



PCS-9571

Fault Current Limiter (FCL)

PCS-9571 fault current limiter (FCL) is based on fast switch, high-speed sampling and fault identification control system, combined with high-potential isolation power supply equipment to achieve the effective suppression of short-circuit current of the power grid.

During normal operation, the fast switch bypasses the current-limiting reactor, and the entire fault current limiter exhibits a very low impedance state, which does not affect the normal operation of the power system. When a short-circuit fault occurs in the power system, the fault is quickly identified by the control system, and the fast switch is opened in a few milliseconds to transfer the short-circuit current to the current-limiting reactor, thereby limiting the short-circuit current.

The power system can install a fault current limiter to achieve the following objectives:

- No adverse effect on the power system during the startup and normal operation (including returning to normal operation from the fault current limit state);
- Quickly and automatically insert a current-limiting reactance and effectively limit the short-circuit current to the required reasonable level;
- It will not cause system transient oscillation and overvoltage;
- It has a soft-closing function to avoid the secondary impacts due to re-close to permanent fault circuit.

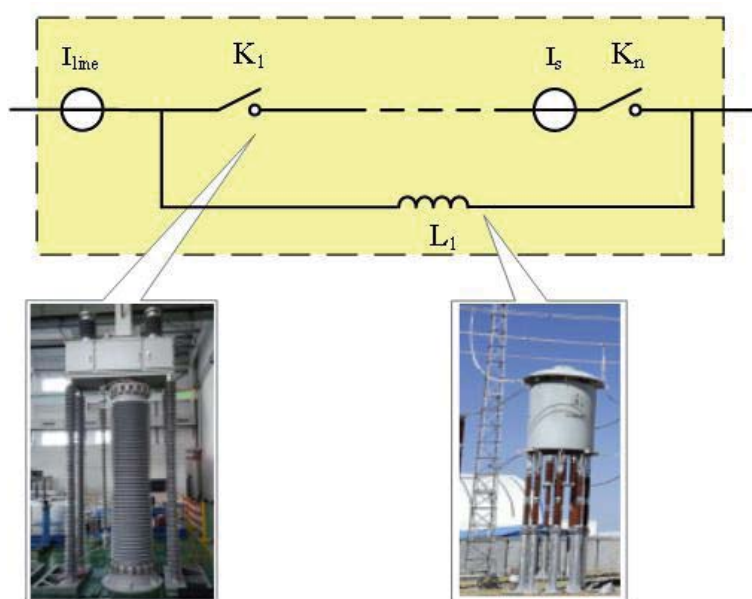


Figure 1 Fault Current Limiter Single Line Diagram

System Components

- Fast switch**
 The fast switch adopts the electromagnetic repulsion operating mechanism and isolation transformer for power supply, it can perform the switching operation when the system line is not powered, the rated opening time is less than 5ms, the closing time is less than 20ms, and the mechanical life is more than 2000 times. High voltage level expansion is achieved by series connection of multi-break, and the number of the series-connected break can be flexibly configured according to the actual system requirement.
- Current limiting reactor**
 Current limiting reactor adopts air core type, the overall insulation heat-resistance grade is required to be F class, the winding inter-turn insulation heat-resistant material is required to be H class, and the pillar insulator adopts a solid core rod-shaped, non-magnetic porcelain pillar insulator. The impedance value can be flexibly configured according to different current limits, meeting the requirements of dynamic and short-time thermal withstand currents.
- Measurement equipment**
 NR provides users with two solutions: electronic current transformer and conventional electromagnetic current transformer. The measurement system has high linearity, no residual magnetism and magnetic hysteresis, and the sampling rate is larger than 10kHz.
- Control system**
 The typical configuration of the control system of fault current limiter is as shown in the figure below. It can realize the quick put-into-service and automatic exit of the fault current limiter, the current setting and the time delay setting are settable. Under certain conditions, the enabling or disabling of the fault current limiter can be blocked. It should be equipped with the manual enabling and disabling function of the fault current limiter, the self-supervision function of the status, and the fault recording function, and timely transmits the status and alarm information to the HMI system.

Features

PCS-9571 fault current limiter product is a complete solution for limiting short-circuit current in AC current system. It integrates a series of AC high-voltage measurement, control and protection principles and experience of NR, and it also combines many years of the running experience of high-voltage flexible DC converter valve and hybrid DC circuit breaker etc. power electronic products. It mainly have the following characteristics:

- Comprehensive system-level analysis**
 Relying on the technical accumulation of many professional directions of NR, design from the aspects of power system temporary and steady-state performance, over-voltage analysis and relay protection etc., and reasonably select the fault current limiter configuration scheme to effectively achieve the better current-limiting effect.
- Equipotential design of fast switch and operating mechanism**
 The operating mechanism and the fast switch break are at a high potential, eliminating the insulation parts between each other, effectively increasing the opening and closing speed and increasing the mechanical life.
- High potential isolation power supply**
 The isolation transformer is used for high-potential power supply, which does not depend on the system, so the opening and closing operation when the system line is not powered can be realized.
- Rapid detection and identification of fault**
 It can quickly identify line fault for it integrates high-sampling-rate current transformer, through the high-speed and high-integration control, the criteria based on line current instantaneous value and slope etc., are adopted.
- Compact structure**
 The primary main device only includes the fast switch and the current limiting reactor, and has a small floor space.

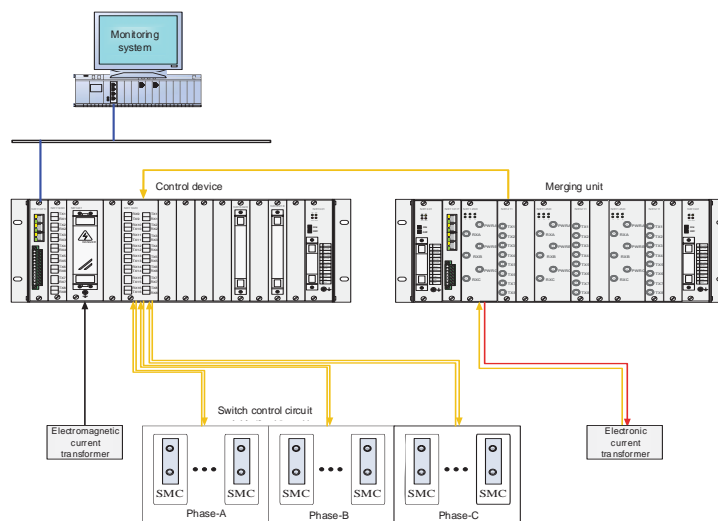


Figure 2 Control System of Fault Current Limiter