Model HEA

Multicontact Auxiliary
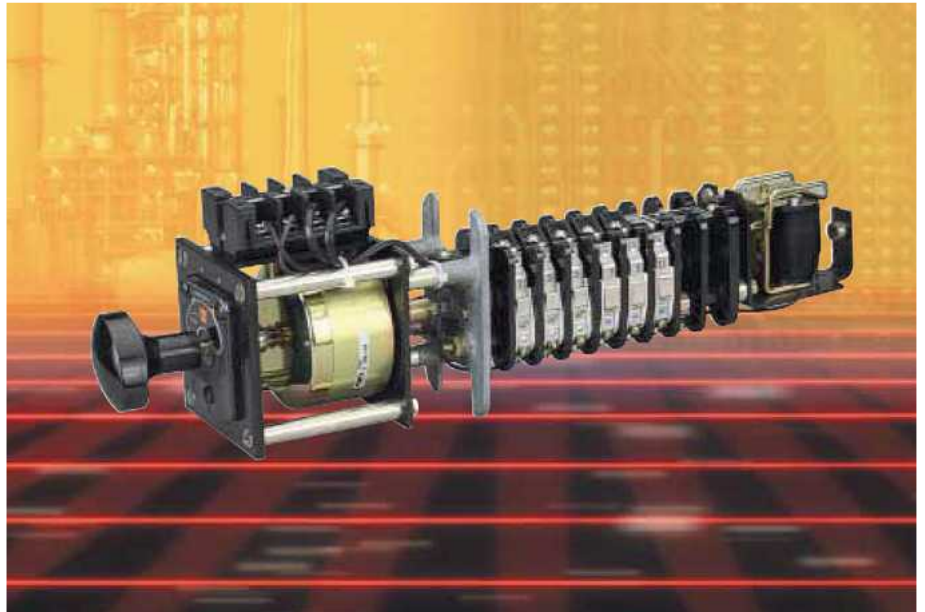
Features and Benefits

- Electrically separate outputs available
- Various shaft lengths available
- Locks equipment out of service

Applications

- Contact multiplication

Protection and Control

- Trip and/or block close breaker control

High-speed multicontact relays to perform auxiliary functions on AC and DC circuits.

Application

HEA high-speed multicontact auxiliary relays are applicable where it is desired that a number of operations be performed simultaneously from the operation of a single relay.

Typical functions that can be performed by these relays are:
1. trip the main circuit breaker of a system
2. trip station auxiliary breakers
3. trip main or auxiliary field breakers
4. trip and lock out all breakers on a bus

Perhaps the most important use of the HEA relay is in conjunction with differential relays which protect transformers, rotating apparatus, buses, etc.

Construction

The HEA multicontact, hand-reset auxiliary relays are built with many parts common to the wellknown Type SB-1 control and transfer switches. The mechanical target on the escutcheon plate assembly indicates the position of the relay. The black target indicates the reset position and the orange target, the tripped position. To reset the relay after being tripped, the handle is turned clockwise as indicated by the arrow on the escutcheon plate.

Since the HEA relay is basically similar to the SB-1 switch, it is available with a shaft long enough to allow it to be mounted on panels with a thickness of from 1/8 inch to 2 inches thick, in increments of 1/16 inch.

Like the SB-1 switch, all HEA relays must be ordered for the specific panel thickness, otherwise the relay will be supplied with a shaft long enough to be mounted only on a 1/8 inch panel.

EXAMPLE: HEA61A222 for 3/4 inch panel relay number would be HEA61A222X12 (3/4 inch = 12/16 = _____ X12).

EXAMPLE: HEA63F272 for 1 1/2 inch panel relay number would be HEA6313272X24 (1-1/2 inch = 24/16 = _____ X24).

HEA61, HEA62, and HEA63

Operation

The operating shaft is held in the reset position by a positive roller latch which is especially constructed to resist shock arid vibration. It is released through the action of the operating coil, in attracting a hinged element.

All HEA relays are made so that they should not normally be tripped manually, although it is possible by removing the rear cover and releasing the hingedarmature element.

Special Mounting

HEA61A, 61B, 61C, 62C, 63C and 63G relays can be supplied with a bevel-gear drive which allows the relay to be mounted in locations where normally the depth is not sufficient. The relays can be mounted like the standard but the bevel-gear drive changes the direction by 90° of that portion of the relay that is behind the panel. The bevel-gear drive is available to change the direction up, down, left, or right.

