DEVICE FUNCTION NUMBERS

DEFINITION

To provide a means of quickly grasping the main purpose of any device used as part of an electrical system, nomenclature known as "device function numbering" has been devised. It provides assignment of a standard number to each of the several fundamental functions performed by the component elements of a complete system.

These device functions may refer to the actual function the device performs or may refer to the electrical or other quantity to which the device is responsive. There may be in some instances a choice of the function number used for a given device. The preferable choice, in all cases, is the one which is recognized to have the narrowest interpretation so that it most specifically identifies the device to all individuals concerned with the design and operation of the system.

The device function numbers with appropriate suffix letter or letters, where necessary, are used on electrical diagrams, in instruction books and in specifications.

LISTED NUMBERS

These numbers are from the USA Industry Standard ANSI C37.2 and are those numbers commonly used in protective relaying.

Device Number	Function Description	Device Number	Function Description
2	Time-delay Starting or Closing	52	Ac Circuit Breaker
15	Speed or Frequency Matching	59	Overvoltage
21	Distance	60	Voltage or Current Balance
24	Overexcitation	62	Time-delay Stopping or Opening
25	Synchronizing or Synchronism-check	63	Gas Pressure or Vacuum
27	Undervoltage	64	Apparatus Ground Detection
30	Annunciator	67	Ac Directional Overcurrent
32	Directional Power	68	Blocking
37	Undercurrent or Underpower	74	Alarm Initiation
38	Machine Bearing	78	Phase-angle or Out-of-Step
40	Machine Field	79	Ac Reclosing
46	Reverse-phase or Phase-balance Current	81	Frequency
47	Phase-sequence Voltage	85	Carrier or Pilot-wire Receiving
49	Machine or Transformer Thermal	86	Locking-out
50	Instantaneous Overcurrent	87	Differential
51	Ac Time Overcurrent	94	Tripping Initiation

Device Number Suffix	Function Description	Device Number Suffix	Function Description
AC	Alternating Current	M	Motor
B	Bus	N	Neutral or Ground
BF	Breaker Failure	R	Reactor or Motor Running
DC	Direct Current	RI	Reclose Initiate
F	Frequency or Machine Field	S	Synchronizing or Starting
G	Generator or Transmission Line Ground	T	Transformer
GACT	Ground Auxiliary Current Transformer	TC	Torque Control
GC	Ground Current	V	Voltage
GS	Ground Sensor	V/Hz	Volts per Hertz
L	Line	X	Auxiliary

GE Protective Relays

GENERATOR PROTECTION

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
21	System Back-up to Distance Line Relays:			
	Distance Relay, Three Phase	SLY82A	1	3
		or SLY92A	1	3
21X	Distance Relay, Single Phase	or CEB51B	3	3
	and Auxiliary Timer	and SAM203	1	6
	(alternative: Device Number 51V)			
24	Overexcitation, Volts/Hertz, Single Phase	STV	1 or 2	11
25	Synchronizing or Synchronism Check,			
	Single Phase	GXS	1	9
25X	Manual Synchronizing Supervision of GXS Relay	NAA30	1	3
27B and 27G	Undervoltage, Bus and Generator, Two			
	Single-phase Units (synchronizing)	NGV12A	1	11
		TOV	1	11
32	Directional Power (anti-motoring):			
	Single Phase (E/M)	ICW	1	4
	Three Phase (E/M)	GGP	1	10
	Single Phase (S/S)	TCW	1	4
38	Bearing Overtemperature, Single Element for RTD	IRT	1	5
40	Field Relay (loss of excitation), Single Phase	CEH	1	10
46	Negative Sequence Time Overcurrent	SGC	1	10
49	Machine Stator (overheating):			
	Single Element for RTD	IRT	1	5
	Three Element Current	or THC	1	5
	Single Element Current	or TMC	1 or 2	5
49 and other functions	Microprocessor-based Small Generator Relay System Consisting of: 46 - Current Unbalance or Phase Reversal (Negative Sequence) Protection 49 - Thermal Image Protection 51 - Phase Fault Protection 51G - Ground Fault Protection	MGC	1	10
50/51 or 51	Phase Overcurrent, Single Phase	IFC	3	2
		or IAC	3	2
		or SFC	3	2
		or DIAC/DIFC/DSFC	3	*
50/51N or 51N	Ground Overcurrent, Single Phase	IFC	1	2
		or IAC	1	2
		or SFC	1	2
		or DIAC/DIFC/DSFC	1	*
50/51 and/or 50/51N	Phase and Ground Overcurrent	MIC	1	2
	Single Phase or Three Phase	or TOC	1	2
	Three Phase and Ground	MDP or SR735	1	*

