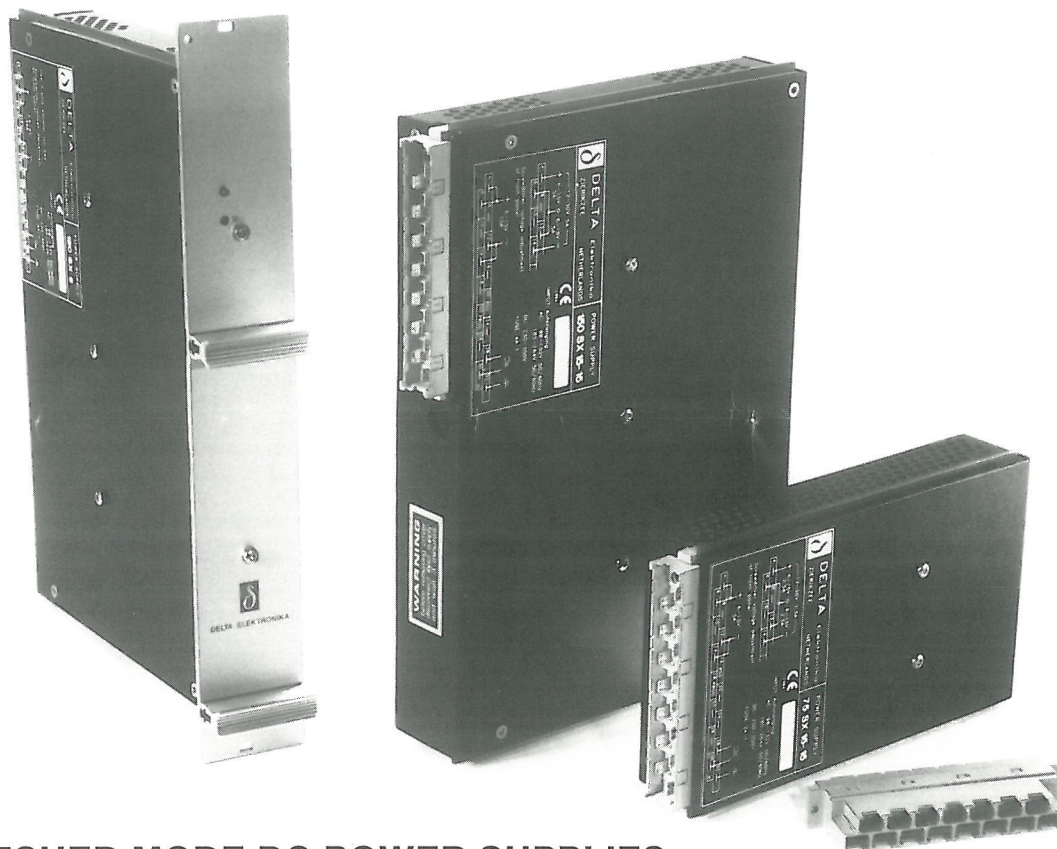


75SX15-15



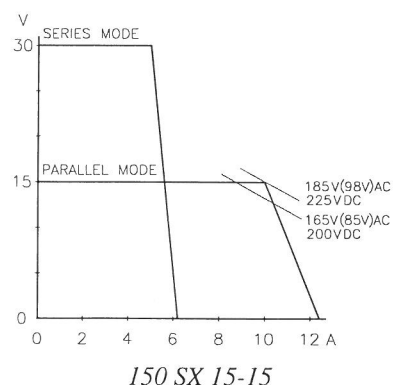
A mating connector with faston tabs is packed with each power supply

SWITCHED MODE DC POWER SUPPLIES

With auto ranging input for world-wide use

The SX-series covers the whole output voltage range between 3.5 V and 400 V.

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

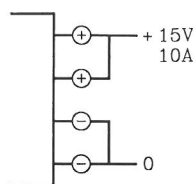


For **24 V 2.5 A** use 75 SX 15-15
For **24 V 5 A** use 150 SX 15-15

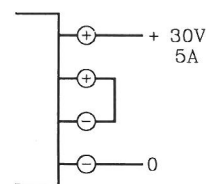
The ST 150 is a combination of a 75 SX 5 and a 75 SX 15-15 in a 150W case. The 5V output is isolated from the 2 x 15V.

The units with two equal outputs can be used in three different modes, series-, parallel- and dual-mode, simply by connecting the outputs in series or parallel at the mating connector.

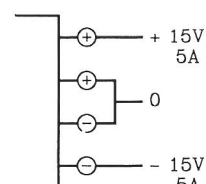
The two outputs cannot be used separately.



Parallel mode



*Series mode
150 SX 15-15*

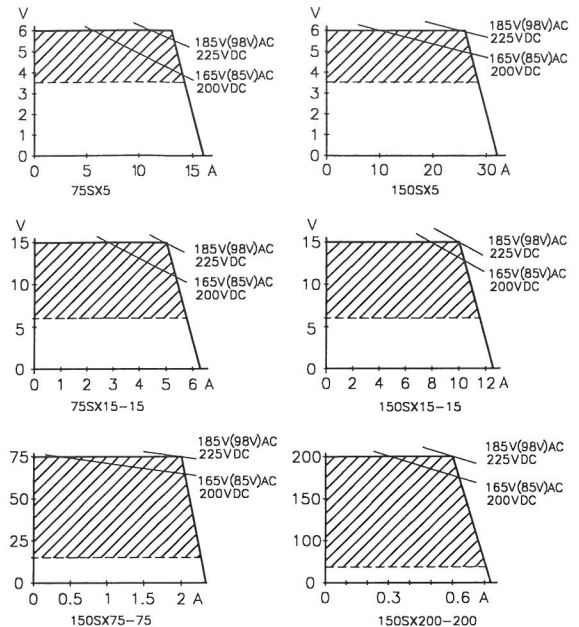


Dual model

Index of possible voltage / current combinations

Voltage range	Max. current	Model
3.5 - 6 V	13 A	75 SX 5
3.5 - 6 V	26 A	150 SX 5
6 - 15 V	5 A	75 SX 15-15
6 - 15 V	10 A	150 SX 15-15
12 - 30 V	2.5 A	75 SX 15-15
12 - 30 V	5 A	150 SX 15-15
15 - 75 V	2 A	150 SX 75-75
30 - 150 V	1 A	150 SX 75-75
35 - 200 V	0.6 A	150 SX 200-200
70 - 400 V	0.3 A	150 SX 200-200
+ and - 6 to 15 V	2.5 A	75 SX 15-15
+ and - 6 to 15 V	5 A	150 SX 15-15
+ and - 15 to 75 V	1 A	150 SX 75-75
+ and - 35 to 200 V	0.3 A	150 SX 200-200
3.5 - 6 V	13 A	ST 150
6 - 15 V	5 A	
3.5 - 6 V	13 A	ST 150
12 - 30 V	2.5 A	
3.5 - 6 V	13 A	ST 150
+ and - 6 to 15 V	2.5 A	

Derating of output current at low line voltage



Specifications:

Input	Autoranging	75W	150W	Fuse	75W	150W
AC 98 - 132 V 50/60 Hz	1.3 A rms	2.6 A rms	2 A T	4 A T		
185 - 264 V 50/60 Hz	0.7 A rms	1.4 A rms				
DC 230 - 350 V	0.3 A	0.6 A				

Operation at 400 Hz is not possible (contact factory if required).

Inrush current limit : 10 A with NTC resistor 30 Ohms cold resistance.

