



September, 1986
 Supersedes Technical Data 41-010,
 pages 1-8, dated August, 1985
 Mailed to: E, D, C/41-000A

Protective Relay Application Guide

Type	Description	Apparatus	Literature		
Rotating Apparatus					
Motor	Overload and phase fault protection	BL-1	DB 41-550		
	Instantaneous ground	IT	DB 41-080		
	Phase balance inverse timing	CM	DB 41-180		
	Overcurrent, locked rotor protection	CO-11	DB 41-100A		
	Overcurrent, locked rotor protection	CO-5	DB 41-100A		
	Over and under current non directional	COD	DB 41-100B		
	Overcurrent, multi-element, motor starting	COM 5,6,7,8,9,11	DB 41-100C		
	Undervoltage, phase sequence and unbalanced	CVQ	DB 41-210		
	Instantaneous phase	SC	DB 41-765		
	Temperature and overload protection	CT	DB 41-550		
	Temperature, high ambient protection, RTD	DT-3	DB 41-550		
	Multifunction	SMP	DB 41-560E		
	Programmable multifunction	MPR	PB 41-155		
	Motor Transfer, high speed voltage	HV-4	DB 41-225		
	Generator	Loss of Field	Delta connected pot. transformers	KLF	DB 41-745B
			Wye connected pot. transformers	KLF-1	DB 41-745A
Differential		Constant percentage, inverse timing	CA	DB 41-331	
		Overexcitation, Volts/Hertz	SRW		
		Variable percentage, instantaneous	SA-1	DB 41-348	
Frequency		Over or under inverse timing	MDF-1, 2, 3, 4	IL 41-505	
Overcurrent		Negative sequence, inverse timing	COQ	DB 41-160	
		Negative sequence, instantaneous	POQ	DB 41-160	
		Negative sequence, solid state inverse	SOQ	IL 41-161	
		Overcurrent, voltage controlled, non-directional	COV-6,7,8,9,11	DB 41-115	
		Undervoltage, phase sequence and unbalanced	CP	DB 41-220DWEA	
Power Flow		Reverse power three phase	H3	DB 41-225	
		Reverse power	SRW		
		Motoring single phase	CRN-1	DB 41-250	
Temperature		Temperature and overload protection	CT	DB 41-550	
		Temperature, high ambient protection, RTD	DT-3	DB 41-550	
Ground	Field ground detection	DGF	DB 41-745C		
	Overvoltage, 8% pickup, 60 Hertz tune	CV-8	DB 41-200		
	100% stator ground protection	DGSH	DB 41-749E		



Type	Description	Apparatus	Literature
Rotating Apparatus (Continued)			
Subsynchronous Resonance	Subsynchronous resonance detector	SSO	B-853
D C Machines	Over-under reverse current	D3	DB 41-150

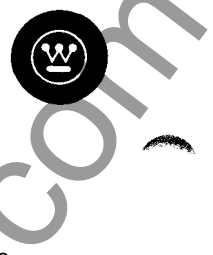
Distribution

Overcurrent	Non-directional	Ratio ground detection	CGRS	DB 41-107
		Inverse time	CO-2,6,7,8,9,11	DB 41-100A
		Inverse time	HiLo CO-2,6,7,8,9,11 ...	DB 41-100DWEA
		Inverse time (cylinder inst.)	CKO-6,7,9	IL 41-101.3
		Overcurrent, inverse time, non directional solid state	SCO-2,5,6,7,8,9,11T ...	IL 41-111
Phase	Directional	Overcurrent phase	CR-2,5,6,7,8,9,11	DB 41-130A
Ground	Directional	Overcurrent ground, current polarized	CRC-2,5,6,7,8,9,11	DB 41-130A
		Overcurrent ground, dual polarized	CRD-2,5,6,7,8,9,11	DB 41-130A
		Overcurrent ground, voltage polarized	CRP-2,5,6,7,8,9,11	DB 41-130A
		Overcurrent, ground, neg seq polarized	CRQ-2,5,6,7,8,9,11	DB 41-130A
		Overcurrent, power	KH-1,2,21	IL 41-138,1,2
Reclosing		Multi-shot reclosing, solid state	DRC-1	DB 41-660
		Multi-shot reclosing, electromechanical	RCD	41-667DWEA
		Multi-shot reclosing, electromech, no Z elem	RCL	DB 41-660
		Multi-shot reclosing, electromechanical	RC	DB 41-660
Frequency		Underfrequency, high speed	KF	DB 41-503
		Underfrequency, high speed with restore function	MDF-1,2,3,4	IL 41-505
		Underfrequency, low speed	CF-1	DB 41-500

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Type	Description	Apparatus	Literature
Substation			
Capacitor	Control	CJ-4, 5	IL 41-869
	Protection, current	COD	DB 41-100B
	Protection, overvoltage	CV-8	DB 41-200
Transformer	Differential	CA	DB 41-332
	Winding differential	CWC	DB 41-240
	Harmonic restraint unit	HRU	DB 41-350
	Overexcitation	MVH	
	Transformer differential, harmonic restraint ..	HU, HU-1, HU-4	DB 41-347
	Transformer differential	CA-26	DB 41-337
Bus	Current differential	CA-16	DB 41-337
	Voltage differential	KAB	DB 41-340
	Linear coupler	LC-1,2	DB 41-342
Breaker	SS breaker failure, case mtd	SBF-1	DB 41-777
	SS breaker failure, rack mtd	SBFU	DB 41-776
	Pole disagreement, single line breaker	SLB	DB 41-775
	Pole disagreement, ring bus and bkr and half	SLB-1	IL 41-775.2



