

RELAYS  
AF, AG, AND AJ TYPES  
(WIRE-SPRING TYPES)  
REQUIREMENTS  
(CONDENSED SECTION FOR 040-502-701)

1. REQUIREMENTS (also see Section 020-012-711)

- 1.01 *Contact Cover Clearance:* Contact cover clears card with cover pushed against stops.
- 1.02 *Armature Position:* Fig. 1 (A)—Armature hinge spring legs, where secured to armature, bear against outer core legs; relay operated and unoperated.

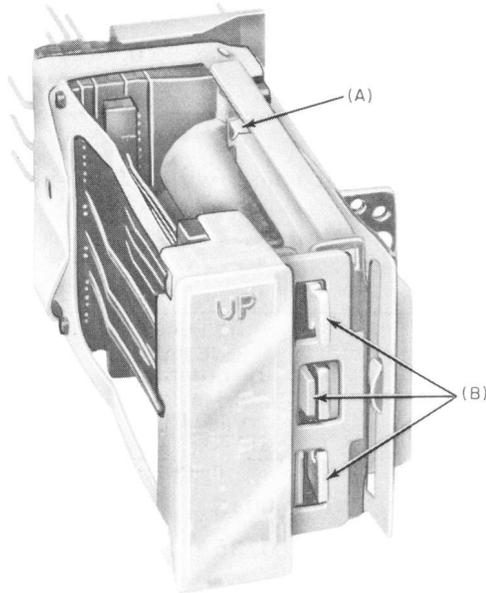


Fig. 1 — AJ-Type Relay

- 1.03 *Balancing Spring Tension:* Fig. 1(B)—Card bears against associated surfaces on armature and armature bears against backstop; relay unoperated.
- 1.04 *Armature Back Tension:* Armature bears against backstop.
- (a) *AF-Type and 12-Position AJ-Type:* Min 25 grams (readjust 30 grams; max 60 grams not applicable if nonoperate or release electrical requirements are specified). 70D or 70J gauge.
- (b) *24-Position AJ-Type:* Min 40 grams (readjust 45 grams; max 80 grams not applicable if nonoperate or release electrical requirements are specified). 70D or 70J gauge.
- (c) *AG-Type:* Min 15 grams (readjust 20 grams). 70D gauge.
- 1.05 *Contact Make and Break*
- (a) Both contacts of movable twin springs make in operated position for make contacts and in unoperated position for break contacts.
- (b) With relay energized against 171A gauge, except where noted, make and break contacts meet following requirements.

SECTION 040-930-701

TEST

- (1) *Before Turnover:* (Refer to Section 040-502-701 for requirements.)
- (2) *After Turnover:*

MAKE CONTACTS	NEITHER PAIR OF CONTACTS MAKE <u>ALL RELAYS</u> (INCH)	AT LEAST ONE PAIR OF CONTACTS MAKE <u>ALL RELAYS</u> (INCH)
	Spring combination No. 1 to 199, 500 and up	†#0.007
Spring combination No. 200 to 399	#0.007	0.0015
Spring combination No. 400 to 499	#0.010	0.0015

BREAK CONTACTS	AT LEAST ONE PAIR OF CONTACTS DO NOT BREAK <u>ALL RELAYS</u> (INCH)	BOTH PAIRS OF CONTACTS BREAK <u>ALL RELAYS</u> (INCH)
	Spring combination No. 1 to 199, 500 and up	†#0.007
Spring combination No. 200 to 399	#0.007	0.0015
Spring combination No. 400 to 499	#0.010	0.0015

# Gauge inserted between armature and backstop.

† For relays having six or less pairs of movable twin springs, requirement is met with 0.0045-inch gauge inserted between armature and backstop.

