

# Technical Information

PrimeSTACK

## 6PS0400R12KE3-3GH



**Zieldaten  
target data**

### Key data

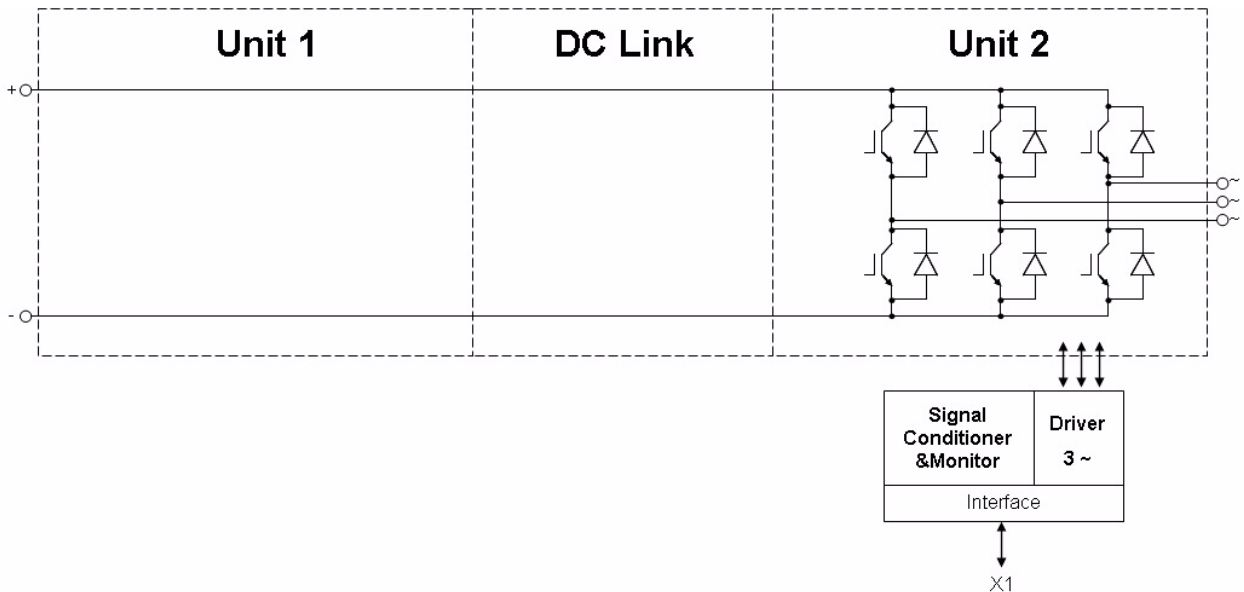
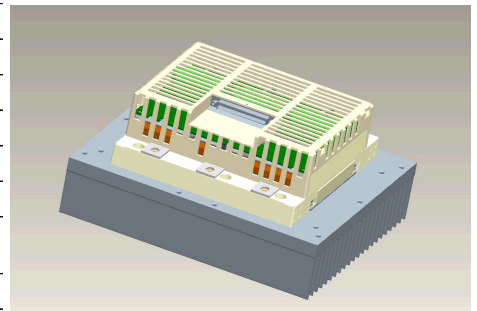
3x 237A AC at 400V AC, forced air (fan not implemented)

### General information for:

Stacks for various inverter application. Semiconductors, heat sinks, drivers and sensors included. These are only technical data!

Please read carefully the complete documentation and maintain the proper design environment! Especially note the EMC environment and the controller's functionality.

|                           |   |
|---------------------------|---|
| Topology                  | B6I                                     |
| Application / Modulation  | Inverter / Sine                         |
| Load type                 | resistive, inductive                    |
| Cooling                   | forced air (fan not implemented)        |
| Market                    | common industrial, drives, power supply |
| Monitors                  | current, temperature                    |
| Semicond. (Unit 1)        | none                                    |
| DC Link                   | none                                    |
| Semicond. (Unit 2)        | IGBT 3x FF400R12KE3                     |
| Interface IGBT            | electrical CMOS                         |
| Standards                 | EN50178, UL94, prepared for UL508C      |
| Product ID (eupec)        | 30188                                   |
| Mechanical drawing number | 38000030                                |
| Electrical drawing number | 6PS-C3-V-Rev03                          |



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|-----------------------------|---------------------------------|
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#### Notes

#### Overvoltage shutdown:

- It must be realized by the customer.

