Product Manual

TCS Basys Controls®

SZ1017N

Modulating Thermostat with
7-day Time Clock

SUPERSTAT™ Communicating Thermostats

METASYS® COMPATIBLE PRODUCT

Description

The SZ1017N is a thermostat with a 7-day time clock designed for applications with modulating heating or cooling.

Features

- Stand-alone or network operation
- 7-day time clock
- Discharge air sensor input with high and low limits and reset
- Outdoor air sensor input with heating & cooling lockout
- Offers up to two stages heating or cooling and a modulating heating or cooling output
- Adjustable delay on powerup for soft starts
- P+I control option
- Smart Recovery
- No backup battery required
- Built-in HVAC equipment protection
- 32 character LCD display
- Six LEDs for status monitoring
- Remote room sensing capability
- User setpoint adjustment limits
- Local and remote override capability
- System and fan switching with access lockouts
- Fan interlock safety option
- Filter service input and indication
- Equipment monitoring inputs and indication
- External time clock input
- Energy management input for setpoint shift
- Access to programming or schedule may be locked out or limited with the use of an access code
- Fahrenheit or Celsius temperature display

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Mounting

The SZ1017N is designed for wall mounting using two #6 sheet metal screws, either over a horizontally installed 2" x 4" junction box, or directly to block or drywall.

For best results, the thermostat should be mounted on an interior wall which reflects normal room environment, at a height of approximately five feet from the floor. Avoid areas exposed to direct sunlight, unusual heat or cool sources, open doors and windows, unventilated locations and hot or cold air from diffusers.

If using a remote room sensor, it should be mounted in the manner described above. The thermostat may be mounted in an area which is accessible for adjusting its settings.

Wiring

The SZ1017N uses standard terminal designations for wiring. See diagram below.

REMOTE SENSOR WIRING

Use 18 AWG shielded twisted-pair grounded at the sensor mounting location. Sensor wiring runs of up to 250 feet are attainable if properly shielded wire is used and the installation environment is free of electrical noise. Sensor wire should be kept at least five feet away from line voltage wiring.

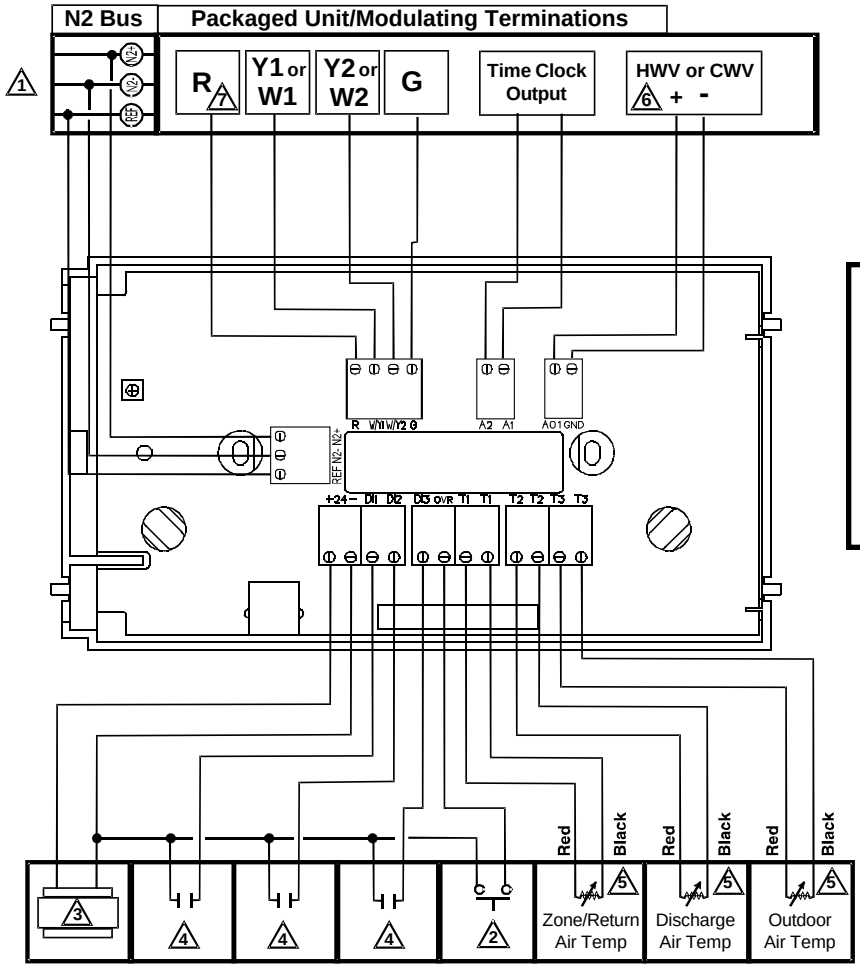
The SZ1017N accept two remote sensors. Consult the TS Series Temperature Sensor Submittal Data sheet for a complete listing of packaging and application styles. When using TCS/Basys Controls three-wire sensors, use the black and red leads and either clip or twist off the white lead. Make sure that the dip switches are set for the sensors you are using.

POWERING THE SZ1017N

The SZ1017N is powered from 24 VAC +/- 20 %.

If wiring for communications, dedicated power must be used to power the SZ1017N. Several S-series thermostats may be powered from the same transformer, provided that the transformer has sufficient power, although the polarity must be kept the same throughout because these are half-wave rectified devices. (SZ1017N thermostats require 8 VA @ 24 VAC).

When the SZ1017N is used as a stand-alone thermostat without communications, the unit transformer may be used to power it. However, using separate power will eliminate possible ground loops which may damage the thermostat.



⚠ CAUTION ⚠

When multiple TCS devices are using a single transformer, the polarity of the power wiring must be maintained because all TCS devices are half-wave rectified and have common return paths.

1 For communication wiring, use twisted, shielded 18 AWG. Must be run separately.

2 Dry momentary contact. Must not be powered.

3 24 VAC transformer. See powering instructions.

4 Dry contact. Must not be powered.

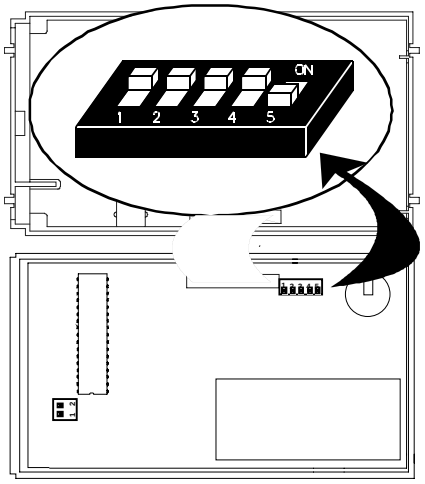
5 Sensor input wiring 18 AWG, twisted, shielded pair.

6 4 to 20 mA output. 600 ohm max. Do not power actuator with power from the thermostat. The thermostats are half-wave rectified, whereby the power ground is common with the signal ground.

7 Up to nominal 28 VAC from equipment transformer.

Setup

Note: If using remote sensor(s), the calibration may need to be adjusted. See "Checkout and Troubleshooting" section.