Insulation

- Input / output : 4 kV rms (1 min.), 8 mm creepage/cl.
- Input / case : 2.5 kV rms (1 min.), 5 mm creepage/cl.
- Output / case : 500 V DC, 1 mm creepage/clearance
1 kV DC for 150 SX 75-75 and 200-200.

Safety : IEC 950, EN 60950

EMC : EN 55011, IEC 801-2, -3, -4, -5

Efficiency : 84 % dual units, 80 % 5V units.
81 % and 78 % respectively at 110V AC input.

Voltage regulation	5 and 15V models	75 and 200V models
Load 0 - 100%	10 mV (with ext.sense)	200 mV
Line 185 - 264V AC	10 mV	150 mV

Ripple + noise : 5 mV rms, max. 20 mV p-p 70 mV rms, 100 mV p-p

Stability : $5 \cdot 10^{-4}$ during 8 hours under constant conditions after 1 hr warm up.

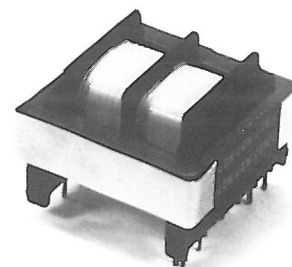
Temp. coefficient : $1 \cdot 10^{-4}$ per °C

Output impedance : Max. 0.1 Ohm up to 100 kHz, except 150 SX 75-75 and 200-200 max. 1 Ohm.

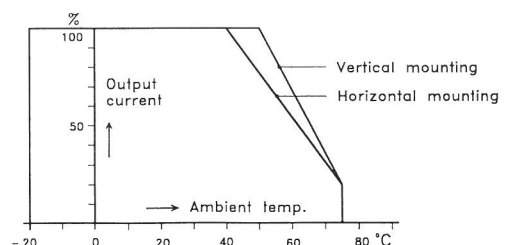
Recovery time : 0.1 ms to recover to within 0.1V after a 50-100% load step. Max. deviation 0.4V.
0.6 ms / 1.2V for 75V and 200V models.

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.

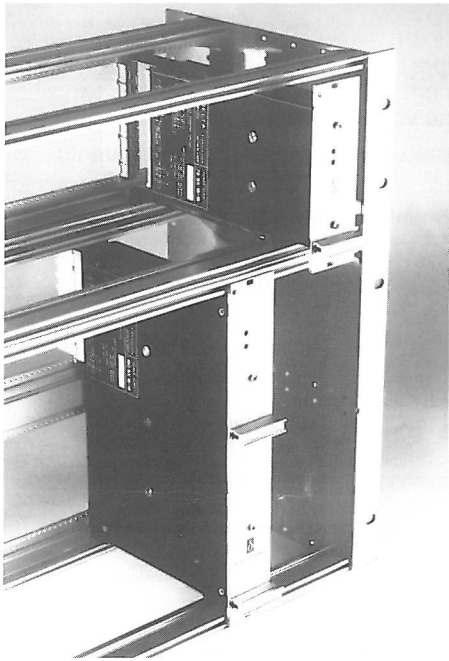


Transformer with split bobbin provides 4 kV dielectric strength between input and output.

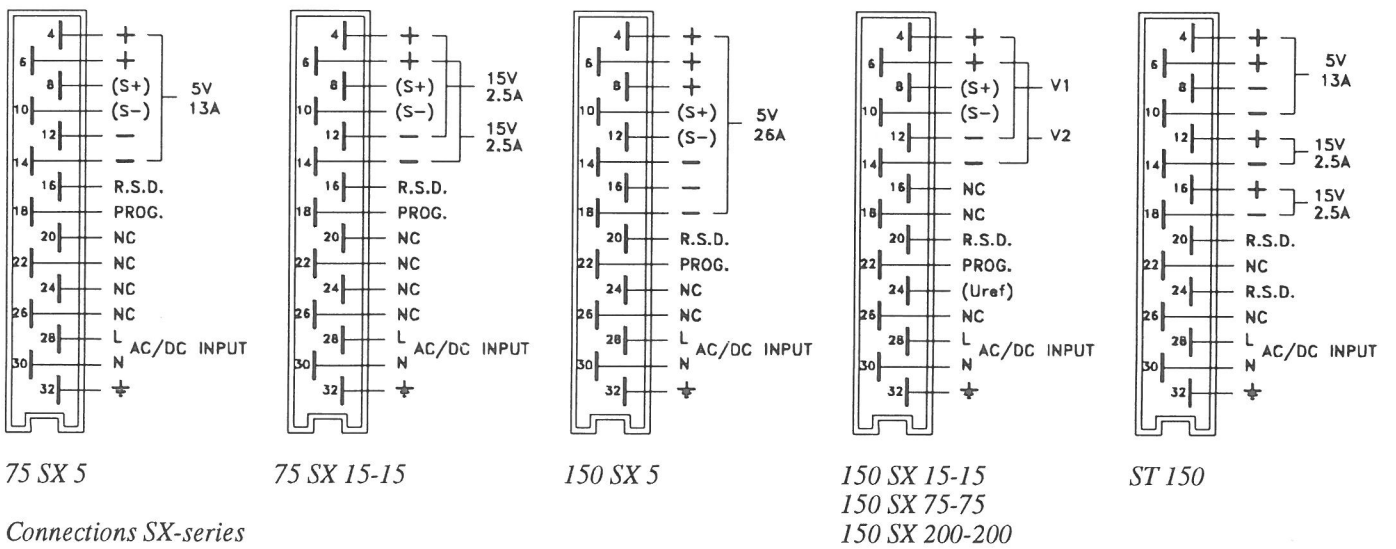
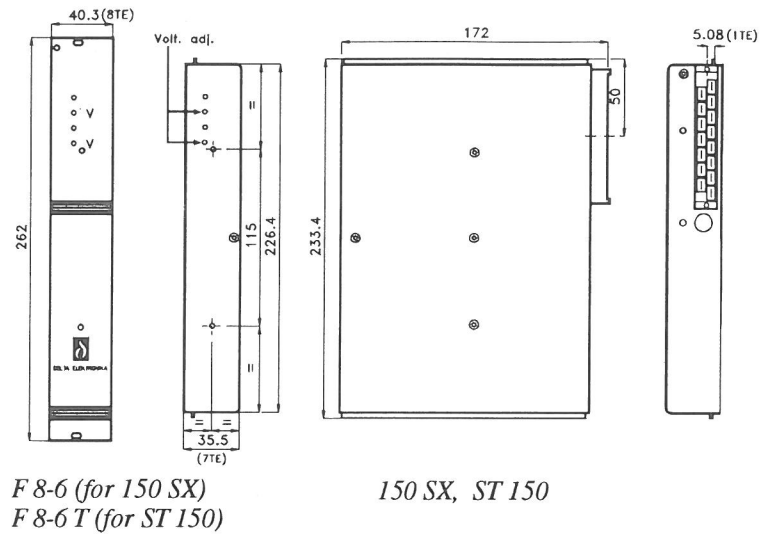
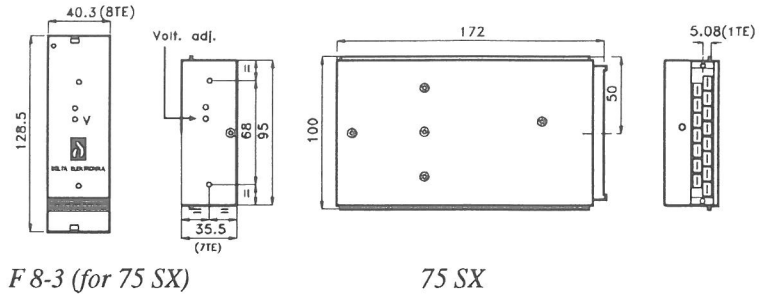


