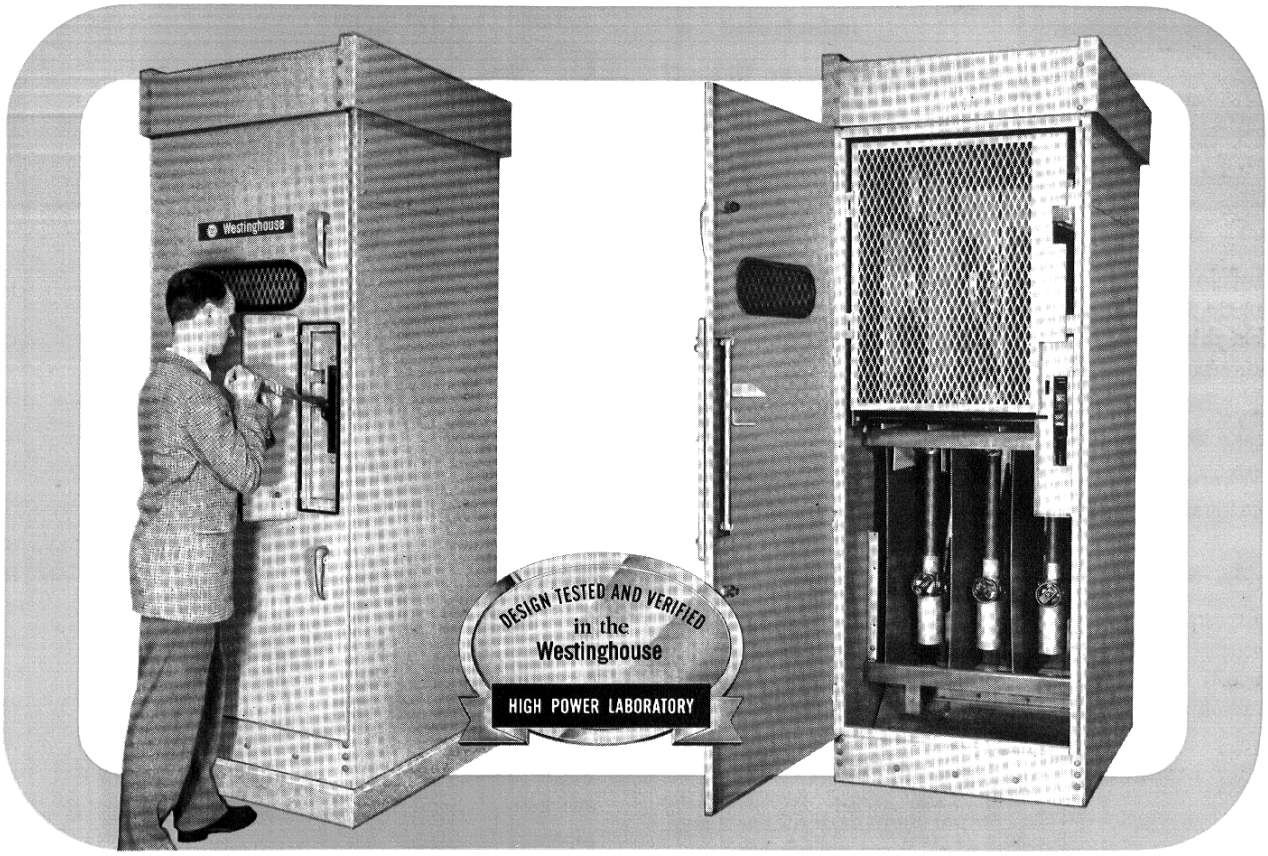
load interrupter switchgear

with quick-make, quick-break mechanism and fuse circuit protection

4.8, 7.2, 13.8 kv; 600 and 1200 amperes
indoor and outdoor service

descriptive bulletin

31-935



application

Load interrupter switchgear provides safe, low-cost switching and circuit protection where occasional or infrequent disconnecting means is desired. The three-pole switch, with its quick-make, quick-break mechanism will interrupt full-load current, and the built-in fuses assure fault protection at all times.

