

TAC Xenta[®] 300

Controller, Freely Programmable

TAC Xenta 300 belongs to a family of freely programmable controllers designed for small and medium-sized heating and air handling systems. A TAC Xenta 300 controller holds full HVAC functionality including control loops, curves, time control, alarm handling, etc.

Two different I/O configurations are available in the TAC Xenta 300 series controllers, which includes the TAC Xenta 301 and TAC Xenta 302. If required, separate I/O modules may be added. Both the controllers and I/O modules are designed for cabinet mounting. The TAC Xenta 300 controller is simple to program using the graphical application programming software, TAC Menta.

The controller communicates on a LonTalk TP/FT-10 network via a twisted-pair, unpolarized cable. It is able to operate as a stand-alone unit, but can also easily be connected to a large LonWorks based network. TAC Xenta 300 can also be connected to a TAC Vista Building Management System. The controller can be removed/inserted from/to the terminal part without disconnecting the power supply. When adding or replacing a controller it's also possible to pre-configure it in order to achieve Plug and Play functionality without any on-site configurations.

For local use, the TAC Xenta OP (Operator Panel) can be connected. The operator panel has a display and push buttons for navigating and altering settings. The operator panel can be snapped onto the TAC Xenta controller unit, mounted on the front of the cabinet, or used as a portable terminal.

SYSTEM CONFIGURATIONS

The TAC Xenta 300 controller can be used in different configurations;

- as a stand-alone unit
- as a controller (with operator panel) in a small network, with extra I/O modules as required
- as a controller (with operator panel) and other equipment in a full network with suitable adapters, possibly connected to a TAC Vista Building Management System

Fig. 1 shows an example of TAC Xenta network configuration.

Sensors and actuators on the field level are mostly connected to the conventional inputs/outputs of the controllers or I/O-modules.

Some external units, however, may connect directly to the network to communicate input/output data, using Standard Network Variable Types (SNVTs).

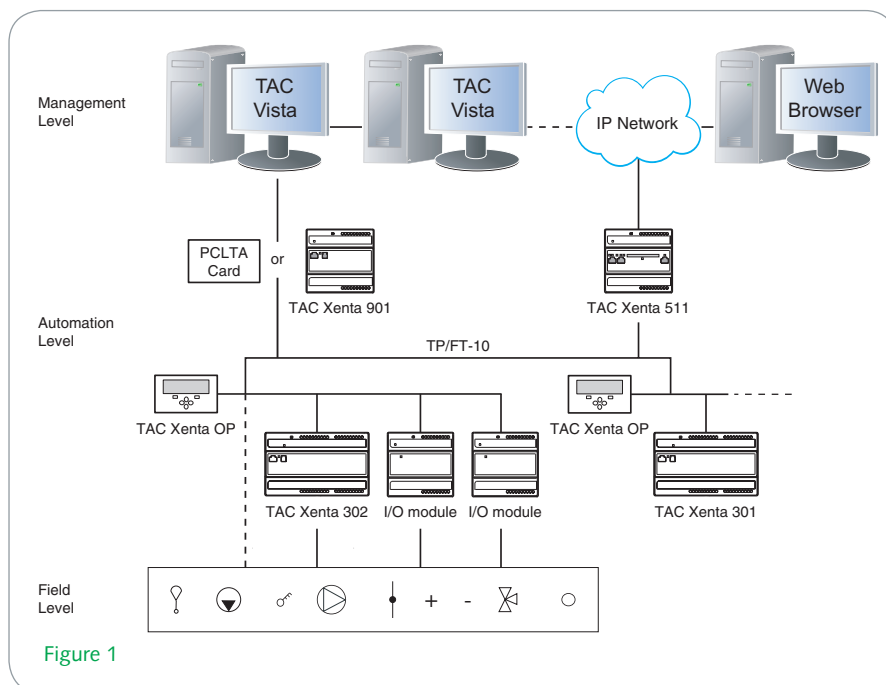


Figure 1

DESIGN

The TAC Xenta 300 controller has been designed as a general purpose unitary (one-to-one) controller. Thus, it can be mounted in close proximity to the controlled equipment, minimizing the wiring required.

The TAC Xenta 300 is microprocessor based. It consists of a terminal and electronics mounted together (Fig. 2).

