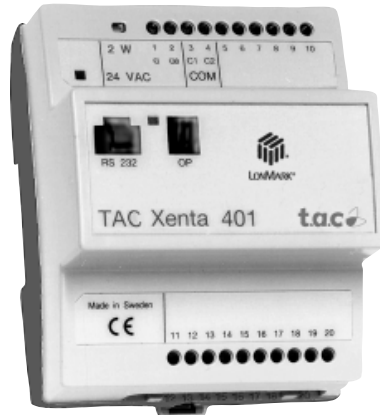# TAC Xenta® 401:B

Controller, Freely programmable

12 Aug 2004

The TAC Xenta 401:B belongs to a family of freely programmable controllers, with communication features, designed for heating and air handling systems,

A TAC Xenta 401:B holds full HVAC functionality including control loops, curves, time control, alarm handling, etc. The controller does not have any physical inputs or outputs and no TAC Xenta 400 I/O modules can be connected. This controller may serve as a data manager that can provide time scheduling, data logging, and other logical functions to less capable network nodes.

The controller communicates on a LONTALK® TP/FT-10 network via a twisted-pair, non-polarized cable. It is able to operate both as a stand-alone unit and as part of a system.

TAC Xenta 401:B can be connected to a modem or the TAC Vista® central system.

With the TAC Menta® graphical tool, a TAC Xenta controller is simple to program and place into operation.

For local use, the TAC Xenta OP (operator panel) can be connected to the TAC Xenta 401:B. It has a display with backlight and push buttons to take readings and alter settings. The operator panel can be mounted in the cabinet front or it can 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. 2 W
Transformer sizing .... 2 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
Flammability class, materials .... UL 94 V-0
Dimensions .... see diagram
Weight .... 0.5 kg (1.2 lbs)

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

Communication:
TAC Menta; modem .... 9600 bps, RS232, RJ45
TAC Vista, also for appl. pgm download
.... TP/FT-10, screw terminal
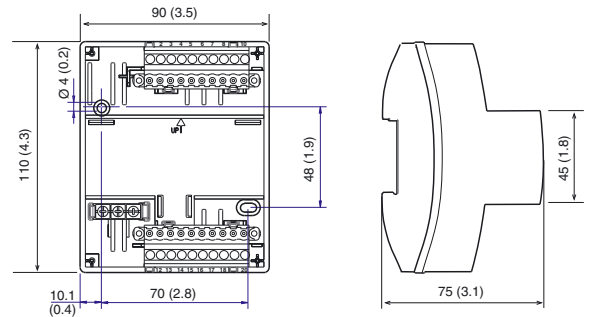TAC Xenta OP .... TP/FT-10, modular jack, RJ10
LONMARK® standard:
Interoperability .... LONMARK Interop. Guidelines v 3.0
Application .. LONMARK Functional Profile: Plant Controller

mm (in.):

Agency Compliances:
Emission .... C-Tick, EN 50081-1, FCC Part 15
Immunity .... EN 50082-1
Safety:
CE .... EN 61010-1
UL 916 .... C-UL US Listed
Part number:
Electronics part TAC Xenta 401:B 0-073-0103
Terminal part TAC Xenta 400 0-073-0902
Operator terminal TAC Xenta OP 0-073-0907
TAC Xenta: Programming Serial Kit 0-073-0920

DESIGN

The TAC Xenta 401:B controller has been designed as a general purpose controller. It is normally mounted in a cabinet with several controllers collected per floor or per building.

The large network variable input capacity makes TAC Xenta 401:B well suited for zone system management applications.

TAC Xenta 401:B is microprocessor based. It consists of a terminal and electronics mounted together (Figure 1).

TAC Xenta 401:B can, via network variables, be interfaced with other LON®-based field sensors/transducers and controlled devices.

The 401:B does not, however, support TAC Xenta I/O modules.

Local operator terminal
The TAC Xenta OP is a small operator terminal which can be connected to the unit through the RJ10 jack (labeled OP) on the front. The operator can read point status, perform manual override, read measured values, alter set points, etc. from the Xenta OP.

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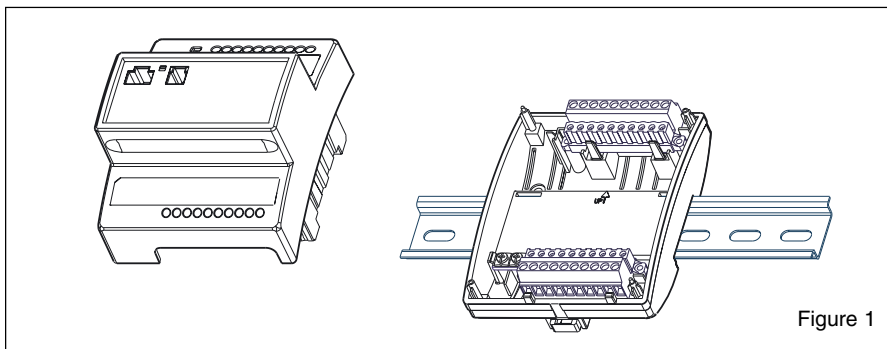

Figure 1

Power failure protection
The application program is stored indefinitely in non-volatile (flash) memory. This enables the unit to start up with user-specified settings and work normally after a power failure.

Real-time clock
The real-time 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 failure.

Daylight Savings Time
European or USA / Canada
Once set, Daylight Savings Time (DST) is fully automatic. The date and magnitude of the time change can be programmed. This function can also be disabled.

