

Westinghouse



Current Relays

Time Overcurrent Unit
Burden Data and Thermal Capacities
Time Curves, 60 Hertz

Ampere Rating:	0.5 to 2.5							2 to 6							4 to 12						
Tap Setting:	0.5	0.6	0.8	1.0	1.5	2.0	2.5	2	2.5	3	3.5	4	5	6	4	5	6	7	8	10	12
Short Time (CO-2)																					
Coil Ratings, Amps.	0.91	0.96	1.18	1.37	1.95	2.24	2.50	3.1	4.0	4.4	4.8	5.2	5.6	6.0	7.3	8.0	8.8	9.6	10.4	11.2	12.0
Cont.	28	28	28	28	28	28	28	110	110	110	110	110	110	110	230	230	230	230	230	230	230
1 Sec ^①	28	28	28	28	28	28	28	110	110	110	110	110	110	110	230	230	230	230	230	230	230
Pf Angle, Lag ^②	58°	57°	53°	50°	40°	36°	29°	59°	55°	51°	47°	45°	41°	37°	65°	50°	47°	46°	43°	37°	34°
V-A Burden ^③																					
@ tap	4.8	4.9	5.0	5.3	6.2	7.2	7.9	5.04	5.13	5.37	5.53	5.72	5.90	6.54	4.92	5.20	5.34	5.53	5.86	6.6	7.00
3 x tap	39.6	39.8	42.7	45.4	54.4	65.4	73.6	38.7	39.8	42.8	42.8	46.0	50.3	54.9	39.1	42.0	44.1	45.8	49.9	55.5	62.3
10 x tap	256	270	308	348	435	580	700	262	280	312	329	360	420	474	268	305	330	364	400	470	528
20 x tap	790	851	1024	1220	1740	2280	2850	800	920	1008	1120	1216	1500	1800	848	1020	1128	1260	1408	1720	2064

Long Time♦ (CO-5) Definite Time (CO-6)

Coil Ratings, Amps.	2.7	3.1	3.7	4.1	5.7	6.8	7.7	8	8.8	9.7	10.4	11.2	12.5	13.7	16	18.8	19.3	20.8	22.5	25	28
Cont.	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
1 Sec ^①	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
Pf Angle, Lag ^②	69°	68°	67°	66°	62°	60°	58°	67°	66°	64°	63°	62°	59°	57°	65°	63°	61°	59°	56°	53°	47°
V-A Burden ^③																					
@ tap	3.92	3.96	3.96	4.07	4.19	4.30	4.37	3.88	3.90	3.93	4.09	4.12	4.20	4.38	4.00	4.15	4.32	4.35	4.40	4.60	4.92
3 x tap	20.6	20.7	21	21.4	23.2	24.9	26.2	21	21.6	22.1	23.1	23.5	24.8	26.5	22.4	23.7	25.3	26.4	27.8	30.1	35.6
10 x tap	103	106	114	122	147	168	180	110	118	126	136	144	162	183	126	143	162	183	204	247	288
20 x tap	270	288	325	360	462	548	630	308	342	381	417	448	540	624	376	450	531	611	699	880	1056

Moderately Inverse Time (CO-7)

Coil Ratings, Amps.	2.7	3.1	3.7	4.1	5.7	6.8	7.7	8	8.8	9.7	10.4	11.2	12.5	13.7	16	18.8	19.3	20.8	22.5	25	28
Cont.	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
1 Sec ^①	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
Pf Angle, Lag ^②	68°	67°	66°	64°	61°	58°	56°	66°	63°	63°	62°	61°	59°	58°	64°	61°	60°	58°	55°	51°	46°
V-A Burden ^③																					
@ tap	3.88	3.93	3.93	4.00	4.08	4.24	4.38	4.06	4.07	4.14	4.34	4.34	4.40	4.62	4.24	4.30	4.62	4.69	4.80	5.20	5.40
3 x tap	20.7	20.9	21.1	21.6	22.9	24.8	25.9	21.3	21.8	22.5	23.4	23.8	25.2	27	22.8	24.2	25.9	27.3	29.8	33	37.5
10 x tap	103	107	114	122	148	174	185	111	120	129	141	149	163	183	129	149	168	187	211	260	308
20 x tap	278	288	320	356	459	552	640	306	342	366	413	448	530	624	392	460	540	626	688	860	1032

