



## TYPE KF FIELD RELAYS

### DESCRIPTION

Type KF relays are designed for switching dc motor shunt fields. They are also suited to switching highly inductive loads such as relay and contactor coil groups. These relays are available with either one normally open (1 NO) or one normally closed (1 NC) contact. The Type KF relays are available with various coils and coil combinations. A relay may have a single series coil or a single shunt coil. The relay could also have two series coils or one shunt and one series coil.

**WARNING: ALL METAL PARTS OF THE RELAY MAY BE AT LINE VOLTAGE. ALL POWER MUST BE DISCONNECTED FROM THE RELAY BEFORE PERFORMING ANY ADJUSTMENT, MAINTENANCE OR TROUBLESHOOTING PROCEDURES.**

### INSTALLATION AND ADJUSTMENT

Mount the relay vertically on a rigid support. Allowances for arcing clearance are not required.

With the relay power off, operate the relay by hand. It should operate freely. If it does not, check for binding in the armature knife edge and where the spring rod passes through the magnet frame. Check that all electrical connections are tight. Adjustments are not required since all relays are factory set.

If the factory setting of any of these relays needs to be altered, the operating characteristic can be varied by changing the spring tension with the adjustment knob (13) on top of the relay. Increasing the spring tension (turn knob clockwise) will cause the relay to pick up and drop out at a higher voltage or current level. Decreasing the spring tension (turn adjustment knob counterclockwise) will cause the relay to pick up and drop out at a lower voltage or current level. After making any adjustment, tighten lock nut (12) against adjustment knob (13).

The armature stop is factory set with adjusting knob (18) as follows:

Normally Open Contacts:

Adjust for  $\frac{1}{8}$ " contact opening.

Normally Closed Contacts:

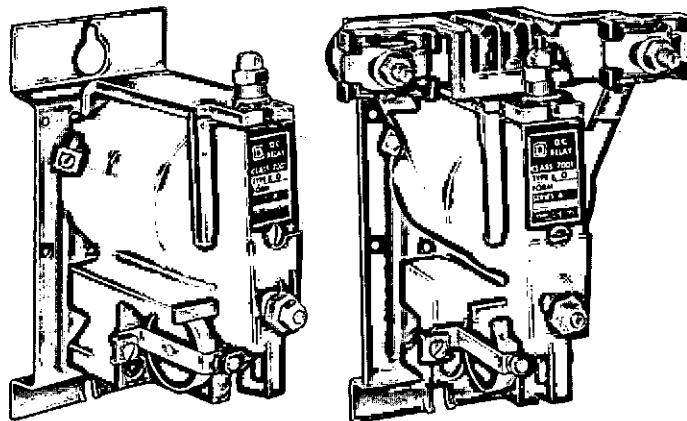
Adjust for  $\frac{1}{8}$ " contact follow-up.

After making any adjustments, tighten lock nut (12) against knob (18).

### TROUBLESHOOTING

**PROBLEM:** Relay does not close when energized.

**SOLUTION:** Check the voltage or current at the operating coil terminals. An absence of voltage or current indicates a fault elsewhere in the circuitry. If the coil voltage or current is normal, disconnect the coil leads and check the coil for continuity. See Coil Data Table. An open or shorted coil must be replaced.



Type KFO-70

Type KFO-57

### REPAIR AND MAINTENANCE

#### CONTACT REPLACEMENT

The relay contacts consist of a copper body with a silver facing. Contacts must be replaced when the silver has worn off. Note: Do not clean the silver facing as the oxides of silver are conductive and discoloration is normal.

To replace contacts, proceed as follows:

#### A. Movable Contacts

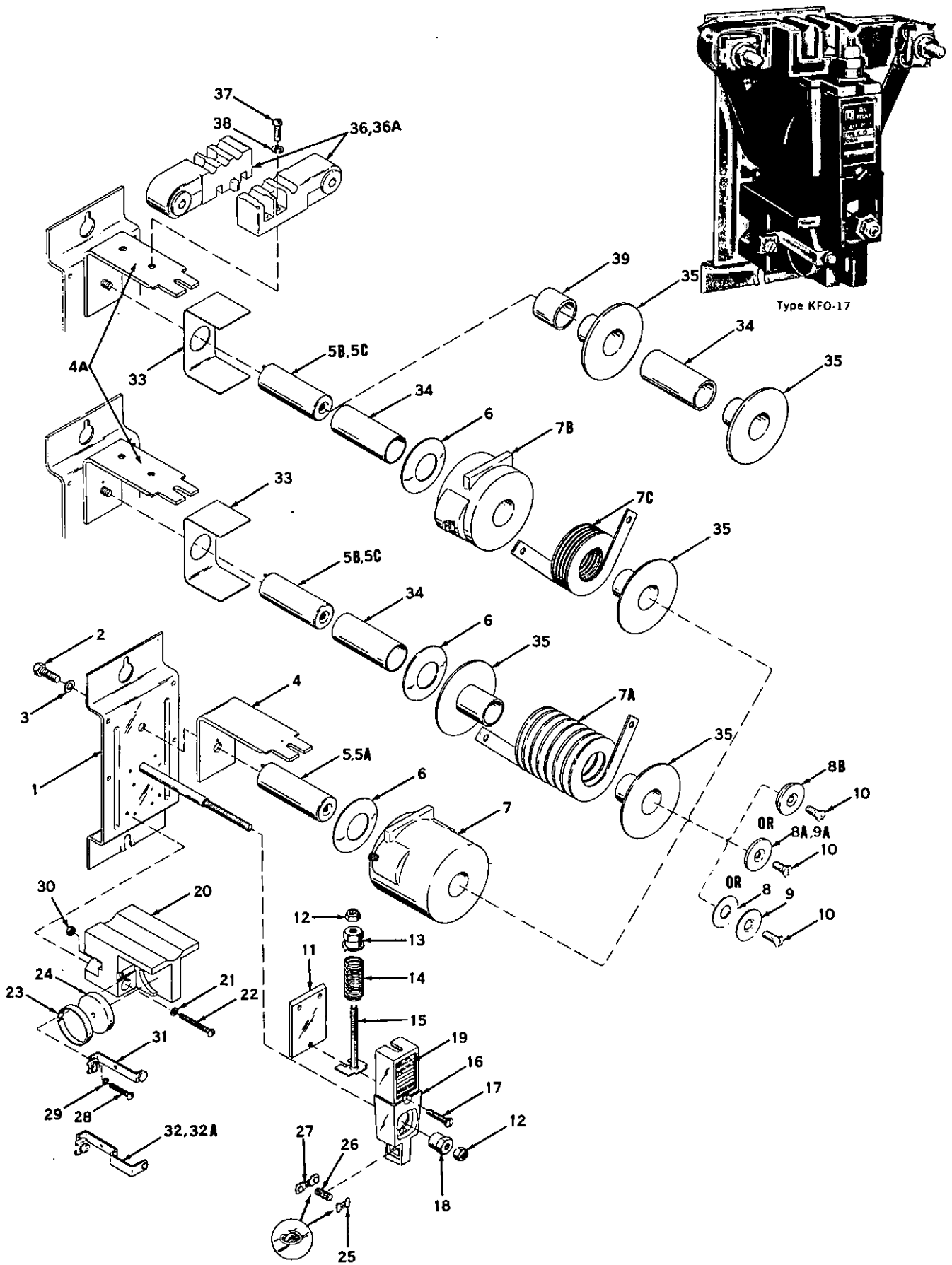
1. Squeeze together spring retainer (25) and assembled contact bridge (27). Rotate parts 90° and remove.
2. Assemble new spring retainer (25), spring (26), and assembled contact bridge (27) by inserting one end of spring in slot of spring retainer and other end of spring in slot of assembled contact bridge. Do not twist spring.
3. Squeeze movable contact assembly together and insert in slot of operator arm (16). Rotate assembly 90° so that assembled contact bridge is closest to stationary contacts. Release assembly. Do not twist spring during assembly.

#### B. Stationary Contacts

1. Remove the two screws (22). Hold onto two nuts (30). They are not held captive.
2. Remove two stationary assembled contacts (31 or 32 & 32A).
3. Install two new stationary assembled contacts (31 or 32 & 32A).
4. Replace screws (22), lock washers (21), and nuts (30). Tighten.
5. With contacts fully closed, check for proper alignment. If necessary, slightly bend stationary contacts to obtain proper alignment.

