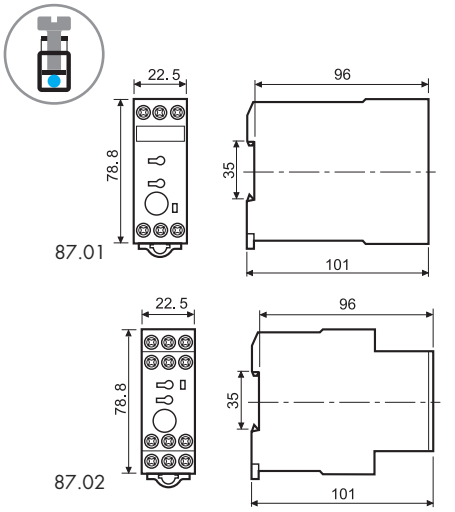
## Features

**Mono-function and multi-function timer range 22.5 mm wide**

**87.01 - 1 Pole - Multi-function and multi-voltage**
**87.02 - 2 Pole - Multi-function and multi-voltage, (timed + instantaneous options)**
**External time setting potentiometer option**

- Wide supply voltage range: (24...240)V AC / (24...48)V DC
- LED indicator
- Time setting from 0.05 seconds to 60 hours
- 35 mm rail (EN 60715) mount

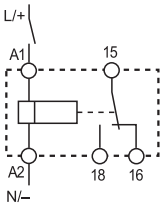
87.01 / 87.02
Screw terminal



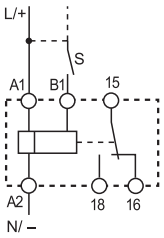

### 87.01

- Multi-function
- 1 pole
- 35 mm rail (EN 60715) mount

**AI:** ON delay
**BE:** Signal OFF delay
**CE:** Signal ON and OFF Delay
**DE:** Signal ON pulse
**DI:** ON pulse
**EE a:** Signal OFF pulse
**GI:** Fixed pulse delayed
**SW:** Symmetrical recycling: ON start




Wiring diagram (without signal START)

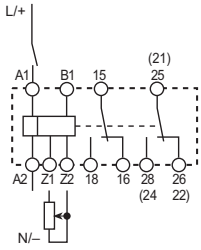



Wiring diagram (with signal START)

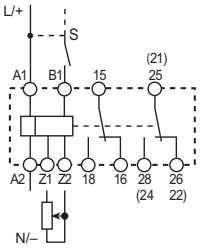
### 87.02

- Multi-function
- Timing can be regulated using ext. Potentiometer
- 2 timed contacts or 1 timed + 1 instantaneous contact
- 35 mm rail (EN 60715) mount

**AI:** ON delay
**BE:** Signal OFF delay
**CE:** Signal ON and OFF Delay
**DE:** Signal ON pulse
**DI:** ON pulse
**EE a:** Signal OFF pulse
**GI:** Fixed pulse delayed
**SW:** Symmetrical recycling: ON start




Wiring diagram (without signal START)




Wiring diagram (with signal START)

| | | | |
|---|---|---|---|
| **Contact specification** | | | |
| Contact configuration | | 1 CO (SPDT) | 2 CO (DPDT) |
| Rated current/Maximum peak current | A | 8/30 | 8/30 |
| Rated voltage/Maximum switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 2,000 | 2,000 |
| Rated load AC15 (230 V AC) | VA | 400 | 400 |
| Single phase motor rating (230 V AC) | kW | 0.185 | 0.185 |
| Breaking capacity DC1: 30/110/220 V | A | 8/0.5/0.2 | 8/0.5/0.2 |
| Minimum switching load | mW (V/mA) | 300 (10/5) | 300 (10/5) |
| Standard contact material | | AgCdO | AgCdO |
| **Supply specification** | | | |
| Nominal voltage ($U_N$) | V AC (50/60 Hz) | 24...240 | 24...240 |
| | V DC | 24...48 | 24...48 |
| Rated power AC/DC | VA (50 Hz)/W | 5/0.5 | 5/0.5 |
| Operating range | AC | (0.85...1.1)$U_N$ | (0.85...1.1)$U_N$ |
| | DC | (0.85...1.2)$U_N$ | (0.85...1.2)$U_N$ |
| **Technical data** | | | |
| Specified time range | | See page 6 | See page 6 |
| Repeatability | % | ± 2 | ± 2 |
| Recovery time | ms | 50 | 50 |
| Minimum control impulse | ms | 50 | 50 |
| Setting accuracy-full range | % | ± 5 | ± 5 |
| Electrical life at rated load in AC1 | cycles | $100 \cdot 10^3$ | $100 \cdot 10^3$ |
| Ambient temperature range (Contact current) | °C | –20...+70 | –20...+60 / –20...+70 (< 5 A) |
| Protection category | | IP 20 | IP 20 |
| **Approvals** (according to type) | | CE GL EAC cULus | |

