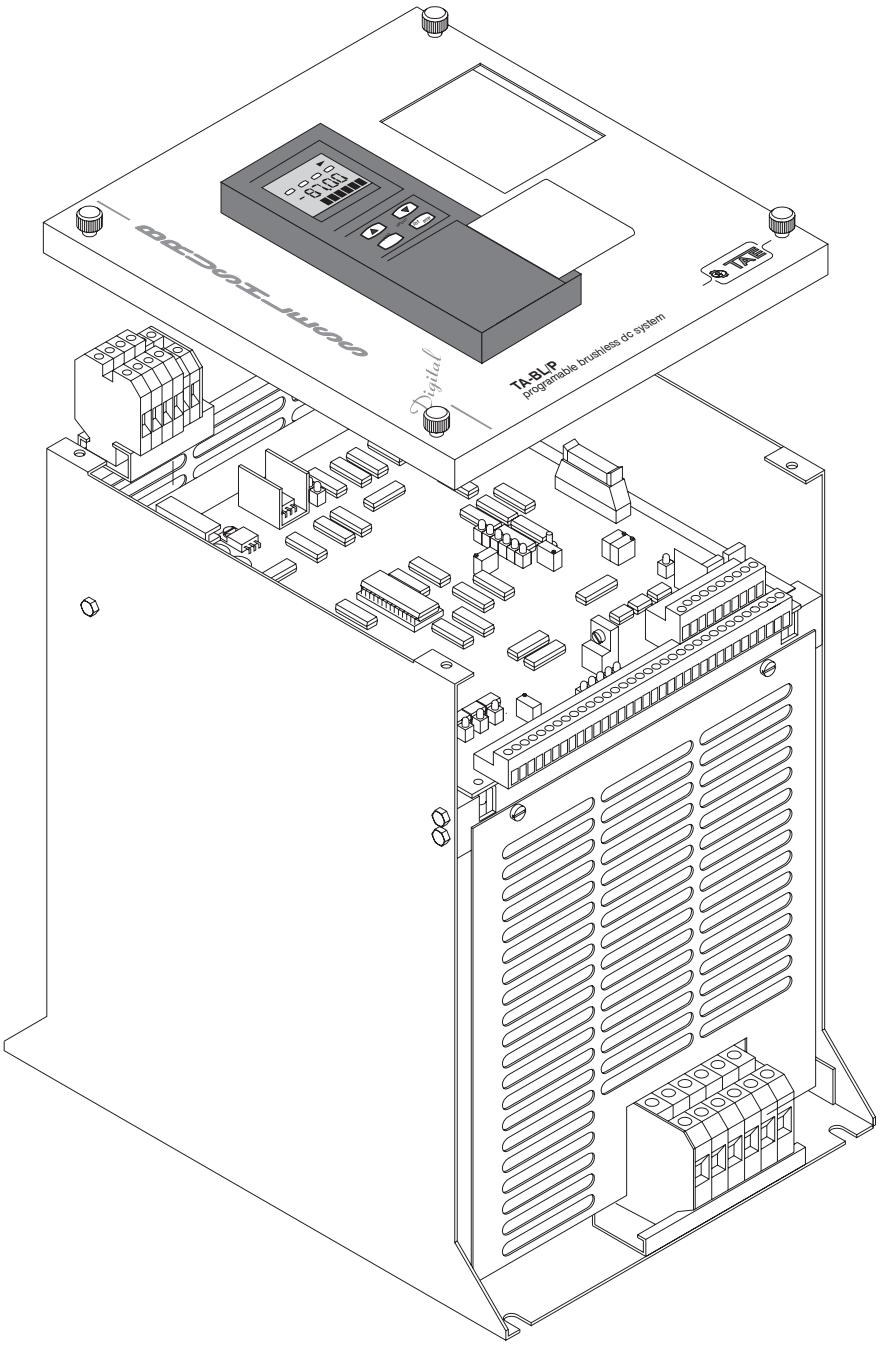
# TA-BL/P 1.2...6.2
# & TA-BL/P 4.1...300.1

## Instruction and Operating Manual

Starting from software version 4.14

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State 01.03.2005 V-15 ETA-BL-P.PMD The German text applies in cases of doubt

# *TA-BL/P*

## Table of content

## About This Instruction Manual

If you look for some definite topic you can use the table of contents at the beginning of these instruction and operation manual. In these instructions is a row of symbols which shall provide you with a fast orientation and show the importants.

This symbol stands for notes and useful informations which shall make the operation easier for you.

Note, disregard can damage or destruct the device.

Note, disregard means a danger for the operator.

# 2. Instructions of Safety

**Before you put the device into operation, please read this instruction and operation manual completely. The operation should only be done by qualified personnel. The precautions and warnings below must be observed at the operation of the device.**

This product is constructed according to the rules of safety. Nevertheless there may be dangerous situations. Use only functional devices. After safety mechanisms have been triggered, the cause must be found and the failure has to be fixed. Defects on the device can only be repaired by TAE or from TAE authorized qualified personal. Safety equipment must not be bypassed or removed. More information about the provided safety and protection equipment may be found in Chapters 5.5 and 9.4.

## 2.1 Instructions and Rules

These guidelines for installation have been compiled with regard to the following standards:

| | |
|---|---|
| EN 60204-1 (VDE 0113: 1992-1) | Electrical equipment for machines |
| EN 60529:1991 (VDE 0470 Part 1) | Protection by frame |
| DIN EN 50178 (VDE 0160-1994-11) | Electronic equipment to be used in electrical power installations |
| DIN VDE 0100 | Erection of power installations with nominal voltage up to 1000 V |
| DIN VDE 0110 | Dimensioning of clearances and creepage distances |
| DIN 40050 | (IP-International Protections) |
| EN 61800-3 | EMC Product standard of electrical power drive systems |

## 2.2 Safety

***Caution - Danger !***

**Disconnect unit from mains before making any repairs. Only when the BUSS-capacitors have discharged, (The unit is still "Live" as long as the red LED 1 on the Current sensor board LP3 lights up), 5 minutes after the device has been seperated from line, the unit may be opened and worked on.**

As with any form of electrical equipment, there is always a risk involved in the handling of electrical machinery. The greatest care must always be exercised during installation and maintenance. It is recommended that service is performed by authorized personnel only.

A careful adjustement of the maximum peak current is necessary!
The peak current must never exceed the maximum current of the motor! For orders of a complete drive unit (unit & motor) then manufacturer will pre-adjust the rated power and the maximum peak current of the unit according to the reference data of the motor.

After the installation make sure that the unit and the motor is properly grounded in order to avoid electrical hazzards! Improper grounding will also cause damage to the electronic circuit and to the Hall-sensors of the motor! The common connection of the electronic circuit is in all units connected with 100R to ground.

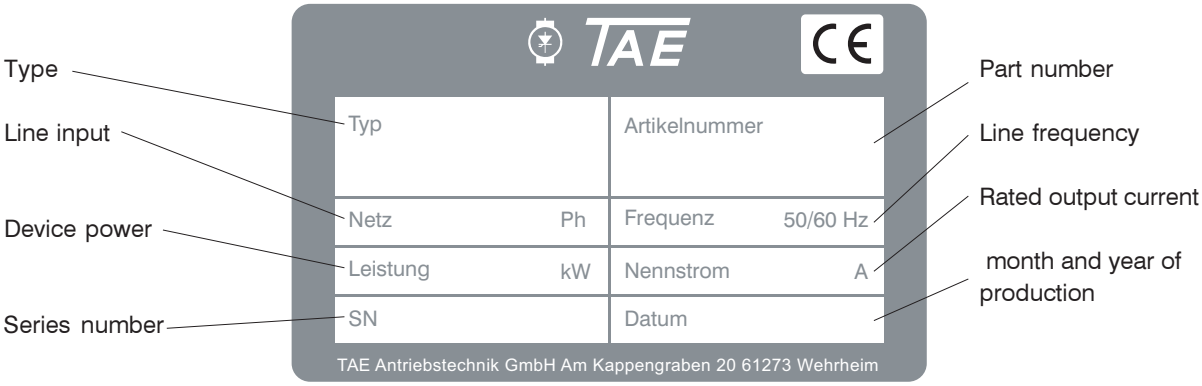
## 2.3 Using Fault-Current-circuit-breaker (FI)

Fault-Current-circuit-breaker (FI) can not be used with the TA-BL/P drives. The high leakage current could trigger or in case of a mistake destruct the FI switch. Please read the instructions for installation in Chapter 6.1.

## 3. General

After production all devices are checked and are ran a 200 hours continuous test. Before delivering the devices are checked again. By this proceedure we want to ensure that only flaw less devices are delivered.
In normal case there are no failures expected if the drive has been adjusted correctly and the issues of the operating manual have been followed.
If, in spite of this, a failure occurs, get in contact with one of our agents or contact us directly.

### 3.1 Name Plate




The name plate is placed on the right side of the device.
Make sure that the device is not damaged by transport before installing it.
Compare the delivered parts (look at name plate) with the bill of delivery.

### 3.2 Expected Readers of this Manual

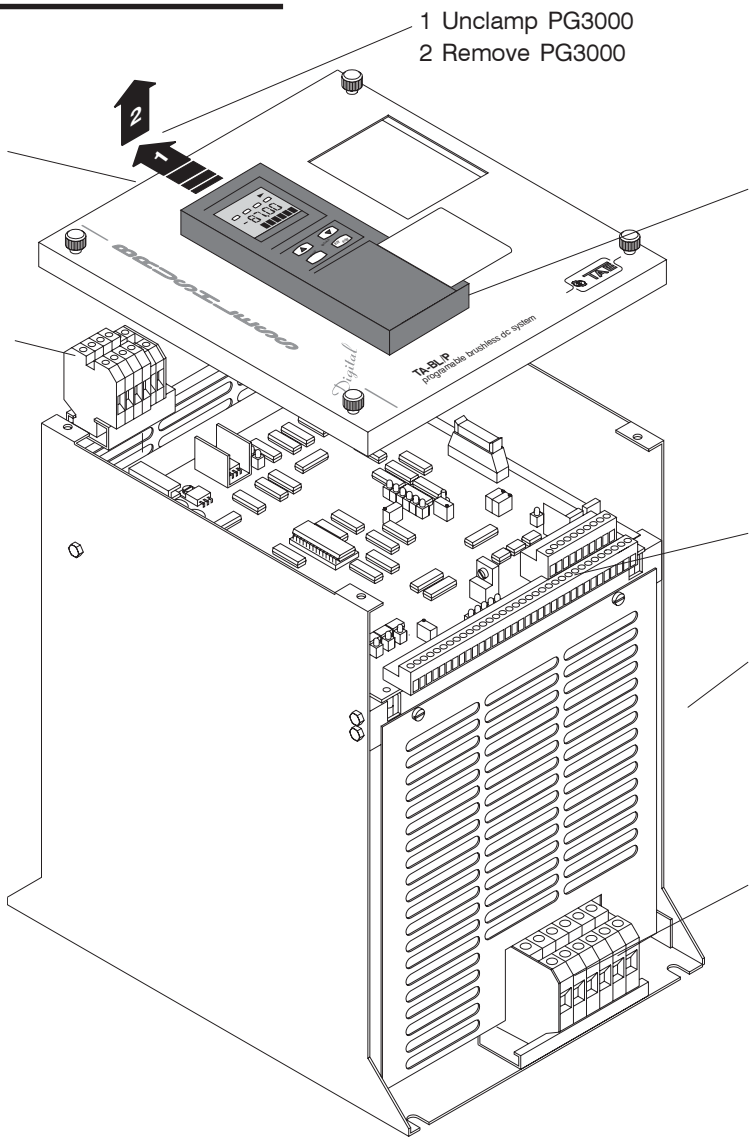
This operating manual is for users which are qualified to handle this device.

### 3.3 Liability

Defects within the device should not be repaired by the user. Nonauthorized repairs leads to loss of warranty.
TAE is not liable if any manipulations have been made, for example, attempts to repair.
If there is any doubt about the cause of failure or possibility of repairing, please contact TAE to avoid further damage to the device or motor.

# 4. Description of the Product

## 4.1 Introduction




### 4.1.1 Usability

Referring to power only those brushless DC motors can be connected to this device which are specified by TAE.

### 4.1.2 Protection Against Irregular Usage

This device does not work as a frequency inverter. Interchanging of the terminals U, V, W while connecting the brushless motor results in a malfunction of the motor. Furthermore the control cable from the motor (12 pole plug at terminal box of the motor) has to be a screened cable. TAE is offering premounted cables for this purpose. Without the correct connection of the cable, the drive is not functional.

**Caution! Do not apply mains to the output terminals U, V, W.**

All devices are tested against high voltage and isolation resistance. Measuring of isolation resistance is only allowed between power terminals and ground, if the connection to the sensor board LP3 is opened and using an EMC filter, the capacitors are disconnected. The connections TB3, TB10 and TB11 are to be disconnected at sensor board LP3. (look at Chapter 5.4 Principle Diagrams). Do not make an isolation measurement at the terminals of the control board. Because of these extensive requirements, the measurement of isolation should be done with greatest care.

### 4.1.3 Norms and Directives

The designated product is in conformity with the provisions of the following European Directives.

**89/ 336/EEC EMC directive**

Directive on the approximation of the laws of the Member States relating to electromagnetic compability. (Amended by Directives 93/68/EEC)

According to these criteria, our products are classified as follows:

- Product components: Parts from suppliers which are inoperative on their own.
- Product distribution: Not commonly available, sold to qualified persons.

The law states that an EC-declaration of conformity, as well as a CE-marking, is not required for such components. In order to meet the requirements of the EMC-directive we supply the following:

- Productrelated documents which describe the interference radiation of our products. This information will enable the user to provide all necessary steps to meet the EMC-requirements during planning and installation.
- EMC-specific components such as filters, chokes, shielded wiring, metal enclosures and others are available from TAE. TAE will furthermore provide specific technical information concerning the proper use of such components for their products in order to meet the requirements of the harmonized standards.

*It is the users responsibility to carry out our instructions and to use adequate provisions. The user is also responsible that his machine and installation meets the requirements of the EMC-standards.*

Based on the EMC directive and its corresponding standards, we have carried out extensive measurements at our premises. These tests have included our complete product line. With the use of filters and proper wiring all our products meet the requirements of the EMC Product standard of electrical power drive systems. These directives and recommendation for the use of electronic equipment are based on the following standards:

**73/23/EEC Low Voltage Directive**

Council Directive on the approximation of the laws of the Member States relating to all electrical equipment designed for use within certain voltages limits. (Amended by Directives 93/68/EEC)

Using a QM system, TAE is watching all steps from development to production of the device. So all norms and directives can be fulfilled referring to this aspect of safety.

**CE-marking**

The CE-marking indicates the conformity of the the TA-BL drive to the european norms and directives.

The fulfillment of the norms and directives is only guaranteed if:

.... The regulator is fitted out with a internal or external EMC filter which is tested by the manufacturer.

.... You exactly follow the Instructions for installation (refer to Chapter 6.0).

Improper installation can lead to exceeding the maximum limits of EMC and to a malfunction of devices of other manufacturers.

| | |
|---|---|
| DIN EN-50178 (VDE 0160:1994-11) | Electronic equipment for use in Electrical Power installations |
| DIN VDE 0100 | Erection of Power Installations |
| DIN VDE 0110 | Dimensioning of Clearance and Creepage distances |
| DIN 40050 | IP-International Protections |
| EN 61800-3 | EMC Product standard of electrical power drive systems |

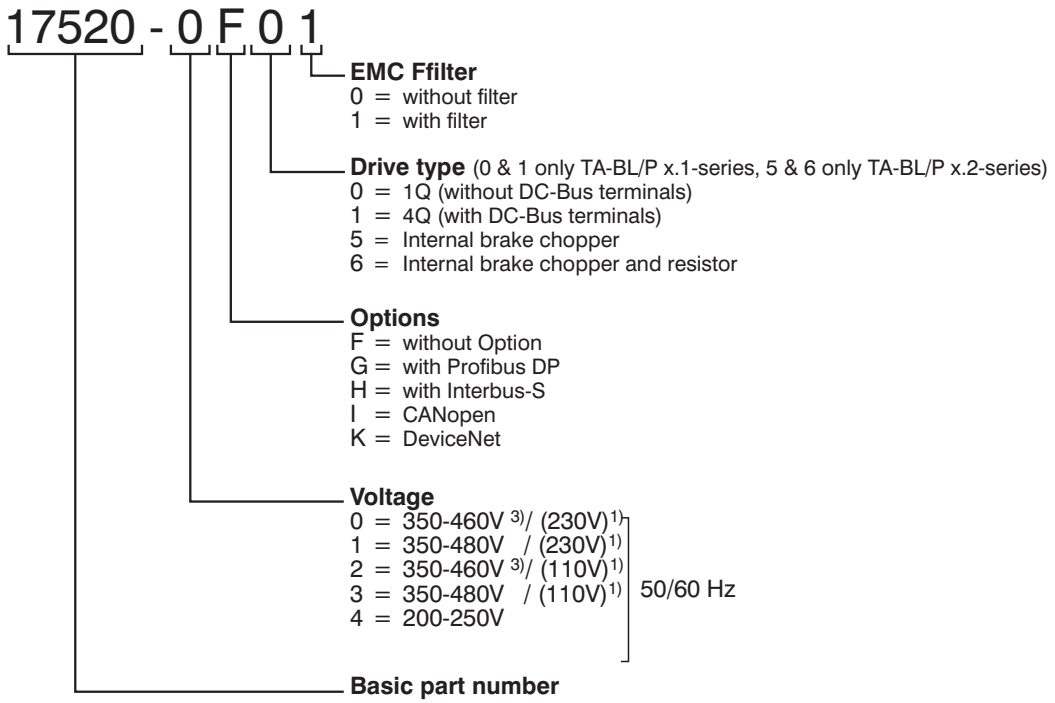
## 4.2 Technical Data

### 4.2.1 TA-BL/P 1.2...6.2

The voltages, currents and power data in this tabel are nominal data at switch frequency 3 kHz. You will find the exact value on the name plate

| Drive type | Mains | | Power 1Q | | Efficiency | | Current (I) | | |
|---|---|---|---|---|---|---|---|---|---|
| Part Number | Voltage | Current | Output | Loss | Drive | System | Rated | Peak | Switch-off |
| ***TA-BL/P 1.2*** 17021-.... | 230 V (1Ph) | 4,5 A | 0,8 kW | 48 W | 94 % | 81,2 % | 4,5 A | 9,0 A | 13,0 A |
| | 230 V (3Ph) | 3,3 A | 1,0 kW | 60 W | | | | | |
| ***TA-BL/P 2.2*** 17022-.... | 230 V (1Ph) | 8,2 A | 1,5 kW | 87 W | 94,2 % | 83,1 % | 8,0 A | 15,0 A | 21,0 A |
| | 230 V (3Ph) | 6,0 A | 1,9 kW | 110 W | | | | | |
| ***TA-BL/P 3.2*** 17023-.... | 230 V (1Ph) | 11,9 A | 2,2 kW | 121 W | 94,5 % | 84,8 % | 13,0 A | 24,0 A | 33,0 A |
| | 230 V (3Ph) | 9,3 A | 3,0 kW | 165 W | | | | | |
| ***TA-BL/P 2.2*** 17031-.... | 400 V | 3,4 A | 1,9 kW | 82 W | 96 % | 84,2 % | 5,0 A | 10,0 A | 14,0 A |
| | 480 V | | 2,2 kW | | | | | | |
| ***TA-BL/P 4.2*** 17032-.... | 400 V | 6,6 A | 3,7 kW | 138 W | 96,6 % | 85,3 % | 10,0 A | 20,0 A | 28,0 A |
| | 480 V | | 4,4 kW | | | | | | |
| ***TA-BL/P 6.2*** 17033-.... | 400 V | 9,7 A | 5,5 kW | 197,5 W | 96,9 % | 86,1 % | 15,0 A | 28,0 A | 40,0 A |
| | 480 V | | 6,6 kW | | | | | | |

***Structure of complete part number:***




***Example:***

TA-BL 50.1 350-420V without options 1Q with EMC filter

### 4.2.2 TA-BL/P 4.1...300.1

The voltages, currents and power data in this tabel are nominal data at switch frequency 3 kHz. You will find the exact value on the name plate

| Drive type | Mains | | Power 1Q | | Efficiency | | Current (I) | | |
|---|---|---|---|---|---|---|---|---|---|
| Part Number | Voltage | Current | Output | Loss | Drive | System | Rated | Peak | Switch-off |
| ***TA-BL/P 4.1*** | 230 V | 8,2 A | 2,7 kW | 160 W | 96,8 % | 85,5 % | 13,0 A | 22,0 A | 29,0 A |
| | 400 V | | 4,6 kW | | | | | | |
| 17050-.... | 480 V | | 5,7 kW | | | | | | |
| ***TA-BL/P 6.1*** | 230 V | 12,2 A | 3,6 kW | 200 W | 97,0 % | 86,2 % | 17,0 A | 28,0 A | 34,0 A |
| | 400 V | | 6,2 kW | | | | | | |
| 17070-.... | 480 V | | 7,4 kW | | | | | | |
| ***TA-BL/P 8.1*** | 230 V | 16,5 A | 5,4 kW | 280 W | 97,1 % | 86,5 % | 27,0 A | 42,0 A | 54,0 A |
| | 400 V | | 9,4 kW | | | | | | |
| 17090-.... | 480 V | | 11,3 kW | | | | | | |
| ***TA-BL/P 10.1*** | 230 V | 23,5 A | 8,1 kW | 420 W | 97,2 % | 87,5 % | 40,0 A | 68,0 A | 82,0 A |
| | 400 V | | 14,0 kW | | | | | | |
| 17110-.... | 480 V | | 16,8 kW | | | | | | |
| ***TA-BL/P 15.1*** | 230 V | 34,0 A | 11,5 kW | 570 W | 97,2 % | 88,5 % | 58,0 A | 91,0 A | 120,0 A |
| | 400 V | | 20,0 kW | | | | | | |
| 17160-.... | 480 V | | 24,0 kW | | | | | | |
| ***TA-BL/P 20.1*** | 230 V | 43,3 A | 15,0 kW | 720 W | 97,3 % | 89,6 % | 75,0 A | 135,0 A | 170,0 A |
| | 400 V | | 26,0 kW | | | | | | |
| 17220-.... | 480 V | | 31,0 kW | | | | | | |
| ***TA-BL/P 30.1*** [1] | 230 V | 60,5 A | 20,2 kW | 890 W | 97,5 % | 90,2 % | 100,0 A | 175,0 A | 210,0 A |
| | 400 V | | 35,0 kW | | | | | | |
| 17320-.... | 480 V | | 42,0 kW | | | | | | |
| ***TA-BL/P 50.1*** [1] | 230 V | 95,0 A | 34,1 kW | 1360 W | 97,7 % | 91,3 % | 170,0 A | 260,0 A | 320,0 A |
| | 400 V | | 59,0 kW | | | | | | |
| 17520-.... | 480 V | | 70,0 kW | | | | | | |
| ***TA-BL/P 60.1*** [1] | 230 V | 115,0 A | 38,7 kW | 1480 W | 97,8 % | 92,2 % | 190,0 A | 340,0 A | 410,0 A |
| | 400 V | | 67,0 kW | | | | | | |
| 17620-.... | 480 V | | 80,0 kW | | | | | | |
| ***TA-BL/P 80.1*** [1] | 230 V | 155,0 A | 55,4 kW | 2200 W | 97,8 % | 94,8 % | 280,0 A | 510,0 A | 560,0 A |
| | 400 V | | 96,0 kW | | | | | | |
| 17820-.... | 480 V | | 115,0 kW | | | | | | |
| ***TA-BL/P 100.1*** [1] | 230 V | 176,0 A | 63,5 kW | 2500 W | 97,8 % | 94,9 % | 330,0 A | 510,0 A | 560,0 A |
| | 400 V | | 110,0 kW | | | | | | |
| 17910-.... | 480 V | | 132,0 kW | | | | | | |
| ***TA-BL/P 150.1*** [1] | 230 V | 240,0 A | 86,6 kW | 3100 W | 98,0 % | 95,0 % | 440,0 A | 700,0 A | 840,0 A |
| | 400 V | | 150,0 kW | | | | | | |
| 17930-.... | 480 V | | 180,0 kW | | | | | | |
| ***TA-BL/P 180.1*** [2] | 230 V | 2x 145,0 A | 103,9 kW | 4000 W | 97,8 % | 94,8 % | 2x 270,0 A | 2x 510,0 A | 2x 560,0 A |
| | 400 V | | 180,0 kW | | | | | | |
| 17940-.... | 480 V | | 216,0 kW | | | | | | |
| ***TA-BL/P 200.1*** [2] | 230 V | 2x 176,0 A | 121,2 kW | 4700 W | 97,8 % | 94,9 % | 2x 320,0 A | 2x 510,0 A | 2x 560,0 A |
| | 400 V | | 210,0 kW | | | | | | |
| 17950-.... | 480 V | | 240,0 kW | | | | | | |
| ***TA-BL/P 300.1*** [2] | 230 V | 2x 240,0 A | 173,2 kW | 6300 W | 98,0 % | 95,0 % | 2x 440,0 A | 2x 700,0 A | 2x 840,0 A |
| | 400 V | | 300,0 kW | | | | | | |
| 17970-.... | 480 V | | 360,0 kW | | | | | | |

[1] The drives TA-BL/P 30.1 to TA-BL/P 150.1 need an external control voltage.

