



# MicroVersaTrip<sup>®</sup> RMS-9 Conversion Kits

## For AK/AKR Low Voltage Power Circuit Breakers

OVERLOAD    SHORT CIRCUIT    GROUND FAULT

**RMS-9**

MicroVersaTrip<sup>®</sup> PROGRAMMER

TRIP INDICATOR  
PUSH TO  
RESET

---

**CURRENT SETTING**

.6X    .8X    1.0X  
5X    7X    8X    9X    11X

**LONG TIME DELAY**

1    2    3    4

**GROUND FAULT PICKUP**

22S    24S    26S    28S  
25    35    37S

**SHORT TIME PICKUP**

1.5C    2C    2.5C    3C    4C    5C    7C    9C

**GROUND FAULT DELAY**

I<sup>2</sup>T IN    I<sup>2</sup>T OUT  
MAX MAX  
INT INT  
MIN MIN

**SHORT TIME DELAY**

I<sup>2</sup>T IN    I<sup>2</sup>T OUT  
MAX MAX  
INT INT  
MIN MIN

C = CURRENT SETTING  
H = FRAME SHORT TIME RATING

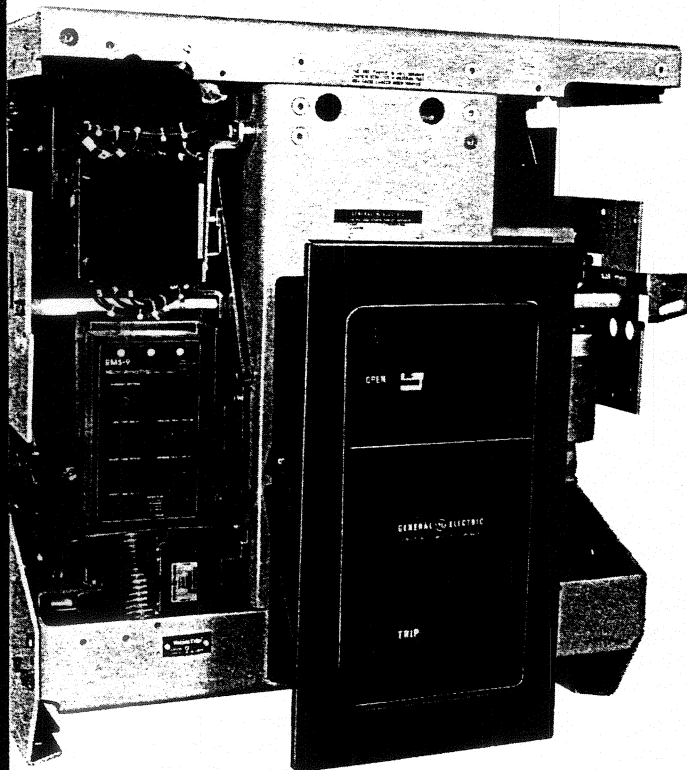
**RATING PLUG**  
CAT. NO. TR32S1200  
X = 600 A  
S = 1200 A

TEST

PICKUP

CAT. NO. TS32LSGT2

212



# MicroVersaTrip® RMS-9 Conversion Kits for AK/AKR Breakers 60–4000A; 600Vac; 50/60 Hz

Introducing MicroVersaTrip® RMS-9 Conversion Kits for AK/AKR circuit breakers. Now your old-style AK/AKR breakers can be equipped with the new digital solid state MicroVersaTrip® RMS-9 overcurrent trip devices used on the latest AKR breakers.

Designed for breakers applied on 50/60 Hz AC systems and originally equipped with Type EC, ECS, SST, or Power Sensor trip devices, MicroVersaTrip® RMS-9 Conversion Kits offer convenient, on-site upgrading of General Electric AK/AKR breakers.

**MICROVERSATRIP® RMS-9 CONVERSION KITS OFFER A LINE-UP OF FEATURES PREVIOUSLY UNAVAILABLE FOR LOW VOLTAGE SYSTEM PROTECTION**

## ■ Improved Accuracy, Reliability and Flexibility

Installation of a MicroVersaTrip® RMS-9 Conversion Kit brings the newest technological advancement in overcurrent protection to your old-style AK/AKR breakers. The nine-function programmer provides maximum application flexibility and improved system coordination with accurate eight-point trip adjustment switches and multiple time delay bands. Increased selectivity is obtained with ramp time functions on both short-time and ground fault. The programmer, constructed with goldplated contacts and protective conformal epoxy coated printed circuit boards, provides the ultimate in accuracy, reliability, and long life.

