



T46 Series Fan Coil Thermostats Product/ Technical Bulletin

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Applications



The T46 Series fan coil thermostats are designed to control line or low voltage heating, cooling, or combination heating and cooling equipment requiring system switches. The T46 thermostats are available in a variety of configurations with single-pole single-throw (SPST) or single-pole double-throw (SPDT) contact action, system and fan speed control, and either knob or concealed adjustment.

Typical applications for the T46 include the control of fan coil units, packaged terminal air conditioners, and combination heating and cooling equipment.

Features

Narrow differential

Increases versatility of the thermostat, that you can use on heating or cooling equipment over a wide range of voltages (24 VAC, 120 VAC, 240 VAC, or 277 VAC).

Line voltage components switch box mounted

Provides isolation of electrical circuit from the sensing element.

Adjustable high/low range stops

Allows adjustments within the required range.

Enclosed pennswitch

Provides dust protection for contacts.

Introduction

► **Important:** All T46 Series thermostats are designed for use only as operating controls. Where an operating control failure would result in personal injury or loss of property, it is the responsibility of the installer to add devices or systems such as alarms or supervisory systems that protect against, or warn of, control failure.

The T46 series thermostats provide SPST or SPDT control for use on low or line voltage heating, cooling, or heating and cooling applications. The T46 has a thermoplastic cover with Allen-head locking screw to discourage unauthorized tampering.

The thermostat consists of a liquid-filled sensing element, which has excellent sensitivity to surrounding air temperature changes. Coupled with a highly efficient diaphragm and lever mechanism, the element operates an enclosed narrow differential Penn switch.

An adjusting knob and easy-to-read dial allow quick selection of the desired setpoint. The standard thermostat is supplied with a thermometer and knob adjustment faceplate installed. See [Ordering information](#) for optional faceplate selections.

Operating differential

The operating temperature differential of any self-contained thermostat depends on the following:

- The velocity of air over the thermostat
- The rate of temperature change to which the thermostat is subjected
- The current flowing through the thermostat amperage load
- Whether the thermostat is operating heating or cooling equipment

Figure 1 and Figure 2 show the operating temperature differentials of the T46 thermostats under various load conditions. The amperage loads are based on the electrical ratings in Table 6. Data are based on an air velocity of 25 ft/min (0.127 m/sec) and a rate of temperature change of 6°F (3.3°C) per hour. For air velocities greater than 25 ft/min and/or rates of temperature change less than 6°F (3.3°C) per hour, the operating differentials will be less than what is shown in the figures.

Figure 1: Operating differential for T46A and heating side of T46S

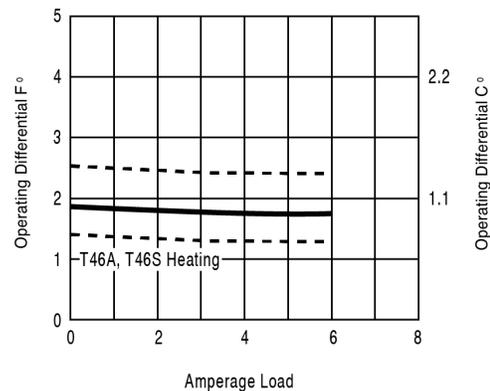
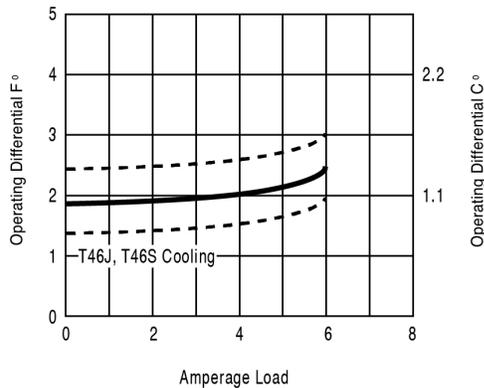


Figure 2: Operating differential for T46J and cooling side of T46S



Note: The heavy line in Figure 1 and Figure 2 is the nominal operating temperature differential. Production thermostats may vary from the norm, as indicated by the dotted line.

Installation

Important: Do not remove the thermostat cover during installation. The sensing element must be carefully protected against accidental damage. All wiring and mounting can be completed without removing the cover.

CAUTION

Shock hazard.

Disconnect power supply before wiring connections are made to avoid electrical shock or possible damage to the equipment.

