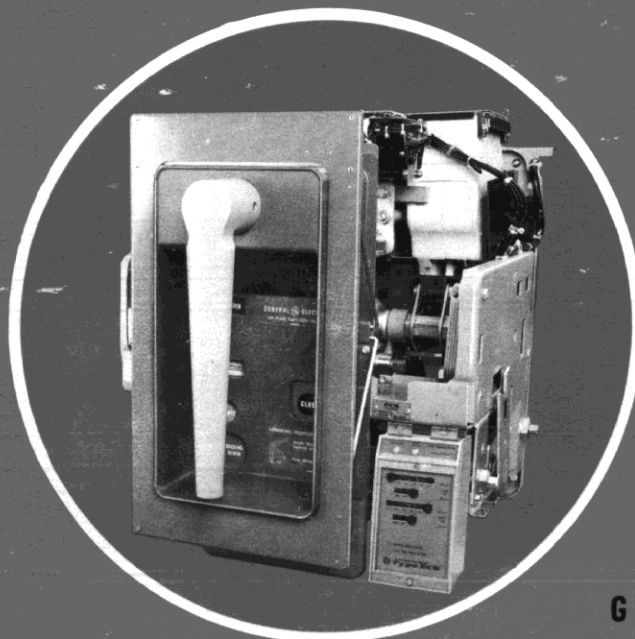




Low Voltage Power Circuit Breakers

Introducing
The AKR Complete Line



GENERAL  ELECTRIC

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Type AKR Breakers

70-4000A.
600V ac 50/60 Hz.

40-6000A.
250V dc



DESCRIPTION

Type AKR low voltage power circuit breakers are intended for use in commercial, industrial and utility applications. Built to withstand intense service conditions, these power breakers may be used as feeders, mains, for capacitor switching, in motor circuits, for resistance welding machines and others.

FEATURES

- Five Frame Sizes: AKR-30, -50, AKRT-50, AKR-75, -100
- Solid State Trip Devices for Ac Ratings:
Types ECS and SST
- Electromechanical Trip Devices for Dc Ratings:
Types EC-1, EC-1B, EC-2A
- Overcurrent Trip Indication Targets with ECS & SST
- Easy Access to Major Components
- Multi-Contact Design
- Stored Energy Closing—Manual & Electrical
- Complete Line of Accessories
- Short-Circuit Ratings Through 200,000 Amperes
- Metal Frame Construction Provides Rigidity and Endurance

DESCRIPTIVE MATERIAL

Order from General Electric Company, Distribution Unit, Hoerle Bldg., Plainville, CT 06062

Bulletins

Breaker Selection & Application GEA-8733

Installation & Operation Instructions:

AK-25, 50, AKT-50, AK-75, 100 GEK-7302

AKR-30, 50, AKRT-50 GEI-86150

AKR-75, 100 GEI-86151

AKJ-50, AKJT-50 GEI-86152

SST Conversion Kits:

AK-15, 25 GEI-86153

AK-50, AKT-50 GEI-86154

AK-75, 100 GEI-86155

ECS, SST Trip Devices GEI-86156

EC-1, 1B, 2A Trip Devices GEI-86157

MAINTENANCE MANUALS:

AK-25 GEI-50299

AK-50, AKT-50, AK-75, 100:

Basic Manual GEK-7303

ECS/SST Supplement (for AK-75, 100) .. GEI-86135

AKR-3/3A-50 GEK-7310

AKR-30 thru AKRT-50,

including AKJ/AKJT-50 GEK-64459

AKR-75, 100 GEK-64460

TESTING INSTRUCTIONS:

Power Sensor Test Set GEK-7301

Power Sensor Hi-Current Testing GEK-7309

ECS/SST Test Set TAK-TS1 GEK-64454

ECS/SST Test Set TAK-TS2 GEK-73300

ECS/SST Hi-Current Testing GEK-64455

RENEWAL PARTS:

AKR-30, 50, AK-25 GEF-4149

AKRT-50 GEF-4527 AK-50 GEF-4150

AKR-75, 100 GEF-4552 AK-75 GEF-4395

AK-100 GEF-4396

Time-current Curves

Trip Device	Trip Elements ①	Trip Characteristic (EC Devices only)	Curve
EC-1	LSI	(See Curves)	GES-6000A
EC-1B	LI	1BB-3	GES-6003
	LI	1CC-3	GES-6004
	LSI	(See Curves)	GES-6005
EC-2/2A	LI	1A-3	GES-6010
	LI	1B-3	GES-6011
	LI	1C-3	GES-6012
Power Sensor	LSI	—	GES-6021A
	G	—	GES-6031 ②
ECS	LSI	—	GES-6032
SST	LSI	—	GES-6033
	G	—	GES-6034, 6035

① L = Long Time I = Instantaneous
S = Short Time G = Ground Fault

② Use GES-6030 for PS-1 units manufactured prior to May 1973.

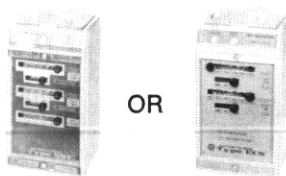
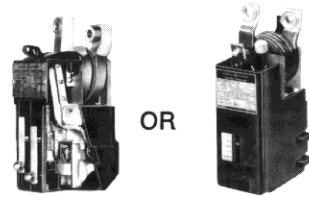
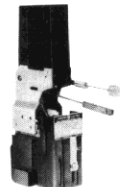


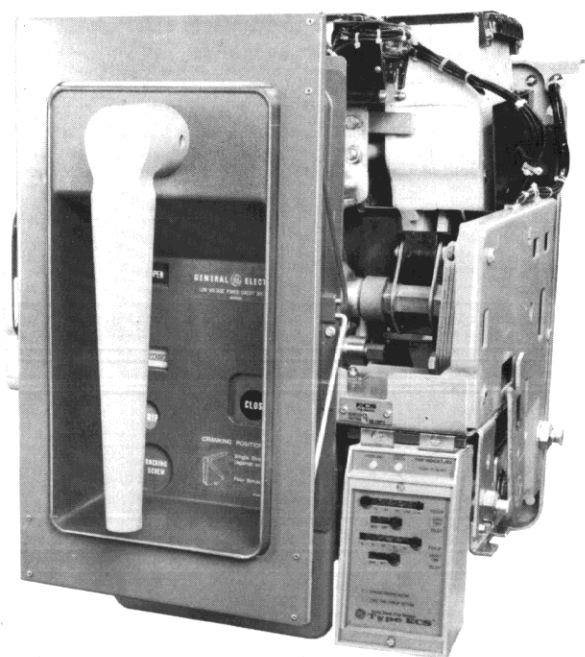
Type AKR Breakers

Quick Selector

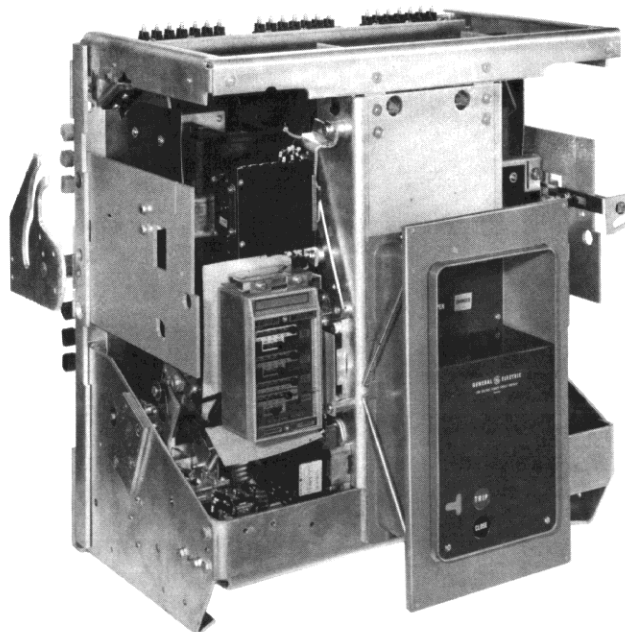
Breaker/Trip Device Combinations

AMPERE RATINGS AND OVERCURRENT TRIP DEVICES

BREAKER TYPE	600V. ac 50/60 Hz.		250V. dc	
	FRAME SIZE (AMPS)	Solid State Trip Device	FRAME SIZE (AMPS)	Electromechanical Trip Device
AKR-30	800	 OR SST ECS	800	 EC-1 EC-2A
AKR-50	1600		2000	
AKRT-50	2000		---	---
AKR-75	3200		4000	 EC-1B
AKR-100	4000		6000	



AKR-4B-30
Manually Operated



AKR-5B-100
Electrically Operated


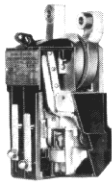



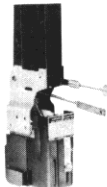
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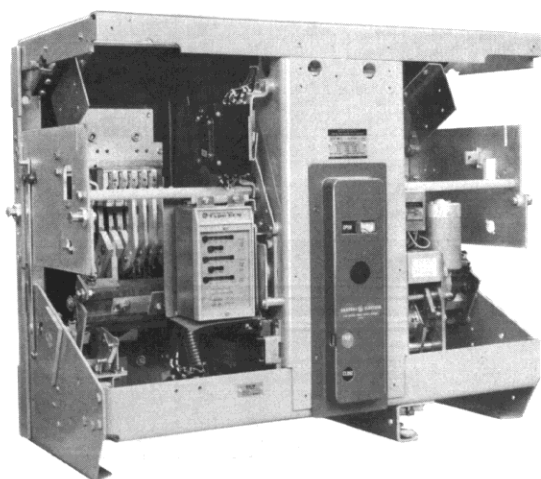
Quick Selector

Breaker/Trip Device Combinations

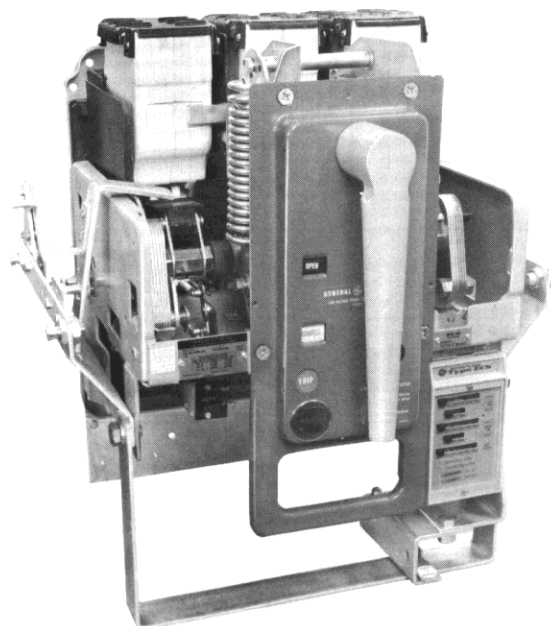


AMPERE RATINGS AND OVERCURRENT TRIP DEVICES

Breaker Type	600 V. ac 50/60 Hz.		250 V. dc	
	Frame Size (Amps)	Solid State Trip Device	Frame Size (Amps)	Electromechanical Trip Device
AK-25	600	 SST	600	 OR 
AKJ-50	1600	 OR  SST ECS	2000	EC-1 EC-2A
AKJT-50	2000		---	---
AKR-75	3000		4000	
AKR-100	4000		6000	