#### Overvoltage and Overcurrent shutdown reaction time:

- This parameter refers to the customers controller.

#### Electrical data

| DC Link |                 | min | typ | max | units |
|---------|-----------------|-----|-----|-----|-------|
| Voltage | V <sub>DC</sub> |     | 650 | 850 | V     |

| Unit 2 AC                        |   | min                       | typ   | max   | units             |
|----------------------------------|---|---------------------------|-------|-------|-------------------|
| Voltage                          | depending on controller   | V <sub>Unit2</sub>        | 400   |       | V <sub>RMS</sub>  |
| Continuous current               | V <sub>Unit2</sub> = 400V <sub>RMS</sub> , V <sub>DC</sub> = 650V, T <sub>inlet</sub> = 40°C, T <sub>J</sub> ≤ 125°C, f <sub>Unit2</sub> = 50Hz, f <sub>sw2</sub> = 5000Hz, cos(phi) = 0,85                           | I <sub>Unit2</sub>        |       | 237   | A <sub>RMS</sub>  |
| Continuous current overload cap. | T <sub>inlet</sub> = 40°C, for overload capability 150% for 60s   |                           | 168   |       | A <sub>RMS</sub>  |
| Short time current               | T <sub>inlet</sub> = 40°C, 10s, every 180s, initial load = 208A <sub>RMS</sub>  | I <sub>Unit2</sub>        |       | 260   | A <sub>RMS</sub>  |
| DC current                       | no rotating field, T <sub>inlet</sub> = 40°C  | I <sub>Unit2</sub> DC     |       | 116,0 | A <sub>av</sub>   |
| Overcurrent shutdown             | within 15µs   |                           | 625   |       | A <sub>peak</sub> |
| Switching frequency              |   | f <sub>sw2</sub>          |       | 20000 | Hz                |
| Power losses                     | V <sub>Unit2</sub> = 400V, V <sub>DC</sub> = 650V, T <sub>inlet</sub> = 40°C, T <sub>J</sub> ≤ 125°C, f <sub>Unit2</sub> = 50Hz, f <sub>sw2</sub> = 5000Hz, cos(phi) = 0,85, I <sub>Unit2</sub> = 237A <sub>RMS</sub> | P <sub>loss2</sub>        | 2300  |       | W                 |
| Power factor                     |   | cos(phi) <sub>Unit2</sub> | -1,00 | 1,00  |                   |

| General data                          |   | min                   | typ                | max    | units             |
|---------------------------------------|---|-----------------------|--------------------|--------|-------------------|
| Power losses (PCB)                    |   | P <sub>loss aux</sub> |                    | t.b.d. | W                 |
| EMC test                              | according to IEC61800-3 at named interfaces | power                 | V <sub>Burst</sub> | 2      | kV                |
|                                       |   | control               | V <sub>Burst</sub> | 1      | kV                |
|                                       |   | aux (24V)             | V <sub>Surge</sub> | 1      | kV                |
| Insulation management is designed for |   | V <sub>Line</sub>     | 500                |        | V <sub>RMS</sub>  |
| Insulation test voltage               | according to EN50178, f = 50Hz, t = 60s     | V <sub>isol</sub>     | 1,8                |        | kV <sub>RMS</sub> |