** Refer to Catalog Volume 1*

GENERATOR PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
51V	System Back-up to Overcurrent Line Relays: Overcurrent-voltage Restraint, Single Phase . . . . . . Overcurrent-voltage Control, Single Phase . . . . . . (Alternative: Device Number 21)	 IFCV IFCS	 3 3	 10 10
59	Phase Overvoltage, Single Phase	IFV71 IAV71 TOV	1 1 1	11 11 11
60	Voltage Balance, Potential Transformer Blown Fuse Three Phase	 CFVB	 1	 11
61	Machine Split Phase Current Balance, Single Phase	 IFC or IAC or DIAC/DIFC/DSFC	 3 3 3	 2 2 *
64F	Machine Field Ground	PJG	1	10
64G	Machine Stator Ground, Single Phase	IFV51KD or IAV51K	1 1	11 11
	100% Stator Ground	SGR	1	*
78	Out-of-Step, Single Phase	CEX57E and GSY51A	1 1	10 10
78	Out-of-Step (power swing) Modular System	OST	1	3
	See Description, Transmission Line, Device 78, Type OST and for ALPS	 ALPS	 1	 *
81	Frequency, Single Phase, Single or Dual Setpoint Up to Four Setpoints	 SFF, MFF or DFF	 1 1	 11 *
86	Lockout Auxiliary	HSA or HEA	1 1	7 7
87G	Machine Differential, Single Phase	CFD or IJD52A	3 3	6 6
Multifunction	Microprocessor-based Large Generator Relay System Consisting of: • 21 Distance Back-up Protection (Opt.) • 24 Overexcitation Protection • 27 Undervoltage (Optional) Protection • 27TN Harmonic Undervoltage (Opt.) • 32 Reverse Power Protection • 40 Loss-of-Excitation Protection • 46 Current Unbalance Protection • 51GN Neutral Overcurrent (Opt.) Protection • 51V Voltage-resistant Overcurrent Protection • 59 Overvoltage Protection • 60 VT Fuse Failure Detect • 64G Stator Ground Protection (100% Optional) • 81 U/O Under-/Over-frequency Protection • 87G Stator Differential Protection Additional Features: • Oscillography Capture (Optional) • Communications Interface • Printer Output (Optional)	DGP	1	*
		** Refer to Catalog Volume 1*		

GE Protective Relays

GENERATOR PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunction	Microprocessor-based Small/Medium Generator Relay System Consisting of: • 12 Overspeed • 24 Overexcitation • 27 Undervoltage • 27 Third TN Harmonic Undervoltage (100% Ground) • 32 Reverse Power • 38 Bearing Overtemperature • 40Q Loss of Field • 46 Negative Sequence Overcurrent • 49 Stator Overtemperature • 50BF Breaker Failure Detection • 51GN Ground Overcurrent • 51V Voltage Restrained Overcurrent • 59 Overvoltage • 60 VT Fuse Failure Detection • 64G Stator Ground • 81U/O Over- and Under-Frequency • 87G Phase Differential Additional Features: • Oscillography Capture • Communications Interface • Analog Outputs	SR489	1	*

TRANSFORMER PROTECTION

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
24	Overexcitation, Volts/Hertz, Single Phase	STV	1	11
32	Directional Power, Sensitive High-Speed, Three Phase	CCP13E and Optional SAM	1 1	4 6
50/51	Phase Overcurrent, Single Phase: Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	3 3 3 3	2 2 2 *
50/51 and/or 50/51N	Phase and Ground Overcurrent Single Phase or Three Phase . . . . . Three Phase and Ground	MIC or TOC MDP or SR735/737	1 1 1	2 2 *
50/51 50/51N	Overcurrent, Phase and/or Ground Multifunction System Combinations. See Description Distribution Feeder, Multifunction Device	DFM or DFP100 or DFP200 or SR750/760	1 1 1	* * *
		* *Refer to Catalog Volume 1*		

GE Protective Relays

TRANSFORMER PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
50/51N	Ground Overcurrent: Time, Inverse, Very Inverse, or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	1 1 1 1	2 2 2 *
59V/Hz	Overexcitation, Volts/Hertz, Single Phase	STV	1	11
61	Exciting Windings of Regulating Transformer, (transformer with load ratio control)	IJC52	1	2
63X	Transformer Pressure Relay Auxiliary (to pressure relay on transformer)	HAA16 or STA	1 1	7 2
86	Lockout Auxiliary	HSA or HEA	1 1	7 7
87T	Transformer Differential, Single Phase, Harmonic Restraint, Percentage Type	BDD or STD	3 3	6 6
	Induction Disk, Percentage Type	IJD53C	3	6
87N	Sensitive W/R Winding Ground Differential, (for Low Impedance Grounded Transformer Neutral).	IFD51D	1	6
87N	Residual or Differential Ground, High Impedance	PVD or SBD	1 1	6 6
Multifunction	Microprocessor-based Small/Medium/Large Transformer Relay System Consisting of: • 87 Percent Harmonic Restrained Overcurrent (2, 3, or 4 Restraint Windings) • 87/50 Unrestrained Differential Instantaneous Overcurrent Additional Features: • Internal Phase Shift Compensation • Oscillography Capture • Communications Interface • Present Value Metering • Test Plugs (Optional)	DTP	1	*
Multifunction	Microprocessor-based Small/Medium/Large Transformer Relay System Consisting of: • 87 Percent Harmonic Restrained Current Differential (2 or 3 Restraint Windings) • 87/50 Unrestrained Differential Instantaneous Overcurrent • 24 Overexcitation • 46 Negative Sequence Overcurrent • 50/51 Phase Overcurrent for each Restraint Winding Input • 50G/51G Ground Overcurrent • 50N/51N Neutral Overcurrent • 81U/O Under-and Over-Frequency • 87TG Restricted Ground Fault Differential	SR745	1	*
		* *Refer to Catalog Volume 1*		

TRANSFORMER PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
Multifunction (cont.)	Additional Features: • Internal Phase Shift Compensation • Dynamic CT Ratio Mismatch Correction • Adaptive Time O/C Curves due to Harmonics • Oscillography Capture • Communications Interface • Present Value Metering	SR745 (Continued)		

BUS PROTECTION

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
86	Lockout Auxiliary	HSA or HEA	1 1	7 7
87B	Bus Differential, Single Phase	PVD or SBD or IFD52B or NBD	3 3 6 3	6 6 6 6
87B	Bus Bar Modular System for Single Bus, Double Bus or Breaker-and-a-Half . . . . Each System Includes: • High Speed Operation for Internal Fault • Security for Severe External Fault When One Line Current Transformer Saturates • Compensation for Current Transformers of Different Ratio, Characteristics and Not Dedicated to Bus Protection • Independent Trip and Alarm Per Line Optional Additions • Per Line Trip Overcurrent Supervision • Per Line Breaker Failure • Testing System During Normal Operation	BUS1000	1	*

