

MODULE : TB14

NUMERICAL MOTOR PROTECTION AND MOTOR CONDITION MONITORING

COURSE DESCRIPTION:

HT MOTORS

- Fundamentals of Induction Motor
 - Speed-Torque Characteristics, Equivalent Circuit, Transient Model, V/F Control
- Major Protection Elements
 - Thermal : Motor curves and over load protection, RTD / thermistor for over load protection, practical way to set over load relay when thermal curves are not available
 - Negative Sequence : Setting criteria, DMT and IDMT characteristics.
 - Locked Rotor : Setting criteria for stalling protection. How to set when starting and stalling data are not known.
 - Short Circuit : Extra features available in numerical protection relays.
 - Earth Fault : Application check for solidly grounded and resistance grounded systems; CBCT applications - problems at site during adopting settings; options to set earth fault element depending on magnitudes of starting current and ground fault current.
 - Other Protections : Differential, under voltage, under current, start up (for hot and cold restarts) and rotor open circuit.
 - Typical calculation for numerical motor protection relay settings (SPAM 150C to 7SJ 600)

LT MOTORS

- Recommended protections for LT motors: emerging trends.
- Why MCC incomer trips before motor fuse blows? Problems of relay - fuse co-ordination- Remedial measures-case study.

- Voltage dip and re-acceleration schemes.

- Variable Frequency Drives
 - Selection of motor insulation-design aspects.
 - Shaft voltage, Bearing current-problem and mitigation.
 - Applicable Standards.

- CONDITION MONITORING
 - IR & PI values : Do they adequately characterise insulation healthiness?
 - New techniques in monitoring motor insulation condition:
 - Dielectric absorption test
 - Capacitance and tan delta measurement
 - Partial discharge testing
 - High pot test: DC vs AC
 - Life of motor insulation.