

Features & Benefits

- Rugged Module for Military Applications
- High Efficiency, High Power Density
- Wide Input Voltage Range
- Programmable Output Voltage and Current
- Charger for Lead-Acid Batteries (Flooded, GEL and AGM) and Li-Ion Batteries (Lithium Iron and Lithium Manganese)
- Droop Current Sharing & Internal ORing Diode
- Multiple Units in a Redundant or Parallel System
- RS-485 Communication
- Input Under Voltage Protection
- Input/Output Over Voltage Protection
- Short Circuit Protection
- Over Temperature Protection
- Reverse Battery Protection
- Baseplate Conduction Cooled
- Flanged Baseplate Version Available

Compliance

Module is designed to meet:

- MIL-STD-461G
- MIL-STD-810G

Typical Applications

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

Product Ratings

$V_{IN} = 250-425\text{ V}_{DC}$	$V_{OUT_TYP} = 28\text{ V}_{DC}$
$V_{IN_NOM} = 270\text{ V}_{DC}$	$I_{OUT_TYP} = 100\text{ A}_{DC}$ $P_{OUT_TYP} = 2800\text{ W}$

Product Description

KMPM01 is a small and efficient isolated DC-DC converter, designed for harsh environments that require a steady 28V DC power supply. It can operate on a wide range of DC input voltages, from 250V to 425V. The design of the converter allows for it to operate at higher than rated power until thermal limits are reached. The module does not require a fan for cooling, relying instead on baseplate cooling technology for silent operation.

The KMPM01 is engineered to perform reliably under extreme environmental conditions. It comes with advanced protection features against external faults and disturbances, meeting major military standards. Thanks to KOLT's innovative engineering, the converter has a compact design that provides high power density and performance. The module can be easily configured at the factory to fit specific electrical and mechanical requirements of the application.



Size: 166 × 130 × 36.5 mm

Electrical Characteristics

Input Characteristics					
Parameters	Comments	Min	Typ	Max	Unit
Input Voltage	Continuous	250	270	425	V _{DC}
Input No Load Current	@Nominal input voltage	-	200	-	mA _{DC}
Input Ripple Current	@Rated output power	-	215	-	mA _{RMS}

Output Characteristics					
Parameters	Comments	Min	Typ	Max	Unit
Output Voltage	User settable	18	28	32.2	V _{DC}
Output Current Limit	User settable	0	100	120	A _{DC}
Output Power		-	2800	3360	W
Output Ripple and Noise	@20 MHz Bandwidth	-	-	400	mV _{pk-pk}
Line Regulation	Over the full range of line input voltage	Insignificantly small			-
Load Regulation	From 10% load to full load, nominal input voltage	-	100	-	mV
External Load Capacitance		-	-	700	μF

General Characteristics					
Parameters	Comments	Min	Typ	Max	Unit
Efficiency	@Rated output power	94%	-	-	-
Turn-on Delay	Factory settable, health check	-	-	500	ms
Soft-Start Time	Factory settable	-	-	1	s
Power Density	@Rated output power	-	3554	4265	W/dm ³
Weight		-	1.2	-	kg
Length	Connectors lengths are not included	-	166	-	mm
Depth		-	130	-	mm
Height		-	36.5	-	mm
Cooling	Baseplate Cooling				
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	215	220	225	V _{DC}
Input Over Voltage Protection		435	440	445	V _{DC}
Output Over Current Protection	Fully electronic against over-load	-	-	130%	I _{OUT_TYP}
Output Over Voltage Protection		-	-	115%	V _{OUT_TYP}
Output Short Circuit Protection	Fully electronic against over-load and continuous short-circuit conditions				
Over Temperature Protection	Automatically resumes operation when the heat sink temperature decreases below 70°C	-	80	-	°C
Battery	Prevention of battery discharge when charger is off				
	Reverse polarity				

Isolation Characteristics					
Parameters	Comments	Min	Typ.	Max	Unit
Insulation Resistance	Input to Case	-	>100	-	MΩ
Isolation Voltage	Input to Output	-	-	1500	V _{DC}
Isolation Voltage	Input to Case	-	-	1500	V _{DC}
Isolation Voltage	Output to Case	-	-	1500	V _{DC}

