Powering the connected world

Power solutions for telecom
Catalogue 2019

Europe, Middle East and Africa

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ENERSAI
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DELTA
Smarter. Greener. Together.

Telecom Infrastructure Solutions

Standard Telecom Power Solutions

We offer indoor and outdoor AC/DC, DC/AC, DC/DC or even AC/DC/AC power systems. The flexible CellD and CabD standard platforms meet most needs. However, should you need a custom solution with a unique architecture, we will design one – to your exact specifications.

- **Rectifiers**
- **CellD**
- **Controllers**
- **Outdoor**
- **Indoor**
- **Batteries**

TPS

Energy Saving Solutions

Delta is a key provider of multi-source, energy-saving power solutions for many of the world's major telecom operators. Where power is unreliable or unavailable, our hybrid power solutions ensure telecom services by combining solar and wind power, diesel generators and fuel cells.

- **Hybrid solutions**
- **Rectifiers retrofit**
- **Solar upgrades**

ESS

Energy Data Management

Our Energy Data Management solution iDEAn puts telecom network operators back in the driver's seat to efficiently manage and maintain their network. Whether the task at hand is to limit disruptions, calculate generator fuel usage and runtime, replace batteries before failure, diagnose faults or schedule timely maintenance, crucial business intelligence is just a click away with iDEAn.

- **ORION**
- **iDEAn**

EDM

Telecom Data Center

With our wide range of uninterruptible power supplies (UPS), we offer a competitive edge to businesses in need of first-rate power solutions. Delta UPSs are designed to ensure that companies can protect their mission critical applications by main-taining a steady flow of energy under adverse circumstances. Delta also provides DC high voltage systems, an alternative solution for UPS.

- **MCIS**
- **HVDC**

TDC

Building Automation Solutions Development

Delta's Building Automation Solutions combine an open building management platform with energy-saving HVAC, lighting, and telecom power products to enable smarter, greener buildings. With technology development like the upcoming 5G in building intergration, smart buildings can be achieved with optimal operation efficiency, comfort and energy savings.

- **LOYTEC**

BASD

Complete telecom infrastructure solutions

Everything is connected. The telecom infrastructure is so much more than power. At Delta, we see the whole picture and offer complete solutions that meet your infrastructure needs.

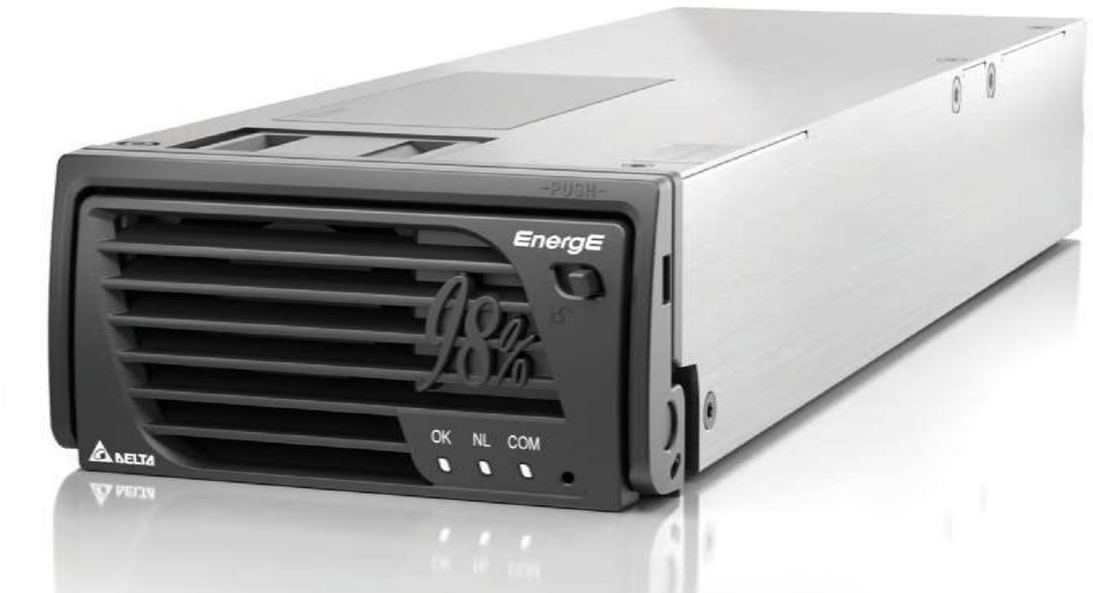
We offer a wide range of power saving products. By combining them we create customer specific solutions. Developed by experts in their field, all our specialty products are combined in integrated solu-tions, delivered by a seamlessly integrated organization with one objective: **to provide you with the optimal solution and a great customer experience.**

All our products are fully compatible, and will ultimately help you bring down both CAPEX and OPEX cost.

Everything connected

Efficient
Power Output

98%



TPS Telecom Power Solutions

Powerful rectifiers

EnergE

Efficiency

Power output	95.2%	96.0%	96.4%	98.0%
2000 W	DPR 850-48	DPR 2000-48		
2900W			DPR 2900-48	
3000 W			DPR 3000B-48	DPR 3000E-48
4000W	DPR 4000-48			
6000W			DPR 6000-48	

With energy efficiency of up to 98%, Delta's EnergE rectifiers are the new benchmark in power density.

EnergE series rectifiers are designed for medium to high power applications and minimizes site energy consumption, delivering significant OPEX savings, lower temperature management requirements and lower CO2 emissions.

Delta's rectifiers are hot-pluggable and can be installed across the majority of our solutions.

Main features

- Market leaders in power density – an essential feature in electronic devices as it defines the product's energy conversion capability in relation to its size
- Small size – Delta EnergE rectifiers require less cabinet space than competing products
- Advanced over-voltage protection – fewer maintenance trips to the site
- High operation temperatures – EnergE rectifiers also tolerate high operating temperatures, which delivers additional savings.

Applications

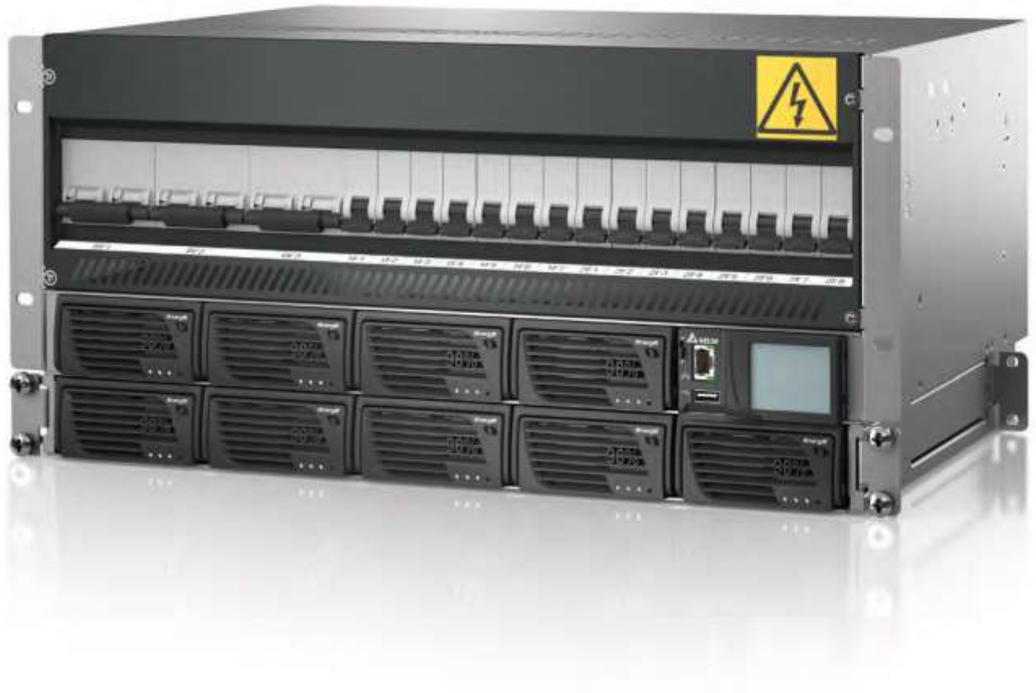
- **Wireless applications**
- **Fixed line applications, data communications**
- **Network base stations**

