Flex

Power Supply

ENG / 05.2013

One solution, many applications

ADELSYSTEM

Integrated Electronic Solutions

A new way to make and use Power Supplies

Yet another strong proposition by Adelsystem for power supplies and power continuity specialists.

Adelsystem aim is to provide designers and users with a complete range of solutions in power supplies and power continuity products, focusing on both standard and special applications.
Our target is to deliver problem-free solutions so that you can safely dedicate your attention to the rest of the automation project.

The FLEX technology is the result of these corner stones of our corporate identity.
Designed taking into account the pressure to optimal use of space, FLEX units are very compact in size.
The wide input voltage range allows to have just one article for many applications and minimize stock.

FLEX is based on semi-resonant switching circuit which allows efficiency up to 93% and a very dynamic and robust power supply to a wide range of loads such as PLC, sensors, motors, resistive/ inductive loads, etc.
The FLEX range conforms with the highest quality standards and guarantees a reliable and durable operation with a MTBF up to 500.000 hours and 3 year warrantee.

Flex

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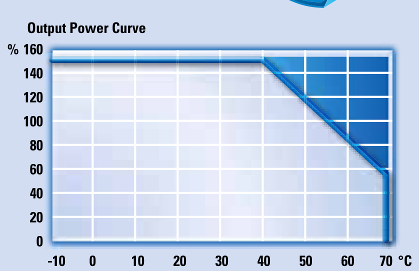
Three modes for output protection.

More flexibility in input voltage

The power supplies FLEX90, FLEX170 and FLEX280 B are suitable to a wide range of input voltage. With a single type it is therefore possible to meet the requirements of more applications and consequently improve design activity and stock management.

More power: "Power Boost"

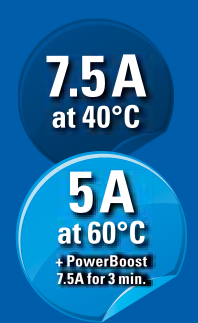
As an example, Flex17024A is a 24Vdc power supply that features a continuous duty current of 5A at 60°C and a Power Boost of 150%, equivalent to 7,5A, for at least 3 min. This features allows the use of a smaller size unit to power demanding loads such as motors, solenoid valves, lamps and other loads with transient overload behavior which would otherwise require an oversize power supply.



More power at varying rated temperature

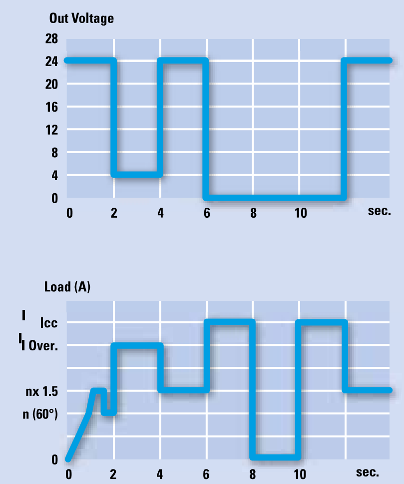
As an example, Flex17024A can be the right solution for two design cases in very different temperature conditions:

1) **7.5A, 24Vdc in continuous duty at 40°C.**
2) **5A, 24Vdc in continuous duty at 60°C +Power Boost 7,5A for at least 3 min.**



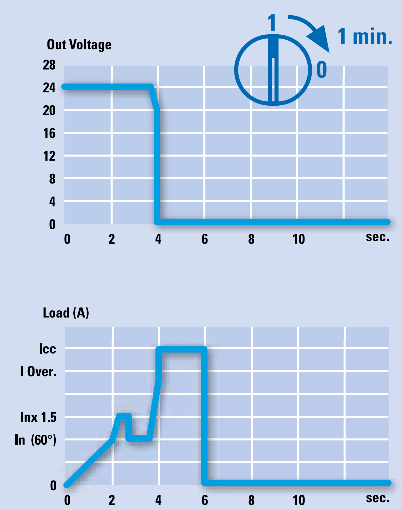
Hiccup Mode Automatic Restart

This is the default factory setting of all FLEX units. In case of short-circuit or overloading, the output current is interrupted. The device tries again to re-establish output voltage and normal condition about every 2 second till the problem is cleared.



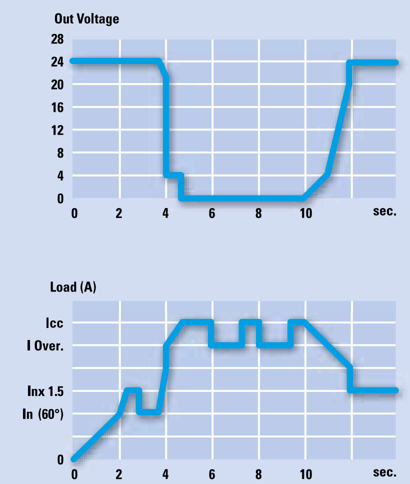
Manual reset manual Restart by Operator

In case of short-circuit or overload, the output current is interrupted. In order to restart the output it is necessary to switch-off the input circuit for about 1 minute. This protection mode is particularly suggested in applications where safety procedures require that reset be carried out only by an authorized person.

