TAC Xenta 300

C-90-05

Controller, Freely programmable

1999-04-13

TAC Xenta 300 belongs to a family of freely programmable controllers designed for small and medium sized heating and air handling systems. Two models offer different communication facilities.

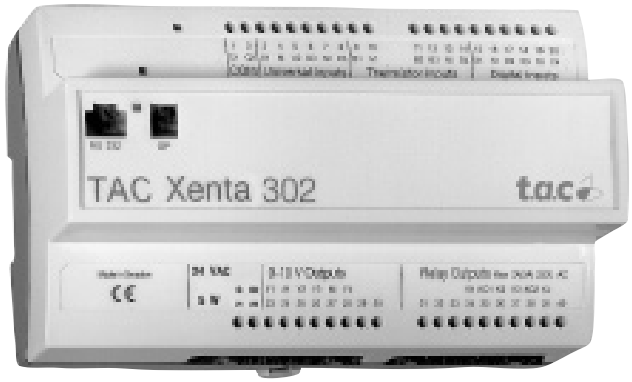
A TAC Xenta 300 controller holds full HVAC functionality including control loops, curves, time control, alarm handling etc.

The Xenta 300 controller is available with two different I/O configurations, TAC Xenta 301 and TAC Xenta 302. If required, separate I/O modules may be added. The Xenta 300 controllers and I/O modules are designed for cabinet mounting.

The TAC Xenta 300 controller is simple to program and put into operation, using the graphical tool TAC Menta.

A number of controllers can form a local network and interchange data, typically in an office building with a number of air handling units and heating plants.

TAC Xenta 300 can also be connected to a Central System, TAC Vista.



For local use the TAC Xenta OP operator panel can be connected to TAC Xenta. It has a display and a minimum number of push buttons for taking readings and altering settings.

The operator panel can be snapped onto the TAC Xenta controller unit, be mounted in the cabinet front or be used as a portable terminal.

TECHNICAL DATA

Supply voltage ..... 24 V AC ±20%, 50/60 Hz
or 19–40 V DC

Power consumption ..... max. 5 W

Ambient temperature:
- Storage ..... –20 °C to +50 °C
- Operation ..... 0 °C to +50 °C

Humidity ..... max. 90% RH non-condensing

Mechanical:
- Enclosure ..... ABS/PC
- Enclosure rating ..... IP 20
- Dimensions (mm) ..... 180 x 110 x 75
- Weight ..... 1,0 kg

Real time clock:
- Accuracy at +25 °C ..... ±12 minutes per year
- Power failure protection ..... 72 h

Digital inputs (X1–X4):
- Quantity 4
- Voltage across open contact ..... 26 V DC
- Current through closed contact ..... 4 mA
- Pulse input duration ..... min. 20 ms

Universal Inputs (U1–U4):
- Quantity 4

– as Digital Inputs;
- Voltage across open contact ..... 26 V DC
- Current through closed contact ..... 4 mA
- Pulse input duration ..... min. 20 ms

– as Thermistor Inputs;
- TAC thermistor sensor ..... 1800 ohm at 25 °C
- Measuring range ..... –50 °C to +150 °C

– as Voltage inputs;
- Input signal ..... 0–10 V DC
- Input resistance ..... 100 kohm
accuracy within 1% of full scale

Sensor inputs (B1–B4):
- Quantity 4
- TAC thermistor sensor ..... 1800 ohm at 25 °C
- Measuring range ..... –50 °C to +150 °C

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 ±1%

Communication:
- TAC Menta; modem ..... 9600 bps, RS232, RJ45
- TAC Vista, also for appl. program download (from v 3.1), ... TP/FT-10, screw terminal
- TAC Xenta OP ..... TP/FT-10, modular jack

Agency Compliances:
- Emission ..... EN 50081-1
- Immunity ..... EN 50082-1
- Safety ..... EN 61010-1

Part number:
- Electronics part TAC Xenta 301 0-073-0013
- Electronics part TAC Xenta 301/N/P 0-073-0009
- Electronics part TAC Xenta 302 0-073-0015
- Electronics part TAC Xenta 302/N/P 0-073-0011
- Terminal part TAC Xenta 300/3000 0-073-0901
- I/O units TAC Xenta .. please refer to separate data sheet
- Operator terminal TAC Xenta OP 0-073-0907
- Connection cable TAC Xenta – RS232 0-073-0903

DESIGN

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

TAC Xenta 300 is microprocessor based. It consists of a terminal part and an electronics part mounted together (figure 1). 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 electronics part may be removed for service without affecting the terminal connections.

