Delta Power Supplies

2008 - 2009

CE

DELTA ELEKTRONIKA BV

Single output units

VOLTAGE	CURRENT	MODEL	Page
5 V	1 A	5 U 5	34
	10 A	ES 015 - 10	4
	10 A	ES 030 - 10	6
	13 A	75 SX 5	24
	26 A	150 SX 5	24
	40 A	S 6-40	26
	60 A	SM 52-AR-60	10
	80 A	SM 7.5-80	8
	100 A	SM 15-100	10
	200 A	SM 15-200 D	12
	400 A	SM 15-400	14
6 V	1 A	5 U 5	34
	10 A	ES 015 - 10	4
	10 A	ES 030 - 10	6
	13 A	75 SX 5	24
	26 A	150 SX 5	24
	40 A	S 6-40	26
	60 A	SM 52-AR-60	10
	80 A	SM 7.5-80	8
	100 A	SM 15-100	10
	200 A	SM 15-200 D	12
	400 A	SM 15-400	14
12 V	0.4 A	5 U 15-15	34
	5 A	75 SX 15-15	24
	10 A	ES 015 - 10	4
	10 A	ES 030 - 10	6
	10 A	150 SX 15-15	24
	12 A	240 S 24	28
	18 A	S 15-18	26
	30 A	600 S 24	30
	50 A	SM 18-50	8
	60 A	SM 52-AR-60	10
	60 A	1200 S 24	32
	100 A	SM 15-100	10
	200 A	SM 15-200 D	12
	400 A	SM 15-400	14
15 V	0.4 A	5 U 15-15	34
	5 A	75 SX 15-15	24
	10 A	ES 015 - 10	4
	10 A	ES 030 - 10	6
	10 A	150 SX 15-15	24
	12 A	240 S 24	28
	18 A	S 15-18	26
	30 A	600 S 24	30
	50 A	SM 18-50	8
	60 A	SM 52-AR-60	10
	60 A	1200 S 24	32
	100 A	SM 15-100	10
	200 A	SM 15-200 D	12
	400 A	SM 15-400	14
24 V	0.2 A	5 U 15-15	34
	2.5 A	75 SX 15-15	24
	5 A	150 SX 15-15	24
	5 A	ES 030 - 5	4
	10 A	ES 030 - 10	6
	10 A	S 28-10	26
	10 A	240 S 24	28
	24 A	SM 70-AR-24	8
	25 A	600 S 24	30
	45 A	SM 35-45	10
	50 A	1200 S 24	32
	60 A	SM 52-AR-60	10
	100 A	SM 30-100 D	12
	200 A	SM 30-200	14
28 V	0.2 A	5 U 15-15	34
	2.5 A	75 SX 15-15	24
	5 A	150 SX 15-15	24
	5 A	ES 030 - 5	4
	9 A	240 S 24	28
	10 A	ES 030 - 10	6
	10 A	S 28-10	26
	20 A	600 S 24	30
	24 A	SM 70-AR-24	8
	30 A	SM 52-AR-60	10
	40 A	1200 S 24	32
	45 A	SM 35-45	10
	100 A	SM 30-100 D	12
	200 A	SM 30-200	14
30 V	0.2 A	5 U 15-15	34
	2.5 A	75 SX 15-15	24
	5 A	150 SX 15-15	24
	5 A	ES 030 - 5	4
	8 A	240 S 24	28
	10 A	ES 030 - 10	6
	20 A	600 S 24	30
	24 A	SM 70-AR-24	8
	30 A	SM 52-AR-60	10
	40 A	1200 S 24	32
	45 A	SM 35-45	10
	100 A	SM 30-100 D	12
	200 A	SM 30-200	14
35 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	24 A	SM 70-AR-24	8
	30 A	1200 S 48	32
	30 A	SM 52-AR-60	10
	45 A	SM 35-45	10
	70 A	SM 45-70 D	12
	140 A	SM 45-140	14
45 V	2 A	ES 075-2	4
	12 A	SM 70-AR-24	8
	30 A	SM 52-30	10
	30 A	SM 52-AR-60	10
	70 A	SM 45-70 D	12
	140 A	SM 45-140	14
48 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	12 A	SM 70-AR-24	8
	25 A	1200 S 48	32
	30 A	SM 52-30	10
	30 A	SM 52-AR-60	10
	45 A	SM 70-45 D	12
	100 A	SM 60-100	14
52 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	12 A	SM 70-AR-24	8
	30 A	SM 52-30	10
	30 A	SM 52-AR-60	10
	45 A	SM 70-45 D	12
	100 A	SM 60-100	14
60 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	12 A	SM 70-AR-24	8
	20 A	1200 S 48	32
	22 A	SM 70-22	10
	45 A	SM 70-45 D	12
	100 A	SM 60-100	14
70 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	12 A	SM 70-AR-24	8
	22 A	SM 70-22	10
	45 A	SM 70-45 D	12
	90 A	SM 70-90	14
75 V	2 A	ES 075-2	4
	2 A	150 SX 75-75	24
	4 A	SM 400-AR-4	8
	8 A	SM 400-AR-8	10
	13 A	SM 120-13	10
	25 A	SM 120-25 D	12
	50 A	SM 120-50	14
100 V	0.45 A	ES 0300-0.45	4
	1 A	150 SX 75-75	24
	4 A	SM 400-AR-4	8
	8 A	SM 400-AR-8	10
	13 A	SM 120-13	10
	25 A	SM 120-25 D	12
	50 A	SM 120-50	14
120 V	0.45 A	ES 0300-0.45	4
	1 A	150 SX 75-75	24
	4 A	SM 400-AR-4	8
	8 A	SM 400-AR-8	10
	13 A	SM 120-13	10
	25 A	SM 120-25 D	12
	50 A	SM 120-50	14
150 V	0.45 A	ES 0300-0.45	4
	1 A	150 SX 75-75	24
	4 A	SM 400-AR-4	8
	8 A	SM 400-AR-8	10
	10 A	SM 300-10 D	12
	20 A	SM 300-20	14
200 V	0.45 A	ES 0300-0.45	4
	0.6 A	150 SX200-200	24
	4 A	SM 400-AR-4	8
	5 A	SM 300-5	10
	8 A	SM 400-AR-8	10
	10 A	SM 300-10 D	12
	20 A	SM 300-20	14
300 V	0.45 A	ES 0300-0.45	4
	0.3 A	150 SX200-200	24
	2 A	SM 400-AR-4	8
	4 A	SM 400-AR-8	10
	5 A	SM 300-5	10
	10 A	SM 300-10 D	12
	20 A	SM 300-20	14
400 V	0.3 A	150 SX200-200	24
	2 A	SM 400-AR-4	8
	4 A	SM 400-AR-8	10

Dual output units

2x 12 V	0.2 A	5 U 15-15	34
	2.5 A	75 SX 15-15	24
	5 A	150 SX 15-15	24
2x 15 V	0.2 A	5 U 15-15	34
	2.5 A	75 SX 15-15	24
	5 A	150 SX 15-15	24
2x 24 V	1 A	150 SX 75-75	24
2x 48 V	1 A	150 SX 75-75	24
2x 75 V	1 A	150 SX 75-75	24
2x 200 V	0.3 A	150 SX200-200	24

Triple output units

6 V	13 A		
15 V	2.5 A	ST 150	24
15 V	2.5 A		
10 V	5 A		
20 V	2.5 A	EST 150	2
20 V	2.5 A		

ES-SERIES

150 W
300 W
Switched Mode

EST 150 (triple)	**2x 20 V, 2.5 A** **1x 10 V, 5 A**
ES 150-series	**up to 300 V, up to 10 A**
ES 300	**30 V, 10 A**

Constant voltage and constant current control from 0 to maximum.
Compact and Light-Weight Bench power supplies.
Extremely low ripple

SM-SERIES

800 W
1500 W
3000 W
6000 W
Switched Mode

SM 800-series	**up to 400 V, up to 80 A**
SM 1500-series	**up to 400 V, up to 100 A**
SM 3000-series	**up to 300 V, up to 200 A**
SM 6000-series	**up to 300 V, up to 400 A**

Constant voltage and constant current control from 0 to maximum.
Programmable.
Bench and 19" rack power supplies.
Very high efficiency, up to 90%.

OPTIONS

Various options and optional equipment

OPTIONS	Fast Programming, Screwdriver Adjustment, Redundant Diode, Power Sink, Battery Charging etc.
PSC-series	Ethernet, IEEE488 and RS232 interfaces
ISO AMP	4 channel analog Isolation Amplifier
M/S ADAPTER	Master / Slave Series Adapter
AL 24-48	Over and Under voltage Alarm

SX-SERIES

75 W
150 W
Switched Mode

75 SX-series	**up to 30 V, up to 13 A**
150 SX-series	**up to 400 V, up to 26 A**

Adjustable voltage and fixed current limit.
Eurocassette power supplies.
Autoranging input for world-wide use.

S-SERIES

280 W
Switched Mode

S 6 - 40	**6 V, 40 A**
S 15 - 18	**15 V, 18 A**
S 28 - 10	**28 V, 10 A**

Constant voltage and constant current control from 0 to maximum.
Programmable.
Industrial power supplies in eurocassette case.

240S - 1200S

240 W
600 W
1200 W
Switched Mode

240 S 24	**24 V, 10 A**
600 S 24	**24 V, 25 A**
1200 S 24	**24 V, 50 A**
1200 S 48	**48 V, 25 A**

Adjustable voltage and fixed current limit.
Industrial power supplies for wall mounting, 19" rack and eurocassette (240S).
Series diode and alarm circuit for N+1 redundant operation.

U-SERIES

6 W
Linear

5 U 5	**6 V, 1 A**
5 U 15 - 15 (dual)	**2x 15 V, 0.2 A**
UCS 50 current source	**50 mA,** max. **30 V**

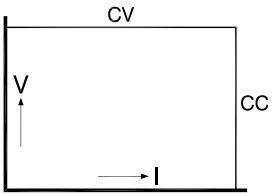
Adjustable voltage and fixed current limit.
High quality power supplies for PCB, rail and eurocassette mounting.

The information in this document is subject to change without notice.

EST - SERIES 150 W TRIPLE DC POWER SUPPLIES

EST 150 **3 Independent Floating Outputs**

Outputs:	***1)***	**0 - 20 V**	**0 - 2.5 A**
	2)	**0 - 20 V**	**0 - 2.5 A**
	3)	**0 - 10 V**	**0 - 5.0 A**

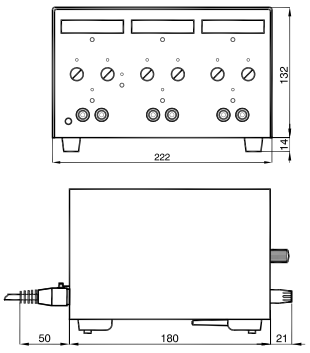


- Weight only 3.5 kg
- 4 mm safety Sockets
- Wide input voltage range:
  90 - 265 V AC, 48 - 62 Hz
- Very low output ripple and spikes
- 20 V outputs tracking or independent
- Display settings buttons, for settings preview
- Designed for **long life** at **full power**
- Voltage and current control with 10 turn potentiometers, resolution 0.03 %
- Efficiency up to 81 %
- Active Power Factor Correction, PF = 0.83
- EMC: high immunity and low emission
- Very stable output voltage or current
- 3 Separate **Output On / Off buttons**
- Input / output insulation 3750 Vrms
- Protected against overload and short circuit

Rear connections

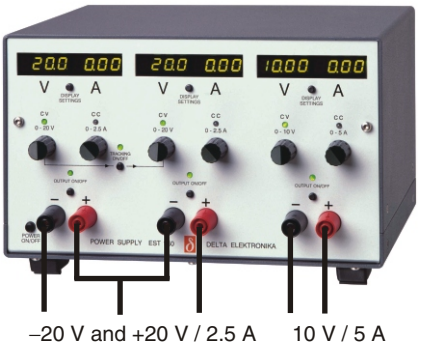
Dimensions and Weight

Width = half 19"
Height = 146 mm
*Weight = **3.5 kg***



Specifications EST 150			
Output		**10 V output**	**20 V outputs**
voltage		0 - 10 V	0 - 20 V
current		0 - 5 A	0 - 2.5 A
Input			
AC single phase, 48 - 62 Hz		90 - 265 V	
Input current @ 230 V AC		1 A	
power factor, 110 / 230 V AC *full load*		0.99 / 0.83	
internal fuses		4 AT	
standby input power (V_o=I_o=0)		12 W	
standby input power (V_o=V_{max})		15 W	
Efficiency			
AC 230 V input, full load		81 %	
AC 110 V input, full load		78 %	
Regulation			
Load 0 - 100%, int. sensing	**CV**	6 mV	5 mV
Line 90 - 265 V AC	**CV**	0.2 mV	0.5 mV
Load 0 - 100%	**CC**	1 mA	0.5 mA
Line 90 - 265 V AC	**CC**	0.2 mA	0.1 mA
Ripple + noise (@full load)			
rms (BW=300 kHz)	**CV**	0.5 mV	0.5 mV
p-p (BW=50 MHz)	**CV**	8 mV	8 mV
rms (BW=300 kHz)	**CC**	0.5 mA	0.25 mA
p-p (BW=50 MHz)	**CC**	4 mA	1 mA
Output impedance 0-100 kHz	**CV**	< 250 mOhm	< 250 mOhm
Temp. coeff., per °C	**CV**	5.10^{-5}	
	CC	10.10^{-5}	
Stability after 1 hr warm-up			
during 8 hrs	**CV**	10.10^{-5}	
	CC	10.10^{-5}	
Tracking accuracy		0.5 %	

Triple Mode



Dual Voltage Tracking Mode

Output configurations		
	Voltage	**Current**
Triple Mode	0 - 10 V 0 - 20 V 0 - 20 V	0 - 5 A 0 - 2.5 A 0 - 2.5 A
Dual Voltage Tracking mode	0 - 10 V 0 - +/– 20 V	0 - 5 A 0 - 2.5 A
Series Mode	0 - 50 V	0 - 2.5 A
Series Tracking Mode	0 - 10 V 0 - 40 V	0 - 5 A 0 - 2.5 A
Parallel Mode	0 - 10 V	0 - 10 A
Parallel Tracking Mode	0 - 10 V 0 - 20 V	0 - 5 A 0 - 5 A

Series Tracking Mode

Insulation
Input/output : 3750 Vrms (1 min.), 8 mm cr./cl.
Input/case : 2500 Vrms (1 min.), 5 mm cr./cl.
Output/case : 600 V DC

Safety : EN 60950 / EN 61010 / SELV

EMC : EN 61204-3 Power Supply Standard
EN 61000-6-3 Gen.Emission (EN 55022**B**)
EN 61000-6-2 Generic Immunity

Recovery time : 100 µs for both 10 V and 20 V outputs (after 50 - 100% load step)

Hold up time : 25 ms full load, 60 ms half load

Turn on delay : 250 ms

Inrush current : 10 A with NTC 30 Ohms cold resistance

Ambient temp. : – 40 to + 85 °C (storage)
– 20 to + 50 °C (operating)

Series operation : Maximum 600 V total voltage

Parallel operation : No limit
max. total current

Over voltage limit : max. 13 V for 10 V output
max. 25 V for 20 V outputs

Digital meters : Digital 3.5 digit.

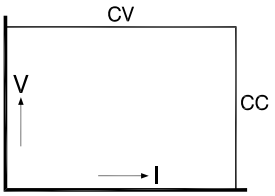
MTBF : 500 000 hrs

Dim. and weight : h x w x d
132 x 222 x 180 mm 3.5 kg

Enclosure : IP20

ES 150 - SERIES 150 W DC POWER SUPPLIES

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**



- Weight only 1.7 kg
- 4 mm safety Sockets
- Wide input voltage range for world wide use
- Very low output ripple and spikes
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Efficiency up to 84 %
- Active Power Factor Correction, PF = 0.83
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional external **isolated analog** programming*
  optional rear power output, incl. remote sensing
  *optional internal **ethernet / RS232** programming*
  *optional external **IEEE488** programming*
  for more options and details see page 16

19" Rack Mounting

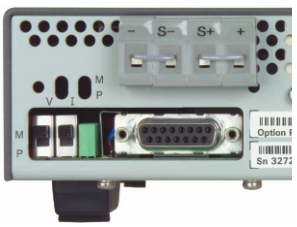
RA 19-1ES
for one ES150

RA 19-2ES
for two ES150

RA 19-ES-PSC
for one ES150
and PSC-488 module
or PSC-232 module

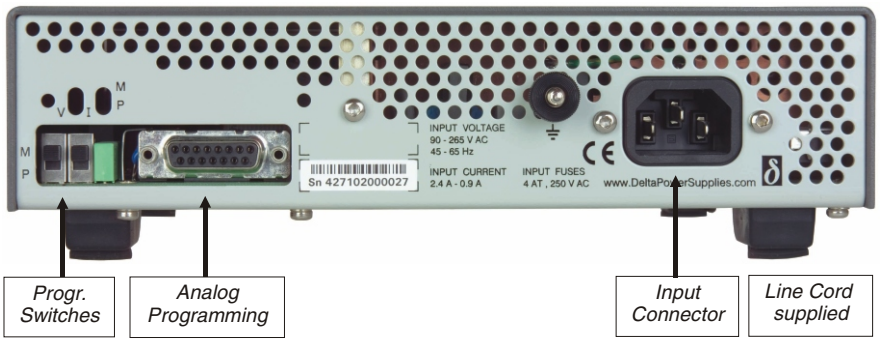
RA 19-ES-PSC-ETH
for one ES150
and PSC-ETH

ES150 option P150:
Built-in PSC-ETH for ethernet communication.