Type	Description	Apparatus	Literature
Transmission			
Phase Protection			
	Instantaneous phase	KRV	DB 41-130C
	Overcurrent, directional phase line volt polarized.	IRV-2,5,6,7,8,9,11	41-130B DWEA
	Voltage, inverse time	CV	DB 41-200
	Over or undervoltage, frequency compensated	CV-26,27	DB 41-200
	Undervoltage, non directional, phase	CV-1,2	DB 41-200
	Undervoltage, frequency compensated	CV-21,22	DB 41-200
	Overvoltage, frequency compensated	CV-24,25	DB 41-200
	Overvoltage, non directional, phase	CV-4,5	DB 41-200
	Over or Undervoltage, non directional, phase	CV-6,7	DB 41-200
	Over and undervoltage, adjustable	CVD	DB 41-200
	Three phase impedance	KD-5	IL 41-498.12
	Phase carrier start	KD-11	41-491DWEA
	Variable offset mho	KD-3	II 41-498
	Out of step (power swing) blocking	KS-3	DB 41-492
	Out of step trip	KST	IL 41-492.5
	Phase distance	KD-10	41-491DWEA
	Time distance	SD-2	DB 41-495
	Over and undervoltage, adjustable	CVD	DB 41-200
	Instantaneous overcurrent	SI-1T,2T,4T	II 41-777
	Impedance start relay	SKD-1T,2T	DB 41-490D
	SS impedance, case mtd.	SKD-T	DB 41-490D
Ground Protection			
	Solid state distance	SDG-1T,2T,4T	DB 41-496
	Overvoltage, 8% pickup, 60 Hertz tune	CV-8	DB 41-200
	Product, single phase, ground protection, cur. pol.	CWC	DB 41-240
	Product, single phase, ground protection, volt pol.	CWP, CWP-1	DB 41-240
	Product, single phase ground protection (For high resistance grounded systems only)	CWP-1	DB 41-240
	Overcurrent, directional phase	CR-2,5,6,7,8,9,11	DB 41-130A
	Overcurrent, directional ground, current polarized.	CRC-2,5,6,7,8,9,11	DB 41-130A
	Overcurrent, directional ground, dual polarized.	CRD-2,5,6,7,8,9,11	DB 41-130A

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Type	Description	Apparatus	Literature
Transmission (Continued)			
Ground Protection (Continued)			
	Overcurrent, directional ground, voltage polarized.....	CRP-2,5,6,7,8,9,11.....	DB 41-130A
	Overcurrent, directional ground, neg seq polarized.....	CRQ-2,5,6,7,8,9,11.....	DB 41-130A
	Power flow, three phase.....	H3.....	DB 41-225
	Ground distance, three zone.....	KDXG.....	DB 41-497
	Directional gnd overcurrent, current polarized.....	IRC-2,5,6,7,8,9,11.....	41-130B DWEA
	Directional gnd overcurrent, dual polarized.....	IRD-2,5,6,7,8,9,11.....	41-130B DWEA
	Directional gnd overcurrent, resid volt polarized.....	IRP-2,5,6,7,8,9,11.....	41-130B DWEA
	Directional gnd overcurrent, neg seq polarized.....	IRQ-2,5,6,7,8,9,11.....	41-130B DWEA
	Directional timer.....	KRT.....	IL 41-497
	Distance timer.....	KDTG.....	IL 41-497.2
	Negative sequence polarized.....	KQS.....	IL 41-928.1
	Residual current polarized ground.....	KRC.....	DB 41-130C
	Ground relay residual current and voltage polar.....	KRD-4, KRD.....	DB 41-130C
	Residual voltage polarized, ground.....	KRP.....	DB 41-130C
Pilot	Current Differential	Current differential, fiber optic or audio tone	LCB-II..... B-796
	Phase Comparison	High speed.....	SKBU-1A..... DB 41-950
		Dual phase comparison.....	SKBU-2A..... DB 41-954
		Segregated phase comparison.....	SPCU-1A..... IL 41-955.2
	Directional Comparison	Zone extension system.....	L-DAR..... B-807
		Solid state system, modular.....	UNIFLEX..... PL 40-021 pg 15-18
	Auxiliaries	Over-reaching transfer trip.....	KA-1..... IL 41-923.1
		Blocking sys auxiliary.....	KA-4..... IL 41-923.4
		Instantaneous overcurrent.....	KC-2..... IL 41-776.2
		Instantaneous overcurrent phase and ground.....	KC-4..... DB 41-170
		Solid state instantaneous overcurrent.....	SIT..... IL 41-777.3
		SS output logic relay.....	SRU..... DB 41-846
		Unblocking sys auxiliary.....	STU..... DB 41-959
	Carrier Sets	On/Off carrier.....	TC-10A..... SA 11411
		Frequency shift carrier.....	TCF-10A..... SA 11412
		Single sideband power line carrier.....	SS-246..... DB 40-444
	Audio Tones	Dual Channel.....	DIT-1U..... IL 41-965.1
		Dual channel.....	DIT-1, DIT-IT..... IL 41-965B
		Single channel.....	DIT-3U..... IL 41-966.1A
		Multitone binary single channel.....	DIT-4A..... IL 41-964.1A
		Amplitude modulated (on-off).....	DIT-5T..... IL 41-967

