

# Chronos 2 electronic timers - 17.5 mm

## 1 changeover relay output

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- 1 changeover relay output: 8 A - 250 V (10 A UL)
- Screw or spring terminals
- 1 LED status indicators
- Option of connecting an external power supply to the control input
- 3-wire sensor control option

### Technical specifications

#### Timing

Repetition accuracy (with constant parameters) ± 0.5 % (CEI 1812-1)

#### Drift

- Temperature ± 0.05 % / °C  
 - Voltage ± 0.2 % / V  
 Display precision according to IEC 1812-1 ±10 % / 25 °C

#### Minimum pulse duration

- Typically (relay version) 30 ms  
 - Typically (solid state version) 50 ms  
 - Typically under load (relay version) 100 ms

#### Maximum reset time by de-energisation

- Typically (relay version) 100 ms  
 - Typically (solid state version) 350 ms  
 Immunity to breaks in supply voltage: typically >10 ms

#### Power supply

Multi-voltage power supply depending on version, see page 1/13  
 Frequency 50/60 Hz  
 Operating range 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)  
 Load factor 100 %  
 Maximum power consumption 0.6 W 24V AC/DC  
 1.5 W 230V AC  
 32 VA 230V AC

#### Output elements relay output

1 or 2 changeover relays, AgNi (cadmium-free) 2000 VA / 80 W  
 Rated power 2000 V A / 80W  
 Maximum breaking current 8 AAC 8 A DC  
 Minimum breaking current 10 mA / 5 VDC  
 Voltage breaking capacity 250V AC/VDC  
 Electrical life 10<sup>5</sup> operations  
 8 A 250V resistive  
 Mechanical life 5 x 10<sup>6</sup> operations  
 Breakdown voltage acc. to IEC 1812-1 2.5 kV / 1min / 1 mA / 50Hz  
 Impulse voltage acc. to IEC 664-1 IEC 1812-1 5 kV, wave 1.2 / 50 µs

#### Display

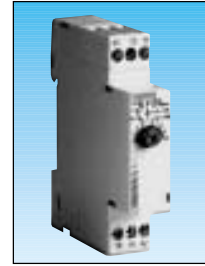
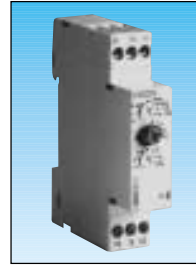
State displayed by 1 LED  
 - Flashing green when on  
 Green LED operation indicator  
 Pulsing:  
 - timer on, no timing in progress (except functions Di-D and Li-L)  
 Flashing:  
 - timing in progress  
 Permanently lit:  
 - Relay waiting, no timing in progress

#### Input type

- Volt-free contact  
 - 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

### Other information

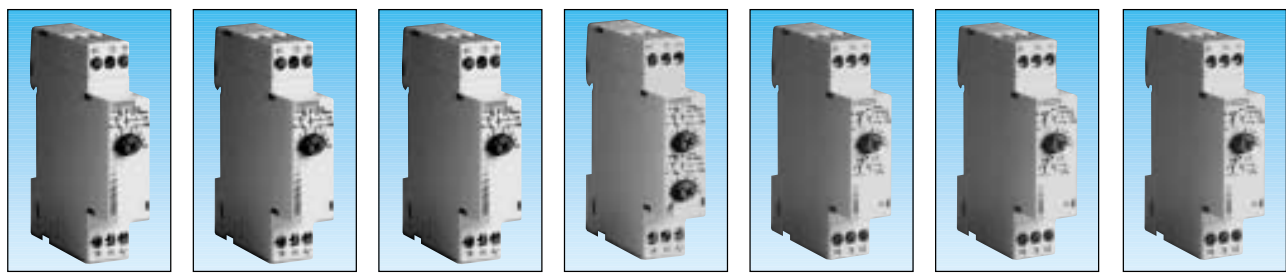
Non stocked, minimum order quantity 100 units.