	DPR 850-48	DPR 2000B-48	DPR 3000B-48
RECTIFIERS			
OUTPUT			
Nominal system voltage	53.5 V_{DC}	54.0 V_{DC}	54.0 V_{DC}
Operating voltage range	42 V_{DC} to 58 V_{DC}	43 V_{DC} to 58 V_{DC}	43 V_{DC} to 58 V_{DC}
Power output	850 W	2000 W	3000 W
Efficiency	95.2 %	96.0 %	96.4 %
Current limitation	17.7 A	37.0 A	59.0 A
INPUT			
Mains voltage	80 V_{AC} to 300 V_{AC}	90 V_{AC} to 295 V_{AC}	90 V_{AC} to 300 V_{AC}
Mains frequency	50 / 60 Hz	45 / 66 Hz	50 / 60 Hz
Protection	Internal fuse 2 x 8 A (L,N)	Internal fuse 16A (L,N)	Internal fuse 2 x 20 A
GENERAL			
Power density	30 W / in^3	36.5 W / in^3	56.8 W / in^3
Control and monitoring	ORION Touch		
Hot-pluggable	Yes	Yes	Yes
Dimensions (W x H x D)	51.8 x 40.0 x 247.2 mm	83.0 x 43.4 x 274.6mm	84.0 x 41.0 x 265.0 mm
Weight	0.6 kg	1.04 kg	1.3kg
Cooling	Fan cooled with speed control		
Operating temperature	-40° C to +75° C	-40° C to +75° C	-40° C to +75° C
STANDARDS			
Safety	EN / IEC 60950; UL 60950; CAN / CSA – C22.2		
EMI (radiated)	EN 55022 class B		
Environment	RoHS compliant		
Protection class	IP20 (EN 60529)		
ORDERING			
Order numbers	TPS1010004A-PML-M	ESR-48/40H E	ESR-48/60A A

	DPR 3000E-48	DPR 4000-48	DPR 6000-48
RECTIFIERS			
OUTPUT			
Nominal system voltage	54.0 V_{DC}	53.5 V_{DC}	53.5 V_{DC}
Operating voltage range	40 V_{DC} to 58 V_{DC}	42 V_{DC} to 58 V_{DC}	42 V_{DC} to 58 V_{DC}
Power output	3000 W	4000 W	6000 W
Efficiency	98.0 %	95.2 %	96.5 %
Current limitation	63.5 A	83.3 A	125.0 A
INPUT			
Mains voltage	80 V_{AC} to 300 V_{AC}	80 V_{AC} to 300 V_{AC}	250 V_{AC} to 530 V_{AC} (3-ph)
Mains frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Protection	Internal fuse 2 x 20 A	Internal fuse 2 x 30 A	Internal fuse 3 x 20 A
GENERAL			
Power density	56.8 W / in^3	27.3 W / in^3	26.5 W / in^3
Control and monitoring	ORION Touch		
Hot-pluggable	Yes	Yes	Yes
Dimensions (W x H x D)	84.0 x 41.0 x 270.0 mm	82.0 x 86.9 x 377.9 mm	129.5 x 83.0 x 380.7 mm
Weight	1.4 kg	3.5 kg	5.2 kg
Cooling	Fan cooled with speed control		
Operating temperature	-40 °C to +75 °C	-45 °C to +75 °C	-40 °C to +70 °C
STANDARDS			
Safety	EN / IEC 60950; UL 60950; CAN / CSA – C22.2		
EMI (radiated)	EN 55022 class B		
Environment	RoHS compliant		
Protection class	IP20 (EN 60529)		
ORDERING			
Order numbers	TPS1010027A	TPS1010016C	DPR 6000B-48 ID:A1

Energ
EnergE
EnergE
EnergE

Efficiency is 95.0 % to 95.9 %
Efficiency is 96.0 % to 96.9 %
Efficiency is 97.0 % to 97.9 %
Efficiency is 98.0%



TPS Telecom Power Solutions

Compact power systems

CellD

Efficiency

Load current | Installed power

			95.2%	96.4%	98%
CellD 20	20A	1.7kW	DPS 850B-48-3		
CellD 40	40A	2.55kW	DPS 850B-48-3		
CellD 100	100A	5.1kW	DPS 850B-48-6		
		8.7kW		DPS 2900B-48-3	
CellD 125	125A	8.7kW		DPS 2900B-48-3	
		9kW		DPS 3000B-48-3	DPS 3000B-48-3
CellD 300	250A	8.7kW		DPS 2900B-48-3	
		14.5kW		DPS 2900B-48-4	
		17.4kW		DPS 2900B-48-6	
		12kW		DPS 3000B-48-4	DPS 3000B-48-4
CellD 600	600A	34.8kW		DPS 2900B-48-12	
		26.1kW		DPS 2900B-48-9	
		27kW		DPS 3000B-48-9	DPS 3000B-48-9
		20kW	DPS 4000B-48-5		

The CellD product family is based on DC power systems. They are modular and can be configured with additional converters to meet any requirement. CellD systems are the most compact on the market and offer extremely high power density. CellD units can be installed alongside other equipment, in an existing rack for example.
They work seamlessly and at optimal efficiency up to 98% with Delta's EnergE rectifiers and advanced controllers. This configuration ensures reliable system operation, generates savings in OPEX and CO2, and maximizes battery lifetime. The CellD family is ready to work as a hybrid system by simply connecting additional power sources like solar or wind.

Main features

- Wide DC power range – systems available from 20A to 600A
- Extremely wide input AC voltage range from 80Vac to 300Vac – for all AC networks (even low-quality AC grids) in any location
- Wide operating temperature range (-45°C to +65°C)
- Modular structure and configuration adjusted to customer requirements
- Highest efficiency – CellD systems use high-efficiency EnergE rectifiers
- Universal 19" rack-mounted modules to be installed in different 19" structures and cabinets
- Advanced monitoring – state-of-the-art controllers from the ORION family; 6 alarm relays, modems, WEB Interface, SNMP protocol
- Hot-plug modules and components
- Fully hybrid capable applications

Applications

- **Mobile telecommunication**
- **Fixed line telecommunication**
- **Broadband networks**
- **Data centers**
- **Switching centers**
- **Modular UPS configurations**

DELTA

COMPACT POWER SYSTEMS	CelliD 20	CelliD 40	CelliD 100	
				
	nerg	Energ	nergE	nerg
Rectifier module	DPR 850B-48 (max. 2 pcs.)	DPR 850B-48 (max. 3 pcs)	DPR 850B-48 (max. 6 pcs)	DPR 2900B-48 (max. 3 pcs)
Efficiency	95.2%	95.2%	95.2%	97.2%
Install power (max. configuration)	1.7 kW	2.55 kW	5.1 kW	8.7 kW
Input protection (recom.)	2x 16 A gL/gG type	25A gL/gG fuse	3x 10A	3x 20A
Dimensions H x W x D	43.6 (1U) x 444 (19') x 290mm	43.6 (1U) x 484.3 (19') x 280mm	86.8 (2U) x 484.3 (19") x 295mm	86.8 (2U) x 484.3 (19') x 323mm
Weight	3.9kg	4.1 kg	7.0 kg	7.0 kg
AC INPUT				
AC configuration	2L + N + PE, optional bridging	L+N+PE	3L+N+PE	3L + N + PE
Input voltage range	80 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}
Frequency range	45 Hz to 66 Hz	45 Hz to 66 Hz	45 Hz to 66 Hz	45 Hz to 66 Hz
Mains connection	Screw terminals	Screw terminals	Screw terminals	Screw terminals
DC OUTPUT				
Max. output current / max. installed power	26A / 1.7 kW	40A / 2.55 kW	100A / 5.1 kW	100A / 8.7 kW
Load breakers	5 x (2 - 30 A)	6x MHCB (2-30A) or 2x MHCB (6-50A)	12x MHCB (2-30 A) or 4x MHCB (16-100 A)	12x MHCB (2-30 A) or 4x MHCB (16-100 A)
Battery breakers	1 x 30 A	2x MHCB 50A	2x MHCB 100A	2x MHCB 100A
LVD (battery)	Optional	Yes	Yes	Yes
PLD (not critical loads)	No	No	Optional	Optional
Output protection	Inbuilt fuses (both poles) Over-heating protection			
Critical / non critical loads configuration	N/A	N/A	6/6 or 2/2	6/6 or 2/2
CONTROL / MONITORING				
Controller	ORION, ORION Touch			
Local interface	Display, keypad, LEDs			
Remote monitoring	Alarm relays, modem option, LAN, SNMP protocol			
OTHERS				
Operating temperature	-45 °C to +65 °C	-45 °C to +65 °C	-45 °C to +65 °C	-45 °C to +65 °C
Max. relative humidity	95%, non condensing	95%, non condensing	95%, non condensing	95%, non condensing
Environment standard	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3
Safety standard	IEC 60950	IEC 60950	IEC 60950	IEC 60950
EMC standard	EN 300386	EN 300386	EN 300386	EN 300386
ORDERING				
System	3799890900	3799321900	3799361100	3799361100
Rectifier	TPS1010004B-PML-M	TPS1010004B-PML-M	TPS1010004B-PML-M	ESR-48/56V F C-A or ESR-48/56D A-M

