HFA100 MULTICONTACT AUXILIARY RELAYS

For AC and DC Circuit Applications.

Description

HFA Century Series relays are designed for applications where a number of auxiliary functions must be performed simultaneously. The Century Series coil design provides longer operating life than previeous designs as a result of changes in the entire coil insulation system.

The six electrically separate contcact circuits are adaptable for either circuit-opening or circuit-closing applications. If more than six circuits are to be controlled, the coils of two or more relays may be connected in series (DC only) or in parallel. HFA Century Series relays are offered in non-drawout case or drawout case construction.

Non-drawout cas HFA relays are available for front connection (suitable for surface mounting only) or back connection (suitable for semi-flush mounting only).

Drawout case HFA relays are back-connected and are suitable for either semi-fluch or surface mounting.
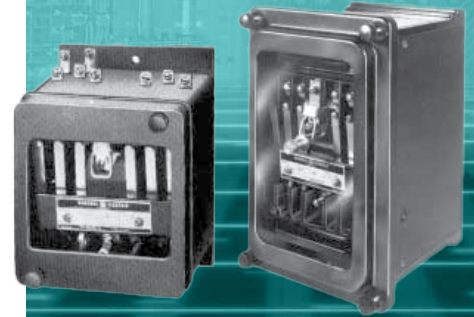
Features and Benefits:

- Durable coil design enhances longevity.
- Green nameplates for easy identification.
- Default contact code is Code 60; field conversion between normally open and normally closed possible.
- Long-wipe closed contact aids in inserting the dropping resistor.

Applications:

- Electric reset relays with configurable options for various operational needs.

Protection and Control:

- Long-wipe closed contact provides effective control by managing resistor insertion in coil circuits.

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Long-Life Coil Design

Basic design features of HFA Century series coils are as follows:

Spool the spool on which this coil is wound is made of high thermal strength, glass-filled polyester to obtain long life at elevated temperatures. This material shows no signs of cracking or brittleness under accelerated life testing.

Wire Insulation the wire insulation is a polyamide-imide wire coating (180°C rating) which retains insulation integrity and mechanical strength at continuous elevated temperatures and which is also non-hydroscopic and fungus resistant. Tefzel insulation is used where required, such as on leads.

Encapsulation Polybutadiene solventless impregnant.

Process the polyamide-imide insulated coils, wound on high-temperature spools, are prebaked to drive off all volatile materials, vacuum-impregnated with the solventless varnish, and then post-baked. The impregnation material is also non-hydroscopic and has temperature expansion ceffiecients compatible with the spool and with the wire, so that stresses do not develop under temperature cycling.

Nameplates for Century Series relays are green to provide easy visual differnetiation from standard life relays.

Accelerated life tests-conducted at elevated temperature and maximum voltage-have established a projected device life of 40 years to 1 percent failure (that is, when 1 percent of all such relays have failed) at 55°C and 110 percent rated voltage.

Application

Selection of DC relays for tripping duty where operating coil circuit is opened by an auxiliary switch:

The operating time of the standard HFA relay is approximately 5 cycles (60 Hertz basis). If used on DC for tripping a circuit breaker, the operating time should be reduced to approximately 1 cycle in order that no appreciable time delay will be added to the operatating time of the protective relay. This can be accomplished by selecting a relay which has a lower voltage rating than the control circuit. Recommended voltage ratings for one minute tripping duty are listed below.

When so applied, the HFA operating coil must be opened by the breaker auxiliary switch, to prevent overheating. The increased current through the HFA operating coil will assure operation of the target on the protective relay.

High-Speed Tripping

HFA153K and 173K relays are designed to have a pickup time of no more than 1/2 cycle (60 Hertz basis). The required coil series resistor is included in the basic model number. All models have one longwipe normally closed contact for inserting this resistor in the coil circuit once the relay is picked up.

