 | | G1Q(2) | 22 | |
| 0V | 4 | | 0,5A | 23 | M7 |
| | 5 | in5 | 0,5A | 24 | M8 |
| | 6 | in3 | 0,5A | 25 | M9 |
| | 7 | in1 | +24V(1) | 26 | |
| | 8 | in4 | 3A | 27 | M3 |
| | 9 | in7 | 3A | 28 | M2 |
| | 10 | in8 | 0,5A | 29 | M10 |
| | 11 | in2 | 0,5A | 30 | M6 |
| | 12 | in6 | 0,5A | 31 | M11 |
| | 13 | in9 | 0,5A | 32 | M5 |
| | 14 | i10 | +24V(1) | 33 | |
| +15V(3) | 15 | | 6,5A | 34 | VR |
| +24V(1) | 16 | | 6,5A | 35 | FL |
| +24V(1) | 17 | | 3A | 36 | M4 |
| +24V(1) | 18 | | 3A | 37 | M1 |
| 0V | 19 | | | | |

19   SUB-D-37   1

37     20    (*)

B11164

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

**Note**
It is possible to set the input switching thresholds. See chapter 11!

1)      Nominal voltage 24V, no-load voltage max. 30V momentarily after power on
2)      Transistor output with open collector max. 40V, 10mA
3)      Nominal voltage 15V, $I_{max}$ = 30mA
4)      Nominal voltage 5V, $I_{max}$ = 20mA
*)      Front view of the socket (component side) and/or rear view of the plug (soldering side)

### 4.3.2  Socket ST3



|      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
| 0V   | N.C. | N.C. | C    | +5V(2) | B  | D    | A    | N.C. |
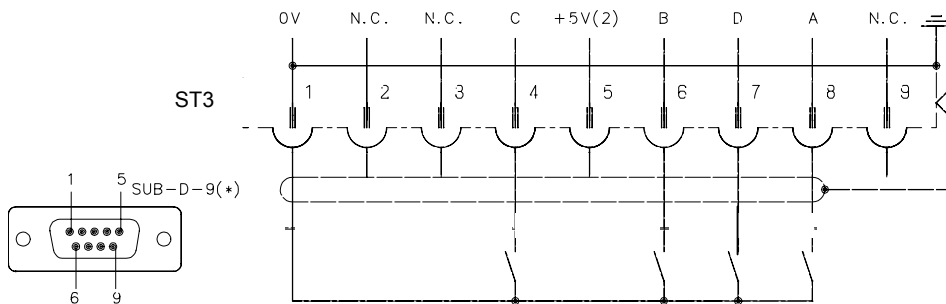
[BI1160]

A  -Input        Open / 0V = active            B  -Input        Open / 0V = active
C  -Input        Open / 0V = active            D  -Input        Open / 0V = active

### 4.3.3  Socket B18

**Connection of a HSM001 Hall sensor module**        **Connection of a LSM002 light barrier module**
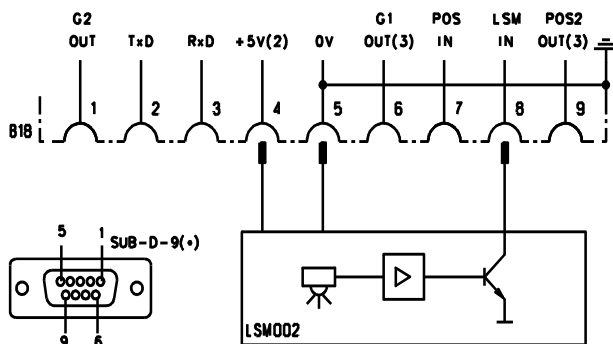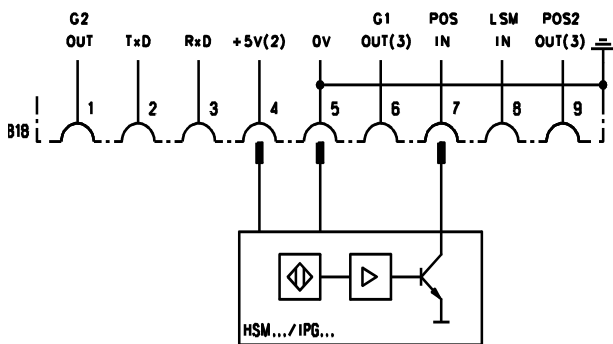


[BI1174]

| POS2 OUT | - Output for position 2 |
| POS IN | - Input for signal from Hall sensor module |
| G1/G2 OUT | - Output of generator impulses |
| TXD/RXD | - Serial transmission lines |
| LSM IN | - Possibility of connecting a light barrier module to socket B18/8 |

There is a supply voltage of +5V for external devices on the B18/4 socket. After opening the cover, this voltage can be changed to +15V by replugging a multipole connector J1 on the printed circuit board.

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



[KL2351]
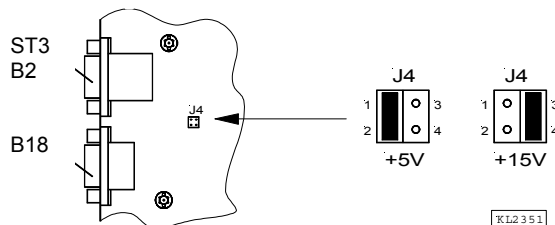


**ATTENTION!**
Before opening the cover, turn power off!

2)          Nominal voltage +15V, 100mA (repluggable to +5V, 100mA)
3)          Transistor output with open collector max. 40V, 10mA
*)          Front view of the socket (component side) and/or rear view of the plug (soldering side)

# 5  Connection Scheme for Stepping Motor Control SM210A

The MC221A / MC321A control can be expanded by up to 5 stepping motor controls.

## 5.1  Connection Scheme for One Stepping Motor Control

mot                    V810/V820/V850                              DC1500/1550



Nr.1113172

SM210....                                    MC221A/MC321A

KL2511a
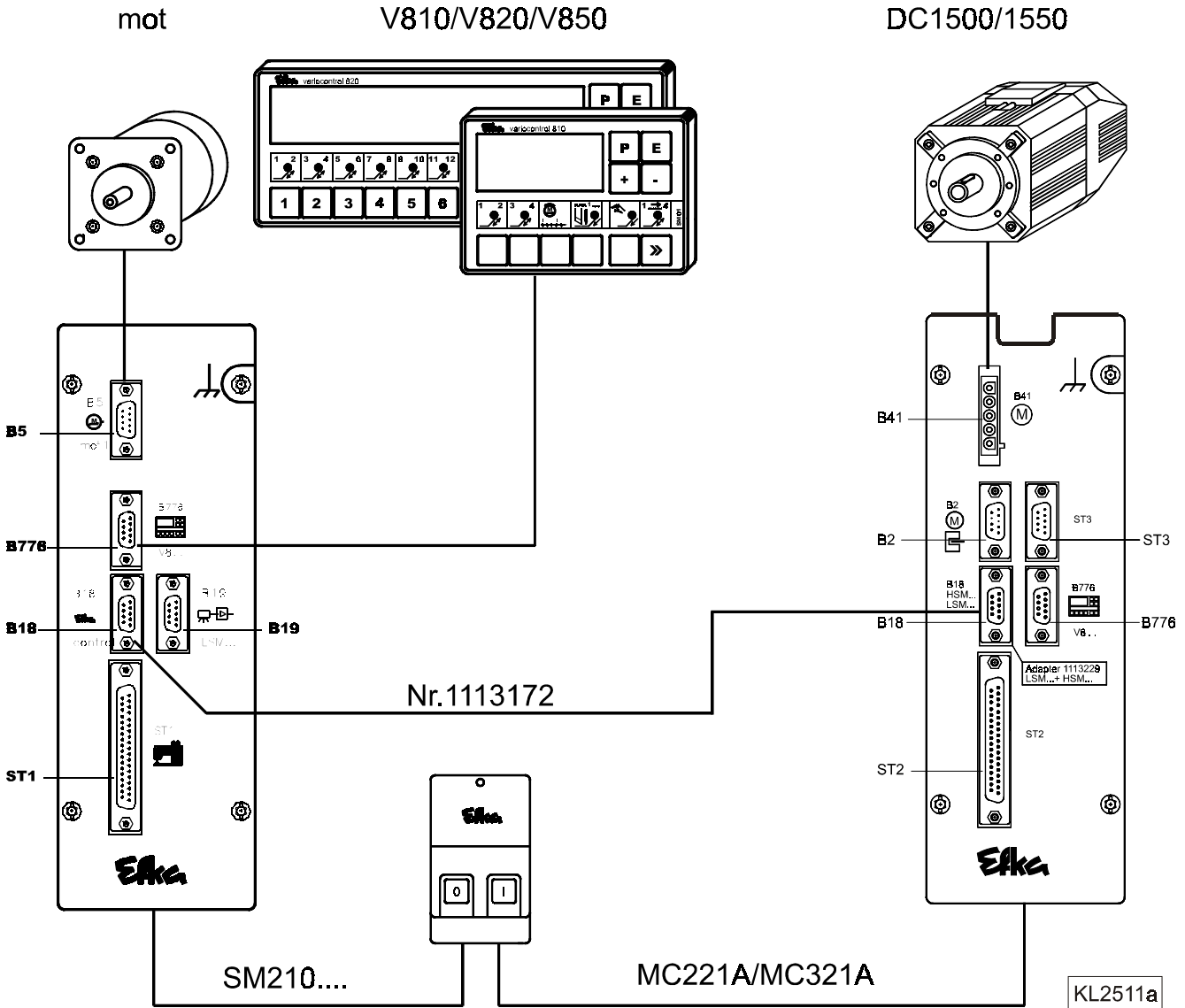
The MC221A./MC321A. d.c. controls (B18) and the SM210A stepping motor control (B18) are connected by means of adapter cord no. 1113172.

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**Note**
By connecting a stepping motor control it is possible to expand the system by 5 outputs and 8 inputs!

