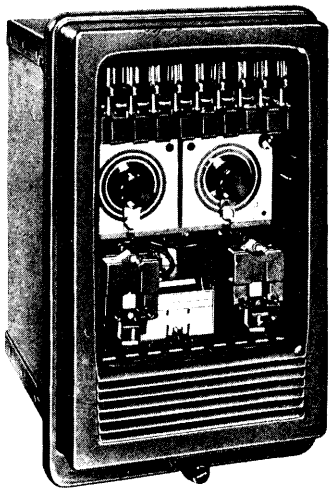
ABB Power T&D Company Inc.
Relay Division
Coral Springs, FL
Allentown, PA

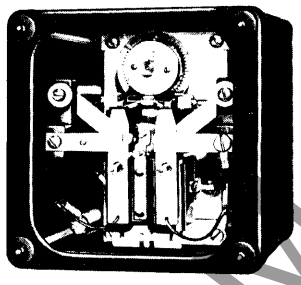
August, 1991
Supersedes DB 41-570, pages 1-20,
dated December, 1987
Mailed to: E, D, C/41-500A

For Ac and Dc Application
Requiring A Definite Time Delay
Device Number: 2

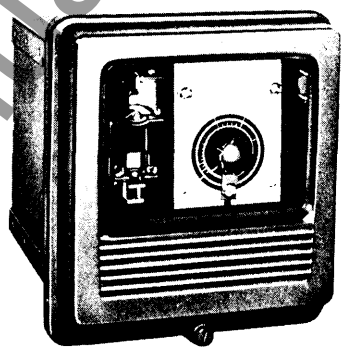
Types TK, TD-4, TD-5, TD-50 and TD-52 Timing Relays



Type TD-52
FT-22 Case



Type TK
Square Metal Case



Type TD-5
FT-11 Case

Applications

Industrial Control
Intermittent duty in process timing (electro-plating, heating, annealing, etc.)

General Auxiliary Service
Coordinating sequential switching functions.

Protective Relaying
Required time delay to obtain selective relay coordination.

Motor Control
Timed steps to cut out starting resistance.

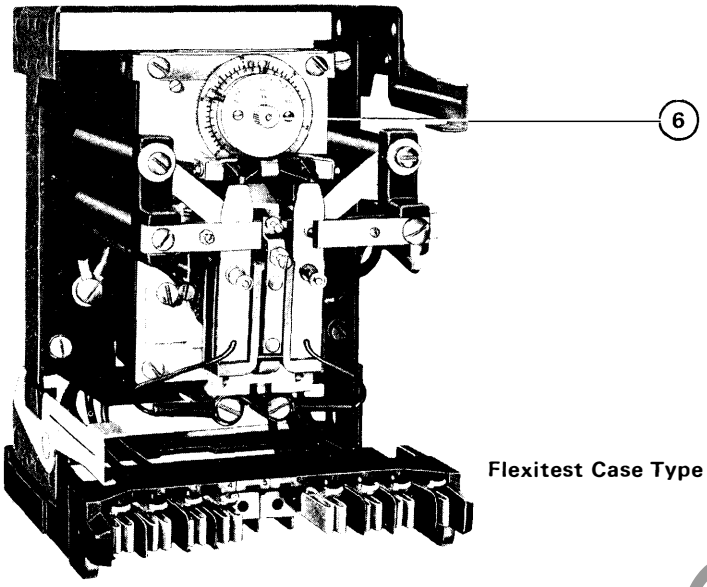
Power Line Carrier
Automatic check-back schemes in checking transmission of carrier between terminals.

Distance Relaying
Time delay backup, zone tripping.

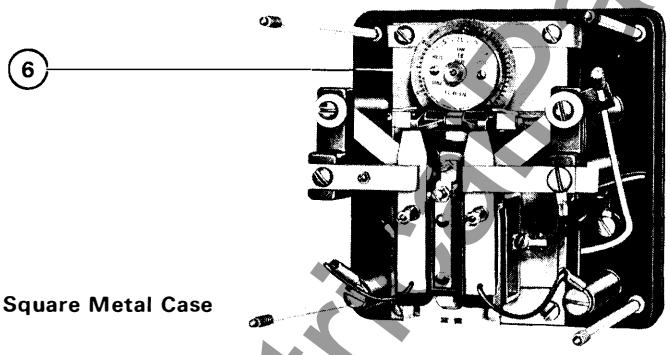
Selector Guide

Relay Type	Page	Device Number	Range of Operating Time Delay	Ratings	
				60 Hertz	Dc
TK	2	2	2-30 sec. 18 sec. – 5 min. 3 min. – 50 min.	115 volts 208 volts 230 volts 460 volts 575 volts	125 and 250 volts dc application require a dc/ac inverter for timer motor operation
TD-4	6	2	zone 2: 0.1 – 1.0 seconds zone 3: 0.5 – 3.0 seconds 0.3 – 1.5 seconds	. . .	48/125/250 volts
TD-5, 52	12	2	.05 – 0.4 .05 – 1.0 0.2 – 4.0 1.5 – 30.0	. . .	24/32 volts 48/125 volts 250 volts
TD-50	16	2	.05 – 0.4 .05 – 1.0 0.2 – 4.0	. . .	125 volts 48/125 volts

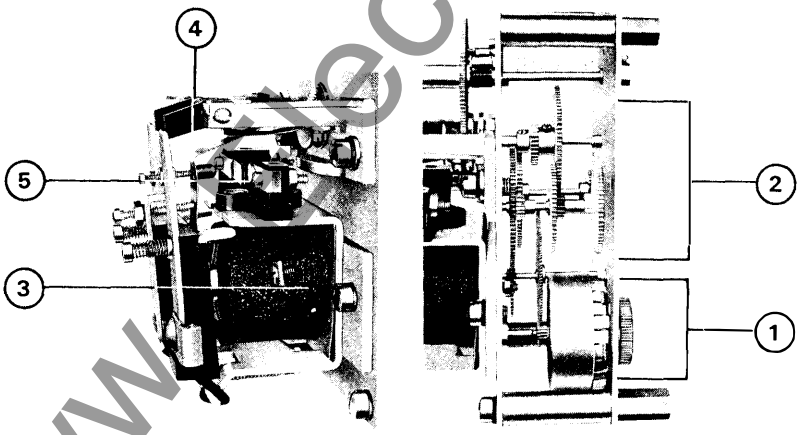
Type TK



Flexitest Case Type



Square Metal Case



Application

The TK relay is an ac timing relay for applications requiring a definite time delay between the closing of other ac or dc circuits.

Accurate time settings can be obtained from two seconds to fifty minutes. The reset time for any setting is less than one second.

The TK relay is widely used in industrial applications, or where a time delay is required in motor, generator, or rectifier control circuits.

One style is suitable for use with a dc to ac inverter where a reliable ac control voltage is not available. See Bulletin Descriptive 41-075D for further information on the inverter.

Construction and Operation

(1) Synchronous Motor
Drives gear train. Runs at a synchronous speed of 600, 500, or 250 rpm for 60, 50 or 25 hertz, respectively.

(2) Gear Train
Three different speed settings of 30 seconds, 5 minutes, and 50 minutes are obtained by changing the location of a sliding gear assembly.

(3) Contactor Coil
On relays rated 230 volts or higher (60 hertz), a tap is brought out to act as an autotransformer to supply 115 volts to the timing motor.

(4) Contactor

(5) Seal-In Contact (Optional)
Keeps the relay energized until the circuit is opened by a switch external to the relay.

(6) Time Scale
Calibrated for three timing ranges.

Burden Data

All ac ratings are 60 hertz

Coil Rating	Watts	Burden	Reactive Volt-Amperes	Power Factor Angle-Lag
Motor (115 volts ac)	1.8	2.5 volt-amps	1.73	44°
Contactor (115 volts ac)	11.5	18.5 volt-amps	14.5	51°

Contact Data

Contact	Voltage of Control Circuit	Amperes Contact Will: (Non-Inductive Load)		
		Open	Close	Carry Continuously
#1, #2①	120 ac	20	20	12
	230 ac	15	20	12
	125 dc	2	20	12
Seal-in,	115 ac	2	2	2
cc	125 ac	. . .	2	2

① Values given are for circuit closing contacts. #1 circuit opening contact will carry 8 amps at same voltages continuously. #1 closing and opening current values are the same as the circuit closing contacts #1 and #2.

Characteristics

In the 50 and 60 hertz relays the time settings available for the three gear positions are:

Minimum	Maximum
2 sec.	30 sec.
0.3 min. (18 sec.)	5 min.
3 min.	50 min.

The smallest sub-division is one second on the 30 second scale, 0.1 minute (6 seconds) on the 5 minute scale, and 1 minute on the 50 minute scale.

With the 25 hertz relays, the maximum time setting available for the three gear positions are 1, 10, and 100 minutes. The smallest sub-division is 2 seconds on the 1 minute scale, 0.2 minute on the 10 minute scale, and 2 minutes on the 100 minute scale.

Reset time for maximum travel is less than one second.

Motor

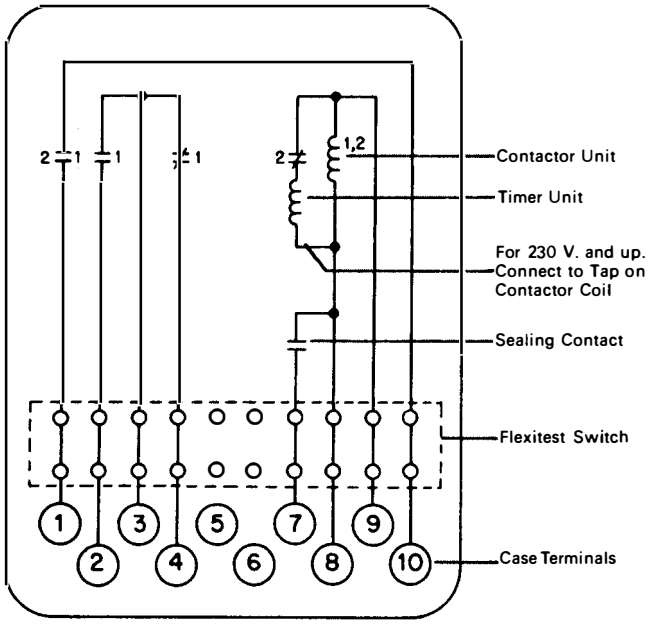
The motor will operate at 10% above or 15% under rated voltage.

