Westinghouse

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Application

Westinghouse molded case breakers are designed for circuit protection of low voltage distribution systems. They are suitable for application as main breakers and for protection of branch and feeder circuits and connected apparatus. These breakers provide overload protection for conductors and short-circuit protection for all circuit elements such as conductors, motors and starters.

They are designed for use in switchboards, control centers, panelboards, combination starters, bus duct plug-in units and separate individual enclosures. In these various enclosures, they are applicable to the requirements of lighting, distribution and other power circuits.

Standard current ratings of AB De-ion circuit breakers correspond in general to the standard ratings in the N. E. C. Paragraph 240-5b. These breakers are primarily designed for the protection of conductors, both aluminum and copper.

User Benefits

Accurate Reliable Protection: The overload element in each pole of every breaker is individually calibrated and tested in a controlled temperature to meet Underwriters' Laboratories, Inc. requirements. Especially hardened, ground and polished trip latches assure continuous and accurate tripping characteristics.

De-ion Arc Quenching: Westinghouse-developed De-ion arc quenchers positively extinguish dangerous arcs in a fraction of a second. Coupled with a positive action quick-make, quick-break toggle mechanism, they assure long circuit breaker life with minimal burning and pitting of contact surfaces.

Reduced Downtime and Maintenance Costs: Circuit breakers are long-lived devices designed for maintenance-free, repetitive duty without costly shutdowns. Because the breaker is resettable, downtime amounts to only a matter of seconds after the overload or fault has been corrected.

Reduced Operation Cost: Welded internal parts, high contact pressure, and silver alloy butt-type contacts used in circuit breakers offer considerably less resistance to electrical current than do the fuse clips, bolted joints and hinge joints of a fusible device. Thus, with a lower watts loss, electrical power cost savings result.

Single-Phase Protection: A fault or overload on any one phase opens all poles of the breaker, minimizing the possibility of single-phasing polyphase motors.

Dual Protective Elements: Bi-metallic thermal elements protect on overloads where inverse time tripping is desirable; magnetic trip elements operate the breaker instantly on dangerous fault currents. Trip-free, the breaker cannot be held closed under fault conditions.

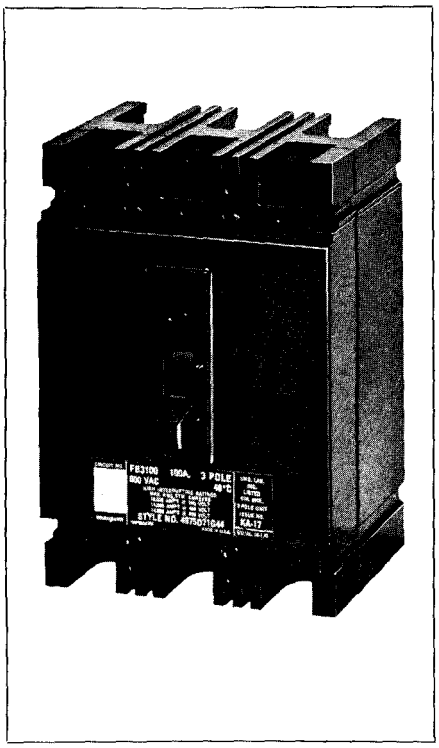
Maximum Safety: Molded case circuit breakers are dead front and personnel are not exposed to "live" parts. Line terminal shields are available for additional protection when required.

Tamperproof: The complete breaker or trip unit is sealed at the factory to prevent tampering and alteration of its rating.

February, 1970
New Information
E, D, C/1901, 1903, 1928/DB

Westinghouse

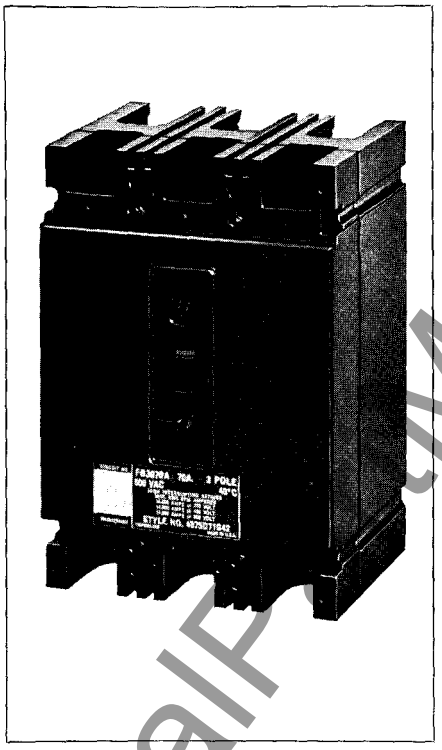
Thermal Magnetic Breakers



Thermal magnetic breakers are general purpose devices suitable for the majority of breaker applications and are considered the industry standard. Combining thermal and magnetic trip elements, they provide accurate overload and short circuit protection for conductors and connected apparatus. Because their continuous current rating changes with ambient temperature variations, these breakers are best suited for conductor overload protection.

Thermal magnetic breakers have all the design features of standard breakers shown on pages 4-5.

Ambient Compensating Breakers

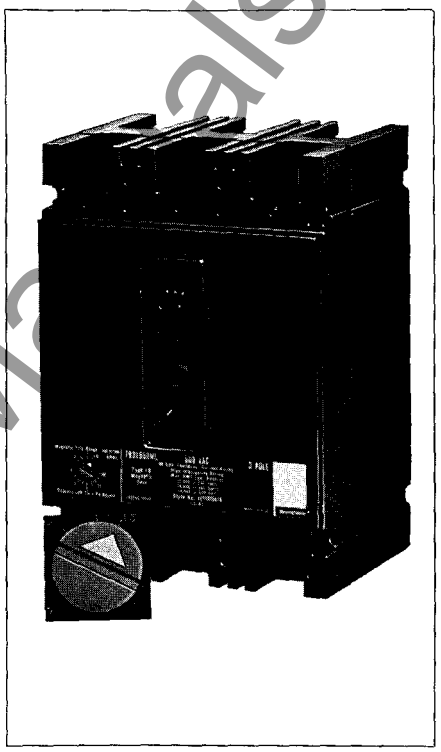


Ambient compensating breakers automatically compensate for variations in ambient temperature, and thus minimize the need for de-rating in higher ambients, and uprating in lower ambients. This provides a near constant current rating over a wide range of temperatures.

Ambient compensating breakers are calibrated at 25°C. However, because of the built-in compensator, they will carry approximately the same current at other ambients with a very small ampere rating change. The trip units are thermally compensated to carry rated load at 50°C while still meeting Underwriters' Laboratories tripping requirements for 25°C breakers at 25°C. These breakers do require slight derating at ambients above 50°C.

Ambient compensating breakers are thermal magnetic and provide overload and short circuit protection. They have all the design features of standard breakers shown on pages 4-5.

Magnetic-Only Breakers



Magnetic-only breakers are similar to standard thermal magnetic breakers except that they do not have thermal trip elements. They are equipped with front-adjustable magnetic trip elements and are used where only short circuit protection is required. Because the adjustment feature allows closer short circuit protection, these breakers are commonly preferred for motor and resistance welder circuits.

Each breaker is calibrated at the factory for a specific trip range and set on the high side. Adjustment knobs located in the front cover can be adjusted downward to a specific requirement within the specified range. The adjustment knobs, made of red nylon, have a high, a low and a series of intermediate setting positions. The magnetic trip is so designed that each point follows a linear scale and each of the intermediate settings has a significant value, within calibration tolerances.

Magnetic-only breakers have all the features of standard breakers shown on pages 4-5, except that they do not have a thermal trip element.

AB De-ion® Circuit Breakers

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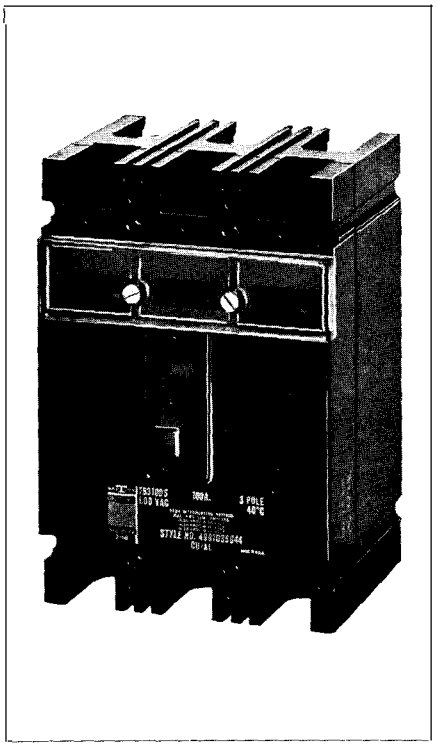
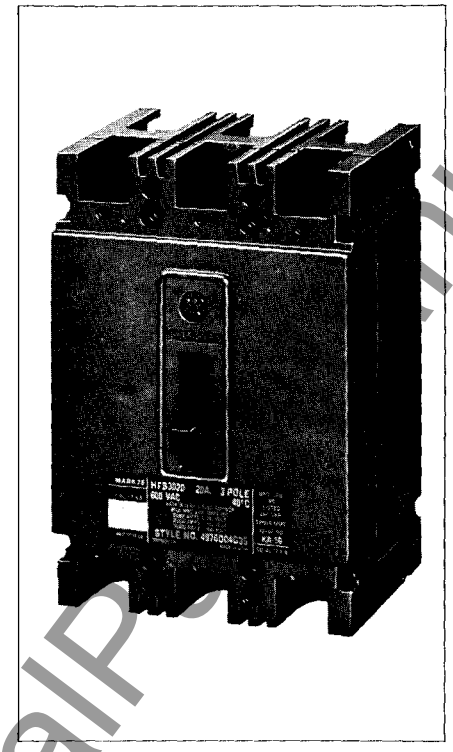
SAF-T-VUE® Breakers



Saf-T-Vue breakers are similar to standard molded case breakers except that they are equipped with a window of transparent, heat resistant thermoplastic over the breaker contacts. This permits instant, visual verification of whether the contacts are open or closed. These breakers fulfill the needs of industrial plants where safety codes require visible contacts as an additional safety precaution for maintenance personnel. They can be supplied with thermal magnetic, magnetic-only or ambient compensated trip elements to cover a wide scope of applications. They are not available in MARK 75 or TRI-PAC breakers.

Saf-T-Vue breakers have all the design features of standard breakers shown on pages 4-5.

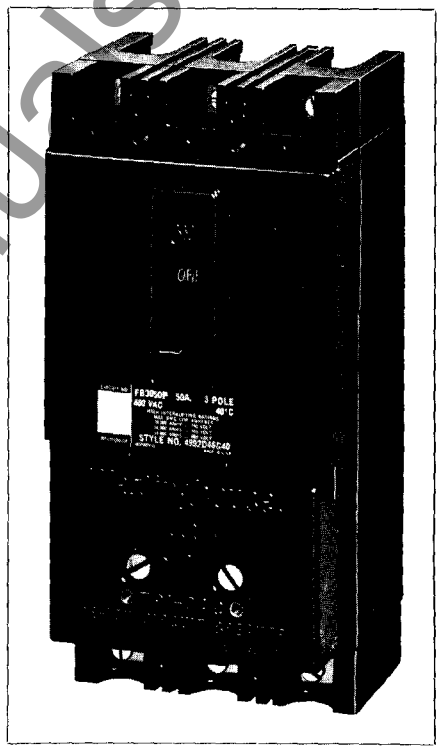
MARK 75® Breakers



MARK 75 breakers are similar to and are the same size as standard thermal magnetic breakers, except that they are designed to provide up to 75,000 amperes asymmetrical interrupting capacity at 240 volts Ac. Thus, MARK 75 breakers are ideally suited for use in network systems and other applications where unusually high fault currents exist. Standard MARK 75 breakers are equipped with thermal magnetic trip elements; they are also available as magnetic-only or ambient compensating breakers.

MARK 75 breakers have all the standard design features shown on pages 4-5, except that the special molded case is gray, instead of black and has greater strength and resistance to tracking.

TRI-PAC® Breakers



TRI-PAC circuit breakers offer an even higher interrupting capacity than MARK 75 breakers. They are similar to standard thermal magnetic breakers except that they incorporate a current limiting device. This enables them to be used in secondary distribution systems where fault currents up to 200,000 symmetrical rms, amperes are available. Thus, they are a triple package of protection – (1) time delay thermal trip for overload protection, (2) instantaneous magnetic trip for normal fault current protection, and (3) current limiting action for higher fault current protection – combined and coordinated in a single compact and economical device. Because they limit current, TRI-PAC breakers can be used to protect smaller AB breakers and other connected apparatus, in addition to protecting feeder and branch circuits.

TRI-PAC breakers incorporate all the design features of standard breakers as shown on pages 4-5, in addition to the current limiter package shown on pages 6-7.

Westinghouse

Design Features of Standard Breakers

1 Molded Cases

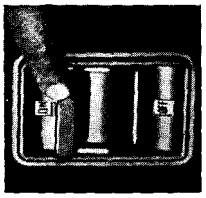
Moldarta® and/or glass polyester cases combine built-in ruggedness and high dielectric strength in a compact design that is both space-saving and attractive. Mechanism is entirely enclosed, providing maximum safety.

2 Free Bearing Surfaces

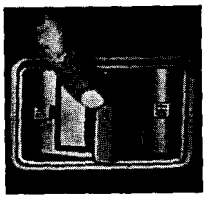
Bearing surfaces are of dissimilar metals. This prevents sticking and bearing wear, allowing long service life.

3 Handle Position Indication

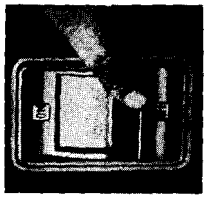
Position of handle gives positive indication of whether circuit is On, Off or Tripped.



ON: Handle in this position indicates that the circuit is closed or On.



TRIPPED: When the breaker trips automatically due to overload or short circuit, the handle moves to a position midway between the manual On and Off.



OFF: Handle is in this position when circuit is open or off. To restore service after automatic tripping, handle is first moved from center to Off and then to On.

4 Accurate Protection

All tripping members have ground and polished latch surfaces and are heat-treated to prevent distortion. Heat-treated bi-metals retain calibration permanently.

5 Factory Sealed

Smaller breakers are sealed to prevent tampering and changing of calibration. In the larger frames, the trip units are individually sealed and are interchangeable by removing the breaker cover.

6 Firm Connectors

Pressure-type connectors are standard with all ratings above 30 amperes and make efficient, dependable connections. Terminals suitable for copper cable are supplied as standard. Terminals suitable for either aluminum or copper cables can be specified for most breakers.

7 De-ion Arc Quenchers

This Westinghouse development consists of a series of grid plates mounted in parallel between supports of insulating material.

The slots in the steel plates extend directly over the contacts and draw the arc from the moving contact up into the divided chamber. The arc is thus confined, divided, and extinguished in less than ½ cycle.

8 Silver Alloy Contacts on all Breakers

For increased contact life and enduring low resistance; special alloys prevent sticking and welding.

9 Electrically Welded Connections

Firm, strong welded connections assure long life. Provide low resistance and low watts loss, with increased economy in operation.

10 Quick-Make, Quick-Break Mechanism

The quick-make, quick-break over center toggle mechanism provides quick, positive action in opening and closing circuits. It prevents "teasing" the contacts.

11 Common Trip

Multi-pole units have insulated common-trip bar that opens all poles when an overload occurs in any one phase. Minimizes possibility of single phasing.

Complete Interpole Barriers

(Not illustrated)

Completely isolate one pole from another, eliminate possibility of phase-to-phase flashover.

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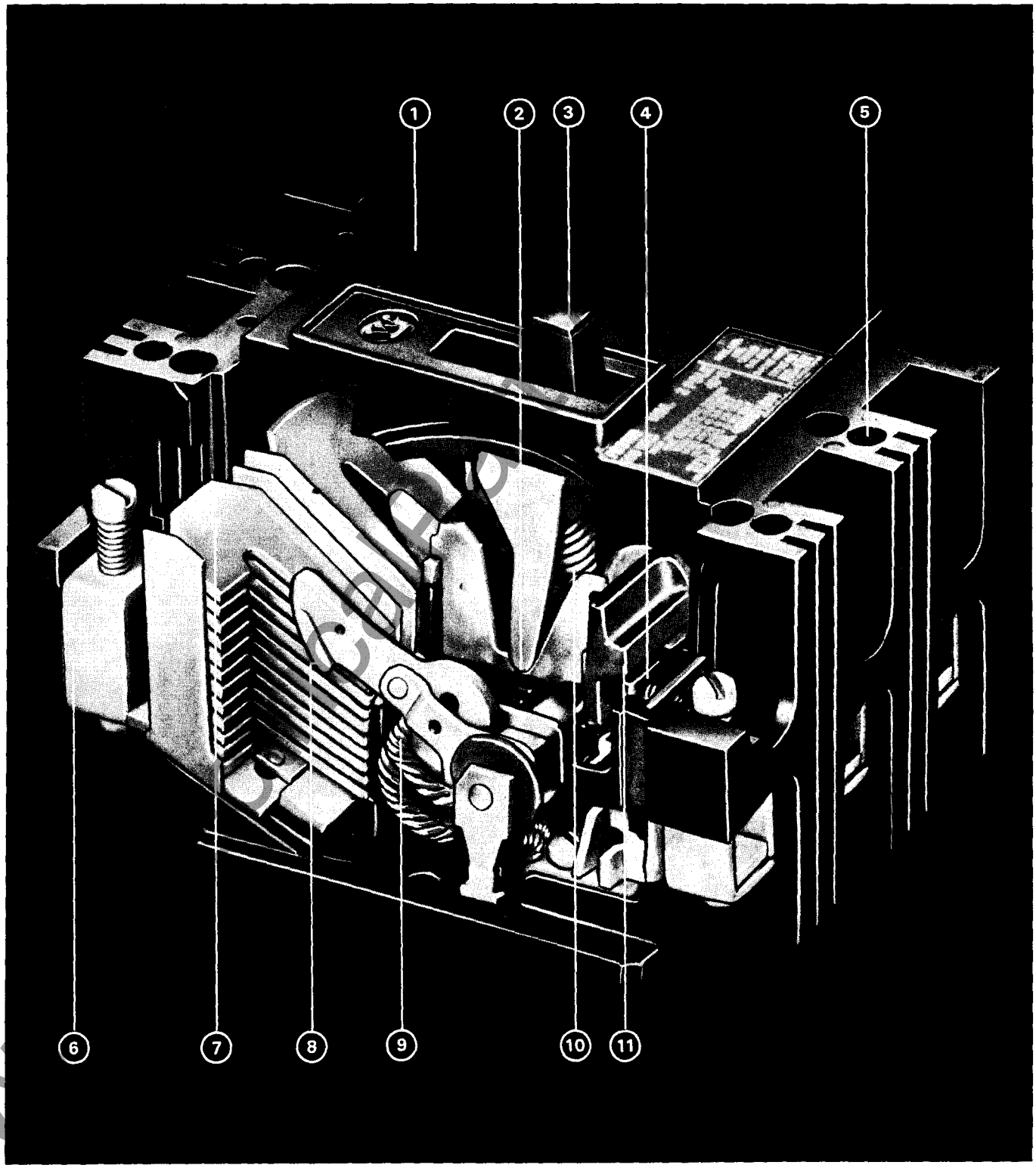

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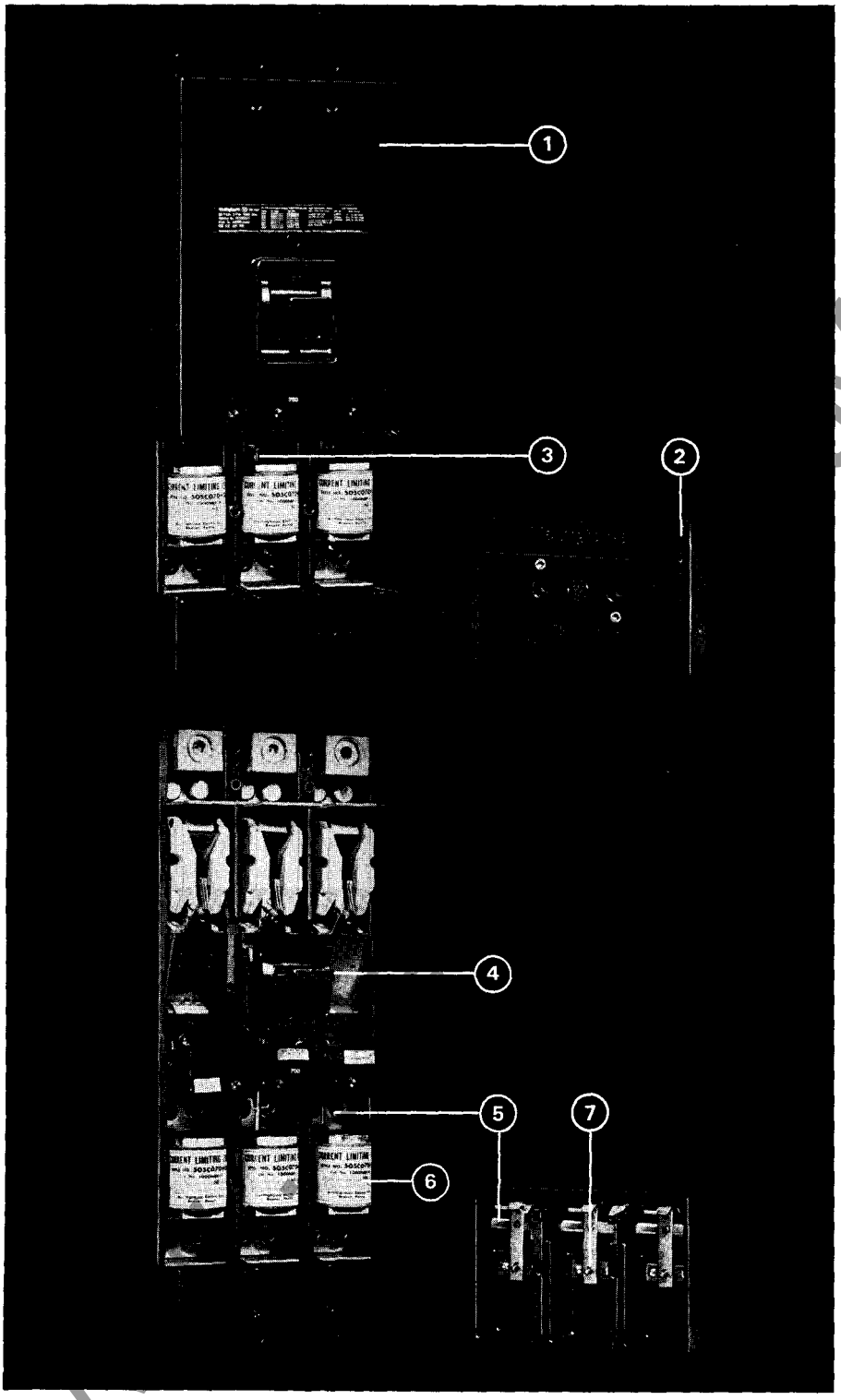
Design Features of TRI-PAC® Breakers



1 Retain All Features of Standard AB De-ion Circuit Breakers

TRI-PAC breakers are built to the same exacting design standards and by the same methods as conventional Westinghouse molded case circuit breakers. They retain all the features of standard breakers including: De-ion arc quenchers, non-welding silver alloy contacts, common trip and Moldarta® and/or glass polyester cases.

2 Compact, Easy-to-Remove Current Limiter Housing

Current limiters are contained within the molded case of the breaker, and are readily accessible from the front when replacement is necessary. On small units the limiters are contained in a removable housing and plug into the breaker as a unit. On larger units the limiters bolt individually to the breaker frame and are enclosed by a separate limiter housing or by the breaker cover.

3 Limiter Housing Safety Interlock

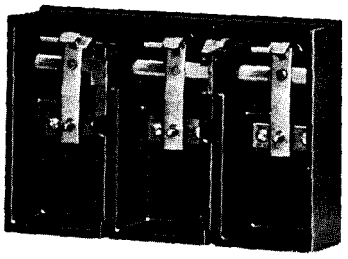
When the limiter housing is removed, a safety interlock trips the breaker. This interlock also prevents closing of the breaker while the limiter housing is removed so that it is impossible to come in contact with "live" parts.

4 Positive Trip Indication

When a breaker trips, the handle always moves to the center "trip" position. In addition, the cause of tripping is indicated in the following ways:

- If the breaker cannot be reset immediately after tripping but can be reset after a short period, it indicates thermal tripping due to an overload or high resistance fault.
- If it can be reset immediately, a "normal" fault current has been interrupted by instantaneous magnetic action.
- If the TRI-PAC cannot be reset, high fault interruption by the current limiter has taken place.

5 Coordinated Common Trip to Prevent Single Phasing



When a current limiter operates, the ejected plunger causes instant release of a common tripping bar. All poles are opened simultaneously, eliminating the possibility of single phasing.

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15 to 2500 Amperes
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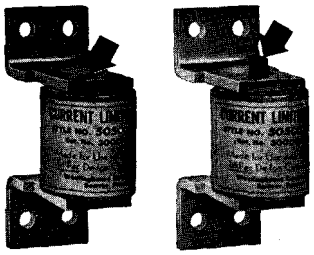
6 Specially Designed Current Limiters



When a high fault current causes one or more limiters to function, a spring-loaded plunger is instantly ejected from the end of the limiter. The plunger strikes a trip bar which causes the breaker contacts to open the instant the fault occurs.

An extended plunger on any limiter indicates, at a glance, on which phase the fault has occurred so that testing of limiters is unnecessary. Presence of an extended plunger also prevents relatching of the breaker. Thus, "good" limiters must be used or the breaker cannot be operated. These limiters are not affected by the overloads or normal short circuits cleared by the thermal-magnectic action of the breaker, and unless they have cleared a high fault current, as evidenced by an extended plunger, they may be used without question.

Since these limiters are designed for use only with TRI-PAC breakers, safe, proper coordination is assured.

7 Missing Limiter Interlock

TRI-PAC breakers with a separate limiter housing are provided with a missing limiter interlock which prevents the breaker being reset unless all limiters are in place. Thus, accidental single phasing is prevented, since the breaker cannot be reclosed when a limiter is missing.

Choice of Three Terminal Connections

TRI-PAC breakers are available with front connected pressure type terminals, bolted rear-connected mounting studs and plug-in terminal mounting blocks.

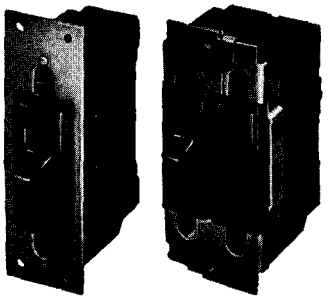
Accessories

TRI-PAC breakers accommodate many standard AB breaker accessories including shunt trip, undervoltage trip and auxiliary contacts. Application of other accessories should be reviewed with Westinghouse.

Accessories for All Type Breakers

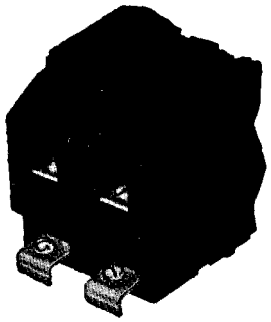
AB De-ion circuit breakers are, for the most part, used in conjunction with, or built into, other equipment such as panelboards, switchboards and numerous types of enclosures. Accessories shown on this and the following pages are available for most breakers. **For application to specific breakers, refer to Price List 29-120.**

Quicklag Faceplate



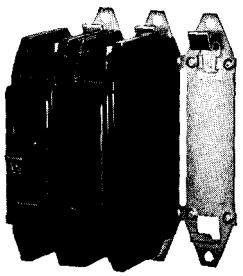
For front panel mounting. Faceplate snaps over the front of the single-pole breaker, is a two-piece wraparound on the two-pole breaker.

Quicklag Clamp



For base mounting of Quicklag breakers on panels. Two needed per breaker.

Quicklag Base Mounting Plate



Plates accommodate six single-pole, three two-pole or two three-pole breakers. Can be cut for specific need.

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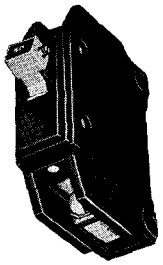
Accessories, *Continued* **(Refer to Accessories section, PL 29-120, for application to specific breakers.)**

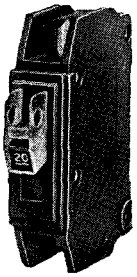
Handle Locks
Various handle locks are available to prevent either accidental or deliberate operation of circuit breakers. The "trip free" handle of the AB De-ion circuit breaker enables it to trip on overload or short circuit conditions, even though handle locks are in place.

For Quicklag Breakers
Refer to Price List 29-120 for application to specific breakers.

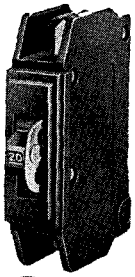
Lockdog
Non-padlocking type, removable.



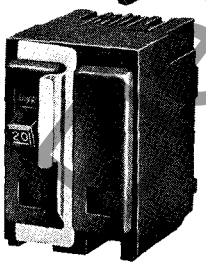
Padlock Attachment
Can be padlocked, is removable.



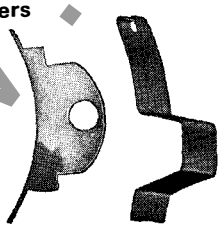
Padlock Device
For 1-pole Quicklags. Padlockable, non-removable, meets California code requirements.



