

SKS SL 150 GD 50/10 - E4 P1



IGBT Module stack

Absolute maximum ratings			
Symbol	Conditions	Values	Unit
$I_{OUT\ MAX}$	Maximum permanent output current	1 600	A_{RMS}
$I_{IN\ MAX}$	Maximum permanent input current	1 700	A_{DC}
$V_{OUT\ MAX}$	Maximum output voltage	530	V_{AC}
$V_{BUS\ MAX}$	Maximum DC bus voltage (without switching)	1 100	V_{DC}
f_{OUT}	Maximum inverter output frequency	500	Hz
f_{SW}	Maximum switching frequency	15	kHz

Electrical characteristics / Typical PV solar application				$T_{cooling\ air}^{1)} = 40^{\circ}C$ unless otherwise specified		
Symbol	Conditions	min	typ	max	Unit	
Ratings						
$I_{OUT\ RATED}$	Rated output current	No overload,			1 470	A_{RMS}
V_{OUT}	Rated output voltage	Chip junction $T^{\circ} < 150^{\circ}C$			360	V_{AC}
PF	Power factor	(Max junction temperature = $175^{\circ}C$)			1	-
P_{OUT}	Rated output power	with SEMIKRON axial fan "AF"			915	kW
f_{SW}	Inverter switching frequency	option 2)			3	kHz
f_{OUT}	Output frequency	or			50	Hz
V_{BUS}	Rated DC voltage	750M3/h			800	V_{DC}
$P_{LOSS\ INV}$	Total power losses	per phase			11 860	W
LTE	Inverter lifetime				100 ¹⁾	kHrs

Electrical characteristics / Typical AC-Drive application				$T_{cooling\ air}^{1)} = 40^{\circ}C$ unless otherwise specified		
Symbol	Conditions	min	typ	max	Unit	
Ratings						
$I_{OUT\ RATED}$	Rated output current	Overload 150% / 1min / 5min			1 030	A_{RMS}
V_{OUT}	Rated output voltage	Chip junction $T^{\circ} < 150^{\circ}C$			400	V_{AC}
PF	Power factor	(Max junction temperature = $175^{\circ}C$)			0,85	-
P_{OUT}	Rated output power	with SEMIKRON axial fan "AF"			605	kW
f_{SW}	Inverter switching frequency	option 2)			3	kHz
f_{OUT}	Output frequency	or			100	Hz
V_{BUS}	Rated DC voltage	750M3/h			650	V_{DC}
$P_{LOSS\ INV}$	Total power losses	per phase			7 980	W
LTE	Inverter lifetime				100 ¹⁾	kHrs

Filtering characteristics				
V_{BUS}	Rated DC voltage applied to the caps bank with switching	800	1 000	V_{DC}
$V_{DC\ CAP}$	Max DC voltage applied to the caps bank without switching	1 100		V_{DC}
$\tau_{d5\%}$	Discharge time of the capacitors (5%)	600		s
C_{DC}	Capacitor bank capacity	5,34	6,19	mF
LTE	Calculated LTE of the caps with forced air cooling	100		kHrs

Stack Insulation				
V_{ISOL}	Frame / Power stage AC/DC (insulation test voltage DC, 60s)	4 200		V

SEMIKUBE® SlimLine - Frame SL150

3-phase IGBT inverter

Ordering No. 08801380

Description SKS SL 150 GD 50/10 - E4 P1 AF

Ordering No. 08801379

Description SKS SL 150 GD 50/10 - E4 P1 G

Features

- Slim design for 300mm deep cabinet
- IP54 heatsink side
- Fast mounting and dismounting
- Current measurement accuracy <2% of $I_{OUT\ RATED}$ at $25^{\circ}C$
- Overvoltage, short circuit, and overtemperature protection
- Air cooled power stack
- UL 1741, UL 508 C and IEC 62109-1 Ready
- D-Sub 25 pin driver interface
- CAN interface for error storage, diagnostic and setting

Typical Applications

- Solar PV Inverters
- AC Drives
- Active Front End

Remarks

For information regarding installation and conditions of use, please refer to SEMIKUBE SlimLine user manual

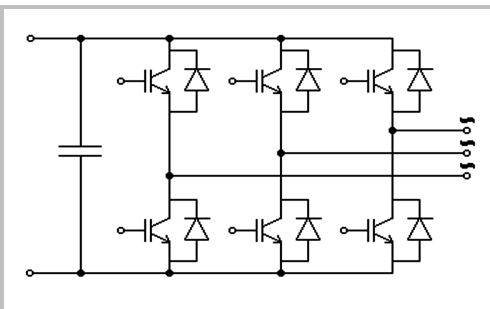
Footnotes

1) $T_{cooling\ air} = 40^{\circ}C$, < 1000m, with fan (AF option), mounted on DC side

$T_{cabinet} = 55^{\circ}C$ with 2m/s air ventilation inside cabinet on stack to avoid hot spots

