Product Manual

TCS Basys Controls®

SZW118

Wireless Modulating Zone Thermostat

SUPERZONE™ Commercial Zoning System

Description

The SZW118 has a 7-day time clock and is designed for applications with modulating zone damper and reheat or peripheral heat.

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
- 2 selectable stages for heating or cooling or 1 of each
- 1 modulating zone damper output and 1 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
- Digital or analog changeover
- Uses ZigBee protocol, IEEE 802.15.4 compliant
- Self-healing, "plug & play" mesh network
- 100mW output at 2.4 GHz
- 150 to 500 feet typical in building range

Contents

Mounting

The SZW118 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 then be mounted in an area which is accessible for adjusting its settings.

⚠ **Caution**: Remove power from thermostat prior to mounting.

Wiring

The SZW118 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 SZW118 accepts 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.

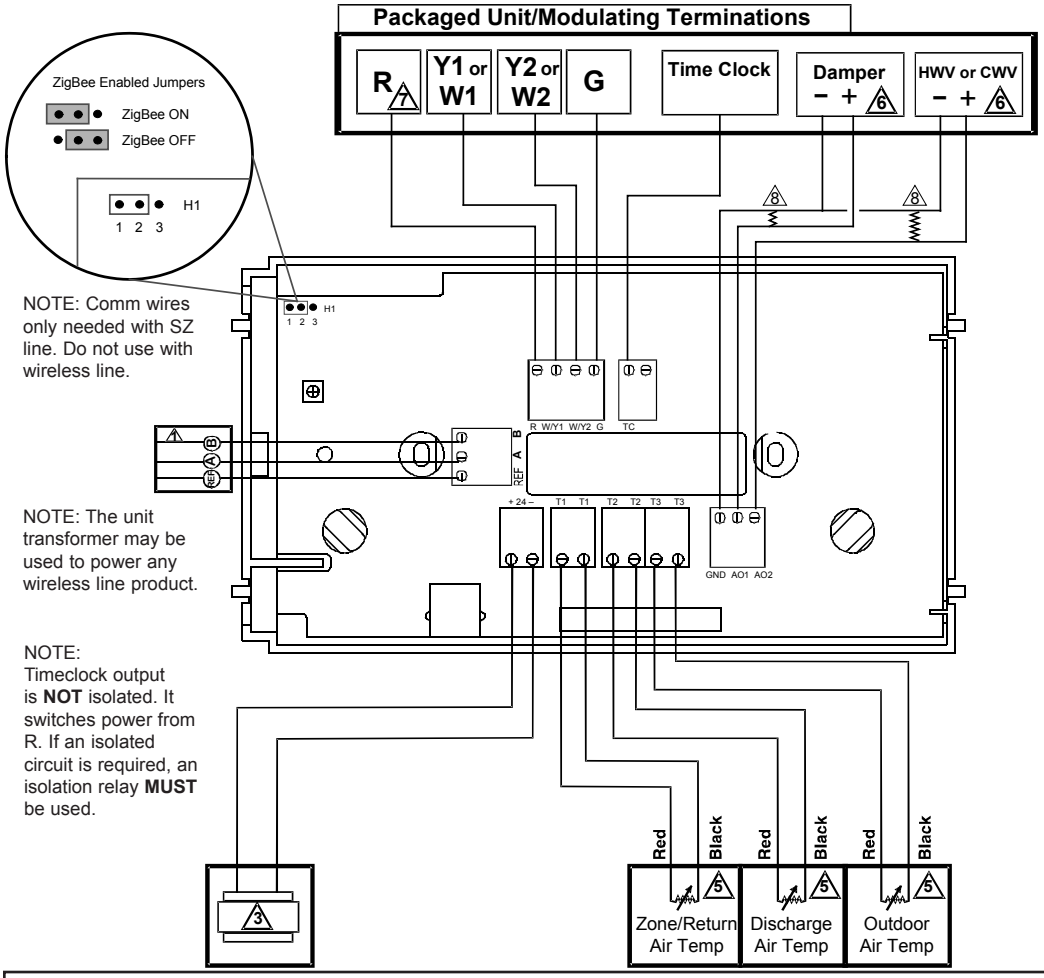
POWERING THE SZW118

Superstats are powered from 24 VAC +20% / -5%.

If using hard wired RS485 communications, dedicated power must be used to power the SZW118. Several S-series thermostats may be powered from the same transformer, provided that the transformer has sufficient power AND the polarity is kept the same throughout. (SZW118 thermostats require 8 VA @ 24 VAC)

Caution: Do not connect to 120 VAC. When multiple TCS Basys Controls 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.

When the SZW118 is used as a stand-alone thermostat without communications or uses ZigBee wireless communications, the unit transformer may be used for power. However, using separate power will eliminate possible ground loops which may damage the device. To do this, install a jumper between "R" and "+24" terminals AND connect "-24" to the common side of the unit transformer.



