

## Power Supplies and DC/DC Converters

Edition 1 | 2009





**Innovating Reliable Power**

# TDK-Lambda

With production facilities in Asia, America and Europe, TDK-Lambda has positioned itself as one of the world's largest manufacturers of electronic power supplies. Boasting a comprehensive range of AC/DC power supplies, DC/DC converters and laboratory power devices ranging from 1.5 W to 15 kW, TDK-Lambda offers the right solution for a host of different applications.

“Power supply” to us is more than just an electronic device. It is the fundamental basis of the safety and reliability of our customers' products. This is why we support you with everything from design, EMC standards and safety certification to serial production, so that we are confident of offering you the best possible solution in every aspect.

## More detailed information:

Visit our website and discover the many possibilities offered by TDK-Lambda. Browse through the latest product highlights and download our catalogues and documentations.

[www.emea.tdk-lambda.com](http://www.emea.tdk-lambda.com)



## Configurable power supplies

### NV Power from 100 W to 300 W

#### Medical approvals available

NV Power is based around a configurable transformer and employs Multiple Efficiency Gain (MEG) technology to achieve its class leading efficiency for multiple output PSUs.

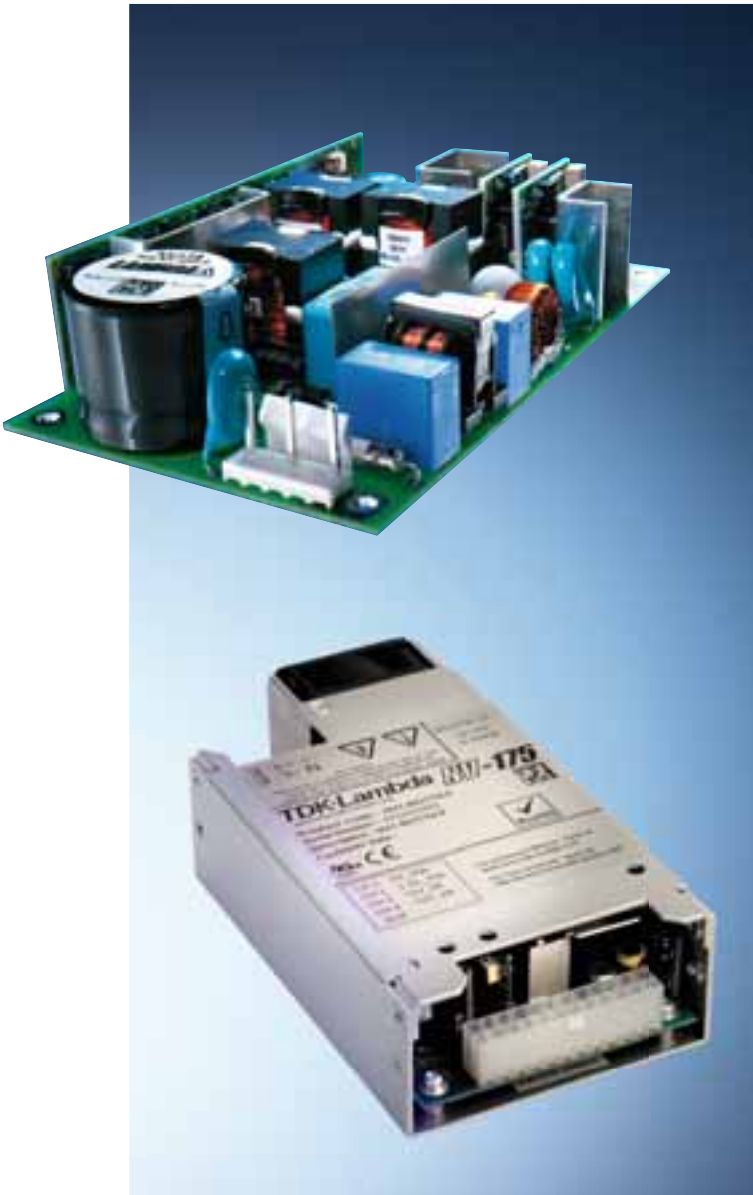
The TDK-Lambda approach is essentially a unique use of synchronous rectifiers in a resonant topology.

The NV-100 up to the NV-300 have class leading power densities i.e.: 8.3 W/in<sup>3</sup> for the NV-300 and 9.36 W/in<sup>3</sup> for the NV-175.

With a total height of only 32 mm (open frame) or 40.6 mm (with cover) the units suit 1 U applications. The units are fully approved to EN60950 and EN61010 and are suitable for automation and general purposes. The new submodel NV-175...-M (for medical) offers reinforced insulation of 4 kV AC between input and output with EN60601-1 approval for use in many kinds of medical equipment.

All units are available as open frame units and with several case options, starting with a U-bracket up to a complete closed case with IEC-inlet and temperature controlled cooling fan.

A DC-input add-on module is available for use with the NV-175 series (NV-175 DC-Frontend).  
(Input: 36 – 72 V; Output: 220 V DC at 225 W)



**NEW**

**NEW**

Series	NV Power 100 W	NV Power 175 W	NV Power Medical	NV Power 300 W
Power	100 W	175 / 180 / 200 W	180 / 200 W	300 W
Number of outputs	4	1 – 5	1 – 3	1 – 5
Output voltage	3.3 – 24 V	1.5 – 28 V	3.3 – 28 V	1.5 – 28 V
Input voltage	90 – 264 V AC 120 – 350 V DC	90 – 264 V AC	90 – 264 V AC	90 – 264 V AC 120 – 350 V DC
Format	open frame optional case	open frame optional case	open frame optional case	open frame optional case
Warranty	3 years	3 years	3 years	3 years

## EFE-300, EFE-400 and EFE-300M Frontend power supplies

**NEW**

The EFE series is a new generation of power supply. It has full digital ( $\mu$ C) control and offers class leading power density of up to 22 W/in<sup>3</sup> 90% efficient typical.

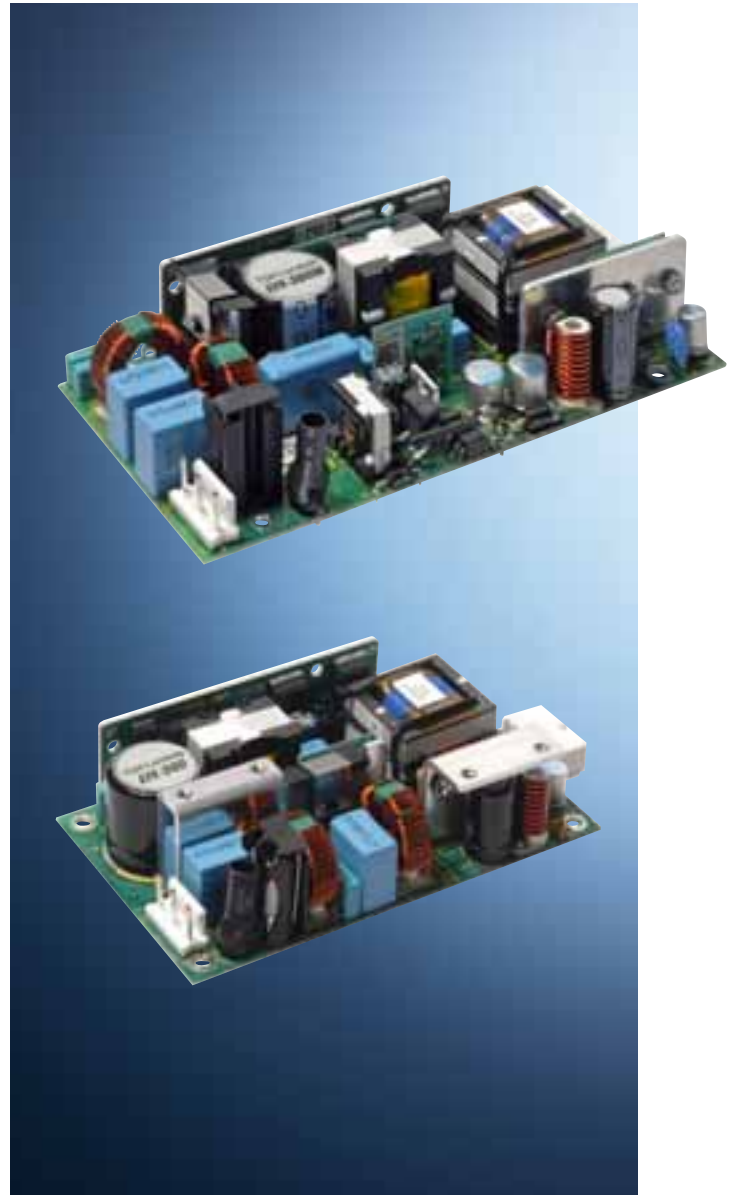
EFE-300 has a 5 x 3 inch footprint, EFE-400 and EFE-300M are 6 x 3 inch. With an open frame height of 34 mm and 40.6 mm with case, all units are suitable for 1 U applications. The digital control enables fewer components to be used (25 % less than comparable single output units) which increases the operational lifetime.

