

SX - series

• 150 SX 15-15

Safety Instructions

Caution

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with the safety precautions or warnings in this document violates safety standards of design, manufacture and intended use of this equipment and may impair the built-in protections within.

Delta Elektronika shall not be liable for user's failure to comply with these requirements.

Installation Category

The Delta Elektronika power supplies have been evaluated to installation category II.(Over voltage category II)

Grounding

This product is a safety Class 1 instrument. To minimize shock hazard, the instrument chassis must be connected to the AC Power Supply mains through a three or four conductor power cable for resp. a single or three phase unit, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet.

For instruments designed to be hard-wired to supply mains, the protective earth terminal must be connected to the safety electrical ground before another connection is made. Any interruption of the protective ground conductor, or disconnection of the protective earth terminal will cause a potential shock hazard that might cause personal injury.

Fuses

Fuses must be changed by authorized Delta Elektronika service personnel only, for continued protection against risk of fire.

Input Ratings

Do not use an AC Supply which exceeds the input voltage and frequency rating of this instrument. The input voltage and frequency rating of the Delta Elektronika power supply series are stated in the accompanying datasheet.

Live Circuits

Operating personnel must not remove the instrument cover. No internal adjustment or component replacement is allowed by non Delta Elektronika qualified personnel. Never replace components with the power cable connected. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

Parts Substitutions & Modifications

Parts substitutions and modifications are allowed by authorized Delta Elektronika service personnel only. For repairs or modifications the unit must be returned to a Delta Elektronika service facility.

Environmental Conditions

The Delta Elektronika power supplies safety approval applies to the following operating conditions:

Indoor use

Ambient temperature : -20 to 50 °C

Maximum relative humidity : 95%, non condensing, up to 40 °C

: 75%, non condensing, up to 50 °C

Altitude: up to 2000 m

Pollution degree 2



Caution risk of electrical Shock



Instruction manual symbol. The instrument will be marked with this symbol when it is necessary for the user to refer to the instruction manual



Protective ground conductor terminal



Off (supply)



On (Supply)

WEEE

(Waste Electrical & Electronic Equipment)

Correct Disposal of this Product

Applicable in the European Union.



This marking shown on the product, its packing or its literature indicates that it should not be disposed with other wastes at the end of its working life, but should be collected separately to recycle it responsibly to promote the sustainable reuse of material resources.

DESCRIPTIONS

1) Mounting in a 19" Eurocard rack

A 150SX15-15, with a front panel F8-6 of 8TE width, fits into a 6 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 shutdown by the overtemperature protection. When cooling down the output automatically resets.

2) Wall and rail mounting

Wall mounting is possible with the help of the front panel W 8-6. For rail mounting, besides the W 8-6, a rail adapter AR 1 is required. For wall and rail mounting also the clamp CL15 is needed to fix the H15 mating connector. Units have to be mounted vertically with sufficient space above and below for optimal cooling (see fig. 3 - 1) Horizontal mounting is not recommended but if necessary the output has to be derated to 80% at 50°C ambient temperature (see fig. 3 - 2). Good cooling is important for a long life.

3) 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 V DC can be used. This is because the voltage doubler can only work with AC.

4) Connections

Note that the two equal outputs have to be connected either parallel or in series and cannot be used separately (isolated from each other) (see fig. 3 - 3).