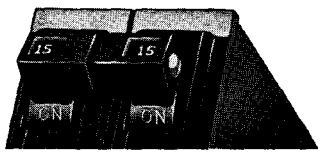
Padlock Device
For 2 and 3-pole breakers. Padlockable, non-removable, meets California code requirements.



For Standard Breakers
Padlockable or non-padlocking. Padlockable type meets California code requirements.

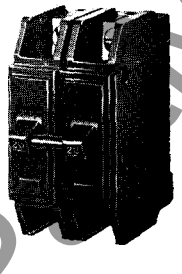


Handle Ties for Quicklag Breakers Standard

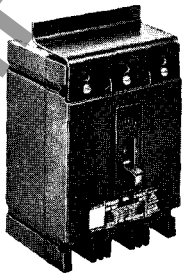


For use with adjacent pairs of breakers which are not interconnected. Affords true trip indication, prevents single-pole operation where double-pole manual switching is required.

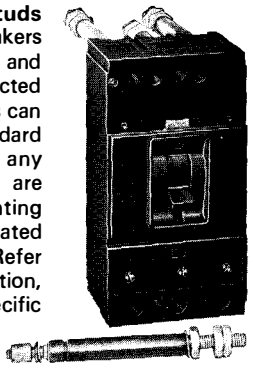
California Type
Meets California code requirements which call for a solid tie.



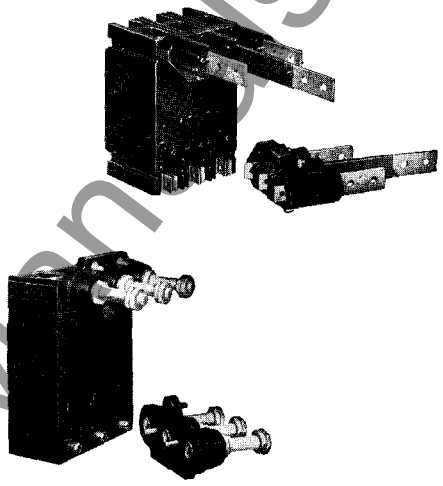
Terminal Shields
Westinghouse offers a complete line of formed terminal shields which fasten over the line ends of AB breakers to protect personnel against accidental contact with the incoming wiring. Meet most exacting safety requirements; e. g. for machine tool control panels where overload relays are internally reset.



Rear Terminal Studs
For adapting breakers for switchboard and other rear connected applications. Studs can be used with standard breakers without any modification and are available for mounting breakers on insulated or steel panels. Refer to Accessories section, PL 29-120, for specific applications.

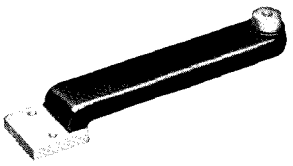


Plug-in Kits



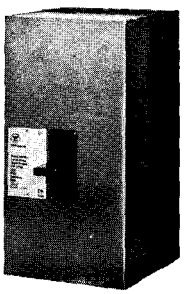
Designed to provide quick and easy plug-in installation in switchboards. Tulip type connectors and threaded studs or flat bus bars are built into the molded support block. Male studs or flat stab connectors are attached to the breaker terminals.

Panelboard Connecting Straps



For connection of breakers to bus bars in narrow or convertible distribution panelboards. Straps and available panelboard parts are shown in Price List 29-120, Accessories section.

Motor Operators
For complete remote operation of circuit breakers. Means for manual operation is provided in the event of power failure or emergency. Available in 120, 208, 240, 480 volt Ac ratings.



Motor operators are intended for infrequent operation in line with Underwriters' Laboratories endurance standards for molded case circuit breakers.

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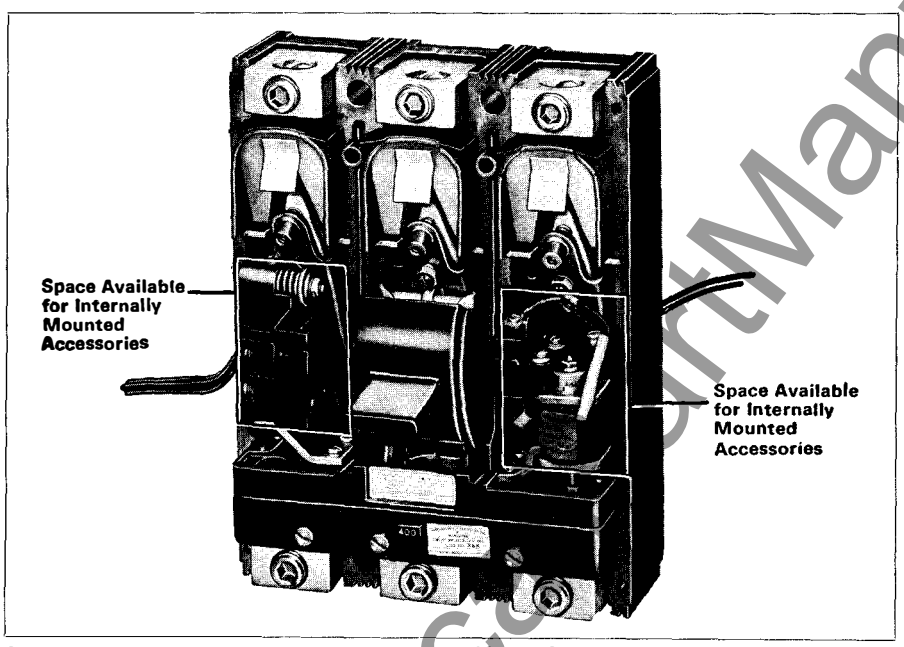
Modifications (Refer to PL 29-120, Modifications, for application to specific breakers.)

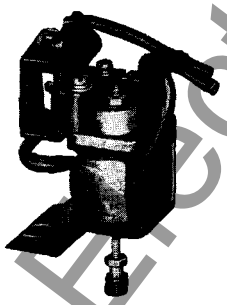
Internally Mounted Modifications

For severe or unusual operating conditions, for special functions or control sequences, Westinghouse breakers can be custom-built or modified with special attachments. Beyond the basic function of overcurrent and short circuit protection, such special breakers meet modern, complex circuit requirements, and add flexibility of operation and efficiency. Those modifications which can be mounted inside the breaker are shown on this page. For application to specific breakers, see Modifications, PL 29-120.



Shunt Trip

Breaker Availability: See PL 29-120, Modifications



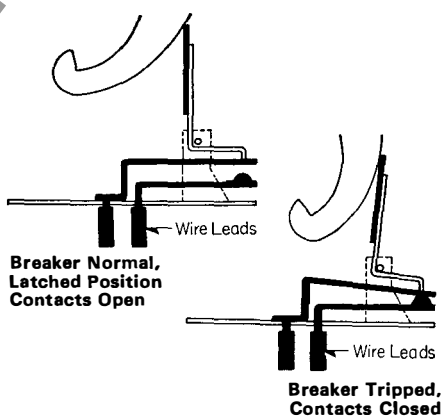
Shunt trips are used to trip the breaker electrically from a remote point.

Shunt trip coils do not have a continuous rating. A cut-off switch is included on most breakers to break the coil circuit when the breaker opens. Available for voltages up to 250 volts Dc and 600 volts Ac.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

Alarm Switch

Breaker Availability: See PL 29-120, Modifications



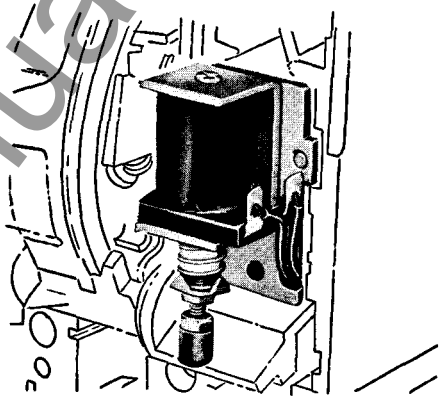
Breaker Normal, Latched Position Contacts Open

Breaker Tripped, Contacts Closed

These switches do not function with manual operation. When the breaker is tripped, the alarm switch closes to energize an indicating light or sound an alarm. Switches which open on tripping can also be supplied when specified. The alarm switch is placed atop at the factory. Alarm bell or light is not included.

Undervoltage Trip

Breaker Availability: See PL 29-120, Modifications

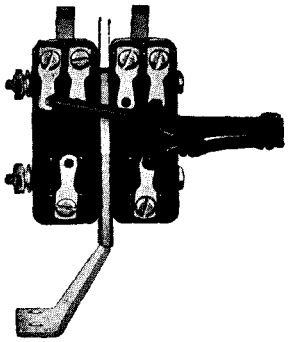


Undervoltage trips automatically trip the breaker when voltage drops below 40% to 60% of coil rating. The breaker cannot be reset until voltage returns to 80% of normal. They are available for voltages up to and including 250 Dc and 600 Ac. For some voltages, an external resistor is supplied for connecting in series with the trip coil. Only instantaneous action is offered.

Must be factory installed, mounting location varies among breakers. Refer to PL 29-120 for specific location.

Auxiliary Switch

Breaker Availability: See PL 29-120, Modifications



Auxiliary switches are used to open or close control circuits as the breaker operates. These internally mounted switches are normally supplied in the form of miniature switches having one A contact, one B contact and common "A" contacts are closed when the breaker is closed and "B" contacts are open when the breaker is closed.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

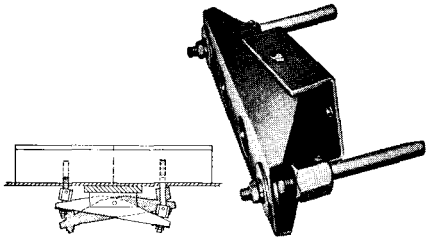
Westinghouse

Modifications, *Continued* (Refer to PL 29-120, Modifications, for application to specific breakers.)

Mechanical Interlocks

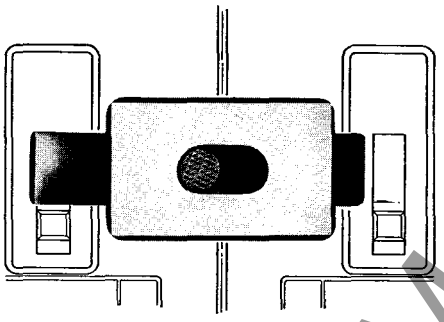
Mechanical interlocks provide a means to interlock two breakers so that only one may be closed, yet both may be open at any given time.

Walking Beam Type



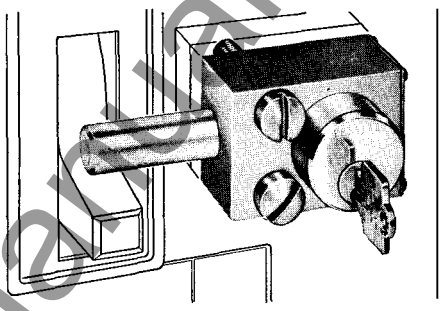
Walking beam interlocks mount on panel at the rear of breakers. When one breaker is closed, a non-conductive plunger extends into the opposite breaker to prevent it from closing. The closed breaker must open before the open breaker may be closed. Circuit breakers require special machining to fit walking beam interlock and should be ordered from the factory with the necessary interlock. Refer to PL 29-120 for standard breaker spacings.

Sliding Bar Type



Sliding bar interlocks mount on customer's panel in front of breakers. When bar is extended toward one breaker blocking handle in open position, opposite breaker can be closed. Closed breaker must be opened and handle blocked with sliding bar before opposite breaker can be closed. Breakers do not require alteration for use with this attachment. Refer to PL 29-120 for standard breaker spacings.

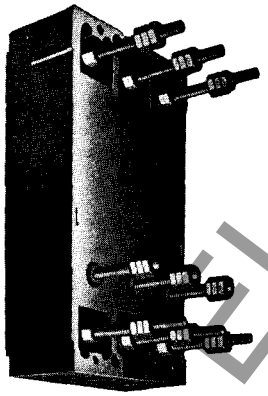
Key Interlock



Key interlocks mount directly to breaker cover. Plunger is extended by turning key in cylinder, thereby locking breaker in open position. Various keying arrangements can be supplied. (e. g.-key removable only when plunger extended; key removable when plunger either extended or retracted; multi-cylinder operation of plunger).

A pair of breakers, remote from each other, can be interlocked so that only one can be closed at one time by using key interlocks operable by the same key and key removable only when plunger is extended. These interlocks cannot be field-mounted.

Dual Voltage Breakers



For dual voltage equipment protection with only one trip rating, breakers may be supplied with center studs. At the maximum voltage the trip unit carries all the current. At the lower voltage, the current is doubled, with half the current by-passing the trip unit through the center stud connections. Thus, one rating breaker can be used for both connections. Rear connecting studs are normally used with center tap studs for line and load connections. These center studs cannot be field mounted.

Breakers with Paralleled Poles

Breaker poles are paralleled for high current single-pole operation by the addition of straps at line and load ends of breaker, as well as internal strap ahead of the trip to assure an equal division of the load. For example, a 2-pole breaker rated 100 amperes would have a single-pole rating of 200 amperes with paralleling straps. Parallel connections are made at factory. Application of parallel poles should be reviewed with Westinghouse.

Field Discharge Breakers

Field discharge breakers are composed of 3-pole frames having two outside non-automatic poles and a center pole field discharge contact arranged to close as the outside contacts are opened and vice versa. Thus, the center pole is used as a field discharge contact. Automatic tripping can be supplied in outside poles if desired.

Fungus-Moisture Proofing and Corrosion Resisting

Breakers may be made to resist extreme moisture and fungus conditions in tropical and other humid localities. Breakers are coated with a varnish; in addition, fibre parts are impregnated and varnished to prevent moisture absorption.

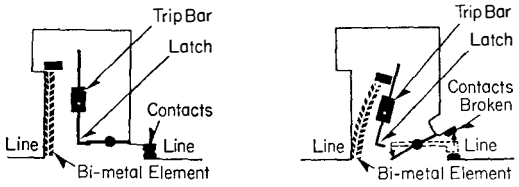
For chemical or heavy salt-laden atmospheres, where corrosion is accelerated, special platings and materials are available. When ordering, these conditions should be specifically outlined to assure best protection.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

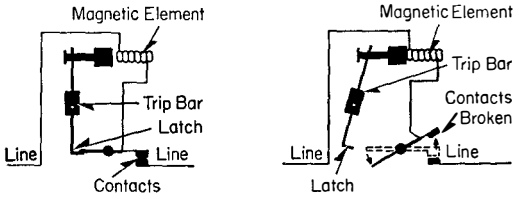
Protective Actions

Thermal Action



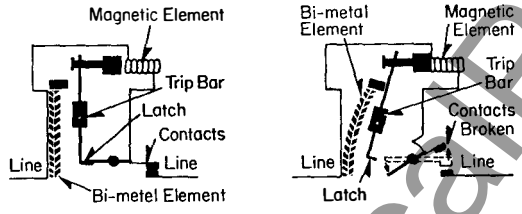
A thermal element is generally best suited for conductor overload protection because its rating changes in about the same ratio as the average conductor rating changes with ambient temperature variations. The thermal element consists of two bonded strips of metals having different rates of thermal expansion. The heat of an excessive current will cause the element to bend; the metal having the greater rate of expansion will be on the outside (longer boundary) of the bend curve. Bi-metals have inverse-time elements, providing a long time delay on light overloads and faster response on heavy ones.

Magnetic Action



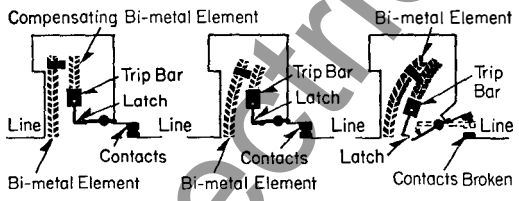
In this action, an electromagnet element is used. When a predetermined current flows through the coil, the armature is attracted, initiating an unlatching action, causing the circuit to open. Magnetic trip settings of magnetic only breakers can be adjusted by varying the air gap. Magnetic tripping cannot be set low enough to allow for load inrush currents and still protect against light overload. A magnetic only breaker provides short-circuit protection only.

Thermal Magnetic Action



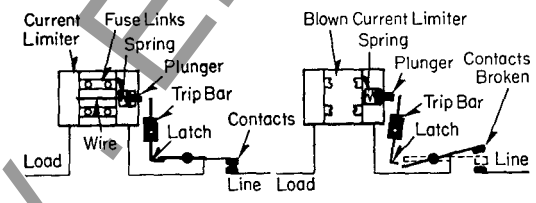
This action combines the features of both thermal and magnetic actions. It provides instantaneous action on short circuits, yet permits momentary overloads such as those encountered in motor starting and initial lighting surges. Thus, this action is best-suited to most applications.

Thermal (Ambient-Compensating) Magnetic Action



Ambient compensation is obtained by using an additional bimetallic element which counteracts the effect of ambient temperature changes on the overload bi-metal. (The magnetic element has been eliminated from the schematic in order to show the thermal action more clearly.) This temperature compensated trip provides a practically constant current rating over a wide range of ambient and is particularly suitable where there are unusually high, low, or fluctuating temperatures.

Current Limiter Action in TRI-PAC Circuit Breakers



TRI-PAC breakers have thermal magnetic and current limiting action. For simplicity, the schematic shows only the current limiting portion of the mechanism; thermal magnetic elements are the same as illustrated above for standard breakers. When fault currents above the nominal rating of the equivalent standard AB breaker are encountered, the silver links in the current limiter melt, thus opening the circuit. This action occurs with such rapidity that the current is limited to a relatively low value. Simultaneously, the magnetic action of the breaker also functions to open the breaker contacts and aids in clearing the short circuit. A wire holding a plunger against the pressure of a spring will melt when the silver links melt. This action causes the plunger to become extended holding the trip bar in the unlatched position. Therefore, it is impossible to reclose the circuit breaker until the blown limiter is replaced. Interlocks (not shown) will prevent relatching of the breaker if a limiter is omitted and will also open the circuit breaker contacts before the limiter plug-in contacts are broken if an attempt is made to remove the limiter housing assembly with the breaker in the on position.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Typical Specifications

Thermal Magnetic Breakers

Electrical Circuits shall be protected by molded case AB De-ion® circuit breakers, as manufactured by Westinghouse Electric Corporation or approved equal. Each pole of these breakers shall provide inverse time delay overload protection and instantaneous short circuit protection by means of a thermal-magnetic element. The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit at the line terminals.

The breakers shall be operated by a toggle type handle and shall have a Quick-make, Quick-break over-center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuits and abnormal currents. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual "ON" and "OFF' 'positions. All latch surfaces shall be ground and polished.

Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have their covers sealed; interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be of non-welding silver alloy. Arc extinction must be accomplished by means of De-ion arc chutes, consisting of metal grids mounted in an insulating support. Circuit breakers shall be listed with Underwriters' Laboratories, Incorporated, conform to requirements of NEMA Standards Publication No. AB 1-1969, and meet the appropriate classifications of Federal Specifications W-C-375a.

TRI-PAC® Breakers

When the interrupting ratings of standard AB breakers are less than the available fault current of the distribution system, TRI-PAC breakers as manufactured by Westinghouse shall be used.

These breakers shall be similar in construction to the standard Westinghouse AB De-ion circuit breaker. On breakers with interchangeable, thermal, adjustable magnetic trip, the accessibility and position of the adjustment knob shall not be changed from those on the standard breaker.

The breakers shall combine time delay thermal trip protection, instantaneous magnetic trip protection and current limiting protection in one complete assembly. The above protective actions shall be so coordinated that overcurrents will be cleared by the thermal action; short circuits of relatively low magnitude will be cleared by the magnetic action; and high fault currents above a predetermined point will be cleared by the current limiters. The current limiters shall not be affected when the thermal and/or magnetic trip functions to clear the circuit. Regardless of which tripping device serves to clear the circuit, all poles of the breaker shall open automatically.

The breaker must not be resettable until current limiters which have functioned have been replaced. The current limiters shall have a visual means to determine which one has operated and requires replacement.

The current limiters shall be mounted within the breaker case and shall be readily accessible by removing a front cover.

TRI-PAC breakers shall meet appropriate sections of NEMA Standards Publication AB1-1969 and meet appropriate classifications of Federal Specification W-C-375a.

Further Information

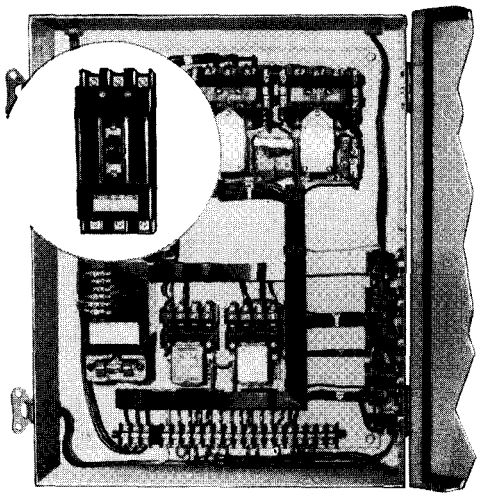
Prices: Price List 29-120
Application: Application Data 29-160
Dimensions: Dimension Sheet 29-170
Specifications: Specification Data 29-180

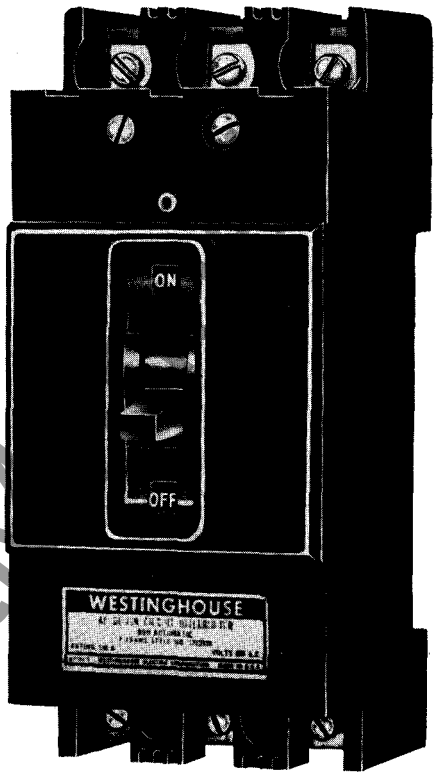
Westinghouse Electric Corporation
Low Voltage Breaker Division, Beaver, Pa. 15009
Printed in USA

AB De-ion® circuit breakers

for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c





application

Westinghouse molded case breakers are primarily designed for circuit protection and are usually applied for this purpose. Breakers provide overload protection for conductors, and short circuit protection for all circuit elements including conductors, motors, starters, etc. Breakers serve dual purposes in that they combine protective devices with a switching mechanism. Because of this, they are load disconnects as well as circuit protectors.

In various enclosures, circuit breakers are adaptable to the requirements of lighting, distribution, or other electric power circuits. There are no power interruptions due to harmless momentary overloads. In cases of real trouble, the circuit is quickly and safely interrupted. Service can be restored by the simple flip of the operating handle after the fault has been cleared.

Current ratings of type AB circuit breakers correspond in general to the NEC ratings of conductor carrying capacities because these breakers are primarily designed for the protection of conductors.

January 1, 1956
new information
mailed to: E/243/DB; D63-5C; C25-6Y

advantages

tested accuracy: Overload element in each pole of every breaker is individually calibrated and is tested to meet Underwriters' Laboratories, Inc., requirements. All breakers are entirely assembled in a temperature-controlled atmosphere to gain perfect mating of parts.

no replacement: Designed for repetitive duty, circuit breakers are long-lived, maintenance-free and prevent costly and unnecessary shutdowns.

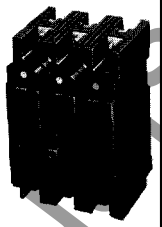
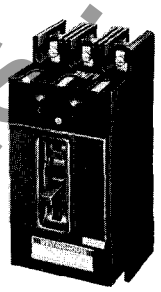
protection against single-phasing: Overload on any pole opens all poles, minimizing the possibility of single-phasing polyphase motors.

De-ion arc quenching: Using De-ion arc quenchers developed by Westinghouse, circuit breakers positively extinguish dangerous hot arcs in a fraction of a second. This assures minimum burning and pitting of contact surfaces and longer circuit breaker life.

dual protection: Thermal element protects on overloads where inverse time tripping is desirable, and the magnetic trip element operates the breaker instantly on dangerous fault currents. Trip-free, the breaker cannot be held closed under fault conditions.

safe: Dead-front cases, sealed to prevent tampering; shields for line terminals furnished when needed.

selector guide

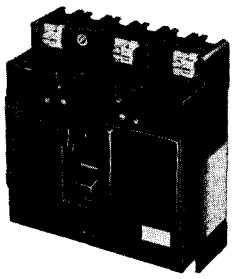
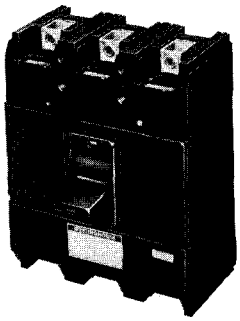
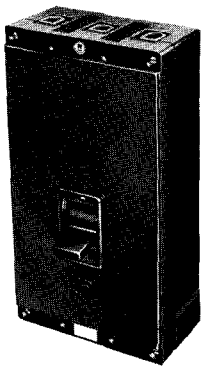
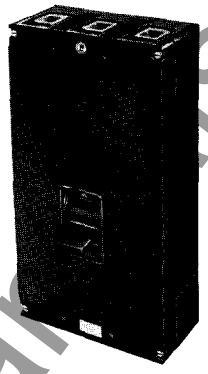
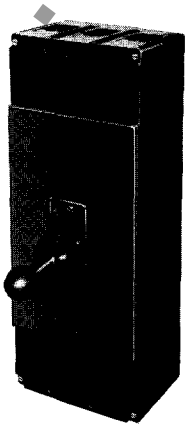
type	P-1	PL	Quicklag-P	Quicklag®	E	F
						
poles available	**1 pole**	**1 pole**	**1,2 poles**	**1,2 poles**	**1,2,3 poles**	**2, 3, □4**
ratings						
ampere rating	10 to 50□	15 to 50	15 to 50		15 to 100	15 to 100
a-c voltage rating	120	120/240,2w	120/240, 2w		120, 240, 277†	600
d-c voltage rating	32	....	....		125, 125/250	250
interrupt ratings, amperes — underwriters' (a-c or d-c)	....	5000	5000		5000, 10,000†	10,000
interrupt ratings, amperes — based on NEMA test procedures — a-c only	5000	5000	5000		7500, 10,000†	600v 15,000 480v 15,000 240v 20,000
interrupt ratings, amperes — based on NEMA test procedures — d-c only	5000	....	....		5000	10,000
features						
De-ion arc chutes	i	i	i		i	
quick-make, quick break	i	i	i		i	i
thermal trip only	i	no	no		no	no
thermal magnetic trip	no	i	i		i	i
adjustable magnetic trip	no	no	no		no	(i)■
interchangeable trip unit	no	no	no		no	no
accessories or modifications						
thermal trip only	no	no	no		add	add
magnetic trip only	no	no	no		no	(i)
non-automatic	(i)	no	no		(i)	(i)
shunt trip	no	no	no		add	add
undervoltage trip	no	no	no		no	add
auxiliary switch	no	no	no		add	add
alarm switch	no	no	no		no	add
mechanical interlock	no	no	no		add	add
field discharge	no	no	no		no	add
center studs	no	no	no		add	add
rear connecting studs	(i)	no	no		add	add
ground current limiter	no	no	no		no	add
reverse current	no	no	no		no	no
575 volt d-c arc chutes	no	no	no		no	no
for oil-immersion	no	no	no		add	add
moisture-fungus treatment	add	add	add		add	add
electrical operation	no	no	no		no	no
handle mechanisms	no	no	no		add	add
spring return breaker	(i)	no	no		no	no
operations counter	no	no	no		no	no
4-pole breakers	no	no	no		no	add
parallel connections	no	no	no		add	add
handle locking device	no	add	add		add	add
true ambient-compensated	no	i	i		add	add
page	**7**	**7**	**8**		**9**	**10**

i included in all cases
(i) included when specified at no additional cost
■ on magnetic interrupters only
† single pole 15 and 20 amp ratings for 277/480 volt a-c circuits

AB De-ion® circuit breakers

for lighting, distribution and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

	G	J	K	KL	L
					
	2,3,□4 poles	**2,3 poles**	**2,3,□4 poles**	**2,3 poles**	**2,3 poles**
	40 to 100	70 to 225	70 to 225	125 to 400	125 to 600I
	600	600	600	600	600
	250	250	250	250	250
	10,000	10,000	10,000	10,000	10,000
600v	15,000	15,000	25,000	25,000	25,000
480v	15,000	20,000	25,000	30,000	35,000
240v	20,000	25,000	30,000	40,000	50,000
	10,000	10,000	10,000	20,000	20,000
	i	i	i	i	
	i	i	i	i	i
	no	no	no	no	no
	i	i	i	i	i
	i	i	i	i	i
	i	no	i	i	i
	add	add	add	add	add
	(i)	(i)	(i)	(i)	(i)
	(i)	(i)	(i)	(i)	(i)
	add	add	add	add	add
	add	add	add	add	add
	add	add	add	add	add
	add	add	add	add	add
	add	add	add	add	add
	add	no	add	add	no
	add	add	add	add	add
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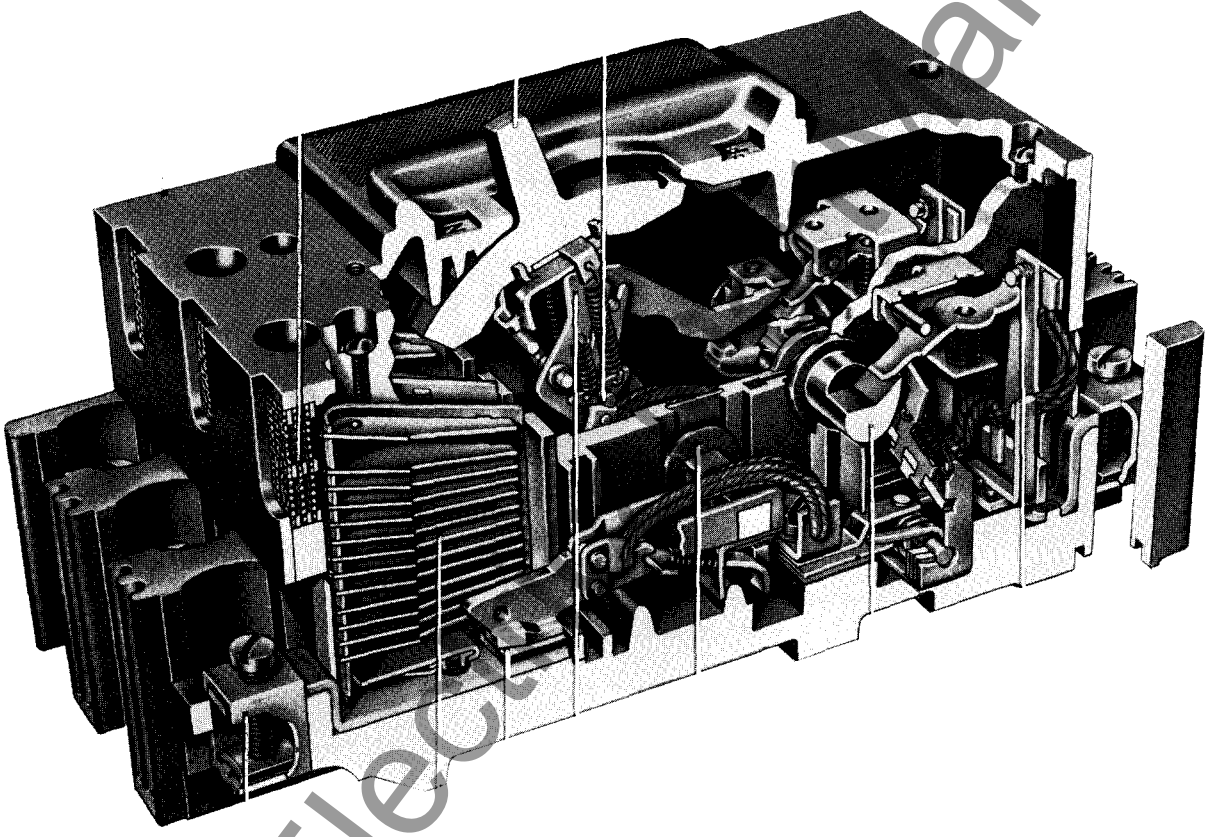
	add	add	add	add	add
	add	add	add	no	add
	no	no	no	add	add
	add	no	add	add	add
	no	add	add	no	add
	no	add△	add△	add△	add△
	add	no	add	no	no
	add	add	add	add	add
	add	add	add	add	add
	add	add	add	add	no
	add◉	add	add	add	add
	11	**12**	**13**	**14**	**15**

□ not UL listed
△ applied with electrical operation only
◉ 3-pole only
I 800 ampere models available as type XL breakers.

general design features

1 2 3 4 5



6 7 8 9 10 11 12

AB De-ion circuit breakers

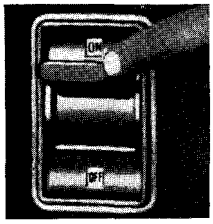
for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

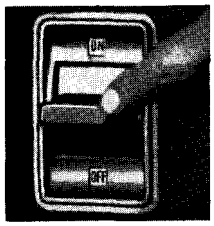
1 Moldarta® case: The hot-molded phenolic (Moldarta) case combines built-in ruggedness and high dielectric strength in a compact design that is both space-saving and attractive. Mechanism is entirely enclosed.

