

DC/DC and AC/DC

planar wide temperature range converters
for land, maritime and aero-space application

CATALOGUE 2023. NEW PRODUCT LINE.

Our motto:

"Always choose the most difficult path – you will not meet competitors there"

Charles de Gaulle



Alexander Goncharov

CEO, founder, general designer

ALEXANDER ELECTRIC s.r.o. was founded in Prague, Czech Republic, in 2006, as a start-up company for design and creation of new power supply systems to compete with American companies like SYNQOR, VPT, INTERPOINT.

Cooperation with European contract manufactures made us into a producer of both serial and custom AC/DC and DC/DC power supply units and converters of both serial and custom products with appropriate lead times.

ALEXANDER ELECTRIC s.r.o. has recently become a member of Czech defense industry association "AOBP" ("DSIA" in English), which defined new constructive-technical properties and abilities for us to reach in our updated products.

This catalog contains the latest information about our developments - tested (within samples) prototypes and custom products of non-series production.

In 2023 **ALEXANDER ELECTRIC s.r.o.** has specialized in design and production of planar AC/DC and DC/DC fan-less power units aimed at application in mission-critical equipment owing to unique characteristics of operation while under effect of extreme environmental factors like ultralow and ultrahigh temperatures, pollution, salt mist, strong vibrations and impacts.

Our core competencies are in the development and production of power supply units and systems for application in:

1. Flying objects - artillery shells, rockets, planes, helicopters, drones.
2. Different types of radar (including APAR and long-distance radars).
3. Armored vehicles - transporters, tanks, launchers, etc.
4. Communication and radio-electronics equipment, including optical fiber equipment.
5. Repairs and modernization of power supply systems for obsolete specialized equipment.

Features and properties of our products:

- Operating case temperature **from -60°C to +125°C** makes possible functioning in compartments with loss of sealing on land, in mountains and deserts, at low and high altitudes, up to near space.
- **Low profile** power supply construction allows minimization of space occupied by the power supply in the whole device, thereby saving up space for most important part of the device. Our units reach power density of more than **200 W/in³** for DC/DC units and more than **40 W/in³** for AC/DC units.
- The units and power blocks offer **adaptation ("flexibility") of its geometric dimensions**, including changing the location of mounting points which is essential when replacing or modernizing a product of other manufacturers.
- Our products are designed to be **cooled conductively** and therefore don't contain any fans which (having moving parts) are an element of unreliability. The ability to use conduction cooling is crucial **in airtight spaces** where air extraction not possible.
- Resistance to mechanical shocks and heavy vibrations due to special potting makes possible application in **artillery shots with overload of up to 10 000 G and more.**

Our outlook into the future is optimistic. We're in search for partners and investors for further development of our company.

Best regards, **Alexander Goncharov CEO.**

Parameters	DC/DC JETDiR-SP	DC/DC JETDiV	DC/DC JETDiR	DC/DC JETDi	AC/DC JETA-LP	AC3PH/DC JETNA-LP
Input type (AC also accepts DC)	DC	DC	DC	DC	AC 1 ph.	AC 3 ph.
Maximum power, W	300	600	1 500*	180*	3 400*	7 000*
Maximum power density, W/in3	57	82	205	124	28	47
Number of channels possible	1, 2, 3	1, 2	1, 2	1, 2	1, 2	1
DC "28W" 16-50 VDC, surge 80 VDC	•		•	•		
DC "28" 16-40 VDC, surge 50 VDC	•		•	•		
DC "48" 34-75 VDC, surge 100 VDC	•		•	•		
DC "48W" 9-80 VDC, surge 100 VDC			•	•		
DC HV "150" 82-200 VDC, surge 230 VDC		•				
DC HV "270" 155-400 VDC, surge 450 VDC		•				
AC 1ph. "115" 80-138 VAC, surge 150 VAC		•			•	
AC 1ph. "230" 187-264 VAC, 263-372 VDC		•				
AC 1ph. "230W" 100-264 VAC, 140-372 VDC					•	
AC 3ph. "220" 187-253 VAC, 263-372 VDC		•				•
AC 3ph. "400" 323-440 VAC, 390-620 VDC		•				•
I out max 15 A		•				
I out max 24 A				•		
I out max 30 A	•					
I out max 50 A			•			
I out max 100 A					•	
I out max 270 A						•
Tcase -50 ... +100°C					•	•
Tcase -60 ... +100°C						
Tcase -60 ... +110°C		•				
Tcase -60 ... +125°C	•		•	•		
Mounting holes	•	•	•		•	•
ON/OFF	•	•	•	•	•	•
Active parallel operation	•	•	•		•	•
Remote sense	•	•	•		•	•
Constant current mode for charging large capacities					•	•

* - Maximum power is given including new modules under development.

NEW! JETDiR-SP series, 5 - 300 W, DC/DC converters for aero-space applications. BRICK formfactors. Reinforced metal case. Counter-bore mounting holes. Up to two output channels. Operating case temperature range -60 ... +125°C. No optocouplers inside, built-in filters, CE MIL-STD-461



- Brick form factors with double-sided counter-bore mounting holes.
- Built-in input and output EMC filters (MIL-STD-461), no opto-couplers circuit solutions.
- Input mains: **28W, 28** and **48**.
- Ultra-wide case operating temperature range -60 ... +125°C.
- Outputs with galvanically isolated channels, which allows them to be connected in series to obtain high-voltage output.

Application: DC/DC **aerospace JETDiR-SP** series is designed to operate in both (a) protected sealed and (b) unprotected compartments of various equipment sensitive to impulse EM interference including:

- analogue signal processing equipment,
- radio-receiving and radio-transmitting equipment,
- radars and digital informational equipment,
- equipment powering gyroscopes.

Beyond standard long-term application **JETDiR-SP** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- short-term over-maximum-power operation.

The purpose of developing this product was to eliminate the use of external interference filters in favor of placing this function in the internal volume of the module.

Electric features: the units operate with three variants of input mains: **28W** (16-50 VDC, 80 VDC tran.), **28** (16-40 VDC, 50 VDC tran.) and **48** (34-75 VDC, 100 VDC tran.). The power supplies have the standard range of service functions, including parallel operation in high-power models. Efficiency of up to 93 % due synchronous rectification in most models makes possible operation with up to +125°C of case temperature.

Design features: **JETDiR-SP** as a series with complete built-in filtering presents unprecedentedly high-power density up to **57 W/in³**. Reinforced aluminum unit's cases contain double-side counter-bore mounting holes which provide space for screw heads. Case base has stiffening ribs and serves for conductive cooling. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is unique.**

These modules are a new development. They are manufactured as prototypes of serial products as well as custom ones!

The converters are meant to be mounted on a coldplate or heatsink for one sided conductive or forced-air cooling. In certain cases purely convective cooling method is allowed.

The table below shows basic parameters of this series.

