

Key data

2x 125A rms at 400V rms, forced air (fan not implemented)

General information

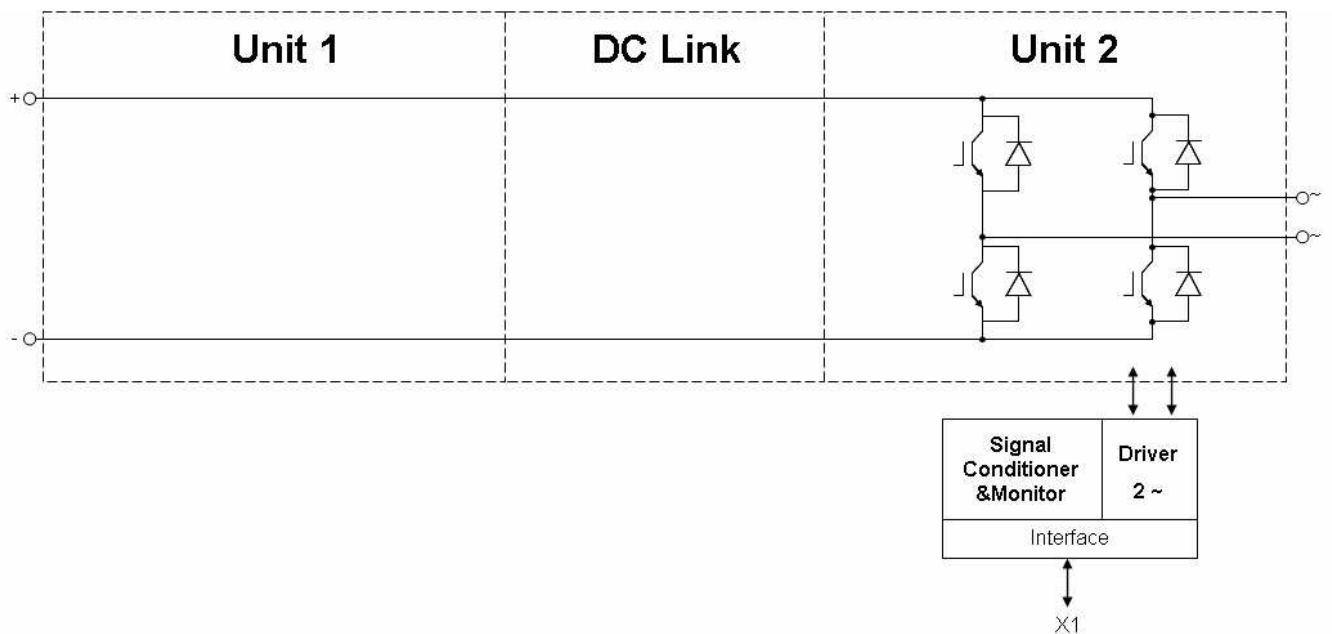
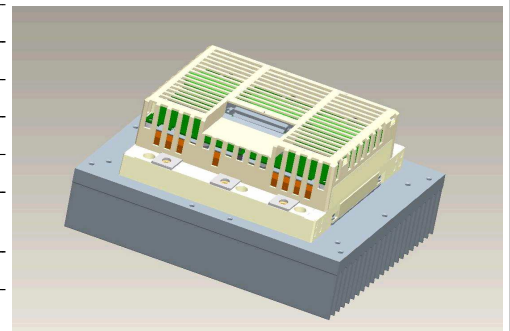
Stacks for various inverter application. Semiconductors, heat sinks, drivers and sensors included.

