Technical Data Sheet

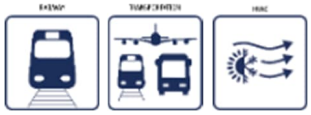
SD3000-I-X RANGE & SD4000-I-X RANGE
2400W-4000W / DC/AC INVERTER

FEATURES

- Sine Wave Output Voltage
- Selectable Output Frequency: 50/60Hz
- Adjustable Output Voltage
- High Input-Output Isolation 3000Vrms
- Remote Inhibit
- Remote Control Via RS232
- Alarms by Isolated Relay Contacts
- Remote Off Opto-Coupled
- Optional Railway Version EN50155
- Fire and Smoke: EN45545-2 Approved
- Efficiency Up to 91%



APPLICATION



SAFETY & EMC

RoHS² compliant 10 from 10 | Reach compliant | WARRANTY 3 YEARS | WARRANTY 5 YEARS | RAILWAY CERTIFIED EN50155 for use on rolling stock

DESCRIPTION

The SD3000-I-X_SD4000-I-X consists of single-phase sine-wave DC/AC inverters with galvanic isolation between input and output.
The unit allows:

- Select 50/60Hz means of DIP-Switch
- Select local/remote (RE-232) by means of DIP-Switch
- Shutdown applying voltage on pins 3 and 4 of signal connector
- Local signalization of Output OK by means of green LED
- Local alarm. Red LED ON when:
  - Output voltage is not OK
  - Output current > output current alarm
  - Input voltage out of margins
  - Unit shutdowns by over-current or remote OFF
- Alarm. Open contacts when output voltage is not OK
- Set and monitor parameters via RS-232

The SD3000-I-X_SD4000-I-X are equipped with a maximum average power protection. This protects the unit even when an output short-circuit occurs. It also features a disable function for input under-voltage, which allows protecting the batteries from harmful discharges.

MODELS

Out/In	24VDC 16.8…30V	36VDC 25.2…45V	48VDC 33.6…60V	72VDC 50.4…90V	110VDC 77…138V	120VDC 84…150V	300VDC 290…330V
120VAC	SD3000-I-X-24-120 2400W	SD3000-I-X-36-120 2500W	SD3000-I-X-48-120 2500W	SD3000-I-X-72-120 2500W	SD3000-I-X-110-120 2500W	Available Under Request*	Available Under Request*
230VAC	SD3000-I-X-24-230 2400W	SD3000-I-X-36-230 3000W	SD3000-I-X-48-230 3000W	SD3000-I-X-72-230 3000W	SD3000-I-X-110-230 3000W	Available Under Request*	Available Under Request*
	Available Under Request*	Available Under Request*	Available Under Request*	Available Under Request*	SD4000-I-X-110-230 4000W	SD4000-I-X-120-230 4000W	SD4000-I-X-300-230 4000W

*References subject to special MOQs and lead times.

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SD3000-I-X RANGE & SD4000-I-X RANGE
2400W-4000W / DC/AC INVERTER

BASIC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.
Input				
Input Voltage Range	See Table			
Maximum Input Ripple	Vrms, 100Hz		5% Vin nom	
Output				
Output Voltage	See table			
Output Frequency			50/60Hz ± 0.25Hz	
Output Wave Distortion THD	Average of 16 Samples		<2%	
Output HF Ripple			<2.5%	
Line Regulation	ΔVin -25%…+25%		<2%	
	ΔVin -30%…+30%		<10%	
Load Regulation			<4%	

ENVIRONMENTAL

Parameter	Conditions	Value	
		Option B and T	Option L (Note-1)
Operating Temperature Range	Full Load	-25°C to +55°C (EN50155 OT1)	-40°C to +55°C (EN50155 OT2)
	62.5% Load	-25°C to +70°C (EN50155 OT3)	-40°C to +70°C (EN50155 OT4)
Storage Temperature		-25°C to +80°C	-40°C to +80°C
Maximum Altitude	At Full Load	2000m	
	At 95% of Load	2500m	
Cooling	Controlled Internal Fan		
Protection Degree		IP20	
Relative Humidity		5…95%	
MTBF (MIL-HDBK-217-E; Gb, 25°C)		100.000h	