## 5.2   Connection Scheme for Several Stepping Motor Controls



KL2484a
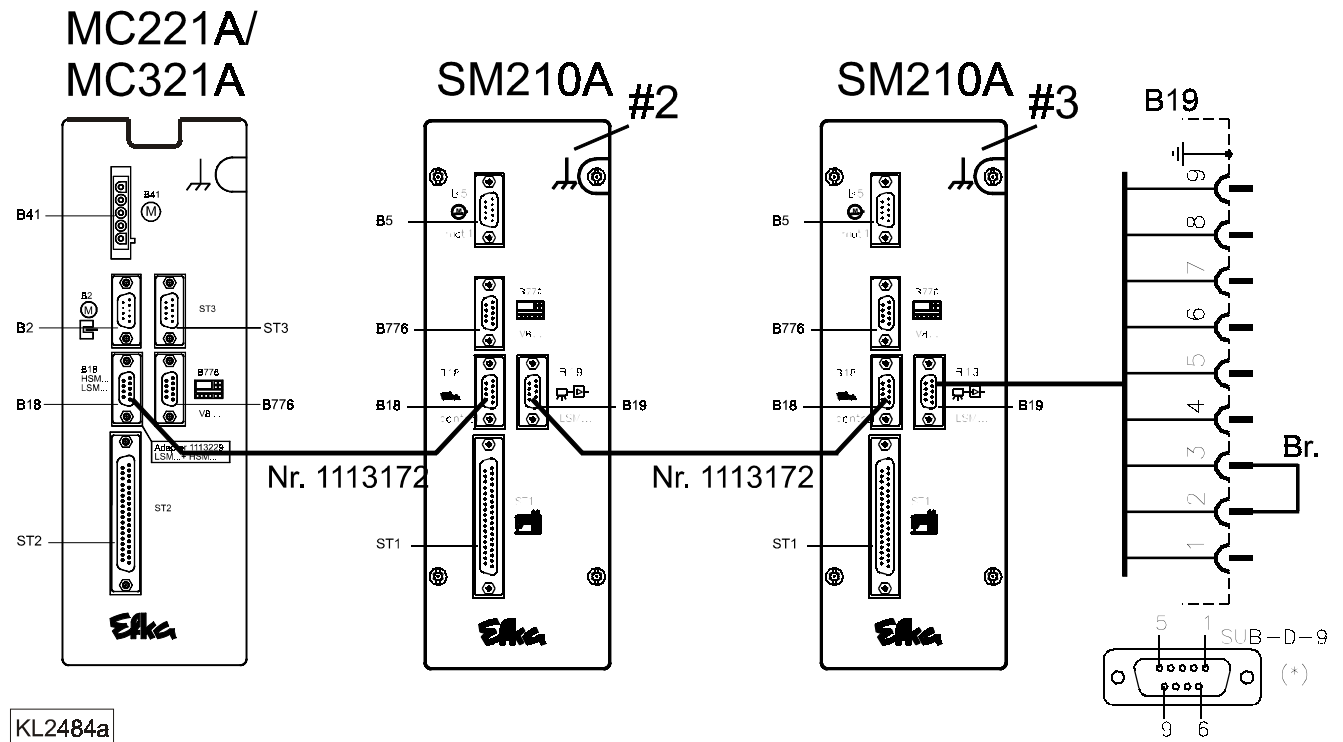
If several stepping motor controls are connected, a jumper must be inserted between pin 2 and 3 on socket B19 of the last stepping motor control.

The stepping motor controls must be set to the "slave" mode using parameter F-290 = 10, and addressed using parameter F-272 = 2...3....4....5....6, e.g. first SM210A / F-272 = 2, second SM210A / F-272 = 3 ......, etc.

# 6   Control Operation without Control Panel

## 6.1   Access Authorization upon Command Input

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

**The following persons have access:**          - the supplier to the highest and all subordinate levels using a code number

- the technician to the next lower and all subordinate levels using a code number

- the operator to the lowest level without using a code number

```
┌──────────┐      ┌──────────────────────────────┐      ┌──────────────────────────┐
│ Call-up  │─┬──▶ │ Supplier: Code number 3112   │──▶   │ Supplier Level           │
└──────────┘ │    └──────────────────────────────┘      │ 200 series of            │
             │                                           │ parameter numbers        │
             │                                           └──────────────────────────┘
             │    ┌──────────────────────────────┐      ┌──────────────────────────┐
             ├──▶ │ Technician: Code number 1907 │──▶   │ Technician Level         │
             │    └──────────────────────────────┘      │ 100 series of            │
             │                                           │ parameter numbers        │
             │                                           └──────────────────────────┘
             │    ┌──────────────────────────────┐      ┌──────────────────────────┐
             └──▶ │ Operator: No code number     │──▶   │ Operator Level           │
                  └──────────────────────────────┘      └──────────────────────────┘
```
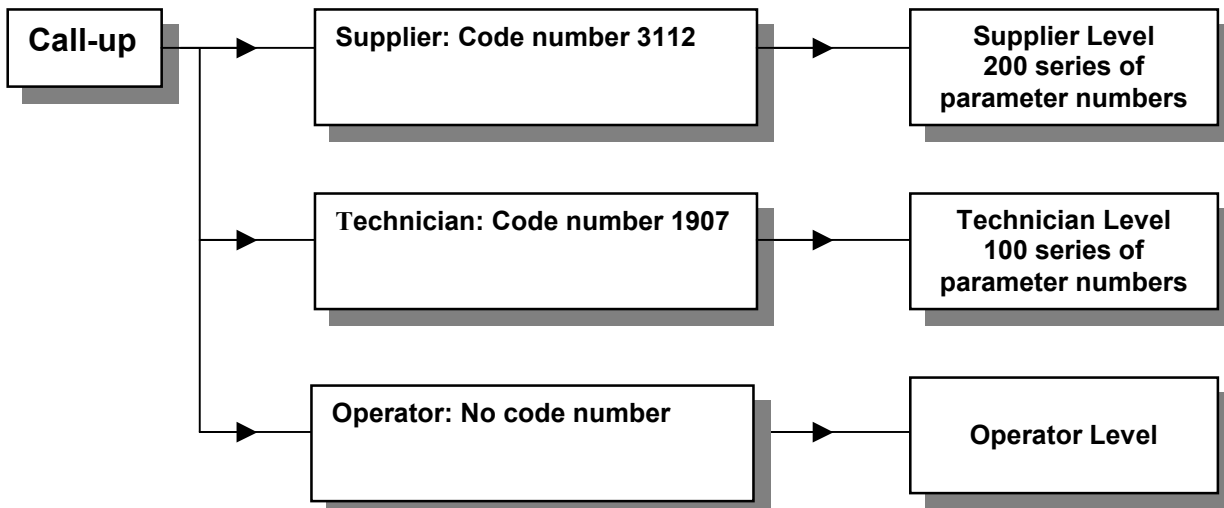
## 6.2   Programming the Code Number

**1.** Press key **P** and turn power on                                    **2.** Press key **>>** (1st digit blinks)



KL2542-01
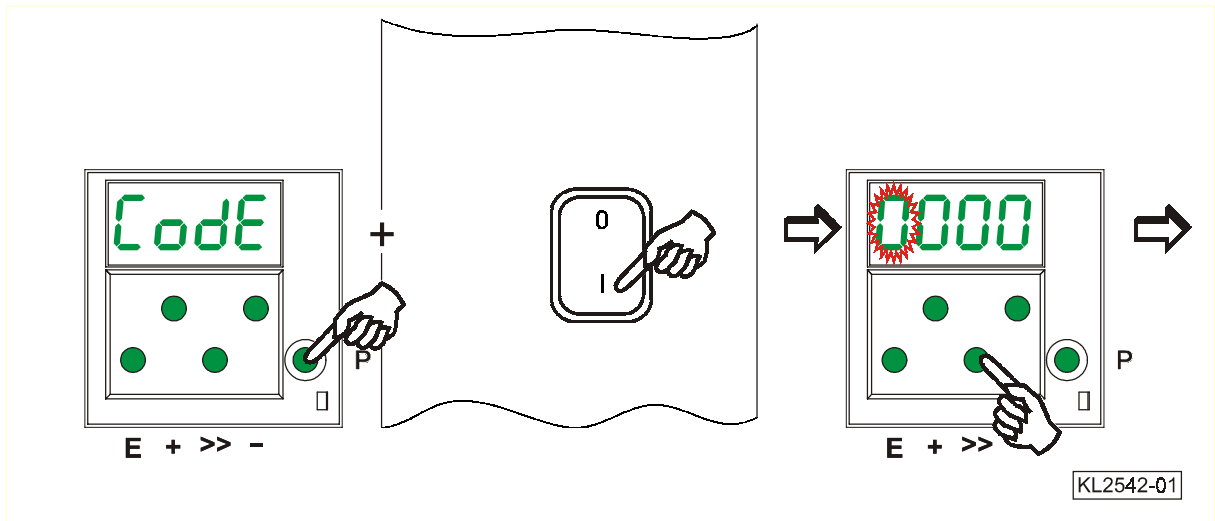
**3.** Press key **+** or **–** to select the 1st digit

**4.** Press key **>>** (2nd digit blinks)

**5.** Press key **+** or **–** to select the 2nd digit

Technician level ➔ Code no. 1907
Supplier level ➔ Code no. 3112



KL2542-02
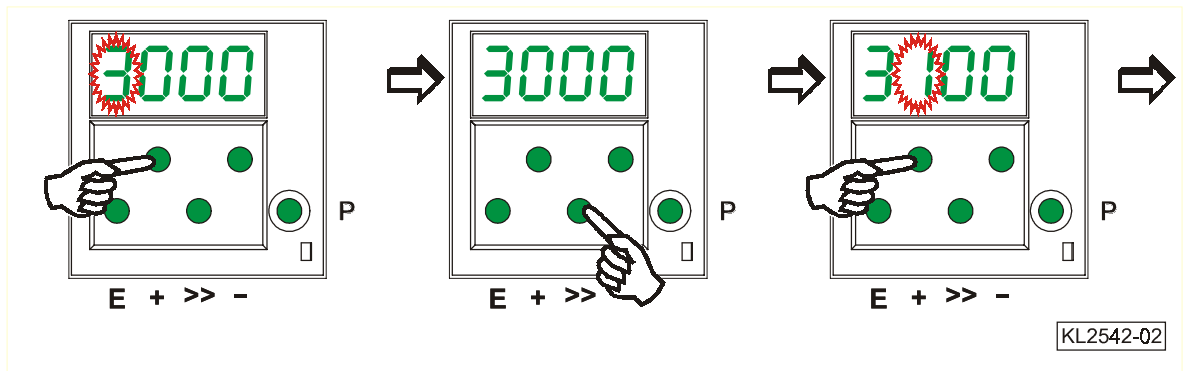
**6.** Press key **>>** (3rd digit blinks)

**7.** Press key **+** or **–** to select the 3rd digit

**8.** Press key **>>** (4th digit blinks)



KL2542-03
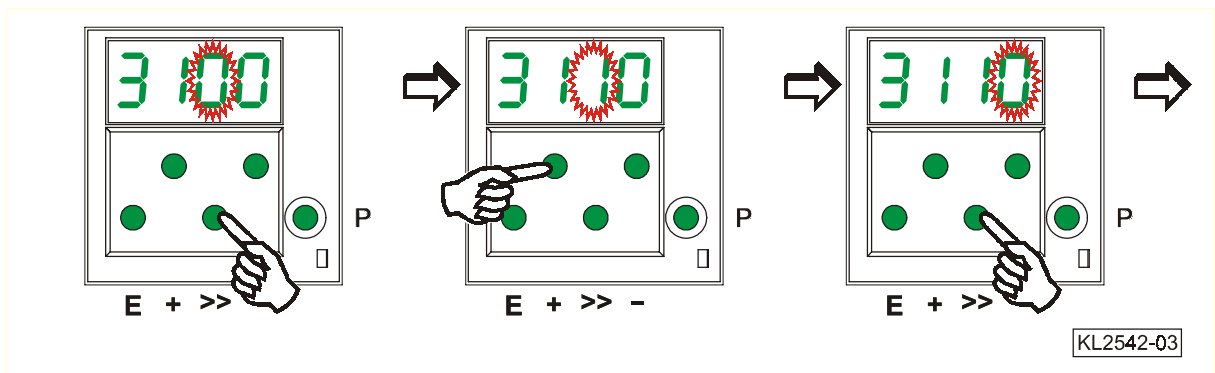
**9.** Press key **+** or **–** to select the 4$^{th}$ digit

