

CATALOG

# Time relays

## CT-C, CT-S, CT-D



- From economic to high end
- A reliable solution for every application
- World wide approvals and support

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**Available in three different ranges to cover every application, CT range time relays are used to provide reliable timing functions worldwide. They have proven their excellent functionality in daily use under the toughest conditions.**

**Choose ABB as the partner for all your low voltage timing control needs to leverage our wide variety of product options. From economic to high-end solutions – the range offers maximum value.**

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# Time relays

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# Time relays for industrial applications

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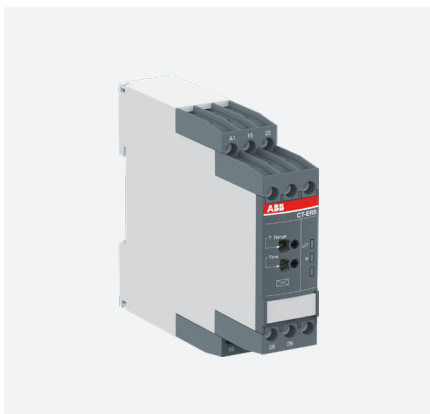
# Time relays for industrial applications

## Offer overview



### CT-C: the compact range

The CT-C range combines lower cost with higher value and performance by offering essential functions in a space-saving 17.5 mm housing. The range offers a choice of 11 devices, including single and multifunctional types, with timing functions that range from 0.05 seconds to 100 hours. Equipped with a wide voltage range, the CT-C range is suitable for a huge variety of applications worldwide.



### CT-S: the high-performance range

The advanced CT-S range is ABB's universal range of electronic timers. It includes 22 single-function devices and 16 multifunction time relays, offering flexibility in operation with up to 13 functions. The devices feature seven or ten time ranges, adjustable from 0.05 seconds to 300 hours. Additionally, every device is available in two different connection technologies: familiar double-chamber cage connection terminals (screw terminals) and ABB's vibration-resistant Easy Connect technology (push-in terminals).

# Time relays for industrial applications

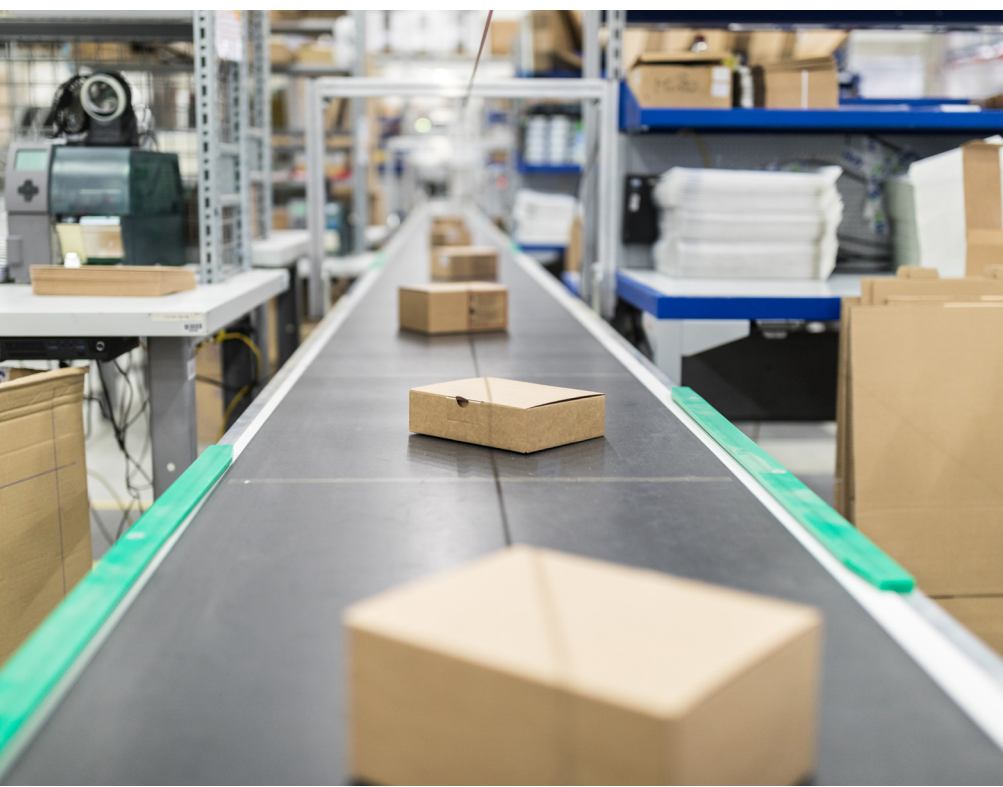
## Type selection

|                                                                                                                             | multi-functional       | single-functional | multi-functional                       | single-functional      |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------|----------------------------------------|------------------------|
| Timing function                                                                                                             | CT-C                   |                   | CT-S                                   |                        |
|  ON-delay                                  | CT-MFC, CT-MKC         | CT-ERC            | CT-MVS, CT-MFS, CT-MBS, CT-WBS         | CT-ERS                 |
|  OFF-delay                                 | CT-MFC, CT-MKC, CT-ARC | CT-AHC            | CT-MVS, CT-MFS, CT-MBS                 | CT-APS, CT-AHS, CT-ARS |
|  ON- and OFF-delay                         |                        |                   | CT-MVS, CT-MXS, CT-MFS, CT-MBS         |                        |
|  Impulse-ON                                | CT-MFC, CT-MKC         | CT-VWC            | CT-MVS, CT-MFS, CT-MBS, CT-WBS         |                        |
|  Impulse-OFF                               | CT-MFC, CT-MKC, CT-ARC |                   | CT-MVS, CT-MFS, CT-MBS                 |                        |
|  Impulse-ON and OFF                        |                        |                   | CT-MXS                                 |                        |
|  Flasher starting with ON                  | CT-MFC, CT-MKC         | CT-EBC            | CT-MFS, CT-MBS, CT-WBS                 |                        |
|  Flasher starting with OFF                 | CT-MFC, CT-MKC         | CT-EBC            | CT-MFS, CT-MBS, CT-WBS                 |                        |
|  Flasher starting with ON or OFF           |                        |                   | CT-MVS                                 |                        |
|  Pulse generator starting with ON or OFF   |                        | CT-TGC            | CT-MXS                                 |                        |
|  Pulse former                            | CT-MFC, CT-MKC         |                   | CT-MVS, CT-MFS, CT-MBS                 |                        |
|  Star-delta change-over                  |                        | CT-SDC, CT-SAC    |                                        | CT-SDS                 |
|  Star-delta change-over with impulse     |                        |                   | CT-MVS.2x, CT-MFS, CT-MBS              |                        |
|  further functions (depending on device) |                        |                   | CT-MVS, CT-MXS, CT-MFS, CT-MBS, CT-WBS |                        |

A detailed explanation of the different timing functions can be found in the chapter "Timing functions".

### Synonyms

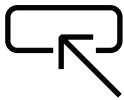
| Used expression | Alternative expression(s) |
|-----------------|---------------------------|
| 1 c/o contact   | SPDT                      |
| 2 c/o contacts  | DPDT                      |
| voltage-related | wet / non-floating        |
| volt-free       | dry / floating            |



# Time relays for industrial applications

## Applications

ABB offers a wide selection of time relays – from economic to high-end – to suit every application for businesses worldwide. ABB time relays provide simple, reliable and economical control solutions in all types of panel. They are typically used in industrial applications and OEM equipment, providing time-delayed switching to start a motor, control a load or manage a process.



Remote control of time delays with a remote potentiometer.



Cyclic switching of machinery, for example the weekly startup of a fan to prevent them sticking or the flushing of pipes to keep them clear.



Lighting control, for example the delayed switching of multiple rows of lamps in production facilities or green-houses.



Time controlled start up or shut down of machinery equipment, for example the delayed switch off of conveyor belts or the successive shut down of a plant.



Alarm triggering in case of fault detection, for example to allow the flashing of a lamp in industrial applications or rolling stock.



Star-delta motor starting to reduce starting current with changeover delay to prevent interphase short-circuits.

Have the perfect timing everywhere with ABB's time relays:

- Control panels
- Pump controls
- Star-delta motor starting
- Movable equipment e.g. cranes
- Machine tools
- Automatic doors
- Car park barriers
- Assembly machines
- HVAC
- Compressor controls
- Transportation
- Industrial refrigeration
- Packaging machines
- Baking ovens
- Water and wastewater
- Wind
- Industrial cleaning processes



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## **CT-C range**

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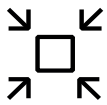
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## CT-C range

### Benefits and advantages



The CT-C range combines lower cost with higher value and performance by offering essential functions in a 17.5 mm housing, freeing up room in any control cabinet. The range includes 11 devices, offering both single and multifunctional types, with a time range from 0.05 seconds to 100 hours. Equipped with wide voltage ranges, CT-C time relays allow for use across a huge variety of applications worldwide.



#### Space savings

With a width of just 17.5 mm, the CT-C range is 22% smaller than standard industrial housings for time relays. Its reduced overall footprint saves space in control cabinets. For more flexibility both 1 c/o and 2 c/o output versions are offered in the compact housing.



#### Cost effective solution

The CT-C range is an economical range that combines lower cost with higher value and performance. It suits basic applications where a time relay is needed, while offering improved functionality in each device.



#### Optimized logistics

By combining more functions into each device, the CT-C range makes it possible to reduce stock by up to 75% compared to other ranges. All devices in the CT-C range offer a wide supply voltage range as well as a wide time setting range from 0.05 seconds to 100 hours. This significantly reduces order code variance, making the range more compact with just 11 order codes covering every requirement.

# CT-C range

## Operating controls



### Connection terminals

Wide terminal spacing makes wiring connections easier:  
2 x 1.5 mm<sup>2</sup> (2 x 16 AWG) with wire end ferrules or 2 x 2.5 mm<sup>2</sup> (2 x 14 AWG) without ferrules.



### Preselection of the time range



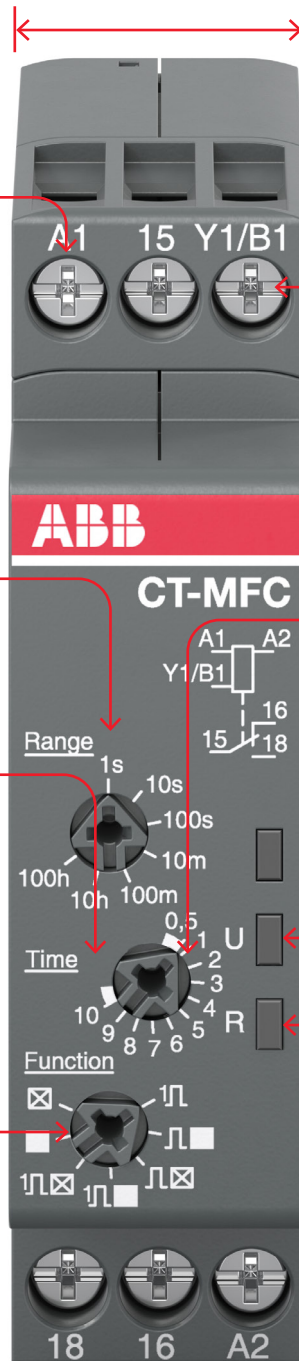
### Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.



### Selection of the timing function

- ON-delay
- OFF-delay with aux. voltage
- Impulse-ON
- Impulse-OFF with aux. voltage
- Flasher starting with ON
- Flasher starting with OFF
- Pulse former



### Width 17.5 mm

With a width of just 17.5mm, CT-C time relays are ideal for installations with limited space.

### Control input to start timing



### Fine adjustment of the time delay



### LEDs for status indication

All actual operational states are displayed by front-facing LEDs, simplifying commissioning and troubleshooting.

- U - green LED:  
 control supply voltage applied / timing
- R, R1, R2 - yellow LED:  
 output relay energized

[illegible]

## CT-C range

### Ordering details



CT-MFC.12

2CDC251030V0018



CT-ERC.22

2CDC251025V0018

- Control input with voltage-related triggering
- No triggering

#### Description

The CT-C range combines lower cost with higher value and performance in a slim 17.5 mm-wide housing. All relays have a wide time setting range from 0.05 seconds up to 100 hours. Combined with a wide voltage range they are the perfect choice for applications worldwide.

#### Ordering details

| Timing function        | Rated control supply voltage | Time ranges          | Control input | Output      | Type                    | Order code      | Weight (1 pc)<br>kg (lb) |
|------------------------|------------------------------|----------------------|---------------|-------------|-------------------------|-----------------|--------------------------|
| Multi <sup>1)</sup>    | 12-240 V AC/DC               | 7 (0.05 s - 100 h)   | ■             | Solid state | CT-MKC.31               | 1SVR508010R1300 | 0.060 (0.132)            |
| Multi <sup>1)</sup>    | 24-240 V AC<br>24-48 V DC    |                      | ■             | 1 c/o       | CT-MFC.12               | 1SVR508020R0000 | 0.060 (0.132)            |
| Multi <sup>1)</sup>    | 12-240 V AC/DC               |                      | ■             | 2 c/o       | CT-MFC.21               | 1SVR508020R1100 | 0.065 (0.143)            |
| Dual <sup>2)</sup>     | 24-240 V AC<br>24-48 V DC    | 7 (0.05 s - 10 min)  | -             | 1 c/o       | CT-ARC.12               | 1SVR508120R0000 | 0.060 (0.132)            |
| ON-delay               | 24-240 V AC<br>24-48 V DC    | 7 (0.05 s - 100 h)   | -             | 1 c/o       | CT-ERC.12               | 1SVR508100R0000 | 0.060 (0.132)            |
|                        |                              |                      | -             | 2 c/o       | CT-ERC.22               | 1SVR508100R0100 | 0.065 (0.143)            |
|                        |                              |                      | ■             | 1 c/o       | CT-AHC.12               | 1SVR508110R0000 | 0.060 (0.132)            |
|                        |                              |                      | ■             | 2 c/o       | CT-AHC.22               | 1SVR508110R0100 | 0.065 (0.143)            |
| OFF-delay              |                              |                      |               |             |                         |                 |                          |
| Impulse-ON             |                              |                      | -             | 1 c/o       | CT-VWC.12               | 1SVR508130R0000 | 0.060 (0.132)            |
| Flasher <sup>3)</sup>  |                              |                      | -             |             | CT-EBC.12               | 1SVR508150R0000 | 0.060 (0.132)            |
| Pulse generator        |                              | 2×7 (0.05 s - 100 h) | ■             |             | CT-TGC.12 <sup>4)</sup> | 1SVR508160R0000 | 0.060 (0.132)            |
|                        |                              |                      | ■             | 2 c/o       | CT-TGC.22 <sup>4)</sup> | 1SVR508160R0100 | 0.065 (0.143)            |
| Star-delta change-over |                              | 4 (0.05 s - 10 min)  | -             | 2 n/o       | CT-SDC.22 <sup>5)</sup> | 1SVR508211R0100 | 0.065 (0.143)            |
|                        |                              |                      | -             |             | CT-SAC.22 <sup>6)</sup> | 1SVR508210R0100 |                          |

<sup>1)</sup> Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

<sup>2)</sup> OFF-delay without aux. voltage (True OFF-delay), True Impulse-OFF

<sup>3)</sup> Flasher starting with ON, Flasher starting with OFF

<sup>4)</sup> ON and OFF times adjustable independently: 2 x 7 time ranges 0.05 s - 100 h

<sup>5)</sup> Transition time 50 ms fixed

<sup>6)</sup> Transition time adjustable

## CT-C range

### Technical data

Data at  $T_a = 25\text{ °C}$  and rated values, unless otherwise indicated

|                                                              |                                                | CT-C with 1 c/o contact                                                                                                                                                                                              | CT-C with 2 c/o contacts | CT-MFC.21      |
|--------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|
| Input circuit - Supply circuit                               |                                                |                                                                                                                                                                                                                      |                          |                |
| Rated control supply voltage U <sub>s</sub>                  |                                                | 24-240 V AC / 24-48 V DC                                                                                                                                                                                             |                          | 12-240 V AC/DC |
| Rated control supply voltage U <sub>s</sub> tolerance        |                                                | -15...+10 %                                                                                                                                                                                                          |                          |                |
| Rated frequency                                              |                                                | DC or 50/60 Hz                                                                                                                                                                                                       |                          |                |
| Frequency range AC                                           |                                                | 47-63 Hz                                                                                                                                                                                                             |                          |                |
| Typical power consumption                                    |                                                | max. 3.5 VA                                                                                                                                                                                                          |                          |                |
| Power failure buffering time                                 |                                                | min. 20 ms                                                                                                                                                                                                           |                          |                |
| Release voltage                                              |                                                | > 10 % of the minimum rated control supply voltage U <sub>s</sub>                                                                                                                                                    |                          |                |
| Input circuit - Control circuit                              |                                                |                                                                                                                                                                                                                      |                          |                |
| Control input, control function                              | A1-Y1/B1                                       | start timing external                                                                                                                                                                                                |                          |                |
| Kind of triggering                                           |                                                | voltage-related triggering                                                                                                                                                                                           |                          |                |
| Resistance to reverse polarity                               |                                                | yes                                                                                                                                                                                                                  |                          |                |
| Parallel load / polarized                                    |                                                | yes / yes                                                                                                                                                                                                            |                          |                |
| Maximum cable length to the control inputs                   |                                                | 50 m - 100 pF/m                                                                                                                                                                                                      |                          |                |
| Minimum control pulse length                                 |                                                | 20 ms                                                                                                                                                                                                                |                          |                |
| Control voltage potential                                    |                                                | see rated control supply voltage                                                                                                                                                                                     |                          |                |
| Timing circuit                                               |                                                |                                                                                                                                                                                                                      |                          |                |
| Time ranges                                                  | 7 time ranges 0.05 s - 100 h                   | 1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min<br>5.) 5-100 min 6.) 0.5-10 h 7.) 5-100 h                                                                                                                       |                          |                |
|                                                              | 4 time ranges 0.05 s - 10 min (CT-SDC, CT-SAC) | 1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min                                                                                                                                                                 |                          |                |
| Recovery time                                                |                                                | < 50 ms                                                                                                                                                                                                              |                          |                |
| Accuracy within the rated control supply voltage tolerance   |                                                | Δt < 0.005 % / V                                                                                                                                                                                                     |                          |                |
| Accuracy within the temperature range                        |                                                | Δt < 0.06 % / °C                                                                                                                                                                                                     |                          |                |
| Repeat accuracy (constant parameters)                        |                                                | Δt < ± 0.5 %                                                                                                                                                                                                         |                          |                |
| Setting accuracy of time delay                               |                                                | ± 10% of full-scale value                                                                                                                                                                                            |                          |                |
| Star-delta transition time                                   | CT-SDC / CT-SAC                                | fixed 50 ms /<br>adjustable: 20 ms, 30 ms, 40 ms, 50 ms, 60 ms, 80 ms or 100 ms                                                                                                                                      |                          |                |
| Star-delta transition time tolerance                         | CT-SDC / CT-SAC                                | ±3 ms                                                                                                                                                                                                                |                          |                |
| Indication of operational states                             |                                                |                                                                                                                                                                                                                      |                          |                |
| Control supply voltage / timing                              | U: green LED                                   |  : control supply voltage applied<br> : timing |                          |                |
| Relay energized                                              | R, R1, R2: yellow LED                          |  : output relay energized                                                                                                         |                          |                |
| Operating elements and controls                              |                                                |                                                                                                                                                                                                                      |                          |                |
| Adjustment of the time range                                 |                                                | front-face rotary switch, direct reading scales                                                                                                                                                                      |                          |                |
| Fine adjustment of the time value                            |                                                | front-face potentiometer                                                                                                                                                                                             |                          |                |
| Preselection of the timing function at multifunction devices |                                                | front-face rotary switch, direct reading scales                                                                                                                                                                      |                          |                |
| Adjustment of the transition time                            | CT-SAC                                         | front-face potentiometer                                                                                                                                                                                             |                          |                |
| Output circuit                                               |                                                |                                                                                                                                                                                                                      |                          |                |

#### Note

Technical information for CT-ARC.12 and CT-MKC.31 on request.

