VICONICS

μNISTΔT

ELECTRONIC THERMOSTAT: T926

- Two analog outputs

DESCRIPTION

The T926 series thermostats are microcomputer-based, proportional and integral (PI) devices with two analog 0 to 10 Vdc outputs. They can be used with most controlled devices in the HVAC industry that are compatible with those signals. A typical applications would be to control an analog actuator on a VAV box with an electric duct heater with an SCR power control. The thermostats also contain 4 dip switch which adjust the following parameters :

- Room or supply control applications **
- Internal or external remote sensor
- Cooling or heating applications
- Dead band value

** See **REMOTE SENSOR TYPICAL WIRING** section for testing procedures when enabling this function.

The thermostat also have 3 internally mounted potentiometers:

- Minimum voltage (Vmin)
- Maximum voltage (Vmax)
- Heat flow maximum voltage (Vheat) ***For VAV applications only***. Re-opens the damper to maximize hot air flow on a call for reheat with cold primary air.

Type of output	In cooling	In heating
Modulating analog 0 to 10 Vdc	**Modulating devices** Analog damper actuator Analog valve actuator	**Modulating devices** Analog damper actuator Analog valve actuator SCR's power controls

HOW TO ORDER

T926 ☐ - ☐

- ☐ D = Day / N = Night
- ☐ C = °C scale / F = °F scale

Notes: Order changeover sensors such as S60, S70, S80 and S90 separately.
Vertical covers are standard.

Example:

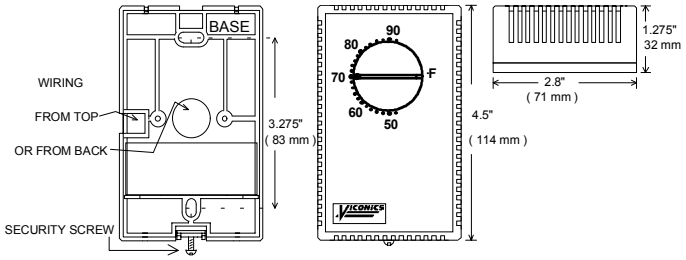
T926D-C Thermostat without night mode
Lexan cover with: °C

DAY-NIGHT MODE (T926N ONLY)

The T926N has a day / night input and an override button and night mode led mounted on the thermostat cover. The night mode, initiated by a remote timer or computer contact, provides energy savings during unoccupied periods of up to 10 %, without sacrificing comfort in occupied rooms. A flashing LED indicates that the thermostat is in Night mode. The occupant may override this condition locally for 2.5 hours by pressing the button on the thermostat cover.

When output is in	NSB input activates
Cooling mode	5°C (9°F) night setup
Heating mode	5°C (9°F) night setback

DIMENSIONS



SPECIFICATIONS

Operating Conditions:	-30 °C to 50 °C (-22 °F to 122 °F) 0% to 95% R.H. non-condensing
Sensor:	Local 47 K NTC thermistor
Resolution:	± 0.1 °C (± 0.2 °F)
Control accuracy:	± 0.2 ° C (± 0.4 °F) (calibrated)
Ranges:	10 °C to 32 °C (50 °F to 90 °F)
Night setup for cooling mode (T926N only):	5°C (9°F) night setup
Night setback for heating mode (T926N only):	5°C (9°F) night setback
Proportional band for room temperature control **(S1 = 0):**	Both outputs: 1.8°C (3.2°F)
Proportional band for supply temperature control **(S1 = 1):**	Both outputs: 28°C (50°F)
Analog outputs:	0 to 10 Vdc into 2KΩ resistance min.
Power:	24 Vac -15%, +10% 50/60 Hz; 2 VA

ANALOG 0 TO 10 VDC OUTPUT #1

This output is designed to give true PI modulation out of analog 0 to 10 Vdc actuator for VAV dampers and valves.

The analog 0 to 10 Vdc output feature internal potentiometers for minimum, maximum voltage adjustment: (Vmin. & Vmax).

Heat flow maximum voltage (Vheat) ***For VAV applications only***. Re-opens the damper to maximize hot air flow on a call for reheat with cold primary air. See control sequence section.

