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PROPERTIES. Switch isolator type LBS and FIS has a high making and a defined breaking capacity whilst at the same time it has the advantages of an isolator:

- 1- It satisfies the isolating requirements specified for an isolator when in the open position.
- 2- The switch cannot by itself fall from the open to the closed position.
- 3- Small space required.
- 4- No danger of fire or explosion.
- 5- Long mechanical life.

CONSTRUCTION. The construction of this switch isolator is based upon that of a conventional isolator see fig 1. In addition to the main contact knives 1. Are fitted auxiliary knives 2. Which, when in the closed position, make contact with the fixed auxiliary contacts in the arc extinguishing chamber 3.

The insulators are hollow on the opening side 4. so that compressed air produced by the switch itself in the compressed air cylinder 5. Can be led to the arc extinguishing chambers 3.and put out the electric arc.

The switch isolator has stored energy operation actuated by springs so that the speed and force of the operation are independent of the operator.

Auxiliary contacts have wolfram as protection from the making and breaking arcs

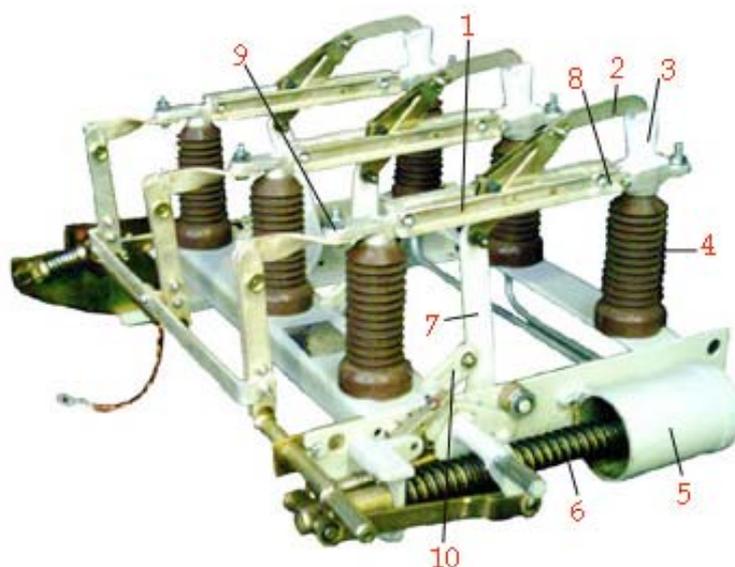


FIG.1

1. Main contact knife.
2. Auxiliary knife.
3. Arc extinguishing chamber with fixed auxiliary contact.
4. Hollow insulator.
5. Compressed air cylinder.
6. Opening spring.
7. Draw bar.
8. Fixed main contact.
9. Connecting screw.
10. Axle with crank

**OPERATING PRINCIPLE.** When closing the switch the main contact knives momentarily and without rebound make contact with the fixed main contacts . A few milliseconds later the auxiliary knives also close.

During the closing process the opening spring is put into tension so that the closed switch is ready for subsequent opening.

**When opening the Switch** the opening spring is forced momentarily. The main contact knives leave the fixed main contacts, the auxiliary knives remaining in position, A few milliseconds later the auxiliary knives break the current. The arc occurring in the arc extinguishing chamber generates gas from the chamber walls . The greater the current the greater the strength of this extinguishing gas jet. See fig 2.

To ensure that even small currents (especially inductive and capacitive no load currents, where the gas jet is weak) are broken, the self-produced compressed air provides extra strength to the jet independently of the breaking current.

This is brought about by the opening spring forcing the piston in the compressed air cylinder inwards thus providing compressed air for the extinguishing of the arc.