## ■ RMS-9 Digital sensing of sinusoidal and harmonic wave forms

MicroVersaTrip® RMS-9 provides accurate and predictable overload and short circuit protection for distribution systems that include AC and DC variable speed drives, induction heating, and other loads that contribute non-sinusoidal wave shapes.

## ■ Rating plugs provide convenient flexibility in matching load requirements with fixed current sensors

RMS-9 programmers utilize a broad range of field installable rating plugs for future upgrading capability, minimum size cable selection, and an extra degree of coordination flexibility.

## ■ Adds the security of Ground Fault with memory

The MicroVersaTrip® RMS-9 conversion kit provides integral ground fault protection with adjustable pick-up and time delay. Due to the highly intermittent and erratic nature of arcing ground faults, a memory circuit is incorporated as a standard feature. Ground fault delay is provided both with and without an I<sup>2</sup>t ramp.

## ■ Assures dependable, fully automatic operation

After installation, the operation of the MicroVersaTrip® programmer is fully automatic and requires no external logic or control power inputs. The self-powered, solid-state logic unit assures dependable operation.

## ■ Mechanical trip indication expedites trouble shooting

Pop-out trip indicators on the MicroVersaTrip® RMS-9 programmer provide clear indication of short circuit, overload, and ground fault conditions. For reliability, the indicators require no external power to operate, and remain in the indicated position until manually reset.

## ■ Long-time timing light

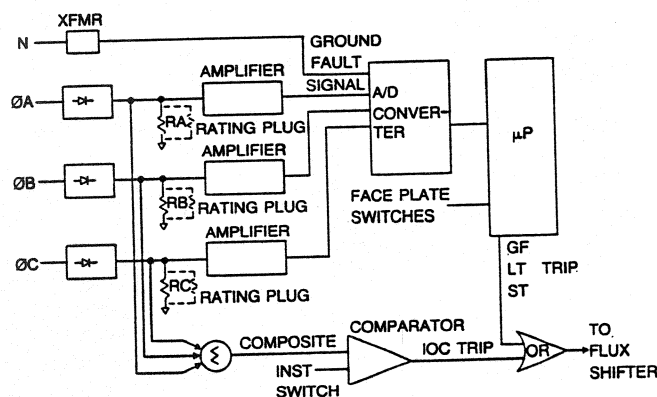
Standard on all MicroVersaTrip RMS-9 units, the long-time timing light provides a visual indication that the breaker is approaching an overload condition (flashing light), or is timing out to trip (continuous light) under an overload.

## ■ Requires minimum down time for installation

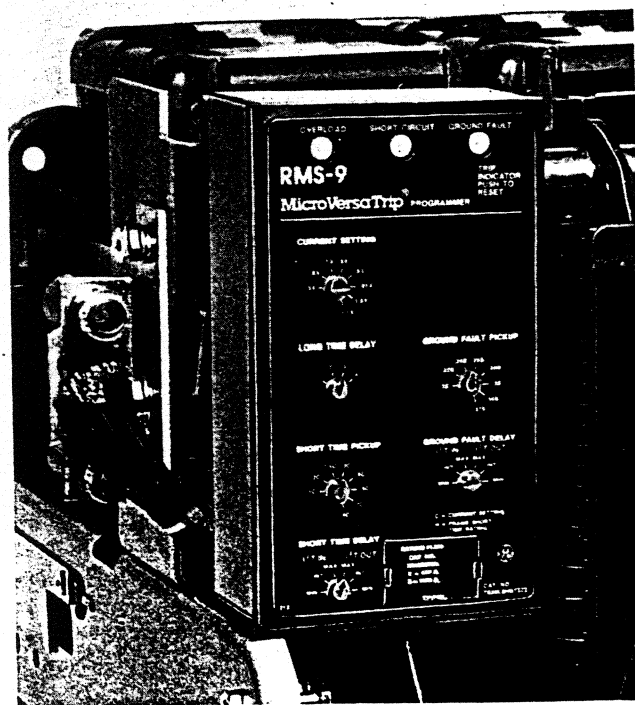
Every MicroVersaTrip® RMS-9 Conversion Kit contains all the components, hardware, wiring, and instructions necessary to completely convert EC, ECS, SST, and Power Sensor breaker types.