## CT-C range

### Technical data

|                                                       |                                                    | CT-C with 1 c/o contact                                 | CT-C with 2 c/o contacts                          | CT-MFC.21             |
|-------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------|-----------------------|
| Kind of output                                        | 15-16/18                                           | Relay, 1 c/o contact                                    | -                                                 |                       |
|                                                       | 15-16/18; 25-26/28                                 | -                                                       | Relay, 2 c/o contacts                             |                       |
|                                                       | 17-18; 17-28                                       |                                                         | Relay, 2 n/o contacts (CT-SDC, CT-SAC)            |                       |
| Contact material                                      |                                                    | AgNi alloy, Cd free                                     |                                                   |                       |
| Rated operational voltage U <sub>e</sub>              |                                                    | 250 V                                                   |                                                   |                       |
| Minimum switching voltage / minimum switching current |                                                    | 12 V / 100 mA                                           |                                                   |                       |
| Maximum switching voltage / maximum switching current |                                                    | 250 V AC / 6 A                                          | 250 V AC / 5 A                                    |                       |
| Rated operational current I <sub>e</sub>              | AC-12 (resistive) at 230 V                         | 4 A                                                     | 4 A                                               |                       |
|                                                       | AC-15 (inductive) at 230 V                         | 3 A                                                     | 3 A                                               | n/o: 3 A n/c: 0.75 A  |
|                                                       | DC-12 (resistive) at 24 V                          | 4 A                                                     | 4 A                                               |                       |
|                                                       | DC-13 (inductive) at 24 V                          | 2 A                                                     | 2 A                                               | 1 A                   |
| AC rating (UL 508)                                    | utilization category (Control Circuit Rating Code) | B 300                                                   |                                                   | n/o: B 300 n/c: C 300 |
|                                                       | max. rated operational voltage                     | 300 V AC                                                |                                                   |                       |
|                                                       | maximum continuous thermal current at B300         | 5 A                                                     |                                                   | n/o: 5 A              |
|                                                       | maximum continuous thermal current at C300         | -                                                       |                                                   | n/c: 2.5 A            |
|                                                       | max. making/breaking apparent power at B300        | 3600 VA / 360 VA                                        |                                                   | n/o: 3600/360 VA      |
|                                                       | max. making/breaking apparent power at C300        | -                                                       |                                                   | n/c: 1800/180 VA      |
|                                                       |                                                    |                                                         |                                                   |                       |
| Mechanical lifetime                                   |                                                    | 30 x 10 <sup>6</sup> switching cycles                   |                                                   |                       |
| Electrical lifetime                                   |                                                    | 0.1 x 10 <sup>6</sup> switching cycles                  |                                                   |                       |
| Max. fuse rating to achieve short-circuit protection  | n/c contact                                        | 6 A fast-acting                                         |                                                   | 6 A fast-acting       |
|                                                       | n/o contact                                        | 10 A fast-acting                                        |                                                   |                       |
| General data                                          |                                                    |                                                         |                                                   |                       |
| Mean time between failures (MTBF)                     |                                                    | on request                                              |                                                   |                       |
| Duty cycle                                            |                                                    | 100%                                                    |                                                   |                       |
| Dimensions                                            |                                                    | see 'Dimensional drawings'                              |                                                   |                       |
| Mounting                                              |                                                    | DIN rail (IEC/EN 60715), snap-mounting without any tool |                                                   |                       |
| Mounting position                                     |                                                    | any                                                     |                                                   |                       |
| Minimum distance to other units                       |                                                    | horizontal / vertical                                   | no / no                                           |                       |
| Degree of protection                                  |                                                    | housing / terminals                                     | IP50 / IP20                                       |                       |
| Electrical connection                                 |                                                    |                                                         |                                                   |                       |
| Connecting capacity                                   | fine-stranded with(out) wire and ferrule           | 2 x 0.5-1.5 mm <sup>2</sup> (2 x 20-16 AWG)             |                                                   |                       |
|                                                       |                                                    | 1 x 0.5-2.5 mm <sup>2</sup> (1 x 20-14 AWG)             |                                                   |                       |
|                                                       | rigid                                              | 2 x 0.5-1.5 mm <sup>2</sup> (2 x 20-16 AWG)             |                                                   |                       |
|                                                       |                                                    | 1 x 0.5-4 mm <sup>2</sup> (1 x 20-12 AWG)               |                                                   |                       |
| Stripping length                                      |                                                    | 7 mm (0.28 in)                                          |                                                   |                       |
| Tightening torque                                     |                                                    | 0.5-0.8 Nm (4.43-7.08 lb.in)                            |                                                   |                       |
| Environmental data                                    |                                                    |                                                         |                                                   |                       |
| Ambient temperature range                             |                                                    | operation / storage                                     | -20 ... +60 °C / -40 ... +85 °C                   |                       |
| Climatic class                                        |                                                    | EC/EN 60068-2-30                                        | 3K3                                               |                       |
| Relative humidity range                               |                                                    | 25-85%                                                  |                                                   |                       |
| Vibration, sinusoidal                                 |                                                    | IEC/EN 60068-2-6                                        | 20 m/s <sup>2</sup> ; 10 cycles, 10...150...10 Hz |                       |
| Shock (half-sine)                                     |                                                    | IEC/EN 60068-2-27                                       | 150 m/s <sup>2</sup> , 11 ms                      |                       |

#### Note

Technical information for CT-ARC.12 and CT-MKC.31 on request.

## CT-C range

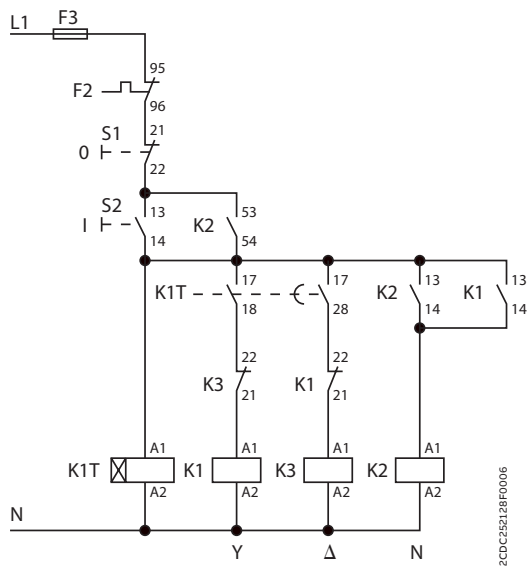
### Technical data

|                                                           |                                     | CT-C with 1 c/o contact | CT-C with 2 c/o contacts | CT-MFC.21 |
|-----------------------------------------------------------|-------------------------------------|-------------------------|--------------------------|-----------|
| Isolation data                                            |                                     |                         |                          |           |
| Rated insulation voltage U <sub>i</sub>                   | input circuit / output circuit      | 300 V                   |                          |           |
|                                                           | output circuit 1 / output circuit 2 | not available           | 300 V                    | 300 V     |
| Rated impulse withstand voltage U <sub>imp</sub>          | between all isolated circuits       | 4 kV; 1.2/50 μs         |                          |           |
| Power-frequency withstand voltage test(test voltage)      | between all isolated circuits       | 2.5 kV; 50 Hz; 60 s     |                          |           |
| Basic insulation (IEC/EN 61140)                           | input circuit / output circuit      | 300 V                   |                          |           |
| Protective separation (IEC/EN 61140, EN 50178)            | input circuit / output circuit      | 250 V                   |                          |           |
| Pollution degree                                          |                                     | 3                       |                          |           |
| Overvoltage category                                      |                                     | III                     |                          |           |
| Standards / Directives                                    |                                     |                         |                          |           |
| Standards                                                 |                                     | IEC/EN 61812-1          |                          |           |
| Low Voltage Directive                                     |                                     | 2014/35/EU              |                          |           |
| EMC Directive                                             |                                     | 2014/30/EU              |                          |           |
| RoHS Directive                                            |                                     | 2011/65/EU              |                          |           |
| Electromagnetic compatibility                             |                                     |                         |                          |           |
| Interference immunity to                                  |                                     | IEC/EN 61000-6-2        |                          |           |
| electrostatic discharge                                   | IEC/EN 61000-4-2                    | Level 3 (6 kV / 8 kV)   |                          |           |
| radiated, radio-frequency, electromagnetic field          | IEC/EN 61000-4-3                    | Level 3 (10 V / m)      |                          |           |
| electrical fast transient / burst                         | IEC/EN 61000-4-4                    | Level 3 (2 kV / 5 kHz)  |                          |           |
| surge                                                     | IEC/EN 61000-4-5                    | Level 4 (2 kV L-L)      |                          |           |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6                    | Level 3 (10 V)          |                          |           |
| Interference emission                                     |                                     | IEC/EN 61000-6-3        |                          |           |
| high-frequency radiated                                   | IEC/CISPR 22, EN 55022              | Class B                 |                          |           |
| high-frequency conducted                                  | IEC/CISPR 22, EN 55022              | Class B                 |                          |           |

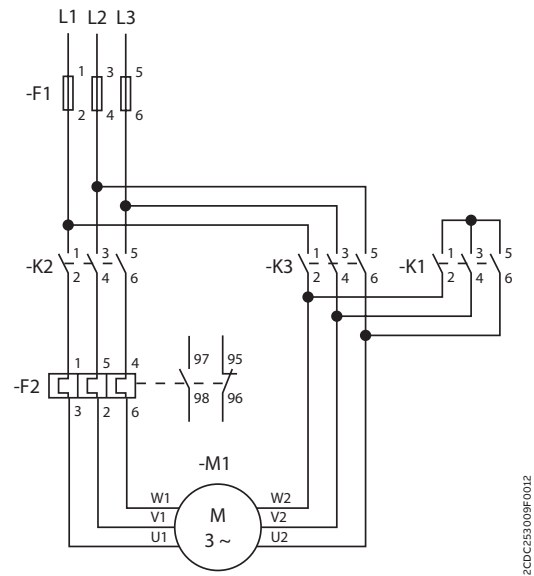
## CT-C range

### Technical diagrams

#### Example of application - Star-delta chnageover



Control circuit diagram



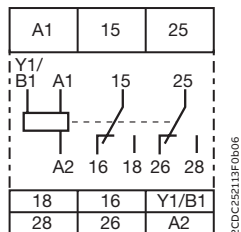
Power circuit diagram

## CT-C range

### Technical diagrams

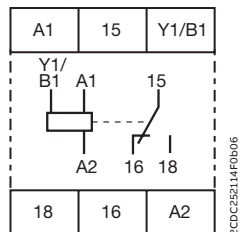
#### Connection diagrams

##### CT-MFC.21



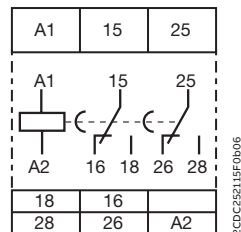
|          |                           |
|----------|---------------------------|
| A1-A2    | Supply:<br>12-240 V AC/DC |
| A1-Y1/B1 | Control input             |
| 15-16/18 | 1st c/o contact           |
| 25-26/28 | 2nd c/o contact           |

##### CT-MFC.12



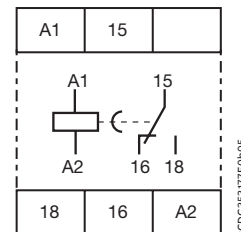
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| A1-Y1/B1 | Control input                           |
| 15-16/18 | 1st c/o contact                         |

##### CT-ERC.22



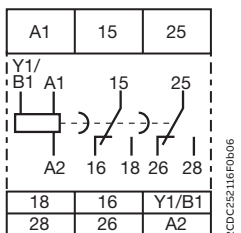
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 15-16/18 | 1st c/o contact                         |
| 25-26/28 | 2nd c/o contact                         |

##### CT-ERC.12



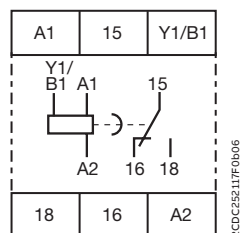
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 15-16/18 | 1st c/o contact                         |

##### CT-AHC.22



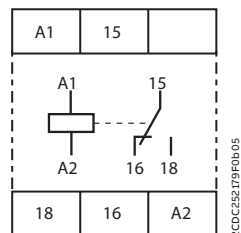
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |
| 25-26/28 | 2nd c/o contact                          |

##### CT-AHC.12



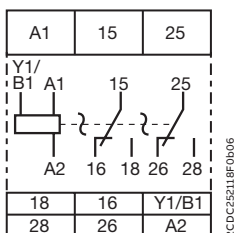
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |

##### CT-VWC.12



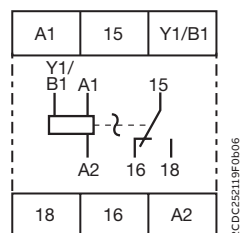
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| 15-16/18 | 1st c/o contact                          |

##### CT-TGC.22



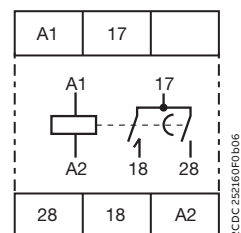
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| A1-Y1/B1 | Control input                           |
| 15-16/18 | 1st c/o contact                         |
| 25-26/28 | 2nd c/o contact                         |

##### CT-TGC.12



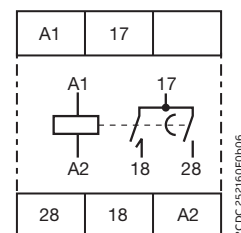
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |

##### CT-SDC.22



|       |                                         |
|-------|-----------------------------------------|
| A1-A2 | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 17-18 | 1st n/o contact<br>(star contactor)     |
| 17-28 | 2nd n/o contact<br>(delta contactor)    |

##### CT-SAC.22



|       |                                         |
|-------|-----------------------------------------|
| A1-A2 | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 17-18 | 1st n/o contact<br>(star contactor)     |
| 17-28 | 2nd n/o contact<br>(delta contactor)    |

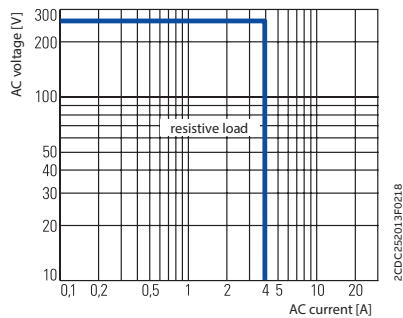
## CT-C range

### Technical diagrams

#### Load limit curves

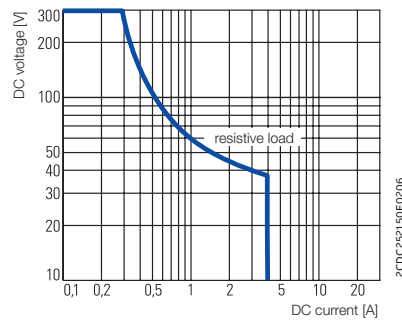
##### AC load (resistive)

###### CT-C.1x

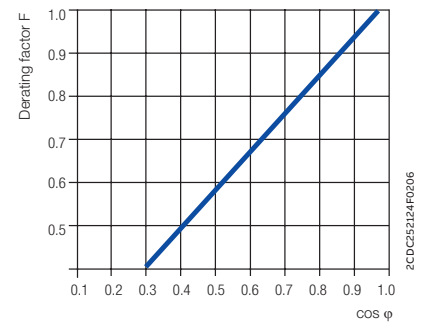


##### DC load (resistive)

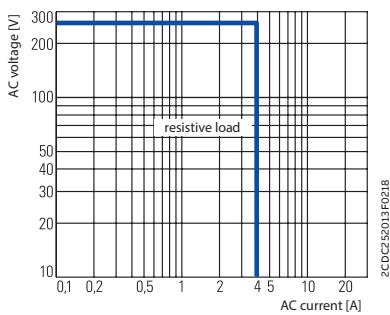
###### CT-C.1x



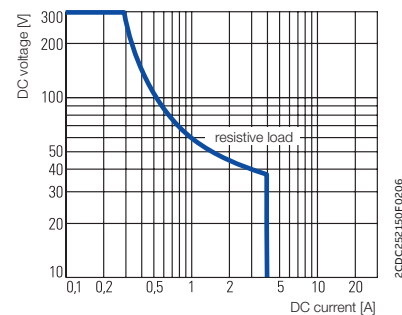
##### Derating factor F for inductive AC load



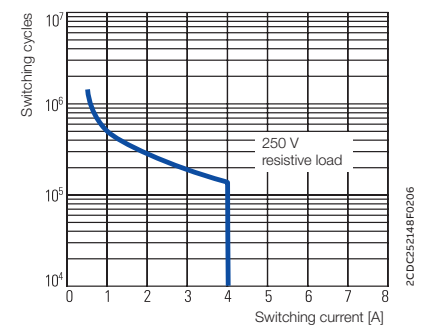
###### CT-C.2x



###### CT-C.2x

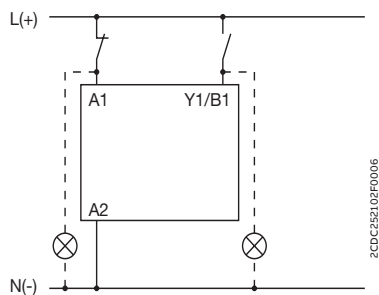


##### Contact lifetime

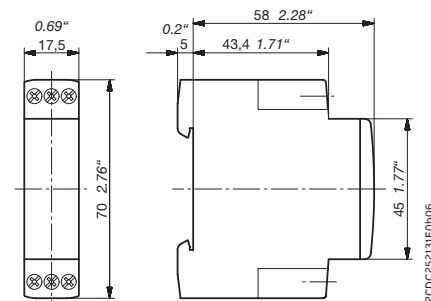


#### Wiring notes for devices with control input

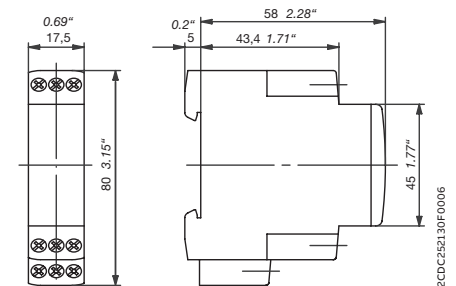
##### A parallel load to the control input is possible



#### Dimensional drawings in mm and inches



CT-C devices with 1 c/o contact or 2 n/o contacts



CT-C devices with 2 c/o contacts



---

## **CT-S range**

### Table of contents

|           |                                                        |
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| <b>28</b> | <b>Selection table</b>                                 |
| <b>29</b> | <b>Ordering details -<br/>multifunctional devices</b>  |
| <b>30</b> | <b>Ordering details -<br/>singlefunctional devices</b> |
| <b>31</b> | <b>Ordering details - Accessories</b>                  |
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## CT-S range

### Benefits and advantages



The advanced CT-S range includes 22 single-function devices and 16 multifunction timers with up to 13 functions. The devices feature seven or ten time ranges, which are adjustable from 0.05 seconds to 300 hours. Every device is available in two different connection technologies: double-chamber cage connection terminals or ABB's vibration-resistant Push-in Technology.