BREAKER FAILURE PROTECTION

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
5QBF	Breaker Failure, Three Phase and Ground with Internal Timer . . . . Breaker Failure, Three Phase and Ground with External Timer	SBC223 CHC11A or CHC15A and SAM or DBF	1 1 1 1 1	2 2 2 6 *
50BF	Breaker Failure, Two Phase and Ground with External Timer	CHC21 and SAM	1 1	2 6
50BF Optional 59	Breaker Failure Backup Modular System for Single-bus Single Breaker, Double-bus Double Breaker, Breaker-and-a-Half, or Ring Bus Each System Includes: • Model Selection for Breaker Tripping of - Three-pole - or Single-pole • Selectable Retripping of Faulted Breaker Before Back-up Tripping • Selectable Input Control • Adjustable Time-delay Tripping Optional Additions • Two Independent Timers for Other Applications • Line Overvoltage. See Description, Transmission Line, Device 59, Type SBC9000	SBC9000		Consult Factory

** Refer to Catalog Volume 1*

GE Protective Relays

SHUNT REACTOR PROTECTION

50/51	Phase Overcurrent, Single Phase: Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	3 3 3 3	2 2 2 *
50/51 50/51N	Overcurrent, Phase and/or Ground Multifunction System Combinations. See Description Distribution Feeder, Multifunction Device	DFM or DFP100 or DFP200 or SR750/760	1	*
50/51N	Ground Overcurrent: Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	1 1 1 1	2 2 2 *
50/51 and/or 50/51N	Phase and Ground Overcurrent Single Phase or Three Phase . . . . . . Three Phase and Ground	MIC or TOC MDP or SR735/737	1 1 1	2 2 *
86	Lockout Auxiliary	HSA or HEA	1 1	7 7
87R	Reactor Three-phase Differential, Single Phase	CFD or IJD52A or PVD or SBD or CEY53A	3 3 3 3 3	6 6 6 6 3
	NOTE: For Reactor Single Phase Differential, Quantity is 1			

TRANSMISSION LINE PROTECTION

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunctions	Microprocessor-Based Digital Relay System with Algorithms to provide High Speed HV and EHV Line Protection and fault location, Applicable for: • Series Compensated (Opt.) or Uncompensated Lines • Long or Short Lines • Single or Double Circuit Lines • High Ground Fault Resistance Each System Includes: • Model Selection for Breaker Tripping of - Three-pole - or Single-pole • Four Zones of Phase and Ground Distance Functions • Ground Directional Overcurrent • Phase and Ground Overcurrent Back-up • Overvoltage and Undervoltage • Multiple Setting Groups • Selectable Scheme Logic 1. Stepped Distance 2. Permissive Overreaching Transfer Tripping 3. Permissive Underreaching Transfer Tripping 4. Directional Comparison Blocking with Reverse Zone 4 Timer 5. Hybrid	ALPS	1 per line end	*
		* *Refer to Catalog Volume 1*		

GE Protective Relays

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
Multifunctions (Continued)	• User Configurable Logic via Expression Builder Software • Out-of-Step Blocking and Optional Out-of-Step Tripping • Close-onto-Fault (line pick-up) • Potential Transformer Fuse Failure Alarm • Optional Four Shot Reclosing • Direct Transfer Trip • Communication Interface • Oscillography Capture	ALPS (Continued)		
Multifunctions	Microprocessor-Based Digital Relay System with Algorithms to provide line protection and fault location, Applicable for: • Uncompensated Lines • Single or Three Pole Tripping • Long or Short Lines Each System Includes: • Four Full Zone Phase and Ground Distance • Ground Directional Overcurrent • Line Pick-up Protection • Line Overload Detection • Out-of-Step Blocking • Fuse Failure Detection • Remote Open Detection • Fault Locator/Fault Reporting • Oscillography Data/Events Reporting • Self Test/Diagnostics Optional Features Include: • Integral Keypad-STD DLP-D • Integral Test Plugs DLP-C • SCADA Interface for Remote Fault Location Indicator STD DLP-D • Two Shot Recloser	DLP-C or DLP-D	1 per line end 1 per line end	3 *
Multifunctions	Line Polyphase Modular System with Positive, Negative and Zero Sequence Measuring Functions (GE time proven line end SLYP-SLCN technology with new design and techniques), Applicable for: • Series Compensated or Uncompensated Lines • Long or Short Lines • Single or Double Circuit Lines • High Ground Fault Resistance Each System Includes: • Model Selection for Breaker Tripping of - Single Pole Only • Model Selection for Application on - Series Compensated Line - or Uncompensated Long Line - or Uncompensated Short Line • Model Selection includes Hybrid Scheme for - Dual FSK Channels Phase Identified Channel Logic - or Dual FSK Channels with Single-pole/ Three-pole Channel Logic - or Single FSK Channel • Out-of-Step Blocking • Fault Detection Supervision of Outputs • Close-onto-Fault (line pick-up)	PLS	1 Per	3
				* *Refer to Catalog Volume 1*

(Continued on next page)

