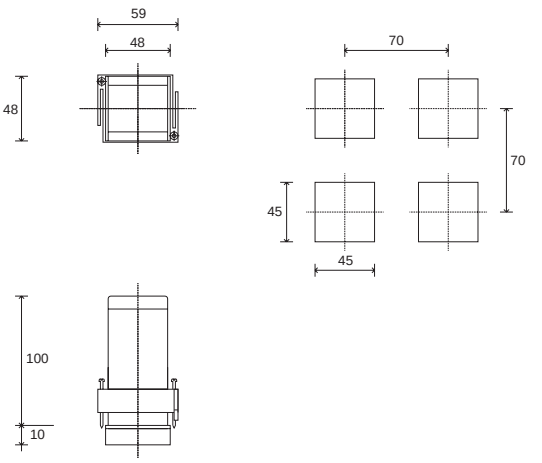
# 1 • INSTALLATION

## • Dimensions and cut-out; panel mounting




**Panel mounting.**
Faceplate dimensions: 48x48mm./1.89”x1.89” (1/16DIN); depth: 100mm/3.94”
Cut-out dimension: 45(+0.6/-0)x45(+0.6/-0)mm/1.77” (+0.02/ -0)x1.77”(+0.02/-0)”.
To attach the instrument, insert the two brackets in the housings on the top and bottom of the case and tighten with the screws. To mount two or more instruments in a row or column, use the clips and respect the following cut-out dimensions:
**Row**: Base (48 x n) -3, (1.89”x n) -0.11” Height 92 (+0.8/ -0) /3.62” (+0.03/ -0)
**Column**: Base 45 (+0.6/-0)1.77”(+0.02/-0) Height (96xn)-4/(3.78”xn)0.15”
where “n” is the number of instruments.
***CE MARKING***: The instrument conforms to the European Directives 2004/108/CE and 2006/95/CE with reference to the generic standards: **EN 61000-6-2** (immunity in industrial environment) **EN 61000-6-3** (emission in residential environment) **EN 61010-1** (safety).
***MAINTENANCE***: Repairs may be done only by trained and specialized personnel. Cut power to the instrument before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (trichloroethylene, gasoline, etc.). The use of such solvents will compromise the instrument’s mechanical reliability. Use a clean cloth moistened with ethyl alcohol or water to clean external plastic parts.
***TECHNICAL SERVICE***: GEFRAN has a technical service department. Defects deriving from any use not conforming to this manual are excluded from the warranty.

For correct installation, follow the instructions and warnings contained in this manual.

# 2 • TECHNICAL DATA

***INPUTS***

2 inputs (IN1, IN2) with start/stop or reset functions for timer or counter and counter input with maximum frequency of 100Hz.
**IN1**
Available from voltage-free contacts, open collector (24Vdc/1Ma) or control in Vac (same voltage as instrument).
**IN2**
Available only if IN1 is not in Vac with control from voltage-free contact or open collector (24Vdc/1mA) active when open or closed.

***OUTPUTS***

***RELAY***
5A/250Vac at cosφ=1 (3.5A at cosφ=0,4)
Spark suppression on NO contact.

***POWER SUPPLY***
110/220Vac ± 10%
120/240Vac ± 10%
24/48Vac ± 10%
24Vdc ± 10%
50/60Hz; 5VA max.

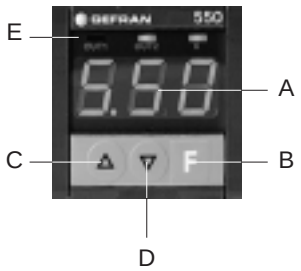
***AMBIENT CONDITIONS***

**Working temperature**: 0…50°C
**Storage temperature**: -20…70°C
**Relative humidity**: 20…85% non-condensing

***FUNCTION***
Timer/Counter functions are described below.

***WEIGHT***
240g

# 3 • FACEPLATE DESCRIPTION




**A Display**
Real value of current time/count (countdown).
In configuration phase, description of functions and/or parameters flashes alternately with value. Flashing of decimal point on right display indicates:
- the display/setting of time 2/count 2 is selected;
- time 2/count 2 is active.

