

# INSTRUCTIONS

## Solid-State Timing Relay

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### ITE-62T

Catalog Series 417T

Test Case

Catalog Series 217T

Standard Case

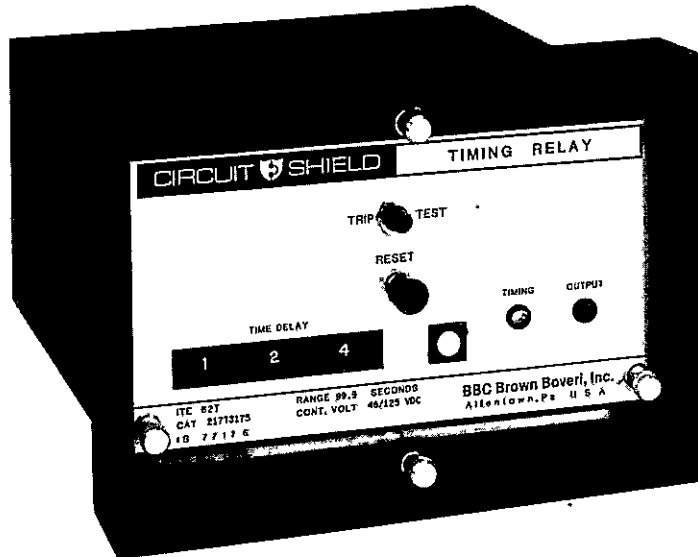


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INTRODUCTION

These instructions contain the information required to properly install, operate, and test the ITE-62T solid-state Timing Relay.

The relay is housed in a case suitable for conventional semiflush panel mounting. All connections to the relay are made at terminals located on the rear of the case that are clearly numbered.

All settings are made on the front panel of the relay, behind a removable clear plastic cover. The target is reset by means of a pushbutton extending through the relay cover.

Relays with catalog numbers starting with 417T are similar in function to relays of the 217T series. Both series offer totally drawout construction; however, the 417T series provides integral test facilities. Note that the connections are different for the two series. Refer to the connection diagrams in this instruction book.

PRECAUTIONS

The following precautions should be taken when applying these relays:

1. Incorrect wiring may result in damage. Be sure wiring agrees with the connection diagram for the particular relay before energizing. *Note especially that the connections for the 417T series units are different than for the 217T series.*
2. Apply only the rated voltage marked on the relay front panel. The proper polarity must be observed when the dc control power connections are made.
3. For relays with dual-rated control voltage, withdraw the relay from the case and check that the movable links on the printed circuit board are in the correct position for the system control voltage.
4. Movable links must be positioned to obtain the desired operating functions. See section on Connections for additional details.
5. High voltage insulation tests are not recommended. See section on testing for additional information.
6. The entire circuit assembly of the relay is removable. The unit should insert smoothly. Do not use excessive force.
7. Follow test instructions to verify that the relay is in proper working order.

**CAUTION:** *since troubleshooting entails working with energized equipment, care should be taken to avoid personal shock. Only competent technicians familiar with good safety practices should service these devices.*

PLACING THE RELAY INTO SERVICE

1. RECEIVING, HANDLING, STORAGE

Upon receipt of the relay (when not included as part of a switchboard) examine for shipping damage. If damage or loss is evident, file a claim at once and promptly notify Asea Brown Boveri. Use normal care in handling to avoid mechanical damage. Keep clean and dry.

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## 2. INSTALLATION

### Mounting:

The outline dimensions and panel drilling and cutout information is given in Fig. 1.

### Connections:

Internal connections are shown in Figure 2. Typical external connections are shown in Figure 3. Note the difference in connections between 217T and 417T series units. *Be sure to use the correct diagram for the unit you have selected.*

Control power must be connected in the proper polarity.

These relays have metal front panels which are connected through printed circuit board runs and connector wiring to a terminal at the rear of the relay case. The terminal is marked "G". In all applications this terminal should be wired to ground.

