

TIMERS



finder[®]
S.p.A
The power in relays and timers since 1954



RATED VOLTAGE - it is the nominal value of the operating voltage of the circuit by which the relay is designed to be supplied and operate. The relays operating and use characteristics are referred to the rated voltage (EN 61810-1).

OPERATING RANGE - it is the range between the minimum and the maximum pick-up voltage.

DIELECTRIC STRENGTH - dielectric strength tests are carried out by applying a specified AC voltage (at 50 Hz) for 1 minute between two circuits (ex. between coil and contacts, between adjacent contacts, between open contacts), and verifying that the leakage current does not overrun 10 mA. During the final 100% tests, the specified voltage is increased by 10%, and applied for 1 second. This refers to the rms value.

INSULATION GROUP - according to VDE 0110.

MECHANICAL LIFE - this test is carried out by energizing the coil without any load applied to the contacts, in order to check metal parts life, solder and residual magnetism intensity, which is checked by connecting one phase of each relay coil in parallel, while the other phase is connected to a contact of a pilot relay. This makes each relay independent in order to avoid induced counter electromotive force which could facilitate the drop-out of the relay with some residual magnetism (EN 61810-1) still on.

AMBIENT TEMPERATURE - it is the temperature of the actual area where the relay is located in which a good operation of the relay is guaranteed. The relay is energized at the rated voltage (or at the voltage indicated in the diagrams, which shows the trend of operating minimum voltage versus temperature). All technical data in this catalogue refer to an ambient temperature +20°C.

TIME SETTING - range in which it is possible to set timing using the time scales.

REPEATABILITY - difference between the upper and lower limits of the confidence range from several time measurements of a specified time relay under identical stated conditions. Preferably the repeatability is indicated as a percentage of the mean value of all measured values.

SETTING ACCURACY - difference between the measured value of the specified time and the reference value set on the scale.

RECOVERY TIME - necessary time to start the relay again with the defined accuracy after the input energizing quantity has been taken away.

CONTACT SPECIFICATION

RATED POWER - it is the maximum switching power or maximum power value (in VA) with resistive load in AC, that a contact can make, hold and break many times.

RATED CURRENT - this is the current for continuous duty, which is the highest value (rms value in AC) that a contact can continuously hold within the prescribed temperature limits. It coincides with the cycling capacity, that is the current that a contact can make, hold and break many times (EN 60225-23).

MAXIMUM PEAK CURRENT - the highest value of current (rms value in AC) that a contact can make and cycle for not more than 0.5 seconds, and with a duty cycle (DC) not higher than 0.1, without undergoing a permanent degradation of its characteristics due to generated heat (EN 60225-23).

RATED VOLTAGE - it is the ratio between the rated power and the rated current.

MAXIMUM SWITCHING VOLTAGE - it is the highest voltage level that the contacts can switch. It is higher than or equal to the rated voltage.

BREAKING CAPACITY IN DC1 - for DC1 loads, it is the maximum value of current which contacts can switch, depending on the value of the load voltage, without any protection circuits.

SINGLE PHASE MOTOR RATING - it is the nominal value of the motors power, using AC3 category, $\cos \varphi = 0.7$, 250 V maximum that a relay can control according to EN 60947-1, UL 508 e CSA 22.2 No.14.

EMC SPECIFICATIONS

TYPE OF TEST	REFERENCE STANDARD
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)
POWER-FREQUENCY (50 Hz)	EN 61000-4-8
RADIATED AND CONDUCTED EMISSION	EN 55022



81 SERIES
Multi-function Modular Timers 16 A



82 SERIES
Modular Timers 5 A



85 SERIES
Miniature Plug-in Timers 5 - 10 A

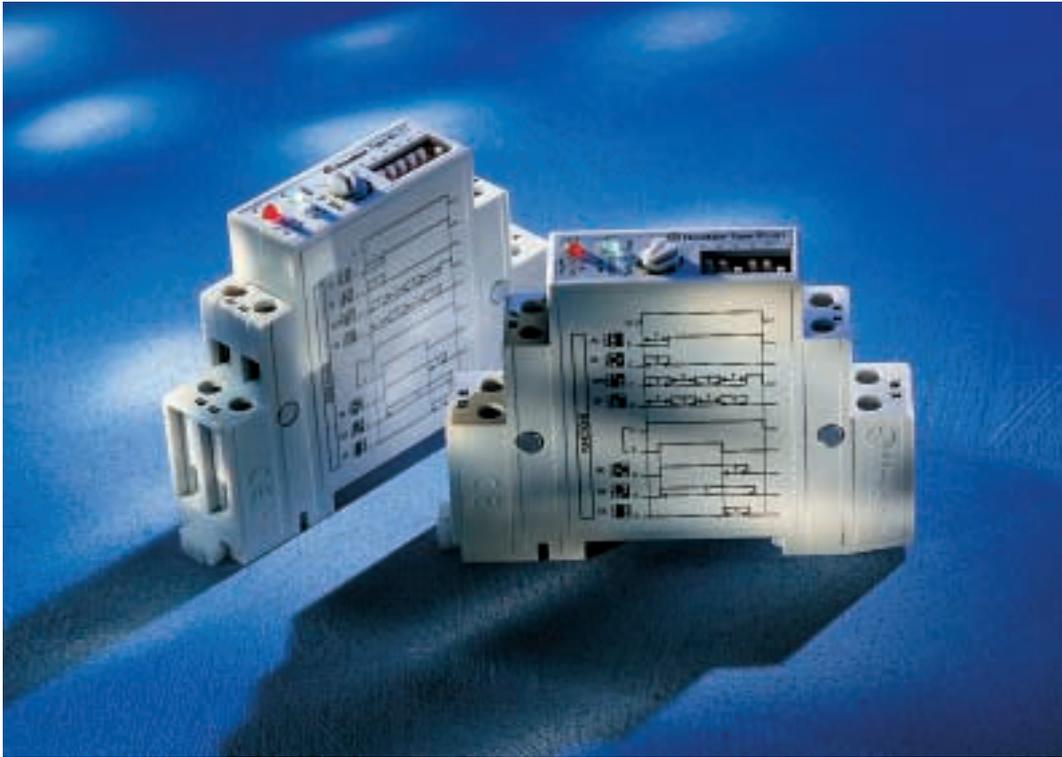
94 SERIES
**Sockets and Accessories
for 85 Series Timers**



86 SERIES
Timer Modules



87 SERIES
Modular Timers 5 - 8 A



A range of mono or multi-voltage multi-function timers

Features include:

- One module (17.5 mm) wide housing
- Seven functions (4 with supply start and 3 with external start)
- Six time scales, from 0.1 s to 10h
- Supply voltage: 12...230 V AC/DC (non polarized) (type 81.01)
12, 24, 48, 110 V AC/DC (non polarized)
230 V AC (type 81.11)
- External START activated by a *make* contact, not requiring an additional voltage supply
- Instantaneous RESET facility
- 35 mm rail (EN 50022) mount
- Protection category IP 20
- LEDs provided: GREEN = power ON
RED = relay ON
- Conforms to EN 61812-1 standard



81.01



81.11



MULTI-FUNCTION MODULAR TIMERS 16 A

TYPE 81.01 1 CO

Multi-voltage from 12 V to 230 V in AC and in DC (non polarized). Automatically recognizes supply voltage used. The device can be supplied with any voltage from 12 to 230 V, both in AC and in DC (non polarized).

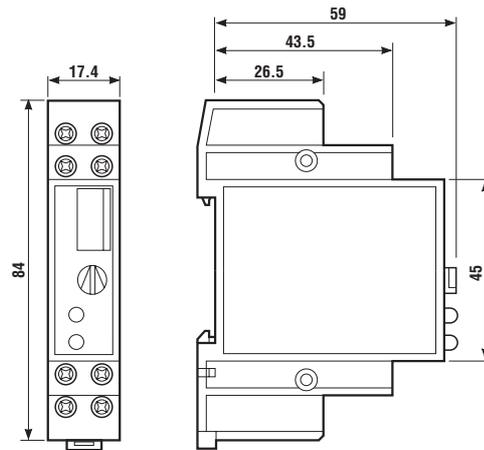
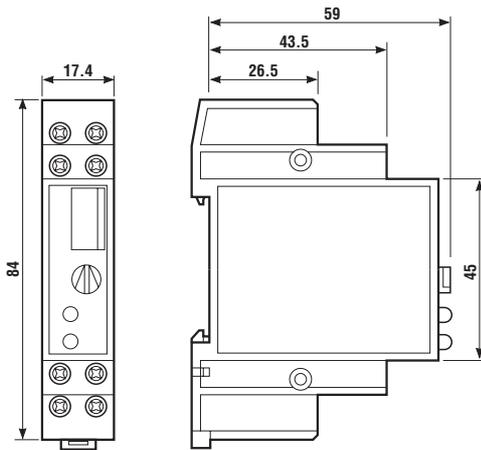
- Functions: see page 3
- Ordering information: see page 5

MULTI-FUNCTION MODULAR TIMERS 16 A

TYPE 81.11 1 CO

Supply voltages available:
 12 V AC/DC (non polarized)
 24 V AC/DC (non polarized)
 48 V AC/DC (non polarized)
 110 V AC/DC (non polarized)
 230 V AC

- Functions: see page 3
- Ordering information: see page 5



EMC SPECIFICATIONS

TYPE OF TEST	REFERENCE STANDARD	81.01	81.11
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2	4 kV 8 kV	4 kV 8 kV
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)	10 V/m	10 V/m
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4	4 kV	4 kV
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5	4 kV 2 kV	4 kV 2 kV
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)	10 V	10 V
RADIATED AND CONDUCTED EMISSION	EN 55022	class A	class B

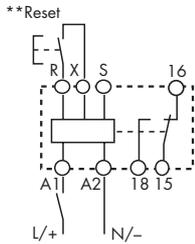
DESCRIPTION OF THE FUNCTIONS

The (C) indicated in the diagrams refers to the position of the NO contact. When the red LED (C) is illuminated the NO contact is closed.

	LED		Supply voltage	NO contact position	Contacts	
	green	red			open	closed
U = Supply voltage			NO	open	15 - 18	15 - 16
S = START			YES	open	15 - 18	15 - 16
C = Relay contact (NO)			YES	closed	15 - 16	15 - 18

Internal Start

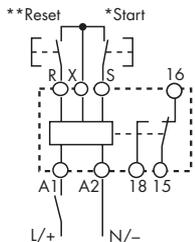
Controlled through signal contact in voltage supply line.



<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>c </p>	<p>(AI) ON delay. Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>c </p>	<p>(DI) ON pulse. Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>c </p>	<p>(SW) Symmetrical recycler: pulse start. Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between ON and OFF as long as power is applied. The ratio is 1:1 (time off = time on).</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>c </p>	<p>(SP) Symmetrical recycler: pause start. Apply power to timer. First transfer of contact occurs after preset time has elapsed. The timer now cycles between OFF and ON as long as power is applied. The ratio is 1:1 (time off = time on).</p>

External Start

Controlled through signal contact of external start switch.



