SPECIFIED CONTROLS

Commercial Zone Control System
Modulating or Two-position

SC-Z20 (Version 2001)

Installation Manual

SPECIFIED CONTROLS

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OVERVIEW

The SC-Z20 (Version 2001) is a commercial, modulating forced air zone control system that allows a single HVAC unit to have up to 20 individual zones. Each zone is controlled by a proprietary space thermostat that wires to a factory mounted actuator board located on a master damper or diffuser serving the zone. The actuator board also wires back to the SC-Z20 logic panel which receives calls from each zone thermostat for either heating or cooling and controls the HVAC equipment based on a selected control sequence configuration.

The SC-Z20 is compatible with 2 Heat / 2 Cool conventional or 3 Heat / 2 Cool heat pump systems. All low voltage wiring is 18 gauge thermostat wire and no computer is required to setup, configure or diagnose the system.

SEQUENCE OF OPERATION

SC-Z20 Panel:
The SC-Z20 controls the system fan and all stages of heating and cooling. During the occupied mode, the fan runs continuously. As calls for heating or cooling are received from the individual zone thermostats, the zone control panel establishes the equipment mode of operation based on a selectable *Majority Wins* or *Cooling Priority* control algorithm. In addition, the panel is equipped with *Minimum Call* selector switches designed to prevent the equipment from coming on until a minimum number of calling zones is reached. This feature helps prevent short equipment run times and minimizes high or low limit trip-out when only a few zones are calling. Refer to the Panel Setup and Scheduling section for configuration guidelines.

SC-Z20-T Zone Thermostat:
The SC-Z20-T zone thermostat is an integral part of the SC-Z20 zoning system. The thermostat not only signals the panel when the zone requires heating or cooling, but also controls the damper or diffuser serving the zone. The SC-Z20-T is a single setpoint thermostat and sends a signal to the SC-Z20 panel for heating or cooling when the temperature in the zone deviates 1.5° F above or below the setpoint. The thermostat can be configured for modulating or two-position damper control and interfaces with a duct sensor mounted in the master damper or diffuser to determine if the discharge air is usable for the call. If the discharge air temperature at the damper is warmer than 72° F, the thermostat will open the damper on a call for heating. If the discharge air temperature at the damper is below 72° F, the thermostat will open the damper on call for cooling. Refer to the Zone Thermostat Setup section for configuration guidelines.

DESIGN AND INSTALLATION GUIDELINES

[ ] Extra consideration should be given when applying any zone control system to a building that requires large amounts of cooling in the core zones during cold weather. Consider adding auxiliary heat to external zones or using one system for the core zones and one system for the external zones.
[ ] It is recommended that the system installation be limited to 25 tons of cooling capacity. Rooftop units with economizers and relief dampers are strongly recommended for building with core cooling loads.
[ ] Using zoning with oversized HVAC equipment is not recommended. This can cause short equipment run times and humidity problems.
[ ] Multi-stage equipment is recommended with zone control systems.
[ ] The pressure drop through zone dampers is negligible and not a factor when sizing branch runs.

DESIGN AND INSTALLATION GUIDELINES

[ ] Zone dampers are rated for applications not exceeding 2" w.c.

[ ] Zone dampers should be installed as far back from discharge air grills and diffusers. Flex duct should be used for the last 5 feet of each branch run.

[ ] Bypass dampers should be sized for 90% of the total system CFM.

[ ] The SC-Z20 panel should be located near an accessible location in the conditioned space and never mounted inside the rooftop unit.

[ ] The SC-Z20 system requires a separate 24VAC, 75VA transformer that provides power to the panel, zone thermostats and dampers. Never use the equipment transformer.