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	B2I
Application / Modulation	Inverter / Sine
Load type	resistive, inductive
Cooling	forced air (fan not implemented)
Implemented sensors	current, voltage, temperature
Semicond. (Unit 1)	none
DC Link	none
Semicond. (Unit 2)	2x FF150R12KS4
Driver signals IGBT	electrical CMOS 0 ... 15V
Standards	EN50178, UL94, prepared for UL508C
Sales - name	4PS01512S43G34512
Internal ID	34512
Mechanical drawing number	38000030
Electrical drawing number	4PS-C3-V



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Technical Information

PrimeSTACK

4PS0150R12KS4-3GV



Vorläufige Daten preliminary data

Electrical data

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

Unit 2 AC			min	typ	max	units
Voltage	depending on controller	V_{Unit2}		400		V_{RMS}
Continuous current	$V_{Unit2} = 400V_{RMS}$, $V_{DC} = 650V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 5000Hz$, $\cos(\phi) = 0,85$	I_{Unit2}			125	A_{RMS}
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s			89		A_{RMS}
DC current	no rotating field	$I_{Unit2 DC}$			69,0	A_{av}
Overcurrent shutdown	within 15 μ s			230		A_{peak}
Switching frequency		f_{sw2}			20000	Hz
Power losses	$V_{Unit2} = 400V$, $V_{DC} = 650V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 5000Hz$, $\cos(\phi) = 0,85$, $I_{Unit2} = 125A_{RMS}$	P_{loss2}		1045		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00		1,00	

General data			min	typ	max	units
Power losses (PCB)		$P_{loss aux}$			t.b.d.	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 $_{RMS}$

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 125A	$V_{ana out}$	5,39	5,50	5,61	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 $T_{NTC} = 81^{\circ}C$ correspond to $T_J = 125^{\circ}C$	$V_{T out}$	9,80	10,00	10,20	V
Overtemperature shutdown	at $T_{NTC} = 81^{\circ}C$ correspond to $T_J = 125^{\circ}C$	$V_{T out OT}$		10		V

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Vorläufige Daten preliminary data

Heat sink air cooled / Thermal data

			min	typ	max	units
Airflow	$T_{Air} = 20^{\circ}\text{C}$, $P_{air} = 1013\text{hPa}$, dry- and dust free, measured on side of heat sink. according to DIN 41882	$\Delta V / \Delta t_{Air}$	535			m^3/h
Air pressure drop		Δp_{Air}		165		Pa
Cooling air inlet temperature	heat sink temperature $> -25^{\circ}\text{C}$	T_{inlet}	-40		40	$^{\circ}\text{C}$

IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	$I_c = 150\text{A}$; $V_{ge} = 15\text{V}$; $T_{vj} = 125^{\circ}\text{C}$	$V_{CE\ sat}$		3,85		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	V_{ce1}		1,757		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	r_{ce1}		9,619		$\text{m}\Omega$
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	V_{ce2}		1,953		V
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	r_{ce2}		12,65		$\text{m}\Omega$
turn-on / turn-off energy loss per pulse	$T_{vj} = 125^{\circ}\text{C}$	E_2		14,5 / 11		mJ
thermal resistance, junction to case	per IGBT	R_{thjc}		0,1		K/W
thermal resistance, case to heatsink	per IGBT	R_{thch}		0,03		K/W

Diode data unit 2

			min	typ	max	units
Type	assumed					
forward voltage	$I_F = 150\text{A}$; $V_{ge} = 0\text{V}$; $T_{vj} = 125^{\circ}\text{C}$	V_F		1,7		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	V_{F1}		1,37		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	r_{F1}		4,199		$\text{m}\Omega$
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	V_{F2}		1,018		V
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	r_{F2}		4,544		$\text{m}\Omega$
reverse recovery energy	$T_{vj} = 25^{\circ}\text{C}$	E_{rec1}		3,2		mJ
reverse recovery energy	$T_{vj} = 125^{\circ}\text{C}$	E_{rec2}		8,4		mJ
thermal resistance, junction to case	per Diode	R_{thjc}		0,25		K/W
thermal resistance, case to heatsink	per Diode	R_{thch}		0,06		K/W

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Vorläufige Daten preliminary data

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 air cooled / Thermal data					
Cooling air velocity (PCB)		$V_{Air PCB}$	0,3			m/s
Air pressure	standard atmosphere	p_{Air}	900		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		216	280	167	mm
Weight with heat sink	approximation			9,1		kg
Weight without heat sink	approximation			2,9		kg