COMPACT POWER SYSTEMS	CelliD 125	
		
	nergE	EnergE
Rectifier module	DPR 2900B-48 (max. 3 pcs)	DPR 3000B/E-48 (max. 3 pcs)
Efficiency	97.2%	96.4% or 98%
Install power (max. configuration)	8.7 kW	9 kW
Input protection (recom.)	3x 20A	3x 20 A
Dimensions H x W x D	132 (3U) x 484.3 (19") x 359 mm	132 (3U) x 484.3 (19") x 343 mm
Weight	8.6 kg	9 kg
AC INPUT		
AC configuration	3L + N + PE	3L + N + PE
Input voltage range	80 V_{RMS} to 300 V_{RMS}	80/90 V_{RMS} to 300 V_{RMS}
Frequency range	45 Hz to 66 Hz	50 Hz to 60 Hz
Mains connection	Screw terminals	Screw terminal
DC OUTPUT		
Max. output current / max. installed power	125A / 8.7 kW	125 A / 9 kW
Load breakers	10x MCB or 15x MCB (up to 63A per pole)	11 x MCB (2 - 63 A)
Battery breakers	6x MCB or 9x MCB (up to 125A per pole)	2 x MCB (80 - 125 A)
LVD (battery)	Yes	Yes
PLD (not critical loads)	Optional	Optional
Output protection	Inbuilt fuses (both poles) Over-temperature protection	
Critical / non critical loads configuration	5/4	5/4
CONTROL / MONITORING		
Controller	ORION, ORION Touch	
Local interface	Display, keypad, LEDs	
Remote monitoring	Alarm relays, modem option, LAN, SNMP protocol	
OTHERS		
Operating temperature	-45 °C to +65 °C	-45 °C to +65 °C
Max. rel. humidity	95%, non condensing	95%, non condensing
Environment standard	ETSI EN 300019-1-3	ETSI EN 300019-1-3
Safety standard	IEC 60950	IEC 60950
EMC standard	EN 300386	EN 300386
ORDERING		
System	3799577600	3799577600
Rectifier	ESR-48/56V F C-A or ESR-48/56D A-M	ESR-48/60A A-S or TPS1010027A-PML-S

Energ Efficiency is 95.0% to 95.9% nergE Efficiency is 97.0% to 97.9%

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ENERSAI System, S.L.

COMPACT POWER SYSTEMS

	CellD 300			
				
	nergE	EnergE	nergE	nergE
Rectifier module	DPR 2900B-48 (max. 3 pcs)	DPR 2900B-48 (max. 5 pcs.)	DPR 2900B-48 (max. 6 pcs.)	DPR 3000B/E-48 (max. 4 pcs.)
Efficiency	97.2%	97.2%	97.2%	96.4% or 98%
Install power (max. configuration)	8.7 kW	14.5kW	17.4kW	12 kW
Input protection (recom.)	3x 20A (3L + N + PE)	3x 40A (3L + N + PE)	3x 40A (3L + N + PE)	3x 40A (3L + N + PE)
Dimensions H x W x D	221.6 (5U) x 482.2 (19") x 322mm	2222 (5U) x 479.7 (19') x 315 mm	266 (6U) x 479.7 (19') x 315 mm	177.8 (4U) x 484.3 (19') x 328 mm
Weight	13 kg	14 kg	14 kg	13 kg
AC INPUT				
AC configuration	3L + N + PE, configurable	3L + N + PE, configurable	3L + N + PE, configurable	3L + N + PE, configurable
Input voltage range	80 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}	80/90 V_{RMS} to 300 V_{RMS}
Frequency range	45 Hz to 66 Hz	45 Hz to 66 Hz	45 Hz to 66 Hz	50Hz to 60 Hz
Mains connection	Screw terminals	Screw terminals	Screw terminals	Screw terminals
DC OUTPUT				
Max. output current / max. installed power	250A / 8.7kW	250 A / 14.5kW	250 A / 17.4 kW	250 A / 12 kW
Load breakers	15-21x MCB (2 -63A)	15-21x MCB (2 -63A)	15-21x MCB (2 -63A)	15 - 21 x MCB (2 - 63 A)
Battery breakers	2-6x MCB (up to 125A), 2-3x MCB (up to 200A), 2x MCB (up to 300A)			
LVD (battery)	Yes	Yes	Yes	Yes
PLD (not critical loads)	Optional	Optional	Optional	Optional
Output protection	Built-in fuses (both poles) Over temperature protection			
Critical / non critical loads configuration	7/8 or 10/8 or 13/8	7/8 or 10/8 or 13/8	7/8 or 10/8 or 13/8	7/8 or 10/8 or 13/8
CONTROL / MONITORING				
Controller	ORION, ORION Touch			
Local interface	Display, keypad, LEDs			
Remote monitoring	Alarm relays, modem option, LAN, SNMP protocol			
OTHERS				
Operating temperature	-45 °C to +65 °C	-45 °C to +65 °C	-45 °C to +65 °C	-45 °C to +65 °C
Max. rel. humidity	95%, non condensing	95%, non condensing	95%, non condensing	95%, non condensing
Environment standard	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3
Safety standard	IEC 60950	IEC 60950	IEC 60950	IEC 60950
EMC standard	EN 300386	EN 300386	EN 300386	EN 300386
ORDERING				
System	3799624700	3799624700	3799624700	3799624700
Rectifier	ESR-48/56V F C-A or ESR-48/56D A-M	ESR-48/56V F C-A or ESR-48/56D A-M	ESR-48/56V F C-A or ESR-48/56D A-M	ESR-48/60A A-S or TPS1010027A-PML-S

COMPACT POWER SYSTEMS

	CellD 600			
				
	EnergE	EnergE	EnergE	Energ
Rectifier module	DPR 2900B-48 (max. 9 pcs)	DPR 2900B-48 (max. 12 pcs)	DPR 3000B-48 (max. 9 pcs)	DPR 4000B-48 (max. 5 pcs)
Efficiency	96.4%, 97.2% or 98%	97.2%	96.4% or 98%	95.2%
Install power (max. configuration)	26.1kW	34.8kW	29 kW	20kW
Input protection (recom.)	2x (3x 40 A)	2x (3x 40 A)	2x (3x 40 A)	3x 50 A
Dimensions H x W x D	308 (7U) x 482 (19") x 335 mm	351 (8U) x 482 (19") x 335mm	221.6 (5U) x 484.3 (19") x 345 mm	266 (6U) x 482 (19") x 500mm
Weight	17.5 kg	20kg	17.5kg	20kg
AC INPUT				
AC configuration	2x (3L + N + PE)	2x (3L + N + PE)	2x (3L + N + PE)	3L + N + PE
Input voltage range	80/90 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}	80/90 V_{RMS} to 300 V_{RMS}	80 V_{RMS} to 300 V_{RMS}
Frequency range	50 Hz to 60 Hz	45 Hz to 66 Hz	50 Hz to 60 Hz	45 Hz to 66 Hz
Mains connection	Screw terminals	Screw terminals	Screw terminals	Screw terminals
DC OUTPUT				
Max. output current / max. installed power	600 A / 26.1 kW	600 A / 34.8 kW	600 A / 29 kW	600 A / 20 kW
Load breakers	10x MCB or 15x MCB (up to 63A per pole)			
Battery breakers	6x MCB or 9x MCB (up to 125A per pole)			
LVD (battery)	Yes	Yes	Yes	Yes
PLD (not critical loads)	Optional	Optional	Optional	Optional
Output protection	Built-in fuses (both poles), Over temperature protection			
Critical / non critical loads configuration	7/8 or 3/7	7/8 or 3/7	7/8 or 3/7	7/8 or 3/7
CONTROL / MONITORING				
Controller	ORION, ORION Touch			
Local interface	Display, keypad, LEDs			
Remote monitoring	Alarm relays, modem option, LAN, SNMP protocol			
OTHERS				
Operating temp.	-45 °C to +45 °C	-45 °C to +65 °C	-45 °C to +45 °C	-45 °C to +45 °C
Max. rel. humidity	95%, non condensing	95%, non condensing	95%, non condensing	95%, non condensing
Environment std.	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3	ETSI EN 300019-1-3
Safety standard	IEC 60950	IEC 60950	IEC 60950	IEC 60950
EMC standard	EN 300386	EN 300386	EN 300386	EN 300386
ORDERING				
System	3799671200	3799671200	3799671200	3799671200
Rectifier	ESR-48/60A A-S or TPS1010027A-PML-S	ESR-48/56V F C-A or ESR-48/56D A-M	ESR-48/60A A-S	TPS1010016C

Energ Efficiency is 95.0% to 95.9% nergE Efficiency is 97.0% to 97.9%

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DELTA

TPS Telecom Power Solutions

Indoor systems

CabD

INDOOR SYSTEMS

CabD Systems

Max. output current / max. installed power	600 A / 48 kW	1000 A / 72 kW	1500 A / 96 kW
Rectifier module	DPR 2900 (max. 12 pcs) DPR 3000 (max. 12 pcs) DPR 4000 (max. 8 pcs) DPR 6000 (max. 6 pcs)	DPR 2900 (max. 20 pcs) DPR 3000 (max. 24 pcs) DPR 4000 (max. 18 pcs) DPR 6000 (max. 12 pcs)	DPR 2900 (max. 28 pcs) DPR 3000 (max. 30 pcs) DPR 4000 (max. 18 pcs) DPR 6000 (max. 12 pcs)
Efficiency	95.2% ... 98%	95.2% ... 98%	95.2% ... 98%
AC configuration	3L + N + PE or 3L + PE		
Load and battery connection	Configurable – modular design		
LVD / PLD	Option / Option		
Controlling and monitoring	ORION, ORION Touch		
Operating temperature	-5 °C to +45 °C		
Dimensions H x W x D	Single cabinet 1800 / 2000 / 2200 x 600 x 600 mm	Single or multicabinets 2000 / 2200 x 600 x 600 / 800 mm	Single or multicabinets 2000 / 2200 x 600 x 600 / 800 mm
Weight	Depends on the configuration		
Ordering	3799363900 Configurator	3791691700 Configurator	3791691700 Configurator

The Delta CabD product series offer high power-density systems, ideal for space critical indoor applications. CabD systems are built on modular basis and allow flexibility in configuration.

