



WavePro™ Low Voltage Power Circuit Breakers with Power+™, Enhanced MicroVersaTrip Plus™ and MicroVersaTrip PM™ Trip Units

Product Overview

WavePro Low Voltage Power Circuit Breaker

The new GE line of WavePro Low Voltage Power Circuit Breakers is intended for use in commercial, industrial, and utility applications. Built to withstand intense service conditions, these circuit breakers provide the ultimate in system selectivity because of their high withstand capabilities. These circuit breakers are UL listed and meet the ANSI standards for low-voltage power circuit breakers. The WavePro line consists of six frame sizes with current ratings of 800 to 5000 amperes and short-circuit ratings through 200,000 amperes.

Power+ Trip Unit

The Power+ trip unit is a new addition to the list of trip units available on GE low voltage power circuit breakers. It provides the same true RMS sensing as the MicroVersaTrip trip units. The liquid crystal display and keypad are replaced by plug-in modules and rotary switches. The plug-in module provides optional LED targets for overload, short circuit and ground fault trips. View and reset push buttons are also provided to monitor status, including a battery check LED. The rating plug module serves the dual purpose of providing the trip rating for the circuit breaker as well as ground fault protection when required. All pickup and delay settings are selected with detented rotary switches.

Enhanced MicroVersaTrip Plus Trip Unit

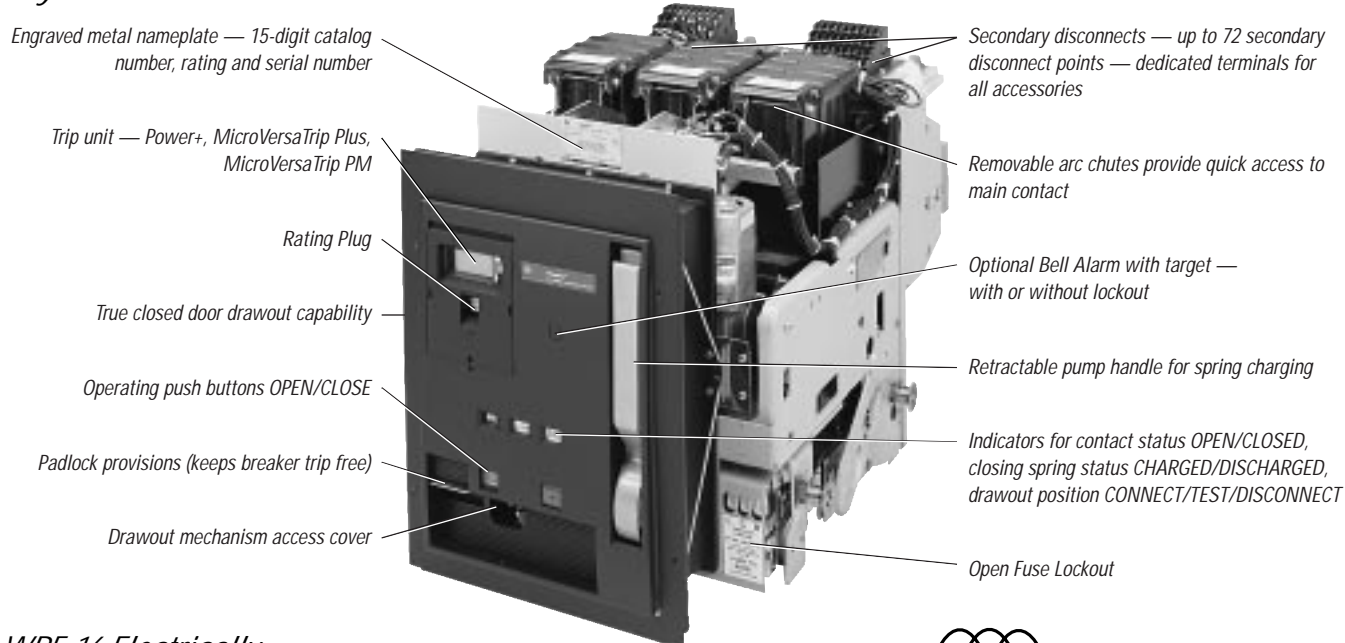
The Enhanced MicroVersaTrip Plus trip unit contains a digital liquid crystal display with a five-button keypad for local setup and readout of trip settings. These enhanced trip units contain a lithium battery for cold setup capability and viewing of targets without external power. A three-phase ammeter and trip indicators are standard. A sealable cover in the breaker escutcheon provides a tamper-resistant installation.

