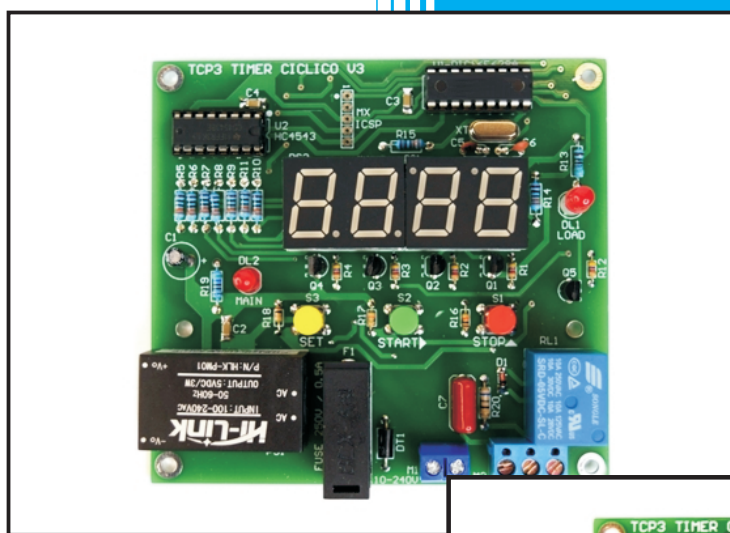




## OWNER's MANUAL

# TCP3 - PROGRAMMABLE CYCLIC TIMER



## TCP3

### Programmable Cyclic Timer V3

based on PIC16F628A

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**AVVERTENZE DI SICUREZZA E CONDIZIONI D'USO (SCHEDA NUDA):** Questo manuale si riferisce a una scheda elettronica fornita esclusivamente in versione nuda, priva di contenitore e di isolamento esterno (open-frame). Si tratta di una realizzazione artigianale in pezzo unico o tiratura limitata, priva di certificazione e marcatura CE, da considerarsi come sub-assemblaggio o modulo sperimentale destinato unicamente all'integrazione in altri apparati o all'uso in ambiente di laboratorio da parte di personale qualificato.

**PERICOLO ELETTRICO:** I collegamenti e l'utilizzo del modulo descritti in questo manuale possono comportare tensioni pericolose e il rischio di folgorazione, cortocircuito o incendio. L'acquirente/utente è l'unico responsabile del corretto isolamento elettrico del circuito, del suo montaggio in un contenitore idoneo a norma di legge, del rispetto delle tensioni d'esercizio e dell'inserimento di adeguate protezioni da sovracorrente (fusibili). L'autore declina ogni responsabilità civile e penale per malfunzionamenti, lesioni o qualsiasi danno diretto o indiretto a cose o persone derivante dall'uso, dal cablaggio o dall'installazione della scheda stessa.

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# FEATURES / CARATTERISTICHE

## FEATURES

- Input Voltage: **100 ~ 240 Vac**
- Management with **PIC** Microcontroller
- **Quartz** accuracy
- **CountDown** Timer
- **Easy** to use
- 3 control buttons: **START STOP** and **SET**
- **Time ON** and **Time OFF** time can be set independently from **1sec.** to **99min. 59sec.**
- Setting for use such as **normal ON / OFF timer** (no Cyclic)
- All times and settings are **stored** in the controller's EEprom, retrieved during Timer's Power On
- **Red LED**: Relay's status (**LOAD ON**)
- **Red LED on board**: Circuit with AT (**MAIN**)
- Installed **10A/250V Relay** with 3 way screw Terminal Block (**NO - Com - NC**)
- Displaying: **4 x Display** 7-segment (H. digit 0.52" / 13 mm.)
- Can be used for **exposure box**, **photography dark room**, as a **light timer** or **scientific experiment**
- Board dimensions: **100 x 76 mm.**
- Possibility to activate the Relay manually

