

## TABLE OF CONTENTS

|                                              |    |
|----------------------------------------------|----|
| General.....                                 | 2  |
| Safety Instructions .....                    | 2  |
| Versions .....                               | 2  |
| Basic Controller Versions.....               | 2  |
| CLTG38EXP01 Expansion Board .....            | 2  |
| CLTG00MMIN01 External MMI.....               | 2  |
| CLMMI00N21.....                              | 2  |
| CLTG38L01 .....                              | 3  |
| CLTG38L11 .....                              | 3  |
| CLTG38EXP01 Expansion Board .....            | 3  |
| Accessories .....                            | 4  |
| Mounting/Connection.....                     | 4  |
| Before Working.....                          | 4  |
| Mounting on the DIN Rail in the Cabinet..... | 5  |
| Mounting on the Wall in the Cabinet .....    | 5  |
| Connecting the CLTG38EXP01.....              | 5  |
| Mounting/Connecting Accessories.....         | 6  |
| Cabling.....                                 | 7  |
| Analog Inputs.....                           | 8  |
| Digital Inputs.....                          | 11 |
| Analog Outputs.....                          | 12 |
| Digital Outputs .....                        | 13 |
| Power Supply.....                            | 13 |
| Adjusting the MMI Display Contrast.....      | 14 |

**Trademark Information**

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## GENERAL

### Safety Instructions

- When performing any work (installation, mounting, start-up), all instructions given by the manufacturer and in particular the safety instructions provided in these Installation Instructions are to be observed.
- The TIGER may be installed and mounted only by authorized and trained personnel.
- If the unit is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that applicable local standards and regulations are observed at all times. Examples of such regulations are VDE 0800 and VDE 0100.
- Use only accessory equipment coming from or approved by CentraLine.
- Before the system is dismantled, disconnect the power supply. Do this by removing terminal block A or by installing an additional 3<sup>rd</sup>-party switch onto the DIN rail close to the controller; see the following caution and note.



### CAUTION

Disconnect the power supply before you start to install the TIGER. Do not reconnect the power supply until you have completed installation.

#### IMPORTANT

*To comply with CE requirements, devices with a voltage in the range of 50 to 1000 Vac or 75 to 1500 Vdc which are not provided with a supply cord and a plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles, must have the means for disconnection incorporated in the fixed wiring.*

## VERSIONS

### Basic Controller Versions

The TIGER controller family consists of the following two basic controller versions:

- CLTG38L01 (without built-in MMI), and
- CLTG38L11 (with built-in MMI).

**NOTE:** The CLTG38L01 and CLTG38L11 both come with accessory mounting clips (for DIN rail mounting).

### CLTG38EXP01 Expansion Board

The TIGER controller family also includes the following unit which can be connected to and thus used to supplement a CLTG38L01 or CLTG38L11:

- CLTG38EXP01 Expansion Board.

**NOTE:** The CLTG38EXP01 comes with the following two accessories:  
Mounting clips (for DIN rail mounting),  
350-mm-long flat-strip connection cable.

### CLTG00MMIN01 External MMI

The TIGER controller family also includes the following Man-Machine-Interface which can be attached (only) to the CLTG38L01:

- CLTG00MMIN01 External MMI.

**NOTE:** The CLTG00MMIN01 comes with the following two accessories:  
cabinet door mounting kit,  
1.5-m-long flat-strip connection cable.

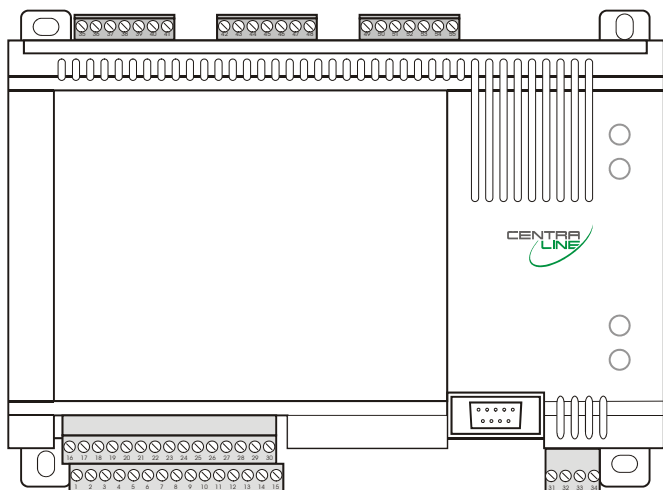
### CLMMI00N21

The following device can be connected to the B-port of the CLTG38L01 or CLTG38L11:

- CLMMI00N21.

**NOTE:** The CLMMI00N21 comes with the following accessory:  
5-m-long connection cable XW582.

The CLMMI00N21 features an MMI and can display special character sets (e.g. Cyrillic, etc.).

**CLTG38L01****Fig. 1. The CLTG38L01**

The CLTG38L01 (see Fig. 1) features:

- eight analog inputs, four analog outputs, and 14 digital inputs all arranged in a single, low-voltage, double-decker terminal block located on the left front of the housing, and also
- twelve digital outputs (including three changeover relays and nine normally-open relays) arranged in three terminal blocks located at the rear of the housing.

**NOTE:** The CLTG38L01 is **not** equipped with an MMI, but **can** be connected to the CLTG00MMIN01 External MMI.

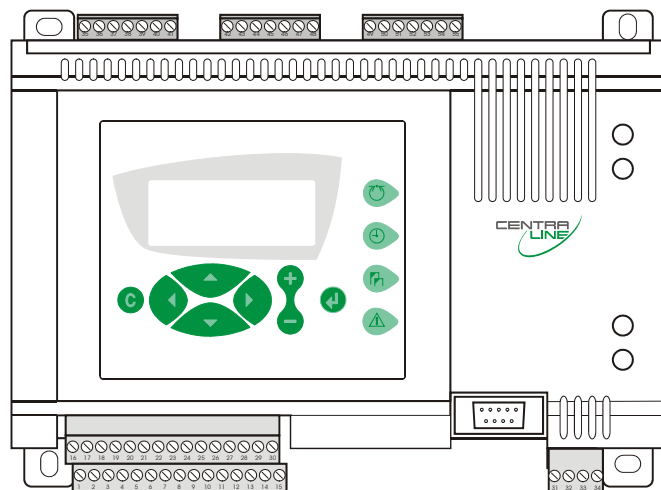
The CLTG38L01 also features a reset button and a power ON LED, both located on the top right of the housing.

The CLTG38L01 can be connected to a maximum of one CLTG38EXP01 Expansion Board.

The CLTG38L01 can be connected to the CLMMI00N21.

The CLTG38L01 has a built-in LONWORKS Module and is thus LONWORKS-capable.

The CLTG38L01 is suitable for mounting in electrical cabinets (on either a DIN rail or a wall).

**CLTG38L11****Fig. 2. The CLTG38L11**

The CLTG38L11 (see Fig. 2) features:

- eight analog inputs, four analog outputs, and 14 digital inputs all arranged in a single, low-voltage, double-decker terminal block located on the left front of the housing, and also
- twelve digital outputs (including three changeover relays and nine normally-open relays) arranged in three terminal blocks located at the rear of the housing.

**NOTE:** The CLTG38L11 **is** equipped with a built-in MMI, and **cannot** be connected to the CLTG00MMIN01 External MMI.

