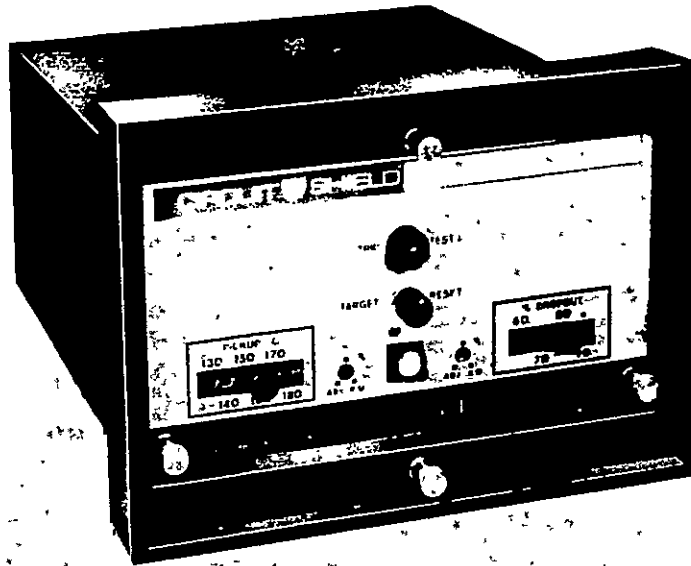


SOLID-STATE TEMPERATURE RELAYS
INSTRUCTIONS

DRAWOUT SEMI-FLUSH MOUNTED
TEMPERATURE RELAYS



Type ITE-49T

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INTRODUCTION

These instructions contain the information required to properly install, operate, and test the ITE-49T series of solid-state Temperature relays.

The ITE-49T Temperature relay is housed in a semi-flush drawout relay case suitable for conventional panel mounting.

All connections to the relay are made at terminals located on the rear of the case and clearly numbered.

Pickup temperature and dropout tap setting are located on the front panel behind a removable clear window.

A target indicator is also mounted on the front panel. The target is reset by means of a pushbutton extending through the relay cover.

SOLID-STATE RELAY PRECAUTIONS

The following precautions should be taken when applying solid-state relays:

1. Incorrect wiring may result in damage in solid-state relays. Be sure wiring agrees with the connection diagram for the particular relay before the relay is energized.
2. Apply only the rated control voltage marked on the relay nameplate.
3. Do not attempt to manually operate target vanes on the relays. Although the targets return their indication under shock, they can be damaged by manual operation with a pencil or pointed object.
4. Do not apply high voltage tests to solid-state relays. If a control wiring insulation test is required, bond all terminals together and disconnect ground wire before applying test voltage.
5. The entire circuit assembly of the ITE-49T Temperature relay is removable. This board should insert smoothly. Do not use force.
6. Note that removal of the tap block pin is equivalent to setting the highest tap.
7. Follow test instructions to verify that relay is in proper working order. If a relay is found to be defective, return to factory for repair. Immediate replacement of the removable element can be made available from the factory; identify by catalog number. We suggest that a complete spare relay be ordered as a replacement, and the damaged unit repaired and retained as a spare. By specifying the relay catalog number, a schematic may be obtained from your sales engineer should you desire to repair or recalibrate the relay.

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 the nearest Brown Boveri Elect. Sales Office. Use normal care in handling to avoid mechanical damage. If kept reasonably clean and dry, the relay has no practical limit to its operating life.

2. INSTALLATION

Mounting

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

Connections

All ITE Protective 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" and is located as shown in Fig. 1. In all applications this terminal should be wired to ground.

External connection diagrams for each relay type are shown in the APPLICATION section.

IMPORTANT: 2 separate conductors must be run from the RTD to terminals 2 and 3 of the relay.

3. SETTINGS

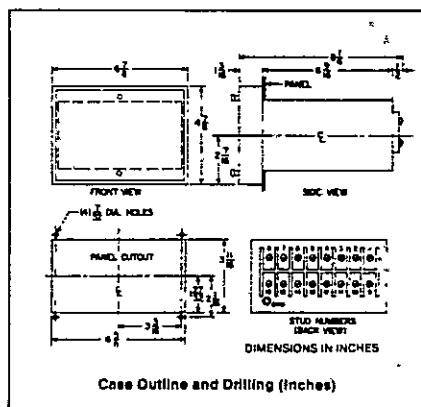
PICKUP

The pickup taps are identified by the actual value of temperature ($^{\circ}\text{C}$) which will cause the output contacts to close.

