Features & Benefits

- Single Phase Universal AC input
- Rugged Unit for Military Applications
- High Efficiency, High Power Density
- Wide Input Voltage Range
- Built-in Active PFC Function
- Charger for Lead-Acid Batteries (Flooded, GEL and AGM) and Li-Ion Batteries (Lithium Iron and Lithium Manganese)
- Internal OR-ing Diode
- Multiple Units in a Redundant or Parallel System
- IP67 Sealed
- Input Under Voltage Protection
- Input/Output Over Voltage Protection
- Short Circuit Protection
- Over Temperature Protection
- Reverse Battery Protection
- Two unit can be mounted in 2U height 19" Rack
- On/Off Switch
- LED Indicators
- Grounding Interface

Compliance

Module is designed to meet:

- MIL-STD-461G
- MIL-STD-810G
- MIL-STD-1275E

Typical Applications

- Military/Defense Power Systems
- Armored Vehicles
- Land Platforms
- Communications and Radar Systems

Product Ratings	
V_{IN}	90–265 V_{RMS} (single phase)
V_{IN_NOM}	220 V_{RMS}
V_{OUT}	28.2 V_{DC}
I_{OUT_MAX}	120 A_{DC}
P_{OUT_MAX}	3384 W

Product Description

KMBC07 is a high efficiency AC-DC battery charger unit. The unit regulates a constant current at the output. Charger unit is designed to guarantee high performance under extreme environmental conditions. It has superior protection features against external faults and disturbances while meeting the major military standards. KOLT's innovative engineering has enabled a compact design of the converter with high power density and performance.

Size: 530 x 220.75 x 87.75 mm
(19"/2 form factor, 2U height)

Weight: 15 kg

Electrical Characteristics

Input Characteristics					
Parameters	**Comments**	**Min**	**Typ**	**Max**	**Unit**
Input Voltage		90	220	265	V_{RMS}
Input Voltage (non-working)	Withstanding input voltage	-	-	300	V_{RMS}
Input Frequency		47	50	63	Hz
Input Current THD	From half load to full load, nominal input voltage	-	-	10%	-
Input No Load Power	Nominal input voltage	-	-	50	W
Inrush Current	Nominal input voltage	-	-	±40	A_{PK}
Leakage Current to Ground	10% load, nominal input voltage	-	-	5	mA_{RMS}

Output Characteristics					
Parameters	**Comments**	**Min**	**Typ**	**Max**	**Unit**
Output Voltage		-	28.2	-	V_{DC}
Output Current		-	-	120	A_{DC}
Output Power	Subject to derating per input voltage (see)	-	-	3384	W
Output Ripple and Noise	20 MHz Bandwidth	-	-	0.4	V_{PK-PK}
Line Regulation	Over the full range of line input voltage	-	±0.1	-	V_{DC}
Load Regulation	From 10% load to full load, nominal input voltage	-	±0.1	-	V_{DC}

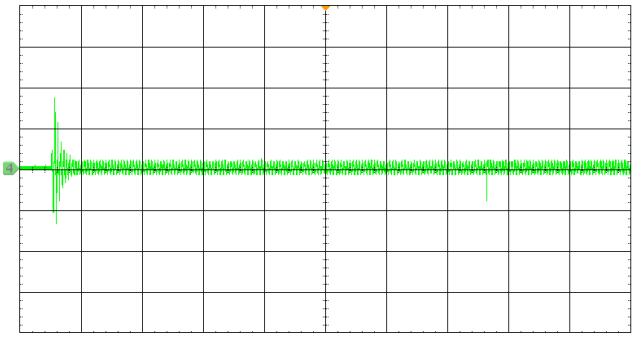
General Characteristics					
Parameters	**Comments**	**Min**	**Typ**	**Max**	**Unit**
Efficiency	Maximum output power, nominal input voltage	92%	-	-	-
Power Factor	Maximum output power, nominal input voltage	0.99	-	-	-
Soft-Start Time		-	-	1	s
Hold-up Time		10	-	-	ms
Weight		-	-	15	kg
Cooling	Forced air by temperature-controlled fans				
Built-in Test Feature	DC OK, Remote Error Sensing				

Protections					
Parameters	**Comments**	**Min**	**Typ**	**Max**	**Unit**
Input Under Voltage Protection	When the voltage returns within the normal limits, unit resumes operation automatically	80	85	90	V_{RMS}
Input Over Voltage Protection		265	270	275	V_{RMS}
Output Over Current Protection	Fully electronic against over-load	-	-	130	A_{DC}
Output Over Voltage Protection		-	-	32.4	V_{DC}
Output Short Circuit Protection	Fully electronic against over-load and continuous short-circuit conditions				
Over Temperature Protection	Automatically resumes operation when temperature decreases				
Battery	Prevention of battery discharge when charger is off				
	Reverse polarity protection				