SAFETY AND CERTIFICATION

Certification (Type)	Standard
Dielectric Strength: Input / Output	3000Vrms / 50Hz / 1min
Dielectric Strength: Output / Earth	1500Vrms / 50Hz / 1min
Dielectric Strength: Input / Earth	500Vrms / 50Hz / 1min
Safety According	EN60950-1, EN62368-1
Fire and Smoke	EN45545-2 Approved

EMC

	Conditions	Value
Immunity According		EN61000-6-2 (EN50121-3-2)
Emission According		EN61000-6-4 (EN50121-3-2)

PROTECTIONS

Parameter	Type	Value
Against Overloads		Current and I^2T Limited (see overload protection)
Against Over-Temperature		Shutdown with Auto-Recovery

CONTROL

Type	Description
Output OK LEC	Green
Alarm LED	Red
Output Failure Alarm	Isolated Contact Relay Open when Alarm (<0.3A at 150Vcc)
Remote OFF Input	OFF Applying 14.4…137,5VDC, Impedance >22k5Ω (Note-1)
Status and Programming	RS232 Port

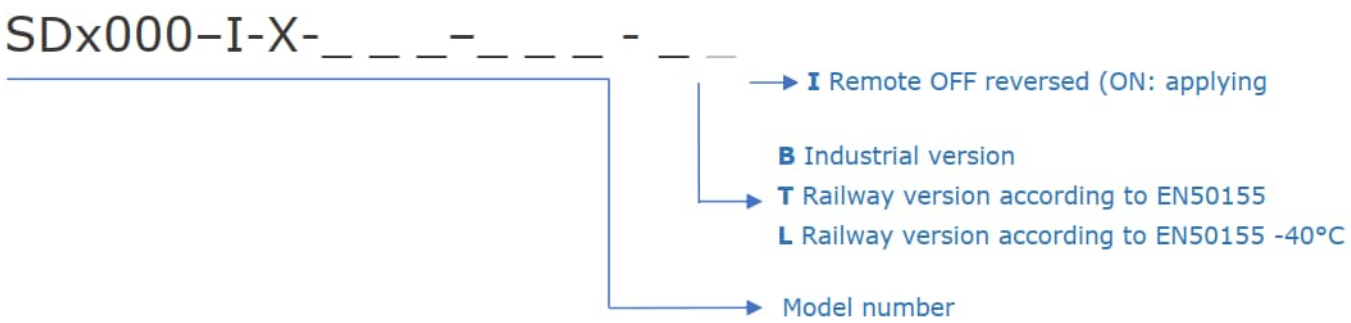
Note-1: Only available depending on HW version. Former models were 4…30V, Impedance 3k3Ω

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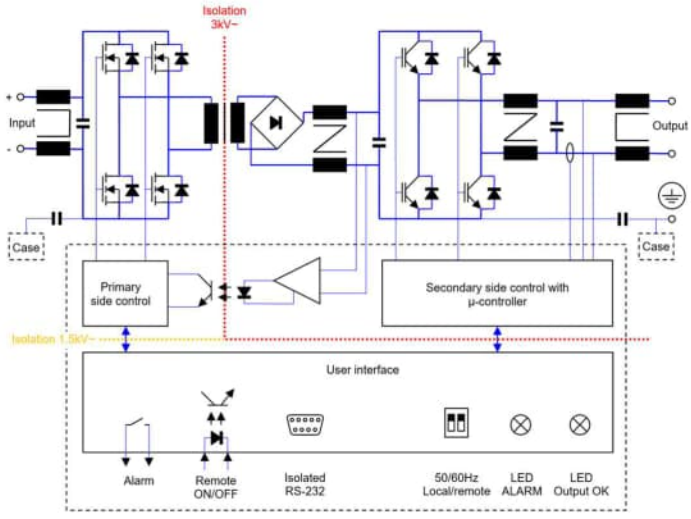
SD3000-I-X RANGE & SD4000-I-X RANGE
2400W-4000W / DC/AC INVERTER