READJUST

MAKE CONTACTS	NEITHER PAIR OF CONTACTS MAKE <u>TYPE RELAY</u>		AT LEAST ONE PAIR OF CONTACTS MAKE <u>TYPE RELAY</u>	
	<u>AF</u>	<u>AG &amp; AJ</u>	<u>AF</u>	<u>AG &amp; AJ</u>
	(INCH)		(INCH)	
M (Make)	0.012	0.0145	0.0045	0.005
EM (Early Make)	0.0215	0.0255	0.0135	0.016
PM (Preliminary Make)	0.031	0.0365	0.023	0.027

BREAK CONTACTS	AT LEAST ONE PAIR OF CONTACTS DO NOT BREAK <u>TYPE RELAY</u>		BOTH PAIRS OF CONTACTS BREAK <u>TYPE RELAY</u>	
	<u>AF</u>	<u>AG &amp; AJ</u>	<u>AF</u>	<u>AG &amp; AJ</u>
	(INCH)		(INCH)	
B (Break)	±0.012	±0.0145	0.0045	0.005
EB (Early Break)	0.0215	0.0255	0.0135	0.016
PB (Preliminary Break)	0.031	0.0365	0.023	0.027

± Relays having spring combination No. 1 to 199 and 500 and up with 7 or more pairs of movable twin springs also meet specified condition with 0.007-inch gauge inserted between armature and backstop.

**1.06 Contact Sequence**

**TEST**

- (a) **EMB Position:** EM contacts make before B contacts break.
- (b) **EBM Position:** EB contacts break before M contacts make.
- (c) **PMEB Position:** PM contacts make before EB contacts break.
- (d) **PBEM Position:** PB contacts break before EM contacts make.
- (e) **EM, EB, PM, and PB Position:** Check sequence if note on circuit requirement table so specifies.

**Readjust:** Covered by readjust requirement 1.05.

**1.07 Buffer Spring Position**

- (a) With relay energized against 171A gauge, buffer spring meets conditions covered below.

	<u>TYPE RELAY</u>	<u>NO MOVEMENT (INCH)</u>	<u>PERCEPTIBLE MOVEMENT (INCH)</u>
*Test (After Turnover)	All Relays	—	0.0015
Readjust	AF	0.007	0.003
	AG & AJ	0.0085	0.0035

\*For before turnover requirement, refer to Section 040-502-701.

- (b) **Buffer Spring Positioned by Core Plate:** Portion of spring between positioning lugs rests against core plate; relay operated and unoperated.
- (c) Buffer spring not used; card should not touch spring operating lug; relay operated.

**1.08 Buffer Spring Tension:** Min 20 grams (readjust 25 grams). 70D gauge.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS									
	1	2	3	4	5	6	7	8	9	10
12	—	—	—	—	M	M	M	M	—	—
11	—	—	—	—	—	M	M	M	—	—
10	—	—	M	M	M	M	M	M	—	—
9	—	—	—	—	—	M	M	M	—	—
8	—	M	M	M	M	M	M	M	—	—
7	—	—	—	—	—	—	—	M	B	B
6	M	M	M	M	M	M	M	M	M	M
5	—	—	—	—	—	—	M	M	—	B
4	—	—	M	M	M	M	M	M	—	—
3	—	—	—	—	—	M	M	M	—	—
2	—	—	—	M	M	M	M	M	—	—
1	—	—	—	—	—	M	M	M	—	—
	11	12	13	14	15	16	17	18	19	20
12	—	M	M	M	M	M	—	—	M	M
11	—	—	—	M	M	M	—	—	—	M
10	M	M	M	M	M	M	—	M	BM	M
9	—	—	—	—	M	M	—	—	—	—
8	M	M	M	M	M	M	M	BM	BM	BM
7	B	B	B	B	B	B	—	—	—	—
6	M	M	M	M	M	M	BM	BM	BM	BM
5	—	—	B	—	—	B	—	—	—	—
4	M	M	M	M	M	M	—	M	BM	M
3	—	—	—	M	M	M	—	—	—	M
2	M	M	M	M	M	M	—	—	M	M
1	—	—	—	M	M	M	—	—	M	M
	21	22	23	24	25	26	27	28	29	30
12	M	—	—	—	M	M	M	M	M	M
11	M	—	B	—	—	M	—	B	M	—
10	M	—	—	BM	BM	BM	M	BM	M	M
9	M	—	B	B	—	M	—	B	—	—
8	BM	BM	—	BM	BM	BM	BM	BM	M	M
7	M	—	B	B	B	B	B	B	B	B
6	BM	BM	—	BM						
5	M	—	B	B	B	M	—	B	B	B
4	BM	—	—	BM	BM	BM	M	BM	M	M
3	M	—	B	B	—	M	—	B	—	—
2	M	—	—	M	M	M	M	M	M	M
1	M	—	—	—	—	M	—	B	M	—