NOTE:
When set for 1 Heat + 1 Cool mode,
Y1 or W1 = Heat
Y2 or W2 = Cool

Installation Note

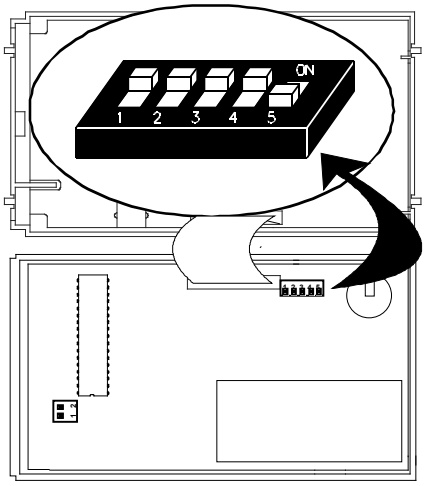
For proper calibration and monitoring, the wireless module within this device must be enabled upon installation AND left ON during normal operation. However, before enabling the wireless module, the device MUST be given a unique address (NOT 0).

1. Power the device.
2. Set unique address. (details on page 4)
3. Move ZigBee jumper to ON position. (see diagram to left)
4. Close cover and allow device to come up to operating temp. (approx 15 min.)
5. Verify calibration and make adjustments in software as needed.

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.
8. Add 500Ω resistor (included in bag) to convert 0/4 to 20mA to, 0/2 to 10 VDC.

Setup

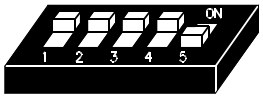
Note: If using remote sensor(s), the calibration may need to be adjusted. See “Checkout and Troubleshooting” section.



SENSOR SELECTION

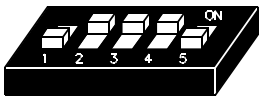
The dipswitches in the cover (shown above connected with ribbon cable) as well as the programming must be set when using remote room, discharge, and/or outdoor sensors. Use the following guide to determine the dipswitch settings for your application.

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



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

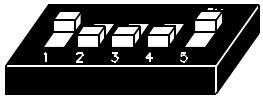
Using built-in room sensor with outdoor air sensor only.



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

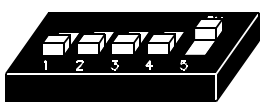
Using remote room sensor only.

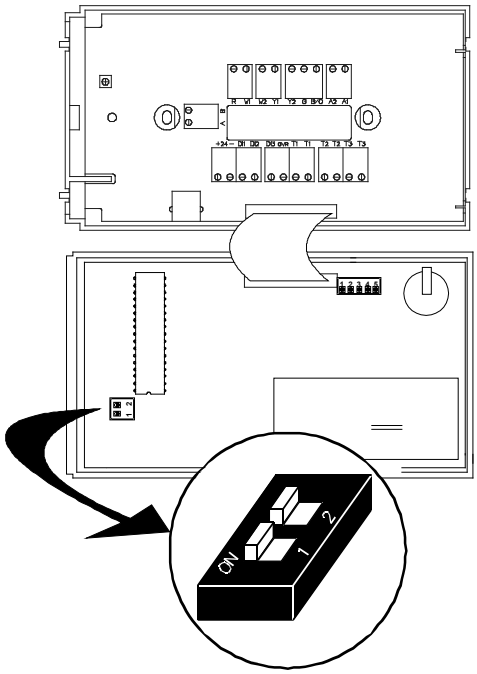
Using remote room sensor with discharge air sensor only.



Using remote room sensor with outdoor air sensor only.

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

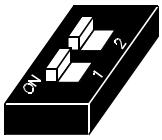




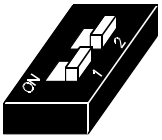
KEYPAD ACCESS

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.)

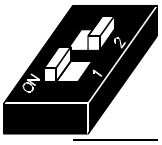
Keypad access to both programming and clock setup. (This is the default setting.)



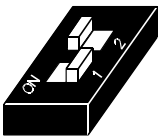
No keypad access to programming or clock setup.



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 dipswitches), 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 SZW118 may be programmed through the display and keypad, or with a PC.

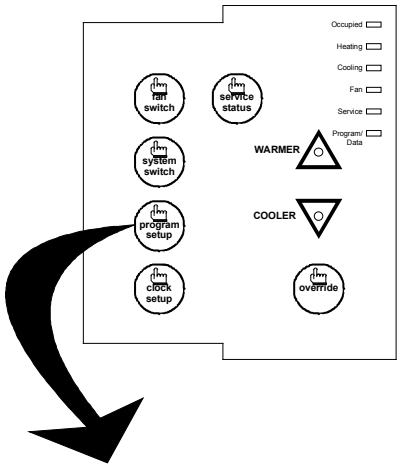
If programming with a PC, the following must be set through the keypad prior to programming:

- Baud Rate (step #3)
- Address (step #2)
- Temperature scale (step #4)

Once those values have been programmed, enable the ZigBee wireless communications by moving the jumper to pins 1+2. See Diagram on page 3 for details. 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 dip-switches, 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 SZW118, set a unique address from 1 to 255.

4. SET BAUD RATE: 9.6k — **Communication Baud Rate Screen.** If using a PC to do programming, *all controllers on a network must be set to the same baud rate*. Choose between 2.4K, 4.8K, 9.6K and 19.2K.