## ■ Portable test kit

The digital processor of the RMS-9 provides a communication link with the small, battery powered TVRMS test kit for programmer self test, setting confirmation, and long time, short time, instantaneous, and ground fault **no trip or trip** functional testing. For all test kit operations, the trip unit remains installed in the breaker, carrying normal load, and continues to provide protection unless a trip functional test is selected. The test kit can also be used to monitor trip current and time and provide temporary ground fault defeat with high current injection test methods.



**MicroVersaTrip® RMS-9 Block Diagram**



**MicroVersaTrip® RMS-9 Programmer Unit  
Installed on AK-75**

**Note: Applicable time-current curves are GES-6228 (ground fault) and GES-6227 (phase overcurrent).**

**MicroVersaTrip® RMS-9 Programmer Characteristics for Conversion Kits With Fixed Sensors and Interchangeable Rating Plug**

Frame Size	Max. Amp Rating	Sensor Rating (Amps) (S)	Rating Plug Rating (Amps) (X)	Current Setting, C (Multiple of Rating Plug Amps) (X)	Long-Time		Short-Time	
					Pick Up (Multiple of Current Setting) (C)	Delay ① (Seconds)	Pick Up (Multiple of Current Setting) (C)	Delay (Seconds)
AKR-30 AKR-30H AKRU-30	800	150	60, 80, 100, 125, 150	.5, .6, .7, .8, .9, .95, 1.0, 1.10	Fixed at 1.0 of Current Setting	2.4, 4.9, 9.8, 20	1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 7.0, 9.0	① I <sup>2</sup> T In: .40
		400	150, 200, 225, 250, 300, 400					
		800	300, 400, 500, 600, 700, 800					
AKR-50 AKR-50H AKRU-50 AKJ-50	1600	800	300, 400, 500, 600, 700, 800					
		1600	600, 800, 1000, 1200, 1600					
AKRT-50 AKRT-50H AKJT-50	2000	2000	800, 1000, 1200, 1600, 2000					
AKR-75	3200	3200	1200, 1600, 2400, 3200					
AKR-100 AKW-100	4000	4000	1600, 2000, 2500, 3000, 4000					

Frame Size	Adjustable Instantaneous Pick Up Without ST (Multiple of Rating Plug Amps) (X)	Adjustable Instantaneous Pick Up With ST (Multiple of Rating Plug Amps) (X)	Ground Fault		
			Pickup ③ (Multiple of Sensor Amp Rating) (S)	Delay With I <sup>2</sup> t (Seconds)	Delay Without I <sup>2</sup> t (Seconds)
AKR-30 AKR-30H AKRU-30	1.5, 2, 3, 5, 7, 9, 10	1.5, 2, 3, 5, 7, 9, 10, 13, 15	.2, .25, .3, .35, .4, .45, .5, .6	.40 at 200% of pickup at lower limit of band	.10, 21, .35 at lower limit of band
AKR-50 AKR-50H AKRU-50 AKJ-50					
AKRT-50 AKRT-50H AKJT-50					
AKR-75					
AKR-100 AKW-100	1.5, 2, 3, 5, 7, 9	1.5, 2, 3, 5, 7, 9	.2, .22, .24, .26, .28, .30, .34, .37		

