TAC Xenta® 110-D

Handbook

0-004-7799-1 (EN), 2001-11-19

Preface

Welcome to the handbook of the TAC Xenta 110-D.

If you should discover errors and/or unclear descriptions in this manual, please contact your TAC representative. You may also send e-mail to **helpdesk@tac.se**

Do not use the product for any other purposes than those indicated in this document.

Revisions

Part number	Comments	Author	Date
0-004-7799-0	First edition.	SUWA	2001-08-14
0-004-7799-1	Second edition. Sun blinds edited. New section (2.8) about lamp loads.	SUWA	2001-11-19

Contents

1 Introduction

1.1 The content of the handbook

Chapter 1 Introduction,

gives an overview over the structure of this handbook, additional information about the product, and has a short terminology section.

Chapter 2 Applications,

describes different applications for the TAC Xenta 110-D.

Chapter 3 Installation,

contains instructions on mechanical and electrical installation of the controller, instructions on commissioning and network installation and describes the setting of the zone controller's configuration parameters.

Chapter 4 Operation,

contains an overview of alarms and some troubleshooting.

Chapter 5 Functional description,

gives detailed information about the zone controller's basic functions, operating modes and other functions.

Chapter 6 Communication,

describes the zone controller's communication with other units via the network by means of network variables.

Appendix A, Technical data

lists all technical data and dimensions for TAC Xenta 110-D.

Appendix B, Commissioning protocol

contains a commissioning protocol, which can be used together with chapter 3 during installation and commissioning.

Index

are in the end of the handbook. Use the index to make your search for information easier, and the reply form to let us know whether there is something wrong or unclear in this handbook.

1.2 Documentation

Enclosed documentation

TAC Xenta 110-D is delivered with an installation instruction for each of the variations of TAC Xenta 110-D:

- TAC Xenta 110-D/24,
  Installation instruction, part number 0FL-3985
- TAC Xenta 110-D/115,
  Installation instruction, part number 0FL-4002
- TAC Xenta 110-D/230,
  Installation instruction, part number 0FL-4003

Other documentation

There is additional information about TAC Xenta 110-D in the following documents:

- Data sheet for TAC Xenta 110-D,
  part number 0-003-2057
- Data sheet for ZS 101-ZS 105,
  part number 0-003-1661. Here the wall modules are described.
- TAC Xenta Network Guide,
  part number 0-004-7460. Here you can find additional information on network installation.
- TAC Xenta OP Handbook,
  part number 0-004-7506. Here you will find information on how to use TAC Xenta OP together with TAC Xenta 110-D and the wall modules.
- TAC Xenta, Zone System Guidelines
  part number 0-004-7637. Here you will find information on how the zone system is built with TAC Xenta-components.
- TAC Xenta and LonMaker for Windows
  part number 0-004-7775. Here you will find information on how to use LonMaker together with TAC Xenta.

All the above mentioned documents can be found on the internet at www.tac-global.com or can be ordered from your nearest TAC service provider.

1.3 Terminology

In this handbook there are some abbreviations and terms which are specific for the zone controller's applications and network communication. Therefore, the most common terms have been gathered, together with a short explanation, in the list below.

CLC	Constant Light Controller
HF unit	High Frequency unit (for electronic light control) without dimming capability
HFD	As above but with dimming capability
LA	Lamp Actuator
LON	Local Operating Network - communication concept from Echelon
LNS	LonWork Network Services; system tool used for installation, configuration and maintenance of a LonWorks network
ncixxx	configuration parameter; variable which gets its value from another unit on the network and keep it during a power failure
neuron	communication processer with built-in protocol
NO/NC	Normally Open/Normally Closed
node	communication unit on the network
nvixxx	variable which gets its value from another unit on the network
nvoxxx	variable which sends its value to another unit on the network
PWM	Pulse Width Modulation
service pin	useful function for locating controller during commissioning
SCC	Space Comfort Controller object
SCPT	Standard Configuration Properties
SNVT	Standard Network Variable Type
wink	confirmation of the connection to a specific controller via the network (a light-emitting diode is lit for about 10 seconds)

2 Applications

2.1 General

The applications shown in this chapter are intended to give examples of the possibilities with TAC Xenta 110-D.

The zone controller TAC Xenta 110-D is intended for cost effective solutions for climate and light control in one or two rooms.

This is achieved by using the 7 LonMark objects (described in chapter 6) in different combinations. There are:

- 4 Lamp Actuator objects
- 1 Constant Light Controller objects
- 2 Space Comfort Controller objects

The lamp outputs are intended for one or two HF-equipped lamps in a typical office room. In larger rooms with several lamps, conference rooms etc, external relays must be used.

The TAC Xenta 110-D controller has,

- climate control with four triac outputs for heating/cooling valves, with possibility for master/slave operation
- light group control with four relay outputs
- an input R1 for use as a dimmer, toggle switch or for temperature setpoint adjustment
- inputs X1-X3 for use as light switcher, bypass or occupancy inputs
- an input U1 for use as a lux-level input, digital input (same as X1-X3) or for temperature setpoint adjustment.

For more detailed information, refer to chapter 5, functional description.

The controller comes in three variations for different voltages:
TAC Xenta 110-D/24, 110-D/115 and 110-D/230.

2.2 Two rooms controlled by one TAC Xenta 110-D

2.2.1 Without locally connected occupancy sensors

Controlling heating and cooling in sequence using thermal actuators (on/off). Setpoint adjustment and operation mode (occupancy) is set via network variables. Bypass is performed with the light switches.

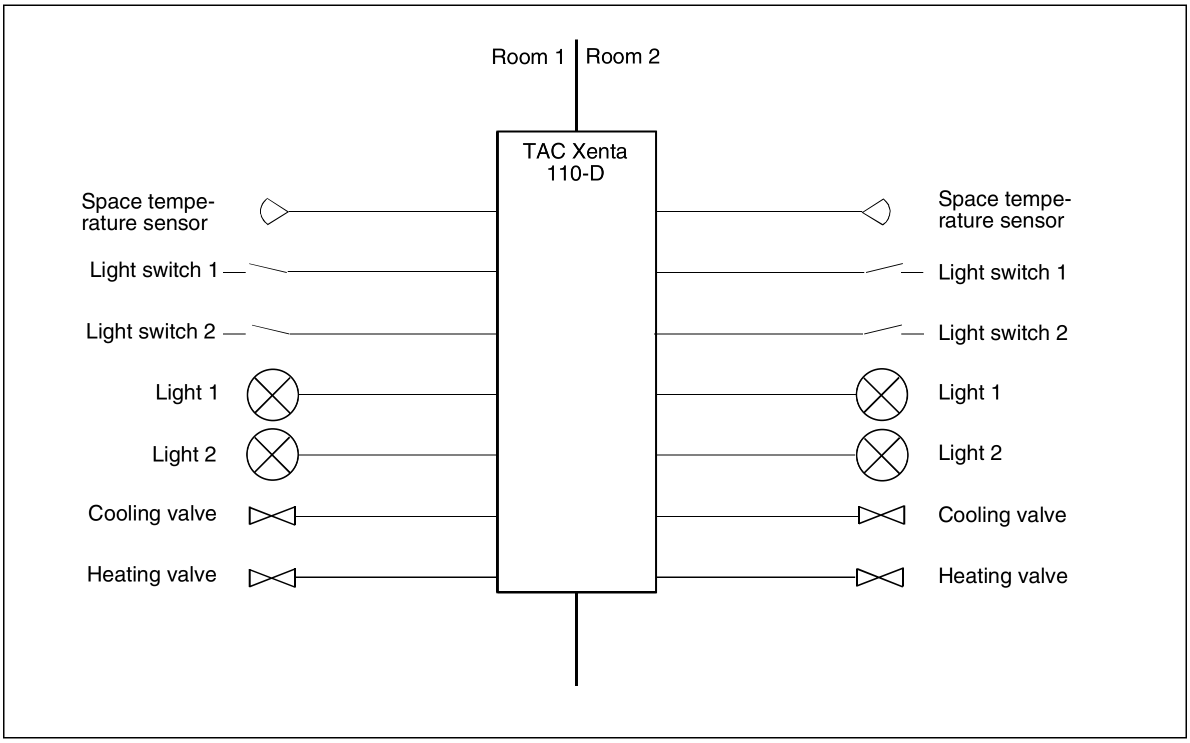

Figure 2.1 Two rooms without occupancy sensors

- Space temperature sensor (input B1 and B2).
- Light switches (inputs X1-3 and U1): Choice of toggle switch disabled/enabled in bit 0-3 in *nciAppOptions2*.
- Choice of toggle switch/bypass disabled/enabled in bits 2-9 in *nciAppOptions*.
- Light actuators (outputs K1-4): Choice if power up status off/on in bit 4-7 in and how occupancy detection will affect light in bit 8-11 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.

It is possible to use the occupancy sensor for light control by interoperation between node objects. The network variables can be bound as in figure 2.2:

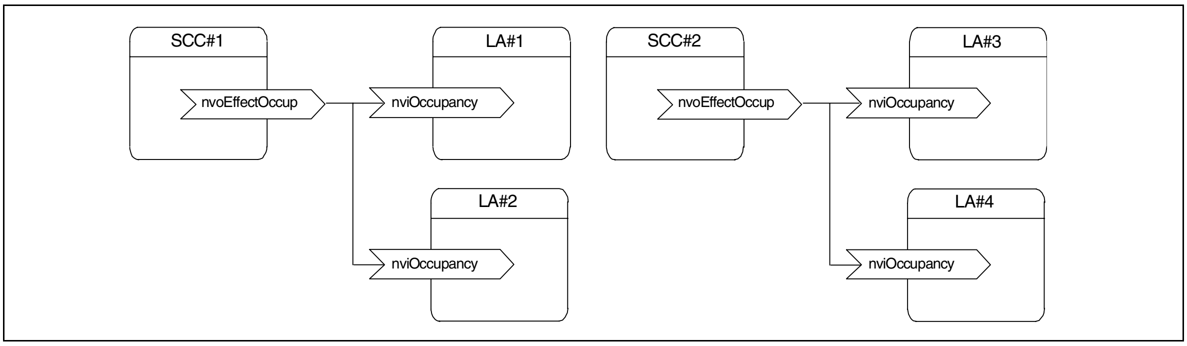

Figure 2.2 LonMark objects for application

2.2.2 With locally connected occupancy sensors

Controlling heating and cooling in sequence using thermal actuators (on/off). Setpoint adjustment is set via network variable. Operation mode (occupancy) is set with local occupancy sensor.

The light is turned on and off with light switches. and effective occupancy status. Light 1 and 2 in paralell.

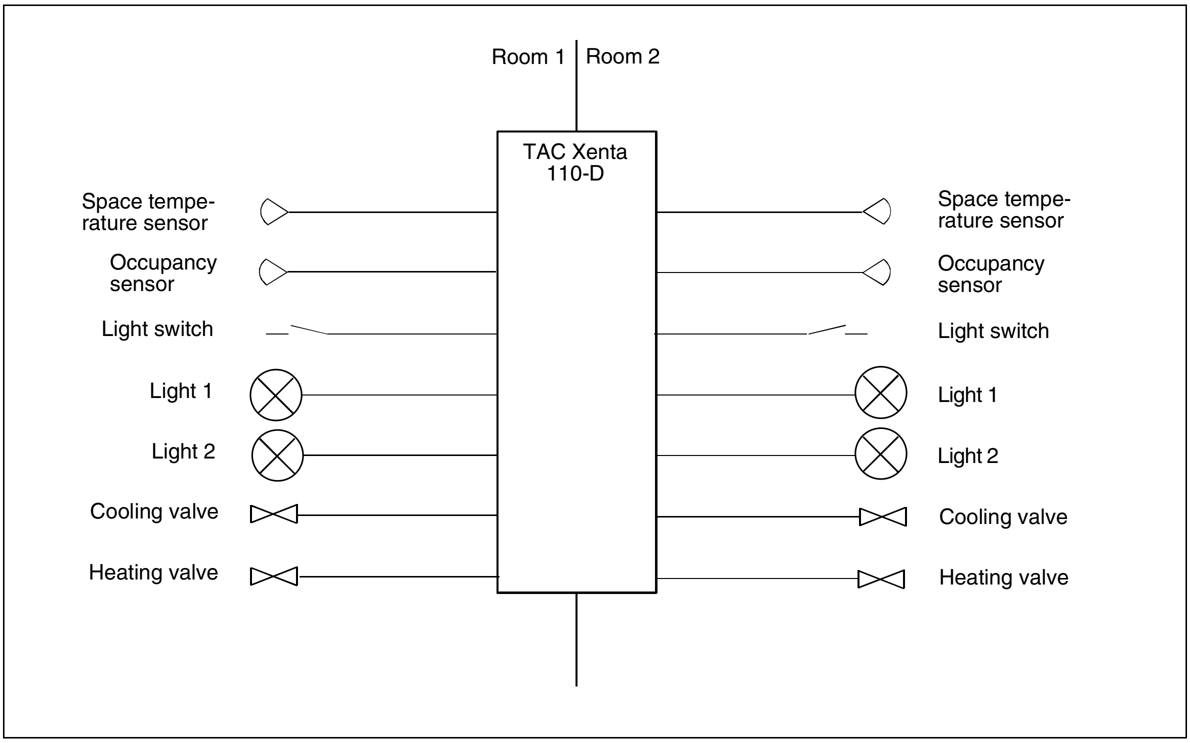

Figure 2.3 Two rooms with locally connected occupancy sensors

- Space temperature sensor (input B1 and B2).
- Occupancy sensor (input X1-X2): Choice of occupancy sensor and configuration in bit 0, 1, 2 and 7 in *nciAppOptions*.
- Light actuators (outputs K1-4): Choice of power up status off/on in bit 4-7 and how occupancy detection will affect light in bit 8-11 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.

It is possible to use the occupancy sensor for light control by interoperation between node objects. The network variables can be bound as in figure 2.4:

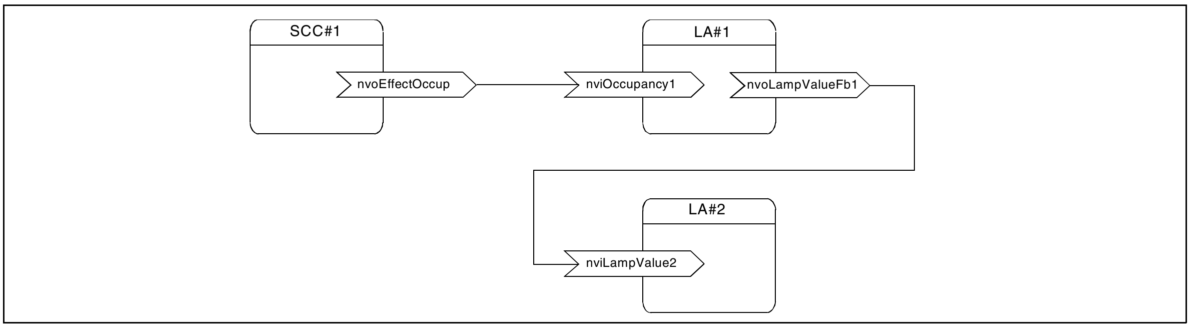

Figure 2.4 Interoperability between objects

2.2.3 With locally connected occupancy sensors and wall modules

Controlling heating and cooling in sequence using thermal actuators (on/off). Setpoint adjustment is set via wall modules. Operation mode (occupancy) is set with local occupancy sensor.

The light is turned on and off with light switches and effective occupancy status.

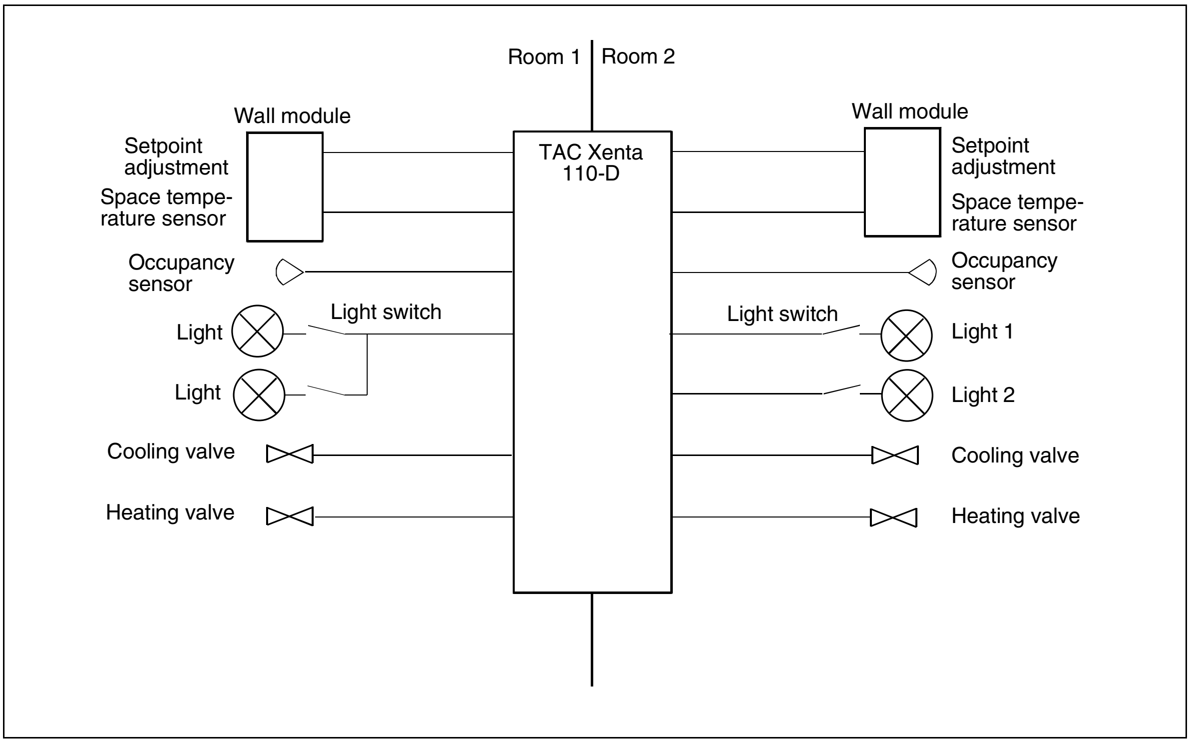

Figure 2.5 Two rooms with locally connected occupancy sensors

- Space temperature sensor (input B1 and B2).
- Setpoint adjustment (input R1 and U1).
- Occupancy sensor (input X1-X2): Choice of occupancy sensor input configuration in bit 0, 1, 2 and 7 in *nciAppOptions*.