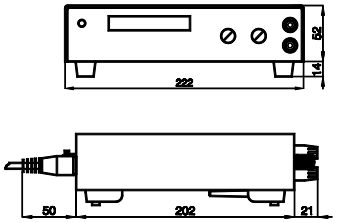
ES150 option P119 - P122:
Power output and remote sensing at rear panel (front panel output removed).

Rear connections



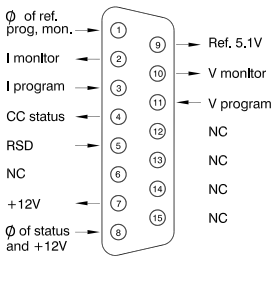
Dimensions and Weight

Width = half 19"
Height = 66 mm
*Weight = **1.7 kg***



Specifications ES 150 - series					
Output		**ES 015-10**	**ES 030-5**	**ES 075-2**	**ES 0300-0.45**
voltage		0 - 15 V	0 - 30 V	0 - 75 V	0 - 300 V
current		0 - 10 A	0 - 5 A	0 - 2 A	0 - 450 mA
Input					
AC single phase, 48 - 62 Hz		90 - 265 V			
Input current @ 230 V AC		1 A			
power factor, 110 / 230 V AC		0.99 / 0.83			
full load					
internal fuses		4 AT			
standby input power (V_o=I_o=0)		6 W			
standby input power (V_o=V_{max})		11 W			
Efficiency					
AC 230 V input, full load		83 %	84 %	84 %	84 %
Regulation					
Load 0 - 100%, int. sensing	**CV**	15 mV	6 mV	5 mV	10 mV
optional remote sensing		2 mV	2 mV	5 mV	10 mV
Line 90 - 265 V AC	**CV**	0.2 mV	0.5 mV	1 mV	3 mV
Load 0 - 100%	**CC**	3 mA	1 mA	0.5 mA	0.3 mA
Line 90 - 265 V AC	**CC**	0.5 mA	0.2 mA	0.1 mA	0.05 mA
Ripple + noise (full load)					
rms (BW=300 kHz)	**CV**	0.5 mV	0.6 mV	1 mV	7 mV
p-p (BW=50 MHz)	**CV**	8 mV	10 mV	15 mV	50 mV (typical 30 mV)
rms (BW=300 kHz)	**CC**	1.5 mA	0.5 mA	0.1 mA	0.03 mA
p-p (BW=50 MHz)	**CC**	10 mA	2 mA	0.5 mA	0.2 mA
Programming speed (10 - 90%)		0 → 15 V	0 → 30 V	0 → 75 V	0 → 300 V
time, (100% load)		7 ms	15 ms	17 ms	10 ms
Output impedance 0-100 kHz	**CV**	< 100 mOhm	< 200 mOhm	< 250mOhm	< 5 Ohm
Temp. coeff., per °C	**CV**	5.10^{-5}			
	CC	10.10^{-5}			
Stability after 1 hr warm-up					
during 8 hrs	**CV**	10.10^{-5}	10.10^{-5}	10.10^{-5}	10.10^{-5}
	CC	10.10^{-5}	10.10^{-5}	10.10^{-5}	12.10^{-5}

Analog Programming	**CV**	**CC**
Programming inputs		
input range	0 - 5 V	0 - 5 V
accuracy	± 0.2%	± 0.8%
offset	0… + 3 mV (on 5 V)	0… + 10 mV (on 5 V)
input impedance	1 MOhm	1 MOhm
Monitoring output	**CV**	**CC**
output range	0 - 5 V	0 - 5 V
accuracy	± 0.2%	± 0.8%
offset	– 1… + 1 mV (on 5 V)	– 10… 0 mV (on 5 V)
output impedance	2 Ohm / max. 4 mA	2 Ohm / max. 4 mA
Ethernet, IEEE488 or RS232 Programming		
Optional with interface PSC-ETH, PSC-488 or PSC-232, see pg. 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		



D15 analog programming connector

Insulation
Input/output : 4 kVrms (1 min.), 8 mm cr./cl.
Input/case : 2.5 kVrms (1 min.), 5 mm cr./cl.
Output/case : 600 V DC

Safety : EN 60950 EN 61010

EMC : EN 61204-3 Power Supply Standard
EN 61000-6-3 Gen.Emission (EN 55022**B**)
EN 61000-6-2 Generic Immunity

Recovery time : 100 µs (after 50-100% load step)

Hold up time : 25 ms full load, 60 ms half load

Ambient temp. : – 40 to + 85 °C (storage)
– 20 to + 50 °C (operating)

Remote ShutDown : With 5 V or relay contact

Series operation : Normal and Master / Slave, max. 600 V total voltage. See page 23 for the M/S SERIES ADAPTER.

Parallel operation : Normal and Master / Slave

CC status output : +5 V (or 5 mA) when in CC mode

Remote sensing : Only with option P119 - 122

Over voltage limit : Fixed at 18 / 40 / 90 / 330 V

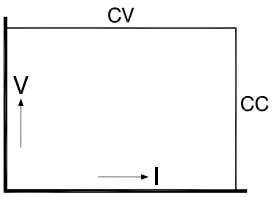
Digital meters : Digital 3.5 digit.

MTBF : 500 000 hrs

Dim. and weight : h x w x d
52 x 222 x 202 mm 1.7 kg

Enclosure : IP20

ES 300 300 W DC POWER SUPPLIES



ES 030-10 **0 - 30 V** **0 - 10 A**

- Weight only 3.1 kg
- Wide input voltage range for world wide use
- Very low output ripple and spikes
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Efficiency 86 %
- Active Power Factor Correction, PF = 0.96
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional external **isolated analog** programming*
  optional rear power output, excl. remote sensing
  *optional internal **ethernet / RS232** programming*
  *optional external **IEEE488** programming*
  for more options and details see page 16

19" Rack Mounting

RA 19-1ES
for one ES030-10

RA 19-2ES
for two ES030-10

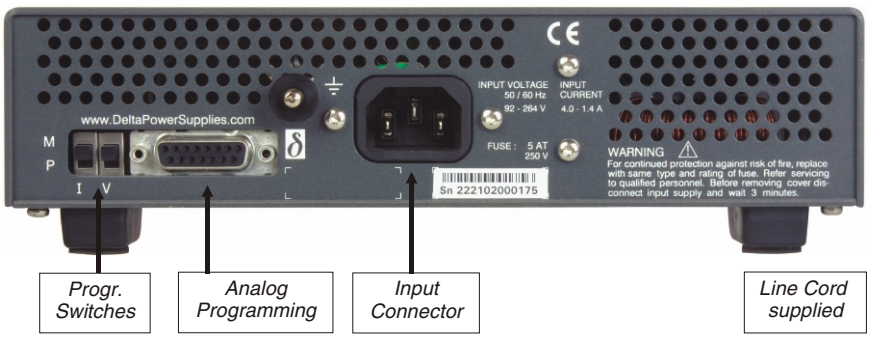
RA 19-ES-PSC
for one ES030-10
and PSC-488 module
or PSC-232 module

RA 19-ES-PSC-ETH
for one ES030-10
and PSC-ETH

ES030-10 option P179:
Built-in PSC-ETH for ethernet communication.

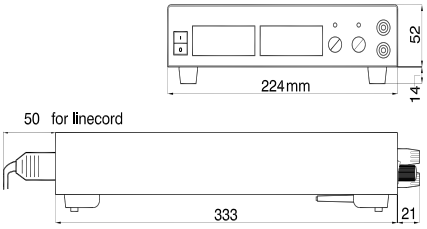
ES030-10 option P185:
Rear power outlet

Rear connections

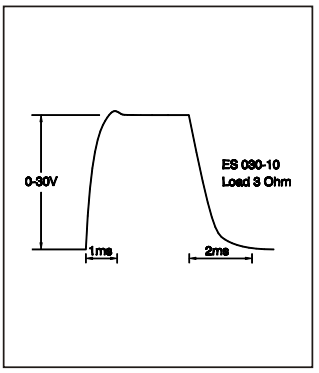


Dimensions and Weight

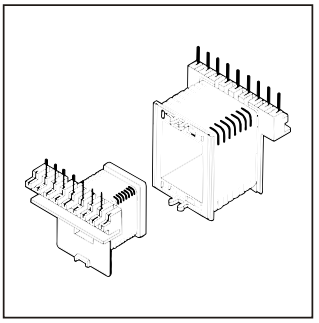
Width = half 19"
Height = 66 mm
*Weight = **3.1 kg***



Specifications ES 030-10		
Output		**ES 030-10**
voltage		0 - 30 V
current		0 - 10 A
Input		
AC single phase, 48 - 62 Hz		92 - 265 V
Input current @ 230 V AC		1.6 A
power factor, 110 / 230 V AC *full load*		0.99 / 0.96
internal fuses		5 AT
standby input power (V_o=I_o=0)		10 W
standby input power (V_o=V_{max})		15 W
Efficiency		
AC 230 V input, full load		86 %
Regulation		
Load 0 - 100%, int. sensing	**CV**	10 mV
optional remote sensing		not available
Line 90 - 265 V AC	**CV**	1 mV
Load 0 - 100%	**CC**	4 mA
Line 90 - 265 V AC	**CC**	1 mA
Ripple + noise (full load)		
rms (BW=300 kHz)	**CV**	5 mV
p-p (BW=50 MHz)	**CV**	15 mV
rms (BW=300 kHz)	**CC**	6 mA
p-p (BW=50 MHz)	**CC**	15 mA
Programming speed (10 - 90%)		0 → 30 V
time, (100% load)		0.8 ms
Output impedance 0-100 kHz	**CV**	< 300 mOhm
Temp. coeff., per °C	**CV**	5.10^{-5}
	CC	10.10^{-5}
Stability after 1 hr warm-up		
during 8 hrs	**CV**	30.10^{-5}
	CC	10.10^{-4}

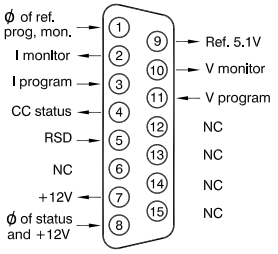


High programming speed of output voltage, 0 - 30 V in less than 1.5 ms (no electrolytic capacitors on output)



HF transformer has two isolated bobbins providing very safe 4 kVrms dielectric strength between input and output circuits.

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	**CV**	**CC**
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
Ethernet, IEEE488 or RS232 Programming		
Optional with interface PSC-ETH, PSC-488 or PSC-232, see pg. 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		



D15 analog programming connector

Insulation
Input/output : 4 kVrms (1 min.), 8 mm cr./cl.
Input/case : 2.5 kVrms (1 min.), 5 mm cr./cl.
Output/case : 600 V DC

Safety : EN 60950 EN 61010

EMC : EN 61204-3 Power Supply Standard
EN 61000-6-3 Gen.Emission (EN 55022**B**)
EN 61000-6-2 Generic Immunity

Recovery time : 50 µs (after 50-100% load step)

Hold up time : 18 ms full load, 50 ms half load

Ambient temp. : – 40 to + 85 °C (storage)
– 20 to + 50 °C (operating)

Remote ShutDown : With 5 V or relay contact

Series operation : Normal and Master / Slave, max. 600 V total voltage. See page 23 for the M/S SERIES ADAPTER.

Parallel operation : Normal and Master / Slave

CC status output : +5 V (or 5 mA) when in CC mode

Remote sensing : Not available.

Over voltage limit : Intern. adjust. 6 - 34 V

Digital meters : Digital 3.5 digit

MTBF : 500 000 hrs

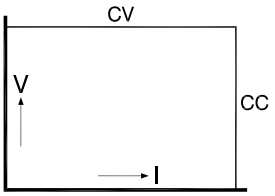
Dim. and weight : h x w x d
52 x 224 x 333 mm 3.1 kg

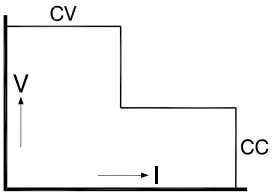
Enclosure : IP20

SM 800 - SERIES 800 W DC POWER SUPPLIES

SM 70-AR-24

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**
	0 - 70 V	**0 - 12 A**	
SM 400-AR-4	**0 - 200 V**	**0 - 4 A**	**autoranging**
	0 - 400 V	**0 - 2 A**	





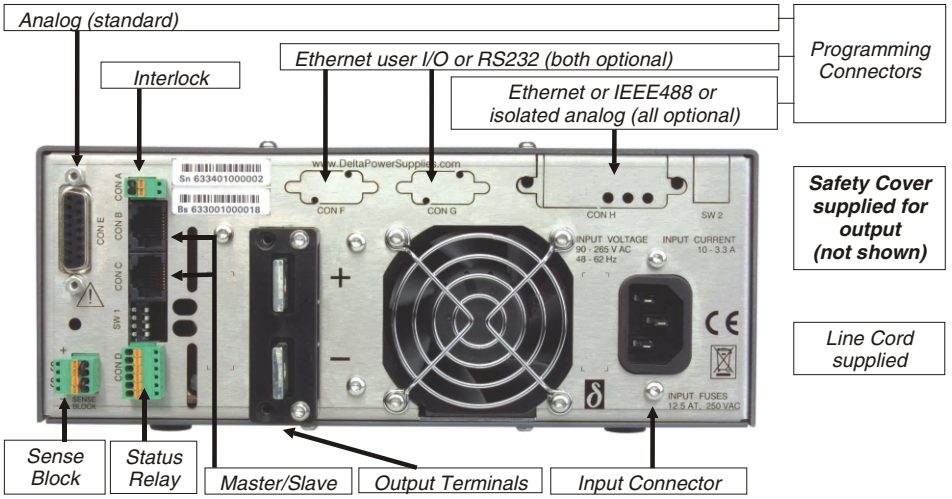
- Very low output ripple and spikes
- Excellent response to load changes
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Designed for **long life** at **full power**
- 100 kHz MOSFET power conversion
- Efficiency up to 89 %

- Active Power Factor Correction, PF=0.99
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional internal **isolated analog** programming*
  optional high speed programming
  *optional internal **ethernet** programming*
  *optional internal **IEEE488 / RS232** programming*
  optional Power Sink
  optional long life high resolution digital encoders
  for more options and details see page 16

19" Adapter
RA 19-2SM

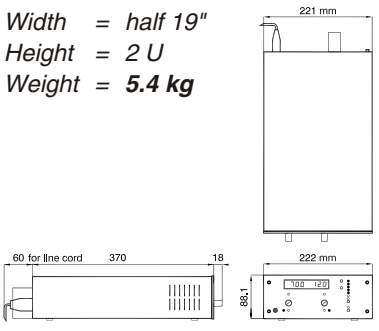
Front connection
option P257 - SM18-50
option P258 - SM70-AR-24
option P259 - SM400-AR-4

Rear connections



Dimensions and Weight

Width = half 19"
Height = 2 U
*Weight = **5.4 kg***



Specifications SM 800 - series				
Output	**SM 7.5-80**	**SM 18-50**	**SM 70-AR-24**	**SM 400-AR-4**
voltage current	0 - 7.5 V 0 - 80 A	0 - 18 V 0 - 50 A	0 - 70 V 0 - 24 A	0 - 400 V 0 - 4 A
Input				
AC, single phase, 48-62Hz *Power derating* vs input at 90, 100, 110 V AC *Power Factor*. 100, 50% load	90 - 265 V 3.3, 0, 0% 0.99, 0.96	90 - 265 V 25.5, 18.9, 14.4% 0.99, 0.98	90 - 265 V 11.9, 1.19, 0% 0.99, 0.98	90 - 265 V 6.25, 0, 0% 0.99, 0.98
current (230 V AC) internal fuses	3.2 12.5 AT	4.5 12.5 AT	4.2 12.5 AT	4 12.5 AT
Efficiency			*35 V / 70 V*	*200 V / 400 V*
AC 230 V input, full load	82%	87%	89 %	89 %
Regulation				
Load 0 - 100% **CV** Line 120 - 265 V AC **CV**	0.2 mV 0.2 mV	0.5 mV 0.2 mV	2 mV 0.5 mV	10 mV 2 mV
Load 0 - 100% **CC** Line 120 - 265 V AC **CC** (internal voltage sense)	4 mA 1 mA	3 mA 1 mA	1.5 mA 1 mA	0.5 mA 0.2 mA
Ripple + noise, rms/p-p **CV** **CC**	2.5 / 10 mV 120 / 25 mA	2 / 8 mV 5 / 25 m A	3 / 15 mV 35 V 3 / 1 mA 70 V 15 / 5 mA	15 / 80 mV 200 V 0.8 / 0.5 mA 300 V 3 / 1.5 mA
Progr. speed (10 - 90%) time, (100% load) *High Speed options (see page 16)* **Progr. speed (10 - 90%)** time, (100% load) *High Speed options (see page 16)*	0 → 7.5 V 6.5 ms *0.20 ms*	0 → 16 V 12 ms *0.22 ms*	0 → 35 V 6 ms *0.24 ms* 0 → 70 V 10 ms *0.24 ms*	0 → 200 V 4 ms *0.40 ms* 0 → 400 V 8 ms *0.82 ms*
Output imp. 1-100 kHz **CV**	< 30 mΩ	< 30 mΩ	< 35 mΩ	< 2 Ω
Temp. coeff., per °C **CV** **CC**	35.10^{-6} 60.10^{-6}			
Stability after 1 hr warm-up **CV** during 8 hrs **CC**	6.10^{-5} 9.10^{-5}			

Analog Programming	CV	CC
Programming inputs input range accuracy / offset input impedance	0 - 5 V ± 0.2% / – 0.1 mV ... + 1.3 mV (on 5 V) > 1 MOhm	0 - 5 V ± 0.5% / 0 mV ... + 2.2 mV (on 5 V) > 1 MOhm
Monitoring output output range accuracy / offset output impedance	0 - 5 V ± 0.2% / – 1 mV ... 0 mV (on 5 V) 2 Ohm / max. 4 mA	0 - 5 V ± 0.5% / – 1.1 mV ... 0 mV (on 5 V) 2 Ohm / max. 4 mA
Ethernet, IEEE488 or RS232 Programming		
Optional with internal interface PSC-ETH, PSC-488 or PSC-232, see page 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		

