



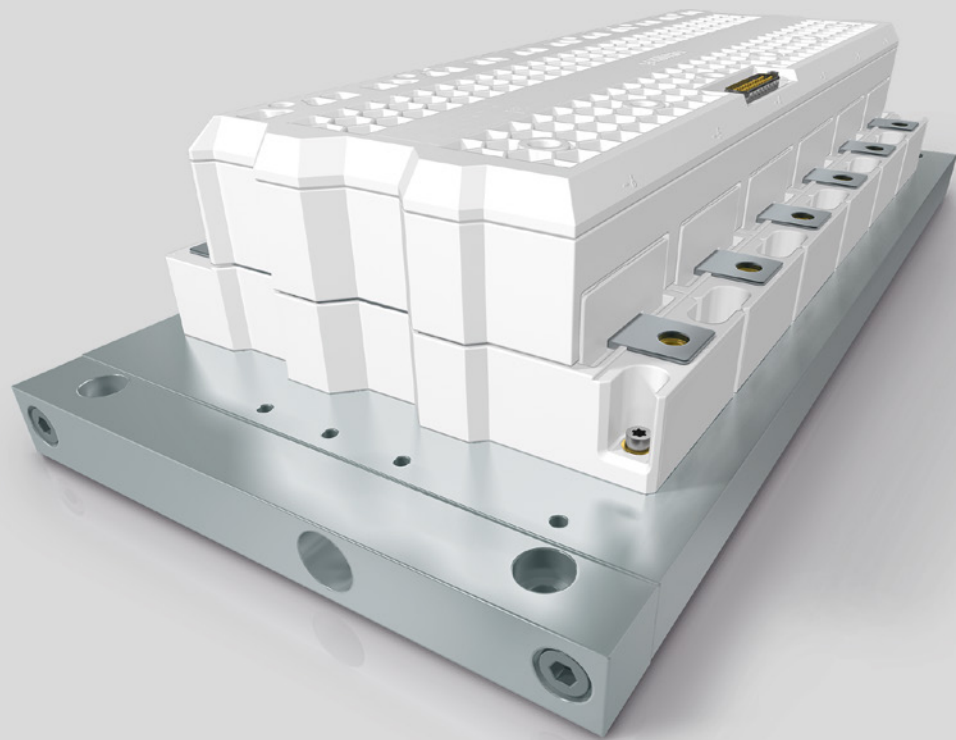
Intelligent Power Modules

IPMs

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SKiiP® 3/4



Intelligent Power Module (IPM) for Maximum Reliability

SKiiP®

Portfolio

SKiiP 3, 4 500A up to 3600A

Short facts

3-in-1: Driver, semiconductor and cooling

2-3 times higher power cycling capability thanks to sinter technology (SKiiP 4)

Fully assembled and 100% tested

Key features

Integrated driver, semiconductor and cooling

Integrated temperature measurement

Integrated current sensors

Integrated DC-Link monitoring

100% solder-free (SKiiP 4)

Applications

SKiiP fully meets the specific requirements for wind turbines in the 0.5 to 6MW power range. Besides wind power applications, SKiiP modules can also be found in elevators, solar power and railway applications – in fact, in any area where powerful, safe and reliable IGBT IPMs are a must.

Benefits

SKiiP is the most powerful IPM on the market. The power semiconductors used in SKiiP 4 modules can be operated up to a junction temperature of 175°C. To make sure these components can be reliably used at these temperatures, the power circuitry is 100% solder-free. Sinter technology is used to create a sintered silver layer instead of the solder layer which could limit the service life of power modules. Reliability during active and passive thermal cycling is greatly improved.

The integrated gate driver in the SKiiP 4 sets new standards in terms of reliability and functionality. The digital driver guarantees safe isolation between the primary and secondary side for both switching signals and parameter measurement. This means the user no longer has to introduce complex and costly topology components to provide safe isolation.

Product range

SKiiP IPMs are available in half-bridge and sixpack topologies in power ratings of up to 2MW without paralleling. Cooling solutions range from water to air-cooled systems and customised cooling in SKiiP 3/4. A wide range of accessories is now also available for both SKiiP 3 and SKiiP 4. These include fiber optic boards, paralleling boards for SKiiP systems and adapter boards to connect SKiiP 4 to SKiiP 3 controller.

Further information: www.semikron.com/skiip



IPM

SEMIKRON For Highly Integrated IPMs

The SKiiP IPMs set a benchmark for high performance and robust converter designs. Especially the SKiiP 4 with its sintered chips is an enabler for maximum load cycle capability and lifetime for use in renewable energy converters such as wind turbines and solar inverters as well as for traction applications.

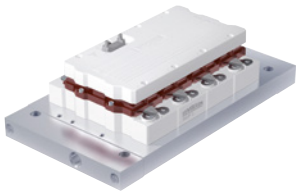
SKiiP 3/4	144
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For detailed information please refer to data sheets.

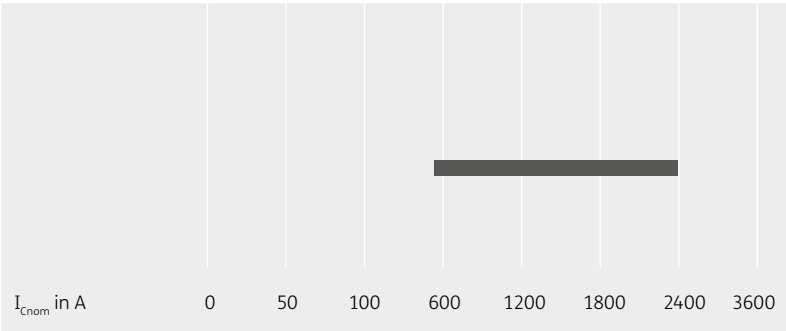
Further information: www.semikron.com/ipm