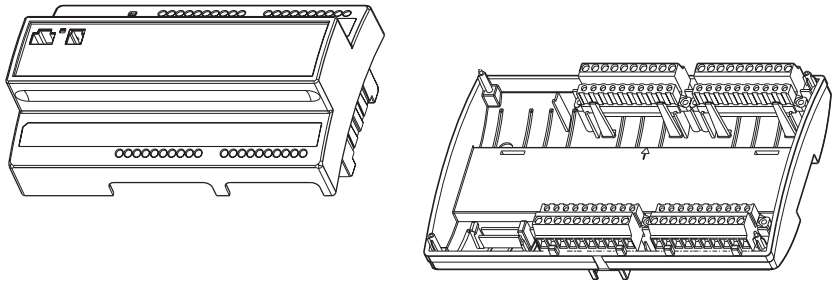


Figure 1

Local operator terminal

The TAC Xenta OP is a small operator terminal 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 TAC Xenta OP.

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

Power failure protection

Thanks to the non-volatile (flash) memory the unit will start up with user settings and work normally after a power failure.

Real-time clock

The real-time clock provides data in the form of year, month, date, day of the week, hour, minute and second. A built-in capacitor maintains operation of the clock for at least 72 hours in the event of a power failure.

Day-light Saving Time

Once set, switching to and from European Daylight Saving Time (DST) is fully automatic. The DST switching function can also be made inoperative, or, alternatively, adjustable times for switching to and from DST, and also the magnitude of the time change, can be entered.

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 is alarm monitoring. Each time an alarm is tripped, the corresponding counter can be arranged to increment, providing data for operating statistics.

The Digital Input circuits are internally powered.

Universal Inputs

The Universal Inputs can be individually configured as an Analog or Digital Input. 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 for the control of equipment such as fans, pumps or similar devices. The output signal can be pulse width modulated and so these outputs can also be used to control actuators of the increase/decrease type.

Analog Outputs

There are Analog Outputs, e.g. for the control of actuators or the connection to controllers. No external power supply is required.

LonWorks SNVT support

The use of Standard Network Variable Types according to Echelon specification makes it possible to communicate with nodes from other manufacturers.

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 Analogue Outputs
- alarm handling; alarm conditions may be detected via the digital or the analogue inputs.
- on and off delays
- pulse counting (Digital Inputs only)
- equipment run time totalisations, on selected objects.
- time schedules (start and stop times in hours and minutes): weekly and holidays
- optimum start/stop programs
- control characteristic curves
- PID control loops (loops may be connected in cascade)
- from v 3.2 trend logging for up to 50 channels is possible (hw version 2 required)
- connection to one or two optional I/O modules
- local level operator interface via TAC Xenta OP
- network communication according to the LonTalk protocol
- communication with Central System via modem

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 Central System or locally from the TAC Xenta OP operator panel.

COMMUNICATION

Communication capabilities

The TAC Xenta 300 comes in two models with different communication capabilities: 300 and 300/N/P.

N stands for Network and P for Presentation; please refer to the table to the right.

Model	Communication with: I/O modules and OP	Other TAC Xenta base units	TAC Vista
300	Yes	-	-
300/N/P	Yes	Yes	Yes

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 foreign equipment.

The Functional Block applications are modelled 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 in the field with the TAC Menta tool.

When connected to a TAC Vista Central System, the operating conditions of the fans, pumps, recovery units etc. can be monitored in colour graphics or as printed reports. Temperatures and alarms may all be read, while setpoints, time settings may be altered as required.

