Data sheet

# Electronic timer CT-MVS.23
## Multifunctional with 2 c/o (SPDT) contacts

The CT-MVS.22 is a multifunctional electronic timer from the CT-S range. It provides 11 timing functions and 10 time ranges.

All electronic timers from the CT-S range are available with two different terminal versions. You can choose between the proven screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals).




2CDC 251 027 V0011

### Characteristics

- Rated control supply voltage 380-440 V AC
- Timing functions:
  ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Star-delta change-over with impulse, Pulse former, Accumulative ON-delay, ON/OFF-function
- 10 time ranges (0.05 s - 300 h)
- Control input with voltage-related triggering to start timing, to stop/pause timing or to select timing function
- Precise adjustment by front-face operating elements
- Screw connection technology or
  Easy Connect Technology available
- Enclosure material for highest fire protection classification
- Tool-free mounting and demounting on DIN-rail
- 2 c/o (SPDT) contacts
- 22.5 mm (0.89 in) width
- 3 LEDs for status indication

### Approvals

- UL 508, CAN/CSA C22.2 No.14
- GL
- GOST
- CB scheme
- CCC

### Marks

- CE
- C-Tick

### Order data

#### Electronic timer

| Type | Rated control supply voltage | Connection technology | Time ranges | Order code |
|---|---|---|---|---|
| CT-MVS.23P | 380-440 V AC | Push-in terminals | 0.05 s - 300 h | 1SVR 740 021 R2300 |
| CT-MVS.23S | 380-440 V AC | Screw type terminals | 0.05 s - 300 h | 1SVR 730 021 R2300 |

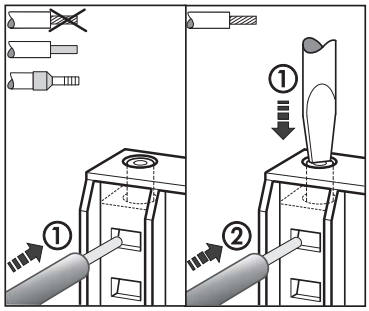
#### Accessories

| Type | Description | Order code |
|---|---|---|
| ADP.01 | Adapter for screw mounting on panel | 1SVR 430 029 R0100 |
| MAR.01 | Beschriftungsschild für Geräte ohne DIP-Schalter | 1SVR 366 017 R0100 |
| COV.11 | Plombierbare Klarsichtabdeckung | 1SVR 600 805 P0000 |

## Connection technology

### Maintenance free Easy Connect Technology with push-in terminals

Type designation CT-xxS.yyP

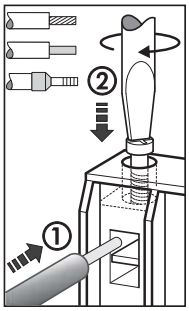



### Push-in terminals

- Tool-free connection of rigid and flexible wires with wire end ferrule
  Wire size: 2 x 0.5-1.5 mm²
- Easy connection of flexible wires without wire end ferrule by opening the terminals
- Opening for testing the electrical contacting
- Gas-tight

### Approved screw connection technology with double-chamber cage connection terminals

Type designation CT-xxS.yyS



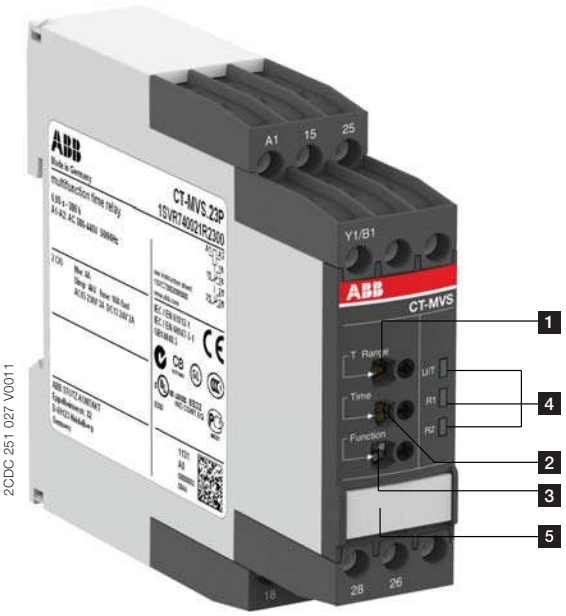

### Double-chamber cage connection terminals

- Terminal spaces for different wire sizes:
  fine-strand with/without wire end ferrule:
  1 x 0.5-2.5 mm², 2 x 0.5-1.5 mm²
  rigid: 1 x 0.5-4 mm², 2 x 0.5-2.5 mm²
- Pozidrive screws for pan- or crosshead screwdrivers

Both the Easy Connect Technology with push-in terminals and screw connection technology with double-chamber cage connection terminals have the same connection geometry as well as terminal position.