### Internal Selector Plugs:

The ITE-62T Timing Relay has FIVE movable plugs on the printed circuit board. Each of these must be placed in the correct position to obtain the desired mode of operation of the relay:

**Voltage Selector Plugs (VSP1, VSP2)** - These two plugs set the relay up for the system dc control voltage. Only the voltages stamped on the front panel apply. VSP1 must be placed in the position corresponding to the control voltage applied to relay terminals 7 and 8. VSP2 must be placed in the position corresponding to the voltage level of the input (initiating) signal. In most applications VSP1 and VSP2 will be set to the same voltage. (Note: relays with a nameplate rating of 110 vdc use the 125 vdc internal position.)

**Delay on Pickup/Dropout Selector Plugs (J2, J3)** - These two plugs set the relay up for delay-on-pickup (PU) OR delay-on-dropout (DO) operation. Both plugs must be set in the same position.

**Target Operation Selector Plug (J1)** - This plug sets the operating mode for the target indicator. With the plug in the internal (INT) position, target operation is obtained electronically at the same time that the output relay is energized. With the plug in the external (EXT) position, a series current of 1 ampere or higher is required through the coil labelled "TAR" on the internal connection diagrams, to obtain the target.

See page 7 for a diagram showing the location of the selector plugs.

## 3. SETTINGS

**Timer Delay** - This set of three thumbwheel switches selects the delay time of the digital timer circuit. The switches are read directly from 001 to 999. The maximum setting in seconds is stamped at the bottom of the front panel, and gives the user the correct placement of the decimal point. For example: for a relay with a range of 9.99 seconds, a setting of 293 corresponds to 2.93 seconds delay. Similarly, for a relay with a 99.9 second range, 293 corresponds to a setting of 29.3 seconds.

For models with the shorter times, the delay of the output stage can be significant compared to the total delay set. The output stage adds approximately 7 milliseconds (.007 sec.) to the timer setting. The timer setting can be reduced accordingly, or the total delay can be set by test if desired.

## 4. INDICATORS

Two light emitting diodes and a target indicator are provided to assist in testing and to provide operating personnel with information of the status of the relay. The yellow led labelled "TIMING" lights when the initiating contact starts the timer. The red led labelled "OUTPUT" lights when the time delay period expires and the output contacts transfer.

A manually reset operation target is also provided. The target may be actuated from external trip circuit current, or internally by electronic means. To reset the target depress the RESET pushbutton. In order to reset the target, control power must be present, and the relay may not be in the "timed-out" condition.

