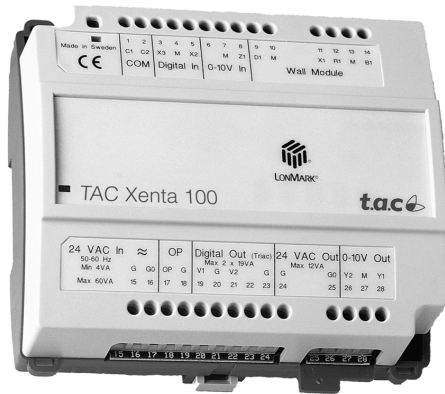




# TAC Xenta 103-A

Zone Controller with Air Quality Control

17 Jan 2003



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 LON<sup>TALK</sup>® 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. 2x19 VA = 38 VA
Total	max 54 VA
Ambient temperature:	
Operation	0 to 50 °C (32 to 122 °F)
Storage	-20 to 50 °C (-4 to 122 °F)
Humidity	max. 90% RH, non-condensing
Enclosure:	
Material	ABS/PC plastic
Enclosure rating	IP 30
Color	grey/red
Dimensions	122 x 126 x 50 mm (4.8 x 5 x 2 in)
Weight	0.4 kg (0.88 lbs)
Inputs X2-X3 for occupancy sensor and window contact:	
Voltage across open contact	23 V DC ± 1 V
Current through closed contact	4 mA
Minimum pulse input duration, inp. X2/X3	250 ms / 15 s
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 to 50 °C (14 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 s
Indication LED colors:	
Power	green
Service	red
Interoperability:	
Standard	conforms to LON <sup>MARK</sup> ®
	Interoperability Guidelines and LON <sup>MARK</sup>
	Functional Profile: Chilled Ceiling Controller
Communication protocol	LON <sup>TALK</sup>
Physical channel	TP/FT-10, 78 kbps
Neuron® type	3150®, 10 MHz
Conformance to standards:	
Emission	C-Tick, FCC Part 15, EN 50081-1
Immunity	EN 50082-1
Safety:	
CE	EN 61010-1
UL 916	Energy Management Equipment
ETL listing	UL 3111-1, first edition
	CAN/CSA C22.2 No. 1010.1-92
Flammability class, materials	UL 94 V-0
Part number, TAC Xenta 103-A:	
Controller	0-073-0561
Handbook (GB)	0-004-7526
Plug-in Terminal Blocks TAC Xenta 100	0-073-0914
Disk with external interface files (XIF) for the TAC Xenta 100 series	0-008-5582



## APPLICATION EXAMPLE

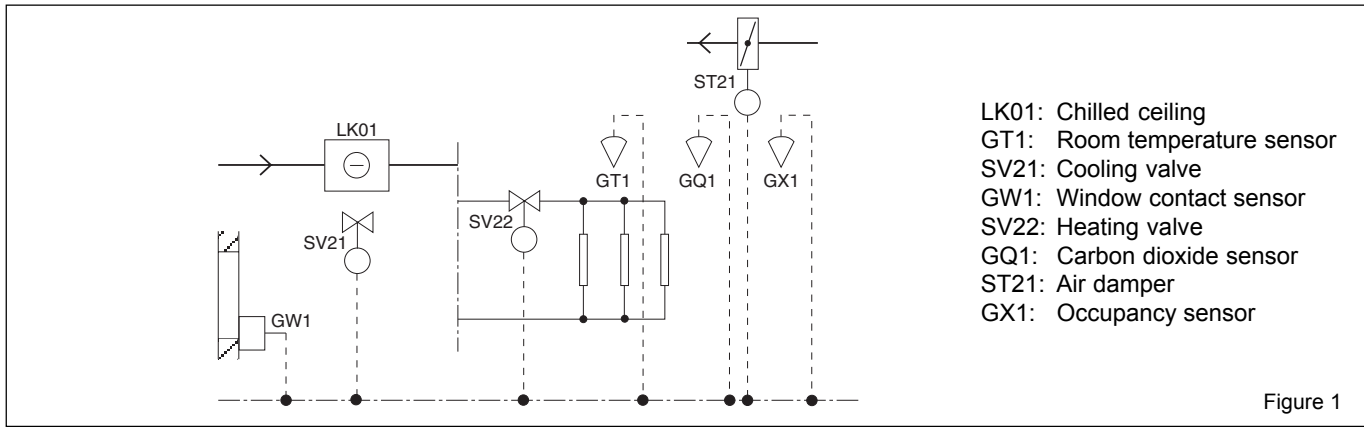


Figure 1

## 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 figure 2). 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).