M — Make  
B — Break

See Reqt 2.11

BM — Break Make — See Reqt 2.11 and 2.12

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	31	32	33	34	35	36	37	38	39	40	
12	BM	—	—	BM	M	—	—	—	—	B	
11	M	—	—	M	M	—	—	—	—	B	
10	BM	M	M	BM	M	M	—	—	—	M	
9	—	—	B	M	B	B	—	—	—	B	
8	BM	BM	M	BM	M	M	M	M	M	M	
7	B	B	B	M	B	B	B	B	B	B	
6	BM	BM	M	BM	M	M	M	M	M	M	
5	—	—	B	M	B	B	—	—	B	B	
4	BM	M	M	BM	M	M	—	M	M	M	
3	M	—	B	M	B	—	—	—	—	B	
2	BM	—	—	BM	M	M	—	—	—	M	
1	M	—	—	M	M	—	—	—	—	B	
	41	42	43	44	45	46	47	48	49	50	
12	—	M	—	—	—	—	—	M	M	—	
11	—	B	—	—	—	—	—	M	M	—	
10	—	M	—	—	—	—	—	M	BM	—	
9	—	B	B	—	B	—	—	—	—	—	
8	M	BM	M	M	M	M	—	M	BM	BM	
7	B	B	B	B	B	—	B	B	—	—	
6	M	BM	M	BM	M	M	—	M	BM	BM	
5	B	B	B	—	B	—	—	—	—	—	
4	—	M	—	M	M	M	—	M	BM	BM	
3	—	B	B	—	—	—	—	—	—	—	
2	—	M	—	—	—	—	—	M	M	—	
1	—	B	—	—	—	—	—	M	M	—	
	51	52	53	54	55	56	57	58	59	60	
12	M	—	—	—	—	B	—	B	BM	—	
11	M	—	—	—	—	—	BM	—	B	BM	
10	M	B	—	M	B	B	M	M	BM	—	
9	B	—	—	—	—	—	BM	—	B	BM	
8	M	—	—	BM	M	M	—	B	BM	—	
7	B	—	—	—	—	—	BM	—	B	BM	
6	BM	M	B	BM	BM	BM	B	—	BM	BM	
5	B	—	—	—	—	—	BM	—	B	BM	
4	M	—	—	M	M	M	M	—	BM	—	
3	—	—	—	—	—	—	BM	—	B	BM	
2	M	—	—	B	—	B	M	BM	BM	—	
1	M	—	—	—	—	—	BM	—	B	BM	

M — Make  
B — Break

See Reqt 2.11.