Although the power density is very high, the EFE series also has peak power capability: EFE-300 and EFE-300M can supply 400 W, and the EFE-400 is capable of supplying 530 W for 10 seconds.

Cooling is easy because the EFE series were designed to minimise resistance to airflow simplifying the fan selection, additionally, a unit with an integral temperature controlled fan (for low noise operation) is also available.

With a wide range of safety approvals (including CE Mark, EN/IEC/UL/CSA 60950 and EN/IEC 61010-1), the EFE series may be used in many applications including factory automation, test & measurement instruments, analytical apparatus, IT devices and control units. The range is available with 12 V or 24 V main channel outputs and a 12 V / 250 mA fan supply.

EFE-300M adds EN/IEC60601-1 medical approval (BF rated) with reinforced isolation (4 kV AC input to output, 1500 V DC output to ground), making it ideal for medical equipment (EFE-300M includes 12 V / 1 A fan supply, built in ORing FET, remote on/off and 5 V / 2 A isolated standby supply).



Series	EFE-300	EFE-400	EFE-300M
Power	300 W	400 W	300 W
Number of outputs	1	1	1
Output voltage	12 V, 24 V	12 V, 24 V	12 V, 24 V
Input voltage	90 – 264 V AC 120 – 350 V DC	90 – 264 V AC 120 – 350 V DC	90 – 264 V AC 120 – 350 V DC
Format	open frame optional case	open frame optional case	open frame optional case
Warranty	3 years	3 years	3 years

## Configurable power supplies

### NV Power 350/700 W

Using the same innovative technology as the NV-175 and NV-300, the NV-350 and NV-700 are fully configurable modular designs. With the increased number of 6 types of output modules with various output voltages, NV-700 could provide up to 8 isolated output voltages and various primary and secondary signal options. The 350 W units offer up to 6 outputs. Additionally the NV-700 is able to deliver a peak load of 1450 W and the NV-350 a peak load of 700 W, both for up to 10 seconds.

To configure a unit, just type in your voltage and current requirements in the NV-configurator on the TDK-Lambda website <http://config.nv-power.com/nv/>.

NV-350 and NV-700 are both fully approved in accordance to EN60950, EN61010 and EN60601 for use in test-equipment factory automation and for medical applications.

Series	NV Power 350 W	NV Power 700 W
Power	350 W	700 W (1150 W)
Peak power	700 W	1450 W
Number of outputs	1 – 6	1 – 8
Output voltage	3.2 – 32 V	3.2 – 32 V
Input voltage	90 – 264 V AC	90 – 264 V AC
Format	closed case	closed case
Warranty	3 years	3 years

### NV-FEP

This model is specially designed for distributed power architectures. It provides a 12 V / 29 A (350 W) main output with an additional 12 V / 1 A auxiliary supply. The unit has a class leading efficiency of 91 %.

Compared with the NV-350 standard unit, the FEP has a length of only 236 mm (46 mm shorter).

Series	NV-FEP
Power	350 W
Number of outputs	2
Output voltage	12 V / 29 A and 12 V / 2 A
Input voltage	90 – 264 V AC
Format	closed case
Warranty	3 years



## VEGA Lite

VEGA Lite is an economic upgrade of the existing VEGA range. The output power is increased to 550 W and 750 W (up to 900 W at highline input) within the same case.

VEGA Lite offers up to 11 outputs from 1.8 V to 56 V with currents up to 60 A.

## VEGA

The most flexible modular power supply manufactured by TDK-Lambda. Providing output ratings of 450 W, 650 W and 900 W and a full range of output voltages between 1.8 V and 62 V with several choices of signaling options, the VEGA series makes it simpler for customers to install in their applications.

Wide range modules and programmable options fitted with an integrated microcontroller provide further applications in testing and laboratory environment.

VEGA is available certified to UL60601 / IEC60601 with reinforced insulation, so it can be used also for medical applications.

Series	VEGA Lite	VEGA
Power	550, 750 W	450, 650, 900 W
Power at highline input	560, 900 W	–
Number of outputs	1 – 11	1 – 11
Output voltage	1.8 – 56 V	1.8 – 62 V
Input voltage	wide range 85 – 264 V AC	wide range 90 – 264 V AC
Input voltage highline	150 – 264 V AC	
Format	closed case	closed case
Warranty	3 years	3 years



## ALPHA

ALPHA is a real “powerpack”, with our 1500 W model offering up to 16 different outputs, with voltage ranging from 1.8 V to 48 V. The 1000 W and 1500 W power ranges available cover a wide range of applications. Fast-On terminals ensure quick installation of ALPHA into customers’ applications.

Series	ALPHA
Power	1000, 1500 W
Number of outputs	1 – 16
Output voltage	1.8 – 48 V
Input voltage	wide range 85 – 264 V AC
Format	closed case
Warranty	3 years



## Power supplies for industrial applications



**Power supplies, designed for high reliability and long product life. Main applications: industrial, telecoms, automation and test.**

### HWS series

To demonstrate the high reliability of the HWS series, TDK-Lambda is the first power supply manufacturer in the world to offer lifetime warranty. The HWS offers a broad range of output voltages from 3.3 V to 60 V in 10 model sizes from 15 W to 1500 W with common height for 2 U applications.

### HWS-P

HWS 300 W, 600 W power supply with 3 times peak load capability for startup of large capacitive loads, motors and solenoid operation.

### HWS/ME series

Medical version of the HWS series approved by UL60601 and EN60601 with reduced leakage current.

### HWS/HD series

HWS for harsh environments. Guaranteed startup at  $-40\text{ }^{\circ}\text{C}$ , PCB coating and shock and vibration tests in accordance with MIL-standards enables the use of this power supply under heavy duty conditions.

### RTW series

The RTW series of single output power supplies will all fit within a 1 U rack format and are designed for no fan or low airflow applications.

### LZSa series

Power supply for harsh environment with high operating temperatures up to  $71\text{ }^{\circ}\text{C}$ .

Series	HWS	HWS-P	RTW	LZSa
Power	15 – 1500 W	300 (900) – 600 (2000) W	50 – 300 W	500 – 1500 W
Number of outputs	1	1	1	1
Output voltage Setting range	3.3 – 60 V	24 – 48 V	3.3 – 48 V	12 V nom. 10 – 15.75 V 24 V nom. 18 – 29.4 V
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC
Format	closed	closed	closed	closed
Warranty	lifetime	lifetime	5 years	5 years

## Power supplies for commercial applications

**A optimum solution in cost and quality for commercial applications in higher volume. Main applications: vending, light, kiosk, displays, automated service.**

### LS series

**NEW**

The LS series is the latest design for cost-critical applications. It offers a great performance for a very low cost. 6 power levels from 25 W to 150 W are available over the complete range of output voltages from 3.3 V up to 48 V.

The LS series is targeted at commercial applications that balance economy and performance with a 3 year warranty.

**Please check availability of all models of the new LS series with Technical Sales.**

### SWS series

The SWS series provide all output voltages from 3.3 V to 24 V (up to 48 V for 300 W and 600 W unit) and offers a power range from 50 W up to 600 W with 6 models.

### SWS-L series

The new design SWS-L offers a very flat power supply for applications like LED-displays. In case of it's low height and a operating temperature range up to 74 °C, it fits in almost every thin gap behind a display. To minimise audible noise, the integrated blower fan is temperature controlled.