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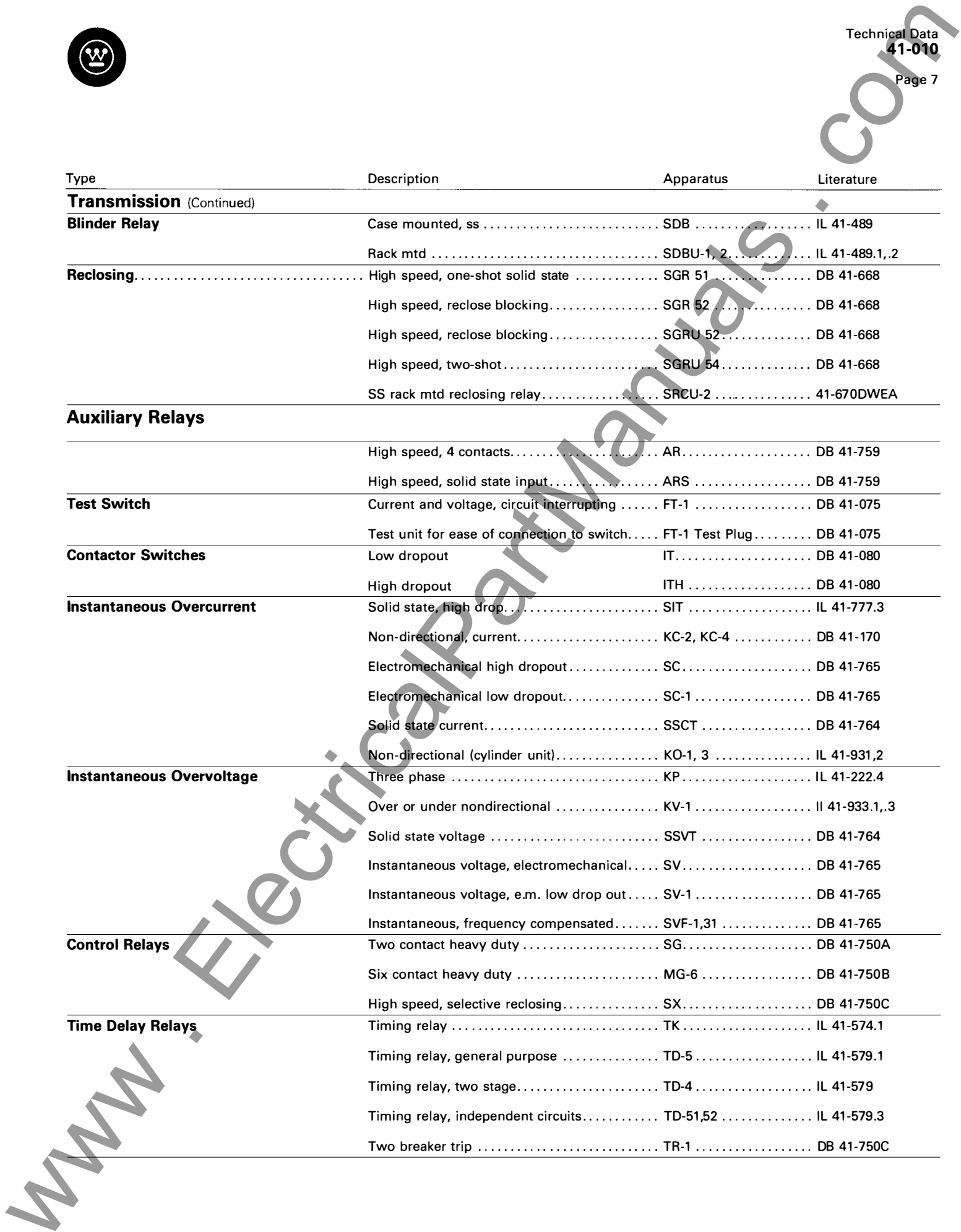


Type	Description	Apparatus	Literature
Transmission (Continued)			
Pilot (Continued)	Tone Auxiliary	Tone auxiliary, solid state.....	STU-12 DB 41-959A
		K-Dar overreaching transfer trip.....	TT-8 IL 41-958
		Tone monitoring for single and dual channel transfer trip system.....	TT-9 IL 41-959.1
		Transfer trip universal channel auxiliary	TT-12 IL 41-958.9
		K-Dar overreaching transfer trip and channel monitoring for use with TCF-10A carrier and DIT-1 tones IL 41-965
		K-Dar overreaching transfer trip.....	TT-16 IL 41-958.8
		K-Dar underreaching transfer trip.....	TT-17 IL 41-958.5
		K-Dar/TCF-10A overreaching transfer trip	TT-21 IL 41-958.6
	Pilot Wire	Fault detecting	HCB, HCB-1,2,3.....
Monitor, shorted, open, reversed.....		PM-2.....	IL 41-973.5
Monitor, shorted, open, reversed and remote trip		PM-23	IL 41-973.5
Remote trip only		PM-3.....	IL 41-973.5
Current limit adjuster.....		PM-4.....	IL 41-973.5
Ground only		PM-5.....	IL 41-973.5
Monitor, shorted, open, reversed, grounded, ac input.....		PMA.....	IL 41-973.4
Monitor, shorted, open, reversed, ac input....		PMA-1	IL 41-973.4
Monitor, shorted, open, reversed, grounded, dc input		PMD.....	IL 41-973.5
Monitor, shorted, open, reversed, dc input....		PMD-1	IL 41-973.5
Monitor, shorted, open, reversed, grounded, dc input		PMG-13	IL 41-973.5
Monitor, shorted, open, reversed, ac input, dc remote.....		PMG-13.....	IL 41-973.5
Monitor, shorted, open, reversed, dc input, dc remote.....		PMG-13.....	IL 41-973.5
Monitor, shorted, open, reversed, grounded, ac input.....		PMG-13	IL 41-973.5
Synchronism check.....		CVE.....	DB 41-680
Synchronism check.....		CVE-1.....	DB 41-680
Time distance.....		SD-2.....	DB 41-495