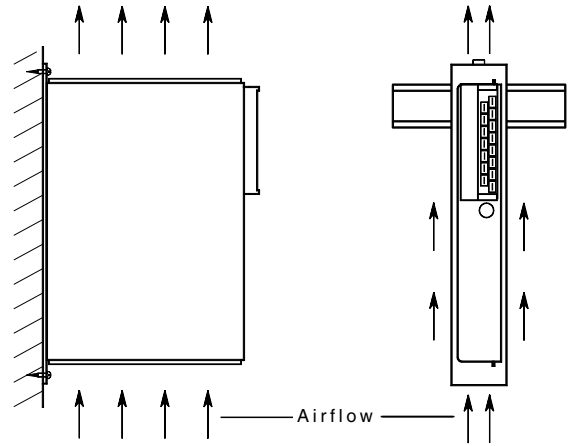


fig. 3 - 1
Vertical wall or rail mounting

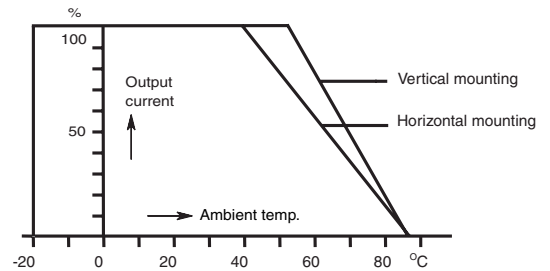


fig. 3 - 2
Temperature derating

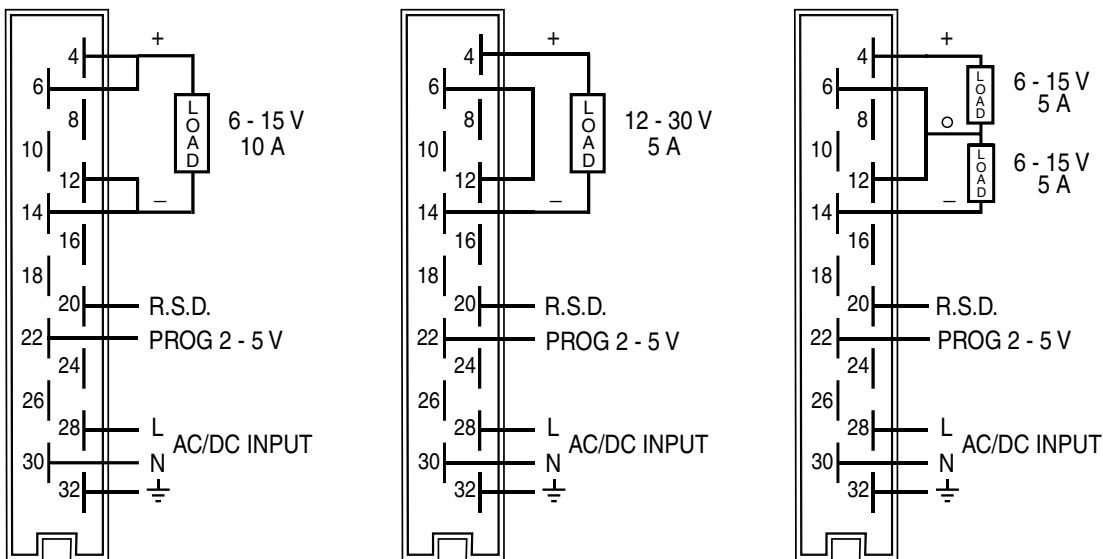


fig. 3 - 3

Parallel mode

Series mode

Dual mode

5) Remote sensing

Because remote sensing (see fig. 3 - 5) 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, R55 and R61 have to be removed (see fig. 3 - 4). 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 150SX15-15 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.

6) Remote programming

The output voltage can be programmed by an external voltage. To use remote programming, change the internal jumper from M to P (see fig. 3 - 4) and connect an analog voltage between pin 10 and pin 22 of the H15 connector (see fig. 3 - 7).

A programming voltage of 2 to 5 V corresponds with 6 to 15 V output voltage (12 - 30 V in series mode) (see fig. 3 - 6).

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 connected to minus output.

7) Remote control

Resistor R54 and R55 between S+ and + have to be removed (see fig. 3 - 4) and the voltage adjustment potentiometer (screwdriver adjustment at the front panel) has to be turned to minimum (anti-clockwise) (see fig. 3 - 8).

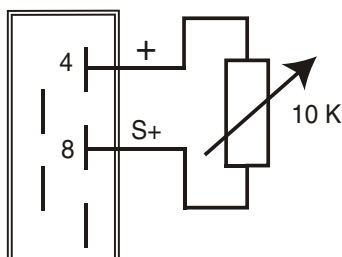


fig. 3 - 8
Connections for remote control

8) Remote ShutDown

Remote ShutDown is possible by +5 V (3.5-12 V) between RSD and S- (pin 20 and pin 10). The ShutDown input is low ohmic (Ri is about 300 Ω).