**"EEP" alarm message**
This message indicates an EEPROM memory fault; if it persists, send the instrument back to the factory for repair.

**E LED signals**
The LEDs show the state of the two output relays (LED on = relay energized) - OUT1, OUT2.
The LEDs show the state of the Input 1 signal (timer input or input pulses to counter):
- LED K off (control inactive) corresponds to input open;
- LED K on (control active) corresponds to input closed.
With jumper S5 open and S6 closed, this state can be reversed (see configuration).

**CONTROLS**

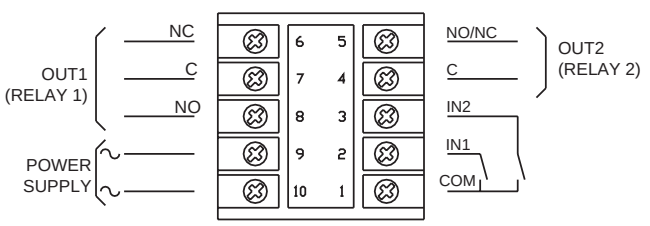
**B FUNCTION Button**
Used to access display/setting phase for Time 2/Count 2 setpoint (decimal point flashes on right display) and confirms modification of setpoints.

If the F button is not pushed to confirm a change, the new value will be stored automatically after 5 seconds.
Push the F button for 5 seconds to access the configuration phase. Scroll the
functions to be set by means of short pulses.
To quit configuration, push the F button again for 5 seconds.

*NOTE: It is not necessary to press the F key to display/modify Time 1/Count 1.*

**D/C Raise/Lower Buttons**
These are used to raise or lower the value displayed in order to change a setting or choose an option.
The speed of raising (lowering) is proportional to the time for which the key is pressed. The operation is not cyclical.
When the maximum (minimum) value is reached, the raise (lower) function causes an automatic scale change (or if configured other than standard, the function remains blocked in the selected scale).
In normal operation, Time 1/Count 1 (setpoint) can be changed directly. If no button is pushed for about 5 sec, the display returns to the current active time.
During the Configuration Phase, the raise (lower) button stops the alternating description/value display. The display shows the value to be displayed/modified for about 5 seconds.

# 4 • CONNECTIONS




**INPUTS**

**INPUT 1**
Digital input from mechanical contact or AC voltage (see order code) between terminals 1 and 2 with the following function:
- Timer Start/Stop or Start/Reset
- Counter input pulses. Voltage level for AC input is the same as required power supply.

**INPUT 2** (use only if INPUT is from mechanical contact)
Digital input from mechanical contact between terminals 1 and 3 with the following function:
- Timer reset
- Counter Start/Reset
- Frequency pulses from solid state sensor for revolution check
- Delay

Note: If both inputs are used, with one of two in AC voltage (24, 110 or 220Vac), you have to use an external AC/DC adapter (see connection diagram).

**OUTPUTS**:

Two relay outputs (5A/220Vac)

OUTPUT1
Available to terminals 8 (NO contact), 7 (common) and 6 (NC contact).

OUTPUT2
Available to terminals 5 and 4 (NO or NC contact) selectable with jumper to solder.

**POWER SUPPLY**

AC Voltage is applied to terminals 9 and 10 (110/220V selected with jumpers to solder).
Voltages available on request: 24Vdc/110/220/120/240/24/48Vac; Vac 50/60Hz ± 10%; 24Vdc, -10%+20%
With 24 Vdc, polarity is not critical. See Hardware Configuration.

