

CT-S range Function diagrams

Remarks

Legend

- Control supply voltage not applied / Output contact open
- Control supply voltage applied / Output contact closed

- A1-Y1/B1 Control input with voltage-related triggering
- Y1-Z2 Control input with volt-free triggering
- X1-Z2 Control input with volt-free triggering

Remote potentiometer connection:

When an external potentiometer is connected to the remote potentiometer connection (terminals **Z1-Z2**, **Z3-Z2** respectively), the internal, front-face potentiometer is disabled and the time adjustment is made via the external potentiometer.

2nd c/o contact selectable as instantaneous contact:

When switch position Inst. "I" is selected, the functionality of the 2nd c/o contact changes to an instantaneous contact. It acts like the c/o contacts of a switching relay, i.e. applying or interrupting the control supply voltage energizes or de-energizes the c/o contact. The designation of the 2nd c/o contact changes from **25-26/28** to **21-22/24**, when selected as instantaneous contact.

Terminal designations on the device and in the diagrams:

The 1st c/o contact is always designated **15-16/18**.
 The 2nd c/o contact is designated **25-26/28**, if it responds to the time delay.
 If the 2nd c/o contact is selected as an instantaneous contact, the designation **25-26/28** is replaced by **21-22/24**.
 Control supply voltage is always applied to terminals **A1-A2**.

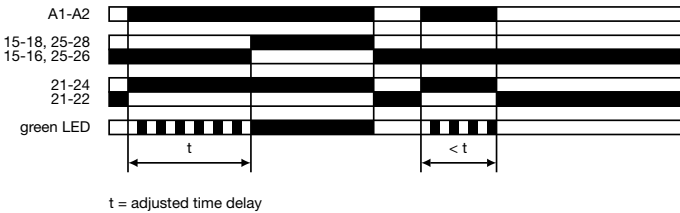
Function of the yellow LEDs:

On devices without the function '2nd c/o contact selectable as instantaneous contact', the yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

Devices with the function '2nd c/o contact selectable as instantaneous contact' have two yellow LEDs, designated **R1** and **R2**. LED **R1** shows the status of the 1st c/o contact (**15-16/18**) and LED **R2** shows the status of the 2nd c/o contact (**25-26/28**, **21-22/24** resp.). LED **R1** or **R2** glow as soon as the corresponding output relay energizes and turns off when the corresponding output relay de-energizes.

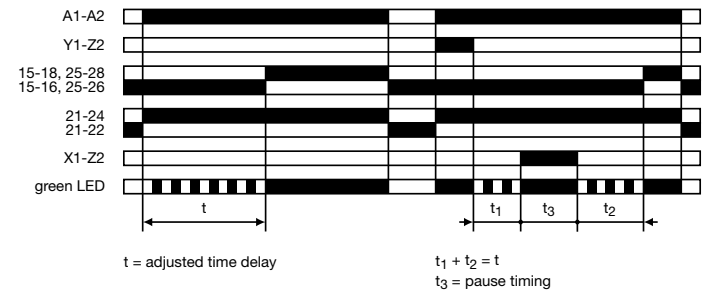
⊗ ON-delay (Delay on make) CT-MVS, CT-ERS, CT-WBS

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.



⊗ ON-delay (Delay on make) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.
 If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** also starts timing. 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 input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay remains de-energized.
 Pause timing / Accumulative ON-delay (CT-MFS):
 Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** 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.



CT-S range Function diagrams

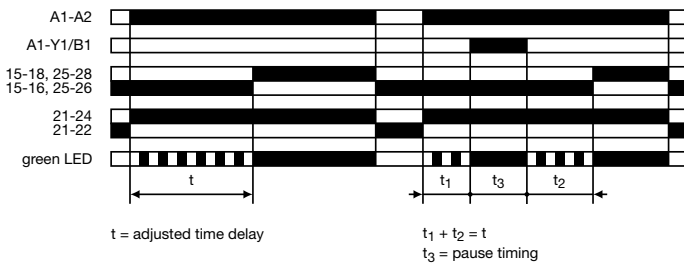
⊞+ Accumulative ON-delay (Accumulative delay on make) CT-MVS

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 t_1 is stored and continues from this time value when **A1-Y1/B1** is re-opened.