Environmental Characteristics					
Parameters	Standard / Method	Min	Typ	Max	Unit
Operational Temperature	MIL-STD-810G Method 501.5/502.5 Procedure II	-32	-	+50	°C
Storage / Transport Temperature	MIL-STD-810G Method 501.5/502.5 Procedure I	-40	-	+63	°C
Operational Low Pressure	MIL-STD-810G Method 500.5 Procedure II	-	-	10000	ft
Storage / Transport Low Pressure	MIL-STD-810G Method 500.5 Procedure I	-	-	15000	ft
Parameters	Standard / Method	Waveform	Peak Value	Pulse Duration	Axis
Shock	MIL-STD-810G Method 516.6 Procedure I	Sawtooth	20g	11 ms	±X, ±Y, ±Z
		Half-Sine	10g	11 ms	±X, ±Y, ±Z
Parameters	Standard / Method	Category		Platform	Vehicle
Vibration	MIL-STD-810G Method 514.6 Procedure I	Category 4		Secured Cargo	Truck Transportation and Composite Wheeled Vehicles
		Category 8		Aircraft	Propeller
		Category 10		Watercraft	Marine Vehicles
		Category 11		Railroad	Train
		Category 20		Ground Vehicles	Wheeled and Tracked Vehicles
		Category 21		Watercraft	Marine Vehicles
Parameters	Standard / Method	Condition			
Fungus	MIL-STD-810G Method 508.6	Analysis of the degree of inertness to fungus growth of the components.			
Solar Radiation	MIL-STD-810G Method 505.5 Procedure I	A2			
Humidity	MIL-STD-810G Method 507.5 Procedure II	≥ %95 Relative @30°C			
Parameters	Standard / Method	Test			
EMI/EMC*	MIL-STD-461E ^b MIL-STD-461G ^a	CE102 ^{a, b} CS101 ^{a, b} CS114 ^{a, b} CS115 ^a CS116 ^{a, b} CS118 ^a RE101 ^b RE102 ^{a, b} RS101 ^b RS103 ^{a, b}			

* Tested at the system level with an EMI filter installed at the input.