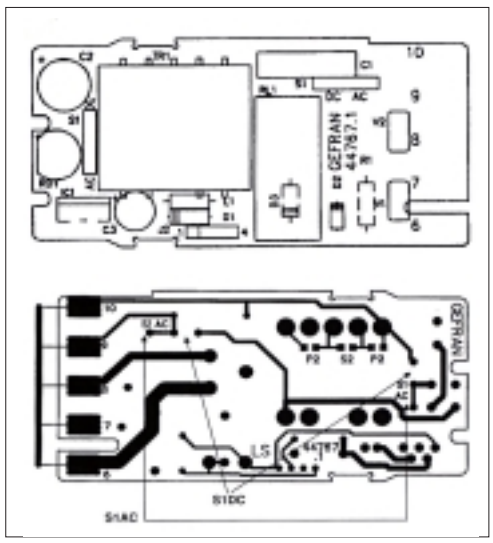
# 5 • HARDWARE CONFIGURATION

**Accessing the boards**
To remove the electronic parts from the case, open the extraction clips.

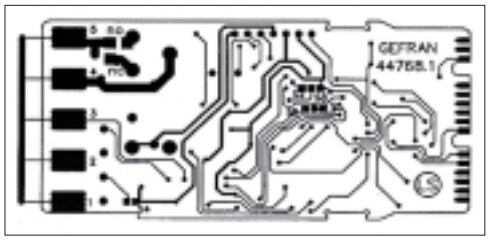
**Power board Fig. 1**
To select the supply voltage 110/220Vac (24/240Vac):
-110V (24/120V) - close the two jumpers marked P2 and open the jumper marked S2.
220V (48/240V) - close the jumper marked S2 and open the two jumpers marked P2.
To select AC/DC voltage: double jumper S1 (See Fig. 1 power board, solder side).
AC voltage: since this is the standard version, the two jumpers S1-AC are already on the printed circuit.
DC voltage: cut the two jumpers S1-AC and solder two jumpers in position S1-DC.

**CPU-inputs boards**
Hardware protection of configuration.
- Configuration disabled: close jumper S2 and remove jumper S3.
- Configuration enabled: close jumper S3 and remove jumper S2.
The standard version is supplied with configuration enabled.
Selection of relay R2 contact:
NO (normally open) / NC (normally closed).
NO: close NO jumper and remove NC jumper.
NC: close NC jumper and remove NO jumper.
The standard version is supplied with contact configured NO.

**POWER BOARD**




**CPU BOARD**




# 6 • PROGRAMMING

**Programming the TIMER:**
In normal operation, display **A** shows the real value of the active time (if Time 2 is active, the decimal point flashes on the right display).
The setpoints for Time 1 (and Time 2) are set by pressing the Raise/Lower buttons.
If the Timer is active, push the raise or lower button to recall the Time 1 setting, then use these buttons for a new setting. Select Time 2 with the **F** key.
The setting of Time 1 is immediate while Time 2 must be selected using the **F** key. When the setting has been made, press the **F** key to return to normal operation. If the **F** key + **raise** button are pressed simultaneously for about 3 sec, the instrument will display the software release.

**Programming the COUNTER:**
In normal operation, display **A** shows the real value of the active count (if count 2 is active, the decimal point flashes on the right display).
The setpoints for Count 1 Time 2/Count 2 are set by pressing the Raise/Lower buttons.
If the Counter is active, push the raise or lower button to recall the Count 1 setting, then use these buttons for a new setting. Select Time 2 / Count 2 with the **F** key. When the setting has been made, press the **F** key to return to normal operation.
Programming can be disabled by setting the software password to 1 (see Configuration phase, “Pro” function).

*Note: the maximum counting frequency is 100Hz*.

# 7 • SOFTWARE CONFIGURATION

**Introduction**
Configuration (CFG) is performed in a single procedure and consists of 9 settable parameters.
To access Configuration (if the hardware protection has been removed), press the F key until the CFG message appears on display A.
Then press the F key briefly to scroll the various functions (parameters) to be set so that the instrument can be configured as required. The display alternately shows the symbol and the value of the parameter.
The raise and lower buttons stop this alternation so that the value to be seen and/or changed remains on the display. Alternation resumes if no button is pushed for about 5 sec. Press the F key for about 5 seconds to quit the configuration procedure. The display returns to the “real” time/count.
Configuration parameters are visible only when applicable, depending on the type of operation selected.

