# TAC Xenta® 103-A
## Zone Controller with Air Quality Control

TAC Xenta 103-A is a zone controller for chilled ceiling applications. The controller keeps a constant temperature by modulating the chilled water flow to ceiling elements, the hot water flow to radiators and the airflow through dampers. By using a carbon dioxide sensor and an airflow damper, the air quality in the zone can be controlled.

The controller can handle the following applications:

- Heating and cooling
- Heating only
- Cooling only, air and/or water

The controller communicates on a LonTalk TP/FT-10 network via a twisted-pair, unpolarized cable. It is able to operate both as a stand-alone unit and as part of a system. All network variables can be monitored and configured by using the TAC Xenta OP, if the OP version is 3.11 or higher.

The STR100 and ZS 100 ranges of wall modules are intended to be used together with TAC Xenta 103.There are plug-in terminal blocks available for the TAC Xenta 100 series that can be attached to the existing terminals.

## TECHNICAL DATA

Supply voltage. . . . . . . . . . . . 24 V AC –10% +20%, 50–60 Hz

Power consumption:
 Controller with TAC Xenta OP . . . . . . . . . . . . . . . . . . 4 VA
 Actuator supply . . . . . . . . . . . . . . . . . . . . . . . . . max. 12 VA
 Digital outputs . . . . . . . . . . . . . . . . . max. 2×19 VA = 38 VA
 Total. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . max. 54 VA

### Ambient Temperature

Storage . . . . . . . . . . . . . . . . –20 °C to +50 °C (–4 °F to 122 °F)
Operation . . . . . . . . . . . . . . . 0 °C to +50 °C (+32 °F to 122 °F)
Humidity . . . . . . . . . . . . . . . . . . max. 90% RH non-condensing

### Mechanical

Enclosure. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ABS/PC
Enclosure rating . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . IP 30
Flammability class, materials . . . . . . . . . . . . . . . . . . .UL 94 5VB
Dimensions . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . see Fig. 1
Weight . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .0.4 kg (0.88 lb.)

### Inputs/Outputs

Inputs X2–X3 for occupancy sensor and window contact:
 Voltage across open contact. . . . . . . . . . . . 23 V DC ±1 V DC
 Current through closed contact . . . . . . . . . . . . . . . . . . . 4 mA
 Minimum pulse input duration, inp. X2/X3 . 250 ms / 15 sec.

Outputs V1–V2 for heating valve actuators (triac):
 Type of actuator. . . . . . incr./decr. or thermal actuator NC/NO
 Minimum output voltage . . . . . . . . . . . supply voltage – 1.5 V
 Maximum load. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .0.8 A

Input X1 for bypass button on wall module:
 Minimum pulse input duration . . . . . . . . . . . . . . . . . 250 ms
 Maximum current, LED . . . . . . . . . . . 2 mA, for ZS 100 series

Temperature sensor input B1:
 Thermistor type . . . . . . . . . . . NTC, 1800 Ω at 25 °C (77 °F)
 Measuring range . . . . . . . . –10 °C to 50 °C (14 °F to 122 °F)
 Accuracy . . . . . . . . . . . . . . . . . . . . . . . . . .±0.2 °C (±0.36 °F)

Input R1, setpoint adjustment on wall module:
 Type. . . . . . . . . . . . . . . . . . . . . . . 10 kΩ linear potentiometer
 Adjustment range. . . . . . . . . . . . . . . . . . . . . . .±5 °C (±9 °F)

 Accuracy . . . . . . . . . . . . . . . . . . . . . . . . . . . .±0.1 °C (±0.18 °F)

Input Z1, carbon dioxide sensor:
 Measuring range . . . . . . . . . . . . . . . . . . . . . . . . 0–10 V DC
 Accuracy . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .±0.05 V

Outputs Y1–Y2, cooling valve and cooling damper:
 Output range. . . . . . . . . . . . . . . . . . . . . . . . . . . . 0–10 V DC
 Maximum current . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2 mA
 Accuracy . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .±0.2 V

### Application Program

Cycle time . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .6 sec.