^a Ground Army

^b Surface Ships

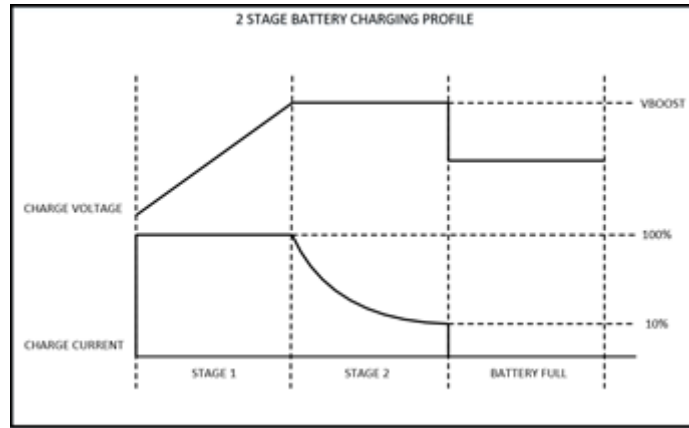


Figure 1. Two stage battery charging profile

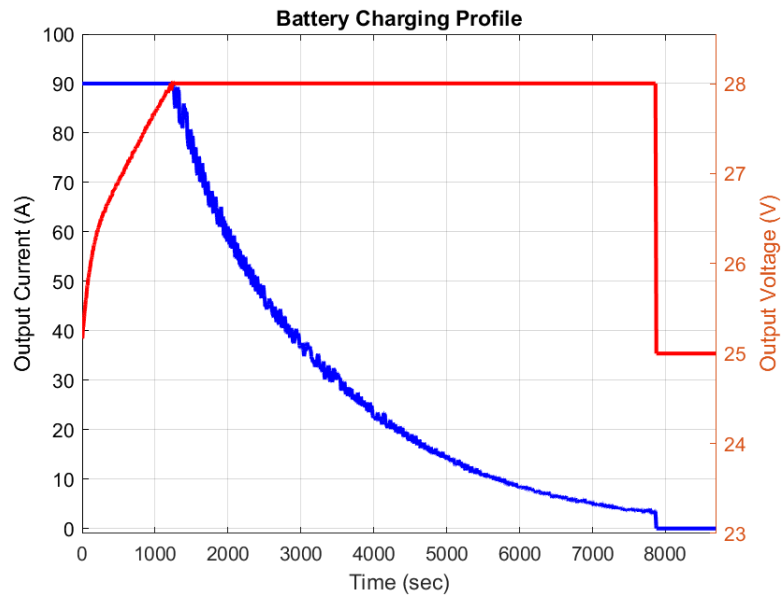
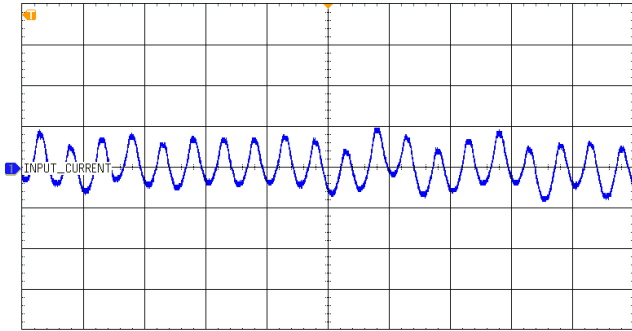
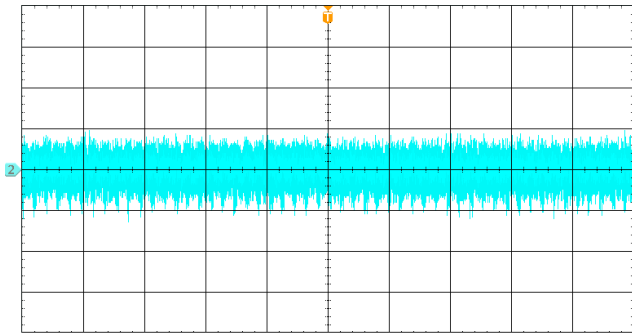


Figure 2. Battery charging profile based on measured battery current and battery voltage data. Maximum power delivered is 2520 W.



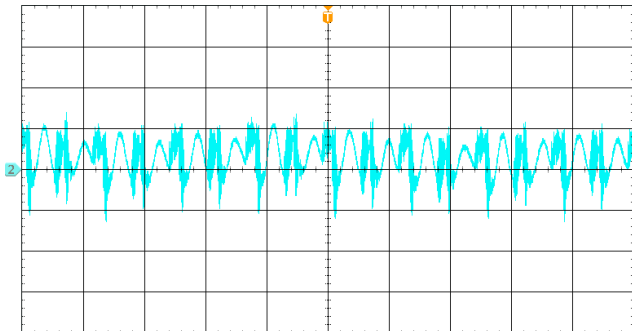
Input Current (navy blue) (500 mA/div) Time base : 10 μ s/div

Figure 3. Input current ripple at nominal input voltage and rated load current (AC Coupled), Bandwidth: 20 MHz



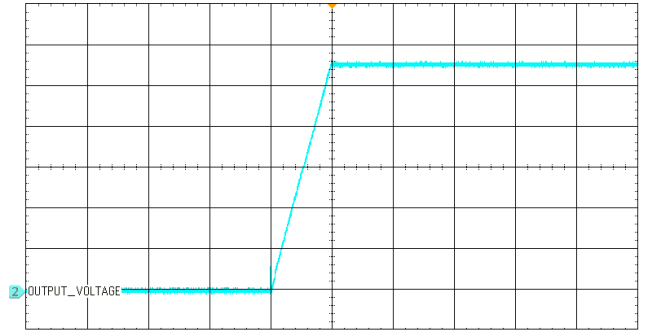
Output voltage (blue) (100 mV/div) Time base : 10 ms/div