Contact Rating

Contacts are electrically separate and easily reversible from normally open to normally closed or vice versa. The current-closing rating of the contacts is 30 aperes. The current-carrying rating is 12 amperes.

SUPPLY VOLTAGE (VOLTS DC)	USE RELAY WITH COIL RATED: (VOLTS DC)	OPER-COIL CURRENT (Amps)	TARGET COIL TAP VALUE IN PROT. RELAY (Amps)	TIME TO CLOSE N.O. CONTACTS AT PICKUP (60 Hz BASIS)
24	6	5.3	2.0	Approxi-mately one cycle
32	6	7.1	2.0	
48	12	2.7	2.0	
125	24	1.7	0.2	
250	48	0.9	0.2	

Recommended voltage ratings for one minute tripping duty

Contact Interrupting Ratings

Volts DC	1 Contact (Amps)	2 Contacts in Series (Amps)	Volts AC	1 Contact (Amps)	2 Contacts in Series (Amps)

Non-Inductive

Volts DC	1 Contact (Amps)	2 Contacts in Series (Amps)	Volts AC	1 Contact (Amps)	2 Contacts in Series (Amps)
6 to 24	15	30	115	30	30
48	8	16	230	20	20
125	3	6	460	8	12
250	1	2			

Inductive

Volts DC	1 Contact (Amps)	2 Contacts in Series (Amps)	Volts AC	1 Contact (Amps)	2 Contacts in Series (Amps)
24	6.0	12	115	20	20
48	3.5	6	230	10	10
125	1.0	1.5	460	5	5
250	0.3	0.35			

SELECTION GUIDE

Self and Hand Reset-Instantaneous Relys

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	APPROX. WEIGHT lbs (kg)	
							NET	SHIP

Non-Drawout Models

Direct Current - Standard Speed

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
6	5.6				HFA151A7 F or H	HFA151B7 F or H		
12	20				A6 F or H	B6 F or H		
24	82				A5 F or H	B5 F or H		
32	145				A13 F or H	B13 F or H		
48	337		5	Table 1	A4F or H	B4F or H	5 (2.3)	7 (3.2)
62.5	507				A3 F or H	B3 F or H		
110	1600				A12 F or H	B12 F or H		
125	2040				A2 F or H	B2 F or H		
220	5350				A11 F or H	B11 F or H		
250	7780				A1 F or H	B1 F or H		

Alternating Current, 60 Hertz

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
120	13.5	446	2	Table 1	HFA151A9 F or H	HFA151B9 F or H	5 (2.3)	7 (3.2)
240	55	1810			A8 F or H	B8 F or H		

Alternating Current, 50 Hertz

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
120	20	540	2	Table 1	HFA151A19 F or H	HFA151B19 F or H	5 (2.3)	7 (3.2)
240	82	2160			A18 F or H	B18 F or H		

Drawout Models - S2 Size Case

Direct Current - Standard Speed

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
6	5.6				HFA171A7A	HFA171B7A		
12	20				A6A	B6A		
24	82				A5A	B5A		
32	145				A13A	B13A		
48	337		5	Table 1	A4A	B4A	12 (5.4)	18 (8.2)
62.5	507				A3A	B3A		
110	1600				A12A	B12A		
125	2040				A2A	B2A		
220	5350				A11A	B11A		
250	7780				A1A	B1A		

Alternating Current, 60 Hertz

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
120	13.5	446	2	Table 1	HFA171A9A	HFA171B9A	12 (5.4)	18 (8.2)
240	55	1810			A8A	B8A		

Alternating Current, 50 Hertz

RATING (Volts)	DC RESISTANCE (Ohms)	IMPEDANCE	OPERATING TIME (CYCLES)	CONTACTS	SELF-RESET MODEL NUMBER	HAND-RESET MODEL NUMBER	NET	SHIP
120	20	540	2	Table 1	HFA171A19A	HFA171B19A	12 (5.4)	18 (8.2)
240	82	2160			A18A	B18A		

