

PRODUCT BROCHURE

SYNCHROTECT® 6

Keep your assets synchronized,
safe and productive



- Half a century of evolution encapsulated in a device
- Safety is guaranteed by the SYNCHROTECT Diverse Dual Channel concept
- Exceptionally reliable device with responsive, competent support
- Training program for commissioning and service personnel

The world's most popular synchronizer

For more than 50 years, SYNCHROTECT® has protected power plant generators and substations from the potentially destructive effects of current surges caused by paralleling in non-synchronized conditions.

It keeps these valuable production assets safe and at the highest levels of availability.

SYNCHROTECT 6 is the sixth generation of this well-proven and popular technology. Over 22,000 SYNCHROTECT units have been sold since its introduction, more than any other synchronizer on the market.

SYNCHROTECT 6 is part of ABB's offering of excitation products and synchronizing equipment for the power generation industry. The portfolio is the most comprehensive and proven on the market, extending from the smallest to the largest power requirements and covering all power generation applications.

Why is SYNCHROTRACT 6 important?

Power plants and substations contain many valuable components, essential to the reliable delivery of electricity from the power plant to the transmission grid.

SYNCHROTRACT 6 protects these assets from the damaging and dangerous effects of paralleling in non-synchronous conditions.

It automatically synchronizes and parallels the generators with the power lines to keep the energy flowing, the equipment productive and people safe.

And it does so at the lowest possible total cost of ownership over a long life cycle.

What is new about SYNCHROTRACT 6?

SYNCHROTRACT 6 is the only synchronizer to have a diverse dual channel design – if one channel should fail, the other prevents the circuit breaker from closing under non-synchronous conditions. Both channels are in the same SYNCHROTRACT unit to minimize wiring, ensure perfect working compatibility and reduce commissioning and engineering costs.

The number of parameter sets has been increased from 7 to 20, enabling up to 20 different circuit breakers to be synchronized by a single SYNCHROTRACT 6 device.

Compliant with the IEC 61850 Ed. 2 international communication standard, SYNCHROTRACT 6 fulfills the most demanding requirements and offers a choice between an electrical or optical interface.

The unit's robust design is in accordance with the IEC 61508 SIL2 safety integrity level and IEC 60255-26, IEC 60255-27 and ANSI/IEEE C37.90 product standards.

What are the benefits?

- Keeps assets productive at the highest levels of safety, redundancy and availability
- Up to 20 different circuit breakers can be synchronized by one SYNCHROTRACT 6 unit
- All hardware and software is housed in a single unit
- Proven technology and reliable components
- Backwardly compatible with previous SYNCHROTRACT generations for easy and cost-effective retrofits

Where is SYNCHROTRACT typically located?

In a power plant it is usually installed in an electrical cubicle or in the control room. In a substation it is usually part of the switchgear.



Safe, flexible and life-cycle secure

1. SAFETY – protects the plant from power surges and people from injury

SYNCHROTACT 6 protects the plant from power surges and people from injury.

It does this for generators up to 2,000 megawatts in all types of conventional power plant – thermal, nuclear and hydro, including pumped storage – as well as for substations.

SYNCHROTACT 6 is the ONLY synchronizer on the market to have a diverse dual channel design. Each channel is made by a different vendor, using different hardware and software. Both channels monitor each other to detect the first sign of a malfunction in the other channel.

Even though the two channels are made by different vendors and use different hardware and software, they are 100-percent compatible. They use the same words for functions and parameter names and are commissioned by the same person.

The benefits are:

- The diverse dual channel design ensures the highest level of safety – if one channel should fail, the other prevents the circuit breaker from closing under non-synchronous conditions and ensures failsafe synchronization.
- The compatibility of the two channels eliminates ambiguity and incorrect commissioning.
- The design complies with the IEC 61508 SIL2 international standard for functional safety.

Nothing could be safer!

2. FLEXIBILITY – synchronizes up to 20 breakers with one unit at lower cost

With 20 parameter sets and eight analog inputs in a single device, one SYNCHROTACT 6 can synchronize multiple plant generators or substation synchronizing points.

This delivers a unique level of flexibility and optimization at considerably lower cost. Only one device is needed instead of many, and only one device needs to be engineered, commissioned and maintained.

The eight analog inputs provide multiple other functionalities such as 3-phase voltage measurement and display of the phase sequence – ensuring that all three electrical phases are measured and are in the correct order to avoid incorrect synchronization, which would destroy the generators.