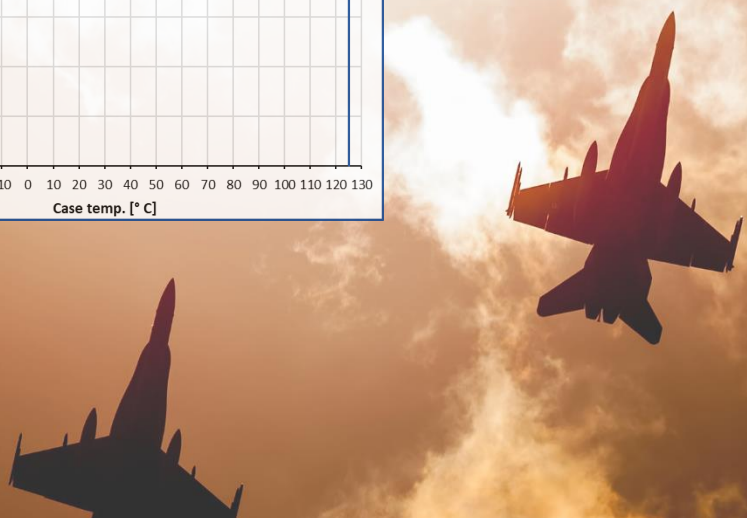
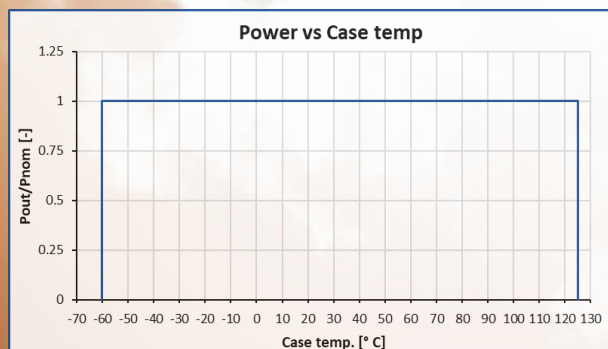
Type of the unit	Maximum power when ordering, W	Dimensions, mm without flanges	Maximum output current, A	Power density, W/in3	Number of outputs	Input 28W (16-50 V), surge 80 V	Input 28 (16-40 V), surge 50 V	Input 48 (34-76 V), surge 100 V	Isolation input-output, kV	Trimming	Parallel operation	EMC standards	
												Additional EMC filter	MIL-STD-461 CE
JETDiR-SP-10	10	R1: 32x21x10 DIP 24	2	25	1	•	•	•	=1.5	•		JETDF2.5	•
JETDiR-SP-15	15	R2: 26x26x10 1x1"	3	35	1	•	•	•	=1.5	•		JETDF2.5	•
JETDiR-SP-20	20	R2B: 37x26x10 1/16 BRICK	4	31	1	•	•	•	=1.5	•		JETDF2.5	•
JETDiR-SP-50	50	R3: 51x26x11 1/8 BRICK	10	57	1	•	•	•	=1.5	•		JETDF5	•
JETDiR-SP-80	80	R4: 58x37x11 1/4 BRICK	16	56	1	•	•	•	=1.5	•		JETDF5	•
JETDiR-SP-150	150	R5: 61x59x12 1/2 BRICK	20	53	1	•	•	•	=1.5	•	•	JETDF10	•
JETDiR-SP-300	300	R6: 117x61x13 FULL BRICK	30	53	1	•	•	•	=1.5	•	•	JETDF20	•

Notes: • - available, the standard version of the input voltage is highlighted in blue.

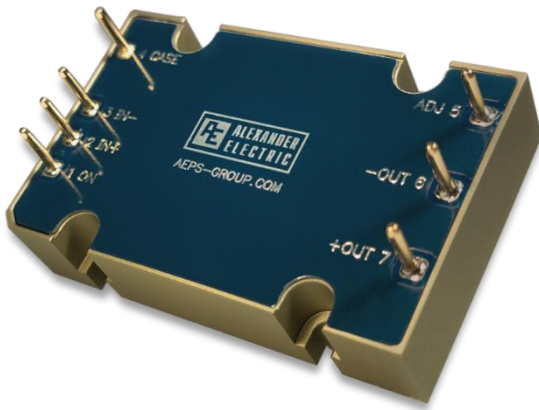
A graph of the relationship between power and ambient temperature is shown on the page [22](#).

Possible cooling methods

These power supplies can operate with conductive heat removal or with forced as an example, see the temperature diagram of **JETDiR-SP-80** (90% efficiency) unit without an additional heat sink with case temperature controlled and maintained under +125°C -air cooling., as well as output power dependence from ambient temperature with no heat sink. As the ambient temperature rises, the output power needs to be reduced.



NEW! JETDiV series, 50 - 600 W, high input voltage DC/DC planar converters with output voltage up to 400 VDC. Open-slot mounting holes. Up to two output channels. Wide operating case temperature range -60 ... +110°C.



- Brick form-factors with open-slot mounting holes.
- High voltage input mains: **150, 270, 115, 230, 220** and **400**.
- Output voltage variants from 5 VDC to 400 VDC.
- Wide case operating temperature range -60°C ... +110°C.
- Outputs with galvanically isolated channels, which allows them to be connected in series to obtain high-voltage output.

Application: DC/DC power supply units of **JETDiV** series are meant for a wide range of application where high input voltage is obtained by rectification and filtration of 3-phase mains or is provided by high voltage lithium battery (and similar). Fit to be used in:

- flying and stationary objects at low, medium, and high altitudes (including long wired power supply lines),
- aircraft and missiles with strong vibrations and mechanical shocks,
- maritime equipment and transport,
- gyroscopes and capacitive energy storage,
- telecommunication facilities and radars.

Beyond standard long-term application **JETDiV** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- short-term over-maximum-power operation.

Electric features: the units operate with three variants of input mains: **150** (82-200 VDC, 230 VDC tran.), **270** (155-400 VDC, 450 VDC tran.), **115** (80-138 VAC, 113-195 VDC), **230** (187-264 VAC, 263-372 VDC), **220** (187-264 VAC, 263-372 VDC, 3ph.), **400** (323-440 VAC, 390-620 VDC, 3ph.). The power supplies have the standard range of service functions, including parallel operation in high-power models. Efficiency of up to 90 % makes possible operation with up to +110°C of case temperature.

Design features: **JETDiV** series presents small dimensions and high-power density up to **82 W/in³**. Reinforced aluminum unit's cases contain open-slot mounting holes allowing certain freedom in choosing of mounting coordinates. Case base has stiffening ribs and serves for conductive cooling. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is unique.**

These modules are a new development. They are manufactured as prototypes of serial products as well as custom ones!

The converters are meant to be mounted on a coldplate or heatsink for one sided conductive or forced-air cooling. In certain cases purely convective cooling method is allowed.

The table below shows basic parameters of this series.

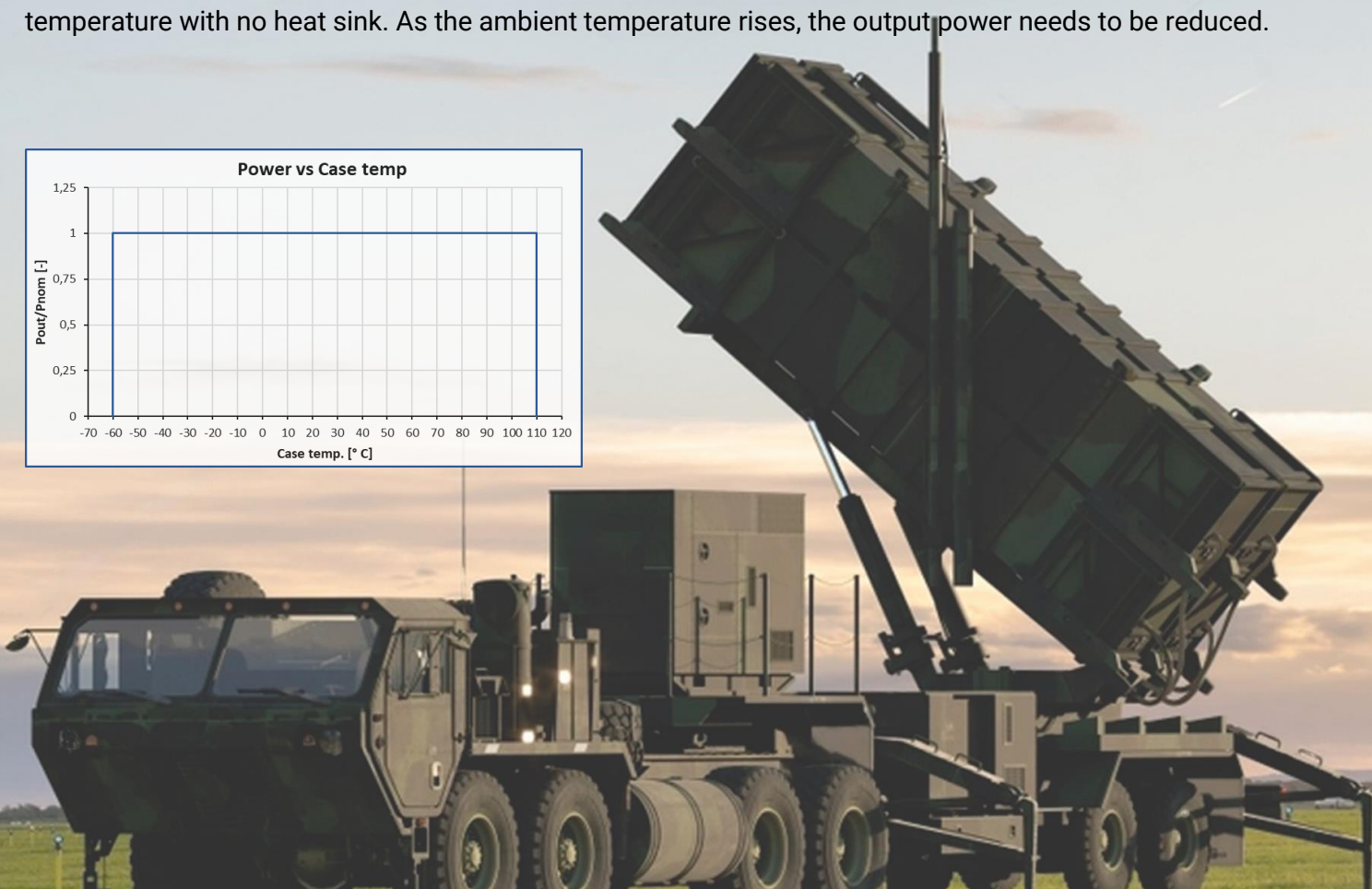
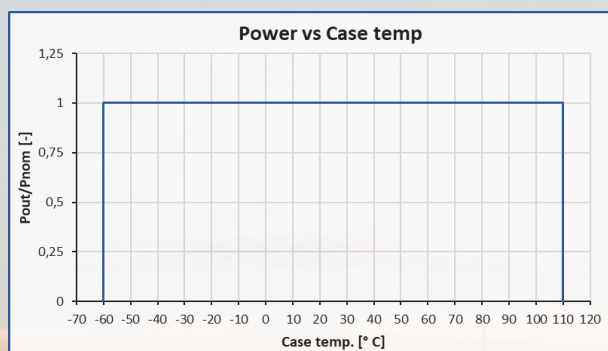
Type of the unit	Maximum power when ordering, W	Dimensions, mm without flanges	Maximum output current, A	Power density, W/in3	Number of outputs	Input 150 (82-200 VDC), surge 230 V	Input 115 (80-138 VAC, 113-195 VDC), surge 150 V	Input 270 (155-400 VDC), surge 450 V	Input 230 (187-264 VAC, 263-372 VDC)	Input 3ph. 220 (187-264 VAC, 263-372 VDC)	Input 3ph. 440 (323-440 VAC, 390-620 VDC)	Isolation input-output, kV	Trimming	Parallel operation	MIL-STD-461 CE
JETDiV75	75	V1: 58x37x11 1/4 BRICK	15	53	1	•	•	•	•	•	•	=1.5	•	•	•
JETDiV150	150	V2: 58x56x13 1/2 BRICK	15	59	1	•	•	•	•	•	•	=1.5	•	•	•
JETDiV300	300	V3: 117x56x13 FULL BRICK	15	58	1	•	•	•	•	•	•	=1.5	•	•	•
JETDiV600	600	V4: 119x63x16 FULL BRICK+	15	82	1	•	•	•	•	•	•	=1.5	•	•	•

