

# Technical

## Journal

### **480 V Selective Trip Coordination with Modern Molded Case Circuit Breakers**

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The following Selective Trip Coordination Table shows the maximum values of short circuit current, at the downstream breaker, that will allow selective trip coordination between the two Siemens breakers. As further industry experience in this area becomes available and further testing is conducted, updates to the table will be published. Please contact your Siemens representative for the latest information.

The following steps will assure the best use of the Selective Trip Coordination Table:

1. Conduct a short circuit study to determine the available fault current values at each level of the system where coordination is critical. This allows the most cost effective selection of breakers to achieve the necessary selective trip coordination. A higher available fault current value will necessitate a larger and more expensive upstream circuit breaker. Accurate short circuit current will also mean more accurate arc-flash energy calculations.
2. Trip coordination is assured up to the value shown in the "Branch Coordination Level" column. A short circuit study will be the best source of the maximum available fault current to be compared to the current value shown in this field. Selective trip coordination is assured where the maximum available fault current value is less than this "Branch Coordination Level". Faults occurring at the maximum calculated values are very rare so this is a conservative approach. The system designer may elect to consider other factors to balance the needs of system protection and coordination at various anticipated levels of current.

If the branch available fault current is not known, the main breaker maximum available fault current value may be used. This is a very conservative approach and may result in the least cost effective solution. For many systems the distribution transformer let-through value will provide a conservative available fault current for this use. The published data for the transformer should be consulted.

In many cases the minimum frame MCCB will only coordinate at relatively low levels of fault current. If the level of selective coordination between the two circuit breakers initially selected is insufficient for the available fault current at that point in the system, the tables may be used to find an alternate upstream circuit breaker that will allow a higher level of coordination. This will usually involve a larger frame size or different type of circuit breaker such as an insulated case or power breaker. The table is ordered from lower to higher coordination current levels so that by moving down the table it is possible to find an upstream breaker that will deliver a higher level of selective coordination.

# Selective Trip Coordination Table

## **TABLE NOTES:**

1. Coordination is assured up to the value of current shown in the "Branch Coordination Level" field.
2. If the available fault current at the branch is unknown, coordination is assured when the available fault current at the main is less than or equal to the value shown in the "Branch Coordination Level" field.
3. If the main breaker has an Instantaneous setting it must be set at maximum, branch Instantaneous must be set below "Branch Coordination Level" including bandwidth tolerances.
4. Coordination in the thermal range is also achieved. Electronic trip units must be adjusted for Long Time and Instantaneous functions (also Short Time if so equipped). As shipped, factory settings are minimum. Electronic trip mains must be adjusted to near maximums, standard trip curve coordination overlay techniques may be used for exact settings.
5. Applicable voltage range is marked for each chart.

## **Breaker Type Key:**

Breaker types shown in the table except as shown below, consult literature for voltage and AIC ratings..

'ED' includes the following types: ED4, ED6, HED4

'FD' includes the following types: FXD6-A, FD6-A, FD6, HFD6, HFXD6

'JD' includes the following types: JXD2-A, JXD6-A, JD6-A, JD6, JXD6, HJD6-A, HJD6, HJXD6-A, HJXD6

'LD' includes the following types: LXD6-A, LD6-A, LD6, LXD6, HLXD6-A, HLD6-A, HLD6, HLXD6