The output is normally cooling but can be reversed to heating mode with 3 different methods:

- **An internal dip switch reverses the output to a fixed heating mode**
- **Auto changeover to heating mode with a supply sensor.** A remote sensor can be used for each thermostat.(S60 or S70 or S90)
  Supply temperature > 78°F (26°C) = heating mode
  Supply temperature < 75°F (24°C) = cooling mode
  Hysterisys is 3°F (2°C)
- **Auto changeover to heating mode with a dry contact**. A closed contact on the changeover input will change operation of the 0 to 10 Vdc output to heating mode.
  Open contact = cooling mode
  Closed contact = heating mode

Characteristics of remote and changeover sensor 47 KΩ (S60, S70 or S90).

Temperature °F	Temperature °C	Sensor resistance
150.0 °F	65.6 °C	9.610 Kohm
140.0 °F	60.0 °C	11.700 Kohm
130.0 °F	54.4 °C	14.342 Kohm
120.0 °F	48.9 °C	17.682 Kohm
110.0 °F	43.3 °C	21.940 Kohm
100.0 °F	37.8 °C	27.412 Kohm
90.0 °F	32.2 °C	34.483 Kohm
80.0 °F	26.7 °C	43.704 Kohm
70.0 °F	21.1 °C	55.834 Kohm
60.0 °F	15.6 °C	71.866 Kohm
50.0 °F	10.0 °C	93.340 Kohm
40.0 °F	4.4 °C	122.298 Kohm

ANALOG 0 TO 10 VDC OUTPUT #2

This thermostat has a second analog output which is designed to operate reheat devices. It is designed to give true PI modulation out of analog 0 to 10 Vdc actuator for valves or SCR power controls.

THERMOSTAT INSTALLATION

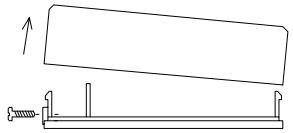
Important.
Electronic controllers require special care for wiring and startup. To avoid problems, carefully follow the procedures below.

Be sure to have all the literature on hand for all components installed: controller, actuators, relay, etc...

Look at the wiring diagrams, and study them carefully. Be sure that you understand how the system is supposed to work.

Make the wiring according to the wiring diagrams. Respect polarity for power terminals # 3 & # 4 between multiple controllers if the same transformer is used.

- Remove security screw on left side of thermostat cover.
- Open up by pulling on the bottom side of thermostat.



A) **Location:**
1- Shouldn't be installed on outside wall.
2- Must be installed away from any heat source.
3- Shouldn't be affected by direct sun radiation.
4- Nothing must restrain vertical air circulation to the thermostat.

B) **Installation:**
1- Pull out cables 6" out of the wall.
2- Wall surface must be flat and clean.
3- Separate the thermostat and the base by pulling the cover by the bottom (same as the security screw.)
4- Insert cable in the central hole of the base.
5- Align the base and mark the location of the two mounting holes on the wall. Install proper side of base up.
6- Install shields in the wall.
7- Insert screws in mounting holes on each side of the base. **DO NOT OVERTIGHTEN!**
8- Strip each wire 1/4 inch.
9- Insert each wire according to wiring diagram.
10- Reinstall the cover (top side first) and gently push back extra wire length in the hole in the wall.
11- Install security screw.

DIP SWITCH ADJUSTMENTS PER APPLICATIONS

S1	S4	APPLICATION SETTING	DEAD BAND ADJUSTMENT
0	**0**	For regular room control applications	2 °F (1.2 °C)
0	**1**	For regular room control applications	4 °F (2.2 °C)
1	**0**	For discharge air or supply temperature control **	2 °F (1.2 °C)
1	**1**	For discharge air or supply temperature control **	10 °F (5.5 °C)

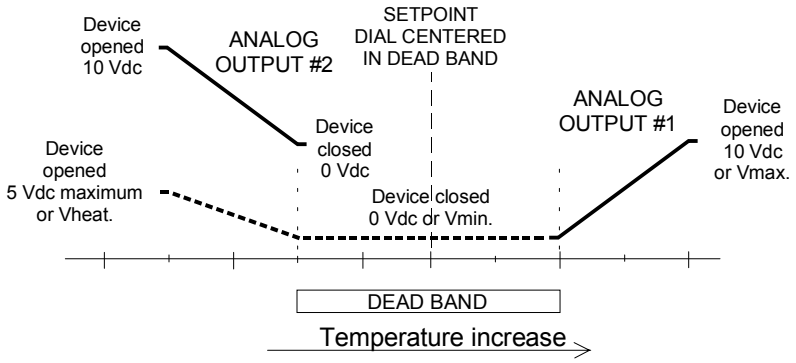
S2	MAIN TEMPERATURE SENSOR
0	Main temperature sensor is remote mounted
1	Thermostat internal sensor for room temperature sensing

