

# REGULATED DC POWER SUPPLIES.

PRODUCT CATALOG 2013-2014

88.1



**DELTAELEKTRONIKA**

DC POWER SUPPLIES

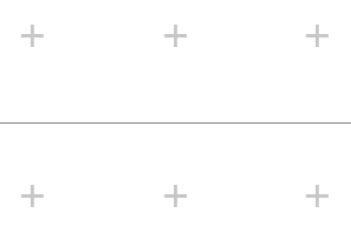
# PRODUCT CATALOG

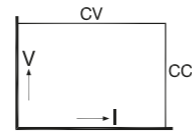
## 2013-2014

DELTA ELEKTRONIKA

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### Features

- Designed for long life at full power
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- EMC surpasses CE requirements: low emission & high immunity
- Low audible noise: fan is temperature controlled

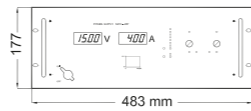
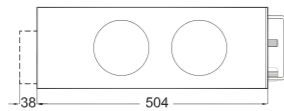
### Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Stacking is allowed, space between units is not required
- High power system configuration from multiple units
- 19" rack mounting or for laboratory use (feet included)
- Remote sensing
- Interlock

Units	Voltage range	Current range
SM 15 - 400	0 - 15 V	0 - 400 A
SM 30 - 200	0 - 30 V	0 - 200 A
SM 45 - 140	0 - 45 V	0 - 140 A
SM 60 - 100	0 - 60 V	0 - 100 A
SM 70 - 90	0 - 70 V	0 - 90 A
SM 120 - 50	0 - 120 V	0 - 50 A
SM 300 - 20	0 - 300 V	0 - 20 A
SM 600 - 10	0 - 600 V	0 - 10 A

### Dimensions and Weight

Width = 19"      Weight = 27 kg  
Height = 4 U



### Specifications

- Three phase input : 380 / 400 / 415 V AC, optional 440 / 480 V AC  $V_{nom}$ , line to line (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.98 (at 100% load)
- Efficiency : up to 90% (at full load)
- Output ripple and spikes : from 0.8 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 2.5 mV (0-100% load step)
- Recovery time : from 100  $\mu$ s (50-100% load step)
- Programming speed : from 3.3 ms (10-90%), optional from 0.4 ms
- Analog programming accuracy : from 0.2%
- Output voltage and current stability :  $5 \cdot 10^{-5}$  /  $10 \cdot 10^{-5}$
- MTBF : 500,000 hrs
- Operating ambient temperature : -20 to +50 °C

### Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20
- cTÜVus

### Typical Applications

- Solar Inverter testing, PV-simulation
- Plasma chambers
- Hybrid car test systems
- ATE in industrial production lines
- Automotive battery simulation
- Controlled battery (dis)charging
- Lasers
- Driving PWM-controlled DC-motors
- Accurate current sources
- Aerospace and military equipment

### Available Options



#### Increased Output Power

The conservatively rated unit allows to deliver extra output power with the same reliability.

At some derating, either the maximum output voltage or the maximum output current can be increased by about 10%.



#### High Speed Programming

A 10 to 20 times higher programming speed (down to 0.4 ms rise time at full load) and

lower output capacitance. Excellent for laser applications, test systems or as current source with low parallel capacitance as used in plasma chambers.



#### Two-Quadrant Output: Power Sink

Two quadrant operation maintains the output voltage constant regardless the output power is positive or negative. Ideal for PWM-speed controlled DC-motors and ATE systems.



#### Sequencer

Arbitrary Waveform generator or stand-alone automation.

The sequencer is integrated in the Ethernet controller.



#### High Voltage Isolation

A higher output isolation allows series operation up to 1200 V.



#### High Input Voltage

Higher input voltages possible for operation at line voltages of 440 V AC and 480 V AC (for USA).

More information about this:  
Page 22



#### Software Control and Interfaces

Factory installed programming interfaces:

- Ethernet controller (incl. sequencer)
- PROFIBUS controller
- CANBUS controller
- RS232 controller
- IEEE488 controller
- ISO AMP CARD – isolated analog

Details about interfaces:  
Page 22-24



#### Digital Voltage and Current Setting

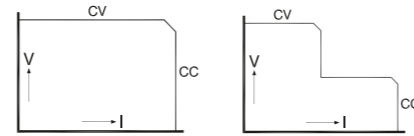
Reliable, longlife digital encoders can be implemented at the front panel. Includes total front panel

lock (also for CV / CC-knobs) and a coarse or fine pitch adjustment depending on the turning speed.



#### Secured Voltage and Current Setting

For maximum security, the CV / CC settings can be adjusted with a screwdriver only and are protected with a plastic cap from accidental adjusting.



## Typical Applications

- Solar Inverter testing, PV-simulation
- Car test systems
- ATE in industrial production lines
- Plasma chambers
- Automotive battery simulation
- Controlled battery (dis)charging
- Lasers
- Driving PWM-controlled DC-motors
- Accurate current sources
- Aerospace and military equipment

## Features

- Designed for long life at full power
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- EMC surpasses CE requirements: low emission & high immunity
- Low audible noise: fan is temperature controlled

## Functionalities

- Operation on single and three phase input voltages
- Standard Ethernet interface, incl. sequencer
- Large user display, menu driven operation
- Durable digital encoders for voltage and current adjustment
- Max. 4 plug and play optional interfaces
- USB input for exchange of settings and wave forms

## Standard Features



### Digital Voltage and Current Setting

Reliable, longlife digital encoders are implemented at the front panel. Includes total front panel

lock (also for CV / CC-knobs) and a coarse or fine pitch adjustment depending on the turning speed.



