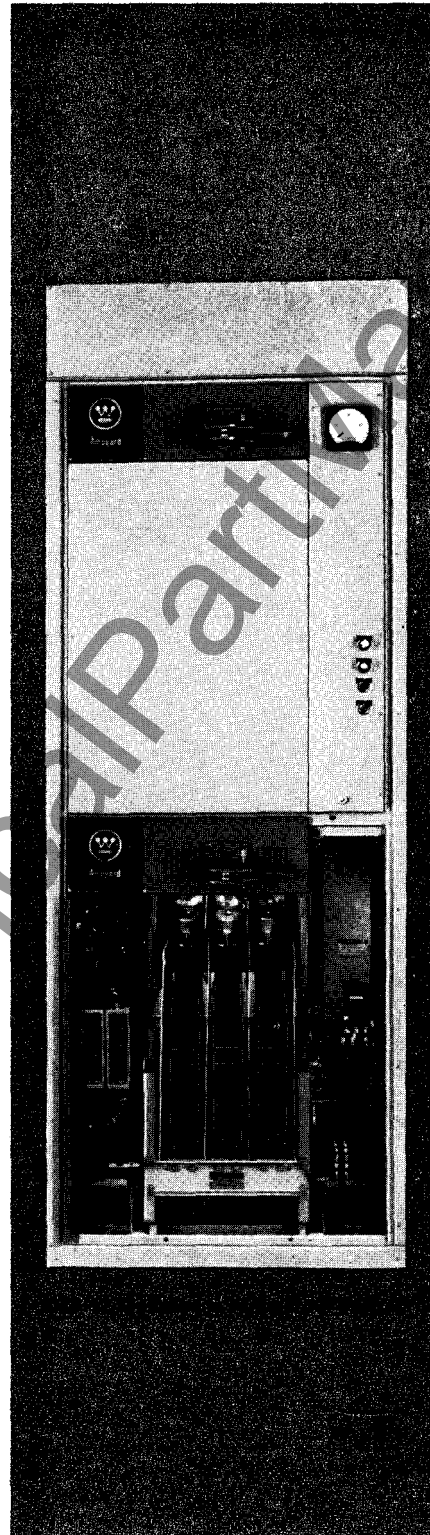
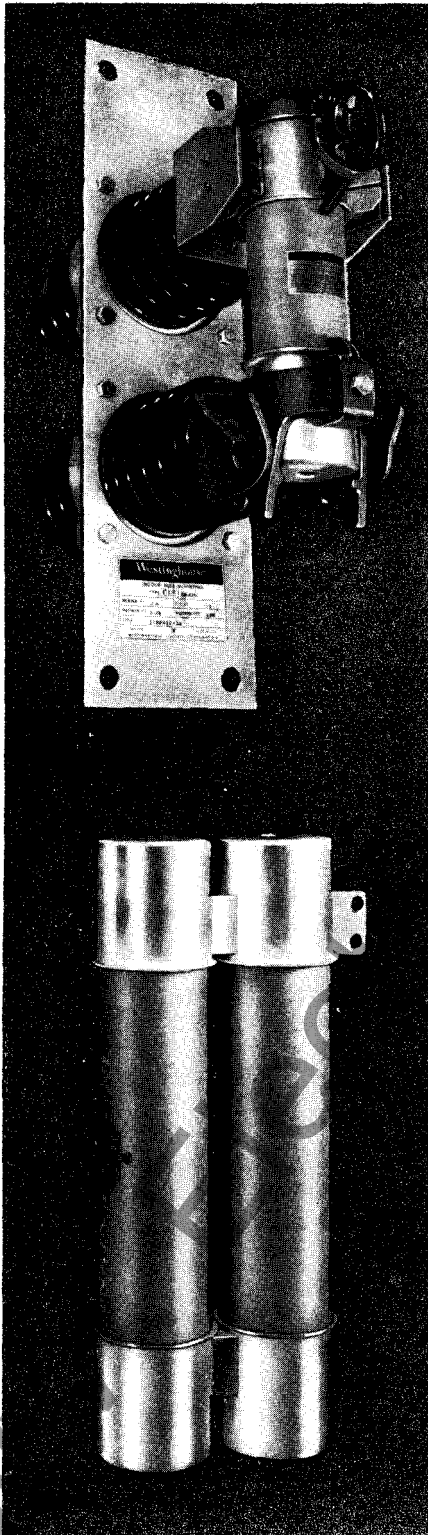


Westinghouse



High Voltage Power Fuses Types CLS-1, CLS-2

Indoor Motor Starter Type
Current Limiting, 2.4 to 4.8 Kv,
50 to 400 Amps, and
Special Types



Application

Type CLS-1 and CLS-2 current limiting fuses are used in conjunction with high voltage motor starters to provide short circuit protection for individual motors. Contactors in motor starting equipment protect the motor against overcurrents due to starting, stalling and plugging while current limiting fuses furnish short circuit protection only.