S3	CHANGEOVER OF ANALOG 0 TO 10 Vdc OUTPUT #1
0	**Output is cooling (DA)** • Auto changeover of output to **heating mode (RA)** with a supply sensor or, • Auto changeover to **heating mode (RA)** with a dry contact
1	• Reverses the output to a fixed **heating mode (RA)**

** See **REMOTE SENSOR TYPICAL WIRING** section for testing procedures when enabling this function.

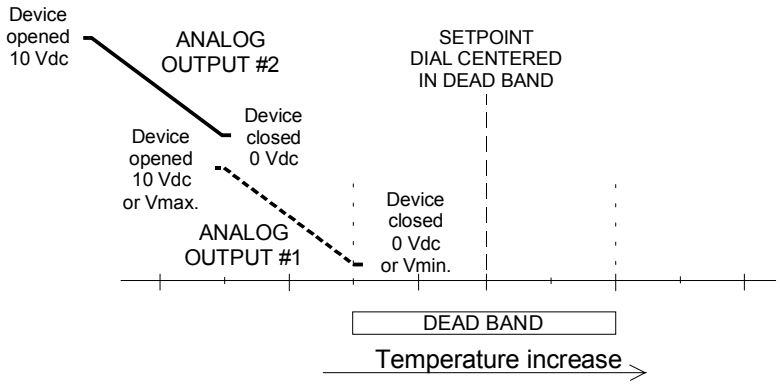
CONTROL CURVES AND SEQUENCE

Analog output #1 in cooling mode, changeover not activated
Analog output #2 in heating mode



Heat flow maximum voltage (Vheat)
For VAV applications only in this mode only
Re-opens the damper to Vheat position to maximize hot air flow when reheat analog output is energized

Analog output #1 in heating mode, changeover activated
Analog output #2 in heating mode

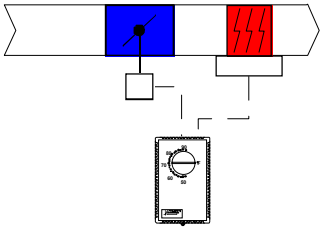


TYPICAL APPLICATIONS

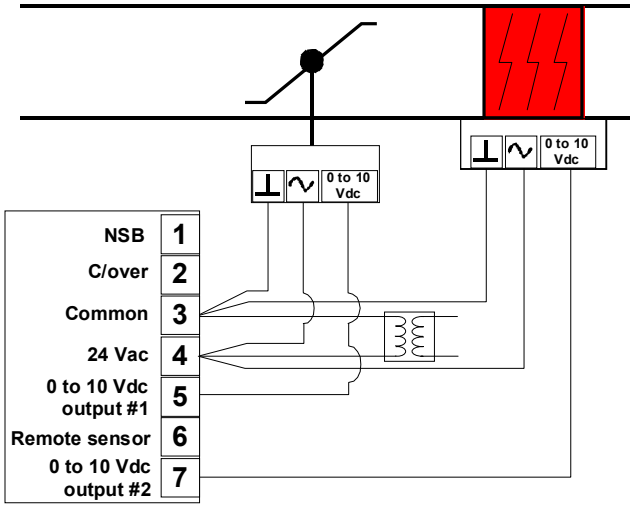
Pressure Dependent VAV With: Modulating SCR Electric Reheat

Dip switch position	S1	S2	S3	S4
VAV is cooling only (2°F deadband)	0	1	0	0

Analog VAV Actuator
& Analog SCR Power Controller



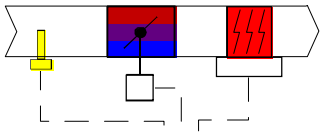
Room Temperature Control Thermostat With Internal Minimum & Maximum Position Adjustments



Pressure Dependent VAV With: Cool / Heat Auto Changeover Input & Modulating SCR Electric Reheat

