ModSTACK™

Data Sheet: 2B6I 500/800-450W Preliminary Data

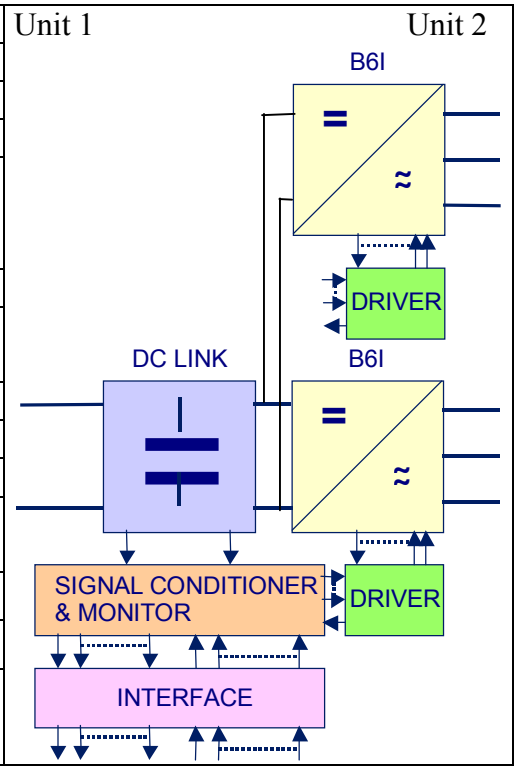
Key Data

2 x 3 x 450A AC at 500V AC, water cooled

General Information

Stack with IGBT's, heatsinks, capacitors, drivers and sensors for several inverter applications. These are only technical data! Please read heedful the complete documentation and attend the adopted design environment! Especially the EMC environment and the controller functionality are important.

Topology		DC Link + 2B6I
Load Type		Resistive, inductive load
Cooling		Water
Target Application		Industrial Drive
Extra		Available in Master [M] or Slave [S] Configuration
Driver core		Scale Driver
Monitors		Current-, Voltage-, Temperature-Monitoring
Module (Unit1)		n.a.
Module (Unit2)	IGBT	6x FF800R12KL4C
Interface		Electrical, opt. optical
Standards		EN50178, UL94, prepared for UL508C
Product ID (eupec)		
Drawing No.		38000002_B_MB
Circuit Diagram No.		57000002



Electrical Data

	Parameter		Min.	Typical	Max.	
Dedicated Line Voltage	For Isolation Management	VLine		500		VRMS
DC Link Voltage		VDC		675	880	Vav
DC Link Over Voltage Shutdown	Within 100µs			VDCmax		V
DC Link Current	At IUnit2, VUnit2, cos_φUnit2	IDCLink Input		1116		Aav
Voltage Unit1		VUnit1		-		VRMS
Continuous Current Unit1	ϑ=ϑair_inlet	IUnit1			-	ARMS
Short-time Current Unit1	10s, every 180s, initial load = IUnit1	IUnit1_10			-	ARMS

