



SKiiP stack

Absolute maximum ratings			
Symbol	Conditions	Values	Unit
$I_{IN\ MAX}$	Maximum permanent input current	2 400	$A_{RMS}$
$I_{OUT\ MAX}$	Maximum permanent output current	2 400	$A_{RMS}$
$V_{IN\ MAX}$	Maximum input voltage	760	$V_{AC}$
$V_{OUT\ MAX}$	Maximum output voltage	760	$V_{AC}$
$V_{BUS\ MAX}$	Maximum DC Bus voltage	1 200	$V_{DC}$
$F_{IN\ MAX}$	Inverter input frequency	100	Hz
$F_{OUT\ MAX}$	Inverter output frequency	100	Hz
$F_{SW\ MAX}$	Maximum switching frequency	5	kHz

Electrical characteristics		$T_{AMBIENT} = 40^{\circ}C$ unless otherwise specified			
Symbol	Conditions	min	typ	max	Unit
<b>AC phase Grid</b>					
$I_{OUT\ RATED}$	Rated output current		2 400		$A_{RMS}$
$I_{OUT\ OVL}$	Overload output current		2 640		$A_{RMS}$
$t_{OVL}$	Overload duration		60		s
$T_{OVL}$	Time between 2 overloads		10		min
$V_{OUT}$	Output voltage		620	690 760	$V_{AC}$
$P_{OUT}$	Rated output power		2 870		kW
$F_{SW}$	Inverter switching frequency		2		kHz
$F_{OUT}$	Output frequency		50		Hz
PF	Power factor		1		-
$P_{LOSS\ INV}^{2)}$	Losses at rated current		28 320		W
$\eta^{2)}$	Efficiency at rated current		99		%

AC phase Generator					
$I_{IN\ RATED}$	Rated input current		2 400		$A_{RMS}$
$I_{IN\ OVL}$	Overload input current		2 640		$A_{RMS}$
$t_{OVL}$	Overload duration		60		s
$T_{OVL}$	Time between 2 overloads		10		min
$V_{OUT}$	Output voltage		620	690 760	$V_{AC}$
$P_{OUT}$	Rated output power		2 870		kW
$F_{SW}$	Inverter switching frequency		2		kHz
$F_{OUT}$	Output frequency		20	100	Hz
PF	Power factor		-1		-
$P_{LOSS\ INV}^{2)}$	Losses at rated current		28 320		W
$\eta^{2)}$	Efficiency at rated current		99		%

DC Bus			
$V_{BUS}$	Rated DC voltage applied to the capacitor bank	1 100	$V_{DC}$
$V_{BUS\ MAX}$	Max DC voltage applied to the caps bank (max 30% of LTE)	1 200	$V_{DC}$
$\tau_{d5\%}$	Discharge time of the capacitors ( $V_{DC} < 60\ V$ )	6	min
$C_{DC}$	Capacitor bank capacity	27,0	mF
LTE	Calculated LTE of the capacitors with forced air cooling	100	kh

Stack Insulation			
Crd	Minimum creepage distance	8,7	mm
Clid	Minimum clearance distance	7,1	mm
Visol	Chassis / Power stage AC/DC (insulation test voltage DC, 5 s)	-4 200	4 200 $V_{DC}$
Visol12	SKiiP driver only, output 1 / output 2 (AC, rms, 2 s)		1 500 V
dv/dt	SKiiP driver only, secondary to primary side		75 kV/ $\mu$ s

**SKiiPRACK® - Type 6A**

4-Quadrant 3-phase IGBT converter

Ordering No. 08800600

Description SKS C 240 GDD 69/11 – A6A MA B1C

**Features**

- Designed in regard to EN50178 recommendations
- Designed for a 1200 x 600 x 2000 mm cabinet
- Embedded SKiiP® Technology 3
- SKiiP 2403GB172-4DW, Trench 3 1700V IGBT, CAL3 diode
- Integrated current and temperature sensors
- Water cooling

