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# **Lonbox® PZM4146 Users Guide**

*Comfort and lightcontroller for  
LonWorks Installations*

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## Abstract

This manual provides detailed technical information on the electrical and mechanical interface and operating environment characteristics for the *Prolon Lonbox PZM4146* Comfort and lightcontroller.

This document also provides guidelines for installation and management of the node in a LonWorks® network.

## Introduction

The Lonbox® PZM4146 Comfort and lightcontroller, is a building automation device for LonWorks installation. The PZM4146 control sunblind, light systems including pendant and HVAC system with CAV, VAV, cool and heat.

The Lonbox® PZM4146 Comfort and lightcontroller is mounted in a box with possibility to use different cable gland plate, or knock-outs plates for mounting of PG.

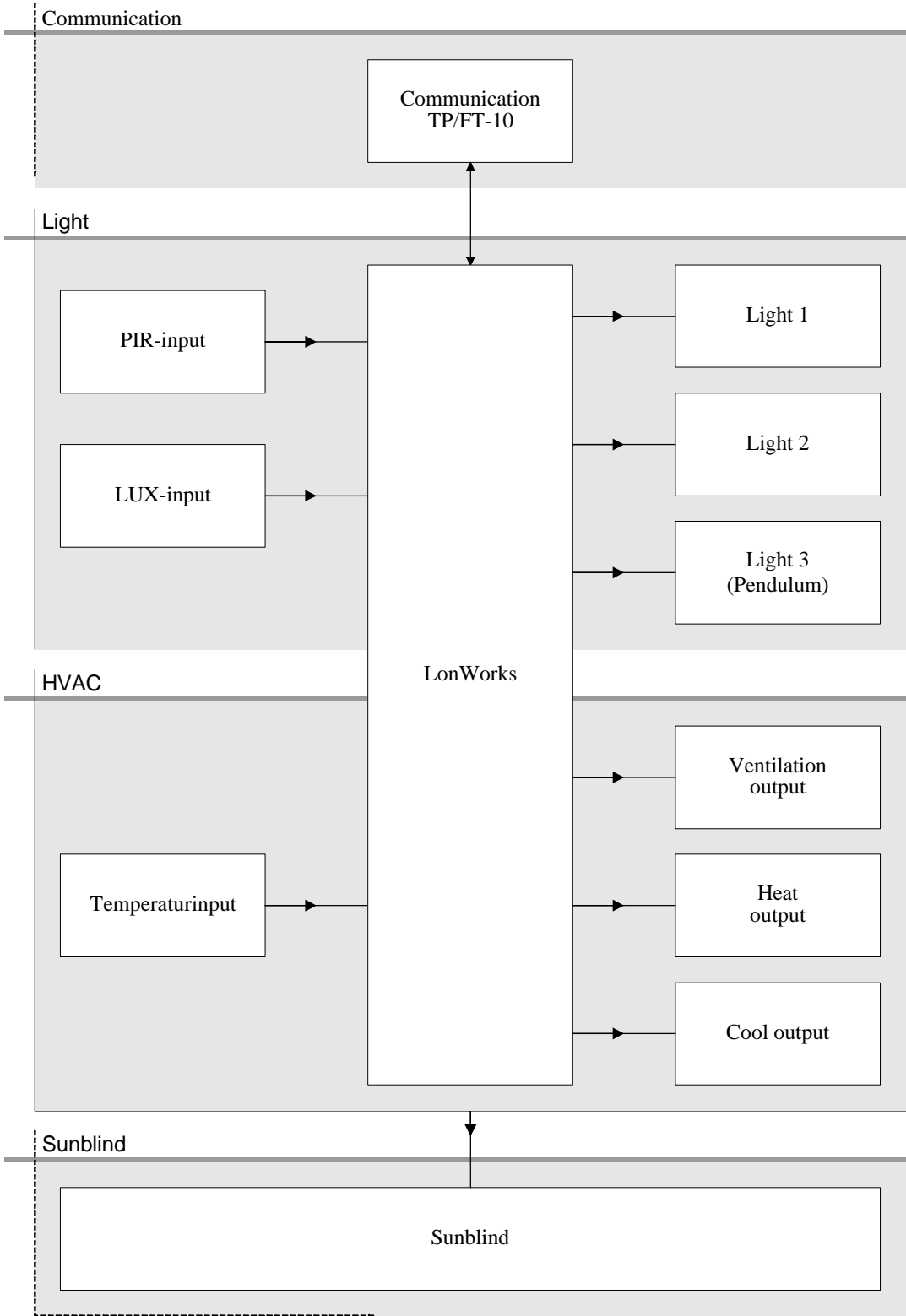
The Lonbox® PZM4146 Comfort and lightcontroller only need 230Vac supply and generate power for connected input sensor and power for connected valves and motors.

The controller box contains connection terminals for each core there are suppose to be connected to the controller, so there won't be any need for loop connections.

## **Functionality**

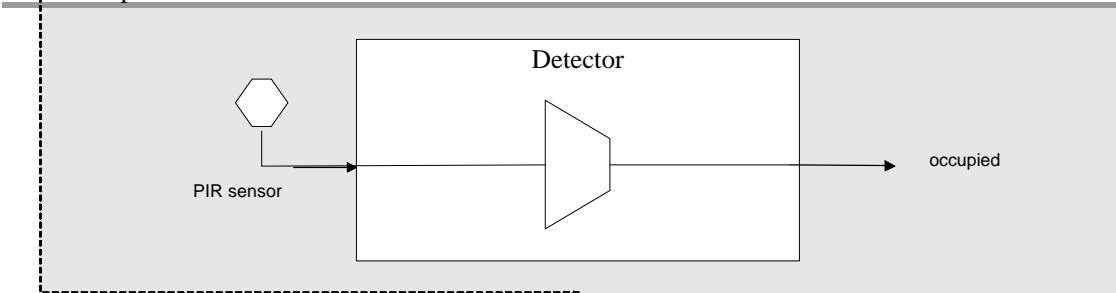
See software description.

Main block diagram:

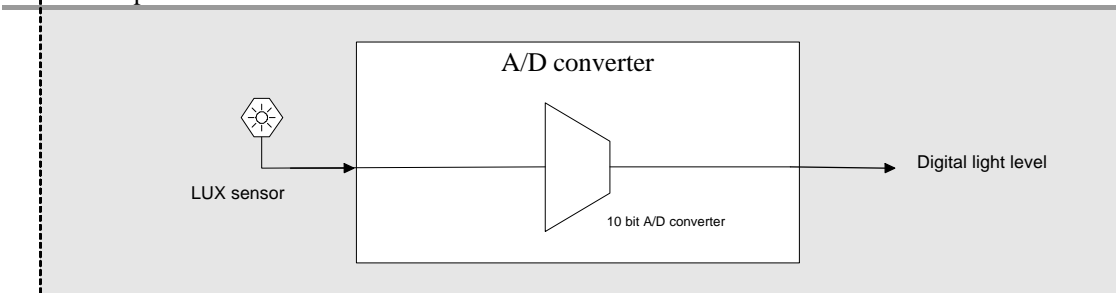


**Block diagram light:**

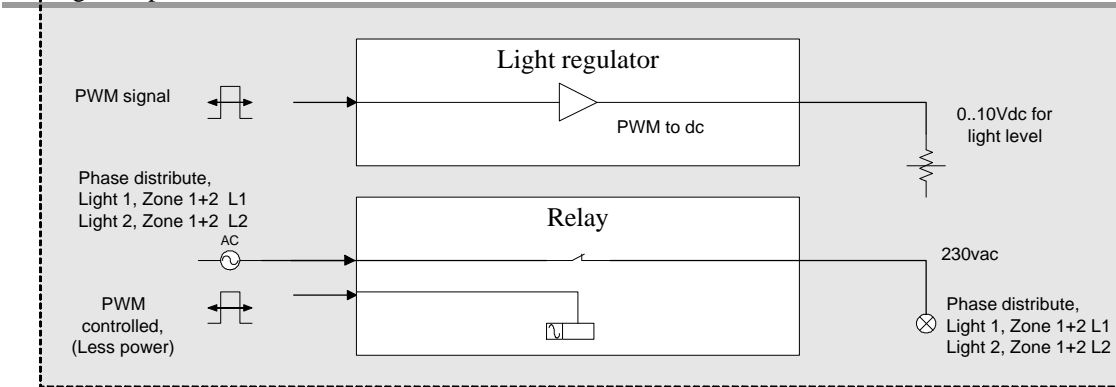
PIR-input



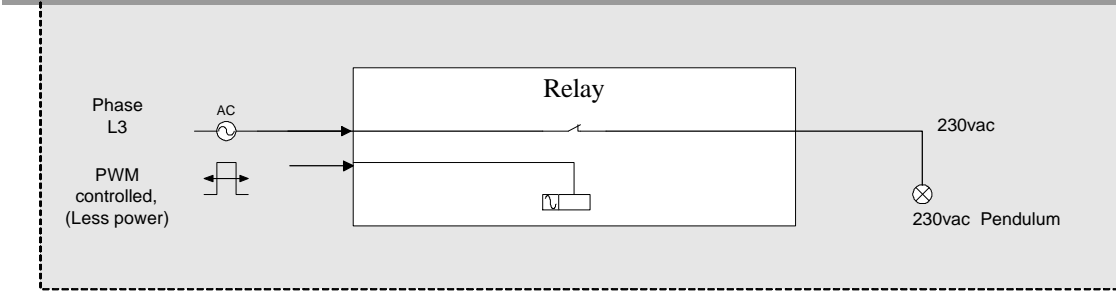
LUX-input



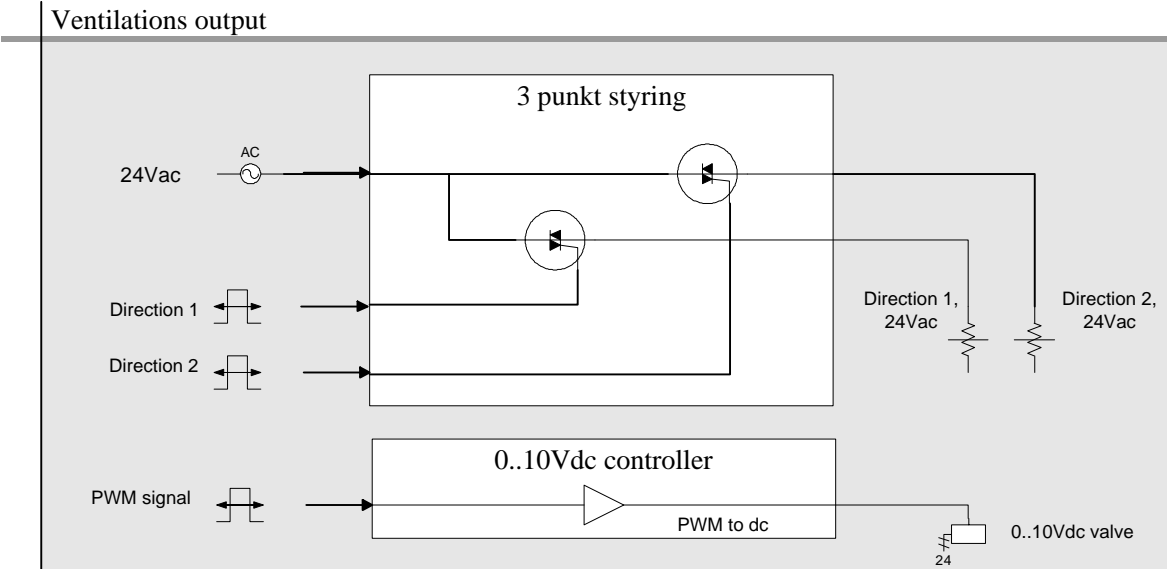
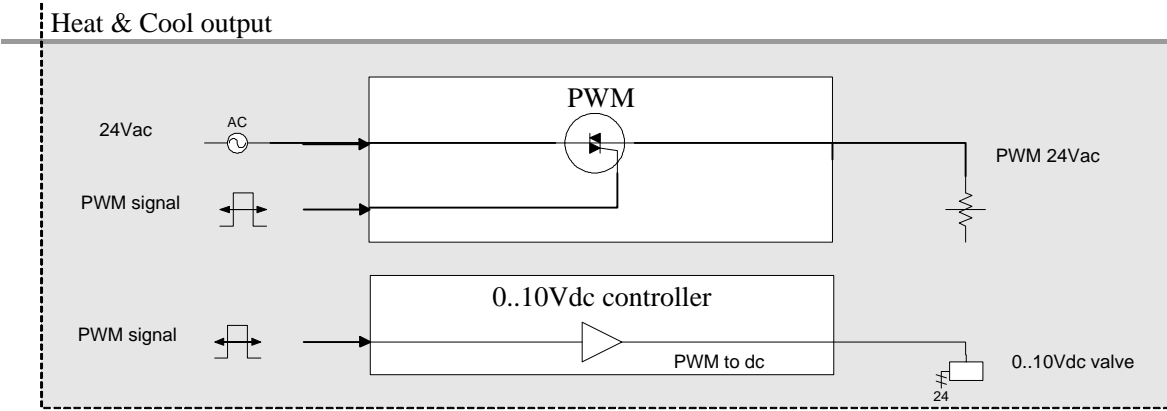
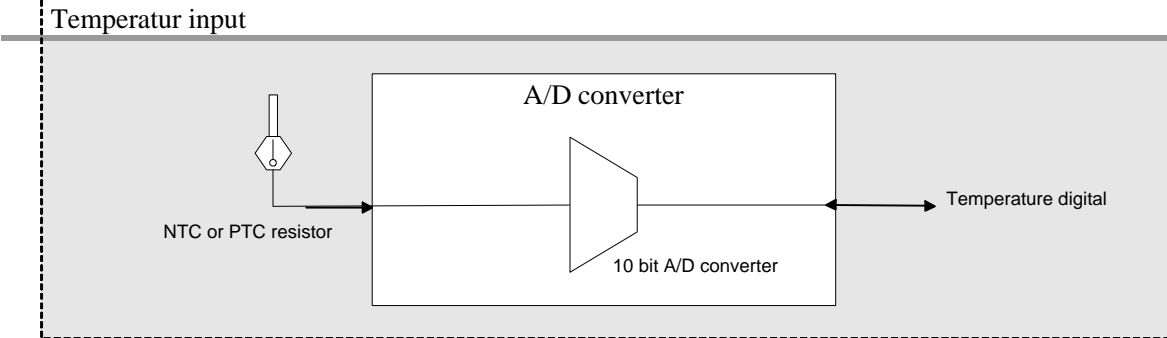
Light output



