

# Fusing Equipment

Electrical Apparatus  
**240-63**

## Direct-Connected Capacitor Fuse

### GENERAL

The use of Cooper Power Systems X-Limiter fuse (Catalog Section 240-56) as a direct-connected Capacitor fuse (particularly for indoor and/or enclosed banks), provides a full-range current-limiting fuse requiring a minimum of mounting space for a smaller low cost package. These units are bus-mounted or mounted directly on the capacitor busing to minimize space requirement and mounting cost. The fuse incorporates a high view operation indicator to quickly locate failed capacitor units.

**TABLE 1**  
Electrical Characteristics

Fuse Type	Full-range
Maximum Interrupting Current	50,000 A rms symmetrical

### APPLICATIONS

The Direct-Connected Capacitor fuse is ideally suited for:

- High available fault current areas (high interrupting capacity).
- Large capacitor banks (up to 140 A available).
- Areas requiring low noise or non-expulsion reaction (noiseless operation).
- High ambient (no thermal derating required).
- Systems with sensitive protection schemes requiring minimum system disturbance.
- Banks having limited electrical spacing (no flying pigtails).



**Figure 1.**  
Direct-connected capacitor fuse.

### CURRENT RATING SELECTION

Individual fuse recommendations are listed in Table 2. Fusing tables are based on the following formulas:

$$\text{Amperes} = \text{kVAR (unit)/kV (unit)}$$

$$\text{Fuse Amperes} = \text{Ampere} \times 1.5 \text{ (protective margin)}$$

Select the next higher standard fuse rating.

The protective margin (1.5) accounts for normal overvoltage, harmonics, and capacitor tolerances as related to fuse melt  $I^2t$ . No derating is required for environmental temperatures below 100 °C.

### PRODUCTION TESTS

Tests are conducted in accordance with Cooper Power Systems requirements.