[2] Drive TA-BL/P 180.1 and up are delivered as 2 parallel connected drives in a switch cabinet (Enclosure IP54).

***Important!***

The motor power should not exceed the drive power. Even if the motor current is lower than the drive current, will it destroy the input rectifier because the motor voltage is very high at neodymium magnet motors.

### 4.2.3 Device data and Dimensions

| | Line voltage | | Deviation |
|---|---|---|---|
| | without EMC Filter | with EMV-Filter | |
| (Voltage according to name plate) | 200-250V | 200-250V | ± 10% |
| | 350-460V | 350-420V [3] | |
| | 360-480V | 360-480V | |
| | 3 Phase 50/60 Hz | | |
| Enclosure | IP 20 | | |
| Environment [4] | Ambient temperature 0-40°C | | |
| Speed deviation | with analogue reference value (0-10V) | less than 1% | |
| | with digital reference value (DGM 2000) | 0% absolute (+/- 1 Digit) | |

[4] The technical data are rated at atmospheric humidity of 90% and at 1000 m above sea level. Above 1000 m and higher ambient temperatures the power must be derated.

| Drive type | Dimensions W x H x D | Mains fuse medium blow | | Min. air flow for switch cabinet fan | Weight net |
|---|---|---|---|---|---|
| | | 1 Ph | 3 Ph | | |
| ***TA-BL/P 1.2*** (200-250V) | 136 x 318 x 288 mm | 10 A | 6 A | - | |
| ***TA-BL/P 2.2*** (200-250V) | | 16 A | 10 A | - | |
| ***TA-BL/P 3.2*** (200-250V) | | 25 A | 16 A | 36 m³/h | |
| ***TA-BL/P 2.2*** (360-480V) | 145 x 343 x 288 mm | - | 6 A | - | |
| ***TA-BL/P 4.2*** (360-480V) | | - | 10 A | 36 m³/h | |
| ***TA-BL/P 6.2*** (360-480V) | | - | 16 A | 36 m³/h | |

| | | | | |
|---|---|---|---|---|
| ***TA-BL/P 4.1*** | 211 x 290 x 301 mm | 3x 10,0 A | 36 m³/h | 11,0 kg |
| ***TA-BL/P 6.1*** | 211 x 290 x 301 mm | 3x 16,0 A | 36 m³/h | 11,5 kg |
| ***TA-BL/P 8.1*** | 228 x 305 x 355 mm | 3x 25,0 A | 72 m³/h | 13,5 kg |
| ***TA-BL/P 10.1*** | 228 x 305 x 355 mm | 3x 25,0 A | 72 m³/h | 14,0 kg |
| ***TA-BL/P 15.1*** | 278 x 385 x 320 mm | 3x 35,0 A | 80 m³/h | 18,0 kg |
| ***TA-BL/P 20.1*** | 307 x 500 x 320 mm | 3x 50,0 A | 100 m³/h | 31,0 kg |
| ***TA-BL/P 30.1*** [1] | 307 x 500 x 320 mm | 3x 63,0 A | 210 m³/h | 33,0 kg |
| ***TA-BL/P 50.1*** [1] | 367 x 645 x 350 mm | 3x 125,0 A | 220 m³/h | 55,0 kg |
| ***TA-BL/P 60.1*** [1] | 367 x 750 x 350 mm | 3x 125,0 A | 240 m³/h | 65,0 kg |
| ***TA-BL/P 80.1*** [1] | 415 x 1000 x 369 mm | 3x 200,0 A | 650 m³/h | 107,0 kg |
| ***TA-BL/P 100.1*** [1] | 440 x 1100 x 369 mm | 3x 200,0 A | 690 m³/h | 125,0 kg |
| ***TA-BL/P 150.1*** [1] | 698 x 980 x 399 mm | 3x 250,0 A | 1150 m³/h | 158,0 kg |
| ***TA-BL/P 180.1*** [2] | (1200 x 2000 x 600 mm) | 6x 200,0 A | 1400 m³/h | 470,0 kg |
| ***TA-BL/P 200.1*** [2] | (1200 x 2000 x 600 mm) | 6x 200,0 A | 1500 m³/h | 720,0 kg |
| ***TA-BL/P 300.1*** [2] | (1600 x 2000 x 600 mm) | 6x 250,0 A | 2300 m³/h | 630,0 kg |

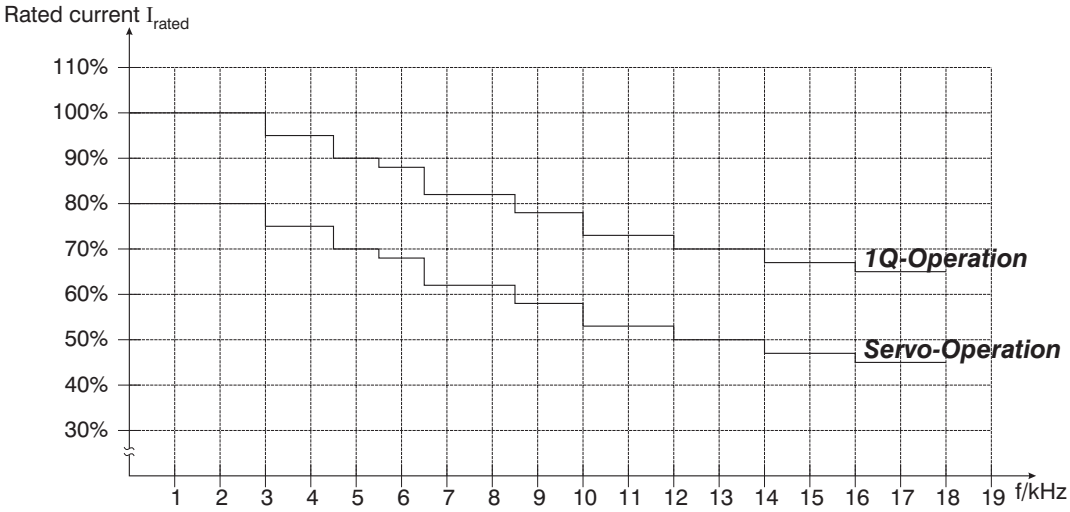
[1] The drives TA-BL/P 30.1 to TA-BL/P 150.1 need an external control voltage.

[2] Drive TA-BL/P 180.1 and up are delivered as 2 parallel connected drives in a switch cabinet (Enclosure IP54).

[3] By drives with a line voltage range from 350-460V and a internal EMC filter, the line voltage range reduces by technical reasons to 350-420V.

### 4.2.4 Rated current de-rating in relation to switch frequency

The rated current is only de-rated, if the peak current (Blocking current) x 0,82 is less than the rated current.




### 4.2.5 Ambient

Ensure that the mains voltage conforms with the data in Chapter 4.2.1.
Environmental influences like high temperature and high air moisture are to be avoided. The same applies to dust, dirt and aggressive gas.
The location of mounting should be well ventilated and not be under direct radiation of the sun. The devices are only specified for mounting in switch cabinet. Install the device on a vertical, not flammable plate which does not transmit vibrations. More information to installation and initial operation may be found in Chapter 6.

### 4.2.6 Standard equipments

- ❒ 12 free programmable digital inputs
- ❒ 1 programmable analog input -10V to +10V, 0-20mA, 4-20mA speed or current
- ❒ 1 programmable analog input 0V to 10V speed or current
- ❒ 1 programmable analog output for speed or current ±10V
- ❒ 2 programmable relay outputs
- ❒ 3 programmable optocoupler outputs
- ❒ 1 transistor output Enable
- ❒ Controlled by PG3000 or computer also in parallel operation
- ❒ Master and Slave function
- ❒ Synchronous run
- ❒ Position control
- ❒ Electronic transmissions
- ❒ Motorpotentiometer function
- ❒ 7 segment indication for status reports
- ❒ LED indication for position encoder, speed encoder 4.Q indication and current limit
- ❒ Failure indication in the PG3000 and on the 7 segment display
- ❒ Programming with PG3000 or computer
- ❒ Data memory with Smartcard or computer
- ❒ Reverse command by bipolar analoge input or digital input (TA-BL/P 4.1...300.1)

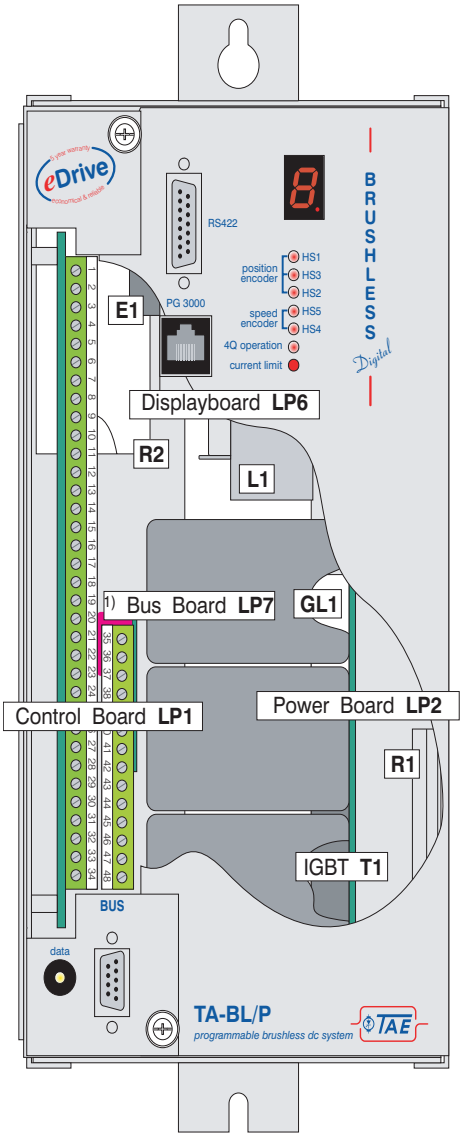
### 4.2.7 Option equipments

- ❒ EMC filter
- ❒ Additional communication cards E.g. Profibus or Interbus
- ❒ Multifunction Control Unit PG 3000
- ❒ SmartCard for PG 3000

