

Technical Information

PrimeSTACK

2PS1800R12KE4-4FH-C26V



Vorläufige Daten
preliminary data

Key data

1x 770 A rms at 400 V rms, forced air (fan included)

General information

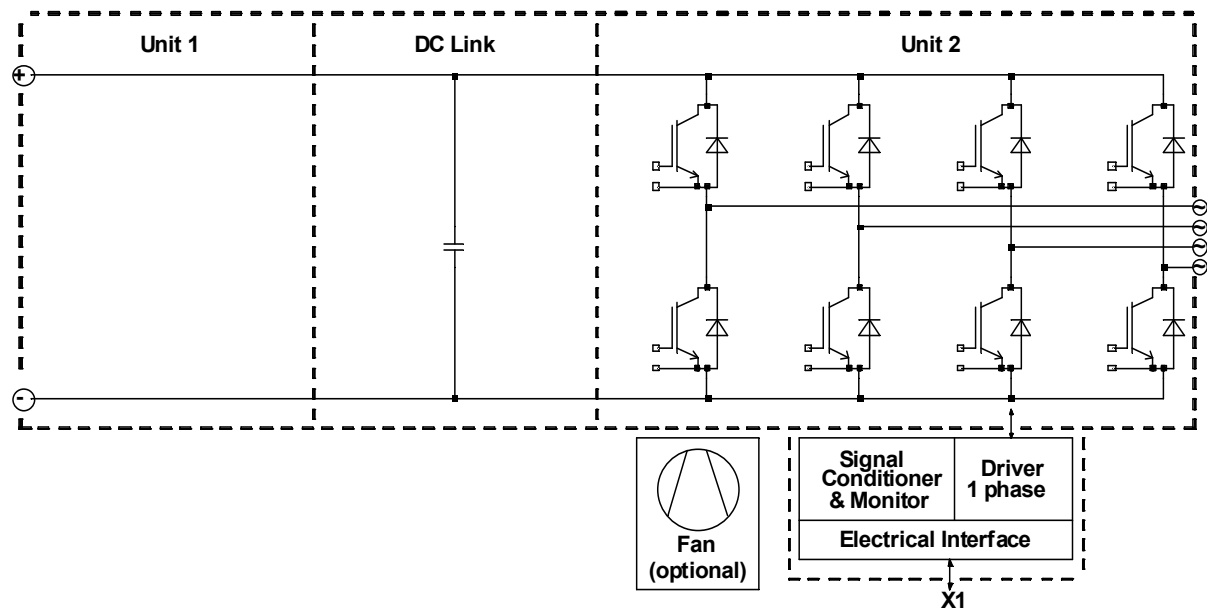
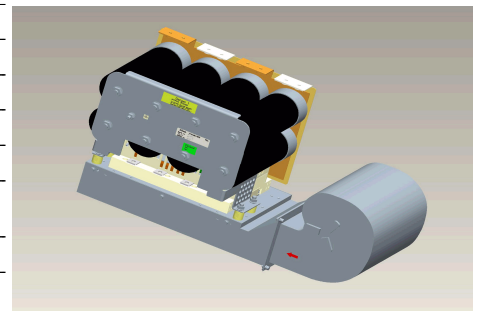
Stacks for various inverter application. Semiconductors, heat sinks, drivers and sensors included.

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 | | 1/2 B2I |
| Application / Modulation | | Inverter / Sine |
| Load type | | resistive, inductive |
| Cooling | | forced air (fan included) |
| Implemented sensors | | current, voltage, temperature |
| Semicond. (Unit 1) | | none |
| DC Link | | 8.48mF |
| Semicond. (Unit 2) | IGBT | 4x FF450R12KE4 |
| Driver signals IGBT | | electrical CMOS 0 .. 15V |
| Standards | | EN50178, UL94, prepared for UL508C |
| Sales - name | | 2PS18012E44F34383 |
| Internal ID | | 34383 |
| Mechanical drawing number | | 34383_MB |
| Electrical drawing number | | 2PS-C4-F-V |