- Light actuators (outputs K1-K4): Choice of power up status off/on in bit 4-7 and how occupancy detection will affect light in bit 8-11 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.

2.2.4 With networked wall module or ScreenMate

To be able to set the setpoint adjustment locally there must be a LonWorks-based wall module or a ScreenMate installed. A LonWorks based wall module can enable functions like space temperature sensor, setpoint adjustment, bypass button, occupancy sensor, light switches and more.

If ScreenMate is used, a local space temperature sensor must be used also. Setpoint adjustment, bypass button and light switches can be handled from the ScreenMate.

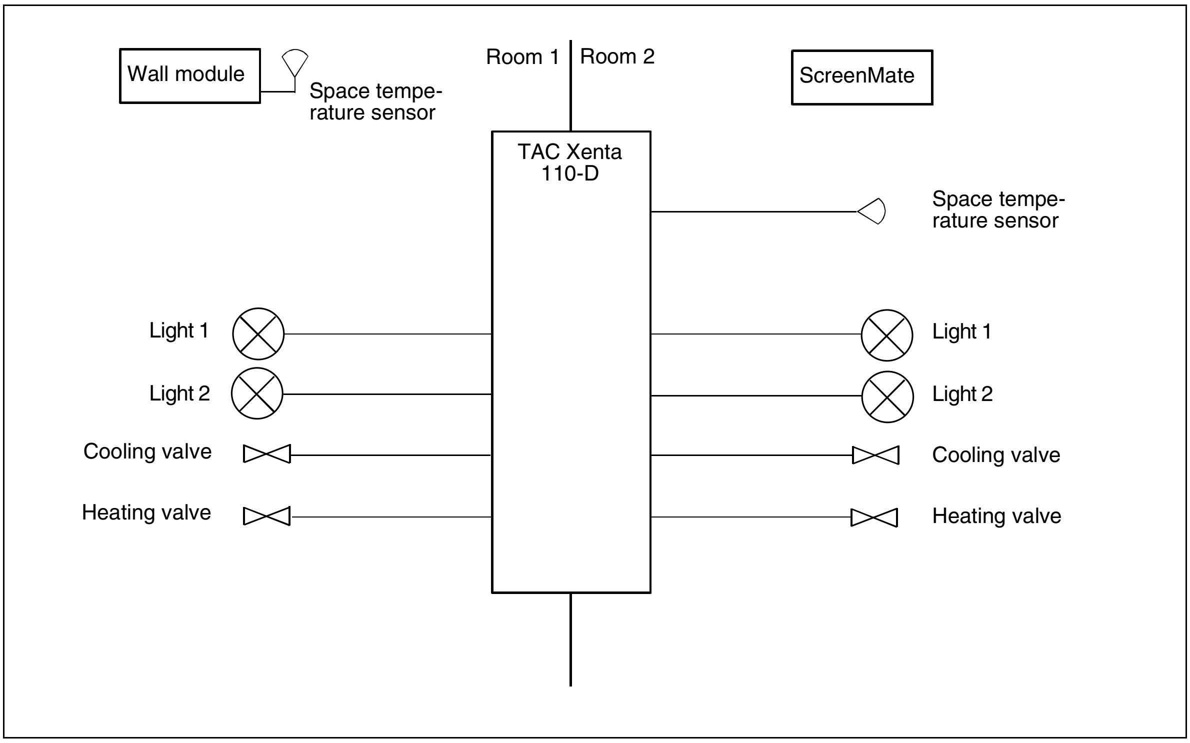

Figure 2.6 Two rooms with networked wall module or ScreenMate

- Space temperature sensor (input B2).
- Light actuators (outputs K1-4): Choice if power up status off/on in bit 4-7 and how occupancy detection will affect light in bit 8-11 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.
- Wall module (section 2.6) or ScreenMate (section 2.7).

2.3 One room controlled by one TAC Xenta 110-D

2.3.1 With light level control

Controlling heating and cooling in sequence using thermal actuators (on/off). Setpoint adjustment and operation mode (occupancy) is set via network variable. Bypass is performed with the light switches.

The three lights are toggled with the light switches when in occupancy mode and turned off in standby and unoccupied mode. Two of the lights are also light-level controlled with a 1-10 V signal for HFD units. A lux sensor and an NV input (lux setpoint) determine the light level.

A switch is also connected for toggling the CLC output between 10%, 100% and controlling the light level.

Auxiliary units (such as relays, fans ,sun blinds) are controlled via network variables and requires the SCC object to be configured for slave mode. The nvi:s get their values from another LON device.

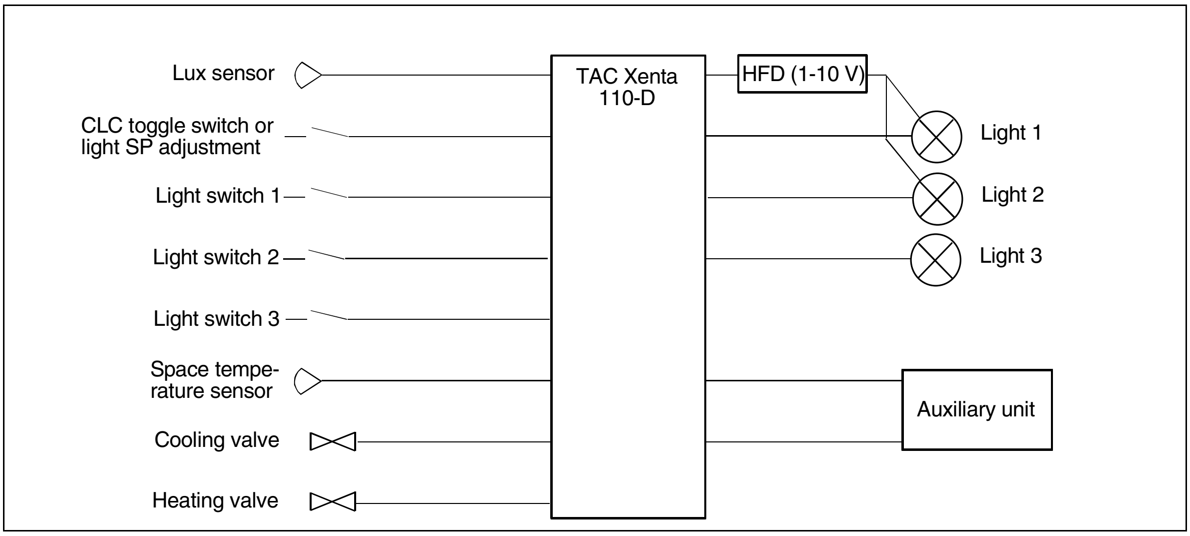

Figure 2.7 One room with light level control

- Lux sensor (input U1): set bit 10 to 0 / bit 11 to 1 in *nciAppOptions*.
- Space temperature sensor (input B1).
- Light switches (inputs X1-3): Set to toggle switches enabled in bit 0-2 in *nciAppOptions2*.
- Toggle switch (input R1): Set bits 12 and 15 in *nciAppOptions2* to 1. *Alternative:* Light SP adjustment (input R1): Set bits 12 to 0 and 15 to 1 in *nciAppOptions2*.
- Light actuators (outputs K1-3): Choice if power up status off/on in bit 4-6 and how occupancy detection will affect light in bit 8-10 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V2): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.
- Auxiliary units (output V3-4): Use master/slave mode, enable slave mode in bit 13 in *nciAppOptions*. Dependant on the cycle time of the controller, 4 seconds.

2.3.2 With occupancy sensor and light level control

Heating and cooling is controlled in sequence using thermal actuators (on/off). Setpoint adjustment and operation mode is set locally.

Lights 1 and 2 are toggled with light switches 1 and 2 when in occupuied mode, and they are off in standby and unoccupied mode. Light 3 is controlled by network variables in occupied mode, and off in standby and unoccupied mode. Two of the lights are also light-level controlled with a 1-10 V signal for HFD units. A lux sensor and an NV input (*nciLuxSetpoint*) determines the light level.

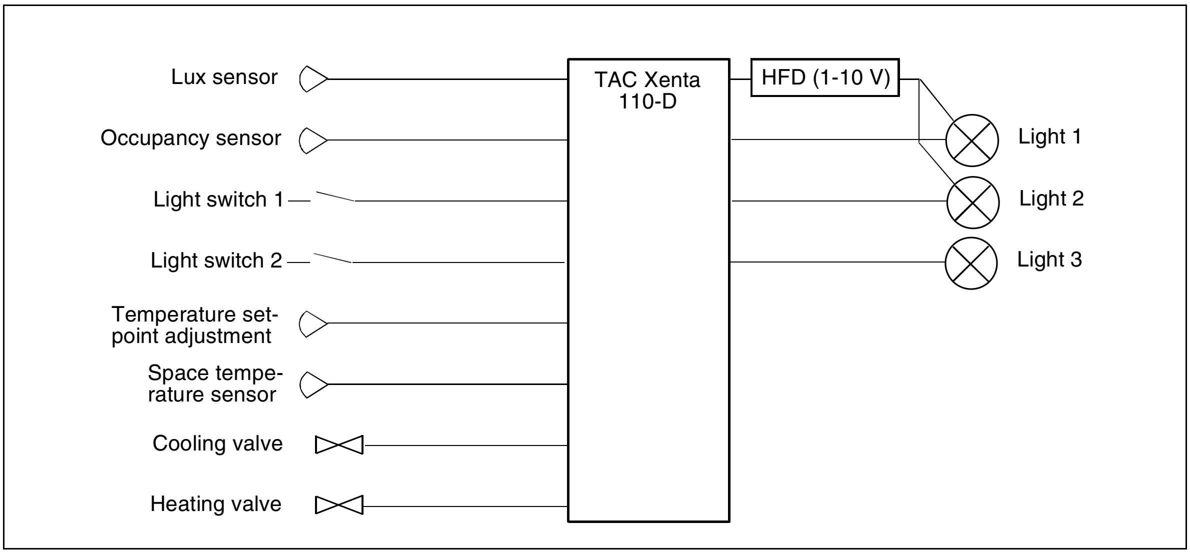

Figure 2.8 One room with lux-sensor and light level control

- Lux sensor (input U1): set bit 10 to 0 and bit 11 to 1 in *nciAppOptions*.
- Occupancy sensor (input X1): Set occupancy sensor input to enabled in bits 0 and 2 in *nciAppOptions*.
- Space temperature sensor (input B1).
- Setpoint adjustment (input R1): Set bit 15 in *nciAppOptions2* to 0.
- Light switches (inputs X2-3): Choice of toggle switch disabled/enabled in bit 1-2 in *nciAppOptions2*.
- Light actuators (outputs K2-4): Choice if power up status off/on in bit 5-7 and if occupancy detection will affect light in bit 8-10 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.

2.3.3 With networked wall module or ScreenMate

Similar to the application in preceding section except for the use of a LonWorks-based wall module or ScreenMate.

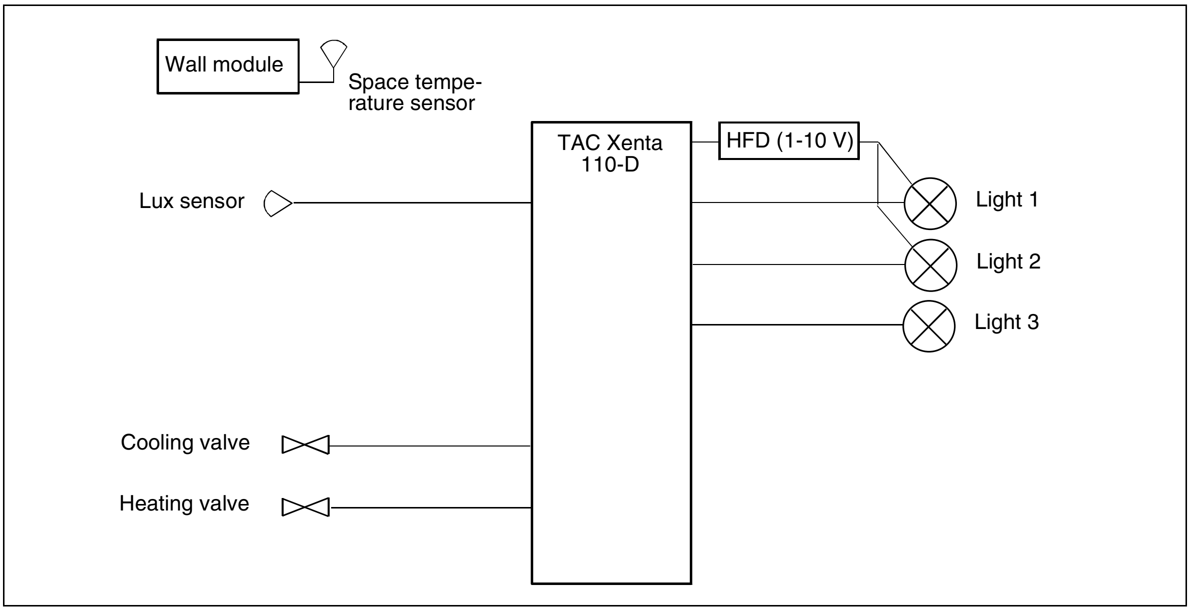

Figure 2.9 One room with networked wall module or ScreenMate

- Lux sensor (input U1): set bit 10 to 0 and bit 11 to 1 in *nciAppOptions*.
- Light actuators (outputs K1-3): Choice if power up status off/on in bit 4-6 and how occupancy detection will affect light in bit 8-10 in *nciAppOptions2*.
- Heating/cooling valves, actuators (outputs V1-V2): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.
- Wall module (section 2.6) or ScreenMate (section 2.7).
- Space temperature sensor (wall module).

2.4 One room controlled by one TAC Xenta 110-D and one TAC Xenta 10x

For more advanced demands the TAC Xenta 110-D can work together with a TAC Xenta 101, TAC Xenta 102, TAC Xenta 103 or TAC Xenta 104 and still be a very competetive solution.

The application below (figure 2.9) shows a combination with TAC Xenta 102-ES (VAV) and TAC Xenta 110-D, but there are many possibilties. The interaction between the TAC Xenta 102-ES and TAC Xenta 110-D is the operation mode (occupied mode). The window contact can be used to control auxiliary units when a window is opened.

