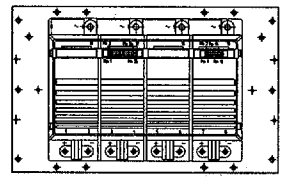
SKiiP 312 GDL 120 - 404 WT (E/U)

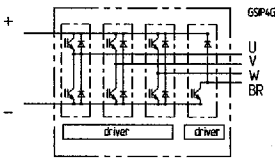
Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
IGBT & Inverse Diode			
V_{CES}		1200	V
V_{CC} [10]	Operating DC link voltage	900	V
I_C	$T_{heatsink}$ = 25 °C	300	A
I_{CM}	$T_{heatsink}$ = 25 °C; t_p < 1 ms	600	A
T_j [3]	IGBT & Diode	−55 . . .+ 150	°C
V_{isol} [4]	AC, 1 min.	3000 [5]	V
I_F	$T_{heatsink}$ = 25 °C	240	A
I_{FM}	$T_{heatsink}$ = 25 °C; t_p < 1 ms	600	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	2160	A
I^2t (Diode)	t_p = 10 ms; T_j = 150 °C	23,4	kA^2s
Driver - inverter			
V_{S1}	Stabilized power supply	18	V
V_{S2} [10]	Nonstabilized power supply	30	V
dv/dt	Primary to second. side	75	kV/µs
T_{op}, T_{stg}	Operating / stor. temperature	−25 . . .+ 85	°C

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
$V_{(BR)CES}$	Driver without power supply	≥ V_{CES}	–	–	V
I_{CES}	V_{GE} = 0, T_j = 25 °C	–	0,3	–	mA
	V_{CE} = V_{CES}, T_j = 125 °C	–	15	–	mA
V_{CEsat} [8]	I_C = 225 A, T_j = 25 (125) °C	–	2,75 (3,6)	–	V
V_{CEsat} [8]	I_C = 300 A, T_j = 25 (125) °C	–	3,15 (4,2)	–	V
I_{CETRIP}	T_j = 125 °C; V_s = 15 V ± 0,6V	≥ 375	–	–	A
C_{CHC}	per SKiiPPACK AC side	–	0,8	–	nF
L_{CE}	Top (Bottom)	–	15	–	nH
$t_{d(on)}$	V_{CC} = 600 V	–	150	–	ns
$t_{d(on)Driver}$	I_C = 300 A		1,2	–	µs
t_r	T_j = 125 °C	–	100	–	ns
$t_{d(off)}$	inductive load	–	0,7	–	µs
$t_{d(off)Driver}$		–	1,2	–	µs
t_f		–	80	–	ns
E_{on} + E_{off}		–	90	–	mJ
Inverse Diode [2] - inverter					
V_F [8] = V_{EC}	I_F = 225 A, T_j = 25 (125) °C	–	2,0(1,8)	–	V
	I_F = 300 A, T_j = 25 (125) °C	–	2,25(2,05)	–	V
V_{TO}	T_j = 125 °C	–	1,0	–	V
r_T	T_j = 125 °C	–	4,0	–	mΩ
E_{on} + E_{off}	I_F = 300 A; T_j = 125 °C	–	12	–	mJ
Diode [2] - brake chopper (BC)					
V_F [8] = V_{EC}	I_F = 150 A T_j = 25 (125) °C	–	2,0(1,8)	–	V
	I_F = 200 A T_j = 25 (125) °C	–	2,25(2,05)	–	V
V_{TO}	T_j = 125 °C	–	1,0	–	V
r_T	T_j = 125 °C	–	6,0	–	mΩ
Thermal Characteristics					
R_{thjh}	per IGBT	–	0,08	–	K/W
R_{thjh}	per diode inverter (BC)	–	0,27(0,4)	–	K/W
T_{tp} [11]	Over temperature protection	109	115	121	°C
R_{thha} [6]	P16/360 F; v_{air} = 297 m^3 / h	–	0,036	–	K/W
Mechanical Data					
Mdc	for DC terminals, SI Units	4	–	6	Nm
Mac	for AC terminals, SI Units	8	–	10	Nm
Case			S5		

SKiiPPACK®
SK integrated intelligent Power PACK
3-phase bridge with brake chopper
SKiiP 312 GDL 120 + Driver 404 WT (E/U) [7]