- 100% Physical Inspection
- 100%  $I^2t$  Testing
- 100% Resistance Testing

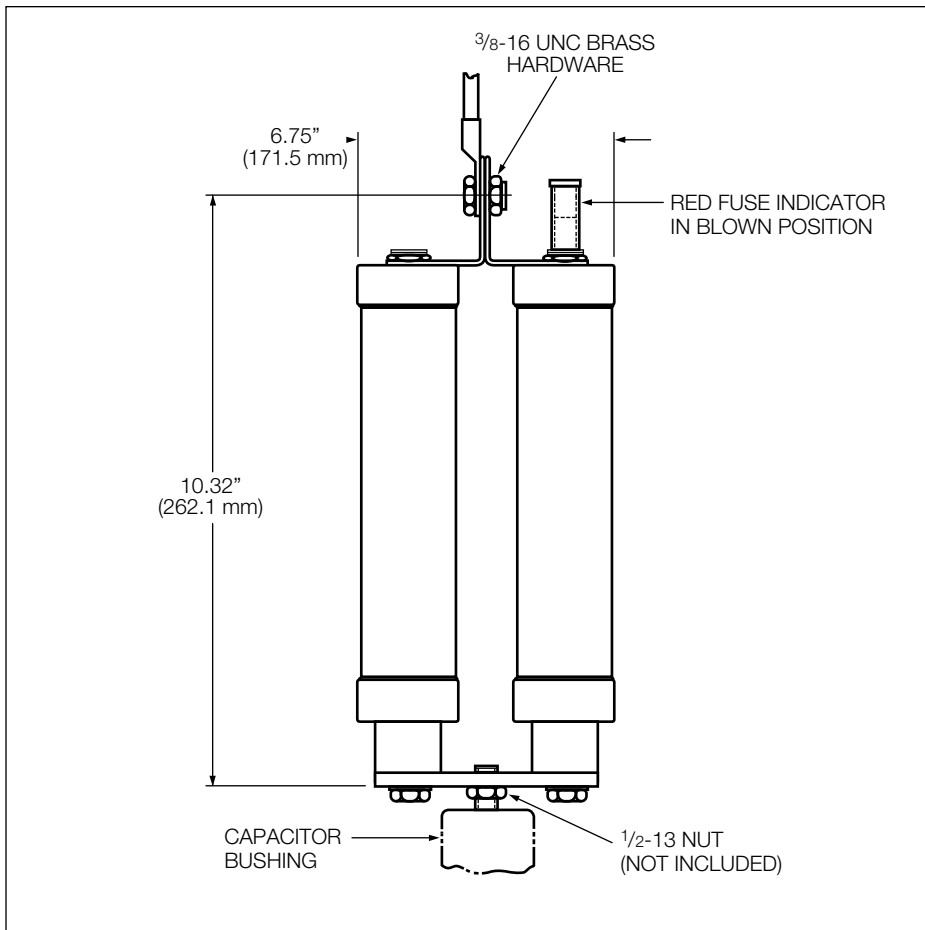
# Features and Detailed Description

**TABLE 2**  
Recommended Capacitor Fuse Current Ratings (Amperes)

1Ø Capacitor Application Recommendation								
Capacitor Voltage Rating	Fuse Voltage Rating (kV)	50 kVAR	100 kVAR	150 kVAR	200 kVAR	300 kVAR	400 kVAR	500 kVAR
		Fuse Rating (A)						
2400	4.3	35	65	100	130*	200*	-	-
2770	4.3	35	65	100	130*	200*	-	-
4160	4.3	18	65	65	75	130*	150*	200*
4800						125 (4)	125 (4)	160 (4)*
4800	5.5	18	40	50	65	130*	130*	-
6640	8.3	12	25	40	50	80	100	125
7200	8.3	12	25	40	50	65	100	125
7620	8.3	12	20	30	40	65	80	100
7960	8.3	10	20	30	40	65	80	100
8320	8.3	10	18	30	40	65	80	100
9960	15.5	10	18	25	40	50	65	80
12470	15.5	6	12	18	25	40	50	65
13280	15.5	6	12	18	25	40	50	65
13800	15.5	6	12	18	25	40	50	65
14400	15.5	6	12	18	25	40	50	65
19920	23.0	6	8	12	18	25	40	40
21600	23.0	6	8	12	18	25	30	40

**NOTES:**

1. All fuses meet "safe zone" tank rupture curves for type "EX" capacitors or equal.
2. Fuse application based on 150% of capacitor current.
3. Fuses do not require derating for environment below 100 °C.
4. Use 8.3 kV fuse.
5. Asterisk (\*) denotes parallel fuse assembly.