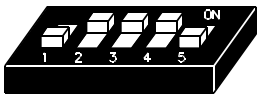
SENSOR SELECTION

The dipswitches in the cover (shown above connected with ribbon cable) as well as the programming must be set when using remote room, discharge, and/or outdoor sensors. Use the following guide to determine the dipswitch settings for your application.

Using built-in room sensor only. (This is the default setting.)

Using built-in room sensor with discharge air sensor only.

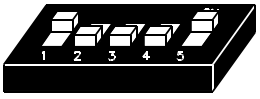
Using built-in room sensor with outdoor air sensor only.



Using built-in room sensor with both discharge and outdoor air sensors.

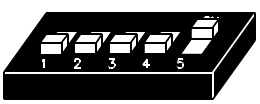
Using remote room sensor only.

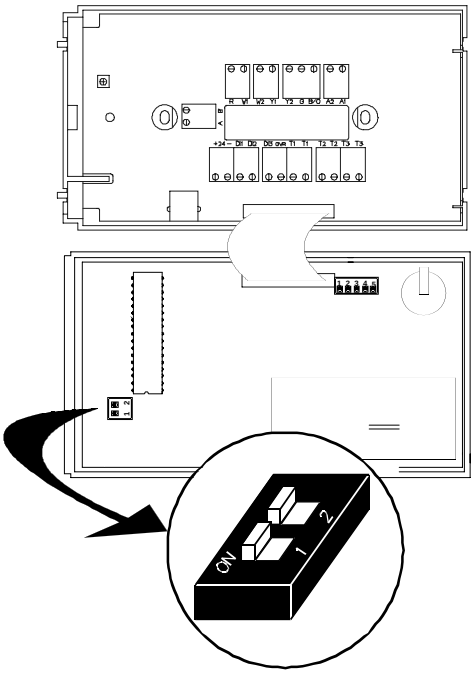
Using remote room sensor with discharge air sensor only.



Using remote room sensor with outdoor air sensor only.

Using remote room sensor with both discharge and outdoor air sensors.

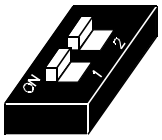




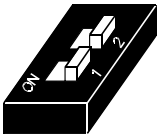
KEYPAD ACCESS

The dipswitches in the cover (shown above connected with ribbon cable) must be set in order to lock the user out of programming and/or to set the clock and schedule. Use the guide below to set these dipswitches for your application. Otherwise, user access may be limited with an access code set in programming. (The fan and system switches are enabled or disabled in programming only, and require no dipswitch placement.)

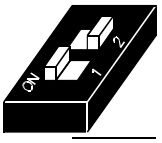
Keypad access to both programming and clock setup. (This is the default setting.)



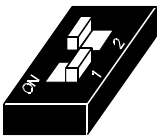
No keypad access to programming or clock setup.



Keypad access to programming only.



Keypad access to clock setup only.



Once the dipswitches have been set and you have confirmed that the sensors are reading correctly (and program and clock setup are finished, if locking out access with dip-switches), secure the cover to the base with the two set screws located at the top right and the left side to prevent tampering.

Programming

The SZ1017N may be programmed through the display and keypad, or with a PC.

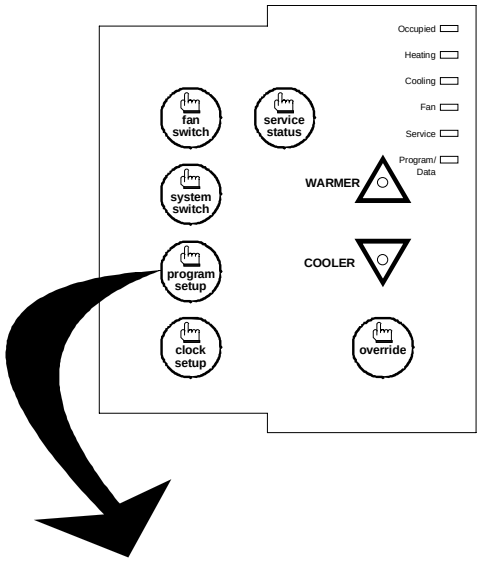
If programming with a PC, the following must be set through the keypad prior to programming:

- Address (step #3)
- Temperature scale (step #4)

For more information on programming through the PC, consult your software manuals.

PROGRAMMING THROUGH THE KEYPAD

To access the programming screens, press the program setup button. To make changes, use the warmer and cooler keys. Access may be locked out with dipswitches, or an access code may be required.



1. MON 12:00 AM 72F — **Main Monitoring Screen.** Press the program setup button to access the following screens.

2. ENTER ACCESS CODE 000 — **Access Code Entry Screen.** Will appear if access code is required for programming. Use 248 as the default. If the wrong code is entered, it will revert to the previous screen.

3. SET ADDRESS: 000 — **Controller Address Screen.** If using a PC to access the SZ1017N, set a unique address from 1 to 255.

4. TEMPS SHOWN IN: FAHRENHEIT — **Display Type Screen.** Choose between FAHRENHEIT and CELSIUS for temperature indication.

5. USER ACCESS TO SYSTEM MODE? YES — **System Access Screen.** Choose whether or not to enable user's access to the system switch to set the system mode.

6. SET SYSTEM MODE: AUTO — **System Mode Screen.** Choose from AUTO, HEAT, COOL, or OFF for system mode. In the OFF mode, all outputs are off.

7. USER ACCESS TO FAN MODE? YES — **Fan Access Screen.** Choose whether or not to enable the user's access to the fan switch to set the occupied fan mode.

8. SET OCCUPIED FAN MODE: ON — **Occupied Fan Mode Screen.** Choose between ON (continuous), COOL (gas heat or no heat), or AUTO for your fan run times during the occupied modes.

9. SET UNOCCUPIED FAN MODE: AUTO — **Unoccupied Fan Mode Screen.** Choose from AUTO or COOL for fan run times in the unoccupied mode.

10. OCCUPIED HEAT SETPOINT: 68F — **Occupied Heat Setpoint Screen.** Set the occupied heat setpoint.

11. UNOCCUPIED HEAT SETPOINT: 60F — **Unoccupied Heat Setpoint Screen.** Set the unoccupied heat setpoint.

12. OCCUPIED COOL SETPOINT: 72F

Occupied Cool Setpoint Screen. Set the occupied cool setpoint.

program setup

13. UNOCCUPIED COOL SETPOINT: 80F

Unoccupied Cool Setpoint Screen. Set the unoccupied cool setpoint.

program setup

14. LIMIT SETPOINT ADJUST +/-: 5F

User Setpoint Limit Screen. Enter the number of degrees you want the user to be allowed to change the preset occupied setpoints up or down.

program setup

15. SET OVERRIDE TIME: 180 MINUTES

Override Time Screen. Enter the number of minutes (0 to 255) that the SZ1017N will maintain occupied setpoints when overridden.

program setup

16. STAGE OUTPUT 1&2 AS: HEAT

Stage Mode Screen. Choose whether stages 1 and 2 perform heating or cooling functions, or whether both stages are to be disabled.

program setup

17. STAGE 1 OFFSET: 0F

Stage 1 Offset Screen. Enter an offset value for stage 1. First stage is normally 0 offset. This screen does not appear if stage outputs 1 and 2 are disabled.

