

### Direct-Connected Capacitor Fuse

#### GENERAL

The use of Cooper Power Systems Combined Technologies (CT) 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

<b>Fuse Type</b>	Full-range
<b>Maximum Interrupting Current</b>	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 pigtailed).



**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:  
 Amperes = kVAR (unit)/kV (unit)  
 Fuse Amperes = Ampere x 1.5 (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

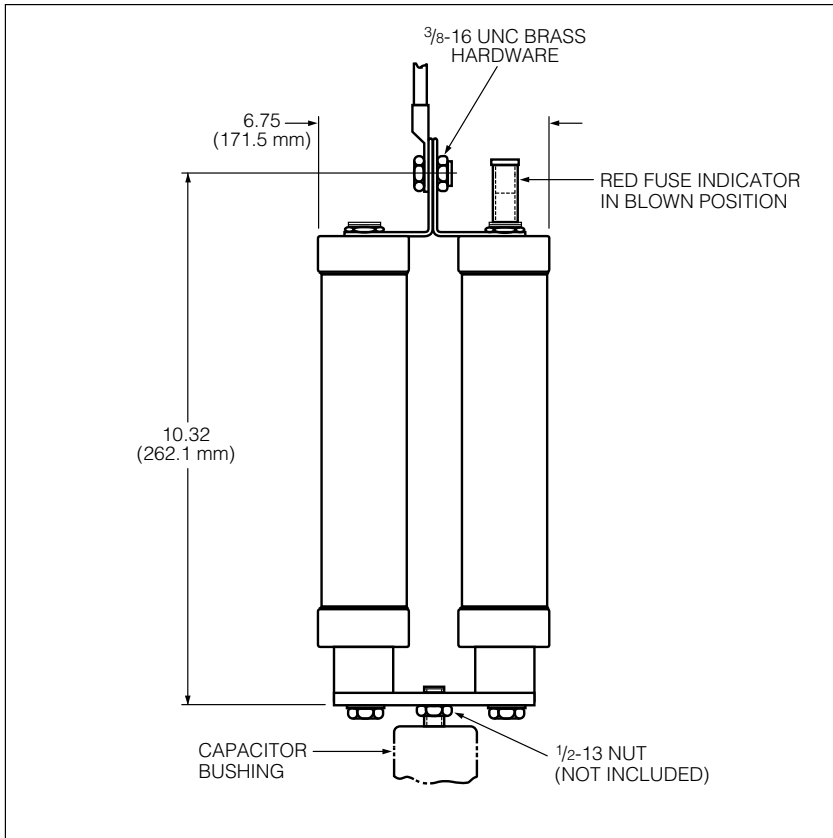
# Features and Detailed Description

**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:**

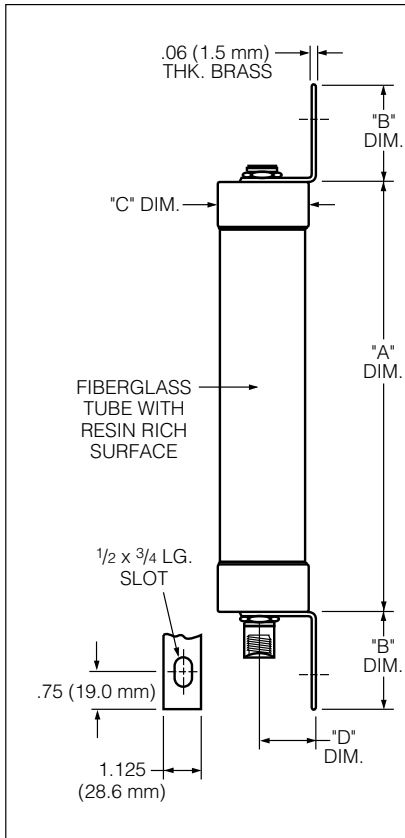
1. All fuses meet "safe zone" tank rupture curves for type "EX" capacitors or equal.
2. Fuse application based on 150% of capacitor current.
3. Fuses do not require derating for environment below 100° C.
4. Use 8.3 kV fuse.
5. Asterisk (\*) denotes parallel fuse assembly.



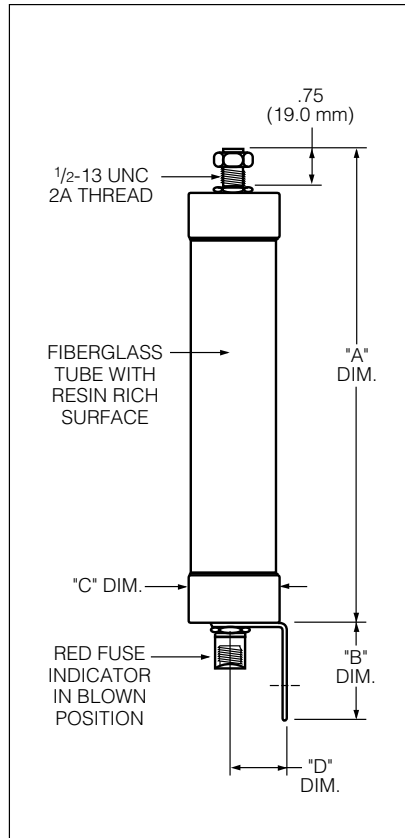
**Figure 2.**  
**BTU design capacitor fuse.**