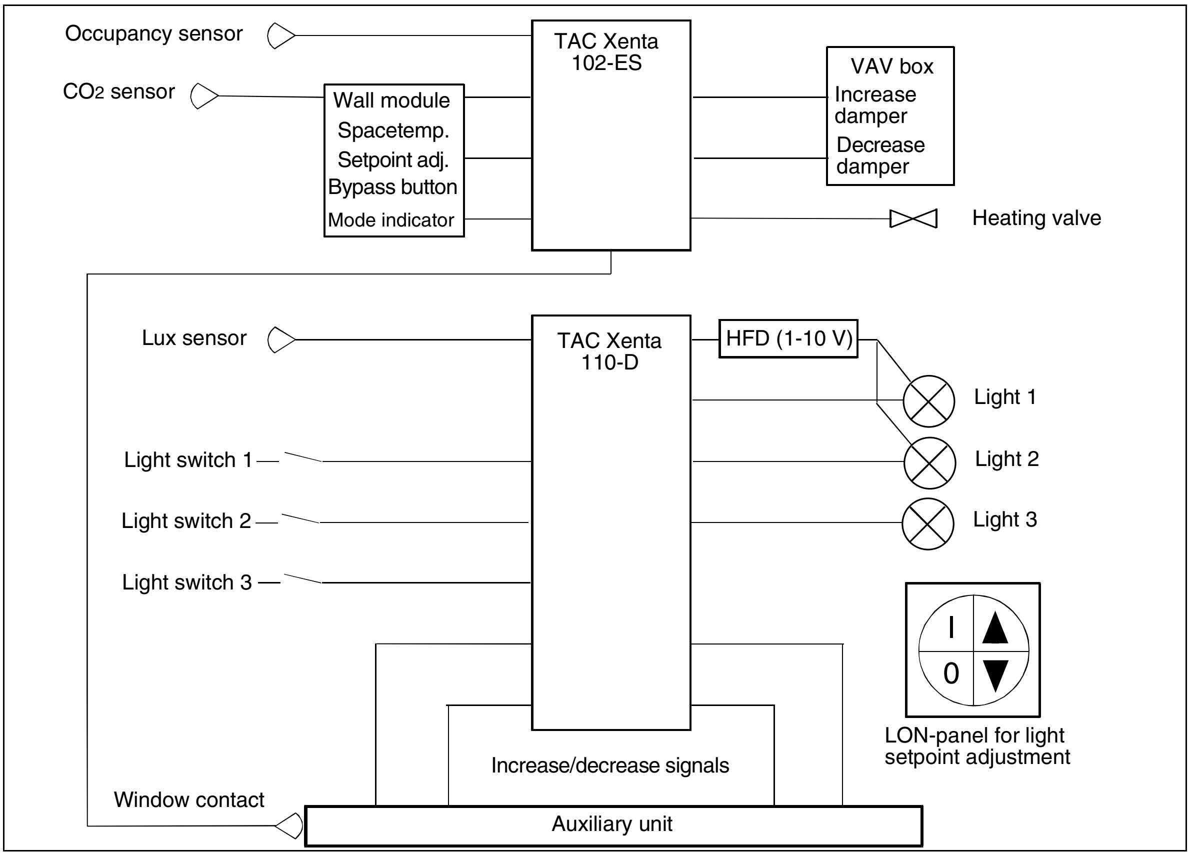

Figure 2.10 One room with one TAC Xenta 110-D and one TAC Xenta 102-ES

- Lux sensor (input U1): set bit 10 to 0 / bit 11 to 1 in *nciAppOptions*.
- Dimmer (input R1): set bit 12 to 0 in *nciAppOptions2*.
- Light switches (inputs X1-3): Choice of toggle switch disabled/enabled in bit 0-2 in *nciAppOptions2*.
- Light actuators (outputs K1-3): Choice if power up status off/on in bit 4-6 and if occupancy detection will turn light off/on in bit 8-10 in *nciAppOptions2*.
- Auxiliary units (output V3-4): Use master/slave mode, enable slave mode in bit 13 in *nciAppOptions*. Dependant on the cycle time of the controller, 4 seconds.
- Wall module with occupancy sensor and CO_2-sensor.
- LON panel bound to *nviSetting*.

2.5 Flexible solutions with master/slave

2.5.1 With two TAC Xenta 110-D

A room is divided into several zones with individual functions or as part of a bigger room, for example in a building with movable walls.

This application has two TAC Xenta 110-D, with one as master and the other as slave. If the room gets divided in two, the slave is configured to be a master and have a wall module and an occupancy sensor connected to it.

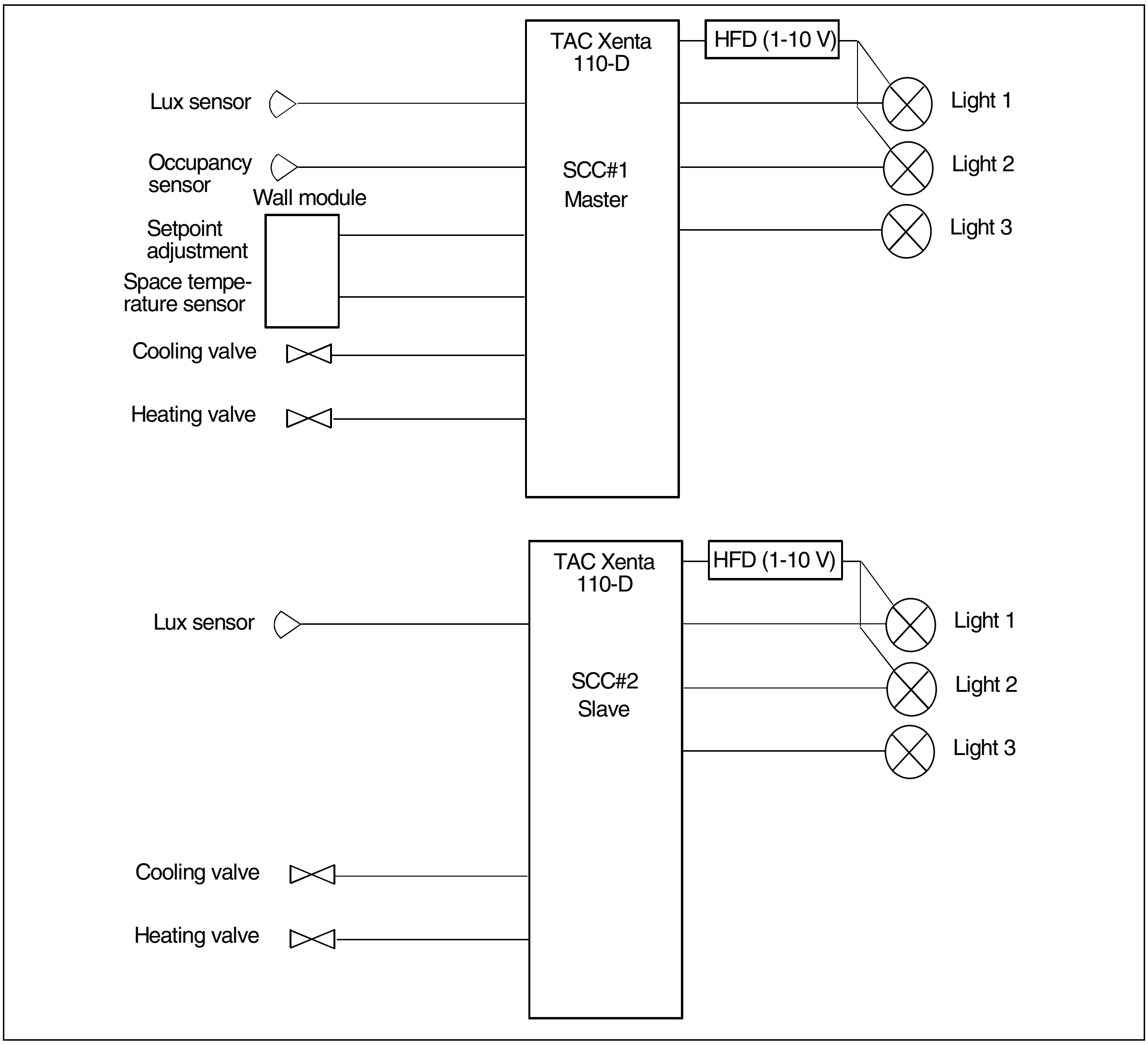

Figure 2.11 One room with two TAC Xenta 110-D as master/slave

- Master/slave operation: choice of slave mode disabled/enabled in bit 12 and bit 13 in *nciAppOptions*.
- Lux sensor (input U1): set bit 10 to 0 and bit 11 to 1 in *nciAppOptions*.
- Light actuators (outputs K1-3): Choice if power up status off/on in bit 4-6 and how occupancy detection will affect light in bit 8-10 in *nciAppOptions2*.

- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.
- Auxiliary units (output V3-4): Use master/slave mode, enable slave mode in bit 13 in *nciAppOptions*. Dependant on the cycle time of the controller, 4 seconds.
- Space temperature sensor (wall module, section 2.6).

2.5.2 With one TAC Xenta 110-D

The separate objects (controllers) inside of TAC Xenta 110-D can be used as master/slave.

Another option is to use a TAC Xenta 400 as a master to several slaves. In one TAC Xenta 400 there may be several masters.

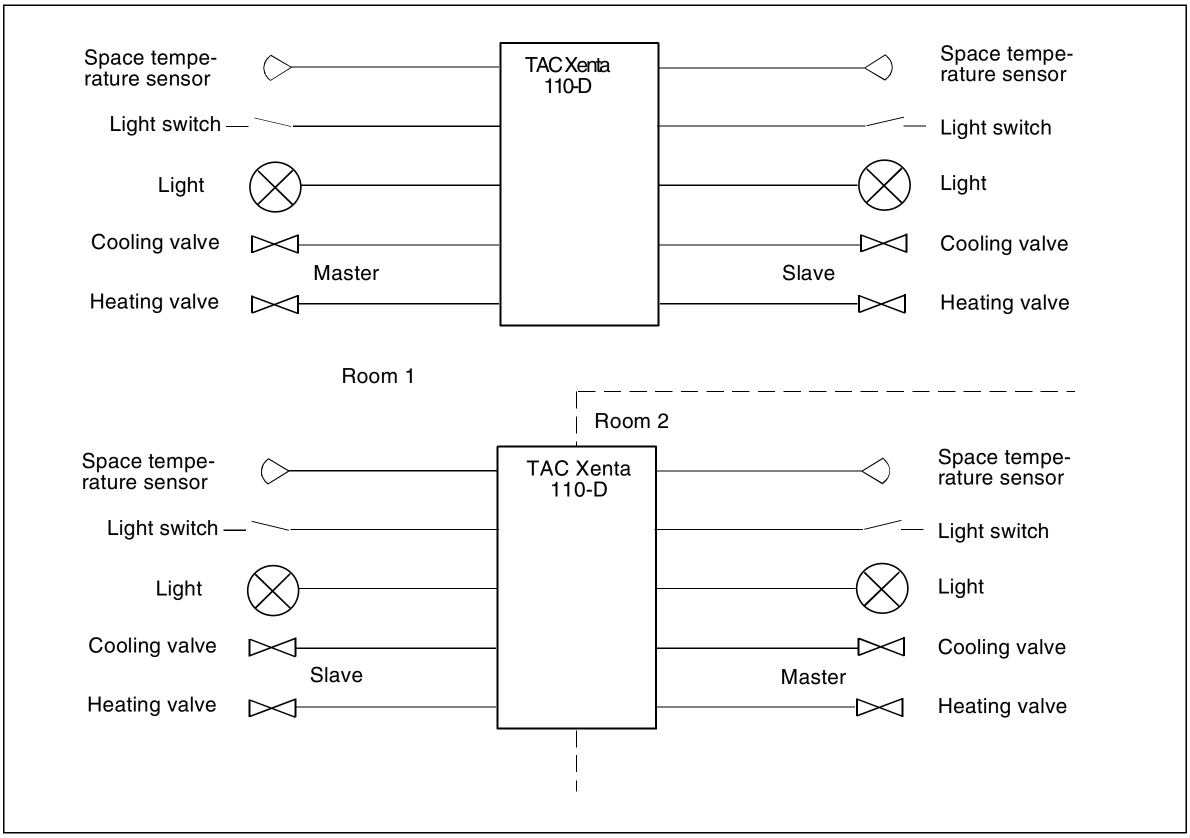

Figure 2.12 Four zones divided into rooms controlled with two TAC Xenta 110-D in master/slave configuration

- Master/slave operation: choice of slave mode disabled/enabled in bit 12 and bit 13 in *nciAppOptions*.
- Space temperature sensor (input B1 and B2).
- Light switches (inputs X1-3 and U1): Choice of toggle switch disabled/enabled in bit 0-3 in *nciAppOptions2*.
- Light actuators (outputs K1-4): Choice if power up status off/on in bit 4-7.
- Heating/cooling valves, actuators (outputs V1-V4): Choice of actuators NC/NO in bit 13 in *nciAppOptions2*.

2.6 Wall modules

It is possible to use a wall module from the ZS 100 (ZS101-ZS104) series, which measures the temperature, together with the TAC Xenta 110-D. On the wall module (figure 2.13) there are a setpoint knob and a bypass button with setting possibilities.

NOTE: TAC Xenta 110-D does not support the LED indicator found on the ZS100 series.

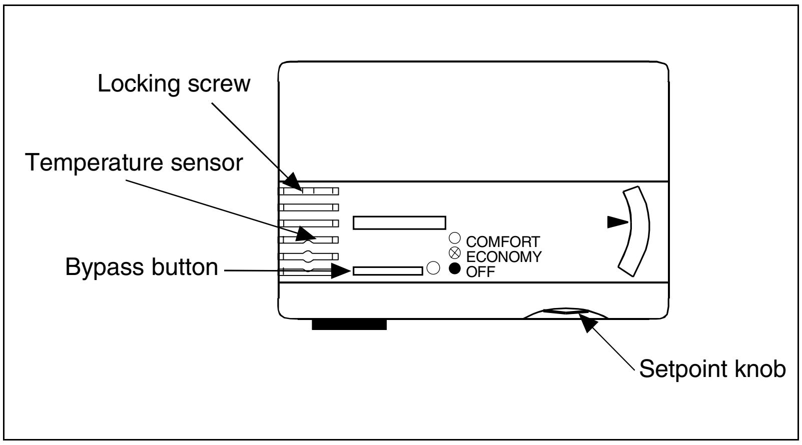

Figure 2.13 Wall module in the ZS100 series

The setpoint knob is used to adjust the zone temperature setpoint with a maximum of ±3 °C (±5 °F).

The bypass button is used to change the operating mode, and by pressing the key, an internal timer in the controller, which runs for a specific time (configurable), is started. Read more about different operating modes and ways to force the controller in chapter 5.

Note! The TAC Xenta OP is normally connected directly to the controller, not the wall module. The TAC Xenta 110-D has a TAC Xenta OP access connecter (type RJ-10) on the controller instead of dedicated terminals.

There is additional information on the wall modules and how the temperatures can be adjusted locally in the zone by means of the keys in "Data sheet for ZS 101-ZS 105", part number 0-003-1661.

2.7 ScreenMate

If a TAC Vista® 3.3 or TAC Vista 2000 is supervising the LonWorks network it is possible to use the TAC Vista ScreenMate. The user can then set indoor temperature and lighting, or other values, depending on the configuration of the ScreenMate.

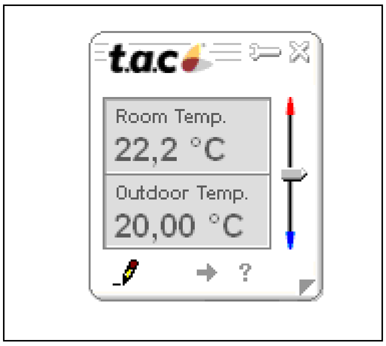

Figure 2.14 TAC Vista ScreenMate

Except for the temperature sensor, the TAC Vista ScreenMate replaces the wall module and makes it possible to control several units at a lower cost. The user can read and make their own settings using their own PC.

The ScreenMate object is created, and configured, with TAC Vista Workstation. For more information about TAC Vista ScreenMate, refer to TAC Vista ScreenMate handbook, 0-004-7794-0.

2.8 Lamp loads

The relay outputs in TAC Xenta 110-D are *only* suitable for modern lamp devices equipped with HF or HFD units.

Maximum lamp load

A maximum of 250W lamp loads is recommended for each relay output to ensure a long relay life time. The limiting factor is the transients of the power-up current.

Note: Conventional old fluorescent lamps suffer from severe power-up current transients and should not be used with the controller's relays. Use external relays instead.

Maximum resistive load

If there is a need to connect something other than lamps (relays etc.), the total resistive load per relay must be less than 3 A.

3 Installation

3.1 Mechanical installation

3.1.1 Fitting

TAC Xenta 110-D can either be snapped onto a DIN rail (figure 3.1) or fastened with two screws to a level surface (figure 3.2). It should always be fitted into a cabinett or other protective enclosure to fulfill the electrical safety requirements.

To fasten the controller onto a DIN rail:

1 Place the controller on the top of the rail as is shown by arrow 1.

2 Turn the controller downwards until it snaps onto the rail as is indicated by arrow 2.

3 To remove, place a screwdriver in the lock on the bottom of the controller and pull down. It is then possible to lift the controller diagonally upwards and off the rail..

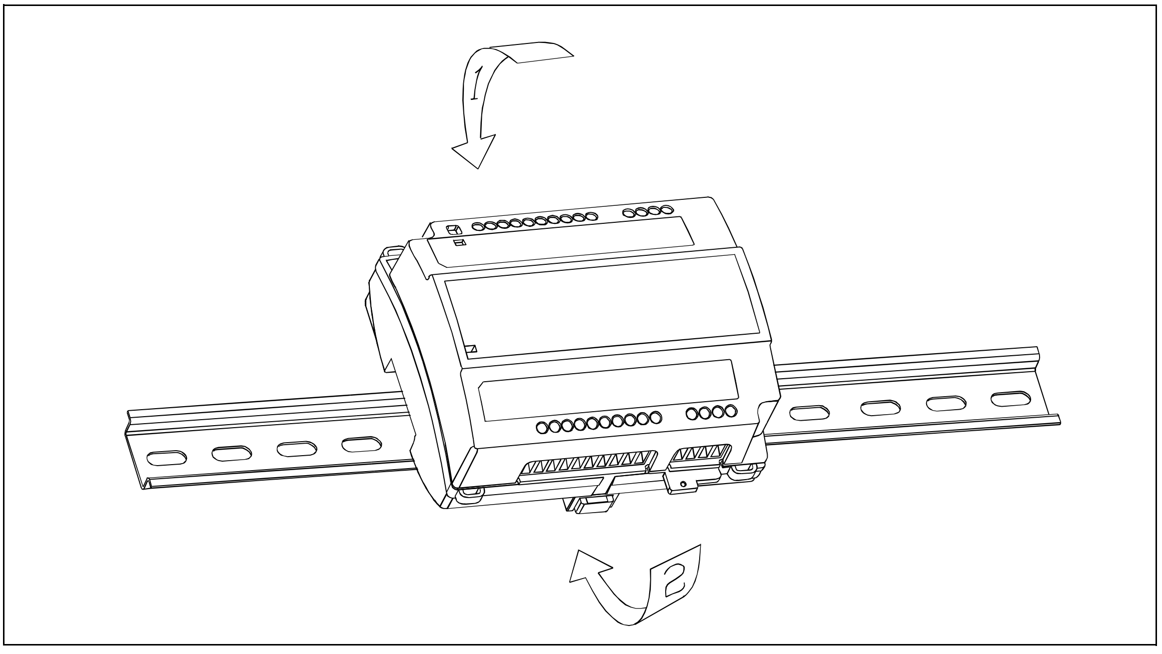

Figure 3.1 TAC Xenta 110-D fastened on a DIN rail

Fastening the controller on a level surface:

Use the two sockets provided for fastening the controller; the maximum screw size is M4 or ST 3,5 (∅ 0.15"). The head of the screw should not exceed 7,5 mm (0.3") in diameter.