## CARATTERISTICHE

- Tensione in ingresso: **100 ~ 240 Vca**
- Gestione a **Microcontrollore PIC**
- Precisione al **Quarzo**
- Conteggio tipo **Count-Down** (conto alla rovescia)
- **Facile** da utilizzare
- 3 pulsanti di comando: **START STOP** e **SET**
- **Tempo di ON** e **Tempo di OFF** indipendenti e programmabili da **1sec.** a **99min. 59sec.**
- Possibilità di utilizzo come normale **Timer ON/OFF** (non ciclico)
- **Memorizzazione** e richiamo automatico all'accensione dei valori programmati dall'utente
- **LED rosso**: visualizza lo stato relè (**LOAD ON**)
- **LED rosso on board**: segnala la presenza dell'Alta Tensione sulla scheda (**POWER ON / MAIN**)
- **Uscita relè**: **AC250V 10A** su morsettiera a vite (**NC - Com - NO**)
- Visualizzazione: **4 x Display** a 7-segmenti (H. digit 0.52" / 13 mm.)
- Può essere utilizzato anche per **bromografi**, in **camera oscura**, etc.
- Dimensioni scheda: **100 x 76 mm.**
- Possibilità di attivare il Relè manualmente

# INSTRUCTIONS

The **TCP3** Timer manages times from **1 second** up to **100 minutes** (displayed in **mm:ss**) and the values to be programmed are in steps 1 second.

The Timer can be set as **CYCLIC** (require two time programming) or as **NORMAL** (require just one time programming).

- If the Timer is set as **CYCLIC mode**, after Power On, the countdown starts automatically by the **OFF TIME** (Relay deactivated): once the OFF TIME has elapsed, the relay is activated and remains activated for the entire **ON TIME**. The cycle repeats indefinitely or until the **STOP** button is pressed.

- If the Timer is set as **NORMAL mode**, to start it press the **START** button. Once the countdown is finished, the Timer returns to the Ready state.

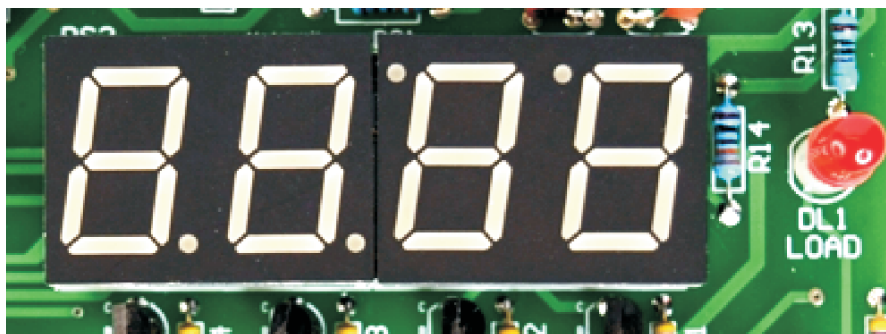
**NOTE** - During a **blackout**, the Timer switches off completely and the relay deactivates. If the Timer was set in **CYCLIC mode**, when the main is restored, the Timer restarts automatically by the **OFF TIME**.

## DEFAULT VALUES

When Power On, the display always shows the last values programmed by the user.  
If it has never been used, after Power On the Timer is set to the following default values:

**01:00** for **ON TIME** (1 minute ACTIVE Relay)  
**30:00** for **OFF TIME** (30 minutes NO ACTIVE Relay, only for CYCLIC mode)  
**0** for the **Operating Mode** (**0** = CYCLIC, **1** = NORMAL)

**NOTE** - As already mentioned, the Timer starts automatically when Power On or after a black out restored ONLY if it was set as a **CYCLIC Mode**. For more information, see the section **CHOOSING THE OPERATING MODE**.



## THE COMMAND BUTTONS

### START / RESTART

This button is for starts the Timer.

- In **CYCLIC mode**, when the **START** button is pressed, the Timer starts with the **OFF TIME** (the relay is deactivated): at the end of the OFF TIME, the relay is activated and remains activated for the entire **ON TIME**. The cycle repeats indefinitely or until the **STOP** button is pressed. The **START** button is also useful for **restarting the Timer** after a STOP.
- In **NORMAL Mode**, when the **START** button is pressed, the Timer starts with the **ON TIME** (the relay is activated): when the ON TIME is elapsed, the relay is deactivated and the Timer returns to the Ready state. If the **STOP** button is pressed during the countdown, the Timer pauses and the relay is deactivated: to reactivate the Timer, press the **START** button.

### STOP / RESET

This button, pressed once, momentarily stops the timer counting and deactivates the relay. To restart the count of the Timer, press the **START** button otherwise a second press of the **STOP** button, definitively stops the count and prepares the Timer ready to be started again (Ready).