Main Contacts

The two sets of main contacts can be adjusted to operate either simultaneously or sequentially. The left hand set is single-pole double-throw (make and break), and the right hand set is single-pole single-throw (make). The right hand contact arm also operates the independent break motor circuit contact. The make contacts will carry 12 amperes continuously and 20 amperes for one minute. The break contact has somewhat less pressure, and will carry about ⅔ this rating. The contacts will open 2 amperes at 125 volts dc; or a non-inductive current of 20 amperes at 115 volts ac, or 15 amperes at 230 volts ac.

TK Internal Wiring (Front-View)

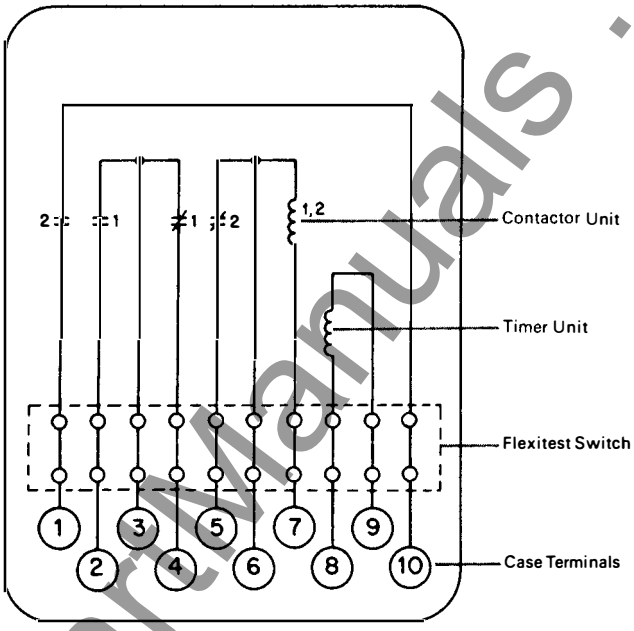
AC Operated with Sealing Contact, FT-21 Case



Note:
1. Operates First in Sequence
2. Operates Next in Sequence

Fig. 1 57-D-7909

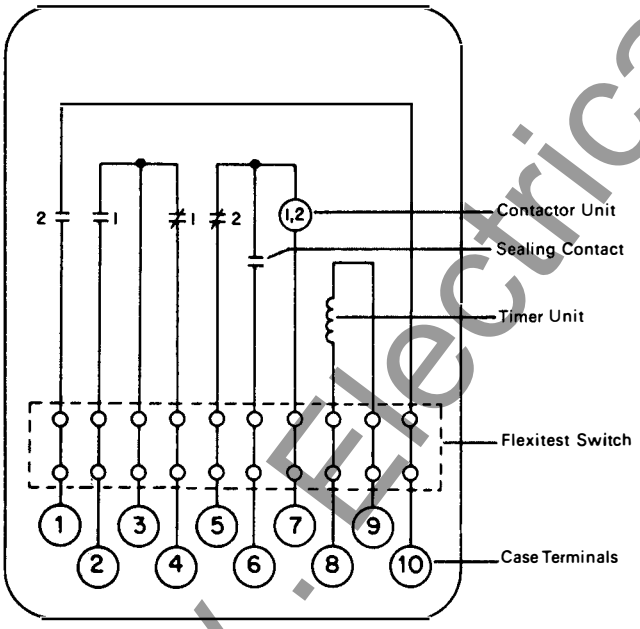
Dc Operated With Inverter, Without Sealing Contact, FT-21 Case



Note:
1. Operates First in Sequence
2. Operates Second in Sequence

Fig. 2 57-D-7911

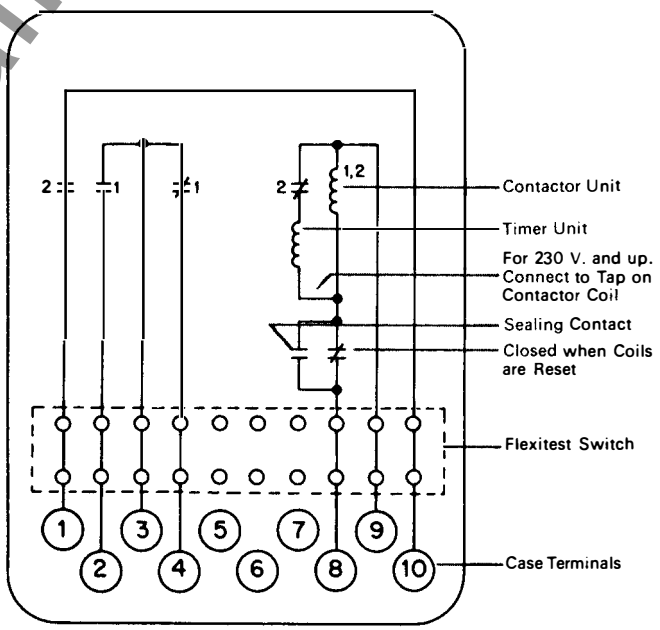
Dc Operated With Inverter, With Sealing Contact, With Momentary Start Contact, FT-21 Case



Note:
1. Operates First in Sequence
2. Operates Second in Sequence

Fig. 3 183A208

Ac Operated With Sealing Contact, With Shaft Contact To Prevent Energization Before Relay Has Reset, FT-21 Case

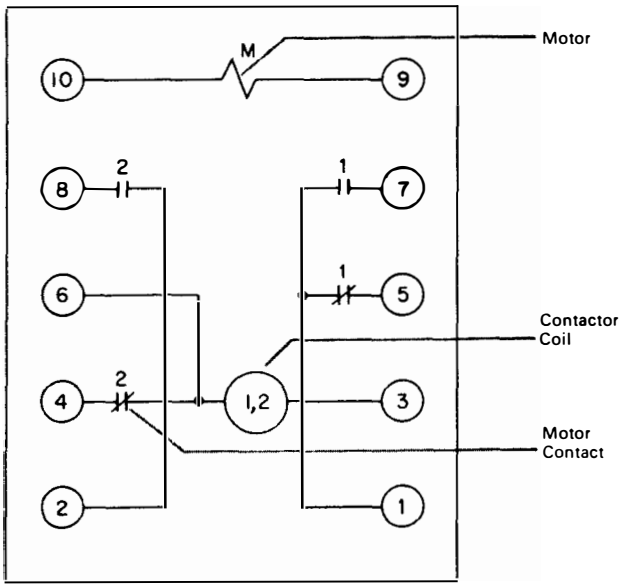


Note:
1. Operates First in Sequence
2. Operates Next in Sequence

Fig. 4 57-D-7910

Metal Cases (Rear View)

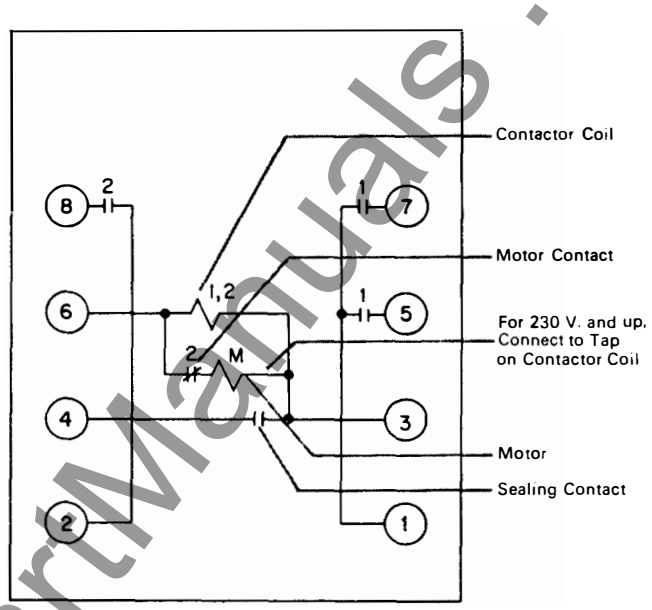
Dc Operated With Inverter, Without Sealing Contacts, 5½" Metal Case



Note:
1. Operates First in Sequence
2. Operates Next in Sequence

Fig. 5 78-D-245

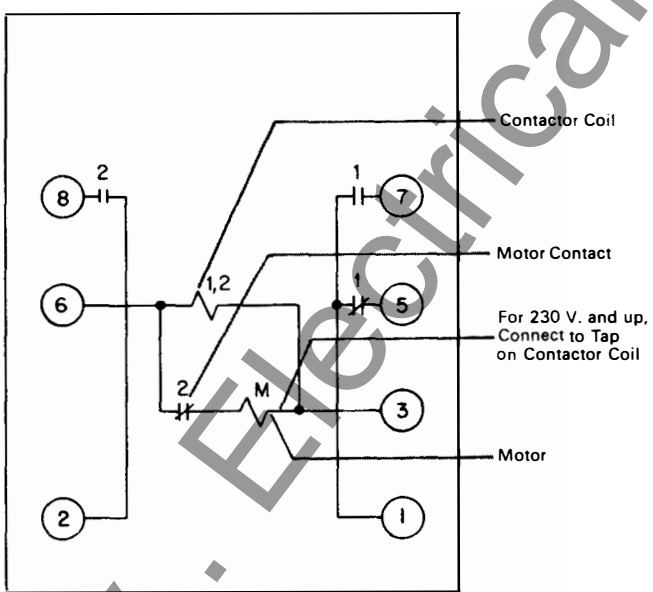
Ac Operated With Sealing Contacts, 5½" Metal Case