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



KL2542-04
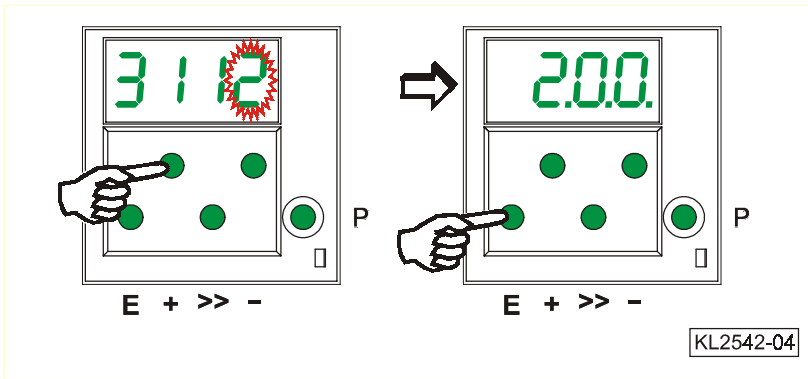
## 6.3   Parameter Selection

### 6.3.1   Direct Parameter Selection

**1.** After code number input at the programming level

**2.** Press key **>>** (1$^{st}$ digit blinks)

**3.** Press key **+** or **–** to select the 1$^{st}$ digit



KL2542-05
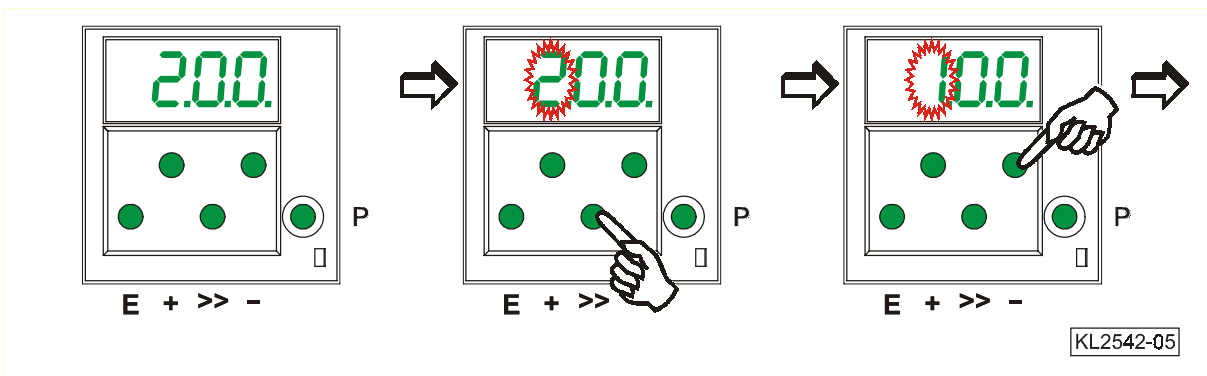
**4.** Press key **>>** (2$^{nd}$ digit blinks)

**5.** Press key **+** or **–** to select the 2$^{nd}$ digit

**6.** Press key **>>** (3$^{rd}$ digit blinks)



KL2542-06
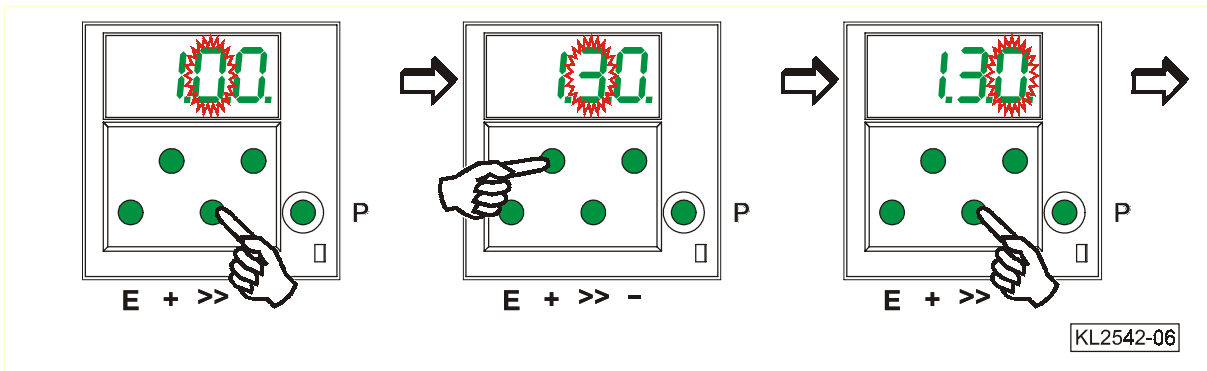
**7.** Press key **+** or **–** to select the 3<sup>rd</sup> digit

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



KL2542-07
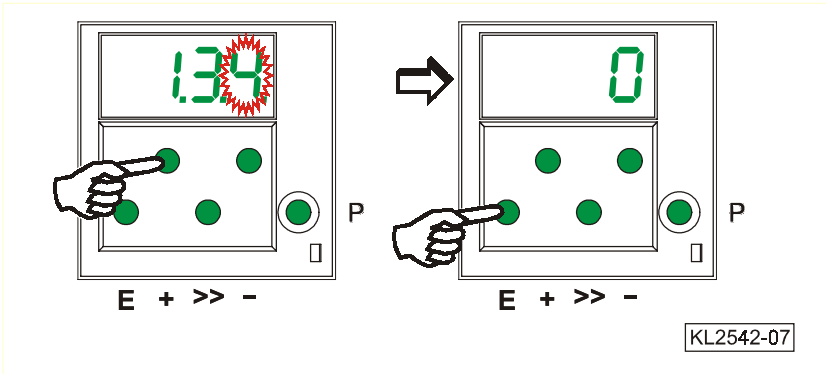
### 6.3.2 Changing Parameter Values

**1.** Display after parameter value selection

**2.** Change the parameter value by pressing key **+** or **–**



KL2542-08
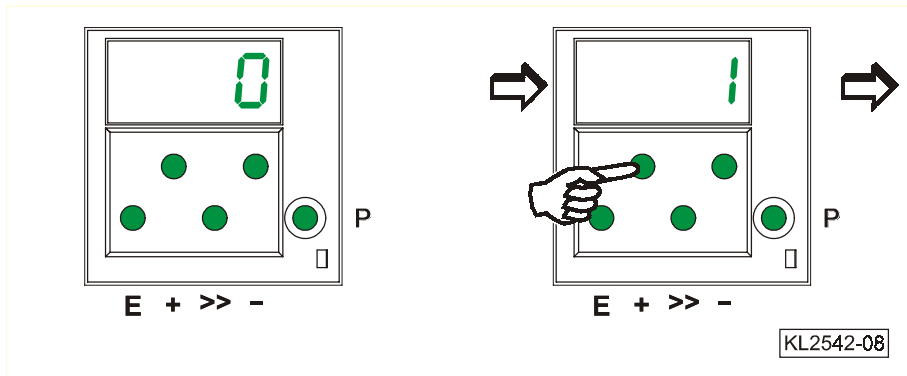
## Option 1

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

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



KL2542-09
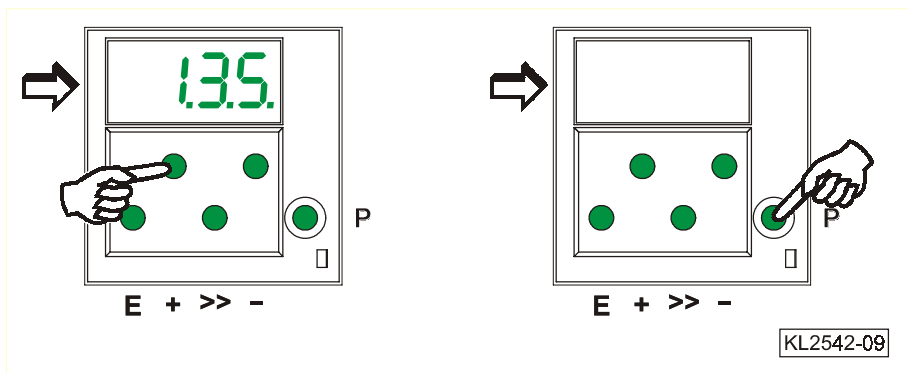
## Option 2

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

Press key **P**. Exit programming.



KL2542-10
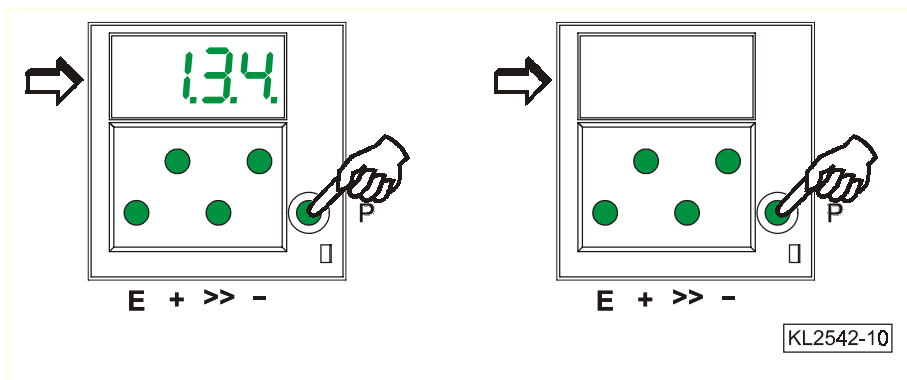
### 6.3.3  Parameter Selection Using Keys +/-

**1.** After code number input at the programming level

**2.** Select the next parameter by pressing key **+**



KL2542-11
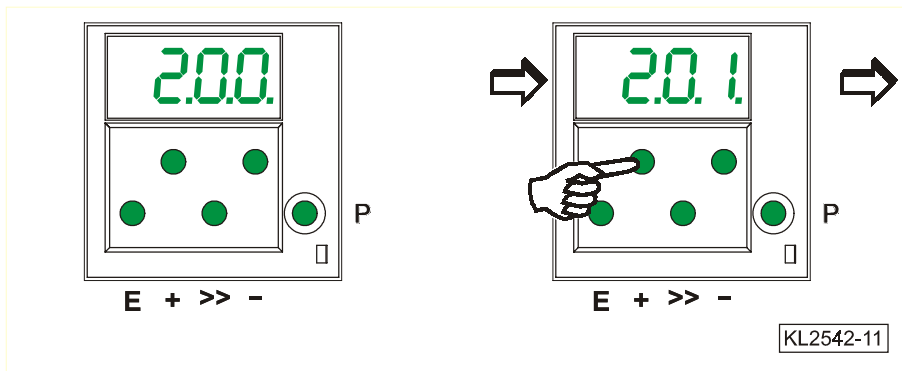
**3.** Select the previous parameter by pressing key **–**

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



KL2542-12
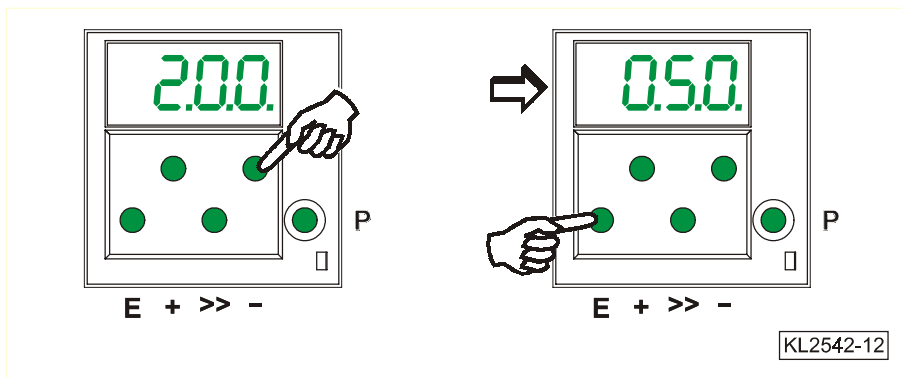
All input parameters must be saved by changing parameter 401.