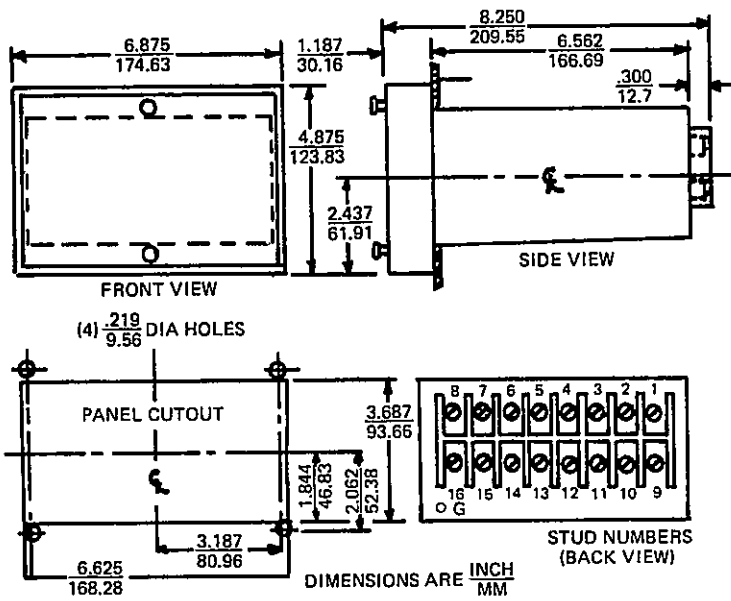


Figure 1: Relay Outline and Drilling

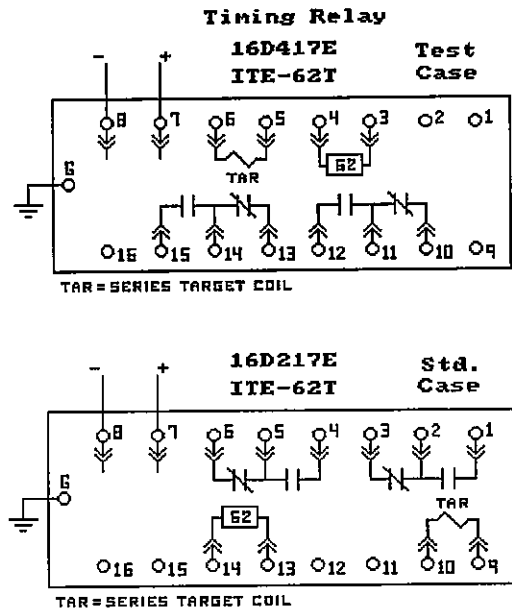


Figure 2: Internal Connections  
(Note: use of the target coil "TAR" is optional; see page 3 for details.)

The following table defines the OUTPUT CONTACT STATES for all possible conditions of the input signal and the dc control power. AS SHOWN means the contacts are in the state shown on the internal connection diagrams. TRANSFERRED means the contacts are in the opposite state to that shown.

RELAY SET FOR DELAY ON PICKUP:

CONDITION	INDICATORS		CONTACT STATE
	Ye1	Red	
DC Control Voltage Applied, and Initiating Contact Open	Off	Off	As Shown
DC Control Voltage Applied, and Initiating Contact Closes:			
a) Initial State	On	Off	As Shown
b) State at End of Time Delay Period	On	On	Transferred
No DC Control Voltage Applied, Initiating Contact Open or Closed	Off	Off	As Shown

RELAY SET FOR DELAY ON DROPOUT:

CONDITION	INDICATORS		CONTACT STATE
	Ye1	Red	
DC Control Voltage Applied, and Initiating Contact Closed	Off	Off	As Shown
DC Control Voltage Applied, and Initiating Contact Opens:			
a) Initial State	On	Off	As Shown
b) State at End of Time Delay Period	On	On	Transferred
No DC Control Voltage Applied, Initiating Contact Open or Closed	Off	Off	As Shown

## APPLICATION DATA

The ITE-62T is a general purpose, dc operated timing relay that provides excellent accuracy and repeatability despite wide variations in ambient temperature and control voltage conditions. It is suitable for transfer schemes, zone timing, alarm schemes, and for breaker failure schemes. (Note that for breaker failure schemes the ITE-62B timer which includes additional logic may be more suitable. See IB 7.7.1.7-5 for a detailed description.)

The ITE-62T uses digital counting techniques to obtain a wide range of settings. Thumbwheel switches make it easy to set the relay.

The relay may be set up during installation to provide either time-delay-on-pickup, or, time-delay-on-dropout.

The mode of target indicator operation is also user selectable between internal electronic operation, or series actuation by the current flowing in the trip circuit.

Light emitting diode indicators are provided for additional operator information and for ease of testing the relay.

The initiating signal is isolated from the relay's internal circuitry by means of an optocoupler. This allows the initiating signal to be derived from a different control power source than that from which the relay is powered. Different voltage levels are also possible for unusual applications. Consult the factory.

## SPECIFICATIONS

Delay setting range: models available for  
 .001 - .999 seconds  
 0.01 - 9.99 seconds  
 00.1 - 99.9 seconds  
 1 - 999 seconds

Fixed Output Stage Delay: 5 - 16 milliseconds.

Repeatability: +/-0.5% or +/-15 milliseconds, whichever is greater.

Variation in Timing with Change in Ambient Temperature:  
 +/-2% or +/-20 milliseconds, whichever is greater, for -20 to +70 degrees C.

Variation in Timing with Change in Control Voltage:  
 +/-2% or +/-15 milliseconds, whichever is greater, for -20%, +10% voltage variation.