The trip unit digitally measures the current waveform in each phase to determine the true RMS value of the current, regardless of the wave shape. MicroVersaTrip Plus trip units provide accurate, predictable overload and short-circuit protection for distribution systems that include variable-speed drives, rectifiers, induction heating, and other loads that cause high harmonic distortion, as well as standard circuits. The wide range of trip characteristics allows maximum breaker-to-breaker selectivity and custom load protection. Short-time and ground-fault functions include the flexibility of coordination with or without I2t ramp.

Enhanced MicroVersaTrip PM Trip Unit

The enhanced MicroVersaTrip (MVT) PM trip unit adds power management system capability, including advanced metering and protective relaying to the basic functions of the MVT Plus. The MVT PM can be interfaced with either Modbus RTU or Ethernet TCP/IP compatible systems.

Key Product Features



WPF-16 Electrically
Operated Circuit Breaker



Breaker Features

- Designed to meet ANSI C37.13, C37.16, C37.17 and tested to ANSI C37.50
- Listed and labeled to UL-1066 and CSA C22.2
- 100% rated, 40°C room ambient temperature
- Six frame sizes: 800, 1600, 2000, 3200, 4000, 5000
- Integral spring charging handle standard on manual and electrically operated breakers
- Improved breaker rating rejection feature
- Trip unit is mounted in the breaker escutcheon, “thru the door” access
- True closed-door drawout for maximum operator safety
- Breaker drawout position indicator in the escutcheon
- Up to 72 secondary disconnect points — accessories have dedicated wiring points
- Choice of three trip units
- Short circuit ratings through 200,000 amperes rms symmetrical
- Metal frame construction provides rigidity and endurance
- Easy access to main components to facilitate inspection and maintenance
- Optional "power management ready" for easy field upgrade

Power+™, MicroVersaTrip Plus™ and MicroVersaTrip PM™ Trip Unit Characteristics

Frame Size	Max. Amp Rating	Sensor Rating (Amps) (CT)	Long-time		Short-time	
			Long Time (LT) (Pickup) Multiple of Rating Plug Amps (In)	① Delay [Band] (Seconds)	Pickup (Multiple of Long Time) (LT)	Delay [Band] (Seconds)
WPS-08 / WPH-08 WPX-08 / WPF-08	800	150, 400, 800	Power+ 0.5 thru 1.1 in in steps of 0.1	[1] [2] [3] [4] 2.4, 4.9, 9.8, 20	Power+ 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 7.0, 9.0	① I ² T in 0.40
WPS-16 / WPH-16 WPF-16	1600	800, 1600				
WPS-20	2000	2000				
WPS-32 / WPH-32	3200	3200	MVT Plus/PM 0.5 thru 1.1 in in steps of 0.05		MVT Plus/PM 1.5 thru 9.0 in steps of 0.5	② I ² T out [1] [2] [3] .10, .21, .35
WPS-40	4000	4000				
WPS-50	5000	5000				

Frame Size	Adjustable Instantaneous Pickup without ST (Multiple of Rating Plug Amps) (In)	Adjustable Instantaneous Pickup with ST (Multiple of Rating Plug Amps) (In)	Ground Fault		
			Pickup (Multiple of Sensor Amp rating) (CT)	Delay with I ² T (Seconds)	Delay without I ² T [Band] (Seconds) ③
WPS-08 / WPH-08 WPX-08 / WPF-08 WPS-16 / WPH-16 WPF-16 WPS-20	Power+ 1.5, 2.0, 3.0, 5.0, 7.0, 9.0, 10.0 MVT Plus/PM 1.5 thru 10.0 in steps of 0.5	Power+ 1.5, 2.0, 3.0, 5.0, 7.0, 9.0, 10.0, 13.0, 15.0 MVT Plus/PM 1.5 thru 15.0 in steps of 0.5	Power+ .20, .25, .30, .35, .40, .45, .50, .60 MVT Plus/PM 0.20 thru 0.60 in steps of 0.01	.44 at 200% of pickup at lower limit of band	[1] [2] [3] .10, .21, .35
WPS-32 / WPH-32		Power+ 1.5, 2.0, 3.0, 5.0, 7.0, 9.0, 10.0, 13.0 MVT Plus/PM 1.5 thru 13.0 in steps of 0.5	Power+ .20, .22, .24, .26, .28, .30, .34, .37 MVT Plus/PM 0.20 thru 0.37 in steps of 0.01		
WPS-40	Power+ 1.5, 2.0, 3.0, 5.0, 7.0, 9.0 MVT Plus/PM 1.5 thru 9.0 in steps of 0.5	Power+ 1.5, 2.0, 3.0, 5.0, 7.0, 9.0 MVT Plus/PM 1.5 thru 9.0 in steps of 0.5	Power+ .20, .22, .24, .26, .28, .30 MVT Plus/PM 0.20 thru 0.30 in steps of 0.01		
WPS-50 ④	MVT Plus/PM 1.5 thru 7.0 in steps of 0.5	MVT Plus/PM 1.5 thru 7.0 in steps of 0.5	MVT Plus/PM 0.20 thru 0.24 in steps of 0.01		