The system includes up to 30 rectifiers, AC and DC connections, battery connection and the Delta ORION controller. The CabD family is ready to work as a hybrid system.

Main features

- Scalable power system up to 96 kW per cabinet and up to 768 kW in parallel
- Up to 281 kW of solar power can be used in parallel
- Truly modular building blocks
- Mirroring the system built for top entry or bottom entry for cabling
- High efficiency rectifiers up to 98 %
- Enhanced monitoring and controlling with ORION controller

Applications

- **Central offices**
- **Telecom switching centers**
- **Data centers**
- **Modular UPS configurations**

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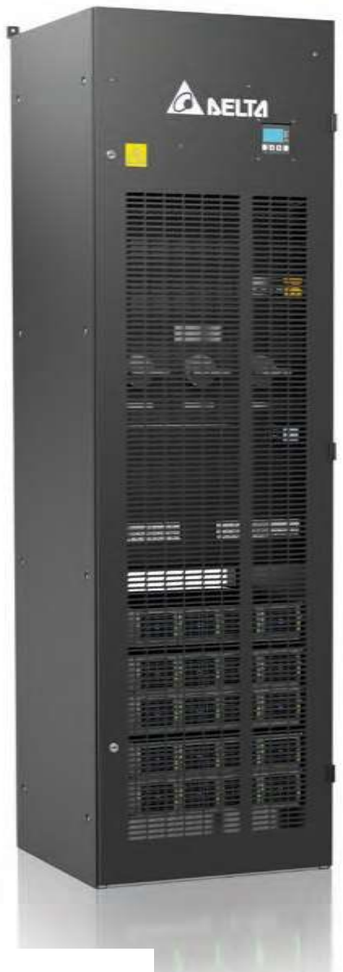

TPS Telecom Power Solutions

Indoor system

Inverter Systems, Cell- & CabD

Main features

- Configurable inverter system using CE+T inverters
- 0 second transfer between AC and DC sources
- Optional manual bypass switch for complete system service
- Integrated AC load distributions
- 1-phase and 3-phase AC inputs and outputs
- Communication with ORION optional

Applications

- **Modular UPS configurations**
- **Mobile telecommunications**
- **Fixed Line telecommunications**
- **Broadband networks**
- **Data centers**
- **Switching centers**
- **Indoor and outdoor**

Delta's inverter systems are integrated with Delta's CabD or standard 19" racks for installation inside outdoor or indoor support cabinets.

The "Twin Sine Innovation" TSI technology eliminates all single points of failure with full scalability. For CellD versions typical configuration is one or two inverter shelves and for CabD – up to 6 for 60 kVA system.

The products offers flexible architecture and can be configured according to specific needs. It is possible to configure an optional manual bypass switch for complete system override. CE+T T2S-RS485 monitor unit can communicate electrical parameters with the Delta ORION controller. AC output is either bulk terminal or based on DPN or RCD devices.

INDOOR SYSTEMS		CellD		CabD
				
Inverter module	CE+T Nova 750 VA (up to 8 pcs)	CE+T Media 1500 VA (up to 8 pcs)	CE+T Bravo 2500 VA (up tor 8 pcs)	CE+T Bravo 2500 VA (up to 24 pcs)
Efficiency EPC mode / DC online mode	93 % / 89 %	95 % / 91 %	96 % / 91 %	96 % / 91 %
Dimensions H x W x D	177.8 (4 U) / 222,3 (5U) x 483 (19") x 410 mm	266.7 (6 U) / 355.6 (8U) x 483 (19") x 379 mm	266.7 (6 U) / 355.6 (8U) x 483 (19") x 511 mm	1800 / 2000 / 2200 x 600 x 600 mm
Manual by-pass	Optional			
AC INPUT				
Voltage range	150 V_{AC} to 265 V_{AC}			
Frequency range (selectable)	47 Hz to 53 Hz or 57 Hz to 63 Hz			
Power factor	> 99 %			
AC input configuration	1-phase	1-phase	1-phase	1-phase or 3-phase
DC INPUT				
Voltage range	40 V_{DC} to 60 V_{DC}			
Nominal current	56A (4 modules) 112A (8 modules)	112A (4 modules) 224A (8 modules)	224A (4 modules) 448A (8 modules)	448A (8 modules) 672A (12 modules) 896A (16 modules) 1344A (24 modules)
Maximum input current	88A (4 modules) 176A (8 modules)	192A (4 modules) 384A (8 modules)	336A (4 modules) 672A (8 modules)	672A (4 modules) 1008A (8 modules) 1344A (16 modules) 2016A (24 modules)
AC OUTPUT				
Redundant output power (n+1)	2250 VA / 1725 W (4 modules) 5250 VA / 4025 W (8 modules)	4500 VA / 3600 W (4 modules) 10.5 kVA / 8.4 kW (8 modules)	7.5 kVA / 6.0 kW (4 modules) 17.5 kVA / 14.0 kW (8 modules)	17.5 kVA / 14 kW (8 modules) 27.5 kVA / 22 kW (12 modules) 37.5 kVA / 30 kW (16 modules) 57.5 kVA / 46 kW (24 modules)
Nominal current per inverter	3.25A	6.6A	10.9A	10.9A
Short circuit clear up capacity per inverter	29.25A for 20 ms (when AC input connected)	66A for 20 ms (when AC input connected)	109A for 20 ms (when AC input connected)	109A for 20 ms (when AC input connected)
AC output options	Bulk terminal, DPN B-curve with optional alarm, RCD B-curve with optional alarm			
OTHERS				
Operating temperature	-20° C to 50° C			
Relative humidity	95 %, non-condensing			
Protection class	IP20			
Safety	IEC EN 60950			
EMC	EN 300386-2			
Monitoring	T2S for communication with ORION	T2S for communication with ORION	T2S for communication with ORION	T2S for communication with ORION, ORION optional
ORDERING				
System	3799531800	3799628800	3799547100	3799626300
Inverter	4909018426	4909018626	4909018526	4909018526

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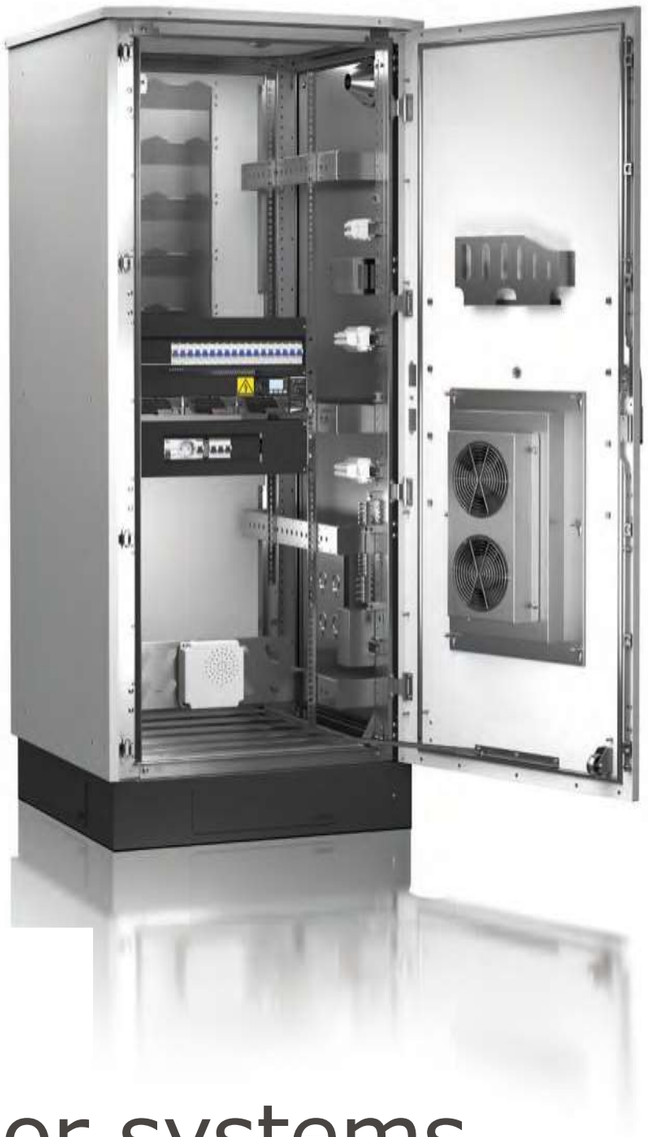