Pulse Current Unit1	Sine half wave 20ms				-	Apeak
DC Current at Unit1	No rotating field, $\vartheta=\vartheta_{air\_inlet}$,	I_{Unit1_DC}			-	Aav
Over Current Shutdown Unit1	Percentage of I_{Unit1}. within 15µs			-		%
Switching Freq. Unit1		f_{sw1}			-	Hz
Power Losses Unit1	$V=V_{unit1\_min}$, $I=I_{Unit1}$, $f_{sw}=f_{sw1}$	P_{loss1}		-		W
Voltage Unit2	Depending on Controller	V_{Unit2}		500		V_{RMS}
Displacement factor		$\cos\_\varphi_{Unit2}$	-0,9		+0,9	
Continuous Current Unit2	$\vartheta=\vartheta_{water\_inlet}$, ϑ_{chip} <= 125°C f_{Unit2}>5Hz both B6I separated	I_{Unit2}			2x3x 450	A_{RMS}
Short-time Current Unit2	ϑ_{water_inlet}<=40°C, 10s, every 180s, initial load = I_{Unit2}	I_{Unit2_10}			2x3x 540	A_{RMS}
Pulse Current Unit2	Sine half wave 20ms, starting from I_{Unit2}.	$I_{Unit2peak}$			-	Apeak
DC Current at Unit2	No rotating field, $\vartheta=\vartheta_{air\_inlet}$,	I_{Unit2_DC}			0,4* I_{Unit2}	ADC
Over Current Shutdown Unit2	Percentage of I_{Unit2}. within 15µs			125		%
Switching Freq. Unit2		f_{sw2}			3000	Hz
Power Losses Unit2	$I=I_{Unit2}$, $f_{sw}=f_{sw2}$	P_{loss2}		8300		W
Power Losses (PCB and Capacitor)		P_{loss_aux}			315	W
Filter resistors at Output Unit2	Applicable for Sine wave filters (damping, optionally)	R_{Filter}		-		Ohm
		$P_{RFilter}$		-		Watt
Auxiliary Voltage		V_{aux}	18	24	30	Vav
Auxiliary Power Demand	V_{aux}=24 Vav, to feed with B6U	P_{aux}		80		W
EMC Test	According EN61800-3 at named interfaces — Power	V_{Burst}		2		kV
	Control	V_{Burst}		1		
	Aux (24V)	V_{Surge}		1		kV
Insulation Test Voltage	According EN50178 f=50Hz, t=1min	V_{isol}		1,8		kV_{RMS}

Important Component Data

DC Link Capacitor		C_{DC}		23,5		mF
DC Link Capacitor		Type		Elcap		
Capacitor Design Lifetime	Load cycle for: Wind	L_{TD}		-		Year
	Load cycle for: Solar	L_{TD}		-		Year

(eupec approximation)	Load cycle for: Industrial Drive (ϑair=35°C, I=0,8, Duration=24h/Day)	LTD		6		Year

Requirements to the Power Source

Assumed Inductance Of Feeding Power Source	(Necessary inductance not included, feeded by B6U)	LFeed		70		µH

Fan Data (requirements when not implemented)

Fan Type	Assumed		-			
Fan Voltage		VFan		-		VRMS
Fan Frequency		fFan		-		Hz
Fan Current		IFan		-		ARMS
Fan Air Pressure	Assumed	ΔpAirFan		-		Pa

Controller Interface Data

Driver	See Data Sheets	PCB	TR10x			
Paralleling Interface	Master (only first B6I)	PCB	SAD101			
	Slave		-			
	See Data Sheet					
Optical Interface	Master (only first B6I) (optionally)	PCB	OEA101			
	Slave		-			
	See Data Sheet					
Digital Input Level	Resistor to Gnd (1,8k) High = on min 15mA	Vin	0		15	V
Digital Output Level	Open collector Low = ok max 15mA	Vout	0		15	V
Analog Current Outputs Unit1	Load max 1mA at IUnit1			-		V
Analog Current Outputs Unit2	Load max 1mA at IUnit2			4		V
Analog DC Link Voltage Output	Load max 1 mA At VDCmax	VDCout		9		V
Analog Temperature Out	Load max 1mA At ϑj=125°C	Vϑout		9		V
Optical Input Level	optionally		12			µW
Optical Output Level	optionally				60	µW

Requirements to the Controller

EMC Protection	According EN61800-3 at auxiliary power and control interface		1			kV

EMC Environment			Shielding concept with TE (True Earth) separated from PE, HF conform installation			
Drive Pulse Time		ton_min	10			µs
Blockout Time		tpause	10			µs
Over Voltage Shutdown Reaction Time	After over voltage message by ModSTACK interface				50	µs
Over Current Shutdown Reaction Time	After over current message by ModSTACK interface				10	µs