<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>S </p> <p>c </p>	<p>(BE) OFF delay: timing on START release (internal start). Power must be applied at all times to timer. On closure of normally open control Signal Switch, the output contact transfers and remains in that position. When the Signal Switch is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>S </p> <p>c </p>	<p>(DE) ON pulse: timing on START pulse. Power must be applied at all times to timer. On momentary or maintained closure of a normally open control Signal Switch, the output contact transfers. After the desired time has elapsed, the contact returns to the original position.</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>S </p> <p>c </p>	<p>(EE) OFF pulse: timing on START release. Power must be applied at all times to timer. On opening a normally open control Signal Switch, the output contact transfers. After the desired time has elapsed, the contact returns to the original position.</p>

RESET FUNCTION(R)

In each and every function and time scale, the timer is immediately released when the reset switch is depressed.

<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>R </p> <p>c </p>	<p>On depressing the External Reset Switch the timer is immediately released. Releasing the Reset Switch reactivates the function. Example: ON delay function.</p>
<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	<p>U </p> <p>S </p> <p>R </p> <p>c </p>	<p>Depressing the External Reset Switch terminates the interval time. To re-start, it is necessary to depress the Start switch again. Example: ON pulse function.</p>

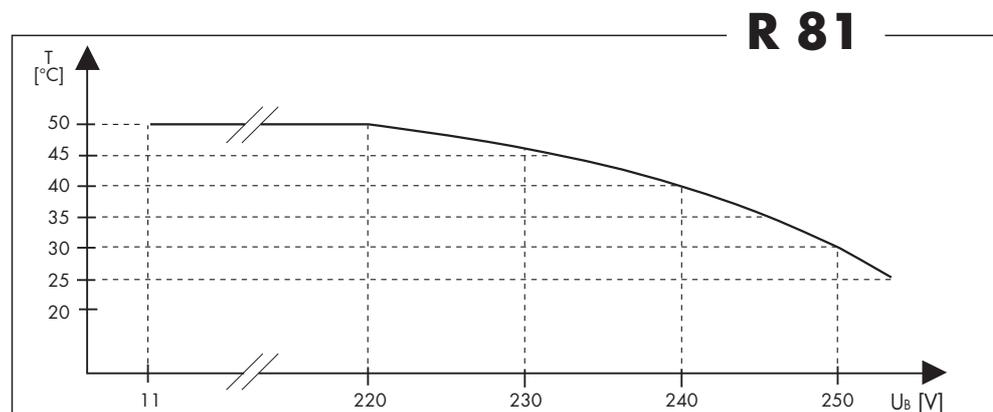
TIME SCALES

(0,1...1) s	(1...10) s	(10...60) s	(1...10) min	(10...60) min	(1...10) h
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6

TECHNICAL DATA

	81.01	81.11		
SUPPLY VOLTAGE (U _N)	(12 ... 230) V AC/DC (non polarized)	12, 24, 48, 110 V AC/DC (non polarized) 230 V AC		
OPERATING RANGE	U _{min} = 11 V U _{max} = 250 V	U _{min} = 0.85 U _N U _{max} = 1.1 U _N		
POWER CONSUMPTION relay OFF: relay ON:	< 35 mW at 12 V; < 1.7 W at 230 V < 400 mW at 12 V; < 2 W at 230 V	< 50 mW < 700 mW		
DIELECTRIC STRENGTH BETWEEN OPEN CONTACTS	1,000 V AC	1,000 V AC		
MECHANICAL LIFE	20 · 10 ⁶ cycles	20 · 10 ⁶ cycles		
PROTECTION CATEGORY	IP 20	IP 20		
DELAY SETTING	0.1 s...10h (see time scales)	0.1 s...10h (see time scales)		
REPEATABILITY	± 1 %	± 1 %		
SETTING ACCURACY - FULL RANGE	± 5 %	± 5 %		
RECOVERY TIME	≤ 100 ms	≤ 100 ms		
MINIMUM START/RESET PULSE DURATION	50 ms	50 ms		
AMBIENT TEMPERATURE	see diagram R 81	(-10...+50)°C		
POWER LOST IN THE ENVIRONMENT	12 V AC/DC - without load: 0.03 W - at full load: 1.9 W	230 V AC/DC 1.03 W 3.2 W	12 V AC/DC 0.05 W 0.9 W	230 V AC/DC 2.2 W 3.4 W

MAX AMBIENT TEMPERATURE
VERSUS SUPPLY VOLTAGE
(for timer type 81.01).
If the apparatus operates at a
temperature near the [R 81] limit
curve, adequate ventilation must
be provided.
Minimum ambient temperature:
-10°C.



WORKING CONDITIONS

In conformity with EC Directive on EMC (89/336), the timer has a high level of immunity, both from radiated and conducted disturbances (according to EN 61812-1). However, the timer (and its supply and control wiring) must be installed as far as possible from disturbance sources (such as transformers, contactors, circuit-breakers and their power cables). The cables for Start and Reset contact wiring must be short and, if possible, shielded.

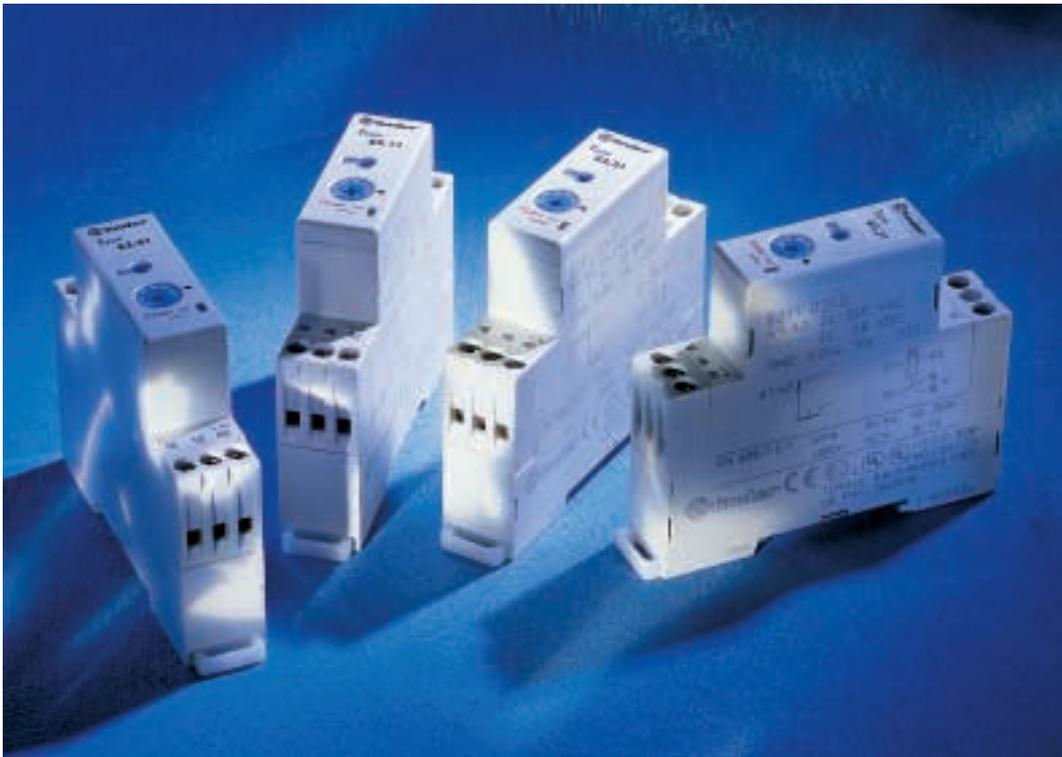
CONTACT SPECIFICATIONS

RATED CURRENT	16 A
MAXIMUM PEAK CURRENT	30 A
RATED VOLTAGE	250 V AC
MAXIMUM SWITCHING VOLTAGE	400 V AC
NOMINAL RATE IN AC1	4,000 VA
SINGLE PHASE HP MOTOR RATING (230 V AC)	0.44 kW/0.6 HP
BREAKING CAPACITY IN DC1: 30/110/220 V	16 A/0.3 A/0.12 A
ELECTRICAL LIFE AT 2.5 kVA AC1	100 · 10 ³ cycles
MINIMUM SWITCHING LOAD	500 mW (10 V/5 mA)
CONTACT MATERIAL	AgCdO

ORDERING INFORMATION

Example: a 81 series multi-voltage 16 A relay with 1 CO (SPDT) contact, supply rated at 12 ... 230 V AC/DC.

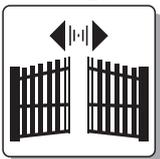
8 1	0	1	0	2 3 0	0	0	0	0
Series	Type	No. of poles	Coil version	Coil voltage				
	0 = Multi-voltage 1 = Mono-voltage	1 = 1 CO (SPDT)	0 = AC (50/60 Hz)/DC 8 = AC (50/60 Hz)	012 = 12 V AC/DC 024 = 24 V AC/DC 048 = 48 V AC/DC 110 = 110 V AC/DC 230 = 230 V AC 230 = 12 ... 230 V AC/DC (81.01)				



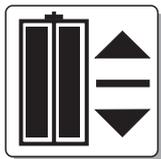
A range of modular timers

- One module (17.5 mm) wide
- Four functions
- Six time scales, from 0.05s to 10h
- Supply voltage: 24...240 V AC
24...48 V DC
- 35 mm rail (EN 50022) mount
- Approvals (according to type): cULus, GL

AUTOMATIC
GATES



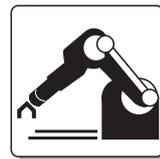
ELEVATORS



ALARM
SYSTEMS



INDUSTRIAL
AUTOMATION



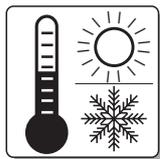
BURNERS



INDUSTRIAL
APPLIANCES



AIR
CONDITIONING



MEDICAL
EQUIPMENT





MODULAR TIMERS 5 A

TYPE 82.01 1 CO (SPDT) Multi-function (AI, DI, SW, BE)

TYPE 82.11 1 CO (SPDT) Mono-function: ON delay (AI)

TYPE 82.21 1 CO (SPDT) Mono-function: ON pulse (DI)

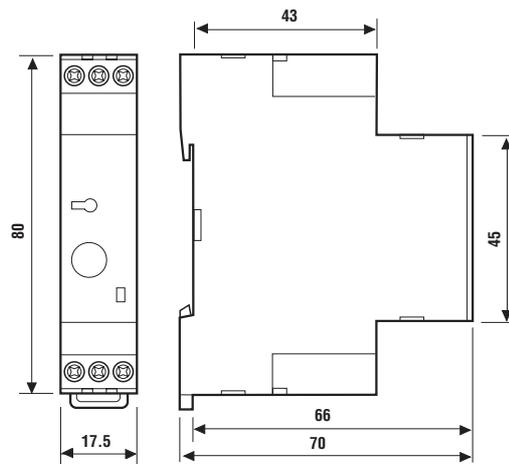
TYPE 82.31 1 CO (SPDT) Mono-function: symmetrical recycler: pulse start (SW)

TYPE 82.41 1 CO (SPDT) Mono-function: OFF delay: timing on START release (internal start) (BE)

TYPE 82.82 2 NO (DPST-NO) Mono-function: star - delta (SD)

- Functions: see page 9

- Ordering information: see page 10



EMC SPECIFICATIONS

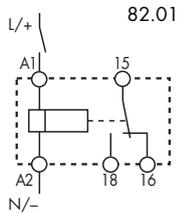
TYPE OF TEST	REFERENCE STANDARD	
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2	8 kV
		8 kV
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)	10 V/m
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4	4 kV
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5	4 kV
		—
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)	10 V
RADIATED AND CONDUCTED EMISSION	EN 55022	class B

DESCRIPTION OF THE FUNCTIONS

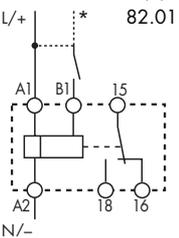
The (C) indicated in the diagrams refers to the position of the NO contact. When the red LED is illuminated the NO contact is closed.