The benefits are:

- One SYNCHROTACT 6 can synchronize up to 20 circuit breakers.
- Up to 70 percent less costly than conventional solutions that require one synchronizer for each synchronizing point.
- Only one device to engineer, commission and maintain.
- Multiple functionalities like display of the phase sequence enhance flexibility.



3. SECURES THE PLANT/SUBSTATION LIFE CYCLE – easy to retrofit

SYNCHROACT 6 is easy to retrofit and upgrade from previous versions.

It has the same housing dimensions and the same electrical connections as all five previous generations, with the exception of SYNCHROACT 4. It fits into the same space in the cubicle or electrical room as the earlier version it replaces, which makes for simple installation at minimal cost and effort.

When upgrading, you can choose to use either the same functionalities of your old SYNCHROACT or take advantage of the new state-of-the-art features like the IEC 61850 Ed. 2 communication interface for intelligent electronic devices.

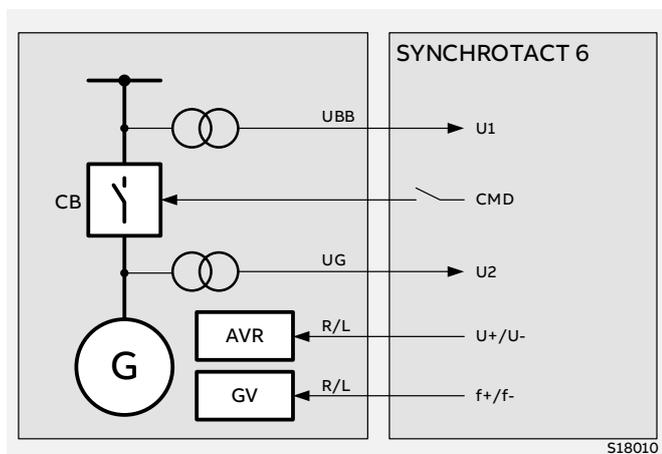
The benefits are:

- Secures the plant and substation life cycle at minimal effort and cost.
- 1:1 replacement with previous generations – same size, same electrical connections.

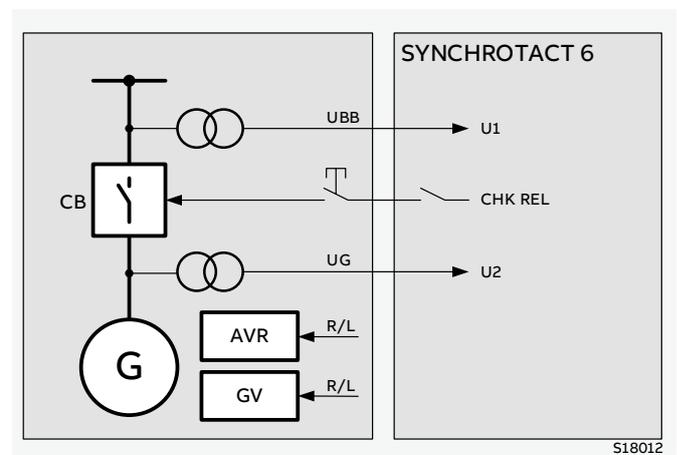
Applications

- Power plants with generators of any type up to 2,000 MW
 - Thermal power plants (diesel, gas, steam), including combined cycle and nuclear power
 - Hydropower plants, including pumped storage
- Industrial plants with own power generation
- Grid paralleling in substations and islanded power networks
- Large AC motors, soft-started and running above nominal speed by means of a variable speed drive and then synchronized during coast-down

SYNCHROTECT 6 application examples



Automatic generator synchronizing



Manual generator synchronizing (with Synchrocheck)

Four functionalities that bring the generator safely online

SYNCHROTECT 6 automatically synchronizes the generators with the grid. It does this through four key functionalities:

Measures – it measures key variables to ensure generator and grid voltage and frequency are synchronous.

Matches – if voltage and frequency are not synchronous, it automatically matches the two by adjusting the generator voltage and frequency.

Monitors – it monitors the operating conditions to ensure the voltage and frequency are synchronous before closing the circuit breaker.

Command generation – as soon as voltage and frequency are synchronous a command is sent to close the circuit breaker.

Service

ABB Excitation Care is a comprehensive life cycle management program to ensure your SYNCHROTECT 6 unit operates reliably for as long as possible, typically around 25 years. It

includes unlimited 24/7 telephone support, guaranteed response time and individual technical support from synchronization experts.