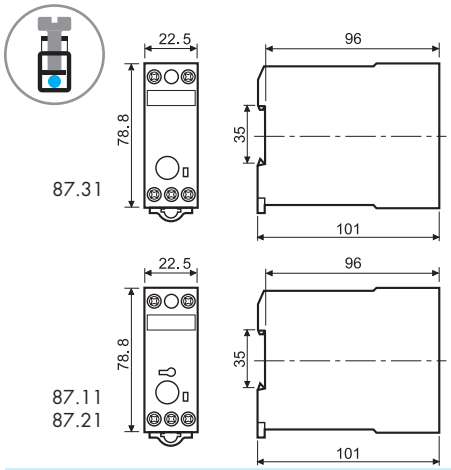
## Features

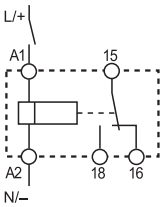
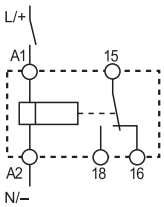
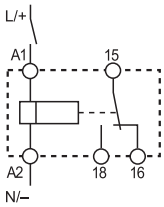
**Mono-function and multi-function timer range 22.5 mm wide**

**87.11 - ON delay, multi-voltage**
**87.21 - ON pulse, multi-voltage**
**87.31 - Symmetrical recycling, multi-voltage**

- 1 Pole output contact
- Wide supply voltage range: (24…240)V AC / (24…48)V DC
- LED indicator
- Time setting: Types 87.11/21 - 0.05 seconds to 60 hours Type 87.31 - 0.5 seconds to 10 seconds
- 35 mm rail (EN 60715) mount

87.11 / 87.21 /87.31
Screw terminal




| | 87.11 | 87.21 | 87.31 |
|---|---|---|---|
| |  |  |  |
| | • Mono-function<br>• 35 mm rail (EN 60715) mount | • Mono-function<br>• 35 mm rail (EN 60715) mount | • Mono-function<br>• 35 mm rail (EN 60715) mount |
| | **AI:** ON delay | **DI:** ON pulse | **SW:** Symmetrical recycling: ON start |
| |  |  |  |
| | Wiring diagram (without signal START) | Wiring diagram (without signal START) | Wiring diagram (without signal START) |
| **Contact specification** | | | |
| Contact configuration | 1 CO (SPDT) | 1 CO (SPDT) | 1 CO (SPDT) |
| Rated current/Maximum peak current A | 8/30 | 8/30 | 8/30 |
| Rated voltage/Maximum switching voltage V AC | 250/400 | 250/400 | 250/400 |
| Rated load AC1 VA | 2,000 | 2,000 | 2,000 |
| Rated load AC15 (230 V AC) VA | 400 | 400 | 400 |
| Single phase motor rating (230 V AC) kW | 0.185 | 0.185 | 0.185 |
| Breaking capacity DC1: 30/110/220 V A | 8/0.5/0.2 | 8/0.5/0.2 | 8/0.5/0.2 |
| Minimum switching load mW (V/mA) | 300 (10/5) | 300 (10/5) | 300 (10/5) |
| Standard contact material | AgCdO | AgCdO | AgCdO |
| **Supply specification** | | | |
| Nominal voltage ($U_N$) V AC (50/60 Hz) | 24…240 | 24…240 | 24…240 |
| V DC | 24…48 | 24…48 | 24…48 |
| Rated power AC/DC VA (50 Hz)/W | 5/0.5 | 5/0.5 | 5/0.5 |
| Operating range AC | (0.85…1.1)$U_N$ | (0.85…1.1)$U_N$ | (0.85…1.1)$U_N$ |
| DC | (0.85…1.2)$U_N$ | (0.85…1.2)$U_N$ | (0.85…1.2)$U_N$ |
| **Technical data** | | | |
| Specified time range | See page 6 | See page 6 | See page 6 |
| Repeatability % | ± 0.2 | ± 0.2 | ± 0.2 |
| Recovery time ms | 50 | 50 | 50 |
| Minimum control impulse ms | — | — | — |
| Setting accuracy-full range % | ± 5 | ± 5 | ± 5 |
| Electrical life at rated load in AC1 cycles | 100 · $10^3$ | 100 · $10^3$ | 100 · $10^3$ |
| Ambient temperature range °C | –20…+70 | –20…+70 | –20…+70 |
| Protection category | IP 20 | IP 20 | IP 20 |
| **Approvals** (according to type) | CE GL EAC cULus | | |