Inverse Time (CO-8) Very Inverse Time (CO-9)

Coil Ratings, Amps.	2.7	3.1	3.7	4.1	5.7	6.8	7.7	8	8.8	9.7	10.4	11.2	12.5	13.7	16	18.8	19.3	20.8	22.5	25	28
Cont.	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
1 Sec ^①	88	88	88	88	88	88	88	230	230	230	230	230	230	230	460	460	460	460	460	460	460
Pf Angle, Lag ^②	72°	71°	69°	67°	62°	57°	53°	70°	66°	64°	62°	60°	58°	56°	68°	63°	60°	57°	54°	48°	45°
V-A Burden ^③																					
@ tap	2.38	2.38	2.40	2.42	2.51	2.65	2.74	2.38	2.40	2.42	2.48	2.53	2.64	2.75	2.38	2.46	2.54	2.62	2.73	3.00	3.46
3 x tap	21	21	21.1	21.2	22	23.5	24.8	21	21.1	21.5	22	22.7	24	25.2	21.3	21.8	22.6	23.6	24.8	27.8	31.4
10 x tap	132	134	142	150	170	200	228	136	142	149	157	164	180	198	146	158	172	190	207	248	292
20 x tap	350	365	400	440	530	675	800	360	395	430	470	500	580	660	420	480	550	620	700	850	1020

Extremely Inverse Time (CO-11)

Coil Ratings, Amps.	1.7	1.9	2.2	2.5	3.0	3.5	3.8	7.0	7.8	8.3	9.0	10.0	11.0	12.0	14	16	17	18	20	22	26
Cont.	56	56	56	56	56	56	56	230	230	230	230	230	230	230	460	460	460	460	460	460	460
1 Sec ^①	56	56	56	56	56	56	56	230	230	230	230	230	230	230	460	460	460	460	460	460	460
Pf Angle, Lag ^②	36	34	30	27	22	17	16	32	30	27	24	23	20	20	29	25	22	20	18	17	16
V-A Burden ^③																					
@ tap	0.72	0.75	0.81	0.89	1.13	1.30	1.48	0.73	0.78	0.83	0.88	0.96	1.07	1.23	0.79	0.89	1.02	1.10	1.23	1.32	1.8
3 x tap	6.54	6.80	7.46	8.30	10.04	11.95	13.95	6.30	7.00	7.74	8.20	9.12	9.80	11.34	7.08	8	9.18	10	11.1	14.9	16.3
10 x tap	71.8	75	84	93.1	115.5	136.3	160	74	78.5	84	89	102	109	129	78.4	90	101.4	110	124.8	131.6	180
20 x tap	250	267	298	330	411	502	610	264	285	309	340	372	430	504	296	340	378	454	480	600	720

Extremely Inverse Time (CO-11)

Ampere Rating:	0.1 to 0.5						
Tap Setting	.10	.12	.16	.20	.30	.40	.50
Pf. Angle, Lag ^②	34°	32°	30°	26°	22°	18°	16°
V-A Burden ^③							
@ tap	.64	.67	.76	.83	1.01	1.21	1.38
3 x tap	6.5	6.66	7.3	8.3	10.3	11.22	13.8
10 x tap	70.3	75.4	82.4	87.8	117.6	140.0	168.0
20 x tap	240	264	297	336	420	520	630

- ♦ Includes CO-4 (4 to 12 ampere range only)
- ① Thermal capacities for short time other than one second may be calculated on the basis of time being inversely proportional to the square of the current. For example, on the 0.5-2.5 amp range the 1 second rating is 88 amps. To obtain the 0.5 second rating, the appropriate formula is: $I^2t = K$, where K is the square of the 1 second rating in amperes:
- $$I^2t = (88)^2 = 7744$$
- $$t = 0.5$$
- $$0.5 I^2 = 7744$$
- $$I^2 = 15488$$
- $$I = \sqrt{15488} = 124.4$$
- ② Degrees current lags voltage at tap value current.
- ③ Voltages taken with Rectox type voltmeter.