① Time delay shown at 600% of current setting at lower limit of band.

② Time delay shown at lower limit of each band. All pickup tolerances are ± 10%.

③ Time delay shown at lower limit of band. Ground fault pick up not to exceed 1200 amps.

④ Power+ not available on 5000 amp (WPS-50) circuit breaker.

In or X = Rating plug amps

CT or S = Sensor amp rating

LT or C = Long-time current setting

ST = Short time characteristic

Enhanced MicroVersaTrip PM™ Trip Unit Features (All Frames)

Function	Description	Trip Unit Suffix	
		M (Metering)	PM (Metering & Relaying)
Amperes (A)	Selectable phase current, $\pm 2.0\%$	X	X
Voltage (V)	L-L or L-N Volts, $\pm 1.5\%$	X	X
Energy (kWh, MWh)	Total energy usage on breaker, $\pm 3.5\%$	X	X
Real Power (kW)	L-L or L-N Power, $\pm 3.5\%$	X	X
Frequency (Hz)	Circuit Frequency, ± 1 Hz	X	X
Undervoltage Trip	Adjustable pickup: 50-90%; adjustable delay: 1-15 s, OFF		X
Overvoltage Trip	Adjustable pickup: 110-150%; adjustable delay: 1-15 s, OFF		X
Voltage Unbalance	Adjustable pickup: 10-50%; adjustable delay: 1-15 s, OFF		X
Current Unbalance	Adjustable pickup: 10-50%; adjustable delay: 1-15 s, OFF		X
Power Reversal	Adjustable pickup: 10-990 kW; adjustable delay: 1-15 s, OFF		X
Power Direction	Setup as line-to-load or load-to-line		X
Communication		X	X

Product Specifications

WavePro Breaker Interrupting Ratings

Rated AC Voltage, Nominal (max)	Breaker Type	Frame Size (amps)	Short-Circuit RMS Symmetrical kA		
			Short-Time Withstand	With Instantaneous Trip	Without Instantaneous Trip
600 (635)	WPS-08	800	30	30	30
	WPH-08	800	42	42	42
	WPX-08	800	50	50	50
	WPS-16	1600	42	42	42
	WPH-16	1600	65	65	65
	WPS-20	2000	65	65	65
	WPS-32	3200	65	65	65
	WPH-32	3200	85	85	85
	WPS-40	4000	85	85	85
480 (508)	WPS-08	800	30	30	30
	WPH-08	800	42	42	42
	WPX-08	800	65	65	65
	WPS-16	1600	50	50	50
	WPH-16	1600	65	65	65
	WPS-20	2000	65	65	65
	WPS-32	3200	65	65	65
	WPH-32	3200	85	85	85
	WPS-40	4000	85	85	85
240 (254)	WPS-08	800	30	42	30
	WPH-08	800	42	50	42
	WPX-08	800	65	65	65
	WPS-16	1600	50	65	50
	WPH-16	1600	65	65	65
	WPS-20	2000	65	65	65
	WPS-32	3200	65	85	65
	WPH-32	3200	85	130	85
	WPS-40	4000	85	130	85
120 (125)	WPS-08	800	30	42	30
	WPH-08	800	42	50	42
	WPX-08	800	65	65	65
	WPS-16	1600	50	65	50
	WPH-16	1600	65	65	65
	WPS-20	2000	65	65	65
	WPS-32	3200	65	85	65
	WPH-32	3200	85	130	85
	WPS-40	4000	85	130	85