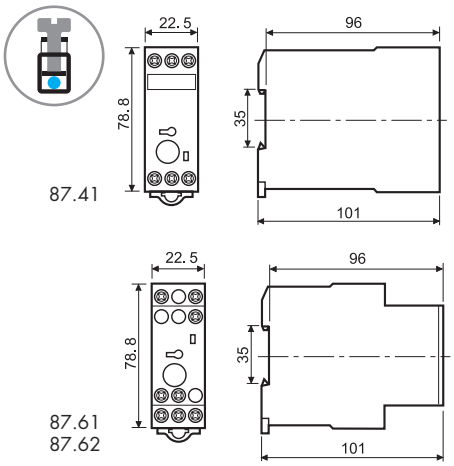
## Features

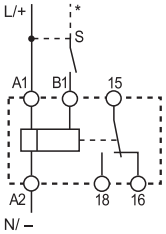
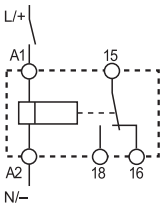
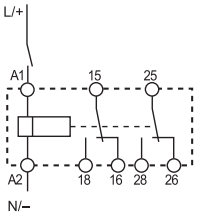
**Mono-function and multi-function timer range 22.5 mm wide**

**87.41 - Signal OFF delay, multi-voltage, 1 Pole**
**87.61 - True OFF delay, multi-voltage, 1 Pole**
**87.62 - True OFF delay, multi-voltage, 2 Pole**

- Wide supply voltage range:
  Type 87.41, (24...240)V AC/(24...48)V DC
  Types 87.61/62, (24...240)V AC/DC
- LED indicator
- Time setting range:
  Type 87.41 - 0.05 seconds to 60 hours
  Types 87.61/62 - 0.15 seconds to 10 minutes
- 35 mm rail (EN 60715) mount