This can be repeated as often as required.

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



■ OFF-delay with auxiliary voltage (Delay on break) CT-MFS, CT-MBS, CT-AHS

This function requires continuous control supply voltage for timing.

If control input **Y1-Z2** is closed, the output relay energizes immediately. If control input **Y1-Z2** 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.

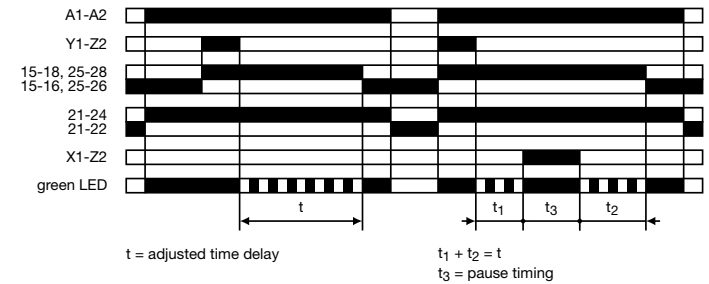
If control input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **Y1-Z2** re-opens.

Pause timing / Accumulative OFF-delay (CT-MFS):

Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** 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.



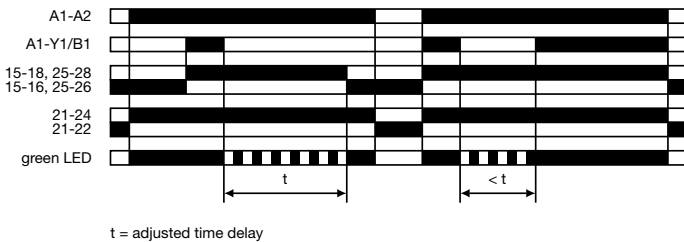
■ OFF-delay with auxiliary voltage (Delay on break) CT-MVS, CT-APS

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.

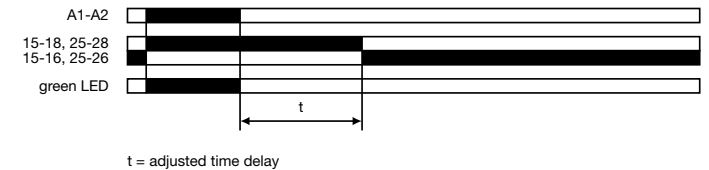


■ OFF-delay without auxiliary voltage (True delay on break) CT-ARS

The OFF-delay function without auxiliary voltage does not require continuous control supply voltage for timing. After a storage time of several months without any voltage, a formatting time of about 5 minutes is necessary.

Applying control supply voltage energizes the output relay immediately. Applied control supply voltage is displayed by the glowing green LED. If control supply voltage is interrupted, the OFF-delay starts and the LED turns off. When timing is complete, the output relay de-energizes.

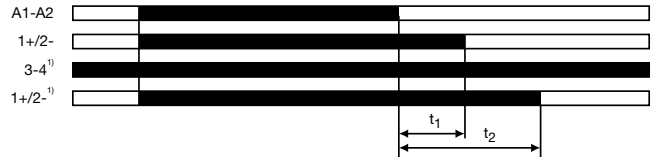
For correct operation of the unit, it is necessary to complete the minimum energizing time. As soon as timing starts, the LED turns off.