BM — Break Make — See Reqt 2.11 and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	61	62	63	64	65	66	67	68	69	70	
12	M	M	M	BM	M	M	M	M	—	BM	
11	M	M	M	BM	—	—	—	—	—	BM	
10	M	BM	BM	BM	M	M	M	M	B	BM	
9	M	—	M	BM	—	—	—	B	—	—	
8	BM	BM	BM	BM	M	M	B	M	BM	BM	
7	M	—	M	BM	—	B	—	B	—	—	
6	BM	BM	BM	BM	BM	M	B	M	BM	BM	
5	M	—	M	BM	—	—	—	B	—	—	
4	M	BM	BM	BM	M	M	M	M	BM	BM	
3	M	M	M	BM	—	—	—	—	—	—	
2	M	M	M	BM	M	M	M	M	—	BM	
1	M	M	M	BM	—	M	—	—	—	BM	
	71	72	73	74	75	76	77				
12	—	—	M	—	B	—	BM				
11	—	—	—	—	—	—	BM				
10	M	M	M	—	—	M	BM				
9	—	—	—	—	—	—	M				
8	M	M	M	BM	—	BM	BM				
7	—	B	B	—	—	B	M				
6	B	BM	BM	BM	—	BM	BM				
5	—	B	—	—	—	B	M				
4	M	M	M	M	—	M	BM				
3	—	—	—	—	—	—	M				
2	M	M	M	—	M	M	BM				
1	—	—	M	—	M	—	BM				
	200	201	202	203	204	205	206	207	208	209	
12	—	—	—	—	M	EMB	EM	—	EMB	—	
11	—	—	—	—	—	M	M	—	—	—	
10	M	—	—	EBM	M	EBM	M	—	EBM	—	
9	—	—	—	—	—	—	—	—	—	—	
8	EBM	EBM	EBM	EBM	EBM	EBM	EBM	EBM	EBM	—	
7	B	—	B	—	B	—	—	—	—	—	
6	EMB	EBM	EMB	EBM	EBM	EMB	EMB	EMB	EMB	EBM	
5	B	—	—	—	—	—	—	—	—	—	
4	EBM	—	M	EBM	EBM	EBM	EBM	EBM	EBM	—	
3	—	—	—	—	—	—	M	—	—	—	
2	M	—	—	—	M	EBM	M	—	EBM	—	
1	—	—	—	—	M	M	M	—	—	—	

M — Make  
B — Break

See Reqt 2.11.

BM — Break Make  
EBM — Early Break Make  
EMB — Early Make Break

See Reqt 2.11  
and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	210	211	212	213	214	215	216	217	218	219	
12	M	—	EM	EM	EM	EM	—	EBM	—	EMB	
11	—	—	M	—	—	—	—	—	—	M	
10	M	—	EBM	M	M	M	—	EBM	M	M	
9	—	—	—	B	—	—	—	—	—	BM	
8	EBM	EBM	EBM	EBM	EBM	EBM	M	EBM	EBM	M	
7	—	—	B	B	B	B	—	—	B	BM	
6	EBM	EMB	EMB	EMB	EMB	EMB	EMB	EBM	EBM	EMB	
5	—	—	—	B	—	B	—	—	—	BM	
4	M	—	EBM	EBM	M	M	M	EBM	M	M	
3	—	—	—	—	—	—	—	—	—	BM	
2	M	—	M	M	M	M	—	EBM	—	M	
1	—	—	M	—	—	M	—	—	—	M	
	220	221	222	223	224	225	226	227	228	229	
12	EBM	EM	EM	EM	EMB	—	EMB	EBM	—	—	
11	EBM	—	—	M	M	—	BM	M	—	—	
10	EBM	M	M	M	EBM	M	EBM	EBM	M	—	
9	EBM	—	—	—	—	—	M	M	B	B	
8	EBM	EBM	EBM	EBM	EBM	EBM	EBM	EBM	EBM	M	
7	EBM	—	B	B	B	—	—	B	B	B	
6	EBM	EMB	EMB	EMB	EMB	EMB	EMB	EBM	EMB	EMB	
5	EBM	—	—	—	—	—	M	M	B	B	
4	EBM	M	M	M	EBM	M	EBM	EBM	M	M	
3	EBM	—	—	M	M	—	BM	M	B	—	
2	EBM	M	M	M	EBM	—	EBM	EBM	M	—	
1	EBM	—	M	M	M	—	BM	M	—	—	
	230	231	232	233	234	235	236	237	238	239	
12	M	M	—	—	EBM	EM	EM	—	—	EMB	
11	M	M	—	—	EBM	M	—	—	EMB	—	
10	EBM	EBM	M	M	EBM	M	M	M	—	EBM	
9	B	M	—	—	EBM	M	B	—	EMB	—	
8	EBM	EBM	M	EBM	EMB	EBM	EBM	EBM	—	EBM	
7	B	B	—	B	—	M	B	—	BM	B	
6	EBM	EBM	EMB	EBM	EMB	EMB	B	EBM	EBM	EMB	
5	B	B	—	B	—	M	BM	—	BM	—	
4	EBM	EBM	M	M	EBM	EBM	M	M	—	EBM	
3	—	M	—	—	EBM	M	—	—	EMB	—	
2	M	M	M	—	EBM	M	M	—	—	EBM	
1	M	M	—	—	EBM	M	M	—	EMB	M	

M — Make  
B — Break

See Reqt 2.11.