Standby input power : 14 W

Remote ShutDown : With +5 V, 1 mA or relay contact

Status outputs : CC, LIM, OT, PSOL, ACF, DCF,

Relay outputs : AC-Fail, DC-Fail

Recovery time : 100 µs (50 -100% load step)

Insulation
- Input/Output : 3750 Vrms (1 min.) 8 mm creepage/clearance
- Input/case : 2500 Vrms
- Output/case : 600 V DC

Safety : EN 60950 / EN 61010

EMC
- Power Supply Standard : EN 61204-3
- Generic Emission : EN 61000-6-3 (EN 55022**B**)
- Generic Immunity : EN 61000-6-2

Thermal protection : Output shuts down in case of insufficient cooling

Operation amb. temp. : – 20 to + 50 °C

Hold-Up time : 16 ms (100 % load) 36 ms (50 % load)

Series operation : Normal and Master / Slave, max. 600 V total voltage

Parallel operation : Normal and Master / Slave

Remote sensing : Max. 2 V per lead

Limit adjust range : 0 - 102 % of V_{max} and I_{max}

Meters : Digital 3.5 digit

Mounting : Stacking allowed, air flow is from rear to the sides

Cooling : Fan with temperature controlled speed, air flow is from rear to the sides

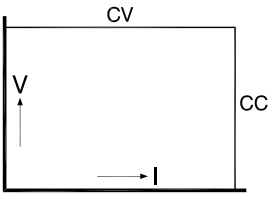
MTBF : 500 000 hrs

Enclosure : IP20

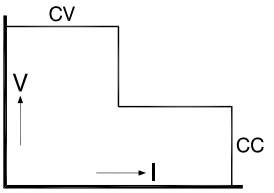
SM 1500 - SERIES 1500 W DC POWER SUPPLIES

SM 52-AR-60

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 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**



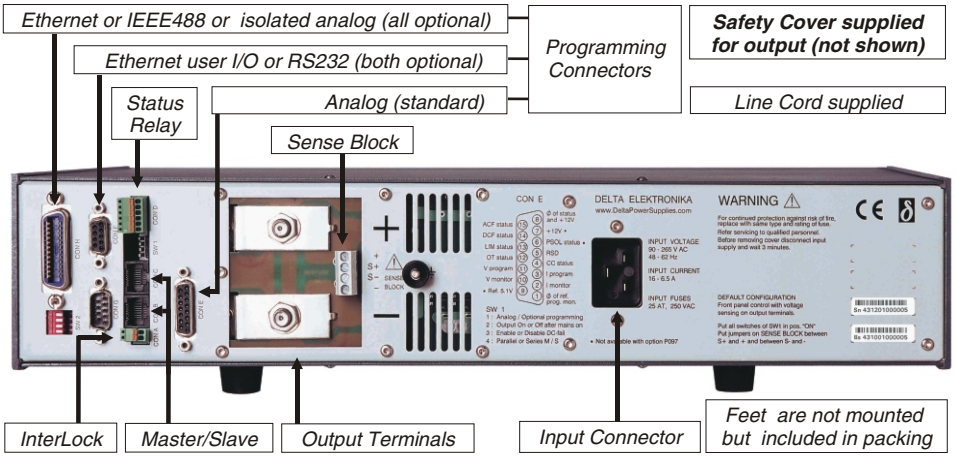
SM 52-AR-60	**0 - 26 V** **0 - 52 V**	**0 - 60 A** **0 - 30 A**	**autoranging**
SM 400-AR-8	**0 - 200 V** **0 - 400 V**	**0 - 8 A** **0 - 4 A**	**autoranging**



- Very low output ripple and spikes
- Excellent response to load changes
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Designed for **long life** at **full power**
- 100 kHz MOSFET power conversion
- Efficiency up to 91 %

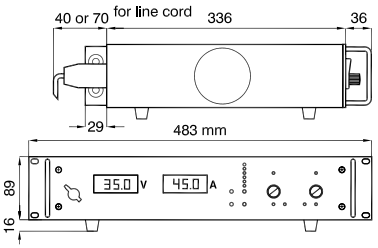
- Active Power Factor Correction, PF=0.99
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional internal **isolated analog** programming*
  optional high speed programming
  *optional internal **ethernet** programming*
  *optional internal **IEEE488** / **RS232** programming*
  optional Power Sink
  optional long life high resolution digital encoders
  for more options and details see page 16

Rear connections



Dimensions and Weight

Width = 19"
Height = 2 U
*Weight = **9.9 kg***



Specifications SM 1500 - series								
Output	**SM 15-100**	**SM 35-45**	**SM 52-30**	**SM 52-AR-60**	**SM 70-22**	**SM 120-13**	**SM 300-5**	**SM 400-AR-8**
voltage current	0 - 15 V 0 - 100 A	0 - 35 V 0 - 45 A	0 - 52 V 0 - 30 A	0-26 V@60 A 0-52 V@30 A	0 - 70 V 0 - 22 A	0 - 120 V 0 - 13 A	0 - 300 V 0 - 5 A	0-200 V@8 A 0-400 V@4 A
Input								
AC, single phase, 48-62Hz *Power derating* vs input at 90, 100, 110 V AC *Power Factor*. 100, 50% load	90 - 265 V 22,13, 1% 0.99, 0.98	90 - 265 V 25,16, 5% 0.99, 0.98	90 - 265 V 24, 14, 4% 0.99, 0.98	90 - 265 V 24,15, 4% 0.99, 0.98	90 - 265 V 22, 13, 3% 0.99, 0.98	90 - 265 V 24, 15, 4% 0.99, 0.98	90 - 265 V 20, 10, 0% 0.99, 0.98	90 - 265 V 25, 16, 6% 0.99, 0.98
current (230 V AC) internal fuses	7.5 Arms 25 AT	7.7 Arms 25 AT	7.7 Arms 25 AT	7.7 Arms 25 AT	7.6 Arms 25 AT	7.7 Arms 25 AT	7.4 Arms 25 AT	7.8 Arms 25 AT
Efficiency				*26 V / 52 V*				*200 V / 400 V*
AC 230 V input, full load	87 %	90 %	90 %	89 / 90 %	90 %	90 %	91 %	90 / 91 %
Regulation								
Load 0 - 100% **CV** Line 120 - 265 V AC **CV**	0.5 mV 0.2 mV	1 mV 0.5 mV	2 mV 0.7 mV	2 mV 0.7 mV	2.5 mV 1 mV	4 mV 2 mV	10 mV 3 mV	12 mV 4 mV
Load 0 - 100% **CC** Line 120 - 265 V AC **CC** (internal voltage sense)	5 mA 1 mA	3 mA 0.5 mA	1.5 mA 0.5 mA	2 mA 1 mA	1 mA 0.25 mA	0.6 mA 0.2 mA	0.5 mA 0.1 mA	0.5 mA 0.2 mA
Ripple + noise, rms/p-p **CV** **CC**	2 / 8 mV 15 / 80 mA	1.8 / 8 mV 5 / 15 mA	2 / 15 mV 3 / 10 mA	2 / 15 mV 26 V 10 / 30 mA 52 V 3 / 10 mA	3 / 15 mV 3 / 10 mA	7 / 30 mV 2 / 6 m A	7 / 50 mV 0.5 / 4 mA	15 / 80 mV 200 V 1.2 / 6 mA 400 V 0.6 / 3 mA
Progr. speed (10 - 90%) time, (100% load) *High Speed options (see page 16)* **Progr. speed (10 - 90%)** time, (100% load) *High Speed options (see page 16)*	0 → 15 V 6.1 ms *0.20 ms*	0 → 35 V 15.4 ms *0.27 ms*	0 → 52 V 7.3 ms *0.31 ms*	0 → 26 V 8.5 ms *0.44 ms* 0 → 52 V 34.2 ms *0.53 ms*	0 → 70 V 13.2 ms *0.47 ms*	0 → 120 V 3.4 ms *0.46 ms*	0 → 300 V 9.0 ms *1.0 ms*	0 → 200 V 3.7 ms *0.35 ms* 0 → 400 V 15 ms *0.98 ms*
Output imp. 0-100 kHz **CV**	< 25 mΩ	< 30 mΩ	< 30 mΩ	< 40 mΩ	< 30 mΩ	< 0.6 Ω	< 1 Ω	< 1.3 Ω
Temp. coeff., per °C **CV** **CC**	35.10^{-6} 60.10^{-6}							
Stability after 1 hr warm-up **CV** during 8 hrs **CC**	6.10^{-5} 9.10^{-5}							

Analog Programming	CV	CC
Programming inputs input range accuracy / offset input impedance	0 - 5 V ± 0.2% / – 0.1 mV ... + 1.3 mV (on 5 V) > 1 MOhm	0 - 5 V ± 0.5% / 0 mV ... + 2.2 mV (on 5 V) > 1 MOhm
Monitoring output output range accuracy / offset output impedance	0 - 5 V ± 0.2% / – 1 mV ... 0 mV (on 5 V) 2 Ohm / max. 4 mA	0 - 5 V ± 0.5% / – 1.1 mV ... 0 mV (on 5 V) 2 Ohm / max. 4 mA
Ethernet, IEEE488 or RS232 Programming		
Optional with internal interface PSC-ETH, PSC-488 or PSC-232, see page 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		

Standby input power : 12 W

Remote ShutDown : With 5 V or relay contact

Status outputs : CC, LIM, OT, ACF, DCF, PSOL

Relay outputs : AC-Fail, DC-Fail

Recovery time : 100 µs (50 -100% load step)

Insulation
- Input/Output : 3750 Vrms (1 min.) 8 mm creepage/clearance
- Input/case : 2500 Vrms (1 min.)
- Output/case : 600 V DC

Safety : EN 60950 / EN 61010

EMC
- Power Supply Standard : EN 61204-3
- Generic Emission : EN 61000-6-3 (EN 55022**B**)
- Generic Immunity : EN 61000-6-2

Thermal protection : Output shuts down in case of insufficient cooling

Operation amb. temp. : – 20 to + 50 °C

Hold-Up time : 16 ms (100 % load) 36 ms (50 % load)

Series operation : Normal and Master / Slave, max. 600 V total voltage

Parallel operation : Normal and Master / Slave

Remote sensing : Max. 2 V per lead

Limit adjust range : 0 - 102 % of V_{max} and I_{max}

Meters : Digital 3.5 digit

Mounting : Stacking allowed, air flow is from left to right

Cooling : Fan with temperature controlled speed, air flow from left to right

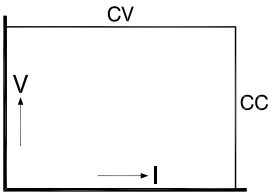
MTBF : 500 000 hrs

Enclosure : IP20

SM 3000 - SERIES 3000 W DC POWER SUPPLIES

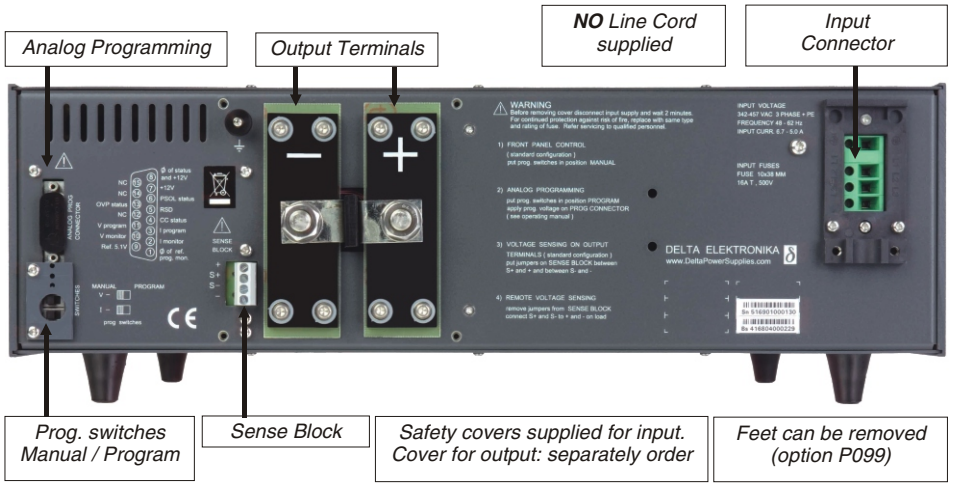
SM 30-100 D

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**



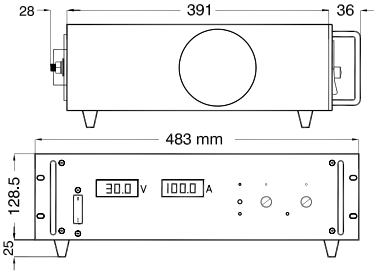
- Very low output ripple and spikes
- Excellent response to load changes
- 3 phase input 380 V, 400 V, 415 V AC
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Designed for **long life** at **full power**
- 200 kHz MOSFET power conversion
- Efficiency up to 91 %
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional internal **isolated analog** programming*
  optional high speed programming
  *optional internal **ethernet** programming*
  *optional internal **IEEE488** / **RS232** programming*
  optional Power Sink
  for more options and details see page 16

Rear connections



Dimensions and Weight

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



Specifications SM 3000 - series						
Output	**SM 15-200 D**	**SM 30-100 D**	**SM 45-70 D**	**SM 70-45 D**	**SM 120-25 D**	**SM 300-10 D**
voltage current	0 - 15 V 0 - 200 A	0 - 30 V 0 - 100 A	0 - 45 V 0 - 70 A	0 - 70 V 0 - 45 A	0 - 120 V 0 - 25 A	0 - 300 V 0 - 10 A
Input						
AC, 3 phase, 48-62 Hz, full load *for use at 380, 400, 415 V nominal line - line voltage* DC	342 - 457 V contact factory	342 - 457 V contact factory	342 - 457 V contact factory	342 - 457 V contact factory	342 - 457 V contact factory	342 - 457 V contact factory
current (380 V AC / 3 phase) fuses	6.0 Arms 16 AT	5.8 Arms 16 AT	6.1 Arms 16 AT	6.1 Arms 16 AT	5.8 Arms 16 AT	5.8 Arms 16 AT
Efficiency						
AC 3 phase input, full load	87 %	90 %	89 %	90 %	90 %	90 %
Regulation						
Load 0 - 100% **CV** Line 342 - 457 V AC **CV**	5 mV 5 mV	5 mV 5 mV	5 mV 5 mV	10 mV 5 mV	10 mV 10 mV	15 mV 10 mV
Load 0 - 100% **CC** Line 342 - 457 V AC **CC**	50 mA 50 mA	25 mA 25 mA	15 mA 15 mA	10 mA 10 mA	10 mA 10 mA	3 mA 3 mA
Ripple + noise, rms / p-p **CV** **CC**	2 / 12 mV 100 / 250 mA	1.6 / 8 mV 20 / 60 mA	3.5 / 17 mV 20 / 60 mA	2 / 12 mV 6 / 25 m A	5 / 25 mV 7 / 25 mA	10 / 50 mV 3 / 10 mA
Programming speed (10 - 90%) time, (100% load) *High Speed options (see page 16)*	0 → 15 V 7 ms *0.36 ms*	0 → 30 V 7 ms *0.33 ms*	0 → 45 V 7 ms *0.50 ms*	0 → 70 V 7 ms *0.45 ms*	0 → 120 V 7 ms *0.34 ms*	0 → 300 V 7 ms *1.00 ms*
Output impedance 0-100 kHz **CV**	0.02 Ohm	0.02 Ohm	0.06 Ohm	0.06 Ohm	0.15 Ohm	0.8 Ohm
Temp. coeff., per °C **CV** **CC**	typical 10.10^{-6}, max. 35.10^{-6} typical 20.10^{-6}, max. 60.10^{-6}					
Stability during 8 hrs after **CV** 1 hr warmup **CC**	typical 2.10^{-5},max.4.10^{-5} typical 3.10^{-5},max.10.10^{-5}					

Analog Programming	**CV**	**CC**
Programming inputs input range accuracy / offset input impedance	0 - 5 V ± 0.2% / 0 mV ... + 8 mV (on 5 V) 1 MOhm	0 - 5 V ± 0.5% / 0 mV ... + 20 mV (on 5 V) 1 MOhm
Monitoring output output range accuracy / offset output impedance	0 - 5 V ± 0.2% / – 3 mV ... + 11 mV (on 5 V) 20 Ohm	0 - 5 V ± 0.5% / – 5 mV ... 0 mV (on 5 V) 20 Ohm
Ethernet, IEEE488 or RS232 Programming		
Optional with internal interface PSC-ETH, PSC-488 or PSC-232, see page 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		

Standby input power : 25 W

Remote ShutDown : With 5 V or relay contact

Recovery time
50 - 100% load step : 100 µs

Insulation
Input/Output : 3750 Vrms (1 min.)
8 mm creepage/clearance
Input/case : 2500 Vrms (1 min.)
Output/case : 600 V DC

Safety : EN 60950 / EN 61010

EMC
Power Supply Standard : EN 61204-3
Generic Emission : EN 61000-6-3 (EN 55022**B**)
Generic Immunity : EN 61000-6-2

Operating ambient temp. : – 20 to + 50 °C

Thermal protection : Output shuts down in case of insufficient cooling

Hold-Up time : 6 ms (100 % load)
15 ms (50 % load)

Phase loss : Power supply will continue operating on one phase but at 90 % of V_{max}