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

6. 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.

7. 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.

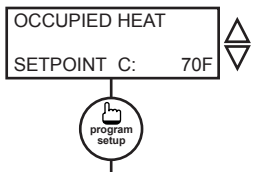
8. USER ACCESS TO FAN MODE?: YES — **Fan Access Screen.** Choose whether or not to enable the user's access to the fan switch to set the occupied fan mode.

9. SET OCCUPIED FAN MODE: AUTO — **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.

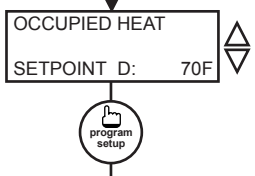
10. SET UNOCCUPIED FAN MODE: AUTO — **Unoccupied Fan Mode Screen.** Choose from AUTO or COOL for fan run times in the unoccupied mode.

11. OCCUPIED HEAT SETPOINT A: 70F — **Occupied Heat Setpoint Screen A.** Set the occupied heat setpoint A.

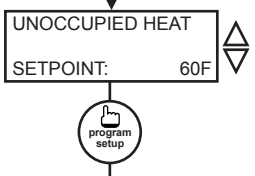
12. OCCUPIED HEAT SETPOINT B: 70F — **Unoccupied Heat Setpoint Screen B.** Set the unoccupied heat setpoint B.

13. 

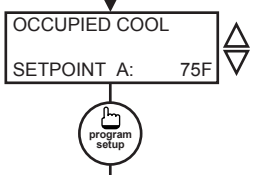
Occupied Heat Setpoint Screen C. Set the occupied heat setpoint C.

14. 

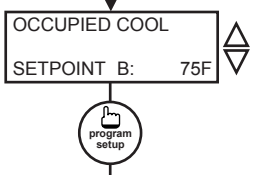
Unoccupied Heat Setpoint Screen D. Set the unoccupied heat setpoint D.

15. 

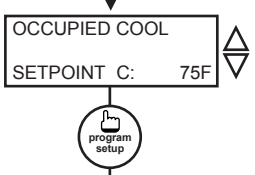
Unoccupied Heat Setpoint Screen. Set the unoccupied heat setpoint.

16. 

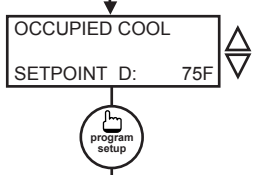
Occupied Cool Setpoint Screen A. Set the occupied cool setpoint A.

17. 

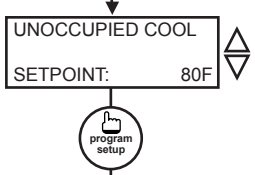
Occupied Cool Setpoint Screen B. Set the occupied cool setpoint B.

18. 

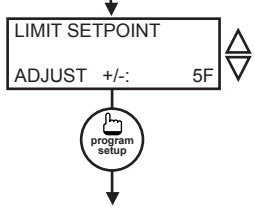
Occupied Cool Setpoint Screen C. Set the occupied cool setpoint C.

19. 

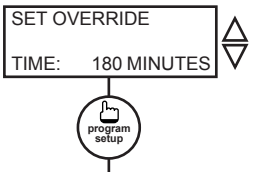
Occupied Cool Setpoint Screen D. Set the occupied cool setpoint D.

20. 

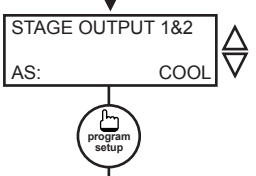
Unoccupied Cool Setpoint Screen. Set the unoccupied cool setpoint.

21. 

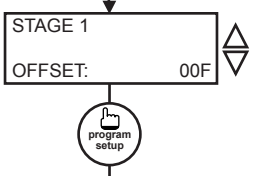
User Setpoint Limit Screen. Enter the number of degrees you want the user to be allowed to change the preset occupied setpoints up or down.

22. 

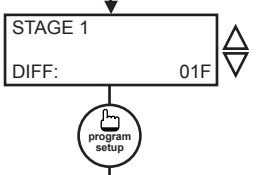
Override Time Screen. Enter the number of minutes (0 to 255) that the SZW118 will maintain occupied setpoints when overridden.

23. 

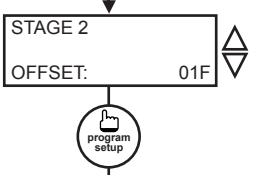
Stage Mode Screen. Choose whether stages 1 and 2 perform heating or cooling functions, Heat & Cool or whether both stages are to be disabled.

24. 

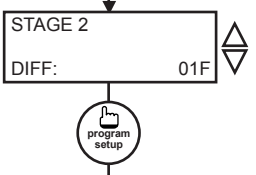
Stage 1 Offset Screen. Enter an offset value for stage 1. First stage is normally 0 offset. This screen does not appear if stage outputs 1 and 2 are disabled.

25. 

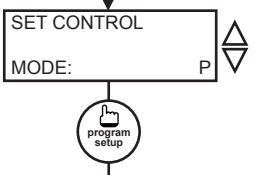
Stage 1 Differential Screen. Enter a differential value for stage 1. This screen does not display if stage outputs 1 and 2 are disabled.