program setup

18. STAGE 1 DIFF: 2F

Stage 1 Differential Screen. Enter a differential value for stage 1. This screen does not appear if stage outputs 1 and 2 are disabled.

program setup

19. STAGE 2 OFFSET: 2F

Stage 2 Offset Screen. Enter an offset value for stage 2. This screen does not appear if stage outputs 1 and 2 are disabled.

program setup

20. STAGE 2 DIFF: 2F

Stage 2 Differential Screen. Enter a differential value for stage 2. This screen does not appear if stage outputs 1 and 2 are disabled.

program setup

21. SET CONTROL MODE: P+I

Control Mode Screen. Enter whether you want to control by temperature only (P) or add a time factor (P+I). This applies to both the stage outputs.

program setup

22. TIME CLOCK OUTPUT OCCUPIED=CLOSED

Time Clock Output Screen. Choose whether the auxiliary output will be OPEN during occupied periods (and closed during unoccupied periods) or CLOSED during occupied periods (and open during unoccupied periods).

program setup

23. MODULATING OUT IS: COOL

Modulating Output Define Screen. Choose whether the modulating output will be used for COOL, HEAT or AQUASTAT. With DI2 set to AQUASTAT, the analog output will be used for cooling with DI2 open and heating with DI2 closed.

program setup

24. OUTPUT ACTION: DIRECT

Modulating Output Action Screen. Choose whether the output will be direct or reverse acting. (When DI2 is set to AQUASTAT, the output will automatically reverse action when DI2 is closed.)

program setup

25. MODULATING OUT RANGE: 4-20 MA

Modulating Output Range Screen. Choose whether the modulating output range will be 0-20 mA or 4-20 mA.

program setup

26. UNOCCUPIED ACTION MODULATING

Unoccupied Action Screen. Choose whether the unoccupied action will be modulating, 0 or 4 mA, or 20 mA.

program setup

27. PROPORTIONAL BAND: 5F

Modulating Output Proportional Band Screen. Enter the number of degrees away from the setpoint that the valve or damper will be fully open.

program setup

28. SETPOINT OFFSET: 00F

Analog Output Setpoint Offset Screen. Enter a setpoint offset. This is a value below the heating setpoint or above the cooling setpoint where the analog output begins to modulate.

program setup

29. ENABLE DISCHARGE AIR SENSOR? YES

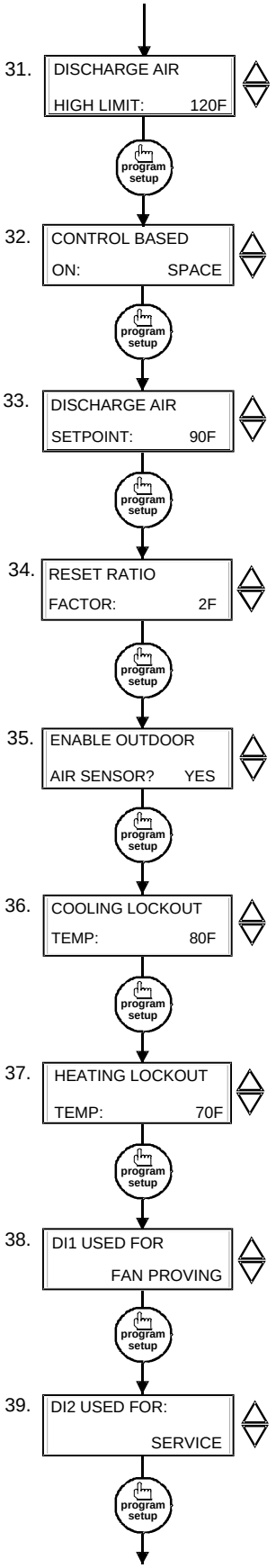
Discharge Air Sensor Screen. Choose whether or not you are using the discharge air sensor function. To monitor only, select no.See setup instructions for dipswitch settings which must also be set.

program setup

30. DISCHARGE AIR LOW LIMIT: 45F

Discharge Air Low Limit Screen. Enter a discharge air low limit value. This screen will not appear if the discharge air sensor function is disabled.

program setup



Discharge Air High Limit Screen. Enter a discharge air high limit value. This screen will not appear if the discharge air sensor function is disabled.

Discharge Air Reset Screen. Choose whether to control based on DISCHARGE air reset or SPACE temperature. This screen will not appear if the discharge air sensor function is disabled.

Discharge Air Setpoint Screen. Enter a value at which the discharge air setpoint is to be controlled. This screen will not appear if the control is based on space temperature.

Reset Ratio Factor Screen. Enter a reset ratio factor. This is the number of degrees that the discharge air setpoint is raised when the space temperature falls by 1 degree for heating, or the number of degrees that the discharge air setpoint is lowered when the space temperature rises by 1 degree for cooling.

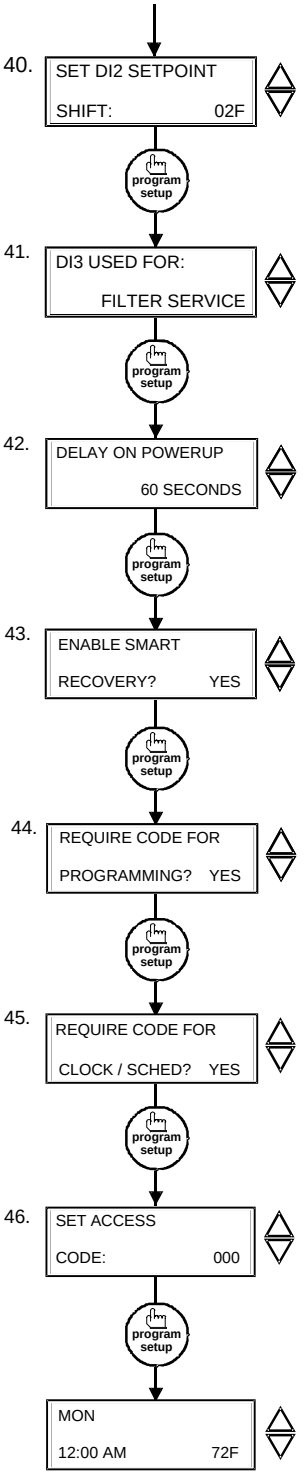
Outdoor Air Sensor Screen. Choose whether or not you are using an outdoor air sensor function To monitor only, select no. See setup instructions for dipswitch settings which must also be set.

Cooling Lockout Screen. Enter an outdoor air cooling lockout temperature. This screen will not appear if the outdoor air sensor function is disabled.

Heating Lockout Screen. Enter an outdoor air heating lockout temperature. This screen will not appear if the outdoor air sensor function is disabled.

DI1 Choice Screen. Choose DI1 as FAN PROVING or a MONITOR point. Select MONITOR if unused.

DI2 Choice Screen. Choose DI2 as SERVICE, AQUASTAT, or MONITOR. Select MONITOR if unused.



DI2 Shift Screen. Enter the setpoint shift value. This screen will only appear if DI2 is set to MONITOR.

DI3 Choice Screen. Choose FILTER SERVICE, EXTernal OVERRIDE, or EXTernal TIME CLOCK. Select FILTER SERVICE if unused.