Case S5



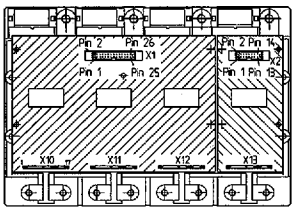


Features

- Low thermal impedance
- Optimal thermal management with integrated heatsink
- Pressure contact technology with increased power cycling capability, compact design
- Low stray inductance
- High power, small losses
- Overtemp. protection
- Short circuit protection
- Isolated power supply

1) $T_{heatsink}$ = 25 °C, unless otherwise specified
2) CAL = Controlled Axial Lifetime Technology (soft and fast)
3) without driver
4) Driver input to DC link/AC output or DC link/AC output to heatsink
5) 3,5 kV (AC; on request)
6) other heatsink on request
7) W - Driver wire input
T - Temperature protection
E/U-voltage levels $V_{DC\ br.\ chopper}$
8) Chip voltage drop
9) 24 V supply voltage selective
10) with SK-DC link (low inductance)
11) thermal reference for R_{thjh}; R_{thha}

SKiiPPACK®
SK integrated intelligent Power PACK
3-phase bridge with brake chopper
SKiiP 312 GDL 120 + Driver 404 WT (E/U)[3)]



Features
3-phase bridge
- CMOS compatible inputs
- Short circuit protection by V_{CE} monitoring and soft switch off
- Drive interlock top/bottom
- Isolation by transformers
- Supply undervoltage protection
- Overtemperature protection

Features
brake chopper
- Short circuit protection by V_{CE} monitoring and soft switch off
- Self controlled switching
- Supply undervoltage protection
- Overtemperature protection

1) 24 V - supply voltage selective
2) Open collector output external pull-up resistor necessary
3) W - Driver wire input
T - Temperature protection
E/U-voltage levels $V_{DC\ br.\ chopper}$
E - EUROPE (400 V_{RMS})
U - USA (460 V_{RMS})
4) 3,5 kV_{AC} (on request)
5) other levels (on request)

SKiiP 312 GDL 120 - 404 WT (E/U)
Driver for 3-phase bridge and brake chopper

Absolute Maximum Ratings		3-phase bridge	brake chopper		
Symbol	Conditions	Values		Units	remark
V_{S1}	supply voltage primary	18		V	
V_{S2} 1)	supply voltage primary	30		V	
I_{outmax}	output peak current max.	± 10	± 1,5	A	
I_{outAV}	output average current	± 50	± 90	mA	
f_{swmax}	switching frequency max.	12	5	kHz	
V_{CE}	collector emitter voltage sense across IGBT	1200		V	
dv/dt	rate of rise and fall of voltage (secondary to primary side)	75	50	kV/µs	
$V_{isol\ IO}$ 4)	Isol. test volt. IN/OUT (RMS; 1 min)	2,5		kV~	
$V_{isol\ 12}$	Isol. test volt. OUT1 - OUT2	1,5		kV=	
T_{op}, T_{stg}	operating / stor. temperature	–25...+85		°C	