**Improve installation efficiency**

The CT-S range allows simple tool free mounting and demounting on the DIN rail. Thanks to the easy connect and the double-chamber cage connection technology simplified wiring with or without wire end ferrules is no problem. Both allow simple and easy installation, even in case of different cable diameters.



**Reliable in harsh conditions**

The CT-S range's extended features make it especially suited for harsh environments. The housing material has the highest UL fire protection classification. All functions are available with Push-in terminals, making operations in environments with high vibrations possible without retightening. Additionally, the CT-S range offers devices with an extended temperature range, running operations in temperatures as low as -40 °C effortlessly. Specific types are tested according to the latest rail industry standards, making them a perfect solution for rolling stock and other rail applications.



**Global availability**

Every device in the CT-S range is designed to provide a wide supply voltage range, making global differences irrelevant. Additionally, the CT-S range meets a broad range of standards and requirements. Together with ABB's global support and sales network, using CT-S gives customers the confidence of worldwide sourcing – no matter where they build, install or operate their equipment.

# CT-S range

## Operating controls

**Control input**  
Starts and pauses timing.



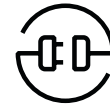
**Preselection of time range**  
Direct assignment of the pre-selected time range to the fine adjustment potentiometer scale by multicolor scales



**Fine adjustment of the time delay**



**Selection of the timing function**



**Connection terminals**  
Screw or push-in connection available.

**Remote potentiometer connection possible**

**2nd contact selectable as an instantaneous contact**

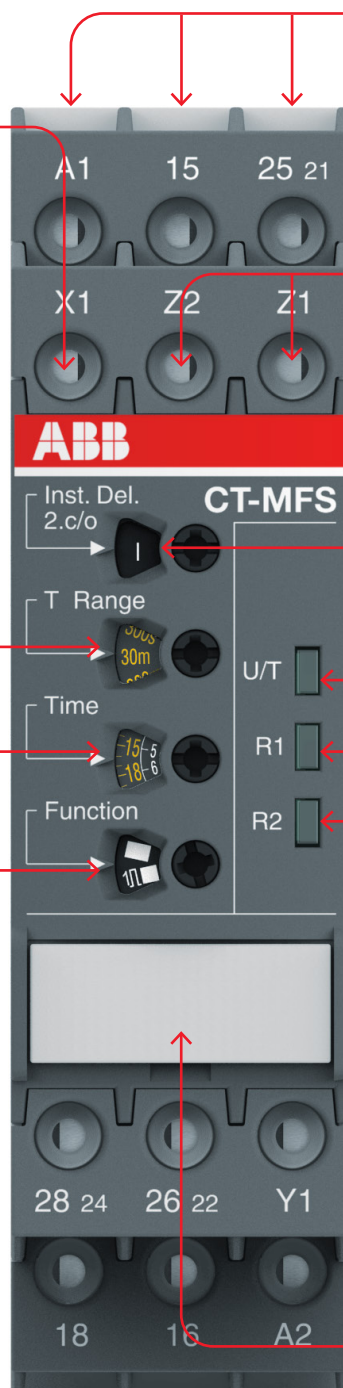


**LEDs for status indication**  
All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

- U/T - green LED:  
 control supply voltage applied /  
 timing
- R, R1, R2 - yellow LED:  
 Output relay energized

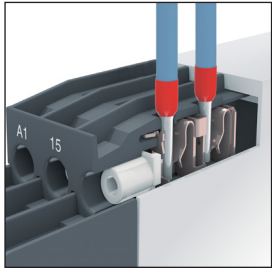


**Integrated marker label**  
Integrated marker labels allow the product to be marked quickly and simply. No additional marker labels are required.

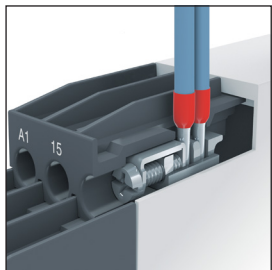


## CT-S range

### Benefits and advantages



01 Tool-free mounting of wires



02 Wiring of double-chamber cage connection terminals with screw driver

#### Easy Connect Technology

Tool-free wiring and excellent vibration resistance. Easy Connect (Push-in terminals) provide connection of wires up to  $2 \times 0.5 - 1.5 \text{ mm}^2$  ( $2 \times 20 - 16 \text{ AWG}$ ), rigid or fine-strand with or without wire end ferrules. The extended type designators for products with push-in terminals are indicated by a **P** following the extended type designator e.g. CT-xxS.xx**P**.

#### Double-chamber cage connection terminals

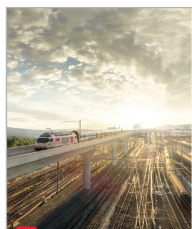
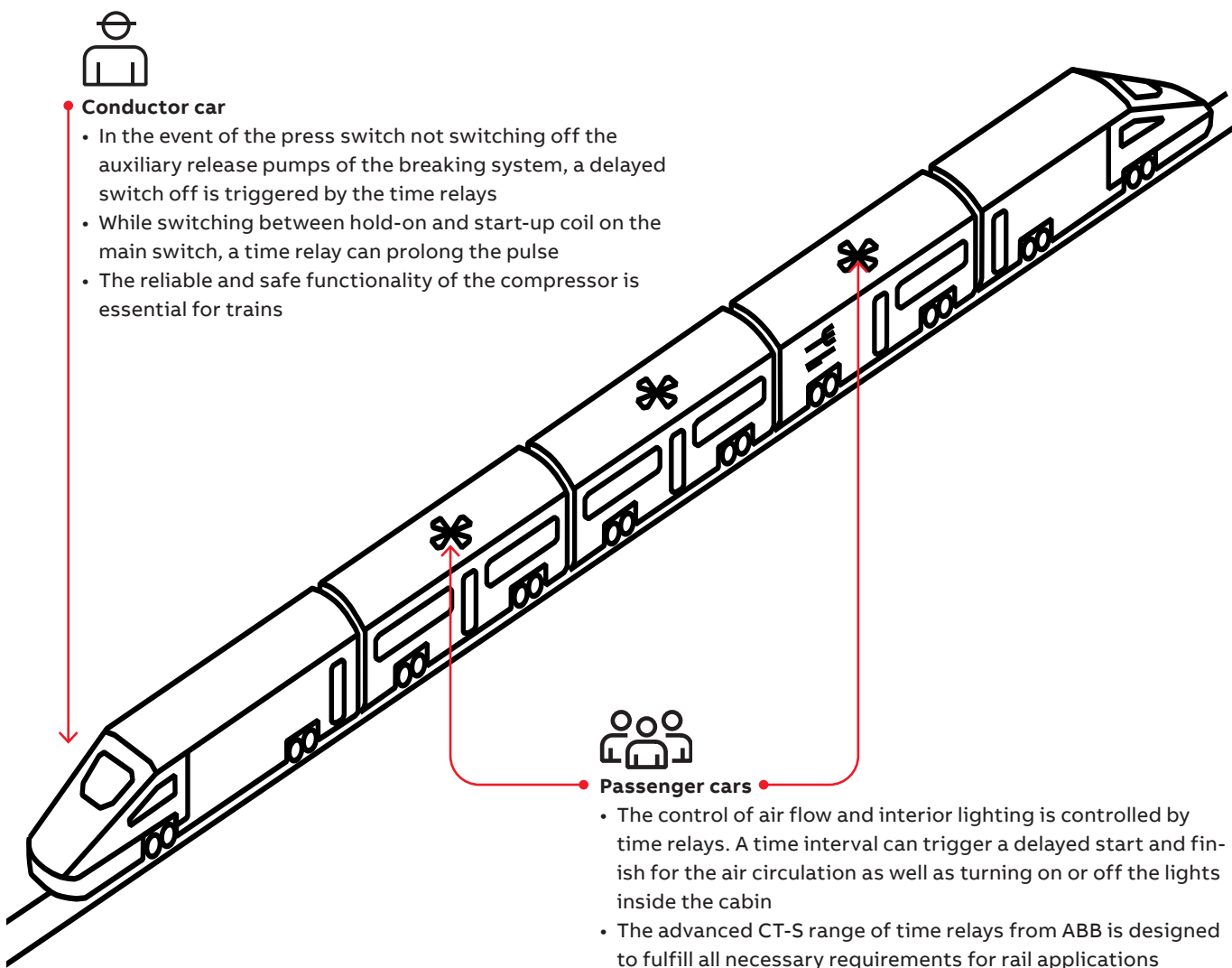
According to IEC/EN 60947-1 double-chamber cage connection terminals provide connection of wires up to  $2 \times 0.5 - 2.5 \text{ mm}^2$  ( $2 \times 20 - 14 \text{ AWG}$ ) rigid or fine-strand, with or without wire end ferrules. Thanks to the technology, using different cable diameters in one terminal is easy and simple to install. Potential distribution does not require additional terminals. The extended type designators for products with double-chamber cage connection terminals (screw terminals) are indicated by an **S** following the extended type designator, e.g. CT-xxS.xx**S**.



## CT-S range

### Made for the most extreme conditions

Selected products of the CT-S range comply to the latest rail standards like EN50155. Designed for harsh environments, not only are standard screw type terminals offered – push-in terminals with excellent vibration resistance are also available. Perfect for use in rolling stock.



**Electronic relays for railway solutions**  
Time, measuring and monitoring relays

### Electronic relays for railway solutions brochure

For more information about time relays in rolling stock applications visit:

[new.abb.com/low-voltage/products/electronicrelays](http://new.abb.com/low-voltage/products/electronicrelays)

or scan the QR code



**Order number and type**  
All devices are available either with push-in terminals (P-type) or double-chamber cage connection terminals (S-type).

| Terminal | Type  | Order number |
|----------|-------|--------------|
| Push-in  | ● = P | ■ = 4        |
| Screw    | ● = S | ■ = 3        |

|  |  | Type*      | Order number*   |
|--|--|------------|-----------------|
|  |  | CT-MVS.21● | 1SVR7■0020R0200 |
|  |  | CT-MVS.22● | 1SVR7■0020R3300 |
|  |  | CT-MVS.23● | 1SVR7■0021R2300 |
|  |  | CT-MVS.12● | 1SVR7■0020R3100 |
|  |  | CT-MXS.22● | 1SVR7■0030R3300 |
|  |  | CT-MFS.21● | 1SVR7■0010R0200 |
|  |  | CT-MBS.22● | 1SVR7■0010R3200 |
|  |  | CT-WBS.22● | 1SVR7■0040R3300 |
|  |  | CT-ERS.21● | 1SVR7■0100R0300 |
|  |  | CT-ERS.22● | 1SVR7■0100R3300 |
|  |  | CT-ERS.12● | 1SVR7■0100R3100 |
|  |  | CT-APS.21● | 1SVR7■0180R0300 |
|  |  | CT-APS.22● | 1SVR7■0180R3300 |
|  |  | CT-APS.12● | 1SVR7■0180R3100 |
|  |  | CT-AHS.22● | 1SVR7■0110R3300 |
|  |  | CT-ARS.11● | 1SVR7■0120R3100 |
|  |  | CT-ARS.21● | 1SVR7■0120R3300 |
|  |  | CT-SDS.22● | 1SVR7■0210R3300 |
|  |  | CT-SDS.23● | 1SVR7■0211R2300 |

| Timing function                              |  |
|----------------------------------------------|--|
| ON-delay                                     |  |
| ON-delay, accumulative                       |  |
| OFF-delay w. aux. voltage                    |  |
| OFF-delay w. aux. voltage, accumulative      |  |
| OFF-delay w/o aux. voltage                   |  |
| ON- and OFF-delay, symmetrical               |  |
| ON- and OFF-delay, symmetrical, accumulative |  |
| ON- and OFF-delay, asymmetrical              |  |
| ON/OFF function                              |  |
| Impulse-ON                                   |  |
| Impulse-ON, accumulative                     |  |
| Impulse-OFF w. aux. voltage                  |  |
| Impulse-OFF w. aux. voltage, accumulative    |  |
| Impulse-ON and OFF                           |  |
| Fixed impulse with adjustable time delay     |  |
| Adjustable impulse with fixed time delay     |  |
| Flasher starting with ON                     |  |
| Flasher with reset, starting with ON         |  |
| Flasher starting with OFF                    |  |
| Flasher with reset, starting with OFF        |  |
| Flasher starting with ON or OFF              |  |
| Pulse generator starting with ON or OFF      |  |
| Single pulse generator                       |  |
| Pulse former                                 |  |
| Star-delta change-over                       |  |
| Star-delta change-over with impulse          |  |

| Features                                            |  |
|-----------------------------------------------------|--|
| Control input, voltage-related triggering           |  |
| Control input, volt-free triggering                 |  |
| Remote potentiometer connection                     |  |
| 2nd c/o contact selectable as instantaneous contact |  |
| Extended temperature range (-40...+60 °C)           |  |

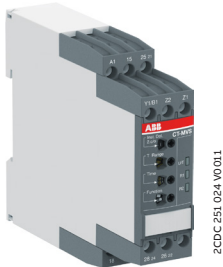
| Time range      |  |
|-----------------|--|
| 0.05 s - 10 min |  |
| 0.05 s - 300 h  |  |

| Supply voltage |  |
|----------------|--|
| 24-48 V DC     |  |
| 24-240 V AC    |  |
| 24-240 V AC/DC |  |
| 380-440 V AC   |  |

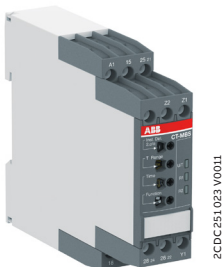
| Output      |  |
|-------------|--|
| c/o contact |  |
| n/o contact |  |

## CT-S range

### Ordering details - multifunctional devices



CT-MVS.21P



CT-MBS.22P

- Control input with voltage-related triggering
- Control input with volt-free triggering
- / □ Two control inputs with volt-free triggering
- No triggering

#### Description

The high-performance CT-S range is ideally suited for universal use and is available with two different connection technologies:

- Double-chamber cage connection terminals (Screw terminals)
- Easy Connect Technology (Push-in terminals)

#### Ordering details

| Timing function <sup>5)</sup> | Rated control supply voltage | Time ranges           | Control input | Output | Type                           | Order code      | Weight (1 pc)<br>kg (lb) |
|-------------------------------|------------------------------|-----------------------|---------------|--------|--------------------------------|-----------------|--------------------------|
| Multi                         | 24- 240 V AC/DC              | 10 (0.05 s - 300 h)   | ■             | 2 c/o  | CT-MVS.21S <sup>1) 2) 3)</sup> | 1SVR730020R0200 | 0.148 (0.326)            |
|                               |                              |                       |               |        | CT-MVS.21P <sup>1) 2) 3)</sup> | 1SVR740020R0200 | 0.136 (0.30)             |
|                               | 24-48 V DC, 24-240 V AC      |                       |               |        | CT-MVS.22S                     | 1SVR730020R3300 | 0.142 (0.313)            |
|                               |                              |                       |               |        | CT-MVS.22P                     | 1SVR740020R3300 | 0.131 (0.289)            |
|                               | 380-440 V AC                 |                       |               |        | CT-MVS.23S                     | 1SVR730021R2300 | 0.144 (0.317)            |
|                               |                              |                       |               |        | CT-MVS.23P                     | 1SVR740021R2300 | 0.133 (0.293)            |
| Multi                         | 24-48 V DC, 24-240 V AC      | 10 (0.05 s - 300 h)   | ■             | 1 c/o  | CT-MVS.12S                     | 1SVR730020R3100 | 0.107 (0.236)            |
|                               |                              |                       |               |        | CT-MVS.12P                     | 1SVR740020R3100 | 0.102 (0.225)            |
| Multi                         | 24-48 V DC, 24-240 V AC      | 2×10 (0.05 s - 300 h) | ■             | 2 c/o  | CT- MXS.22S <sup>4)</sup>      | 1SVR730030R3300 | 0.142 (0.313)            |
|                               |                              |                       |               |        | CT-MXS.22P <sup>4)</sup>       | 1SVR740030R3300 | 0.131 (0.289)            |
| Multi                         | 24- 240 V AC/DC              | 10 (0.05 s - 300 h)   | □ / □         | 2 c/o  | CT-MFS.21S <sup>1) 2) 3)</sup> | 1SVR730010R0200 | 0.145 (0.32)             |
|                               |                              |                       |               |        | CT-MFS.21P <sup>1) 2) 3)</sup> | 1SVR740010R0200 | 0.133 (0.293)            |
|                               | 24-48 V DC, 24-240 V AC      | 10 (0.05 s - 300 h)   | □             | 2 c/o  | CT-MBS.22S <sup>2) 3)</sup>    | 1SVR730010R3200 | 0.14 (0.309)             |
|                               |                              |                       |               |        | CT-MBS.22P <sup>2) 3)</sup>    | 1SVR740010R3200 | 0.129 (0.284)            |
| Multi                         | 24-48 V DC, 24-240 V AC      | 10 (0.05 s - 300 h)   | -             | 2 c/o  | CT-WBS.22S                     | 1SVR730040R3300 | 0.123 (0.271)            |
|                               |                              |                       |               |        | CT-WBS.22P                     | 1SVR740040R3300 | 0.115 (0.254)            |