Westinghouse



Time Curves, Time-Overcurrent Unit (CO-2) 50/60 Hertz^②

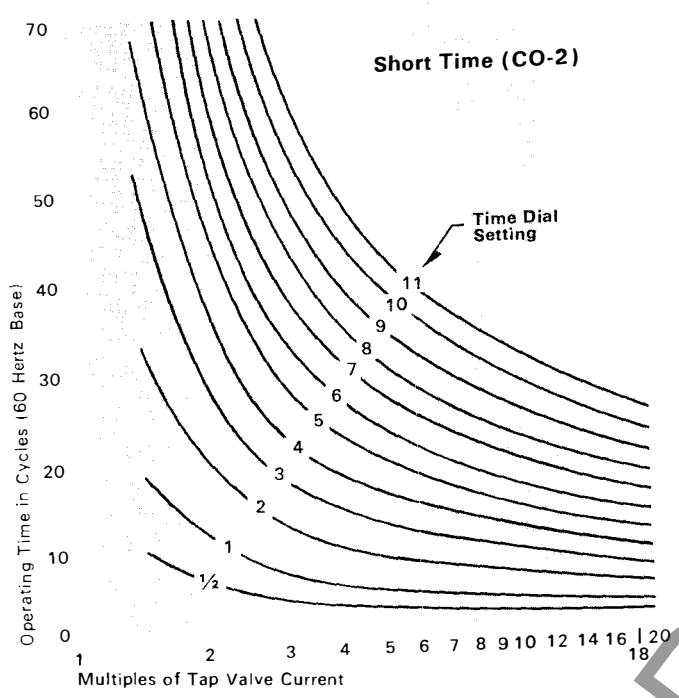


Figure 1

418244

