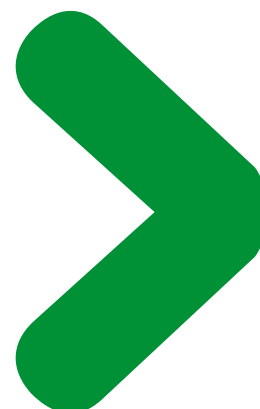


RelayAux

# Time-Lag relay

Technical Datasheet

PM105F18



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# 1. Object

The purpose of this manual is to help users to operate the RelayAux time-lag relay.

## 2. Operating principles

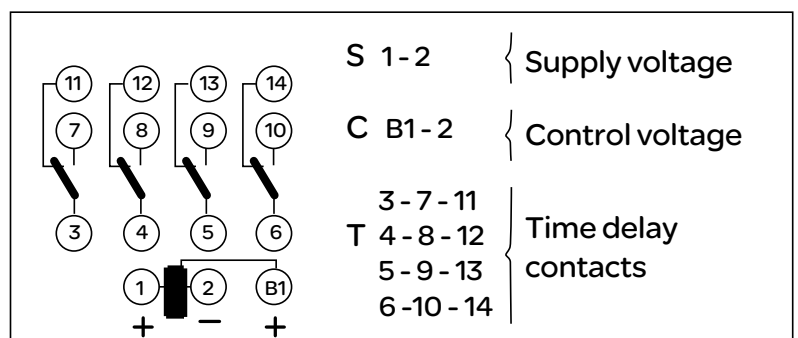
The RelayAux time-lag relay includes multiple timing functions. Furthermore, this relay stands out by its wide range of timings, as well as, by the simplicity of the operation. All the relay rated voltages work indistinctly both with direct or alternating current and the operation range is +25% / -30% of the nominal voltage (UN), except the one of 220 that has a range of +10% / -20%. These voltage ranges are for both auxiliary voltage and command voltage.

## 3. Reception and Storage

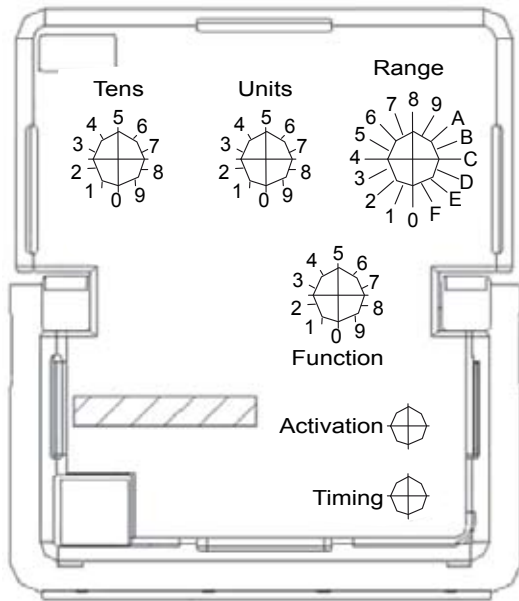
The RelayAux time-lag relay is supplied with packaging capable of protecting it during normal handling for equipment of this type.  
If the relay is not to be installed immediately, it is recommended that it remains in its packaging, perfectly closed and in indoor environmental conditions away from pollution, rain, dust, vibration, etc.

## 4. External connections diagram

- The terminals 1-2 are for the auxiliary supply of the relay.
- As the command is dependent, the negative of the same is shared with the negative of the auxiliary supply (terminal 2) and the control signal is B1.
- The 3 – 7 – 11; 4 – 8 – 12; 5 – 9 – 13 and 6 – 10 – 14 are timer contacts.



## 5. Functional characteristics



### 5.1 Timing

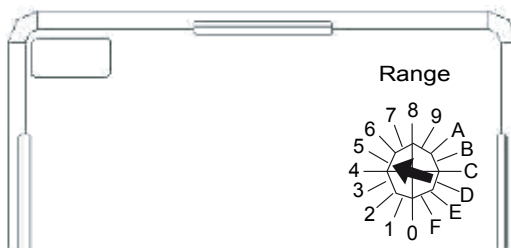
To choose the desired timing, the relay has 3 selectors available on the front part. In each of them the position of the point of the arrow indicates the option number selected. All the selectors are of discreet step not continuous, and for this reason the arrow cannot stay in an intermediate position.

