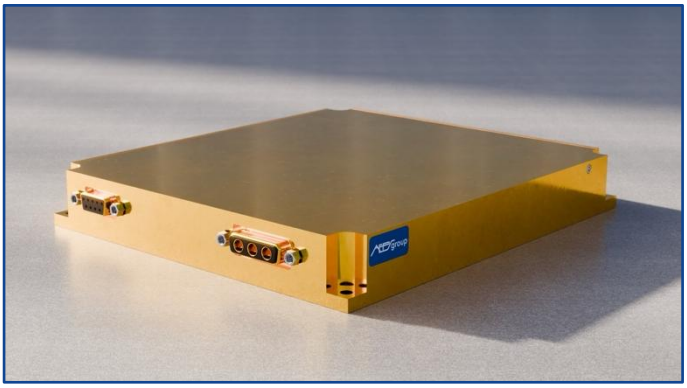
JETDiR-MIL-SUB-525

Features

- **Output power up to 525 W**
- **Operating case temperature -40 ... +95 °C**
- **Case dimensions:**
  180 x 160 x 25 (mm)
- **Input 160-240 VDC (200 VDC nom.)**
- **Aluminum case with Yellow Chromate coating (Alodine), fully enclosed**
- **MIL-STD-461F CE102 built-in**
- **No external components needed for operation**
- **D-SUB MIL-grade type connectors**



Description

JETDiR-MIL-SUB are the series of isolated DC/DC converters meant to work under both heavy electrical and environmental conditions while providing built-in MIL-STD-461 CE102. The units feature a system of over-current protection and over-voltage protection. Its versatility allows you to implement the converter in a vast number of industrial applications, supplying capacitive, constant-power and impulse load. Application fields: low-high altitude, land transport, supercomputers, mining, equipment in high and low temperature regions, digital signage equipment, APAR radars and others - where there are needed low-profile and high efficiency.

one channel, 525 W total					
Part Number	**Input voltage range**	**Power max.**	**Output voltage nom.**	**Output current max.**	**Efficiency typ.**
JETDiR-MIL-SUB-525-200T48	160-240 VDC **nom. 200 VDC**	**525 W**	**48 VDC**	**11.0 A**	**92.5%**

Important parameters

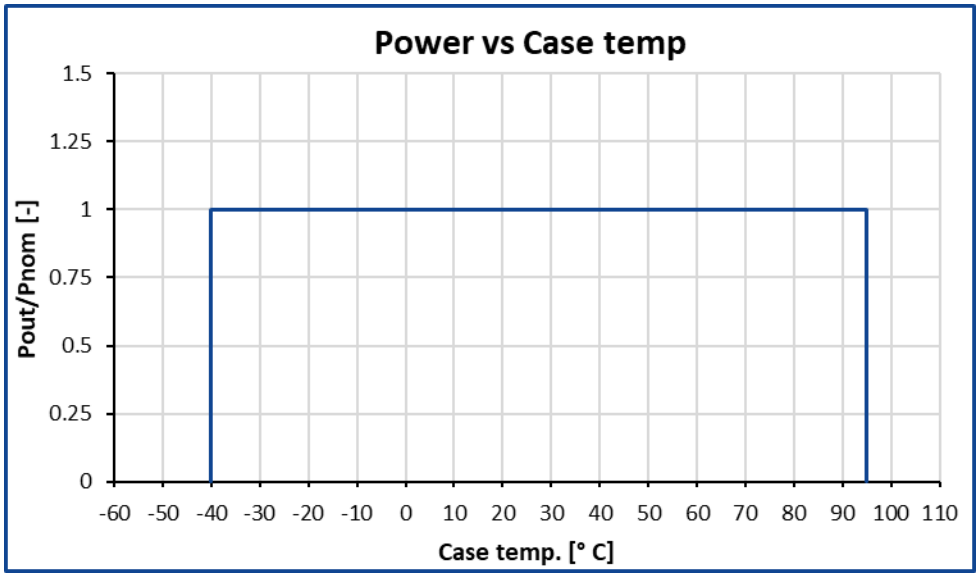
INPUT PARAMETERS	
1.1 Reverse polarity protection	indefinite without damage
1.2 No-load power consumption	3.5 W measured @ 200 VDC
1.3 EMC compliance	MIL-STD-461F CE102 built-in filter
1.4 Connection scheme	operation with no additional components
1.5 Insulation	>1000 VDC in/out, in/case, out/case
1.6 Input voltage monitor	UVLO and OVLO