## Functions

### Operating controls




**1** **Rotary switch for the preselection of the time range**

**2** **Fine adjustment of the time delay**

**3** **Rotary switch for the preselection of the timing function**

**4** **Indication of operational states**

U: green LED - control supply voltage / timing

R: yellow LED - output relays energized

**5** **Marker label**

### Application

The CT-S range timers are designed for use in industrial applications. They operate over a universal range of supply voltages and a large time delay range, within compact dimensions. The easy-to-set front-face potentiometers, with direct reading scales, provide accurate time delay adjustment.

Multifunction timers are ideally suited for service and maintenance applications, because one device can replace a number of time relays with different functions, voltage and time ranges. This reduces inventory and saves money.

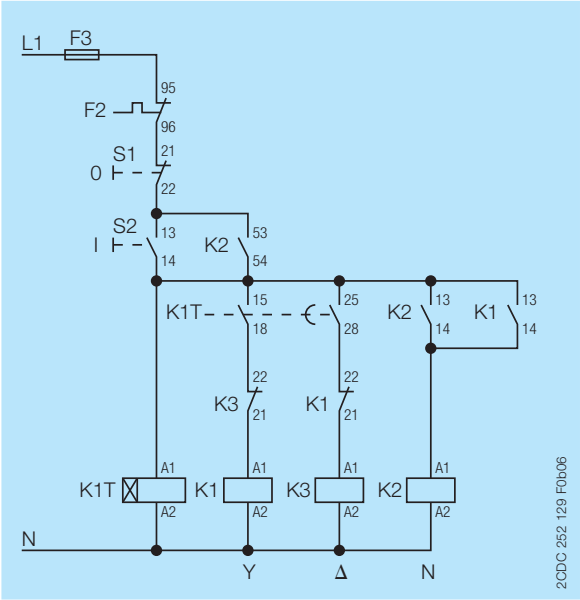
### Operating mode

The CT-MVS.22 with 2 c/o (SPDT) contacts offers 11 timing functions. The function is rotary switch selectable on the front of the unit. Each function is indicated by an international function symbol.

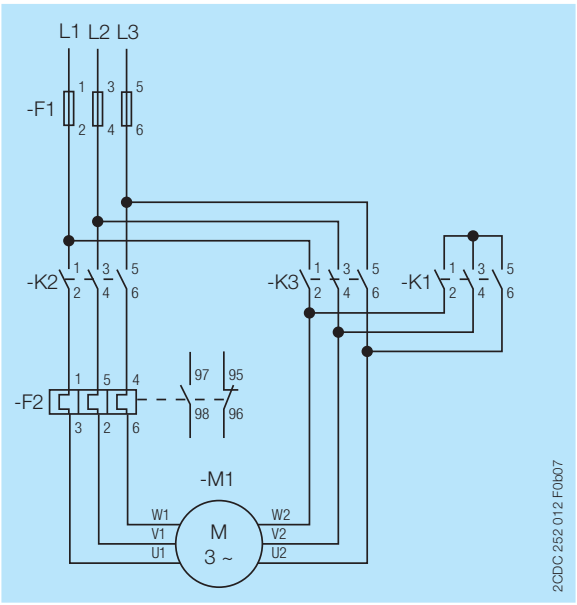
One of 10 time ranges, from 0.05 s to 300 h, can be selected with an other rotary switch. The fine adjustment of the time delay is made via an internal potentiometer, with a direct reading scale, on the front of the unit.

Timing is displayed by a flashing green LED labelled U/T.