To install the T46 thermostat:

1. Select the proper mounting location and install a two gang or junction box approximately 5 ft (1.2 m to 1.5 m) above the floor. See [Location considerations](#).
2. Run conduit or cable, as required by national and local electric codes, from the junction box to the equipment to be controlled. Leave approximately 6 in. (152 mm) of wire for connection to the thermostat terminals.
3. Remove the subbase by loosening the subbase locking screw, and lifting and removing the subbase. See Figure 4.
4. Pull wires through the subbase and fasten, grounding screw end up to the junction box with the screws provided.

CAUTION

Equipment damage hazard.

Unused leads must be individually insulated to avoid shorting to the thermostat, subbase, wiring box, or other leads.

5. Make the necessary wiring connections based on the required color codes in Table 1 depending on which model is being used. See Figure 6 through Figure 11 for wiring diagrams.

Note:

Use the terminal screws furnished (8/32 in. x 1/4 in. binder head). Substitution of other screws can cause problems in making proper connections.

6. Ground the thermostat to the branch circuit ground as required by National Electric Code and local regulations. Use the grounding terminal provided.
7. Hook the two slots in the thermostat base over the tabs on the subbase and swing the thermostat into place. Push the wires back flush into the junction box.
8. Securely tighten the subbase locking screw.

Table 1: Wiring identification

System		Fan		Thermostat	
Black	L1 (Hot)	Orange	High speed	Grey	Terminal 1
Red	Heating	Yellow	Medium speed	Violet	Terminal 2
Blue	Cooling	Brown	Low speed	Light blue	Terminal 3

Supplies

- Two gang box or a 4 in. x 4 in. (102 mm x 102 mm) junction box with a 2-fixture plaster ring, field supplied
- Slotted standard screwdriver
- Marking pencil
- Wire strippers

Location considerations

Locate the T46 thermostat as follows:

- On a partitioning interior wall, and approximately 5 ft (1.5 m) above the floor in a location of average temperature
- Away from direct sunlight or radiant heat, outside walls or behind doors, air discharge grills, stairwells, or outside doors
- Away from steam or water pipes, warm air stacks, or unheated/uncooled areas

Figure 3: Dimensions

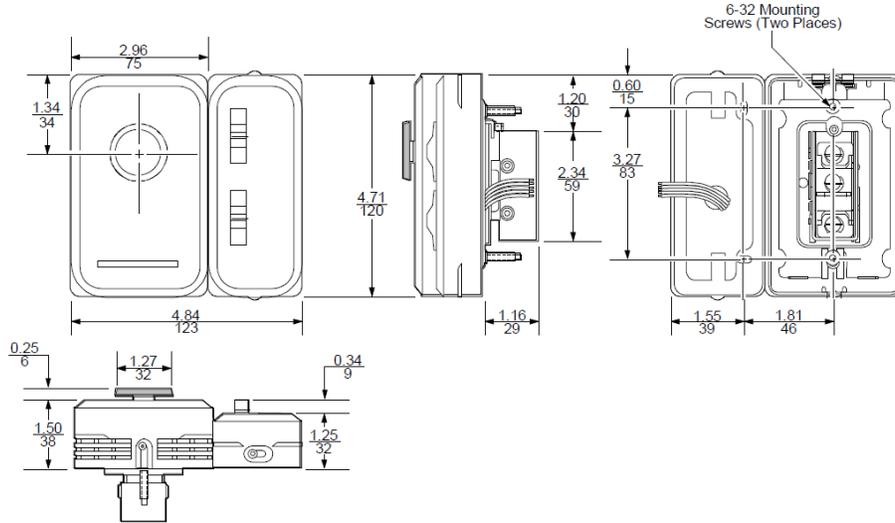
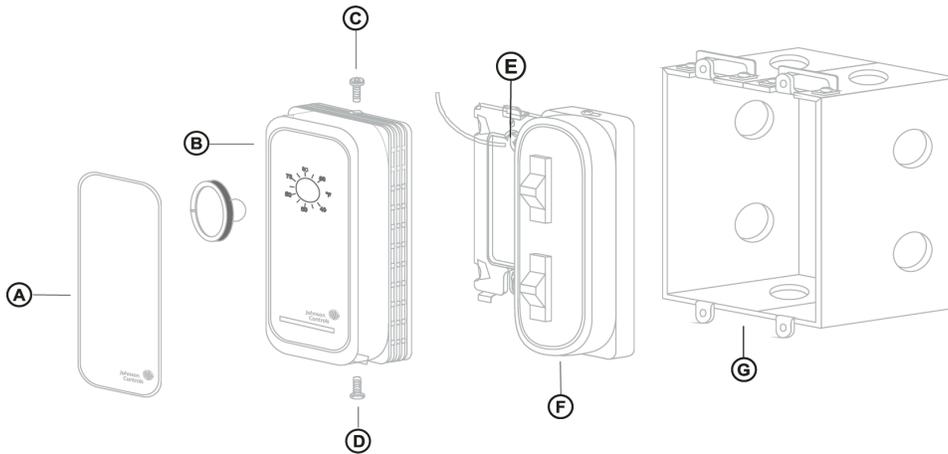