Timing	0.1s • 100h	0.1s • 100h
<b>Types</b>		
Screw terminals	<b>MUR1</b>	<b>MAR1</b>
Spring terminals	—	—
<b>Part numbers and voltage</b>		
24V <sub>c</sub> / 24 • 240V <sub>a</sub>	<b>88 826 105</b>	<b>88 826 115</b>
12 V <sub>a</sub> / c	—	—
12 • 240 V <sub>a</sub> / c	—	—
<b>Functions</b>	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Bifunction A - At
<b>Nominal current</b>	8 A	8 A
<b>Timing ranges (7 ranges)</b>	1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h	

### General specifications

Conforming to standards IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals UL - CSA - cUL pending	
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	f = 10 • 55 Hz A = 0.35 mm
Relative humidity acc. to IEC 68-2-3 without condensation	93 %
Electromagnetic compatibility	Level III
- Immunity to electrostatic discharges acc. to IEC 1000-42	(Air 8 K / Contact 6 KV)
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	Level III 10V/m: 80 MHz to 1 GHz)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	Level III (direct 2kV/ Capacitive coupling clamp 1 KV)
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	Level III (common mode 2 KV / residual current mode 1KV)
- Immunity to radiofrequency in common mode acc. to ENV	Level III (10V rms: 0.15 MHz to 80 MHz)
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	30 % / 10 ms 60 % / 100 ms > 95 % / 5 s
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	Class B
Fixing: Symmetrical DIN rail (EN 50022)	35 mm
Connection capacity	
- without ferrule	2 x 2.5 mm <sup>2</sup>
- with ferrule	2 x 1.5 mm <sup>2</sup>
Spring terminals, 2 terminals per connection point	
- flexible wire	1.5 mm <sup>2</sup>
- rigid wire	2.5 mm <sup>2</sup>
Casing material	Self-extinguishing
Weight : 17.5 mm casing	60 g



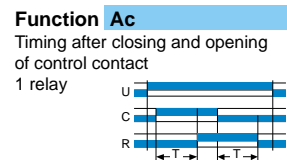
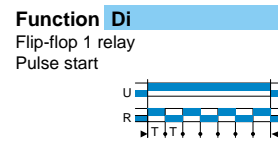
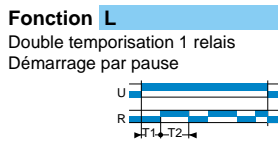
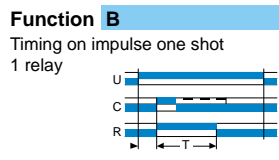
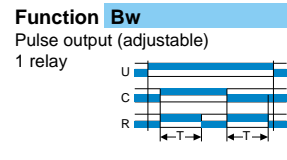
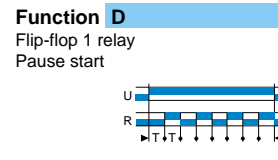
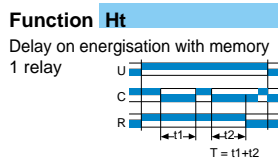
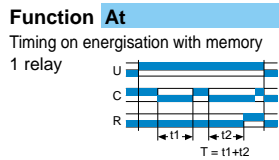
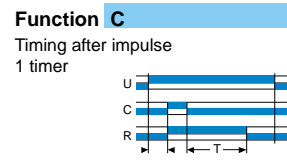
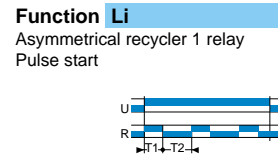
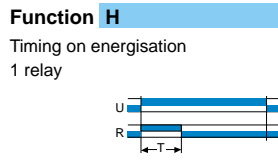
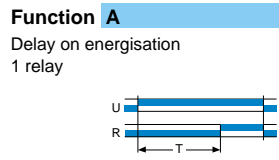
0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
<b>MBR1</b>	<b>MCR1</b>	<b>MHR1</b>	<b>MLR1</b>	<b>MUR4</b>	<b>MUR3</b>	<b>MXR1</b>
—	—	—	—	—	<b>MURc3</b>	—
<b>88 826 125</b>	<b>88 826 135</b>	<b>88 826 145</b>	<b>88 826 155</b>	<b>88 826 100</b>	<b>88 826 103</b> <b>88 826 503</b>	<b>88 826 185</b>
Mono-function	Mono-function	Bifunction	Bifunction	Multi-function	Multi-function	Multi-function
B	C	H - Ht	Li - L	A - At - B - C - H - Ht - Di - D - Ac - Bw	A - At - B - C - H - Ht - Di - D - Ac - Bw	Ad - Ah - N - O - P - Pt - TL - Tt - W
8 A	8 A	8 A	8 A	8 A	8 A	8 A