OUTPUT PARAMETERS	
2.1 Ripple and noise	< 0.3% peak-to-peak (typically 100 mVpp)
2.2 Regulation	< 0.3 % for 10-100 % load
2.3 Efficiency	92.5 % @ 70 % P_{out} at nominal input voltage

OTHER PARAMETERS	
3.1 Case operating temp.	–40 to +95 °C, preferred cooling method via heatsink or coldplate
3.2 Case type	metal case
3.3 Case material and coating	Alu 6061 (or equivalent) with Yellow Chromate coating (Alodine)
3.4 Weight max	850 g
3.5 Dimensions	180 x 160 x 25 (mm)
3.6 Connector type	D-SUB 3 and 9 Pins (MIL-Grade)
3.7 Service functions	ADJ, OGOOD, REM

General characteristics [3]		
Switching frequency		250 kHz typ. (PWM modulation)
Temperature ranges	case operating temperature	–40 °C to +95 °C
	storage temperature	–60 °C to +125 °C
Over-temperature protection		+95 °C typ., auto-recovery
Thermal mode and cooling method	cooling methods, from most preferred (for the unit to be used with a coldplate or heatsink it's necessary to consult with the producer)	1. Conductive - heatsink-coldplate. 2. Forced air heatsink cooler. 3. Convectional heatsink cooling with vertical orientation of itself and vertical orientation of its ribs for free air flow from bottom to top.
Humidity (non-condensing)		5-95 % rel. H
Insulation	in/out	2000 VDC
	in/case	1500 VDC
	out/case	1000 VDC
Isolating resistance @ 500 VDC		>20 MOhm
Thermal shock, mechanical shock & vibration		MIL-STD-810F
Typical MTBF	Pout = 0.7·Pout,max	375 000 hrs (Tcase = 25° C)
Weight (max)		*see "Important parameters"*
Input characteristics [3]		
Input voltage range (with power derating)	"200"	160-240 VDC, 200 VDC nom.
	-	-
	-	-
Start-up input voltage	-	typ. 150 VDC
EMC standard compliance[1]	MIL-STD-461F CE102 built-in	
Output characteristics [3]		
Power derating based on input voltage	-	no derating
Output voltage adjustment	typ. in range -7 % to +5 %. Connect ADJ to +OUTA to trim down, connect ADJ to –OUT to trim up.	
Output voltage regulation	input variance Uin,min to Uin,max	*see "Important parameters"*
	load variance 10 % to 100 %	*see "Important parameters"*
Ripple and noise (peak-to-peak)	20 MHz bandwidth	*see "Important parameters"*
Protection	over-current	*auto-reset at 105-135 % of Iout,nom*
	over-voltage	<130 % Uout
Capacitive load (max)	50% Pout,nom	typ. 10 000 uF
Remote OFF	Unit is shut down by applying 3-5VDC (2-10 mA) to +REM, -REM pins or by connecting AUX to +REM.	
"OGOOD" function	open-collector. LOW resistance if Uout > 0,7*Uout.nom; HIGH if Uout < 0,7*Uout.nom. Umax = 20 V, Imax = 15 mA	

Power-temperature relationship



Additional application information

1. Value of case temperature

The case temperature is measured at the middle of the long side of the case base. When using a thermocouple, it is necessary to fixate the conductors (connected to the thermocouple end) to the base surface at a distance of at least 20 mm. The thermocouple measuring end and its conductors must be covered with a layer of heat-conducting paste 2-3 mm thick to provide correct measurements.

2. Possible cooling methods

Conductive cooling with aluminum (or copper) **heatsink-coldplate,** for example, aluminum plate thicker than 2 mm.

To use the units without a heatsink it's mandatory to consult with the producer.

Most of the unit's dissipated heat (93-95 %) is concentrated on the bottom surface of the unit, its base, which must be attached to the heatsink-coldplate or ribbed heatsink surface. Requirements for the heatsink surface (preferably CNC milled) - flatness tolerance of the heatsink surface must be lower than 0.1 mm per 100 mm of length.

3. Unit heatsink fixation

If 4 mounting holes are available, then first one pair of diagonally located holes is connected with screws, then a second pair. First installation of the screws should be done without force. Then all the screws should be tightened with the recommended torque.