*NOTE - During a PAUSE (after pressing the **STOP** button once), the two separator dots remain off light on the display.*

### SET (Programming)

Press this button to **enter in PROGRAMMING** and set the **ON TIME**. In CYCLIC mode, press this button a second time to switch to the **OFF TIME programming**. To exit the PROGRAMMING, press still the **SET** button.

*NOTE - The entry into PROGRAMMING is possible only when the Timer is Ready and NOT in pause. If the Timer does not enter PROGRAMMING, try pressing the **STOP** button to completely stops the Timer and bring it back to the Ready state.*

*During the ON TIME programming, the upper separator dot is lit. During the OFF TIME programming, the lower separator dot is lit.*

*The OFF TIME is available only if the Timer is set in CYCLIC mode (see the section SELECTING THE OPERATING MODE).*

- **Select the DISPLAY and the values to be programmed.**

The **START** and **STOP** buttons have a double function: when entering the PROGRAMMING mode, these buttons allow you to select a single display and enter the value to be programmed:

► button (**START**): each time this button is pressed, one display at a time lights up, from left to right. The lit display is the one in which the digit to be programmed will be entered. After the fourth display, a further press of the button restarts the sequence from the first display and so on.

▲ button (**STOP**): each time this button is pressed, a value from **0** to **9** is entered on the selected display: after digit **9**, a further press of the button restarts the sequence of numbers from **0** and so on.

## THE DISPLAY

While the Timer is running, one or both of the red dots may light up on the display. All possible situations are described in the following list.

### PUNTINI ACCESI FISSI (*Timer pronto*)

They indicate that the **Timer is ready** to be started (by pressing the **START** button) or ready to be programmed (by pressing the **SET** button).



### DOTS ON FLASHING (*Timer running*)

They indicate that the **Timer is running** and the flashing of the dots marks the seconds. During the count, it is possible to **PAUSE** the Timer (and deactivate the relay) by pressing the **STOP** button.

The **RED LED** on indicates that the relay is activated.



### BOTH DOTS OFF (*Timer paused*)

If the STOP button is pressed the count, **the Timer pauses** and the separator dots remain off: in this situation, pressing the **START** button restarts the count otherwise pressing the **STOP** button a second time, the count stops definitively and returns in the state of Timer Ready.



### UPPER DOT LIT (*ON TIME programming*)

When the Timer is ready and IS NOT PAUSED, you can enter the programming phase by pressing the **SET** button: the display appears as shown in the figure and the **upper dot lit** indicates that the **ON TIME** is being programmed (Activation time of the relay).

Press the ► button (**START**) to select the single display or press the ▲ button (**STOP**) to insert to the selected display a digit from 0 to 9.



### LOWER DOT LIT (*OFF TIME programming*)

In **CYCLIC mode**, by pressing the **SET** button a second time, you pass to the programming of the **OFF TIME**, indicated by the lighting of the lower dot.

Press the ► button (**START**) to select the single display or press the ▲ button (**STOP**) to insert to the selected display a digit from 0 to 9.

By pressing the **SET** button still, on exit the Programming mode and return to the Timer ready state.



## SELECTING THE OPERATING MODE

The TCP3 Timer can work both in **CYCLIC** mode (automatic repetition of times) and in **NORMAL** mode.

To change the operating mode, the Timer must be in the Ready state and NOT paused: then, while holding down the **STOP** button, press the **SET** button at the same time and release both. Each time this procedure is carried out, the display briefly shows the number "0" or "1" depending on the operating mode selected as illustrated in the following figures (by default, the Timer is set to **CYCLIC**).



*The Timer will work in **CYCLIC** mode*



*The Timer will work in **NORMAL** mode*

## THE LEDs OF TIMER

There are TWO LED in the Timer:

- **DL1 - LOAD** (near to the display) turns on ONLY when the relay is activated (during the **ON TIME**).
- **DL2 - MAIN** (on/board) indicates that **the Timer is powered by the mains voltage** therefore a special attention required. During any intervention to the board, this light **MUST BE OFF** and the board **disconnected from the main**.