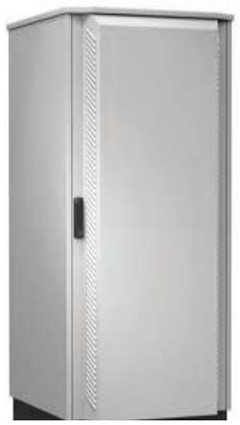

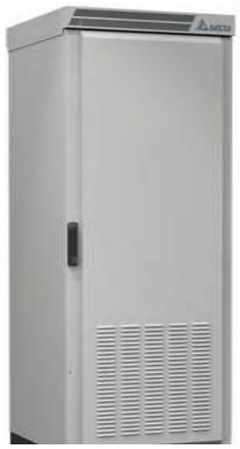

M series,
passive cooling

M series,
active cooling

V series,
passive cooling

V series,
active cooling

TPS Telecom Power Solutions

Outdoor systems

OutD

Delta OutD are cost-effective and high-density outdoor systems, suitable for any climate. The OutD systems are equipped with advanced cooling solutions and ensure substantial savings in both capital and operational expenditures. Additionally, all OutD products ensure low noise levels and feature a multi lock mechanism.

We offer a choice between a basic cost-effective configuration and an optimized modular system alternative.

Main features

- Modular
- Flexible configuration
- Multiple thermal management options
- Enhanced noise management
- Choice between cost effective or fully optimized configuration

Applications

- **Network base stations**
- **Wireless applications**
- **Fixed line applications, data communications**

Active Cooling Possibilties

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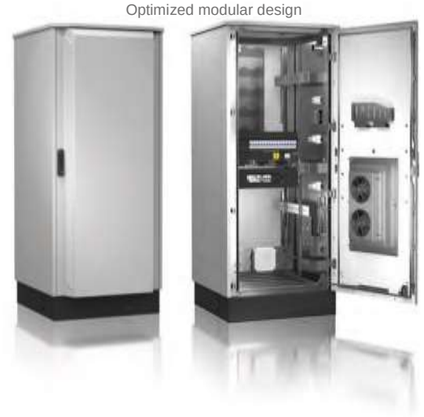
OutD X Systems

OUTDOOR SYSTEMS

Key advantages	• Single or Multilayer wall design • -7dB(A) (lower than std. cabinets with the same cooling capacity) • Flexible configuration - 19' or 21' racks, battery shelves, multiple PSU options (power supply systems), multiple cable management options • Battery box extension (battery cooler) • IP20 equipment extension • Side by side connection available
Dimensions H x W x D	OutD 1.5M H1500 x W770 x D852mm - 28HU OutD 1.8M H1829 x W770 x D852mm - 35HU OutD 2.0M H2052 x W870 x D952mm - 40HU
Protection class	IP55
Material	Steel or Aluminium, Single or multilayer with optional thermal insulation
Lifetime	Steel: up to 15 year, Aluminium: up to 20 years
Cooling options	AV (Air Ventilation), HEX (Heat Exchanger), AC (Air Con), Hybrid AV+AC (Hybrid Cooling + Air Ventilation + Air Con)
Features	• Resistant outdoor enclosure made from non-corrosive aluminum and galvanized steel sheets • Multi layer wall design with thermal insulation of the walls • Bottom cable entry with MC25 cable glands and easy cable routing • Various thermal management options • CAPEX Optimized - Design to cost • Modular, dismountable solution • Cooling systems located on the door only • Internal structure supporting FT batteries up to 190Ah • Alarms terminals
Options	Cable management: Delta universal, PG, Multigate, Roxtec, service LED light, smoke detectors, flood water sensor, blocked filter sensors, high humidity sensor, notebook shelf, battery movable tray, heaters, alarm terminals (Krone, Screw) and much more

OutD Systems

OUTDOOR SYSTEMS

	Optimized modular design	Basic and cost effective solution
		
Key advantages	• Flexible and modular • Multiple cooling options (AV, AC, Hybrid AC+AC)	• Cost effective, basic solution for high runner applications • Multiple cooling options (AV, AC, Hybrid AC+AC)
Dimensions H x W x D	• Low audible noise emissions OutD 1.5M 1500 (28 U) x 770 x 852 mm OutD 1.8M 1829 (35 U) x 770 x 852 mm OutD 2.0M 2052 (40 U) x 870 x 952 mm	• Low audible noise emissions OutD 0.7V 701 (12 U) x 605 x 530 mm OutD 1.2V 1257 (21 U) x 708 x 752 mm OutD 1.8V 1860 (35 U) x 708 x 752 mm OutD 2.0V 2047 (39 U) x 808 x 852 mm OutD 2.2V 2247 (44 U) x 808 x 852 mm
Protection class	Up to IP55	
Material	Steel or aluminum, single or multilayer with optional thermal isolation	
Lifetime	Steel: up to 15 years, aluminium: up to 20 years	
Cooling options	AV (Air Ventilation), HEX (Heat Exchanger), AC (Air Con), Hybrid AV+AC (Hybrid Cooling + Air Ventilation + Air Con)	
Features	• Multilayer wall design based on steel • Assembling – disassembling on site, • Flat packing • Rear door available, side panels removable • Side by side and vertical extension modules • Flexible configuration – 19" or 21" racks, battery shelves, multiple power supply systems, multiple cable management options • Optional battery box extension (battery cooler) • Optional extension IP20 equipment • Noise 7dB(A) lower than standard cabinets with the same cooling capacity (for AV system)	• Single or multilayer wall design • Steel or aluminum outside walls • Flexible configuration – 19" or 21" racks, battery shelves, multiple power supply systems, multiple cable management options • Optional battery cooler • Optional extension IP20 equipment • Noise 7dB(A) lower than standard cabinets with the same cooling capacity (for AV system)
Options	Cable management: Delta universal, PG, Multigate, Roxtec, service LED light, smoke detectors, flood water sensor, blocked filter sensors, high humidity sensor, notebook shelf, battery movable tray, heaters, alarm terminals (Krone, Screw) and much more	

TPS Telecom Power Solutions

Outdoor small cells

BoxD

BoxD Systems				
OUTDOOR SYSTEMS	Golden Eagle	Outdoor Rectifier	Small Cell BoxD (Type V)	Small Cell BoxD (Type H)
				
Dimensions H x W x D	286.4 x 393.6 x 94.6mm	360 x 209,8 x 88,8mm	684 x 489 x 312mm	584 x 635 x 315mm
EN 60529 class	IP65	IP65	IP55	IP55
Material	Aluminium	Aluminium	Enclosure: Aluminium / Internal Parts: Galvanized steel	
Internal 19” space	n/a	n/a	2.5U (no battery) max. depth 282mm	5U (no battery) max. depth 415mm
Weight	9kg	6,4kg	28kg	35kg
User Interface	CANbus to System Controller	Status Indication	None or ORION UIM	CellD configurable
Mounting	Lamppost, pole or wall mountable	Lamppost, pole or wall mountable	Lamppost, pole or wall mountable	Lamppost, pole or wall mountable
Cooling options	Natural cooling	Natural Cooling	Heat Exchanger 15W/K	Heat Exchanger 15W/K
PSU Power		1000W / 42 - 58Vdc	2x850W / 42 - 58Vdc	CellD configurable
Battery	-	-	14Ah (1.5U) or 24Ah (2.5U)	Li-Ion 19”, max. depth 415mm
Operating temperature / Humidity	-40° C to +55° C / 95% RH non-cond.	-40° C to +60° C / 95% RH non-cond.	-33° C to +40° C / 95% RH non-cond.	-33° C to +40° C / 95% RH non-cond.
Connectors	AC, DC, Battery, Alarm	AC input, 2 DC outputs, Alarms	n/a	CellD configurable
Options	n/a	Service LED light Alarm terminals	n/a	- DC Power supply: 1U Delta PS / 2-4U Li-Ion batt. - Inverter system:1U Delta PS / 2-3U Li-Ion batt. / 1U Inverter 230V - Outdoor UPS:1U AC panel / 2U UPS main unit / 2U Batt. Pack

The Delta BoxD Small Cells series is the choice when space is scarce or site density needs to be increased cost-effectively. Available in several dimensions, power levels and form factors, Delta's Small Cell series is the perfect solution for nearly any setting.