	LED	Type	Supply voltage	NO contact position	Contact	
					open	closed
U = Supply Voltage		82.01	YES	open	15 - 18	15 - 16
		82.11				
S = START		82.31	YES	closed	15 - 16	15 - 18
		82.41				
C = Relay Contact (NO)		82.82	YES	closed (λ)	17 - 28	17 - 18
			YES	closed (Δ)	17 - 18	17 - 28

wiring diagram
without external
START



wiring diagram with
external START (S)



Type 82.01

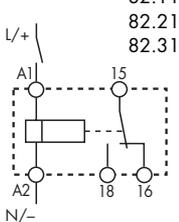
(AI) ON delay.
Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.

(DI) ON pulse.
Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.

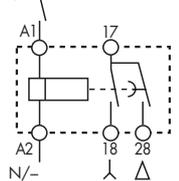
(SW) Symmetrical recycler: pulse start.
Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between **ON** and **OFF** as long as power is applied. The ratio is 1:1 (time off = time on).

(BE) OFF delay: timing on START release (internal start).
Power must be applied at all times to timer. On closure of normally open control **Signal Switch**, the output contact transfers and remains in that position. When the **Signal Switch** is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.

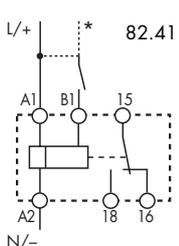
wiring diagram
without external
START



wiring diagram
with external START



wiring diagram
with external START



82.11

(AI) ON delay.
Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.

82.21

(DI) ON pulse.
Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.

82.31

(SW) Symmetrical recycler: pulse start.
Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between **ON** and **OFF** as long as power is applied. The ratio is 1:1 (time off = time on).

82.82

(SD) Star - delta.
Apply power to relay. Closure of the star contact (λ) occurs immediately. After preset time has elapsed the star contact (λ) returns to the original position. After a fixed time of ~60 ms the delta contact (Δ) closes and remains in that position.

82.41

(BE) OFF delay: timing on START release (internal start).
Power must be applied at all times to timer. On closure of normally open control **Signal Switch**, the output contact transfers and remains in that position. When the **Signal Switch** is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.

* 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

TECHNICAL DATA

SUPPLY VOLTAGE (U _N)	AC: (24...240) V 50/60 Hz DC: (24...48) V
OPERATING RANGE	AC: (0.85...1.1)U _N DC: (0.85...1.2)U _N
POWER CONSUMPTION	AC: 5 VA to 240 V DC: 0.5 W to 24 V
DIELECTRIC STRENGTH BETWEEN OPEN CONTACTS	2 kV AC
SURGE TEST (1.2/50 μs) BETWEEN COIL AND CONTACTS	4 kV
DELAY SETTING	0.05 s to 10h (see time scales)
REPEATABILITY	± 1 %
SETTING ACCURACY - FULL RANGE	± 5%
RECOVERY TIME	≤ 100 ms
MINIMUM START PULSE DURATION	≥ 250 ms
AMBIENT TEMPERATURE	(-20...+50)°C

CONTACT SPECIFICATIONS

RATED CURRENT	5 A
MAXIMUM PEAK CURRENT	20 A
RATED VOLTAGE	250 V AC
MAXIMUM SWITCHING VOLTAGE	440 V AC
BREAKING CAPACITY IN DC1: 30/110/220 V	5 A/0.3 A/0.12 A
NOMINAL RATE IN AC1	1,000 VA
MINIMUM SWITCHING LOAD	300 mW (10 V/5mA)
CONTACT MATERIAL	AgCdO

FUNCTIONS AND TIME SCALES

Type	Function Code	Function	Time Scales							
			s	s	s	min	min	h	h	
			0.05	0.15	0.5	0.05	0.5	0.05	0.5	
			1	3	10	1	10	1	10	
82.01	AI	ON delay	•		•	•	•	•	•	
	BE	OFF delay: timing on START release (internal start)	•		•	•	•	•	•	
	DI	ON pulse	•		•	•	•	•	•	
	SW	Symmetrical recycler: pulse start	•		•	•	•	•	•	
82.11	AI	ON delay	•		•	•	•	•		
82.21	DI	ON pulse	•		•	•	•	•		
82.31	SW	Symmetrical recycler: pulse start	•		•	•	•	•		
82.41	BE	OFF delay: timing on START release (internal start)	•		•	•	•	•		
82.82	SD	Star - delta		•	•	•	•			

ORDERING INFORMATION

Example: a 82 series, multi-function modular timer, 24...48 V DC and 24...240 V AC (50/60) Hz supply voltage.

8 2 0 1 0 240 0 0 0 0

Series

No. of poles

1 = 1 CO (SPDT)
for function
0, 1, 2, 3, 4
2 = 2 NO (DPST-NO)
for star - delta

Coil version

0 = AC (50/60 Hz)/DC

Coil voltage

240 = { 24 ... 48 V DC
24 ... 240 V AC (50/60) Hz

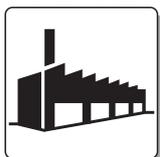
Type

0 = Multi-function
1 = ON delay (AI)
2 = ON pulse (DI)
3 = Symmetrical recycler: pulse start (SW)
4 = OFF delay: timing on START release (internal start) (BE)
8 = Star - delta (SD)



- Six time scales, from 0.1 s to 10h
- Each timer has 2 functions
- Supply voltage: 12, 24, 48, 110/125 V AC/DC (non polarized);
230/240 V AC
- Functions and time scales set by DIP switches situati sulla parte superiore del relè
- LED indication
- 2 CO (DPDT), 3 CO (3PDT) 10 A 250 V AC1 or 4 CO (4PDT) 5 A 252 V AC1 contacts available
- Sockets and accessories: see 94 series
- Conforms to EN 61812-1 standard
- Approvals (according to type): CSA, cULus

INDUSTRIAL
APPLIANCES



INDUSTRIAL
AUTOMATION





85.32



85.54



MINIATURE PLUG-IN TIMERS 5 - 10 A

TYPE 85.32 2 CO (DPDT) 10 A

TYPE 85.33 3 CO (3PDT) 10 A

TYPE 85.34 4 CO (4PDT) 5 A

- Functions available, see page 13:
 - ON delay (AI)
 - ON pulse (DI)
- 2.0 x 0.5 mm terminals
- LED indication: red = relay ON
green = power ON
- Mounting: see 94 series sockets
- Ordering information: see page 15

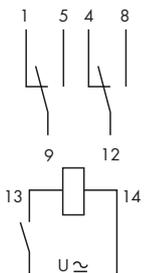
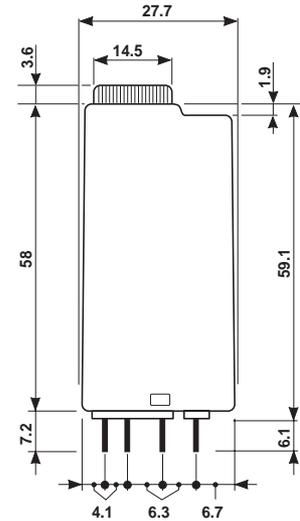
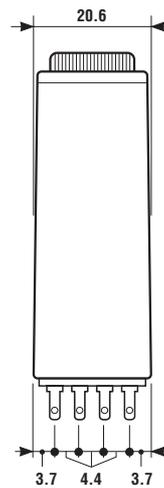
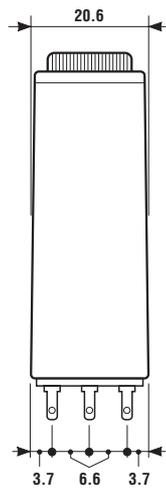
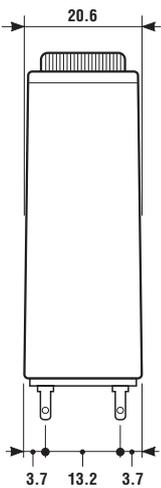
MINIATURE PLUG-IN TIMERS 5 - 10 A

TYPE 85.52 2 CO (DPDT) 10 A

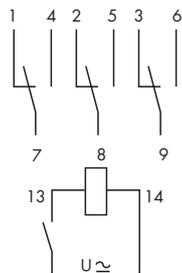
TYPE 85.53 3 CO (3PDT) 10 A

TYPE 85.54 4 CO (4PDT) 5 A

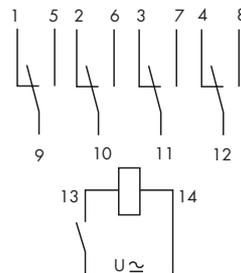
- Functions available, see page 13:
 - symmetrical recycler: pulse start (SW)
 - symmetrical recycler: pause start (SP)
- 2.0 x 0.5 mm terminals
- LED indication: red = relay ON
green = power ON
- Mounting: see 94 series sockets
- Ordering information: see page 15



85.32 / 85.52



85.33 / 85.53



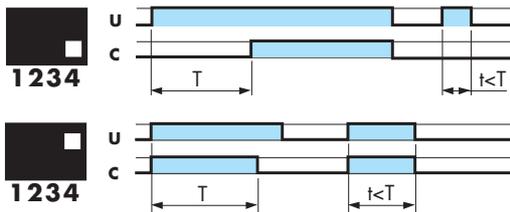
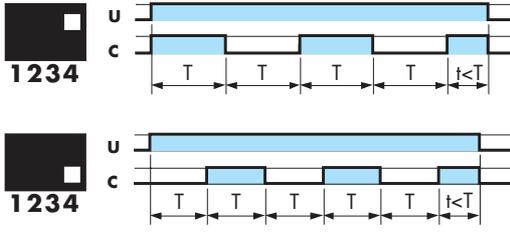
85.34 / 85.54

EMC SPECIFICATIONS

TYPE OF TEST	REFERENCE STANDARD	
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2	n.a. 8 kV
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)	15 V/m
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4	4 kV
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5	4 kV 2 kV
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)	10 V
POWER-FREQUENCY (50 Hz)	EN 61000-4-8	30 A/m
RADIATED AND CONDUCTED EMISSION	EN 55022	class B

DESCRIPTION OF THE FUNCTIONS

The (C) indicated in the diagrams refers to the position of the NO contacts.
When the red LED (C) is illuminated the NO contact are closed.

