TAC Xenta® 102-B

VAV Controller

TAC Xenta® 102-B is a zone controller VAV cooling applications. It is possible to switch between the heating and cooling via the network.

The controller keeps a constant temperature in the zone by controlling the airflow with the aid of a Belimo® VAV Compact. It is also possible to limit the airflow. By using a carbon dioxide sensor, the air quality can be controlled in the zone.

The controller is a LonMark®-compliant device that 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 via the TAC Xenta OP, if the OP version is 3.11 or higher.

ZS 100 is a range of wall modules intended to be used with TAC Xenta 102.

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
Total .... max. 16 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 × 5 × 2 in)
Weight .... 0.4 kg (0.88 lbs)

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

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

Input for zone temperature sensor, 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)

Inputs for air flow and carbon dioxide sensor, Z1–Z2:
Measuring range .... 0–10 V DC
Accuracy .... ±0.05 V

Input setpoint adjustment on wall module, R1:
Type .... 10 kΩ linear potentiometer
Adjustment range .... ±5 °C (±9 °F)
Accuracy .... ±0.1 °C (±0.18 °F)

Output for air flow controller, Y1:
Output range .... 0–10 V DC
Maximum current .... 2 mA
Accuracy .... ±0.2 V

Application program:
Cycle time .... 15 s

Indication LED colors:
Power .... green
Service .... red

Interoperability:
Standard .... conforms to
LonMark Interoperability Guidelines and
LonMark Functional Profile: VAV Controller
Communication protocol .... LonTalk
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 102-B:
Controller 0-073-0531
Manual (GB) 0-004-7516
Plug-in Terminal Blocks TAC Xenta 100 0-073-0914

Window contact

Damper and air flow sensor

Carbon dioxide sensor

Wall module

Occupancy sensor
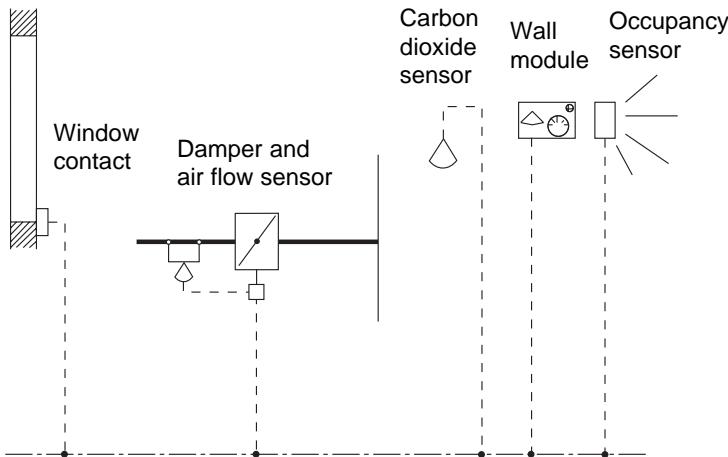
N.B.!
It is **not** appropriate to mix TAC Xenta 102-B, TAC Xenta 102-EF and TAC Xenta 102-VF in a project when TAC Xenta 102-B is to control a heating application, as TAC Xenta 102-B uses hot air from the central air handling unit in the heating mode.

Figure 1

FUNCTIONS

The function of TAC Xenta 102-B is determined by the occupancy mode, the application mode, the emergency mode, the manual mode and the node state.

Normally, the controller has cooling control only. The air flow increases when the cooling demand increases (see figure 2). With a network variable, the control sequence can be changed to heating; in this case, the air flow increases and provides heated supply air.

Air quality control
In order to maintain the air quality, the controller selects the highest of three air flow values: the air flow ordered from the cooling sequence, the air quality control or the set minimum position for the damper. At a high carbon dioxide concentration, the air flow is set from the air quality control (see figure 3); at other times, it is set by the temperature control sequence. The air quality control is enabled in the occupied and bypass modes.

Air flow

100%

0%

Heating

Change via network variable

Cooling

Cooling demand

Figure 2

Air flow

100%

max.

min.