Temperature derating

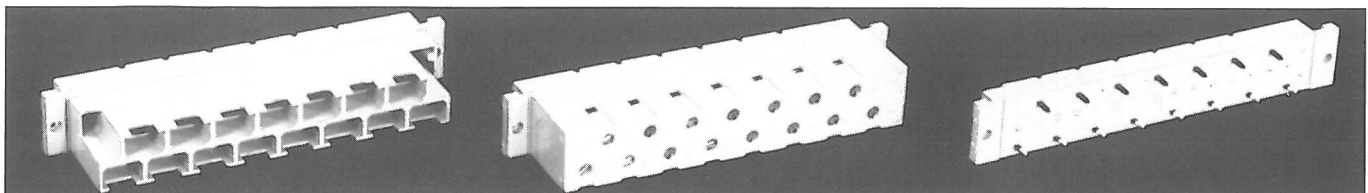
Eurocard rack mounting



Dimensions acc. to DIN 41494 to fit into Eurocard racks 3U height (132.5 mm) or 6U height (265 mm)



The H15 mating connector (DIN 41612) is available in three versions:



H15 with faston tabs 6.3 x 0.8 mm

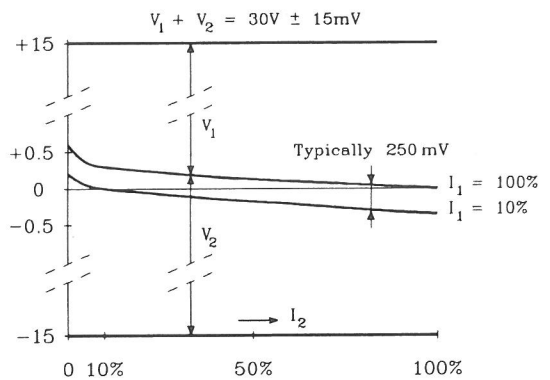
with screw terminals

with solder pins

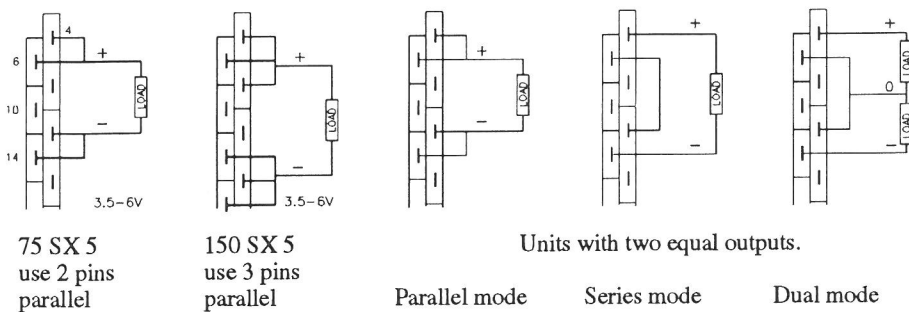
- Hold-up time** : 15 ms at full load, 30 ms at half load (220V AC).
- RFI suppression** : VDE 0871B both on input and output, except 150 SX 75-75 and 200-200 which have VDE 0871B on input and VDE 0871A on output.
- Series operation** : Up to 500 V total voltage. Up to 1 kV for 150 SX 75-75 and 200-200.
- Parallel operation** : Allowed up to 40 °C ambient temperature
- Current limit** : The current limit is fixed and protects the power supply during overloading and short circuiting. Continuous overload and short circuit does not harm the unit. 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 frontpanel.
- Remote control** : Voltage control with an external potentiometer is possible after some small internal changes (see manual).
- Remote programming** : Remote programming of the output voltage is possible after changing an internal link on the PCB. An analog voltage of 5V between PROG. and S- corresponds with the max. output voltage. Note: In dual mode S- is at a negative polarity.
- Remote sensing** : The sense points are internally connected to + and - output. These links have to be removed when remote sensing is required. The max. sense range is 2V per load lead for SX 15-15 and 0.5V for SX 5. However the voltage across the leads plus the load cannot exceed the supply max. output rating. ST 150, 150 SX 75-75 and 200-200 have no remote sensing facility.
- Remote shut down** : By +5V (3.5 - 12V) between RSD and S- or -. Note: In dual mode S- is at neg. polarity.
- Led lamp** : A green led lamp at the front panel indicates the output.
- Dim. and weight** : 75W 100 x 172 x 35.5 mm 0.6 kgs 150W 233.4 x 172 x 35.5 mm 1.2 kgs

75SX15-15 or 150SX15-15 used as dual power supply

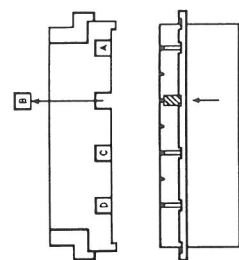
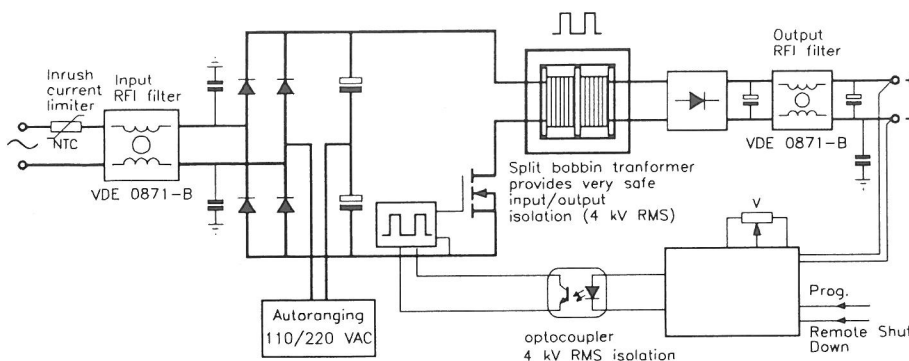
Because the sense points of the regulation are internally connected to the + and -15V terminals, the total voltage $V_1 + V_2$ is kept constant. When V_1 and V_2 are equally loaded the zero point will be in the middle. With unequal loads a slight zero shift will occur. Asymmetrical overloading and short-circuiting will not damage the unit. The 150 SX 75-75 and 200-200 have similar characteristics (relatively better).



Zero-shift caused by unequal loading of the + and -15V

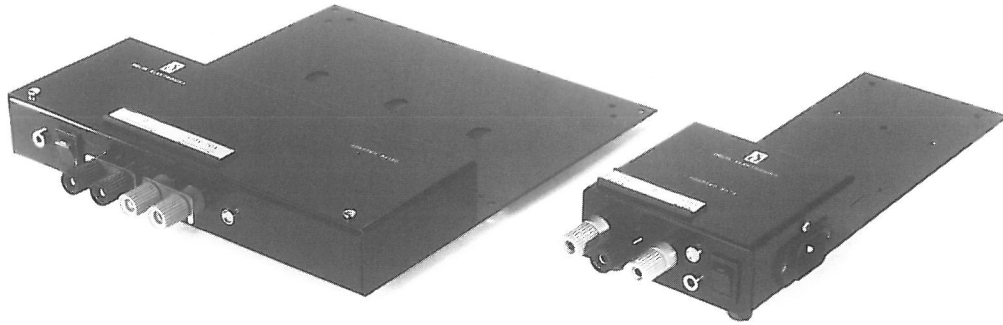


The sense points S+ and S- are internally connected to + and -. If remote sensing is required the internal links have to be removed (not allowed at 75V, 200V and triple units).