The SWS-L are available with 600 W and 1000 W output power and output voltages from 3.3 V to 60 V.

The SWS-1000L is also approved to EN60601 for medical applications.



**NEW**

Series	LS	SWS	SWS-L
Power	25 – 150 W	50 – 600 W	600 – 1000 W
Number of outputs	1	1	1
Output voltage	3.3 – 48 V	3.3 – 24 V (50 – 150 W) 3.3 – 48 V (300 – 600 W)	3.3 – 60 V
Cooling	convection	convection (50 – 150 W) integrated fan (300 – 600 W)	integrated fan temperature controlled
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC
Format	closed	closed	closed
Warranty	3 years	2 years	3 years

## DIN rail products

**Compact and robust, these products are designed for easy installation onto standard rails.**

As these power supplies typically are mounted in cabinets or switchboards, their dimensions have to complement to switchboard components like contactors and automatic circuit breakers.

### DSP series

Flat DIN rail power supply with only 56 mm depth for mounting in wall cabinets. Four output voltages between 5 V and 24 V with output power from 10 W to 100 W are available.

### DPP-15 to DPP-100 series

The most compact DIN rail power supply with 15 W to 100 W output power and various output voltages between 5 V and 48 V. The compact size enables this power supply to be used even in applications with very narrow space.

### DLP series

The DLP range offers power supplies between 75 W and 240 W with 24 V output in a metal case. Low cost and high reliability. Main applications: factory automation, industrial control and test and measurement applications.

### DLP-PU

Parallel operation backup unit for DLP series. DLP-PU will provide you with not only backup function but also capacity addition by being used with DLP series of power supplies in parallel operation. Capability 21–28 V at 20 A.

### DPP-120 to DPP-480 series

The most powerful DIN rail supplies from TDK-Lambda. With single-phase and three-phase input, these units offer nom. 24 V and 48 V output voltage with 120 W, 240 W and 480 W.

**Additional models with 3-phase input and output power up to 1 kW under development. Please ask Technical Sales for actual status.**



Series	DSP-10 to -100	DPP-15 to -100	DLP-75 to -240	DPP-120 to -480
Rating	15 – 100 W	15 – 100 W	75 – 240 W	120 – 480 W
Output voltage	5 – 24 V DC	5 – 48 V DC	22 – 28 V DC	22.5 – 56 V DC
Input voltage	1-phase 85 – 264 V AC	1-phase 85 – 264 V AC	1-phase 85 – 264 V AC	1-phase 85 – 264 V AC 3-phase 340 – 575 V AC
Warranty	2 years	2 years	3 years	2 years

## IP-67 power supplies

Encapsulated power supplies to be used in wet applications.

### NEW IPS series

Robust power supplies with 50 W, 75 W and 100 W output power for harsh environmental conditions with 5 V to 48 V single output.



Series	IPS50	IPS75	IPS100
Output power	50 W	75 W	100 W
Number of outputs	1	1	1
Output voltages	5 – 48 V DC	12 – 48 V DC	24 – 48 V DC
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC
Format	vacuum encapsulated case IP 67		
Warranty	tba.	tba.	tba.

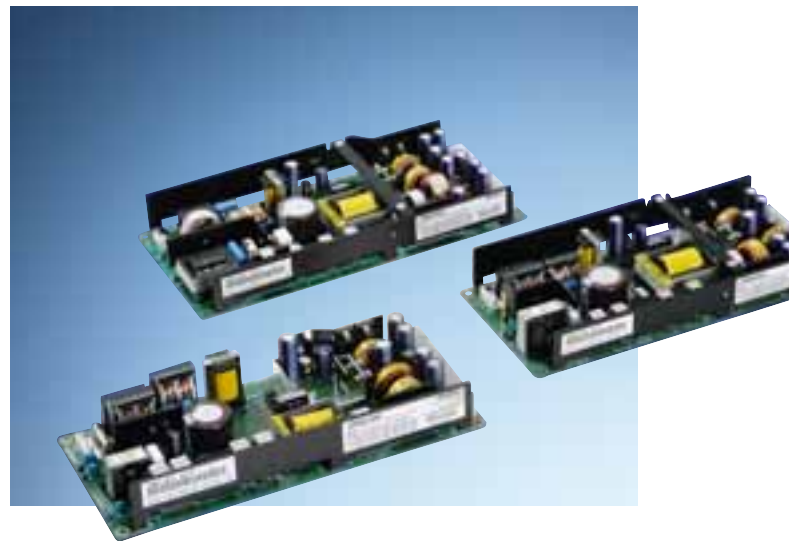
## Industrial ATX power supplies

Power supplies for industrial computer equipment used in factory automation and automated test systems.

### ZWX series

ATX-standard power supply for 1 U integration without fan. Reliable design with high operating temperature range for industrial computers. The ZWX offer the possibility to be operated with natural convection by derating the output power.

Standard ATX-Cable looms are available as option.



Series	ZWX-180	ZWX-240	ZWX-300
Output power convection forced air	90 W 180 W	120 W 240 W	150 W 300 W
Number of outputs	5	5	5
Output voltages	+ 3.3 V + 5 V +12 V – 12 V + 5 V (standby)	+ 3.3 V + 5 V +12 V – 12 V + 5 V (standby)	+ 3.3 V + 5 V +12 V – 12 V + 5 V (standby)
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC
Format	open frame mounting bracket and cover optional		
Size (W x H x D)	94 x 36 x 210 mm	106 x 36 x 225 mm	119 x 36 x 250 mm
Warranty	3 years	3 years	3 years



## PCB-mount power modules

### KM series

Medical EN60601 approved AC / DC power modules for PCB-mounting with 4 kV AC reinforced barrier for portable medical equipment. Protection class II (no ground needed) Single-/Dual-/Triple-outputs with all common voltage combinations.

Series	KMS-15	KMD-15	KMT-15	KMS-40	KMD-40	KMT-40
Output power	15 W	15 W	15 W	40 W	40 W	40 W
Number of outputs	1	2	3	1	2	3
Output voltages	3.3 – 24 V	5 – 12 V	5 – 15 V	3.3 – 24 V	5 – 24 V	5 – 15 V
Input voltage	wide range 85 – 265 V AC					
Format	closed case with pinning					
Warranty	2 years	2 years	2 years	2 years	2 years	2 years



## OEM power supplies

### ZW series

Open frame power supplies rating from 5 W up to 240 W with 1 to 4 output voltages. PAF models provide peak output performance for up to 10 seconds for high current motor applications. Covers and mounting bracket options available.

#### ZWS

Single output 5 W up to 240 W with output voltages from 3.3 V to 48 V.

#### ZWD

Dual output models 5 V / 24 V without minimum load. Double output power for 10 sec for start-up of DC-motors.

#### ZWQ

Quad output models with optional L bracket or case. 5 V main output with  $\pm 12$  V or  $\pm 15$  V and additional auxiliary output.

#### SWT

Triple output models from 30 W to 100 W. 5 V main output with  $\pm 12$  V or  $\pm 15$  V.

#### MTW

Output models from 15 W to 60 W with three fully regulated outputs without any minimum load.