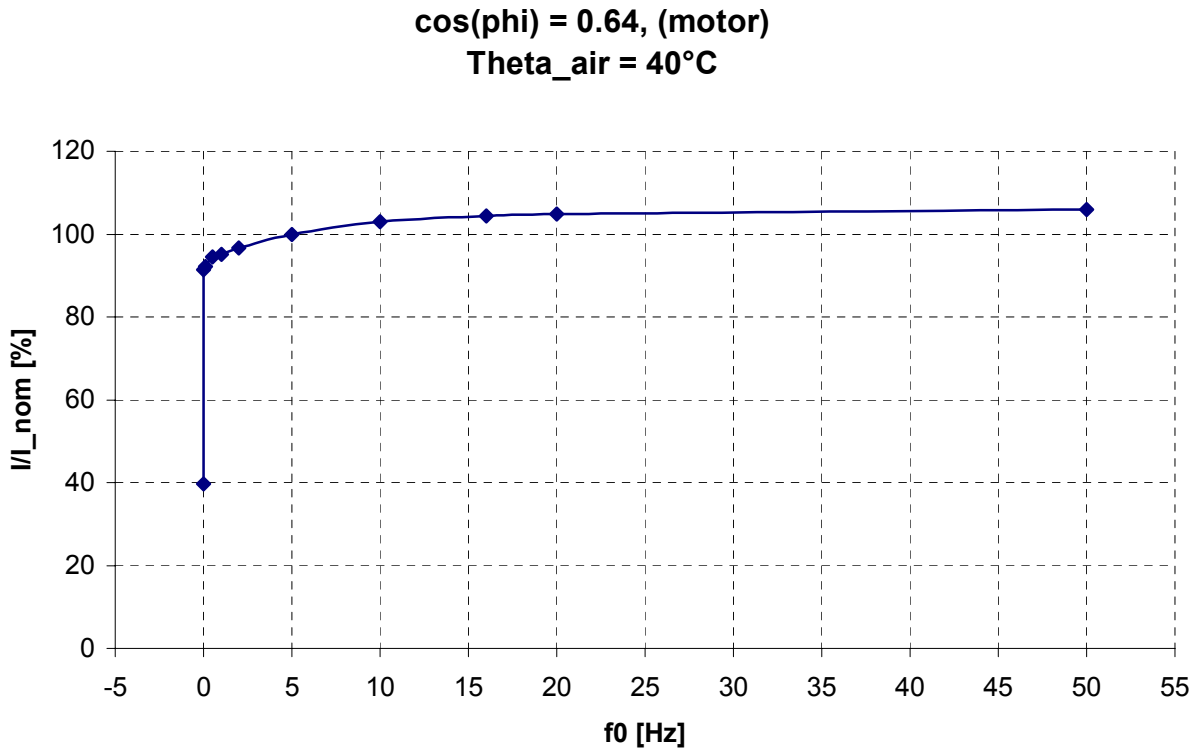
Mechanical Data

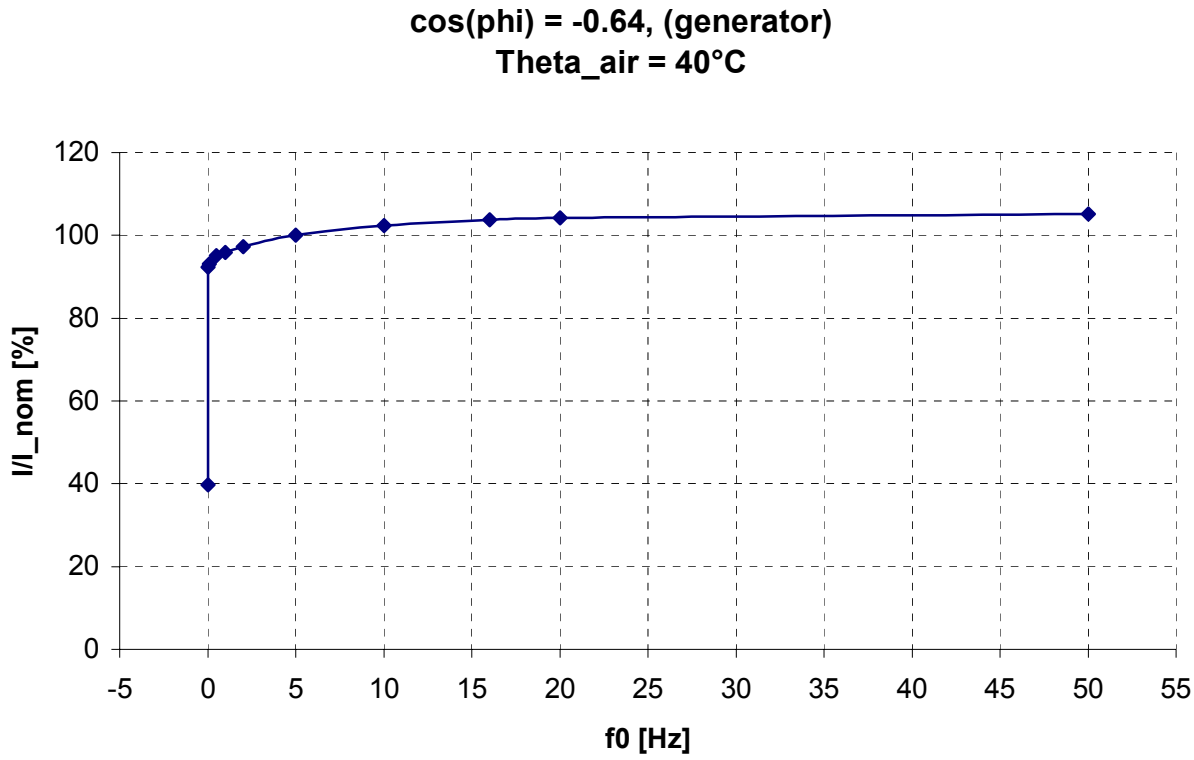
Air Velocity	ϑAir=20°C	vAir	-			m/s
Air Flow/ heatsink	Pair=1013 hPa	dV/dtAir	-			m³/h
Air Pressure Drop/ heatsink	Dry- and dust free, measured outside of heatsink. According DIN 41882	ΔpAir		-		Pa
Water Flow/ heatsink	According Coolingwater Specification from eupec for copper tubes	dV/dt Water	16			l/min
Water Pressure Drop/ heatsink		ΔpWater		200		mbar
Max. Water Pressure				8		bar
Water connection (Tube diameter)				¾”		Inch
Dimensions	Width x Depth x Height		1090	596	250	mm
Mass	Approximation			101		kg
Storage Temperature Range		ϑstor	-40		+65	°C
Operating Temperature range (PCB and Capacitor)	Minimal 0 °C for optional optical interface	ϑop	-25 (0)		+55	°C
Cooling Air Inlet Temperature (Heatsink)		ϑair_inlet	-		-	°C
	Heatsink temperature > -25°C		-			
Cooling Water Inlet Temperature (Heatsink)		ϑwater_ inlet	-25		+40	°C
Cooling Air Velocity (PCB and Capacitor)		vAir_PCB	2			m/s
Air Pressure	Standard atmosphere	pAir	900		1100	hPa
Humidity	No Condensation	Rel. H	0		95	%
Installation Height			0		1000	m
Vibration	EN60068-2-6, Fc 10..59Hz 0,075mm				10	m/s²

Permanence Vibration	EN60068-2-6, Fc 10-150Hz, 20 Cycles				20	m/s²
Shock	EN60068-2-27, Ea Halfsine 11ms, 3 pulses				100	m/s²
Protection Degree			IP00			
Pollution Degree			2			
Over Voltage Category			III			