87.41 / 87.61 / 87.62
Screw terminal




| | 87.41 | 87.61 | 87.62 |
|---|---|---|---|
| |  |  |  |
| | • Mono-function<br>• 1 pole<br>• 35 mm rail (EN 60715) mount | • Mono-function<br>• 1 pole<br>• 35 mm rail (EN 60715) mount | • Mono-function<br>• 2 pole<br>• 35 mm rail (EN 60715) mount |
| | **BE:** Signal OFF delay | **BI:** True OFF delay | **BI:** True OFF delay |
| |  |  |  |
| | Wiring diagram (with signal START) | Wiring diagram (without signal START) | Wiring diagram (without signal START) |
| **Contact specification** | | | |
| Contact configuration | 1 CO (SPDT) | 1 CO (SPDT) | 2 CO (DPDT) |
| Rated current/Maximum peak current A | 8/30 | 5/10 | 5/10 |
| Rated voltage/Maximum switching voltage V AC | 250/400 | 250/400 | 250/400 |
| Rated load AC1 VA | 2,000 | 1,250 | 1,250 |
| Rated load AC15 (230 V AC) VA | 400 | 250 | 250 |
| Single phase motor rating (230 V AC) kW | 0.185 | 0.125 | 0.125 |
| Breaking capacity DC1: 30/110/220 V A | 8/0.5/0.2 | 5/0.5/0.2 | 5/0.5/0.2 |
| Minimum switching load mW (V/mA) | 300 (10/5) | 300 (10/5) | 300 (10/5) |
| Standard contact material | AgCdO | AgCdO | AgCdO |
| **Supply specification** | | | |
| Nominal voltage ($U_N$) V AC (50/60 Hz) | 24...240 | 24...240 | 24...240 |
| V DC | 24...48 | 24...240 | 24...240 |
| Rated power AC/DC VA (50 Hz)/W | 5/0.5 | 1.5/1.5 | 1.5/1.5 |
| Operating range AC | (0.85...1.1)$U_N$ | (0.85...1.1)$U_N$ | (0.85...1.1)$U_N$ |
| DC | (0.85...1.2)$U_N$ | (0.85...1.2)$U_N$ | (0.85...1.2)$U_N$ |
| **Technical data** | | | |
| Specified time range | See page 6 | See page 6 | See page 6 |
| Repeatability % | ± 0.2 | ± 1 | ± 1 |
| Recovery time ms | 50 | 200 | 200 |
| Minimum control impulse ms | 50 | 800 ms (A1 - A2) | 800 ms (A1 - A2) |
| Setting accuracy-full range % | ± 5 | ± 5 | ± 5 |
| Electrical life at rated load in AC1 cycles | 100 · $10^3$ | 100 · $10^3$ | 100 · $10^3$ |
| Ambient temperature range °C | –20...+70 | –20...+70 | –20...+70 |
| Protection category | IP 20 | IP 20 | IP 20 |
| **Approvals** (according to type) | CE GL EAC cULus | CE EAC cULus | |

## Features

**Mono-function and multi-function timer range 22.5 mm wide**

**87.82 - Star-Delta timer, multi-voltage, star and delta output contacts**

**87.91 - Multi-function Recycling timer, 1 Pole**

- Wide supply range: (24...240)V AC / (24...48)V DC
- LED indicator
- Time setting voltage range: Type 87.82 - 0.05 minute to 1 minute Type 87.91 - 0.05 seconds to 60 hours
- 35 mm rail (EN 60715) mount

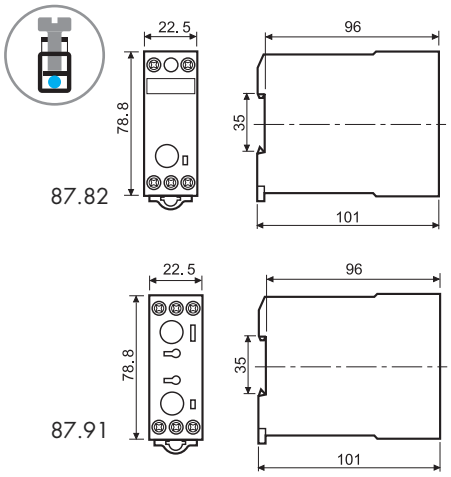
### 87.82

- Mono-function: Star - delta
- 2 pole
- 35 mm rail (EN 60715) mount

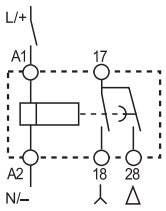
### 87.91

- Multi-function recycling
- 1 pole
- 35 mm rail (EN 60715) mount

87.82 / 87.91
Screw terminal

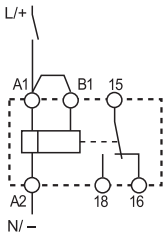



**SD:** Star - delta

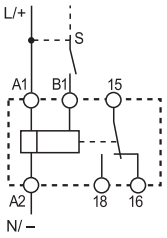



Wiring diagram
(without signal START)

**LI:** Asymmetrical recycling (ON starting)
**LE:** Signal asymmetrical recycling (ON starting)
**PI:** Asymmetrical recycling (OFF starting)
**PE:** Signal asymmetrical recycling (OFF starting)




Wiring diagram
(without signal START)