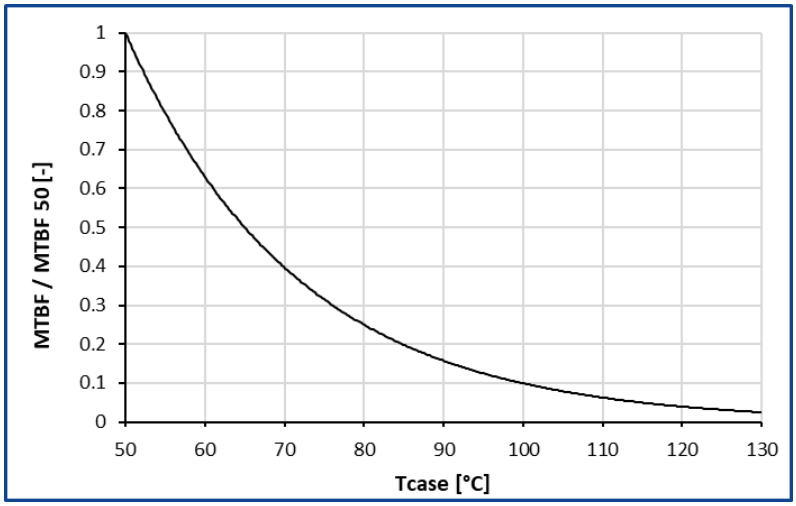
For quality contact between the unit and a heatsink - it's necessary to use thermal conductive paste with thickness less than 0.1 mm, with thermal conductivity **greater than 2 W/K.m**. The paste must be applied with mesh stencil in a pattern of squares (i.e. 2x2 mm to 4x4 mm squares mm with 0.5-1 mm spacing between the squares). This allows paste to be evenly spread in a thin layer and excess air to escape when tightening screws during unit mounting.

4. Short-term unit operation

If it's necessary to shortly turn on the unit for 3-5 minutes (for example for input-control testing), an aluminium (copper) coldplate must be used as a heatsink. Its width and length must be not less than of the unit itself, with thickness at least 8 mm. The unit must be placed on coldplate through a thin (0.15-0.3 mm) silicone-based heat-conducting sheet.

5. MTBF dependance on case temperature

When using the unit, a customer must in one way or another monitor maximal heatsink temperature. Maximal heatsink temperature near the center point of the longer unit's side (considered as unit case temperature) must correspond to the expected unit's MTBF. Approximate MTBF function shown on the graph lower, where MTBF / MTBF 50 is unit's MTBF value at chosen unit's case operating temperature relative to value at 50°C unit's case temperature. Maximal unit's case temperature is recorded by internal unit's thermal sensor-monitor.



6. Thermal protection tripping

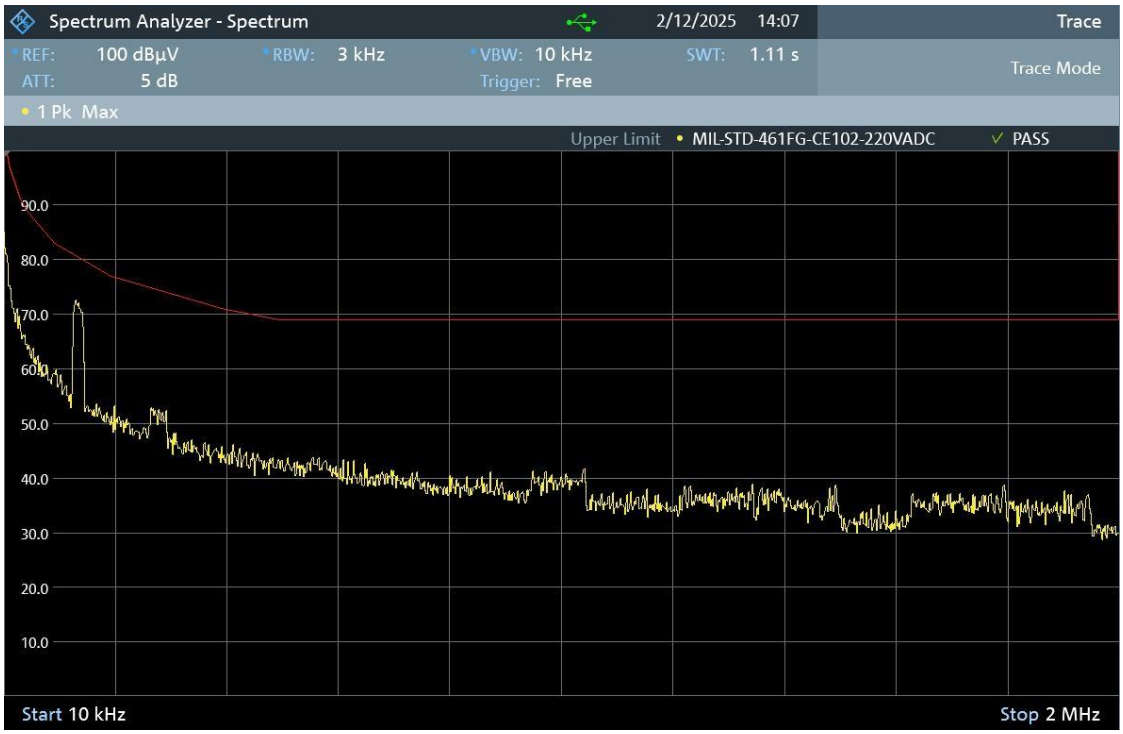
When internal unit's thermal protection is tripped the unit is turned off (until automatic restart). **Such state should lead to measures of forced heatsink cooling, for example via fans turn-on.** Time before automatic restart of the unit after thermal protection tripping can last from several seconds up to several minutes depending on thermal inertia of the heatsink.