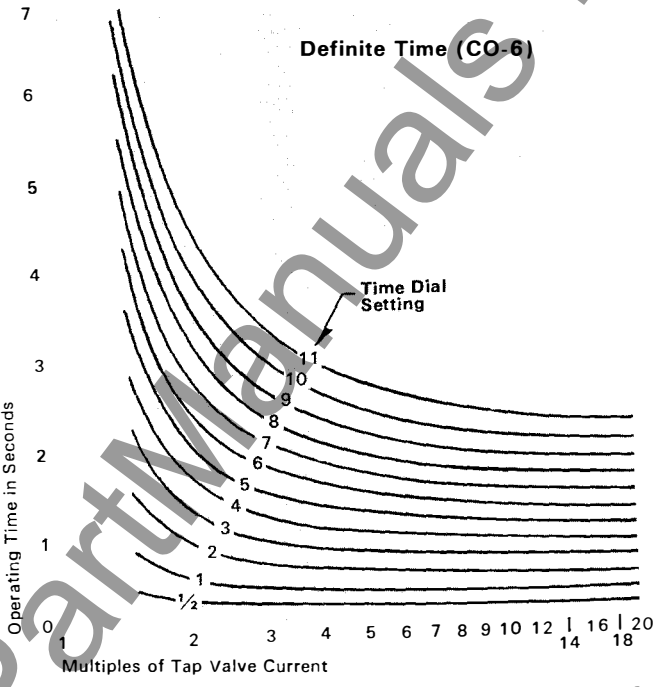


Figure 3

418246

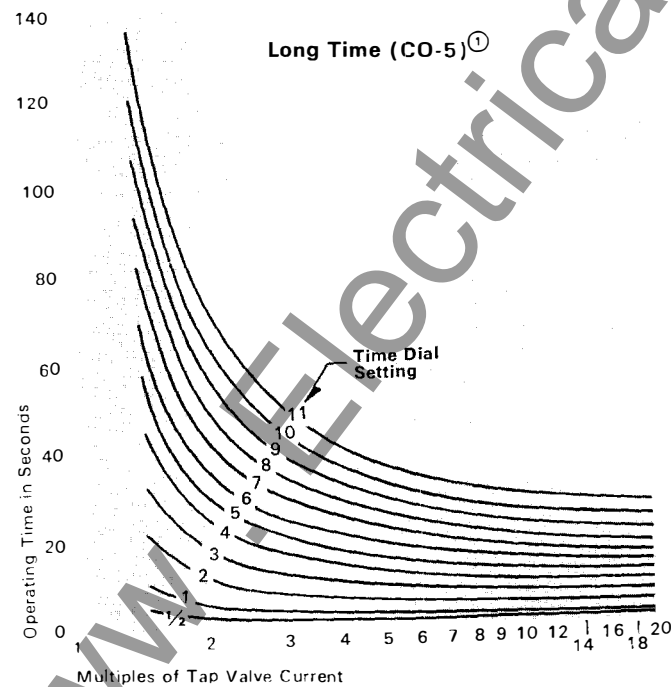


Figure 2

418245

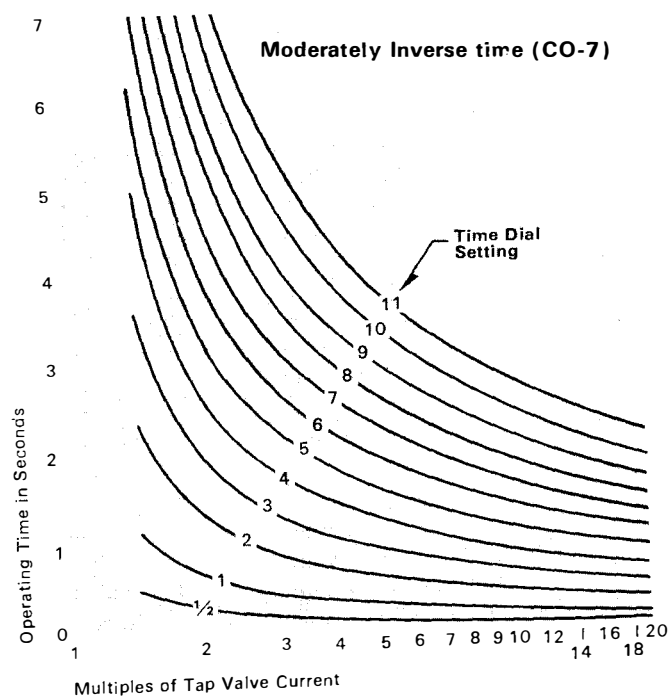
