

High Voltage Products | Hybrid Switchgear

# Plug and Switch System (PASS) M00 for offshore wind turbine applications

Product information



Compact, safe and reliable switchgear for a sustainable wind power generation.

The energy generated by offshore wind farms is essential to reach the global target of decarbonization and to enable a climate-neutral power generation. The wind farms are expected to bring 300 to 400 GW globally to the power grids in the next 20 years, and the importance of reliable switchgear solutions, capable of ensuring the safe operation is growing rapidly.

The generation capacity of wind turbines is improved significantly during the last five years and the multi-megawatt (MW) turbines have been developed with ratings up to 14 MW. Due to increased power generation capacity per unit, the offshore electrical network between the wind towers switches from 33 kV to 66 kV voltage to reduce the Levelized Cost of Energy (LCoE). This is already a reality in Northern Europe, where the 66kV network is established for new installations.

Committed to sustainable development, we at Hitachi Energy come together to improve the quality of life of people around the world through pioneering technologies. As more renewable power sources join to replace carbon-based energy gradually, we need to ensure our grids remain resilient and become more flexible as they adapt to fast-changing demands and increasing decentralization.

## Technical features

PASS M00 - Wind is designed to meet the highest industry standards for offshore installations, providing maximum safety for wind park operators, easy maintenance, and excellent resistance to vibrations and harsh marine environment.

### Single-phase encapsulation

- Lowest probability of phase-to-phase failure
- Single-pole replacement concept through WT door



### All-around IAC protection

- Robust and arc-proof HV cable compartments
- Maximum safety



### Digital control cabinet

- Smart Control Cabinet
- Remote monitoring services



### MotorDrive

- PMI-controlled servo-motor
- Stable self-calibrated CB operation
- Minimum N° of moving parts
- Highest reliability



### Tee Connectors Type F

- Epoxy Resin bushings
- Compatible with standard Tee Connectors



## Solid experience

PASS M00 - Wind is based on Hitachi Energy's Hybrid well-proven technology platform. With more than 1,300 units installed since 2003, PASS switchgear is known for its high exceptional reliability, space saving, reduced footprint and best in class performances for applications up to 72.5 kV. It has been installed in several multiple countries in Europe, Africa, South Asia and Australia to withstand diverse and challenging harsh climatic weather conditions.

## High availability

PASS M00 - Wind uses consolidated SF<sub>6</sub> technology for the circuit breaker and disconnecter / earthing switches, together with digitally controlled circuit breaker drive (Motor Drive), which drastically increases the availability of the product, making it virtually maintenance-free.

Single-phase encapsulation leads to a simplified maintenance concept, where any maintenance activity can be limited to one single pole. This approach leads to lighter, more compact and lower cost replacement units (single poles), reducing the required lifting capabilities and simplifying the logistic efforts.

Digitally controlled Motor Drive is tested for 30,000 mechanical operations (three times more compared with the industry standard), bringing the reliability of the drive to the highest possible level. Moreover, the drive includes self-diagnostic features with real-time and precise identification of malfunctioning.