## Examples of application




**Star-delta change-over Control circuit diagram**




**Star-delta change-over Power circuit diagram**

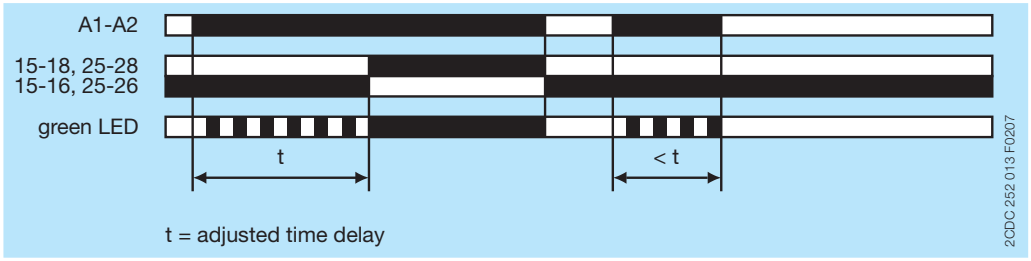
## Function diagrams

### ON-delay

This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



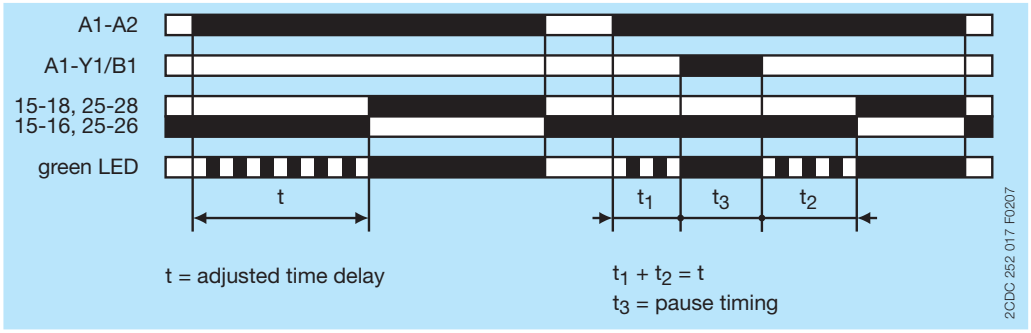

### Accumulative ON-delay

This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

Timing can be paused by closing control input A1-Y1/B1. The elapsed time t1 is stored and continues from this time value when A1-Y1/B1 is re-opened. This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



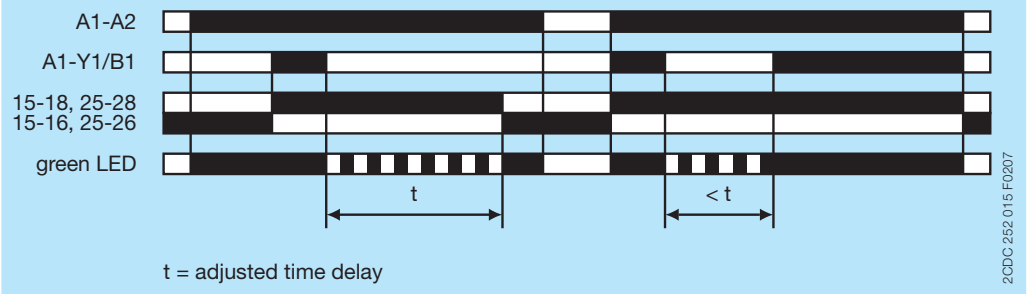
### OFF-delay with auxiliary voltage

This function requires continuous control supply voltage for timing.

If control input A1-Y1/B1 is closed, the output relay energizes immediately. If control input A1-Y1/B1 is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

If control input A1-Y1/B1 recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input A1-Y1/B1 re-opens.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



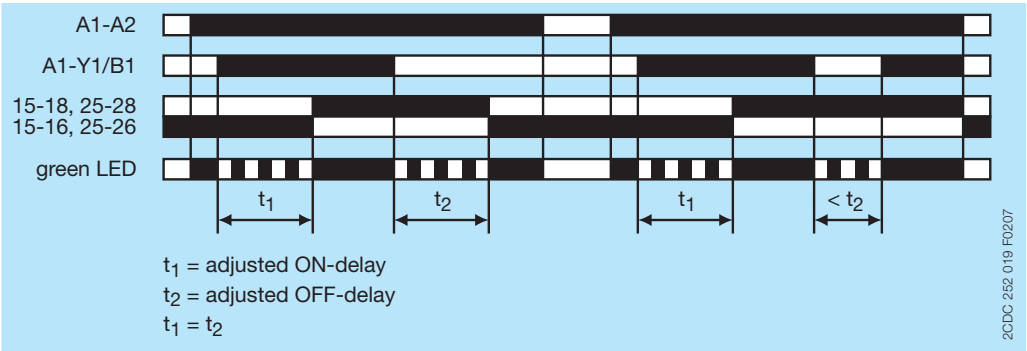

### Symmetrical ON- and OFF-delay

This function requires continuous control supply voltage for timing.

Closing control input A1-Y1/B1 starts the ON-delay t1. When timing is complete, the output relay energizes. Opening control input A1-Y1/ B1 starts the OFF-delay t2. Both timing functions are displayed by the flashing green LED. When the OFF-delay t2 is complete, the output relay de-energizes.

