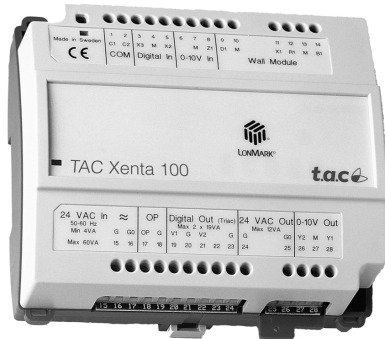# TAC Xenta 101-VF

3-Speed Fan Coil Controller

17 Jan 2003

TAC Xenta® 101-VF is a zone controller intended primarily for fan coil applications with the ability to control fans with multiple speeds, with one or two valve applications.

The TAC Xenta 101-VF also has an auxiliary output for general use. The TAC Xenta 101-VF controls the space temperature in a zone by regulating the temperature of the air circulated through the fan-coil unit.

The TAC Xenta 101-VF is available in three different models: 24 V AC supply, 115 V mains supply and 230 V mains supply.

The controller is a LONMARK® compliant device aimed at communicating on a LONTALK® TP/FT-10 channel via a twisted-pair, unpolarized cable. It is able to operate both as a stand-alone device and as part of a system. All network variables can be monitored and configured via the TAC Xenta OP, if the OP version is 3.33 or higher.

The STR100 and ZS 100 ranges of wall modules are intended to be used together with TAC Xenta 101-VF.

There are plug-in terminal blocks available for the TAC Xenta 100 series which can be attached to the existing terminals.

TECHNICAL DATA

Supply voltage VF/24 .... 24 V AC ±20%, 50–60 Hz
   VF/115 .... 115 V AC ±10%, 60 Hz
   VF/230 .... 230 V AC ±10%, 50–60 Hz

Power consumption VF/24:
   Controller with TAC Xenta OP .... 4 VA
   Digital outputs .... max. 4×19 VA = 76 VA
   Total .... max. 80 VA

Power consumption VF/115 or VF/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
   Color .... grey/red
   Dimensions .... 122×126×50 mm (4.8"x5.0"x2")
   Weight .... VF/24 - 0.3 kg (0.66 lb),
   .... VF/115 and VF/230 - 0.6 kg (1.3 lb)

Inputs X1–X2 for bypass button and occupancy sensor:
   Voltage across open contact .... 23 V DC ± 1 V DC
   Current through closed contact .... 4 mA
   Minimum pulse input duration .... 250 ms

Input X3 for energy hold off device:
   Voltage across open contact .... 23 V DC ± 1 V DC
   Current through closed contact .... 4 mA
   Minimum pulse input duration .... 10 s

Outputs V1–V4 for heating/cooling valve actuators (triac):
   Type of actuator .... incr./decr. or thermal actuator NC/NO
   Maximum load .... VF/24 - 0.8 A
   .... VF/115 and VF/230 - 0.5 A

Relay outputs for fan on-off control, K1, K2, K3 and KC1; for auxiliary output K4 and KC2:
   Maximum voltage .... 250 V AC
   Maximum load .... 3 A

Inputs for zone temperature and discharge air sensors, B1–B2 and water temperature sensor U1:
   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)

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

Application program:
   Cycle time .... 10 s

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

Interoperability:
   Standard .... TAC Xenta 101-VF conforms to
      LONMARK Interoperability Guidelines and
      LONMARK Functional Profile: Fan Coil Unit
   Communication protocol .... LONTALK
   Physical channel .... TP/FT-10, 78 kbps
   Neuron® type .... 3150®, 10 MHz

Conformance to standards:
   Emission .... C-Tick, EN 50081-1, FCC Part 15
   Immunity .... EN 50082-1
   Safety:
      CE .... EN 61010-1
      ETL listing .... UL 3111-1, first edition
      .... CAN/CSA C22.2 No. 1010.1-92
      UL 916 (pending) .... Energy Management Equipment
      Flammability class, materials .... UL 94 V-0