Series	ZWS	ZWD	ZWQ	SWT	MTW
Power	5 – 240 W	75 – 225 W	80 – 130 W	30 – 100 W	15 – 60 W
Number of outputs	1	2	4	3	3
Output voltage Setting range	3.3 – 48 V $\pm 10$ %	5/12 V 5/24 V	5 $\pm$ 12 V and 3.3, 5, 12, 24 V	5, 12, 12 V 5, 15, 15 V	5, $\pm$ 12 V 5, $\pm$ 15 V
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC	wide range 85 – 265 V AC
Format	open frame, cover optional	open frame, cover optional	open frame, with mount- ing bracket, with cover	open frame	open frame for 1U applications
Warranty	2 years	2 years	1 year	1 year	3 years

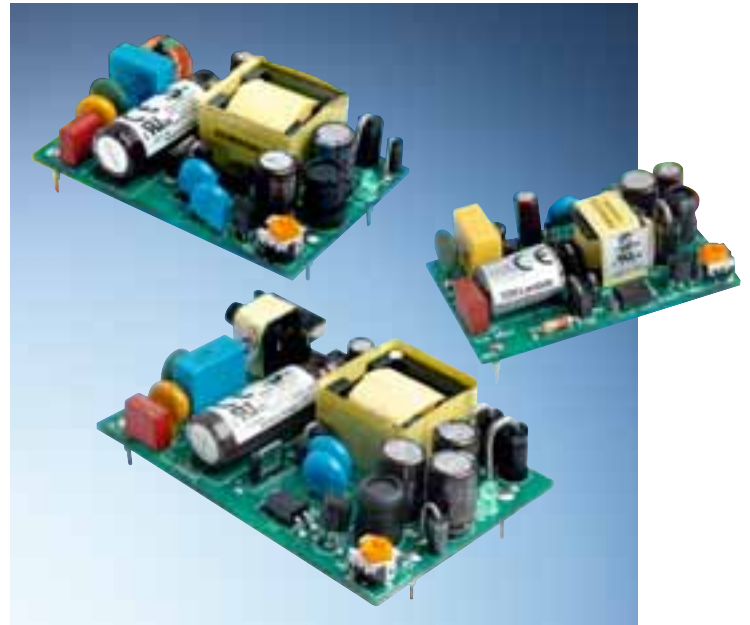
## AC / DC modules

### KPSA series

The KPSA series are the improvement of the existing KPS series PCB-mounted power supplies with wide range input and output voltages from 5 V to 15 V.

The KPSA offers now better performance and keeps PCB size and pinning. Three different models with 5 W, 10 W and 15 W output power are available.

Series	KPSA
Rating	5 – 15 W
Output voltage	3 – 24 V
Input voltage	wide range 85 – 265 V AC
Format	open frame with pinning
Warranty	1 year



### ZP series

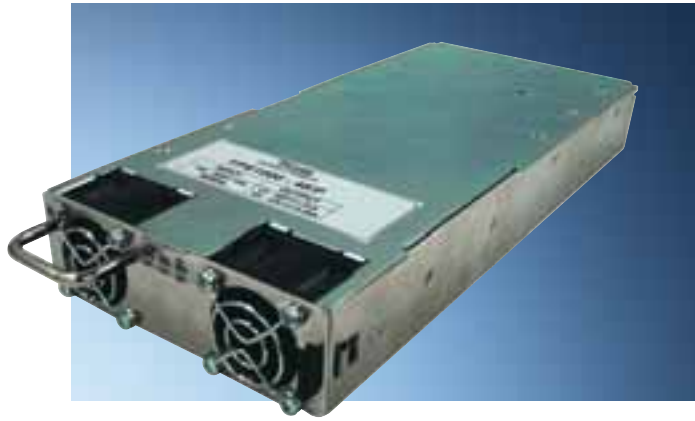
**New generation of open frame power supplies.  
High efficiency design in very compact format.**

Only 2" x 3.5" for 20 W units and 2" x 4" for 40 W and 60 W units, 3" x 5" for 100 W units.

In the 40 W range there are also models with double and triple output available. All single output models are now available as ZPSA with new PCB design for higher efficiency, improved thermal performance and lower height.



Series	ZPSA	ZPD	ZPT
Power	20 – 100 W	40 W	40 W
Number of outputs	1	2	3
Output voltage	3 – 48 V	5 V, 12 V 5 V, 24 V	5 V and 3.3 V main output 5 V, ±12 V, ±15 V, 24 V auxiliary outputs
Input voltage	wide range 85 – 264 V AC	wide range 85 – 264 V AC	wide range 85 – 264 V AC
Format	open frame	open frame	open frame
Warranty	1 year	1 year	1 year



## Frontend power supplies

**AC / DC-Frontend power supply packaged in 1 U rack size. 1000 W max. with universal input.**

### FPS series

FPS series will contribute to space saving on rack mount requirement in telecommunication and data communication equipment. Low profile, 3000 W AC / DC-Frontend power supply in 1 U / 19" rack (by driving 3 units).

Model	FPS-1000-48	FPS-1000-32	FPS-1000-24	FPS-1000-12
Nominal output voltage	48 V	32 V	24 V	12 V
Output voltage adj. range	43 V ~ 58 V	28.8 V ~ 38.4 V	21.5 V ~ 29 V	11 V ~ 15 V
Nominal output current	21 A	31 A	40 A	72 A
Maximum output power	1008 W	992 W	960 W	864 W
Input voltage	85 – 265 V AC, 47 ~ 63 Hz, single phase			
Efficiency (typ)	85 / 88 % at 100 / 200 V AC, maximum output power, Ta = 25 °C			
Protection	Over current protection, Over voltage protection, Over temperature protection			
Front panel LED indicators	AC OK (green), DC OK (green), DC FAIL (red)			
Operating ambient temp.	0 ~ 50 °C (by internal fans. Variable speed control.)			
Dimensions (W x H x D)	127 x 41 x 290 mm, refer to outline drawing			
Interface	I <sup>2</sup> C Interface bus: optional model (/S)			
Front IEC inlet	Front IEC Inlet: optional model (/P) Standard: rear connector			



## Line filter

**TDK-Lambda offers a complete range of line filters to provide optimum attenuation of conducted noise. Further series with higher current capability and designs for 48 V DC are available on request.**

### MC12 / MZ12 series 1-phase

New standard, complies with RoHS directive led by lead free. Meets every aspect of industrial requirement for EMC solution. High cost performance, terminal connection type Noise Filter. Available with low leakage and DIN-Rail option.

### MC13 series 3-phase

Compact & clean. Small to mount on FA / Robot control panel. Environmentally friendly and lead free. Available for screw mounting and DIN-Rail mounting.

Series	MC12	MZ12	MC13
Rated voltage	250 V	250 V	500 V AC 3-phase 50/60 Hz
Rated current	6 A – 30 A	6 A – 30 A	6 A – 30 A
Test voltage	terminal-case: 2500 V AC (20 mA)	terminal-case: 2500 V AC (20 mA)	terminal-case: 2000 V AC (100 mA)
Leakage current standard or low leakage type	1 mA max. at 250 V AC or 10 µA max. at 250 V AC	1 mA max. at 250 V AC or 10 µA max. at 250 V AC	5 mA max. at 500 V AC
Dimensions (DIN-type)	97 (108) x 34.5 x 60 mm	97 (108) x 34.5 x 60 mm	145 (136) x 52 x 63 mm
Weight	300 g	300 g	600 g

## Programmable power supplies

**Programmable power supplies for test and laboratory. Control all functions of the power supply from a Windows PC. Software download on the TDK-Lambda website for free.**

### Genesys™

Broadest power range of rackmounted programmable power supplies in the world. Eight different power-levels starting from 750 W 9.5" 1 U up to 15 kW 19" 3 U with common design and common interfaces.