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Electrical data

DC Link

| | | | min | typ | max | units |
|----------------------|---------------------|----------|-----|-----|-----|-------|
| Voltage | | V_{DC} | | 650 | 850 | V |
| Overtoltage shutdown | within 5000 μ s | | | 850 | | V |

Unit 2 AC

| | | | min | typ | max | units |
|----------------------------------|---|----------------------|-------|------|-------|------------|
| Voltage | depending on controller | V_{Unit2} | | 400 | | V_{RMS} |
| Continuous current | $V_{Unit2} = 400V_{RMS}$, $V_{DC} = 650V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 5000Hz$, $\cos(\phi) = 0,85$ | I_{Unit2} | | | 770 | A_{RMS} |
| Continuous current overload cap. | $T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s | | | 558 | | A_{RMS} |
| DC current | no rotating field, $T_{inlet} = 40^{\circ}C$ | $I_{Unit2 DC}$ | | | 358,0 | A_{av} |
| Overcurrent shutdown | within 15 μ s | | | 2500 | | A_{peak} |
| Switching frequency | | f_{sw2} | | | 6825 | Hz |
| Power losses | $V_{Unit2} = 400V$, $V_{DC} = 650V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 5000Hz$, $\cos(\phi) = 0,85$, $I_{Unit2} = 770A_{RMS}$ | P_{loss2} | | 2605 | | W |
| Power factor | | $\cos(\phi)_{Unit2}$ | -1,00 | | 1,00 | |

General data

| | | | min | typ | max | units |
|---------------------------------------|--|----------------|-------------|-----|--------|------------|
| Power losses (PCB) | | $P_{loss aux}$ | | | t.b.d. | W |
| EMC test | according to IEC61800-3 at named interfaces | power | V_{Burst} | 2 | | kV |
| | | control | V_{Burst} | 1 | | kV |
| | | aux (24V) | V_{Surge} | 1 | | kV |
| Insulation management is designed for | | V_{Line} | | 500 | | V_{RMS} |
| Insulation test voltage | according to EN50178, $f = 50Hz$, $t = 60s$ | V_{isol} | | 2,5 | | kV_{RMS} |

Important component data

| | | | min | typ | max | units |
|--------------------------------|-------------------------------------|------------|-----|--------|-----|-------------|
| DC Link capacitor | | C_{DC} | | 8,48 | | mF |
| | | type | | Foil | | |
| Temperature range | | | -25 | | +85 | $^{\circ}C$ |
| Rated voltage | per device | U_R | | 900 | | V_{DC} |
| Rated capacitance | per device | C_R | | 1060 | | μF |
| Capacitance tolerance | per device | Tol | -10 | | +10 | % |
| Maximum ripple current | per device, $T_{amb} = 60^{\circ}C$ | I_{Rmax} | | | 60 | A_{RMS} |
| wiring system | series, parallel | | | 1s, 8p | | |
| Balance or discharge resistors | per DC Link unit | R_b | | 82,0 | | k Ω |

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Controller interface data

| | | | min | typ | max | units |
|-------------------------------|---|----------------|---------------------------|-------|-------|----------|
| Auxiliary voltage | | V_{aux} | 13 | 24 | 30 | V_{av} |
| Auxiliary power requirement | $V_{aux} = 24V_{av}$ | P_{aux} | 40 | | | W |
| Driver and interface board | see separate technical information | | DR240 | | | |
| Driver core | | | EiceDRIVER 2ED300C17-S | | | |
| Digital input level | resistor to GND 10,0k Ω , capacitor to GND 1nF | 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 5mA; at 770A | $V_{ana out}$ | 3,10 | 3,16 | 3,22 | V |
| Analog DC Link voltage output | load max 1mA; at 850V | $V_{DC out}$ | 8,33 | 8,50 | 8,67 | V |
| Analog temperature output | load max 5mA; at $T_{NTC} = 87^{\circ}C$ correspond to $T_j = 125^{\circ}C$ | $V_{T out}$ | 11,17 | 11,40 | 11,63 | V |
| Overtemperature shutdown | at $T_{NTC} = 87^{\circ}C$ correspond to $T_j = 125^{\circ}C$ | $V_{T out OT}$ | | 11,4 | | V |

