



TAC Xenta[®] 280

Programmable Controller

10 Oct 2003

The TAC Xenta[®] 280 is a family of programmable controllers designed for zone control or small-sized heating and air handling systems.

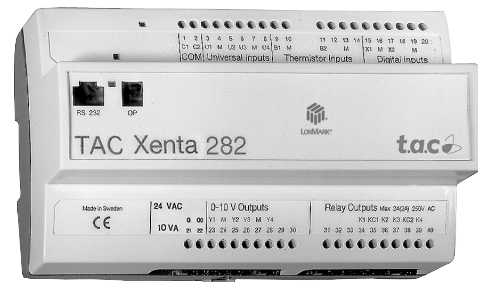
A TAC Xenta 280 controller contains basic HVAC functionality including control loops, curves, time control, alarm handling etc. The TAC Xenta 283 has a LONMARK[®] Real Time Keeper object.

The Xenta 280 controller is available with three different I/O configurations, the TAC Xenta 281, 282 and 283.

The controllers are designed for cabinet mounting.

They are simple to program and put into operation, using the TAC Menta[®] graphical software tool.

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 and can be easily connected to a large LONWORKS based network.



For local use, the TAC Xenta OP operator panel can be connected. The OP 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.

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:

Storage -20 to +50 °C (-4 to +122 °F)
Operation 0 to +50 °C (+32 to +122 °F)

Humidity max. 90% RH non-condensing

Mechanical:

Enclosure ABS/PC
Enclosure rating IP 20
Dimensions, mm (in.) 180 x 110 x 75 (7.1 x 4.3 x 3.0)
Weight 1.0 kg (2.2 lbs)

Real time clock:

Accuracy at +25 °C (77 °F) ± 12 minutes per year
Power failure protection 72 h

Digital inputs (Xenta 281, 282, 283: X1–X2)

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

Universal inputs (Xenta 281, 282: U1–U4)

– 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 (77 °F)
Measuring range -50 to +150 °C (-58 to +302 °F)

– as Voltage inputs;

Input signal 0–10 V DC
Input resistance 100 kohm
..... accuracy within 1% of full scale

Sensor inputs (B1–B2, only TAC Xenta 282)

TAC thermistor sensor 1800 ohm at 25 °C (+77 °F)
Measuring range -50 to +150 °C (-58 to +302 °F)

Sensor inputs (B1–B4, only TAC Xenta 283)

TAC thermistor sensor 1800 ohm at 25 °C (+77 °F)
..... or (individually selectable) 10 kohm at 25 °C (+77 °F)
Measuring range -20 to +120 °C (-4 to +248 °F)

Digital outputs (relays; Xenta 281: K1–K3, Xenta 282: K1–K4)

Control voltage, relay outputs up to 230 V AC

Ctrl curr., to be protected by max. 10 A fuse, max. 2 A

Outputs V1–V6 (triac; TAC Xenta 283 only):

Control voltage max. 30 V AC

Control current max. 0.8 A

Total control current max. 3 A

Analog outputs (Xenta 281: Y1–Y3, Xenta 282: Y1–Y4)

Control voltage 0–10 V DC

Control current, short-circuit proof max. 2 mA

Deviation max $\pm 1\%$

Communication:

TAC Menta 9600 bps, RS232, RJ45

TAC Vista, also for application program download

..... TP/FT-10, screw terminal

TAC Xenta OP TP/FT-10, modular jack

LONMARK[®] standard:

TAC Xenta 281, 282:

Interoperability LONMARK Interop. Guidelines v 3.0

Application .. LONMARK Functional Profile: Plant Controller

TAC Xenta 283:

Interoperability LONMARK Interop. Guidelines v 3.3

Application LONMARK Funct. Profile: Real Time Keeper

Agency Compliances:

Emission C-Tick, EN 50081-1, FCC Part 15

Immunity EN 50082-1

Safety:

CE EN 61010-1

UL 916 (Xenta 283 pending). Energy Mngmnt Equipm.