2 corrosion-resistant: All parts are especially treated or selected to resist corrosion encountered in normal applications.

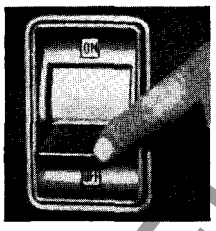
3 positive indication: Position of handle gives positive indication of whether circuit breaker is ***on, off*** or ***tripped.***



on: Handle in this position indicates that the circuit is closed or ***on***.



tripped: When the breaker trips automatically due to overload or short circuit, the handle moves to a position midway between the manual ***on*** and ***off***.



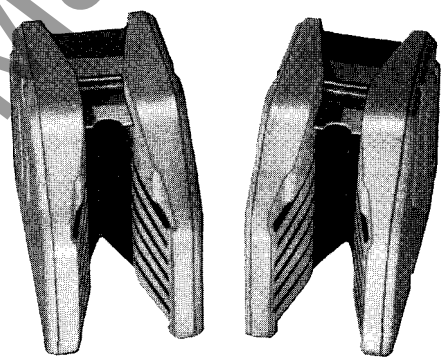
off: Handle is in this position when circuit is open or ***off.*** To restore service after automatic tripping, handle is first moved from center to ***off*** and then to ***on***.

4 free bearing surfaces: These are of dissimilar metals to prevent sticking due to possible corrosion and to prevent bearing wear.

5 factory sealed: Smaller breakers are sealed to prevent unauthorized changing of calibration. In the G, K, KL and L frames the trip units are individually sealed and are interchangeable by removing the breaker cover.

6 firm connectors: Pressure type connectors are standard with all ratings above 30 amperes and make efficient dependable connections. Some breakers rated 30 amperes or less have screw type terminals; all type F and larger use pressure connectors.

7 De-ion arc quenchers: This Westinghouse development consists of a series of grid plates mounted in parallel between supports of insulating material. The slots in the steel plates extend directly over the contacts; and draw the arc from the moving contact up into the divided chamber. The arc is thus confined, divided, and extinguished in less than ½ cycle.



8 silver alloy contacts on all breakers: For increased contact life and enduring low resistance; special alloys prevent sticking and welding.

9 quick-make, quick-break mechanism: The quick-make, quick-break over center toggle mechanism provides quick, positive action in opening and closing circuits. It prevents "teasing" the contacts.

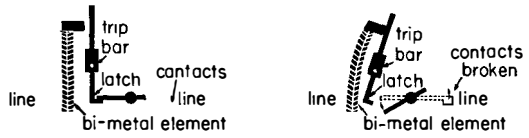
10 complete interpole barriers: These insure against internal flashovers on faults.

11 common-trip: Multipole units have insulated common-trip bar that opens all poles when an overload occurs on any one.

12 accurate protection: All tripping members have ground and polished latch surfaces and are heat-treated to prevent later distortion. Heat-treated bimetals retain calibration permanently.

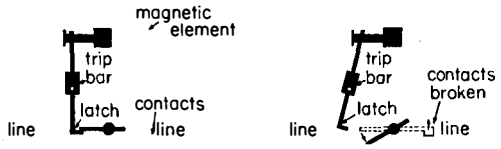
protective actions

thermal action



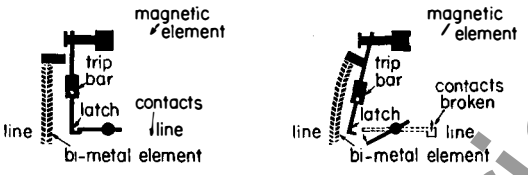
A thermal element is generally best suited for conductor overload protection because its rating changes in about the same ratio as the average conductor rating changes, with ambient temperature variations. The thermal element consists of two bonded strips of metals having different rates of thermal expansion. The heat of an excessive current will cause the element to bend; the metal having the greater rate of expansion will be on the outside (longer boundary) of the bend curve. Bimetals are inverse-time elements, providing a long time delay on light overloads and fast response on heavy ones. Thermal only breakers can be used in selective tripping schemes if fault currents cannot exceed several thousand amperes.

magnetic action



In this action, a magnet is used. When a predetermined current flows through the coil, the armature is drawn, causing the circuit to open. Trip settings of some breakers can be adjusted by varying the air gap. Except on special applications, magnetic action alone is not practical. It cannot be set low enough to allow for inrush currents and still protect all cases of overload.

thermal-magnetic action



Combining the better features of both actions, Westinghouse thermal-magnetic breakers provide instant action on shorts, yet allow momentary overloads such as encountered in motor starting and initial lighting surges. Best suited to most applications

thermal (ambient-compensating)-magnetic action

Ambient compensation is obtained by using a second thermal element which counteracts the effect of temperature changes. (The magnetic element has been eliminated from the schematic in order to show the thermal action more clearly.) This type trip allows "closer" application of the breaker where there are unusually high or fluctuating temperatures and is standard for PL, Quicklag-P and Quicklag breakers. For an explanation of application, see application data 29-160, page 22, paragraph 4.

Thermal (including temperature-compensating) devices are superior to magnetic dashpot devices in that thermal elements protect against overload cycles through "thermal memory". Thermal trips remember previous load conditions affecting the present conditions of conductors or windings to be guarded.

AB De-ion circuit breakers

for lighting, distribution, and power circuits

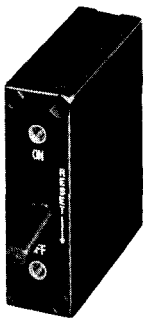
amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

P-1 breaker 50 ampere frame

1-pole, 120 v a-c; 32 v d-c
10 to 50 amperes
5000 amperes interrupting rating

application

Designed for applications in the transportation field and in other fields where high shock or vibration is likely to be encountered. These breakers are not listed with the Underwriters' Laboratories, Inc.



construction

The rugged P-1 breaker is a commercial version of the "PT" breaker developed during World War II to meet U. S. Navy shock specifications for PT torpedo craft use. This breaker has a high impact resistance of 150 foot pounds. It is trip-free, quick-make quick-break, and is enclosed in a heavy duty Moldarta housing. Front-connected and rear-connected models may be either flush-mounted or surface-mounted.

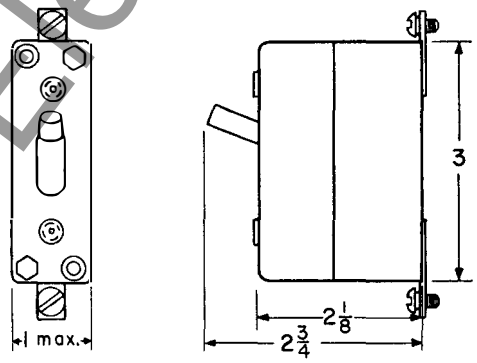
thermal trip

Details of operation of the thermal trip element are given on page 6. Trip unit is non-adjustable and non-interchangeable.

accessories, modifications

Mounting base and handle yoke for two single pole breakers. Spring return (dead-man) handle. Non-automatic breakers.

dimensions: inches



PL breaker 50 ampere frame

Plug-in type
1-pole, 120/240 v a-c, 2w
15 to 50 amperes
5000 amperes interrupting rating

application

Used primarily in lighting panelboards and residential loadcenters where its plug-in contact feature provides faster mounting. Underwriters' Laboratories, Inc., listed.

construction

Similar in construction and dimensions to the Quicklag-P it is designed to provide the finest in a low cost plug-in type breaker.

The line side connection is made by the female clamp which clips onto a bus-stab projection. A screw-type load terminal used on 30 ampere ratings or less eliminates wire-looping. Higher rated breakers have pressure type connectors for load leads.

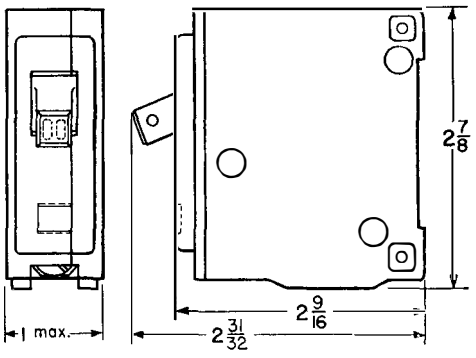
thermal-magnetic trip

Trip elements function similarly to those of Quicklag, described on page 8. Trip unit is non-adjustable and non-interchangeable. True ambient compensation.

accessories

Accessories available include: handle clip to lock breaker on or off and handle extension set. Breaker can be treated to resist extreme moisture, fungus and corrosion conditions.

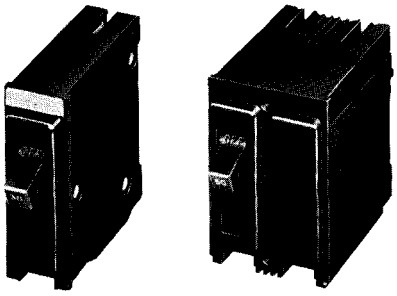
dimensions: inches



Quicklag-P® 50 ampere frame

plug-in type
120/240 v a-c, 2w
15 to 50 amperes
5000 amperes interrupting rating

application
Used primarily in panelboards and residential loadcenters where its plug-in contact feature provides faster mounting. Underwriters' Laboratories, Inc., listed.

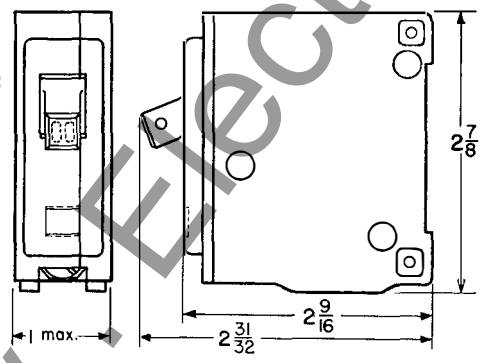


construction
The highest quality of the plug-in group, the Quicklag-P has the features of the Quicklag as described at left. The plug-in consists of a female line terminal clamp which clips onto a bus-stab projection. A screw type load terminal used on 30 ampere ratings or less eliminates wire-looping. Higher rated breakers have pressure type connectors for load leads. Two-pole breaker has common mechanism and common trip bar to insure simultaneous manual or automatic opening of both poles.

thermal-magnetic trip
Operation of the thermal-magnetic trip is similar to that for Quicklag breaker described at left. Trip unit is non-adjustable and non-interchangeable. True ambient compensation.

accessories, modifications
Accessories and modifications available include: handle locking device, moisture and fungus treatment, and handle extension set for using two single-pole breakers for 120/240 volt 2-wire operation. This set explained for Quicklag assures simultaneous switching, but at the same time allows either breaker to register independent trip positions.

dimensions: inches△

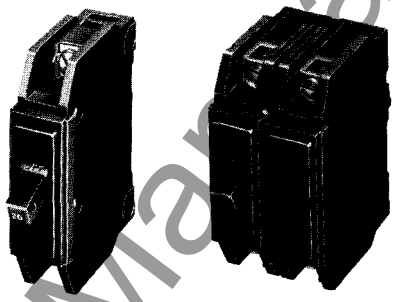


△ 2-pole common trip breaker is 2" wide, all other dimensions are the same as for 1-pole shown above.

Quicklag® 50 ampere frame

120/240 v a-c, 2w
15 to 50 amperes
5000 amperes interrupting rating

application
Designed for small-wire general lighting and branch circuit protection in loadcenters, panelboards or for individual mounting. Underwriters' Laboratories, Inc., listed.

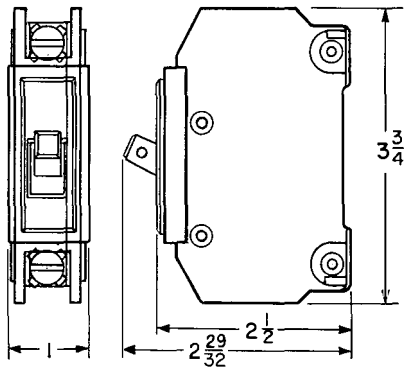


construction
Features of this breaker include the De-ion arc quencher, quick-make quick-break trip-free mechanism, silver alloy contacts, electrically welded connections, and a Moldarta case. Two-pole breaker has common mechanism and common trip bar to insure simultaneous manual or automatic opening of both poles. Standard unit is front connected with wire binding screws on breakers rated through 30 amperes. Breakers above this rating are provided with pressure-type connectors.

thermal-magnetic trip
The Quicklag breaker has a cooperative thermal-magnetic trip unit. On temporary overloads the breaker will not trip. On sustained overloads beyond safe limits for the wire, the bimetal will deflect, causing the breaker to trip. On heavy overloads the deflection of the bimetal reduces the air gap of the magnetic element. This increases the magnetic pull of the fixed magnet on the armature and results in a cooperative action which trips the breaker. Instantaneous tripping is provided by the magnetic element under short circuit conditions. Trip units are non-adjustable and non-interchangeable. True ambient compensation.

accessories, modifications
Special face-mounting plate which snaps over front of breaker, clamps for fastening back of breaker to panels, handle lock, moisture-fungus resistant treatment, and a handle extension set used with two single-pole breakers for 120/240 volt 2-wire service where the two circuits should be manually switched simultaneously though automatic opening of both together is not necessary or may not be desirable, (see page 5).

dimensions: inches▲



▲ 2-pole common trip breaker is 2" wide, all other dimensions are the same as for 1-pole shown above.

AB De-ion circuit breakers

for lighting, distribution, and power circuits

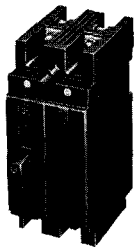
amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

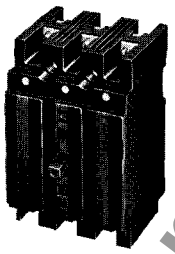
type E • 100 ampere

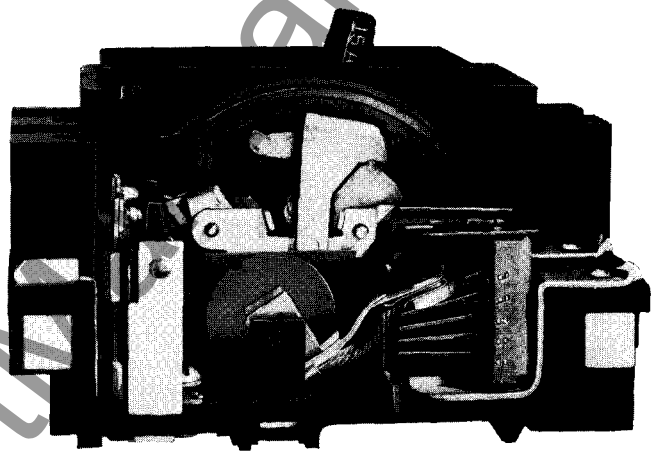
1-pole, 120 v a-c, d-c; 277 v a-c
2, 3-pole, 240 v a-c; 125/250 v d-c
15 to 100 amperes
7500 amperes a-c interrupting rating
(10,000 amperes for 15 and 20 ampere, 277 v a-c models)

application

Designed for use in loadcenters, switchboards, panelboards, machine tool control panels or in separate enclosures where load may include motors, lighting or appliances. Listed by Underwriters' Laboratories, Inc.







cutaway of E breaker

construction

Has all of the standard AB breaker features described on pages 4 and 5.

Breakers rated 30 amperes and less have screw-type terminals; higher rated breakers have pressure type lugs.

thermal-magnetic trip

The E frame breaker is equipped with a cooperative thermal magnetic trip unit. On low overloads the bimetal initiates tripping action. On short circuits the magnetic element instantly opens the circuit. On high overloads the bimetal, gradually bending, assists magnetic tripping by shortening the air gap. After calibration, breaker cases are sealed to prevent tampering; thus trip units are not adjustable and are not interchangeable.

ratings

number poles	voltage	ampere rating▲
1	120 a-c	15, 20, 25, 30, 35, 40, 50
	125 d-c	70, 90, 100
	277 a-c	15, 20
2	240 a-c	15, 20, 25, 30, 35, 40, 50
	125/250 d-c	70, 90, 100
3	240 a-c	15, 20, 25, 30, 35, 40, 50
	125/250 d-c	70, 90, 100

▲ 1, 2 or 3-pole E breakers also available in 5, 8, 10, and 12 ampere models, not listed with U/L.

non-automatic interrupters

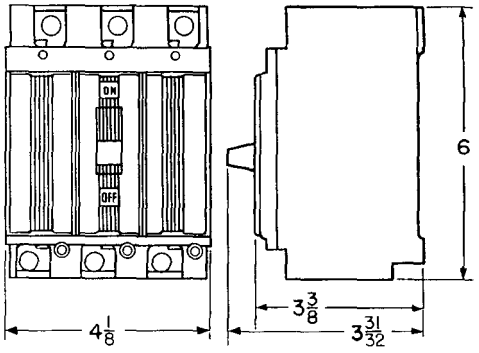
E frame breakers without overload elements can be installed where a high capacity disconnect switch is required.

accessories, modifications

Accessories and modifications available include: line terminal shields, ambient compensating breakers, oil immersion breakers, rear connecting studs, center studs, auxiliary switch, mechanical interlock, shunt trip, moisture-and-fungus-proofing, handle locking device and parallel connectors. See pages 18 to 24 for description of each of above.

Breaker shown has line terminals and line mounting holes "off-center". Centerline E breakers at upper left of page have these points balanced with respect to vertical centerline.

dimensions: inches△



△ Single-pole is 1⅜" wide; 2-pole breaker is 2¾" wide. Other dimensions same as for 3-pole shown above.

type F • 100 ampere

2, 3, 4-pole, 600 v a-c; 250 v d-c
15 to 100 amperes
15,000 amps 600 v a-c
15,000 amps 480 v a-c
20,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

The type F breaker is designed for use in control panels, convertible power panelboards, switchboards, lighting panels, bus duct plug-ins and individual enclosures. This breaker is used most frequently on motor branch circuits because its ratings cover most protective requirements.

Four-pole breakers are available for 2-phase 4-wire and 2-phase 5-wire service. These special breakers are not listed with the Underwriters' Laboratories, Inc., all others are listed.

construction

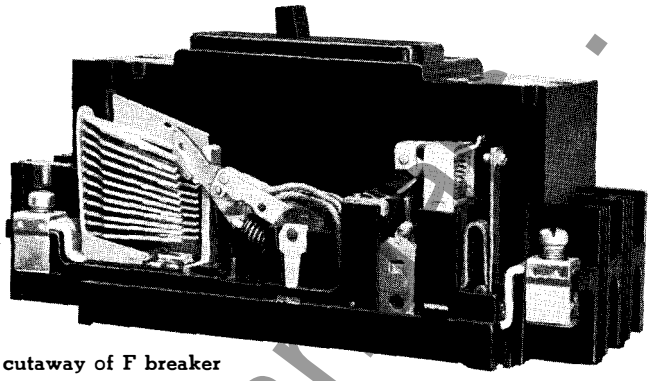
F breaker has all the standard AB breaker features described on pages 4 and 5. An exclusive design feature of the F breaker causes the contact pressure to increase with wear, prolonging the life of the breaker. All poles of 2-, 3- and 4-pole breakers have thermal-magnetic trip units. Common trip bar insures simultaneous opening of all poles. Pressure-type terminals accommodate wire sizes from no. 14 to 0. Terminal arrangement permits ready use of rear connecting studs.

Meets Federal specifications W-P-131a for class D and class E breakers.

thermal-magnetic trip

The type F breaker is equipped with a thermal-magnetic trip. For details of operation see page 6. Trip elements for ratings 50 amperes and over have indirectly heated bi-metallic thermal trips, plus the magnetic portions. Indirect heating increases the thermal time lag, permitting the starting of motors having high inrush currents of long duration. The magnetic trip elements are calibrated to operate instantly at 9 to 14 times the thermal rating. Trip units are non-adjustable and non-interchangeable.

ampere ratings: 15, 20, 25, 30, 35, 40, 50, 70, 90, 100, U/L listed 10, not U/L listed



cutaway of F breaker

magnetic circuit interrupters

These are breakers with magnetic trip only for certain applications where short circuit protection only is required. Magnetic trip settings available are given as follows:

ampere continuous rating	5	10	25	50	50	70	100	100
magnetic trip setting range▲								
high	15	35	80	180	560	270	560	1500
low	5	12	30	70	170	100	170	500

▲ All AB magnetic interrupters are set at the upper limit, but may be adjusted down to the low limit in the field.

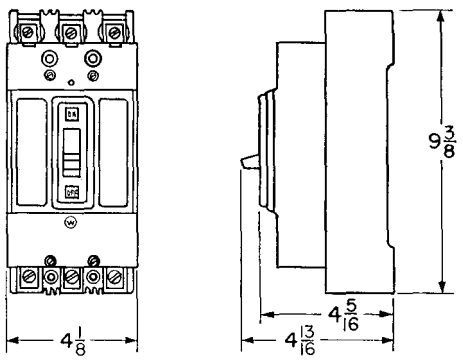
non-automatic interrupters

Type F breaker without overload elements can be installed where a compact high capacity disconnect switch is required.

accessories, modifications

Accessories and modifications available include: line terminal shields, field discharge breaker, oil-immersion breakers, ambient-compensating breakers, rear-connecting studs, center studs, handle locking device, parallel connectors, moisture-and-fungus treatment, shunt trip, low voltage trip, auxiliary switch, alarm switch, mechanical interlock and ground current limiter. See pages 18 to 23 for a description of each of the above.

dimensions: inches▲



▲ 2-pole is 2¾" wide; 4-pole is 5½" wide; all other dimensions are the same as 3-pole shown above.

AB De-ion circuit breakers

for lighting, distribution, and power circuits

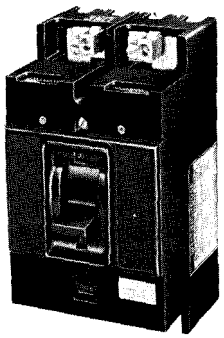
amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

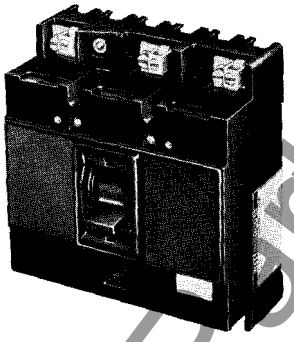
type G • 100 ampere

2, 3, 4-pole, 600 v a-c; 250 v d-c
40 to 100 amperes
15,000 amps 600 v a-c
15,000 amps 480 v a-c
20,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

Designed for heavy duty use in panelboards, switchboard, or separate enclosures. This breaker has an interchangeable trip unit which makes it particularly valuable for applications where changes in circuit loads may develop. Four-pole breakers are available for application on 2-phase 4-wire or 2-phase 5-wire systems. These special breakers are not listed with the Underwriters' Laboratories, Inc.; all others are listed.





construction

Has all the standard AB breaker features described on pages 4 and 5. Contacts and other parts are heavily built to take the strain of hard, frequent usage. Increased spacing between poles give higher dielectric strength under abnormal conditions such as dust-laden atmospheres. Four-pole breakers have thermal magnetic elements in three poles and the fourth pole is unprotected; common trip bar insures simultaneous opening of all poles. Pressure-type connectors for wire sizes no. 14 to 0 are standard on all ratings.

interchangeable trip, thermal and adjustable magnetic

Principle of operation of this thermal-magnetic trip are given on page 6. Trip element has an indirectly heated bi-metallic trip to increase thermal time lag required to start motors having high inrush currents of long duration. The instantaneous magnetic setting of each trip may be varied between established limits to take care of circuit surge conditions. Trip units are interchangeable and the rating of the trip being used shows in the cover window.

ampere rating	40◇	50	70	90	100
magnetic trip setting range▲					
high	600	600	800	1000	1100
low	250	250	280	330	350

◆ not listed with Underwriters' Laboratories, Inc.

▲ All AB magnetic trip breakers are set at the upper limit, but may be adjusted down to the low limit in the field.

magnetic circuit interrupters

These are breakers with magnetic trip only for certain applications where short circuit or surge protection is required. Magnetic trip settings available are given in the rating table.

ampere rating continuous	magnetic trip setting amperes▲
100	250-600
100	350-1100
100	650-2200

▲ All AB magnetic trip breakers are set at the upper limit, but may be adjusted down to the low limit in the field.