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 | $\Delta V/\Delta t_{Air}$ | 430 | | | m^3/h |
| Air pressure drop | | Δp_{Air} | | 425 | | Pa |
| Cooling air inlet temperature | heat sink temperature $< -25^{\circ}C$ | T_{inlet} | -40 | | 40 | $^{\circ}C$ |

Fan data

| | | | min | typ | max | units |
|-----------|---------|-----------|-------------------|------|-----|-----------|
| Type | assumed | | EBM. D2E 146-AP47 | | | |
| Voltage | | V_{Fan} | | 230 | | V_{RMS} |
| Frequency | | f_{Fan} | | 50 | | Hz |
| Current | | I_{Fan} | | 1,31 | | A_{RMS} |

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IGBT data unit 2

| Type | assumed | | min | typ | max | units |
|--|--|---------------|-----|---------|-----|-------|
| collector-emitter saturation voltage | $I_c = 450A; V_{ge} = 15V; T_{vj} = 150^\circ C$ | $V_{CE\ sat}$ | | 2,05 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | V_{ce1} | | 0,922 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | r_{ce1} | | 1,84 | | mΩ |
| parameter for linear model | $T_{vj} = 150^\circ C$ | V_{ce2} | | 0,79 | | V |
| parameter for linear model | $T_{vj} = 150^\circ C$ | r_{ce2} | | 2,8 | | mΩ |
| turn-on / turn-off energy loss per pulse | $T_{vj} = 25^\circ C$ | E_1 | | 19 / 33 | | mJ |
| turn-on / turn-off energy loss per pulse | $T_{vj} = 150^\circ C$ | E_2 | | 36 / 56 | | mJ |
| thermal resistance, junction to case | per IGBT | R_{thjc} | | 0,062 | | K/W |
| thermal resistance, case to heatsink | per IGBT | R_{thch} | | 0,031 | | K/W |

Diode data unit 2

| Type | assumed | | min | typ | max | units |
|--------------------------------------|---|------------|-----|-------|-----|-------|
| forward voltage | $I_F = 450A; V_{ge} = 0V; T_{vj} = 150^\circ C$ | V_F | | 1,75 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | V_{F1} | | 1,05 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | r_{F1} | | 1,444 | | mΩ |
| parameter for linear model | $T_{vj} = 150^\circ C$ | V_{F2} | | 0,833 | | V |
| parameter for linear model | $T_{vj} = 150^\circ C$ | r_{F2} | | 2,037 | | mΩ |
| reverse recovery energy | $T_{vj} = 25^\circ C$ | E_{rec1} | | 19 | | mJ |
| reverse recovery energy | $T_{vj} = 150^\circ C$ | E_{rec2} | | 39 | | mJ |
| thermal resistance, junction to case | per Diode | R_{thjc} | | 0,11 | | K/W |
| thermal resistance, case to heatsink | per Diode | R_{thch} | | 0,055 | | K/W |

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Environmental conditions

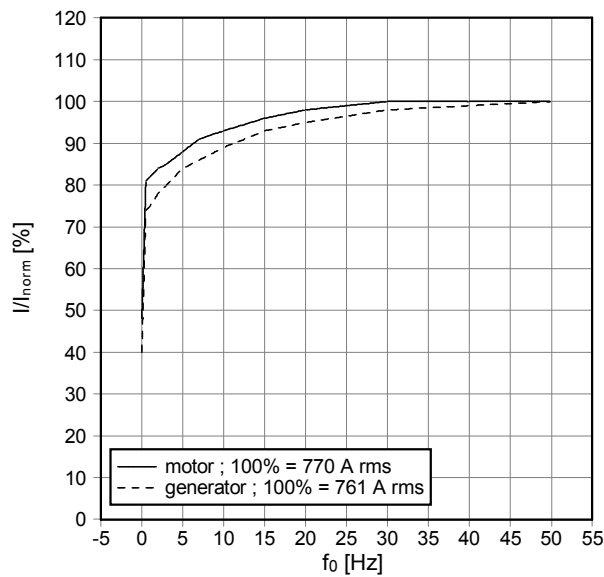
| | | | min | typ | max | units |
|----------------------------|---|---------------|------|------|------|------------------|
| Storage temperature | | T_{stor} | -40 | | 85 | °C |
| Ambient temperature | | T_{amb} | -25 | | 55 | °C |
| Operating temperature | see chapter Heat sink air cooled / Thermal 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 ² |
| Shock | according to IEC60721 | | | | 40 | m/s ² |
| 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 × depth × height | | 324 | 651 | 380 | mm |
| Weight with heat sink | approximation | | | 35,0 | | kg |