Reset Time: approximately 10 milliseconds.

Control Power: models available for 48/125 vdc nominal @ 0.04 A max.  
 48/110 vdc nominal @ 0.04 A max.  
 24/ 32 vdc nominal @ 0.06 A max.

allowable variations: 100-140 vdc for 125V rating.  
 88-125 vdc for 110V rating.  
 38- 58 vdc for 48V rating.  
 26- 38 vdc for 32V rating.  
 19- 29 vdc for 24V rating.

Input Burden: 0.5 VA.

Output Contacts: rated at 125 vdc - 30 amps tripping  
 5 amps continuous  
 1 amp break, resistive  
 0.3 amp break, inductive

Output Contact Logic: the tables on page 4 define the output contact states for various conditions of the input signal and the dc control power supply.

Operating Temperature: -30 to +70 degrees C.

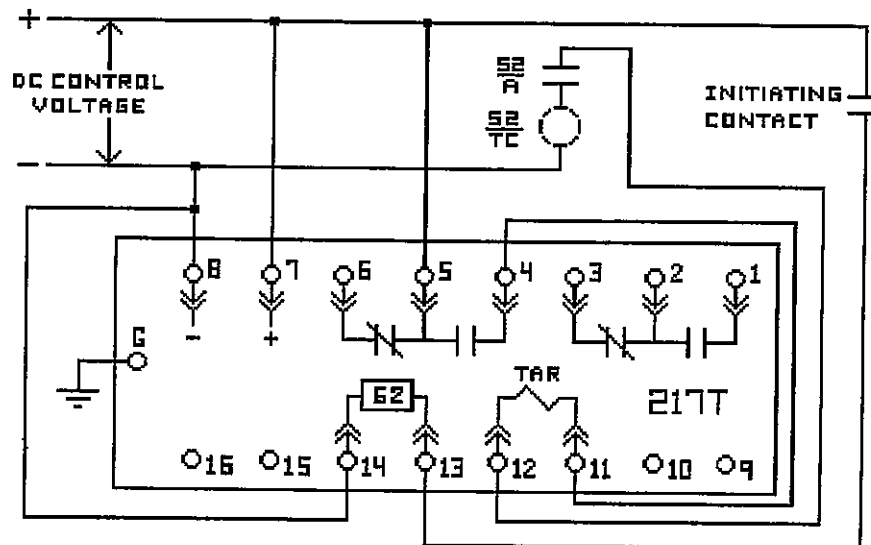
Series Target Coil: 1 ampere minimum trip current required to insure target operation. Rated 30 amperes tripping circuit duty.

Dielectric Strength: 2000 vac rms 50/60 Hz., 60 seconds; all circuits to ground.

CHARACTERISTICS OF COMMON UNITS

Timer Range	Control Voltage	Catalog Numbers	
		Std Case	Test Case
.001 - .999 sec	48/125 vdc	217T1175	417T1175
	48/110 vdc	217T1105	417T1105
	24/ 32 vdc	217T1195	417T1195
0.01 - 9.99 sec	48/125 vdc	217T2175	417T2175
	48/110 vdc	217T2105	417T2105
	24/ 32 vdc	217T2195	417T2195
00.1 - 99.9 sec	48/125 vdc	217T3175	417T3175
	48/110 vdc	217T3105	417T3105
	24/ 32 vdc	217T3195	417T3195
001 - 999 sec	48/125 vdc	217T4175	417T4175
	48/110 vdc	217T4105	417T4105
	24/ 32 vdc	217T4195	417T4195