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

② Time delay shown at lower limit of each band

③ Ground fault pickup not to exceed 1200 Amps

X= Rating Plug Amps  
S= Sensor Amp Rating  
C= Current Setting

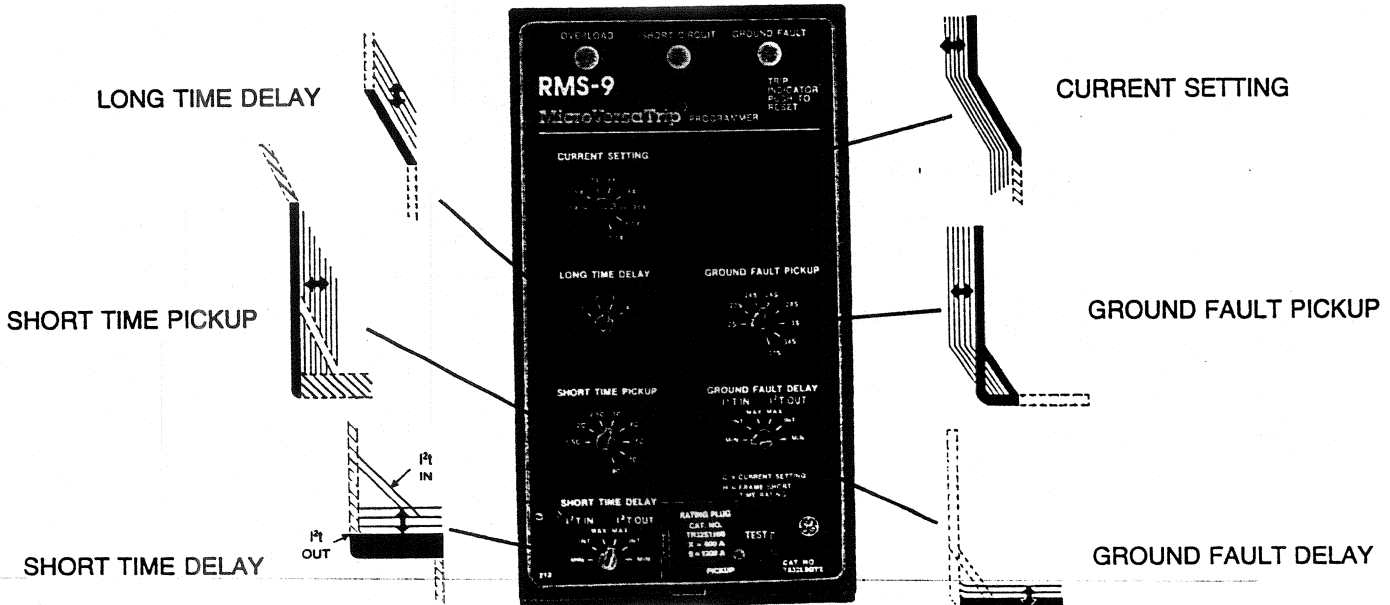
# MicroVersaTrip® RMS-9 Programmer Characteristics For Conversion Kits With Tapped Sensors and Fixed Rating Plug

Frame Size	Sensor Amp Rating (S)	Sensor Tap Rating (Amps) (X)	Current Setting, C (Multiple of Sensor Tap) (X)	Long-Time		Short-Time	
				Pick Up (Multiple of Current Setting) (C)	Delay ① (Seconds)	Pick Up (Multiple of Current Setting) (C)	Delay (Seconds)
AK-15	225	70, 100, 150, 225	.5, .6, .7, .8, .9, .95, 1.0, 1.10	Fixed at 1.0 of Current Setting	2.4, 4.9, 9.8, 20	1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 7.0, 9.0	① I <sup>2</sup> T In: .40  ② I <sup>2</sup> T Out: .10, .21, .35
AK-25	225	70, 100, 150, 225					
AKU-25	600	200, 300, 400, 600					
AK-50	800	300, 400, 600, 800					
AKU-50	1600	600, 800, 1200, 1600					
AKS-50		600, 800, 1200, 1600					
AKSU-50	1600	1200, 1600					
AKT-50	2000	800, 1200, 1600, 2000					
AKST-50	3000	1200, 1600, 2000, 3000					
AK-75	4000	1600, 2000, 3000, 4000					