Figure 4: Mounting and wiring



Callout	Component
A	Optional concealed adjustment faceplate
B	Faceplate with knob and thermometer
C	Mounting plate locking screw
D	Cover locking screw
E	Grounding screw
F	Switching subbase
G	Conduit box

Adjustments

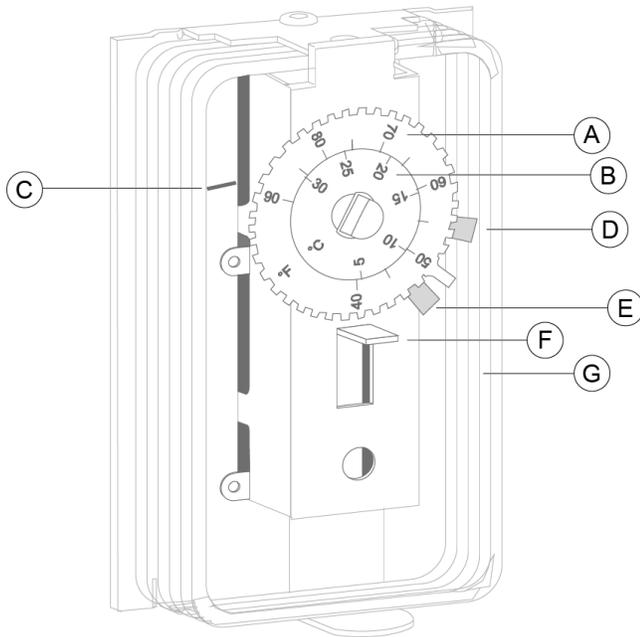
On models with an external knob, adjust the temperature by rotating the knob. The indicator notch on the knob denotes the dial setting.

Line up the dial with the reference mark on the thermostat for concealed dial models without a cover. The dial reference mark is set at the 9 o'clock position when the thermostat is held vertically, See Figure 5.

Range stops

High and low range stops can be field adjusted. Use the following procedures to set the high and low range stops.

Figure 5: T46 Thermostat Range Tabs and Stop Pin



Callout	Component
A	Outside scale (°F)
B	Inside scale (°C)
C	Reference mark
D	Low range stop tab "B"
E	High range stop tab "A"
F	Stop pin "C"
G	Sensing Element

High range stop

1. Set the adjustment knob to the maximum desired temperature setting.
2. Pull the adjustment knob off the thermostat cover.
3. Loosen the bottom cover screw and remove the cover.
4. While holding the dial firmly in place, keeping the setting in line with the reference mark, depress the tab A and rotate it clockwise until it is against the stop pin C. See Figure 5.
5. Release the tab making sure it fits into the nearest notch.
6. Replace the thermostat cover, tighten the bottom cover screw, and replace the adjustment knob.
7. Rotate adjustment knob to desired normal operating setpoint.

Low range stop

1. Set the adjustment knob to the minimum temperature setting.
2. Pull the adjustment knob off the thermostat cover.
3. Loosen the bottom cover screw and remove the cover.

4. While holding the dial firmly in place, keeping the setting in line with the reference mark, depress the tab B and rotate it counterclockwise until it is against the stop pin C. See Figure 5.
5. Release the tab making sure it fits into the nearest notch.
6. Replace the thermostat cover, tighten the bottom cover screw, and replace the adjustment knob.
7. Rotate adjustment knob to desired normal operating setpoint.

Dial lock

The high range stop and low range stop can be set to keep the adjustment knob from rotating. To lock the dial:

1. Set the adjustment knob to the required temperature setting.
2. Pull the adjustment knob off the thermostat cover.
3. Loosen the bottom cover screw and remove the cover.
4. While holding the dial firmly in place, keeping the setting in line with the reference mark, depress the tab A and rotate it clockwise until it is against the stop pin C. Depress the tab B and rotate it counterclockwise until it is against the stop pin C. See Figure 5.
5. Make sure each tab fits into the notch closest to the stop.
6. Replace the thermostat cover, tighten the bottom cover screw, and replace the adjustment knob.

Checkout

Before applying power, make sure installation and wiring connections are according to job specifications.