217T



417T

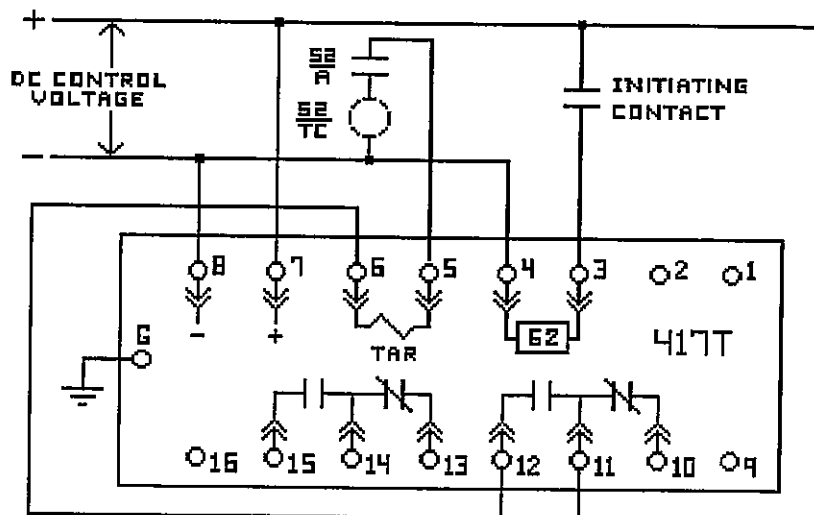


Figure 3: Typical External Connections

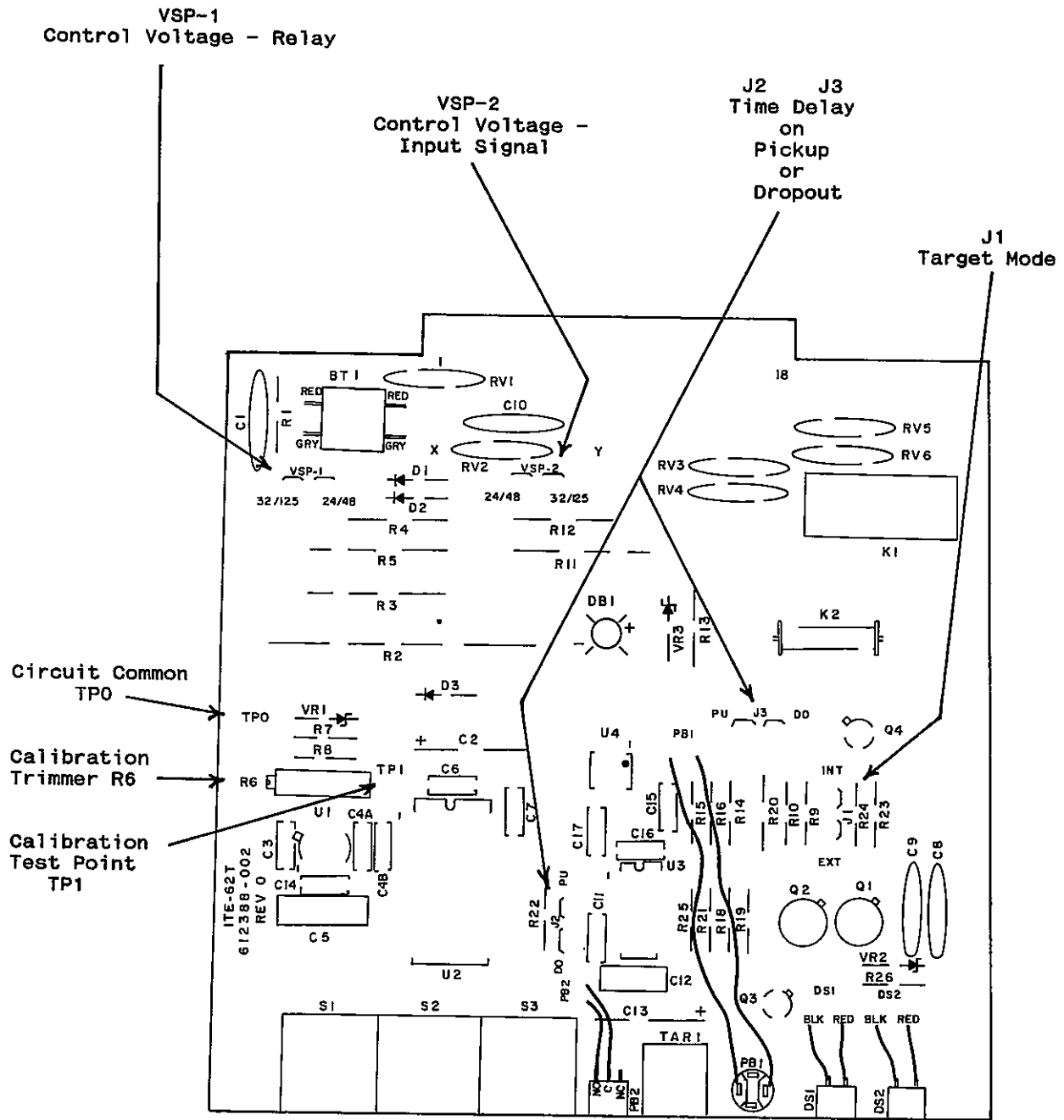


Figure 4: Location of Circuit Board Plug Selectors

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TESTING

1. MAINTENANCE AND RENEWAL PARTS

No routine maintenance is required on the ITE-62T relay. Follow test instructions to verify that the relay is in proper working order. We recommend that an inoperative relay be returned to the factory for repair; however, a schematic diagram will be provided on request. Renewal parts will be quoted by the factory on request.

*Caution: since troubleshooting entails working with energized equipment, care should be taken to avoid personal shock. Only competent technicians familiar with good safety practices should service these devices.*

217T Series Units

Drawout circuit boards of the same catalog number are interchangeable. A unit is identified by the catalog number stamped on the front panel and the serial number stamped on the bottom side of the drawout circuit board.

The board is removed by using the metal pull knobs on the front panel. Removing the board in service *may cause an undesired operation.*

An 18 point extender board (cat 200X0018) is available for use in troubleshooting and calibration.

417T Series Units

Metal handles provide leverage to withdraw the relay assembly from the case. Removing the unit in an application that uses the normally-closed contact will cause an operation. The assembly is identified by a catalog number stamped on the front of the unit and a serial number stamped on the bottom of the board.

Test connections are readily made to the drawout relay unit by using standard banana plug leads at the rear vertical circuit board. This rear board is marked for easier identification of the connection points.

A test plug assembly, catalog 400X0002 is available for use with the 417T series units. This device plugs into the relay case on the switchboard and allows access to all external circuits wired to the case. See Instruction Book IB 7.7.1.7-8 for details on the use of this device.