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#### Controller interface data

|                                    |   |                | min                       | typ   | max   | units    |
|------------------------------------|---|----------------|---------------------------|-------|-------|----------|
| Auxiliary voltage                  |   | $V_{aux}$      | 18                        | 24    | 30    | $V_{av}$ |
| Auxiliary power requirement        | $V_{aux} = 24V_{av}$  | $P_{aux}$      | 40                        |       |       | W        |
| Driver and interface board         | see separate technical information  |                | DR210                     |       |       |          |
| Driver core                        |   |                | EiceDRIVER<br>2ED300C17-S |       |       |          |
| Digital input level                | resistor to GND 10,0k $\Omega$ , capacitor to GND 1nF, high = on, min 15mA  | $V_{in}$       | 0,0                       |       | 15,0  | V        |
| Digital output level               | open collector, low = ok, max 15mA  | $V_{out}$      | 0,0                       |       | 30,0  | V        |
| Analog current outputs Unit 2      | load max 1mA; at 237A   | $V_{ana\ out}$ | 3,78                      | 3,86  | 3,94  | V        |
| Analog temperature output          | load max 1mA; at $T_{NTC} = 85^{\circ}C$ correspond to $T_j = 125^{\circ}C$ | $V_{T\ out}$   | 10,69                     | 10,91 | 11,13 | V        |
| Overvoltage shutdown reaction time | after overvoltage message by PrimeSTACK interface                           |                |                           |       | 50    | $\mu s$  |
| Overcurrent shutdown reaction time | after overvoltage message by PrimeSTACK interface                           |                |                           |       | 10    | $\mu s$  |

#### Heat sink air cooled / Thermal data

|                               |   |                           | min | typ | max | units             |
|-------------------------------|---|---------------------------|-----|-----|-----|-------------------|
| Airflow                       | $T_{Air} = 20^{\circ}C$ , $P_{air} = 1013hPa$ , dry- and dust free, measured on side of heat sink. according to DIN 41882 | $\Delta V/\Delta t_{Air}$ | 500 |     |     | m <sup>3</sup> /h |
| Air pressure drop             |   | $\Delta p_{Air}$          |     | 400 |     | Pa                |
| Cooling air inlet temperature | heat sink temperature > -25 $^{\circ}C$   | $T_{inlet}$               | -25 |     | 40  | $^{\circ}C$       |

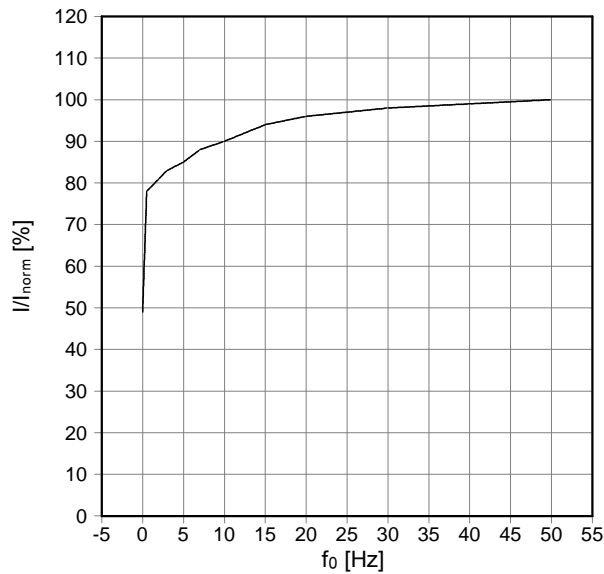
#### Environmental conditions

|                            |   |                | min  | typ | max  | units            |
|----------------------------|---|----------------|------|-----|------|------------------|
| Storage temperature        |   | $T_{stor}$     | -40  |     | 85   | $^{\circ}C$      |
| Ambient temperature (PCB)  |   | $T_{amp}$      | -25  |     | 55   | $^{\circ}C$      |
| Operating temperature      | see chapter Heat sink air cooled / Thermal data |                |      |     |      |                  |
| Cooling air velocity (PCB) |   | $V_{Air\ PCB}$ | 0,3  |     |      | m/s              |
| Air pressure               | standard atmosphere                             | $p_{Air}$      | 900  |     | 1100 | hPa              |
| Humidity                   | no condensation                                 | Rel. F         | 5    |     | 85   | %                |
| Installation height        |   |                | 0    |     | 1000 | m                |
| Vibration                  | according to IEC60721                           |                |      |     | 5    | m/s <sup>2</sup> |
| Shock                      | according to IEC60721                           |                |      |     | 40   | m/s <sup>2</sup> |
| Protection degree          |   |                | IP00 |     |      |                  |
| Pollution degree           |   |                | 2    |     |      |                  |
| Torque at DC Terminals     |   | $M_{DC}$       | 6,0  |     | 10,0 | Nm               |
| Torque at AC Terminals     |   | $M_{AC}$       | 16,0 |     | 20,0 | Nm               |
| Dimensions                 | width $\times$ depth $\times$ height            |                | 216  | 280 | 165  | mm               |
| Weight with heat sink      | approximation                                   |                |      | 8,9 |      | kg               |
| Weight without heat sink   | approximation                                   |                |      | 2,9 |      | kg               |