High-Speed Tripping Models

RATING (Volts)	COIL RESISTANCE (Ohms)	RESISTOR Ohms	OPERATING TIME (CYCLES)	CONTACTS	MODEL NUMBER	APPROX. WEIGHT lbs (kg)	
						NET	SHIP

Non-Drawout Case Models

RATING (Volts)	COIL RESISTANCE (Ohms)	RESISTOR Ohms	OPERATING TIME (CYCLES)	CONTACTS	MODEL NUMBER	NET	SHIP
24	0.8	7.5			HFA153K5 F or H		
48	2.5	30	0.5	Table 2	K4 F or H	6 (2.7)	9 (4.1)
125	20	200			K2 F or H		
250	82	800			K1 F or H		

Drawout Case Models - S2 Case

RATING (Volts)	COIL RESISTANCE (Ohms)	RESISTOR Ohms	OPERATING TIME (CYCLES)	CONTACTS	MODEL NUMBER	NET	SHIP
24	0.8	18			HFA173K5A		
48	2.5	75	0.5	Table 3	K4A	12 (5.4)	18 (8.2)
125	20	500			K2A		
250	82	2000			K1A		

Within plus or minus 10 percent.
60-Hertz-basis. Time for energizing operating coil to closing of normally open contacts.

Specify desired mounting on order. For semi-flush mounting back connected add letter ÒFÓ to listed model number. For example - HFA151A2F. If for surface mounting, front connected, add letter ÒHÓ to listed model number, for example - HFA151A2H.

TABLE 1	CODE NUMBER						
	60	51	42	33	24	15	06
Position No.	Contact Arrangement						
1	—̇—	—̇—	—̇—	—̇—	—̇—	—̇—	⧦
2	—̇—	—̇—	—̇—	—̇—	⧦	⧦	⧦
3	—̇—	—̇—	⧦	⧦	⧦	⧦	⧦
4	—̇—	⧦	⧦	⧦	⧦	⧦	⧦
5	—̇—	—̇—	—̇—	⧦	⧦	⧦	⧦
6	—̇—	—̇—	—̇—	—̇—	—̇—	⧦	⧦

Notes:

—̇— = Normally open contact, open when relay is de-energized.

⧦ = Normally closed contact, closed when relay is de-energized.

TABLE 2	CODE NUMBER		
	1	2	3
Position No.	Contact Arrangement		
1	—̇—	—̇—	—̇—
2	—̇—	—̇—	—̇—
3	⧦•	⧦•	⧦•
4	—̇—	—̇—	⧦
5	—̇—	⧦	⧦
6	—̇—	—̇—	—̇—

Notes:

—̇— = Normally open contact, open when relay is de-energized.

⧦ = Normally closed contact, closed when relay is de-energized.

⧦• = Long-wipe closed contact, closed when relay is de-energized and opens after the standard NC contact. This contact is used to insert the dropping resistor into the coil circuit.

TABLE 3	CODE NUMBER
	1
Position No.	**Contact Arrangement**
1	╪
2	╪
3	╪
4	≠•
5	╪
6	╪

TABLE C	CODE NUMBER					
	60	**51**	**42**	**33**	**24**	**15**
Position No.	**Contact Arrangement**					
1	╪	╪	╪	╪	╪	≠
2	╪	╪	╪	╪	≠	≠
3	╪	╪	≠	≠	≠	≠
4	╪	≠	≠	≠	≠	≠
5	╪	╪	╪	≠	≠	≠
6[2]	╪	╪	╪	╪	╪	╪

[2] This contact is reserved for opening the reset coil circuit to protect the intermittently rated reset coil.

Notes:

╪ = Normally open contact, open when relay is de-energized.

≠ = Normally closed contact, closed when relay is de-energized.

Note:

If contact code is not specified on the order, Code 60 will be furnished. Relays stocked in the warehouse are stocked with contact Code 60. Conversion from normally open to normally closed or vice-versa, can be easily accomplished in the field.