ORDERING CODES

Model	Input Voltage DC [V]	Input Voltage Range [V]	Max. Input Current [A]	Output Voltage AC [V]	Output Current [A]	Active Output Power [W]	Appar. Output Power [VA]	Output Peak Curr. 10ms		Efficiency [%] *	No Load Input Current [A]*
								5s [Arms]	(Iopk) 10ms [Apk]		
SD3000-I-X-230	24	16.8-30	161	230	10.4	2400	2400	15	32	89	<0.88
SD3000-I-X-36-230	36	25.2-45	133	230	13.0	3000	3000	20	32	90	<0.60
SD3000-I-X-48-230	48	33.6-60	99	230	13.0	3000	3000	20	32	91	<0.42
SD3000-I-X-72-230	72	50.4-90	66	230	13.0	3000	3000	20	32	91	<0.30
SD3000-I-X-110-230	110	77-138	43	230	13.0	3000	3000	20	32	92	<0.17
SD3000-I-X-24-120	24	16.8-30	163	120	20.0	2400	2400	28	52	88	<0.65
SD3000-I-X-36-120	36	25.2-45	134	120	20.8	2500	2500	32	52	89	<0.49
SD3000-I-X-48-120	48	33.6-60	84	120	20.8	2500	2500	32	52	89	<0.38
SD3000-I-X-72-120	72	50.4-90	56	120	20.8	2500	2500	32	52	90	<0.28
SD3000-I-X-110-120	110	77-138	36	120	20.8	2500	2500	32	52	91	<0.17
SD4000-I-X-110-230	110	77-138	57	230	17.4	4000	4000	22	34	92	<0.20
SD4000-I-X-120-230	120	84-150	52	230	17.4	4000	4000	22	34	92	
SD4000-I-X-300-230	300	290-330	15	230	17.4	4000	4000	22	34	92	

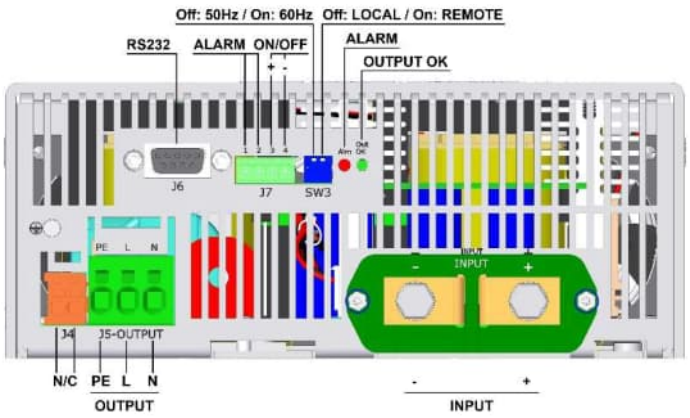


BLOCK DIAGRAM



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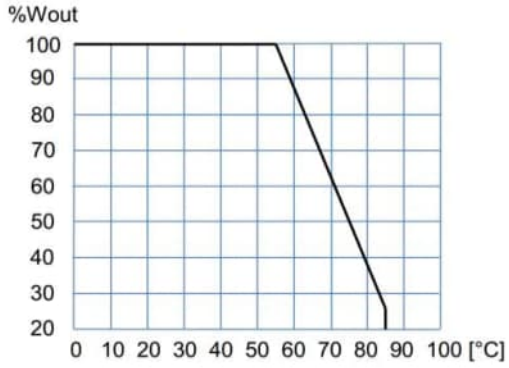
CONNECTIONS



CONNECTIONS

Terminal	Notes
Input	Terminal M6 (Rec. torque 6 Nm)
Output	Cable Up to 4mm²
Alarm	Phoenix Contact MC1.5/4-G-3.81 (See accessories)
ON/OFF	
RS232	DB9
N/C	Do Not Use

POWER DERATING vs AMBIENT TEMPERATURE



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START-UP

- The unit has 6 threaded holes for the fixation on a mounting surface.
- The unit has internal fans. For an appropriate cooling, the air input and output should be free of elements that cause and an air flow reduction (minimum recommended distance to other objects 50mm).
- Make connection as shown in the figure
- The default output frequency is 50Hz. For 60Hz simply actuate the DIP-switch as indicated in the figure

For safety reasons, the following requirements must be met:

- Provide the equipment with some kind of protective enclosure that complies with the electrical safety directives in effect within the country where the equipment is installed
- Include a time lag input fuse o current breaker curve D with a rating immediately higher than the maximum input current
- Use cables of adequate cross-sections to connect inputs and outputs.

