TAC Xenta® 121-FC

Programmable Fan Coil Application

TAC Xenta 121-FC is an easily programmable controller intended for both 2-pipe and 4-pipe applications, with or without re-heat. It can be configured for use with a multitude of valve actuator types, such as on/off, multistage, increse/decrease, PWM, and so on. The controller has different types of fan control and advanced fan control functions, including on/off delays, boosting, and conditioning.

The sequences for cooling, heating, and fan are completely user-programmable, allowing for numerous different applications. For energy savings the controller has built-in economizer functionality. Use TAC Xenta 121-FC with any TAC STR (1.8 kohm) room unit.

Set-up is done using the programming tool TAC ZBuilder, which can be run stand-alone or as a device plug-in to either TAC Vista® or LonMaker®. Using Vista or LonMaker, the configuration settings are downloaded into a TAC Xenta 121, prepared with the necessary basic application software.

The controller is a LonMark® compliant device aimed at communicating on a LonTalk® TP/FT-10 channel. It is able to operate both as a stand-alone device and as part of a system. In- and output network variables can be monitored via the TAC Xenta OP, but programming relies on the use of the TAC ZBuilder.

TECHNICAL DATA

Supply Voltage
FC/24 . . . . . 24 V AC ±20%, 50–60 Hz
FC/230 . . . . . .230 V AC ±10%, 50–60 Hz

Power Consumption
FC/24:
Controller with TAC Xenta OP . . . . . 5 VA
Digital outputs . . . . . max. 4×19 VA = 76 VA
Total. . . . . max. 81 VA
FC/230:
Controller with TAC Xenta OP . . . . . 5 VA
Digital outputs, individual outputs and total . . . . . max. 12 VA
Total. . . . . max. 20 VA

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

Enclosure
Material. . . . . .ABS/PC plastic
Enclosure rating. . . . . IP 30
Flammability class, materials . . . . . .UL 94 5VB
Color. . . . . gray/red
Dimensions, mm (in.). . . . . 122×126×50 (4.8x5.0x2)
Weight, kg (lb.) . . . . . FC/24: 0.3 (0.66) / FC/230: 0.6 (1.3)

Inputs X1–X3
Voltage across open contact . . . . . .23 V DC ± 1 V DC
Current through closed contact . . . . . .4 mA
Minimum pulse input duration . . . . . 250 ms

Inputs for Sensors B1–B2
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 (±0.4 °F)

Universal Input U1
As temperature input. . . . . same as B(1–2)
As digital input . . . . . same as X(1–3)
As analog input . . . . . 0–10 V DC

Input R1
Type . . . . . 10 kΩ linear potentiometer
Adjustment range . . . . . software configurable

Triac Outputs V1–V4 (24 V AC Internally Supplied)
Maximum load per output. . . . . FC/24: 0.8 A / FC/230: 0.5 A

Relay Outputs K1–K3
Maximum voltage . . . . . 250 V AC
Maximum resistive load. . . . . 3 A

Relay Output K4
Maximum voltage . . . . . FC/24: 24 V AC / FC/230: 250 V AC
Maximum resistive load. . . . . 3 A

Voltage Output Y1
Range . . . . . 0–10 V DC
Maximum load . . . . . .2 mA

Indication LED Colors
Power . . . . . .green
Service. . . . . .red

Interoperability
Standard . . . . . .TAC Xenta 121-FC conforms to
LonMark Interoperability Guidelines 3.4 and
LonMark Functional Profile: 8501 SCC – Fan Coil
Communication protocol . . . . . LonTalk
Physical channel . . . . . .TP/FT-10, 78 kbps
Neuron type . . . . . .3150, 10 MHz

Agency Compliances
Emission: CE . . . . . .C-Tick, EN 61000-6-3, FCC Part 15
Immunity: CE. . . . . EN 61000-6-1
Safety: CE . . . . . .EN 61010-1
UL 916 (TAC Xenta 121-FC/24) . . . . . C-UL US Listed

Energy Management Equipment
TAC Xenta 121-FC/24 . . . . Approved for plenum installations

Part Numbers
Contr Zone TAC Xenta 121-FC/24 0-073-0621
Contr Zone TAC Xenta 121-FC/230 0-073-0622
Manual Engineering TAC Xenta 120 (EN) 0-004-7692
Plug-in Terminal Blocks TAC Xenta 100 0-073-0914

APPLICATION EXAMPLES

TAC Xenta 121-FC can be programmed to have up to two heating devices and one cooling device. Each of these can be a multistage, pwm, analog, or increase/decrease device.