“We installed SYNCHROTECT® 3 in 1988. It worked flawlessly for nearly 30 years. But the time came to replace it. As an electronic device, it had reached the end of its technical life expectancy.

“From day one, SYNCHROTECT 6 proved itself without the slightest problem. It is fascinating to see how relatively simple it can be to link such a modern pioneering device like SYNCHROTECT 6 with existing technology.”

Peter Rothenfluh
Head of plant operations and maintenance
Limmatkraftwerke, Switzerland

SYNCHROTECT synchronizes all 26 generators at the 22,500-megawatt Three Gorges hydropower plant in China, the world’s largest power generation facility.

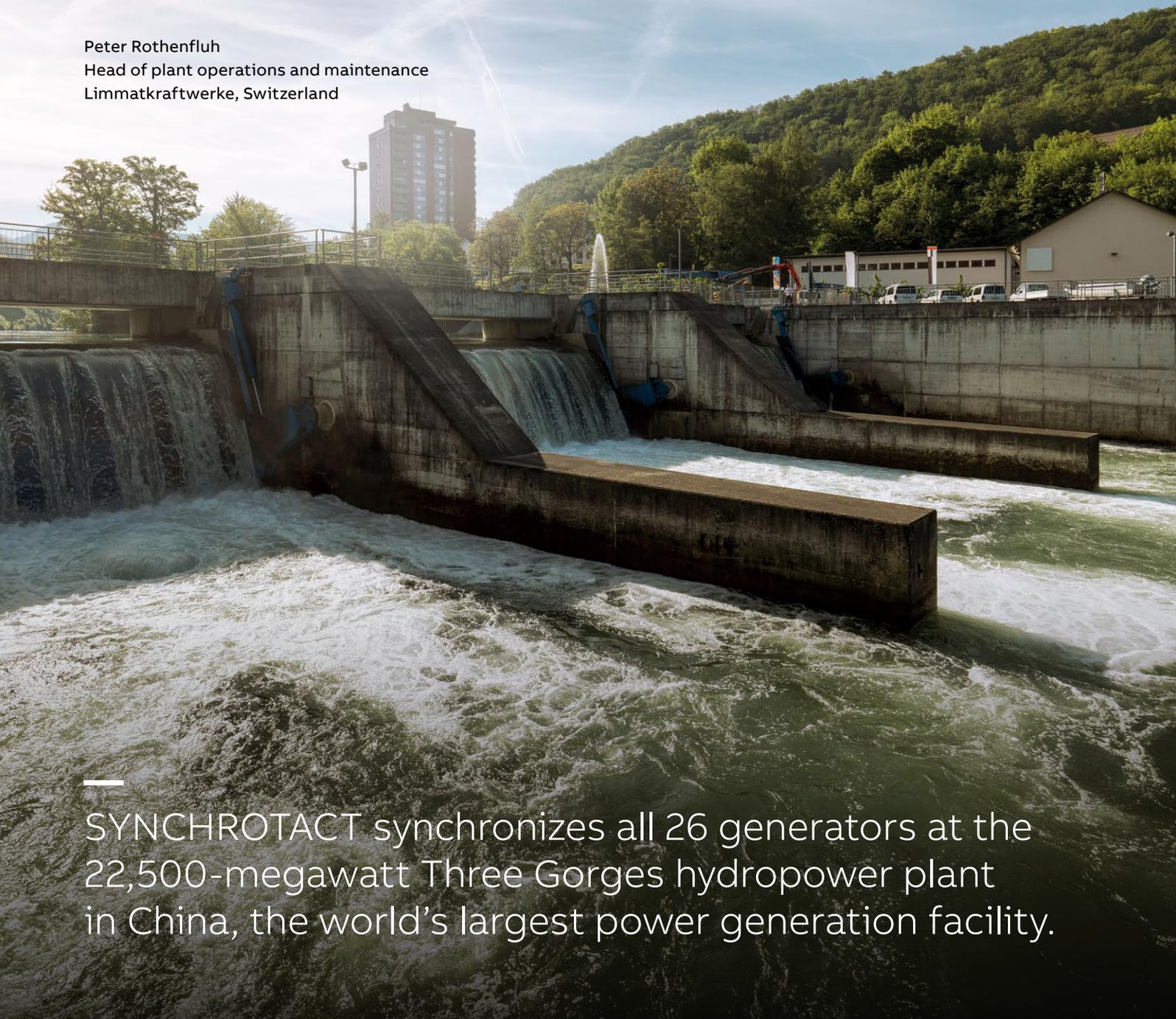




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