### Ethernet Controller

A 16 bit Ethernet interface for programming and monitoring.



### Sequencer

Arbitrary Waveform generator or stand-alone automation.



### High Voltage Isolation

A higher output isolation allows series operation up to 1320 V.



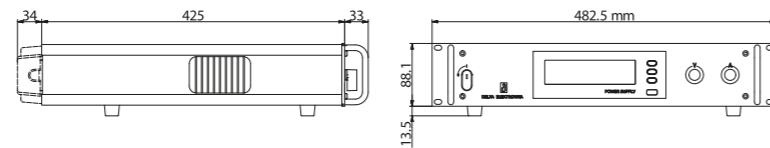
### USB-Input

Front panel USB-input for exchange of settings and waveforms (host).

Units	Voltage range	Current range
SM 18 - 220	0 - 18 V	0 - 220 A
SM 66 - AR - 110	0 - 33 V	0 - 110 A
Autoranging output	0 - 66 V	0 - 55 A
SM 100 - AR - 75	0 - 50 V	0 - 75 A
Autoranging output	0 - 100 V	0 - 37.5 V
SM 330 - AR - 22	0 - 165 V	0 - 22 A
Autoranging output	0 - 330 V	0 - 11 A
SM 660 - AR - 11	0 - 330 V	0 - 11 A
Autoranging output	0 - 660 V	0 - 5.5 A

## Dimensions and Weight

Width = 19" Weight = 15 kg  
Height = 2 U



## Specifications

- Single and three phase input : 180-528 V AC (single or three phase 48-62 Hz) derating at low input voltage
- Active Power Factor Correction (PFC) : up to 0.99 (at 100 % load)
- Efficiency : up to 92% (at full load)
- Output ripple and spikes : from 3 mV<sub>rms</sub> / 12 mV<sub>pp</sub>
- Regulation : from 2.5 mV (0-100% load step)
- Recovery time : from 100 μs (50-100% load step)
- Programming speed : from 1.6 ms (10-90%), optional from 0.2 ms
- Output voltage and current stability : from 6.10<sup>-5</sup> / 9.10<sup>-5</sup>
- MTBF : 500,000 hrs
- Operating ambient temperature : -20 to +50 °C

## Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20
- cTUVus

## Available Options



### Software Control and Interfaces

Field installable interfaces:

- Isolated Analog Programming
- Serial: RS232, RS485, RS422, USB (host)
- Digital I / O
- Master / Slave
- Isolated contacts
- PROFIBUS
- CANBUS

Note: standard no analog interface. Details about SM3300 interfaces: page 21



### High Speed Programming

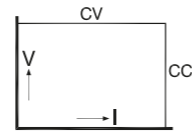
A 10 to 20 times higher programming speed (down to 0.2 ms rise time at full load)

and lower output capacitance. Excellent for laser applications, test systems or as current source with low parallel capacitance as used in plasma chambers.



### Two-Quadrant Output: Power Sink

Two quadrant operation maintains the output voltage constant regardless the output power is positive or negative. Ideal for PWM-speed controlled DC-motors and ATE systems.



### Features

- Designed for long life at full power
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- EMC surpasses CE requirements: low emission & high immunity
- Low audible noise: fan is temperature controlled

### Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Stacking is allowed, space between units is not required
- 19" rack mounting or for laboratory use (feet included)
- High power system configuration from multiple units
- Remote sensing

### Typical Applications

- Solar Inverter testing, PV-simulation
- Plasma chambers
- Car test systems
- ATE in industrial production lines
- Automotive battery simulation
- Controlled battery (dis)charging
- Lasers
- Driving PWM-controlled DC-motors
- Accurate current sources
- Aerospace and military equipment

### Available Options



#### Increased Output Power

The conservatively rated unit allows to deliver extra output power with the same reliability.

At some derating, either the maximum output voltage or the maximum output current can be increased by about 10%.



#### High Speed Programming

A 10 to 20 times higher programming speed (down to 0.33 ms rise time at full load)

and lower output capacitance. Excellent for laser applications, test systems or as current source with low parallel capacitance as used in plasma chambers.



#### Two-Quadrant Output: Power Sink

Two quadrant operation maintains the output voltage constant regardless the output power is

positive or negative. Ideal for PWM-speed controlled DC-motors and ATE systems.



#### Sequencer

Arbitrary Waveform generator or stand-alone automation.

The sequencer is integrated in the Ethernet controller.



#### High Voltage Isolation

A higher output isolation allows series operation up to 1000 V.

More information about this: Page 22



#### Software Control and Interfaces

Factory installed programming interfaces:

- Ethernet controller (incl. sequencer)
- PROFIBUS controller
- CANBUS controller
- RS232 controller
- IEEE488 controller
- ISO AMP CARD – isolated analog

Details about interfaces: Page 22-24



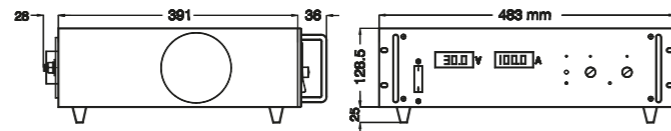
#### Secured Voltage and Current Setting

For maximum security, the CV / CC settings can be adjusted with a screwdriver only and are protected with a plastic cap from accidental adjusting.