SKiiP® 3

Sixpack
Half-Bridge



1200V up to 1700V

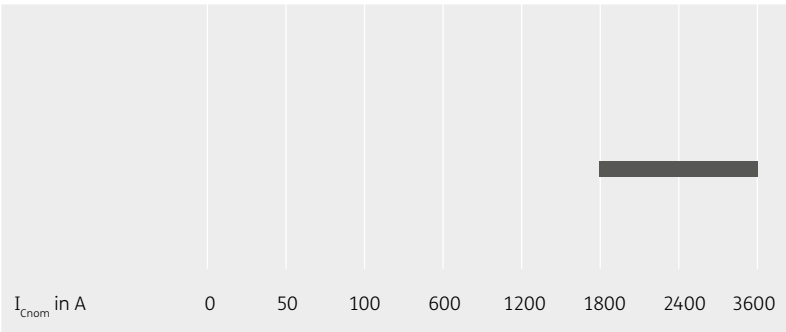


SKiiP® 4

Half-Bridge



1200V up to 1700V



IPM / SKiiP

Type	IGBT				Diode			Module		
	$I_c @ T_s = 25^{\circ}\text{C}$	I_{nom}	$V_{CE(sat)} @ T_j = 25^{\circ}\text{C typ.}$	$E_{on} + E_{off}$	$I_f @ T_s = 25^{\circ}\text{C}$	$V_f @ T_j = 25^{\circ}\text{C typ.}$	E_{rr}	Options F=F-Option U=U-Option S=SKiFace Adapter	Package	Topology
	A	A	V	mJ	A	V	mJ			
1200V - IGBT 3 (Trench) - SKiiP3										
SKiiP 603 GD123-3DUL V3	627	600	1.7	195	508	1.50	28	-	S33	
SKiiP 603 GD123-3DUW V3	627	600	1.7	195	508	1.50	28	-	S33	
SKiiP 613 GD123-3DUL V3	577	600	1.7	195	466	1.50	28	-	S33	
SKiiP 613 GD123-3DUW V3	577	600	1.7	195	466	1.50	28	-	S33	
SKiiP 1213 GB123-2DL V3	1145	1200	1.7	390	925	1.50	56	F	S23	
SKiiP 1213 GB123-2DW V3	1145	1200	1.7	390	925	1.50	56	F	S23	
SKiiP 1813 GB123-3DL V3	1695	1800	1.7	585	1411	1.50	84	F,U	S33	
SKiiP 1813 GB123-3DW V3	1695	1800	1.7	585	1411	1.50	84	F,U	S33	
SKiiP 1813 GB123-3DUL V3	1695	1800	1.7	585	1411	1.50	84	F,U	S33	
SKiiP 2413 GB123-4DUL V3	2280	2400	1.7	780	1807	1.50	112	F,U	S43	
SKiiP 2413 GB123-4DL V3	2280	2400	1.7	780	1807	1.50	112	F,U	S43	
SKiiP 2413 GB123-4DW V3	2280	2400	1.7	780	1807	1.50	112	F,U	S43	
1200V - IGBT 4 (Trench) - SKiiP4										
SKiiP 1814 GB12E4-3DUL	2345	1800	2.01	1260	1776	2.33	150	F,S	S34	
SKiiP 1814 GB12E4-3DUW	2345	1800	2.01	1260	1776	2.33	150	F,S	S34	
SKiiP 1814 GB12E4-3DUSL	2345	1800	2.01	1260	1776	2.33	150	F,S	S34	
SKiiP 2414 GB12E4-4DUL	3109	2400	2.01	1680	2369	2.33	200	F,S	S44	
SKiiP 2414 GB12E4-4DUW	3109	2400	2.01	1680	2369	2.33	200	F,S	S44	
SKiiP 2414 GB12E4-4DUSL	3109	2400	2.01	1680	2369	2.33	200	F,S	S44	
SKiiP 2414 GB12E4-4DULR	3109	2400	2.01	1680	2369	2.33	200	F,S	S44	
SKiiP 3614 GB12E4-6DUL	4664	3600	2.01	2520	3558	2.33	300	F,S	S64	
SKiiP 3614 GB12E4-6DUW	4664	3600	2.01	2520	3558	2.33	300	F,S	S64	
SKiiP 3614 GB12E4-6DULR	4664	3600	2.01	2520	3558	2.33	300	F,S	S64	
SKiiP 3614 GB12E4-6DUSL	4664	3600	2.01	2520	3558	2.33	300	F,S	S64	
SKiiP 3614 GB12E4-6DUL	4664	3600	2.01	2520	3558	2.33	300	F,S	S64	
1700V - IGBT 3 (Trench) - SKiiP3										
SKiiP 513 GD172-3DUL V3	540	500	1.9	288	438	2.00	43	-	S33	
SKiiP 513 GD172-3DUW V3	540	500	1.9	288	438	2.00	43	-	S33	
SKiiP 603 GD172-3DUL V3	587	570	1.9	288	476	2.00	43	-	S33	
SKiiP 603 GD172-3DUW V3	570	570	1.9	288	476	2.00	43	-	S33	