The Xenta 300 can be interfaced with a wide variety of field sensors/transducers and controlled devices. All terminations of field wires are made to the terminal part only. Thus, the electronic part may be removed for service without affecting the terminal connections.

Local Operator Panel

The TAC Xenta OP (Operator Panel) is a small operator panel which can be connected to the unit through its enclosure. The operator can read point status, perform manual override, read measured values, alter set points etc., from the operator panel.

The functions are selected from menus. Access to the unit is enabled by using an access code. It is possible to access other TAC Xenta units on the same network.

Real Time Clock

The clock provides data such as year, month, date, day, hour, minute and second.

A built-in capacitor maintains operation of the clock for at least 72 hours in the event of a power outage.

Daylight Saving Time:

European, Australian or USA/Canada

Once set, Daylight Saving Time (DST) is fully automatic. The change-over date and the number of hours to change are programmable. This function can also be disabled.

Digital Inputs

The digital inputs are used to sense alarm contacts, status indications, pulse counting, etc.

Each digital input can be used as a pulse counter (e.g. for flow measurement).

Another application available when using the digital inputs is for alarm monitoring. Each time an alarm is tripped, the corresponding counter can be incremented, providing data for operating statistics. The digital inputs circuits are internally powered.

Universal Inputs

The Universal Inputs can be individually configured as analog or digital inputs.

A high and a low limit can be set for each universal input. If configured as digital inputs, the universal inputs may be used, for example, for sensing switch positions.

The universal input types are selected via the application program.

Digital Outputs

There are digital outputs controlling equipment such as fans, pumps or similar devices. The output signal can be pulse width modulated and can be used to control increase/decrease actuators.

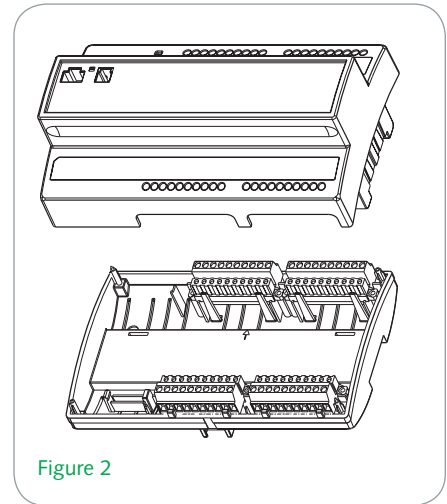


Figure 2

Analog Outputs

There are analog outputs for controlling actuators or other analog equipment.

LonWorks SNVT Support

The use of Standard Network Variable Types (SNVT), in accordance with the Echelon specification, makes it possible to communicate with nodes made by other manufacturers.

Power Outage Protection

Using non-volatile (flash) memory, the unit will start up with user settings and work normally after a power outage.

COMMUNICATION

Communication Capabilities

The TAC Xenta 300 has several communication capabilities within a Network with a TAC Vista Building Management System and/or a hand-held operator panel.

LonWorks Connection

TAC Xenta controllers communicate with each other using a common network, LonWorks TP/FT-10, 78 kbps. A number of controllers can form a network and exchange data.

Additional I/O units also connect to the network and may be added as required. An I/O unit can only be associated with one controller.

The LonTalk protocol makes it possible to use network variables defined in equipment from third party manufacturers.

The functional block applications are modeled as true LonMark controller objects.

The network variable interface (including the Standard Network Variable Types, SNVTs) can be customized, and external interface files (XIFs) can be generated with the TAC Menta programming tool.

TAC Vista Building Management System

When connected to a TAC Vista Building Management System, the operating conditions of the fans, pumps, heat exchangers, etc. can be monitored in color graphics or printed reports.

Temperatures and alarms can be read, while setpoints, time settings may be altered as required.

TAC Xenta controllers can be reached from TAC Vista in one of the following ways:

- 1 Any controller in the network via a PCLTA card.
- 2 A specific controller via the RS-232 connection.
- 3 Any controller in the network via the TAC Xenta 901 LonTalk adapter.

Application programs generated in TAC Menta may be downloaded from TAC Vista via the network.

TAC Xenta Operator Panel Port

The TAC Xenta OP (Operator Panel) is also connected to the network and can thus act as an operator panel for other units in the network. The connection is

made via the modular jack on the front of the controller or directly, using the network cable.