If control input A1-Y1/B1 opens before the ON-delay t1 is complete, the time delay is reset and the output relay remains de-energized. If control input A1-Y1/B1 closes before the OFF-delay t2 is complete, the time delay is reset and the output relay remains energized.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

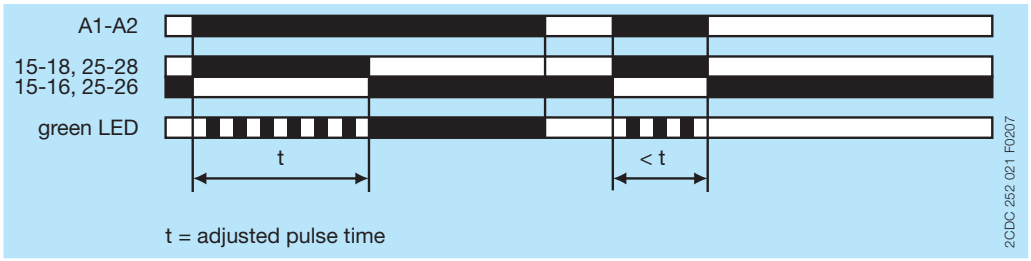


### Impulse-ON

This function requires continuous control supply voltage for timing.

The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



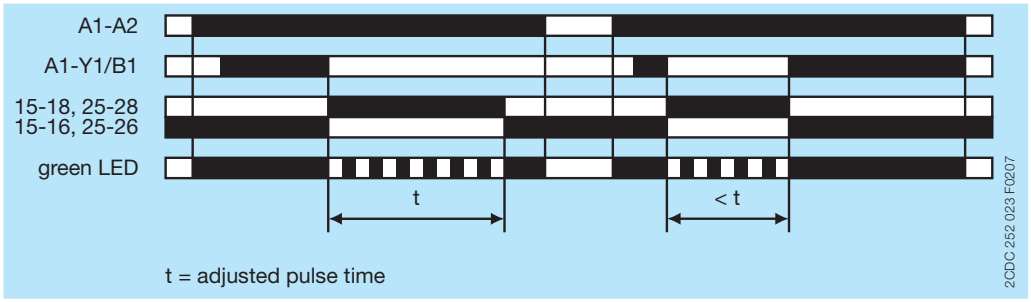

### Impulse-OFF with auxiliary voltage

This function requires continuous control supply voltage for timing.

If control supply voltage is applied, opening control input A1-Y1/B1 energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input A1-Y1/B1, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

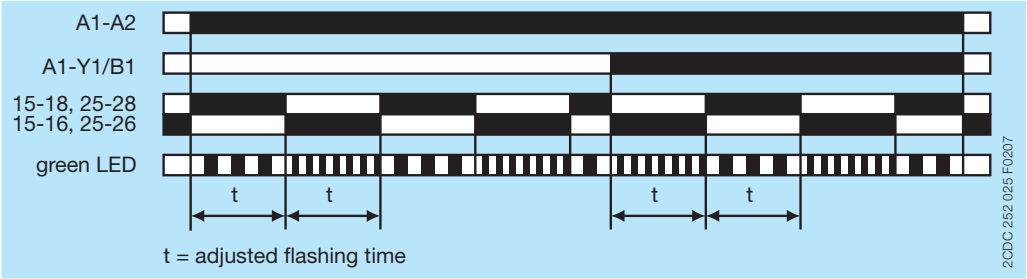


### Flasher, starting with ON or OFF

Applying control supply voltage starts timing with symmetrical ON / OFF times. The cycle starts with an ON time first.

Closing control input A1-Y1/B1, with control supply voltage applied, starts the cycle with an OFF time first. The ON / OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

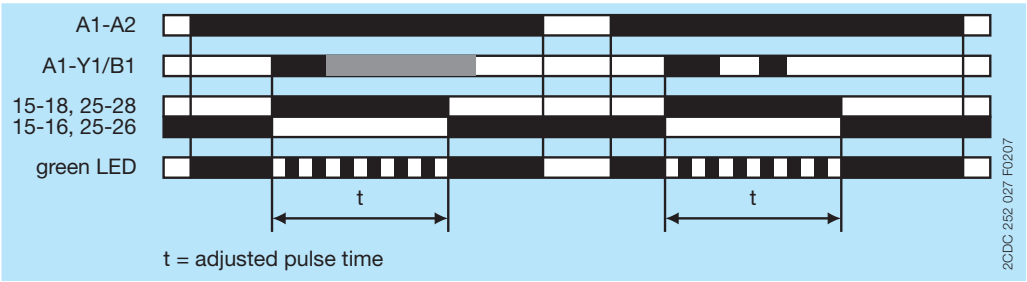



### Pulse former

This function requires continuous control supply voltage for timing.