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Type	Description	Apparatus	Literature
Transmission (Continued)			
Blinder Relay	Case mounted, ss	SDB	IL 41-489
	Rack mtd	SDBU-1, 2	IL 41-489.1,2
Reclosing	High speed, one-shot solid state	SGR 51	DB 41-668
	High speed, reclose blocking	SGR 52	DB 41-668
	High speed, reclose blocking	SGRU 52	DB 41-668
	High speed, two-shot	SGRU 54	DB 41-668
	SS rack mtd reclosing relay	SRCU-2	41-670DWEA
Auxiliary Relays			
	High speed, 4 contacts	AR	DB 41-759
	High speed, solid state input	ARS	DB 41-759
Test Switch	Current and voltage, circuit interrupting	FT-1	DB 41-075
	Test unit for ease of connection to switch	FT-1 Test Plug	DB 41-075
Contactor Switches	Low dropout	IT	DB 41-080
	High dropout	ITH	DB 41-080
Instantaneous Overcurrent	Solid state, high drop	SIT	IL 41-777.3
	Non-directional, current	KC-2, KC-4	DB 41-170
	Electromechanical high dropout	SC	DB 41-765
	Electromechanical low dropout	SC-1	DB 41-765
	Solid state current	SSCT	DB 41-764
	Non-directional (cylinder unit)	KO-1, 3	IL 41-931,2
	Instantaneous Overvoltage	Three phase	KP
Over or under nondirectional		KV-1	IL 41-933.1,3
Solid state voltage		SSVT	DB 41-764
Instantaneous voltage, electromechanical		SV	DB 41-765
Instantaneous voltage, e.m. low drop out		SV-1	DB 41-765
Instantaneous, frequency compensated		SVF-1,31	DB 41-765
Control Relays		Two contact heavy duty	SG
	Six contact heavy duty	MG-6	DB 41-750B
	High speed, selective reclosing	SX	DB 41-750C
Time Delay Relays	Timing relay	TK	IL 41-574.1
	Timing relay, general purpose	TD-5	IL 41-579.1
	Timing relay, two stage	TD-4	IL 41-579
	Timing relay, independent circuits	TD-51,52	IL 41-579.3
	Two breaker trip	TR-1	DB 41-750C





Type	Description	Apparatus	Literature
Auxiliary Relays (Continued)			
Time Delay Relays (Continued)			
	Several breaker trip	TR-3	DB 41-750C
	SS tripping unit for double trip schemes.....	TRB.....	DB 41-750C
	SS tripping unit	TRB 2,3,4	DB 41-750C
Annunciator			
	Indicator lockout	JL	DB 41-740
	Parallel, series current indicator	JM	DB 41-740
Inverter			
	Dc to Ac	Inverter	DB 41-075D
Relay Systems			
Electromechanical			
	Electromechanical switchboards.....	All.....	AD 40-100
	Schematics	All	EMS-1
Solid State			
	Relay panels	All	AD 40-100

Additional Information

General ordering information including electrical and mechanical specifications on electromechanical and solid state relays and systems can be found in Technical Data 41-020 and Price List 40-021 and 40-022.



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Protective Relay Application/ Selector Guide

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Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Rotating Apparatus						
Generator						
Loss of Field	40	3P/3W wye or delta connected PT's	KLF	DB 41-745B	.41-748	.41-748
	40	3P/4W wye connected PT's	KLF-1	DB 41-745A	.41-748.1	.41-748.1
Differential	87	Constant percentage, inverse timing	CA(gen)	DB 41-331	.41-331.2	.41-331
	87	Variable percentage, instantaneous, solid-state	SA-1	DB 41-348	.41-348.1	
	87G	Ground fault, current polarized	CWC	DB 41-240	.41-242.4	.41-242
Overexcitation	24	Microprocessor Volts/Hertz, inverse timing	MVH		.41-745	
Out-of-Step	78	Out-of-step (power swing) tripping relay	KST		.41-492.5	
	68	Out of step (power swing) blocking relay	KS-3	DB 41-492		
Single Blinder Out-of-Step Scheme	78	Blinder relay, rack mounted	SDBU-1	RPL 79-1	.41-489.1	
		Overcurrent power swing detector	SI-T			
		High speed dc tripping unit w/keying input	ARS	DB 41-759	.41-759.2	
Frequency	81o/u	Microprocessor over/underfrequency, selectable time	MDF		.41-505	
	81	Over or under, inverse timing	CF-1	DB 41-500	.41-501.2	.41-292
	81	Underfrequency, high speed w/six cycle time delay	KF	DB 41-503	.41-503	.41-503
Phase Overcurrent	51V	Voltage controlled, inverse timing	COV	DB 41-115	.41-116	.41-116
	51	Inverse timing	CO-HiLo	DB 41-100	.41-100	.41-100A1
	50/51	Inverse timing w/instantaneous	CO-HiLo	DB 41-100	.41-100	.41-100A1
	50/51	Microprocessor based, inverse timing w/instantaneous	MCO	PB 41-120	.41-120	
	50/51	Multi-phase, microprocessor based, inverse timing, w/instantaneous	MMCO	Refer to Division		
	46	Negative sequence, inverse timing	COQ	DB 41-160	.41-161	.41-161
Inadvertent Energization	67	Directional overcurrent	CR	DB 41-130A	.41-131	.41-131A1
	67	Sensitive directional overcurrent	CRG	consult factory		