Note:
1. Operates First in Sequence
2. Operates Next in Sequence

Fig. 6 56-D-807

Ac Operated Without Sealing Contacts, 5½" Metal Case



Note:
1. Operates First in Sequence
2. Operates Next in Sequence

Fig. 7 56-D-806

External Wiring

TK Relay In FT-21 Case① Device Numbers

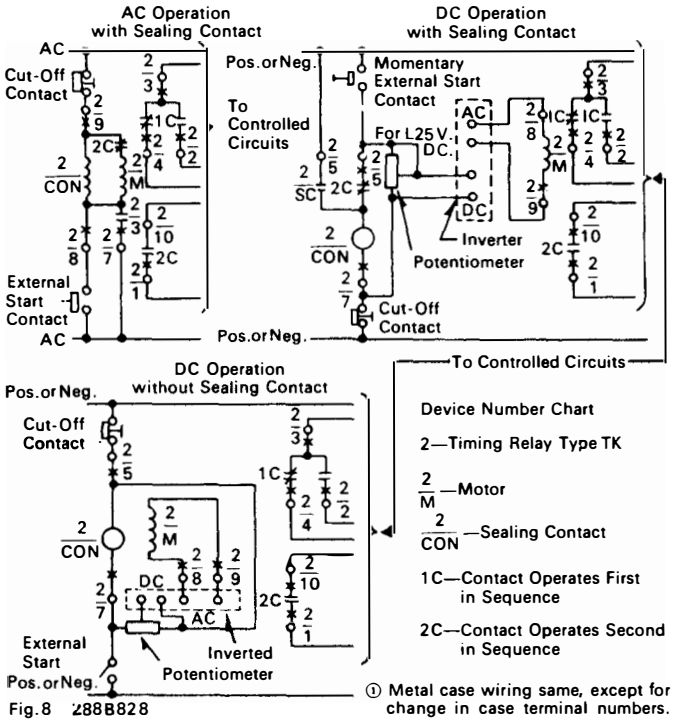
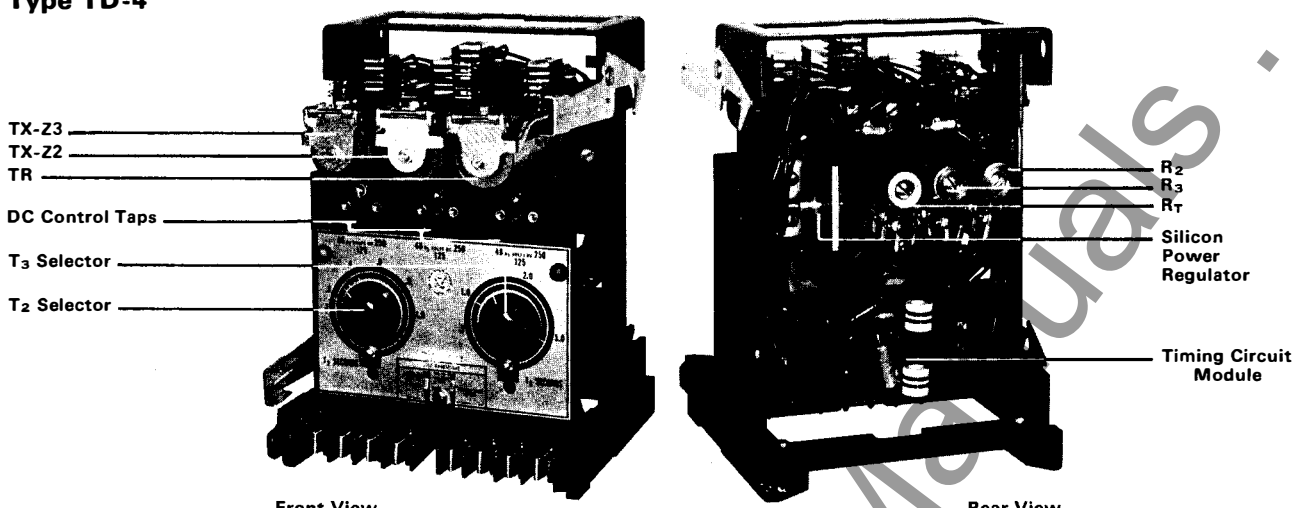


Fig. 8 288B828

① Metal case wiring same, except for change in case terminal numbers.

Type TD-4



Application

The TD-4 relay may be used for any timing application requiring a two-stage timing interval. The first stage being adjustable from 0.1 to 1.0 seconds, and the second stage for 0.5 to 3.0 seconds. The relay operates from a dc source of 48, 125, or 250 volts dc.

This relay is particularly suitable for use as a timing unit for the second and third zone KD-4 and KD-41 relays in a compensator distance relaying scheme. By proper connections in the relaying scheme, the TD-4 will provide a single time delay for zone 2 faults, or a longer time delay for zone 3 faults.

Construction

The TD-4 consists of an auxiliary circuit (consisting of two telephone type relays (TX-Z2, TX-23) and two tapped resistors (R_2, R_3) to initiate the time delay; a reference voltage circuit consisting of a silicon power regulator (DZ) and a tapped resistor (RT); a time delay circuit with two rheostats (T_2 ,T_3); a telephone relay (TR); and a timing circuit module (M).

Operation

Zone 2, Non-Carrier

For a zone 2 fault, both zone 2 and zone 3 KD-4 contacts close, energizing both TX-Z2 and TX-Z3. This completes the dc reference voltage. When the time delay is completed, telephone relay TR is energized and completes the trip circuit path through the normally open TX-Z2 contact.

Zone 2, Carrier

This case is similar to Zone 2, Non-Carrier except that the zone 2 KD contact only is closed. Therefore, only TX-Z2 is energized since zone 3 reach is reversed. The operation of the timing circuit and trip circuit is identical to that described for Zone 2, Non-Carrier.

Zone 3, Carrier Or Non-Carrier

For a zone 3 fault the zone 3 KD-41 contact only is closed. This energizes TX-Z3 and completes the timing circuit. At the end of the time delay, TR is energized and completes the trip path through the normally closed TX-Z2 contact.

Zone 2 Fault Which Appears As A Zone 3 Fault, Due to Infeed

A zone 2 fault may appear to a distance relay as a zone 3 fault. This condition occurs when current infeed changes the apparent impedance as seen by the distance relay.

When this fault occurs, the zone 3 distance relay energizes TX-Z3 and starts the timing function at the zone 3 rate, as described in Zone 3, Non-Carrier or Carrier. As soon as the infeed is removed, the zone 2 distance relay operates to energize TX-Z2. The timing function now continues at the zone 2 rate. The total time delay depends on the T_2 setting, the T_3 setting, and the time at which the breaker clears the infeed. In any event, the trip time following zone 2 KD-4 operation will be less than the T_2 setting.

Characteristics

Time Delay Range

Zone 2: 0.1 second – 1.0 second
Zone 3: 0.5 second – 3.0 second or 0.3 second – 1.5 second.

Reset Time

TR Dropout Time: 0.1 second or less.
TX-Z2, TX-Z3 Dropout Time: 0.06 second or less.

Discharge To timing Capacitor: Discharges to less than 1% of full voltage in 0.015 second.

For relays with slow dropout, reset time is:

TX-Z2 Dropout Time: .045 – .075 second
TX-Z3 Dropout Time: .090 – 0.15 second

Voltage Rating Over the Temperature Range

48, 125, or 250 volts dc. The relay can stand 110% voltage continuously from −20°C to +70°C.

Battery Drain

	48 Volts Dc	125 Volts Dc	250 Volts Dc
Non Operating Condition	0	0	0
Operating Condition:			
Timing Circuit and DZ_1	50-90 ma	30-80 ma	25-70 ma
TX-Z2	117 ma	106 ma	103 ma
TX-Z3	117 ma	106 ma	103 ma

Accuracy

The accuracy of the time delay depends upon the repetition rate of consecutive timings, the supply voltage, and the ambient temperature. Self-heating has a negligible effect on the timing accuracy.

Time Delay Versus Ambient Temperature

Relay Type TD-4 Time Delay Versus Ambient Temperature

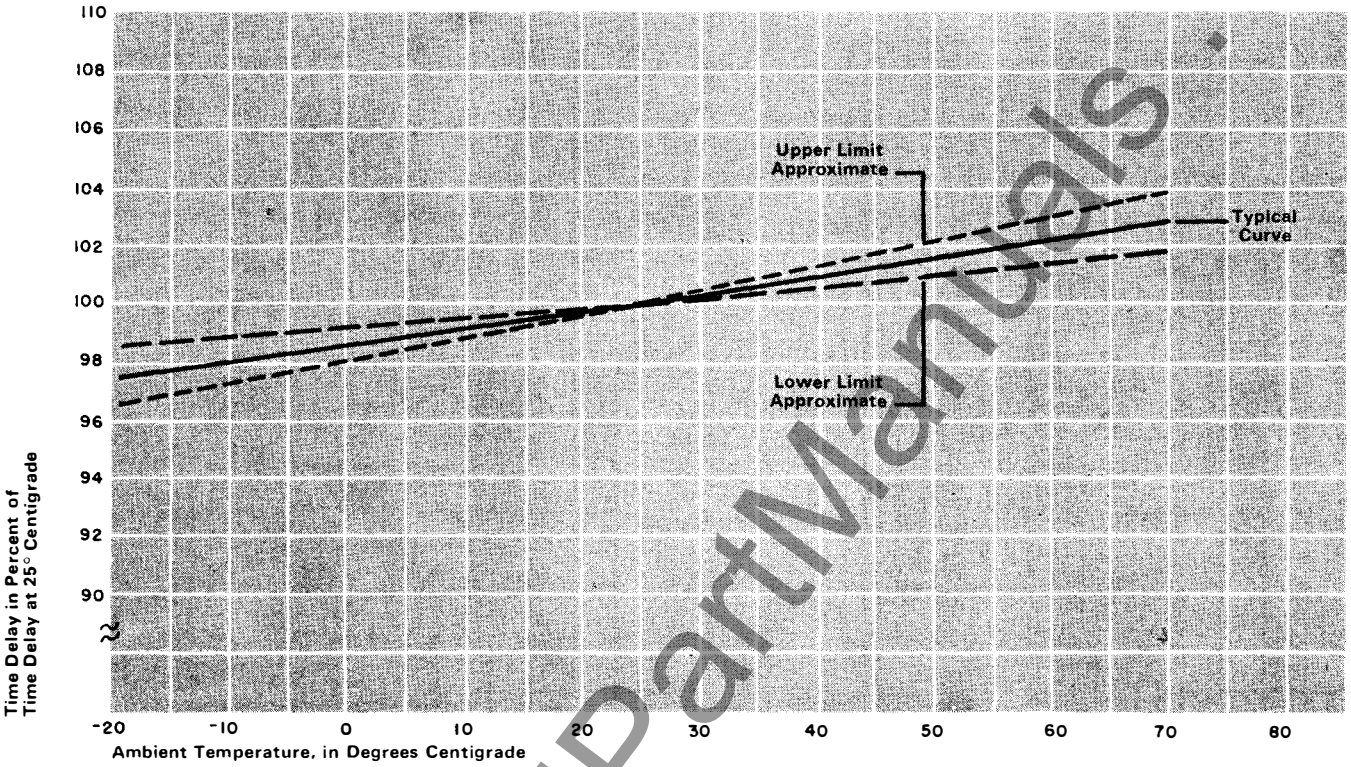


Fig. 9 185A171

Type TD—4 Voltage Time Curve

Zone 2 Range 0.1-1.0 Sec.
Zone 3 Range 0.5-3.0 Sec.

