REMOTE ISOLATION SWITCH

RIS

Tender specificationGENERALITIES

* Remote Isolation Switch (RIS) equipment allows disconnection of the supplying line (overhead conductor or 3rd rail conductor). It ensure on load making or breaking.
* RIS monitor the voltage on the supplying line in order to inform of the voltage presence. Alarms on voltage threshold allow alerting in case of abnormal deviation. The voltage monitoring system proposed a register of measurements and alarms to study the infrastructure behaviour during the time.
* RIS must be built to resist against outdoor environment, with constraints like heat, cold, snow, humidity, conductive dust, salt mist, thunder…
* The switch-disconnector and other components must be provided in an enclosure.
* To ensure people safety and operation continuity, the enclosure will be vandalism proof.
* Critical components, such as switch-disconnector, voltage monitoring system or the enclosure, are design, manufactured, assembled and tested by the constructor himself.
* RIS is designed and manufactured by an ISO 9001 qualified organisation.
* RIS is compliant to standards from chapter VII.

1. REMOTE ISOLATION SWITCH (RIS)

Remote Isolation Switch (RIS) equipment is constitute by:

* Switch-disconnector, motorized SIRCOMOT DC type or manual SIRCO DC type
* Lockout system of the switch-disconnector operating handle
* Round connectors for switch-disconnector earthing
* Voltage monitoring Diris Digiware DC type
* Safe control interface
* Differentiated compartments 750Vdc and auxiliaries, with secured access
* 750Vdc surge arrester, if not yet available on the line

RIS must especially meet the following requirements:

* Pollution degree (EN 50124)
  + Outdoor application **PD4A**
  + Indoor application **PD3**
* Overvoltage category (EN 50124) **OV4**
* Duty class / overloads (EN 50328) **Class VI**
* Vandalism resistance class (EN 1627) **RC2**

1. SWITCH-DISCONNECTOR
   1. ***Electrical and mechanical characteristics***

The switch-disconnector has been designed and tested according to the electrical and mechanical characteristics required by standard EN 50123-3 and according to operating needs, in particular overload withstand.

* 1. ***Operations***

The switching must be performed by manual and/or motorized operations.

* In the case of a manual control, the handle must allow a lockout up to 3 padlocks.
* In the case of a motorized control, the operation can be carried out remotely or locally by push button. A manual handle must be available for emergency operation. The motorized control must allow a lockout up to 3 padlocks.
* It must not be possible to undertake a manual operation in the motorized position.
  1. ***Switch state monitoring***

The switch-disconnector must communicate its OPEN / CLOSED / FAULT state.

* 1. ***Maintenance***

Earthing spheres must allow each polarity of the switch-disconnector to be connected in order to ensure safe intervention.

To allow a short repair time and maximum operational availability, the switch-disconnector must have self-cleaning contacts and an easily replaceable motor, even on load.

1. VOLTAGE MONITORING
   1. ***Electrical and mechanical characteristics***

The voltage monitoring device must meet the electrical and mechanical characteristics of standard EN 50123-7;

The voltage is measured downstream or upstream + downstream of the switch-disconnector.

* 1. ***Voltage monitoring***

The instantaneous voltage must be measured and registered.

Minimum, maximum and average values ​​are available for an analysis of the voltage behaviour of the infrastructure at the RIS level.

* 1. ***Alarms***

Alarms are communicated for the minimum and maximum voltage values, respectively pre-set at 500Vdc and 900Vdc and configurable.

* 1. ***Consultation***

The instantaneous and historical voltage parameters can be viewed locally on a backlit display.

The alarms are communicated by relays for remote information (supervision, voltage presence light…). Alarms are also available locally on the RIS panel by LED indicators.

* 1. ***Cyber-security***

The voltage monitoring device is protected against cyber-attacks in accordance with standard IEC 62443, with level SL1.

1. CONTROL AND MONITORING INTERFACE
   1. ***Remote control***

The interface allows remote control, via terminal contacts, of the following functions:

* Switch opening
* Closing the switch
  1. ***Local control***

The interface allows local control of the following functions:

* Selection of LOCAL or REMOTE switch-disconnector operation
* Switch opening, by push button
* Switch closing, by push button
* LED indicator test, by push button
  1. ***Remote monitoring***

The interface must remotely signal, by reporting information on terminals / relays, the following parameters:

* 750VDC upstream voltage presence
* 750VDC downstream voltage presence
* switch OPEN
* switch CLOSED
* 230VAC voltage presence
* door open
  1. ***Local monitoring***

The interface must indicate locally, by LED indicators, the following parameters:

* Presence of upstream voltage
* Presence of downstream voltage
* switch OPEN
* switch CLOSED
* switch FAULT
* 230V presence
  1. ***Access***

The interface is protected against direct contact with an IP2X degree of protection.

Local control units are protected against intentional or malicious actions.

1. INTEGRATION WITHIN ENCLOSURE

The components of the Remote Isolation Switch (RIS) equipment are integrated into an enclosure developed and tested by the same manufacturer.

* 1. ***Mechanical characteristics***

The enclosure provides an IP55 degree of protection and is impact protected with an IK10 degree.

The outdoor installation requires the enclosure to be resistant to corrosion, which is justified by tests.

Insulating protections and clearance distances that comply with standards ensure safety against the risk of ignition between active parts and the enclosure.

The environment inside the cabinet is temperature-regulated to face humidity and temperature constraints.

* 1. ***Compartments***

In order to ensure operator safety, the integration is compartmentalized between the elements for traction power (750 Vdc) and the accessory components for control and measurement (<230Vac).

An IP2X ingress protection is ensured between these compartments.

Access to these two compartments is separated by a system of differentiated keys.

A light comes ON automatically when the door opens.

* 1. ***Anti-vandalism***

The enclosure must be protected against the risk of vandalism with a minimum RC2 level, according to standard EN 1627.

1. STANDARDS COMPLIANCE

The Remote Isolation Switch (RIS) equipment must comply with the following standards:

* EN 50123-6: Indoor D.C. switchgear assemblies
* IEC 61439: Low-voltage switchgear and controlgear assemblies
* EN 50123-3: Indoor d.c. disconnectors, switch-disconnectors and earthing switches
* EN 60947-3: Switches, disconnectors, switch-disconnectors and fuse-combination units

A certificate of conformity by an accredited laboratory must be provided.

Must also be considered:

* EN 50121-5: EMC emission and immunity of fixed power supply installations and apparatus
* EN 50122: Electrical safety, earthing and the return circuit
* EN 50124-1: Clearances and creepage distances for all electrical and electronic equipment
* EN 50123-7: Measurement, control and protection devices for d.c. traction systems
* EN 50124-2: Overvoltages and related protection
* EN 50526: D.C. surge arresters and voltage limiting devices
* IEC 60529: Degrees of protection provided by enclosures (IP)
* IEC 62262: Degrees of protection against external mechanical impacts (IK)
* EN 1627 : Burglar resistance - Requirements and classification

1. RAMS data

MTBF: 131 400h (switch-disconnector)

MTTR: 0,5h (switch-disconnector)