Protective Relay Application/Selector Guide

Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Power Flow	32	Anti-motoring, inverse timing, watt characteristic.....	CW.....	DB 41-245.....	41-241.....	41-241A1
	32	Anti-motoring, inverse timing, 20 milliamp pickup.....	CRN-1.....	DB 41-250.....	41-251.2.....	41-251A1
	32	Anti-motoring, definite timing, solid-state, high sensitivity.....	SRW.....		41-252.....	
Temperature	49	Overtemperature for use with RTD.....	DT-3.....	DB 41-550.....	41-552.1.....	41-151A1
Ground Relays	59	Low pickup overvoltage.....	CV-8.....	DB 41-200.....	41-201.....	41-201A1
	59	Third harmonic voltage comparator.....	DGSH.....	DB 41-749.....		
	64	Field winding ground detection.....	DGF.....	DB 41-745.....	41-747.....	41-151A1
	51N	Overcurrent, inverse timing.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51N	Overcurrent, inverse timing w/instantaneous.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51N	Microprocessor based time overcurrent w/instantaneous.....	MCO.....	PB 41-120.....	41-120.....	
	Subsynchronous Resonance		Subsynchronous Resonance Detector, for protection of turbine generator shaft.....	SSO.....	Brochure B-853.....	
Motor						
Phase Fault	87	Differential, constant percentage, inverse timing.....	CA(gen).....	DB 41-331.....	41-331.2.....	41-331
	87	Differential, flux balance type, instantaneous.....	IT.....		41-771.1.....	41-771.1
	50	Overcurrent, instantaneous.....	SC.....	DB 41-765.....	41-766.1.....	41-766A1
	†	Programmable Motor Protective Relay.....	MPR.....	PB 41-155.....	41-155.....	
Ground Fault	50N	Overcurrent, instantaneous.....	IT.....		41-771.1.....	41-771
	51N	Overcurrent, inverse timing.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51N	Overcurrent, inverse timing w/instantaneous.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51N	Microprocessor based time overcurrent w/instantaneous.....	MCO.....	PB 41-120.....	41-120.....	
	50/51N	Multi-phase and ground, microprocessor based time overcurrent w/instantaneous.....	MMCO.....	Refer to Division.....		
	†	Programmable Motor Protective Relay.....	MPR.....	PB 41-155.....	41-155.....	
Locked Rotor	51	Overcurrent, inverse timing.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51	Overcurrent, inverse timing w/instantaneous.....	CO-HiLo.....	DB 41-100.....	41-100.....	41-100A1
	50/51	Microprocessor based time overcurrent w/instantaneous.....	MCO.....	PB 41-120.....	41-120.....	
	50/51	Multi-phase and ground, microprocessor based time overcurrent w/instantaneous.....	MMCO.....	Refer to Division.....		
	†	Programmable Motor Protective Relay.....	MPR.....	PB 41-155.....	41-155.....	
Overload	50/51	Overcurrent, multi-element for motor starting.....	COM.....	DB 41-100C.....	41-102.....	41-101A1
	49	Overtemperature for use with search coil.....	DT-3.....	DB 41-550.....	41-552.1.....	41-151A1
	49/50	Thermal overload and phase fault.....	BL-1.....	DB 41-550.....	41-553.1.....	41-553A1
	†	Programmable Motor Protective Relay.....	MPR.....	PB 41-155.....	41-155.....	
	Phase Voltage Unbalance and Undervoltage	27/47	Negative sequence overvoltage, phase undervoltage.....	CVQ.....	DB 41-210.....	41-223.....
27/47		Reverse phase, balanced over/undervoltage, inverse timing.....	CP.....	DB 41-220.....	41-222.2.....	41-295
27/47		Reverse phase, balanced over/undervoltage, instantaneous.....	KP.....		41-222.4.....	
†		Programmable Motor Protective Relay.....	MPR.....	PB 41-155.....	41-155.....	



Protective Relay Application/Selector Guide

Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Phase current unbalance	46	Loss of phase, unbalanced current	CM	DB 41-180	41-181.2	.41-181A1
	†	Programmable Motor Protective Relay	MPR	PB 41-155		
Power Factor	55/78	Loss of field (synchronous motor only)	CW	DB 41-245	41-241.2	.41-241A1
Frequency	81	Underfrequency, high speed w/six cycle time delay	KF	DB 41-503	41-503	.41-503
	81o/u	Microprocessor over/underfrequency, definite timing	MDF		41-505	
	81	Over or under, inverse timing	CF-1	DB 41-500	41-501.2	.41-292
Programmable Multifunction	†	Overload, locked rotor, phase overcurrent, phase unbalance, phase reversal, load loss, phase differential, and overtemperature	MPR	PB 41-155	41-155	
DC Machines	37/76	Over/under/reverse current	D-3	DB 41-150	41-151.1	.41-151A1
Distribution Feeder						
Phase Fault	51	Overcurrent, inverse timing	CO-HiLo	DB 41-100	41-100	.41-100A1
	51	Overcurrent, inverse timing w/torque control	CO	DB 41-100A	41-101	.41-101A1
	67	Overcurrent, directional, inverse timing	CR	DB 41-130A	41-131	.41-131A1
	50/51	Overcurrent, inverse timing w/instantaneous	CO-HiLo	DB 41-100	41-100	.41-100A1
	50/51	Microprocessor based time overcurrent w/instantaneous	MCO	PB 41-120	41-120	
	50/51	Multi-phase and ground, microprocessor based time overcurrent w/instantaneous	MMCO		41-121	
Ground Fault	67N	Overcurrent, directional, current polarized	CRD	DB 41-130A	41-131	.41-131A1
	67N	Overcurrent, directional, voltage polarized	CRP	DB 41-130A	41-131	.41-131A1
	67N	Overcurrent, directional, dual polarized	CRD	DB 41-130A	41-131	.41-131A1
	67N	Overcurrent, directional, negative sequence polarized	CRQ	DB 41-130A	41-163.2	.41-131A1
	46N	Fallen Conductor Detector	CGRS	DB 41-107		
Reclosing/ Synch Check	79	Multi-shot reclose, dc, solid-state	DRC-1		41-667.3	.41-667.3
	79	Multi-shot reclose	RC, RCL	DB 41-660	41-661	.41-661A1
	79	Microprocessor based multi-shot reclose	MRC		41-665	
	65	Synch check for automatic fast transfer schemes	CVE-3		41-681.1	
Frequency	81o/u	Microprocessor over/underfrequency, definite timing	MDF		41-505	
	81	Underfrequency, high speed	KF	DB 41-503	41-503	.41-503
	81	Over or under, inverse timing	CF-1	DB 41-500	41-501.2	.41-292
Substation Apparatus						
Capacitor	90	Current regulating relay (contact making ammeter)	COD	DB 41-100B	41-112, 112.1	.41-112
	59	Overvoltage, low pick-up	CV-8	DB 41-200	41-201	.41-201A1