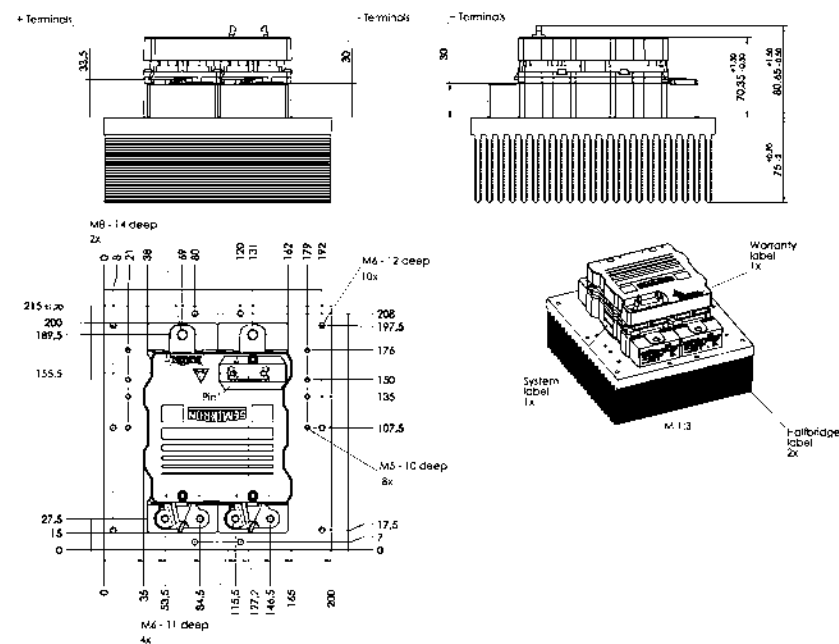
IPM / SKiiP

Type	IGBT			Diode			Module			
	$I_c @ T_s = 25^{\circ}\text{C}$	I_{nom}	$V_{CE(sat)} @ T_j = 25^{\circ}\text{C typ.}$	$E_{on} + E_{off}$	$I_f @ T_s = 25^{\circ}\text{C}$	$V_f @ T_j = 25^{\circ}\text{C typ.}$	E_{rr}	Options F=F-Option U=U-Option S=SKiFace Adapter	Package	Topology
	A	A	V	mJ	A	V	mJ			
1700V - IGBT 3 (Trench) - SKiiP3										
SKiiP 1013 GB172-2DL V3	1072	1000	1.9	575	879	2.00	86	F	S23	
SKiiP 1013 GB172-2DW V3	1072	1000	1.9	575	879	2.00	86	F	S23	
SKiiP 1203 GB172-2DL V3	1159	1200	1.9	575	961	2.00	86	F	S23	
SKiiP 1203 GB172-2DW V3	1159	1200	1.9	575	961	2.00	86	F	S23	
SKiiP 1513 GB172-3DL V3	1589	1500	1.9	863	1336	2.00	128	F,U	S33	
SKiiP 1513 GB172-3DW V3	1589	1500	1.9	863	1336	2.00	128	F,U	S33	
SKiiP 1513 GB172-3DFL V3	1589	1500	1.9	863	1336	2.00	128	F,U	S33	
SKiiP 1803 GB172-3DL V3	1744	1800	1.9	863	1454	2.00	128	F,U	S33	
SKiiP 1803 GB172-3DW V3	1744	1800	1.9	863	1454	2.00	128	F,U	S33	
SKiiP 2013 GB172-4DL V3	2102	2000	1.9	1150	1758	2.00	171	F,U	S43	
SKiiP 2013 GB172-4DW V3	2102	2000	1.9	1150	1758	2.00	171	F,U	S43	
SKiiP 2013 GB172-4DFL V3	2102	2000	1.9	1150	1758	2.00	171	F,U	S43	
SKiiP 2403 GB172-4DL V3	2282	2400	1.9	1150	1921	2.00	171	F,U	S43	
SKiiP 2403 GB172-4DW V3	2282	2400	1.9	1150	1921	2.00	171	F,U	S43	
1700V - IGBT 4 (Trench) - SKiiP4										
SKiiP 1814 GB17E4-3DUL V2	2547	1800	2.12	2130	1771	2.02	498	F,S	S34	
SKiiP 1814 GB17E4-3DUW V2	2547	1800	2.12	2130	1771	2.02	498	F,S	S34	
SKiiP 2414 GB17E4-4DUL V2	3385	2400	2.12	2840	2362	2.02	664	F,S	S44	
SKiiP 2414 GB17E4-4DUW V2	3385	2400	2.12	2840	2362	2.02	664	F,S	S44	
SKiiP 2414 GB17E4-4DPVL	3385	2400	2.12	2840	2362	2.02	664	F,S	S44	
SKiiP 2414 GB17E4-4DPVW	3385	2400	2.12	2840	2362	2.02	664	F,S	S44	
SKiiP 3614 GB17E4-6DUL V2	5078	3600	2.12	6840	3547	2.02	996	F,S	S64	
SKiiP 3614 GB17E4-6DUW V2	5078	3600	2.12	6840	3547	2.02	996	F,S	S64	
SKiiP 3614 GB17E4-6DULR V2	5078	3600	2.12	6840	3547	2.02	996	F,S	S64	
SKiiP 3614 GB17E4-6DPVLR	5078	3600	2.12	6840	3547	2.02	996	F,S	S64	
SKiiP 3614 GB17E4-6DPVL	5078	3600	2.12	6840	3547	2.02	996	F,S	S64	