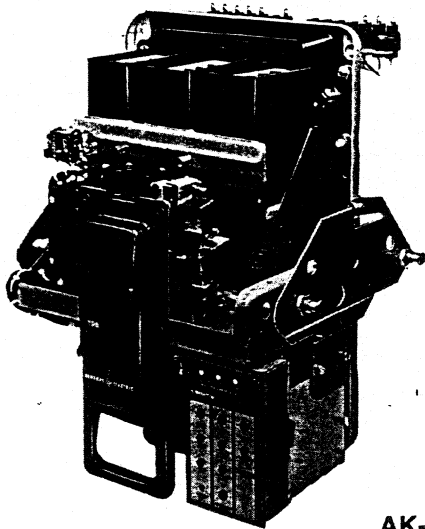
Frame Size	Instantaneous				
	Adjustable Instantaneous Pick Up Without ST (Multiple of Sensor Tap Amps) (X)	Adjustable Instantaneous Pick Up With ST (Multiple of Sensor Tap Amps) (X)	Ground Fault		
			Pickup ③ (Multiple of Sensor Amp Rating) (S)	Delay With I <sup>2</sup> t (Seconds)	Delay Without I <sup>2</sup> t (Seconds)
AK-15	1.5, 2, 3, 5, 7, 9, 10	1.5, 2, 3, 5, 7, 9, 10, 13, 15	.2, .25, .3, .35, .4, .45, .5, .6	.40 at 200% of pickup at lower limit of band	.10, .21, .35 at lower limit of band
AK-25					
AKU-25					
AK-50					
AKU-50					
AKS-50					
AKSU-50	1.5, 2, 3, 5, 7, 9, 10, 13	.2, .22, .24, .26, .28, .30, .34, .37			
AKT-50					
AKST-50	1.5, 2, 3, 5, 7, 9	1.5, 2, 3, 5, 7, 9	.2, .22, .24, .26, .28, .30		
AK-75					
AK-100	1.5, 2, 3, 5, 7, 9	1.5, 2, 3, 5, 7, 9	.2, .22, .24, .26, .28, .30		

- ① Time delay shown at 600% of current setting at lower limit of band
  - ② Time delay shown at lower limit of each band
  - ③ Ground fault pickup not to exceed 1200 Amps
- X = Current Sensor Tap Rating (Amps)  
 C = Current Setting  
 S = Sensor Amp Rating

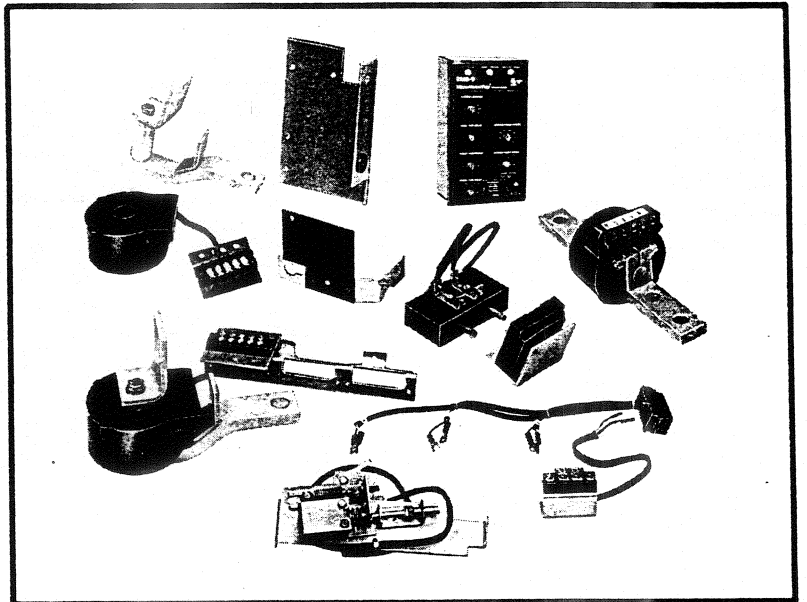
## MicroVersaTrip® RMS-9 Programmer Unit