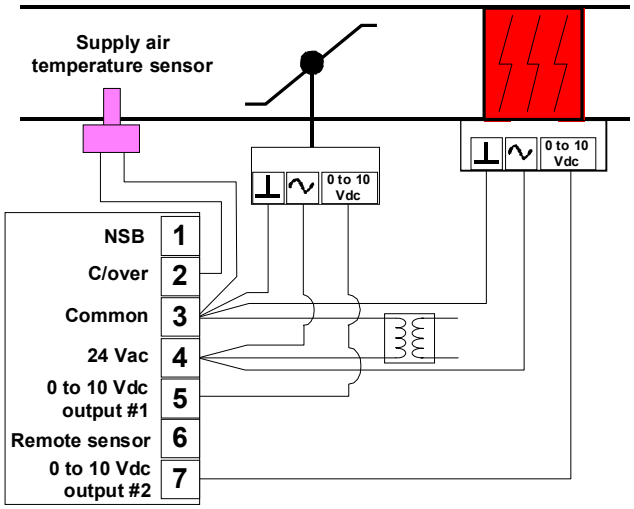
Dip switch position	S1	S2	S3	S4
Cool/heat auto changeover input (2°F deadband)	0	1	0	0

Analog VAV Actuator
Heating and/or Cooling
& Analog SCR Power Controller



Changeover Sensor

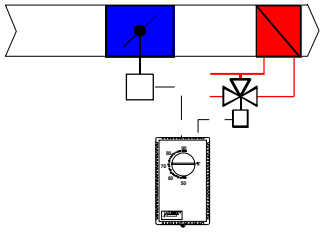
Room Temperature Control Thermostat With Internal Minimum & Maximum Position Adjustments



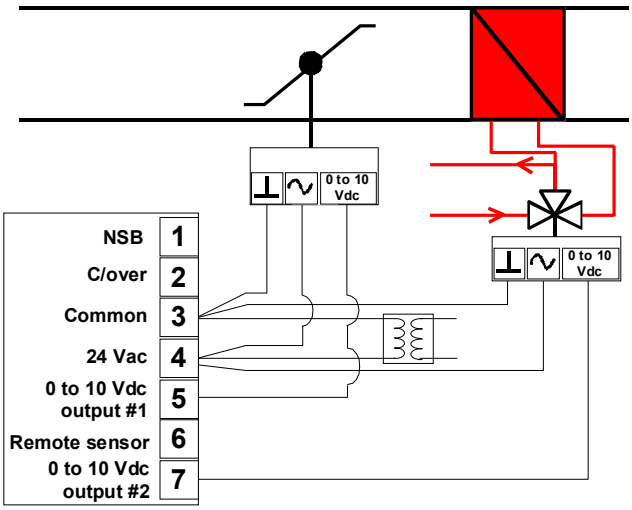
Pressure Dependent VAV With: Modulating Valve Reheat

Dip switch position	S1	S2	S3	S4
VAV is cooling only (2°F deadband)	0	1	0	0

Analog VAV Actuator & Analog Valve Heating



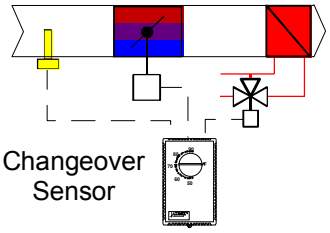
Room Temperature Control Thermostat With Internal Minimum & Maximum Position Adjustments



Pressure Dependent VAV With: Cool / Heat Auto Changeover Input & Modulating Valve Reheat

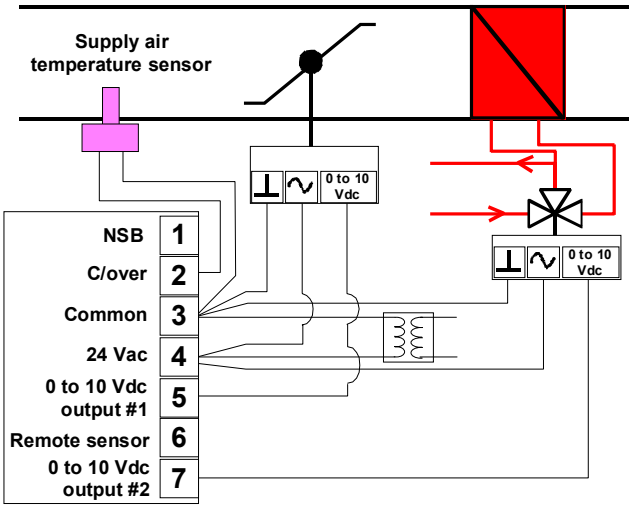
Dip switch position	S1	S2	S3	S4
Cool/heat auto changeover input (2°F deadband)	0	1	0	0