To select the proper model number of the special relay, select the number of the standard relay desired (example: HEA61C230X2). If a right angle drive upward is desired, add the letters "Right-angle Up" to the standard model number. Hence, the model number would be HEA61CRU230X2 (for 1/8 inch panel).

Contact Ratings

The current-closing rating of the contacts is 50 A for voltages not exceeding 600 V. The contacts have a current-carrying capacity of 20 A continuously or 50 A for one minute. The interrupting ability of the contacts varies with the inductance of the circuit. The values (in amperes) given in Table 1, for DC inductive circuits, are based on the average trip coil.

Burdens

The burdens for the Type HEA relays are given in Table 2.

Model HEA - Table 1. Contact interrupting ratings

Circuit Volts	Amps Noninductive Circuits Number of Contacts			Amps Inductive Circuit Number of Contacts		
	1	2 in Series	4 in Series	1	2 in Series	4 in Series
24 DC	6.0	30.0	- - - -	4.0	20.0	30.0
48 DC	5.0	25.0	40.0	3.0	15.0	25.0
125 DC	2.5	11.0	25.0	2.0	6.25	9.5
250 DC	0.75	2.0	8.0	0.7	1.75	6.5
600 DC	0.25	0.45	1.35	0.15	0.35	1.25
115 AC	40.0	50.0	- - - -	24.0	50.0	- - - -
230 AC	25.0	50.0	- - - -	12.0	25.0	40.0
460 AC	12.0	25.0	- - - -	5.0	12.0	20.0
550 AC	6.0	12.0	- - - -	4.0	10.0	15.0

HEA61 Hand Reset

Application

The HEA61 relay is a hand-reset high speed auxiliary relay. When it is used in conjunction with differential relays which are protecting transformers, rotating machines, buses, etc., it is preferred that the auxiliary relay be hand reset to prevent accidental reclosing of breakers when an internal fault has caused the differential relay to operate.

Operation

The HEA61 relay is available with 6, 10, or 16 main electrically separate contacts. In addition, there are 2 normally closed contacts that are wired for opening the operating coil circuit. See Figure 2.
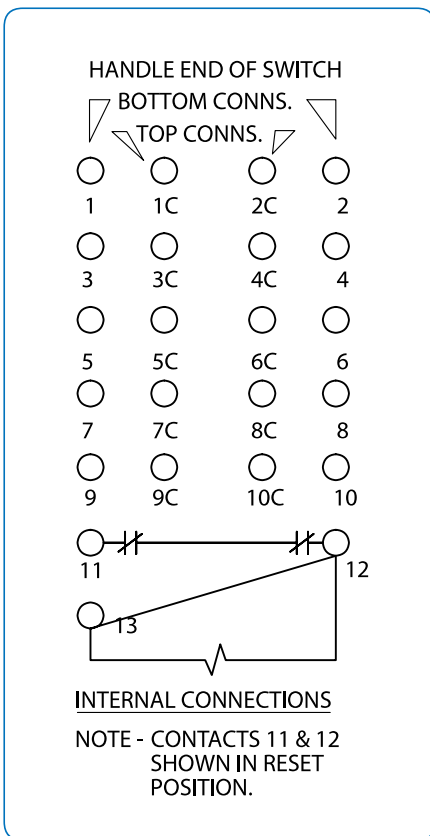

Fig. 2. Typical HEA61B relay contact arrangement

Model HEA

Table 2. Burden data of trip coil

Intermittent Rating Volts	Frequency	Coil Resis. Ohms at 25°C	AC Coil Current Amps at (Rated Volts)	Operating Range Volt	Rating of Protective Relay Target Coil Amps	
					Universal Target Seal-in	SeparateTarget and Seal-in
24	DC	1.2	- - - -	14-30	2.0	1.0
48	DC	4.5	- - - -	28-60	2.0	1.0
125	DC	23	- - - -	70-140	0.2	1.0
250	DC	103	- - - -	140-280	0.2	0.2
115	50/60 Hz	- - - -	25	95-125	2.0	- - - -
230	50/60 Hz	- - - -	14	190-250	2.0	- - - -
460	50/60 Hz	- - - -	7	380-500	2.0	- - - -