26. 

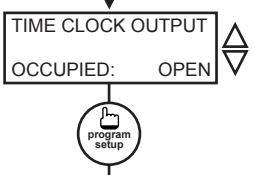
Stage 2 Offset Screen. Enter an offset value for stage 2. This screen is not displayed if stage outputs 1 and 2 are disabled.

27. 

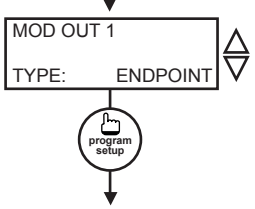
Stage 2 Differential Screen. Enter a differential value for stage 2. This screen is not displayed if stage outputs 1 and 2 are disabled.

28. 

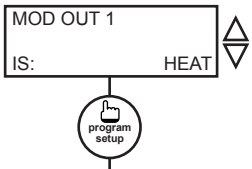
Control Mode Screen. Enter whether you want to control by temperature only (P) or add a time factor (P+I). This is applies to both the stage outputs.

29. 

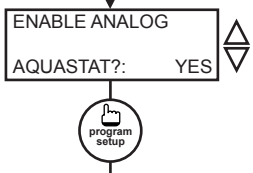
Time Clock Output Screen. Choose whether the auxiliary output will be OPEN during occupied periods (and closed during unoccupied periods) or CLOSED during occupied periods (and open during unoccupied periods).

30. 

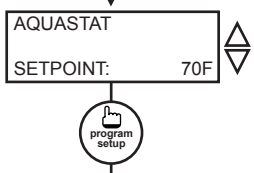
Modulating Output 1 Type Screen. Choose whether the modulating output will use Endpoint or Midpoint Control.

31. 

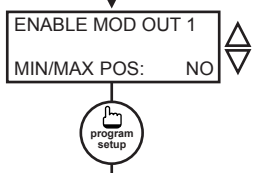
Modulating Output 1 Define Screen. Choose whether modulating output one is used for heat, cool or aquastat.

32. 

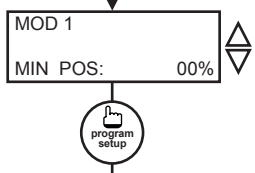
Analog Aquastat Selection Screen. If you wish to use the aquastat function, you must select YES to this sceen. (This screen is not shown if step 31 is not programmed for aquastat)

33. 

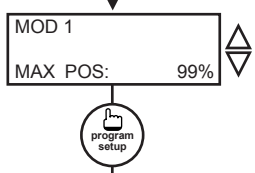
Analog Aquastat Input Screen. Choose the setpoint to distinguish when hot or cold water or discharge is available. If the discharge temperature is below this setpoint, analog output 1 will do cooling. If the discharge temperature is above this setpoint, analog output 1 will do heating. (This step is not shown if step 31 is not programmed for aquastat)

34. 

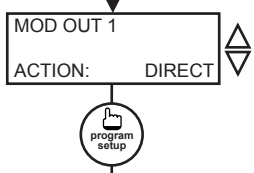
Minimum / Maximum Position. Selection Choose whether to set a min or max position for analog output 1.

35. 

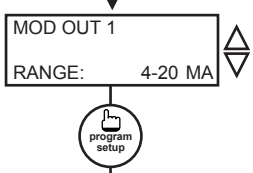
MOD 1 Minimum Position Screen. Set the min position for analog output 1. (This screen is not shown if step 34 is programmed for NO.)

36. 

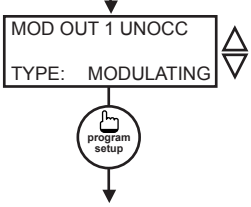
MOD 1 Maximum Position Screen. Set the max position for analog output 1. (This screen is not shown if step 34 is programmed for NO.)

37. 

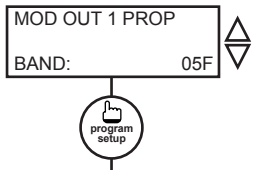
Modulating Output 1 Action Screen. Choose whether the output will be direct or reverse acting. (When DI2 is set to AQUASTAT in step 59, the output will automatically reverse action when DI2 is closed).

38. 

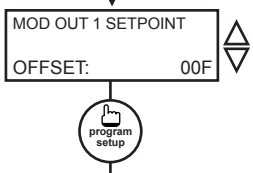
Modulating Output 1 Range Screen. Choose whether the modulating output range will be 0-20 mA or 4-20 mA.

39. 

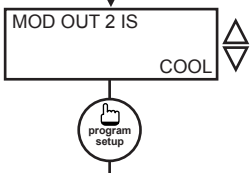
Modulating Output 1 Unoccupied Action Screen. Choose whether the unoccupied action will be modulating, 0 or 4 mA, or 20 mA.

40. 

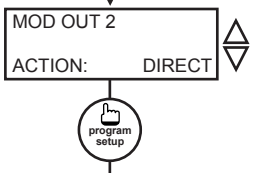
Modulating Output 1 Proportional Band Screen. Enter the number of degrees away from the setpoint that the valve or damper will be fully open.

41. 