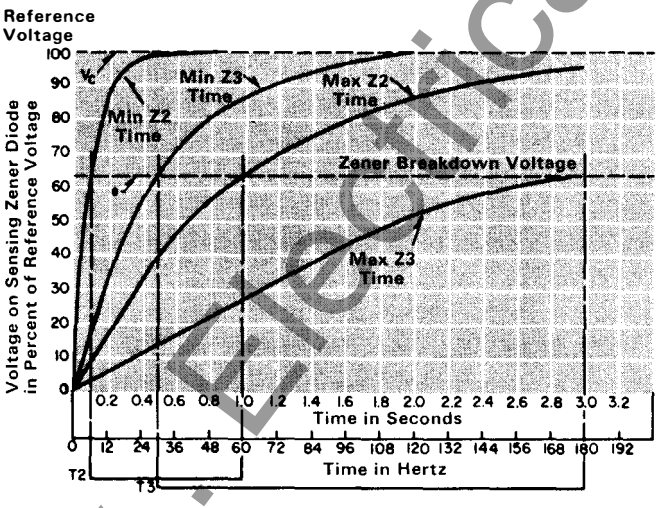


Fig. 10 471118

Timer Control Circuit

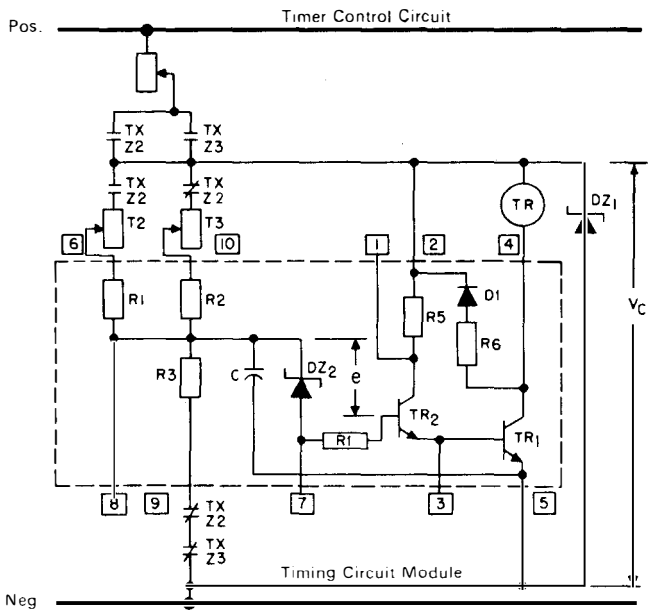
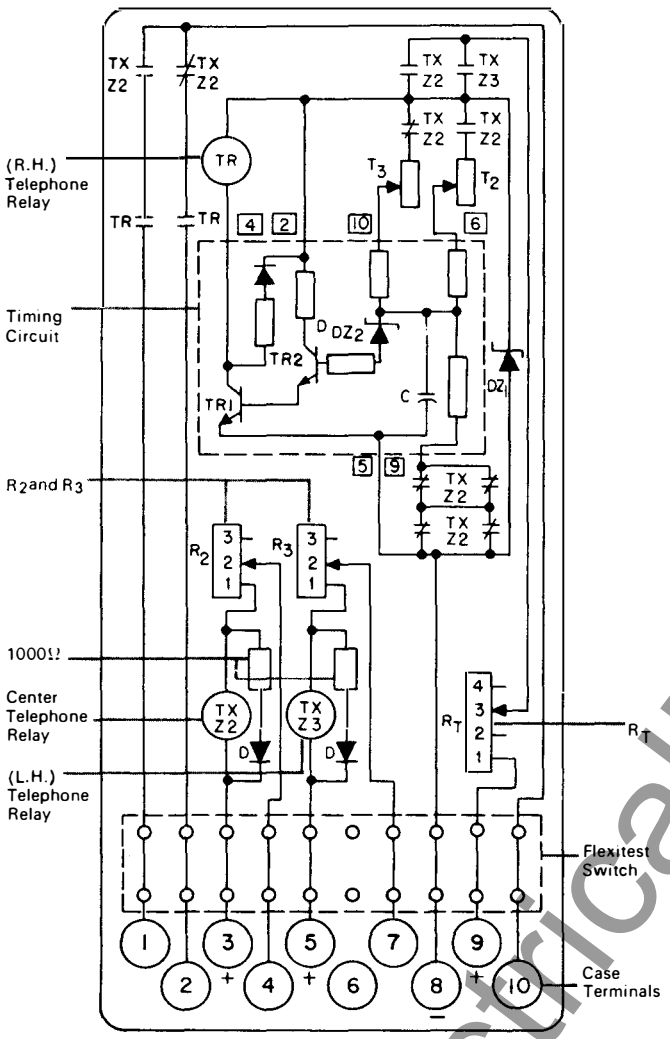


Fig. 11 185A515

TD-4 Internal Wiring (Front-View)

With Slow Dropout, FT-21 Case

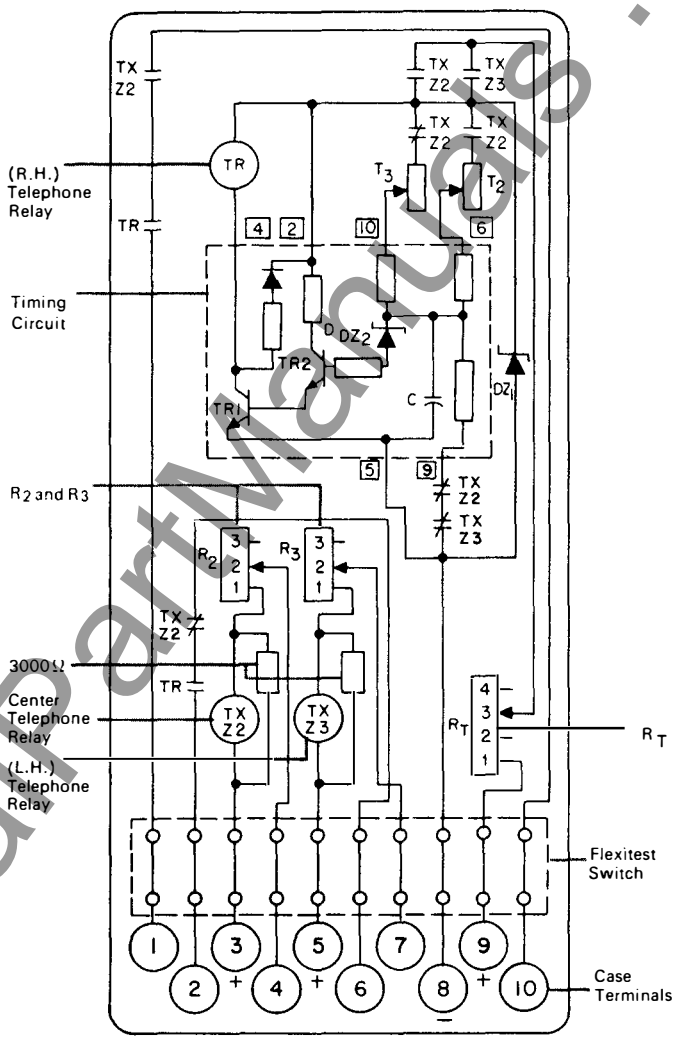


R_2 and R_3		
D.C. Control CKT		
Trip Volt	Lead Position	Resis. Value
48	1	0
125	2	750
250	3	2000

R_T		
D.C. Control CKT.		
Trip Volt	Lead Position	Resis. Value
	1	0
48	2	350
125	3	2500
250	4	6500

Fig. 12 185A210

Independent Tripping Circuits, FT-21 Case

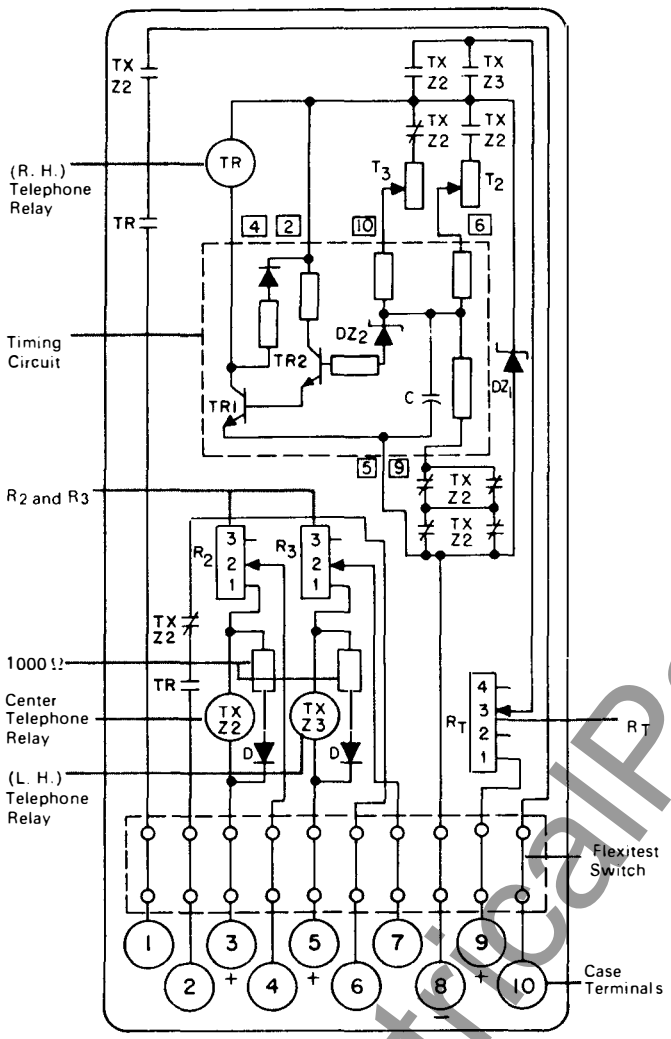


R_2 and R_3		
D.C. Control CKT		
Trip Volt	Lead Position	Resis. Value
48	1	0
125	2	750
250	3	2000

R_T		
D.C. Control CKT.		
Trip Volt	Lead Position	Resis. Value
	1	0
48	2	350
125	3	2500
250	4	6500