The H 15 connector has coding wedges and notches (4 on each side)

Bench adapters



BA 150

Can be used with:

150 SX 15-15
ST 150
240 S 24

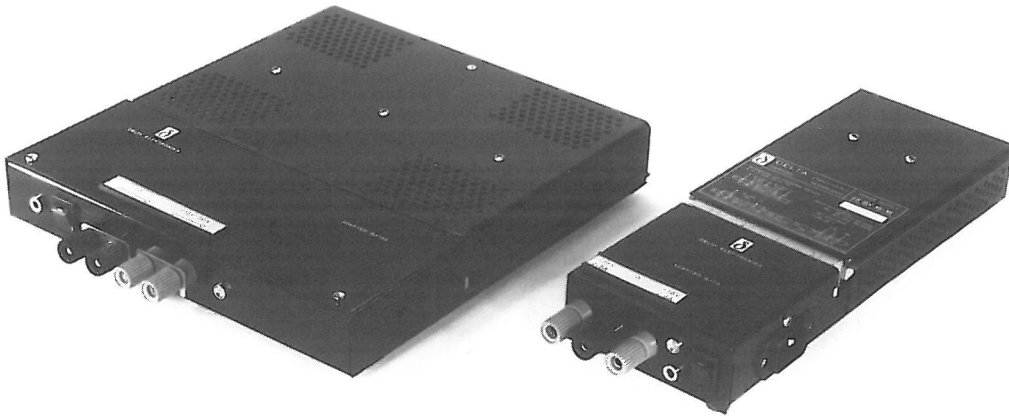
BA 75

Can be used with:

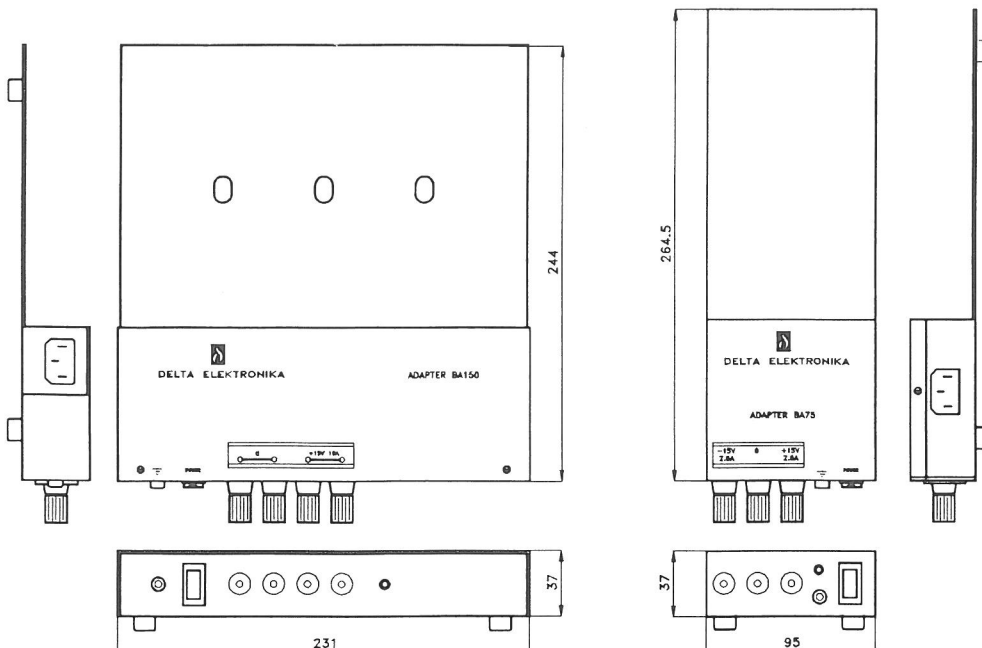
75 SX 5
75 SX 15-15

Optional (after small changes) also with:

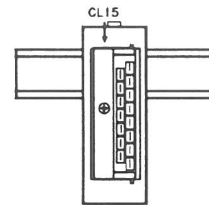
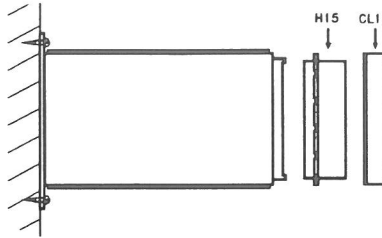
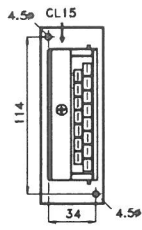
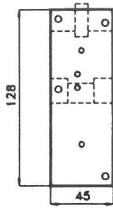
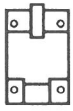
150 SX 5
150 SX 75-75
150 SX 200-200



Bench adapters with power supplies



Wall and rail mounting 75 SX

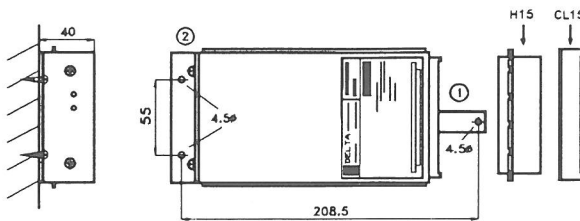
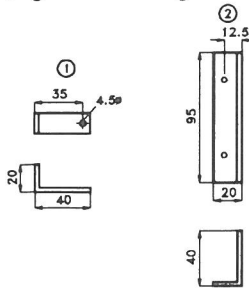


Adapter AR1
for 35 mm
rail mounting

W8-3 for verti-
cal wall or rail
mounting

Vertical wall mounting with W8-3 and CL15

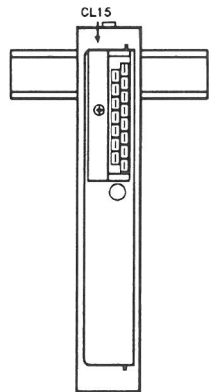
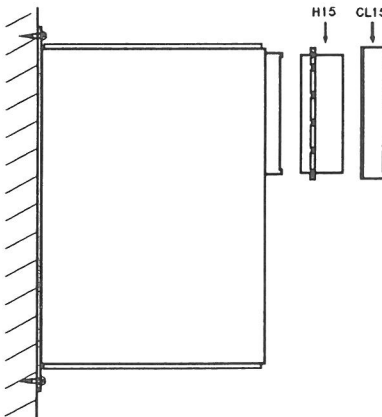
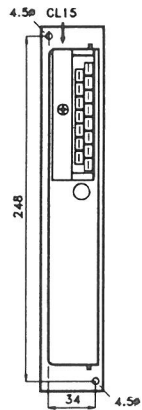
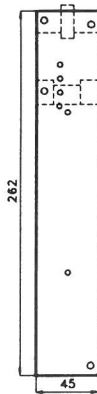
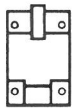
Rail mounting with
W8-3, AR1 and CL15



Mounting kit H95 for
flat wall mounting

Flat wall mounting with H95 kit and CL15

Wall and rail mounting 150 SX, ST 150

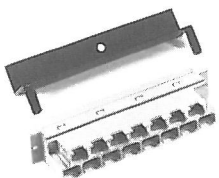


Adapter AR1
for 35 mm
rail mounting

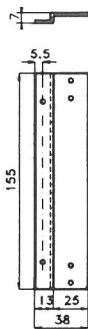
W8-6 for verti-
cal wall or rail
mounting