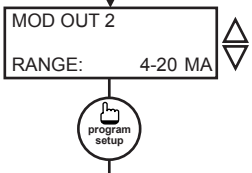
Analog Output 1 Setpoint Offset Screen. Enter a setpoint offset. This is a value below the heating setpoint or above the cooling setpoint where the analog output begins to modulate.

42. 

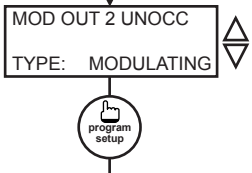
Modulating Output 2 Type Screen. Choose whether the modulating output 2 will be used for heating or cooling.

43. 

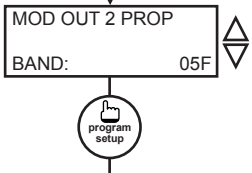
Modulating Output 2 Action Screen. Choose whether the output will be direct or reverse acting.

44. 

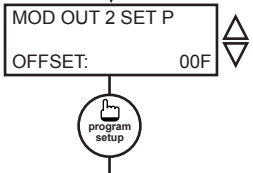
Modulating Output 2 Range Screen. Choose whether the modulating output range will be 0-20 mA or 4-20 mA.

45. 

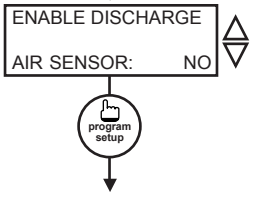
Modulating Output 2 Unoccupied Action Screen. Choose whether the unoccupied action will be modulating, 0 or 4 mA, or 20 mA.

46. 

Modulating Output 2 Proportional Band Screen. Enter the number of degrees away from the setpoint that the valve or damper will be fully open.

47. 

Analog Output 2 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.

48 

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.

49. 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.)

50. DISCHARGE AIR / HIGH LIMIT: 125 F

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.)

51. CONTROL BASED / ON: SPACE

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.)

52. ENABLE HEATING / LOW LIMIT: YES

Discharge Air Enable Heating Low Limit Screen. Choose wether to enable Heating Low temperature Limit. (This screen will not appear if control is based on space temperature.)

53. DISCHARGE AIR / SETPOINT: 75F

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.)

54. RESET RATIO / FACTOR: 2.0

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. (This screen will not appear if the control is based on space temperature.)

55. ENABLE OUTDOOR / AIR SENSOR?: NO

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.

56. COOLING LOCKOUT / TEMP: 60F

Cooling Lockout Screen. Enter an outdoor air cooling lockout temperature. This screen will not appear if the outdoor air sensor function is disabled. **Do not use with Zoning System.*

57. HEATING LOCKOUT / TEMP: 70F

Heating Lockout Screen. Enter an outdoor air heating lockout temperature. This screen will not appear if the outdoor air sensor function is disabled. **Do not use with Zoning System.*

Note: **The SZW118 does not have physical DI's, only virtual for programming steps 58 - 61. You are programming how you want the DI's to affect control. If you through software change the state of DI or connect and "marry" a SZW244 to the unit.**

58. DI1 USED FOR: / FAN PROVING

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

59. DI2 USED FOR: / SERVICE

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

60. SET DI2 SETPOINT / SHIFT: 00F

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

61. DI3 USED FOR: / FILTER SERVICE

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

62. DELAY ON POWERUP: / 010 SECONDS

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.

63. ENABLE SMART / RECOVERY: NO

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.*

64. REQUIRE CODE FOR / PROGRAMMING?: YES

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.

65. REQUIRE CODE FOR / CLOCK/SCHED: YES

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.

66. SET ACCESS:
CODE: 000

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.

program setup

MON
12:00 AM 72F

Main Monitoring Screen.

Setting Clock & Schedule

The SZW118 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.

clock setup

MON
12:00 AM 72F

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

clock setup

1. ENTER ACCESS:
CODE: 000

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.

clock setup

2. SET TIME & DAY:
12:00 AM MON

override

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

clock setup

3. SET OCCUPIED:
TIMES MONDAY: 000

Schedule Announcement Screen. Announces the next screen.

clock setup

4. A: 08:00 TO 17:00
B: 00:00 TO 00:00

override

Occupied Times Screen. Set hours and minutes of start and end times for occupied periods A + B.

clock setup

5. C: 00:00 TO 00:00
D: 00:00 TO 00:00

Occupied Times Screen. Set hours and minutes of start and end times for occupied periods C + D.

clock setup

The following screens are repeated for Wednesday, Thursday, Friday, Saturday and Sunday.

6. SET OCCUPIED
TIMES TUESDAY

Schedule Announcement Screen. Announces the next screen.

clock setup

7. COPY MON FOR
TUE? YES

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

clock setup

8. A: 08:00 TO 17:00
B: 00;00 TO 00;00

override

Occupied Times Screen. Set hours or minutes of start and end times for occupied periods A + B.

clock setup

9. C: 00:00 TO 00:00
D: 00;00 TO 00;00

Occupied Tim-es Screen. Set hours or minutes of start and end times for occupied periods C + D.

clock setup

MON
12:00 AM 72F

Main Monitoring Screen.