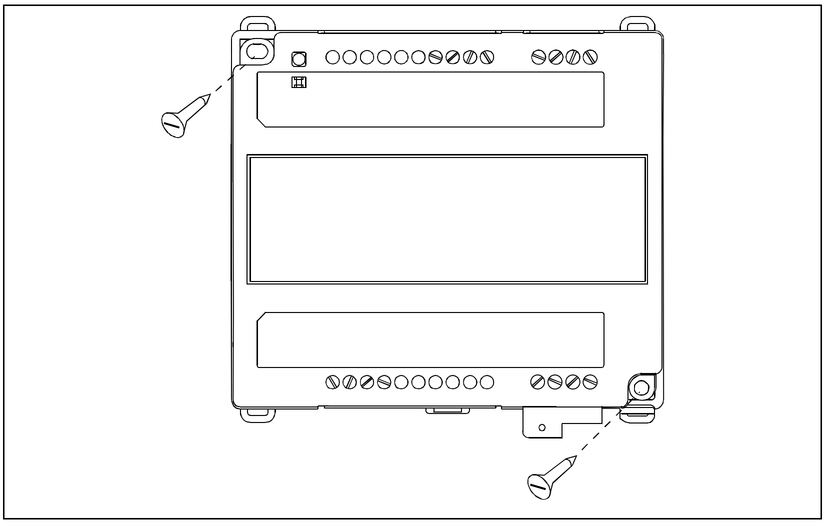

Figure 3.2 TAC Xenta 110-D fastened on level surface

3.2 Electrical installation

3.2.1 General

> ⚠ **Warning!** All 230/115 V supply cables must be installed by authorised electricians.

1. Each controller or group of controllers must be fitted with max. 6 A fuses.
2. The controller is only intended for mounting inside an enclosure providing required cable clamping and necessary protection against electrical shock.
3. Strap wires or shrink-to-fit tubes must be fitted to make sure that loose 230 V (115 V) cables cannot get in contact with ELV supply cables or signal cables-and vice versa.
4. It must be simple to break the power supply for the controller or for the complete installation.
5. TAC Xenta 110-D/24: When several TAC Xenta controllers are supplied from a common transformer, it is important that all G's are connected with each other and that all G0's are connected with each other. They must not be interchanged.
6. TAC Xenta 110-D/24: At the transformer, G0 should be connected to protective earth. This is to get a grounding point for interference diversion.
7. Lamp Loads: Conventional old fluorescent lamps suffer from severe power-up current transients. The relay outputs in TAC Xenta 110-D are **only** suitable for modern lamp devices equipped with HF- units. A maximum of 250W lamp loads is recommended for each output to ensure a long relay life time.

Safety standard

Transformers supplying the controller must comply to the safety standard EN 60 742 or any other relevant safety standard for ELV, 24 V AC. When equipment with a power supply of its own is connected, this power supply must also comply with this norm.

Cable lengths

For information on communication cable lengths, see TAC Xenta Network Guide, part number 0-004-7460. For all other cables, maximum length is 30 m (100 feet) and min. area is 0,7 mm^2 (AWG-19).

The wall modules ZS 101-ZS 104

The wall modules ZS 101-ZS 104 are intended for use with the TAC Xenta 110-D.

Connection terminals

The designation of the connection terminals can be seen in two places on the controller: on the edge of the printed circuit board, and on the label on the front of the controller.

Termin.	Design.	Function	Type
1*[1]	X2	Light switch/Occupancy sensor/Bypass	Digital input
2	M	Measurement neutral	-
3*[1]	X3	Light switch/Occupancy sensor/Bypass	Digital input
4	B2	Zone temperature sensor SCC#2	Thermistor input
5	Y1	Modulating light control	1-10 V output
6	M	Measurement neutral	-
7*[1]	X1	Light switch/Occupancy sensor/bypass	Digital input
8*[1]	R1	Setpoint adjustment for SCC#1 Toggle switch for CLC	10 kΩ linear potentiometer SCC#1 Digital input CLC
9	M	Measurement neutral	-
10	B1	Zone temperature sensor SCC#1	Thermistor input
11	K4	Light control LA#4	Relay output
12	KC2	Light control LA#4 relay common	-
13	G0/115/230 V	Supply voltage	-
14	G/115/230 V	Supply voltage	-
15	C1	TP/FT-10 communication channel	LON
16	C2	TP/FT-10 communication channel	LON
17	M	Measurement neutral	-
18*[1]	U1	Light switch / occupancy sensor / bypass / lux sensor/ setpoint offset dial SCC#2	Digital input 0-10 V 10 kΩ linear potentiometer SCC#2
19*[1]	V1	Heating valve SCC#1, on-off	Triac output
20	G	24 V AC (L) supply for V1, V2	-
21*[1]	V2	Cooling valve SCC#1, on-off	Triac output
22*[1]	V3	Heating valve SCC#2, on-off	Triac output
23	G	24 V AC (L) supply for V3, V4	-
24*[1]	V4	Cooling valve SCC#2, on-off	Triac output
25	K3	Light control LA#3	Relay output
26	K2	Light control LA#2	Relay output
27	K1	Light control LA#1	Relay output
28	KC1	Light control LA#1-3 common	-

*[1] See Configuration parameters

3.2.2 Wiring of TAC Xenta 110-D/24

Note! Read section 3.2.1 "General" before you connect the cables according to the wiring diagram in figure 3.3.

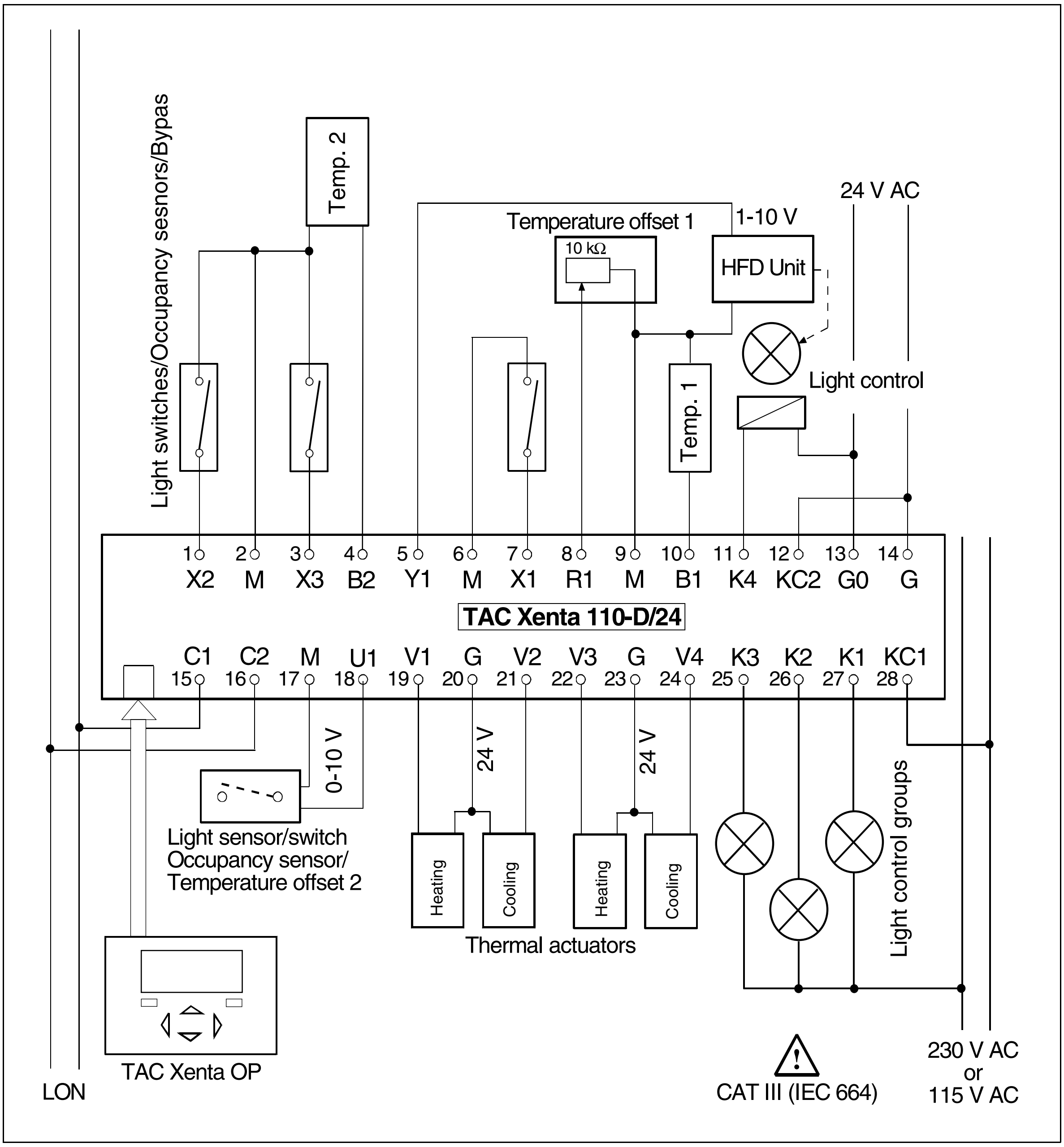

Figure 3.3 Wiring of TAC Xenta 110-D/24

Note: KC2/K4 may not be connected to mains supply since isolation clearance to G0 terminal does not meet 6.5 mm (1/4") safety requirement.

3.2.3 Wiring of TAC Xenta 110-D/115

Note! Read section 3.2.1 "General" before you connect the cables according to the wiring diagram in figure 3.4.

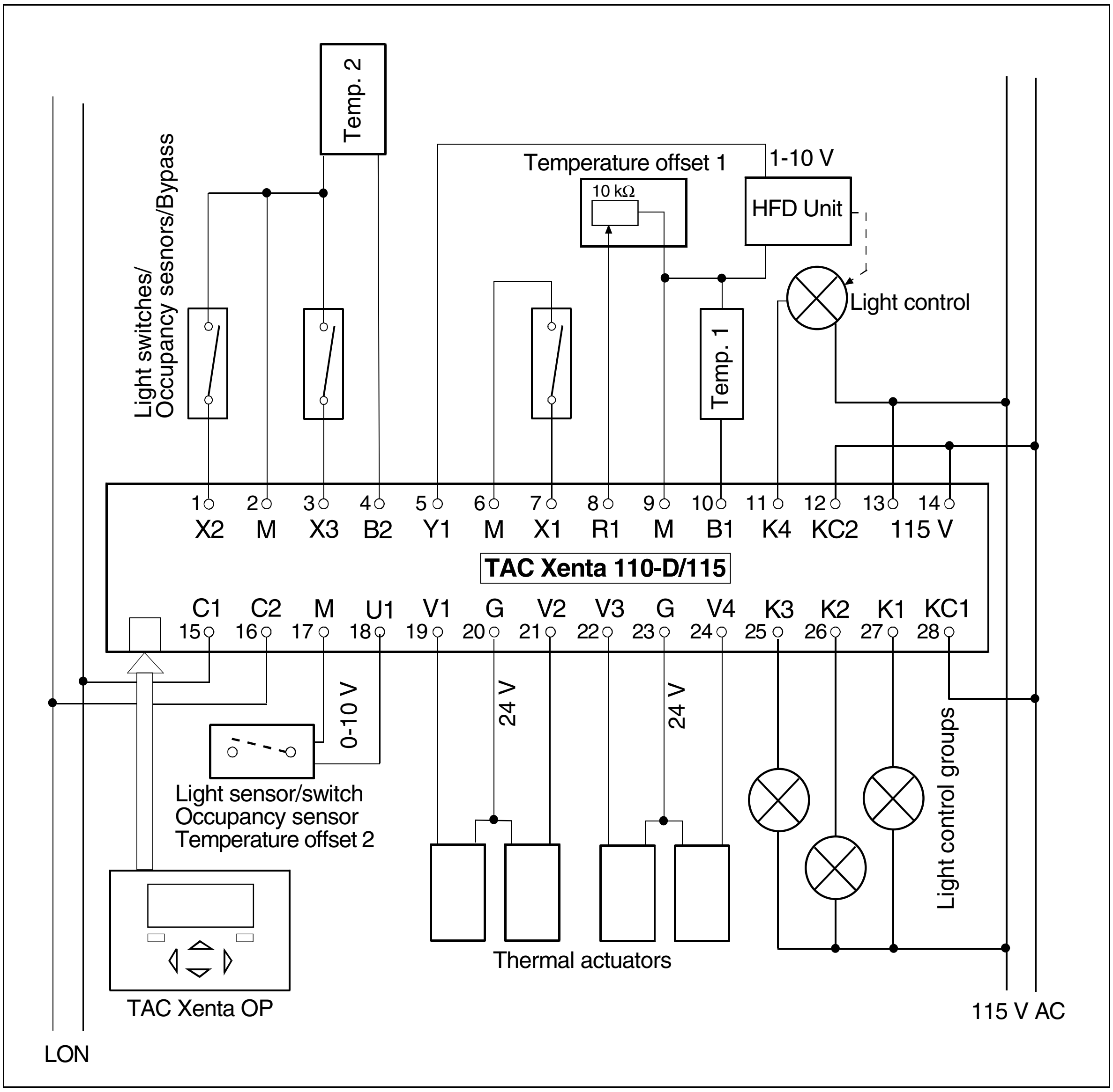

Figure 3.4 Wiring of TAC Xenta 110-D/115

Note: KC2 may also be connected to 24 V but must in this case be wired according to mains safety rules since isolation clearance to the mains terminal do not meet 6.5 mm (1/4") safety requirements.

3.2.4 Wiring of TAC Xenta 110-D/230

Note! Read section 3.2.1 "General" before you connect the cables according to the wiring diagram in figure 3.5.

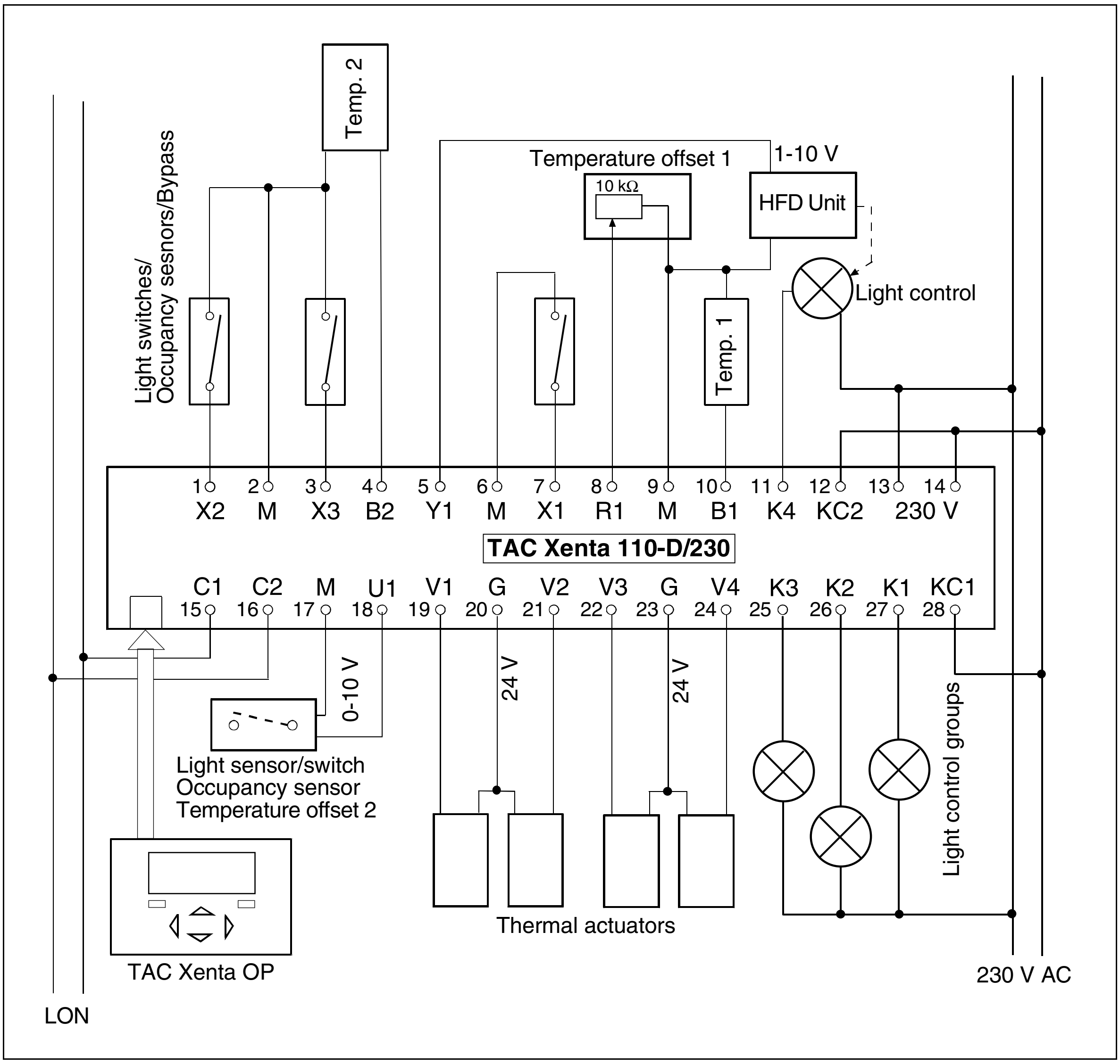

Figure 3.5 Wiring of TAC Xenta 110-D/230

Note: KC2 may also be connected to 24 V but must in this case be wired according to mains safety rules since isolation clearance to the mains terminal do not meet 6.5 mm (1/4") safety requirements.