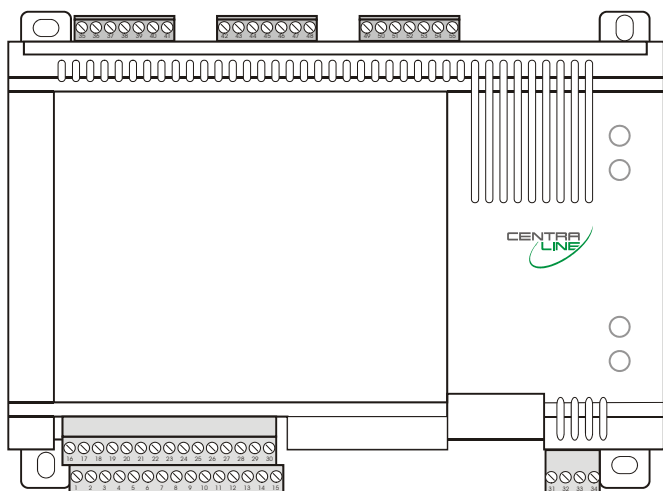
The CLTG38L11 also features a reset button and a power ON LED, both located on the top right of the housing.

The CLTG38L11 can be connected to a maximum of one CLTG38EXP01 Expansion Board.

The CLTG38L11 can be connected to the CLMMI00N21.

The CLTG38L11 has a built-in LONWORKS Module and is thus LONWORKS-capable.

The CLTG38L11 is suitable for mounting in electrical cabinets (on either a DIN rail or a wall).

**Fig. 3. The CLTG38EXP01****CLTG38EXP01 Expansion Board**

The CLTG38EXP01 (see Fig. 3) features:

- eight analog inputs, four analog outputs, and 14 digital inputs all arranged in a single, low-voltage, double-decker terminal block located on the left front of the housing, and also
- twelve digital outputs (including three changeover relays and nine normally-open relays) arranged in three terminal blocks located at the rear of the housing.

A maximum of one CLTG38EXP01 can be connected to each CLTG38L01 or CLTG38L11.

**NOTE:** The CLTG38EXP01 is not equipped with an MMI, and **cannot** be connected to the CLTG00MMIN01 External MMI or to the CLMMI00N21. Rather, it can be connected only to the CLTG38L01 or CLTG38L11.

The CLTG38EXP01 does **not** have a built-in LONWORKS Module but is nonetheless LONWORKS-capable via the CLTG38L01 or CLTG38L11 to which you connect it.

## Accessories

The CLTG38L01 and CLTG38L11 both come with accessory mounting clips (for DIN rail mounting).

The CLTG38EXP01 comes with the following two accessories:

- Mounting clips (for DIN rail mounting),
- 350-mm-long flat-strip connection cable.

The CLTG00MMIN01 comes with the following two accessories:

- cabinet door mounting kit,
- 1.5-m-long flat-strip connection cable.

### CLTG00MMIN01 External MMI

The CLTG00MMIN01 External MMI can be connected only to the CLTG38L01.

The CLTG00MMIN01 External MMI is suitable for installation in cabinet doors (see section "Mounting the CLTG00MMIN01 External MMI" on page 6).

The CLTG00MMIN01 External MMI comes complete with a 1.5-m-long flat-strip connection cable.

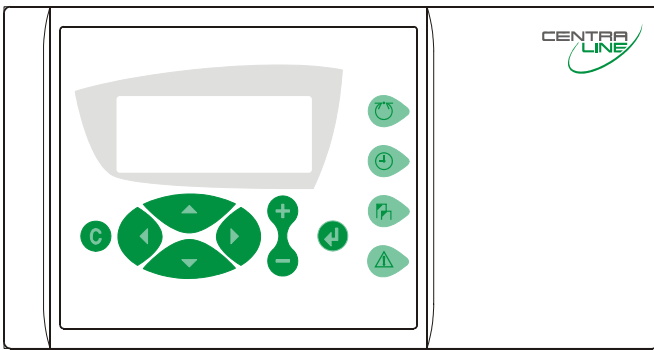


Fig. 4. The CLTG00MMIN01 External MMI

### CLMMI00N21 External MMI

The CLMMI00N21 External MMI can be connected (via the B-Port) to any TIGER or PANTHER controller.

**NOTE:** The use of Cyrillic characters in conjunction with a TIGER is possible only in the case of a CLTG38L01 which has been connected with the CLMMI00N21.

The CLMMI00N21 External MMI is suitable for installation in a cabinet door or wall.

The CLMMI00N21 External MMI comes complete with the XW582 connection cable (5 meters long).

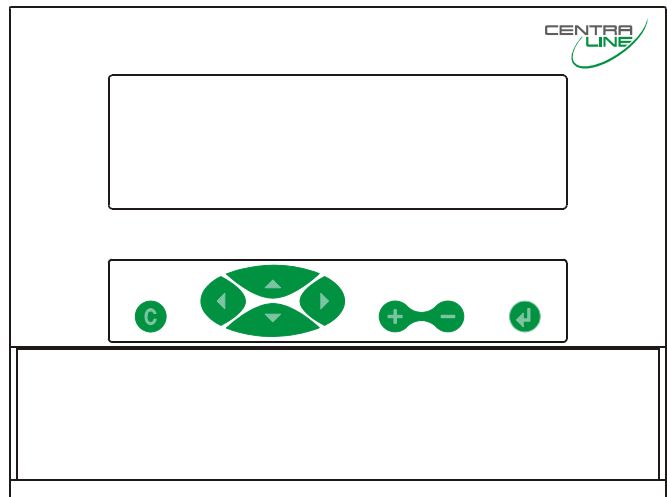


Fig. 5. The CLMMI00N21 External MMI

## MOUNTING/CONNECTION

The CLTG38L01, CLTG38L11, and CLTG38EXP01 are all suitable for mounting in electrical cabinets (on either the DIN rail or the wall). To mount, proceed as described in the following.

### Before Working

- When performing any work (installation, mounting, start-up), all instructions given by the manufacturer and in particular the safety instructions provided in these Installation Instructions are to be observed.
- The TIGER controllers and accessories are to be installed and mounted only by authorized and trained personnel.
- If the unit is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that certain local standards and regulations are observed at all times. Examples of such regulations are VDE 0800 and VDE 0100.
- Use only accessory equipment coming from or approved by CentraLine.
- Before the system is dismantled, disconnect the power supply. Do this by unplugging the power supply terminal block connector or by installing an additional 3rd-party switch onto the DIN rail close to the TIGER; see the following caution and note.



## CAUTION

Disconnect the power supply before you begin installing the TIGER or connecting accessories. Do not reconnect the power supply until you have completed installation.