2) Performances with "AF" option on DC side according drawing page 4&5

S K S S L 1 5 0 G D 5 0 / 9 0 E 4 P 1 A F



B6CI

SEMIKRON Stack

Platform name

SL : SEMIKUBE SlimLine

Maximum AC Output Current of the converter

150 : 1470 A_{RMS}

Stack topology

GD : 3-phase IGBT inverter

Voltages

50/90 : Rated 500V_{AC} Output voltage / 900V_{DC} Bus Voltage

IGBT semiconductor technology

E4 : SEMITRANS E4

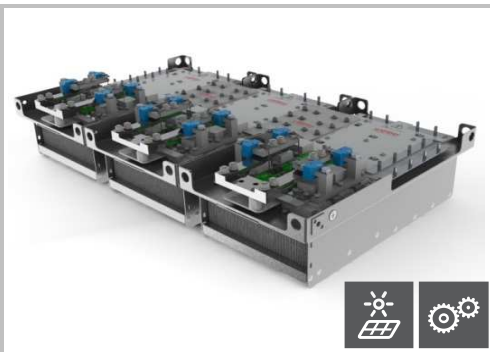
Power capacitor technology

P1 : polypropylene 1,100V type #1

Cooling type

G : forced air convection, supplied by the customer

AF : forced air convection, power assembly delivered with axial fans



IGBT Module stack

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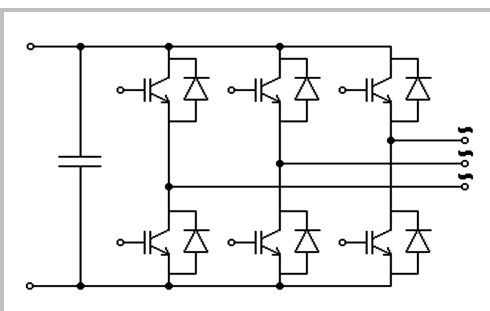
Remarks

For information regarding installation and conditions of use, please refer to SEMIKUBE SlimLine user manual

Footnotes

1) Tcooling air =40°C, < 1000m, with fan option (AF option), mounted on DC side
Tcabinet = 55°C with 2m/s air ventilation inside cabinet on stack to avoid hot spots

2) Factory settings, OTP level must be set according application, contact SEMIKRON for details



B6CI

Environmental conditions					
Characteristics	Conditions	min	typ	max	Unit
Storage, Transport, Operation					
Temperature	Storage: IEC 60721-3-1, class 1K4	-40		70	°C
	Transportation: IEC 60721-3-2, class 2K4	-40		70	°C
	Operation ¹⁾ : IEC 60721-3-3, class 3K3 extended	-30		60	°C
Humidity	Operation (3K3) extended (no condensation)	5		93	%

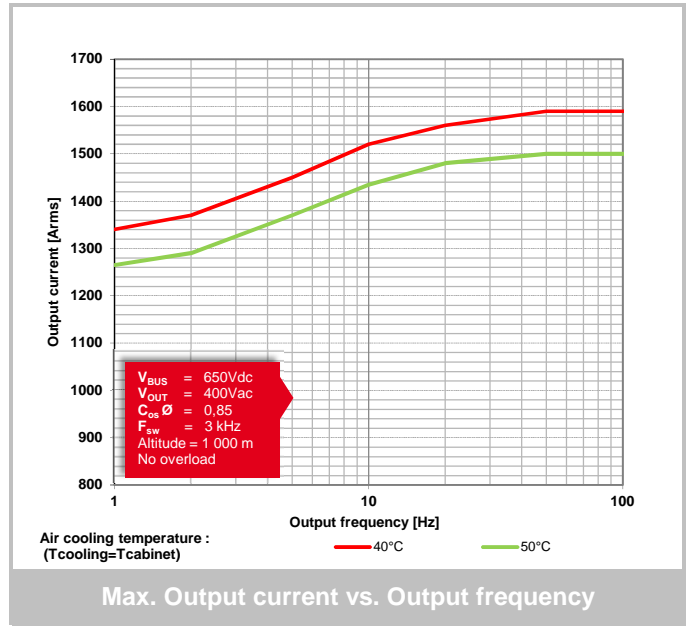
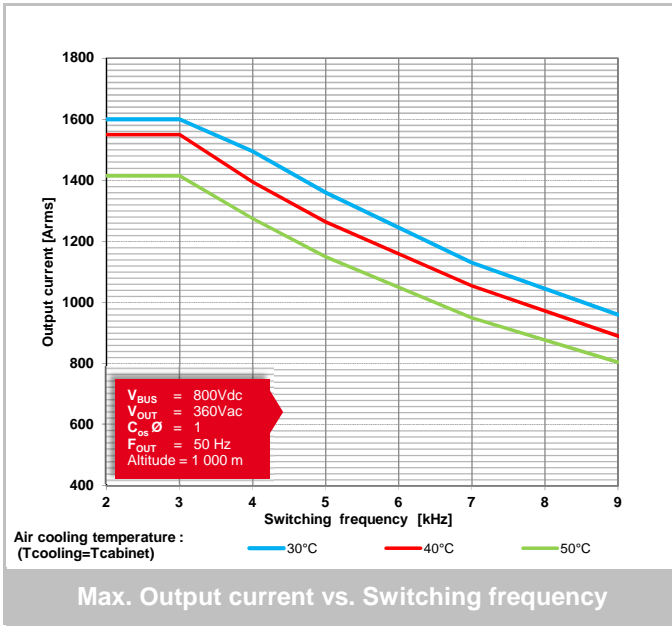
Standard compliance, Mechanical features					
Installation altitude	Altitude without voltage derating		2 000		m
Protection index	Between air cooling and electrical connections			IP54	-
	At electronic side			IP00	-
Pollution degree	In compliance with IEC standards			PD2	-
Overvoltage category	According to UL1741 standard			OVC III	-
	According to IEC 62109-1 (Basic Insulation)			OVC II	-
Protective Separation (Sichere Trennung)	According to IEC 62109-1 standard			Reinforced insulation	-
Weight	3-phase IGBT inverter			92,5	kg
	3-phase IGBT inverter including fan assembly			97,5	

Axial fan data						
Heatsink fans	V_{SUPPLY}	Heatsink fan DC voltage supply		24	30	V_{DC}
	P_{FAN}	Rated power at V_{SUPPLY} , PWM 100%			660	W
	LTE	Fan Life time expectancy L_{TOD} at 40°C		115 000		h