U = SUPPLY VOLTAGE C = RELAY CONTACT (NO)	
Types 85.32 85.33 85.34	 <p>(AI) ON delay. Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.</p> <p>(DI) ON pulse. Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.</p>
Types 85.52 85.53 85.54	 <p>(SW) Symmetrical recycler: pulse start. Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between ON and OFF as long as power is applied. The ratio is 1:1 (time off = time on).</p> <p>(SP) Symmetrical recycler: pause start. Apply power to timer. First transfer of contact occurs after preset time has elapsed. The timer now cycles between OFF and ON as long as power (time off = time on).</p>

TIME SCALES

(0.1...1) s	(1...10) s	(10...60) s	(1...10) min	(10...60) min	(1...10) h
					
1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

TECHNICAL DATA

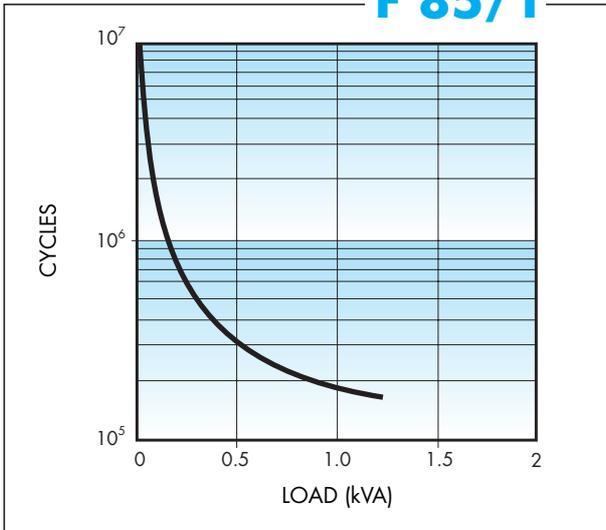
SUPPLY VOLTAGE (U _N)		12, 24, 48, 110/125 V AC/DC (non polarized) 230/240 V AC	
OPERATING RANGE		AC (50/60 Hz)/DC: (0.85...1.1)U _N	
POWER CONSUMPTION		AC: ≤ 2 VA DC: ≤ 2 W	
DIELECTRIC STRENGTH		2 (DPDT) - 3 CO (3PDT)	4 CO (4PDT)
	between coil and contacts:	2,000 V	2,000 V
	between open contacts:	1,000 V	1,000 V
	between adjacent contacts:	2,000 V	1,550 V
	between frame and live parts:	1,500 V	1,500 V
MECHANICAL LIFE		10 · 10 ⁶ cycles	
PROTECTION CATEGORY		IP 40	
DELAY SETTING		0.1 s...10h (see time scales)	
REPEATABILITY		± 2%	
SETTING ACCURACY - FULL RANGE		± 5%	
RECOVERY TIME		≤ 20 ms	
AMBIENT TEMPERATURE		(-20...+60)°C	
POWER LOST IN THE ENVIRONMENT		85.x2.8.230	85.x3.8.230
- without load:		0.6 W	0.6 W
- at full load:		3.7 W	4.7 W
			85.x4.8.230
			0.6 W
			3.3 W

WORKING CONDITIONS: in conformity with EC Directive on EMC (89/336), the timer has a high level of immunity, both from radiated and conducted disturbances (according to EN 61812-1). However, the timer (and its supply and control wiring) must be installed as far as possible from disturbance sources (such as transformers contactors, circuit-breakers and their power cables).

CONTACT SPECIFICATIONS

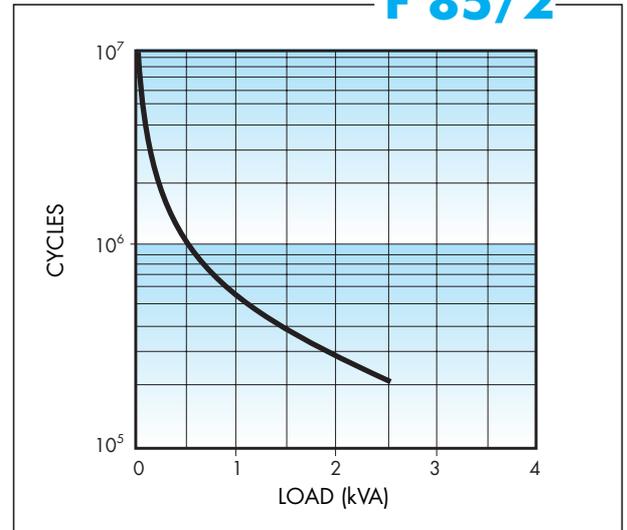
	2 CO (DPDT)	3 CO (3PDT)	4 CO (4PDT)
RATED CURRENT	10 A	10 A	5 A
MAXIMUM PEAK CURRENT	20 A	20 A	10 A
RATED VOLTAGE	250 V AC	250 V AC	250 V AC
MAXIMUM SWITCHING VOLTAGE	400 V AC	400 V AC	400 V AC
NOMINAL RATE IN AC1	2,500 VA	2,500 VA	1,250 VA
NOMINAL RATE IN AC15 (230 V)	500 VA	500 VA	250 VA
BREAKING CAPACITY IN DC1	see diagram H 85	see diagram H 85	see diagram H 85
SINGLE PHASE MOTOR RATING (230 V AC)	0.37 kW/0.6 HP	0.37 kW/0.6 HP	0.125 kW/0.2 HP
ELECTRICAL LIFE IN AC1	see diagram F 85/2	see diagram F 85/2	see F 85/1
CONTACT RESISTANCE: initial	≤ 50 mΩ	≤ 50 mΩ	≤ 50 mΩ
CONTACT MATERIAL	AgNi	AgNi	AgNi

F 85/1



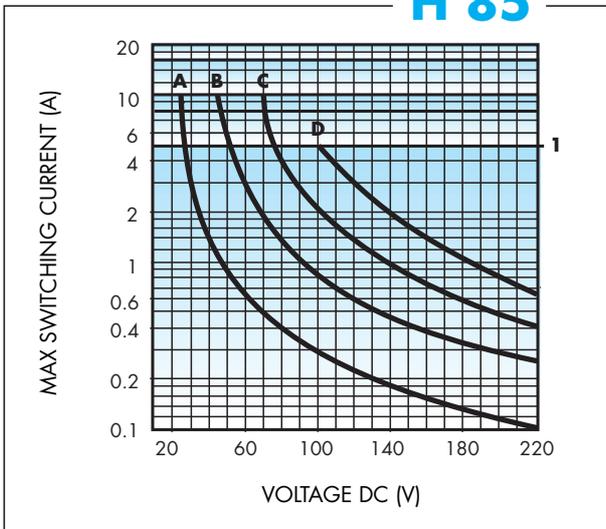
DC contact life vs AC1 load. 4 CO types (5 A)

F 85/2



Contact life vs AC1 load. 2 - 3 CO types (10 A)

H 85



Breaking capacity for DC1 load.

1 = 4 CO type

A = load applied to 1 contact

B = load applied to 2 contacts in series

C = load applied to 3 contacts in series

D = load applied to 4 contacts in series

ORDERING INFORMATION

Example: 85 series timer, 4 CO (4PDT), 24 V AC/DC supply voltage with AI - DI functions.

8	5	3	4	0	0	2	4	0	0	0	0
Series		No. of poles		Coil version		Coil voltage					
3 = Functions: AI - DI 5 = Functions: SW - SP		2 = 2 CO (DPDT) - 10A 3 = 3 CO (3PDT) - 10A 4 = 4 CO (4PDT) - 5A		0 = AC (50/60 Hz)/DC 8 = AC (50/60 Hz) for 230 V only		012 = 12 V AC/DC 024 = 24 V AC/DC 048 = 48 V AC/DC 110 = 110/125 V AC/DC 230 = 230/240 V AC					



A range of sockets and accessories for 85 series timers

Features include:

- PCB, screw terminal, panel or 35 mm rail (EN 50022) mount versions
- Flammability in conformity with UL 94
- Approvals (according to type): BBJ, CSA, DEMKO, CS - IMQ, SEV, cULus



94.14



94.22



P.C.B. SOCKETS

TYPE 94.12 for types 85.32 - 85.52

TYPE 94.13 for types 85.33 - 85.53

TYPE 94.14 for types 85.34 - 85.54

CHARACTERISTICS

- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PPEm (V1)
- CONNECTIONS: Cu Sn 6 tin plated

PANEL MOUNT SOLDER SOCKETS (1 mm thick panel mount)

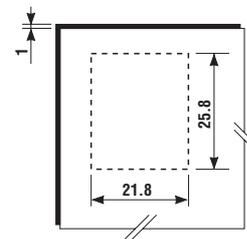
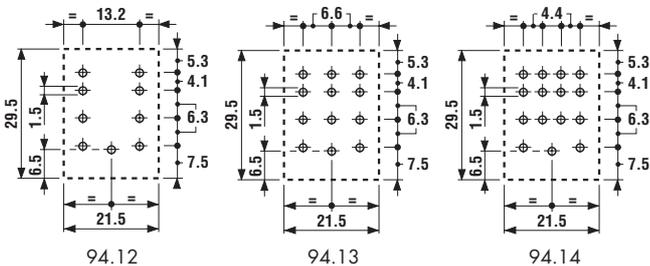
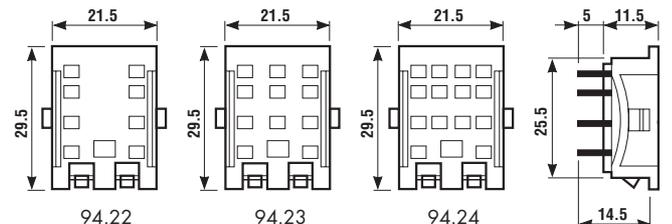
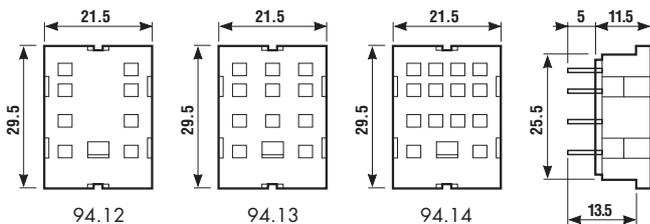
TYPE 94.22 for types 85.32 - 85.52

TYPE 94.23 for types 85.33 - 85.53

TYPE 94.24 for types 85.34 - 85.54

CHARACTERISTICS

- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: polycarbonate (PC)
- CONNECTIONS: Cu Sn 6 silver plated





94.34



94.64



PANEL MOUNT SOLDER SOCKETS (M3 screw mount)

TYPE 94.32 for types 85.32 - 85.52

TYPE 94.33 for types 85.33 - 85.53

TYPE 94.34 for types 85.34 - 85.54

CHARACTERISTICS

- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PPEm (V1)
- CONNECTIONS: Cu Sn 6 tin plated

CLAMP TERMINALS SOCKETS

(panel or 35 mm rail - EN 50022- mount)