<sup>1)</sup> Extended temperature range -40 °C

<sup>2)</sup> Remote potentiometer connection

<sup>3)</sup> 2nd c/o contact selectable as instantaneous contact

<sup>4)</sup> 2 remote potentiometer connections

<sup>5)</sup> See selection table on previous page

S: Screw connection

P: Push-in / easy connect

## CT-S range

### Ordering details - singlefunctional devices



CT-ERS.21P

2CDC 251 030 V0011



CT-AHS.22P

2CDC 251 033 V0011



CT-SDS.23P

2CDC 251 040 V0011

- Control input with voltage-related triggering
- Control input with volt-free triggering
- /□ Two control inputs with volt-free triggering
- No triggering

#### Ordering details

| Timing function                      | Rated control supply voltage | Time ranges         | Control input | Output     | Type                     | Order code      | Weight (1 pc)<br>kg (lb) |
|--------------------------------------|------------------------------|---------------------|---------------|------------|--------------------------|-----------------|--------------------------|
| ON-delay                             | 24-240 V AC/<br>DC           | 10 (0.05 s - 300 h) | -             | 2 c/o      | CT-ERS.21S <sup>1)</sup> | 1SVR730100R0300 | 0.13 (0.287)             |
|                                      |                              |                     |               |            | CT-ERS.21P <sup>1)</sup> | 1SVR740100R0300 | 0.121 (0.267)            |
|                                      |                              |                     |               |            | CT-ERS.22S               | 1SVR730100R3300 | 0.121 (0.267)            |
|                                      |                              |                     |               |            | CT-ERS.22P               | 1SVR740100R3300 | 0.113 (0.249)            |
|                                      | 24-48 V DC,<br>24-240 V AC   | -                   | 1 c/o         | CT-ERS.12S | 1SVR730100R3100          | 0.106 (0.234)   |                          |
|                                      |                              |                     |               | CT-ERS.12P | 1SVR740100R3100          | 0.101 (0.222)   |                          |
| OFF-delay                            | 24-240 V AC/<br>DC           | 10 (0.05 s - 300 h) | ■             | 2 c/o      | CT-APS.21S <sup>1)</sup> | 1SVR730180R0300 | 0.146 (0.322)            |
|                                      |                              |                     |               |            | CT-APS.21P <sup>1)</sup> | 1SVR740180R0300 | 0.125 (0.276)            |
|                                      |                              |                     |               |            | CT-APS.22S               | 1SVR730180R3300 | 0.138 (0.304)            |
|                                      |                              |                     |               |            | CT-APS.22P               | 1SVR740180R3300 | 0.127 (0.28)             |
|                                      | 24-48 V DC,<br>24-240 V AC   | ■                   | 1 c/o         | CT-APS.12S | 1SVR730180R3100          | 0.109 (0.24)    |                          |
|                                      |                              |                     |               | CT-APS.12P | 1SVR740180R3100          | 0.103 (0.227)   |                          |
|                                      |                              | 10 (0.05 s - 300 h) | □             | 2 c/o      | CT-AHS.22S               | 1SVR730110R3300 | 0.136 (0.30)             |
|                                      |                              |                     |               |            | CT-AHS.22P               | 1SVR740110R3300 | 0.125 (0.276)            |
| OFF-delay <sup>2)</sup>              | 24-240 V AC/DC               | 7 (0.05 s - 10 min) | -             | 1 c/o      | CT-ARS.11S               | 1SVR730120R3100 | 0.106 (0.234)            |
|                                      |                              |                     |               |            | CT-ARS.11P               | 1SVR740120R3100 | 0.10 (0.22)              |
|                                      |                              |                     | -             | 2 c/o      | CT-ARS.21S               | 1SVR730120R3300 | 0.124 (0.273)            |
|                                      |                              |                     |               |            | CT-ARS.21P               | 1SVR740120R3300 | 0.115 (0.254)            |
| Star-delta change-over <sup>3)</sup> | 24-48 V DC,<br>24-240 V AC   | 7 (0.05 s - 10 min) | -             | 2 n/o      | CT-SDS.22S               | 1SVR730210R3300 | 0.114 (0.251)            |
|                                      |                              |                     |               |            | CT-SDS.22P               | 1SVR740210R3300 | 0.108 (0.238)            |
|                                      | 380-440 V AC                 |                     |               |            | CT-SDS.23S               | 1SVR730211R2300 | 0.118 (0.26)             |
|                                      |                              |                     |               |            | CT-SDS.23P               | 1SVR740211R2300 | 0.112 (0.247)            |

<sup>1)</sup> Extended temperature range -40 °C<sup>2)</sup> Without auxiliary voltage<sup>3)</sup> 50 ms transition time

S: Screw connection

P: Push-in / easy connect

## CT-S range

### Ordering details - Accessories



MT-x50B

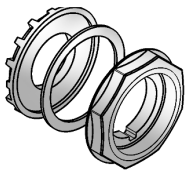
1SFC 151 139 V0001

The CT-S range offers the possibility of using accessories such as a remote potentiometer to adjust the time delay or a sealable, transparent cover to protect against unauthorized changes of time and threshold values.

#### Remote potentiometer

50 k $\Omega$   $\pm$ 20 % - 0.2  $\Omega$ , degree of protection IP66

| Material        | Diameter<br>in mm | Type    | Order code      | Pack.-<br>unit<br>pieces | Weight<br>1 piece<br>g / oz |
|-----------------|-------------------|---------|-----------------|--------------------------|-----------------------------|
| Plastic, black  | 22.5              | MT-150B | 1SFA611410R1506 | 1                        | 0.040                       |
| Plastic, chrome | 22.5              | MT-250B | 1SFA611410R2506 | 1                        | 0.040                       |
| Metal, chrome   | 22.5              | MT-350B | 1SFA611410R3506 | 1                        | 0.048                       |

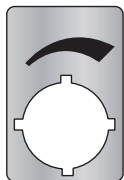


30 mm adapters

2CDC 252 042 F0009

#### 30 mm adapter for attaching the potentiometer 22 mm in 30 mm mounting hole

| Material       | Type     | Order code      | Pack.-<br>unit<br>pieces | Weight<br>1 piece<br>g / oz |
|----------------|----------|-----------------|--------------------------|-----------------------------|
| Plastic, black | KA1-8029 | 1SFA616920R8029 | 1                        |                             |
| Metal, chrome  | KA1-8030 | 1SFA616920R8030 | 1                        |                             |

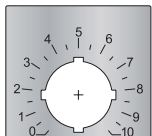


Marker label 29.6 x 44.5 mm

2CDC 252 043 F0209

#### Marker label

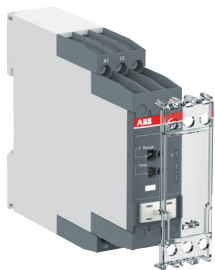
| Caption                   | Type          | Order code      | Pack.-<br>unit<br>pieces | Weight<br>1 piece<br>g / oz |
|---------------------------|---------------|-----------------|--------------------------|-----------------------------|
| Symbol (see illustration) | SK 615 562-87 | GJD6155620R0087 | 1                        | 0.002                       |
| Scale 0 - 10              | SK 615 562-88 | GJD6155620R0088 | 1                        | 0.002                       |
| Scale 0 - 30              | MA16-1060     | 1SFA611940R1060 | 1                        | 0.002                       |

Marker label with scale 0-10  
48.5 x 44.5 mm

2CDC 252 044 F0209

#### Accessories for CT-S

| Description                                | Type   | Order code      | Pack.-<br>unit<br>pieces | Weight<br>1 piece<br>g / oz |
|--------------------------------------------|--------|-----------------|--------------------------|-----------------------------|
| Adapter for screw mounting                 | ADP.01 | 1SVR430029R0100 | 1                        | 0.018<br>(0.040)            |
| Sealable transparent cover                 | COV.11 | 1SVR730005R0100 | 1                        | 0.004<br>(0.009)            |
| Marker label for devices w/o DIP switches  | MAR.01 | 1SVR366017R0100 | 10                       | 0.001<br>(0.002)            |
| Marker label for devices with DIP switches | MAR.12 | 1SVR730006R0000 | 10                       | 0.001<br>(0.002)            |

Sealable transparent cover  
for CT-S in new housing

2CDC 255 006 S0011

## CT-S range

### Technical data

Data at  $T_a = 25\text{ °C}$  and rated values, unless otherwise indicated

|                                                            |                                                | CT-S                                                                                                                                        |
|------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input circuit - Supply circuit</b>                      |                                                |                                                                                                                                             |
| Rated control supply voltage $U_s$                         | CT-xxx.x1                                      | 24-240 V AC/DC                                                                                                                              |
|                                                            | CT-xxx.x2                                      | 24-48 V DC, 24-240 V AC                                                                                                                     |
|                                                            | CT-xxx.x3                                      | 380-440 V AC                                                                                                                                |
| Rated control supply voltage $U_s$ tolerance               |                                                | -15...+10 %                                                                                                                                 |
| Rated frequency                                            |                                                | DC or 50/60 Hz                                                                                                                              |
| Frequency range AC                                         |                                                | 47-63 Hz                                                                                                                                    |
| Typical power consumption                                  |                                                | max. 16 VA                                                                                                                                  |
| Power failure buffering time                               | 24 V DC                                        | min. 15 ms                                                                                                                                  |
|                                                            | 230/400 V AC                                   | min. 20 ms                                                                                                                                  |
| Release voltage                                            |                                                | > 10 % of the minimum rated control supply voltage $U_s$                                                                                    |
| Minimum energizing time                                    |                                                | 100 ms (CT-ARS)                                                                                                                             |
| Formatting time <sup>1)</sup>                              |                                                | 5 min (CT-ARS)                                                                                                                              |
| <b>Input circuit - Control circuit</b>                     |                                                |                                                                                                                                             |
| Kind of triggering                                         | CT-MVS, CT-MXS, CT-APS                         | voltage-related triggering                                                                                                                  |
| Control input, Control function                            | A1-Y1/B1                                       | start timing external                                                                                                                       |
| Parallel load / polarized                                  |                                                | yes / no                                                                                                                                    |
| Maximum cable length to the control input                  |                                                | 50 m - 100 pF/m                                                                                                                             |
| Minimum control pulse length                               |                                                | 20 ms                                                                                                                                       |
| Control voltage potential                                  |                                                | see rated control supply voltage                                                                                                            |
| Current consumption of the control input                   | 24 V DC                                        | 1.2 mA                                                                                                                                      |
|                                                            | 230 V AC                                       | 8 mA                                                                                                                                        |
|                                                            | 400 V AC                                       | 6 mA                                                                                                                                        |
| Kind of triggering                                         | CT-MFS, CT-MBS, CT-AHS                         | volt-free triggering                                                                                                                        |
| Control input, Control function                            | Y1-Z2                                          | start timing external                                                                                                                       |
|                                                            | X1-Z2                                          | pause timing / accumulative functions (CT-MFS)                                                                                              |
| Maximum switching current in the control circuit           |                                                | 1 mA                                                                                                                                        |
| Maximum cable length to the control input                  |                                                | 50 m - 100 pF/m                                                                                                                             |
| Minimum control pulse length                               |                                                | 20 ms                                                                                                                                       |
| No-load voltage at the control inputs                      |                                                | 10-40 V DC                                                                                                                                  |
| <b>Remote potentiometer</b>                                |                                                |                                                                                                                                             |
| Remote potentiometer connections, resistance value         | Z1-Z2                                          | 50 kΩ (CT-MFS, CT-MBS, CT-MVS.21, CT-MXS)                                                                                                   |
|                                                            | Z3-Z2                                          | 50 kΩ (CT-MXS)                                                                                                                              |
| Maximum cable length to remote potentiometer               |                                                | 2 x 25 m, shielded with 100 pF/m                                                                                                            |
| Shield connection                                          |                                                | Z2                                                                                                                                          |
| <b>Timing circuit</b>                                      |                                                |                                                                                                                                             |
| Time ranges                                                | 10 time ranges 0.05 s - 300 h                  | 1.) 0.05-1 s 2.) 0.15-3 s 3.) 0.5-10 s 4.) 1.5-30 s 5.) 5-100 s<br>6.) 15-300 s 7.) 1.5-30 min 8.) 15-300 min 9.) 1.5-30 h<br>10.) 15-300 h |
|                                                            | 7 time ranges 0.05 s - 10 min (CT-SDS, CT-ARS) | 1.) 0.05-1 s 2.) 0.15-3 s 3.) 0.5-10 s<br>4.) 1.5-30 s 5.) 5-100 s 6.) 15-300 s 7.) 0.5-10 min                                              |
| Recovery time                                              | 24-240 V AC/DC                                 | < 50 ms                                                                                                                                     |
|                                                            | 24-48 V DC, 24-240 V AC                        | < 80 ms                                                                                                                                     |
|                                                            | 380-440 V AC                                   | < 60 ms                                                                                                                                     |
| Accuracy within the rated control supply voltage tolerance |                                                | $\Delta t < 0.004\text{ %} / V$                                                                                                             |
| Accuracy within the temperature range                      |                                                | $\Delta t < 0.03\text{ %} / \text{°C}$                                                                                                      |
| Repeat accuracy (constant parameters)                      |                                                | < $\pm 0.2\text{ %}$                                                                                                                        |
| Setting accuracy of time delay                             |                                                | $\pm 6\text{ %}$ of full-scale value                                                                                                        |
| Star-delta transition time                                 |                                                | fixed 50 ms (CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x)                                                                                             |
| Star-delta transition time tolerance                       |                                                | $\pm 2\text{ ms}$                                                                                                                           |

<sup>1)</sup> Prior to first commissioning and after a six-month stop in operation

## CT-S range

### Technical data

| Indication of operational states                      |                                                    |                                                                                                                                                                                                                 |                                                                                          |
|-------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Control supply voltage / timing                       | U/T: green LED                                     |  : control supply voltage applied /  : timing |                                                                                          |
| Control supply voltage                                | U: green LED                                       |  : control supply voltage applied                                                                                              |                                                                                          |
| Relay state                                           | R, R1, R2: yellow LED                              |  : output relay energized                                                                                                      |                                                                                          |
| Output circuit                                        |                                                    |                                                                                                                                                                                                                 |                                                                                          |
| Kind of output                                        | 15-16/18                                           | relay, 1 c/o contact                                                                                                                                                                                            |                                                                                          |
|                                                       | 15-16/18; 25-26/28                                 | relay, 2 c/o contacts                                                                                                                                                                                           |                                                                                          |
|                                                       | 15-16/18; 25(21)-26(22)/28(24)                     | relay, 2 c/o contacts, 2nd c/o contact selectable as inst. contact                                                                                                                                              |                                                                                          |
|                                                       | 17-18; 17-28                                       | relay, 2 n/o contacts (CT-SDS)                                                                                                                                                                                  |                                                                                          |
| Contact material                                      |                                                    | Cd-free, on request                                                                                                                                                                                             |                                                                                          |
| Rated operational voltage U <sub>e</sub>              | IEC/EN 60947-1                                     | 250 V                                                                                                                                                                                                           |                                                                                          |
| Minimum switching voltage / minimum switching current |                                                    | 12 V / 100 mA                                                                                                                                                                                                   |                                                                                          |
| Maximum switching voltage / maximum switching current |                                                    | see load limit curves                                                                                                                                                                                           |                                                                                          |
| Rated operational current I <sub>e</sub>              | AC-12 (resistive) at 230 V                         | 4 A                                                                                                                                                                                                             |                                                                                          |
|                                                       | AC-15 (inductive) at 230 V                         | 3 A                                                                                                                                                                                                             |                                                                                          |
|                                                       | DC-12 (resistive) at 24 V                          | 4 A                                                                                                                                                                                                             |                                                                                          |
|                                                       | DC-13 (inductive) at 24 V                          | 2 A (CT-ARS; 1.5 A)                                                                                                                                                                                             |                                                                                          |
| AC rating (UL 508)                                    | utilization category (Control Circuit Rating Code) | B 300                                                                                                                                                                                                           |                                                                                          |
|                                                       | max. rated operational voltage                     | 300 V AC                                                                                                                                                                                                        |                                                                                          |
|                                                       | maximum continuous thermal current at B300         | 5 A                                                                                                                                                                                                             |                                                                                          |
|                                                       | max. making/breaking apparent power at B300        | 3600 VA / 360 VA                                                                                                                                                                                                |                                                                                          |
| Mechanical lifetime                                   |                                                    | 30 x 10 <sup>6</sup> switching cycles                                                                                                                                                                           |                                                                                          |
| Electrical lifetime                                   | at AC-12, 230 V, 4 A                               | 0.1 x 10 <sup>6</sup> switching cycles                                                                                                                                                                          |                                                                                          |
| Frequency of operation                                | with/without load                                  | 360/72000 h <sup>-1</sup> CT-ARS: 1200/18000 h <sup>-1</sup>                                                                                                                                                    |                                                                                          |
| Max. fuse rating to achieve short-circuit protection  | n/c contact                                        | 6 A fast-acting                                                                                                                                                                                                 |                                                                                          |
|                                                       | n/o contact                                        | 10 A fast-acting                                                                                                                                                                                                |                                                                                          |
| General data                                          |                                                    |                                                                                                                                                                                                                 |                                                                                          |
| MTBF                                                  |                                                    | on request                                                                                                                                                                                                      |                                                                                          |
| Duty cycle                                            |                                                    | 100%                                                                                                                                                                                                            |                                                                                          |
| Dimensions                                            |                                                    | see ‘Dimensional drawings’                                                                                                                                                                                      |                                                                                          |
| Mounting                                              |                                                    | DIN rail (IEC/EN 60715), snap-on mounting without any tool                                                                                                                                                      |                                                                                          |
| Mounting position                                     |                                                    | any                                                                                                                                                                                                             |                                                                                          |
| Minimum distance to other units                       | vertical / horizontal                              | not necessary / not necessary                                                                                                                                                                                   |                                                                                          |
| Material of housing                                   |                                                    | UL 94 V-0                                                                                                                                                                                                       |                                                                                          |
| Degree of protection                                  | housing / terminals                                | IP50 / IP20                                                                                                                                                                                                     |                                                                                          |
| Electrical connection                                 |                                                    |                                                                                                                                                                                                                 |                                                                                          |
|                                                       |                                                    | <b>Screw connection technology</b>                                                                                                                                                                              | <b>Easy Connect Technology (Push-in)</b>                                                 |
| Connecting capacity                                   | fine-strand with(out) wire end ferrule             | 1 x 0.5-2.5 mm <sup>2</sup> (1 x 18-14 AWG)<br>2 x 0.5-1.5 mm <sup>2</sup> (2 x 18-16 AWG)                                                                                                                      | 2 x 0.5-1.5 mm <sup>2</sup> (2 x 18-16 AWG)                                              |
|                                                       |                                                    | rigid                                                                                                                                                                                                           | 1 x 0.5-4 mm <sup>2</sup> (1 x 20-12 AWG)<br>2 x 0.5-2.5 mm <sup>2</sup> (2 x 20-14 AWG) |
| Stripping length                                      |                                                    | 8 mm (0.32 in)                                                                                                                                                                                                  |                                                                                          |
| Tightening torque                                     |                                                    | 0.6-0.8 Nm (7.08 lb.in)                                                                                                                                                                                         | -                                                                                        |