From our smallest DC powered units to our largest model that can be outfitted with battery backup, Li-Ion technology, UPS and an AC Inverter, Delta Small Cells can cope wtih increasing traffic needs, network coverage and capacity challenges.

Main features

- Highly configurable with: battery backup, Li-Ion technology, UPS, AC Inverter
- Wall and pole mounted outdoor envi-ronment according to ETS 300 019-1-4 class 4.1
- Optional power system controller ORION can be used as system and climate controller
- Cooling system based on heat exchanger
- Up to 2.5U x 19” structure for -48V user equipment
- Compatible with small 19inch CellD40/ CellD100 Delta power systems

Applications

- **Integral part of LTE, 5G network**
- **Network base stations**
- **Wireless applications**
- **Industrial design in urban areas**
- **Fixed line applications, data communications**

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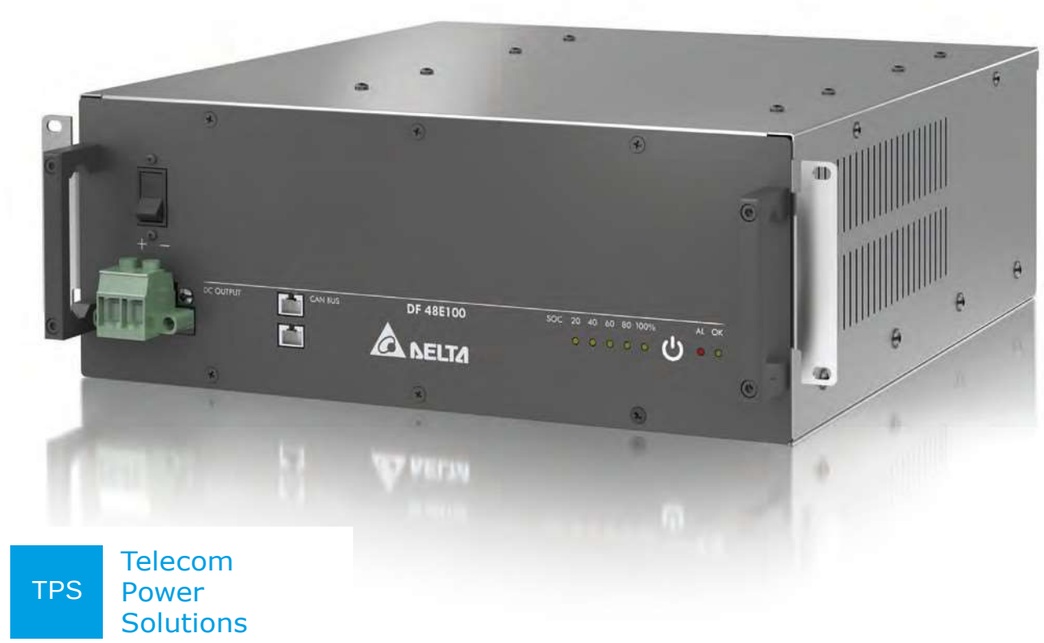
Main features

- High safety
- Certification: IEC 60 950-1, EN 300 386
- Advanced BMS to protect battery module from abnormal conditions
- Retrofit application
- Direct replacement of Lead-acid battery pack
- Flexible capacity expansion
- Parallel expansion up to 16 modules
- Excellent manageability
- Very compact design - 19IN 2U panel
- Hot plug connection
- Signal indication battery status
- Allowed for multi-units or multi-sites remote management

Applications

- **Telecom Back-up power**
- **Energy Back-up and storage for residential, commercial and industrial needs**
- **Direct replacement of conventional 48V lead-acid battery system**



TPS Telecom Power Solutions

Batteries

Lithium-Ion Battery

Delta DF 48E100 battery module is an excellent energy source with a long service life for 48V applications such as telecom, data center and residential power backup. It is in a compact package of high energy density to save space and weight.

The maintenance free design coupled with the intelligent remote monitoring function can eliminate on-site maintenance efforts and save considerable operational costs. To ensure the safety and reliability of the battery, advanced BMS (Battery Management System) can protect the battery from abnormal conditions, such as over temperature, over charging/ discharging.

It can also control the battery operation at the optimal condition to guarantee long service life. Delta DF 48E100 is an incomparable replacement to VRLA and conventional batteries of lower TCO (Total cost of Ownership): at least 3 times longer service life, more than 50% space saving and 65% lighter weight and maintenance free.

Lithium-ion Battery		
BATTERIES	DF 48E40SR	DF48E100
Cells type	Li-ion (NCA+NCM blending)	Li-ion (NCM)
Battery nominal capacity	40 Ah	100 Ah
Battery usable capacity	37 Ah	97 Ah
Expected life	15 years	15 years
Nominal energy	2,1 kWh	5,2 kWh
Nominal / Floating module voltage	51,8 / 56,7 V	51,8 / 55.3 V
Module voltage	48 V	33 A (0,33C)
Maximum discharge current (continuous)	40 A (1C)	100 A (1C)
Maximum discharge current (not continuous)	80 A (2C)	200 A (2C)
Discharging cut-off voltage (LVD)	40,5 V	42 V
Energy metering	Internal SOC counter, measurements based on advanced ICPT algorithms	Internal SOC counter, measurements based on advanced ICPT algorithms
OPERATING CONDITION		
Temperature range recommended	0° C to +45° C	0° C to +45° C
Temperature range extended (derating)	-20° C to +60° C	-20° C to +60° C
Protection class	IP 20	IP 31
SAFETY		
Safe cell design	Cylindrical cells with venting device	Cylindrical cells with venting device
Advanced BMS	ICPT BMS system with safety lines, with galvanic isolated power supply, multi-level fault detection system	
Cells thermal management	Integrated cells cooling system	
STANDARDS		
EMC	EN 300 386	EN 300 386
Safety (Functional and electric)	IEC 60 950-1	IEC 62619
Environment	ETS 300 119-1-3 Class 3.2, Protection class IP 20	ETS 300 119-1-3
Transport	IEC 62 281, UN 38.3	UN 38.3
MECHANIC		
Dimensions (W x H x L)	439 x 85 x 404 mm (19IN / 2U)	439 x 157 x 500 mm (19IN / 4U)
Weight	Approx. 23 Kg	Approx. 40 Kg

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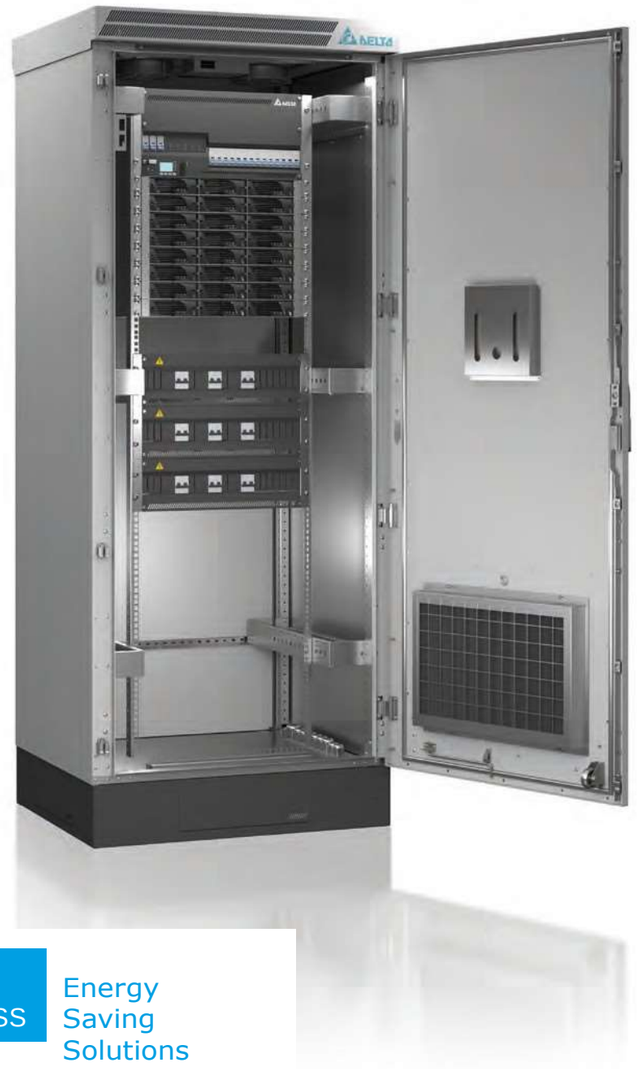


ESS Energy Saving Solutions

Renewable hybrid energy solutions

RenE

RenE secures reliable and uninterrupted power supply even in remote and rural areas with missing power network or low network reliability. In combination with careful energy management from alternative sources, the system lowers operational expenditure, minimizes the waste of energy and can significantly drop CO2 emissions.