Fused Breaker Ratings (Max. 600 Vac. 50/60 Hz)

Breaker Type	Frame Size (amps)	Fuse Rating, A ^①		Interrupting Rating RMS Symmetrical kA
		Min.	Max.	
WPF-08	800	300	1600	200
WPF-16	1600	450	2500	200
WPS-20 ^②	2000	2000	2500	200
WPS-32 ^②	3200	2000	4000	200
WPS-40 ^②	4000	2000	5000	200
WPS-50 ^②	5000	2000	5000	200

^① The maximum fuse rating is the largest fuse that tests show will result in proper performance of the breaker and fuse in combination under short-circuit conditions. Only Gould-Shawmut fuses should be used for proper coordination.

^② Fuses are mounted on separate fuse roll-out element.

Shipping Weight

Draw-Out Breaker Element	Net (lbs)	
	Manual	Electrical
WPS/WPH/WPX-08	200	205
WPF-08	245	250
WPS/WPH-16	210	215
WPF-16	255	260
WPS-20	220	225
WPS/WPH-32	475	485
WPS-40	535	545
WPS-50	575	585

Operating Time (Cycles on 60 Hz Base; All Frame Sizes)

Closing electrically

Time from energizing closing circuit until contacts touch __ 5

Open (maximum clearing time)

With instantaneous overcurrent trip _____ 3

With shunt trip _____ 3.5

WavePro Breaker Catalog Number Guide (Catalog number stamped on breaker nameplate)

For identifying exact replacement WavePro breakers and verifying ratings and features of the circuit breaker

Equipment Usage			Frame Sizes & Interrupting Rating		Trip Unit Type, Characteristics & Trip Rating								
W		E	2	D	A		Q		D				
1		2		3		4		5		6		7	
Usage			Code		Trip Unit type			Code					
AKD10/PBII/AV3 Access Equipment			WE		none (non-automatic)			X					
OEM Equipment (Substructure Based)			WS		MVT Plus			A					
					MVT M (metering & communications)			B					
					MVT PM (relaying, metering & communications)			C					
					Power + ①			G					
					Power + (w/GF) ① ③			H					
					Power + (w/Defeatable GF) ① ② ③			J					
					Power + (w/targets) ①			K					
					Power + (w/targets & GF) ① ③			L					
					Power + (w/targets & Defeatable GF) ① ② ③			M					
					① Power + is not available for 5000A frame breakers								
					② Not UL Listed ③ GF is 3w/4w (See Note 1)								
Interrupting Capability/ Fuse Type			Code		Trip unit codes (See Table A)								
Standard (ex. WPS)			1		TU function		Code	TU function		Code			
High (ex. WPH)			2		none		X	LIGDZ1 ① ③		N			
Extended (ex. WPX)			3		LS ②		A	LSI ②		P			
OFLO only			4		LSG ③		B	LSIG ③		Q			
300A Class "J" fuse			A		LSGZ1 ③		C	LSIGX ① ③		R			
350A Class "J" fuse			B		LSGZ2 ③		D	LSIGZ1 ③		S			
400A Class "J" fuse			C		LSGD ① ③		E	LSIGZ2 ③		T			
450A Class "J" fuse			D		LSGDZ1 ① ③		F	LSIGD ① ③		V			
500A Class "J" fuse			E		LSGDZ2 ① ③		G	LSIGDZ1 ① ③		W			
600A Class "J" fuse			F		LI ②		J	LSIGDZ2 ① ③		Y			
800A Class "L" fuse			G		LIG ③		K	① Not UL Listed					
1000A Class "L" fuse			H		LIGZ1 ③		L	② Power+ available with LI, LS or LSI only					
1200A Class "L" fuse			J		LIGD ① ③		M	③ GF is 3w/4w (See Note 1)					
1600A Class "L" fuse			K										
2000A Class "L" fuse			L										
2500A Silver "L" fuse			M										
800A "Welder" limiter			N										
1200A "Welder" limiter			P										
1600A "Welder" limiter			Q										
2000A "Welder" limiter			R										

Frame	&	Sensor	Code (See Note 1)
800		none	A
		150	B
		400	C
		800	D
1600		none	E
		800	F
		1600	G
2000		none	H
		2000	J
3200		none	K
		3200	L
4000		none	M
		4000	N
5000		none	P
		5000	R

