Technical Information

PrimeSTACK

4PS0150R12KS4-3GV

Vorläufige Daten
preliminary data

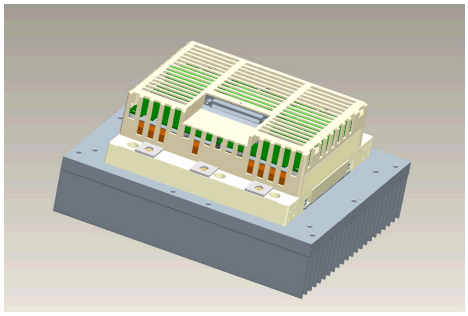
Key data

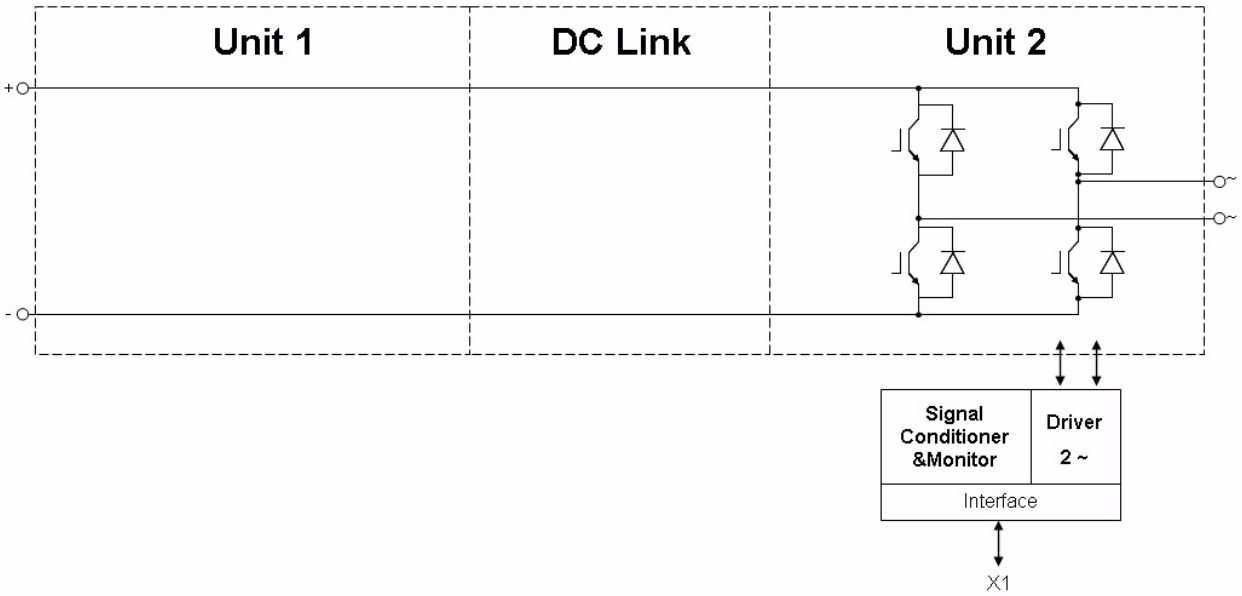
2x 125A rms at 400V rms, forced air (fan not implemented)

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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Electrical data

DC Link				min	typ	max	units
Voltage			V_{DC}		650	850	V
Overvoltage shutdown	within 5000µs				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°C, $T_J \leq$ 125°C, f_{Unit2} = 50Hz, f_{sw2} = 5000Hz, cos(phi) = 0,85		I_{Unit2}			125	A_{RMS}
Continuous current overload cap.	T_{inlet} = 40°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 15µs				230		A_{peak}
Switching frequency			f_{sw2}			20000	Hz
Power losses	V_{Unit2} = 400V, V_{DC} = 650V, T_{inlet} = 40°C, $T_J \leq$ 125°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 10,0kΩ, 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°C correspond to T_j = 125°C	$V_{T\ out}$	9,80	10,00	10,20	V
Overtemperature shutdown	at T_{NTC} = 81°C correspond to T_j = 125°C	$V_{T\ out\ OT}$		10		V

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Heat sink air cooled / Thermal data

			min	typ	max	units
Airflow	T_{Air} = 20°C, Pair = 1013hPa, dry- and dust free, measured on side of heat sink. according to DIN 41882	$\Delta V/\Delta t_{Air}$	535			m³/h
Air pressure drop		Δp_{Air}		165		Pa
Cooling air inlet temperature	heat sink temperature > -25°C	T_{inlet}	-40		40	°C

IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	I_c = 150A; V_{ge} = 15V; T_{vj} = 125°C	$V_{CE\ sat}$		3,85		V
parameter for linear model	T_{vj} = 25°C	V_{ce1}		1,757		V
parameter for linear model	T_{vj} = 25°C	r_{ce1}		9,619		mΩ
parameter for linear model	T_{vj} = 125°C	V_{ce2}		1,953		V
parameter for linear model	T_{vj} = 125°C	r_{ce2}		12,65		mΩ
turn-on / turn-off energy loss per pulse	T_{vj} = 125°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 = 150A; V_{ge} = 0V; T_{vj} = 125°C	V_F		1,7		V
parameter for linear model	T_{vj} = 25°C	V_{F1}		1,37		V
parameter for linear model	T_{vj} = 25°C	r_{F1}		4,199		mΩ
parameter for linear model	T_{vj} = 125°C	V_{F2}		1,018		V
parameter for linear model	T_{vj} = 125°C	r_{F2}		4,544		mΩ
reverse recovery energy	T_{vj} = 25°C	E_{rec1}		3,2		mJ
reverse recovery energy	T_{vj} = 125°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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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/s²
Shock	according to IEC60721				40	m/s²
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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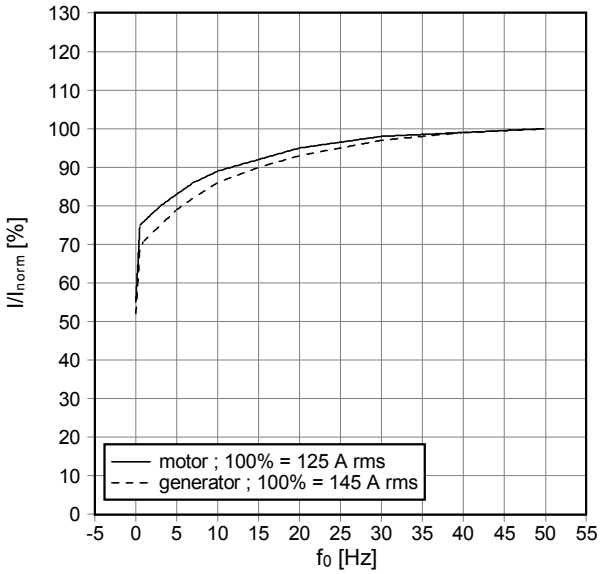
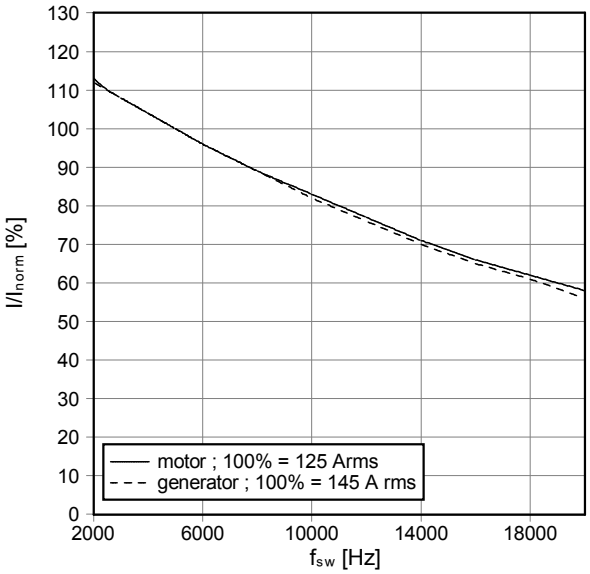
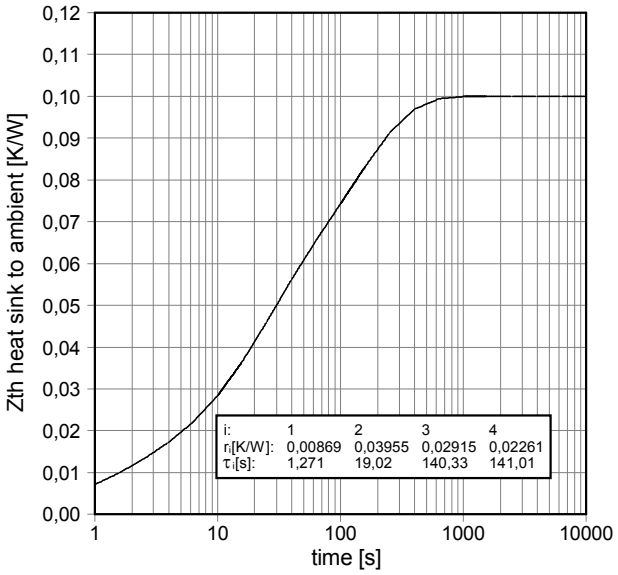
fo - derating curve IGBT (motor), Diode (generator)
cos(phi) = ±0,85
$T_{cool\ medium}$ = 40°C



