

T - Timing Relays for EASY500/700

Can be used for	
Device	From version no.:
EASY500	01
EASY700	01

General

The devices provide 16 timing relays T01...T16.

A timing relay can be used to simulate a timer function in which you can change the switching times for the on and off switching of a switching contact.

The configurable delay times can be between 10 ms and 99 h 59 min.

Positive values, such as analog input values or the actual values of counter and timing relays, can be used as a setpoint.

Minimum time setting: 0.01 s (10 ms).

A timing relay can be used in your circuit diagram both as a coil or as a contact (switch contact).

Compatibility with EASY400 and EASY600

The timing relays of an EASY500 or EASY700 operate in the same way as the timing relays of an EASY400 or EASY600.

Exception: The "flash" function starts on EASY500 and EASY700 with the pulse. With EASY400 and EASY600 the "flash" function starts with the pause. If required, the same timing relays can also be used for retentive data.

Function

You can activate a timing relay in your circuit diagram as a coil and use its time-controlled switch contact in a contact field.

Activating the timing relay:

For starting, stopping or resetting a timing relay, add it to your circuit diagram as a coil (in the coil field). In the Coil function area you define which of these three functions are to be triggered by the associated contacts.

Switch function of the timing relay:

In order for the timing relay to operate as a switch, add it in the circuit diagram as a contact (in the contact field). Choose the Properties field window, Circuit Diagram Element tab, Contact area to define the switch function of the contact as a make or break contact.

The timer function, i.e. the way in which a timing relay controls the switching time, depends primarily on the [mode](#) configured.

Linking and Parameter Assignment of a Timing Relay

Requirements: You have included a control relay in the project and have switched to Circuit Diagram View.

Activating a timing relay

- ▶ Position a T timing relay operand in the circuit diagram on a coil field so that you can control a switch time.
- ▶ In the Circuit Diagram Element tab of the Properties field window select the required function block number between 1 and 16 and the Trigger coil function. The operand TTxx will now be shown in the circuit diagram.
- ▶ Select the required mode and the time range.

- ▶ In the Parameters tab set the setpoint for the input I1 and, if necessary, I2 if you have selected a suitable operating mode.
At the end of this section is a description of the selectable [operands](#) - Constant or actual value of another function relay.
- ▶ If required, change the enable of the parameter display and/or write a [comment](#) for the selected operand.
- ▶ Connect the TTxx coil with an appropriate contact for triggering.
The timing relay is incremented as long as the coil is set to 1.
If you are using single pulse mode, the timing relay will start when a rising edge is detected at TTxx.

Evaluation of a timing relay

To use the time-controlled switch contact of the relay, the T timing relay, which is linked as a coil, must be added to the circuit diagram again on a contact field. The contact switches according to the operating mode set and the setpoint.

- ▶ Position the T timing relay on a contact field and select the same function block number in the Circuit Diagram Element tab that you have assigned to its corresponding coil.
- ▶ If required, change the switch function of the contact from break to make contact.
- ▶ Connect this Txx contact in the circuit diagram.

Resetting a timing relay

- ▶ In order to reset the timing relay and the associated switching contact, position the T timing relay that has already been linked as a trigger coil once more on a coil field in your circuit diagram.
- ▶ In the Circuit Diagram Element tab select the function block number between 1 and 16 that has already been used for the activation and the Reset coil function. The operand RTxx will now be shown in the circuit diagram.
- ▶ Connect the RTxx coil with an appropriate contact for triggering.

Circuit diagram elements and parameters

	Description	Note
Function relay inputs (setpoints)		
I1	Time setpoint 1	See the following note
I2	Time setpoint 2 (for operating mode with 2 setpoints, e.g. flashing)	
Function relay output		
T	Integer value depending on the configured time range. 0 to max. 99990 in the Second:millisecond time range This output can be used as a setpoint for the C counter relay, other T timing relays and the A analog value comparator as well as an actual value for the D text display.	
Contact		
Txx	Switching contact	
Coil function		Designation
Trigger	The timing relay is started when a rising edge (Trigger) is detected. This coil must then be set to 1 (Enable) continuously until the required time has elapsed. Only in Single pulse mode is one rising edge enough to trigger the required timing response.	TTxx
Reset	Reset coil function: 1 resets the timing relay and the associated switch contact.	RTxx
Stop	Stop coil The timing relay is stopped. The started time will cease to time out whilst the HTxx Stop coil is set to 1. The stopped time will continue to time out if the signal at	HTxx