Notes: • - available, the standard version of the input voltage is highlighted in blue.

A graph of the relationship between power and ambient temperature is shown on the page [22](#).

Possible cooling methods

These power supplies can operate with conductive heat removal or with forced-air cooling. As an example, see the temperature diagram of **JETDiV75** (91% efficiency) unit without an additional heat sink with case temperature controlled and maintained under +110°C, as well as output power dependence from ambient temperature with no heat sink. As the ambient temperature rises, the output power needs to be reduced.



UPGRADED! JETDiR universal series, 15 - 1500 W, planar DC/DC units for aerial, land and maritime applications. Aluminum case of BRICK format. Minimized dimensions and weight. Operating case temperature range -60 ... +125°C



- Brick form factors with double-sided count-bore mounting holes.
- Flexible cases - customization of case dimensions is available (dimensions can be increased only).
- A wide selection of input mains: **28, 28W, 48, 48W**.
- Ultra-wide case operating temperature range -60 ... +125°C.

Application: DC/DC power supply units of **JETDiR** series are meant for universal application with different low voltage DC input ranges. In both (a) protected sealed and (b) unprotected compartments of:

- flying and stationary objects at low, medium and high altitudes,
- ground transport, i.e. railway, automobile, and tracked types of vehicles,
- maritime equipment,
- telecommunication facilities, radars, supercomputers,
- digital signage equipment, flat displays and other informational devices.

Beyond standard long-term application **JETDiR** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- operation in case of contamination by sand, in salt fog, in high humidity,
- short-term over-maximum-power operation.

Electric features: the units operate with three variants of input mains: **28W** (16-50 VDC, 80 VDC tran.), **28** (16-40 VDC, 50 VDC tran.), **48** (34-75 VDC, 100 VDC tran.), **48W** (9-80 VDC, 100 VDC tran.). The power converters offer the standard range of service functions, including parallel operation in high-power models. Efficiency of up to 93 % due synchronous rectification in most models makes possible operation with up to +125°C of case temperature.

Design features: **JETDiR** series presents small dimensions and high-power density up to **205 W/in³**. Reinforced aluminum unit's cases contain double-side counter-bore mounting holes which provide space for screw heads. Case base has stiffening ribs and serves for conductive cooling. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is unique.**

The converters are meant to be mounted on a coldplate or heatsink for one sided conductive or forced-air cooling. In certain cases purely convective cooling method is allowed.

JETDiR series units may be modified to offer different dimensions (increased), mounting holes placement, additional constructive components (like cooling ribs).

The table below shows basic parameters of this series.

Type of the unit	Maximum power when ordering, W	Dimensions, mm without flanges	Maximum output current, A	Power density, W/in ³	Input 28W (16-50 V), surge 80 V	Input 28 (16-40 V), surge 50 V	Input 48 (34-75 V), surge 100 V	Input 48W (9-80 V), surge 100 V	Isolation input-output, kV	Trimming	Parallel operation	EMC standards	
												Additional EMC filter	MIL-STD-461 CE
JETDiR20	20	R1: 32x21x10, DIP 24	4	49	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR25	25	R1: 32x21x10, DIP 24	4	61	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR30	30	R2: 26x26x10, 1x1"	6	73	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR40	40	R2: 26x26x10, 1x1"	6	97	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR40	40	R2B: 37x26x11, 1/16 BRICK	10	62	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR50	50	R2B: 37x26x11, 1/16 BRICK	10	78	•	•	•	•	1.5	•	•	JETDF2.5	•
JETDiR100	100	R3: 51x26x11, 1/8 BRICK	14	113	•	•	•	•	1.5	•	•	JETDF5	•
JETDiR120	120	R3: 51x26x11, 1/8 BRICK	14	135	•	•	•	•	1.5	•	•	JETDF5	•
JETDiR150	150	R4: 58x37x11, 1/4 BRICK	24	105	•	•	•	•	1.5	•	•	JETDF10	•
JETDiR180	180	R4: 58x37x11, 1/4 BRICK	24	125	•	•	•	•	1.5	•	•	JETDF10	•
JETDiR300	300	R5: 61x59x12, 1/2 BRICK	40	114	•	•	•	•	1.5	•	•	JETDF20	•
JETDiR700	700	R6: 117x61x13, FULL BRICK	50	124	•	•	•	•	1.5	•	•	external	•
JETDiR1500	1500	R6E: 119x63x16, FULL BRICK+	60	205	•	•	•	•	1.5	•	•	external	•