Closing control input A1-Y1/B1 energizes the output relay immediately and starts timing. Operating the control contact switch A1-Y1/B1 during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay deenergizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input A1-Y1/B1.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



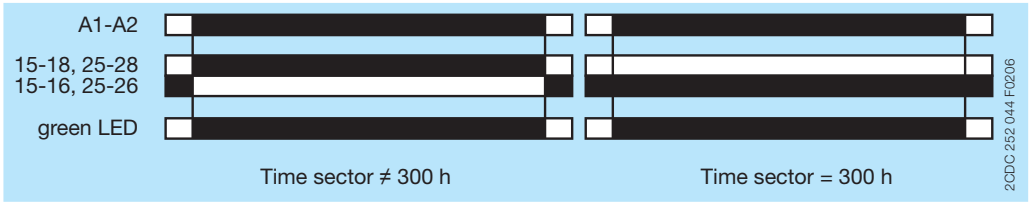
## ON/OFF-function

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

If the selected max. value of the time range is smaller than 300 h (front-face potentiometer “Time sector” not 300 h), applying control supply voltage energizes the output relay immediately and the green LED glows. Interrupting control supply voltage, de-energizes the output relay.

If the selected max. value of the time range is 300 h (front-face potentiometer “Time sector” = 300 h) and control supply voltage is applied, the green LED glows, but the output relay does not energize.

Time settings and operating of the control inputs have no effect on the operation.

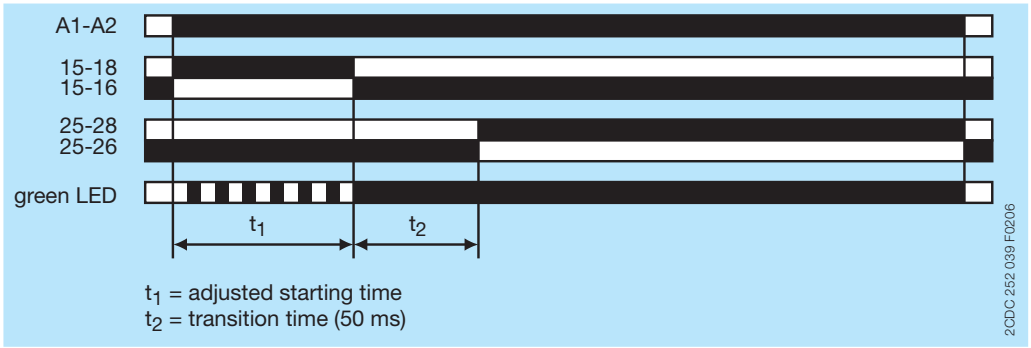



## Star-delta change-over with impulse

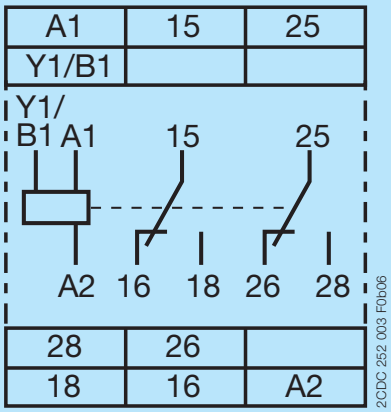
This function requires continuous control supply voltage for timing.

Applying control supply voltage to terminals A1-A2, energizes the star contactor connected to terminals 15-18 and begins the set starting time t1. The green LED flashes during timing. When the starting time is complete, the first c/o (SPDT) contact de-energizes the star contactor.

Now, the fixed transition time t2 of 50 ms starts. When the transition time is complete, the second c/o (SPDT) contact energizes the delta contactor connected to terminals 25-28. The delta contactor remains energized as long as control supply voltage is applied to the unit.



## Electrical connection



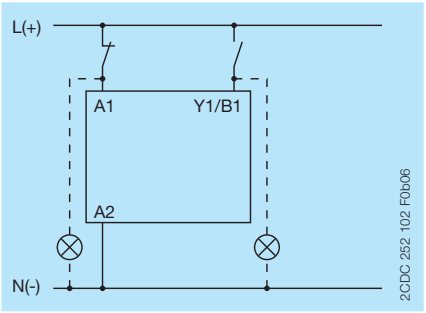

| | |
|---|---|
| 15-16/18 | 1. c/o (SPDT) contact |
| 25-26/28 | 2. c/o (SPDT) contact |
| A1-A2 | Rated control supply voltage $U_S$ 380-440 V AC |
| A1-Y1/B1 | Control input |

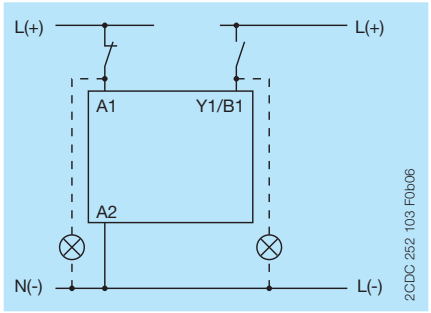
**Connection diagram**

## Wiring instructions

### Control input (voltage-related triggering)

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.