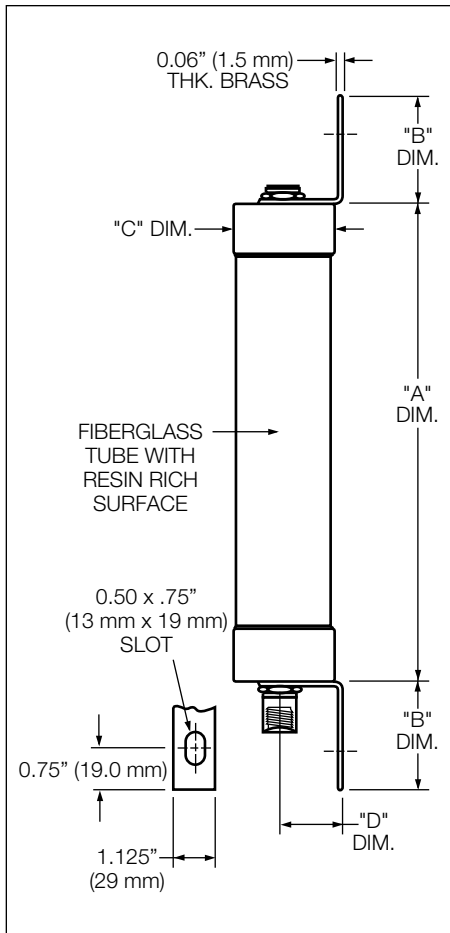


**Figure 2.**  
BTU design capacitor fuse.

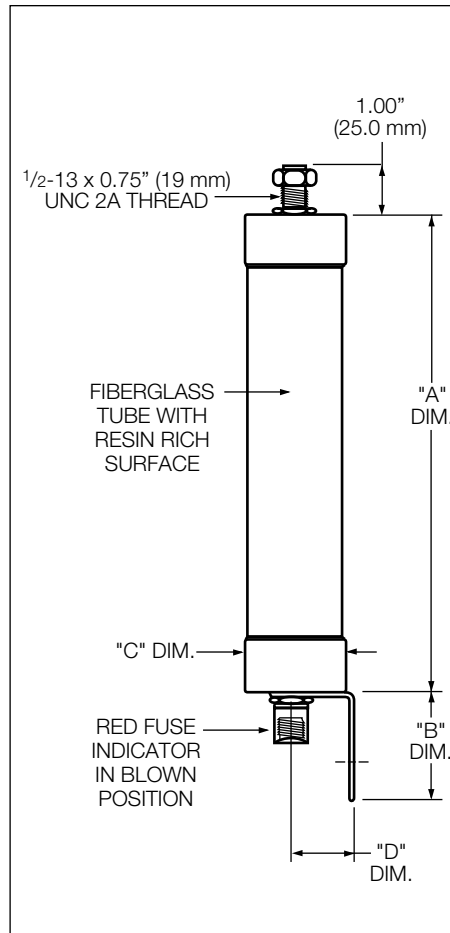
NOTE: Dimensions given are for reference only. Do not use for construction. Contact your Cooper Power Systems representative for detailed drawings.

**TABLE 3**  
Direct-Connected Capacitor Fuse – BTU Design

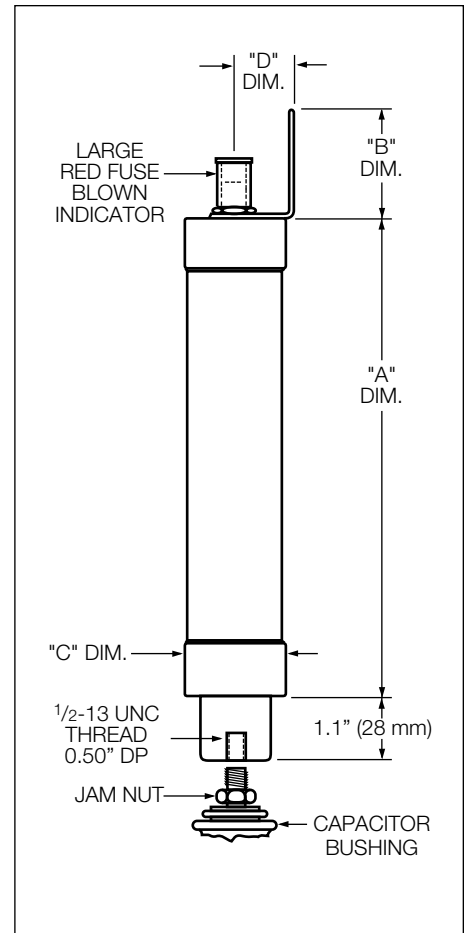
Voltage Rating (kV)	Current Rating (A)	Catalog Number BTU Design	Weight lb/(kg)
4.3	130	43F130-IVBTU	4.5 (2.0)
	150	43F150-IVBTU	
	200	43F200-IVBTU	
5.5	100	55F100-IVBTU	
	130	55F130-IVBTU	
	150	55F150-IVBTU	



**Figure 3.**  
BT design capacitor fuse.



**Figure 4.**  
BTS design capacitor fuse.



**Figure 5.**  
BTB design capacitor fuse.

NOTE: Dimensions given are for reference only. Do not use for construction. Contact your Cooper Power Systems representative for detailed drawings.