This switchgear can be applied for a number of switching duties where manual operation is satisfactory:

Transformer primary switching

Transformer secondary switching

Service entrance switching

Switching at power centers

advantages

quick-make, quick-break mechanism: A reliable torsion bar mechanism drives the switch blades at high speed into either the open or the closed position.

"De-ion®" arc interruption: "De-ion" arc chambers and spring loaded auxiliary blades ensure fast load current interruption.

interlocked for safety: Mechanical interlocks prevent the closing of the switch when the compartment door is open, or the opening of the door when the switch is closed.

safety under fault conditions: Switch may be closed against fault currents of up to 61,000 amperes without damage to equipment or danger to the operator.

high-power-laboratory tested: Design-tested and verified in the Westinghouse high power laboratory.

positive switch position indication: Operating mechanism gives visual indication of switch position.

December, 1965
supersedes descriptive bulletin 32-755, pages 1-4, dated December, 1963
mailed to: E/1138/DB; D/810/DB; C/347, 348/DB

construction

1 weather-proof door

On outdoor units, a flanged door with projecting door frame assures weather-proof construction.

2 BIL insulators

Insulators used in load interrupter switchgear meet basic insulation levels (BIL) and standardization of heights, bolt circles and strengths according to NEMA standards.

3 provision for future extension

Where it is required, provision is made for future bus extension through side panels as shown.

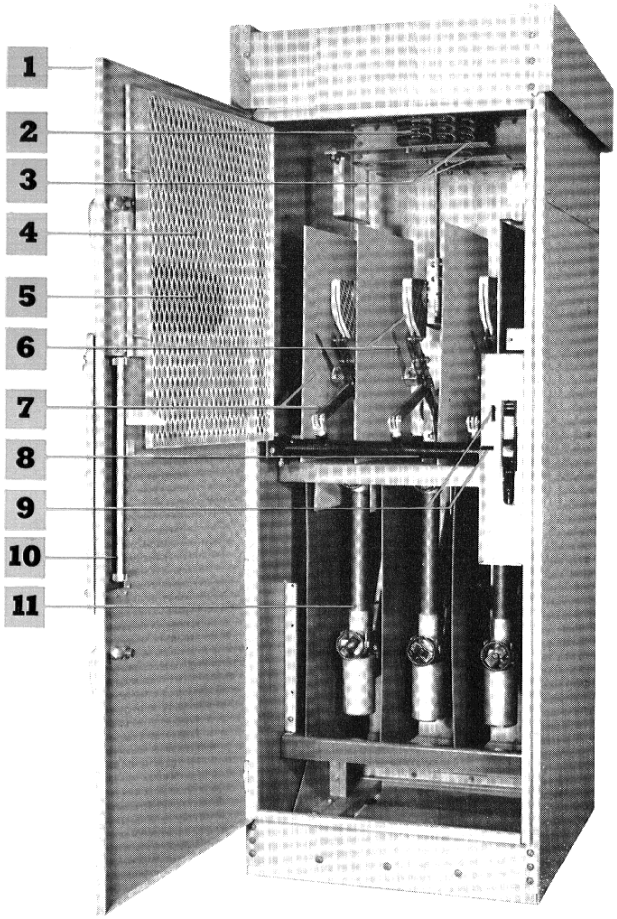
4 safety barrier

An expanded-metal barrier, hinged, and held in place with captive screws, shields the disconnect switch when the compartment door is opened. It may be opened for inspection of the switch.

5 inspection window

A large window in the compartment door allows visual inspection of the position of all three switch blades.