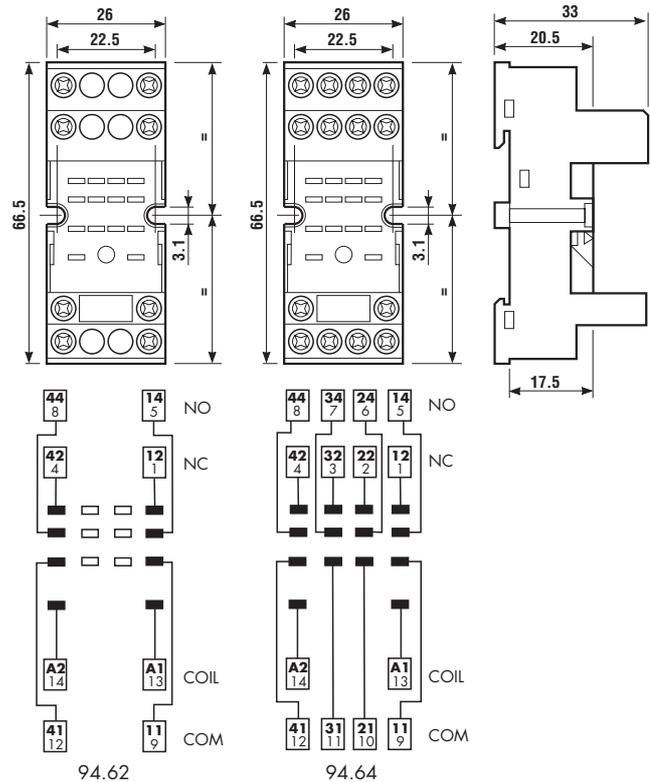
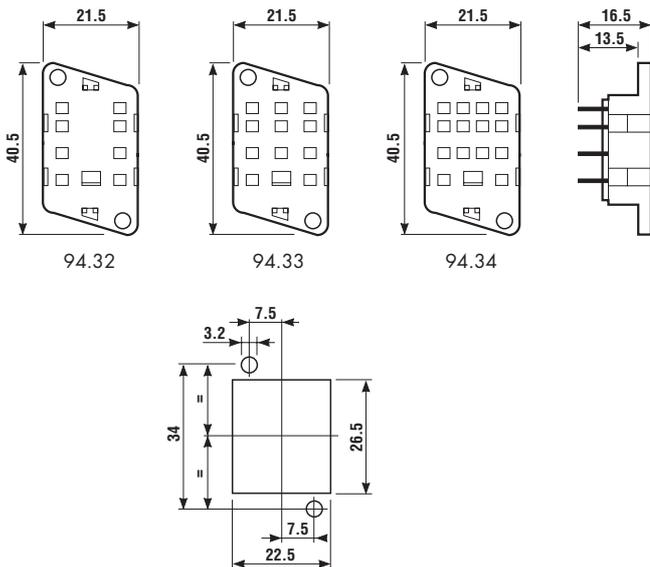
TYPE 94.62 for types 85.32 - 85.52

TYPE 94.64 for types 85.34 - 85.54

Accessories: **TYPE 094.81** retaining clip

CHARACTERISTICS

- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PPEm (V1)
- CONNECTIONS: Cu Zn 33 nickel plated
- PROTECTION CATEGORY: IP 20
- Non removable pozidrive slotted terminal screws.
- Identification label.





94.74



94.82



SCREW TERMINALS SOCKETS (panel or 35 mm rail - EN 50022- mount)

TYPE 94.73 for types 85.32 - 85.52

TYPE 94.74 for types 85.34 - 85.54

Accessories: **TYPE 094.81** retaining clip

CHARACTERISTICS

- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PPEm (V1)
- CONNECTIONS: Cu Zn 33 nickel plated
- PROTECTION CATEGORY: IP 20
- Non removable pozidrive slotted terminal screws.
- Identification label.

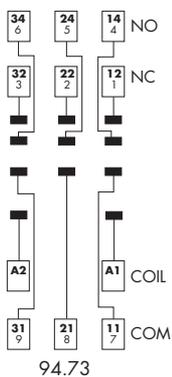
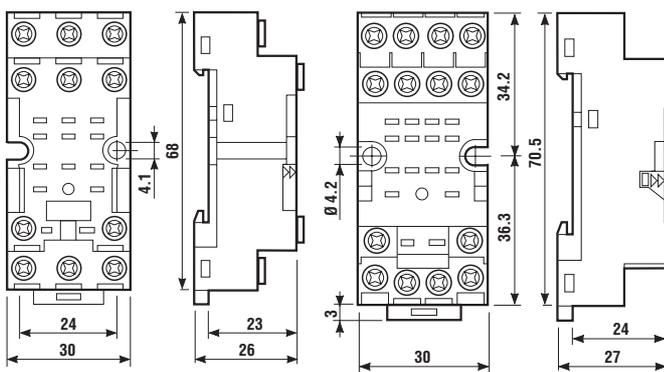
SCREW TERMINALS SOCKETS (panel or 35 mm rail - EN 50022- mount)

TYPE 94.82 for types 85.32 - 85.52

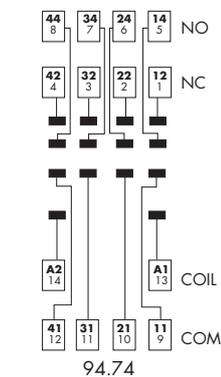
Accessories: **TYPE 094.81** retaining clip

CHARACTERISTICS

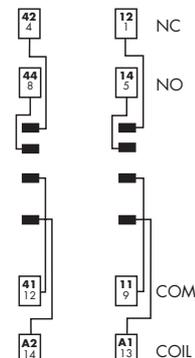
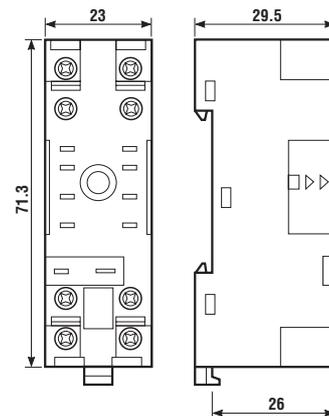
- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PPEm (V1)
- CONNECTIONS: Cu Zn 33 nickel plated
- PROTECTION CATEGORY: IP 20
- Non removable pozidrive slotted terminal screws.
- Identification label.



94.73



94.74





94.04



094.06



CLAMP TERMINALS SOCKETS (panel or 35 mm rail - EN 50022- mount)

TYPE 94.02 for types 85.32 - 85.52

TYPE 94.04 for types 85.34 - 85.54

Accessories: **TYPE 094.81** retaining clip

TYPE 094.06 6-way jumper link

CHARACTERISTICS

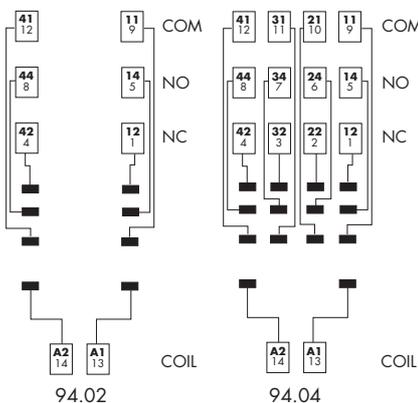
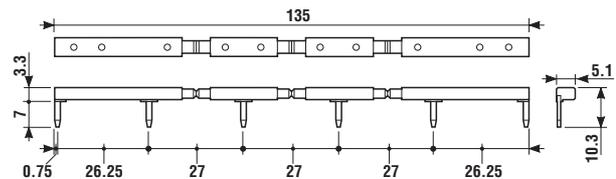
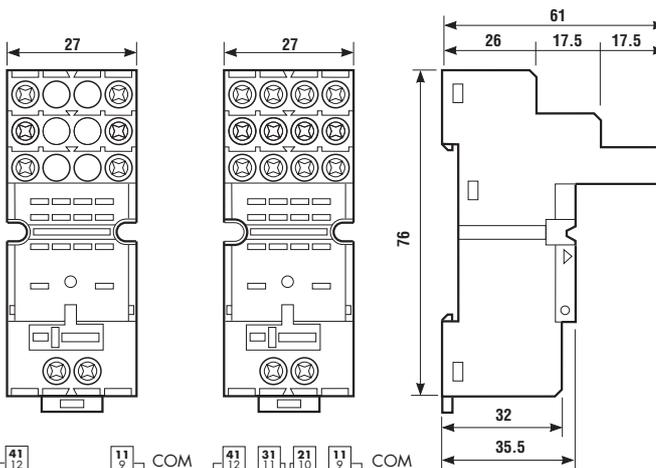
- LOAD: 10 A 250 V
- ISOLATION RESISTANCE: $\geq 10^3 \text{ M}\Omega$
- DIELECTRIC STRENGTH: $\geq 2 \text{ kV AC}$
- MATERIAL: self-extinguishing PA 6 20% FV (V1)
- CONNECTIONS: Cu Zn 33 nickel plated
- PROTECTION CATEGORY: IP 20
- Non removable pozidrive slotted terminal screws.
- Identification label.

6-WAY JUMPER LINK

TYPE 094.06 for socket 94.02 and 94.04

CHARACTERISTICS

- LOAD: 10 A 250 V





- Type 86.60 for use with 90.73 socket and 60.13 relay, or with 90.72 socket and 60.12 relay
- Type 86.10 and 86.20 for use with 95.03 or 95.05 sockets and 40 or 44 series relays, with 94.02 or 94.04 sockets and 55.32 and 55.34 relays, with 92.03 socket and 62.32 and 62.33 relays
- LED indication
- Approvals (according to type): cULus

TOOLING
MACHINES



INDUSTRIAL
APPLIANCES



INDUSTRIAL
AUTOMATION





86.10



86.60



MONO-FUNCTION TIMER MODULE

TYPE 86.10 - ON delay (AI): see page 25

TYPE 86.20 - ON pulse (DI): see page 25

- LED indication: relay ON
- 4 time scales: see page 24
- Ordering information: see page 26

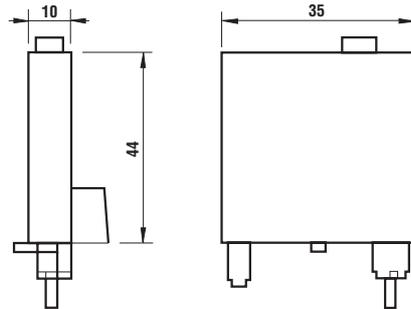
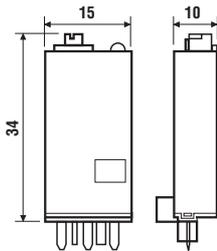
The 86.10 and 86.20 timer modules are for use with 92.03 - 94.02 - 94.04 - 95.03 - 95.05 sockets.