## Technical data

Data at $T_a$ = 25 °C and rated values, unless otherwise indicated

### Input circuits

| **Supply circuit** | | **A1-A2** |
|---|---|---|
| Rated control supply voltage $U_S$ | | 380 - 440 V AC |
| Rated control supply voltage $U_S$ tolerance | 380 - 440 V AC | -15...+10 % |
| Rated frequency | DC | n/a |
| | AC | 50/60 Hz |
| Frequency range | AC | 47-63 Hz |
| Typical current / power consumption | 400 V AC | 4 mA / on request |
| Power failure buffering time | 400 V AC | min. 20 ms |

| **Control circuit** | | |
|---|---|---|
| Control input, control function | A1-Y1/B1 | start timing external |
| Kind of triggering | | voltage-related triggering |
| Restistance to reverse polarity | | yes |
| Polarized | | no |
| Capable for switching a parallel load | | 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 $U_S$ |
| Current consumption of the control input | 400 V AC | 6 mA |

| **Timing circuit** | | |
|---|---|---|
| Kind of timer | Multifunction timer | ON-delay<br>OFF-delay with auxiliary voltage<br>Impulse-ON<br>Impulse-OFF with auxiliary voltage<br>Symmetrical ON- and OFF-delay<br>Flasher, starting with ON or OFF<br>Star-delta change-over<br>Pulse former<br>ON/OFF-function |
| Time ranges 0.05 s - 300 h | | 0.05-1 s, 0.15-3 s, 0.5-10 s, 1.5-30 s, 5-100 s,<br>15-300 s, 1.5-30 min, 15-300 min, 1.5-30 h, 15-300 h |
| Recovery time | | < 60 ms |
| Repeat accuracy (constant parameters) | | Δt <± 0.2 % |
| Accuracy within the rated control supply voltage tolerance | | Δt < 0.004 %/V |
| Accuracy within the temperature range | | Δt < 0.03 %/°C |
| Star-delta transition time | | fixed, 50 ms |
| Star-delta transition time tolerance | | ± 2 ms |

### User interface

| **Indication of operational states** | | |
|---|---|---|
| Control supply voltage / timing | U/T: green LED | ⎍: control supply voltage applied |
| | U/T: green LED | ⎍⎍⎍: timing |
| Relay status | R: yellow LED | ⎍: output relay energized |

## Output circuits

| | | |
|---|---|---|
| Kind of output | 15-16/18 | Relay, 1 c/o (SPDT) contact |
| | 25-26/28 | Relay, 2. c/o (SPDT) contacts |
| Contact material | | Cd-free |
| Rated operational voltage $U_e$ | | 250 V |
| Minimum switching voltage / Minimum switching current | | 12 V / 10 mA |
| Maximum switching voltage / Minimum switching current | | see 'Load limit curves' on page 15 |
| Rated operational current $I_e$ (IEC/EN 60947-5-1) | AC12 (resistive) at 230 V | 4 A |
| | AC15 (inductive) at 230 V | 3 A |
| | DC12 (resistive) at 24 V | 4 A |
| | DC13 (inductive) at 24 V | 2 A |
| AC rating (UL 508) | utilization category (Control Circuit Rating Code) | B 300 |
| | max. rated operational voltage | 300 V AC |
| | max. continuous thermal current at B 300 | 5 A |
| | max. making / breaking apparent power at B 300 | 3600/360 VA |
| Mechanical lifetime | | 30 x $10^6$ switching cycles |
| Electrical lifetime | AC12, 230 V, 4 A | 0.1 x $10^6$ switching cycles |
| Maximum fuse rating to achieve short-circuit protection (IEC/EN 60947-5-1) | n/c contact | 6 A fast-acting |
| | n/o contact | 10 A fast-acting |

## General data

| | | |
|---|---|---|
| MTBF | | on request |
| Duty time | | 100 % |
| Dimensions (W x H x D) | product dimensions | 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in) |
| | packaging dimensions | 97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in) |
| Weight | net weight | |
| | gross weight | |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool |
| Mounting position | | any |
| Minimum distance to other units | vertical | not necessary |
| | horizontal | not necessary |
| Degree of protection | enclosure | IP50 |
| | terminals | IP20 |

## Electrical connection

| | | Screw connection technology | Easy Connect Technology (Push-in) |
|---|---|---|---|
| Wire size | fine-strand with wire end ferrule | 1 x 0.5-2.5 mm² (1 x 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| | fine-strand without wire end ferrule | 1 x 0.5-2.5 mm² (1 x 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| | rigid | 1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| Stripping length | | 8 mm (0.32 in) | |
| Tightening torque | | 0.6 - 0.8 Nm (5.31 - 7.08 lb.in) | - |

