GEC Measurements

RELAY APPLICATION GUIDE

FEEDER PROTECTION

PROTECTION	DETAILS	RELAY TYPE
Differential	Sensitive high speed circulating current scheme. Pilots up to 1000 ohms resistance	DMW
Differential	Modular differential feeder protection Electromagnetic differential: (i) medium speed and two terminal lines teed feeders (ii) high speed and two terminal lines teed feeders	Translay S HO4, HOC4 HOA4, HT DS7, DSF7 DSC8, DSB7
Overcurrent	Directional, inverse time, with voltage or current polarisation Directional definite time, with voltage or current polarisation	CDD CAUD CTU/CTD
Overcurrent	Non-directional, inverse time for phase and earth faults Non-directional, definite time for phase and earth faults	CDG,CTG CAU, CTU
Directional	Polyphase for directional control of overcurrent relays	PCD
High-set	Instantaneous overcurrent for heavy fault currents	CAG13
High-set	Instantaneous overcurrent, immune to offset in transient currents	CAG17 CAG19
Earth fault	To detect very low earth fault currents, definite time delay	CMU CTU15 CTU25
Overcurrent	Definite time, phase and earth faults	CTU
Auto-reclosing	Instantaneous or time-delayed reclosures, standard schemes	VAR
Auto-reclosing	National Committee schemes	VAR29 VAR39 VAR49 VAR79
Auto-reclosing	Delayed reclosure for busbar type stations CEGB TPS 12/12	VAR82F
Negative phase sequence	To detect unbalanced faults on secondary of small teed-off transformers	CAN
Feeder flow alarm	High drop-off/pick-up ratio	CMQ
Insulated systems	Detects capacitance current under earth faults	NSS4 45° leading MTA
Petersen Coil/ High resistance earthed systems	Detects active current under earth faults	NSS4 0° MTA
Breaker failure	Local breaker back-up	CTIG39
Three zone phase fault protection	One YTG31 distance relay comprising three mho measuring units for zones 1 and 2, and three offset mho starting units for zone 3	M3T
Three zone phase and earth fault protection	Two YTG31 distance relay, each comprising three mho measuring units for zones 1 and 2, and three offset mho starting units for zone 3, with one additional case containing the neutral replica impedance	MM3T
Switched three or four zones phase and earth fault protection	One fully cross-polarised mho measuring unit, switched to the correct fault loop impedance by either overcurrent starters or under-impedance starters. Overhead transmission lines Cable feeders	 PYTS PYTC
Modular three zone phase and earth fault protection	Modular self-contained distance protection with 18 comparators, six for each zone of measurement, microprocessor based with a choice of five operating modes: • Basic three zone distance • Zone 1 extension • Permissive underreach • Permissive overreach • Blocking	Micromho
Phase Comparison	Phase Angle Comparison of the fault current at both ends of the line via high frequency carrier	P10

BUSBAR PROTECTION

PROTECTION	DETAILS	RELAY TYPE
Differential	Instantaneous unbiased, circulating current	CAG34, FAC34
Frame leakage	With switchgear lightly insulated from earth	CAG12
Earth fault check	Operated from three residually connected C.T.'s or from one C.T. in neutral connection	CAG14, FAC14, CAG12
Protective scheme supervision	Monitors C.T.'s and interconnecting bus wiring	VTX31

GENERATOR AND GENERATOR/TRANSFORMER PROTECTION

PROTECTION	DETAILS	RELAY TYPE
Differential	Unbiased, with series stablising resistor, for machines above 1 MVA	CAG34, FAC34
Differential	Biased, for machines above 1 MVA with unmatched CT's	DDG31
Differential	Biased, for overall protection of generator transformers	DDGT31
Transverse differential	For machine with split windings	CAG14, DDG11
Overcurrent	Inverse time overcurrent for grading with line protection	CDG11, CDG13, CDG14
Overcurrent	Inverse time, voltage controlled with two operating characteristics	CDV62
Overcurrent	Inverse time, voltage restraint with single voltage dependent characteristic	CDV61
Stator earth fault	Instantaneous for generator and L.V. transformer winding where generator is earthed through resistance or solidly earthed	CAG14, CAG19
Restricted earth fault	Instantaneous, for generator or transformer with C.T. in neutral connection	CAG14, FAC14
Time graded earth fault	For resistance earthed systems, inverse time delay	CDG11
Long time earth fault	For back-up protection or to protect neutral earthing resistor	CDG12
Neutral displacement	For generators earthed through voltage transformer	VDG14, VMU31
Neutral displacement	Definite time relay	VMU21, VMU22
Overvoltage	Protection against overspeed on hydroelectric generators	VTIG12, VTU21, VTU31
Interlocked current	Back-up protection against faults between C.T.'s and circuit breakers where overlapping protection is not possible	PDI
Under power	Interlocked protection against overspeed	WCD12/VAT11
Rotor earth fault	Thyristor excitation systems	DBAE4
Rotor earth fault	D.C. shunt excitation systems	VME
Negative phase sequence	Protection against rotor heating due to unbalanced loads	CTN
Field failure	Detects reduction of field below machine stability limit (Mho characteristic)	YCGF11/VAT
Reverse power	Interlocked protection against overspeed or primary protection against motoring	WCD11/VAT11
Reverse power	Protection of diesel generators against motoring; inverse time	WDG11
Reverse power	Detects motoring conditions in diesel alternators and back-pressure turbines. Definite time characteristics	WCG
Back-up impedance	Back-up protection of large generator and generator transformer units, single step	ZMG31/VAT11
Reverse power/load shedding/ overload	Protective relays for small marine diesel generators	CWTG

TRANSFORMER PROTECTION

PROTECTION	DETAILS	RELAY TYPE
Differential	Biased, for transformers	DDT32
Differential	Biased, with second harmonic restraint against inrush currents	DMH31, DMH32, DTH31, DTH32
Overcurrent	Inverse time overcurrent, non-directional	CDG
Overcurrent	Inverse time overcurrent, directional	CDD
Earth fault	Restricted, for faults in transformer windings	CAG14, FAC14
Earth fault	Inverse time overcurrent	CDG11
Neutral displacement	For transformers with delta windings	VDG12, VMU22
Earth fault	Long time delay for back-up protection of earthing resistor	CDG12
Temperature	Protection, control and indication	TTT
Back-up impedance	Back-up impedance for large auto-transformers; single step for phase and earth faults. Mho/offset mho characteristic	MM1T
Overfluxing	Detects overfluxing conditions in generator/transformers	GTT