**Typical Applications**

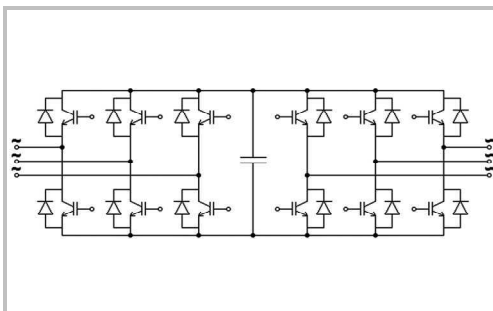
- Wind generators (SG and DFIG)
- High power AC drives

**Footnotes**

- <sup>1)</sup> Absolute maximum ratings are values not to be exceeded in any case and do not imply that the stack can operate in all these conditions taken together
- <sup>2)</sup> fan consumption and losses in air included

**REMARKS**

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee, expressed or implied is made regarding delivery, performance or suitability.  
 Before using the converter, please read carefully the SKiiPRACK® user manual.



B6CI + B6CI

# SKS C 240 GDD 69/11 – A6A MA B1C



SKiiP stack

Environmental conditions		T <sub>AMBIENT</sub> =40°C unless otherwise specified			
Characteristics	Conditions	min	typ	max	Unit
<b>Climatic</b>					
Ambiant temperature 1)	IEC 60721-3, class 1K2 & 2K2 Storage & transportation	-25		60	°C
	IEC 60721-3-3, class 3K3 extended In operation	-20		55	°C
Humidity	IEC 60721-3-3, class 3K3 no condensation no icing	5		85	%
<b>Mechanical</b>					
Installation altitude	without derating			1 000	m
Max. installation altitude	with derating			4 000	m
Protection degree	IEC 60529		IP00		-
Vibrations & Shocks	IEC 60721-3-2, storage & transportation, 1 cell		2M1		-
	IEC 60721-3-3, in operation, 1 cell		3M3		-
Pollution degree	EN 50178		2		-
Mass	Cell		80		kg
	4-Quadrant converter		550		kg
<b>Thermal</b>					
ΔV/Δt <sub>WATER</sub>	Water flow per cell	8	12	24	L/min
	Water flow per 4Q-converter	48	72	144	L/min
ΔP <sub>WATER</sub>	Pressure drop per cell with male and female connectors, 50% glycol, 12 L/min		150		mbar
	Pressure drop per 4Q converter with male and female connectors, 50% glycol, 72 L/min		150		mbar
Water pressure	Maximum water pressure permissible per cell		3		bar
Coolant type	Recommended coolant		50% Glycol / 50% water		-
T <sub>INLET</sub>	Cooling water inlet temperature	-20	45	60	°C
External cooling airflow	Snubbers, required airflow direction bottom-top		1		ms <sup>-1</sup>
V <sub>SUPPLY</sub> [fan]	Capacitor DC fan operating voltage	18	24	28	V <sub>DC</sub>
P <sub>FAN</sub> per fan	Fan power consumption at typical voltage supply		3,6		W
LTE [fan]	Capacitor DC fan life time expectancy (L10 method)		65		kh

## SKiiPRACK® - Type 6A

4-Quadrant 3-phase IGBT converter

Ordering No. 08800600

Description SKS C 240 GDD 69/11 – A6A MA B1C

### Features

- Designed in regard to EN50178 recommendations
- Designed for a 1200 x 600 x 2000 mm cabinet
- Embedded SKiiP® Technology 3
- SKiiP 2403GB172-4DW, Trench 3 1700V IGBT, CAL3 diode
- Integrated current and temperature sensors
- Water cooling

### Typical Applications

- Wind generators (SG and DFIG)
- High power AC drives

### Footnotes

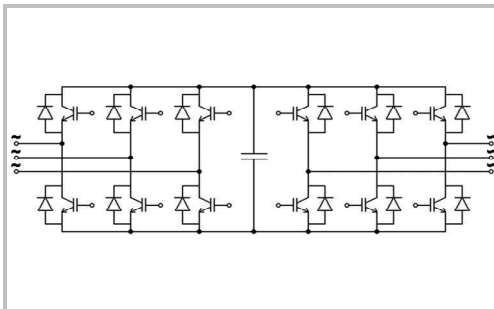
1) the user shall ensure that the ambient air is sufficiently ventilated to avoid hot spots.