Isolation Characteristics					
Parameters	**Comments**	**Min**	**Typ**	**Max**	**Unit**
Insulation Resistance	Input to Case	-	>1	-	MΩ
	Output to Case	-	>1	-	MΩ
Isolation Voltage	Input to Output	**-**	-	500	V
	Input to Case	**-**	-	500	V
	Output to Case	**-**	-	500	V

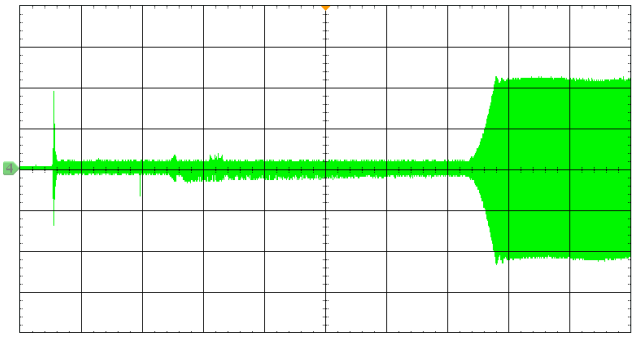
Environmental Characteristics						
Parameters	**Standard**	**Min**	**Typ**	**Max**	**Unit**	**Status**
Operational Temperature	MIL-STD-810G Method 501.5/502.5 Procedure II	-32	-	+50	°C	Passed
Storage / Transport Temperature	MIL-STD-810G Method 501.5/502.5 Procedure I	-40	-	+63	°C	Passed
Operational Low Pressure	MIL-STD-810G Method 500.5 Procedure II	-	-	3000	m	Similarity*
Storage / Transport Low Pressure	MIL-STD-810G Method 500.5 Procedure I	-	-	4500	m	Designed to Meet
Parameters	**Standard**	**Waveform**	**Peak Value**	**Pulse Duration**	**Axis**	**Status**
Shock	MIL-STD-810G Method 516.6 Procedure I	Sawtooth	20g	11 ms	±X, ±Y, ±Z	Similarity*
		Half-Sine	10g	11 ms	±X, ±Y, ±Z	Similarity*
Parameters	**Standard**	**Category**	**Figure**	**Platform**	**Vehicle**	**Status**
Vibration	MIL-STD-810G Method 514.6 Procedure I	Category 4	514.7C-2	Secured Cargo	Truck Transportation and Composite Wheeled Vehicles	Similarity*
		Category 8	514.7C-8	Aircraft	Propeller	Similarity*
		Category 11	514.7C-11	Railroad	Train	Similarity*
		Category 20	514.7C-4	Ground	Wheeled Vehicles	Similarity*
		Category 21	514.7D-9	Watercraft	Marine Vehicles	Similarity*
Parameters	**Standard**	**Condition**				**Status**
Salt Fog	MIL-STD-810G Method 509.5	24 hours spray, 24 hours dry, applied 2 times				Designed to Meet
Sand and Dust	MIL-STD-810G Method 510.5 Procedure I/II	<150 µm Dust 150-850 µm Sand				Similarity*
Fungus	MIL-STD-810G Method 508.6	Analysis of the degree of inertness to fungus growth of the components.				Analysis
Solar Radiation	MIL-STD-810G Method 505.5 Procedure I	A2				Designed to Meet
Humidity	MIL-STD-810G Method 507.5 Procedure II	≥ %95 Relative @30°C				Similarity*
Noise	MIL-STD-1474E	≤ 70 dB at a distance of 1 meter				Passed
Impermeability	IP67	Tested by immersion in 1 m water for 30 minutes				Passed
Parameters	**Standard**	**Test**				**Status**
EMI/EMC	MIL-STD-461G Ground Army	CE102	CS101 CS114 CS115 CS116 CS118	RE102	RS103	Similarity*

* Verified on similar unit. Both units consist of identical converter modules.



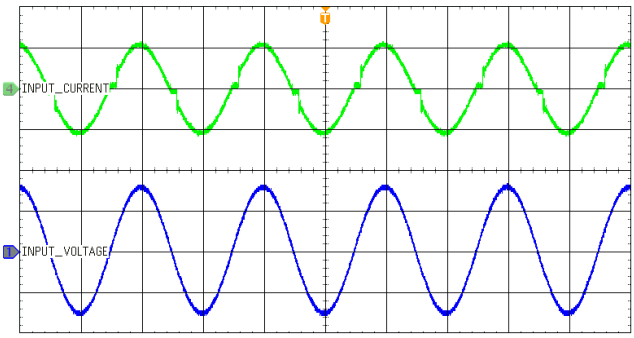
Input current (green) (10 A/div) Time base : 400 ms/div