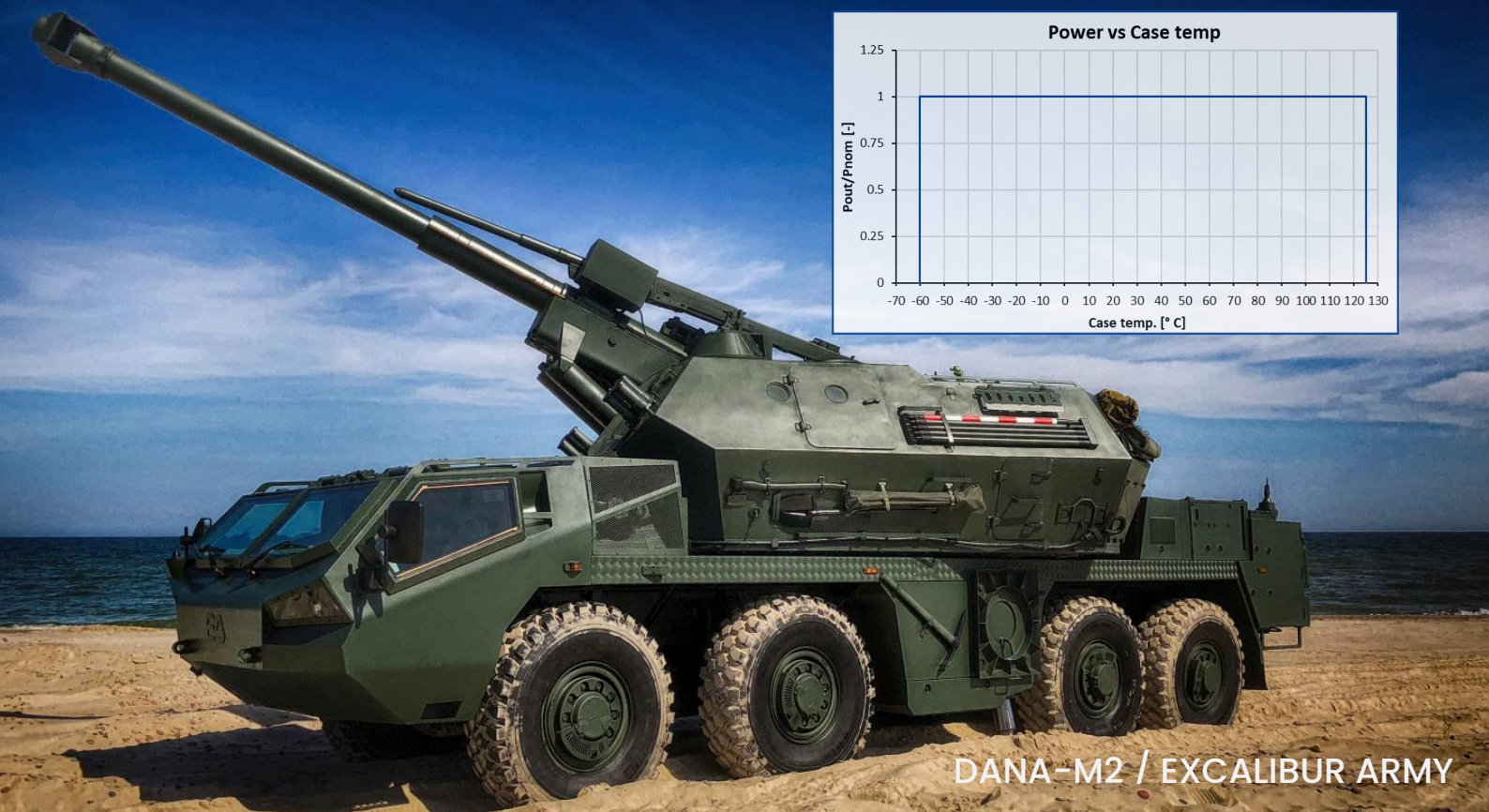
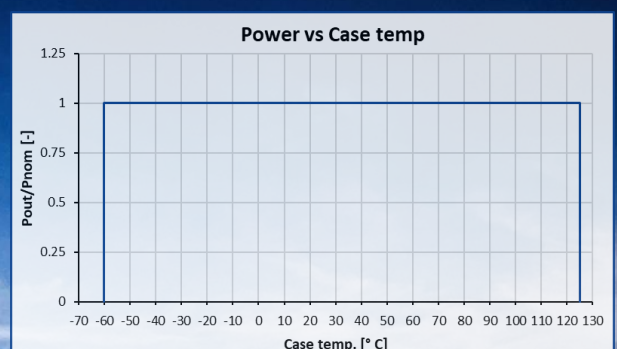
Notes: • - available, the standard version of the input voltage is highlighted in blue.

■ - new development. Manufacturing as prototypes as well as custom ones.

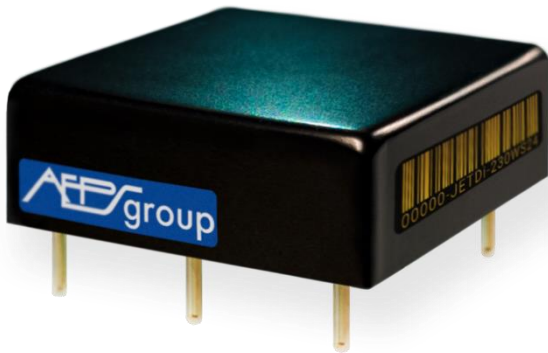
A graph of the relationship between power and ambient temperature is shown on the page [22](#).

Possible cooling methods

These power supplies can operate with conductive heat removal or with forced-air cooling. As an example, see the temperature diagram of JETDiR40 unit without an additional heat sink with case temperature controlled and maintained under +125°C, as well as output power dependence from ambient temperature with no heat sink. As the ambient temperature rises, the output power needs to be reduced.



UPGRADED! JETDi series, 10 - 180 W, DC/DC converters with no mounting holes for simple installation. Copper thin-walled cases, minimized weight and dimensions. Operating case temperature range - 60 ... +125°C



- Thin-walled copper cases with excellent heat conduction, pin-to-pin compatible with most popular models of other manufacturers that can be replaced by JETDi with improvement of basic specifications (like power output).
- Ultra-wide case operating temperature range -60 ... +125°C.
- A wide selection of input mains: **28W**, **28**, **48** and **48W**.
- Feasibility of two-channel output with galvanically isolated channels, which allows them to be connected in parallel or in series to obtain high-voltage output.
- Lightweight construction doesn't require additional mounting.

Application: DC/DC power supply units of **JETDi** series are designed to operate in various conditions. However due to simplified casing without any mounting holes the units should only be used with medium-strength vibrations and mechanical shocks, in equipment of:

- flying and stationary objects at low and medium altitudes,
- ground transport, i.e. railway, automobile, and tracked types of vehicles,
- maritime equipment,
- telecommunication facilities, radars, supercomputers,
- digital signage equipment, flat displays and other informational devices.

Beyond standard long-term application **JETDi** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- operation in case of contamination by sand, in salt fog, in high humidity.

Electric features: the units operate with three variants of input mains: **28W** (16-50 VDC, 80 VDC tran.), **28** (16-40 VDC, 50 VDC tran.), **48** (34-75 VDC, 100 VDC tran.), **48W** (9-80 VDC, 100 VDC tran.). The power supplies have the standard range of service functions, including parallel operation in high-power models. Efficiency of up to 93 % due synchronous rectification in most models makes possible operation with up to +125°C of case temperature.

Design features: **JETDi** series presents small dimensions and high-power density up to **125 W/in³**. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is high**.

The converters are meant to be attached to a coldplate or heatsink via thermal adhesive for one sided conductive or forced-air cooling. In certain cases purely convective cooling method is allowed.

The table below shows basic parameters of this series.

Type of the unit	Maximum power when ordering, W	Dimensions, mm without flanges	Maximum output current, A	Power density, W/in ³	Number of outputs	Input 28W (16-50 V), surge 80 V	Input 48 (34-76 V), surge 100 V	Input 48W (9-80 V), surge 100 V	Isolation input-output, kV	Trimming	EMC standards	
											Additional EMC filter	MIL-STD-461 CE
JETDi20	20	C1: 32x21x10 DIP 24	4	49	1, 2	•	•	•	1.5	•	JETDF2.5	•
JETDi25	25	C1: 32x21x10 DIP 24	4	61	1, 2	•	•		1.5	•	JETDF2.5	•
JETDi30	30	C2: 26x26x10 1x1"	6	73	1, 2	•	•	•	1.5	•	JETDF2.5	•
JETDi40	40	C2: 26x26x10 1x1"	6	97	1, 2	•	•		1.5	•	JETDF2.5	•
JETDi50	50	C2B: 37x26x11, 1/16 BRICK	10	78	1, 2	•	•	•	1.5	•	JETDF2.5	
JETDi100	100	C3: 51x26x10 1/8 BRICK	15	124	1, 2	•	•	•	1.5	•	JETDF5	•
JETDi120	120	C3: 51x26x10 1/8 BRICK	15	149	1, 2	•	•		1.5	•	JETDF5	•
JETDi150	150	C4: 58x37x11 1/4 BRICK	24	105	1	•	•	•	1.5	•	JETDF10	•
JETDi180	180	C4: 58x37x11 1/4 BRICK	24	125	1	•	•		1.5	•	JETDF10	•

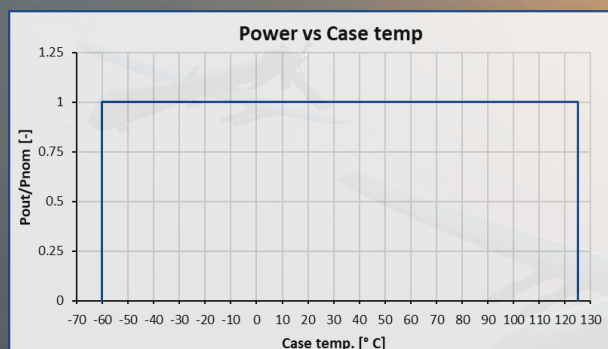
Notes: • - available, the standard version of the input voltage is highlighted in blue.