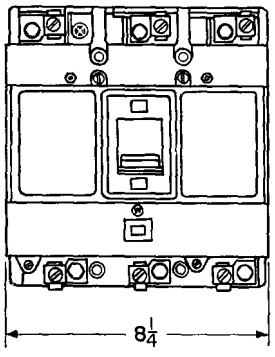
non-automatic interrupters

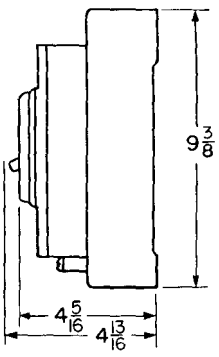
G breakers with latch and connector parts in lieu of a trip unit can be installed where a heavy duty high capacity disconnect switch is required.

accessories, modifications

Accessories and modifications available include: breakers for oil-immersion, ambient compensating breakers, field discharge breakers, rear connecting studs, center studs, handle locking device, parallel connectors, moisture and fungus treatment, shunt trip, low voltage trip, auxiliary switch, alarm switch, mechanical interlock, ground current limiter and 575 v d-c arc chutes. Description of each of the above are given on pages 18 to 23.

dimensions: inches△





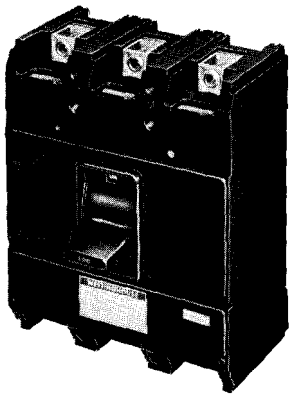
▲ 2-pole is 5½" wide; all other dimensions are the same as shown for 3-pole above.

type J • 225 ampere

2, 3-pole, 600 v a-c; 250 v d-c
70 to 225 amperes
15,000 amps 600 v a-c
20,000 amps 480 v a-c
25,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

The J breaker is distinguished by its notably compact design. Small size plus low cost make this breaker ideally suited for panelboards, switchboards, control panels, or separate enclosures where 225 ampere frame size is required. Listed by Underwriters' Laboratories, Inc.



construction

Has all the standard AB breaker features described on pages 4 and 5. Two and three-pole breakers have the same dimensions. The current-carrying parts in the center pole are removed for a 2-pole breaker. Extended terminal inserts facilitate the use of the J breaker for panelboard applications by allowing a simpler and more economical line side connector to be used. Pressure-type connectors are standard on all ratings for wire sizes from no. 6 to 350 MCM. Use of Allen-head bolts for terminal mounting permits easy removal of terminals for panelboard applications.

thermal-magnetic (adjustable) trip

Principle of operation of this thermal-magnetic trip are given on page 6. Like other AB breakers, the thermal-trip is set and cannot be adjusted. The trip units are non-interchangeable. The instantaneous magnetic setting may be varied between established limits to bring it to a point just above normal surges, providing short circuit protection.

ampere rating

	70	90	100	125	150	175	200	225
magnetic trip setting range, adjustable◇								
high	700	900	1000	1250	1590	1750	2000	2250
low	300	400	400	400	500	500	600	600

◇ All adjustable magnetic AB trips set on high side, may be adjusted down to low limit in field.

magnetic circuit interrupters

These are breakers with magnetic trip elements only for certain applications where short circuit protection *only* is required. These interrupters have the same magnetic trip ranges as the thermal-magnetic breakers, but continuous current carrying capacities in all cases would be 225 amperes.

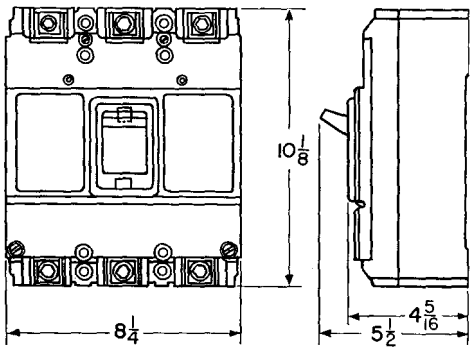
non-automatic interrupters

J breaker without overload elements can be installed where a high capacity disconnect switch is required.

accessories, modifications

Accessories and modifications available include: breakers for oil-immersion, line terminal shields, rear connecting studs, center studs, handle locking device, parallel connectors, moisture and fungus treatment, shunt trip, low voltage trip, auxiliary switch, alarm switch, mechanical interlock, ground current limiter, remote operation, operations counter and ambient compensating breakers. Description of each of above is given on pages 18 to 23.

dimensions: inches△



△ 2 and 3-pole breakers are same size; center pole not used in 2-pole breaker

AB De-ion circuit breakers

for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

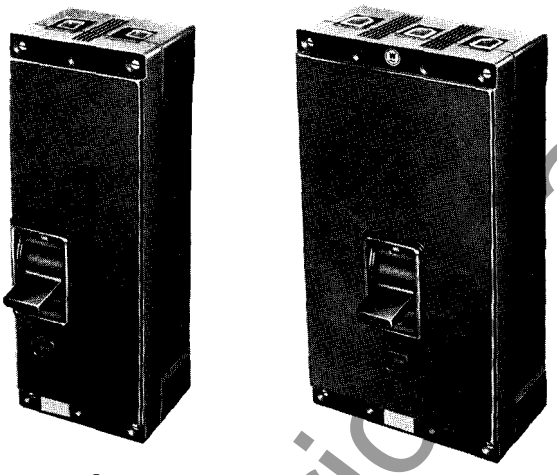
type K • 225 ampere

2, 3, 4-pole, 600 v a-c; 250 v d-c
70 to 225 amperes
25,000 amps 600 v a-c
25,000 amps 480 v a-c
30,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

For use when severe operating conditions are encountered and where convenient changing of trip ratings in the field is important. More accessories may be added than to the J frame fitting it for a greater variety of special applications.

Four-pole breakers are available for use on 2-phase 4-wire and 2-phase 5-wire systems. Three poles have thermal magnetic trip elements and fourth pole is used as a non-automatic disconnect. These special breakers are not listed with Underwriters' Laboratories, Inc.



construction

Longer contact life and low contact resistance are obtained through use of arc transfer horns and special contact design.

Pressure-type terminals are supplied for front connections for no. 14 to 350 MCM cable.

interchangeable trip, thermal and adjustable magnetic

Explanation of thermal-magnetic trip is given on page 6. The thermal trip is set and cannot be adjusted. The instantaneous magnetic setting may be varied between established limits to take care of circuit surge conditions. Sealed trip units are interchangeable. The trip rating may be readily identified through the cover window.

ampere rating	70	90	100	125	150	175	200	225
magnetic trip setting range▲								
high	700	900	1000	1250	1500	1750	1000	2250
low	300	400	400	400	500	500	600	600

▲ All adjustable AB trips set on high side at factory; may be adjusted down to low limit in the field.

magnetic circuit interrupters

These are breakers with magnetic trip elements only for certain applications where short circuit protection only is required. Magnetic trip settings available are given in the rating table

ampere rating	225	225	225
magnetic trip setting range▲			
high	700	1500	2250
low	300	450	600

▲ All adjustable AB trips set on high side at factory; may be adjusted down to low limit in the field.

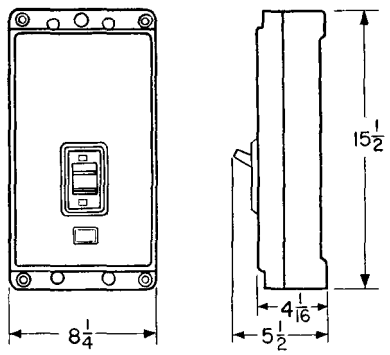
non-automatic interrupters

For a compact, dead-front, high capacity disconnect, use a K frame plus terminals and with non-automatic details (latch bracket and bridging straps) in lieu of an automatic trip.

accessories, modifications

Accessories and modifications available include: breakers for oil-immersion, line terminal shields, field discharge breakers, rear connecting studs, center studs, terminal screens, handle locking device, parallel connectors, moisture and fungus treatment, shunt trip, low voltage trip, auxiliary switch, alarm switch, mechanical interlock, ground current limiter, reverse current trip, 575 v d-c arc chutes, remote operation, an operation counter and ambient compensating breakers. Description of each of the above is given on pages 18 to 23.

dimensions: inches▲



▲ 2-pole is 5½" wide; 4-pole is 11" wide; all other dimensions are the same as shown for 3-pole above.

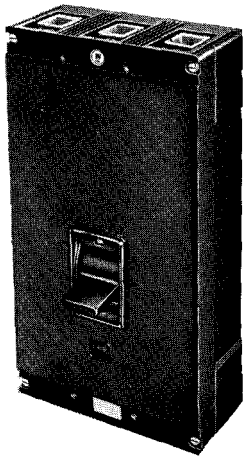
type KL • 400 ampere

2, 3-pole, 600 v a-c; 250 v d-c
125 to 400 amperes
25,000 amps 600 v a-c
30,000 amps 480 v a-c
40,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

For use on switchboards, panelboards or in separate enclosures where a compact breaker up to 400 amperes is required.

Because of its compact design, the KL breaker affords savings in space and cost, heretofore unattainable because of the unavailability of a frame size between the K and L breakers. Listed by Underwriters' Laboratories, Inc.



construction

Has all the standard AB breaker features described on pages 4 and 5. In addition, the KL has arc transfer horns, as do the K and L. Arc transfer horns extend contact life by sequence breaking so high-power arcs do not burn main contacts. De-ion chutes snatch arcs off the horns.

Pressure type terminals are supplied for front connections for no. 1 to 600 MCM cable on ratings up to 350 amperes. Double-cable terminals for 3/0 to 250 MCM cable are usually supplied on 400 ampere ratings.

magnetic circuit interrupters

These are breakers with magnetic trip elements only for applications where short circuit protection *only* is required. All can carry 400 amperes continuously.

magnetic trip setting range▲, amperes

high	1250	1750	2250	3000	4000
low	400	500	600	800	1000

▲ All adjustable AB trips are set on high side; may be adjusted down to low limit in the field.

interchangeable trip, thermal and adjustable magnetic

The thermal trip is set and cannot be adjusted. The trip element is an individual unit within the case and is readily interchangeable with trip units of a different rating. The trip rating may be readily identified through the cover window. Instantaneous magnetic trip setting may be adjusted between established limits to take care of circuit surge conditions.

ampere rating

	125	150	175	200	225	250	300	350	400

magnetic trip setting range▲

high	1250	1500	1750	2000	2250	2500	3000	3500	4000
low	400	500	500	600	600	700	800	800	1000

▲ All adjustable AB trips are set on high side; may be adjusted down to low limit in the field.

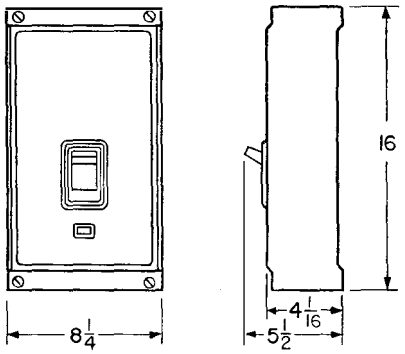
non-magnetic interrupters

KL frame breakers without overload elements can be installed where a high capacity disconnect switch is required.

accessories, modifications

Accessories and modifications available include: line terminal shields, shunt trip, undervoltage trip, auxiliary switch, alarm switch, ground current limiter, field discharge, mechanical interlock, remote operation, operations counter, center studs, rear connecting studs, terminal screens, handle locking device, parallel connectors, moisture-and-fungus treatment, breakers for oil-immersion and ambient compensating breakers.

dimensions: inches△



△ 2-pole and 3-pole breakers are same size; center pole unused in 2-pole breaker.

AB De-ion circuit breakers

for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

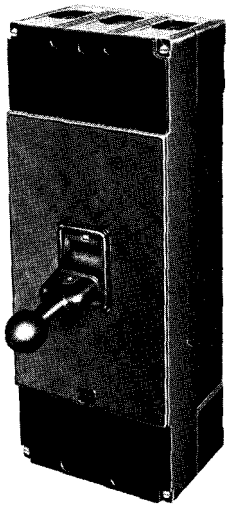
type L • 600 ampere

2, 3-pole, 600 v a-c; 250 v d-c
100 to 600 amperes
25,000 amps 600 v a-c
35,000 amps 480 v a-c
50,000 amps 240 v a-c
interrupting capacity based on NEMA test procedures

application

For use in distribution feeders in commercial buildings or industrial plants and for heavy equipment circuits.

Designed for use in switchboards, panelboards, and separate enclosures where circuit load is large and high interrupting rating is necessary. Listed with Underwriters' Laboratories, Inc.



construction

Has all the standard AB breaker features described on pages 4 and 5 plus a detachable extension handle. In addition to sequence breaking the contact design includes a self-cleaning feature. The low-cover L can use several single cable lugs accommodating #1 cable minimum to 1000 MCM maximum. If double cables of 2/0 to 500 MCM each are installed, an L having the high cover (raised ends to house two-cable lugs) is used.

magnetic circuit interrupters

These are breakers with magnetic trip elements only for applications where short circuit protection *only* is required. All can carry 600 amperes continuously without overheating.

magnetic trip setting range▲, amperes

high◇	700	1000	2000	4000	6000
low◇	350	400	600	1100	1500

▲ All adjustable AB trips set on high side, may be adjusted down to low limit in field.
◇ A-c values; d-c values are approximately 40% higher.

non-automatic interrupters

Bridging connectors and a permanent latch are used in the L frame to replace the trip unit when a rugged switch without circuit protection is needed.

interchangeable trip, thermal and adjustable magnetic

Thermal-magnetic trips are explained on page 6. The thermal trip is set and is not to be adjusted in the field. The trip unit is encased in its own sealed housing and may be replaced by a trip of another rating. The trip rating may be readily identified through the cover window. The instantaneous magnetic trip setting may be adjusted between established limits. These trip settings are listed below.

ampere rating

	125	150	175	200	225	250	300

magnetic trip setting range▲

high◇	1250	1500	1750	2000	2250	2500	3000
low◇	450	500	550	600	650	700	800

ampere rating

	350	400	450	500	550	600

magnetic trip setting range▲

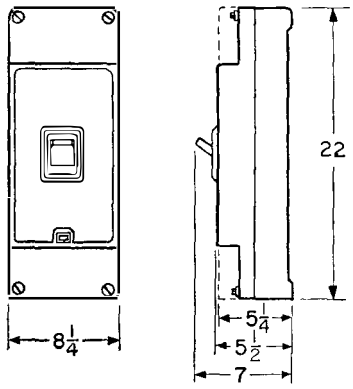
high◇	3500	4000	....	5000	....	6000
low◇	1000	1100	....	1300	....	1500

▲ All adjustable AB trips set on high side, may be adjusted down to low limit in field.
◇ A-c values; d-c values are approximately 40% higher.

accessories, modifications

Accessories and modifications available include: line terminal shields, breakers for oil-immersion, rear connecting studs, center studs, terminal opening screens, parallel connectors, moisture-and-fungus treatment, shunt trip, low voltage trip, auxiliary switch, alarm switch, mechanical interlock, ground current limiter, reverse current trip, 575 v d-c arc chutes, remote operation, an operations counter and ambient compensating breakers. Description of each of the above is given on pages 18 to 23.

dimensions: inches▲



△ 2-pole and 3-pole breakers are the same size; center pole not used in 2-pole breaker.
Dotted line shows alternate cover with ends raised to 5¼" to accommodate two-cable lugs.
Type XL breaker with 700 and 800 ampere ratings is built in the high-cover L frame.

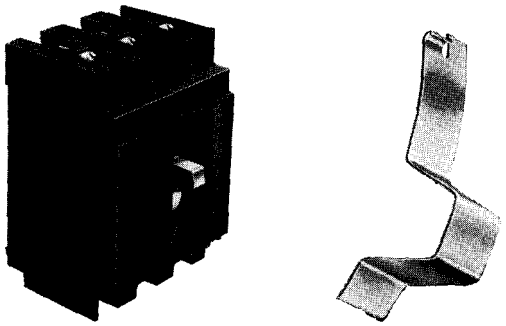
accessories

AB breakers are, for the most part, used in conjunction with . . . or built into . . . other equipment such as panelboards, switchboards and numerous types of enclosures. Realizing that matched parts mean flexibility and time-saving assembly for the builder, Westinghouse offers the following:

for general use

handle lockoff

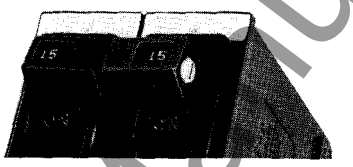
availability: all AB breakers except P-1 and L



Handle guards may be fastened over breaker handles to prevent manual operation. On the J, K, and KL frames, a hole must be drilled in the handle for cotter pin to hold device in place. "Trip-free" handle of AB breakers enables breaker to trip on overload or short circuit even though handle guard is in place.

handle tie

availability: Quicklag, Quicklag-P



For use with adjacent pairs of breakers which are not interconnected. Affords true trip indication, bars single pole operation when double pole manual switching is required.

terminal shields

availability: E through L breakers

Westinghouse offers a complete line of formed terminal shields which fasten over the line ends of AB breakers to protect personnel against accidental contact with the incoming wiring. Meet most exacting requirements for machine control panels where overload relays are internally reset.

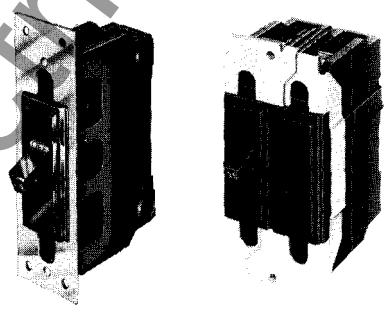
for enclosures

mounting hardware

availability: E through L breakers

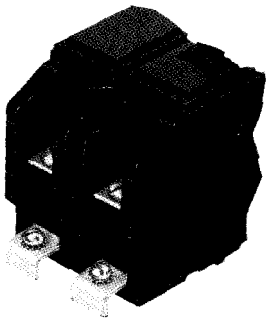
Hardware sets include bolts and washers suited for base-mounting of breakers in individual enclosures, combination starters, control panels and control centers. These sets are listed with the particular frames to which they are applicable. Because of the variety of mountings, hardware suitable for fastening ends of breakers to panelboard pans are not offered.

Quicklag faceplate



For mounting from the front of a panel. Face plate snaps over the front of the single pole breaker, is a two piece wraparound on the two pole breaker.

Quicklag clamp



For base mounting of Quicklag breakers on panels. Two needed per breaker.

for panelboards

Panelboard mounting parts are available for all AB breakers except the P-1. They consist of connectors grouped according to the types of panelboards to be constructed and there are also end covers, brackets, buttons and filler plates among the miscellaneous parts. See price list 29-220 for complete listings.

AB De-ion circuit breakers

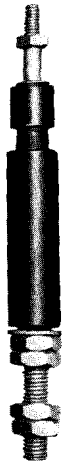
for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

for switchboards and rear connections

rear terminal studs

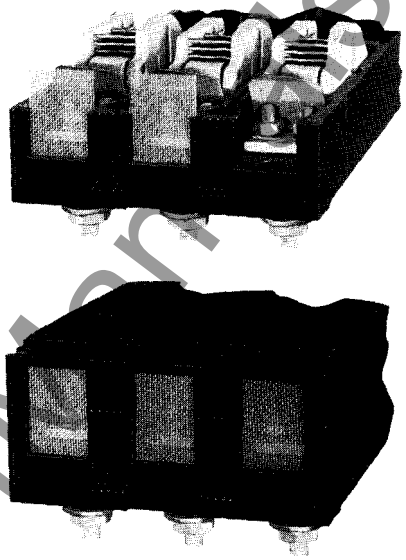
availability: E through L breakers



For adapting breakers for switchboard and other rear connected applications. Studs can be used with standard breakers without any modification. E and F breaker studs are available for mounting breakers on insulated or steel panels. Studs for larger breakers are designed for use on insulated panels. See explanation of drawout breakers below.

terminal screens

availability: K through L breakers



Screens are used to close unused terminal openings in all poles of rear-connected K, KL and L breakers and to close center pole openings in 2-pole front-connected KL and L breakers. Illustrations show cover off and cover closed views.

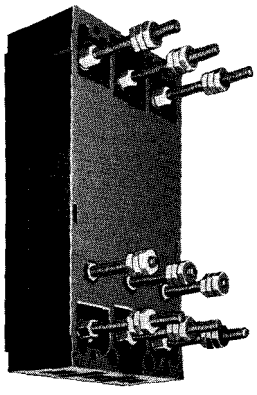
drawout breakers

availability: 100, 225, 400 and 600 ampere frame sizes

Designed to provide quick and easy plug-in installation in switchboards. Tulip-type connectors are built into the base of the breaker. Mounting block complete with studs or studs alone can be used to make rear connections.

dual voltage breakers

availability: E through L breakers

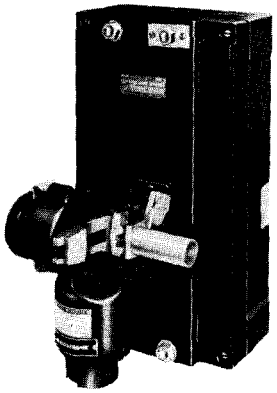


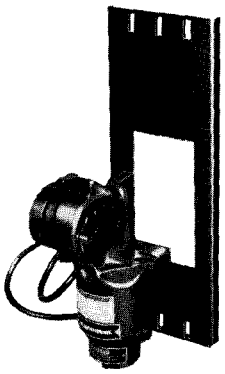
For dual voltage equipment protection with only one trip rating, breakers may be supplied with center studs. At the maximum voltage the trip unit carries all the current. At the lower voltage, the current is doubled, with half the current by-passing the trip unit through the center stud connections. Thus, one rating breaker can be used for both connections. Rear connecting studs are normally used with center tap studs for line and load connections.

special breakers

For severe or unusual operating conditions, for special functions or control sequences, Westinghouse breakers can be custom built or modified with special attachments. Beyond the basic function of over-current and short-circuit protection, such special breakers meet modern, complex circuit requirements, and add flexibility of operation and efficiency.

motor operated breakers: availability: J, K, KL, and L breakers



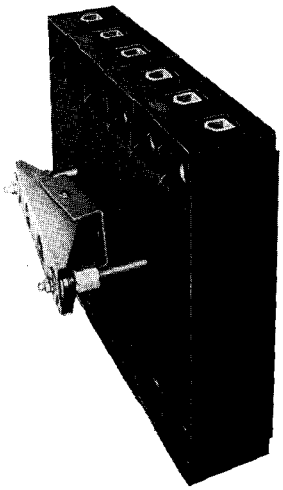


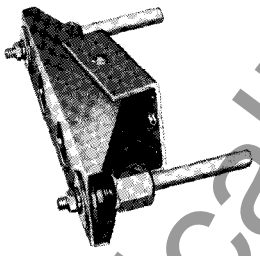
For complete remote control of the breaker. This externally-mounted motor operator provides remote opening and closing of the breaker when used with a separately-mounted momentary contact pushbutton or spring return switch.

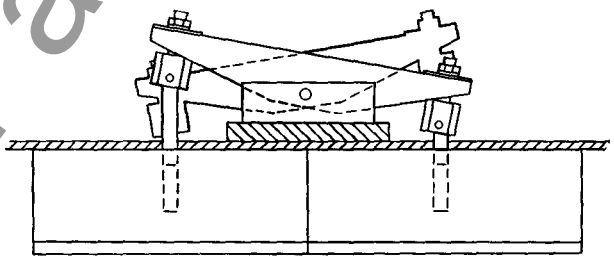
Whenever the breaker is tripped, reclosing is accomplished remotely by pushing the "*open*" button first and then the "*close*" button. If automatic resetting is desired after the breaker has tripped, an auxiliary switch can be mounted inside the breaker to operate the motor and return the breaker handle to the open (reset) position automatically.

A handle is provided for emergency manual operation. Universal motors are rated 120 volts a-c or d-c and 240 volts a-c or d-c. An operations counter can also be supplied with this attachment; and so can internal devices, as well. Must be factory-assembled on breakers.

mechanically-interlocked breakers: availability: E through L breakers







For mechanically interlocking two breakers to permit only one breaker to be closed at any time, a walking-beam or sliding bar attachment may be externally mounted. Both interlocks permit opening both breakers at one time. The walking-beam type is mounted to the rear of the breaker mounting panel. The sliding bar type is front-mounted on the panel.

Only the sliding bar type is available on the E breaker. F and G breakers can only be supplied with walking-beam type. Both types can be used with other breakers. Breakers require special machining to fit walking-beam interlock and should be ordered when interlock is ordered.

Kirk key interlocks can be adapted for use with type F and larger breakers. Any problems referred to factory should completely outline interlocking scheme.

electrically-interlocked breakers: availability: K, KL and L breakers

Energizing a rear-mounted relay will trip the breaker and prevent its reclosure until relay is de-energized. This is exclusively a factory modification.

breakers with paralleled poles

Breaker poles are paralleled for high current single-pole operation by the addition of straps at line and load ends of breaker, as well as internal strap ahead of the trip, to assure an equal division of the load. For example, a 2-pole F breaker rated 100 amperes would have a single-pole rating of 200 amperes with paralleling straps. Parallel connections are made at factory and are available for E through L breakers.

Series connection of breaker poles for single-pole high voltage operation can be made without any special parts. Application of either series or paralleled poles should be discussed with the Westinghouse representative.

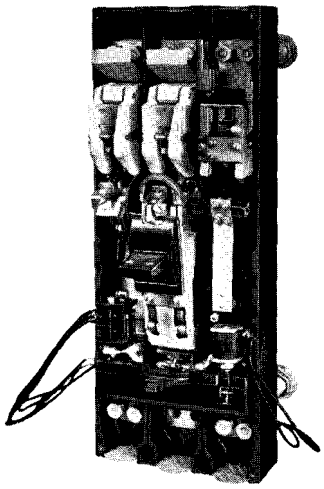
AB De-ion circuit breakers

for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

reverse current breaker

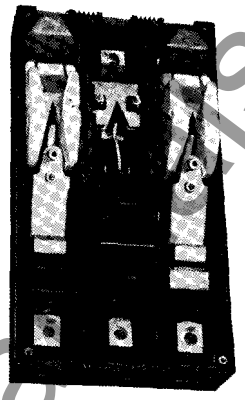
availability: 2-pole K or L in 3-pole frame



This internally-mounted device is used on d-c circuits to open on a 10-15 percent reversal of current. Mounted in the right pole (positions **2** and **3** of illustration on page 20) are a reverse-current relay and a shunt trip actuated by this switch. These breakers must be factory assembled.

field discharge breaker

availability: F, G, K, and KL breakers



Field discharge breakers are composed of 3-pole frames having two outside non-automatic poles and a center pole field discharge contact arranged to close as the outside contacts are opened and vice versa. Thus, the center pole is used as a field discharge contact. Automatic tripping can be supplied in outside poles if desired.

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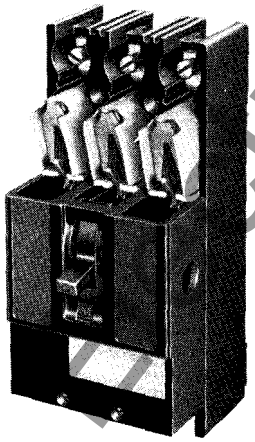
for severe atmospheres

breakers for oil-immersion

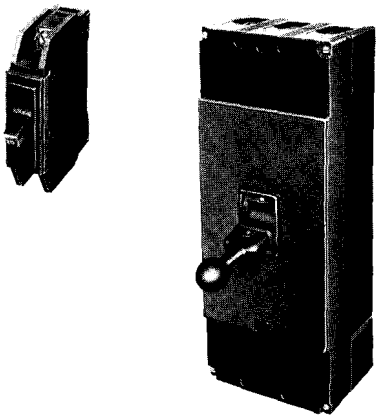
availability: E through L breakers



Designed for use in oil-filled enclosures for corrosive or explosive atmospheres. Thermal only E breakers are supplied with compensating bimetals to take care of temperature changes in the oil. Other frame sizes are the magnetic only trip type, which are not affected by changes in oil temperature. Magnetic elements are adjustable over the same ranges as corresponding standard magnetic only units. These breakers are not listed with the Underwriters' Laboratories, Inc.

fungus-moisture proofed breakers

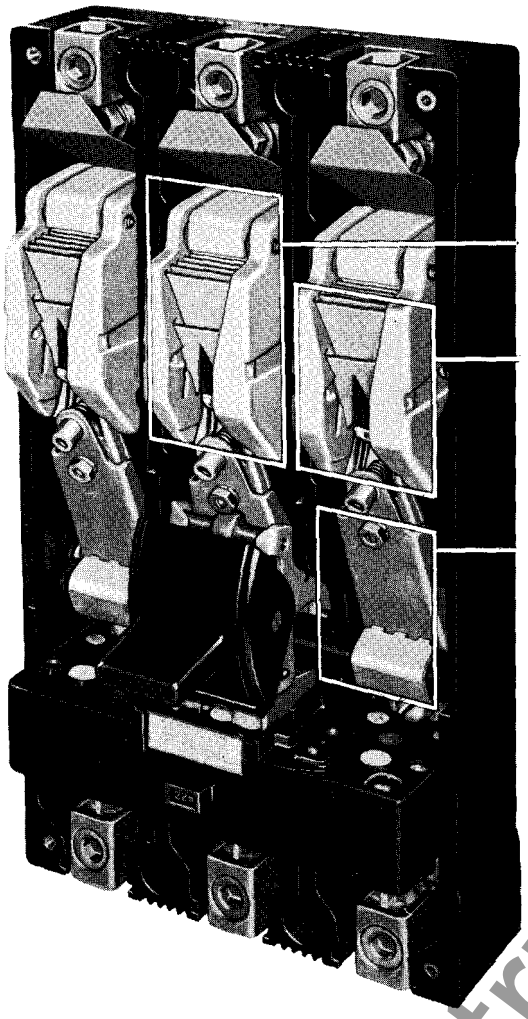
availability: all AB breakers



Breakers may be made to resist extreme moisture and fungus conditions found in tropical and other humid locales. Breakers are coated with a varnish; in addition, fibre parts are impregnated and varnished to prevent moisture absorption.

For chemical or heavy salt-laden atmospheres, where corrosion is accelerated, special platings and materials are used. When ordering, these conditions should be specifically outlined to assure best protection.

internally mounted accessories



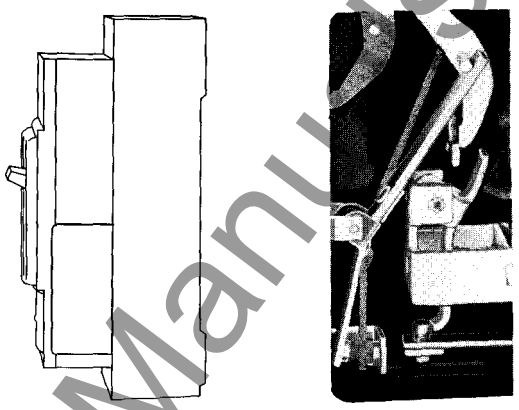
1 Upper central area of breaker delineates portion generally occupied by De-ion arc chutes and, in the larger breakers, is the pole omitted for 2-pole use.

