

Vorläufige Daten
preliminary data

Key data

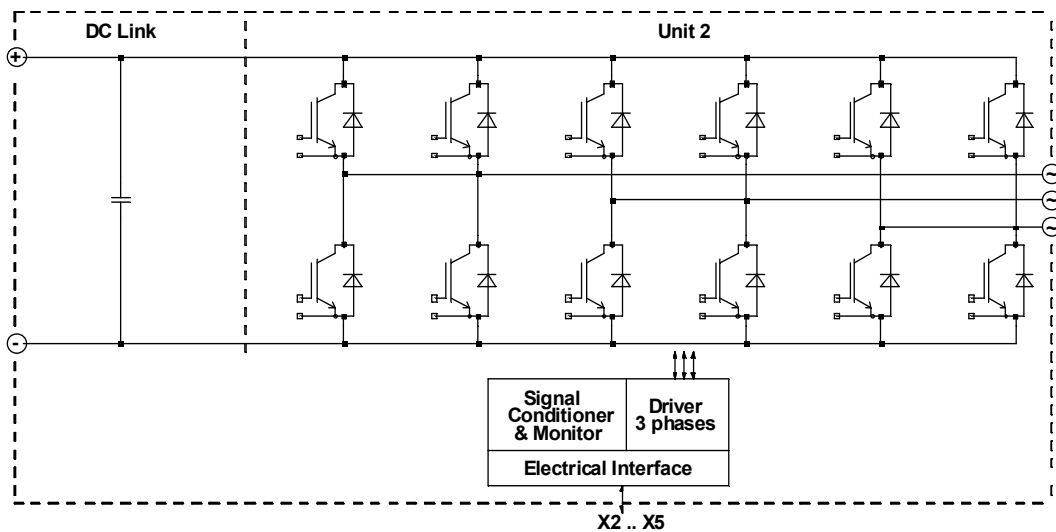
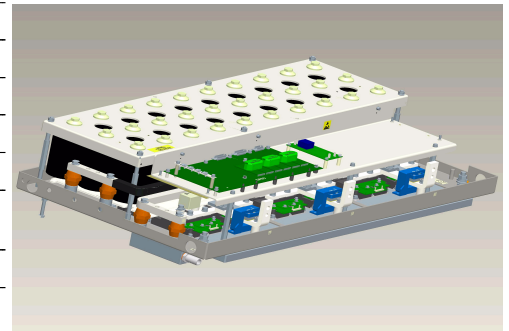
3x 726A rms at 707V rms, water cooled

General information

Stacks for various inverter application. Semiconductors, heat sinks, capacitors, 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 | DC Link + B6I | |
| Application / Modulation | Inverter / Sine | |
| Load type | resistive, inductive | |
| Cooling | water cooled | |
| Implemented sensors | current, voltage, temperature | |
| Semicond. (Unit 1) | none | |
| DC Link | 18.8mF | |
| Semicond. (Unit 2) | IGBT | 6x FF1200R17KE3_B2 |
| Driver signals IGBT | electrical CMOS 0 .. 15V | |
| Standards | EN50178 | |
| Sales - name | 6MS24017E33W31361 | |
| Internal ID | 31361 | |
| Mechanical drawing number | 31361_MB_Rev02 | |
| Electrical drawing number | 57000008 | |
| Dimensions (width x depth x height) | 1090 mm x 596 mm x 273 mm | |
| Weight | 83 kg | |



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Technical Information

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6MS2400R17KE3-3WAH-VZ



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Note

Heat sink with aluminium cooling channel.
Composites of fluid: Water and 52 vol. % Antifrogen N.