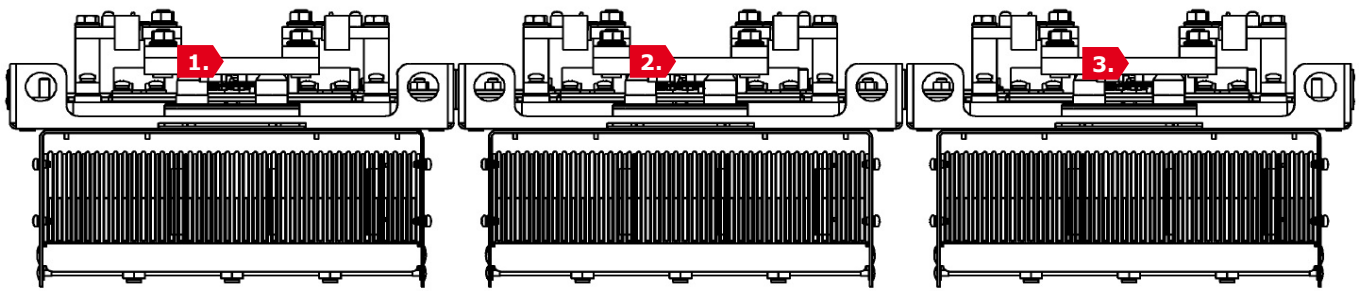
Driver Characteristics					
Symbol	Conditions	min	typ	max	Unit
Driver board data					
V_S	Supply voltage	19,2	24	28,8	V_{DC}
I_{VP_IDLE}	Supply primary current (no load)		190		mA
I_{VP_LOAD}	Max. supply primary current			1 200	mA
V_{IT+}	input threshold voltage HIGH	+11,6	V_S	+16,7	V_{DC}
V_{IT-}	input threshold voltage LOW	+6,2	GND	+9,8	V_{DC}
R_{IN}	Input resistance		30		kΩ
$t_{powerup}$	Power up time		200	300	ms
t_D	Dead Time		2		μs

Measurements & protections					
DC link voltage sensing	Scaling		10		$mV.V^{-1}$
	Accuracy of analogue signal @ $T_a=25°C$	-2		+2	%
	Temperature coefficient			tbc	%. K^{-1}
	$U_{DC\ analogue\ OUT}$	Max. output current			5
$U_{DC\ analogue\ OUT}$	Max. voltage range	0		10	V_{DC}
	Max measurable DC Link Voltage			1 000	V_{DC}
	V_{DCTRIP}	Over voltage trip level O.V.P		1 000 ²⁾	
Current sensing	Scaling		3,364		$mV.A^{-1}$
	Accuracy of analogue signal at 25°C		2		%
	Temperature drift of voltage output (IF_HB_ANLG / X1:10)			tbc	$mV.K^{-1}$
	$I_{analogue\ OUT\ per\ phase}$	Max. output current			5
$I_{analogue\ OUT\ per\ phase}$	Voltage range	-10		10	V_{DC}
	I_{TRIPSC}	Over current trip level O.C.P		3 000 ²⁾	A_{PEAK}
	Scaling over 30°C...110°C temperature range			$VTana^*8+30$	$mV.°C^{-1}$
Temperature sensing	Linear temperature range	30		110	°C
	Accuracy of analogue signal over 65°C...110°C range	-2,5		2,5	%
	$T_{analogue\ OUT}$	Max. output current			5
$T_{analogue\ OUT}$	Max. voltage range	0		10	V_{DC}
	T_{TRIP}	Over temperature trip level O.T.P		110 ²⁾	°C
T_{th}	Threshold level for reset after failure event		70		°C
HALT signal	Bidirectional signal with dominant (LOW)		GND	5	V_{DC}
	Bidirectional signal with recessive (HIGH)	10	V_S		V_{DC}

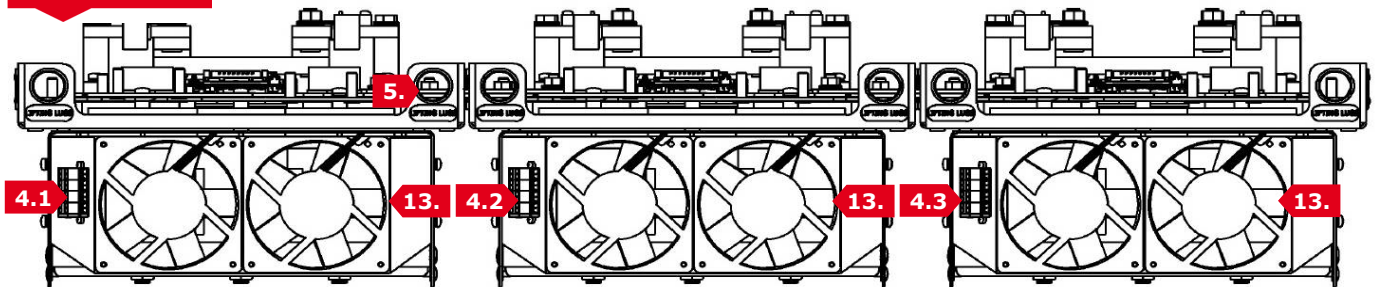
EMC test	Norm / Standard	Parameter
ESD	IEC 61000-4-2	6 kV contact discharge /
	IEC 61800-3	8 kV air discharge
Burst	IEC 61000-4-4	≥ 2kV on signal lines
	IEC 61800-3	≥ 4kV for AC lines
Immunity against radiated interference	IEC 61000-4-3	≥ 20V/m
	IEC 61800-3	80MHz – 1000 MHz
Immunity against conducted interference	IEC 61000-4-6	≥ 20V
	IEC 61800-3	150kHz – 80MHz