■ - new development. Manufacturing as prototypes as well as custom ones.

A graph of the relationship between power and ambient temperature is shown on the page [23](#).

Possible cooling methods

These power supplies can operate with conductive heat removal or with forced-air cooling. As an example, see the temperature diagram of **JETDi100** unit without an additional heat sink with case temperature controlled and maintained under +125°C, as well as output power dependence from ambient temperature with no heat sink. As the ambient temperature rises, the output power needs to be reduced.



UPGRADED! JETA-LP series, 50 - 3400 W, 1 ph. AC/DC fan-less units. High precision CNC-milled aluminum cases. Top output power in low-profile. Operating case temperature range -50 ... +100°C



- CNC milled casings, mounting footprint replacing units of previous generations.
- Powered by 1-phase AC input or DC equivalent, up to 400 Hz on request.
- The max heights of the units of this series are from 19 mm (100 W) to 39 mm (3400 W).
- Ultra-wide case operating temperature range -50 ... +100°C.
- Dual-zone unit temperature sensor.
- Output up to 400 VDC on request.

Application: AC/DC 1 phase power supply units of **JETA-LP** series are designed to operate in both (a) protected sealed and (b) unprotected compartments of:

- flying and stationary objects at low and medium altitudes,
- ground transport, i.e. railway, automobile, and tracked types of vehicles,
- maritime equipment,
- telecommunication facilities, radars, supercomputers,
- digital signage equipment, flat displays and other informational devices.

Beyond standard long-term application **JETA-LP** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- operation in case of contamination by sand, in salt fog, in high humidity.

Electric features: the **JETA-LP** units operate with two variants of input mains: **115** (80-138 VAC, surge 150 VAC) and **230W** (100-264 VAC, 140-372 VDC). The power supplies have the standard range of service functions, including parallel operation in high-power models. The series offers up to 95 % efficiency and +100°C of case operating temperature. Units of 300 W and higher contain active PFC.

Design features: **JETA-LP** series doesn't contain any fans, presents small dimensions, low profile and high-power density up to **33 W/in³**. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is high.**

The power supply units are meant to be attached to a coldplate or heatsink via thermal adhesive for one sided conductive or forced-air cooling. Power supplies of 300 W and higher are equipped with a dual-zone temperature sensor with one control zone in the lower area next to the baseplate, and the second control area in the upper part of the unit under the cover. This ensures high reliability and makes it possible to solve the problems of so-called thermal pockets in the unit's operating area, for example, under its casing.

The table below shows basic parameters of this series.

Type of the unit	Maximum power when ordering, W	Dimensions, mm	Maximum output current, A	Power density, W/in ³	Number of outputs	Input 115 (80-138 VAC), surge 150 VAC	Input 230W (100-264 VAC, 140-372 VDC), no surge	Isolation input-output, kVAC	Parallel operation	Trimming	Parallel operation	EMC Standards		
												EN55022 Class B	EN55022 Class A	MIL-STD-461 CE
JETA100-LP	100	A1: 100x51x19	16	17	1, 2	×	•	3				•		•
JETA125-LP	125	A1: 100x51x19	16	21	1, 2	×	•	3				•		•
JETA150-LP	150	A2: 110x61x21	24	18	1, 2	×	•	3				•		•
JETA200-LP	200	A2: 110x61x21	24	23	1, 2	×	•	3				•		•
JETA300-LP	300	A3: 133x83x25	30	18	1, 2	×	•	3		•		JETAF5	•	•
JETA400-LP	400	A3: 133x83x25	30	24	1, 2	×	•	3		•		JETAF5	•	•
JETA700-LP	700	A4: 174x92x29	50	25	1	×	•	3	•	•	•	JETAF10	•	•
JETA900-LP	900	A4: 174x92x29	50	32	1	×	•	3	•	•	•	JETAF10	•	•
JETA1500-LP	1500	A5: 210x116x37	60	28	1	×	•	3	•	•	•	JETAF10	•	•
JETA1800-LP	1800	A5: 210x116x37	60	33	1	×	•	3	•	•	•	JETAF10	•	•
JETA2000-LP	2000	A6: 250x141x38	80	25	1	×	•	3	•	•	•	JETAF20	•	•
JETA2400-LP	2400	A6: 250x141x38	80	29	1	×	•	3	•	•	•	JETAF20	•	•
JETA3000-LP	3000	A7: 300x170x39	100	25	1	×	•	3	•	•	•	JETAF20	•	•
JETA3400-LP	3400	A7: 300x170x39	100	28	1	×	•	3	•	•	•	JETAF20	•	•

Notes: • - available, × - on request, the standard version of the input voltage is highlighted in blue.

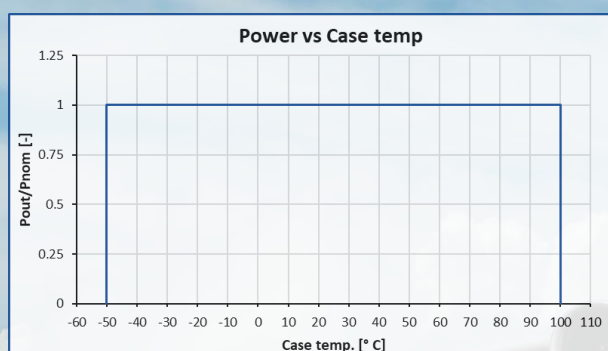
■ - new development. Manufacturing as prototypes as well as custom ones.

A graph of the relationship between power and ambient temperature is shown on the page [23](#).

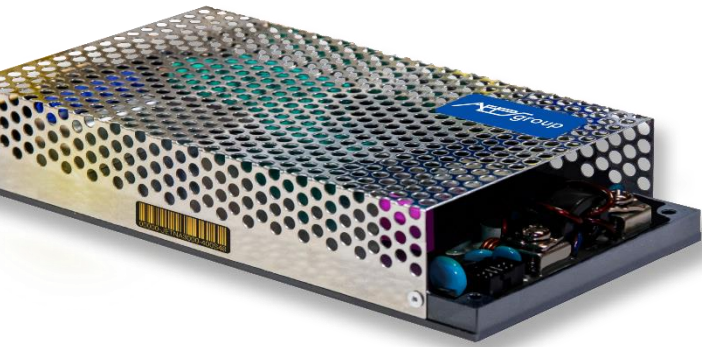
Possible cooling methods

JETA100-LP, JETA150-LP and JETA300-LP units can be used without an additional heat sink in accordance with the diagram below (**JETA150-LP**); for example, they can be located on a metal wall of an equipment cabinet (use of heat-conducting paste is needed). As the ambient temperature rises, the output power needs to be reduced.

JETA700-LP - JETA3000-LP power supply units of higher power are designed only for use either with conductive cooling using aluminum or copper heatsink for forced air cooling or with a natural convection heatsink with vertical fins for easy passage of air between the fins from bottom up.



UPGRADED! JETNA-LP series, 1000 - 7000 W, 3 ph. AC/DC fan-less units. High precision CNC-milled aluminum cases. Top output power in low-profile. Operating case temperature range -60 ... +100°C



- Aluminum or copper CNC milled casings, mounting footprint replacing units of previous generations.
- Powered by 3-phase AC input 50 Hz up to 400 Hz on request without neutral or DC equivalent.
- The max heights of the units of this series are from 29 mm (1000 W) to 40 mm (7000 W).
- Ultra-wide case operating temperature range -60°C ... +100°C.
- Dual-zone unit temperature sensor.
- Output up to 400 VDC on request.

Application: AC/DC 3 phase power supply units of **JETNA-LP** series are designed to operate in both (a) protected sealed and (b) unprotected compartments of:

- flying and stationary objects at low and medium altitudes,
- ground transport, i.e. railway, automobile, and tracked types of vehicles,
- maritime equipment,
- telecommunication facilities, radars, supercomputers,
- digital signage equipment, flat displays and other informational devices.

Beyond standard long-term application **JETNA-LP** series units are also designed for **mission-critical** applications:

- operation in case of equipment compartment breach and loss of airseal,
- operation in case of contamination by sand, in salt fog, in high humidity.

Electric features: the **JETNA-LP** units operate with two variants of input mains (3 phases without neutral): **400** (323-440 VAC, 390-620 VDC) and **220** (187-264 VAC, 263-372 VDC). The power supplies have the standard range of service functions, including parallel operation. The series offers up to 96 % efficiency and +100°C of case operating temperature.

