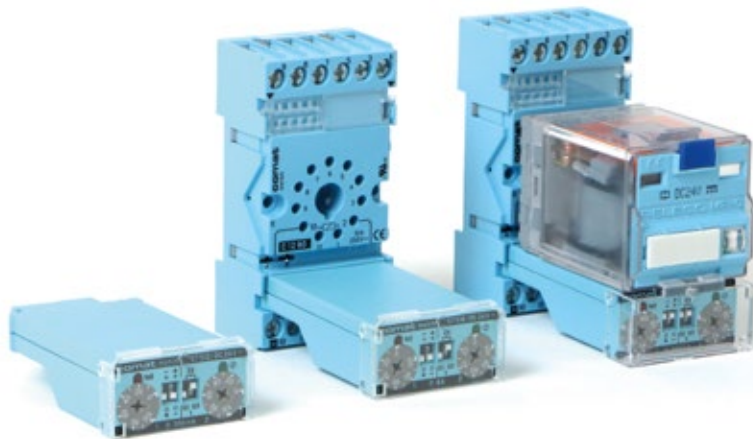


3.6 Monitoring Modules



The modular monitoring system consists of individual plug-in monitoring 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 monitoring CT System

The 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 CS-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 4mm² 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 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 EN 50155. Please refer to our special railway brochure for details.

CT512, CT515, CT516

Plug-in current monitoring modules (combined with industrial relays)
0.2 A, 2 A, 6 A. DC 24 V operation

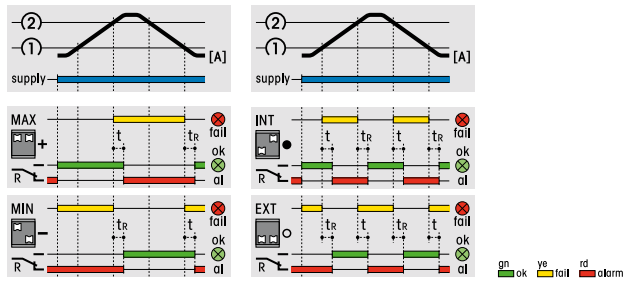


Type CT512, CT515, CT516 /24V R CT512R, CT515R, CT516R /36V R

Plug-in current monitoring modules for sockets with module slot in combination with plug-in relays. DC 24 V operation. LED alarm state indicators for OK and fail.
 Separate adjustment of upper and lower level.



Monitoring functions



Over / under voltage internal / external range

Measuring circuit data

Type	CT512	CT515	CT516
Measuring and setting ranges (rotary knobs)	0 ... 200 mA	0 ... 2 A	0 ... 6 A
Max. current 100% duty cycle	300 mA	3 A	7 A
Voltage drop on internal shunt res. @ I _{max}	300 mV	200 mV	100 mV
Temperature drift -25 ... 60 °C	≤ 3 %	≤ 3 %	≤ 3 %

Time data

Alarm delay time settings	100 ms, 500 ms, 2 s
Reset time	100 ms

Power supply

	DC 24 V	DC 36 V
Nominal voltage	18 ... 30 V	18 ... 45 V
Operation voltage range	3 ... 7 mA	5 mA
Supply current	- 30 V	- 51 V
Polarity reversal protection		

General specifications

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

Standard types

CT512/, CT515/, CT516/ DC24

CT51x/DC24V R

Railway types:

CT512R/, CT515R/, CT516R/ DC24



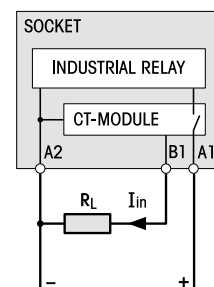
CT51xR/DC24V

CT512R/, CT515R/, CT516R/ DC36

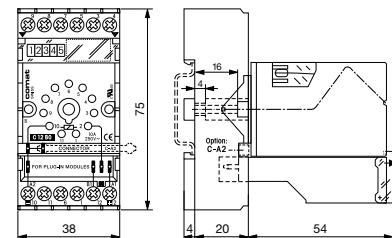
CT51xR/DC36V

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

Connection diagram



Dimensions [mm]



Technical approvals, conformities



CT524

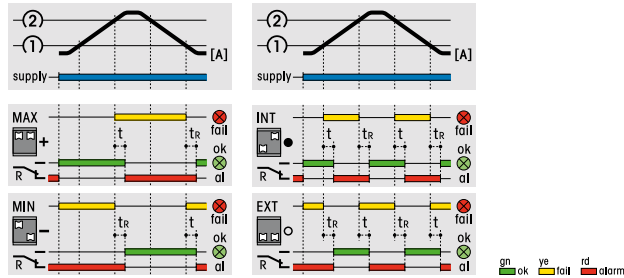
Plug-in DC voltage monitoring module. DC 24 V operation.
(combined with industrial relays)

Type CT524/24V R

Plug-in DC voltage monitoring module for sockets with module slot in combination with 11p plug-in relays. DC 24 V operation. LED alarm state indicators for OK and fail.
Separate adjustment of upper and lower level.