Operation

UNOCCUPIED SETBACK

The SZW118 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 using the button on the face of the thermostat or through momentary contacts wired into the OVR terminal. The amount of time the unit will be overrid-

den is set from 0 to 255 minutes in the programming screen. This override behaves differently depending on the mode the thermostat is operating in (occupied or unoccupied) and the options that have been enabled within the software.

In standard mode, the override only activates in unoccupied mode and takes the thermostat into occupied mode. If "Override for Occupied Period" is enabled using the software, the override also activates in occupied mode and takes the thermostat into unoccupied mode. In either case, you are able to view the time remaining in the override period both within the software and by using the service button to scroll through the status screens. If the occupant desires to return the thermostat to unoccupied or occupied operation (depending on how the override was used) before the override time remaining elapses, they may press the override button again.

Additionally, an "Override Hold" feature is built into the thermostats. When in unoccupied mode, pressing the override once and then pressing/holding it for 5 seconds puts the thermostat into a "hold" mode (the override LED on the thermostat will flash quickly to confirm the mode change). In this mode, the override setpoints are used until the next occupied period is reached or until the thermostat is manually taken out of the "hold" mode by pressing the override button again. This feature also works when the "Override for Occupied Period" is enabled BUT starting from the occupied mode and holding the thermostat in the unoccupied state.

A continuous override is available through the DI3 contact or the software. 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.

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 SZW118 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 #48 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 #49 and #50. 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 SZW118 can use a remote discharge temperature sensor for changeover from heating to cooling based on the ANALOG SETPOINT set in step #25.

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 SZW118 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 #48, the discharge air sensor must be enabled. In programming step #51, the control must be based on DISCHARGE air.

In programming screen #53, 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 #54, 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 SZW118 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 #55 only if you are using an outdoor air sensor and you want to enable the outdoor air heating and cooling lockout functions (Do not use with Zoning System). 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 #56 and #57. 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).

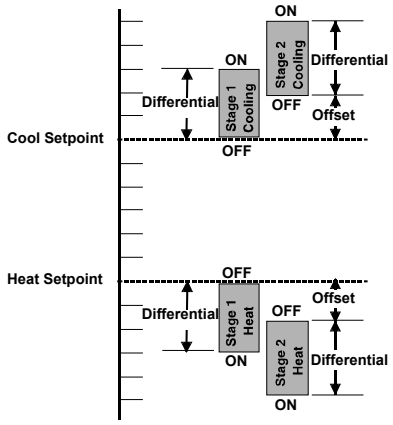
FAN PROVING

The SZW118 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 SZW118 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

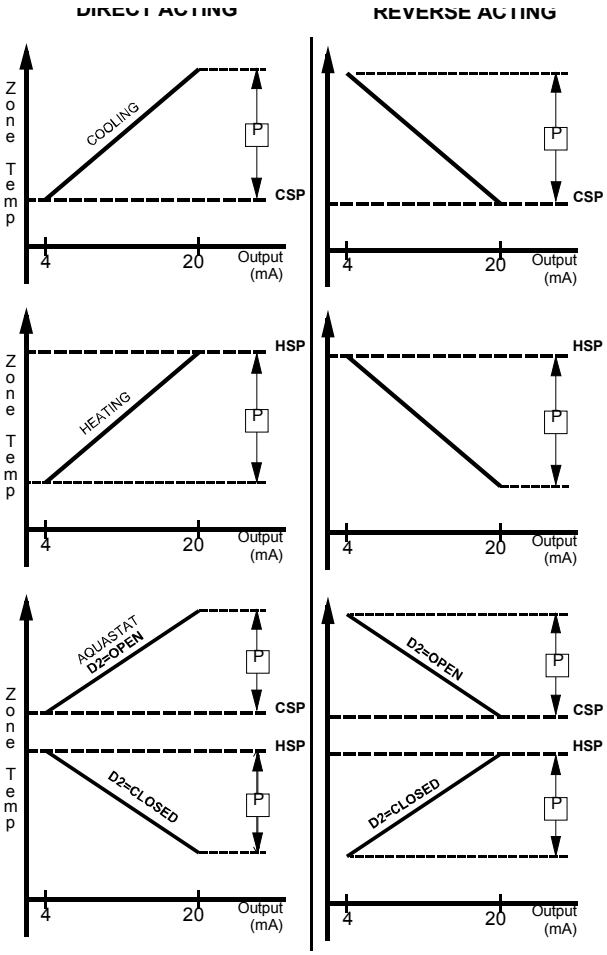


The SZW118 will control up to two stages of either heating or cooling.

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 #30 through #41 to program the operating parameters for analog output 1. Use programming steps #42 through #47 to program the operating parameters for analog output 2.



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 SZW118 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 set-

point 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 SZW118 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 SZW118 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.

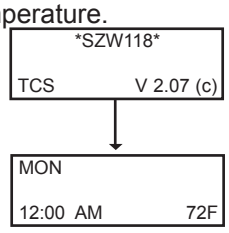
Checkout & Troubleshooting

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 # 21 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 #21 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

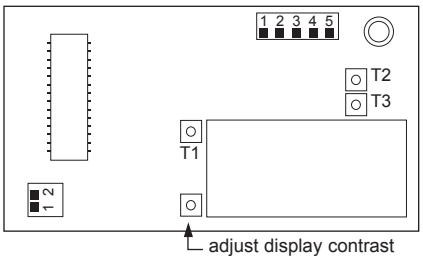
fan comes on. This is a check for a mechanical relay failure.