The 16 position selector with the indication "Range", on top right part, allows to choose between the different 16 time ranges available. Each of the ranges is determined by a low limit and a top limit, as well as, by a step, as it is shown in the following table (this same table is printed on the side of the relay).

On the following example, the chosen range would be the 5, which low limit is 1 second and the top is 99 seconds, with a step of 1 second.

Range	Low limit	Top limit	Step
0	30ms	990ms	10ms
1	30ms	2,97s	30ms
2	0,1s	9,9s	100ms
3	0,2s	19,8s	200ms
4	0,5s	49,5s	0,5s
5	1s	99s	1s
6	3s	297s	3s
7	5s	495s	5s

Range	Low limit	Top limit	Step
8	10s	990s	10s
9	0,5min	49,5min	0,5min
A	1min	99min	1min
B	3min	297min	3min
C	5min	495min	5min
D	10min	990min	10min
E	0,5h	49,5h	0,5h
F	1h	99h	1h



The combination of the two 10 position selectors, placed on the left side of the "Range" selector, allows to select a number between 1 and 99. The number selected on the selector "Tens" multiplied by 10, plus the number selected on the selector "Unit" will be the chosen number. Once the range is selected, this number is the times that the step is going be multiplied, in order to choose this way the time on which the relay will operate.

This way, on the following example: The "range" that has been chosen is the 5, which step is 1 second. As the "tens" selector is on the position 5 ( $5 \times 10 = 50$ ) and the "units" one is on the 3 ( $50 + 3 = 53$ ), the relay will temporize 53 times the step, in other words, it will temporize  $53 \times 1 = 53$  seconds.

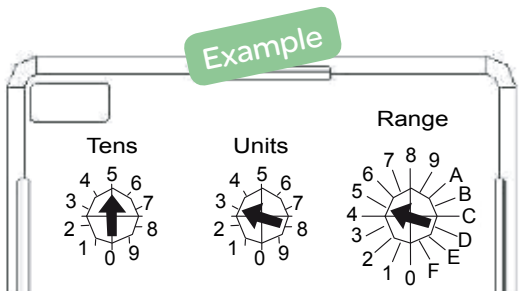
**NOTE 1:** If the "tens" selector is placed on the 0 and the unit one on the 0 or on the 1, the relay temporizes the step of the selected range.

**NOTE 2:** As the relay cannot temporize less than 30 milliseconds, if by the selectors it is chosen an option that would suppose a timing lower than this value, the relay will temporize 30ms. (for example, if it is selected the "range" = 0, "tens" = 0, and "units" = 1 or 2, according to what was mentioned on the preceding page, the timing would be 10 ms or 20 ms respectively, but the relay will temporize 30 ms as it is the minimum timing limit).

On the rest of the positions the timing will be the selected value.

**NOTE 3:** If all the selectors are placed on 0 ("Tens" = 0, "Units" = 0, "Range" = 0 and "Function" = 0), the timing will be disabled and the relay will operate in the minimum time possible (electronical and mechanical initialization delay). This time is a bit lower than 20ms.

**NOTE 4:** The accuracy of the timing will be  $\pm 5ms$  or  $\pm 1\%$ , the one which is higher.



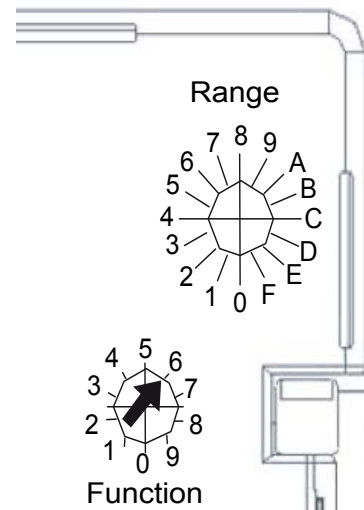
## 5. Functional characteristics

(cont.)