Main Features

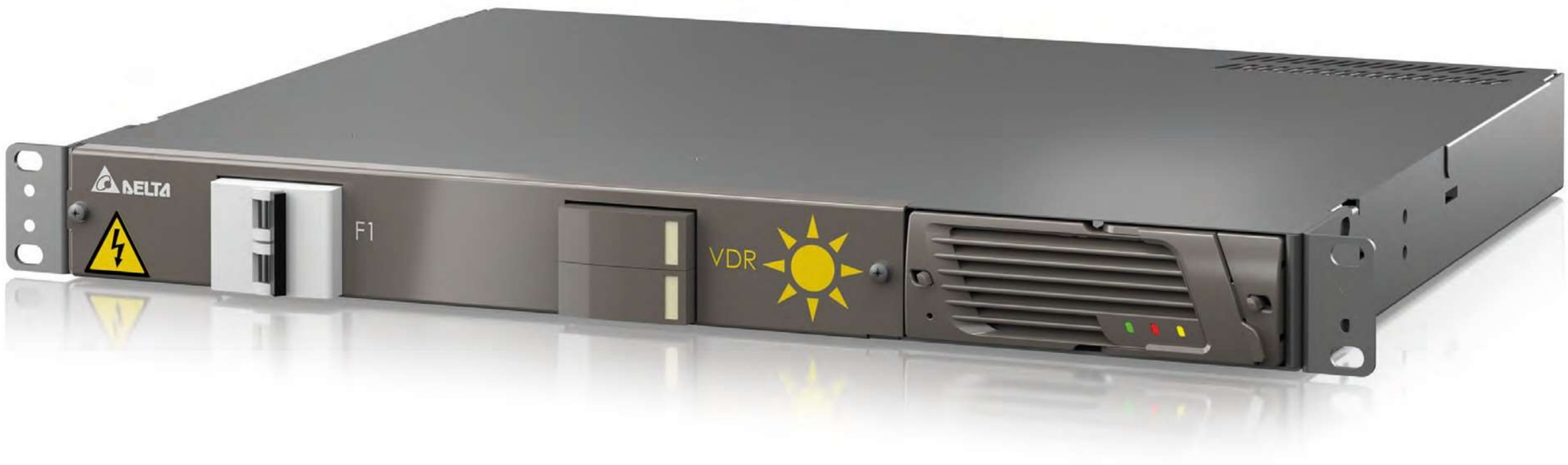
- Power up to 24 kW, high power density
- Renewable green energy by wind and solar power
- Cyclic battery discharge for genset fuel efficiency
- ORION controller for ultimate energy management and site control

Applications

- **Wireless applications, network base stations**
- **Remote areas with difficult site access**
- **Areas with unreliable mains grid or off-grid**

	nergE	nergE
INPUT GRID SECTION		
AC connection	3L + N + PE or L + N + PE	
Nominal voltage	3x 230VAC (L-N, 3-phase) or 230VAC (1-phase)	
Voltage range	88 V_{RMS} to 300 V_{RMS}	
Frequency range	45 to 66 Hz	
Nominal current / phase	Up to 50 A_{RMS}	
Mains terminal	Terminal blocks or main switch	
Input protection, transient OVP	Optional	
INPUT GENERATOR SECTION		
AC connection	3L + N + PE or L + N + PE	
Nominal voltage	3x 230VAC (L-N, 3-phase) or 230VAC (1-phase)	
Voltage range	88 V_{RMS} to 300 V_{RMS}	
Frequency range	45 to 66 Hz	
Automatic transfer switch	Voltage relay monitoring, mechanical interlocking (optional)	
Mains terminal	Terminal blocks or main breaker	
Input protection	Optional	
INPUT SOLAR SECTION		
Solar DC connection	Up to 15 feeds, 10A each	
Voltage range	80 V_{DC} to 350 V_{DC}	
Current max / pole	10 A_{DC}	
Input terminal	Up to 15 breakers 2P 10A	
Input protection	Internal fuse	
Transient protection	600 V_{DC} / 2+V	
INPUT WIND SECTION (OPTIONAL)		
Wind DC connection	One feed 48 V_{DC}	
Max power of the turbine	Up to 3kW	
Voltage range	42 V_{DC} to 58 V_{DC}	
Max current	63 A	
Input terminal	1 breaker 1P 63A	
OUTPUT POWER SECTION		
Rectifier max power	34,8 kW	
Solar chargers max power	33,0 kW	
Wind input max power	3,0 kW	
Voltage range	42 V_{DC} to 58 V_{DC} , 54 V_{DC} nominal	
Battery MCB, Load MCB	See CellD specifications	
LVLD	250A or 600A depending on actual capacity	
PLD	(optional) 250A or 600A depending on actual capacity	
Battery capacity extention	Front Terminal or OPzV or Li-Ion	
ENERGY MANAGEMENT SECTION		
Energy management	Configurable, depending on applied energy sources and OPEX saving targets	
Thermal management	Optional	
AC & generator management	Automatic, configurable	
Energy meter	AC and DC power throughput	
GENERAL		
Ambient temperature	-5° C to +45° C	-40° C to +45° C
Safety	IEC/EN 60950	
EMC	EN 300386	
Protection	IP20, ETS 300019 Part 1 - 3	IP55, ETS 300019 Part 1 - 4
Ordering	3799279100 Configurator	

nerg Efficiency is 97.0% to 97.9%



Main features

- Significant OPEX reduction/savings
- High efficiency >96% by using the Delta PVC 2200B-48 solar converters for reduced of Energy consumption on on-grid or diesel powered off-grid networks and reduced CO2 emissions
- Reduced service requirements by using Delta advanced ORION power system controller technology for optimized system operation
- Support of up to 6 solar panel arrays with 8 to 9 solar panels connected in series
- Easy installation, commission and maintenance

Applications

- **Telecom - mobile / wireless**
- **Radio bbase stations/ cell cites**
- **LTE / 4G / WiMAX**
- **Microwave**
- **Broadband**
- **Telecom - fixed**
- **Central office**
- **Telephony servers / switches**
- **Fiber optics / FTTx**
- **Microwave**
- **Cable**
- **Broadband**
- **Data center**

ESS Energy Saving Solutions

Solar upgrades

Power Systems

The Delta Solar Upgrades are the ideal solution for enhancing existing on-grid and off-grid powered system installations.

The usage of renewable solar energy provides a strategic way to reduce total consumption and CO2 emissions of the power system, thus providing savings on energy costs and reduction of the carbon footprint of the power system during its operational lifetime.

With Delta state of the art ORION power system controller the overall performance of the solar upgrade enhanced system can be further optimized for energy savings (kWh) and CO2 emissions per consumed kWh.

The Delta Solar Upgrades product family consists of modular 19”/21” building blocks which are easily adaptable to various 48 V power system installations providing scalability to meet different load requirements.

The upgrades can be paralleled for flexible configuration. Upgrading may include all the cabling, wall mounting and the ORION controller.

