

Technical Information

PrimeSTACK

6PS0450R12KE4-3WH-VT



Vorläufige Daten
preliminary data

Key data

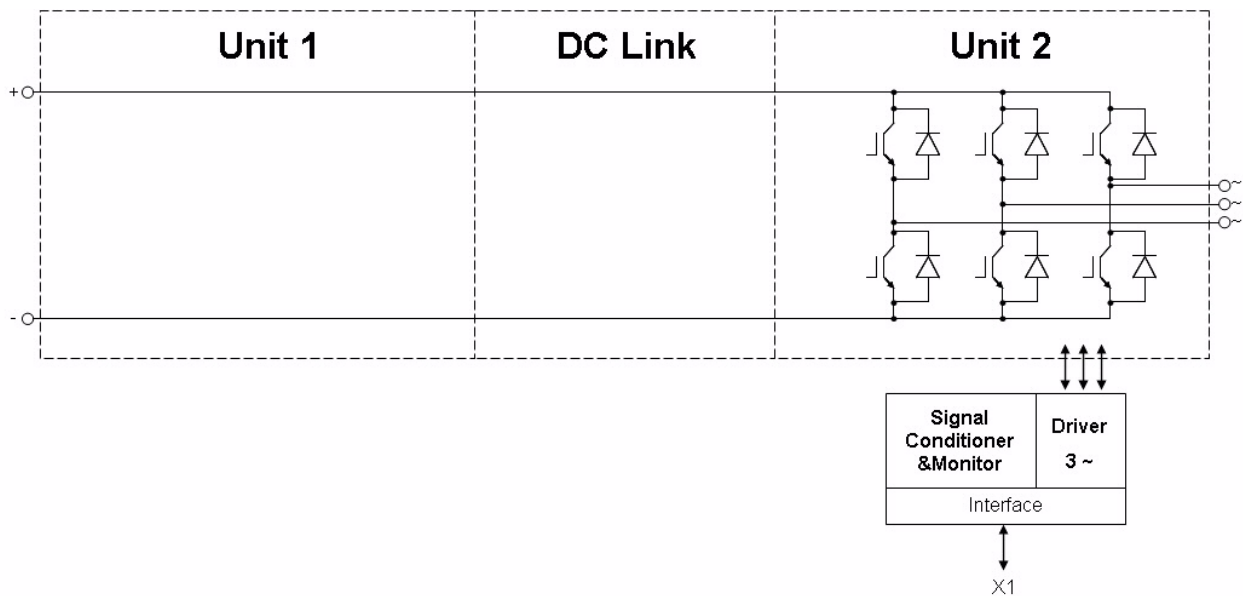
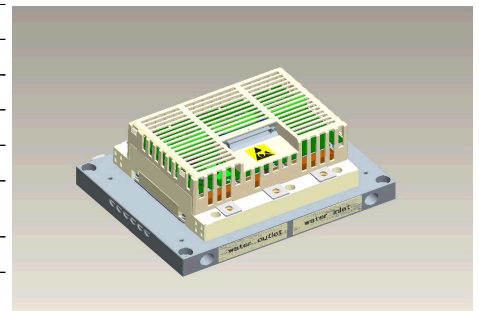
3x 300A rms at 500V rms, water cooled

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		B6I
Application / Modulation		Inverter / Sine
Load type		resistive, inductive
Cooling		water cooled
Implemented sensors		current, voltage, temperature
Semicond. (Unit 1)		none
DC Link		none
Semicond. (Unit 2)	IGBT	3x FF450R12KE4
Driver signals IGBT		electrical CMOS 0 .. 15V
Standards		EN50178, UL94, prepared for UL508C
Sales - name		6PS04512E43W 34482
Internal ID		34482
Mechanical drawing number		34482_MB
Electrical drawing number		6PS-C3-V-Rev03



prepared by: Hoelbe Oliver	date of publication: 2010-12-16
approved by: Sören Dreifke	revision: 2.2

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Notes

Heat sink with aluminum cooling channel.
Composites of fluid: Water and 52 vol. % Antifrogen N.
Integrated current sensor: permanent current 300 A rms.