### IMPORTANT

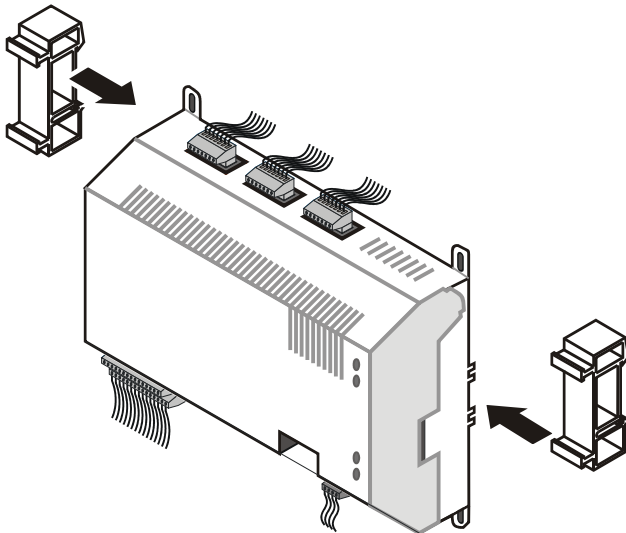
*To comply with CE requirements, devices with a voltage in the range of 50 to 1000 Vac or 75 to 1500 Vdc which are not provided with a supply cord and a plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles, must have the means for disconnection incorporated in the fixed wiring.*

## Mounting on the DIN Rail in the Cabinet

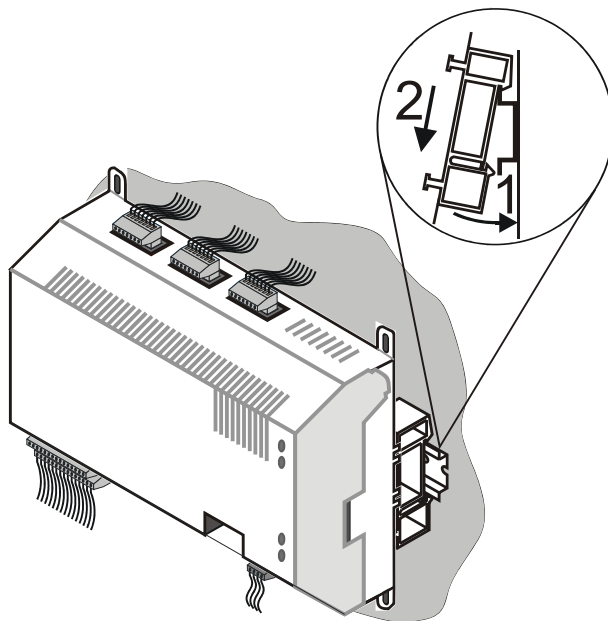
The following instructions refer to mounting the CLTG38L01, the CLTG38L11, or the CLTG38EXPN01 onto the DIN rail in an electrical cabinet.

To mount, proceed as follows:

1. Read the complete section "Before Working" carefully.
2. Wire the terminal blocks.
3. Attach the DIN rail mounting clips at the housing as shown in Fig. 6.
4. Mount the controller on the DIN rail as shown in Fig. 7



**Fig. 6. Attaching DIN rail mounting clips**

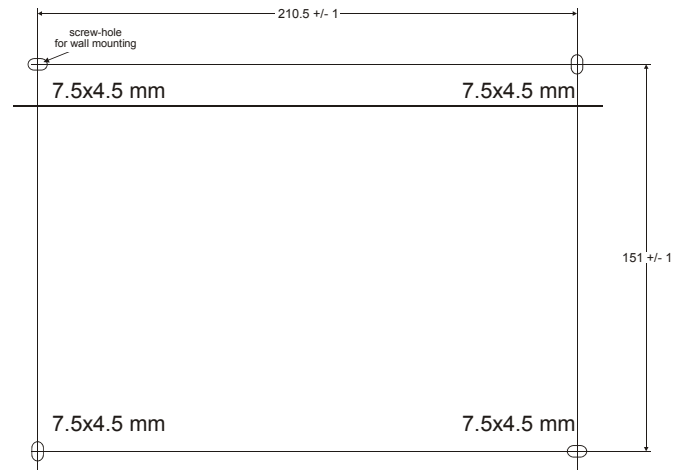


**Fig. 7. Mounting controller on DIN rail**

## Mounting on the Wall in the Cabinet

The following instructions refer to mounting the CLTG38L01, CLTG38L11, or CLTG38EXPN01 onto the wall in an electrical cabinet. To mount, proceed as follows:

1. Read the complete section "Before Working" carefully.
2. Drill screw-holes in the wall according to the template depicted in Fig. 8.
3. Position the controller and screw in the screws.
4. Wire the terminal blocks.



**Fig. 8. Drilling template**

## Connecting the CLTG38EXPN01

The following instructions refer to the connection of an already-mounted CLTG38EXPN01 Expansion Board to an already-mounted CLTG38L01 or CLTG38L11:

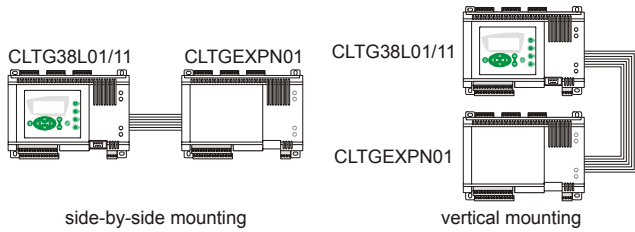
The CLTG38EXPN01 can be mounted either the right of (i.e. side-by-side installation) or below/above (i.e. vertical installation) the CLTG38L01 or CLTG38L11 (see also Fig. 9).

In the case of side-by-side installation, the CLTG38EXPN01 is connected to the controller using its accessory 350-mm cable; in the case of vertical installation, the CLTG38EXPN01 is connected to the CLTG38L01 or CLTG38L11 using its accessory 350-mm cable.

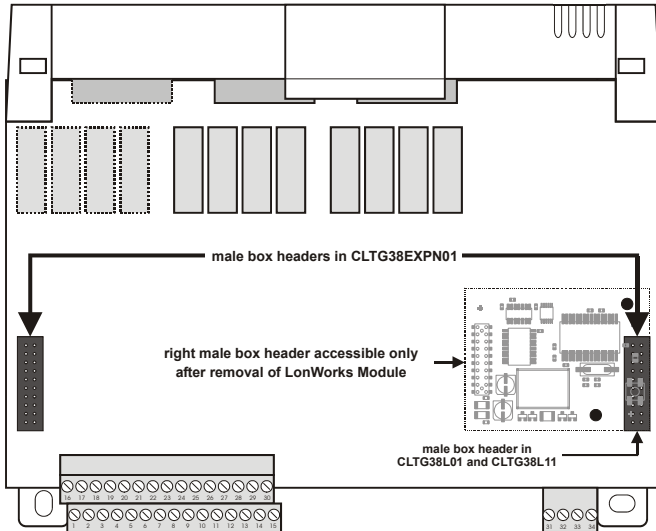
To connect, proceed as follows:

1. Read the complete section "Before Working" carefully.
2. Disconnect the controller's power supply.
3. Unplug the digital output terminal block connectors located at the rear of the controller and at the rear of the CLTG38EXPN01.
4. Raise the controller's and the Expansion Board's housing cover.
5. Remove the appropriate cut-outs in the controller's housing and in the Expansion Board's housing.
6. Remove the LONWORKS Module.
7. Plug one end of the flat-strip cable into the controller's male box header (located to the right) and the other end into one of the Expansion Board's two male box headers (located at the right and left).
8. Replace the LONWORKS Module removed in step 6.

The CLTG38EXPN01 draws its power from the CLTG38L01 or CLTG38L11 to which it is connected via the flat-strip cable and is thus powered by the same transformer.