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



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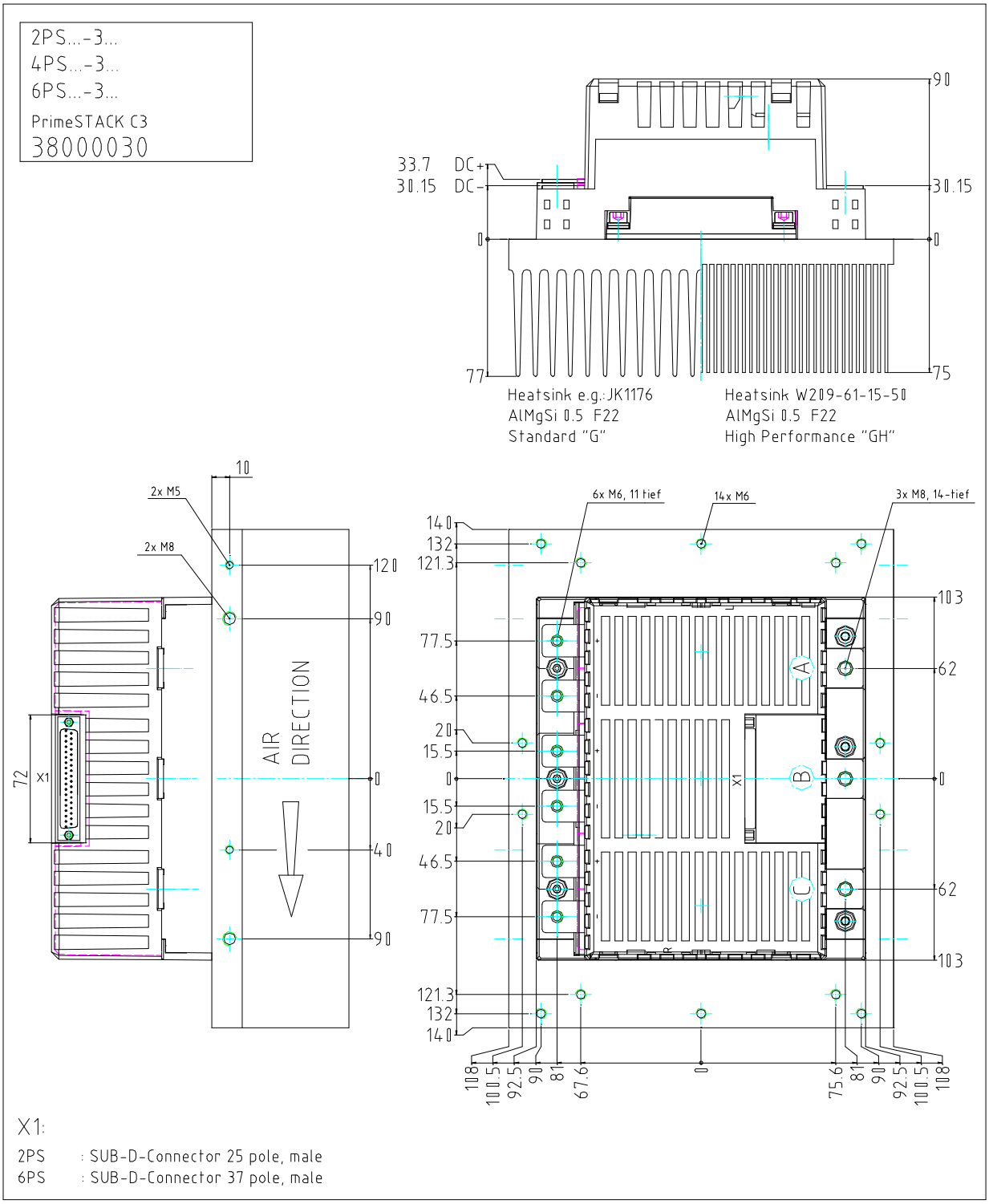
Mechanical drawing