## CT-S range

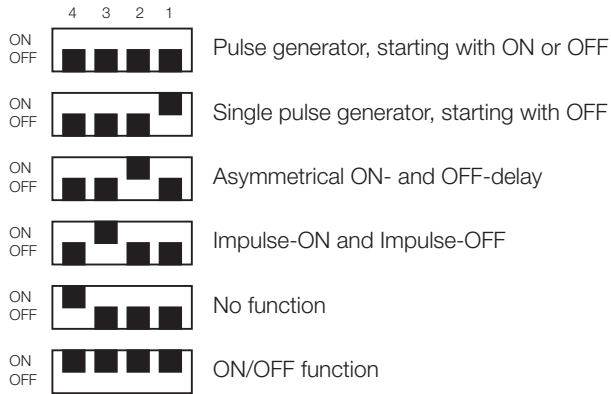
### Technical data

| Environmental data                                        |                                     |                                                                                                                         |
|-----------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature ranges                                | operation / storage                 | -25...+60 °C / -40...+85 °C,<br>-40...+60 °C / -40...+85 °C for CT-MVS.21, CT-MFS.21, CT-ERS.21, CT-APS.21              |
| Relative humidity range                                   |                                     | 25 % to 85 %                                                                                                            |
| Vibration, sinusoidal (IEC/EN 60068-2-6)                  | functioning                         | 40 m/s <sup>2</sup> , 10-58/60-150 Hz                                                                                   |
|                                                           | resistance                          | 60 m/s <sup>2</sup> , 10-58/60-150 Hz, 20 cycles                                                                        |
| Vibration, seismic (IEC/EN 60068-3-3)                     | functioning                         | 20 m/s <sup>2</sup>                                                                                                     |
| Shock, half-sine (IEC/EN 60068-2-27)                      | functioning                         | 150 m/s <sup>2</sup> , 11 ms, 3 shocks/direction                                                                        |
|                                                           | resistance                          | 300 m/s <sup>2</sup> , 11 ms, 3 shocks/direction                                                                        |
| Isolation data                                            |                                     | CT-S with 1 c/o      CT-S with 2 c/o                                                                                    |
| Rated insulation voltage U <sub>i</sub>                   | input circuit / output circuit      | 500 V                                                                                                                   |
|                                                           | output circuit 1 / output circuit 2 | not available      300 V                                                                                                |
| Rated impulse withstand voltage U <sub>imp</sub>          | between all isolated circuits       | 4 kV; 1.2/50 µs<br>except devices CT-xxx.23:<br>input / output: 6 kV; 1.2/50 µs<br>output 1 / output 2: 4 kV; 1.2/50 µs |
| Power-frequency withstand voltage (test voltage)          | between all isolated circuits       | 2.0 kV; 50 Hz; 60 s                                                                                                     |
| Basic insulation (IEC/EN 61140)                           | input circuit / output circuit      | 500 V                                                                                                                   |
| Protective separation (IEC/EN 61140; EN 50178)            | input circuit / output circuit      | 250 V                                                                                                                   |
| Pollution degree                                          |                                     | 3                                                                                                                       |
| Overvoltage category                                      |                                     | III                                                                                                                     |
| Standards / Directives                                    |                                     |                                                                                                                         |
| Standards                                                 |                                     | IEC/EN 61812-1                                                                                                          |
| Low Voltage Directive                                     |                                     | 2014/35/EU                                                                                                              |
| EMC Directive                                             |                                     | 2014/30/EU                                                                                                              |
| RoHS Directive                                            |                                     | 2011/65/EU                                                                                                              |
| Electromagnetic compatibility                             |                                     |                                                                                                                         |
| Interference immunity to                                  |                                     | IEC/EN 61000-6-2                                                                                                        |
| electrostatic discharge                                   | IEC/EN 61000-4-2                    | Level 3, 6 kV / 8 kV                                                                                                    |
| radiated, radio-frequency electromagnetic field           | IEC/EN 61000-4-3                    | Level 3, 10 V/m (1 GHz) 3 V/m (2 GHz) 1 V/m (2.7 GHz)                                                                   |
| electrical fast transient / burst                         | IEC/EN 61000-4-4                    | Level 3, 2 kV / 5 kHz                                                                                                   |
| surge                                                     | IEC/EN 61000-4-5                    | Level 4, 2 kV A1-A2                                                                                                     |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6                    | Level 3, 10 V                                                                                                           |
| harmonics and interharmonics                              | IEC/EN 61000-4-13                   | Class 3                                                                                                                 |
| Interference emission                                     |                                     | IEC/EN 61000-6-3                                                                                                        |
| high-frequency radiated                                   | IEC/CISPR 22, EN 55022              | Class B                                                                                                                 |
| high-frequency conducted                                  | IEC/CISPR 22, EN 55022              | Class B                                                                                                                 |

## CT-S range

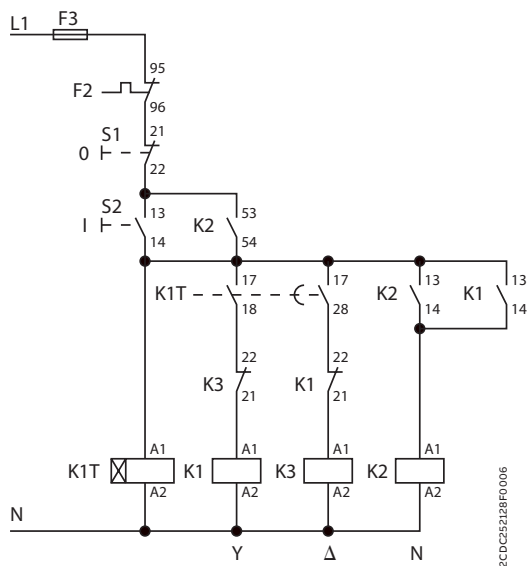
### Technical diagrams

#### DIP switch configuration CT-MXS.22x

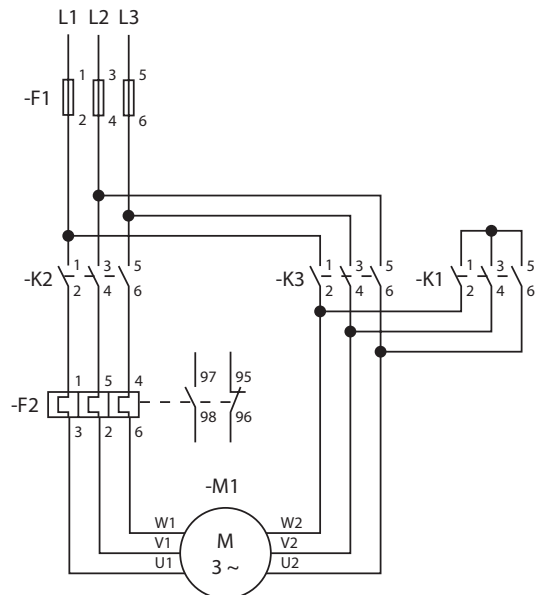


Default setting: all DIP switches in position OFF

#### Example of application - Star-delta changeover



Control circuit diagram



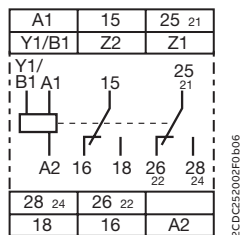
Power circuit diagram

## CT-S range

### Technical diagrams

#### Connection diagrams

##### CT-MVS.21



A1-A2 Supply:  
24-240 V AC/DC

A1-Y1/B1 Control input

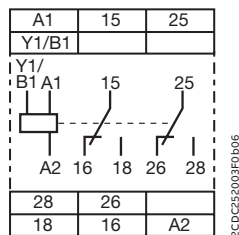
15-16/18 1st c/o contact

25-26/28 2nd c/o contact

21-22/24 2nd c/o contact as  
instantaneous contact

Z1-Z2 Remote potentiometer  
connection

##### CT-MVS.22



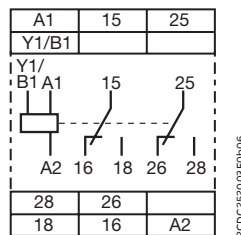
A1-A2 Supply:  
224-48 V DC or  
24-240 V AC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-MVS.23



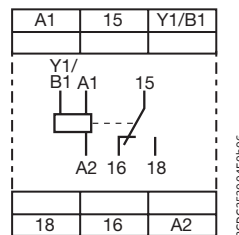
A1-A2 Supply:  
380-440V AC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-MVS.12

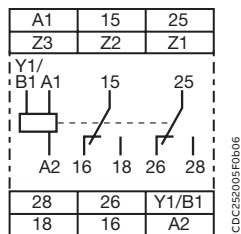


A1-A2 Supply: 24-48 V DC or  
24-240 V AC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

##### CT-MXS.22



A1-A2 Supply: 24-48 V DC or  
24-240 V AC

A1-Y1/B1 Control input

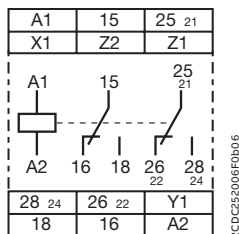
15-16/18 1st c/o contact

25-26/28 2nd c/o contact

Z1-Z2 Remote potentiometer  
connection

Z3-Z2 Remote potentiometer  
connection

##### CT-MFS.21



A1-A2 Supply:  
24-240 V AC/DC

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

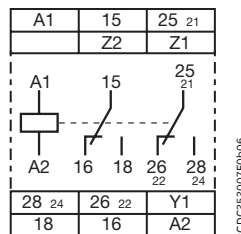
21-22/24 2nd c/o contact as  
instantaneous contact

Y1-Z2 Control input

X1-Z2 Control input

Z1-Z2 Remote  
potentiometer  
connection

##### CT-MBS.22



A1-A2 Supply: 24-48 V DC or  
24-240 V AC

15-16/18 1st c/o contact

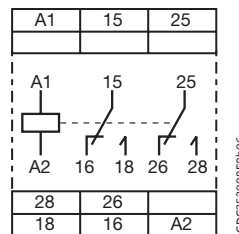
25-26/28 2nd c/o contact

21-22/24 2nd c/o contact as  
instantaneous contact

Y1-Z2 Control input

Z1-Z2 Remote potentiometer  
connection

##### CT-WBS.22



A1-A2 Supply: 24-48 V DC or  
24-240 V AC

15-16/18 1st c/o contact

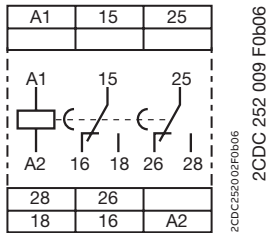
25-26/28 2nd c/o contact

## CT-S range

### Technical diagrams

#### Connection diagrams

##### CT-ERS.21

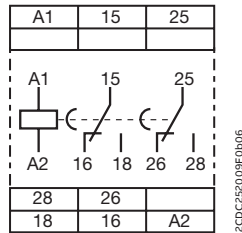


A1-A2 Supply:  
24-240 V AC/DC

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-ERS.22

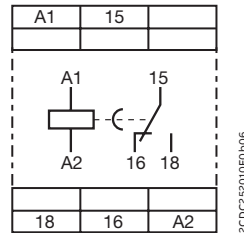


A1-A2 Supply: 24-48 V DC or  
24-240 V AC

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

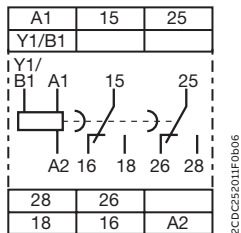
##### CT-ERS.12



A1-A2 Supply: 24-48 V DC or  
24-240 V AC

15-16/18 1st c/o contact

##### CT-APS.21



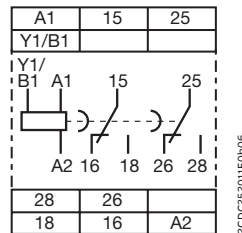
A1-A2 Supply:  
24-240 V AC/DC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-APS.22



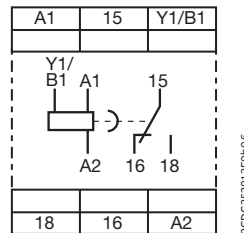
A1-A2 Supply: 24-48 V DC or  
24-240 V AC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-APS.12

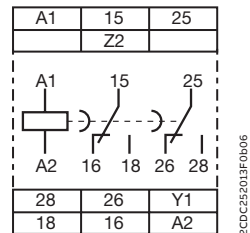


A1-A2 Supply: 24-48 V DC or  
24-240 V AC

A1-Y1/B1 Control input

15-16/18 1st c/o contact

##### CT-AHS.22



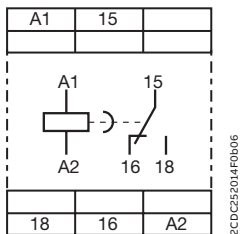
A1-A2 Supply: 24-48 V DC or  
24-240 V AC

Y1-Z2 Control input

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

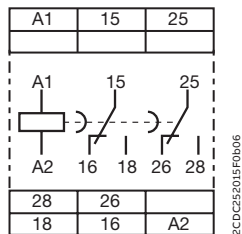
##### CT-ARS.11



A1-A2 Supply:  
24-240 V AC/DC

15-16/18 1st c/o contact

##### CT-ARS.21

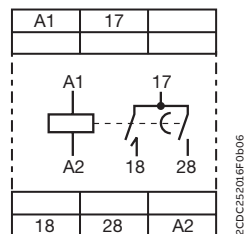


A1-A2 Supply:  
24-240 V AC/DC

15-16/18 1st c/o contact

25-26/28 2nd c/o contact

##### CT-SDS.22

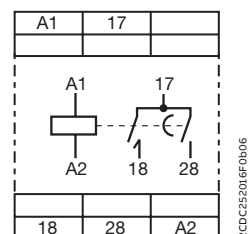


A1-A2 Supply: 24-48 V DC or  
24-240 V AC

17-18 1st n/o contact

17-28 2nd n/o contact

##### CT-SDS.23



A1-A2 Supply: 380-440 V AC

17-18 1st n/o contact

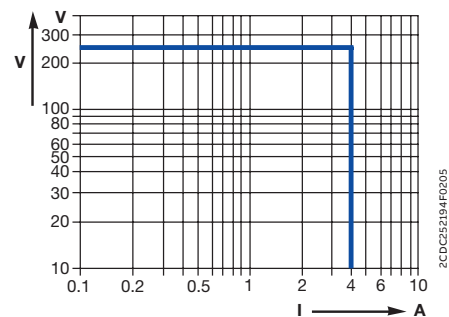
17-28 2nd n/o contact

## CT-S range

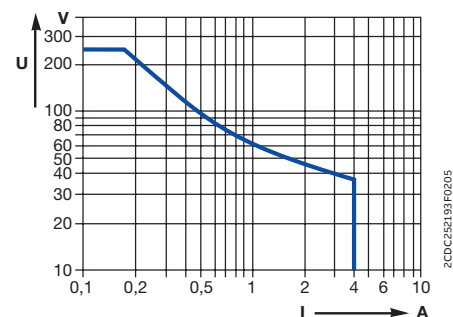
### Technical diagrams

#### Load limit curves

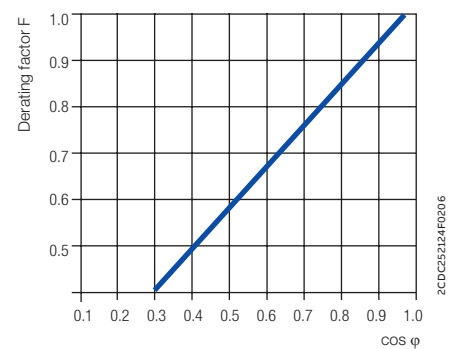
##### AC load (resistive)



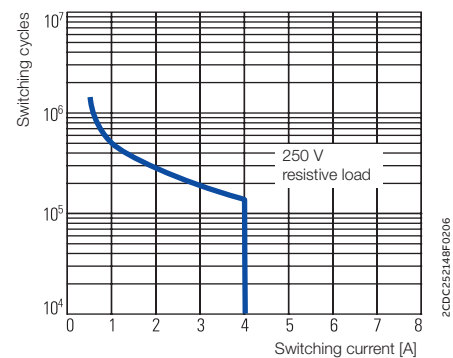
##### DC load (resistive)