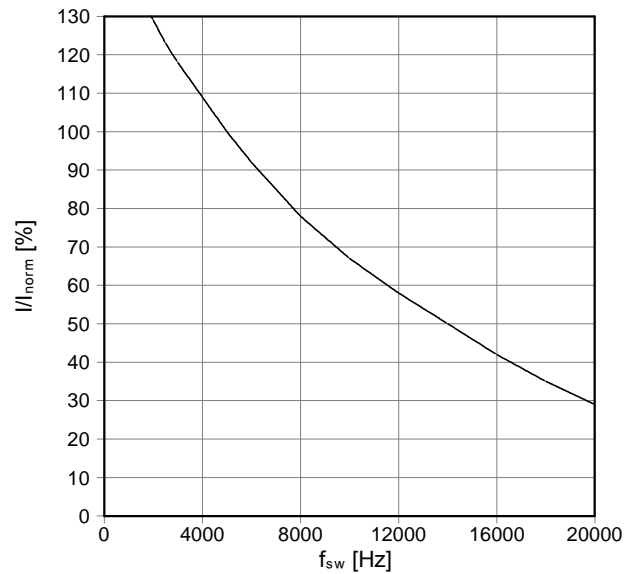
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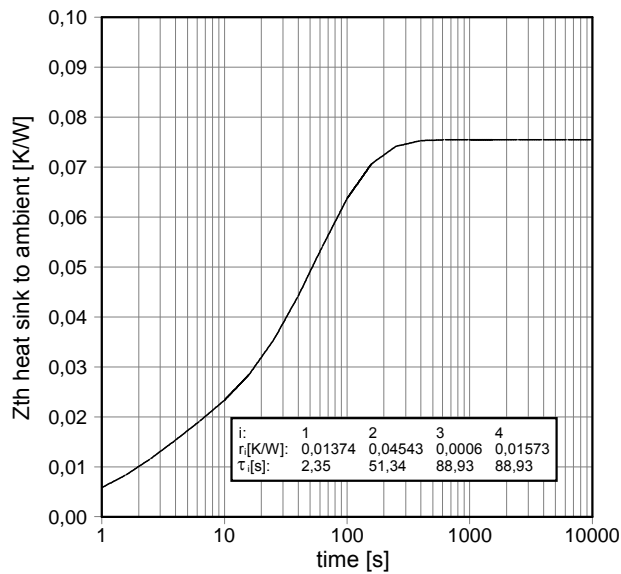
fo - derating curve IGBT (motor)  
cos(phi) = 0,85  
T<sub>cool medium</sub> = 40



fsw - derating curve IGBT (motor)  
cos(phi) = 0,85  
T<sub>cool medium</sub> = 40°C