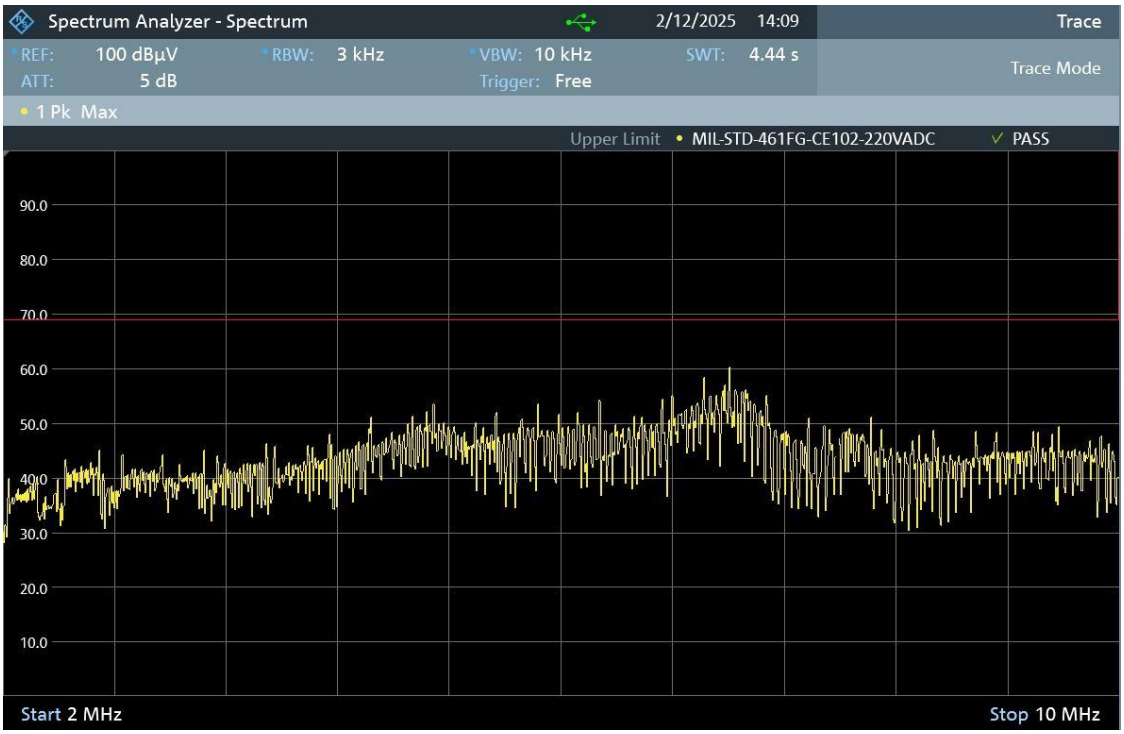
7. Operation with shorted outputs

The units have a short-circuit output protection. **The protection is for emergency only, not for long-term operation. It's prohibited to use the units with shorted outputs (the units have the special detectors inside).**

EMC graphs

EMC CE102 compliance is confirmed based on in-house measurements at a test-bench built as per guidelines of the MIL-STD-461 CE102 standard. EMC graphs for 10 kHz to 2 MHz and 2 MHz to 10 MHz are shown below.