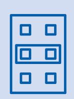


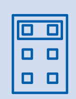
"Continuous Output mode"

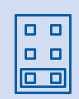
In case of short-circuit or overload, the output current is kept at high values with near zero voltage. In case of short circuit the current can reach up to 3 times the rated current at 60°C. This protection mode is used to meet the requirements of demanding loads such as motors, solenoid valves, lamps, PLC with highly capacitive input circuits and other loads with marked transient overload behavior.



Jumper settings

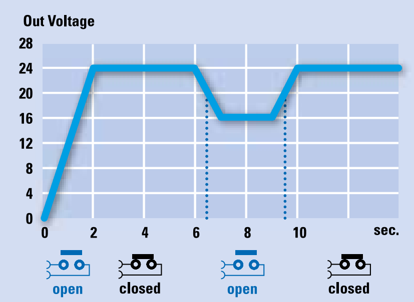

HICCUP MODE


MANUAL RESET


CONTINUOUS OUT MODE

"Power Good" relay for monitoring the output voltage level

Output voltage is continuously monitored. The units 24 Vdc output FLEX170, FLEX280 and FLEX500 are equipped with Power Good relay. The NO contact triggers any time the output voltage level goes below 20Vdc (24 Vdc output). This feature is particularly useful in redundant applications.

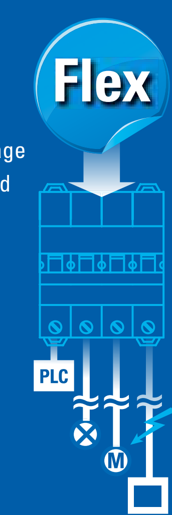


Applications in compliance with the norm EN 60204-1

FLEX units comply with the norm requirement that an overload of 50% over the nominal current be withstand by the power supply for at least 1 hour to allow the tripping of magneto-thermic switches on the output. These features allows the implementation of "Control of commands and Emergency stops" by means of industrial PCs, PLC, remote I/O, etc. required by the norm. Adelsystem supplies a table for the sizing and length of connecting cables and the choice of proper magneto-thermic switches.

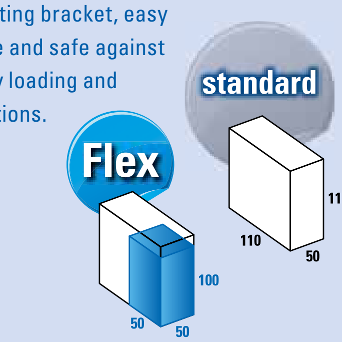
Output circuits protected by magneto-thermic circuit breakers

Standard output circuit breakers can be triggered quickly and reliably with FLEX technology, which allows three times the nominal current at 60°C. Defective current paths are selectively disconnected, the defect is limited and the important parts of the system remain in operation. This together with the 50% overload capacity in compliance with EN60204-1 allows to safely manage any overload and short circuit condition.



Reduced dimensions and snap-on DIN rail bracket

The higher performances obtained with the FLEX! line, allow almost half dimensions as conventional technology and higher performances. An example is Flex6024A 60W with maximum current till 6A. In permanent duty at 40°C it can deliver 3A at 24Vdc. All FLEX units feature the new DIN rail mounting bracket, easy to use and safe against heavy loading and vibrations.



Easy Parallel connection

With FLEX technology it is easier to double capacity. The units FLEX280 and FLEX500 can be easily connected in parallel without needing high precision instruments, but a normal tester. Just remove the jumper and the trick is done!