1

2

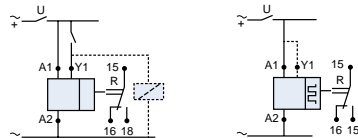
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**Function diagrams**

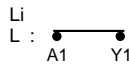


MXR1 functions see page 1/10, 1/11

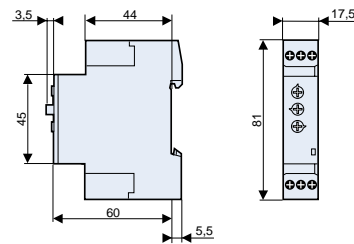
**Connections**



Functions :  
A - At / H - Ht / B / C  
Di - D / Ac / BW /  
Ad - Ah - N - O - P  
Pt - TL - Tt - W



**Dimensions**



**To order, specify:**

Standard products

1 Type

2 Part number

Example: Chronos 2 Timers MUR1 88 826 105

# Chronos 2 electronic timers - 17.5 mm

## Solid state output

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- Solid state output: 0.7 A - 250 V (0.5 A UL)
- Screw or spring terminals
- 1 LED status indicators

### Technical specifications

#### Timing

Repetition accuracy (with constant parameters) ± 0.5 % (CEI 1812-1)

#### Drift

- Temperature ± 0.05 % / °C  
 - Voltage ± 0.2 % / V  
 Display precision according to IEC 1812-1 ±10 % / 25 °C

#### Minimum pulse duration

- Typically (relay version) 30 ms  
 - Typically (solid state version) 50 ms  
 - Typically under load (relay version) 100 ms

#### Maximum reset time by de-energisation

- Typically (relay version) 100 ms  
 - Typically (solid state version) 350 ms  
 Immunity to breaks in supply voltage: typically >10 ms

#### Power supply

Multi-voltage power supply depending on version, see page 1/15

#### Frequency

50/60 Hz  
 Operating range 85 to 110 % Un (85 to 120 % Un for 12V AC/DC)

#### Load factor

100 %  
 Maximum power consumption 0.6 W 24V AC/DC  
 1.5 W 230V AC  
 32 VA 230V AC

#### Output elements: Solid state output

Rated power 0.7 A AC/DC  
 20 °C (0.5A UL)  
 Derating 5 mA / °C  
 Maximum admissible current 20 A ≤ 10 ms  
 Minimum breaking current 10 mA  
 Off-state leakage < 5 mA  
 Voltage breaking capacity 250V AC/VDC  
 Maximum voltage drop at terminals 3 fils 4V - 2 fils 8V  
 Electrical life 10<sup>8</sup> operations  
 Mechanical life 10<sup>8</sup> operations  
 Breakdown voltage acc. to IEC 664, IEC 255-5 2.5 kV to 1 mA / 1 min.

#### Display

State displayed by 1 LED  
 - Flashing green when on  
 Green LED operation indicator  
 ■■■■■ Pulsing:  
 - timer on, no timing in progress (except functions Di-D and Li-L)  
 ■■■■■ Flashing:  
 - timing in progress  
 ■■■■■ Permanently lit:  
 - Relay waiting, no timing in progress

#### Input type

- Volt-free contact  
 - 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply

### Other information

Non stocked, minimum order quantity 100 units.

### Timing

#### Types

### Part numbers and voltage

24 • 240 V ~ 50 • 60 Hz  
 24 • 240 V ~ 50 • Hz

### Functions

### Nominal current

### Timing ranges (7 ranges)

1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h

### General specifications

Conforming to standards IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)

Approvals  
 UL - CSA - cUL pending

Temperatures limits  
 - use -20 °C + 60 °C  
 - stored -30 °C + 60 °C

Installation category (acc. to IEC 664-1) Voltage surge category

Creepage distance and clearance acc. to IEC 664-1 4 kV / 3

Degree of protection acc. to IEC 529  
 - terminal block IP 20  
 - casing IP 40  
 - front face (except Tk2R1) IP 50