Units	Voltage range	Current range
SM 15 - 200 D	0 - 15 V	0 - 200 A
SM 30 - 100 D	0 - 30 V	0 - 100 A
SM 45 - 70 D	0 - 45 V	0 - 70 A
SM 70 - 45 D	0 - 70 V	0 - 45 A
SM 120 - 25 D	0 - 120 V	0 - 25 A
SM 300 - 10 D	0 - 300 V	0 - 10 A

### Dimensions and Weight

Width = 19"      Weight = 15 kg  
Height = 3 U

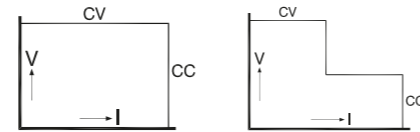


### Specifications

- Three phase input : 380 / 400 / 415 V AC,  $V_{nom}$  line to line (48-62 Hz)
- Efficiency : up to 90% (at full load)
- Output ripple and spikes : from 1.6 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 5 mV (0-100% load step)
- Recovery time : from 100  $\mu$ s (50-100% load step)
- Programming speed : 7 ms (10-90%), optional from 0.33 ms
- Analog programming accuracy : from 0.2%
- Output voltage and current stability :  $4 \cdot 10^{-5}$  /  $10 \cdot 10^{-5}$
- MTBF : 500.000 hrs
- Operating ambient temperature : -20 to +50 °C

### Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20



### Features

- Designed for long life at full power
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- EMC surpasses CE requirements: low emission & high immunity
- Low audible noise: fan is temperature controlled

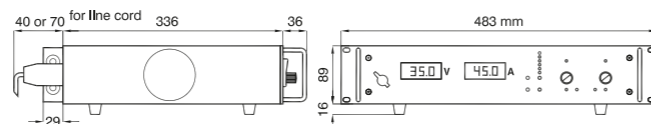
### Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Stacking is allowed, space between units is not required
- 19" rack mounting or for laboratory use (feet included)
- High power system configuration from multiple units
- Remote sensing
- Interlock

Units	Voltage range	Current range
SM 15 - 100	0 - 15 V	0 - 100 A
SM 35 - 45	0 - 35 V	0 - 45 A
SM 52 - 30	0 - 52 V	0 - 30 A
SM 52 - AR - 60	0 - 26 V	0 - 60 A
Autoranging output	0 - 52 V	0 - 30 A
SM 70 - 22	0 - 70 V	0 - 22 A
SM 120 - 13	0 - 120 V	0 - 13 A
SM 300 - 5	0 - 300 V	0 - 5 A
SM 400 - AR - 8	0 - 200 V	0 - 8 A
Autoranging output	0 - 400 V	0 - 4 A

### Dimensions and Weight

Width = 19"      Weight = 9,9 kg  
Height = 2 U



### Specifications

- Single phase input : 90-265 V AC (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.99 (at 100 % load)
- Efficiency : up to 91% (at full load)
- Output ripple and spikes : from 1.8 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 0.5 mV (0-100% load step)
- Recovery time : from 100 μs (50-100% load step)
- Programming speed : from 3.4 ms (10-90%), optional from 0.2 ms
- Analog programming accuracy : from 0.2%
- Output voltage and current stability : 6.10<sup>-5</sup> / 9.10<sup>-5</sup>
- MTBF : 500,000 hrs
- Operating ambient temperature : -20 to +50 °C

### Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20
- cTUVus

### Typical Applications

- Solar Inverter testing, PV-simulation
- Semiconductor burn-in & processing
- Car test systems
- ATE in industrial production lines
- Lasers
- Controlled battery (dis)charging
- Component device testing
- Driving PWM-controlled DC-motors
- Accurate current sources
- Aerospace and military equipment

### Available Options



#### Increased Output Power

The conservatively rated unit allows to deliver extra output power with the same reliability.

At some derating, either the maximum output voltage or the maximum output current can be increased by about 10%.



#### High Speed Programming

A 10 to 20 times higher programming speed (down to 0.2 ms rise time at full load)

and lower output capacitance. Excellent for laser applications, test systems or as current source with low parallel capacitance as used in plasma chambers.



#### Two-Quadrant Output: Power Sink

Two quadrant operation maintains the output voltage constant regardless the output power is

positive or negative. Ideal for PWM-speed controlled DC-motors and ATE systems.



#### Sequencer

Arbitrary Waveform generator or stand-alone automation.

The sequencer is integrated in the Ethernet controller.



#### High Voltage Isolation

A higher output isolation allows series operation up to 1000 V.



#### Secured Voltage and Current Setting

For maximum security, the CV / CC settings can be adjusted with a screwdriver only and are protected

with a plastic cap from accidental adjusting.

More information about this:  
Page 22



#### Software Control and Interfaces

Factory installed programming interfaces:

- Ethernet controller (incl. sequencer)
- PROFIBUS controller
- CANBUS controller
- RS232 controller
- IEEE488 controller
- ISO AMP CARD – isolated analog

Details about interfaces:  
Page 22-24

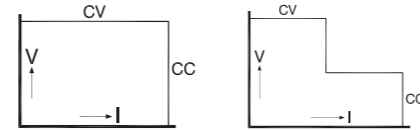


#### Digital Voltage and Current Setting

Reliable, longlife digital encoders can be implemented at the front panel.