Electrical data

| DC Link | | | min | typ | max | units |
|----------------------|--|----------|-----|------|------|-------|
| Voltage | | V_{DC} | | 1150 | 1250 | V |
| Overvoltage shutdown | | | | 1250 | | V |

| Unit 2 AC | | | min | typ | max | units |
|----------------------------------|--|----------------------|-------|-------|-------|------------|
| Voltage | depending on controller | V_{Unit2} | | 707 | | V_{RMS} |
| Continuous current | $V_{Unit2} = 707V_{RMS}$, $V_{DC} = 1150V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 3000Hz$, $\cos(\phi) = 0,95$ | I_{Unit2} | | | 726 | A_{RMS} |
| Continuous current overload cap. | $T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s | | | 553 | | A_{RMS} |
| Short time current | $T_{inlet} = 40^{\circ}C$, 10s, every 180s, initial load = $701A_{RMS}$ | I_{Unit2} | | | 876 | A_{RMS} |
| DC current | no rotating field, $T_{inlet} = 40^{\circ}C$ | $I_{Unit2 DC}$ | | | 290,0 | A_{av} |
| Overcurrent shutdown | within 15 μ s | | | 1500 | | A_{peak} |
| Switching frequency | | f_{sw2} | | | 3000 | Hz |
| Power losses | $V_{Unit2} = 707V$, $V_{DC} = 1150V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 3000Hz$, $\cos(\phi) = 0,95$, $I_{Unit2} = 726A_{RMS}$ | P_{loss2} | | 12200 | | W |
| Power factor | | $\cos(\phi)_{Unit2}$ | -1,00 | | 1,00 | |

| General data | | | min | typ | max | units |
|---------------------------------------|--|----------------|-------------|-----|-----|------------|
| Power losses (PCB and capacitor) | | $P_{loss aux}$ | | | 400 | 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} | | 690 | | 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} | | 18,80 | | mF |
| | | type | Electrolytic Capacitor | | | |
| wiring system | series, parallel | | 3s, 10p | | | |
| Balance or discharge resistors | per DC Link unit | R_b | | 6,0 | | k Ω |

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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 | | TR110 / DR110 | | | |
| Driver core | | | EiceDRIVER 2ED300C17-S | | | |
| Digital input level | resistor to GND 1,8k Ω , capacitor to GND 4nF, high = on, min 15mA | V_{in} | 0,0 | | 15,0 | V |
| Digital output level | open collector, low = ok, max 15mA | V_{out} | 0,0 | | 15,0 | V |
| Analog current outputs Unit 2 | load max 1mA; at 726A | $V_{ana\ out}$ | 4,78 | 4,88 | 4,98 | V |
| Analog DC Link voltage output | load max 1mA; at 1250V | $V_{DC\ out}$ | 8,79 | 8,97 | 9,15 | V |
| Analog temperature output | load max 1mA; at $T_{NTC} = 69^{\circ}C$ correspond to $T_j = 125^{\circ}C$ | $V_{T\ out}$ | 9,80 | 10,00 | 10,20 | V |
| Overtemperature shutdown | at $T_{NTC} = 69^{\circ}C$ correspond to $T_j = 125^{\circ}C$ | $V_{T\ out\ OT}$ | | 10 | | V |
| Overvoltage shutdown reaction time | after overvoltage message by ModSTACK™ interface | | | | 50 | μs |
| Overcurrent shutdown reaction time | after overcurrent message by ModSTACK™ interface | | | | 10 | μs |

Heat sink water cooled / Thermal data

| | | | min | typ | max | units |
|---------------------------------|---|-----------------------------|-----|-----|-----|----------------------|
| Water flow | according cooling water specification from infineon | $\Delta V/\Delta t_{Water}$ | 12 | | | dm ³ /min |
| Water pressure drop | | Δp_{Water} | | 550 | | mbar |
| Water pressure | | | | | 8 | bar |
| Cooling water inlet temperature | | T_{inlet} | -25 | | 40 | $^{\circ}C$ |
| Water connection | | | | 3/4 | | in |