TYPICAL WIRING AND LAYOUT GUIDE

SC-Z20 PANEL LAYOUT

MODULATING 20 ZONE PANEL (Version 2001)
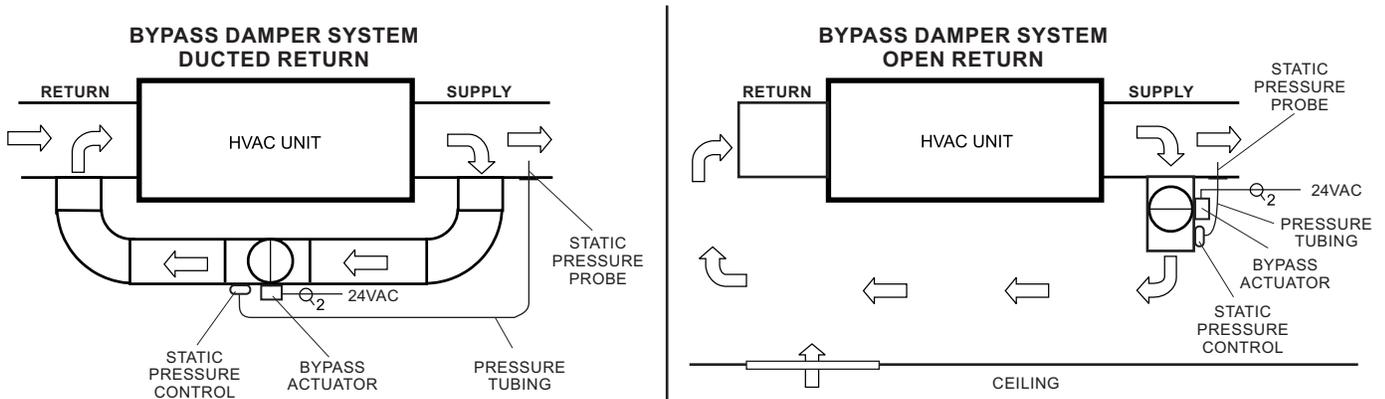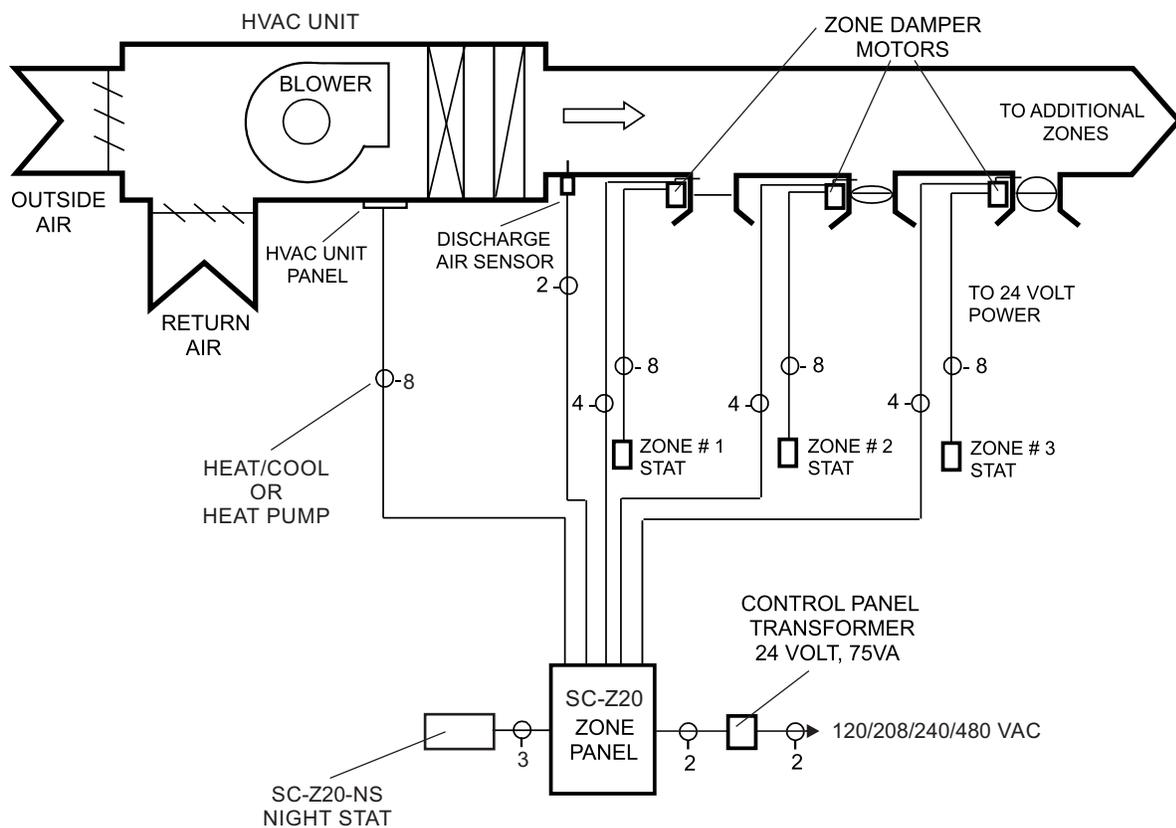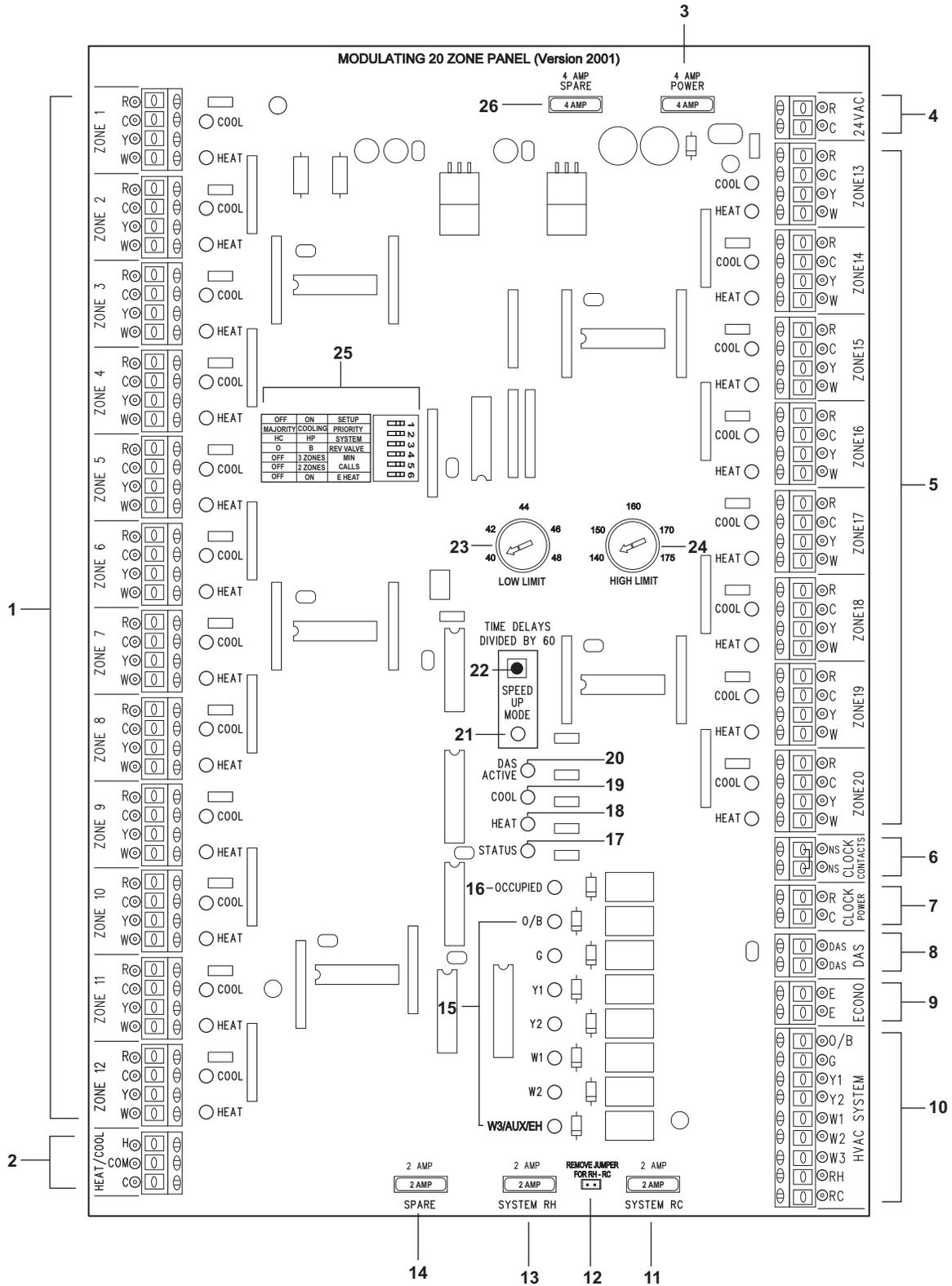
1. Zone 1-12 Thermostat Terminals with Heat/Cool LED Indication
2. Cool/Auto/Heat Terminals
3. 4 AMP System Power Fuse
4. 24VAC System Power Terminals (Input)
5. Zone 13-20 Thermostat Terminals with Heat/Cool LED Indication
6. Scheduling Clock Terminals (Factory Jumper Installed)
7. 24VAC Clock Power Terminals (Output)
8. Discharge Air Sensor Terminals
9. Economizer Terminals

10. HVAC System Terminals
11. 2 AMP RC Fuse
12. RH/RC Jumper
13. 2 AMP RH Fuse
14. 2 AMP Spare Fuse
15. HVAC System Status LEDs
16. Occupied LED
17. System Status LED

18. Heat Status LED
19. Cool Status LED
20. Discharge Air Sensor LED
21. Speed UP Mode LED
22. Speed UP Mode Button
23. Low Limit Adjustment
24. High Limit Adjustment
25. System Configuration Switches
26. 4 AMP Spare Power Fuse

5

SYSTEM WIRING

WARNING!
1. Turn power off to HVAC equipment and control panel during installation to prevent serious injury from electrical shock and/or damage to the system.
2. Use extreme care when making duct openings and handling sheet metal to avoid injury.
3. Install all components in a manner that provides easy access for test, check and startup.

CAUTION!
1. Installation of this system must be in compliance with all applicable codes.
2. HVAC system must be properly sized and balanced to assure optimum system performance.
3. An electronic bypass damper or VFD (Variable Frequency Drive) must be installed to maintain proper system static pressure.
4. All low voltage wire must be 18 gauge.
5. All wiring should be color coded and tagged for proper identification.

SC-Z20 PANEL WIRING

System Power
1. Wire a 24VAC, 75VA transformer to the 24VAC 'R' and 'C' terminals on the SC-Z20 panel.