Protective Relay Application/Selector Guide

Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Transformer						
	87	Differential, constant percentage type, inverse timing.	CA	DB 41-332	.41-332.2	.41-331
	87	Differential, w/second harmonic restraint, high speed.	HU, -1, -4	DB 41-347	.41-347.1	.41-347
	87	Differential, inverse timing	CA-26	DB 41-337	.41-337.3	.41-337
	87N	Differential, ground protection, wye winding, inverse timing.	CWC	DB 41-240	.41-242.4	.41-242
	50	Harmonic restraint overcurrent, instantaneous	HRU	DB 41-350	.41-347.3	
	24	Microprocessor Volts/Hertz, inverse timing.	MVH		.41-745	
Bus						
	87	Differential, inverse timing	CA-16	DB 41-337	.41-337.3	.41-337
	87	Differential, high impedance type, instantaneous	KAB	DB 41-340	.41-337.4	.41-337.4
	87	Differential for linear couplers	LC-1, -2	DB 41-342	.41-342.1	
Breaker						
	50/62BF	Breaker failure w/BFI timer, FT case	SBF-1	DB 41-777	.41-776.5B	
	50/62BF	Breaker failure, rack mounted	SBFU	DB 41-776	.41-776.4	
	50BF	Fault detector, three overcurrent units	KC-4	DB 41-170	.41-776.1	.41-776.1
	50BF	Fault detector, high speed, solid-state	SI, SI-T		.41-777	.41-777
	62BF	Breaker failure timer for use with KC-4 or SI-T	TD-5	DB 41-570	.41-579.1	
	62BF	Breaker failure timer for use with SI	TD-50	DB 41-570	.41-579.2	
	50	Power flow supervision	KH-1		.41-138.1	
	61	Pole current disagreement detector (single line)	SLB	DB 41-775	.41-775	
	61	Pole current disagreement detector (ring bus or breaker-and-a-half scheme)	SLB-1		.41-775.2	
Transmission Line						
Phase Distance (Mho Characteristic)						
	21	Three phase, single zone	KD-10	DB 41-491	.41-490	.41-491A1
	21	Similar to KD-10 except for carrier start	KD-11	DB 41-491	.41-490	.41-491A1
	21	Three phase, single zone, enhanced line angle	KD-5		.41-498.12	.41-491A1
	21	Single phase, variable offset mho characteristic	KD-3		.41-498	.41-491A1
	21	Similar to KD-10 except solid-state	SKD-T	DB 41-490		
	21	Similar to KD-11 except solid-state	SKD-1T	DB 41-490		
	21/2	Three phase, single zone, w/timer	SD-2	DB 41-495	.41-499.1	.41-499
Ground Distance						
	21N	Three phase, single zone, solid-state	SDG-1, -2, -4T	DB 41-496	.41-496.5	.41-496A1
	21N	Single phase, three zone, reactance type	KDXG	DB 41-497	.41-496	.41-496
	21N/2	Directional distance, w/2 zone timer, for use with KDXG relay	KDTG		.41-497.2	.41-497A2
	67N/2	Instantaneous, dual polarized ground overcurrent w/timer for use with KDXG relay KRT			.41-497	



