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# Technical Information

ModSTACK™ 6MS2400R17KE3-3G-C20MVTIOIN



**Vorläufige Daten**  
preliminary data

## Key data

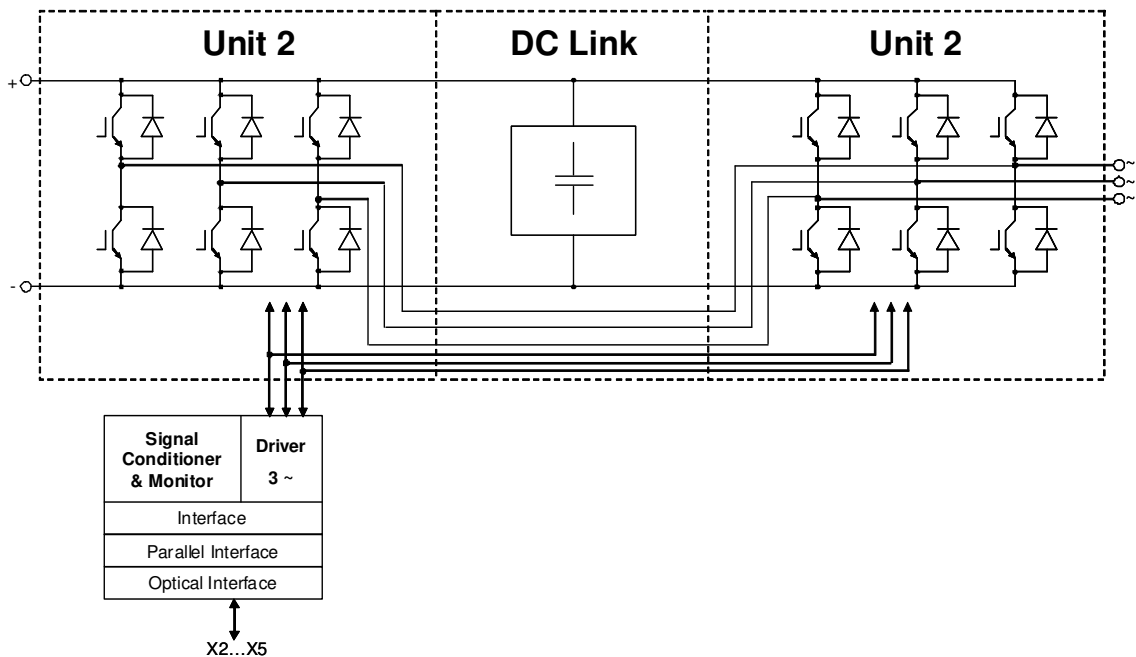
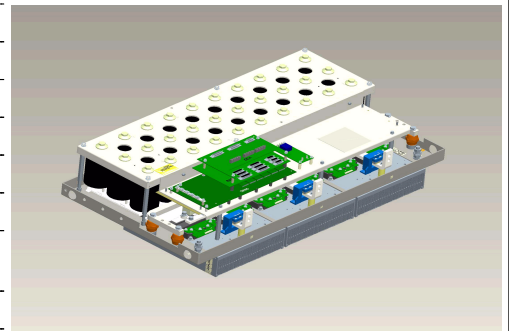
3x 800A rms at 400V rms, forced air (fan not implemented)

## 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		forced air (fan not implemented)
Market		common industrial, drives, power supply
Implemented sensors		current, voltage, temperature
Semicond. (Unit 1)		none
DC Link		18.8mF
Semicond. (Unit 2)	IGBT	6x FF1200R17KE3_B2
Driver signals IGBT		optical
Standards		EN50178
Sales - name		6MS24017E33G32859
Internal ID		32859
Mechanical drawing number		32859_MB
Electrical drawing number		ModSTACK B6_01_OEA101_Rev02



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### Electrical data

DC Link			min	typ	max	units
Voltage		$V_{DC}$		932	1200	V
Overvoltage shutdown	within 150µs			1250		V