Figure 1. Inrush current at nominal input voltage



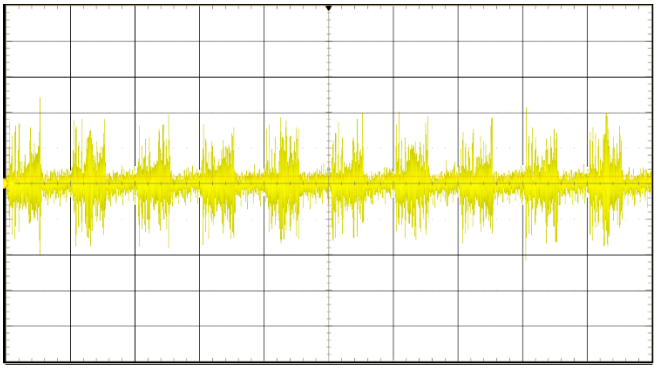
Input current (green) (10 A/div) Time base : 2 s/div

Figure 2. Input current for inrush and start-up stages at nominal input voltage



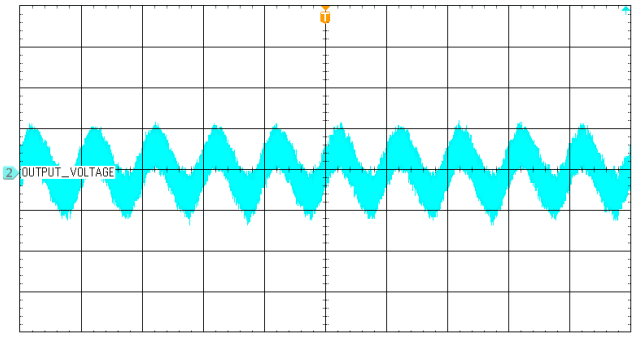
Input voltage (navy blue) (200 V/div) Time base : 10 ms/div
Input current (green) (20 A/div)

Figure 3. Typical input voltage and current waveforms at rated load current



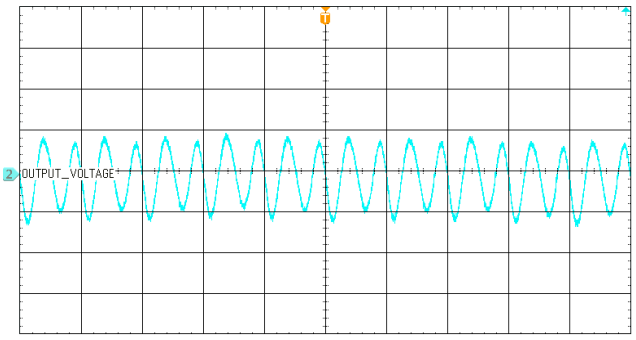
Leakage current (yellow) (10 mA/div) Time base : 20 ms/div

Figure 4. Leakage current at nominal input voltage and 10% load current



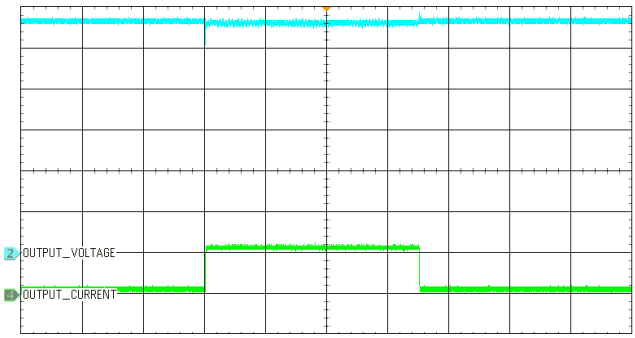
Output voltage (blue) (200 mV/div) Time base : 10 ms/div

Figure 5. Output voltage ripple at nominal input voltage and rated load current (AC Coupled), Bandwidth: 20 MHz



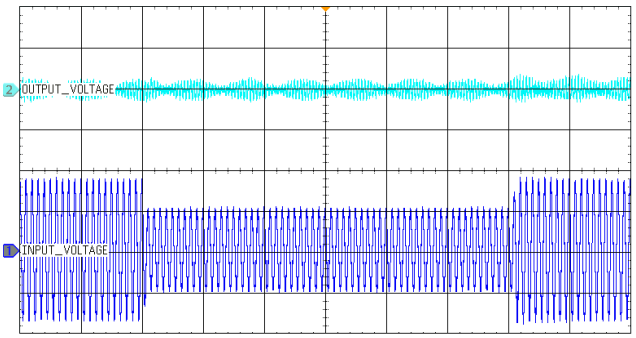
Output voltage (blue) (100 mV/div) Time base : 10 µs/div

Figure 6. Output voltage ripple at nominal input voltage and rated load current (AC Coupled), Bandwidth: 20 MHz



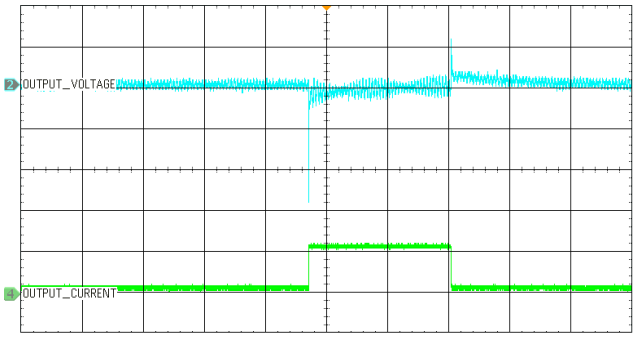
Output voltage (blue) (5 V/div) Time base : 200 ms/div
Output current (green) (100 A/div)