0%

"low" limit

"high" limit

CO_2 level
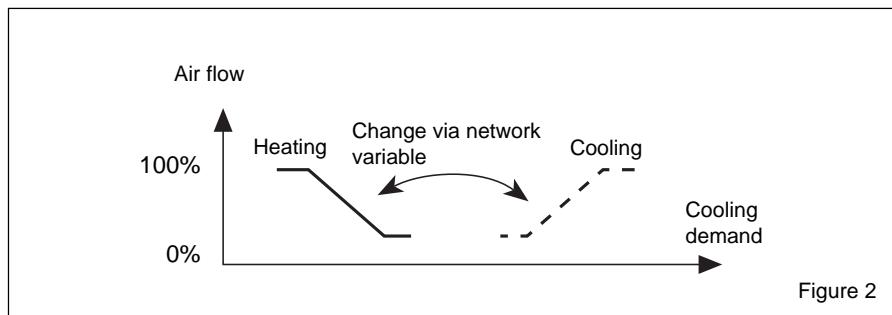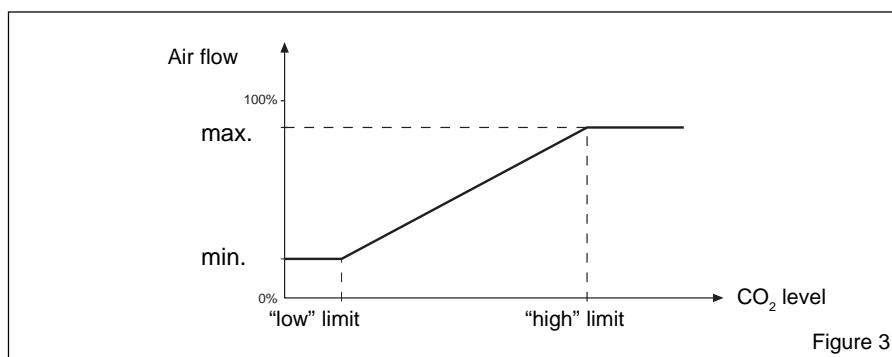
Figure 3

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.

Standby mode
The standby mode reduces energy consumption when enabled. Standby setpoints for heating or cooling are used, and the air flow is diminished from "minimum occupied air flow" to "minimum standby air flow".

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

Unoccupied and off modes
The controller stops running when the unoccupied or off mode is centrally ordered, when a window is opened or slave mode is enabled. The damper is fully closed.

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

The slave controller goes into off mode and receives copies of output signals from the master controller. In slave mode, both the slave and master controllers must be equipped with identical auxiliary units.

OPERATING MODES (CONT'D.)

Night purge mode
In night purge mode, the air flow is set to its maximum value in order to cool the zone with outdoor air. If the controller is used in a heating application, the heating is off.

EMERGENCY MODE

Emergency mode is forced and has two different settings:

Shutdown mode
The damper is fully closed.

Purge mode
The air flow is set to its nominal value, which equals a fully open damper.

When emergency mode is not needed, the network variable is set to normal control.

INSTALLATION

The controller may be mounted on a DIN rail or fastened onto a ceiling or a wall. 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 cross-sectional area of 0.7 mm^2 (20 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 4), it is possible to achieve different options in TAC Xenta 102-B.

The default setting of the controller disables all auxiliary units. Below is a list of the different options:

- Occupancy sensor enabled/disabled
- Window contact enabled/disabled
- Cooling only enabled/disabled
- Air quality controller enabled/disabled
- Slave mode disabled/enabled
- Occupancy sensor normally open/normally closed

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 - VAV Controller Object
Object Type: 8010

	Mandatory Network Variables	
nv1 nviSpaceTemp SNVT_temp_p		nv3 nvoSpaceTemp SNVT_temp_p
nv2 nviSetpoint SNVT_temp_p		nv4 nvoUnitStatus SNVT_hvac_stat

	Optional Network Variables	
nv5 nviApplicMode SNVT_hvac_mode		nv16 nvoEffectSetpt SNVT_temp_p
nv6 nviManOverride SNVT_hvac_overid		nv17 nvoFlowControlPt SNVT_flow
nv7 nviSetpntOffset SNVT_temp_p		nv18 nvoBoxFlow SNVT_flow
nv8 nviManOccCmd SNVT_occupancy		nv19 nvoTerminalLoad SNVT_lev_percent
nv9 nviEmergCmd SNVT_hvac_emerg		nv20 nvoEnergyHoldOff SNVT_switch
nv10 nvoBoxFlow SNVT_flow		
nv11 nviEnergyHoldOff SNVT_switch		
nv13 nviSpaceCO2 SNVT_ppm		