	Input 24V	Input 36V	Input 48V	Input 72V	Input 110V	Output 120V	Output 230V
Current Protection	175A	150A	110A	70A	50A	25A	15A
Cable Cross-Section	50mm²	50mm²	25mm²	16mm²	10mm²	2.5mm²	1.5mm²

	Monitor	Set
RS232 Functions	Input Voltage	Input Under-Voltage Lockout
	Output Voltage	Input Under-Voltage Alarm
	Output Current	ON/OFF
	Internal Temperature	Output Frequency
	Output Frequency	Maximum Output Current
	Output Power	Output Voltage

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RS232 COMMUNICATION PORT

It is possible to control and monitor de unit via RS232 by means a terminal emulator like “Tera Term” or “Putty”. Also, it is possible to control and monitor the unit directly using the protocol showed in table:
Protocol Configuration: ASCII Code, 19200Bauds, Parity None, 8Bits, 1Bit Stop

TABLE

Header		Function	Parameter		Returns	Description
P	R	L	V		PTV■■■.■	Input Voltage in Volts
			U		PTU■■■.■	Output voltage in Volts RMS
			I		PTI■■■.■	Output Current in Amps RMS
			T		PTT■■■.■	Internal Temperature in °C
			F		PTF■■■.■	Output Frequency in Hz
			W		PTW■■■.■	Output Power in W
			S		PTS■■■.■	Inverter Status 999.9 -> Inverted Enabled 000.0 -> Inverted Disabled 222.2 -> Inverted Blocked by Overload 111.1 -> Inverter Blocked by Overload or Short-Circuit
			M		PTM■■■.■	Model Number
			R		PTR■■■.■	Firmware Version
			Other Character		PTE	Command Not Supported
		G	1	■■■.■	OK	Set the Minimum Input Working Voltage in Volts
					ERR	Value NO VALID for this Parameter
			2	■■■.■	OK	Set the Minimum Alarm Input Voltage in Volts (it should be higher than PRG1)
					ERR	Value NO VALID for this Parameter
			3	■■■.■	OK	Changes the Status Bit (After Start-Up Enabled with SW3 = LOCAL and Disable with SW3 = REMOTE) 999.9 -> Inverted Enable 000.0 -> Inverted Disable
					ERR	Value NO VALID for this Parameter
			4	■■■.■	OK	Set the Output Voltage in Volts RMS 80% Vnom ≤ ■■■.■ ≤ 105% Vnom
					ERR	Value NO VALID for this Parameter
			5	■■■.■	OK	Set the Maximum Output Current in Amps 20% Inom ≤ ■■■.■ ≤ 100% Inom
					ERR	Value NO VALID for this Parameter
			6	■■■.■	OK	Changes the Output Frequency (it is not stored for the next start-up) 050.0 -> 50Hz 060.0 -> 60Hz
					ERR	Value NO VALID for this Parameter
			7	■■■.■	OK	Set the Output Current Alarm 0 ≤ ■■■.■ ≤ 100% Imax_warning
					ERR	Value NO VALID for this Parameter
			8	■■■.■	OK	111.1 -> Reset the Inverter
					ERR	Value NO VALID for this Parameter
			A	■■■.■	OK	Set the Start-up Voltage in Volts (it should be higher than PRG1)
					ERR	Value NO VALID for this Parameter

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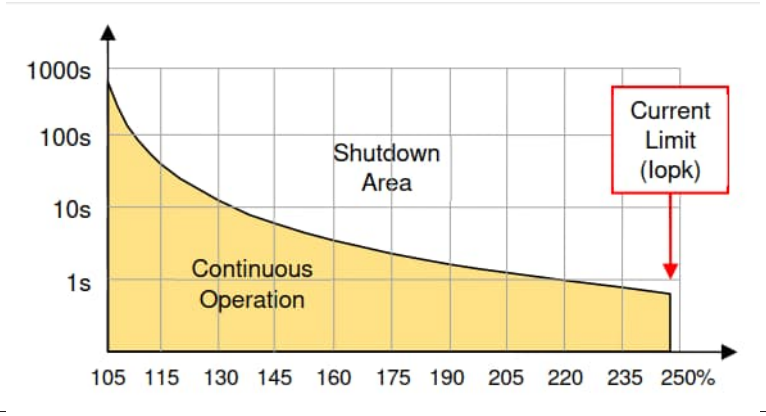
SD3000-I-X RANGE & SD4000-I-X RANGE
2400W-4000W / DC/AC INVERTER