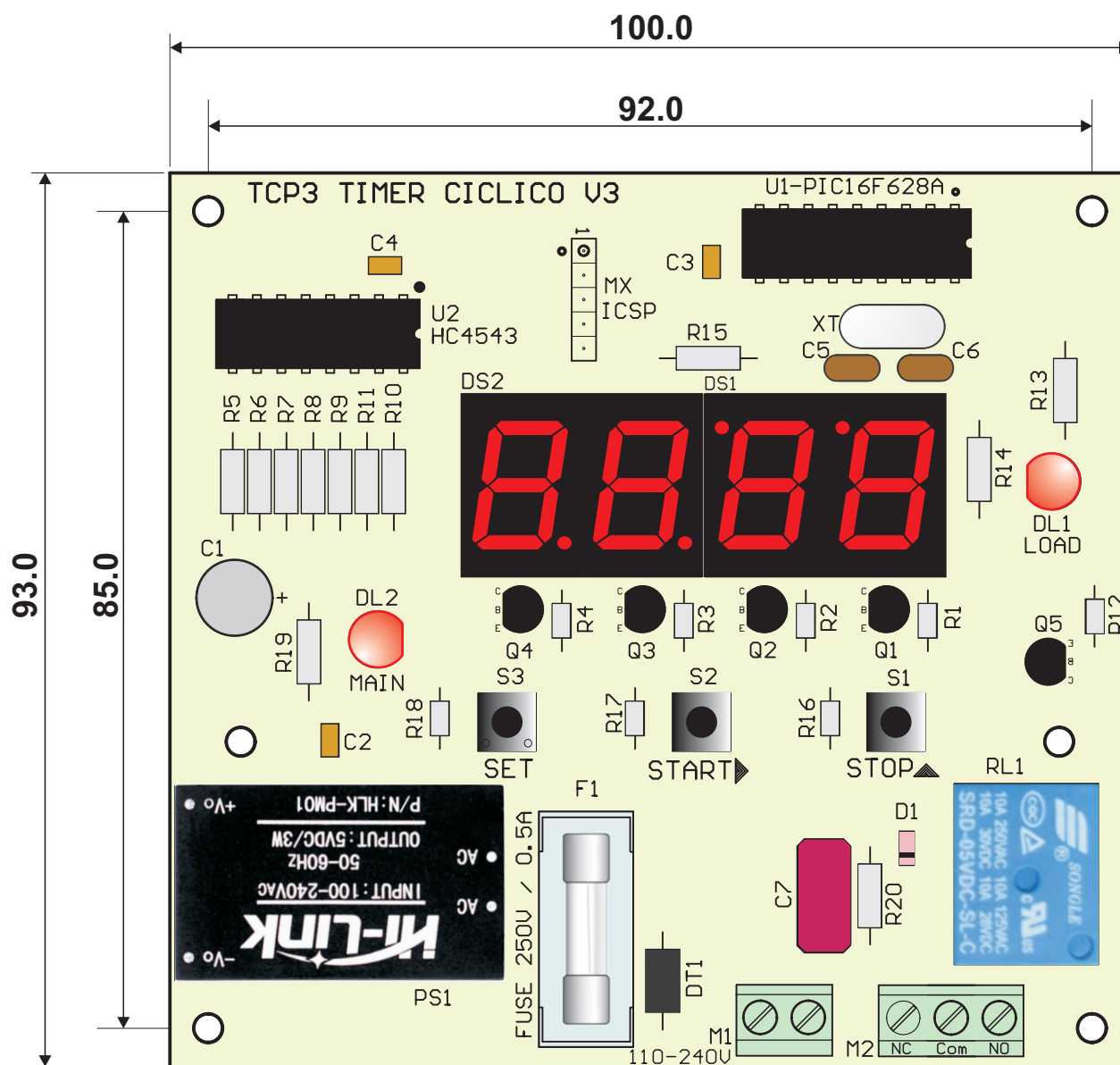
## MANUAL ACTIVATION of the RELAY

When the **Timer is Ready** (and not in PAUSE), it is possible to manually activate the relay, completely ignoring the programmed values.

To do this, press and hold the **START** button for at least 2 seconds, after which the relay is activated.