The duty of fuses in motor starter is characterized by the frequent application of high overloads such as motor starting currents. Motor starter fuses, therefore must be designed to withstand these frequent severe heating and cooling cycles without fatigue failures. Type CLS fuses are of such construction. They contain no elements sensitive to low currents. The CLS fuses are designed with a "fatigue proof" feature to provide highly uniform flexing of elements during heating cycles.

Advantages

Quiet Safe Operation

Designed for silent operation and elimination of flame discharges when fuse blows.

Easy Identification of Blown Fuse

Indicator will protrude from the bottom end of indicating type fuse providing a visual aid when the fuse has blown.

Space Economy

The fuse being designed for elimination of flame or gas discharges when operated, requires no discharge filters, fire boxes, special vents or reinforcing.

Complete Protection Provided

Current limiting fuses insure positive interruption even on low fault currents. The fuse limits the magnitude of electro-mechanical stresses in the apparatus to be protected. They also control the surge voltage that is produced when the short circuit is limited to less than twice that of the nominal voltage rating.

Fatigue Proof

Bending or crimping of the silver elements prior to assembly permits the current limiting fuse to stand up under the most severe duty cycling without failure.

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Construction

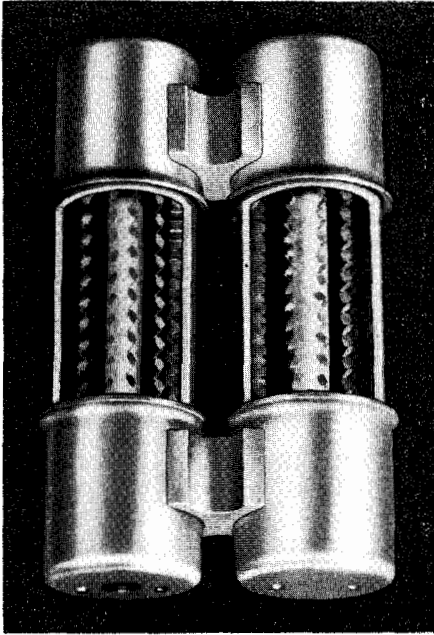


Figure 1

The CLS fuse is basically of inorganic construction, the only organic material used is glass resin outer casing and the plastic indicator. The fuse elements are pure silver and are crimped or bent at regular intervals to make the element structurally stronger and distribute expansion uniformly preventing failure due to severe duty cycling.

The design of the element combines maximum load carrying ability with the most favorable short circuit interruption characteristics. CLS fuses are filled with a high purity silica sand of controlled grain size.

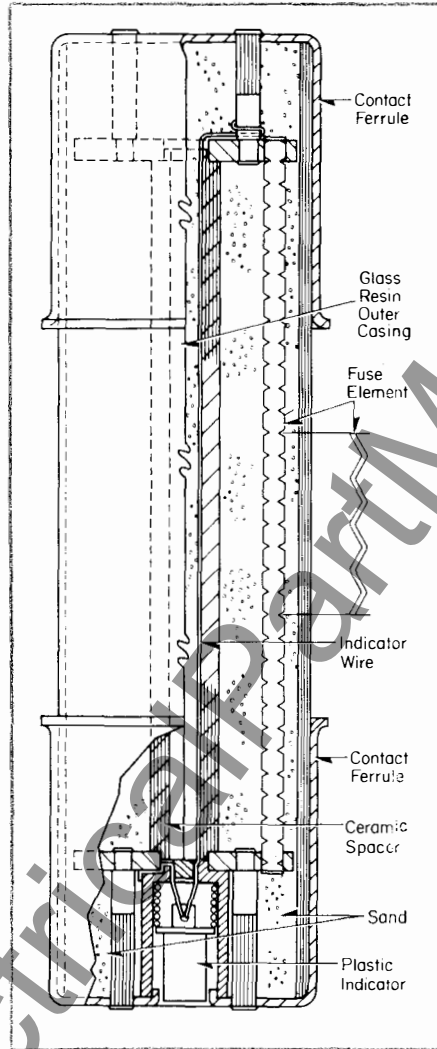


Figure 2

Four types of CLS fuses are offered for 2400 and 4800 volt application for use with high voltage motor starters.