RS-232 Port

The TAC Xenta 300 controller has an RS-232 port. This port is intended for connection to a PC using the TAC Menta programming tool for loading and commissioning the application program.

The port can also be used for connection between TAC Vista and specific TAC Xenta 300 units (see 2 under "TAC Vista Building Management System" above).

TECHNICAL DATA

Supply voltage. 24 V AC $\pm 20\%$, 50/60 Hz or 19–40 V DC
Power consumption. max. 5 W
Transformer sizing. 10 VA

Ambient Temperature

– Except TAC Xenta 301XT/N/P:
Storage $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$)
Operation $\pm 0\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$)
– TAC Xenta 301XT/N/P:
Storage $-20\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+158\text{ }^{\circ}\text{F}$)
Operation $-20\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+158\text{ }^{\circ}\text{F}$)
Humidity max. 90% RH non-condensing

Mechanical

Enclosure. ABS/PC
Enclosure rating. IP 20
Flammability class, materials UL 94 V-0
Dimensions see Fig. 3
Weight 1.0 kg (2.2 lb.)

CPU

CPU. 32 bit, 10 MHz, 512 kB flash memory, 128 kB SRAM

Real Time Clock

Accuracy at $+25\text{ }^{\circ}\text{C}$ ($77\text{ }^{\circ}\text{F}$) ± 12 minutes per year
Power outage protection 72 h

Digital Inputs (X1–X4)

Quantity 4
Voltage across open contact 33 V DC
Current through closed contact 4 mA
Pulse input duration. min. 20 ms

Universal Inputs (U1–U4)

Quantity 4
– Digital inputs:
Voltage across open contact. 26 V DC
Current through closed contact 4 mA
Pulse input duration. min. 20 ms
– Thermistor inputs:
TAC thermistor sensor 1.8 k Ω at $25\text{ }^{\circ}\text{C}$ ($77\text{ }^{\circ}\text{F}$)
Measuring range $-50\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ ($-58\text{ }^{\circ}\text{F}$ to $+302\text{ }^{\circ}\text{F}$)
– Voltage inputs:
Input signal 0–10 V DC
Input resistance 100 k Ω accuracy within 1% of full scale
Inaccuracy $\leq \pm 1\%$

Sensor Inputs (B1–B4)

Quantity 4
TAC thermistor sensor 1.8 k Ω at $25\text{ }^{\circ}\text{C}$ ($+77\text{ }^{\circ}\text{F}$)
Measuring range $-50\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ ($-58\text{ }^{\circ}\text{F}$ to $+302\text{ }^{\circ}\text{F}$)

Digital Outputs (relays; K1–K6 or K1–K4)

Quantity, TAC Xenta 301. 6
Quantity, TAC Xenta 302. 4
Control voltage, relay outputs up to 230 V AC
Control current, to be protected by max. 10 A fuse. max. 2 A

Analog Outputs (Y1–Y2 or Y1–Y4)

Quantity, TAC Xenta 301. 2
Quantity, TAC Xenta 302. 4
Control voltage 0–10 V DC
Control current, short-circuit proof max. 2 mA
Deviation. max $\pm 1\%$

Communication

TAC Menta; modem 9600 bps, RS-232, RJ-45
TAC Vista TP/FT-10, screw terminal
(also for application program download)
TAC Xenta OP. TP/FT-10, modular jack

LonMark Standard

Interoperability LonMark Interop. Guidelines v 3.0
Application LonMark Functional Profile: Plant Controller

Agency Compliances

Emission C-Tick; EN 61000-6-3; FCC Part 15, Subpart B, Class B
Immunity. EN 61000-6-1

Safety

CE EN 61010-1
UL 916 C-UL US Listed

Part Numbers

Electronics part TAC Xenta 301/N/P 0-073-0009
Electronics part TAC Xenta 301XT/N/P 0-073-0010
Electronics part TAC Xenta 302/N/P 0-073-0011
Terminal part TAC Xenta 280/300 0-073-0901
I/O units TAC Xenta see separate data sheet
Operator panel TAC Xenta OP 0-073-0907
TAC Xenta: Programming Serial Kit 0-073-0920