Rating	Sensor	Plug	Code	Rating	Sensor	Plug	Code	Rating	Sensor	Plug	Code				
150	none	X	1	800	600	D	3200	1200	K	1600	M				
												700	E	2400	P
				1600	600 ①	D		1600	800			G	1600	M	
															1000
1100 ①	J	4000	2500				3000			R					
				1200	K	3600 ①		T							
1600	M	4000	V												
				400	150 ①	5	2000	750 ①	F	3200 ①	S				
200	6	1000	H									5000	4000 ①	V	
															1200
225	7	1500 ①	L												
														250	8
300	9	2000	N												
						400	A								
800	300 ①	9	400	A	1500 ①							L			
						450 ①	B	1600	M						
															500

Note 1: If 4 wire GF is required then the "A-Disc" [character position 14] must be selected and the 4th wire (neutral) sensor must be ordered separately. Refer to DEP-080 Product Catalog.

Sensor = "none" for non-automatic breakers

Table A

L = Long Time (LT)
S = Short Time (ST)
I = Instantaneous (Inst)
G = Ground Fault (GF)
GD = Defeatable GF

X = Switchable ST or Inst and GF
Z1 = Zone Selective Interlocking—GF
Z2 = Zone Selective Interlocking—GF and ST

Breaker Operation & Control Voltages

Breaker Mounted Accessories

F		1
8		9
Operation		Code
Charge & Close		
manual		X
manual with remote close ①		
Close voltage		
120v-60Hz		1
240v-60Hz		3
120v-50Hz		4
240v-50Hz		6
48v -DC		A
110v-DC		B
125v-DC		C
250v-DC		D
electrical ①		
Charge / Close		
48v-DC		E
120v-60Hz		F
120v-50Hz		H
120v-50/60/48v-DC		N
110v-DC		P
125v-DC		Q
250v-DC		R
240v-60Hz		T
240v-50Hz		W
① (Requires min 4 stage auxiliary switch and shunt trip)		

Shunt Trip-1			
Code		Code	
none	X	24VDC ①	B
120VAC, 60Hz ①	1	48VDC	D
208VAC, 60Hz	2	110 / 125VDC ①	E
240VAC, 60Hz ①	3	250VDC ①	F
70VAC, 60Hz	4	① Coil ratings available for Shunt Trip-1 or Shunt Trip-2. All other ratings apply to Shunt Trip-1 only.	
120VAC, 50Hz	5		
208VAC, 50Hz	6		
240VAC, 50Hz	7		
12VDC	A		

Undervoltage (UV) or Electric Lockout (ELO) (See Note 2 Below)			
Code			
	UV	UV w/TD	ELO
none	X	X	X
120V-50/60Hz	1		4
208V-50/60Hz		3 (TAKYUVT-3)	
240V-50/60Hz	2	3 (TAKYUVT-3)	5
24VDC	A		G
48VDC	B		H
110VDC	C		J
125VDC	C	E (TAKYUVT-1)	J
250VDC	D	F (TAKYUVT-2)	K
Note 2: Order Static Time Delay Unit (TAKYUVT-1,2,3) separately			









X	B	B	X	Q	X
10	11	12	13	14	15
Accessory Code		Accessory Code		Accessory Code	
none		none		none	
Aux switch		Aux switch		Aux switch	
4 stages		4 stages		4 stages	
7 stages		7 stages		7 stages	
Bell alarm		Bell alarm		Bell alarm	
Bell alarm with lockout		Bell alarm with lockout		Bell alarm with lockout	
Shunt Trip-2 (Not available on WPS-50)		Shunt Trip-2 (Not available on WPS-50)		Shunt Trip-2 (Not available on WPS-50)	
Future use		Future use		Future use	




"A - Disc"	Hidden	Operation	Remote Charge	
(See Note 3 Below)	Close PB (E/O only)	Counter	Indicator (E/O only)	Code
No	No	No	No	X
No	No	No	Yes	A
No	No	Yes	No	B
No	No	Yes	Yes	C
No	Yes	No	No	D
No	Yes	No	Yes	E
No	Yes	Yes	No	F
No	Yes	Yes	Yes	G
Yes	No	No	No	H
Yes	No	No	Yes	J
Yes	No	Yes	No	K
Yes	No	Yes	Yes	L
Yes	Yes	No	No	M
Yes	Yes	No	Yes	N
Yes	Yes	Yes	No	P
Yes	Yes	Yes	Yes	Q

Note 3: "A-Disconnect" (A-Disc) — the 36 point A-Disc is automatically supplied whenever any of the following accessories/features are ordered: zone selective interlock, shunt trip, auxiliary switch, bell alarm, undervoltage, electric lockout, E/O, MVT PM. Select the A-Disc if 4-wire GF is required or if a breaker is to be "PM Ready" and none of the above accessories/features are ordered. "PM Ready" wiring includes inputs for 24vDC auxiliary power, communications, and 3 phase voltage.