**Fig. 9. Connecting the CLTG38EXPN01 Expansion Board**



**Fig. 10. Position of male box header(s) in CLTG38L01, CLTG38L11, and CLTG38EXPN01 (cover raised)**

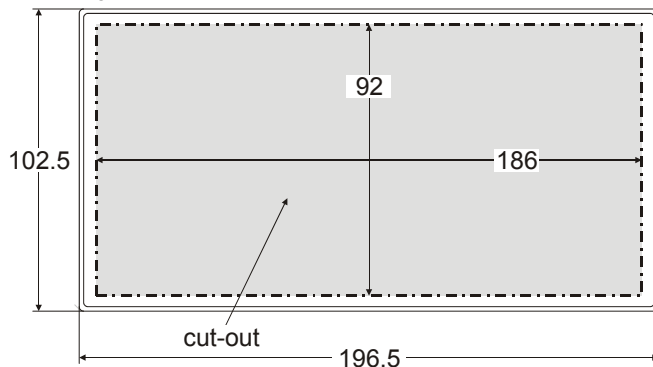
## Mounting/Connecting Accessories

### Mounting the CLTG00MMIN01 External MMI

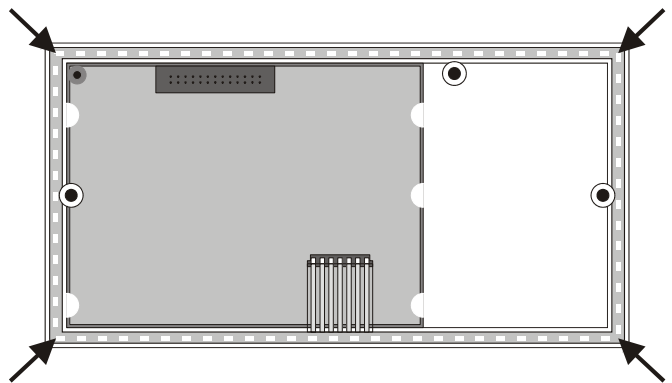
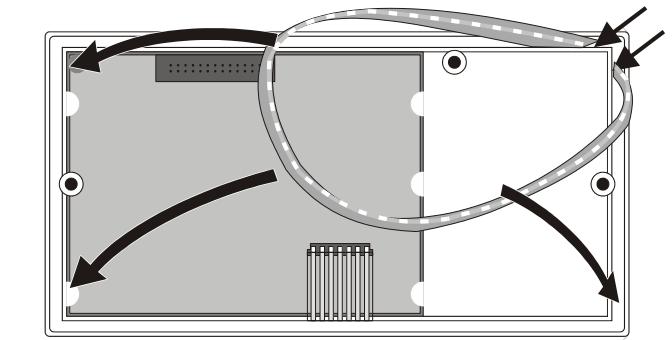
The CLTG00MMIN01 External MMI is suitable for mounting in a cabinet door.

To mount, proceed as follows:

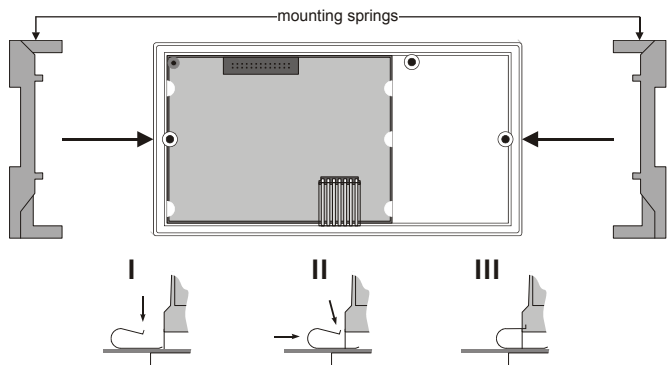
1. Read the complete section "Before Working" carefully.
2. Cut out a hole in the door according to the template presented in Fig. 11.
3. Attach the seal as shown in Fig. 12.
4. Insert the unit into the cut-out in the cabinet door.
5. Mount the springs in the three-step procedure as shown in Fig. 13.



**Fig. 11. Template for cut-out**



**Fig. 12. Attaching the seal**



**Fig. 13. Inserting the springs**

### Connecting the CLTG00MMIN01 External MMI

The following instructions refer to the connection of an already mounted CLTG00MMIN01 to an already-mounted CLTG38L01.

To connect, proceed as follows:

1. Read the complete section "Before Working" carefully.
2. Disconnect the controller's power supply.
3. Unplug the digital output terminal block connectors located at the rear of the CLTG38L01.
4. Raise the housing cover of the CLTG38L01.
5. Plug the special 1.5-m flat-strip cable into the male box header of the controller and lead it out through the corresponding slot in the housing.
6. Plug the other end of the flat-strip cable into male box header of the CLTG00MMIN01 External MMI.

The CLTG00MMIN01 External MMI draws its power from the CLTG38L01 to which it is connected via the flat-strip cable and is thus powered by the same transformer.

## LonWorks Module

The CLTG38L01 and CLTG38L11 are both already equipped with a LONWORKS module and are thus LONWORKS-capable.

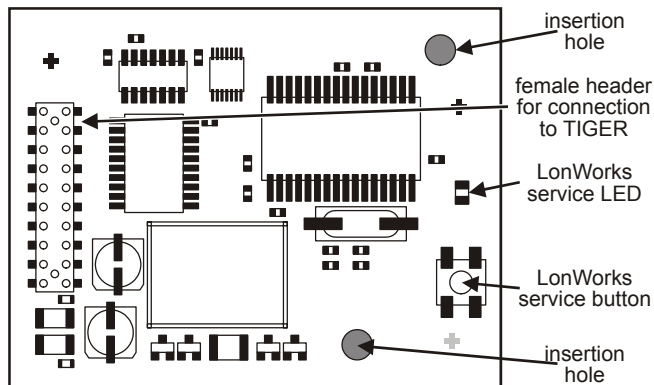


Fig. 14. LonWorks Module (details)

## Cabling

### Cable Routing

All signal cables (i.e. input/output and low-voltage cables) are communication circuits in accordance with VDE 0100, VDE 0800 and local regulations and should therefore be routed separately from line voltage.

Table 1. Minimum distances to line voltage

| cable type       | minimum distance |
|------------------|------------------|
| unshielded cable | 100 mm           |
| shielded cable   | 10 mm            |

### IMPORTANT

Avoid joining sensor cables.

### Shielding

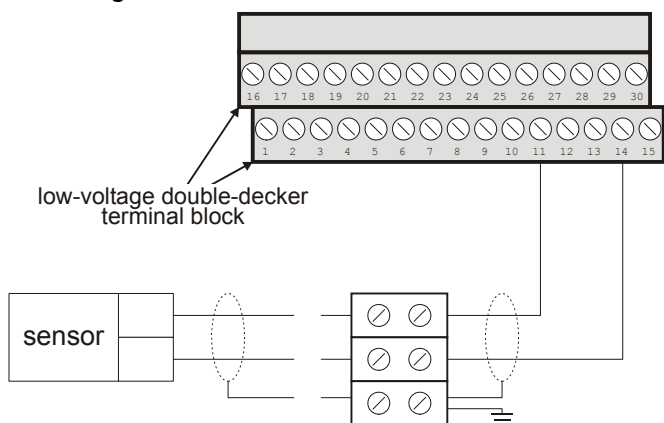


Fig. 15. Sensor shielding (example)

If the general guidelines on cable routing are observed (see section "Cable Routing"), the shielding of sensor and actuator cables with low safety voltages is not necessary. If these guidelines cannot be observed, cables must always be shielded. The shielded cables must be grounded as is shown in Fig. 15.

### IMPORTANT

The shielding of I/O cables connected to peripherals such as sensors and actuators must be grounded at the control cabinet side, only; this is in order to avoid ground loops.

All Honeywell actuators are RFI suppressed in accordance with VDE 0871/B and VDE 0875/N.

### Lightning Protection

Please check with your local CentralLine representative for information on lightning protection.

## Cable Lengths and Cross-sectional Areas

Table 2. Signal types and cross-sectional areas

| type of signal        | length of cable       |                       |         |
|-----------------------|-----------------------|-----------------------|---------|
|                       | ≤ 100 m               | ≤ 170 m               | ≤ 400 m |
| power supply (24 Vac) | ≤ 1.5 mm <sup>2</sup> | ≥ 2.5 mm <sup>2</sup> | -       |
| low-current signals*  | ≥ 0.5 mm <sup>2</sup> |                       |         |

\*E.g. for 0...10 V sensors, digital inputs, 0...10 V signals for actuators.

