

Technical Information

ModSTACK™ 6MS1600R17KE3-3WAH-B9C18VTIOIN



Vorläufige Daten
preliminary data

Key data

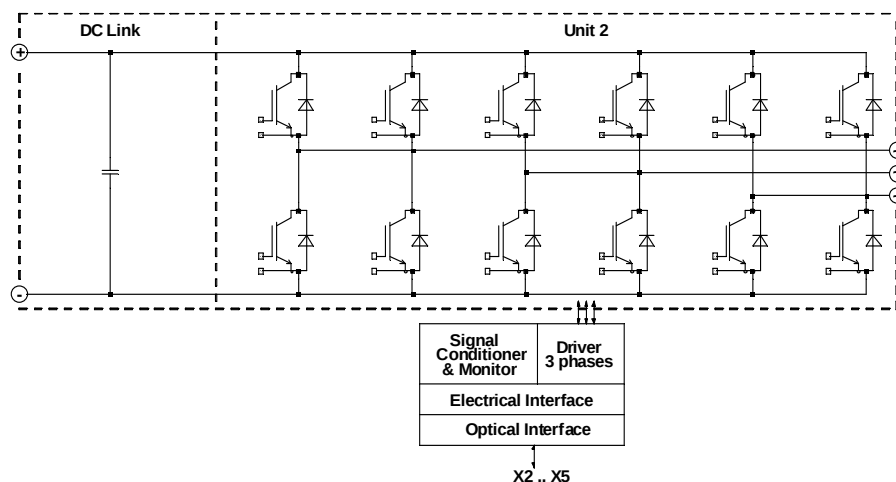
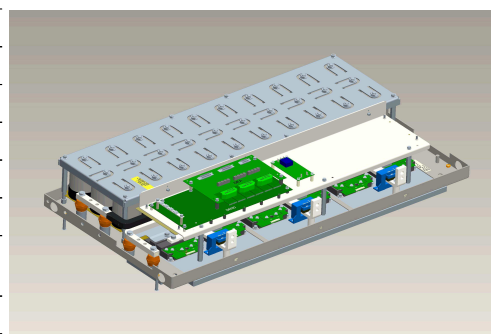
3x 974A rms at 690V rms, water cooled

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	
Market	wind	
Implemented sensors	current, voltage, temperature	
Semicond. (Unit 1)	none	
DC Link	12mF	
Semicond. (Unit 2)	IGBT	6x FF800R17KE3_B2
Driver signals IGBT	optical HFBR-15X1 / HFBR-25X1	
Standards	EN50178	
Sales - name	6MS16017E33W32630	
Internal ID	32630	
Mechanical drawing number	32630_MB	
Electrical drawing number	57000008	
Dimensions (width x depth x height)	1090 mm x 596 mm x 257 mm	
Weight	83 kg	



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Note

Heat sink with aluminum cooling channel.
Composites of fluid: Water and 52 vol. % Antifrogen N.
Water connection pipe not mounted (IN); available on request.
Grounding terminal (screw) not mounted (IN); available on request.

Electrical data

DC Link			min	typ	max	units
Voltage		V_{DC}		1100	1250	V
Overvoltage shutdown	within 150µs			1250		V

Unit 2 AC			min	typ	max	units
Voltage	depending on controller	V_{Unit2}		690		V_{RMS}
Continuous current	$V_{Unit2} = 690V_{RMS}$, $V_{DC} = 1100V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 2000Hz$, $\cos(\phi) = 0,90$	I_{Unit2}			974	A_{RMS}
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s			659		A_{RMS}
Short time current	$T_{inlet} = 40^{\circ}C$, 10s, every 180s, initial load = 832 A_{RMS}	I_{Unit2}			1040	A_{RMS}
DC current	no rotating field, $T_{inlet} = 40^{\circ}C$	$I_{Unit2\ DC}$			488,0	A_{av}
Overcurrent shutdown	within 15µs			1700		A_{peak}
Switching frequency		f_{sw2}			4500	Hz
Power losses	$V_{Unit2} = 690V$, $V_{DC} = 1100V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 2000Hz$, $\cos(\phi) = 0,90$, $I_{Unit2} = 974A_{RMS}$	P_{loss2}		12300		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}

