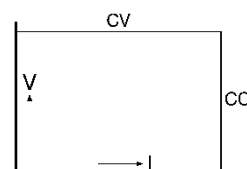




## ES 300 - Series 300W DC POWER SUPPLIES

Models	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
- High programming speed
- Excellent dynamic response to load changes
- Protected against all overload and short circuit conditions
- Designed for a long life at full power

### Functionalities

- Voltage and current control with 10 turn potentiometers
- Master/Slave parallel and series operation with  
voltage and current sharing
- 19" rack mounting or for laboratory use  
(feet included)
- Optional Remote sensing
- Convection cooling

ES 030-10		
<b>Output</b> voltage current		0 - 30 V 0 - 10 A
<b>Input</b> <b>AC</b> single phase, 48 - 62 Hz		92 - 264 V
Input current @ 230 VAC power factor full load		1.55 A > 0.97
internal fuses		4 AT
standby input power (Vo=Io=0) standby input power (Vo=Vmax)		6 W 11 W
<b>Efficiency</b> AC 230 V input, full load AC 115 V input, full load		86 % 82 %
<b>Regulation</b>		
Load 0 - 100% internal sensing <b>CV</b>		10 mV
Line 100 - 260 V AC <b>CV</b>		1 mV
Load 0 - 100% <b>CC</b>		4 mA
Line 100 - 260 V AC (internal voltage sensing) <b>CC</b>		1 mA
<b>Ripple + noise (full load)</b> rms (BW=300 kHz) <b>CV</b> p-p (BW=20 MHz) <b>CV</b>		5 mV 15 mV
rms (BW=300 kHz) <b>CC</b> p-p (BW=20 MHz) <b>CC</b>		6 mA 15 mA
<b>Temp. coeff., per °C</b> <b>CV</b> <b>CC</b>		$5 \cdot 10^{-5}$ $10 \cdot 10^{-5}$
<b>Stability</b> after 1 hr. warm-up during 8 hrs. <b>CV</b> <b>CC</b>  $t_{amb} = 25 \pm 1 \text{ °C}$ , $V_{in} = 230 \text{ VAC}$ (internal voltage sensing for CC-stab.)		$3 \cdot 10^{-4}$ $10 \cdot 10^{-4}$

Analog Programming	CV	CC
<b>Programming inputs</b> input range accuracy offset input impedance	0 - 5 V $\pm 0.2\%$ - 3 ... + 10 mV (on 5 V) 1 MOhm	0 - 5 V $\pm 0.5\%$ 0 ... + 20 mV (on 5 V) 1 MOhm
<b>Monitoring output</b> output range accuracy offset output impedance	0 - 5 V $\pm 0.2\%$ 0 ... + 7 mV (on 5 V) 1 Ohm / max. 4 mA	0 - 5 V $\pm 0.5\%$ - 5 ... 0 mV (on 5 V) 1 Ohm / max. 4 mA

<b>Reference voltage</b> on prog. connector	$V_{ref}$ TC	5.165 ±31 mV 12 ppm / 30ppm max.
<b>+12 V output</b> on prog. Connector	$V_o$ $R_o$	12 V 500 Ohm

<b>Status output</b> CC - status	CC - operation	5 V / 5 mA = logic 1
<b>Remote shutdown</b> Response time		with + 5 V (3.5 - 12V) or relay contact 3 ms
<b>Indicators</b> (front panel)		CV-mode, CC-mode
<b>Controls</b> (front panel)		Mains on/off, CV- and CC-potmeter

<b>Programming speed</b> (resistive load)	<b>ES 030-10</b>
<b>Rise time (10 - 90%)</b> output voltage step time, (100% load)	0 → 30 V 1 ms
<b>Fall time (90 - 10%)</b> output voltage step time, (100% load)	30 → 5 V 2 ms

	<b>ES 030-10</b>
<b>Recovery time</b> recovery within time, @ 50 - 100% load step max. deviation @ 230 VAC input voltage	100 mV 50 µs 300 mV
<b>Output impedance</b> CV, 0-100 kHz, $I_o > 0.5A$	< 300 mOhm

<b>Insulation</b> input / output creepage / clearance  input / case output / case	3750 Vrms (1 min.) 8 mm  2500 Vrms 600 V DC
<b>Safety</b>	EN 60950 / EN 61010
<b>EMC</b> Emission Immunity	<b>EN 61326-1</b> , class B equipment (for use in domestic establishments) <b>EN 61326-1</b> , equipment for use in industrial and domestic establishments
<b>Operating Temperature at full load</b> Above 50 °C	-20 to +50 °C derate output current linearly to 20% at 75 °C
<b>Humidity</b>	max. 95% RH, non-condensing, up to 40 °C max. 75% RH, non-condensing, up to 50 °C
<b>Storage temperature</b>	-40 to +70 °C
<b>Thermal protection</b>	Output shuts down in case of insufficient cooling
<b>MTBF</b>	500 000 hrs

<b>Hold-Up time</b> (100 - 230 VAC input) Vout = 100% , Iout = 100% Vout = 100% , Iout = 50%	18 ms 50 ms
<b>Inrush current</b>	Limited with NTC resistor of 16 Ohms cold resistance