2. HIGH POTENTIAL TESTS

High potential tests are not recommended. A hi-pot test was performed at the factory before shipping. If a control wiring insulation test is required, partially withdraw the relay unit from the case sufficient to break the rear connections before applying the test voltage.

3. BUILT-IN TEST FUNCTION

Tests should be made with the main circuit de-energized.

The built-in test is provided as a convenient functional test of the relay and associated circuit. When you depress the button labelled TRIP, the timing circuit of the relay is actuated. The relay then times out, the output contacts operate to trip the circuit breaker, or other associated circuitry, and the target is displayed. The test button must be held down continuously for the operating time set on the relay in order to obtain an operation.



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#### 4. ACCEPTANCE TESTS

Typical test connections for checking delay-on-pickup for both the 217T and 417T series units are shown in Figure 5. (To check a unit set for the delay-on-dropout mode change the initiating switch (S1A) to a normally-closed contact.) The dc control voltage source must match the relay's rating and should have less than +/- 6% ripple.

Set the (5) circuit board plugs to the correct positions for the control voltage and desired mode of operation - see pages 3 and 7. If the external target operating mode is selected, a load which will draw more than 1 ampere (such as a lockout relay) must be connected to the series target coil.

Set the thumbwheel switches for 999. Actuate the initiating contact. The yellow led should light. At the end of the delay period the red led should come on and the output contacts should stop the external timer. Timing should be within +/-3% of the setting.

If the setting to be used in the application is known, it can be verified by setting the thumbwheel switches to the desired values and repeating the test. The thumbwheel switches can be readjusted as necessary to obtain the exact operating time desired.

