TABLE OF DISTANCE RELAYS

This tabulation of distance relays lists most of the common types that are currently available. Obsolete relay models are listed in Table 6, along with the nearest replacement model.

The tabulation provides a description, the most typical ratings and ranges available, and the principal application of the relay. Where applicable, the minimum reach taps and the maximum reach are shown. For example, 1/2/3-30 describes the reach of a relay with minimum reach taps of 1, 2, and 3 ohms with a maximum setting of 30 ohms on the three ohm tap. The maximum torque angle (angle of maximum reach) for the given reach range is listed since the reach will be different at another angle. Where applicable, the range of adjustment of the angle of maximum reach is given. Maximum reach angles are given in degrees lag, except as noted.

Tabulations are as follows:

TABLE 1	CEB, CEH, CEX
TABLE 2	CEY, CEYG
TABLE 3	GCX, GCXG
TABLE 4	GCXY, GCY
TABLE 5	SLY, SLYG
TABLE 6	Obsolete models and replacements

All distance relays covered by this publication are drawout case component relays suitable for switchboard mounting. Refer to other General Electric Company publications for information on distance relays and modular systems suitable for 19 inch rack mounting.

TABLE 1

TYPE CEB, CEH, CEX ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
CEB51A	Single-phase offset mho blocking relay	3-30 ohms at 60°, 60-75° 0-4 ohms offset in one ohm steps	To coordinate with other mho units to provide out-of-step blocking
CEB51B	Single-phase offset mho relay	3-30 ohms at 60°, 60-75° 0-4 ohms offset in one ohm steps	Phase distance relay for generator backup protection
CEB52A	Zone packaged three phase offset mho relay, zone 3	1/2/3-30 ohms at 75°, 60-75°, 0/0.5-ohms offset	Zone 3 phase protection or carrier start in a directional comparison scheme
CEH51A	Single-phase offset mho unit	5-50 ohms at 90° lead, offset so as to exclude R-X origin, 0/0.5/1/2.5/4 ohms or 0/2.5/5/12.5/20 ohms	Generator loss of excitation relay
CEH52A	Two single-phase offset mho units with timer and two auxiliary units	10-100 ohms at 90° lead (both units), offset so as to exclude R-X origin, 0/0.5/1/2.5/4/5.5/6 (both units)	Generator loss of excitation relay
CEX57D	Two single-phase angle impedance units with opposite polarity	0.5/1.5/3-30 ohms at 5-35° lead	Used as blinder units with phase mho units
CEX57E	Two single-phase angle impedance units with opposite polarity	Same as CEX57D, except different wiring	Used with GSY51A for generator out-of-step tripping
CEX57F	Two single-phase angle impedance units with opposite polarity	Same as CEX57D, except four milliseconds pickup time on auxiliary unit	Used as blinder units with phase mho units

TABLE 2

TYPE CEY, CEYG ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
CEY51A	Zone packaged mho distance relay, zone 1, three phase	0.75/1.5/3-30 ohms at 60°, 60-75° 0.375/0.75/1.5-15 ohms at 60°, 60-75° 0.2/0.4/0.8-8 ohms at 60°, 60-75°	Zone 1 phase protection for transmission lines
CEY51B	Same as CEY51A, except for seal-in circuit wiring	0.75/1.5/3-30 ohms at 60°, 60-75°	Zone 1 phase protection for transmission lines
CEY52A	Zone packaged mho distance relay, zone 2, three phase	0.5/1/1.5-15 ohms at 60°, 60-75° 1/2/3-30 ohms at 60°, 60-75°	Zone 2 phase protection for time delay backup or in pilot relay scheme
CEY53A	Single zone single-phase mho distance relay	0.75/1.5/3-30 ohms at 75° 1.5/3/6-60 ohms at 75°	Connected at reactor terminals to detect internal phase faults
CEY54A	Zone packaged mho distance relay, zone 2, three phase	1/2/3-30 ohms at 60°, 60-75°	Zone 2 phase protection for time delay backup or in pilot relay scheme. Three normally open contacts connected in parallel.
CEY56A	Same as CEY54A, except contacts arranged per obosolete relay CEY16A	1/2/3-30 ohms at 60°, 60-75°	
CEY61A	Same as CEY51A, except both normally open and normally closed contacts are present	0.75/1.5/3-30 ohms at 60°, 60-75°	Zone 1 phase protection for transmission lines
CEYG51A	Three single-phase mho units for ground protection. Quadrature polarized with zero sequence current compensation	1/2/3-30 ohms at 60°, 60-75°	Ground distance relay for pilot relaying schemes or zone 2 backup

TABLE 2 (con't)