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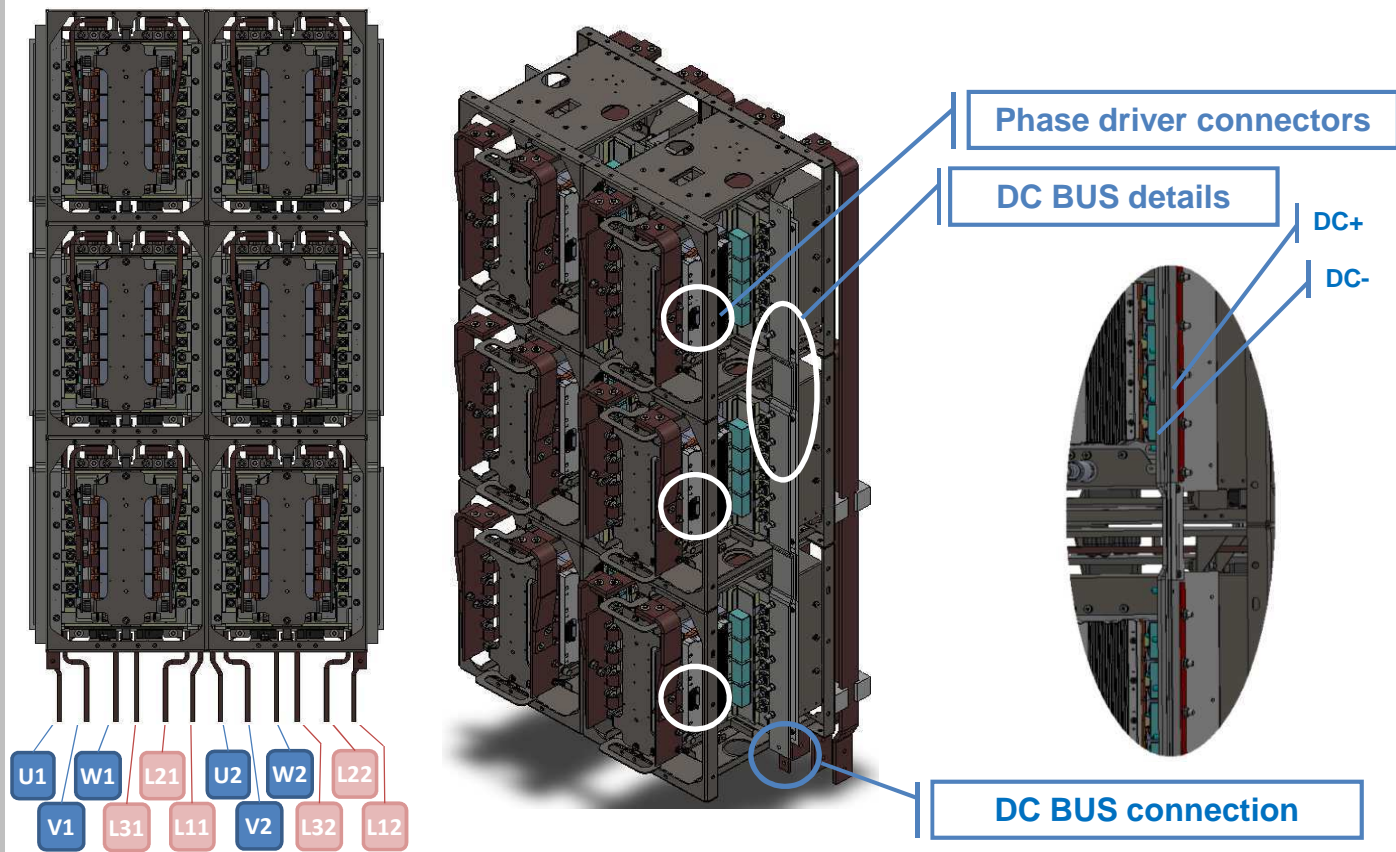
Before using the converter, please read carefully the SKiiPRACK® user manual.

