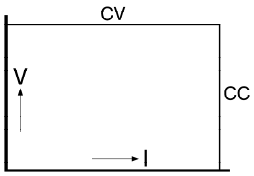
DELTA ELEKTRONIKA B.V.
DC POWER SUPPLIES

Vissersdijk 4, 4301 ND
Zierikzee, the Netherlands

www.DeltaPowerSupplies.com
Tel. +31 111 413656

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
Output	
voltage	0 - 30 V
current	0 - 10 A
Input	
AC single phase, 48 - 62 Hz	92 - 264 V
Input current @ 230 VAC	1.55 A
power factor	> 0.97
full load	
internal fuses	4 AT
standby input power (Vo=Io=0)	6 W
standby input power (Vo=Vmax)	11 W
Efficiency	
AC 230 V input, full load	86 %
AC 115 V input, full load	82 %
Regulation	
Load 0 - 100% **CV**	
internal sensing	10 mV
Line 100 - 260 V AC **CV**	1 mV
Load 0 - 100% **CC**	4 mA
Line 100 - 260 V AC **CC**	1 mA
(internal voltage sensing)	
Ripple + noise (full load)	
rms (BW=300 kHz) **CV**	5 mV
p-p (BW=20 MHz) **CV**	15 mV
rms (BW=300 kHz) **CC**	6 mA
p-p (BW=20 MHz) **CC**	15 mA
Temp. coeff., per °C **CV**	5.10^{-5}
CC	10.10^{-5}
Stability after 1 hr warm-up	
during 8 hrs **CV**	3.10^{-4}
CC	10.10^{-4}
t_{amb} = 25 ± 1 °C, Vin = 230 VAC	
(internal voltage sensing for CC-stab.)	

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

Reference voltage		
on prog. connector	V_{ref}	5.165 ±31 mV
	TC	12 ppm / 30ppm max.
+12 V output	**Vo**	12 V
on prog. Connector	Ro	500 Ohm

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

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

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

Insulation	
input / output	3750 Vrms (1 min.)
creepage / clearance	8 mm
input / case	2500 Vrms
output / case	600 V DC
Safety	EN 60950 / EN 61010
EMC Power Supply Standard	**EN 61204-3,** Emission: residential, **light** industrial environment (CISPR22-Class **B**) Immunity: industrial environment
Generic Emission	**EN 61000-6-3,** residential, **light** industrial environment (EN 55022 **B**)
Generic Immunity	**EN 61000-6-2,** industrial environment
Operating Temperature at full load	– 20 to + 50 °C
Above 50 °C	derate output current linearly to 20% at 75 °C
Humidity	max. 95% RH, non condensing, up to 40 °C max. 75% RH, non condensing, up to 50 °C
Storage temperature	– 40 to + 85 °C
Thermal protection	Output shuts down in case of insufficient cooling
MTBF	500 000 hrs

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

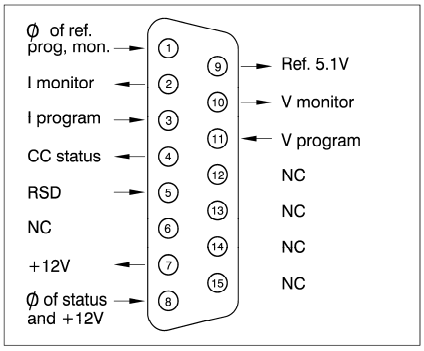
	ES 030-10
Series operation max. total voltage Master / Slave operation	 600 V with optional external Master / Slave Adapter
Parallel operation max. total current Master / Slave operation	 no limit max. 4 units
Remote sensing (optional)	option P185
max. voltage drop per load lead	2 V *Note: voltage drop across load leads will subtract from max. available output voltage*
Over Voltage Limit (variable)	default 34 V, adjustable from 6...34V with trimmer R402
Potentiometers front panel control with knobs resolution	 standard 0.03%
Meters 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

Input Connector	Euro-connector at rear panel 10 Amp / 65 °C IEC320/C14, EN60320/C14
DC Output Terminals	Standard:4 mm sockets at front-panel Option: screw terminals (0.2-4 mm^2) at rear-panel (sockets at front removed) only combined with remote sensing, option P185.
Programming connector	15 pole D-connector at rear panel (FEMALE)
Cooling	Convection cooling
Enclosure degree of protection	IP20
Dimensions (h x w x d)	52 x 333 x 214 mm
Weight	3.1 kg