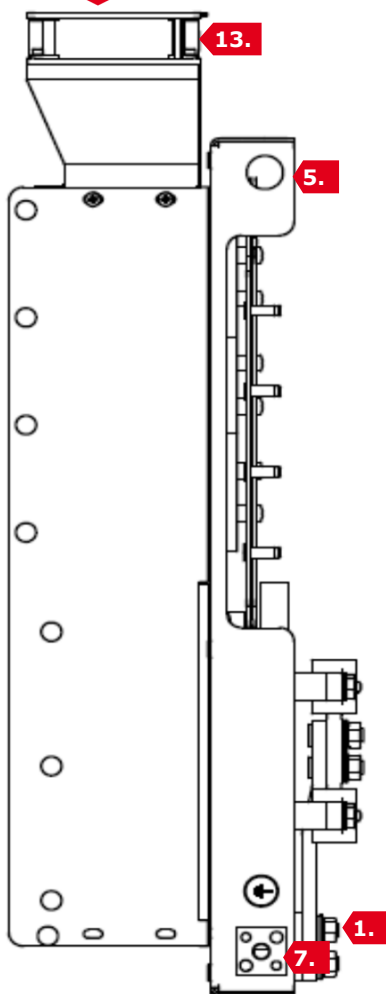
Bottom View



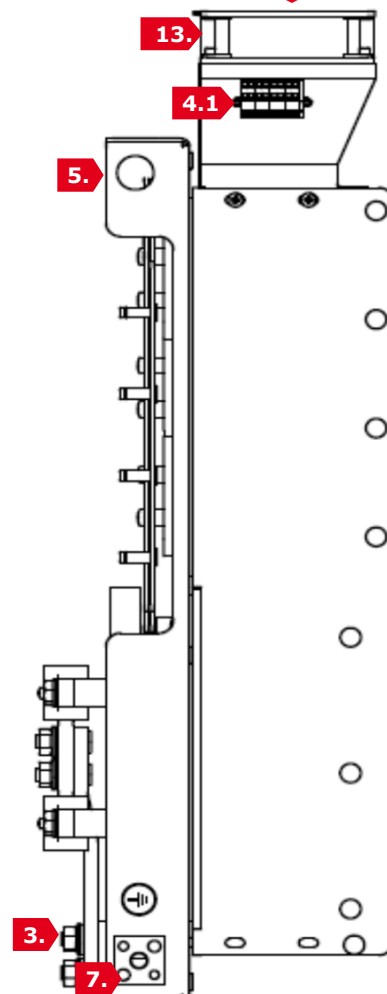
Top View

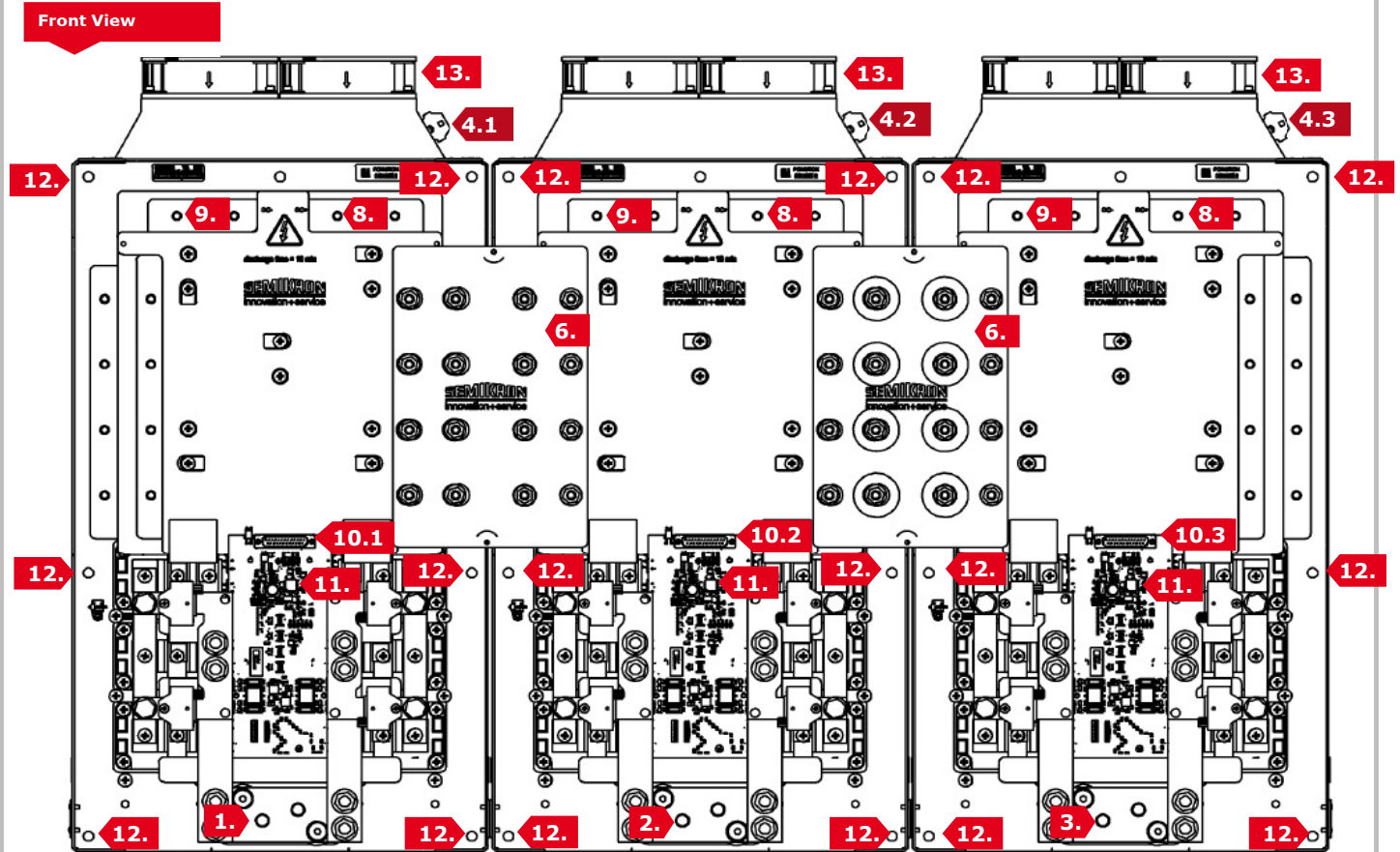


Left View



Right View





- 1. Phase "U" AC Output terminal
- 2. Phase "V" AC Output terminal
- 3. Phase "W" AC Output terminal
- 4.1 X10.1 - U leg - Fan system connector
- 4.2 X10.2 - V leg - Fan system connector
- 4.2 X10.3 - W leg - Fan system connector
- 5. Lifting lugs
- 6. SEMIKRON DC Interconnections (x2 - 16 per units)
- 7. Protective earth terminal (PE)
- 8. Positive Input terminal "DC+" (x6 screws)
- 9. Negative Input terminal "DC-" (x6 screws)
- 10.1 X1.1 - U leg - Driver connector
- 10.2 X1.2 - V leg - Driver connector
- 10.3 X1.3 - W leg - Driver connector
- 11. LED driver status
(Refer to "flashcode" for driver error status)
- 12. Mounting holes (x18)
- 13. Heatsink fan assembly mounted on AC side (option : 3x 08801139)