WORKING PARAMETERS

Thermal Protection	SD3000-I-X / SD4000-I-X					
Internal Warning Temperature	88°C					
Internal Shutdown Temperature	92°C					
Internal Restart Temperature After Over-Temperature Shutdown	75°C					
Input Voltage Parameters	24-yyy	36-yyy	48-yyy	72-yyy	110-yyy	300-230
Max. Input Voltage Shutdown Instantaneous	33.7VDC	50.6VDC	67.3VDC	100.9VDC	154.1VDC	368.5VDC
Max. Input Voltage Timed Shutdown (0.1s)	30.1VDC	45.2VDC	60.1VDC	90.1VDC	138.6VDC	331.4VDC
Maximum Start-Up Voltage	29.9VDC	44.9VDC	59.8VDC	89.7VDC	137.4VDC	328.6VDC
Minimum Start-Up Voltage	17.9VDC	26.9VDC	35.9VDC	53.9VDC	82.4VDC	310.3VDC
Min. Input Voltage Shutdown Timed 0.1s	16.7VDC	25.1VDC	33.5VDC	50.3VDC	76.9VDC	289.6VDC
Min. Input Voltage Instantaneous Shutdown	14.4VDC	21.6VDC	28.7VDC	43.1VDC	65.9VDC	248.2VDC
Output Voltage Parameters	SD3000-XXX-230		SD3000-XXX-120		SD4000-XXX-230	
Output Voltage OF Short Circuit or Deep Overload	<164VAC		<86VAC		<214VAC	
Time of Short-Circuit	1000ms					
Time of Start-Up After Shutdown by Short-Circuit	2000ms					
Number of Start-Up Attempts After Short Circuit	5					
Output Current Parameters	SD3000-XXX-230		SD3000-XXX-120		SD4000-XXX-230	
Maximum Continuous Output Current	13.2A		21.1A		17.7A	
Warning Current	13A		20.8A		17.4A	
Start-Up Time After Shutdown by Overload	1500ms		2000ms		1000ms	
Maximum Overload I^2t	See Figure Below					
Number of Attempts of Consecutive Overload	5					
Start-Up and Working Errors						
Maximum Time for Overload or Internal Failure	Unlimited					
Minimum Time Required Between Disconnection and Next Connection	2min					

OVERLOAD PROTECTION

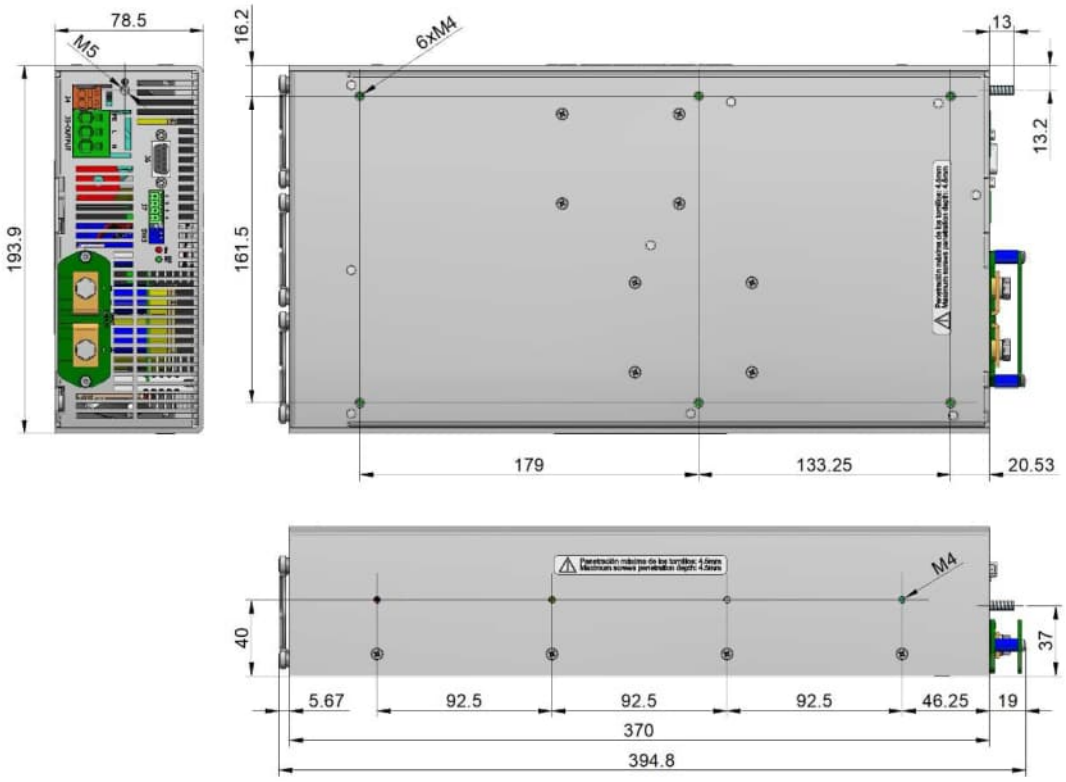
Protection Against Overloads and Short-Circuit	By Current Limiting at Iopk By I^2t. The Unit Shutdown when the Current-Time is over the Continuous Operation Curve
Overload Protection Recovery	Every 2 Seconds After Shutdown, the Unit tries to Restart Up to 5 Times. If the Overload Persists, the Unit Reminds Shutdown Until an Input Reconnection