### 6.3.4  Immediate Storage of All Changed Data

| Functions | | Parameter |
|---|---|---|
| Storage of all changed data | (EEP) | **401** |

- Input code number 3112 after power On                        ➔ Press key **E**
- Input parameter 401                                                      ➔ Press key **E**
- Set display from **0** to **1**                                           ➔ Press key **E** or **P**
- All data have been saved!

## 6.4   Program Identification on the Control

| Function **without** control panel | Parameter |
|---|---|
| Program number, modification index and identification number display | **179** |

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

1. Select parameter **179.**
2. Press key **E.**                    Display of letter symbol **Sr5**
3. Press key **>>.**                   Display of program number ( **5800** )
4. Press key **E.**                    Display of modification index    (    **A** )
5. Press key **E.**                    Display of identification number digit 1 and 2
6. Press key **E.**                    Display of identification number digit 3 and 4
7. Press key **E.**                    Display of identification number digit 5 and 6
8. Press key **E.**                    Display of identification number digit 7 and 8


Exit the routine after pressing key **P** once. The next parameter number is displayed. Exit programming after pressing key **P** twice.

## 7    Control Operation with Control Panel

### 7.1    Operation of the V810 Control Panel

### 7.1.1    Code Number Input on the V810 Control Panel

| Technician Level Code Number =>  1907 and Supplier Level Code Number =>  3112 |
| --- |

**Example:** Technician level CODE number selection on the V810 control panel

TURN POWER OFF.

| | | | | |
|---|---|---|---|---|
| **P**  **+** | TURN POWER ON.  First digit blinks. | ➜ | C – 0 0 0 0 |
| **+**  **-** | Press key **+** or **–** to select the first digit. | ➜ | C – 1 0 0 0 |
| **»** | Press key **>>.** Second digit blinks. | ➜ | C – 1 0 0 0 |
| **+**  **-** | Press key **+** or **–** to select the second digit. | ➜ | C – 1 9 0 0 |
| **»**  **»** | Press key **>>** twice.<br>Fourth digit blinks. | ➜ | C – 1 9 0 0 |
| **+**  **-** | Press key **+** or **–** to select the fourth digit. | ➜ | C – 1 9 0 7 |
| **E** | If the CODE number is correct, the first PARAMETER number at the selected level is displayed. | ➜ | F –    1 0 0 |

### 7.1.2    Parameter Input at the Operator Level on the V810 Control Panel

**Example:** CODE number has not been input.

| | | | | |
|---|---|---|---|---|
| | TURN POWER ON. | ➜ | MC 2 2 1 A |
| **P** | First parameter at the operator level is displayed. | ➜ | F –    0 0 0 |
| **+** | Second parameter at the operator level is displayed. The next or previous parameter can be called up by pressing the +/- keys. | ➜ | F –    0 0 1 |
| **E** | Parameter value is displayed. | ➜ | 0 0 3 |
| **+** | Change parameter value by pressing the **+/-** keys. | ➜ | X X X |
| **E** | Parameter value is entered.<br>Display advances to the next parameter. | ➜ | F –    0 0 2 |
| **+** | Press key **+** several times until the desired parameter is displayed. | ➜ | F –    0 0 9 |

| E | Parameter value is displayed. | ➔ | 0 |
| + | New parameter value is displayed. | ➔ | 1 |
| E | Next parameter is displayed. | ➔ | F – 0 1 3 |

or

| P | Exit programming. | ➔ | MC 2 2 1 A |

**Note!**  The parameter number can also be selected directly, like the code number!

## 7.1.3  Parameter Input at the Technician/Supplier Level on the V810 Control Panel

**Example:**  After CODE number input at the technician level.

| | After CODE number input, the first PARAMETER number is displayed. | ➔ | F – 1 0 0 |
| + | Press key **+**. The next parameter number is displayed. | ➔ | F – 1 1 0 |
| E | Press key **E.** The parameter value is displayed. | ➔ | 0 1 8 0 |
| + | - | Change the parameter value. | ➔ | 0 X X X |
| E | Parameter value is entered. Display advances to the next parameter. | ➔ | F – 1 1 1 |

or

| P | Parameter value is entered. The actual PARAMETER number is displayed. | ➔ | F - 1 1 0 |

or

| P | P | Press key **P** twice. Exit programming. | ➔ | MC 2 2 1 A |

## 7.2  V820/V850 Control Panel Operation

## 7.2.1  Code Number Input on the V820/V850 Control Panel

**Technician Level Code Number =>  1907 and Supplier Level Code Number  =>  3112**

**Example:**  Technician level CODE number selection on the V820 control panel

|  | TURN POWER OFF. |  |  |
| P | + | TURN POWER ON | ➔ | C–0000 |
| 1 | 9 | 0 | 7 | Input CODE number. | ➔ | C–1907 |

| | | |
|---|---|---|
| **E** | If CODE number is incorrect, repeat input. | ➔ **C–0000    InFo  F1** |
| **E** | If CODE number is correct, the first PARAMETER number at the selected level is displayed. | ➔ **F–100** |

## 7.2.2  Parameter Input at the Operator Level on the V820/V850 Control Panel

**Example:**  CODE number has not been input.

| | | |
|---|---|---|
| | TURN POWER ON. | ➔ **4000    MC221A** |
| **P** | Display shows no reading. | ➔ |
| **E** | First parameter at the operator level is displayed. PARAMETER number is not displayed. | ➔ **c2    003** |
| **+**  **-** | Change the parameter value. | ➔ **c2    XXX** |
| **E** | Parameter value is entered. Display advances to the next parameter. | ➔ **c1    003** |
| or | | |
| **P** | Exit programming. | ➔ **4000** |

## 7.2.3  Parameter Input at the Technician/Supplier Level on the V820/V850 Control Panel

**Example:**  After CODE number input at the technician level.

| | | |
|---|---|---|
| | After CODE number input, the first PARAMETER number is displayed. | ➔ **F-100** |
| **E** | The most significant digit of the PARAMETER number blinks. | ➔ **F-100** |
| **1**  **1**  **0** | Input desired PARAMETER number. | ➔ **F-110** |
| **E** | If PARAMETER number is incorrect, repeat input. | ➔ **F–XXX  InFo  F1** |
| **E** | If PARAMETER number is correct | ➔ **F–110  n1    180** |
| **+**  **-** | Change the parameter value. | ➔ **F-110  n1    XXX** |
| **E** | Parameter value is entered. Display advances to the next parameter. | ➔ **F-111  n2-  4000** |
| or | | |
| **P** | Parameter value is entered. A new PARAMETER number can be selected. | ➔ **F-XXX** |
| or | | |
| **P**  **P** | Press key **P** twice. Exit programming. | ➔ **4000    MC221A** |

## 7.3   Program Identification

| Function **with** control panel | Parameter |
|---|---|
| Program number, modification index and identification number display | **179** |

**Display example parameter 179 on the V810 control panel:**
- Select parameter 179.
- Press key **E**                    ➔   **Sr5 [°]** is displayed
- Press key **>>**                   ➔   e. g. **5800A** is displayed           (Program number with index)
- Press key **E**                    ➔   e. g. **010823** is displayed          (1st part of date)
- Press key **E**                    ➔   e. g. **15** is displayed              (2nd part of date)
- Press key **P** twice              ➔   **MC221A** is displayed                (Procedure completed)

**Display example parameter 179 on the V820/V850 control panel:**
- Select parameter 179.
- Press key **E**                    ➔   **F-179 Sr5 [°]** is displayed
- Press key **>>**                   ➔   e. g. **PrG   5800A** is displayed      (Program number with index)
- Press key **E**                    ➔   e. g. **dAt    01082315** is displayed  (Date)
- Press key **E**                    ➔   e. g. **132650210015** is displayed     (Serial number)
- Press key **E**                    ➔   e. g. **Skn   01047543** is displayed   (Control box number)
- Press key **P** twice              ➔   **MC221A** is displayed                (Procedure completed)

## 7.3.1   Further Functions of the V810/V820/V850 Control Panels

- Press key **>>**                          ➔ The most significant digit blinks.
- Press key **+/-** briefly                 ➔ The blinking digit changes by ±1.
- Keep key **+/-** pressed down             ➔ The blinking digit keeps changing its value, as long as the key is pressed down.
- Press key **>>** once more                ➔ The next digit blinks.
- Press key **+/-** as above.
- Press key **E**                           ➔ The setting is completed.

With the code number and parameter number there is no carry over when changing from **0 to 9** or vice versa. Parameter values are, however, carried over. Therefore, you can use the **+/-** keys to change the value between the minimum and maximum value.
If the value change is significant, it is better to use key **>>**. If the value change is insignificant, use key **+/-**.
For setting the minimum or maximum value, select the most significant digit by means of key **>>**. Then keep pressing the **–** key for the minimum or the **+** key for the maximum value.

The above description is applicable to the V810, V820 and V850 control panels. Direct input of values is possible with the V820/V850 using keys **0...9**.

# 8   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**
- **If necessary, the correct adjustment of the direction of motor rotation using parameter 161**
- **If necessary, the setting of the 0 reference position using parameter 170**
- **If necessary, the setting of the positions using parameter 171**
- **The setting of the transmission ratio between motor shaft and machine shaft using parameter 272**
- **The correct maximum speed compatible with the sewing machine using parameter 111**
- **The setting of the remaining relevant parameters**
- **Save the set values using parameter 401**


The programmable MC221A or MC321A control is a compact plug-and-play unit including frequency converter and power supply.  When putting it into service, note the following:

- Power supply =  230V
- The frequency converter is adapted to the respective motor :   MC221A/DC1500 or MC321A/DC1550

- Programming the maximum speed of the systems                    - Parameter F-111.   ( see chapter 10)
- Programming the motor braking power at standstill                   - Parameter F-153   ( see chapter 10)
- Programming the direction of motor rotation                            - Parameter F-161   ( see chapter 10)
- Programming the accelerating curve                                       - Parameter F-220   ( see chapter 10)
- Programming the braking curve                                             - Parameter F-208   ( see chapter 10)
- Testing the connected sensors / actuators                             - Parameter F-173   ( see chapter 13)

- Operation of the control and motor must be generated by download into the control using the "Compiler C200" software.


All parameters can be changed using the connected control panel or, directly by the program created by C200.

# 9   Programming Control Functions using Compiler C200

The Efka Compiler C200 is a software tool for programming user-defined functions on the MC221A or MC321A control. For further programming information see "Compiler C200" user manual.