TR-75 TRANSFORMER

HVAC System
2. Wire the HVAC equipment to the HVAC SYSTEM terminals on the SC-Z20 panel.
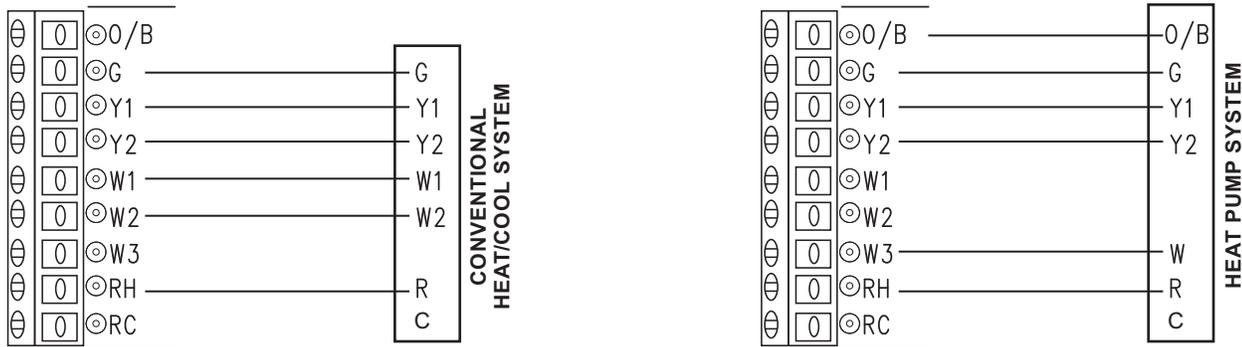
DO NOT WIRE EQUIPMENT COMMON TO PANEL

Discharge Air Sensor
3. Mount the SC-Z20-DAS Discharge Air Sensor in the main supply plenum as far down stream from the evaporator coil but prior to any duct transitions and dampers. Wire the discharge air sensor to the DAS terminals on the SC-Z20 panel.

SC-Z20-DAS

6
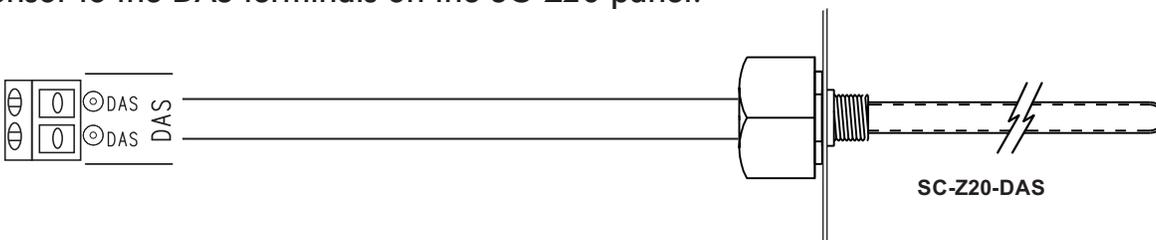
SYSTEM WIRING

Night Stat

4. Remove the factory jumper on the SC-Z20 panel from the NS CLOCK CONTACT terminals. Wire the SC-Z20-NS Night Stat as shown in the wiring diagram. The SC-Z20-NS Night Stat should be located in an area that represents the general load characteristics of the building. If the thermostat is located in an equipment room, a remote sensor may be required. In applications where 24 hour occupancy exists, a night stat may not be necessary.
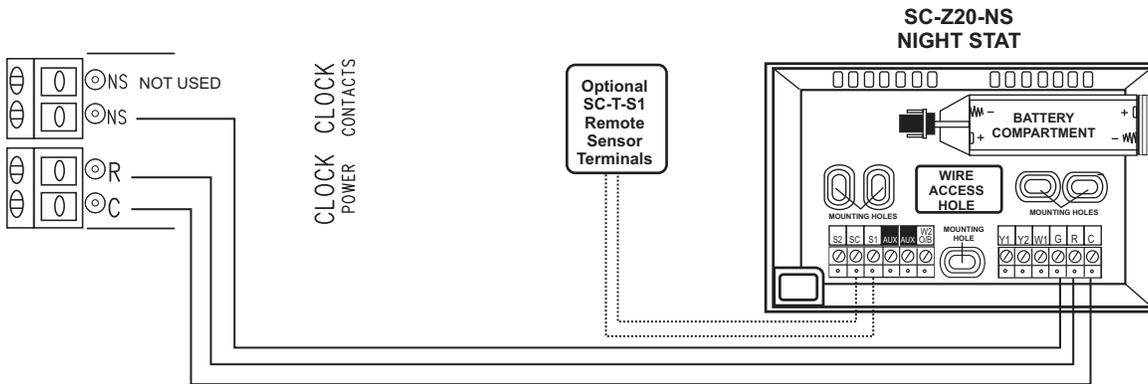
Economizer

If the HVAC unit has an economizer, the auxiliary contacts on the SC-Z20-NS Night Stat can be used with the ECONO contacts on the SC-Z20 panel so that the economizer is only energized during the occupied period. Wire the Night Stat as illustrated above and the ECONO terminals as illustrated below. Refer to the SC-Z20-NS Installation Manual on assigning the auxiliary contacts.
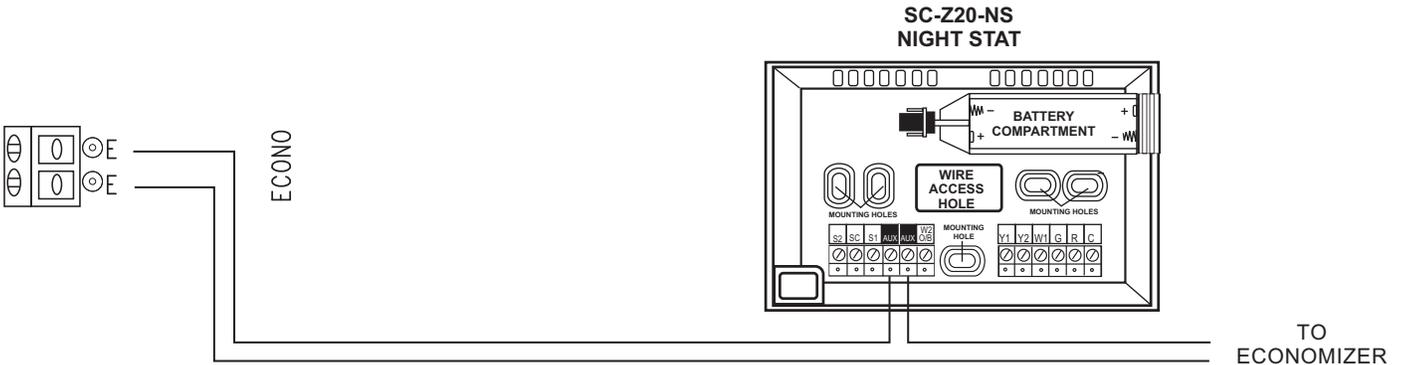
Heat/Auto/Cool Terminals

The SC-Z20 panel has a set of terminals that can be used to place the panel in heating only, cooling only or auto changeover mode. A simple jumper wire can be placed between the COM and H for heat only or, COM and C for cool only mode. If a jumper is not used, the panel is in Auto Changeover. The terminals can also be used with a 3-position selector switch for remote applications.
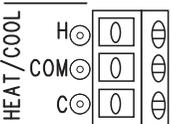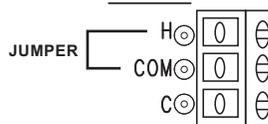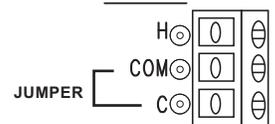
SYSTEM WIRING

Zone Damper Actuator Board

Each master zone damper has an actuator board mounted to the side of the damper motor or diffuser. Run 4-wire cable from the SC-Z20 panel to each zone actuator board as illustrated.