IPM / SKiïP

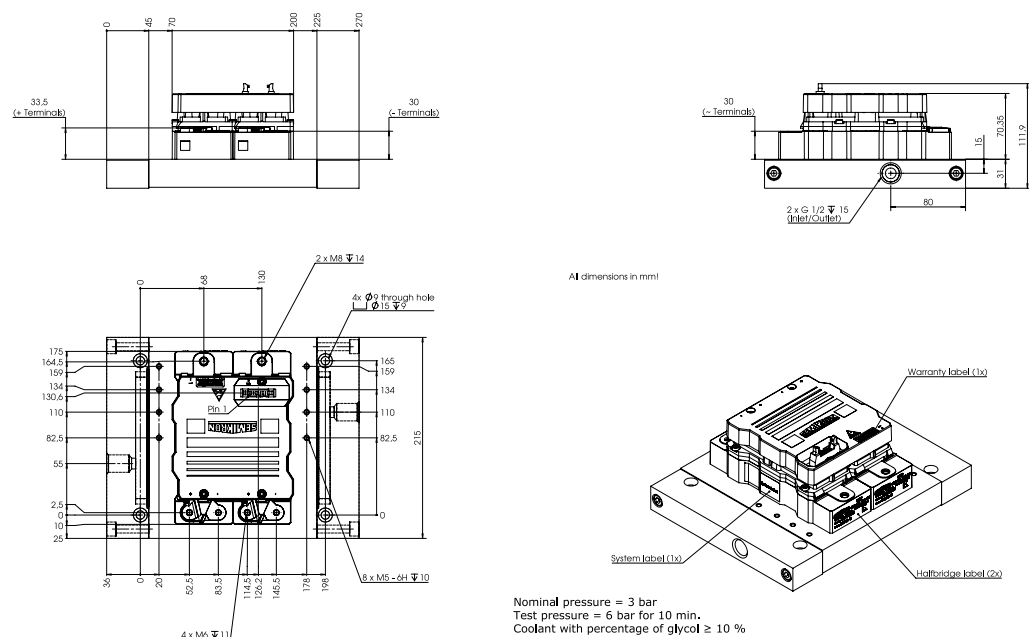
SKiIP 3

Package S 23 mounted on P3016 heat sink



Weight without heat sink:	1,7 kg
P3016:	4,4 kg

Package S 23 mounted on liquid cooled heat sink NWK 40



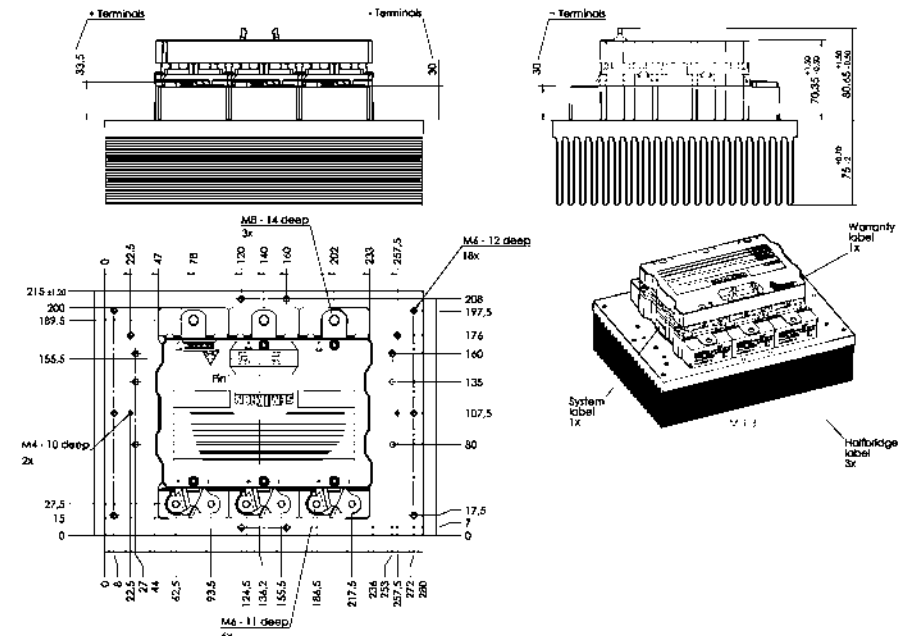
NWK 40: 2,8 kg

Dimensions in mm

IPM / SKiïP

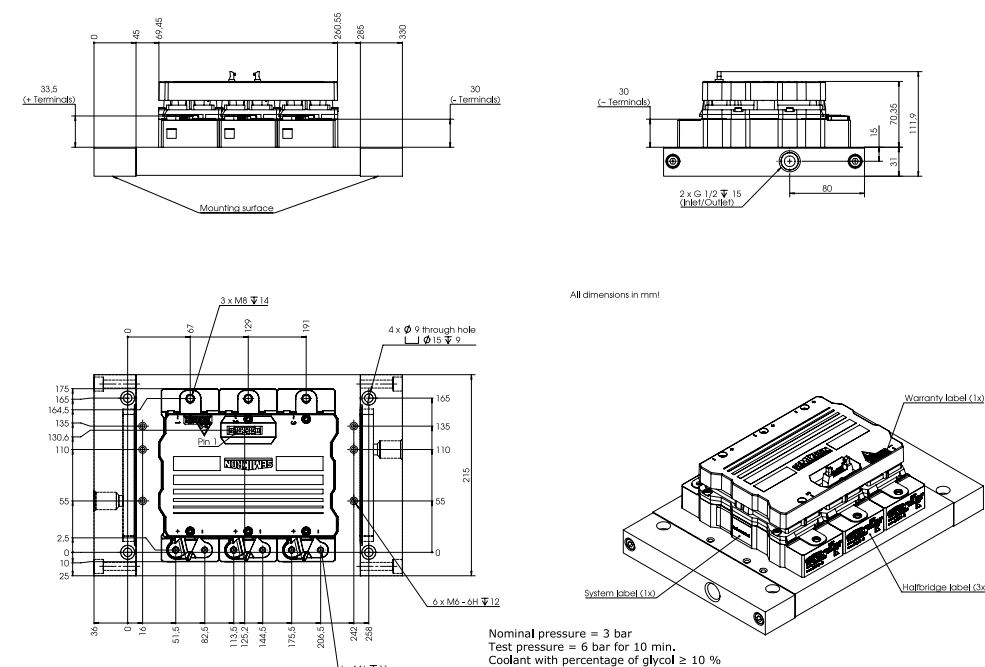
SKiIP 3

Package S 33 mounted on P3016 heat sink



Weight without heat sink:	2,4 kg
P3016:	6,2 kg