Wiring diagram
(with signal START)

| | | | |
|---|---|---|---|
| **Contact specification** | | | |
| Contact configuration | | 2 NO (DPST-NO) | 1 CO (SPDT) |
| Rated current/Maximum peak current | A | 8/30 | 8/30 |
| Rated voltage/Maximum switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 2,000 | 2,000 |
| Rated load AC15 (230 V AC) | VA | 400 | 400 |
| Single phase motor rating (230 V AC) | kW | 0.185 | 0.185 |
| Breaking capacity DC1: 30/110/220 V | A | 8/0.5/0.2 | 8/0.5/0.2 |
| Minimum switching load | mW (V/mA) | 300 (10/5) | 300 (10/5) |
| Standard contact material | | AgCdO | AgCdO |
| **Supply specification** | | | |
| Nominal voltage ($U_N$) | V AC (50/60 Hz) | 24...240 | 24...240 |
| | V DC | 24...48 | 24...48 |
| Rated power AC/DC | VA (50 Hz)/W | 5/0.5 | 5/0.5 |
| Operating range | AC | (0.85...1.1)$U_N$ | (0.85...1.1)$U_N$ |
| | DC | (0.85...1.2)$U_N$ | (0.85...1.2)$U_N$ |
| **Technical data** | | | |
| Specified time range | | See page 6 | See page 6 |
| Repeatability | % | ± 0.2 | ± 0.2 |
| Recovery time | ms | 50 | 50 |
| Minimum control impulse | ms | — | 50 |
| Setting accuracy-full range | % | ± 5 | ± 5 |
| Electrical life at rated load in AC1 | cycles | $100 \cdot 10^3$ | $100 \cdot 10^3$ |
| Ambient temperature range | °C | –20...+70 | –20...+70 |
| Protection category | | IP 20 | IP 20 |
| **Approvals** (according to type) | | CE GL PG cULus | |

## Ordering information

Example: 87 series multi-function timer 8 A, 1 CO (SPDT) contact, (24…240)V AC (50/60 Hz) and (24…48)V DC supply.

**8 7 . 0 1 . 0 . 2 4 0 . 0 0 0 0**

**Series**

**Type**
0 = Multi-function
(AI, BE, CE, DI, DE, EE a, GI, SW, ON, OFF)
1 = ON delay (AI)
2 = ON pulse (DI)
3 = Symmetrical recycling: ON start (SW)
4 = Signal OFF delay (BE)
6 = True OFF delay (power OFF) (BI)
8 = Star - delta (SD)
9 = Asymmetrical recycling (LI, LE, PI, PE)

**No. of poles**
1 = 1 pole
2 = 2 pole for 87.02/62
2 = 2 NO (DPST-NO) for 87.82

**Supply version**
0 = AC (50/60 Hz)/DC

**Supply voltage**
240 = { (24…48)V DC / (24…240)V AC
240 = (24…240)V AC/DC for 87.61 and 87.62

## Technical data

| | | | | | |
|---|---|---|---|---|---|
| **Insulation** | | | | | |
| Dielectric strength | between input and output circuit | V AC | 4,000 | | |
| | insulation (1.2/50 µs) between input and output | kV | 6 | | |
| | between open contacts | V AC | 1,000 | | |
| | between adjacent contacts | V AC | 2,000 (Type 87.02, 87.62) | | |
| **EMC specifications** | | | | | |
| **Type of test** | | | **Reference standard** | | |
| Electrostatic discharge | contact discharge | | EN 61000-4-2 | 8 kV | |
| | air discharge | | EN 61000-4-2 | 8 kV | |
| Radio-frequency electromagnetic field (80 ÷ 1000 MHz) | | | EN 61000-4-3 | 10 V/m | |
| Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals | | | EN 61000-4-4 | 6 kV | |
| Surges (1.2/50 µs) on Supply terminals | common mode | | EN 61000-4-5 | 4 kV | |
| | differential mode | | EN 61000-4-5 | 4 kV | |
| Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals | | | EN 61000-4-6 | 10 V | |
| Radiated and conducted emission | | | EN 55022 | class B | |
| **Other data** | | | | | |
| Signal control (B1) | | | | | |
| | - current absorption | | 1 mA | | |
| | - max cable length (capacity of ≤ 10 nF / 100 m) | | 250 m | | |
| | - when applying a control signal to B1, which is different from the supply voltage at A1/A2 | | B1 is isolated from A1 and A2 by an opto-coupler, and can therefore be operated at a voltage other than the supply voltage | | |
| Note: when applying a control signal to B1 it is recommended to attach a bypass resistance 56 kOhm/2 W across B1 - A2 | | | If using a control signal of between (24... 48)V DC and a supply voltage of (24...240)V AC; ensure that the signal – is connected to A2 and the + is applied to B1, and that L is applied to B1 and N to A2 | | |
| External potentiometer for 87.02 | | | Use a 10 kΩ/ ≥ 0,25 W linear potentiometer. Maximum cable length 10 m. When using an external potentiometer, remove the bridge between Z1 and Z2, and set the timer'spotentiometer to its minimum setting. Consider the voltage potential at the potentiometer to be the same as the timer supply voltage. | | |
| Power lost to the environment | | | **87.01/02/11/21/31/41/91** | **87.61/62** | **87.82** |
| | without contact current | W | 5 | 1.5 | 8 |
| | with rated current | W | 15 | 7 | 18 |
| Screw torque | | Nm | 1.2 | | |
| Max. wire size | | | solid cable | stranded cable | |
| | | $mm^2$ | 1x4 / 2x2.5 | 1x4 / 2x1.5 | |
| | | AWG | 1x12 / 2x14 | 1x12 / 2x16 | |