3.2.5 How to connect the TAC Xenta OP to the wall module

The TAC Xenta 110-D has an OP access connecter (RJ-10) mounted directly on the controller. This should be used to connect the TAC Xenta OP (not to the wall module as with previous TAC Xenta 100 controllers).

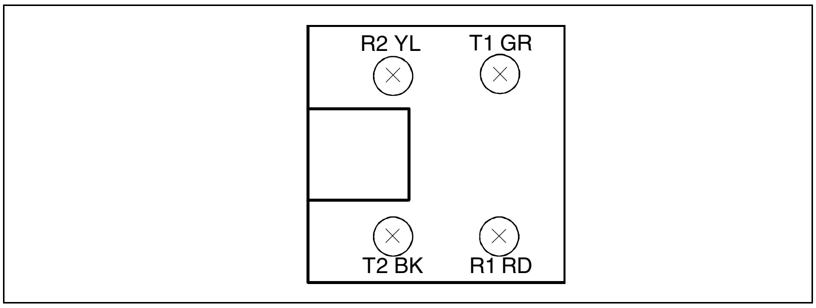

Figure 3.6 Terminal adapter

If there is a need to connect the TAC Xenta OP to the wall module, it is possible to modify the wiring and connect an RJ-10 to terminal adapter (0-073-0921-0). The same requirements apply to the LON-connection as for the rest of the installation (see section 3.2.1). The terminals should be connected as:

RJ-10 to terminal adapter	Signal	Wall module
T2 BK	24 V AC, OP supply	OP
R1 RD	24 V AC, OP supply	G
T1 GR	Lon (TP/FT-10)	C1
R2 YL	Lon (TP/FT-10)	C2

How to connect the adapter (with two different ways to connect to the LonWorks network) can be seen in the figures below:

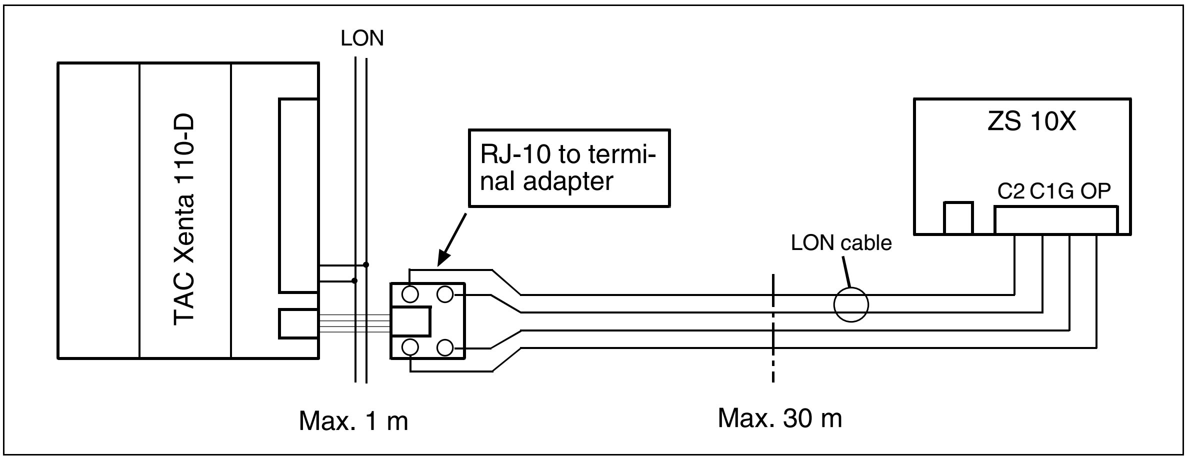

Figure 3.7 TAC Xenta OP to wall module connection, alternative 1

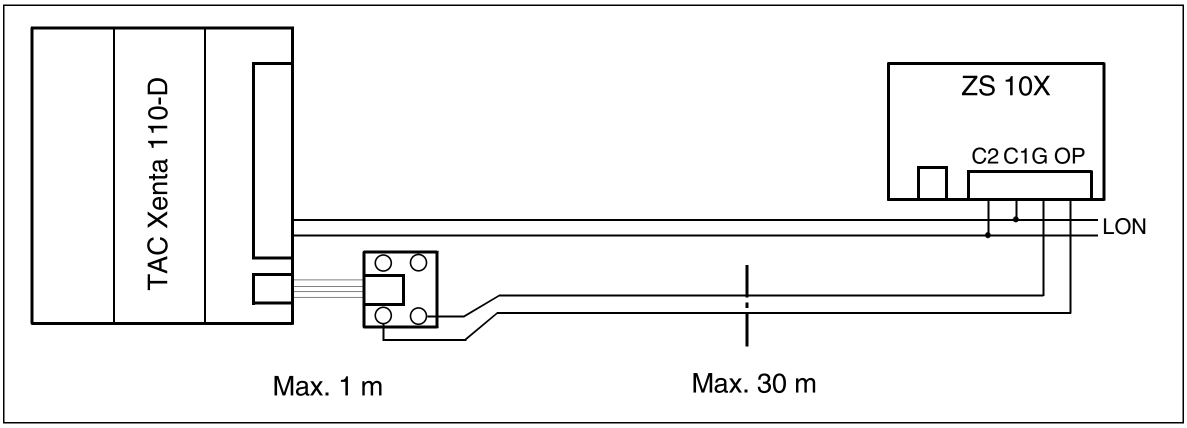

Figure 3.8 TAC Xenta OP to wall module connection, , alternative 2

Note! The cable between the controller and the adapter must not be crossed (see figures above).

3.3 Commissioning

3.3.1 General

When the mechanical and electrical installation has been made, you can commission the controller. This means:

- Installing the controller on the network, set node status and give it an address.
- Set the controller's configuration parameters.
- Bind network variables.
- Test the function.

When it comes to the commisioning of complete zone systems, read the manual "TAC Xenta - Zone Systems Guideline". Here you will find a short description of what to do and when to do it.

When TAC Xenta 100 will be used stand-alone, this is how:

1 Set node status to "Configured" with TAC Xenta OP.

2 Set the basic parameters with TAC Xenta OP.

3 Test the function.

4 If required, fine tune other parameters and variables with TAC Xenta OP.

You could also use a network management tool for the commissioning.

3.3.2 Node status

The node status indicates which mode the controller is in, when it comes to network configuration and program. The status can be changed with TAC Vista (version 3.1 or later), network management tool, or, to some extent, TAC Xenta OP. The controller can be in these states:

Unconfigured

The controller is in this state when delivered from the factory. Neither the program nor the network communication are running. The service light emitting diode is flashing.

The controller cannot work on a network in this state. To do so, it must be in configured, online state, see below.

You cannot set configuration parameters or network variables in this state.

Configured, online

By means of TAC Xenta OP, TAC Vista or a network management tool, the status can be changed to configured. Then, both the program and the network communication are running. The service LED is off. This is the normal state for a controller in operation.

Now the controller uses the address which it was given by the tool during configuration. With TAC Xenta OP you cannot, however, set an address. Therefore all controllers get default addresses. This means that such a TAC Xenta 100 cannot work on a network. It can only work stand-alone.

In this state you can set parameters and variables.

Configured, soft offline

To get the controller into this state, you need a network management tool. The controller has a program and a network configuration, but the program and the communication are at a standstill. The light emitting diode is off. If the controller is reset, it will go into configured, online.

Configured, hard offline

To get the controller into this state, you need a network management tool. The controller has a program and a network configuration, but the program and the communication are at a standstill. The light emitting diode is off. If the controller is reset, it will remain in this state.

Without a program and not configured

This states indicates that there is something wrong with the controller. No program can be detected. The ligh emitting diode is lit.

3.3.3 Configuration parameters (nci's)

TAC Xenta 100 has a number of configuration parameters, where you can set how the controller should be working. There are also network variables which controls the controller during operation. For a description of the configuration parameters, see section 3.4.

Use the commissioning protocol in Appendix B to write down your settings at commissioning. In chapter 6, there is information on all parameters and variables, such as their index, accepted values, default values.

A plug-in for use with LonMaker for Windows is available.

3.3.4 Network installation

For network installation, you need either a network management tool (LNS based or not). The TAC prefered choice of network management tools is LonMaker for Windows. Here you find brief information on how this is made. You find more information in "TAC Xenta, Guidelines for zone applications" and "TAC Xenta and LonMaker".

The installation has two steps:

1 Feed information about the controllers' unique neuron-ID into the network management tool's data base.

2 Let the network management tool install the controller on the network. The controller will then also get an address.

There are two ways to feed the neuron-ID into the data base:

1 Manually feed the neuron-ID into the network management tool. To make this easier you can use a bar code reader to read the detachable ID-neuron label, which you find on every controller. It is suitable to gather these labels when you go around and make the basic configuration, and stick them to a form, drawing or similar. In the

manual "TAC Xenta, Guidelines for zone applications" there is a form for this purpose.

2 Use the service pin function. You can only do this when the controller is connected to the network. On the controller there is a service pin key in a hole in the upper left corner, at terminal X2. When you push this, the controller sends out its neuron-ID. The network management tool can then read the neuron-ID from the network, to save it in its data base.

3.3.5 Network variable binding

How binding is done depends on which network management tool is used. To get exact information, you should use the tool's documentation. In "TAC Xenta Network manual", there is a description of how network variables are bound.

To bind network variables is not an issue when the controller is used in stand-alone operation.

3.3.6 Network variable preservation

It is important to know that only configuration variable (nci:s) are preserved after a power down.

Note: If not bound network variables (nvi:s) are changed by a network tool, TAC Xenta OP or LonMaker for Windows, their value will revert to default after a power up.

3.3.7 Function test

You should also make sure that the controller works as intended.

In chapter 5 all the controller's functions are described.

In chapter 4 you find help, should a problem occur.

3.4 Configuration parameters

The controller can be easily configured by using the configuration parameters:

Index	Variable	Description
0	*nciLocation*	Location label. Used to make a label for the actual place where the controller is mounted.
16	*nciLuxSepoint*	Lux control setpoint. Default value 300 lux.
17	*nciLuxMin*	Minimum lux level. Default value 0 lux.
18	*nciGain*	Gain for lux controller. Default value 1.
19	*nciItime*	Integral time for lux controller. Default value 60 s.
20	*nciLuxPerVolt*	Conversion factor Lux per Volt. Default value 1000.
34	*nciSetpoints1*	Occupancy temperature setpoints for SCC#1. Used for setting the temperature setpoints in the different operating modes: comfort, economy and unoccupied mode (see section 5.2).
35	*nciBypassTime1*	Time for bypass mode for SCC#1. Default value 120 minutes.
36	*nciHeatPrimMin1*	Minimum output for heating controller for SCC#1. Used for setting the minimum value for the operation of the heating valve. Default value 0%.
50	*nciSetpoints2*	Occupancy temperature setpoints for SCC#2. Used for setting the temperature setpoints in the different operating modes: comfort, economy and unoccupied mode (see section 5.2).
51	*nciBypassTime2*	Time for bypass mode for SCC#2. Default value 120 minutes.
52	*nciHeatPrimMin2*	Minimum output for heating controller for SCC#2. Used for setting the minimum value for the operation of the heating valve. Default value 0%.
58	*nciAppOptions*	See section 3.4.1.
59	*nciAppOptions2*	See section 3.4.2.
60	*nciSndHrtBt*	Send heartbeat. Used for setting the intervall between sending the nvo's on the network. Default value 0.0 s (disabled).

3.4.1 nciAppOptions

These parameters are used to set selectable functions in the controller. *nciAppOptions* consists of 16 bits, where each bit sets a specific function (0 or 1). When you use the TAC Xenta OP to view *nciAppOptions*, the leftmost digit shown is bit 0. The table below shows an overview of the options. Default values in bold.

Bit no.		Function
Bit 0	**0**	Hard wired bypass button for SCC#1 control
	1	Hard wired occupancy sensor for SCC#1 control
Bit 1	**0**	Hard wired bypass button for SCC#2 control

Bit no.		Function
	1	Hard wired occupancy sensor for SCC#2 control
Bit 2	**0**	Disable X1 as bypass/occupancy input for SCC#1
	1	Enable X1 as bypass/occupancy input for SCC#1
Bit 3	**0**	Disable X2 as bypass/occupancy input for SCC#1
	1	Enable X2 as bypass/occupancy input for SCC#1
Bit 4	**0**	Disable X3 as bypass/occupancy input for SCC#1
	1	Enable X3 as bypass/occupancy input for SCC#1
Bit 5	**0**	Disable U1 as bypass/occupancy input for SCC#1
	1	Enable U1 as bypass/occupancy input for SCC#1
Bit 6	**0**	Diable X1 as bypass/occupancy input for SCC#2
	1	Enable X1 as bypass/occupancy input for SCC#2
Bit 7	**0**	Disable X2 as bypass/occupancy input for SCC#2
	1	Enable X2 as bypass/occupancy input for SCC#2
Bit 8	**0**	Disable X3 as bypass/occupancy input for SCC#2
	1	Enable X3 as bypass/occupancy input for SCC#2
Bit 9	**0**	Disable U1 as bypass/occupancy input for SCC#2
	1	Enable U1 as bypass/occupancy input for SCC#2
Bit 10&11	00	U1 used as digital input for toggle switch or bypass/occupancy input
	01	U1 used as lux input for the CLC
	10	U1 used as temperature offset input for SCC#2
Bit 12	**0**	Slave mode for SCC#1 disabled
	1	Slave mode for SCC#1 enabled
Bit 13	**0**	Slave mode for SCC#2 disabled
	1	Slave mode for SCC#2 enabled
Bit 14	0	Not used

3.4.2 nciAppOptions2

nciAppOptions2 also consists of 16 bits, where each bit sets a specific function (0 or 1). When you use the TAC Xenta OP to view *nciAppOptions2*, the leftmost digit shown is bit 0. Default values in bold.

The table below shows an overview of the options:

Bit no.		Function
Bit 0	0	Disable X1 as toggle switch for Lamp actuator #1

Bit no.		Function
	1	Enable X1 as toggle switch for Lamp actuator #1
Bit 1	0	Disable X2 as toggle switch for Lamp actuator #2
	1	Enable X2 as toggle switch for Lamp actuator #2
Bit 2	0	Disable X3 as toggle switch for Lamp actuator #3
	1	Enable X3 as toggle switch for Lamp actuator #3
Bit 3	0	Disable U1 as toggle switch for Lamp actuator #4
	1	Enable U1 as toggle switch for Lamp actuator #4
Bit 4	0	Power up status for Lamp Actuator #1 is OFF
	1	Power up status for Lamp Actuator #1 is ON
Bit 5	0	Power up status for Lamp Actuator #2 is OFF
	1	Power up status for Lamp Actuator #2 is ON
Bit 6	0	Power up status for Lamp Actuator #3 is OFF
	1	Power up status for Lamp Actuator #3 is ON
Bit 7	0	Power up status for Lamp Actuator #4 is OFF
	1	Power up status for Lamp Actuator #4 is ON
Bit 8	0	Occupancy detection resumes status of Lamp Actuator #1
	1	Occupancy detection requires switch X1 action to turn Lamp Actuator #1 on
Bit 9	0	Occupancy detection resumes status of Lamp Actuator #2
	1	Occupancy detection for toggle switch X2 action to turn Lamp Actuator #2 on
Bit 10	0	Occupancy detection resumes status of Lamp Actuator #3
	1	Occupancy detection for toggle switch X3 action to turn Lamp Actuator #3 on
Bit 11	0	Occupancy detection resumes status of Lamp Actuator #4
	1	Occupancy detection for toggle switch U1 action to turn Lamp Actuator #4 on
Bit 12	**0**	R1 used as input for setpoint adjustment to CLC (only when bit 15=1)
	1	R1 used as input for light toggle switch to CLC (only when bit 15=1)
Bit 13	**0**	Thermal actuators are of NC type (Normally Closed)
	1	Thermal actuators are of NO type (Normally Open)
Bit 14	**0**	Temperature control hysteris is 0.2 degrees
	1	Temperature control hysteris is 0.8 degrees
Bit 15	**0**	R1 used as input for SCC#1
	1	R1 used as input for CLC

4 Operation

4.1 General

TAC Xenta 110-D is normally a very reliable controller.