**The Compiler provides the following basic functions:**

- predetermined functions which are integrated by means of a system file
- 24kB for user programs and data
- error management routine with automatic error marking
- loader for program storing in the control
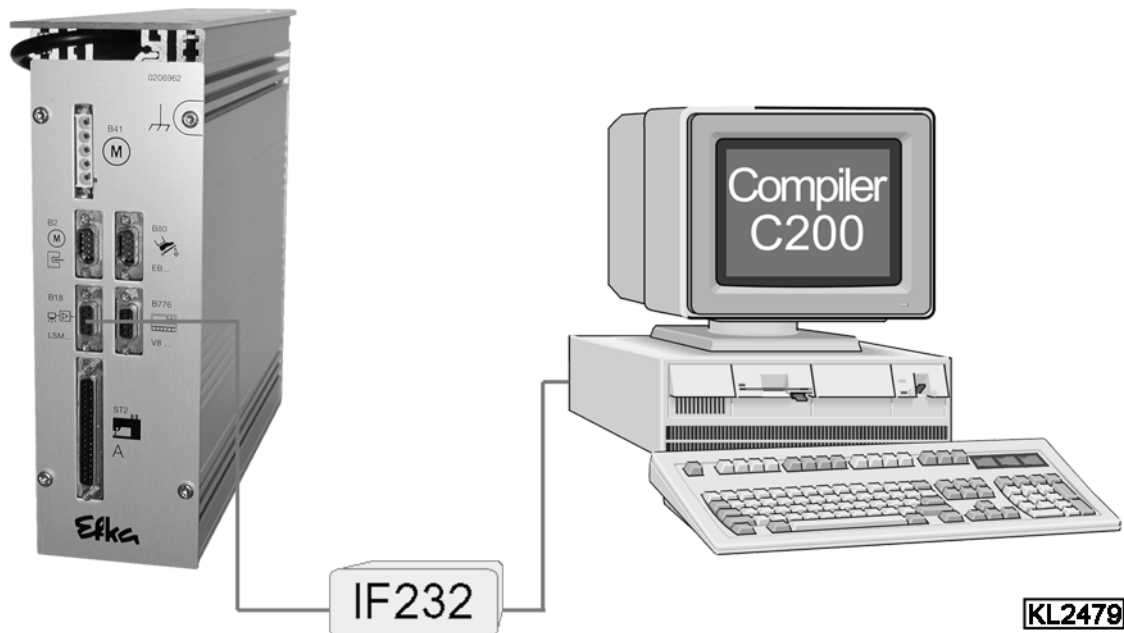


The MC221A or MC321A control (socket B18) and the computer (socket COMx) are connected by means of interface IF232-3.

Set of special C200 Compiler accessories consisting of:                order no. 1113262
- C200 Compiler Software CD-ROM
- C200 Compiler User Manual
- EFKANET IF232-3 Interface

CD – ROM contents:

- Compiler C200
- Loader
- Editor ( UltraEdit ®-32, Copyright ©1994-2001 IDM Computer Solutions, Inc )
  Shareware version
- Compiler manual in PDF format
- Sample programs

## 9.1   C200 Compiler Installation

Provided that the AUTORUN function in the target computer is On, the installation assistent starts automatically upon loading the CD. Otherwise start SETUP.EXE on the CD.
At the beginning of the installation you will be asked if you want to install the compiler only, or the editor as well. The compiler is installed in a first step. If not otherwise selected, the program is installed under C:\EfkaComp\. Then the editor is installed. You can use the editor as shareware for 40 days. For further use, a fee is to be paid to the manufacturer in order to receive an authorization code.
You can start or integrate the compiler using other editors, too. However, we recommend using the editor supplied with the unit, since all three components will be set up as integrated development environment "IDE". The same user interface serves for programming, compiling and downloading. Moreover, the "syntax highlighting" and "upper casing" functions will be executed when creating the programs, which helps to detect syntax errors immediately.

## 9.2   Editor



Start button for loader
Start button for compiler

```
PROGRAM A04
SYSTEM  FP220AE

VAR
STATUS        :VALUE := 0;

ALIAS
Sensor1       : In1;
Sensor2       : In2;
StackerClose  : SetOut8;
StackerMove   : SetOut9;

BEGIN
  WHILE (1)
      SELECT ( STATUS ) OF
        CASE 0: IF (Sensor1 = ON ) THEN
                    StackerClose := ON;
                    SetTimer(Timer1,500);
                    STATUS := STATUS + 1;
                END_IF;
        CASE 1: IF (GetTimer(Timer1)  = 0 ) THEN
                    StackerMove := ON;
                    STATUS := STATUS + 1;
                END_IF;
        CASE 2: IF (Sensor2 = ON) THEN
                    StackerClose := OFF;
                    SetTimer(Timer1,700);
                    STATUS := STATUS + 1;
                END_IF;
        CASE 3: IF ( GetTimer(Timer1)  = 0 ) THEN
                    StackerMove := OFF;
                    STATUS := 0;
                END_IF;
      END_SELECT;
  END_WHILE;
END.
```

SOURCE CODE TEXT WINDOW

## 9.3   Compiler

When starting the compiler, the source text is translated into the machine code, and a download file is generated, which will be stored in the same directory as the source code file. The source code file has the extension **"PRC"**, the download file **"PRG"**.
The compilation result is displayed in the result window.
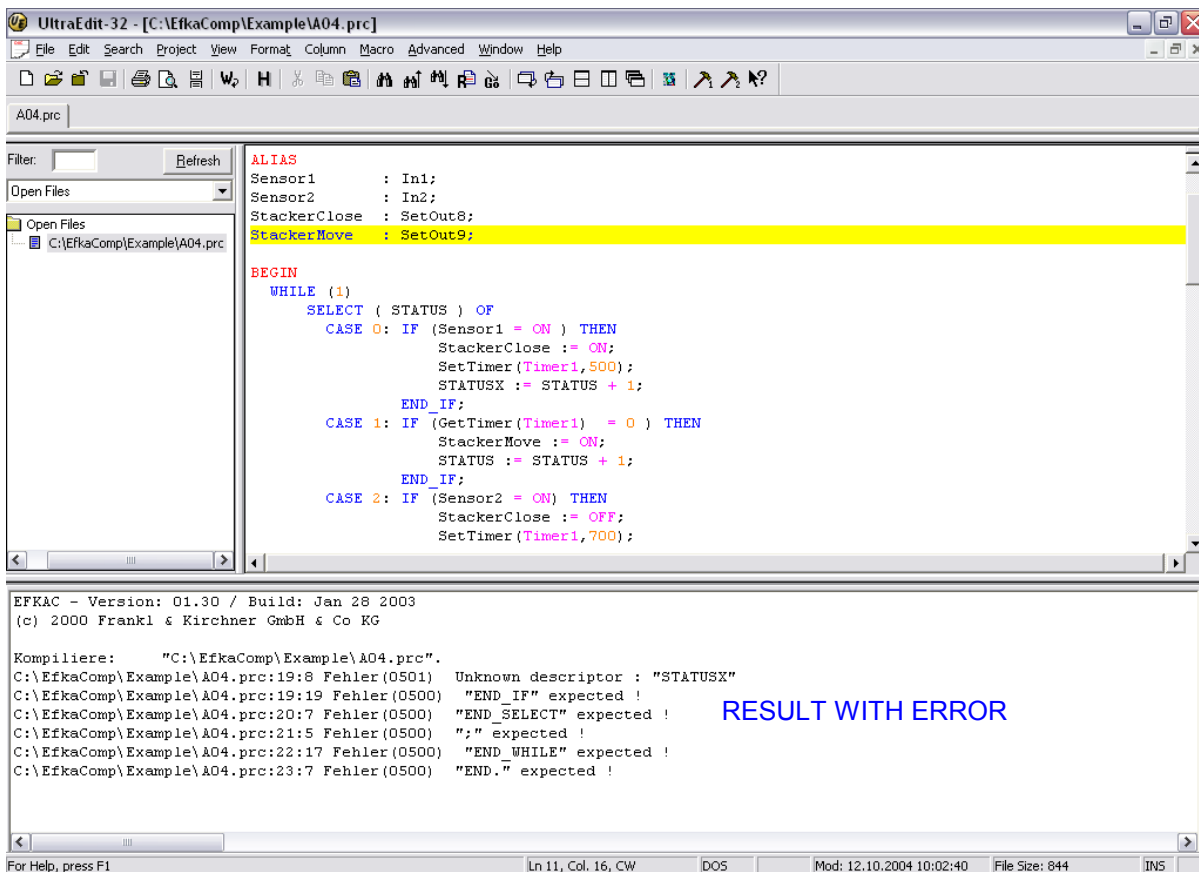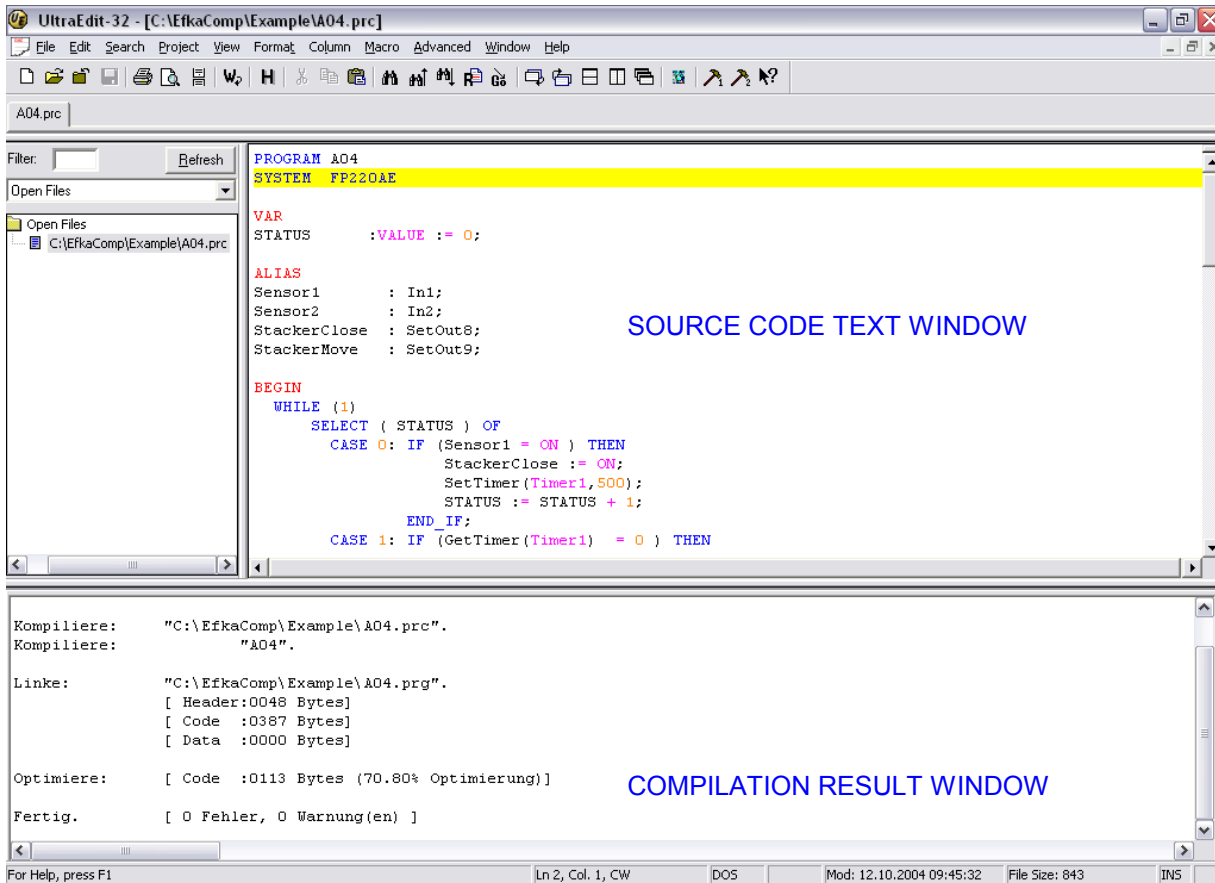
## 9.4  Loader