AKR-4A-100
Electrically Operated
(Arc quenchers removed)



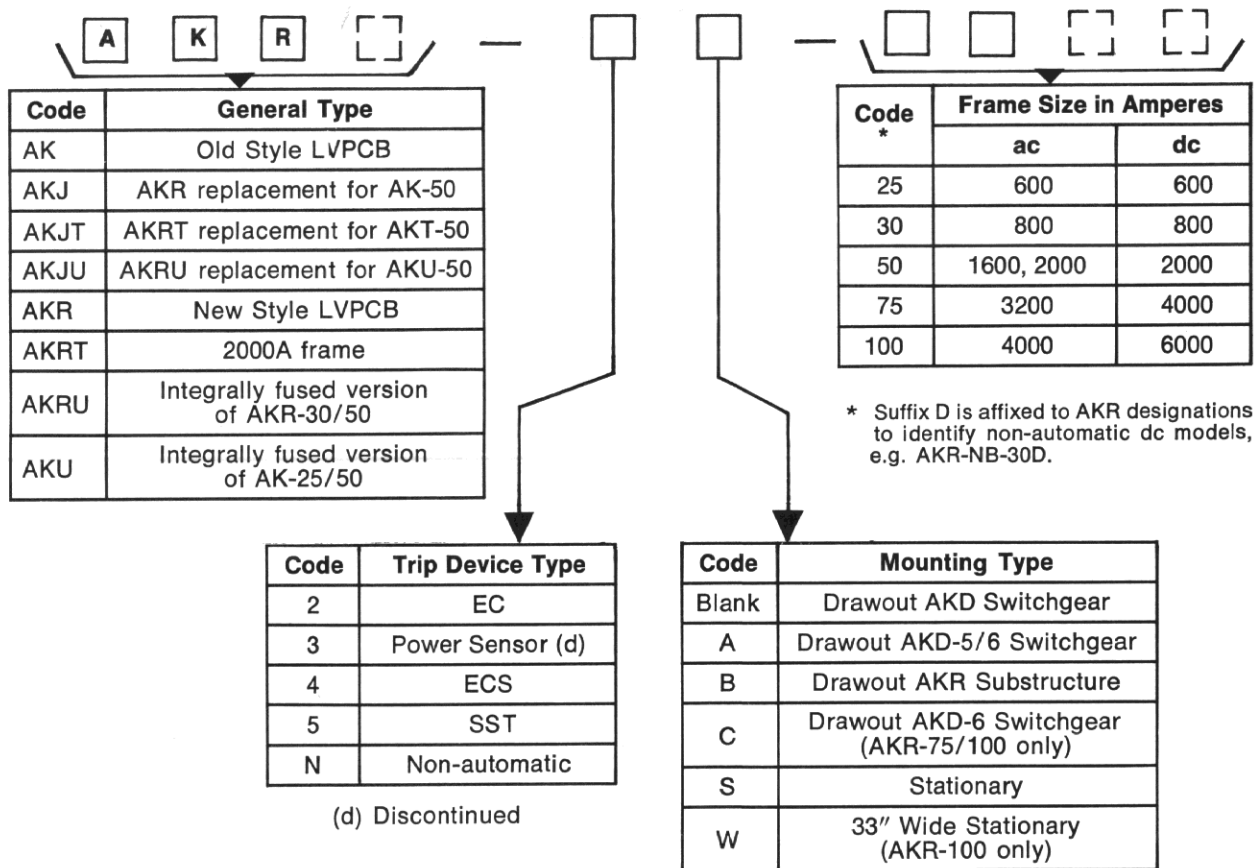
AKJ-4A-50
Manually Operated



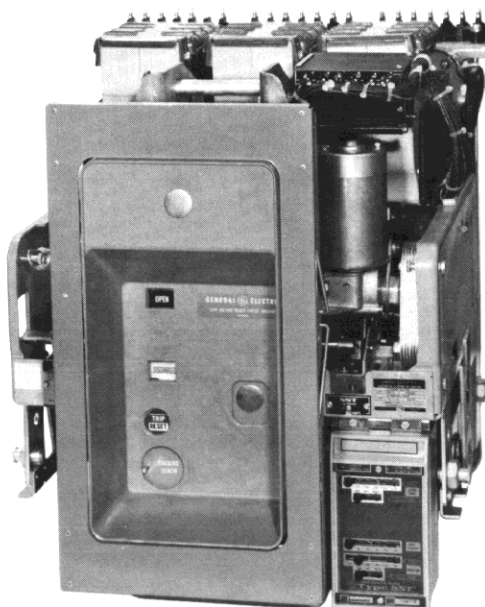
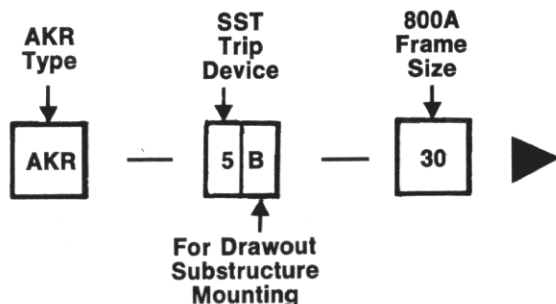
Type AKR Breakers

Identification

LEGEND-BREAKER DESIGNATIONS



EXAMPLE OF NAMEPLATE DESIGNATION



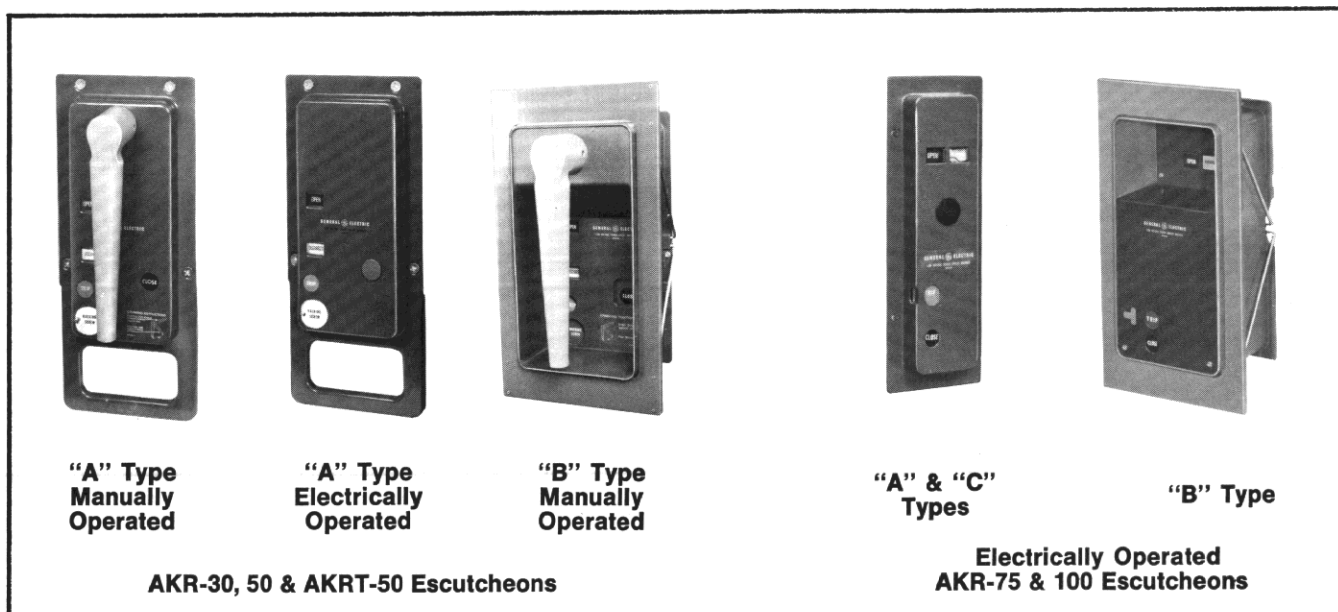
AKR-5B-30
Electrically Operated

Type AKR Breakers

Description



OPERATING MECHANISMS



The closing mechanisms of low voltage power circuit breakers may be either the manually or electrically operated type. Manual is for local control, electrical for remote operation.

Both mechanisms employ the stored energy principle by interposing an energy storage spring between the operator and the breaker contacts. This provides a constant closing speed not influenced by the operator or control power voltage level, promoting reduced maintenance and increased contact and breaker life.

MANUAL CLOSING

The manually operated AKR-30, 50 and AKRT-50 frame models have front-mounted handles. The closing springs are charged by any number of handle strokes from one to four, depending on the angle through which the handle is rotated. Upon completion of the charging action, the springs are held "propped" in the fully charged position and discharge only upon receipt of a closing signal. Normal closing is initiated by depressing a mechanical CLOSE button on the escutcheon. A maintenance handle is provided for the slow-closing motion required during contact adjustment procedures. A control solenoid for remote closing is optionally available.

AKR-75 and -100 manual breakers require four handle strokes to charge the springs; unlike the smaller AKR frame sizes above, the breaker's contacts close during the fourth handle stroke — initiation of closing by separate CLOSE button does not apply.

Manually operated AK-25 models are closed by first rotating the handle counterclockwise approximately 100 degrees; this resets the mechanism and partially charges the closing spring. Returning the handle clockwise to the normal position completes the spring charging and drives the toggle mechanism over center, closing the contacts.

ELECTRICAL CLOSING

All electrically operated AKR breaker types utilize a motor to automatically keep the closing springs in a charged state; upon receipt of a closing signal, a control solenoid releases the springs, closing the breaker's contacts. An electrical CLOSE pushbutton is mounted on the breaker escutcheon when specified. A manual closing handle is provided for maintenance purposes.

All electrically operated breakers close in 5 cycles. Spring charging requires approximately 3 seconds.

Electrically operated AK-25 breakers employ a solenoid to actuate the toggle mechanism.

OPENING

All breakers, manual and electrical, are equipped with a mechanical TRIP button located on the breaker escutcheon. When specified, electrical breakers include a shunt trip device for remote opening.



Type AKR Breakers

Description

OVERCURRENT TRIP DEVICES

Overcurrent trip devices are the solid-state types SST and ECS for ac applications, and the electromechanical EC type for dc systems. Each may be ordered with various combinations of long-time, short-time and instantaneous tripping elements. In addition, SST offers optional integral groundfault protection.

All trip devices sense current in each pole of the breaker. EC trip elements are adjustable on a per-pole basis. The solid state devices employ a protection programmer unit which sets the current detection level of all poles with a single knob adjustment. SST units provide additional flexibility by extending this adjustment range via taps on the sensor CT's.