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunctions (cont.)	Optional Additions: • Continuous Monitor with Notification of Abnormal PLS Conditions and Response Data for Each PLS Trip Operation	PLS (Continued)		
21 and other Functions	Line Distance Modular System with Dedicated Phase and GroundMeasuring Functions Universally Applicable for: • Series Compensated or Uncompensated Lines • Long or Short Lines • Single or Double Circuit Lines • High Ground Fault Resistance Each System Includes: • Model Selection for Breaker Tripping of - Three-pole - or Single-pole • Model Selection or Forward Protection Zones of - Two Independent Zones with One Switched Zone - or Three Independent Zones - or One Independent Zone • Selectable Scheme Logic 1. Stepped Distance 2. Zone 2 Acceleration 3. Permissive Overreaching Transfer Tripping 4. Permissive Underreaching Transfer Tripping 5. Directional Comparison Blocking with Reverse Zone 4 Timer 6. Hybrid • Switched Zone 1 Reach • Out-of-Step Blocking • Fault Detector Supervision of the Trip Bus • Close-onto-Fault (line pick-up) • Potential Transformer Fuse Failure Alarm • Sequential Reclosing Control • Channel Repeat (echo) • Weak-infeed Tripping • Direct Transfer Trip	TLS	1 per line end	3
21 and other Functions	Line Distance Modular System with Dedicated Phase and Ground Distance or Ground Directional Overcurrent Measuring Functions, Applicable for: • Long or Short Lines • Single or Double Circuit Lines • High Ground Fault Resistance Each System Includes: • Model Selection for Breaker Tripping of - Three-pole Only • Model Selection for Scheme of - Directional Comparison for OFF-ON Channel - or Hybrid/Permissive Mode for FSK Channel - or Stepped Distance • Model Selection of Measuring Functions of - Phase Variable MHO Distance and Ground Selectable Variable MHO or Reactance Distance and Optional Addition of Time and Instantaneous Overcurrent, Selectable for Directional, Tripping Independent of Pilot Tripping	TYS3	1 per line end	3

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
21 and other functions (Continued) Optional 79	- or Phase Variable MHO and Ground Directional Overcurrent, including Time and Instantaneous Overcurrent, Selectable for Directional, Tripping Independent of Pilot Tripping • Model Selection of Protective Zones of - Three Zones Consisting of Two Independent Zones and One Switched Zone - or One Independent Zone Each System Includes: • Out-of-Step Blocking • Fault Detector Supervision of Outputs • Close-onto-Fault (line pick-up) • Potential Transformer Fuse Failure Detection Optional Additions: • Continuous Monitor with Notification of Abnormal TYS Conditions and Response Data for each TYS Trip Operation • Multi-shot Automatic Reclosing	TYS3 (Continued)		
21 and other Functions	Line Distance Component Packages, Consisting of Individual Protective Drawout Relays, Non-drawout Relays and Auxiliary Devices for Pilot Channel Schemes of: • Directional Comparison Blocking • Directional Comparison Unblocking • Line Transferred Tripping, Direct Underreaching • Line Transferred Tripping, Permissive Underreaching • Line Transferred Tripping, Permissive Overreaching • Direct Transferred Tripping, to be Added to Breaker Failure, Transformer, Shunt Reactor, or Similar Protective Relays	Various	1 per line end	3
21 All Lines	Distance, Phase MHO, Three Phase (ZONE PACKAGE) First Zone . . . . . . Second Zone	 CEY51A or SLY81A CEY52A or SLY81A Plus 21X for Second Zone	 1 1 1 1	 3 3 3 3
21 All Lines	Distance, Second Zone, Phase MHO with Out-of-Step Blocking, Three Phase (ZONE PACKAGE)	SLY81B plus 21X	1	3
21 All Lines	Distance, Second or Third Zone Extended Range, Offset MHO, Three Phase (ZONE PACKAGE)	CEB52A plus 21X	1	3
21 Short and Medium Lines	Two-step Phase Distance Overcurrent Three-phase MHO (ZONE PACKAGE), Zone 1 . . . . . . Zone 2 . . . . . . Overcurrent, Torque Controlled	 CEY51A and CEY52A and IAC60T or IAC80T or IAC90T	 1 1 1 1 1	 3 3 3 3 3

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
21G All Lines	Distance, Ground MHO, Three Phase (ZONE PACKAGE) First Zone . . . . . . Second Zone	 SLYG81A SLYG81A or CEYG51A or CEYG53A plus 21GX for Second Zone	 1 1 1 1	 3 3 3 3
21G All Lines	Distance, First or Second Zone, Ground MHO, Three Phase (ZONE PACKAGE)	SLYG81A plus 21GX for Second Zone	1	3
21 Short and Medium Lines	Distance, 3 Zone, Phase Reactance, Single Phase (PHASE PACKAGE)	GCX plus 21X	3	3
21G All Lines	Distance, 3 Zone, Ground Reactance, Single Phase (PHASE PACKAGE)	GCXG plus 21GX, 21GC, 21G/ACT	3	3
21 Medium and Long Lines	Distance, 2 Zone, Phase MHO, (Figure 8), Single-phase (PHASE PACKAGE)	GCY51F plus 21X	3	3
21 Medium and Long Lines	Distance, 3 Zone, Phase MHO, Single Phase (PHASE PACKAGE)	GCY plus 21X	3	3
21X or 21GX	Timer Auxiliary, for Second and Third Zones	SAM	1	6
21GC	Overcurrent Auxiliary, for Ground Distance Relay Type GCXG	NAA15	1	3
21G-ACT	Auxiliary Current Transformer, for Ground Distance Relay or Schemes	0367A0266G1 or G2	1 or 2	12
25/27B/27L	Synchronism Check, Option 27B and 27L, when Two Sources are Already Interconnected, Single Phase	 IJS or SLJ	 1 1	 9 9
25	Synchronism Check, when Two Sources are NOT Already Interconnected and with High Speed Reclosing of Remote Line Terminal, Single Phase	GXS	1	9
25X	Manual Synchronizing Supervision of GXS Relay	NAA30	1	3
27	Undervoltage: Instantaneous, One, Two, or Three Phase Time, Single Phase	 NGV IAV TOV	 1, 2, or 3 1, 2, or 3 1	 11 11 11
32	Directional Power, Time, Single Phase	ICW or TCW	1 1	4 4
50	Instantaneous Overcurrent, Fault Detector, Three Phase	CHC12 or PJC32 or SBC231	1 1 1	2 2 2