Gate Driver Characteristics		T <sub>AMBIENT</sub> =25°C unless otherwise specified			
Symbol	Conditions	min	typ	max	Unit
<b>Gate Driver / controller data</b>					
V <sub>S2</sub>	supply voltage non stabilized	13	24	30	V <sub>DC</sub>
I <sub>S2</sub>	V <sub>S2</sub> = 13V - 30 V, F <sub>SW</sub> in kHz, I <sub>AC</sub> in A	330 + 55×F <sub>SW</sub> + 0.00035×I <sub>AC</sub> <sup>2</sup>			mA
V <sub>IT+</sub>	input threshold voltage HIGH	12,3			V <sub>DC</sub>
V <sub>IT-</sub>	input threshold voltage LOW	4,6			V <sub>DC</sub>
R <sub>IN</sub>	Input resistance	10			kΩ
C <sub>IN</sub>	Input capacitance	1			nF
<b>Measurement &amp; protection</b>					
HB_I	Analogue current signal HB_I	245	250	255	A·V <sup>-1</sup>
I <sub>TRIPSC</sub>	over current trip level (I <sub>analog</sub> OUT=10V)	2 450	2 500	2 550	A <sub>PEAK</sub>
CMN_TMP	Analogue temperature signal Th < 80°C	min	17 + 10,3×CMN_TMP		°C
		typ	19 + 10,5×CMN_TMP		°C
		max	20 + 10,5×CMN_TMP		°C
CMN_TMP	Analogue temperature signal Th > 80°C	min	26 + 8,8×CMN_TMP		°C
		typ	28 + 8,8×CMN_TMP		°C
		max	30 + 8,9×CMN_TMP		°C
T <sub>trip</sub>	Over temperature protection	110	115	120	°C