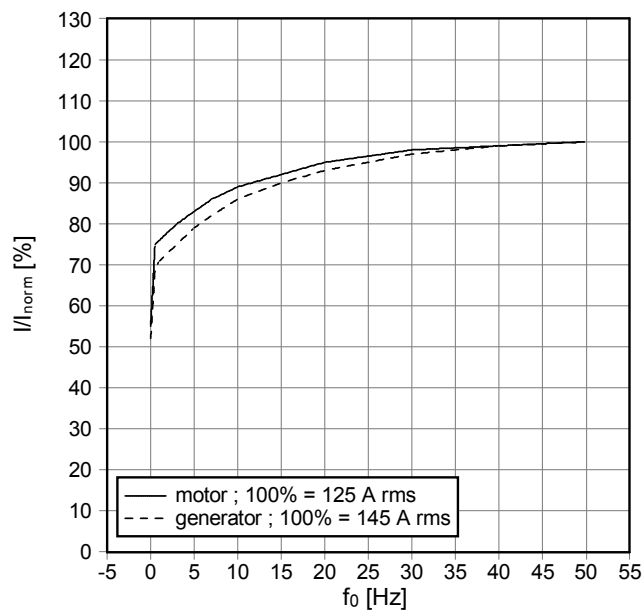
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Vorläufige Daten
preliminary data

fo - derating curve IGBT (motor), Diode (generator)

$\cos(\phi) = \pm 0,85$

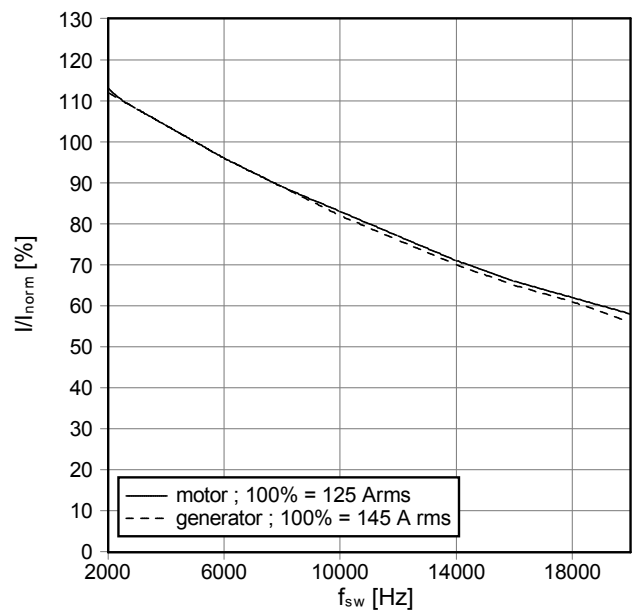
$T_{cool\ medium} = 40^{\circ}C$



fsw - derating curve IGBT (motor), Diode (generator)