Electrical data

DC Link		min	typ	max	units
Voltage		V_{DC}	650	850	V
Overvoltage shutdown	within 5000 μ s		900		V

Unit 2 AC		min	typ	max	units
Voltage	depending on controller	V_{Unit2}	500		V_{RMS}
Continuous current	$V_{Unit2} = 500V_{RMS}$, $V_{DC} = 800V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 5Hz$, $f_{sw2} = 2500Hz$, $\cos(\phi) = 0,85$	I_{Unit2}		300	A_{RMS}
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s		221		A_{RMS}
DC current	no rotating field, $T_{inlet} = 40^{\circ}C$	$I_{Unit2 DC}$		223,0	A_{av}
Overcurrent shutdown	within 15 μ s		625		A_{peak}
Switching frequency		f_{sw2}		14000	Hz
Power losses	$V_{Unit2} = 500V$, $V_{DC} = 800V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 5Hz$, $f_{sw2} = 2500Hz$, $\cos(\phi) = 0,85$, $I_{Unit2} = 300A_{RMS}$	P_{loss2}	2400		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00	1,00	

General data		min	typ	max	units
Power losses (PCB)		$P_{loss aux}$		40	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

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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		DR210			
Driver core			EiceDRIVER 2ED300C17-S			
Digital input level	resistor to GND 10,0k Ω , capacitor to GND 1nF, high = on, min 15mA	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 1mA; at 300A	$V_{ana\ out}$	4,82	4,92	5,02	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 1mA; at $T_{NTC} = 57^{\circ}C$ correspond to $T_j = 125^{\circ}C$	$V_{T\ out}$	9,47	9,66	9,85	V
Overtemperature shutdown	at $T_{NTC} = 58^{\circ}C$ correspond to $T_j = 128^{\circ}C$	$V_{T\ out\ OT}$		10		V

Heat sink water cooled / Thermal data

			min	typ	max	units
Water flow	according cooling water specification from infineon	$\Delta V/\Delta t_{Water}$	10			dm ³ /min
Water pressure drop		Δp_{Water}		50		mbar
Water pressure					8	bar
Cooling water inlet temperature		T_{inlet}	-40		40	$^{\circ}C$

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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

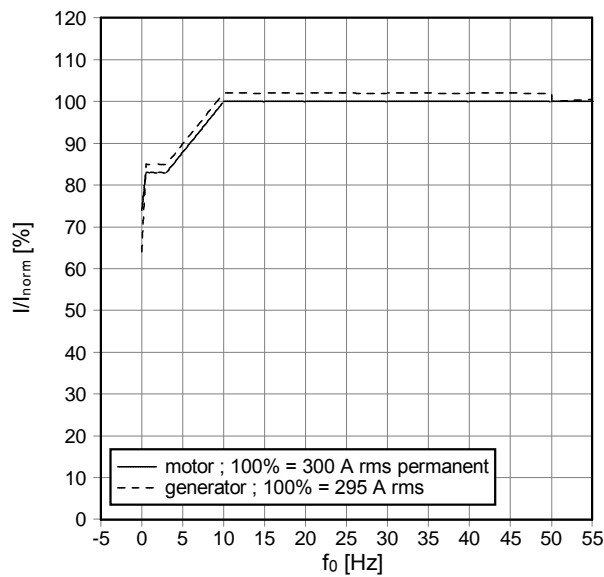
			min	typ	max	units
Storage temperature		T_{stor}	-40		85	°C
Ambient temperature		T_{amb}	-25		55	°C
Operating temperature	see chapter Heat sink water cooled / Thermal data					
Cooling air velocity (PCB)		$V_{Air PCB}$	0,3			m/s
Air pressure	standard atmosphere	p_{Air}			1100	hPa
Humidity	no condensation	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		215	280	120	mm
Weight with heat sink	approximation			7,7		kg
Weight without heat sink	approximation			2,9		kg

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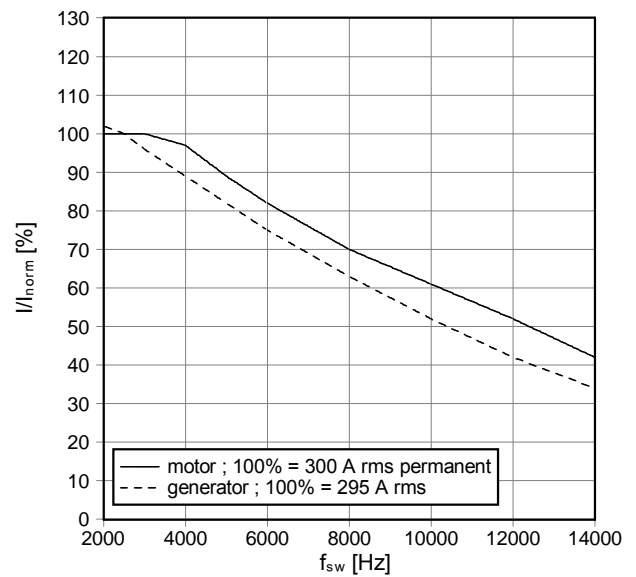