#### Derating factor F for inductive AC load

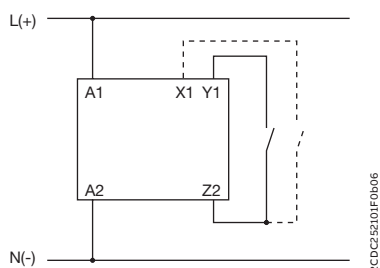


#### Contact lifetime

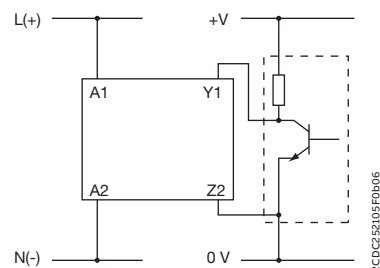


#### Wiring notes

##### Control inputs (volt-free triggering)



##### Triggering of the control inputs (volt-free) with a proximity switch (3 wire)

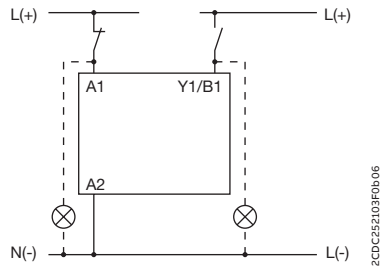
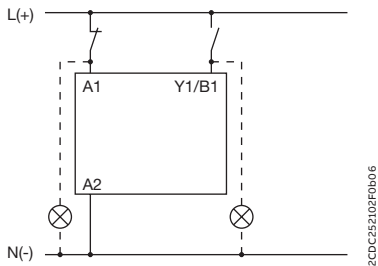


## CT-S range

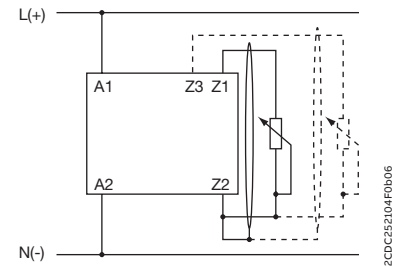
### Technical diagrams

#### Wiring notes

##### Control inputs (voltage-related triggering)



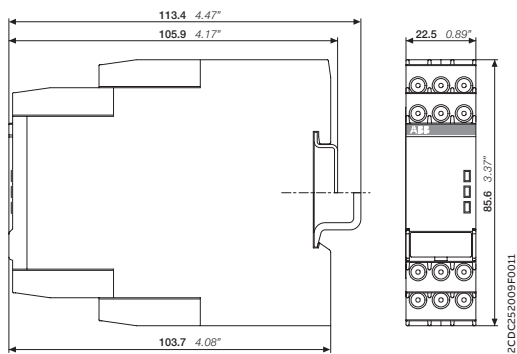
##### Remote potentiometer



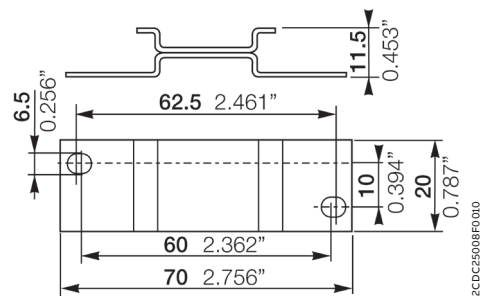
The control input Y1/B1 is triggered with electric potential against A2. It is possible to use the control supply voltage from terminal A1 or any other voltage within the rated control supply voltage range.

#### Dimensional drawings

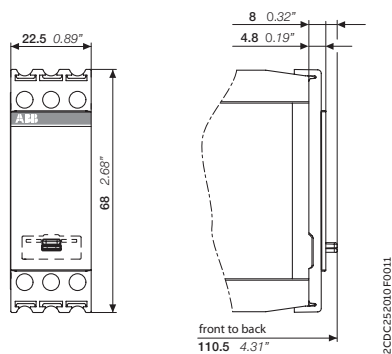
in mm and inches



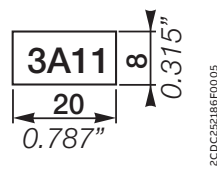
Main device



ADP.01 adapter for screw mounting



COV.11 sealable transparent cover



MAR.01 marker label

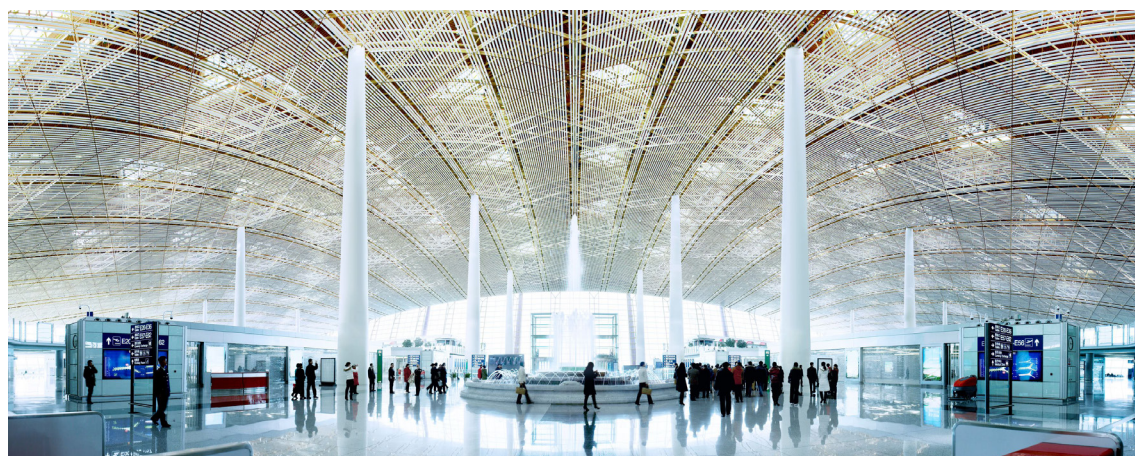
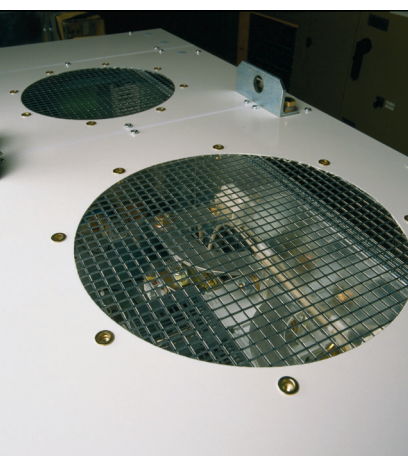


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# Time relays for building applications

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# Time relays for building applications

## Applications

The CT-D range is designed in a modular housing, making it well suited for building and residential applications. In just 12 order codes the CT-D range covers all the main timing functions needed for building automation, safely and reliably.



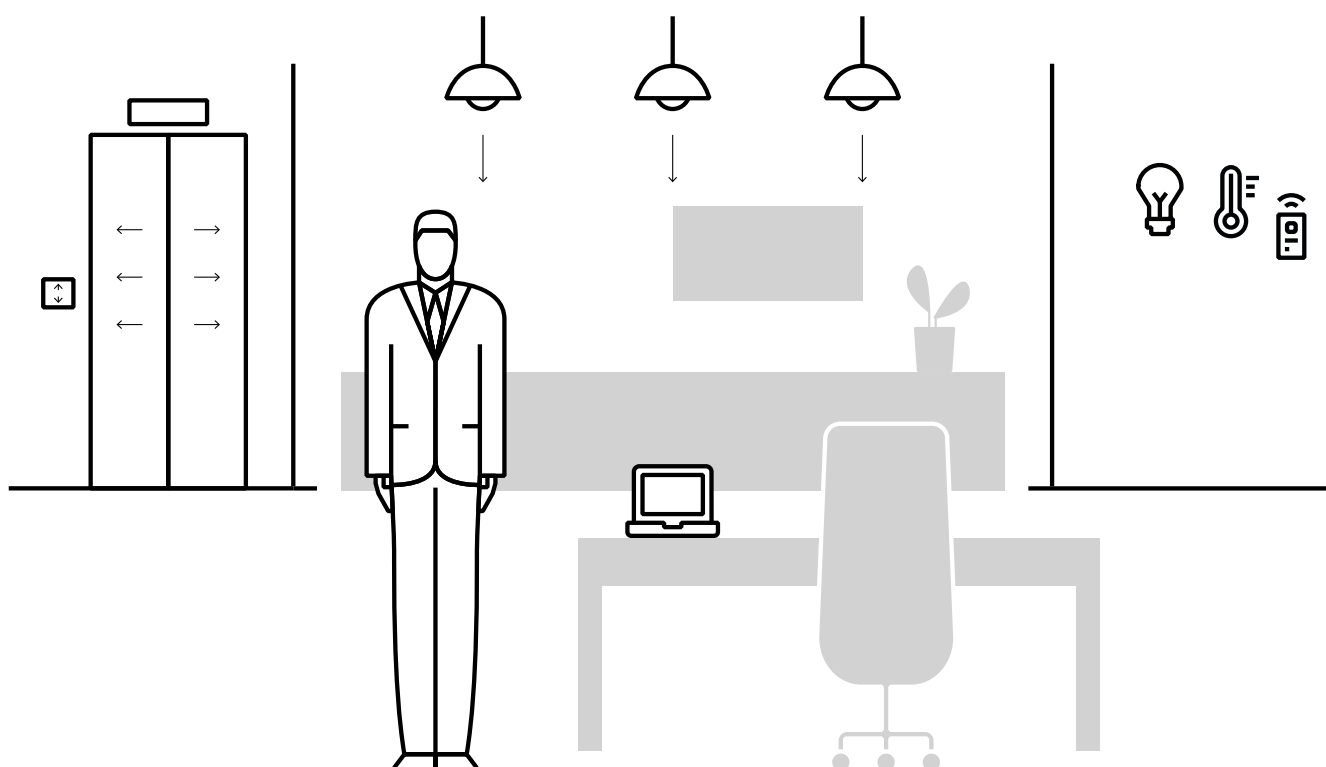
A typical application for timers is delayed switching. Switching several rows of lamps on and off in corridors, stairwells, staircases, etc, is a widespread application in which the excellent functionality of the CT-D timers is undisputed.



Air conditioning systems, heaters and fans can be found everywhere in buildings - just like the CT-D timers long used to switch them. On-delay, off-delay and a range of other functions cover all requirements.



Elevators, escalators, gates, compressors and doors - here too ABB timers ensure optimum and time-delayed opening as required. ABB's CT-D timers cover most functions with just 12 order codes.

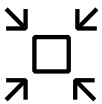


## CT-D range

### Benefits and advantages



The CT-D range is ideal for building applications and installation panels, due to its compact modular housing. For maximum flexibility in operation, nine single-function as well as two multifunction devices with seven timing functions are available. The devices offer four or seven time ranges from 0.05 seconds up to 100 hours. Their wide supply voltage range allows their use in applications worldwide.



#### Space savings

The CT-D range is ideal for installation panels thanks to its compact modular housing. The housing's design helps make the status and configuration more clearly visible. The CT-D range also offers a higher output current than standard industrial types. As well as the 1 c/o contacts, ABB offers devices with 2 c/o contacts for maximum flexibility.



#### Easy to install

Direct reading scales help make time setting quick and easy. A pre-selection for the time range together with an additional scale for fine adjustments help improve installation efficiency. For more flexibility, the delay time can even be changed when processes are running, making optimization to fit the application even simpler. All devices can be mounted and demounted tool-free.



#### Global availability

The CT-D range fulfills various global standards and approvals, supporting business worldwide. Additionally, all devices from the CT-D range have a wide supply voltage from 24-48 V DC and 24-240 V AC, making it ideal for the use in installation panels around the world.

# CT-D range

## Operating controls



### Connection terminals

Wide terminal spacing makes connection of wires simpler: 2 x 1.5 mm<sup>2</sup> (2 x 16 AWG) with wire end ferrules or 2 x 2.5 mm<sup>2</sup> (2 x 14 AWG) without ferrules.



### Preselection of the time range



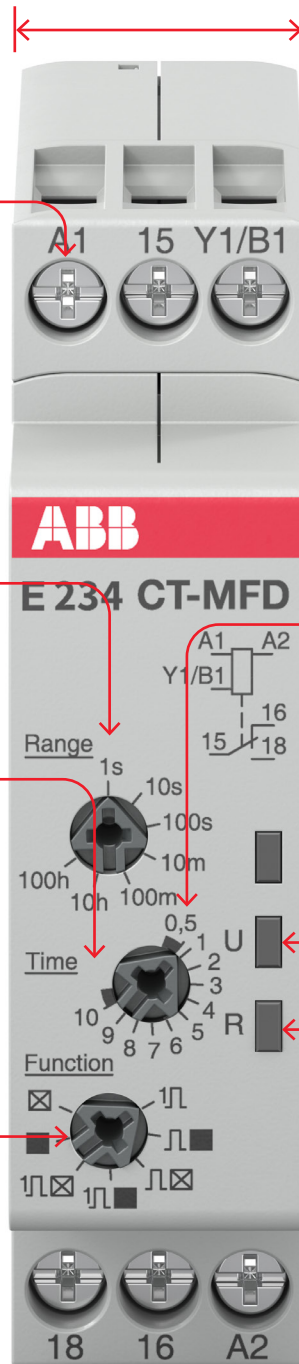
### Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.



### Selection of the timing function

- ON-delay
- OFF-delay with aux. voltage
- Impulse-ON
- Impulse-OFF with aux. voltage
- Flasher starting with ON
- Flasher starting with OFF
- Pulse former



### Width 17.5 mm

With a width of just 17.5 mm, the CT-D range timers are ideally suited for installation in distribution panels.



### Fine adjustment of the time delay



### LEDs for status indication

All actual operational states are displayed by front-facing LEDs, thus simplifying commissioning and troubleshooting.

- U - green LED:  
 control supply voltage applied /  
 timing
- R, R1, R2 - yellow LED:  
 output relay energized

\_\_\_\_\_

|                                           | Type      | Order number        |
|-------------------------------------------|-----------|---------------------|
|                                           | CT-MFD.12 | 1SVR500020R0000     |
|                                           | CT-MFD.21 | 1SVR500020R1100     |
|                                           | CT-ERD.12 | 1SVR500100R0000     |
|                                           | CT-ERD.22 | 1SVR500100R0100     |
|                                           | CT-AHD.12 | 1SVR500110R0000     |
|                                           | CT-AHD.22 | 1SVR500110R0100     |
|                                           | CT-VWD.12 | 1SVR500130R0000     |
|                                           | CT-EBD.12 | 1SVR500150R0000     |
|                                           | CT-TGD.12 | 1SVR500160R0000     |
|                                           | CT-TGD.22 | 1SVR500160R0100     |
|                                           | CT-SAD.22 | 1SVR500210R0100     |
|                                           | CT-SDD.22 | 1SVR500211R0100     |
| <b>Timing function</b>                    |           |                     |
| ON-delay                                  |           | ■ ■ ■ ■             |
| OFF-delay with aux. voltage               |           | ■ ■                 |
| Impulse-ON                                |           | ■ ■                 |
| Impulse-OFF with aux. voltage             |           | ■ ■                 |
| Flasher starting with ON                  |           | ■ ■                 |
| Flasher starting with OFF                 |           | ■ ■                 |
| Pulse generator starting with ON or OFF   |           |                     |
| Pulse former                              |           | ■ ■                 |
| Star-delta change-over                    |           |                     |
| <b>Features</b>                           |           |                     |
| Control input, voltage-related triggering |           | ■ ■                 |
| <b>Time range</b>                         |           |                     |
| 0.05 s - 100 h                            |           | ■ ■ ■ ■ ■ ■ ■ ■ 2 2 |
| 0.05 s - 10 min                           |           | ■ ■                 |
| <b>Supply voltage</b>                     |           |                     |
| 12-240 V AC/DC                            |           | ■                   |
| 24-48 V DC                                | ■         | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ |
| 24-240 V AC                               | ■         | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ |
| <b>Output</b>                             |           |                     |
| c/o contact                               | 1 2       | 1 2 1 2 1 2 1 1 1 2 |
| n/o contact                               |           | 2 2                 |

## CT-D range

### Ordering details



2CDC251002V0018

CT-MFD.12



2CDC251002V0018

CT-ERD.22

- Control input with voltage-related triggering
- No triggering

#### Description

The CT-D range with its modular design is a perfect solution for installation panels. For maximum flexibility in operation, 10 single-function as well as two multifunction devices with seven timing functions are available. The devices offer four or seven time ranges from 0.05 seconds up to 100 hours. Their wide input range allows their use in applications worldwide.