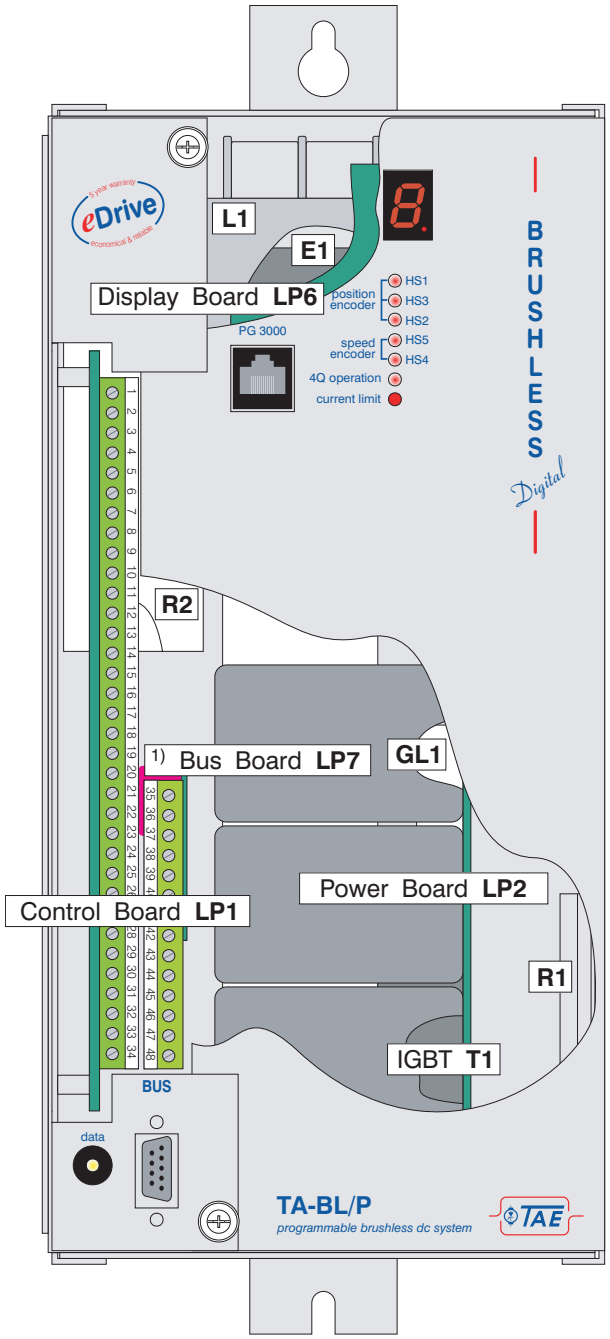
# 5. Construction and Function

## 5.1 Construction and Layouts TA-BL/P 1.2...6.2

### 5.1.1 TA-BL/P 1.2...3.2 (200-250V Devices)



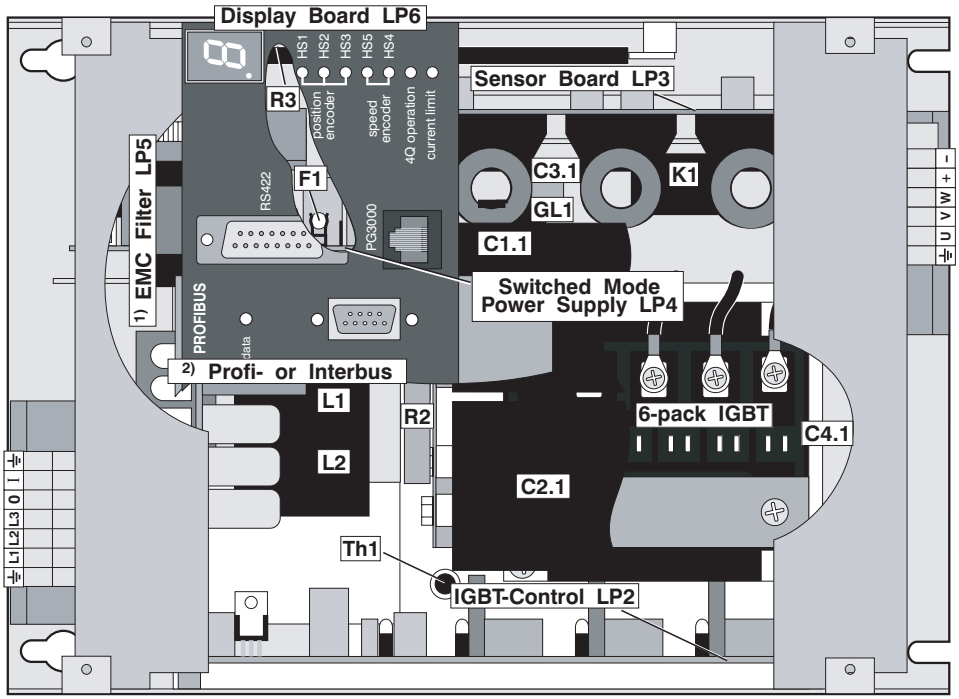

### 5.1.2 TA-BL/P 2.2...6.2 (350-480V Devices)



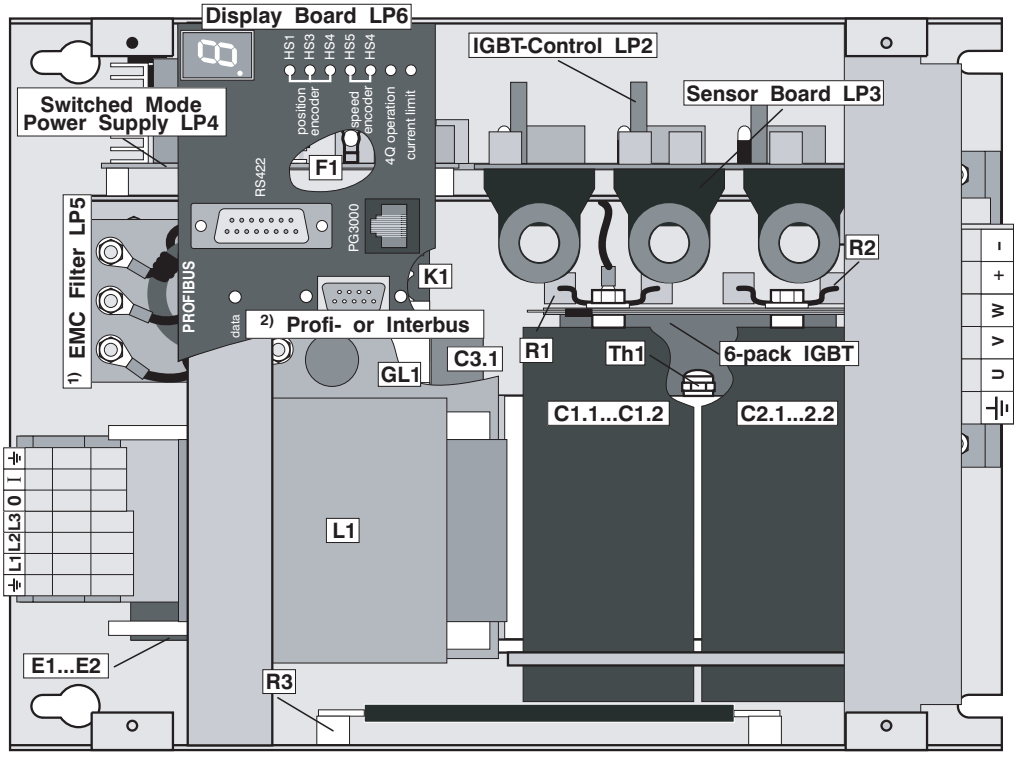

[1] Option Bus-System E.g. Profibus Interbus, CAN-Bus or DeviceNet

## 5.2 Construction and Layouts TA-BL/P 4.1...150.1

### 5.2.1 TA-BL/P 4.1...6.1



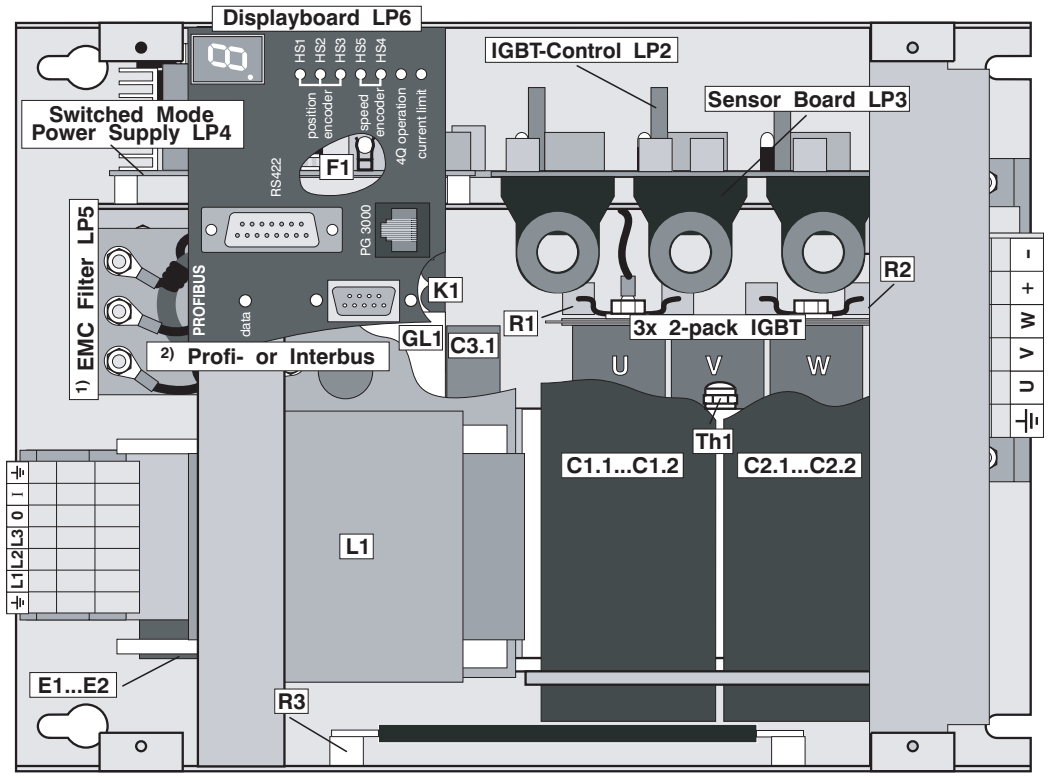

### 5.2.2 TA-BL/P 8.1



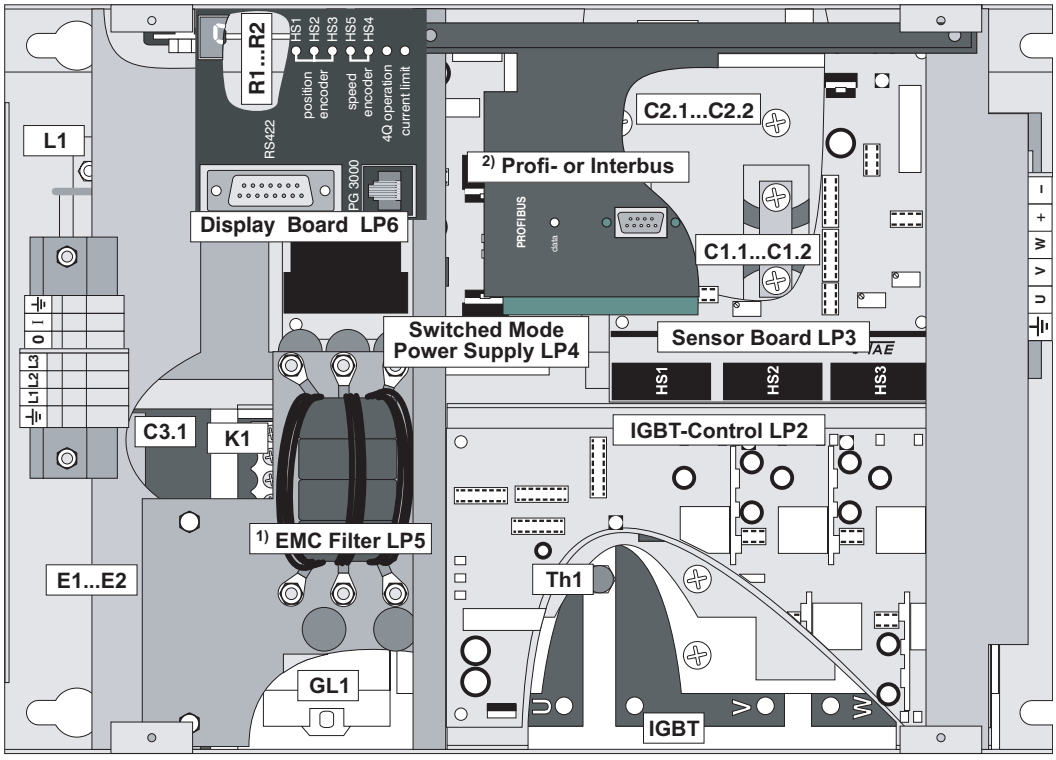

[1] Option EMC Filter

[2] Option Bus-System E.g. Profibus or Interbus

### 5.2.3 TA-BL/P 10.1

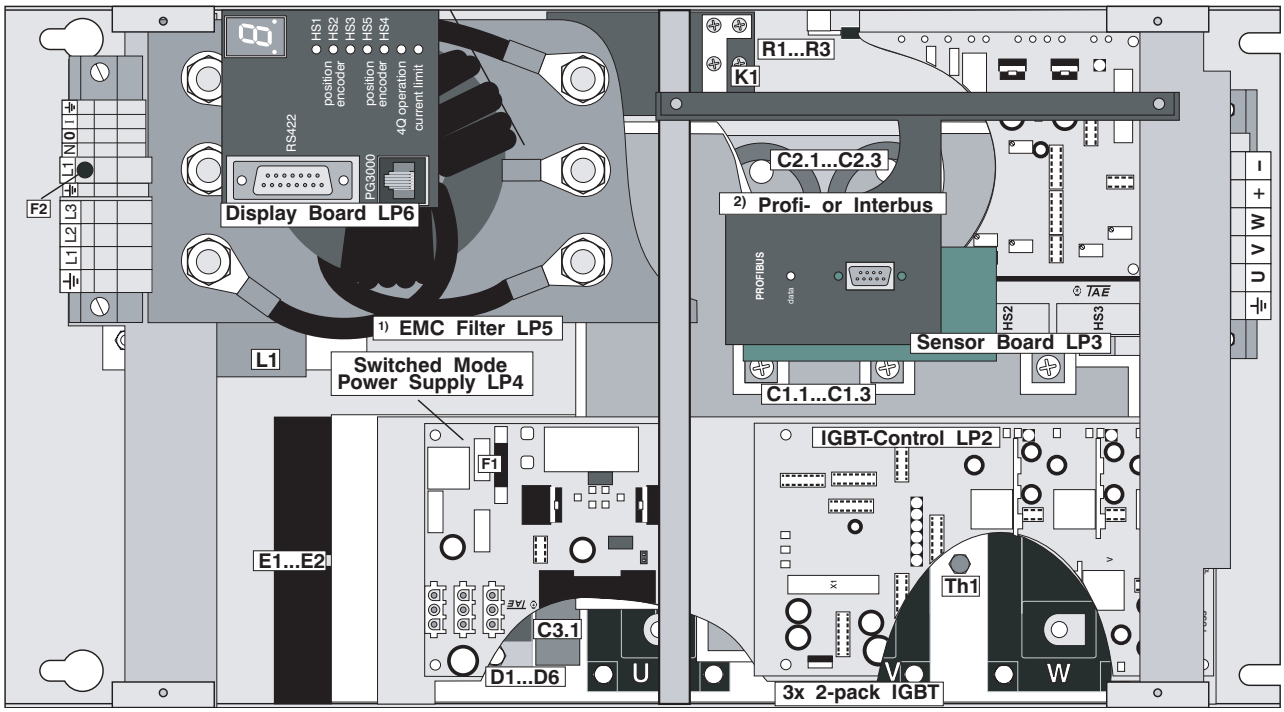



### 5.2.4 TA-BL/P 15.1

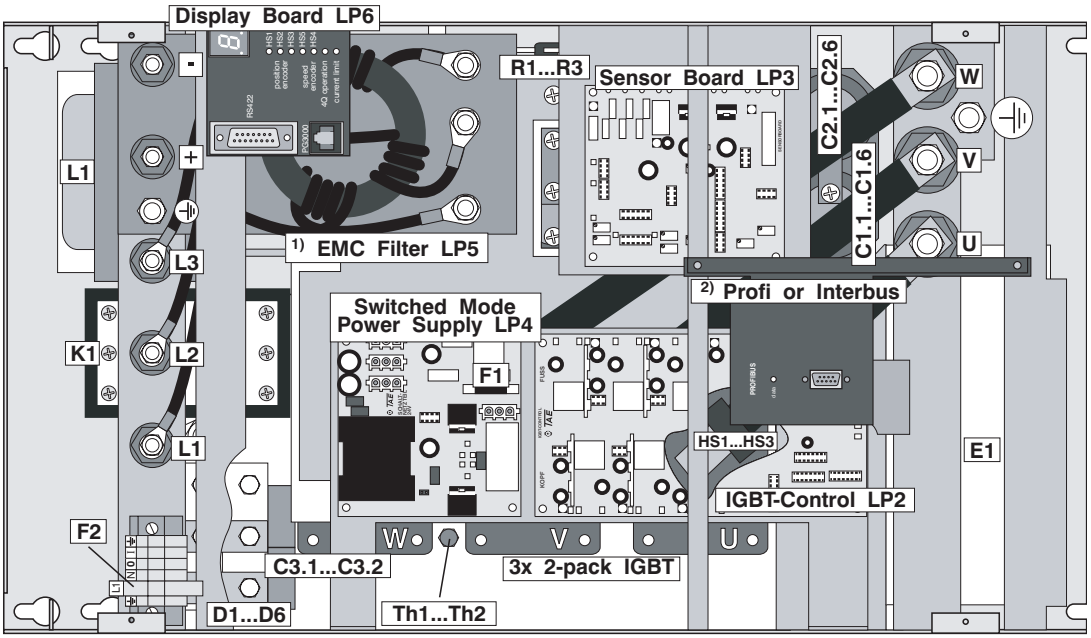



[1] Option EMC Filter
[2] Option Bus-System E.g. Profibus or Interbus

### 5.2.5 TA-BL/P 20.1...30.1



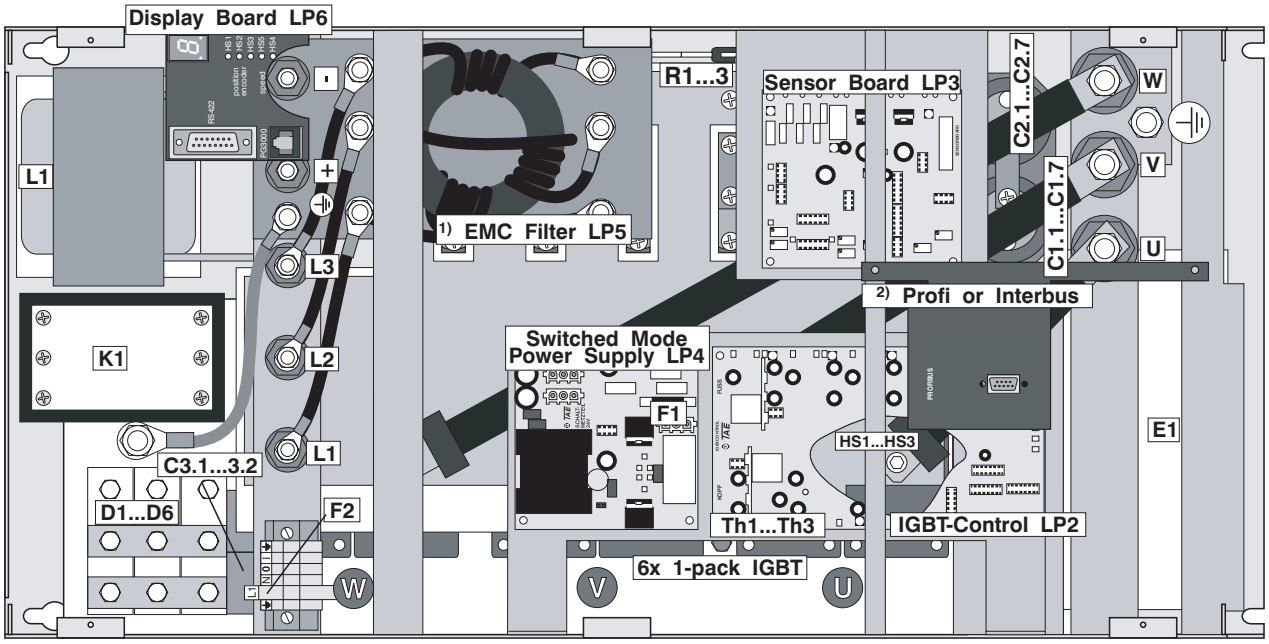

### 5.2.6 TA-BL/P 50.1



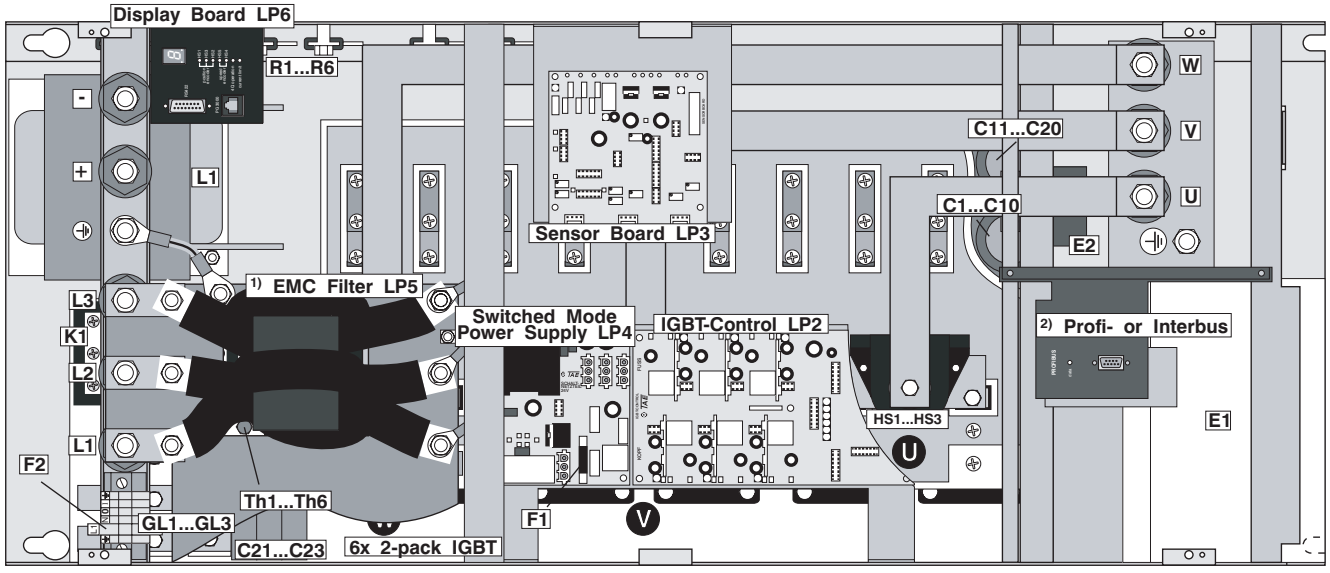

[1] Option EMC Filter

[2] Option Bus-System E.g. Profibus or Interbus

### 5.2.7 TA-BL/P 60.1

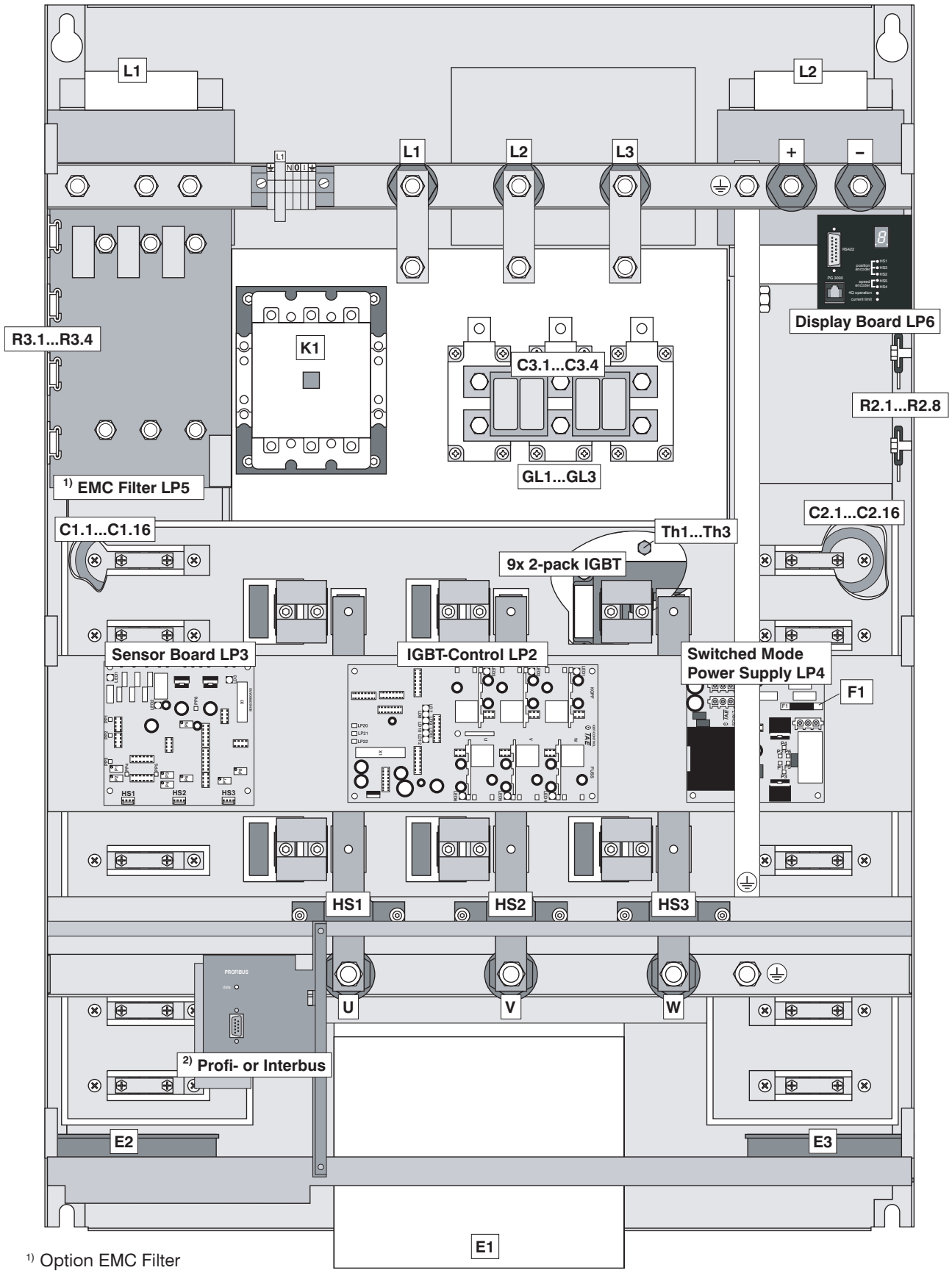



### 5.2.8 TA-BL/P 80.1




[1] Option EMC Filter
[2] Option Bus-System E.g. Profibus or Interbus

### 5.2.9 TA-BL/P 150.1

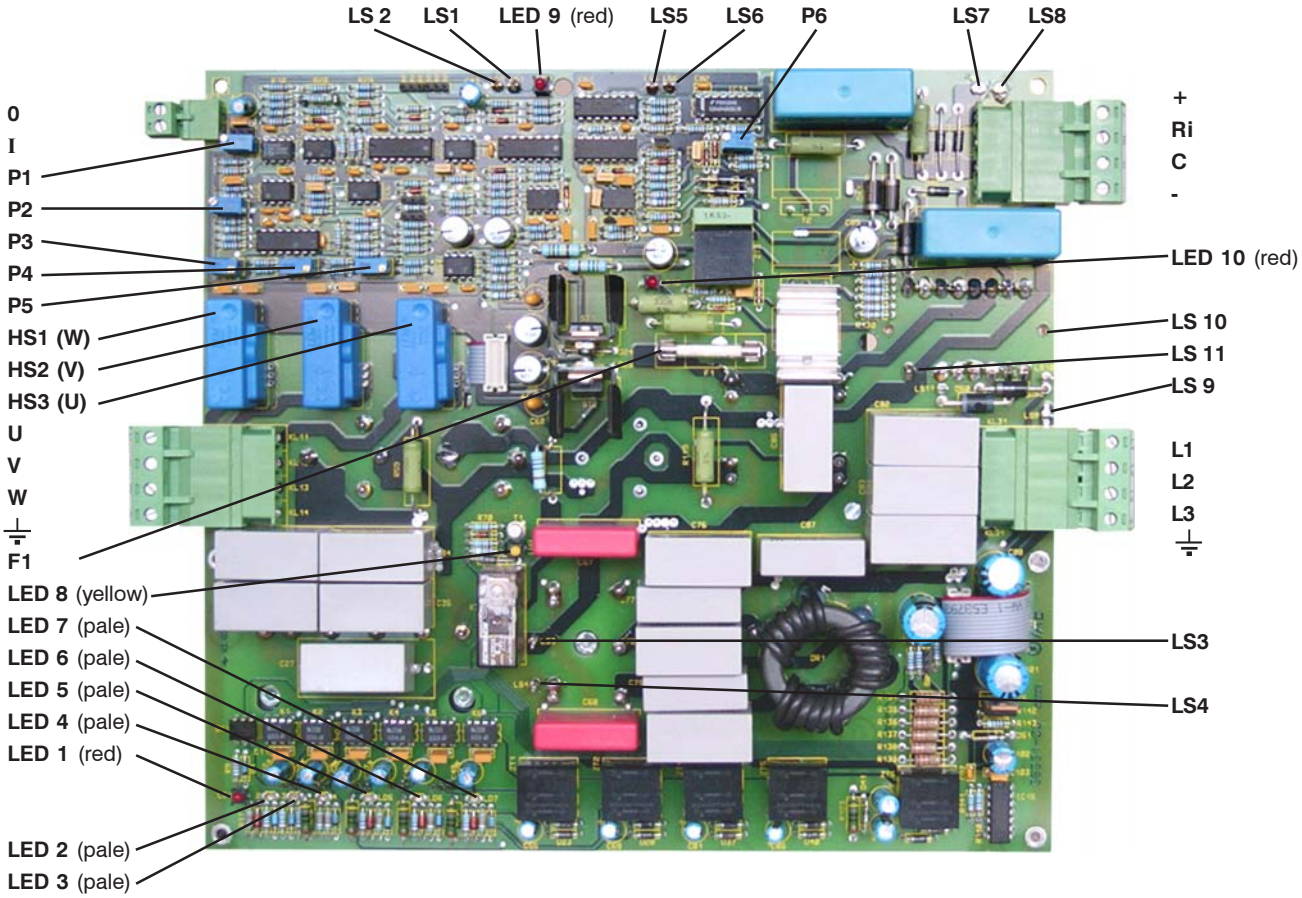



1) Option EMC Filter

2) Option Bus-System E.g. Profibus or Interbus

## 5.3 PC Boards LP2 to LP5

### 5.3.1 LP2 Powerboard TA-BL/P 1.2...3.2 (200-250V Devices)




**LED1** - (red) IGBT Error (Short-circuit)
**LED2** - (pale) Bottom transistor U
**LED3** - (pale) Bottom transistor V
**LED4** - (pale) Bottom transistor W
**LED5** - (pale) Top transistor W
**LED6** - (pale) Top transistor V
**LED7** - (pale) Top transistor U
**LED8** - (yellow) Relay K8 Charge resistor bridge connected
**LED9** - (rot) Overtemperature Power unit (IGBT)
**LED10** - (rot) Reducing circuit voltage available

**P1** - amplification actual current
**P2** - zero point actual current
**P3** - amplification phase U ..... (HS1)
**P4** - amplification phase V ..... (HS2)
**P5** - amplification phase W ..... (HS3)
**P6** - Brake chopper switch-on voltage

**HS1** - Current sensor (**W**)
**HS2** - Current sensor (**V**)
**HS3** - Current sensor (**U**)

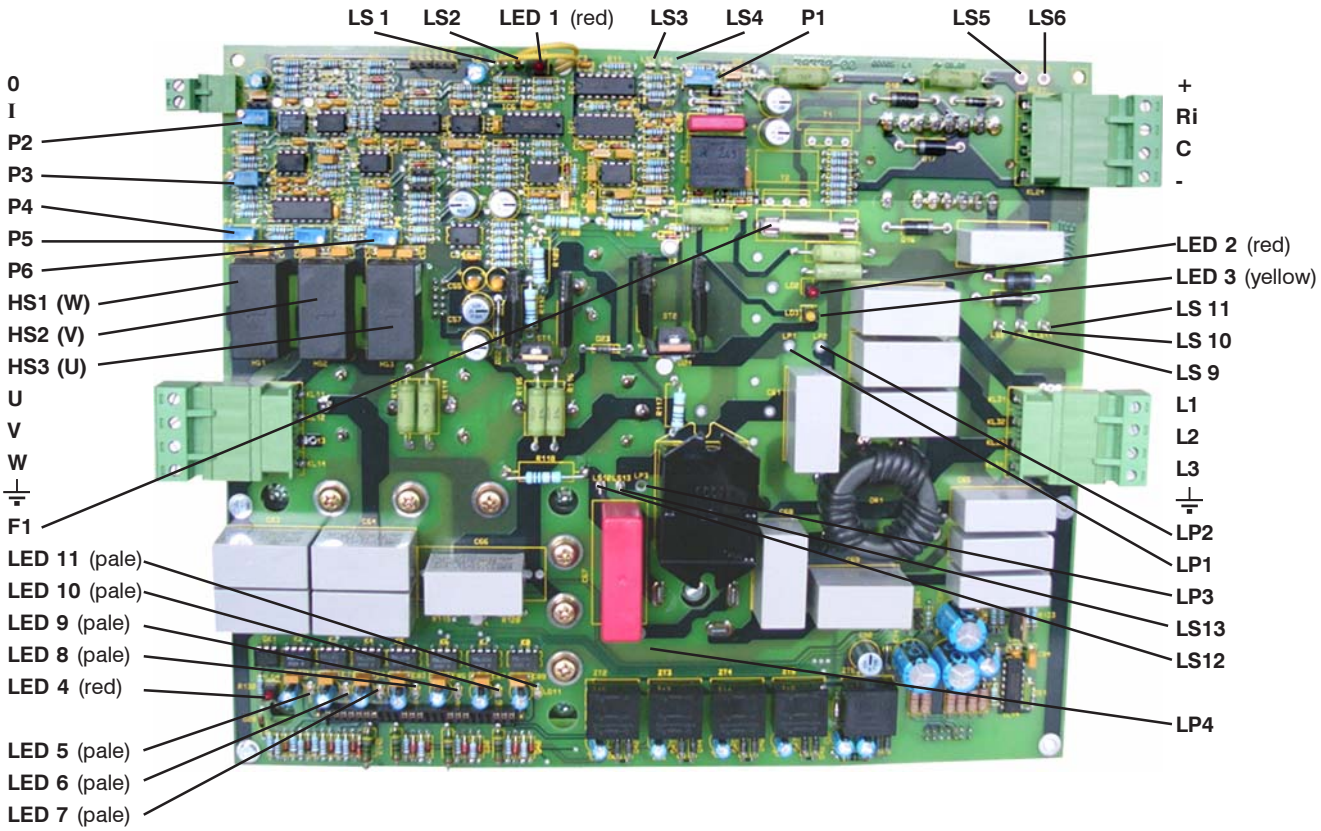
**X1/X2** - Connection to the control board LP1 LP1 by a flat cable

**BR 1** - **Actual current**
PIN 1-2 closed: Factory adjustment
PIN 2-3 closed: Option actual current positiv against common
**BR 2/4** - PIN 1-2 closed: Factory adjustment
**BR 3** - PIN 2-3 closed: Factory adjustment

**F1** - Fuse Switched Mode Power Supply 3,15A medium blow

**LS 1/2** - Thermal switch power unit
**LS 3/4** - Charge resistor
**LS 5/6** - Thermal switch brake resistor
**LS 7/8** - Brake resistor internal
**LS 9** - Device Fan (common)
**LS 10** - not used (-24V)
**LS 11** - Device Fan (+24V)

### 5.3.2 LP2 Powerboard TA-BL/P 2.2...6.2 (350-480V Devices)




**LED1** - (red) Overtemperature Power unit (IGBT)
**LED2** - (red) Reducing circuit voltage available
**LED3** - (yellow) Relay K8 Charge resistor bridge connected
**LED4** - (red) IGBT Error (Short-circuit)
**LED5** - (pale) Bottom transistor W
**LED6** - (pale) Bottom transistor V
**LED7** - (pale) Bottom transistor U
**LED8** - (pale) Brake chopper active
**LED9** - (pale) Top transistor W
**LED10** - (pale) Top transistor V
**LED11** - (pale) Top transistor U

**P1** - Brake chopper switch-on voltage
**P2** - amplification actual current
**P3** - zero point actual current
**P4** - amplification phase U ..... (HS1)
**P5** - amplification phase V ..... (HS2)
**P6** - amplification phase W ..... (HS3)

**HS1** - Current sensor (**W**)
**HS2** - Current sensor (**V**)
**HS3** - Current sensor (**U**)

**X1/X2** - Connection to the control board LP1 by a flat cable

**BR 1** - **Actual current**
PIN 1-2 closed: Factory adjustment
PIN 2-3 closed: Option actual current positiv against common
**BR 2/4** - PIN 1-2 closed: Factory adjustment
**BR 3** - PIN 2-3 closed: Factory adjustment

**F1** - Fuse Switched Mode Power Supply 3,15A medium blow

**LS 1/2** - Thermal switch power unit
**LS 3/4** - Thermal switch brake resistor
**LS 5/6** - Brake resistor internal
**LS 9** - Device Fan (common)
**LS 10** - not used (-24V)
**LS 11** - Device Fan (+24V)
**LS 12/13** - Charge resistor

**LP 1-4** - Line choke

### 5.3.3 LP2-IGBT-CONTROL TA-BL/P 4.1...300.1

***Transistor T3 (top transistor)***
**LED1** - (pale) transistor driver T3 active
**LP1** - Gate Output to transistor T3
**LP2** - Emitter Output to transistor T3
**LP3** - Buss +

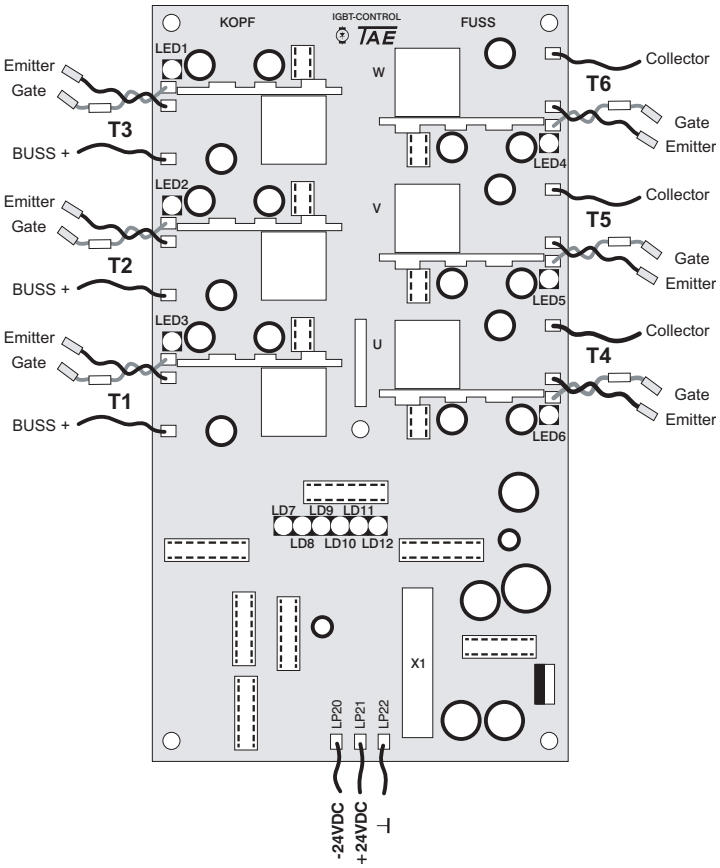
***Transistor T2 (top transistor)***
**LED2** - (pale) transistor driver T2 active
**LP4** - Gate Output to transistor T2
**LP5** - Emitter Output to transistor T2
**LP6** - Buss +

***Transistor T1 (top transistor)***
**LED3** - (pale) transistor driver T1 active
**LP7** - Gate Output to transistor T1
**LP8** - Emitter transistor T1
**LP9** - Buss +

***Transistor T6 (bottom transistor)***
**LED4** - (pale) transistor driver T6 active
**LP10** - Collector transistor T6
**LP11** - Emitter Output to transistor T6
**LP12** - Gate Output ransistor T6

***Transistor T5 (bottom transistor)***
**LED5** - (pale) transistor driver T5 active
**LP13** - Collector trnsistor T5
**LP14** - Emitter Output to transistor T5
**LP15** - Gate Output to transistor T5

**Transistor T4 (bottom transistor)**
**LED6** - (pale) transistor driver T4 active
**LP16** - Collector transistor T4
**LP17** - Emitter Output to transistor T4
**LP18** - Gate Output to transistor T4




**The IGBT-CONTROL board has been checked and adjusted by the manufacturer.**
**If the seal is opened all warranty will become void!**

**Overcurrent/Short-circuit signal**
**LED7** - (pale) for transistor 3 top
**LED8** - (pale) for transistor 2 top
**LED9** - (pale) for transistor 1 top
**LED10** - (pale) for transistor 6 bottom
**LED11** - (pale) for transistor 5 bottom
**LED12** - (pale) for transistor 4 bottom

**LP22** - supply voltage DC/DC converter 0V
**LP21** - supply voltage DC/DC converter +24V
**LP20** - supply voltage DC/DC converter -24V

### 5.3.4 LP3 - Sensor Board TA-BL/P 4.1...300.1

**Caution!**
**The unit is still "Live" as long as the red LED lights up! (BUSS voltage!)**

**LED1** - (red) BUSS-voltage exist
**LED2** - (yellow) contactor **K1** is energized (ON)
**LED3** - (red) Klixon over temperature

The drive is switched OFF if the unit has reached a temperature above 80°C. LED 7 red, BUSS-voltage/ overtemperature on control board **LP1** will also light up.