Design features: **JETNA-LP** series doesn't contain any fans, presents small dimensions, low profile and high-power density up to **61 W/in³**. Considering that all components are constructively connected to the base and submerged in heat-transferring potting – **resistance to and durability against mechanical stress is high.**

The power supply units are only meant to be attached to a coldplate or heatsink via thermal adhesive for one sided conductive or forced-air cooling. Power supplies of 300 W and higher are equipped with a dual-zone temperature sensor with one control zone in the lower area next to the baseplate, and the second control area in the upper part of the unit under the cover. This ensures high reliability and makes it possible to solve the problems of so-called thermal pockets in the unit's operating area, for example, under its casing.

The table below shows basic parameters of JETNA-LP series.

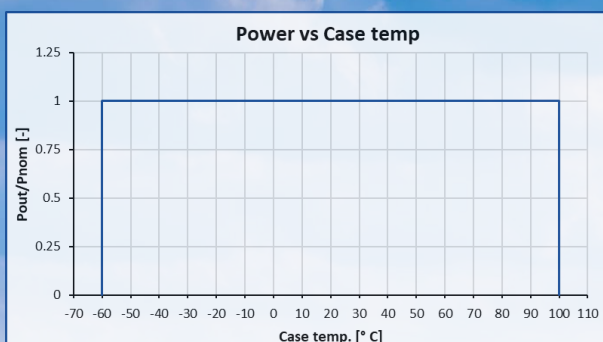
Type of the unit	Maximum output power, W	Dimensions, mm	Maximum output current, A	Power density, W/in ³	Input 220 (187-264 VAC, 263-372 VDC) 3 phases without N	Input 400 (323-440 VAC, 390-620 VDC) 3 phases without N	Isolation input-output, kVAC	Number of outputs	Dual-zone temperature sensor	Trimming	Parallel operation	EMC Standards		
												EN55022 Class B	EN55022 Class A	MIL-STD-461 CE
JETNA1000-LP	1000	A4: 174x92x29	60	36	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA1500-LP	1500	A4: 174x92x29	60	53	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA2000-LP	2000	A5: 210x116x37	100	37	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA3000-LP	3000	A5: 210x116x37	100	54	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA3000-LP	3000	A6: 250x141x38	125	37	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA5000-LP	5000	A6: 250x141x38	125	61	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA5000-LP	5000	A7: 300x170x39	200	42	×	•	3	1	•	•	•	JETAF15-400	•	•
JETNA7000-LP	7000	A7: 300x170x39	200	57	×	•	3	1	•	•	•	JETAF7500	•	•

Notes: • - available, × - on request, the standard version of the input voltage is highlighted in blue.

- new development. Manufacturing as prototypes as well as custom ones.

Possible cooling methods

These units do not have their own cooling system and are intended for use in conjunction with conductive cooling using an aluminum or copper heatsink or coldplate (for example, an aluminum plate 4 mm thick or more). Forced air cooling or a convection heatsink with a vertical arrangement of fins can also be used for easy air passage between the fins from bottom up.





JETDF series, 2.5-20 A, filters for DC/DC units - short impulse noise and emission limiters, metal case

JETDF series, interference filters with varistor and suppressor limiters for short pulses coming from the input mains, **JETDF2.5**, **JETDF5**, **JETDF10** and **JETDF20**.

The AEPS-group's **JETDF** series filter modules for DC mains are designed to operate in harsh environments. They protect critical analog and digital equipment circuits from mains surges and filter interference in the input and output circuits of modules and power supplies. High reliability, mechanical strength and resistance to vibration and shock, temperature stability are ensured using electromagnetic components based on amorphous nanocrystalline materials.

Nominal current, A	Type of the unit	Dimensions, mm	Maximum output current, A	Input 28W (16-50V)	Input 48W (9-80V)	Case operating temperature - 60...+125 °C	Isolation input/output, kVAC	Insertion loss 1 -10 MHz, dB
2,5	JETDF2.5M	R1: 32x21x10	250-200	•	•	•	1	55
5	JETDF5M	R2B: 37x26x11	250 1200	•	•	•	1	55
10	JETDF10M	R3: 51x26x11	250-1200	•	•	•	1	55
20	JETDF20M	R4: 58x37x11	250-1200	•	•	•	1	55





JETAF series, 1-20 A, filters for AC/DC units, short emission limiters, metal case

JETAF series, noise filters with varistor and suppressor for short pulses coming from the input mains, **JETAF1, JETAF5, JETAF10, JETAF20** and **JETAF15-400**

Nominal current, A	Type of the unit	Dimensions, mm	Current surge, A	Input 400 (323-440 VAC, 390-620 VDC), no surge	Input 115 (80-138 VAC), surge 150 VAC	Input 230W (100-264 VAC, 140-372 VDC), no surge	Operating case temperature – 60...+100 °C	Insulation case to input/output, kVAC	Insertion loss 1 -10 MHz, dB
1	JETAF1	R4: 58x37x11	1200		•	•	•	~1,5	55
5	JETAF5	100x51x19	1200		•	•	•	~1,5	55
1	JETAF10	110x61x21	1200		•	•	•	~1,5	55
20	JETAF20	133x83x25	1200		•	•	•	~1,5	55
15	JETAF15-400	133x83x25	4500	•	•	•	•	~1,5	55

The AEPS-group's **JETAF** series filter modules for AC mains and **JETDF** series filter modules for DC mains are designed to operate in harsh environments. They protect critical analog and digital equipment circuits from mains surges and filter interference in the input and output circuits of modules and power supplies. High reliability, mechanical strength and resistance to vibration and shock, thermal stability are ensured using electromagnetic components based on amorphous nanocrystalline materials.

The greatest effect is achieved when used together with **ALEXANDER ELECTRIC** units.



Recommendations for safe work with power supply modules (PSU) and ALEXANDER ELECTRIC modules typical connection diagrams

Our team is confident that you have highly qualified personnel with skills in the power supply industry, a good understanding of the inner workings of the PSU and an optimistic view of our innovative solutions. We have experience investigating your typical mistakes caused by traditional approaches to new products. As the General Designer of **ALEXANDER ELECTRIC**, I will try to tell you about the most "effective" mistakes.

You must understand that the most destructive thing for PSU is heat, due to the direct influence of temperature on reliability. The most important thing both you and we should strive for is to "spread" the heat centroids over the heat dissipating surface of the PSU, over its "soleplate" as much as possible! Miniaturization required for hardware, is a process aimed at reducing and thinning everything that lends itself to it.

As a result, the heat dissipating pad in our designs has a thickness up to 0.4 mm in the thinnest places of low power PSUs and up to 0.8-1.5 mm in high power PSUs. If you turn on the module without heat dissipation plate or heat sink, you can get the components temperature (transistors, diodes, suppressors, chips) at 150°C - 200°C, within 10 seconds! If you manage to turn off the module quickly, it does not mean that fate will forgive you another such attempt.

Be warned: a plastic fan is no help to you there, even if you put it in a cardboard tube for efficiency.

TIP: Follow the datasheet carefully, don't run the PSU on an office desk without a heat dissipation plate to simulate heat sink.

If you have a heat sink, you are in for some common mistakes:

- The radiator surface has a flatness of more than 0.1 mm for linear spacing up to 100 mm or more than 0.2 mm for spacing up to 200-300 mm.
- You are using thermal paste with coefficient less than 3.0 W/(m*K).
- You applied thermal paste without mesh stencil with formation of 2x2mm...4x4mm square sections of paste and 0.5-1mm spacing between squares, which provides exit of excess air and minimal thickness of paste layer when pulling the unit to the heatsink.
- Finally, you just forgot to remove the advertising label from the soleplate.

If you need to turn on the unit for a short time, e.g. for input inspection, **a 4-8mm copper plate should be used as a temporary heat sink**. The width and length of the plate should be in 1.5-2 times the size of the unit itself.

Do not solder wires to the pins of the DC/DC PSU type! All DC/DC PSUs with pins are designed to be mounted on printed circuit boards only!

When soldering a wire, especially a large diameter, and when unit is operating in a vibration and shock environment, and even during assembly, the unit pin is a cantilever that transmits the force to the PCB inside the PSU, both during soldering and long term in operation. And, combined with heating, micro-movements give rise to forces on the ceramic capacitors inside the PSU that split the ultra-thin layers of ceramics.

Explosions and PCB burnouts in these areas are inevitable.

Filling compound, even very stiff, does not help here and can add to the trouble on thermal cycles.