### Indication LED Colors

Power On . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .green
Service. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .red

### LonMark Standard

 . . . . . . . . . . . . . . . . . . LonMark Interoperability Guidelines
 . . . . . . LonMark Functional Profile: Chilled Ceiling Controller
Communication protocol . . . . . . . . . . . . . . . . . . . . . . LonTalk
Physical channel . . . . . . . . . . . . . . . . . . . . . . .TP/FT-10, 78 kbps
Neuron type . . . . . . . . . . . . . . . . . . . . . . . . . . . .3150, 10 MHz

### Agency Compliances

Emission:
 CE . . . . . . . . . . . . . . . . . .EN 61000-6-3, C-Tick, FCC Part 15
Immunity:
 CE . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . EN 61000-6-1
Safety:
 CE . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .EN 61010-1
 UL 916, C-UL US, Enclosed Energy Management Equipment
 Approved for plenum installations
RoHS directive. . . . . . . . . . . . . . . . . . . . . . . . . . . . 2002/95/EG

### Part Numbers

Controller . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 007305610
Manual . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .04-00060-01
Plug-in Terminal Blocks TAC Xenta 100 . . . . . . . . . . 007309140

Schneider Electric

Figure 1

## APPLICATION EXAMPLE



Figure 2

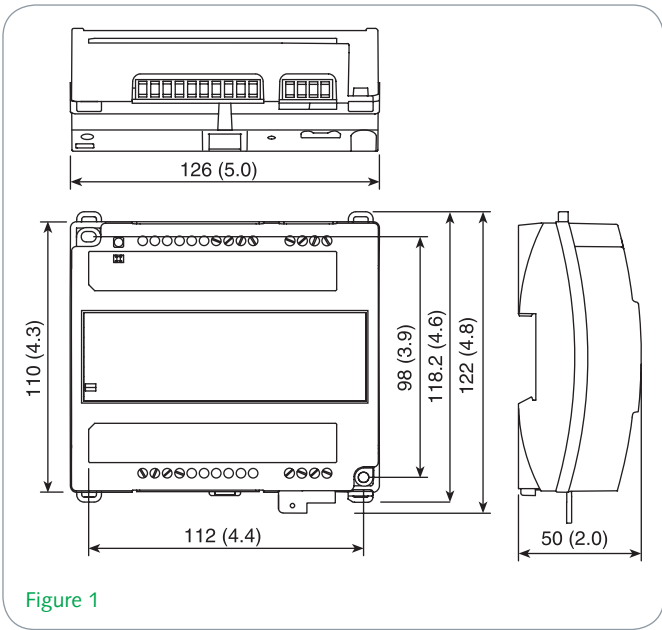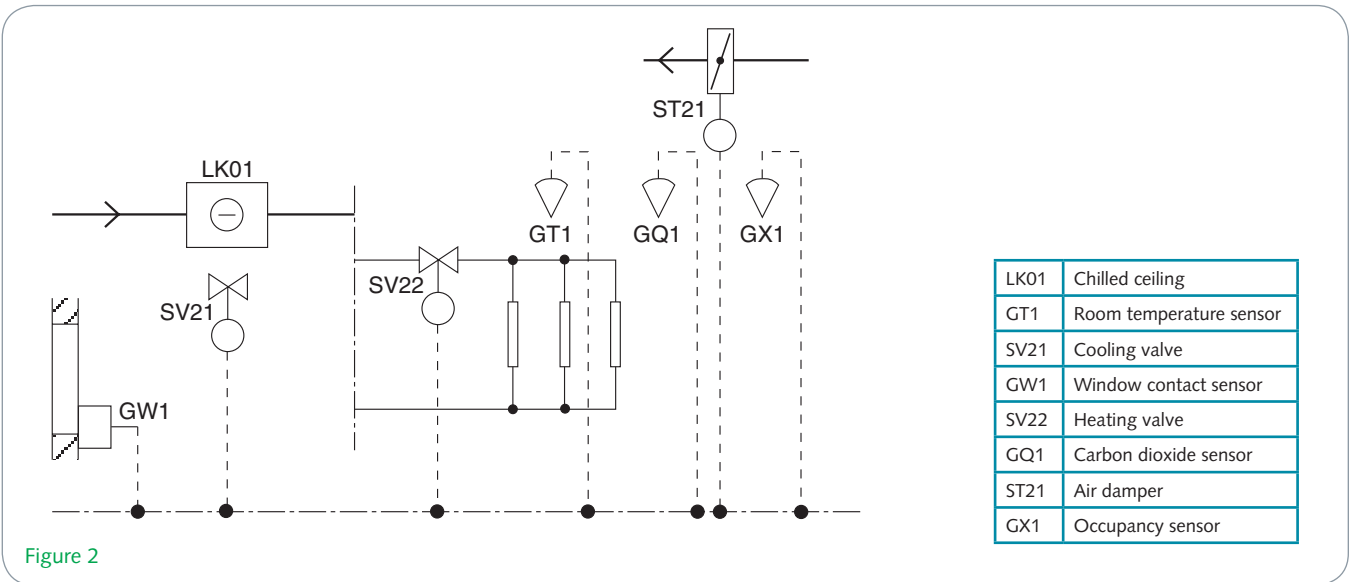| LK01 | Chilled ceiling |
| GT1 | Room temperature sensor |
| SV21 | Cooling valve |
| GW1 | Window contact sensor |
| SV22 | Heating valve |
| GQ1 | Carbon dioxide sensor |
| ST21 | Air damper |
| GX1 | Occupancy sensor |

