

# A test center for large-scale UPS systems

New facility at ABB's power protection factory in Switzerland allows advanced testing of high-power UPS systems



There is a clear trend in the critical power industry for larger scale installations. These large sites need a bigger power infrastructure – and a bigger uninterruptible power supply (UPS) to match. ABB's comprehensive UPS test facility at its power protection factory in Switzerland can handle the biggest UPS systems around and is dimensioned to accommodate the even larger sizes expected in the future.

## A comprehensive test facility

To make the integration of an ABB UPS into the customer's power infrastructure a smooth and simple operation, the entire UPS configuration – including ancillary system components such as switchgear and static transfer switches – is tested as one integrated unit before it leaves the factory.

ABB's UPS customers are purchasing UPS systems that are far larger than before. For example, data center operators are already at the 2 to 3 MW level and systems beyond 3 MW are beginning to appear. ABB's new UPS facility ensures that these, and future, even larger, UPS systems can be completely tested before delivery.

The most important function of the facility is the customer factory acceptance test (FAT) and the layout has been designed with this in mind. Not only that, but the facility also provides a unique tool for new product development, special product testing and type tests.

## A full suite of test tools

ABB's UPS test facility is located in its power protection factory in Switzerland. The center boasts five test stations, each with an AC capability of 800 kW (4 MW total) and a DC capability that can simulate 480 kW of battery power (2.4 MW total).

Real batteries can be used too: the test facility has 200 batteries of 90 Ah each, which provides 10 minutes of autonomy at 500 kW. The batteries can be set up in a one- to four-string configuration, with 40 to 50 batteries per string.

The AC nominal test voltage provided can be 400 VAC (variable to – 30%) or 480 VAC (variable to +10%) – all at 50 or 60 Hz, variable to 35/70 Hz with  $\pm 0.5$  power factor.



In addition to accommodating testing at 400 VAC, and standard voltages for Europe and other IEC markets, the facility can be adapted to perform tests at 208 VAC and 480 V, typical for the North America area and other UL markets.

This full spectrum of power availability enables even the largest and most varied UPS systems to be fully tested.

#### Flexible layout

The test area is laid out so as to make it easy to test extended UPS systems – including, for example, UPSs, input and output switchgear, power distribution units (PDUs) and static transfer switches (STSs). The facility also features dual input feed for large UPS systems; up to 10 UPS units in one parallel system; and static system bypass module tests up to 5000 A.

There is ample capacity to accommodate future, larger UPS sizes, which enhances ABB's ability to address data center and industry trends to larger-sized installations.

#### Test regimes

Naturally, system requirements differ from customer to customer. To cover all possible customer test requests, a fully comprehensive suite of test procedures is catered for in the test center:

- Visual inspection (quality, safety, labels and markings, etc.)
- Insulation resistance and ground continuity
- Steady-state tests (input/output stability, harmonics, efficiency, standard nonlinear load, variable cos phi, etc.)
- Dynamic tests (changes of operating mode, step load, overload, fuse clearing, etc.)
- Transformer heat run
- Failure simulations (e.g., over-temperature tripping, battery failure, etc.)
- System tests (load sharing, faulty module isolation, etc.)
- Burn-in test
- Connectivity test
- AC load short-circuit test: individual phases or all together (phase to phase, phase to neutral, etc.)
- AC mains failure test: low-impedance and high-impedance mains failure capability
- AC UPS without neutral test: up to 2 x 800 kVA



### Witness test experience in comfort and modern ambiance

ABB places great value on customer participation at every step of the product delivery process, from initial design to final commissioning, and beyond. This is why the ABB UPS test facility includes a fully equipped conference room. In this comfortable location, which has large windows that overlook the test bays, customers and ABB engineers have a safe environment in which they can closely monitor the entire test process. As well as direct visual access, measurements from the test bays are displayed in the conference room.

The test center is right beside the FAT area - where customers participate in the final testing of their products before they are shipped. In case travel is not convenient or the customer wants to share the FAT event with others, the facility is fully equipped with teleconference and video services to allow customer participation in FATs, or any part thereof, from anywhere on the planet. FATs are recorded for future forensic analysis, record keeping and traceability.



### Electronic load saves energy

By their very nature, large power set-ups consume a lot of energy. ABB places great emphasis on lowering emissions and that is why ABB's UPS test equipment has been designed to recycle the energy used during testing. The test power is circulated around electronic loads, which means only 10 percent of the actual power used in the test is taken from the public mains.

### Keeping an eye on the future

UPS system power specifications are increasing year-by-year, as applications grow ever more power-hungry and complex. As one of the few major players in the UPS market, ABB has, with this test facility, a tool to reinforce the ability of the company to successfully design, build and test high-quality UPS systems for applications involving the highest power applications.