Figure 7. Load transient response: from 10% to 100% and from 100% to 10% at nominal output voltage (DC Coupled)



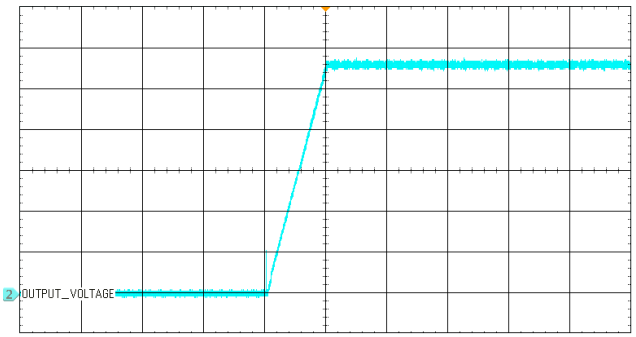
Output voltage (blue) (1 V/div) Time base : 200 ms/div
Input voltage (navy blue) (200 V/div)

Figure 10. Line transient response: from 265 V_{RMS} to 135 V_{RMS} and from 135 V_{RMS} to 250 V_{RMS} at nominal output voltage (AC Coupled)



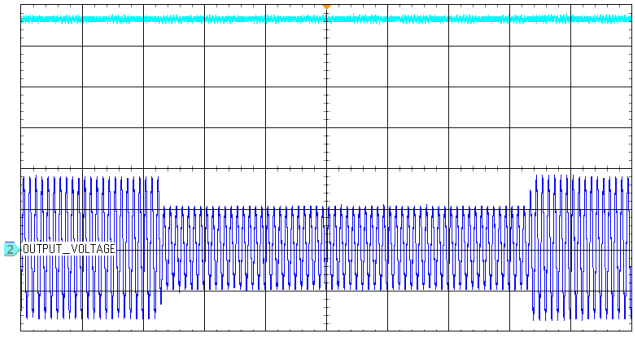
Output voltage (blue) (1 V/div) Time base : 100 ms/div
Output current (green) (100 A/div)

Figure 8. Load transient response: from 10% to 100% and from 100% to 10% at nominal output voltage (AC Coupled)



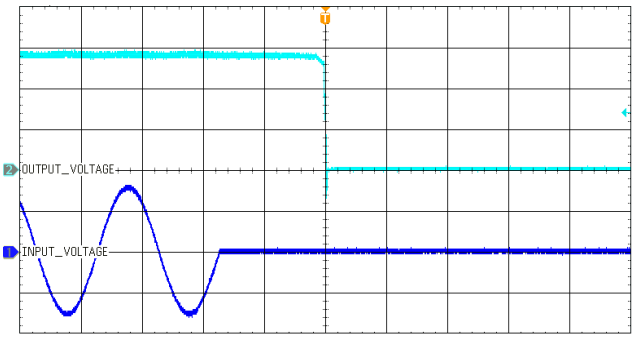
Output voltage (blue) (5 V/div) Time base : 1 s/div

Figure 11. Start-up waveform at rated load current and nominal output voltage



Output voltage (blue) (5 V/div) Time base : 200 ms/div
Input voltage (navy blue) (200 V/div)

Figure 9. Line transient response: from 265 V_{RMS} to 135 V_{RMS} and from 135 V_{RMS} to 250 V_{RMS} at nominal output voltage (DC Coupled)



Output voltage (blue) (10 V/div) Time base : 10 ms/div
Input voltage (navy blue) (200 V/div)