After all necessary adjustments and electrical connections are made, put the system into operation and observe at least three complete operating cycles before leaving the installation.

Repairs and replacement

Do not carry out field repairs except for replacement of the adjustment knob, cover, faceplate, or mounting plate.

See Table 2: Replacement Parts for replacement part ordering information. For a replacement T46, contact a Johnson Controls® representative.

Table 2: Replacement parts

Item	Product code number
Thermoplastic push on adjustment knob	KNB26A-600R
Switch buttons	BTN22-1R

Ordering information

Table 3: Series part number information

Series part number	System switch	Fan switch
T46ABH (Heating Only)	Auto-off-fan	None
T46JDH (Cooling Only)	Off-auto	None
T46JEA (Cooling Only)	On-off	Low-med-high
T46SAA (Heating and Cooling)	Heat-off-cool	Low-med-high
T46SDA (Heating and Cooling)	Off-auto	Low-med-high

Faceplates

Faceplates are available in separate kits for on-the-job installation. All plates have peel-off backing strips. Faceplates must be ordered in quantities of ten.

Table 4: Faceplate ordering information

Kit number	Adjustment type	Thermometer cutout Temperature scale
PLT333-3R	Concealed	Fahrenheit
PLT333-5R	Knob	Celsius
PLT333-12R	Concealed	—

Technical specifications

Table 5: T46 Series Fan Coil Thermostat technical specifications

Specification	Description	
Range	Thermostat	40 to 90°F (5 to 30°C)
	Thermometer	50 to 90°F (10 to 30°C)
Differential	Mechanical	Approximately 0.7°F (0.4°C)
	Operating	See Figure 1 and Figure 2.
Finish	Cover	Almond
	Faceplate	Gold metallic with dark brown border and lettering
Mounting	Double gang box, separable mounting plate	
Material	Base	0.050 in. (1 mm) cold rolled steel
	Cover	0.090 in. (2 mm) high-impact plastic
Sensing element	Liquid-filled for positive trouble-free operation	
Shipping weight	Individual pack	1 lb (0.45 kg)
	Overpack of 20 units	20 lb (9.07 kg)
Thermometer	Bimetal type for accuracy and clarity, can be field-calibrated	
Wiring connections	Color coded No. 16 AWG wires, 8 in. (203 mm) long	

Table 6: T46 electrical ratings

Description	cULus			
	120	208	240	277
Volts AC 60 Hz	120	208	240	277
Full load amps	12.0	6.9	6.0	5.2
Lock rotor amps	72.0	41.4	36.0	31.2
Resistive amps	6.5	6.5	6.5	-
Pilot duty	125 VA, 24 VAC to 277 VAC			

T46 conformity declaration

Table 7: T46 conformity declaration

Information	Description	
Purpose of control	T46 fan coil thermostats	
Construction of control	Electromechanical independently mounted control	
Number of cycles	100K cycles (auto reset switch)	
	6K cycles (manual operated slide switch)	
Method of mounting control	Two gang switch box 4 in. x 4 in. (102 mm x 102 mm) wall box	
Method of earthing of control	Wiring binding screw terminal	
Type 1 or type 2 action	Type 1.C (micro-interruption)	
External pollution situation	Pollution degree 3	
Internal pollution situation	Pollution degree 2	
Rated impulse voltage	4000 VAC	
Ball pressure temperature	Auto reset switch component: 302°F (150°C)	
Control adjustment instruction	—	
Field wiring rating	Use copper conductors only	
Switch	Thermostat SPST; T46A, -J SPDT; T46S (auto reset switch)	
	Fan	
	System	
Enclosure	UL: TYPE 1 (NEMA)	
Wiring connection	Color-coded 16 AWG wires, 8 in. long	
Ambient conditions	32°F to 105°F (0°C to 40°C)	
Compliance	North America	cULus listed; UL60730, E60730, file E6688

Figure 6: T46ADH off-auto selector switch with continuous fan for heating only

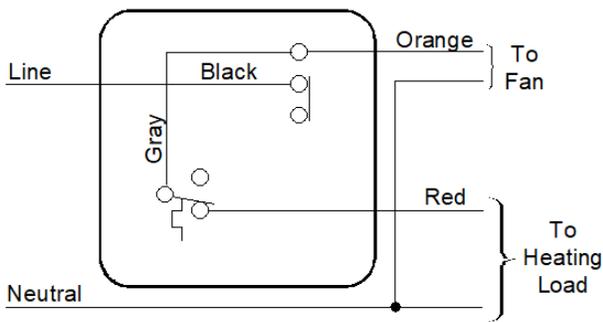


Figure 7: T46ABH auto-off-fan selector switch with continuous fan for heating only