Series operation : Normal and Master / Slave, max. 600 V total voltage

Parallel operation : Normal and Master / Slave

Remote sensing : Max. 2 V per lead

OVP / OVL adjust range : 0 - 115 % of V_{max}

Meters : Digital 3.5 digit

Mounting : Stacking allowed, air flow is from left to right

Cooling : Fan with temperature controlled speed, air flow from left to right

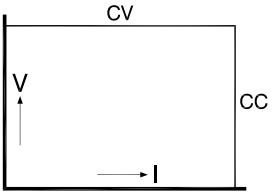
MTBF : 500 000 hrs

Enclosure : IP20

SM 6000 - SERIES 6000 W DC POWER SUPPLIES

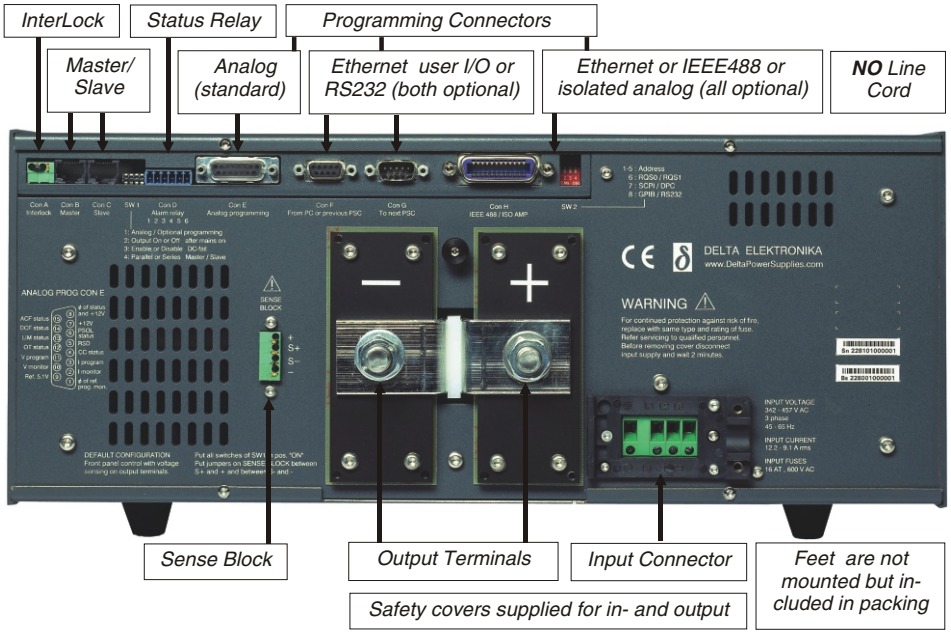
SM 15-400

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**



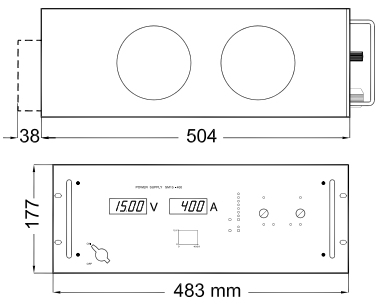
- Very low output ripple and spikes
- Excellent response to load changes
- 3 phase input 380 V, 400 V, 415 V AC
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel and series operation
- Very stable output voltage or current
- Designed for **long life** at **full power**
- Efficiency up to 90 %
- Active Power Factor Correction, PF=0.98
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional 480 V AC input voltage (US)*
  *optional internal **isolated analog** programming*
  optional high speed programming
  *optional internal **ethernet** programming*
  *optional internal **IEEE488** / **RS232** programming*
  optional long life high resolution digital encoders
  optional Power Sink
  for more options and details see page 16

Rear connections



Dimensions and Weight

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



Specifications SM 6000 - series							
Output	**SM 15-400**	**SM 30-200**	**SM 45-140**	**SM 60-100**	**SM70-90**	**SM 120-50**	**SM 300-20**
voltage current	0 - 15 V 0 - 400 A	0 - 30 V 0 - 200 A	0 - 45 V 0 - 140 A	0 - 60 V 0 - 100 A	0 - 70 V 0 - 90 A	0 - 120 V 0 - 50 A	0 - 300 V 0 - 20 A
Input							
AC 3 phase, 48 - 62 Hz *for use at 380 V, 400 V, 415 V nominal line - line voltage* **Option P165** *for use at 440 V, 480 V (USA)*	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V	342 - 457 V 396 - 528 V
power factor, 100, 50% load	0.98, 0.97	0.98, 0.97	0.98, 0.97	0.98, 0.97	0.98, 0.97	0.98, 0.97	0.98, 0.97
current (400 V / 3 ph, full load) internal fuses	10.2 A 16 AT	10 A 16 AT	10.3 A 16 AT	10 A 16 AT	10.4 A 16 AT	9.9 A 16 AT	10 A 16 AT
Efficiency							
400 V AC, 3 ph input, full load	87 %	89 %	90 %	89 %	89 %	89 %	89 %
Regulation							
Load 0 - 100% **CV** Line 342 - 457 V AC **CV** (external voltage sense)	2.5 mV 0.2 mV	5 mV 0.5 mV	5 mV 1 mV	5 mV 2 mV	5 mV 2 mV	8 mV 2 mV	15 mV 3 mV
Load 0 - 100% **CC** Line 342 - 457 V AC **CC** (internal voltage sense, after warm-up)	24 mA 4 mA	12 mA 2 mA	9 mA 1.5 mA	6 mA 1 mA	5 mA 1 mA	3 mA 0.5 mA	1.2 mA 0.2 mA
Ripple + noise, rms/p-p **CV** **CC**	0.8 / 8 mV 100 / 300 mA	1 / 8 mV 20 / 60 mA	1.5 / 10 mV 8 / 25 mA	2 / 10 mV 3 / 10 mA	2 / 10 mV 3 / 10 mA	3 / 25 mV 3 / 10 mA	5 / 50 mV 2 / 5 mA
Programming speed (10 - 90%) time, (100% load *High Speed options (see page 16)*	0 → 15 V 3.3 ms *0.40 ms*	0 → 30 V 6.4 ms *0.41 ms*	0 → 45 V 2.7 ms *0.53 ms*	0 → 60 V 5.4 ms *0.44 ms*	0 → 70 V 6.8 ms *0.62 ms*	0 → 120 V 5.1 ms *0.57 ms*	0 → 300 V 8.5 ms *1.1 ms*
Output impedance 0-100 kHz **CV**	< 2.3 mΩ	< 5 mΩ	< 10 mΩ	< 12 mΩ	< 12 mΩ	< 90 mΩ	< 330 mΩ
Temp. coeff., per °C **CV** **CC**	35.10^{-6} 60.10^{-6}						
Stability after 1 hr warm-up **CV** during 8 hrs **CC**	5.10^{-5} 10.10^{-5}						

Analog Programming	CV	CC
Programming inputs input range accuracy / offset input impedance	0 - 5 V ± 0.2% / - 0.1... +1.3 mV (on 5 V) > 1 MOhm	0 - 5 V ± 0.5% / 0... +2.2 mV (on 5 V) > 1 MOhm
Monitoring output output range accuracy / offset output impedance	0 - 5 V ± 0.2% / - 1... 0 mV (on 5 V) 2 Ohm / max. 4 mA	0 - 5 V ± 0.5% / - 1.1 ... 0 mV (on 5 V) 2 Ohm / max. 4 mA
Ethernet, IEEE488 or RS232 Programming		
Optional with internal interface PSC-ETH, PSC-488 or PSC-232, see page 18 and 20 of this catalog. After calibration, the programming accuracy is –0.01%, the monitoring accuracy is ± 0.01%.		

Standby input power : 55 W

Remote ShutDown : With 5 V or relay contact

Recovery time
50 - 100% load step : 100 µs (120 µs for SM15-400)

Insulation
Input/Output : 3750 Vrms (1 min.)
8 mm creepage/clearance
Input/case : 2500 Vrms (1 min.)
Output/case : 600 V DC

Safety : EN 60950 / EN 61010

EMC
Power Supply Standard : EN 61204 - 3
Generic Emission : EN 61000-6-3 (EN 55022**B**)
Generic Immunity : EN 61000-6-2

Operating amb. temp. : – 20 to + 50 °C

Thermal protection : Output shuts down in case of insufficient cooling

Hold-Up time : 11 ms (100 % load)
27 ms (50 % load)

Phase loss : Power supply will shut down

Series operation : Normal and Master / Slave, max. 600 V total voltage

Parallel operation : Normal and Master / Slave

Remote sensing : Max. 2 V per lead

Limit adjust range : 0 - 102 % of V_{max} and I_{max}

Meters : Digital 3.5 digit

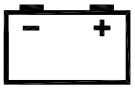
Mounting : Stacking allowed, air flow is from left to right

Cooling : Two fans with temperature controlled speed, air flow from left to right

MTBF : 500 000 hrs

OPTIONS for SM - SERIES

Battery Charging



- The CV / CC regulated power supplies are ideal battery chargers.
  Once set at the correct output voltage, the battery will charge constantly without overcharging.
  This can be useful for **emergency power systems**.
- Use a circuit breaker in series to protect the internal diode from reverse connection of the battery.
- Some units need an **external diode set** on the output as extra protection for the internal diode.

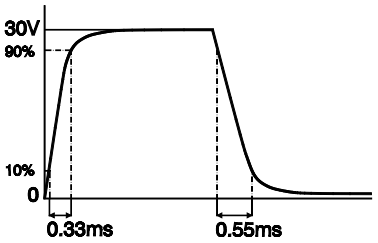
Download the special Battery Charging datasheet from 'www.DeltaPowerSupplies.com'.

High Speed Programming

- The speed is **10 - 20 times higher** because of the smaller output capacitors.
- Recovery time only 100 µs for a 50 → 100% load step
- Relatively low current overshoots (if any) in case of sudden voltage variations caused by the load, this is of great advantage for laser diode applications.

Applications:

- **Laser diode** power supply, continuous or pulsed.
- Test systems requiring a fast settling time to improve throughput of factory.
- A constant current source with a low parallel capacitance: plasma, load sensitive to current overshoots, etc.
- A constant current source on a load with **fast voltage variations**.



Example of rise and fall time SM30-100D with option P031

Specifications and ordering information: see datasheet on 'www.DeltaPowerSupplies.com'.

SM 800				
Programming speed *High Speed Version*	**SM 7.5-80** *option P250*	**SM 18-50** *option P251*	**SM 70-AR-24** *option P252*	**SM 400-AR-4** *option P253*
Rise time (10 - 90%) output voltage step time, (100 % load)	0 → 7.5V 0.20 ms	0 → 16 V 0.22 ms	0 → 70 V 0.24 ms	0 → 400 V 0.82 ms
Fall time (90 - 10%) output voltage step time, (100 % load)	7.5 → 0 V 0.20 ms	16 → 0 V 0.24 ms	70 → 0 V 0.85 ms	400 → 0 V 1.7 ms
Output Capacitance	310 µF	200 µF	80 µF	4 µF

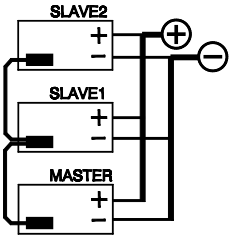
SM 1500								
Programming speed *High Speed Version*	**SM 15-100** *option P210*	**SM 35-45** *option P211*	**SM 52-30** *option P212*	**SM 52-AR-60** *option P213*	**SM 70-22** *option P214*	**SM 120-13** *option P215*	**SM 300-5** *option P216*	**SM400-AR-8** *option P217*
Rise time (10 - 90%) output voltage step time, (100 % load)	0 → 15 V 0.20 ms	0 → 35 V 0.27 ms	0 → 52 V 0.31 ms	0 → 52 V 0.53 ms	0 → 70 V 0.47 ms	0 → 120 V 0.46 ms	0 → 300 V 1.0 ms	0 → 400 V 0.98 ms
Fall time (90 - 10%) output voltage step time, (100 % load)	15 → 0 V 0.21 ms	35 → 0 V 0.33 ms	52 → 0 V 0.38 ms	52 → 0 V 1.0 ms	70 → 0 V 0.78 ms	120 → 0 V 0.51 ms	300 → 0 V 1.40 ms	400 → 0 V 1.7 ms
Output Capacitance	390 µF	190 µF	91 µF	195 µF	113 µF	21 µF	10 µF	7 µF

SM 3000						
Programming speed *High Speed Version*	**SM 15-200 D** *option P104*	**SM 30-100 D** *option P031*	**SM 45-70 D** *option P105*	**SM 70-45 D** *option P032*	**SM 120-25 D** *option P106*	**SM 300-10 D** *option P061*
Rise time (10 - 90%) output voltage step time, (100 % load)	0 → 15 V 0.36 ms	0 → 30 V 0.33 ms	0 → 45 V 0.50 ms	0 → 70 V 0.45 ms	0 → 120 V 0.34 ms	0 → 300 V 1.00 ms
Fall time (90 - 10%) output voltage step time, (100 % load)	15 → 0 V 0.37 ms	30 → 0 V 0.55 ms	45 → 0 V 0.60 ms	70 → 0 V 0.67 ms	120 → 0 V 0.38 ms	300 → 0 V 1.20 ms
Output Capacitance	800 µF	500 µF	360 µF	170 µF	33 µF	16 µF

SM 6000							
Programming speed *High Speed Version*	**SM 15-400** *option P166*	**SM 30-200** *option P167*	**SM 45-140** *option P168*	**SM 60-100** *option P169*	**SM 70-90** *option P170*	**SM 120-50** *option P171*	**SM 300-20** *option P172*
Rise time (10 - 90%) output voltage step time, (100 % load)	0 → 15 V 0.40 ms	0 → 30 V 0.41 ms	0 → 45 V 0.53 ms	0 → 60 V 0.44 ms	0 → 70 V 0.62 ms	0 → 120 V 0.57 ms	0 → 300 V 1.1 ms
Fall time (90 - 10%) output voltage step time, (100 % load)	15 → 0 V 0.39 ms	30 → 0 V 0.41 ms	45 → 0 V 0.26 ms	60 → 0 V 0.57 ms	70 → 0 V 0.50 ms	120 → 0 V 0.38 ms	300 → 0 V 1.0 ms
Output Capacitance	1200 µF	800 µF	520 µF	330 µF	290 µF	73 µF	32 µF

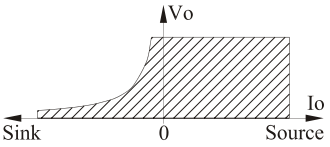
OPTIONS for SM - SERIES

Master / Slave operation



- Parallel and Series operation with **equal Current and Voltage sharing**.
- This way two or more units can be used together as one high power unit.
- Voltage and current of the units is controlled by the master (by potentiometers or by programming).
- The SM800, SM1500 and SM6000 units are easy to connect in Master / Slave mode, using standard UTP-cables (RJ45). **No special option is required**.
- For other units in M/S series mode, the M/S SERIES ADAPTER must be used, see page 23. For M/S parallel operation, a special programming cable must be used.

Power Sink for 2 quadrant operation



- Maintains output voltage regardless the output current is positive or negative (source & sink).
- Ideal solution for supplying **electric motors** with PWM-speed control.
- Fast down programming at no load conditions.
- Peak **power absorption** 140 W in SM800, 200 W in SM1500, 300 W in SM3000.

Ordering information:

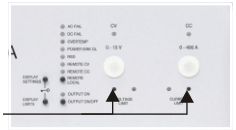
SM 800 *Power Sink*	**SM 7.5-80** *option P245*	**SM 18-50** *option P246*	**SM 70-AR-24** *option P247*	**SM 400-AR-4** *option P248*	-
SM 1500 *Power Sink*	**SM 15-100** *option P202*	**SM 35-45** *option P203*	**SM 52-30** *option P204*	**SM 52-AR-60** *option P205*	**SM 70-22** *option P206*
SM 3000 *Power Sink*	**SM 15-200D** *option P127*	**SM 30-100D** *option P128*	**SM 45-70D** *option P129*	**SM 70-45D** *option P130*	-
SM 6000 *Power Sink*	**SM 15-400** *option P230*	**SM 30-200** *option P231*	**SM 45-140** *option P232*	**SM 60-100** *option P233*	**SM 70-90** *option P234*

Download the special Power Sink datasheet from 'www.DeltaPowerSupplies.com'.

Fixed output settings — OPTION P001

- Screwdriver adjustment standard potentiometers
  CV and CC knobs are moved backwards to avoid accidental adjusting

Contact technical support for more information on 'Support@Delta-Elektronika.nl'.



screwdriver adjustment

Digital Encoders — OPTION P236 / P220

- CV and CC encoders with a very long life time and intelligent functions (e.g. Keylock)
  SM800 - Option 236, SM1500 and SM6000 - Option 220
  Contact technical support for more information on 'Support@Delta-Elektronika.nl'.

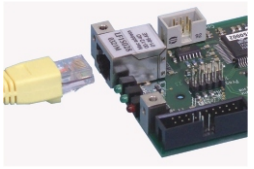
Increased max. output voltage/current — OPTION P069

- The maximum output voltage or current can be increased by **approximately 10%.**
  Normally this results in a derating of the maximum ambient temperature or other parameters.
- Always add increased value for voltage or current in ordercode, for example **SM35-45 P069 output 38 V**.

Enforced secondary insulation 1000 V — OPTION P089

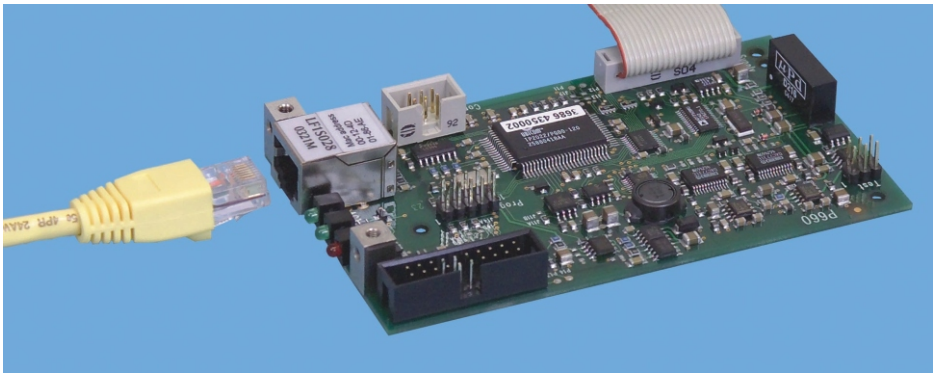
- The secondary insulation between output and ground is increased from standard 600 V to 1000 V .