IGBT data unit 2

| | | | min | typ | max | units |
|--|--|---------------|-----|-----------|-----|------------|
| Type | assumed | | | | | |
| collector-emitter saturation voltage | $I_c = 1200A; V_{ge} = 15V; T_{vj} = 125^{\circ}C$ | $V_{CE\ sat}$ | | 2,4 | | V |
| parameter for linear model | $T_{vj} = 25^{\circ}C$ | V_{ce1} | | 1,1 | | V |
| parameter for linear model | $T_{vj} = 25^{\circ}C$ | r_{ce1} | | 0,75 | | m Ω |
| parameter for linear model | $T_{vj} = 125^{\circ}C$ | V_{ce2} | | 1 | | V |
| parameter for linear model | $T_{vj} = 125^{\circ}C$ | r_{ce2} | | 1,167 | | m Ω |
| turn-on / turn-off energy loss per pulse | $T_{vj} = 25^{\circ}C$ | E_1 | | 240 / 305 | | mJ |
| turn-on / turn-off energy loss per pulse | $T_{vj} = 125^{\circ}C$ | E_2 | | 350 / 445 | | mJ |
| thermal resistance, junction to case | per IGBT | R_{thjc} | | 0,019 | | K/W |
| thermal resistance, case to heatsink | per IGBT | R_{thch} | | 0,023 | | K/W |

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Diode data unit 2

| Type | | | min | typ | max | units |
|--------------------------------------|--|------------|-----|-------|-----|-------|
| Type | assumed | | | | | |
| forward voltage | $I_F = 1200A; V_{ge} = 0V; T_{vj} = 125^\circ C$ | V_F | | 1,9 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | V_{F1} | | 1,15 | | V |
| parameter for linear model | $T_{vj} = 25^\circ C$ | r_{F1} | | 0,542 | | mΩ |
| parameter for linear model | $T_{vj} = 125^\circ C$ | V_{F2} | | 1 | | V |
| parameter for linear model | $T_{vj} = 125^\circ C$ | r_{F2} | | 0,75 | | mΩ |
| reverse recovery energy | $T_{vj} = 25^\circ C$ | E_{rec1} | | 190 | | mJ |
| reverse recovery energy | $T_{vj} = 125^\circ C$ | E_{rec2} | | 340 | | mJ |
| thermal resistance, junction to case | per Diode | R_{thjc} | | 0,042 | | K/W |
| thermal resistance, case to heatsink | per Diode | R_{thch} | | 0,052 | | K/W |

Environmental conditions

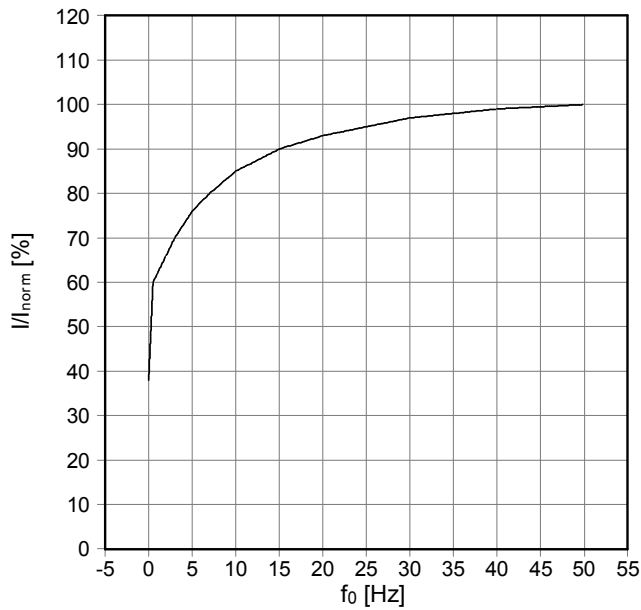
| | | | min | typ | max | units |
|--|---|---------------|------|------|------|------------------|
| Storage temperature | | T_{stor} | -40 | | 65 | °C |
| Ambient temperature | | T_{amb} | -25 | | 55 | °C |
| Operating temperature | see chapter Heat sink water cooled / Thermal data | | | | | |
| Cooling air velocity (PCB and capacitor) | | $V_{Air PCB}$ | 2,0 | | | m/s |
| Air pressure | standard atmosphere | p_{Air} | 900 | | 1100 | hPa |
| Humidity | no condensation | Rel. F | 0 | | 95 | % |
| Installation height | | | 0 | | 1000 | m |
| Vibration | according to EN60068 | | | | 10 | m/s ² |
| Continuous vibration | according to EN60068 | | | | 20 | m/s ² |
| Shock | according to EN60068 | | | | 100 | m/s ² |
| Protection degree | | | | IP00 | | |
| Pollution degree | | | | 2 | | |
| Dimensions | width × depth × height | | 1090 | 596 | 273 | mm |
| Weight with heat sink | approximation | | | 83,0 | | kg |
| Weight without heat sink | approximation | | | 65,0 | | kg |