DAMPER OR DIFFUSER MOTOR

ACTUATOR BOARD

SC-Z20 PANEL

DUCT SENSOR
(10K OHMS @77°)
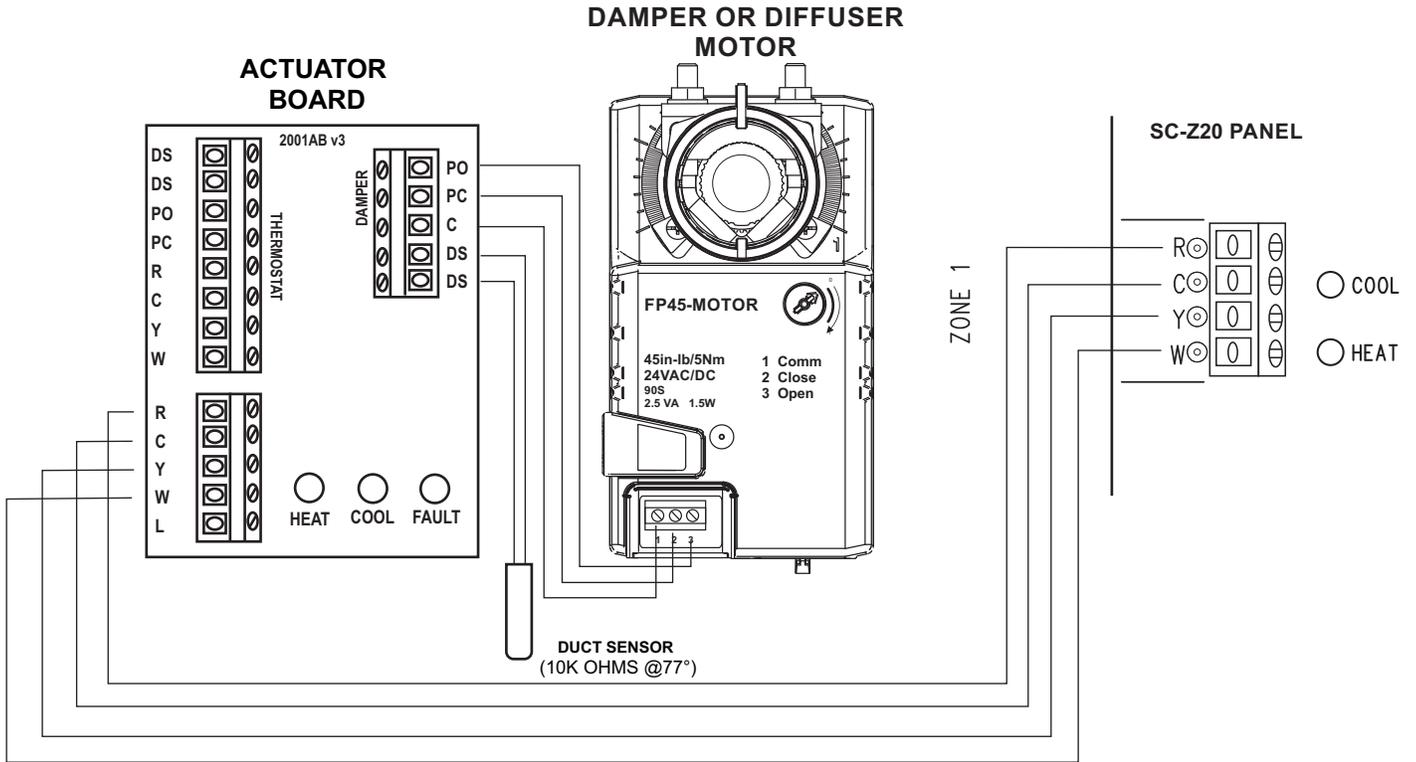
SC-Z20-T Zone Thermostat Wiring

Each SC-Z20-T zone thermostat wires to its master zone damper actuator board. Run 8-wire cable from the thermostat subbase terminals to the actuator board as illustrated.

SC-Z20-T
AUTO CHANGEOVER
SPACE THERMOSTAT

ACTUATOR BOARD

DAMPER OR DIFFUSER MOTOR

Terminal	Description
DS	DUCT SENSOR
DS	DUCT SENSOR
PO	DAMPER OPEN (24VAC)
PC	DAMPER CLOSED (24VAC)
R	24VAC POWER (HOT)
C	24VAC POWER (COMMON)
Y	CALL FOR COOL (24VAC)
W	CALL FOR HEAT (24VAC)

TO Z-20 PANEL

DUCT SENSOR
(10K OHMS @77°)
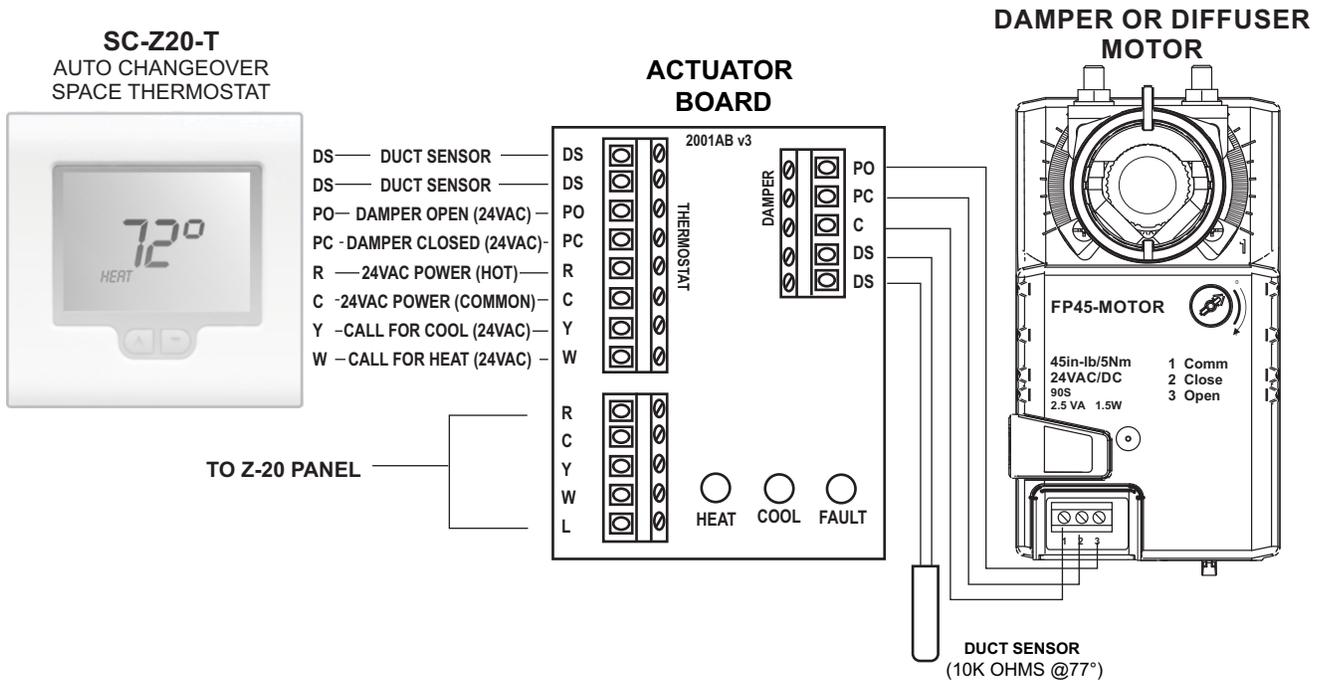
SYSTEM WIRING