If a very fast operating time is to be used, the approximately 7 millisecond fixed delay of the output stage will be significant, and the timer setting will have to be reduced to compensate. Again, the final setting can be verified by test. Be sure the external timer used to make these measurements has sufficient accuracy and resolution.

#### 5. CALIBRATION

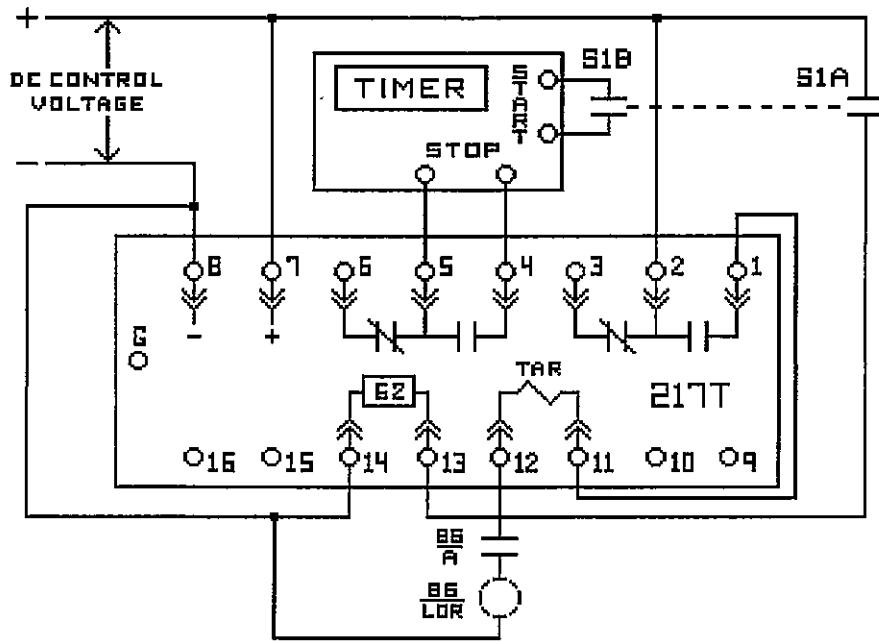
If the acceptance tests indicate a need for recalibration of the relay the following procedure may be used.

For a 217T series unit, the 18 point extender board will be needed to gain access to the circuit board.

Connect a frequency counter from test point TP to circuit common (see Figure 4). Apply rated dc control voltage to the relay (be sure the selector plugs are in the correct position). Allow the unit to stabilize for 5 minutes. Adjust trimmer R6 to obtain the frequency as shown:

Relay Timing Range	Frequency (Hertz)
.999 sec.	999.5 - 1000.5
9.99 sec.	99.95 - 100.05
99.9 sec	9.995 - 10.005