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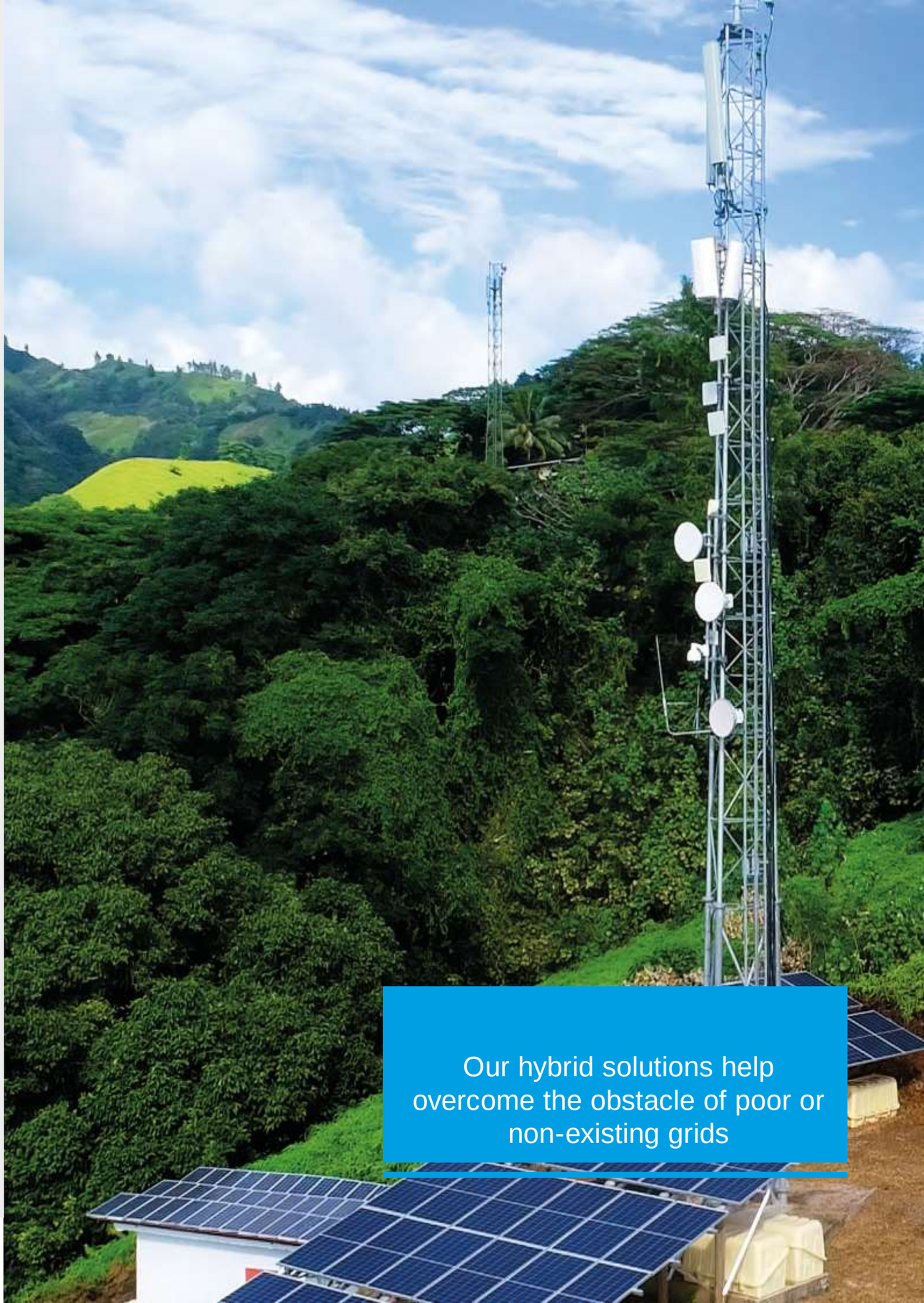
	PVS 2200B-48-1	PVS 2200B-48-3	PVS 2200B-48-6
SOLAR SYSTEMS			
OUTPUT			
Operating voltage range	42 V to 58 V	42 V to 58 V	42 V to 58 V
Peak power	2.2 kW $_{DC}$	6.6 kW $_{DC}$	13.2 kW $_{DC}$
Efficiency	96 %	96 %	96 %
MTTP efficiency	> 99.5 %	> 99.5 %	> 99.5 %
Current limitation	46 A	138 A	276 A
SOLAR INPUT			
Solar modules	1 x PVC 220B-48	3 x PVC 220B-48	6 x PVC 220B-48
Voltage range	50 V_{DC} to 350 V_{DC}		
Voltage range, full power	250 V_{DC} to 350 V_{DC}		
Current	10 A per string		
Connections	Screw terminals for cables		
Input protection	2-pole MCB 10A		
Over voltage protection	Surge protection devices (SPD) 2 + 0 type 2		
GENERAL			
Dimensions (W x H x D)	483.0 (19”) x 43.5 (1 U) x 372.0 mm	483.0 (19”) x 178.0 (4 U) x 298.0 mm	483.0 (19”) x 221.0 (45 U) + 88.0 for cabeling x 298.0 mm
Weight (without chargers)	4 kg	10 kg	12 kg
Operating temperature	-40° C to +75° C		
Relative humidity	≤ 95 %, non-condensing		
CONTROL / MONITORING			
Interface to ORION controller	RJ12 terminal, RECT bus		
Module interface	Status indication LED		
Optional ORION add-on	Delta CabD control module, 19” rack module and ORIONc		
OPTIONS			
Solar panel cabel kit	5, 10, 15 , 20, 25, 30, or 35 m		
DC cables to system	1, 3, and 6 m		
Wall mounting equipment	5 U and 8 U high wall boxes		
STANDARDS			
Safety	EN / IEC 60950		
EMC	EN 300386		
Environment	ETSI EN 300019-1-3		
ORDERING			
Product configurator	3799761500		
Fixed product configurations	Upon request		
PV charger PVC 2200B-48	DCS-48/45A A-A		



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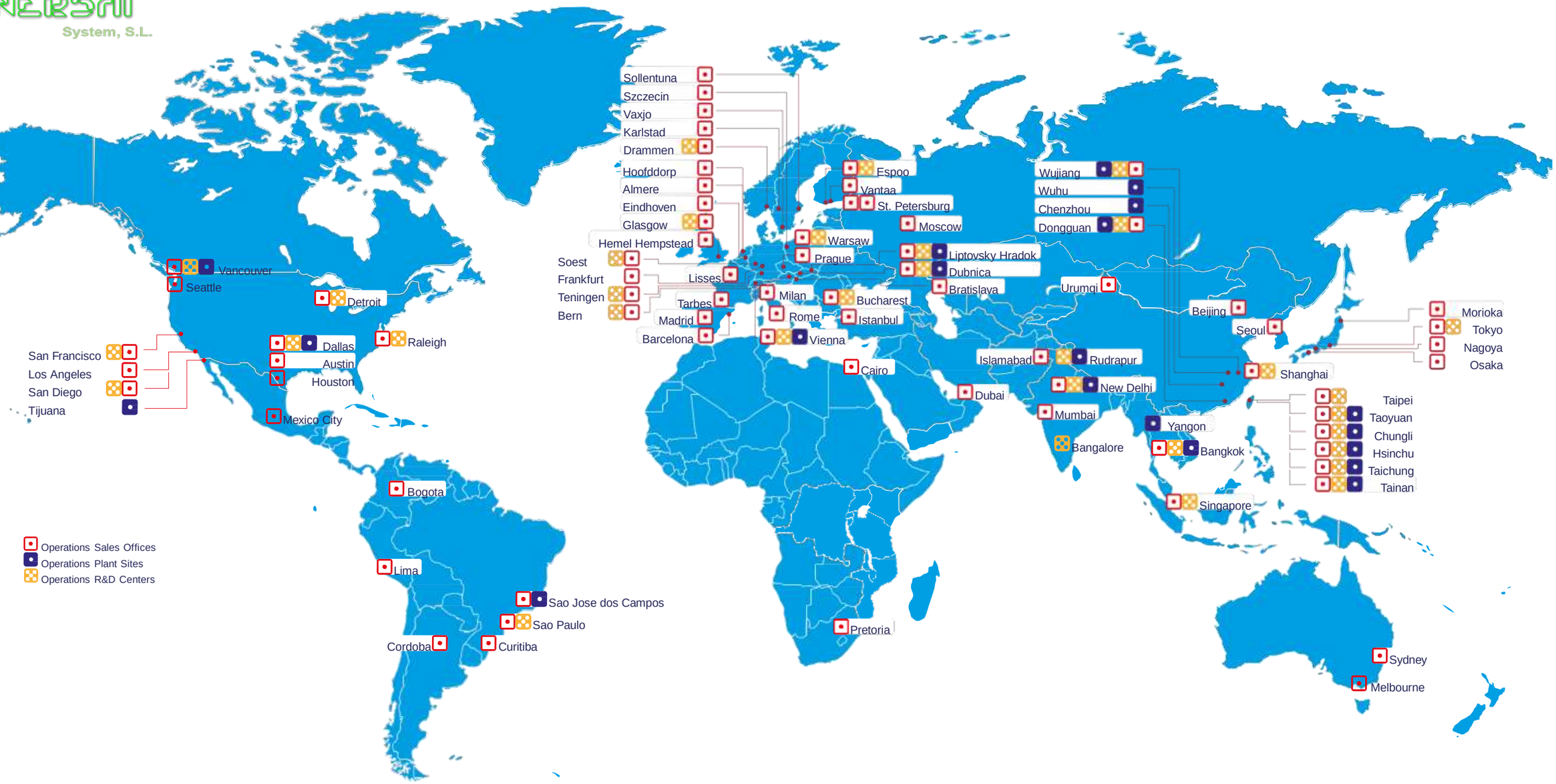

Our global reach

169 Sales offices
38 Plant sites
70 R&D centers
7000 R&D engineers

Delta, founded in 1971, is a global leader in power and thermal management solutions and a major player in several product segments such as industrial automation, displays, and networking. Its mission statement, “To provide innovative, clean and energy-efficient solutions for a better tomorrow,” focuses on addressing key environmental issues such as global climate change. As an energy-saving solutions provider with core competencies in power electronics and innovative research and development, Delta's business categories include Power Electronics, Automation, and Infrastructure. Delta has 163 sales offices, 64 R&D centers and 39 manufacturing facilities worldwide.

Throughout its history, Delta has received many global awards and recognition for its business achievements, innovative technologies and dedication to corporate social responsibility. Since 2011, Delta has been selected as a member of the Dow Jones Sustainability™ World Index (DJSI World) for 7 consecutive years. In 2016, Delta was selected out of 5,800 large companies by CDP (formerly the Carbon Disclosure Project) for its climate change leadership level.

Local execution power