ZONE THERMOSTAT WIRING WITH ELECTRIC DUCT HEATER OR BASEBOARD ELECTRIC

SC-Z20-T with Electric Duct Heater
There are two wiring options when using an electric duct heater in a zone.

Option1. A DPDT relay can be used to bring on the electric heat and drive the damper open without relocating the duct sensor. A 15K Ohm resistor must be wired to one side of the relay contact so that when the relay is energized, the resistor will be in parallel with the duct sensor. This will change the ohms value, translating to a higher duct temperature which will drive the damper open.

Option 2. The duct sensor can be relocated after the electric duct heater. A SPDT relay with a 24 volt coil can be applied and the coil wired to terminals C and W on the actuator board. Remove the factory jumper. The relay contacts are wired in series with the duct heater terminals.
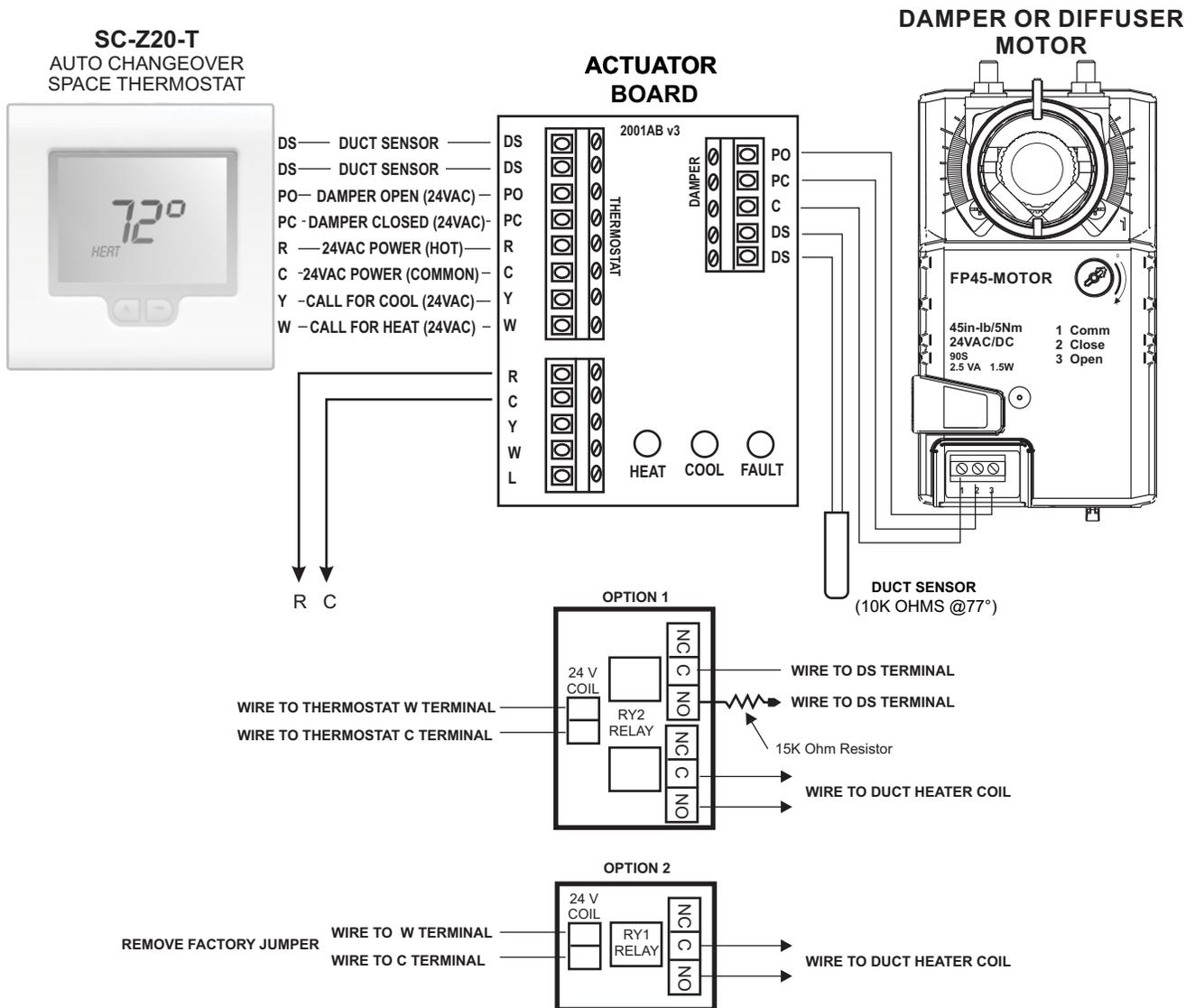
SC-Z20-T with Electric Baseboard Heat
Option 2 above would apply for electric baseboard heat with the exception that the duct sensor would not have to be relocated. The contact rating of the relay must be determined for the specific electric baseboard application.

PANEL SETUP

The SC-Z20 panel has a row of slide switches that are used to configure the panel for the specific equipment application along with other options. Switch definitions are as follows:

OFF	ON	SETUP
MAJORITY	COOLING	PRIORITY
HC	HP	SYSTEM
O	B	REV VALVE
OFF	3 ZONES	MIN
OFF	2 ZONES	CALLS
OFF	ON	E HEAT
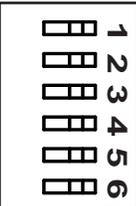
Switch 1 - Priority:
> **OFF = Majority**
> When the Priority switch is placed in the OFF position, the panel treat calls for heating and cooling based on a Majority Wins control algorithm. This means that the panel will energize the equipment in the mode that represents the greatest number of calls. In the event of a tie, cooling will receive priority.
> **ON = Cooling**
> When the Priority switch is placed in the ON position, the panel gives priority to any cooling call regardless how many heating calls are taking place.

Switch 2 - System:
> **OFF = HC**
> When the System switch is placed in the OFF position, the panel is configured for conventional heating/cooling systems with up to 2 stages of heat and 2 stages of cooling.
> **ON = HP**
> When the Priority switch is placed in the ON position, the panel is configured for heat pump systems with up to 3 stage heat / 2 stage cool.