CLS-1 is a single barrel design with a rating from 50 amps to 225 amps. The fuse has a 3 inch diameter ferrule with a fuse clip center of 7" for 2400 volts and 14" for 4800 volts. To supplement the CLS-1 for higher currents of 300 amps and 400 amps the CLS-2 is provided. It is made with two single barrel fuse units that have been brazed together.



Figure 3: CLS-1

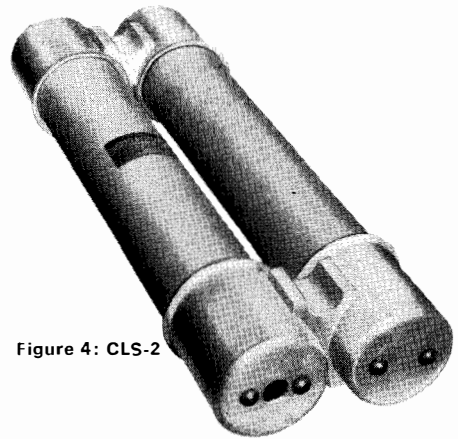


Figure 4: CLS-2

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High Voltage Power Fuses Types CLS-1, CLS-2

Indoor Motor Starter Type
Current Limiting, 2.4 to 4.8 Kv,
50 to 400 Amps, and
Special Types

CLS-11 and CLS-21 for 2400 volt applications can be provided for those customers standardizing on 4.8 kv mounting. These fuses have the same ampere rating and characteristic as the CLS-1 and CLS-2 but have a 14" fuse clip center for use with a 4.8 kv mounting.

CLS-12 and CLS-22 – 2400/4800 volts – have the same 50 amps to 400 amps ratings, melting time and mechanical characteristics as the CLS-1 and CLS-2, except that they have a built-in hookeye, a 12 inch fuse clip center and are designed for use in the new Westinghouse motor starters as well as all other makes of motor starters.

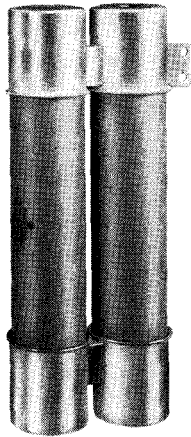


Figure 5: CLS-22

CLS-13 and CLS-23 for Class #1, Group D, Division 2 for hazardous locations can also be provided. These fuses are identical in all respects to the CLS-1 and CLS-2, but have been hermetically sealed with a clear plastic cover cemented over the indicator providing a means for viewing the indicator under these conditions.



Figure 6: CLS-13

Fuse Mountings

Mounting devices for current limiting CLS fuses are available in a wide variety of types and sizes.

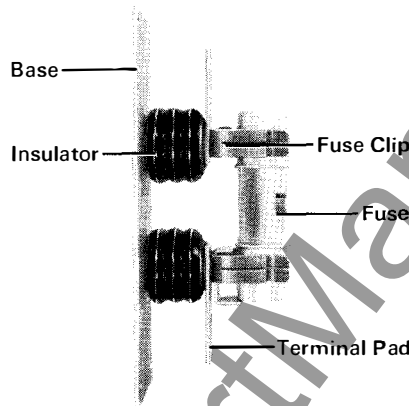


Figure 7
Standard non-disconnecting type fuse mounting TTFC

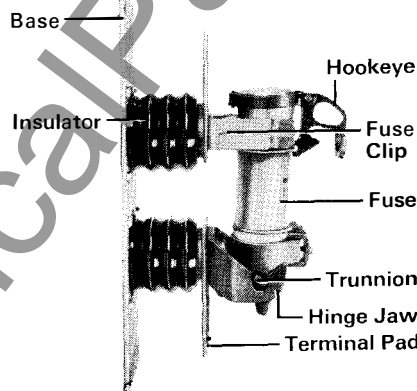


Figure 8
Standard disconnecting type fuse mounting BTFC

There are seven basic types of mountings available:

Non-Disconnecting

TTFC – Two Terminals Front Connected

OTRC – One Terminal Rear Connected

TTRC – Two Terminals Rear Connected

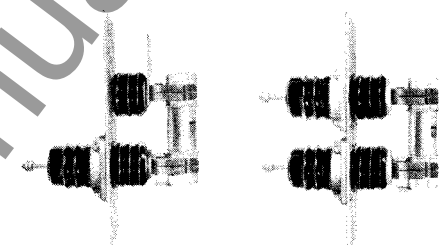


Figure 9
OTRC

Figure 10
TTRC

Disconnecting

BTFC – Both Terminals Front Connected

BRHF – Break Terminal Rear Connected
Hinge Terminal Front Connected

HRBF – Hinge Terminal Rear Connected
Break Terminal Front Connected

BTRC – Both Terminals Rear Connected

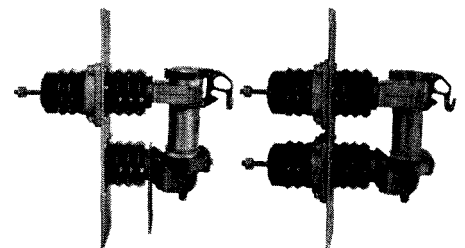
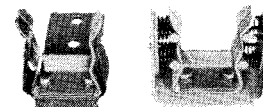


