

SZ1025b

VAV Box Controller

The SZ1025b is a microprocessor-based controller designed for VAV terminal unit applications.

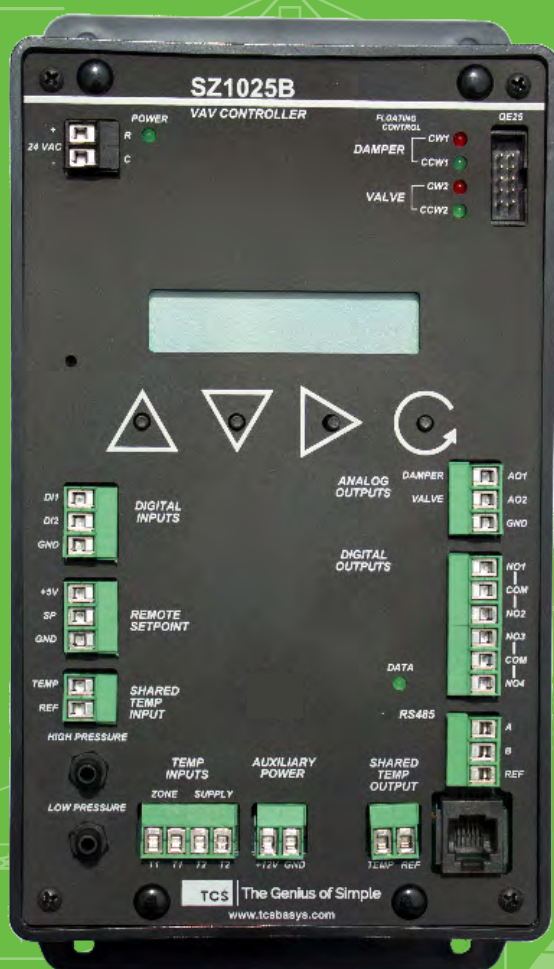


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Manual Key ---

The following symbols are used throughout this document. Their meanings are as follows:



Caution: Requires special attention.



Note: Something you should know.

Features

- Stand-alone or network operation
- Built-in velocity pressure sensor with K-factor correction
- Pressure dependent or pressure independent operation
- Capable of controlling series or parallel fan-powered boxes
- Offers two independent modulating outputs
- Adjustable PID control of modulating outputs
- Interface available for tri-state actuator motors (QE25)
- Separate heating and cooling minimum and maximum CFM settings
- Four independent dry contact outputs
- Remote setpoint capability
- Discharge air sensor input
- Filter monitor input
- External time clock input

Mounting

Use two #10 sheet metal screws to mount the SZ1025b.

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

Wiring

The SZ1025b terminal designations are shown below.

Remote Sensor Wiring

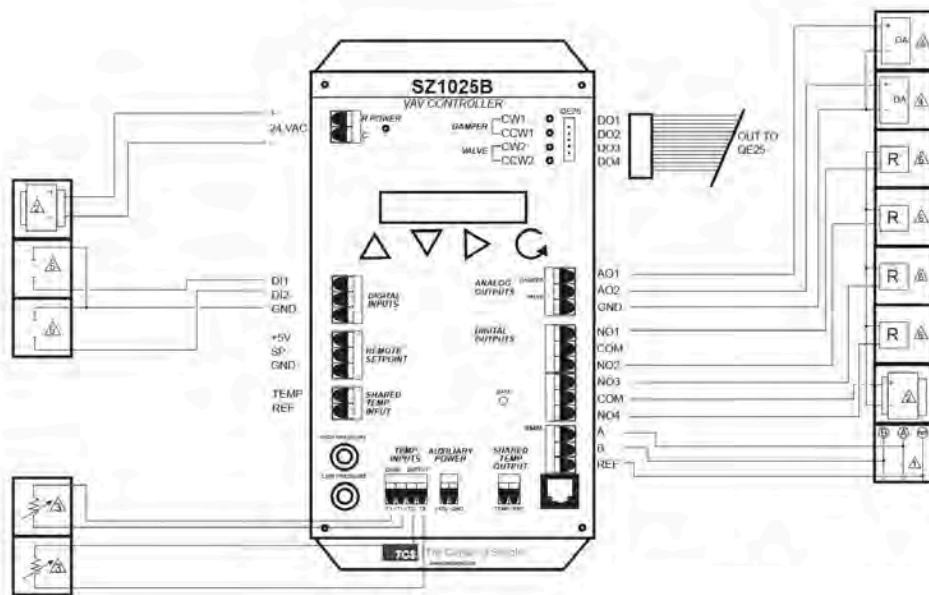
The SZ1025b accepts two 1000 Ω two-wire platinum RTD sensors. Use TS2000 or TS3000 for room sensing, TS2023a for analog room sensing with setpoint adjustment, PX1060 or equivalent for digital room sensing with setpoint adjustment and TS1009 or TS1002 for duct sensing. When using TCS Basys Controls three-wire RTD sensors, use the black and red leads, and either clip or twist off the white lead. The wiring length from the room sensor to the SZ1025b should not exceed 250 ft.