The pickup vernier allows adjustment of pickup temperature to 10° below the tap setting up to the tap setting. For example, a relay with $130 - 180^{\circ}\text{C}$ tap ranges, with tap set at 130° , may be set to trip at 120°C by rotating the vernier from the fully CCW position (factory setting) to the fully CW position. A setting of 125°C would be obtained by rotating the vernier to the 12 o'clock position indicated by the dot on the front panel.

DROPOUT

The dropout taps are identified as 60, 70, 80, 90 percent dropout. The magnitude of temperature below which the relay's output contact will open is determined by the dropout tap setting and the pickup tap setting. For example: with pickup at 100°C and dropout at 80%, the relay's output contact will open if the temperature decreases below 80% of $100^{\circ}\text{C} = 80^{\circ}\text{C}$.



APPLICATION DATA

The type ITE-49T relay is used for protection against excessive temperature in electrical machines. This relay is used in conjunction with a resistance temperature detector (RTD) embedded in the winding of the machine to detect an overtemperature condition. The relay responds to changes in resistance of the RTD installed in the protected apparatus.

There are two relay settings. The pickup is calibrated in degrees centigrade. The dropout is calibrated in percent of pickup.

The operation of the relay contacts may be used to trip a circuit breaker, or open the holding coil of a motor - starter.

Typical external connections are shown in Figure

RELAY SELECTION - TAP RANGE

For general - purpose applications, select relays and settings as below:

CLASS	INSULATION		SETTINGS	
	TEMPERATURE	ITE-49T TAP RANGE	PICKUP	DROPOUT
A	105°C	70-120°C	95°	90%
B	130°C	130-180°C	120°	90%
D	155°C	130-180°C	145°	90%
H	180°C	130-180°C	170°	90%

TEMPERATURE RELAYS (For use with Resistance Temperature Detector)
Type ITE-49T

Type	RTD Resistance	Pickup Temperature	Dropout Temperature	Internal Connections	Contacts	Control Voltage	Catalog Number
ITE-49T	10 Ohm Copper	60-120°C	60-90% of Pickup	16D236A	2 Form C	120 Vac	236B2065
	120 Ohm Nickel	120-180°C					236D2065
	100 Ohm Nickel	60-120°C					236B5065
	100 Ohm Platinum	120-180°C					236D5065
	100 Ohm Platinum	60-120°C					236B6065
100 Ohm Platinum	120-180°C	236D6065					

SPECIFICATIONS

- Temperature Range:**
- Pickup:** adjustable; models available for:
 - 60 - 120°C
 - 120 - 180°C
- Dropout:** adjustable 60 to 90% of Pickup
- RTD Characteristic:** models available for:
 - 10 ohms at 25°C (copper)
 - 120 ohms at 0°C (nickel)
 - 100 Ohms at 90°C (Platinum)
- Control Power:** 120 VAC, 50-60 Hz.
- Burden:** .08 Amperes
- Output Circuit:** Two Form C contacts
- Output Circuit Rating:** Each contact
 - At 125 VDC
 - 30 amps. Tripping Duty
 - 5 amps. Continuous
 - 1 amp. Opening Resistive
 - 0.3 amp. Opening Inductive
 - At 120 VAC
 - 30 amps. Tripping Duty
 - 5 amps. Continuous
 - 3 amps. Opening Resistive
 - 1 amp. Opening Inductive
- Operating Temperature:** Minus 20 to Plus 75 C