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

Initially, verify the wiring connections to check for problems (poor connections, opens, or shorts). If the temperature is at a minimum or maximum reading, check that the sensor dipswitch positions are correct as shown in the Setup section of this document. Also, verify the resistance reading for the sensor in question. A remote sensor should read 1080 to 1090 ohms at room temperature. The built-in sensor should read 108 to 109 ohms at room temperature. If any of the temperatures are still reading slightly high or low, you can add in a temperature offset (calibration) using Ubiquity or TCS Insight. In Ubiquity, you can edit the calibration offset for each temperature input (room, discharge, outdoor air, etc.) on the controller's programming page. For example, if the room temperature is reading 2 degrees high, you would subtract 2 from the existing offset in the room temperature calibration offset field and submit the page. In TCS Insight, the process is similar. Refer to the Calibrate Using TCS Insight Tech Bulletin # 1019 for details. As a last resort and only when directed to do so by TCS technical support, you may be able to use the onboard adjustment pots. Refer to the Thermostat Sensor Calibration Tech Bulletin # 1005 for details.



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.

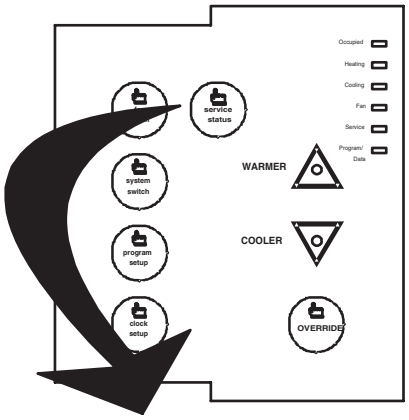
Analog Output Not Working Properly

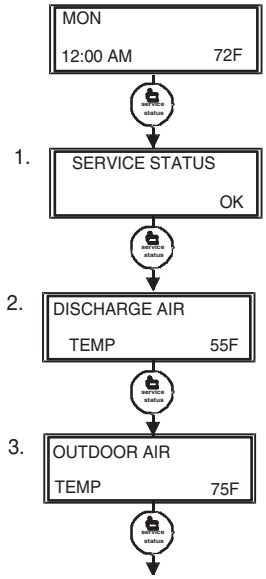
Check wiring. A separate transformer should be used for the SZW118 and a separate transformer should be used for the damper motor(s). Check to make sure that the analog output is programmed correctly.

Check the Service Menu. The Mod Out Screen will tell you what the SZW118 is trying to put out for an output. Compare this with the actual position of the heating or cooling device.

SERVICE SCREENS

Through repeated pressing of the SERVICE STATUS button, the service screens (shown here) are displayed, which enables you to monitor various functions of the Superstat.



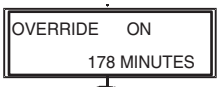


Main Monitoring Screen. Press the service button to access the following screens.

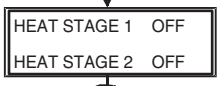
Service Screen. This message may be followed by any or all of the following: CHECK FILTER, CHECK FAN, DISCHARGE HIGH, DISCHARGE LOW, or CHECK DI2.

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

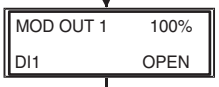
Outdoor Air Temperature Screen. Shows outdoor air temperature if sensor is used.

4. 

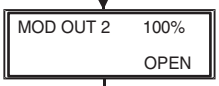
Override Status Screen. Shows whether the override is active and if so, how many minutes remaining.

5. 

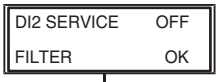
Heat or Cool Stages Status Screen. Shows the status of the first and second stages of heating or cooling.

6. 

Mod Out and DI1 Screen. Shows the percentage of modulating output 1 and the status of the fan interlock, or DI1.

7. 

MOD OUT 2 Screen. Shows the percentage of modulating output 2.

8. 

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

Main Monitoring Screen.

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.

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 # 21.

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 # 22.

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 #8.

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 #6.

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 # 65, or access may be denied altogether using dipswitches described in the setup section.

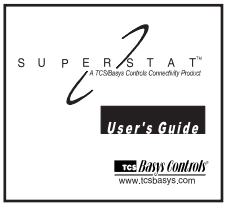
PROGRAMMING

The ability to program control parameters is allowed by factory default. An access code may be required as set in programming step # 64, or access may be denied altogether using dipswitches described in the setup section.

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.