Protective Relay Application/Selector Guide

Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Out-of-Step						
	68	Out of step (power swing) blocking relay	KS-3	DB 41-492	41-492.3	
	68/78	Out-of-step (power swing) tripping relay	KST		41-492.5	
Phase Overcurrent, Directional						
	67	Inverse timing	CR	DB 41-130A	41-131	41-131A1
	67	Instantaneous, voltage polarized	KRV	DB 41-130C	41-137.2	41-137.2
	67	Inverse timing and instantaneous, voltage polarized	IRV	DB 41-130B	41-133.3	41-133A1
Ground Overcurrent, Directional						
	67N	Inverse timing, current polarized	CRC	DB 41-130A	41-131	41-131A1
	67N	Inverse timing, voltage polarized	CRP	DB 41-130A	41-131	41-131A1
	67N	Inverse timing, dual polarized	CRD	DB 41-130A	41-131	41-131A1
	67N	Inverse timing, negative sequence polarized	CRO	DB 41-130A	41-163.2	41-131A1
	67N	Instantaneous, current polarized	KRC	DB 41-130C	41-137	41-137
	67N	Instantaneous, voltage polarized	KRP	DB 41-130C	41-137	41-137
	67N	Instantaneous, dual polarized	KRD, -4	DB 41-130C	41-137, 137.3	41-137
	67N	Instantaneous, negative sequence polarized	KRO	DB 41-130C	41-164	
	67N	Inverse timing and instantaneous, current polarized	IRC	DB 41-130B	41-133	41-133A1
	67N	Inverse timing and instantaneous, voltage polarized	IRP	DB 41-130B	41-133	41-133A1
	67N	Inverse timing and instantaneous, dual polarized	IRD	DB 41-130B	41-133	41-133A1
	67N	Inverse timing and instantaneous, negative sequence polarized	IRQ	DB 41-130B	41-133.2	41-133A2
	67N	Inverse timing, current polarized	CWC	DB 41-240	41-242.4	41-242
	67N	Inverse timing, voltage polarized	CWP	DB 41-240	41-242.4	41-242
	67N	Inverse timing for high resistance grounded system	CWP-1	DB 41-240	41-242.5	41-242
Phase Voltage						
	27	Under, inverse timing	CV-1, -2	DB 41-200	41-201	41-201A1
	27	Under, inverse timing, frequency compensated	CV-21, -22	DB 41-200	41-201.2	41-201A1
	59	Over, inverse timing	CV-4, -5	DB 41-200	41-201	41-201A1
	59	Over, inverse timing, frequency compensated	CV-24, -25	DB 41-200	41-201.2	41-201A1
	27/59	Over/under, inverse timing	CV-6, -7	DB 41-200	41-201	41-201A1
	27/59	Over/under, inverse timing, frequency compensated	CV-26, -27	DB 41-200	41-201.2	41-201A1
	27/59	Over/under, inverse timing (contact making voltmeter)	CVD	DB 41-200	L-385794	
	27	Under, for use in carrier trip or carrier start	KV-1		41-933.3	



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Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Reclosing						
	79	Single shot, solid-state, instantaneous reclose	SGR-51	DB 41-668	41-668.1	
	79	Single shot, solid-state, w/reclose initiate input	SGR-52	DB 41-668	41-668.12	
	79	Two-shot, rack-mounted	SGRU-54	DB 41-668	L-835846-B	
	79	Multi-shot reclose, dc, solid-state	DRC-1		41-667.3	41-667.3
	79	Multi-shot reclose	RC, RCL	DB 41-660	41-661	41-661A1
	79	Microprocessor multi-shot reclose	MRC	Refer to Division	41-665	
	25	Synchronism check	CVE	DB 41-680	41-681.1Q	
	25/27/79	Synch check w/bus & line voltage units	CVE-1, -2	DB 41-680	41-681.1Q	
	25	Synch check for automatic fast transfer schemes	CVE-3		41-681.1Q	
	25/79	Multi-shot reclose, solid-state, w/synch check	SRCU-2	DB 41-670	41-670	
Blinder Relay						
	21B	For supervision of distance relays during load or swing conditions	SDB		41-489	
Timers and Auxiliaries for Transmission Line Protection						
	2	Dc controlled timer, general purpose	TD-5	DB 41-570	41-579.1	
	2	Dc controlled timer, for use in zone distance scheme	TD-4	DB 41-570	41-579	
	2	Dc controlled timer, two timing units	TD-52	DB 41-570	41-579.3	
	32	Power flow, three phase, instantaneous	H-3	DB 41-225	41-226.2	41-419
	50	Overcurrent, for carrier blocking or ground fault trip	KO-1		41-931	
	50	Overcurrent, directional w/adjustable pickup	KH-2		41-138	
	50	Fault detector for KD scheme	KC-2		41-776.2	41-776.2
	50	Overcurrent fault detector, high speed, solid-state	SI-T	DB 41-777	41-777.3	
Pilot Systems						
Current Differential	87	Modular, solid-state, high speed, w/fiber optic or audio tone channel interface	LCB-II	Brochure B-796A	40-217A	
	87	High speed, for use with metallic pilot wires	HCB-1,2,3	DB 41-971	41-971.2,3,4	41-971A1, A2
		Fiber optic channel interface for HCB system	FCB	PB 40-975	40-975	
	74/85	Metallic pilot wire monitor/fault detector	PM		I.L. 41-973.5	
		Protection guide for metallic pilot wires			I.L. 41-971.4	
Phase Comparison	78	Current or distance type, blocking carrier system, for pilot only	SKBU-1	PL 40-021	41-954.3	
	78	Current or distance type, dual comparison, for unblocking or transfer trip	SKBU-2A	PL 40-021	41-954.6A	
	78	Segregated phase comparison type, dual comparer, for unblocking or transfer trip	SPCU-1A	PL 40-021	41-955.2A	
Directional Comparison	21	Modular, solid-state relay system	L-DAR	Brochure B-807	40-380.4	
	21	Microprocessor relay system	M-DAR	PDL 40-385	40-385	
	21	Modular, solid-state directional comparison systems	Uniflex	PL 40-021	40-848.3	