Note that the zero of the ShutDown voltage is galvanically connected to minus output, also in the dual mode.

Change jumper for remote programming Remove R55 and R6 for remote sensing

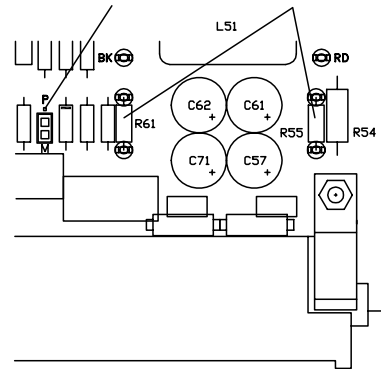


fig. 3 - 4
Location of programming/manual jumper, R54, R55 and R61 on PCB

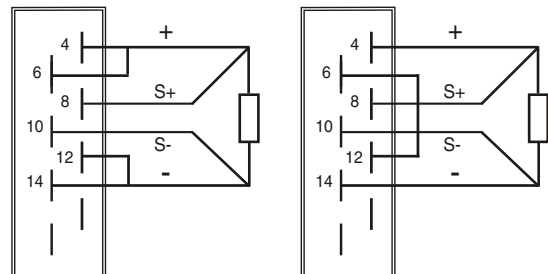


fig. 3 - 5
Parallel mode, remote sensing Series mode, remote sensing

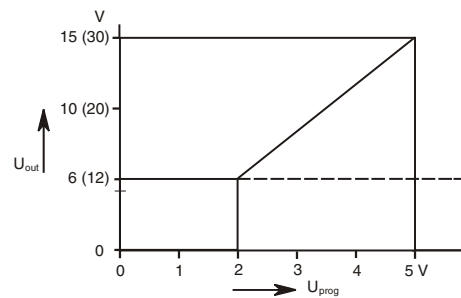


fig. 3 - 6
Output voltage vs prog. voltage

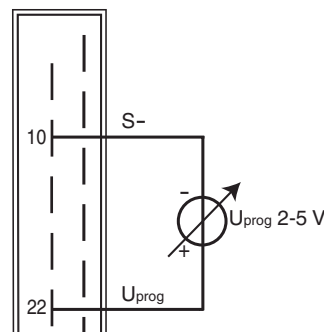


fig. 3 - 7
Connections for remote programming

9) Current limit

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 (see fig. 3 - 9).

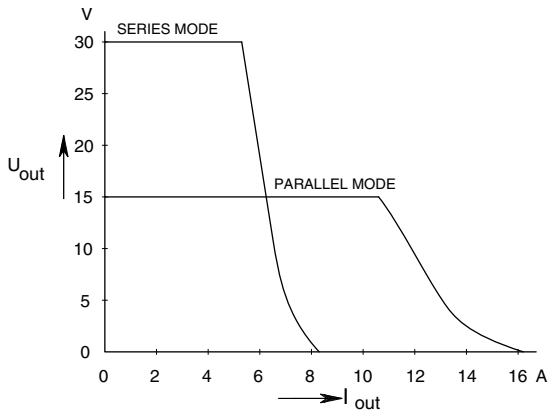


fig. 3 - 9
Current limit

10) Parallel operation

Two or more units can be used in parallel (see fig. 3 - 11) 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 voltage 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 (see fig. 3 - 10).

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.

11) Dual mode

In the dual mode the 150SX15-15 can be used as a dual power supply with equal positive and negative output voltage (see fig. 3 - 12).

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.