Derating Curves *(IGBT Part)*

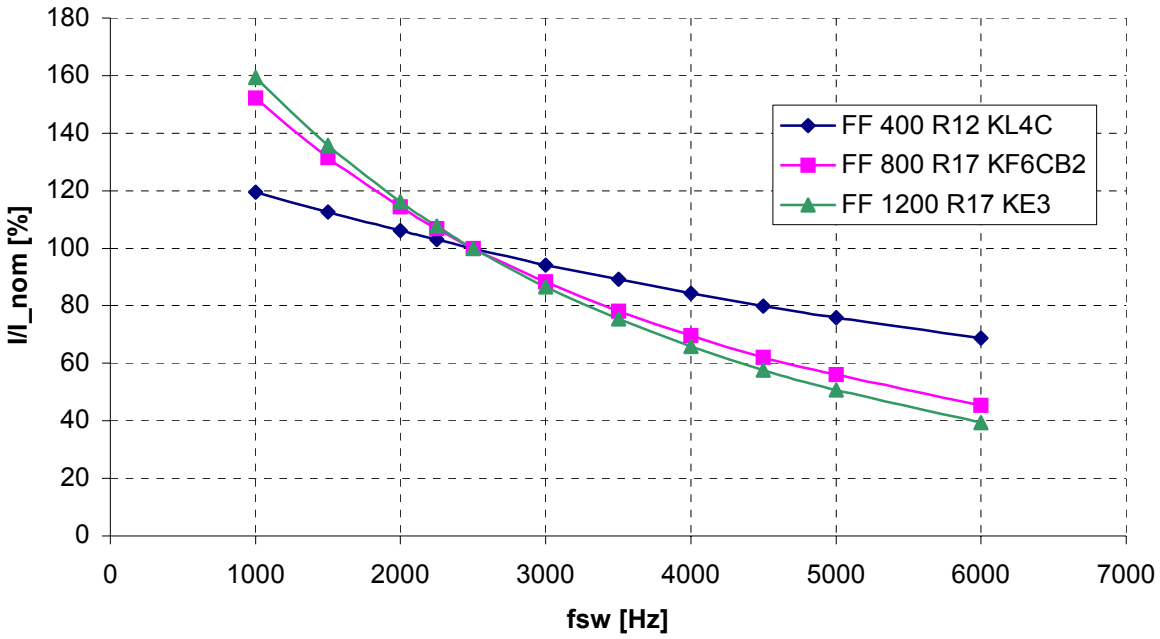
Current derating at low rotating field frequency (f0). **Maximal 100% current is allowed.**



