**Technical specification for** **110kV combine instrument transformers**

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.

In one project all instrument transformers must have the same type of insulation – either gas or oil!

1. **Technical requirements**

| **Description** | **Required** | **Offered** |
| --- | --- | --- |
| Type of design: gas or paper/oil insulated | yes/please specify |  |
| Measuring transformer hermetically sealed | yes |  |
| Combined metering units shall be accompanied with valid certificate of Latvian National Metrology Centre at the time of delivery | yes |  |
| The supplier must perform the initial verification of the instrument transformers in a laboratory accredited in Latvia in accordance with the Cabinet of Ministers Regulation No. 624 "Regulations Regarding the Procedures for the Metrological Control of Measuring Instruments and the Initial Verification Marks", paragraph 6.*Note: It is permissible for the Factory/Supplier to cooperate with a laboratory accredited in Latvia to provide calibration results and uncertainty, based on which a certificate of initial verification could be issued in the Republic of Latvia.* | yes |  |
| Quantity (for line bays) | According to substation single-line diagram |  |
| Quantity (for transformer bays) |  |
| **Current transformer part** | See below |  |
| **For line bays** | 1-st core accuracy class | According to substation single-line diagram |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 2-nd core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 3-rd core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 4-th core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| Primary current setting changeable in primary part | yes |  |
| **For transformer bays** | 1-st core accuracy class | According to substation single-line diagram |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 2-nd core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 3-rd core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| 4-th core accuracy class |  |
| Rated primary current (*Ipr*) / secondary current (*Isr*) |  |
| Rated output |  |
| Primary current setting changeable in secondary part | yes |  |
| **Voltage transformer part** | **See below** |  |
| **For line bays** | Transformation ratio (*Kr*) | According to substation single-line diagram |  |
| 1-st secondary measuring winding accuracy class  |  |
| Rated output |  |
| 2-nd tertiary earth-fault winding accuracy class |  |
| Rated output |  |
| **For transformer bays** | Transformation ratio (*Kr*) |  According to substation single-line diagram |  |
| 1-st secondary measuring winding accuracy class  |  |
| Rated output |  |
| 2-nd secondary measuring winding accuracy class |  |
| Rated output |  |
| 3-rd tertiary earth-fault winding accuracy class |  |
| Rated output |  |
| **Requirements for gas insulated instrument transformers** | **See below** |  |
| Insulation medium chemical composition | please specify |  |
| Insulation gas GWP≤1 | please specify GWP |  |
| Gas density monitor with two step signalling connected through self-closing valve | yes |  |
| Temperature-compensated gas density monitor with MPa/bar scale | yes |  |
| Gas leakage rate per year | ≤1% |  |
| Gas for the first filling included | yes |  |
| Pressure relief device (rupture disc) | yes |  |
| External thread for gas filling equipment connection | yes/please specify |  |
| **Requirements for paper/oil insulated instrument transformers** | See below |  |
| Insulation medium: Readily biodegradable oil | yes |  |
| Readily biodegradable oil type | please specify |  |
| Oil level indicator | yes |  |
| Leakproof design | yes |  |
| Tested by leak detection | yes |  |
| Stainless steel expansion bellows for oil | yes |  |
| Readily biodegradable oil according to IEC 60296  | yes |  |
| **Common requirements** | See below |  |
| Composite insulators with silicone sheds | yes |  |
| Rated short time thermal current *(Ith)* | According to substation single-line diagram, but not less than 20kA at tk=3s |  |
| Rated dynamic current *(Idyn)* | ≥ 50 kA |  |
| Highest voltage for equipment (*Um*) | ≥ 123 kV |  |
| Rated power frequency withstand voltage *(Ud)* | ≥ 230 kV |  |
| Rated lightning impulse withstand voltage *(Up)* | ≥ 550 kV |  |
| Insulation requirements of secondary terminals | ≥ 3 kV |  |
| Interturn insulation requirements | ≥ 4,5 kV |  |
| Rated frequency (*fr*) | 50 Hz |  |
| Creepage distance (based on Um/√3) | ≥ 43.3 mm / kV |  |
| Ambient air temperature range | -40°C up to +40°C |  |
| Intended for out-door installation | yes |  |
| Instrument transformers shall be designed, type tested and passed routine tests before delivery according to IEC 61869-1 and 61869-4 | yes |  |
| Rated continuous thermal current *(Icth)* | 120% |  |
| Rated voltage factor (continuous) | 1.2 Un |  |
| Rated voltage factor (30s) | 1.5 Un |  |
| Distance between hole centres of terminals  | 45 × 45 mm |  |
| Static withstand load (*F*) (Load class II) | ≥ 3000N |  |
| Terminals for control, earthing and shield | yes |  |
| Feed – through secondary terminal blocks (e.g., Phoenix UT 10) | yes/please specify |  |
| All steel parts – hot-dip galvanised or of stainless steel | yes |  |
| Marking of all internal wiring should be made | yes |  |
| End of VT primary winding (terminal N) should be in terminal box | yes |  |
| Terminal box of non-corroding cast aluminium or stainless steel with air vent | yes |  |
| Secondary cable gland plate undrilled, at the bottom of terminal box | yes |  |
| Terminal box degree of protection (in accordance with IEC 60529) | ≥ IP-54 |  |
| Scheme plate on terminal box cover | yes |  |
| To the tender should be attached operating, maintenance and installation manuals in Latvian or English and preliminary drawing of offered equipment  | yes |  |
| All nameplates in Latvian | yes |  |
| **Informative part:** | See below |  |
| Manufacturer | please specify |  |
| Type No. | please specify |  |
| Country of origin | please specify |  |
| Internal arc fault protection class (Class IA1 or Class IA2) | please specify |  |
| Gas nominal pressure at 20°C | MPa/bar |  |
| Quantity of gas or oil for 1 phase | kg |  |
| Approx. total weight of 1 phase-unit | kg |  |

**2. Spare parts, tools and services**

|  |  |  |
| --- | --- | --- |
| **Description:** | **Required:** | **Offered:** |
| Gas pressure gauge with necessary O-rings for it exchange (only for gas insulatedinstrument transformers) | 3 units |  |
| Oil sampling equipment (only for oil insulated instrument transformer) | 1 set |  |
| For each oil insulated instrument transformer oil DGA should be performed after instrument transformer routine test | yes |  |

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 instrument transformer in electronical PDF format:Dimensional drawingRating plate drawingSecondary terminal box drawingElectrical diagram drawing | Within 60 days after signing of Contract |  |
| The corrected drawings of instrument transformer in electronical PDF format:Dimensional drawing (also in .dwg format)Rating plate drawingSecondary terminal box drawingElectrical diagram drawing | Within 14 days after Purchaser’s approval diagrams |  |
| Routine test reports in electronical PDF format | On time of instrument transformers delivery |  |
| Oil DGA test reports (only for oil insulated instrument transformers) in electronical PDF format |  |
| Technical data sheet in electronical PDF format |  |