6 quick-break "De-ion" arc interruption



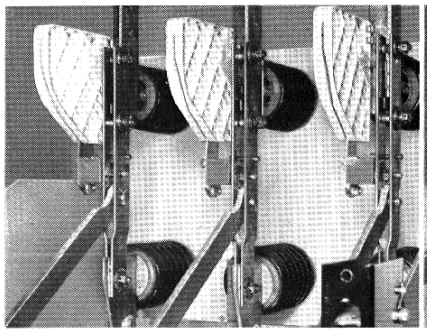


figure 1

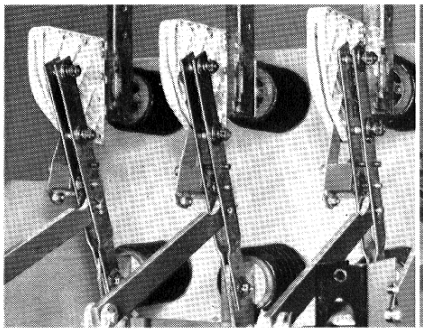


figure 2

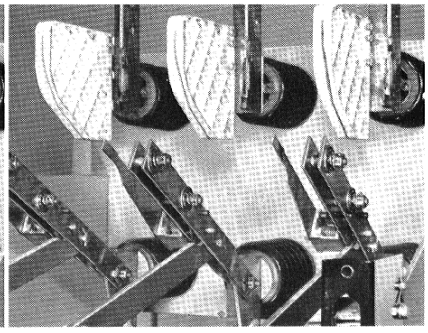


figure 3

figure 1: Switch closed . . . both main and auxiliary blades are closed, and practically all of the current flows through the main blades.

figure 2: Main blades open . . . as the main contacts part, current is transferred momentarily to the quick-break blade, which is held in the arc chute by high-pressure contact fingers. There is no arcing at the main blades.

figure 3: Quick-break blades open . . . the main blades open until the stop in the quick-break hinge prevents further angular movement between the main and quick-break blades. This starts the quick-break blade out of the high pressure contacts in the arc chamber, and as contact is broken, the quick-break blade snaps into the open position at high speed. The heat of the arc, meanwhile, releases a blast of de-ionizing gas

from the gas-generating material of the arc chamber. This combination of quick-break and De-ion action quickly extinguishes the arc and the circuit is safely de-energized.

7 high dielectric insulation

Operating links, and barriers between phases, and between the outer phases and the housing, are of high-strength, high-dielectric material.

8 torsion bar mechanism

The quick-make, quick-break mechanism contains a set of torsion bars which provide powerful spring action.

The torsion bars are housed inside the shaft which operates the switch blades. They are solidly connected at one end to the shaft and on the other end to the mechanism cam. In order to close the switch, the mechanism cam is rotated (by means of a removable handle) through 120°. This charges the torsion bars as the shaft cannot rotate since it is held in position by a latch. At the end of the 120° motion, the mechanism cam lifts the latch. This releases the shaft which is accelerated rapidly by the stored energy and the switch is snapped closed. In order to open the switch, the mechanism cam is rotated in the opposite direction resulting in charging of the torsion bars in a similar sequence.

Due to the action of the latch, the clearance across the open switch, from blade to jaw, is maintained during the total time the mechanism cam is being rotated. It is, therefore, impossible to "tease" the switch into any intermediate position.

The mechanism cam is not solidly linked to the switch blades at any time. The closing speed of the blades is, therefore, independent of the speed of rotation of the mechanism cam. When the switch is closed against a fault, the blow-out forces are not transmitted to the mechanism cam.

The operating mechanism is designed to provide sufficient power to overcome the blow-out forces when closing the switch against a fault. When the switch is not closed against a fault, the excessive closing power of the mechanism is absorbed by an adjustable stop mechanism. This eliminates damaging closing impact on the stationary contacts and insulators.

9 interlocks

The LBF switch assembly is equipped with two mechanical interlocks:

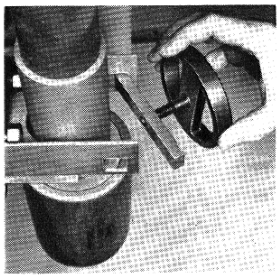
One interlock prevents inadvertent closure of the switch if the door of the enclosure is open. When the door is closed, the interlock is automatically deflected and the switch is free to be closed.

The second interlock prevents the door of the enclosure from being opened when the switch is closed. On opening the switch, the interlock disengages automatically from an eyelet which is provided on the back of the door, so that the door can be opened.

10 operating handle

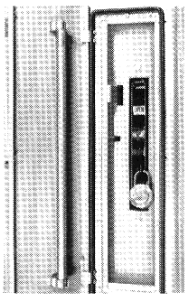
The operating handle for the switch is conveniently located on the small access door.