Figure 11
BRHF

Figure 12
BTRC

Heavy duty mountings are recommended where the full load exceed 200 amps. These mountings are furnished with a heavy duty clip.

Fuse Clips



Standard

Heavy Duty

Figure 13

High Voltage Power Fuses Types CLS-1, CLS-2

Indoor Motor Starter Type
Current Limiting, 2.4 to 4.8 Kv,
50 to 400 Amps, and
Special Types

Adapter and Conversion Kits

When CLS-2 fuses are ordered as a replacement for the BAL-LR 400 fuses in existing installations, an adapter kit is required. The CLS-2 being of different design than the BAL-LR 400 cannot be mounted without this adapter. Conversion kits are available for converting the BAL-400 LR mounting to accept the CLS-1 and CLS-2 type of fuse. All live parts above the insulator will be replaced when the conversion is made.

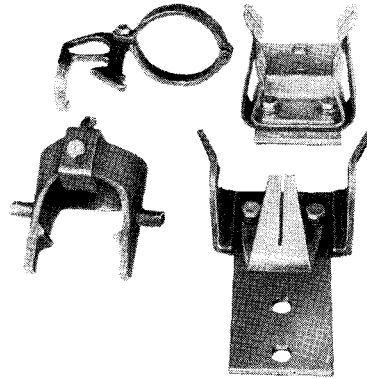


Figure 17
Live parts above insulator for CLS-1

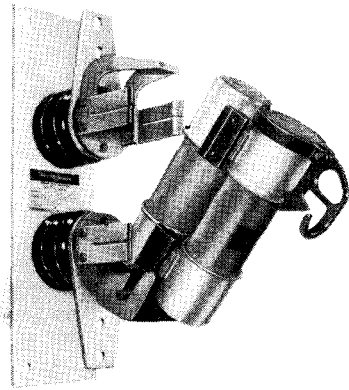


Figure 14
Adapter shown in figure 15 is mounted on CLS-2 fuse, shown in BAL-LR 400 mounting.

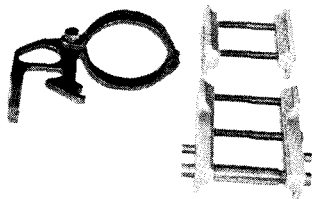


Figure 15
Adapter to convert CLS-2 to fit BAL mounting.

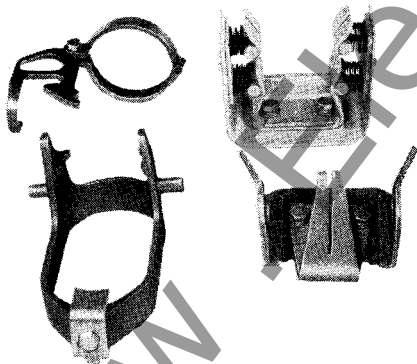


Figure 16
Parts for converting BAL-LR 400 mounting to a CLS-2 mounting.

Interrupting Ratings

Fuse Rating Fuse	Fuse Voltage Rating	Amps Continuous Current	Total RMS Amps Sym.	Interrupting Rating at Rated Kv	
				Total RMS Amps Assym.	Maximum Three Phase Kva Symmetrical
CLS-1	2400 4800	50 to 225	50,000	80,000	205,000 415,000
CLS-2	2400 4800	300, 400	50,000	80,000	205,000 415,000
CLS-11	2400	50 to 225	50,000	80,000	205,000
CLS-21	2400	300, 400	50,000	80,000	105,000
CLS-12	2.4/4.8	30 to 225	50,000	80,000	205,000 415,000
CLS-22	2.4/4.8	300, 400	50,000	80,000	205,000 415,000
CLS-13	2400 4800	50 to 225	50,000	80,000	205,000 415,000
CLS-23	2400 4800	300, 400	50,000	80,000	205,000 415,000

E— Ratings are defined by NEMA Standards.

Further Information

Price List 36-622
Application Data 36-660, 36-661
Technical Certification Section 36-672