MULTI-FUNCTION TIMER MODULE

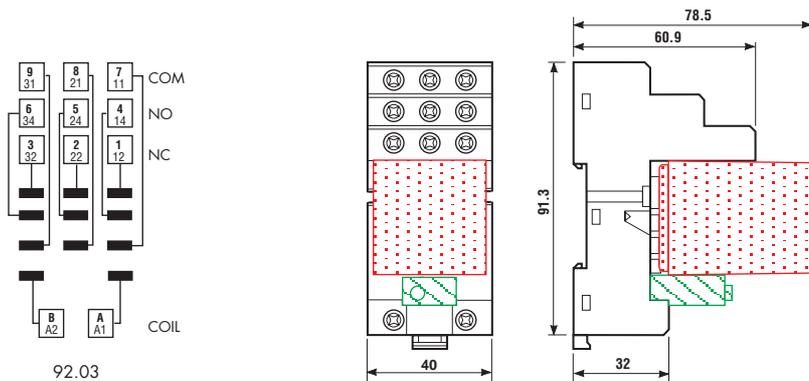
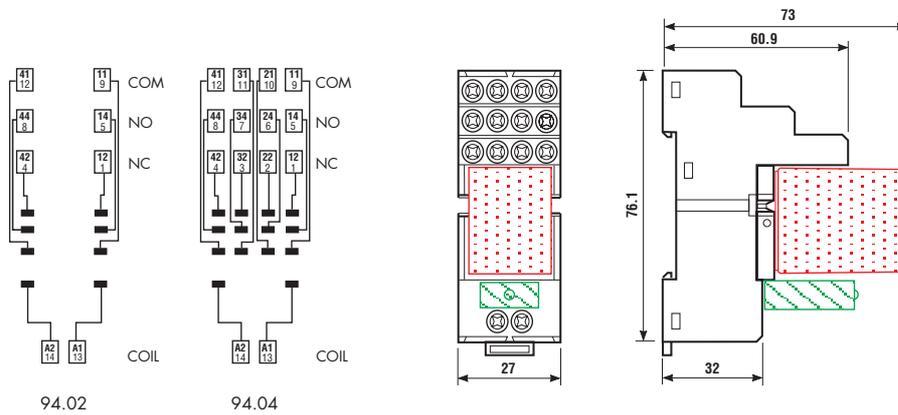
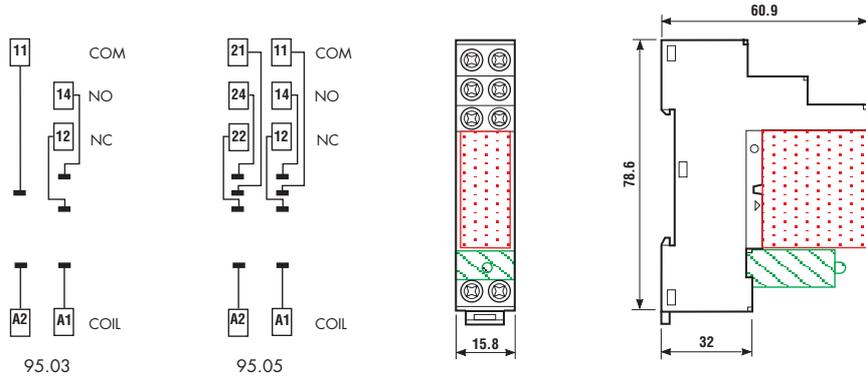
TYPE 86.60 module for use with 90.72 and 90.73 sockets

- Temporizzazioni disponibili: vedere pagina 24
- Additional clamp-terminal for external START (B1)
- LED indication:
 - green = relay ON
 - yellow = relay ON
- Time scales: see page 24
- Ordering information: see page 26

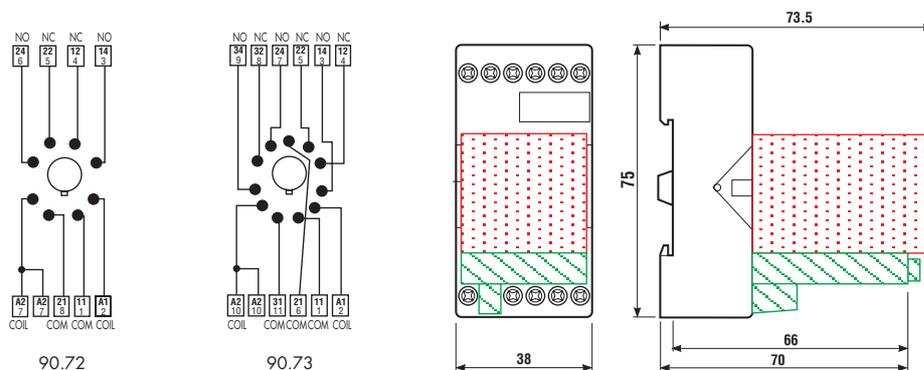
The 86.60 timer module is for use with 90.72 - 90.73 sockets.



MODULES TYPES 86.10 AND 86.20 WITH SOCKETS AND RELAYS



MODULE TYPE 86.60 WITH SOCKET AND RELAY



EMC SPECIFICATIONS

TYPE OF TEST	REFERENCE STANDARD	86.10/20	86.60
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2	n.a. 8 kV	4 kV 8 kV
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)	10 V/m	10 V/m
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4	2 kV	2 kV
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5	— —	2 kV 1 kV
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)	10 V	10 V
POWER-FREQUENCY (50 Hz)	EN 61000-4-8	—	—

TIME SCALES

Type 86.10
Type 86.20

(1.5...15) s	(6...60) s	(0.8...8) min	(6.4...64) min
			

Type 86.60

(15...125) ms	(0.1...1) s	(1...10) s	(0.1...1) min	(1...10) min	(0.1...1) h	(1...10) h
						

Type 86.60...3

(15...400) ms	(0.3...3) s	(3...30) s	(0.3...3) min	(3...30) min	(0.3...3) h	(3...30) h
						

TECHNICAL DATA

Type 86.10
Type 86.20

SUPPLY VOLTAGE (U _N)	(12...24) V AC (50/60 Hz)/DC
RELAY OPERATING RANGE	(0.8...1.1)U _N
DELAY SETTING	1.5s...64 min (see time scales)
REPEATABILITY	± 1%
SETTING ACCURACY - FULL RANGE	± 5%
AMBIENT TEMPERATURE	(-20...+50)°C
RECOVERY TIME	≤150 ms
POWER LOST IN THE ENVIRONMENT - without load: - at full load:	0.2 W see 40, 55, 62 series relays

TYPE 86.60

SUPPLY VOLTAGE (U _N)	AC: (12...240)V (50/60 Hz) DC: (12...125)V	
OPERATING RANGE	AC: (10.8...252)V DC: (10.8...135)V	
RELAY OPERATING RANGE	(0.8...1.1)U _N	
DELAY SETTING	15 ms ... 10h / 15 ms ... 30 h (see time scales)	
REPEATABILITY AND SCALE TOLERANCE - FULL RANGE	± 1%	
RESET TIME	≤ 120 ms	
MINIMUM START PULSE DURATION	20 ms	
AMBIENT TEMPERATURE	(-20...+50)°C	
POWER LOST IN THE ENVIRONMENT - without load: - at full load:	12 V 0.2 W see 60 series relays	230 V see 60 series relays

CONTACT SPECIFICATIONS

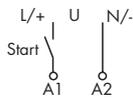
TYPES 86.10 and 86.20: see 40, 44, 55 and 62 series

TYPE 86.60: see types 60.12 and 60.13

DESCRIPTION OF THE FUNCTIONS

The (C) indicated in the diagrams refers to the position of the NO contact.

	LED		Supply voltage	NO contact position
	green (86.60 only)	yellow		
U = Supply Voltage			NO	open
S = START			YES	open
C = Relay Contact (NO)			YES	closed



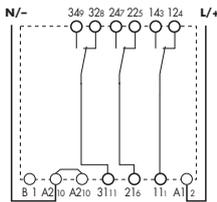
Type 86.10

(AI) ON delay.
Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.

Type 86.20

(DI) ON pulse.
Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.

Function *
wiring diagram without external START



3 2 1

(AI) ON delay.
Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.

3 2 1

(DI) ON pulse.
Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.

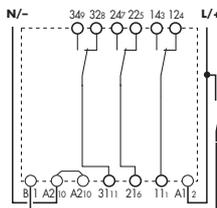
3 2 1

(SW) Symmetrical recycler: pulse start.
Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between **ON** and **OFF** as long as power is applied. The ratio is 1:1 (time off = time on).

3 2 1

(SP) Symmetrical recycler: pause start.
Apply power to timer. First transfer of contact occurs after preset time has elapsed. The timer now cycles between **OFF** and **ON** as long as power is applied. The ratio is 1:1 (time off = time on).

Function *
wiring diagram without external START o in conformita a EN 60204-1



3 2 1

(BE) OFF delay: timing on START release (internal start).
Power must be applied at all times to timer. On closure of normally open control **Signal Switch**, the output contact transfers and remains in that position. When the **Signal Switch** is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.

3 2 1

(DE) ON pulse: timing on START pulse.
Power must be applied at all times to timer. On momentary or maintained closure of a normally open control **Signal Switch**, the output contact transfers. After the desired time has elapsed, the contact returns to the original position.

3 2 1

(EE) OFF pulse: timing on START release.
Power must be applied at all times to timer. On opening a normally open control **Signal Switch**, the output contact transfers. After the desired time has elapsed, the contact returns to the original position.

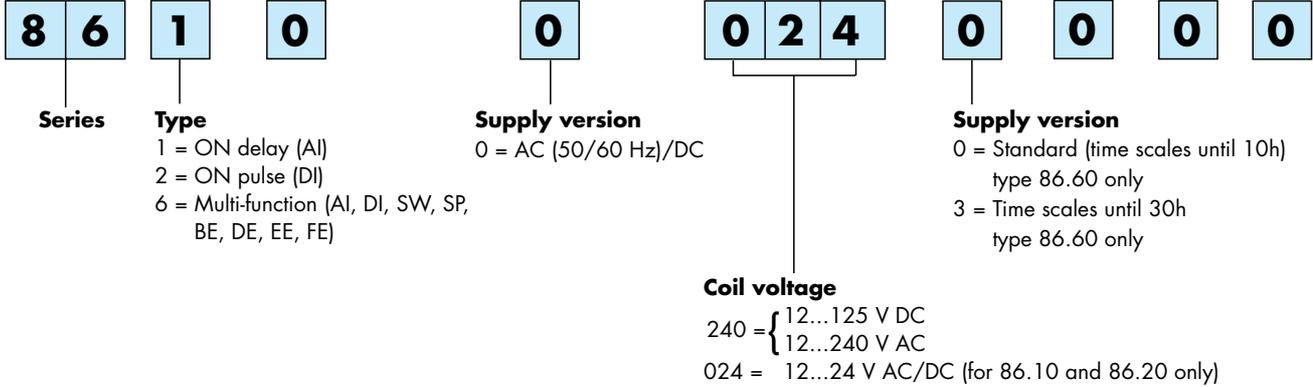
3 2 1

(FE) On pulse + OFF pulse: timing on Start pulse and on START release.
Power must be applied at all times to timer. On opening or closing of a normally open **Signal Switch**, the output contact occurs. After the desired time has elapsed, the contact returns to the original position.

* Contacts 31-32-34 are not connected when mounted with 60.12 relay and 90.72 socket.

ORDERING INFORMATION

Example: 86 series multi-function timer module, with (12 to 240) V AC and (12 to 115) V DC supply voltage.