**Configuration (CFG) procedure**
**Configuration (CFG)**
(accessible only with jumper S3 closed)
Pro/software protection level in range 0-2 according to table:

| LEVEL | DISPLAY ONLY | DISPLAY AND CHANGE |
|---|---|---|
| 0 | | SETPOINTS |
| 1 | SET POINTS | |
| 2 | MAX. PROTECTION | MAX. PROTECTION |

**NOTE**: At level 2, the instrument displays the time or current counter only (standard protection level: 0).

# 7 • SOFTWARE CONFIGURATION

**Typ**/instrument type:

**0** - single timer **1** - double timer
**2** - cyclical timer **3** - revolution check
**4** - delay timer **5** - (not used)
**6** - (not used) **7** - (not used)
**8** - "standard single counter **9** - non-cyclical "monostable" counter (with time T2) without block of count during T2.
**10** - non-cyclical "monostable" counter (with time T2) with block of count during T2.
**11** - cyclical "monostable" counter (with time T2) without block of count during T2.
**12** - cyclical "monostable" counter (with time T2) with block of count during T2.
**13** - non-cyclical double counter
**14** - cyclical double counter

**out**/output function.
Operating modes in range 1÷9

**Out=1** Delay at energizing of single relay:
Relay R1 energizes at end of time T1.
- In double time and
- cyclical versions,
relay de-energizes at end of time T2.

**Out=2** 2 relays: R1 delayed at energizing - R2 instantaneous
R1 - same as Out=1 R2 energizes instantaneously at close of contact IN1 and de-energizes at opening.

**Out=3** 2 relays in phase:
R1 same as Out=1 R2 same as R1

**Out=4** 2 relays in opposition:
R1 - delayed at energizing - R2 - delayed at de-energizing
R1 - same as Out=1
R2 - energizes during timing and de-energizes when time T1 has elapsed
- In double time and
- cyclical versions,
R2 remains de-energized for duration of time T2, then re-energizes.

**Out=5** 2 relays, double time
R1 - same as Out=1
R2 - energizes at end of total time T1+T2 with relay R1 de-energized

**Out=6** 2 relays, double time
R1 - energizes at end of time T1 (same as Out=1; does not de-energize at end of time T2)
R2 - energizes at end of total time T1+T2

**Out=7** Not used

**Out=8** Revolution check
2 relays, 2 concurrent times, 2 limits T1 and T2 with T1, T2
Measures time between 2 consecutive pulses of input signal IN.2
Timers T1 and T2 start (countdown) at each rise front of the IN.2 signal.
If interval t between two pulses is greater than T1, relay R1 energizes.
R1 stays energized as long as this (cyclically checked) situation persists.
R1 de-energizes as soon as t<T1.
If interval t between two pulses is less than T2, relay R2 energizes. R2 stays energized as long as this (cyclically checked) situation persists.
R2 de-energizes as soon as t>T2. T2<t<T1- for normal speed (frequency) (within set limits)
t>T1- for low speed (frequency) (below set limit)
t>T2- for high speed (frequency) (above set limit)

**Out=9** Control signal delay. Single relay, single timer.
The timer starts and restarts on the 2 change fronts of the control signal.
The timer starts when the IN2 signal switches from OFF to ON; the relay energizes at the end of time T and the timer is reset. The timer restarts when the IN2 signal switches from ON to OFF; the relay de-energizes at the end of time T. The cycle is repetitive and follows the IN2 signal.
For correct operation, the IN2 signal ON time must exceed delay time T.