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

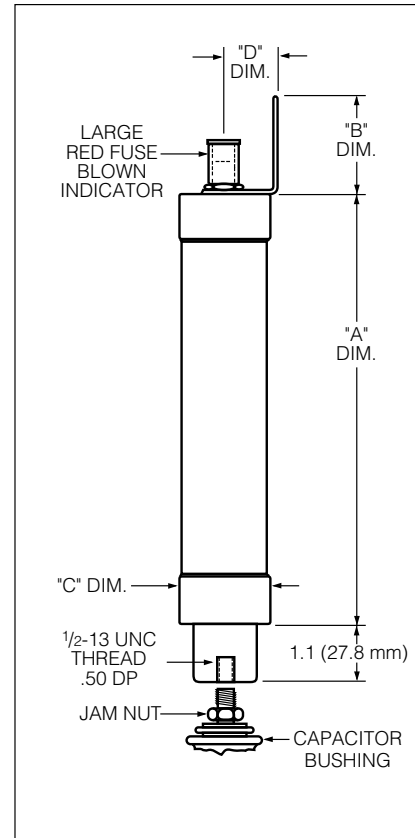
Voltage Rating (kV)	Current Rating (A)	Catalog Number BTU Design	Weight lb/(kg)
4.3	130	43F130-IV-BTU	4.5 (2.0)
	150	43F150-IV-BTU	
	200	43F200-IV-BTU	
5.5	100	55F100-IV-BTU	
	130	55F130-IV-BTU	
	150	55F150-IV-BTU	



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



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



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

**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-IV-BT	43F018-IV-BTS	43F018-IV-BTB	7.65 (194.3)	2.75 (69.9)	2.13 (54.1)	1.125 (28.6)	2.0 (.9)
	25	43F025-IV-BT	43F025-IV-BTS	43F025-IV-BTB					
	35	43F035-IV-BT	43F035-IV-BTS	43F035-IV-BTB					
	45	43F045-IV-BT	43F045-IV-BTS	43F045-IV-BTB					
	50	43F050-IV-BT	43F050-IV-BTS	43F050-IV-BTB					
	65	43F065-IV-BT	43F065-IV-BTS	43F065-IV-BTB					
5.5	25	55F025-IV-BT	55F025-IV-BTS	55F025-IV-BTB	7.65 (194.3)	2.75 (69.9)	2.13 (54.1)	1.125 (28.6)	2.0 (.9)
	30	55F030-IV-BT	55F030-IV-BTS	55F030-IV-BTB					
	40	55F040-IV-BT	55F040-IV-BTS	55F040-IV-BTB					
	50	55F050-IV-BT	55F050-IV-BTS	55F050-IV-BTB					
	65	55F065-IV-BT	55F065-IV-BTS	55F065-IV-BTB					
	75	55F075-IV-BT	55F075-IV-BTS	55F075-IV-BTB					
8.3	10	83F010-IV-BT	83F010-IV-BTS	83F010-IV-BTB	7.65 (194.3)	2.75 (69.9)	2.13 (54.1)	1.125 (28.6)	2.0 (.9)
	12	83F012-IV-BT	83F012-IV-BTS	83F012-IV-BTB					
	20	83F020-IV-BT	83F020-IV-BTS	83F020-IV-BTB					
	25	83F025-IV-BT	83F025-IV-BTS	83F025-IV-BTB					
	30	83F030-IV-BT	83F030-IV-BTS	83F030-IV-BTB					
	40	83F040-IV-BT	83F040-IV-BTS	83F040-IV-BTB					
	50	83F050-IV-BT	83F050-IV-BTS	83F050-IV-BTB	11.94 (303.3)	1.83 (46.6)	3.16 (80.3)	1.75 (44.5)	5.5 (2.5)
	65	83F065-IV-BT	83F065-IV-BTS	83F065-IV-BTB					
	80	83F080-IV-BT	83F080-IV-BTS	83F080-IV-BTB					
	100	83F100-IV-BT	83F100-IV-BTS	83F100-IV-BTB					
	125	83F125-IV-BT	83F125-IV-BTS	83F125-IV-BTB					
15.5	6	155F006-IV-BT	155F006-IV-BTS	155F006-IV-BTB	11.94 (303.3)	2.75 (69.9)	2.13 (54.1)	1.125 (28.6)	2.0 (.9)
	8	155F008-IV-BT	155F008-IV-BTS	155F008-IV-BTB					
	10	155F010-IV-BT	155F010-IV-BTS	155F010-IV-BTB					
	12	155F012-IV-BT	155F012-IV-BTS	155F012-IV-BTB					
	18	155F018-IV-BT	155F018-IV-BTS	155F018-IV-BTB					
	20	155F020-IV-BT	155F020-IV-BTS	155F020-IV-BTB					
	25	155F025-IV-BT	155F025-IV-BTS	155F025-IV-BTB					
	30	155F030-IV-BT	155F030-IV-BTS	155F030-IV-BTB					
	40	155F040-IV-BT	155F040-IV-BTS	155F040-IV-BTB					
	50	155F050-IV-BT	155F050-IV-BTS	155F050-IV-BTB					
	65	155F065-IV-BT	155F065-IV-BTS	155F065-IV-BTB					
	80	155F080-IV-BT	155F080-IV-BTS	155F080-IV-BTB					
	23	6	23F006-IV-BT	23F006-IV-BTS	23F006-IV-BTB	14.75 (376.9)	2.75 (69.9)	2.13 (54.1)	1.125 (28.6)
8		23F008-IV-BT	23F008-IV-BTS	23F008-IV-BTB					
10		23F010-IV-BT	23F010-IV-BTS	23F010-IV-BTB					
12		23F012-IV-BT	23F012-IV-BTS	23F012-IV-BTB					
18		23F018-IV-BT	23F018-IV-BTS	23F018-IV-BTB					
20		23F020-IV-BT	23F020-IV-BTS	23F020-IV-BTB					
25		23F025-IV-BT	23F025-IV-BTS	23F025-IV-BTB					
30		23F030-IV-BT	23F030-IV-BTS	23F030-IV-BTB					
40		23F040-IV-BT	23F040-IV-BTS	23F040-IV-BTB					