A range of modular timers 5 - 8 A

Features include:

- One module (22.5 mm) wide
- Monofunction and multifunction versions available
- Time scales from 0.05s to 60h
- "1 delayed contact + 1 instantaneous contact" version available (type 87.02)
- LED indicator
- 35 mm rail (EN 50022) mounting
- Approvals (according to type): cUL, GL

INDUSTRIAL
APPLICATIONS



INDUSTRIAL
AUTOMATION



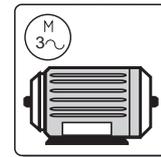
TOOLING
MACHINES



PLASTIC
MOULDING
MACHINES



ELECTRIC
MOTORS





87.01



87.02



MODULAR TIMERS 8 A

TYPE 87.01 1 CO (SPDT)
Multifunction (AI, BE, CE, DI, DE, EE, GI, SW, ON, OFF)

TYPE 87.11 1 CO (SPDT)
ON Delay (AI)

TYPE 87.21 1 CO (SPDT)
ON Pulse (DI)

TYPE 87.31 1 CO (SPDT)
Symmetrical recycler: pulse start (SW)

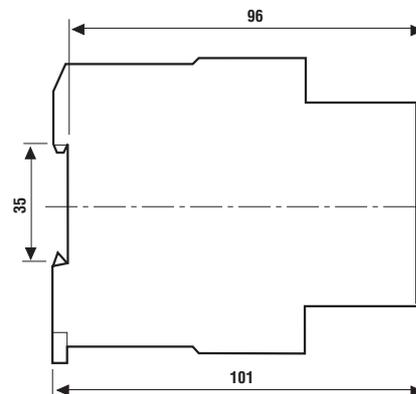
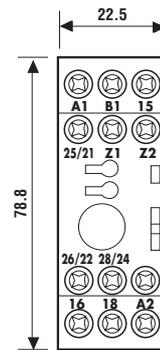
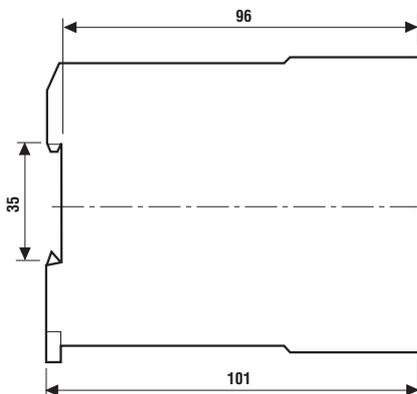
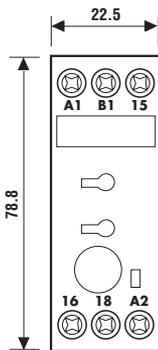
TYPE 87.41 1 CO (SPDT)
OFF delay: timing on START release (internal start) (BE)

TYPE 87.82 2 NO (DPST)
Star - delta (SD)
- Functions: see page 30, 31
- Ordering information: see page 34

MODULAR TIMER 8 A

TYPE 87.02 2 delayed contacts or 1 delayed contact +
1 instantaneous contact

Multifunction (AI, BE, CE, DI, DE, EE, GI, SW, ON, OFF)
- Regulated using an external potentiometer (10 kΩ)
- Functions: see page 30
- Ordering information: see page 34




87.61

87.91


MODULAR TIMERS 5 A

TYPE 87.61 1 CO (SPDT)

TYPE 87.62 2 CO (DPDT)

True OFF delay (power OFF) (BI) without auxiliary supply

- Functions: see page 31

- Ordering information: see page 34

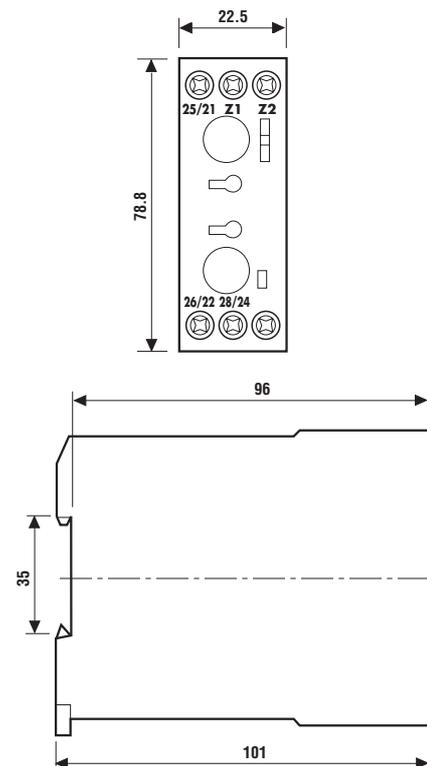
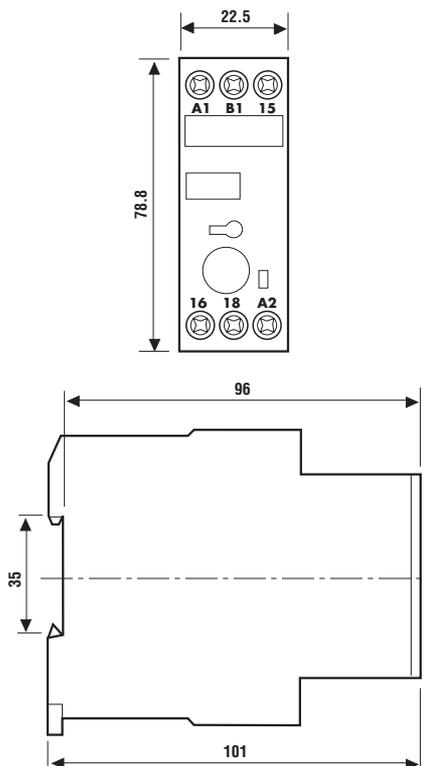
MODULAR TIMER 8 A

TYPE 87.91 1 CO (SPDT)

Asymmetrical recycler (LI, LE, PI, PE)

- Functions: see page 31

- Ordering information: see page 34



The (C) indicated in the diagrams refers to the position of the NO contact.

U = Supply Voltage
S = START
C = Relay Contact (NO)

LED** green	Timing	NO contact position	Timed		Contact DIP switch	Instantaneous*	
			open	closed		open	closed
	none	open	15 - 18 25 - 28*	15 - 16 25 - 26*	up	21 - 24*	21 - 22*
	in progress	open	15 - 18 25 - 28*	15 - 16 25 - 26*		21 - 22*	21 - 24*
	in progress	closed	15 - 16 25 - 26*	15 - 18 25 - 28*		21 - 22*	21 - 24*
	none	closed	15 - 16 25 - 26*	15 - 18 25 - 28*	down	21 - 22*	21 - 24*

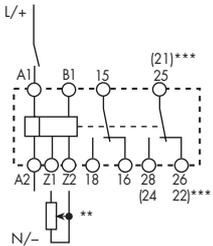
* 25-26-28 only for type 87.02 with 2 timed contacts. 21-22-24 only for type 87.02 with 1 instantaneous contact (+1 timed) positioning the front DIP switch.

** The LED on type 87.61 is illuminated when supply voltage is supplied to timer.

Functions

Multi-function

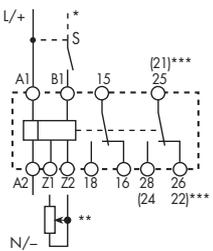
wiring diagram without external START



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

NB.: position the potentiometer on "zero".

wiring diagram without external START



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

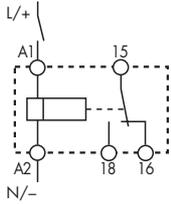
NB.: position the potentiometer on "zero".

* A voltage other than the supply voltage can be applied to the command START (B1).

Types 87.01 and 87.02		(AI) ON delay. Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.
		(DI) ON pulse. Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.
		(GI) Fixed pulse (0.5s) delayed. Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs after a fixed time of 0.5s.
		(SW) Symmetrical recycler: pulse start. Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between ON and OFF as long as power is applied. The ratio is 1:1 (time off = time on).
		(BE) OFF delay: timing on START release (internal start). Power must be applied at all times to timer. On closure of normally open control Signal Switch , the output contact transfers and remains in that position. When the Signal Switch is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.
		(CE) ON and OFF delay (external start). On closure of the normally open control Signal Switch , the desired delay begins. After the preset time has elapsed the output contact transfers and remains in that position. When the Signal Switch is reopened, the desired delay begins again. After the preset time has elapsed, the contact returns to the original position.
		(DE) ON pulse: timing on START pulse. Power must be applied at all times to timer. On momentary or maintained closure of a normally open control Signal Switch , the output contact transfers. After the desired time has elapsed, the contact returns to the original position.
		(EE) OFF pulse: timing on START release. Power must be applied at all times to timer. On opening a normally open control Signal Switch , the output contact transfers. After the desired time has elapsed, the contact returns to the original position.
		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.	

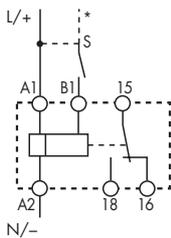
Functions

wiring diagram without external START



Functions

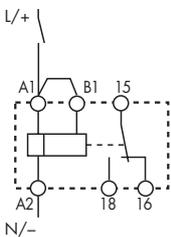
wiring diagram with external START



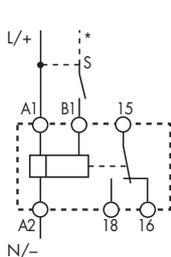
Asymmetrical recycler

Functions

wiring diagram without external START



wiring diagram with external START



Types		
87.11		<p>(AI) ON delay. Apply power to timer. Contact transfers after preset time has elapsed. Reset occurs when power is removed.</p>
87.21		<p>(DI) ON pulse. Apply power to timer. Contact transfers immediately. After preset time has elapsed, contact returns to original position.</p>
87.31		<p>(SW) Symmetrical recycler: pulse start. Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between ON and OFF as long as power is applied. The ratio is 1:1 (time off = time on).</p>
87.61 87.62		<p>(BI) True OFF delay (power OFF). Apply power to timer ($T_{min} = 300ms$). Contact transfers immediately. Reset occurs when power is removed after preset time elapsed.</p>
87.82		<p>(SD) Star - delta. Apply power to timer. Closure of the star contact () occurs immediately. After preset time has elapsed the star contact () returns to the original position. After a fixed time of ~ 60 ms the delta contact (Δ) closed and remains in that position.</p>
87.41		<p>(BE) OFF delay: timing on START release (internal start). Power must be applied at all times to timer. On closure of normally open control Signal Switch, the output contact transfers and remains in that position. When the Signal Switch is reopened, the desired delay begins. After preset time has elapsed, the contact returns to the original position.</p>

87.91		<p>(LI) Asymmetrical recycler pulse start. Apply power to timer. First transfer of contact occurs as soon as power is applied. The timer now cycles between ON and OFF as long as power is applied. The cycles are not equal (time off = time on).</p>
		<p>(PI) Asymmetrical recycler pause start. Apply power to relay. First transfer of contact occurs as soon as power is applied. The timer now cycles between OFF and ON as long as power is applied. The cycles are not equal (time off = time on).</p>
		<p>(LE) Asymmetrical recycler pulse start (external start). On closure of the normally open control Signal Switch the first transfer of contact occurs. The timer now cycles between ON and OFF. The cycles are not equal (time off = time on).</p>
		<p>(PE) Asymmetrical recycler pause start (external start). On closure of the normally open control Signal Switch the first transfer of contact occurs. The timer now cycles between OFF and ON. The cycles are not equal (time off = time on).</p>