TAC Xenta base units can be reached from TAC Vista in one of the following ways.

1 Any base unit in the network via a PCLTA card.

2 A specific base unit via the RS232 connection, possibly via modem (all v 3.x).

3 Any base unit in the network via TAC Xenta 901 LonTalk adapter (and an optional modem connection), with the added possibility for the base unit to initiate the dial-up (the latter only for v 3.2).

Starting with v 3.1, application programs generated in TAC Menta may be downloaded from TAC Vista via the network.

TAC Xenta OP port

The 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 to the modular jack on the front of the controller or directly to the network cable.

RS232 port

The TAC Xenta 300 controller has an RS232 port. This port is intended for connection to a PC with the programming tool TAC Menta 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 above.

SYSTEM CONFIGURATIONS

The TAC Xenta 300 controllers can be used in different configurations.

- Stand-alone.
- Controllers and OPs in a network, with extra I/O modules as required.
- Controllers, OPs, I/O modules and other equipment in a full network with suitable adapters, possibly with connection to a TAC Vista Central System (CS)

Figure 2 shows an example of a networked TAC Xenta 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 Variables (SNVTs).

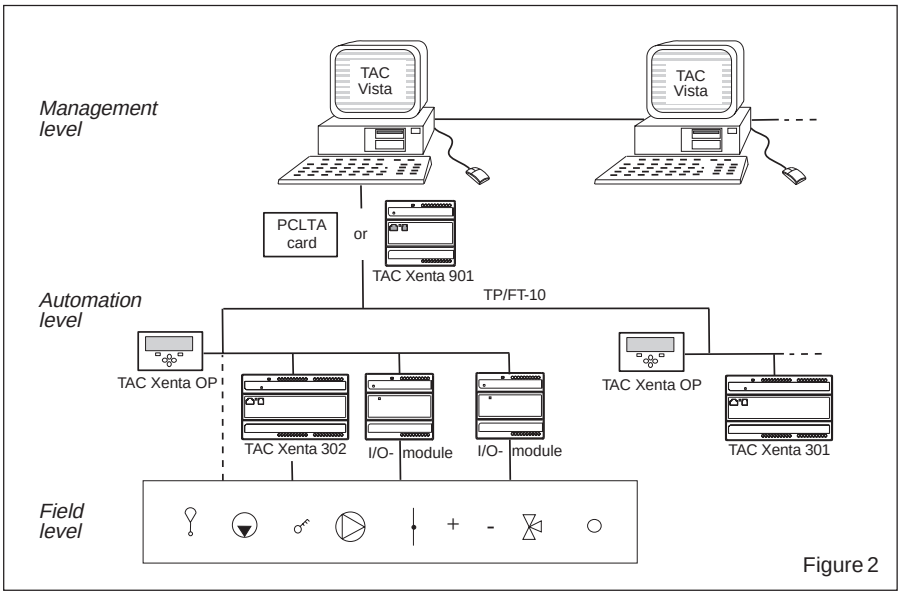


Figure 2

TAC XENTA NETWORK AND UNIT PERFORMANCE

No. of Base units 400
No. of I/O modules 200
No. of Operator Panels 100
No. of TAC Xenta Groups 30
No. of Base units per Group 30

Per TAC Xenta Base unit:

No. of I/O modules
- TAC Xenta 301, 302 1
- TAC Xenta 301 /N/P, 302 /N/P 2

No. of subscriptions *
- In ..... max. 15
- Out ..... max. 30

Trend logging in TAC Xenta 300 (from v 3.2, hw version 2)
- Channels ..... 1 – 50
- Interval ..... 10 s – 530 weeks
- Total logging cap. ~ 2000 float. no.s ..... or ~ 4000 integers ..... or ~ 32 000 digital values
- Optimised storage ..... Yes

Application size
- program and data ..... max. 56 kB
- parameters ..... max. 64 kB

* Subscriptions may utilize standard SNVTs or TACNVs (TAC Network Variables). These may 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) must not exceed the stated figures.