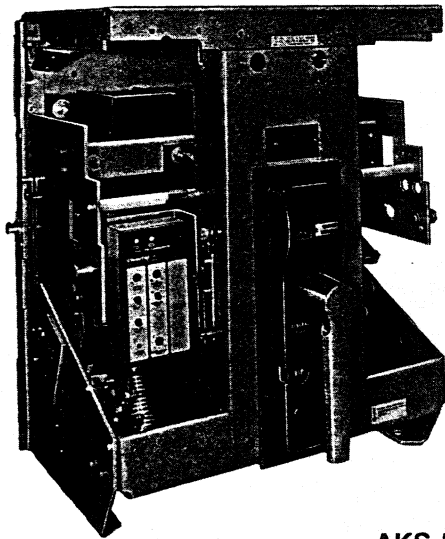
**AK-15/25 Conversion Kit**



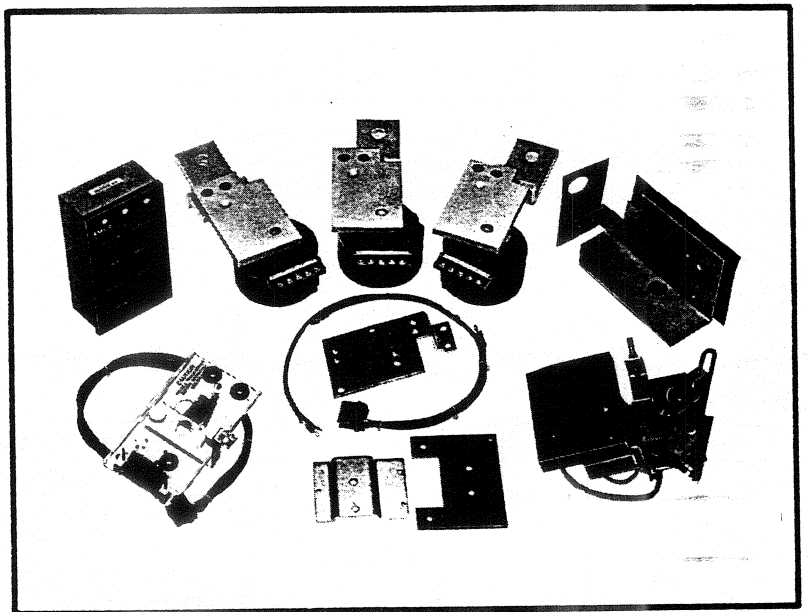
**AK-25**



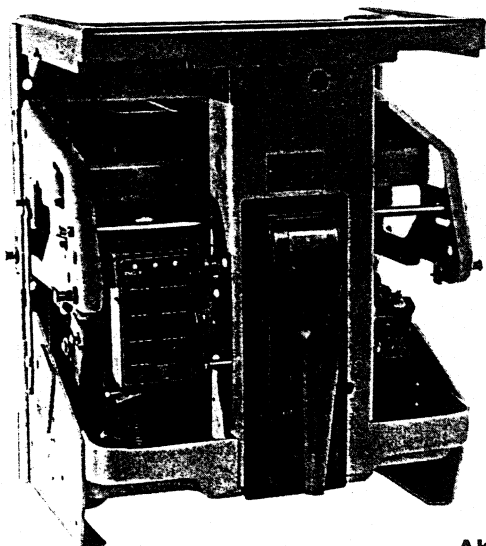
**AK-50 Conversion Kit**



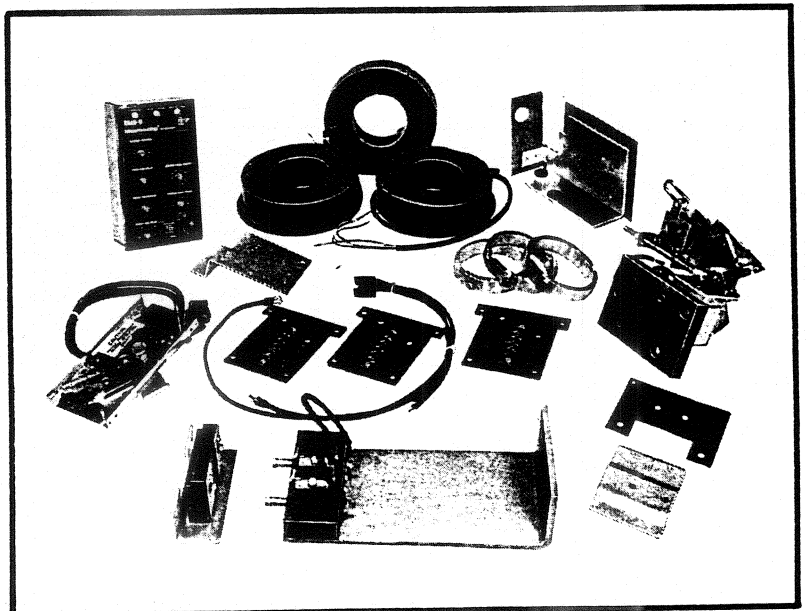
**AKS-50**



**AK-75/100 Conversion Kit**



**AK-75**



**MicroVersaTrip® RMS-9  
Conversion  
Kits  
Available  
for AK/AKR  
Breakers**

Stationary Mounted	Draw-out Type		
	AKD	AKD-5	AKD-6
AK-2-15	AK-2-15	AK-2A-15	—
AK-2/3-25	AK-2/3-25 AKU-2/3-25	AK-2A/3A-25 AKU-2A/3A-25	—
AKR-4S/5S-30/30H	Not Available	Not Available	AKR-4A/5A-30/30H AKRU-4A/5A-30/30H
AK-2/3-50/50H AKR-4S/5S-50/50H AKT-2/3-50/50H AKRT-4S/5S-50/50H	AK-2/3-50/50H AKU-2/3-50 AKT-2/3-50/50H	AK-2A/3A-50/50H AKU-2A/3A-50 AKT-2A/3A-50/50H	AKR-4A/5A-50/50H AKRU-4A/5A-50 AKRT-4A/5A-50/50H
AK-4/5-75 AKR-4S/5S-75	AK-1/2/3-75	AK-2A/3A-75	AKR-4C/5C
AKR-4/5-100 AKR-4S-5S-100 AKR-4W/5W-100	AK-1/2/3-100	AK-2A/3A-100	AKR-4C/5C

**Ordering Instructions**

- Determine required programmer functions from Table 1.
- Determine breaker configuration (stationary or draw-out), and power system wiring scheme (3- or 4-wire).
- Locate appropriate breaker type and select conversion kit model from Table 2A (fixed sensors with interchangeable rating plug), or Table 2B (tapped sensors with fixed rating plug).
- Select interchangeable rating plug from Table 3 for fixed sensor conversion kits (must be separately priced and ordered).
- Neutral sensor is included when 4-wire system with ground fault option is selected (see Table 4 for reference cat. no.).

**Table 1 Available Programmer Functions For MicroVersaTrip® RMS-9 Conversion Kits**

Function	Model Code	Programmer Function Definition
LI	01	Long-Time, Instantaneous
LIT1	02	Long-Time, Instantaneous, Overload—Short Circuit Trip Indicators