TARGET INDICATORS

Target indicators are available on SST or ECS trip devices. A ground fault target indicator is furnished as standard whenever ground fault protection is furnished on the SST trip device. Each target is an electrically operated plunger which pops out when the breaker trips on overload—short circuit or ground fault. These ground fault indicators require no external power to operate and remain in the indicated position after the breaker has cleared the fault. They are located across the top of the programmer and are manually reset.

GROUND FAULT PROTECTION

A ground fault is unintentional grounding of a phase conductor. This condition may produce arcing or non-arcing current levels less than that required to activate the conventional overcurrent trip device. Two options are available to protect against this hazardous condition.

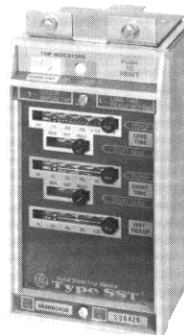
SST — Provides ground fault protection as an integral part of the breaker. Supplied with adjustable pick up and time delay.

GROUND BREAK* — A component system for separate mounting.

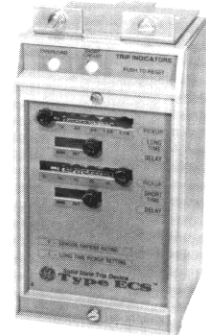
FUSED BREAKERS

Fused Low Voltage Power Circuit Breakers provide protection for systems with available fault current to 200,000 amperes RMS symmetrical. Current limiting fuses are provided as an integral part of fused drawout breakers in the 800 and 1600 ampere frame sizes. The 3200 and 4000 ampere frames are available with coordinated fuses separately mounted in a drawout fuse carriage or "fuse rollout element."

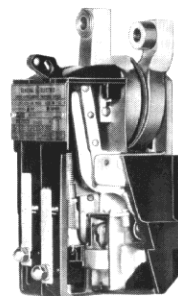
An open fuse lockout device is an integral part of all fused power circuit breakers. This device prevents single phasing by monitoring the fuses. Should any fuse blow, this direct-acting device trips the breaker, opening all three poles simultaneously. Individual phase indicators pinpoint the blown fuse. The breaker remains locked out until the device is reset.



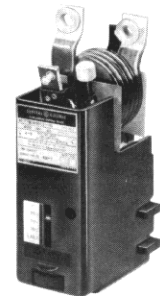
SST
Solid State
Programmer



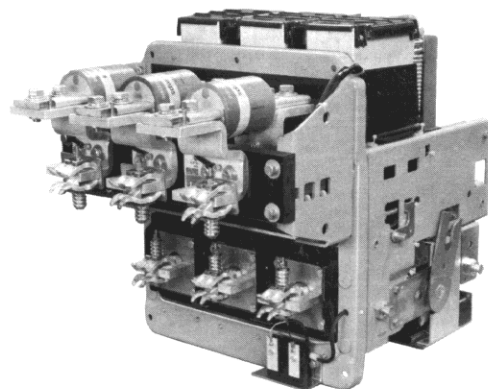
ECS
Solid State
Programmer



EC-1
Overcurrent
Trip Device



EC-2A
Overcurrent
Trip Device



AKRU-5A-30 Integrally Fused Breaker

Type AKR Breakers

Enclosures and Mounting



AKR breakers may be applied as individual units or grouped in load center or switchgear line-ups. Mounting types are stationary or drawout.

STATIONARY MOUNTING

Breaker only. For use in stationary switchboards and other equipments requiring stationary mounted breakers.

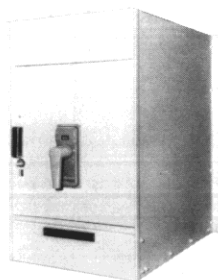
DRAWOUT GENERAL PURPOSE ENCLOSURE NEMA 1

For indoor use. A complete one-high, AKD-5 type, closed-door drawout steel housing containing a drawout breaker. The unit is wall-mounted in the AKR-30 and -50 sizes, floor-mounted for the AKR-75 and -100.

The drawout operation features four positions. In the **CONNECTED** position the primary and secondary disconnects are fully engaged. The breaker must be tripped before it can be racked in or out of this position. When in the **TEST** position the primary contacts are disconnected but secondary contacts remain engaged. This allows complete breaker operation without energizing the primary circuit. In the **DISCONNECTED** position neither primary nor secondary contacts are made. Breakers may be racked between these three positions with the compartment door closed. Each position is clearly identified by a rotary indicator visible through an opening in the door.

With the door open, the breaker can be pulled manually out from the **DISCONNECTED** to the **WITHDRAWN** position; here the breaker is completely out of its compartment, ready for removal.

The drawout mechanism is externally operated by a removable racking handle. Two mechanism types are employed. A breaker-mounted, screw/traveling nut type serves the AKR-30 and -50 frames; for these the racking handle is inserted through an opening in the breaker escutcheon. The equipment-mounted AKD-5 type mechanism is employed on the AKR-75 and -100 models; here the racking handle is inserted through an opening in the left side of the door. In both types the breaker is supported by two pins protruding from each side of its frame, these engaging slots in the telescoping rails fastened to the enclosure walls.



**AKD-5 Type NEMA 1
General Purpose Enclosure**

DRAWOUT AKR SUBSTRUCTURES

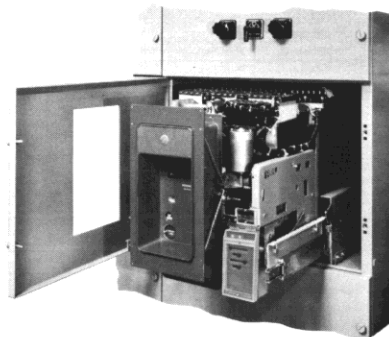
By definition, an AKR substructure is the equipment-mounted component of a closed-door drawout breaker unit. Serving as the stationary receptacle, it provides means for mounting and connecting (both primary and secondary) the drawout breaker (removable element). The basic substructure is an open type, self-contained, factory-aligned framework designed for convenient mounting in individual breaker compartments of switchgear equipments. In conjunction with a line of accessories, it offers the equipment builder all the mechanical and electrical components necessary to outfit a compartment for closed-door drawout AKR breakers.

All AKR substructure breakers (drawout mounting letter "B") are equipped with an extended ("deep") escutcheon compared to that of the AKD-5 ("A" type) models. This configuration allows the breaker to be racked between the **CONNECTED** and **DISCONNECTED** positions without having to open the compartment door; the latter does not move with the breaker as in AKD-5.

On substructures 800 and 2000A, the breaker is supported on telescoping slide rails similar to the AKD-5 drawout arrangement. On substructures for the larger AKR-75 and -100 frames, the breaker is bolted to a roller-mounted tray.

On all frame sizes the drawout mechanism is breaker-mounted. The racking handle is inserted thru the breaker escutcheon on frame sizes 800–2000A, thru the compartment door for the AKR-75 and -100. As the rackout handle is turned, it rotates slotted racking arms or cams on each side of the breaker frame. The cams engage fixed pins mounted on both side plates of the substructure, moving the breaker in and out. In operation, the substructure moves the breaker through the same four positions and functions in the same manner as described in the second and third paragraphs under Drawout General Purpose Enclosure above. Breaker position is registered directly by markings which appear on the left side of the escutcheon as it emerges through the door cutout.

Breakers, substructures and their accessories are available as detailed in Handbook Section 7696.



AKR Substructure

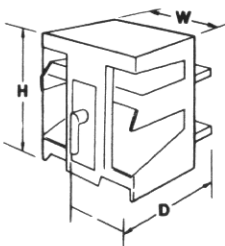


Type AKR Breakers

Dimensions

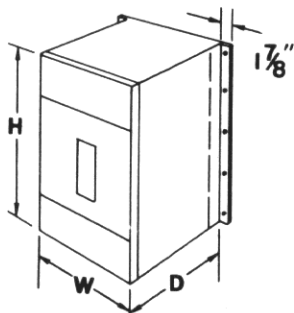
These over-all breaker dimensions are approximate and should be used for estimating purposes only. Refer to appropriate outline drawings for detailed information.

STATIONARY BREAKER



Breaker Type		Dimensions in Inches			Outline Drawing
		H	W	D	
AK-25	Manual	20-1/4	13	15-1/16	695C116
	Electrical			12-9/16	
AKR-30	Manual	20-1/8	17	24-3/16	139C4300
	Electrical			21-5/16	139C4301
AKJ-50, AKJT-50	Manual	24-1/2	22	22-7/16	139C4675
	Electrical			19-9/16	139C4676
AKR-50, AKRT-50	Manual	20-1/4	17	24-1/16	139C4701
	Electrical			21-5/16	139C4762
AKR-75, AKR-100	Manual	27	25	29	139C4560
	Electrical			26-1/16	139C4561

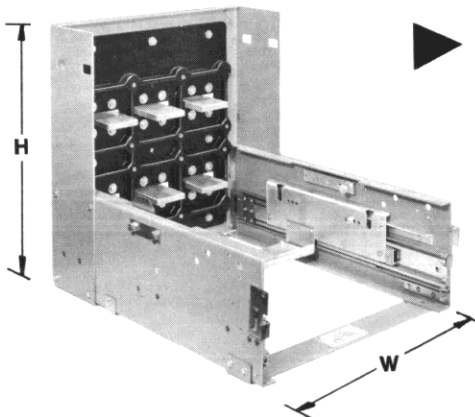
GENERAL PURPOSE ENCLOSURE AKD-5 TYPE



AKR-30	40-3/8	22-1/2	34	0149C6761
AKR-50				245C764
AKR-75	64	30-1/2	48	0134C3052
AKR-100	64	38-1/2	48	

AKR-30, 50 enclosures have flanges for wall mounting,
AKR-75, 100 enclosures are floor mounted.

DRAWOUT SUBSTRUCTURE



AKR Substructure Breakers			AKR Substructures			
Breaker Type	Outline Drawing		Outline Drawing	Com-part-ment Depth (inches)	Substructure	
	Manual Operation	Electrical Operation			H ①	W ②
AKR-30, 30H	139C4469	139C4466	139C4455 SH, 1 & 3	26	22 1/4"	21 1/4"
			139C4455 SH, 2 & 3	33		
AKR-50, 50H, AKRT-50	139C4468	139C4467	139C4455 SH, 1 & 3	26		
			130C4455 SH, 2 & 3	33		
AKRU-30 300-1600A Fuses	139C4462	139C4465		33		
AKRU-50 450-2000A Fuses	139C4460	139C4464		33		
AKRU-50 2500A Fuses	139C4463	139C4461		33		
AKR-75	139C4572	139C4573	139C4595	33	29 3/4"	29"
AKR-100	139C4574	139C4575		33		

① H dimension includes secondary disconnect blocks (not shown).

② W dimension includes provision for key interlock.