## Remote diagnostic

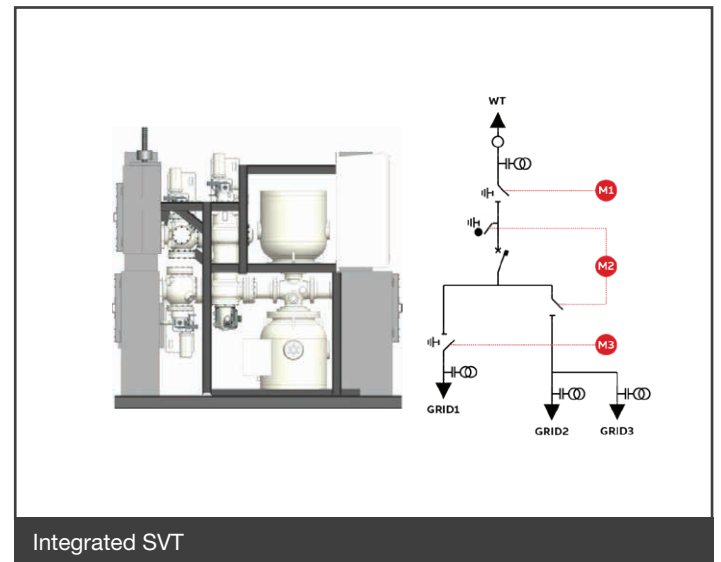
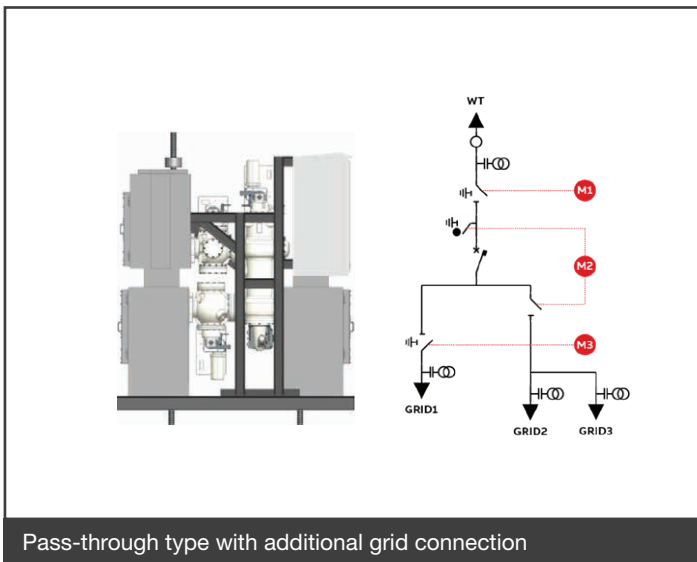
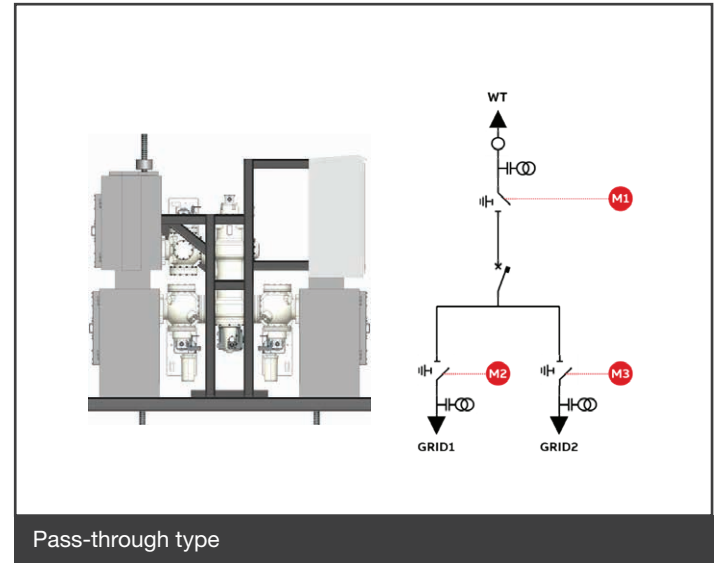
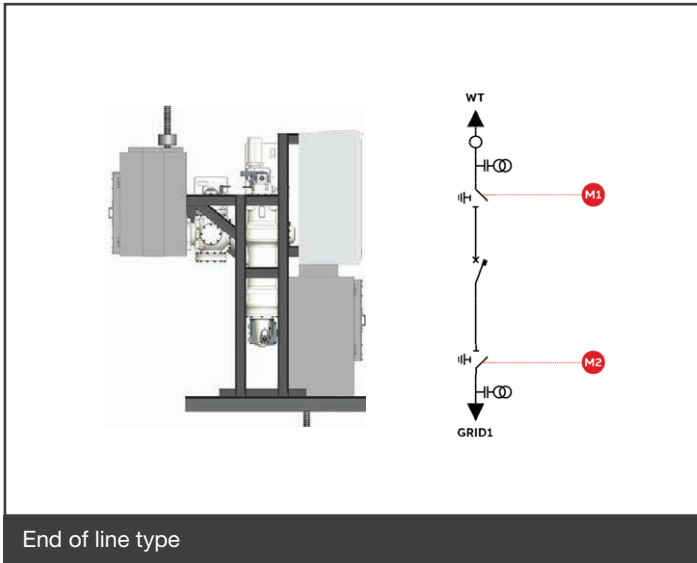
PASS M00 - Wind is equipped with Hitachi Energy's digitally controlled circuit breaker drive (Motor Drive). With a minimum number of moving parts and continuous self-calibration, it provides stable operation without mechanical adjustment and superior performance in terms of reliability and availability.

## Drive monitoring functions

- Continuous check of drive status and performance (e.g. kinematic chain, each electronic module, CB/DS/ES status)
- Remote monitoring (possible from both customer and Hitachi Energy)
- Real time and precise identification of malfunctioning
- Event log for operation and failure tracking

## Configurability

The layout of the switchgear can be customized according to the application needs, in terms of single line diagram, accessibility requirements, dimensional and footprint constraints.





## PASS M00 - Wind

A compact, safe and reliable solution meeting the highest industry standards for offshore installations.

### Performance data – PASS M00 - Wind

|                                   |   |                              |
|-----------------------------------|---|------------------------------|
| Applicable standards              | IEC 62271-1, IEC 62271-203, IEEE and local standards on request |                              |
| Rated Voltage                     | kV  | 72.5                         |
| Rated frequency                   | Hz  | 50 / 60                      |
| Rated continuous current          | A   | Up to 2000                   |
| Rated short circuit current       | kA  | 25 (31.5 upgrade on request) |
| Rated short-time current duration | s   | 1                            |
| Internal fault protection         | 25 kA x 1 s, IAC-A FLR (acc. IEC 62271-200)                     |                              |
| Ingress protection                | Up to IP54  |                              |
| Resistance to corrosion           | C4-H  |                              |
| Air salinity (maximum)            | $\mu\text{g}/\text{m}^3$  | 35                           |
| Vibration withstand class         | 3M3   |                              |
| Seismic                           | AF5   |                              |
| Ambient temperature               | $^{\circ}\text{C}$  | -30 ... +50                  |

The data are not limiting values. Additional data on request.