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Important component data

			min	typ	max	units
DC Link capacitor		C_{DC}		12,00		mF
		type	Foil			
Temperature range			-40		+85	°C
Rated voltage	per device	U_R	1100			V_{DC}
Surge voltage	per device	U_{Surge}			1650	V
Rated capacitance	per device	C_R	400			µF
Capacitance tolerance	per device	Tol	-10		+10	%
Maximum ripple current	per device, $T_{amb} = 60^\circ\text{C}$	I_{Rmax}			45	ARMS
wiring system	series, parallel		1s, 30p			
Balance or discharge resistors	per DC Link unit	R_b	6,0			kΩ

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 1,8kΩ, 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 900A	$V_{ana out}$	4,50	4,59	4,68	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 $T_{NTC} = 66^\circ\text{C}$ correspond to $T_j = 125^\circ\text{C}$	$V_{T out}$	9,21	9,40	9,59	V
Overttemperature shutdown	at $T_{NTC} = 69^\circ\text{C}$ correspond to $T_j = 130^\circ\text{C}$	$V_{T out OT}$		10		V
Optical interface board	see separate technical information		OEA101			
Optical input power				12		µW
Optical output power					60	µW

Heat sink water cooled / Thermal data

			min	typ	max	units
Water flow	according cooling water specification from infineon	$\Delta V / \Delta t_{Water}$	12			dm³/min
Water pressure drop		Δp_{Water}		400		mbar
Water pressure					8	bar
Cooling water inlet temperature		T_{inlet}	-25		40	°C
Water connection				3/4		in

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IGBT data unit 2

Type	assumed		min	typ	max	units
collector-emitter saturation voltage	$I_c = 800A$; $V_{ge} = 15V$; $T_{vj} = 125^\circ C$	$V_{CE\ sat}$		2,4		V
parameter for linear model	$T_{vj} = 25^\circ C$	V_{ce1}		1,08		V
parameter for linear model	$T_{vj} = 25^\circ C$	r_{ce1}		1,15		mΩ
parameter for linear model	$T_{vj} = 125^\circ C$	V_{ce2}		1		V
parameter for linear model	$T_{vj} = 125^\circ C$	r_{ce2}		1,75		mΩ
turn-on / turn-off energy loss per pulse	$T_{vj} = 25^\circ C$	E_1		165 / 200		mJ
turn-on / turn-off energy loss per pulse	$T_{vj} = 125^\circ C$	E_2		240 / 295		mJ
thermal resistance, junction to case	per IGBT	R_{thjc}		0,024		K/W
thermal resistance, case to heatsink	per IGBT	R_{thch}		0,025		K/W

Diode data unit 2

Type	assumed		min	typ	max	units
forward voltage	$I_F = 800A$; $V_{ge} = 0V$; $T_{vj} = 125^\circ C$	V_F		1,6		V
parameter for linear model	$T_{vj} = 25^\circ C$	V_{F1}		1,03		V
parameter for linear model	$T_{vj} = 25^\circ C$	r_{F1}		0,65		mΩ
parameter for linear model	$T_{vj} = 125^\circ C$	V_{F2}		0,84		V
parameter for linear model	$T_{vj} = 125^\circ C$	r_{F2}		0,95		mΩ
reverse recovery energy	$T_{vj} = 25^\circ C$	E_{rec1}		160		mJ
reverse recovery energy	$T_{vj} = 125^\circ C$	E_{rec2}		280		mJ
thermal resistance, junction to case	per Diode	R_{thjc}		0,042		K/W
thermal resistance, case to heatsink	per Diode	R_{thch}		0,044		K/W

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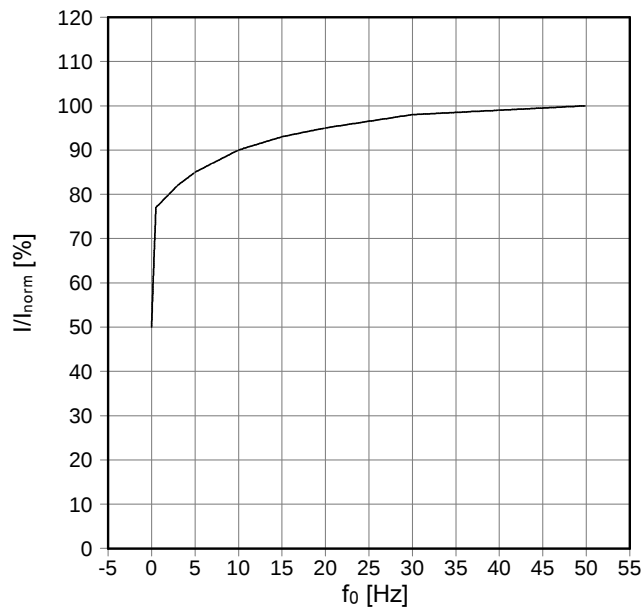
Environmental conditions