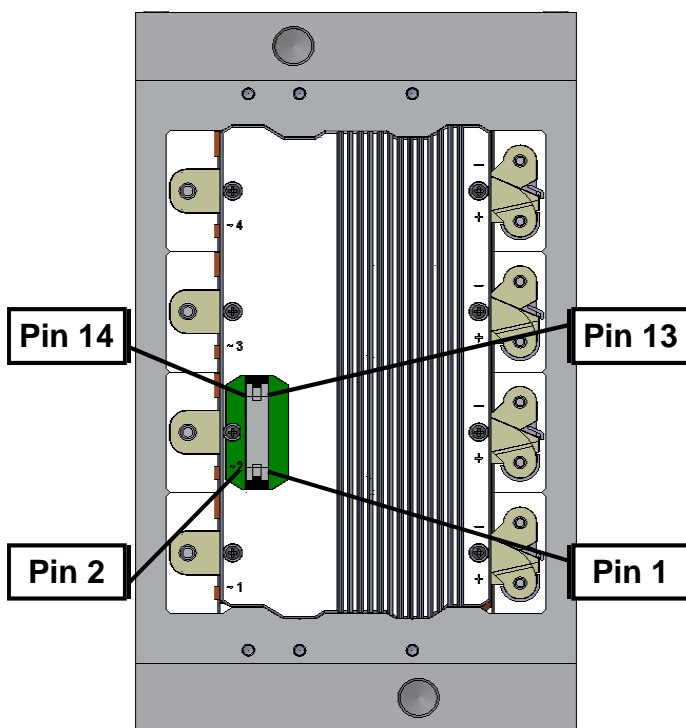


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Electrical connection



Phase Driver connector assignment

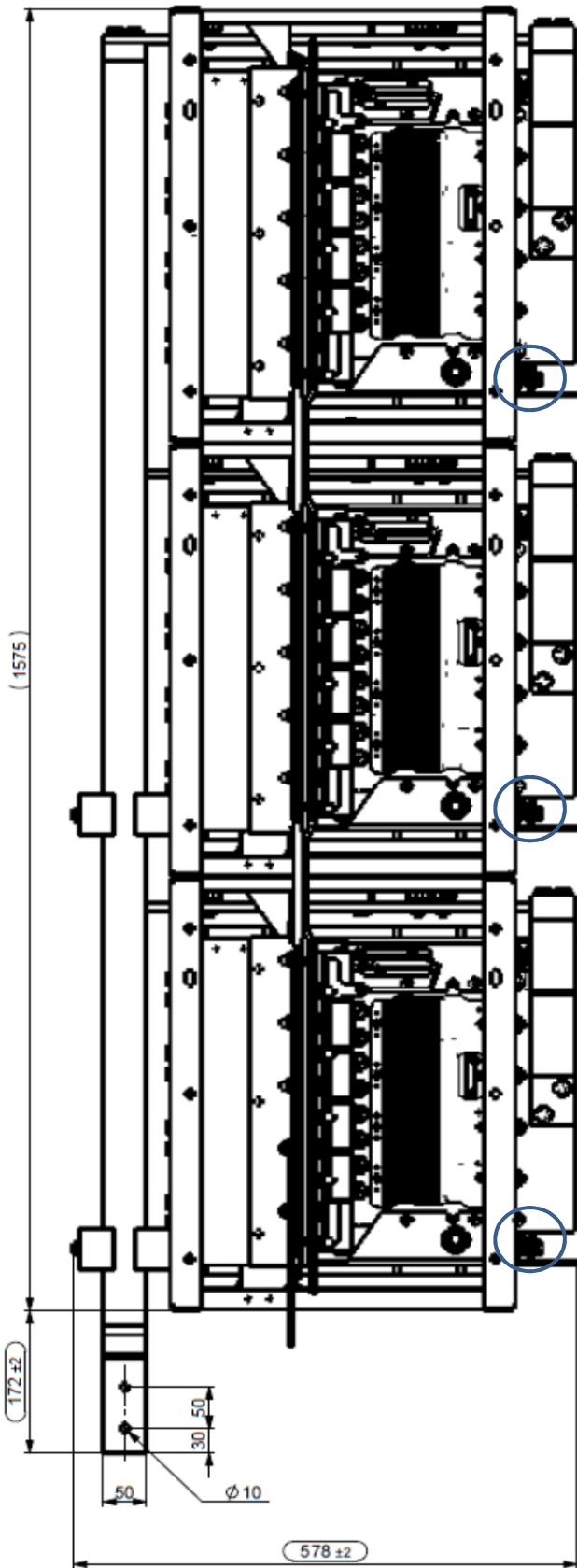


HE10-14 male connector

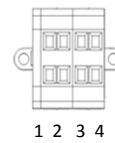
X1U, X1V, X1W, X1L1, X1L2, X1L3

Pin	Signal	Remark
1	Shield	
2	BOT IN (2)	positive 15V CMOS logic; 10 kΩ impedance, don't connect when using fiber optic
3	ERROR OUT (1)	LOW = NO ERROR; open Collector Output; max. 30 V / 15 mA don't connect when using fiber optic, propagation delay 1 μs min. pulsewidth error-memory-reset 9 μs
4	TOP IN (2)	positive 15V CMOS logic; 10 kΩ impedance don't connect when using fiber optic
5	Overtemp. OUT (1)	LOW = NO ERROR = ̸DCB < 115 + 5°C open collector Output; max. 30 V / 15 mA „low“ output voltage < 0,6 V „high“ output voltage max. 30 V
6	+ 24 VDC IN	24 V <sub>DC</sub> supply
7	+ 24 VDC IN	24 V <sub>DC</sub> supply supply voltage monitoring threshold 19,5 V
8	+ 15 VDC OUT	max. 50 mA auxiliary power supply
9	+ 15 VDC OUT	
10	GND	GND for power supply and
11	GND	GND for digital signals
12	Temp. analog OUT	max output current 5mA
13	GND aux	reference for analog output signals
14	I analog OUT	SKiiP 3 with Al2O3 ceramic substrate current actual value 8,0 V ⇔ 100 % IC @ 25 °C overcurrent trip level 10 V ⇔ 125 % IC @ 25 °C current value > 0 ⇔ SKiiP system is source current value < 0 ⇔ SKiiP system is sink SKiiP 3 with AlN ceramic substrate: refer to corresponding datasheet