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DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Weight		<6000g

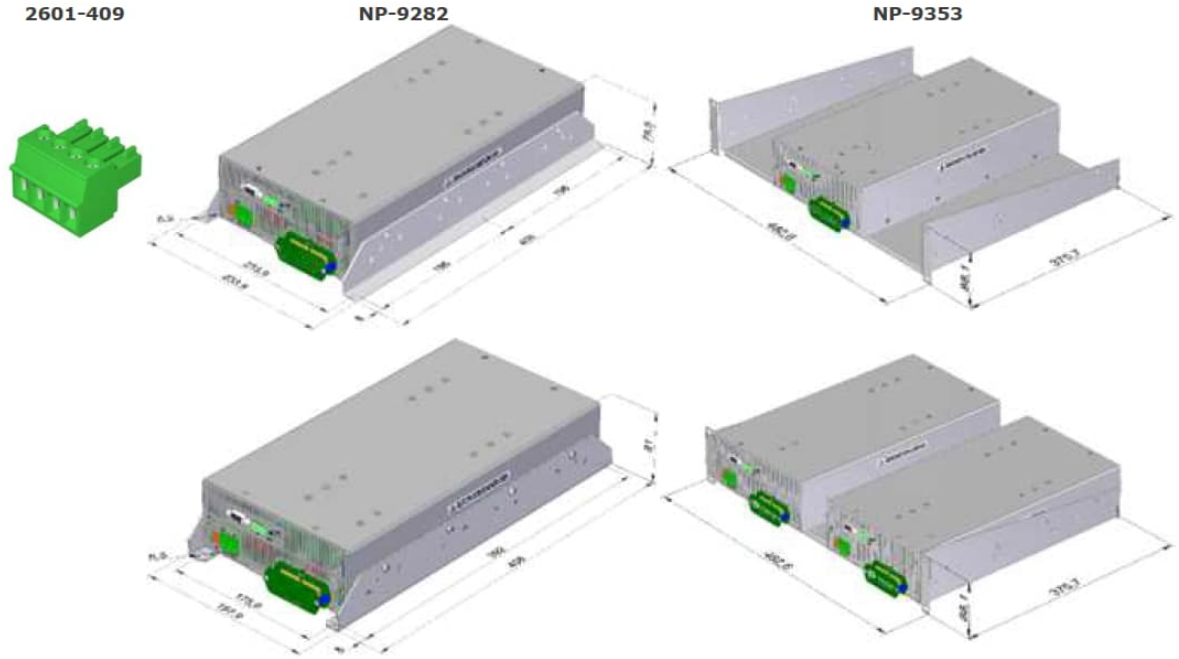


Maximum depth for the screws M4: 4.5 mm

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ACCESSORIES

Description	Notes	Code
Signal Female Connector		2601-409
Mounting Brackets Kit	Contains Two Brackets and Screws	NP-9282
2U 19" Rackmount Tray Kit	It Allows to Install One or Two Units	NP-9353



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