Vibration resistance acc. to IEC 68-2-6 f = 10 • 55 Hz  
 A = 0.35 mm

Relative humidity acc. to IEC 68-2-3 without condensation 93 %

Electromagnetic compatibility  
 - Immunity to electrostatic discharges acc. to IEC 1000-42 Level III (Air 8 K / Contact 6 KV)  
 - Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3) Level III 10V/m: 80 MHz to 1 GHz)  
 - Immunity to rapid transient bursts acc. to IEC 1000-4-4 Level III (direct 2kV/ Capacitive coupling clamp 1 KV)

- Immunity to shock waves on power supply acc. to IEC 1000-4-5 Level III (common mode 2 KV / residual current mode 1KV)  
 Level III (10V rms: 0.15 MHz to 80 MHz)

- Immunity to radiofrequency in common mode acc. to ENV Level III (10V rms: 0.15 MHz to 80 MHz)

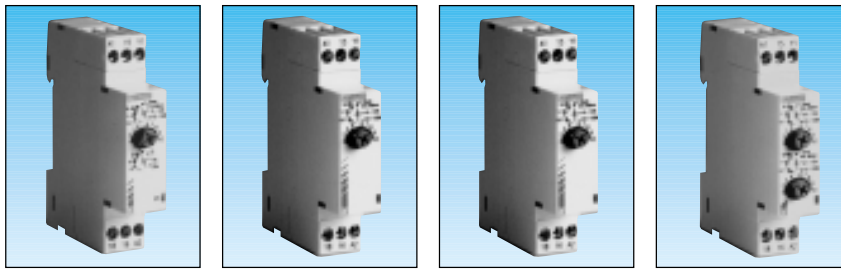
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11 30 % / 10 ms  
 60 % / 100 ms > 95 % / 5 s

- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1) Class B  
 Fixing: Symmetrical DIN rail (EN 50022) 35 mm

Connection capacity  
 - without ferrule 2 x 2.5 mm<sup>2</sup>  
 - with ferrule 2 x 1.5 mm<sup>2</sup>

Spring terminals, 2 terminals per connection point  
 - flexible wire 1.5 mm<sup>2</sup>  
 - rigid wire 2.5 mm<sup>2</sup>

Casing material Self-extinguishing  
 Weight : 17.5 mm casing 60 g



0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
<b>MUS2</b>	<b>MAS5</b>	<b>MHS2</b>	<b>MLS2</b>
<b>1</b>			
<b>2</b>			
88 826 004	88 826 014	88 826 044	88 826 054
Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Mono-function A	Mono-function H	Bifunction Li - L
0.7 A	0.7 A	0.7 A	0.7 A

### Function diagrams

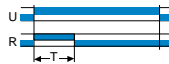
#### Function A

Delay on energisation  
1 relay



#### Function H

Timing on energisation  
1 relay



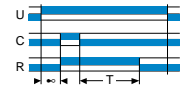
#### Function Li

Asymmetrical recycler 1 relay  
Pulse start



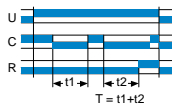
#### Function C

Timing after impulse  
1 timer



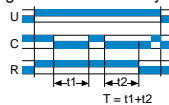
#### Function At

Timing on energisation with memory  
1 relay



#### Function Ht

Delay on energisation with memory  
1 relay



#### Function D

Flip-flop 1 relay  
Pause start



#### Function Bw

Pulse output (adjustable)  
1 relay



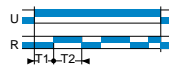
#### Function B

Timing on impulse one shot  
1 relay



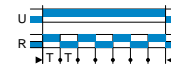
#### Function L

Asymmetrical recycler 1 relay  
Pause start



#### Function Di

Flip-flop 1 relay  
Pulse start

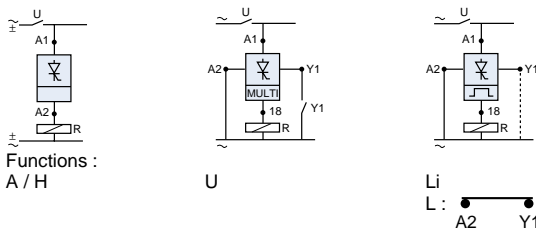


#### Function Ac

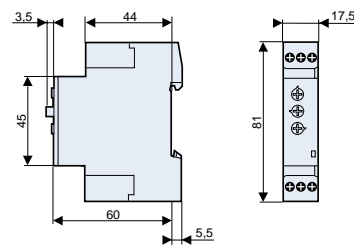
Timing after closing and opening  
of control contact  
1 relay



