

# APPLICATION INFORMATION

## SELECTIVITY BETWEEN 240, 480 OR 600 VOLT MAIN AND BRANCH FUSES

### Definition

Coordination is defined as properly localizing a fault condition to restrict outages to the equipment affected, accomplished by choice of selective fault protective devices.

Coordination (selectivity, discrimination) is desirable and often times mandatory. A lack of coordination can represent a hazard to people and equipment. When designing for coordination, fuses provide distinct advantages over other types of overcurrent protective devices.

To coordinate a circuit breaker protected system, it is generally necessary intentionally to delay the short circuit response of upstream breakers. Though coordination may be achieved, short circuit protection is compromised. The speed and consistency of response of fuses allows coordination without compromising component protection.

The terms coordination and selectivity are often used inter-

changeably. The term coordination should be used to describe a system as defined above, while two fuses are said to be selective if the downstream fuse opens while the upstream fuse remains operable under **all** conditions of overcurrent. The term “discrimination” is synonymous with selectivity and is the preferred international term for this definition.

The word **all** is key. Fuse selectivity cannot be assured by comparing fuse time current curves alone. These curves stop at .01 second. Fuse performance under high fault conditions must also be evaluated. Fuse I<sup>2</sup>t is the best tool for assuring coordination under high fault current conditions. If the total clearing I<sup>2</sup>t of the downstream fuse is less than the melting I<sup>2</sup>t of the main upstream fuse, the fuses will be selective under high fault conditions.

To simplify presenting weighty I<sup>2</sup>t data, selectivity information can simply be found in selectivity ratio tables.

The ratios found in the following tables are conservative and are appropriate for all overcurrents up to 200,000 amperes RMS. In some cases smaller ratios than shown may be used. Consult your Ferraz Shawmut representative for specific recommendations.

### Fuse Selectivity Ratios - 600 and 480 Volt Applications Up to 200,000 RMS Symmetrical Amperes

BRANCH FUSE	RATIO*								
	MAIN FUSE								
	A4BQ	A4BY	A4BT	TRS	A6K	A6D	A4J	AJT	A6T
A4BQ	2:1	2:1	2:1	-	-	-	-	-	-
A4BY	-	2.5:1	2:1	-	-	-	-	-	-
A4BT	2.5:1	2.5:1	2:1	-	-	-	-	-	-
TRS	4:1	4:1	3:1	2:1	4:1	4:1	4:1	3:1	4.5:1
A6K	2:1	2:1	1.5:1	1.5:1	2:1	2:1	3:1	2:1	3.5:1
A6D	2:1	2:1	1.5:1	1.5:1	2:1	2:1	3:1	2:1	3.5:1
A4J	2:1	2:1	1.5:1	1.5:1	2:1	2:1	2:1	2:1	3:1
AJT	2:1**	2:1**	2:1	1.5:1	2:1	2:1	2.5:1	2:1	3.5:1
A6T	3:1	2.5:1	2:1	1.5:1	2:1	2:1	2:1	2:1	2.5:1

### Fuse Selectivity Ratios - 240 Volt Applications Up to 200,000 RMS Symmetrical Amperes

BRANCH FUSE	RATIO*								
	MAIN FUSE								
	A4BQ	A4BY	A4BT	TR	A2K	A2D	A4J	AJT	A3T
A4BQ	2:1	2:1	2:1	-	-	-	-	-	-
A4BY	-	2.5:1	2:1	-	-	-	-	-	-
A4BT	2.5:1	2.5:1	2:1	-	-	-	-	-	-
TR	4:1	4:1	4:1	1.5:1	4:1	3:1	4:1	3:1	5:1
A2K	2:1	2:1	1.5:1	1.5:1	2:1	1.5:1	2:1	1.5:1	3:1
A2D	2.5:1	2.5:1	2:1	1.5:1	2:1	1.5:1	2:1	2:1	3:1
A4J	2:1	2:1	1.5:1	1.5:1	2:1	1.5:1	2:1	2:1	3:1
AJT	2:1	2:1	2:1	1.5:1	2.5:1	2:1	2.5:1	2:1	3:1
A3T	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	2:1

\*These ratios apply to fuses rated 61-6000A.

\*\*Exception: For AJT450-600 use 2:1 on 480V only, 2.25:1 on 600V.