

2.1 Time Cubes

Timecube



CT2, CT3

8-pin and 11-pin Timecube®

Type: CT2: 8 pole, CT3: 11 pole

The CT2 or CT3 Timecube® is an electronic timer that is inserted between the plug-in industrial relay and the socket. This combination is a modular complete time relay without additional space requirement. It offers up to three changeover contacts with a variety of signal contacts and power contacts.

The Timecubes® are suitable for all 8 pin and 11 pin standard industrial relays of the C2 and C3 series according to IEC 67 and also for relays of other manufacturers.



Time functions (Function diagrams: refer to page 130)

Operating voltage controlled types

- CT2- / CT3-E30: Function E, on delay
- CT2- / CT3-W30: Function W, one shot
- CT2- / CT3-B30: Function B, blinker

Trigger input controlled types

- CT2- / CT3-A30, off delay
- CT2- / CT3-K30, pulse shaping

Time data

4 partial time ranges (DIP switch)



Fine adjustment time range (rotary knob)

$t_{min} \dots t_{max}, 2 \dots 30$

Time range tolerance

$t_{min}: 0 \dots + 35 \%$

Repetition accuracy

$\pm 0.5 \%$ or ± 20 ms

Reset time

≤ 200 ms

Reset time B1 (trigg. inp.) A, K

≤ 80 ms

Voltage failure buffering

5 ms (except the relay)

Power supply- and control input (UC = AC or DC)

CT2- / CT3- ... / S	DC 9.5 ... 18 V	12 mA
CT2- / CT3- ... / L	UC 20 ... 65 V	6 mA
CT2- / CT3- ... / M	UC 90 ... 150 V	2 mA
CT2- / CT3- ... / U	UC 180 ... 265 V	2 mA
CT2- / CT3- ... / H	UC 90 ... 265 V	2 mA
Residual current E, W, B	≤ 0.3 mA	
Residual current B1 (trigg. inp.) A, K	≤ 0.2 mA	

General specifications

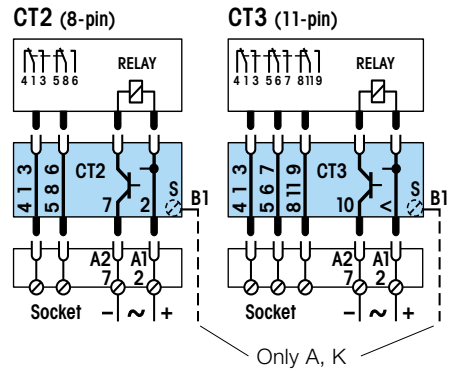
Ambient temperature storage / operation	-40 ... +70 °C / -25 ... +60 °C
Ingress protection degree	IP40
Housing material	Lexan
Weight	35 g

Standard types

UC 50 Hz / 60 Hz: 20 ... 265 V
DC 12 V

8 pole	11 pole	Voltage
CT2-E30/S CT2-W30/S CT2-B30/S CT2-A30/S CT2-K30/S	CT3-E30/S CT3-W30/S CT3-B30/S CT3-A30/S CT3-K30/S	DC 9.5...18 V
CT2-E30/L CT2-W30/L CT2-B30/L CT2-A30/L CT2-K30/L	CT3-E30/L CT3-W30/L CT3-B30/L CT3-A30/L CT3-K30/L	UC 20...65 V
CT2-A30/M CT2-K30/M	CT3-A30/M CT3-K30/M	UC 90...150 V
CT2-A30/U CT2-K30/U	CT3-A30/U CT3-K30/U	UC 180...265 V
CT2-E30/H CT2-W30/H CT2-B30/H	CT3-E30/H CT3-W30/H CT3-B30/H	UC 90...265 V

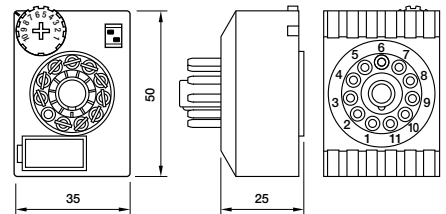
Wiring diagram



Time Relays 2.1

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Dimensions [mm]