### 5.2 Functions

Below the 3 timing selectors, there is a forth 10 position selector, which allows to choose the different functions that the relay can execute. The way to make the selection is the same as ones explained before, by the point of the arrow.

On the figure shown below, the selected "function" would be the 6.



The time diagrams for each of the functions available are printed on the side of the relay. The descriptions, as well as, the mentioned diagrams for each of these functions are shown below.

First, the following table resumes all the functions available with a short description of each one:

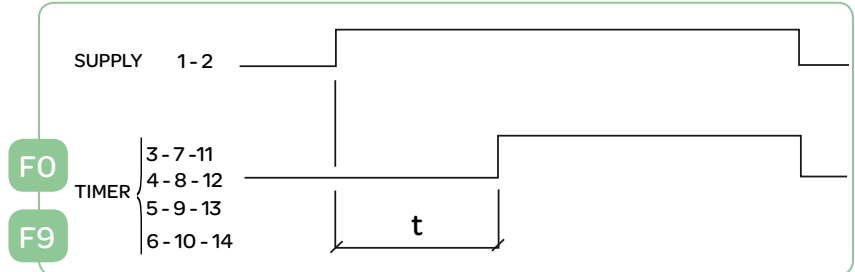
<b>Function 0</b>	Pick up timing
<b>Function 1</b>	Pick up timing with acceleration by external command
<b>Function 2</b>	Drop out timing
<b>Function 3</b>	Drop out timing
<b>Function 4</b>	Timing with continuity control
<b>Function 5</b>	Permanent cycle timing
<b>Function 6</b>	Flashing timing
<b>Function 7</b>	Pick up timing
<b>Function 8</b>	Drop out timing
<b>Function 9</b>	Pick up timing with reduced resetting time

# 5. Functional characteristics

(cont.)

## ■ Function 0 - Function 9 Pick up timing

As soon as the relay is with auxiliary supply, the timing starts, and the contacts pick up (go from the resting position to the working position) after a period of time  $t$  has passed (selected time).



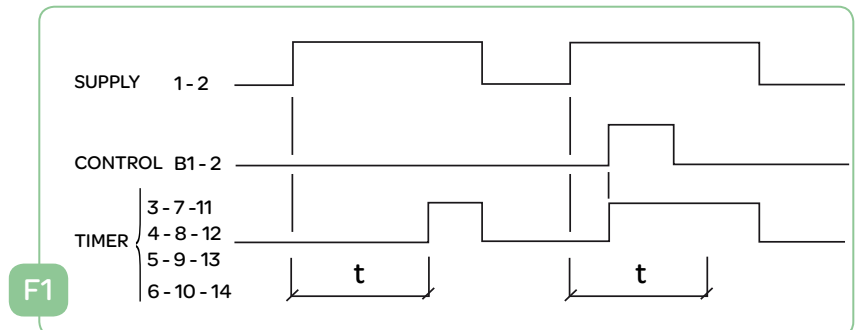
The only difference between functions F0 and F9 is the time the relay resets, (becomes operative again), after a loss of auxiliary supply. In the function F0, as in the rest of the functions except F9, this time is guaranteed to be less than 200 milliseconds, being at the same time, higher than 100 milliseconds (because this 100 milliseconds is the voltage gap guaranteed). In the function F9, this time is 50 milliseconds.

**NOTE:** The period of time mentioned above is the one the relay takes in reset itself (start working as if it has been connected with auxiliary supply for the first time). If the relay loses the auxiliary supply for a lower period of time, the contacts drop out (the mechanics detect the loss) but the timing goes on as if there has not been any loss (the electronics do not detect the loss).

## ■ Function 1 Pick up timing with acceleration by external command

This function differs from the function F0, in that there is an external command, that when the signal appears, the contacts pick up (go from the resting position to the working position), regardless of the timing that has been selected.

In other words, as soon as the relay is with auxiliary supply, if there is no command signal, the contacts pick up in the period of time selected  $t$ ; whereas if the command signal appears (which must last more than 10 ms) the contacts pick up, without waiting for this selected period of time to go by (as it is shown in the time diagram).