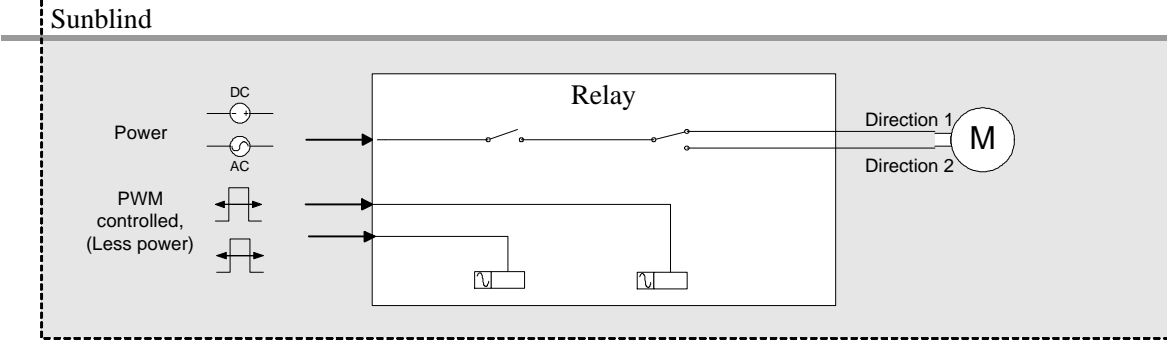
Pendulum



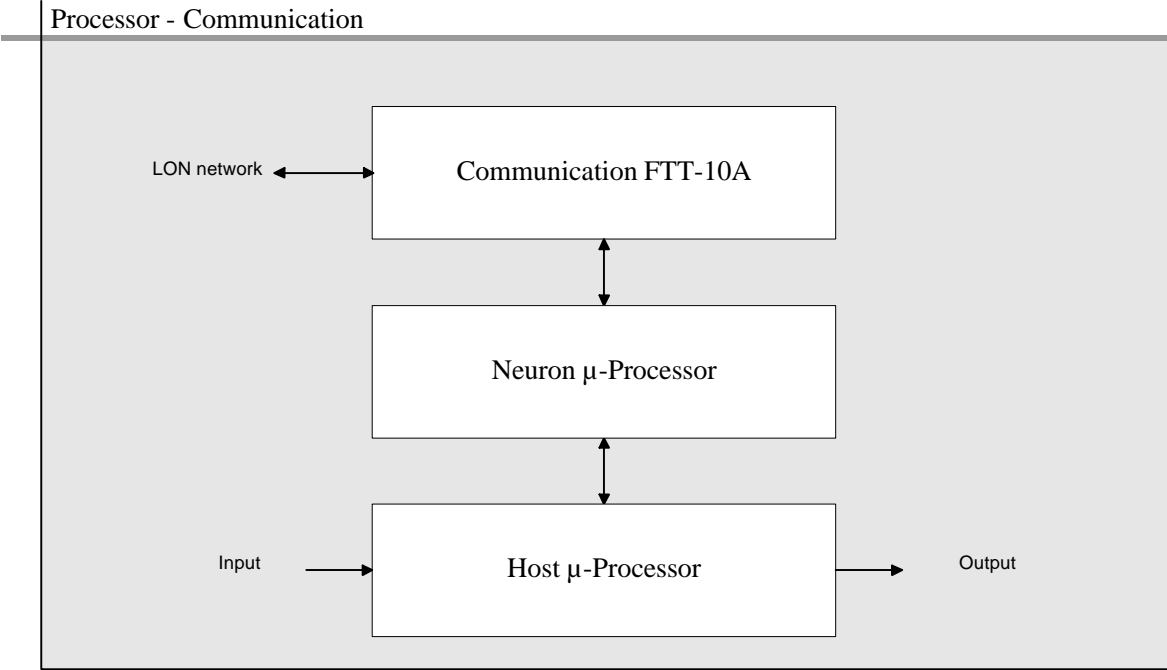
**Block diagram comfort (HVAC):**



**Block diagram sunblind:**



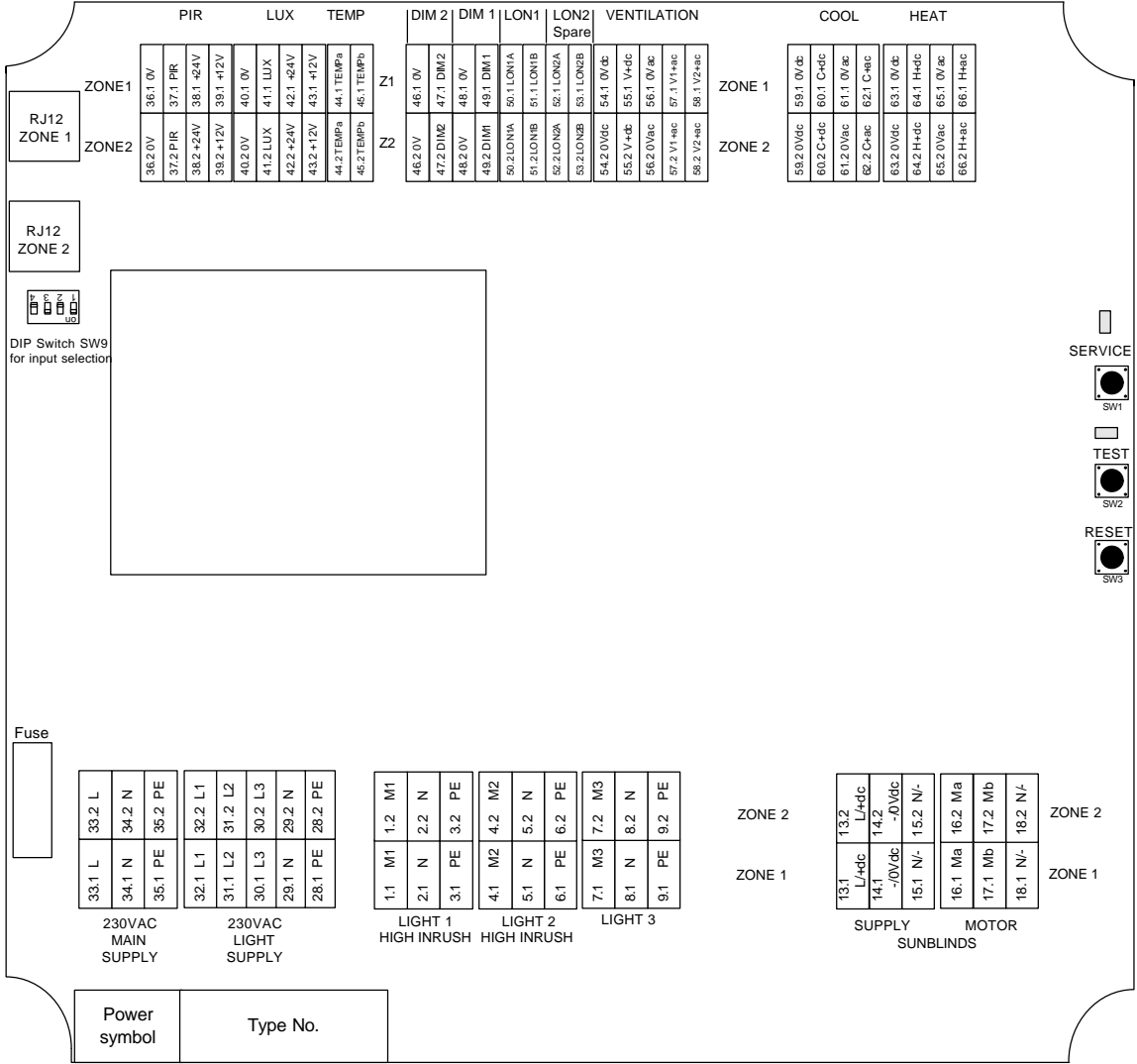
**Block diagram processor - communication:**



**Mounting**

**Connection**

The PZM4146 Comfort and lightcontroller module contains a printed circuit (See figure 5). In the following each terminal will be described.



Pin description.

| Term. | Short | Description        | Block              |
|-------|-------|--------------------|--------------------|
| 1.1   | M1    | 230Vac Phase       | ZONE 1, LIGHT 1    |
| 1.2   | M1    | 230Vac Phase       | ZONE 2, LIGHT 1    |
| 2.1   | N     | Neutral            | ZONE 1, LIGHT 1    |
| 2.2   | N     | Neutral            | ZONE 2, LIGHT 1    |
| 3.1   | PE    | Protection Earth   | ZONE 1, LIGHT 1    |
| 3.2   | PE    | Protection Earth   | ZONE 2, LIGHT 1    |
| 4.1   | M2    | 230Vac Phase       | ZONE 1, LIGHT 2    |
| 4.2   | M2    | 230Vac Phase       | ZONE 2, LIGHT 2    |
| 5.1   | N     | Neutral            | ZONE 1, LIGHT 2    |
| 5.2   | N     | Neutral            | ZONE 2, LIGHT 2    |
| 6.1   | PE    | Protection Earth   | ZONE 1, LIGHT 2    |
| 6.2   | PE    | Protection Earth   | ZONE 2, LIGHT 2    |
| 7.1   | M3    | 230Vac Phase       | ZONE 1, LIGHT 3    |
| 7.2   | M3    | 230Vac Phase       | ZONE 2, LIGHT 3    |
| 8.1   | N     | Neutral            | ZONE 1, LIGHT 3    |
| 8.2   | N     | Neutral            | ZONE 2, LIGHT 3    |
| 9.1   | PE    | Protection Earth   | ZONE 1, LIGHT 3    |
| 9.2   | PE    | Protection Earth   | ZONE 2, LIGHT 3    |
| 13.1  | L/+dc | Supply Phase / +DC | ZONE 1, SUNBLIND   |
| 13.2  | L/+dc | Supply Phase / +DC | ZONE 2, SUNBLIND   |
| 14.1  | -     | Supply - / 0V DC   | ZONE 1, SUNBLIND   |
| 14.2  | -     | Supply - / 0V DC   | ZONE 2, SUNBLIND   |
| 15.1  | N/-   | Supply Neutral / - | ZONE 1, SUNBLIND   |
| 15.2  | N/-   | Supply Neutral / - | ZONE 2, SUNBLIND   |
| 16.1  | Ma    | Motor a            | ZONE 1, SUNBLIND   |
| 16.2  | Ma    | Motor a            | ZONE 2, SUNBLIND   |
| 17.1  | Mb    | Motor b            | ZONE 1, SUNBLIND   |
| 17.2  | Mb    | Motor b            | ZONE 2, SUNBLIND   |
| 18.1  | N/-   | Motor Neutral      | ZONE 1, SUNBLIND   |
| 18.2  | N/-   | Motor Neutral      | ZONE 2, SUNBLIND   |
| 28.1  | PE    | Protection Earth   | LIGHT SUPPLY       |
| 28.2  | PE    | Protection Earth   | LIGHT SUPPLY, LOOP |
| 29.1  | N     | Neutral            | LIGHT SUPPLY       |
| 29.2  | N     | Neutral            | LIGHT SUPPLY, LOOP |
| 30.1  | L3    | Phase 3            | LIGHT SUPPLY       |
| 30.2  | L3    | Phase 3            | LIGHT SUPPLY, LOOP |
| 31.1  | L2    | Phase 2            | LIGHT SUPPLY       |
| 31.2  | L2    | Phase 2            | LIGHT SUPPLY, LOOP |
| 32.1  | L1    | Phase 1            | LIGHT SUPPLY       |
| 32.2  | L1    | Phase 1            | LIGHT SUPPLY, LOOP |
| 33.1  | L     | Phase              | MAIN SUPPLY        |
| 33.2  | L     | Phase              | MAIN SUPPLY, LOOP  |
| 34.1  | N     | Neutral            | MAIN SUPPLY        |
| 34.2  | N     | Neutral            | MAIN SUPPLY, LOOP  |
| 35.1  | PE    | Protection Earth   | MAIN SUPPLY        |
| 35.2  | PE    | Protection Earth   | MAIN SUPPLY, LOOP  |
| 36.1  | 0V    | 0V DC              | ZONE 1, PIR        |
| 36.2  | 0V    | 0V DC              | ZONE 2, PIR        |
| 37.1  | PIR   | PIR input          | ZONE 1, PIR        |
| 37.2  | PIR   | PIR input          | ZONE 2, PIR        |
| 38.1  | +24V  | +24Vdc out         | ZONE 1, PIR        |
| 38.2  | +24V  | +24Vdc out         | ZONE 2, PIR        |
| 39.1  | +12V  | +12Vdc out         | ZONE 1, PIR        |
| 39.2  | +12V  | +12Vdc out         | ZONE 2, PIR        |
|       |       |                    |                    |
|       |       |                    |                    |
| Term. | Short | Description        | Block              |
| 40.1  | 0V    | 0V DC              | ZONE 1, LUX        |

|      |      |                      |                     |
|------|------|----------------------|---------------------|
| 41.1 | LUX  | LUX input            | ZONE 1, LUX         |
| 41.2 | LUX  | LUX input            | ZONE 2, LUX         |
| 42.1 | +24V | +24Vdc out           | ZONE 1, LUX         |
| 42.2 | +24V | +24Vdc out           | ZONE 2, LUX         |
| 43.1 | +12V | +12Vdc out           | ZONE 1, LUX         |
| 43.1 | +12V | +12Vdc out           | ZONE 2, LUX         |
| 44.1 | TEMP | Sensor a             | ZONE 1, TEMP        |
| 44.2 | TEMP | Sensor a             | ZONE 2, TEMP        |
| 45.1 | TEMP | Sensor b             | ZONE 1, TEMP        |
| 45.2 | TEMP | Sensor b             | ZONE 2, TEMP        |
| 46.1 | 0V   | 0V DC                | ZONE 1, DIMMER 2    |
| 46.2 | 0V   | 0V DC                | ZONE 2, DIMMER 2    |
| 47.1 | DIM2 | 0-10V Output         | ZONE 1, DIMMER 2    |
| 47.2 | DIM2 | 0-10V Output         | ZONE 2, DIMMER 2    |
| 48.1 | 0V   | 0V DC                | ZONE 1, DIMMER 1    |
| 48.2 | 0V   | 0V DC                | ZONE 2, DIMMER 1    |
| 49.1 | DIM1 | 0-10V Output         | ZONE 1, DIMMER 1    |
| 49.2 | DIM1 | 0-10V Output         | ZONE 2, DIMMER 1    |
| 50.1 | LON1 | TP/FT-10 a           | LON1a (In)          |
| 50.2 | LON1 | TP/FT-10 a           | LON1a (Out)         |
| 51.1 | LON1 | TP/FT-10 b           | LON1b (In)          |
| 51.2 | LON1 | TP/FT-10 b           | LON1b (Out)         |
| 52.1 | LON2 | Spare a              | LON2a (In)          |
| 52.2 | LON2 | Spare a              | LON2a (Out)         |
| 53.1 | LON2 | Spare b              | LON2b (In)          |
| 53.2 | LON2 | Spare b              | LON2b (Out)         |
| 54.1 | 0Vdc | 0V DC                | ZONE 1, VENTILATION |
| 54.2 | 0Vdc | 0V DC                | ZONE 2, VENTILATION |
| 55.1 | V+dc | 0-10V Vent. Output   | ZONE 1, VENTILATION |
| 55.2 | V+dc | 0-10V Vent. Output   | ZONE 2, VENTILATION |
| 56.1 | 0Vac | 0Vac                 | ZONE 1, VENTILATION |
| 56.2 | 0Vac | 0Vac                 | ZONE 2, VENTILATION |
| 57.1 | V1+a | +24Vac Vent. Open.1  | ZONE 1, VENTILATION |
| 57.2 | V1+a | +24Vac Vent. Open.1  | ZONE 2, VENTILATION |
| 58.1 | V2+a | +24Vac Vent. Close.2 | ZONE 1, VENTILATION |
| 58.2 | V2+a | +24Vac Vent. Close.2 | ZONE 2, VENTILATION |
| 59.1 | 0Vdc | 0Vdc                 | ZONE 1, COOL        |
| 59.1 | 0Vdc | 0Vdc                 | ZONE 2, COOL        |
| 60.1 | C+dc | 0-10V Cool Output    | ZONE 1, COOL        |
| 60.2 | C+dc | 0-10V Cool Output    | ZONE 2, COOL        |
| 61.1 | 0Vac | 0Vac                 | ZONE 1, COOL        |
| 61.2 | 0Vac | 0Vac                 | ZONE 2, COOL        |
| 62.1 | C+ac | +24Vac Cool Open     | ZONE 1, COOL        |
| 62.2 | C+ac | +24Vac Cool Open     | ZONE 2, COOL        |
| 63.1 | 0Vdc | 0Vdc                 | ZONE 1, HEAT        |
| 63.2 | 0Vdc | 0Vdc                 | ZONE 2, HEAT        |
| 64.1 | H+dc | 0-10V Heat Output    | ZONE 1, HEAT        |
| 64.2 | H+dc | 0-10V Heat Output    | ZONE 2, HEAT        |
| 65.1 | 0Vac | 0Vac                 | ZONE 1, HEAT        |
| 65.2 | 0Vac | 0Vac                 | ZONE 2, HEAT        |
| 66.1 | H+ac | +24Vac Heat Open     | ZONE 1, HEAT        |
| 66.2 | H+ac | +24Vac Heat Open     | ZONE 2, HEAT        |
|      |      |                      |                     |