The time required to trip the relay, from the instant of energization of the coil to the closing of the contacts, is approximately 15 ms (1 cycle on 60 Hz basis) –slightly less for opening of the contacts. See Figure 3.
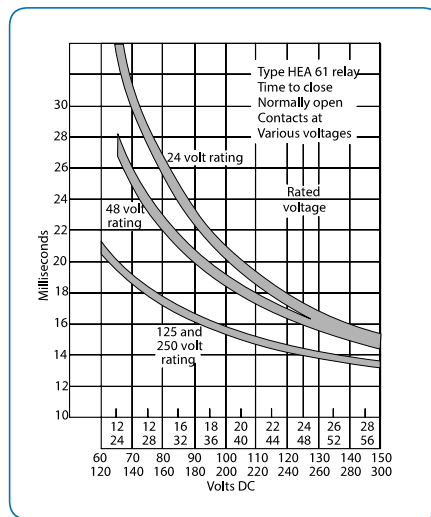

Fig. 3. Typical time-voltage characteristics of Type HEA61 relay

NOTE: When viewed from the handle end of the relay, the odd contacts are on the right-hand side and the even contacts are on the left-hand side starting at the handle end and proceeding to the rear of the relay. Normally, open contacts are the first contacts (nearest the handle) on the relay, in the reset position.

Example: HEA61B233 rated 125 VDC
3 NO (contact numbers 1, 2, and 3)
7 NC (contact numbers 4, 5, 6, 7, 8, 9, 10)

HEA62 Hand Reset

The HEA62 relay is identical to the HEA61 with the exception that on the HEA62 there is a diode-resistor combination inserted across the coil circuit. See Fig. 4. This diode-resistor suppresses the surge sometimes caused by the interruption of the coil contacts on a DC circuit.
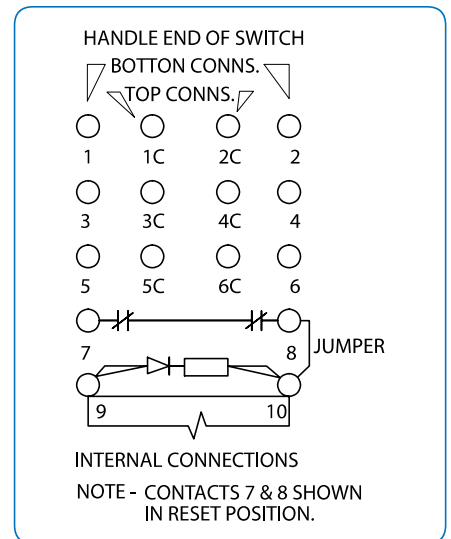

Fig. 4. Typical HEA62A relay contact arrangement

The diode-resistor combination is mounted on a small board that is mechanically attached beneath the trip coil frame. Although in most cases this diode-resistor combination is unnecessary, it is offered for those unusual conditions where the user might feel it necessary. The HEA62 is available only in the 62A, 62B, and 62C DC series.

HEA63 Hand and Electric Reset

Application

The HEA63 relay is basically a standard HEA61 except it has a rotary solenoid which is used to electrically reset the relay and there are only certain contact sequences available (see Selection Guide). This relay is especially useful where the operator and the HEA63 relay are some distance apart.

Operation

The operation of the relay may be understood by referring to Fig. 5. When electrical resetting is desired, a contact or switch is closed which completes the HGA33 relay (which is a part of the overall HEA63 relay and is supplied automatically with the relay) coil circuit through a contact of the HEA relay. This contact is closed in the trip position. Closure of the HGA33 contacts energizes the rotary solenoid which imparts enough rotational force to the HEA shaft through a coupling to cause the HEA to reset and latch. When the HEA resets, the contact which energized the HGA33 coil opens and de-energizes the HGA33 relay. This HGA is of the time delay drop out variety with approximately 0.25 sec drop out time. The time delay insures that the HEA has fully latched. The contacts of the HGA33 then interrupt the rotary solenoid operating current. The HGA33 contacts have a high interrupting rating which is required because the rotary solenoid current is of a relatively high inductive magnitude.