**In.2**/input 2 digital function
0 - no function 1 - reset timer

**LoG**./Logic for digital input IN2 / Enables automatic change of time scales (only for scales in seconds).

| LoG | IN.2 | Scale change |
|---|---|---|
| 0 | Active in closing | Automatic |
| 1 | Active in opening | Automatic |
| 2 | Active in closing | Blocked |
| 3 | Active in opening | Blocked |

Note: state of first input is defined by means of jumper:
S5 closed, S6 open for IN1 active in closing
S5 open, S6 closed for IN1 active in opening

# 7 • SOFTWARE CONFIGURATION

**Sc.1/selection of Time 1 scale**
0 - seconds (0.00-9.99)
1 - seconds (00.0-99.9)
2 - seconds (000-999)
3 - minutes/seconds (0.00-9.59)
4 - hours/minutes (0.00-9.59)

**Sc.2/ selection of Time 2 scale**
0 - seconds (0 00-9.99)
1 - seconds (00 0-99 9)
2 - seconds (000-999)
3 - minutes/seconds (0.00-9 59)
4 - hours/minutes (0 00-9.59)

**Ps.1/ selection of Count 1 prescaler factor**
O - count
1 - count: 2
2 - count: 10
3 - count: 100
4 - count x 2

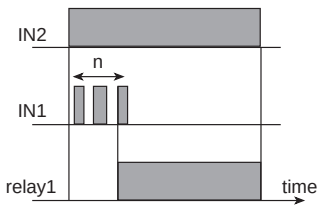
**Ps.2/ selection of Count 2 prescaler factor**
O - count: I
I - count: 2
2 - count: 10
3 - count: 100
4 - count x 2

# 8 • OPERATION

### Standard counter

Countdown begins at set value n(=SP1), and continues to zero. Counts pulses on IN1 if IN2 signal is present. Relay 1 energizes when zero is reached and de-energizes when IN2 signal is removed. Relay 2 function depends on OUT configuration.

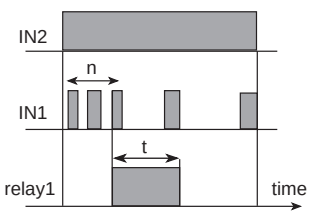
typ = 8
out = see note (**)
(*) CP-U1
in2 = 2




### Non-cyclical monostable counter

Countdown begins at set value n(=SP1). Counts pulses on IN1 if IN2 signal is present. Countdown does not stop when zero is reached, but continues with negative values. Relay 1 energizes when zero is reached and remains energized for time t (=SP2). Relay 2 function depends on OUT configuration.

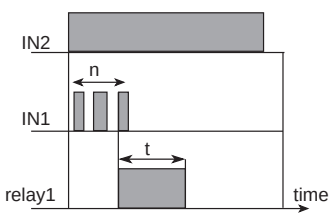
typ = 9
out = see note (**)
in 2 = 2




### Non-cyclical monostable counter with count block

Countdown begins at set value n(=SP1), and continues to zero. Counts pulses on IN1 if IN2 signal is present. Relay 1 energizes when zero is reached and remains energized for time t (=SP2). Relay 2 function depends on OUT configuration

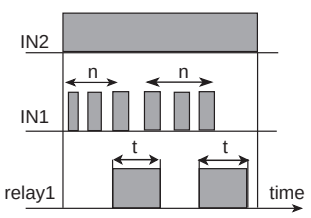
typ = 10
out = see note (**)
in2 = 2




### Cyclical monostable counter

Countdown begins at set value n(=SP1) and continues to zero. Counts pulses on IN1 if IN2 signal is present. When zero is reached, restarts immediately from beginning. Relay 1 energizes when zero is reached and remains energized for time t (=SP2).

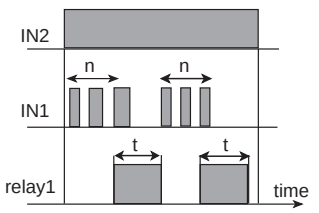
typ = 11
out = see note (**)
(*) CP-U2
in2 = 2




### Cyclical monostable counter with count block

Countdown begins at set value n(=SP1), and continues to zero. Counts pulses on IN1 if IN2 signal is present. Relay 1 energizes when zero is reached and remains energized for time t (=SP2), after which it restarts from the beginning.