Delay On Powerup Screen. Enter a value in seconds, such that when the unit is powered up, no control starts for this amount of time.

Smart Recovery Screen. Choose whether or not smart recovery will be used. *Note: Smart Recovery is not available when DI3 is used as EXTernal TIME CLOCK.*

Programming Access Screen. Choose whether or not a code will be required to enter programming setup. A dipswitch option to lock out access altogether is also available.

Clock and Schedule Access Screen. Choose whether or not a code will be required to enter clock and schedule setup. A dipswitch option to lock out access altogether is also available.

Access Code Screen. Enter an access (0 to 255) code that will be used to enter the programming and/or clock and schedule setups if access code has been required in the last two steps. The default is 248.

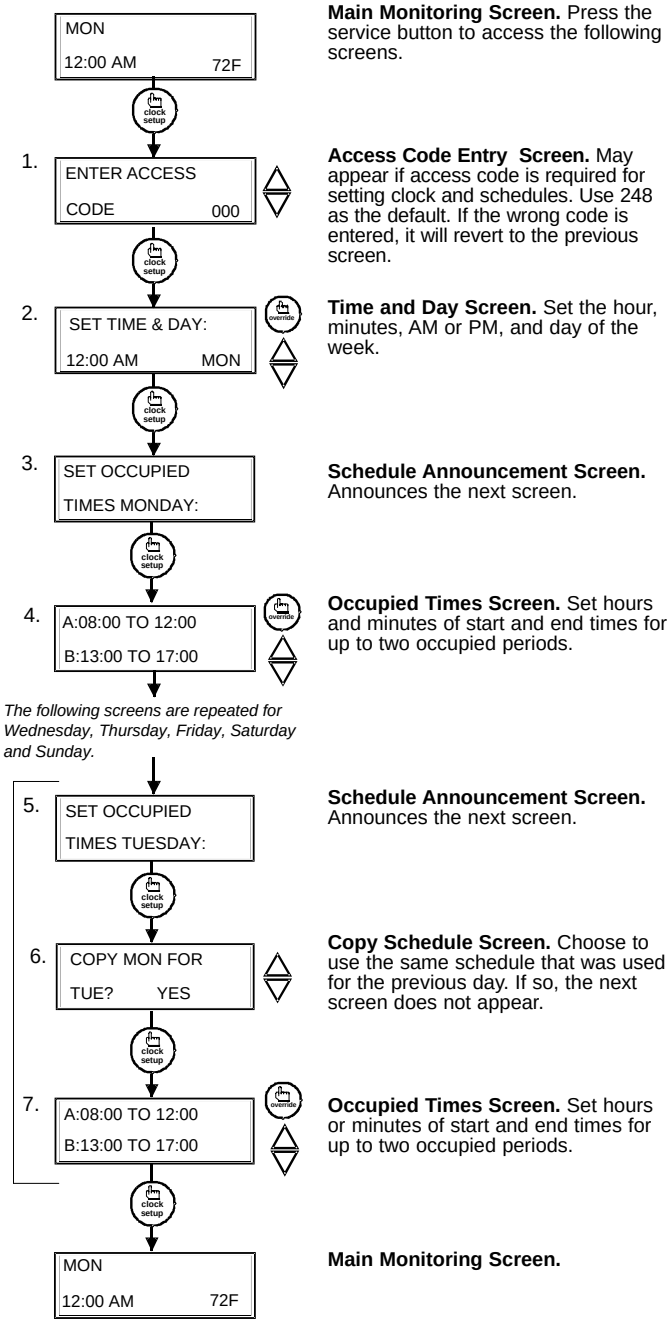
Main Monitoring Screen.

Setting Clock & Schedule

The SZ1017N clock and schedule may be set through the keypad on the face, or with a PC. For more information on programming through the PC, consult your software manual.

SETTING CLOCK & SCHEDULE THROUGH THE KEYPAD

To access the clock and schedule screens, press the clock setup button. To make changes, use the warmer and cooler keys. For screens that have more than one field to set, use the override key to move to the next field. Access may be locked out with dipswitches, or an access code may be required.



Main Monitoring Screen. Press the service button to access the following screens.

Access Code Entry Screen. May appear if access code is required for setting clock and schedules. Use 248 as the default. If the wrong code is entered, it will revert to the previous screen.

Time and Day Screen. Set the hour, minutes, AM or PM, and day of the week.

Schedule Announcement Screen. Announces the next screen.

Occupied Times Screen. Set hours and minutes of start and end times for up to two occupied periods.

Schedule Announcement Screen. Announces the next screen.

Copy Schedule Screen. Choose to use the same schedule that was used for the previous day. If so, the next screen does not appear.

Occupied Times Screen. Set hours or minutes of start and end times for up to two occupied periods.

Main Monitoring Screen.

Operation

UNOCCUPIED SETBACK

The SZ1017N operates in either an occupied or unoccupied mode. During the occupied mode, the occupied heating and cooling setpoints will be maintained, and the fan will operate according to its occupied setting. During the unoccupied mode, the unoccupied heating and cooling setpoints will be maintained, and the fan will operate according to its unoccupied setting. The occupied LED will be lit when the unit is operating in the occupied mode.

The occupied schedule may be set utilizing the internal time clock or DI3 may be used with an external time clock, whereas when DI3 is closed, the unit is in the occupied mode. The Smart Recovery function is disabled when DI3 is used for external time clock.

OVERRIDE

A timed override is available on the keypad or through momentary N.O. contacts. The amount of time the unit will be overridden is set from 0 to 255 minutes in the programming. This override only activates when the thermostat is operating in the unoccupied mode. Both the software and the service button allows you to view the time remaining in the override mode. If the occupant desires to return the thermostat to unoccupied operation before that time interval is up, they may press the button on the keypad or the momentary contact again.

Continuous override is available using DI3. If DI3 is set to external override, the unit will be in the occupied mode whenever the DI3 contact is closed. When using this option, the timed override may still be activated.

The software allows you to override the thermostat by putting the override parameter into the remote mode, and thus disabling the timed override.

SETBACK AND OVERRIDE APPLICATIONS

In most applications, it is desired to maintain a regular schedule, and allow timed override with the button on the face or with a remote momentary contact.

To allow a regular schedule, and also automatically override with the use of occupancy or light sensor, set DI3 to override and set it up so that the contact is closed when you want the override.

For applications where a room might not be used on a regular schedule, such as conference rooms, set DI3 to time clock and close the contact when you want the room occupied, such as with a switch or wind-up timer. If each occupancy period is about the same, (theaters, meetings) another option is to set the DI3 to time clock, and use the timed override button to put the unit in occupied mode.

To make the unit always occupied, set DI3 to time clock and short the DI3 terminal to ground.

DISCHARGE AIR TEMPERATURE SENSING

The SZ1017N accepts a remote 1000 Ω discharge air sensor (TS1009 or TS1002) for monitoring purposes. (See setup instructions for dipswitch placement for this option.)

Choose YES in programming screen #28 only if you are using a discharge air sensor and you want to enable the discharge air temperature high and low limit functions or discharge air reset function. See Discharge Air Reset section for further programming options. If NO is chosen, the discharge air is still monitored.