BM — Break Make  
EM — Early Make  
EBM — Early Break Make  
EMB — Early Make Break

See Reqt 2.11  
and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	240	241	242	243	244	245	246	247	248	249	
12	—	M	—	EM	EM	—	—	M	EM	EBM	
11	—	M	—	M	M	—	—	M	—	EBM	
10	EBM	EBM	—	M	M	EBM	—	M	M	EBM	
9	—	M	—	—	M	B	—	—	—	EBM	
8	EMB	EBM	M	EBM	EBM	EBM	EBM	EBM	M	EMB	
7	—	—	B	B	B	B	B	B	B	EBM	
6	EMB	EBM	EBM	EMB	EMB	EBM	EBM	EBM	EMB	EMB	
5	EM	M	B	—	B	B	B	—	B	EMB	
4	EB	EBM	M	EBM	M	EBM	M	EBM	M	EBM	
3	—	M	—	—	M	B	—	M	—	EBM	
2	—	M	—	M	M	M	—	M	M	EBM	
1	—	M	—	M	M	—	—	M	—	EBM	
	250	251	252	253	254	255	256	257	258	259	
12	EM	—	EMB	—	EBM	EM	—	EM	—	EBM	
11	B	—	M	—	EBM	M	—	M	—	EBM	
10	EBM	—	EBM	M	EBM	M	M	EBM	—	EBM	
9	B	—	M	—	—	—	B	M	—	EBM	
8	EBM	EBM	EBM	EBM	EMB	M	EBM	EBM	EMB	EM	
7	B	B	—	—	—	B	B	—	—	—	
6	EMB	EMB	EMB	EMB	EMB	EM	EMB	EMB	EMB	EMB	
5	B	B	—	—	—	B	B	M	—	EM	
4	EBM	—	EBM	EBM	EBM	M	EBM	EBM	M	EBM	
3	B	—	M	—	—	M	B	M	—	EBM	
2	M	—	EBM	—	EBM	M	—	EBM	—	EBM	
1	M	—	M	—	EBM	M	—	M	—	EBM	
	260	261	262	263	264	265	266	267	268	269	
12	—	M	M	M	—	EM	EM	—	M	M	
11	—	M	M	M	—	B	M	—	M	—	
10	—	M	EBM	EBM	M	EBM	M	M	M	M	
9	EB	—	M	—	B	B	B	—	M	—	
8	EMB	EBM	EMB	EBM	EBM	EBM	M	EBM	EBM	EMB	
7	EB	B	—	B	B	B	B	—	—	—	
6	EMB	EBM	EMB	EBM	EBM	EMB	EM	EBM	EBM	EMB	
5	B	B	—	—	B	B	B	—	—	EM	
4	M	M	EBM	EBM	M	EBM	M	EBM	EBM	—	
3	—	M	M	—	—	B	—	—	M	—	
2	—	M	EBM	M	—	EBM	M	—	M	M	
1	—	M	M	M	—	—	M	—	M	—	
M — Make	See Reqt 2.11.					EB — Early Break			See Reqt 2.11 and 2.12.		
B — Break						EM — Early Make					
						EBM — Early Break Make					
						EMB — Early Make Break					