A Fan Coil unit can have a heating coil and a cooling coil (4-pipe, Fig. 1a).

It can also be a combined cooling and heating coil (2-pipe, Fig. 1b). For the 2-pipe application, a water temperature sensor is required for crossover.

An electrical heater is common as the second device.

The user defines the sequence; there are no restrictions that a specific device be activated first, in parallel, in series, or so on.

Fan control outputs are always either a multistage output (1, 2, or 3 stages) or an analog output.

Economizer control using an outside air damper, as well as CO_2 control and %RH control are available.

When the temperature in the zone increases, the heating valve closes, see Fig. 2. If there is still a cooling demand, the cooling valve opens and the fan speed increases in steps until the highest fan speed is reached.

This sequence is reversed when the temperature drops.

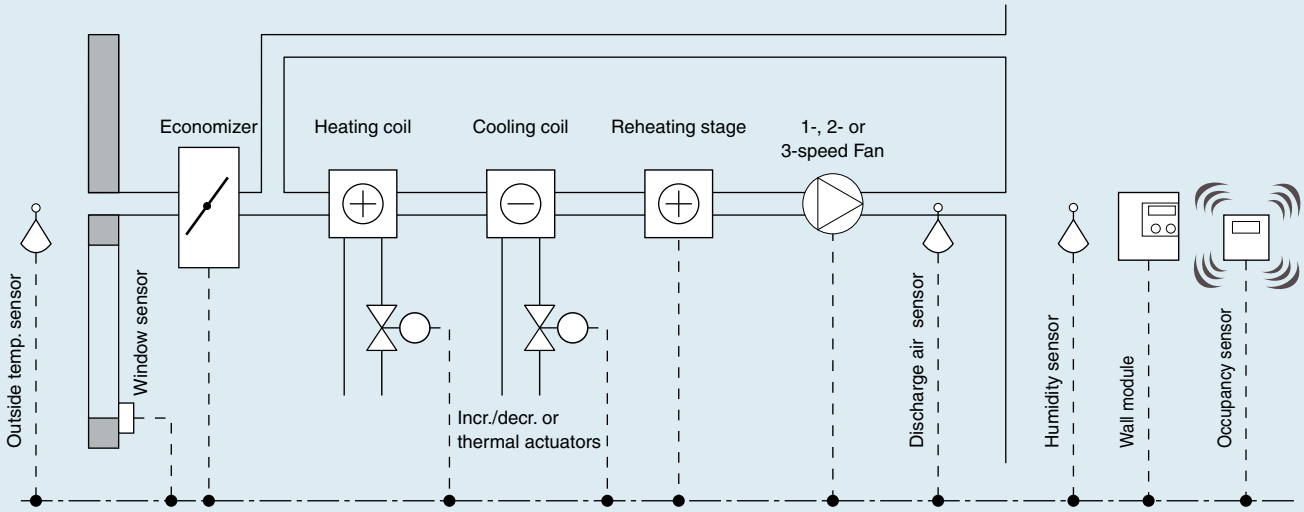

Figure 1a: Fan Coil unit, 4-pipe

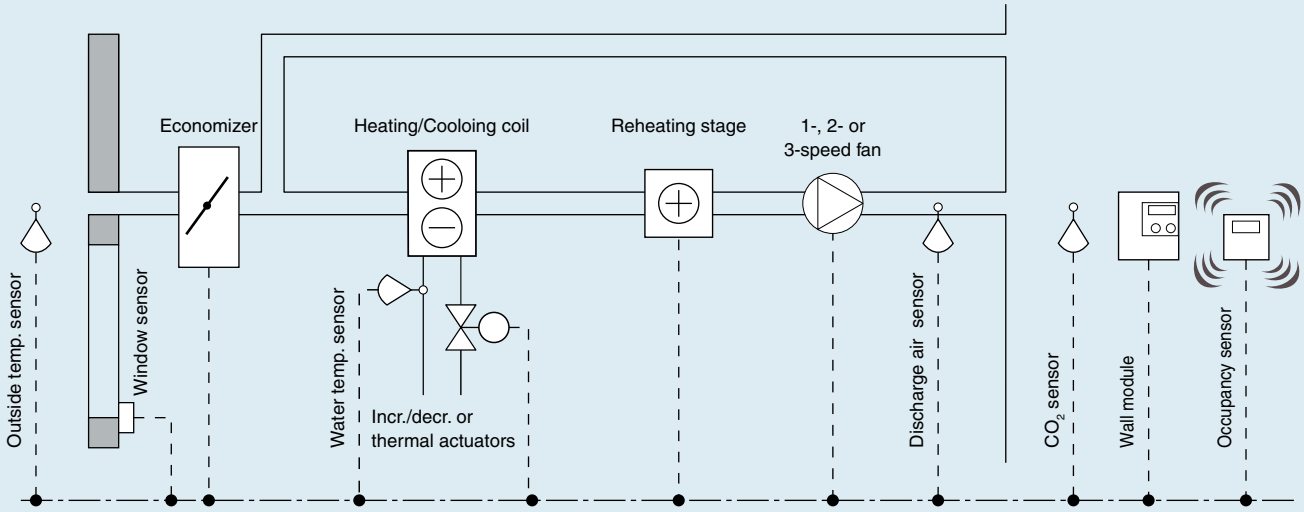

Figure 1b: Fan Coil unit, 2-pipe

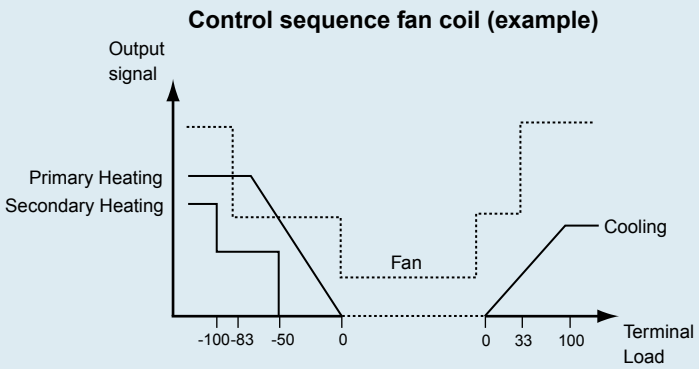

Figure 2

CONTROL OPTIONS

The valve control options are as follows:

Analog, 0–10V

Incr/Decr (3-point)

Pulse Width Modulation

One digital signal gives a modulating signal by using a variable duty cycle.

Multistage

1–3 digital outputs are used to give up to three levels of control. A special case of this is one stage, which is just on/off.

General

For the different types of control, different set-ups like scaling or signal limitation values, hysteresis, timing, and so on, can be given.