Analog VAV Actuator Heating and/or Cooling & Analog Valve Heating



Changeover Sensor

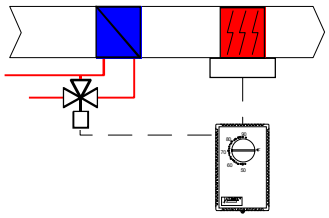
Room Temperature Control Thermostat With Internal Minimum & Maximum Position Adjustments



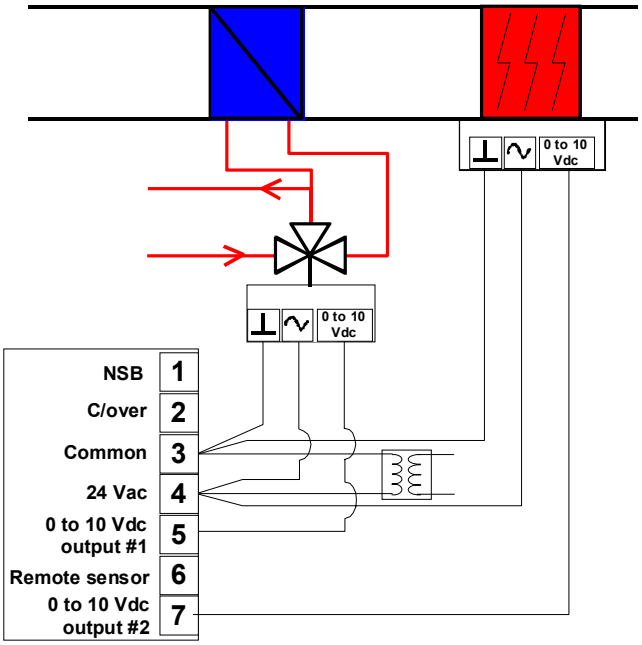
Valve Control Room Thermostat With: Modulating SCR Electric Reheat

Dip switch position	S1	S2	S3	S4
Valve is cooling only (2°F deadband)	0	1	0	0

Analog Valve Cooling
& Analog SCR Power Controller



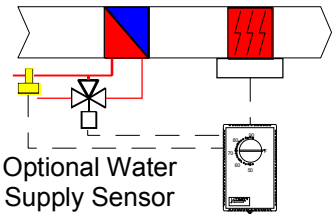
Room Temperature
Control Thermostat



Valve Control Room Thermostat VAV With: Cool / Heat Auto Changeover Input & Modulating SCR Electric Reheat

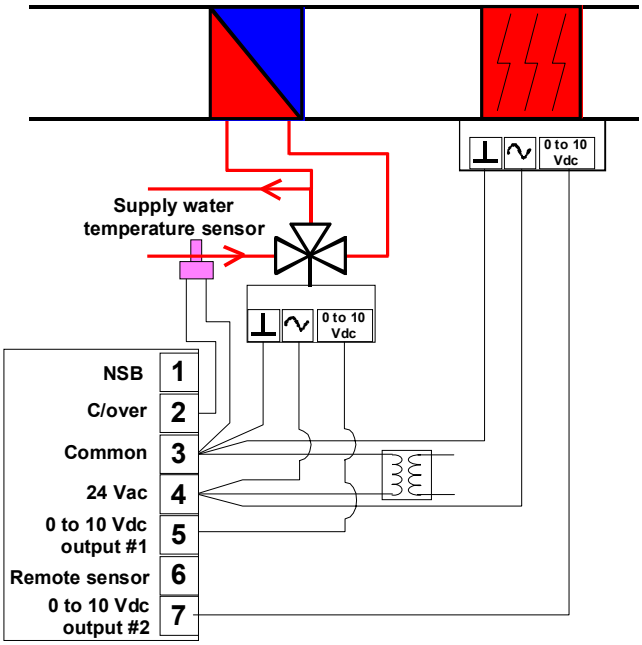
Dip switch position	S1	S2	S3	S4
Cool/heat auto changeover input (2°F deadband)	0	1	0	0