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	270	271	272	273	274	275	276	277	278	279	
12	EM	EMB	B	—	—	EBM	EMB	EM	EB	EMB	
11	M	M	—	—	—	EBM	—	B	EBM	—	
10	M	EBM	EBM	EBM	M	EBM	EBM	M	EBM	M	
9	M	—	—	B	—	EB	—	B	EBM	B	
8	EBM	EBM	EBM	EBM	EBM	—	EBM	EBM	B	M	
7	B	B	—	B	—	M	—	B	M	B	
6	EMB	EMB	EMB	EBM	B	EMB	EMB	EMB	B	EMB	
5	M	—	—	B	—	—	—	B	EMB	B	
4	EBM	EBM	EBM	EBM	M	EBM	M	M	M	M	
3	M	—	—	B	—	EB	B	B	EBM	—	
2	M	EBM	—	—	EBM	EBM	EBM	M	EBM	—	
1	M	M	—	—	—	EBM	B	BM	EBM	—	
	280	281	282	283	284	285	286	287	288	289	
12	M	EM	—	M	—	M	M	—	—	M	
11	—	M	—	M	—	M	—	—	—	M	
10	M	M	M	M	M	M	EBM	M	M	M	
9	—	BM	—	BM	—	B	—	—	—	—	
8	EBM	—	EMB	EBM	B	EBM	B	EMB	EBM	EM	
7	B	BM	—	BM	—	B	—	—	—	M	
6	EBM	—	EMB	EBM	B	EBM	B	EMB	EMB	EM	
5	B	BM	—	BM	—	B	—	EM	—	EM	
4	EBM	M	M	EBM	EBM	M	EBM	—	M	—	
3	—	BM	—	M	—	M	—	—	—	M	
2	M	M	M	M	M	M	M	M	M	M	
1	—	M	—	M	—	M	—	—	—	M	
	290	291	292	293	294	295	296	297	298	299	
12	EMB	B	—	—	—	—	—	—	M	EBM	
11	—	M	—	—	—	—	—	—	M	EMB	
10	EB	EBM	—	—	M	M	M	M	EBM	EBM	
9	—	—	—	B	—	—	B	—	M	EMB	
8	EB	EBM	EBM	EBM	EBM	M	M	EMB	EBM	EBM	
7	—	—	B	B	—	B	B	EB	M	BM	
6	EMB	EMB	EMB	EBM	EBM	EMB	EMB	EMB	EBM	EBM	
5	—	—	B	B	—	B	B	—	M	BM	
4	EBM	—	M	M	M	M	M	EBM	EBM	EBM	
3	—	B	—	B	—	—	—	—	M	EMB	
2	—	EBM	—	—	M	M	—	—	M	EBM	
1	—	BM	—	—	—	—	—	—	M	EMB	

M – Make  
B – Break

See Reqt 2.11.

BM – Break Make  
EB – Early Break  
EM – Early Make  
FBM – Early Break Make  
EMB – Early Make Break