## Environmental data

| | | |
|---|---|---|
| Ambient temperature ranges | operation | -25...+60 °C |
| | storage | -40...+85 °C |
| Damp heat, cyclic (IEC/EN 60068-2-30) | | 6 x 24 h cycle, 55 °C, 95 % RH |
| Vibration, sinusoidal (IEC/EN 60068-2-6) | functioning | 40 m/s², 10-58/60-150 Hz |
| | resistance | 60 m/s², 10-58/60-150 Hz, 20 cycles |
| Vibration, seismic (IEC/EN 60068-3-3) | functioning | 20 m/s² |
| Shock, half-sine (IEC/EN 60068-2-27) | functioning | 100 m/s², 11 ms, 3 shocks/direction |
| | resistance | 300 m/s², 11 ms, 3 shocks/direction |

## Isolation data

| | | |
|---|---|---|
| Rated insulation voltage $U_i$ | output circuit 1 / output circuit 2 | 300 V |
| | input circuit / output circuit | 500 V |
| Rated impulse withstand voltage $U_{imp}$ between all isolated circuits (IEC/EN 60664-1, VDE 0110) | | 4 kV; 1.2/50 µs |
| Power-frequency withstand voltage test between all isolated circuits (test voltage) | | routine test: 2.0 kV; 50 Hz, 1 s<br>type test: 2.5 kV; 50 Hz, 1 min |
| Basic insulation (IEC/EN 61140) | input circuit / output circuit | 500 V |
| Protective separation (IEC/EN 61140; IEC/EN 50178; VDE 0106 part 101 and part 101/A1) | input circuit / output circuit | 250 V |
| Pollution degree (IEC/EN 60664-1, VDE 0110) | | 3 |
| Overvoltage category (IEC/EN 60664-1, VDE 0110) | | III |

## Standards

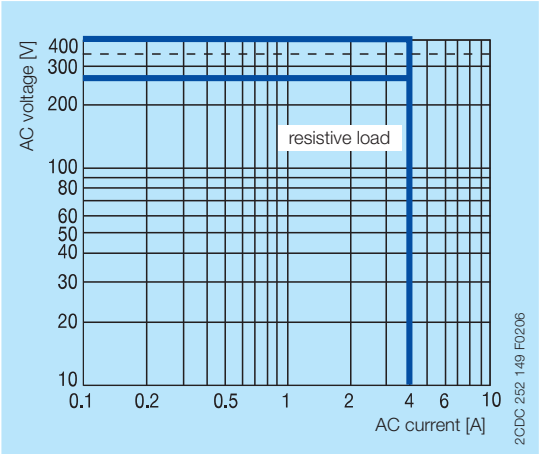
| | |
|---|---|
| Product standard | IEC 61812-1, EN 61812-1 + A11,<br>DIN VDE 0435 part 2021 |
| Low Voltage Directive | 2006/95/EC |
| EMC Directive | 2004/108/EC |
| RoHS Directive | 2002/95/EC |

## Electromagnetic compatibility

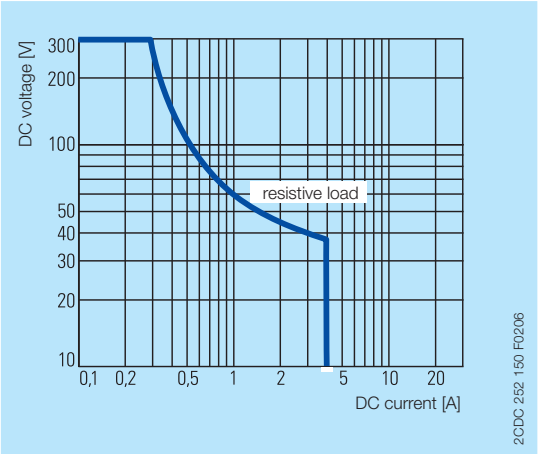
| | | |
|---|---|---|
| Interference immunity to | | IEC/EN 61000-6-1, IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3, 6 kV / 8 kV |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3, 10 V/m (1 GHz) / 3 V/m (2 GHz) / 1 V/m (2.7 GHz) |
| electrical 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 | Level 3 |
| Interference emission | | IEC/EN 61000-6-3, IEC/EN 61000-6-4 |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B |