#### Ordering details

| Timing function          | Rated control supply voltage | Time ranges         | Control input | Output | Type                    | Order code      | Weight (1 pc)<br><br>kg (lb) |
|--------------------------|------------------------------|---------------------|---------------|--------|-------------------------|-----------------|------------------------------|
| Multi <sup>1)</sup>      | 24-240 V AC<br>24-48 V DC    | 7 (0.05 s - 100 h)  | ■             | 1 c/o  | CT-MFD.12               | 1SVR500020R0000 | 0.060<br>(0.132)             |
| Multi <sup>1)</sup>      | 12-240 V AC/DC               | 7 (0.05 s - 100 h)  | ■             | 2 c/o  | CT-MFD.21               | 1SVR500020R1100 | 0.065<br>(0.143)             |
| ON-delay                 | 24-240 V AC<br>24-48 V DC    | 7 (0.05 s - 100 h)  | -             | 1 c/o  | CT-ERD.12               | 1SVR500100R0000 | 0.060<br>(0.132)             |
|                          |                              |                     | -             | 2 c/o  | CT-ERD.22               | 1SVR500100R0100 | 0.065<br>(0.143)             |
| OFF-delay                |                              |                     | ■             | 1 c/o  | CT-AHD.12               | 1SVR500110R0000 | 0.060<br>(0.132)             |
|                          |                              |                     | ■             | 2 c/o  | CT-AHD.22               | 1SVR500110R0100 | 0.065<br>(0.143)             |
| Impulse-ON               |                              |                     | -             | 1 c/o  | CT-VWD.12               | 1SVR500130R0000 | 0.060<br>(0.132)             |
| Flasher starting with ON |                              |                     |               |        | CT-EBD.12               | 1SVR500150R0000 |                              |
| Pulse generator          |                              |                     |               |        | CT-TGD.12 <sup>2)</sup> | 1SVR500160R0000 | 0.060<br>(0.132)             |
|                          |                              |                     |               |        | ■                       | 2 c/o           | CT-TGD.22 <sup>2)</sup>      |
| Star-delta change-over   |                              | 4 (0.05 s - 10 min) | -             | 2 n/o  | CT-SDD.22 <sup>3)</sup> | 1SVR500211R0100 | 0.065<br>(0.143)             |
|                          |                              |                     | -             |        | CT-SAD.22 <sup>4)</sup> | 1SVR500210R0100 |                              |

<sup>1)</sup> Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

<sup>2)</sup> ON and OFF times adjustable independently: 2 x 7 time ranges 0.05 s - 100 h

<sup>3)</sup> Transition time 50 ms fixed

<sup>4)</sup> Transition time adjustable

## CT-D range

### Technical data

Data at  $T_a = 25\text{ °C}$  and rated values, unless otherwise indicated

|                                                              |                                                | CT-D with 1 c/o contact                                                                                                                                                                                              | CT-D with 2 c/o contacts | CT-MFD.21      |
|--------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|
| <b>Input circuit - Supply circuit</b>                        |                                                |                                                                                                                                                                                                                      |                          |                |
| Rated control supply voltage U <sub>s</sub>                  |                                                | 24-240 V AC / 24-48 V DC                                                                                                                                                                                             |                          | 12-240 V AC/DC |
| Rated control supply voltage U <sub>s</sub> tolerance        |                                                | -15...+10 %                                                                                                                                                                                                          |                          |                |
| Rated frequency                                              |                                                | DC or 50/60 Hz                                                                                                                                                                                                       |                          |                |
| Frequency range AC                                           |                                                | 47-63 Hz                                                                                                                                                                                                             |                          |                |
| Typical power consumption                                    |                                                | max. 3.5 VA                                                                                                                                                                                                          |                          |                |
| Power failure buffering time                                 |                                                | min. 20 ms                                                                                                                                                                                                           |                          |                |
| Release voltage                                              |                                                | > 10 % of the minimum rated control supply voltage U <sub>s</sub>                                                                                                                                                    |                          |                |
| <b>Input circuit - Control circuit</b>                       |                                                |                                                                                                                                                                                                                      |                          |                |
| Control input, control function                              | A1-Y1/B1                                       | start timing external                                                                                                                                                                                                |                          |                |
| Kind of triggering                                           |                                                | voltage-related triggering                                                                                                                                                                                           |                          |                |
| Resistance to reverse polarity                               |                                                | yes                                                                                                                                                                                                                  |                          |                |
| Parallel load / polarized                                    |                                                | yes / yes                                                                                                                                                                                                            |                          |                |
| Maximum cable length to the control inputs                   |                                                | 50 m - 100 pF/m                                                                                                                                                                                                      |                          |                |
| Minimum control pulse length                                 |                                                | 20 ms                                                                                                                                                                                                                |                          |                |
| Control voltage potential                                    |                                                | see rated control supply voltage                                                                                                                                                                                     |                          |                |
| Current consumption of the control input                     |                                                | see data sheet                                                                                                                                                                                                       |                          |                |
| <b>Timing circuit</b>                                        |                                                |                                                                                                                                                                                                                      |                          |                |
| Time ranges                                                  | 7 time ranges 0.05 s - 100 h                   | 1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min<br>5.) 5-100 min 6.) 0.5-10 h 7.) 5-100 h                                                                                                                       |                          |                |
|                                                              | 4 time ranges 0.05 s - 10 min (CT-SDD, CT-SAD) | 1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 0.5-10 min                                                                                                                                                                 |                          |                |
| Recovery time                                                |                                                | < 50 ms                                                                                                                                                                                                              |                          |                |
| Accuracy within the rated control supply voltage tolerance   |                                                | Δt < 0.005 % / V                                                                                                                                                                                                     |                          |                |
| Accuracy within the temperature range                        |                                                | Δt < 0.06 % / °C                                                                                                                                                                                                     |                          |                |
| Repeat accuracy (constant parameters)                        |                                                | Δt < ± 0.5 %                                                                                                                                                                                                         |                          |                |
| Setting accuracy of time delay                               |                                                | ± 10% of full-scale value                                                                                                                                                                                            |                          |                |
| Star-delta transition time                                   | CT-SDD/ CT-SAD                                 | fixed 50 ms /<br>adjustable: 20 ms, 30 ms, 40 ms, 50 ms, 60 ms, 80 ms or 100 ms                                                                                                                                      |                          |                |
| Star-delta transition time tolerance                         | CT-SDD / CT-SAD                                | ±3 ms                                                                                                                                                                                                                |                          |                |
| <b>Indication of operational states</b>                      |                                                |                                                                                                                                                                                                                      |                          |                |
| Control supply voltage / timing                              | U: green LED                                   |  : control supply voltage applied<br> : timing |                          |                |
| Relay energized                                              | R, R1, R2: yellow LED                          |  : output relay energized                                                                                                         |                          |                |
| <b>Operating elements and controls</b>                       |                                                |                                                                                                                                                                                                                      |                          |                |
| Adjustment of the time range                                 |                                                | front-face rotary switch, direct reading scales                                                                                                                                                                      |                          |                |
| Fine adjustment of the time value                            |                                                | front-face potentiometer                                                                                                                                                                                             |                          |                |
| Preselection of the timing function at multifunction devices |                                                | front-face rotary switch, direct reading scales                                                                                                                                                                      |                          |                |
| Adjustment of the transition time                            | CT-SAC                                         | front-face potentiometer                                                                                                                                                                                             |                          |                |

## CT-D range

### Technical data

|                                                       |                                                    | CT-D with 1 c/o contact                                 | CT-D with 2 c/o contacts               | CT-MFD.21             |
|-------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|----------------------------------------|-----------------------|
| Output circuit                                        |                                                    |                                                         |                                        |                       |
| Kind of output                                        | 15-16/18                                           | Relay, 1 c/o contact                                    | -                                      |                       |
|                                                       | 15-16/18; 25-26/28                                 | -                                                       | Relay, 2 c/o contacts                  |                       |
|                                                       | 17-18; 17-28                                       |                                                         | Relay, 2 n/o contacts (CT-SDC, CT-SAC) |                       |
| Contact material                                      |                                                    | AgNi alloy, Cd free                                     |                                        |                       |
| Rated operational voltage U <sub>e</sub>              |                                                    | 250 V                                                   |                                        |                       |
| Minimum switching voltage / minimum switching current |                                                    | 12 V / 100 mA                                           |                                        |                       |
| Maximum switching voltage / maximum switching current |                                                    | 250 V AC / 6 A                                          | 250 V AC / 5 A                         |                       |
| Rated operational current I <sub>e</sub>              | AC-12 (resistive) at 230 V                         | 6 A                                                     | 5 A                                    |                       |
|                                                       | AC-15 (inductive) at 230 V                         | 3 A                                                     | 3 A                                    | n/o: 3 A n/c: 0.75 A  |
|                                                       | DC-12 (resistive) at 24 V                          | 6 A                                                     | 5 A                                    |                       |
|                                                       | DC-13 (inductive) at 24 V                          | 2 A                                                     | 2 A                                    | 1 A                   |
| AC rating (UL 508)                                    | utilization category (Control Circuit Rating Code) | B 300                                                   |                                        | n/o: B 300 n/c: C 300 |
|                                                       | max. rated operational voltage                     | 300 V AC                                                |                                        |                       |
|                                                       | maximum continuous thermal current at B300         | 5 A                                                     |                                        | n/o: 5 A              |
|                                                       | maximum continuous thermal current at C300         | -                                                       |                                        | n/c: 2.5 A            |
|                                                       | max. making/breaking apparent power at B300        | 3600 VA / 360 VA                                        |                                        | n/o: 3600/360 VA      |
|                                                       | max. making/breaking apparent power at C300        | -                                                       |                                        | n/c: 1800/180 VA      |
|                                                       |                                                    |                                                         |                                        |                       |
| Mechanical lifetime                                   |                                                    | 30 x 10 <sup>6</sup> switching cycles                   |                                        |                       |
| Electrical lifetime                                   |                                                    | 0.1 x 10 <sup>6</sup> switching cycles                  |                                        |                       |
| Max. fuse rating to achieve short-circuit protection  | n/c contact                                        | 6 A fast-acting                                         |                                        |                       |
|                                                       | n/o contact                                        | 10 A fast-acting                                        |                                        | 6 A fast-acting       |
| General data                                          |                                                    |                                                         |                                        |                       |
| Mean time between failures (MTBF)                     |                                                    | on request                                              |                                        |                       |
| Duty cycle                                            |                                                    | 100%                                                    |                                        |                       |
| Dimensions                                            |                                                    | see 'Dimensional drawings'                              |                                        |                       |
| Mounting                                              |                                                    | DIN rail (IEC/EN 60715), snap-mounting without any tool |                                        |                       |
| Mounting position                                     |                                                    | any                                                     |                                        |                       |
| Minimum distance to other units                       | horizontal / vertical                              | no / no                                                 |                                        |                       |
| Degree of protection                                  | housing / terminals                                | IP50 / IP20                                             |                                        |                       |
| Electrical connection                                 |                                                    |                                                         |                                        |                       |
| Connecting capacity                                   | fine-stranded with(out) wire and ferrule           | 2 x 0.5-1.5 mm <sup>2</sup> (2 x 20-16 AWG)             |                                        |                       |
|                                                       |                                                    | 1 x 0.5-2.5 mm <sup>2</sup> (1 x 20-14 AWG)             |                                        |                       |
|                                                       | rigid                                              | 2 x 0.5-1.5 mm <sup>2</sup> (2 x 20-16 AWG)             |                                        |                       |
|                                                       |                                                    | 1 x 0.5-4 mm <sup>2</sup> (1 x 20-12 AWG)               |                                        |                       |
| Stripping length                                      |                                                    | 7 mm (0.28 in)                                          |                                        |                       |
| Tightening torque                                     |                                                    | 0.5-0.8 Nm (4.43-7.08 lb.in)                            |                                        |                       |
| Environmental data                                    |                                                    |                                                         |                                        |                       |
| Ambient temperature range                             | operation / storage                                | -20 ... +60 °C / -40 ... +85 °C                         |                                        |                       |
| Climatic class                                        | EC/EN 60068-2-30                                   | 3K3                                                     |                                        |                       |
| Relative humidity range                               |                                                    | 25-85%                                                  |                                        |                       |
| Vibration, sinusoidal                                 | IEC/EN 60068-2-6                                   | 20 m/s <sup>2</sup> ; 10 cycles, 10...150...10 Hz       |                                        |                       |
| Shock (half-sine)                                     | IEC/EN 60068-2-27                                  | 150 m/s <sup>2</sup> , 11 ms                            |                                        |                       |

## CT-D range

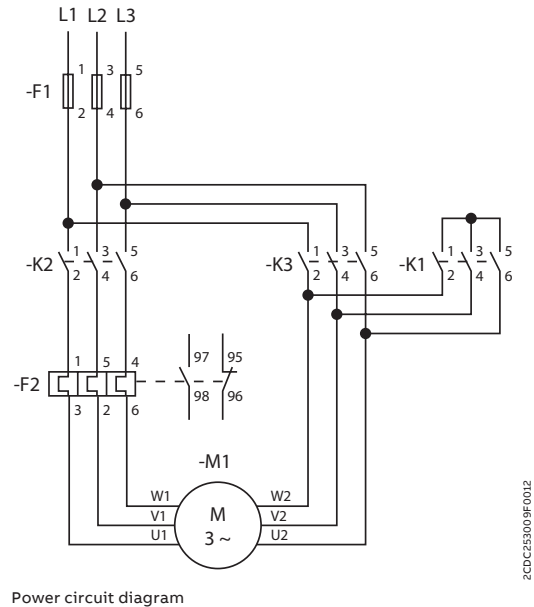
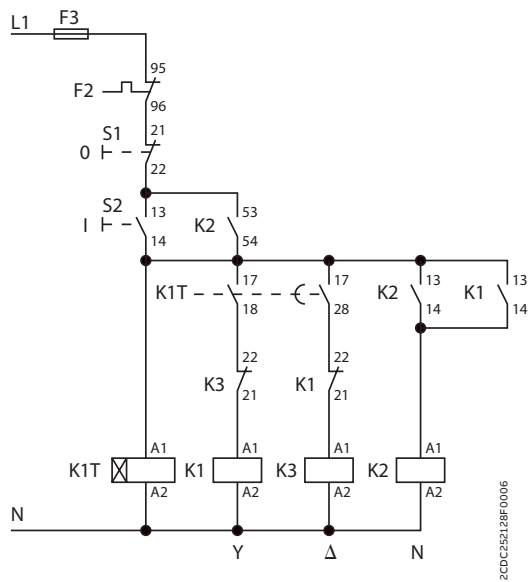
### Technical data

|                                                           |                                     | CT-D with 1 c/o contact | CT-D with 2 c/o contacts | CT-MFC.21 |
|-----------------------------------------------------------|-------------------------------------|-------------------------|--------------------------|-----------|
| Isolation data                                            |                                     |                         |                          |           |
| Rated insulation voltage U <sub>i</sub>                   | input circuit / output circuit      | 300 V                   |                          |           |
|                                                           | output circuit 1 / output circuit 2 | not available           | 300 V                    | 300 V     |
| Rated impulse withstand voltage U <sub>imp</sub>          | between all isolated circuits       | 4 kV; 1.2/50 μs         |                          |           |
| Power-frequency withstand voltage test(test voltage)      | between all isolated circuits       | 2.5 kV; 50 Hz; 60 s     |                          |           |
| Basic insulation (IEC/EN 61140)                           | input circuit / output circuit      | 300 V                   |                          |           |
| Protective separation (IEC/EN 61140, EN 50178)            | input circuit / output circuit      | 250 V                   |                          |           |
| Pollution degree                                          |                                     | 3                       |                          |           |
| Overvoltage category                                      |                                     | III                     |                          |           |
| Standards / Directives                                    |                                     |                         |                          |           |
| Standards                                                 |                                     | IEC/EN 61812-1          |                          |           |
| Low Voltage Directive                                     |                                     | 2014/35/EU              |                          |           |
| EMC Directive                                             |                                     | 2014/30/EU              |                          |           |
| RoHS Directive                                            |                                     | 2011/65/EU              |                          |           |
| Electromagnetic compatibility                             |                                     |                         |                          |           |
| Interference immunity to                                  |                                     | IEC/EN 61000-6-2        |                          |           |
| electrostatic discharge                                   | IEC/EN 61000-4-2                    | Level 3 (6 kV / 8 kV)   |                          |           |
| radiated, radio-frequency, electromagnetic field          | IEC/EN 61000-4-3                    | Level 3 (10 V / m)      |                          |           |
| electrical fast transient / burst                         | IEC/EN 61000-4-4                    | Level 3 (2 kV / 5 kHz)  |                          |           |
| surge                                                     | IEC/EN 61000-4-5                    | Level 4 (2 kV L-L)      |                          |           |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6                    | Level 3 (10 V)          |                          |           |
| Interference emission                                     |                                     | IEC/EN 61000-6-3        |                          |           |
| high-frequency radiated                                   | IEC/CISPR 22, EN 55022              | Class B                 |                          |           |
| high-frequency conducted                                  | IEC/CISPR 22, EN 55022              | Class B                 |                          |           |

## CT-D range

## Technical diagrams

### Example of application - Star-delta changeover

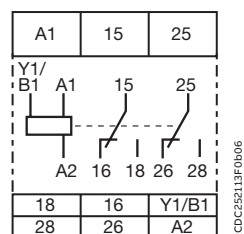


## CT-D range

### Technical diagrams

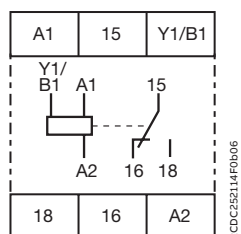
#### Connection diagrams

##### CT-MFD.21



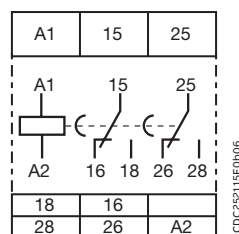
|          |                           |
|----------|---------------------------|
| A1-A2    | Supply:<br>12-240 V AC/DC |
| A1-Y1/B1 | Control input             |
| 15-16/18 | 1st c/o contact           |
| 25-26/28 | 2nd c/o contact           |

##### CT-MFD.12



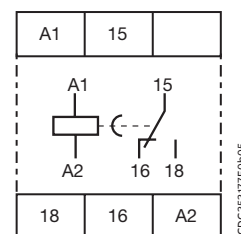
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| A1-Y1/B1 | Control input                           |
| 15-16/18 | 1st c/o contact                         |

##### CT-ERD.22



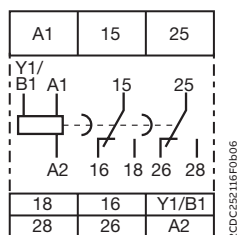
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 15-16/18 | 1st c/o contact                         |
| 25-26/28 | 2nd c/o contact                         |

##### CT-ERD.12



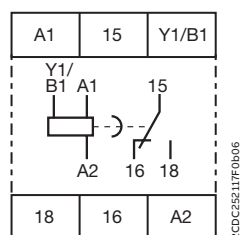
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 15-16/18 | 1st c/o contact                         |

##### CT-AHD.22



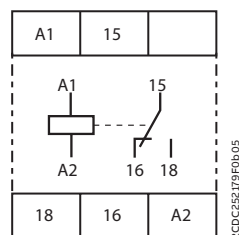
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |
| 25-26/28 | 2nd c/o contact                          |

##### CT-AHD.12



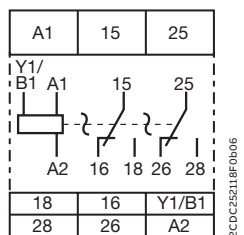
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |

##### CT-VWD.12



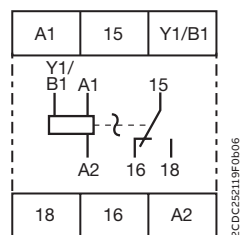
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| 15-16/18 | 1st c/o contact                          |