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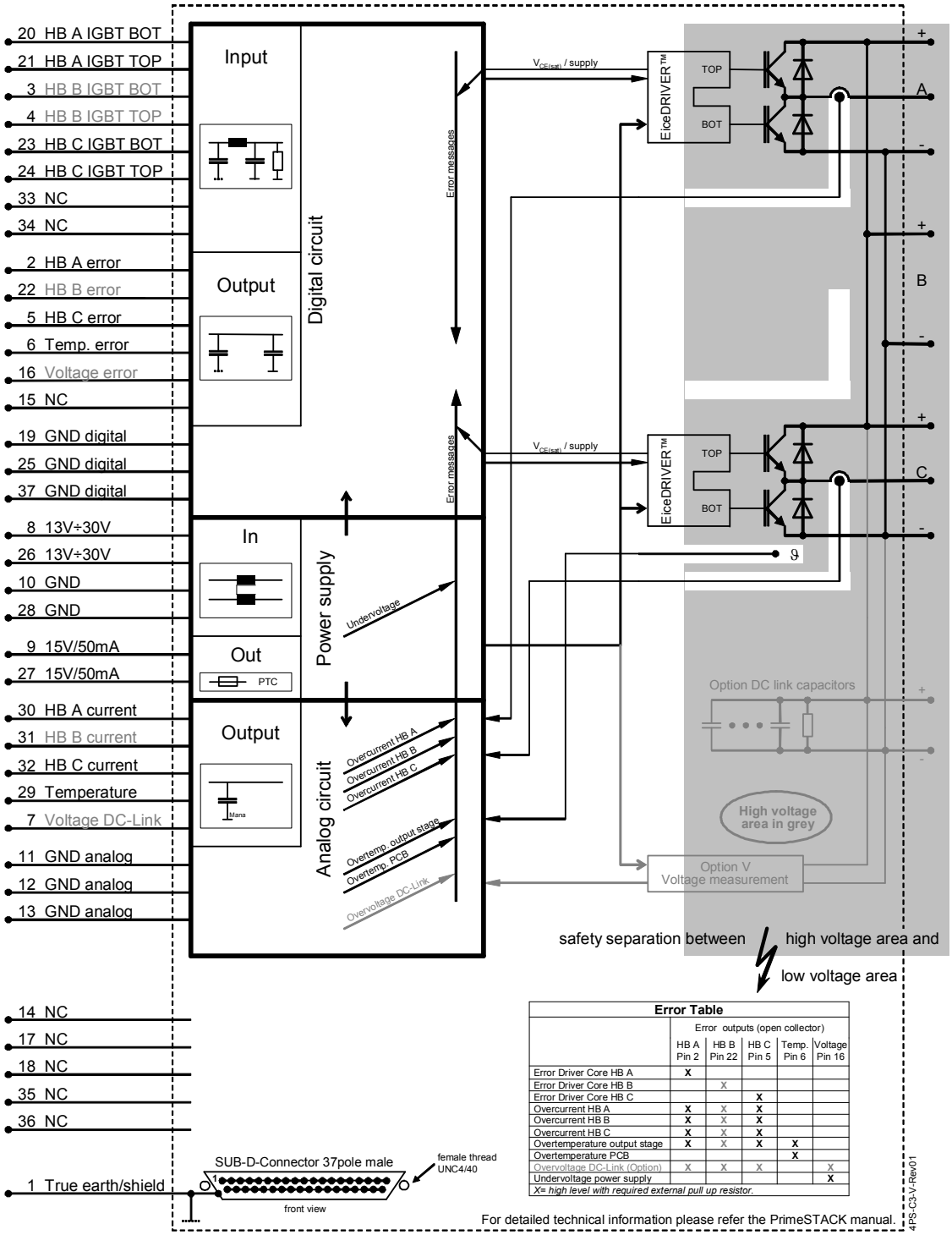
Circuit diagram



Error Table

	Error outputs (open collector)				
	HB A Pin 2	HB B Pin 22	HB C Pin 5	Temp. Pin 6	Voltage Pin 16
Error Driver Core HB A	X				
Error Driver Core HB B		X			
Error Driver Core HB C			X		
Overcurrent HB A	X	X	X		
Overcurrent HB B	X	X	X		
Overcurrent HB C	X	X	X		
Overtemperature output stage	X	X	X	X	
Overtemperature PCB				X	
Overvoltage DC-Link (Option)	X	X	X		X
Undervoltage power supply					X

X= high level with required external pull up resistor.

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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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