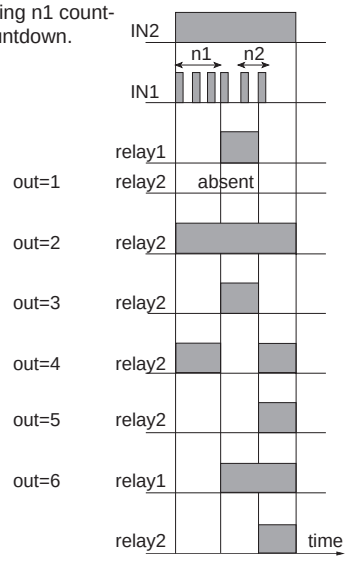
typ = 12
out = see note (**)
(*) CP-U3
in2 = 2




### Non-cyclical double counter

Countdown begins at set value n1(=SP1). When zero is reached, n2(=SP2) begins countdown to zero and then stops. Relay 1 is de-energized during n1 countdown and energized during n2 countdown.

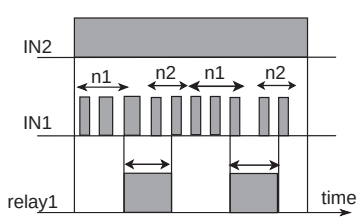
typ = 13
out = 1÷6
in2 = 2




### Cyclical double counter

Countdown begins at set value n1(=SP1). When zero is reached, n2(=SP2) begins countdown.
When zero is reached again, n1 begins countdown. Relay 1 is de-energized during n1 countdown and energized during n2 countdown.

typ = 14
out = see note (**)
in2 = 2

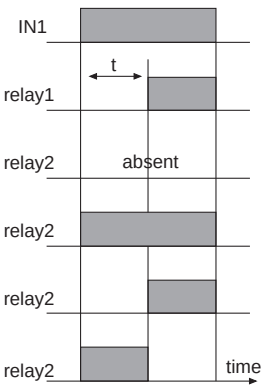



***NOTE:***
(*) Gefran instruments replaced by model described
(**) out = 1 relay 2 absent, out = 2 relay 2 repeats input signal, out = 3 relay 2 repeats relay 1, out = 4 relay 2 opposed relay 1

### Non-cyclical single timer without reset

Timing begins with IN1 signal.
Relay energizes at end of time t(=SP1) and de-energizes when IN1 signal is removed. Relay 2 depends on OUT configuration.

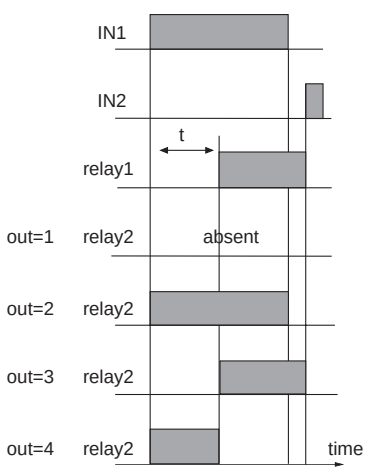
typ = 0
out = 1÷4
in2 = 0




### Non-cyclical single timer with reset

Timing is active if IN1 signal is present.
Relay 1 energizes at end of time t(=SP1) and de-energizes with IN2 (reset) signal. Relay 2 depends on OUT configuration.