Powering the SZ1025b

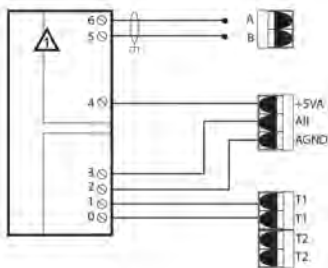
The SZ1025b is powered from 24 VAC $\pm$ 10 %. If wiring for communications, dedicated power must be used to power the SZ1025b. Several S-series thermostats may be powered from the same transformer, provided that the transformer has enough power.



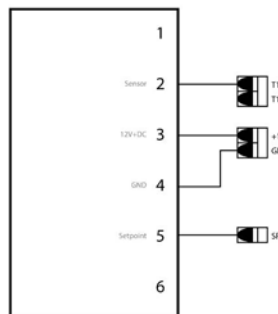
Caution: When multiple TCS Basys Controls devices are using a single transformer, the polarity of the power wiring must be maintained because all TCS devices are half-wave rectified.



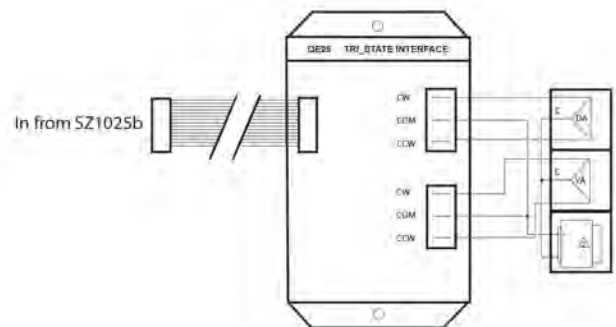
TS2023a wiring to SZ1025b



PX1060 wiring to SZ1025b



Optional QE25 Tri-state interface wiring

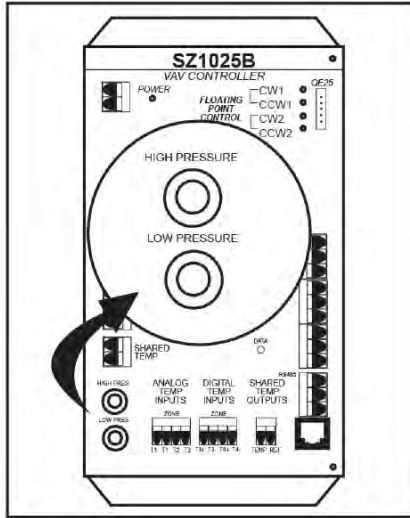


- | | |
|--|--|
| <p>1 Twisted, Shielded 18 AWG. Must be run separately.</p> <p>2 24AC transformer. The SZ1025b power must be dedicated.</p> <p>3 If using TS2000 or TS1009, use red and black leads. If using PX1060 sensor connect to T1 left terminal.</p> <p>4 4 to 20mA output. 600 Ohm max. Do not power actuators with SZ1025b power. The SZ1025b is half-wave rectified, where by the power ground is common with the signal ground.</p> | <p>5 Dry contact. Must not be powered.</p> <p>6 Dry contact rated 24 VAC @ 2A. Do not power relay with SZ1025b power.</p> <p>7 If not using TS2023a setpoint adjustment pot., you must short SP to GND.</p> <p>8 12VDC power for digital setpoint adjust sensor (PX1060) with wiring to setpoint pin (SP).</p> |
|--|--|

Setup

PRESSURE CONNECTIONS

For pressure independent applications, the SZ1025b provides a velocity pressure transducer. To utilize this, connect the high port on the SZ1025b to the air flow measuring station port or pitot tube port that faces the flow. Connect the low port on the SZ1025b to the air flow measuring station port or pitot tube port that faces away from the flow.



USING TRI-STATE ACTUATORS

If using tri-state instead of 4 to 20 mA, actuators a QE25 transducer is available. To connect the QE25 to the SZ1025b, use the ribbon connector included with the QE25 as shown, in the wiring section.

Programming

The SZ1025b may be programmed through the display and keypad, or with a PC.

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

- Address (step #2)
- Baud rate (step #3)

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

PROGRAMMING THROUGH THE KEYPAD

Access Programming Screens: Press both the "Scroll" and "Next" keys simultaneously.

Exit Programming Screen: Press the "Next" key. This will not save changes to the current screen.

Scroll Key



Press to save any changes to the "current" screen and advance to the next screen while programming.

Next Key



Press to exit programming without saving changes to the current screen.

Increment/Decrement Keys



Press to increase or decrease the value.

Zone temp
71F

Main Monitoring Screen. Press the scroll and next buttons to access the following screens.

1. ENTER ACCESS
CODE 000

Access Code Entry Screen. Enter the access code. If the wrong code is entered, the prorm reverts to the main screen. 248 is the default access cose.

2. SET ADDRESS:
000

Controller Address Screen. If using a PC to access the SZ1025b, set a unique address from 0 to 255, excluding 248.

3. SET BAUD RATE:
9.6k

Communication Baud Rate Screen. If using a PC to access the SZ1025b, all controllers on a network must be set to the same baud rate. Choose between 2.4K, 4.8K, 9.6K and 19.2K.