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
50/51	Phase Overcurrent, Single Phase Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	3 3 3 3	2 2 2 *
50/51 and/or 50/51N	Phase and Ground Overcurrent Single Phase or Three Phase . . . . . . Three Phase and Ground	MIC or TOC MDP or SR735/737	1 1 1	2 2 *
50/51 50/51N	Overcurrent, Phase and Ground Multifunction System Combinations. See Description Distribution Feeder, Multifunction Device	DFP100 or DFP200 or SR750/760	1	*
50/51N	Ground Overcurrent Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	1 1 1 1	2 2 2 *
59	Overvoltage Time, Single Phase	IFV51AD or IAV51A TOV	1, 2, or 3 1, 2, or 3 1	11 11 11
59 Optional 50BF	Line Overvoltage Modular System . . . . . . Each System Includes: • Overvoltage Functions for Local and Remote Line Ends • Instantaneous and Time Delay Functions, Each Selectable for Overvoltages at Local and/or Remote Line Ends Note: Overvoltage System can be Included as an Independent System in the Same Package Case as the Device 50BF, Breaker Failure Backup, Type SBC 9000	SBC 9000	1	Consult Factory
60	Voltage Balance, Potential Transformer Blown Fuse, Three Phase	CFVB	1	11
67	Directional Phase Overcurrent, Single Phase: Instantaneous . . . . . . Time, Inverse, Very Inverse or Extremely Inverse . . with Directional Instantaneous Overcurrent . . . . with Directional Instantaneous Overcurrent and Voltage Restraint	CJC15 IBC JBC JBCV	3 3 3 3	4 4 4 4
	Directional Phase Overcurrent, Three Phase	CAP15A and IAC60 or IAC80 or IAC90	1 3 3 3	4 2 2 2
67/67G	Directional Overcurrent, Phase and Ground Modular System Combinations. See Description Distribution Feeder Device 67/67N, Type TCC	TCC	1	4
Optional 79	Directional Overcurrent, Phase/Ground and Reclosing . . .	MOR	1	4

* *Refer to Catalog Volume 1*

GE Protective Relays

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
67G	Directional Ground Overcurrent:			
	Instantaneous	CJCG15	1	4
	Time, Inverse, Very Inverse or Extremely Inverse	JBCG	1	4
	with Directional Instantaneous Overcurrent	JBCG	1	4
67G	Transferred Tripping Directional Ground Overcurrent:			
	Instantaneous	CJCG16	1	4
	Time and Directional Instantaneous Overcurrent			
	Inverse	JBCG61	1	4
	Very Inverse	JBCG63	1	4
67G	Carrier Directional and Overcurrent Ground	CLPG	1	3
68	Distance, Offset MHO with Out-of-Step Auxiliary, Single Phase	CEB51A	1	3
68	Distance, Offset Phase MHO Blocking, Three Phase	SLY82A	1	3
68G	Distance, Offset Ground MHO Blocking, Three Phase	SLYG82A	1	3
78	Angle Impedance, Blinder Restriction on Tripping, Single Phase	CEX57D or CEX57F	3 3	10 10
78	Angle Impedance, Out-of-Step Tripping	CEX57E and NAA19B	1 1	10 3
78	Out-of-Step (power swing) Modular System Each System Includes: • Positive Sequence, Offset, MHO Measuring Functions Providing, Determination of Out-of-Step Condition or Fault, Selectable Adjustment for Maximum Slip Frequency, Improved Security on Evolving Faults, and Reduced Probability of Incorrectly Setting Up Blocking for Non-out-of-Step Condition • Selectable Tripping, on Confirmed Out-of-Step Condition, or Delayed for Power System/Circuit Breaker Requirements • Selectable Tripping or Blocking • Two Self Testing Modes, One Continuous and One Selectable	OST	1	3
79	Reclosing: Single Shot	NSR or HGA18	1 1	8 8
79	Breaker Automatic Reclosing System 3 Pole or 1 Pole with Synch Check	MRS	1	3
79	Breaker Automatic Reclosing System, Universally Applicable Each System Includes: • Model Selection for - One Breaker - or Two Breakers	TRS	1	3

GE Protective Relays

TRANSMISSION LINE PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
79 (continued)	One Breaker System Includes: • Various Selectable Programs with Combinations of: - Single-pole and/or Three-pole Reclosing - Single-shot or Two-shot Reclosing - High Speed or Time-delay Reclosing • Selectable Program Modifications by Changes in Power System and/or Operating Conditions • Selectable Local and Remote Control Additions for Two Breaker System • Selection of Either Breaker to be Reclosed First with Other Breaker Second • Inhibit Control of Second Breaker Reclosing by Control or Operating Conditions • Provisions for Interconnections of 2-Two Breaker Systems in a Breaker-and-a-Half Scheme for Two Lines	TRS (continued)		
Optional 25/27	Optional Addition: • Synchronism Check to Supervise Reclosing and Selectable Line/Bus Voltage Monitoring			
79RI	Initiate Automatic Reclosing (when not included in other relays)	NGA15AA or NGA15AH or NGA15AJ	1 1 1	7 7 7
85	Carrier Receiver Auxiliary for: Directional Comparison Blocking	SCA	1	3
	Transferred Tripping	NAA27	1	3
87L	Differential, Wire-Pilot, Three Phase	SPD	1	6
Optional 85L	Optional Pilot Wire Supervision or Transfer Tripping (SPD and SPA are required at remote terminal)	optional SPA	1	6
87L and other Functions	Line Current Modular System for Audio Channel or Fiber Optic Channel, and Direct Transfer Tripping. See Description, Distribution Feeder Protection, Device 87L, Type DLS	DLS	1 per line end	3

