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Power Supply Solutions for Data Centers

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Data Center is a blooming industry today due to the driven of AI. Its high demand not only disturbs supplies chain but also brings opportunity to other sectors such as ESS, Fuel Cell or Liquid Cooling. There are two types of Data Center infrastructures. One is AC powered Data Center and the other is DC powered Data Center. This article pins point MEAN WELL products that are suitable for both AC and DC powered Data centers.

- ❖ AC powered Data Center infrastructures (figure 1): it usually powered by three-phases 400~480Vac power consists of a backup Diesel Generator, AC Online UPS (Uninterrupted Power Supply) system and Liquid cooling system to cool the heat-generation compute racks. The AC Online UPS system in Data Center installs in series with the Three-phase power to supply few minutes of power for the backup Diesel Generator to start up. The Liquid Cooling System consists of hot/cold liquid circulation and a RDHx (Rear Door Heat Exchanger) which is attached to the compute rack to exact the heat.

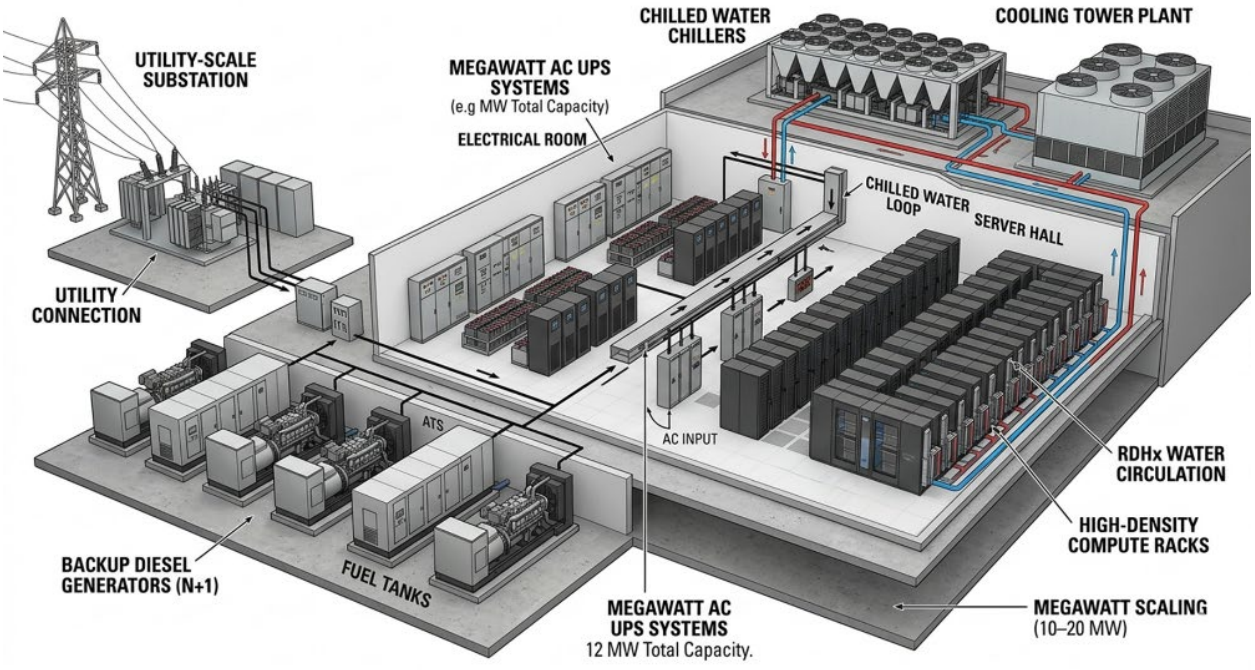


Figure 1 AC powered Data Center infrastructure

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Introduction	Photo
The AC Online UPS system is a scalable 250KW Three-phase power cabinet that encloses high-power inverter, battery charger and battery packs. To cool the internal power electronics, it usually uses the XTR-480-24 to power multiples 24V/50W DC fan because the XTR-480-24 is Three-phase input and can withstand the momentary Voltage surge of the inverter during startup.	
Cooling System is essential in Data Centers because there is too much heat generated by the Servers. Liquid cooling is often used for the Data Center. The 12.8KW 19" DHP-1UT-B rack system uses to power the BLDC motors for the hot/cold water circulation and 500W DC fans of the RDHx.	