2 This area defines the upper right hand pole space and only very special modifications are built in after removal of arc chutes.

3 This lower right pole area is the space most generally used for the various modifications shown on these pages. Please read the specific descriptions carefully for notes regarding left pole and right pole placements.

alarm switch

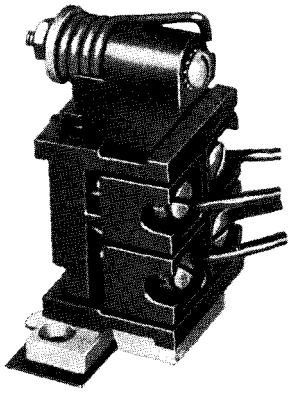
availability: F through L breakers



These switches do not function with manual operation. When the breaker is tripped, the alarm switch closes to energize an indicating light or sound an alarm. Switches which open on tripping can also be supplied when specified. Illustrations at left show position occupied; right, color indicates alarm switch in operating position. The alarm switch is placed atop the trip trigger section and must be built-in at the factory.

auxiliary switch

availability:
E through L breakers



ratings

volts a-c	amps
120	10
240	5
480	3
600	2

These internally-mounted switches can be used to open or close control circuits as the breaker operates. External leads are brought out the side of the breaker. Type A contacts are closed when the breaker is closed and type B contacts are open when the breaker is closed. Normally mounted in left pole unless right pole mounting (position **3**) is specified. Single pole double-throw switches are used in the E and F breakers. Independent contacts are used in other frame sizes. Can be field installed.

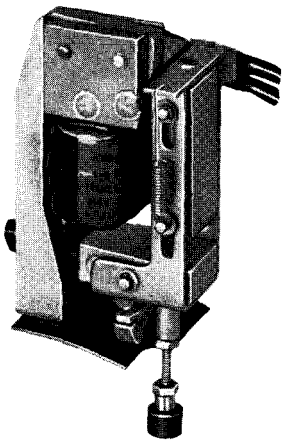
AB De-ion circuit breakers

for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

undervoltage trip

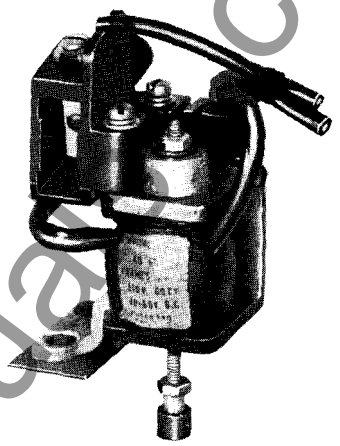
availability:
F through L breakers



A solenoid plunger actuates the trip mechanism to automatically trip the breaker when the line voltage drops below 40 to 60 percent of normal. The breaker cannot be reset until voltage returns to 80% of normal. The device is usually mounted in the right pole of J, K, KL, L and 3-pole G (position **3**) unless left-hand mounting is specified. It can be supplied only for left pole mounting in the F breaker. Flexible 18″ leads are brought out the side of the breaker for connecting to the control circuit. Undervoltage trips are available for voltages up to and including 250 volts d-c and 600 volts a-c. For some voltages, a 10″ external resistor is supplied for connecting in series with the trip coil. Only instantaneous action is offered. Must be factory-installed in F breakers.

shunt trip

availability:
E through L breakers



For tripping the breaker electrically from a remote point.

Because the shunt trip coil does not have a continuous rating, a cut-off switch is included to break the energizing current when the breaker opens. A cut-off switch is not provided in the E breaker; therefore, the energizing current can be broken by making connections to the load side of the breaker or using an auxiliary switch in a 3-pole E breaker. Available for voltages up to 250 volts d-c and 600 volts a-c. Right pole mounting (position **3**), except only in left pole of F breaker. E and F breaker shunt trips cannot be field installed.

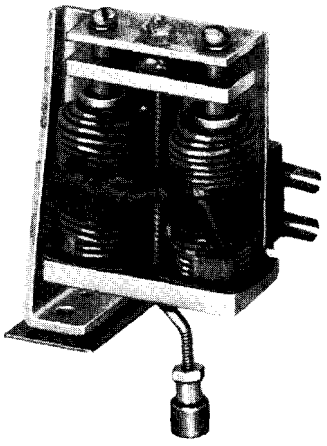
575 volt d-c arc chutes

availability:
G, K or L breakers

For mining, railway, and other 550 to 600 volt d-c applications, G, K, and L breakers with special arc extinguishers may be used with two poles in series on the positive side of the line and one pole in the negative. Can be installed in G and K breakers already in use. For the L breaker, high frame covers must be used with the arc chutes for field installation.

ground current limiter

availability:
F through L breakers



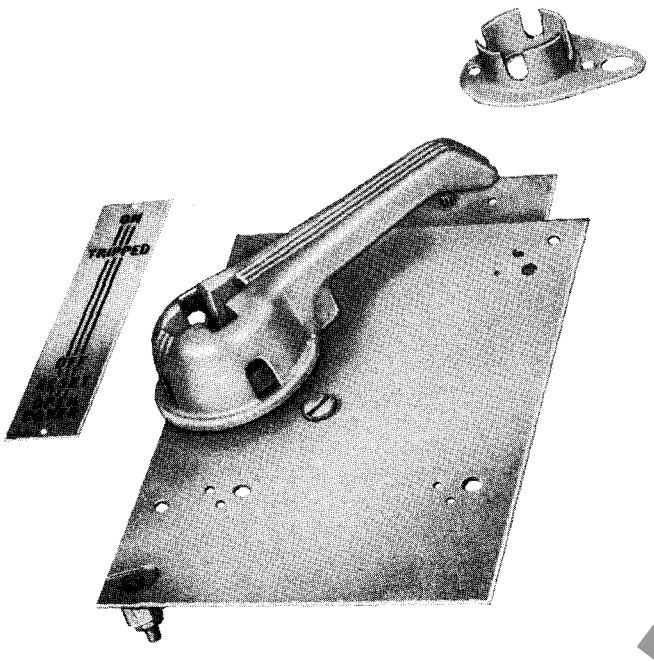
This device is used primarily for mining applications where a ground wire is used. When ground current reaches the rating of the limiter the breaker is tripped. Ratings from 5 to 20 amperes are available.

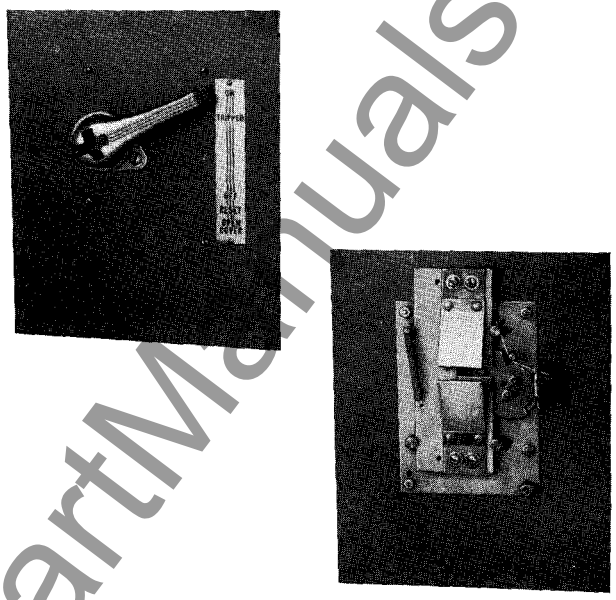
For a-c applications where three trip elements are required, or for L breakers, ground current protection is achieved by using a separate attachment (position **3**) as pictured above. For d-c service, the ground current trip can be built into the trip element space of an F, G, J, K or KL breaker. These instantaneous magnetic trips can be supplemented by thermal protection in G, J, K and KL breakers to prevent repeated momentary reclosures (manual) on a fault. Must be factory-installed.

sliding plate handle mechanism

availability: De-ion Switches and E through L sizes of AB breakers

components





features

positive handle indication: Position of handle indicates whether breaker is *"on", "tripped",* or *"off".*

safety interlocking: Cover cannot be opened with breaker in *"on"* position, except that maintenance men can void interlock with screwdriver in emergency. Otherwise, handle must be moved to *"open cover"* position, opening breaker before cover can be opened. Provision for three safety padlocks to lock breaker in *"off"* position and, at the same time, lock the cover closed.

slam-proof mechanism: Designed to protect breaker and mechanism itself against rough or careless slamming of cover door.

flexible mounting: Shims provided permit unit mounting on any enclosure from 1/16" to 1/4" thickness. Versatility of design provides up to 3/8" tolerance on breaker mounting dimensions, both vertically and horizontally.

modified version saves money: Series 64A3127 models with cups already welded to mechanism plates halve labor time.

assembly

Handle mechanism is packaged for shipment as a single pre-assembled unit. Mounting requires only that five holes be drilled in the cover door—three small holes for the mechanism plate mounting screws and two larger ones for the handle and the emergency cover-opening screw. Mechanism plate may also be fastened to the door by riveting, welding or some other preferred means. Locking cup is welded or screwed to the cabinet door for De-ion Switch, E, F, G, and J mechanisms, and attached by means of four flat-head screws for K, KL, and L assemblies. Shims are provided which permit use on covers up to and including 1/4" thickness, and the location of the spring fingers may be adjusted after mounting. Kits include mounting plans and nameplates with self-tapping screws. Mechanisms can be furnished for doors hinged either on left or right.

AB De-ion circuit breakers

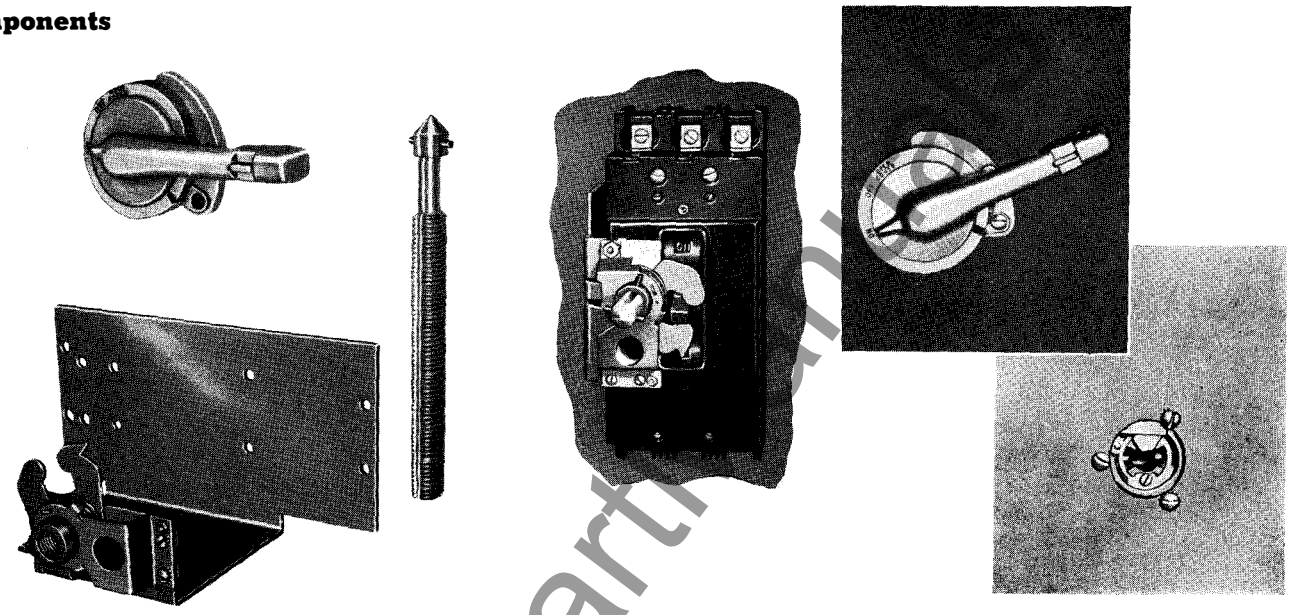
for lighting, distribution, and power circuits

amperes: 15 to 600
maximum voltage: 600 v a-c • 250 v d-c

Vari-Depth* handle mechanism for various cabinet depths

availability: E, F breakers; 30, 60, 100 ampere De-ion Switches

components



features

simple mounting: No stilts are required in deep cabinets or machine cavities to raise switch or breaker to meet door mechanism.

depth-adjustable: Shaft supplied is suitable for panel depth maximum of 11″ and is marked at intervals to guide cutting for depths down to less than 6½″. (For E: 5¾″ to 10¼″). Shaft 3¾″ longer can be furnished.

safety-interlocking: Cover cannot be opened with breaker in *on* position, except by turning emergency access screw with screwdriver. A disc furnished with mechanism can be inserted to deny emergency access. Up to three padlocks can be used to lock in *off* position, which also locks cover closed.

self-aligning: Door handle lines up with breaker or switch handle when door is closed, indicating true position.

stock flexibility: Only one model need be stocked for use with F breakers and 30, 60 and 100 ampere De-ion Switches. (Cam and frame assembly of internal portion slightly different for type E.) This same mechanism is used for either right-hand or left-hand doors. When indication of tripped and reset positions of breaker is desired, nameplate kit can be used. This plate is fastened over the standard legend by two furnished screws in holes factory-drilled.

fewer parts: No shims needed to compensate for various cover thicknesses; no interlock bracket to mount because interlock is built into mechanism. Top of shaft has wobble to tolerate for slight error in cover drillings.

rugged: Cast handle withstands abuse. Door slamming will not damage either handle or internal mechanism.

*Trademark

assembly

1. Breaker, or switch, and mechanism frame are mounted on base of panel using bolts supplied on request. No stilts are required to raise breaker.

2. After shaft is cut to desired length in line with plans furnished, shaft is turned into its threaded coupling and held by a set screw fit into a channel in the shaft. This design permits ±½″ length adjustment to compensate for inaccurate shaft cut.

3. After mounting internal assembly, merely closing door locates cover drilling as conical shaft end will mark the door.

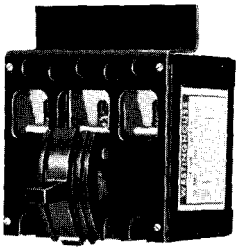
4. Total of four holes to be drilled in cover; three screws secure gasketed mechanism to door, fourth hole is for the shaft and interlock engagement. Separate nameplate not required as the legend is inscribed on handle hub.

AB De-ion circuit breakers
for lighting, distribution, and power circuits

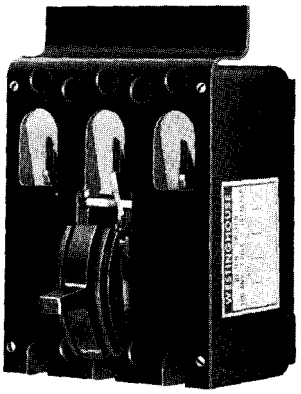
De-ion Switch visible blade

3-pole, 600 volts
30, 60, 100, 200 amperes

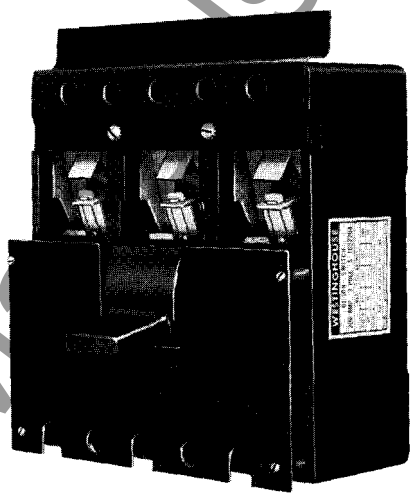
30 and 60 ampere



100 ampere



200 ampere



application

This De-ion Switch is designed for use as a load break disconnect in combination starters, switchboards, separate enclosures, and control panels for machine tools. It can break high currents in excess of those which any comparable device can handle. To correspond to standard switch sizes, ratings have been set conservatively at 30, 60, 100 and 200 amperes, with equivalent 3-phase horsepower ratings as given below. Listed through 50 horsepower with Underwriters' Laboratories, Inc.

construction

Rather than knife-blade contacts, this switch has high-pressure, silver alloy contacts. The contact force of the 100-ampere model increases with wear, keeping resistance and resultant wattage loss to a minimum.

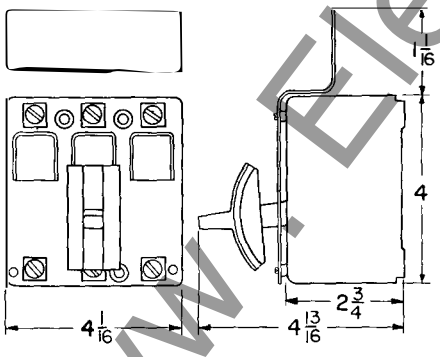
Equipped with De-ion arc quencher which confines, divides and extinguishes arcs quickly; non-welding silver alloy butt contacts; and a quick-make quick-break toggle mechanism. May be used with cabinet handle mechanism as a front operated switch. Complete integral barriers between poles contribute to high dielectric strength and make possible the compact design of this De-ion switch. A protective Micarta shield is provided to prevent accidental contact with live parts or incoming lead lines.

ratings

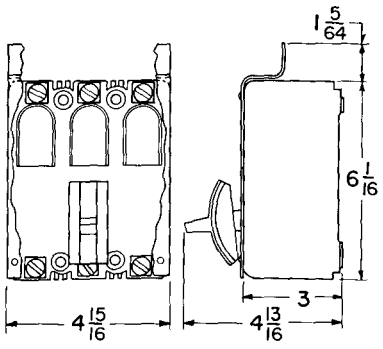
volts a-c	max. hp three phase			
	30 amp	60 amp	100 amp	200 amp
120	5	7½	20	30
240	10	20	40	75
480	20	40	75	125
600	25	50	100	150

dimensions: inches

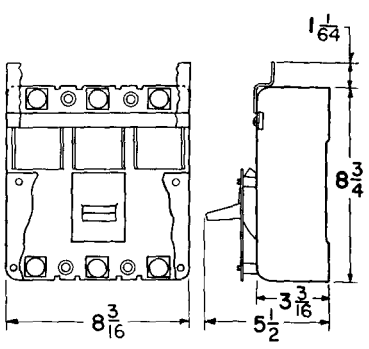
30 and 60 ampere



100 ampere



200 ampere



further information: prices: pl 29-120; application: ad 29-160; dimensions: ds 29-170

Westinghouse Electric Corporation
standard control division: Beaver plant • Beaver, Pa.
printed in U.S.A.

Westinghouse

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Application

Westinghouse molded case breakers are designed for circuit protection of low voltage distribution systems. They are suitable for application as main breakers and for protection of branch and feeder circuits and connected apparatus. These breakers provide overload protection for conductors and short-circuit protection for all circuit elements such as conductors, motors and starters.

They are designed for use in switchboards, control centers, panelboards, combination starters, bus duct plug-in units and separate individual enclosures. In these various enclosures, they are applicable to the requirements of lighting, distribution and other power circuits.

Standard current ratings of AB De-ion circuit breakers correspond in general to the standard ratings in the N. E. C. Paragraph 240-5b. These breakers are primarily designed for the protection of conductors, both aluminum and copper.

User Benefits

Accurate Reliable Protection: The overload element in each pole of every breaker is individually calibrated and tested in a controlled temperature to meet Underwriters' Laboratories, Inc. requirements. Especially hardened, ground and polished trip latches assure continuous and accurate tripping characteristics.

De-ion Arc Quenching: Westinghouse-developed De-ion arc quenchers positively extinguish dangerous arcs in a fraction of a second. Coupled with a positive action quick-make, quick-break toggle mechanism, they assure long circuit breaker life with minimal burning and pitting of contact surfaces.

Reduced Downtime and Maintenance Costs: Circuit breakers are long-lived devices designed for maintenance-free, repetitive duty without costly shutdowns. Because the breaker is resettable, downtime amounts to only a matter of seconds after the overload or fault has been corrected.

Reduced Operation Cost: Welded internal parts, high contact pressure, and silver alloy butt-type contacts used in circuit breakers offer considerably less resistance to electrical current than do the fuse clips, bolted joints and hinge joints of a fusible device. Thus, with a lower watts loss, electrical power cost savings result.

Single-Phase Protection: A fault or overload on any one phase opens all poles of the breaker, minimizing the possibility of single-phasing polyphase motors.

Dual Protective Elements: Bi-metallic thermal elements protect on overloads where inverse time tripping is desirable; magnetic trip elements operate the breaker instantly on dangerous fault currents. Trip-free, the breaker cannot be held closed under fault conditions.

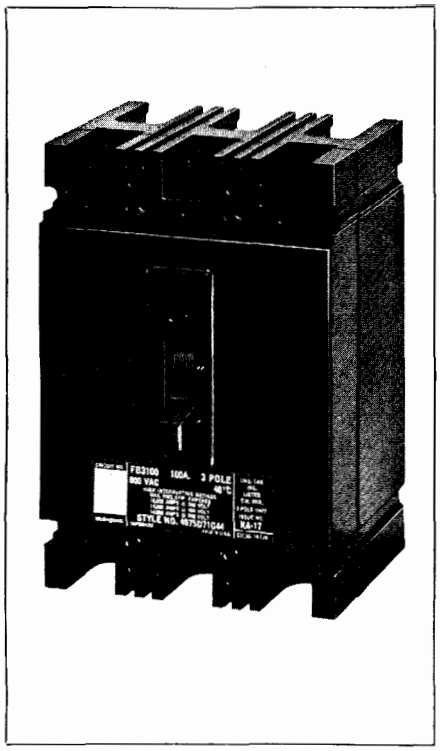
Maximum Safety: Molded case circuit breakers are dead front and personnel are not exposed to "live" parts. Line terminal shields are available for additional protection when required.

Tamperproof: The complete breaker or trip unit is sealed at the factory to prevent tampering and alteration of its rating.

February, 1970
New Information
E, D, C/1901, 1903, 1928/DB

Westinghouse

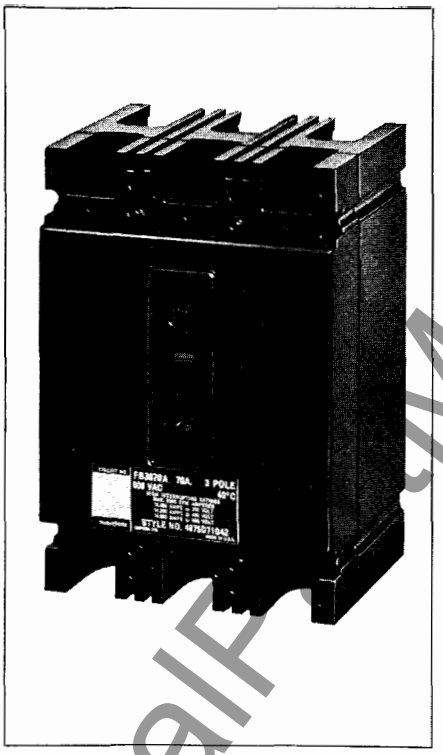
Thermal Magnetic Breakers



Thermal magnetic breakers are general purpose devices suitable for the majority of breaker applications and are considered the industry standard. Combining thermal and magnetic trip elements, they provide accurate overload and short circuit protection for conductors and connected apparatus. Because their continuous current rating changes with ambient temperature variations, these breakers are best suited for conductor overload protection.

Thermal magnetic breakers have all the design features of standard breakers shown on pages 4-5.

Ambient Compensating Breakers

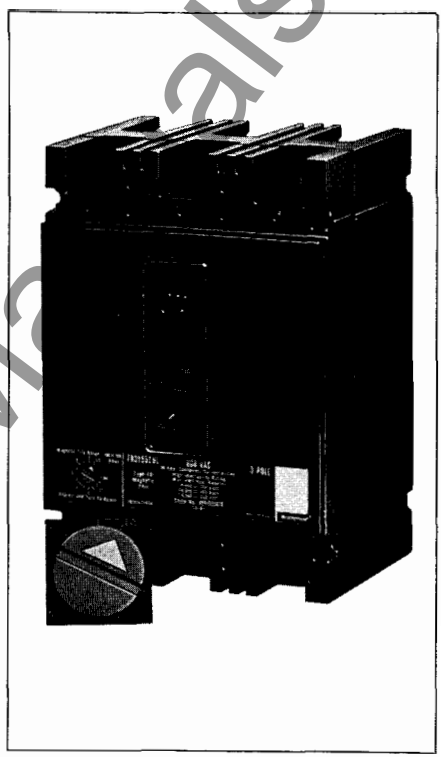


Ambient compensating breakers automatically compensate for variations in ambient temperature, and thus minimize the need for de-rating in higher ambients, and uprating in lower ambients. This provides a near constant current rating over a wide range of temperatures.

Ambient compensating breakers are calibrated at 25°C. However, because of the built-in compensator, they will carry approximately the same current at other ambients with a very small ampere rating change. The trip units are thermally compensated to carry rated load at 50°C while still meeting Underwriters' Laboratories tripping requirements for 25°C breakers at 25°C. These breakers do require slight derating at ambients above 50°C.

Ambient compensating breakers are thermal magnetic and provide overload and short circuit protection. They have all the design features of standard breakers shown on pages 4-5.

Magnetic-Only Breakers



Magnetic-only breakers are similar to standard thermal magnetic breakers except that they do not have thermal trip elements. They are equipped with front-adjustable magnetic trip elements and are used where only short circuit protection is required. Because the adjustment feature allows closer short circuit protection, these breakers are commonly preferred for motor and resistance welder circuits.

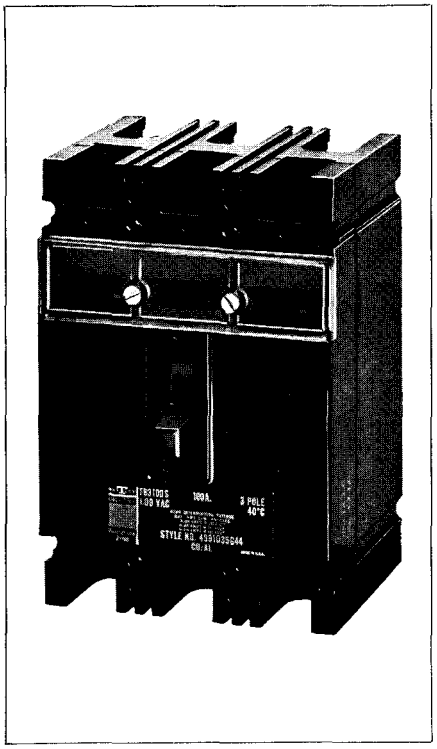
Each breaker is calibrated at the factory for a specific trip range and set on the high side. Adjustment knobs located in the front cover can be adjusted downward to a specific requirement within the specified range. The adjustment knobs, made of red nylon, have a high, a low and a series of intermediate setting positions. The magnetic trip is so designed that each point follows a linear scale and each of the intermediate settings has a significant value, within calibration tolerances.

Magnetic-only breakers have all the features of standard breakers shown on pages 4-5, except that they do not have a thermal trip element.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

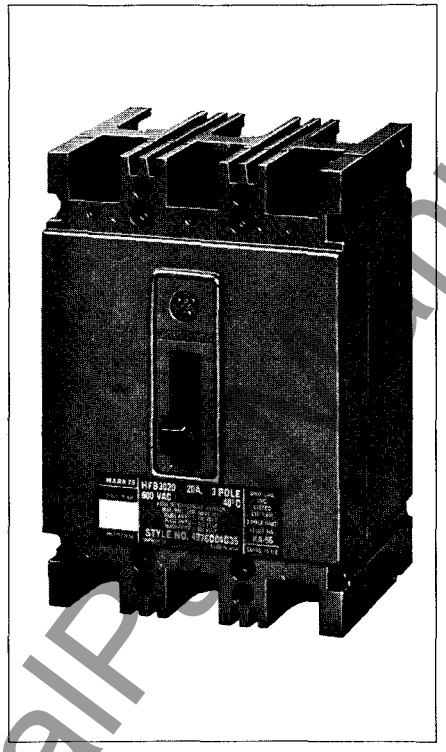
SAF-T-VUE® Breakers



Saf-T-Vue breakers are similar to standard molded case breakers except that they are equipped with a window of transparent, heat resistant thermoplastic over the breaker contacts. This permits instant, visual verification of whether the contacts are open or closed. These breakers fulfill the needs of industrial plants where safety codes require visible contacts as an additional safety precaution for maintenance personnel. They can be supplied with thermal magnetic, magnetic-only or ambient compensated trip elements to cover a wide scope of applications. They are not available in MARK 75 or TRI-PAC breakers.

Saf-T-Vue breakers have all the design features of standard breakers shown on pages **4-5.**

MARK 75® Breakers



MARK 75 breakers are similar to and are the same size as standard thermal magnetic breakers, except that they are designed to provide up to 75,000 amperes asymmetrical interrupting capacity at 240 volts Ac. Thus, MARK 75 breakers are ideally suited for use in network systems and other applications where unusually high fault currents exist. Standard MARK 75 breakers are equipped with thermal magnetic trip elements; they are also available as magnetic-only or ambient compensating breakers.

MARK 75 breakers have all the standard design features shown on pages 4-5, except that the special molded case is gray, instead of black and has greater strength and resistance to tracking.