Any type of control can be used with any equipment, but some types are more suitable than others.

All control can be done either over physical outputs of the controller or on other devices connected to the controller over a LON® network.

Available I/O

- 3 digital inputs (X)
- 2 temperature inputs (B) NTC 1.8 kohm
- 1 universal input (U), temperature or digital
- 1 pot.meter input (R) linear 10 kohm
- 4 Triac outputs (V): valve actuators or other devices
- 4 relay outputs (K): Fan or other devices
- 1 analog output, 0-10 V (Y): analog or LED

INSTALLATION

To safisfy regulatory safety requirements, the controller must be built-in when line voltage is connected.

It may be mounted on a DIN rail or fastened onto a surface with screws. There are two sockets provided for that purpose.

Cable lengths

Communication cables: please refer to the TAC Xenta Network Guide, part no. 0-004-7460.

CONFIGURATION OPTIONS

By selecting among the Configuration Modules in the TAC ZBuilder, it is possible to achieve different options in TAC Xenta 121-FC for the following:

- Space (Wall module) and outside temperature sensors
- Discharge (Supply) Air temperature sensor
- Water temperature sensor (2-pipe)
- Setpoint adjustment
- Outside air damper (Economizer control)
- Relative Humidity sensors, space and outside
- reversing valve
- CO_2 sensor
- Bypass or On/Off button
- Room temperature offset scaling
- Occupancy sensor
- Fan status
- Window contact
- Freeze protection
- Alarm output
- Main switch (for example, hotel room key)

TAC Xenta OP can be used to inspect nvi and nvo values. Due to the many configuration possibilities, it cannot be used to configure the controller.