Type AKR Breakers

70-4000 Amperes
600 Volts ac 50/60 Hz.

Rating Data

40-6000 Amperes
250 Volts dc



NOTE: For complete details on breaker application such as motor applications, fused breakers, overcurrent trip details, etc., refer to Bulletin GEA-8733, Selection and Application of Low-voltage Power Circuit Breakers.

Table 1—50/60 Hz. ac Current Ratings

Rated Voltage (Nominal) ac	Breaker Type	Frame Size in Amperes	Short Circuit Ratings—RMS Symmetrical KA		
			Short Time	With Instantaneous Trip	Without Instantaneous Trip
600	AK-25	600	22	22	22
	AKR-30	800	30	30	30
	AKR-30H		42	42	42
	AKJ/AKR-50	1600	42	42	42
	AKJ/AKR-50H		50	50	50
	AKJT/AKRT-50	2000	42	42	42
	AKR-75	3200	65	65	65
	AKR-100	4000	85	85	85
480	AK-25	600	22	30	22
	AKR-30	800	30	30	30
	AKR-30H		42	42	42
	AKJ/AKR-50	1600	50	50	50
	AKJ/AKR-50H		65	65	65
	AKJT/AKRT-50	2000	50	50	50
	AKR-75	3200	65	65	65
	AKR-100	4000	85	85	85
240	AK-25	600	22	42	22
	AKR-30	800	30	42	30
	AKR-30H		42	50	42
	AKJ/AKR-50	1600	50	65	50
	AKJ/AKR-50H		65	65	65
	AKJT/AKRT-50	2000	50	65	50
	AKR-75	3200	65	85	65
	AKR-100	4000	85	130	85

Table 2—Overcurrent Trip Device Current Ratings in Amperes

Breaker Frame	50/60 Hz. ac		dc
	ECS	SST	EC ④
	Sensor Rating	Sensor Tap Range	Device Rating
AK-25	NOT AVAILABLE	(70-100-150-225) or (200-300-400-600)	40, 50, 70, 90, 100, 125, 150, 175, 200, 225, 250, 300, 350, 400, 500, 600
AKR-30	100, 150, 225, 300, 400, 600, 800	(100-150-225-300) or (300-400-600-800)	100, 125, 150, 175, 200, 225, 250, 300, 350, 400, 500, 600, 800
AKJ/AKR-50	300, 400, 600, 800, 1200, 1600	(300-400-600-800) or (600-800-1200-1600)	200, 225, 250, 300, 350, 400, 500, 600, 800, 1000, 1200, 1600, 2000
AKJT/AKRT-50	800, 1200, 1600, 2000	(800-1200-1600-2000)	-----
AKR-75	1200, 1600, 2000, 3000, 3200	(1200-1600-2000-3200)	2000, 2500, 3000, 4000
AKR-100	1600, 2000, 3000, 4000	(1600-2000-3000-4000)	200, 2500, 3000, 4000, 5000, 6000

Table 3—250v. dc Current Ratings—
with EC Trip Device Only

Breaker Type	Frame Size Amperes	Short Circuit KA
AK-25	600	25
AKR-30	800	25
AKR-50	2000	50
AKR-75	4000	75
AKR-100	6000	100

Table 4—Fused Breaker Ratings—
Maximum 600v. ac 50/60 Hz.

Breaker Type	Frame Size Amperes	① CLF Fuse Rating Amperes		Interrupting Rating RMS Symmetrical KA
		Min.	Max.	
AKU-25	600	300	1200	200
AKRU-30	800	300	1600	200
AKRU-50	1600	450	2500	200
AKR-75 ②	3200	2000	3000	200
AKR-100 ②	4000	2000	4000	200

Table 5—Minimum EC Trip Ratings—
Amperes at 250v. dc.

Breaker Type	With Instantaneous Trip	With Short Time Trip Characteristic ③		
		2C	2B	2A
AK-25	40	175	200	250
AKR-30	100	175	200	250
AKR-50	200	350	400	500
		2CC	2BB	2AA
AKR-75 AKR-100	2000	2000	2000	2000

① The maximum fuse rating is the largest fuse which tests show will result in proper performance of the breaker and fuse in combination under short circuit conditions. Only GE type CLF fuses should be used for proper coordination.

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

③ Refer to time-current curves GES-6000 (for EC-1) and GES-6005 (for EC-1B).

④ Observe Table 5 minimum overcurrent trip ratings.



Type AKR Breakers With SST™ Trip Device

100-4000 Amperes

600V. ac 50/60 Hz.

SST is a trip device developed for types AK and AKR breakers. It incorporates the newest technological advancements in overcurrent protection for the ultimate in reliability, long life and flexibility.

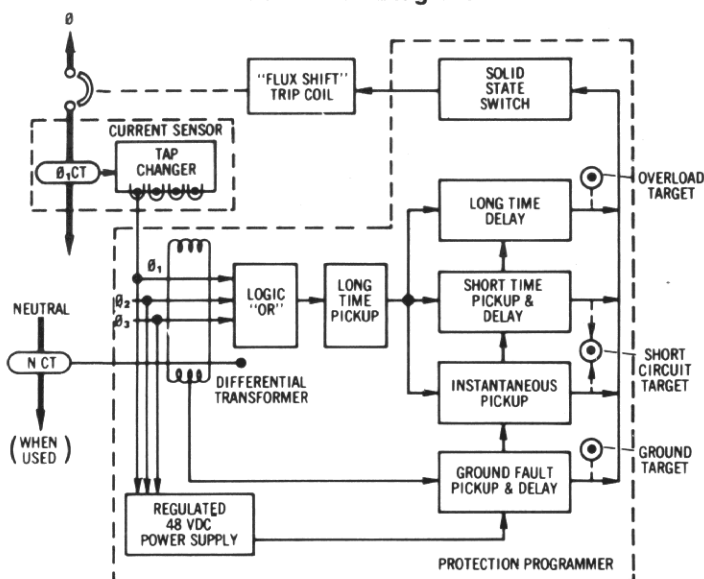
Operation is fully automatic and no external logic or control power inputs are required. SST is an integral part of the breaker and consists of three major parts:

TAPPED CURRENT SENSORS—Factory mounted in each pole. Monitors current for the protection programmer's logic and power supply circuitry.

PROTECTION PROGRAMMER—Self powering solid state logic center. Incorporates set-point programming ability for seven functions as well as TARGETS for mechanical fault trip indication. A portable test set with 110 volt AC input is available for field testing.

FLUX-SHIFT TRIP DEVICE—Low energy positive action tripping device. Automatically powered and controlled by the protection programmer.

SST Block Diagram



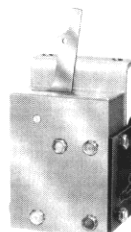
Fault Target Indicators



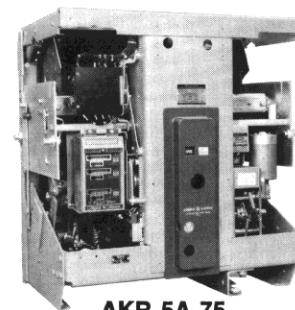
Tapped Current Sensor



Protection Programmer



Flux Shift Trip Device



AKR-5A-75

SST TRIP CHARACTERISTICS—Applicable time-current curves: GES-6033B, 6034A, 6035B

Breaker Frame Type	Frame Size (Amperes)	Sensor Taps (X) (Amperes)	SST PROGRAMMER ADJUSTMENT RANGE (Set Points)						
			Ground Fault		Long Time		Short Time		Instantaneous Pickup (Multiple of L)
			Pickup (Multiple of X)	Delay Band (Seconds)	Pickup (L) (Multiple of X)	Delay Band (Seconds)	Pickup (Multiple of L)	Delay Band (Seconds)	
AKR-30	800	100, 150, 225, 300 — or — 300, 400, 600, 800	.4, .5, .6, .8, 1.0, 1.2 (X)	Maximum 0.30 Intermed. 0.165 Minimum 0.065	.6, .7, .8, .9, 1, 1.1 (X)	Maximum 22 Intermed. 10 Minimum 4	1.75, 2, 2.25, 2.5, 3, 4 (L) — or — 3, 4, 5, 6, 8, 10 (L)	Maximum 0.35 Intermed. 0.21 Minimum 0.095	4, 5, 6, 8, 10, 12 (L)
AKJ-50 AKR-50	1600	300, 400, 600, 800 — or — 600, 800, 1200, 1600	.25, .3, .4, .5, .6, .7 (X)						
AKJT-50 AKRT-50	2000	800, 1200, 1600, 2000	.2, .25, .3, .4, .5, .6 (X)						
AK-5/5A-75 AKR-5/5A-75	3000	1200, 1600, 2000, 3000	.2, .22, .25, .3, .35, .37 (X)						
AKR-5B/5C/5S-75	3200	1200, 1600, 2000, 3200							
AK-100 AKR-100	4000	1600, 2000, 3000, 4000	.18, .2, .22, .25, .27, .3 (X)						
NOTES		①	②	④	②	③	②	④	②

① X = Sensor ampere rating = trip rating.

② Pickup tolerance = $\pm 10\%$.

③ Time delay at lower limit of band @ 6L.

④ Time delay at lower limit of band.

Type AKR Breakers With ECS™ Trip Device

100-4000 Amperes

600 Volts Ac 50/60 Hz.



ECS is a three-phase overcurrent trip device for types AK and AKR breakers. It is constructed as an integral part of the breaker and utilizes the following components:

CURRENT SENSORS—Factory mounted in each pole and used to monitor current for the protection programmer's logic and power supply circuitry.

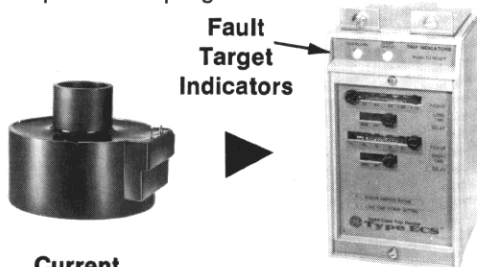
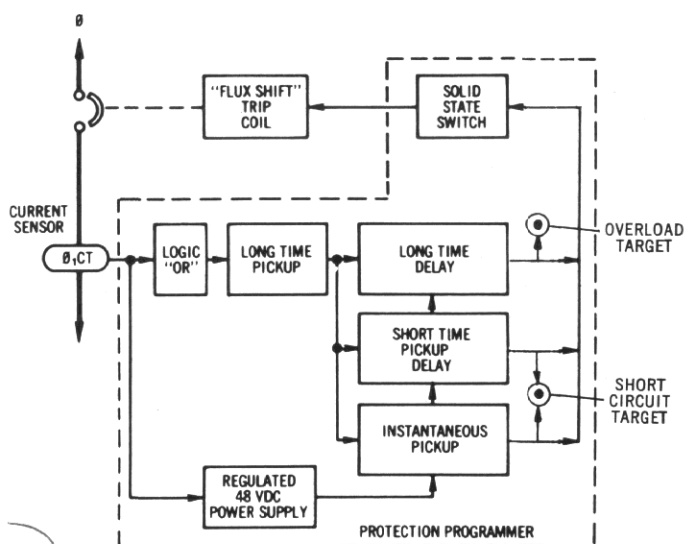
PROTECTION PROGRAMMER—Solid state logic control center. Utilizes signals from current sensors for analysis as well as power. Also incorporates a set-point programmer for field adjustment of overcurrent trip functions. All settings are protected against tampering by a transparent cover.