The controller has several alarms, explained in section 4.2.

If there are any problems, you can use the troubleshooting tips in this chapter (section 4.3), preferably when the controller is run on a network, but also when it is used stand-alone. If you need further help, please contact the nearest local sales office.

4.2 Alarm

When TAC Xenta 110-D reports alarms to a monitoring system, this is done with the network variable *nvoAlarmStatus*. The variable has 16 bits, which corresponds to different alarm situations.

Alarm modes for nvoAlarmStatus

Bit	Alarm	Cuts out when...	Is reset when...
0	Deviating zone temperature SCC#1	The deviation in zone temperature is more than 2 °C (4 °F) for more than 60 minutes (occupied and bypass modes).	The deviation in zone temperature is less than 1.5 °C (3 °F) (hysteresis 0.5 °C, 0.9 °F)
1	Deviating zone temperature SCC#2	The deviation in zone temperature is more than 2 °C (4 °F) for more than 60 minutes (occupied and bypass modes).	The deviation in zone temperature is less than 1.5 °C (3 °F) (hysteresis 0.5 °C, 0.9 °F)
2	Low zone temperature SCC#1	The zone temperature is lower than 10 °C (50 °F) for more than 60 minutes (standby and unocc. modes).	The zone temperature is more than 12 °C (54 °F).
3	Low zone temperature SCC#2	The zone temperature is lower than 10 °C (50 °F) for more than 60 minutes (standby and unocc. modes).	The zone temperature is more than 12 °C (54 °F).
4	Deviation of CLC light level	The deviation of CLC level is more than 20% of actual setpoint.	The deviation of CLC level is less than 20% of actual setpoint.
10	Unbound *nvi:s* have not been received	Power on.	When the first not bound network variable have been received.
11	Adaption of thermistor	Internal writing error in the controller memory.	The controller must be replaced.
13	Non-valid value on input	An input network variable is outside of its accepted values.	The variable gets an accepted value.
14	No application program	No valid application program.	The controller must be replaced.
15	(Flash) memory write error	The controller is faulty.	The controller must be replaced.

4.3 Problems and solutions

A list of common problems and solutions is supplied below:

What affects...	Check...
Operation?	• Bypass button on wall module (X1-3, U1). If the bypass button has been pressed, the time (*nciBypassTime*) must expire before normal occupancy mode returns. • Occupancy sensor (X1-3, U1) or network variable *nviOccSensor*. If the occupancy sensor indicated occupancy, there will be a delay (*nciBypassTime*) before switching to standby. • Order via network, *nviOccManCmd*.
Operation mode? (Forcing the controller)	• Chosen settings in *nciAppOptions* and *nciAppOptions2*. • Outputs heating/cooling, *nvoUnitStatus*, *nvoTerminalLoad*, *nvoHeatPrimary*, *nvoCoolPrimary* which can be affected by normal control or *nciHeatPrimMin*.
Control temperature set-point?	• Current operation mode, *nvoEffectOccup*. • Set basic setpoints, *nciSetpoints*. • *nviSetpntOffset* and or the setpoint knob on the wall module. Both of them give an offset to the values in *nciSetpoints*.
Read room temperature?	• Zone temperature sensor (B1-2) or network variable *nviSpaceTemp*. A valid value on the network overrides the temperature sensor.
That an alarm is set?	• Current operation mode, *nvoEffectOccup*.
The light is off when entering a room?	• Current state of *nviLampValue* and occupancy mode, *nviOccupancy*. • Configuration of toggle switch in bit 0-3 in *nciAppOptions2*. • Configuration of power up status in bit 4-7 in *nciAppOptions2*. • Configuration of resume function in bit 8-11 in *nciAppOptions2*.
Light level control?	• The value of *nvoLampValue*. • Lux level sensor (U1) or network variable *nviLuxLevel*. • If the input R1 is assigned as a toggle switch, the light level setpoint will toggle between 10%, 100% and light control. • If the Input R1 is assigned for light SP adjustment, the effective setpoint is not possible to monitor once the adjustment switch has been pushed the first time. • Configuration of input R1, bit 12 and 15 in *nciAppOptions2*. • Configuration of input U1, bit 10/11 in *nciAppOptions*.

5 Functional description

5.1 General

The TAC Xenta 110-D introduces several new features to the TAC Xenta 100 family:

- It is possible to have space comfort control and lighting control in two zones.
- There are several inputs with multi-purpose use, for occupancy sensors, bypass buttons , toggle switch and more.

The controller contains 8 LonMark objects:

- 2 Space comfort controllers, SCC (section 5.2) for basic cooling and heating (on/off) control.
- 4 light actuator objects, LA (section 5.3) for switching lamps on/off by using switches and occupancy signals.
- 1 Constant Light controller object, CLC (section 5.4) for adjustable light level control.
- 1 node object

The flexibility of the TAC Xenta 110-D is the possibility of interaction between the different objects.

The node status is explained in section 5.5.

In section 5.6, More about functions, you will find a description of: occupancy sensors, minimum heat output, sun-blind control and master/slave operation.

Each section in this chapter is ended with information on which network variables are used in the current control situation. If you need details about the network variables' characteristics, such as default values and accepted values, you find this in chapter 6.

5.2 *Space Comfort controller, SCC*

The controller has two identical Space Confort controller objects. In the description below, all the variables are mentioned without any SCC number. They all have either a 1 or a 2, depending on which SCC they belong to.

5.2.1 *Occupancy modes*

The two SCC objects has four selectable operation modes:

- Occupied
- Standby
- Bypass
- Unoccupied

The occupancy mode is controlled by *nviOccManCmd*, but is also influenced by occupancy sensors or the bypass button on the wall module. The connection between these are shown in table below. There you will also find the controller's values during stand-alone operation.

Desired operation *nviOccManCmd*	Bypass timer[1]	Occupancy sensor[2]	*nvoEffectOccup*
Occupied OC_OCCUPIED	Enabled	Without significance	OC_OCCUPIED
	At a stand-still	Occupied Unoccupied	OC_OCCUPIED OC_STANDBY
Standby OC_STANDBY	Enabled	Without significance	OC_BYPASS
	At a stand-still	Without significance	OC_STANDBY
Unoccupied OC_UNOCCUPIED	Enabled	Without significance	OC_BYPASS
	At a stand-still	Without significance	OC_UNOCCUPIED
Stand-alone OC_NUL	Enabled	Occupied Unoccupied	OC_OCCUPIED OC_BYPASS
	At a stand-still	Occupied Unoccupied	OC_OCCUPIED OC_STANDBY
Bypass OC_BYPASS	Without significance	Without significance	OC_BYPASS

[1] *Activated by the bypass button on the wall module*

[2] *See section 5.5.1 about occupancy sensors*

Occupied mode

In occupied mode, the controller maintains a comfortable indoor climate. This is the default mode after power up or reset. The controller is in this mode when *nviOccManCmd*=OC_OCCUPIED (or OC_NUL after a power down).

- The setpoints used are found in *nciSetpoints* (occupied_heat and occupied_cool).
- Bypass function is enabled.
- Network variable *nviSetpntOffset* is valid.
- Setpoint offset dial is valid.
- The alarm for zone temperature deviation is enabled.
- The alarm for low zone temperature is disabled.

Standby mode

In standby mode, the controller lowers the energy consumption in the zone. The controller is in this mode when *nviOccManCmd* = OC_STANDBY and the bypass button has not been pressed.

- The setpoints used are found in *nciSetpoints* (standby_heat and standby_cool).
- Bypass function is enabled.
- Network variable *nviSetpntOffset* is valid.
- Setpoint offset dial is valid.
- The alarm for zone temperature deviation is disabled.
- The alarm for low zone temperature is enabled.

Bypass mode

The bypass key on the wall module is used if you want to turn to occupied mode occasionally from standby or unoccupied mode. When someone presses the bypass button on the wall module, the bypass timer is started and the controller turns to bypass mode. The bypass timer runs for the time specified in *nciBypassTime*, and after that the controller changes operation mode according to table above.

Bypass mode can also be set with *nviOccManCmd*. When *nciBypassTime* has elapsed, *nviOccManCmd* resumes it's previous state.

- The setpoints used are found in *nciSetpoints* (occupied_heat and occupied_cool).
- Bypass function is enabled.
- Network variable *nviSetpntOffset* is valid.
- Setpoint offset dial is valid.
- The alarm for zone temperature deviation is enabled.
- The alarm for low zone temperature is disabled.

Unoccupied mode

When the zone is not used for a longer period of time, the controller can be set in unoccupied mode. The controller is in this mode when *nviOccManCmd*=OC_UNOCCUPIED.

- The setpoints used are found in *nciSetpoints* (unoccupied_heat and unoccupied_cool).
- Bypass function is enabled.

- Network variable *nviSetpntOffset* is invalid.
- Setpoint offset dial is invalid.
- The alarm for zone temperature deviation is disabled.
- The alarm for low zone temperature is enabled.

Index	Variable name	Description
21	*nvoEffectOccup1*	Actual occupancy output SCC#1
28	*nviOccManCmd1*	Occupancy scheduler input SCC#1
34	*nciSetpoints1*	Temperature setpoints SCC#1
35	*nciBypassTime1*	Bypass timer SCC#1
37	*nvoEffectOccup2*	Actual occupancy output SCC#2
44	*nviOccManCmd2*	Occupancy scheduler input SCC#2
50	*nciSetpoints2*	Temperature setpoints SCC#2
51	*nciBypassTime2*	Bypass timer SCC#2

5.2.2 Zone temperature control

SCC#1 and SCC#2 have 3 dedicated physical in/outputs each:

	Heating output	Cooling output	Space temperature input
SCC#1	V1	V2	B1
SCC#2	V3	V4	B2

The control principle is ON/OFF with configurable hysteresis and neutral zone. Some additional inputs, like bypass and occupancy signals, can be configured to different inputs.

Zone temperature measurement

The zone temperature can be measured either with a hard-wired temperature sensor (usually in the wall module) or with a LonTalk temperature sensor node connected to *nviSpaceTemp*.

The network variable *nvoSpaceTemp* is used to monitor the effective zone temperature. If *nviSpaceTemp* has a valid value, this output will echo the value of the input. If there is no valid value for *nviSpaceTemp*, the value from the hard-wired sensor is used. If neither variable is available, the output will send the invalid value.

nvoSpaceTemp is sent out when it has changed more than 0,1°C.

Zone temperature setpoints

nciSetpoints defines six temperature setpoints:

- heating setpoint occupied mode
- cooling setpoint occupied mode

- heating setpoint standby mode
- cooling setpoint standby mode
- heating setpoint unoccupied mode
- cooling setpoint unoccupied mode

The minimum accepted deviation between the heating and cooling setpoints is 0,5 °C, and the heating setpoints must be lower than the cooling setpoints. If the heating setpoints are higher or equal to the cooling setpoints, the controller resets the heating setpoint to 0,5 °C lower than the cooling setpoint. The table below shows accepted values and default values for the six temperature setpoints in *nciSetpoints*.

The setpoints for occupied and standby mode are basic setpoints, which can be changed with *nviSetPntOffset* and the setpoint knob. The unoccupied mode setpoints are always valid.

Setpoint	Min.	Max.	Default
Cooling, occupied	10 °C	35 °C	23 °C
Heating, occupied	10 °C	35 °C	21 °C
Cooling, standby	10 °C	35 °C	25 °C
Heating, standby	10 °C	35 °C	19 °C
Cooling, unoccupied	10 °C	35 °C	28 °C
Heating, unoccupied	10 °C	35 °C	16 °C

Setpoint offset input

The network varaible *nviSetpointOffset* is used for adding an offset to the current setpoint (only for occupied and standby mode).

Can be used:

- bound to a supervisory node providing outside temperature compensation
- bound to an external Lon-based wall module node with a relative setpoint dial.
- Inputs R1 (SCC#1) and U1 (SCC#2) can be configured for hardwired setpoint offset dials (e.g. wall module).

If both *nviSetpointOffset* and the local setpoint offset dial are used together, the result on the effective setpoints is additive.

Index	Variable name	Description
25	*nvoSpaceTemp1*	Zone temperature output SCC#1
29	*nviSpaceTemp1*	Zone temperature input SCC#1
30	*nviSetpntOffset1*	Setpoint offset input SCC#1
34	*nciSetpoints1*	Occupancy temperature setpoints SCC#1

Index	Variable name	Description
41	*nvoSpaceTemp2*	Zone temperature output SCC#2
45	*nviSpaceTemp2*	Zone temperature input SCC#2
46	*nviSetpntOffset2*	Setpoint offset input SCC#2
50	*nciSetpoints2*	Occupancy temperature setpoints SCC#2
58	*nciAppOptions*	Application options
59	*nciAppOptions2*	Application options 2

Effective Setpoint output

The output variable *nvoEffectSetpt* is used for monitoring the effective temperature setpoint. The value of *nvoEffectSetpt* depends on the application mode, *nciSetpoints*, *nvoEffectOccup* and local setpoint adjustment.

Index	Variable name	Description
24	*nvoEffectSetpt1*	Effective setpoint output SCC#1
40	*nvoEffectSetpt2*	Effective setpoint output SCC#2

5.2.3 Heating and cooling control

The zone temperature is controlled with a heating and cooling controller, using on-off outputs for thermal actuators. The actuator type is configurable for NC (normally closed) or NO (normally open) in bit 13 in *nciAppOptions2*. NC is the default.

The outputs are 0%(off status) or 100% (on status). The switch between on/off is done with a hysteresis of 0.2 ºC (0.4 ºF). The hysteris can be changed to 0.8ºC (1.4 ºF) with bit 14 in *nciAppOptions2*.

nvoHeatPrimary and the heating value in *nvoUnitStatus* show the current heating output value. *nvoHeatPrimary* can be used to remotly control a heating source.

nvoCoolPrimary and the cooling value in *nvoUnitStatus* show the current cooling output value. *nvoCoolPrimary* can be used to remotly control a cooling source.

nvoTerminalLoad (current output heating/cooling) shows the current heating or cooling demand for the controller, and normally the variable is bound to an energy supply node. Negative values indicate a heating demand and positive values indicate a cooling demand.

Information about the function of Minimum heat output can be found in section 5.6.2.

Index	Variable name	Description
22	*nvoUnitStatus1*	Unit status output SCC#1

Index	Variable name	Description
23	*nvoTerminalLoad1*	Heating/cooling demand output SCC#1
26	*nvoHeatPrimary1*	Heating control output SCC#1
27	*nvoCoolPrimary1*	Cooling control output SCC#1
38	*nvoUnitStatus2*	Unit status output SCC#2
39	*nvoTerminalLoad2*	Heating/cooling demand output SCC#2
42	*nvoHeatPrimary2*	Heating control output SCC#2
43	*nvoCoolPrimary2*	Cooling control output SCC#2
59	*nciAppOptions2*	Application options 2

5.3 Lamp actuators, LA

The controller has four identical Lamp Actuator objects. In the description below, all the variables are mentioned without any LA number. They all have either 1, 2, 3 or 4, depending on which LA they belong to.

The controller can control up to four lamp relays at the same time by Lamp Actuator objects, LA#1-LA#4. The are linked to relay outputs K1-K4 respectively.

nviLampValue is affected by network changes but also by the toggle switch inputs configured in *nciAppOptons2* for the object. The state changes on the negative flank, and will take 250 ms at most. The network variable *nvoLampValueFb:state* always reflects the current relay status according to *nviLampValue:state* and *nviOccupancy* (see table below).

To achieve increased lamp load capacity, LA objects can be bound together, in paralell or in chains, and still be controlled by a single toggle switch, configured for the first object in the chain.

To share an occupancy sensor between climate and light control, a binding between *nvoEffectOccup* on one of the SCCs and *nviOccupancy* on one or more LA can be done.

nviLampValue	*nviOccupancy*	*nvoLampValueFb*
Off	Occupied	Off
Off	Bypass	Off
Off	Standby	Off
Off	Unoccupied	Off
Off	Invalid (default)	Off
On	Occupied	On
On	Bypass	On
On	Standby	Off
On	Unoccupied	Off
On	Invalid (default)	On

There are two different ways of occupancy detection. The choice of function is made in bit 8-11 in *nciAppOptions2*. At power up, the lamp status will reflect the settings in *nciAppOptions2*.

When reentering a zone with an occupancy sensor, there are two modes to choose from:

1 the light is switched on using the toggle switch

2 the same state (on/off) is resumed as when the zone was last occupied.

Index	Variable name	Description
1	*nvoLampValueFb1*	Lamp value output LA#1
2	*nviLampValue1*	Lamp value input LA#1
3	*nviOccupancy1*	Occupancy input LA#1
4	*nvoLampValueFb2*	Lamp value output LA#2
5	*nviLampValue2*	Lamp value input LA#2
6	*nviOccupancy2*	Occupancy input LA#2
7	*nvoLampValueFb3*	Lamp value output LA#3
8	*nviLampValue3*	Lamp value input LA#3
9	*nviOccupancy3*	Occupancy input LA#3
10	*nvoLampValueFb4*	Lamp value output LA#4
11	*nviLampValue4*	Lamp value input LA#4
12	*nviOccupancy4*	Occupancy input LA#4
59	*nciAppOptions2*	Application options 2

5.4 Constant light control, CLC

The controller has one constant light control object, CLC.