Package S 33 mounted on liquid cooled heat sink NWK 40



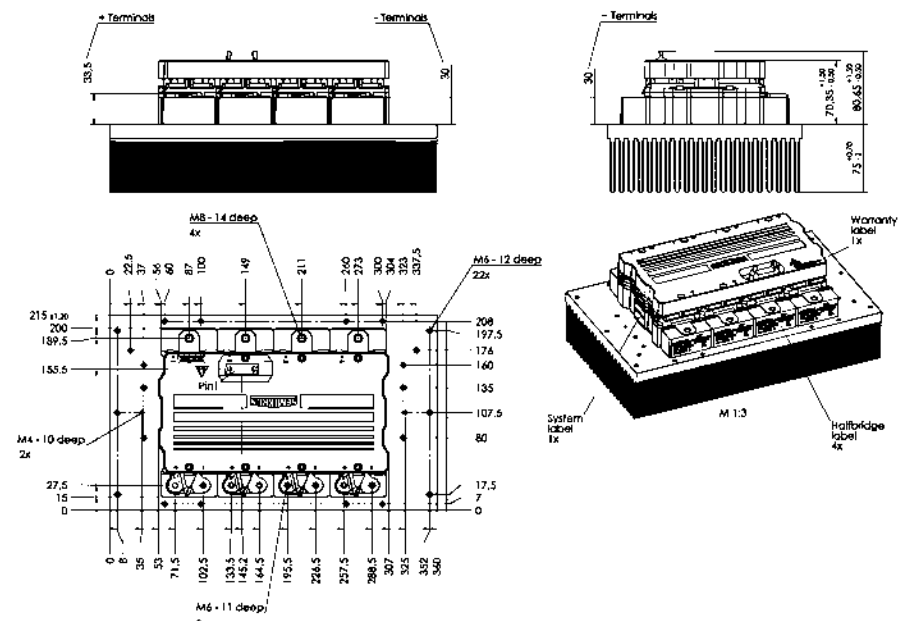
NWK 40: 5,2 kg

Dimensions in mm

IPM / SKiïP

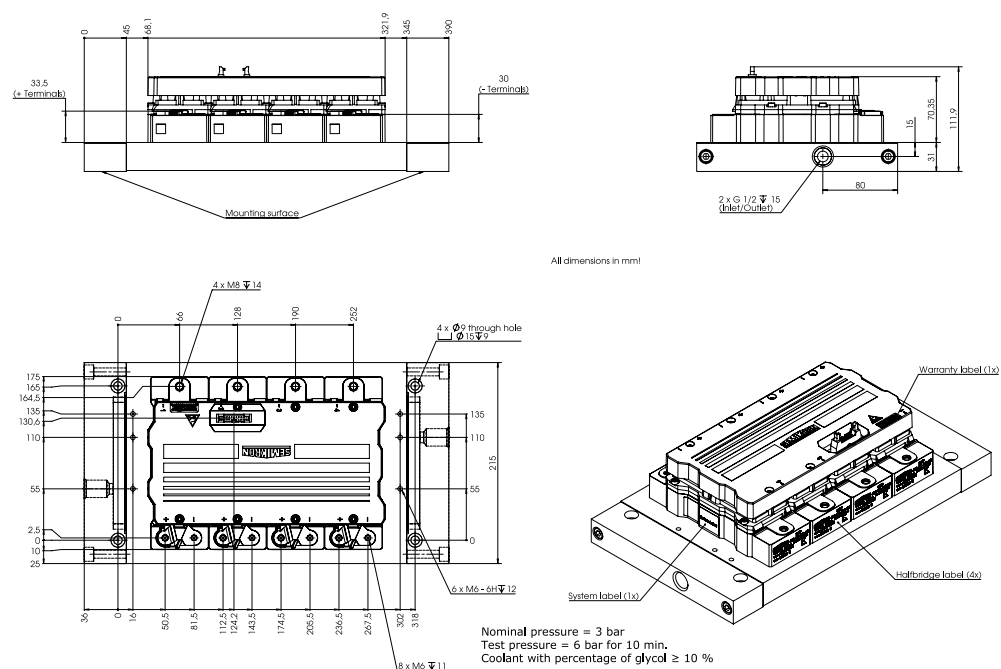
SKiIP 3

Package S 43 mounted on P3016 heat sink



Weight without heat sink:	3,1 kg
P3016:	8,0 kg

Package S 43 mounted on liquid cooled heat sink NWK 40



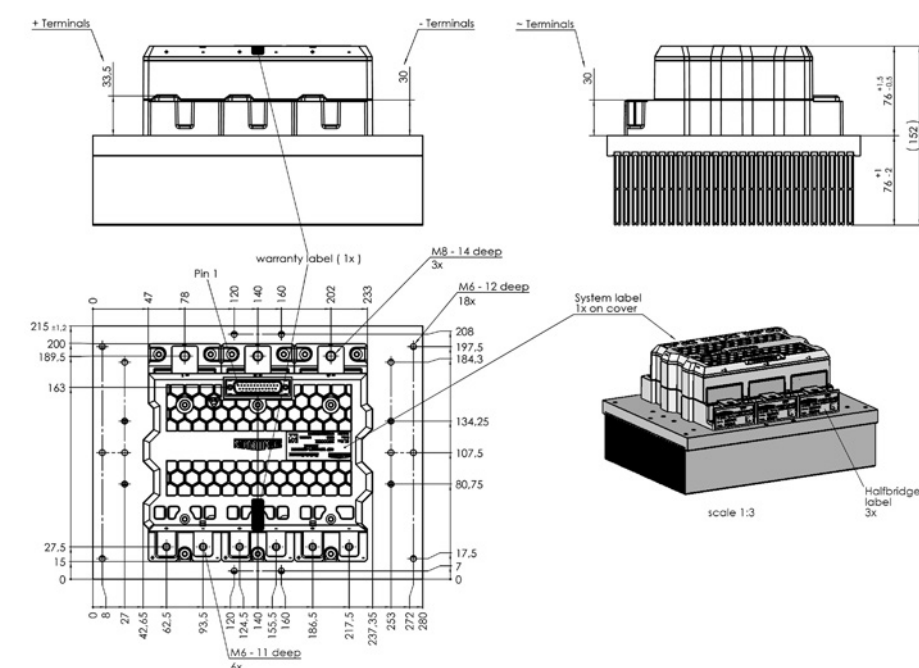
NWK 40: 6,2 kg

Dimensions in mm

IPM / SKiïP