Flammability class, materials UL 94 V-0

ETL listing UL 3111-1, first edition

..... CAN/CSA C22.2 No. 1010.1-92

Part numbers:

Electronics part TAC Xenta 281/N/P 0-073-0030

Electronics part TAC Xenta 282/N/P 0-073-0031

Electronics part TAC Xenta 283/N/P 0-073-0032

Terminal part TAC Xenta 280/300 0-073-0901

Operator terminal TAC Xenta OP 0-073-0907

TAC Xenta: Programming Serial Kit 0-073-0920



DESIGN

The TAC Xenta 280 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 280 is microprocessor based. It consists of a terminal and electronics fitted together (Figure 1).

The Xenta 280 can be interfaced with a wide variety of field sensors/transducers and controlled devices. All terminations of field wires are done on the terminal part only. Thus the electronics part may be removed for service without affecting the terminal connections.

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 the point status, perform manual override, read measured values, alter set points etc., from the TAC Xenta OP.

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 the year, month, date, day, hour, minute and second. A built-in capacitor guarantees operation of the clock for at least 72 hours in the event of a power outage. The TAC Xenta 283 is intended to be used as a Real Time Keeper. Real time is exposed as an output network variable, SNVT_time_stamp, which can be bound to other LonWorks devices.

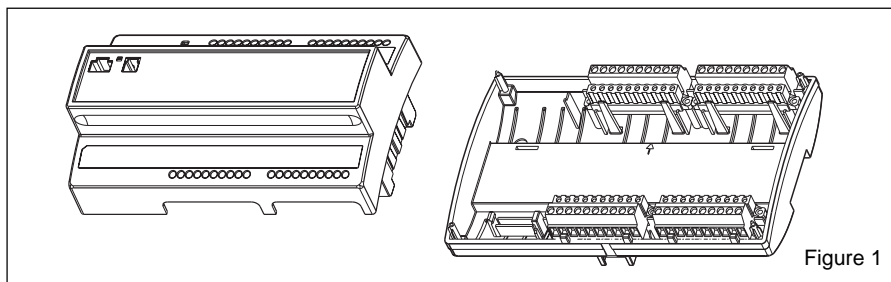


Figure 1

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 DIs 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 incremented, providing data for operating statistics. The digital input 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.

Thermistor Inputs

The TAC Xenta 282 and 283 have thermistor inputs, 1800 ohm at 25 °C (+77 °F).

In the Xenta 283, these inputs are also individually configurable for 10 kohm at 25 °C (+77 °F).

Digital Outputs

There are digital outputs for controlling equipment such as fans, pumps or similar devices. The output signal can be pulse-width modulated.

In the TAC Xenta 283, the DOs are designed as TRIAC outputs.

Analog Outputs

There are analog outputs for controlling actuators or connections with controllers.

LonWorks® SNVT support

The use of Standard Network Variable Types, 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.

I/O CONFIGURATIONS

The Xenta 280 controller is available with three different I/O configurations, the TAC Xenta 281, 282 and 283.

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

No external I/O modules are used with the TAC Xenta 280.

TAC Xenta	DI	UI	TI	DO	AO
281	2	4	-	3	3
282	2	4	2	4	4
283	2	-	4	6	-

DI (Xn): Digital input
 UI (Un): Universal input
 TI (Bn): Thermistor input
 DO (Kn,Vn): Digital output
 AO (Yn): Analog output

SOFTWARE FEATURES

With the assistance of TAC Menta (4.0 or higher; for Xenta 283 4.10 or higher), a graphical programming tool using Functional Block Diagrams (FBDs), the TAC Xenta 280 may be easily adapted to different control and monitoring tasks.

The basic software includes pre-programmed routines for:

- reading Digital Inputs (alarms, pulse counting, interlocks)
- reading Universal Inputs (individually selectable as analog or digital)
- controlling Digital Outputs
- controlling 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.
- one-time schedule block with four entries (start and stop times in hours and minutes): weekly and/or holidays
- programs for optimum start/stop
- outdoor temp. 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
- network communication according to the LONTALK® protocol

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 non-volatile memory.