			min	typ	max	units
Storage temperature		T _{stor}	-40		65	°C
Ambient temperature	minimum 0°C for optional optical interface	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/s²
Continuous vibration	according to EN60068				20	m/s²
Shock	according to EN60068				100	m/s²
Protection degree			IP00			
Pollution degree			2			
Dimensions	width × depth × height		1090	596	257	mm
Weight with heat sink	approximation			83,0		kg
Weight without heat sink	approximation			65,0		kg

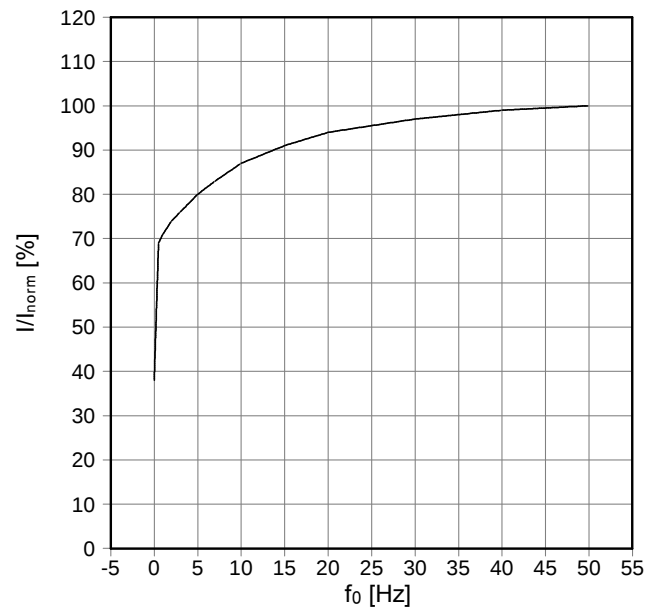
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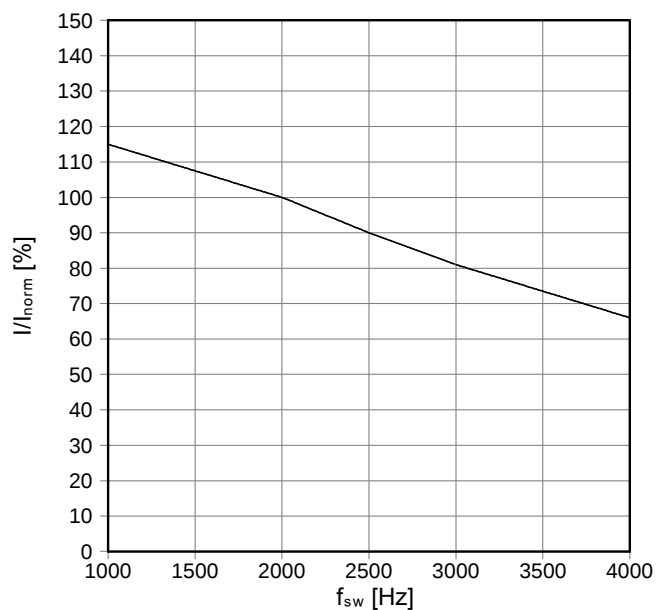
f_o - derating curve IGBT (motor)
 $\cos(\phi) = 0,90$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 974 A rms



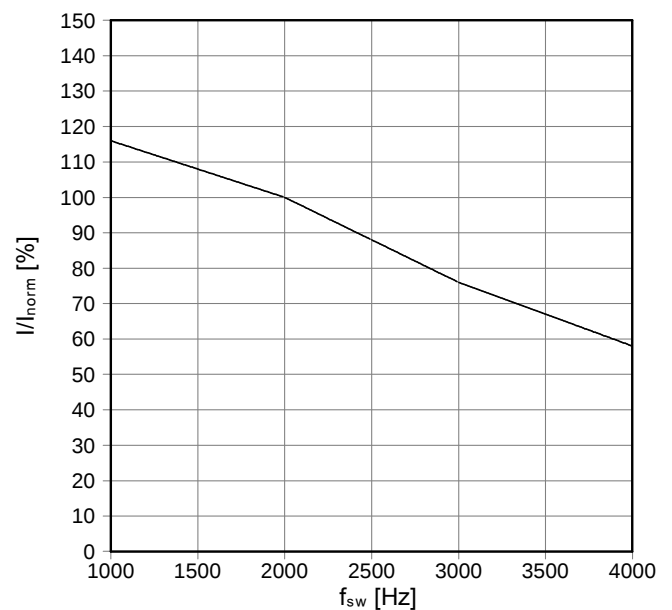
f_o - derating curve Diode (generator)
 $\cos(\phi) = -0,90$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 973 A rms



f_{sw} - derating curve IGBT (motor)
 $\cos(\phi) = 0,90$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 974 A rms