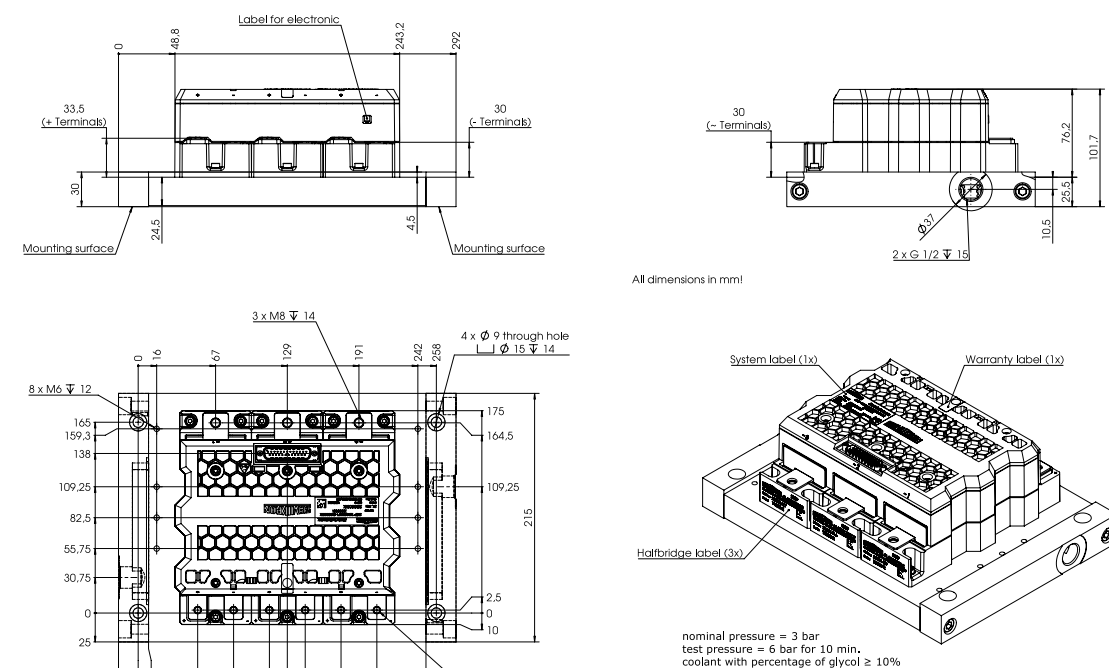
SKiIP 4

Package S 34 mounted on P4016 heat sink



Weight without heat sink:	2,48 kg
P4016:	5,9 kg

Package S 34 mounted on liquid cooled heat sink NHC



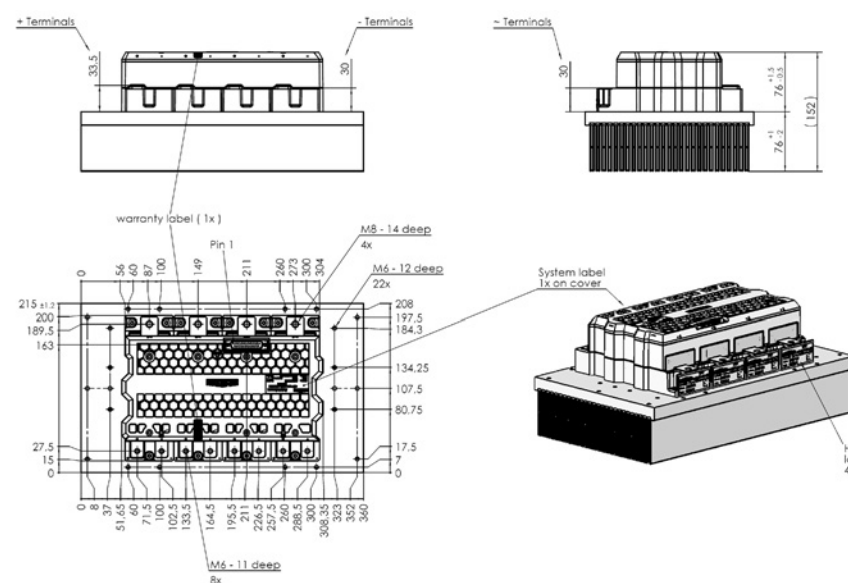
NHC: 3,49 kg

Dimensions in mm

IPM / SKiïP

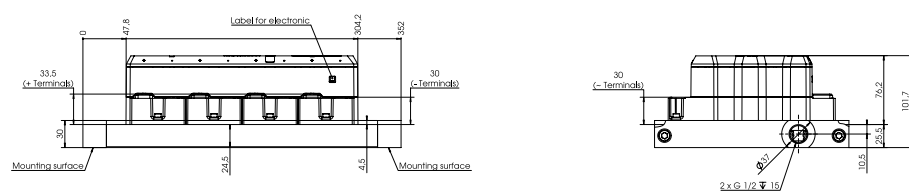
SKiIP 4

Package S 44 mounted on P4016 heat sink

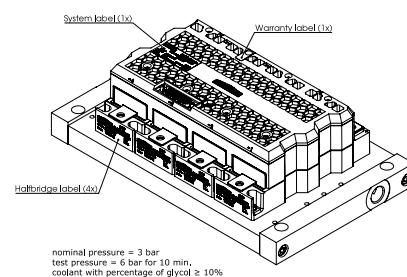
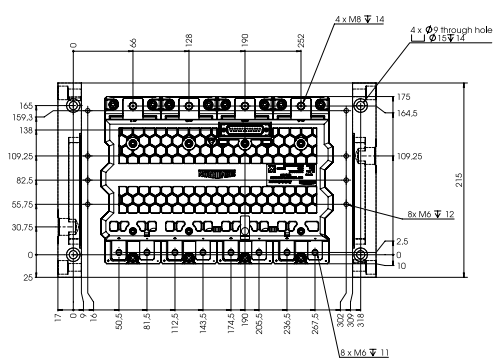