'LMD' includes the following types: LMD6, LMXD6

'MD' includes the following types: MD6, MXD6

**Voltage range 120-480 Vac. Rev. 7**

Main Amps	Main Breaker	Branch Coordination Level	1, 2, and 3 Pole Branch Breakers
175A	FD 175A	1.5kA	15-70A ED, NEB, NEG, NGG, NGB, BQD, CQD
250A	FD 250A	2.4kA	15-125A ED, NEB, NEG, NGG, NGB
	JD 250A		70-150A FD
400A	JD 400A LD 400A	6kA*	15-125 NGG, NGB
		3.6kA	15-125 ED, NEB, NEG, BQD, CQD
			70-250A FD
	200A JD		
	SLD6-A 600/400A LG-545 600/400A	9kA *	15-125A NGB, NGG
		6.4kA	15-125 ED, NEB, NEG, BQD, CQD
			70-250A FD
	200A JD		
	NG-545 1000/400A	15kA *	15-125A NGB, NGG
		10kA	15-125 ED, NEB, NEG, BQD, CQD
			70-250A FD
	200A JD		
	SBS1200/400A LS Trip	18kA	15-125A ED4
		25kA	15-125A ED6, NEB, NEG, NGB, NGG
			70-250A FD
	200-250A JD		
SBS2000/400A LS Trip	25kA	15-125A NGB, NGG, ED6	
	35kA	15-125A HED4, NEB, NEG	
		70-250A FD	
200-250A JD			
WL 800/400A FS1 Class S LS Trip	65kA	15-125 HHED6, HEB, HEG	
		70-250A HFD6, HFXD6	
		200-250A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A	
	35kA	15-125 NEB, NEG	
		70-250A FD	
		200-250A JD6-A, JXD6-A, LD6, LXD6	
42kA	15-125 HED4		
25kA	15-125A ED6, NGB, NGG		
14kA	15-100A BQD, CQD		

\* Further tests pending, level may be increased.

**Voltage range 120-480 Vac.**

Main Amps	Main Breaker	Branch Coordination Level	1, 2, and 3 Pole Branch Breakers	
600A	600A LD LMXD6, LMD6 MXD6, MD6	5.4kA	15-125 ED4, NEB, NEG, NGB, NGG, BQD, CQD	
			70-250A FD	
			200-300A JD6-A, JXD6-A, LD6, LXD6	
	SLD6-A 600A	11kA*	6.4kA	15-125A NGB, NGG
				15-125A ED4, NEB, NEG
	MG-525 800/600A	6.4kA	6.4kA	70-250A FD
				200-300A JD6-A, JXD6-A, LD6, LXD6
	SMD6 800/600A NG-545 1000/600	15kA*	10kA	15-125A NGB, NGG
				15-125 ED4, NEB, NEG
				70-250A FD 200-300A JD, LD
	SBS1200/600A LS Trip	25kA	25kA	15-125A NGB, NGG
				15-125A ED6, NEB, NEG, NGG, NGB
				70-250A FD 200-300A JD6-A, JXD6-A, LD6, LXD6
	SBS2000/600A LS Trip	25kA	35kA	15-125A NGB, NGG
				15-125A ED
				70-250A FD6 200-300A HJD6-A, HJDX6-A
	WL 800/600A FS1 Class S 745 LS Trip	65kA	35kA	15-125 HHED6, HEB, HEG
				70-250A HFD6, HFXD6
				200-300A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A
				15-125 NEB, NEG
				70-250A FD6
				200-250A JD6-A, JXD6-A, LD6, LXD6
	WL 800/600A FS2 Class ??? 745 LS Trip	85kA	65kA	70-250A HHFD6, HHFXD6
				200-400A HHJD6-A, HHJXD6-A
250-300 HHL6-A, HHLXD6-A				
15-125 HHED6, HEB, HEG				
70-250A HFD6, HFXD6				
200-300A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A				
15-125 NEB, NEG				
70-250A FD				
200-300A JD, LD				
42kA				15-125 HED4
25kA	15-125A ED6, NGB, NGG			
14kA	15-100A BQD, CQD			
WL 800/600A FS2 Class ??? 745 LS Trip	85kA	65kA	70-250A HHFD6, HHFXD6	
			200-400A HHJD6-A, HHJXD6-A	
			250-300 HHL6-A, HHLXD6-A	
			15-125 HHED6, HEB, HEG	
			70-250A HFD6, HFXD6	
			200-300A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A	
WL 800/600A FS2 Class ??? 745 LS Trip	85kA	65kA	15-125 NEB, NEG	
			70-250A FD	
			200-300A JD, LD	
			42kA	15-125 HED4
			25kA	15-125A ED6, NGB, NGG
			14kA	15-100A BQD, CQD

\* Further tests pending, level may be increased.