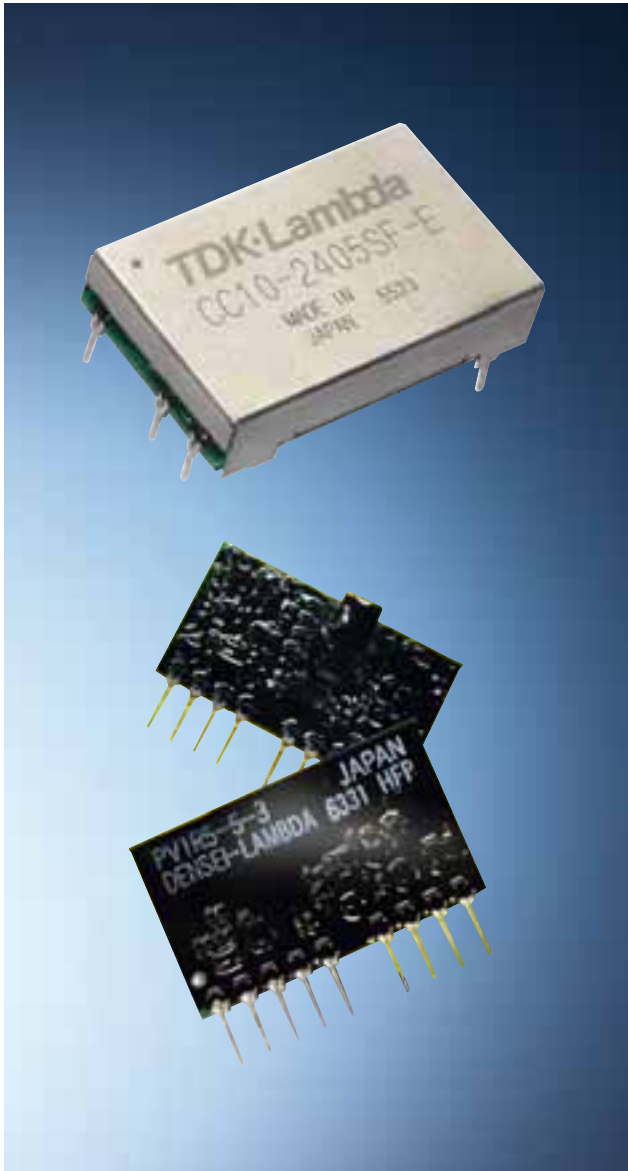
**NEW** 2400 W output power in only 1 U height! All Genesys™ are fully equipped with RS-232/RS-485 interface as well as analog programming and monitoring capability. Digital and isolated analog interface are optional. The IEEE digital interface is IEEE 488.2 & SCPI compliant and the newest LAN option is a **LXI** class C certified interface. Both interfaces can communicate via multidrop-function (MD) which allow to address up to 31 units just with one interface card.

### Zero-up™

Programmable power supplies with integrated RS-232/RS-485 interface. Programming directly via test system. For GPIB system use the GP485 controller to control up to 31 ZUP units in a single GPIB address. Up to 6 single units can be integrated in a 3 U rack, building up a complete multi output test system.



Series	GENH	<b>NEW</b> GEN 1 U	GEN 2 U	GEN 3 U	ZUP
Rated output power	750 W	750, 1500, <b>2400 W</b>	3.3 kW, 5 kW	10 kW, 15 kW	200, 400, 800 W
Output voltage	0 – 6 V DC to 0 – 600 V DC	0 – 6 V DC to 0 – 600 V DC	0 – 8 V DC to 0 – 600 V DC	0 – 7.5 V DC to 0 – 600 V DC	0 – 6 V DC to 0 – 120 V DC
Output current	1.3 – 100 A	1.3 – 300 A	5.5 – 600 A	17 – 1000 A	1.8 – 132 A
Programming	RS-232/RS-485 analog 0 – 5 V or 0 – 10 V optional: GPIB Ethernet/LAN ( <b>LXI</b> ) Isolated analog interface	RS-232/RS-485 analog 0 – 5 V or 0 – 10 V optional: GPIB Ethernet/LAN ( <b>LXI</b> ) Isolated analog interface	RS-232/RS-485 analog 0 – 5 V or 0 – 10 V optional: GPIB Ethernet/LAN ( <b>LXI</b> ) Isolated analog interface	RS-232/RS-485 analog 0 – 5 V or 0 – 10 V optional: GPIB Ethernet/LAN ( <b>LXI</b> ) Isolated analog interface	RS-232/RS-485 analog 0 – 4 V external GPIB controller as accessory
Resolution for digital programming	0.002 % of $V_{out\ max}$ .	0.002 % of $V_{out\ max}$ .	0.002 % of $V_{out\ max}$ .	0.02 % of $V_{out\ max}$ .	0.028 % of $V_{out\ max}$ .
Input voltage	wide range 85 – 265 V AC	wide range 85 – 265 V AC (750 W, 1500 W only) 1-phase 170 – 265 V AC (2400 W) 3-phase 208 V AC (2400 W)	1-phase 170 – 265 V AC (3.3 kW only) 3-phase 170 – 265 V AC 3-phase 342 – 460 V AC	3-phase 208 V AC 3-phase 400 V AC 3-phase 480 V AC	wide range 85 – 265 V AC
Format	1/2 19" 1 U	19" 1 U	19" 2 U	19" 3 U	3 U rack available for 19" integration
Warranty	5 years	5 years	5 years	5 years	3 years



*DC/DC converters,  
mini converters*

**These ranges of physically small DC/DC converters are intended for circuit board mounting for powering a broad range of devices and distributed power applications.**

**CC-E series**

A range of high efficiency DC/DC converters, covering the output power range from 1.5 to 30 W in both surface mount and through hole packages has now been extended with the addition of the all new CC-P-E products. With all the standard family features, the CC-P-E also provides 1500 V input/output isolation, parallel operation, global start-up, alarm and overvoltage protection.

- High efficiency, up to 90 %
- Extremely compact size – low profile
- 500 V AC isolation
- Through hole or surface mount versions
- Size: 16.5 x 16.6 to 43 x 45 mm depending upon power
- Constant switching frequency
- Remote on/off control
- Output voltage trim

**PXC series**

This range has both industry standard 24 pin DIP through hole and SMT packages, with 3 and 5 W output power ratings, featuring single and dual outputs with a 4:1 input voltage range.

**PV series**

The PV series provides up to 3 W of output power in a vertical single in-line package.

Series	CC-E	PXC	PV / PVD
Power	1.5 – 30 W	3 – 6 W	1.5 – 3 W
Number of outputs	1 and 2	1 and 2	1 and 2
Output voltage Setting range	3.3, 5, 12 / 15 V ± 12 / 15 V	3.3, 5, 12, 15 V ± 5, 12, 15 V	3.3, 5, 12 V ±12 V
Input voltage	5, 12, 24, 48 V	9 – 36, 18 – 75 V	5, 12, 24, 48 V
Format	metal cover SMT / through hole	metal cover SMT / through hole DIP	encapsulated through hole SIP
Warranty	5 years	1 year	1 year

## 2 x X" DC/DC converters

The PXX range of industry standard footprint DC/DC converters feature wide 4:1 input voltage range; single, dual and triple outputs and up to 40 W output power capability.

- Industry standard footprint
- Six sided shielding
- Agency approved
- 12 V, 24 V and 48 V inputs

### PXA / PXB series

New 1" x 1" DC / DC converters with same pinning than PXD series but half space. Available as open PCB and closed metal case.

**Please ask Technical Sales for availability.**

### PXD series

2 x 1" package, 10 or 20 W output power rated, featuring single and dual outputs.

**NEW** Now with 30 W output power frame size available.

### PXE series

2 x 1.6" package, 20 or 30 W output power rated, featuring single and dual outputs.

### PXF series

2 x 2" package, 40 W output power rated, featuring single, dual and triple outputs.



Series	PXA	PXB	PXD <b>NEW</b>	PXE	PXF
Power	15 W	15 W	10, 15, 20, <b>30 W</b>	20, 30 W	40 W
Number of outputs	1	1	1 and 2	1 and 2	1, 2 and 3
Output voltage	3.3, 5, 12, 15 V	3.3, 5, 12, 15 V	3.3, 5, 12, 15 V	1.5, 1.8, 2.5, 3.3, 5, 12, 15 V	3, 5, 12, 15 V 3.3/5, ± 12, 15 V
Setting range	± 5, 12, 15 V	± 5, 12, 15 V	± 5, 12, 15 V	± 5, 12, 15 V	3.3 / ± 12, 5 / ± 12, 3.3 / ± 12, 5 / ± 15 V
Input voltage	12, 24, 48 V 18 – 36, 18 – 75 V	12, 24, 48 V 9 – 36, 18 – 75 V	12, 24, 48 V 18 – 36, 18 – 75 V	12, 24, 48 V 9 – 36, 18 – 75 V	12, 24, 48 V
Format	open PCB 1 x 1", through hole	metal cover 1 x 1", through hole	metal cover 2 x 1", through hole	metal cover 2 x 1.6", through hole	metal cover 2 x 2", through hole
Warranty	tba.	tba.	1 year	1 year	1 year

## DC/DC converters, point of load converters



A very broad line up of non-isolated DC/DC converters intended for point of load power conversion in distributed, intermediate and local power architectures for applications including telecom, datacom, access, wireless, test & measurement, broadcast, industrial and many others.