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	1 Phase												2 Phases			3 Phases
	5 Vdc	12 Vdc			48 Vdc			24 Vdc								
Input (Volt)	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac	230 - 400 - 500 Vac	230 - 400 - 500 Vac	230 - 400 - 500 Vac	400 - 500 Vac
Output (Vdc - W)	5 Vdc 35 W	12 Vdc 36 - 72 W	12 Vdc 120 - 180 W	12 Vdc 280 - 336 W	48 Vdc 120 - 180 W	48 Vdc 240 - 345 W	48 Vdc - 480 - 600 W	24 Vdc - 40 - 70 W	24 Vdc 95 - 120 W	24 Vdc 120 - 180 W	24 Vdc 240 - 330 W	24 Vdc 480 - 600 W	24 Vdc 95 - 120 W	24 Vdc 120 - 180 W	24 Vdc 240 - 330 W	24 Vdc 480 - 600 W
Model	FLEX6005A	FLEX6012A	FLEX17012A	FLEX28012A	FLEX17048A	FLEX28048A	FLEX50048A	FLEX6024A	FLEX9024A	FLEX17024A	FLEX28024A	FLEX50024A	FLEX9024B	FLEX17024B	FLEX28024B	FLEX50024B
										2 x Vac						3 x Vac
INPUT DATA																
Nominal Input Voltage	115 - 230 Vac	115 - 230 Vac	115 - 230 Vac Input*	115 - 230 Vac Input*	115 - 230 Vac Input*	115 - 230 Vac Input*	115 - 230 Vac Input*	115 - 230 Vac	115 - 230 Vac*	115 - 230 Vac*	115 - 230 Vac*	115 - 230 Vac*	230 - 400 - 500 Vac*	230 - 400 - 500 Vac*	230 - 400 - 500 Vac*	400 - 500Vac
Input Voltage Range	90 - 264	90 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	90 - 135 Vac 180 - 264 Vac	187 - 264 Vac 330 - 550 Vac	187 - 264 Vac 330 - 550 Vac	187 - 264 Vac 330 - 550 Vac	330 - 550Vac
Inrush Current (Vn and In Load) I2t	≤ 7 A ≤ 5 msec.	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 7 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 17 A ≤ 5msec	≤ 17 A ≤5 msec	≤ 17 A ≤5 msec	≤ 17 A ≤ 5 msec
Frequency	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%	47 - 63 Hz ±6%
Input Current	0.5 - 0.25 A	1 - 0.7 A	2.8 - 1.3 A	3.3 - 2.2 A	2.8 - 1.3 A	3.3 - 2.2 A	8.5 - 4.2 A	1.0 - 0.7A	1.8 - 0.9A	2.8 - 1.3A	3.3 - 2.2A	8.5 - 4.2 A	1.0 - 0.5 - 0.4A	1.5 - 0.8 - 0.7 A	2.2 - 1.4 - 1.0A	1,7A
Internal Fuse	4.0 A	4.0 A	4.0 A	6.3 A	4.0 A	6.3 A	10.0 A	4A	4A	4A	6.3A	10A	4A	4A	4A	6.3A
External Fuse (recommended)	6 A (MCB curve B)	6.0 A	10.0 A	16.0 A	10.0 A	16.0 A	16.0 A	6A	10A	10A	16A	16A	10A	10A	16 A	16A
OUTPUTS DATA																
Output Voltage Factory Setting ±3%	5 Vdc	12 Vdc	12 Vdc	12 Vdc	48 Vdc	48 Vdc	48 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc
Adjustment range (Vadj)	4.75 - 5.25 Vdc	10 - 15.5Vdc	10 - 14 Vdc	10 - 14 Vdc	41 - 55 Vdc	41 - 55 Vdc	41 - 55 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc	22 - 27 Vdc
Start up with capacitive load	≤ 50.000 mF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF
Turn-On delay after applying mains voltage	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1.5 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)
Continuous Current at 24 V < 40°C (In)	5.0 A	4 A (115) 6A (230)	14 A	16 A	3.75 A	7.0 A	12.0 A	2.0A (115) 3.0 A (230)	5.0A	7.5A	14A	25 A	5.0 A	7.5 A	14 A	25 A
Continuous Current at 24 V < 50°C (In)	5.0 A	3 A (115) 5A (230)	12 A	15 A	3.0 A	6.0 A	11.0 A	1.5A (115) 2.5A (230)	4.5A	6.0A	12A	22 A	4.5 A	6.0 A	12 A	22 A
Continuous Current at 24 V < 60°C (In)	5.0 A	2 A (115) 3A (230)	10 A	14 A	2.5 A	5.0 A	10.0 A	-	4.0A	5.0A	10A	20 A	4.0 A	5.0 A	10 A	20 A
Power Boost Current (at 24Vdc 60°C ≥ 3min.)	5.0 A	4 A (115) 6A (230)	14 A	16 A	3.75 A	7.0 A	12.0 A	3.5A	5.0A	7.5A	14A	25 A	5.0 A	7.5 A	14 A	25 A
Short circuit current (Icc)								7.0A	12A	16A	30A	60 A	12 A	16 A	30 A	60 A
Hold-up Time (min. Vac) 24Vdc	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec
Residual Ripple	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}	≤ 80 mV_{pp}
Efficiency (50% of In)	≤ 82 %	≤ 88 %	≤ 91 %	≤ 92 %	≤ 91 %	≤ 91 %	≤ 92 %	≥ 88%	≥ 91%	≥ 91%	≥ 91%	≥ 92%	≥ 91%	≥ 91%	≥ 91%	≥ 92%
Over temperature Protection	Shut-down output and automatic restart															
Short-circuit protection	Continuous Mode		1° Hiccup Mode ; 2° Continuous Mode ; 3° Manual Reset					Continuous Mode	1° Hiccup Mode; 2° Continuous Mode; 3° Restart After Main							
Dissipation power load max (W)	6	6	17	28	17	28	54	6	11	17	28	54	11	17	28	54
Over Load protection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Over voltage output protection (Internal Failure)	Yes (typ. 15 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 72 Vdc)	Yes (typ. 72 Vdc)	Yes (typ. 72 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)	Yes (typ. 35 Vdc)
Parallel connection	✓	✓	✓	Easy parallel	✓	Easy parallel	Easy parallel	✓	✓	✓	Easy parallel	Easy parallel	✓	✓	Easy parallel	Easy parallel
Relay power good	✗	✗	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
CLIMATIC DATA																
Ambient Temperature operation	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C	-25 - +70°C
De rating T° > (In)	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	>60° 2.5% °C	> 50° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C
Ambient Temperature Storage	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C	-40 - +85°C
Humidity at 25 °C	95 % to 25 °C	95 % to 25 °C	95 % to 25 °C	95 % to 25 °C	95 % to 25 °C	95 % to 25 °C	95 % to 25 °C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C
GENERAL DATA																
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac	3000 Vac
Isolation Voltage(IN / PE)	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac	1605 Vac
Isolation Voltage(OUT / PE)	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac	500 Vac
Reliability (MTBF IEC 61709)	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h	> 500 000 h
Pollution Degree Environment	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Connection Terminal Blocks Screw Type	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm	4 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm	4 mm	2,5 mm	2,5 mm	2,5 mm	4 mm
Dimension (w-h-d) mm	50x120x50	50x120x50	55x110x105	72x115x135	55x110x105	72x115x135	85x120x140	50x120x50	55x110x105	55x110x105	72x115x135	85x120x140	55x110x105	55x110x105	72x115x135	85x120x140
Weight	0.30 kg approx	0.30 kg approx	0.6 kg approx	0.77 kg approx	0.60 kg approx	0.77 kg approx	1.1 kg approx	0.30 kg approx	0.50 kg approx	0.60 kg approx	0.72 kg approx	1.1 kg approx	0.50 kg approx	0.60 kg approx	0.72 kg approx	1.0 kg approx
Safety Standard Approval	CE	CE	CE	CE	CE	CE	CE	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed	CE, UL listed