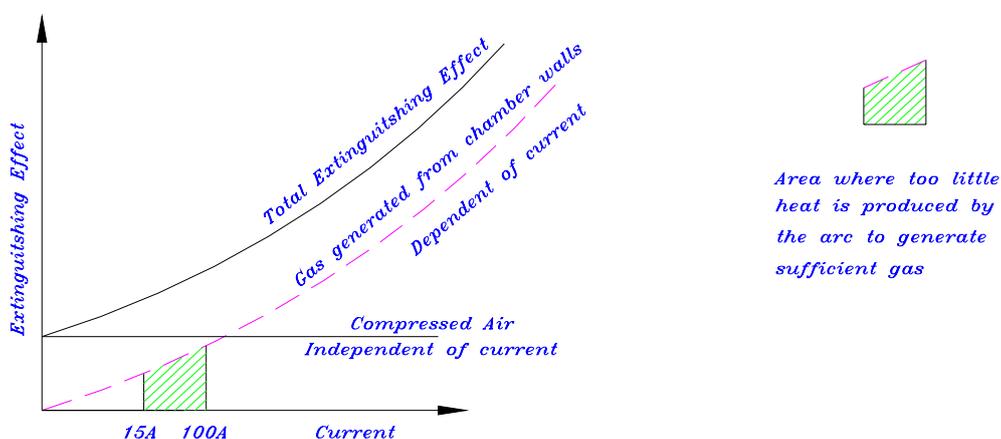


Fig. 2. illustration showing the dual extinguishing effect of the switch isolator.

The constant addition of Compressed air enables the switch isolator to Operate satisfactorily even when breaking

small and no-load currents

**APPLICATION. TYPE LBS without built-in HBC fuses** has the same properties as an isolator, but with a defined making and breaking capacity. It can therefore everywhere, replace isolators it is desirable for the sake of safety to avoid them.

Type LBS is used in closed loop nets. If protection is provided against short-circuiting, type LBS is used in radial nets in front of transformers, condensers and in starting equipment for high-voltage motors.

**Type FIS has built-in HBC fuses** giving especially effective protection against short-circuiting it is therefore especially suitable in front of transformers, high –voltage motors, batteries of condensers and branches.

Switch isolator FIS can also be equipped with a 3-pole tripping device causing 3-pole interruption when one or more fuse-links is blown. Also type FIS can be combined with relays enabling it to be used instead of a circuit breaker at places where immediate reconnection is not essential i.e. where there is time to replace fuse-links

**INSTALLATION .** Switch isolators may be fitted to walls, floors or ceilings in any position provided that the knives swing in a vertical plane.

Illustrated installation and operating instructions accompany every switch.

OPERATION: Switch isolators types LBS and FIS can be operated either by hand or by remote control with the help of motor.