TIP: If you have difficulty designing a part of the PCB for a PSU, we can do it for you for free. The best way to connect the PSU pins in your equipment is **to use PCBs with at least four layers of 100 - 400 µm foil**. We can supply these printed circuit boards to order. We can also provide pre-design and simulating the cooling system.

The customer's top errors include a very interesting point - how to measure ripple at the output of the PSU correctly?

We RECOMMEND:

a) Use an oscilloscope cable with a "closed" input and with a increased resistance core, for example 200...400 ohms.

b) The cable should be loaded with a resistance equal to the waveform (often 50 ohms), usually placed in a **shielded volume on the OSC input connector**.

c) A resistor equal to the cable impedance and an isolation capacitor (not ceramic) should be connected in series with the cable core on the output side of the module in the shielded volume.

d) Conduct measurements using only the external components recommended in the datasheet of the module.

e) **Do not measure ripple if the unshielded part of the cable (facing the output of the module) is longer than 3-4 mm.**

f) It is better to measure ripple at some distance from the module's case, the distance should be approximately corresponding to the real one in the equipment. We recommend connecting the output contacts of the PSU to the measuring point with a twisted pair.

All of the above is quite difficult, but otherwise you will measure not the true pulsations of the PSU, but the artifacts in the OSRC cable, caused by the resonances of the cable and connection scheme!

In our opinion, it is better to use special OSCs with differential input and at least special cables for measuring exactly the pulsations of pulsed power supplies.

AC/DC PSUs have all the necessary elements in their composition for matching with typical electronic and electrical circuits and usually do not require additional components on the input and output.

However, it should be borne in mind that the input fuse they contain is only intended for **fire-fighting functions**, i.e. it is designed to withstand a considerable excess of input current caused by a major malfunction in the module itself.

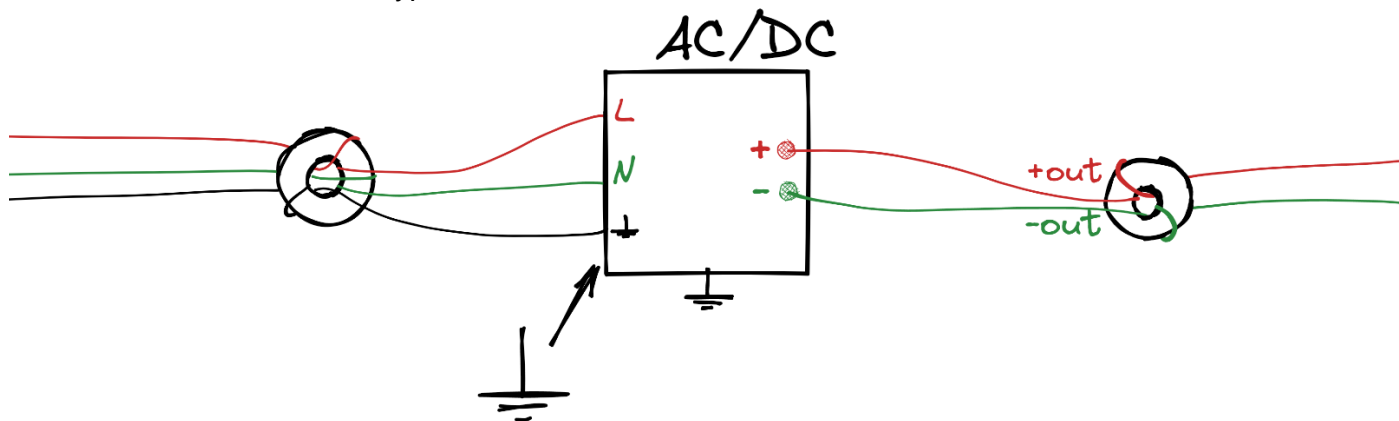
This fuse is irreplaceable, the module itself in such an accident also suffers a number of damages and is not repairable. For example, due to external influences the varistors can fail (in case of emergency overvoltage of the mains), the semiconductor suppressors, the printed circuits on the board are damaged, etc.

In this regard, for safety reasons, it is mandatory for AC/DC modules to include a hardware type fast-acting fuse, replaceable type (or a fast-acting circuit breaker) and, most importantly, with a triggering current that will not lead to fires in the module structure.

The fuse as well as the mains protection circuit breaker is selected by the condition: $I = (2...2.5) \times P$ of the module on the label, divided by $U_{in,min}$.

*For example, the **JETA2400** module must be connected in equipment with a minimum line voltage of 100V through a $2 \times 2400 / 100 = (50...70A)$ fuse.*

In critical cases to reduce disturbances in the input and output conductors, ferrite cores with high magnetic permeability (5 000 – 10 000), dressed on the input and output conductors, are effective, so that inductances of the common type are obtained.



This is shown schematically in picture above. Usually, one or two turns are required. But the most effective solution to improve the EMC parameters is to use the interference filters in this catalog.

But there are differences in case of DC/DC type modules. Small dimensions and high-power density do not allow in some cases to place all protective and interference-suppressing elements in the module design.

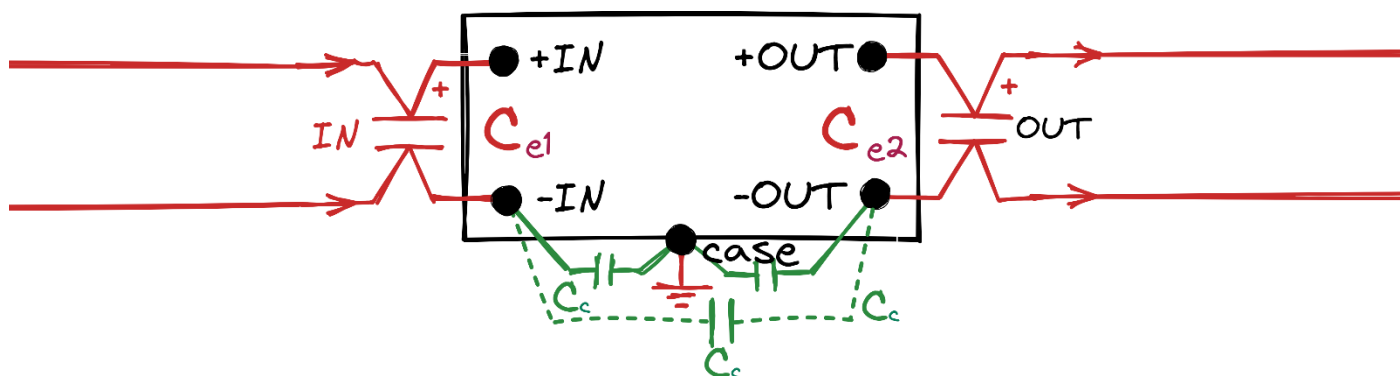
Also, such modules have a pronounced negative input impedance, which often leads to failure of their stability. Therefore, we recommend connecting electrolytic and ceramic capacitors of different types to the input pins (consult us).

Further in picture below we show a minimum connection diagram, i.e. the DC/DC module must not be switched on without the external elements shown in the diagram!

The input and output points (pins), the module case as a rectangle and the case pin as ground are shown conventionally. The components shown in the picture - electrolytic and ceramic capacitors are connected in a very short way to the corresponding case pins, case is grounded by the shortest possible route.

Ceramic capacitors with capacity 10 - 20 nF are chosen of temperature group X7R at operating input voltages up to 50 V, at higher voltages, e.g. 100...200 V they are chosen with capacity 3 - 6 nF.

Electrolytic capacitors (aluminum, polymer aluminum, polymer tantalum), are placed in close proximity to the corresponding pins. In this case, their internal ohmic resistance is used to damp high-frequency resonance oscillations.



Their operating voltage should be at least 1.5 times the maximum voltage applied to them, any foreseeable surges, even of microsecond duration, should be taken into account when selecting capacitors.

In special cases, if there are circuits with commutated inductances near the module (e.g. relays, chokes, transformers, electric motors, etc.), which can cause pulse interference in the conductors connected to the

module - it is desirable to have semiconductor suppressors on the input and output leads of the module (not shown in the figure).

It is highly desirable (!) that the printed conductors connecting capacitors to pins do not get into the projection area of the module's case (go under the case as little as possible).

It is also desirable to place a shielding surface on the printed circuit board, connected to the ground pin, under the module in the case projection. It is not permissible to run signal conductors in this area.

An approximate calculation of the capacitance of the input electrolytic capacitors to ensure **stable** operation of the DC/DC type module is as follows.