### Connections



### Dimensions



### To order, specify:

Standard products

**1** Type

**2** Part number

Example: Chronos 2 Timers MUS2 88 826 004

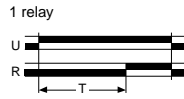
# Functions

U : Supply  
 R : Output or load relay  
 T : Timing  
 C (Y1) : Control contact  
 : indefinite

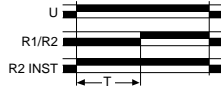
## Function A: Delay on energisation

Single timing cycle which begins on energisation.

The output changes state after timing.

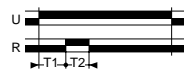


2 relays timed or  
 1 relay timed and 1 instantaneous



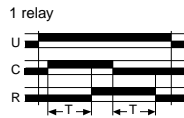
## Function Ab: One-shot cycle

The output changes states at the end of the set time T1, for a period T2.  
 Both T1 and T2 independently adjustable.

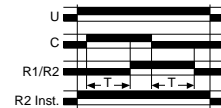


## Function Ac: Timing after closing and opening of control contact

After energisation, closure of the control contact causes the timing period T to commence and output relay R (or the load) changes state at the end of this interval. When contact C (Y1) opens, relay R resets after a second timing period T.

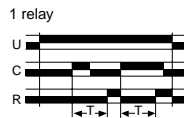


2 relays timed or  
 1 relay timed and 1 instantaneous



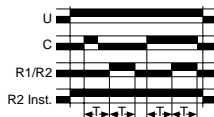
## Function Ad: Delay on energisation by switch (not resettable)

After power-up, pressing or holding down the switch starts timing. At the end of timing, the output is energised. The output will be reset the next time the switch is pressed or held down.



## Function Ah: Flashing single cycle by switch (not resettable)

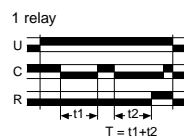
After power-up, pressing or holding down the switch starts timing. At the end of timing, the output is energised. At the end of this second timing, the output falls back to its initial value.



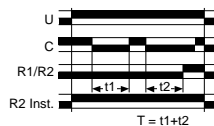
## Function At: Timing on energisation with memory

Provides a cumulative time for contact opening.

The output changes states at the end of the set time.

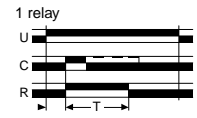


2 relays timed or  
 1 relay timed and 1 instantaneous



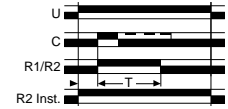
## Function B: Timing on impulse one shot On pulse (with constant supply)

After energisation; a pulse ( $\geq 50$  ms) or a maintained control contact will cause the output to change state which reverts to the rest position at the end of timing.



**N.B.:** this process enables shortening or lengthening of a signal.

2 relays timed or  
 1 relay timed and 1 instantaneous

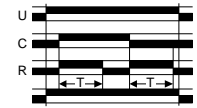


## Function Bw: Pulse output (adjustable)

A Output relay R (or the load) changes state, and remains in the changed-over state for the timing period, both when control contact C (Y1) closes and when it opens.

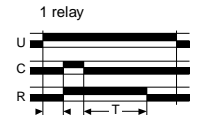


2 relays timed or  
 1 relay timed and 1 instantaneous



## Function C: Timing after impulse Delay OFF (with constant supply)

After energisation, once the control contact is closed the output state changes. Timing will only begin on the re-opening of this control contact (one shot). Relay R returns to its initial position at the end of the timing period.