Unit 2 AC			min	typ	max	units
Voltage	depending on controller	$V_{Unit2}$		400		$V_{RMS}$
Continuous current	$V_{Unit2} = 400V_{RMS}$ , $V_{DC} = 932V$ , $T_{inlet} = 25^{\circ}C$ , $T_J \leq 125^{\circ}C$ , $f_{Unit2} = 2Hz$ , $f_{sw2} = 2500Hz$ , $\cos(\phi) = 0,87$	$I_{Unit2}$			800	$A_{RMS}$
Continuous current overload cap.	$T_{inlet} = 25^{\circ}C$ , for overload capability 150% for 60s			573		$A_{RMS}$
Short time current	$T_{inlet} = 25^{\circ}C$ , 10s, every 180s, initial load = 717 $A_{RMS}$	$I_{Unit2}$			896	$A_{RMS}$
DC current	no rotating field, $T_{inlet} = 25^{\circ}C$	$I_{Unit2 DC}$			350,0	$A_{av}$
Overcurrent shutdown	within 15µs			3800		$A_{peak}$
Switching frequency		$f_{sw2}$			2500	Hz
Power losses	$V_{Unit2} = 400V$ , $V_{DC} = 932V$ , $T_{inlet} = 25^{\circ}C$ , $T_J \leq 125^{\circ}C$ , $f_{Unit2} = 2Hz$ , $f_{sw2} = 2500Hz$ , $\cos(\phi) = 0,87$ , $I_{Unit2} = 800A_{RMS}$	$P_{loss2}$		9980		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00		1,00	

General data			min	typ	max	units
Power losses (PCB and capacitor)		$P_{loss aux}$			220	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			

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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			
Parallel interface board	see separate technical information		SAD101			
Digital input level	resistor to GND 1,8k $\Omega$ , 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 800A	$V_{ana\ out}$	3,99	4,07	4,15	V
Analog DC Link voltage output	load max 1mA; at 932V	$V_{DC\ out}$	6,56	6,69	6,82	V
Analog temperature output	load max 1mA; at $T_{NTC} = 62^{\circ}C$ correspond to $T_j = 125^{\circ}C$	$V_{T\ out}$	9,21	9,40	9,59	V
Overtemperature shutdown	at $T_{NTC} = 66^{\circ}C$ correspond to $T_j = 135^{\circ}C$	$V_{T\ out\ OT}$		10		V
Overvoltage shutdown reaction time	after overvoltage message by ModSTACK™ interface				50	$\mu s$
Overcurrent shutdown reaction time	after overcurrent message by ModSTACK™ interface				10	$\mu s$
Optical interface board	see separate technical information		OEA101			
Optical input power				12		$\mu W$
Optical output power					60	$\mu W$

### 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	$\Delta V / \Delta t_{Air}$	3800			$m^3/h$
Air pressure drop		$\Delta p_{Air}$		520		Pa
Cooling air inlet temperature	heat sink temperature $> -25^{\circ}C$	$T_{inlet}$	-25		25	$^{\circ}C$

### 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 $\Omega$
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 $\Omega$
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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## Vorläufige Daten preliminary data