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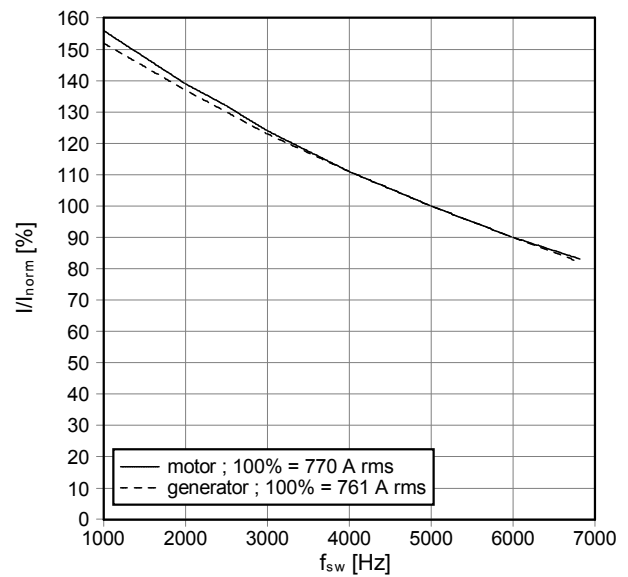


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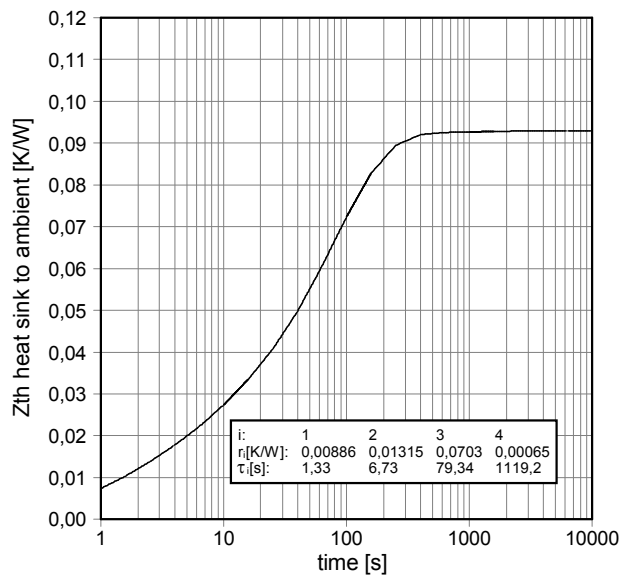
fo - derating curve IGBT (motor), Diode (generator)
cos(phi) = ± 0,85
T_{cool medium} = 40°C



fsw - derating curve IGBT (motor), Diode (generator)
cos(phi) = ± 0,85
T_{cool medium} = 40°C