4. TEMPS SHOWN IN:
FAHRENHEIT

Temperature Selection Screen. Select whether youwant to show Deg. Fahrenheit or Celsias.

5. ENABLE SHARED
TEMP INPUT? NO

Shared Temperature Enable Screen. Sharing zone temperature with another SZ1025b (2 max.) Select YES if not select NO.

6. CALIBRATE ZONE
TEMP. 0F

Zone Temperature Calibration Screen. A calibration factor (+/- 25°F) for zone temperature Input.

7. CALIBRATE SUPPLY
TEMP. 0F

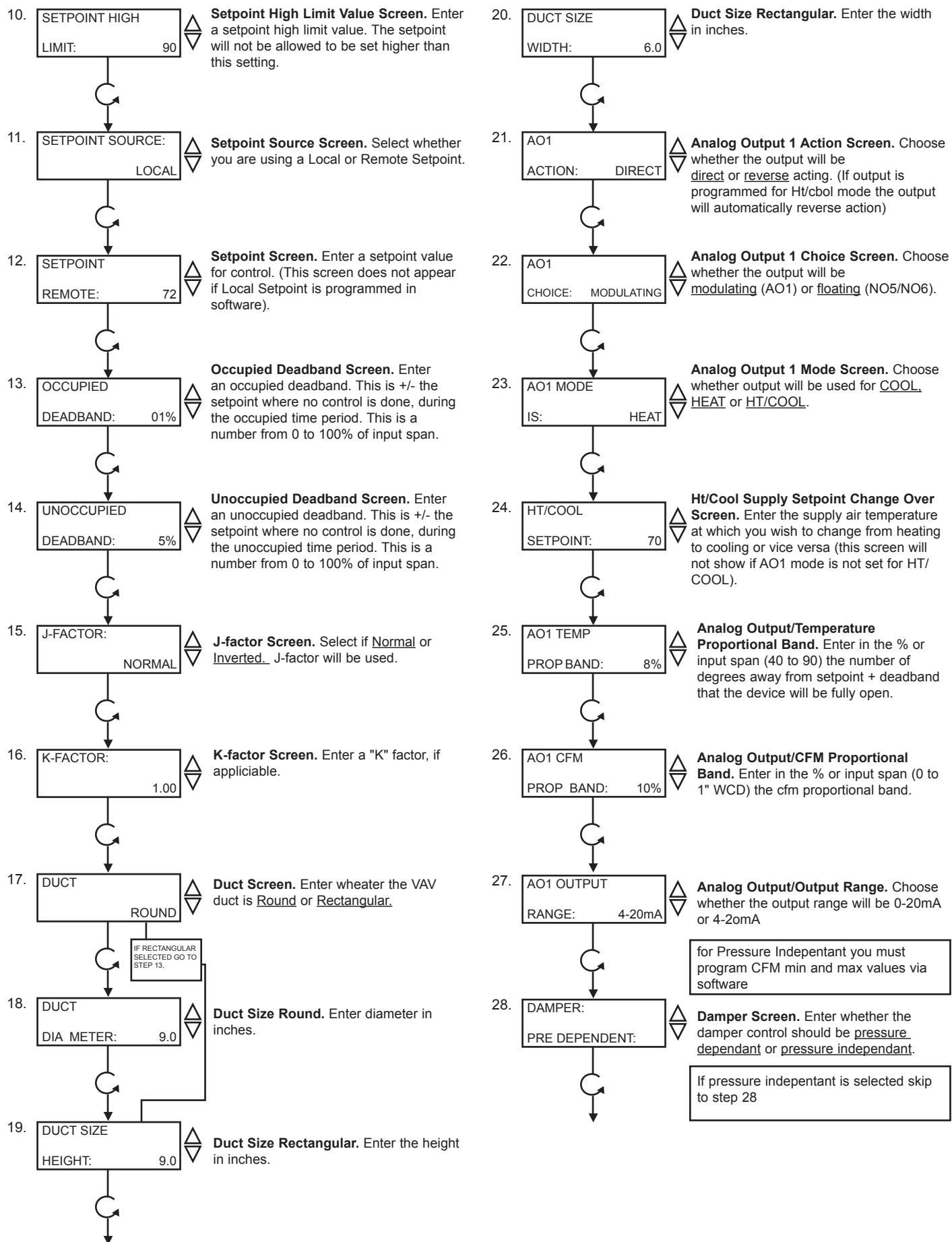
Supply Temperature Calibration Screen. Enter a calibration factor (+/- 50°F) for supply temp Input.