Switch 3 - Rev Valve: (Applies to heat pump operation only)
> **OFF = O**
> In heat pump configuration, when the Rev Valve switch is OFF, the reversing valve will energize on a call for cooling.
> **ON = B**
> In heat pump configuration, when the Rev Valve switch is ON, the reversing valve will energize on a call for heating.

Switch 4 and 5 - Min Call:
> **4 OFF and 5 OFF = No Minimum Call Requirement**
> When both Min Call switches are OFF, any single zone can initiate an equipment call.
> **4 ON and 5 OFF = 2 Zones**
> When switch 4 is ON and switch 5 is OFF, at least two zones must be calling in the same mode before the panel will energize the equipment.
> **4 OFF and 5 ON = 3 Zones**
> When switch 4 is OFF and switch 5 is ON, at least three zones must be calling in the same mode before the panel will energize the equipment.
> **4 ON and 4 ON = 5 Zones**
> When both switch 4 and 5 are ON, at least five zones must be calling in the same mode before the panel will energize the equipment.

Switch 6 - E Heat (Applies to heat pump operation only)
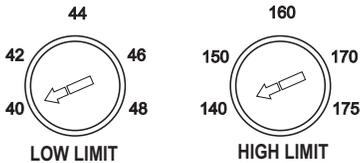> **OFF = No Emergency Heat**
> When switch 6 is OFF, the panel uses the compressor(s) and auxiliary heat for normal heating
> calls.
> **ON = Emergency Heat**

PANEL SETUP

High and Low Limit Settings
The panel has adjustable High and Low Limit potentiometers. When the low or high limit discharge air setpoint is reached, the panel will lock out the equipment while maintaining fan operation and initiate a time delay before the equipment is allowed to come back on. In conventional heating and cooling configuration, the time delay only applies to the cooling cycle. In heat pump configuration, the time delay applies to both heating and cooling.

```
        44                      160
  42         46          150         170

  40         48          140         175
     LOW LIMIT              HIGH LIMIT
```

NIGHT STAT SETUP AND SCHEDULING

OVERVIEW:
The SC-Z20-NS programmable touchscreen thermostat can be used for occupied and unoccupied scheduling of the SC-Z20 panel. When wired and configured properly, the thermostat takes the place of a separate 7-day clock, night stat and override timer. The SC-Z20-NS Programmable Fan option is used to trigger the 'G' fan relay to open or close the Clock Contact 'NS' terminals on the SC-Z20 panel that places the system in the occupied or unoccupied mode of operation. The thermostat can also be used with a SC-Z20-S1 Indoor Remote Sensor. 24 volt power to the thermostat is supplied by the SC-Z20 panel through dedicated Clock Power terminals 'R' and 'C'. The thermostat also has battery backup to maintain the real-time clock in the event of a power failure. The thermostat can be configured to provide 7-day scheduling with 2 or 4 events per day. For commercial schedules, 2 events per day is typical.

HOW IT WORKS:
The SC-Z20-NS does not control the HVAC equipment and only uses the 'G' fan relay to set the Z-2000 panel in either the occupied or unoccupied mode. This is accomplished by using the Programmable Fan option so that the fan relay is energized during occupied mode (Always On) and de-energized during unoccupied mode (Automatic). When in Automatic mode, the fan relay will only energize when the temperature falls below or rises above the programmed unoccupied heating and cooling setpoints.

RECOMMENDED SETUP:
After mounting and wiring the thermostat subbase to the SC-Z20 panel, follow the recommended setup and scheduling steps.

SYSTEM SWITCH SETTINGS:
The SC-Z20-NS contains a set of four system switches located on the printed circuit board on the back of the thermostat. Make sure the system switches are set as follows:

      Sw 1 = OFF
      Sw 2 = ON
      Sw 3 = ON
      Sw 4 = OFF

NIGHT STAT SETUP AND SCHEDULING

INSTALLER SETUP MENU CHANGES:
After the thermostat is powered up, touch and hold both the **Clock** and **Mode** section for 5 second to enter the Installer Menu. Touch **Next** to advance forward through the menu or touch **Back** to backup.

REQUIRED MENU CHANGES:

02= 2   (Program Schedules)
04 = 1   (Programmable Fan)

DAYLIGHT SAVING TIME:
The Z-20-NS default setting compensates for Daylight Saving Time. In areas of the country where DST is not observed, the feature can be disabled by entering Installer Menu 30. Touch the **UP** or **DOWN** arrows to change the selection to 0.

After the changes have been made, touch and hold **N**ext until the thermostat exits the Installer menu. All changes will be stored in non-volitile memory.

SETTING THE CLOCK AND DAY OF WEEK:
It is important that the time of day and day of the week is set properly so that occupied and unoccupied programs start on time.
1. Touch the **Clock** until the hour flashes. Tap the **UP** or **DOWN** arrow to select the hour. Note: Make sure hour is correctly set for AM or PM.
2. Touch **Clock** again and the minutes will flash. Tap the **UP** or **DOWN** arrow to select the correct minutes.
3. Touch **Clock** again and month will flash. Tap the **UP** or **Down** arrow to select the correct month.
4. Touch **Clock** again and the day will flash. Tap the **UP** or **Down** arrow to select the day of the month.
5. Touch **Clock** again and the year will flash. Tap the **UP** or **Down** arrow to select the year.
6. To exit the menu, touch **Clock** again. The proper day of the week will automatically be displayed with the clock and calendar.

PROGRAMMING EVENTS:
When the thermostat is configured to provide 2 schedules per day (Occupied/Unoccupied), 7 day per week, each event is displayed on the LCD as **DAY** (Occupied) and **NIGHT** (Unoccupied).
1. Touch **Program** until **Mon** (Monday) flashes.
2. Tap **Program** again until the hour flashes and **Day** is displayed on the LCD. Use the **UP** or **DOWN** arrow to set the hour start time. Note: Make sure hour is correctly set for AM or PM.
3. Tap **Program** again until the minutes flash. Use the **UP** or **DOWN** arrow to set the minutes.
4. Tap **Program** again and the heating setpoint will flash. Leave the setpoint at the factory default.
5. Tap **Program** again and the cooling setpoint will flash. Leave the setpoint at the factory default.
6. Tap **Program** again and the fan option **Automatic** will flash. Use the **UP** or **DOWN** arrow to set the fan option to **Always On**.

NIGHT STAT SETUP AND SCHEDULING

7. Tap **Program** again until the hour flashes and **Night** is displayed on the LCD. Use the **UP** or **DOWN** arrow to set the hour start
   time. Note: Make sure hour is correctly set for AM or PM.

8. Tap **Program** again until the minutes flash. Use the **UP** or **DOWN** arrow to set the minutes.

9. Tap **Program** again and the cooling setpoint will flash. You can use the **UP** or **DOWN** arrow to change the cooling setpoint or
   use the factory default of 78 degrees.

10. Tap **Program** again and the heating setpoint will flash. You can use the **UP** or **DOWN** arrow to change the heating setpoint or
    use the factory default of 62 degrees.