Figure 12. Hold-up waveform at rated load current and nominal output voltage

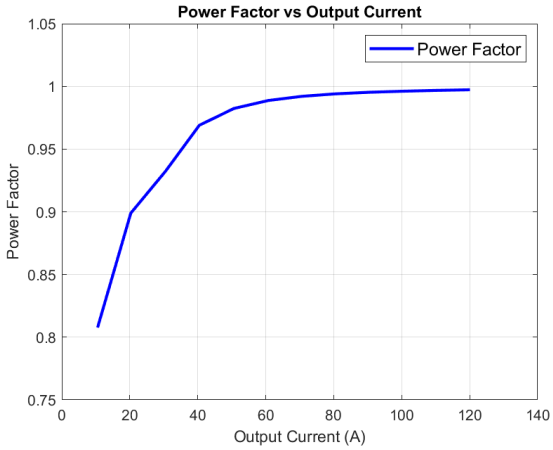


Figure 13. Power factor versus output current at nominal input voltage

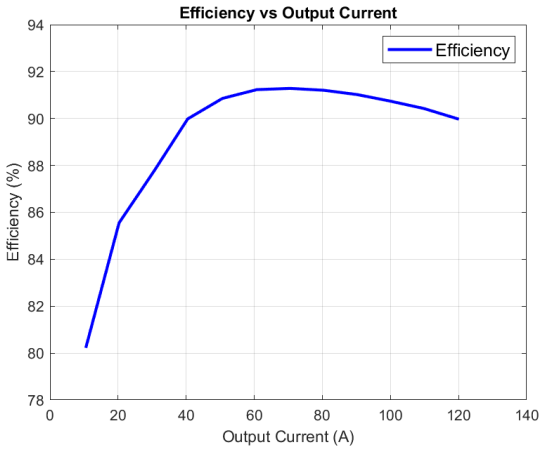


Figure 14. Efficiency versus output current at nominal input voltage

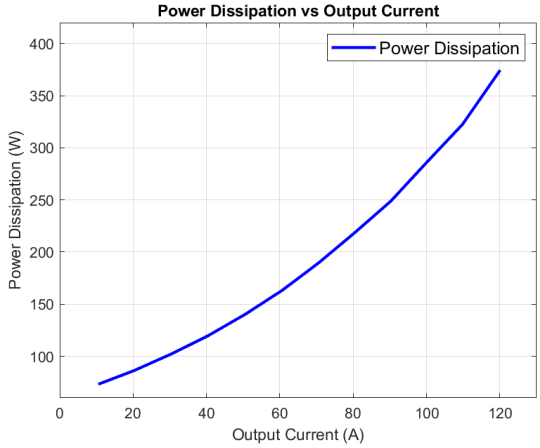


Figure 15. Power dissipation versus output current at nominal input voltage

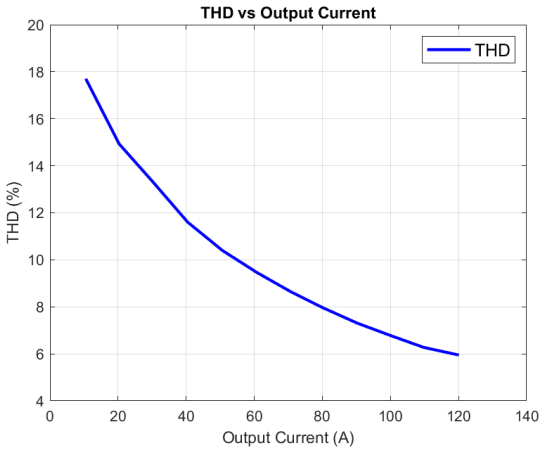


Figure 16. Total harmonic distortion (THD) versus output current at nominal input voltage

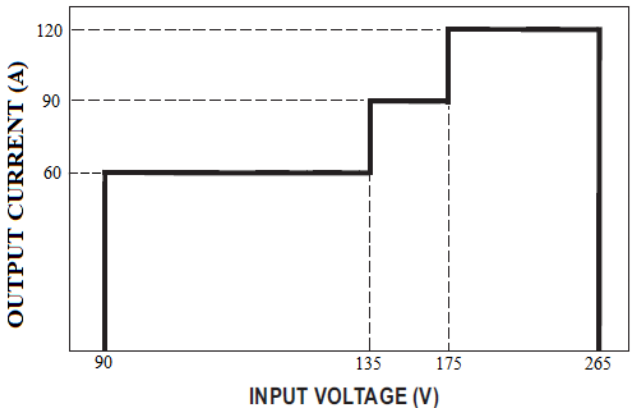


Figure 17. Derating curve of output load versus input voltage

Input Connector Configuration

Part Numbers (interchangeable):

- Amphenol 97B-3102E-16-10P
- ITT Cannon CA3102E16-10PB

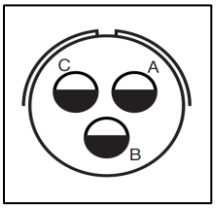


Figure 18. Input Connector View

Pin	Signal Name	Function
A	PHASE	AC Line Input (PHASE)
B	NEUTRAL	AC Line Input (NEUTRAL)
C	CHASSIS	AC Line Input (EARTH)

Output Connector Configuration

Part Numbers (interchangeable):

- Amphenol 97B-3102E-32-17S
- ITT Cannon 97B-3102E-32-17S

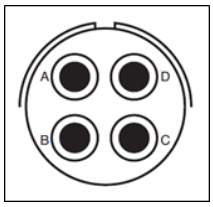


Figure 19. Output Connector View

Pin	Signal Name	Function
A	OUT	DC Output
B	OUT	DC Output
C	OUT_RTN	DC Output Return
D	OUT_RTN	DC Output Return

Signal Connector Configuration

Part Numbers:

- D38999/20WB35SN

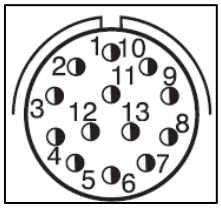


Figure 20. Signal Connector View

Pin	Signal Name	Function
1	Data+	Factory service input.
2	Data-	Factory service input.
3	RTN	Factory service input.
4	-	-
5	-	-
6	-	-
7	PGOOD	Power good signal.
8	PGOOD_RTN	Power good return signal.
9	NTC	Temperature sensor.
10	NTC_RTN	Temperature sensor return signal.
11	-	-
12	-	-
13	-	-

Led Configuration

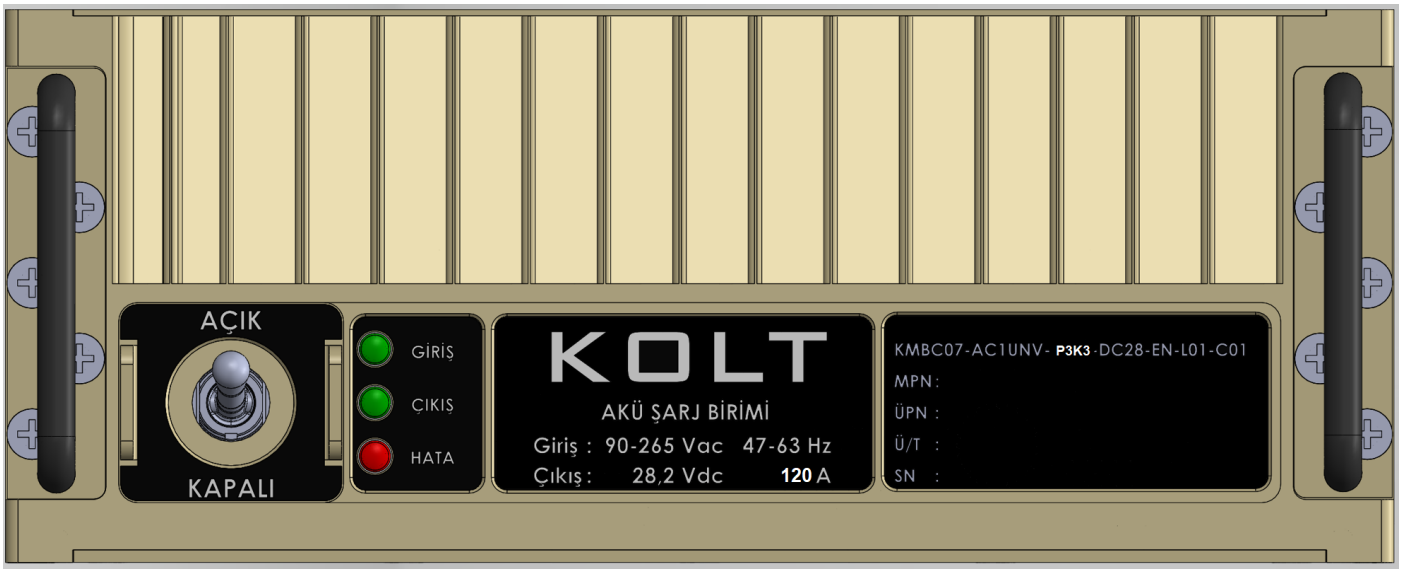


Figure 21. Front Panel

LED Name	Status	Description	Function
Input	Off	AC Input Passive	AC input is below 70 Vac.
	Green	AC Input Active	AC input voltage is within the operating limit (90-265 Vac).
	Red	AC Input Fault	• Input Under Voltage / Over Voltage, • Input Over Current, • Line Frequency not within limits

LED Name	Status	Description	Function
Output	Off	DC Output Passive	DC output is not active
	Green	DC Output Active	DC output is within the defined limits
	Red	DC Output Fault	• Output Over Voltage / Short Circuit • Output Reverse Voltage • Output Regulation error

LED Name	Status	Description	Function
Fault	Off	Device OK	No fault is present
	Red	Device Fault	• Mid-Bus Over Voltage • Temperature • Critical Fault

Color Configuration

Color Option	Standard	Color Code	Color Name
C01	RAL	6014	Yellow Olive
C02	RAL	9005	Jet Black
C03	FED-STD-595C	34094	Green 383 Camouflage
C04	FED-STD-595C	37030	Black Camouflage

Label Configuration

Label Option	Description
L01	Label for Turkish language
L02	Label for English language