Vertical wall mounting with W8-6 and CL15

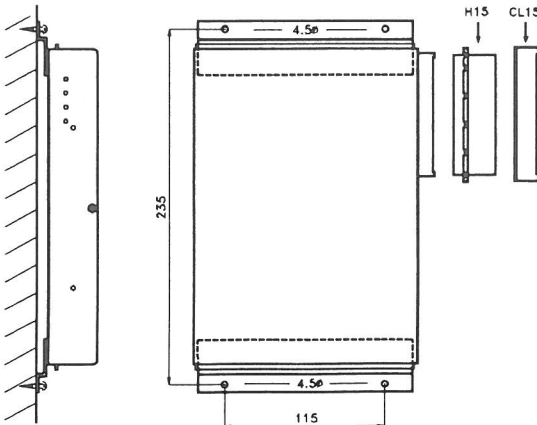
Rail mounting with
W8-6, AR1 and CL15



Clamp CL15 to fix the
H15 connector



Bracket H155
for flat wall
mounting



Flat wall mounting with 2 pcs H155 and CL15



EC Declaration of Conformity

We

Delta Elektronika
P.O. BOX 27
4300 AA Zierikzee
The Netherlands

declare under sole responsibility that the Power Supply

75SX15-15

meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility.
Compliance was demonstrated to the following specification as listed in the
official Journal of the European Communities:

EN 50081-1 Generic Emissions:

EN 55022 Radiated, Class B
EN 55022 Conducted, Class B
EN 60555-2 Power Harmonics

EN 50082-1 Generic Immunity:

IEC 801-2	Electrostatic Discharge	Level 3, air discharge.
IEC 801-3	Radiated electromagnetic fields	Level 3.
IEC 801-4	Electrical Fast Transients / Bursts	Level 4.
IEC 801-5	Surge on DC output	Level 2.
IEC 801-5	Surge on line input	Level 3, differential mode.
IEC 801-5	Surge on line input	Level 4, common mode.

Mounting in a 19" euro-card rack

A 75SX 15-15, with a front panel F 8-3 of 8 TE width, fits into a 3 HE Eurocard rack.

Sufficient space above and below the unit has to be kept to allow the air to flow freely along the unit for optimal cooling. If the cooling is insufficient the output will be shut down by the overtemperature protection. When cooling down the output automatically resets.

Wall and rail mounting

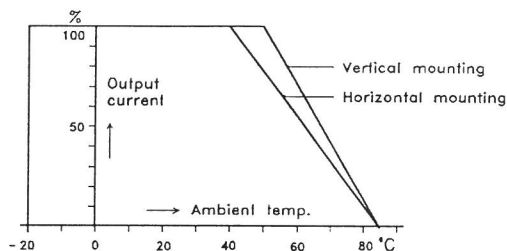
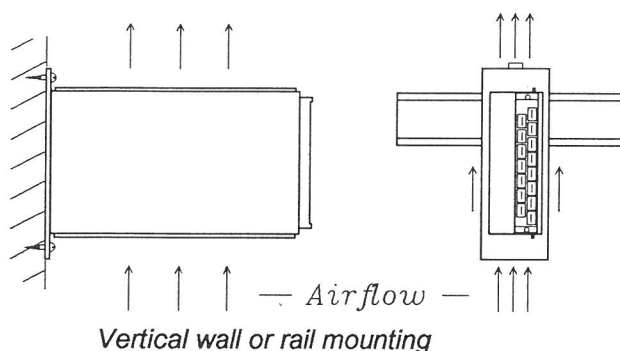
Wall mounting is possible with the help of the front panel W 8-3.

For rail mounting, besides the W 8-3, a rail adapter AR 1 is required.

For wall and rail mounting also the clamp CL 15 is needed to fix the H 15 mating connector.

Units have to be mounted vertically with sufficient space above and below for optimal cooling.

Horizontal mounting is not recommended but if necessary the output has to be derated to 80 % at 50 °C ambient temperature. Good cooling is important for a long life.



Autoranging input.

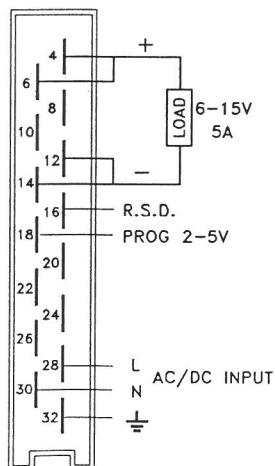
This power supply can be used at any AC input voltage within the ranges 98-132 V and 185-264 V.

At the lowest range the input rectifier circuit changes automatically from a bridge rectifier into a voltage doubler.

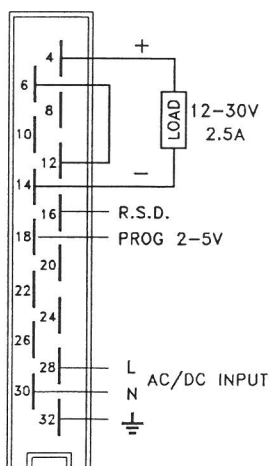
At DC the input circuit does not switch over, so only the upper range 230-350 VDC can be used.

This is because the voltage doubler can only work with AC.

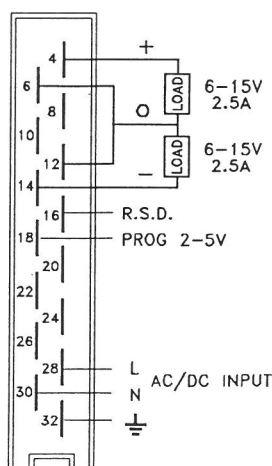
Connections



75 SX 15-15
parallel mode



75 SX 15-15
series mode



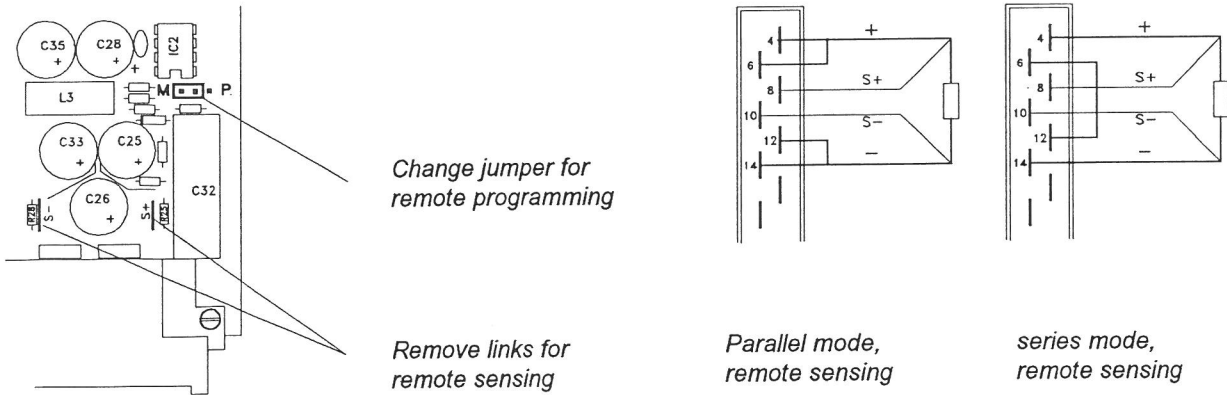
75 SX 15-15
dual mode

Note that the two equal outputs have to be connected either parallel or in series and cannot be used separately (isolated from each other).