Fig. 6. Typical HEA63B contact arrangement
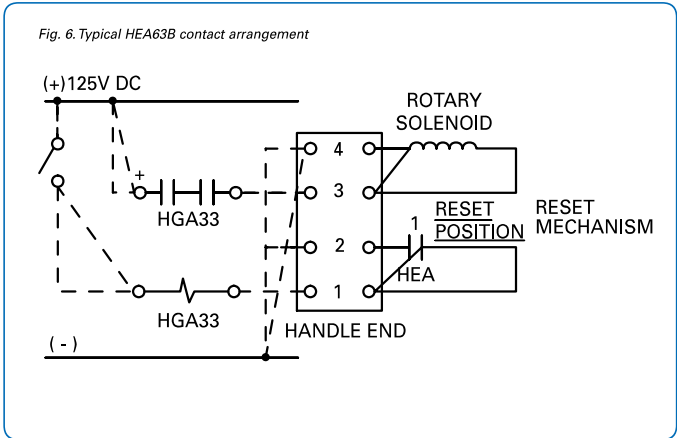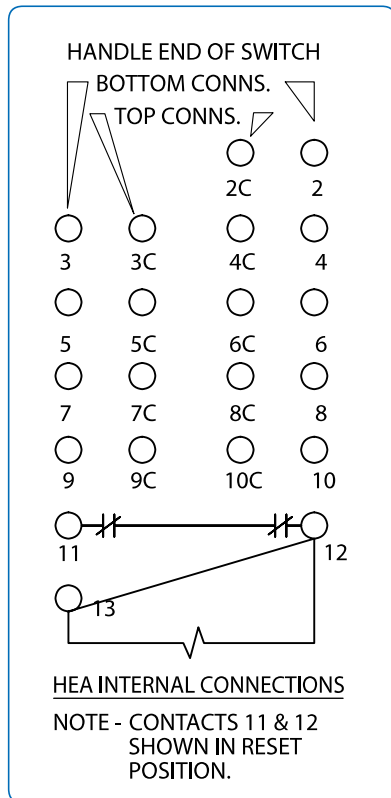

Fig. 6. Typical HEA63B contact arrangement

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Rating (Volts)	Rotary Solenoid Coil Current (Amps)
24	26.8
48	13.5
125	5.5
250	2.8

Fig. 5. Typical schematic of HEA63 relay

Model HEA61 Hand Reset Selection Guide

| Contact Option	Group 24 VDC	48 VDC	125 VDC	220 VDC	250 VDC	115 V 50/60 Hz	230 V 50/60 Hz	Contact Arrangement Contact Numbers N.O	Contact Numbers N.C	Approx. Wt. in lbs (kg) Net	Ship
	40	30	20	80	10	90	100	3-4	None		
	41	31	21	81	11	91	101	3	4	3 (1.3)	5 (2.2)
M	42	32	22	82	12	92	102	None	3-4		
	240	230	220	280	210	290	300	None	1-6		
	241	231	221	281	211	291	301	1	2-6		
	242	232	222	282	212	292	302	1-2	3-6		
	243	233	223	283	213	293	303	1-3	4-6		
	244	234	224	284	214	294	304	1-4	5-6		
	245	235	225	285	215	295	305	1-5	6	4 (1.8)	6 (2.7)
A	246	236	226	286	216	296	306	1-6	None		
	270	250	230	330	210	350	370	None	1-10		
	271	251	231	331	211	351	371	1	2-10		
	272	252	232	332	212	352	372	1-2	3-10		
	273	253	233	333	213	353	373	1-3	4-10		
	274	254	234	334	214	354	374	1-4	5-10		
	275	255	235	335	215	355	375	1-5	6-10		
	276	2 56	236	336	216	356	376	1-6	7-10		
	277	257	237	337	217	357	377	1-7	8-10		
	278	258	238	338	218	358	378	1-8	9-10		
	279	259	239	339	219	359	379	1-9	10	6 (2.7)	8 (3.6)
B	280	260	240	340	220	360	380	1-10	None		
	70	50	30	----	10	90	110	None	1-14		
	71	51	31	----	11	91	111	1	2-14		
	72	52	32	----	12	92	112	1-2	3-14		
	73	53	33	----	13	93	113	1-3	4-14		
	74	54	34	----	14	94	114	1-4	5-14		
	75	55	35	----	15	95	115	1-5	6-14		
	76	56	36	----	16	96	116	1-6	7-14		
	77	57	37	----	17	97	117	1-7	8-14		
	78	58	38	----	18	98	118	1-8	9-14		
	79	59	39	----	19	99	119	1-9	10-14		
	80	60	40	----	20	100	120	1-10	11-14		
	81	61	41	----	21	101	121	1-11	12-14		
	82	62	42	----	22	102	122	1-12	13-14		
	83	63	43	----	23	103	123	1-13	14	8 (3.6)	10 (4.5)
V	84	64	44	----	24	104	124	1-14	None		
	270	250	230	290	210	310	350	None	1-16		
	271	251	231	291	211	311	351	1	2-16		
	272	252	232	292	212	312	352	1-2	3-16		
	273	253	233	293	213	313	353	1-3	4-16		
	274	254	234	294	214	314	354	1-4	5-16		
	275	255	235	295	215	315	355	1-5	6-16		
	276	256	236	296	216	316	356	1-6	7-16		
	277	257	237	297	217	317	357	1-7	8-16		
	278	258	238	298	218	318	358	1-8	9-16		
	279	259	239	299	219	319	359	1-9	10-16		
	280	260	240	300	220	320	360	1-10	11-16		
	281	261	241	301	221	321	361	1-11	12-16		
	282	262	242	302	222	322	362	1-12	13-16		
	283	263	243	303	223	323	363	1-13	14-16		
	284	264	244	304	224	324	364	1-14	15-16		
	285	265	245	305	225	325	365	1- 15	16	8 (3.6)	10 (4.5)
C	286	266	246	306	226	326	366	1-16	None		