### CE-10XX series

This series features wide range programmable output voltages and a broad selection of input voltage ranges with very low profile 4.5 mm and 5.5 mm SMT packages, enabling mounting on either component or non component sides of user board for compact applications.

- Up to 15 W output power
- High efficiency, up to 91.5 %
- 18.3 x 12.3 x 4.5 mm
- 21.3 x 16.4 x 5.5 mm
- Remote on /off
- Surface mount
- Programmable output voltage

### Very low current / power

Series	CE-1003	CE-1004	CE-1005	CE-1050
Output current / power	1.5 A / 5 W	1.5 A / 7.5 W	2.5 A / 8.3 W	2.5 A / 15 W
Output voltage	1.5 – 3.3 V	3.3 – 5.0 V	1.0 – 3.3 V	3.3 – 12.6 V
Input voltage	6 – 16 V	6 – 16 V	3 – 5.25 V	9 – 26.4 V
Format	metal cover SMT	metal cover SMT	metal cover SMT	metal cover SMT
Warranty	1 year	1 year	1 year	1 year



### iCX series

The first of an all new product family, the 2<sup>nd</sup> generation DOSA packaged range of POL converters covers the output current range up to 6 A with useable power up to 30 W, with two types of SMT mounting available from a single package. The designer can choose between the DOSA standard Land Grid Array or the Edge Plated Castellations giving greater flexibility to the range of applications for the iCF POL.

- Very low profile, 3 A only 3.66 mm
- Positive or negative remote on/off
- Sequencing
- Remote sense
- Industry standard trim
- Constant switching frequency
- Wide output voltage adjustment range

Series	iCF05003	ICG05006
Output current / power	3 A / 10 W	6 A / 30 W
Efficiency	up to 94 %	up to 94 %
Output voltage	0.6 – 3.63 V	0.6 – 3.63 V
Input voltage	2.4 – 5.5 V	2.4 – 5.5 V
Format 2 <sup>nd</sup> generation DOSA	Open frame SMT LGA/EPC	Open frame SMT LGA/EPC
Warranty	3 years	3 years

## PL and iAX/iBX series, 1<sup>st</sup> generation DOSA

This broad range of POL converters covers the output current range from 1 A to 20 A with useable power up to 100 W, with both SMT and SIP packages available. With remote on/off, sequencing and remote sense, the PL and iXX products are easily integrated into user systems, compatible with 3.3, 5, 8.3, 9.6 and 12 V bus architectures.

- High efficiency, up to 96 %
- Constant switching frequency
- Positive or negative remote on/off
- Sequencing
- Wide output adjustment range
- Surface mount or SIP



### Low current / power

Series	PL5S05	PL5S12	iBA	IBC	IBD
Output current / power	5 A / 16.5 W	5 A / 16.5 W	8 A / 26 W	7 A / 35 W	7 A / 35 W
Efficiency	up to 94 %	up to 92 %	up to 97 %	up to 96 %	up to 93 %
Output voltage	0.75 – 3.3 V	0.75 – 5.5 V	0.75 – 3.63 V	0.8 – 5.5 V	0.8 – 5.5 V
Input voltage	3.0 – 5.5 V	8.3 – 14.0 V	3.0 – 5.5 V	6.0 – 14.0 V	6.0 – 14.0 V
Format DOSA	SMT or SIP	SMT or SIP	SMT	SMT	SIP
Warranty	2 years	2 years	3 years	3 years	3 years

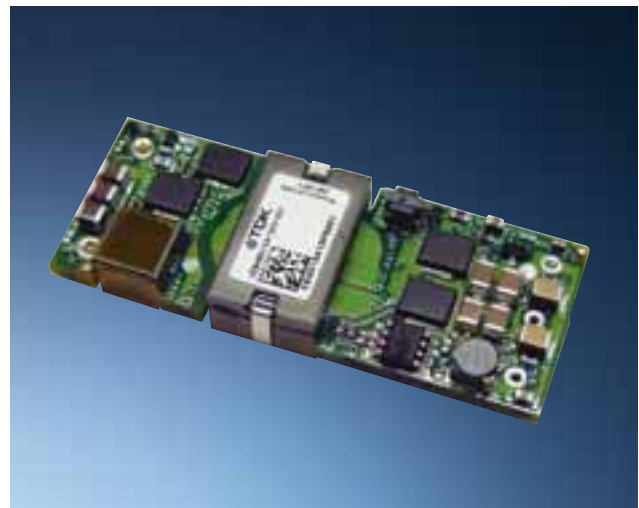
### Mid and high current / power

Series	PL10S12	PL15S05	iAA	PL16S12	iAC	iAD	PL20S12
Output current / power	10 A / 50 W	15 A / 50 W	15 A / 50 W	16 A / 80 W	16 A / 80 W	16 A / 80 W	20 A / 100 W
Efficiency	up to 95 %	up to 94 %	up to 97 %	up to 94 %	up to 97 %	up to 97 %	up to 94 %
Output voltage	0.75 – 5.0 V	0.75 – 3.3 V	0.75 – 3.63 V	0.75 – 5.0 V	0.8 – 5.0 V	0.8 – 5.0 V	0.75 – 5 V
Input voltage	6.0 – 14.0 V	3.0 – 5.5 V	3.0 – 5.5 V	6 – 14 V 9 – 14 V	6 – 14 V	6 – 14 V	6 – 14 V
Format DOSA	SMT or SIP	SMT or SIP	SMT	SMT or SIP	SMT	SIP	SMT or SIP
Warranty	2 years	2 years	3 years	2 years	3 years	3 years	1 year

*DC/DC converters, intermediate bus architecture – fixed ratio*

A range of eighth-brick and quarter-brick converters offering a choice of 4:1 and 5:1 input to output voltage conversion ratios, intended for powering 12 V and 9.6 V intermediate or bus architectures, with a power rating up to 300 W.

- Constant switching frequency
- 1500 V isolation (2250 V, 17 A)
- Choice of pin lengths
- Positive or negative remote on/off
- High efficiency, up to 96 %



Series	iEB48013A120	iEB48017A120	iQD48031A096	iQD48025A120
Output current / power	13 A / 150 W	16.7 A / 200 W	31 A / 300 W	20 A / 100 W
Efficiency	up to 95.5 %	up to 95.5 %	up to 96 %	up to 96 %
Output voltage	12 V	12 V	9.6 V	12 V
Input voltage	42 – 56 V	38 – 53 V	36 – 60 V	42 – 53 V
Format DOSA	Open frame eighth-brick through hole	Open frame eighth-brick through hole	Open frame quarter-brick through hole	Open frame quarter-brick through hole
Warranty	3 years	3 years	3 years	3 years



*DC/DC converters, intermediate bus architecture – regulated*

**A series of products that offer a fully regulated output for powering 8.3 V, 9.6 V or 12 V intermediate bus architectures allowing full telecom input range operation without compromise.**

**Quarter-brick**

- ATCA suitable
- 12.7 mm (13.2 mm with baseplate)
- 1500 V isolation
- No baseplate option
- Monotonic start-up
- Starts into pre-biased load
- Constant switching frequency
- Choice of pin lengths
- Positive or negative on/off logic
- Latching / non-latching protection options

Series	iQG	iQL
Output current / power	25 A / 300 W	30 A / 300 W
Efficiency	up to 95 %	up to 94 %
Output voltage	12 V	8.3 V, 9.6 V, 12 V
Input voltage	36 – 75 V	36 – 75 V
Output trim	no	yes
Remote sense	no	no
Format DOSA	open frame / baseplate, quarter-brick through hole	open frame / baseplate, quarter-brick through hole
Warranty	3 years	3 years