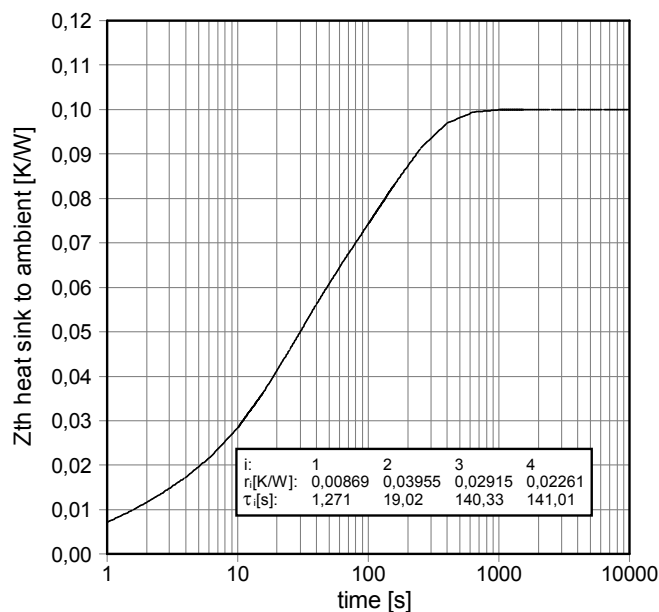
$\cos(\phi) = \pm 0.85$

$T_{cool\ medium} = 40^{\circ}C$



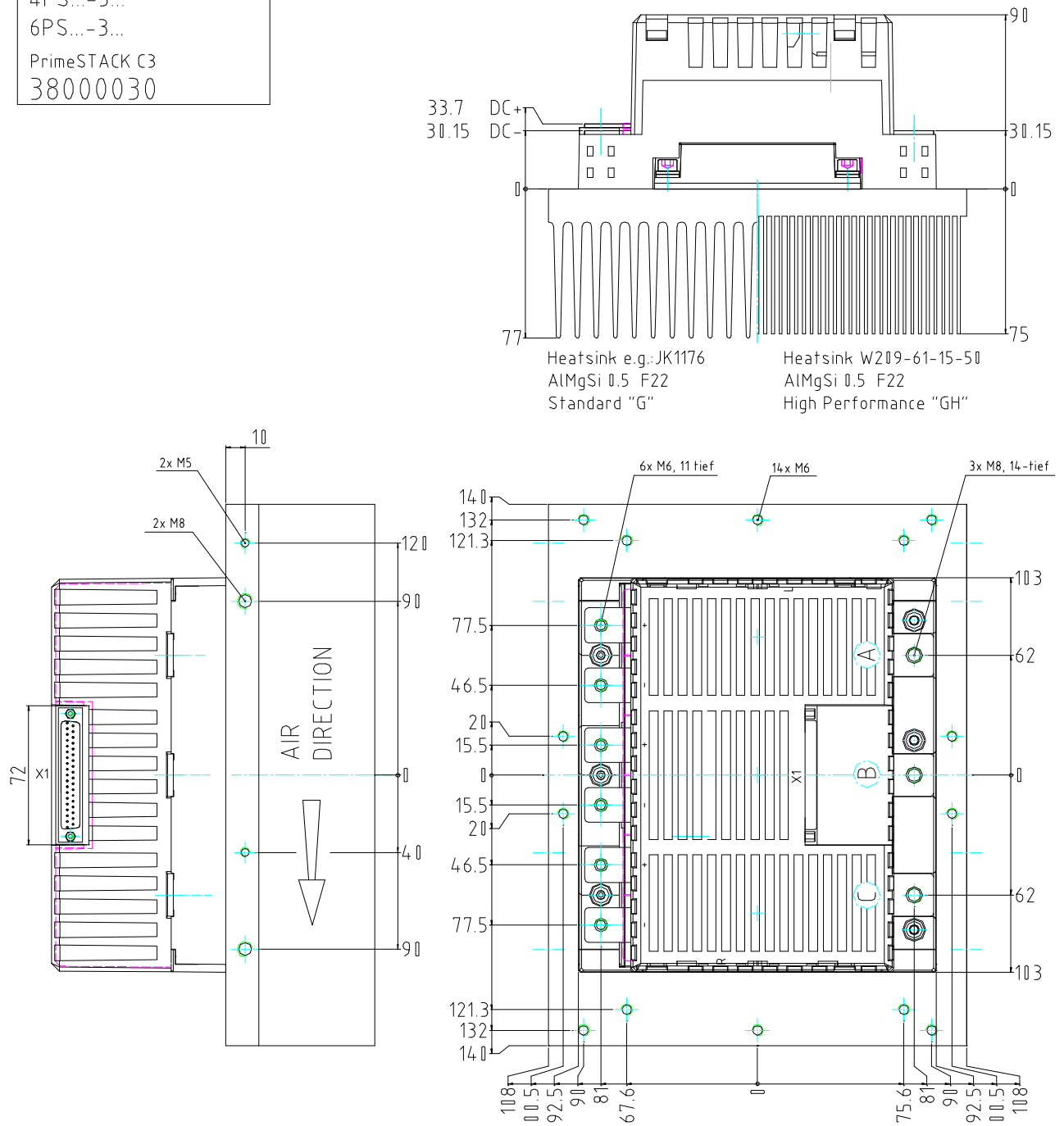
Transient thermal impedance per module

$T_{cool\ medium} = 40^{\circ}C$



Mechanical drawing

2PS...-3...
4PS...-3...
6PS...-3...
PrimeSTACK C3
38000030



X1:
2PS : SUB-D-Connector 25 pole, male
6PS : SUB-D-Connector 37 pole, male

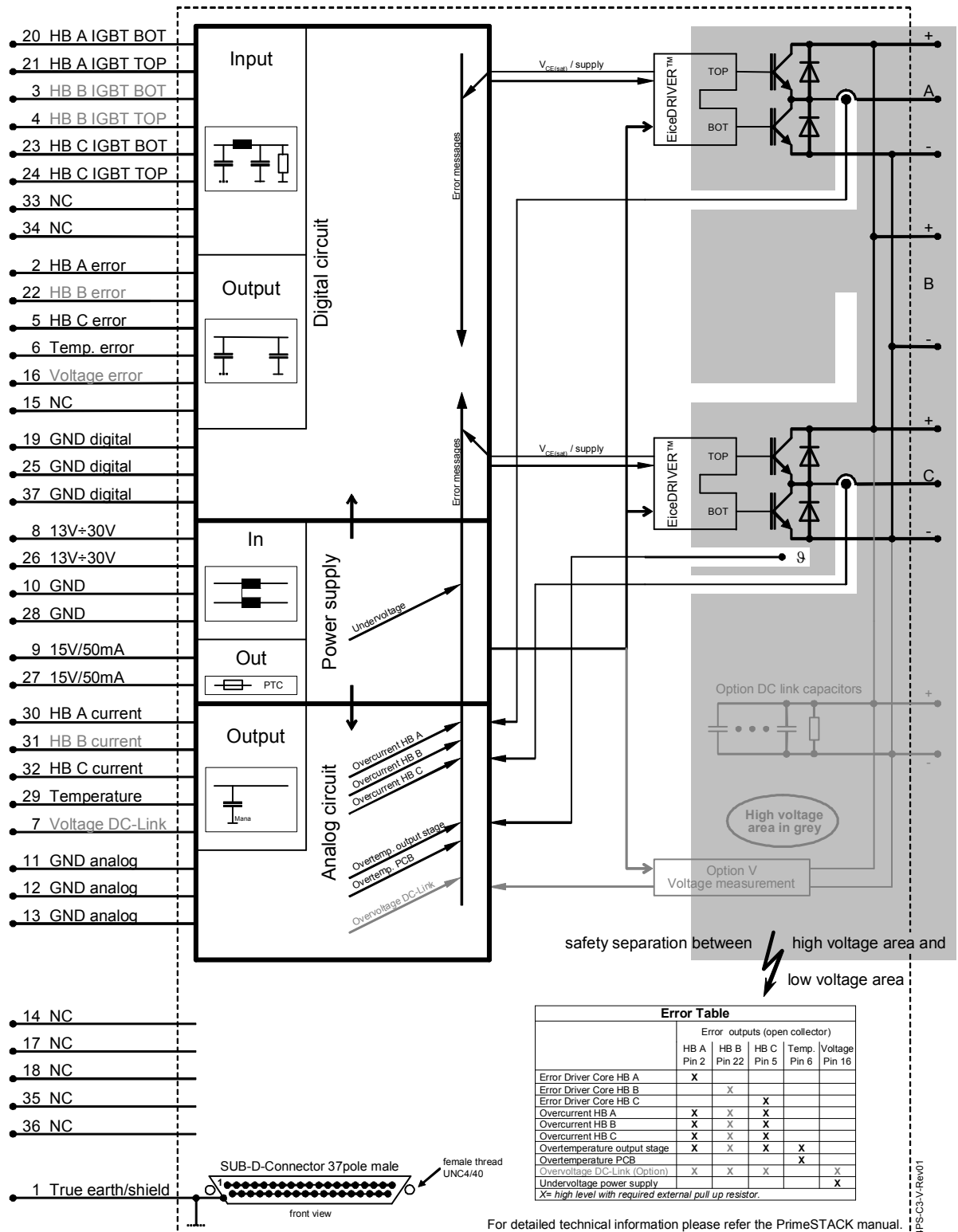
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Circuit diagram



For detailed technical information please refer the PrimeSTACK manual.

4PS-C3-V-Rev01

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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.

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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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