TAC XENTA UNIT PERFORMANCE

LonWorks

No. of I/O modules. 2
No. of STR350/351 (non-SNVT mode) 2
No. of subscriptions*
In. max. 15
Out max. 30

Trend Logging in the TAC Xenta 300 (from v 3.3, hw version 2)

Channels 1–50
Interval 10 s – 530 weeks
Total logging cap. approx. 4,000 floating point numbers
. or approx. 8,000 integers
or approx. 60,000 digital values
Optimized storage. Yes

Application Size

Program and data max. 56 kB
Parameters max. 64 kB

* Subscriptions can utilize Standard Network Variable Types (SNVTs) or TAC Network Variables (TACNVs). These can be combined if the following restrictions are observed: the sum of the TACNV subscriptions and the number of SNVT members (no. of values in structured SNVTs) does not exceed the stated figures.

MOUNTING

The TAC Xenta 300 is cabinet mounted on a TS 35 mm Norm rail EN 50 022.

The controller unit consists of two parts; a terminal part with screw terminals, and electronics with the circuit boards.

To simplify installation, the terminal can be pre-mounted in the cabinet (see Fig. 1).

If the TAC Xenta 300 controller is wall mounted, a wide range of standardized boxes are available.

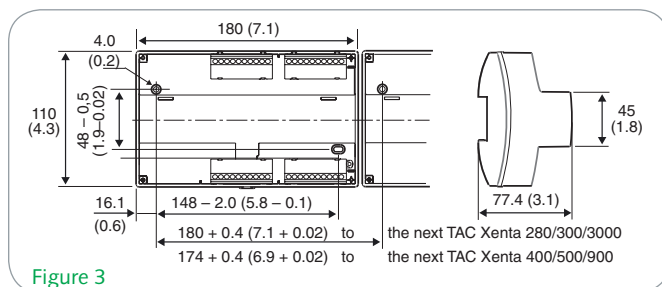


Figure 3

MAINTENANCE

The only care needed is to keep the controller dry and to clean it externally with a dry cloth when needed.

SOFTWARE FEATURES

With the assistance of TAC Menta, a graphical programming tool using Functional Block Diagrams (FBDs), the TAC Xenta 300 may be easily adapted to different control and monitoring tasks.

The basic software includes pre-programmed routines for:

- reading of digital inputs (alarms, pulse counting, interlocks)
- reading of universal inputs (individually selectable as analog or digital)
- control of digital outputs
- control of analog outputs
- on and off delays
- pulse counting (digital inputs only)

- alarm handling; alarm conditions may be detected via the digital or analog inputs
- equipment run time totals on selected objects
- programs for optimum start/stop
- control characteristic curves
- outdoor temperature compensating control curves
- PID control loops (loops may be connected in cascade)
- trend logging (max. 5 kB)
- local level operator interface via TAC Xenta OP (Operator Panel)
- network communication according to the LonTalk protocol

- communication with the TAC Vista Building Management System via modem
- connection to one or two optional I/O modules

The basic software is adapted to the current application by connecting pre-programmed functional blocks and by adjusting the relevant parameters. These connections and parameters are stored in a non-volatile memory.

The parameters may be changed during ongoing operation either from the TAC Vista Building Management System or locally from the TAC Xenta OP (Operator Panel).

CABLES

G and G0

Min. area 0.75–1.5 mm² (19–16 AWG).

Cable with modular jack for RS-232 serial communication port: Max. 10 m (32 ft.).

Terminals X1–X4

Min. area 0.25 mm² (23 AWG).

Max. cable length 200 m (650 ft.).

Terminals U1–U4, B1–B4, Y1–Y4

Min. area 0.25–0.75 mm² (23–19 AWG).

Max. cable length 20–200 m (65–650 ft.). For more details, see the TAC Xenta 280/300/401 Handbook (part no. 0-004-7768).

Terminals K1–K6

Min. area 0.75–1.5 mm² (19–16 AWG).

Max. cable length 200 m (650 ft.).

C1 and C2

TP/FT-10 allows the user to wire the control devices with virtually no topology restrictions. The max. wire distance in one segment depends on the type of wire and the topology, see the table below.

The TAC Xenta Network guide (part no. 0-004-7460) gives a more detailed description.