When the function is enabled, a LOW LIMIT and HIGH LIMIT are entered in steps #29 and #30. If the HIGH LIMIT is reached, the fan and heating stages will be turned off and will remain off until the discharge air temperature falls 3° below that limit. If the LOW LIMIT is reached, the fan and cooling stages will be turned off and will remain off until the discharge air rises 3° above that limit. When either limit is reached, the service LED will be on until normal operation resumes.

The discharge air span is 0 to 150 °F (-17.8 to 65.6 °C).

ANALOG OUTPUT / DISCHARGE AIR RESET

The analog output on the SZ1017N is used to control the heating or cooling in a space. To use the discharge air reset function, a discharge air sensor must be installed. In programming step #28, the discharge air sensor must be enabled. In programming step #31, the control must be based on DISCHARGE air.

In programming screen #32, you are asked to enter a discharge air setpoint. The discharge air temperature will be controlled to this setting by modulating the heating or cooling device.

In programming screen #33, you are asked to enter a reset ratio factor. This is the number of degrees that the discharge air setpoint is raised when the room temperature falls below the heating setpoint by 1 degree if the analog output is set for heating, or the number of degrees that the discharge air setpoint is lowered when the room temperature rises above the cooling setpoint by 1 degree if the analog output is set for cooling.

OUTDOOR AIR TEMPERATURE SENSING

The SZ1017N accepts a remote 1000 Ω outdoor temperature sensor (TS1003) for monitoring purposes. (See setup instructions for dipswitch placement for this option.)

Choose YES in programming screen #34 only if you are using an outdoor air sensor and you want to enable the outdoor air heating and cooling lockout functions. If NO is chosen, the outdoor air is still monitored.

When the function is enabled, a COOLING LOCKOUT TEMP and HEATING LOCKOUT TEMP are entered in steps #35 and #36. If the outdoor temperature falls below the COOLING LOCKOUT TEMP, all cooling stages will be locked out and will remain locked out until the outdoor air temperature rises 2° above the lockout temperature. If the outdoor temperature rises above the HEATING LOCKOUT TEMP, all heating stages will be locked out and will remain locked out until the outdoor air temperature falls 2° below the lockout temperature.

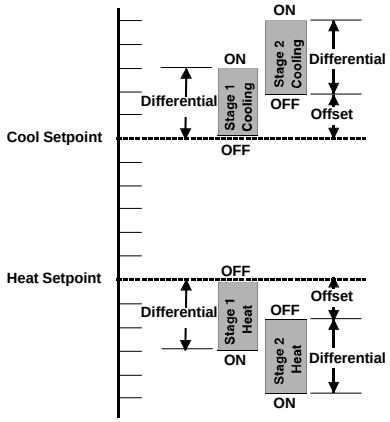
The outdoor air span is -40 to 160 °F (-40.0 to 71.1 °C).

FAN PROVING

The SZ1017N allows DI1 to be set for fan proving to protect equipment on fan failure. To utilize this, a pressure or current switch is required, which indicates when the fan is running. If the thermostat turns on the FAN, and DI1 is not closed after thirty seconds, the system will go to OFF, disabling all outputs, the fan LED will turn off, and the service LED will be lit until the system is manually reset by switching the system to a mode other than OFF.

DI2 SETPOINT SHIFT

The SZ1017N allows DI2 to be set for setpoint shift for energy demand setback. This is enabled by setting DI2 to the MONITOR mode. A digital contact that closes when setback is needed should be wired into DI2. You may specify a number of degrees such that, when the thermostat is operating in the occupied mode, and DI2 is closed, the heating setpoint will be lowered this number of degrees, and the cooling setpoint will be raised this number of degrees. The fan will continue to operate according to its occupied setting. If you are using DI2 as monitor for another purpose, make sure to set the setpoint and shift value to zero.



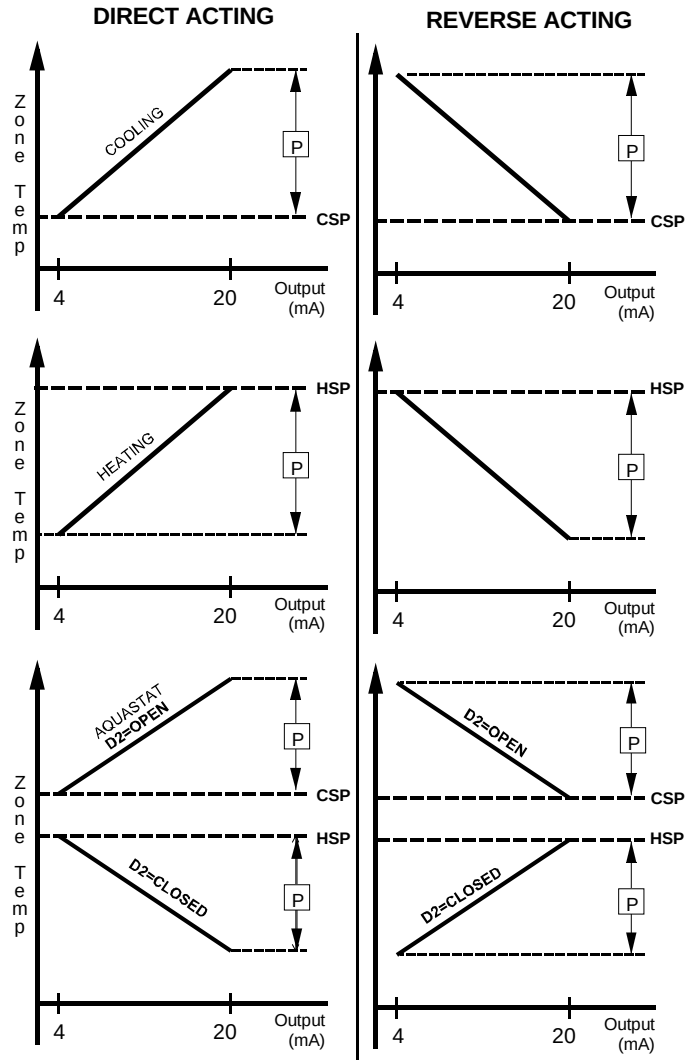
STAGE OUTPUT PARAMETERS

The SZ1017N will control up to two stages of either heating or cooling.

For each stage, you may specify an offset and a differential value. The offset value is the amount away from the setpoint a stage will turn off. By assigning a stage a value other than zero, you "anticipate" that the residual heat or cooling in the duct or the other stages will bring the temperature back to setpoint. In most cases, the first stage is set to zero. The differential value is the difference between the on and off points.

ANALOG OUTPUT PARAMETERS

Use programming steps #22 through #26 to program the operating parameters for the analog output. Select whether the analog output is set for heating, cooling or aquastat. Select direct or reverse action. Select whether you want the analog output to modulate from 4 to 20mA or 0 to 20mA. Select the unoccupied action ("20mA or 0 / 4mA" will hold the analog output device open or closed during unoccupied times. "Modulating" will modulate the analog output device to maintain the unoccupied heating or cooling setpoint.). Enter a proportional band (throttling range) in degrees.



P+I OPTION

The SZ1017N also has a P+I option. Without enabling this option, stages turn on and off based on temperature vs. setpoint alone, as described above. By enabling this option, you add a time factor to anticipate heating and cooling.