When starting the loader, the machine code stored in the download file is transmitted to the control. The data transmission progress is displayed in the message window.
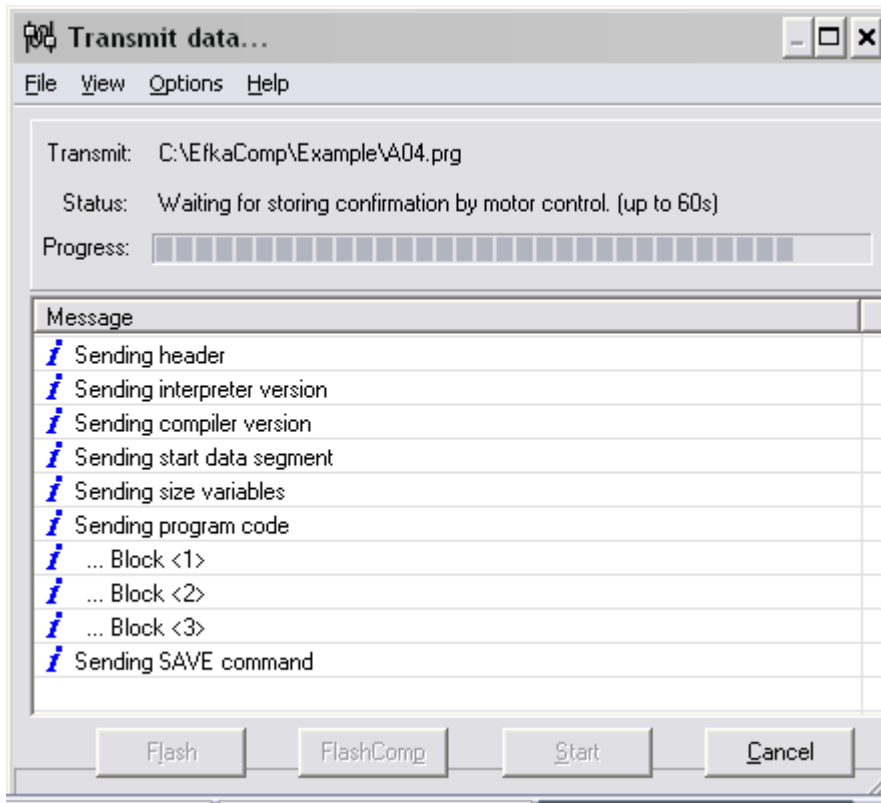


The parameters of the serial interface can be set using the "FILE SETTINGS" menu.
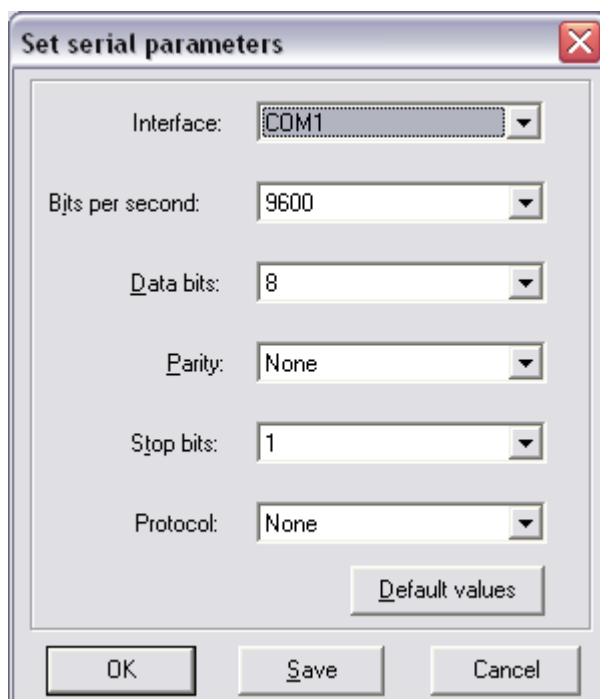
## 9.5   Programming Example

The following cycle is programmed:

The motor is started by an impulse (sensor1) at input In5 and runs a distance of 15000 increments at a speed of 2000 rev./min.
After the stop, an output (actuator1) will be activated for 600 ms. Then the motor returns to its initial position at a speed of 4000 rev./min.

```
PROGRAM   Example1

SYSTEM   FP220AE

VAR
status  :VALUE := 0;

ALIAS
Sensor1   : In5;
Actuator1 : SetOut10;

BEGIN
  WHILE (1)
    SELECT ( status ) OF
     CASE 0: IF (sensor1) THEN
                  RunIncrements(15000,2000,0);
                  status := 1;
             END_IF;

     CASE 1: IF (GetRestRunIncrements() < 10 ) THEN
                  TimerSetOut(timer1,600,actuator1,ON);
                  status := 2;
             END_IF;

     CASE 2: IF ( GetTimer(Timer1)  = 0 ) THEN
                  RunIncrements(15000,4000,1);
                  status := 3;
             END_IF;

     CASE 3: IF (GetRestRunIncrements() < 10  ) THEN
                  status := 4;
             END_IF;

     CASE 4: IF (NOT sensor1) THEN
                  status := 0;
             END_IF;

    END_SELECT;
  END_WHILE;
END.
```

Please see user manual Compiler C200 for the description of syntax and commands.

# 10  Setting the Basic Functions

| Note! | The basic functions can be set manually on the control panel, or automatically using the download program created by the Compiler C200! |
|---|---|

## 10.1  Direction of Motor Rotation

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

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

⚠️

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

## 10.2  Maximum Speed Compatible with the Machine

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

| **Note** |
|---|
| See instruction manual of the machine manufacturer for the maximum speed of the machine. |

## 10.3  Starting Characteristics

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Starting edge | (ALF) | **220** |

The drive acceleration dynamics can be adapted to the machine characteristic.

- Example: F-220 = 50   ➔   Acceleration = 50 rev./min. per millisecond

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.

## 10.4 Braking Characteristics

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Braking effect | (br2) | **208** |

- Example: F-208 = 30 ➔ Braking effect = 50 rev./min. per millisecond

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

## 10.5 Braking Power at Standstill

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Braking power at standstill | (brt) | **153** |

- The braking power is effective at standstill

- The higher the set value, the stronger the braking power

## 10.6 Holding Power of Output VR

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Time of full power | (t10) | **212** |
| Holding power | (t11) | **213** |

Output VR 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 consumer. Set the duration of full power using parameter **212** and the partial holding power using parameter **213**.

⚠️

**CAUTION!**
If the holding power is set too high, the consumer and the control may be permanently damaged. Please observe the permissible duty ratio (ED) of the consumer 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) |

## 10.7  Holding Power of Output FL

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Time of full power | (t10) | **203** |
| Holding power | (t11) | **204** |

Output FL 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 consumer. Set the duration of full power using parameter **203** and the partial holding power using parameter **204**.

**CAUTION!**
If the holding power is set too high, the load and the control may be permanently damaged. Please observe the permissible duty ratio (ED) of the load 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) |

# 11 Setting the Input Switching Thresholds

**Diagram representing the lower and upper switching thresholds of inputs IN1...IN10**
(parameters  340 - 359 )
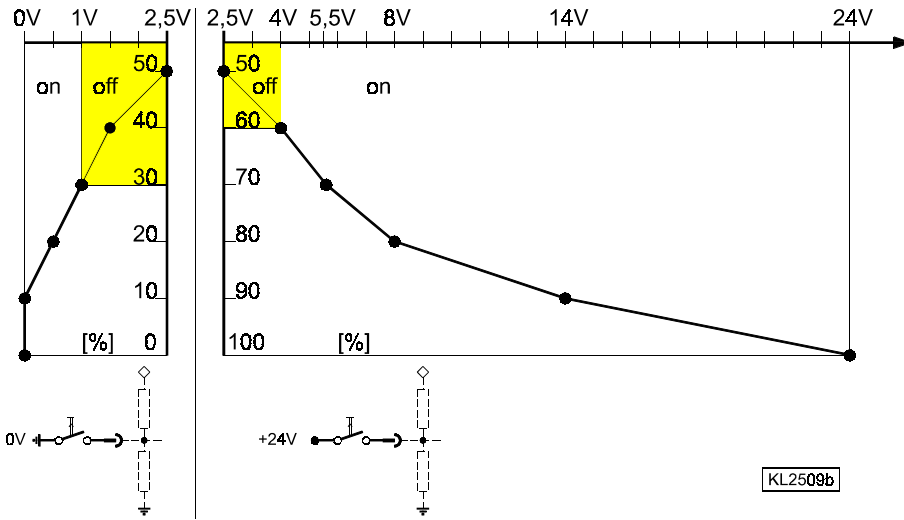


| Pa. 340 | Pa.341 | Input  IN1 |
| Pa. 342 | Pa.343 | IN2 |
| Pa. 344 | Pa.345 | IN3 |
| Pa. 346 | Pa.347 | IN4 |
| Pa. 348 | Pa.349 | IN5 |
| Pa. 350 | Pa.351 | IN6 |
| Pa. 352 | Pa.353 | IN7 |
| Pa. 354 | Pa.355 | IN8 |
| Pa. 356 | Pa.357 | IN9 |
| Pa. 358 | Pa.359 | IN10 |
| Pa. 360 | Pa.361 | LSM |

Inputs IN1 – IN10 can be switched to both +24V and 0V. These inputs work as window comparators with lower and upper limit.
The lower and upper limit of each input can be set individually using 2 parameters each.
**Lower switching threshold (switch to 0V):** Below the set value the control logic recognizes "**On**" (switch closed); above the set value the control logic recognizes "**Off**" (switch open).
**Upper switching threshold (switch to +24V):** Below the set value the control logic recognizes "**Off**" (switch open); above the set value the control logic recognizes "**On**" (switch closed).
The factory setting of these parameters is 30% ≈ 0.9V (for the lower switching threshold) and 80% ≈ 8.0V (for the upper switching threshold).
When a micro switch is used, this factory setting works without problem if any of the two contacts is connected to 0V or +24V of the control.

However, the factory settings will not work if control elements with bipolar signals are connected, instead of switches, keys, or "open collector" elements.
These control elements switch one signal each between 0V and +Vdd to the control input ( e.g. 5V..24V ).
In this case, the upper switching threshold must be set to 100, or the lower switching threshold to 0.

# 12 Programming 2 Position Signals per Motor Rotation

## 12.1 Setting the Reference Position (Parameter 270 = 0)

The angular positions necessary on the machine are stored in the control. A reference position is needed in order to establish a relationship between position transmitter information and actual mechanical position.

