

Advel Application Note – AAN2015.2

New DX series vs DZ1 series

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1. Introduction

Starting from October 2015, a new series of Advel power supplies, for DIN rail mounting, was born: the **DX** series. This new series takes the place of the **DZ1** series, above all thanks to its smaller size. However, the full electrical compatibility between the two power supply series remains.

2. Dimensions

The power supplies produced by Advel are typically bigger, with equal power, than those of some other manufacturers for three reasons:

- the internal presence of the parallel diode (absent in almost all the power supplies present on the market),
- the large electrolytic Hold-Up capacitors necessary to guarantee the output voltage after a loss of input voltage of even 80 ÷ 100msec at full load (against 20msec required by law),
- the output Crowbar protection, which consists of a large SCR with attached dissipator.

The **DZ1** power supplies ultimately take up almost twice as much space as power supplies of the same power produced by other manufacturers.

The **DX** series was born with the intent of reducing the width of the **DZ1** series power supply, while maintaining exactly the same electrical characteristics. In fact, the **DX** series can be understood as a just restyling of the **DZ1** series.

Figure 1 shows the dimensions of the two power supplies compared: the old DZ1 is 200mm wide, the new DX is 142mm wide.

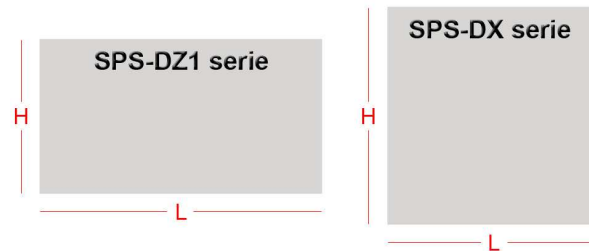


Figure1 – The figure shows the frontal dimensions of the power supplies for DZ1 (on the left) and DX (on the right) series:

DZ1 → L x H = 200mm x 100mm
DX → L x H = 142mm x 145mm

Inside an industrial cabinet, the width is the parameter that determines the size of a power supply, while for the height typically 20 ÷ 25cm are available for each omega mounting bar.

3. Calibration bushings

The new DX series power supplies, compared to the old DZ1 series, have two frontal bushings for a easy reading of the output voltage.

Remember that the power supplies produced by Advel are equipped with active current sharing, a system that guarantees a equal distribution of the load current between the power supplies in parallel, however it is always recommended to carry out at least a first calibration when the system is switched on and the new bushings make the calibration operation extremely convenient and fast.

4. Comparison with competitors

We have examined n.4 power supplies of known manufacturers, which we will call A, B, C and D, and reported in Table1 some main characteristics. The power supplies are all 250W power, input voltage 230Vac (or 88÷264Vac), output voltage 24V. This is the most used model.

In the case of systems with parallel power supplies of type A, B, C or D, the purchase and the size of the parallel diodes must be added. Conversely, with a DX (or DZ1) power supply system produced by Advel, it is not necessary to use external diodes for the parallel, since they are already present internally.

Alimentatore	A	B	C	D	Advel-DZ1	Advel-DX
W x H [mm ²]	83 x 124	123 x 138	69 x 130	59 x 124	200 x 100	142 x 146
Parallel diodes	no	no	no	no	yes	yes
Hold Up time [msec]	20 msec	20 msec	20 msec	20 msec	100 msec	100 msec
crowbar	no	no	no	no	yes	yes
current sharing	passive	passive	passive	passive	active	active
Remote power off	no	no	no	yes	no	no
Calibration bushings	no	no	no	no	no	yes
Costo (*)	\$	\$	\$	\$ \$	\$ \$ \$	\$ \$ \$

Table1 – The table shows some characteristics of power supplies from different manufacturers, for DIN mounting power supplies, 250W power, input/output voltage = 230Vac / 24Vdc.

(*) **NOTE:** at cost for power supplies A, B, C, D must be added the cost of any parallel diode (to be purchased separately).

For power supplies A, B, C, D we can calculate an average dimension: L x H = 84mm x 129mm.

The classic parallel diodes for this power size, have dimension L x H = 50mm x 100mm and contain 2 diodes.