Analog Valve
Heating and/or Cooling
& Analog SCR Power Controller



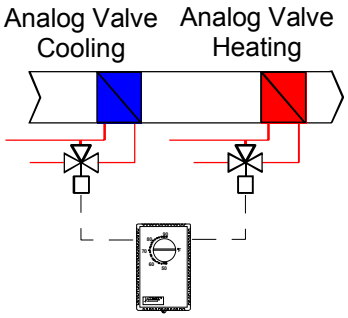
Optional Water
Supply Sensor

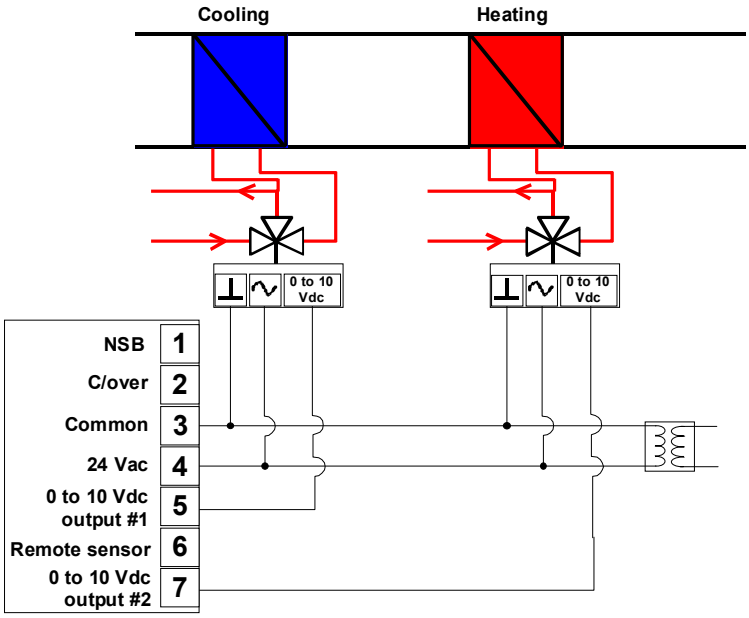
Room Temperature
Control Thermostat



Room Thermostat With: Modulating Heating & Cooling Valve

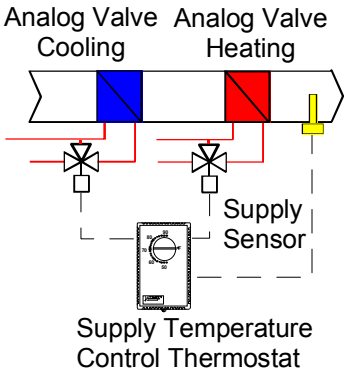
Dip switch position	S1	S2	S3	S4
(2°F deadband)	0	1	0	0