Choosing an HEA

1) Decide if a Hand Reset or both Hand and electric Reset HEA is required
2) For an Electric Reset HWA go to step 3 For a Hand Reset HWA go to step 4
3) An HGA33 Auzilary Relay will accompany the HEA. The HGA is available as front or back connected.
4) Choose the number of contacts required and their action N.O and N.C)
5) Opening voltage of the HEA must be known

Order Code breakdown

HEA61 * *** ** *
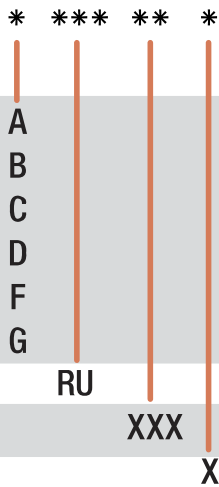
Contact option

A	6 Contacts (plus 2 cotacts in coil circuit)
B	10 Contacts (plus 2 cotacts in coil circuit)
C	16 Contacts (plus 2 cotacts in coil circuit)
M	2 Contacts (plus 2 cotacts in coil circuit)
V	14 Contacts (plus 2 cotacts in coil circuit)
RU	Right angle up handle
RD	Right angle down handle
XXX	Electrical data (see Group column under Selection guide)
X	Panel thickness in inches

HEA63 * *** ** * Order Code Breakdown

Code	Description
A **B** **C** **D** **F** **G**	**Contact Option**
A	5 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
B	9 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
C	15 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
D	5 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
F	9 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
G	15 Contacts (plus 2 cotacts in coil circuit) with HGA33 aux relay front connected
RU	Right angle up handle
XXX	Electrical data (see Group column under Selection guide)
X	Panel thickness in inches

Model HEA Hand and Electric Reset Selection Guide

Contact Numbers Norm open	Contact Numbers Norm Closed	Contact Option	Group With Front-connected Auxiliary (HGA33A)				Contact Option	Group With Back-connected Auxiliary (HGA33B)				Approx Wt in lbs (kg)	
			24 VDC	48 VDC	125 VDC	250 VDC		24 VDC	48 VDC	125 VDC	250 VDC	Net	Ship
			5 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit)										
None	2-6	A	241	331	221	211	D	241	331	221	211	14 (6.3)	18 (8.2)
2	3-6		242	332	222	212		242	332	222	212		
2-3	4-6		243	333	223	213		243	333	223	213		
2-4	5-6		244	334	224	214		244	334	224	214		
2-5	6		245	335	225	215		245	335	225	215		
2-6	None		246	336	226	216		246	336	226	216		
			9 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit)										
2	3-10	B	272	252	232	212	F	272	252	232	212	15 (6.8)	19 (8.6)
2-3	4-10		273	253	233	213		273	253	233	213		
2-4	5-10		274	254	234	214		274	254	234	214		
2-5	6-10		275	255	235	215		275	255	235	215		
2-6	7-10		276	256	236	216		276	256	236	216		
2-7	8-10		277	257	237	217		277	257	237	217		
2-8	9-10		278	258	238	218		278	258	238	218		
2-9	10		279	259	239	219		279	259	239	219		
2-10	None		280	260	240	220		280	260	240	220		
			15 Contact (Plus 2 in Contacts in Trip Circuit and 1 Contact in Reset Circuit)										
2-8	9-16	C	318	278	238	218	G	318	278	238	218	16 (7.2)	20 (9)
2-9	10-16		319	279	239	219		319	279	239	219		
2-10	11-16		320	280	240	220		320	280	240	220		
2-11	12-16		321	281	241	221		321	281	241	221		
2-12	13-16		322	282	242	222		322	282	242	222		
2-13	14-16		323	283	243	223		323	283	243	223		
2-14	15-16		324	284	244	224		324	284	244	224		
2-15	16		325	285	245	225		325	285	245	225		
2-16	None		326	286	246	226		326	286	246	226		

Contact Arrangement Reset (latched) Position