DISTRIBUTION FEEDER PROTECTION

27	Undervoltage: Instantaneous, One, Two or Three Phase	NGV	1, 2, or 3	11
	Time, Single Phase	IAV	1, 2, or 3	11
		TOV	1	11
27DC	DC Undervoltage: Instantaneous	NGV17 or 18	1	11
		or PJV	1	11
		or HGA	1	7
		or HMA	1	7
27/59	Under and Overvoltage Time, Single Phase	IAV	1, 2, or 3	11
		TOV	1	11
32	Directional Power, Time, Single Phase	ICW	1	4
		or TCW	1	4
47/27	Phase Sequence and Undervoltage, Three Phase: Instantaneous	NBV	1	11
	and Timer	and SAM	1	6
	Time	ICR	1	11

GE Protective Relays

DISTRIBUTION FEEDER PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
(49+) Other Functions	Microprocessor-based System Containing: 49 - Thermal Image Overcurrent Protection 50 - Instantaneous Overcurrent Protection 51 - Two-step Definite Time Overcurrent Protection Phase Current Indication Last Trip Fault Record	MRC	1	5
50	Instantaneous Overcurrent, Fast Pickup and Reset with Minimum Overreach, Three Phase	SBC231	1	2
50/50N	Instantaneous Overcurrent, One, Two or Three Phase	HFC or PJC	1, 2, 3, or 4 1, 2, 3, or 4	2 2
50/51	Phase Overcurrent, Single Phase: Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	3 3 3 3	2 2 2 *
	For Load Center Substation	IAC66T or DIAC/DIFC/DSFC	3 3	2 *
50/51N	Ground Overcurrent: Time, Inverse, Very Inverse or Extremely Inverse, with or without Instantaneous	IFC or IAC or SFC or DIAC/DIFC/DSFC	1 1 1 1	2 2 2 *
50/51 and/or 50/51N	Phase and Ground Overcurrent Single Phase or Three Phase	MIC or TOC	1 1	2 2
	Three Phase and Ground	MDP or 735/737	1	*
59	Overvoltage, Phase: Instantaneous, Single Phase	PJV	1, 2, or 3	11
	Instantaneous, Three Phase	NGV21	1	11
	Time, Single Phase	IFV or IAV TOV	1, 2, or 3 1, 2, or 3 1	11 11 11
59DC	DC Overvoltage, Instantaneous	PJV	1	11
59N	Overvoltage, Ground Detection: Time	IFV or IAV TOV	1 1 1	11 11 11
67	Directional Phase Overcurrent, Single Phase: Time, Inverse, Very Inverse or Extremely Inverse . . with Directional Instantaneous Current	IBC JBC	3 3	4 4
	with Directional Instantaneous Overcurrent and Voltage Restraint	JBCV	3	4
67N	Directional Ground Overcurrent: Time, Inverse, Very Inverse or Extremely Inverse . . with Directional Instantaneous Overcurrent	JBCG JBCG	1 1	4 4
		** Refer to Catalog Volume 1*		

GE Protective Relays

DISTRIBUTION FEEDER PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
67/67G	Directional Overcurrent, Phase and Ground Modular System Combinations. See Description Distribution Feeder Device 67/67N, Type TCC	TCC	1	4
Optional 79	Directional Overcurrent, Phase/Ground and Reclosing . .	MOR	1	4
79	Reclosing Multi-shot	NLR or SLR	1 1	8 8
87L Optional 85L	Differential, Wire Pilot, Three Phase . . . . . . Optional Pilot-Wire Supervision or Transfer Tripping (SPD and SPA are required on remote terminal)	SPD optional SPA	1 1	6 6
87L and other Functions	Line Current Differential Modular System . . . . . . Each System Includes: • Model Selection for Transmitter and Receiver Channel Interface for - 600-ohm, 4-Wire Audio Cable Pairs or Multiplex Channels - or Fiber Optic Cable and 820 Nanometers or 1300 Nanometers and with Increased Security for Channel Noise Distortion • Current Differential Function with Compensation for all Types of Faults Independent of Load, Current Transformer Saturation, and Current Transformers of Same/Different Ratios • Continuous Channel Monitoring with Alarm and Selectable Blocking or Permitting Current Differential Tripping During Abnormal Channel Conditions • Direct Transfer Tripping over the Relay Channel in One or Both Directions • Three-pole Breaker Tripping • Model Selection for 2 or 3 Terminal Line	DLS	1 for each Line End	3
Multifunction	Microprocessor-based Feeder Protection, Metering, Monitoring, and Control System Consisting of: • 50/51 Phase Overcurrent • 50G/51G Ground Overcurrent Additional Features: • High Impedance Fault Detection • Recognition of Downed Lines • User-Defined Time Current Characteristics • Cold Load Pickup Logic • Power Quality Monitoring • Oscillography Capture • Watt/Var Demand Profiles • Communications Interface	DFM	1	*
Multifunction	Microprocessor-based Feeder Protection, Metering, Monitoring, and Control System Consisting of: • 50/51 Phase Overcurrent • 50G/51G Ground Overcurrent • 21 Phase Distance Protection (or Phase Directional Control) • 27/59 Under-and Overvoltage • 46 Negative Sequence Overcurrent	DFP100	1	*
		* *Refer to Catalog Volume 1*		

(Continued on next page)