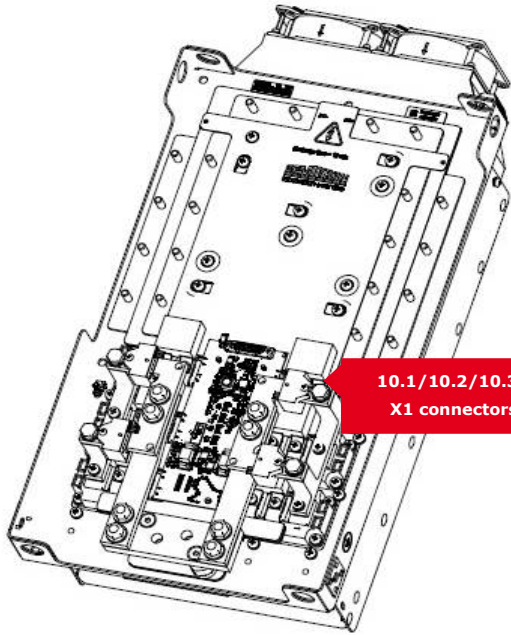
ⓘ **WARNING 1** : Stack shall be mounted using the dedicated mounting kit assembly (DC Interconnections, protective earth terminals) delivered with the stack, please refer to the Installation Manual

ⓘ **WARNING 2** : It is the customer's responsibility to ensure that the environment of the SlimLine is installed into conforms to the SlimLine specifications.

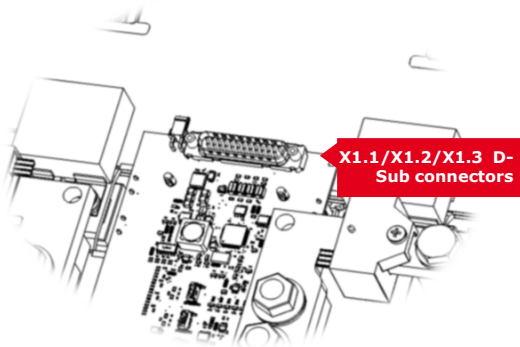
ⓘ **WARNING 3** : It is the customer's responsibility to ensure that the mechanical frame of the SEMIKUBE SL is installed into conforms to the Installation Manual

Connectors assignment per phase

**X1.1/X1.2/X1.3
Connector
assignment**



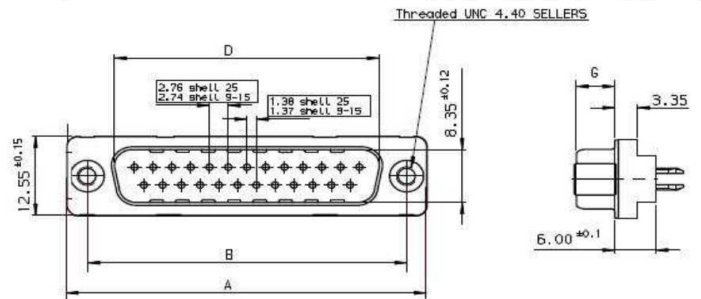
**10.1/10.2/10.3
X1 connectors**



**X1.1/X1.2/X1.3 D-
Sub connectors**

X1.1 - U leg - Driver connector
X1.2 - V leg - Driver connector
X1.3 - W leg - Driver connector