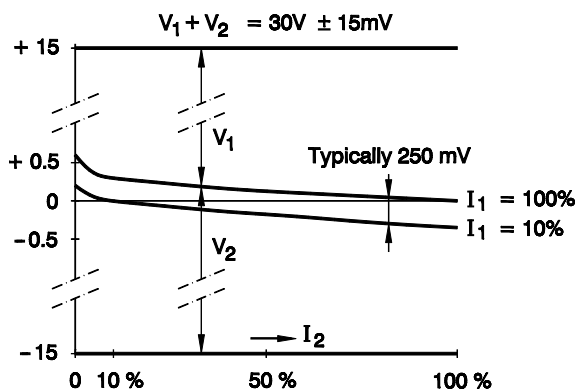


fig. 3 - 12
Zero-shift caused by unequal loading of + and - 15 V

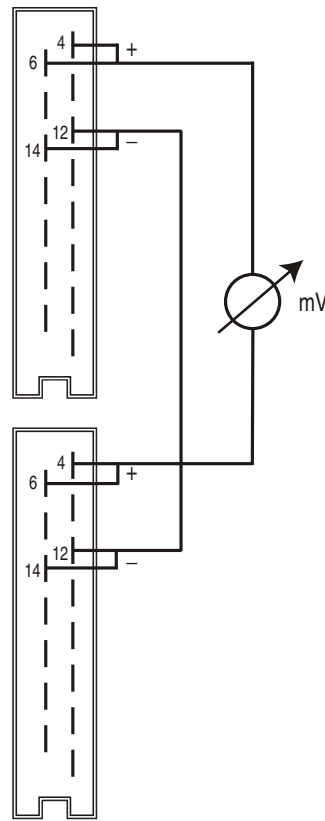


fig. 3 - 10
Adjustment at equal output voltages

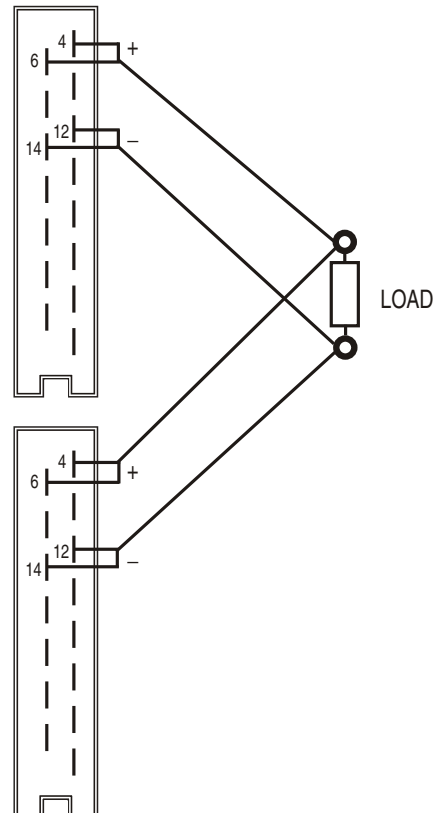


fig. 3 - 11
Two 150SX15-15 in parallel

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EC Declaration of Conformity

We

Delta Elektronika
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The Netherlands

declare under sole responsibility that the following Power Supply:

150 SX 15-15

meet the intent of Directives 2004/108/EC; 92/31/EEC; 93/68/EEC for Electromagnetic Compatibility and Directives 73/23/EEC; 93/68/EEC regarding Electrical Safety. (Low Voltage Directive)
Compliance was demonstrated to the following specification as listed in the official Journal of the European Communities:

EN 61204-3 EMC, low voltage power supplies

EN 61000-6-3 Generic Emissions: (residential, light industrial)

EN 55022 Radiated and conducted, Class **B**
EN 61000-3-2 Power Harmonics
EN 61000-3-3 Voltage fluctuation and flicker

EN 61000-6-1 Generic Immunity: (residential, light industrial)

EN 61000-4-2 Electrostatic Discharge
EN 61000-4-3 Radiated electromagnetic fields
EN 61000-4-4 Electrical Fast Transients / Bursts
EN 61000-4-5 Surge on DC output
EN 61000-4-5 Surge on line input
EN 61000-4-6 RF common mode, conducted
EN 61000-4-11 Voltage variations and dips

EN 60950 Safety of IT equipment

EN 61010 Safety of electrical equipment for measurement, control and laboratory use

Managing director