**CAUTION: WHEN INSTALLING STATIONARY NORMALLY CLOSED CONTACT ASSEMBLY, MOUNT ASSEMBLY MARKED "R" ON RIGHT SIDE AND ASSEMBLY MARKED "L" ON LEFT SIDE.**

(Continued on page 4)



## PARTS LIST FOR TYPE KF FIELD RELAY

Item No.	Part No.	Description	No. Required	Item No.	Part No.	Description	No. Required
1	A51152-024-50	Assembled Base	1	19	A51139-108-01	Nameplate	1
2	21401-22280	5/16" - 18 x 7/8" Steel Hex Cap Screw	1	20	C51152-016-01	Contact Block	1
3	23701-00220	5/16" Plain Lock Washer	1	21	23701-00160	No. 10 Plain Lock Washer	2
4	A51152-007-01	Magnet Frame	1	22A	21507-16480	No. 10 - 24 x 1 1/2" Pan Head Screw	2
4A	A51152-007-02	Magnet Frame	1**	23	A51152-021-01	Arc-Runner	2
5	A51152-025-50	Assembled Coil Core (Long)	1	24	A51152-020-01	Blowout Magnet	2
5A	A51152-075-50	Assembled Coil Core (Short)*	1	*25		Spring Retainer	
5B	A51152-037-51	Assembled Coil Core (Long)	1	*26	Class 9999	Spring	
5C	A51152-037-50	Assembled Coil Core (Short)*	1	*27		Assembled Contact Bridge	
6	A51017-041-01	Spring Washer	1	*28	Type KX-4	No. 8-32 x 1 1/4" Pan Head Screw (2 Req'd.)	1
* 7	SEE COIL	Assembled Operating Coil (Shunt)	As	*29	Kit	No. 8 Plain Lock Washer (2 Req'd.)	
* 7A	DATA FOR	Assembled Operating Coil (Series)	Required	*30		No. 8-32 Hex Nut (2 Req'd.)	
* 7B	SELECTION	Assembled Operating Coil (Half Shunt)		*31		Assembled N.O. Contact (2 Req'd.)	
* 7C	(Page 4)	Assembled Operating Coil (Half Series)		*25		Spring Retainer	
8	A51152-023-01	Core Cap (Steel)	1	*26	Class 9999	Spring	1
8A	A51152-059-01	Core Cap (Aluminum)	1	*27		Assembled Contact Bridge	
8B	A51152-038-01	Core Cap (Aluminum)*	1	*28	Type KX-5	No. 8 - 32 x 1 1/4" Pan Head Screw (2 Req'd.)	1
9	A51152-022-01	Core Cap Spacer (Stainless Steel)	1	*29	Kit	No. 8 Plain Lock Washer (2 Req'd.)	
9A	A51152-153-01	Core Cap (Steel)	1	*30		No. 8-32 Hex Nut (2 Req'd.)	
10	21714-20240	1/4" - 20 x 3/4" Flat Hd. Brass Nylock Screw	1	*32		Assembled N.C. Contact (Right Hand)	1
11	A51152-008-01	Armature	1	*32A		Assembled N.C. Contact (Left Hand)	1
12	23201-00210	1/4" - 28 Jam Nut	2	33	A51152-042-01	Insulator	1**
13	A51152-030-50	Assembled Adjusting Nut	1	34	A51152-039-01	Insulator Tube	1**
14	B50502-601-40	Operating Spring (Red)	1	35	A51152-040-01	Coil Insulator	2**
	B50502-601-41	Operating Spring (Yellow)	1	36	C51152-032-50	Terminal Block (300A Max.)	2**
	B50502-601-42	Operating Spring (Blue)	1	36A	C51152-032-51	Terminal Block (300A and Up)	2**
15	A51152-013-50	Assembled Spring Adjustment Rod	1	37	21001-20240	1/4" - 20 x 3/4" Rd. Hd. Steel Screw	2**
16	C51152-009-01	Operator Arm	1	38	23701-00200	5/16" Plain Lock Washer	2**
17	21933-16400	No. 10-24 x 1 1/4" Oval Head Screw	1	39	B50512-053-03	Spacer	1**
18	A51152-029-01	Adjusting Knob	1				

- \* Essential Parts For General Maintenance.
- Short Coil Core Used Only With Core Cap 8B
- \*\* Used Only When Strap Wound Series Coil is used