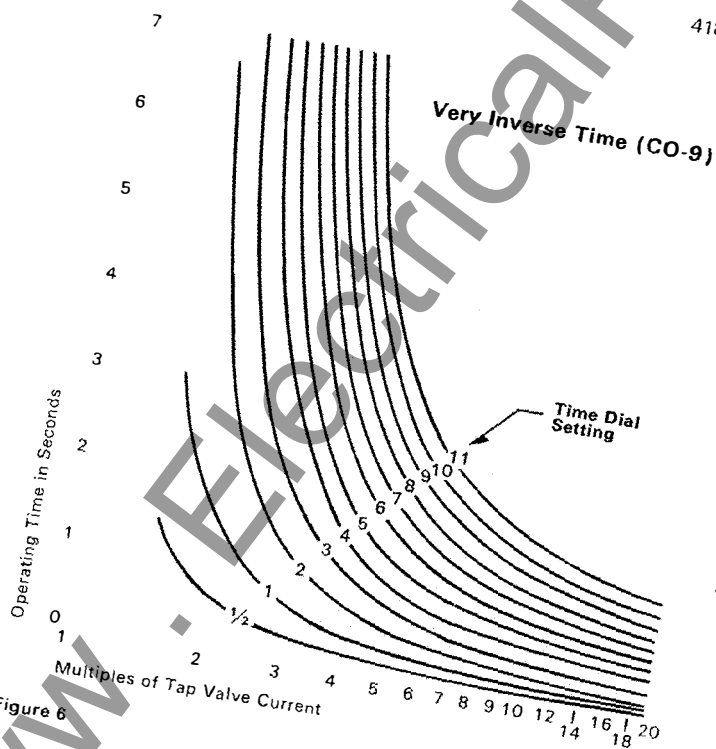
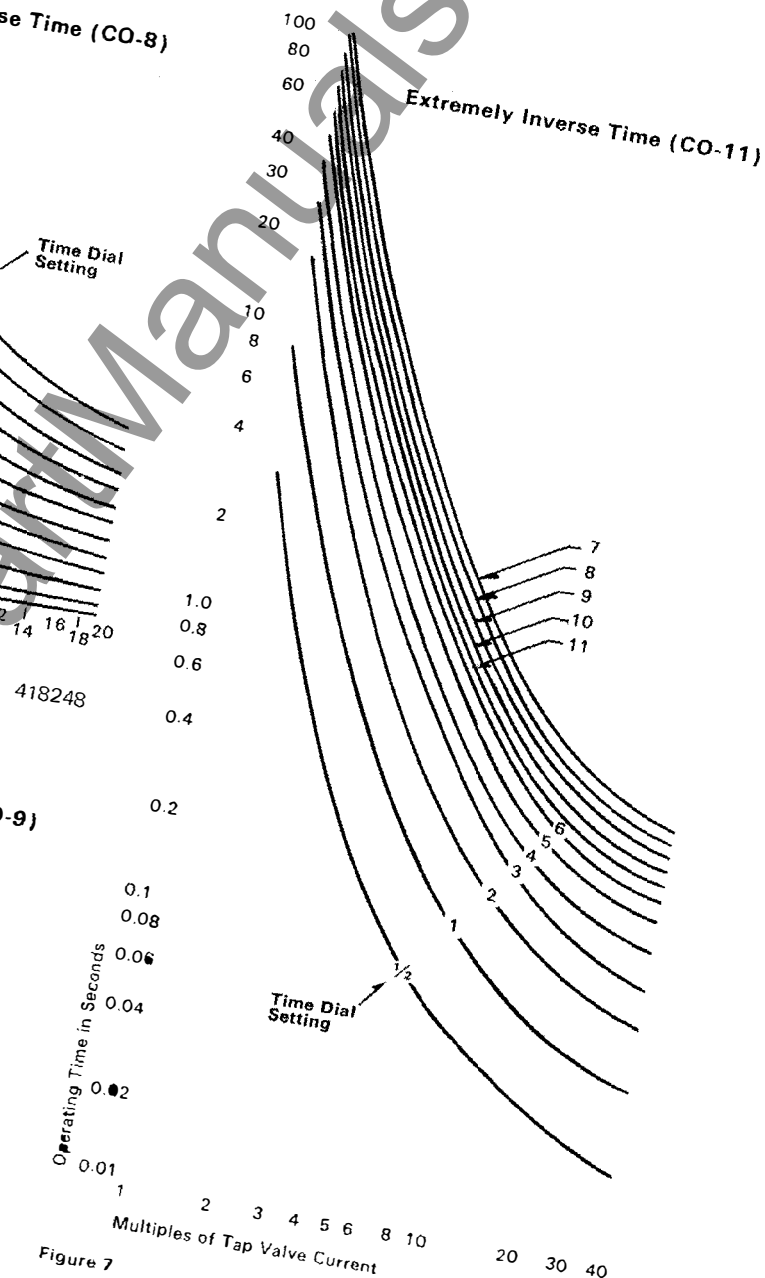
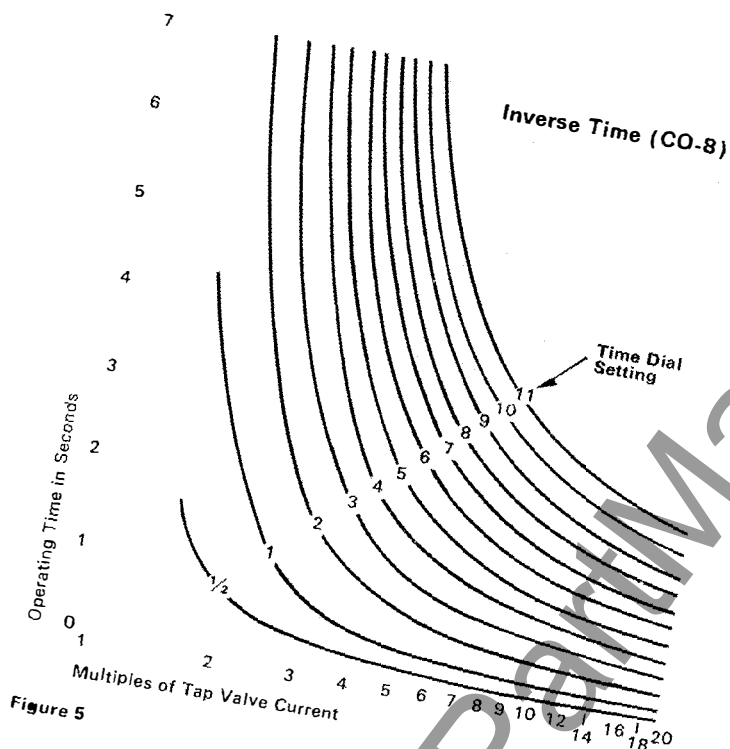