TRI-PAC® Breakers

TRI-PAC circuit breakers offer an even higher interrupting capacity than MARK 75 breakers. They are similar to standard thermal magnetic breakers except that they incorporate a current limiting device. This enables them to be used in secondary distribution systems where fault currents up to 200,000 symmetrical rms, amperes are available. Thus, they are a triple package of protection – (1) time delay thermal trip for overload protection, (2) instantaneous magnetic trip for normal fault current protection, and (3) current limiting action for higher fault current protection – combined and coordinated in a single compact and economical device. Because they limit current, TRI-PAC breakers can be used to protect smaller AB breakers and other connected apparatus, in addition to protecting feeder and branch circuits.

TRI-PAC breakers incorporate all the design features of standard breakers as shown on pages 4-5, in addition to the current limiter package shown on pages **6-7.**

Westinghouse

Design Features of Standard Breakers

1 Molded Cases

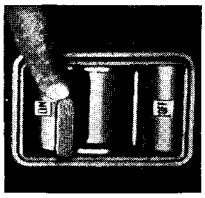
Moldarta® and/or glass polyester cases combine built-in ruggedness and high dielectric strength in a compact design that is both space-saving and attractive. Mechanism is entirely enclosed, providing maximum safety.

2 Free Bearing Surfaces

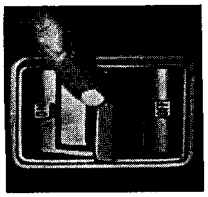
Bearing surfaces are of dissimilar metals. This prevents sticking and bearing wear, allowing long service life.

3 Handle Position Indication

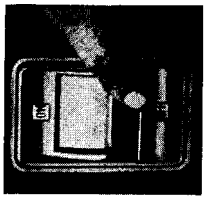
Position of handle gives positive indication of whether circuit is On, Off or Tripped.



ON: Handle in this position indicates that the circuit is closed or On.



TRIPPED: When the breaker trips automatically due to overload or short circuit, the handle moves to a position midway between the manual On and Off.



OFF: Handle is in this position when circuit is open or off. To restore service after automatic tripping, handle is first moved from center to Off and then to On.

4 Accurate Protection

All tripping members have ground and polished latch surfaces and are heat-treated to prevent distortion. Heat-treated bi-metals retain calibration permanently.

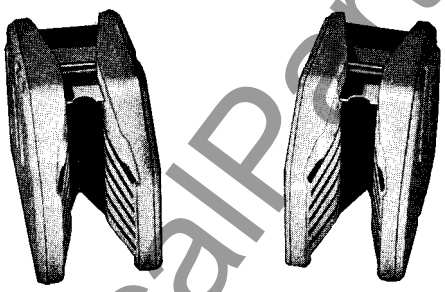
5 Factory Sealed

Smaller breakers are sealed to prevent tampering and changing of calibration. In the larger frames, the trip units are individually sealed and are interchangeable by removing the breaker cover.

6 Firm Connectors

Pressure-type connectors are standard with all ratings above 30 amperes and make efficient, dependable connections. Terminals suitable for copper cable are supplied as standard. Terminals suitable for either aluminum or copper cables can be specified for most breakers.

7 De-ion Arc Quenchers



This Westinghouse development consists of a series of grid plates mounted in parallel between supports of insulating material.

The slots in the steel plates extend directly over the contacts and draw the arc from the moving contact up into the divided chamber. The arc is thus confined, divided, and extinguished in less than ½ cycle.

8 Silver Alloy Contacts on all Breakers

For increased contact life and enduring low resistance; special alloys prevent sticking and welding.

9 Electrically Welded Connections

Firm, strong welded connections assure long life. Provide low resistance and low watts loss, with increased economy in operation.

10 Quick-Make, Quick-Break Mechanism

The quick-make, quick-break over center toggle mechanism provides quick, positive action in opening and closing circuits. It prevents "teasing" the contacts.

11 Common Trip

Multi-pole units have insulated common-trip bar that opens all poles when an overload occurs in any one phase. Minimizes possibility of single phasing.

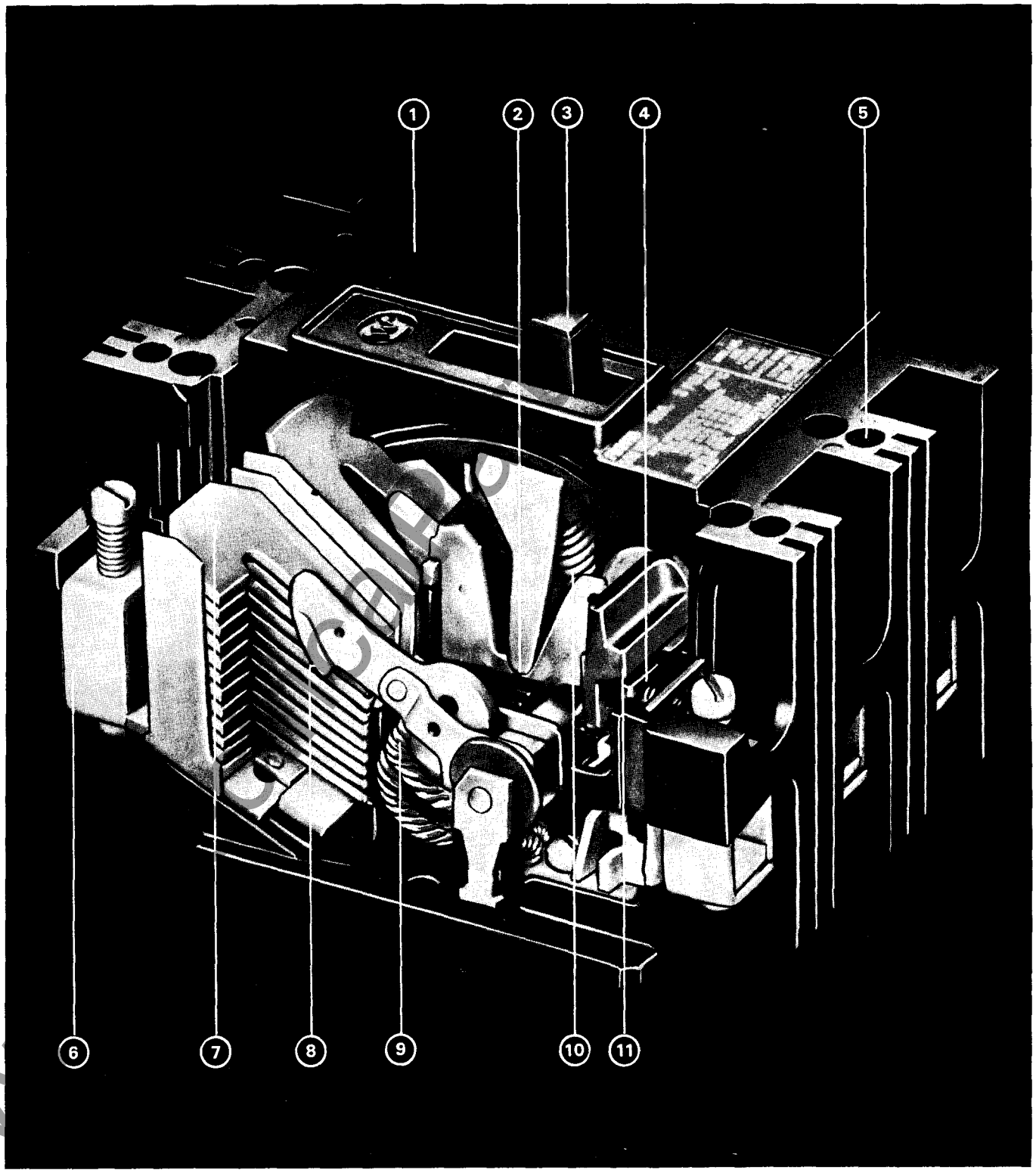
Complete Interpole Barriers

(Not illustrated)

Completely isolate one pole from another, eliminate possibility of phase-to-phase flashover.

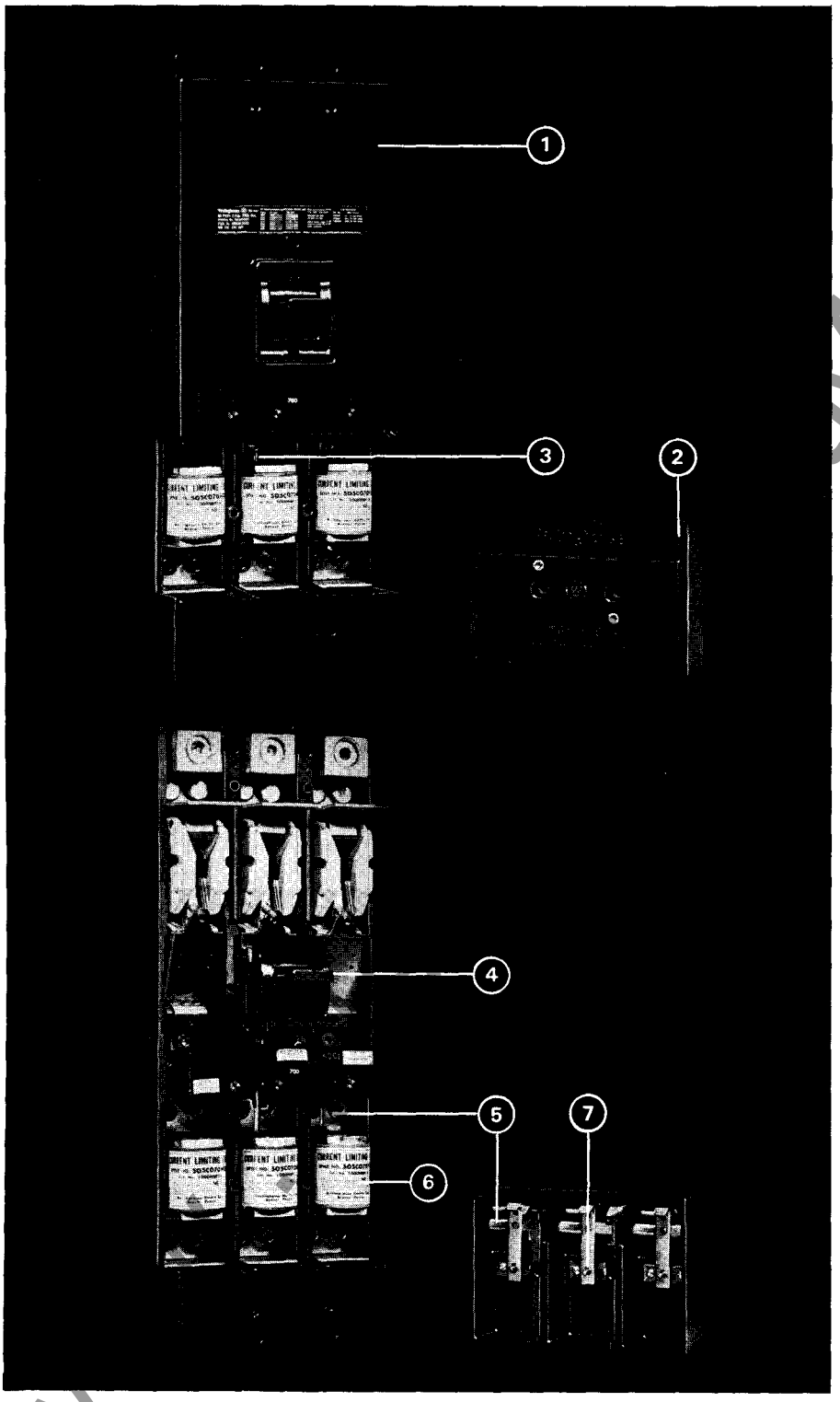
AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum



Westinghouse

Design Features of TRI-PAC® Breakers



1 Retain All Features of Standard AB De-ion Circuit Breakers

TRI-PAC breakers are built to the same exacting design standards and by the same methods as conventional Westinghouse molded case circuit breakers. They retain all the features of standard breakers including: De-ion arc quenchers, non-welding silver alloy contacts, common trip and Moldarta® and/or glass polyester cases.

2 Compact, Easy-to-Remove Current Limiter Housing

Current limiters are contained within the molded case of the breaker, and are readily accessible from the front when replacement is necessary. On small units the limiters are contained in a removable housing and plug into the breaker as a unit. On larger units the limiters bolt individually to the breaker frame and are enclosed by a separate limiter housing or by the breaker cover.

3 Limiter Housing Safety Interlock

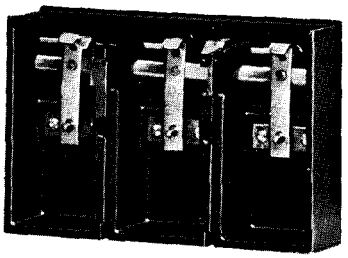
When the limiter housing is removed, a safety interlock trips the breaker. This interlock also prevents closing of the breaker while the limiter housing is removed so that it is impossible to come in contact with "live" parts.

4 Positive Trip Indication

When a breaker trips, the handle always moves to the center "trip" position. In addition, the cause of tripping is indicated in the following ways:

- If the breaker cannot be reset immediately after tripping but can be reset after a short period, it indicates thermal tripping due to an overload or high resistance fault.
- If it can be reset immediately, a "normal" fault current has been interrupted by instantaneous magnetic action.
- If the TRI-PAC cannot be reset, high fault interruption by the current limiter has taken place.

5 Coordinated Common Trip to Prevent Single Phasing

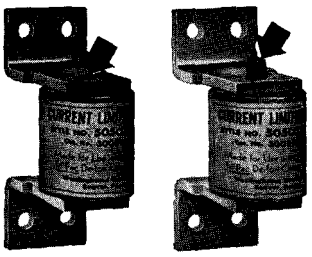


When a current limiter operates, the ejected plunger causes instant release of a common tripping bar. All poles are opened simultaneously, eliminating the possibility of single phasing.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

6 Specially Designed Current Limiters



When a high fault current causes one or more limiters to function, a spring-loaded plunger is instantly ejected from the end of the limiter. The plunger strikes a trip bar which causes the breaker contacts to open the instant the fault occurs.

An extended plunger on any limiter indicates, at a glance, on which phase the fault has occurred so that testing of limiters is unnecessary. Presence of an extended plunger also prevents relatching of the breaker. Thus, "good" limiters must be used or the breaker cannot be operated. These limiters are not affected by the overloads or normal short circuits cleared by the thermal-magnectic action of the breaker, and unless they have cleared a high fault current, as evidenced by an extended plunger, they may be used without question.

Since these limiters are designed for use only with TRI-PAC breakers, safe, proper coordination is assured.

7 Missing Limiter Interlock

TRI-PAC breakers with a separate limiter housing are provided with a missing limiter interlock which prevents the breaker being reset unless all limiters are in place. Thus, accidental single phasing is prevented. since the breaker cannot be reclosed when a limiter is missing.

Choice of Three Terminal Connections

TRI-PAC breakers are available with front connected pressure type terminals, bolted rear-connected mounting studs and plug-in terminal mounting blocks.

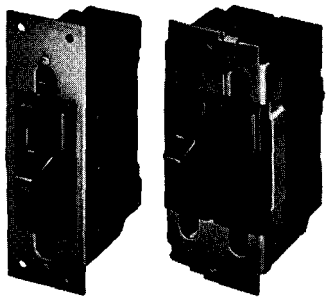
Accessories

TRI-PAC breakers accommodate many standard AB breaker accessories including shunt trip, undervoltage trip and auxiliary contacts. Application of other accessories should be reviewed with Westinghouse.

Accessories for All Type Breakers

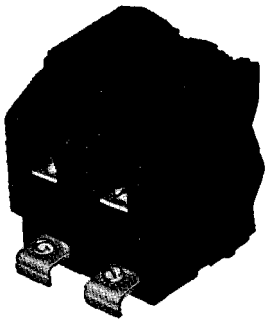
AB De-ion circuit breakers are, for the most part, used in conjunction with, or built into, other equipment such as panelboards, switchboards and numerous types of enclosures. Accessories shown on this and the following pages are available for most breakers. **For application to specific breakers, refer to Price List 29-120.**

Quicklag Faceplate



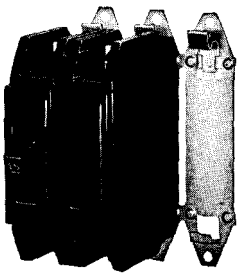
For front panel mounting. Faceplate snaps over the front of the single-pole breaker, is a two-piece wraparound on the two-pole breaker.

Quicklag Clamp



For base mounting of Quicklag breakers on panels. Two needed per breaker.

Quicklag Base Mounting Plate



Plates accommodate six single-pole, three two-pole or two three-pole breakers. Can be cut for specific need.

Westinghouse

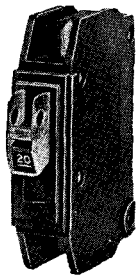
Accessories, *Continued* **(Refer to Accessories section, PL 29-120, for application to specific breakers.)**

Handle Locks
Various handle locks are available to prevent either accidental or deliberate operation of circuit breakers. The "trip free" handle of the AB De-ion circuit breaker enables it to trip on overload or short circuit conditions, even though handle locks are in place.

For Quicklag Breakers
Refer to Price List 29-120 for application to specific breakers.

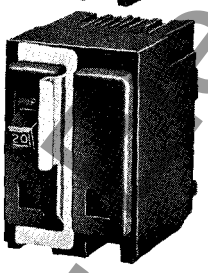
Lockdog
Non-padlocking type, removable.

PadlockAttachment
Can be padlocked, is removable.

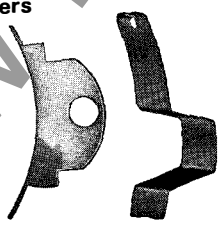


Padlock Device
For 1-pole Quicklags. Padlockable, non-removable, meets California code requirements.

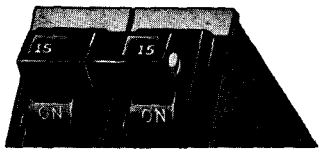
Padlock Device
For 2 and 3-pole breakers. Padlockable, non-removable, meets California code requirements.



For Standard Breakers
Padlockable or non-padlocking. Padlockable type meets California code requirements.

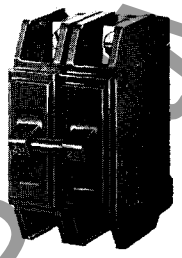


Handle Ties for Quicklag Breakers Standard

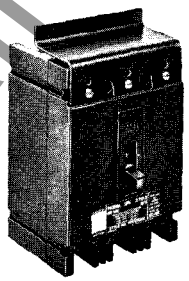


For use with adjacent pairs of breakers which are not interconnected. Affords true trip indication, prevents single-pole operation where double-pole manual switching is required.

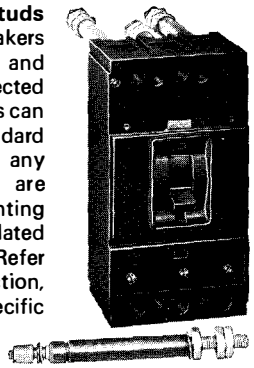
California Type
Meets California code requirements which call for a solid tie.



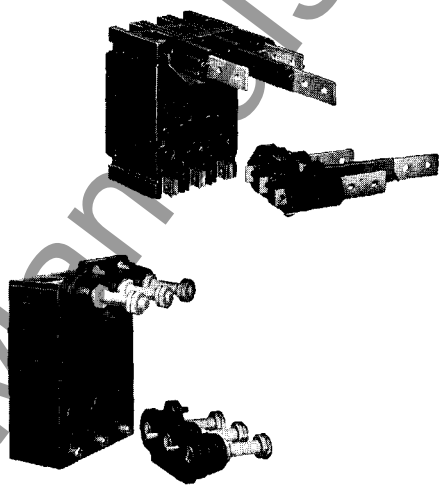
Terminal Shields
Westinghouse offers a complete line of formed terminal shields which fasten over the line ends of AB breakers to protect personnel against accidental contact with the incoming wiring. Meet most exacting safety requirements; e.g. for machine tool control panels where overload relays are internally reset.



Rear Terminal Studs
For adapting breakers for switchboard and other rear connected applications. Studs can be used with standard breakers without any modification and are available for mounting breakers on insulated or steel panels. Refer to Accessories section, PL 29-120, for specific applications.

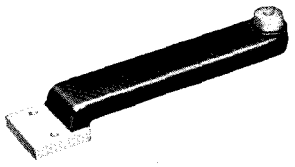


Plug-in Kits



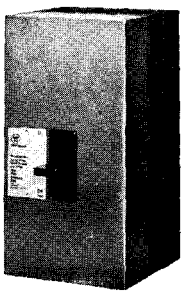
Designed to provide quick and easy plug-in installation in switchboards. Tulip type connectors and threaded studs or flat bus bars are built into the molded support block. Male studs or flat stab connectors are attached to the breaker terminals.

Panelboard Connecting Straps



For connection of breakers to bus bars in narrow or convertible distribution panelboards. Straps and available panelboard parts are shown in Price List 29-120, Accessories section.

Motor Operators
For complete remote operation of circuit breakers. Means for manual operation is provided in the event of power failure or emergency. Available in 120, 208, 240, 480 volt Ac ratings.



Motor operators are intended for infrequent operation in line with Underwriters' Laboratories endurance standards for molded case circuit breakers.

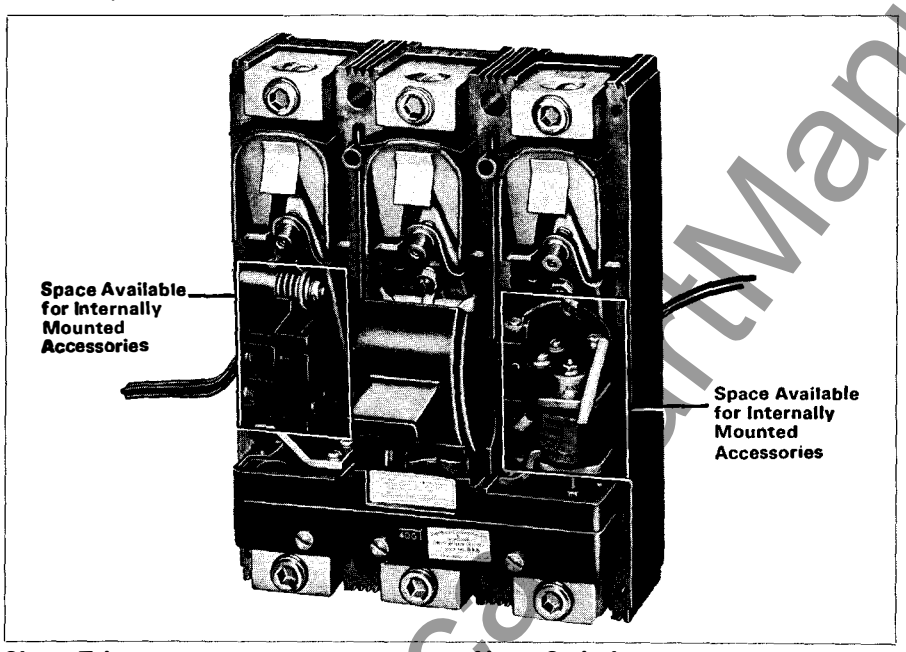
AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Modifications (Refer to PL 29-120, Modifications, for application to specific breakers.)

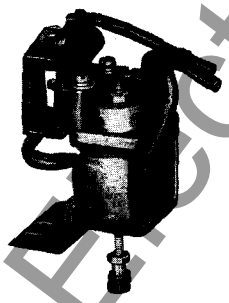
Internally Mounted Modifications

For severe or unusual operating conditions, for special functions or control sequences, Westinghouse breakers can be custom-built or modified with special attachments. Beyond the basic function of overcurrent and short circuit protection, such special breakers meet modern, complex circuit requirements, and add flexibility of operation and efficiency. Those modifications which can be mounted inside the breaker are shown on this page. For application to specific breakers, see Modifications, PL 29-120.



Shunt Trip

Breaker Availability: See PL 29-120, Modifications



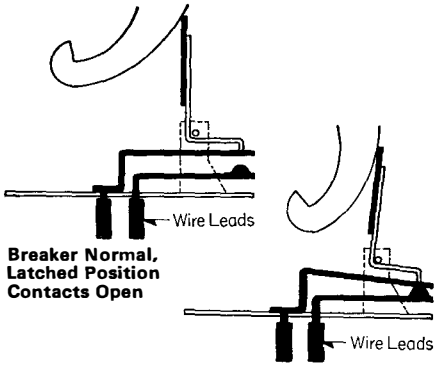
Shunt trips are used to trip the breaker electrically from a remote point.

Shunt trip coils do not have a continuous rating. A cut-off switch is included on most breakers to break the coil circuit when the breaker opens. Available for voltages up to 250 volts Dc and 600 volts Ac.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

Alarm Switch

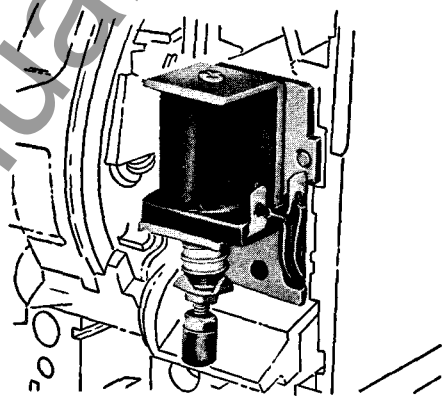
Breaker Availability: See PL 29-120, Modifications



These switches do not function with manual operation. When the breaker is tripped, the alarm switch closes to energize an indicating light or sound an alarm. Switches which open on tripping can also be supplied when specified. The alarm switch is placed atop at the factory. Alarm bell or light is not included.

Undervoltage Trip

Breaker Availability: See PL 29-120, Modifications

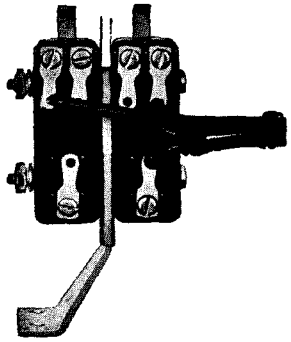


Undervoltage trips automatically trip the breaker when voltage drops below 40% to 60% of coil rating. The breaker cannot be reset until voltage returns to 80% of normal. They are available for voltages up to and including 250 Dc and 600 Ac. For some voltages, an external resistor is supplied for connecting in series with the trip coil. Only instantaneous action is offered.

Must be factory installed, mounting location varies among breakers. Refer to PL 29-120 for specific location.

Auxiliary Switch

Breaker Availability: See PL 29-120, Modifications



Auxiliary switches are used to open or close control circuits as the breaker operates. These internally mounted switches are normally supplied in the form of miniature switches having one A contact, one B contact and common "A" contacts are closed when the breaker is closed and "B" contacts are open when the breaker is closed.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

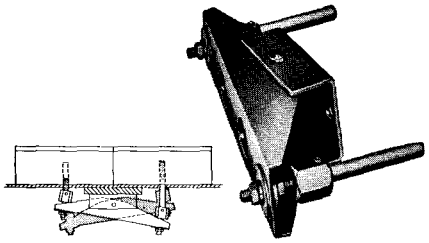
Westinghouse

Modifications, *Continued* (Refer to PL 29-120, Modifications, for application to specific breakers.)

Mechanical Interlocks

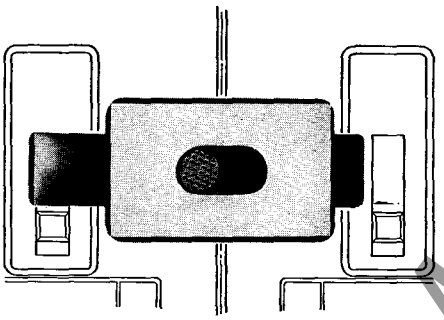
Mechanical interlocks provide a means to interlock two breakers so that only one may be closed, yet both may be open at any given time.

Walking Beam Type



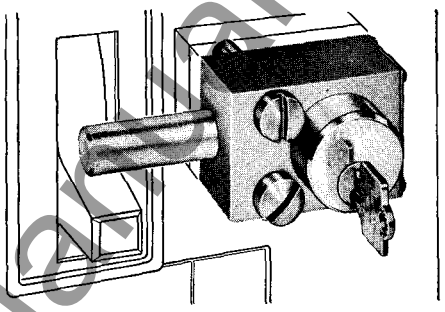
Walking beam interlocks mount on panel at the rear of breakers. When one breaker is closed, a non-conductive plunger extends into the opposite breaker to prevent it from closing. The closed breaker must open before the open breaker may be closed. Circuit breakers require special machining to fit walking beam interlock and should be ordered from the factory with the necessary interlock. Refer to PL 29-120 for standard breaker spacings.

Sliding Bar Type



Sliding bar interlocks mount on customer's panel in front of breakers. When bar is extended toward one breaker blocking handle in open position, opposite breaker can be closed. Closed breaker must be opened and handle blocked with sliding bar before opposite breaker can be closed. Breakers do not require alteration for use with this attachment. Refer to PL 29-120 for standard breaker spacings.

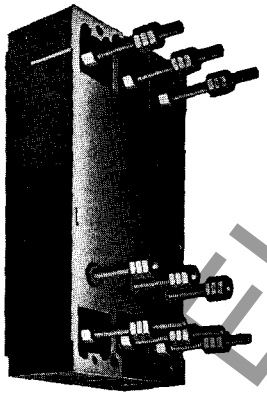
Key Interlock



Key interlocks mount directly to breaker cover. Plunger is extended by turning key in cylinder, thereby locking breaker in open position. Various keying arrangements can be supplied. (e. g.-key removable only when plunger extended; key removable when plunger either extended or retracted; multi-cylinder operation of plunger).