Interfaces and Programmers



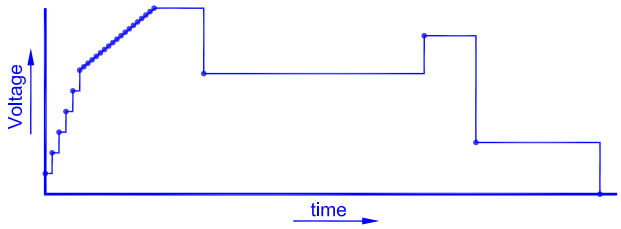
Ethernet Power Supply Controller **see page 18**
IEEE488 Power Supply Controller **see page 20**
RS232 Power Supply Controller **see page 20**
Isolated analog programming interface **see page 22**

PSC - SERIES ETHERNET INTERFACE

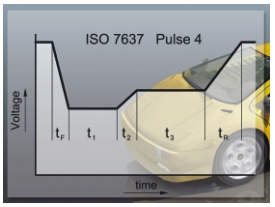


PSC-ETH Interface between Ethernet IP Network and Power Supply

- Built-in Card or External Module
- Make use of existing IP networks
- **16-bit programming** and monitoring
- Digital user in- and outputs (isolated)
- IP-address configurable
- Software Calibration
- LabVIEW driver included
- Read-back of status signals



User defined Waveforms can be stored in the Sequencer



Test pulses for Automotive applications

Integrated Sequencer:

- Ideal for repetitive testing and automotive
- Converts Power Supply into **Waveform Generator**
- Can work like a PLC for stand-alone automation: steps interact with the actual in- and outputs
- **Car battery simulation**, Surges, etc.
- 25 free programmable sequences, 2000 steps each
- Combination of very fast and slow sequences, steps from 1 millisecond till hours

19" Rack mounting

*Behind the panel **RA19-3-PSC** or **RA19-3-PSC-ETH** up to 3 external PSCs can be mounted. See page 20 for the panel **RA19-ES-PSC** or **RA19-ES-PSC-ETH** to mount a PSC in combination with a power supply from the ES-SERIES.*

External module

External module PSC-ETH

The Sequencer

The PSC-ETH can control the power supply by a sequence without the need of an external computer.

A sequence step can do the following:

- Set the output Voltage or Current
- Set a Digital output (6 available), read a digital input (8 available)
- Wait for trigger from computer or Pause
- Set an internal Variable (8x) or an internal Timer (2x)
- Possibility to create loops, subroutines, ramps etc.
- Increment or Decrement output Voltage or Current

Sequences can be started / paused / stopped by : Commands via Ethernet (software) or by User Inputs (hardware).

Using digital user inputs for starting or stopping a sequence, makes it possible to choose the sequences by selecting the corresponding input, without being connected to a computer.

Specifications

Analog inputs and outputs

The 2 analog in- and outputs have a 16 bits resolution. Offset and full scale can be software calibrated. Input linearity error is 1 LSB, output linearity error is 2 LSB. TC typical is 10 ppm / °C.

Status monitoring

The PSC provides logic status inputs to monitor the status signals of the power supply such as CC mode, current or voltage limit, DC fail, AC fail, Over Temperature, PSOL, etc.

Controls

Remote ShutDown: Enables / disables the output voltage of the power supply.
REMOTE: Switches from manual control to remote control (only on SM800 / SM1500 / SM6000)

Digital User Inputs and Outputs (not on ES- and SM3000-SERIES)

The PSC-ETH provides eight 1000 V opto-isolated logic inputs with common zero for custom use. The input impedance is 1800 Ohm, Logic high = 2.5 ... 30 V, Logic low = 0 V.
The PSC-ETH provides also six 1000 V opto-isolated, logic, open drain outputs with common zero for custom use. The output impedance is 7 Ohm, maximum rating is 30 V / 200 mA.

Accessories

PSC built-in: CD with example software and manual in PDF format.
External module: CD with example software and manual in PDF format, Analog cable and Line Cord.

Ordering information

	Description	Digital User I/O	Notes
ES 150 option P150	ES 150 - series with Built-in Card	not available	Analog programming connector removed
ES 300 option P179	ES 300 - series with Built-in Card	not available	Analog programming connector removed
SM 800 option P256	SM 800 - series with Built-in Card	yes	Analog programming connector still **available**
SM 1500 option P177	SM 1500 - series with Built-in Card	yes	Analog programming connector still **available**
SM 3000 option P149	SM 3000 - series with Built-in Card	not available	Analog programming connector removed
SM 6000 option P157	SM 6000 - series with Built-in Card	yes	Analog programming connector still **available**
PSC-ETH	External module	yes	Uses analog programming connector

Specifications external module

Dimensions (h x w x d)

89 x 85.5 x 118.5 mm, 0.7 kg

Input Power

Wide range 98-264 V AC, 48-62 Hz
Power consumption 10 W
Hold-up time @ 110 V AC : 80 ms
Hold-up time @ 230 V AC : 300 ms

Ambient temperature

Operating 0 to +55 °C
Storage –20 to +70 °C

Insulation

Analog in- and outputs to case : 1000 V DC
Logic in- and outputs to case : 1000 V DC
Ethernet to case : 1000 V DC
Line input to case : 2500 V AC

EMC

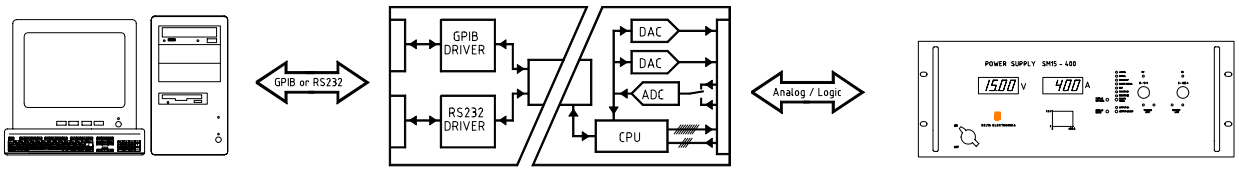
Emission : EN 61000-6-3, residential, light industrial environment
EN 55022**B**
Immunity : EN 61000-6-2, industrial environment
Enclosure : IP20

PSC - SERIES RS232 and IEEE488 INTERFACES

PSC-232 Interface between RS232 Computer port and Power Supply

PSC-488 Interface between IEEE488 Computer port and Power Supply

- Built-in Card or External Module
- **14 Bit** voltage and current **programming**
- 12 - 16 Bit voltage and current monitoring
- Up to 15 PSCs on 1 BUS to control multiple supplies
- SCPI commands
- Software Calibration
- LabVIEW driver included
- Read-back of status signals



The PSC is an interface between the Computer and an analog programmable Power Supply.

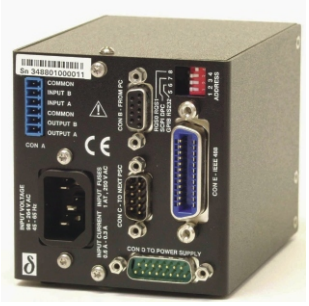
- **RS232 Programming**
  The interface PSC-232 programs a Power Supply through the standard RS232 port on the computer.
- **IEEE488 Programming**
  The interface PSC-488 programs a Power Supply through the IEEE488 Bus.

19" Rack mounting

*Use panel **RA19-ES-PSC** or **RA19-ES-PSC-ETH** to mount a PSC in combination with a power supply from the ES-SERIES.*

*Behind the panel **RA19-3-PSC** or **RA19-3-PSC-ETH** up to 3 external PSCs can be mounted (see also page 18).*

External module



External module PSC-488

Commands

The PSC allows three groups of commands:

- IEEE488.2 Common Commands
- SCPI (Standard Commands for Programmable Instruments)
- DPC (Delta Programming Commands) emulation mode of the old PSC44M (for compatibility only)

The PSC can be programmed using languages like Basic, Pascal, C, Visual Basic, Delphi, Hpvee, Labview etc.
Software examples are available on *www.DeltaPowerSupplies.com*

Specifications

Analog inputs and outputs

The 2 analog inputs have a 12 - 16 bit resolution. The 2 analog outputs have a 14 bits resolution.
Offset and full scale can be software calibrated.
Input linearity error is 2 LSB, output linearity error is 1 LSB. TC typical is 30 ppm / °C.

Status monitoring

The PSC provides logic status inputs to monitor the status signals of the power supply such as CC mode, current or voltage limit, DC fail, AC fail, PSOL and Over Temperature.

Controls

Remote ShutDown: Enables / disables the output voltage of the power supply.
REMOTE: Switches from manual control to remote control (only on SM800 / SM1500 / SM6000)

User Inputs (only on module)

The PSC-232 and the PSC-488 provide two 1000 V opto-isolated logic inputs with common zero for custom use. The input impedance is 470 Ohm, Logic high = 2.5 ... 8 V, Logic low = 0 V.

User Outputs (only on module)

The PSC-232 and the PSC-488 provide two 1000 V opto-isolated, logic, open collector outputs with common zero for custom use. The output collector emitter max. rating is 50 V / 4.5 - 7 mA (dissipation max. 150 mW).

Accessories

PSC built-in: CD with example software and manual in PDF format, RS232 cable (except with option P164).
External module: CD with example software and manual in PDF format, RS232 cable, Analog cable and Line Cord.

	Description	Notes
ES 150 option P148	ES 150 - series with Built-in RS232 Card	Analog programming connector removed
ES 300 option P180	ES 300 - series with Built-in RS232 Card	
SM 800 option P255	SM 800 - series with Built-in PSC-488 Card	Analog programming connector still **available**
SM 800 option P254	SM 800 - series with Built-in PSC-232 Card	
SM 1500 option P184	SM 1500 - series with Built-in IEEE488 Card	Analog programming connector still **available**
SM 1500 option P183	SM 1500 - series with Built-in RS232 Card	
SM 3000 option P164	SM 3000 - series with Built-in IEEE488 Card	Analog programming connector removed
SM 3000 option P146	SM 3000 - series with Built-in RS232 Card	
SM 6000 option P156	SM 6000 - series with Built-in IEEE488 Card	Analog programming connector still **available**
SM 6000 option P155	SM 6000 - series with Built-in RS232 Card	
PSC-488 module	External IEEE488 module	Uses analog programming connector
PSC-232 module	External RS232 module	

Note: the PSC-488 models can also be configured for RS232 programming.

Specifications external module

Dimensions (h x w x d)

89 x 85.5 x 118 mm, 0.8 kg

Input Power

Wide range 98-264 V AC, 48-62 Hz
Power consumption 10 W
Hold-up time @ 110 V AC : 80 ms
Hold-up time @ 230 V AC : 300 ms

Ambient temperature

Operating 0 to +55 °C
Storage –20 to +70 °C

Insulation

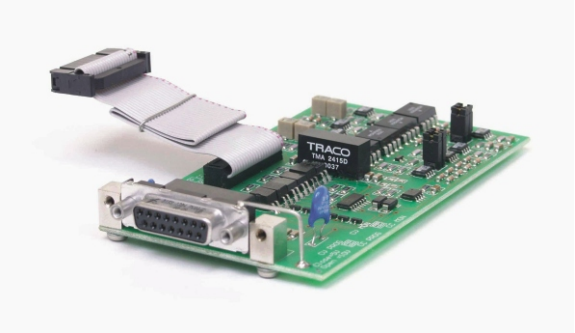
Analog in- and outputs to case	:	1000 V DC
Logic in- and outputs to case	:	1000 V DC
GPIB or RS232 to case	:	1000 V DC
Line input to case	:	2500 V AC

EMC

Emission	:	EN 61000-6-3, residential, light industrial environment
		EN 55022**B**
Immunity	:	EN 61000-6-2, industrial environment
Enclosure	:	IP20

OPTIONS

ISO AMP ISOLATED ANALOG PROGRAMMING



4 channel analog isolation amplifier

- Built-in Card or External Module
- **Isolated programming** of voltage and current
- Galvanic isolation when programming and monitoring
- **Prevents** problems with **earth loops** and common mode voltages
- **Isolated logic inputs** and **outputs**
- Isolated monitoring of voltage and current
- Selectable 0 - 5 V or 0 - 10 V signal levels
- The external Module is pin compatible with the D15 connector on Delta Elektronika power supplies

Ordering information

- The ISO AMP CARD is mounted, tested and calibrated in combination with the power supply:
  SM 800 **option P249**
  SM 1500 **option P218**
  SM 3000 **option P145**
  SM 6000 **option P154**
- Order **ISO AMP MODULE** for the external module. The module can be used in combination with all programmable Delta Elektronika power supplies. For operation of the module an external 24 V DC supply voltage is needed.

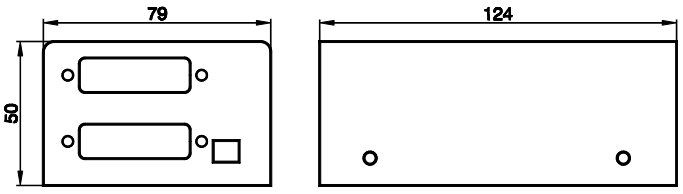
Specifications

Analog inputs / outputs	
Offset	± 60 µV typical, ± 180 µV max
Full scale error	0.1 % calibrated
Non-linearity	0.01 % typical, 0.05 % max
Temperature coefficient	– 65 ppm typical
Common mode rejection	80 dB @ 50 Hz
Voltage range	0 – 5 V or 0 – 10 V (dip-jumper)

Accessories External Module

- rail adapter for 35 mm rail mounting
- wall mounting adapter
- 0.6 m cable with 15 pole D-connectors (for connecting to power supply).

Dimensions

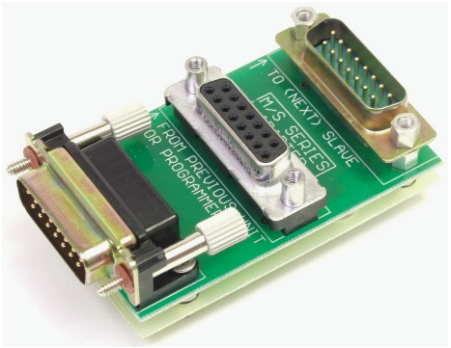


Dimensions of the external ISO AMP MODULE

External module

External ISO AMP MODULE

MASTER / SLAVE SERIES ADAPTER



Operation in Master / Slave Series Mode

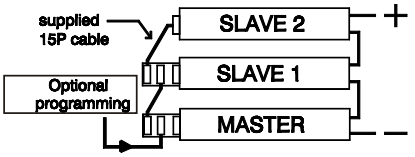
- Provides equal voltage sharing in series mode
- Connecting power supplies in Master / Slave series mode (for ES - and SM3000 - SERIES)
- Series operation possible up to 600 V total voltage
- The master power supply can be the upper or the lower power supply in the series system

OPTIONS

Specifications

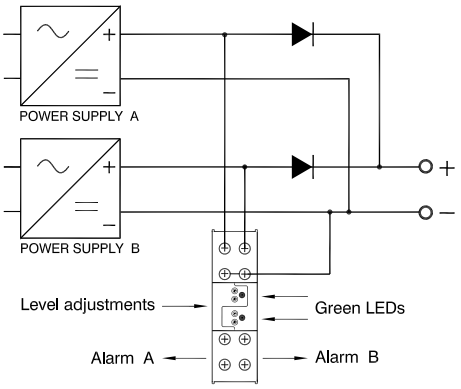
Slave programming voltage	
Offset	± 60 µV typical, ± 180 µV max
Full scale error	0.1 % calibrated
Non-linearity	0.01 % typical, 0.05 % max
Temperature coefficient	– 65 ppm typical

Connections



Example with 3 supplies in series

AL24-48 UNDER AND OVER VOLTAGE ALARM



Monitoring 2 power supplies in redundant operation.

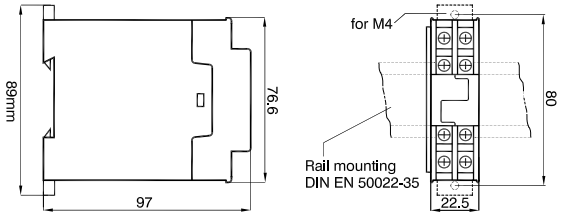
2 channel alarm for use from 18 V to 64 V DC

- Large adjustment for use on both 24 V and 48 V DC.
- Contains two window comparator circuits, isolated from each other. Each has an isolated alarm contact.
- Monitors the output voltages of two power supplies.
- Between the levels of under and over voltage a green LED lights up and an alarm contact closes.