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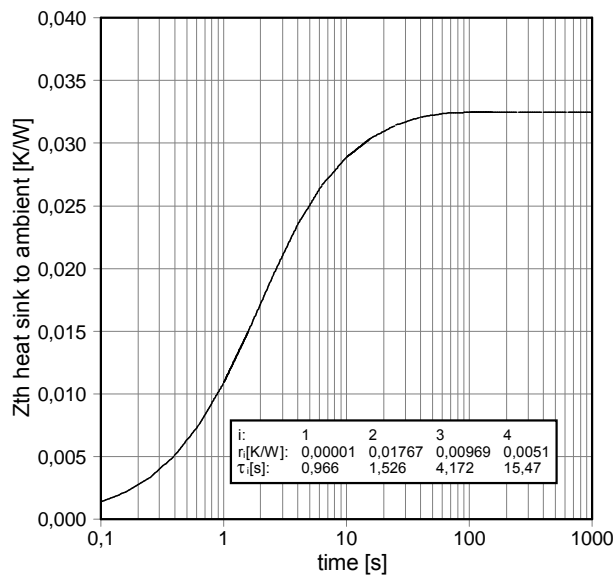
fo - derating curve IGBT (motor), Diode (generator)
cos(phi) = ±0,85
T_{cool medium} = 40°C



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



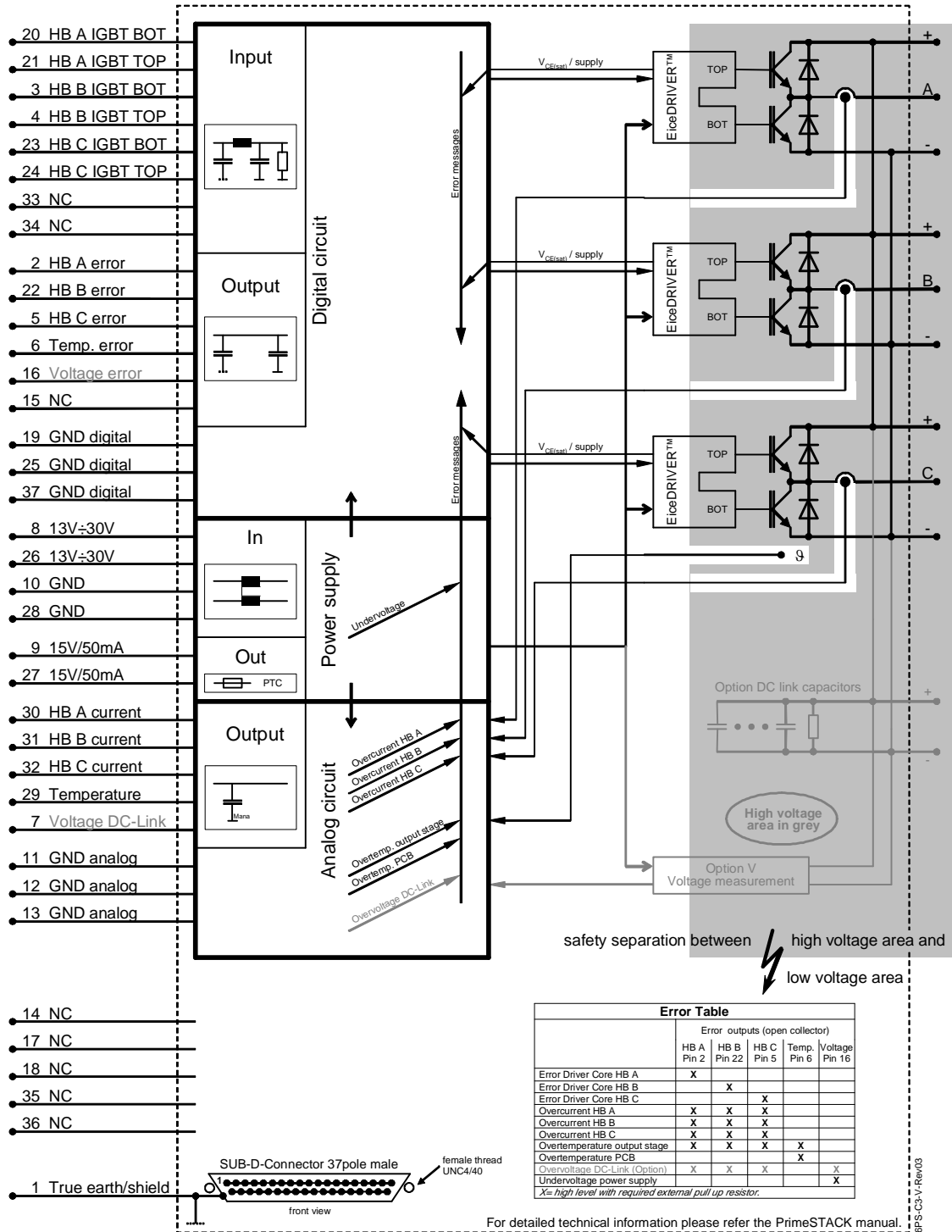
Transient thermal impedance per module
T_{cool medium} = 40°C