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 401:B may be easily adapted to different control and monitoring tasks.

The basic functions available with this controller include:

– alarm handling
– on/off delays
– equipment run time totals 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)
– trend logging for up to 50 channels is possible
– local level operator interface via TAC 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 function blocks and adjusting the relevant parameters. These connections and parameters are stored in non-volatile memory.

The parameters may be changed during on-going operation either from the Central System or from the TAC Xenta OP.

COMMUNICATION

LonWorks connection

TAC Xenta controllers communicate with each other using a common network, LonWorks TP/FT-10.78 kbps.

When connected to a TAC Vista Central System, the operating conditions of the fans, pumps, recovery units, etc. can be monitored in color graphics or printed reports.

Temperatures and alarms may 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 or via a TAC Xenta 511 or 911 acting as an LTA.

2 A specific base unit via the RS232 connection, possibly via modem.

3 Any base unit in the network via TAC Xenta 901 LonTalk adapter (and an optional modem connection), with the additional capability for the base unit to initiate the dial-up.

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

TAC Xenta OP port (RJ10)

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 net cable.

RS232 port

The TAC Xenta 401:B controller has an RS232 port. This port is intended for connection to a PC when using the TAC Menta programming tool to load the application program.

The port can also be used for connection via modem between TAC Vista and specific TAC Xenta 401:B units (item 2 above).

SYSTEM CONFIGURATIONS

The TAC Xenta 401:B can be used as a zone manager in different configurations.

• Stand-alone (together with suitable LonMark-approved equipment).

• Other controllers, I/O modules and OPs in small networks.

• Controllers, OPs, I/O modules and other equipment in a full network with suitable adaptors, possibly with a 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 and outputs of the I/O-modules.

As TAC Xenta 401:B does not support any I/O-modules, it communicates with other units on the network using Network Variables.
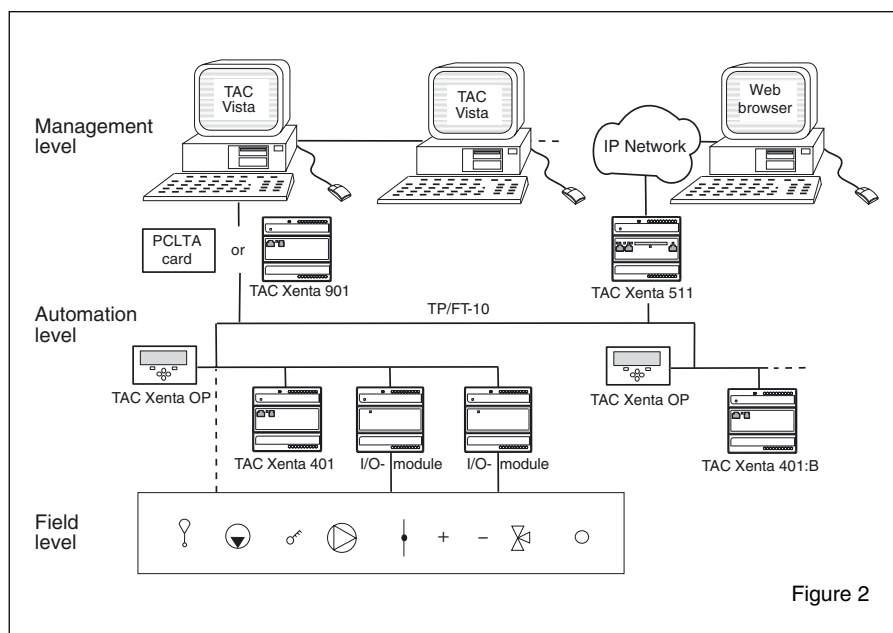

Figure 2

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 401:B unit:

No. of I/O modules .... none

No. of subscriptions *

    In .... max. 210
    Out .... max. 70
    Total ** .... max. 250

Trend logging in TAC Xenta 401:B
    Channels .... 1 – 50
    Interval .... 10 s – 530 weeks
    Total logging cap. ~ 7000 float. no.s
    .... or ~ 15,000 integers
    .... or ~ 110,000 digital values
    Optimized storage .... Yes

Application size
    program and data ...... max. ~234 kB
    parameters .... max. ~234 kB

* Subscriptions may utilize 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.

** Please note that the total max. is less than the sum of the possible inbound and outbound subscriptions.

MOUNTING

The TAC Xenta 401:B 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 figure 1).

The operator panel is either mounted onto the controller on the snap-in connector or flush-mounted in the cabinet front. It can also be used as a portable, hand held panel.

If the TAC Xenta 401:B controller is wall mounted, a wide range of standardized boxes are available.

CABLES

G and G0:
Min. cross-sectional area 0.75 and 1.5 mm² (19 and 16 AWG).

Cable with modular jack for RS232 serial communication port: Max. 10 m (32 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	2700 (9000)	500 (1600)	500 (1600)
Belden 8471, single twisted pair	2700 (9000)	400 (1300)	500 (1600)
UL Level IV 22AWG, twisted pair	1400 (4600)	400 (1300)	500 (1600)
Connect-Air 22AWG, 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 24AWG, twisted pair	900 (3000)	250 (820)	450 (1500)

INSTALLATION

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.

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

LED indicator
An indicator on the electronic unit of the TAC Xenta 401:B 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

Term. no.	Term. name	Description
1	G	24 V AC (or DC+)
2	G0	24 V AC common
3	C1 }	LONWORKS TP/FT-10
4	C2 }	

MAINTENANCE

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

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