1) Open collector output, external pull up resistor necessary  
added signal to GND



LEFT SIDE VIEW

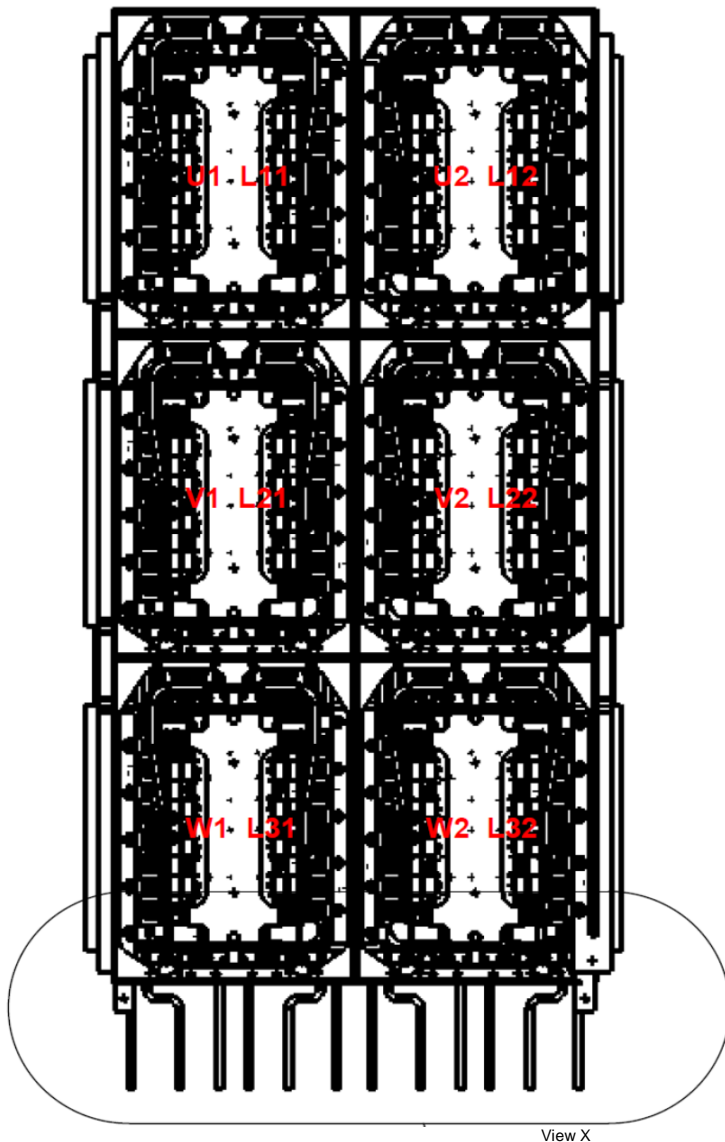


Pin	Designation
1	+24VDC
2	+24VDC
3	GND
4	GND

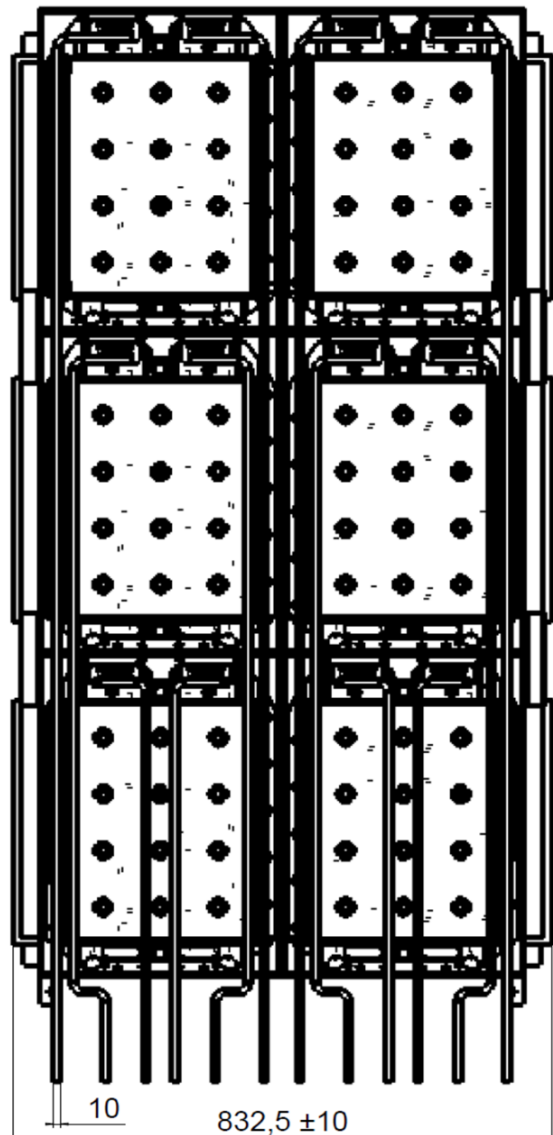
DC FAN CONNECTION (6 times)