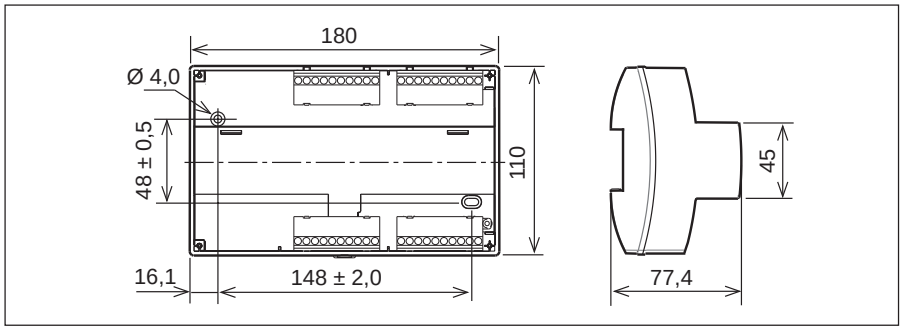
A Network Manager, like MetraVision from Metra Corporation, is required to perform the SNVT bindings.

MOUNTING

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

The controller unit consists of two parts; a terminal part including the screw terminals, and an electronics part holding the circuit boards. To simplify commissioning the terminal part can be pre-mounted in the cabinet, see figure 1.

If the Xenta 300 controller is to be wall mounted a wide range of standardised boxes are available.



CABLES

G and G0:
Min. cross-sectional area 0,75 and 1,5 mm².

Cable with modular jack for RS232 serial communication port: Max. 10 m.

Terminals X1–X4:
Min. cross-sectional area 0,25 mm².
Max. cable length 200 m.

Terminals U1–U4, B1–B4, Y1–Y4:
Min. cross-sectional area 0,25–0,75 mm².
Max. cable length 20–200 m (please refer to the TAC Xenta 300 Handbook for details).

Terminals K1–K6:
Cross-sectional area 0,75–1,5 mm².
Max. cable length 200 m.

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 gives a more detailed description.

Cable	Max. bus length, doubly terminated bus topology (m)	Max. node-to-node distance, singly terminated free topology (m)	Max. length, singly terminated free topology (m)
Belden 85102, single twisted pair	2700	500	500
Belden 8471, single twisted pair	2700	400	500
UL Level IV 22AWG, twisted pair	1400	400	500
Connect-Air 22AWG, one or two pairs	1400	400	500
Siemens J-Y(st)Y 2x2x0.8 4-wire helical twist, solid, shielded	900	320	500
TIA568A Cat. 5 24AWG, twisted pair	900	250	450

INSTALLATION

The two TAC Xenta 300 controllers have different 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 both the numbers and the names of the terminals (1 C1, 2 C2 and so on). The numbers are also shown in the plastic of the terminal part.

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

For detailed information, please refer to the TAC Xenta 300 Handbook.

Operator panel
The operator panel is easily connected to the network by means of the modular socket on the front of the controller.

LED indicator
An 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 301/302	Description
1	C1	LonWorksTP/FT-10
2	C2	
3	U1	Universal
4	M	Measurem. neutral
5	U2	Universal
6	U3	Universal
7	M	Measurem. neutral
8	U4	Universal
9	B1	Thermistor
10	M	Measurem. neutral
11	B2	Thermistor
12	B3	Thermistor
13	M	Measurem. neutral
14	B4	Thermistor
15	X1	Digital
16	M	Measurem. neutral
17	X2	Digital
18	X3	Digital
19	M	Measurem. neutral
20	X4	Digital

Terminal connections: Outputs

Term. no.	Term.name 301	302	Description
21	G	G	24 V AC (or DC+)
22	G0	G0	24 V AC common
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	–	–	

MAINTENANCE

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

TAC AB, Jägershillgatan 18, SE-213 75 MALMÖ, SWEDEN, +46 40 38 68 50 (switchboard)