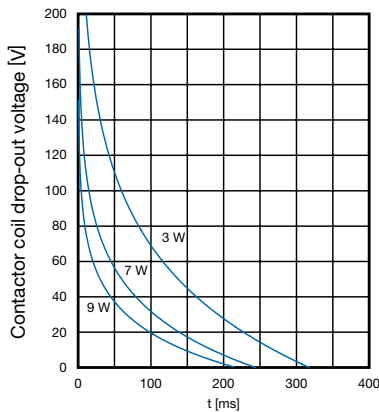
CT-S range Function diagrams

OFF-delay without auxiliary voltage for DC contactor coils CT-VBS

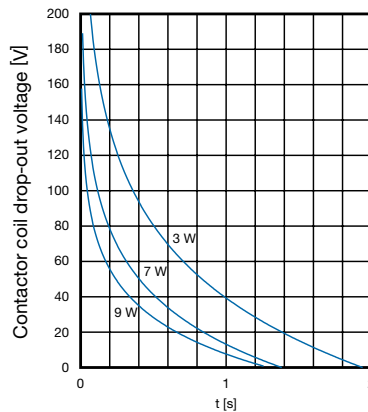
The DC contactor coil connected to the output is energized when control supply voltage is applied.
If control supply voltage is disconnected, the DC contactor coil remains energized for a short time delay. This time delay depends on the coil drop-out voltage and on the wattage of the contactor coil.



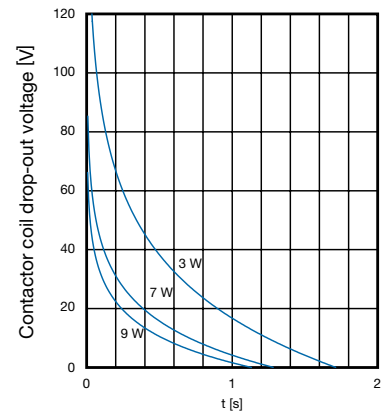
t₁ = OFF-delay (without jumper between terminals 3 and 4 ¹⁾)
t₂ = OFF-delay (with jumper between terminals 3 and 4 ¹⁾)
¹⁾ only for version 200-240 V AC



Time delay guideline values
200-240 V AC version without jumper 3/4



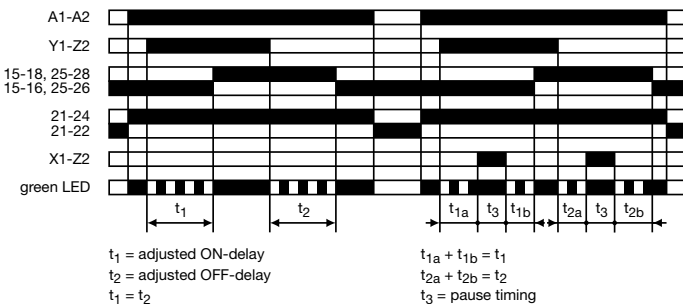
Time delay guideline values
200-240 V AC version with jumper 3/4



Time delay guideline values
110-127 V AC version

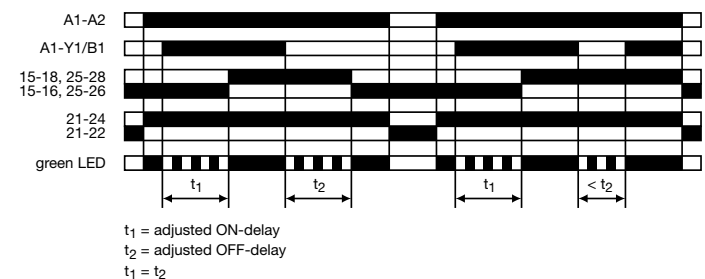
Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.
Closing control input Y1-Z2 starts the ON-delay t₁. When timing is complete, the output relay energizes. Opening control input Y1-Z2 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 Y1-Z2 opens before the ON-delay t₁ is complete, the time delay is reset and the output relay remains de-energized. If control input Y1-Z2 closes before the OFF-delay t₂ is complete, the time delay is reset and the output relay remains energized.
Pause timing / Accumulative, symmetrical ON-delay and OFF-delay (CT-MFS): Timing can be paused by closing control input X1-Z2. The elapsed time t_{1a} or t_{2a} is stored and continues from this time value when X1-Z2 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.



Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MVS

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.