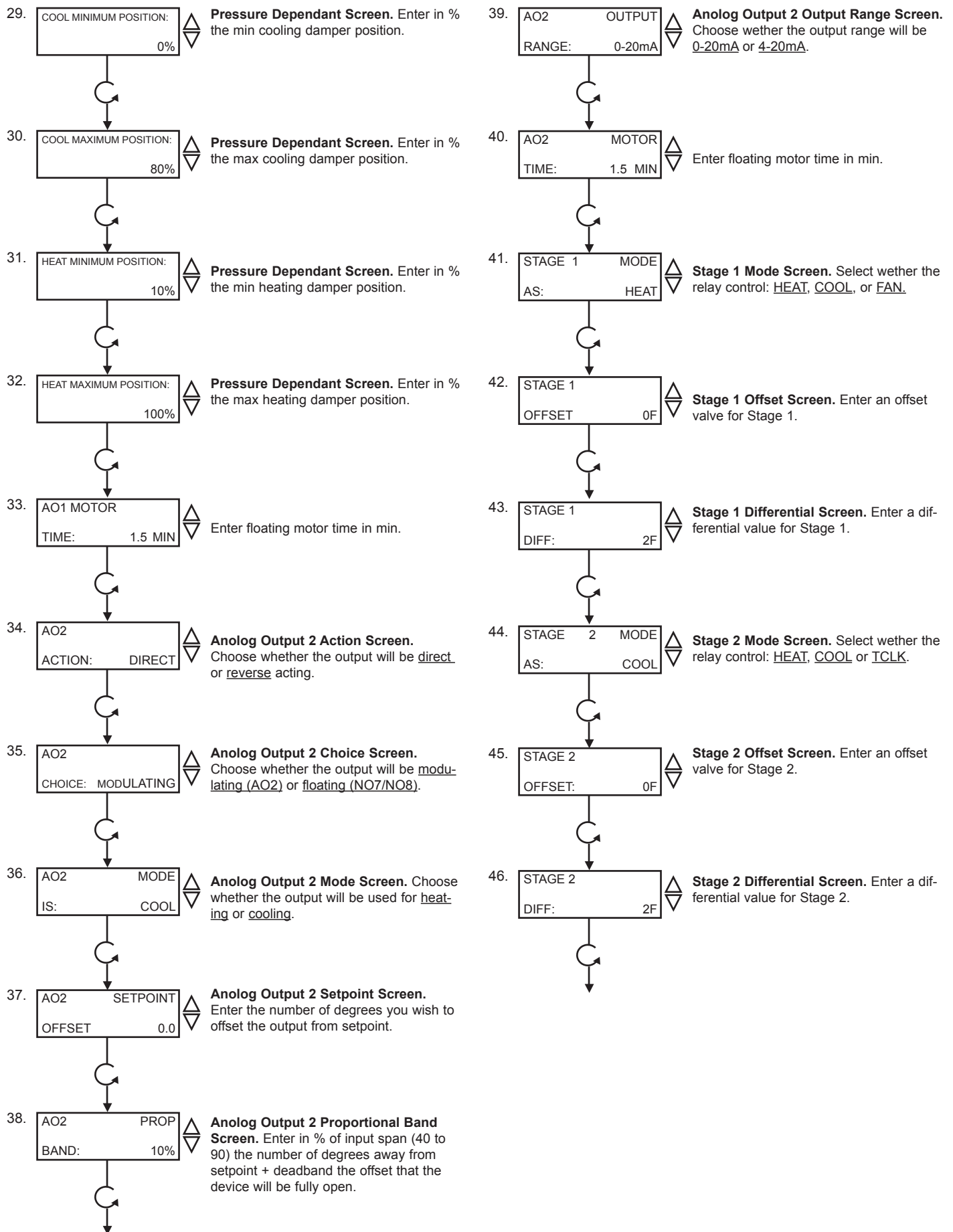
8. CALIBRATE
PRESSURE 0.00 WCD

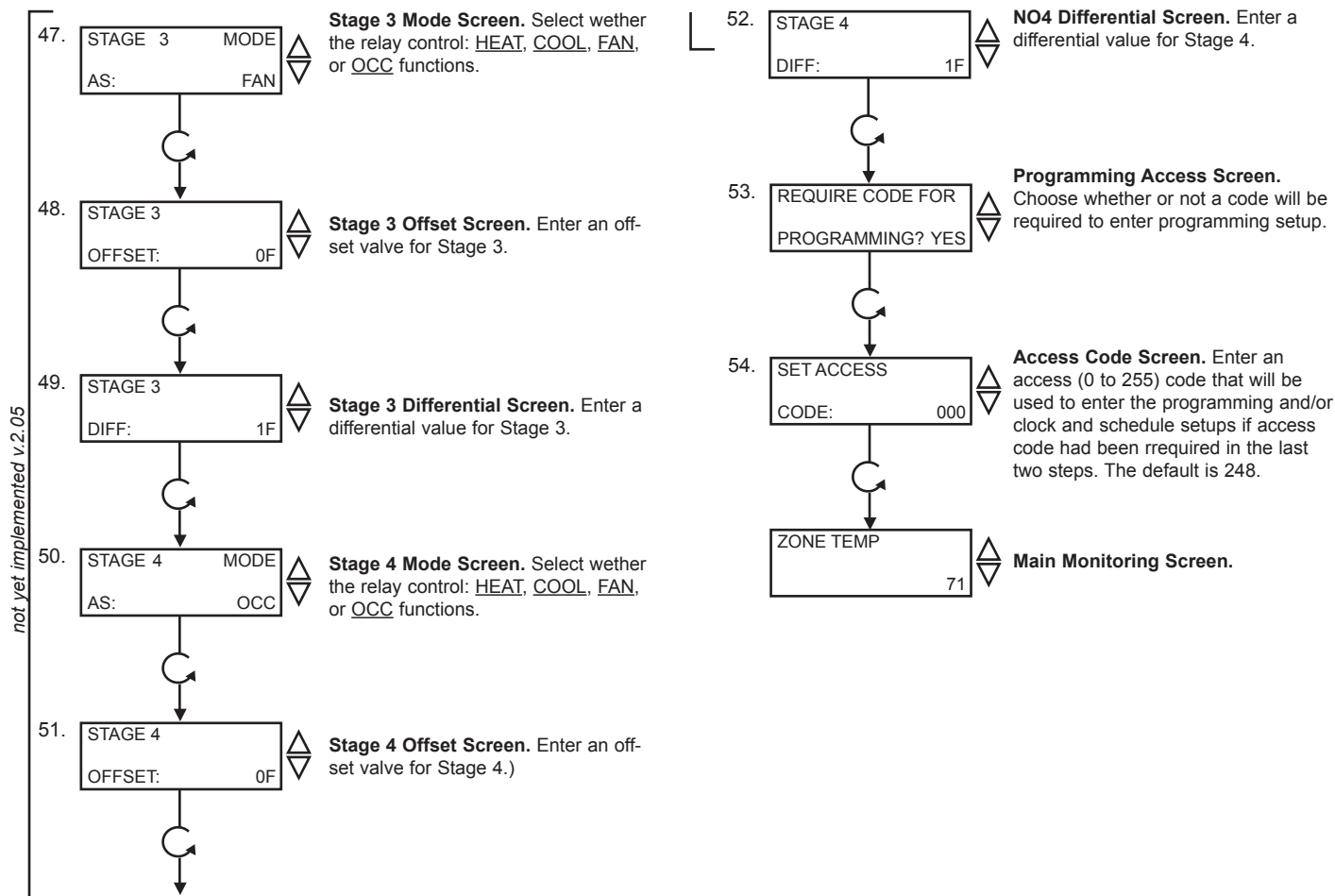
Pressure Calibration Screen. Enter a calibration factor (+/- 0.50WCD) for pressure.

9. SETPOINT LOW
LIMIT: 40

Setpoint Low Limit Value Screen. Enter a setpoint low limit value. The setpoint will not be allowed to be set lower than this setting.







AUXILIARY RELAYS STAGE 1&2

Select the mode for which can be “Heat” or “Cool” control, and for Stage 3&4 which can be “Heat” or “Cool” control, “FAN” controls or for an external time clock “Occ” signal.