Figure 4

418247

Current Relays

Time Overcurrent Unit
Burden Data and Thermal Capacities
Time Curves



- ① Includes CO-4 (4 to 12 Ampere range on 14).
- ② Curves as shown are available on 8 1/2" x 11" paper, or on Log-Log paper. Consult nearest Westinghouse sales office.

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Current Relays

Time Overcurrent Unit
Burden Data and Thermal Capacities
Time Curves, 60 Hertz

Time Curves, Time-Overcurrent Unit (CO-2) 50/60 Hertz²

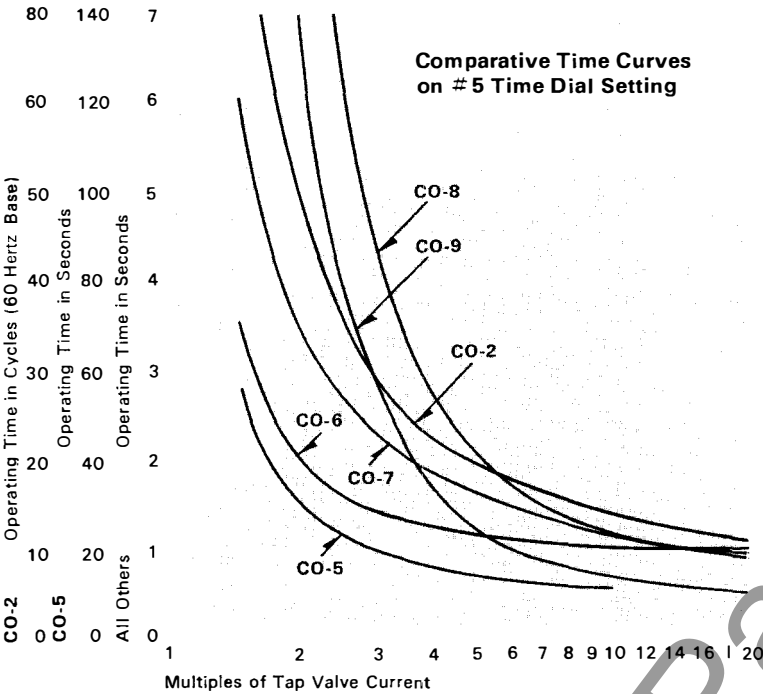


Figure 8

Further Information:

See Relay Application Index 41-000.

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