### COIL DATA

COIL PART NO.	COIL RATING (CONTIN.)	COIL RES. (COLD)
A51017-067-50	300 V	2050 Ohms
A51017-056-50	240 V	1619
A51017-067-52	190 V	863
A51017-067-53	150 V	547
A51017-056-51	120 V	407
A51017-067-55	100 V	226
A51017-067-56	75 V	140
A51017-067-57	60 V	90
A51017-067-58	45 V	57
A51017-067-59	36 V	36
A51017-067-60	24 V	13
A51017-067-61	12 V	3.5
A51017-067-62	6 V	0.88
† A51152-044-50	240 V	1828
† A51152-044-51	120 V	477

COIL PART NO.	COIL RATING (CONTIN.)	COIL RES. (COLD)
A51152-077-50	0.39A	177 Ohms
A51152-077-51	0.49A	110
A51152-077-52	0.62A	71
A51152-077-53	0.77A	46
A51152-077-54	0.97A	29
A51152-077-55	1.2 A	17
A51152-077-56	1.6 A	10
A51152-077-57	2.0 A	6.7
A51152-077-58	2.4 A	4.5
A51152-077-59	3.1 A	2.8
A51152-077-60	3.8 A	1.8
A51152-077-61	4.9 A	1.1
A51152-077-62	6.1 A	0.69
A51152-077-63	7.8 A	0.44
A51152-077-64	9.9 A	0.27

COIL PART NO.	COIL RATING (CONTIN.)	NO. OF TURNS
A51152-078-50	12.5A	200
A51152-078-51	16.0A	156
A51152-078-52	20.8A	120
A51152-078-53	26.8A	93
A51152-078-54	35.2A	71
A51152-078-55	45.3A	55
A51152-078-56	58.0A	43
A51152-078-57	75.6A	33
A51152-078-58	114 A	25.5
A51152-079-02	172 A	16.5
A51152-079-03	258 A	10.5
††B51152-036-50	7.4A	140
††B51152-036-51	11.7A	88
††B51152-036-52	18.8A	55
††B51152-036-53	29.5A	35
††B51152-036-54	46.9A	22
††B51152-036-55	73.6A	14
††A51152-033-01	114 A	9.5
††A51152-033-02	172 A	6.5
††A51152-033-03	258 A	4.5

- † Half Shunt Coils For Series and
- †† Half Series Coils Shunt Coil Combinations.

## REPAIR AND MAINTENANCE (cont'd.)

## C. Blowout Magnets

The blowout magnets will normally remain in place by mutual attraction during replacement of contact parts (31 or 32 & 32A). If the magnets are replaced, make sure they are in such a position that their mutual attraction holds them on contact block (20).

## COIL REPLACEMENT

To replace the operating coil, proceed as follows:

1. Remove the coil leads. Grasp the operating arm (16) and also the adjustment knob (13) on top of the relay.
2. Pull down on the operator arm and lift the adjustment knob. (If this is not possible, see 2A.) Pull the entire assembly forward and it will snap free from the main part of the relay.
  - 2A. When a strong operating spring (red) is used, it may not be possible to lift the adjustment knob (13). In this case, the adjustment must be changed. Back off or remove the lock nut (12). Mark the front of adjustment knob (13). Loosen adjustment knob and count the number of turns. Proceed as in 2 above.
3. Remove screw (10), holding the core cap (8) and core cap spacer (9). Observe the number and order of core caps and core cap spacers.

4. Remove the core cap and core cap spacer. Note: Some relays use only a single core cap (8A, 9A, 8B) and no core cap spacer.
5. Remove the defecting operating coil (7, 7A, 7B, 7C) and replace it with a new coil.
6. Replace the core cap (8) and core cap spacer (9). Fasten with screw (10). Connect coil leads.
7. To reassemble relay, grasp operating arm and lift the adjustment knob. Replace assembly on relay.
8. No adjustments are necessary since the adjustments were not disturbed during the coil change.
  - 8A. If adjustment was changed per 2A, return adjustment to original setting by tightening adjustment knob same number of turns as loosened in 2A. Lock adjustment knob (13) with lock nut (12).

**CAUTION: THE TWO PROJECTING POINTS ON THE BOTTOM OF THE ADJUSTING KNOB (13) MUST BE PROPERLY SEATED IN THE TWO SLOTS ON TOP OF MAGNET FRAME (4).**

## LUBRICATION

The Type KF relays require no lubrication.