## Time scales

| Type | Function Code | Function | Time ranges - minimum to maximum span | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | s | s | s | min | min | min | h | h | h | h |
| | | | 0.05 | 0.15 | 0.5 | 0.05 | 0.15 | 0.5 | 0.05 | 0.15 | 0.5 | 3 |
| | | | 1 | 3 | 10 | 1 | 3 | 10 | 1 | 3 | 10 | 60 |
| 87.01 | AI | ON delay | • | • | • | • | • | • | • | • | • | • |
| 87.02 | BE | Signal OFF delay | • | • | • | • | • | • | • | • | • | • |
| | CE | Signal ON and OFF delay | • | • | • | • | • | • | • | • | • | • |
| | DI | ON pulse | • | • | • | • | • | • | • | • | • | • |
| | DE | Signal ON pulse | • | • | • | • | • | • | • | • | • | • |
| | EE a | Signal OFF pulse | • | • | • | • | • | • | • | • | • | • |
| | GI | Fixed pulse (0.5s) delayed | • | • | • | • | • | • | • | • | • | • |
| | SW | Symmetrical recycling: ON start | • | • | • | • | • | • | • | • | • | • |
| 87.11 | AI | ON delay | • | • | • | • | • | • | • | • | • | • |
| 87.21 | DI | ON pulse | • | • | • | • | • | • | • | • | • | • |
| 87.31 | SW | Symmetrical recycling: ON start | | | • | | | | | | | |
| 87.41 | BE | Signal OFF delay | • | • | • | • | • | • | • | • | • | • |
| 87.61<br>87.62 | BI | True OFF delay (power OFF) | | 0.15<br>2.5 | • | 0.07<br>1.3 | | • | | | | |
| 87.82 | SD | Star - delta ($T_U$ = ~60 ms) | | | | • | | | | | | |
| 87.91 | LI | Asymmetrical recycling (ON start) | • | • | • | • | • | • | • | • | • | • |
| | LE | Signal asymmetrical recycling (ON start) | • | • | • | • | • | • | • | • | • | • |
| | PI | Asymmetrical recycling (OFF start) | • | • | • | • | • | • | • | • | • | • |
| | PE | Signal asymmetrical recycling (OFF start) | • | • | • | • | • | • | • | • | • | • |

## Functions

**U** = Supply Voltage

**S** = Signal switch

**C** = Output Contact

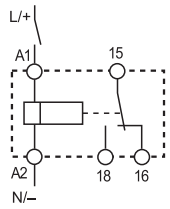
| LED** Green | Timing | NO output contact | Contacts Timed Open | Contacts Timed Closed | DIP switch | Contacts Instantaneous* Open | Contacts Instantaneous* Closed |
|---|---|---|---|---|---|---|---|
| | None | Open | 15 - 18<br>25 - 28* | 15 - 16<br>25 - 26* | Up | 21 - 24* | 21 - 22* |
| | In progress | Open | 15 - 18<br>25 - 28* | 15 - 16<br>25 - 26* | | 21 - 22* | 21 - 24* |
| | In progress | Closed | 15 - 16<br>25 - 26* | 15 - 18<br>25 - 28* | | 21 - 22* | 21 - 24* |
| | None | Closed | 15 - 16<br>25 - 26* | 15 - 18<br>25 - 28* | Down | 21 - 22* | 21 - 24* |

* 25-26-28 only for type 87.02 with 2 timed contacts. 21-22-24 only for type 87.02 with 1 instantaneous contact + 1 timed positioning the front DIP switch.