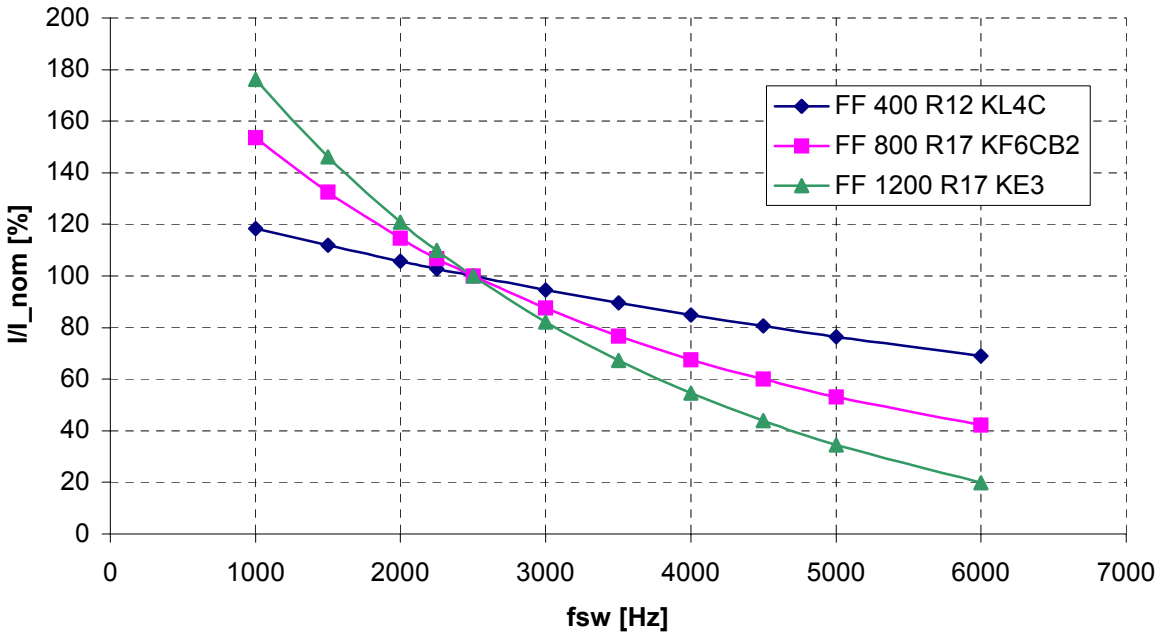


Current derating at different switching frequencies. See datatable for nominal switching frequency. In this drawing 2500Hz is assumed. **Maximal 100% current is allowed.**