Mechanical targets for trip indication are optionally available.

A portable test set with input of 110 volts A-c is available for field testing.

FLUX-SHIFT TRIP DEVICE—Low energy positive action tripping device, sealed to protect against entrance of contaminants. Automatically powered and controlled by the protection programmer.

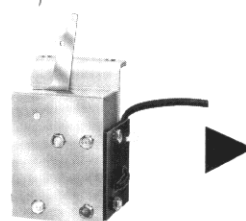
ECS Block Diagram



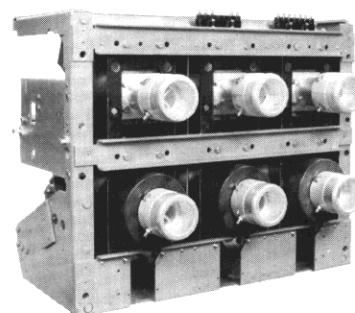
Current Sensor

Protection Programmer

(ECS)



Flux Shift Trip Device



AKR-4A-100
Rear View

ECS TRIP CHARACTERISTICS—Applicable time-current curve: GES-6032A

Breaker Frame Type	Frame Size (Amperes)	Sensor Ampere Rating (X)	ECS PROGRAMMER ADJUSTMENT RANGE (Set Points)				
			Long Time		Short Time		Instantaneous Pickup (Multiple of L)
			Pickup (L) (Multiple of X)	Delay Band (Seconds)	Pickup (Multiple of L)	Delay Band (Seconds)	
AKR-30	800	100, 150, 225, 300, 400, 600, 800	.6, .7, .8, .9, 1.0, 1.1 (X)	Maximum 22 Intermed. 10 Minimum 4	1.75, 2, 2.25, 2.5, 3, 4 (L) — or — 3, 4, 5, 6, 8, 10 (L)	Maximum 0.35 Intermed. 0.21 Minimum 0.095	4, 5, 6, 8, 10, 12 (L)
AKJ-50 AKR-50	1600	300, 400, 600, 800, 120, 1600					
AKJT-50 AKRT-50	2000	800, 1200, 1600, 2000					
AK-4/4A-75 AKR-4/4A-75	3000	1200, 1600, 2000, 3000					
AKR-4B/4C/4S-75	3200	1200, 1600, 2000, 3000, 3200					
AK-100 AKR-100	4000	1600, 2000, 3000, 4000					
NOTES		①	②	③	②	④	②

① X = Sensor ampere rating = trip rating.

② Pickup tolerance = $\pm 10\%$.

③ Time delay at lower limit of band @ 6L.

④ Time delay at lower limit of band.



Type AKR Breakers With EC Trip Devices

40-6000A. 250V. dc

Type EC overcurrent trip devices are magnetically operated, using a series coil (or single conductor and an associated magnetic structure) to provide tripping force. Three basic characteristics: long time delay, short time delay and instantaneous, can be used in various combinations to suit the application.

LONG TIME DELAY is accomplished with a positive-displacement oil piston. Sealing of the assembly eliminates variations caused by atmospheric contamination, and sili-

cone oil minimizes variations in time delay due to changes in ambient temperature.

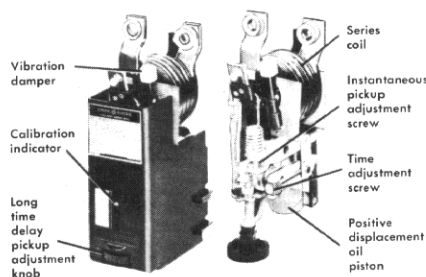
SHORT TIME DELAY is accomplished with a rugged mechanical escapement.

INSTANTANEOUS tripping is obtained when a tension spring yields to the force exerted on the magnetic armature at short circuit current levels, permitting the armature to move independently of the time delay piston.

AKR breakers with EC trips are

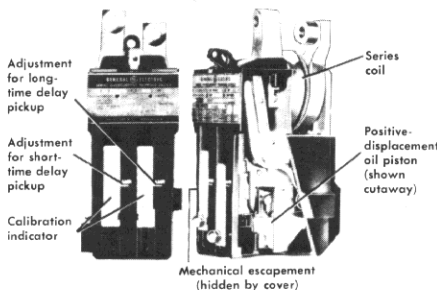
for use on DC system voltages, and are available in ratings of 40-6000 amperes. One EC trip device is mounted in each breaker pole and contains functional adjustments, overcurrent detection and tripping hardware.

EC trip devices are available as type EC-2A (standard for frames through 2000A), EC-1 (optional for frames through 2000A) and EC-1B (standard for 4000 and 6000A frames). Trip characteristics are described in the table below.



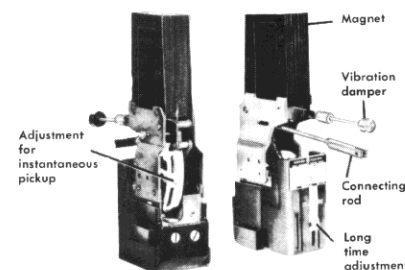
Type EC-2A

Trip Device for 600-2000 amp frame breakers. Available in combinations of long time and instantaneous elements, or instantaneous alone.



Type EC-1

Trip Device for 600-2000 amp frame breakers. Combines long time and short time elements for intentional delay up to the short time rating of the breaker. Instantaneous may be added.



Type EC-1B

Trip Device for 4000 and 6000 amp frame breakers. Combines long time and short time elements for intentional delay up to the short time rating of the breaker. Instantaneous may be added.

ADJUSTMENT RANGES FOR EC TRIP DEVICES

Trip Device	Long Time		Short Time		Instantaneous Pickup
	Pickup ①	Delay ②	Pickup	Delay ③	
EC-2A	80-160% X (± 10%)	(1A) MAX. - adj. 15-38 sec. or (1B) INTER. - adj. 7.5-18 sec. or (1C) MIN. - adj. 3.3-8.2 sec.			4-9X, 6-12X, 9-15X or 80-250% X ④
EC-1	80-160% X (± 10%)	(1A) MAX. - 30 sec. or (1B) INTER. - 15 sec. or (1C) MIN. - 5 sec.	2-5X, 3-7X or 4-10X	(2A) MAX. - .23 sec. or (2B) INTER. - .15 sec. or (2C) MIN. - .07 sec.	High Set up to 15X, Non-Adjustable
EC-1B	80-160% X (± 15%)	(1BB) MAX. - 4.5 sec. or (1CC) MIN. - 2 sec.	2-5X, 3-7X or 4-10X	(2AA) MAX. - .20 sec. or (2BB) INTER. - .13 sec. or (2CC) MIN. - .07 sec.	4-9X, 6-12X, 9-15X or 80-250% X ④

① X = Trip device ampere rating. If trip devices are set above 100% for coordination purposes, such settings do not increase the breaker's continuous current rating.

② At lower limit of band at 6 times pickup setting.

③ At lower limit of band at 2½ times pickup setting.

④ Low-set instantaneous. Not available in combination with long time delay.

Type AKR Breakers

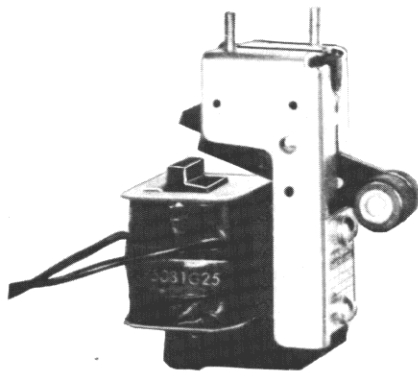
Accessories



Shunt Trip

Offers remote electrical tripping of breaker. Usually controlled by a switch or pushbutton, it may also be used in conjunction with protective relays for automatic tripping.

The shunt trip coil is rated for intermittent duty. When factory installed it is supplied with a cutoff switch which automatically removes control power following a breaker trip.



Shunt Trip Device

CONTROL VOLTAGE			Shunt Trip Amperes	
Nominal	Operating Range		Inrush	Sustained
Dc	48	28-56	4.5	4.5
	125	70-140	1.9	1.9
	250	140-280	1.0	1.0
60 Hz. Ac	120	104-127	12.3	10.8
	208	175-225	3.2	2.6
	240	208-254	3.9	3.4
	480	416-508	3.4	3.1
	575	475-625	2.8	2.5

Selective Trip (Type EC-1)

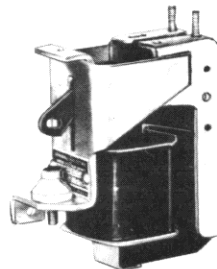
Applied to circuit breakers in series so that only the breaker nearest the over-current fault opens. Allows for added system coordination.

Undervoltage Trip (UV)

Protects against harmful drops in line voltage by automatically tripping the breaker. This device is set to pickup at approximately 85% of bus voltage and drop out between 30% and 60%.

The UV device is also available with an optional static time-delay unit. This offers a field adjustable 2 to 6 second delay between undervoltage fault and breaker trip to prevent potential nuisance tripping due to momentary loss of voltage.

The time-delay unit is mounted external to the breaker. It is rated 125 or 250 V. DC or 208/240 VAC, 50 or 60 Hz. For any other AC source voltage, a control power transformer with a 240 volt secondary rated at least 100 VA is required.



Undervoltage Device

Control Voltage		UV Coil Amperes	
		Inrush	Sustained
Dc	48	0.20	0.20
	125	0.07	0.07
	250	0.04	0.04
60 Hz. Ac	120	0.66	0.24
	208	0.51	0.17
	240	0.37	0.12
	480	0.23	0.08
50 Hz. Ac	120	0.75	0.25
	208	0.30	0.10
	240	0.34	0.11
	480	0.20	0.07

Key Interlock Provision

Prevents operation of a remote function unless the breaker has been tripped. Provision is made to accept a lock assembly furnished by purchaser (GEE or Kirk).

Auxiliary Switch

Used for remote indication of breaker main contact position. Available in groupings of four contacts (two stages) or ten contacts (five stages). Each stage is composed of one "a" Type (N.O.) contact and one "b" Type (N.C.) contact. All contacts feature rugged double break construction.

CB Main Contacts	Auxiliary Switch Position	
	"a" Contact	"b" Contact
Open or Tripped	Open	Closed
Closed	Closed	Open

Control Voltage		Auxiliary Switch Interrupting Ratings (Amperes)	
		Non-Inductive	Inductive
Dc	125	11 ①	6.3 ①
	250	2	1.8
Ac	115	75 1	50 1
	240	50 1	25 1
	480	25 1	12 1

① Limited to 20A continuous rating of switch on all breakers and to 5A continuous rating of #16 wire on drawout breakers.