A pair of breakers, remote from each other, can be interlocked so that only one can be closed at one time by using key interlocks operable by the same key and key removable only when plunger is extended. These interlocks cannot be field-mounted.

Dual Voltage Breakers



For dual voltage equipment protection with only one trip rating, breakers may be supplied with center studs. At the maximum voltage the trip unit carries all the current. At the lower voltage, the current is doubled, with half the current by-passing the trip unit through the center stud connections. Thus, one rating breaker can be used for both connections. Rear connecting studs are normally used with center tap studs for line and load connections. These center studs cannot be field mounted.

Breakers with Paralleled Poles

Breaker poles are paralleled for high current single-pole operation by the addition of straps at line and load ends of breaker, as well as internal strap ahead of the trip to assure an equal division of the load. For example, a 2-pole breaker rated 100 amperes would have a single-pole rating of 200 amperes with paralleling straps. Parallel connections are made at factory. Application of parallel poles should be reviewed with Westinghouse.

Field Discharge Breakers

Field discharge breakers are composed of 3-pole frames having two outside non-automatic poles and a center pole field discharge contact arranged to close as the outside contacts are opened and vice versa. Thus, the center pole is used as a field discharge contact. Automatic tripping can be supplied in outside poles if desired.

Fungus-Moisture Proofing and Corrosion Resisting

Breakers may be made to resist extreme moisture and fungus conditions in tropical and other humid localities. Breakers are coated with a varnish; in addition, fibre parts are impregnated and varnished to prevent moisture absorption.

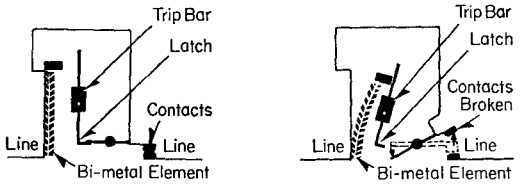
For chemical or heavy salt-laden atmospheres, where corrosion is accelerated, special platings and materials are available. When ordering, these conditions should be specifically outlined to assure best protection.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

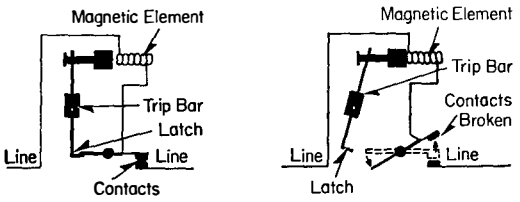
Protective Actions

Thermal Action



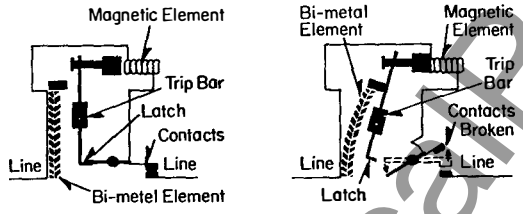
A thermal element is generally best suited for conductor overload protection because its rating changes in about the same ratio as the average conductor rating changes with ambient temperature variations. The thermal element consists of two bonded strips of metals having different rates of thermal expansion. The heat of an excessive current will cause the element to bend; the metal having the greater rate of expansion will be on the outside (longer boundary) of the bend curve. Bi-metals have inverse-time elements, providing a long time delay on light overloads and faster response on heavy ones.

Magnetic Action



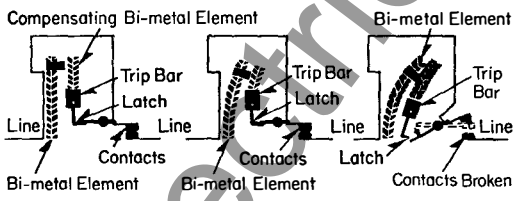
In this action, an electromagnet element is used. When a predetermined current flows through the coil, the armature is attracted, initiating an unlatching action, causing the circuit to open. Magnetic trip settings of magnetic only breakers can be adjusted by varying the air gap. Magnetic tripping cannot be set low enough to allow for load inrush currents and still protect against light overload. A magnetic only breaker provides short-circuit protection only.

Thermal Magnetic Action



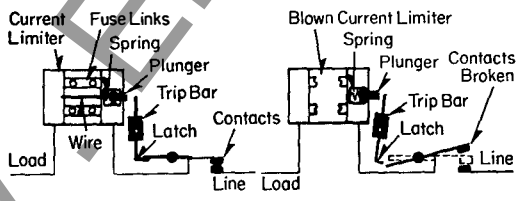
This action combines the features of both thermal and magnetic actions. It provides instantaneous action on short circuits, yet permits momentary overloads such as those encountered in motor starting and initial lighting surges. Thus, this action is best-suited to most applications.

Thermal (Ambient-Compensating) Magnetic Action



Ambient compensation is obtained by using an additional bimetallic element which counteracts the effect of ambient temperature changes on the overload bi-metal. (The magnetic element has been eliminated from the schematic in order to show the thermal action more clearly.) This temperature compensated trip provides a practically constant current rating over a wide range of ambient and is particularly suitable where there are unusually high, low, or fluctuating temperatures.

Current Limiter Action in TRI-PAC Circuit Breakers



TRI-PAC breakers have thermal magnetic and current limiting action. For simplicity, the schematic shows only the current limiting portion of the mechanism; thermal magnetic elements are the same as illustrated above for standard breakers. When fault currents above the nominal rating of the equivalent standard AB breaker are encountered, the silver links in the current limiter melt, thus opening the circuit. This action occurs with such rapidity that the current is limited to a relatively low value. Simultaneously, the magnetic action of the breaker also functions to open the breaker contacts and aids in clearing the short circuit. A wire holding a plunger against the pressure of a spring will melt when the silver links melt. This action causes the plunger to become extended holding the trip bar in the unlatched position. Therefore, it is impossible to reclose the circuit breaker until the blown limiter is replaced. Interlocks (not shown) will prevent relatching of the breaker if a limiter is omitted and will also open the circuit breaker contacts before the limiter plug-in contacts are broken if an attempt is made to remove the limiter housing assembly with the breaker in the on position.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Typical Specifications

Thermal Magnetic Breakers

Electrical Circuits shall be protected by molded case AB De-ion® circuit breakers, as manufactured by Westinghouse Electric Corporation or approved equal. Each pole of these breakers shall provide inverse time delay overload protection and instantaneous short circuit protection by means of a thermal-magnetic element. The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit at the line terminals.

The breakers shall be operated by a toggle type handle and shall have a Quick-make, Quick-break over-center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuits and abnormal currents. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual "ON" and "OFF''positions. All latch surfaces shall be ground and polished.

Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have their covers sealed; interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be of non-welding silver alloy. Arc extinction must be accomplished by means of De-ion arc chutes, consisting of metal grids mounted in an insulating support. Circuit breakers shall be listed with Underwriters' Laboratories, Incorporated, conform to requirements of NEMA Standards Publication No. AB 1-1969, and meet the appropriate classifications of Federal Specifications W-C-375a.

TRI-PAC® Breakers

When the interrupting ratings of standard AB breakers are less than the available fault current of the distribution system, TRI-PAC breakers as manufactured by Westinghouse shall be used.

These breakers shall be similar in construction to the standard Westinghouse AB De-ion circuit breaker. On breakers with interchangeable, thermal, adjustable magnetic trip, the accessibility and position of the adjustment knob shall not be changed from those on the standard breaker.

The breakers shall combine time delay thermal trip protection, instantaneous magnetic trip protection and current limiting protection in one complete assembly. The above protective actions shall be so coordinated that overcurrents will be cleared by the thermal action; short circuits of relatively low magnitude will be cleared by the magnetic action; and high fault currents above a predetermined point will be cleared by the current limiters. The current limiters shall not be affected when the thermal and/or magnetic trip functions to clear the circuit. Regardless of which tripping device serves to clear the circuit, all poles of the breaker shall open automatically.

The breaker must not be resettable until current limiters which have functioned have been replaced. The current limiters shall have a visual means to determine which one has operated and requires replacement.

The current limiters shall be mounted within the breaker case and shall be readily accessible by removing a front cover.

TRI-PAC breakers shall meet appropriate sections of NEMA Standards Publication AB1-1969 and meet appropriate classifications of Federal Specification W-C-375a.

Further Information

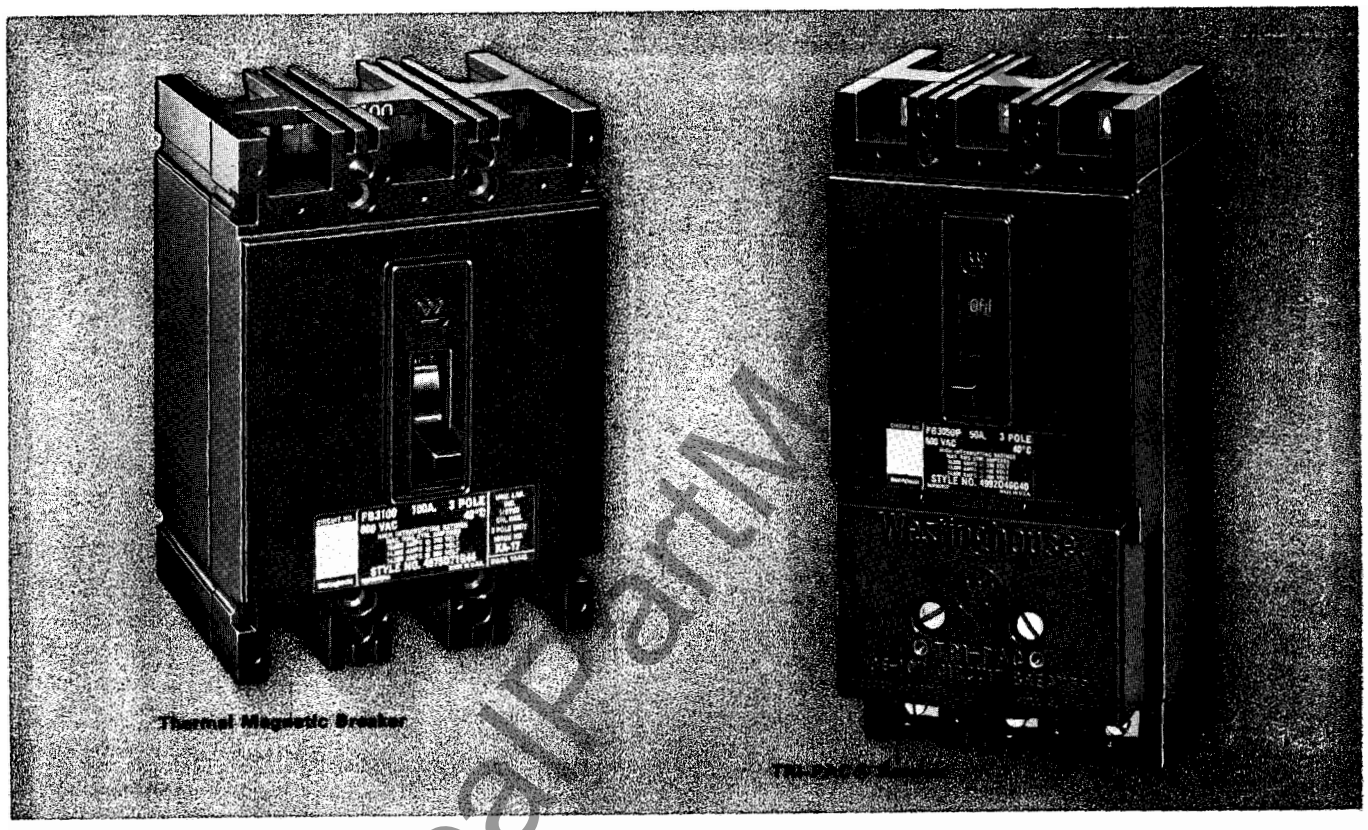
Prices: Price List 29-120
Application: Application Data 29-160
Dimensions: Dimension Sheet 29-170
Specifications: Specification Data 29-180

Westinghouse Electric Corporation
Low Voltage Breaker Division, Beaver, Pa. 15009
Printed in USA

Westinghouse

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum



Application

Westinghouse molded case breakers are designed for circuit protection of low voltage distribution systems. They are suitable for application as main breakers and for protection of branch and feeder circuits and connected apparatus. These breakers provide overload protection for conductors and short-circuit protection for all circuit elements such as conductors, motors and starters.

They are designed for use in switchboards, control centers, panelboards, combination starters, bus duct plug-in units and separate individual enclosures. In these various enclosures, they are applicable to the requirements of lighting, distribution and other power circuits.

Standard current ratings of AB De-ion circuit breakers correspond in general to the standard ratings in the N. E. C. Paragraph 240-5b. These breakers are primarily designed for the protection of conductors, both aluminum and copper.

User Benefits

Accurate Reliable Protection: The overload element in each pole of every breaker is individually calibrated and tested in a controlled temperature to meet Underwriters' Laboratories, Inc. requirements. Especially hardened, ground and polished trip latches assure continuous and accurate tripping characteristics.

De-ion Arc Quenching: Westinghouse-developed De-ion arc quenchers positively extinguish dangerous arcs in a fraction of a second. Coupled with a positive action quick-make, quick-break toggle mechanism, they assure long circuit breaker life with minimal burning and pitting of contact surfaces.

Reduced Downtime and Maintenance Costs: Circuit breakers are long-lived devices designed for maintenance-free, repetitive duty without costly shutdowns. Because the breaker is resettable, downtime amounts to only a matter of seconds after the overload or fault has been corrected.

Reduced Operation Cost: Welded internal parts, high contact pressure, and silver alloy butt-type contacts used in circuit breakers offer considerably less resistance to electrical current than do the fuse clips, bolted joints and hinge joints of a fusible device. Thus, with a lower watts loss, electrical power cost savings result.

Single-Phase Protection: A fault or overload on any one phase opens all poles of the breaker, minimizing the possibility of single-phasing polyphase motors.

Dual Protective Elements: Bi-metallic thermal elements protect on overloads where inverse time tripping is desirable; magnetic trip elements operate the breaker instantly on dangerous fault currents. Trip-free, the breaker cannot be held closed under fault conditions.

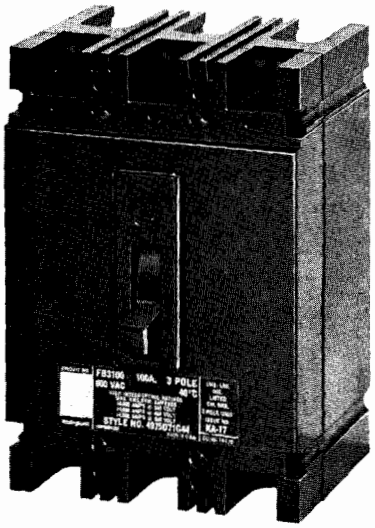
Maximum Safety: Molded case circuit breakers are dead front and personnel are not exposed to "live" parts. Line terminal shields are available for additional protection when required.

Tamperproof: The complete breaker or trip unit is sealed at the factory to prevent tampering and alteration of its rating.

February, 1970
New Information
E, D, C/1901, 1903, 1928/DB

Westinghouse

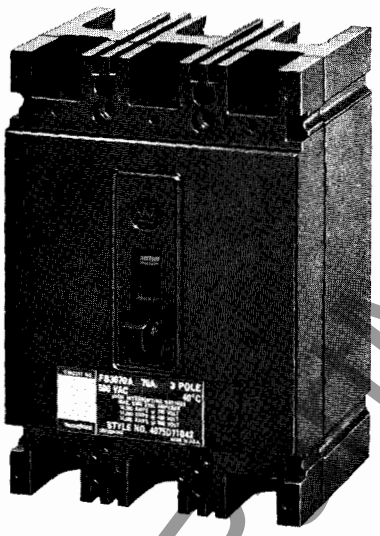
Thermal Magnetic Breakers



Thermal magnetic breakers are general purpose devices suitable for the majority of breaker applications and are considered the industry standard. Combining thermal and magnetic trip elements, they provide accurate overload and short circuit protection for conductors and connected apparatus. Because their continuous current rating changes with ambient temperature variations, these breakers are best suited for conductor overload protection.

Thermal magnetic breakers have all the design features of standard breakers shown on pages 4-5.

Ambient Compensating Breakers

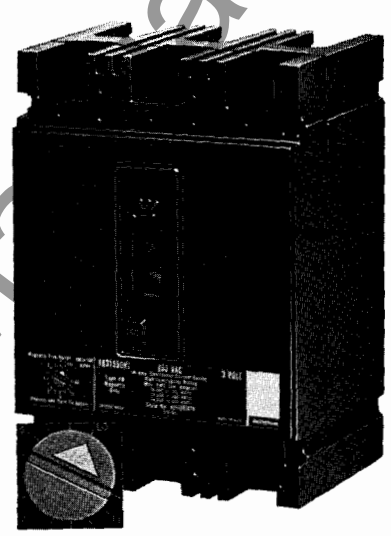


Ambient compensating breakers automatically compensate for variations in ambient temperature, and thus minimize the need for de-rating in higher ambients, and uprating in lower ambients. This provides a near constant current rating over a wide range of temperatures

Ambient compensating breakers are calibrated at 25°C. However, because of the built-in compensator, they will carry approximately the same current at other ambients with a very small ampere rating change. The trip units are thermally compensated to carry rated load at 50°C while still meeting Underwriters' Laboratories tripping requirements for 25°C breakers at 25°C. These breakers do require slight derating at ambients above 50°C.

Ambient compensating breakers are thermal magnetic and provide overload and short circuit protection. They have all the design features of standard breakers shown on pages 4-5.

Magnetic-Only Breakers



Magnetic-only breakers are similar to standard thermal magnetic breakers except that they do not have thermal trip elements. They are equipped with front-adjustable magnetic trip elements and are used where only short circuit protection is required. Because the adjustment feature allows closer short circuit protection, these breakers are commonly preferred for motor and resistance welder circuits.

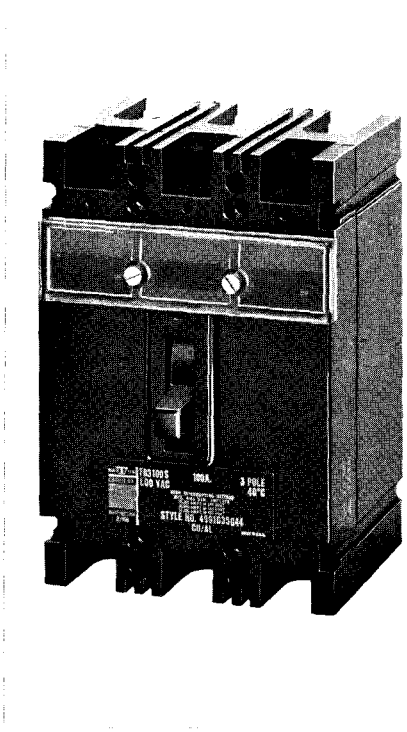
Each breaker is calibrated at the factory for a specific trip range and set on the high side. Adjustment knobs located in the front cover can be adjusted downward to a specific requirement within the specified range. The adjustment knobs, made of red nylon, have a high, a low and a series of intermediate setting positions. The magnetic trip is so designed that each point follows a linear scale and each of the intermediate settings has a significant value, within calibration tolerances.

Magnetic-only breakers have all the features of standard breakers shown on pages 4-5, except that they do not have a thermal trip element.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

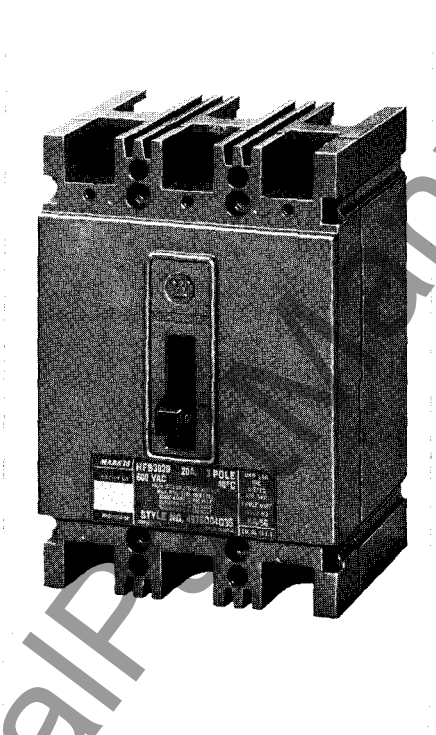
SAF-T-VUE® Breakers



Saf-T-Vue breakers are similar to standard molded case breakers except that they are equipped with a window of transparent, heat resistant thermoplastic over the breaker contacts. This permits instant, visual verification of whether the contacts are open or closed. These breakers fulfill the needs of industrial plants where safety codes require visible contacts as an additional safety precaution for maintenance personnel. They can be supplied with thermal magnetic, magnetic-only or ambient compensated trip elements to cover a wide scope of applications. They are not available in MARK 75 or TRI-PAC breakers.

Saf-T-Vue breakers have all the design features of standard breakers shown on pages 4-5.

MARK 75® Breakers



MARK 75 breakers are similar to and are the same size as standard thermal magnetic breakers, except that they are designed to provide up to 75,000 amperes asymmetrical interrupting capacity at 240 volts Ac. Thus, MARK 75 breakers are ideally suited for use in network systems and other applications where unusually high fault currents exist. Standard MARK 75 breakers are equipped with thermal magnetic trip elements; they are also available as magnetic-only or ambient compensating breakers.

MARK 75 breakers have all the standard design features shown on pages 4-5, except that the special molded case is gray, instead of black and has greater strength and resistance to tracking.

TRI-PAC® Breakers

TRI-PAC circuit breakers offer an even higher interrupting capacity than MARK 75 breakers. They are similar to standard thermal magnetic breakers except that they incorporate a current limiting device. This enables them to be used in secondary distribution systems where fault currents up to 200,000 symmetrical rms, amperes are available. Thus, they are a triple package of protection – (1) time delay thermal trip for overload protection, (2) instantaneous magnetic trip for normal fault current protection, and (3) current limiting action for higher fault current protection – combined and coordinated in a single compact and economical device. Because they limit current, TRI-PAC breakers can be used to protect smaller AB breakers and other connected apparatus, in addition to protecting feeder and branch circuits.

TRI-PAC breakers incorporate all the design features of standard breakers as shown on pages 4-5, in addition to the current limiter package shown on pages 6-7.

Westinghouse

Design Features of Standard Breakers

Molded Cases

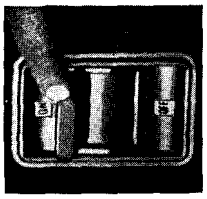
Moldarta® and/or glass polyester cases combine built-in ruggedness and high dielectric strength in a compact design that is both space-saving and attractive. Mechanism is entirely enclosed, providing maximum safety.

Free Bearing Surfaces

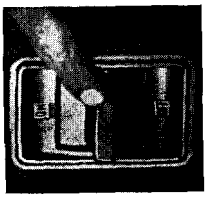
Bearing surfaces are of dissimilar metals. This prevents sticking and bearing wear, allowing long service life.

Handle Position Indication

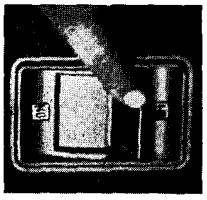
Position of handle gives positive indication of whether circuit is On, Off or Tripped.



ON: Handle in this position indicates that the circuit is closed or **On.**



TRIPPED: When the breaker trips automatically due to overload or short circuit, the handle moves to a position midway between the manual On and Off.



OFF: Handle is in this position when circuit is open or off. To restore service after automatic tripping, handle is first moved from center to Off and then to On.

Accurate Protection

All tripping members have ground and polished latch surfaces and are heat-treated to prevent distortion. Heat-treated bi-metals retain calibration permanently.

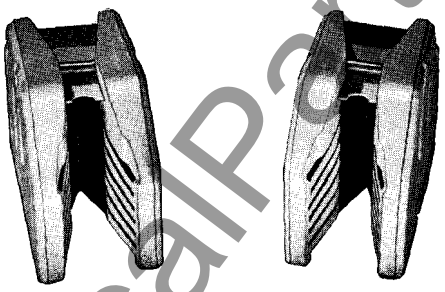
Factory Sealed

Smaller breakers are sealed to prevent tampering and changing of calibration. In the larger frames, the trip units are individually sealed and are interchangeable by removing the breaker cover.

Firm Connectors

Pressure-type connectors are standard with all ratings above 30 amperes and make efficient, dependable connections. Terminals suitable for copper cable are supplied as standard. Terminals suitable for either aluminum or copper cables can be specified for most breakers.

De-ion Arc Quenchers



This Westinghouse development consists of a series of grid plates mounted in parallel between supports of insulating material.

The slots in the steel plates extend directly over the contacts and draw the arc from the moving contact up into the divided chamber. The arc is thus confined, divided, and extinguished in less than ½ cycle.

Silver Alloy Contacts on all Breakers

For increased contact life and enduring low resistance; special alloys prevent sticking and welding.

Electrically Welded Connections

Firm, strong welded connections assure long life. Provide low resistance and low watts loss, with increased economy in operation.

Quick-Make, Quick-Break Mechanism

The quick-make, quick-break over center toggle mechanism provides quick, positive action in opening and closing circuits. It prevents "teasing" the contacts.

Common Trip

Multi-pole units have insulated common-trip bar that opens all poles when an overload occurs in any one phase. Minimizes possibility of single phasing.

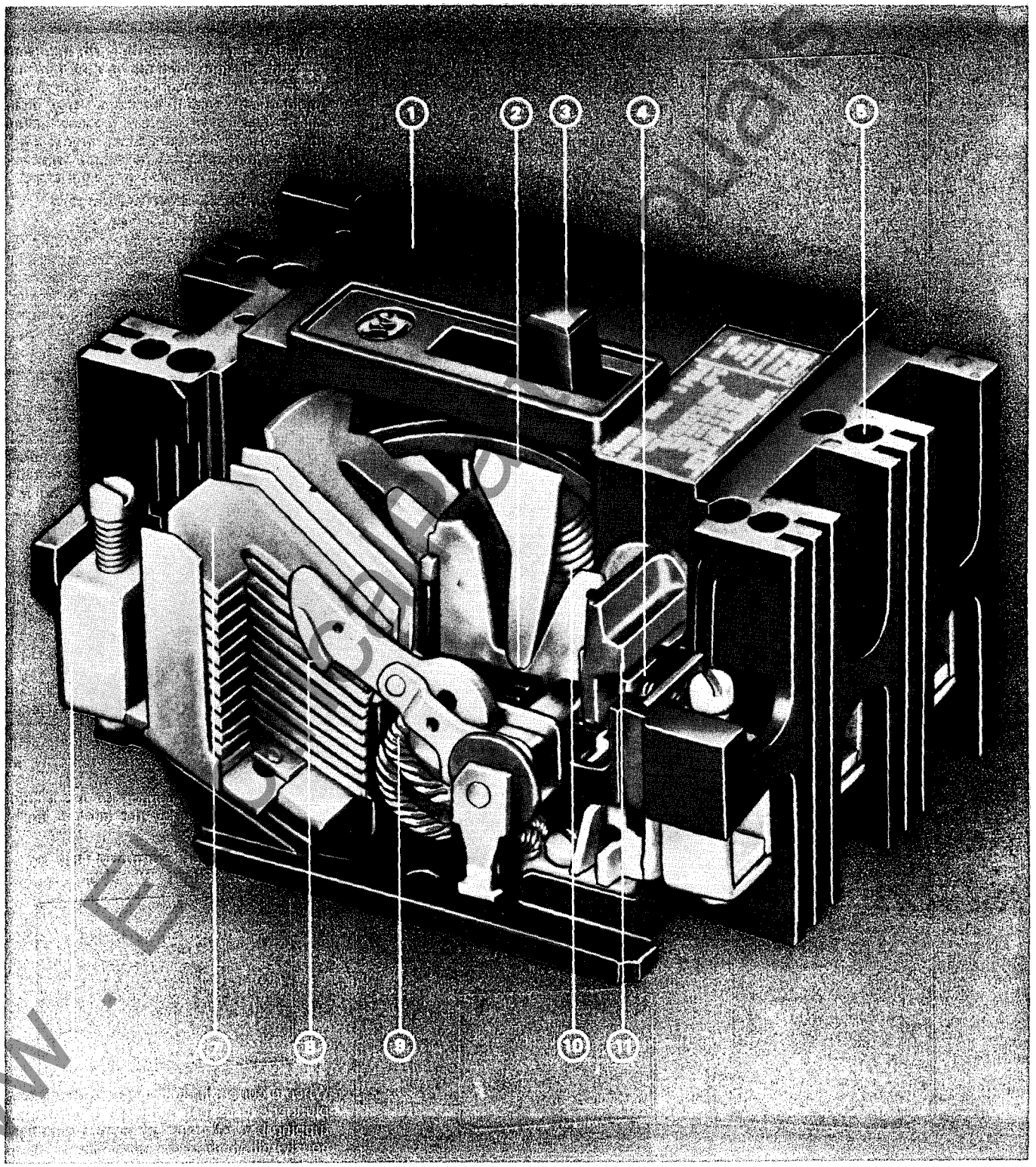
Complete Interpole Barriers

(Not illustrated)

Completely isolate one pole from another, eliminate possibility of phase-to-phase flashover.