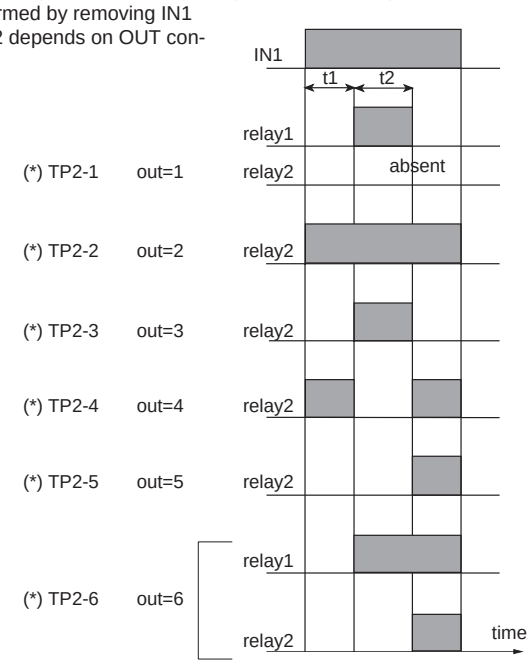
typ = 0
out = 1÷4
in2 = 1




### Non-cyclical double timer without reset

Timing is active if IN1 signal is present Relay 1 is de-energized for time t1(=SP1) and energized for time t2(=SP2), then rests except for Out=6.
Reset is performed by removing IN1 signal. Relay 2 depends on OUT configuration.

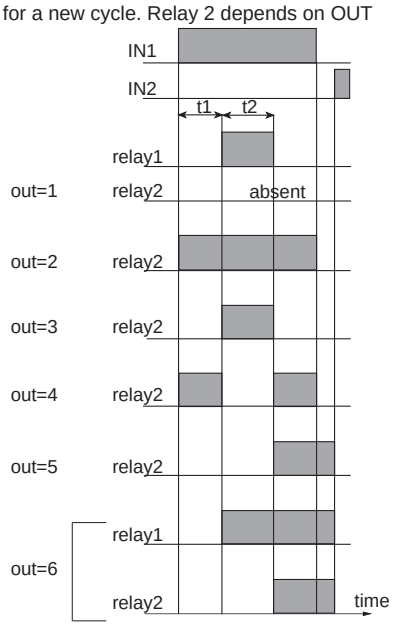
typ = 1
out = 1÷6
in2 = 0




### Non-cyclical double timer with reset

Timing begins with IN1 signal. Relay 1 is de-energized for time t1(=SP1) and energized for time t2(=SP2), then rests except for Out=6.
IN2 (reset) signal is required for a new cycle. Relay 2 depends on OUT configuration.

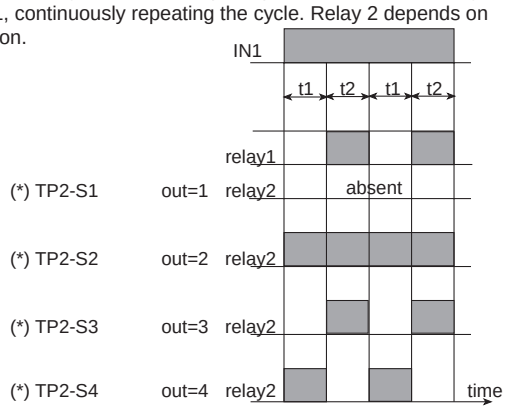
typ = 1
out = 1÷6
in2 = 1




### Cyclical double timer

Timing is active if IN1 signal is present. Relay 1 is de-energized during time t1(=SP1) and energizes for time t2(SP=2), after which it de-energizes to restart time t1, continuously repeating the cycle. Relay 2 depends on OUT configuration.

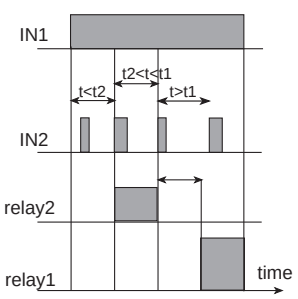
typ = 2
out = 1÷4
in2 = 0




### Revolution timer

Timing is active only with IN1 signal.
The two relays remain de-energized when time t between two pulses is in range t1(=SP1) - t2(=SP2). Relay 1 energizes when time t exceeds t1. Relay 2 energizes when time t is less than t2.