Reverse Current Device

Used with D-c breakers. Designed to trip the breaker if current reverses direction.

Neutral Connector

For use in general-purpose enclosures, provides termination for system neutral.

Operations Counter

A 5-digit, non-resettable counter actuated by the breaker cam shaft. Mounts on breaker.

PRICES: . . . See Handbook Section 7696



Type AKR Breakers

Accessories

Bell Alarm With Lockout

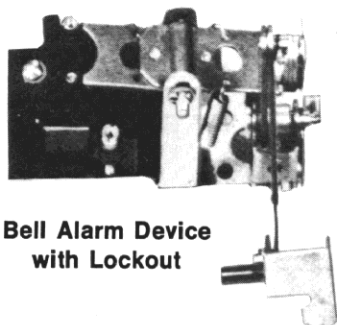
The bell alarm operates one "a" and one "b" contact; or, two "a's" or two "b's". It is activated when the breaker is tripped by any means (automatic) other than the manual trip button or the shunt trip device.

The contacts may be used for remote indication of an automatic trip.

The lockout feature is available to mechanically lock the breaker "open" when the device is activated. "Reset" is accomplished through operation of the manual trip button or shunt trip device.

The bell alarm is available without the lockout feature when so specified.

Control Voltage		Bell Alarm Contact Ratings (amperes)	
		Inrush	Continuous
Dc	125	2.5	2.5
	250	0.9	0.9
60 Hz. Ac	120	30	10
	240	15	5
	480	7	3



Bell Alarm Device with Lockout

Closing Mechanism Operating Amperes

Breaker Frame	120 Volt, 60 Hz (Operating Range 104-127 VAC)			240 Volt, 60 Hz (Operating Range 208-254 VAC)			125 Volt, Dc (Operating Range 100-140 VDC)			250 Volt, Dc (Operating Range 200-280 VDC)		
	Inrush	Sustained	Recommended Fuse Size	Inrush	Sustained	Recommended Fuse Size	Inrush	Sustained	Recommended Fuse Size	Inrush	Sustained	Recommended Fuse Size
AKR-30 AKR-50 AKRT-50	25	5	6	12	3	6	27	5	6	13	3	6
AKR-75 AKR-100	25	8.1	10	12	3.5	10	27	7	10	13	3.2	10
AK-25 AK-50	153	78	30	68	28	15	44	44	10	24	24	6
AKT-50 AK-75	9	4	6	4	2.6	6	30	4	6	15	2	6
AK-100	9	4	10	4	3.2	10	30	5	10	15	2.5	10

Electric Lockout

The electric lockout device provides a means of electrically interlocking breakers so that two cannot be closed at the same time. This electro-mechanical device consists of a coil whose winding must be energized to close the breaker. Once the breaker is closed, loss of voltage will not trip the breaker. A bypass interlock is provided for initial start-up. Refer to the UV device for ratings and coil characteristics.

Auxiliary switches for cross-interlocking breakers must be ordered separately.

Remote Close Solenoid for Manually-Operated AKR-30, 50, AKRT-50 Breakers

Provides a means to electrically close the above breakers from a remote location. May be controlled by a switch or pushbutton for five-cycle closing. Breaker must be charged locally. Available ratings:

Control Voltage		Amperes	
		Inrush	Sustained
Dc	48	2.7	0.58
	125	1.3	0.32
	250	0.68	0.15
60 Hz. Ac	120	2	0.4
	240	1	0.2

ECS/SST Test Set Cat. No. TAK-TS1

A portable instrument for field checking the performance of Types ECS and SST solid-state trip devices.

Verifies the following:

- Pick-up calibrations and time-delay; characteristics of various trip elements;
- Ability of the flux-shift trip device to trip the breaker;
- Target indicator operation;
- Phase sensor continuity.

Required input: 105-125V ac 50/60Hz.

Weight: 20 lbs.



Test Set TAK-TS1

Type AKR Breakers

Ordering Information



HOW TO ORDER

For details on breaker application, refer to the bulletins and time current curves referenced within these pages.

To assure prompt shipment and avoid unnecessary delays, orders for Low Voltage Power Circuit Breakers must include the following information:

A. Quantity

B. Type — Include complete nomenclature (i.e., AKR-4B-50, etc.).

C. Number of poles.

D. Voltage Rating — If a-c, specify frequency.

E. Breaker Ampere Rating — (frame size).

F. Method of Operation — Manual or electrical. If electrical, specify voltage and, if a-c, frequency of closing and tripping sources.

G. Type of Enclosure or Mounting — i.e., drawout substructure, drawout general purpose enclosure or stationary.

H. Type of Overcurrent Trip Device —

1. SST* — Specify:

a) **Sensor ampere tap range.**

b) **Trip element combination** — select one of the following:

LI LIG3 LIG4
LS LSG3 LSG4
LSI LSIG3 LSIG4

where:

L = Long Time

S = Short Time (optional) (*)

I = Instantaneous

G3 = 3-Wire Ground Fault (optional)

G4 = 4-Wire Ground Fault (optional)

(*) Specify pickup range — Low or High.

Note: All adjustments on programmer unit are factory set at minimum positions.

c) **Target Indicators (2) (optional)** — includes one for Overload and one for Short Circuit.

Note: Each unit equipped with Ground Fault includes a Ground Fault target indicator.

2. ECS* — Specify:

a) **Sensor ampere rating.**

b) **Trip element combination** — select LI, LS or LSI, where:

L = Long Time

S = Short Time (optional) (*)

I = Instantaneous

(*) Specify pickup range — Low or High.

Note: All adjustments on programmer unit are factory set at minimum positions.

c) **Target Indicators (2) (optional)** — includes one for Overload and one for Short Circuit.

3. EC (Electromechanical) — Specify:

a) **Quantity per breaker**

b) **Trip ampere rating**

c) **Type:**

(1) *Dual magnetic* (long time and instantaneous) — Unless otherwise specified, characteristics will be supplied as follows: For AKR-30, 50 and AKRT-50, long-time characteristic 1B and instantaneous setting 12X; for AKR-75 & 100, long-time characteristic ICC and instantaneous setting 12X.

(2) *Instantaneous-magnetic* (instantaneous only) — Specify pickup setting.

(3) *Selective* (long time & short time) (optional) — Specify time bands and settings.

I. Accessories Specify those required per breaker (i.e., shunt trip, bell alarm, etc.). Specify ratings as required.

J. Terminal Facilities —

1. For breakers in General Purpose Enclosures specify size and number of cables per stud.

2. For AKR-75 & 100 stationary breakers, specify whether studs are to be horizontal or vertical. Unless otherwise specified, the breakers will be supplied with upper studs horizontal and lower studs vertical.

BASIC PRICES

The basic prices include the following:

Manually Operated Breakers

Stored-energy manual closing mechanism.

Trip-free breaker, mounted on a metal base, with:

Revolving pistol-grip operating handle.

Overcurrent trip device with LI elements.

Trip button (mechanical, breaker mounted).

Position indicator.

Provision for up to three padlocks (for locking breaker in the trip-free position).

Bolted-type terminal connectors — with drawout general-purpose enclosures only.

Maintenance closing handle (not required for AKR-75 & 100).

Electrically Operated

Except for omission of pistol-grip operating handle, same as manually operated breaker above, plus:

Motor-operated, stored-energy operating mechanism (except AK-25, which is solenoid-operated).

Control devices

Shunt trip device.

Four-circuit auxiliary switch.

Close button, escutcheon mounted, momentary contact (when specified)

Maintenance closing handle.



SST Conversion Kits for AK Breakers

70-4000A 600V ac 50/60 Hz.

The solid-state SST overcurrent trip devices used on AKR breakers are also available in kit form for field retrofit of existing AK breakers. Designed for breakers applied on 50/60 Hz ac systems and originally equipped with types EC or Power Sensor trip devices, these kits offer the user the opportunity for convenient, on-site upgrading of existing breakers by removing and replacing their obsolete trip devices with the full-featured, flexible SST system.

Each kit contains all the components, hardware, wiring and instructions necessary to completely convert both EC and Power Sensor breaker types. No special tools are required. A post-conversion test check is performed using a standard high-current test set or the SST portable test sets TAK-TS1 or TAK-TS2.

Kits are available for the following breakers — for complete catalog numbers, prices and ordering information, see Handbook Section 7696.

Available Kits

Stationary Mounted	Drawout Type	
	AKD	AKD-5
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
AK-2/3-50/50H — AKT-2/3-50/50H	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
NA	AK-2/3-75	AK-2A/3A-75
NA	AK-2/3-100	AK-2A/3A-100

NA = Not Available



SST TRIP CHARACTERISTICS—CONVERSION KITS

Applicable time-current Curves: GES-6033B, 6034A, 6035B

Breaker Frame Type	Frame Size (Amperes)	Sensor Taps (X) (Amperes)	SST Programmer Adjustment Range (Set Points)						
			Ground Fault		Long Time		Short Time		Instantaneous Pickup (Multiple of L)
			Pickup (Multiple of X)	Delay Band (Seconds)	Pickup (L) (Multiple of X)	Delay Band (Seconds)	Pickup (Multiple of L)	Delay Band (Seconds)	
AK-15	225	70, 100, 150, 225	.5, .6, .8, 1, 1.5, 2 (X)	Maximum 0.30	.6, .7, .8, .9, 1, 1.1 (X)	Maximum 22	1.75, 2, 2.25, 2.5, 3, 4 (L)	Maximum 0.35	4, 5, 6, 8, 10, 12 (L)
AK-25	600	70, 100, 150, 225 or 200, 300, 400, 600		Intermed. 0.165		Intermed. 10	or	Intermed. 0.21	
AK-50	1600	300, 400, 600, 800 or 600, 800, 1200, 1600	.25, .3, .4, .5, .6, .7 (X)	Minimum 0.065	.6, .7, .8, .9, 1, 1.1 (X)	Minimum 4	3, 4, 5, 6, 8, 10 (L)	Minimum 0.095	4, 5, 6, 8, 10, 12 (L)
AKT-50	2000	800, 1200, 1600, 2000							
AK-75	3000	1200, 1600, 2000, 3000	.2, .22, .25, .3, .35, .37 (X)						
AK-100	4000	1600, 2000, 3000, 4000	.18, .2, .22, .25, .27, .3 (X)						
NOTES			①	②	④	②	③	②	④