Remote sensing

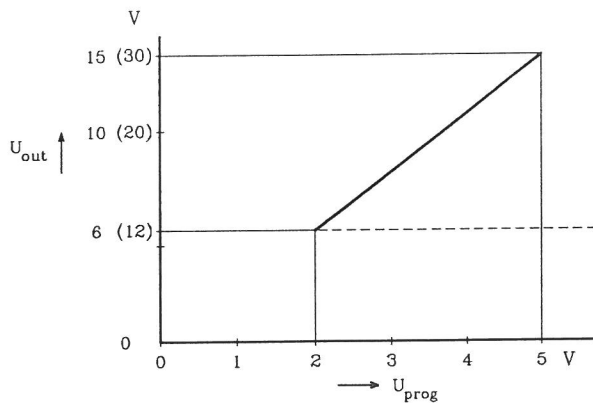
Because remote sensing is often not used, the sense points S+ and S- are connected internally to + and -. This prevents errors in wiring for the user.

If remote sensing is required, two internal links have to be removed. The maximum voltage drop that can be compensated is 2 V per lead (4 V total). However this subtracts from the maximum voltage range. For example if a 75SX 15-15 is used with remote sensing at 12 V there is 3 V available for remote sensing (=1.5 V per lead), because then the voltage at the output terminals becomes 15 V.

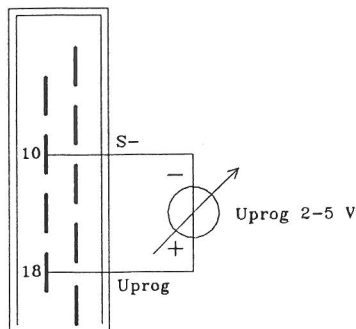


Location of programming/manual jumper, R 25 and links on PCB

Remote programming



Output voltage vs prog. voltage.



Connections for remote programming.

The output voltage can be programmed by an external voltage.

To use remote programming, change the internal jumper from M to P and connect an analog voltage between pin 10 and pin 18 of the H15 connector. A programming voltage of 2 to 5 V corresponds with 6 to 15 V output voltage (12-30 V in series mode).

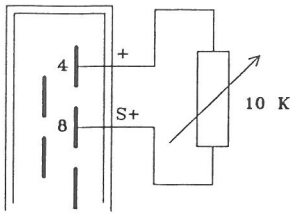
The input impedance of the programming input is about 9 kΩ.

To calibrate the multiplying factor of the programming voltage, put 5 V at the programming input and adjust the output voltage to 15 V (30 V in series mode) with the voltage adjustment potentiometer (screwdriver adjustment at the front panel). The adjustment range is so large that it can also be calibrated to 10 V programming voltage for full range output.

Linearity is 0.2%.

Note that the zero of the programming voltage is galvanically coupled to minus output.

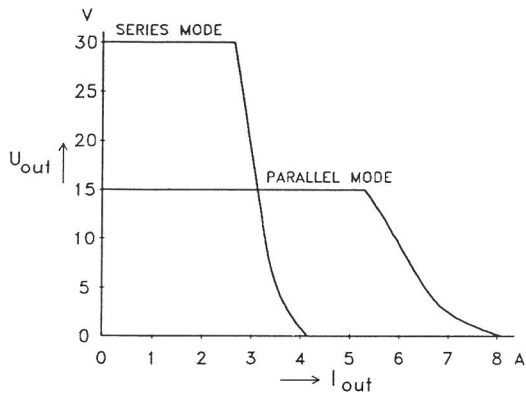
Remote control



connections for remote control

Resistor R 25 and the link between S+ and + have to be removed and the voltage adjustment potentiometer (screwdriver adjustment at the front panel) has to be turned to minimum (anti-clockwise)

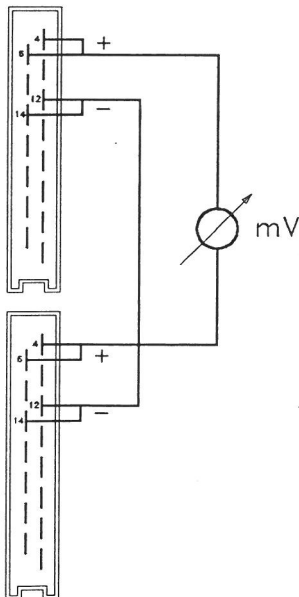
Current limit



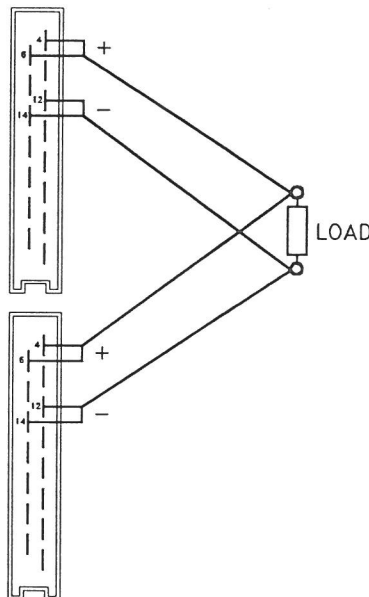
current limit 75SX15-15

At overload and short circuit the current is limited to a safe value. At the low end of the voltage range a slightly higher current can be taken.

Parallel operation



Adjustment at equal output voltages



Two 75SX15-15 in parallel

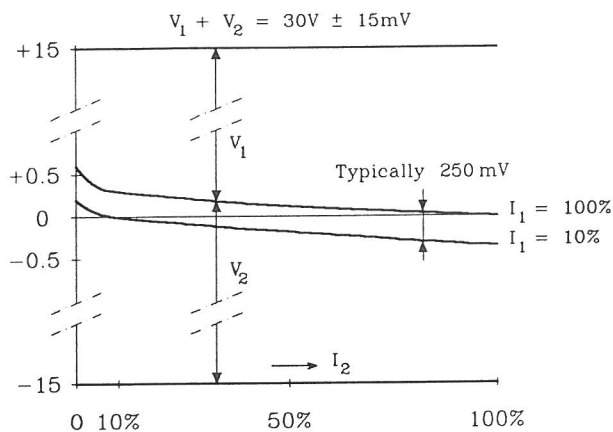
Two or more units can be used in parallel up to an ambient temperature of 40°C. This temperature restriction is because in parallel operation it is possible that a unit works continuously in current limit and this is higher than the nominal current rating of the power supply. To obtain a reasonable current sharing it is necessary to adjust the outputs at equal voltages before connecting them in parallel. This can easily be done by using a multimeter to measure the difference of the output voltages and adjust the difference to zero. Also important is to keep the leads to the summing points of equal length. Remote sensing is not recommended with parallel operation. As an option the current limit can be factory set at a lower value if parallel operation at a higher ambient temperature is required.

Remote shut down

Remote shut down is possible by +5V (3.5-12V) between RSD and S- (pin 16 and pin 10). The shut down input is low ohmic (R_i is about $300\ \Omega$). Note that the zero of the shut down voltage is galvanically coupled to minus output, also in the dual mode.