i:	1	2	3	4
r _i [K/W]:	0,00001	0,01767	0,00969	0,0051
τ _i [s]:	0,966	1,526	4,172	15,47

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Circuit diagram



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approved by: Sören Dreifke	revision: 2.2



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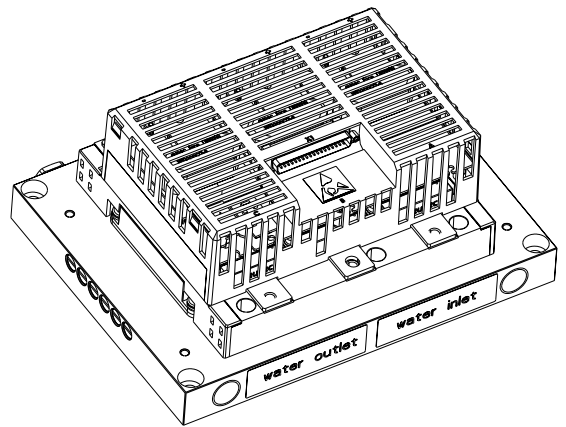
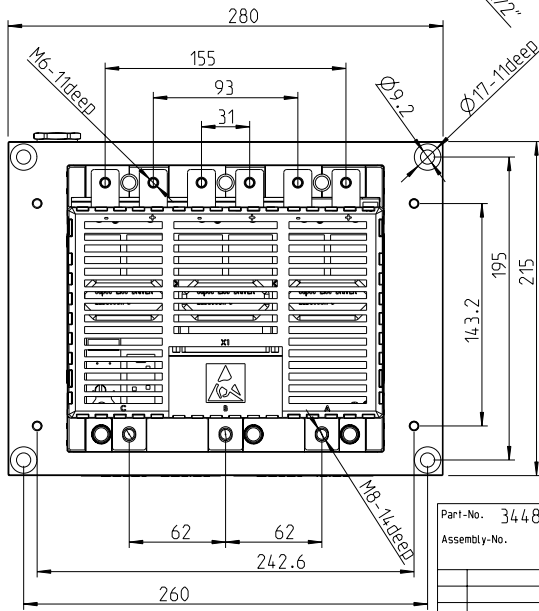
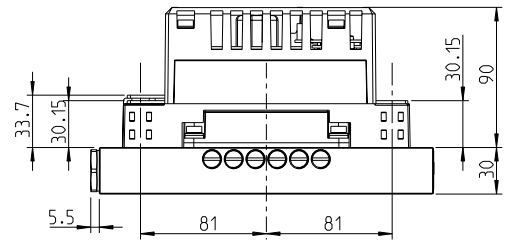
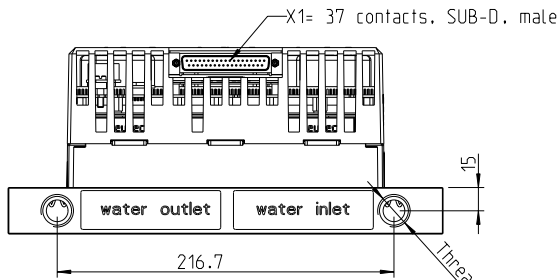
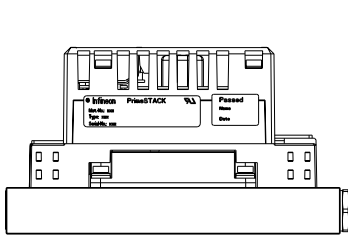
Sicherheitshinweise

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. 34482	general Tolerance	Surface	Scale 2:5
Assembly-No.			Material
			Material-No.
	Agent 12.11.10 Papenfort	Date	Description
	Checked 12.11.10 bez. Kanschaf		.PS...-3WH-..
	Norm		(hose connectors optional)
			Graph-No. 34482 Mb
			Version 0
			Sheet 1/1
Vers.	Revision	Date	Origin
			Constructed for



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