① \times = Sensor ampere tap = trip rating

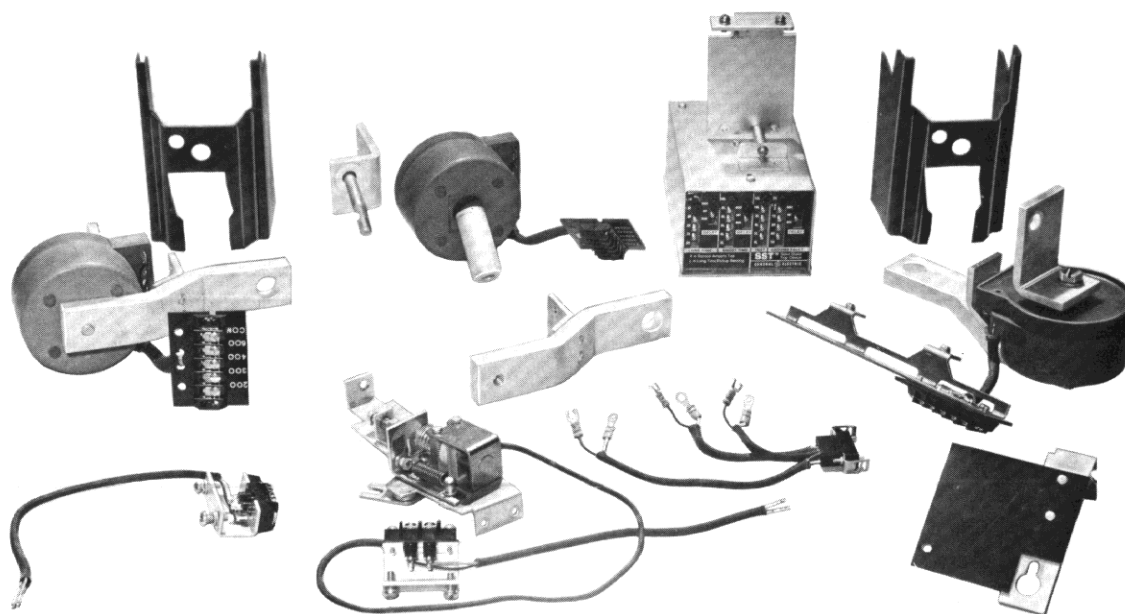
② Pickup tolerance = $\pm 10\%$

③ Time delay at lower limit of band @ 6L

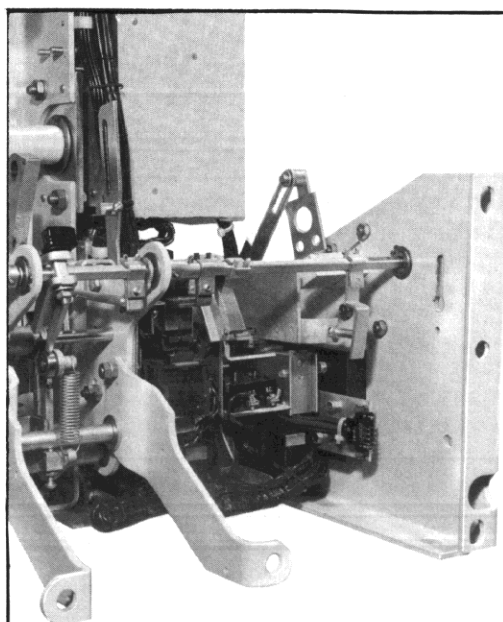
④ Time delay at lower limit of band

SST Conversion Kits for AK Breakers

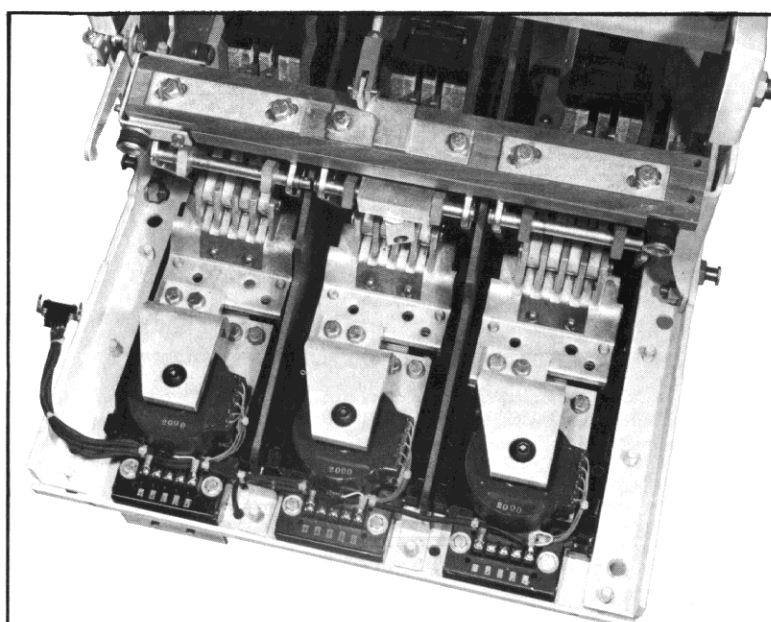
70-4000 A 600V ac 50/60 Hz.



Complete SST kit for AK-15/25



**Rear View of AK-50 Front Frame
Showing Location of Flux Shift Trip Device**



**AK-50 Back Frame Showing
Mounting of SST Current Sensors**



Application Information

REPETITIVE DUTY

Circuit breakers are designed primarily to perform the function of circuit interruption under short-circuit conditions. Nevertheless modern circuit breaker mechanisms are capable of many operations under full-load operation and in-rush conditions such as encountered

in motor starting applications. Industry standards have been established for the minimum performance which is indicated in the table below. With adequate maintenance, GE breakers can be expected to exceed the standards.

REPETITIVE DUTY AND NORMAL MAINTENANCE

Circuit Breaker Frame Size (Amperes)	Number of Operations Between Servicing	Number of Operations Rated Continuous Current Switching (A) (C) (D) (E) (F) (G) (H) and (J)	Number of Operations No-Load Closing and Opening (A) (B) (C) (D) (E) (F) and (G)	Number of Operations In-Rush Current Switching (C) (D) (E) (F) (G) (I) and (J)
225	2500	4000	10000	2000
800	1750	2800	9700	1400
1600	500	800	3200	400
2000	500	800	3200	400
3200	250	400	1100	—
4000	250	400	1100	—

NOTES

Power operated circuit breakers, when operating under usual service conditions, shall be capable of operating the number of times specified in the above table. The operating conditions and the permissible effect of such operations upon the breaker are given in the following lettered paragraphs. For each column, all paragraphs listed in the column heading must be given consideration.

This standard applies to all parts of a circuit breaker that function during normal operation. It does not apply to other parts, such as overcurrent tripping devices, that function only during infrequent abnormal circuit conditions.

(A) Servicing consists of adjusting, cleaning, lubricating, tightening, etc., as recommended by the manufacturer. When current is interrupted, dressing of contacts may be required as well. The operations listed are on the basis of servicing at intervals of 6 months or less.

(B) When closing and opening no-load.

(C) With rated control voltage applied.

(D) Frequency of operation not to exceed 20 in 10 minutes or 30 in an hour. Rectifiers or other auxiliary devices may further limit the frequency of operation.

(E) Servicing at no greater intervals than shown in Column 2 above.

(F) No functional parts should have been replaced dur-

ing the listed operations.

(G) The circuit breaker should be in a condition to carry its rated continuous current at rated maximum voltage and perform at least one opening operation at rated short-circuit current. After completion of this series of operations, functional part replacement and general servicing may be necessary.

(H) When closing and opening current up to the continuous current rating of the circuit breaker at voltages up to the rated maximum voltage and at 85% of the power factor or higher.

(I) When closing currents up to 600% and opening currents up to 100% (80% power factor or higher) of the continuous current rating of the circuit breaker at voltages up to the rated maximum voltage.

When closing currents up to 600% and opening currents up to 600% (50% power factor or less) of the continuous current rating of the circuit breaker at voltages up to rated maximum voltage, the number of operations shown shall be reduced to 10% of the number listed.

(J) If a fault operation occurs before the completion of the listed operations, servicing is recommended and possible functional part replacements may be necessary, depending on previous accumulated duty, fault magnitude, and expected future operations.

Application Information

AKRU-Fused Breaker



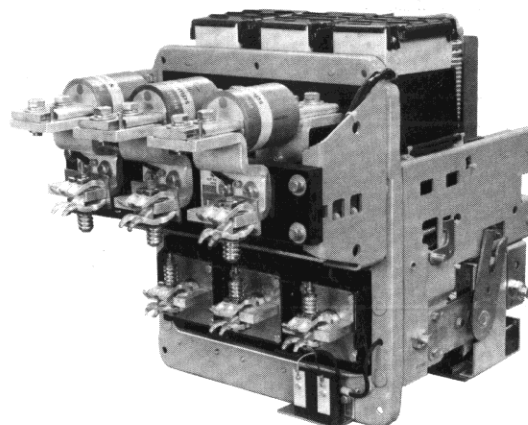
THE FOLLOWING FOUR-STEP PROCEDURE WILL SERVE AS A GUIDE IN SELECTING A FUSED BREAKER:

1. Calculate the available short-circuit current at the point of application in terms of rms symmetrical amperes. (If the calculated available short-circuit current is below 200,000 amperes no further consideration need be given to this point.)
2. Determine the continuous current rating of the breaker on the basis of established practices considering the characteristics of the load and the protection to be provided for conductors.
3. Select the trip device characteristics based on the load characteristics and the type of protection to be provided.
4. Determine the rating of the fuse which co-ordinated with the trip rating and characteristics selected (see co-ordination tables).

GUIDE FORM SPECIFICATIONS:

Fused breakers shall have stored-energy closing mechanisms, racking mechanisms, mechanical interlocks, three over-current trip devices and rear-mounted current limiting fuses in series. All low-voltage power circuit breakers shall be equipped with an open fuse lockout device that is visible from the front of the breaker and capable of indicating which fuses are blown, tripping all three phases of the breaker upon the fuse blowing and preventing the circuit breaker from being reclosed on a single phase condition.

The circuit breaker shall be of the drawout type capable of being racked to the disconnect position with the door closed. Interlocks will be provided to prevent connecting or disconnecting the circuit breaker unless the breaker is open. The breaker shall be prevented from being closed during any racking operation. A test position shall be provided to permit operating the breaker while it is disconnected from the power circuit.



**Fused Breaker Ratings—
Maximum 600v. ac 50/60 Hz.**

Breaker Type	Frame Size Amperes	① CLF Fuse Rating Amperes		Inter-rupting Rating RMS Symmet-rical KA
		Min.	Max.	
AKU-25	600	300	1200	200
AKRU-30	800	300	1600	200
AKRU-50	1600	450	2500	200
AKR-75 ②	3200	2000	3000	200
AKR-100 ②	4000	2000	4000	200

① The maximum fuse rating is the largest fuse which tests show will result in proper performance of the breaker and fuse in combination under short circuit conditions. Only GE type CLF fuses should be used for proper coordination.

