**Technical specification for** **330kV circuit breaker**

The technical offer must be prepared according to the substation single-line diagram, which can be found in the substations design order or as a separate document.

1. **Technical requirements**

| **Description** | **Required** | **Offered** |
| --- | --- | --- |
| Quantity  | According to substation single-line diagram |  |
| Rated voltage *(Ur)* | ≥ 362 kV |  |
| Rated frequency *(fr)* | 50 Hz |  |
| Rated continuous current *(Ir)*  | According to substation single-line diagram, but not less than 2000A |  |
| Rated short-circuit breaking current *(ISC)*  | According to substation single-line diagram, but not less than 20kA at tk=3s |  |
| Rated first-pole-to-clear factor *(kpp)* | 1.3 |  |
| Rated out-of-phase making and breaking current *(Id)* | ≥ 5 kA (2.0 p.u.) |  |
| Rated short-circuit making current | ≥ 50 kA |  |
| Rated peak withstand current *(Ip)* | ≥ 50 kA |  |
| Rated line-charging breaking current (*Il*) (at a voltage range factor) | ≥ 315A (1.2 p.u.) |  |
| Rated cable-charging breaking current (*Ic*) (at a voltage range factor) | ≥ 355A (1.2 p.u.) |  |
| Rated power-frequency withstand voltage *(Ud)* to earth and between phases | ≥ 450 kV |  |
| Rated short-duration power-frequency withstand voltage *(Ud)* across the open circuit breaker | ≥ 520 kV |  |
| Rated switching impulse withstand voltage *(Us)* to earth  | ≥ 950 kV |  |
| Rated lightning impulse withstand voltage *(Up)* to earth and between phases | ≥ 1425 kV |  |
| Rated operating sequence | O-0.3s-CO-15s-CO |  |
| Spring operating mechanism | single pole operating |  |
| Mechanical endurance class | M2 |  |
| Rated duration of short-circuit *(tk)* | 3s |  |
| Creepage distance (phase - ground) | ≥ 43.3 mm / kV |  |
| Number of breaks per pole | 2 |  |
| Ambient air temperature range | -40°C up to +40°C |  |
| Intended for out-door installation | yes |  |
| Interruption medium  | pure SF6 |  |
| Gas density monitor with two step signalling connected through self-closing valve | yes |  |
| Gas density monitor with MPa/bar scale | yes |  |
| Gas leakage rate per year | ≤0.5%  |  |
| Gas for the first filling included | yes |  |
| Overpressure relief device per pole | yes |  |
| Flat primary terminals with 4 drillholes positioned in square | yes |  |
| Distance between hole centres of terminals  | 45 × 45 mm |  |
| Composite or porcelain insulator | please specify |  |
| Without steel supporting structures | yes |  |
| Pole columns mounted on hot dip galvanised base frame | yes |  |
| Control voltage for motor, closing and tripping coils | 110 V DC |  |
| Auxiliary voltage for heating of operating mechanisms | 230 V AC |  |
| Number of closing coils | 1 |  |
| Number of tripping coils | 2 |  |
| Motor protection by MCB | yes |  |
| Operating mechanism with limit switch for emergency hand operation | yes |  |
| Operating cycle counter (none-resettable) | yes |  |
| Pushbuttons or switch “on/off” for operation on-site | yes |  |
| Selector switch “local/remote/off” for control variations | yes |  |
| Lettering on pushbuttons and switches should be in Latvian language | yes |  |
| Electrical local-remote control | yes |  |
| Contacts for electrical interlocking | yes |  |
| Terminals for control, motor circuit, earthing and shield | yes |  |
| Disconnectable secondary terminal blocks (e.g., Phoenix URTK) | yes/please specify |  |
| Free auxiliary contacts | ≥ 10 NO, ≥ 10 NC, 1 W |  |
| Marking of all internal wiring in operating mechanism should be made | yes |  |
| Operating mechanism boxes mounted to the steel structure under the pole | yes |  |
| Operating mechanisms situated in lockable non-corroding cast aluminium or stainless-steel boxes with air vent | yes/please specify |  |
| Degree of protection for terminal and operating mechanism boxes | ≥ IP-54 |  |
| Door locking with butterfly nut and possibility for padlock | yes |  |
| Operating mechanism boxes with panel light and 230V socket outlet (CEE 7/7) | yes |  |
| With necessary crank handles | yes |  |
| Connecting cables between pole operating mechanisms boxes and marshelling box should be included in scope of delivery | yes |  |
| To the tender should be attached operating, maintenance and installation manuals in Latvian or English and preliminary drawing of offered equipment | yes |  |
| Circuit breakers must be designed, type tested and passed routine tests before delivery according to IEC 62271-100 | yes |  |
| All nameplates in Latvian | yes |  |
| **Informative part** | **See below** | **Offered** |
| Manufacturer of circuit breaker | please specify |  |
| Type of circuit breaker | please specify |  |
| Type of circuit breaker operating mechanism | please specify |  |
| Country of origin | please specify |  |
| Opening time  | ms |  |
| Brake time  | ms |  |
| Arcing time | ms |  |
| Closing time  | ms |  |
| Total mass of gas  | kg |  |
| Gas nominal pressure at 20°C | MPa/bar |  |
| Approx. total weight of 1 phase-unit | kg |  |
| Anti-condensation heating via thermal relay (if applicable) | W |  |
| Anti-condensation permanent heating | W |  |

**2. Spare parts and special tools**

|  |  |  |
| --- | --- | --- |
| **Description** | **Required** | **Offered** |
| Electric drive motor  | 1 unit |  |
| Tripping and closing coils of each type | 1 set |  |
| Heating element | 3 units |  |
| Auxiliary relays of each type | 1 set |  |
| Operation counter | 3 units |  |
| Necessary lubricants for installing procedure  | yes |  |
| Gas pressure gauge with necessary o-rings for it exchange | 3 units |  |

1. **Technical documentation**

|  |  |  |
| --- | --- | --- |
| **Description:** | **Required** | **Offered** |
| Operations, Maintenance and Installation manuals in Latvian and English in electronical PDF format | Not later than two months before delivery of equipment |  |
| Preliminary drawings of circuit breaker in electronical PDF format:Dimensional drawingRating plate drawingElectrical diagram of operating mechanism  | Within 60 days after signing of Contract |  |
| The corrected drawings of circuit breaker in electronical PDF format:Dimensional drawing (also in .dwg format)Rating plate drawingElectrical diagram of operating mechanism | Within 14 days after Purchaser’s approval diagrams |  |
| Routine test reports in electronical PDF format | On time of circuit breaker delivery |  |
| Technical data sheet according to IEC standard in electronical PDF format |  |

*Note. The filling of circuit breakers with gas, inspection and commissioning will be performed by certified personnel of JSC "Augstsprieguma tīkls".*