**Voltage range 120-480 Vac.**

Main Amps	Main Breaker	Branch Coordination Level	1, 2, and 3 Pole Branch Breakers
800A	800A LMXD6, LMD6 MXD6, MD6, MG	7.2kA	15-125 ED
			70-250A FD
			200-400A JD, LD
	SMD6 800A  NG-545 1000/800A	15kA*	15-125A NGB, NGG
		10kA	15-125 ED
	SBS1200/800A LS Trip	25kA	15-125A NGB, NGG
		25kA	15-125A ED
			70-250A FD
			200-400A JD
	SBS2000/800A LS Trip	25kA	15-125A NGB, NGG
		35kA	15-125A HED4, NEB, NEG
			70-250A FD
			200-400A JD
	WL 800/800A FS1 Class S 745 LS Trip	65kA	15-125 HHED6, HEB, HEG
			70-250A HFD6, HFXD6
			200-400A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A
			250-500A HLD6-A, HLXD6-A
			300-600A SHLD6-A
		35kA	15-125 NEB, NEG
			70-250A FD
WL 800/800A FS2 Class L 745 LS Trip	85kA	70-250A HHFD6, HHFXD6	
		200-400A HHJD6-A, HHJXD6-A	
		250-300 HHLD6-A, HHLXD6-A	
	65kA	15-125 HHED6, HEB, HEG	
		70-250A HFD6, HFXD6	
		200-300A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A	
		300-600A SHLD6-A	
	35kA	15-125 NEB, NEG	
		70-250A FD	
		200-400A JD	
	250-500 LD		
	250-600 SLD6-A		
42kA	15-125 HED4		
25kA	15-125A ED6, NGB, NGG		
14kA	15-100A BQD, CQD		

**Voltage range 120-480 Vac.**

Main Amps	Main Breaker	Branch Coordination Level	1, 2, and 3 Pole Branch Breakers
1200A	1200A ND6,NXD6	15kA*	15-125A NGB, NGG
		9kA	15-125 ED
			70-250A FD
			200-400A JD
			450-600A LD
			500-600A LMD
	600-800A SMD6		
	SND 1200A NG 545 1200A	10kA	15-125 ED
	70-250A FD		
	200-400A JD		
	450-600A LD		
	500-700 LMD		
	500-600A MD		
	600-800A SMD6, NG 576		
	SBS1200/1200A LS Trip	25kA	15-125A NGB, NGG
25kA	15-125A ED		
	70-250A FD		
	200-400A JD		
	450-600A LD		
	500-700 LMD		
	500-600A MD		
600-800A SMD, NG 576			
SBS2000/1200A LS Trip	25kA	15-125A NGB, NGG	
35kA	15-125A ED		
	70-250A FD		
	200-400A JD		
	450-600A LD		
	500-700 LMD		
	500-600A MD		
600-800A SMD6			

**Voltage range 120-480 Vac.**

Main Amps	Main Breaker	Branch Coordination Level	1, 2, and 3 Pole Branch Breakers
	WL 1200/1200A FS1 Class S 745 LS Trip	65kA	15-125 HHED6, HEB, HEG
			70-250A HFD6, HFXD6
			200-400A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A
			250-600A HLD6-A, HLXD6-A
			300-600A SHLD6-A
			500-700 HLMD
			500-700A HMD
		600-800A SHMD6	
		35kA	15-125 NEB, NEG
			70-250A FD
	200-400A JD 250-600 LD 250-600 SLD6-A 500-700 LMD 500-700A MD 600-800A SMD6		
	42kA	15-125 HED4	
	25kA	15-125A ED6, NGB, NGG	
14kA	15-100A BQD, CQD		
	WL 1200/1200A FS2 Class L 745 LS Trip	85kA	70-250A HHFD6, HHFXD6
			200-400A HHJD6-A, HHJXD6-A
			250-600 HHLD6-A, HHLXD6-A
			600-800A SCMD6
		65kA	15-125 HHED6, HEB, HEG
			70-250A HFD6, HFXD6
			200-400A HJD6-A, HJDX6-A, HLD6-A, HLXD6-A
			300-600A SHLD6-A
			500-700 HLMD
			500-700A HMD
	600-800A SHMD6		
	35kA	15-125 NEB, NEG	
		70-250A FD	
200-400A JD 250-600 LD 250-600 SLD6-A 500-700 LMD 500-700A MD 600-800A SMD6, NG-545			
600-800A SMD6, NG-545			
42kA	15-125 HED4		
25kA	15-125A ED6, NGB, NGG		
14kA	15-100A BQD, CQD		