Imagine that the minimum input voltage at the outputs of the module is 9 V, the output power of the module is 100 W. In that case, you would need an electrolytic capacitor directly on the input pins with a capacity greater than 250 μF , or a capacity greater than 100 μF for every 100 W of power for a mains with a minimum input voltage of 16 V. Considering that the capacitance can be reduced by about 2.5-3 times if the voltage is increased by a factor of 2, we give an approximate table for the selection of DC/DC input electrolytic capacitors for our "28", "28W", "48W", "150" and "270" mains.

Mains	«48W»	«28», «28W»	«48»	«150»	«270»
Input capacitance per 100 W	6x47...8x47 μF or 3x100...4x100 μF 100V e.g., UBW NICHICON	3x47...4x47 μF or 2x100...3x100 μF 100V e.g.,UBW NICHICON	3x22...4x22 μF or 2x47...3x47 μF 160V e.g.,UBX NICHICON	3x6,8...4x6,8 μF or 2x10...3x10 μF 350V e.g.,UBX NICHICON	2x15...3x15 μF or 2x18...3x18 μF 500V e.g.,UCY NICHICON

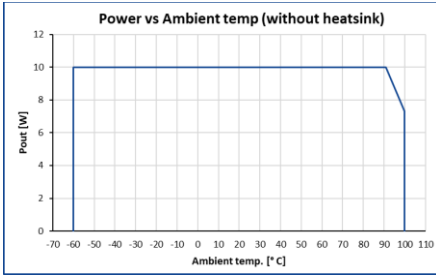
We remind you that the best solution to reduce the level of interference is to use in addition to the considered filters of our production listed in this catalog.

Best regards, general designer of ALEXANDER ELECTRIC

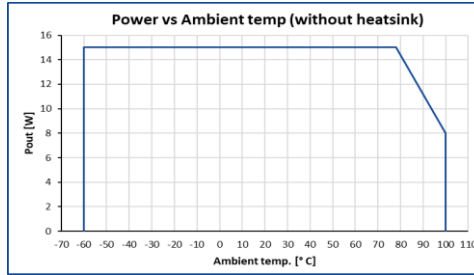
Alexander Goncharov

Diagrams

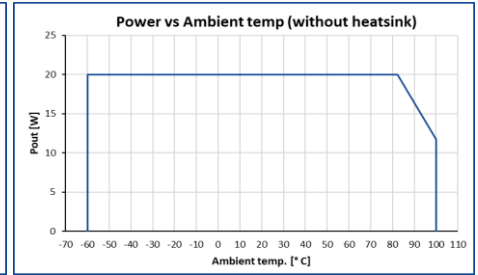
JETDiR-SP series



JETDiR-SP-10

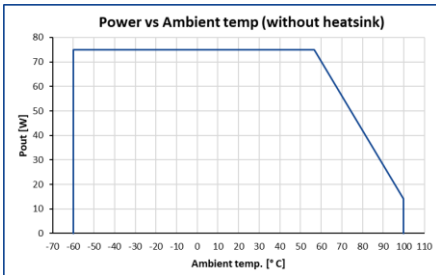


JETDiR-SP-15

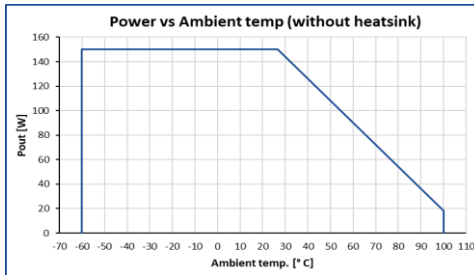


JETDiR-SP-20

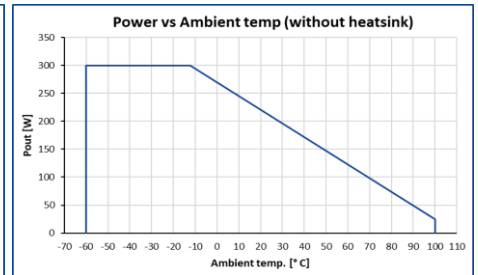
JETDiV series



JETDiV75

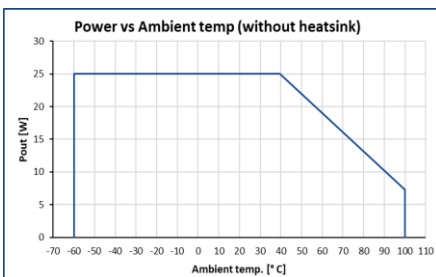


JETDiV150

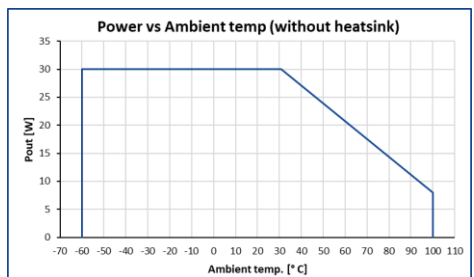


JETDiV300

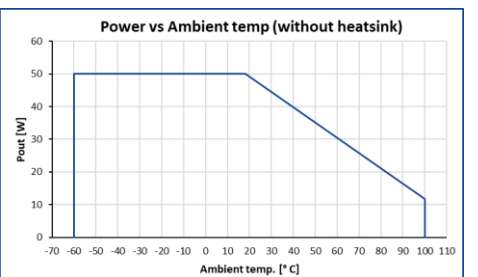
JETDiR series



JETDiR25

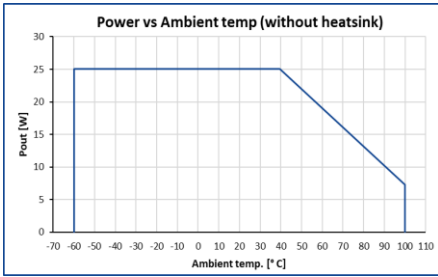


JETDiR30

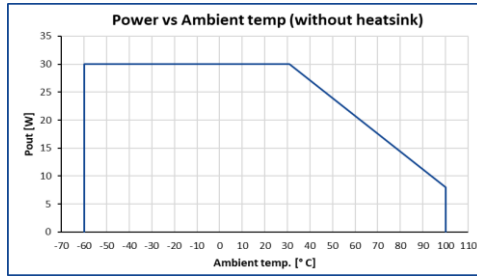


JETDiR50

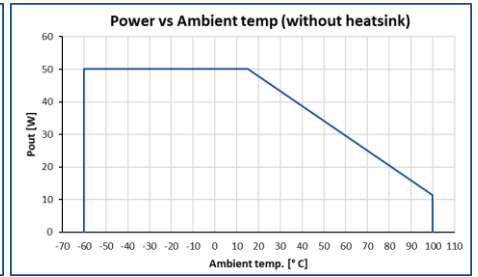
JETDi series



JETDi25

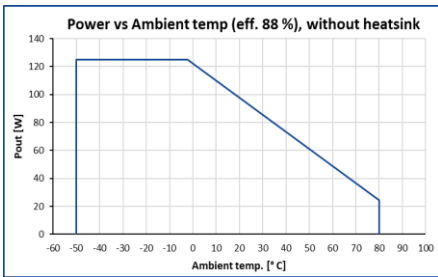


JETDi30

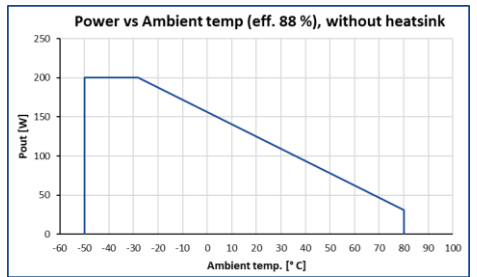


JETDi50

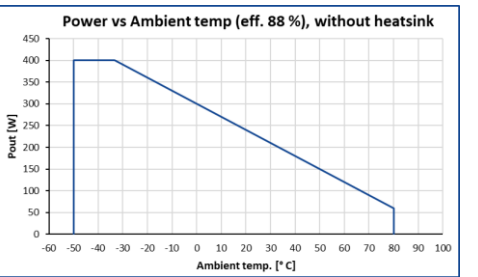
JETA-LP series



JETA125-LP



JETA200-LP



JETA400-LP





ALEXANDER ELECTRIC s.r.o.

AEPS-group located in the Czech Republic is an European developer and manufacturer of high-tech planar AC/DC and DC/DC power supply units, converters and custom systems of power from 10 to 10 000 Watts for reliable use in demanding applications and extreme harsh environment operating conditions.

aeeps@aeeps-group.cz

+420 281 001 341

www.aeeps-group.com

AUTHORS:

A. Goncharov

M. Goncharov

E. Vasilenko