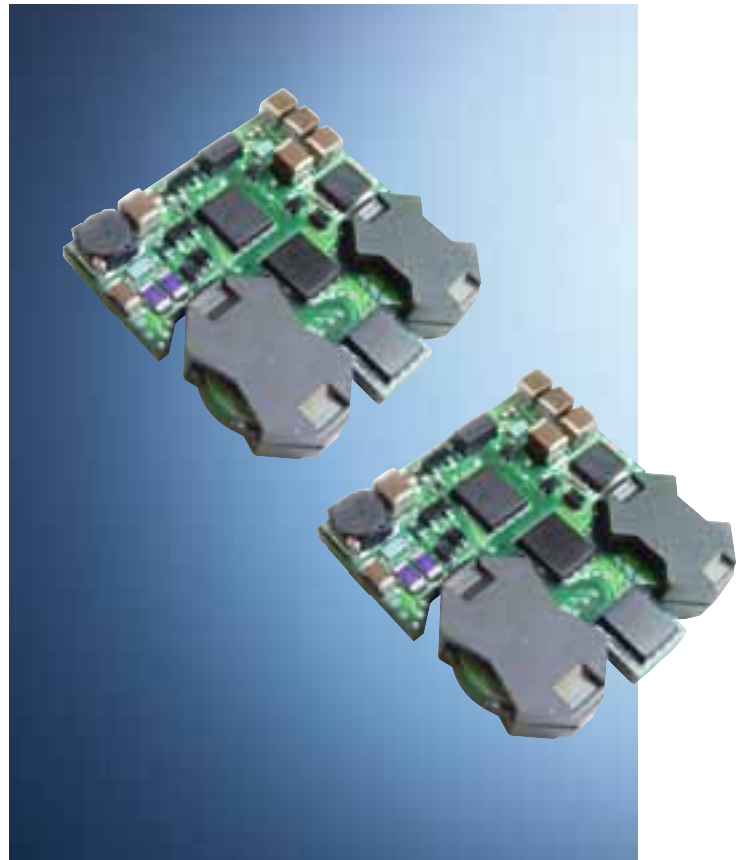
*DC/DC converters, fully featured, fully regulated*

### Pico-brick

The pico-brick family provides a high level of output power in a surface mount package, in high operating ambient temperatures with minimal airflow.

- High efficiency, up to 92 %
- Extremely compact size
- 30.5 x 29.3 x 8.1 mm
- 1500 V isolation
- Surface mount, P&P, T&R
- Constant switching frequency
- Choice of positive or negative on/off logic
- Output voltage trim

Series	iPB
Output current / power	up to 30 A / 45 W
Efficiency	up to 89 %
Output voltage	1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V, 15 V, 18 V
Input voltage	36 – 75 V
Format	open frame, SMT
Warranty	3 years



### 1/16-brick

- 1500 V isolation
- DOSA industry standard footprint
- Size: 33 x 22.9 x 12.7 mm
- Constant switching frequency
- Selection of pin lengths
- Choice of positive or negative on/off logic
- Output voltage trim
- Remote sense

Series	iSA
Output current / power	up to 30 A / 78 W
Efficiency	up to 92 %
Output voltage	1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V
Input voltage	36 – 75 V
Format	open frame
DOSA	1/16-brick through hole
Warranty	3 years





## Eighth-brick

The eighth-brick series has one of the broadest ranges of output voltages available, covering from 1.2 V to 28 V, offering good useable power ratings with minimal airflow.

- High efficiency, up to 92 %
- 1500 V isolation
- Size: 58.4 x 22.9 mm
- 8.5 (PAE) or 8.8 mm (iEA) heights
- Constant switching frequency
- Selection of pin lengths
- Choice of positive or negative on/off logic
- Output voltage trim
- Remote sense

Series	iEA	PAE
Output current / power	up to 25 A / 78 W	up to 30 A / 100 W
Efficiency	up to 91 %	up to 92 %
Output voltage	1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V, 15 V, 18 V, 28 V	1.8 V, 2.5 V, 3.3 V, 5 V, 6 V
Input voltage	36 – 75 V	36 – 75 V 18 – 36 V
Format DOSA	open frame eighth-brick through hole	open frame eighth-brick through hole
Warranty	3 years	1 year



## Quarter-brick

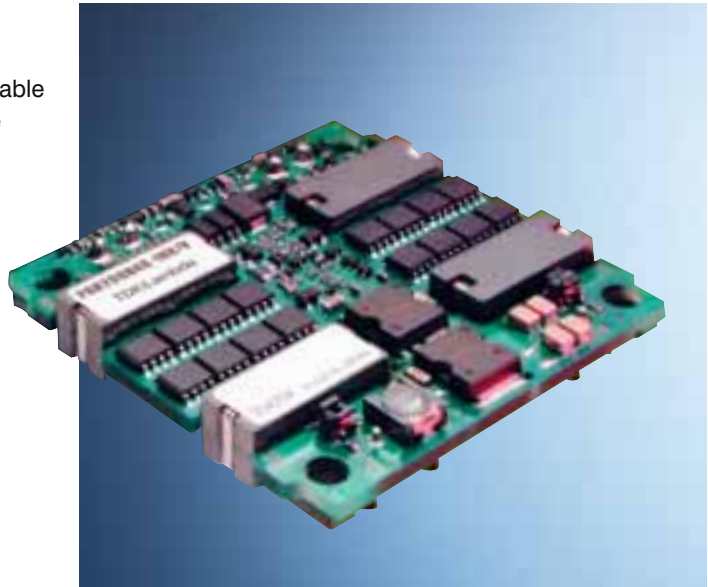
The quarter-brick broad product range provides output voltages from 1.2 V to 28 V, with high current and true useable power ratings and a choice of thermal management strategies, including open frame contact cooling.

Series	PAQ	iQB	iQE	iQL
Output current / power	20 A / 100 W	25 A / 150 W	40 A / 204 W	70 A / 300 W
Efficiency	up to 90 %	up to 92 %	up to 94 %	up to 94 %
Output voltage	1.2 V, 1.8 V, 2.5 V, 3.3 V, 5 V	1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V	3.3 V, 5 V, 8 V, 12 V, 15 V	1.2 V, 1.5 V, 1.8 V, 3.3 V, 5 V, 24 V, 28 V
Input voltage	36 – 75 V	36 – 75 V 18 – 36 V	36 – 75 V 18 – 36 V 18 – 75 V	36 – 75 V 18 – 36 V
Format DOSA	open frame baseplate optional quarter-brick through hole	open frame, quarter-brick through hole	open frame, quarter-brick through hole	open frame baseplate optional quarter-brick through hole
Warranty	2 years	3 years	3 years	3 years

## Half-brick

The half-brick line up offers a vast array of alternatives, including single and dual outputs, a selection of adjustable output voltages from 1 V to 53 V, open or closed frame construction and base-plated or non-base-plated construction, giving the designer the full freedom of optimal product selection.

- Up to 80 A / 450 W output power
- High efficiency, up to 95 %
- 1500 V isolation
- Industry standard footprint
- Constant switching frequency
- Selection of pin lengths
- Choice of positive or negative on/off logic
- Wide output voltage trim
- Remote sense
- Monotonic start-up
- Starts into pre-biased load



Series	PAH	PAH-D	iHG
Output current / power	29 A / 450 W	2x 15 A / 75 W	80 A / 300 W
Efficiency	up to 94 %	up to 94 %	up to 93 %
Output voltage	1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V, 15 V, 24 V, 28 V, 48 V	DUAL 1.8 – 5 V 1.8 – 5 V	1.2 V, 1.5 V, 1.8 V, 3.3 V, 5 V
Input voltage	36 – 75 V 18 – 36 V	36 – 75 V	36 – 75 V
Format DOSA	closed frame half-brick through hole	closed frame half-brick through hole	open frame half-brick through hole
Warranty	2 years	2 years	3 years

## Full-brick

The range of full-brick products includes 24 V, 48 V and 400 V input devices with a broad range of output voltages, and many additional functions, some highlighted below.

- Up to 100 A / 700 W output power
- High efficiency, up to 94.5 %
- 400 V input voltage versions
- Industry standard footprint
- Constant switching frequency
- Selection of pin lengths
- Choice of pos or neg on/off logic
- Wide output voltage trim
- Remote sense
- Monotonic start-up
- Starts into pre-biased load
- Single wire current share



Series	iFA	PAF
Output current / power	up to 55 A / 600 W	up to 100 A / 700 W
Efficiency	up to 94.5 %	up to 91 %
Output voltage	9.6 V, 12 V	1.8 V, 3.3 V, 5 V, 12 V, 24 V, 28 V
Input voltage	36 – 75 V	36 – 75 V 18 – 36 V 200 – 400 V
Format DOSA	open frame with baseplate full-brick through hole	closed frame with baseplate full-brick through hole
Warranty	3 years	1 year

## AC/DC front end converters

### PFE series

This range of AC/DC converters completes the TDK-Lambda range of power modules, by providing “front end” AC/DC conversion. They can be used as “stand alone” to directly power OEM equipment, or combined with any suitable DC/DC converters and few external components to facilitate a quick to market, very low profile, fully featured AC-DC PSU, complete with PFC and meeting the latest IEC61000-4-5 input lightning surge specifications.