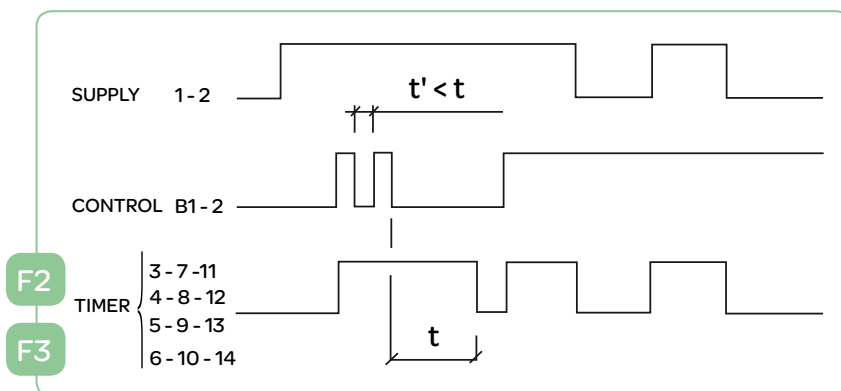


## 5. Functional characteristics

(cont.)

### ■ Function 2 - Function 3 Drop out timing

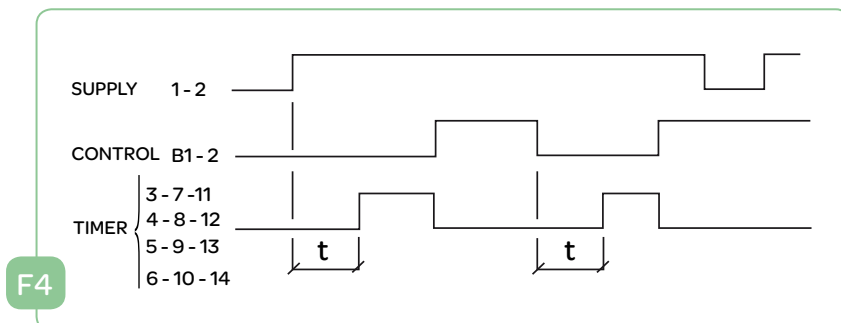
If the relay is with auxiliary supply and the command signal appears (must last more than 10 ms) the contacts pick up (go from the resting position to the working position); once the command signal disappears, the selected period of time starts to count, after which the contacts drop out (go from the working position to the resting position). In case the command signal disappears and appears again after a period of time  $t'$  lower than the time  $t$ , the relay clock resets and goes to zero, restarting the time counting. Once the command signal disappears, the contacts continue to be in the working position until the selected period of time  $t$  has passed, moment in which the contacts drop out.



### ■ Function 4 Timing with continuity control

When the relay has auxiliary supply, the time  $t$  (selected period of time) starts to count, after which the contacts pick up (go from the resting position to the working position). If there is no command signal, the contacts stay this way every time the relay has auxiliary supply.

The moment the command signal appears (must last more than 10 ms) the contacts drop out (go from the working position to the resting position). Just after the command signal disappears, the period of time  $t$  starts to count, after which the contacts return to the working position. The resting position will be recovered as soon as the command signal appears again.

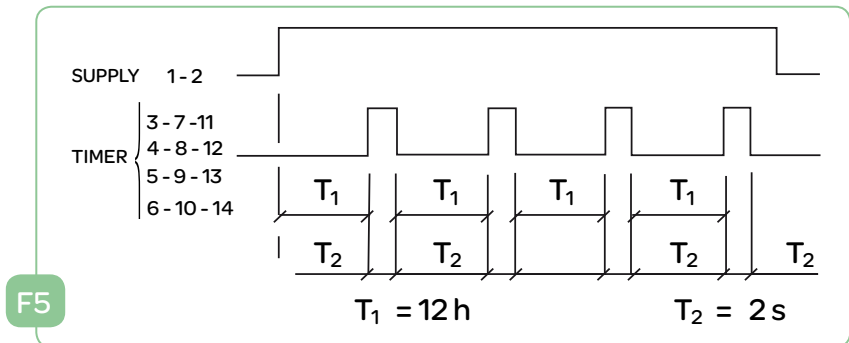


## 5. Functional characteristics

(cont.)