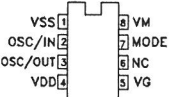
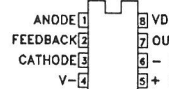
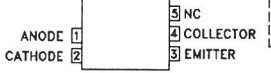
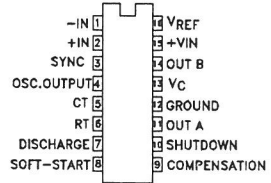
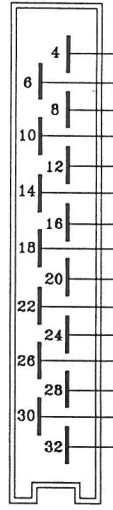
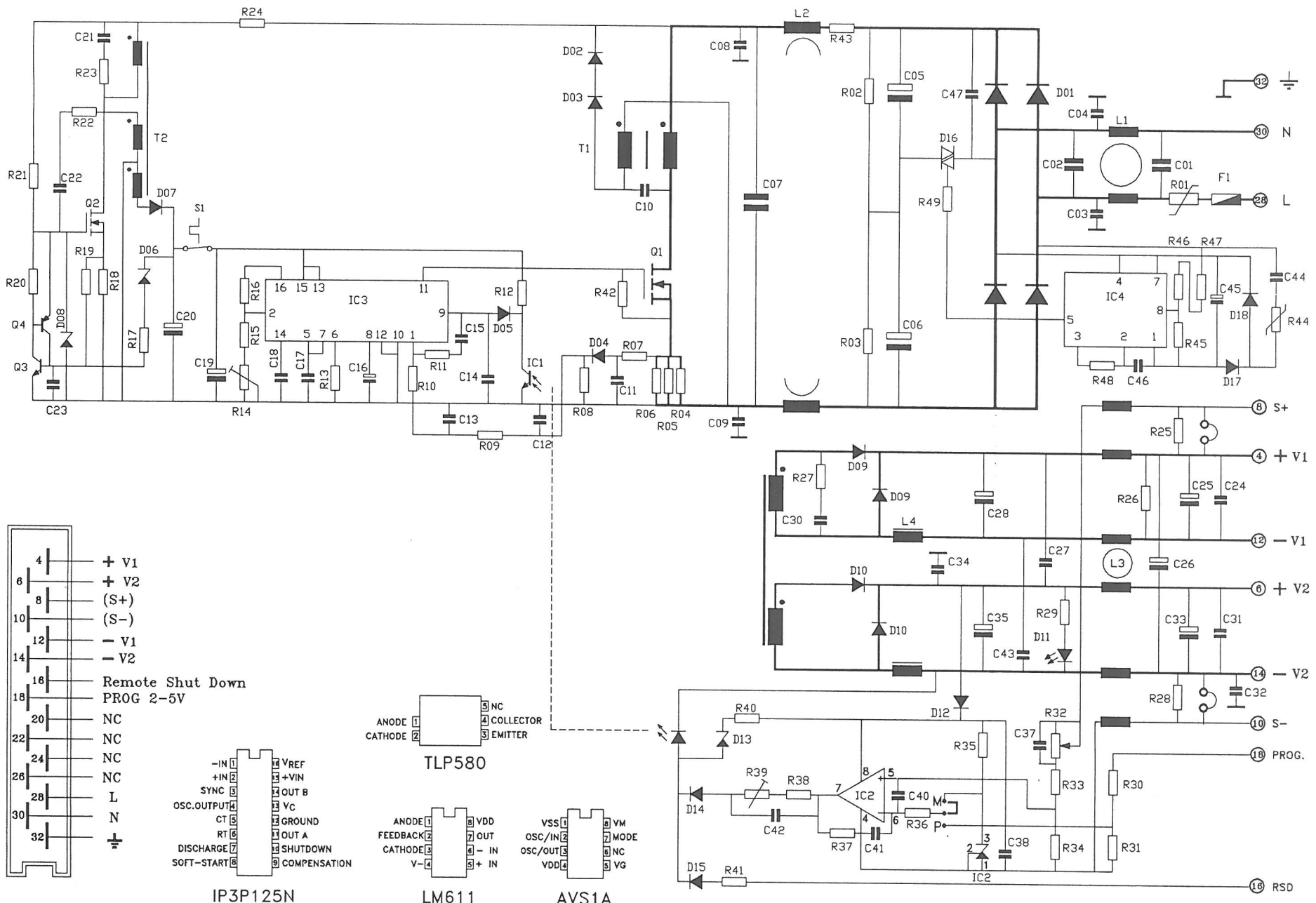
Dual mode

In the dual mode the 75SX15-15 can be used as a dual power supply with equal positive and negative output voltage. It is not an ideal dual with two independently regulated outputs. The sense points are connected to the + and -, so that only the total voltage is kept constant within millivolts. The shift of the zero point at unequal loading is so small that it is a practical, inexpensive dual which can be used for nearly all applications.