Includes total front panel lock (also for CV / CC-knobs) and a coarse or fine pitch adjustment depending on the turning speed.





### Features

- Designed for long life at full power
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- EMC surpasses CE requirements: low emission & high immunity
- Low audible noise: fan is temperature controlled

### Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Stacking is allowed, space between units is not required
- High power system configuration from multiple units
- Laboratory use (feet included), 19" rack mounting optional
- Remote sensing
- Interlock

### Typical Applications

- Accurate current sources
- Electronic circuit development
- Component device testing
- ATE in industrial production lines
- Automotive battery simulation
- Controlled battery (dis)charging
- Lasers
- Driving PWM-controlled DC-motors
- Medical research equipment
- Aerospace and military equipment

### Available Options



#### Increased Output Power

The conservatively rated unit allows to deliver extra output power with the same reliability.

At some derating, either the maximum output voltage or the maximum output current can be increased by about 10%.



#### High Speed Programming

A 10 to 20 times higher programming speed (down to 0.2 ms rise time at full load)

and lower output capacitance. Excellent for laser applications, test systems or as current source with low parallel capacitance as used in plasma chambers.



#### Two-Quadrant Output: Power Sink

Two quadrant operation maintains the output voltage constant regardless the output power is

positive or negative. Ideal for PWM-speed controlled DC-motors and ATE systems.



#### Sequencer

Arbitrary Waveform generator or stand-alone automation.

The sequencer is integrated in the Ethernet controller.



#### High Voltage Isolation

A higher output isolation allows series operation up to 1000 V.



#### Secured Voltage and Current Setting

For maximum security, the CV / CC settings can be adjusted with a screwdriver only and are protected

with a plastic cap from accidental adjusting.

More information about this: Page 22



#### Software Control and Interfaces

Factory installed programming interfaces:

- Ethernet controller (incl. sequencer)
- PROFIBUS controller
- CANBUS controller
- RS232 controller
- IEEE488 controller
- ISO AMP CARD – isolated analog

Details about interfaces: Page 22-24



#### Digital Voltage and Current Setting

Reliable, longlife digital encoders are implemented at the front panel.

Includes total front panel lock (also for CV / CC-knobs) and a coarse or fine pitch adjustment depending on the turning speed.



#### Front Power Output

Bind posts at the front panel instead of at the rear panel.



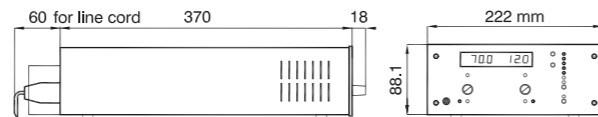
#### 19" Rack Mounting Adapter

The 19" mounting adapters makes it possible to position one or two units side by side in a 19" rack.

Units	Voltage range	Current range
SM 7.5 - 80	0 - 7.5 V	0 - 80 A
SM 18 - 50	0 - 18 V	0 - 50 A
SM 70 - AR - 24	0 - 35 V	0 - 24 A
Autoranging output	0 - 70 V	0 - 12 A
SM 400 - AR - 4	0 - 200 V	0 - 4 A
Autoranging output	0 - 400 V	0 - 2 A

### Dimensions and Weight

Width = half 19"      Weight = 5,4 kg  
Height = 2 U



### Specifications

- Single phase input : 90-265 V AC (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.99 (at 100% load)
- Efficiency : up to 89% (at full load)
- Output ripple and spikes : from 2 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 0.2 mV (0-100% load step)
- Recovery time : from 100 μs (50-100% load step)
- Programming speed : from 4 ms (10-90%), optional from 0.2 ms
- Analog programming accuracy : from 0.2%
- Output voltage and current stability : 6.10<sup>-5</sup> / 9.10<sup>-5</sup>
- MTBF : 500,000 hrs
- Operating ambient temperature : -20 to +50 °C

### Standards

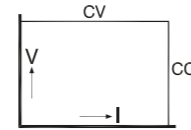
- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20

# ES300 Series

300 W DC POWER SUPPLIES

# ES150 Series

150 W DC POWER SUPPLIES



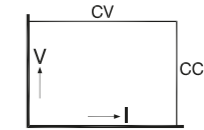
## Features

- Very low output ripple and spikes
- EMC surpasses CE requirements: low emission & high immunity
- High programming speed
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- Designed for long life at full power

## Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Voltage and current control with 10 turn potentiometers
- For laboratory use or optional 19" rack mounting

Unit	Voltage range	Current range
ES 030 - 10	0 - 30 V	0 - 10 A



## Features

- Very low output ripple and spikes
- EMC surpasses CE requirements: low emission & high immunity
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- Designed for long life at full power

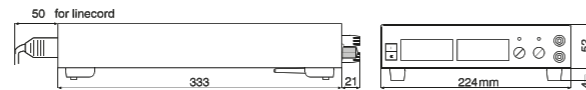
## Functionalities

- Master / Slave parallel and series operation with voltage and current sharing
- Voltage and current control with 10 turn potentiometers
- For laboratory use or optional 19" rack mounting
- Convection cooling

Units	Voltage range	Current range
ES 015 - 10	0 - 15 V	0 - 10 A
ES 030 - 5	0 - 30 V	0 - 5 A
ES 075 - 2	0 - 75 V	0 - 2 A
ES 0300 - 0.45	0 - 300 V	0 - 450 mA