DI2 AQUASTAT

DI2 may be set as an aquastat function. When DI2 is selected to have an aquastat function, and the analog output is selected to have an aquastat function, operation is as follows.

With DI2 "Open", the analog output operates in cooling mode, and uses selected direct or reverse action. When DI2 is "Closed", the analog output operates in heating mode, and uses the opposite of the selected direct or reverse action.

SMART RECOVERY

"Smart Recovery" may be enabled. It ramps the setpoint 4°F/hr. when going from the unoccupied mode to the occupied mode. At the beginning of the occupied mode, the occupied setpoint will be reached, many times without the need for the second stage to come on. This feature is automatically disabled when DI3 is set to external time clock.

BUILT-IN DELAYS

The SZ1017N has delays built into the programming sequences to protect equipment. The fan has a minimum on and off time of 30 seconds. When the fan is in AUTO or COOL mode, it will come on 30 seconds before the heating or cooling stages are allowed to sequence on, and remain on for 30 seconds after the heating or cooling stages sequence off. Each stage has a minimum on and off time of two minutes. There is a minimum of two minutes between when one stage turns on until the next stage is allowed to turn on, as well as when one stage turns off until the next stage is allowed to turn off.

DELAY ON POWERUP

The SZ1017N has an adjustable delay on powerup. When several thermostats are used at one location, and the power goes out, most thermostats turn all of the units back on at the same time on regain of power, creating a peak. The thermostat allows you to set a value, in seconds, where no outputs are allowed to turn on for that length of time on powerup. Setting each unit to a different delay allows you to soft start your system, and thus prevent this peak.

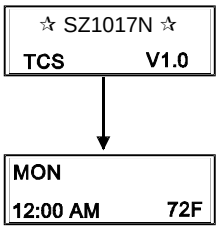
Checkout & Troubleshooting

CHECKOUT

Note: The fan has a minimum on and off time of 30 seconds. The heating and cooling stages have a minimum on and off time of 2 minutes.

You may verify the status of heating and cooling stages and fan in monitoring screens 5, 6, and 7, which are accessed by pressing the SERVICE STATUS button.

1.Verify all wiring prior to powering the thermostat.
2. Turn power on. The thermostat will display a momentary screen with the model number , and then the main monitoring screen with the time, day and current temperature.



3. Press the PROGRAM SETUP button until you reach the screen # 14 which allows you to set the occupant setpoint adjustment limits. Change this to +/-20 °F (11.1 °C). Press the PROGRAM SETUP button once more to store the change. Then press the SERVICE STATUS button once to exit the programming.

4. Press the FAN SWITCH button to access the fan mode and change the mode to AUTO. Press the FAN SWITCH button once more to store the change. Press the SYSTEM SWITCH button to access the system mode and change the mode to AUTO. Press the SYSTEM SWITCH button once more to store the change.
5. Verify that the thermostat is operating in the occupied mode by making sure that the top LED is lit. If not, press the OVERRIDE button. The LED should light up.
6. Take note of the current temperature reading. Press the WARMER (up) button. The setpoint adjustment screen should now be showing. Press the WARMER button until the heating setpoint is greater than the current temperature by at least five degrees. The fan will come on. The heating stage(s) will sequence on after 30 seconds.
7. Press the cooler (down) button until the heating setpoint is one degree less than the current temperature. The heating stage(s) will sequence off. The fan will turn off 30 seconds after the last heating stage.
8. Press the cooler button until the cooling setpoint is less than the current temperature by at least five degrees. The fan will come on. The cooling stage(s) will sequence on after 30 seconds.
9. Press the warmer button until the cooling setpoint is greater than the current temperature by one degree. The cooling stage(s) will sequence off. The fan will turn off 30 seconds after the last cooling stage.
10. Take note of the room (and discharge) air temperatures. If the analog output is set for Cooling, press the Cooler button until the cooling setpoint is less than the current room temperature by at least 5°. The cooling device should start operating. If the analog output is set for Heating, press the Warmer button until the heating setpoint is greater than the current room temperature by at least 5°. The heating device should start operating.
11. Go back to programming step #14 and set the setpoint adjust limit back to the desired value. Make any other changes in programming, clock, and schedule. Set the fan and system modes to their desired settings.
12. If using remote sensors, verify that the reading is correct. If not, see *Wrong Temperature Display* in "Troubleshooting" section.

TROUBLESHOOTING

No Display

Check for 24 VAC on terminals "+24" and "-24". Check the cable connecting the cover to the base for a good connection.

Fan Does Not Come On

The fan is on whenever the fan LED is on. If the fan should be on, but the fan LED is off, check the fan and system switch modes, and the unoccupied fan mode in programming. If the fan is off but the fan LED is on, check wiring. Short terminals "R" to "G" and see if the fan comes on. This is a check for a mechanical relay failure.

Heating or Cooling Does Not Come On

At least one stage of heating is on whenever the heating LED is on, and at least one stage of cooling is on whenever the cooling LED is on. If heating or cooling should be on but the heating or cooling LED is off, check the fan and system switch modes. Also, check the heating and cooling setpoints, offsets and differentials, and the room temperature to be sure heating or cooling should be on. If using outdoor air heating and cooling lockouts, or discharge air high and low limits, check their values to be sure heating or cooling is allowed. If heating or cooling is off, but the corresponding LED is on, check the wiring. Short terminals "R" to "Y/W1" or "Y/W2" and see if the heating or cooling comes on. This is a check for a mechanical relay failure.

Wrong Temperature Display

If any of the temperatures is reading slightly high or low, there are three adjustment pots located in the cover to adjust them. "T1" is for the room temperature, "T2" is for the discharge air temperature, and "T3" is for the outdoor air temperature. If the temperature is at a minimum or maximum reading, check the sensor dipswitch positions. (See setup instructions.) Check for wiring problems (opens or shorts). A remote 1000 Ω sensor should read 1080 to 1090 Ω at room temperature. The built-in sensor should read 108 to 109 Ω at room temperature.

Service LED is On

If the service LED is on, it may be for monitoring purposes or it may indicate a critical problem. The first monitoring screen accessed by pressing the service status button will display why the light is on.

Outputs Will Not Shut Off

First check the room temperature and the setpoints and determine whether the output should be on. There are delays and minimum on and off times for the fan and heating and cooling stages. Also, check the service status menus to verify that the outputs are on. Turning the system to "off" will instantly turn all outputs off. The thermostat can be reset by pressing the system switch button and the service status button simultaneously.

Analog Output Not Working Properly

Check wiring. A separate transformer should be used for the SZ1017N and a separate transformer should be used for the damper motor(s). Check to make sure that the analog output is programmed correctly.

Check the Service Menu. The Mod Out Screen will tell you what the SZ1017N is trying to put out for an output. Compare this with the actual position of the heating or cooling device.

SERVICE SCREENS

Continually pressing the service status button allows more extensive monitoring. The screens are shown at right.

LED Description

Six LEDs on the face allow the occupant to view the current operating status of the thermostat.

OCCUPIED

This LED will be lit whenever the unit is operating in the occupied mode.

HEATING

This LED will be lit when any heat output is on.

COOLING

This LED will be lit when any cooling output is on.