Figure 1 PZM4146 Comfort and lightcontroller terminals

## 1: Mains supply terminal.

The product has two power terminal blocks, main and light power, all terminal in these blocks doubled so the power can be loop through the PZM4146 Comfort and light controller.

Main supply, supplies the micro controller and all the electronic in the unit, and is also supply for the different output, apart from the 230VAC to the light 1-6. The mains supply should always be earthed.

Light supply, supplies the 230VAC light output 1-6

Light 1 and 2 are supplied from the L1 phase

Light 3 and 4 are supplied from the L2 phase

Light 5 and 6 are supplied from the L3 phase

| PE                                 | N                 | L                         |
|------------------------------------|-------------------|---------------------------|
| Protection Earth<br>(Yellow/green) | Neutral<br>(Blue) | Phase<br>(Brown or black) |

*Table 1 Mains supply connections*

| PE                                    | N                 | L1                           | L2                           | L3                           |
|---------------------------------------|-------------------|------------------------------|------------------------------|------------------------------|
| Protection<br>Earth<br>(Yellow/green) | Neutral<br>(Blue) | Phase<br>(Brown or<br>black) | Phase<br>(Brown or<br>black) | Phase<br>(Brown or<br>black) |

*Table 2 Light supply connections*

There are many ways to supply the product, depending how the light system are supplied and fused. The following will describe some way to supplied the product

- 1 Group, 1 Phase see
- 1 Group, 3 Phase
- 2 Group, 1 Phase + 3 Phase
- 1 Group, 3 Phase with loop through

If plenty of PZM4146 Comfort and light controller are connected to 1 group with 3 phases the main supply can be connected to one of the 3 phases to make sure that there are the same load of each phase.

Figure 2 Mains supply connections 1 phase

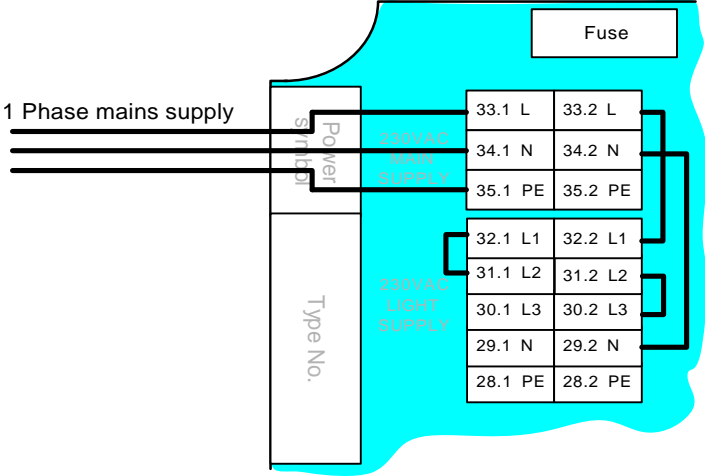


Figure 3 Mains supply connection 3 phases

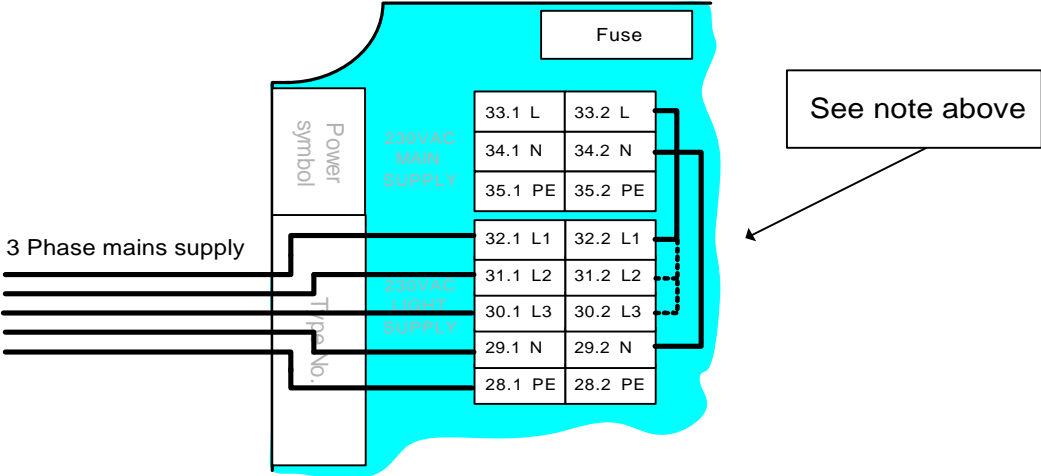


Figure 4 Mains supply 1 phase and Light supply 3 phases connection

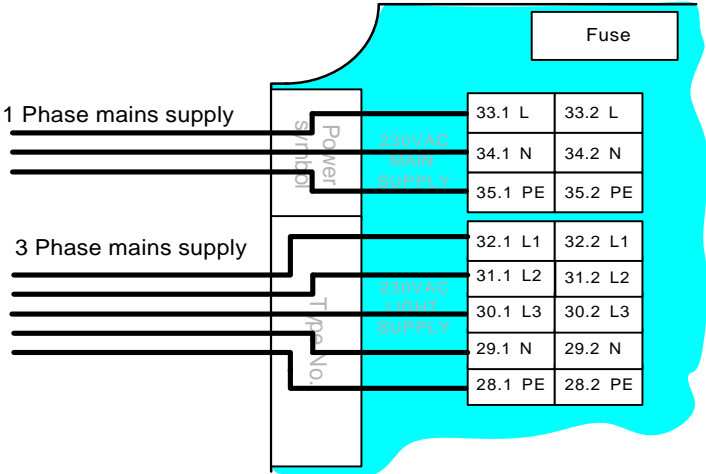
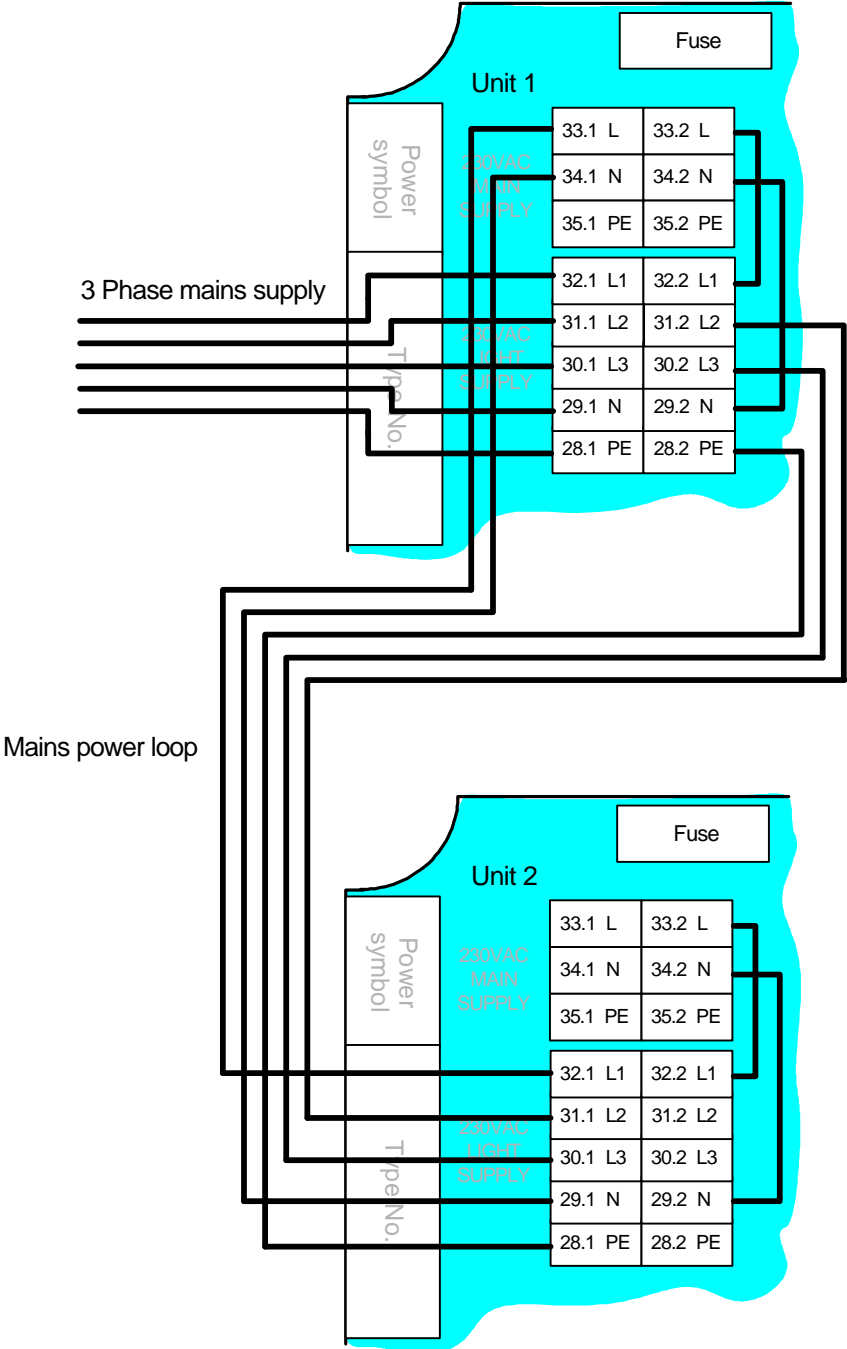