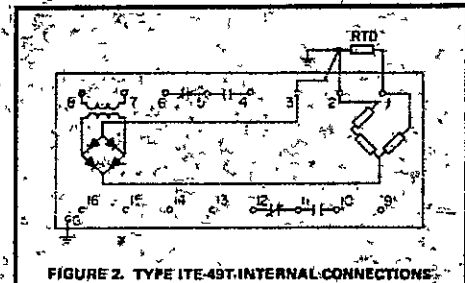


FIGURE 2. TYPE ITE-49T INTERNAL CONNECTIONS

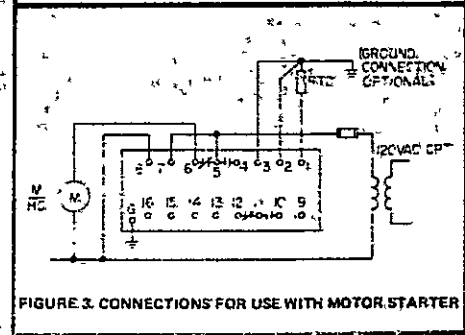


FIGURE 3. CONNECTIONS FOR USE WITH MOTOR STARTER

TESTING**1. MAINTENANCE AND RENEWAL PARTS**

No maintenance is required on the ITE-49T relay. Should the relay be damaged physically or electrically due to improper connections or applications, we recommend that a new relay be ordered from the factory. The ITE-49T has a plug-in control relay as the output stage. This output relay may be ordered from the factory. When ordering, state the type relay, catalog number, control voltage and serial number.

Also available from the factory are circuit card extenders.

2. HIGH POTENTIAL TESTS

Do not apply high voltage tests to solid-state relay circuits. If a control wiring insulation test is required, bond all terminals together and disconnect grounding wire before applying test voltage.

3. ACCEPTANCE TESTS

Follow the calibration test procedure under paragraph 4. Any pickup or dropout values between tap values can be selected by adjusting the pickup vernier or dropout vernier located on the front panel.

4. TESTS

In general, it is not necessary to schedule periodic maintenance of this relay. However, if tests are desired to confirm the proper functioning of the system, the following procedure can be used.

Mounted in Switchgear

Tests should be made on a de-energized main circuit. If tests are to be made on an energized circuit, be sure to take all necessary precautions.

It is customary to test the trip circuit of electromechanical relays by manually closing the trip contacts to trip their associated circuit breakers. If the contacts are allowed to part before the seal-in contact closes, the relay contacts are eroded by the arc. Also, high transient voltages will appear from trip bus to positive.

This problem is avoided in the ITE-49T Temperature relay by the operational test feature. A pushbutton labeled "Trip" is provided. The pushbutton, recessed to prevent accidental operation, will cause the breaker to trip.

To exercise the solid-state circuitry, the input bridge supplies a voltage that corresponds to about 200% of the pickup value when the test button is depressed. If held long enough, the relay contacts will close to trip the breaker or auxiliary associated.

Drawout Element

Drawout circuit boards of the same catalog number are interchangeable. The board is removed by using the metal pull knobs on the front panel. The relay is identified by a catalog number on the front panel and a serial number on the under side of the circuit board.

CALIBRATION TESTS

Connect the relay to the proper AC control voltage and to the test resistance source as shown in Figure 4. Set the pickup and dropout taps to the desired values. Select the resistance value that corresponds to the pickup temperature off the RTD resistance characteristic charts.

A touch-up of the relay calibration may be made up by adjusting the pickup vernier located on the faceplate. Clockwise rotation will decrease the pickup value from the highest value tap to the next lowest value tap. Setting the potentiometer midway corresponds to a pickup value midway between tap values.

Dropout values may be adjusted in the same fashion as the pickup values.

RTD RESISTANCE VS TEMPERATURE CHART

Temperature Deg. Celcius	RTD Resistance - ohms		
	10 ohm copper	100 ohm platinum	120 ohm nickel
70	11.8		174
80	12.1		182
90	12.5	134.7	191
100	12.9		200
110	13.3		210
120	13.7	146.0	221
130	14.0	149.8	226
140	14.4	153.6	237
150	14.8	157.3	249
160	15.2	161.0	261
170	15.6	164.8	267
180	16.0	168.5	280

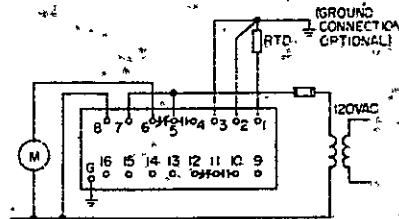


FIGURE 4: TYPICAL TEST CIRCUIT

Use high accuracy resistance box to simulate RTD.

M is voltmeter

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection 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 Brown Boveri Electric.

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