Dimensions

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FRONT VIEW

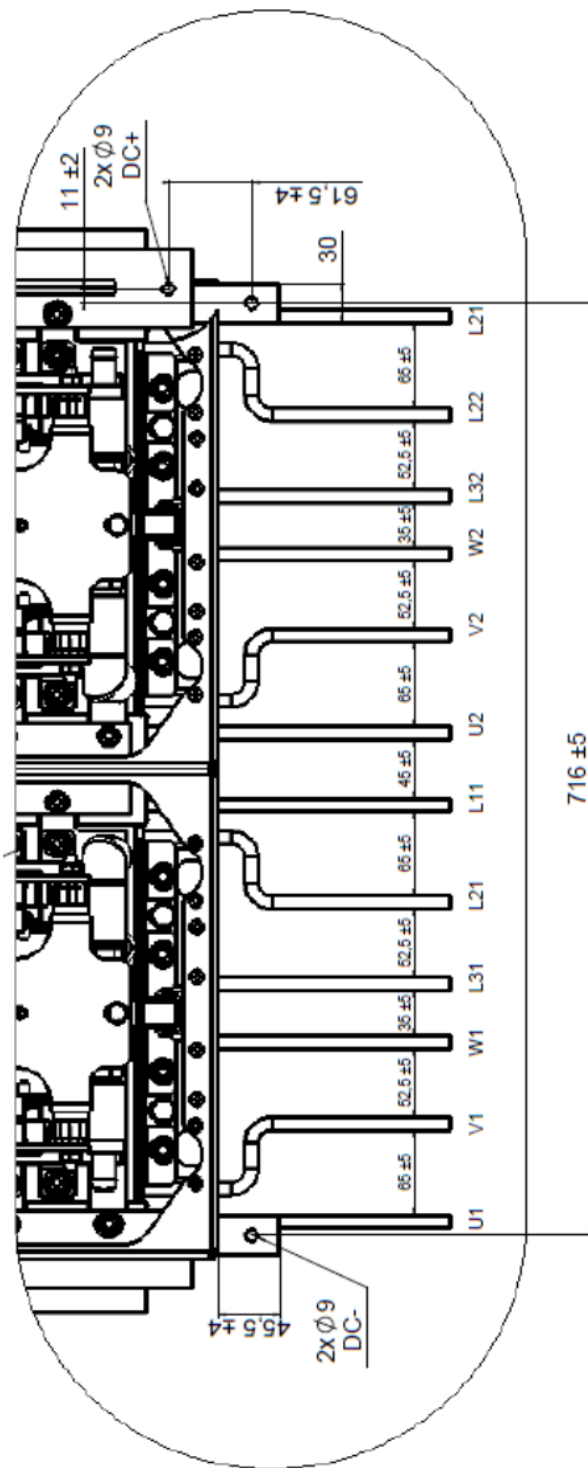


REAR VIEW

U, V, W are generator side converter phases  
 L1, L2, L3 are grid side converter phases  
 2 SKiiPs in parallel cannot be on the same SKiiPRACK cell

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Details - View X

Dimensions

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