Figure 5 Mains supply connection 3 phases loop through



**2: Light 1 to light 6 out terminals.**

These terminals are for light connections, and can together with one of the dimmer output also regulate the light (See description below).

Light 1 and Dimmer 1 output in Zone 1 and Light 1 and Dimmer 1 output in Zone 2, are as pair, prepared for regulate light and are supplied from L1. See dimmer connection below.

Light 2 and Dimmer 1 in Zone 2 and Light 2 and Dimmer 2 in Zone 2, are as pair, prepared for regulate light and are supplied from L2. See dimmer connection below.

Light 3 in Zone 1 and Light 3 in Zone 2, are supplied from L3 and are for pendant lamp and can not supply high start current.

For connection see “Figure 6 Light output connections for regulated light”

|                                    |                   |   |
|------------------------------------|-------------------|---|
| PE                                 | N                 | ZONE 1 M1,M2,M3<br>ZONE 2, M1,M2,M3<br>Switched |
| Protection Earth<br>(Yellow/green) | Neutral<br>(Blue) | Phase<br>(Brown or black)                       |

*Table 3 Light output connections*

If a light output is used to drive an external relay, there should be placed a decoupling RC over the external relay, to reduce the electricity noise when the relay bounce. The value of this RC could be 0,1uF and 100 ohm.

**3: Dimmer terminals.**

These terminals are for light attenuation, and are a 0 to 10 voltage output.

These control output are only a low voltage output and must be isolated from the 230V power in the light module.

For connection see “Figure 6 Light output connections for regulated light”

|                              |                           |
|------------------------------|---------------------------|
| 46.1 , 46.2 , 48.1 ,<br>48.2 | 47.1 , 47.2 , 49.1 , 49.2 |
| 0V for output                | 0-10V Output              |

*Table 4 Dimmer connections*



Figure 6 Light output connections for regulated light

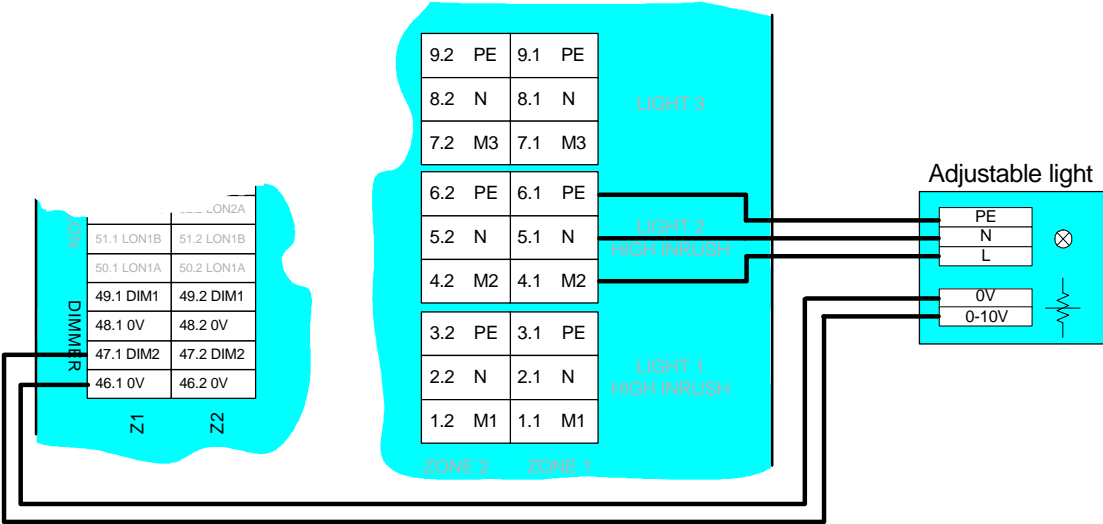
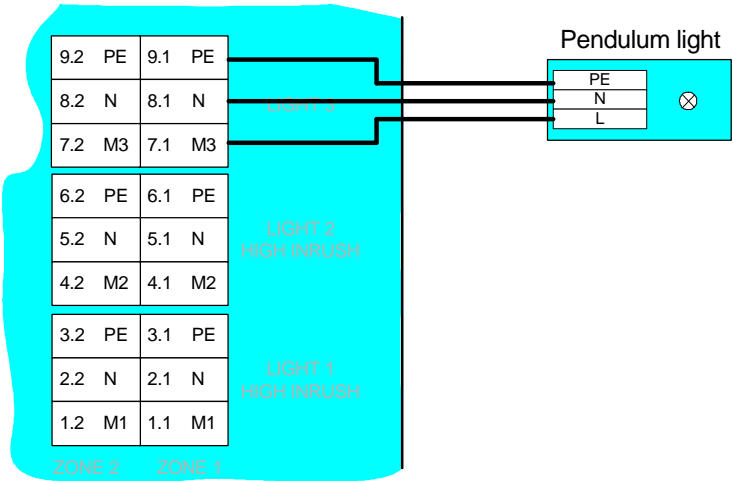


Figure 7 Light output connections for pendulum or similar



#### 4: Sunblind.

These terminals are for sunblind use, and can drive a motor. Two different kinds of motors can be connected, a DC motor where the polarities of the power, control the direction of the motor, or an AC or DC motor with a common connector and a connector for each direction can be connected.

It is very important that the two sunblinds are connected to the same supply because of the distance between the terminals.

|                             | Supply       |              |              |
|-----------------------------|--------------|--------------|--------------|
| Marking Zone<br>1<br>Zone 2 | 13.1<br>13.2 | 14.1<br>14.2 | 15.1<br>15.2 |
| Polarity controlled motor   | DC+          | DC-          | (Not used)   |
| Direction controlled motor  | Phase L      | (Not used)   | Neutral N    |

*Table 5 Sunblind supply connections*

|                             | Motor        |              |              |
|-----------------------------|--------------|--------------|--------------|
| Marking Zone<br>1<br>Zone 2 | 16.1<br>16.2 | 17.1<br>17.2 | 18.1<br>18.2 |
| Polarity controlled motor   | DC+ or DC-   | DC+ or DC-   | (Not used)   |
| Direction controlled motor  | Phase L1     | Phase L2     | Neutral N    |

*Table 6 Sunblind motor connections*

If the one of the outputs is used to drive an external relay, there should be placed a decoupling RC over the external relay, to reduce the electricity noise when the relay bounce. The value of this RC could be 0,1uF and 100 ohm.