Figure 22. L01 Label Option View

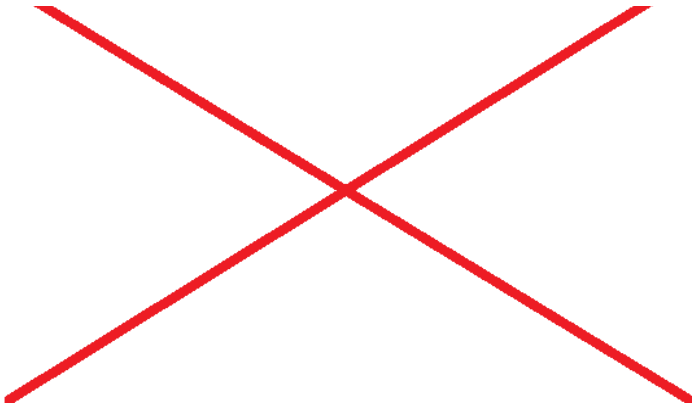


Figure 23. L02 Label Option View

Mechanical Drawings

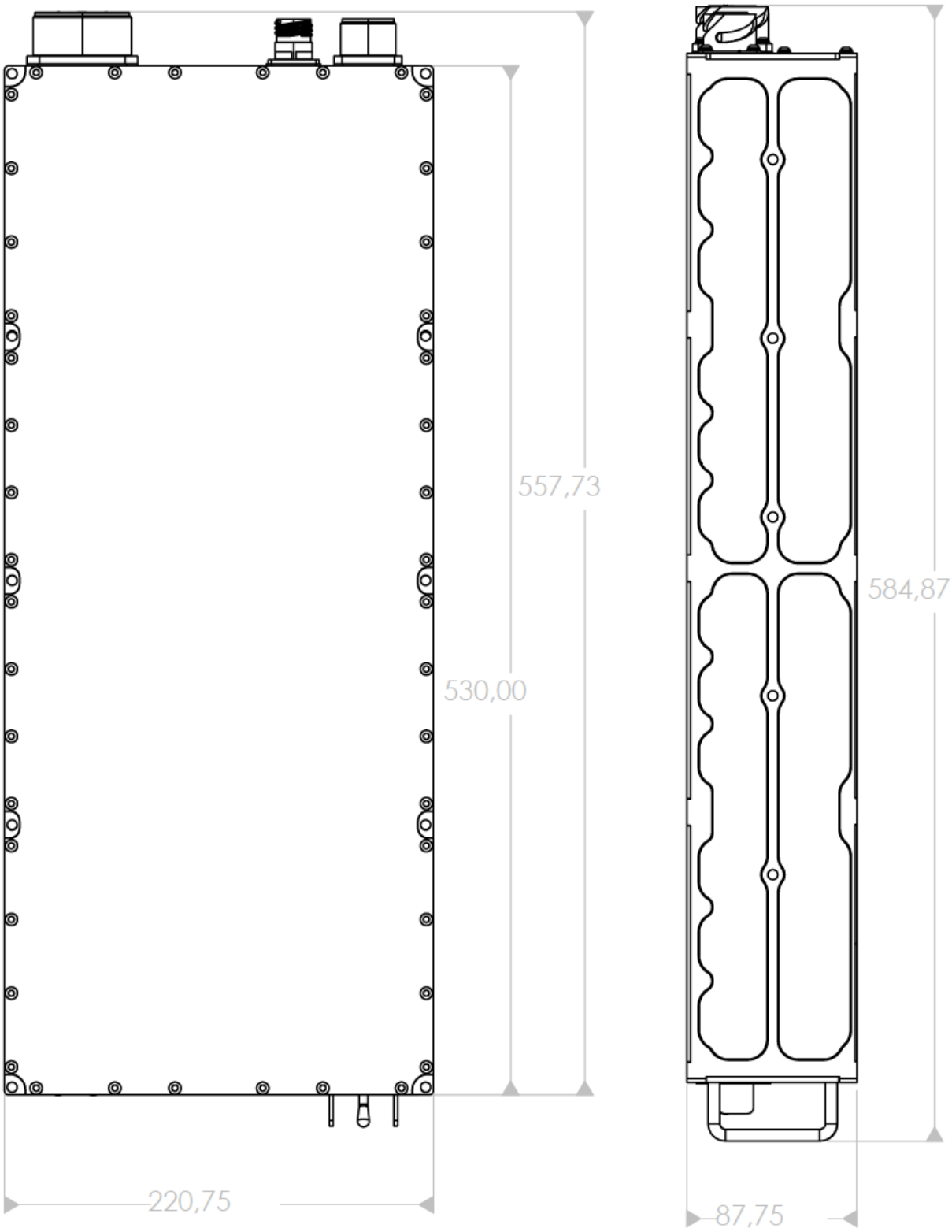


Figure 24. Mechanical Dimensions

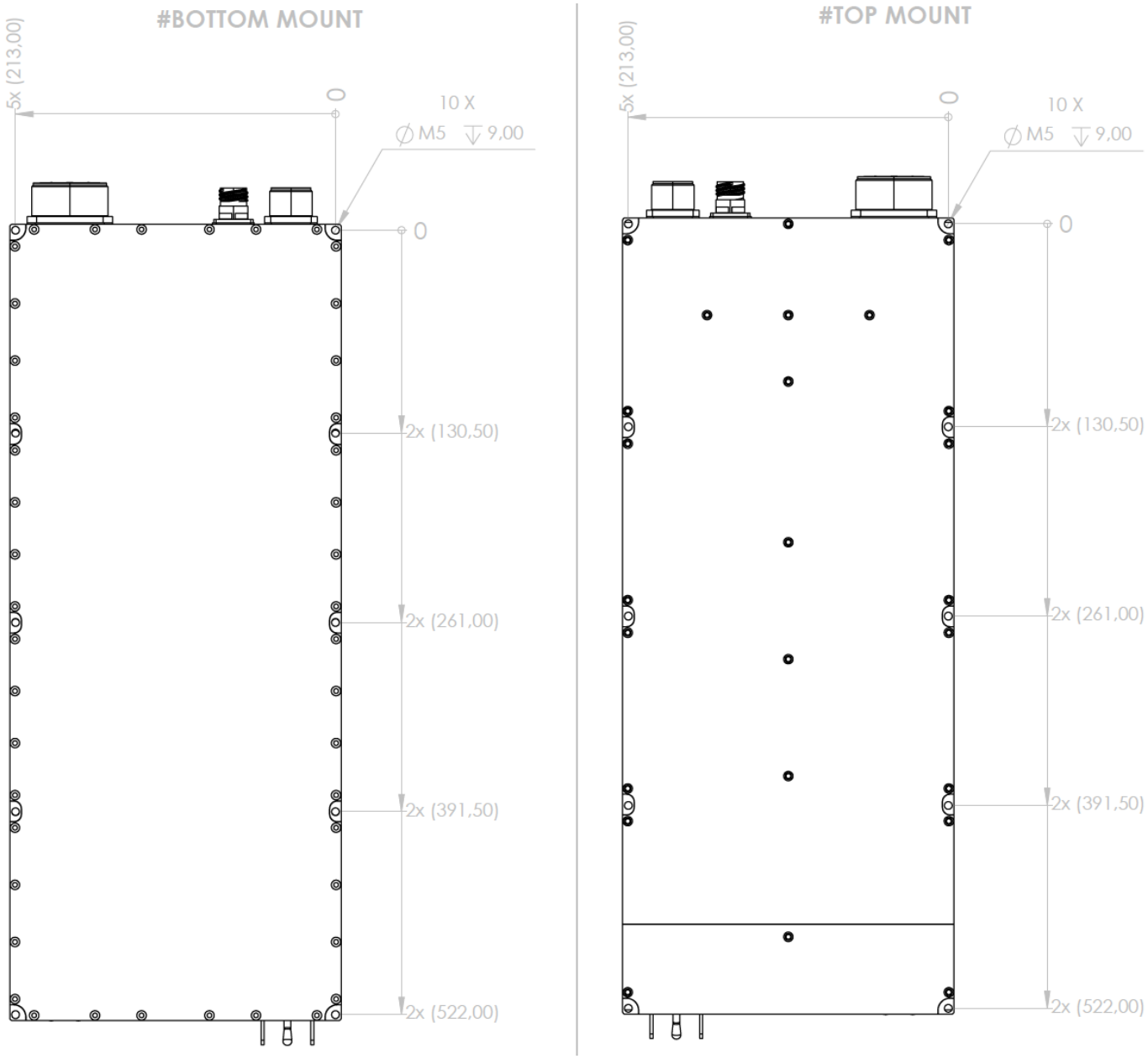


Figure 25. Mounting Details and Mounting Holes Coordinates

Material: Aluminum Alloy 6061-T6

Part Ordering Information

Family	Input Voltage	Power	Output Voltage	Package	Color	Label	Option Field
KMBC07	**AC1UNV:** Single Phase Universal AC	**P3K3:** 3.3 kW	**DC28**: 28.2 V	**EN**: Enclosed	**Cxx** (C01-C99)	**Lxx** (L01-L99)	**-**

Ordering Number	Color Option	Label Option
KMBC07-AC1UNV-P3K3-DC28-EN-C01-L01	RAL 6014 Yellow Olive	Turkish
KMBC07-AC1UNV-P3K3-DC28-EN-C02-L01	RAL 9005 Jet Black	Turkish
KMBC07-AC1UNV-P3K3-DC28-EN-C03-L01	FED-STD-595C 34094 Green 383 Camouflage	Turkish
KMBC07-AC1UNV-P3K3-DC28-EN-C04-L01	FED-STD-595C 37030 Black Camouflage	Turkish
KMBC07-AC1UNV-P3K3-DC28-EN-C01-L02	RAL 6014 Yellow Olive	English
KMBC07-AC1UNV-P3K3-DC28-EN-C02-L02	RAL 9005 Jet Black	English
KMBC07-AC1UNV-P3K3-DC28-EN-C03-L02	FED-STD-595C 34094 Green 383 Camouflage	English
KMBC07-AC1UNV-P3K3-DC28-EN-C04-L02	FED-STD-595C 37030 Black Camouflage	English

Revision History

Revision	Date	Description	Page Number(s)
A-PC1	31.05.2023	Initial Release	-