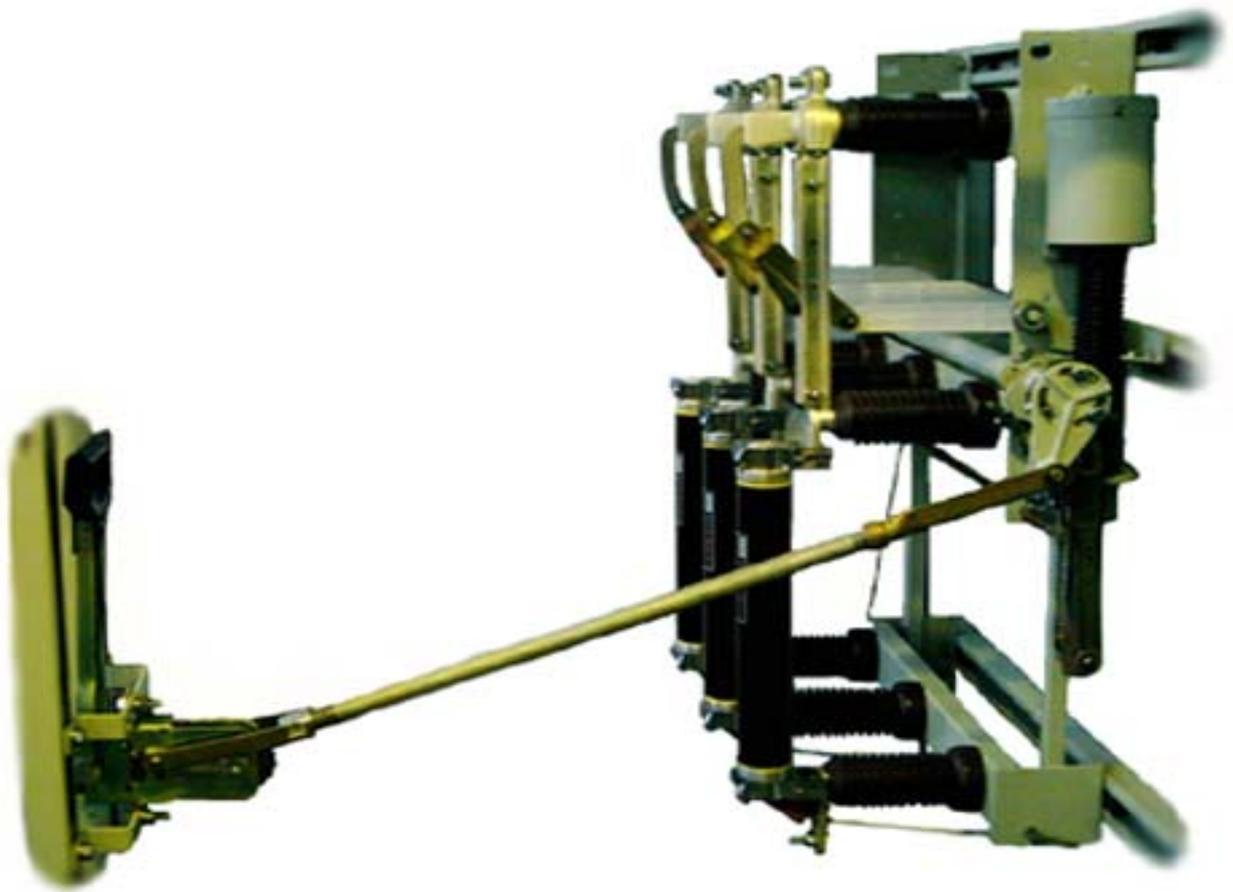


Fig 3- Hand operating mechanism with slid draw bar for LBS and FIS without free motion.

EQUIPMENT: Switch isolator type FIS can be fitted with:

**1. Automatic release in single or multi-pole melting if fuse link.** Thereby one can guard against:

- a) single or two pole operation of high voltage commonly network.
- b) Fuse failure caused by small over-currents where high voltage fuses can act unreliably.

One account of FIS's high breaking capacity, release due to a) or b) will always result in a reliable 3-phase interruption.

**2. Magnetic release. Work current or no-signal (0-voltage) circuit.**

For the connection of work current magnetic release the switch must also be equipped with an auxiliary switch to break the work current after the switch isolator is released.

Magnetic release can be supplied for the following used voltages:

Voltage	Frequency	Load	
		Work current	No-signal current
220 V ~	50 Hz	590 VA	53 VA
110 V =	0	80 W	12 W
24 V =	0	80 W	11 W

On request magnetic release may be supplied for other voltages and frequencies.

Magnetic release makes possible remote control and the combination of the switch with:

**3- Secondary over-current relays, under-voltage relays, return voltage relays, gas alarms etc.**

Correct coordination between the switch isolator and the high-voltage fuses must be provided so that the fuses undertake the breaking of currents greater than the breaking capacity of the switch. This is attained by choosing the correct size of fuses, in other words by comparing the characteristics in pricelist AB 703 with the characteristic of the relay

**4- Primary bimetallic relays for protection against over-currents.**

**5- Auxiliary switches for signaling purposes** with 2 or 4 circuits. On request these may also be supplied with up to 8 circuits.

**6- Earthing switch type ADJ** with or without interlocking with the switch isolator, for hand or motor operation.

MAINTENANCE. Frequency of maintenance depends in the amount of usage and the magnitude of the current. However, the switch should be inspected after begin operated 30 time at the rated current.

Above all the arc extinguishing chambers should be checked for evaporation and if necessary replaced. The auxiliary contacts should be inspected and if necessary replaced.

After 10000 operations a complete overhaul of the switch should be carried out.

The cylinder and moving parts are greased with the lubricating compound "Beacon P-290" . Even if the switch is not greased subsequently and the fat in the compound has volatolized, the graphic will provide sufficient lubrication and protection against rust for the breaker to operate satisfactorily.

Under especially unfavorable conditions (in corrosive atmospheres) the switch should be relubricated ad frequency as necessary with: "Beacon P-290".

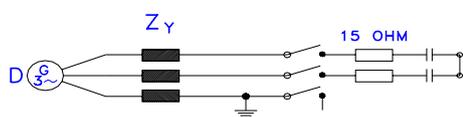
## STANDARDS AND SPECIFICATIONS.