## Dimensions and Weight

Width = half 19"      Weight = 3,1 kg  
Height = 66 mm, incl. feet



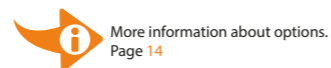
## Specifications

- Single phase input : 92-265 V AC (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.99 / 0.96 (at 100% load)
- Efficiency : up to 86% (at full load)
- Output ripple and spikes : 5 mV<sub>rms</sub> / 15 mV<sub>pp</sub>
- Regulation : 10 mV (0-100% load step)
- Recovery time : 50 μs (50-100% load step)
- Programming speed : 0.8 ms (10-90%)
- Analog programming accuracy : from 0.2%
- Output voltage and current stability : 30.10<sup>-5</sup> / 10.10<sup>-4</sup>
- MTBF : 500.000 hrs
- Operating ambient temperature : -20 to +50 °C

## Standards

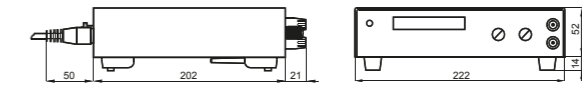
- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20

## Available Options



## Dimensions and Weight

Width = half 19"      Weight = 1,7 kg  
Height = 66 mm, incl. feet



## Specifications

- Single phase input : 90-265 V AC (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.99 / 0.83 (at 100% load)
- Efficiency : up to 84% (at full load)
- Output ripple and spikes : from 0.5 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 5 mV (0-100% load step)
- Recovery time : from 100 μs (50-100% load step)
- Programming speed : from 7 ms (10-90%)
- Analog programming accuracy : from 0.2%
- Output voltage and current stability : from 10.10<sup>-5</sup> / 10.10<sup>-5</sup>
- MTBF : 500.000 hrs
- Operating ambient temperature : -20 to +50 °C

## Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20
- cTUVus

## Available Options





# Applications & Options

ES150 / 300 Series

# EST150 Series

150 W, TRIPLE OUTPUT DC POWER SUPPLIES

## Typical Applications

- Test and Measurement
- Component device testing
- Controlled battery charging
- ATE in industrial production lines
- Electronic Circuit Development
- Laboratory analysis
- Medical research equipment
- Accurate current sources

## Available Options (Not for EST150)



### Increased Output Power

The conservatively rated unit allows to deliver extra output power with the same reliability.

At some derating, either the maximum output voltage or the maximum output current can be increased by about 10%.



### High Voltage Isolation

A higher output isolation allows series operation up to 1000 V.



### Secured Voltage and Current Setting

For maximum security, the CV / CC settings can be adjusted with a screwdriver only and are protected with a plastic cap from accidental adjusting.

Only available for the ES 150 series



### Sequencer

Arbitrary Waveform generator or stand-alone automation. The sequencer is integrated in the Ethernet controller.

More information about this:  
Page 22



### Rear Power Output and Remote Sensing

Output terminals at the rear panel instead of bind posts at the front panel, includes remote sensing.



### Software Control and Interfaces

Factory installed programming interfaces:

- Ethernet controller
- PROFIBUS controller
- CANBUS controller
- RS232 controller

External programming interface modules:

- IEEE488 controller module
- ISO AMP module

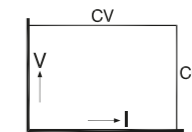
Details about interfaces:  
Page 22-24



### 19" Rack Mounting Adapter

Using the 19" mounting adapters, it is possible to position the ES units in a 19" rack.

Several configurations possible with multiple ES and / or PSC or ISO AMP modules.



## Features

- Very low output ripple and spikes
- EMC surpasses CE requirements: low emission & high immunity
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- Designed for long life at full power

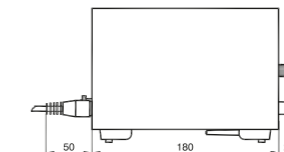
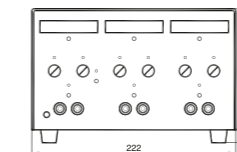
Unit	Voltage range	Current range
EST 150		
Output 1	0 - 20 V	0 - 2.5 A
Output 2	0 - 20 V	0 - 2.5 A
Output 3	0 - 10 V	0 - 5 A

## Functionalities

- 3 independent, floating outputs
- Dual voltage tracking or series tracking mode
- 3 output On / Off buttons
- Convection cooling
- Voltage and current control with 10 turn potentiometers

## Dimensions and Weight

Width = half 19"      Weight = 3,5 kg  
Height = 146 mm, incl. feet



## Specifications

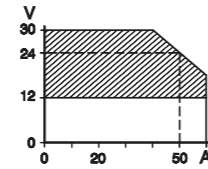
- Single phase input : 90-265 V AC (48-62 Hz)
- Active Power Factor Correction (PFC) : 0.99 / 0.83 (at 100% load)
- Efficiency : up to 81% (at full load)
- Output ripple and spikes : from 0.5 mV<sub>rms</sub> / 8 mV<sub>pp</sub>
- Regulation : from 5 mV (0-100% load step)
- Recovery time : 100 μs (50-100% load step)
- Tracking accuracy : 0.5%
- Output voltage and current stability : 10.10<sup>-5</sup> / 10.10<sup>-5</sup>
- MTBF : 500.000 hrs
- Operating ambient temperature : -20 to +50 °C