### Diode data unit 2

			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

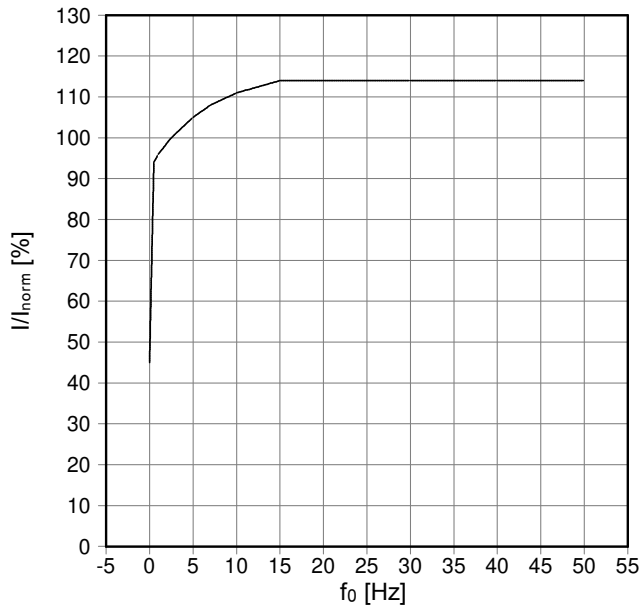
			min	typ	max	units
Storage temperature		$T_{stor}$	-40		65	°C
Ambient temperature	minimum 0°C for optional optical interface	$T_{amb}$	-25		55	°C
Operating temperature	see chapter Heat sink air cooled / Thermal data					
Cooling air velocity (PCB and capacitor)		$V_{Air PCB}$	2,0			m/s
Air pressure	standard 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 <sup>2</sup>
Continuous vibration	according to EN60068				20	m/s <sup>2</sup>
Shock	according to EN60068				100	m/s <sup>2</sup>
Protection degree				IP00		
Pollution degree				2		
Dimensions	width × depth × height		1090	596	330	mm
Weight with heat sink	approximation			110,0		kg

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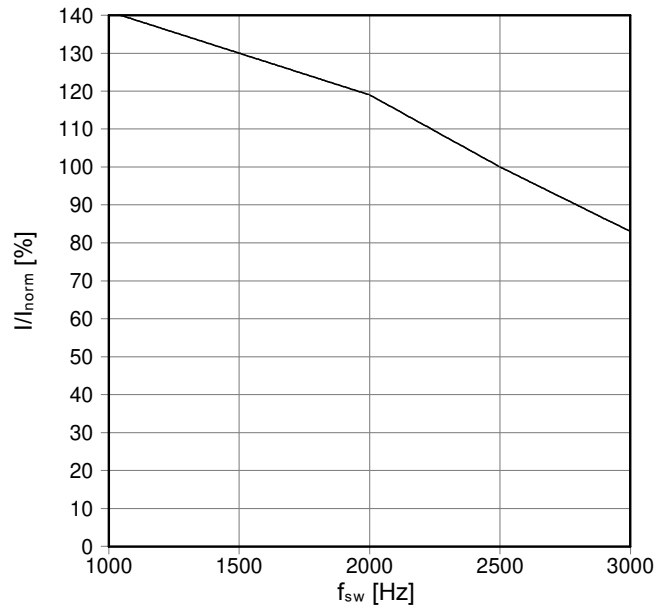


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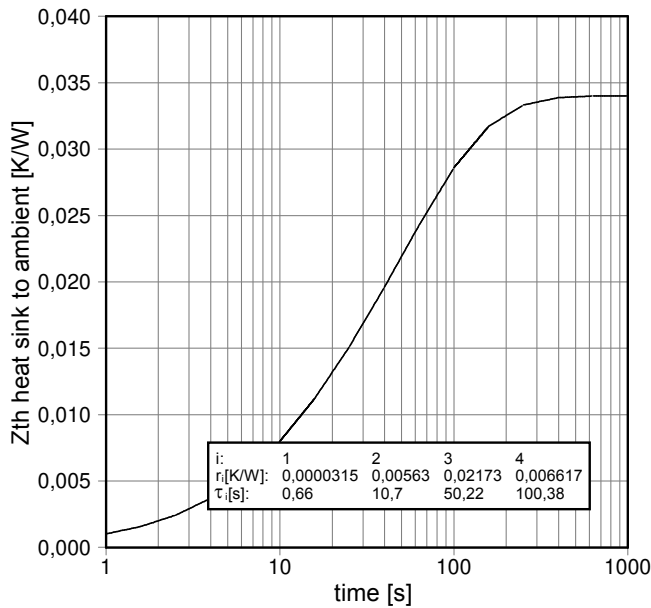
fo - derating curve IGBT (motor)  
cos(phi) = 0,87  
T<sub>cool medium</sub> = 25°C



fsw - derating curve IGBT (motor)  
cos(phi) = 0,87  
T<sub>cool medium</sub> = 25°C