Monitoring functions



Over / under voltage internal / external range

Measuring circuit data

Type	CT524
Measuring and setting ranges (rotary knobs)	0 ... 30 V
Over voltage (10 ms)	± 150 V
Input resistance	106 kΩ
Temperature drift -25 ... 60 °C	≤ 2 %

Time data

Alarm delay time settings	100 ms, 500 ms, 2 s
Reset time	100 ms

Power supply

Nominal voltage	DC 24 V
Operation voltage range	18 ... 30 V
Supply current	8 ... 13 mA
Polarity reversal protection (1 minute)	- 30 V

General specifications

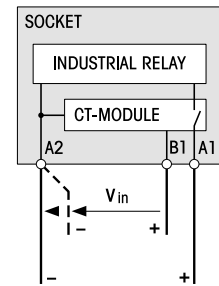
Ambient temperature storage/operation	-40 ... 85 °C / -25 ... 60 °C
Ingress Protection degree	IP 40 when plugged in
Housing material	Lexan
Weight	25 g

Standard types

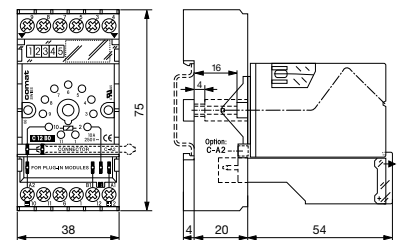
DC 24 **CT524/DC24V R**

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

Connection diagram



Dimensions [mm]



Technical approvals, conformities



DC Voltage Monitoring-Set
DC Current Monitoring-Set

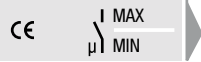


- Set-Delivery includes:
- Relay
 - Module
 - Front cover
 - Socket
 - Retaining clip

Monitoring Module

4 functions can be selected:
Overvoltage/undervoltage monitoring with adjustable hysteresis or 2 range monitors (INT or EXT). Adjustable alarm delay. LED display for errors and ok. Contact inspection window at the top. Manual safety operation.

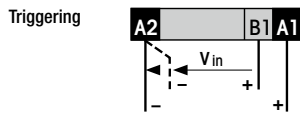
Relay data's see:
Section Industrial Relays



Alarm delay t	0,1/0,5/2s
Reset time t_R	100ms
Voltage tolerance	0,8 -1,2Un
Power consumption	$\leq 0,5W$
Ambient temperature	-25...+60°C

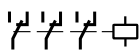
CT524
DC Voltage Monitoring

Range: **0-30V**
U_{max}: **40V**



Input resistance
B1 → A2: 100kΩ

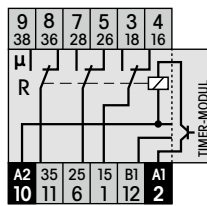
Power Relay



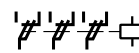
C3-A30X

Universal
Power Relay 10A.
With 3 power changeover-contacts this is the robust relay for AC and DC circuits ranging from 10mA 10V.

10A 250V~
10mA 10V



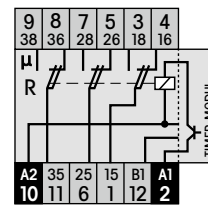
Control Relay



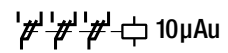
C3-T31X

Relay with 3 twin contacts 6A
The control relay with highest switching reliability for control and signal circuits ranging from 5mA 5V.

6A 250V~
5mA 5V



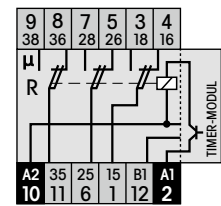
Signal Relay



C3-T32X

Relay with 3 twin contacts, 10µ gold flush
The twin contact relay with highest switching reliability for signal circuits ranging from 1mA 5V. Recommend. upto 0,2A 30V.