### IMPORTANT

The maximum length of a signal cable with 24 Vac supply is 170 m. The maximum length of a two-wire, 0...10 Vdc signal cable is 400 m. The secondary side of the transformer must not be connected to earth ground.

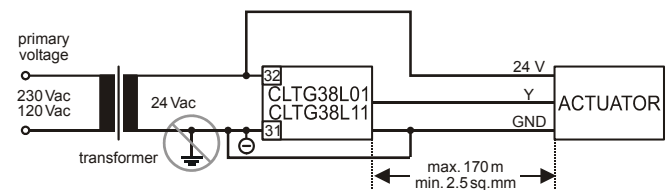


Fig. 16. Cabling of actuator (24 Vac supply, max. 170 m)

If the distance between the controller and actuator or sensor with 24 Vac supply is greater than 170 m, a separate external transformer for the actuator or sensor is necessary.

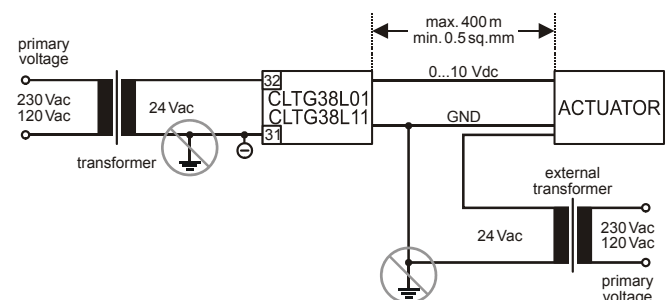


Fig. 17. Cabling of actuator (24 Vac supply, max. 400 m)

### IMPORTANT

We recommend installing a fuse on the secondary side of the transformer in order to protect the devices against miswiring.

## Analog Inputs

### Technical Description

The analog inputs convert data from passive sensors and active sensors with voltage output. The analog inputs can be used as current inputs for active sensors, but then an external resistor parallel to the sensor is necessary. It is also possible to feed digital signals to the analog inputs (see also section "Sensors and Transducers").

### Analog Input Ratings

The CLTG38L01, the CLTG38L11, and the CLTG38EXP01 feature analog inputs as listed in Table 3.

**Table 3. Number of AI's and terminals (by version)**

| version     | no. of AI's | no. of terminals |
|-------------|-------------|------------------|
| CLTG38L01   | 8           | 9                |
| CLTG38L11   | 8           | 9                |
| CLTG38EXP01 | 8           | 9                |

Each analog input is switchable by software to the input conditions listed in Table 4.

**Table 4. Input conditions for switching analog inputs**

|                                                |               |
|------------------------------------------------|---------------|
| NTC (20k $\Omega$ ) / 0...10 V (low impedance) | -50...+150 °C |
| 0...20 mA (external 500 $\Omega$ resistor)     | 0...+10 V     |
| slow digital inputs                            | dry contact   |

The analog inputs of the CLTG38L01, the CLTG38L11, and the CLTG38EXP01 have an FIO (Field Input Output) cycle time of 1 second.

When equipped with an external 500  $\Omega$  resistor, the analog inputs can also be used to provide 0...20 mA current input.

### IMPORTANT

*The analog inputs are protected against short-circuit and over-voltage up to 24 Vac. If any input is sourced with more than 20 Vdc or with negative voltage, the other inputs will be influenced. This could result in incorrect values.*

The input impedances are defined as followed:

- Input impedance (NTC / 0...10 V): 200k $\Omega$  to GND / 25k $\Omega$  to +10 V.
- Max. ratings (voltage): +20 V / -1 V.
- The analog inputs are not galvanically isolated.
- Resolution: 10 bit.

Table 5 and Table 6 provide information on the resolution of analog input sensors and on their accuracy, respectively.

- Accuracy of analog input voltage: 0...10 V /  $\pm 200$  mV.
- Accuracy of analog input current: 0...20 mA /  $\pm 1$  mA (when equipped with external 500  $\Omega$  resistor).
- Sample time: 1 s.

**Table 5. Resolution of AI sensors**

| range        | resolution/step of A/D-converter (approx.) |
|--------------|--------------------------------------------|
| -50...-20 °C | $\pm 1.0$ K                                |
| -20...0 °C   | $\pm 0.2$ K                                |
| 0...30 °C    | $\pm 0.1$ K                                |
| 30...70 °C   | $\pm 0.3$ K                                |
| 70...100 °C  | $\pm 0.8$ K                                |
| 100...130 °C | $\pm 2.0$ K                                |
| 130...150 °C | $\pm 3.5$ K                                |

**Table 6. Accuracy / deviation of AI sensors**

| range                       | deviation ( $\pm$ Kelvin, not incl. sensor tolerance) |                             |
|-----------------------------|-------------------------------------------------------|-----------------------------|
|                             | hardware-specific deviation                           | software-specific deviation |
| -50...-40 °C                | $\pm 7.5$ K                                           | $\pm 0.5$ K                 |
| -40...-30 °C                | $\pm 4.0$ K                                           | $\pm 0.4$ K                 |
| -30...-20 °C                | $\pm 2.5$ K                                           | $\pm 0.2$ K                 |
| -20...-10 °C                | $\pm 1.5$ K                                           | $\pm 0.1$ K                 |
| -10...0 °C                  | $\pm 1.0$ K                                           | $\pm 0.1$ K                 |
| 0...10 °C                   | $\pm 0.7$ K                                           | $\pm 0.05$ K                |
| 10...50 °C                  | $\pm 0.5$ K                                           | $\pm 0.05$ K                |
| 50...70 °C                  | $\pm 0.8$ K                                           | $\pm 0.05$ K                |
| 70...90 °C                  | $\pm 1.3$ K                                           | $\pm 0.1$ K                 |
| 90...100 °C                 | $\pm 1.8$ K                                           | $\pm 0.1$ K                 |
| 100...120 °C                | $\pm 3.4$ K                                           | $\pm 0.3$ K                 |
| 120...150 °C                | $\pm 8.5$ K                                           | $\pm 0.5$ K                 |
| ambient temperature = 25 °C |                                                       |                             |

### Types of input signals:

NTC 20k $\Omega$  (range: -50 °C to +150 °C)

0 to +10 V

0 (4) to 20 mA (with an external resistor of 499  $\Omega \pm 0.25\%$ )

Regardless whether defined (during COACH engineering) as being connected to an NTC 20k $\Omega$  or to a voltage source, the inputs are always enabled (see section "Pull-Up Resistor Handling").