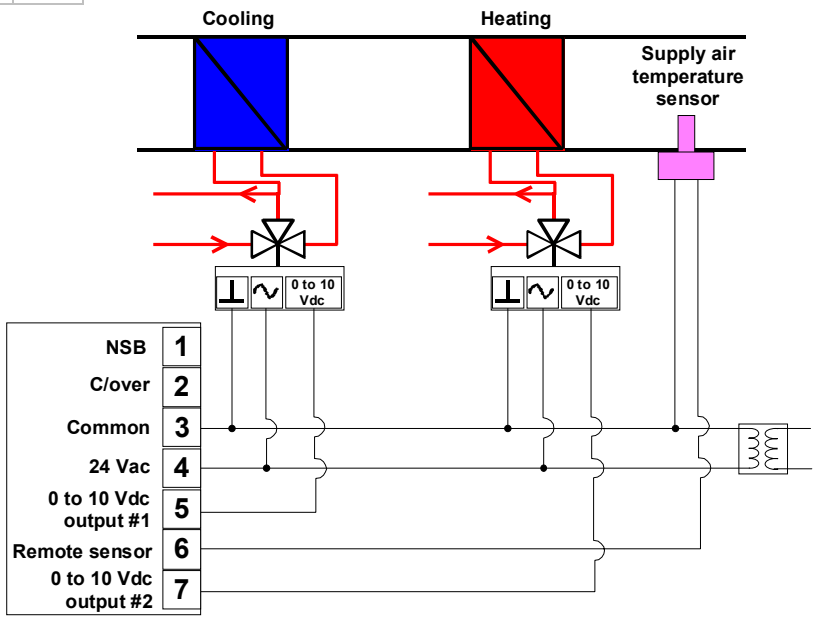




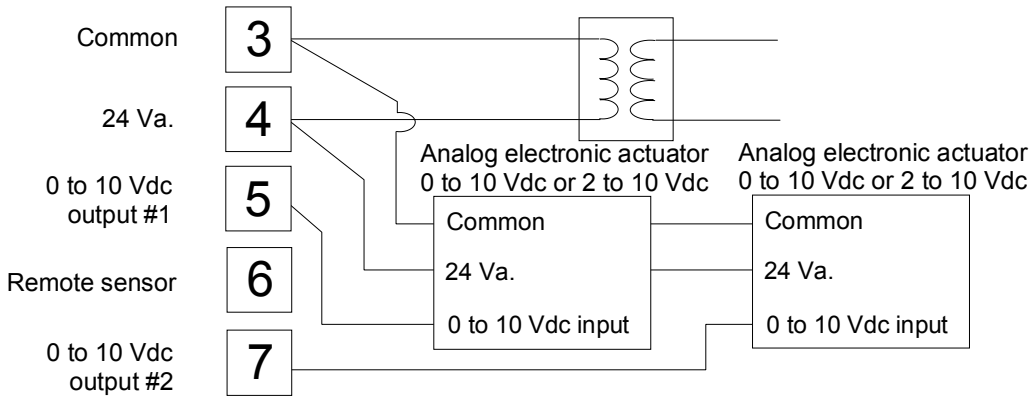
Supply control Thermostat With: Modulating Heating & Cooling Valve

Dip switch position	S1	S2	S3	S4
(2°F deadband)	1	0	0	0
(10°F deadband)	1	0	0	1





24 VAC POWER AND ANALOG ACTUATORS TYPICAL WIRING



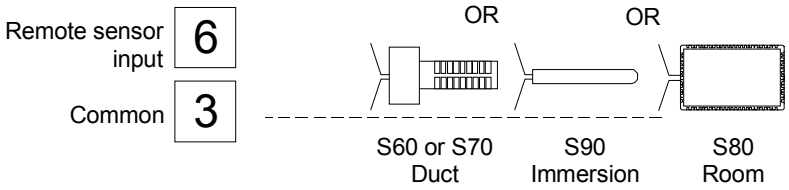
- Power Supply 24 Vac -15% +10% 50/60 HZ 2 VA
- Note: terminals 1, 2, and 3 can be wired together between each thermostat if polarity is respected
- Important: if using a common transformer, respect polarity (Common and 24 Vac between thermostats and actuator)

REMOTE TEMPERATURE SENSOR TYPICAL WIRING

If a remote sensor is used, set dip switch S2 to position 0 (off). 3 types of remote sensor can be used for different applications.
S60 or S70 for remote duct sensor applications
S80 for remote room sensor applications
S90 for immersion sensor applications

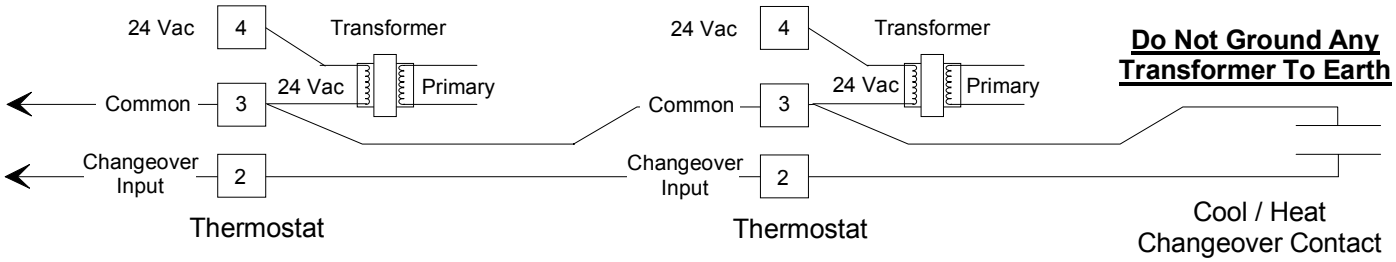
When using the thermostat in a supply control or a discharge control application, set dip switch S1 to position 1 (on). This will enable control parameters for these applications that make temperature control more stable.

Special testing procedures when supply control mode is enabled (S1 = 1). Due to the large value of the proportional bands in this mode 28°C (50°F), it will not be possible to bring immediately both output to either 0 Vdc or 10 Vdc value by turning the dial to full heat or full cold when testing. The PI control loop in this case is designed to give stable supply control with as few movement possible to the end devices. To speed up the testing procedure, it is recommended that both output be tested in the room control mode (S1 = 0) to confirm that both end devices are operating properly from full open to full close. after the tests are done, reset the switch to supply control mode (S1 = 1).