Cable	Max. bus length, doubly terminated bus topology m (ft.)	Max. node-to-node distance, singly terminated free topology m (ft.)	Max. length singly terminated free topology m (ft.)
Belden 85102, single twisted pair	2,700 (9,000)	500 (1,600)	500 (1,600)
Belden 8471, single twisted pair	2,700 (9,000)	400 (1,300)	500 (1,600)
UL Level IV 22AWG, twisted pair	1,400 (4,600)	400 (1,300)	500 (1,600)
Connect-Air 22AWG, one or two pairs	1,400 (4,600)	400 (1,300)	500 (1,600)
Siemens J-Y(st)Y 2x2x0.8 4-wire helical twist, solid, shielded	900 (3,000)	320 (1,000)	500 (1,600)
TIA568A Cat. 5 24AWG, twisted pair	900 (3,000)	250 (820)	450 (1,500)

I/O MODULES

TAC Xenta 300 can use up to two I/O modules from the TAC Xenta 400 series devices.

The table gives an overview of the different numbers of inputs and outputs.

DI, DO: Digital input, output

UI: Universal input

TI: Thermistor input

AO: Analog output

The Xenta 4x2 modules have manual overrides for the DO or AO, and/or DI status indication, where applicable.

I/O Module	DI	DO	UI	TI	AO
TAC Xenta 411/412	10	–	–	–	–
TAC Xenta 421/422	4	5	–	–	–
TAC Xenta 421A/422A ¹	–	5	4 ²	–	–
TAC Xenta 451/452 ¹	–	–	4 ³	4	2
TAC Xenta 451A/452A ¹	–	–	8 ²	–	2
TAC Xenta 471	–	–	8 ⁴	–	–
TAC Xenta 491/492	–	–	–	–	8

¹ Status indication only when the corresponding universal inputs (UI) are used as digital inputs (DI).

² 1.8/10 kΩ TI, 0–10 V DC, 0–20 mA, DI

³ 1.8 kΩ TI, 0–10 V DC, DI

⁴ 0–10 V DC, 0–20 mA

INSTALLATION

The two TAC Xenta 300 controllers have different inputs and outputs. The adjacent table shows the terminal connections of the two TAC Xenta controllers.

There is a label on the front of the controller with the numbers and the names of the terminals (1 C1, 2 C2 and so on). The numbers are also moulded in the plastic of the terminal part.

Note! The installation of high voltage cables must be performed by qualified personnel!

For detailed information, please refer to the TAC Xenta 280/300/401 Handbook (part no. 0-004-7768).

TAC Xenta Operator Panel

The TAC Xenta operator panel can easily be connected to the network by means of the modular socket on the front of the controller.

LED Indicator

An LED indicator on the electronic unit of the TAC Xenta 300 indicates when the application program is running.

Service Pin

To simplify network commissioning, there is a service pin on the electronic unit which, when pressed, identifies the unit on the network.

Terminal Connections (Inputs)

Term. No.	Term. Name	Description
1	C1	LonWorks TP/FT-10
2	C2	LonWorks TP/FT-10
3	U1	Universal
4	M	Measurement neutral
5	U2	Universal
6	U3	Universal
7	M	Measurement neutral
8	U4	Universal
9	B1	Thermistor
10	M	Measurement neutral
11	B2	Thermistor
12	B3	Thermistor
13	M	Measurement neutral
14	B4	Thermistor
15	X1	Digital
16	M	Measurement neutral
17	X2	Digital
18	X3	Digital
19	M	Measurement neutral
20	X4	Digital

Terminal Connections (Outputs)

Term. No.	Term. Name		Description
	301	302	
21	G	G	24 V AC (or DC+)
22	G0	G0	Ground
23	Y1	Y1	0–10 V
24	M	M	Output neutral
25	Y2	Y2	0–10 V
26	–	Y3	0–10 V
27	–	M	Output neutral
28	–	Y4	0–10 V
29	–	–	
30	–	–	
31	K5	–	Relay
32	KC3	–	K5, K6 common
33	K6	–	Relay
34	K1	K1	Relay
35	KC1	KC1	K1, K2 common
36	K2	K2	Relay
37	K3	K3	Relay
38	KC2	KC2	K3, K4 common
39	K4	K4	Relay
40	–	–	