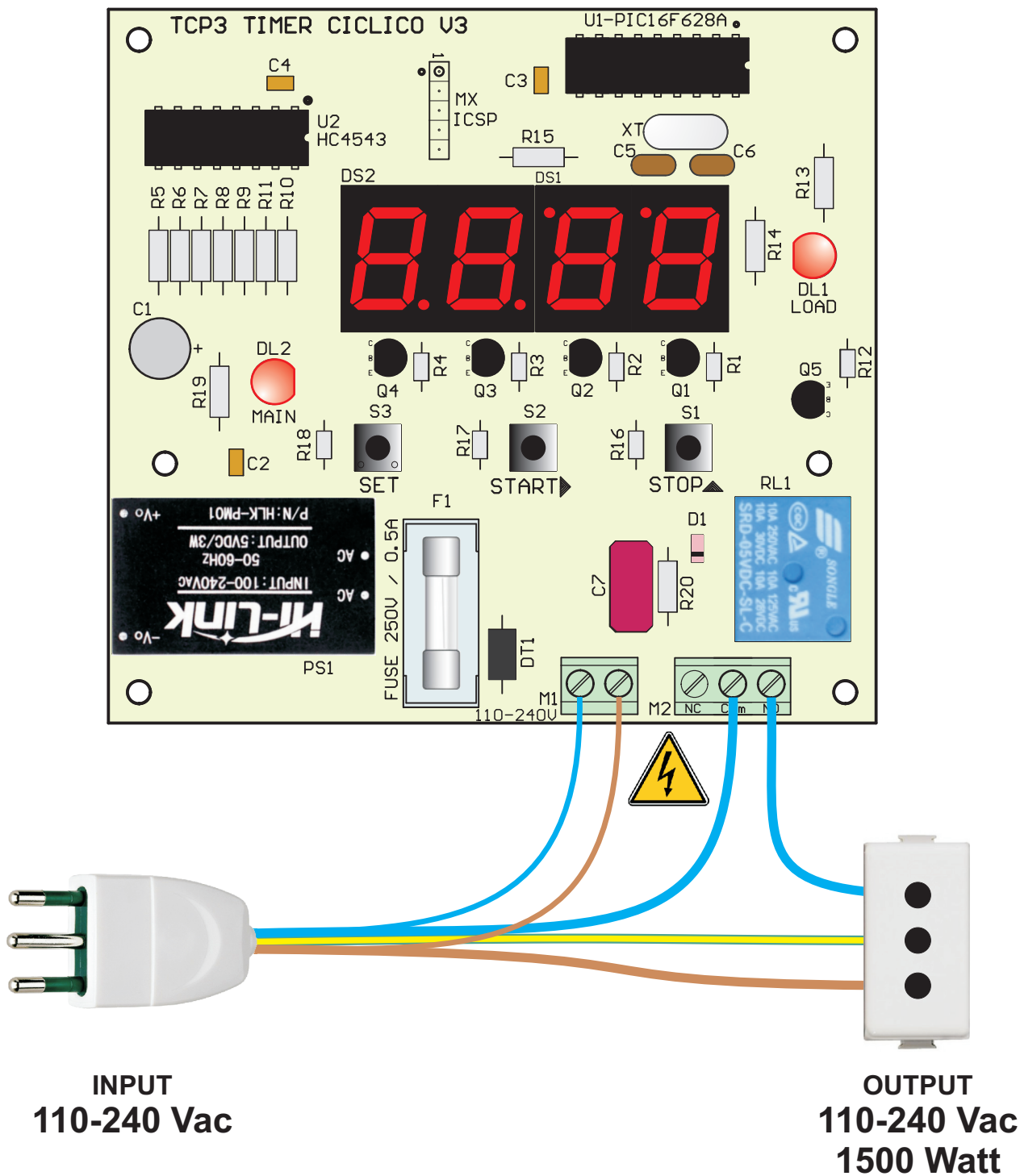
To deactivate the relay, press the **STOP** button.

# BOARD DIMENSIONS / DIMENSIONI SCHEDA



## CONNECTIONS / COLLEGAMENTI

**Installing the PCB in the bottom of the box or to the wall (All components to the Top)**  
**Montaggio scheda su fondo contenitore oppure a muro (Tutti i componenti sul lato Top)**