FAN

This LED will be lit when the fan output is on.

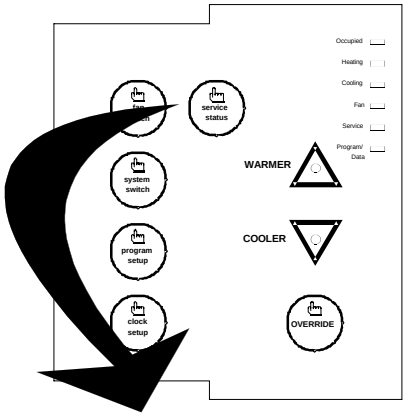
SERVICE

This LED will be lit when the high or low discharge air limit has been reached, when the fan interlock has indicated failure, or when the filter service or service input are closed.

PROGRAM/DATA

This LED will be lit when the thermostat is within the programming or clock setup menus. It will blink when the unit is being accessed by a PC.

Additional monitoring is available by continually pressing the service key.



MON
12:00 AM 72F

Main Monitoring Screen. Press the service button to access the following screens.

1. SERVICE STATUS
OK

Service Screen. This message may be followed by any or all of the following: CHECK FILTER, CHECK FAN, DISCHARGE HIGH, DISCHARGE LOW, or CHECK DI2.

2. DISCHARGE AIR
TEMP 55F

Discharge Air Temperature Screen. Shows discharge air temperature if sensor is used.

3. OUTDOOR AIR
TEMP 75F

Outdoor Air Temperature Screen. Shows outdoor air temperature if sensor is used.

4. OVERRIDE ON
178 MINUTES

Override Status Screen. Shows whether the override is active and if so, how many minutes remaining.

5. HEAT STAGE 1 OFF
HEAT STAGE 2 OFF

Heat or Cool Stages Status Screen. Shows the status of the first and second stages of heating or cooling.

6. MOD OUT 100%
DI1 OPEN

Mod Out and DI1 Screen. Shows the percentage of modulating output and the status of the fan interlock, or DI1.

7. DI2 SERVICE OFF
FILTER OK

DI2 and DI3 Status Screen. Shows DI2 status and filter status or DI3 status.

MON
12:00 AM 72F

Main Monitoring Screen.

Limiting Occupant Access

SETPOINT ADJUSTMENT

The occupant may temporarily change the occupied heating and cooling setpoints +/- 5°F by factory default. This setpoint change will remain until the end of the current occupied period, at which time the program reverts to the setpoints defined in programming. To change the range of adjustment allowed, see programming step # 14.

OVERRIDE

The occupant has the ability to put the unit into occupied mode by pressing the override button on the front. By factory default, the unit will remain in the occupied mode for 180 minutes. This value may be changed from 0 to 255 minutes in programming step # 15.

FAN SWITCHING

The option to allow the occupant to change the occupied fan mode is allowed by factory default. To lock out access to fan switching, see programming step #7.

SYSTEM SWITCHING

The option to allow the occupant to change the system mode is allowed by factory default. To lock out access to system switching, see programming step #5.

SETTING CLOCK & SCHEDULE

The ability to set the clock and schedule is allowed by factory default. An access code may be required as set in programming step # 44, or access may be denied altogether using dipswitches described in the setup section.

PROGRAMMING

The ability to program control parameters is allowed by factory default. An access code may be required as set in programming step # 43, or access may be denied altogether using dipswitches described in the setup section.

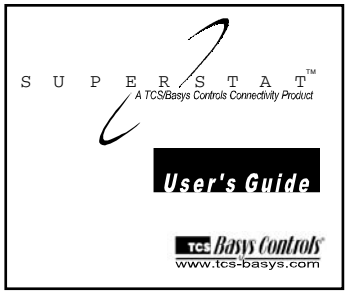
POINT MAPPING TABLES

SZ1017N.....Pages 13 - 15

TCS/Basys Controls Technical Support

800-288-9383

User's Guide



Inside the hinged door of the thermostat is the Superstat™ User's Guide. This guide is designed to assist the installer in explaining to the end user how to operate their new thermostat, as well as serve as a handy future reference for the end user.

We recommend that the installer fill out pages 1, 5, 7 and 8 (where applicable) and explain to the user how the thermostat operates, what settings may be changed, and how the time clock schedules are used.

Pointmap Table for SZ1017N

NPT	NPA	UNITS	POINT DESCRIPTION	RANGE/VALUE	ADDITIONAL NOTES
ADI	1	#	DI2 control mode	0=Aquastat, 1=monitor, 2=service	See programming step #39.
ADI	2	#	Unocc Analog output action	0=0or4 mA, 1=20 mA 2=Modulating	See programming step #26.
ADI	3	#	Analog output mode	0=heat, 1= cool, 2=Aquastat	See programming step #23.
ADI	4	#	DI3 control mode	0=filter service, 1=external override, 2= external timeclock	See programming step #41.
ADI	5	#	Occupied Fan mode	0=on, 1=cool, 2=auto	"Fan Switch" button on keypad.
ADI	6	#	System mode	0=off,1=auto,2=heat 3=cool	"System Switch" button on keypad.
ADI	7	Day	Internal time clock "day"	0-6, mon to sunday	Day of Week.
ADI	8	Hours	Internal time clock "hours"	0-23	0-12 (AM), 13-23 (PM).
ADI	9	DegF	Setpoint adjust limit from keypad	0-50	Limits keypad adjustment of occupied heating and cooling setpoints.
ADI	10	DegF	Differential for stage 1	0-50	
ADI	11	DegF	Offset for stage 1	0-50	
ADI	12	DegF	Differential for stage 2	0-50	
ADI	13	DegF	Offset for stage 2	0-50	
ADI	14	DegF	Setpoint shift value	0-50	When DI2 is selected "Monitor", this is number of degrees that the occupied cooling setpoint is shifted up and the heating setpoint is shifted down.
ADI	15	DegF	(space) Setpoint offset	0-50	See programming step #28.
ADI	16	DegF	AO Proportional Band	0-50	See programming step #27.
ADI	17	Seconds	Internal time clock "second"	0-59	
ADI	18	Minutes	Internal time clock "minute"	0-59	
ADI	19	DegF	Occupied heating setpoint	40-90	Occupied heating setpoint must be less than occupied cooling setpoint.
ADI less	20	DegF	Unoccupied heating setpoint	40-90	Unoccupied heating setpoint must be than unoccupied cooling setpoint.
ADI	21	DegF	Occupied cooling setpoint	40-90	
ADI	22	DegF	Unoccupied cooling setpoint	40-90	
ADI	23	DegF	Room temperature	40-90	Read only.
ADI	24	%	Analog Output	0-100%	Read only.
ADI	25	DegF	Discharge air setpoint	0-150	See programming step #33.
ADI	26	#	Reset ratio	0-150	See programming step #34 (Note 6).
ADI	27	DegF	Discharge air low limit	0-150	Discharge air high limit must be less than discharge air low limit.
ADI	28	DegF	Discharge air high limit	0-150	
ADI	29	DegF	Discharge air temperature	0-150	Read only.
ADI	30	DegF	Outdoor heat lockout temp	-40 to 160	See programming step #37.
ADI	31	DegF	Outdoor cool lockout	-40 to 160	See programming step #36.
ADI	32	DegF	Outdoor air temperature	-40 to 160	See Note 4
ADI	33	Minutes	Override period	0-255	Unoccupied override time allowed.
ADI	34	Seconds	Power on delay time	0-255	Time before control begins on powerup.
ADI	35	Minutes	Remaining override time	0-255	Read Only. Time remaining before the override period expires.
ADI	36	DegF	Current user setpoint adjust	Min=-50, Max=50	Read Only. + or - amount the occupied setpoint has been adjusted from actual settings.
ADI	37	Minutes	Monday Occupied start time for schedule A	0-1439	There are two occupied and two un-occupied time periods allowed per day.
ADI	38	Minutes	Monday Occupied end time for schedule A	0-1439	All times are measured in minutes from midnight.