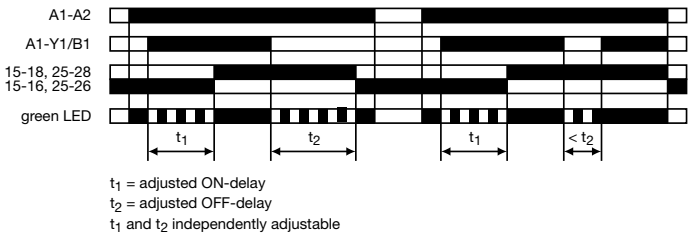


CT-S range Function diagrams

 **Asymmetrical ON-delay and OFF-delay
(Asymmetrical delay on make and delay on break)
CT-MXS**

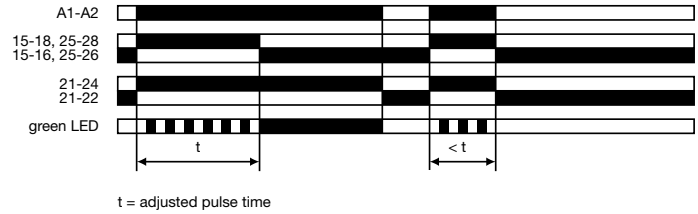
This function requires continuous control supply voltage for timing.
Closing control input **A1-Y1/B1** starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input **A1-Y1/B1** starts the OFF-delay t_2 . When the OFF-delay is complete, the output relay de-energizes. Both timing functions are displayed by the flashing green LED. The ON-delay and OFF-delay are independently adjustable.
If control input **A1-Y1/B1** opens before the ON-delay is complete ($<t_1$), the time delay is reset and the output relay remains de-energized.
If control input **A1-Y1/B1** closes before the OFF-delay is complete ($<t_2$), 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.

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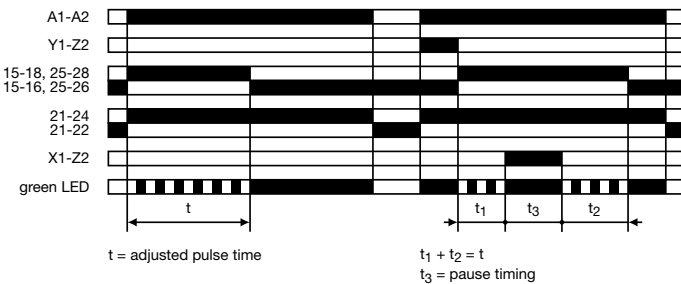
**Impulse-ON
(Interval)
CT-MVS, CT-WBS**

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.



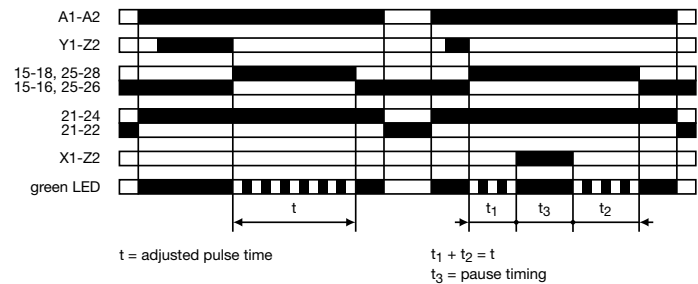
 **Impulse-ON
(Interval)
CT-MFS, CT-MBS**

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. If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** 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 **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.
Pause timing / Accumulative impulse-ON (CT-MFS):
Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** 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.



 **Impulse-OFF with auxiliary voltage
(Trailing edge interval)
CT-MFS, CT-MBS**

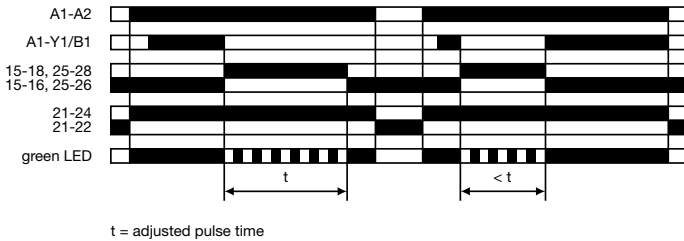
This function requires continuous control supply voltage for timing.
If control supply voltage is applied, opening control input **Y1-Z2** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.
Closing control input **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.
Pause timing / Accumulative impulse-OFF (CT-MFS):
Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** 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.