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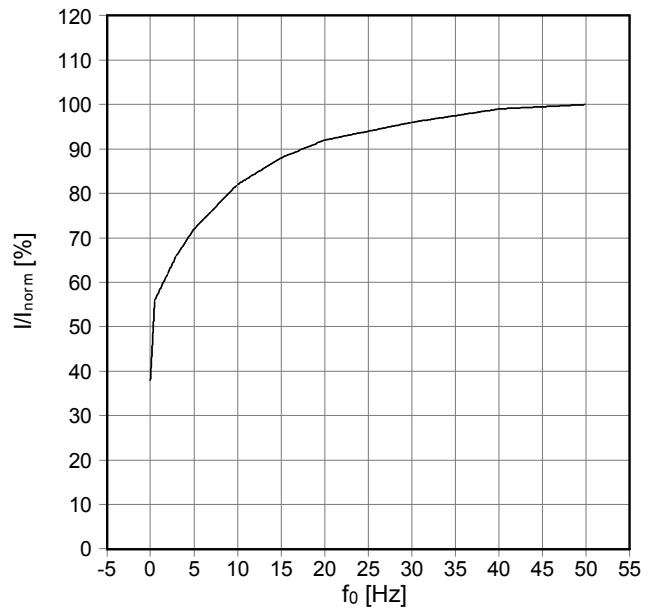


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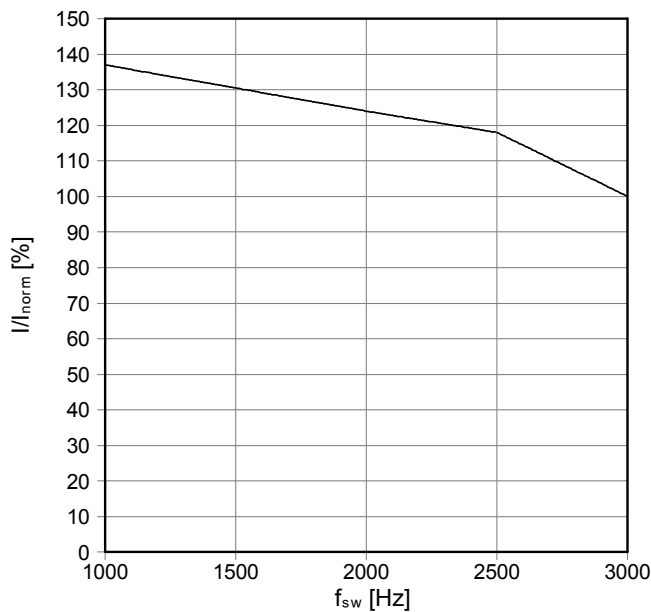
fo - derating curve IGBT (motor)
 $\cos(\phi) = 0,95$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 726 A rms