### ■ Function 5 Permanent cycle timing

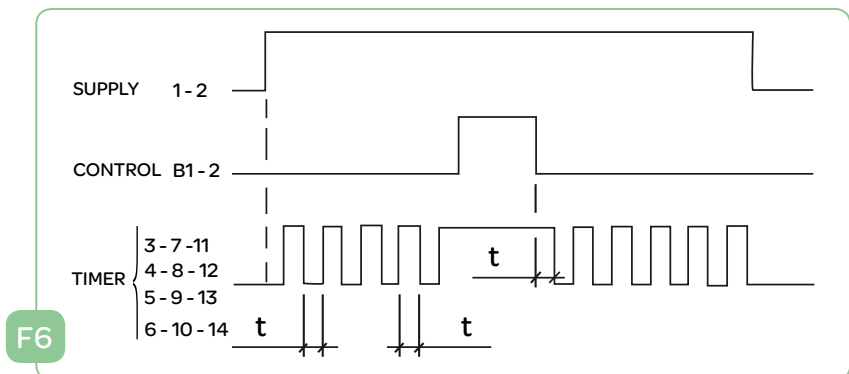
As soon as the relay has auxiliary supply a timing cycle begins, in which the contacts are 12 hours dropped out and 2 seconds picked up. This process lasts while the relay has auxiliary supply.



### ■ Function 6 Flashing timing

As soon as the relay has auxiliary supply the timing begins, and after the selected period of time  $T$  the contacts pick up (go from the resting position to the working position) and remain in that position for the same period of time. After this time, the contacts drop out (go from the working position to the resting position) and remain in this position for the time  $T$  and so on, until the auxiliary supply disappears.

This process changes in case the command signal appears (it must last longer than 10 ms). If this happens, while the command signal exists the contacts remain picked up. Once this signal disappears, the contacts stay in the working position for the period of time  $T$ , and afterwards start again with the timing cycles as explained above.





## 5. Functional characteristics

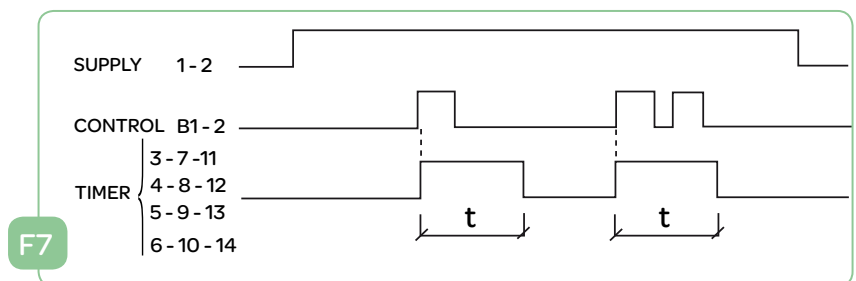
(cont.)

### ■ Function 7 Pick up timing

If the relay is with auxiliary supply and the command signal appears (must last longer than 10 ms), the contacts pick up (go from the resting position to the working position) and remain in that position for a period of time  $t$ .

The time starts running once the command signal appears. If it disappears and returns again before it has passed the time  $t$ , does not affect to the counting. The time starts to count when the command appears, and only the first time for each timing.

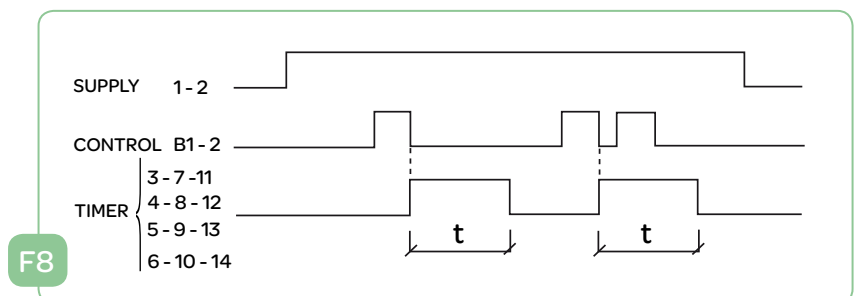
It can happens that the time  $t$  of the command signal could be longer than the timing  $t$ , the contacts pick up when the command signals begins to temporize the time  $t$ . Once the time  $t$  is over, the command signal remains and the selected period of time starts to count, after which the contacts drop out, regardless of the fact that the command signal disappeared in the mean time