Specifications

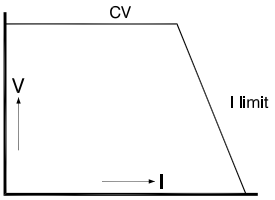
Alarm circuits	
Undervoltage range	18 - 48 V
Overvoltage range	24 - 64 V
insulation between circuits	500 V
Alarm contact, gold, rating	100 mA / 30 V, Normally Closed
Ambient temperature	– 20 to + 70 °C

Dimensions



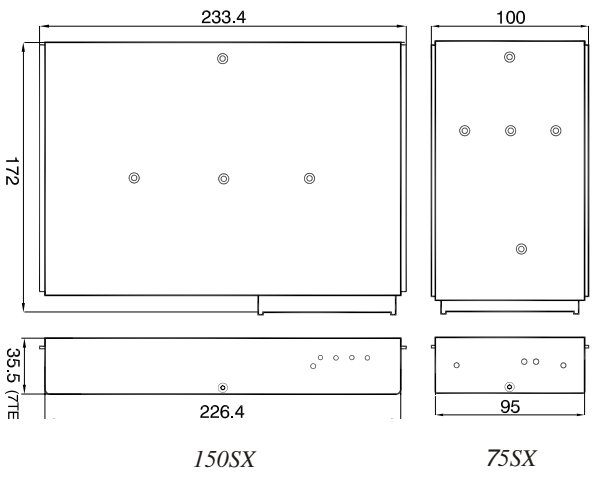
SX - SERIES 75 W / 150 W DC POWER SUPPLIES

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	**2 x 15 - 75 V**	**1**	**A**
150 SX 200-200	**2 x 35 - 200 V**	**0.3**	**A**
ST 150	**3.5 - 6 V**	**13**	**A**
	2 x 6 - 15 V	**2.5**	**A**

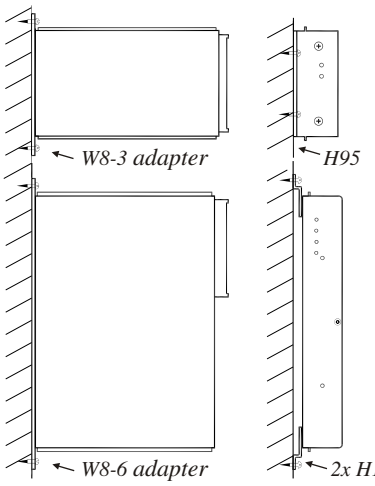


- Very low output ripple and spikes
- Weight only 0.6 kg (75SX), 1.2 kg (150SX)
- Covers whole output range from 3.5 V to 400 V DC
- Wide input voltage range for world wide use
- 2 outputs series mode, parallel mode or dual mode
- Protected against overload and short circuit
- Output voltage adjustable with 20 turn trimmer
- Including mating connector with faston tabs

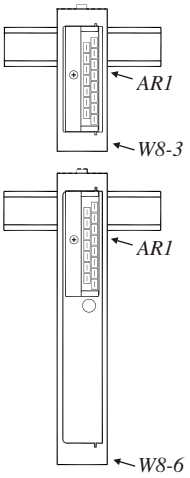
Dimensions



Wall mounting



Rail mounting

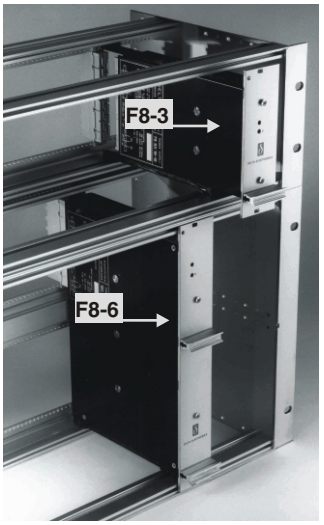


Specifications 75SX - series and 150SX - series

Input voltage	:	98 - 132 V AC or 185 - 264 V AC, 48 - 62 Hz For DC operation and operation at 400 Hz contact factory.
Input current	:	75SX 1.3 Arms (98 - 132 V AC), 0.7 Arms (185 - 264 V AC) 150SX 2.6 Arms (98 - 132 V AC), 1.4 Arms (185 - 264 V AC)
Fuses	:	75SX 2 A T 150SX 4 A T
Inrush current limit	:	10 A with NTC resistor 30 Ohms cold resistance.
Insulation		
Input / output	:	4 kVrms (1 min.), 8 mm creepage/cl.
Input / case	:	2.5 kVrms (1 min.), 5 mm creepage/cl.
Output / case	:	500 V DC, 1 mm creepage/clearance 1 kV DC for 150 SX75-75 and 200-200.
Safety	:	EN 60950 EN 61010
EMC	:	EN 61204-3 Power Supply Standard EN 61000-6-3 (EN 55022**B)** Generic Emission EN 61000-6-2 Generic Immunity
Efficiency	:	84 % dual units, 80 % 5 V units at 230 V AC input. 81 % and 78 % respectively at 110 V AC input.

		5 and 15 V models	75 and 200 V models
Voltage regulation			
Load 0 - 100%	:	10 mV (with remote sensing)	200 mV
Line 185 - 264 V AC	:	10 mV	150 mV
Ripple + noise	:	5 mVrms, max. 20 mV p-p	70 mVrms, 100 mV p-p

Stability	:	5.10^{-4} during 8 hours after 1 hr warm up.
Temp. coefficient	:	1.10^{-4} per °C
Output impedance	:	Max. 0.1 Ohm up to 100 kHz, except 150SX75-75 and 200-200 max. 1 Ohm.
Recovery time	:	0.1 ms to recover to within 0.1 V after a 50-100% load step. Max. deviation 0.4 V. 0.6 ms / 1.2 V for 75 V and 200 V models.
Ambient temperature	:	Storage : – 40 to + 85 °C Operating : – 20 to + 50 °C, derate current linearly to 20% from 50 to 75 °C.
Temp. protection	:	Overtemperature protected.
Hold-up time	:	15 ms at full load, 30 ms at half load (230 V AC).
Series operation	:	Up to 500 V total voltage. Up to 1 kV for 150SX75-75 and 200-200.
Parallel operation	:	Allowed up to 40 °C ambient temperature
Redundant par. operation	:	Is possible with external diodes
Current limit	:	The current limit is fixed and protects the power supply during overload and short circuit. 10% more current can be taken at the low end of the voltage range.
Voltage limit	:	For safety a second regulation circuit limits the output voltage to about 10% above its range in case the normal regulation loop fails.
Voltage adjustment	:	The output voltage is continuously variable over the whole range with a 20 turn screw driver adjustment through the front panel.
Remote control	:	Voltage control with an external potentiometer is possible after some small internal changes.
Remote programming	:	An analog voltage of 5 V between PROG. and S– corresponds with the max output voltage.
Remote sensing	:	Max. 2 V per load lead for SX15-15 and 0.5 V for SX5. ST150, 150SX75-75 and 200-200 have no remote sensing.
Remote ShutDown	:	By +5 V (3.5 - 12 V) between RSD and S– or –.
MTBF	:	1 000 000 hrs
Dim. and weight	:	75SX h x w x d = 100 x 35.5 x 172 mm, 0.6 kg 150SX h x w x d = 233.4 x 35.5 x 172 mm, 1.2 kg



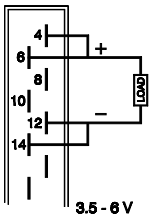
Eurocard rack mounting:
Use front panel F8-3 for 75SX, 3U height (132.5 mm).
Use front panel F8-6 for 150SX, 6U height (265 mm).
Use front panel F8-6T for ST150, 6U height (265 mm).

Transformer with split bobbin provides 4 kV insulation.

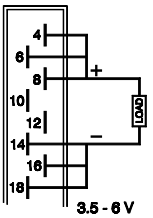
SX-SERIES

Bench operation — Parallel- , Series- and Dual-Mode

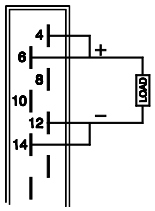
Adapter BA 150 for 150SX.
Use BA 75 for the 75SX.

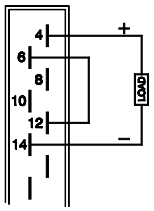


75SX5,
2 pins parallel

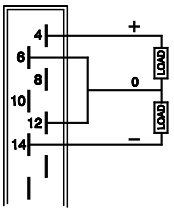


150SX5,
3 pins parallel



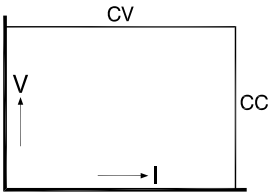


Units with two equal outputs:
Parallel mode *Series mode*



Dual mode

S 280 - SERIES 280 W DC POWER SUPPLIES



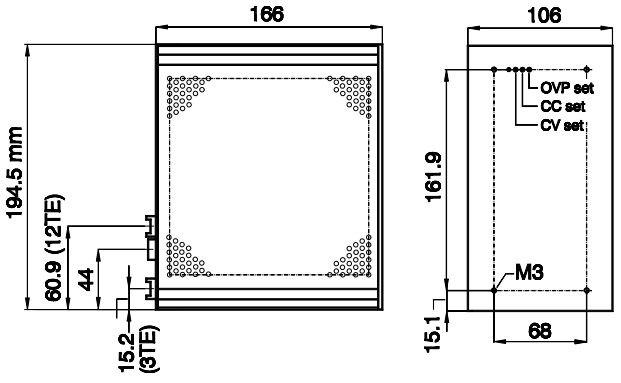
S 6 - 40	**0 - 6 V**	**0 - 40 A**
S 15 - 18	**0 - 15 V**	**0 - 18 A**
S 28 - 10	**0 - 28 V**	**0 - 10 A**

- Very low output ripple and spikes
- Redundant operation with RA-10 adapter
- Low offset analog programming, 0 - 5 V
- **Master / Slave** parallel operation
- Adjustable output voltage and current
- Designed for **long life** at **full power**
- Efficiency up to 88 %
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit
- *optional **isolated analog** programming*
  *optional **Ethernet / IEEE488** / **RS232** programming*
  for more options and details see page 16

Wall mounting with front panel FPW

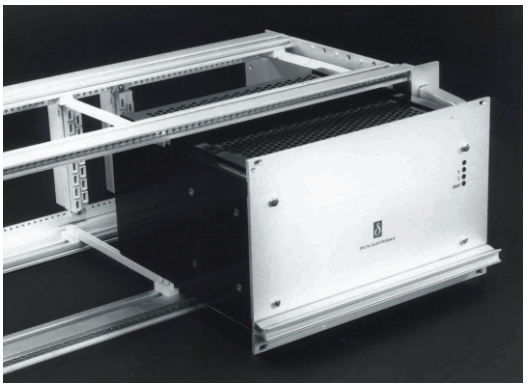
Redundant adapter RA 10 for S28-10

Dimensions



Dimensions S280

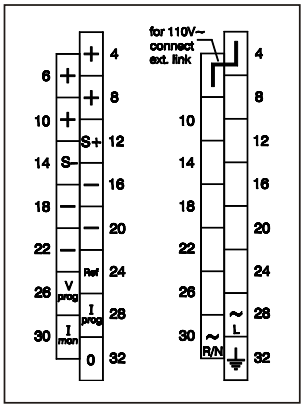
Eurocard rack mounting



Eurorack mounting with front panel FP40

Specifications S 280 - series			
Output	**S 6 - 40**	**S 15 - 18**	**S 28 - 10**
voltage / current	0 - 6 V / 0 - 40 A	0 - 15 V / 0 - 18 A	0 - 28 V / 0 - 10 A
Input			
AC input, full load DC input, full load	100 - 132 V 48 - 62 Hz 195 - 265 V 48 - 62 Hz contact factory	100 - 132 V 48 - 62 Hz 195 - 265 V 48 - 62 Hz contact factory	100 - 132 V 48 - 62 Hz 195 - 265 V 48 - 62 Hz contact factory
current (230 V AC / 110 V AC) fuse 230 V / 110 V	2.2 / 4.0 Arms 4 AT / 6.3 AT	2.3 / 4.2 Arms 4 AT / 6.3 AT	2.3 / 4.2 Arms 4 AT / 6.3 AT
Efficiency			
AC input, 220 V, full load	80 %	86 %	88 %
Regulation			
Load 0 - 100% **CV** Line 198 - 265 V AC **CV**	5 mV 5 mV	5 mV 5 mV	5 mV 5 mV
Load 0 - 100% **CC** Line 198 - 265 V AC **CC**	30 mA 30 mA	10 mA 10 mA	10 mA 10 mA
Ripple + noise, rms / p-p **CV** **CC**	5 / 25 mV 15 / 50 mA	5 / 25 mV 5 / 15 mA	5 / 25 mV 5 / 15 mA
Programming speed $0 \rightarrow V_{max}$	10 ms	12 ms	15 ms
Output impedance 0-100 kHz **CV**	0.1 Ohm	0.1 Ohm	0.1 Ohm
Temp. coeff., per °C **CV** **CC**	5.10^{-5} 1.10^{-4}		
Stability during 8 hrs after **CV** 1 hr warmup **CC**	5.10^{-4} 1.10^{-3}		

Analog Programming	**CV**	**CC**
Programming inputs input range accuracy input impedance	0 - 5 V ± 0.2% – 5 mV / + 12 mV 5 kOhm	0 - 5 V ± 0.5% – 4 mV / + 20 mV 5 kOhm
Monitoring output output range accuracy output impedance	not available	0 - 5 V ± 0.5% – 6 mV / + 0 mV 20 Ohm
Ethernet, IEEE488 or RS232 Programming		
Optional with external interface PSC-ETH, PSC-488 or PSC-232, see pg. 18 and 20. Programming and monitoring of Voltage and Current with accurate AD and DA converters.		



Output and input S280

Standby input power : 4 W

Recovery time
50 - 100% load step : 100 µs S6-40, S28-10
200 µs S15-18

Insulation
Input/Output : 3750 Vrms (1 min.)
8 mm creepage/clearance
Input/case : 2500 Vrms (1 min.)
Output/case : 500 V DC

Safety : EN 60950 EN 61010

EMC
Power Supply Standard : EN 61204-3
Generic Emission : EN 61000-6-3 (EN 55022**B**)
Generic Immunity : EN 61000-6-2

Thermal protection : Output shuts down in case of insufficient cooling

Operating ambient temp. : – 20 to + 50 °C

OVP / OVL adjust range : 5 - 35 V

Hold-up time
100 % load, 230 VAC : 20 ms
50 % load, 230 VAC : 40 ms

Series operation : Max. 500 V total voltage

Remote sensing : Max. 2 V per lead

Mounting : Vertical airflow through the unit should not be obstructed

Cooling : Natural convection cooling, no blower, no noise.

MTBF : 500 000 hrs

Dimensions (h x w x d) : 106 x 194.5 x 166 mm

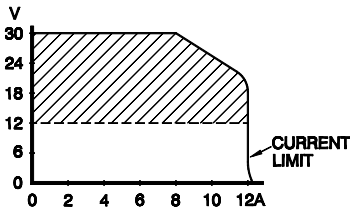
Case : DIN 41494 / IP20

Connectors : H15 (DIN 41612)

Weight : 2.8 kg

S-SERIES

240 S 24 240 W DC POWER SUPPLIES

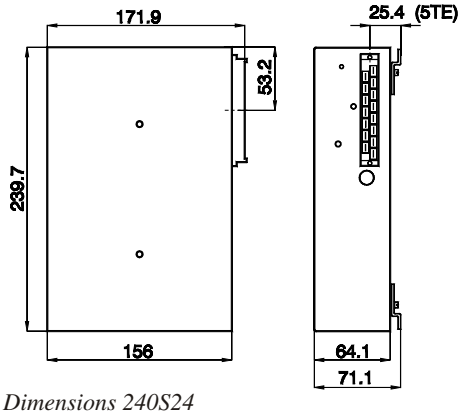


240 S 24	**12 - 15 V**	**12 A**
	24 V	**10 A**
	30 V	**8 A**

- Very low output ripple and spikes
- Built-in diode for redundant operation
- Low offset analog programming, 2 - 5 V
- Adjustable output voltage
- Very high reliability, MTBF 1000 000 hrs
- Designed for **long life** at **full power**
- Natural convection cooling, no blower no noise
- Efficiency up to 87 %
- Under voltage alarm contact
- Low inrush current
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit

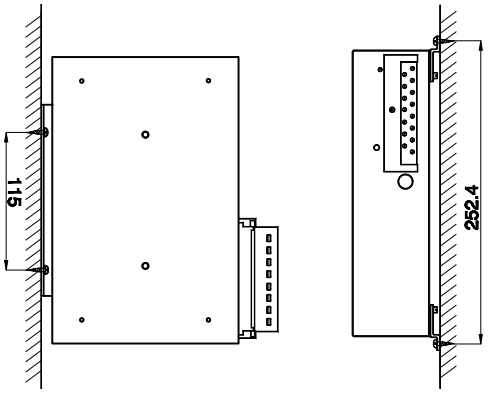
240S - 1200S

Dimensions



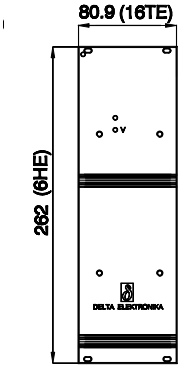
Dimensions 240S24

Wall mounting



Two ways of vertical wall mounting with the included brackets H155 (2 pieces).

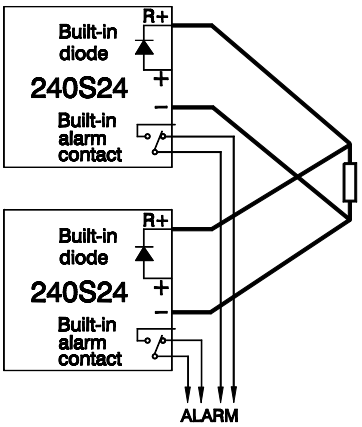
Eurocard Rack mounting



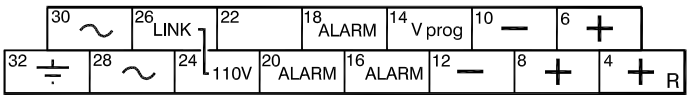
Use front panel F16-6 for Eurocard Rack Mounting.