Weight without heat sink:	3,22 kg
P4016:	7,55 kg

Package S 44 mounted on liquid cooled heat sink NHC



All dimensions in mm



nominal pressure = 3 bar
test pressure = 6 bar for 10 min.
coolant with percentage of glycol $\geq 10\%$

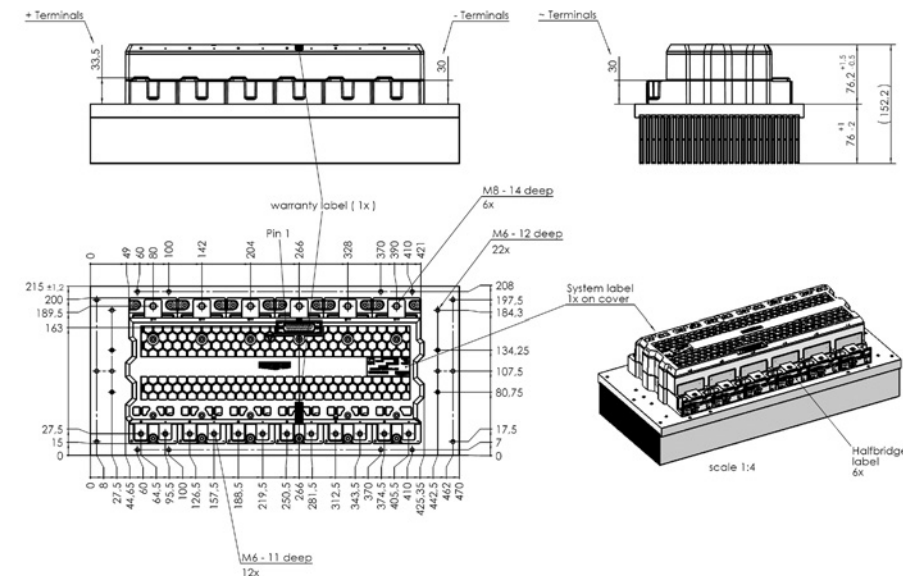
NHC: 4,25 kg

Dimensions in mm

IPM / SKiïP

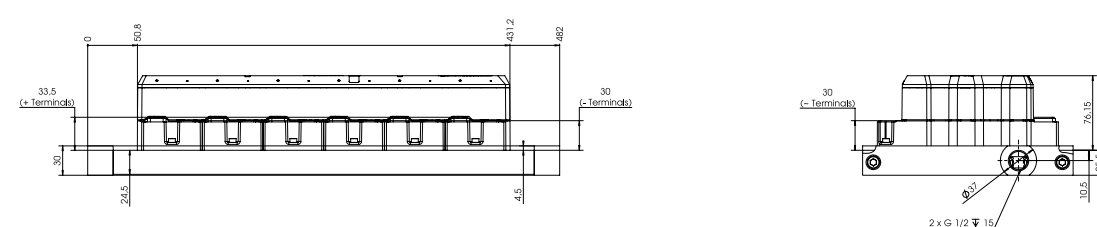
SKiIP 4

Package S 64 mounted on P4016 heat sink

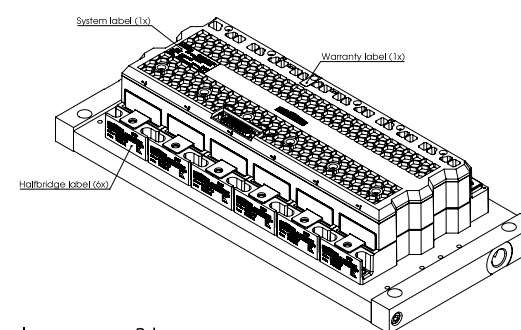
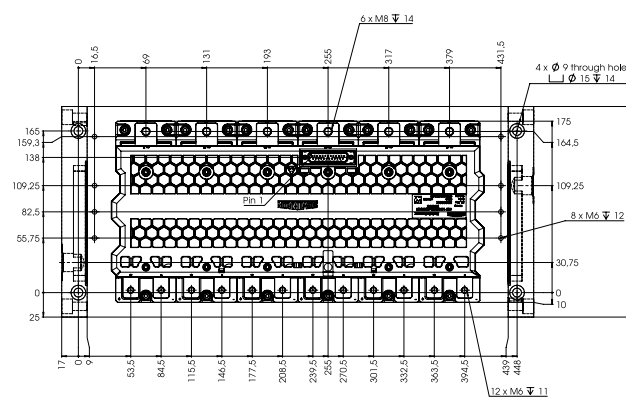


Weight without heat sink:	4,84 kg
P4016:	9,9 kg

Package S 64 mounted on liquid cooled heat sink NHC



All dimensions in mm!