### ■ Function 8 Drop out timing

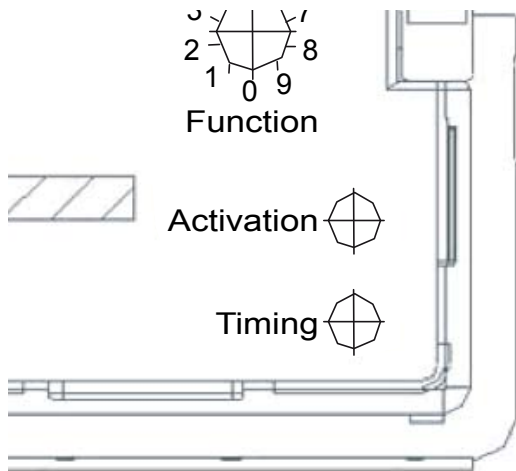
If the relay is with auxiliary supply and the command signal appears and disappears (must last longer than 10 ms), the contacts pick up (go from the resting position to the working position) and remain in that position for a period of time  $t$ .

The time starts running once the command signal disappears. If it returns and goes away before it has passed the time  $t$ , does not affect to the counting. The time starts to count from the disappearance of the command and only the first time for each timing.



## 5. Functional characteristics

(cont.)



### 5.3 Indicators in the relay

There are 2 led on the front part of the relay :

- Activation Led: it is a green led that is illuminated permanently when the timer contacts are picked up.
- Timing Led: it is a red led that flashes intermittently while the timing is in process in the relay, and turns off once the timing has finished.

### 5.4 Changing the time or function settings

In case the time or function selectors are changed, two situations may happen:

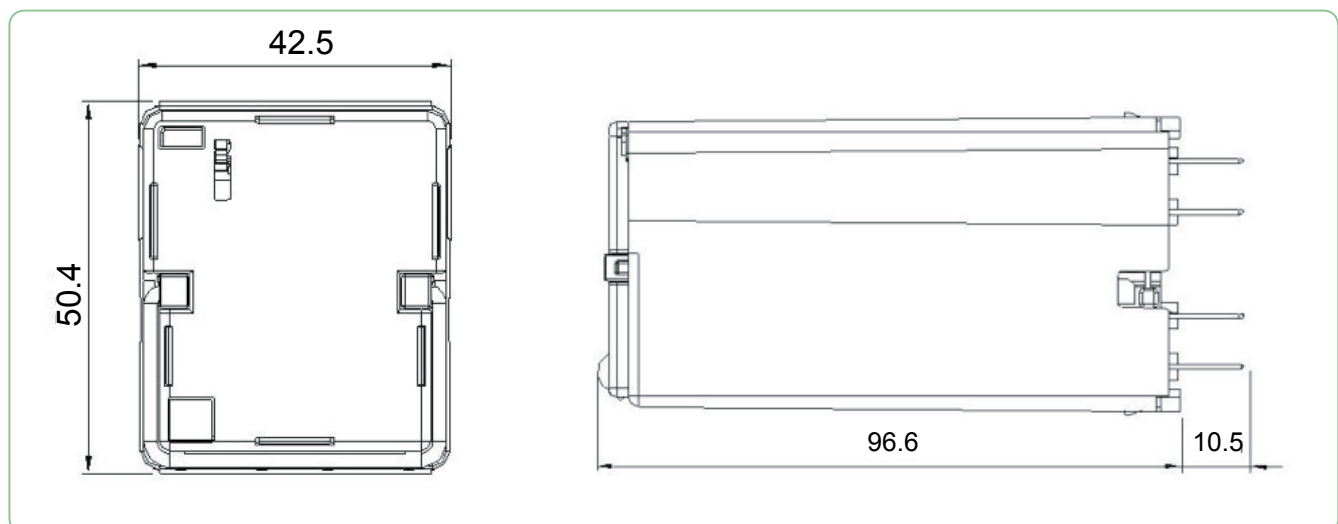
- The changes are made in the relay without the auxiliary supply:  
In this case, the changes in the settings, both in the timing and in the the function, will we applied the next time the relay has auxiliary supply.
- The changes are made while the relay has auxiliary supply:  
In this case, the modifications will not applied until the relay completely loses the auxiliary supply and is restored again. The loss of the auxiliary supply must be longer than 1s. In other words, it is necessary to disconnect the auxiliary supply of the relay at least 1 second to make effective any change of time or timing function.