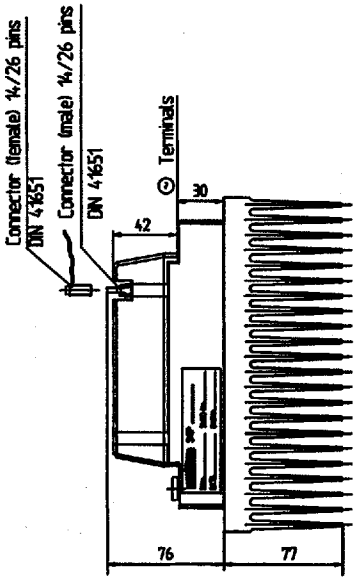
Characteristics					
Symbol	Conditions	Values		Units	remark
V_{S1}	supply voltage primary	15,0 ±4%		V	
V_{S2} 1)	supply voltage primary	24,0		V	+25%/-15%
V_{uvs}	supply undervolt. monitoring	13			
V_{uvs} 1)	supply undervolt. monitoring	19,5	16	V	
I_{S01}	sup. current pr.side (standby)	380	67	mA	
I_{S02} 1)	sup. current pr.side (standby)	300	67	mA	
I_{S1}	sup. current pr.side (max)	900	77	mA	
I_{S2} 1)	sup. current pr.side (max)	700	77	mA	
V_{IT+}	input thresh. volt. (high) min	12,9		V	
V_{IT-}	input thresh. volt. (low) max.	2,1		V	
$V_{GE(on)}$	turn-on output gate voltage	15	15	V	
$V_{GE(off)}$	turn-off output gate voltage	– 8	0	V	
$t_{d(on)}$	propagation delay time on	1,2	< 20	µs	typ.
$t_{d(off)}$	propagation delay time off	1,2	< 25	µs	typ.
t_{TD}	dead time of interlock	3		µs	typ.
V_{CEstat}	V_{CE}-thresh. st. monitoring	5,1	5	V	typ.
V_{CEdyn}	V_{CE}-thresh. dyn. monitoring	9,5	10	V	typ.
V_{ol} 2)	logic low output voltage	< 0,5		V	15mA sink
			< 0,6	V	2,5mA sink
V_{oH} 2)	logic high output voltage	max.30		V	
$V_{RESET\ L}$	Input voltage RESET Low		< 2	V	
$V_{RESET\ H}$	Input voltage RESET High		> 12	V	
V_{iL}	logic low input volt. Chop. ext. ON		< 5	V	> 5 mA
V_{iH}	logic high input volt. Chop.ext. ON		> 11,5	V	< 1 mA
$t_{pdon-error}$	propag. delay time-on error	6	< 60	µs	
$t_{p\ RESET}$	min. pulse width error	5		µs	
	memory RESET		300	ms	
T_{err}	max. temperature	115 ± 6		°C	
I_{AOmax}	max. output current	± 5		mA	pin 20

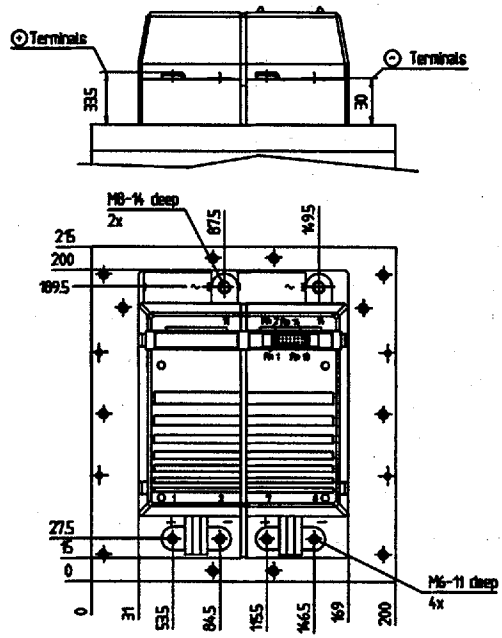
Voltage levels $V_{DCbrake}$ 5)					
Symbol	Conditions	Values		Units	remark
V_{DCmax}	DC-link voltage (max)		730	V	E
			860	V	U
V_{DCON}	Chopper voltage ON		681	V	E
			802	V	U
V_{DCOFF}	Chopper voltage OFF		667	V	E
			786	V	U