Figure 4. Output voltage ripple at nominal input voltage and rated load current (AC Coupled), Bandwidth: 20 MHz



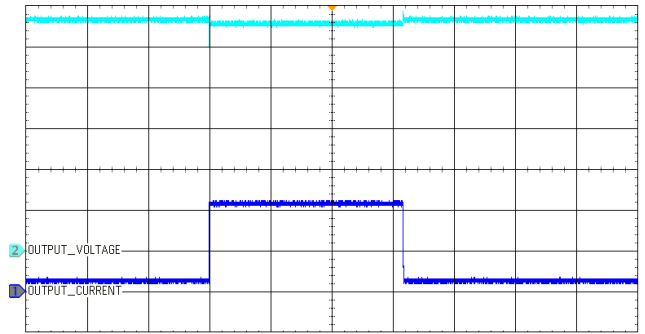
Output voltage (blue) (50 mV/div) Time base : 8 μ s/div

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



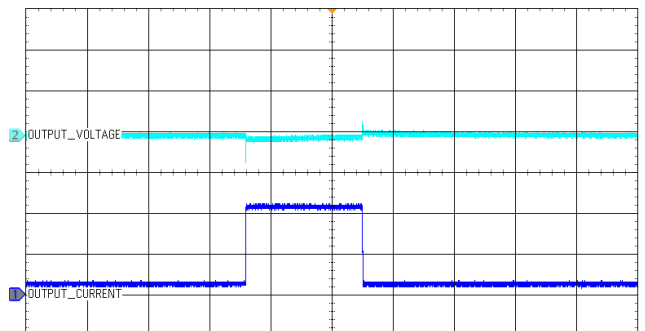
Output voltage (blue) (5 V/div) Time base : 1 s/div

Figure 6. Start-up waveform at rated load current and nominal output voltage



Output voltage (blue) (5 V/div) Time base : 200 ms/div
Output current (navy blue) (50 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) (5 V/div) Time base : 100 ms/div
Output current (navy blue) (50 A/div)

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

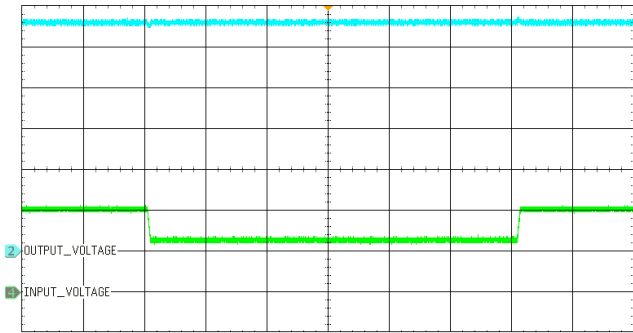


Figure 9. Line transient response: from 425 V_{DC} to 250 V_{DC} and from 250 V_{DC} to 425 V_{DC} at nominal output voltage (DC Coupled)

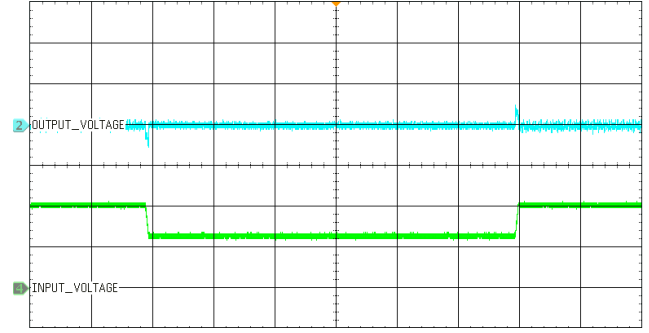


Figure 11. Line transient response: from 425 V_{DC} to 250 V_{DC} and from 250 V_{DC} to 425 V_{DC} at nominal output voltage (AC Coupled)