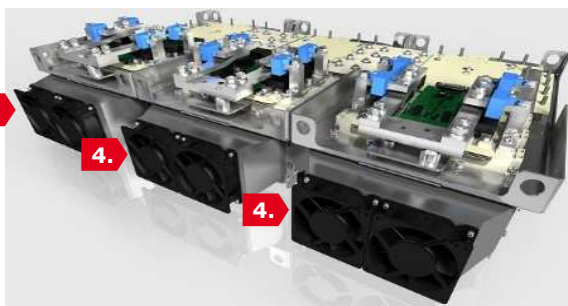
PIN	Signal	Function	Specification
1/2/3	IF_PWR_VP	Power Supply	+24V (+/- 20%)
4	IF_CMN_DIAG	Reserved	Not used
5	IF_CMN_nHALT	Digital I/O Bidirectional status signal	LOW (dominant) = not ready to operate (e.g. error) HIGH (recessive) = ready to operate
6	IF_CMN_ANLG0	Temperature signal	Max. output current: 5mA Turns ratio: 125mV/°C -3,75 Max. voltage range: +10V Nominal voltage range: 0 ... 10V
7	IF_CMN_ANLG1	DC-Link voltage	Max. output current: 5mA Turns ratio: 10mV/V Max. voltage range: ±10V Nominal voltage range: 0 ... 10V
8	IF_HB_TOP	Switching signal input (HB1 TOP switch) [push pull]	30 kΩ input impedance, Digital IF_PWR_VP logic LOW = TOP switch off HIGH = TOP switch on
9	IF_HB_RSVD	Reserved	Not connected
10	IF_HB_ANLG	I analog out HB [analog]	Max. output current: ±5mA Turns ratio GB3: 3,364mV/A Max. voltage range: ±10V Nominal voltage range: -10 ... 10V
11	IF_AUX_OA	CAN interface INPUT/ OUTPUT HIGH	Input impedance = infinite, Specification according to ISO 11898.
12	IF_AUX_1A		Internally connected to AUX_OA
13	IF_SHLD_GND	GND	Internally connected to PWR_GND
14/15/ 16	IF_PWR_GND	GND for IF_PWR_VP	
17	IF_CMN_GND	Ground for CMN_HALT, CMN_GPIO	Internally connected to PWR_GND
18	IF_CMN_GPIO	Status signal inverted HALT (unidirectional signal)	51,1 kΩ pull up, 10nF capacitance Digital IF_PWR_VP logic LOW (dominant) = ready to operate HIGH (recessive) = not ready
19	IF_CMN_AGND0	GND for IF_CMN_ANLG0	Ground for temperature signal
20	IF_CMN_AGND1	GND for IF_CMN_ANLG1	Ground for DC Link signal
21	IF_HB_BOT	Switching signal input (HB1 BOT switch) [push pull]	30 kΩ input impedance, Digital IF_PWR_VP logic LOW = BOT switch off HIGH = BOT switch on
22	IF_HB_GND	GND for IF_HB1_TOP, IF_HB1_BOT, IF_HB1_rsvd	Internally connected to PWR_GND
23	IF_HB_ANLG_GND	GND for IF_HB_ANLG	Ground for current analogue signal
24	IF_AUX_OB	CAN interface INPUT/ OUTPUT LOW	Input impedance = infinite; Specification according to ISO 11898.
25	IF_AUX_1B		Internally connected to AUX_OB



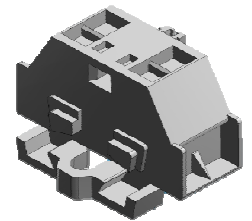
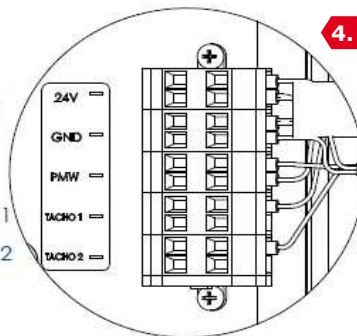
SHELL	A±0.38	B±0.12	C±0.10	D±0.25	G±0.25
25	53.03	47.04	39.12	38.84	5.70