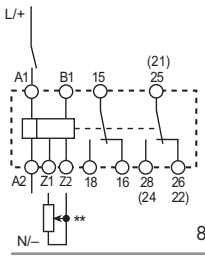
** The LED on types 87.61 and 87.62 is illuminated when supply voltage is supplied to timer.

## Wiring diagram

**Multi-function**
without signal START

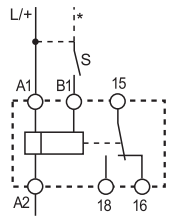



87.01

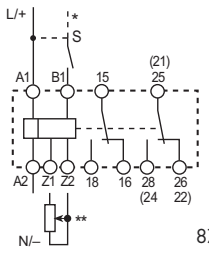



87.02

with signal START




87.01



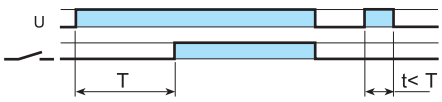

87.02

* A voltage other than the supply voltage can be applied to the command START (B1).
Example:
A1 - A2 = 230 V AC
B1 - A2 = 24 V AC

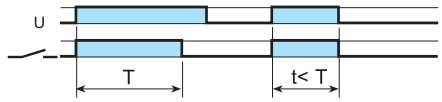
** Type 87.02: regulated using an external potentiometer (10 kΩ - 0.25 W).

NB.: remove link between Z1-Z2 and position the Timer potentiometer on "zero".

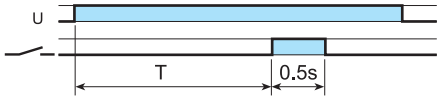
**Type**
**87.01**
**87.02**



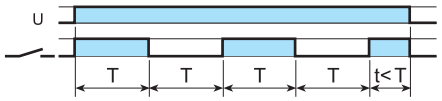

**(AI) ON delay.**
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



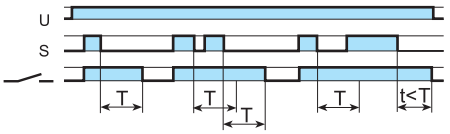

**(DI) ON pulse.**
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



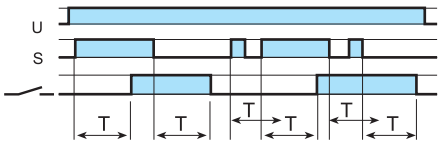

**(GI) Fixed pulse (0.5s) delayed.**
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



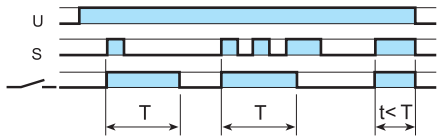

**(SW) Symmetrical recycling: ON start.**
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).



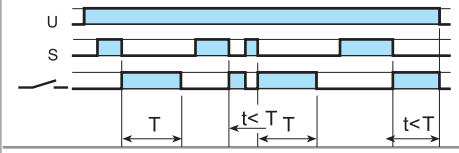

**(BE) Signal OFF delay.**
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



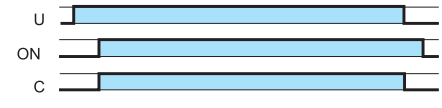

**(CE) Signal ON and OFF delay.**
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



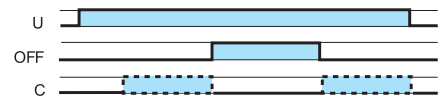

**(DE) Signal ON pulse.**
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.




**(EE a) Signal OFF pulse.**
Power is permenently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.




**Permanently ON.**
Selecting the function ON when power is applied to the relay the first contact transfers immediately and remains in that position.