Case S2

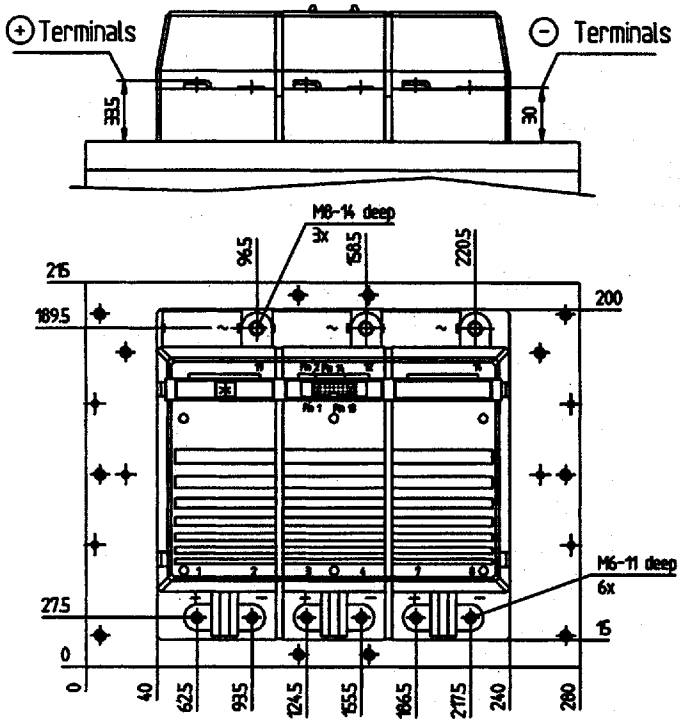
SKiiPPACK

View from right



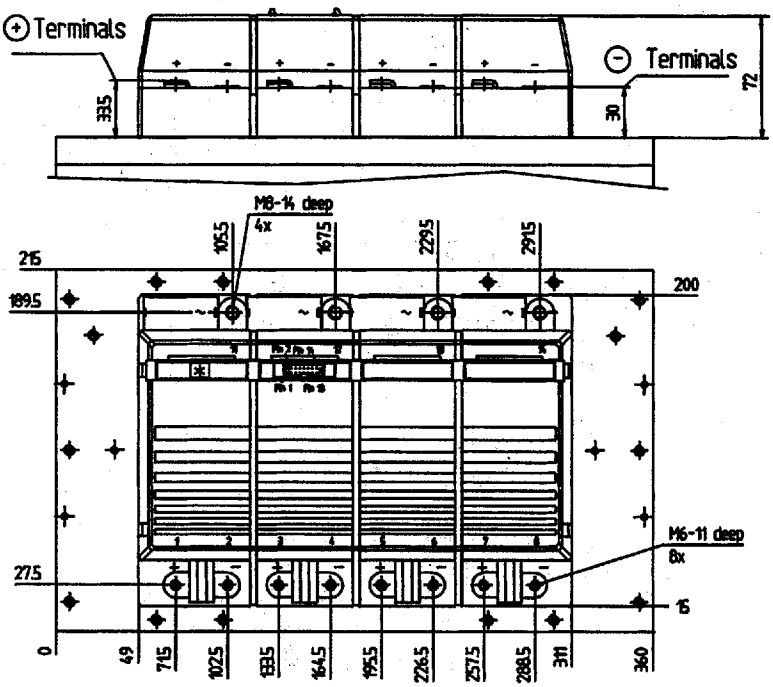


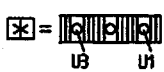
CASES3



Version SKiiP ... GB ... FT (Fibreoptic input)

CASES4

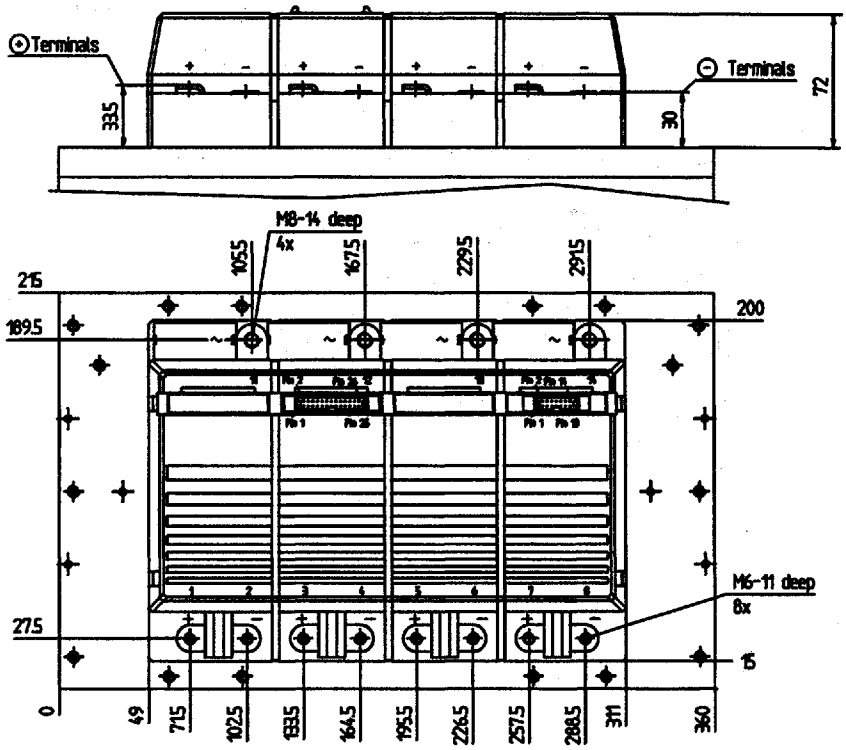




Version SKiiP ... GB ... FT (Fibreoptic input)

Case S5 **SKiiPPACK 4 - GDL**

CASES5



SKiiPPACK view from right