##### CT-TGD.22



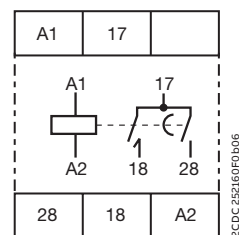
|          |                                         |
|----------|-----------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or<br>24-240 V AC |
| A1-Y1/B1 | Control input                           |
| 15-16/18 | 1st c/o contact                         |
| 25-26/28 | 2nd c/o contact                         |

##### CT-TGD.12



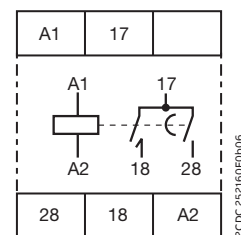
|          |                                          |
|----------|------------------------------------------|
| A1-A2    | Supply:<br>24-48 V DC or 24-<br>240 V AC |
| A1-Y1/B1 | Control input                            |
| 15-16/18 | 1st c/o contact                          |

##### CT-SDD.22



|       |                                         |
|-------|-----------------------------------------|
| A1-A2 | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 17-18 | 1st n/o contact<br>(star contactor)     |
| 17-28 | 2nd n/o contact<br>(delta contactor)    |

##### CT-SAD.22



|       |                                         |
|-------|-----------------------------------------|
| A1-A2 | Supply:<br>24-48 V DC or<br>24-240 V AC |
| 17-18 | 1st n/o contact<br>(star contactor)     |
| 17-28 | 2nd n/o contact<br>(delta contactor)    |

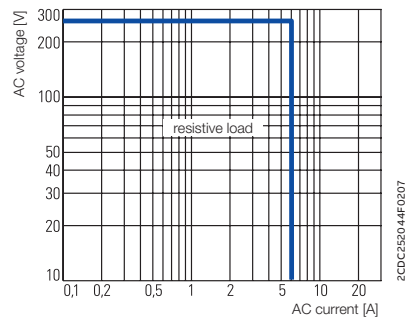
## CT-D range

### Technical diagrams

#### Load limit curves

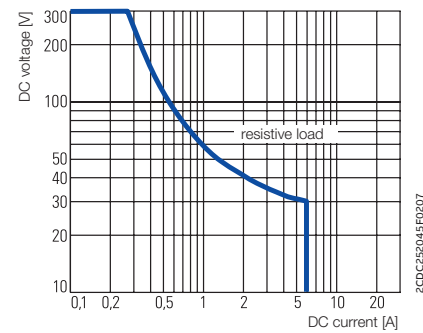
##### AC load (resistive)

###### CT-D.1x

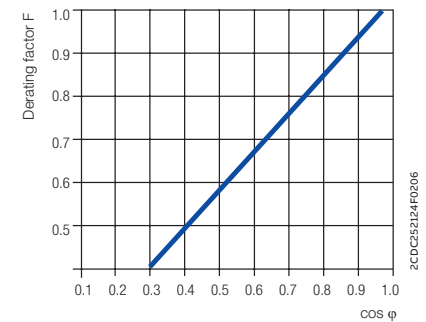


##### DC load (resistive)

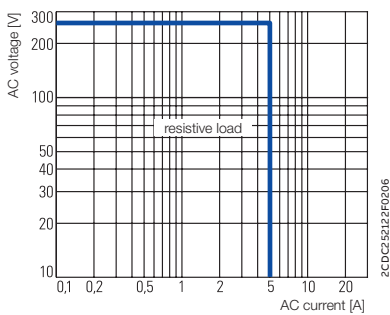
###### CT-D.1x



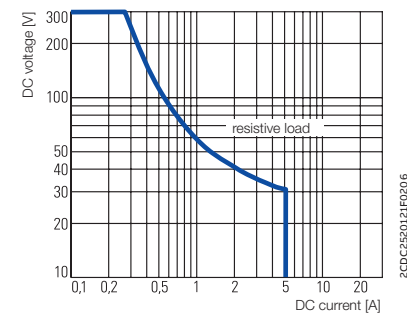
##### Derating factor F for inductive AC load



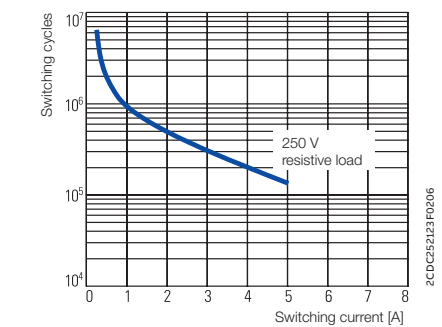
###### CT-D.2x



###### CT-D.2x

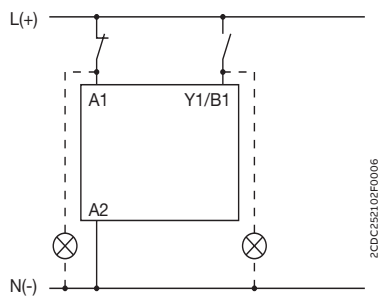


##### Contact lifetime

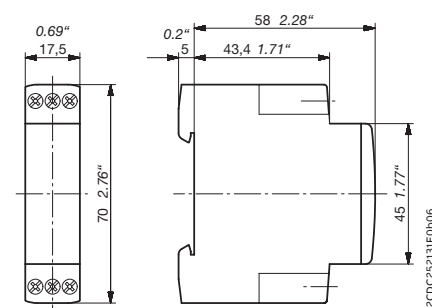


#### Wiring notes for devices with control input

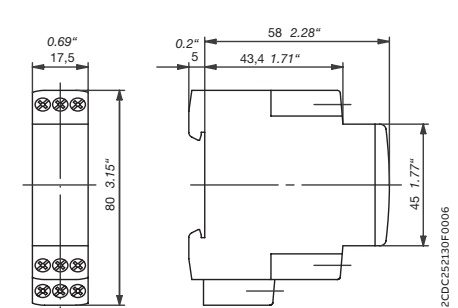
##### A parallel load to the control input is possible



#### Dimensional drawings in mm and inches



CT-D devices with 1 c/o contact or 2 n/o contacts



CT-D devices with 2 c/o contacts





## Timing functions

# Timing functions

## CT-C, CT-S, CT-D

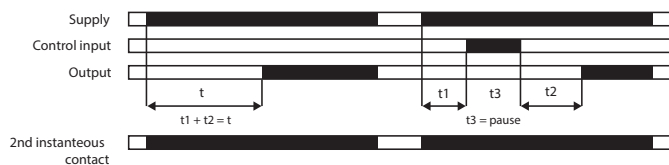
### On delay functions (Delay on make) ☒

#### On-delay



This function requires a continuous control supply voltage for timing. Timing begins when a control supply voltage is applied. When the selected time delay is complete, the output relay energizes. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

#### ON-delay accumulative

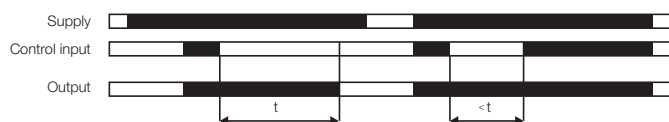


This function requires a continuous control supply voltage for timing. Timing begins when a control supply voltage is applied. When the selected time delay is complete, the output relay energizes. Timing can be paused by closing the control input.

The elapsed time  $t_1$  is stored and continues from this time value when the control input is re-opened. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### OFF delay functions (Delay on break) ■

#### OFF-delay with auxiliary voltage



This function requires a continuous control supply voltage for timing. If the control input is closed, the output relay energizes immediately. If the control input is opened, the time delay starts. When the selected time delay is complete, the output relay de-energizes.

If control input re-closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when the control input re-opens. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

#### OFF-delay without auxiliary voltage



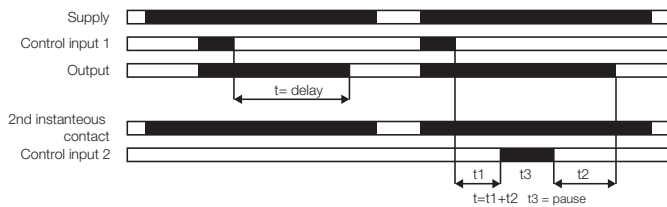
The OFF-delay function without auxiliary voltage does not require a continuous control supply voltage for timing. Applying a control supply voltage energizes the output relay. If the control supply voltage is interrupted, the OFF-delay starts. When timing is complete, the output relay de-energizes.

If a control supply voltage is re-applied before the time delay is complete, the time delay is reset and the output relay remains energized. A control supply voltage must be applied for the minimum energizing time (200 ms), for correct operation.

# Timing functions

## CT-C, CT-S, CT-D

### OFF-delay with auxiliary voltage, accumulative



This function requires a continuous control supply voltage for timing. If the control input is closed, the output relay energizes immediately. If the control input is opened, the time delay starts. When the selected time delay is complete, the output relay de-energizes. If the control input closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when the control input reopens.

**Pause timing / Accumulative OFF-delay:** Timing can be paused by closing control 1. The elapsed time  $t_1$  is stored and continues from this time value when control input 1 is re-opened. This can be repeated as often as required. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Impulse-ON functions 1

#### Impulse-ON (interval)



This function requires a continuous control supply voltage for timing. The output relay energizes immediately when the control supply voltage is applied and de-energizes after the set pulse time is complete. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

#### Impulse-ON, accumulative



This function requires a continuous control supply voltage for timing. The output relay energizes immediately when the control supply voltage is applied and de-energizes after the set pulse time is complete. If control input 1 is open, timing begins when a control supply voltage is applied. Or, if control a supply voltage is already applied, opening control input 1 starts timing. When the selected pulse time is complete, the output relay de-energizes. Closing control input 1, before the pulse time is complete, de-energizes the output relay and re-sets the pulse time.

**Pause timing / Accumulative impulse-ON:** Timing can be paused by closing control input 2. The elapsed time  $t_1$  is stored and continues from this time value when control input 2 is re-opened. This can be repeated as often as required. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

# Timing functions

## CT-C, CT-S, CT-D

### Impulse-OFF functions 1

#### Impulse-OFF with auxiliary voltage



This function requires a continuous control supply voltage for timing. The output relay energizes immediately when the control input is de-energized and the output de-energizes after the set pulse time is complete. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

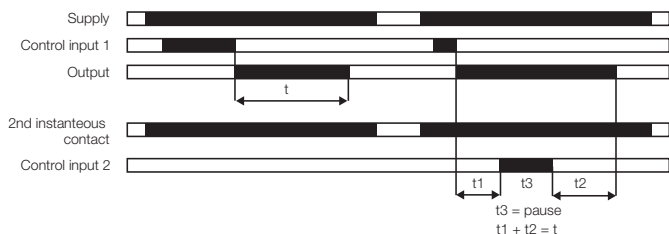
#### Impulse-OFF without auxiliary voltage



This function does not require a continuous control supply voltage for timing.

If the control supply voltage is interrupted, the output relay energizes and the OFF time starts. When timing is complete, the output relay de-energizes. If a control supply voltage is re-applied before the time delay is complete, the time delay is reset and the output relay de-energizes. A control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.

#### Impulse-OFF with auxiliary voltage (Trailing edge interval) accumulative



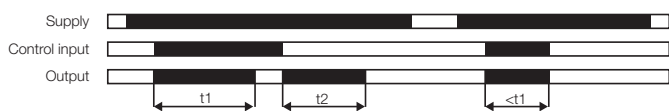
This function requires a continuous control supply voltage for timing. If a control supply voltage is applied, opening control input 1 energizes the output relay immediately and starts timing. When the selected pulse time is complete, the output relay de-energizes. Closing control input 1, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

#### Pause timing / Accumulative impulse-OFF:

Timing can be paused by closing control input 2. The elapsed time  $t_1$  is stored and continues from this time value when control input 2 is re-opened. This can be repeated as often as required. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Impulse-ON and Impulse-OFF functions 1

#### Impulse-ON and impulse-OFF



This function requires a continuous control supply voltage for timing. If a control supply voltage is applied, closing the control input energizes the output relay immediately and starts the pulse time  $t_1$ . When  $t_1$  is complete, the output relay de-energizes. Re-opening the control input energizes the output relay immediately and starts the pulse time  $t_2$ . When  $t_2$  is complete, the output relay de-energizes.  $t_1$  and  $t_2$  are independently adjustable. If the control input changes state before the pulse time is complete, the output relay de-energizes and the pulse time is reset. If the control input changes state again, the interrupted pulse time restarts. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

# Timing functions

## CT-C, CT-S, CT-D

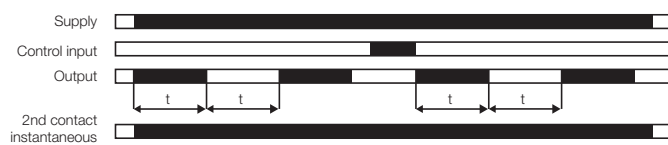
### Flasher starting with ON functions

#### Flasher starting with ON



Applying a control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

#### Flasher with reset starting with ON



Applying a control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The time delay can be reset by closing the control input. Opening the control input starts the timer pulsing again with symmetrical ON & OFF times. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

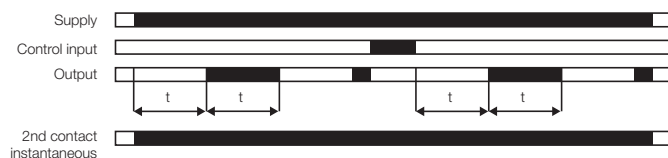
### Flasher starting with OFF functions

#### Flasher starting with OFF



Applying a control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

#### Flasher with reset starting with OFF



Applying a control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The time delay can be reset by closing the control input. Opening the control input starts the timer pulsing again with symmetrical ON & OFF times. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Flasher starting with ON or OFF functions

#### Flasher starting with ON or OFF



Applying a control supply voltage starts timing with symmetrical ON / OFF times. If the control input is open while supply voltage is connected the cycle starts with an ON time first. If the control input is closed while supply voltage is connected the cycle starts with an OFF time first.

# Timing functions

## CT-C, CT-S, CT-D

### Pulse former

#### Puls former (single shot)



This function requires a continuous control supply voltage for timing. Closing the control input energizes the output relay immediately and starts timing. Operating the control input during the time delay has no effect. When the selected ON time is complete, the output relay de-energizes. After the ON time is complete, it can be restarted by closing the control input. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Single-pulse generator

#### Single-pulse generator, starting with OFF



This function requires a continuous control supply voltage for timing. Applying a control supply voltage while the control input is open energizes the output relay after the OFF time  $t_1$  is complete. When the following ON time  $t_2$  is complete, the output relay de-energizes. Alternatively, when a control supply voltage is already applied, the timing process can be started by opening control input. Closing the control input with a control supply voltage applied, de-energizes the output relay and re-sets the time delay. The ON & OFF times are independently adjustable.

### Pulse generator

#### Starting with the ON or OFF time (Recycling unequal times, ON or OFF first)



This function requires a continuous control supply voltage for timing. Applying a control supply voltage, with closed control input, starts timing with an OFF time first. Applying a control supply voltage, with open control input, starts timing with an ON time first. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Impulse with delay

#### Fixed impulse with adjustable time delay



This function requires a continuous control supply voltage for timing. The time delay  $t_1$  starts when a control supply voltage is applied. When  $t_1$  is complete, the output relay energizes for the fixed impulse time  $t_2$  of 500 ms. If the control supply voltage is interrupted, the time delay is re-set. The output relay does not change state.

#### Adjustable impulse with fixed time delay



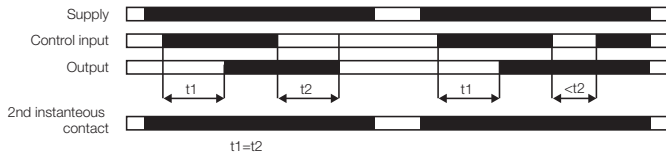
This function requires a continuous control supply voltage for timing. As soon as the control supply voltage is applied the output relay will close after 500 ms. When  $t_2$  is complete, the output relay energizes and the selected pulse time  $t_1$  starts. When  $t_1$  is complete, the output relay de-energizes. If the control supply voltage is interrupted, the pulse time is reset and the output relay de-energizes.

# Timing functions

## CT-C, CT-S, CT-D

### ON- and OFF-delay

#### Symmetrical ON- and OFF-delay <sup>1)</sup>



This function requires a continuous control supply voltage for timing. Closing the control input starts the ON-delay time  $t_1$ . When timing is complete, the output relay energizes. Opening the control input starts the OFF-delay time  $t_2$ . When the OFF-delay  $t_2$  is complete, the output relay de-energizes. If the control input opens before the ON-delay ( $<t_1$ ) is complete, the time delay is reset and the output relay remains de-energized. If control input closes before the OFF-delay time ( $<t_2$ ) is complete, the time delay is reset and the output relay remains energized.

1) Variant with 2nd control input for pause timing is available too.

#### Asymmetrical ON- and OFF-delay



This function requires a continuous control supply voltage for timing. Closing the control input starts the ON-delay  $t_1$ . When timing is complete, the output relay energizes. Opening the control input starts the OFF-delay  $t_2$ . When the OFF-delay is complete, the output relay de-energizes. The ON-delay and OFF-delay are independently adjustable. If the control input opens before the ON-delay is complete ( $<t_1$ ), the time delay is reset and the output relay remains de-energized. If the control input closes before the OFF-delay is complete ( $<t_2$ ), the time delay is reset and the output relay remains energized. If the control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

### Star-Delta changeover



This function requires a continuous control supply voltage for timing. Applying a control supply voltage, energizes the star contactor connected to output 1 and begins the set starting time  $t_1$ . When the starting time is complete, the first output contact de-energizes the star contactor. When the transition time  $t_2$  is complete, the second output contact energizes the delta contactor. The delta contactor remains energized as long as the control supply voltage is applied.  $t_2$  is fixed to 50 ms or in some variants adjustable.

### Further functions

#### ON/OFF function



This function is used for test purposes during commissioning and troubleshooting.

If the selected maximum value of the time range is smaller than 300 hours (front-face potentiometer "Time sector"  $\neq 300$  h), applying a control supply voltage energizes the output relay immediately. Interrupting the control supply voltage, de-energizes the output relay.

If the selected maximum value of the time range is 300 hours (front-face potentiometer "Time sector" = 300 h) and a control supply voltage is applied the output relay does not energize.

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