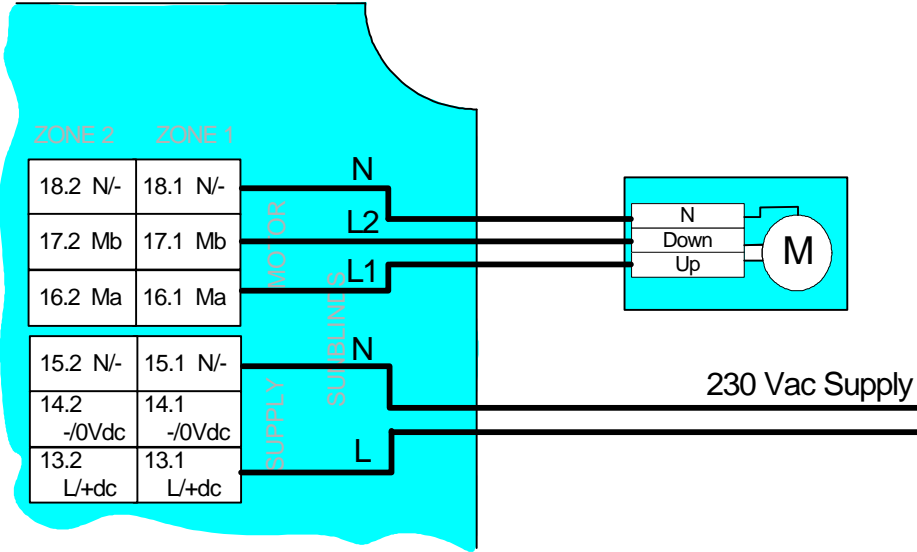


Figure 8 Sunblind for 2 core motor connections

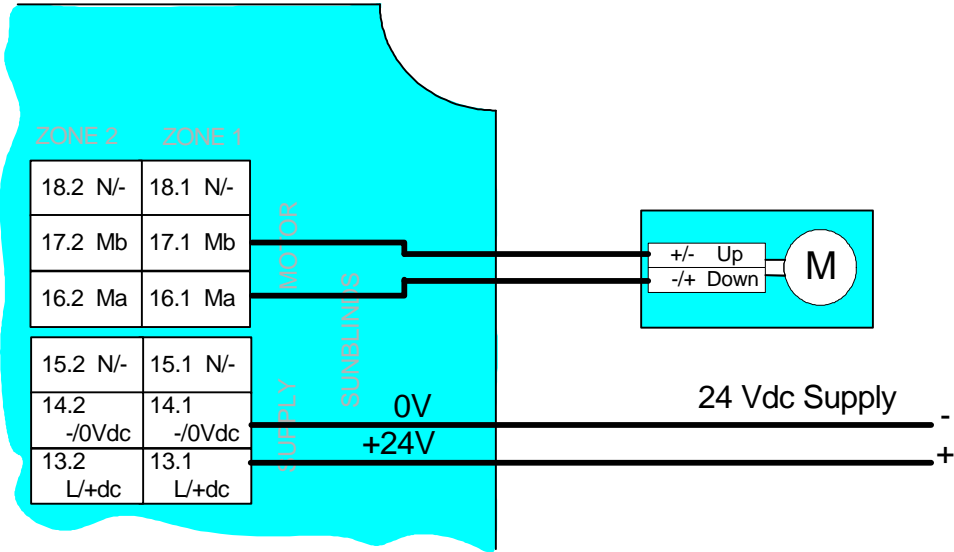


Figure 9 Sunblind for 3 core motor connections

**5: Input 1 - 4 terminals.**

These terminals are for input sensors and switches. The PZM4146 Comfort and light controller generate power for the sensors, and can supply +12Vdc or +24Vdc to the sensors.

Sensors with analog output or a voltage output are connected to IN, and the switch behind the connector must be “Off”.

Sensors with a potential free switch or an open collector output must be connected between IN and 0V, and the switch behind the connector must be “On”.

Two different kind of adjustable resistor can be used. If a 3 wire adjustable resistor is used, the adjustable pin must be connected to IN and the two other must be connected to +12V and 0V. If a 2 wire adjustable resistor is used, the adjustable pin must be connected to IN and the other must be connected to 0V, The switch must be “On”.

|                             | Switch | 0V                         | IN             | +24V        | +12V                    |
|-----------------------------|--------|----------------------------|----------------|-------------|-------------------------|
| Analog input                | Off    | 0V for signal and power.   | Analog input   | Can be used | Can be used             |
| Switch                      | On     | Switch-A                   | Switch-B       | (Not used)  | (Not used)              |
| Open collector              | On     | 0V for power.              | Input          | Can be used | Can be used             |
| Adjustable resistor, 3 wire | Off    | Bottom pin of the resistor | Adjustable pin | (Not used)  | Top pin of the resistor |
| Adjustable resistor, 2 wire | On     | Bottom pin of the resistor | Adjustable pin | (Not used)  | (Not used)              |

Table 7 Input connections

Figure 10 Input connections for PIR sensor

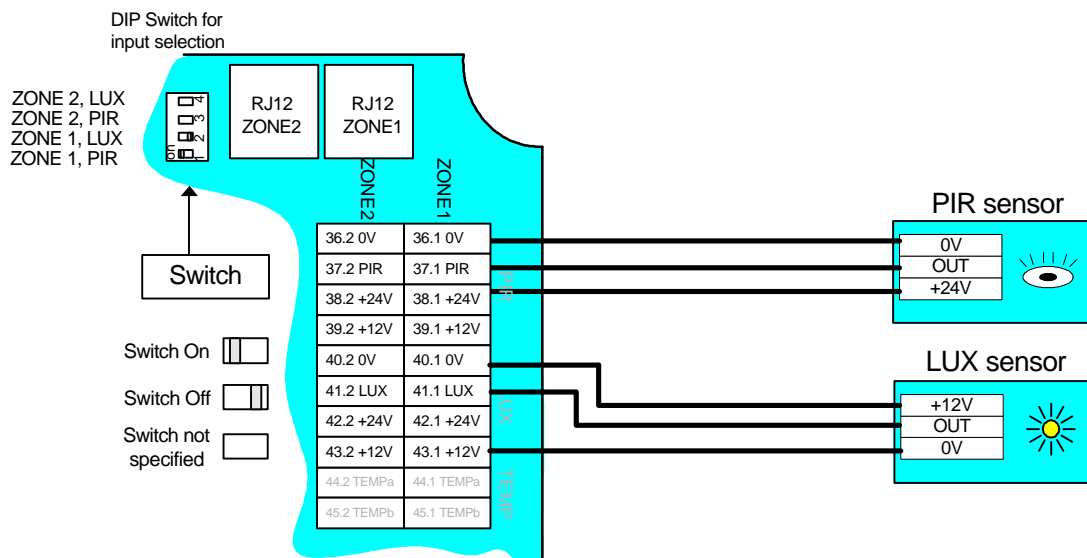


Figure 11 Input connections for LUX sensor

Figure 12 Input connections for switch

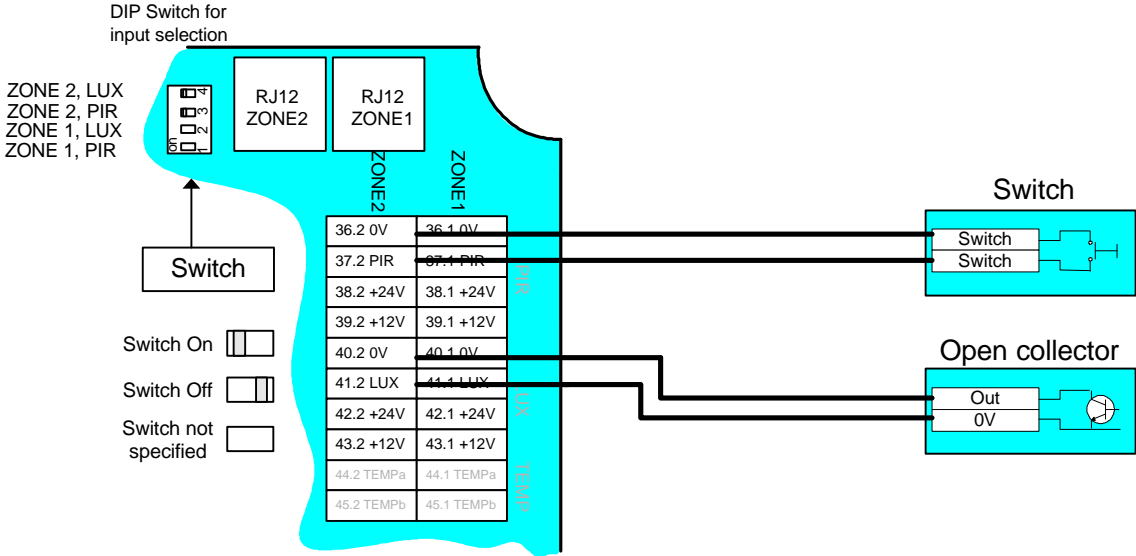


Figure 13 Input connections for open collector

Figure 14 Input connections for 2-wire set point resistor

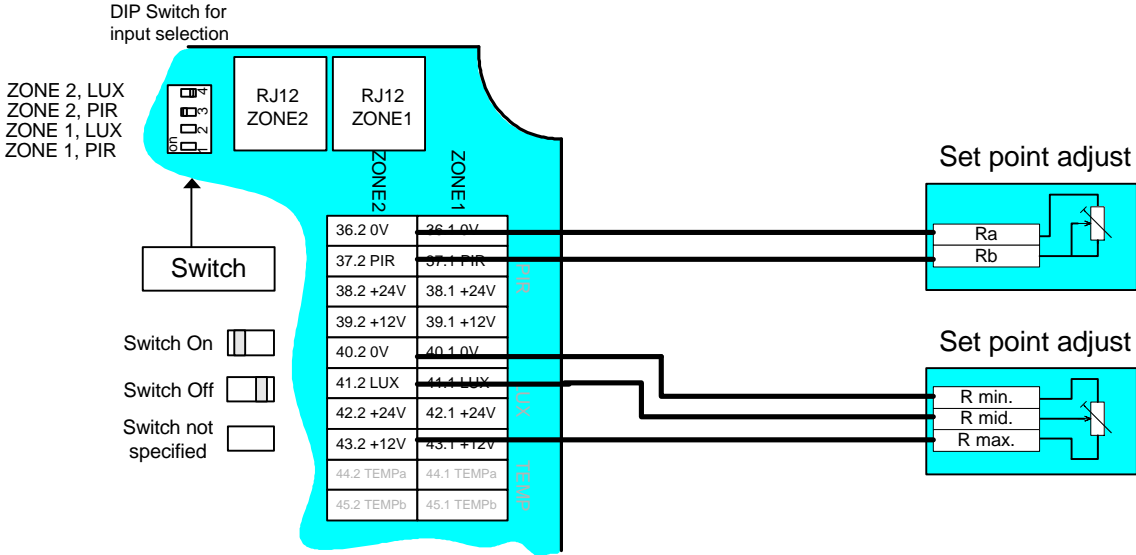


Figure 15 Input connections for 3-wire set point resistor

It is also possible to connect PIR and LUX sensors through a RJ12 connector, there are a connector for each zone. See pin configuration below.

Table 8 RJ12 connections

| Pin no. | Description |
|---------|-------------|
| 1       | +12Vdc      |
| 2       | 0V          |
| 3       | (+5Vdc)     |
| 4       | LUX         |
| 5       | (IR)        |
| 6       | PIR         |

Texts in brackets are option.

**6: Temperature terminals.**

These terminals are for a simple temperature NTC 5K @ 25°C, NTC 1K8 @ 25°C, NTC 10-15K sensors or PT-1000 sensors.