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- DC powered Data Center infrastructure (figure 2): the heat-generation compute racks are still present but they powered by high Voltage 800Vdc, which is derived from a Solid-State Transformer, instead of 400~480Vac. HVDC power can lower the current to safe material cost and power loss on the power cables. Moreover, with HVDC power, 800Vdc BESS (Battery Energy Storage System) replaces the AC Online UPS that improves few percent overall efficiency. Therefore, the HVDC 800Vdc can save costs and lower energy loss.

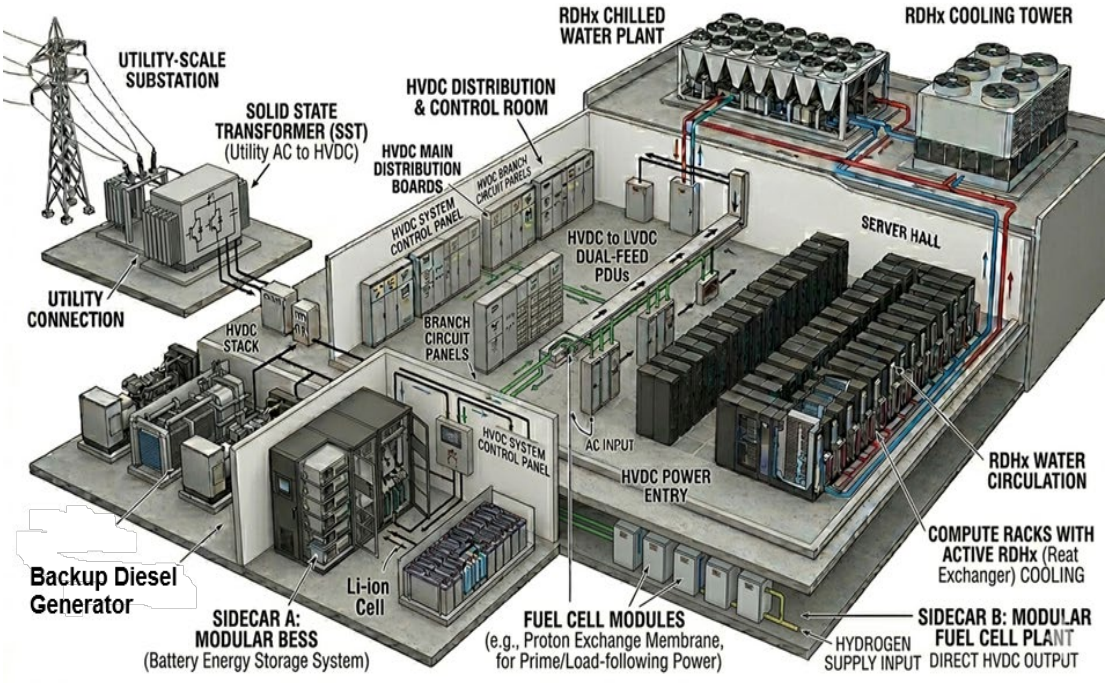


Figure 2 DC powered Data Center infrastructure

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Introduction	Photo
BESS in Data Center outputs 800Vdc to keep the Data Center running for few minutes until the backup Diesel Generator starts up. The BESS Energy Management System, Display or Controllers is usually lower DC that the HVDC RSDH-150/300 or DDRH-120/240 is often used because these DC/DC power supplies offer wide input range from 250~1500VDC.	 
In Data Center, Fuel Cell Modules can be used to replace both the Diesel Generator and the BESS because Fuel Cell output can last up to days with Hydrogen, which often delivers from an off-site generation. Moreover, Fuel Cell does not require wait time and costs less than BESS at large size. The MEAN WELL System Power Solution consists of 8 SHP-30K-55 in parallel to deliver 130KW power to drive the Electrolysis Stacks to quickly generate Hydrogen off-site for the Fuel Cell.	 

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In Summary, MEAN WELL offers both AC/DC and DC/DC power supplies for Data Center. For thermal Management, the next generation three-phase input XTR series and high efficiency DHP-1UT-B rack power is suitable for BLDC motor/pump and DC fans. In HVDC Data Center, the wide input range 250~1500Vdc RSDH-150/300 or DDRH-120/240 series can step down the 800Vdc to low DC voltage to power BESS Peripherals. Lastly, the System Power Solution offers ultra-high power to generate Hydrogen for Fuel Cell power.

For related products and application needs, please contact MEAN WELL distributors or technical personnel. You are also welcome to follow MEAN WELL Virtual Expo for more product information and solution courses.



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