Accessory Wiring Guide for WavePro Breakers




A-Disc Block (left side from front)




10	Aux Switch (N.O. contact)	
1	Aux Switch	
2	Aux Switch	
11	Aux Switch (N.C. contact)	
12	Aux Switch (N.O. contact)	
3	Aux Switch	
4	Aux Switch	
13	Aux Switch (N.C. contact)	



5	Aux Switch (N.O. contact)	
6	Aux Switch (N.C. contact)	
7	(Note 1) Aux Switch (common)	



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

5	Shunt Trip (N.O. contact)	
6	Shunt Trip (N.C. contact)	
7	(Note 1) Shunt Trip (common)	

14	Bell Alarm (N.O. contact)	
15	Bell Alarm (N.C. contact)	
16	Bell Alarm (common)	

19	Bell Alarm (N.O. contact)	
20	Bell Alarm (N.C. contact)	
21	Bell Alarm (common)	

8	Closing Spring Charging Motor	
17	Closing Spring Charging Motor	

9	Close Circuit (electric bkr) *	
18	Close Circuit	

22	Undervoltage or Electric Lockout	
23	Undervoltage or Electric Lockout	









24	Neutral Sensor — Tap	
25	Neutral Sensor — Common	



26	Commnet +	
27	Commnet -	
28	Zone Selective Interlock (In +)	
29	Zone Selective Interlock (In -)	
30	Zone Selective Interlock (Out +)	
31	Zone Selective Interlock (Out -)	
32	Va (voltage conditioner)	
33	Vb (voltage conditioner)	
34	Vc (voltage conditioner)	
35	Trip Unit Auxiliary Power (24VDC +)	
36	Trip Unit Auxiliary Power (24VDC -)	

* Remote Close Accessory on manual breaker



** Remote Charge Indicator (closing springs) applies to E/O breakers only



C-Disc Block (right side from front)



10	Aux Switch (N.O. contact)	
1	Aux Switch	
2	Aux Switch	
11	Aux Switch (N.C. contact)	
12	Aux Switch (N.O. contact)	
3	Aux Switch	
4	Aux Switch	
13	Aux Switch (N.C. contact)	



14	2nd Shunt Trip	
5	(Note 1) 2nd Shunt Trip	

or

14	Aux Switch (N.O. contact)	
5	(Note 1) Aux Switch	



6	Aux Switch	
15	Aux Switch (N.C. contact)	



8	Remote Charge Indicator **	
17	Remote Charge Indicator **	

16	WPS-50 Fan Motor — 120VAC (H)	
7	WPS-50 Fan Motor — 120VAC (N)	

9	Spare	
18	Spare	
19	Spare	
20	Spare	
21	Spare	

22	OFLO (phase A)	
23	OFLO (phase A)	

24	OFLO (phase B)	
25	OFLO (phase B)	

26	OFLO (phase C)	
27	OFLO (phase C)	

28	Spare	
29	Spare	
30	Spare	
31	Spare	
32	Spare	
33	Spare	
34	Spare	
35	Spare	
36	Spare	

Notes

1. Auxiliary switch contacts are wired out if shunt trip is not provided.
2. This drawing shows all breaker accessories. Refer to breaker catalog number for accessories included with the breaker.

Reference Publications

DES-001	Time current curve	Power+, MVT Plus / PM LSI	DET-167	WavePro Breaker Application Guide
DES-002	Time current curve	Power+, MVT Plus / PM GF	DEU-020	Breaker Guideform Specification, Substructure Drawings and Publications (CD-ROM)
DEH-178	MicroVersaTrip Plus/PM Trip Unit Users Guide		DEE-194	WavePro User Publications Summary
DEH-179	Power+ Trip Unit Users Guide			



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