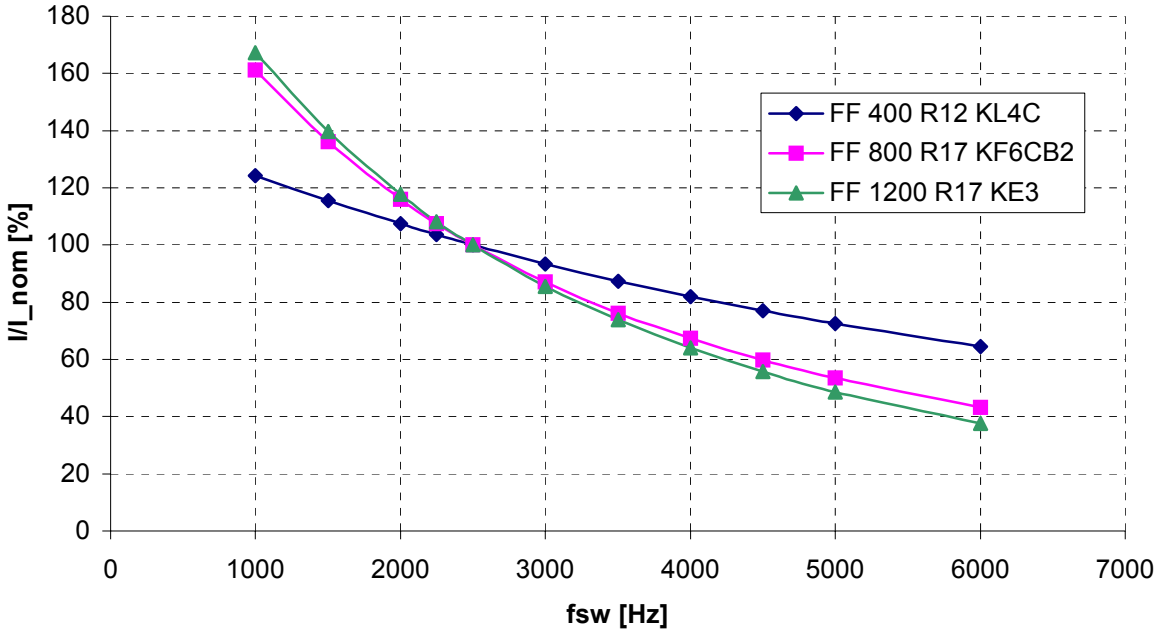
IGBT, cos(phi) = 0.64
Theta_air = 40°C



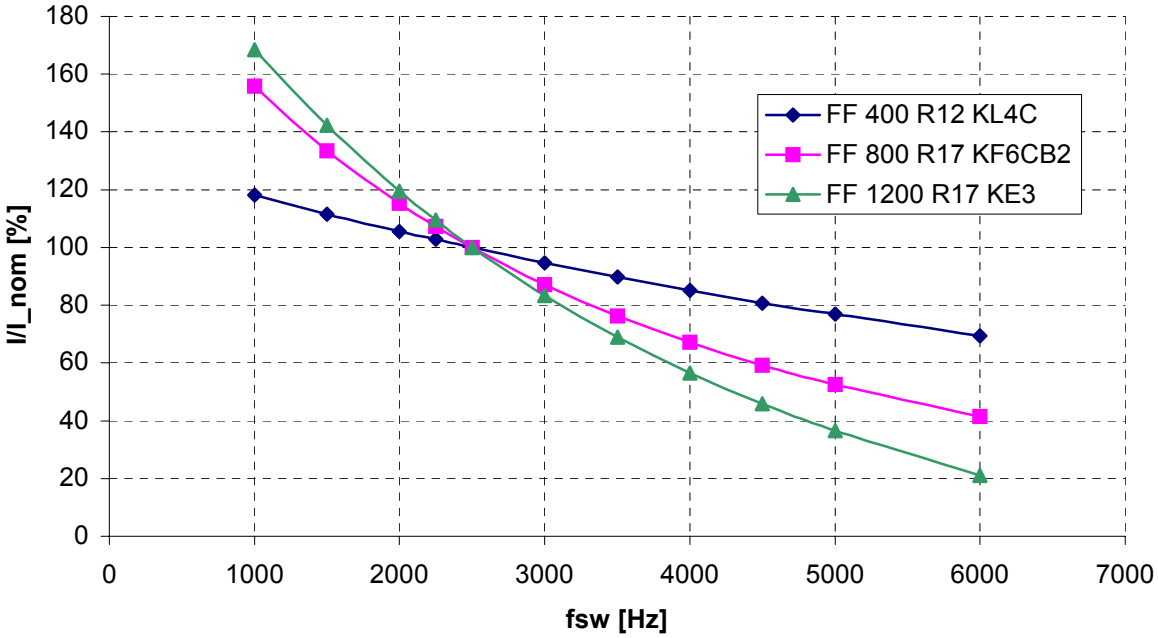
Diode, cos(phi) = 0.64
Theta_air = 40°C



IGBT, cos(phi) = - 0.64
Theta_air = 40°C



Diode, cos(phi) = -0.64
Theta_air = 40°C



Miscellaneous

This technical information specifies semiconductor stacks but promises no characteristics. It is valid in combination with the belonging technical notes.
This document may be changed without prior notice.

Warning!

Prior to installation and commissioning 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 missing or damaged signs are replaced.

The safety instructions have to be strictly adhered to.
The manual contains detailed information on all technical topics with regard to the eupec ModSTACK. For further details regarding publications of the eupec ModSTACK and information on other publications in the area of ModSTACKs please contact your nearest eupec branch or visit our website: http://www.eupec.com.