2 relays timed or  
 1 relay timed and 1 instantaneous

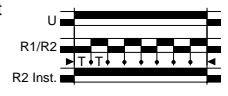


## Function D or Di: Flip-flop

Repetitive cycle which switches the output alternately between the rest and operating position for equal time bases.  
 $T1 + T2 = T$  total

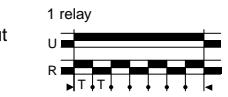


**Function D:** the cycle begins with the output in rest position. Pause start.

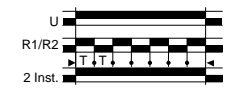


2 relays timed or  
 1 relay timed and 1 instantaneous

**Function Di:** the cycle begins with the output in the operating position. Pulse start.

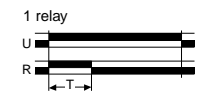


2 relays timed or  
 1 relay timed and 1 instantaneous



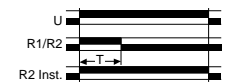
## Function H: Timing on energisation Interval timer - one shot

On energisation, the output changes state, remains in that state for the duration of timing and resets at the end of the single cycle.



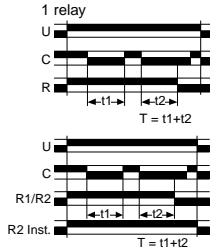
**N.B.** This is complementary to function A.

2 relays timed or  
 1 relay timed and 1 instantaneous



### Function Ht : Delay on energisation with memory

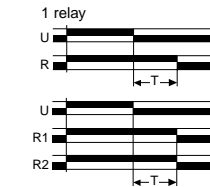
Provides a cumulative time for contact opening. On energisation, the output changes state, remains in that state for the duration of timing and resets at the end of the single cycle.



2 relays timed or  
1 relay timed and 1 instantaneous

### Function K: Delay on de-energisation - True delay OFF

On energisation, the output changes state. On de-energisation timing commences and the output only returns to the reset condition after timing.



2 relays timed or  
1 relay timed and 1 instantaneous

### Function L : Cyclic timing - Asymmetrical recycler

Repetitive cycle comprising 2 independent adjustable time bases. Each time base corresponds alternately to a different output state.

**N.B. :** The cycle starts with the output in the rest position.



2 relays timed or  
1 relay timed and 1 instantaneous

### Function Li : Cyclic timing - Asymmetrical recycler

Repetitive cycle comprising 2 independent adjustable time bases. Each time base corresponds alternately to a different output state.

**N.B. :** The cycle starts with the output in the operating position.



2 relays timed or  
1 relay timed and 1 instantaneous

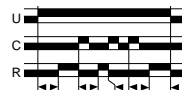
### Function N : "Safe-guard"

At the first control pulse the output is energised. To complete the timing the interval between the two control pulses must be greater than the timing set.



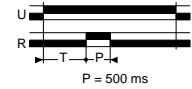
### Function O : "Delayed safe-guard".

On energisation, a first timing sequence occurs and the output changes state. With the closing of the control contact, the output resets and the timing starts, with the output being activated after timing. For the timing to be completed, the interval between the closing of two control contacts must be greater than the timing set.



### Function P : Delayed fixed-length pulse

Timing begins on energisation. At the end of the timing period output relay R (or the load) changes state for a period of approx. 500 milliseconds.



### Function Pt : Impulse counter (delay on)

Calculates the total opening time of a contact. At the end of timing, the output is energised for approximately 500 ms.



### Function Q : Star-delta"

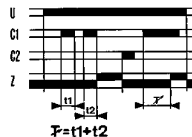
At the end of timing, the output is not energised. It remains "open" (not conducting) and will only change state after the fixed time of  $T_i$  has elapsed. Dwell time selectable



### Function T : Timing on energisation with memory

#### a - energisation by control signal

The timer sums the times for which the control contact is closed (C1). Reset is by the reset signal (C2) only.



#### b - energisation by supply voltage

The timer sums the times for which the supply voltage (U) is on. Reset is by the reset signal (C2) only



### Function T : Impulse relay

After power-up, pressing or holding down the switch closes the relay. Pressing the switch a second time opens the relay.



### Function Tt : Timed impulse relay

After power-up, pressing or holding down the switch closes the relay and starts timing. The relay opens at the end of timing or when the switch is pressed a second time.



### Function W : Timing after pulse on control contact

After energisation, if the control contact opens it causes output relay R (or the load) to change state and timing to start. At the end of the timing period, relay R resets to its original state.