## 6. Standard voltages and Consumption

- Standard voltages  
(UN): 24, 30, 48, 110, 125, 220 Vdc/Vac: 50/60 Hz
- (Vdc/Vac voltage supply available in the same relay)  
Voltage operation range: +25% -30% UN (except 220 V = +10% -20% UN)
- Consumption (UN):  $\leq 4,52$  W

## 7. Dimensions and Types of Sockets

### 7.1 RelayAux Time-Lag relay dimensions



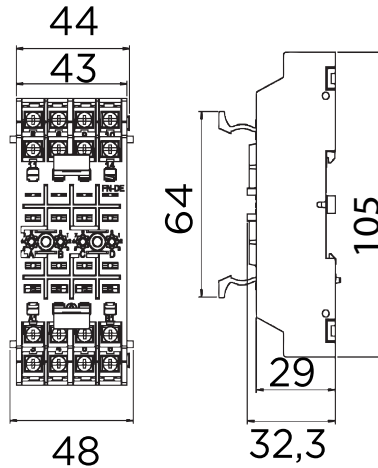
# 7. Dimensions and Types of Sockets

(cont.)

## 7.2 RelayAux Time-Lag relay Sockets

### 7.2.1 Front connection socket – Screw

PM103518



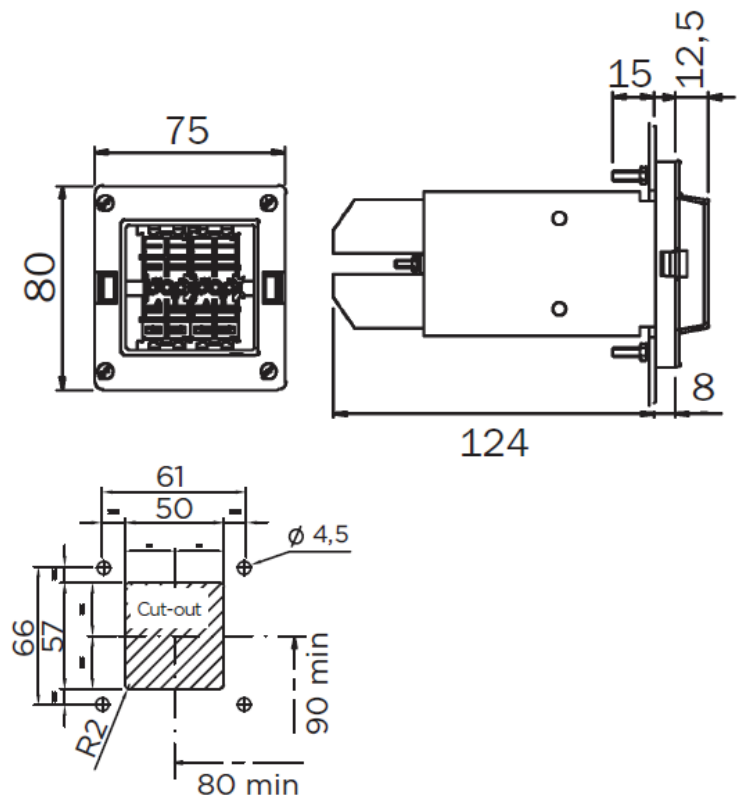
DINrail according to  
EN50022, DIN46277/3

PM103526



### 7.2.2 Flush mounting socket – Screw

PM103524



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