Part number, TAC Xenta 101-VF:
   Controller VF/24 0-073-0505
   Controller VF/115 0-073-0506
   Controller VF/230 0-073-0507
   Manual (EN) 0-004-7797
   Plug-in Terminal Blocks TAC Xenta 100 0-073-0914
   Disk with external interface files (XIF) for the
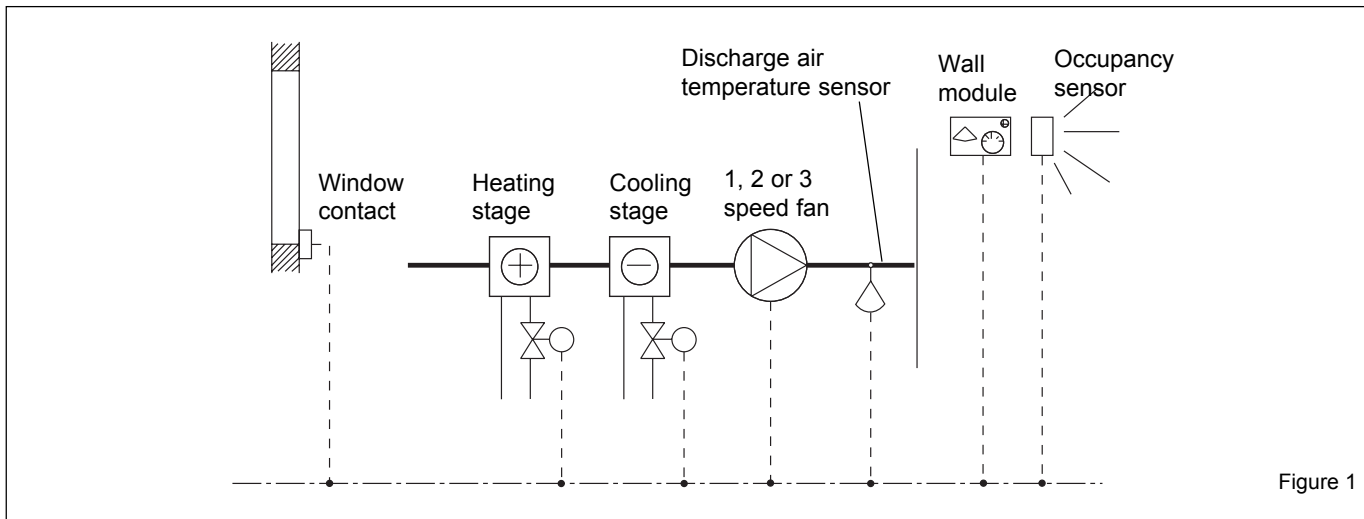   TAC Xenta 100 series 0-008-5582

Figure 1

FUNCTIONS

The function of TAC Xenta 101-VF is determined by the occupancy mode, the application mode and the node state.

When the temperature in the zone increases, the heating valve closes, see figure 2. If there is still a cooling demand, the cooling valve opens and when fully open, the fan speed increases in steps until the highest fan speed is reached, see figure 2. This sequence is reversed when the temperature drops.

Cascade control
Control of zone and discharge air temperature can be done in cascade. The controller will use an extra PI controller to calculate a setpoint for the discharge air temperature, based on the current zone temperature.

Fan control
The fan is controlled by 3 relay outputs (maximum) and can be used for 1, 2 or 3-speed fans. An example of fan control with a 3-speed fan can be seen in figure 3. It is also possible to configure during which application modes the fan will be activated.
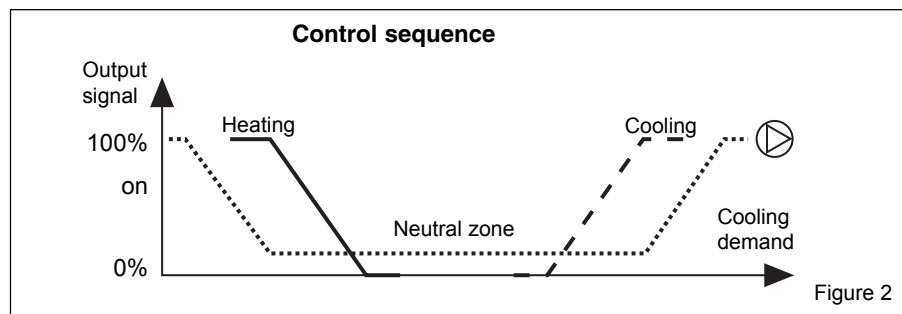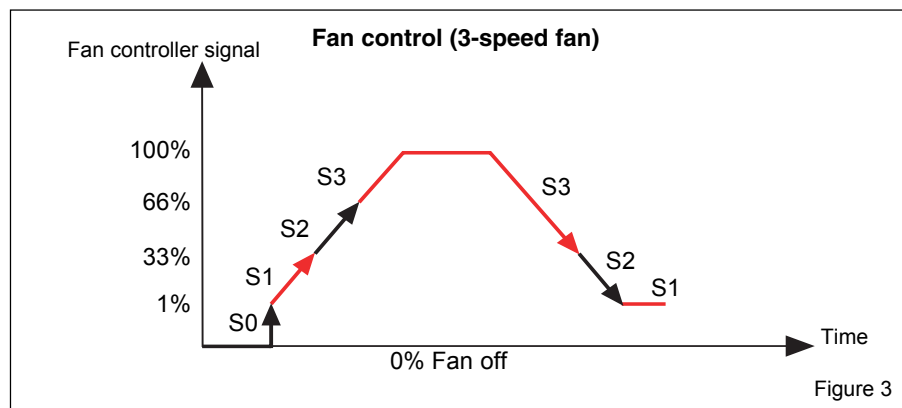