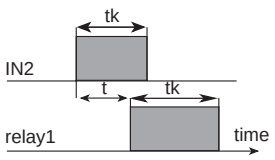
typ = 3
out = 8
in2 = 1




### Delay timer

Relay 1 repeats variations of IN2 control signal with delay t(=SP1). For correct operation, tk>t, where tk is duration of control signal pulses.

typ = 4
out = 9
in2 = 1



## ORDER CODE

550 □ □

| POWER SUPPLY | |
|---|---|
| 24Vdc | **0** |
| 110Vac | **1** |
| 220Vac | **2*** |
| 240Vac | **3** |
| 24Vac | **4** |
| 48Vac | **5** |
| 120Vac | **6** |

| INPUT | |
|---|---|
| From voltage-free contact | **C** |
| Direct Vac control | **AC** |

(*) Positions marked with asterisk indicate standard model

Please, contact GEFRAN sales people for the codes availability.

## • WARNINGS

**WARNING**: this symbol indicates danger.
It is placed near the power supply circuit and near high-voltage relay contacts.

**Read the following warnings before installing, connecting or using the device:**
• follow instructions precisely when connecting the device.
• always use cables that are suitable for the voltage and current levels indicated in the technical specifications.
• the device has no ON/OFF switch: it switches on immediately when power is turned on. For safety reasons, devices permanently connected to the power supply require a two-phase disconnecting switch with proper marking. Such switch must be located near the device and must be easily reachable by the user. A single switch can control several units.
• if the device is connected to electrically NON-ISOLATED equipment (e.g. thermocouples), a grounding wire must be applied to assure that this connection is not made directly through the machine structure.
• if the device is used in applications where there is risk of injury to persons and/or damage to machines or materials, it MUST be used with auxiliary alarm units. You should be able to check the correct operation of such units during normal operation of the device.
• before using the device, the user must check that all device parameters are correctly set in order to avoid injury to persons and/or damage to property.
• the device must NOT be used in inflammable or explosive environments. It may be connected to units operating in such environments only by means of suitable interfaces in conformity to local safety regulations.
• the device contains components that are sensitive to static electrical discharges. Therefore, take appropriate precautions when handling electronic circuit boards in order to prevent permanent damage to these components.
***Installation*:** installation category II, pollution level 2, double isolation
• power supply lines must be separated from device input and output lines; always check that the supply voltage matches the voltage indicated on the device label.
• install the instrumentation separately from the relays and power switching devices
• do not install high-power remote switches, contactors, relays, thyristor power units (particularly if “phase angle” type), motors, etc... in the same cabinet.
• avoid dust, humidity, corrosive gases and heat sources.
• do not close the ventilation holes; working temperature must be in the range of 0...50°C.
If the device has faston terminals, they must be protected and isolated; if the device has screw terminals, wires should be attached at least in pairs.
• *Power*: supplied from a disconnecting switch with fuse for the device section; path of wires from switch to devices should be as straight as possible; the same supply should not be used to power relays, contactors, solenoid valves, etc.; if the voltage waveform is strongly distorted by thyristor switching units or by electric motors, it is recommended that an isolation transformer be used only for the devices, connecting the screen to ground; it is important for the electrical system to have a good ground connection; voltage between neutral and ground must not exceed 1V and resistance must be less than 6Ohm; if the supply voltage is highly variable, use a voltage stabilizer for the device; use line filters in the vicinity of high frequency generators or arc welders; power supply lines must be separated from device input and output lines; always check that the supply voltage matches the voltage indicated on the device label.
• *Input and output connections*: external connected circuits must have double insulation; to connect analog inputs (TC, RTD) you have to: physically separate input wiring from power supply wiring, from output wiring, and from power connections; use twisted and screened cables, with screen connected to ground at only one point; to connect adjustment and alarm outputs (contactors, solenoid valves, motors, fans, etc.), install RC groups (resistor and capacitor in series) in parallel with inductive loads that work in AC *(Note: all capacitors must conform to VDE standards (class x2) and support at least 220 VAC. Resistors must be at least 2W)*; fit a 1N4007 diode in parallel with the coil of inductive loads that operate in DC.
**GEFRAN spa will not be held liable for any injury to persons and/or damage to property deriving from tampering, from any incorrect or erroneous use, or from any use not conforming to the device specifications.**