LIGT2	03	Long-Time, Instantaneous, Ground Fault, Overload—Short Circuit—Ground Fault Trip Indicators
LSIT1	04	Long-Time, Short-Time, Instantaneous, Overload—Short Circuit Trip Indicators
LSITGT2	05	Long-Time, Short-Time, Instantaneous, Ground Fault, Overload—Short Circuit—Ground Fault Trip Indicators
LST1	06	Long-Time, Short-Time, Overload—Short Circuit Trip Indicators
LSGT2	07	Long-Time, Short-Time, Ground Fault, Overload—Short Circuit—Ground Fault Trip Indicators
LSIGT2X	08	Long-Time, Short-Time, Switchable Instantaneous Pickup (Off Position), Switchable Ground Fault Pickup (Off Position), Overload—Short Circuit—Ground Fault Trip Indicators

**Table 2A MicroVersaTrip® RMS-9 Conversion Kit Model Selection For Fixed Sensors With Interchangeable Rating Plug**

Frame Size	Stationary or Draw-out	3- or 4-Wire	Fixed Sensor	Sensor Rating	Programmer Functions
AKR-30/30H = TKR30 AKRU-30	S OR D	3 OR 4*	F	AKR-30/30H 150A=01 AKRU-30 400A=04 800A=08	LI=01
AKR-50/50H = TKR50 ** AKRU-50 AKRT-50/50H				AKR-50/50H 800A=08 AKRU-50 1600A=16 AKRT-50/50H 2000A=20	LIT1=02 LIGT2=03 LSIT1=04
AKJ-50 = TKJ50 AKJT-50				AKJ-50 800A=08 1600A=16 AKJT-50 2000A=20	LSIGT2=05 LST1=06 LSGT2=07
AKR-75 = TKR75				AKR-75 3200=32	LSIGT2X=08
AKR-100 = TKR10				AKR-100 4000A=40	
AKW-100 = TKW10				AKW-100 4000A=40	

\*Only applicable to programmer functions with ground fault

\*\*Not suitable for converting Power Sensor equipped breakers

**EXAMPLE:**

- AKR-50, Draw-out construction, 3-wire system, 1600 Amp fixed sensor, LSIGT2 programmer, 1200 Amp rating plug
- MicroVersaTrip® RMS-9 conversion kit model number: TKR50D3F1605
- Interchangeable rating plug, 1200 Amp, model number: TR16S1200 (select from Table 4 and order separately)