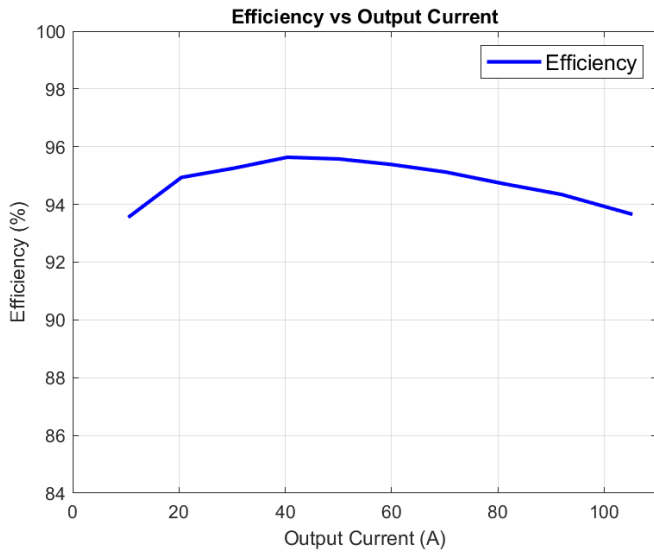


Figure 10. Efficiency versus output current at nominal input voltage

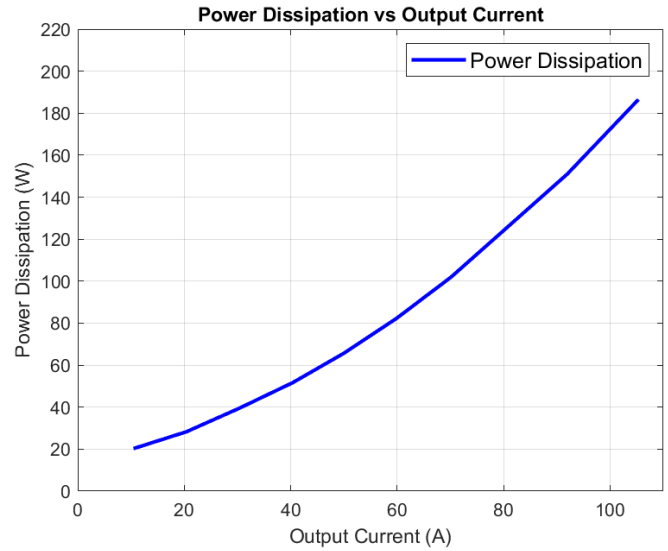
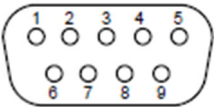


Figure 12. Power dissipation versus output current at nominal input voltage

Connector Configuration

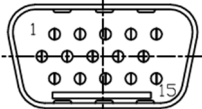
Input Connector DEMM9PL	
Pin	Signal
1	DCIN
2	DCIN
3	NC
4	HVGND
5	HVGND
6	DCIN
7	NC
8	NC
9	HVGND



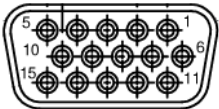
Output Terminals 7461098	
Pin	Signal
+	OUT
-	OUT RTN



Input Signal Connector 10090926-P154XLF	
Pin	Signal
1	NC
2	NC
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC



Output Signal Connector ICD15S13E4GV00LF	
Pin	Signal
1	RS485 Data-
2	RS485 Data+
3	NC
4	NC
5	NC
6	RS485 RTN
7	CS RTN
8	NC
9	NC
10	NC
11	CS Data-
12	CS Data+
13	NC
14	NC
15	NC