**Table 7. Sensors suitable for use with TIGER (external transducer not required)**

| sensor type                                                                           | range                        | characteristic in controller<br>(set using COACH) |
|---------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------|
| CLSN1T10 Outside Air Temperature Sensor                                               | -20...+30° C                 | NTC                                               |
| CLSN2T10 Strap-On Temperature Sensor                                                  | 0...+110° C                  |                                                   |
| CLSN3T120 Boiler Temperature Sensor                                                   | 0...+100° C                  |                                                   |
| CLSN4T11 Duct Temperature Sensor                                                      | -30...+100° C                |                                                   |
| CLCM1C155 or AQS51 or C7110C1001 CO <sub>2</sub> Sensor                               | 0...2000 ppm CO <sub>2</sub> | 0...10 V = 0...2000 ppm                           |
| CLCMNA172 Air Quality (Mixed Gas) Sensor                                              | 0...100%                     | 0...10 V = 0...100%                               |
| C7110A1005 Air Quality (Mixed Gas) Sensor                                             |                              |                                                   |
| CLCM1H112 Combined Room Temp. / Humidity Sensor<br>or H7012B1023 Room Humidity Sensor | 6...40°C                     | NTC                                               |
|                                                                                       | 20...95% relative humidity   | 0...10 V = 0...100%                               |

**Table 8. Room Temperature Sensors suitable for use with TIGER (external transducer not required)**

| sensor type                                                         | range                        | characteristic in controller<br>(set using COACH) |
|---------------------------------------------------------------------|------------------------------|---------------------------------------------------|
| CLCM1T11N Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
| CLCM2T11N Room Temperature Sensor                                   | setpoint wheel               | linear input                                      |
| CLCM3T111 Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | operating knob               | -                                                 |
| CLCM4T111 Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
| CLCM5T111 Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
|                                                                     | fan speed, 3 stages          | -                                                 |
| CLCM6T111 Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
|                                                                     | fan speed, 5 stages          | -                                                 |
| CLCM6T21N Room Temperature Sensor                                   | 6...40°C                     | NTC                                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
|                                                                     | fan speed, 5 stages          | -                                                 |
| CLCM1H112 Combined Room Temperature / Humidity Sensor               | 6...40°C                     | NTC                                               |
|                                                                     | 20...95% r.h.                | 0...10 V = 0...100%                               |
| CLCM4C155 Combined Room Temperature / Humidity Sensor               | 6...40°C                     | NTC                                               |
|                                                                     | 0...2000 ppm CO <sub>2</sub> | 0...10 V = 0...2000 ppm                           |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
| CLCM6H212 or T7560B1008 Combined Room Temperature / Humidity Sensor | 6...40°C                     | NTC                                               |
|                                                                     | 20...95% r.h.                | 0...10 V = 0...100%                               |
|                                                                     | setpoint wheel               | linear input                                      |
|                                                                     | occupancy button*            | -                                                 |
|                                                                     | fan speed, 5 stages          | -                                                 |

\*supported in AH03

**Table 9. Humidity Sensor suitable for use with TIGER (external transducer not required)**

| sensor type                        | characteristic in controller<br>(set using COACH) | additional remarks     |
|------------------------------------|---------------------------------------------------|------------------------|
| H7015B1020 Duct Humidity Sensor    | 0..10 V = 0...100%                                | set jumper to 0...10 V |
| H7508A1042 Outside Humidity Sensor |                                                   |                        |

**Table 10. Flue Gas Sensors suitable for use with TIGER (external transducer required)**

| sensor type | characteristic in controller<br>(set using COACH) | additional remarks                                                                                                                             |
|-------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| AGF1        | 0...10 V = 0...400 °C                             | requires LC-MV-1xPT1000.0-400°C: converts PT1000 to 0...10 V: order from: <a href="http://www.rinck-electronic.de">www.rinck-electronic.de</a> |

**Table 11. Differential (+ Static Duct) Pressure Sensor suitable for use with TIGER (external transducer required)**

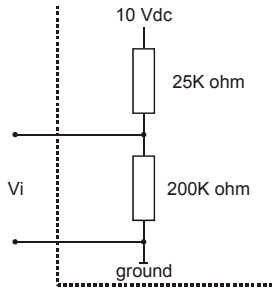
| sensor type                                         | range        | characteristic in controller<br>(set using COACH) | additional remarks                                                                                                                                                                                                                 |
|-----------------------------------------------------|--------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DPT500 Differential (+ Static Duct) Pressure Sensor | 0...500 Pa   | 0..10 V = 0...500 Pa                              | requires external converter from 0..10 V to 0..10 V for adaptation to TIGER I/O. Order at <a href="http://www.rinck-electronic.de">www.rinck-electronic.de</a> under order number: "LC-TV-1U.1U 10V.10V" set jumper to 0...500 Pa  |
|                                                     | 0... 1000 Pa | 0..10 V = 0...1000 Pa                             | requires external converter from 0..10 V to 0..10 V for adaptation to TIGER I/O. Order at <a href="http://www.rinck-electronic.de">www.rinck-electronic.de</a> under order number: "LC-TV-1U.1U 10V.10V" set jumper to 0...1000 Pa |

**Table 12. Differential Pipe Pressure Sensors suitable for use with TIGER (external transducer not required)**

| sensor type  | range       | characteristic in controller<br>(set using COACH) | additional remarks                                   |
|--------------|-------------|---------------------------------------------------|------------------------------------------------------|
| FHBN 3+ED1   | 0 – 2.5 bar | 0...10 V = 0...250 kPa                            | ED1 is an integrated transducer with 0...10 V output |
| FHBN 5 +ED1  | 0 – 5 bar   | 0...10 V = 0...500 kPa                            |                                                      |
| FHBN 10 +ED1 | 0 – 10 bar  | 0...10 V = 0...1000 kPa                           |                                                      |

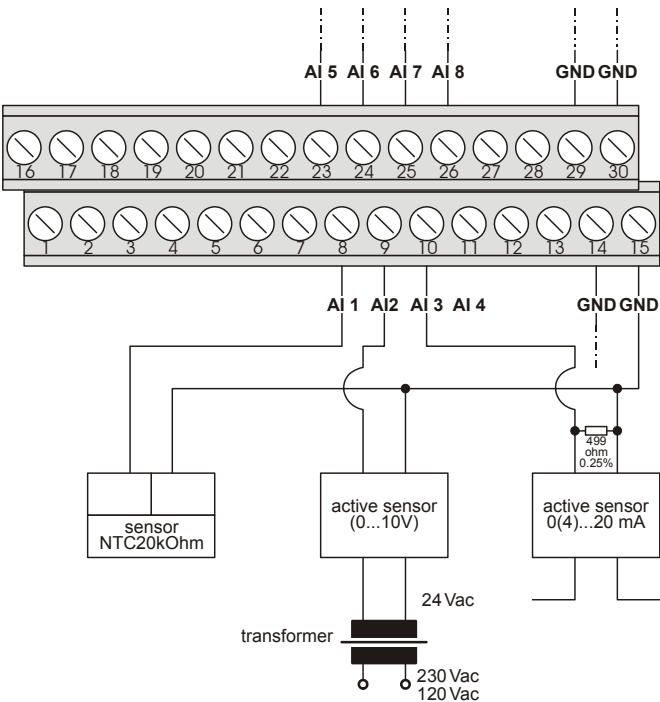
**Pull-Up Resistor Handling**

NTC and Low-Impedance Sensors. Characteristic name: NTC. The internal pull-up resistor is always enabled.