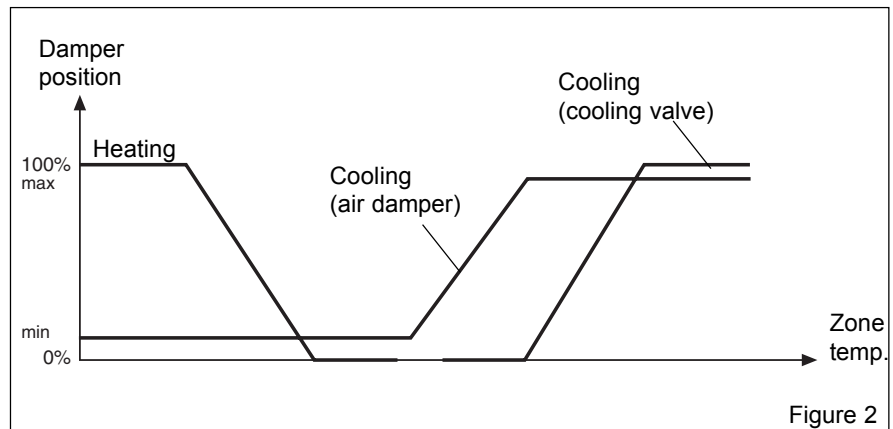


Figure 2

## 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 figure 3); 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.

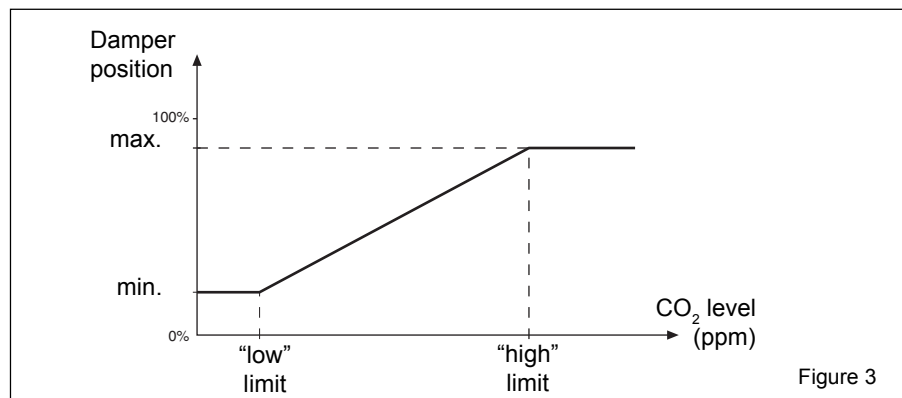


Figure 3

### 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.

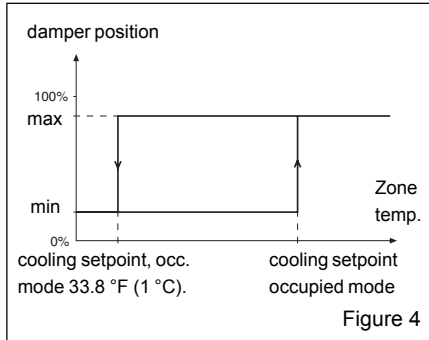
The frost protection is off in the slave controller, but it is on in the master controller.

## OPERATING MODES (CONT'D.)

### Night purge mode

In night purge mode, the setpoint for cooling in occupied mode  $-1\text{ }^{\circ}\text{C}$  ( $30.2\text{ }^{\circ}\text{F}$ ) is used (see figure 4). 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  $1\text{ }^{\circ}\text{C}$  ( $33.8\text{ }^{\circ}\text{F}$ ).



## 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.

### Cable lengths

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  $0.7\text{ mm}^2$  (18 AWG) applies to all other cables and all other equipment. The cables are to be twisted, but not shielded.

## CONFIGURATION OPTIONS

By changing the network variable *nciAppOptions* (see figure 5), 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