	the Stop coil HTxx is reset to 0. If the stop coil HTxx is set to 1 with a rising edge at the trigger coil TTxx, the transfer of the time setpoint will be delayed for as long as the signal at HTxx is 1. The status change on the switch contact is delayed in the same way.	
Mode		
On-delayed	On-delayed switching	
On-delayed + T(rnd)	On-delayed switching <u>with random time range</u>	
Off-delayed	Off-delayed switching	
Off-delayed + T (rnd)	Off-delayed switching <u>with random time range</u>	
On/off delayed	On and off delayed switching there are two time setpoints to be configured	
On/Off-delayed + T (rnd)	On and off delayed switching <u>with random time range</u> there are two time setpoints to be configured	
Single pulse	Single pulse switching	Normalises input signals of different pulse lengths to a fixed pulse length at the switch contact of the timing relay.
Flashing	Flash switching there are two time setpoints to be configured. Synchronous flashing: S1 equals S2 Mark-to-space ratio = 1:1 Asynchronous flashing: S1 not equal S2 Mark-to-space ratio not equal 1:1	Time values: S1= Mark time, S2= Space time;
Time range		
S	Second:Milliseconds Configurable as a constant: 00.00 to 99.99 (s.ms), max. 99990 ms.	Resolution: 10 ms
M : S	Minutes:Seconds Configurable: 00:01 to 99:59 (min:s), max. 5999 sec.	Resolution: 1 sec
H : M	Hours:Minutes Configurable: 00:01 to 99:59 (h:min), max. 5999 min.	Resolution: 1 min
Parameter display		
Call enabled	The parameters can be viewed on the device.	
Simulation		
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Note on the minimum time setting: If a time value is less than the program cycle time, the elapsed time will not be recognised until the next cycle. This may cause unforeseeable switching states.

Operand Selection for the Inputs I1 and I2 (time setpoints)

Operand	Description
Constant	0...99:59 (time range »M : S/H: M) or 0 - 99.99 (time range S)
C	Output of a counter relay (e.g. C3QV) If the counter actual value is greater than the maximum permissible setpoint of the configured time range, the setpoint will be limited to this maximum value. Example: You have configured the time range M : S and the counter actual value is 31333. The device limits the setpoint to 5999 min.
IA	Analog input of the device (I7 = IA1, I8 = IA2, I11 = IA3, I12 = IA4), if available. Note the relationship described below between the permissible analog value and the timing relay setpoint.
T	Output of a timing relay (e.g. T4QV).

Analog value and timing relay setpoint

If you wish to use variable values as a timing relay setpoint, such as an analog input, the following conversion rules apply, depending on the time base configured.

S time base

Equation: Time setpoint = (Variable value*10) in [ms]

Variable value	Time setpoint in [s]
0 (Minimum)	00.000
100	01.000
300	03.000
500	05.000
1023 (Maximum)	10.230

M:S time base

Rule: Time setpoint = Variable value/60

Integer = Number of minutes,

Remainder = Number of seconds

Variable value	Time setpoint in [M:S]
0 (Minimum)	00.000
100	01:040
300	05.000
500	08:020
1023 (Maximum)	17:003

Time base H:M

Rule: Time setpoint = Variable value/60

Integer = Number of hours,

Remainder = Number of minutes,

Variable value	Time setpoint in [H:M]
0 (Minimum)	00.000
100	01:040
300	05.000
606	10:006
1023 (Maximum)	17:003

Note: You can only use analog values as setpoints if the value of the analog input is stable. Fluctuating analog values impair a reproducible timing response.

Retention

Selected timing relays can be run with retentive actual values. If a timing relay is retentive, the actual value is retained when the operating mode is changed from RUN to STOP and when the power supply is switched off. When the control relay is restarted in RUN mode, the timing relay continues with the retentively stored actual value.

In Project View, select in the System tab which of the timing relays T7, T8 and T13 to T16 are to be kept retentive. The

retentive actual value requires 4 bytes of memory.

Tip: Refer to the EASY500/700 manual (AWB 2528-1508x) for more information on the function block (e.g. signal diagram).