TYPE CEY, CEYG ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
CEYG51B	Same as CEYG51A, except no target/seal-in	1/2/3-30 ohms at 60^{o}, 60-75^{o}	Ground distance relay for pilot relaying schemes or zone 2 backup
CEYG52A	Three single-phase mho units for zone 1 ground protection. Phase-to-ground polarization with zero sequence current compensation	0.375/0.75/1.5-15 ohms at 60^{o}, 60-75^{o} 0.75/1.5/3-30 ohms at 60^{o}, 60-75^{o}	Zone 1 ground distance rely. Unit resistive coverage limited to R-X plot of steady state characteristic
CEYG53A	Three single-phase mho units for zone 1 ground protection. Median polarized with zero sequence current compensation.	1/2/3-30 ohms at 60^{o}, 60-75^{o} 2/4/6-60 ohms at 60^{o}, 60-75^{o}	Ground distance relay for pilot relaying schemes or zone 2 backup

TABLE 3

TYPE GCX, GCXG ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
GCX51A	Phase packaged reactance distance relay. Mho third zone and supervision. Reactance zones 1 and 2.	Mho: 1-4 ohms at 60°, 60-75° Ohm: 0.25/0.5/1-10 ohms --- Mho: 2.5-10 ohms at 60°, 60-75° Ohm: 0.25/0.5/1-10 ohms -or- 0.5/1/2-20 ohms	Phase distance relay for short transmission lines and where arc resistance is a significant portion of the total impedance
GCX51B	Same as GCX51A, except for inclusion of overcurrent fault detector	Mho/ohm similar to GCX51A 1-4, 2-8, 4-16, 10-40 amp ranges for overcurrent function	Overcurrent detector intended to prevent operation for loss of potential
GCX51F	Same as GXC51B, except with special wiring to be electrically and mechanically interchangeable with GCX17B	Similar to GCX51B	To replace obsolete relays without having to rewire panels
GCX51H	Same as GCX51A, except for 75° angle of maximum torque setting	Mho: 2.5-10 ohms at 60°, 60-75° Ohm: 0.25/0.5/1-10 ohms	
GCX51M	Modified design to replace GCX51A short reach models	Mho: 1-4 ohms at 60°, 60-75° Ohm: 0.1/0.2/0.4-4 ohms	Phase distance relay for very short transmission line applications
GCX51N	Modified design to replace GCX51B short reach models	Mho/ohm similar to GCX51M 2-8, 4-16, 10-40 amp overcurrent	Very short line phase distance relay with overcurrent detector
GCX51P	Modified design to replace GCX51F short reach models	Similar to GCX51N, except special wiring per GCX17B	To replace obsolete relays on very short lines
GCX51R	Modified design to replace GCX51H short reach models	Same as CGX51M, except 75° maximum torque setting	

TABLE 3 (Cont'd)

TYPE GCX, GCXG ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
GCXG51A	Phase packaged reactance distance relay. Mho third zone and supervision. Reactance zones 1 and 2. Quadrature polarized.	Mho: 1/3-30 ohms at 60° Ohm: 0.1/0.2/0.4-4 ohms -or- 0.25/0.5/1-10 ohms --- Mho: 2/6-60 ohms at 60° Ohm: 0.5/1/2-20 ohms	Ground distance relay for transmission line applications. Ohm unit has zero sequence current compensation for the protected line and for the mutual coupling of a parallel line.
GCXG53A	Same as GCXG51A, except mho unit is median polarized and has provision for zero sequence current compensation.	Similar to GCXG51A	Particularly applicable for longer lines where ground fault impedance is a less significant portion of the total impedance.

TABLE 4

TYPE GCXY, GCY ELECTROMECHANICAL DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
GCXY51A	Phase packaged reactance and mho relay, 4 zones. Zones 1 and 2 reactance, zone 3 mho, and zone 4 offset mho	Mho: 1/2/3-12 ohms at 60°, 60-75° Offset mho: 3-30 ohms at 75° 0/0.5 ohms offset Ohm: 0.1/0.2/0.4-4 ohms -or- 0.25/0.5/1-10 ohms	Phase distance relay for short line section followed by long line section. Zone 4 may be used in forward or reverse direction.
GCY51A	Phase packaged mho distance relay. Three zones: M1, M2, and OM3:	M1: 0.75/1.5/3-30 ohms at 60°, 60-75° M2: 1/2/3-30 ohms at 60°, 60-75° OM3: 3-30 ohms at 75°, 0/0.5 ohms offset	Three zone phase distance protection for longer transmission lines. Also used in directional comparison schemes.
GCY51C	Same as GCY51A	Same as GCY51A, except special wiring. All potential circuits connected to studs 17-18, and OM3 current circuits reversed on studs 5, 6-9, 10	Mechanically and electrically interchangeable with GCY12A used in a directional comparison blocking scheme
GCY51D	Same as GCY51A	Same as GCY51A, except: M2: 1/2/3-30 ohms at 75°	Zone 2 has 75° maximum torque angle to reduce interference with load or swings.
GCY51F	Single phase, two-step mho. M1 with reverse offset and M2 with forward offset.	M1: 0.75/1.5/3-30 ohms at 75° 0/0.5 ohms offset M2: 1/2/3-30 ohms at 75° 0/1/2/3/4 ohms offset	Figure eight R-X characteristic for very long lines to reduce interference with load or swings.
GCY51H	Same as GCY51A	Same as GCY51A, except all units set at 75° maximum torque angle.	Similar to GCY51D.