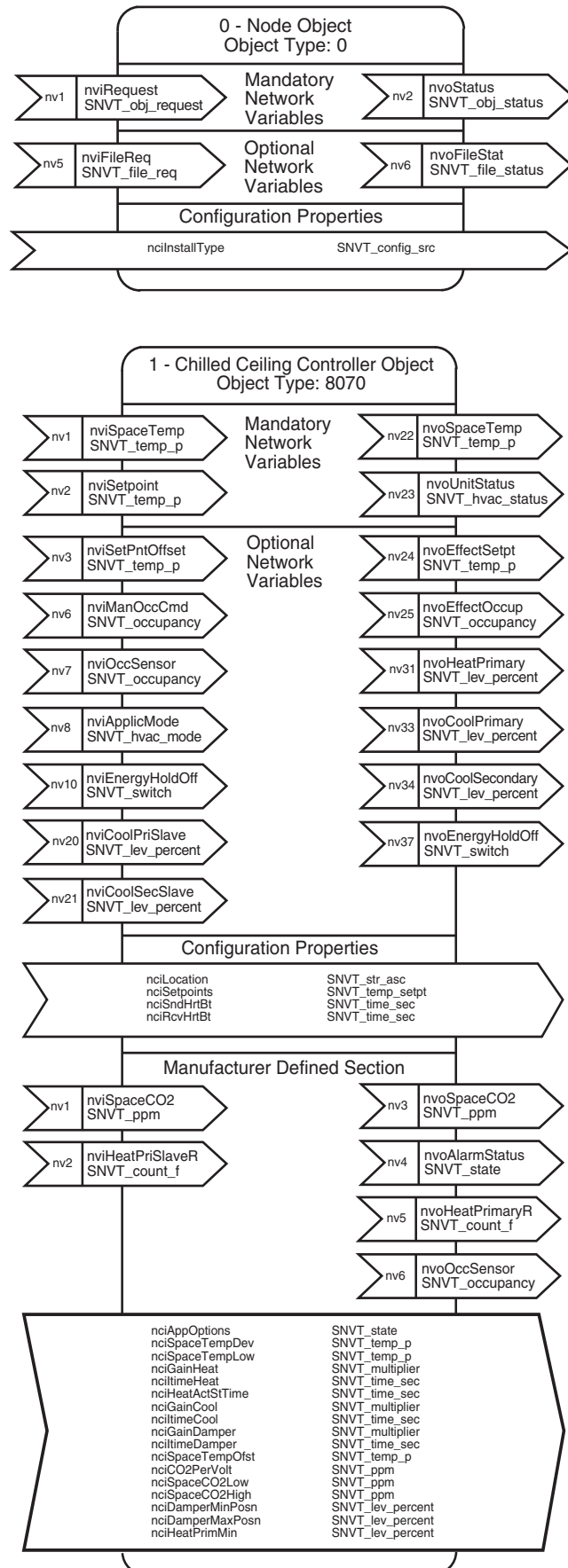


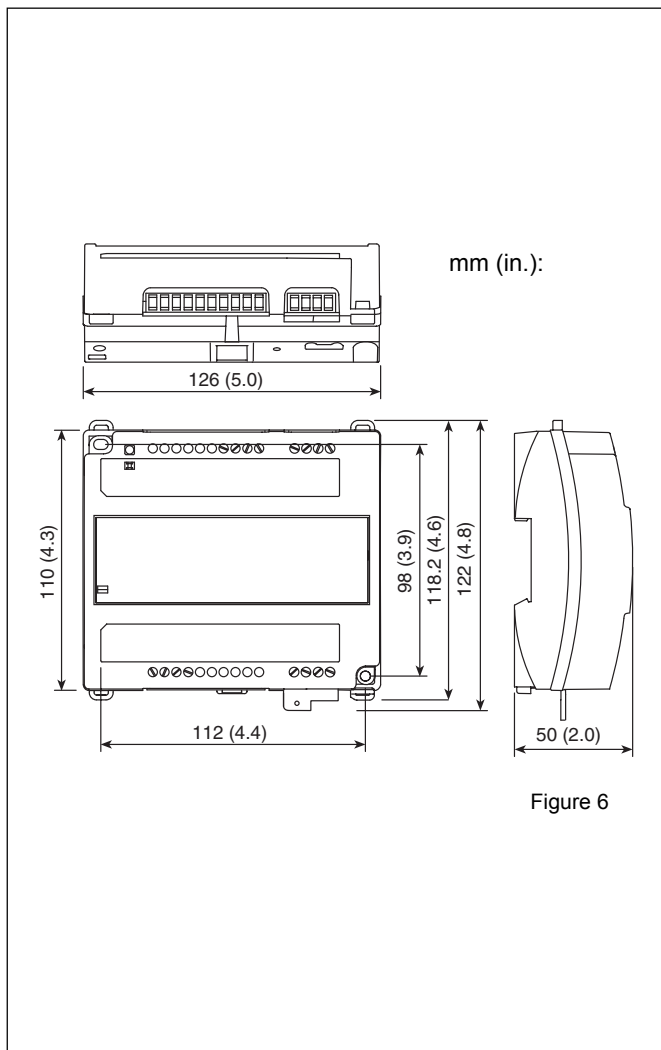
Figure 5

## HARDWARE INTERFACE

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

## DIMENSIONS



## STR WALL MODULES

Designation Part number	Description
STR100 0-046-0010	Temperature sensor
STR101 0-046-0020	Temperature sensor, mode indication and OP connector
STR102 0-046-0030	Temperature sensor, setpoint dial, mode indication and OP connector
STR104 0-046-0040	Temperature sensor, setpoint dial, mode indication, bypass button and OP connector
STR150 0-046-0280	Temperature sensor, setpoint dial, mode indication, bypass button and OP connector

## ZS WALL MODULES

Designation Part number	Description
ZS 101 0-073-0908	Temperature sensor, mode indication and OP connector
ZS 102 0-073-0909	Temperature sensor, setpoint dial, mode indication and OP connector
ZS 103 0-073-0910	Temperature sensor, mode indication, bypass button and OP connector
ZS 104 0-073-0911	Temperature sensor, mode indication, bypass button, setpoint dial and OP connector

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