The switches satisfy VDE 0670. Part 3 and IEC 17A (secretariat) 54. (General purpose switches).

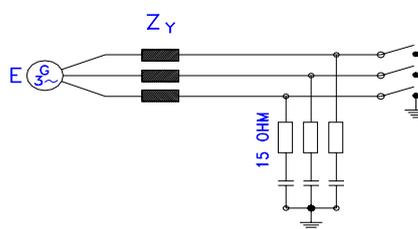
However the special requirements in VDE 0670 part 3/2-66 are also met by the switch, for instance:

39: Switching in overhead lines and cable networks with earths.

LI and FIS 24 are tested in circuits according to fig. 4D and 4E at 24kV r.m.s and earth fault current up to 155 A.



Test circuit fig. 4D

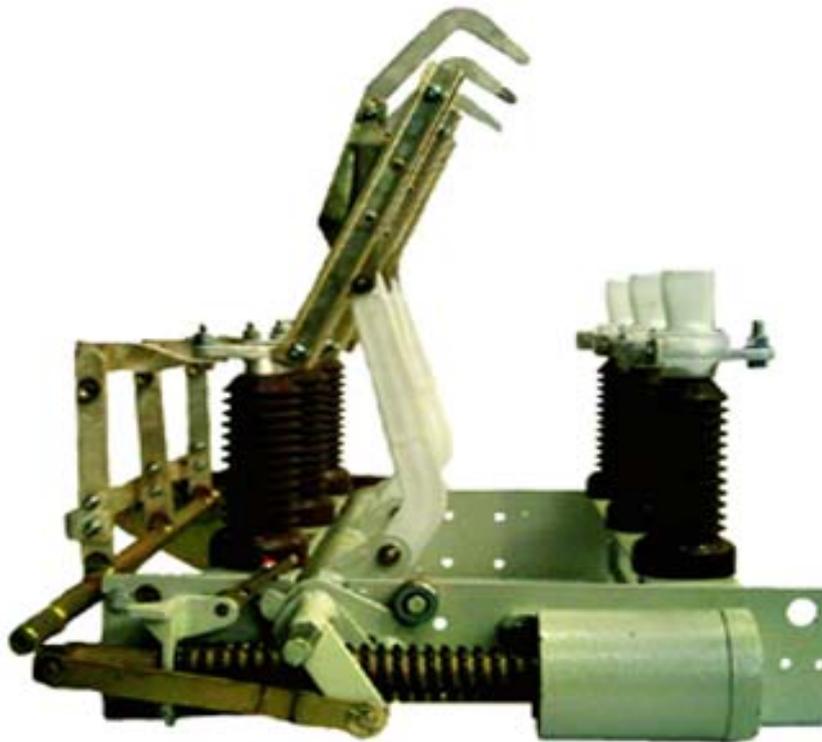


Test circuit fig. 4E

The isolating switches are able to interrupt common load currents. Earth fault current. Inductive and capacitive no-load currents in two poles (for instance when one fuse is blown.)

The insulation satisfies the IEC and VDE standard voltage.