CT-S range Function diagrams

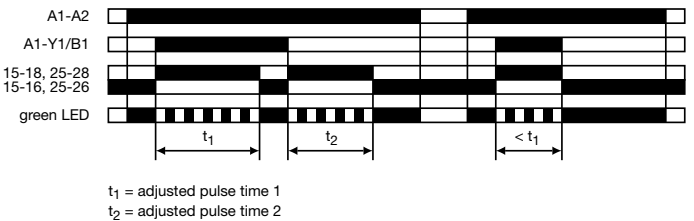
Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MVS

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.



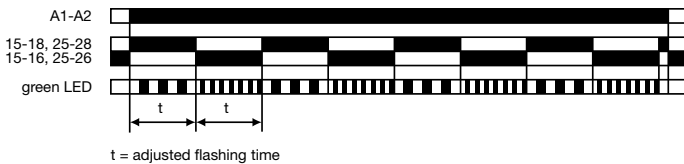
Impulse-ON and impulse-OFF (Interval and trailing edge interval) CT-MXS

This function requires continuous control supply voltage for timing.
If control supply voltage is applied, closing control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_1 . The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady.
Re-opening control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_2 . The green LED flashes during timing. When t_2 is complete, the output relay de-energizes and the flashing green LED turns steady. t_1 and t_2 are independently adjustable.
If control input **A1-Y1/B1** changes state before the pulse time is complete, the output relay de-energizes and the pulse time is reset. If control input **A1-Y1/B1** changes state again, the interrupted pulse time restarts.
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



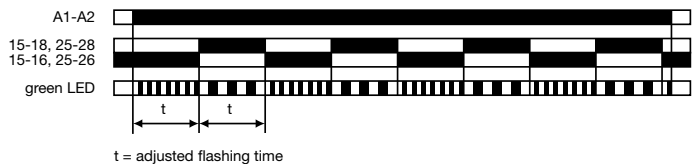
Flasher, starting with the ON time (Recycling equal times, ON first) CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON 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.



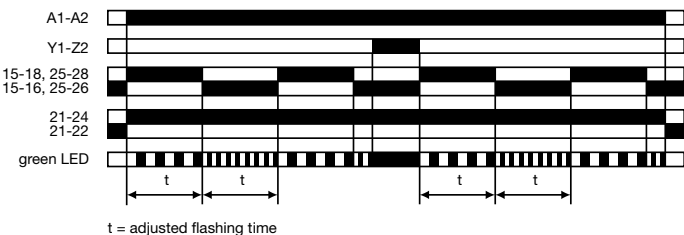
Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts 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.



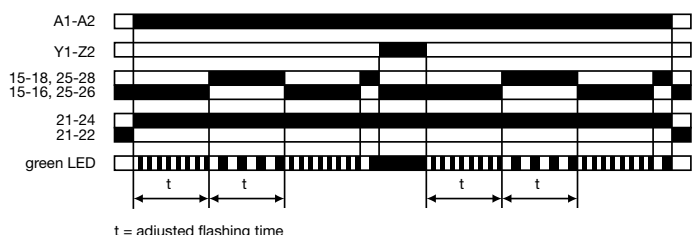
Flasher with reset, starting with the ON time (Recycling equal times with reset, ON first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.
The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Flasher with reset, starting with the OFF time (Recycling equal times with reset, OFF first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts 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.
The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



CT-S range Function diagrams

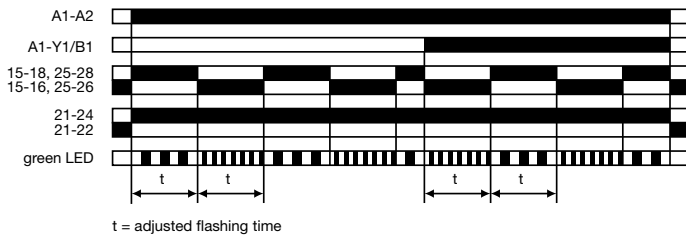
Flasher, starting with the ON or OFF time (Recycling equal times, ON or OFF first) CT-MVS

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.