Two families are available, the original “S” range, and the newly included feature rich “F” range adding; auxiliary supply, active current share, remote on/off, and module good functions.



### PFE series, simple function

Series	PFE300S			PFE500S			PFE700S
Input voltage	85 – 265 V AC single phase with PFHC						
Output voltage	12 V	28 V	48 V	12 V	28 V	48 V	51 V (50 – 57 V)
	fully-regulated						semi-regulated
Output current	25 A	10.8 A	6.3 A	33 A	18 A	10.5 A	14 A
Output power	300 W	302.4 W		396 W	504 W		714 W
Operating temperature (baseplate)	–40 °C ~ 100 °C			–40 °C ~ 85 °C	–40 °C ~ 100 °C		–40 °C ~ 85 °C @ full load –40 °C ~ 100 °C @ 85% load
Size	116.8 x 61 x 12.7 mm						

### PFE series, full function

Series	PFE500F			PFE1000F		
Input voltage	85 – 265 V AC, with PFHC					
Output voltage	12 V	28 V	48 V	12 V	28 V	48 V
Output current	42 A	18 A	10.5 A	60 A	36 A	21 A
Output power	504 W			720 W	1008 W	
Remote on/off	possible					
Parallel operation	possible					
Operating temperature (baseplate)	–40 °C ~ 85 °C		–40 °C ~ 100 °C		–40 °C ~ 100 °C @ 200 V AC –40 °C ~ 85 °C @ 100 V AC	
Size	122 x 70 x 12.7 mm			160 x 100 x 13.4 mm		

## Power modules

These modules comprise the basic element for developing customized power supplies. The modules include all main functions for a fast and reliable design.

### PH series

The broadest range of power modules for customized power supplies. 4 wide input voltage ranges from 18 – 400 V DC makes it simple to build a customized power supply based on standard modules for nearly every kind of application.

The PH series are offered as “Full function” modules with signaling and parallel operation function with a very wide output voltage adjustment range from –60 % up to +20 % of the nominal output voltage. The “Simple function” modules offer a output voltage adjustment range  $\pm 20\%$  in a more compact format.



Series	PH-(F)	PH (S)
Rating	75 – 300 W	50 – 600 W
Output voltage	2 – 28 V	3.3 – 48 V
Input voltage	24, 48, 110, 280 V DC	24, 48, 110, 280 V DC
Warranty	2 years	2 years

## Power factor modules

### PF series

This modules offer a easy solution to connect the PH series with 280 V DC input to AC-mains with wide range input. The modules achive a power factor of 0.95 and fit together with the PH modules.

The PF-500A-360 delivers 500 W output power at wide range input and up to 750 W output power at high line input.

The PF-1000A-360 offers 1000 W output power at wide range input and 1500 W at high line.



Series	PF-500A-360	PF-1000A-360
Rating	500 W (750 W)	1000 W (1500 W)
Output voltage	360 V DC	360 V DC
Input voltage	85 – 265 V AC	85 – 265 V AC
Warranty	2 years	2 years

# Value added

*Customized products  
based on power modules*



## **800 W power supply with multiple outputs**

for medical application

- Features:**
- AC/DC-Frontend 230 V AC (PF-1000 A-360)
  - 14 separate outputs between 3.3 V and 50 V (several PH-modules)
  - control- and signal-interface
  - EN 60601-1
  - mechanical design for rotating system

**Application:** • computer tomograph

## **1000 W DC/DC power supply with multiple outputs**

for medical application

- Features:**
- input 244 – 358 V DC
  - 12 separate outputs
  - 4 x 24 V (PAF)
  - $\pm 15$  V (PXE)
  - 5 V (PXE)
  - 15 V (PH)
  - 2 x 325 V (direct from input)
  - mechanical design for rotating system

**Application:** • computer tomograph

## **1500 W AC/DC Frontend**

for medical application

- Features:**
- 170 – 265 V AC input, nominal output 360 V DC
  - designed for 50 G continuous centrifugal force
  - EN 60601-1

**Application:** • computer tomograph

## Customized solutions

**TDK-Lambda offers you a total power solution. We want to offer you the complete solution to power up your application.**

Our customers, their specific needs and requirements, take centre stage of all our actions. Our wide range of products of high quality and reliability meet the first part of our customers' needs. TDK-Lambda is unique in the industry when offering the second, customized part.

TDK-Lambda means "engineering" – support and solutions for any application whether, from our standard products or specific customer solutions.

### 300 W power supply with input-/output-connectors

- Features:**
- AC input 85 – 265 V AC / 50 Hz
  - 48 V 5 A output
  - customized mechanic assembly IP30
  - customized input/output cable and connectors
  - EN 60950
  - EN 61000-6-4,-2

**Application:** • industrial automation

### 50 W customized power supply

- Features:**
- AC input 85 – 265 V AC / 50 Hz
  - 1 output 12 V or 24 V, cable junction
  - EN60950
  - EN55022

**Application:** • supply for computer peripherals

### Power supply in customized case

- Features:**
- AC input 85 – 265 V AC / 50 Hz
  - 2 outputs 24 V and 12 V with ITT-high current contacts
  - EN60950
  - EN55022

**Application:** • process automation

### Complete 19" rack system

- Features:**
- AC-Input 3-phase
  - customized 19" rack
  - 6 Laboratory power supplies
  - Genesys™ series

**Application:** • Medical equipment



Please contact your local sales office to find the best solution to your application.



**TDK-Lambda Germany GmbH**  
Karl-Bold-Strasse 40  
77855 Achern  
Tel. +49 7841 666 0  
Fax +49 7841 5000  
info.germany@de.tdk-lambda.com  
www.emea.tdk-lambda.com



**TDK-Lambda Italy S.r.l.**  
Via dei Lavoratori 128/130  
20092 Cinisello Balsamo (MI)  
Italy  
Tel. +39 02 61 29 38 63  
Fax +39 02 61 29 09 00  
info.italia@it.tdk-lambda.com  
www.it.tdk-lambda.com



**TDK-Lambda Corporation**  
5F Dempa Bldg. 1-11-15  
Higashigotanda  
Shinagawa-Ku  
Tokyo, 141-0022  
Japan  
Tel. +81 3 3447 4693  
Fax +81 3 3447 4750  
www.jp.tdk-lambda.com



**TDK-Lambda Austria Sales Office**  
Aredstrasse 22  
2544 Leobersdorf  
Tel. +43 2256 655 84  
Fax +43 2256 645 12  
info.germany@de.tdk-lambda.com  
www.emea.tdk-lambda.com



**Nemic Lambda Ltd.**  
Kibbutz Givat  
Hashlosha 48800  
Israel  
Tel. +9 723 902 4333  
Fax +9 723 902 4777  
www.nemic.co.il



**TDK-Lambda UK Ltd.**  
Kingsley Avenue  
Ilfracombe  
Devon EX34 8ES  
United Kingdom  
Tel. +44 12 71 85 66 66  
Fax +44 12 71 86 48 94  
powersolutions@emea.tdk-lambda.com  
www.uk.tdk-lambda.com



**TDK-Lambda Americas Inc.**  
3055 Del Sol Blvd.  
San Diego, CA 92154  
USA  
Tel. +1 800-LAMBDA-4  
Tel. +1 619-575-4400  
Fax +1 619-429-1011



**TDK-Lambda France SAS**  
ZAC des Delaches  
BP 1077-Gometz-le-Chatel  
91940 LES ULIS  
France  
Tel. +33 1 60 12 71 65  
Fax +33 1 60 12 71 66  
france@fr.tdk-lambda.com  
www.fr.tdk-lambda.com



**TDK-Lambda EMEA**  
www.emea.tdk-lambda.com