**MAKING AND BREAKING CAPACITY, SHORT TIME CURRENTS AND WEIGHTS**

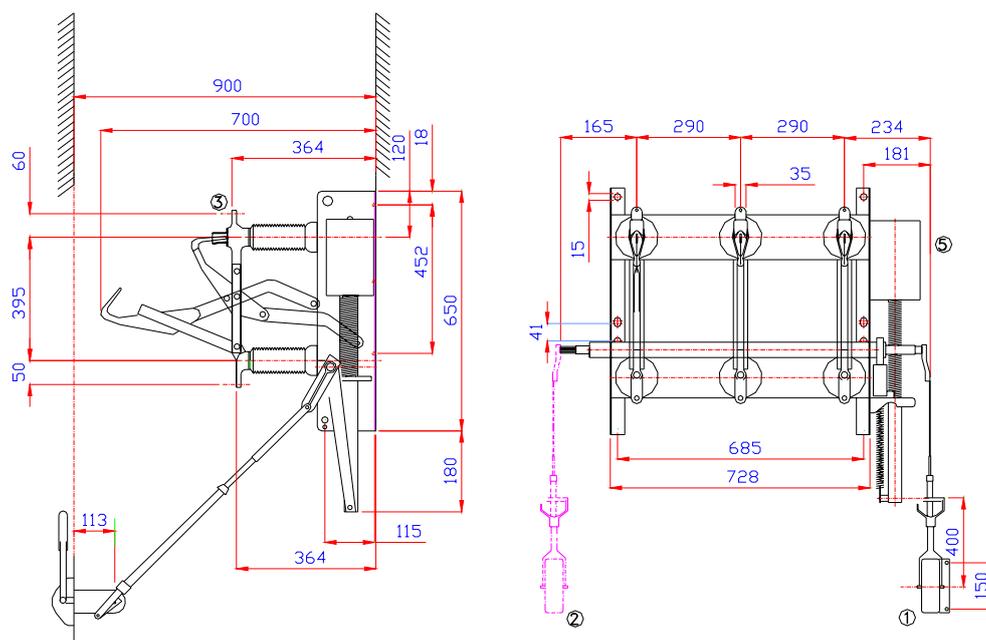


3- POLE SWITCH ISOLATOR TYPE LBS WITH HAND OPERATING MECHANISM 24 KV . BASIC CONSTRUCTION									
Type	Rated voltage Highest system voltage	Rated Current  A r.m.s	3- phase Breaking Capacity ①			Making Capacity  kA	Short time current 1 sec.  KA r.m.s	Peak withstand current  KA	Weight  Kg
	kv r.m.s.		MVA	at natural freq. kHz	Capacitive MVAr				
LBS 24	24	630	50	4.6	1	40	16	40	64

1.The switch is certain to cope with the breaking of transformer no-load current. See also under standards and specifications.

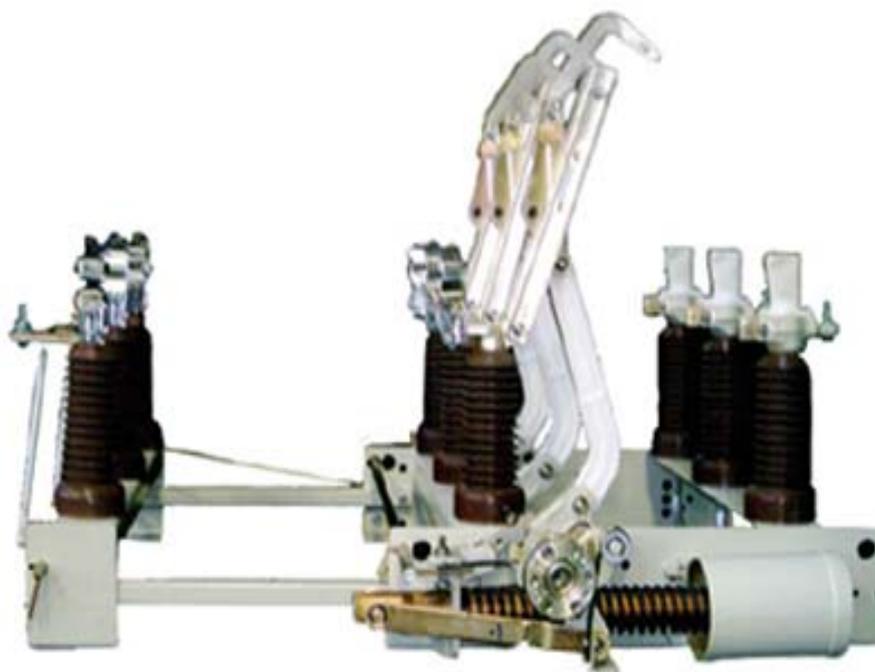
LBS is supplied normally with hand operating mechanism type HC 1 (if desired type HA 2.) These can be supplied as desired on either in either the right or left hand side of the switch if the draw-bar between the operating handle and switch is to be included the dimensions  $f_1$  and  $f_2$  must be given (see sketch).

LBS may also be supplied for motor-powered operation.  
Illustrate installation instruction accompany every switch.



Switch isolator type LI 24KV, 630A

- ①- Hand operating mechanism fitted to right side of switch
  - ②- Hand operating mechanism fitted to left side of switch
- The mechanism can be fitted anywhere along the arc with radius F
- ③- Terminal contact screws M12
  - ④- Earthing screw M8
  - ⑤- Compressed air cylinder.
  - ⑦- Auxiliary switch



3- Pole switch isolators type FIS with fuse bases for HBC cartridge fuse  
Links according to DIN 43625 with hand operating mechanism, 24 kv . Basic construction.