The parameters may be changed during operation either from the Central System or locally from the TAC Xenta Operator Panel.

COMMUNICATION

Communication capabilities

The TAC Xenta 280 has several communication capabilities: within the network, with a central presentation system and with 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.

The LONTALK protocol makes it possible to use Network Variables defined in equipment made by other 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 in the field using the TAC Menta tool.

TAC Vista presentation system

When connected to a TAC Vista Central System (version 4.0 or higher, for Xenta 283 version 4.10 or higher), the operating conditions of the fans, pumps, recovery units etc. can be monitored via color graphics or printed reports.

Temperatures and alarms can be read, while setpoints and 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 RS232 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 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 via the modular jack on the front of the controller or directly, using the network cable.

RS232 port

The TAC Xenta 280 controller has an RS232 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 connecting between TAC Vista and specific TAC Xenta 280 units (see above). Connection via a modem is not supported.

SYSTEM CONFIGURATIONS

The TAC Xenta 280 controllers can be used in different configurations.

- Stand-alone.
- Controllers and OPs in a network.
- Controllers, OPs and other equipment in a full network with suitable adapters, possibly connected to a TAC Vista Central System.

Figure 2 shows an example of a TAC Xenta network configuration.

Sensors and actuators on the field level are mostly connected to the conventional inputs/outputs of the controllers.

Some external units, however, may be connected directly to the network to communicate input/output data, using Standard Network Variables (SNVTs).

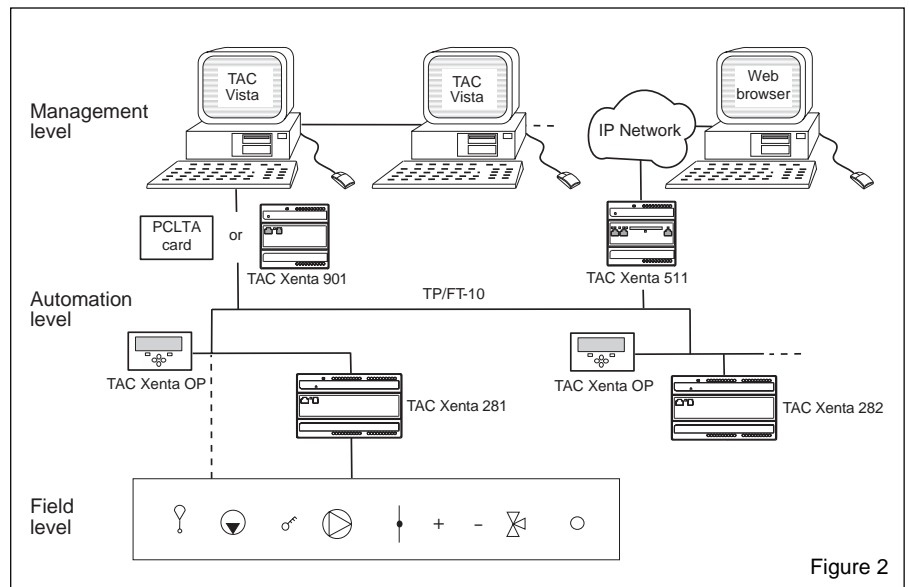


Figure 2

TAC XENTA NETWORK AND UNIT PERFORMANCE

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

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

Trend logging in the TAC Xenta 280
 Channels 1 – 50
 Interval 10 s – 530 weeks
 Total logging cap. ... ~ 650 float. no.s
 or ~ 1,300 integers
 or ~ 10,000 digital values
 Optimized storage Yes
 Time Channels 1
 Application size
 program and data max. 56 kB
 parameters max. 64 kB