**WARNING ! ELECTRICAL EQUIPMENT POWERED BY MAINS VOLTAGE.**

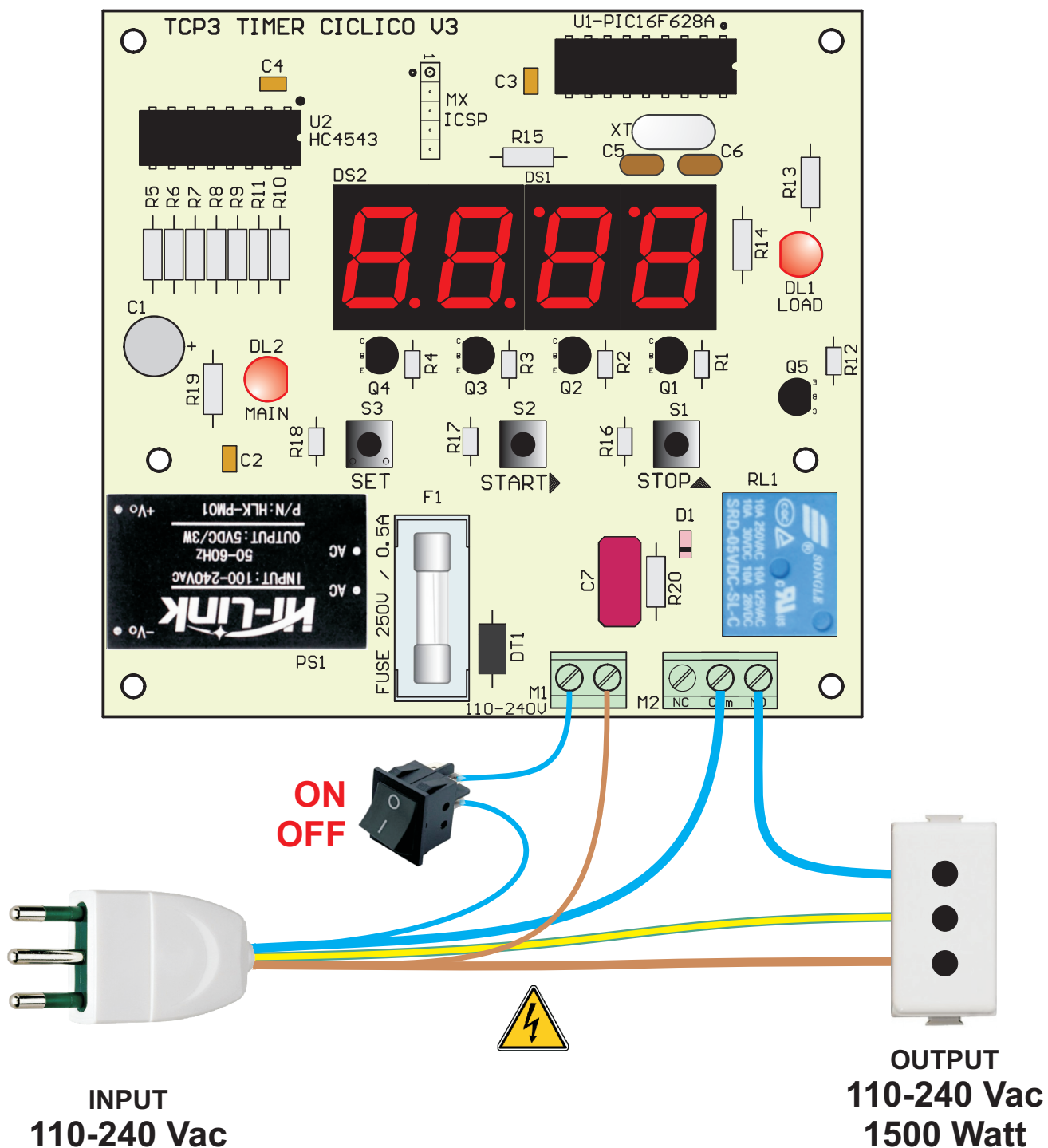
Any connection or intervention on the board must be carried out **ONLY** and **EXCLUSIVELY** by qualified staff.

**ATTENZIONE ! APPARECCHIATURA SOTTO TENSIONE DI RETE.**

Qualsiasi collegamento o intervento sulla scheda deve essere eseguito **SOLO** ed **ESCLUSIVAMENTE** da personale qualificato.