Mechanical Drawings

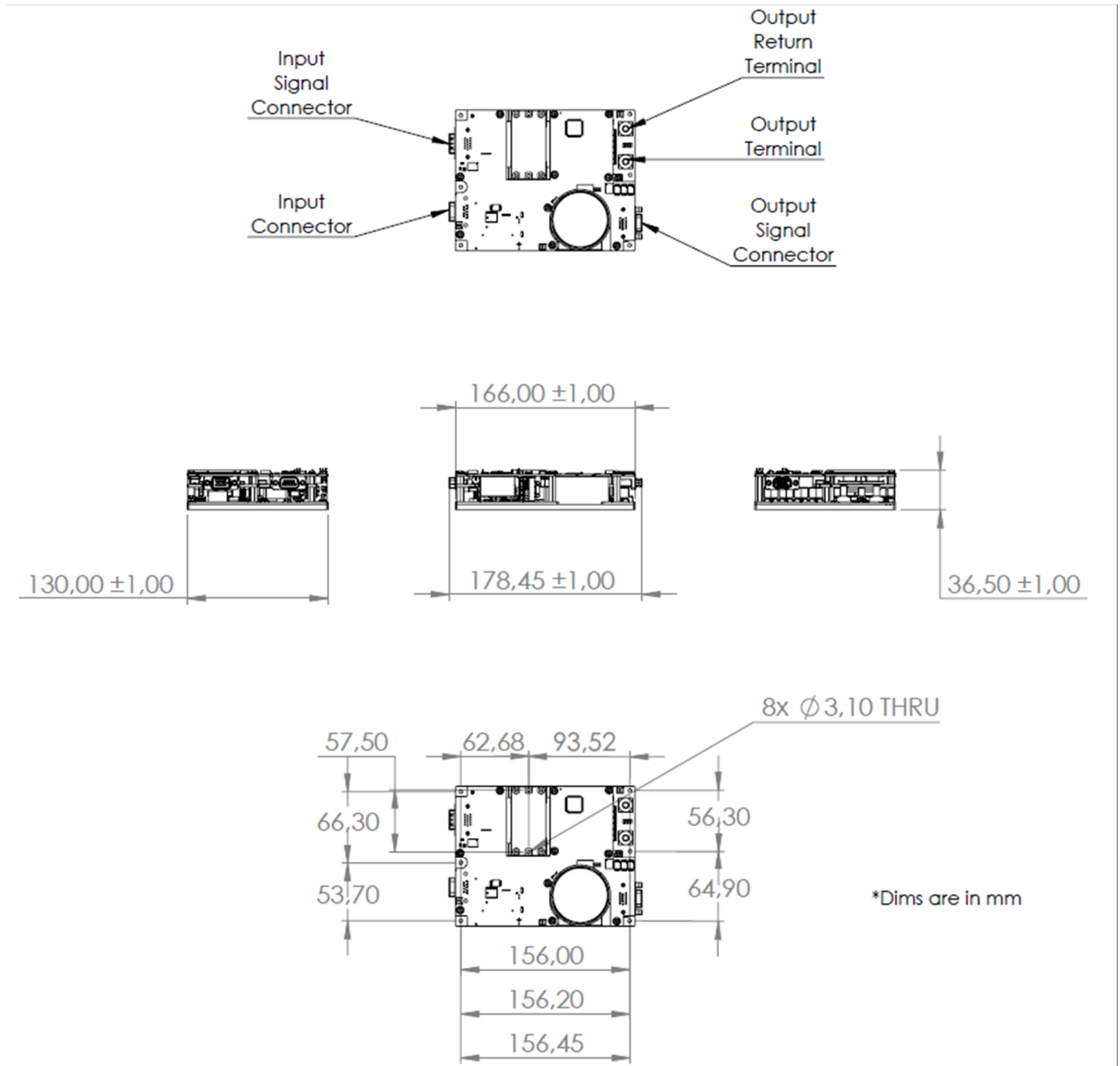


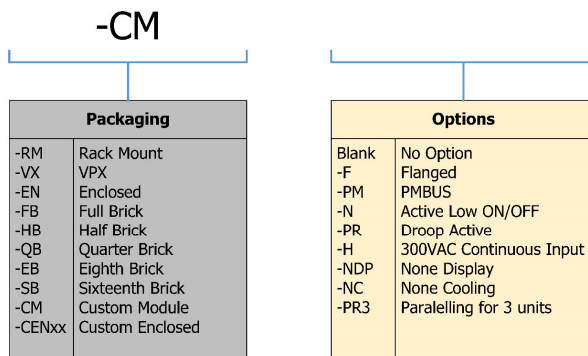
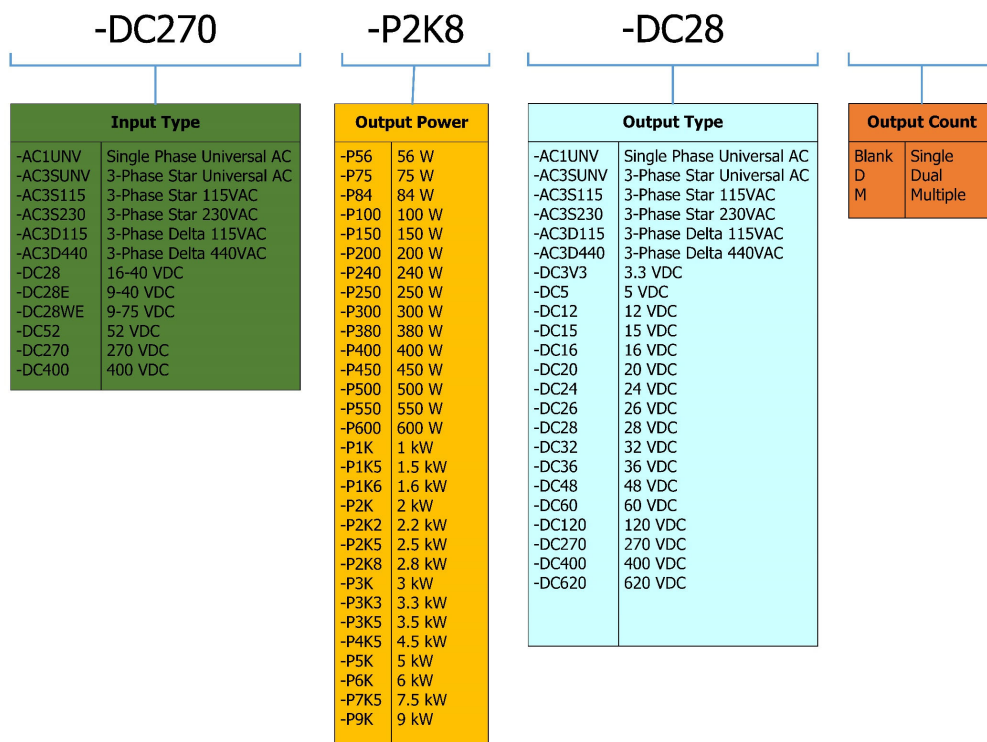
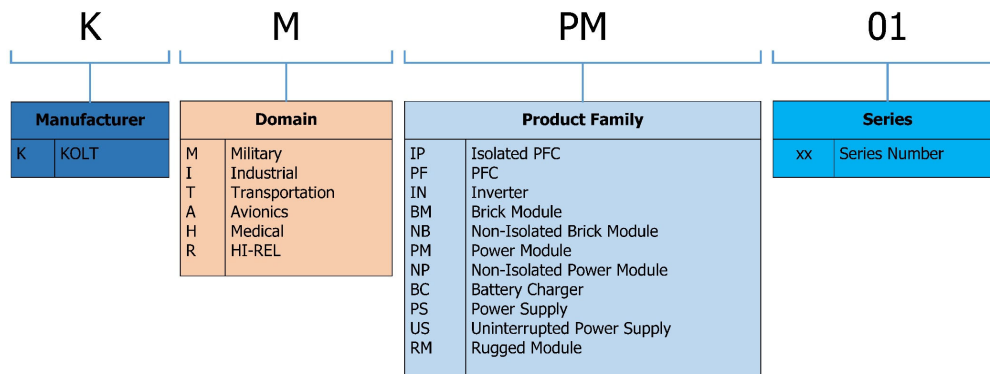
Figure 13. Mechanical Dimensions

Material Finish

Sealed Aluminum Alloy 6061-T6 Case

Part Ordering Information

Manufacturer	Manufacturer Part Number
KOLT	KMPM01-DC270-P2K8-DC28-CM



Not all combinations make valid part numbers, please contact KOLT for availability.

Revision History

Revision	Date	Description	Page Number(s)
A-PC1	25.04.2023	Initial Release	-
A-PC2	27.04.2023	Second Release	-