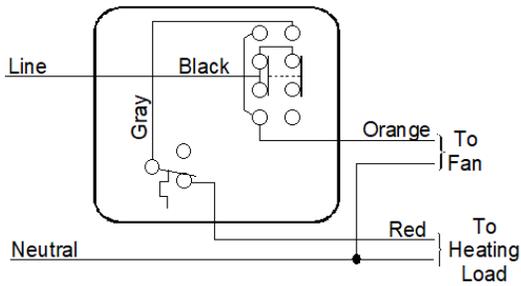


Figure 8: T46JDH off-auto selector switch with continuous fan for cooling only

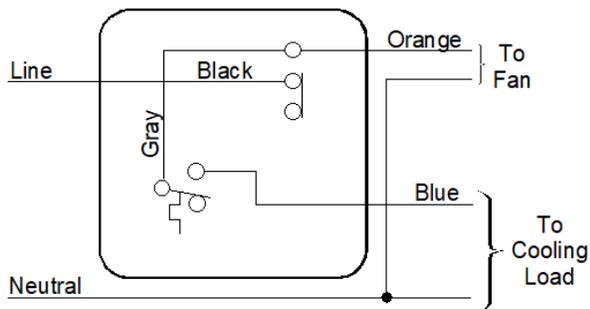


Figure 9: T46JEA on-off selector switch with fan speed control for cooling only

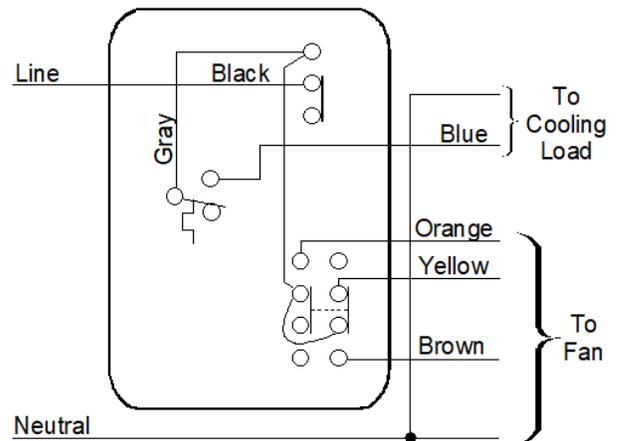


Figure 10: T46SDA off-auto selector switch with fan speed control and manual or automatic changeover switch for heating and cooling

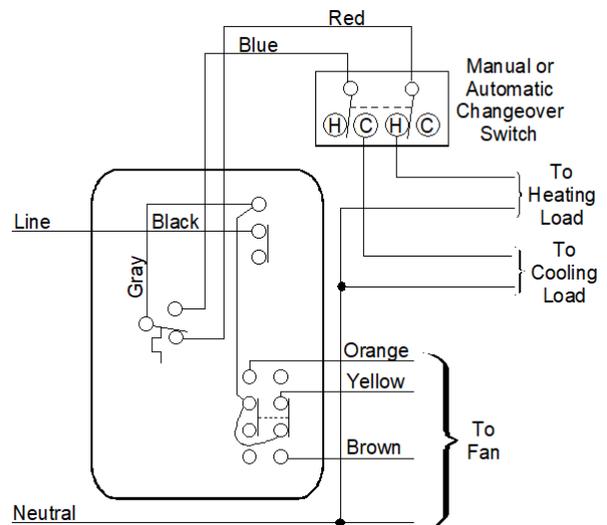
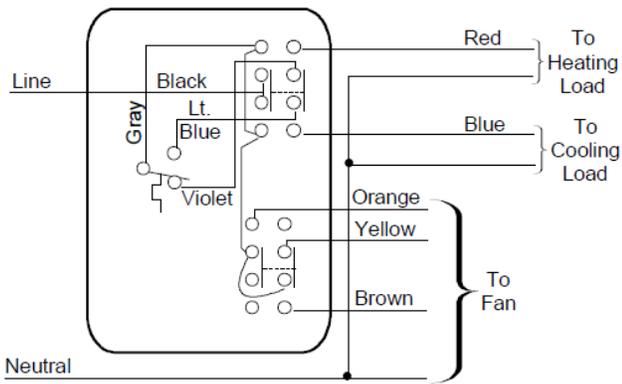


Figure 11: T46SAA heat-off-cool selector switch with fan speed control for heating and cooling



Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Single point of contact

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