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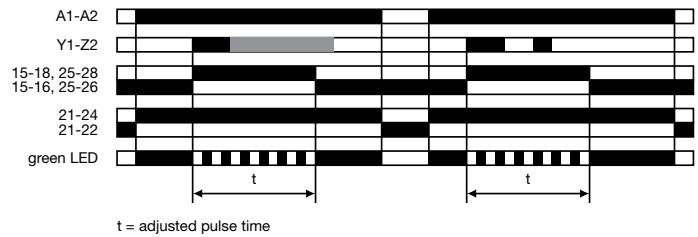


Pulse former (Single shot) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

Closing control input **Y1-Z2** energizes the output relay immediately and starts timing. Operating the control contact switch **Y1-Z2** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **Y1-Z2**.

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

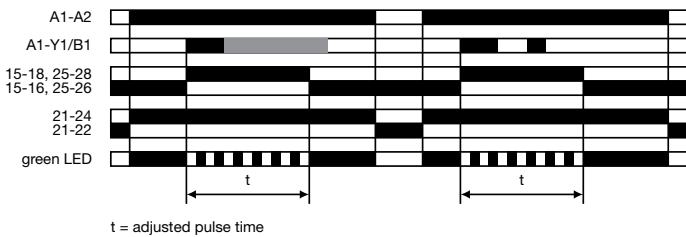


Pulse former (Single shot) CT-MVS

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 de-energizes 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.

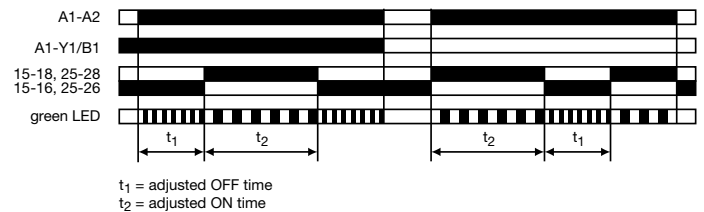


Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-MXS


This function requires continuous control supply voltage for timing.

Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time t_2 first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time t_1 first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. The ON & OFF times are independently adjustable.

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

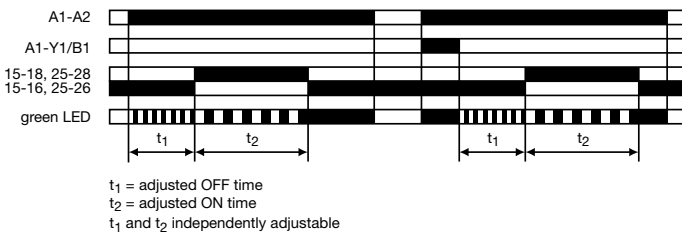



CT-S range Function diagrams

 **Single-pulse generator, starting with the OFF time (Delay on make with interval output) CT-MXS**

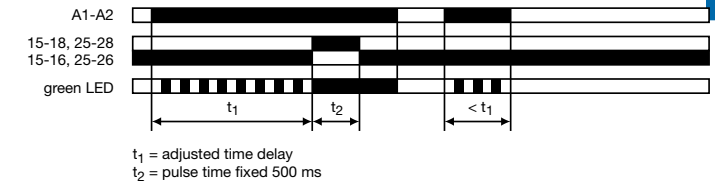
This function requires continuous control supply voltage for timing. Applying control supply voltage, or, if control supply voltage is already applied, opening control input **A1-Y1/B1** energizes the output relay after the OFF time t_1 is complete. When the following ON time t_2 is complete, the output relay de-energizes. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable. Closing control input **A1-Y1/B1**, with control supply voltage applied, de-energizes the output relay and resets the time delay. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



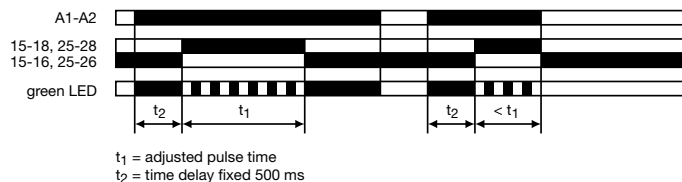
 **Fixed impulse with adjustable time delay (Delayed pulse output) CT-WBS**


This function requires continuous control supply voltage for timing. The time delay t_1 starts when control supply voltage is applied. The green LED flashes during timing. When t_1 is complete, the output relay energizes for the fixed impulse time t_2 of 500 ms and the flashing green LED turns steady. If control supply voltage is interrupted, the time delay is reset. The output relay does not change state.