By using a lux sensor (hardwired or networked) the controller can control an external HFD-unit. The Constant Light object can be configured in several ways:

- All functions controlled via network. Usually with a LON-based panel (see section 2.4).
- Light level setpoint temporarily changed (up/down) by a one-pole switch on R1.
- Light level toggled between 10%, 100% and SP-control by a one-pole switch on R1.

Configuration is made in *nciAppOptions* bit 10 & 11:

Bit 10	**Bit 11**	Input U1 used as:
0	0	Digital input for toggle switch or bypass/occupancy
0	1	Lux input for the CLC object
1	0	Temperature offset input for SCC#2

and in *nciAppOptions2* in bit 12 and 15:

Bit 12	Input R1 used as:
0	Setpoint adjustment to CLC
1	Light toggle switch to CLC

Bit 15	Input R1 used as:
0	Input to SCC#1
1	Input to CLC

The output Y1 will deliver the constant light level, 1-10V (10-100%). *nvoLampValue* will echo the output (10-100%). An external HFD-device connected to a light group executes the light control.

The light feedback is fetched from *nviLuxLevel* (if *nciAppOptions* bit 11=0) or the physical input U1 (if *nciAppOptions* bit 10=0 and 11=1).

The real light value can be monitored in *nviLuxLevel* when a hard-wired sensor is connected to U1. No dedicated output variable has been assigned so binding the light value is not possible.

The effective setpoint used by the controller is a combination of *nciLuxSetpoint* and *nviSetting*. When *nviSetting* = SET_UP or SET_DOWN, every NV- update results in an increment or decrement on the Y1 output and *nvoLampValue* by 2%. 10 sec. after last NV- update, the real light value (from *nviLuxLevel* or U1) is fetched and used as a new temporary light level setpoint.

When *nviSetting* receives SET_OFF, the light controller is disabled and the Y1 output and *nvoLampValue* (value) preserves their present status (*nvoLampValue* (state)=0). This gives the possibility to freeze a desired light output value without any control function active. When *nviSetting* again receives SET_ON, the light controller is enabled and starts to control against *nciLuxSetpoint* until a new temporary change order is received (*nvoLampValue* (state)=1).

The output *nvoLampValue* from the CLC- object can be bound to the corresponding input on one of the lamp actuator objects for power On/Off (relay K1-K4) to the light level controlled lamp group.

In this way a LON- rotary switch can be used to toggle the lamp on/off (by pushing the rotary switch) and to adjust the lamp to a desired light level (by turning the rotary switch). In a similar way a LON- four-button switch (up, down, on, off) can be used for the same purpose.

When *nviSetting* receives SET_STATE, the real light value (from *nviLuxLevel* or U1) is fetched and copied to *nciLuxSetpoint* as a new default setpoint for the light level.

nciGain and *nciItime* are configuration variables for fine tuning the light level control function.

If R1 has been assigned as light setpoint adjustment input (*nciAppOptions2* bit 12 and 15), a wall-mounted switch gives the possibility to temporarily offset the light setpoint up/down from the lux setpoint. Holding the switch starts ramping the setpoint up/down (appr. 10%/sec) until the switch is released. The next the switch is used, it will do the same, but in the opposite direction.

If R1 is assigned as a toggle light switch input, the light level will toggle between 0%, 100% and light setpoint for each negative signal transition.

An alarm bit, in *nvoAlarmStatus*, will be set when the deviation between effective setpoint and the real value is more than 20%.

The calculated real value from Lux input U1 equals the voltage level (0-10 V) times the constant in *nviLuxPerVolt*.

Index	Variable name	Description
13	*nvoLampValue*	Lamp value output CLC
14	*nviLuxLevel*	Lux level input CLC
15	*nviSetting*	Settings for CLC
16	*nciLuxSetpoint*	Basic lux setpoint for CLC
17	*nciLuxMin*	Minimum allowed lux level
18	*nciGain*	Gain for CLC
19	*nciItime*	Integral time for CLC
20	*nciLuxPerVolt*	Conversion factor Lux per volt
57	*nvoAlarmStatus*	Alarm status output

Index	Variable name	Description
58	*nciAppOptions*	Application options
59	*nciAppOptions2*	Application options 2

5.5 More about functions

5.5.1 Occupancy sensor

The TAC Xenta 110-D has four digital inputs configurable for use with occupancy sensors, input X1, X2, X3 and U1. The configuration are done with *nciAppOptions*:

Bit	0	1
0	Hard wired bypass button for SCC#1	Hard wired occupancy sensor for SCC#1
1	Hard wired bypass button for SCC#2	Hard wired occupancy sensor for SCC#2
2	Disable X1 as bypass/occupancy input for SCC#1	Ensable X1 as bypass/occupancy input for SCC#1
3	Disable X2 as bypass/occupancy input for SCC#1	Ensable X2 as bypass/occupancy input for SCC#1
4	Disable X3 as bypass/occupancy input for SCC#1	Ensable X3 as bypass/occupancy input for SCC#1
5	Disable U1 as bypass/occupancy input for SCC#1	Ensable U1 as bypass/occupancy input for SCC#1
6	Disable X1 as bypass/occupancy input for SCC#2	Ensable X1 as bypass/occupancy input for SCC#2
7	Disable X2 as bypass/occupancy input for SCC#2	Ensable X2 as bypass/occupancy input for SCC#2
8	Disable X3 as bypass/occupancy input for SCC#2	Ensable X3 as bypass/occupancy input for SCC#2
9	Disable U1 as bypass/occupancy input for SCC#2	Ensable U1 as bypass/occupancy input for SCC#2

Bit 10/11 in *nciAppOptions* configures the use of input U1:

Bit 10	Bit 11	Input U1 used as:
0	0	Digital input for toggle switch or bypass/occupancy
0	1	Lux input for the CLC object
1	0	Temperature offset input for SCC#2

There can be a sensor connected to TAC Xenta 110-D, to each SCC, to determine whether someone is in the room or not. If there is no occupancy sensor connected, the controller supposes that there is always someone in the room. The controller uses the information to determine the operation mode. When the controller is used stand-alone, the sensor is used to choose between occupied mode or standby mode. See table in chapter 5.2.1.

All the digital inputs (X1, X2, X3 and U1) are fast scanned, with a 250 ms interval.

If the input is configured for use with an occupancy sensor, the value in *nciBypassTime* determines the delay before mode change when occupancy is no longer detected.

If the input is configured for use with a bypass button the detection is used for starting the bypass timer. Then the controller will be in occupied mode, for the time set in *nciBypassTime*.

Index	Variable name	Description
33	*nviOccSensor1*	Occupancy sensor input SCC#1
49	*nviOccSensor2*	Occupancy sensor input SCC#2
58	*nciAppOptions*	Application options

5.5.2 Minimum heat output, nciHeatPrimMin

During cold periods, there is often a back draught at the windows in the room. To avoid this, the TAC Xenta 110-D offers a possibility to have a little heat on even if it is not really necessary to keep the temperature in the room.

This is done by controlling the heating actuator with a fixed cycle time (10 s) PWM, 0%-100%, when there is no heating demand.

Index	Variable name	Description
36	*nciHeatPrimMin1*	Min. output heating controller SCC#1
52	*nciHeatPrimMin2*	Min. output heating controller SCC#2

5.5.3 Master/slave operation

The controller can control a number of slave units, which makes it possible to control several TAC Xenta 100 controllers in the same building. When bit 12 (SCC#1) or bit 13 (SCC#2) in *nciAppOptions* is active (=1) the controller works as a slave, otherwise as a master (=0). The slave and the master controller must have the same type of actuators.

The communicating network variables between the master controller and all slave controllers are bound according to figure 5.6. The only variables used are *nvoHeatPriSlave* and *nvoCoolPriSlave*. Apart from *nvoUnitStatus*, no other nvo's have reliable values, and these therefore should not be bound to other units.

A TAC Xenta 110-D working as a slave controller only controls the heating and cooling, according to the values sent by its master controller on the network. It does not consider other input. The application mode of the controller is indicated by *nvoUnitStatus* (set to off for the slave).

By using master/slave operation, the outputs V1-V4 can be used for control of auxiliary units. *nviHeatPriSlave* and *nviCoolPriSlave* can be used to control the auxiliary unit from any supervisory node. The cycle time for the controller is 4 seconds.

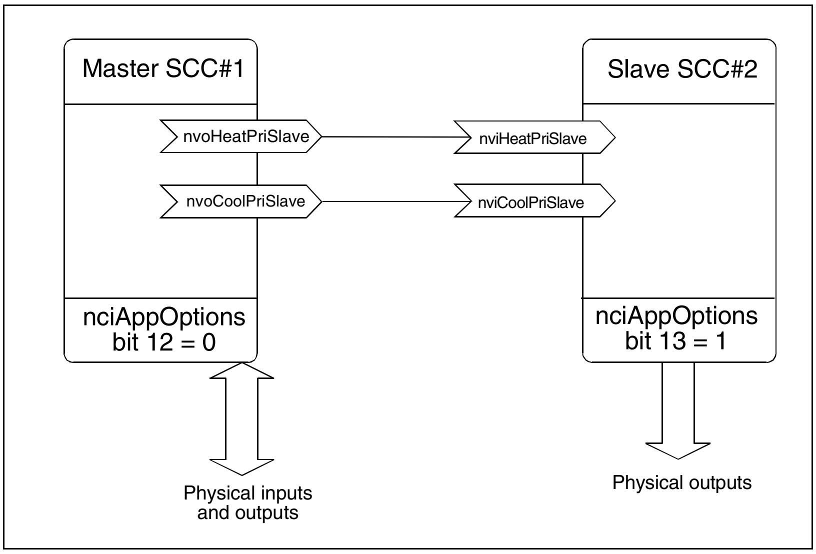

Figure 5.6 Variable bindings between master/slave controllers

Index	Variable name	Description
22	*nvoUnitStatus1*	Unit status SCC#1
31	*nviHeatPriSlave1*	Heating control input for slave1
32	*nviCoolPriSlave1*	Cooling control input for slave1
38	*nvoUnitStatus2*	Unit status SCC#2
47	*nviHeatPriSlave2*	Heating control input for slave2
48	*nviCoolPriSlave2*	Cooling control input for slave2
58	*nciAppOptions*	Application options

6 Communication

6.1 General

The controller consists of 8 LonMark objects: the node object (section 6.5), 4 lamp actuator objects (section 6.6), one constant light controller object (section 6.7) and 2 space comfort controller objects (section 6.8). These objects are monitored by using the network variables *nviRequest* (object request) and *nvoStatus* (object status).

The network variable *nciLocation* (location label) is used when configuring the basic parameters (chapter 3) to give a detailed description of the actual place of the controller. The variable receives an arbitrary string of characters and dividers as long as the string is not longer than 30 characters. You can program a certain location label, i. e.

```
TAMF.main.floor3.room343/RC40
```

A LNS based network management tool uses *nciLocation* when a database is recreated. The monitoring of an already installed network is made by the LNS tool reading *nciLocation*, and using the information to give the node a subsystem name and a unit name. The string should consist of a name and a search path for the subsystem, followed by a slash and the unit name, i.e.

```
system.subsystem[.subsystem...]/unitname
```

6.2 Default settings and power on

The default settings are:

- *nvo:s* are all unacknowledged
- *nvi:s* and *nci:s* are all acknowledged.

All network variables have the same index as in the operator panel TAC Xenta OP. They represent the order by which they are declared in the system program. The order is important for the self documentatory string of each variable. The variables are of type SNVT (Standard Network Variable Types) and the values each SNVT can receive are listed in tables in the latter part of this chapter (see section 6.5-6.8).

There are also two types of parameters: SCPT (Standard Configuration Property Types) and UCPT (User Configuration Property Types). If you want more information about SNVT/SCPT/UCPT and their functions, look for "The SNVT Master List and Programmer's Guide" available at www.lonmark.org.

6.3 Updating network variables, Heartbeat

The TAC Xenta 110-D has a function, called Heartbeat, which can be configured to frequently update the output variables on the network.

The values of the bound outputs are usually sent when they change.

If a network variable is sent on heartbeat, it is shown in tables in the latter part of this chapter under the heading Hb (see section 6.5-6.8).

The update intervals are set in *nciSndHrtBt*. The default value is 0.0, no frequent update is performed.

6.4 Not accepted values

All *nvo's* are limited to their accepted values, and all *nvi's* detect whether the incoming value is within the accepted limits. If the value is not accepted, the controller activates bit 13 in *nvoAlarmStatus*. For an *nvi*, the controller resume the default value, which is included as an accepted value.

6.5 The node object

The variables in the node object (figure 6.1) are separated into three categories:

- Mandatory (M)
- Optional (O)
- Configuration properties (C)

The category “Mandatory” contains mandatory variables (according to LonMark profile for node objects), “Optional” are also described in the same profile and “Configuration properties” contains the *nci’s*.

Note! The network variables’ indexes are not the same as “nv” in the figure below.

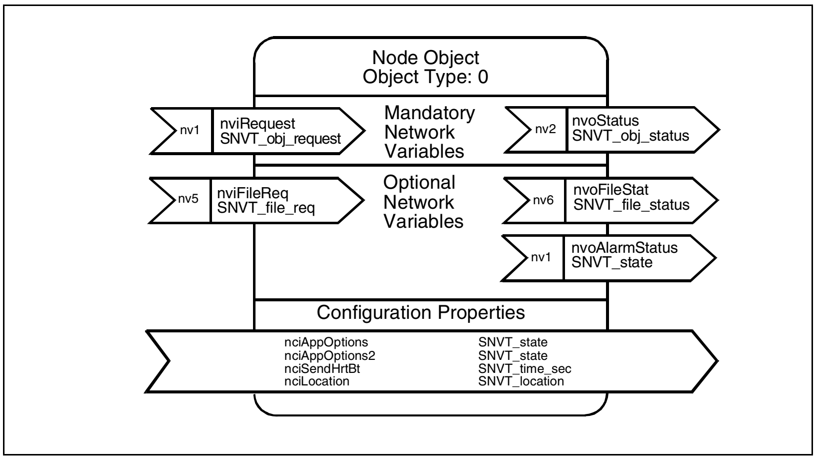

Figure 6.1 The node object

6.5.1 The node object’s inputs (nvi)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
53	nviRequest	No	SNVT_obj_ request	0=RQ_NORMAL 2=RQ_UPDATE_STATUS 5=RQ_REPORT_MASK	RQ_NUL (Confirmed)	Object request
55	nviFileReq	No	SNVT_file_req	see “SNVT Master List”	FR_NUL (Confirmed)	File request

[1] *Heartbeat*

6.5.2 The node object's outputs (nvo)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
54	nvoStatus	No	SNVT_obj_status	invalid_id (0..1) invalid_request (0..1)	All=0 (Confirmed)	Object status
56	nvoFileStat	No	SNVT_file_status	see "SNVT Master List"	FS_NUL (Confirmed)	File status
57	nvoAlarm-Status	No	SNVT_state	16 bits, 0=normal, 1=alarm	00000000 00000000	Alarm status output

[1] *Heartbeat*

6.5.3 The node object's configuration parameters (nci)

	Variable	SNVT	Accepted values	Default value	Description
0	nciLocation	SNVT_str_asc SCPT_location (17)	30 ASCII characters	All nul	Location label
58	nciAppOptions	SNVT_state UCPT (1)	16 bits, 0-1	00000000 00100000	Application options
59	nciAppOptions2	SNVT_state UCPT (62)	16 bits, 0-1	11111111 11110000	Application options2
60	nciSndHrtBt	SNVT_time_sec SCPT_maxSendTime(49)	5.0 s to 6553.4 s 0.0 s = disabled	0.0 s (disabled)	Send heartbeat

6.6 Lamp actuator object

The variables in the 4 lamp actuator objects (figure 6.2) are separated into two categories:

- Mandatory (M)
- Manufacture defined

The category “Mandatory” contains mandatory variables (according to LonMark profile for Lamp Actuator Objects), **Note!** The network variables’ indexes are not the same as “nv” in the figure below.

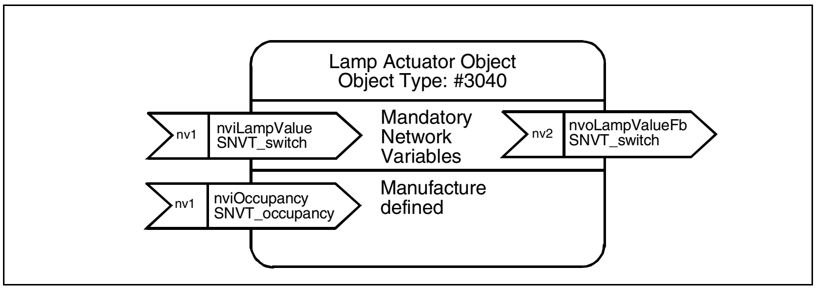

Figure 6.2 Lamp actuator object

6.6.1 The lamp actuator object’s inputs (nvi)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
2 5 8 11	nviLampValue1 nviLampValue2 nviLampValue3 nviLampValue4	No	SNVT_switch	state: 0=Off, 1=On, 255=invalid value: 0-100%	state:On value: 0%	Lamp command
3 6 9, 12	nviOccupancy1 nviOccupancy2 nviOccupancy3 nviOccupancy4	No	SNVT_occupancy	OC_OCCUPIED OC_UNOCCUPIED OC_BYPASS OC_STANDBY OC_NUL	OC_NUL	Occupancy scheduler input

[1] *Heartbeat*

6.6.2 The lamp actuator object’s outputs (nvo)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
1 4 7 10	nvoLampValueFb1 nvoLampValueFb2 nvoLampValueFb3 nvoLampValueFb4	No	SNVT_switch	state: 0=Off, 1=On value: 0-100%	-	Lamp status

[1] *Heartbeat*

6.7 The constant light controller object

The variables in the constant light controller object (figure 6.3) are separated into two categories:

- Mandatory (M)
- Configuration properties (C)

The category "Mandatory" contains mandatory variables (according to LonMark profile for CLC Objects), and "Configuration properties" contains the *nci's*.