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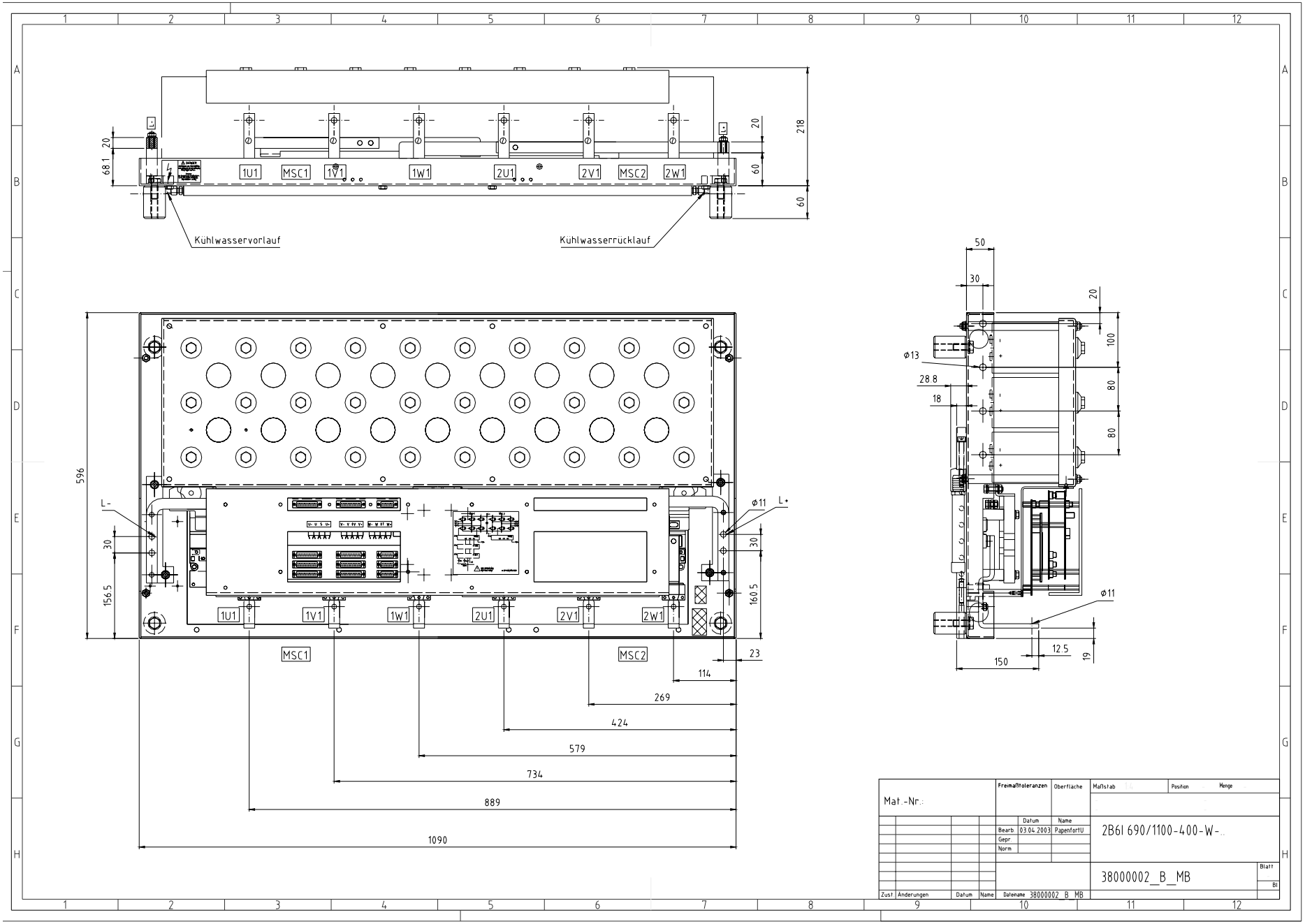
1U1
MSC1
1V1
1W1
2U1
2V1
MSC2
2W1
Kühlwasservorlauf
Kühlwasserrücklauf
68.1
20
218
60
596
156.5
160.5
30
L-
L+
ø11
MSC1
MSC2
23
114
269
424
579
734
889
1090
50
30
ø13
28.8
18
100
80
12.5
150
19
Mat.-Nr.:
Freimaßtoleranzen
Oberfläche
Maßstab
Position
Menge
Datum
Name
Bearb. 03.04.2003 PapenfortU
Gepr.
Norm
2B6I 690/1100-400-W-..
38000002_B_MB
Blatt
Zust. Änderungen
Datum
Name
Datename 38000002_B_MB