TABLE 5

TYPE SLY, SLYG (DRAWOUT CASE) STATIC DISTANCE RELAY TABULATION

MODEL	DESCRIPTION	TYPICAL RATINGS AND RANGES	PRINCIPAL APPLICATION
SLY81A	Zone packaged mho distance relay, zone 1 or zone 2, three phase	0.1/0.2/0.4-4 ohms at 85° 0.75/1.5/3-30 ohms at 85° DC power: 48, 125, 250 volts DC	Zone 1 or zone 2 overreaching pilot zone phase protection for transmission lines. A separate relay is required for each zone.
SLY81B	Same as SLY81A, except an out-of-step blocking circuit is included.	Same as SLY81A	Same as SLY81A, but where out-of-step blocking is required.
SLY82A	Zone packaged offset mho distance relay, zone 3, three phase	0.75/1.5/3-30 ohms at 85° 3.75/7.5/15-150 ohms at 85° 10/20/30% reverse offset DC power: 48, 125 volts DC	Used as the blocking relay - zone 3 - in a blocking scheme when an SLY81A relay is used as the overreaching trip relay.
SLY92A	Zone packaged offset mho distance relay, single zone, three phase. AC voltage shifted 30° leading by internal circuitry.	0.75/1.5/3-30 ohms at 75° 10/20/30% reverse offset DC power: 48, 125 volts DC	Special purpose relay designed for use where a delta-wye or wye-delta transformer bank exists between the relay location and the protected line. Well suited for application in unit generator schemes to provide backup protection against phase faults on the adjacent system
SLYG81A	Zone packaged mho distance relay, zone 1 or zone 2, three phase	0.1/0.2/0.4-4 ohms at 85° 0.75/1.5/3-30 ohms at 85° Zero sequence impedance angle at 75° DC power: 48, 125, 250 volts DC	Zone 1 or zone 2 overreaching pilot zone for ground fault protection on transmission lines. A separate relay is required for each zone.
SLYG82A	Zone packaged offset mho distance relay, zone 3, three phase	0.75/1.5/3-30 ohms at 85° Zero sequence impedance angle at 75° 10/20/30% reverse offset DC power: 48, 125 volts DC	Used as the blocking relay - zone 3 - in a blocking scheme when an SLYG81A relay is used as the overreaching trip relay.

TABLE 6
OBSOLETE MODELS AND NEAREST REPLACEMENTS

MODEL	REPLACEMENT	COMMENTS
CEB12A	CEB51A	
CEB12B	CEB51A	
CEB12C	CEB51B	
CEB13B	CEB52A	
CEB13C	SLY92A	
CEB13G	CEYG51A	
CEB15A	*	Special application only
CEB16A	CEB52A	CEB52A is a functional replacement
CEB16B	CEB52A	CEB52A is a functional replacement
CEB17A	CEB52A	
CEX17D	CEX57D	
CEX17E	CEX57E	
CEX17F	CEX57F	
CEX17G	*	
CEX19A	*	
CEX20A	*	
CEX20B	*	
CEXG19A	*	
CEXG20A	*	
CEY12A	CEY51A	
CEY15A	CEY51A	
CEY16A	CEY52A	
CEY16G	CEYG51A	
CEY20A	CEY52B	
CEY20B	CEY52B	
CEYB52A	CEY52A/CEB52A	
GCX51D	*	
GCX51E	*	
GCX51J	GCX51B	
GCX51K	GCX51B	
GCX51L	*	
GCXG51C	GCXG51A	
GCXY11A	GCXY51A	Functional replacement
GCY11A	GCY51A	
GCY12A	GCY51A	
GCY12C	GCY51A	Functional replacement
GCY13A	GCY51A	Functional replacement
GCY13C	*	
GCY15A	GCY51F	
GCY51E	*	
GCYG51A	*	

*Refer to factory

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