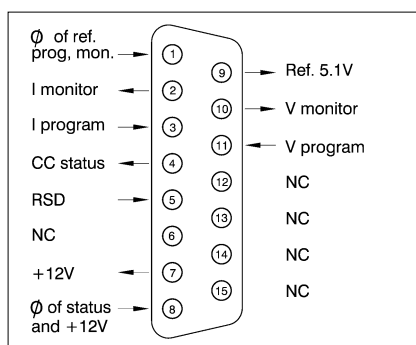
	<b>ES 030-10</b>
<b>Series operation</b> max. total voltage Master / Slave operation	600 V with optional external Master / Slave Adapter
<b>Parallel operation</b> max. total current Master / Slave operation	no limit max. 4 units
<b>Remote sensing</b> (optional)	option P185
max. voltage drop per load lead	2 V <i>Note: voltage drop across load leads will subtract from max. available output voltage</i>
<b>Over Voltage Limit</b> (variable)	default 34 V, adjustable from 6...34V with trimmer R402
<b>Potentiometers</b> front panel control with knobs resolution	standard 0.03%
<b>Meters</b> scale voltage scale current accuracy V-meter accuracy A-meter	3.5 digit 0 - 30.0 V 0 - 10.00 A 0.5% + 2 digits 1% + 2 digits

<b>Input Connector</b>	Euro-connector at rear panel 10 Amp / 65 °C IEC320/C14, EN60320/C14
<b>DC Output Terminals</b>	Standard: 4 mm sockets at front-panel  Option: screw terminals (0.2-4 mm <sup>2</sup> ) at rear-panel (sockets at front removed) only combined with remote sensing, option P185.
<b>Programming connector</b>	15 pole D-connector at rear panel (FEMALE)
<b>Cooling</b>	low noise blower, fan speed adapts to temperature of internal system
<b>Enclosure</b> degree of protection	IP20
<b>Dimensions</b> (h x w x d)	52 x 333 x 214 mm
<b>Weight</b>	3.1 kg

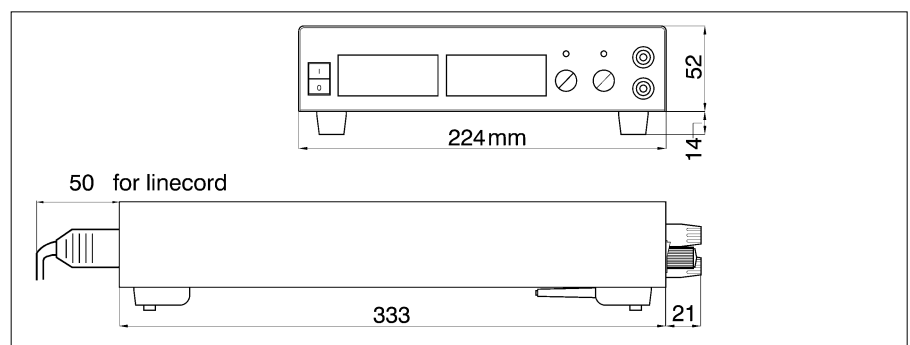
CV = Constant Voltage  
CC = Constant Current

OVL = Over Voltage Limit

Specifications measured at  $t_{amb} = 25 \pm 5$  °C and  $V_{in} = 230$  VAC, 50 Hz unless otherwise noted.



Connections programming connector



Dimensions

## Typical Applications

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

## Available Options

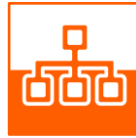


### Increased Output Power

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

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

- Order Code - P069



### Sequencer

Arbitrary Waveform generator or standalone automation. The sequencer is integrated in the Ethernet controller.

- Order Code - P179



### Rear Power Output and Remote Sensing

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

- Order Code - P185



### 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.



### Software control and Interfaces

Interfaces to be installed by factory:

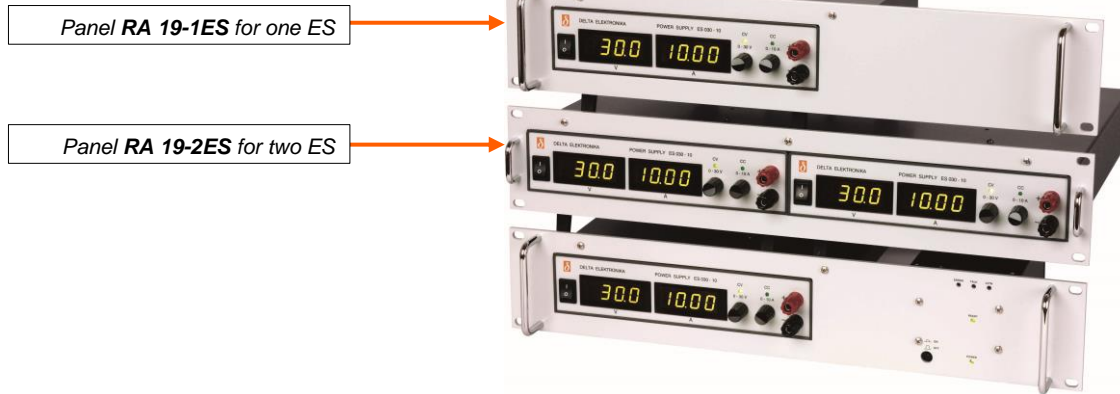
- Ethernet (+ sequencer) - P179
- RS232 controller - P180

External programming interface modules:

- ISO AMP module

Notes: 1. Download the special datasheet about Battery Charging from <http://www.DeltaPowerSupplies.com/>.  
2. There is only room for one of the interfaces in a unit, see next page for configurations.

## 19" rack mounting



## Rear Connections

**Standard unit:**  
Analog programming

Switches Manual / Programming  
Analog programming

**Option P179:**  
Ethernet programming

Ethernet programming  
Switches Manual / Programming  
To combine with P185 (=P325)

**Option P180:**  
RS232 programming

RS232 programming  
Switches Manual / Programming

**Option P185:**  
Rear power outlet /  
Remote sensing

Rear power out / Remote sensing  
Switches Manual / Programming  
Analog programming