## Standards

- Power supply standard : EN 61204-3
- Generic Emission : EN 61000-6-3 (EN 55022B)
- Generic Immunity : EN 61000-6-2
- Safety : EN 60950 / EN 61010 / SELV
- Insulation input / output : 3750 V<sub>rms</sub>
- Enclosure : IP20

# 1200S Series

600 W & 1200 W DC POWER SUPPLIES



## Features

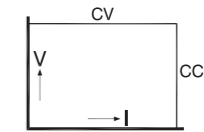
- Very high reliability, designed for long life at full power
- EMC surpasses CE requirements: low emission & high immunity
- Protected against all overload and short circuit conditions
- Excellent dynamic response to load changes
- Very low output ripple and spikes

## Functionalities

- Redundant parallel operation with undervoltage alarm contact
- Screwdriver adjustable or analog programmable
- Parallel and series operation
- 19" rack mounting or wall mounting
- Convection cooling
- Remote sensing

# S280 Series

280 W DC POWER SUPPLIES



## Features

- Output programmable from zero till max.
- Very high reliability, designed for long life at full power
- EMC surpasses CE requirements: low emission & high immunity
- Protected against all overload and short circuit conditions
- Very low output ripple and spikes

## Functionalities

- Screwdriver adjustable or analog programming
- Master / Slave parallel operation with current sharing
- Optional with external interfaces Ethernet, IEEE488, RS232 or ISO AMP.
- Euro rack mounting or wall mounting optional
- Redundant parallel operation with optional RA-10 adapter
- Convection cooling
- Remote sensing

Units	Voltage range	Current range
600 S 24	12 - 15 V	30 A
	24 V	25 A
	30 V	20 A
1200 S 24	12 - 15 V	60 A
	24 V	50 A
	30 V	40 A
1200 S 48	24 - 30 V	30 A
	48 V	25 A
	60 V	20 A

Units	Voltage range	Current range
S 6 - 40	0 - 6 V	0 - 40 A
S 15 - 18	0 - 15 V	0 - 18 A
S 28 - 10	0 - 28 V	0 - 10 A

## Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20

## Dimensions and Weight

Height = 88 mm      Weight = 11 kg  
Width = 433 mm  
Depth = 385 mm

## Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20

## Dimensions and Weight

Height = 106 mm      Weight = 2,8 kg  
Width = 195 mm  
Depth = 166 mm

## Specifications

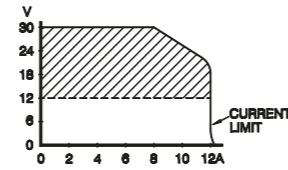
- Single phase input : 198-264 V AC (48-62 Hz)  
99-132 V AC (48-62 Hz)
- Power Factor Correction : up to 0.76 (at 100 % load)
- Efficiency : up to 89% (at full load)
- Output ripple and spikes : 7 mV<sub>rms</sub> / 20 mV<sub>pp</sub>
- Regulation : from 5 mV (0-100% load step)
- Recovery time : 300 μs (50-100% load step)
- Stability : 30.10<sup>-5</sup>
- MTBF : up to 1.000.000 hrs
- Operating ambient temperature : -20 to +50 °C, derate current linearly to 20% at 75 °C

## Specifications

- Single phase input : 195-265 V AC (48-62 Hz)  
100-132 V AC (48-62 Hz)
- Efficiency : up to 88% (at full load)
- Output ripple and spikes : 5 mV<sub>rms</sub> / 25 mV<sub>pp</sub>
- Regulation : 5 mV (0-100% load step)
- Recovery time : from 100 μs (50-100% load step)
- Programming speed : from 10 ms (10 to 90%)
- Analog programming accuracy : from 0.2%
- Stability : 50.10<sup>-5</sup> / 10.10<sup>-4</sup>
- MTBF : 500.000 hrs
- Operating ambient temperature : -20 to +50 °C

# 240S Series

240 W DC POWER SUPPLIES



## Features

- Very high reliability, designed for long life at full power
- EMC surpasses CE requirements: low emission & high immunity
- Protected against all overload and short circuit conditions
- Excellent dynamic response to load changes
- Very low output ripple and spikes

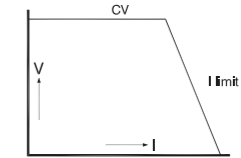
## Functionalities

- Redundant parallel operation with under voltage alarm contact
- Screwdriver adjustable or analog programmable
- Parallel and series operation
- Bench operation with bench adapter (optional)
- Euro rack, 19" rack or wall mounting optional
- Convection cooling
- Remote sensing

Unit	Voltage range	Current range
240 S 24	12 - 15 V	12 A
	24 V	10 A
	30 V	8 A

# SX Series

75 W / 150 W DC POWER SUPPLIES



## Features

- Very high reliability, designed for long life at full power
- EMC surpasses CE requirements: low emission & high immunity
- Protected against all overload and short circuit conditions
- Excellent dynamic response to load changes
- Very low output ripple and spikes

## Functionalities

- 2 outputs; series, parallel or dual mode
- Redundant parallel operation with external diodes
- Remote control with an external potentiometer
- Bench operation with bench adapter (optional)
- Euro rack or wall mounting optional
- Convection cooling

Units	Voltage range	Current range
75 SX 5	3.5 - 6 V	13 A
150 SX 5	3.5 - 6 V	26 A
75 SX 15-15	2 x 6 - 15 V	2.5 A
150 SX 15-15	2 x 6 - 15 V	5 A
150 SX 75-75	2x 15 - 75 V	1 A
150 SX 200 - 200	2x 35 - 200 V	0.3 A
ST 150	3.5 - 6 V	13 A
	2x 6 - 15 V	2.5 A