Pointmap Table for SZ1017N (continued)

NPT	NPA	UNITS	POINT DESCRIPTION	RANGE/VALUE	ADDITIONAL NOTES
ADI	39	Minutes	Monday Occupied start time for schedule B	0-1439	
ADI	40	Minutes	Monday Occupied end time for schedule B	0-1439	
ADI	41		Tuesday	0-1439	
ADI	42		Tuesday	0-1439	
ADI	43		Tuesday	0-1439	
ADI	44		Tuesday	0-1439	
ADI	45		Wednesday	0-1439	
ADI	46		Wednesday	0-1439	
ADI	47		Wednesday	0-1439	
ADI	48		Wednesday	0-1439	
ADI	49		Thursday	0-1439	
ADI	50		Thursday	0-1439	
ADI	51		Thursday	0-1439	
ADI	52		Thursday	0-1439	
ADI	53		Friday	0-1439	
ADI	54		Friday	0-1439	
ADI	55		Friday	0-1439	
ADI	56		Friday	0-1439	
ADI	57		Saturday	0-1439	
ADI	58		Saturday	0-1439	
ADI	59		Saturday	0-1439	
ADI	60		Saturday	0-1439	
ADI	61		Sunday	0-1439	
ADI	62		Sunday	0-1439	
ADI	63		Sunday	0-1439	
ADI	64		Sunday	0-1439	
BD	1		DI1 control mode	0=fan proving, 1=Monitor	See programming step #38.
BD	2		Unocc fan mode	0=cool, 1= auto	Not accessible with "Fan Switch" button.
BD	3		Enable occupied fan switch	0 = No, 1=Yes	Enables "Fan Switch" button.
BD	4		Enable system switch	0 = No, 1=Yes	Enables "System Switch" button.
BD	5		Use of discharge air sensor	0 = No, 1=Yes	Always monitored, enables discharge air function.
BD	6		Use of outdoor air sensor	0 = No, 1=Yes	
BD	7		Enable smart recovery routine	0 = No, 1=Yes	4° per hour setpoint ramp prior to occupancy forboth heating and cooling.
BD	8		Require access code for programming?	0 = No, 1=Yes	Programming access from keypad.
BD	9		Require access code for clock/schedule?	0 = No, 1=Yes	Clock/Schedule access from keypad.
BD	10		Enable stage 1 & 2	0=disable, 1=enable	See programming step #16.
BD	11		Stage 1 & 2 action	0=cool, 1=heat	See programming step #16.
BD	12		Time clock relay output	0=Normally Open 1=Normally Closed	State of relay output during occupied period.
BD	13		Control mode	0=Proportional	Stages turned on and off using offsets and differentials only.
				1=Prop. + Integral	Stages turned on and off using offsets and differentials + a time factor.
BD	14		Control is based on	0=Space 1=Discharge	See programming step #32.
BD	15		Analog output range	0 = 0 - 20 ma, 1 = 4 - 20 ma	See programming step #25.
BD	16		Analog output action	0 = Direct, 1 = Reverse	See programming step #24.

Pointmap Table for SZ1017N (continued)

NPT	NPA	UNITS	POINT DESCRIPTION	RANGE/VALUE	ADDITIONAL NOTES
BD	17		DI1 source	0=local contact	"Local" means read by or controlled by Thermostat.
				1=remote request	"Remote" means the state of the input
or					
					output is controlled only by computer.
BD	18		DI2 source	0=local contact 1=remote request	
BD	19		DI3 source	0=local contact 1=remote request	
BD	20		Override function source	0=local keypad 1=remote request	
BD	21		Fan relay source	0=local mode 1=remote requset	
BD	22		Remote DI1 request	0=off, 1=on	When selected to be "Remote", turns input or output on and off.
BD	23		Remote DI2 request	0=off, 1=on	
BD	24		Remote DI3 request	0=off, 1=on	
BD	25		Remote override request	0=off, 1=on	This is a permanent override.
BD	26		Remote Fan request	0=off, 1=on	
BD	27		Stage 1 relay status	0=off, 1=on	Read only.
BD	28		Stage 2 relay status	0=off, 1=on	Read Only
BD	29		Fan relay status	0=off, 1=on	Read only.
BD	30		Timeclock relay status	0=off, 1=on	Read only.
BD	31		DI1 status	0=off, 1=on	Read only.
BD	32		DI2 status	0=off, 1=on	Read only.
BD	33		DI3 status	0=off, 1=on	Read only.
BD	34		Override status	0=off, 1=on	Read only. Timed override.
BD	35		Device's occupied status	0=Occupied 1=Unoccupied	Read only.
BD	36		Service status	0=OK, 1= fail	Read only. See Note 1.
BD	37		Fan interlock status	0= OK, 1= Fan interlock fail	Read only. DI1 Fan Proving.
BD	38		Filter service status	0=OK, 1=check Filter	Read only. DI3 Filter Status.
BD	39		Discharge air high limit	0=OK, 1= Above high limit	Read only. Discharge air function.
BD	40		Discharge air low limit	0=OK, 1= Below low limit	Read only. Discharge air function.
BD	41		DI2 service status	0=OK, 1= Check DI2	Read only. DI2 Service.

NOTE 1: The Service status point represents general Check status, if this is point is 1, then by polling point 37 to 41 the user can find out actual failing condition. If this point is 0 then points 37 to 41 will be also 0.

NOTE 2: All of the ADI and BD points support the override function. The value overridden will be stored permanently, so the status attribute will never have any override active status. Because none of these points support the override release function, the controller will acknowledge the override release function but never release the value. The controller will respond with NAK error N10 if the value for the override command is outside the limits for that point. Points that are "Read Only" can not be overridden. The controller will acknowledge the override command, but the actual change will never happen.

NOTE 3: All of the points in this map can be adjusted through the keypad except: “Read Only” points, ADI 32, and BDpoints 17 through 26. In the case of loss of communications for 15 minutes (i.e., if the controller is not addressed for 15 minutes), the controller will revert BD points 17 to 26 to zero value (make them all local requests).

NOTE 4: ADI point 32, Outdoor Air Temp., can be overridden for a default of 10 minutes. After 10 minutes it reverts back to its original port value.

NOTE 5: Communications are disabled when programming mode or clock/schedule mode is entered via the keypad. Entering programming mode via the keypad can be disabled.

NOTE 6: 0-150 number represents 0.0 to 15.0°F.

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