For a “Cooling” output, the relay energizes when the input equals the “Setpoint” + “Deadband” + “Offset” + “Differential and de-energizes when the input falls to the “Setpoint” + “Deadband” + “Offset.”

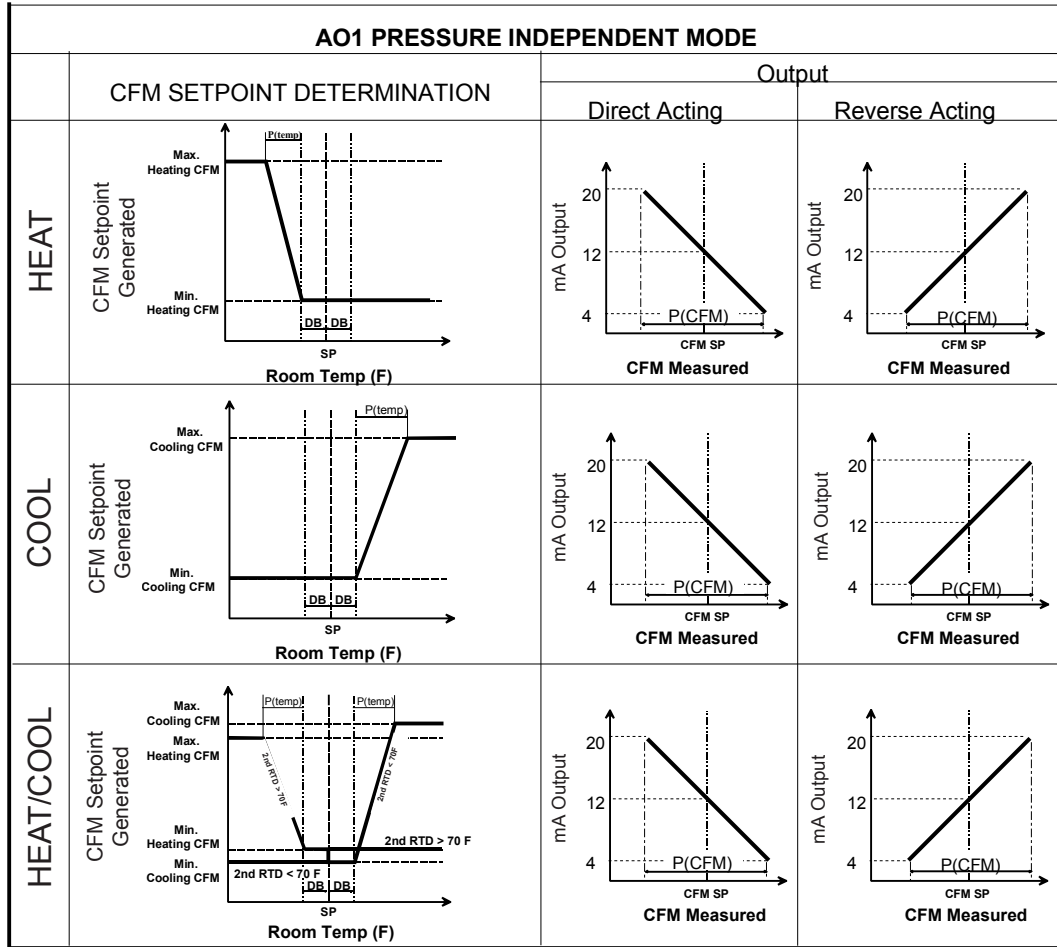
For a “Heating” output, the relay energizes when the input equals the “Setpoint” - “Deadband” - “Offset” - “Differential and de-energizes when the input rises to the “Setpoint” - “Deadband” - “Offset.”