## FUNCTIONS

The function of TAC Xenta 103-A is determined by the occupancy mode, the application mode and the node state.

When zone temperature increases, the heating valve closes (see fig. 3). The air damper is opened, and finally, the cooling valve is opened. This sequence is reversed when the temperature drops.

Low temperature protection

When the zone temperature drops below 10 °C (50 °F), the controller goes into heating mode to ensure low temperature protection in the off and "fan only" modes (see below).

## OPERATING MODES

### Occupied Mode

Occupied mode is used when the zone is occupied. This mode is also the default mode after a reset or a power up.

In order to maintain the air quality, the controller selects the highest of three positions for the damper: the position ordered from the cooling sequence, the air quality control or the set minimum position for the damper. At a high carbon dioxide concentration, the position of the damper is set from the air quality control (see fig. 4); at other times, it is set by the temperature control sequence.

### Standby Mode

This mode reduces energy consumption when enabled. The neutral zone is larger and the air quality control is disabled in this mode.

### Bypass Mode

To bypass the centrally set standby mode, press the bypass button on the wall module, upon which the controller starts running in occupied mode. When two hours have passed, the controller reverts to standby mode.

### Unoccupied Mode

This mode is used when the building is unoccupied for a longer period of time. Here, the neutral zone is at its largest. The air quality control is disabled in this mode.

### Off Mode

The controller stops running when centrally ordered, when a window is opened or slave mode is enabled in the controller. In this mode, frost protection only is active.

### Slave Mode

The following occurs when the network variable nciAppOptions enables the slave mode:

The slave controller goes into off mode and executes copies of output signals from the master controller. Therefore, both the slave and master controllers must control actuators and valves of the same type and size.
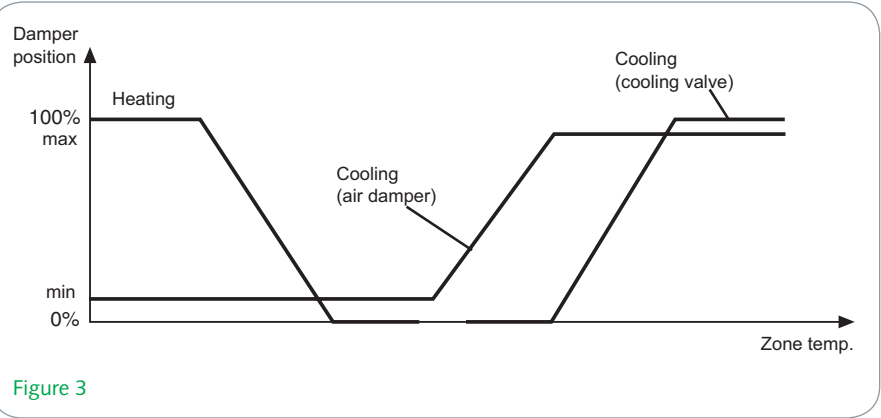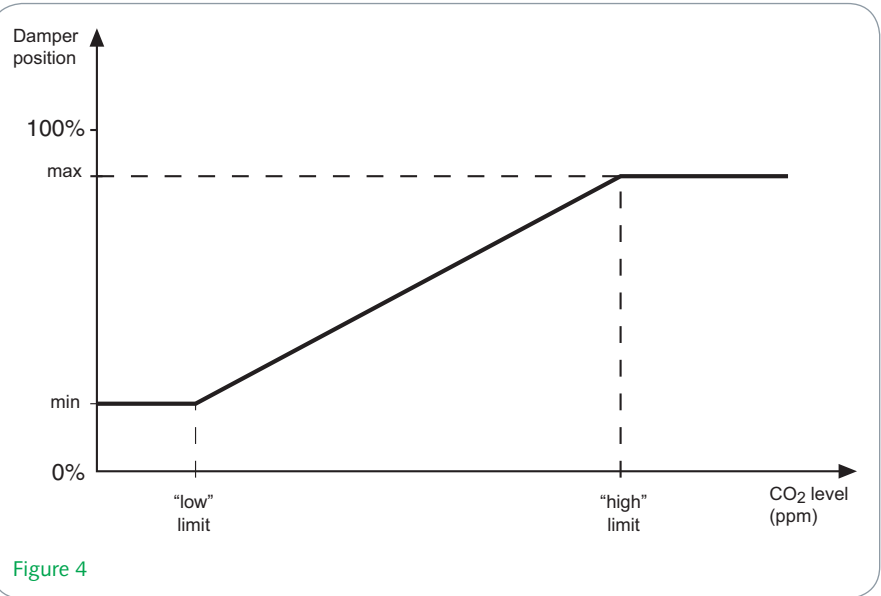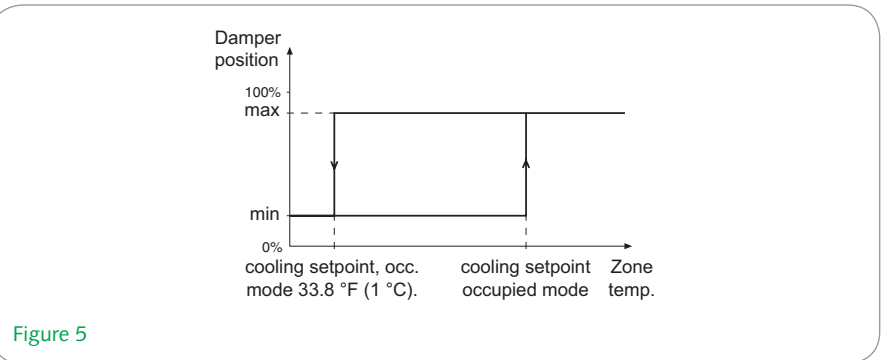


Figure 3



Figure 4



Figure 5

The frost protection is off in the slave controller, but it is on in the master controller.

### Night Purge Mode

In night purge mode, the setpoint for cooling in occupied mode –1 °C (30.2 °F) is used (see fig. 5). The heating and cooling valves are closed, but the frost protection is on.

When the room temperature falls below the setpoint, the damper adopts its minimum position. It is reopened with a fixed hysteresis of 1 °C (33.8 °F).

## INSTALLATION

The controller may be mounted on a DIN rail or fastened onto a ceiling or a wall with screws. Two sockets are provided for that purpose.

## CABLES

Communication cables: refer to the TAC Xenta Network Guide, part number 0-004-7460.

Other cables: maximum length 30 m (100 ft), minimum wire size of 0.7 mm² (18 AWG) applies to all other cables and all other equipment. The cables are to be twisted, but not shielded.

## CONFIGURATIONS OPTIONS

By changing the network variable nciAppOptions (see fig. 6), it is possible to achieve different options in TAC Xenta 103-A.

The factory setting of the controller is that all auxiliary units are disabled. Below is a list of the different options:

- Occupancy sensor enabled/disabled
- Occupancy sensor normally open/normally closed
- Window contact enabled/disabled
- Heating valve enabled/disabled
- Cooling valve enabled/disabled
- Cooling damper enabled/disabled
- Carbon dioxide sensor and air quality controller enabled/disabled
- Heating valve actuator is of ON/OFF type/three-point increase/decrease
- Slave mode disabled/enabled
- Thermal actuator NC/NO
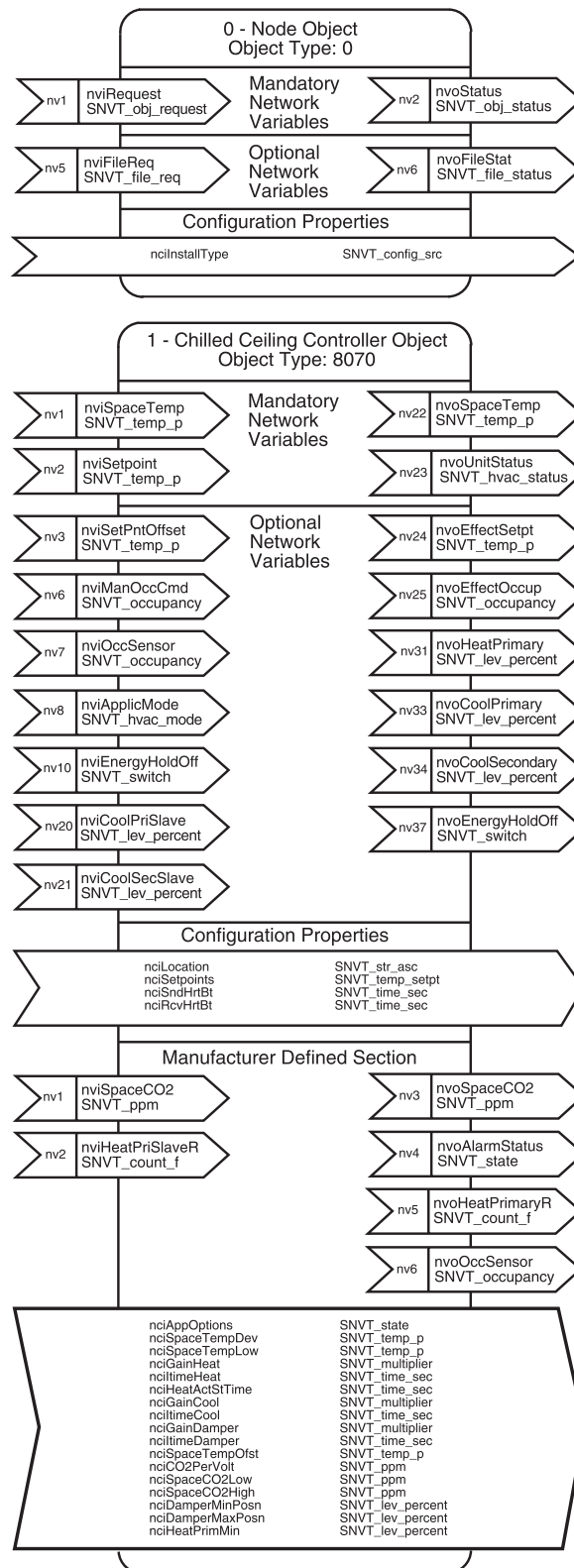
## LONMARK OBJECTS AND NETWORK VARIABLES

**0 - Node Object**
**Object Type: 0**

Mandatory Network Variables

| nv1 | nviRequest SNVT_obj_request | | nv2 | nvoStatus SNVT_obj_status |

Optional Network Variables

| nv5 | nviFileReq SNVT_file_req | | nv6 | nvoFileStat SNVT_file_status |

Configuration Properties

| nciInstallType | SNVT_config_src |

**1 - Chilled Ceiling Controller Object**
**Object Type: 8070**

Mandatory Network Variables

| nv1 | nviSpaceTemp SNVT_temp_p | | nv22 | nvoSpaceTemp SNVT_temp_p |
| nv2 | nviSetpoint SNVT_temp_p | | nv23 | nvoUnitStatus SNVT_hvac_status |

Optional Network Variables

| nv3 | nviSetPntOffset SNVT_temp_p | | nv24 | nvoEffectSetpt SNVT_temp_p |
| nv6 | nviManOccCmd SNVT_occupancy | | nv25 | nvoEffectOccup SNVT_occupancy |
| nv7 | nviOccSensor SNVT_occupancy | | nv31 | nvoHeatPrimary SNVT_lev_percent |
| nv8 | nviApplicMode SNVT_hvac_mode | | nv33 | nvoCoolPrimary SNVT_lev_percent |
| nv10 | nviEnergyHoldOff SNVT_switch | | nv34 | nvoCoolSecondary SNVT_lev_percent |
| nv20 | nviCoolPriSlave SNVT_lev_percent | | nv37 | nvoEnergyHoldOff SNVT_switch |
| nv21 | nviCoolSecSlave SNVT_lev_percent | | | |

Configuration Properties

| nciLocation | SNVT_str_asc |
| nciSetpoints | SNVT_temp_setpt |
| nciSndHrtBt | SNVT_time_sec |
| nciRcvHrtBt | SNVT_time_sec |