Figure 2

Figure 3

Low temperature protection
When the zone temperature drops below 10 °C (50 °F), the controller goes into heating mode in order 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.

Standby mode
The controller reduces the energy consumption in the zone when standby mode is enabled. The neutral zone is larger than in occupied mode.

Bypass mode
The controller enters the bypass mode by pressing the bypass button on the wall module, which will set the controller to function as in occupied mode. When the bypass time (configurable) has passed, the controller goes back to standby mode again.

Unoccupied mode
Unoccupied mode is used when the building is unoccupied for a longer period. The neutral zone is even larger than in standby mode.

Off mode

The controller stops running when off mode is centrally ordered, when a window is opened or slave mode is enabled in the controller.

Slave mode

When the network variable *nciAppOptions* is set so that slave mode is enabled, the following happens:

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 actuators and valves.

Fan override function

Fan override can be set from the central system using the network variable *nviFanSpeedCmd* (see figure 4) or using a local switch wired to input X1.

INSTALLATION

The controller is only intended for built-in installation and may be mounted on a DIN rail or by fastening it onto a surface with screws. There are two sockets provided for that purpose.

Cable lengths

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

CONFIGURATION OPTIONS

By changing the network variables *nciAppOptions* or *nciAppOptions2*, see figure 4, it is possible to achieve different options in TAC Xenta 101-VF.

Different options available:

- Occupancy sensor enabled/disabled
- Window contact enabled/disabled
- Cascade control enabled/disabled.
- Cooling valve enabled/disabled
- Heating valve enabled/disabled
- Slave mode enabled/disabled
- Occupancy sensor normally open/ normally closed
- One-, two- or three-speed fan
- Actuator types
- Fan running mode
- One or two valve configuration
- Type of Wall Modules used
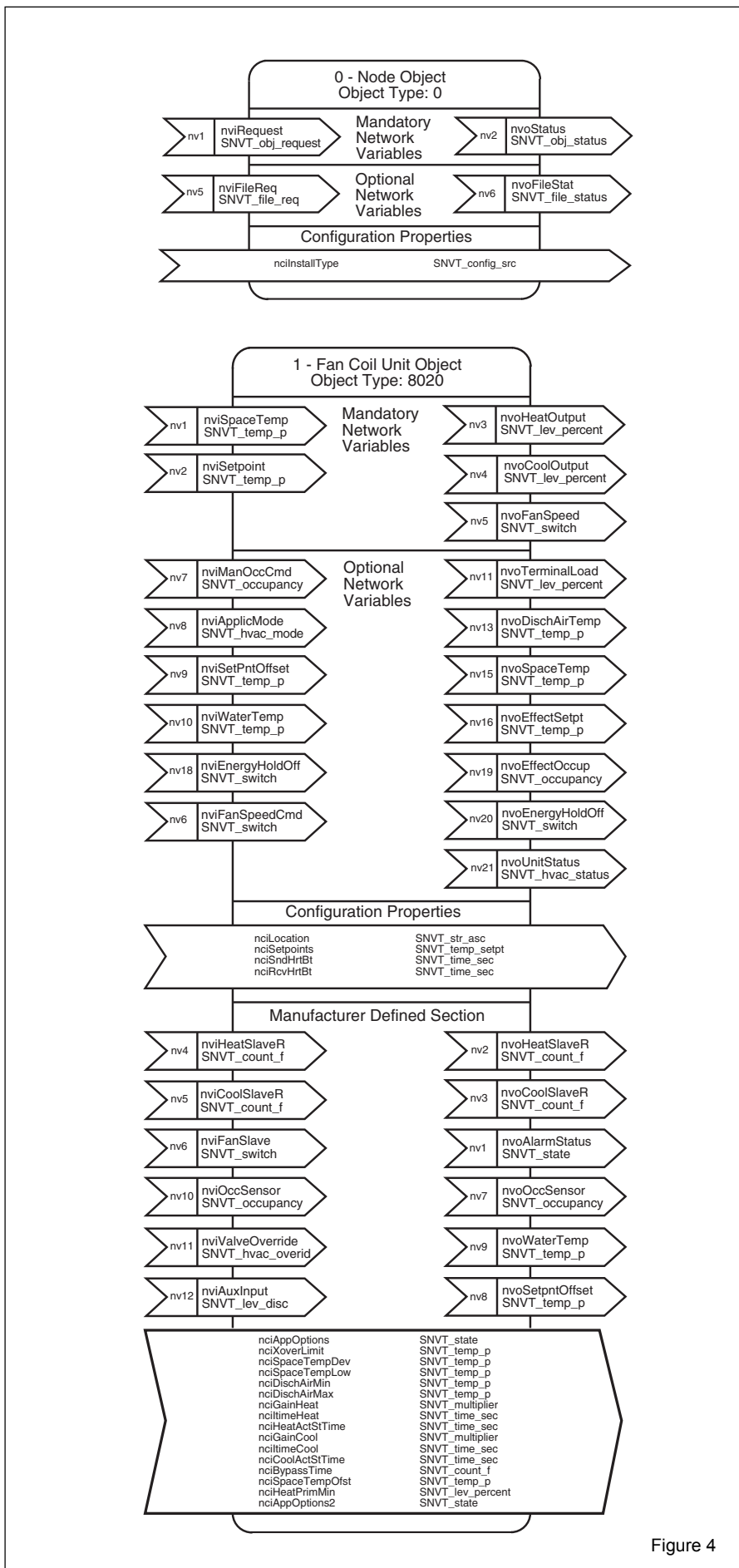- Controlling mode "Fan Off"

LONMARK OBJECTS AND NETWORK VARIABLES

0 - Node Object
Object Type: 0

nv1	nviRequest SNVT_obj_request	Mandatory Network Variables	nv2 nvoStatus SNVT_obj_status
nv5	nviFileReq SNVT_file_req	Optional Network Variables	nv6 nvoFileStat SNVT_file_status

Configuration Properties

nciInstallType   SNVT_config_src

1 - Fan Coil Unit Object
Object Type: 8020

nv1	nviSpaceTemp SNVT_temp_p	Mandatory Network Variables	nv3 nvoHeatOutput SNVT_lev_percent
nv2	nviSetpoint SNVT_temp_p		nv4 nvoCoolOutput SNVT_lev_percent
			nv5 nvoFanSpeed SNVT_switch

nv7	nviManOccCmd SNVT_occupancy	Optional Network Variables	nv11 nvoTerminalLoad SNVT_lev_percent
nv8	nviApplicMode SNVT_hvac_mode		nv13 nvoDischAirTemp SNVT_temp_p
nv9	nviSetPntOffset SNVT_temp_p		nv15 nvoSpaceTemp SNVT_temp_p
nv10	nviWaterTemp SNVT_temp_p		nv16 nvoEffectSetpt SNVT_temp_p
nv18	nviEnergyHoldOff SNVT_switch		nv19 nvoEffectOccup SNVT_occupancy
nv6	nviFanSpeedCmd SNVT_switch		nv20 nvoEnergyHoldOff SNVT_switch
			nv21 nvoUnitStatus SNVT_hvac_status

Configuration Properties

nciLocation	SNVT_str_asc
nciSetpoints	SNVT_temp_setpt
nciSndHrtBt	SNVT_time_sec
nciRcvHrtBt	SNVT_time_sec