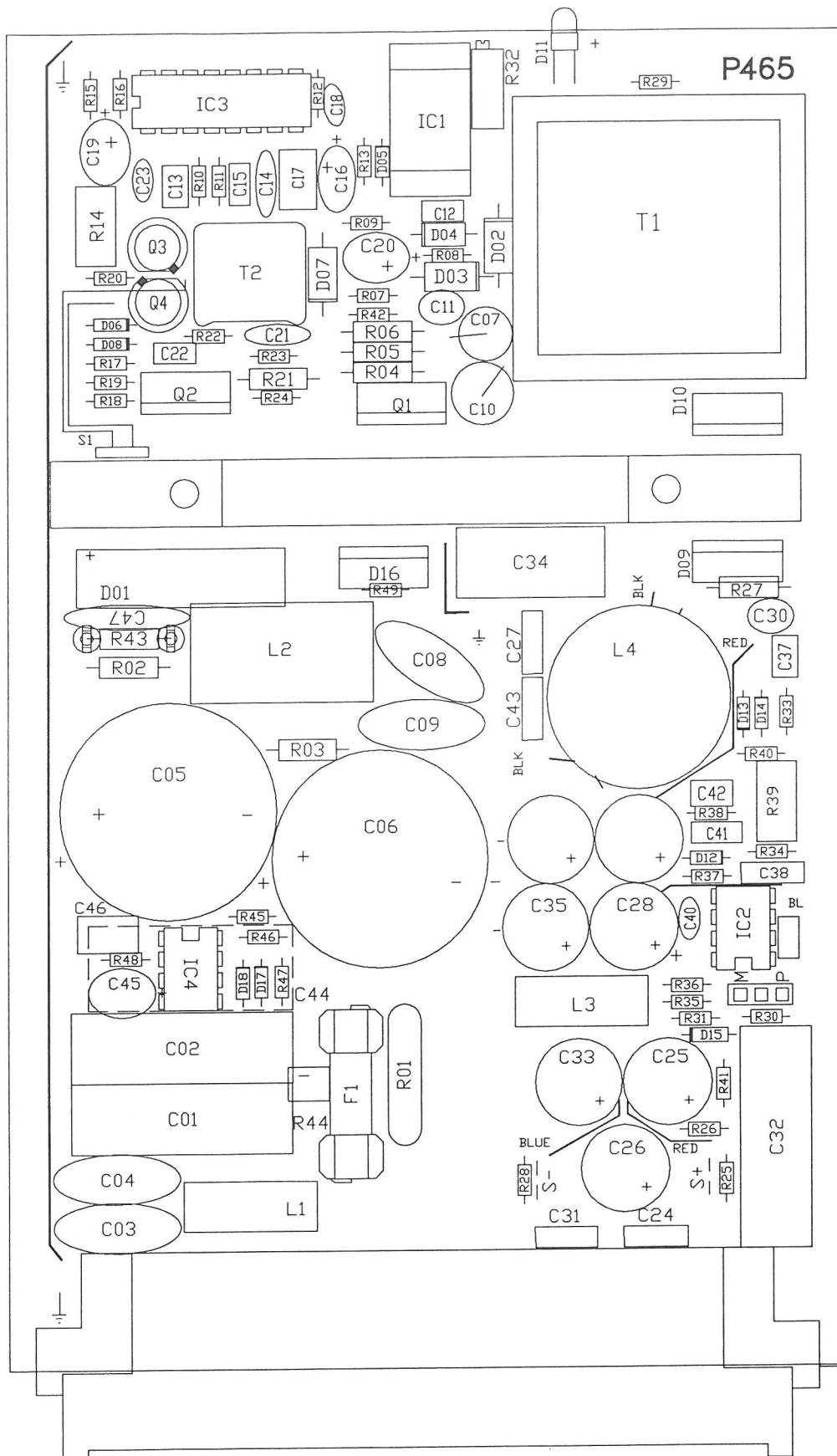



75SX15-15

Zero-shift caused by unequal loading of + and - 15V



	WH	Title:	
		75SX15-15	
		Date:	16-7-92
Modifications	Date	App.	DELTA ELEKTRONIKA BV



			Title: P465 75SX15-15	
			Date: 16-7-92	
Modifications	Date	App.	DELTA ELEKTRONIKA BV	

75SX15-15

D10 = BYS24

C01	= 0.22UF 250V RMS	X2	D11	= LED 3MM GREEN	AEG
C02	= 0.22UF 250V RMS	X2	D12	= 1N4148	PHILIPS
C03	= 2200PF 400V RMS	SAFETY	D13	= BZX55-C15	ITT
C04	= 2200PF 400V RMS	SAFETY	D14	= 1N4148	PHILIPS
C05	= 150UF 200V	SPRAGUE	D15	= BAT85	PHILIPS
C06	= 150UF 200V	SPRAGUE	D16	= AVS10	ST
C07	= 0.1UF 400V	MET POLYES	D17	= 1N4148	PHILIPS
C08	= 2200PF 400V RMS	SAFETY	D18	= 1N4148	PHILIPS
C09	= 2200PF 400V RMS	SAFETY	F1	= FUSE 5X20 2T	
C10	= 68NF 250V RMS	X2	IC1	= TLP580	TOSHIBA
C11	= 1000PF 1000V	CERAMIC	IC2	= LM611	NAT. SEMICON
C12	= 10NF 100V	MULT LAYR	IC3	= IP3P125N	SEAGATE
C13	= 0.1UF 100V	MULT LAYR	IC4	= AVS1A	ST
C14	= 47PF 400V	CERAMIC	L1	= XL395	DELTA
C15	= 10NF 100V	MULT LAYR	L2	= 2X39MH 0.5A	THAILIN
C16	= 2.2UF 25V	SOLID ALU	L3	= XL393	DELTA
C17	= 1000PF 100V	POLYPROP	L4	= XL391	DELTA
C18	= 470PF 500V	CERAMIC	Q1	= BUK446	PHILIPS
C19	= 15UF 16V	SOLID ALU	Q2	= BUK444-800B	PHILIPS
C20	= 15UF 16V	SOLID ALU	Q3	= 2N2222A	PHIL
C21	= 47PF 400V	CERAMIC	Q4	= 2N2907A	ST
C22	= 10NF 100V	MULT LAYR	R01	= NTC 30	SIEMENS
C23	= 2200PF 100V	CERAMIC	R02	= 150K	MF/0.6W/350V
C24	= 0.33UF 100V	MULT LAYR	R03	= 150K	MF/0.6W/350V
C25	= 220UF 25V	SPRAGUE	R04	= 3.32	MF/0.6W/350V
C26	= 100UF 40V	SPRAGUE	R05	= 3.32	MF/0.6W/350V
C27	= 0.33UF 100V	MULT LAYR	R06	= 3.32	MF/0.6W/350V
C28	= 220UF 25V	SPRAGUE	R07	= 27	MF/0.5W/200V
C30	= 1000PF 1000V	CERAMIC	R08	= 10K	MF/0.5W/200V
C31	= 0.33UF 100V	MULT LAYR	R09	= 1K	MF/0.5W/200V
C32	= 0.22UF 250V RMS	X2	R10	= 15K	MF/0.5W/200V
C33	= 220UF 25V	SPRAGUE	R11	= 39K	MF/0.5W/200V
C34	= 0.1UF 250V RMS	X2	R12	= 10K	MF/0.5W/200V
C35	= 220UF 25V	SPRAGUE	R13	= 3.9K	MF/0.5W/200V
C37	= 0.1UF 100V	MULT LAYR	R14	= 5K TRIMPOT 1 TURN	
C38	= 0.33UF 100V	MULT LAYR	R15	= 2.7K	MF/0.5W/200V
C40	= 100PF 400V	CERAMIC	R16	= 22K	MF/0.5W/200V
C41	= 22NF 100V	FILM	R17	= 1.5K	MF/0.5W/200V
C42	= 0.1UF 100V	MULT LAYR	R18	= 47	MF/0.5W/200V
C43	= 0.33UF 100V	MULT LAYR	R19	= 1.5K	MF/0.5W/200V
C44	= 0.33UF 250V RMS	X2	R20	= 470	MF/0.5W/200V
C45	= 33UF 10V	SOLID ALU	R21	= 1M	MF/0.25W/1600V
C46	= 150PF 100V	POLYPROP	R22	= 5.6K	MF/0.5W/200V
C47	= 10NF 500V	CERAMIC	R23	= 10K	MF/0.5W/200V
D01	= D10XB60H	SHINDENGEN	R24	= 10	MF/0.5W/200V
D02	= BYV26B	PHILIPS	R25	= 1K	MF/0.5W/200V
D03	= BYV26B	PHILIPS	R26	= 1K	MF/0.5W/200V
D04	= 1N5818	MOTOROLA	R27	= 150	MF/0.6W/350V
D05	= 1N4148	PHILIPS	R28	= 270	MF/0.5W/200V
D06	= BZX55-C12	ITT	R29	= 1K	MF/0.5W/200V
D07	= BYV26B	PHILIPS			
D08	= BZX55-C12	ITT			
D09	= BYS24-90	SIEMENS			

R30 = 6.8K MF/0.5W/200V
R31 = 2.2K MF/0.5W/200V
R32 = 10K TRIM 25 TURNS
R33 = 1.5K MF/0.5W/200V
R34 = 470 MF/0.5W/200V
R35 = 10K MF/0.5W/200V
R36 = 1.2K MF/0.5W/200V
R37 = 12K MF/0.5W/200V
R38 = 47 MF/0.5W/200V
R39 = 1K TRIMPOT 1 TURN
R40 = 270 MF/0.5W/200V
R41 = 330 MF/0.5W/200V
R42 = 10K MF/0.5W/200V
R43 = 1.0 MF/0.6W/350V
R44 = PTC 1.5K C886 SIEMENS
R45 = 18K MF/0.5W/200V
R46 = 470K MF/0.5W/200V
R47 = 330K MF/0.5W/200V
R48 = 56K MF/0.5W/200V
R49 = 390 MF/0.5W/200V

S1 = THERM SWITCH 85 DEGR

T1 = XT387 DELTA
T2 = XT382 DELTA