TCS Basys Controls

ZigBee Wireless

EZ Installation Instructions for TCS ZigBee wireless devices

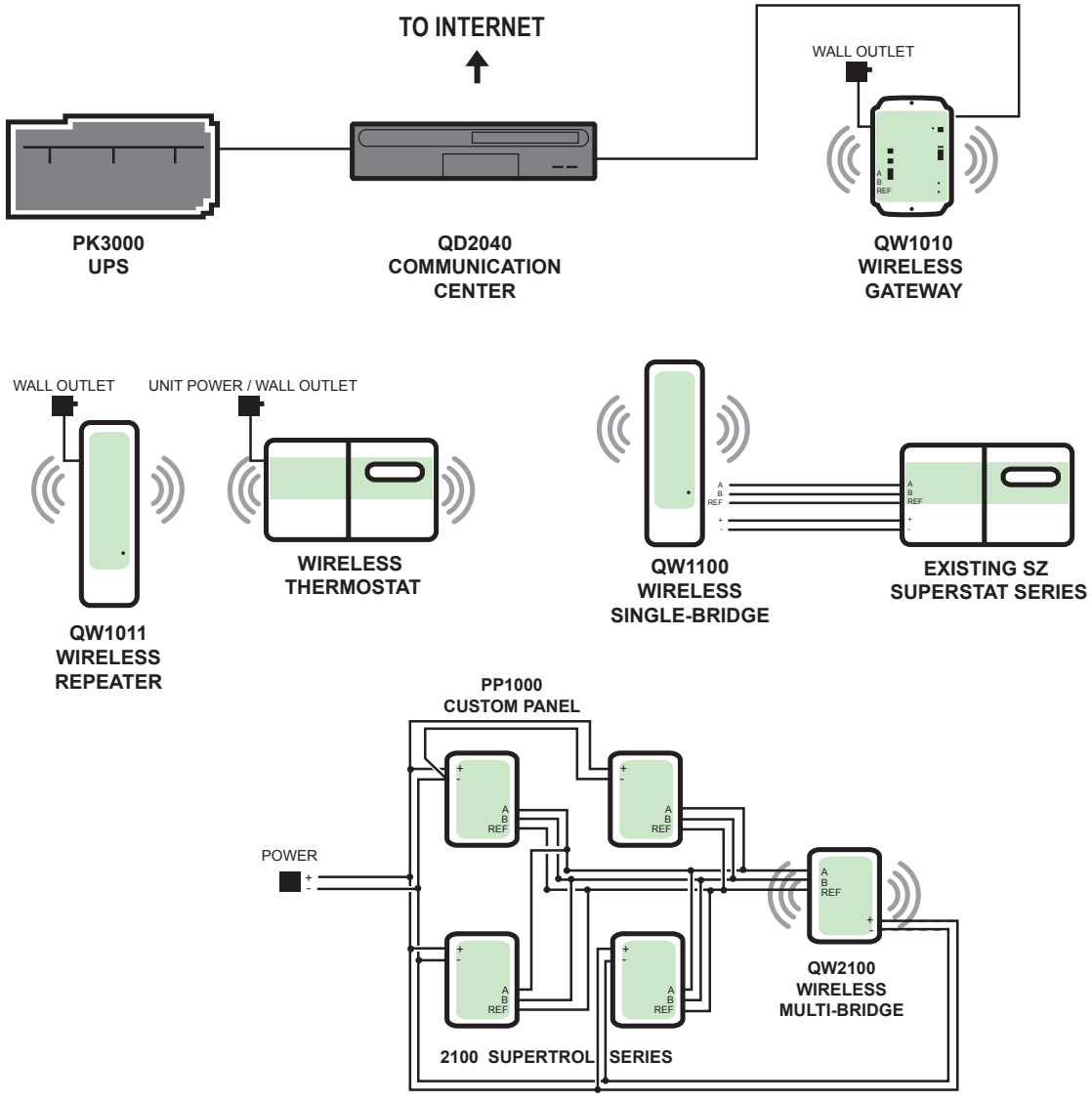
1. Install all SZ10xxW and SZW series controllers and QW2100 series devices. Ensure that you have a unique RS485 address programmed in each controller. Insert the ZigBee module.

2. Install the QW1010, give the ZigBee network 1 minute per controller to mesh before connecting to the QD2040-MAX.

3. Install the QD2040-MAX, PK3000 and then wire the QW1010 to the QD2040-MAX.

4. Log into www.ubiquitysystems.net or a stand-alone QD2040-MAX and, using Ubiquity, or connect using InSight verify that all controllers are communicating.

5. If any controller(s) is (are) not communicating it may require a QW1011 wireless repeater nearby to connect to the ZigBee network.



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NOTE: max distance for indoor ZigBee wireless network is 150' to 500' depending on conditions.

The ZigBee wireless network supports 40 wireless nodes (including Gateway, Bridges & Repeaters)

PP1000
Custom panel

PK3000
UPS

QD2040
Embedded site communication center

QW1010
Wireless Gateway

QW1011
ZigBee wireless indoor repeater

QW1100
ZigBee wireless bridge - single device

QW2100
ZigBee wireless bridge - multi device supports up to 32 hard wired controllers/devices

SW Superstat Series
ZigBee wireless thermostat (SZ10xxW series)

SW133
ZigBee wireless thermostat

SW244
ZigBee wireless unit board - Input

SZ Superstat Series
Hard-ware thermostat (SZ10xx series)

2100 Supertrol Series
SL21xx + SZ21xx series controllers

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