**P1** - amplification phase U ..... (HS1)
**P2** - zero point phase U ..... (HS1)
**P3** - amplification phase V..... (HS2)
**P4** - zero point phase V..... (HS2)
**P6** - zero point phase W ..... (HS3)
**P7** - amplification phase W ..... (HS3)
**P5** - amplification actual current
**P8** - zero point actual current

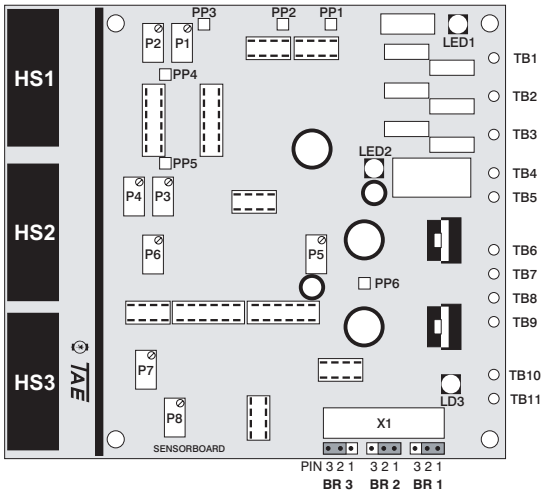
**HS1** - motor line (**U**)
**HS2** - motor line (**V**)
**HS3** - motor line (**W**)
Current sensors external or on Sensor Board

**X1** - Connection to the control board LP1 by a flat cable

**BR 1** - **Actual current**
PIN 1-2 closed: Factory adjustment
PIN 2-3 closed: Option actual current positiv against common

**BR 2** - PIN 1-2 closed: Factory adjustment

**BR 3** - PIN 2-3 closed: Factory adjustment




**TB1** - BUSS negative
**TB2** - BUSS positive
**TB3** - precharge
**TB4** - Connection of the coil from contactor **K1**
**TB5** - +24V TA-BL/P 4.1...20.1
230VAC TA-BL/P 30.1...300.1
**TB6/7** - Klixon Th1 refer to chapter 5.4
**TB8/9** - Klixon refer to chapter 5.4
**TB10** - common actual current output
**TB11** - negative actual current output

**The Current sensor board is checked and adjusted by the manufacturer.**
**If the seal is opened all warranty will become void!**

### 5.3.5 LP4 - Switched Mode Power Supply TA-BL/P 4.1...300.1

**Input voltage:**

200-400VDC

**BR1:** closed

Terminal pins for transformator TR1:

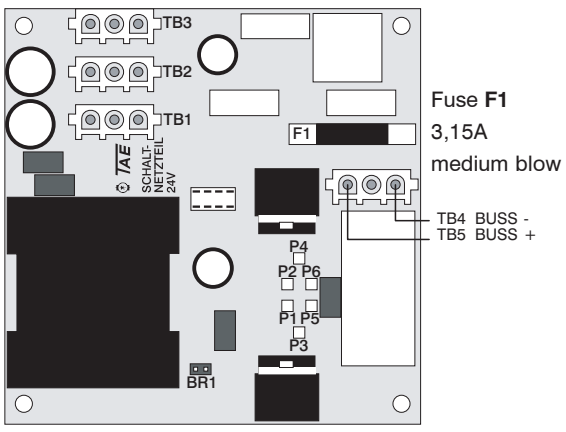
PIN-No.: color
**P3** - green
**P4** - blue
**P5** - white
**P6** - red

450-800VDC

**BR1:** open

Terminal pins for transformator TR1:

PIN-No.: color
**P1** - blue
**P2** - green
**P5** - white
**P6** - red

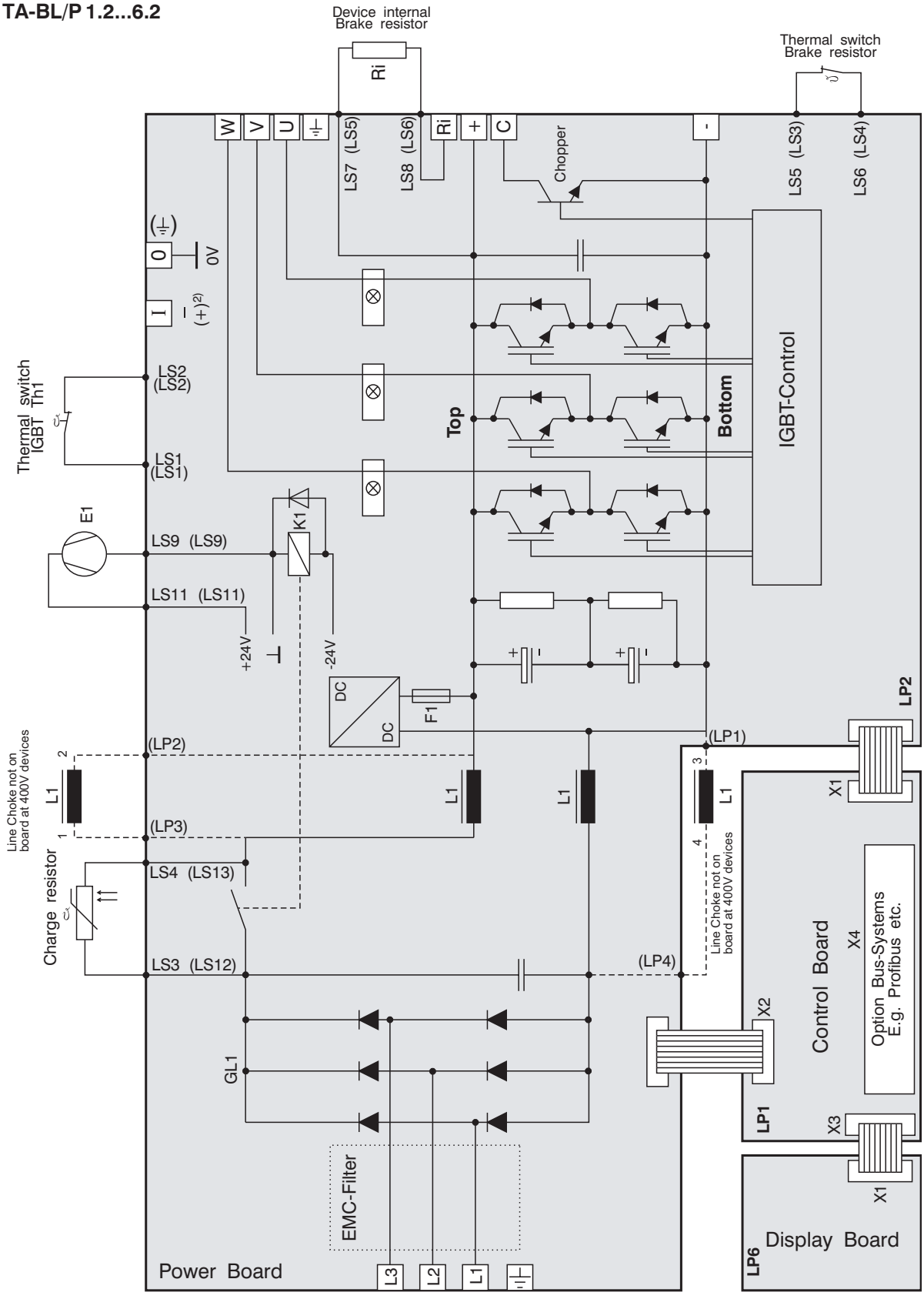



Fuse **F1**
3,15A
medium blow

Switched Mode Power Supply switchs on, after approx. 6-8 seconds at voltage (min. 350VDC ).

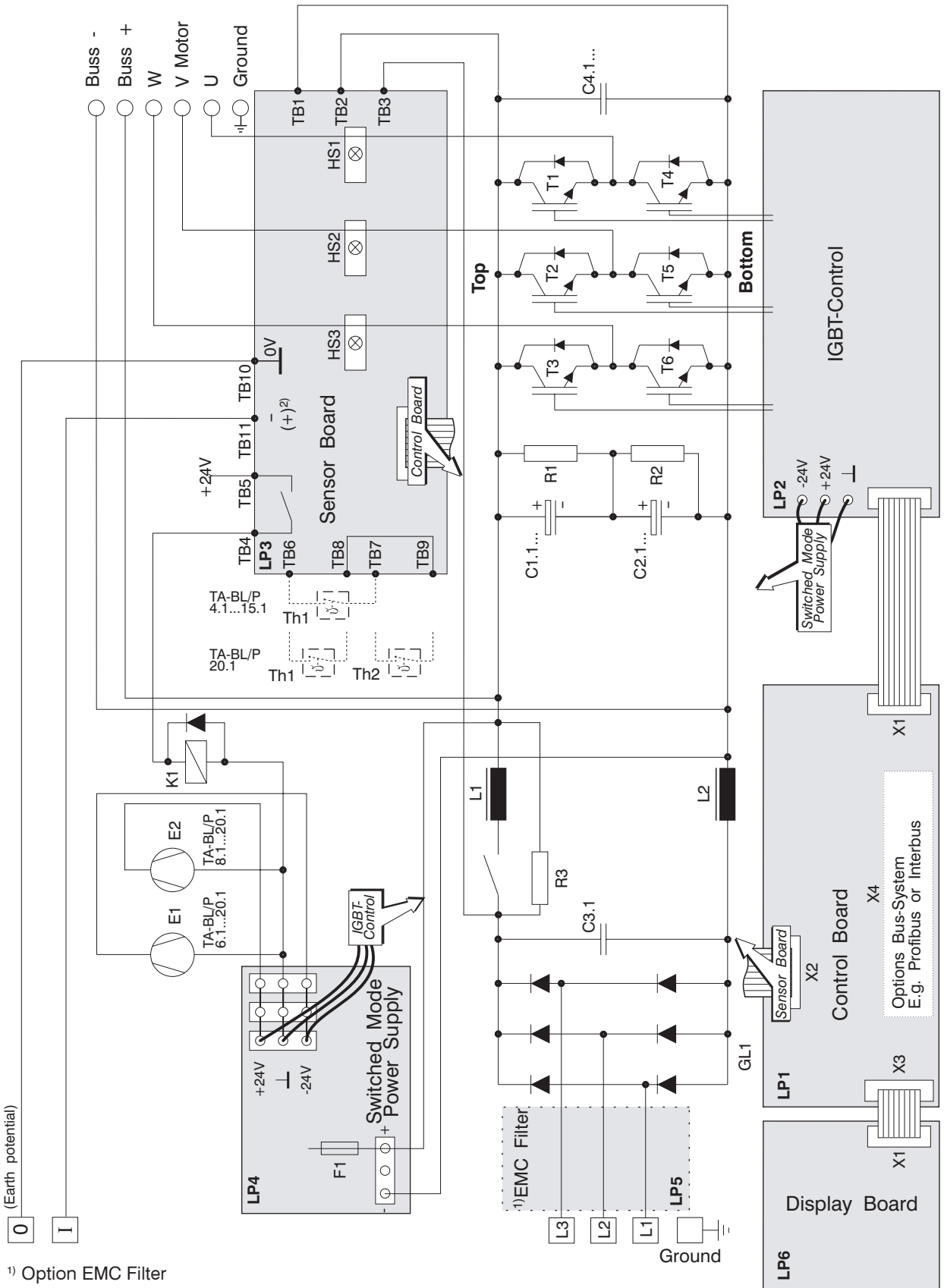
## 5.4 Principle Diagrams

### 5.4.1 TA-BL/P 1.2...6.2




Connection indication ( ) 350-480V Devices

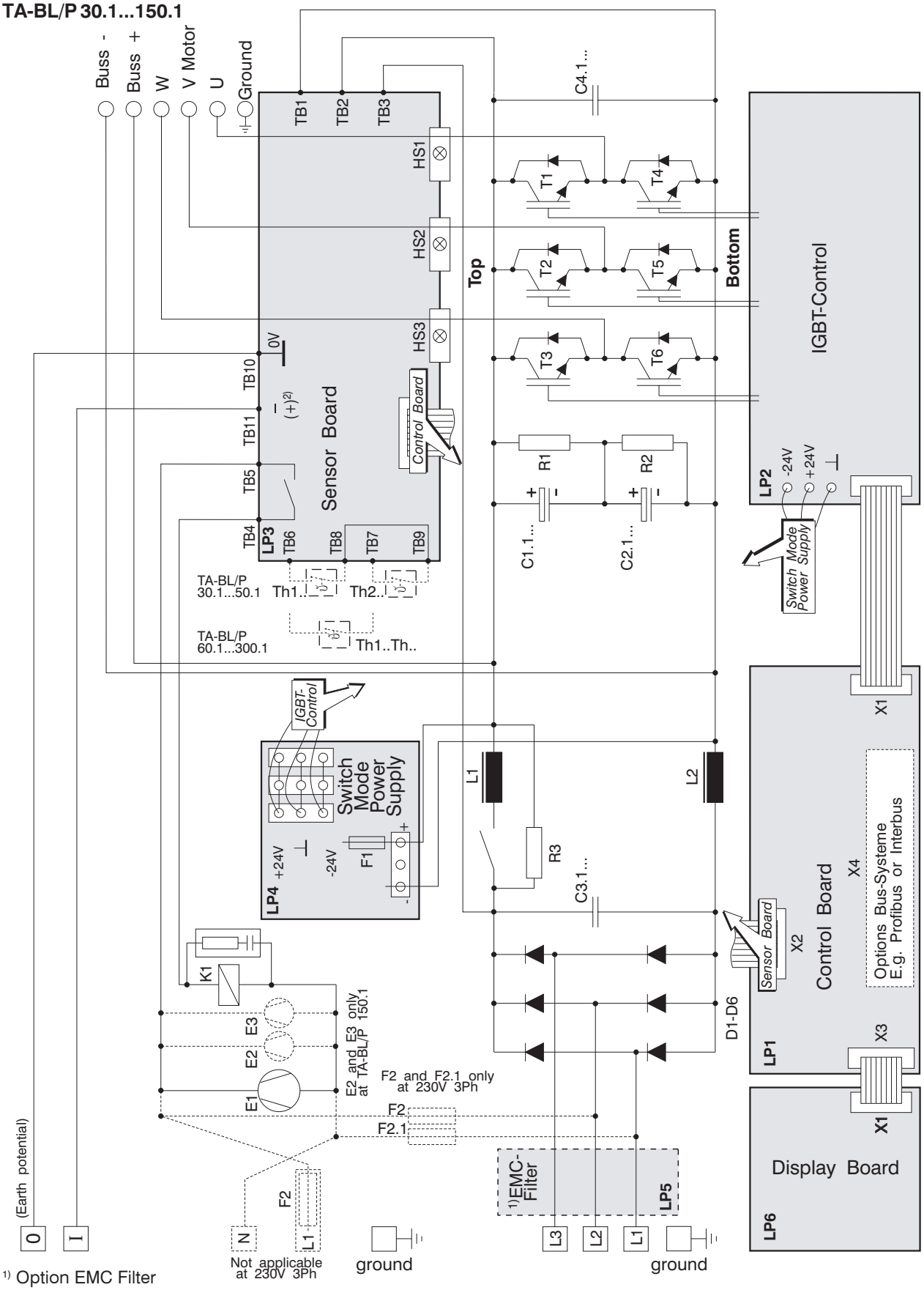
### 5.4.2 TA-BL/P 4.1...20.1




[1] Option EMC Filter

[2] Option actual current positiv against common

### 5.4.3 TA-BL/P 30.1...150.1




[1] Option EMC Filter

[2] Option actual current positiv against common

## 5.5 Safety and Supervising Equipment

**Separating protection equipment:**

Internal: Prefuse F1 switched mode power supply (look at Chapter 5.1 and 5.2 Construction and Layouts)

Internal: Prefuse F2 blower and contactor TA-BL/P 30.1 (look at Chapter 5.4 Principle Diagrams)

External: Mains fuse (look at Chapter 4.2.3 Drive data and Dimensions)

**Non separating protection equipment:**

To keep the device working correctly the following errors will be evaluated by the control board LP1. They will be displayed and stored.

These errors cut off the current to the motor. Chapter 9.4 gives detailed information about this.

- F0 Motor overtemperature (only if parameter 3/55 KLIXEN is set on 1)
- F1 Overcurrent
- F2 Overtemperature Power Stage
- F3 BUSS Undervoltage (only if the motor is in operation)
- F4 BUSS Overvoltage
- F5 Rippel Current
- F6 Position Sensor HS1, HS2 and HS3 (only if parameter 3/73 POSEN is set on 1)
- F7 Speed Sensor HS4 and HS5
- F8 Plausibility Error
- F9 Short-Circuit IGBT
- E1 External error (only active if a digital input is associated with parameter 3/22 SSER)

Additional signals which do not lead to a cut off:

- Delayed Current Limit
- Speed Reached
- Ready for Work
- Run
- Speed Signal
- n > 9 $min^{-1}$
- Current Limit

# 6.0 Initial Operation

**Only devices with integrated or external EMC filter are within the limit of the radiated emission norm.**

The greatest care has been taken in constructing our devices to minimize radiated and conducted interference. The guidelines of installation should be carefully executed. Improper installation can lead to exceeding the maximum limits of EMC and to a malfunction of devices of other manufacturers.

## 6.1 Instructions for Installation

Follow the safety advises in Chapter 2. Furthermore the following advice for installation have to be applied.
The installation should only be done by qualified personnel.
This device does not work as a frequency inverter. Interchanging of the terminals U, V, W while connecting the brushless motor results in a malfunction of the motor. Furthermore, the control cable from the motor (12 pole plug at terminal box of the motor) has to be a screened cable. TAE is offering premounted cables for this purpose. Without the correct connection of the cable, the drive is not functional.

During installation, general installation regulations such as the following should be observed:

**VDE 0100** General requirements for the installation of power with mains voltage up to 1000V.
**VDE 0113** General requirements for the installation of electrical equipment for production and tooling machines.
**VDE 0160** Requirements for electronic equipment for use in electrical power installations.

Further regulations may have to be observed if a special use for the unit is planned.
As protection equipment the following concepts could be used if allowed by your energy supplier:
Fault-Voltage-circuit-breaker (FU), protection earth or grounding (if allowed), Fault-Current-circuit-breaker (FI) can not be used with the TA-BL. In some countries this is prohibited. The reasons are:

a) All rectifiers (not only transistor regulators) could cause direct current which reduces the sensibility of the protection device.

b) An asymmetrical load caused by radio noise suppression filters can trigger the FI to switch prematurely which would cause the undesired loss of the drive.

c) High leakage currents of EMC filters could trigger the protection device.

Use only functional devices. After safety equipment has been triggered, the cause must be found and the failure has to be corrected. Defects on the device can only be repaired by TAE or from TAE authorized qualified personal. Safety equipment must not be bypassed or removed. More information about the provided safety and protection equipment may be found in Chapter 5.5 and 9.4.

### 6.1.1 Switching Devices

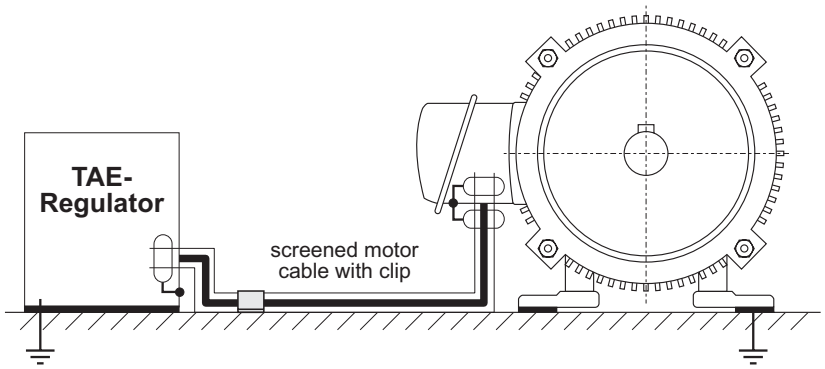
According to the VDE regulations, the transistor controller must be connected to mains supply line in such a manner that it can be separated from the mains supply with suitable circuit breakers (for example main switch, circuit).

### 6.1.2 Arrangement of Wires

The supply cable should be a stranded conductor and not a solid conductor type to achieve proper connection inside the terminal block. Rails for high current with their screw connection are also suited. Cable lengths inside the wiring cabinet should be kept to a minimum.

The supply cables, motor cables and control cables should never run together in the same trunking or conduit. If the cables are put together in cable trees then the wires of the control cables have to be twisted. Keep the electronic control cables separated from the power control cables to avoid feedback. The distance should be at least 20 cm. For the digital and analog reference and feedback cables screened cable has to be used in general.

Since the cable between regulator and motor is the major source of radiated and conducted interference, it should be a screened type and as short as possible.




### 6.1.3 Conditions for Grounding

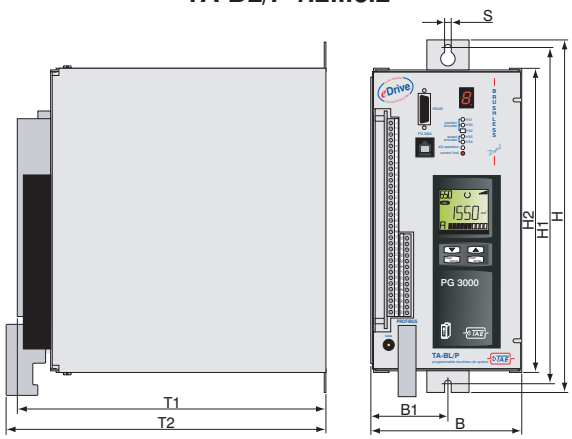
All metal frames have to be connected to ground by their own. Make a well defined path for high ground currents. For short-circuits to frame and leakage currents of filter components exists minimum cross-sections.
If one or two phases become disconnected the EMC filter can produce leakage currents up to 100mA. Filters and devices with build in filters have to be connected to ground before mains.

To clamp high frequency currents it is required to take some care along to the advice made above about grounding: All grounding leads should be as short as possible. Poor connections and loops of cable will act as aerials and pick up stray radiated emissions. The screen should be connected to ground by removing the coat pressing the screen with a clip to the backplate bonded ground. Do not use a "pig tail" to connect the screen of the cable. The screen should lead into the device. On the motor it is possible to connect the screen with a EMC screwing. On the regulator the screen will be surrounded by a metal clip pressing it on the blank chassis. (Look at figure in Chapter 6.1.7)

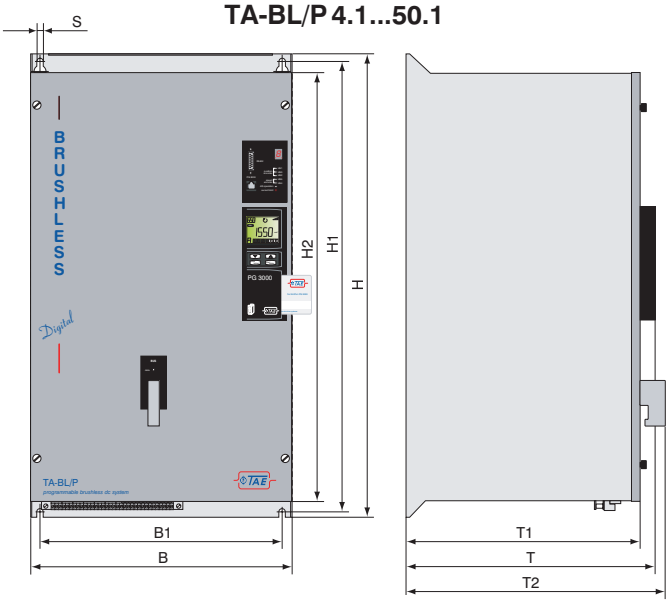
Make ground connection of the regulator by a wide plain on the backplate of the wiring cabinet. It is preferable to use a galvanized backplate not sealed with varnish. This concept does not replace the national safety codes for grounding.