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



Specifications

Type **AKR Low Voltage Power Circuit Breakers 600 ac 50/60 Hz.**

DESIGNATIONS

Drawout Breaker Elements for AKD-6 Switchgear		
Frame Size (Amperes)	With Type ECS Solid State Trip Device	With Type SST Solid State Trip Device
800	AKR-4A-30/30H AKRU-4A-30	AKR-5A-30/30H AKRU-5A-30
1600	AKR-4A-50/50H AKRU-4A-50	AKR-5A-50/50H AKRU-5A-50
2000	AKRT-4A-50	AKRT-5A-50
3000	AKR-4A-75	AKR-5A-75
3200	AKR-4C-75	AKR-5C-75
4000 (33" wide)	AKR-4A-100	AKR-5A-100
4000 (25" wide)	AKR-4C-100	AKR-5C-100

OPERATING CURRENTS

Mode	Rated Voltage		Voltage Range	Amperes Inrush/Sustained	
				AKR-30/50, AKRT/50	AKR-75/100
Closing	AC	120	104-127	25/5	25/8.1
		240	208-254	12/3	12/3.5
	DC	125	100-140	27/5	27/7
		250	200-280	13/3	13/3.2
Tripping	AC	120	104-127	12.3/10.8	
		240	208-254	3.9/3.4	
	DC	125	70-140	1.9/1.9	
		250	140-280	1.0/1.0	

INSULATION (60 HERTZ kV)

Breaker	2.2
Control Wiring	1.5
Closing Motor	0.9

OPERATING TIME (CYCLES on 60 HERTZ BASE) (all frame sizes)

Closing Electrically	
Time from energizing closing circuit	
until contacts touch	5
Opening (Maximum Clearing Time)	
With Instantaneous Overcurrent Trip	3
With Shunt Trip	3.5

ACCESSORIES

UNDERVOLTAGE TRIPPING DEVICE

Instantaneous Only—Pickup @ 85% rated control voltage, dropout between 30% and 60%. No adjustments.

With Optional Time-delay Unit—Separate static time-delay unit is mounted external to the breaker, requires 125/250 VDC or 208/240 VAC input. Provides adjustable dropout time from 2-6 seconds on complete loss of voltage.

BREAKER RATINGS

Frame Size Amperes	Breaker Type	System Nominal Voltage 60 Hz. AC	Three Phase Short-Circuit Rating RMS Symmetrical KA	
			With Instanta- neous Trip	Without Instanta- neous Trip§
800	AKR-30	600 480 240	30 30 42	30 30 30
		600 480 240	42 42 50	42 42 42
1600	AKR-50	600 480 240	42 50 65	42 50 50
		600 480 240	50 65 65	50 65 65
2000	AKRT-50	600 480 240	42 50 65	42 50 50
3000, 3200	AKR-75	600 480 240	65 65 85	65 65 65
4000	AKR-100	600 480 240	85 85 130	85 85 85

§ Short-time current ratings.

INTEGRALLY FUSED BREAKER RATINGS

Frame Size Amperes	Breaker Type	Rated Maximum Voltage 60 Hz. AC	CLF Fuse Rating Amperes		Interrupt- ing Rating RMS Symme- trical KA
			Min.	Max.	
800	AKRU-30	600	300	1600	200
1600	AKRU-50	600	450	2500	200

Auxiliary Switch—Manual Breaker: 4 or 10 contacts (2 or 5 "a" and 2 or 5 "b") ①②

Electrical Breaker: 6 or 12 contacts (3 or 6 "a" and 3 or 6 "b") ①③

- ① Shunt Trip requires one "a" contact
- ② Remote close requires one "b" contact
- ③ Closing circuit requires one "b" contact

BELL ALARM DEVICE (With or without lockout) —

Hand/electrical reset, two contacts provided for remote indication—both NO, both NC or one of each.

Specifications



TRIP CHARACTERISTICS—Type ECS Solid State Trip Device

Applicable time-current curve: GES-6032A

Breaker Frame Type	Frame Size (Amperes)	Sensor Ampere Rating (X)	ECS PROGRAMMER ADJUSTMENT RANGE (Set Points)				
			Long Time		Short Time		Instantaneous Pickup (Multiple of L)
			Pickup (L) (Multiple of X)	Delay Band (Seconds)	Pickup (Multiple of L)	Delay Band (Seconds)	
AKR-30	800	100, 150, 225, 300, 400, 600, 800	.6, .7, .8, .9, 1.0, 1.1 (X)	Maximum 22 Intermed. 10 Minimum 4	1.75, 2, 2.25, 2.5, 3, 4 (L) — or — 3, 4, 5, 6, 8, 10 (L)	Maximum 0.35 Intermed. 0.21 Minimum 0.095	4, 5, 6, 8, 10, 12 (L)
AKJ-50 AKR-50	1600	300, 400, 600, 800, 1200, 1600					
AKJT-50 AKRT-50	2000	800, 1200, 1600, 2000					
AK-4A-75 AKR-4A-75	3000	1200, 1600, 2000, 3000					
AKR-4C-75	3200	1200, 1600, 2000, 3000, 3200					
AK-100 AKR-100	4000	1600, 2000, 3000, 4000					
NOTES		①	②	③	②	④	②

TRIP CHARACTERISTICS—Type SST Solid State Trip Device

Applicable time-current curves: GES-6033B, 6034A, 6035B

BREAKER FRAME TYPE	FRAME SIZE (Amperes)	SENSOR TAPS (X) (Amperes)	SST PROGRAMMER ADJUSTMENT RANGE (Set Points)						
			Ground Fault		Long Time		Short Time		Instantaneous Pickup (Multiple of L)
			PICKUP (Multiple of X)	DELAY BAND (Seconds)	PICKUP (L) (Multiple of X)	DELAY BAND (Seconds)	PICKUP (Multiple of L)	DELAY BAND (Seconds)	
AKR-30	800	100, 150, 225, 300 —or— 300, 400, 600, 800	.4, .5, .6, .8, 1.0, 1.2 (X)	Maximum 0.30 Intermed. 0.165 Minimum 0.065	.6, .7, .8, .9, 1, 1.1 (X)	Maximum 22 Intermed. 10 Minimum 4	1.75, 2, 2.25, 2.5, 3, 4 (L) —or— 3, 4, 5, 6, 8, 10 (L)	Maximum 0.35 Intermed. 0.21 Minimum 0.095	4, 5, 6, 8, 10, 12 (L)
AKJ-50 AKR-50	1600	300, 400, 600, 800 —or— 600, 800, 1200, 1600	.25, .3, .4, .5, .6, .7 (X)						
AKJT-50 AKRT-50	2000	800, 1200, 1600, 2000	.2, .25, .3, .4, .5, .6 (X)						
AK-5A-75 AKR-5A-75	3000	1200, 1600, 2000, 3000	.2, .22, .25, .3, .35, .37 (X)						
AKR-5C-75	3200	1200, 1600, 2000, 3200							
AK-100 AKR-100	4000	1600, 2000, 3000, 4000							
NOTES		①	②	④	②	③	②	④	②

- ① For ECS, X = Sensor ampere rating = trip rating ③ Time delay at lower limit of band @ 6L
 For SST, X = Sensor ampere tap = trip rating ④ Time delay at lower limit band
 ② Pickup tolerance = $\pm 10\%$

AVERAGE WEIGHTS—Pounds

Drawout Breaker Element	NET		SHIPPING	
	Manual	Electrical	Manual	Electrical
AKR-30	200	205	225	230
AKRU-30	245	250	275	280
AKR-50	210	215	235	240
AKRU-50	255	260	285	290
AKRT-50	215	220	240	245

Drawout Breaker Element	NET		SHIPPING	
	Manual	Electrical	Manual	Electrical
AKR-75	420	435	470	485
AKR-100 (25" wide)	525	540	575	590
AKR-100 (33" wide)	540	555	615	630



Guide form specifications

General

The individually mounted low-voltage power circuit breaker shall consist of an electrically and mechanically trip-free circuit breaker element.

The circuit breaker shall be of the drawout type capable of being racked to the disconnect position with the door closed.

Interlocks will be provided to prevent connecting or disconnecting the circuit breaker unless the breaker is open. The breaker shall be prevented from being closed during any racking operation. A test position shall be provided to permit operating the breaker while it is disconnected from the power circuit.

SST Trip Devices Shall Include:

- All time current characteristic adjustments shall be of the fixed-point type, gold-plated, for maximum reliability and setting accuracy.
- All internal solid state circuitry shall be epoxy conformal coated and shall have gold-plated electrical interconnections to resist environmental contamination.
- Tapped current transformers for application flexibility.
- Adjustable long-time pickup from .6 to 1.1 of transformer tap and three (3) time delay bands.
- Adjustable instantaneous.

Options Characteristics

- Short-time pickup and delay.
- Ground fault protection, 3 ϕ -3W, or 3 ϕ -4W.
- Ground fault, overload and short-circuit target indicators shall be self-powered and continue to give indication even when control power has been lost.

ECS Trip Devices Shall Include:

- All time current characteristic adjustments shall be of the fixed-point type, gold-plated, for maximum reliability and setting accuracy.
- All internal solid state circuitry shall be epoxy conformal coated and shall have gold-plated electrical interconnections to resist environmental contamination.
- Fixed current transformers.
- Adjustable long-time pickup from .6 to 1.1 of transformer tap and three (3) time delay bands.
- Adjustable instantaneous.

Options Characteristics

- Short-time pickup and delay.
- Overload and short-circuit target indicators. All indicators shall be self-powered and continue to give indication even when control power has been lost.

Guide form specifications



Detailed

- This specification covers General Electric Company Low Voltage Power Circuit Breakers, types AKR or AKRU.
- The continuous current frame ratings shall be 800, 1600, 2000, 3200, 4000.
- Circuit breakers shall be manually or electrically operated.
- Control voltage for electrically operated breakers shall be: _____.
- Volts:
AC _____ Cycles _____
3 ϕ -3W _____ 3 ϕ -4W _____
- Circuit breaker RMS symmetrical interrupting ratings:
240VAC KA _____
480VAC KA _____
600VAC KA _____
250VDC KA _____
- Overcurrent trip devices shall be solid state type SST or ECS.
- Each solid state trip unit shall be equipped with the following field adjustable, fixed-point time-current characteristics:
 - Long-time pickup, Long-time delay.
 - Short-time pickup, Short-time delay.
 - Instantaneous.
 - Ground fault pickup, Ground fault delay. Arranged for 3 ϕ -3W, 3 ϕ -4W.
 - Target indicators, Overload, short-circuit, ground fault.
- Each circuit breaker shall be equipped with the following accessories:
 - Shunt trip — Voltage _____
 - Undervoltage release —
Voltage _____
 - Undervoltage release with time delay —
Voltage _____
 - Overload bell alarm.
 - Lockout device.
 - Auxiliary Switch:
Number of contacts:
Normally open "a" type _____
Normally closed "b" type _____

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GE-1675

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