See Reqt 2.11 and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBERS										
	300	301	302	303	304	305	306	307	308	309	
12	—	—	EM	—	EM	EM	EM	M	EM	EM	
11	—	—	—	—	BM	—	M	M	B	—	
10	M	EBM	—	M	M	M	EBM	EBM	M	M	
9	—	M	BM	—	B	B	B	—	BM	B	
8	EBM	EBM	—	EMB	M	EBM	EBM	EBM	—	EBM	
7	—	M	BM	—	B	B	B	—	B	B	
6	EBM	EBM	—	EMB	EM	EMB	EMB	EBM	—	B	
5	—	M	BM	—	B	B	B	—	B	BM	
4	EBM	EBM	—	EBM	M	EBM	EBM	EBM	M	EBM	
3	—	M	—	—	B	—	B	—	BM	—	
2	M	M	—	M	M	M	M	EBM	M	M	
1	—	—	—	—	M	M	M	M	M	M	
	310	311	312	313	314	315	316	317	318	319	
12	EM	EBM	EM	M	EBM	—	EBM	—	—	—	
11	—	EBM	—	M	BM	—	M	—	EMB	M	
10	M	EBM	M	EBM	EBM	—	EBM	M	—	M	
9	B	—	—	EB	M	B	M	B	EMB	—	
8	EB	B	EBM	EMB	EBM	—	EMB	EBM	EBM	EBM	
7	B	—	B	EB	—	B	EB	B	BM	—	
6	B	EMB	EMB	EMB	EBM	EBM	EMB	EBM	EBM	EMB	
5	B	—	—	B	—	B	—	B	BM	—	
4	M	M	EBM	EBM	M	—	EBM	M	—	M	
3	B	EB	—	EB	BM	—	M	B	EMB	—	
2	M	EBM	M	M	EBM	—	EBM	M	—	M	
1	—	EBM	—	M	BM	—	M	B	EMB	M	
	320	321	322	323	324	325	326	327	328	329	
12	EM	M	M	EBM	—	—	EBM	EM	—	—	
11	BM	M	EMB	M	—	—	BM	—	—	M	
10	M	M	—	EBM	EBM	EBM	EBM	M	EBM	M	
9	B	—	B	—	—	—	M	—	M	—	
8	EBM	EBM	—	—	EBM	M	EBM	M	EBM	M	
7	B	B	B	M	—	—	M	—	M	B	
6	EM	EBM	EB	EMB	EMB	EM	EBM	EMB	EMB	EMB	
5	B	B	B	—	—	—	M	—	M	B	
4	EBM	M	—	M	EBM	M	EBM	M	EBM	M	
3	M	B	B	—	—	—	BM	—	M	—	
2	EBM	M	M	EBM	EBM	EBM	EBM	M	EBM	—	
1	M	M	EMB	M	—	—	BM	M	—	M	

M — Make  
B — Break

See Reqt 2.11.

BM — Break Make  
EB — Early Break  
EM — Early Make  
EBM — Early Break Make  
EMB — Early Make Break

See Reqt 2.11 and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATIONS FIGURE NUMBERS										
	330	331	332	333	334	335	336	337	338	339	
12	EMB	M	M	M	—	—	EBM	EMB	M	EMB	
11	M	—	M	EM	M	—	EMB	—	M	—	
10	EBM	M	M	M	M	EBM	EBM	M	M	M	
9	M	—	EB	EM	M	—	EMB	—	BM	—	
8	EBM	EBM	EMB	M	B	EBM	EBM	EBM	EBM	—	
7	M	EB	EB	EM	EBM	—	EMB	—	B	—	
6	EM	EBM	EMB	M	B	EBM	EBM	EMB	—	—	
5	M	EB	B	EM	EMB	—	EMB	B	BM	B	
4	EBM	—	EBM	M	EBM	EBM	EBM	M	EBM	—	
3	M	M	EBM	EM	M	—	EMB	—	M	BM	
2	M	M	M	M	M	M	EBM	EBM	M	M	
1	M	M	M	EM	M	—	EMB	—	M	M	
	340	341	342	343	344	345	346	347			
12				EBM		M	EBM	EM			
11				M		—	EMB	—			
10				EBM		M	EBM	—			
9				M		—	EMB	—			
8				EBM		EBM	EBM	M			
7				M		—	B	—			
6				EBM		M	EBM	EMB			
5				M		B	BM	B			
4				EBM		M	EBM	—			
3				M		—	EMB	B			
2				EBM		M	EBM	M			
1				M		—	EMB	—			
	348	349	350	351	352						
12	—	M	M	—	M						
11	—	EMB	M	—	—						
10	M	EBM	M	—	EBM						
9	—	EM	M	—	—						
8	M	M	EBM	EBM	EMB						
7	B	B	M	B	EB						
6	EM	EBM	EBM	EM	EMB						
5	—	B	M	—	B						
4	M	M	EBM	EBM	EBM						
3	—	EMB	M	—	—						
2	—	M	M	—	M						
1	—	EMB	M	—	—						

M — Make  
B — Break

See Reqt 2.11.