EMC SPECIFICATIONS

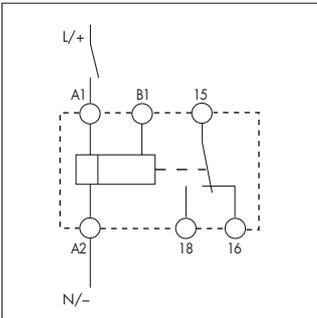
TYPE OF TEST	REFERENCE STANDARD	
ELECTROSTATIC DISCHARGE - contact discharge - air discharge	EN 61000-4-2	8 kV
		8 kV
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	ENV 50140 (IEC 1000-4-3)	10 V/m
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz) on Supply terminals	EN 61000-4-4	6 kV
SURGES (1.2/50 µs) on Supply terminals - common mode - differential mode	EN 61000-4-5	4 kV
		—
RADIO-FREQUENCY COMMON MODE (0.15 ÷ 80 MHz) on Supply terminals	ENV 50141 (IEC 1000-4-6)	10 V
RADIATED AND CONDUCTED EMISSION	EN 55022	class B

WIRING DIAGRAMS

TYPE 87.01

INTERNAL START

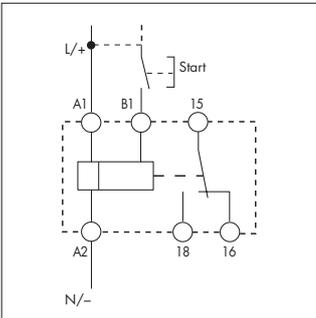
FUNCTIONS: AI, DI, GI, SW, ON, OFF



TYPE 87.01*

EXTERNAL START

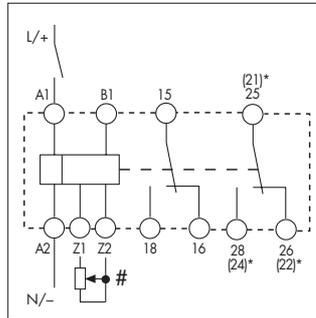
FUNCTIONS: BE, CE, DE, EE



TYPE 87.02

INTERNAL START

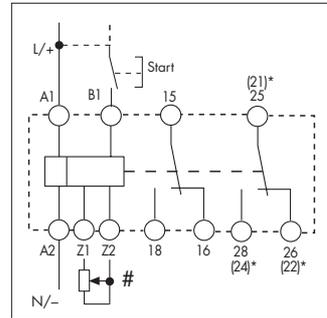
FUNCTIONS: AI, DI, GI, SW, ON, OFF



TYPE 87.02*

EXTERNAL START

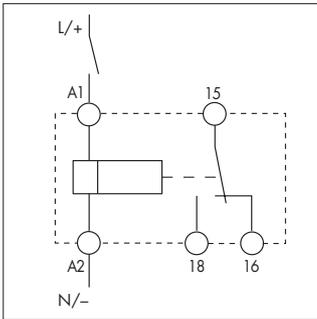
FUNCTIONS: BE, CE, DE, EE



TYPE 87.11-87.21-87.31-87.61

INTERNAL START

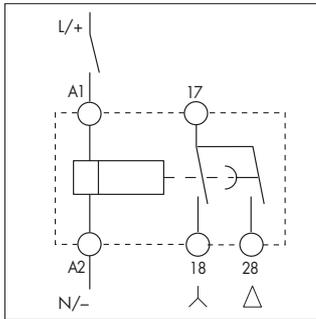
FUNCTIONS: AI, BI, DI, SW



TYPE 87.82

INTERNAL START

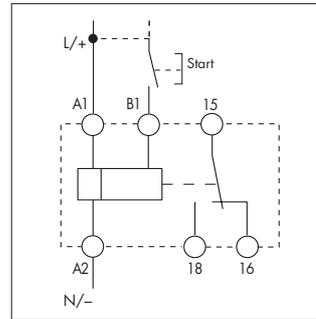
FUNCTIONS: SD



TYPE 87.41*

EXTERNAL START

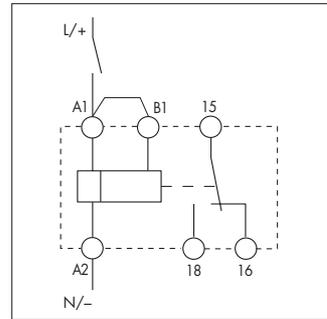
FUNCTIONS: BE



TYPE 87.91

INTERNAL START

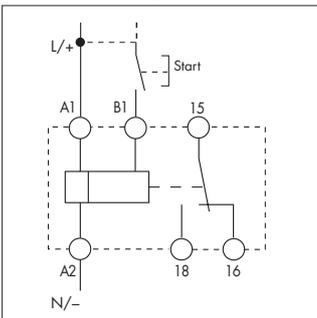
FUNCTIONS: LI, PI



TYPE 87.91*

EXTERNAL START

FUNCTIONS: LE, PE



* The functions with external start (B1) may be activated using a different voltage from that used for the supply voltage.

Example: A1 - A2 = 230 V AC

B1 - A2 = 24 V AC

TYPE 87.02:

The 1st contact (terminal numbers 15 - 16 - 18) is always timed according to the function selected.

The 2nd contact is:

- timed in the same way as the 1st contact only if the selector switch is set in the following position: In this case terminals 25 - 26 - 28 must be used.

- instantaneous: In this case terminals 21 - 22 - 24 must be used.

A (10 KΩ) potentiometer may be connected between terminals Z1 and Z2 for external timer regulation. Set the potentiometer to zero.

TIME SCALES

Types: 87.01, 87.02, 87.11, 87.21, 87.41, 87.91

0.05 ÷ 1 s	0.15 ÷ 3 s	0.5 ÷ 10 s	
0.05 ÷ 1 min	0.15 ÷ 3 min	0.5 ÷ 10 min	
0.05 ÷ 1 h	0.15 ÷ 3 h	0.5 ÷ 10 h	3 ÷ 60 h

Type: 87.31

0.5 ÷ 10 s

Type: 87.82

0.05 ÷ 1 min

 Types: 87.61
87.62

0.15 ÷ 2.5 s
0.5 ÷ 10 s
4 ÷ 80 s
30 s ÷ 10 min

TECHNICAL DATA

SUPPLY VOLTAGE (U_N)	AC: (24...240) V 50/60 Hz DC: (24...48) V (24...240) V AC (50/60 Hz)/DC (for 87.61 and 87.62 only)
OPERATING RANGE	AC: (0.85...1.1) U_N DC: (0.85...1.2) U_N
POWER CONSUMPTION	AC: 1.5 VA DC: 1.5 W
DIELECTRIC STRENGTH BETWEEN OPEN CONTACTS	2 kV AC
SURGE TEST (1.2/50 μ s) BETWEEN COIL AND CONTACTS	6 kV
MECHANICAL LIFE	30 · 10 ⁶ cycles
PROTECTION CATEGORY	IP 20
DELAY SETTING	0.05s to 60h (\pm 1% for 87.61 and 87.62 only)
REPEATABILITY	\pm 0.2%
SETTING ACCURACY - FULL RANGE	\pm 5 %
RECOVERY TIME	\leq 50 ms
MINIMUM START PULSE DURATION	AC: 50 ms DC: 30ms 300 ms (for 87.61 and 87.62 only)
AMBIENT TEMPERATURE	(-20 ... +60)°C

CONTACT SPECIFICATIONS

	87.01/02/11/21/31/41/82/91	87.61/62
RATED CURRENT	8 A	5 A
MAX PEAK CURRENT	30 A	10 A
RATED VOLTAGE	250 V AC	250 V AC
MAX SWITCHING VOLTAGE	440 V AC	440 V AC
NOMINAL RATE IN AC1	2,000 VA	1,250 VA
ELECTRICAL LIFE IN AC1	100 · 10 ³ cycles	100 · 10 ³ cycles
BREAKING CAPACITY IN DC1: 30/110/220 V	8/0.5/0.2	5/0.5/0.2
CONTACT MATERIAL	AgCdO	AgCdO
MINIMUM SWITCHING LOAD	300 mW (10 V/5 mA)	300 mW (10 V/5 mA)

Type	Function Code	Function	Time scales									
			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/ 87.02	AI	ON delay	•	•	•	•	•	•	•	•	•	•
	BE	OFF delay: timing on START release (internal start)	•	•	•	•	•	•	•	•	•	•
	CE	ON and OFF delay (external start)	•	•	•	•	•	•	•	•	•	•
	DI	ON pulse	•	•	•	•	•	•	•	•	•	•
	DE	ON pulse: timing on START pulse	•	•	•	•	•	•	•	•	•	•
	EE	OFF pulse: timing on START release	•	•	•	•	•	•	•	•	•	•
	GI	Fixed pulse (0,5s) delayed	•	•	•	•	•	•	•	•	•	•
	SW	Symmetrical recycler: pulse start	•	•	•	•	•	•	•	•	•	•
	ON	Permanently ON										
	OFF	Permanently OFF										
87.11	AI	ON delay	•	•	•	•	•	•	•	•	•	•
87.21	DI	ON pulse	•	•	•	•	•	•	•	•	•	•
87.31	SW	Symmetrical recycler: pulse start			•							
87.41	BE	OFF delay: timing on START release (internal start)	•	•	•	•	•	•	•	•	•	•
87.61 87.62	BI	True OFF delay (power OFF)		0.15	•	0.07	•					
		True OFF delay (power OFF)		2.5		1.3						
87.82	SD	Star - delta $T_U = (50...65) \text{ ms}$				•						
	-	Asymmetrical recycler:										
	LI	Asymmetrical recycler pulse start	•	•	•	•	•	•	•	•	•	•
	LE	Asymmetrical recycler pulse start (external start)	•	•	•	•	•	•	•	•	•	•
	PI	Asymmetrical recycler pause start	•	•	•	•	•	•	•	•	•	•
	PE	Asymmetrical recycler pause start (external start)	•	•	•	•	•	•	•	•	•	•

ORDERING INFORMATION

Example: 87 series 8 A multi-function timer, 1 CO contact, with (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

No. of contact

1 = 1 CO
2 = 2 CO for
87.02, 87.62
2 = 2 NO for 87.82

Supply version

0 = AC (50/60 Hz)/DC

Supply voltage

240 = $\begin{cases} 24...48 \text{ V DC} \\ 24...240 \text{ V AC} \end{cases}$
240 = 24...240 V AC/DC (for 87.61 and 87.62 only)

Type

0 = Multi-function (AI, BE, CE, DI, DE, EE, GI, SW, ON, OFF)
1 = ON delay (AI)
2 = ON pulse (DI)
3 = Symmetrical recycler: pulse start (SW)
4 = OFF delay: timing on START release (internal start) (BE)
6 = True OFF delay (power OFF) (BI)
8 = Star - delta (SD)
9 = Asymmetrical recycler (LI, LE, PI, PE)



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