**The reference position must be set:**
- for initial operation
- after replacing the motor

**Setting the reference position on the control**
- Input code number and select parameter 170.
- Press key **E**                                       ➔    Display          **Sr1**
- Press key **>>**                                      ➔    Display          **P o** (character o rotating)
  Turn motor shaft until rotating            ➔    Display          **P**
  character **o** goes off on the display.
- Then turn motor shaft to the               ➔    Set machine reference point
  reference position.
- Press key **P** once                             ➔    Actual parameter number is displayed
- Press key **P** twice                            ➔    Exit programming at the technician level

**Setting the reference position on the V810 control panel**
- Input code number and select parameter 170.
- Press key **E**                                       ➔    Display          **Sr1 [o]**
- Press key **>>**                                      ➔    Display          **PoS0 o** (character o rotating)
  Turn motor shaft until rotating            ➔    Display          **PoS0**
  character **o** goes off on the display.
- Then turn motor shaft to the               ➔    Set machine reference point
  reference position.
- Press key **P** once                             ➔    Actual parameter number is displayed
- Press key **P** twice                            ➔    Exit programming at the technician level

**Setting the reference position on the V820 control panel**
- Input code number and select parameter 170.
- Press key **E**                                       ➔    Display          **F-170 Sr1 [o]**
- Press key **>>**                                      ➔    Display          **PoS0 o** (character o rotating)
  Turn motor shaft until rotating            ➔    Display          **PoS0**
  character **o** goes off on the display.
- Then turn motor shaft to the               ➔    Set machine reference point
  reference position.
- Press key **P** once                             ➔    Actual parameter number is displayed
- Press key **P** twice                            ➔    Exit programming at the technician level

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

## 12.2 Setting the Positions on the Control (Parameter 270 = 0)

If parameter 270 = 0, the positions integrated in the motor are activated and can be set as follows:

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

## 12.3 Setting the Positions on the V810 Control Panel (Parameter 270 = 0)

If parameter 270 = 0, the positions integrated in the motor are activated and can be set as follows:

|  |  |  |  |
|---|---|---|---|
|  | Select parameter **171** | ➜ | `F – 1 7 1` |
| **E** | Press key **E** | ➜ | `[ o ]` |
| **»** | Press key **>>** (key B). 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 motor shaft (> 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 motor shaft (> 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 motor shaft (> 1 rotation) | ➜ | `P 1 A  X X X` |
| **E** | Parameter value of position 2A appears on the display | ➜ | `P 2 A  4 0 0` |
| **+** **-** | If necessary, change parameter value by pressing key **>>** or **+/-**, or by turning the motor shaft (> 1 rotation) | ➜ | `P 2 A  X X X` |
| **P** **P** | Press the P key twice. Settings are completed. Exit programming. | ➜ | `M C  2 2 1 A` |

## 12.4 Setting the Positions on the V820/V850 Control Panel (Parameter 270 = 0)

If parameter 270 = 0, the positions integrated in the motor are activated and can be set as follows:

|  |  |  |  |
|---|---|---|---|
|  | Display before programming | ➜ | `4000      MC221A` |
| **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 (key B) | ➜ | `P1E  140` |

| | | | |
|---|---|---|---|
| **0** ... **9** | If necessary, change parameter value by pressing keys +/- or 0...9, or by turning the motor shaft (> 1 rotation). | ➔ | **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 motor shaft (> 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 motor shaft (> 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 motor shaft (> 1 rotation). | ➔ | **P2A  XXX** |
| **P** **P** | Settings are completed. Exit programming. | ➔ | **4000    MC221A** |

---

**Note**
When setting the positions by turning the motor shaft, make sure that the displayed numerical value changes.

---

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

## 12.5  Signal Output Position 1

▪ Transistor output with open collector
▪ Suitable e. g. for the connection of a counter
▪ An inverted signal is issued at socket ST2/20

## 12.6  Signal Output Position 2

▪ Transistor output with open collector
▪ Suitable e. g. for the connection of a counter
▪ An inverted signal is issued at socket ST2/21

## 12.7  Signal Output 512 Impulses per Rotation

▪ Transistor output with open collector
▪ Signal whenever a generator slot of the encoder is sensed
▪ 512 impulses per rotation of the motor shaft
▪ Suitable e. g. for the connection of a counter
▪ An inverted signal is issued at socket ST2/22

## 12.8 Use of a Hall Sensor Module HSM001

If the position signals are to be issued with respect to the driven shaft and the transmission ratio between motor shaft and driven shaft is not 1:1, the Hall sensor HSM001 must be used on the driven shaft. Parameter F-270 must be programmed to value 1.

## 12.9 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!** |

| 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...255 using parameter 272.

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

# 13 Service Functions

## 13.1 Signal Test

| Function **with** or **without** control panel | | Parameter |
|---|---|---|
| Input and output test | (Sr4) | **173** |

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

## 13.2 Signal Test Using the V810/V820/V850

**Input Test:**

- Select parameter 173.
- **V810 control panel:** The above signals are indicated by means of arrows above the 2...4 keys. Inputs in1...in10 appear individually on the LC display. Several switches and/or keys must not be actuated at the same time (see control).
- **V820/850 control panel:** Inputs in1...in10 and signals "light barrier, sensor, generator impulse 1 and 2, positions 1 and 2" are displayed by means of arrows above the 1...10 keys. Several inputs can be actuated and displayed at the same time.
- If several keys and/or switches are actuated at the same time, e.g. **in3, in5, in6, in7**, the least significant input will be displayed, e.g. **in3**.

<center>**V820/V850 Control Panel**                                  **V810 Control Panel**</center>
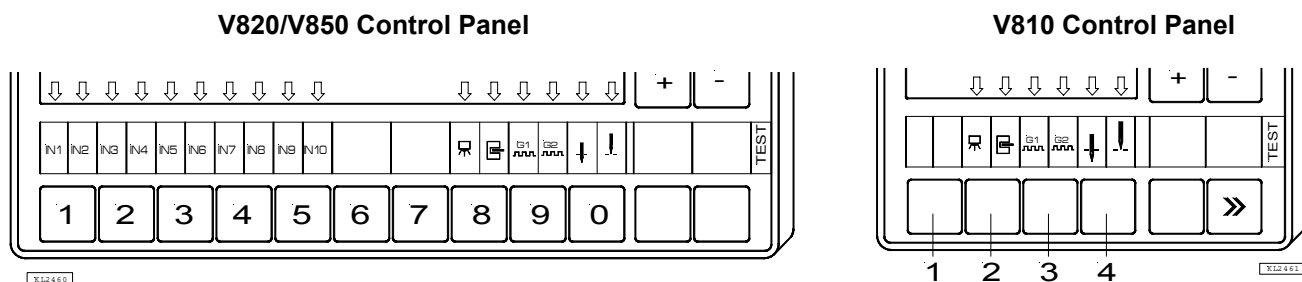


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**Note**
If an input is active with open contact, the corresponding arrow lights up when the contact is open. If an input is active with closed contact, the corresponding arrow lights up when the contact is closed.

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**Output Test:**

- Select the desired output using key **+/-**
- Enable the selected output using key **>>** on the V810 or the incorporated control panel
- Enable the selected output using the key at the bottom right on the V820/V850 control panel

| Display | Assignment of the outputs | |
|---|---|---|
| **01** | Output VR | on socket ST2/34 |
| **02** | Output FL | on socket ST2/35 |
| **03** | Output M1 | on socket ST2/37 |
| **04** | Output M3 | on socket ST2/27 |
| **05** | Output M2 | on socket ST2/28 |
| **06** | Output M4 | on socket ST2/36 |
| **07** | Output M5 | on socket ST2/32 |
| **08** | Output M11 | on socket ST2/31 |
| **09** | Output M6 | on socket ST2/30 |
| **010** | Output M9 | on socket ST2/25 |
| **011** | Output M8 | on socket ST2/24 |
| **012** | Output M7 | on socket ST2/23 |
| **013** | Output M10 | on socket ST2/29 |

## 13.3 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
- With control panel, the control panel display shows "Sr3"
- Turn motor shaft according to the direction of motor rotation


**V810/V820 control panel display**
- Arrow above symbol "position 1" on the 4 key (V810) / on the 7 key (V820) is displayed corresponds to position 1
- Arrow above symbol "position 1" on the 4 key (V810) / on the 7 key (V820) is displayed corresponds to position 1A
- Arrow above symbol "position 2" on the 4 key (V810) / on the 7 key (V820) is displayed corresponds to position 2
- Arrow above symbol "position 2" on the 4 key (V810) / on the 7 key (V820) is displayed corresponds to position 2A

# 14 List of Parameters

## 14.1 Technician Level

Code no.        1907

| Parameter | | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|---|
| 110 | n1 | Positioning speed | RPM | 390 | 70 | 200 | |
| 111 | n2- | Upper limit setting range of the maximum speed | RPM | 9900 | 400 | 4000 | |
| 118 | n12 | Automatic speed | RPM | 9900 | 400 | 3500 | |
| 139 | nIS | Display of machine speed On/Off | | 1 | 0 | 0 | |
| 153 | brt | Braking power at machine standstill | | 50 | 0 | 10 | |
| 161 | drE | Direction of motor rotation<br>0 = Clockwise rotation<br>1 = Counterclockwise rotation | | 1 | 0 | 1 | |
| 170 | Sr1 | **Setting the reference position:**<br>-      Press key **E**.<br>-      Press key **>>**.<br>-      Turn motor shaft until symbol on display goes off.<br>       Then set the motor shaft to the reference position.<br>-      Press key **P** twice. | | | | | |
| 171 | Sr2 | **Setting the signal positions:**<br>1E =      Start position 1<br>2E =      Start position 2<br>1A =      End position 1<br>2A =      End position 2 | degrees | 359 | 0 | 56<br>281<br>98<br>323 | |
| 172 | Sr3 | **Display on the V810 control panel:**<br>Pos. 1 to 1A (lefthand arrow above key 4 On)<br>Pos. 2 to 2A (righthand arrow above key 4 On) | | | | | |
| 172 | Sr3 | **Display on the V820/V850 control panel:**<br>Pos. 1 to 1A (lefthand arrow above key 7 On)<br>Pos. 2 to 2A (righthand arrow above key 7 On) | | | | | |
| 173 | Sr4 | Checking of the signal outputs and inputs using the incorporated control panel or the V810/V820 control panels<br>01 =      Output VR   on socket ST2/34<br>02 =      Output FL    on socket ST2/35<br>03 =      Output M1   on socket ST2/37<br>04 =      Output M3   on socket ST2/27<br>05 =      Output M2   on socket ST2/28<br>06 =      Output M4   on socket ST2/36<br>07 =      Output M5   on socket ST2/32<br>08 =      Output M11 on socket ST2/31<br>09 =      Output M6   on socket ST2/30<br>10 =      Output M9   on socket ST2/25<br>11 =      Output M8   on socket ST2/24<br>12 =      Output M7   on socket ST2/23<br>13 =      Output M10 on socket ST2/29<br>OFF/ON = By actuating the switches connected to the<br>            control, the function of these switches is<br>            checked and displayed on the control.<br>            **OFF** is displayed with open switch and the<br>            activated input **in1...i10** with closed switch. | | | | | |
| 176 | Sr6 | Service routine 6  - Display of operating hours | | | | | |
| 177 | Sr7 | Service routine 7  - Display of operating hours before the next service | | | | | |
| 179 | Sr5 | Control program number with index and more identification numbers. Upon pressing the appropriate key the data will be displayed in succession.<br>**V810 control panel display example:**<br>Press key **E**          ➔ Display e. g. **Sr [°]**<br>Press key **>>**         ➔ Display e. g. **5211A**<br>Press key **E**          ➔ Display e. g. **010823**<br>Press key **E**          ➔ Display e. g. **15**<br>Press key **E**          ➔ Display e. g. **1F68**<br>Press key **P** twice    ➔ Display **Ab320A** | | | | | |

| | |
|---|---|
| **V820 control panel display example:** | |
| Press key **E** | ➔ Display **F-179  Sr5** [°] |
| Press key **>>** | ➔ Display e. g. **PrG          5211A** |
| Press key **E** | ➔ Display e. g. **dAt 01082315** |
| Press key **E** | ➔ Display e. g. **chk          1F68** |
| Press key **E** | ➔ Display e. g. **132650210015** |
| Press key **E** | ➔ Display e. g. **Skn 01047543** |
| Press key **P** twice | ➔ Display **4000  Ab320A** |
| See chapter 7.3 for control display example. | |