**Table 2B MicroVersaTrip® RMS-9 Conversion Kit Model Selection For Tapped Sensor With Fixed Rating Plug**

Frame Size	Stationary or Draw-out	3- or 4-Wire	Tapped Sensor	Sensor Rating	Programmer Functions
AK-15 = TK015	S* OR D	3 OR 4**	T	AK-15 225A=02	LI=01
AK/AKU-25 = TK025				AK/AKU-25 225A=02 600A=06	LIT1=02
AK/AKU-50 = TK050 AKT-50				AK/AKU-50 800A=08 1600A=16 AKT-50 2000A=20	LIGT2=03 LSIT1=04 LSIGT2=05
AKS/AKSU-50 = TKS50 AKST-50				AKS/AKSU-50 800A=08 1600A=16 AKST-50 2000A=20	LST1=06 LSGT2=07
AK-75 = TK075				AK-75 3000A=30	LSIGT2X=08
AK-100 = TK010				AK-100 4000A=40	

\*Not Available for AK-75 or AK-100 \*\*Only applicable to programmer functions with ground fault

**EXAMPLE:**

- AK-25, Stationary construction, 4-wire system, 600 Amp tapped sensor, LIGT2 programmer
- MicroVersaTrip® RMS-9 conversion kit model number: TK025S4T0603 (fixed rating plug will be installed in programmer and neutral sensor cat. no. TSVG206BK is provided)

**Table 3 Interchangeable Rating Plug Selection for Use With Fixed Sensor Kits (Table 2A)**

Frame Size (Amps)	Sensor Rating (Amps)	Current Rating (Amps)	Rating Plug Cat. No.
800	150	60	TR1S60
		80	TR1S80
		100	TR1S100
		125	TR1S125
		150	TR1S150
800	400	150	TR4S150
		200	TR4S200
		225	TR4S225
		250	TR4S250
		300	TR4S300
		400	TR4S400
800 or 1600	800	300	TR8S300
		400	TR8S400
		500	TR8S500
		600	TR8S600
		700	TR8S700
		800	TR8S800
1600	1600	600	TR16S600
		800	TR16S800
		1000	TR16S1000
		1200	TR16S1200
		1600	TR16S1600
2000	2000	800	TR20S800
		1000	TR20S1000
		1200	TR20S1200
		1600	TR20S1600
		2000	TR20S2000
3200	3200	1200	TR32S1200
		1600	TR32S1600
		2400	TR32S2400
		3200	TR32S3200
4000	4000	1600	TR40S1600
		2000	TR40S2000
		2500	TR40S2500
		3000	TR40S3000
		4000	TR40S4000

**Pricing Instructions**

GEA-10678-1B

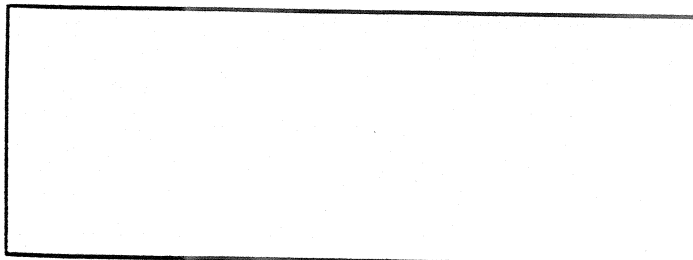
**Table 4 Neutral Current Sensors—  
(One provided for 4-wire ground fault applications)**

Frame Size (Amps)	Sensor Range (Amps)	Cat. No.
600	70-225	TSVG225BK
	200-600	TSVG206BK
800	100-300	TSVG303BK
	300-800	TSVG508BK
1600	300-800	TSVG508BK
	600-1600	TSVG516BK
2000	800-2000	TSVG620BK
3000	1200-3000	TSVG830BK
3200	1200-3200	TSVG832BK
4000	1600-4000	TSVG940BK

**Installation Instructions**

Breaker Type	Manual
AK-15 AK-25, AKU-25	GEH-5415
AKR-30/30H AKRU-30 AKR-50/50H AKRU-50 AKRT-50/50H	GEK-97729
AK/AKT/AKU-50 AKS/AKST/AKSU-50 AK/AKR-75 AK/AKR-100	GEK-97728

© 1987 GE



For further information, call or write your local GE sales office, or:  
 GE Construction Equipment Business  
 41 Woodford Avenue  
 Plainville, Connecticut 062062 USA

Outside the US and Canada, write:  
 GE Construction Equipment Export Operation  
 411 Theodore Fremd Avenue  
 Rye, New York 10580 USA