11. Tap **Program** again and the fan option **Automatic** will flash. Leave fan option set to **Automatic**.

12. Tap **Program** again and **CPY** (Copy) will appear on the LCD. If you wish to copy the Monday program to additional days of the
    week, use the **UP** or **DOWN** arrow to add additional days. Example: **Mon Tue Wed Thu Fri**

TYPICAL 7-DAY SCHEDULE HAVING 2 EVENTS PER DAY WITH SATURDAY/SUNDAY UNOCCUPIED

PROGRAM DAYS	SCHEDULE	START TIME	HEAT SETPOINT	COOL SETPOINT	FAN MODE
MON THRU FRI	DAY	7:00 AM	70 FACTORY DEFAULT	75 FACTORY DEFAULT	ALWAYS ON
	NIGHT	5:00 PM	62 FACTORY DEFAULT	78 FACTORY DEFAULT	AUTOMATIC
SAT AND SUNDAY	DAY	7:00 PM	62	78	AUTOMATIC
	NIGHT	5:00 PM	62 FACTORY DEFAULT	78 FACTORY DEFAULT	AUTOMATIC

ZONE THERMOSTAT SETUP

SWITCH FUNCTIONS
The SC-Z20-T contains a set of dip switches numbered 1 through 8. Only dip switches 1, 2, 3, 6 and 7 are active.

FACTORY DEFAULT SETTING FOR ALL SWITCHES IF OFF

ON
1 2 3 4 5 6 7 8

A   B   C   D   E   F
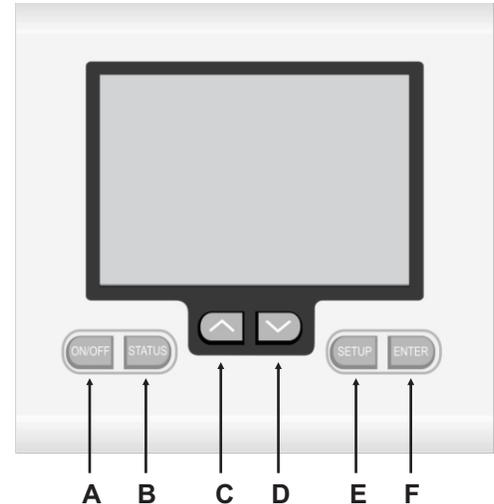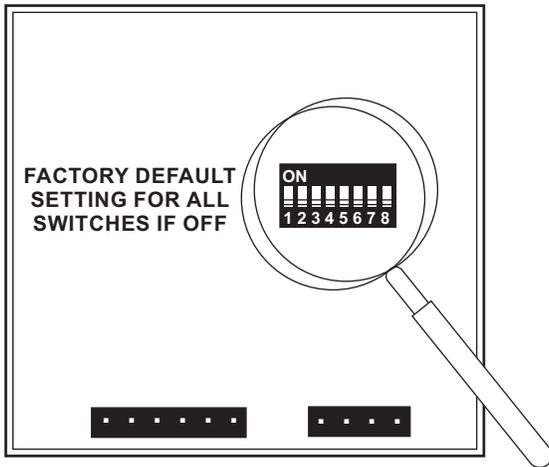
Switch 1 - Switch 1 is used to lock the thermostat after setup is completed. When the thermostat is locked (ON position) a padlock icon will show on the LCD. When locked, only setpoint changes and status functions can be accessed by the user. **Do not set Switch 1 in the ON position until all setup functions are completed.**
Switch 2 - Switch 2 is used to display the space temperature, duct temperature and setpoint in Celsius (ON position) or Fahrenheit (OFF position). Select Celsius or Fahrenheit before proceeding to the thermostat setup menu.
Switch 3 - Switch 3 is used to select two-position (ON position) or fully modulating (OFF position) damper control to best suit the specific application requirement.
Switch 6 - When switch 6 is ON, Heat or Cool are not displayed.
Switch 7 - When switch 7 is ON, the space temperature is replaced by the setpoint.

KEY FUNCTIONS

A = ON/OFF KEY - When the SC-Z20-T is not locked, this key allows the thermostat to be turned ON or OFF. When in the OFF position, the damper is also driven closed.

B = STATUS KEY - Pressing the STATUS key repeatedly scrolls through the UNIT number, ZONE number, DUCT temperature and DAMPER position.

C and **D = UP** and **DOWN KEYS** - Used to increase and decrease the setpoint, as well as change thermostat setup values.

E = SETUP KEY - Used to toggle through the thermostat setup menu.

F = ENTER KEY - Used to enter changes as well as exit the setup menu.

ZONE THERMOSTAT SETUP

ENTERING THE SETUP MENU
Press and hold the **SETUP** key until the word DAMPER appears on the LCD. (Figure 1)

FIGURE 1

FIGURE 2

SETTING THE MINIMUM DAMPER POSITION
Press the **SETUP** key again and the LCD will display the minimum damper position. The factory default is 10% which means the damper is driven 90% closed after a heating or cooling call is satisfied. Press the **UP** and **DOWN** keys to change the minimum damper position. Position may be adjusted in 10% increments. (Figure 2)

FIGURE 3

FIGURE 4

SETTING THE MAXIMUM DAMPER POSITION
Press the **SETUP** key again and the LCD will display the maximum damper position for heating and cooling. The factory default is 100% which means the damper can drive fully open with a call for heating or cooling. Position may be adjusted in 10% increments using the **UP** and **DOWN** keys. (Figure 3)

SETTING A UNIT NUMBER
Press the **SETUP** key again and the LCD will display the word UNIT. The factory default is 00. This number can be used to assign the SC-Z20-T to a particular HVAC unit. Use the **UP** and **DOWN** keys to assign a UNIT number from 00 to 99. (Figure 4)

ZONE THERMOSTAT SETUP

SETTING A ZONE NUMBER
Press the **SETUP** key again and the LCD will display the word ZONE. The factory default is 00. This number can be used to identify each SC-Z20-T thermostat wired to a SC-Z20 zone control panel or when used in multiple stand-alone applications. Use the **UP** and **DOWN** keys to assign a ZONE number from 00 to 99. (Figure 5)

FIGURE 5

FIGURE 6

SETTING THE HEATING LIMIT
Press the **SETUP** key again and the LCD will display the heating limit. The factory default is 76° F. Press the **UP** and **DOWN** keys to change the heating limit setting. It is strongly recommended that the limit not be set above the factory default setting. (Figure 6)

FIGURE 7

FIGURE 8

SETTING THE COOLING LIMIT
Press the **SETUP** key again and the LCD will display the cooling limit. The factory default is 68° F. Press the **UP** and **DOWN** keys to change the cooling limit setting. It is strongly recommended that the limit not be set below the factory default setting. (Figure 7)

SETTING THE ACTUATOR SPEED
Press the **SETUP** key again and the LCD will display the actuator speed. The factory default is 90 seconds which is the time it takes the actuator to drive the damper blade fully open or fully closed. This is a critical step in the SC-Z20-T setup since the thermostat can be used with a variety of 24 Volt actuators. If you are unsure of the actuator speed, place the actuator in the fully closed position and then apply 24 Volts to common and normally open. The time it takes to drive the damper blade fully open equals the actuator speed setting. (Figure 8)

ZONE THERMOSTAT SETUP

SETTING THE MODBUS ADDRESS
Press the **SETUP** key again and the LCD will display the Modbus communications address. The factory default is 01. The SC-Z20-T has integrated Modbus communications capability for remote monitoring and control. For more information on Modus Communications, contact Specified Controls at 888.359.0365 or www.specifiedcontrols.com. (Figure 9)

FIGURE 9

FIGURE 10

SENSOR LOCATION

TEMPERATURE CALIBRATION OFFSET
Press the **SETUP** key again and the LCD will display the temperature calibration offset. The factory default setting is 0. Typically, it is not necessary to adjust the temperature calibration offset, as the SC-Z20-T has been factory calibrated. If calibration is necessary, a high quality electronic digital thermometer must be used. Place the thermometer sensor probe next to the thermostat sensor and allow five minutes before comparing the temperature readings. Use the **UP** and **DOWN** keys to adjust the temperature calibration. The range is +/- 9° F.
(Figure 10)

SAVING SETTINGS AND EXITING THE SETUP MENU
Press the **ENTER** key and the SC-Z20-T will save the setup menu settings and exit the program. The LCD will display the space temperature along with other normal operating functions. To review the thermostat settings, simply press and hold the **SETUP** key until the setup menu is displayed and then toggle through the settings. Press the **ENTER** key to exit the setup menu.