Specifications 240 S 24

Output	:	Adjustable 12 - 30 V with a screwdriver or analog programmable by 2 - 5 V. Factory set at 24 V.
Input	:	AC 195 - 265 V 48 - 62 Hz 1.8 Arms 100 - 132 V 48 - 62 Hz 3.2 Arms For DC or operation at 400 Hz contact factory Fuse 4 A T at 230 V, 6.3 A T at 110 V
Safety	:	EN 60950 EN 61010
EMC	:	EN 61204-3 Power Supply Standard EN 61000-6-3 (EN 55022**B**) Generic Emission EN 61000-6-2 Generic Immunity
Efficiency	:	87% at 240 W output (max.heat dissipation 36 W)
Regulation		
Load 0 - 100%	:	50 mV (10 mV when using sense points)
Line 198 - 265 V AC	:	10 mV
Ripple + noise	:	5 mV rms, 15 mV p-p
Temperature coefficient	:	5.10^{-5} per °C
Stability during 8 hrs	:	3.10^{-4} (after 1 hr warm up)
Output impedance	:	0.1 Ohm up to 100 kHz
Recovery time	:	200 µs after 50 - 100% load step
Insulation		
Input / output	:	3750 Vrms (1 min.)
Input / case	:	2500 Vrms (1 min.)
Output / case	:	500 V DC
Hold-up time	:	20 ms (24 V / 10 A, 230 V AC input)
Ambient temperature	:	Operating: – 10 to + 50 °C. Above 50 °C derate current linearly to 20% at 80 °C. Storage: – 40 to + 85 °C.
Series operation	:	Up to 500 V total voltage
Parallel operation	:	At 90% of max. current (Internal current limit switch at low). The extra positive output terminal, via a built-in Schottky diode, separates the output circuits when units are operated in parallel.
Alarm circuit	:	A relay contact changes over when the output drops 10% below the set value. Gold contact, rating max. 100 mA / 30 V.
Current limit	:	Constant power limit from 30 to 22 V, constant current below 22 V. Current limit protects against continuous overload and short circuit.
OVL	:	Limits the maximum output voltage at about 33 V.
Mounting	:	The 240 S 24 should be mounted vertically for optimal cooling. When mounted horizontally put internal current limit switch at low and keep the ambient temperature below 40 °C.
MTBF	:	1 000 000 hrs
Dimensions and weight	:	240 x 71 x 156 mm (h x w x d) 14 TE 6 U 2.0 kg
Remote sensing	:	The sense points (pin 8 and 10) are internally connected to + and – output (pin 6 and pin 12), but these links can be removed when remote sensing is required. The voltage drop across the leads plus the load can never exceed the supply maximum output rating. For example at 24 V 8 A it is possible to compensate 6 V (3 V per lead) because the unit can supply max. 30 V 8 A.
Remote programming	:	2 - 5 V between pin 14 and 10 gives 12 - 30 V output (internal switch in position P).
Voltage adjustment with external potmeter	:	Is possible if an internal link and a resistor are removed
In- and output connections	:	



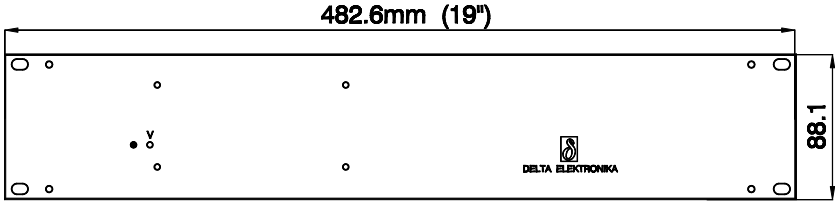
Redundant parallel operation with undervoltage alarm. Outputs are separated by built-in Schottky series diodes.



Bench operation

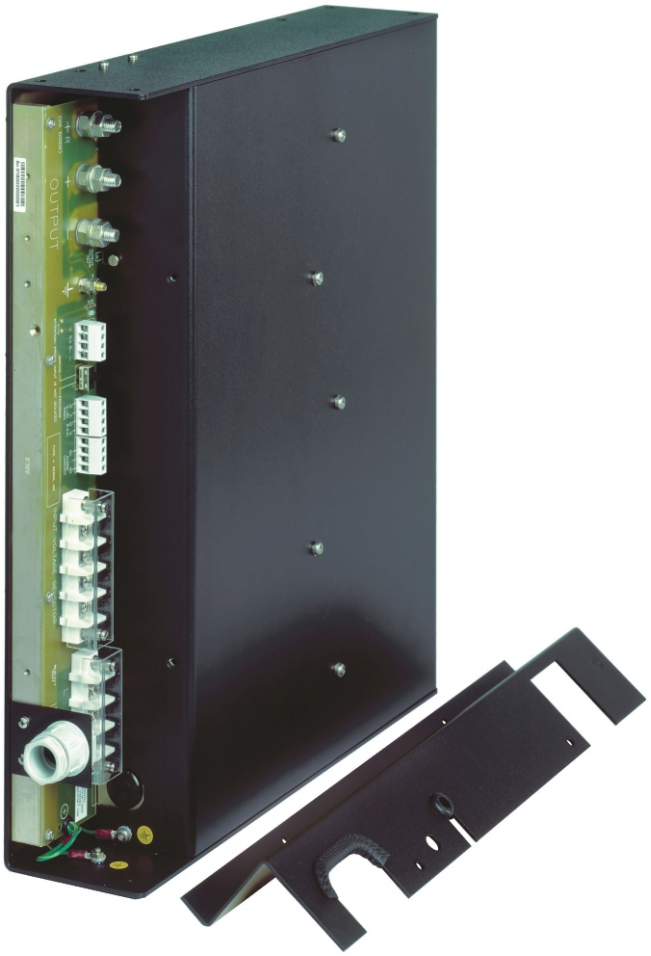
240S24 with bench adapter BA 150

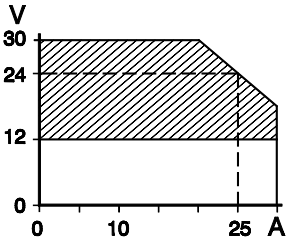
19" Rack mounting



Front panel F 19 /2 for horizontal 19" rack mounting of one unit

600 S 24 600 W DC POWER SUPPLIES

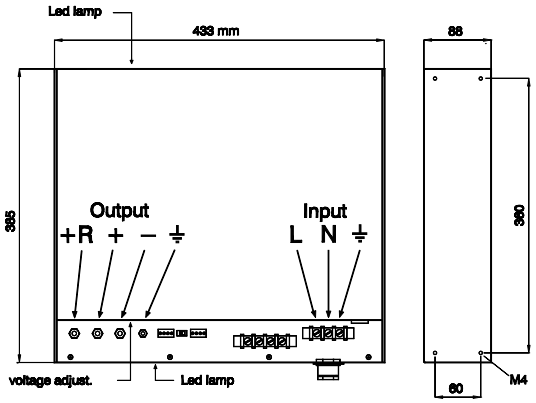




600 S 24	**12 - 15 V**	**30 A**
	24 V	**25 A**
	30 V	**20 A**

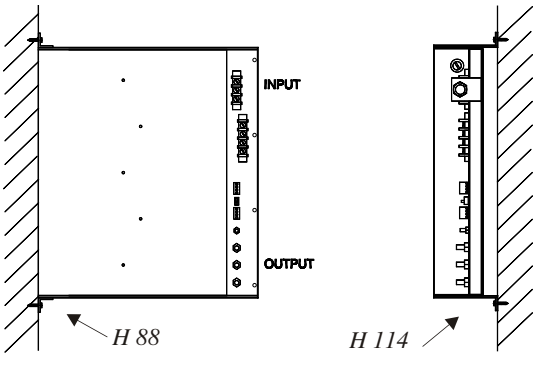
- Very low output ripple and spikes
- Built-in diode for redundant operation
- Low offset analog programming, 2 - 5 V
- Adjustable output voltage
- Very high reliability, MTBF 1000 000 hrs
- Designed for **long life** at **full power**
- Natural convection cooling, no blower no noise
- Efficiency up to 89 %
- Under voltage alarm contact
- Low inrush current
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit

Dimensions



Dimensions 600S24

Wall mounting



Two ways of vertical wall mounting

Specifications 600 S 24

Input voltage : AC 198-264 V 48-62 Hz
3.8 Arms, fuse 6.3 A T
crest factor 2.0

AC 99-132 V 48-62 Hz
7.6 Arms, fuse 12.5 A T

DC contact factory

Insulation
Input / output : 3750 Vrms (1 min.)
Input / case : 2500 Vrms (1 min.)
Output / case : 500 V DC

Inrush current : Limited by 47 Ohm during start up

Line distortion : Harmonic current meets EN 61000-3-2

Power factor : 0.76 at 230 V AC input and full load.

Safety : EN 60950 EN 61010

EMC
Power Supply
Standard : EN 61204-3
Generic Emission : EN 61000-6-3 (EN 55022**B**)
Generic Immunity : EN 61000-6-2

VDE0160 impuls test : Input withstands non periodic impuls 2.3 $\hat{U}_N$ 1.3 ms of VDE0160 class 2.

Output voltage : Factory set at 24.0 V.
Screwdriver adjustable with 10-turn potmeter at the rear side.
Analog programmable by 2 - 5 V.

Efficiency : 89% at 230 VAC input

Temp. coeff. : 5.10^{-5} per °C

Stability : 3.10^{-4} during 8 hours after 1 hr warm up.

Regulation
Load 0 - 100% : Better than 10 mV
Line 198 - 264 V : Better than 5 mV

Ripple + noise : Max. 7 mVrms, 20 mV p-p.

Output imp. : Less than 0.05 Ohm up to 100 kHz

Recovery time : 0.3 milliseconds to recover to within 100 mV after a 50 to 100% load step. Max. deviation 300 mV.

Hold-up time : 30 ms at 230 V AC input and full load. 60 ms at half load.

Series operation : Up to 500 V total voltage

Parallel operation: No restrictions.

Redundant parallel operation : Use R+ connection via the built-in Schottky diode to separate the outputs. Do not use remote sensing.

Under voltage alarm contact : Changes over when output voltage drops to 10% below the set value. Gold contact, rating 100 mA/30 V.

Remote control : Is possible with a 10 kΩ potmeter.

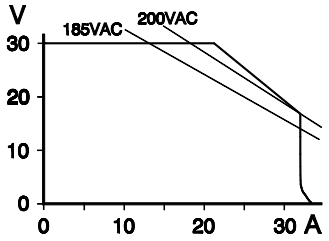
Remote progr. : Output voltage is programmable with 2 - 5 V, corresponding with 12 - 30 V. Programming speed is 100 ms from 12 - 30 V at max. Current.

Remote sensing : Max. 3 V per load lead. With parallel operation remote sensing is not recommended.

Remote on/off : By 5 V, optocoupler isolated.

Ambient temperature
Storage : – 40 to + 85 °C
Operating : – 20 to + 60 °C, derate to 20% at 75 °C

Current limit : From 30 to 18 V the current limit follows more or less a constant power curve. Below 18 V it resembles a constant current curve.



Normal current limit and derating at low input voltage

Overload protection : Continuous overload and short circuit does not harm the unit.

Voltage limit : For safety an extra regulation circuit limits the output voltage to about 31 V in case of malfunction of the normal regulation. This limit is internally adjustable 20 - 31 V (R111).

Overtemperature protection : In case of insufficient cooling the output shuts down.

Led lamps : Green leds on front and rear panel indicate output voltage.

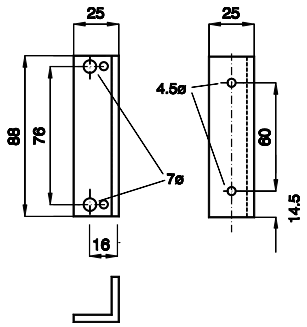
Wall mounting : Any position, as long as the air can flow freely along the unit for cooling.

19 inch rack mounting : With two brackets H88 with handle the unit can be 19 inch rack mounted (2U height).

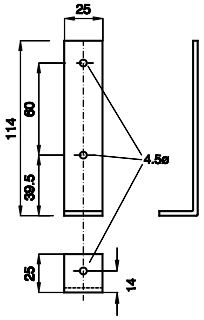
MTBF : 1 000 000 hrs

Dim. and weight : 88 x 433 x 385 mm (h x w x d), 10.5 kg

Wall mounting brackets

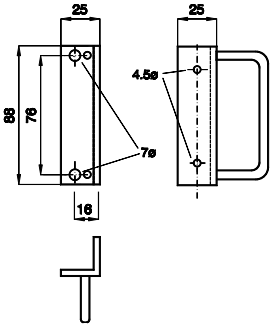


Bracket H88 for vertical wall mounting (2 pcs required)



Bracket H114 for vertical wall mounting (4 pcs required)

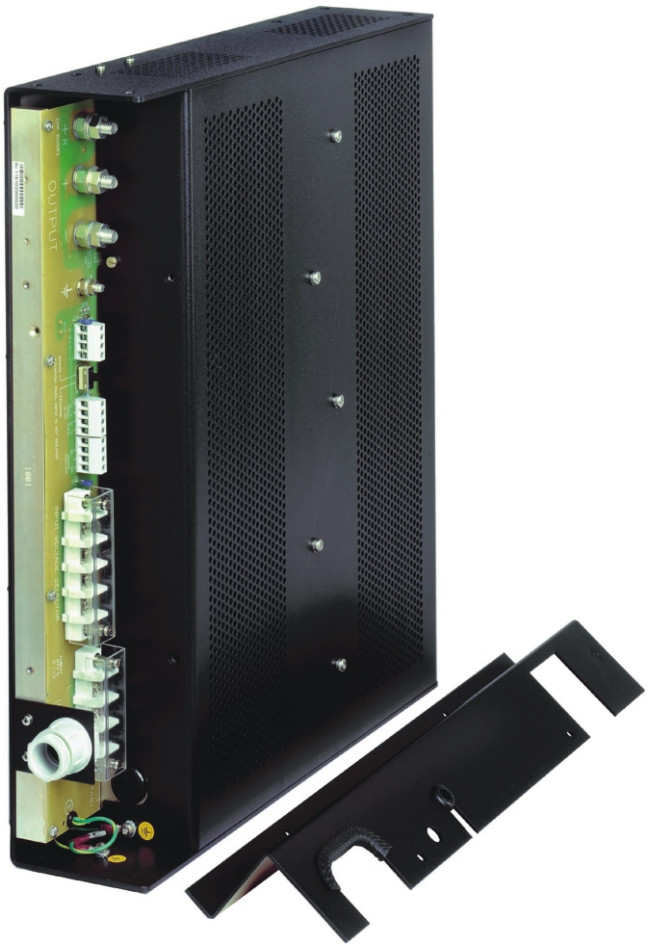
19" Rack mounting brackets

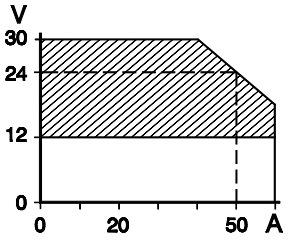


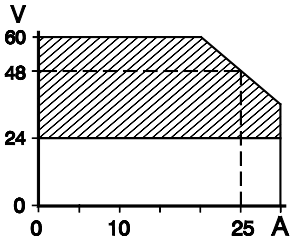
Bracket H88 with handle for 19" rack mounting (2 pcs required)

240S - 1200S

1200 S 1200 W DC POWER SUPPLIES



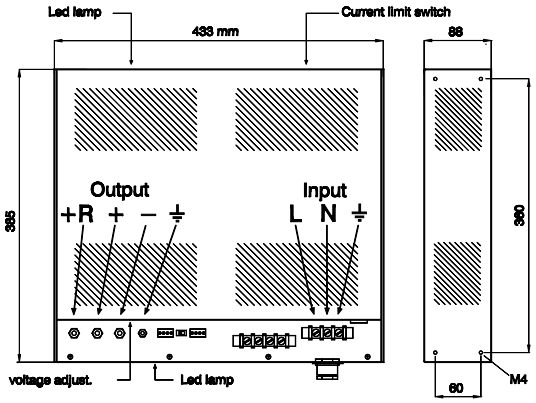




1200 S 24	**12 - 15 V**	**60 A**
	24 V	**50 A**
	30 V	**40 A**
1200 S 48	**24 - 30 V**	**30 A**
	48 V	**25 A**
	60 V	**20 A**

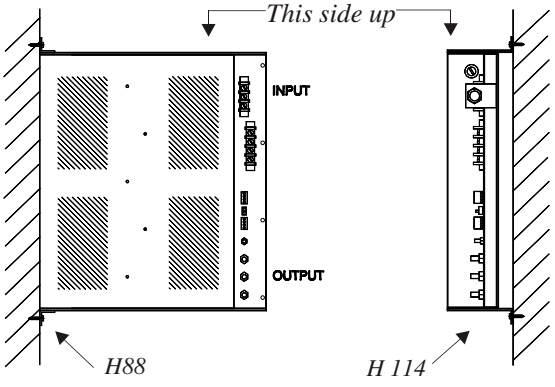
- Very low output ripple and spikes
- Built-in diode for redundant operation
- Low offset analog programming, 2 - 5 V
- Adjustable output voltage
- Very high reliability, MTBF 500 000 hrs
- Designed for **long life** at **full power**
- Natural convection cooling, no blower no noise
- Efficiency up to 89 %
- Under voltage alarm contact
- Low inrush current
- Excellent EMC: high immunity, low emission
- Protected against overload and short circuit

Dimensions



Dimensions 1200S24

Wall mounting



Two ways of vertical wall mounting

Specifications 1200 S 24 and 1200 S 48

Input voltage : AC 198-264 V 48-62 Hz
8.2 Arms, fuse 15 A T
crest factor 2.2

AC 99-132 V 48-62 Hz
16.4 Arms, fuse 25 A T

DC contact factory

Insulation
Input / output : 3750 Vrms (1 min.)
Input / case : 2500 Vrms (1 min.)
Output / case : 500 V DC

Inrush current : Limited by 39 Ohm during start up

Line distortion : Suppressed by a large input choke.

Power factor : 0.72 at 230 V AC input and full load.

Safety : EN 60950 EN 61010

EMC
Power Supply
Standard : EN 61204-3
Generic Emission : EN 61000-6-3 (EN 55022**B**)
Generic Immunity : EN 61000-6-2

VDE0160 impuls test : Input withstands non periodic impuls 2.3 $\hat{U}_N$ 0.3 ms of VDE0160 class 1.