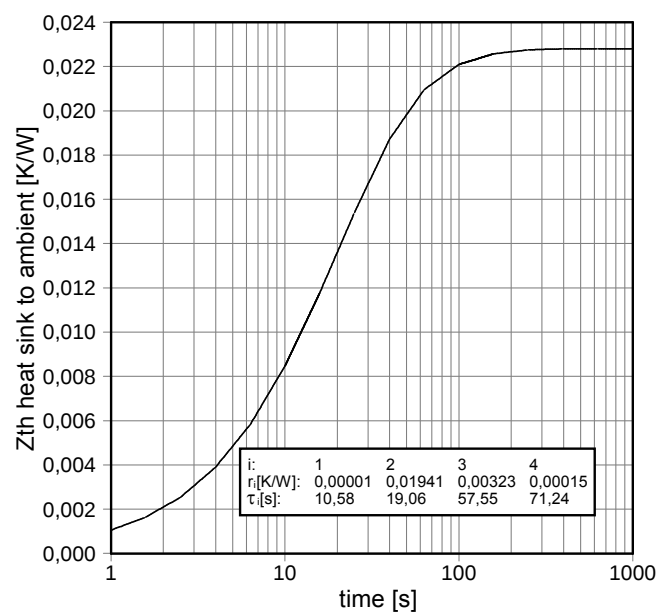


f_{sw} - derating curve Diode (generator)
 $\cos(\phi) = -0,90$
 $T_{cool\ medium} = 40^{\circ}C$; 100% = 973 A rms



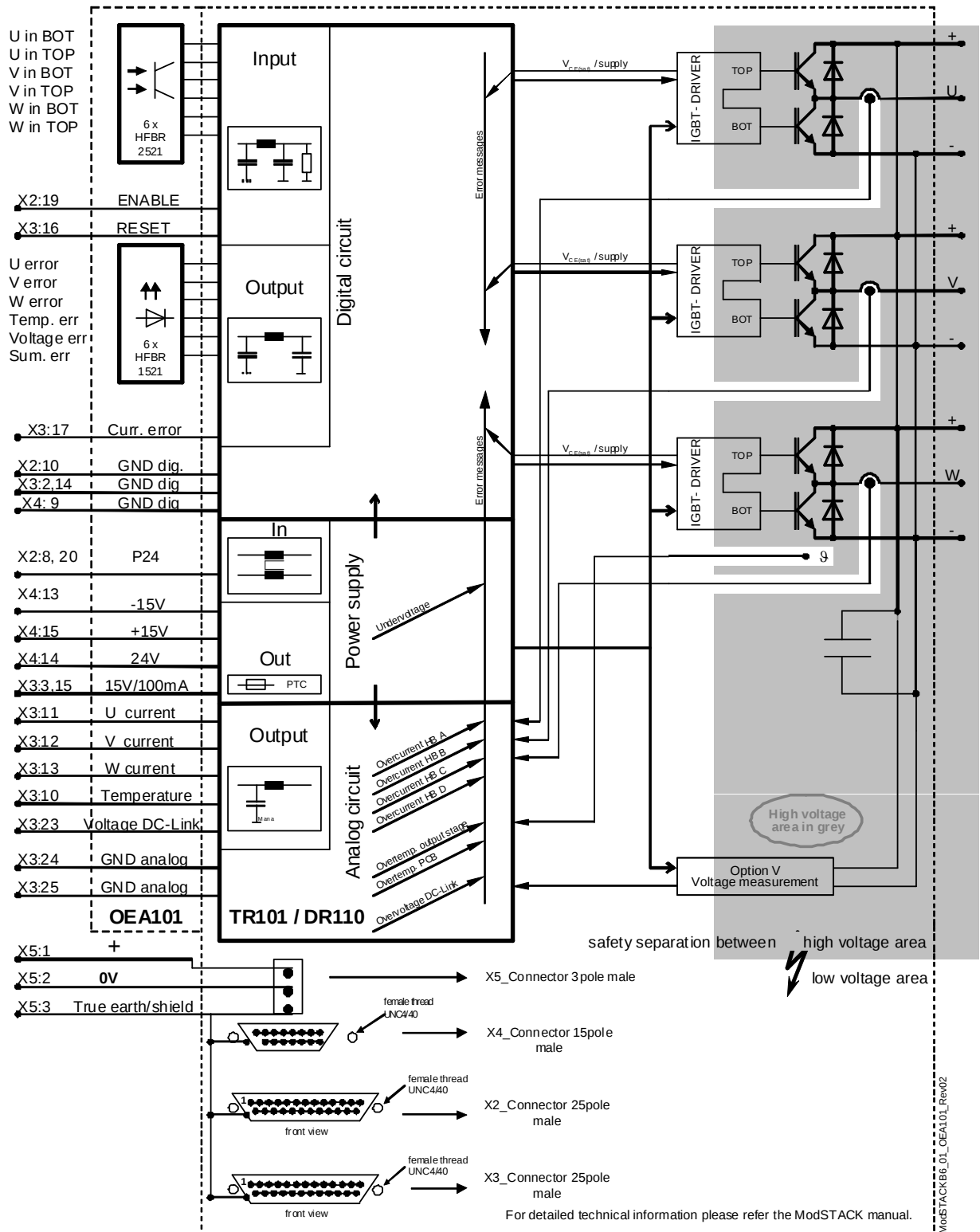
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Transient thermal impedance per module
T_{cool medium} = 40°C