Fig. 13 185A232

With Slow Dropout And Independent Tripping Circuits, FT-21 Case

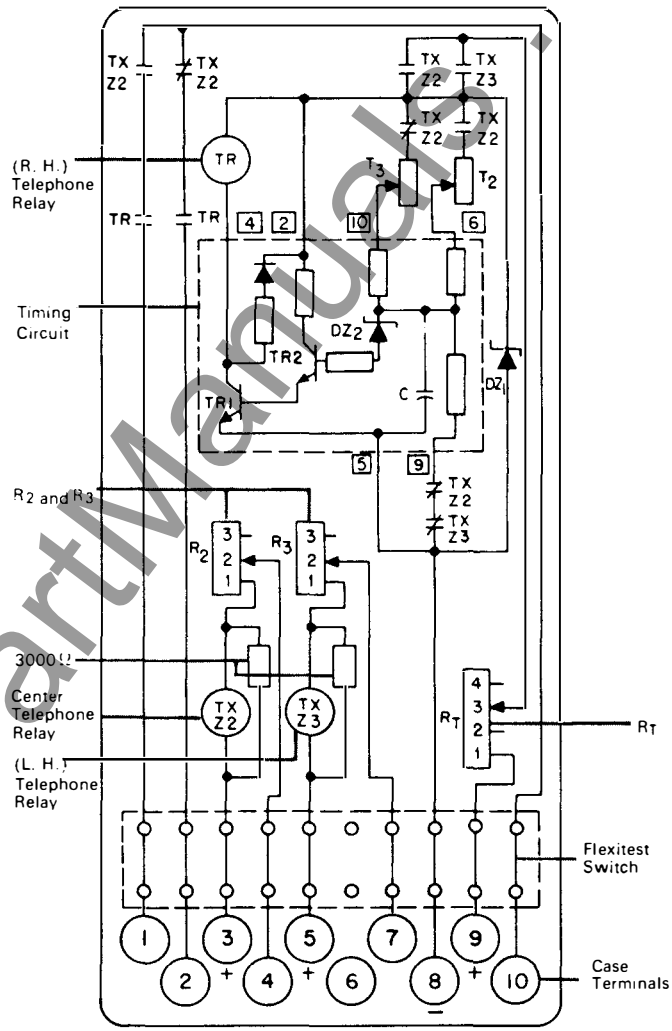


R_2 and R_3		
D.C. Control CKT		
Trip Volt	Lead Position	Resis. Value
48	1	0
125	2	750
250	3	2000

R_T		
D.C. Control CKT.		
Trip Volt	Lead Position	Resis. Value
	1	0
48	2	350
125	3	2500
250	4	6500

Fig. 14 837A071

FT-21 Case

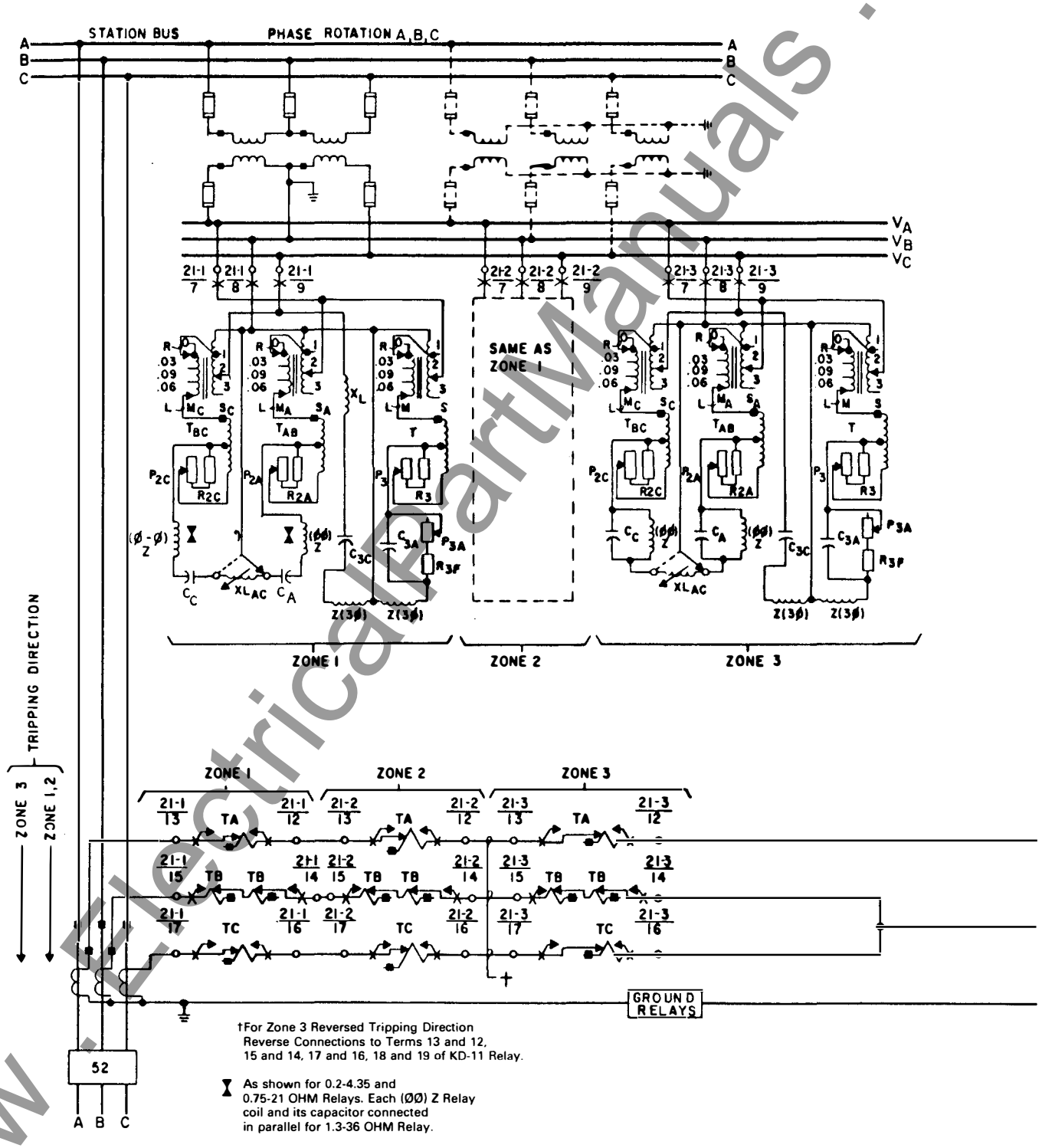


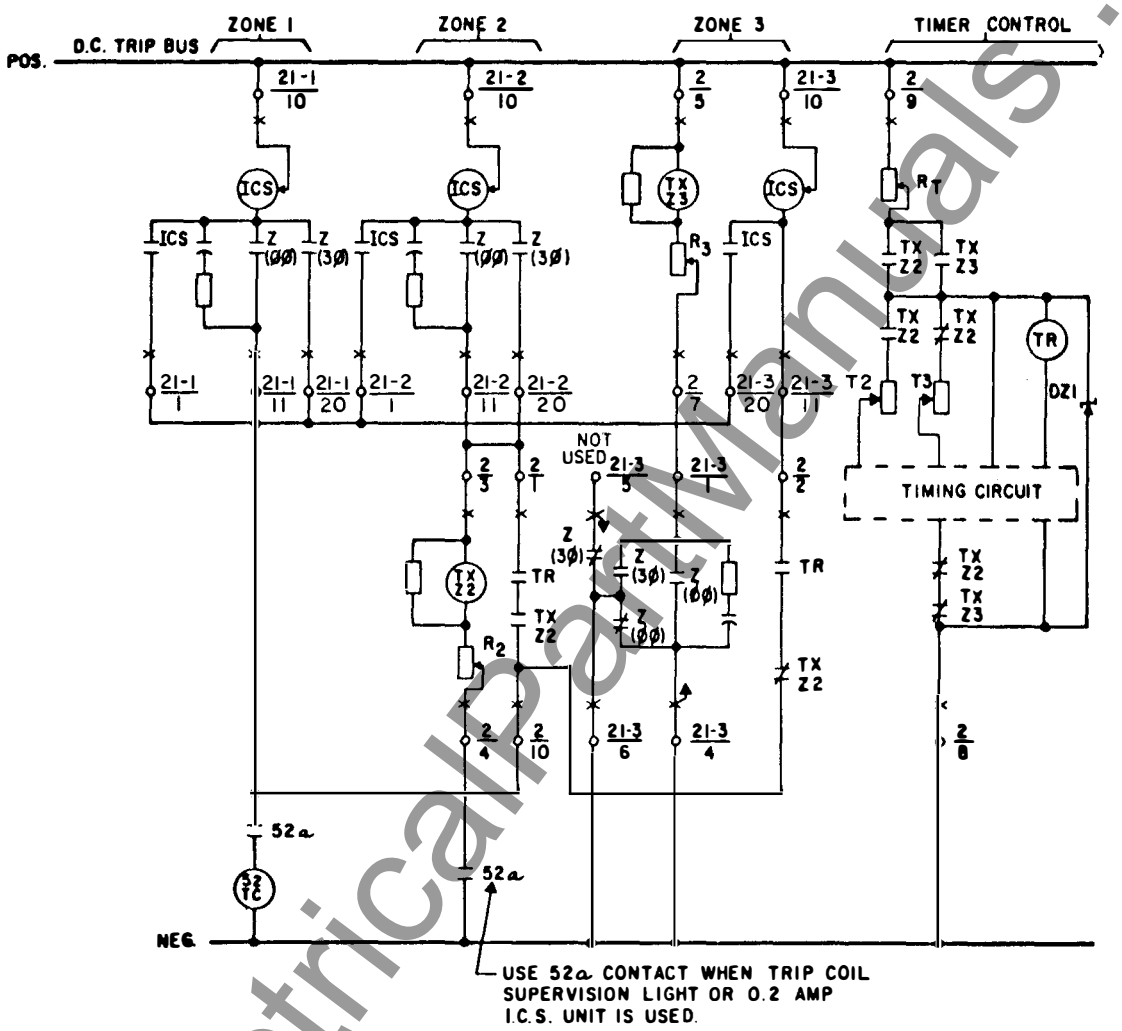
R_2 and R_3		
D.C. Control CKT		
Trip Volt	Lead Position	Resis Value
48	1	0
125	2	750
250	3	2000

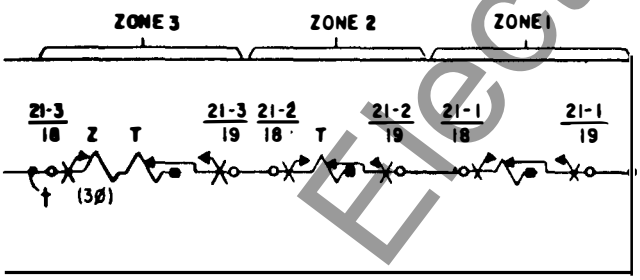
R_T		
D.C. Control CKT.		
Trip Volt	Lead Position	Resis. Value
	1	0
48	2	350
125	3	2500
250	4	6500