## 6.1.4 Diagram of Dimensions

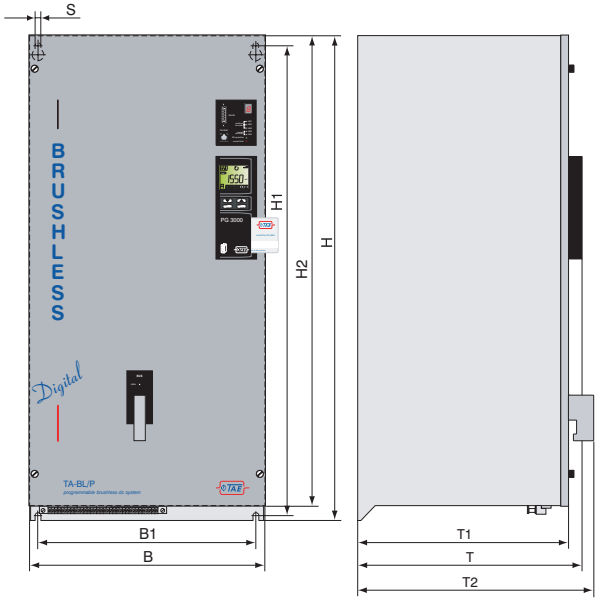
### TA-BL/P 1.2...6.2



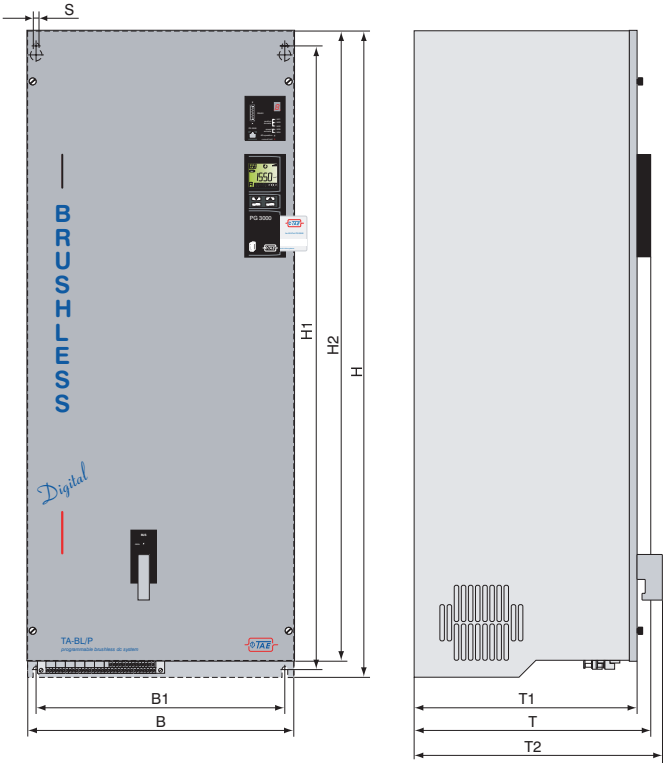

### TA-BL/P 4.1...50.1




### TA-BL/P 60.1




### TA-BL/P 80.1...150.1




*All Measures in Millimeters*

**TA-BL/P**

| *Device size* | *1.2...3.2* 200-250V | *2.2...6.2* 350-480V | *4.1...6.1* | *8.1...10.1* | *15.1* | *20.1...30.1* | *50.1* | *60.1* | *80.1* | *100.1* | *150.1* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **B** | 136 | 145 | 211 | 228 | 278 | 307 | 367 | 367 | 415 | 440 | 698 |
| **B1** | 69,5 | 72,5 | 182 | 198 | 245 | 275 | 337 | 337 | 381 | 406 | 660 |
| **H** | 318 | 343 | 290 | 305 | 385 | 500 | 645 | 750 | 1000 | 1100 | 980 |
| **H1** | 302,5 | 327,5 | 271 | 285 | 365 | 470 | 627 | 727 | 970 | 1070 | 955 |
| **H2** | 274 | 299 | 253 | 260 | 341 | 433 | 600 | 730 | 973 | 1036 | 940 |
| **T** | - | - | 301 | 355 | 320 | 320 | 350 | 350 | 369 | 392 | 399 |
| **T1** | 278 | 278 | 277 | 331 | 296 | 296 | 326 | 326 | 345 | 368 | 375 |
| **T2** | 288 | 288 | 317 | 371 | 336 | 336 | 366 | 366 | 385 | 408 | 415 |
| **S** | 6 | 6 | 7 | 7 | 9 | 9 | 9 | 9 | 12 | 12 | 9 |

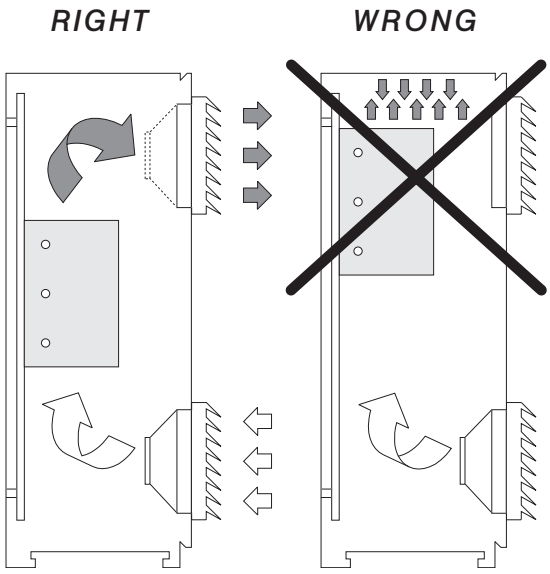
### 6.1.5 International Protection

All TA-BL/P transistors controllers are designed to suit protection class IP20 for switch cabinet mounting.

### 6.1.6 Instruction for Mounting

It is recommended to use a galvanized or chrome-plated backplate.
All TA-BL/P controllers are to be mounted in a vertical position with 4 screws. The location where the unit is mounted should be free of dust, moisture and aggressive gas. In cases where the unit or the switch cabinet is subjected to excessive vibrations, it is recommended to protect the electronic components by either mounting the plate or the complete switch cabinet in a shock and vibration absorbing manner.
The sum of the air flows of the devices in the switch cabinet should be equal to the air flow of the switch cabinet.

The power data sheet shown in the technical data for the TA-BL/P refer to a internal switch-cabinet-temperature of 0 - 40°C. (see drawing)



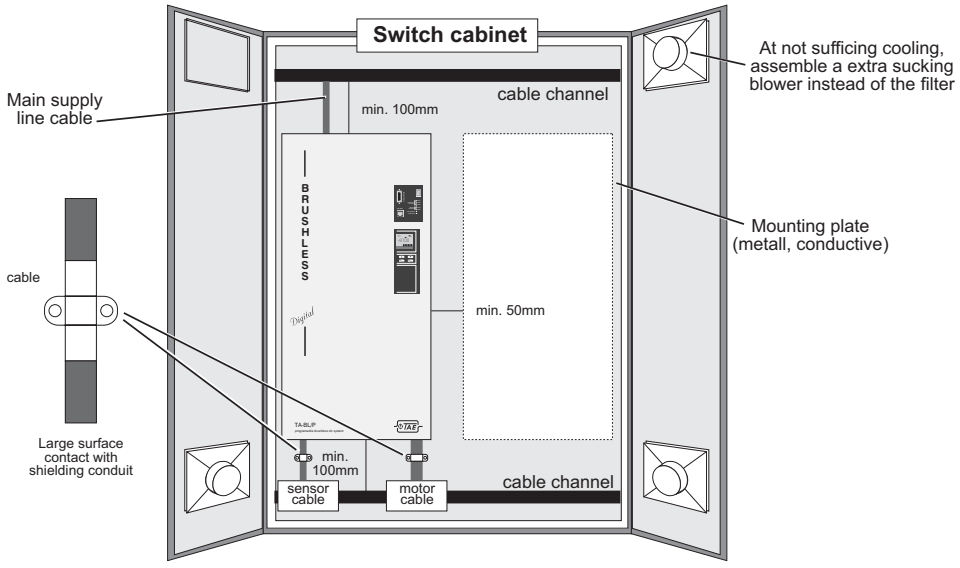

*Drawing*
The left picture shows the unit mounted in a optimal position. In the right hand picture the unit is mounted too high. The developed heat cannot escape from the upper part of the cabinet.

### 6.1.7 Arrangement in Switch Cabinet

If several units are installed next to each other, then a minimum clearance of 50mm should be maintained. When installing several TA-BL controllers one above the other, a minimum clearance of 100mm should be maintained. For units without heat source,-for example cable channels - then a minimum clearance should be observed. This spacing is 150mm above and 100mm below the units and 50mm to each side.

**Power Supply and Motor Cable**

Keep the separation of input and output cables as great as possible to prevent feedback. Input and output cables should never be run together in the same trunking or conduit. Power supply cable and motor cable must be screened and should not run side by side, or in the same cable channel.



### 6.1.8 Braking Unit

Connection between braking chopper, braking resistor and regulator are a source of radiated and conducted interference. The cable should be screened and as short as possible. Ensure proper grounding (Chapter 6.1.3).

## 6.2 Connections

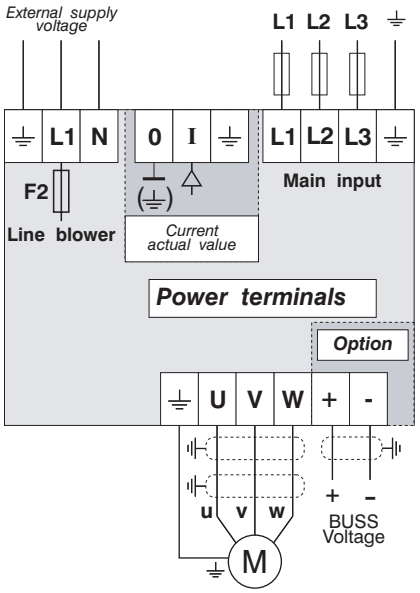
### 6.2.1 Power Connections

**L1 - L2 - L3** Input from mains
***Voltage according to type-marking***

**U - V - W** Terminals for connection of the brushless DC motor

**L1 - N** *Upward TA-BL/P 30.1*
External supply voltage for Line blower and contactor. Connection voltage refer to Basic part number chapter 4.2.2. The correct part number is on the nameplate or on the order confirmation. **F2** 20 x 5mm medium blow 2,5A/250V~ fuse for contactor K1 and blower

***Connection diagramm TA-BL/P4.1...150.1***

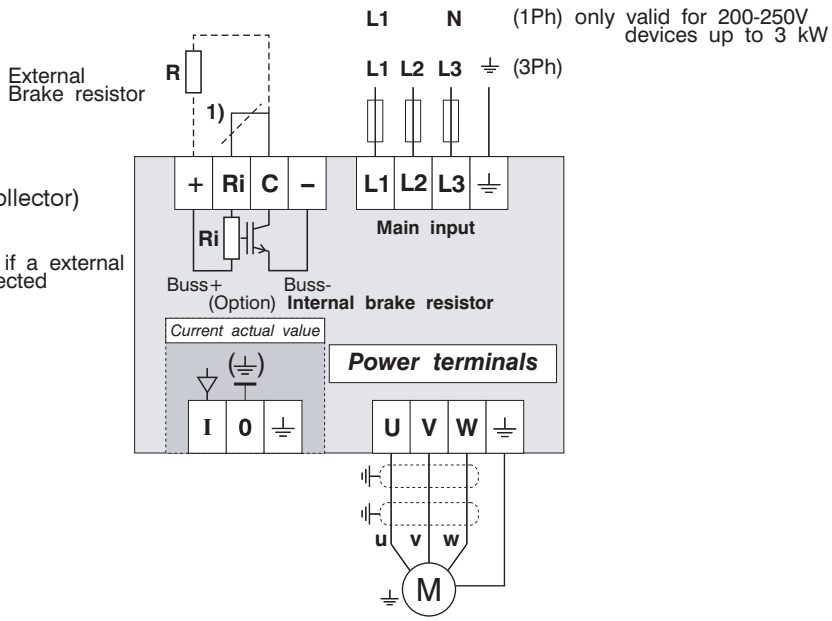



### Control terminals

**0 - I** Output actual current:
0 - $I_{rated}$ 0 - (-5V) ± 3%
Terminal **I** output signal
Terminal **0** common (earth potential)

**Option actual current positiv against common *(Please indicate by order)***
On request the output signal can be postiv configurated. **I** 0-5V

***Connection diagramm TA-BL/P1.2...6.2***




**Ri - C** *Only TA-BL/P 1.2...6.2*
Ri: internal Brake resistor
C: Chopper transistor (Collector)

1) Disconnect wire jumper if a external brake resistor is connected

### 6.2.2 Optional Connections

Up to TA-BL/P30... general exsisting

**+ -** **Option** BUSS-voltage The BUSS-voltage (Reducing circuit voltage) depends on the supplied AC-linevoltage. (refer to Chapter 4.2 Technical Data)

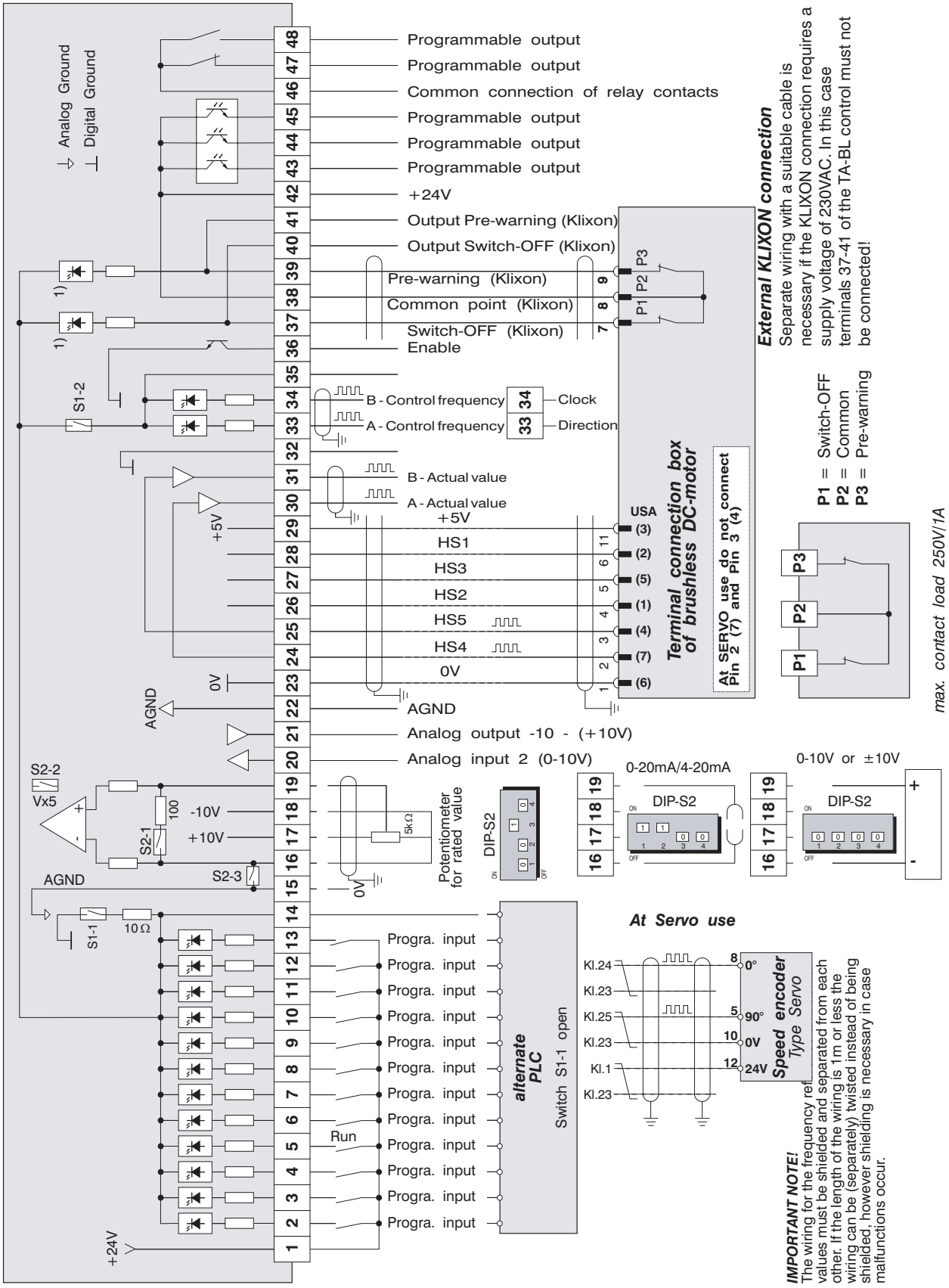
**The unit and the motor most be properly grounded! Improper grounding will cause damage to the electronic circuit and to the Hall-sensors of the motor. The common connection of the electronic circuit is in all units connected with 100R to ground.**

### 6.2.3 Control connections

| kl. | Description | Standard parameter | Value |
|---|---|---|---|
| 1 | Output +24V digital | | max.100mA |
| 2 | Programmable digital input | Reset | 15 to 30V<br>0: < 3V<br>1: > 8V<br>Ri = 3kOhm |
| 3 | Programmable digital input | Run clockwise | |
| 4 | Programmable digital input | Preset 1 | |
| 5 | Programmable digital input / Run | counter clockwise | |
| 6 | Programmable digital input | Hold | |
| 7 | Programmable digital input | Preset 2 | |
| 8 | Programmable digital input | motor potentiometer function | |
| 9 | Programmable digital input | Up/motor potentiometer function Up+Down=Reset | |
| 10 | Programmable digital input | Down | |
| 11 | Programmable digital input | Increase | |
| 12 | Programmable digital input | Decrease | |
| 13 | Programmable digital input | Slave / control frequency on | |
| 14 | 0V for Programmable inputs | S1-1 open | |
| 15 | 0V for analog inputs | | |
| 16 | Analog input Ref. in - or 0V (plug-in) | S2-3 closed | |
| 17 | Analog output +10V Ref. | | max. 4mA |
| 18 | Analog output -10V Ref. | | |
| 19 | Programmable analog input 1 | Ref. in + 0-10V S2-1 and S2-2 open | +/-10V/Ri 10k 0-/4-20mA 100R (10 Bit) |
| 20 | Programmable analog input 2 | 0-10V | 0-10V (10 Bit) |
| 21 | Analog output e. g. n-actual or I-actual value | n-actual value | -10V to +10V / 2mA (8 Bit) |
| 22 | 0V analog ground | | |
| 23 | 0V for encoder | | |
| 24 | Input speed encoder HS4, track A | | 5V to 30V / Ri 2,2k |
| 25 | Input speed encoder HS5, track B | | |
| 26 | Input position encoder HS2 | | 5V |
| 27 | Input position encoder HS3 | | |
| 28 | Input position encoder HS1 | | |
| 29 | +5V supply voltage encoder | | 50mA |
| 30 | Output actual value track A | | 15 - 30V max. 20mA |
| 31 | Output actual value track B | | |
| 32 | 0V digital | | |
| 33 | Input A-control frequency | | 15V- 30V / Ri=1,5k |
| 34 | Input B-control frequency | | |
| 35 | Common connection of control frequency | S1-2 open (Galvanically separated) | |
| 36 | Transistor output (open Collector) low active | Enable | 5 - 30V |
| 37 | Input switch-off klixon | | 15 - 30V |
| 38 | Common point klixon | | |
| 39 | Input pre-warning klixon | | |
| 40 | Output switch-off klixon (+24V) | | 15 - 30V max. 100mA |
| 41 | Output pre-warning klixon (+24V) | | |
| 42 | Common connection of optocoupler +24V and klixon | | Input 15 - 30V |
| 43 | Programmable output (optocoupler) | Speed signal | 15 - 30V / max. 20mA |
| 44 | Programmable output (optocoupler) | I-Limit ( IL 20 delayed) | |
| 45 | Programmable output (optocoupler) | n>9 RPM | |
| 46 | Common connection of relays (COM) | | 250VAC / 2A / 500VA<br>48VDC / 2A / 10W |
| 47 | Programmable output (relay / break contact) | Error / Common fault | |
| 48 | Programmable output (relay / contact) | BUSS-Ready | |

## Connection Diagram Control Board LP1

(Connection diagram for differential encoders with interface RS 422, refer to last page)




[1] Error is only evaluated at Regulators with Control Board TA-BL-E/P98 Art.-No. 78320-0F

## 6.3 Requirements before Initial Operation

### 6.3.1 Dip-switches

Before operating the drive it is necessary to check the configuration of the Dip-switches on the control board LP1.
In general these Dip-switches are already properly configured with factory settings.
Nevertheless make sure that the configuration corresponds to your requirements.
Detailed information concerning the settings of these Dip-switches is provided in Chapter 7.4

### 6.3.2 Setting of Motor Parameters

The motor parameters (Chapter 7.4) are programmed with standard parameters by the factory. The adjustment refers to the nominal data of the selected motor and are documented in the applied test protocol.

## 6.4 Functional Tests and Initial Operation

Every statement in this chapter is referring to the control board LP1. Chapters 6.2.3 and 7.4 give a description of the control connections, signals and adjustments. Before the first operation of the TA-BL drive proceed according to the following check-list:

**1)** Install and interconnect the TA-BL unit with reference to Chapters 6.1 and 6.2

**2)** Check,...

.... **if your line voltage corresponds to the voltage indicated on the type-marking of the TA-BL/P drive.**

.... **if the unit and the motor is properly grounded.**

.... if all terminals and bolts are properly tightened.

.... if all Dip-switches on the control board LP1 are properly adjusted.

.... if all connections correspond to the wiring-schematic

.... the motor output phases U, V and W with an ohm-meter for possible shorts to ground. The measuring should read a resistance of 500KΩ-1MΩ to ground.

**3)** Switch on the line voltage

- After the TA-BL drive has been connected to the line voltage within 5-8 seconds the 7 segment display on the Displayboard with *0* and min. 1 LED and max. 4 LEDs (HS1 to HS5) must shine. You hear the net contactor when it switchs on. This indicates that the TA-BL/P controller is ready-to-operate now.

- Within the unit on the Sensorboard BUSS- voltage ( LED1-red ) and contactor on (LED 2-yellow ) will light up.

Check , ...
.... the sensors as described in Chapter 7.3.3
.... with help of the Keypad PG3000 the parameters, so that they correspond to your requirements.

**4)** Start the drive

- The drive is switched on by closing the contact "operation" terminal 5. The 7 segment display goes on operation (Enable) *1*. If you now provide a rated value, the motor starts to rotate and the LEDs from the position encoder and speed encoder turns on or off according to the diagram Chapter 7.3.3.

**Please take the corresponding parameters from the description of the Keypad PG 3000.**

**5)** Adjustment of current limit

**Attention**

For this regulator with IGBT power stage the torque is almost linear from 0 to maximum speed. The torque increases between maximum and 10 $min^{-1}$ speed is lower than 5% driving at current limit. The same moment is available at 0 $min^{-1}$ to max. speed. Please note that in blocked state measured motor phase currents (with true RMS measurement) are 1.25 times higher than the max. currents in the rotating motor. The current display in the PG3000 always displays the current responsible for the torque.

Adjust with parameter max. current 1.Q the desired max. current in the 1. quadrant and with parameter max. current 4.Q in 4. quadrant. The max. current of the unit at running motor, can never be more than the motor peak current times 0,82. The limit of the max. current is the motor peak current times 0,65. The motor is only prevented against demagnetizing, if the motor data are correctly entered with software parameters.

**6)** After you has taken the unit in operation check once again whether your parameters minimum and maximum speed, preset, acceleration, deceleration etc. corresponds to your requirements.

# 7. Operation

## 7.1 Instructions of Safety

The operation should only be done by qualified personnel. Follow the advice in Chapter 2 and 3 about usability and protection against irregular usage.

***Caution - Danger !***

**Disconnect unit from mains before making any repairs. Only when the BUSS-capacitors have discharged, (The unit is still "Live" as long as the red LED 1 on the Current sensor board LP3 lights up), 5 minutes after the device has been seperated from line, the unit may be opened and worked on.**

As with any form of electrical equipment, there is always a risk involved in the handling of electrical machinery. The greatest care must always be exercised during installation and maintenance. It is recommended that service is performed by authorized personnel only.

A careful adjustement of the maximum peak current is necessary!
The peak current must never exceed the maximum current of the motor! For orders of a complete drive unit (unit & motor) then manufacturer will pre-adjust the rated power and the maximum peak current of the unit according to the reference data of the motor.

After the installation make sure that the unit and the motor is properly grounded in order to avoid electrical hazzards! Improper grounding will also cause damage to the electronic circuit and to the Hall-sensors of the motor! The common connection of the electronic circuit is in all units connected with 100R to ground.

## 7.2 Sequence for Turn On / Turn Off

There is no sequence for turn on/turn off in general. Nevertheless we recommend the following to take care of relais' and fuses.

- Connect device with mains. After signal "ready for operation" you can turn on RUN.
- Turn off; The device first should be disabled and after signal speed < 9 $min^{-1}$ off be disconnected from mains.
- Immediate turn on is possible while the signal "ready for operation" is active. Otherwise turn on again after10 seconds or after the supply of the electronic is off (Switched mode power supply is off, the 7 segment display will then extinguish).
- Short phase failure is not indicated ! If the buss voltage sinks below 420V, undervoltage is indicated.