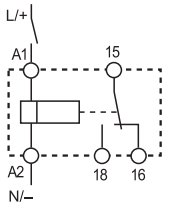



**Permanently OFF.**
The contact returns to the original position when the OFF function is selected.

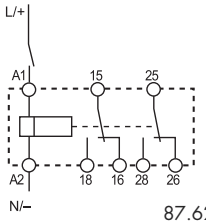
# Functions

## Wiring diagram

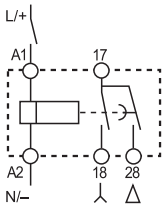
### Mono-function
without signal START




87.11
87.21
87.31
87.61

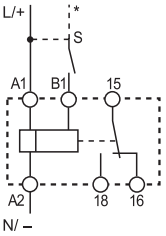



87.62



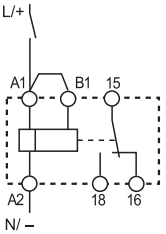

87.82

### with signal START (S)



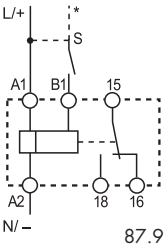

87.41

### Asymmetrical recycler
without signal START

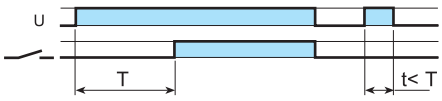
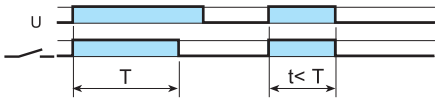
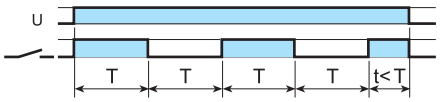
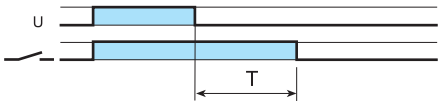
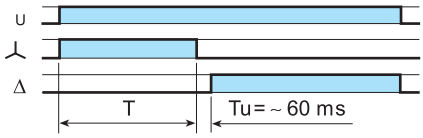
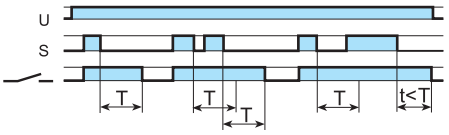
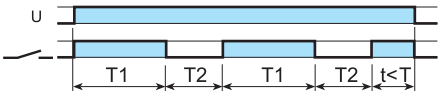
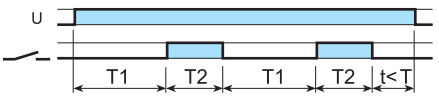
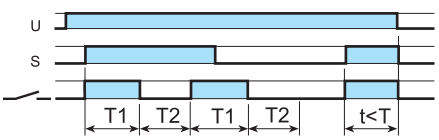



87.91

### with signal START (S)




87.91

| Type | | |
|---|---|---|
| 87.11 |  | **(AI) ON delay.** Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed. |
| 87.21 |  | **(DI) ON pulse.** Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset. |
| 87.31 |  | **(SW) Symmetrical recycling: ON start.** Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off). |
| 87.61<br>87.62 |  | **(BI) True OFF delay (power OFF).** Apply power to timer (minimum 300 ms). Output contacts transfer immediately. Removal of power initiates the preset delay, after which time the output contacts reset. |
| 87.82 |  | **(SD) Star - delta.** Apply power to timer. The star contact (⅄) closes immediately. After preset delay has elapsed the star contact (⅄) resets. After a further fixed time of ~60 ms the delta contact ( Δ ) closes and remains in that position, until reset on power off. |
| 87.41 |  | **(BE) Signal OFF delay.** Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset. |
| 87.91<br>switch position<br>  <br>switch position<br>  <br>switch position |  | **(LI) Asymmetrical recycling (ON start).** Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ON and OFF times are independently adjustable. |
| |  | **(PI) Asymmetrical recycling (OFF start).** Apply power to timer. Output contacts transfer after time T1 has elapsed and cycle between OFF and ON for as long as power is applied. The ON and OFF times are independently adjustable. |
| 87.91<br>switch position<br>  <br>switch position<br>  |  | **(LE) Signal asymmetrical recycling (ON start)** Power is permenently applied to the timer. Closing Signal Switch (S) causes the output contacts to transfer immediately and cycle between ON and OFF, until opened. |
| |  | **(PE) Signal asymmetrical recycling (OFF start).** Power is permenently applied to the timer. Closing the Signal Switch (S) initiates delay T1 after which the output contacts transfer and continue to cycle between OFF and ON, until the Signal Switch is opened. |