Transient thermal impedance per module  
T<sub>cool medium</sub> = 25°C

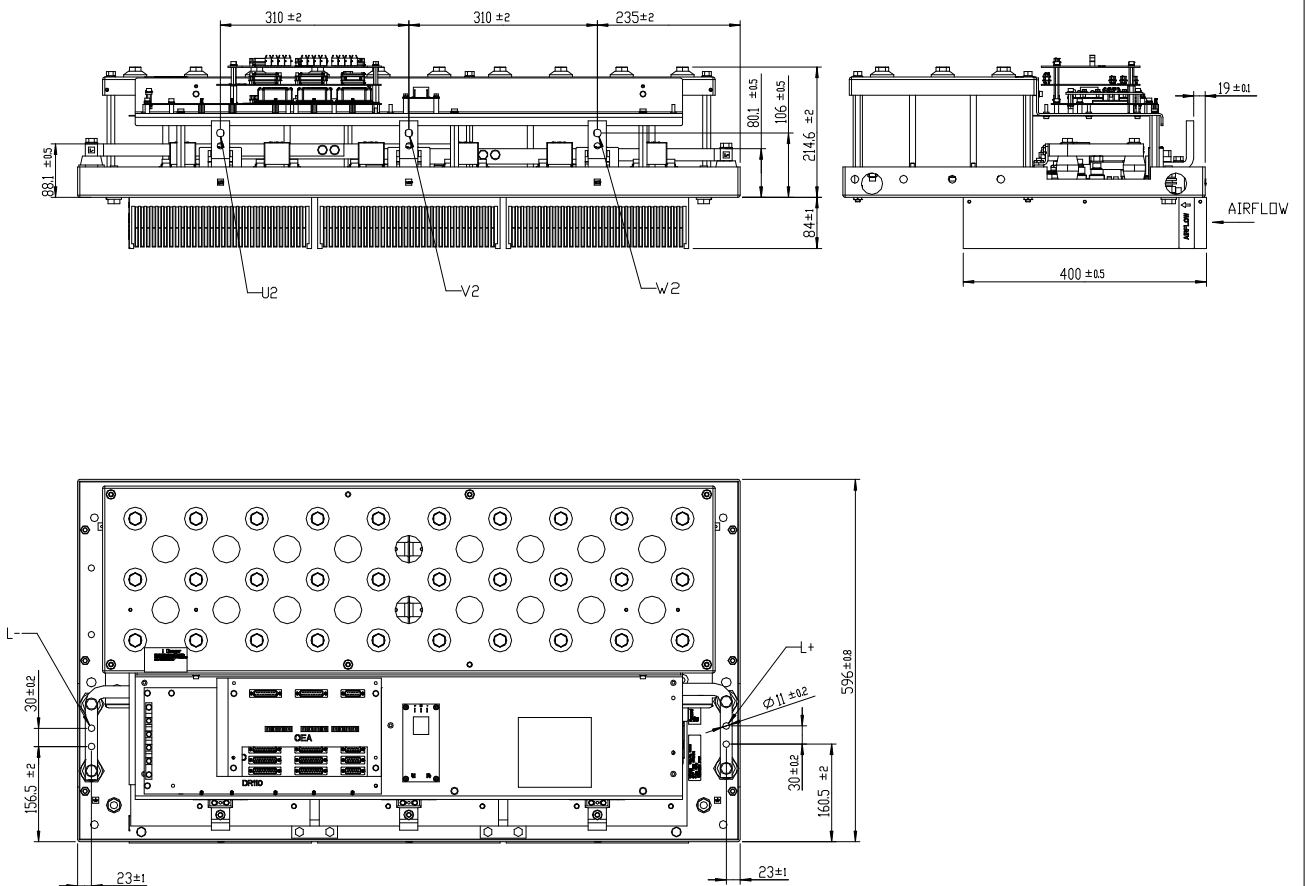


i:	1	2	3	4
r <sub>i</sub> [K/W]:	0,0000315	0,00563	0,02173	0,006617
τ <sub>i</sub> [s]:	0,66	10,7	50,22	100,38