For “Fan” control, the relay is energized during the occupied time and energized on a call for heat or cool during the occupied time.

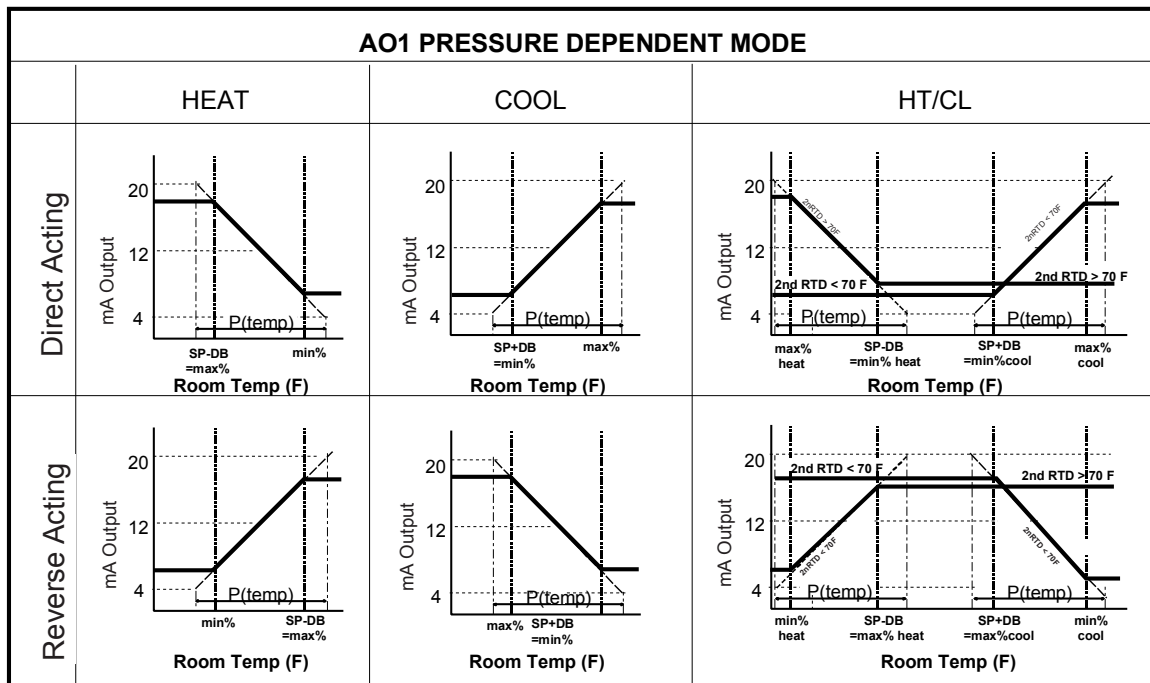
MOTOR TIME

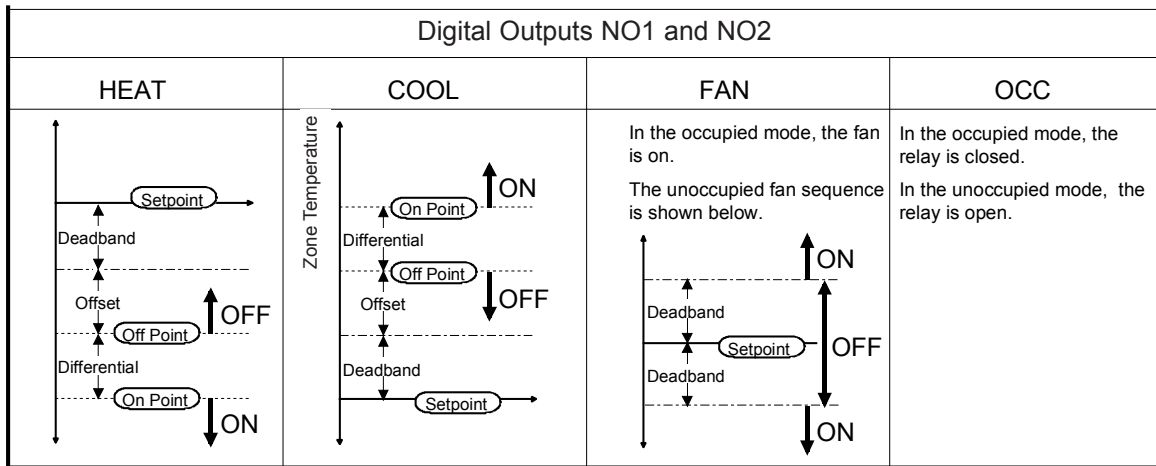
Enter the “Motor Time” in minutes if you choose that the actuator is “floating or tri-state”. Larger times will slow down the response and smaller times will speed up the response. The number of minutes is from 1 to 10 minutes. We recommend to use the speed actuator takes to go from fully open to fully closed.

AOI Pressure Independent Mode



Modulating Output AO1





Sequence of Operations

SEQUENCE LEGEND

SP=Setpoint

DB=Deadband

P(temp)=Temperature Proportional Band

P(CFM)=CFM Proportional Band

MODULATING OUTPUT AO1

For pressure independent systems, a CFM setpoint is generated based on: temperature proportional band, sensed temperature and the temperature setpoint. The control output is dependent on the CFM proportional band, CFM measured and the CFM setpoint that has been generated. For pressure dependent systems, the control output is based on the temperature proportional band, sensed temperature and the temperature setpoint.

TRIACS DO1, DO2, DO3, DO4

The SZ1025b can be configured for floating damper and/or valve motors when used with the QE25 interface. The CW1 provides clockwise rotation to open the damper motor.