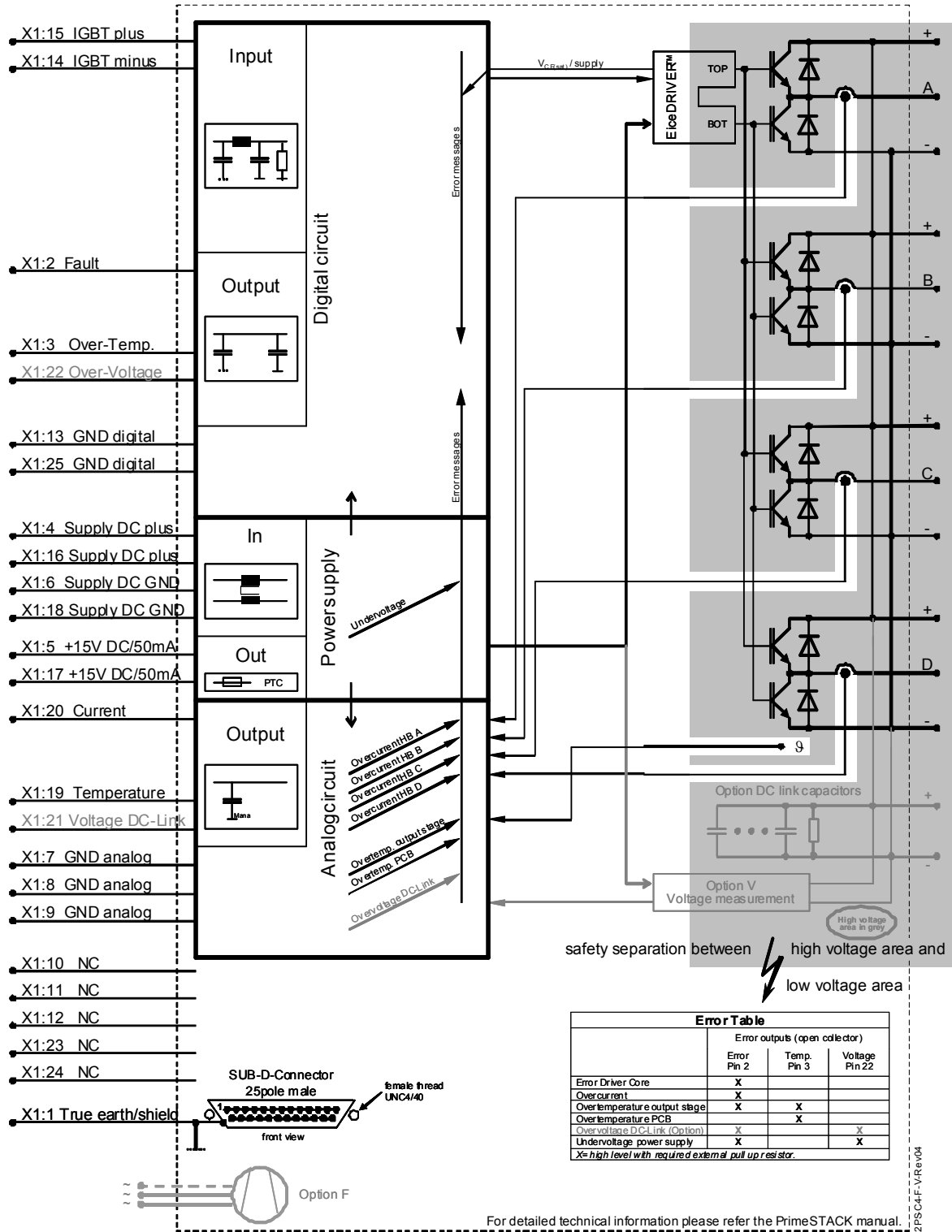


Transient thermal impedance per module
T_{cool medium} = 40°C



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Circuit diagram



Error Table

| | Error outputs (open collector) | | |
|-------------------------------|--------------------------------|-------------|----------------|
| | Error Pin 2 | Temp. Pin 3 | Voltage Pin 22 |
| Error Driver Core | X | | |
| Over current | X | | |
| Over temperature output stage | X | X | |
| Over temperature PCB | | X | |
| Overvoltage DC-Link (Option) | X | | X |
| Undervoltage power supply | X | | X |

X= high level with required external pull up resistor.

For detailed technical information please refer the PrimeSTACK manual.