OTHER FUNCTIONS

Exception Modes

Exception Mode is a common name for all kinds of situations where normal control no longer can be used. Examples are window contact, freeze protection, and morning warm-up.

Up to eight different exception modes can be configured.

Each mode will have its predefined values on heating devices one and two, cooling device, fan status, speed, and outside air damper. If applicable, it can also be connected to a digital output.

Each of the eight exception modes has its own indicator in nvoSystemStatus.

When the exception mode situation clears, it is possible to configure if it is allowed to go out of the exception mode and, if so, the delay before normal control is resumed.

Examples where exception modes are useful:

- Window contact
- Main Switch
- Smoke input
- Freeze protection

Resync

All outputs configured as inc/dec outputs will have a cyclic resync interval of 18 h. Resync can also be initiated via nviDOResync and is always done towards the closed position.

Installations Test – Checkout Mode

To facilitate the testing and installation, it is possible to override the physical outputs. By setting a certain status override SNVT, all outputs will be controlled by the user, who can test them freely. No fan interlock or other logical conditions will be activated.

Forcing the Space temp makes it possible to verify the sequence.

Unused Digital Inputs and Outputs

Some digital outputs will have a SNVT input, which allows any other LON device to control these digital outputs.

A condition is that the application is not using the output. Some unused inputs will have the same functionality, using a SNVT output.

Not all digital inputs/outputs can have a mirror SNVT, due to the limitation of the SNVTs. If feasible, the same will be applied for analog in/outputs.

Flexible Combinations

By using TAC ZBuilder stand-alone on a PC, you can easily explore the many features and the great versatility of this product.

Please refer to the TAC ZBuilder data sheet 0-003-3010 for further details about the easy way to program your TAC Xenta 121.

LonMark OBJECTS AND NETWORK VARIABLES

Additionally, the following objects are used, all with their configuration parameters handled by TAC ZBuilder:

Config. Param.	Description
20023	Application Object
20024	Control Object
20026	Fan Object
20028	I/O Object
20025	Temperature Control Device Object
20027	Exception Mode Object