Nominal pressure = 3 bar
Test pressure = 6 bar for 10 min.
Coolant with percentage of glycol $\geq 10\%$

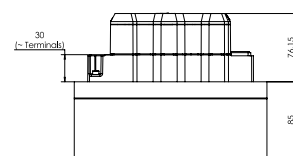
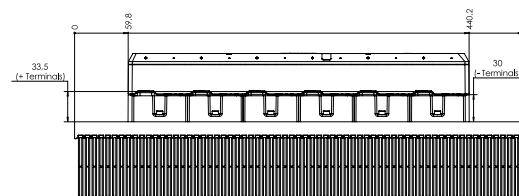
NHC: 5,77 kg

Dimensions in mm

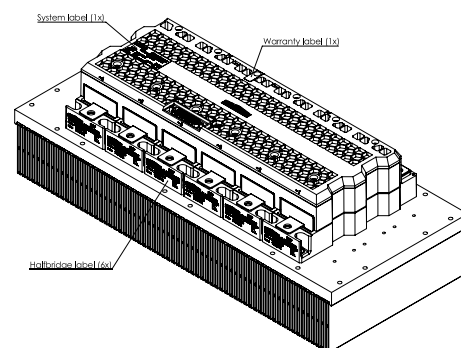
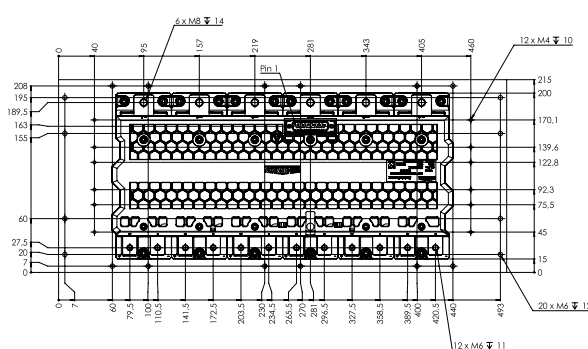
IPM / SKiïP

SKiIP 4

Package S 64 mounted on P4016 heat sink with 90° rotated fins

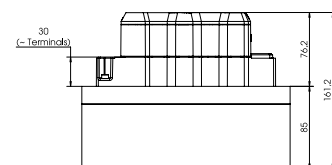
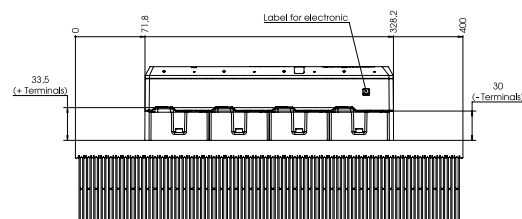


All dimensions in mm!

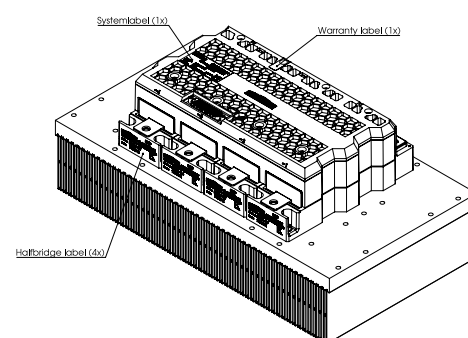
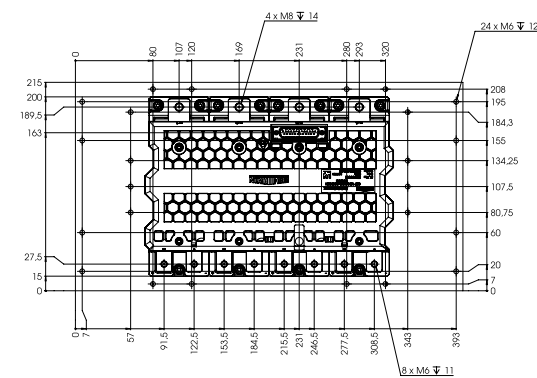


Weight without heat sink:	4,84 kg
P4016:	9,9 kg

Package S 44 mounted on P4016 heat sink with 90° rotated fins



All dimensions in mm



Weight without heat sink:	3,22 kg
P4016:	8,5 kg

Dimensions in mm

IPM / SKiïP Accessories

Type

F-Option SKiiP3

SKiiP3 F-Option	Fiber optic control board for SKiiP3
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F-Option SKiiP4

SKiiP4 F-Option	Fiber optic control board for SKiiP4
SKiiP4 F-Option with D-Sub connector	Fiber optic control board for SKiiP4

SKiiP3 Parallel Board

SKiiP3 Parallel Board 4-fold	Board for paralleling of 4 SKiiP3, F-Option usage possible
SKiiP3 Parallel Board 3-fold	Board for paralleling of 3 SKiiP3, F-Option usage possible
SKiiP3 Parallel Board 2-fold	Board for paralleling of 2 SKiiP3, F-Option usage possible

SKiiP4 Parallel Board

SKiiP4 Parallel Board 4-fold without F-Option	Board for paralleling of 4 SKiiP4, F-Option usage not possible
SKiiP4 Parallel Board 4-fold F-Option	Board for paralleling of 4 SKiiP4, F-Option usage possible
SKiiP4 Parallel Board 3-fold without F-Option	Board for paralleling of 3 SKiiP4, F-Option usage not possible
SKiiP4 Parallel Board 3-fold F-Option	Board for paralleling of 3 SKiiP4, F-Option usage possible
SKiiP4 Parallel Board 2-fold without F-Option	Board for paralleling of 2 SKiiP4, F-Option usage not possible
SKiiP4 Parallel Board 2-fold F-Option	Board for paralleling of 2 SKiiP4, F-Option usage possible

SKiFace Adapter Board

SKiiP4 SKiFace Adapter UZK	Adapter board to connect SKiiP4 to SKiiP3 controller with DC-Link voltage measurement function
SKiiP4 SKiFace Adapter Temp	Adapter board to connect SKiiP4 to SKiiP3 controller with temperatur measurement function