**TABLE 4**  
**Direct-Connected Capacitor Fuses – BT, BTS and BTB Designs**

Voltage Rating (kV)	Current Rating (A)	Catalog Number BT Design	Catalog Number BTS Design	Catalog Number BTB Design	A in (mm)	B in (mm)	C in (mm)	D in (mm)	Weight lb (kg)					
4.3	18	43F018-IVBT	43F018-IVBTS	43F018-IVBTB	7.5 (191)	2.75 (70)	2.13 (54)	1.125 (29)	2.0 (.9)					
	25	43F025-IVBT	43F025-IVBTS	43F025-IVBTB										
	35	43F035-IVBT	43F035-IVBTS	43F035-IVBTB										
	45	43F045-IVBT	43F045-IVBTS	43F045-IVBTB										
	50	43F050-IVBT	43F050-IVBTS	43F050-IVBTB										
	65	43F065-IVBT	43F065-IVBTS	43F065-IVBTB										
	75	43F075-IVBT	43F075-IVBTS	43F075-IVBTB										
5.5	25	55F025-IVBT	55F025-IVBTS	55F025-IVBTB	7.5 (191)	2.75 (70)	2.13 (54)	1.125 (29)	2.0 (.9)					
	30	55F030-IVBT	55F030-IVBTS	55F030-IVBTB										
	40	55F040-IVBT	55F040-IVBTS	55F040-IVBTB										
	50	55F050-IVBT	55F050-IVBTS	55F050-IVBTB										
	65	55F065-IVBT	55F065-IVBTS	55F065-IVBTB										
	75	55F075-IVBT	55F075-IVBTS	55F075-IVBTB										
8.3	10	83F010-IVBT	83F010-IVBTS	83F010-IVBTB	7.5 (191)	2.75 (70)	2.13 (54)	1.125 (29)	2.0 (.9)					
	12	83F012-IVBT	83F012-IVBTS	83F012-IVBTB										
	20	83F020-IVBT	83F020-IVBTS	83F020-IVBTB										
	25	83F025-IVBT	83F025-IVBTS	83F025-IVBTB										
	30	83F030-IVBT	83F030-IVBTS	83F030-IVBTB										
	40	83F040-IVBT	83F040-IVBTS	83F040-IVBTB										
	65	83F065-IVBT	83F065-IVBTS	83F065-IVBTB	11.80 (300)	1.83 (47)	3.16 (80)	1.75 (45)	5.5 (2.5)					
	80	83F080-IVBT	83F080-IVBTS	83F080-IVBTB										
	100	83F100-IVBT	83F100-IVBTS	83F100-IVBTB										
	125	83F125-IVBT	83F125-IVBTS	83F125-IVBTB										
15.5	6	155F006-IVBT	155F006-IVBTS	155F006-IVBTB	11.80 (300)	2.75 (70)	2.13 (54)	1.125 (29)	2.0 (.9)					
	8	155F008-IVBT	155F008-IVBTS	155F008-IVBTB										
	10	155F010-IVBT	155F010-IVBTS	155F010-IVBTB										
	12	155F012-IVBT	155F012-IVBTS	155F012-IVBTB										
	18	155F018-IVBT	155F018-IVBTS	155F018-IVBTB										
	20	155F020-IVBT	155F020-IVBTS	155F020-IVBTB										
	25	155F025-IVBT	155F025-IVBTS	155F025-IVBTB										
	30	155F030-IVBT	155F030-IVBTS	155F030-IVBTB										
	40	155F040-IVBT	155F040-IVBTS	155F040-IVBTB										
	65	155F065-IVBT	155F065-IVBTS	155F065-IVBTB	14.60 (371)	1.83 (47)	3.16 (80)	1.75 (45)	8.0 (3.6)					
	80	155F080-IVBT	155F080-IVBTS	155F080-IVBTB										
	23	6	23F006-IVBT	23F006-IVBTS						23F006-IVBTB	14.64 (372)	2.75 (70)	2.13 (54)	1.125 (29)
8		23F008-IVBT	23F008-IVBTS	23F008-IVBTB										
10		23F010-IVBT	23F010-IVBTS	23F010-IVBTB										
12		23F012-IVBT	23F012-IVBTS	23F012-IVBTB										
18		23F018-IVBT	23F018-IVBTS	23F018-IVBTB										
20		23F020-IVBT	23F020-IVBTS	23F020-IVBTB										
25		23F025-IVBT	23F025-IVBTS	23F025-IVBTB										
30		23F030-IVBT	23F030-IVBTS	23F030-IVBTB										
40	23F040-IVBT	23F040-IVBTS	23F040-IVBTB											