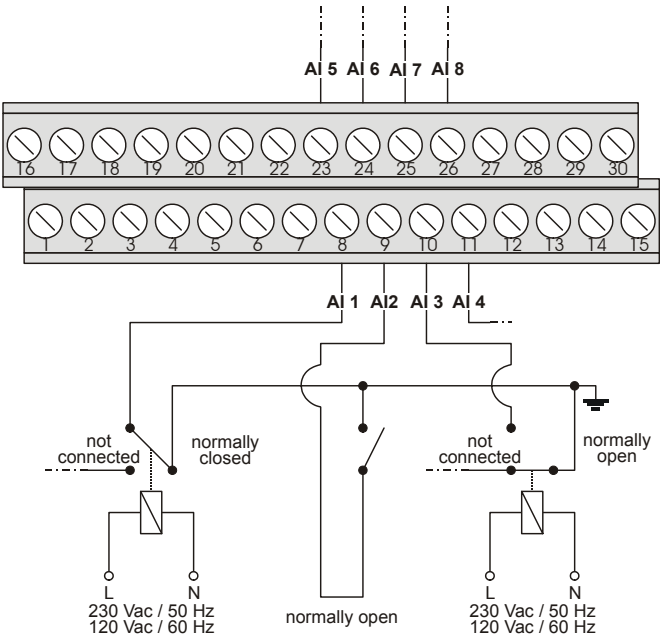
**Fig. 18. Analog input / low-impedance sensors**

**Sensors and Transducers**



**Fig. 19. AI's, sensor connections (example)**

**Analog Inputs Used as Digital Inputs**



**Fig. 20. AI's used as DI's (example)**

For normally-open contacts, a digital signal must be switched via the changeover contact of an additional relay.

Unconnected analog inputs have a default voltage of 8.5 V. This is interpreted by the controller as a logical 1. This means that, in general, no external relay is needed for normally-open contacts.

**IMPORTANT**

*The relay contact must be suitable for switching low voltage. For long cable distances, the analog input signal may be sensitive to interference. In this case, an external relay may also be used for normally closed contacts.*

**Digital Inputs**

**Technical Description**

**Digital Input Ratings**

The CLTG38L01, the CLTG38L11, and the CLTG38EXPN01 feature numerous digital inputs as listed in Table 13.

**Table 13. Number of DI's and terminals (by version)**

| version      | no. of DI's | no. of terminals |
|--------------|-------------|------------------|
| CLTG38L01    | 14          | 15               |
| CLTG38L11    | 14          | 15               |
| CLTG38EXPN01 | 14          | 15               |

The digital inputs are not galvanically isolated.

24 Vac via dry contact. No special auxiliary voltage is provided.

The digital inputs can be used only as status inputs, as alarms, or as slow totalizers.

Pulse times are specified in Table 14.

The digital inputs have an FIO (Field Input Output) cycle time of  $\leq 250$  msec.

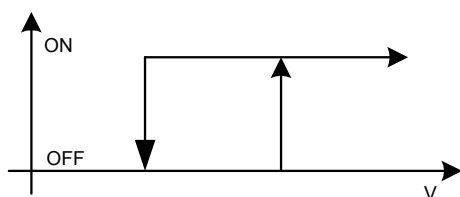
**Table 14. Pulse times of digital inputs**

| kind of signal                       | special requirements                                                     | pulse time      | pulse pause     |
|--------------------------------------|--------------------------------------------------------------------------|-----------------|-----------------|
| potential-free contact (dry contact) | contact must be able to switch low voltages, max. bouncing time: 50 msec | $\geq 300$ msec | $\geq 300$ msec |
| AC voltage                           | none                                                                     | $\geq 300$ msec | $\geq 300$ msec |

**Types of signals:**

DC signal, max. 24 Vdc. The DC voltage switching thresholds of the digital inputs are:

- ON: 4.7...7.7 Vdc
- OFF: switching ON level -0.8...-3 Vdc (i.e. there is a hysteresis of between 0.8 and 3 V to switch back to OFF)

**Fig. 21. DC voltage switching thresholds of digital inputs**

- The minimum AC voltage switching threshold of the digital inputs is: 24 Vac -20%.
- Sample time: 250 msec.

**Input resistance:**

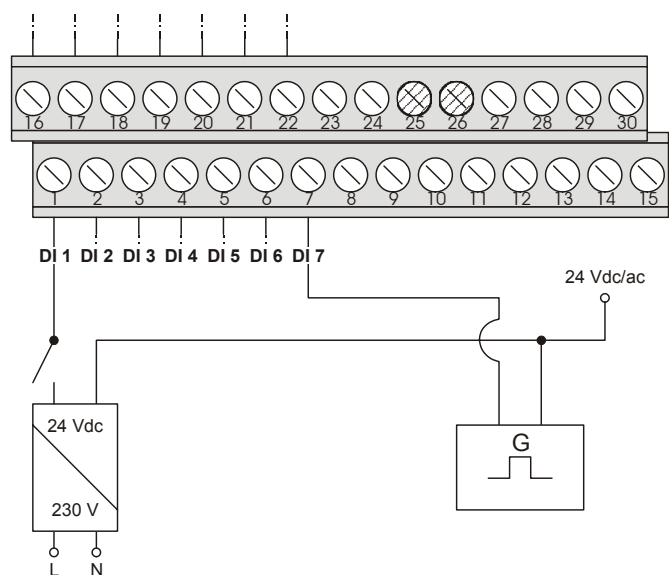
10k  $\Omega$

**Parameter requirements:**

If the digital inputs are used for normal digital or analog signals, the signals have to meet the static requirements stated in Table 15.

**Table 15. Static parameters of digital inputs**

| contact position | NO/NC attribute | logical status |
|------------------|-----------------|----------------|
| open             | NO              | 0              |
| closed           | NO              | 1              |
| open             | NC              | 1              |
| closed           | NC              | 0              |

**Connection Examples****Fig. 22. DI's, sensor connections (example)****Analog Outputs****Technical Description**

Analog outputs can be used, for example, to operate valve or damper actuators. The characteristic curves for these actuators can be defined via MMI; see PANTHER - User Guide (EN2Z-0908GE51).

Each analog output can also be used as a digital output.

**Technical Specification****Analog Output Ratings**

The CLTG38L01, the CLTG38L11, and the CLTG38EXP01 feature four analog outputs as listed in Table 16.

**Table 16. Number of AO's and terminals (by version)**

| version     | no. of AO's | no. of terminals |
|-------------|-------------|------------------|
| CLTG38L01   | 4           | 5                |
| CLTG38L11   | 4           | 5                |
| CLTG38EXP01 | 4           | 5                |

The analog outputs have an FIO (Field Input Output) cycle time of 1 second.

- Output voltage: 0...10 V (max. 11 V) or 2...10 V.

The analog outputs are not galvanically separated.

- Max. output current (sink/source): -0.5 mA / +1 mA.
- Resolution: 8 bit.
- Accuracy:  $\pm 150$  mV +  $\pm 1$  LSB (Least Significant Bit)
- Zero-point:  $\pm 150$  mV +  $\pm 1$  LSB.
- Min. voltage step (LSB): 0.043 V.

The outputs are protected against over-voltage up to 24 Vac.

- Reset / watchdog position: 0%.
- Refresh cycle: 1 second.

## Digital Outputs

### Technical Description

The digital outputs are switched by a relay which can be connected directly to an external load.

### Technical Specification

#### Digital Output Ratings

The CLTG38L01, the CLTG38L11, and the CLTG38EXP01 feature digital outputs – functioning as changeover relays (CO's) and normally-open relays (NO's) – as listed in Table 17.

**Table 17. Number of DO's and terminals (by version)**

| version     | no. of DO's |      | no. of terminals |
|-------------|-------------|------|------------------|
|             | CO's        | NO's |                  |
| CLTG38L01   | 3           | 9    | 21               |
| CLTG38L11   | 3           | 9    | 21               |
| CLTG38EXP01 | 3           | 9    | 21               |

The digital outputs have an FIO (Field Input Output) cycle time of  $\leq 250$  msec.

- Output stage: relays (one CO per terminal block).
- Power failure position: inactive.
- Reset / watchdog position: inactive.
- Max. voltage: 230 Vac. The digital output terminals can switch 24 or 230 Vac or Vdc.