Note! The network variables' indexes are not the same as "nv" in the figure below.

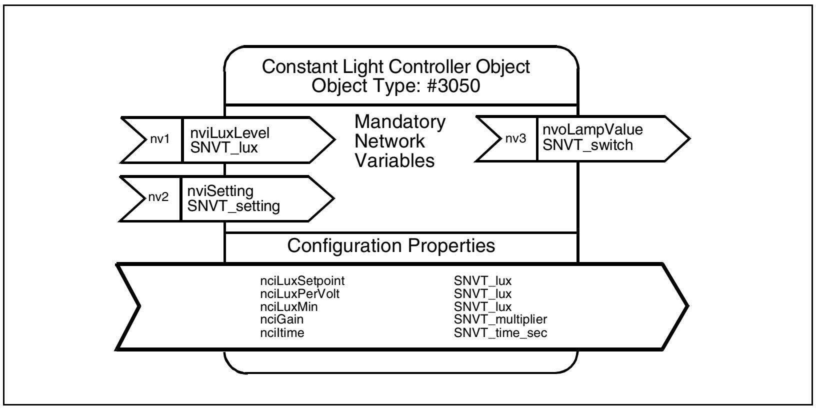

Figure 6.3 The constant light controllerobject

6.7.1 The constant light controller object's inputs (nvi)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
14	nviLuxLevel	No	SNVT_lux	value: 0-65534 65535[2]	65535[2]	Lux level input
15	nviSetting	No	SNVT_setting	0=SET_ON 1=SET_OFF 2=SET_DOWN 3=SET_UP 4=SET_STATE	SET_OFF	Lamp control settings: Controller on Controller off Decrement setpoint Increment setpoint Copy real value to *nciLuxSetpoint*

[1] *Heartbeat*
[2] *Invalid value*

6.7.2 The constant light controller object's outputs (nvo)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
13	nvoLampValue	No	SNVT_switch	state: 0=Off, 1=On, value: 0-100%	Off 0%	Lamp status output

[1] *Heartbeat*

6.7.3 The constant light controller object's configuration parameters (nci)

	Variable	SNVT	Accepted values	Default value	Description
16	nciLuxSetpoint	SNVT_lux	value: 0-65535	300	Lux control setpoint
17	nciLuxMin	SNVT_lux	value: 0-65535	0	Minimum lux level
18	nciGain	SNVT_multiplier	0 to 32.7675	1	Gain for lux controller
19	nciItime	SNVT_time_sec	0 to 3600 s 0.0 s = disabled	60 s (1 minute)	Integral time for lux controller
20	nciLuxPerVolt	SNVT_lux	0-5000	1000	Lux per volt

6.8 The space comfort controller object

The variables in the two space comfort controller objects (figure 6.4) are separated into four categories: Mandatory (M), Optional (O), Manufacturer Defined Section (MDS) andf Configuration properties (C)

The category “Mandatory” contains mandatory variables (according to LonMark profile for Space Comfort Controller objectss), “Optional” are also described in the same profile. The “Manufacturer Defined Section” are variables used in the controller (not in the profile). “Configuration properties” contains the *nci’s*.

Note! The indexes of the network variables are not the same as “nv” in the figure below.

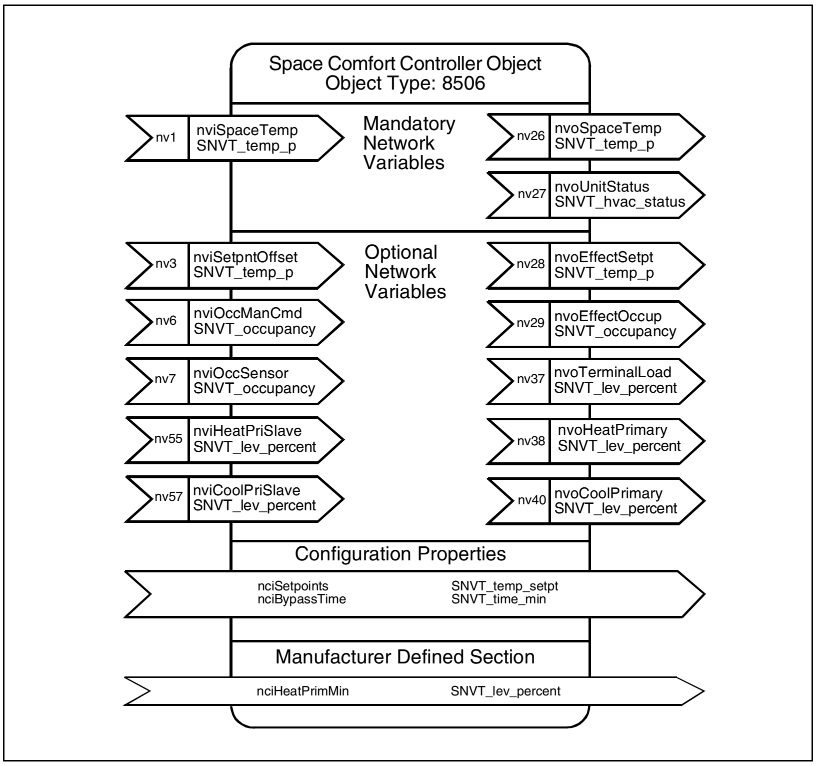

Figure 6.4 The space comfort controller

6.8.1 The space comfort controller's inputs (nvi)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
28 44	nviOccManCmd1 nviOccManCmd2	No	SNVT_ occupancy	0=OC_OCCUPIED 1=OC_UNOCCUPIED 2=OC_BYPASS 3=OC_STANDBY 4-255=OC_NUL	OC_NUL	Occupancy scheduler input
29 45	nviSpaceTemp1 nviSpaceTemp2	No	SNVT_temp_p	-10 ºC to 50 ºC (14 ºF to 122 ºF) 327,67 ºC[2] (621.81 ºF)	327,67 ºC[2] (621.81 ºF)	Zone tempe-rature input
30 46	nviSetpntOffset1 nviSetpntOffset2	No	SNVT_temp_p	±10 ºC (±18) ºF	0 º	Setpoint off-set input
31 47	nviHeatPriSlave1 nviHeatPriSlave2	No	SNVT_lev_ percent	0 to 100% 163.84% [2]	163.84%[2]	Heat control input for slave
32 48	nviCoolPriSlave1 nviCoolPriSlave2	No	SNVT_count_f	0 to 100% 163.84%[2]	163.84%[2]	Cool control input for slave
33 49	nviOccSensor1 nviOccSensor2	No	SNVT_occupancy	0=OCCUPIED 1=OC_UNOCCUPIED 2-255=OC_NUL	OC_NUL	Occupancy sensor input

[1] *Heartbeat*
[2] *Invalid value*

6.8.2 The space comfort controller's outputs (nvo)

	Variable	Hb[1]	SNVT	Accepted values	Default value	Description
21 37	nvoEffectOccup1 nvoEffectOccup2	Yes	SNVT_occupancy	0=OCCUPIED 1=OC_UNOCCUPIED 2=OC_BYPASS 3=OC_STANDBY	OC_OC-CUPIED	Effective occupancy output
22 38	nvoUnitStatus1 nvoUnitStatus2	Yes	SNVT_hvac_statusmode heat_output_primary heat_output_secondary cool_output	1=HVAC_HEAT 3=HVAC_COOL 6=HVAC_OFF 0% to 100% 163.84%[2] 0% to 100% 163.84%[2] 0% to 100% 163.84%[2]	HVAC_-HEAT 163.83%[2] 163.83%[2] 163.83%[2]	Unit status output
23 39	nvoTerminalLoad1 nvoTerminalLoad2	Yes	SNVT_lev_percent	-163.84% to 163.83%	0%	Terninal load output
24 40	nvoEffectSetpt1 nvoEffectSetpt2	Yes	SNVT_temp_p	10 °C to 35 °C (50 °F to 95 °F) 327,67 °C[2]	327,67 °C[2]	Effective set-point output
25 41	nvoSpaceTemp1 nvoSpaceTemp2	Yes	SNVT_temp_p	-10 °C to 50 °C (14 °F to 122 °F) 327,67 °[2]C	327,67 °C[2]	Zone tempe-rature output
26 42	nvoHeatPrimary1 nvoHeatPrimary2	Yes	SNVT_lev_percent	0% to 100% 163.84%[2]	0	Heating con-trol output for slave
27 43	nvoCoolPrimary1 nvoCoolPrimary2	Yes	SNVT_lev_percent	0% to 100% 163.84%[2]	0	Cooling con-trol output for slave

[1] Heartbeat
[2] Invalid value

6.8.3 The controller object's configuration parameters (nci))

	Variable	SNVT	Accepted values	Default value	Description
34 50	nciSetpoints1 nciSetpoints2	SNVT_temp_setpt SCPTsetPnts (60)	10 °C to 35 °C (50 °F to 95 °F)	occ cool = 23 °C (73 °F) stby cool = 25 °C (77 °F) unoc cool = 28 °C (82 °F) occ heat = 21 °C (70 °F) stby heat = 19 °C (66 °F) unocc heat = 16 °C (61 °F)	Occupancy temperature setpoints
35 51	nciBypassTime1 nciBypassTime2	SNVT_time_min	0 to 65535 minutes	120 minutes	Bypass timer duration
36 52	nciHeatPrimMin1 nciHeatPrimMin2	SNVT_lev_percent	0% to 100%	0%	Minimum output for heating valve

Appendix A: Technical data

Supply voltage:

110-D/24 ....24 V AC –20% +20%, 50–60 Hz
110-D/115 ....115 V AC –10% +10%, 60 Hz
110-D/230 ....230 V AC –10% +10%, 50–60 Hz

Power consumption 110-D/24:

Controller with TAC Xenta OP..4 VA
Digital outputs..max. 4×19 VA = 76 VA
Total ....max. 80 VA

Power consumption 110-D/115 or 110-D/230:

Controller with TAC Xenta OP...5 VA
Digital outputs, individual outputs and total..................max. 12 VA
Total (including transformer losses) ....max. 20 VA

Ambient temperature:

Operation....................................... 0 °C – +50 °C (32 °F – 122 °F)
Storage....................................... –20 °C – +50 °C (-4 °F – 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.. 110-D/24 - 0.3 kg (0.66 lb)
......................................110-D/115 and 110-D/230 - 0.6 kg (1.3 lb)

Inputs X1–X3 and U1 for bypass button, light switch or occupancy sensor:

Voltage across open contact.............................. 23 V DC ± 1 V DC
Current through closed contact ....4 mA
Minimum pulse input duration ....250 ms

Outputs V1–V4 for heating/cooling valve actuators (triac):

Type of actuator ....thermal actuator NC/NO
Maximum load ....110-D/24 - 0.8 A
....110-D/115 and 110-D/230 - 0.5 A

Relay outputs for light control, K1, K2, K3 and KC1/K4 and KC2:

Maximum voltage .... 250 V AC
Maximum resistive load (see section 2.8)....................................3 A
Maximum lamp load (see section 2.8) ....250 W

Output for modulating light control, Y1:

Voltage range ....1-10 V DC
Maximum load ....2 mA

Inputs for zone temperature sensors, B1–B2:
- Thermistor type ....NTC, 1800 Ω at 25 °C (77 °F)
- Measuring range .... –10 °C – +50 °C (14 °F – 122 °F)
- Accuracy .... ±0,2 °C (±0.4 °F)

Input R1 and U1, configured for temperature setpoint adjustment:
- Type .... 10 kΩ linear potentiometer
- Adjustment range... ±4 °C (±7 °F)

Application program:
- Cycle time..4 s

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

Interoperability:
- Standard .... TAC Xenta 110-D conforms to .... LONMARK Interoperability Guidelines and .... LONMARK Functional Profiles:3040, 3050, 8506
- Communication protocol .... LONTALK
- Physical channel ....TP/FT-10, 78 kbps
- Neuron® type .... 3150®, 10 MHz

Conformance to standards:
- EMC (product standard) ....EN 61326
- Emission (generic standard) ....EN 50081-1
- Immunity (generic standard) ....EN 50082-1
- Safety ....EN 61010-1
- ETL listing.. UL 3111-1, first version .... CAN/CSA C22.2 1100.1
- Flammability class, materials ....UL 94 V-0

Part number, TAC Xenta 110-D:
- Controller 110-D/24 0-073-0601
- Controller 110-D/115 0-073-0602
- Controller 110-D/230 0-073-0603
- Handbook (GB) 0-004-7799
- Plug-in terminal blocks, TAC Xenta 100 0-073-0914
- Disk with external interface files (XIF)...........................0-008-5582

Appendix B: Commissioning protocol

This protocol can be used when commissioning the TAC Xenta 110-D. **Note:** The variables are listed in numerical order, not in the order followed during commissioning. If you need information on accepted values, these can be found in tables in chapter 6.

Index	Function	Variable	Default value	Set value	Remarks
0	Configuration location label	*nciLocation*	0		
2	Lamp command 1	*nviLampvalue1*	state: 255 value: 0%		
3	Occupancy scheduler input 1	*nviOccupancy1*	OC_NUL		
5	Lamp command 2	*nviLampvalue2*	state: 255 value: 0%		
6	Occupancy scheduler input 2	*nviOccupancy2*	OC_NUL		
8	Lamp command 3	*nviLampvalue3*	state: 255 value: 0%		
9	Occupancy scheduler input 3	*nviOccupancy3*	OC_NUL		
11	Lamp command 4	*nviLampvalue4*	state: 255 value: 0%		
12	Occupancy scheduler input 4	*nviOccupancy4*	OC_NUL		
14	Lux level input	*nviLuxLevel*	65535		
15	Lamp control settings	*nviSetting*	SET_OFF		
28	Occupancy scheduler input SCC#1	*nviOccManCmd1*	OC_NUL		
29	Zone temperature input SCC#1	*nviSpaceTemp1*	327,67 °C (invalid value)		
30	Setpoint offset input SCC#1	*nviSetpntOffset1*	0 °C		
31	Heat control input for slave SCC#1	*nviHeatPriSlave1*	163.84% (invalid value)		
32	Cool control input for slave SCC#1	*nviCoolPriSlave1*	163.84% (invalid value)		
33	Occupancy sensor input SCC#1	*nviOccSensor1*	OC_NUL		

Index	Function	Variable	Default value	Set value	Remarks
44	Occupancy scheduler input SCC#2	*nviOccManCmd2*	OC_NUL		
45	Zone temperature input SCC#2	*nviSpaceTemp2*	327,67 °C (invalid value)		
46	Setpoint offset input SCC#2	*nviSetpntOffset2*	0 °C		
47	Heat control input for slave SCC#2	*nviHeatPriSlave2*	163.84% (invalid value)		
48	Cool control input for slave SCC#2	*nviCoolPriSlave2*	163.84% (invalid value)		
49	Occupancy sensor input SCC#2	*nviOccSensor2*	OC_NUL		
16	Config. Lux control setpoint	*nciLuxSetpoint*	300		
17	Config. Minimum lux level	*nciLuxMin*	0		
18	Config. gain for lux controller	*nciGain*	1		
19	Config. integral time lux controller	*nciItime*	60 s		
20	Config. integral time for lux controller	*nciLuxPerVolt*	1000		
34	Config. occup temp setpoints 1 (Cooling occup. (Cooling standby (Cooling unocup. (Heating occup. (Heating standby (Heating unoccup.	*nciSetpoints1* occupied_cool standby_cool unoccupied_cool occupied_heat standby_heat unoccupied_heat	 23 °C (73 °F)) 25 °C (77 °F)) 28 °C (82 °F)) 21 °C (70 °F)) 19 °C (66 °F)) 16 °C (61 °F))		
35	Config. bypass timer 1	*nciBypassTime1*	120 minutes		
36	Config. min. output heating controller 2	*nciHeatPrimMin2*	0 %		
50	Config. occup temp setpoints 1 (Cooling occup. (Cooling standby (Cooling unocup. (Heating occup. (Heating standby (Heating unoccup.	*nciSetpoints2* occupied_cool standby_cool unoccupied_cool occupied_heat standby_heat unoccupied_heat	 23 °C (73 °F)) 25 °C (77 °F)) 28 °C (82 °F)) 21 °C (70 °F)) 19 °C (66 °F)) 16 °C (61 °F))		
51	Config. bypass timer 2	*nciBypassTime2*	120 minutes		
52	Config. min. output heating controller 2	*nciHeatPrimMin1*	0 %		
58	Config. application options	*nciAppOptions*	00000000 00000000		
59	Config. application Options 2	*nciAppOptions2*	00000000 00000000		
60	Config. send heartbeat	*nciSndHrtBt*	0.0 s		

Index

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