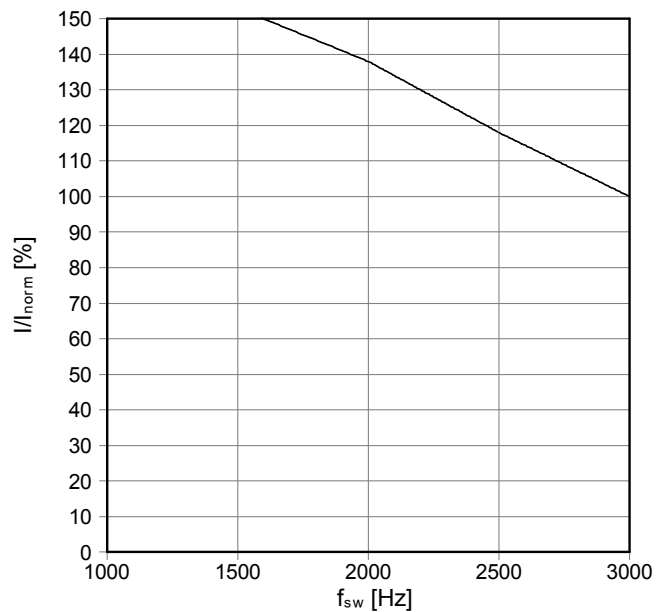
fo - derating curve Diode (generator)
 $\cos(\phi) = -0,95$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 632 A rms



fsw - derating curve IGBT (motor)
 $\cos(\phi) = 0,95$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 726 A rms



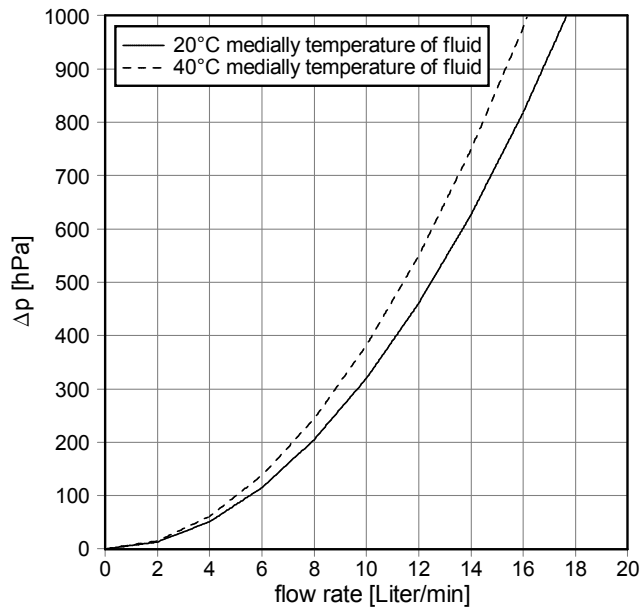
fsw - derating curve Diode (generator)
 $\cos(\phi) = 0,95$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 632 A rms



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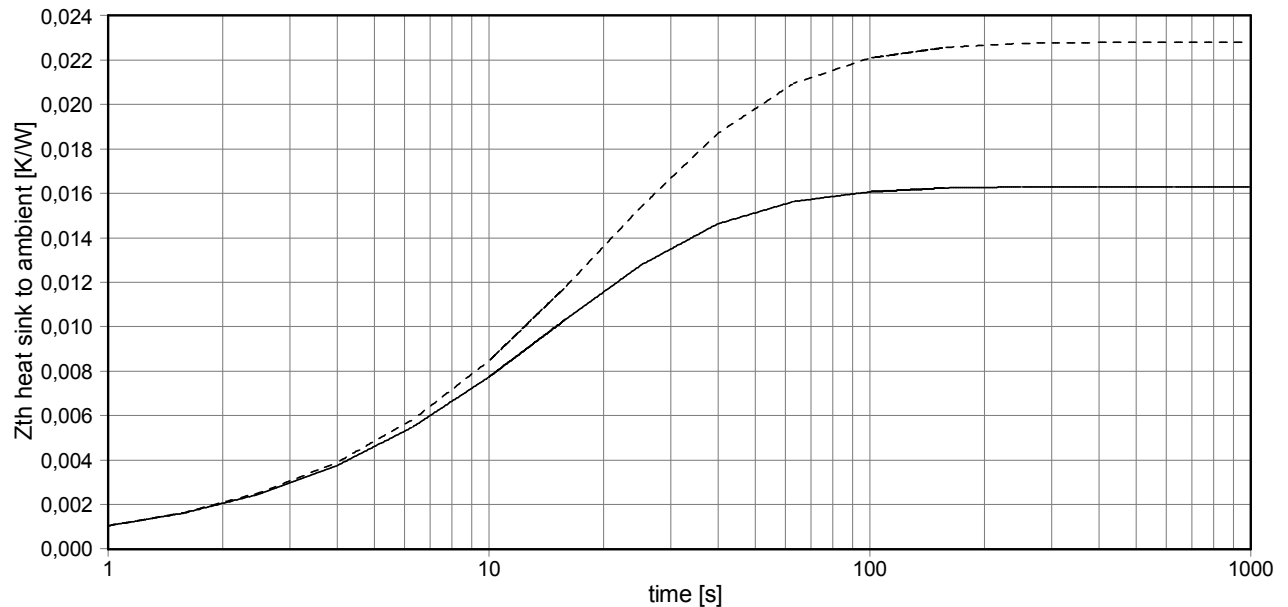
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Pressure drop as a function of flow rate