Notes:

╪ = Normally open contact, open when relay is de-energized.

≠• = Long-wipe closed contact, used to insert the dropping resistor into the coil circuits.

Note:

If contact code is not specified on the order, Code 60 will be furnished. Relays stocked in the warehouse are stocked with contact Code 60. Conversion from normally open to normally closed or vice-versa, can be easily accomplished in the field.

Electric Reset Relays

Table A lists the combination of reset and mounting available.

Table B lists the voltage and frequencies of the operating and reset coils.

Table C shows the variaous contact configurations available.

To obtain a complete catalogue number, select the basic number from Table A; insert the form number from Table B; specify the contact code from Table C.

Example:

Electric reset only Front connected Surface mounting	Select HFA154E-H from Table A
48V DC operate coil 120V 60 Hz reset coil	Select form number 44 from Table B
3 N.O. and 2 N.C. contacts	Select contact code 42 from Table C

Thus, HFA154E44H code 42 is the complete relay number.

Table A

Selection of HFA Electric Reset Models

TYPE OF RESET	MOUNTING	CONTACTS	BASIC NUMBER ①	WEIGHT lbs(kg) NET	WEIGHT lbs(kg) SHIP
Electric and Hand Reset	Back connected semi-flush	Table C	HFA154B-F	5 (2.3)	7 (3.2)
	Front connected Surface mounted		A154B-H	5 (2.3)	7 (3.2)
	Back connected drawout case		A174B-A	12 (5.4)	18 (8.2)
Electric Reset Only	Back connected semi-flush	Table C	HFA154E-F	5 (2.3)	7 (3.2)
	Front connected Surface mounted		A154E-H	5 (2.3)	7 (3.2)
	Back connected drawout case		A174E-A	12 (5.4)	18 (8.2)

① On hand and electric reset Types HFA154B, 174B, 154E and 174E one contact is wired in series with reset coil to provide positive cutoff. Thus five contacts are available for external circuits.

Table B

Selection Guide - Form Numbers

VOLTAGE AND FREQUENCY	RESET COIL RATING FORM NUMBERS 110 DC	125 DC	220 DC	250 DC	120 DC 60 Hz	120 DC 50 Hz
OPERATE COIL RATING						
6V DC		27		7	47	
12V DC		26		6	46	
24V DC		25		5	45	
32V DC	33		13			53
48V DC		24		4	44	
62.5V DC		23		3	43	
110V DC	32		12			52
125V DC		22		2	42	
220V DC	31		11			51
250V DC		21		1	41	
120V 60 Hz		29		9	49	
240V 60 Hz		28		8	48	
120V 50 Hz	39		19			59
240V 50 Hz	38		18			58

Operating Characteristics

MODEL NUMBER	PICKUP VOLTAGE IN PERCENT OF RATING HOT	PICKUP VOLTAGE IN PERCENT OF RATING COLD	DROPOUT VOLTAGE IN PERCENT OF RATING AC	DROPOUT VOLTAGE IN PERCENT OF RATING DC	OPERATING TIME AT RATED VOLTAGE TO CLOSE A N.O. CONTACT AC	OPERATING TIME AT RATED VOLTAGE TO CLOSE A N.O. CONTACT DC	OPERATING TIME TO OPEN A N.O. CONTACT WHEN VOLTAGE REDUCED TO ZERO AC	OPERATING TIME TO OPEN A N.O. CONTACT WHEN VOLTAGE REDUCED TO ZERO DC
HFA151A, -B HFA171A, -B	80 or Less, AC or DC	60 DC 80AC or Higher	30 - 60	2 - 10	33 ms or Less	84 ms or Less	14 ms or Less	28 ms or Less
HFA153K HFA173K	8 or Less (DC Only)	6 or Less (DC Only)	--	2 - 10	9 ms or Less for Tripping Duty			9 ms or Less

For more information, visit
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