**Attention!**
**Do not turn on again before 10 sec. after the signal "ready for operation" is <u>not active</u>. The turn on in this moment results in a high inrush current which causes stress to relais' and fuses. That can lead to a premature failure.**

## 7.3 Displayboard LP6

### 7.3.1 7 Segment Display

*0* Ready for run

*1* run (Enable)

**Fault signals:** (F and number shine alternately)

*F0* Motor overtemperature (only if parameter *3/55 KLIXEN* is set on 1)

*F1* Overcurrent

*F2* Overtemperature Power Stage

*F3* Undervoltage (only if the motor is in operation)

*F4* BUSS Overvoltage

*F5* Rippel Current

*F6* Position Sensor HS1, HS2 and HS3 (only if parameter *3/13 POSEN* is set on 1)

*F7* Speed Sensor HS4 and HS5

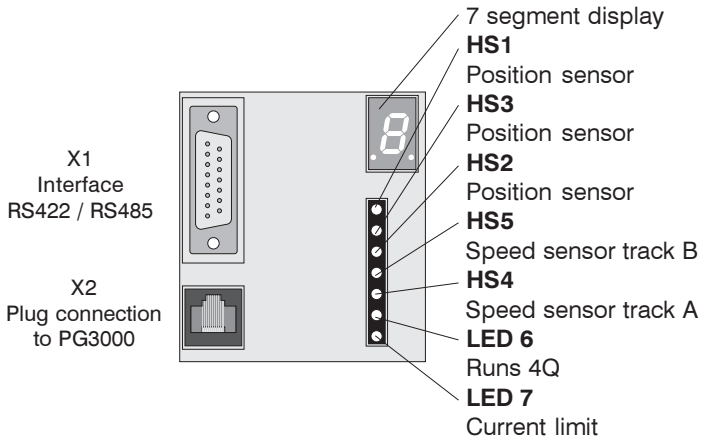
*F8* Plausibility Error

*F9* Short-Circuit IGBT

*E1* External error at terminals (only active if a digital input is associated with parameter *3/22 SSER*)

### 7.3.2 LED indication Display Board LP6

**HS 1** pale Position sensor
**HS 3** pale Position sensor
**HS 2** pale Position sensor
**HS 5** pale Speed sensor track B
**HS 4** pale Speed sensor track A
**LED 6** pale Runs 4Q
**LED 7** pale Current limit



### 7.3.3 Sensor Test

The five LED indicators LED 18 to LED 22 (pale) on the control board LP1 indicates, if the hall-sensors on the brushless DC motor are working proper or not.

HS1 / HS2 / HS3 - Position sensors

HS4 / HS5 - Speed sensors

To check the hall-sensors, you have to proceed as follows:

a) Disconnect device from mains.

b) Connect control cables to motor.

**c) Remove power cables of motor on terminals U, V, W on the regulator.**

d) Turn on mains and control voltage and carry out after the operationally following test.

e) Turn the motor shaft slowly counterclockwise with your hand (look at output shaft). The LED indicators LED18to LED 22 start to light on and off in a definite order. (refer to diagram below).

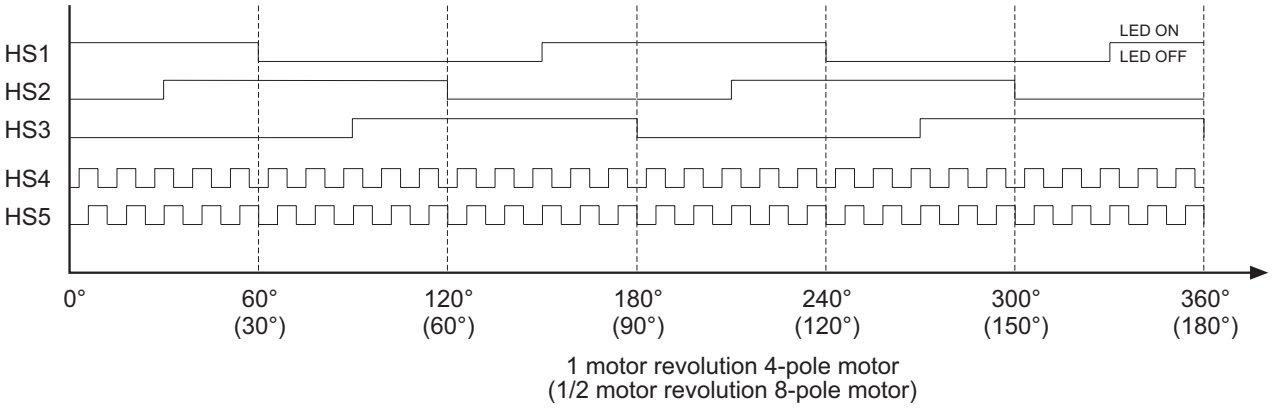
**Diagramm:** light-intervals (ideal diagram)

4-pole motor: **BL-71...BL-160** with incremental encoder with 30 pulses/360° scale 0-360°

6-pole motor: **BL-N-71...BL-N-100** with incremental encoder with 30 pulses/360° scale 0-360°

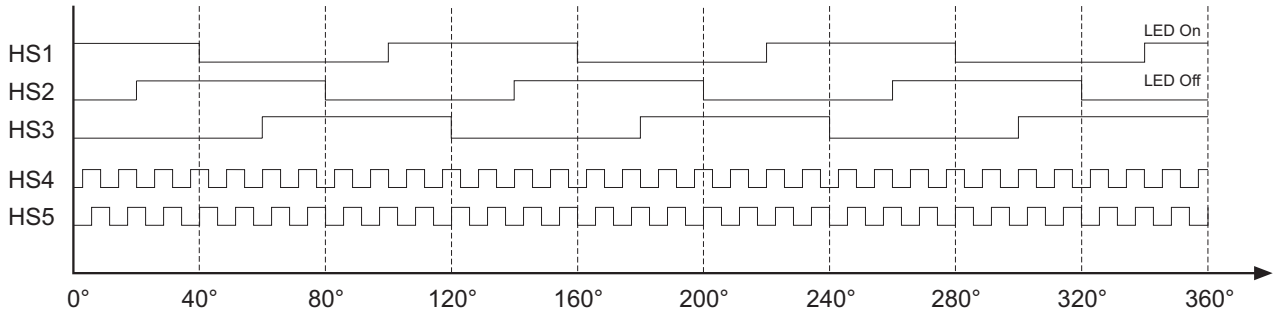
8-pole motor: **BL-180...BL-315 and BL-N-112...BL-N-180** with incremental encoder with 60 pulses/360° scale 0-180°

***Diagramm light-intervals 4- and 8-pole motors***



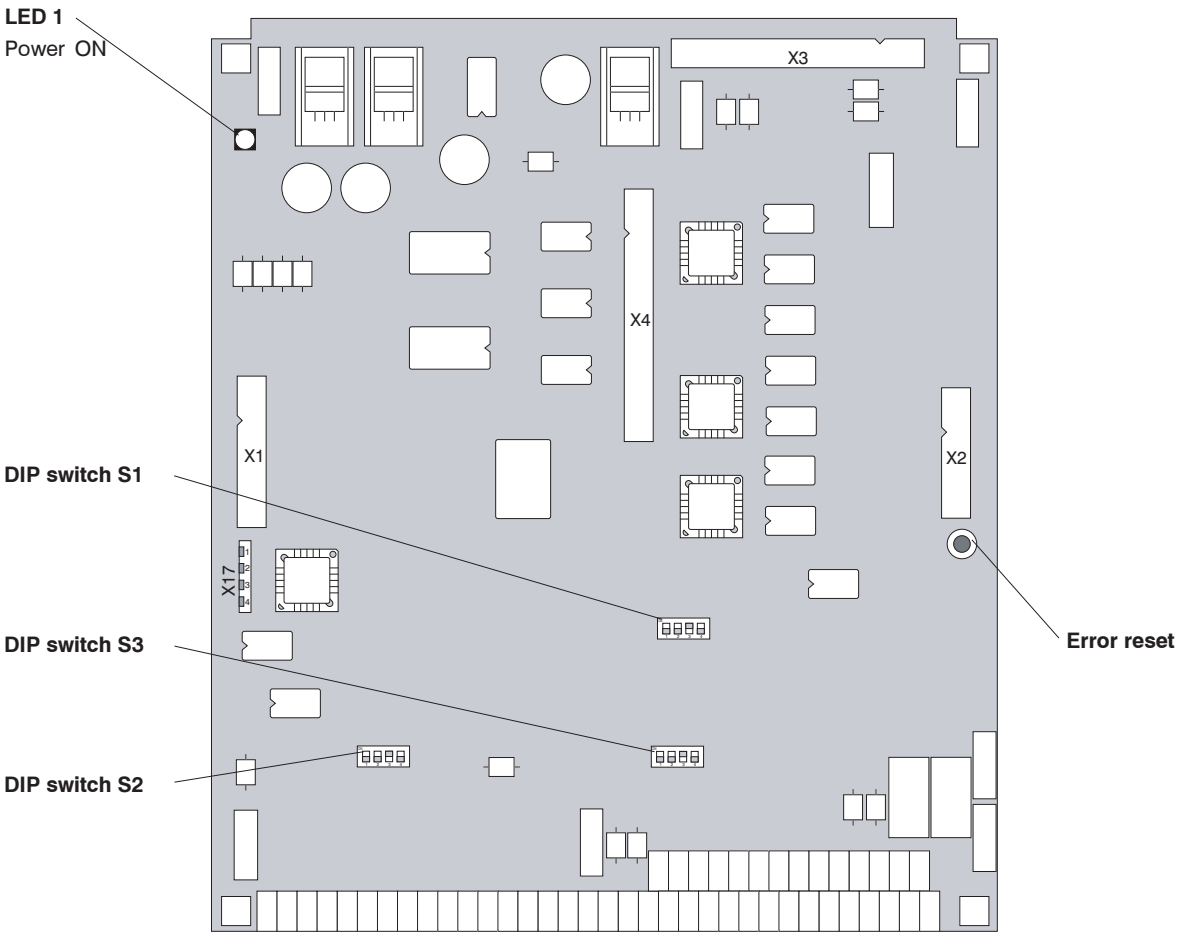

1 motor revolution 4-pole motor
(1/2 motor revolution 8-pole motor)

***Diagramm light-intervals 6-pole motors***




1 motor revolution 6-pole motor

## 7.4 Layout Control Board LP1




### Layout Control Board LP1

Power supply (Power ON) ..... **LED 1** green

#### 7.4.1 DIP switch S1

Common connection of digital inputs ..... **S1-1** Page 39
Potential control frequency ..... **S1-2** Page 39
Parameter write protection ..... **S1-3** Page 39
Current consumption 5VDC Encoder ..... **S1-4** Page 39

#### 7.4.2 DIP switch S2

Reference signal current or voltage ..... **S2-1** Page 39
Reference signal current or voltage ..... **S2-2** Page 39
Common connection ..... **S2-3** Page 39
*-Not used-* ..... **S2-4**

#### 7.4.3 DIP switch S3

Number of pulses from Encoder ..... **S3-1** Page 40
Encoder 5VDC or 24VDC ..... **S3-2** Page 40
Encoder impulse ..... **S3-3** Page 40
Encoder 5VDC or 24VDC ..... **S3-4** Page 40

### 7.4.1 DIP switch S1

**Common connection of digital inputs:*DIP switch S1-1***

With DIP switch S1-1 the terminal 14 can be connected or disconnected to internal electronic common.

OFF: Terminal 14 disconnected from electronic common.
(**Controlled by PLC** ).

ON: Terminal 14 connected to electronic common.
(Controlled by potential free contacts)

**Potential control frequency:** ***DIP switch S1-2***

OFF: Terminal 35 disconnected from device common.

ON: Terminal 35 connected to terminal 14.

**Parameter write protection:** ***DIP switch S1-3***

With DIP switch S1-3 the write protection of the parameters can be activated or deactivated.

OFF: Write protection.

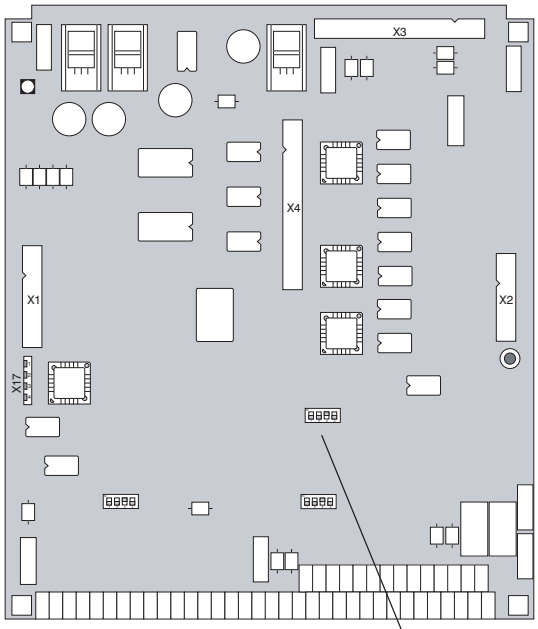
ON: Parameters can be saved.

**Current consumption 5V Encoder:** ***DIP switch S1-4***

With DIP switch S1-4 the internal 5VDC supply voltage can be adjusted on the current consumption of the Encoder.

OFF: Hallsensor encoder 5VDC, current consumption < 150 mA

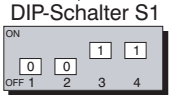
ON: Encoder 5VDC, current consumption >150 mA
(TAE standard)




***Factory adjustment:***

*DIP switch S1*

DIP-Schalter S1




S1-1: OFF S1-2: OFF S1-3: ON S1-4: ON

### 7.4.2 DIP switch S2

**Rated value current or voltage:** ***DIP switch S2-1/S2-2***

With the DIP switches S2-1 and S2-2 the reference signal can be adjusted (both DIP switches must have the same position).

OFF: Reference signal 0- 10V or ±10V (voltage).

ON: Reference signal 0- 20 mA or 4-20 mA (current).

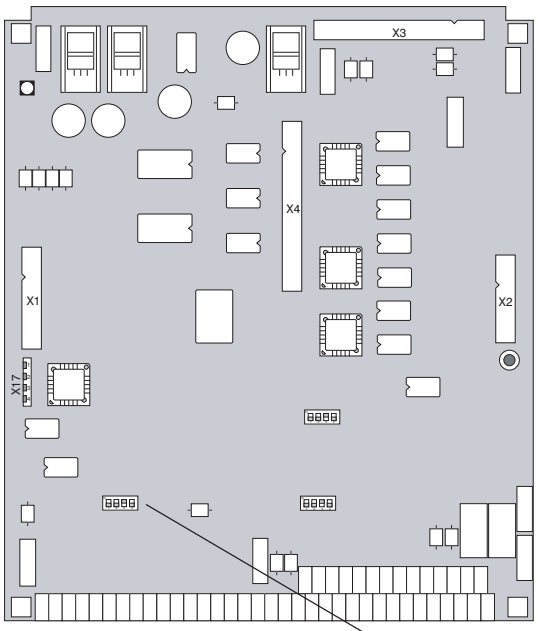
**Common connection:** ***DIP switch S2-3***

With DIP switch S1-1 terminal 16 can be connected or disconnected to electronic common.

OFF: Analog reference signal current or voltage.

ON: Reference signal by external potentiometers.

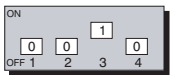
*- Not used -* ***DIP switch S2-4***




***Factory adjustment:***

*DIP switch S2*

DIP-Schalter S2




S2-1: OFF S2-2: OFF S2-3: ON

### 7.4.3 DIP switch S3

**Encoder impulse:** ***DIP switch S3-1 and S3-3***

With the DIP switches S3-1 and S3-3 the impulses of the encoder can be selected (both DIP switches must have the same position).

OFF: Encoder with more than 100 increments resp.pulses/rotation.
ON: Encoder with less than 100 increments resp.pulses/rotation.

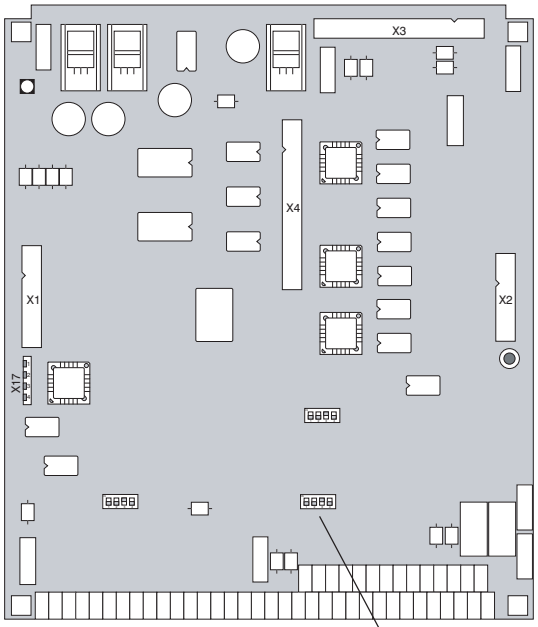
**Encoder 5VDC or 24VDC:** ***DIP switch S3-2 and S3-4***

With the DIP switches S3-2 and S3-4 the signal level from the encoder can be selected (both DIP switches must have the same position).

OFF: Encoder supply voltage 5VDC.

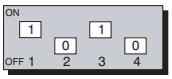
ON: Encoder supply voltage 24VDC.

***(12V Encoders are not supported)***




*DIP switch S3*
If the motor is TAE unknown adjust like description:

DIP-Schalter S3

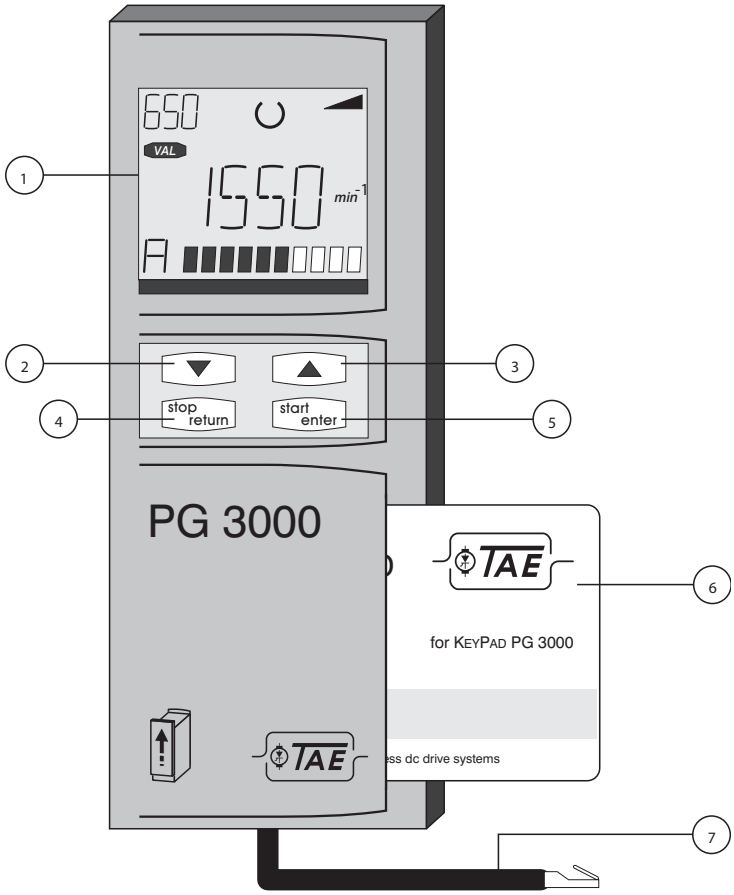



S3-1: ON S3-2: OFF S3-3: ON S3-4: OFF

If the motor is known or delivered by TAE the encoder is adjusted.

# 8. Multifunction Control Unit PG 3000

## 8.1 Layout plan PG 3000




| Pos. | Designation | Function |
|---|---|---|
| 1 | LCD display field | 140 segments, green/red background |
| 2 | Arrow key down | Scroll back in menu structure |
| 3 | Arrow key up | Scroll forward in menu structure |
| 4 | Stop/Return key | Stop (Menu CTRL), interrupt or exit from selected menu |
| 5 | Start/Enter key | Start (Menu CTRL), confirm or select menu |
| 6 | SmartCard | SmartCard data storage, saving appliance settings |
| 7 | Terminal cable | Max. length 0.30 m |

### 8.1.1 Technical data PG 3000

| | |
|---|---|
| Dimensions (WxHxD) | 62x158x21 mm |
| Weight | 100 g |
| Degree of protection | VBG4, IP20 |
| Ambient temperature | 0...40°C |

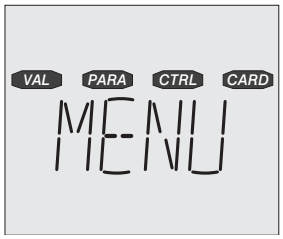
## 8.2 Using the control elements

### 8.2.1 General

After the mains voltage has been switched on the appliance carries out a self-test (display background red).

The TA-BL/P... controller ends the test with a direct jump to the set actual value display (parameter 4/09)(display background green).
The menu option **VAL** is active. Press the **stop**/**return** key twice to switch the display to MENU and open the selection of other **MENU** options.

| Menu option | Description |
|---|---|
| **VAL** | Display actual values |
| **PARA** | Change parameter settings |
| **CTRL** | Control motor via KeyPad PG 3000 |
| **CARD** | Load/save appliance settings with SmartCard |

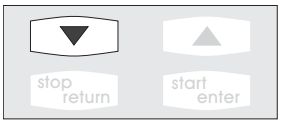


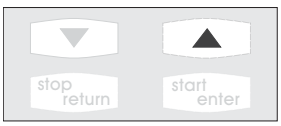

### 8.2.2 Control elements

Use the arrow keys to select or a menu option or to select/update individual parameters.

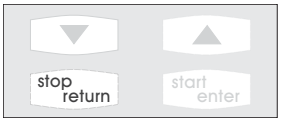
Press once to jump to the next menu option or parameter or to change the setting by one step.

Hold the key to scroll the settings automatically, release to stop.

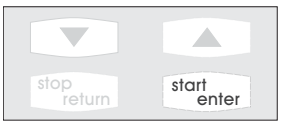


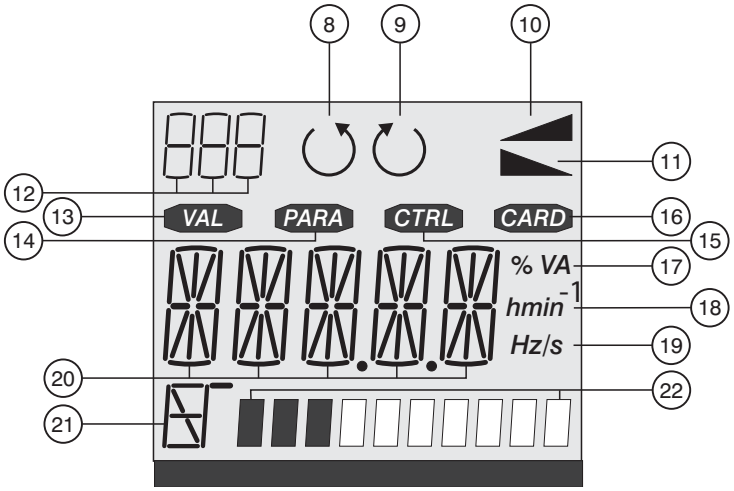

Use the **stop**/**return** key to exit a menu option or interrupt parameter updates (previous value remains in force).




Use the **start**/**enter** key to move to menu options or parameters and save changes.



### 8.2.3 LCD display




| Pos. | Designation | Function |
|---|---|---|
| 8 | Turn to left | Control display for motor direction, counterclockwise active |
| 9 | Turn to right | Control display for motor direction, clockwise active |
| 10 | Acceleration ramp | Control display, active during acceleration |
| 11 | Brake ramp | Control display, active during braking |
| 12 | 3-digitnumeric display | 7-segment display for actual speed value in ‰ and parameter no. |
| 13 | VAL menu | Display actual values, e.g. speed, current, line speed, a.s.o. |
| 14 | PARA menu | Change parameter settings |
| 15 | CTRL menu | Control motor via the KeyPad PG 3000 |
| 16 | CARD menu | Load/save appliance settings with the SmartCard |
| 17 | Phys. unit for Pos. 20 | Displays %, V, A, VA with automatic allocation |
| 18 | Phys. unit for Pos. 20 | Displays h, rpm with automatic allocation |
| 19 | Phys. unit for Pos. 20 | Displays Hz, s, Hz/s with automatic allocation |
| 20 | 5-digitnumerical display | 15-segment display for parameter name and display |
| 21 | Bar graph designation | Displays formula characters and physical units for Pos. 22 |
| 22 | 10-digit bar graph | Displays parameter values, e.g. speed, current (parameter 4/10) |

## 8.3 Actual values menu

### 8.3.1 Structure of the VAL menu

Use the arrow keys to select the **VAL** menu.