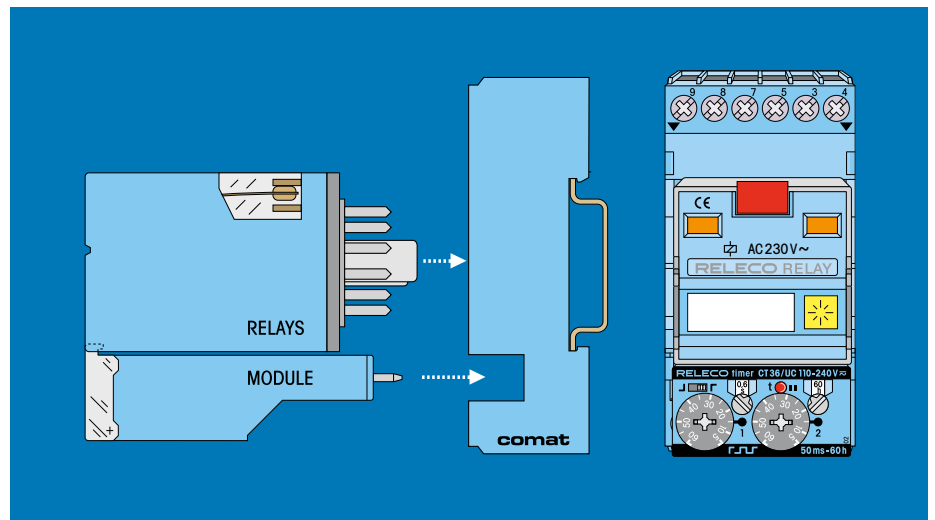
Only 11-pin version shown.
The dimension of the 8-pin version are identical

Technical approvals, conformities



2.2 Time Modules

Modular plug-in Time Relays (CT-System)



The modular timer system consists of individual plug-in timer modules with front cover, an 11-pole plug-in relay and a system socket with retaining spring.

The individual combination allows an optimal device selection for the foreseen application.

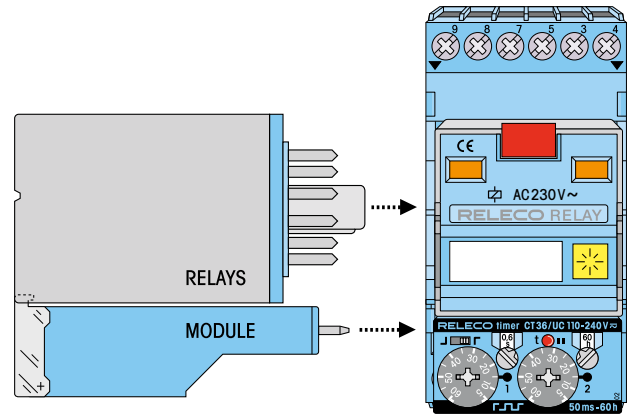
Later modifications as for example an exchange of relay from mechanical contacts to a relay with solid-state outputs are possible at any time. The user profits of a universal system of worldwide unique flexibility.

The modular Comat timer CT System

The time delay relays and monitoring relays consist of plug-in CT electronic modules and 11-pole output relays. Both system components can be combined in a variety of combinations. This allows adapting the system for the specific application.

Subsequent modifications, for example a change from mechanical contacts to solid-state outputs, are possible at any time just by replacing the relay.

This system provides the user a complete universal system with worldwide unmatched flexibility.



The system sockets C12B0 or C-155 serve as a basis for the secure reception of the electronic modules. The sockets have a 4-pole module slot in which the CT modules lock firmly and vibration proof also without the output relay. Contact is made with reliable twin knife contacts.

With the A2 connector bridge "C-A2", the neutral conductor (N/-) can be connected from socket to socket. It reduces wiring work considerably.

