



UGC RECOGNIZED

PDEU PANDIT
DEENDAYAL
ENERGY
UNIVERSITY

Formerly Pandit Deendayal Petroleum University (PDPU)



SCHOOL OF ENERGY TECHNOLOGY

Department of Electrical Engineering

Name of Laboratory : Power System Protection & Switchgear Lab

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NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF FUSE, MCB & ELCB

TECHNICAL SPECIFICATIONS :

- MCB Types: Type B (3–5I_n), Type C (5–10I_n), Type D (10–20I_n)
- MCB Ratings: 6A, 10A, 16A, 20A, 32A (1P & 3P)
- Fuse: HRC cartridge & rewirable types
- ELCB/RCCB: 30mA & 100mA trip sensitivity
- Tripping Time: Programmable / characterised
- Test Panel: Fault injection for each device
- Standards: IEC 60898, IS 8828



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF INVERSE TIME OVER CURRENT RELAYS

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Over-Current Relay (e.g. ABB REF615)
- Characteristic Curves: Normal Inverse, Very Inverse, Extremely Inverse
- Setting Range: Plug Setting Multiplier 0.1 – 2.0 In
- Time Multiplier Setting (TMS): 0.05 – 1.0
- Current Input: 1A / 5A (selectable CT secondary)
- Auxiliary Supply: 24–250V AC/DC
- Communication: IEC 61850, MODBUS RTU
- Standards: IEC 60255