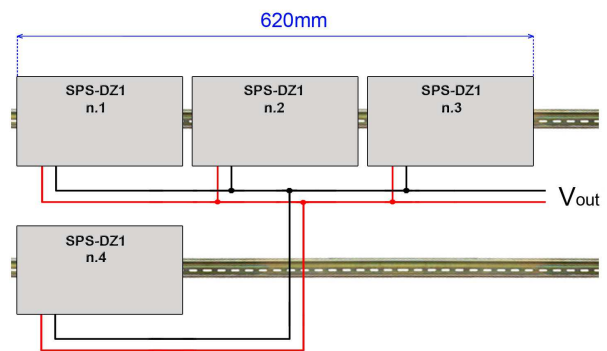
About cabinets for industrial use, there are many shapes and sizes. Let's take a look at what is perhaps the most used one, that is the one in the 19 "rack format.



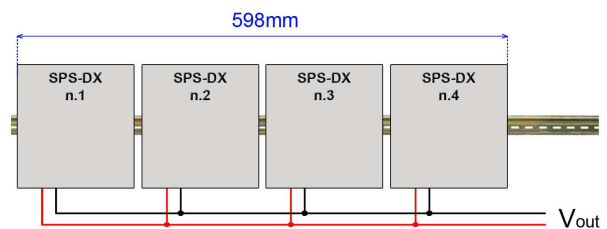
Figure2 – The figure shows the classic 19 "rack cabinet, which has an external width of 800mm, and an internal working width of about 650mm.

The 19" rack cabinet has an internal working width of about 650mm: in this width it is possible to mount n.4 Advel-DX power supplies, with a relatively simple wiring; in the same width it is possible to mount a similar system with n.4 power supplies produced by other manufacturers, however in this last case we must consider the addition of parallel diodes, it follows a more complex wiring (Figure 3) as well as an additional cost .

Advel **SPS-DZ1** system:



Advel **SPS-DX** system:



other manufacturer system:

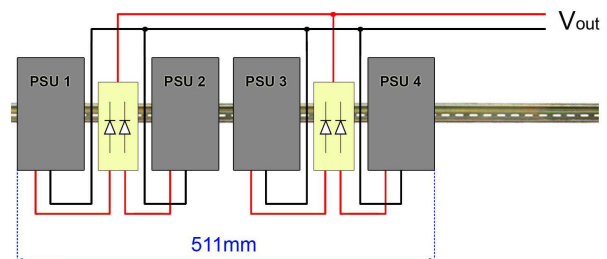


Figure3 – System of four 250W power supplies in parallel / redundancy, realized by power supplies of the old Advel-DZ1 series (above), or of the new Advel-DX series (in the middle) or by power supplies of other well-known manufacturers on the market (below) . A space of 10mm has been assumed between one element and another.

The system made with Advel-DZ1 power supplies is very bulky, in fact in the 19" rack there are only 3 aligned power supplies. Conversely a system

made with the new Advel-DX power supplies saves a lot of space inside the cabinet, while still being a bit larger than what can be achieved with other power supplies on the market.

However, it is necessary to consider that the system realized with Advel power supplies allows a better equipartition of the current, thanks to the internal parallel diodes and the Active Current Sharing system (CSa): instead in systems with external parallel diode, and strictly passive current sharing, it is not possible to balance the load currents of the power supplies, if not in a less precise way (see "AAN2013.1 - Current Sharing passive vs. active") with a consequent deterioration of the reliability of the system.

Finally, it should be remembered that the power supplies produced by Advel, both the old DZ1 series and the new DX series, are available in many versions of input/output voltage, also totally customizable by the customer.

The DX series, like the DZ1 series, is also available in different power size for each power supply, from 150W to 1000W.

5. Conclusions

The new DX series power supplies produced by Advel for DIN rail mounting were presented.

The biggest difference compared to the old DZ1 series is the smaller width, which allows a better use of the space inside the industrial cabinets.

Then, three systems of n.4 power supplies in parallel/redundancy were compared: one realized using the old Advel-DZ1 power supplies, one using the new Advel-DX and one using power supplies produced by other manufacturers. The Advel-DX system has considerably optimized the space compared to the Advel-DZ1 system, resulting only a little more bulky compared to a system obtained from different branded power supplies. Compared to the latter, however, the Advel-DX system ensures greater Hold-Up time (ie resistance to input voltage drops), greater ease of wiring (and therefore also maintenance), greater reliability (thanks to current sharing active which improves the distribution of the load current between the power supplies in parallel), a greater ease in the calibration procedure (thanks to the front bushings) and finally a greater customization of the input/output voltages by the end customer.

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