Output voltage : Factory set at 24.0 V.
Screwdriver adjustable with 10-turn potmeter at the rear side.
Analog programmable by 2 - 5 V.

Efficiency : 89% at 230 V AC input.

Temp. coeff. : 5.10^{-5} per °C

Stability : 3.10^{-4} during 8 hours after 1 hr warm up.

Regulation
Load 0 - 100% : Better than 10 mV
Line 198 - 264 V : Better than 5 mV

Ripple + noise : Max. 7 mVrms, 20 mV p-p.

Output imp. : Less than 0.05 Ohm up to 100 kHz

Recovery time : 0.3 milliseconds to recover to within 100 mV after a 50 to 100% load step. Max. deviation 300 mV.

Hold-up time : 20 ms at 230 V AC input and full load.
40 ms at half load.

Series operation : Up to 500 V total voltage

Parallel operation: For safe parallel operation put current limit switch at 'LO' (max. 1100 W).

Redundant parallel operation : Use R+ connection via built-in Schottky diode to separate the outputs.
Put current limit at 'LO'.
Do not use remote sensing.

Under voltage alarm contact : Changes over when output voltage drops to 10% below the set value.
Gold contact, rating 100 mA/30 V.

Remote control : Is possible with a 10 kΩ potmeter.

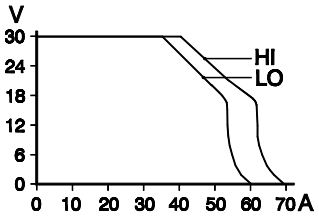
Remote progr. : Output voltage is programmable with 2 - 5 V, corresponding with 12 - 30 V (24 - 60 V). Programming speed is 100 ms from 12 - 30 V (24 - 60 V) at max. current.

Remote sensing : Max. 3 V per load lead.
With parallel operation remote sensing is not recommended.

Remote on/off : By 5 V, optocoupler isolated.

Ambient temperature
Storage : – 40 to + 85 °C
Operating : – 20 to + 50 °C mounted vertically.
– 20 to + 40 °C mounted horizontally.
Derate to 20% at 75 °C

Current limit : Can be put on HI or LO with a switch on the front panel.
From 30 to 18 V (60 to 36 V) the current limit follows more or less a constant power curve. Below 18 V (36 V) it resembles a constant current curve.



Current limit 1200 S 24

Overload protection : Continuous overload and short circuit does not harm the unit.

Voltage limit : For safety an extra regulation circuit limits the output voltage to about 31 V (62 V) in case of malfunction of the normal regulation. This limit is internally adjustable 20-31 V (40-62 V).

Overtemperature protection : In case of insufficient cooling the output shuts down.

Led lamps : Green leds on front and rear panel indicate output voltage.

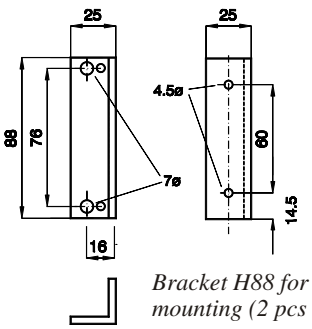
Wall mounting : The natural convection cooling functions best when the unit is mounted vertically as drawn (input at upper side).
The covers are used as heat sinks, so some space between cover and wall is necessary.

19 inch rack mounting : With a unit mounted horizontally in a 19" rack (2 U), the current limit switch has to be put on 'LO' (max. 1100 W). With forced cooling, the full 1200 W can be taken continuously (limit ='HI').

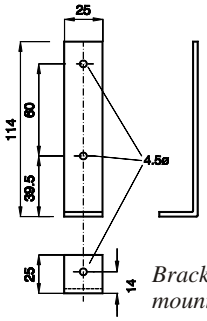
MTBF : 500 000 hrs

Dim. and weight : 88 x 433 x 385 mm (h x w x d), 11 kg.

Wall mounting brackets

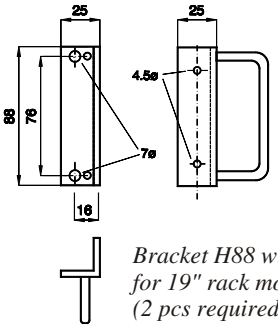


Bracket H88 for vertical wall mounting (2 pcs required)



Bracket H114 for vertical wall mounting (4 pcs required)

19" Rack mounting brackets



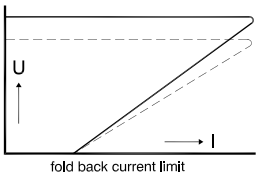
Bracket H88 with handle for 19" rack mounting (2 pcs required)

240S - 1200S

U - SERIES 6 W DC POWER SUPPLIES

5 U 5 **5 - 6 V** **1 A**

5 U 15 - 15 **2 x 12 - 15 V** **0.2 A**



- Very low output ripple and spikes
- Two outputs for series-, parallel- or dual mode (5U15-15)
- Very low leakage current and coupling capacitance
- Protected against overload and short circuit
- Output voltage adjustable with 20 turn trimmer
- Eurocard mounting with optional adapter

Output configurations

The **5 U 15 - 15** has two isolated, regulated outputs which are independently adjustable from 12 to 15 V. The unit can be used in 4 different configurations:

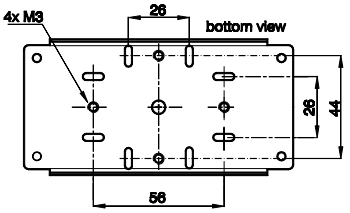
1) Isolated outputs	2 x **12 - 15 V**	**0.2 A**
2) Parallel mode	**12 - 15 V**	**0.4 A**
3) Series mode	**24 - 30 V**	**0.2 A**
4) Dual mode	+/– **12 - 15 V**	**0.2 A**

B-models

The 5 U 5 **B** and the 5 U 15-15 **B** are models with screw terminals for wall and rail mounting.

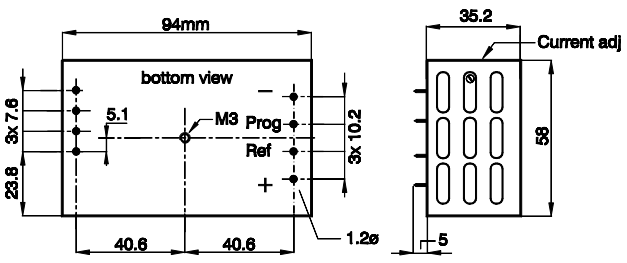
Included with these units are two clamps for 35 mm rail mounting.

On the rearside of the B-models there are M3 holes for wall or rail mounting



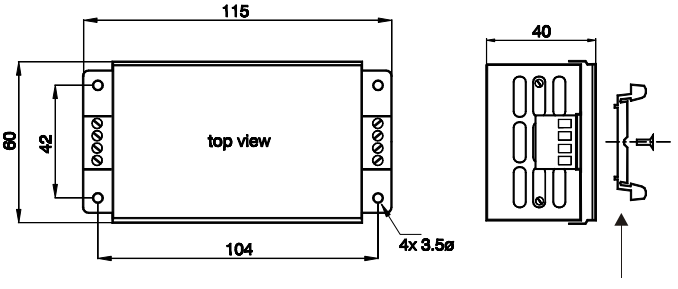
Accessories: P500 Eurocard for 2 U-units
Front panel F10-3 for P500

Dimensions



Standard U-model has solder pins of 1.2 mm Ø for PCB mounting

Wall and rail mounting



B-model with screw terminals for wall or rail mounting, incl. 2 clamps for 35 mm DIN rail

Clamp for rail mounting

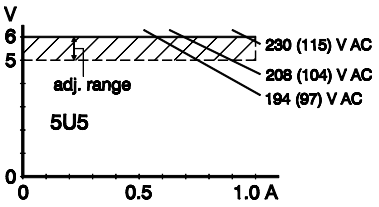
U-SERIES

Specifications 5U5 and 5U15-15

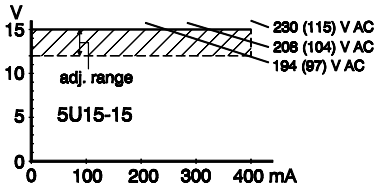
Input	:	230 / 115 V 48 - 62 Hz
Transformer	:	Split bobbin, potted, safety transformer according to: VDE0551 EN 60742
Test voltage:		
Input / Output	:	4000 Vrms (output / case shorted)
Input / Case	:	4000 Vrms (output / case shorted)
Output / Case	:	500 V DC
Output / Output	:	500 V DC (5 U 15-15)
Input to output		
Leakage current	:	Typical 5 micro-amps
Coupling capacitance	:	Less than 60 pF
Insulation resistance	:	1000 MOhms
Attenuation input spikes	:	Better than 100 dB
Safety	:	EN 60950 EN 61010

EMC		
Power Supply Standard	:	EN 61204-3
Generic Emission	:	EN 61000-6-3 (EN 55022**B**)
Generic Immunity	:	EN 61000-6-2
Current limit	:	Foldback characteristic
Regulation		
Load 0 - 100%	:	5 mV
Line ±10%	:	5 mV (at 4 W output)
Ripple + noise	:	0.5 mVrms, 2 mV p-p
Temp. coeff., per °C	:	0.01%
Output impedance		
up to 100 kHz	:	0.5 Ohm
Recovery time		
10 - 100% load step	:	25 µs
Operating ambient temp.	:	– 20 to + 50 °C
MTBF	:	1 000 000 hrs
Dim. and weight (h x w x d)	:	35 x 58 x 94 mm, 0.39 kg

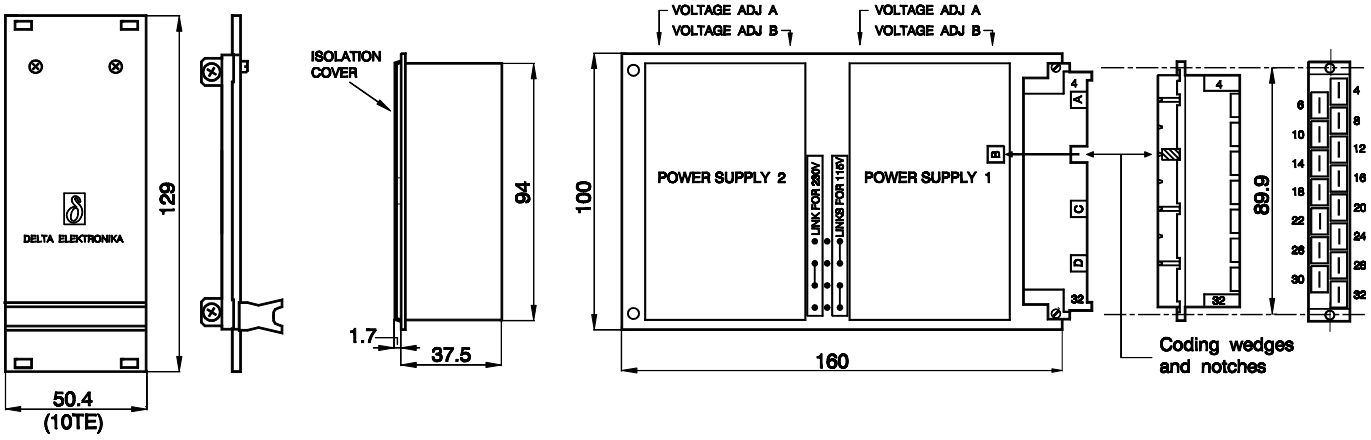
5 U 5: Output voltage and current derating at low AC input voltage.



5 U 15-15: Output voltage and current derating at low AC input voltage.



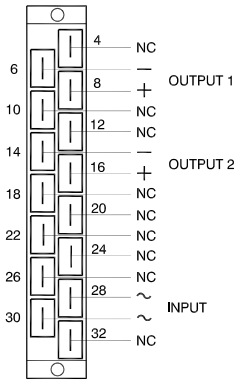
Eurocard mounting



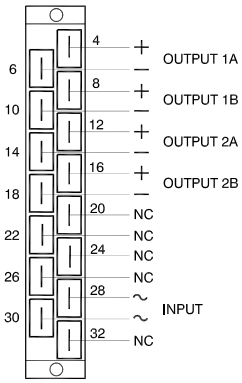
F 10-3 front panel

P500 Eurocard for 1 or 2 U-units, incl. contra connector H15

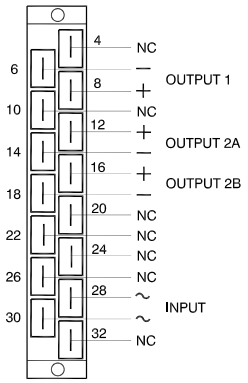
2x 5U5



2x 5U15-15



1x 5U5 and 1x 5U15-15



Input and output connections of P500

U-SERIES

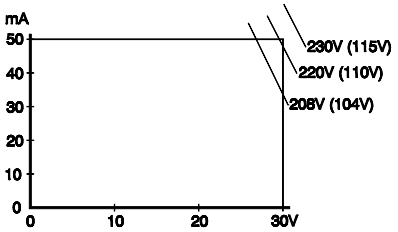
UCS 50 6 W DC CURRENT SOURCE

UCS 50 0-50 mA, max 30 V

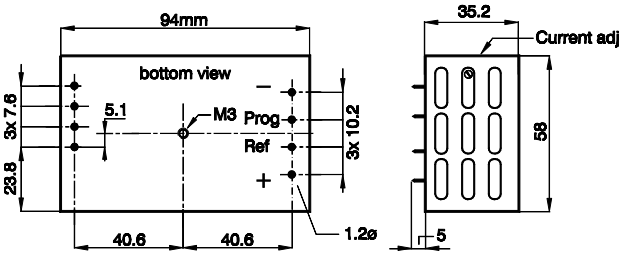
Input	:	230 / 115 V 48 - 62 Hz Split bobbin, potted, safety transformer according to VDE0551 EN 60742
Test voltage		
Input / output	:	4 kV rms (output/case shorted)
Input / case	:	4 kV rms (output/case shorted)
Output / case	:	500 V DC (output shorted)
Input to output		
Leakage current	:	Typical 5 µA
Coupling capacitance	:	Less than 60 pF
Insulation resistance	:	1000 MOhms
Attenuation input spikes	:	Better than 100 dB
Safety	:	EN 60950 EN 61010
EMC		
Power Supply Standard	:	EN 61204-3
Generic Emission	:	EN 61000-6-3 (EN 55022**B**)
Generic Immunity	:	EN 61000-6-2
Current adjustment	:	0-50 mA a) By 20-turn screwdriver adjustment b) By external potmeter 10 kΩ c) By 0-5 V analog programming
Programming input	:	0-5 V, full scale error ± 0.2%, offset error ≤ 20 µA, input impedance 500 kOhm.
Current regulation		
Load 600 - 0 Ohm	:	3 µA
Line +/– 10%	:	3 µA

Ripple + noise	:	30 µA p-p, measured across 600 Ohm // 0.1 µF
Temp. coeff.	:	0.005% per °C
Stability	:	0.01% per 8 hrs after 20 min. warm up
Output impedance		
DC	:	10 MOhm
1 kHz	:	33 kOhm
10 kHz	:	3.3 kOhm
100 kHz	:	0.33 kOhm
Recovery time		
600 - 60 Ohm	:	10 µs
Open voltage limit	:	33 V +/– 5%
Ambient temp.	:	– 20 to + 50 °C
MTBF	:	1 000 000 hrs
Dim. and weight	:	35 x 58 x 94 mm (h x w x d) 0.39 kg
Accessories	:	P500 Eurocard for 2 units. Front panel F10-3 for P500. For more details see also U-series.

Derating of max. voltage at low line voltage

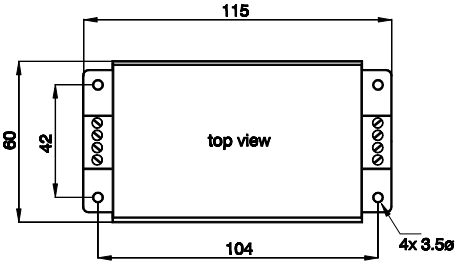


Dimensions

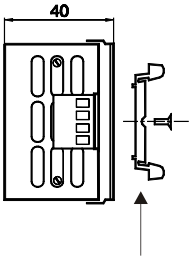


UCS 50 with solder pins for PCB mounting

Wall mounting



UCS 50 B with screw terminals for wall or rail mounting



Clamp for rail mounting

U-SERIES

About us....

Delta Elektronika operates from the 13th century city of Zierikzee in the southwest of Holland. The city was a very important centre as far back as the 14th and 15th century, where most of the shipping trade in the area was concentrated. Zierikzee is now a quiet city where tourists can stroll and admire the attractive panorama.

Our factory which is located just outside the city walls manufactures power units which today are an integral component in equipment found all over the world. Unfortunately, the power supply is a minor part of any equipment, since for many it is just the electronic `box`, often taken for granted, and usually ordered at the last moment. At the same time, any power supply will be expected to supply the demands of the equipment it is driving. However, the design of any complicated machinery rarely starts from the power supply – which is needed so that the equipment functions efficiently.

The Delta range of products has been designed to meet the challenges of today's demanding equipment. Since it's inception in 1959, Delta has been designing and producing power supplies and has become a leader in a market that demands efficiency and reliability. An on-going research programme has resulted in production designs that can meet an ever-increasing number of specifications. Tracking Mode, Master / Slave Configuration, Active PFC, Clean Current, Low Ripple are terms frequently used to describe Delta units.

All Delta power supply units undergo rigorous thermal soaking tests before being dispatched to the customer. This ensures the long term correct functioning of each unit and client satisfaction.

Designers at Delta are extremely conscious of the problems engineers encounter on site.
Delta Power Supplies are guaranteed to meet the challenges found in today's market.

View from office Delta Elektronika

Delta Elektronika main building

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