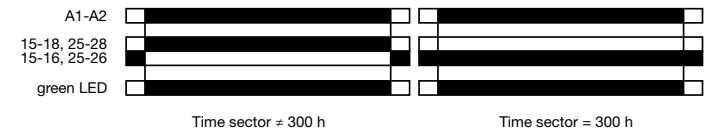
 **Adjustable impulse with fixed time delay (Delayed Interval) CT-WBS**

This function requires continuous control supply voltage for timing. Applying control supply voltage starts the fixed time delay t_2 of 500 ms. When t_2 is complete, the output relay energizes and the selected pulse time t_1 starts. The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady. If control supply voltage is interrupted, the pulse time is reset. The output relay does not change state.



 **ON/OFF-Function CT-MFS, CT-MBS, CT-MVS, CT-MXS, CT-WBS**

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" \neq 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.



 **Switching relays CT-IRS**

The switching relay may be used to increase the number of available contacts or to reinforce contacts, or as a coupling/decoupling interface. Approx. 10 ms after applying control supply voltage to terminals **A1-A2**, the output relay energizes. If control supply voltage is interrupted, the output relay de-energizes.

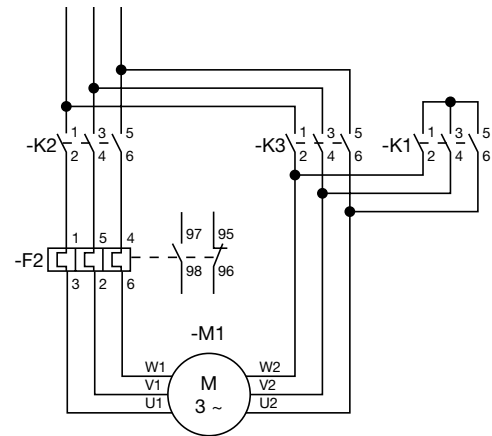
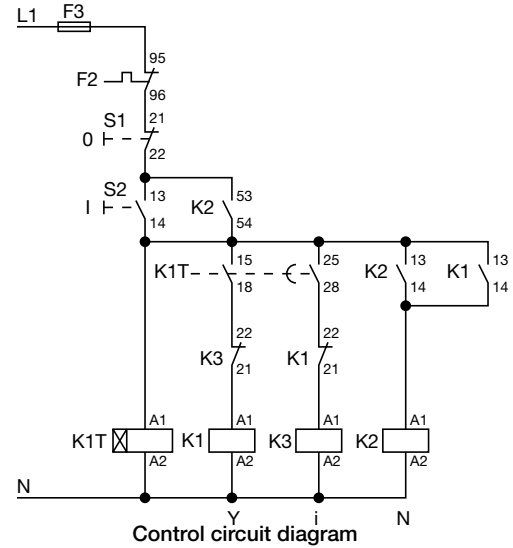
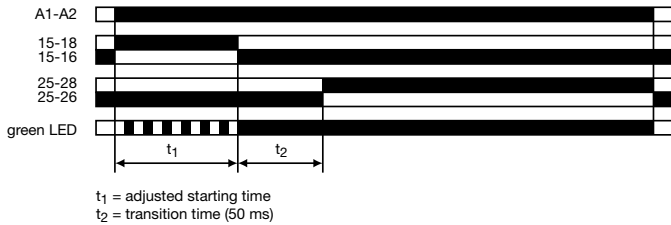


CT-S range Function diagrams

△1□ Star-delta change-over with impulse function (Star-delta starting, interval/delay on make) CT-MFS, CT-MBS, CT-MVS.2x

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 t_1 . The green LED flashes during timing. When the starting time is complete, the first c/o contact de-energizes the star contactor.
Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second c/o 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.

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△ Star-delta change-over (Star-delta starting) CT-SDS

This function requires continuous control supply voltage for timing.
Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t_1 . The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.
Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.