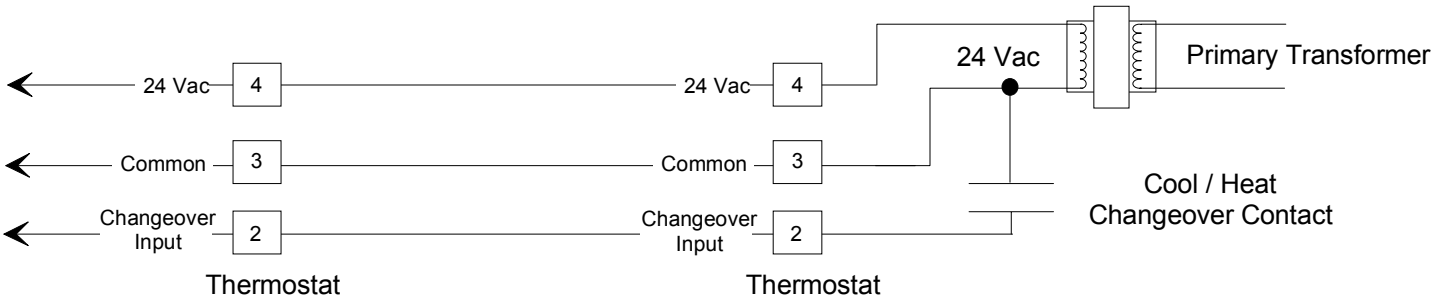


CHANGEOVER INPUT TYPICAL WIRING

MULTIPLE TRANSFORMERS (1 DRY CONTACT FOR ALL THERMOSTATS)
Open contact = Cooling mode. Closed contact = Heating mode

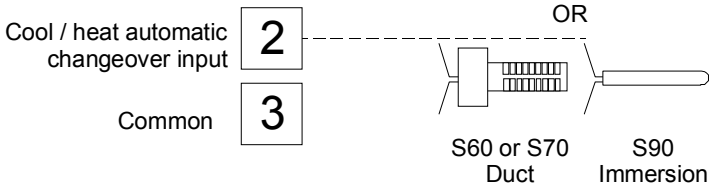


SINGLE TRANSFORMER (1 DRY CONTACT FOR ALL THERMOSTATS)
Open contact = Cooling mode. Closed contact = Heating mode



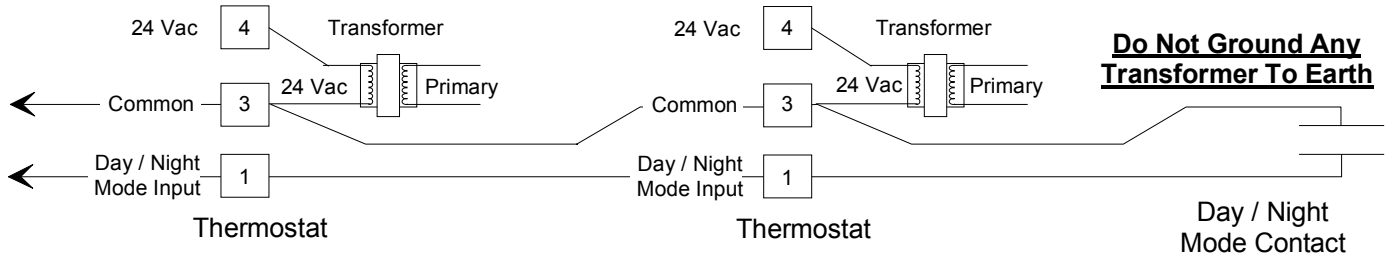
1 SUPPLY CHANGEOVER SENSOR PER THERMOSTAT (1 SUPPLY SENSOR PER THERMOSTAT)
Auto changeover input using an S60, S70 duct supply sensor or S90 immersion supply sensor

Supply temperature > 78°F (26°C) = Heating mode
Supply temperature < 75°F (24°C) = Cooling mode
Hysterisys is 3°F (2°C) between heating and cooling



NSB INPUT TYPICAL WIRING (T926N ONLY)

- **MULTIPLE TRANSFORMERS**
  Closed = night mode. 1 contact can be used for all thermostats on the same transformer.



- **SINGLE TRANSFORMER**
  Closed = night mode. 1 contact can be used for all thermostats on the same transformer.