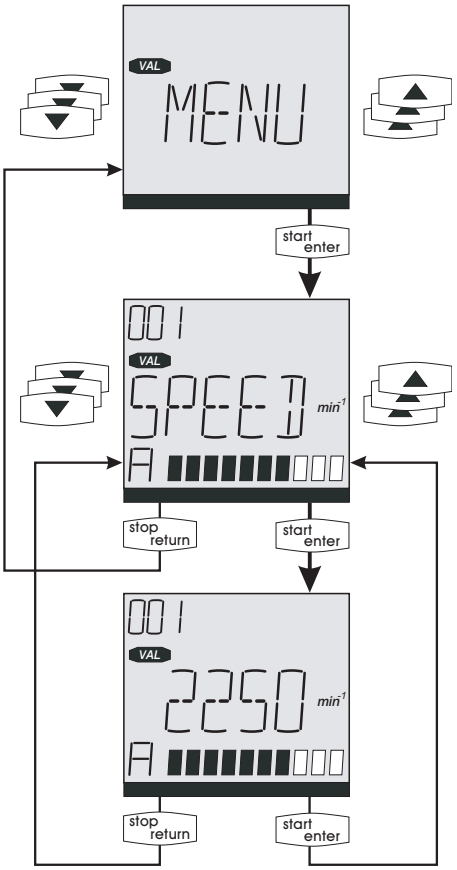
Use the **start**/**enter** key to confirm and switch to the **VAL** menu.

Use the arrow keys to select the required value for the display. The preset actual values are shown in table 4.2 below.

In the example, the **SPEED** value is used.

Press the **start**/**enter** key to display the actual value.

Press the **start**/**enter** or the **stop**/**return** key to return to the actual value selection.




### 8.3.2 Actual values

| Parameter | Display | Designation | Unit | Range |
|---|---|---|---|---|
| 0/01 | SPEED | Motor speed | rpm | 0 - 6000 |
| 0/02 | CURR | Motor current | A | 0.0 - 3000.0 |
| 0/03 | LSPD | Line speed | - | 0 - 30000 |
| 0/04 | LSPD1 | Line speed 1 | - | 0.0 - 3000.0 |
| 0/05 | LSPD2 | Line speed 2 | - | 0.00 - 300.00 |
| 0/06 | POSLO | Position (low word) | - | 0 - 65535 |
| 0/07 | POSHI | Position (high word) | - | 0 - 65535 |
| 0/08 | LEAD | Leading speed | rpm | 0 - 6000 |
| 0/09 | SW | Software version | - | 0 - 9999 |
| 0/10 | BUSV | Buss voltage | V | 0 - 9999 |

## 8.4 Parameter menu

### 8.4.1 Structure of the PARA menu

Use the arrow keys to select the **PARA** menu.

Use the **start**/**enter** key to confirm and the menu changes to the parameter level and the display changes to **MODE**.

Select the parameter set (**MODE**) you want to use.

Press the **start**/**enter** key to display the actual parameter set.

Switch to another parameter set with the arrow keys.

Press the **start**/**enter** key to confirm the selected parameter set and the display switches back to **MODE**.

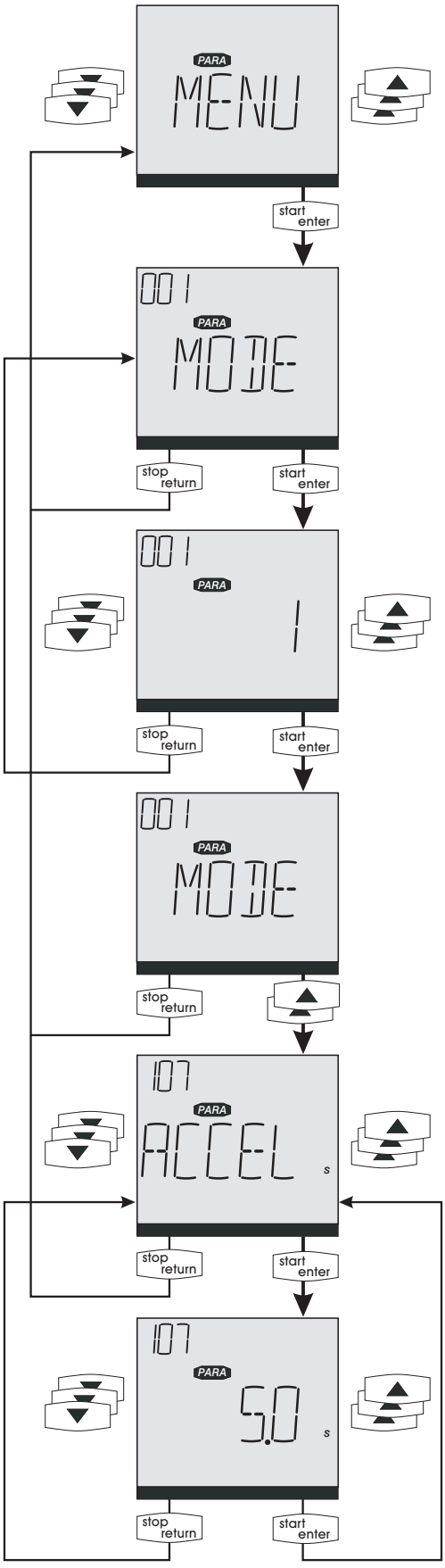
Use the arrow keys to move through the preset parameters (**MODE**).

Use the ↑ key to move upwards through the parameter list, and use the ↓ key to move down.

When you reach the parameter you want (in the example **ACCEL**) press the **start**/**enter** key to display the parameter's current value.

Use the arrow keys to change the value. Press the **start**/**enter** key to save the new value.

You can use the **stop**/**return** key to break off the procedure at any time. The previously stored value remains in force.



## 8.5 Motor control menu

### 8.5.1 Structure of the CTRL menu

Use the arrow keys to select the **CTRL** menu.

Press the **start**/**enter** key to confirm and the program changes to password input and the display shows **PW**.

Use the arrow keys to enter the password and press the **start**/**enter** key to confirm (*factory setting for password* = 111).

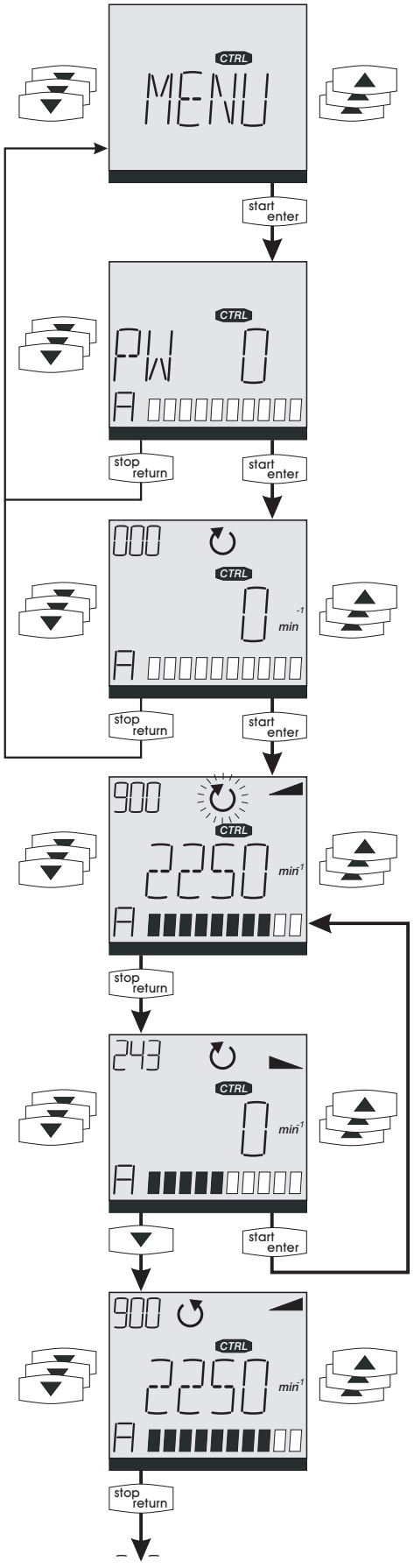
You can now enter a setpoint value using the arrow keys (e.g. 2250 rpm).

Press the **start**/**enter** key and the direction of rotation display begins to blink; the controller starts with the preset acceleration ramp to the setpoint value.
The display also shows the actual value in % (small display).
You can change the setpoint with the arrow keys.

Press the **start**/**enter** key to stop the rotation display blinking; the controller moves on the preset braking ramp down to speed 0. (braking only possible at 4 quadrant operation or servo operation)

If you want to change the direction of rotation you must use the arrow keys beforehand to set the setpoint to 0. If the drive is not moving, use the ↓ key to change the direction of rotation.

You can now enter a setpoint value and release the controller be pressing the **start**/**enter** key.



## 8.6 SmartCard menu

### 8.6.1 Structure of the CARD menu

Use the arrow keys to select the **CARD** menu.

Use the **start**/**enter** key to confirm and switch to the SmartCard menu.

Use the arrow keys to select the required function. The existing functions are shown in table 8.6.2 below.

In the example, the **READ** function (download appliance settings from the SmartCard) is used.

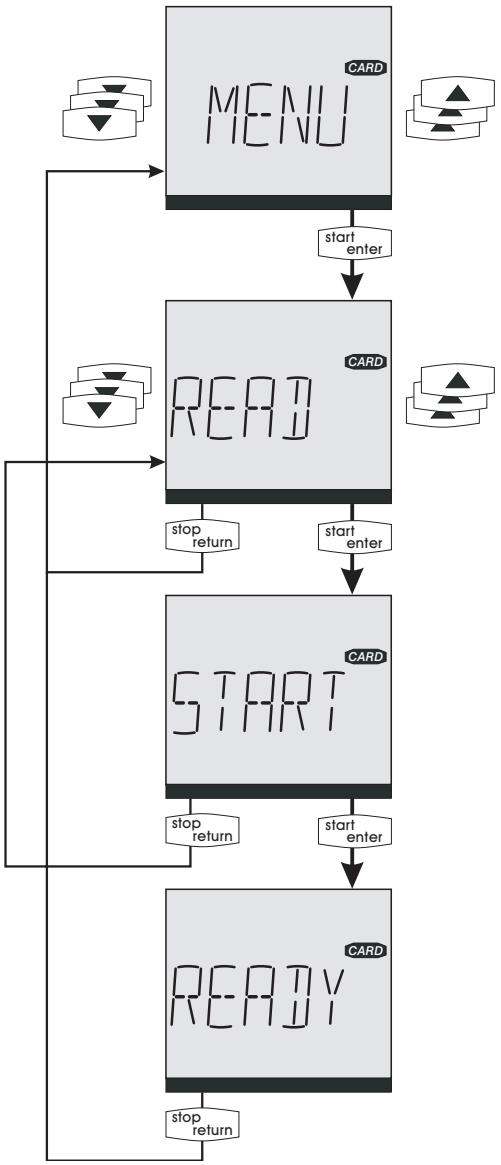
Press the **start**/**enter** key to confirm the function and the display shows **START**.

Press the **start**/**enter** to start the function.

In the example, the appliance settings are downloaded from the SmartCard to the TA-BL/P ... appliance.

If the function is completed without faults, **READY** appears in the display.

Press the **stop**/**return** key to return to menu selection.




### 8.6.2 SmartCard functions

| Display | Designation |
|---|---|
| READ | Download appliance settings from the SmartCard to the controller. |
| WRITE | Save appliance settings to the SmartCard. |
| LOCK | No function (reserved) |
| UNLOCK | No function (reserved) |

# 9.0 Errors

## 9.1 Error messages of the TA-BL/P

The device displays following faults. The device is jammed when a fault appears, which is displayed by a red background light in the display of the PG 3000.

| Error | Display | |
|---|---|---|
| | Device | PG3000 |
| Motor overtemperature (only if parameter 3/55 KLIXEN is set on 1) | F0 | MTEMP |
| Overcurrent | F1 | OC |
| Overtemperature Power unit | F2 | TEMP |
| Undervoltage (only if the motor is in operation) | F3 | UV |
| BUSS-Overvoltage | F4 | OV |
| Ripple Current | F5 | RC |
| Position Sensor HS1, HS2 or HS3 (only if parameter 3/73 POSEN is set on 1) | F6 | POS |
| Speed sensor HS4 or HS3 | F7 | SPEED |
| Plausibility Error | F8 | PFLT |
| Short-Circuit IGBT | F9 | IGBT |
| External Error (only active if a digital input is associated with parameter 3/22 SSER) | E1 | EXT |

All faults can be reseted by the terminals, the serial interface (RS 485 and RS 422), with the PG 3000 or by a communication option e.g. profibus or interbus. A fault reset is only possible when the drive is locked, the motor stands still and all faults are disappeared. If the fault is reseted externaly, the latest fault in the PG 3000 remains till the PG 3000 is reseted. The PG 3000 can also be reseted during operation. If a fault in the PG 3000 is not reseted the background remains red and the display shows always the latest fault.

## 9.2 PG 3000 operator errors *(no equipment malfunktion)*

**ATT1** Changing parameters in online mode (with motor running) not allowed
**ATT2** Controlling motor from KeyPad PG 3000 not allowed in online mode.
**ATT3** Accesss to SmartCard not allowed in online mode.
**ATT4** System malfunction. Control from KeyPad PG 3000 not allowed.
**ATT5** Motor data must be complete for selected function.
**ERROR** Invalid password

*Acknowledge error by pressing* **start**/**enter** *key.*

## 9.3 Errors when using SmartCard *(no equipment malfunktion)*

**ERR91** SmartCard is write protected.
**ERR92** Validity check error.
**ERR93** SmartCard not readable. Inverter/Servo Controller type incorrect.
**ERR94** SmartCard not readable. Parameters incompatible.
**ERR96** Connection to SmartCard broken.
**ERR97** SmartCard data invalide.
**ERR98** Insufficient memory on SmartCar.

*Acknowledge error by pressing* **start**/**enter** *key.*

## 9.4 Fault Description

| | | |
|---|---|---|
| F0 | Motor Over Temperature | a) Overload motor.<br>b) Sensor cable defective.<br>c) Klixon defective. |
| F1 | Overcurrent | Overcurrent switching off can only result if:<br>a) Short-circuit power stage.<br>b) The motor has a winding short-circuit or a ground fault. |
| F2 | Over Temperature Power Stage | The heat sink temperature of the device has max. temperature exceeded ( > 80 ° C ):<br>a) The ambient temperature is too high ( about 40 ° C ).<br>b) The internal fan is faulty.<br>c) The permanent current of the device ($I_{rated}$) is exceeded.<br>d) The device is wrongly built-in (see chapter 6.1.7 Arrangement in Switch Cabinet ). |
| F3 | Buss Undervoltage | The buss voltage is too low:<br>a) Mains too low.<br>b) A phase is missing.<br>c) Contactor K1 is not switching or defective.<br>d) Contactor / fan supply voltage (230V) not available, fuse F2 defect (only at TA-BL/P 30.1 and bigger). |
| F4 | Buss Overvoltage | The buss voltage is too high (>780V) :<br>a) The device current in 4Q operation is too high for attached chopper or braking resistor.<br>b) The 4th quadrant is operate without chopper.<br>(PG 3000 parameter 1/05) |
| F5 | Ripple Current | The ripple in the buss voltage is too high:<br>a) A phase is missing.<br>b) Buss capacitor is defective. |
| F6 | Position Sensor HS1, HS2 and HS3 | The feedback of the motor about the rotor position is faulty:<br>a) Cables or plugs defective.<br>b) Position sensor is defective ; sensorboard or encoder assembly is defective. Position 15 and 17<br>( see Operating & Maintenance Manual Chapter 10.0 Overview Drawing and Spare Part List ). |
| F7 | *)Speedsensor | The feedback from the speedsensor is faulty:<br>a) HS4 or HS5 is not conected<br>b) HS4 with HS5 is exchanged |
| F8 | Plausibility Error | Wrong inputs. |
| F9 | Short-Circuit IGBT | a) Short-circuit at output U, V, W.<br>b) Motor power cable defective.<br>c) Power stage (IGBT) defective. |
| E1 | External Error | An external error can be release by a digital input. The digital input can be associated with parameter 3/22 SSER. The input can supervise e.g. overcurrent release from a independent blower of the motor |

# 10.0 Spare Part List

## 10.1 TA-BL/P 1.2...6.2

| Supply voltage 200V-250V | | | TA-BL/P | | |
|---|---|---|---|---|---|
| | **Article-No.** | **Description** | **1.2** | **2.2** | **3.2** |
| **LP1** | 78320-0F | Control Board TA-BL-E/98 | • | • | • |
| **LP2** | 78331-1F50 | Power Board (Complete) without EMC | 1) | | |
| **LP2** | 78331-1F51 | Power Board (Complete) with EMC | 1) | | |
| **LP2** | 78331-2F50 | Power Board (Complete) without EMC | | 1) | |
| **LP2** | 78331-2F51 | Power Board (Complete) with EMC | | 1) | |
| **LP2** | 78331-3F50 | Power Board (Complete) without EMC | | | 1) |
| **LP2** | 78331-3F51 | Power Board (Complete) with EMC | | | 1) |
| **T1** | 34291-05 | IGBT 6MBP 15RH-060 | • | | |
| **T1** | 34291-10 | IGBT 6MBP 20RH-060 | | • | • |
| **GL1** | 34368-D08 | Rectifier SK 70 D08 | • | • | • |
| **L1** | 36312-07 | Line Choke ZKD60/21-7/3,7 mH | • | | |
| **L1** | 36312-12 | Line Choke ZKD60/25,5-12/1,61mH | | • | |
| **L1** | 36312-16 | Line Choke ZKD60/31-16,5/1,07mH | | | • |
| | 29554-AF | Profibus Board TA-BL/P 1.2...6.2 | 2) | 2) | 2) |
| **LP6** | 78305-00F | Display Board TA-BL/P | • | • | • |
| **R1** | 31366-175K | PTC Resistor 175R L 88 T10 | • | • | • |
| **R2** | 30588-042 | Brake Resistor 42R RFHT 75 | 3) | 3) | 3) |
| **E1** | 68053-00 | Fan 24V type 614 | | | • |

| Supply voltage 350V-480V* | | | | | |
|---|---|---|---|---|---|
| | **Article-No.** | **Description** | **2.2** | **4.2** | **6.2** |
| **LP1** | 78320-0F | Steuerelektronik TA-BL-E/98 | • | • | • |
| **LP2** | 78330-2F50 | Power Board (Complete) without EMC | 1) | | |
| **LP2** | 78330-2F51 | Power Board (Complete) with EMC | 1) | | |
| **LP2** | 78330-4F50 | Power Board (Complete) without EMC | | 1) | |
| **LP2** | 78330-4F51 | Power Board (Complete) with EMC | | 1) | |
| **LP2** | 78330-6F50 | Power Board (Complete) without EMC | | | 1) |
| **LP2** | 78330-6F51 | Power Board (Complete) with EMC | | | 1) |
| **T1** | 34292-15 | IGBT 7MBP 25RA-120 | • | • | • |
| **GL1** | 34364-00 | Rectifier 36 MT 120A DS-GL 35A 1200V | • | • | • |
| **L1** | 36314-06 | Line Choke ZKD78/27,5-4pol. 6A 3,15mH/Winding | • | | |
| **L1** | 36314-12 | Line Choke ZKD78/36,5-4pol. 12A 1,037mH/Winding | | • | |
| **L1** | 36314-18 | Line Choke ZKD78/40,5-4pol. 18A 0,49mH/Winding | | | • |
| | 29554-AF | Profibus Board TA-BL/P 1.2...6.2 | 2) | 2) | 2) |
| **LP6** | 78305-00F | Display Board TA-BL/P | • | • | • |
| **R1** | 31366-175K | PTC Resistor 175R L 88 T10 | • | • | • |
| **R2** | 30588-075 | Brake Resistor 75R RFHT 100 | 3) | 3) | 3) |
| **E1** | 68053-00 | Fan 24V type 614 | | • | • |

*) With EMC the voltage be reduced to 350-420V
1) Version with or without EMC Filter
2) Only existing at version profibus
3) Only existing at option internal Brake resistor

## 10.2 TA-BL/P 4.1...150.1

| | | | TA-BL/P... | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Article-No. | Description | 4.1 | 6.1 | 8.1 | 10.1 | 15.1 | 20.1 | 30.1 | 50.1 | 60.1 | 80.1 | 150.1 |
| LP1 | 78280-1F | Control Board TA-BL/E94-PRG 10 | • | • | • | • | • | • | • | • | • | • | • |
| LP2 | 78285-0F | IGBT-CONTROL EXB841 | • | • | • | • | • | • | • | • | • | • | • |
| LP3 | 78304-0F | Sensor Board | • | • | • | • | • | • | • | | | | |
| | 78313-0F | Sensor Board | | | | | | | | • | • | • | • |
| LP4 | 78287-0F | Switched Mode Power Supply 24V | • | • | • | • | • | • | • | • | • | • | • |
| LP5 | 78297-0F | EMC Filter TA-BL/P 4.1 | 2) | | | | | | | | | | |
| | 78298-0F | EMC Filter TA-BL/P 6.1 | | 2) | | | | | | | | | |
| | 78299-1F | EMC Filter TA-BL/P 8.1 | | | 2) | | | | | | | | |
| | 78299-2F | EMC Filter TA-BL/P 10.1 | | | | 2) | | | | | | | |
| | 78300-1F | EMC Filter TA-BL/P 15.1 | | | | | 2) | | | | | | |
| | 78300-2F | EMC Filter TA-BL/P 20.1 | | | | | | 2) | | | | | |
| | 78300-3F | EMC Filter TA-BL/P 30.1 | | | | | | | 2) | | | | |
| | 78300-5F | EMC Filter TA-BL/P 50.1 | | | | | | | | 2) | | | |
| | 78300-6F | EMC Filter TA-BL/P 60.1 | | | | | | | | | 2) | | |
| | 78300-8F | EMC Filter TA-BL/P 80.1 | | | | | | | | | | 2) | |
| | 78300-9FC | EMC Filter TA-BL/P 150.1 | | | | | | | | | | | 2) |
| LP6 | 78305-.. | Display Board TA-BL/P | • | • | • | • | • | • | • | • | • | • | • |
| | 29553-0F | Profibus | 3) | 3) | 3) | 3) | 3) | 3) | 3) | 3) | 3) | 3) | 3) |
| T1...T6 | 34292-11 | IGBT-6MBI 25F-120 | • | • | | | | | | | | | |
| | 34292-21 | IGBT-6MBI 50F-120 | | 1) | • | | | | | | | | |
| | 34292-47 | IGBT-2MBI 75N-120 | | | | • | | | | | | | |
| | 34292-52 | IGBT-2MBI 100N-120 | | | | | • | | | | | | |
| | 34292-57 | IGBT-2MBI 150N-120 | | | | | | • | | | | | |
| | 34292-62 | IGBT-2MBI 200N-120 | | | | | | | • | | | | |
| | 34292-67 | IGBT-2MBI 300N-120 | | | | | | | | • | | • | • |
| | 34292-87 | IGBT-1MBI 400N-120 | | | | | | | | | • | | |
| GL1 | 34364-00 | Rectifier 36 MT 120A DS-GL. 35A 1200V | • | • | | | | | | | | | |
| | 34366-00 | Rectifier SKD 60/12 | | | • | • | • | | | | | | |
| | 34370-A0 | Rectifier IRKD 61/12 | | | | | | • | • | | | | |
| | 34370-C0 | Rectifier SKKD 100/14 | | | | | | | | • | • | | |
| | 34370-E0 | Rectifier SKKD 162/12 | | | | | | | | | | • | |
| | 34374-07 | Rectifier SKKE 201/14 | | | | | | | | | | | • |
| L1 | 36315-00 | Line Choke NGD78/40-9,8/2x4,4 | • | | | | | | | | | | |
| | 36317-01 | Line Choke ZKD96/36,5-2x16A/2,5mH | | • | | | | | | | | | |
| | 36322-01 | Line Choke ZKD9/59,7-2x 28A/1,4mH | | | • | • | | | | | | | |
| | 36329-01 | Line Choke ZKD105/86-2x40A/1,0mH | | | | | • | | | | | | |
| | 36331-01 | Line Choke ZKD135/72-2x50A/1,1mH | | | | | | • | | | | | |
| | 36334-01 | Line Choke ZKD135/72-2x66A/0,8mH | | | | | | | • | | | | |
| | 36343-01 | Line Choke ZKD150/66-2x120A/0,17mH | | | | | | | | • | | | |
| | 36348-01 | Line Choke ZKD150/92-2x140A/0,17mH | | | | | | | | | • | | |
| | 36350-02 | Line Choke ZKD192/110-2x190A/2x0,3mH | | | | | | | | | | • | |
| | 36353-L0 | Line Choke ZKD174/102-300/0,24mH (L) | | | | | | | | | | | • |
| | 36353-R0 | Line Choke ZKD174/102-300/0,24mH (R) | | | | | | | | | | | • |
| R1,R2 | 30470-22 | BUSS Balance Resistors 33k Ohm 11W | • | • | • | • | | | | | | | |
| | 30522-U0 | BUSS Balance Resistors 10k 65W | | | | | • | • | • | • | • | • | • |
| R3 | 30522-K0 | BUSS Charging Resistors 470 Ohm 65W | • | • | • | • | • | • | • | • | • | • | • |
| C1.1.../C2.1.-.. | 32126-A0 | BUSS Capacitors 2200µF 400VDC (to 460V) | • | • | • | • | • | • | • | • | • | • | • |
| | 32126-00 | BUSS Capacitors 2200µF 450VDC (to 480V) | | | | | | | | | | | |
| C3.1 | 31791-00 | Rectifier Capacitors 0,22µF 1000V MKP1 | • | • | | | | | | | | | |
| | 31791-A0 | Rectifier Capacitors 0,22µF 1250V FKP1 | | | • | • | • | • | • | • | • | • | • |
| C4.1 | 31665-A0 | Snubber Capacitor 1µF F250V ACX2 | • | • | • | • | | | | | | | |
| | 31665-B0 | Snubber Capacitor 2,2µF F250V ACX2 | | | | | • | • | • | • | • | • | • |
| K1 | 35020-A0 | Relay SDS JA1a-TM DC24V | • | • | | | | | | | | | |
| | 36738-AD | Contactor 20A 24VDC | | | • | • | • | • | | | | | |
| | 36745-I0 | Contactor 35A 230V | | | | | | | • | | | | |
| | 36751-I0 | Contactor 90A 230V | | | | | | | | • | • | • | |
| | 36754-I0 | Contactor 160A 230V | | | | | | | | | | | • |
| F1 | 34472-00 | Fuse 30x5 medium blow 3,15A | • | • | • | • | • | • | • | • | • | • | • |
| F2 | 34442-00 | Fuse 20x5 medium blow 2,5A | | | | | | | • | • | • | • | • |
| Th1.../Th2... | 31330-00 | Klixon 80°C | • | • | • | • | • | • | • | • | • | • | • |
| E1-E2-E3 | 68053-00 | Fan 24V type 614 | | • | • | • | • | • | | | | • | |
| | 68058-00 | Fan 230V type 5656 | | | | | | | • | | | | • |
| | 68062-00 | Radial Fan 230V type 621 AL-F38 | | | | | | | | • | • | | |
| | 68065-00 | Radial Fan 230V type D2E 133-AM47 | | | | | | | | | | • | |
| | 68066-00 | Radial Fan 230V type D2E 133-DM47 | | | | | | | | | | | • |
| | 40304-02 | Metall Cover TA-BL/P 4.1...6.1 | • | • | | | | | | | | | |
| | 40304-03 | Metall Cover TA-BL/P 8.1...10.1 | | | • | • | | | | | | | |
| | 40304-04 | Metall Cover TA-BL/P 15.1 | | | | | • | | | | | | |
| | 40304-05 | Metall Cover TA-BL/P 20.1...30.1 | | | | | | • | • | | | | |
| | 40304-06 | Metall Cover TA-BL/P 50.1 | | | | | | | | • | | | |
| | 40304-07 | Metall Cover TA-BL/P 60.1 | | | | | | | | | • | | |
| | 40304-08 | Metall Cover TA-BL/P 80.1 | | | | | | | | | | • | |
| | 40304-12 | Metall Cover TA-BL/P 150.1 | | | | | | | | | | | • |