Robust terminals for wires up to 4 mm² and spacious labeling are other advantages of this practical Comat modular system.

Clear markings close to the terminal connections on the sockets make it easy to identify the connections for wiring and servicing.

The CT modules are proof of the practical oriented experiences of Comat in the field of industrial electronics. All control and display elements are arranged easy accessible at all times on the front side of the modules. The functions and settings are self-explanatory schematically illustrated on the front and allow to review the set values also during operation.

A transparent cover over the module setting components provides protection from unintentional settings and additionally links the module to the output relay.

Triggering is performed with the operating voltage. (L1 or +). No potential-free contacts are therefore required. The triggering complies to machine standards. Parallel connection to B1 is admissible.

The wide UC voltage range (AC/DC) of the modules give a wide flexibility. It permits the connection to AC or DC supplies and provides a high level of reliability in triggering.

Note: In case of even wider voltage ranges, for example UC 24-240V, triggering currents on B1 are often in the range of 100µA with simultaneous low threshold voltages of less than 20V. Due to capacitive or inductive pickups this may lead to unintentional triggering or switching errors caused by insufficient load on the control contacts (It is not seldom that 50V or more can be measured in open lines).

The output relays show the connection diagram and the technical values on the front side, (exception C3 and C5 relays). A color code indicates an AC coil with red and a DC coil with blue color. Most of the relays have a lockable test button for manual operation.

The standard contacts have proven its reliability for high switching current applications over many years. The contact material AgNi permits a wide switching range and due to the large dimensioning they are designed for a high number of switching cycles. The high breaking capacity of up to 10A/400V and a low load switching capability of 12V/10mA makes the contact suitable for the use in main circuits as well as for low voltage applications.

The twin contacts are switching the load circuit with 2 independent contact tongues. The switching safety for low currents is therefore 100 times higher compared to a single contact relay. Despite the high switching capacity of up to 6A/250V, these contacts are very suitable to switch low currents and voltages up to 1mA/6V.

The solid-state relays are an alternative to mechanical relays. In the standard version, the relay has a potential-free universal semiconductor output for AC or DC loads. The advantage is a bouncing- and wear-free, overload resistant, short circuit protected output with a practical unlimited life cycle.

Solid-state relays are specially recommended for applications of high switching cycles, for example for repeat cycle timers, flushing lights, but also for high inductive switching loads of solenoid valves, couplings, motors, etc. The solid state relays are also suitable for capacitive loads, for example long power lines, or compensated lighting circuits.

Additional protection circuits of the output or of the load are not necessary in any application for this type of Comat relays.

The solid-state relays are insensitive in any aggressive environment such as chemical plants, sewage plants etc. and are therefore an excellent choice for the employment in such environments.



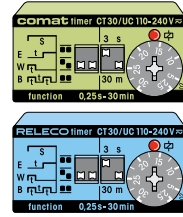
The train symbol indicates products available in a special railway execution according to EN 50155. Please refer to our special railway brochure for details.

CT30, CT32, CT33, CT36

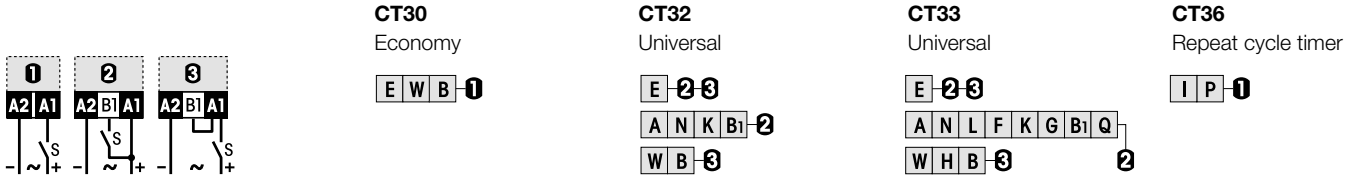
Plug-in time modules (combined with industrial relays)

Type Blue: CT30, CT32, CT33, CT36, /...V R
Green: CT30, CT32, CT33, CT36, /...V

Plug-in time modules for sockets with module slot in combination with plug-in relays.
Power supply and control voltages 24 ... 240 V. Time ranges 30 ms up to 60 h.
LED output state indicator.