Manufacturer Defined Section

| nv1 | nviSpaceCO2 SNVT_ppm | | nv3 | nvoSpaceCO2 SNVT_ppm |
| nv2 | nviHeatPriSlaveR SNVT_count_f | | nv4 | nvoAlarmStatus SNVT_state |
| | | | nv5 | nvoHeatPrimaryR SNVT_count_f |
| | | | nv6 | nvoOccSensor SNVT_occupancy |

| nciAppOptions | SNVT_state |
| nciSpaceTempDev | SNVT_temp_p |
| nciSpaceTempLow | SNVT_temp_p |
| nciGainHeat | SNVT_multiplier |
| nciltimeHeat | SNVT_time_sec |
| nciHeatActStTime | SNVT_time_sec |
| nciGainCool | SNVT_multiplier |
| nciltimeCool | SNVT_time_sec |
| nciGainDamper | SNVT_multiplier |
| nciltimeDamper | SNVT_time_sec |
| nciSpaceTempOfst | SNVT_temp_p |
| nciCO2PerVolt | SNVT_ppm |
| nciSpaceCO2Low | SNVT_ppm |
| nciSpaceCO2High | SNVT_ppm |
| nciDamperMinPosn | SNVT_lev_percent |
| nciDamperMaxPosn | SNVT_lev_percent |
| nciHeatPrimMin | SNVT_lev_percent |

Figure 6

## HARDWARE INTERFACE

| Term. No. | Term. Name | Description |
|---|---|---|
| 1 | C1 | TP/FT-10 communication channel |
| 2 | C2 | TP/FT-10 communication channel |
| 3 | X3 | Input, window contact |
| 4 | M | Measurement neutral |
| 5 | X2 | Input, occupancy sensor |
| 6 | – | Not used |
| 7 | M | Measurement neutral |
| 8 | Z1 | Input, carbon dioxide sensor |
| 9 | D1 | Output, indication on wall module |
| 10 | M | Measurement neutral |
| 11 | X1 | Input, bypass button on wall module |
| 12 | R1 | Input, setpoint offset dial on wall module |
| 13 | M | Measurement neutral |
| 14 | B1 | Input, temperature sensor |
| 15 | G | 24 V AC (G) input |
| 16 | G0 | 24 V AC (G0) input |
| 17 | OP | 24 V AC supply for TAC Xenta OP |
| 18 | G | 24 V AC supply for TAC Xenta OP |
| 19 | V1 | Output, heating valve, increase or on/off |
| 20 | G | 24 V AC (G) output for V1 and V2 |
| 21 | V2 | Output, heating valve, decrease or on/off |
| 22 | – | Not used |
| 23 | G | 24 V AC (G) output for actuators |
| 24 | G | 24 V AC (G) output for actuators |
| 25 | G0 | 24 V AC (G0) output for actuators |
| 26 | Y2 | Output, cooling valve act., 0 (2)–10 V* |
| 27 | M | Measurement neutral |
| 28 | Y1 | Output, cooling damper actuator |

*0 or 2 V equals a closed cooling valve, 10 V equals an open cooling valve. The actuator should be able to switch running directions.

## ROOM UNITS

The STR is a series of wall modules optimized for public facilities such as office buildings, hotels, hospitals, schools, and shopping malls.

The following room units can be configured with the TAC Xenta 103-A.

| Model | Temp. Sensor | Mode Indicator | Setpoint Offset | Bypass Button | Back Light | SNVT Binding Required |
|---|---|---|---|---|---|---|
| STR100 | X | | | | | |
| STR101 | X | X | | | | |
| STR102 | X | X | X | | | |
| STR103 | X | X | | X | | |
| STR104 | X | X | X | X | | |
| STR150 | X | X | X | X | | |
| STR350 | X | X | X | X | | X |
| STR351 | X | X | X | X | X | X |

## PART NUMBERS

STR100 . . . . . . . . . . . . . . . .004600100
STR100-W (White) . . . . . . . .004600110
STR101 . . . . . . . . . . . . . . . .004600200
STR102 . . . . . . . . . . . . . . . .004600300
STR103 . . . . . . . . . . . . . . . .004600700
STR104 . . . . . . . . . . . . . . . .004600400
STR150 . . . . . . . . . . . . . . . .004602800

**LON Modules**
STR350 . . . . . . . . . . . . . . . .004605000
STR351 . . . . . . . . . . . . . . . .004605100

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