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Circuit diagram



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- den Abschluss von speziellen Qualitätssicherungsvereinbarungen;
- 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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Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify. Please note, that for any such applications we urgently recommend

- 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 depended 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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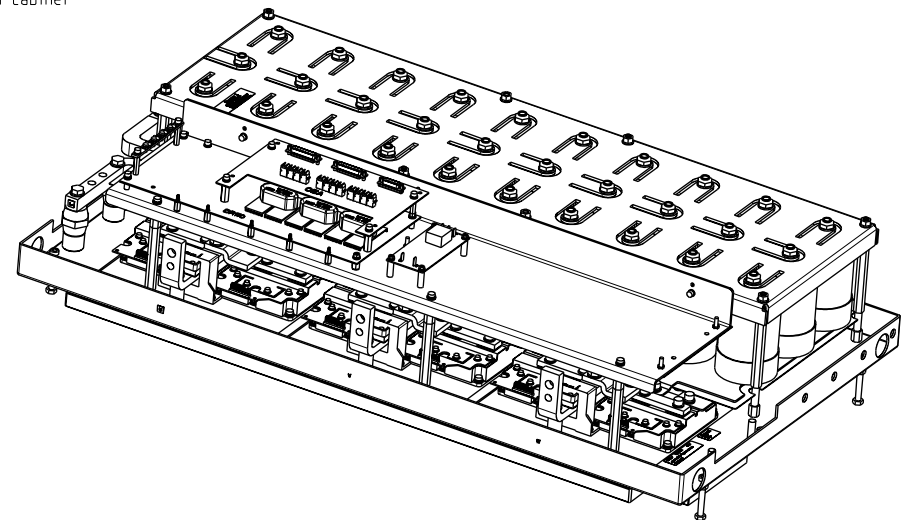
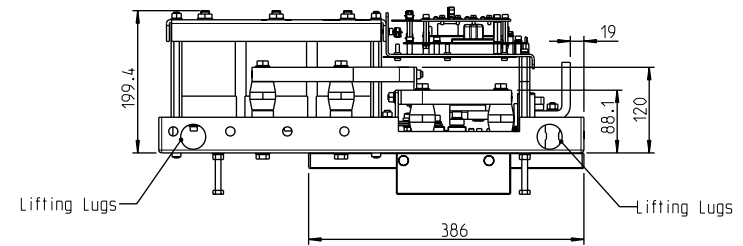
Sicherheitshinweise

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. 32630		general Tolerance		Surface		Scale 1:5			
Assembly-No.						Material			
						Material-No.			
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						Outline MS3			
						6MSxx00Rxx xxx-3WCH-Cxx			
						Graph-No.			
						32630		Version 0	
02 Kuestner_ohtne Title 12.08.09 Pe								Sheet 1/2	
01 Bau-Gruppe:33881 27.07.09 Pe									
Vers. Revision Date Name		Origin		Constructed for				A2	