Fig. 15 184A615

External Wiring KD-10 Relaying Using Two KD-10, One KD-11, And One TD-4 Relay







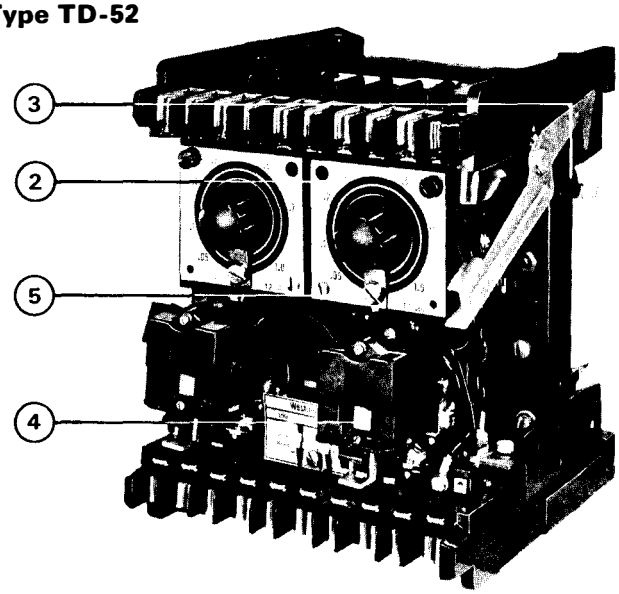
Resistance Values in OHMS

	48 V.D.C.	125 V.D.C.	250 V.D.C.
R_T	350	2500	6500
R_2	0	750	2000
R_3	0	750	2000

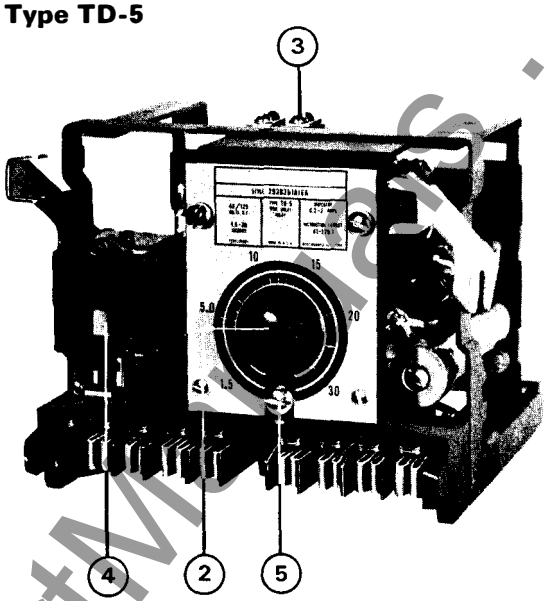
Device Number Chart

Device No.	Zone	Device Relay	Device
21-1	1	KD-10	
21-2	2	KD-10	
21-3	3	KD-11	
2		TD-4 Timing	
52			Power CKT. BKR.
52a			BKR. AUX. Contact
52TC			BKR. Trip Coil

Type TD-52



Type TD-5



The TD-5 is a general purpose timing relay which may be used for applications requiring a time delay within the overall range of 0.5 to 30 seconds.

It operates from a dc source of 24, 32, 48, 125 or 250 volts. It will stand 110% of rated input voltage continuously over an ambient temperature range of −40°C to +70°C.

The TD-52 consists of two TD-5 units mounted in an FT-22 case. This allows utilization of two completely independent timing circuits for such applications as primary and back-up relaying systems.

The telephone type output relay contacts are suitable for circuit breaker trip duty. Two sets of transfer contacts adapt the relay to various trip circuit arrangements.

Construction

(1) Reference Voltage Circuit
Provides a fixed supply voltage to the time delay circuit, and protects the solid state components from high voltages.

(2) Rheostat And Scale Plate
Non-linear calibrating scale plate permits more accurate settings at the lower end of the scale.

(3) Telephone Relay (TR)
Energized by the SCR at the conclusion of the time delay. The coil is energized by at least three times pickup wattage to insure positive contact operation.

(4) Indicating Contactor Switch

(5) Rheostat Locking Screw

(6) Additional Telephone Relay
TD-5 units are also available with an additional telephone type relay (TX) which is energized by application of dc voltage to the relay. A contact of the TX unit seals in around the contact of the initiating relay to maintain voltage to the timing circuit, should the contact of the initiating relay bounce. A diode and resistor connected across the TX unit coil protects the solid state circuitry from inductive voltage kicks.

Characteristics

Relay Burden Data

Relay Rating	Standby	Operating
24 v dc	0	500 ma
32 v dc	0	420 ma
48 v dc	0	270 ma
125 v dc	0	180 ma
250 v dc	0	80 ma

TX Telephone Relay Burden Data

Trip Circuit	Watts
125 v dc	7.8
48 v dc	3.1

Accuracy
The accuracy of the time delay is affected by:

Repetition Rate of Timings
The reset time of the relay can affect the next timing cycle if started before the capacitor discharge is complete. Timing accuracy for normal repetetive rates are as follows:

Relay Rating In Seconds	Minimum Delay (Seconds) Between Timings	Accuracy (In Percent of Setting) ①
.05 – 1.0	3	±2%
.2 – 4.0	5	±2%
1.5 – 30	5	±2%

① Fast repetetive timings (approximately .5 second) will change the accuracy to approximately ±4% (in percent of setting).

Supply Voltage Variation

Voltages between 80% and 110% of nominal will affect the timing accuracy not more than ±3 milliseconds for settings 0.3 seconds or less, or ±1% for settings above 0.3 seconds.

The relay will withstand 110% voltage continuously, over a temperature range of −40°C to 100°C.

Ambient Temperature

See Figure 17.

Time Delay Versus Ambient Temperature

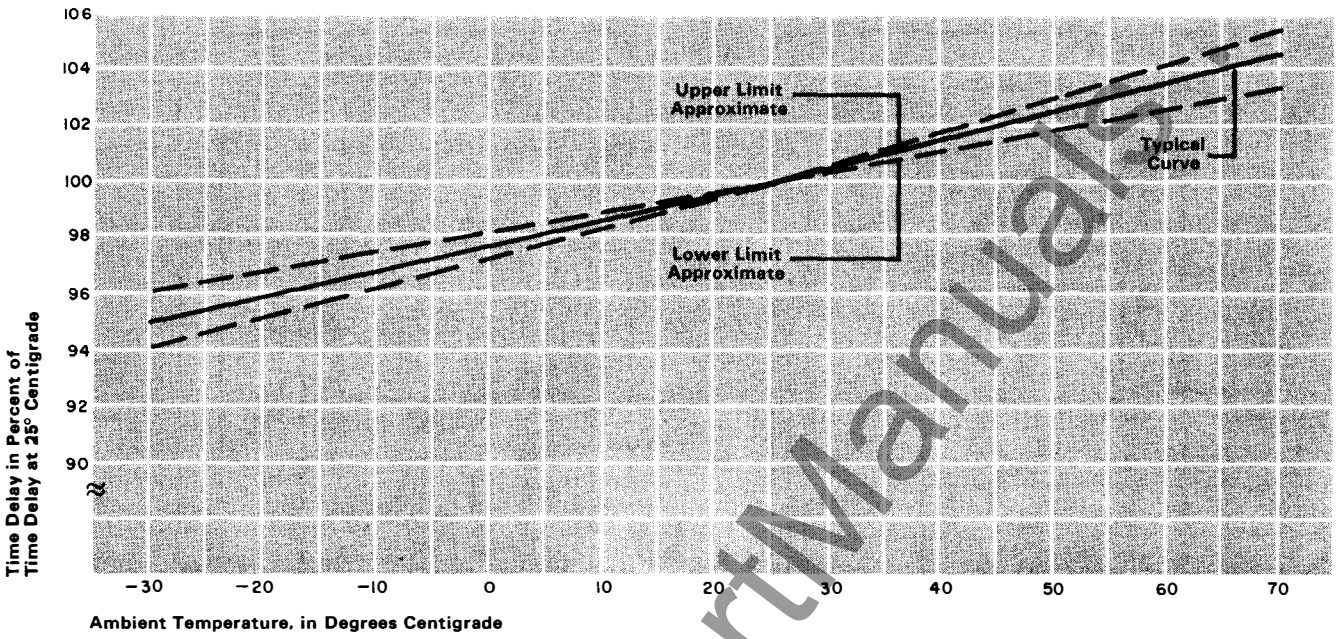
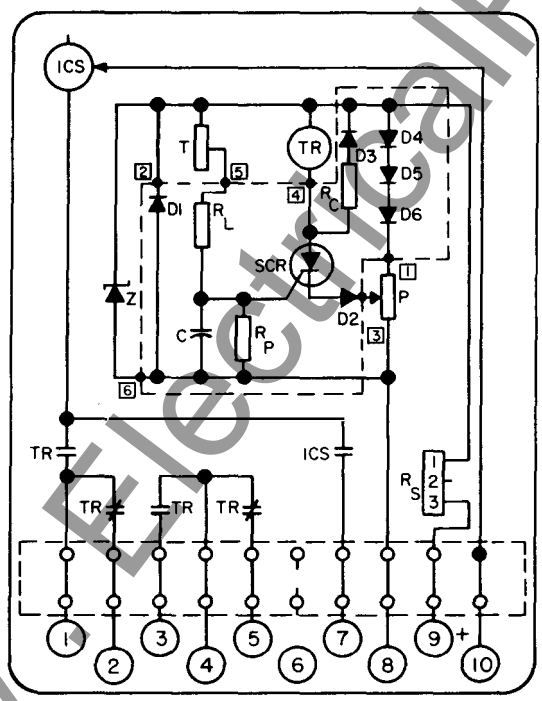


Fig. 17 187A526

TD-5 Internal Wiring FT-11 Case (Front View)



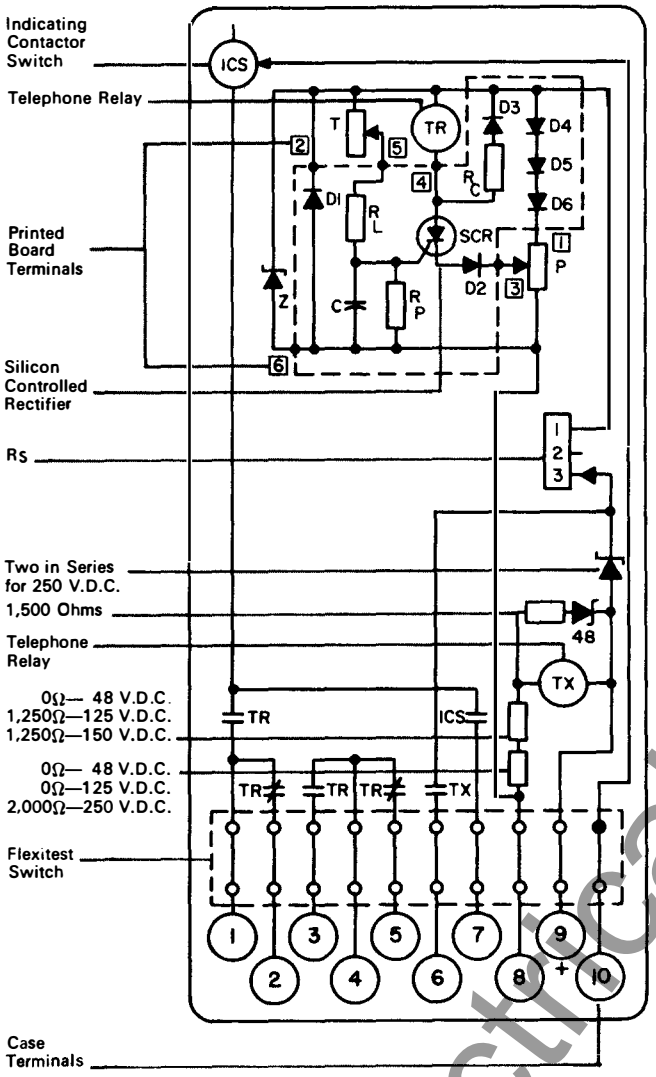
R_S		
D.C. Control CKT		
Trip Volt	Lead Position	Resis. Value
	1	0
24	2	22.5
32	3	45
	1	0
48	2	90
125	3	550
	1	0
—	2	—
250 △	3	2500