217T



417T

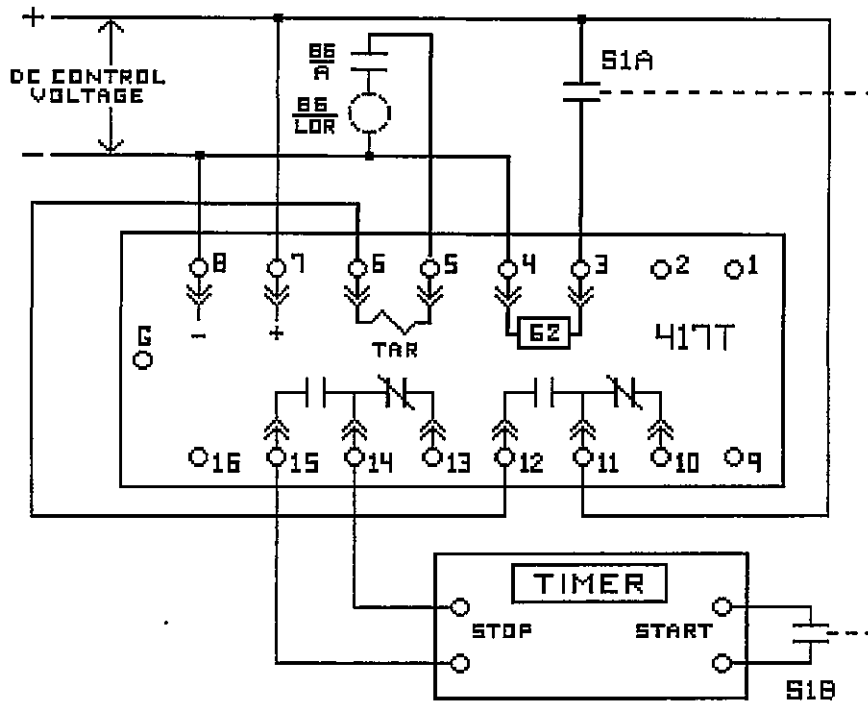


Figure 5: Typical Test Circuit Connections

- Notes:
1. Connect proper source of dc control power.
  2. Lockout relay or similar load required only if checking operation of target when set for "external" mode of operation. (see pg. 3)
  3. Test circuit shown for checking relay set in delay-on-pickup mode. Change S1A to normally-closed to check relay set for delay-on-dropout.

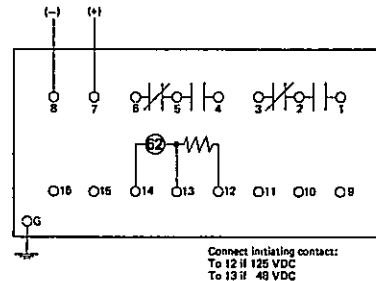
6. REPLACEMENT OF EARLIER MODEL, TYPE ITE-62K

The ITE-62T series timing relays with digital circuitry superseded the ITE-62K timing relay which was based on analog circuitry. The following information is offered as a guide to the replacement of the ITE-62K with the ITE-62T should that be necessary.

Catalog Number	Control Voltage	Delay-on-	Range	Recommended Replacement
217K1075	48/125vdc	Pickup	.05-1 sec	217T1175 or 417T1175
217K2075	"	"	.2-4 sec	217T2175 or 417T2175
217K2095	24/ 32vdc	"	.2-4 sec	217T2195 or 417T2195
217K4075	48/125vdc	"	0-10 sec	217T2175 or 417T2175
217K5075	"	"	0-100 sec	217T3175 or 417T3175
217K0175	48/125vdc	Dropout	.05-1 sec	217T1175 or 417T1175
217K0275	"	"	.2-4 sec	217T2175 or 417T2175
217K0475	"	"	0-10 sec	217T2175 or 417T2175
217K0575	"	"	0-100 sec	217T3175 or 417T3175

Delay-on-dropout models with suffix "D" at end of catalog number had slightly different output logic than standard models. Refer to original I/B 7.7.1.7-1 for details.

16D217D  
Internal Connections  
ITE-62K Timing Relay



1. Contacts shown for initiating contact open for delay-on-pickup units.
2. Contacts shown for initiating contact closed and control power applied for delay-on-dropout units.

Replacement with the 217T series unit:

Choosing the 217T unit as the replacement offers the advantage of virtually no change in connections. *The entire case assembly must be replaced.* Do not attempt to plug the 217T circuit board into a 217K case - they are not compatible.

The 217T replacement should be set up for internal target operation and the control voltage to match the system. Also set the plugs for the proper delay mode.

**WIRING:** When the 217T case is installed, the wires should be connected to the same terminals as they were on the 217K case, *with the following exception:* any wire connected to terminal 12 of the 217K unit should be moved to terminal 13 on the 217T unit.

Replacement with the 417T series unit:

The 417T series unit offers the advantage of the built-in test facilities; however, the difference in connections is greater and may be a factor.

The 417T replacement should be set up for internal target operation and the control voltage to match the system. Also set the plugs for the proper delay mode.

The rewiring is as follows:

Wire on 217K terminal---	1	2	3	4	5	6	7	8	12	13	14	G
Terminal on 417T unit---	12	11	10	15	14	13	7	8	3	3	4	G



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Issue B (4/88)  
Supersedes Issue A

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These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in conjunction with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to Asea Brown Boveri.