| **System** | **Project** | **Equipment** | **The Main Parameters** |
| --- | --- | --- | --- |
| AC System | AC System Frequency | | 50±0.5 Hz |
| 35kV AC Bus Voltage | | 34-37.5kV |
| 132kV AC Bus Voltage | | 125-139kV |
| 500kV AC Bus Voltage | | 475-540kV |
| 500Kv ACF 3-Phase Unbalanced Current | | Section I Alarm (Delay 10s): Primary Value of Ground Current x Balance Coefficient (HP12/24: 0.000388(65mA), SC:0.000472(81mA))  Section II Trip (Delay 120min): Primary Value of Ground Current x Balance Coefficient (HP12/24: 0.000879(148mA), SC:0.001021(185mA))  Section III Trip(Delay 0.02s): Primary Value of Ground Current x Balance Coefficient (HP12/24: 0.001114(187mA), SC:0.001292(234mA)) |
| 500kV Station Transformer | Oil Temperature | 85⁰C I Section Alarm, 95⁰C II Section Alarm |
| Winding Temperature | 105⁰C I Section Alarm, 115⁰C II Section Alarm |
| Oil Level | 5% - 95% |
| Cooler Switching Strategy | Upper oil temperature reach 65⁰C start two set of cooler fan.  When the load exceed 70% of rated capacity (103A) Start two set of cooler fan.  When the upper oil temperature drops to 45⁰C two set of cooler fans all stop. |
| 500kV AC Field | Circuit Breaker | 0.8MPa highest, 0.7MPa rated, 0.62MPa alarm, 0.6MPa blocking (B1Q1, B1Q3, B2Q1, B2Q3, B3Q1, B3Q3, B3Q2, B4Q1, B4Q3, B4Q21, B5Q1, B5Q3, B6Q1, B6Q3)  0.9MPa maximum,0.8MPa rated, 0.72MPa alarm, 0.7MPa blocking (B1Q2, B2Q2, B5Q2, B6Q2, B7Q1, B7Q2) |
| 500kV ACF Field | Circuit Breaker | 0.9MPa maximum,0.85MPa rated, 0.77MPa alarm, 0.75MPa lockout |
| 35kV AC Field | Circuit Breaker | 0.8MPa maximum, 0.7MPa rated, 0.62MPa alarm, 0.6MPa lockout |
| 35kV Transformer | Oil Temperature | 85℃ Ⅰ section alarm, 95℃ Ⅱ section alarm |
| 11kV Dry Type Transformer | Winding Temperature | Fan start temperature 90℃, 130℃ section I alarm, 150℃ section II alarm |
| 10kV, 400V/220V Bus Voltage | | 10.45-11.55kV, 380-420V |
| 230V DC Voltage | | 218.5-241.5V |
| DC System | Extinction Angle | 17±2.5⁰ | Extinction Angle |
| DC Filter | Unbalanced Current | HP12/24: 0.006/10S, HP6/42: 0.006/10S, alarm |
| Converter Transformer | Top Oil Temperature | 85℃ Ⅰ section alarm, 100℃ Ⅱ section alarm |
| Winding Temperature | 100℃ Ⅰ section alarm, 115℃ Ⅱ section alarm |
| Oil Level | Low oil level≦80mm, high oil level≧1850mm |
| Converter transformer Valve side Bushing | SF6 Pressure | 0.24MPa alarm, 0.10MPa trip |
| DC Field | 660kV DC Wall Bushing | 0.57MPa rated, 0.53MPa alarm, 0.50MPa trip |
| DC Voltage Divider | 0.35MPa rated, 0.30MPa section I alarm, 0.27MPa section II alarm, 0.22MPa trip |
| DC Field Circuit Breaker | 0.70MPa rated, 0.62MPa alarm, 0.60MPa lockout |
| Electrode Line | ∣IDEL1－IDEL2∣ | 0.02pu (60.6A) delay 1s alarm, 0.134pu (406.02A) unipolar 2S action, bipolar 1.5S action |
| Mono Pole mode Electrode Line Current | More than 0.6pu (1818A) delay 500ms alarm, delay 120s action |
| Inverter | Trip Condition 1 | The number of damaged thyristor stages in a single valve>5 (redundant number) |
|  | Trip Condition 2 | The number of thyristor stages triggered by over-voltage protection (FOP) in a single valve>9 |
| DC Voltage | Reduced Voltage Operation | 100%, 85%, 70% Adjustable |
| Fire Fighting System | Valve Hall Trip Logic | | At least one very early air sampling detector and at least one ultraviolet detector report a fire alarm;  Very early air-collecting detectors at the fresh air outlet of the valve hall air conditioning and at least two UV detectors report fire |
| Starting Condition of Converter Transformer Spray Valve | | Temperature sensing cable 1 action (or abnormal), Temperature sensing cable 2 action (or abnormal), Three flame detectors have 1 action take two out of three, and the commutation transformer outlet circuit breaker is opened |
| Station Transformer Spray Valve Starting Condition | | When the two sets of temperature sensing cables of the station transformer are both operating (105℃) and the circuit breaker on the high voltage side of the station transformer is opened |
| DGA | Dissolved Gas Analysis Limit  Values | | acetylene <1μL/L, total hydrocarbon <150μL/L, hydrogen <150μL/L |
| Valve Cooling System | Valve Inlet Temperature | | 10℃ Low Inlet Temperature |
| 46℃ High Inlet Temperature |
| 49℃ Inlet Valve Temperature is Extremely High |
| Valve Outlet Temperature | | 61℃ high outlet temperature |
| Temperature Difference Limit between Inlet and Outlet of Valve | | 15℃ high temperature difference between inlet and outlet of valves |
| Cooling Water Flow | | 89L/s is Ultra Low (Trip) |
| 94L/s is Low (Trip) |
| Deionized Water Flow | | 2.50L/s is Low |
| Inlet Valve Pressure | | 0.60Mpa is Ultra Low (Trip) |
| 0.65MPa is Low (Trip) |
| 0.88MPa is High (Trip) |
| 0.92MPa is Very High (Trip) |
| Outlet Pressure | | 0.28MPa is Ultra Low |
| 0.30MPa is Low |
| Cooling Water Conductivity | | 0.5µS/cm High |
| 0.7µS/cm Very High |
| Deionized Water Conductivity | | 0.1µS/cm High |
| Expansion Tank Liquid Level | | 5% Ultra Low (Trip) |
| 15% Low Level |
| 90% High Level |
| Expansion Tank Pressure | | 0.28MPa Very Low |
| 0.30MPa Low |
| 0.40MPa High |
| 0.42MPa Very High |
| Valve Cooling System Leakage | | 0.3%/30s (The temperature change of inlet valve is less than 0.2℃) |