Fan system X10 connector assignment

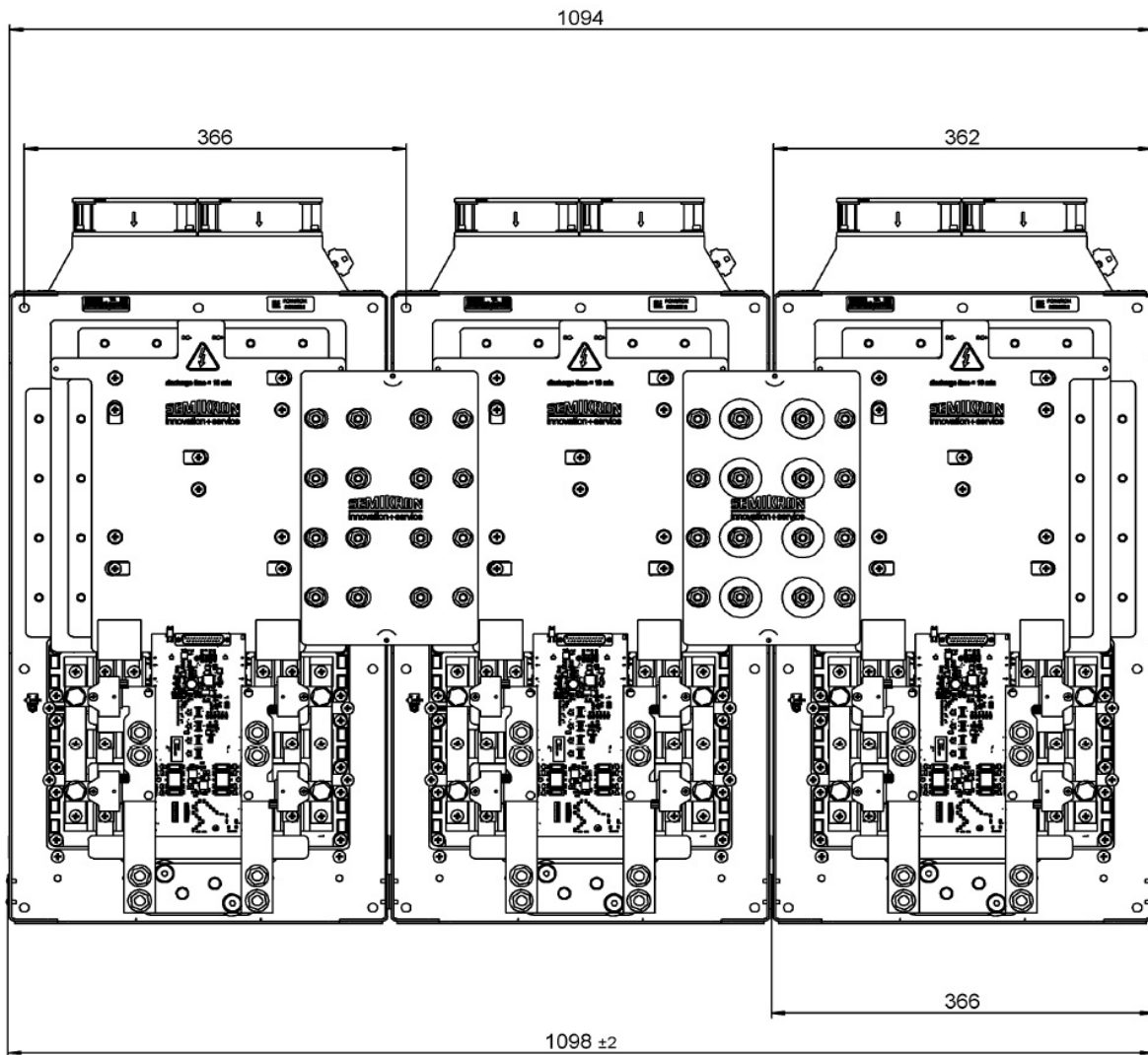
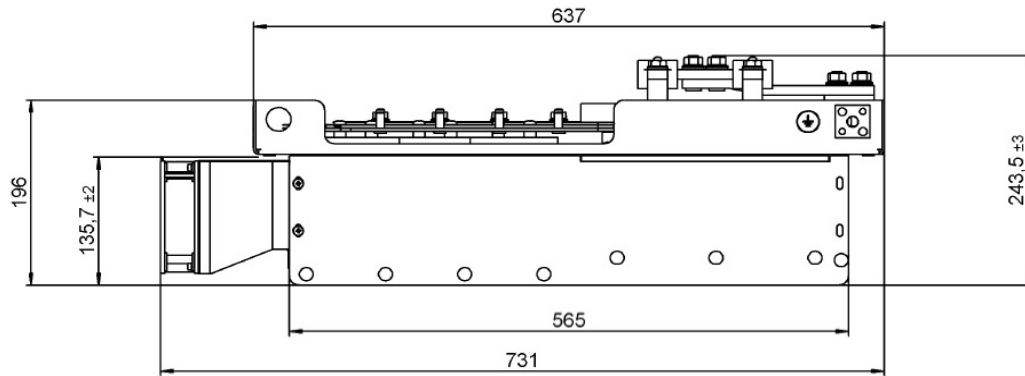
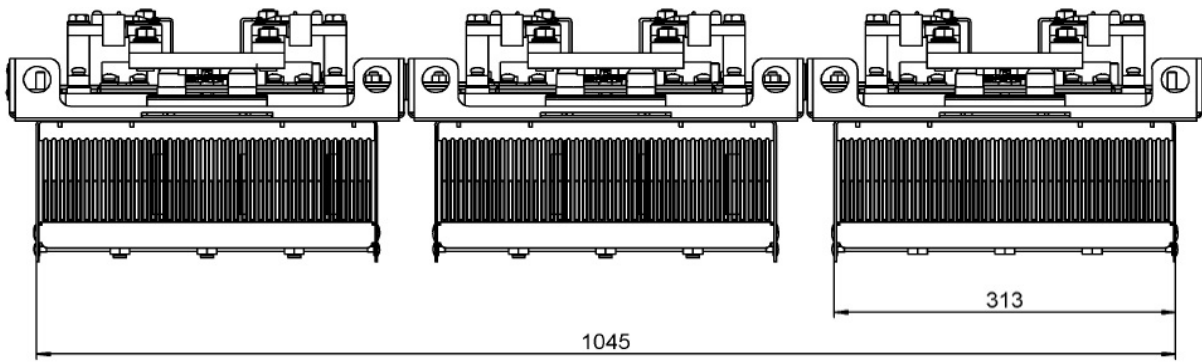
**X10 Connector
assignment**