# CONNECTIONS / COLLEGAMENTI

How to connect a ON/OFF switch  
*Collegamento di un interruttore ON/OFF*



**WARNING ! ELECTRICAL EQUIPMENT POWERED BY MAINS VOLTAGE.**

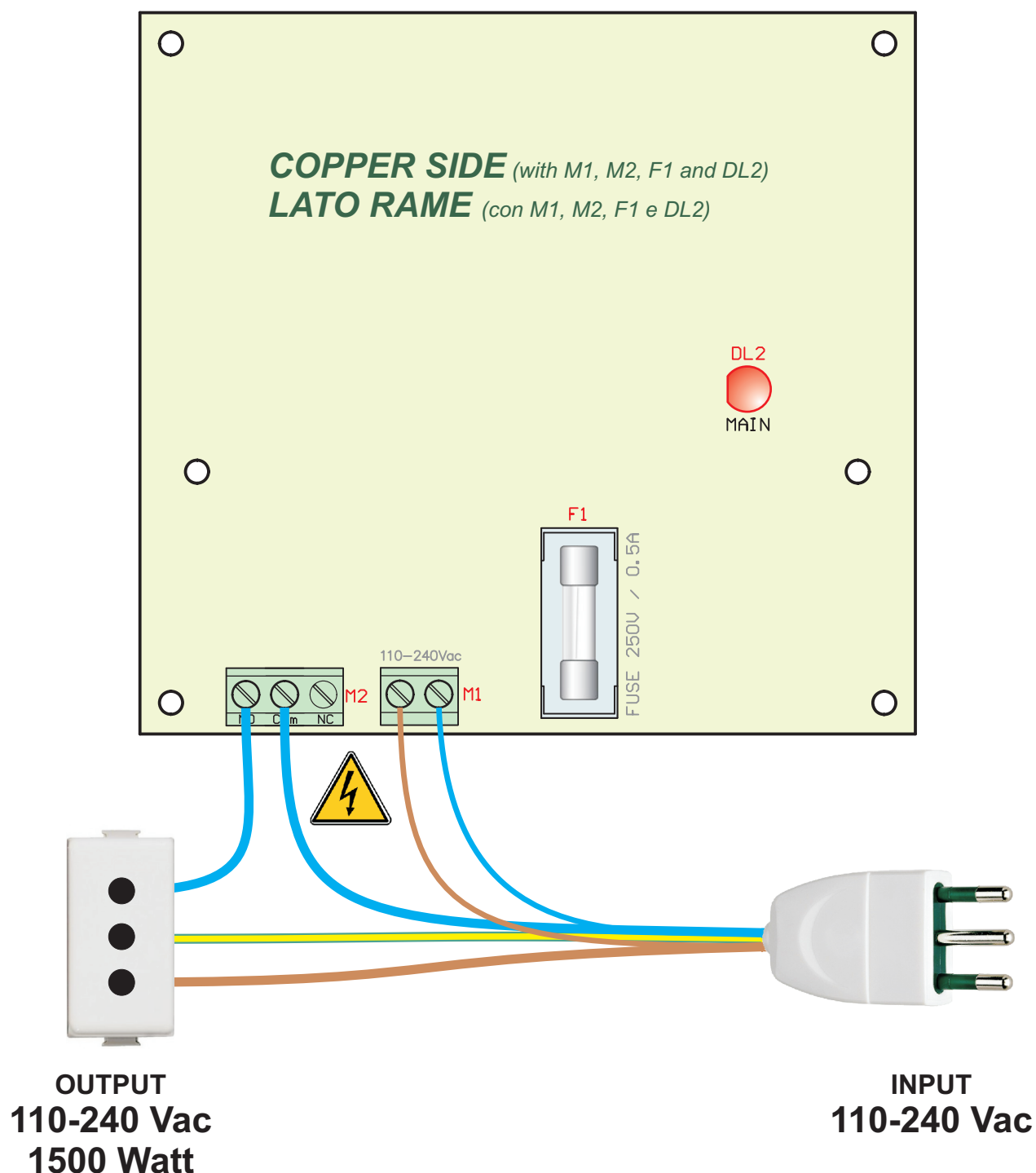
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# CONNECTIONS / COLLEGAMENTI

Installing the PCB on a control panel (M1, M2, F1 and DL2 in the Copper Side)  
*Montaggio scheda su pannello (M1, M2, F1 e DL2 saldati sul lato rame)*



**WARNING ! ELECTRICAL EQUIPMENT POWERED BY MAINS VOLTAGE.**

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**ATTENZIONE ! APPARECCHIATURA SOTTO TENSIONE DI RETE.**

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