GE Protective Relays

DISTRIBUTION FEEDER PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunction (continued)	• 50BF Breaker Failure • 67N Negative Sequence Directional Control • 81U/O Under-and Overfrequency Additional Features: • Multiple Setting Groups • Cold Load Pickup Logic • Optional four shot Recloser • Trip Circuit Monitor • Fault Location • Ampere Demand Profiles • Oscillography Capture • Communications Interface • Horizontal or Vertical Mounting Selectable	DFP 100 (Continued)		
Multifunction	Microprocessor-based Feeder Protection, Metering, Monitoring, and Control System Consisting of: • 50/51 Phase Overcurrent • 50G/51G Ground Overcurrent • 27/59 Under-and Overvoltage • 46 Negative Sequence Overcurrent • 50BF Breaker Failure • 67P Phase Overcurrent Directional Control • 67N Negative Sequence Directional Control for Ground Overcurrent • 67G Zero Sequence Directional Control for Ground Overcurrent • 81U/O Under-and Overfrequency Additional Features: • High Impedance Fault Detection • Recognition of Downed Lines • Power Quality Monitoring • Multiple Setting Groups • Cold Load Pickup Logic • Optional four shot Recloser • Programmable Logic Via Expression Builder Software • Fault Location • Trip Circuit Monitor • Watt/Var Demand Profiles • Optional Removable Keypad and Display • Oscillography Capture • Communications Interface • Horizontal or Vertical Mounting (Field Convertible)	DFP200	1	*
Multifunction	Microprocessor-based Feeder Protection, Metering, Monitoring, and Control System Consising of: • 50/51 Phase Overcurrent • 50G/51G Ground Overcurrent • 25 Synchronism Check • 27/59 Under-and Overvoltage • 46 Negative Sequence Overcurrent • 47 Voltage Phase Sequence • 50BF Breaker Failure • 60 Negative Sequence Overvoltage • 67P Phase Overcurrent Directional Control • 67G Zero Sequence Directional Control for Ground Overcurrent • 81U/O Under-and Overfrequency	750/760	1	*
		** Refer to Catalog Volume 1*		

DISTRIBUTION FEEDER PROTECTION (Continued)

Device Function Number	Function Description	Relay Type	Relay Quantity	Vol 2 Section Number
Multifunction (continued)	Additional Features: • Fault Location • Power Quality Monitoring • Multiple Setting Groups • Cold Load Pickup Logic • Optional four shot Recloser (760 Only) • Watt/Var Demand Profiles • Oscillography Capture • Communications Interface	750/760 (Continued)		

MOTOR PROTECTION

46	Current Phase Balance, Three Phase	IJC	1	2
47/27	Phase Sequence and Undervoltage, Three Phase:			
	Instantaneous	NBV	1	11
	and Timer	and SAM	1	6
	Time	ICR	1	11
49	Machine Thermal, Single Element for use with RTD in Machine	IRT	1	5
49/50	Thermal and Instantaneous Overcurrent:			
	Single Phase	TMC	1 or 2	5
	Three Phase	THC	1	5
49S/49/50	Starting, Overload and Fault, Single Phase	IFC66KD	2 or 3	2
		or IAC66K	2 or 3	2
		or IAC66M	2 or 3	2
		or IAC66S	2 or 3	2
		or IAC66T	2 or 3	2
		or DIAC/DIFC/DSFC	2 or 3	*
50	Instantaneous Phase Overcurrent, One or Two Phase	HFC	1 or 2	2
		or PJC	1 or 2	2
50N or 50GS	Instantaneous Ground Overcurrent	HFC	1	2
		or PJC	1	2
51R	Time Overcurrent, Running	IAC60	1	2
60	Voltage Unbalance, Bus Potential Transformer Blown Fuse, Three Phase with Optional Timer or Auxiliary	NBV	1	11
87M	Machine Differential:			
	Single Phase	CFD	3	6
		or IJD52A	3	6
	Single or Three Phase (for use with one current-transformer for two ends of one machine winding)	HFC	3 or 1	2
		or PJC	3 or 1	2
		or MDP	1	*
		or 735/737	1	*

* *Refer to Catalog Volume 1*

GE Protective Relays

MOTOR PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunction	Microprocessor-based Motor Protection System 46 Protection Against Unbalance or Current Reversal (Negative Sequence) 49 Thermal Image Protection 50 Phase Fault Protection 51G Ground Fault Protection 51LR Locked Rotor Protection 37 Undercurrent Unit 66 Successive Starts Unit	MMC	1	10
Multifunction	Microprocessor-based Low and Medium Voltage Motor Protection Consisting of: • 46 Current Unbalance • 49 Thermal Overload via Thermistor Input • 49/51 Thermal Overload • 50G/51G Ground Fault Overcurrent • 50S Locked Rotor Additional Features: • Motor Amps Analog Output	P4A	1	*
Multifunction	Microprocessor-based Low Voltage Motor Protection and Control Consisting of: • 27/59 Under-and Overvoltage • 37 Undercurrent • 46 Current Unbalance • 48 (50S) Jam/Stall Protection • 49 Thermal Overload via Thermistor Input • 49/51 Thermal Overload • 50G/51G Ground Fault Overcurrent Additional Features: • Exponential Motor Cooldown Characteristic • Control Contacts for a variety of Contactors • Present Value Metering • Communication Interface	MMII	1	*
Multifunction	Microprocessor-based Small and Medium Sized Motor Protection Consisting of: • 37 Undercurrent • 46 Current Unbalance • 48 (50S) Jam/Stall Protection • 49 Thermal Overload via Thermistor (or 3-RTD Inputs Optional) • 49/51 Thermal Overload • 50 Short Circuit Protection • 50G/51G Ground Fault Overcurrent Additional Features: • Exponential Motor Cooldown Characteristic • Separate Start and Run Thermal Models • Present Value Metering • Communication Interface • Selectable Analog Output (Optional)	239	1	*