## Standards

- Power supply standard : EN 61204-3
- Generic Emission : EN 61000-6-3 (EN 55022B)
- Generic Immunity : EN 61000-6-2
- Safety : EN 60950 / EN 61010
- Insulation input / output : 3750 V<sub>rms</sub>
- Enclosure : IP20

## Dimensions and Weight

Height = 240 mm    Weight = 2 kg  
 Width = 71 mm  
 Depth = 156 mm

## Standards

- Power supply standard : EN 61204-3
- Generic Emission : EN 61000-6-3 (EN 55022B)
- Generic Immunity : EN 61000-6-2
- Safety : EN 60950 / EN 61010
- Insulation input / output : 3750 V<sub>rms</sub>
- Enclosure : IP20

## Dimensions and Weight

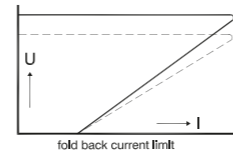
<b>75SX</b>	<b>150SX</b>
Height = 100 mm	Height = 233 mm
Width = 36 mm	Width = 36 mm
Depth = 172 mm	Depth = 172 mm
Weight = 0,6 kg	Weight = 1,2 kg

## Specifications

- |   |  |
|---|--|
| • Single phase input : 195-265 V AC (48-62 Hz)<br>100-132 V AC (48-62 Hz) | • Recovery time : 200 μs (50-100% load step)   |
| • Efficiency : up to 88% (at full load)                                   | • Stability : 30.10 <sup>-5</sup>  |
| • Output ripple and spikes : 5 mV <sub>rms</sub> / 15 mV <sub>pp</sub>    | • MTBF : 1.000.000 hrs   |
| • Regulation : from 10 mV (0-100% load step, external sensing)            | • Operating ambient temperature : -10 to +50 °C, derate current linearly to 20% at 80 °C |

## Specifications

- |   |  |
|---|--|
| • Single phase input : 185-264 V AC (48-62 Hz)<br>98-132 V AC (48-62 Hz)    | • Stability : 50.10 <sup>-5</sup>  |
| • Efficiency : up to 84% (at full load)                                     | • MTBF : 1.000.000 hrs   |
| • Output ripple and spikes : from 5 mV <sub>rms</sub> / 20 mV <sub>pp</sub> | • Operating ambient temperature : -20 to +50 °C, derate current linearly to 20% at 75 °C |
| • Regulation : from 10 mV (0-100% load step)                                |  |
| • Recovery time : from 100 μs (50-100% load step)                           |  |



### Features

- Very low output ripple and spikes (linear design)
- Protected against all overload and short circuit conditions
- Excellent dynamic response to load changes
- Very high reliability, designed for long life at full power

### Functionalities

- Accurate 20 turn trimmer for adjusting output voltage (5U5, 5U15-15) or current (UCS50)
- Parallel and series operation
- Eurocard, rail or wall mounting optional
- Convection cooling

Units	Voltage range	Current range
5 U 5 (voltage source)	5 - 6 V	1 A
5 U 15 - 15 (voltage source)	2 x 12 - 15 V	0.2 A
UCS 50 (current source)	30 V	0 - 50 mA

### Standards

- Power supply standard EN 61204-3
- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation input / output 3750 V<sub>rms</sub>
- Enclosure IP20

### Specifications

- Single phase input : 230 / 115 V AC (48-62 Hz)
- Output ripple and spikes : 0.5 mV<sub>rms</sub> / 2 mV<sub>pp</sub> for 5U5 and 5U15-15  
30 μA<sub>pp</sub> for UCS50
- Regulation : 5 mV (0-100% load step) for 5U5 and 5U15-15  
3 μA (load 600-0 Ohm) for UCS50
- Recovery time : from 10 μs (10-100% load step)
- MTBF : 1.000.000 hrs
- Operating ambient temperature : -20 to +50 °C



Interfaces	
INT MOD ANA	Analog controller
INT MOD DIG	Digital (user) I/O
INT MOD CON	Isolated contacts
INT MOD SER	Serial controller
INT MOD MS	Master / Slave Controller

### General Features

- Isolated from the output voltage  
Working voltage 1000V
- Floating with respect to earth

### Features INT MOD ANA Analog controller

- High accuracy, low drift
- 16 bit AD and DA conversion.
- Compatible with other Delta Elektronika 15p analog interfaces

### Features INT MOD DIG Digital (user) I/O

- 8 inputs Logic high = 2.5 ... 30 V, Logic low = 0 V
- 8 Open Collector outputs 0 - 30 V, max. 200 mA

### Features INT MOD CON Isolated contacts

- 4 relays with make-and-break contacts
- Additional (floating) Interlock with 24V enable system

### Features INT MOD SER Serial controller

- Multi protocol RS232, RS485, RS422, USB
- Web based configuration

### Features INT MOD MS Master / Slave Controller

- Expected in 2013

# PSC Series

## INTERFACES



### Interface

PSC-ETH	Ethernet Controller
---------	---------------------

### Features

- Voltage and current programming and monitoring
- Uses existing IP-networks
- Integrated sequencer
- Software calibration
- Isolated digital user in- and outputs
- Factory installed or external module