Mount the sensor between the two terminals.

|                      |                      |
|----------------------|----------------------|
| 44                   | 45                   |
| Temperature sensor - | Temperature sensor + |

Table 9 Temperature sensor connections

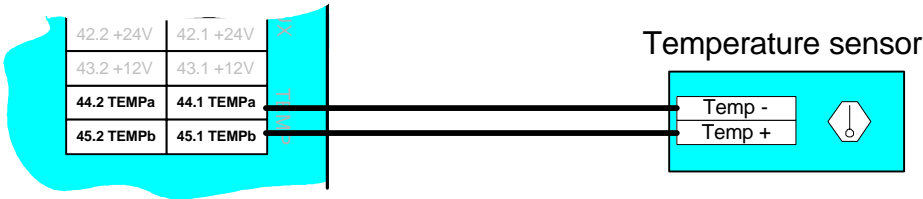


Figure 16 Temperature sensor connections

**7: LonWorks communication terminal.**

Connection to the LonWorks network using the TP/FT-10 transceiver.

There are two connections for each core so the LONWORKS net can be loop through the PZM2114 Zone Controller. The PZM4146 Comfort and light controller are connected to the LON1

|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| 50.1 | 51.1 | 50.2 | 51.2 | 52.1 | 53.1 | 52.2 | 53.2 |
| LON1 |      | LON1 |      | LON2 |      | LON2 |      |
| a    | b    | a    | b    | a    | b    | a    | b    |

Table 10 LonWorks connections

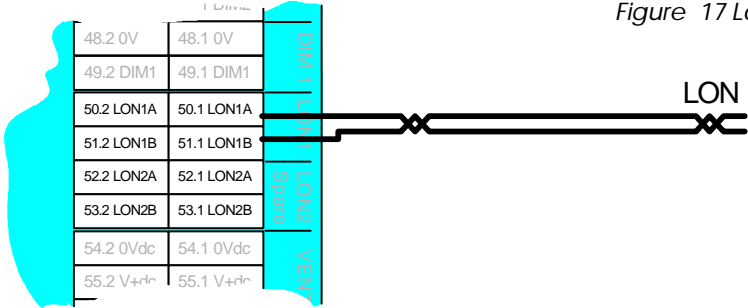


Figure 17 LonWorks connections

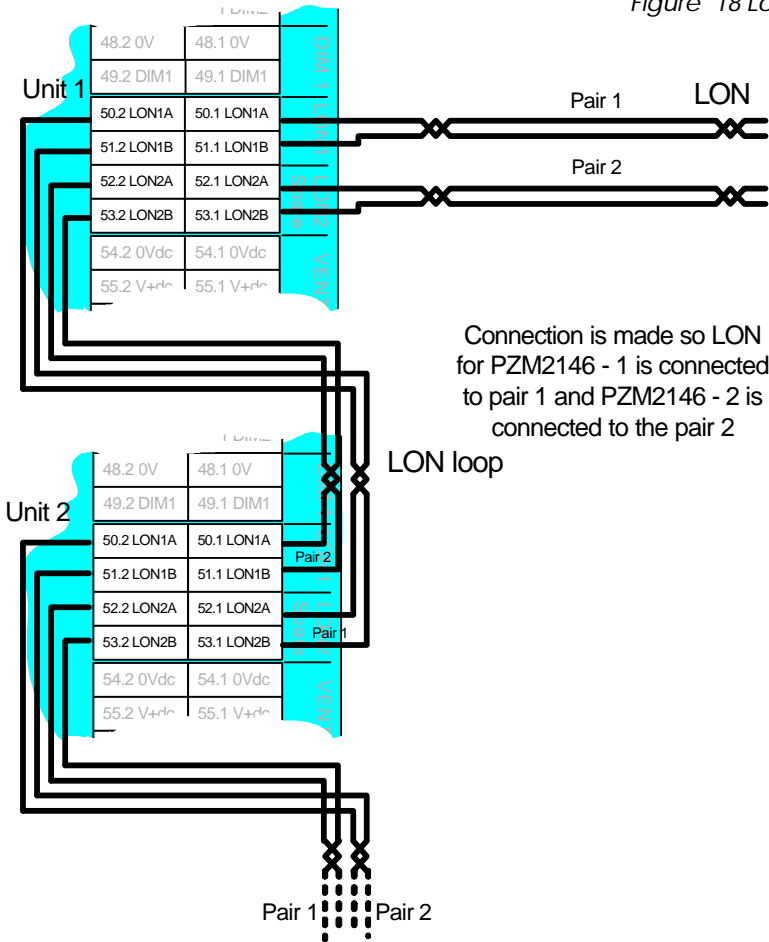
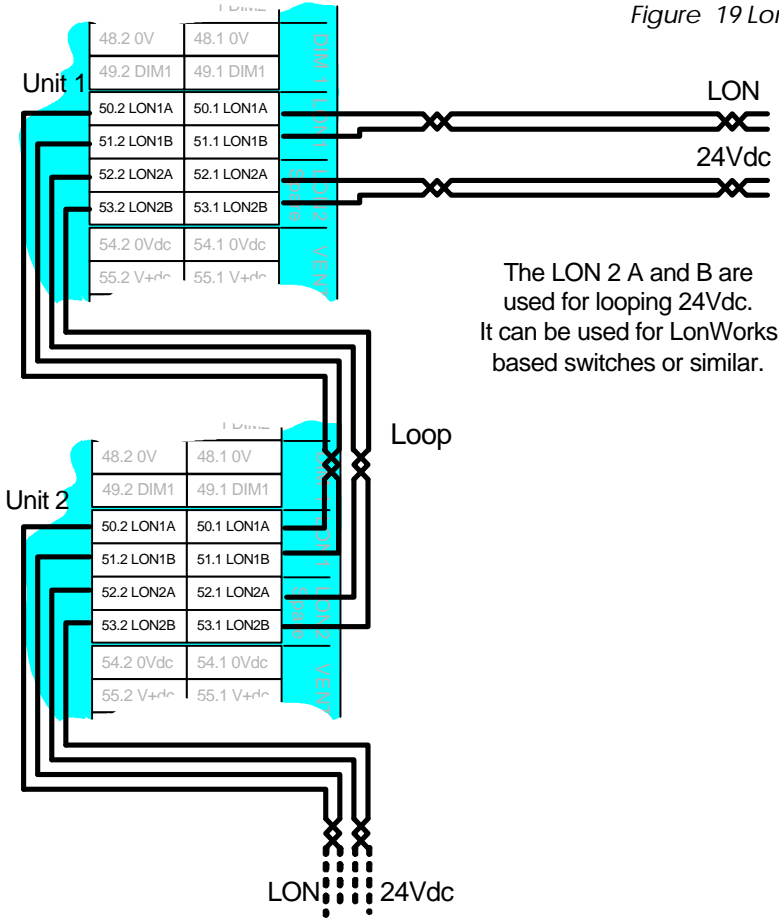


Figure 18 LonWorks connections for two pairs

Connection is made so LON for PZM2146 - 1 is connected to pair 1 and PZM2146 - 2 is connected to the pair 2

Figure 19 LonWorks connections with looped



### 8: Ventilations terminals.

These terminals are for the HVAC system and can control 0 to 10 voltage valve or 3 point actuator. In “Figure 20 VAV connections” is a 0-10V valve connected, the supply for the valve 24Vac is connected to terminal 56 and 57. The supply is 24Vac.

In “Figure 21 CAV connections” is 3 point actuator connected, note that it is 24Vac.

|                          |              |      |                        |       |
|--------------------------|--------------|------|------------------------|-------|
| 54.1                     | 55.1         | 56.1 | 57.1                   | 58.1  |
| 54.2                     | 55.2         | 56.2 | 57.2                   | 58.2  |
| 0Vdc for<br>0-10V output | 0-10V output | 0Vac | Open<br>(24Vac supply) | Close |

Table 11 Ventilation connections

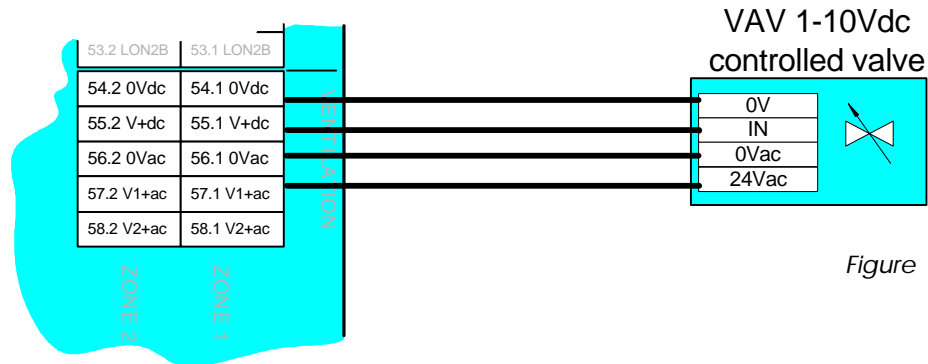


Figure 22 VAV connector

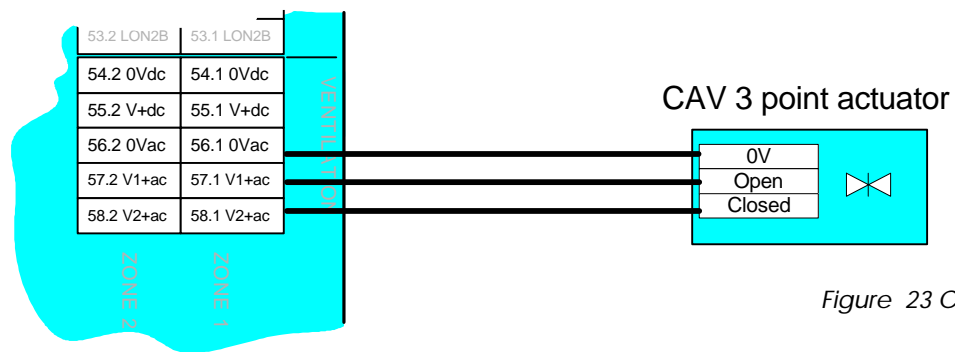


Figure 23 CAV connections

**9: Cool and heat terminals.**

These terminals are for the HVAC system.