The CCW1 provides a counter-clockwise rotation to close the damper motor. The power that CW1 and CCW1 provide to the damper motor must not exceed 200 mA.

The CCW2 provides clockwise rotation to open the valve motor. The CCW2 provides a counter-clockwise rotation to close the valve motor. The power that CW2 and CCW2 provide to the valve motor must not exceed 200 mA.

Checkout & Troubleshooting

1. Be sure to check and verify all wiring before powering the SZ1025b.
2. Turn power on. The SZ1025b display LED should light up.

3. If the SZ1025b has not been pre-programmed, it should be programmed at this time.
4. Increase the setpoint on the analog (TS2032a) or digital (PX1060) zone sensor. Observe the damper operation and heating stage(s) if used.
5. Decrease the setpoint on the analog (TS2032a) or digital (PX1060) zone sensor. Observe the damper operation and cooling stage(s) if used.
6. Note that the operation of the SZ1025b will depend on how it is programmed.

The SZ1025b is now ready for operation.

TROUBLESHOOTING

No Display

Check for 24 VAC on terminals "R" and "C".

No communication

Make sure baud rate selection jumper for the QD1010 is the same as programmed in the SZ1025b.

No communication while connected to TS2023a

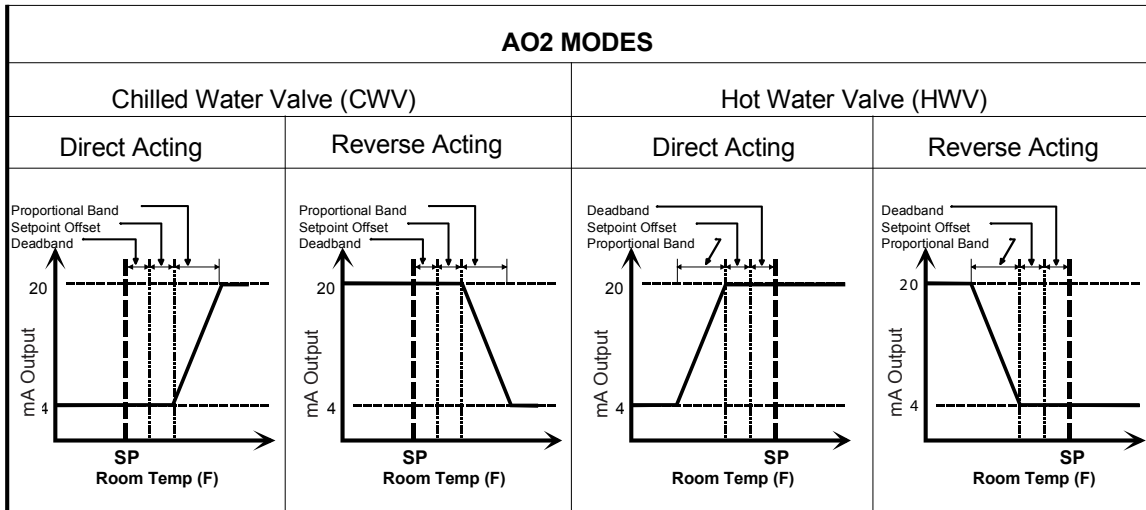
When a QD1010 is connected to a PX1060 or TS2023a, the QD1010 must be powered with the external power supply supplied with the QD1010. The TS2023a or PX1060 does not provide power on the phone connector.