### Specifications

- Programming and monitoring resolution: 16 bit
- Linearity error: +/- 2 LSB (prg.) +/- 1 LSB (mon.)  
TC = 10 ppm/°C
- Input voltage (external module): 98-264 V AC (48-62 Hz)

# PSC Series

## INTERFACES



### Interfaces

PSC-CAN	CANopen Controller
PSC-PB	PROFIBUS Controller

### Functionalities

#### CANopen Functionalities:

- SYNC Object
- Emergency Object
- Node Guarding
- Heartbeat
- Expedited and Nonexpedited SDO transfer
- Node address range 1 - 127

### Features

- Voltage and current programming and monitoring
- Node address setting selectable
- Read back of power supply status signals
- 600 V galvanic isolation
- Factory installed

### Specifications

- Programming and monitoring resolution: 14 bit
- Communication speed: up to 12Mbit/s for PSC-PB up to 1Mbit/s for PSC-CAN
- Full scale accuracy: < 0.1%

#### PROFIBUS Functionalities:

- Slave in a PROFIBUS-DP network
- DP-V0 standard acc. IEC 61784 Ed. 1:2002 CPF 3/1
- PROFIBUS protocol acc. IEC 61158
- Slave address range 1 - 127



## Functionalities



#### Interface:

- Monitoring status outputs: ACF, DCF, CC-mode, Over Temp, PSOL etc.
- Isolated user inputs (8) and outputs (6)
- Software calibration for offset and full scale



#### Integrated sequencer:

- Converts power supply into an arbitrary waveform generator
- Stand-alone automation like a PLC
- 25 free programmable sequences, 2000 steps each
- Combination of very fast and slow sequences
- Possibility to create loops, sub-routines, ramps etc.

## External module PSC-ETH

#### Standards:

- Generic Emission EN 61000-6-3 (EN 55022B)
- Generic Immunity EN 61000-6-2
- Safety EN 60950 / EN 61010
- Insulation in/outputs - case 1000 V<sub>DC</sub>
- Enclosure IP20



#### Dimensions and weight:

Dimensions: 89 x 86 x 119 mm  
Weight: 0,7 kg  
Optional 19" rack mounting



### Interfaces

PSC-232	RS232 Controller
PSC-488	IEEE488 Controller

### Functionalities

- Monitoring status outputs: ACF, DCF, CC-mode, Over Temp, PSOL etc.
- Two isolated user inputs and outputs (external modules only)
- Software calibration for offset and full scale
- PSC-488 Units can also be configured as PSC-232

### Features

- Voltage and current programming and monitoring
- Up to 15 PSCs on one BUS
- Software calibration
- Isolated digital user in- and outputs
- Factory installed or external module

### Specifications

- Programming and monitoring resolution: 16 bit
- Linearity error: +/- 2 LSB (prg.) +/- 1 LSB (mon.)  
TC = 10 ppm/°C
- Input voltage (external module): 98-264 V AC (48-62 Hz)

## External module PSC-232/488

#### Standards:

- Generic Emission: EN 61000-6-3 (EN 55022B)
- Generic Immunity: EN 61000-6-2
- Safety: EN 60950 / EN 61010
- Insulation input / output: 1000 V<sub>rms</sub>
- Enclosure: IP20

#### Dimensions and weight:

Dimensions: 89 x 86 x 119 mm  
Weight: 0,8 kg  
Optional 19" rack mounting





# Analog Series

## ANALOG INTERFACES

### Unit

ISO AMP | Isolated Analog Programming

### Features

- Selectable 0-5 V and 0-10 V signal levels
- Isolated programming and monitoring of U, I and status signals
- Prevents problems with earth loops and CM-voltages
- Factory installed or **external module**
- Reinforced safety insulation 1000 VDC\*

\* External module has Basic insulation only



### Specifications

- Programming and monitoring offset : +/- 60  $\mu$ V typical
- Full scale error : 0.1% calibrated
- Non-linearity : 0.01% typical, TC = - 65ppm/ $^{\circ}$ C
- Common mode rejection : 80 dB @ 50 Hz

### Unit

M / S - ADAPTER | Master / Slave Series Adapter

### Features

- Connecting SM3000 and ES-series in M/S series mode
- Equal voltage sharing in series operation
- Series operation possible up to 600 V



### Specifications

- Programming and monitoring offset : +/- 60  $\mu$ V typical
- Full scale error : 0.1% calibrated
- Non-linearity : 0.01% typical, TC = - 65ppm/ $^{\circ}$ C
- Common mode rejection : 80 dB @ 50 Hz

### Unit

AL 24-48 | Under and Over Voltage Alarm

### Features

- Large adjustment for use on both 24 V and 48 V
- Two isolated comparator circuits with alarm contact and LED indication
- Monitors output voltage of 2 power supplies



### Specifications

- Undervoltage range : 18-48 V
- Overvoltage range : 24-64 V
- Insulation between circuits : 500 V DC
- Alarm contact : 100 mA / 30 V, Normally Closed



DC POWER SUPPLIES

13.5

88.1



**DELTAELEKTRONIKA B.V.**

PO Box 27  
4300 AA Zierikzee  
The Netherlands  
Tel. +31 111 413656  
Fax. +31 111 416919

Vissersdijk 4  
4301 ND Zierikzee  
The Netherlands

[www.deltapowersupplies.com](http://www.deltapowersupplies.com)