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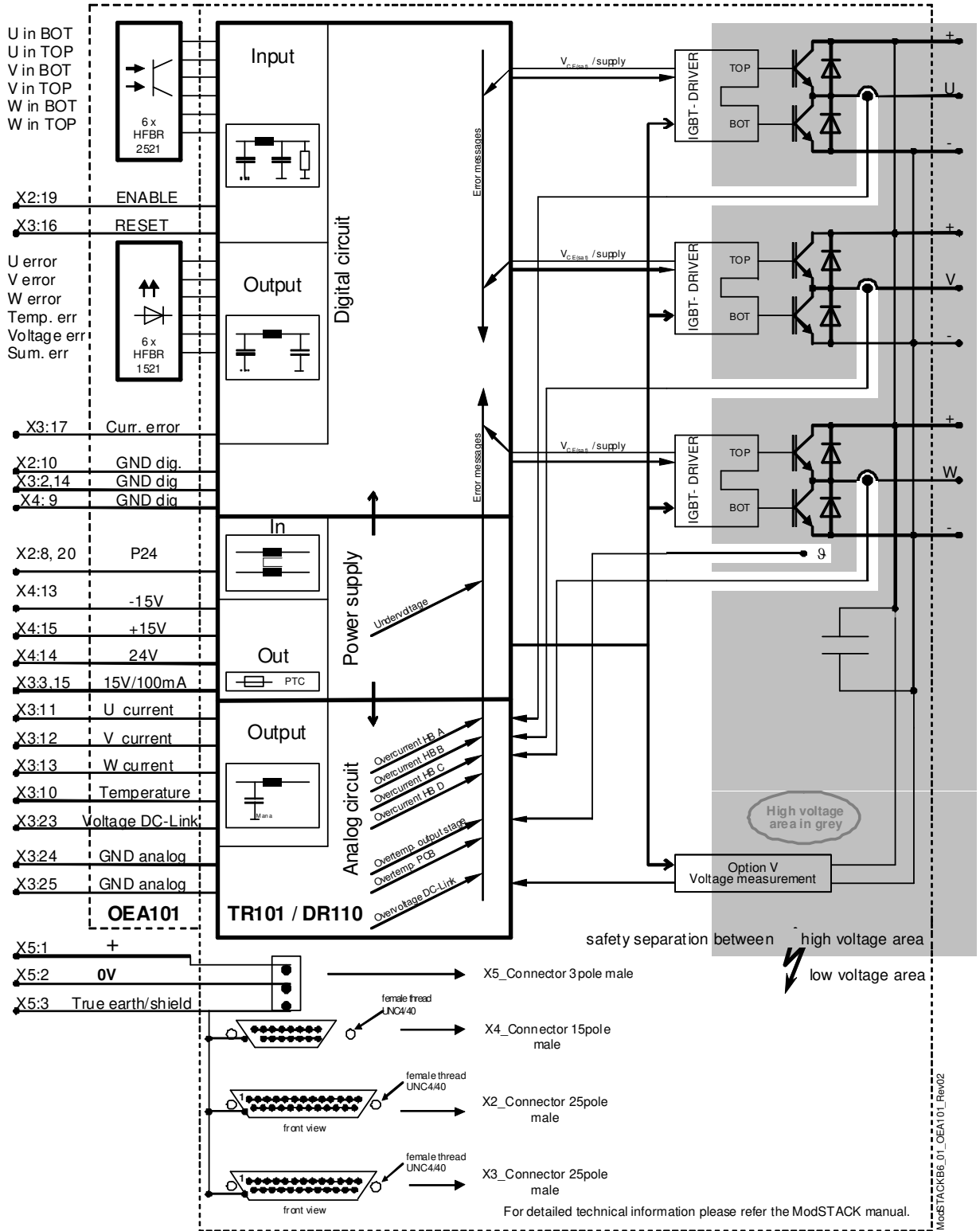
Mechanical drawing

6MS...-3G-Cx...  
ModSTACK  
32859 MB



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Circuit diagram



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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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