Transient thermal impedance per module  
T<sub>cool medium</sub> = 40°C

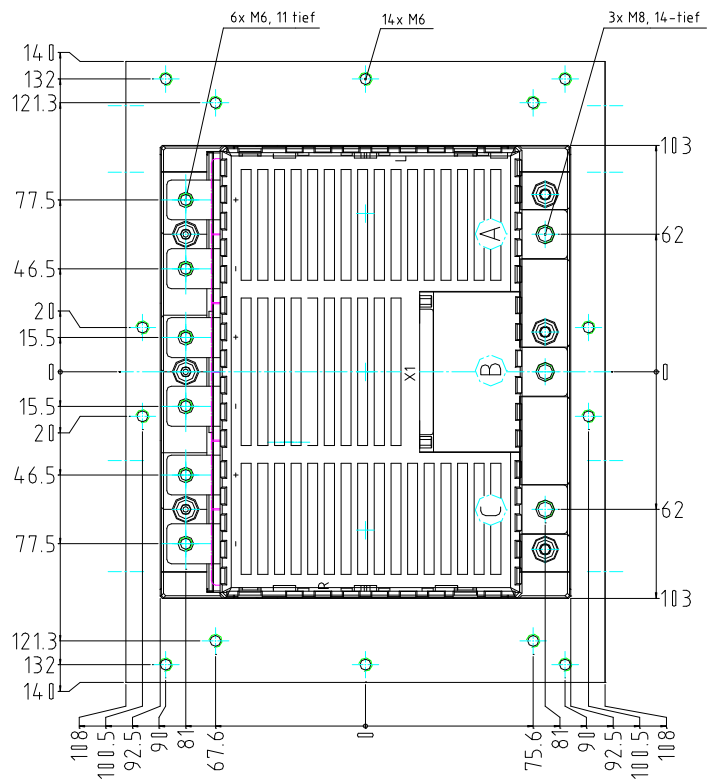
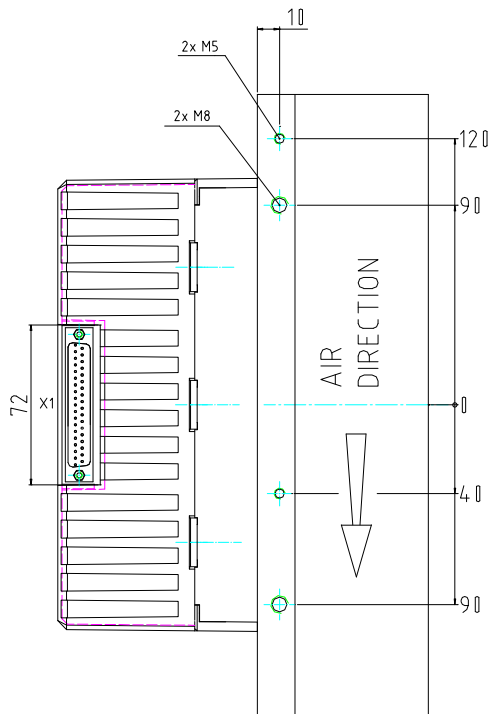
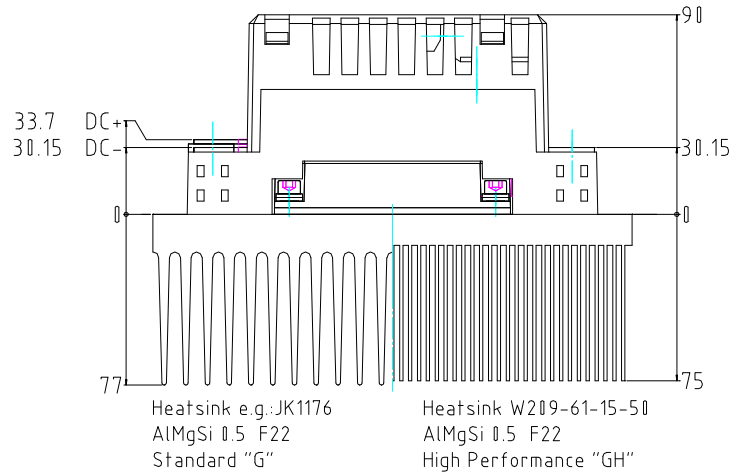