* selectable

Product range

DC UPS "All In One"

DC Power Back Up units. Multi-function devices: power supply, battery charger and back-up module in the same casing together with Adel Battery Care software

Flex

DIN rail Switching Power Supplies. Very compact in size, 150% power boost, wide input voltage range 110 - 230 - 400 - 500 Vac. Selectable output protection mode

D-Flex

High efficiency Power Supplies in DIN type modules. For all kinds of small power. Requirements in installation, building automation and Industrial applications.

CB

New generation of Battery Chargers with 4 charging levels, equipped with Adel Battery Care software. One product for all batteries types.

Power supply low input voltage

Switching power suppy for direct connection to secondary transformer In 24 Vac Out 12-24-48 Vdc Watt: 25 - 460.

Dc / Dc converter

Dc / Dc Converter, step Up and Step down. Input - Output isolated, low voltage. With or without DIN Rail.

Interfaces

Wide range of passive interfaces units for Input and Output connections, for PLC and CNC machine.

BM

Battery Modules and Battery holders for connection to DC-UPS or battery charger units Battery sizes: 1.2; 3; 7.2; 12 Ah at 12Vdc and 24 Vdc.

Auxiliary Module

- Decoupling Modules for redundancy applications.
- Electronic Fuses for Over Load output control, up to 4 cannel

SFP

Safety Power. Power continuity solutions for alarm systems and fire alarms. Available as a fully enclosed device conforming with EN54.4 or as a component to be integrated in other instrumentation.

Innovation and Functionality

Persist the technical proposal of ADEL system dedicated to the innovative products for the electrical continuity in DIN rail applications. The research objective of the design team, aimed to offer products which are able to solving in an innovative and functional way every application. The wide range of power supplies ADEL system SW, PFAL, PSM, PST, is added to the last generation of products that changes the way of Power Supply, FLEX!. Since 1991 ADELsystem designs and produces products in Italy, since the second half of 2008 in a new building located in Reggio Emilia, it is consolidated in logistics and production process the aim of achieving greater efficiency and innovative technology.