△Not Tapped

Fig. 18 187A293

Internal Wiring (Front View)

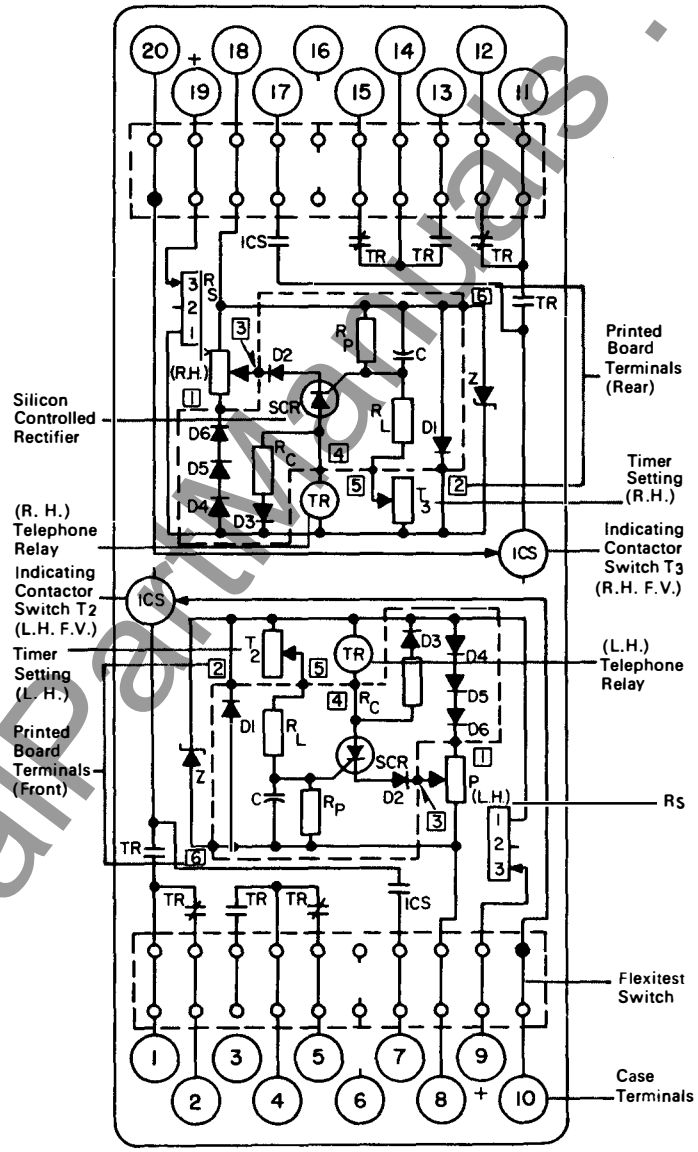
TD-5 With Initiating Telephone Relay TX, FT-11 Case



Rs		
D.C. Control CKT.		
Trip Volt	Lead Position	Resis. Value
	1	0
48	2	90
125	3	550
250	3	2500

Fig. 19 188A016

TD-52, FT-22 Case

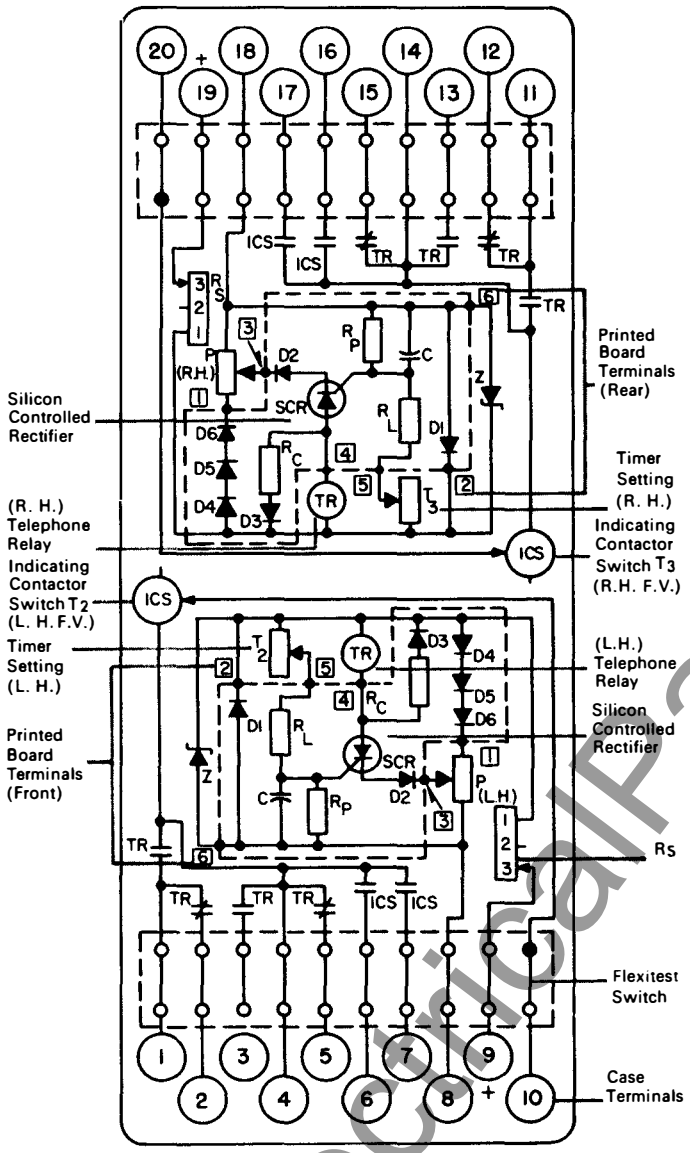


Rs		
D.C. Control Circuit		
Trip Volt	Lead Pos.	Resis. Value
	1	0
24	2	22.5
32	3	45
	1	0
48	2	90
125	3	550
	1	0
—	2	—
250 △	3	2500

△Not Tapped

Fig. 20 762A500

TD-52 With Double Trip ICS Contacts, FT-22 Case

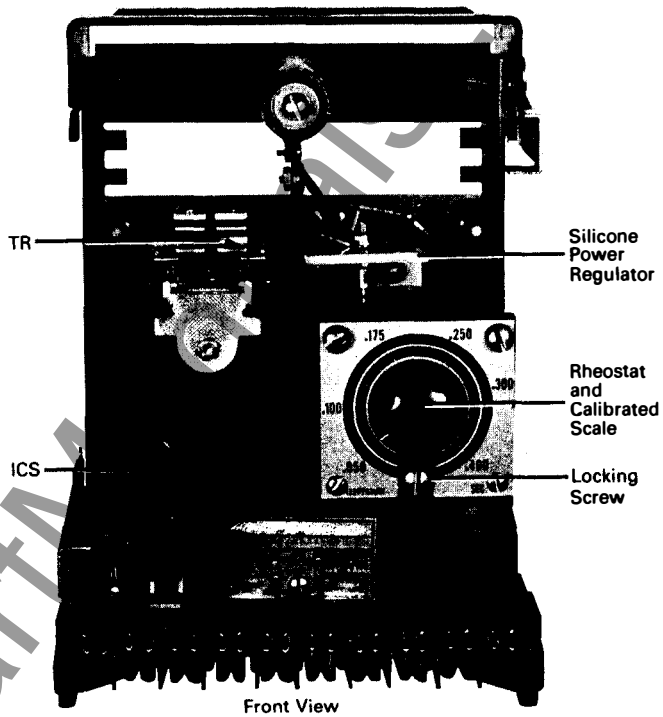


Rs		
D.C. Control CKT		
Trip Volt	Lead Position	Resis. Value
	1	0
24	2	22.5
32	3	45
	1	0
48	2	90
125	3	550
	1	0
—	2	—
250 △	3	2500

△Not Tapped

Fig. 21 629A606

Type TD-50



Front View

Application

The TD-50 is similar in construction to a type TD-5 except for a transistor starting circuit rather than an external contact.

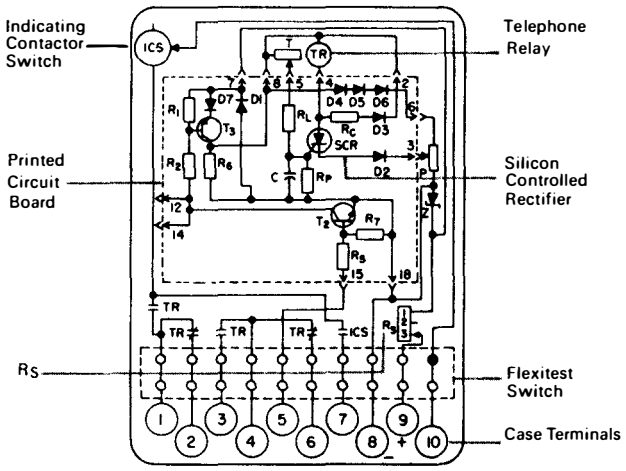
This relay is for use with other solid-state relays whose output is capable of supplying sufficient base current to drive the TD-50 input transistors into saturation. When used in this manner, the logic may be arranged for use in breaker failure schemes or similar applications where various combination of "AND" and "OR" logic are desired.

Construction

Similar to the type TD-5 timing relay, except with a different printed circuit board containing the necessary switching and logic circuitry.