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Zieldaten  
target data

Mechanical drawing

2PS...-3...  
4PS...-3...  
6PS...-3...  
PrimeSTACK C3  
38000030

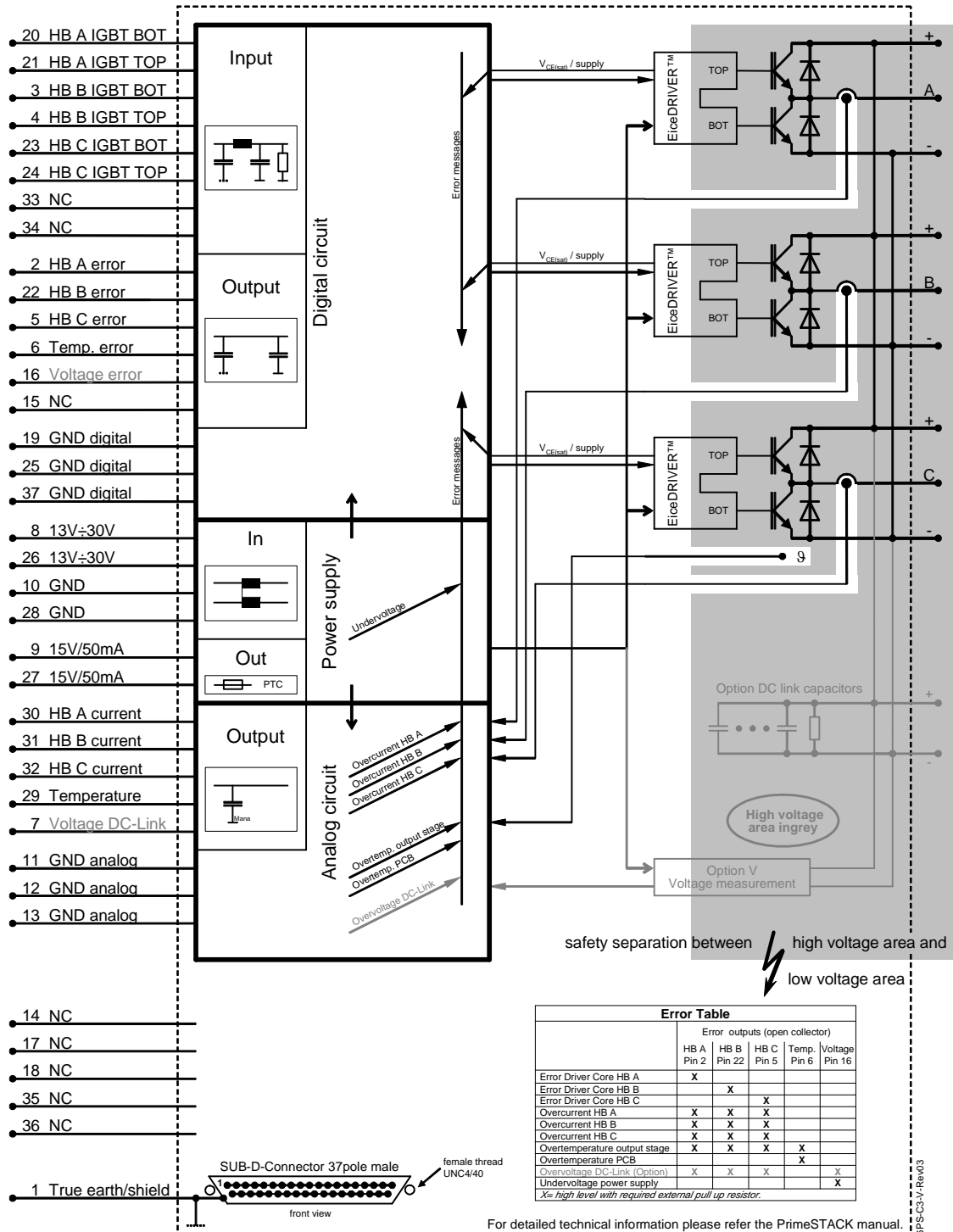


X1:

- 2PS : SUB-D-Connector 25 pole, male
- 6PS : SUB-D-Connector 37 pole, male

|                             |                                 |
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## Circuit diagram



|                             |                                 |
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**Ziel Daten  
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**Sicherheitshinweise**

Bevor Sie mit der Installation und dem Betrieb der Baugruppe beginnen, lesen Sie bitte sorgfältig alle Sicherheitshinweise, Warnungen und beachten Sie die angebrachten Warnschilder. Vergewissern Sie sich, dass alle Warnschilder in leserlichem Zustand verbleiben und fehlende oder beschädigte Schilder ersetzt werden.

**Safety Instructions**

Prior to installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced. To installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced.

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