## Technical diagrams

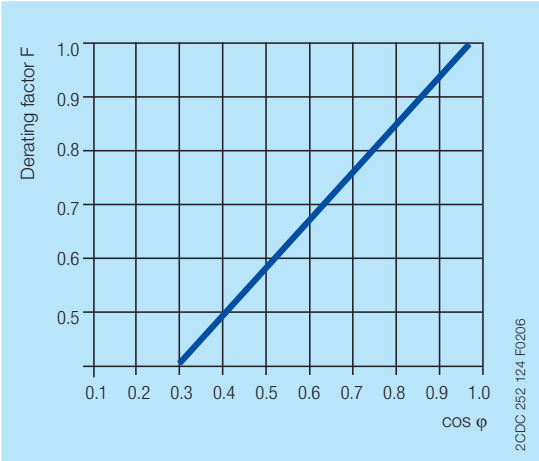
### Load limit curves



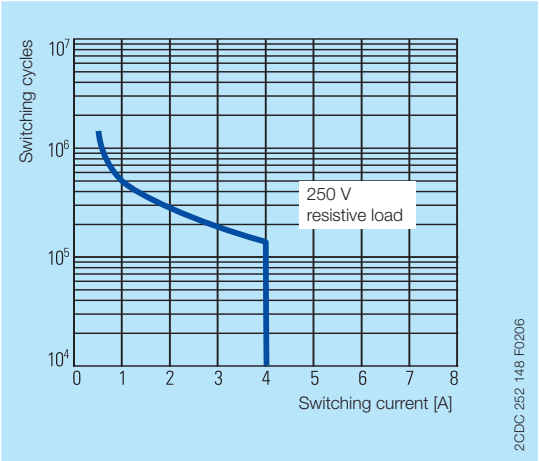

**AC load (resistive)**




**DC load (resistive)**



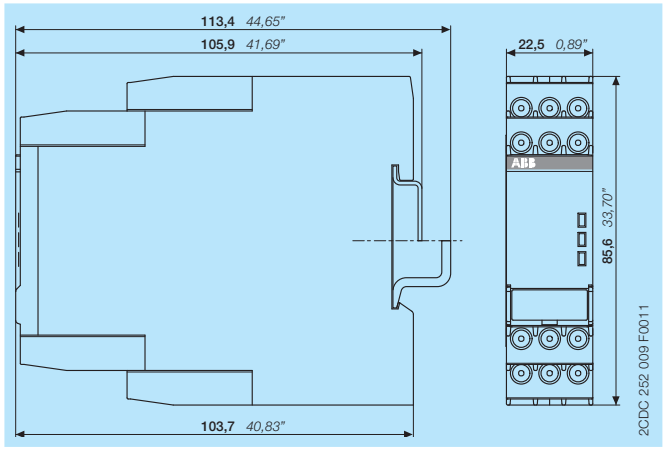

**Derating factor F for inductive AC load**




**Contact lifetime**

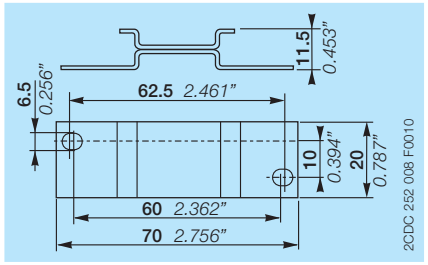
## Dimensions

in **mm** and *inches*

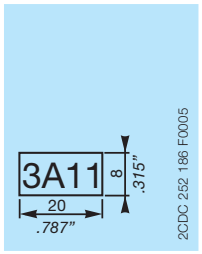



## Accessories

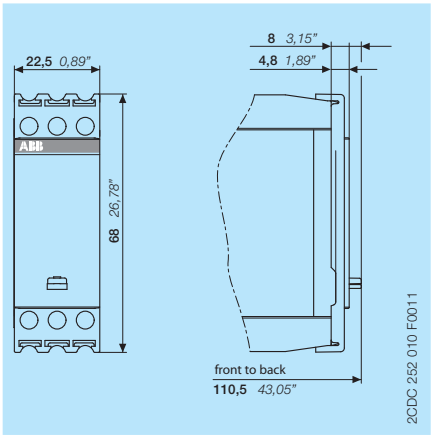
in **mm** and *inches*




**ADP.01 - Adapter for screw mounting**




**MAR.01 - Marker label**




**COV.11 - Sealable transparent cover**

## Further documentation

| Document title | Document type | Document number |
|---|---|---|
| Electronic Products and Relays | Technical catalogue | 2CDC 110 004 C020x |
| CT-AHS, CT-ARS, CT-MBS, CT-MFS | Instruction manual | 1SVC 730 010 M0000 |
| Remote potentiometer for CT-S range time relays | Data sheet | 2CDC 111 108 D0201 |

You can find the documentation on the internet at www.abb.com/lowvoltage -> Control Products -> Electronic Relays and Controls -> Time Relays

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