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Transient thermal impedance per module
 $T_{cool\ medium} = 40^{\circ}C$



— Water

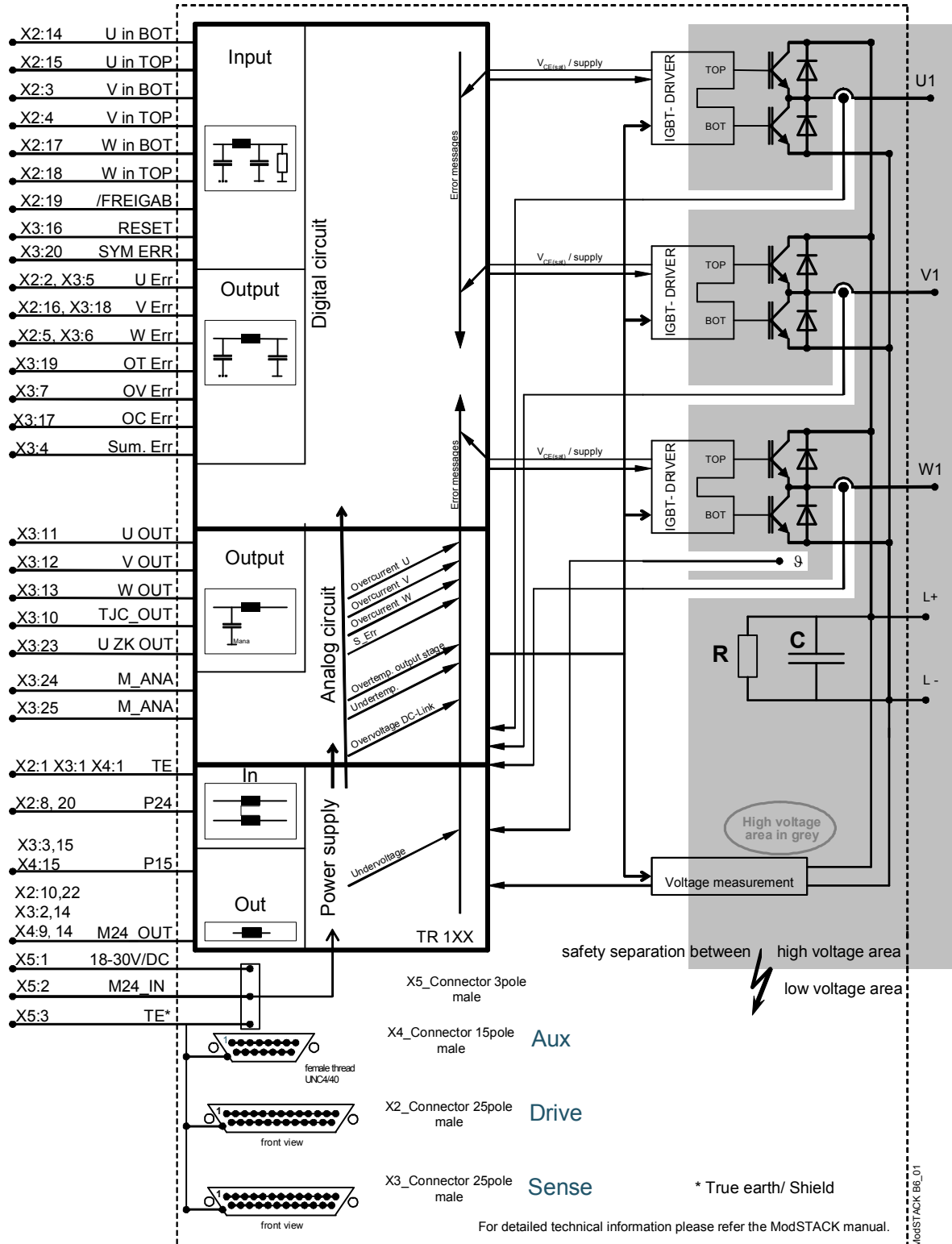
| | | | | |
|---------------|---------|---------|---------|---------|
| i: | 1 | 2 | 3 | 4 |
| r_i [K/W]: | 0,00001 | 0,01387 | 0,00231 | 0,00011 |
| τ_i [s]: | 7,556 | 13,62 | 41,1 | 50,89 |