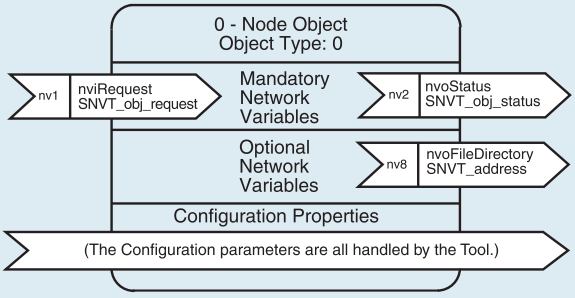

Figure 3

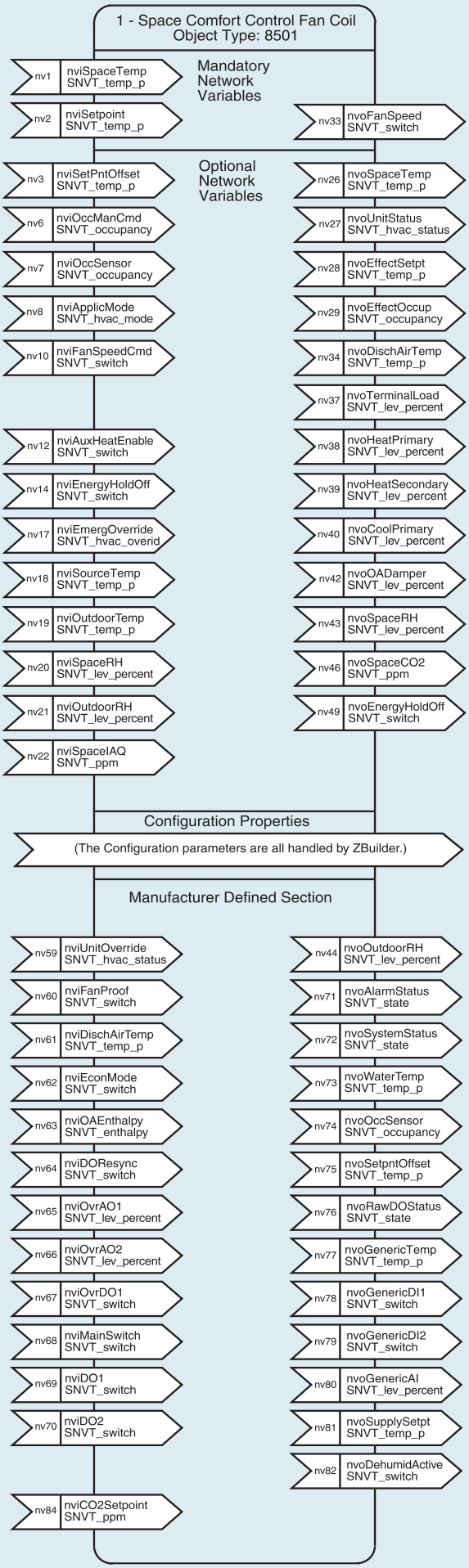

Figure 4

HARDWARE INTERFACE

No.	Designation	Description
1	X2	Input, digital
2	M	Measurement neutral
3	X3	Input, digital
4	B2	Input, temperature sensor
5	Y1	Output, analog
6	M	Measurement neutral
7	X1	Input, digital
8	R1	Input, setpoint offset dial on wall module
9	M	Measurement neutral
10	B1	Input, temperature sensor
11	K4	Output, relay 4
12	KC2	Relay 4, common
13	G0 or N	See 14
14	G or L	FC/24: 24V AC Supply FC/230: Mains Supply

No.	Designation	Description
15	C1	TP/FT-10 communication channel
16	C2	See above
17	M	Measurement neutral
18	U1	Input, temp. sensor/digital/analog
19	V1	Output, Triac 24 V AC
20	G	24 V AC (L) output for V1 and V2
21	V2	Output, Triac 24 V AC
22	V3	Output, Triac 24 V AC
23	G	24 V AC (L) output for V3 and V4
24	V4	Output, Triac 24 V AC
25	K3	Output, relay 3
26	K2	Output, relay 2
27	K1	Output, relay 1
28	KC1	Relay 1-3, common
	OP	TAC Xenta OP RJ-10 access connector

DIMENSIONS

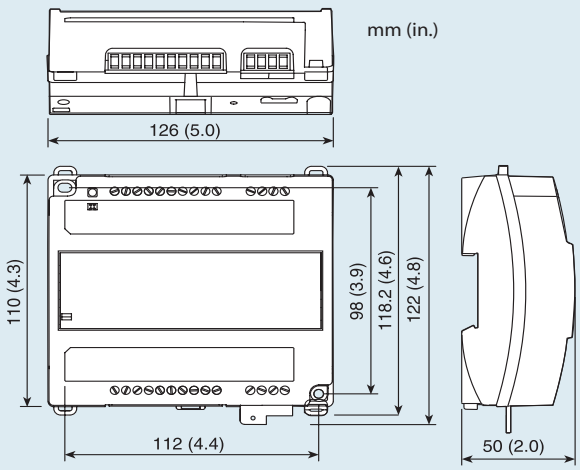

Figure 5

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 121-FC.

Model	Temp. Sensor	Mode Indicator	Setpoint Offset	Bypass Button	Fan Speed Control	Back Light	SNVT Binding Required
STR100	X						
STR101	X	X					
STR102	X	X	X				
STR103	X	X		X			
STR104	X	X	X	X			
STR106	X	X	X	X	X*		
STR107	X	X	X	X	X**		
STR150	X	X	X	X	X***		
STR350	X	X	X	X	X***		X
STR351	X	X	X	X	X***	X	X

* STR106 Fan speed: Auto-0-I-II-III
** STR107 Fan speed: Auto-Off-On
*** STR150, 350/351 Fan speed: configurable

PART NUMBERS

STR100 0-046-0010
STR100-W (White) 0-046-0011
STR101 0-046-0020
STR102 0-046-0030
STR103 0-046-0070
STR104 0-046-0040
STR106 0-046-0050
STR107 0-046-0060
STR150 0-046-0280

LON Modules

STR350 0-046-0500
STR351 0-046-0510

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