These terminals are for heating or cooling valve in the HVAC system and can control 0 to 10 voltage valve or 24Vac valve. In “Figure 24 Cool connections” is a 0-10V valve connected, to the cool terminals. The 24VaC supply for the valve is connected to terminal 61 and 62. In “Figure 25 Heat terminals” is 24Vac valve connected to the heat terminals, note that it’s 24Vac.

|                       |              |      |                     |
|-----------------------|--------------|------|---------------------|
| 59.1                  | 60.1         | 61.1 | 62.1                |
| 59.2                  | 60.2         | 61.2 | 62.2                |
| 0Vdc for 0-10V output | 0-10V output | 0Vac | Open (24Vac supply) |

Table 12 Heat connections

|                       |              |      |                     |
|-----------------------|--------------|------|---------------------|
| 63.1                  | 64.1         | 65.1 | 66.1                |
| 63.2                  | 64.2         | 65.2 | 66.2                |
| 0Vdc for 0-10V output | 0-10V output | 0Vac | Open (24Vac supply) |

Table 13 Cool connections

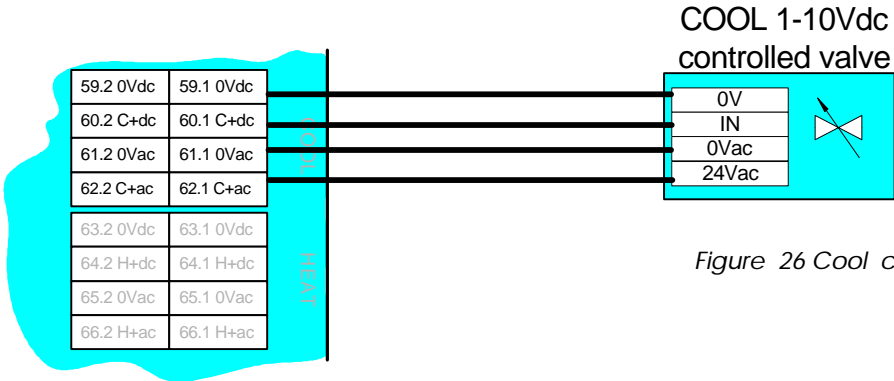


Figure 26 Cool connections

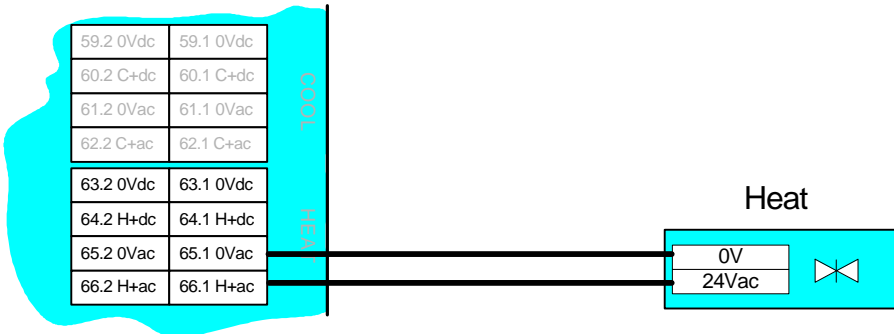


Figure 27 Heat terminals

**Mechanical**

The PZM4146 Comfort and lightcontroller is mount in a Fibox SP2828 box and can be mounted on the wall or ceiling by using the four screw holes in the corner of the box. The front cover has to be removed to access these mounting holes. The box has possibility to use different cable gland plate, or knock-outs plates for mounting of PG

**Network Interface**

See software description.

**Electrical Specifications****Supply**

|                               |              |
|-------------------------------|--------------|
| Operating voltage             | 230Vac ±10%  |
| Frequency                     | 50 Hz        |
| Fuse for PZM4146              | T 315 mA     |
| Power consumption for PZM4146 | Typical __ W |
| Power consumption peripheral  | Max. __ W    |
| Total Power consumption       | Max. __ W    |

**Temperature**

|           |                                 |
|-----------|---------------------------------|
| Operating | 5 °C to + 45 °C                 |
| Storage   | -0 °C to + 50 °C                |
| Humidity  | 80% @temp.<31°C<br>50% @31-40°C |

**Mechanical Data**

|                     |                                  |
|---------------------|----------------------------------|
| Mounting box        | Fibox                            |
| - Dimension (LxWxH) | 280x280x130 mm                   |
| - Weight            | __ Kg                            |
| - Material          | ABS/PC                           |
| Protection Class    | IP __                            |
| Housing             | Fibox SP2828, 280 * 280 * 130 mm |
| Mounting            | 4 screws 254 * 254 mm            |
| Terminals           | Cage clamp                       |
| - Core dimension    | 0,08 - 2,5 mm <sup>2</sup>       |
| - Isolation removal | 5-6 mm                           |
| - Ratings           | 250 Vac / 16A                    |

**EMC**

|          |                         |
|----------|-------------------------|
| Immunity | According to EN 50082-2 |
| Emission | According to EN 50081-1 |

**Input Data**

|                         |  |
|-------------------------|--|
| Number                  | 4  |
| Input voltage maximum   | 12V  |
| Over voltage protection | 15V  |
| Input impedance         | 39,8 K ohm   |
| Digital conversion      | $D = V_{in} * 8,2 / 39,8 * 1024 / 2,5$                         |
| Puls width              | Min. ___mS   |
| Supply out              | 24Vdc $\pm 10\%$<br>12Vdc $\pm 10\%$                           |
| Current out             | 100mA@24Vdc <i>see note 1</i><br>100mA@12Vdc <i>see note 2</i> |

**Temperature Input *see note 3***

|                   |  |
|-------------------|--|
| Sensor type       | NTC 1K8 @ 25 °C, 5K5 @ 25 °C, 10K-15K and PT1000 |
| Measuring range   | -10 to +50 °C                                    |
| Temperature / bit | 0,1 °C /bit                                      |
| Accuracy          | $\pm 0,5^{\circ}\text{C}$                        |

**Light 1-4 Output**

|                       |  |
|-----------------------|--|
| Contact               | Normally open (Make)   |
| Max switching voltage | 250 Vac  |
| Max. current          | 16 A   |
| Start current         | 950A@200 $\mu$ S, 900A@220 $\mu$ S, 800A@300 $\mu$ S, 500A@1mS, 150A@1S, |
| Switching voltage     | 230 Vac  |
| Mechanical life       | 1 mil.   |

**Light 5-6 Output**

|                       |                      |
|-----------------------|----------------------|
| Contact               | Normally open (Make) |
| Max switching voltage | 250 Vac              |
| Max. current          | 16 A                 |
| Mechanical life       | 1 mil.               |

**Dimmer output**

|                         |            |
|-------------------------|------------|
| Number                  | 4          |
| Output voltage          | 0 – 10 Vdc |
| Over voltage protection | 15V        |
| Output impedance        | 100Ω       |
| Voltage / bit           | 1 mV/bit   |
| Output current          | ±20 mA     |

**Ventilation output**

|                         |                          |
|-------------------------|--------------------------|
| Number                  | 2                        |
| Output voltage          | 0 – 10 Vdc               |
| Over voltage protection | 15V                      |
| Output impedance        | 100Ω                     |
| Voltage / bit           | 1 mV/bit                 |
| <b>Output current</b>   | ±20 mA                   |
| Output voltage          | 24V ac±20%               |
| Contact                 | Change over              |
| Output current (24Vac)  | 700 mA <i>see note 4</i> |

**Cool output**

|                         |                          |
|-------------------------|--------------------------|
| Number                  | 2                        |
| Output voltage          | 0 – 10 Vdc               |
| Over voltage protection | 15V                      |
| Output impedance        | 100Ω                     |
| Voltage / bit           | 1 mV/bit                 |
| Output voltage          | ±20 mA                   |
| Output voltage          | 24V ac±20%               |
| Output current (24Vac)  | 700 mA <i>see note 4</i> |

**Heat output**

|                         |                          |
|-------------------------|--------------------------|
| Number                  | 2                        |
| Output voltage          | 0 – 10 Vdc               |
| Over voltage protection | 15V                      |
| Output impedance        | 100Ω                     |
| Voltage / bit           | 1 mV/bit                 |
| Output voltage          | ±20 mA                   |
| Output voltage          | 24V ac±20%               |
| Output current (24Vac)  | 700 mA <i>see note 4</i> |

**Relay for Sunblind**

|                       |                      |
|-----------------------|----------------------|
| Number                | 2 (3 relay/sunblind) |
| Contact               | Change over          |
| Max switching voltage | 250 VAC              |
| Max switching current | 16 A                 |
| Max switching power   | 4000 VA AC           |
| Switching voltage     | 230 VAC              |
| Mechanical life       | 1 mil.               |

**LONWORKS Communication Port**

|                        |                         |
|------------------------|-------------------------|
| Type                   | Local Operating Network |
| Communication protocol | LonTalk                 |
| Physical channel       | TP/FT-10, 78Kbps        |

**Control Circuit**

|                              |            |
|------------------------------|------------|
| Microprocessor               | Atmel AT91 |
| Crystal Oscillator Frequency | 16 MHz     |

**Indicators**

|                       |   |
|-----------------------|---|
| Power indicator led's | 24 V Ext. power on, green<br>12 V PWM power on, green<br>12 V Ext. power on, green<br>12 V Ana. power on, green<br>5 V power on, green<br>3,3 V power on, green |
| Service indicator     | Yellow LED Applicationless: On<br>Unconfigured: Flashing<br>Configured: Off   |
| Test indicator        | Yellow LED  |

**Note**

1. Max. outgoing current on all 24 Vdc is 200 mA.
2. Max. outgoing current on all 12 Vdc is 150 mA.
3. Different kind of temperature sensor can be used etc. NTC 1K8 @ 25°C, Invensys 5K @ 25°C and PT-1000.
4. Max. outgoing current on all 24 Vac is 1,5 A.

## References

See software description.