** Refer to Catalog Volume 1*

MOTOR PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunction	Microprocessor-based Medium and Large Sized Motor Protection Consisting of: • 37 Undercurrent • 38 Bearing Overtemperature • 46 Negative Sequence Current Bias • 48 (50S) Jam/Stall Protection • 49 Thermal Overload via 10-RTD Inputs • 49/51 Thermal Overload • 50 Short Circuit Protection • 50G/51G Ground Fault Overcurrent • 66 Starts per Hour/Time Between Starts • 86 Latched Main Trip Relay • 27 Undervoltage (Meter Option) • 47 Volts Phase Reversal (Meter Option) • 55 Power Factor (Meter Option) Additional Features: • Thermal Capacity Modeling and RTD Hot Motor Compensation Used for Overload Protection • Custom Motor Overload Curve Creation • Exponential Motor Cooldown Characteristic • Separate Start and Run Thermal Models • Learned Motor Parameters for Matched Protection • Suitable for Variable Frequency Drive Motors • Present Value Metering • Communication Interface • Selectable Analog Output • Optional Drawout Case • Optional PQM Meter Provides Additional Metering and Output Capabilities	269+	1	*
Mulifunction	Microprocessor-based Medium and Large Sized Motor Protection Consisting of: • 27/59 Under and Overvoltage • 37 Undercurrent • 38 Bearing Overtemperature • 46 Negative Sequence Current Bias • 47 Volts Phase Reversal • 48 (50S) Jam/Stall Protection • 49 Thermal Overload via 12-RTD Inputs • 49/51 Thermal Overload • 50 Short Circuit Protection • 50G/51G Ground Fault Overcurrent • 55/78 Power Factor/Out-of-Step for Synch. Motor • 66 Starts per Hour/Time Between Starts • 81U/O Under-and Overfrequency • 86 Latched Main Trip Relay • 87 Self-Balance Differential Additional Features: • Thermal Capacity Modeling and RTD Hot/Cold Motor Compensation Used for Overload Protection • Dual Overload Curves for Two-Speed Motors • Custom Motor Overload Curve Creation • Exponential Motor Cooldown Characteristic • Separate Start and Run Thermal Models • Learned Motor Parameters for Matched Protection **(continued on next page)**	469	1	*
		* *Refer to Catalog Volume 1*		

MOTOR PROTECTION (Continued)

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
Multifunction (cont.)	• Suitable for Variable Frequency Drive Motors • Overload Protection Suitable for Motors with High Inertia Loads • RTD Failure Detection • Present Value Metering • Communication Interface • Analog Outputs and Inputs • Drawout Case	469 (Continued)		
Multifunction	Microprocessor-based System for Starting, Synchronizing and Protection of Synchronous Motors Consisting of: • 26F Field Overtemperature (Opt) • 27DC DC Field Undervoltage • 37 DC Field Undercurrent or Underpower (Opt) • 48 Incomplete Starting Sequence • 50 Instantaneous Overcurrent • 51 Locked Rotor/Acceleration Overcurrent • 55 Power Factor/Out-of-Step • 56 Field Application • 66 Multiple Starts • 86 Lockout Relay Output • 94 Self-reset Trip Relay Output • 95 Reluctance Torque Synchronizing and Resynchronizing • 96 Autoloading/Unloading Relay Additional Features: • Cage Heating Protection for Brushless Motors uses AC Current Sensing • Cage Heating Protection for Collector Ring Motors uses the frequency of the Induced Field Current • Reduced Voltage Starting Adaptation for Stall Protection • Optional Power Factor Regulation for Motors with Proportional SCR Exciter • Present Values Metering (True RMS with DFT filtering) • Recording of Run Time and Number and Types of Trips • Communications Interface • Drawout Case	SPM	1	*
MONITORING SYSTEMS				
Multifunction	Subsystem Integration System Base System includes Host Computer, Color Monitor, Keyboard and Operational Software	GESI DDS	1	*
LOAD CONSERVATION				
81	Frequency, Single Phase, One or Two or Four Steps . . .	SFF, MFF DFF	1 or more 1	11 *
		* *Refer to Catalog Volume 1*		

GE Protective Relays

CAPACITOR BANK PROTECTION

Device Function Number	Function Description	Relay		Vol 2 Section Number
		Type	Quantity	
50/51(+) other functions	Microprocessor-based Capacitor Bank Protection and Control Consisting of: . . . . . • 50/51 Phase Fault Protection • 50N/51N Ground Fault Protection • 51D Neutral Unbalance Protection • 59 Time and Instantaneous Overvoltage Additional Features: • Auto Switching via 27/59 • Scheduled Switching by Week • Event Recording • Communication Interface	MCP	1	*

GENERAL PURPOSE RELAYS

30	Annunciator or Target	HAA	1 or more	7
37	Undercurrent, Time, Single Phase	IAC59	1	2
51TC	Overcurrent, Torque Controlled by other Protective Relay, Single Phase with Optional Instantaneous Overcurrent	IAC60 or IAC80 or IAC90 or DFP100	1, 2, or 3 1, 2, or 3 1, 2, or 3 1	2 2 2 *
64DC	Battery Ground Detector	NGV29	1	11
74	Alarm Initiate Auxiliary	HFA or HGA or HMA	1 or more 1 or more 1 or more	7 7 7
74	Trip Circuit Supervision	NBT DBT	1 1	7 *
74B	Station Battery Monitoring	NGV19A	1	11
86	Lock Out Auxiliary	HSA or HEA or HFA	1 1 1	7 7 7
94	Tripping Auxiliary	SBA or HFA or HGA	1 or more 1 or more 1 or more	7 7 7
	Auxiliary Relays	HAA HEA HFA HGA HMA HSA NGA SBA		7 7 7 7 7 7 7 7
	Timing Relays	SAM201 SAM203 SAM207		6 6 6

* *Refer to Catalog Volume 1*