Internal Wiring (Front View)

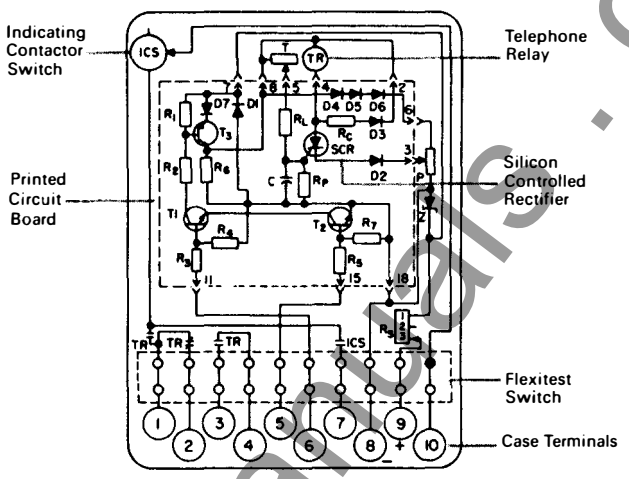
TD-50, Single Input Starting, FT-21 Case



RS D.C. Control CKT.		
Trip Volt	Lead Pos.	Resis. Value
0	1	0
48	2	90
125	3	550

Fig. 22 763A929

TD-50, Two Input Starting, FT-21 Case



RS D.C. Control CKT.		
Trip Volt	Lead Pos.	Resis. Value
0	1	0
48	2	90
125	3	550

Fig. 23 764A264

TD-50, Three Input With Two Input Starting, FT-21 Case

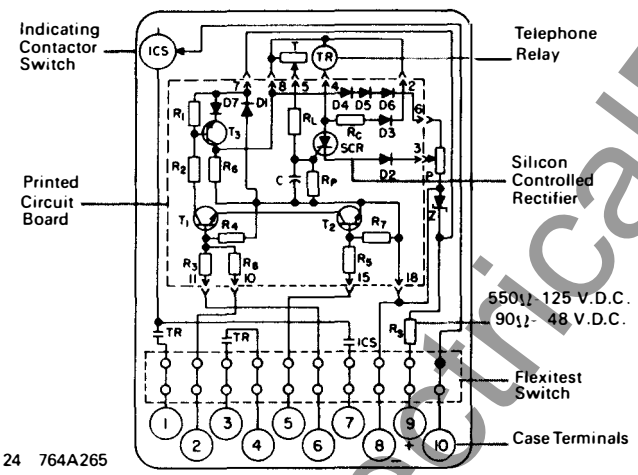


Fig. 24 764A265

TD-50, Three Input With Two Input Starting and Seal-In Circuit, FT-21 Case

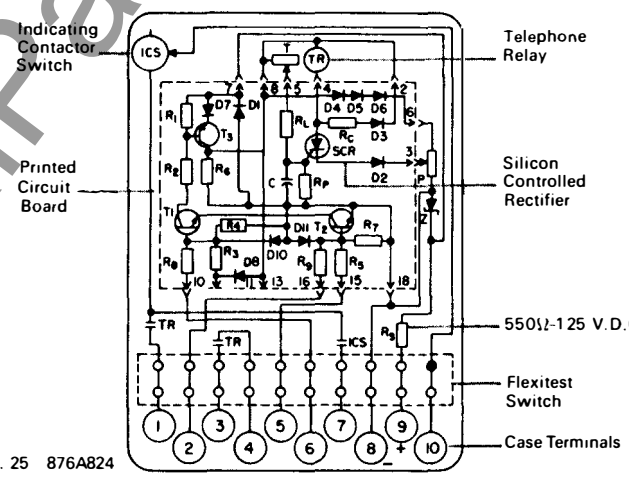


Fig. 25 876A824

Carton Weights and Shipping Dimensions

Case Type	Relay Type	Weight: Pounds		Domestic Shipping Carton Dimensions: Inches
		Net	Shipping	
FT-11	TD-5	8	10	9 x 9 x10
FT-21	TD-4	15	13	9 x 12 x 13
	TD-50	12	16	9 x 12 x 13
	TK	12	16	9 x 12 x 13
FT-22	TD-52	..	..	9 x 12 x 13
Square Metal	TK	10	14	9 x 9 x 10

Further Information

List Prices: PL 41-020
Technical Data: TD 41-025
Instructions: TK—IL 41-574.1
TD-4—IL 41-579
TD-5—IL 41-579.1
TD-50—IL 41-579.2
TD-52—IL 41-579.3
Flexitest Cases: DB 41-076
Other Cases: DB 41-080
Dc to Ac Inverter: DB 41-082
Other Protective Relays:
Application Selector Guide, TD 41-016

Printed in U.S.A.

August, 1991
Supersedes TD 41-020, Types TK, TD-4, TD-5, TD-50 and TD-52 on pages 84 and 85, dated November, 1987
Mailed to: E, D, C/41-500A

For Ac and Dc Applications
Requiring A Definite Time Delay

Types TK, TD-4, TD-5, TD-50 and TD-52 Timing Relays

Timing Relays (Device Number: 2)

Type	Time Range: Reset Stroke	Time Range: Energized Stroke	Seal-in Contact	Frequency	Volts	Relay Data: Internal Schematic	Relay Data: Style Number	Relay Data: Case Size
Square Metal Case (Projection Mounted)								
TK ①	Quick	2 Sec. to 50 Min.	Without	60 Hertz	115	56D806	1877 892	5½" square
					208		1956 243	
					230		1877 893	
					460		1877 894	
					575		1877 897	
				Dc②	125	78D245	1956 290	
					250		1956 240	
			With	60 Hertz	115	56D807	1877 904	
					208		1956 244	
					230		1877 905	
					460		1877 906	
					575		1877 909	
				Dc②	125	183A901	1956 242	
					250		1956 241	
Flexitest Case								
	Quick	2 Sec. to 50 Min.	Without	60 Hertz	115	57D7908	1876 009	FT-21
					208		1956 238	
					230		1876 010	
					460		1876 011	
					575		1876 012	
				Dc②	125	57D7911	1876 013	
					250		1956 067	
			With	60 Hertz	115	57D7909	1876 014	
					208		1956 239	
					230		1876 015	
					460		1876 016	
					575		1876 017	
				Dc②	125	183A208	1876 018	
					250		1956 068	

Type	Timing Range: Seconds Min.	Timing Range: Seconds Max.	Dc Voltage	Output Contact Circuits	TX Units	Reset Time	Relay Data: Internal Schematic	Relay Data: Style Number	Relay Data: Case Size
TD-4	Zone 2 0.1-1.0	Zone 3 0.5-3.0	48/125/250	Common	2	.06 sec. or less	184A615	644B301A09⑤	FT-21
				Independent			185A232	644B301A10⑤	
				Independent		Zone 2, .045-.075 Zone 3, .090-0.15	837A071	644B301A19	
	Zone 2 0.1-1.0	Zone 3 0.3-1.5		Common			185A210	644B301A17	
				Independent			837A071	644B301A18	

Dc to Ac Inverter (DB 41-082)

Output Volt-Amperes: Ac	Conversion Factor	Applied with Relay Type:	Style Number
0-3 va	125/250 volts dc to 115 volts 60 Hertz③	TK	1008 561
0-8 va		RC	1008 549

⑤ Denotes item available from stock.
① 50 Hertz relays and auxiliaries can be supplied at same price. Order "Similar to Style Number . . . . . , except 50 Hertz".
② For 125 or 250 volt dc operation, order dc to ac inverter from table above. Potentiometer required on 250 volt operation.
③ For conversion from 250 volts dc, order 8½" long, 160 watt, 1825 ohm potentiometer (with mounting bracket) style number 07B4865G17. Outline dimensions per DB 41-082.

Timing Relays, Continued

Type	Timing Range: Seconds	Rating: Dc Volts	TX Units	Indicating Contactor Switch⑤	Relay Data: Internal Schematic	Relay Data: Style Number	Relay Data: Case Size
TD-5 One unit per case Time delay on pickup	.05-0.4	24/32 48/125 250	None	0.2/2.0 amps dc	187A293	293B301A21 293B301A22⑤ 293B301A23	**FT-11**
		48/125 250	One		188A016	293B301A30 293B301A31	
	0.5-1.0	24/32 48/125 250	None		187A293	293B301A09 293B301A10⑤ 293B301A11	
		48/125 250	One		188A016	293B301A24⑤ 293B301A27	
	0.2-4.0	24/32 48/125 250	None		187A293	293B301A12 293B301A13⑤ 293B301A14	
		48/125 250	One		188A016	293B301A25 293B301A28	
	1.5-30.0	24/32 48/125 250	None		187A293	293B301A15 293B301A16⑤ 293B301A17	
		48/125 250	One		188A016	293B301A26 293B301A29	
With Avalanche Diodes	.05-0.4	48/125 250	One	0.2/2.0 amps dc	876A763	293B301A37 293B301A38	**FT-11**
	.05-1.0	48/125 250				293B301A33 293B301A35	
	.2-4	48/125				293B301A39	
	1.5-30	48/125 250				293B301A34 293B301A36	
TD-50 2 input start	.05-0.4 .05-1 .2-4 .05-0.4	48/125 48/125 48/125 250	With	0.2/2.0 amps dc	3504A92	774B872A09 774B872A11 774B872A12 774B872A10	**FT-21**
TD-52 Two timing ranges per case	.05-.04	24/32 48/125 250	None	0.2/2.0 amps dc	629A606	606B038A09 606B038A10 606B038A11	**FT-22**
	.05-1.0	24/32 48/125 250	None		629A606	606B038A17 606B038A18 606B038A19	
	0.2-4.0	24/32 48/125 250	None		629A606	606B038A25 606B038A26 606B038A27	
		48/125	None	1.0 amp dc	849A147	606B038A29	
	1.5-30.0	24/32 48/125 250	None	0.2/2.0 amps dc	629A606	606B038A33 606B038A34 606B038A35	
TD-53	.05-1.0 0.2-4.0 0.2-4.0	125 125 250	None	0.2/2.0 amps dc	764A246	644B297A15 644B297A20 644B297A21	**FT-11**

⑤ Denotes item available from stock.

③ ICS: Indicating Contactor Switch (dc current operated) having seal in contacts and indicating target which are actuated when the ICS coil is energized at or above pickup current setting. Suitable for dc control voltages up to and including 250 volts dc. Two current ranges available:
(1) 0.2/2.0 amps dc, with tapped coil.
(2) 1.0 amp dc, without taps.

Rating of ICS unit used in specific types of relays is shown in price tables. All other ratings must be negotiated.

When ac current is necessary in a control trip circuit, the ICS unit can be replaced by an ACS unit.

The ACS unit may be supplied in place of an ICS unit at no additional cost. Specify system voltage rating on order.

ABB Power T&D Company Inc.
Relay Division
4300 Coral Ridge Drive
Coral Springs, FL 33065
954-752-6700

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ABB Power T&D Company Inc.
Relay Division
7036 Snowdrift Road, Suite 2
Allentown, PA 18106
610-395-7333

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