ADVANCED FUNCTIONS

DAMPER POSITION OVERRIDE
The SC-Z20-T has a damper position override feature to assist in air balancing and bypass damper setup. With the thermostat unlocked, press twice and hold the **SETUP** key until the word DAMPER appears on the LCD.(Figure 11)
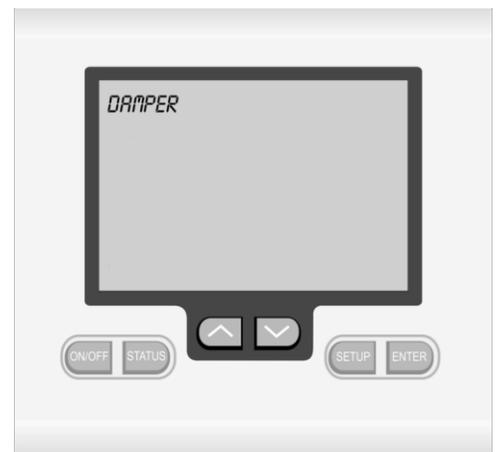

FIGURE 11

ZONE THERMOSTAT SETUP

OVERRIDE TO OPEN
Press the **UP** or **DOWN** key until the word OPEN appears on the LCD and then press the **ENTER** key. The damper will drive open and remain in the open position until the override is cancelled. (Figure 12)

FIGURE 12

FIGURE 13

OVERRIDE TO CLOSE
Press the **UP** or **DOWN** key until the word CLOSED appears on the LCD and press the **ENTER** key. The damper will drive closed and remain in the closed position until the override is cancelled. (Figure 13)

CANCELLING THE DAMPER OVERRIDE
In order for the SC-Z20-T to return to normal operation, the override must be cancelled. Press and hold the **SETUP** key until the word DAMPER OPEN or DAMPER CLOSE appears on the LCD. Use the **UP** or **DOWN** key until only the word DAMPER is displayed and then press the **ENTER** key. The thermostat will then resume normal operation. (Figure 14)

FIGURE 14

CHECKING THERMOSTAT STATUS POINTS
When the thermostat is first powered, it goes through a synchronization process to confirm the damper position before becoming operational, after which status points can be checked by repeatedly pressing the **STATUS** key and toggling through the following:

UNIT - Displays the HVAC unit number assigned to thermostat.

ZONE - Displays the thermostat zone number.

DUCT - Displays the duct temperature.

DAMPER - Displays the damper position in one degree increments.
(0% = fully closed and 100% = fully open)

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SYSTEM LED STATUS DEFINITIONS

SC-Z20 LED FUNCTION	COLOR	STATUS
Zones (1-20)	Red Green	ON when there is a heating call. ON when there is a cooling call.
Time Delay Speed Up Mode	Red	OFF in normal mode. Blinks in speedup mode. Manual ON/OFF button with 10 minute auto-reset.
DAS Active	Green	On when DAS is connected.
COOL	Green	ON when system is in cooling mode. Blinks when system down-stages or goes out on cooling limit.
HEAT	Red	ON when system is in heating mode. Blinks when system down-stages or goes out on heating limit.
OCCUPIED	Green	On when system is in occupied mode. OFF during unoccupied mode.
O/B	Green	ON when reversing valve is energized.
G	Green	ON constantly during occupied mode and for 5 minutes after panel goes unoccupied.
Y1	Green	ON with 1st stage cooling or compressor.
Y2	Green	ON with 2nd stage cooling or compressor.
W1	Green	ON with 1st stage heating.
W2	Green	ON with 2nd stage heating.
W3/AUX/EH	Green	ON with 3rd stage auxiliary heat or E. Heat.
ACTUATOR BOARD LED FUNCTION		
HEAT	Red	ON when space temperature drops 1.5° F below setpoint sending signal to SC-Z20 panel.
COOL	Green	ON when space temperature rises 1.5° F above setpoint sending signal to SC-Z20 panel.

SC-Z20 PANEL TIME DELAYS

FUNCTION	NORMAL MODE	SPEEDUP MODE
MINIMUM TIME IN HEAT OR COOL MODE Once system is in the heat or cool mode, it will remain there for a minimum of 15 minutes. The equipment may or may not be on during this period.	15 MIN	60 SEC
MINIMUM CHANGEOVER TIME BETWEEN HEAT OR COOL CALL	5 MIN	20 SEC
UPSTAGE TIMING	10 MIN	40 SEC
MINIMUM ON/OFF TIME	5 MIN	20 SEC
FAN RUN TIME AFTER CLOCK CONTACTS OPEN	5 MIN	20 SEC

STAGING AND LIMIT CONTROL SEQUENCE

Discharge Air Temperature Setpoints for Conventional Heating

Any time the discharge air temperature goes above the adjustable high limit setting of 145° F to 175° F, stage 1 heat will drop out.

Any time the discharge air temperature drops below 135° F, stage 1 heat will come on.

Any time the discharge air temperature goes above 125° F, stage 2 heat will drop out.

Any time the discharge air temperature drops below 115° F, stage 2 heat will come on.

Discharge Air Temperature Heating Setpoints for Heat Pump Mode Only

Any time the discharge air temperature goes above 110° F, stage 1 will drop out.

Any time the discharge air temperature drops below 105° F, stage 1 will come on.

Any time the discharge air temperature goes above 100° F, stage 2 will drop out.

Any time the discharge air temperature drops below 95° F, stage 2 will come on.

Any time the discharge air temperature goes above 120° F, stage 3 will drop out.

Any time the discharge air temperature drops below 115° F, stage 3 will come on.

When stage 3 is energized, heat pump stage 1 and 2 are locked on and their limits ignored.

When the discharge air temperature goes above 120° F, stage 3 is drops out and a 2 minute time delay is initiated before stage 1 and 2 limits are activated.

Discharge Air Temperature Setpoints for Conventional Cooling and Heat Pump

Any time the discharge air temperature drops below the adjustable low limit of 40° F to 48° F, stage 1 cooling will drop out.

Any time the discharge air temperature goes above 53° F, stage 1 cooling will come on.

Any time the discharge air temperature drops below 52° F, stage 2 cooling will drop out.

Any time the discharge air temperature goes above 57° F, stage 2 cooling will come on.

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