Inputs do not read correctly

If not using a setpoint input, SP must be shorted to GND. For the room temperature and supply air temperature readings, slight adjustments can be made in via software. For different pressure readings, make slight adjustments to the zero port which is the middle pressure pot located closest to the high pressure port fitting.

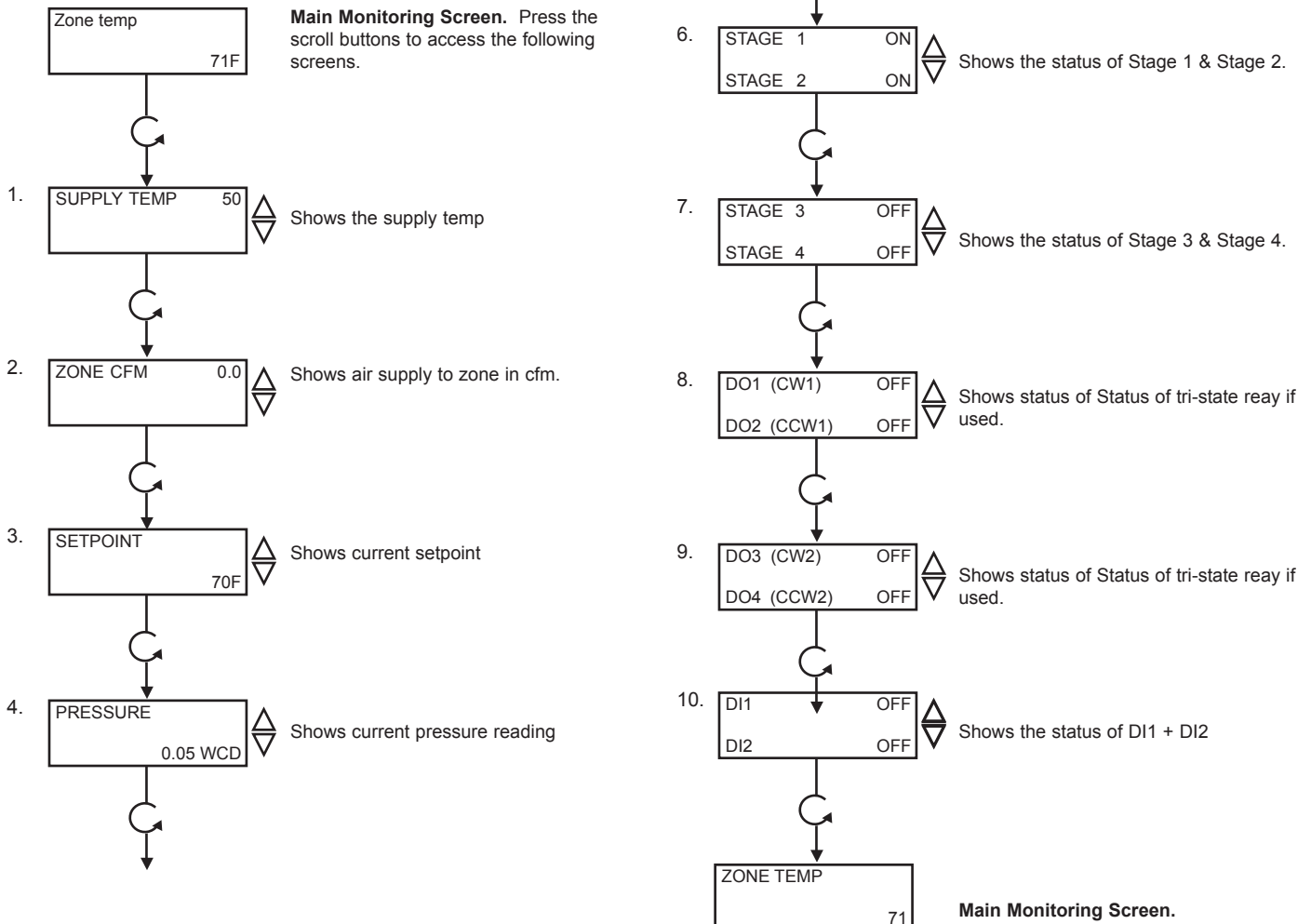
Output operation is not correct

Check programmed parameters. In particular check "Reverse" and "Direct" acting selections for the damper and valve and offset and differential selections for the relay outputs. Check wiring.



MONITORING SCREENS

Continually pressing the scroll button allows more extensive monitoring. The screens are shown below (see attached monitoring screens page).



LED Description

Six LEDs on the face allow the occupant to view the current operating status of the SZ1025b.

POWER: This LED will be lit whenever the unit has power.

CW and CCW: These four LEDs will be lit when the corresponding tri-state relay is active. The upper two indicate the relays and the lower two indicate the CW1 & CCW1 CW2 & CCW2 relays.

PROGRAM/DATA: This LED will blink when the unit is being accessed via the RS485 network, or via the push buttons.