Type	Rated Voltage Highest System Voltage KV r.m.s	Rated Current A r.m.s.	3-phase breaking Capacity ①			Making Capacity KA	Short Time Current 1 sec. KA r.m.s	Peak Withstand Current KA	Weight Kg
			p.f.≥0.2 inductive. Capacity at natural freq. MVA	kHz	MVA <sub>r</sub>				
FIS24	24	630	50	4,6	1	40 ②	16 ②	40 ②	81

①- The switch is certain to cope with transformer no-load currents. See also under Standards and Specifications.

②- These figures apply to switches with fuse-links replaced by solid links. If HBC cartridges type CD are used. the application of switch isolator type FIS will only be limited by the breaking capacity of the HBC fuse links type CD.

FIS is suitable for HBC fuse-links type CD and all other cartridges  
Conforming with DIN 43625.

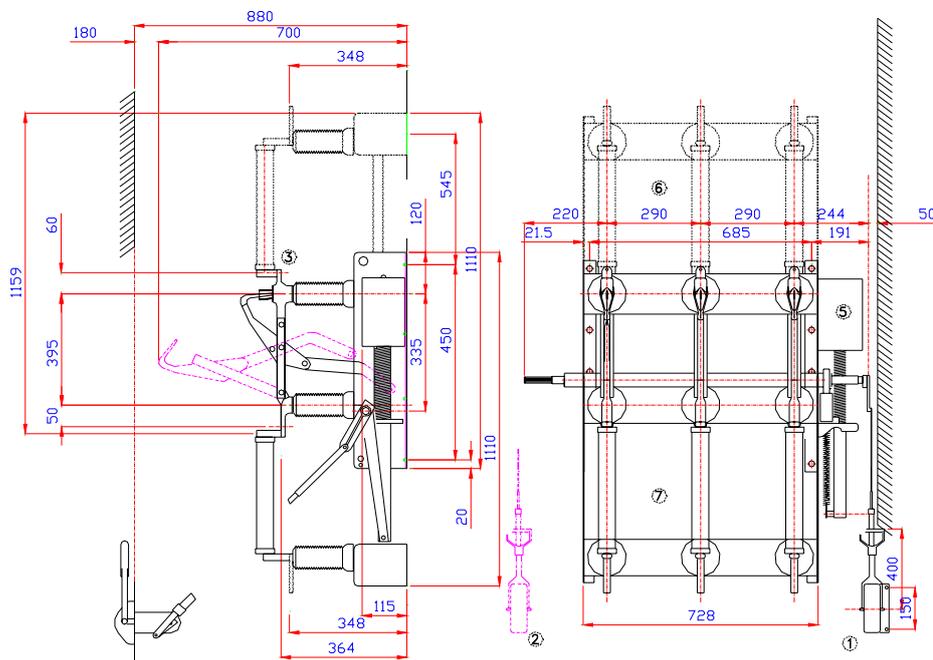
FIS,s lower insulator cross-bar is adjustable so that cartridge fuse links with any length can be fitted.

When ordering FIS with automatic release on single or multipole melting of fuse links the size of the cartridges should be quoted so that the release mechanism may be delivered correctly adjusted from the factory.

Normally the fuses are placed on the pivot point side of FIS . FIS may also be ordered with the fuses on the opening side.

FIS is normally supplied with hand-operating mechanism type HC 1 (if desired type HA 2). This can be delivered on either the right or left side of the switch. If the drawbar between the operating mechanism and switch shall be included the dimensions f1 and f2 must be quoted (see sketch.)

FIS may also be supplied with or motor-powered operation. Illustrated installation instructions accompany every switch.



Switch isolator type FIS 24 KV, 400A

- ①- Hand operating mechanism fitted to right side of switch
- ②- Hand operating mechanism fitted to left side of switch
- The mechanism can be fitted anywhere along the arc with radius F
- ③- Terminal contact screws M 12.
- ④- Earthing screw M 8 .
- ⑤- Compressed air cylinder.
- ⑥- Auxiliary Switch
- ⑦- Fuse bases on opening side.
- ⑧- Fuse bases on pivot point side.