6A 250V~
1mA 5V



Set Order-Nr.:
CT524.3-A30/DC24V R

- Delivery includes:
- Relay C3-A30X/DC24V R
 - Module CT524/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT524.3-T31/DC24V R

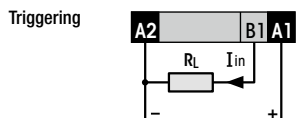
- Delivery includes:
- Relay C3-T31X/DC24V R
 - Module CT524/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT524.3-T32/DC24V R

- Delivery includes:
- Relay C3-T32X/DC24V R
 - Module CT524/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

CT512
DC Current Monitoring

Range: **0-200mA**
I_{max}: **300mA**



Voltage drop
A1 → B1 $\leq 300mV$

Set Order-Nr.:
CT512.3-A30/DC24V R

- Delivery includes:
- Relay C3-A30X/DC24V R
 - Module CT512/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT512.3-T31/DC24V R

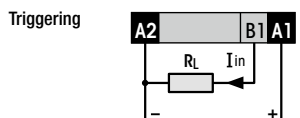
- Delivery includes:
- Relay C3-T31X/DC24V R
 - Module CT512/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT512.3-T32/DC24V R

- Delivery includes:
- Relay C3-T32X/DC24V R
 - Module CT512/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

CT515
DC Current Monitoring

Range: **0-2A**
I_{max}: **3A**



Voltage drop
A1 → B1 $\leq 200mV$

Set Order-Nr.:
CT515.3-A30/DC24V R

- Delivery includes:
- Relay C3-A30X/DC24V R
 - Module CT515/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT515.3-T31/DC24V R

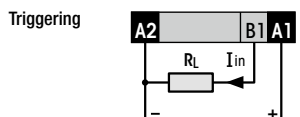
- Delivery includes:
- Relay C3-T31X/DC24V R
 - Module CT515/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT515.3-T32/DC24V R

- Delivery includes:
- Relay C3-T32X/DC24V R
 - Module CT515/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

CT516
DC Current Monitoring

Range: **0-6A**
I_{max}: **7A**



Voltage drop
A1 → B1 $\leq 100mV$

Set Order-Nr.:
CT516.3-A30/DC24V R

- Delivery includes:
- Relay C3-A30X/DC24V R
 - Module CT516/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

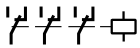
Set Order-Nr.:
CT516.3-T31/DC24V R

- Delivery includes:
- Relay C3-T31X/DC24V R
 - Module CT516/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Set Order-Nr.:
CT516.3-T32/DC24V R

- Delivery includes:
- Relay C3-T32X/DC24V R
 - Module CT516/DC24V R
 - Front cover FS-R
 - Socket C12B0 R
 - Retaining clip S3-C

Power Relay

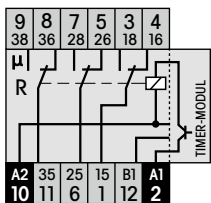


C31L

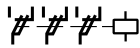
Universal Power Relay 10 A
with 3 power changeover-contacts
this is the robust relay for AC and
DC circuits ranging from
50 mA 10 V.

10 A 250 V~

50 mA 10 V



Control Relay

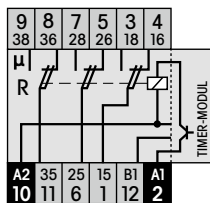


C32L

**Relay with
3 twin contacts 6 A**
The control relay with highest
switching reliability for control
and signal circuits ranging from
10 mA 5 V.

6 A 250 V~

10 mA 5 V



Set Order-Nr.:

CT524.31/DC24V

Delivery includes:

- Relay C31L/DC24V
- Module CT524/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT524.31R/...V 

DC 24, 36V

Set Order-Nr.:

CT524.32/DC24V

Delivery includes:

- Relay C32L/DC24V
- Module CT524/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT524.32R/...V 

DC 24, 36V

Set Order-Nr.:

CT512.31/DC24V

Delivery includes:

- Relay C31L/DC24V
- Module CT512/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT512.31R/...V 

DC 24, 36V

Set Order-Nr.:

CT512.32/DC24V

Delivery includes:

- Relay C32L/DC24V
- Module CT512/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT512.32R/...V 

DC 24, 36V

Set Order-Nr.:

CT515.31/DC24V

Delivery includes:

- Relay C31L/24V
- Module CT515/24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT515.31R/...V 

DC 24, 36V

Set Order-Nr.:

CT515.32/DC24V

Delivery includes:

- Relay C32L/24V
- Module CT515/24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT515.32R/...V 

DC 24, 36V

Set Order-Nr.:

CT516.31/DC24V

Delivery includes:

- Relay C31L/DC24V
- Module CT516/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT516.31R/...V 

DC 24, 36V

Set Order-Nr.:

CT516.32/DC24V

Delivery includes:

- Relay C32L/DC24V
- Module CT516/DC24V
- Front cover FS-C
- Socket C12B0
- Retaining clip HF-32

CT516.32R/...V 

DC 24, 36V

DC Voltage Monitoring-Set
DC Current Monitoring-Set

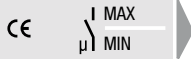


- Set-Delivery includes:
- Relay
 - Module
 - Front cover
 - Socket
 - Retaining clip

Monitoring Module

4 functions can be selected:
Overvoltage/undervoltage monitoring with adjustable hysteresis or 2 range monitors (INT or EXT). Adjustable alarm delay. LED display for errors and ok. Contact inspection window at the top. Manual safety operation.

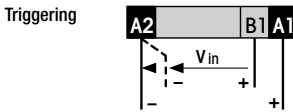
Relay data's see:
Section industrial Relays



Alarm delay t	0,1/0,5/2s
Reset time tR	100ms
Voltage tolerance	0,8 -1,2Un
Power consumption	≤0,5W
Ambient temperature	-25...+60°C

CT524
DC Voltage Monitoring

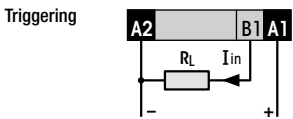
Range: **0-30V**
Umax: **40V**



Input resistance
B1 → A2: 100kΩ

CT512
DC Current Monitoring

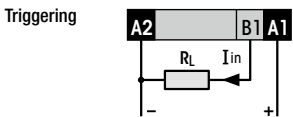
Range: **0-200mA**
Imax: **300mA**



Voltage drop
A1 → B1 ≤ 300mV

CT515
DC Current Monitoring

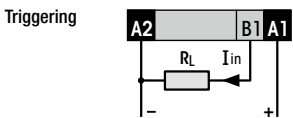
Range: **0-2A**
Imax: **3A**



Voltage drop
A1 → B1 ≤ 200mV

CT516
DC Current Monitoring

Range: **0-6A**
Imax: **7A**



Voltage drop
A1 B1 ≤ 100mV

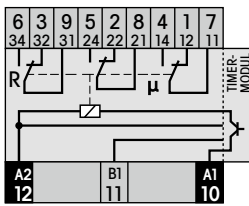
High Power Relay DC
16A 400V~



C5-A30X

Universal Power Relay 16A
With 3 power changeover-contacts this is the robust relay for AC and DC circuits ranging from 10mA 10V.

16A 400V~
10mA 10V



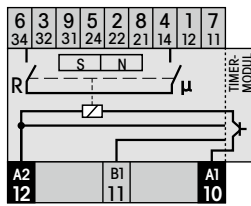
High Power Relay DC
10A @ 220V==



C5-M10X

Highpower Relay, in particular for DC loads upto 10A 220V== (DC1)
With 2 NO contacts in series and a blow magnet for safe arc extinguishing.

16A 400V~
10mA 10V



Set Order-Nr.:
CT524.5-A30/DC24V R

- Delivery includes:
- Relay C5-A30/DC24V R
 - Module CT524/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT524.5-M10/DC24V R

- Delivery includes:
- Relay C5-M10/DC24V R
 - Module CT524/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT512.5-A30/DC24V R

- Delivery includes:
- Relay C5-A30/DC24V R
 - Module CT512/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT512.5-M10/DC24V R

- Delivery includes:
- Relay C5-M10/DC24V R
 - Module CT512/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT515.5-A30/DC24V R

- Delivery includes:
- Relay C5-A30/DC24V R
 - Module CT515/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT515.5-M10/DC24V R

- Delivery includes:
- Relay C5-M10/DC24V R
 - Module CT515/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT516.5-A30/DC24V R

- Delivery includes:
- Relay C5-A30/DC24V R
 - Module CT516/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

Set Order-Nr.:
CT516.5-M10/DC24V R

- Delivery includes:
- Relay C5-M10/DC24V R
 - Module CT516/DC24V R
 - Front cover FS-C5
 - Socket S-5M
 - Retaining clip S3-C