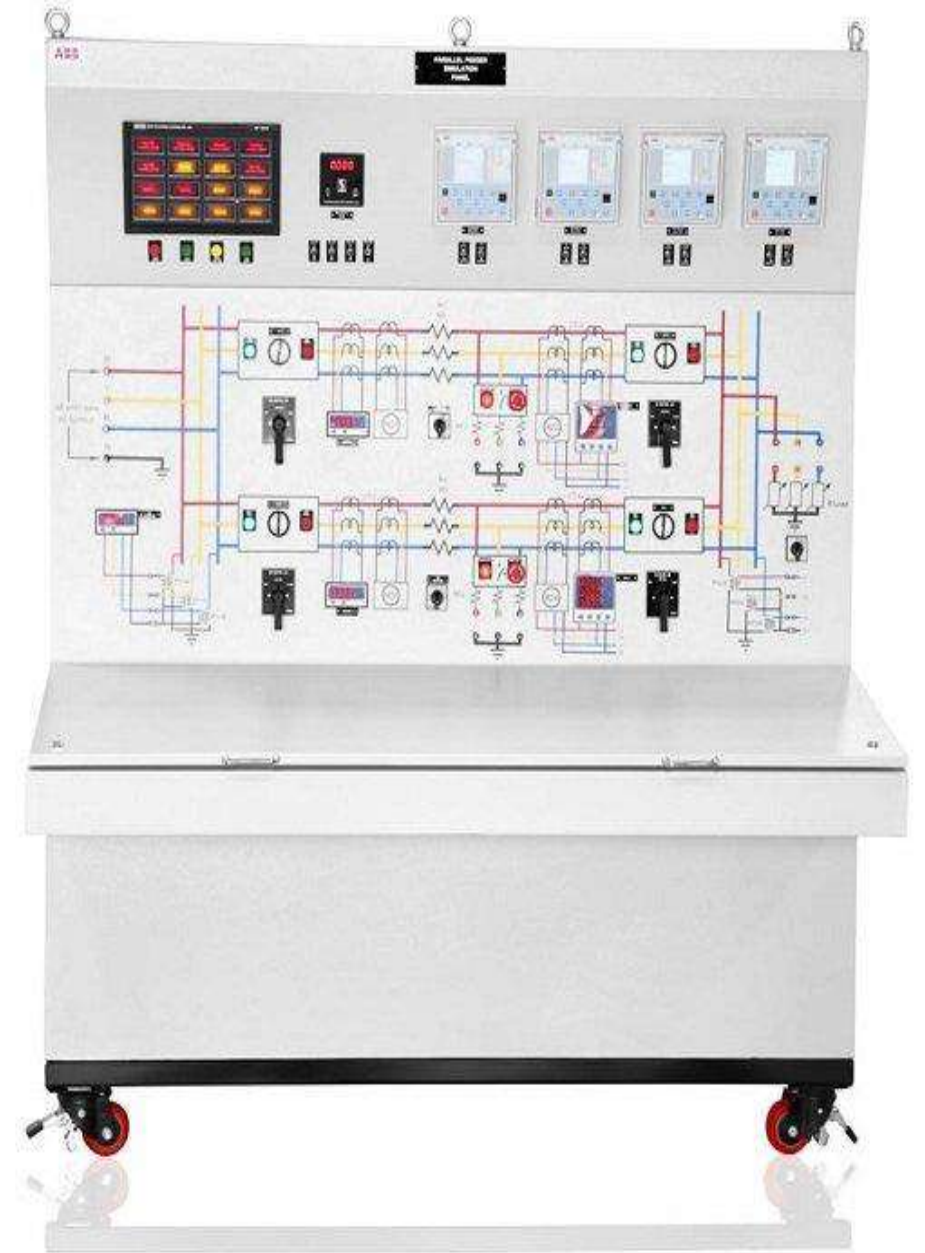


NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF PARALLEL FEEDER PROTECTION. (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Directional O/C Relay (e.g. REF615)
- Function: Parallel feeder protection (directional element)
- Directional Element: Power factor angle 0° – 360° setting
- Fault Types: Phase-to-phase, phase-to-earth
- CT Ratio: 1A/5A secondary
- VT Input: 110V (standard metering VT)
- Trip Output: 2 NO/NC contacts, 5A rated
- Communication: IEC 61850 GOOSE messaging



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF PROTECTION OF INDUCTION MOTOR. (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Motor Protection Relay (e.g. ABB M102-M)
- Protection Functions: Thermal overload, stall, unbalance, short circuit
- Trip Class: Class 10, 20, 30 (programmable)
- Current Sensing: 3-phase CT input, 1A/5A
- Phase Unbalance: Trip at >10% unbalance
- Start Inhibit: Configurable start inhibit timer
- Communication: MODBUS RTU / RS485
- Standards: IEC 60255-8, IS 3231



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF OVER VOLTAGE & UNDER VOLTAGE PROTECTION (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Voltage Protection Relay
- OV Setting: 105% – 130% of nominal (V_n)
- UV Setting: 70% – 95% of nominal (V_n)
- Time Delay: 0.1 – 60s (independent for OV and UV)
- VT Input: 110V (standard VT secondary)
- Trip Output: 2 relay contacts
- Reset: Auto / Manual
- Standards: IEC 60255-27



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF COMPREHENSIVE PROTECTION OF TRANSFORMER. (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Transformer Protection Relay (e.g. RET615)
- Protection Functions: Differential, REF, thermal, O/C, Buchholz
- Differential Element: Biased differential with 2nd harmonic restraint
- Harmonic Restraint: 15% (2nd), 50% (5th)
- CT Ratio: Configurable for both HV & LV sides
- Auxiliaries: Trip, alarm, Buchholz & PRD inputs
- Communication: IEC 61850, IEC 60870-5-103
- Standards: IEC 60255, IS 3231



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF GENERATOR UNIT PROTECTION. (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Generator Protection Relay (e.g. REM615)
- Protection Functions: Differential, loss of excitation, overload, reverse power
- Loss of Excitation: Admittance-based (Mho characteristic)
- Stator Earth Fault: 95% winding coverage
- Reverse Power: Setting 0.5% – 20% rated power
- Sync Check: Voltage, angle & frequency matching
- Communication: IEC 61850 GOOSE
- Standards: IEC 60034, IEC 60255



NAME OF EQUIPMENT :

SET UP FOR CHECKING CHARACTERISTIC & OPERATION OF DISTANCE PROTECTION FUNCTION. (NUMERICAL RELAY)

TECHNICAL SPECIFICATIONS :

- Relay Type: Numerical Distance Protection Relay (e.g. REL670)
- Zones: Zone 1, 2, 3, Reverse Zone
- Characteristic: Quadrilateral / Mho (selectable)
- Reach: Independently settable per zone (Ω primary/secondary)
- Zone 1 Time: Instantaneous ($< 20\text{ms}$)
- Zone 2 Time: 200 – 500ms (coordinated)
- Fault Types: Ph-Ph, Ph-E, 3-Ph
- Communication: IEC 61850, MODBUS, DNP3
- Standards: IEC 60255, ANSI/IEEE C37.113