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Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Relay Communication Equipment						
On/Off Type		Transmitter/receiver, programmable, 30-535KHz range	TC-10B		I.L. 41-944.8	
Frequency Shift Type		Transmitter, programmable, 30-535KHz range	TCF-10B		I.L. 41-945.90	
		Receiver, programmable, 30-535KHz range	TCF-10B		I.L. 41-945.90	
		Transmitter/receiver, programmable, 30-535KHz range	TCF-10B		I.L. 41-945.90	
Single-Side Band Type		Voice grade, 8 to 500KHz range	SS-246	DB 40-444		
Line Tuners and Accessories		Line tuners and coupling devices	JZ	PL 40-022	{I.L. 41-947 I.L. 41-948 I.L. 41-949}	
Audio Tone Equipment		Dual channel frequency shift, high security	DIT-1	PL 40-022	41-965	
		Audio tone for use with SPCU-1A	DIT-4A	PL 40-022	41-964.1	
		On/off audio tone	DIT-5	PL 40-022	41-967	
		Single channel, frequency shift audio tone	DIT-3	PL 40-022	41-966	
Auxiliaries for Carrier and Pilot Systems						
	85	For use with K-Dar directional comparison overreaching transfer trip system	KA-1		I.L. 41-923.1	41-923.1
	85	For use with carrier and tone unblocking system	KA-4		I.L. 41-923.4	41-923A1
	85	For use with K-Dar overreaching transfer trip system using tones or carrier	TT-12		I.L. 41-958.9	
	85	Tone monitoring for single and dual transfer trip system	TT-9		I.L. 41-959.1	
	85	For use with K-Dar underreaching transfer trip system	TT-17		I.L. 41-958.5	
	85	Solid-state for use with DIT-1 tone permissive overreaching transfer trip system	STU-12		I.L. 41-959.7	
		Solid-state for use with TCF-10 carrier unblock system	STU		I.L. 41-959	
Auxiliary and General Purpose Relays and Accessories						
Instantaneous Current						
	50	Overcurrent, plunger type, high dropout	SC	DB 41-765	41-766.1	41-766A1
	50	Overcurrent, plunger type, low dropout	SC-1	DB 41-765	41-766.1	41-766A1
	37/50	Over or undercurrent, solid-state, high dropout	SSCT		I.L. 41-766.5	
	50	Fault detector, plunger type, for breaker trip duty	IT		I.L. 41-771.1	
	50	Fault detector, plunger type, high dropout, for breaker trip duty	ITH		I.L. 41-771	
Instantaneous Voltage						
	59	Overvoltage, plunger type, high dropout	SV	DB 41-765	41-766.1	41-766A1
	59	Overvoltage, plunger type, low dropout	SV-1	DB 41-765	41-766.1	41-766A1
	59	Overvoltage, frequency compensated	SVF	DB 41-765	41-766.4	41-766A1
	2/59	Overvoltage, two unit w/secondary timer	SVT		L-779577	
	27/59	Over or undervoltage, solid-state, high dropout	SSVT		I.L. 41-766.5	



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Type of Protection	Device Number	Description	Relay Type	Literature Reference	Instruction Leaflet	Renewal Parts Data
Tripping Relays						
	94	High speed, dc rated, four contacts	AR	DB 41-759	41-759.3	41-759
	94	High speed, dc rated, 20 V. input	ARS	DB 41-759	41-759.2	
	94	Ac or dc rated, two or four heavy duty contacts	SG	DB 41-750A	41-751.1	41-751A1
	94	Ac or dc rated, six heavy duty contacts	MG-6	DB 41-750B	41-753.1	41-753A2
	94	High speed for selective reclosing	SX	DB 41-750C	41-962.2	41-962A1
	94	Contactor switch w/indicator, for breaker trip duty	TR-1	DB 41-750C	41-758.1	
	94	Zener diode tripping unit	TRB-2, -3, -4	DB 41-750C	41-842	
Timers						
	2	Ac controlled timer, extended range	TK	DB 41-570	41-574.1	41-366A1
	2	Dc controlled timer, general purpose	TD-5	DB 41-570	41-579.1	
	2	Dc controlled timer, for use in zone distance scheme	TD-4	DB 41-570	41-579	
	2	Dc controlled timer, two timing units	TD-52	DB 41-570	41-579.3	
Annunciator						
	30	Mechanical operation indicator	JM	DB 41-740	41-741	41-740A1
Test switches and Test plugs						
	—	Two to ten pole current and/or potential test	FT-1	DB 41-075C	41-076	
	—	Two to ten pole current and/or potential testplug	FT-1	DB 41-075C	41-076	41-076A1
Inverter						
	—	Dc to ac inverter		DB 41-075D	41-856	41-852A1
Relay Systems						
		Solid-state or electromechanical panels and 9" racks		AD 40-100		

Literature Reference Key:

- DB Descriptive Bulletin
- PB Product Bulletin
- PL Price List
- IL Instruction Leaflet
- L-Spec Supplementary Instruction Leaflet
- Brochure .. Full Color Brochure
- PRSC Protective Relay Systems Committee
- RPL Relay Pointer Letter
- AD Application Data
- PDL Product Description Leaflet

Additional Information

General ordering information, including style numbers and descriptions of the relays found in this publication can be found in Technical Data 41-020 and Price Lists 41-020, 40-021 and 40-022.

Other helpful relay application guides:

- B-7235-G Applied Protective Relaying
- RPL index Relay Pointer Letter Index of selected relay topics
- AD 41-300 Differential Relays for Protection of AC Generators, Transformers and Station Bus
- Industrial and Commercial Power System Application Series
 - PRSC-1. AC Generator Protection Guide
 - PRSC-2. AC Motor Protection Guide
 - PRSC-3. Transformer Protection Guide
 - PRSC-4. System Neutral Grounding and Ground Fault Protection Guide
 - PRSC-5. Plant-Utility Tie Circuit Protection Guide
 - PRSC-6. Relay Current Transformer Application Guide
 - PRSC-7. Capacitor Protection Guide
 - PRSC-8. Induction Generator Protection Guide