11 fuses



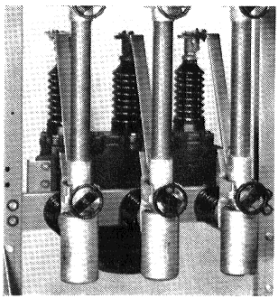
Fault protection is provided either by Type BA boric acid (refill type) fuses, or by type CLE current limiting fuses, depending on requirements. The fuse mounts are a new design in which the fuses are positively clamped in position, and yet are easy to remove or install.

padlocking



The load interrupter switch may be padlocked in either the open or the closed position.

auxiliary equipment



Where required, various entrance devices, such as single-conductor and three-conductor (illustrated) potheads, roof bushings or stress cones can be provided. Lightning protection can be provided by Westinghouse LV or SV arresters.

load interrupter switchgear
with quick-make, quick-break mechanism

switch ratings

type	kv	impulse withstand, kv	ampere rating			
			continuous	interrupting	fault closing ①	momentary (switch closed)
LBF-1	4.8	60	600	600	27,500	40,000
LBF-2			1200	600	61,000	61,000
LBF-2			1200	1200	61,000	61,000
LBF-1	7.2	75	600	600	27,500	40,000
LBF-2			1200	600	40,000	61,000
LBF-2			1200	1200	40,000	61,000
LBF-1	13.8	95	600	600	27,500	40,000
LBF-2	②		1200	600	40,000	61,000
LBF-2			1200	1200	40,000	61,000

① Maximum asymmetrical rms current the switch can be closed against, and held for 10 cycles, without incurring sufficient deterioration to the switch to materially affect continuous current carrying or load interrupting ability.
② For nominal 14.4 kv with 110 BIL requirement, refer to Westinghouse representative.

fuse ratings

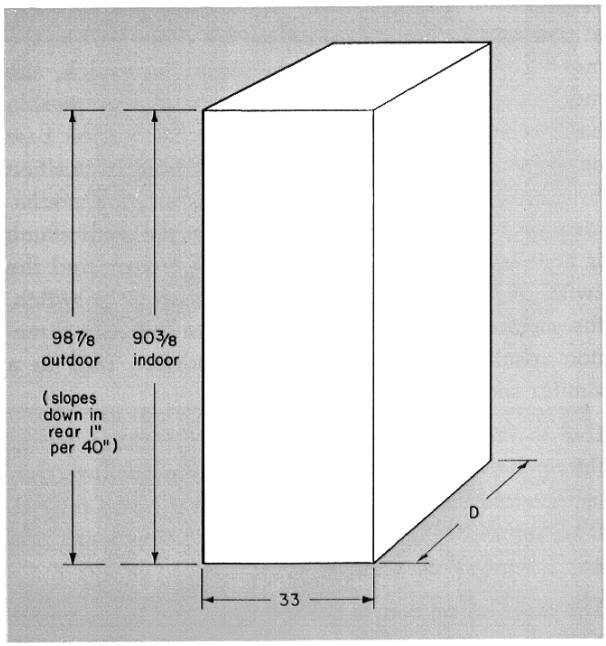
type ③	kv	maximum rating	interrupting capacity symmetrical amps (rms) ④
BA 200		200 E	17,500
BA 400	4.8	400 E	25,000
CLE-2		300 E	40,000
BA 200		200 E	16,000
BA 400	7.2	400 E	25,000
CLE-1		125 E	50,000
CLE-2		200 E	40,000
BA 200		200 E	12,500
BA 400	13.8	400 E	20,000
CLE-2		100 E	31,500

③ BA 200 and BA 400 fuses equipped with discharge filter. For rating of fuses equipped with condenser—refer to Westinghouse representative.
④ For interrupting ratings greater than those listed, refer to Westinghouse representative. For rating in asymmetrical amperes, multiply listed figures by 1.6.

further information

LBF interrupter switches catalog section 36-151
BA fuses application data 36-660
CLE fuses descriptive bulletin 36-651

dimensions in inches



description	dimension D
standard unit with bus, switch, fuses and pothead	42" ⑤
standard unit with bus, switch, fuses and pothead. Additional depth for lightning arresters or current transformers or additional potheads, etc.	56"

⑤ Bottom feed pothead may require 56" depth.

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