Dimensions

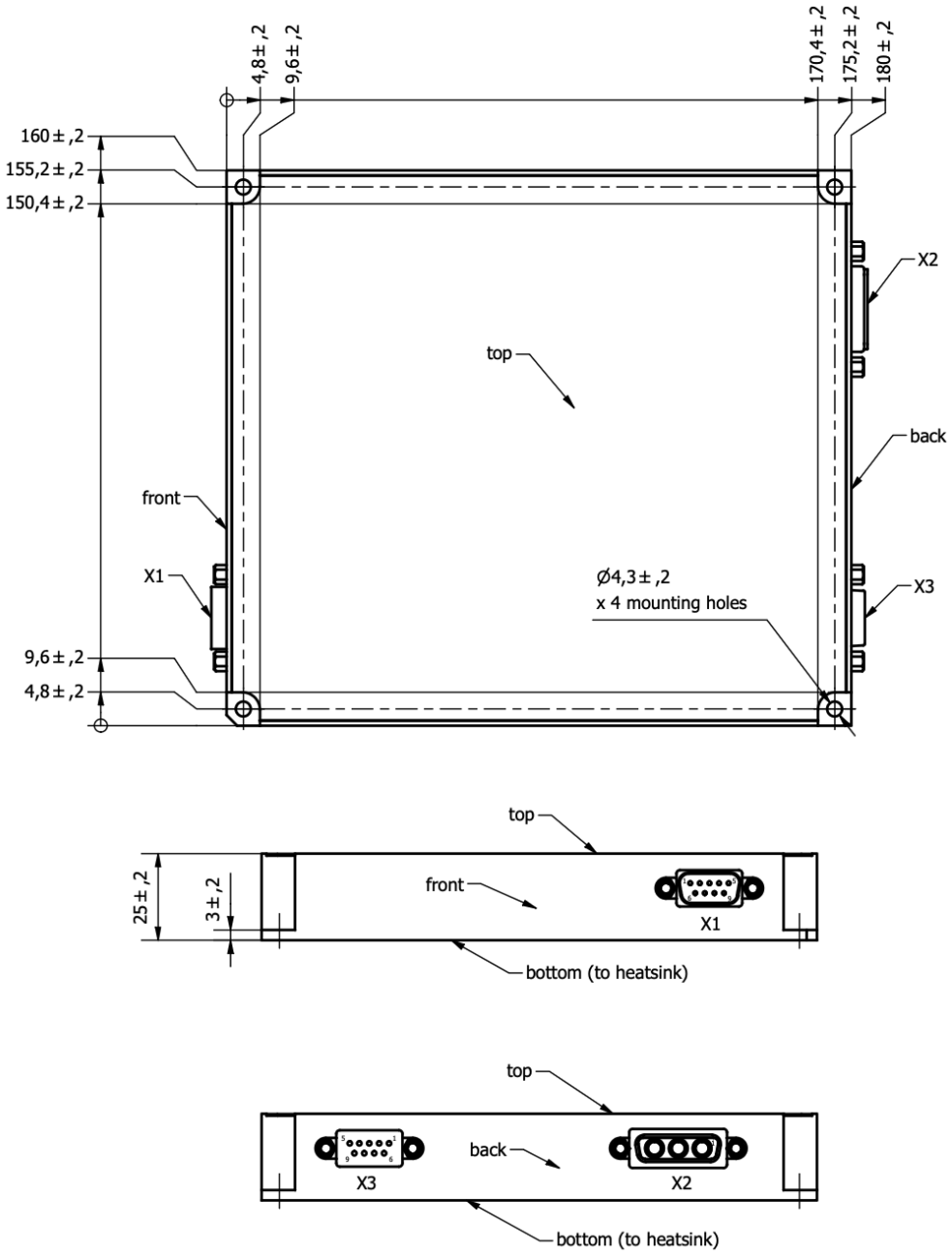
X1					
1, 6	2	3	4	5, 9	7, 8
-IN	*n.c.*	GND	*n.c.*	+IN	n.c.

X2		
1	2	3
GND	+OUT	-OUT

X3								
1	2	3	4	5	6	7	8	9
ADJ	+OUTA	-REM	+REM	+OGOOD	-OUT	*n.c.*	+AUX	-OGOOD

X1	D-Sub Mil Spec Connector ITT Cannon M24308/3-1F, pin (male), 9 position x 2 row
X2	D-Sub Mil Spec Connector AMPHENOL LCC17-A3W3SM-2N0, socket (female), 3 position x 1 row
X3	D-Sub Mil Spec Connector ITT Cannon M24308/1-1F, socket (female), 9 position x 2 row

Dimensions in millimeters, 4 mounting holes, connectors mating parts and accessories are included



Additional information

After ordering the product - the customer is fully responsible for applying the product in strict compliance with mentioned rules and principles of use in the product datasheet and reference technical material (RTM) which is downloadable at www.aeps-group.com.

Please, note that all information in this material is for reference only. Further detailed information (including: additional requirements, manuals and circuit schemes, etc.) is found at www.aeps-group.com or provided via an email request at aeps@aeps-group.cz. All pictures shown are for illustration purpose only, actual product appearance may vary, incl. inner components choice and placement and connectors placement.

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