Time functions and related connection diagrams (Function diagrams: refer to page 130)



Time data

Type	CT 30	CT 32	CT33	CT36
Partial time ranges, t_{max}	3, 30 /s /min	1.5, 6, 15, 60 /s /min	150, 600 ms	2 x 600 ms
Min. time t_{min}	0.25 s	0.15 s	1.5, 6, 15, 60 /s /min /h	2 x 6, 60 /s /min /h
Fine adj. range $t_{min} \dots t_{max}$	2.5 ... 30	1 ... 10	30 ms	2 x 50 ms
Time range tolerance t_{min}	-25 ... 0 %	-25 ... 0 %	0.2 ... 1	2 x 5 ... 60
t_{max}	0 ... 35 %	0 ... 25 %	-25 ... 0 %	-25 ... 0 %
Repetition accuracy	± 0.2 % or 20 ms	± 0.2 % or 20 ms	0 ... 25 %	0 ... 25 %
Temperature drift of time	0.25 % / K	± 0.1 % / K	± 0.2 % or 20 ms	± 0.2 % or 20 ms
Min. trigger pulse width B1	-	≥ 30 ms	0.1 % / K	0.1 % / K
Reset time pow. supply	≤ 200 ms	≥ 30 ms	-	-
Voltage failure buffering	≥ 20 ms	≤ 150 ms	≤ 150 ms	≤ 150 ms
		≥ 20 ms	≥ 20 ms	≥ 20 ms

Output data

Nominal voltage	UC 24 – 48 V	110 – 240, 115, 230 V
Type	Solid state	Solid state
Rated operational current	150 mA	50 mA
On-state resistance	$\leq 25 \Omega$	$\leq 100 \Omega$
Leakage current	$\leq 150 \mu A$	$\leq 150 \mu A$

Power supply and control input (UC = AC / DC)

Type	CT 30	CT 30	CT36	CT36
Nominal voltage	UC 24 – 48 V	UC 110 – 240 V	UC 24 – 48 V	UC 110 – 240 V
Operating voltage range	19 ... 75 V	90 ... 265 V	19...60 V	82 ... 265 V
Supply current	3 ... 5 mA	2 ... 4 mA	6 ... 12 mA	4 ... 8 mA
Type	CT32, CT33	CT32, CT33	CT32, CT33	
Nominal voltage	UC 24 – 48 V	UC 115 V	UC 230 V	
Operating voltage range	19 ... 60 V	90 ... 150 V	180 ... 265 V	
Input B1 inactive	≤ 9 V	≤ 60 V	≤ 100 V	
Supply current	5 ... 11 mA	4 ... 7 mA	1 ... 4 mA	

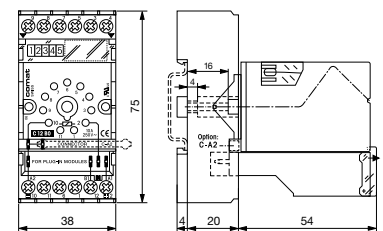
General Specification

Ambient temperature storage /operation	-40 ... 85 °C / -40 ... 60 °C
Ingress Protection degree	IP 40 when plugged in
Housing material	Lexan
Weight	25 g

Standard types

	Blue	Green
CT30, CT32, CT33, CT36, UC24-48	CT3x/UC24-48V R	CT3x/UC24-48V
CT30, CT36, UC110-240	CT3x/UC110-240V R	CT3x/UC110-240V
CT32, CT33, UC115	CT3x/UC115V R	CT3x/UC115V
CT32, CT33, UC230	CT3x/UC230V R	CT3x/UC230V

Dimensions [mm]



Technical approvals, conformities



Remark: This module is part of several ready for connection units consisting of socket, relay and module. A wide range of suitable relays are available.