--- Water + Antifrogen N (52%)

| | | | | |
|---------------|---------|---------|---------|---------|
| i: | 1 | 2 | 3 | 4 |
| r_i [K/W]: | 0,00001 | 0,01941 | 0,00323 | 0,00015 |
| τ_i [s]: | 10,58 | 19,06 | 57,55 | 71,24 |

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Circuit diagram



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- die gemeinsame Einführung von Maßnahmen zu einer laufenden Produktbeobachtung dringend empfehlen und gegebenenfalls die Belieferung von der Umsetzung solcher Maßnahmen abhängig machen.

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- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

If and to the extent necessary, please forward equivalent notices to your customers.

Changes of this product data sheet are reserved.

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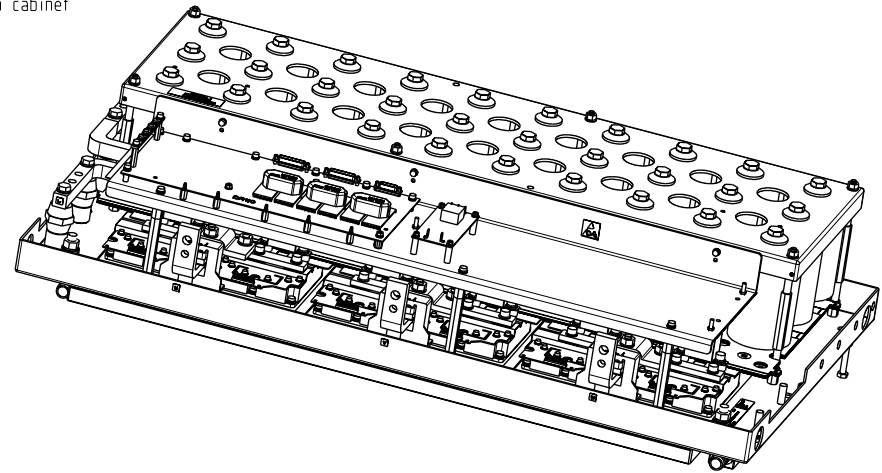
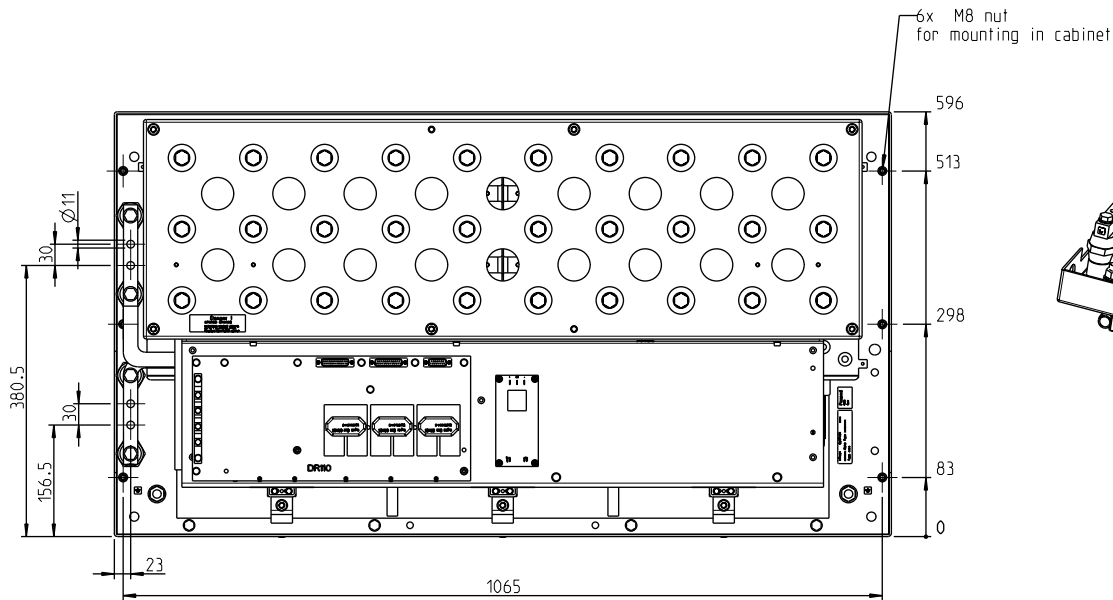
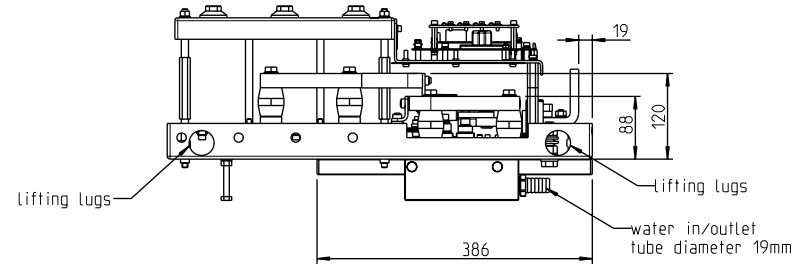
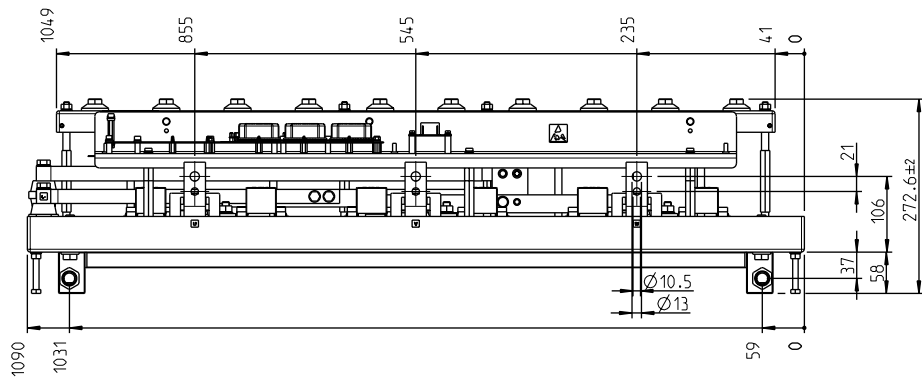
Sicherheitshinweise

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. | general Tolerance | Surface | Scale | 1:5 | |
| Assembly-No. | | | Material | | |
| | | | Material-No. | | |
| | | | Description | Outline MS3 | |
| | | | | 6MSxx00Rxx xxx-3W AH-Vx | |
| 02 | Reihenleiste entf. | 25.06.09 | Pe | Graph-No. | Version |
| 01 | Reihenleiste | 31.08.08 | Pe | 31361 | 0 |
| | Revision | Date | Name | Constructed for | Sheet |
| | | | | | 2/2 |
| | | | | | AZ |