Manufacturer Defined Section

nv4	nviHeatSlaveR SNVT_count_f	nv2	nvoHeatSlaveR SNVT_count_f
nv5	nviCoolSlaveR SNVT_count_f	nv3	nvoCoolSlaveR SNVT_count_f
nv6	nviFanSlave SNVT_switch	nv1	nvoAlarmStatus SNVT_state
nv10	nviOccSensor SNVT_occupancy	nv7	nvoOccSensor SNVT_occupancy
nv11	nviValveOverride SNVT_hvac_overid	nv9	nvoWaterTemp SNVT_temp_p
nv12	nviAuxInput SNVT_lev_disc	nv8	nvoSetpntOffset SNVT_temp_p

nciAppOptions	SNVT_state
nciXoverLimit	SNVT_temp_p
nciSpaceTempDev	SNVT_temp_p
nciSpaceTempLow	SNVT_temp_p
nciDischAirMin	SNVT_temp_p
nciDischAirMax	SNVT_temp_p
nciGainHeat	SNVT_multiplier
nciItimeHeat	SNVT_time_sec
nciHeatActStTime	SNVT_time_sec
nciGainCool	SNVT_multiplier
nciItimeCool	SNVT_time_sec
nciCoolActStTime	SNVT_time_sec
nciBypassTime	SNVT_count_f
nciSpaceTempOfst	SNVT_temp_p
nciHeatPrimMin	SNVT_lev_percent
nciAppOptions2	SNVT_state

Figure 4

HARDWARE INTERFACE

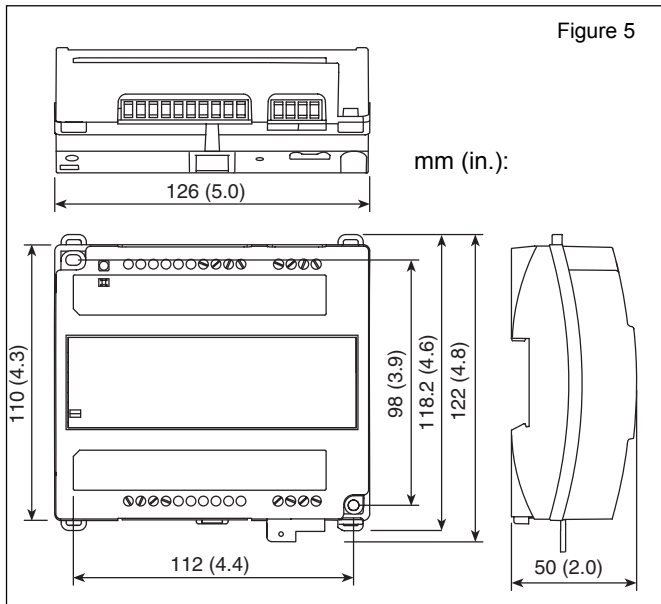| No.	Designation	Description	No.	Designation	Description
1	X2	Input, occupancy sensor	15	C1	TP/FT-10 communication channel
2	M	Measurement neutral	16	C2	see above
3	X3	Input, energy hold off device	17	M	Measurement neutral
4	B2	Input, discharge air temp. sensor	18	U1	Input, water temperature sensor
5	D1	Output, indication on wall module	19	V1	Output, heating/cooling valve: open
6	M	Measurement neutral	20	G	24 V AC (G) output for V1 and V2
7	X1	Input, bypass button / Fan override	21	V2	Output, heating/cooling valve: close
8	R1	Input, setpoint offset dial on wall module	22	V3	Output, cooling valve: open
9	M	Measurement neutral	23	G	24 V AC (G) output for V3 and V4
10	B1	Input, Zone temperature sensor	24	V4	Output, cooling valve: close
11	K4	Auxiliary relay output	25	K3	Fan speed 3 relay output
12	KC2	Auxiliary relay output	26	K2	Fan speed 2 relay output
13	G0	VF/24: 24V AC Supply	27	K1	Fan speed 1 relay output
	or 115V	VF/115: Mains Supply	28	KC1	Fan speed relay common
	or 230V	VF/230: Mains Supply			
14	G/115V/230V	See 13		OP	TAC Xenta OP access 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

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
STR106 0-046-0050	Temperature sensor, setpoint dial, mode indication, bypass button, fan speed control and OP connector
STR107 0-046-0060	Temperature sensor, setpoint dial, mode indication, bypass button, fan speed control and OP connector
STR150 0-046-0280	Temperature sensor, setpoint dial, mode indication, bypass button, fan speed control and OP connector

DIMENSIONS

Figure 5

mm (in.):
126 (5.0)
110 (4.3)
98 (3.9)
118.2 (4.6)
122 (4.8)
112 (4.4)
50 (2.0)