Configuration Properties

nciLocation	SNVT_str_asc
nciSetpoints	SNVT_temp_setpt
nciMinFlow	SNVT_flow
nciMaxFlow	SNVT_flow
nciNomFlow	SNVT_flow
nciMinFlowHeat	SNVT_flow
nciMinFlowStand	SNVT_flow
nciVAVGain	SNVT_multiplier
nciSndHrtBt	SNVT_time_sec
nciRcvHrtBt	SNVT_time_sec

Manufacturer Defined Section

nv1 nviHeatSlave SNVT_count_f	nv2 nvoHeatSlave SNVT_count_f
nv22 nviOccSensor SNVT_occupancy	nv3 nvoEffectOccup SNVT_occupancy
	nv4 nvoAlarmStatus SNVT_state
	nv5 nvoSpaceCO2 SNVT_ppm
	nv6 nvoFlowSetpoint SNVT_lev_percent
	nv27 nvoOccSensor SNVT_occupancy

nciAppOptions	SNVT_state
nciGainHeat	SNVT_multiplier
nciItimeHeat	SNVT_time_sec
nciHeatPrimMin	SNVT_lev_percent
nciVAVItime	SNVT_time_sec
nciCO2PerVolt	SNVT_ppm
nciSpaceCO2Low	SNVT_ppm
nciSpaceCO2High	SNVT_ppm
nciFlowOfstSlave	SNVT_flow_f
nciSpaceTempDev	SNVT_temp_p
nciSpaceTempLow	SNVT_temp_p
nciSpaceTempOfst	SNVT_temp_p

Figure 4

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	—	Not used
6	Z2	Input, carbon dioxide sensor	20	G	24 V AC (G) output
7	M	Measurement neutral	21	G0	24 V AC (G0) output
8	Z1	Input, air flow	22	—	Not used
9	D1	Output, indication on wall module	23	M	Measurement neutral
10	M	Measurement neutral	24	Y1	Air flow controller setpoint
11	X1	Input, bypass button on wall module	25	—	Not used
12	R1	Input, setpoint offset dial on wall module	26	—	Not used
13	M	Measurement neutral	27	—	Not used
14	B1	Input, temperature sensor	28	—	Not used

DIMENSIONS

126 (5.0)
110 (4.3)
98 (3.9)
118.2 (4.6)
122 (4.8)
112 (4.4)
50 (2.0)
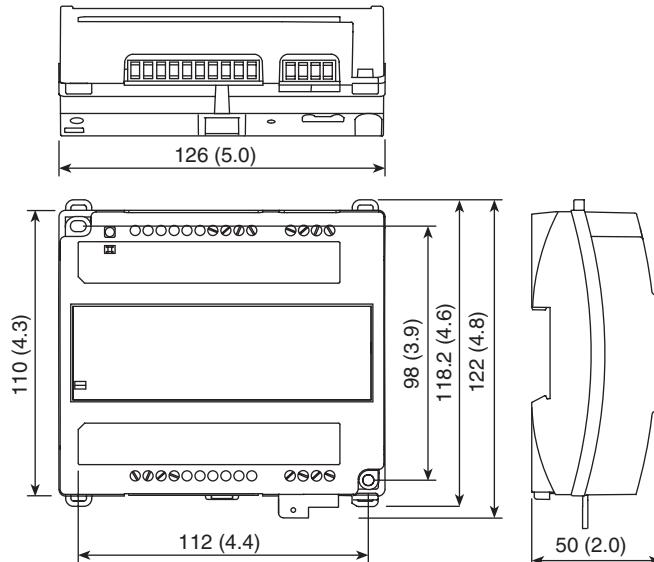
Figure 5

WALL MODULES

Designation	Description	Part number
Sensor Zone ZS 101	Wall module with temperature sensor, mode indication LED and OP connector	0-073-0908
Sensor Zone ZS 102	Wall module with temperature sensor, mode indication LED, setpoint dial and OP connector	0-073-0909
Sensor Zone ZS 103	Wall module with temperature sensor, mode indication LED, bypass button and OP connector	0-073-0910
Sensor Zone ZS 104	Wall module with temperature sensor, mode indication LED, bypass button, setpoint dial and OP connector	0-073-0911

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