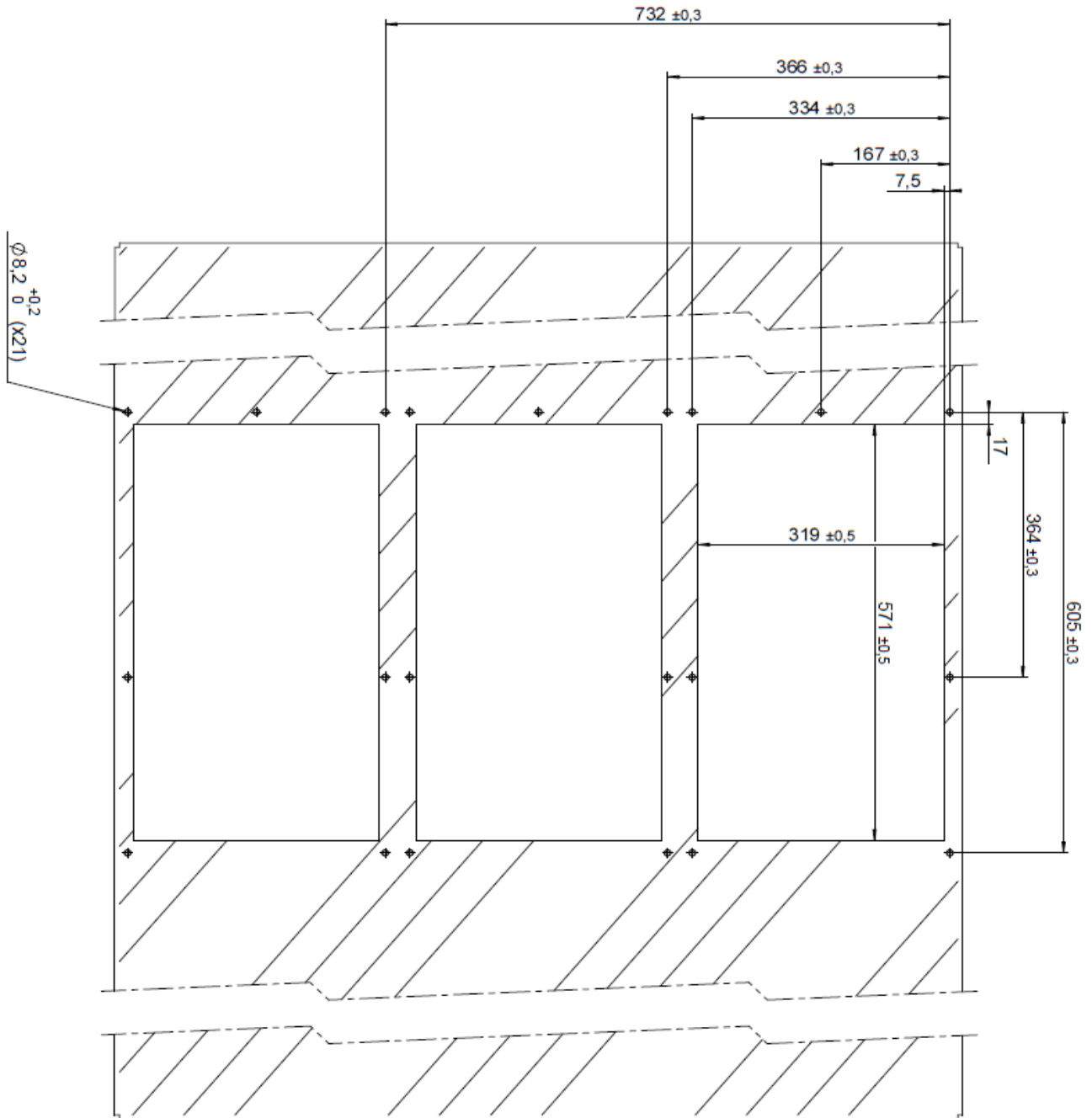


24Vdc
GND
PWM
TACHO 1
TACHO 2

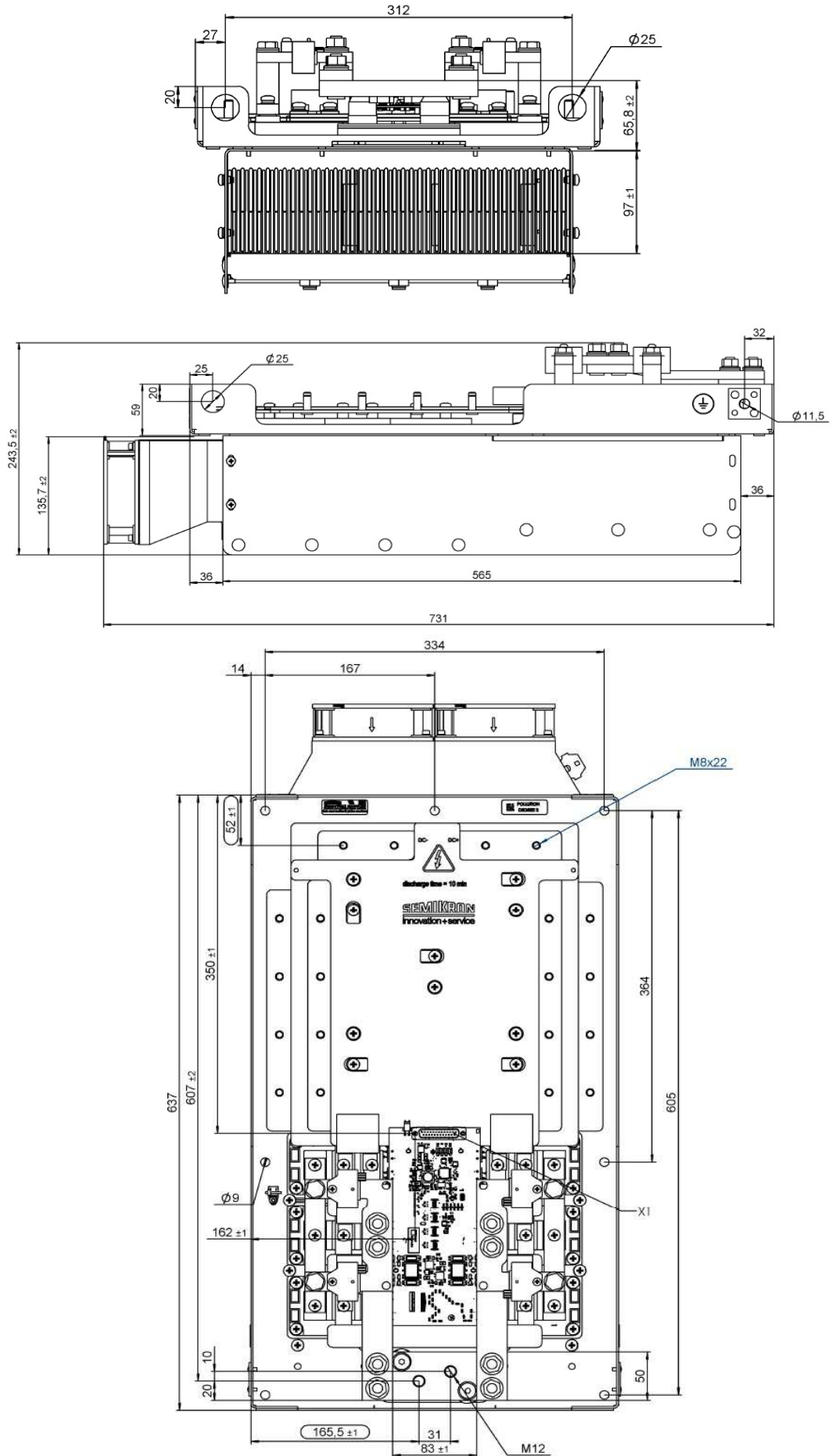


WAGO (261-333)
4-Conductor
terminal block
with fixing flange





* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff



This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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