## 14.2 Supplier Level

Code no.          3112

| Parameter | | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|---|
| 203 | t4 | Time of full power of output FL | ms | 600 | 0 | 500 | |
| 204 | t5 | Holding power for output FL        1...100%<br>1%        ➔            low holding power<br>100%      ➔            high holding power | % | 100 | 1 | 40 | |
| 208 | br2 | Braking effect when modifying the preset value<br>(indicated values only with transmission ratio 1:1)<br>**Values with the MC221A control**<br>**Values with the MC321A control** | | <br><br>55<br>55 | <br><br>1<br>1 | <br><br>35<br>30 | |
| 212 | t10 | Time of full power of output VR | ms | 600 | 0 | 500 | |
| 213 | t11 | Holding power for output VR<br>1%        ➔            low holding power<br>100%      ➔            high holding power | % | 100 | 1 | 40 | |
| 217 | t11 | Hours before the next service | hours | | 0 | 0 | |
| 220 | ALF | Accelerating power of the drive<br>(indicated values only with transmission ratio 1:1)<br>**Values with the MC221A control**<br>**Values with the MC321A control** | | <br><br>55<br>55 | <br><br>1<br>1 | <br><br>35<br>20 | |
| 270 | PGm | Connection of a sensor e. g. light barrier sensor to light barrier socket B18/7. Selection of the desired function!<br>0 = The positions are generated by means of the transmitter incorporated in the motor and can be set by means of parameter 171.<br>1 = Setting the sensor to position 2.<br>    Set position 1 using parameter 271, starting from leading edge position 2.<br>2 = Setting the sensor to position 2.<br>    Set position 1 using parameter 271, starting from trailing edge position 2.<br>3 = Setting the sensor to position 1.<br>    Set position 2 using parameter 271, starting from leading edge position 1.<br>4 = Setting the sensor to position 1.<br>    Set position 2 using parameter 271, starting from trailing edge position 1.<br>5 = No position sensor available. The drive stops unpositioned. | 5 | 0 | 0 | |
| 272 | trr | Transmission ratio between motor shaft and machine shaft (calculation formula see chapter 12.9)<br>**The transmission ratio should be determined and indicated as precisely as possible!** | 255 | 015 | 100 | |

| Parameter | | Designation | Unit | max | min | Preset | Ind. |
|---|---|---|---|---|---|---|---|
| 340 | 1L | Lower switching threshold input in1 | % | 100 | 0 | 30 | |
| 341 | 1H | Upper switching threshold input in1 | % | 100 | 0 | 80 | |
| 342 | 2L | Lower switching threshold input in2 | % | 100 | 0 | 30 | |
| 343 | 2H | Upper switching threshold input in2 | % | 100 | 0 | 80 | |
| 344 | 3L | Lower switching threshold input in3 | % | 100 | 0 | 30 | |
| 345 | 3H | Upper switching threshold input in3 | % | 100 | 0 | 80 | |
| 346 | 4L | Lower switching threshold input in4 | % | 100 | 0 | 30 | |
| 347 | 4H | Upper switching threshold input in4 | % | 100 | 0 | 80 | |
| 348 | 5L | Lower switching threshold input in5 | % | 100 | 0 | 30 | |
| 349 | 5H | Upper switching threshold input in5 | % | 100 | 0 | 80 | |
| 350 | 6L | Lower switching threshold input in6 | % | 100 | 0 | 30 | |
| 351 | 6H | Upper switching threshold input in6 | % | 100 | 0 | 80 | |
| 352 | 7L | Lower switching threshold input in7 | % | 100 | 0 | 30 | |
| 353 | 7H | Upper switching threshold input in7 | % | 100 | 0 | 80 | |
| 354 | 8L | Lower switching threshold input in8 | % | 100 | 0 | 30 | |
| 355 | 8L | Upper switching threshold input in8 | % | 100 | 0 | 80 | |
| 356 | 19 | Lower switching threshold input in9 | % | 100 | 0 | 30 | |
| 357 | 19 | Upper switching threshold input in9 | % | 100 | 0 | 80 | |
| 358 | 10L | Lower switching threshold input in10 | % | 100 | 0 | 30 | |
| 359 | 10H | Upper switching threshold input in10 | % | 100 | 0 | 80 | |
| 399 | cFP | Delete download program memory | | 3112 | | | |
| 401 | EEP | Immediate storage of all changed data<br>- Input code number 3112 after power On<br>- Press key E<br>- Input parameter 401<br>- Press key E<br>- Set display from 0 to 1<br>- Press key E or P<br>- All data are stored | | 1 | 0 | 0 | |

# 15 Error Displays

| General Information | | | |
|---|---|---|---|
| **On the control** | **On the V810** | **On the V820** | **Signification** |
| A2 | -StoP- blinking | -StoP- blinking + symbol display | Machine run blockage |
| A3 | InF A3 | InF A3 | Reference position is not set |

| Serious Condition | | | |
|---|---|---|---|
| **On the control** | **On the V810** | **On the V820** | **Signification** |
| E1 | InF E1 | InF E1 | The external pulse encoder is defective or not connected. |
| E2 | InF E2 | InF E2 | Line voltage too low, or time between power off and power on too short. |
| E3 | InF E3 | InF E3 | Machine blocked or does not reach the desired speed. |
| E4 | InF E4 | InF E4 | Control disturbed by deficient grounding or loose contact. |

| Hardware Disturbance | | | |
|---|---|---|---|
| **On the control** | **On the V810** | **On the V820** | **Signification** |
| H1 | InF H1 | InF H1 | Commutation transmitter cord or frequency converter disturbed. |
| H2 | InF H2 | InF H2 | Processor disturbed |

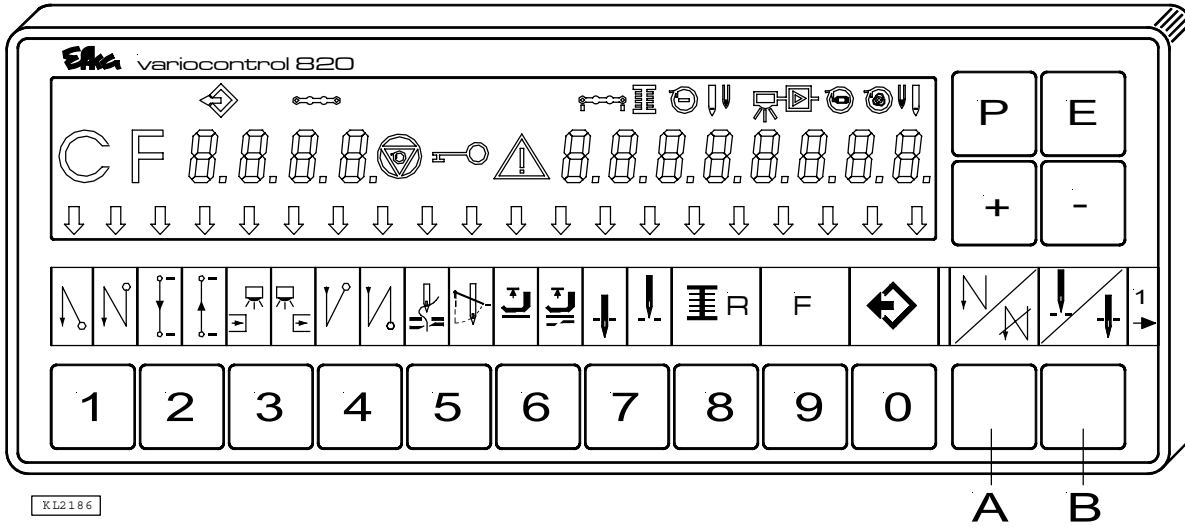## 16 Operating Elements of the V810 Control Panel
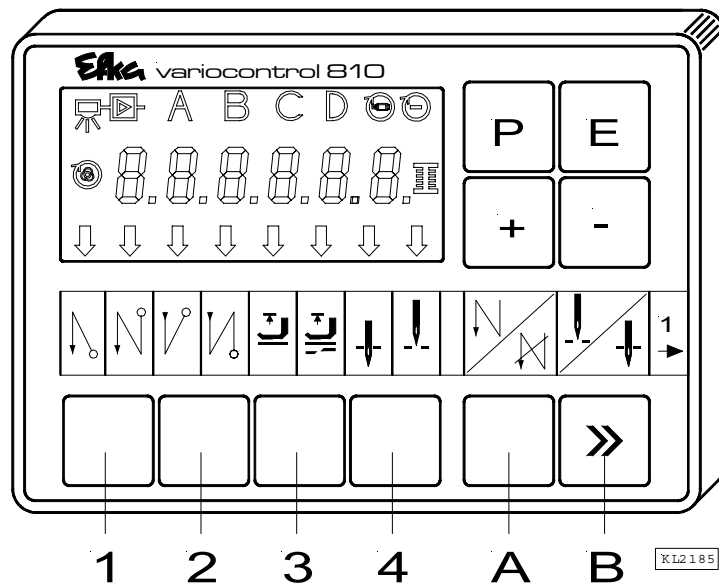


The V810 control panel is supplied with the **no. 1** slide-in strip above the keys. For different functions the strip can be replaced with another user-created one.

### Function Assignment to the Keys

| | |
|---|---|
| Key P = | Call or exit of programming mode |
| Key E = | Enter key for modifications in the programming mode |
| Key + = | Increase in the value indicated in the programming mode |
| Key - = | Decrease in the value indicated in the programming mode |
| Keys 1 - 4 = | User-customized assignment |
| Keys A + B = | User-customized assignment |

# 17 Operating Elements of the V820/V850 Control Panel



KL2186

The V820/V850 control panel is supplied with the **no. 1** slide-in strip above the keys. For different functions the strip can be replaced with another user-created one.

**Function Assignment to the Keys**

| | |
|---|---|
| Key P = | Call or exit of programming mode |
| Key E = | Enter key for modifications in the programming mode |
| Key + = | Increase in the value indicated in the programming mode |
| Key - = | Decrease in the value indicated in the programming mode |
| Keys 0 – 9 | Numerical input in the programming mode / user-customized assignment |
| Keys A + B | User-customized assignment |