BM — Break Make  
EB — Early Break  
EM — Early Make  
EBM — Early Break Make  
EMB — Early Make Break

See Reqt 2.11 and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATIONS FIGURE NUMBERS									
	400	401	402	403	404	405	406	407	408	409
12	—	—	—	EM	—	—	EM	PBEM	—	—
11	—	—	—	—	—	—	—	—	—	—
10	M	EBM	EBM	EBM	—	EBM	EBM	—	EBM	M
9	—	PM	—	—	—	—	—	—	PMEB	—
8	EMB	—	—	EMB	—	—	EMB	EMB	EMB	EMB
7	B	—	—	B	—	—	B	—	BM	B
6	EBM	EBM	EBM	EBM	—	—	EBM	EBM	EBM	EBM
5	B	—	—	B	—	—	B	BM	BM	B
4	PM	PM	PM	PM	—	—	PM	—	PMEB	PM
3	—	M	—	—	—	—	B	B	BM	B
2	—	—	—	EM	—	PBEM	EM	EM	EM	—
1	—	—	—	—	—	—	—	B	—	—
	<b>410</b>	<b>411</b>	<b>412</b>	<b>413</b>	<b>414</b>	<b>415</b>	<b>416</b>	<b>417</b>	<b>418</b>	<b>419</b>
12	PB	—	PBEM	EM	PBEM	PBEM	—	PB	EM	—
11	M	BM	—	BM	BM	—	M	M	BM	M
10	M	EBM	—	M	EBM	EBM	EBM	EB	EBM	EBM
9	—	—	—	PMEB	PMEB	—	—	PM	—	—
8	EMB	EM	EMB	EMB	EMB	EMB	EMB	—	EM	EMB
7	—	B	—	B	BM	—	B	M	—	B
6	EBM	EBM	—	M	EBM	EBM	EBM	EBM	EBM	EBM
5	B	B	—	B	BM	—	B	M	—	B
4	—	PM	—	PMEB	PMEB	—	PM	—	PM	PMEB
3	—	B	—	M	BM	BM	—	M	BM	—
2	PBEM	EM	PBEM	PBEM	PBEM	PBEM	EM	PB	EM	PBEM
1	M	BM	—	M	BM	BM	M	M	M	M
	<b>420</b>	<b>421</b>	<b>422</b>	<b>423</b>	<b>424</b>	<b>425</b>	<b>426</b>	<b>427</b>		
12	EM	—	EM	PB	—	EMPB	EBM	EM		
11	B	—	B	M	BM	—	EBM	M		
10	M	M	M	EB	EBM	EBM	EBM	M		
9	—	—	PMEB	PM	—	—	EBM	—		
8	EM	EMB	EM	EM	EMB	EMB	EMB	EM		
7	B	B	B	M	B	—	PMEB	B		
6	EBM	EBM	EBM	EBM	EBM	EBM	EBM	EBM		
5	B	B	B	M	B	M	EMB	—		
4	PM	PM	PM	—	PMEB	—	EBM	PM		
3	B	B	B	M	—	B	EBM	M		
2	EM	EM	EM	PB	PBEM	—	EBM	EM		
1	B	—	B	M	M	M	EBM	M		

M — Make  
 B — Break  
 BM — Break Make  
 EB — Early Break  
 EM — Early Make  
 PM — Preliminary Make

See Reqt 2.11.

See Reqt 2.11 and 2.12.

PB — Preliminary Break  
 EBM — Early Break Make  
 EMB — Early Make Break  
 PBEM — Preliminary Break Early Make  
 PME B — Preliminary Make Early Break

See Reqt 2.11 and 2.12.

TABLE A – SPRING COMBINATION FIGURE NUMBERS AND CONTACT POSITIONS (Cont)

CONTACT POSITIONS	SPRING COMBINATION FIGURE NUMBER	
	500	501
12 & 24	M	B
11 & 23	M	B
10 & 22	M	B
9 & 21	M	B
8 & 20	M	B
7 & 19	M	B
6 & 18	M	B
5 & 17	M	B
4 & 16	M	B
3 & 15	M	B
2 & 14	M	B
1 & 13	M	B

M – Make      See Reqt 2.11.