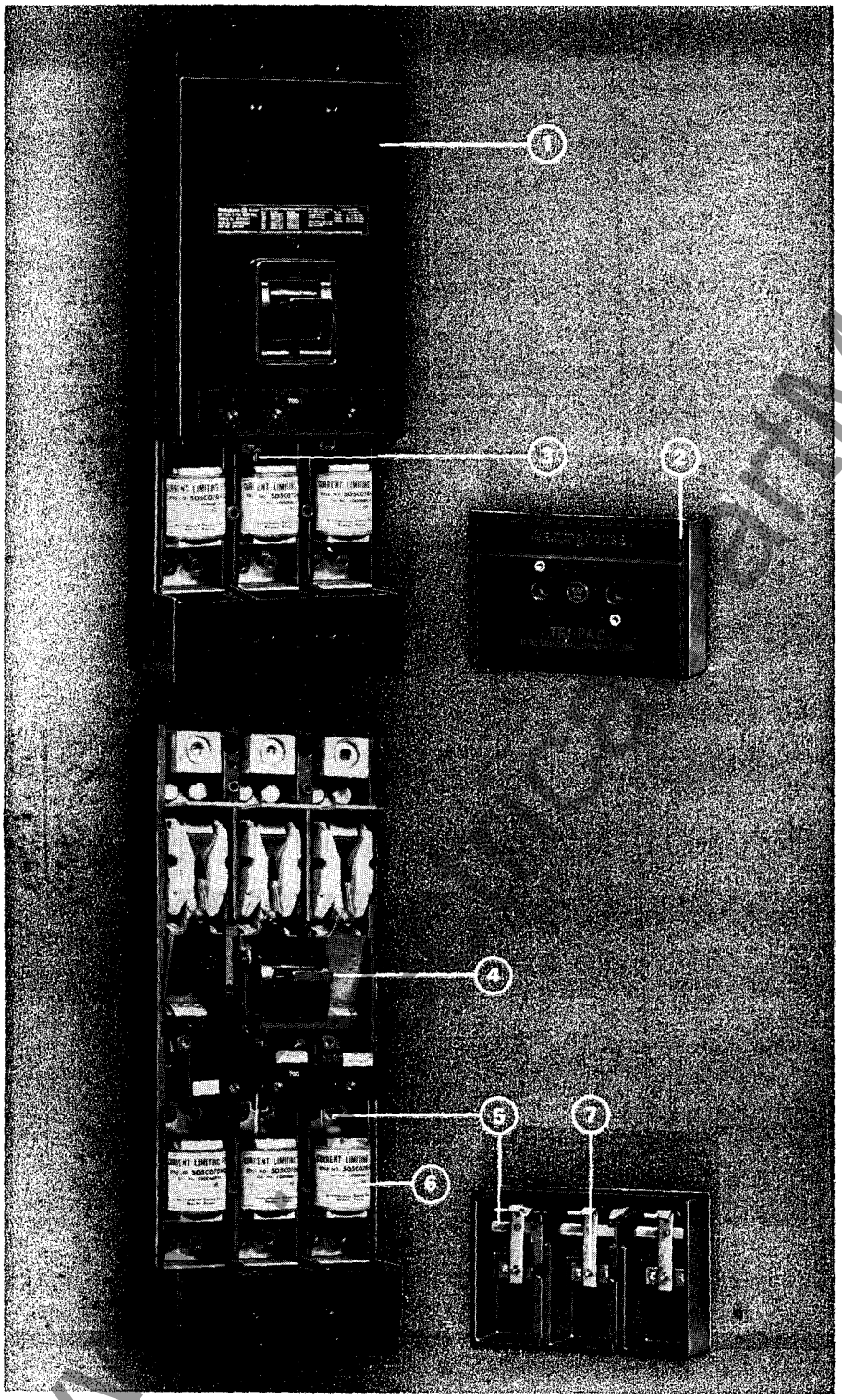
AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum



Westinghouse

Design Features of TRI-PAC® Breakers



1 Retain All Features of Standard AB De-ion Circuit Breakers

TRI-PAC breakers are built to the same exacting design standards and by the same methods as conventional Westinghouse molded case circuit breakers. They retain all the features of standard breakers including: De-ion arc quenchers, non-welding silver alloy contacts, common trip and Moldarta® and/or glass polyester cases.

2 Compact, Easy-to-Remove Current Limiter Housing

Current limiters are contained within the molded case of the breaker, and are readily accessible from the front when replacement is necessary. On small units the limiters are contained in a removable housing and plug into the breaker as a unit. On larger units the limiters bolt individually to the breaker frame and are enclosed by a separate limiter housing or by the breaker cover.

3 Limiter Housing Safety Interlock

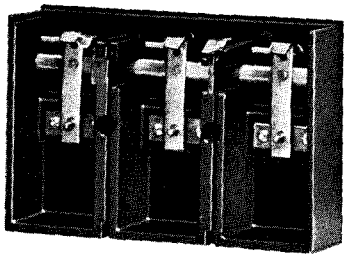
When the limiter housing is removed, a safety interlock trips the breaker. This interlock also prevents closing of the breaker while the limiter housing is removed so that it is impossible to come in contact with "live" parts.

4 Positive Trip Indication

When a breaker trips, the handle always moves to the center "trip" position. In addition, the cause of tripping is indicated in the following ways:

- If the breaker cannot be reset immediately after tripping but can be reset after a short period, it indicates thermal tripping due to an overload or high resistance fault.
- If it can be reset immediately, a "normal" fault current has been interrupted by instantaneous magnetic action.
- If the TRI-PAC cannot be reset, high fault interruption by the current limiter has taken place.

5 Coordinated Common Trip to Prevent Single Phasing

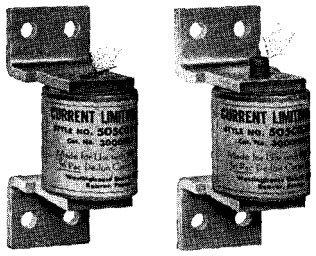


When a current limiter operates, the ejected plunger causes instant release of a common tripping bar. All poles are opened simultaneously, eliminating the possibility of single phasing.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Specially Designed Current Limiters



When a high fault current causes one or more limiters to function, a spring-loaded plunger is instantly ejected from the end of the limiter. The plunger strikes a trip bar which causes the breaker contacts to open the instant the fault occurs.

An extended plunger on any limiter indicates, at a glance, on which phase the fault has occurred so that testing of limiters is unnecessary. Presence of an extended plunger also prevents relatching of the breaker. Thus, "good" limiters must be used or the breaker cannot be operated. These limiters are not affected by the overloads or normal short circuits cleared by the thermal-magnectic action of the breaker, and unless they have cleared a high fault current, as evidenced by an extended plunger, they may be used without question.

Since these limiters are designed for use only with TRI-PAC breakers, safe, proper coordination is assured.

Missing Limiter Interlock

TRI-PAC breakers with a separate limiter housing are provided with a missing limiter interlock which prevents the breaker being reset unless all limiters are in place. Thus, accidental single phasing is prevented. since the breaker cannot be reclosed when a limiter is missing.

Choice of Three Terminal Connections

TRI-PAC breakers are available with front connected pressure type terminals, bolted rear-connected mounting studs and plug-in terminal mounting blocks.

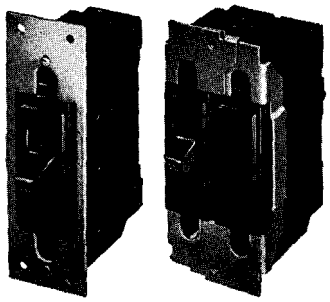
Accessories

TRI-PAC breakers accommodate many standard AB breaker accessories including shunt trip, undervoltage trip and auxiliary contacts. Application of other accessories should be reviewed with Westinghouse.

Accessories for All Type Breakers

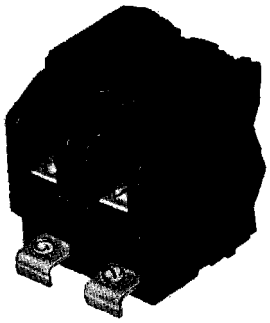
AB De-ion circuit breakers are, for the most part, used in conjunction with, or built into, other equipment such as panelboards, switchboards and numerous types of enclosures. Accessories shown on this and the following pages are available for most breakers. **For application to specific breakers, refer to Price List 29-120.**

Quicklag Faceplate



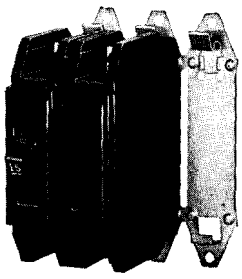
For front panel mounting. Faceplate snaps over the front of the single-pole breaker, is a two-piece wraparound on the two-pole breaker.

Quicklag Clamp



For base mounting of Quicklag breakers on panels. Two needed per breaker.

Quicklag Base Mounting Plate



Plates accommodate six single-pole, three two-pole or two three-pole breakers. **Can be** cut for specific **need.**

Westinghouse

Accessories, *Continued* **(Refer to Accessories section, PL 29-120, for application to specific breakers.)**

Handle Locks
Various handle locks are available to prevent either accidental or deliberate operation of circuit breakers. The "trip free" handle of the AB De-ion circuit breaker enables it to trip on overload or short circuit conditions, even though handle locks are in place.

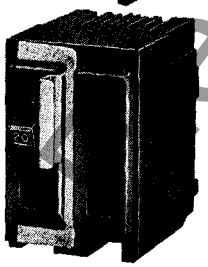
For Quicklag Breakers
Refer to Price List 29-120 for application to specific breakers.

Lockdog
Non-padlocking type, removable.

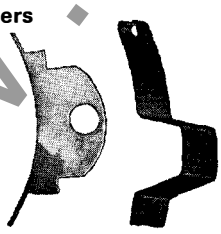
Padlock Attachment
Can be padlocked, is removable.

Padlock Device
For 1-pole Quicklags. Padlockable, non-removable, meets California code requirements.

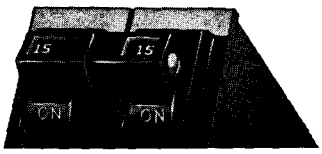
Padlock Device
For 2 and 3-pole breakers. Padlockable, non-removable, meets California code requirements.



For Standard Breakers
Padlockable or non-padlocking. Padlockable type meets California code requirements.

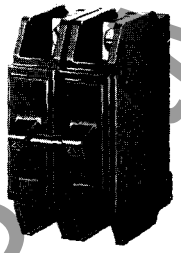


Handle Ties for Quicklag Breakers Standard

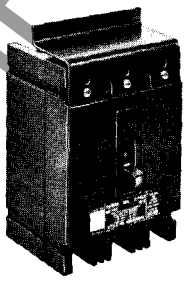


For use with adjacent pairs of breakers which are not interconnected. Affords true trip indication, prevents single-pole operation where double-pole manual switching is required.

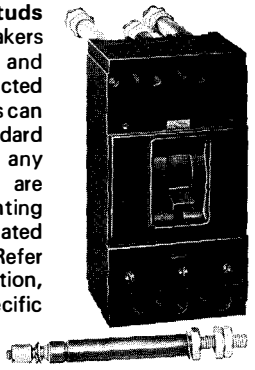
California Type
Meets California code requirements which call for a solid tie.



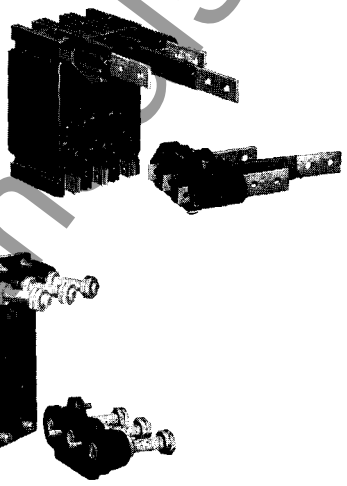
Terminal Shields
Westinghouse offers a complete line of formed terminal shields which fasten over the line ends of AB breakers to protect personnel against accidental contact with the incoming wiring. Meet most exacting safety requirements; e.g. for machine tool control panels where overload relays are internally reset.



Rear Terminal Studs
For adapting breakers for switchboard and other rear connected applications. Studs can be used with standard breakers without any modification and are available for mounting breakers on insulated or steel panels. Refer to Accessories section, PL 29-120, for specific applications.

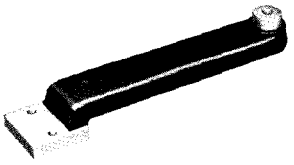


Plug-in Kits



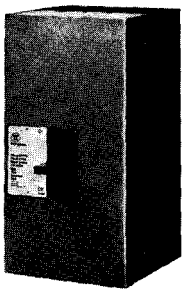
Designed to provide quick and easy plug-in installation in switchboards. Tulip type connectors and threaded studs or flat bus bars are built into the molded support block. Male studs or flat stab connectors are attached to the breaker terminals.

Panelboard Connecting Straps



For connection of breakers to bus bars in narrow or convertible distribution panelboards. Straps and available panelboard parts are shown in Price List 29-120, Accessories section.

Motor Operators
For complete remote operation of circuit breakers. Means for manual operation is provided in the event of power failure or emergency. Available in 120, 208, 240, 480 volt Ac ratings.



Motor operators are intended for infrequent operation in line with Underwriters' Laboratories endurance standards for molded case circuit breakers.

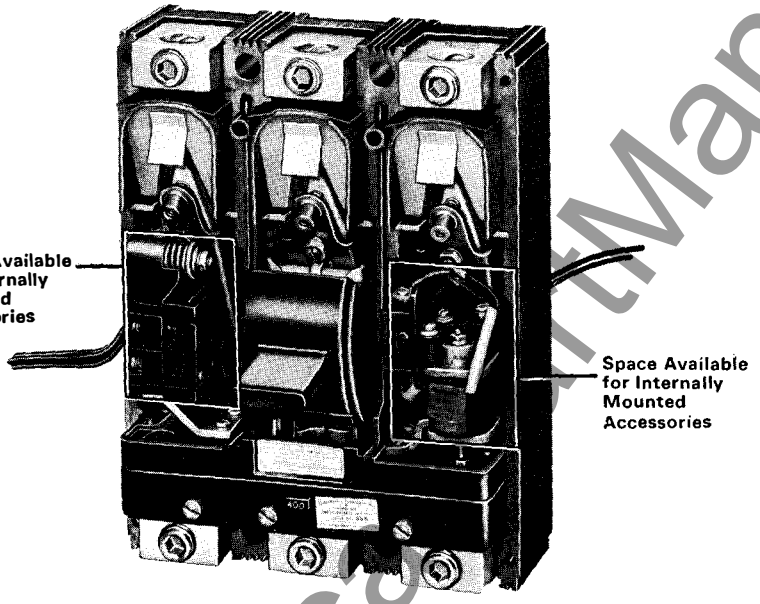
AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Modifications (Refer to PL 29-120, Modifications, for application to specific breakers.)

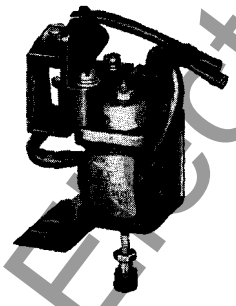
Internally Mounted Modifications

For severe or unusual operating conditions, for special functions or control sequences, Westinghouse breakers can be custom-built or modified with special attachments. Beyond the basic function of overcurrent and short circuit protection, such special breakers meet modern, complex circuit requirements, and add flexibility of operation and efficiency. Those modifications which can be mounted inside the breaker are shown on this page. For application to specific breakers, see Modifications, PL 29-120.



Shunt Trip

Breaker Availability: See PL 29-120, Modifications



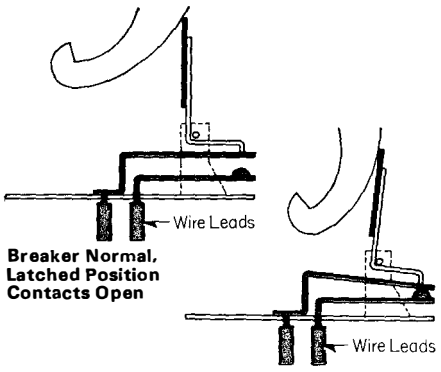
Shunt trips are used to trip the breaker electrically from a remote point.

Shunt trip coils do not have a continuous rating. A cut-off switch is included on most breakers to break the coil circuit when the breaker opens. Available for voltages up to 250 volts Dc and 600 volts Ac.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

Alarm Switch

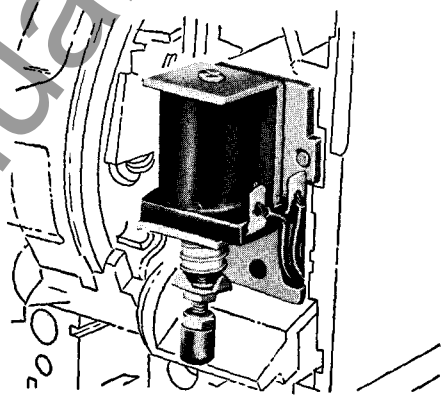
Breaker Availability: See PL 29-120, Modifications



These switches do not function with manual operation. When the breaker is tripped, the alarm switch closes to energize an indicating light or sound an alarm. Switches which open on tripping can also be supplied when specified. The alarm switch is placed atop at the factory. Alarm bell or light is not included.

Undervoltage Trip

Breaker Availability: See PL 29-120, Modifications

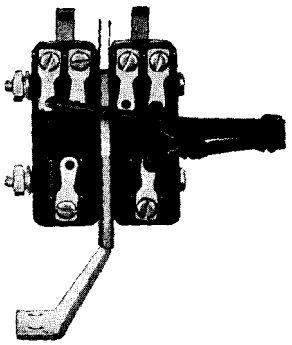


Undervoltage trips automatically trip the breaker when voltage drops below 40% to 60% of coil rating. The breaker cannot be reset until voltage returns to 80% of normal. They are available for voltages up to and including 250 Dc and 600 Ac. For some voltages, an external resistor is supplied for connecting in series with the trip coil. Only instantaneous action is offered.

Must be factory installed, mounting location varies among breakers. Refer to PL 29-120 for specific location.

Auxiliary Switch

Breaker Availability: See PL 29-120, Modifications



Auxiliary switches are used to open or close control circuits as the breaker operates. These internally mounted switches are normally supplied in the form of miniature switches having one A contact, one B contact and common "A" contacts are closed when the breaker is closed and "B" contacts are open when the breaker is closed.

Mounting location varies among breakers. Refer to PL 29-120 for specific locations. May be field installed in most larger breakers.

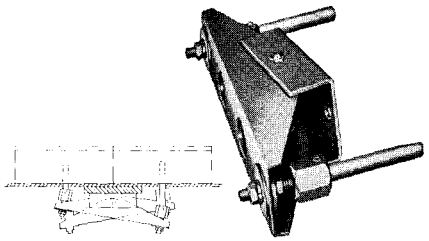
Westinghouse

Modifications, *Continued* (Refer to PL 29-120, Modifications, for application to specific breakers.)

Mechanical Interlocks

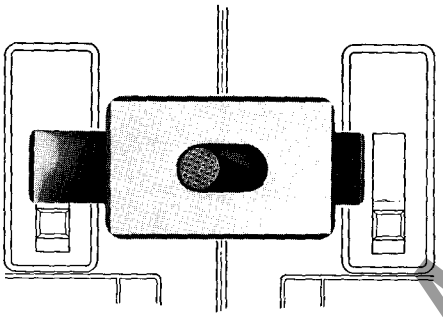
Mechanical interlocks provide a means to interlock two breakers so that only one may be closed, yet both may be open at any given time.

Walking Beam Type



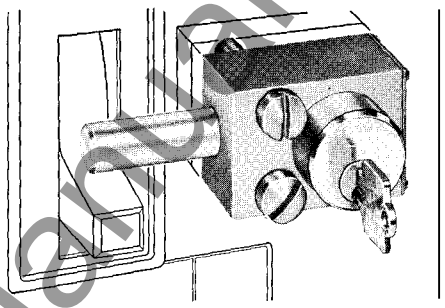
Walking beam interlocks mount on panel at the rear of breakers. When one breaker is closed, a non-conductive plunger extends into the opposite breaker to prevent it from closing. The closed breaker must open before the open breaker may be closed. Circuit breakers require special machining to fit walking beam interlock and should be ordered from the factory with the necessary interlock. Refer to PL 29-120 for standard breaker spacings.

Sliding Bar Type



Sliding bar interlocks mount on customer's panel in front of breakers. When bar is extended toward one breaker blocking handle in open position, opposite breaker can be closed. Closed breaker must be opened and handle blocked with sliding bar before opposite breaker can be closed. Breakers do not require alteration for use with this attachment. Refer to PL 29-120 for standard breaker spacings.

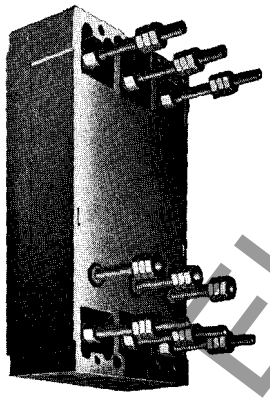
Key Interlock



Key interlocks mount directly to breaker cover. Plunger is extended by turning key in cylinder, thereby locking breaker in open position. Various keying arrangements can be supplied. (e. g.-key removable only when plunger extended; key removable when plunger either extended or retracted; multi-cylinder operation of plunger).

A pair of breakers, remote from each other, can be interlocked so that only one can be closed at one time by using key interlocks operable by the same key and key removable only when plunger is extended. These interlocks cannot be field-mounted.

Dual Voltage Breakers



For dual voltage equipment protection with only one trip rating, breakers may be supplied with center studs. At the maximum voltage the trip unit carries all the current. At the lower voltage, the current is doubled, with half the current by-passing the trip unit through the center stud connections. Thus, one rating breaker can be used for both connections. Rear connecting studs are normally used with center tap studs for line and load connections. These center studs cannot be field mounted.

Breakers with Paralleled Poles

Breaker poles are paralleled for high current single-pole operation by the addition of straps at line and load ends of breaker, as well as internal strap ahead of the trip to assure an equal division of the load. For example, a 2-pole breaker rated 100 amperes would have a single-pole rating of 200 amperes with paralleling straps. Parallel connections are made at factory. Application of parallel poles should be reviewed with Westinghouse.

Field Discharge Breakers

Field discharge breakers are composed of 3-pole frames having two outside non-automatic poles and a center pole field discharge contact arranged to close as the outside contacts are opened and vice versa. Thus, the center pole is used as a field discharge contact. Automatic tripping can be supplied in outside poles if desired.

Fungus-Moisture Proofing and Corrosion Resisting

Breakers may be made to resist extreme moisture and fungus conditions in tropical and other humid localities. Breakers are coated with a varnish; in addition, fibre parts are impregnated and varnished to prevent moisture absorption.

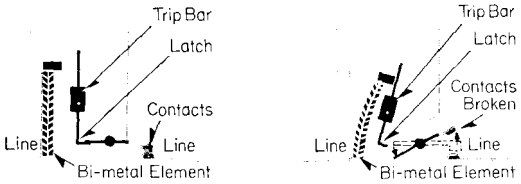
For chemical or heavy salt-laden atmospheres, where corrosion is accelerated, special platings and materials are available. When ordering, these conditions should be specifically outlined to assure best protection.

A B De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

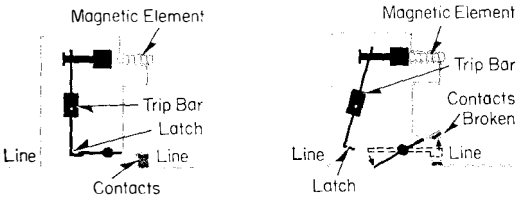
Protective Actions

Thermal Action



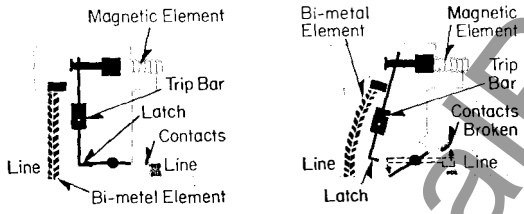
A thermal element is generally best suited for conductor overload protection because its rating changes in about the same ratio as the average conductor rating changes with ambient temperature variations. The thermal element consists of two bonded strips of metals having different rates of thermal expansion. The heat of an excessive current will cause the element to bend; the metal having the greater rate of expansion will be on the outside (longer boundary) of the bend curve. Bi-metals have inverse-time elements, providing a long time delay on light overloads and faster response on heavy ones.

Magnetic Action



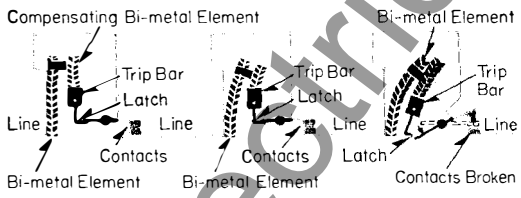
In this action, an electromagnet element is used. When a predetermined current flows through the coil, the armature is attracted, initiating an unlatching action, causing the circuit to open. Magnetic trip settings of magnetic only breakers can be adjusted by varying the air gap. Magnetic tripping cannot be set low enough to allow for load inrush currents and still protect against light overload. A magnetic only breaker provides short-circuit protection only.

Thermal Magnetic Action



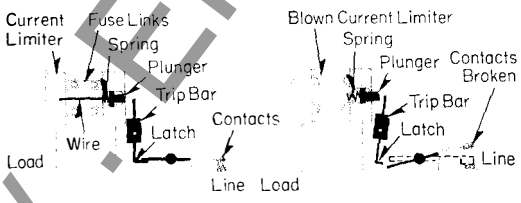
This action combines the features of both thermal and magnetic actions. It provides instantaneous action on short circuits, yet permits momentary overloads such as those encountered in motor starting and initial lighting surges. Thus, this action is best-suited to most applications.

Thermal (Ambient-Compensating) Magnetic Action



Ambient compensation is obtained by using an additional bimetallic element which counteracts the effect of ambient temperature changes on the overload bi-metal. (The magnetic element has been eliminated from the schematic in order to show the thermal action more clearly.) This temperature compensated trip provides a practically constant current rating over a wide range of ambient and is particularly suitable where there are unusually high, low, or fluctuating temperatures.

Current Limiter Action in TRI-PAC Circuit Breakers



TRI-PAC breakers have thermal magnetic and current limiting action. For simplicity, the schematic shows only the current limiting portion of the mechanism; thermal magnetic elements are the same as illustrated above for standard breakers. When fault currents above the nominal rating of the equivalent standard AB breaker are encountered, the silver links in the current limiter melt, thus opening the circuit. This action occurs with such rapidity that the current is limited to a relatively low value. Simultaneously, the magnetic action of the breaker also functions to open the breaker contacts and aids in clearing the short circuit. A wire holding a plunger against the pressure of a spring will melt when the silver links melt. This action causes the plunger to become extended holding the trip bar in the unlatched position. Therefore, it is impossible to reclose the circuit breaker until the blown limiter is replaced. Interlocks (not shown) will prevent relatching of the breaker if a limiter is omitted and will also open the circuit breaker contacts before the limiter plug-in contacts are broken if an attempt is made to remove the limiter housing assembly with the breaker in the on position.

AB De-ion® Circuit Breakers

15 to 2500 Amperes
600 Volts Ac, 250 Volts Dc Maximum

Typical Specifications

Thermal Magnetic Breakers

Electrical Circuits shall be protected by molded case AB De-ion® circuit breakers, as manufactured by Westinghouse Electric Corporation or approved equal. Each pole of these breakers shall provide inverse time delay overload protection and instantaneous short circuit protection by means of a thermal-magnetic element. The minimum interrupting ratings of the circuit breakers shall be at least equal to the available short circuit at the line terminals.

The breakers shall be operated by a toggle type handle and shall have a Quick-make, Quick-break over-center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuits and abnormal currents. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual "ON" and "OFF" positions. All latch surfaces shall be ground and polished.

Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have their covers sealed; interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be of non-welding silver alloy. Arc extinction must be accomplished by means of De-ion arc chutes, consisting of metal grids mounted in an insulating support. Circuit breakers shall be listed with Underwriters' Laboratories, Incorporated, conform to requirements of NEMA Standards Publication No. AB 1-1969, and meet the appropriate classifications of Federal Specifications W-C-375a.

TRI-PAC® Breakers

When the interrupting ratings of standard AB breakers are less than the available fault current of the distribution system, TRI-PAC breakers as manufactured by Westinghouse shall be used.

These breakers shall be similar in construction to the standard Westinghouse AB De-ion circuit breaker. On breakers with interchangeable, thermal, adjustable magnetic trip, the accessibility and position of the adjustment knob shall not be changed from those on the standard breaker.

The breakers shall combine time delay thermal trip protection, instantaneous magnetic trip protection and current limiting protection in one complete assembly. The above protective actions shall be so coordinated that overcurrents will be cleared by the thermal action; short circuits of relatively low magnitude will be cleared by the magnetic action; and high fault currents above a predetermined point will be cleared by the current limiters. The current limiters shall not be affected when the thermal and/or magnetic trip functions to clear the circuit. Regardless of which tripping device serves to clear the circuit, all poles of the breaker shall open automatically.

The breaker must not be resettable until current limiters which have functioned have been replaced. The current limiters shall have a visual means to determine which one has operated and requires replacement.

The current limiters shall be mounted within the breaker case and shall be readily accessible by removing a front cover.

TRI-PAC breakers shall meet appropriate sections of NEMA Standards Publication AB1-1969 and meet appropriate classifications of Federal Specification W-C-375a.

Further Information

Prices: Price List 29-120
Application: Application Data 29-160
Dimensions: Dimension Sheet 29-170
Specifications: Specification Data 29-180

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Low Voltage Breaker Division, Beaver, Pa. 15009
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