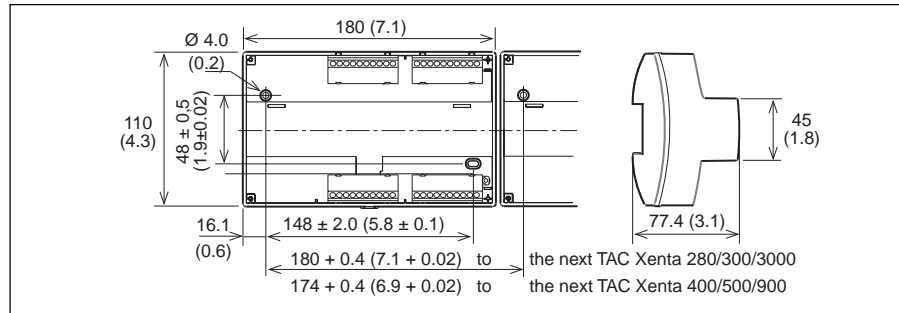
* Subscriptions can utilize standard SNVTs or TACNVs (TAC Network Variables). These can be combined if the following restrictions are observed: the sum of the TACNV subscriptions and the number of SNVT members (no. of values in structured SNVTs) does not exceed the stated figures.

MOUNTING

The TAC Xenta 280 controller is cabinet-mounted on a TS 35 mm Norm rail EN 50 022.

The controller consists of two parts; a terminal part with the screw terminals, and an electronics part with the circuit boards. To simplify installation, the terminal can be pre-mounted in the cabinet (see Figure 1).

If the Xenta 280 controller is to be wall-mounted, a wide range of standardized boxes are available.



CABLES

G and G0:

Min. wire gauge 0.75 and 1.5 mm² (19 and 16 AWG).

Cable with modular jack for the RS232 serial communication port: Max. 10 m (32 ft.).

Terminals X:

Min. wire gauge 0.25 mm² (23 AWG).
Max. cable length 200 m (650 ft.).

Terminals U, B, Y:

Min. wire gauge 0.25–0.75 mm² (23–19 AWG).

Max. cable length 20–200 m (65 to 650 ft.) (see TAC Xenta 280/300/401 manual for details).

Terminals K, V:

Wire gauge 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.

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	2700 (9000)	500 (1600)	500 (1600)
Belden 8471, single twisted pair	2700 (9000)	400 (1300)	500 (1600)
UL Level IV 22 AWG, twisted pair	1400 (4600)	400 (1300)	500 (1600)
Connect-Air 22 AWG, one or two pairs	1400 (4600)	400 (1300)	500 (1600)
Siemens J-Y(st)Y 2x2x0.8 4-wire helical twist, solid, shielded	900 (3000)	320 (1000)	500 (1600)
TIA568A Cat. 5 24 AWG, twisted pair	900 (3000)	250 (820)	450 (1500)

INSTALLATION

The three TAC Xenta 280 controllers have different inputs and outputs. The adjacent table shows the terminal connections of the three 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.

Operator Panel

The Operator Panel can easily be 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 280 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 C1 C1	LONWORKS TP/FT-10
2	C2 C2 C2	
3	U1 U1 –	Universal
4	M M M	Msrmt. neutral
5	U2 U2 –	Universal
6	U3 U3 –	Universal
7	M M M	Msrmt. neutral
8	U4 U4 –	Universal
9	– B1 B1	Thermistor
10	– M M	Msrmt. neutral
11	– B2 B2	Thermistor
12	– – B3	Thermistor
13	– M M	Msrmt. neutral
14	– – B4	Thermistor
15	X1 X1 X1	Digital
16	M M M	Msrmt. neutral
17	X2 X2 X2	Digital
18	– – –	
19	M M M	Msrmt. neutral
20	– – –	

Terminal connections: Outputs

Term. no.	Term. name	Description
21	G G G	24 V AC (or DC+)
22	G0 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 Y3 –	0–10 V
27	M M –	Output neutral
28	– Y4 –	0–10 V
29	– – –	
30	– – –	
31	– – V5	TRIAC out
32	– – –	
33	– – V6	TRIAC out
34	K1 K1 V1	Relay; TRIAC out
35	KC1 KC1 –	K1, K2 common
36	K2 K2 V2	Relay; TRIAC out
37	K3 K3 V3	Relay; TRIAC out
38	KC2 KC2 –	K3, K4 common
39	– K4 V4	Relay; TRIAC out
40	– – VC	24 V AC, TRIACs

MAINTENANCE

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

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