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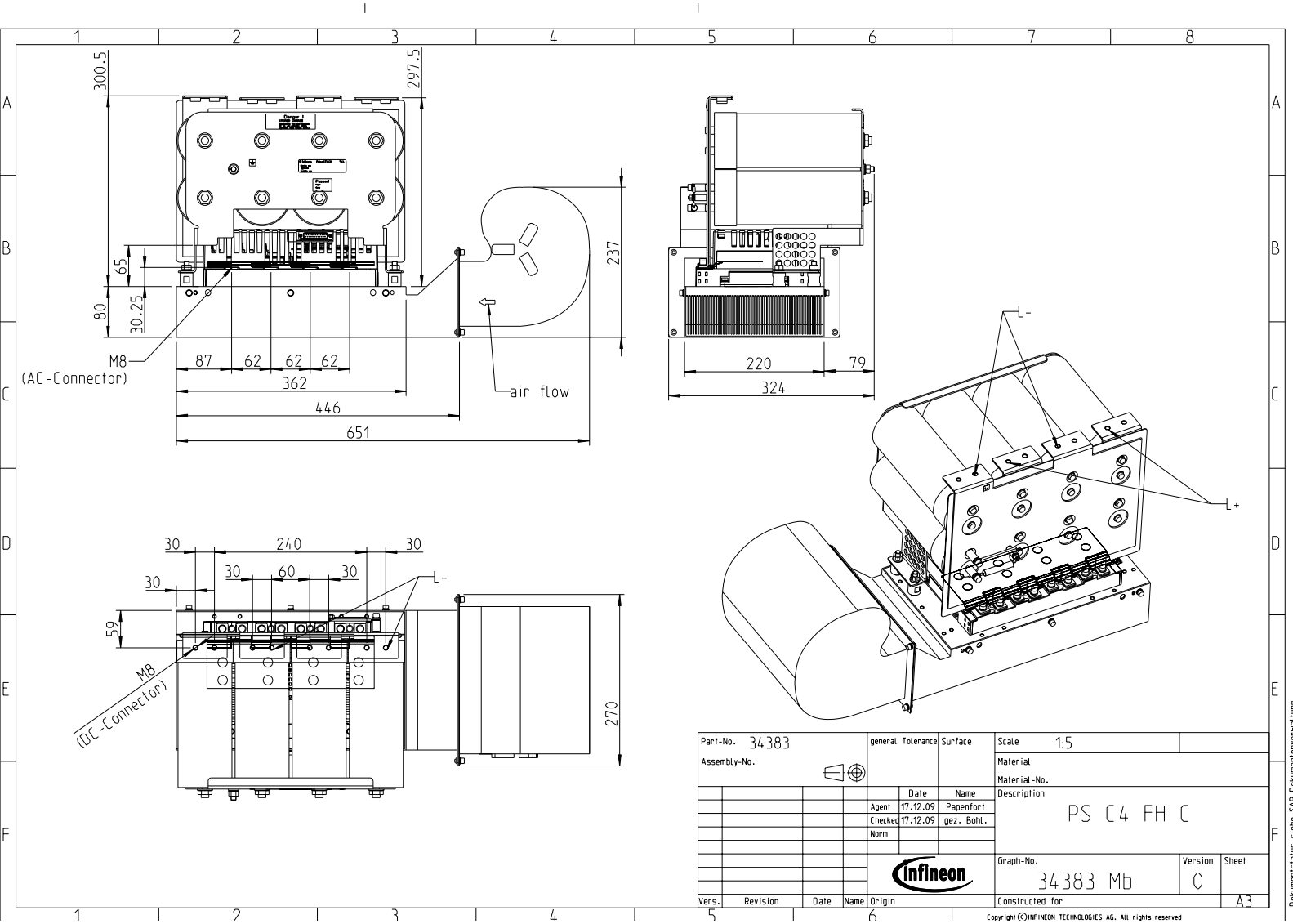
Sicherheitshinweise

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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| | | | | | |
|--------------|----------|-------------------|----------|--------------|-----------------|
| Part-No. | 34383 | general Tolerance | Surface | Scale | 1:5 |
| Assembly-No. | | | | Material | |
| | | | | Material-No. | |
| | | Date | Name | Description | |
| | | Agent | 17.12.09 | Papenfort | PS C4 FH C |
| | | Checked | 17.12.09 | gez. Bohl. | |
| | | Norm | | | |
| | | | | Graph-No. | |
| | | | | 34383 Mb | |
| | | | | Version | 0 |
| | | | | Sheet | A3 |
| Vers. | Revision | Date | Name | Origin | Constructed for |



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