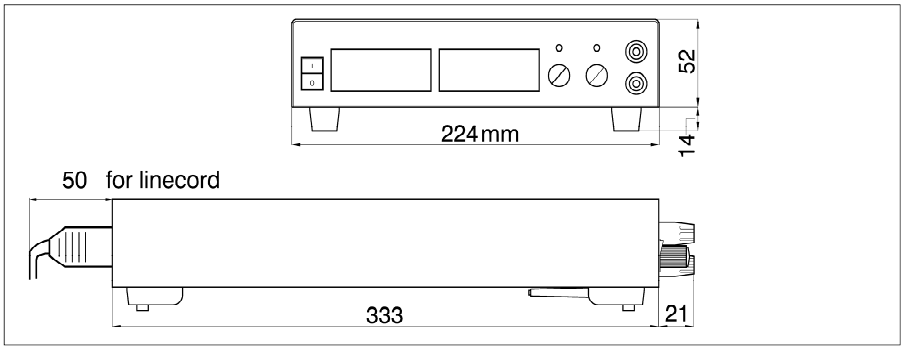
CV = Constant Voltage
CC = Constant Current

OVL = Over Voltage Limit

Specifications measured at t_{amb} = 25 ± 5 °C and Vin = 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
- PROFIBUS controller - P281
- CANBUS controller - P282

External programming interface modules:

- IEEE488 controller module
- 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

*Panel **RA 19-1ES** for one ES*

*Panel **RA 19-2ES** for two ES*

*Panel **RA 19-ES-PSC** for one ES and one PSC-488 module*

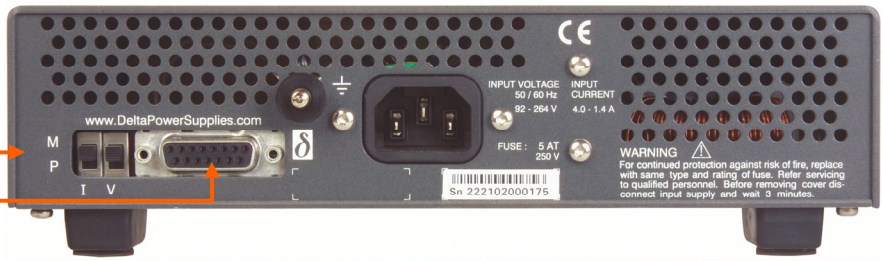
Rear Connections

Input connector *Linecord supplied*

Standard unit:
Analog programming

Switches Manual / Programming

Analog programming

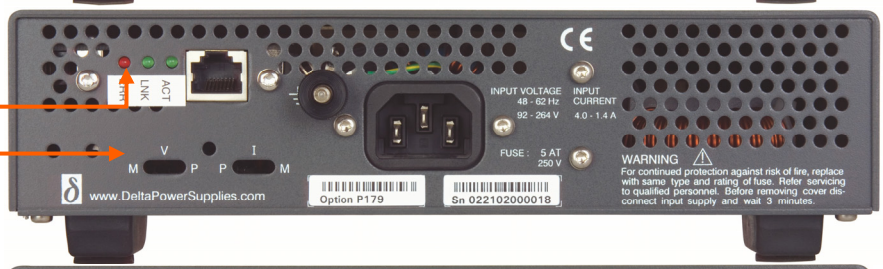


Option P179:
Ethernet programming

Ethernet programming

Switches Manual / Programming

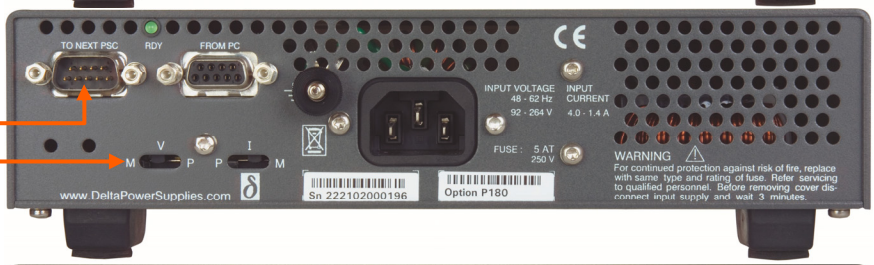
To combine with P185 (=P325)



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