[1] Option Servo
[2] Option EMC Filter
[3] Option Profibus

**Orders must always indicate type of unit, serial number and supply voltage.**

## 11.0 List of Paramerters

### 11.1 Parameter group 1

| Group/ Parameter | Display | Description | Range | Standard Parameter | Unit |
|---|---|---|---|---|---|
| 1/02 | MAXS | Maximum speed | 100 - 6000 | 1000 | $min^{-1}$ |
| 1/03 | MINS | Minimum speed | 0 - 6000 | 0 | $min^{-1}$ |
| 1/04 | PRST1 | 1. preset speed at master operation<br>1. multiplier in slave operation | 0 - 64000 | 0 | - |
| 1/05 | PRST2 | 2. preset speed at master operation<br>2. multiplier in slave operation | 0 - 64000 | 0 | - |
| 1/06 | PRST3 | 3. preset speed at master operation<br>3. multiplier in slave operation | 0 - 64000 | 0 | - |
| 1/07 | IL1Q | Max. current during motor operation (1Q) | 0,1 - I-max. | I-max. | A |
| 1/08 | 4QEN | Generator operation, enabled | 0 or 1 | 0 | - |
| 1/09 | IL4Q | Curremt limit, Generator operation | 0,1 - I-max. | I-max. | A |
| 1/10 | RAMP | Speed ramp type | 0=jump<br>1=ramp<br>2=S-curve | 1 | - |
| 1/11 | ACCEL | Acceleration time A (start-up) | 0,1 - 599,9 | 10,0 | s |
| 1/12 | DECEL | Deceleration time A (shut-down) | 0,1 - 599,9 | 10,0 | s |
| 1/13 | LEADE | Leaded deceleration | 0 or 1 | 0 | - |
| 1/14 | BRADE | 0,5s stopping torque at n<10 | 0 or 1 | 0 | - |
| 1/15 | DELOF | Drive lock at set-point value=0 & n=0 | 0 or 1 | 0 | - |
| 1/16 | P AMP | Speed regulator, P-amplification | 0 - 100 | 5 | % |
| 1/17 | I AMP | Speed regulator, Integral proportion | 0 - 100 | 4 | % |
| 1/18 | YIOP | Valid range of I-proportion in n-regulator | 1 - 255 | 255 | $min^{-1}$ |
| 1/19 | SAVE | Save Parameter to EEPROM | 0 or 1 | 0 | - |

## 11.2 Parameter group 2

| Group/ Parameter | Display | Description | Range | Standard-Parameter | Unit |
|---|---|---|---|---|---|
| 2/02 | STORD | Read standard parameters | 0 or 1 | - | - |
| 2/03 | RATSP | Motor rated speed (Lower Speed by BL-N-Motors) | 0 - 6000 | - | $min^{-1}$ |
| 2/04 | POLES | Motor poles | 2 - 32 | - | - |
| 2/05 | PPR | Pulses per revolution from Motor x4 | 1 - 9999 | - | - |
| 2/06 | MRACU | Motor rated current | 1,0 - 3000,0 | - | A |
| 2/07 | MPECU | Motor peak current | 1,0 - 3000,0 | - | A |
| 2/08 | OCTIM | Overcurrent time (at n<300 $min^{-1}$) | 0 - 200 | 80 | s |
| 2/09 | SETAB | Selection ramp A or B or change between ramp A or B | 0 = ramp A<br>1 = SWTR<br>3 = dir<br>4 = ramp B<br>5 = motorpoti<br>6 = set B<br>7= slave set B | 0 | - |
| 2/10 | ACC B | Acceleration time B (start-up) | 0,1 - 599,9 | 180,0 | s |
| 2/11 | DEC B | Deceleration time B (shut-down) | 0,1 - 599,9 | 180,0 | s |
| 2/12 | PHADV | Phase advance | 0 or 1 | 0 | - |
| 2/13 | PHADR | Phase advance at nominal speed | 0 - 99 | 30 | % |
| 2/14 | PHADM | Phase advance at maximum speed | 0 - 99 | 50 | % |
| 2/15 | INCR | Increase speed (master operation) Increase multiplier (slave operation) | 0 - 9999 | 0 | $min^{-1}$/- |
| 2/16 | DECR | Decrease speed (master operation) Decrease multiplier (slave operation) | 0 - 9999 | 0 | $min^{-1}$/- |
| 2/17 | FINE | Speed fine tuning1/4 rpm | 0 - 3 | 0 | 1/4 $min^{-1}$ |
| 2/18 | SWTR | Speed message | 10 - 6000 | 100 | $min^{-1}$ |
| 2/19 | IL20 | Message delay, current limit reached | 1 - 9999 | 1 | s |
| 2/20 | CODO | Fixed configuration of the digital outputs | 0 or 1 | 0 | - |
| 2/21 | DIRAN | Revers by negative input voltage | 0 or 1 | 0 | - |
| 2/22 | 4MA | Analog input 1, 0-20mA or 20mA | 0 or 1 | 0 | - |
| 2/23 | CLT1 | Torque limit, time constant | 0,01 - 300,00 | 0,01 | s |
| 2/24 | UVTIM | Delay of undervoltage switch off | 0,0 - 3000,0 | 0,1 | s |
| 2/25 | OV_40 | Maximum reducing circuit voltage | 100 - 1500 | 900 | V |
| 2/26 | PTQL | Programable torque limit | 0 - 100,0 | 100,0 | % |
| 2/27 | MPTUL | Motorpoti transmission limit (UP) | 0 - 100 | 0 | % |
| 2/28 | MPTDL | Motorpoti transmission limit (DOWN) | 0 - 100 | 0 | % |

***Parameters 2/29 to 2/37 are parameters for options refer to chapter 11.5***

## 11.3 Parameter group 3

| Group/ Parameter | Display | Description Range | | Range | Standard-Parameter |
|---|---|---|---|---|---|
| 3/02 | SRES | Reset fault | | 0 = OFF<br>1 = ON<br><br>2 to 13 = terminals at the TA-BL/P | 2 (TE.2) |
| 3/03 | SRUN | Run | | | 3 (TE.3) |
| 3/04 | SPRS1 | Preset speed (1) | | | 4 (TE.4) |
| 3/05 | SDIR | Direction of rotation (Master mode) | | | 5 (TE.5) |
| 3/06 | SHOLD | Quick stop | | | 6 (TE.6) |
| 3/07 | SPRS2 | Preset speed (2) | | | 7 (TE.7) |
| 3/08 | SMOT | Motorpoti function / ON-OFF | | | 8 (TE.8) |
| 3/09 | SUP | Motorpoti function speed - UP | | | 9 (TE.9) |
| 3/10 | SDOWN | Motorpoti function speed - DOWN | | | 10 (TE.10) |
| 3/11 | SINC | Increase speed (master operation) Increase multiplier (slave operation) | | | 11 (TE.11) |
| 3/12 | SDEC | Decrease speed (master operation) Decrease multiplier (slave operation) | | | 12 (TE.12) |
| 3/13 | SSLAV | Master/Slave | | | 13 (TE.13) |
| 3/14 | SSPER | Suppress feedback error | | | 0 |
| 3/15 | SSYNC | Synchron, angle or speed | | | 1 |
| 3/16 | SANG | Angle correction | | | 0 |
| 3/17 | SICW | End switch clockwise (cw) | | | 0 |
| 3/18 | SICCW | End switch counter clockwise (ccw) | | | 0 |
| 3/19 | SSETB | Ramp A or ramp B selection | | | 0 |
| 3/20 | SLDIR | Change rotating direction for follow-up drives | | | 0 |
| 3/21 | STQL | External torque limit | | | 0 |
| 3/22 | SSER | External Error shut down | | | 0 |
| 3/23 | SSDC | Disable controller | | | 0 |
| 3/24 | STLAP | Torque limit analog / Programmable | | | 0 |
| 3/25 | IPL2 | Input logic terminals 2 to 13 (Polarity inversion) | TE.2 | 0=Input is active and if +24V are connected input is inactive<br><br>1=Input is inactive and if +24V are connected input is active | 1 |
| 3/26 | IPL3 | | TE.3 | | 1 |
| 3/27 | IPL4 | | TE.4 | | 1 |

| Group/ Parameter | Display | Description Range | | Range | Standard Parameter | |
|---|---|---|---|---|---|---|
| 3/28 | IPL5 | Input logic terminals 2 to 13 (Polarity inversion) | TE.5 | 0=Input is active and if +24V are connected input is inactive<br>1=Input is inactive and if +24V are connected input is active | 1 | |
| 3/29 | IPL6 | | TE.6 | | 1 | |
| 3/30 | IPL7 | | TE.7 | | 1 | |
| 3/31 | IPL8 | | TE.8 | | 1 | |
| 3/32 | IPL9 | | TE.9 | | 1 | |
| 3/33 | IPL10 | | TE.10 | | 1 | |
| 3/34 | IPL11 | | TE.11 | | 1 | |
| 3/35 | IPL12 | | TE.12 | | 1 | |
| 3/36 | IPL13 | | TE.13 | | 1 | |
| 3/37 | SO48 | Output programming | TE.48 | 0=OFF<br>1=Fault<br>2=Delayed Current limit<br>3=Speed reached<br>4=Ready<br>5=Operation<br>6=Speed detected<br>7=n > 9 rpm<br>8=current limit<br>9=motor over current<br>10=reserve<br>11=position OK<br>12=leaded speed reached<br>13=position pass | 4 | If the fixed configuration of the digital outputs is set (parameter 2/20 = 1), the values of the parameters 3/37 to 3/46 are without any function. |
| 3/38 | SO47 | | TE.47 | | 1 | |
| 3/39 | SOK45 | | TE.45 | | 7 | |
| 3/40 | SOK44 | | TE.44 | | 2 | |
| 3/41 | SOK43 | | TE.43 | | 6 | |
| 3/42 | PO48 | Output logic relay | TE.48 | 0 or 1 | 1 | |
| 3/43 | PO47 | | TE.47 | 0 or 1 | 1 | |
| 3/44 | POK45 | Output logic optocoupler | TE.45 | 0 or 1 | 1 | |
| 3/45 | POK44 | | TE.44 | 0 or 1 | 0 | |
| 3/46 | POK43 | | TE.43 | 0 or 1 | 1 | |
| 3/47 | AOSEL | Function analog output | | 1=Motor speed<br>2=Motor current | 1 | |
| 3/48 | RSEL1 | Set-point speed with ramp | | 0=OFF<br>1=analog input<br>2=analog input 2<br>3=(without funktion)<br>.<br>.<br>.<br>15=(without funktion) | 1 | |
| 3/49 | RSEL2 | Set-point speed without ramp | | | 0 | |
| 3/50 | RSEL3 | Set-point value, torque limit | | | 0 | |
| 3/51 | RSEL4 | Source of Position maximum speed | | | 0 | |
| 3/52 | RSEL5 | Selection of analog input (reserved) | | | 0 | |
| 3/53 | RSEL6 | Selection of analog input (reserved) | | | 0 | |
| 3/54 | TRQEN | Operate Torque regulation | | 0=OFF<br>1=ON | 0 | |
| 3/55 | KLIXEN | Thermal switch active | | 0=inactive<br>1=active | 0 | |

| Group/ Parameter | Display | Description Range | | | Range | Standard Parameter |
|---|---|---|---|---|---|---|
| 3/56 | PP0R | Profibus parameters | 0 | read | Profibus-No. 0 - 255 | 0 |
| 3/57 | PP0W | | 0 | write | | 0 |
| 3/58 | PP1R | | 1 | read | | 0 |
| 3/59 | PP1W | | 1 | write | | 0 |
| 3/60 | PP2R | | 2 | read | | 0 |
| 3/61 | PP2W | | 2 | write | | 0 |
| 3/62 | PP3R | | 3 | read | | 0 |
| 3/63 | PP3W | | 3 | write | | 0 |
| 3/64 | PP4R | | 4 | read | | 0 |
| 3/65 | PP4W | | 4 | write | | 0 |
| 3/66 | PP5R | | 5 | read | | 0 |
| 3/67 | PP5W | | 5 | write | | 0 |
| 3/68 | PP6R | | 6 | read | | 0 |
| 3/69 | PP6W | | 6 | write | | 0 |
| 3/70 | PP7R | | 7 | read | | 0 |
| 3/71 | PP7W | | 7 | write | | 0 |
| 3/72 | CAOP1 | Change analog output polarity | | | 0=inactive 1=active | 0 |
| 3/73 | POSEN | Commonfault in position sensor | | | 0=inactive 1=active | 0 |
| 3/80 | INVCO | Invert Counter dir when Pos-Off | | | 0=inactive 1=active | 0 |
| 3/82 | SMPOT | Save Motorpoti value by Power down | | | 0=inactive 1=active | 0 |

***Parameters 3/74 to 3/79, 3/81 are parameters for options refer to chapter 11.5***

**An alteration of the parameters in the parameter group -4-, may be carried out by trained staff only.**

## 11.4 Parameter group 4

| Group/ Parameter | Display | Description | Range | Standard Parameter | Unit |
|---|---|---|---|---|---|
| 4/02 | CFMAX | Maximum switch frequency | 500 - 18000 | 4500 | Hz |
| 4/03 | CFMIN | Start-up frequency | 300 - 2500 | 500 | Hz |
| 4/04 | CREND | Vertex for maximum switch frequency | 100 - 800 | 300 | $min^{-1}$ |
| 4/05 | SERVO | Servo function | 0 or 1 | 0 | - |
| 4/06 | ADR | Device address for serial interface | 1 - 99 | 1 | - |
| 4/07 | PW PA | Parameter password(PG3000) | 0 - 999 | 0 | - |
| 4/08 | PW CN | Control password(PG3000) | 0 - 999 | 111 | - |
| 4/09 | C DSP | Selection of the actual value which is indicated on the display of the PG 3000 after switch on. | 1=Speed<br>2=Current<br>3=Line speed<br>4=Line speed 1<br>5=Line speed 2<br>6=Position (low)<br>7=Position (high)<br>8=Leading speed<br>9=Software vers.<br>10=Buss voltage | 1 | - |
| 4/10 | B DSP | Bargraph selection(PG3000) | 0=OFF<br>1=Speed<br>2=Current<br>3=Position (low)<br>4=reserved | 2 | - |
| 4/11 | DSP F | Line speed multiplier 1,000 (PG3000) | 1 - 9999 | 1000 | - |
| 4/12 | TRAN1 | Ratio multplier n (Master) x value | 1 - 64000 | 1000 | - |
| 4/13 | TRAN2 | Ratio multplier n (Master) / value | 1 - 64000 | 1000 | - |
| 4/14 | LIMIT | Master-Slave pulse limiting at current limit | 0 or 1 | 1 | - |
| 4/15 | AB CD | Leading frequency AB-signal or switch/direction of rotation | 0 or 1 | 0 | - |
| 4/16 | ANCOR | Angle correction | 0 - 99 | 0 | - |
| 4/17 | PPR M | Pulses from Master | 1 - 9999 | 120 | - |
| 4/18 | KPSLV | P-amplification slave (static) | 0 - 100 | 1 | % |
| 4/19 | KPAM | P-amplification acceleration | 0 - 100 | 0 | % |
| 4/20 | SMOD | Select operating mode of slave | 1=Elektrical gear | 1 | - |
| 4/21 | PULSE | Target puls number | 1 - 64000 | 1 | - |
| 4/22 | CORR | Dynamic advance | 0 - 9999 | 0 | - |

## 11.5 Parameters for option positioning

| Group/ Parameter | Display | Description | Range | Standard-parameter | Unit |
|---|---|---|---|---|---|
| 2/29 | DEC_C | Deceleration Time C | 0,1 - 599,9 | 180,0 | s |
| 2/30 | PHMAX | Maximum rated-Position x10000 | 0 - 65535 | 0 | - |
| 2/31 | PLMAX | Maximum rated-Position x1 | 0 - 9999 | 0 | - |
| 2/32 | PHIGH | Rated-Position x10000 | 0 - 65535 | 0 | - |
| 2/33 | PLOW | Rated-Position x1 | 0 - 9999 | 0 | - |
| 2/34 | MPOSP | Position maximum speed | 1 - 6000 | 100 | $min^{-1}$ |
| 2/35 | WINPO | position window(encoder pulses x4) | 1 - 255 | 30 | - |
| 2/36 | KPP_P | proportional Amplifier for Positioning | 1 - 255 | 75 | - |
| 2/37 | ADJBC | Adjust start of breaking curve | 0,1 - 100,0 | 1,0 | s |

| | | | | | |
|---|---|---|---|---|---|
| 3/74 | STPOS | Input Selection Go to 1st position | 0=OFF<br>1=ON<br><br>2 to 13= terminals at the TA-BL/P | 0 | - |
| 3/75 | BRCUR | Input Selection Type of Break curve: Ramp/S-curve | | 0 | - |
| 3/76 | REPOS | Input Selection Reset Position | | 0 | - |
| 3/77 | REFPO | Input Selection Define direction of position | | 0 | - |
| 3/78 | RUKPO | Input Selection Go to Start position | | 0 | - |
| 3/79 | ENPOS | Input Selection Enable positioning | | 0 | - |
| 3/81 | F_JOG | Input Select. Dig. Speed Rated Value enable | | 0 | - |

*At version BL60430:*

***Remark:***
The source of maximum positioning speed (analog or digital) can be selected through Parameter 3/51

3/51 = 0 Digital Value = (2/34) Position maximum speed done by field bus system
3/51 = 1 Analog input 1 Position maximum speed done by analog input 1
3/51 = 2 Analog input 2 Position maximum speed done by analog input 2

The parameters 3/74 to 3/79 and 3/81 can be also activated through digital inputs.

# 12. Interface RS422/RS485

## 12.1 Protocol RS422/RS485

The transmission is done by 7 bit data, parity even, 1 stopbit. The bit rate is 9600 Baud (300 Baud optional). The RS422 (and RS485) specifications are met. The transmission is halfduplex.

The transmission has the following sequence:

*Example:*

transmission from host: (Host transmits reference value)

| *12 24 0987 (BCC)<CR> |
|---|

*  : Device address follows

12  : Device address (1-255)

24  : Parameter address / Parameter name (1-255)

0987 : Parameter which is stored at parameter address.
The parameter must have 4 digits.

BCC : Blockcheck: (in this case 043)
('*'+'1'+'2'+' '+'2'+'4'+' '+'0'+'9'+'8'+'7'+' ') MOD 256 = 43
The Blockcheck must have 3 digits.

<CR>: Carriage return signals end of transmission (CR=13)

Response from device:

| *12 OK (BCC)<CR> |
|---|

*12  : Device address will be repeated

OK  : Positive acknowledge

or ER : Negative acknowledge (Error in transmission, syntax or so)

BCC  : Blockcheck

<CR>: End of transmission

Transmission from host: (Host queries feedback)

| *12 ?26 (BCC)<CR> |
|---|

*12  : Device address

?  : Host wants to read the contents of the now following parameter address

26  : parameter address

BCC  : Blockcheck

<CR>: Carriage return signals end of transmission

Response from device:

| *12 0987 (BCC)<CR> |
|---|

*12  : Device address will be repeated

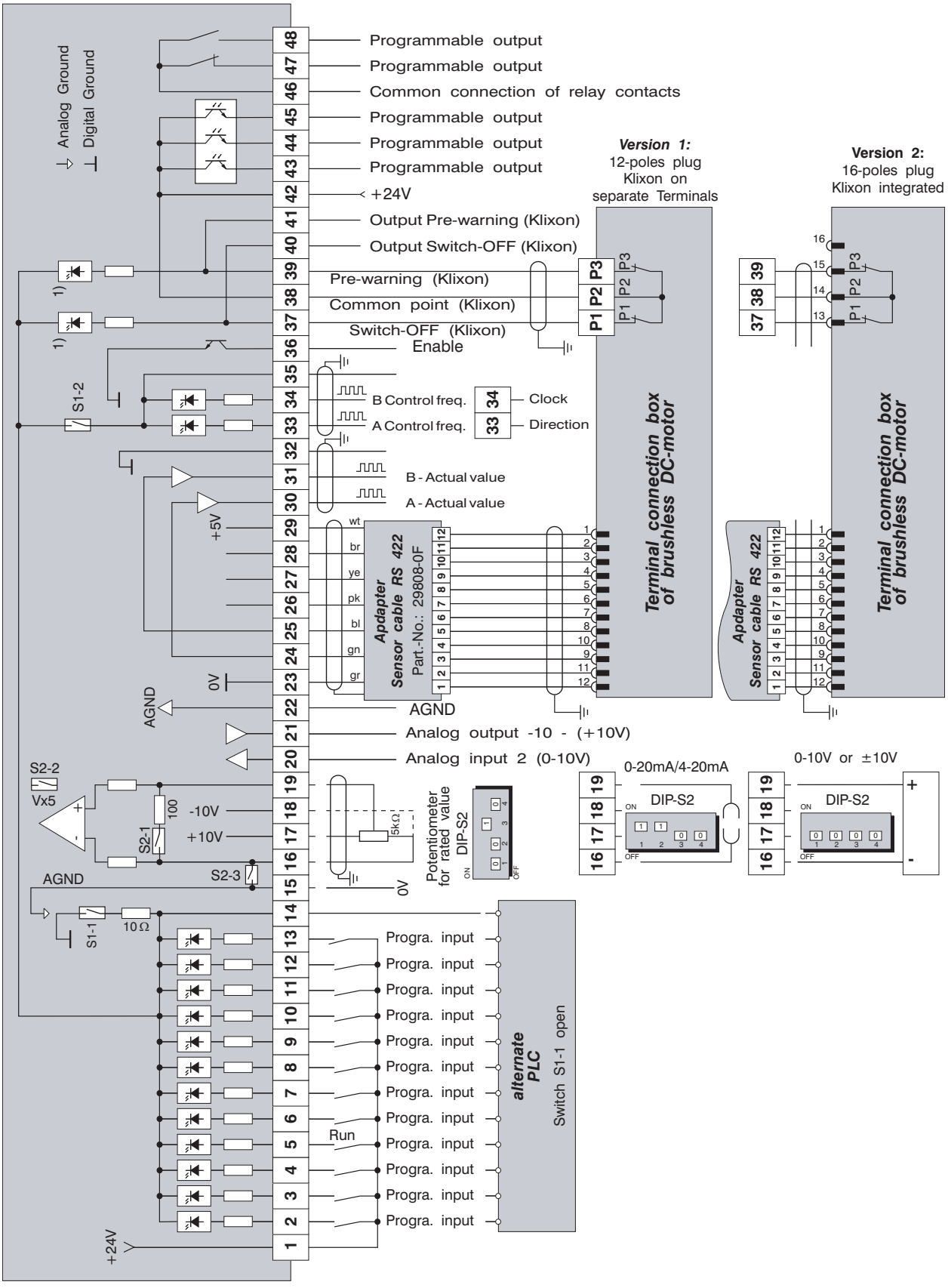
0987  : Device delivers contents of parameter address

or ER : Negative acknowledge (Error in transmission, syntax or so)

BCC  : Blockcheck

<CR>: End of transmission

## Connection diagram Control Board LP1 for differential encoders with interface RS 422




[1] Error is only evaluated at Regulators with Control Board TA-BL-E/P98 Art.-No. 78320-0F