## CAUTION

It is not allowed to mix the voltages on a digital output terminal block!

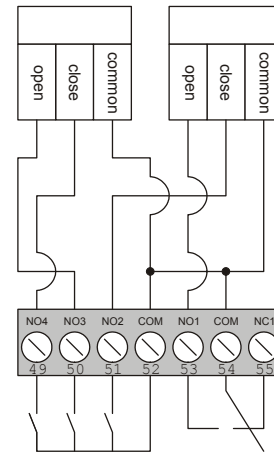
- Max. switch frequency:  $< 2$  Hz.
- Min. ON/OFF time  $\geq 250$  msec.
- Output strength: 2 A / 230 Vac ( $\cos \phi = 1.0$ ).
- Total device (TIGER): max. 12 A.
- Lifetime (electrical): 500000 cycles (2 A), the unit lifetime (as measured in the no. of switching cycles) increases when current  $< 2$  A.
- Lifetime (mechanical):  $30 \times 10^6$  cycles.

The online point attribute "Normally Open / Normally Closed" (NO/NC) defines the relation between the physical state (relay on/off) and its logical status. See Table 18.

**Table 18. Digital output parameters**

| relay ON/OFF | NO/NC attribute | logical status |
|--------------|-----------------|----------------|
| ON           | NO              | 1              |
| OFF          | NO              | 0              |
| ON           | NC              | 0              |
| OFF          | NC              | 1              |

### Connection Examples



**Fig. 23. DO's, direct connection of 3-position actuators (example)**

### Power Supply

The TIGER is powered by an external transformer.

#### Transformer requirements for one TIGER:

|         |                          |
|---------|--------------------------|
| Voltage | 24 Vac $\pm 20\%$        |
| Power   | 15 VA, if fully equipped |

If capable of providing sufficient power, the transformer, already installed in the cabinet, can be used to supply several controllers, communication devices, or peripherals (actuators, etc.).

### CRT-Series

**Table 19. No. of TIGER controllers (inc. CLTG38EXP01 expansion boards) connected to one transformer**

| transformer | no. of controllers |
|-------------|--------------------|
| CRT 2       | 3                  |
| CRT 6       | 8                  |
| CRT 12      | 15                 |

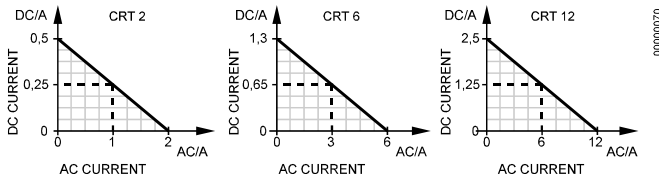
Use a quick-acting backup fuse 10 A (or automatic H16 or L16) to protect the transformer primary side. On the primary side of the CRT 2, there is a fusible output of type M 0.315 A (T) 250 V for the purpose of fine fusing.

**Table 20. Overview of CRT Series AC/DC current**

| transformer | max. AC current | max. DC current |
|-------------|-----------------|-----------------|
| CRT 2       | 2 A             | 0.5 A = 500 mA  |
| CRT 6       | 6 A             | 1.3 A = 1300 mA |
| CRT 12      | 12 A            | 2.5 A = 2500 mA |

**Table 21. Overview of CRT Series AC/DC current**

| transformer | max. AC current | max. DC current |
|-------------|-----------------|-----------------|
| CRT 2       | 2 A             | 0.5 A = 500 mA  |
| CRT 6       | 6 A             | 1.3 A = 1300 mA |
| CRT 12      | 12 A            | 2.5 A = 2500 mA |

**Fig. 24. AC/DC current graphs**

## 1450 Series

All transformers of the 1450 series are designed for 50/60 Hz AC and have insulated accessory outputs. The transformers include built-in fuses, line transient/surge protection and AC convenience outlets and meet NEC class 2 requirements.

**Table 22. 1450 Series transformers**

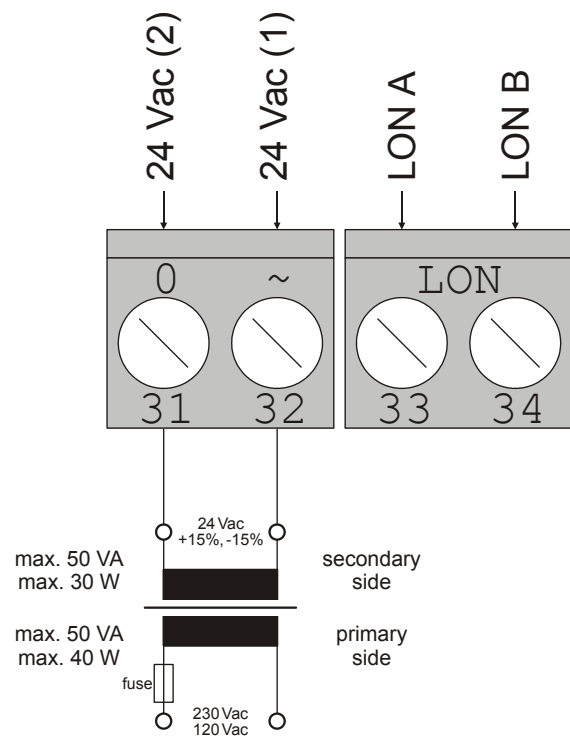
| part #<br>1450 7287 | primary side | secondary side                                         |
|---------------------|--------------|--------------------------------------------------------|
| -001                | 120 Vac      | 24 Vac, 50 VA                                          |
| -002                | 120 Vac      | 2 x 24 Vac, 40 VA and 100 VA from separate transformer |
| -003                | 120 Vac      | 24 Vac, 100 VA and 24 Vdc 600 mA                       |
| -004                | 240/220 Vac  | 24 Vac, 50 VA                                          |
| -005                | 240/220 Vac  | 2 x 24 Vac, 40 VA and 100 VA from separate transformer |
| -006                | 240/220 Vac  | 24 Vac, 100 VA and 24 Vdc, 600 mA                      |

## Standard Transformers

Standard commercially available transformers must fulfill the following specifications:

**Table 23. Requirements for standard transformers**

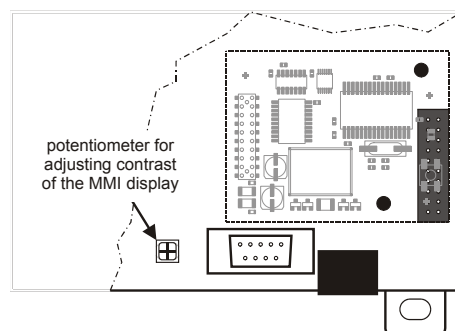
| output voltage       | impedance          | AC current |
|----------------------|--------------------|------------|
| 24.5 Vac to 25.5 Vac | $\leq 1.15 \Omega$ | max. 2 A   |
| 24.5 Vac to 25.5 Vac | $\leq 0.40 \Omega$ | max. 6 A   |
| 24.5 Vac to 25.5 Vac | $\leq 0.17 \Omega$ | max. 12 A  |

**Fig. 25. Connecting the power supply**

## Adjusting the MMI Display Contrast

To adjust the display contrast of the MMI, proceed as follows:

1. Read the complete section "Before Working" carefully.
2. Without disconnecting the controller's power supply, unplug the digital output terminal block connectors located at the rear of the controller
3. Raise the controller's housing cover.
4. Using a slotted or cross-tip screwdriver, turn the potentiometer, thus adjusting the contrast to the desired level. A maximum of one half-turn is possible.

**Fig. 26. Adjusting the display contrast**

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