



# World of Automation

## Chapter 3: Timing relays

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## 3 Chapter 3: Timing relays

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# ITM16

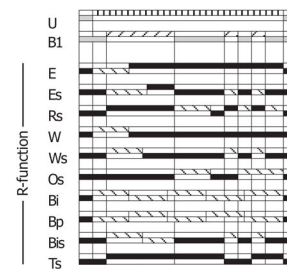
## overview

- ◆ multi-function timing relay
- ◆ all common supply voltages on one unit
- ◆ 9 selectable timing ranges (1sec - 10d)
- ◆ 10 selectable timing functions
- ◆ SPCO configuration
- ◆ LED indicators for power supply, failure, status of the output relay, control contact & timer
- ◆ 22.5mm DIN rail mount housing



### Multifunction

- Supply voltage (U) on
- Supply voltage (U) off
- Starting contact S on B1 closed
- Starting contact S on B1 open
- Output relay contact closed
- Output relay contact open
- Time is running



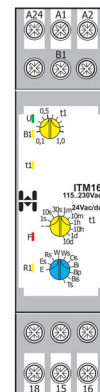
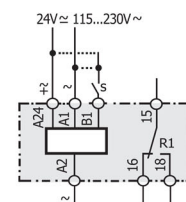
### Functions:

- E...On delay
- Es...On delay with external control input
- Rs...Off delay with external control input
- W...On pulse single shot
- Ws...On pulse single shot with external control input
- Os...Off pulse with external control input
- Bi...Symmetrical recycler pulse first
- Bp...Symmetrical recycler pause first
- Bis...Symmetrical recycler pulse first with external control input
- Ts...Bistable

### Time ranges

1s, 10s, 30s, 1m, 10m, 1h, 10h, 1d, 10d

The required delay time within the range selected is set using the potentiometer on the front.



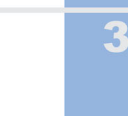
## specification

<b>supply voltage variation</b>	nominal voltage -20%..+10%
<b>frequency range</b>	48 - 63 Hz
<b>duty cycle</b>	100%
<b>repeat accuracy</b>	<1%
<b>output relay specification</b>	max. 6A 230V~
Ue/Ie AC-15	24V/1,5A 115V/1,5A 230V/1,5A
Ue/Ie DC-13	24V/1,5A
<b>expected life time</b>	SPCO
mechanical	10 x 10 <sup>6</sup> operations
electrical	1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20°C bis +60 °C non condensing * EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	c	RI	US	housing types
ITM16	24V~ = / 115..230V~	6VA / 1W	SPCO	-	-	-	L

\* The measurement input is galvanically isolated from the power supply



# ITM216

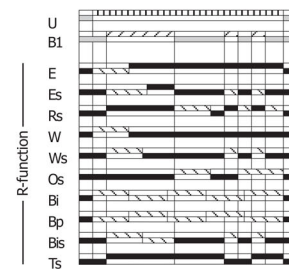
## overview

- ◆ multi-function timing relay
- ◆ all common supply voltages on one unit
- ◆ 9 selectable time ranges (1sec - 10d)
- ◆ 3 selectable parallel functions
- ◆ 10 selectable timing functions
- ◆ 2x SPCO configuration
- ◆ LED indicators for power supply, failure, status of the output relay, control contact & timer
- ◆ 22.5mm DIN rail mount housing



### Multifunction

- Supply voltage (U) on
- Supply voltage (U) off
- Starting contact S on B1 closed
- Starting contact S on B1 open
- Output relay contact closed
- Output relay contact open
- Time is running



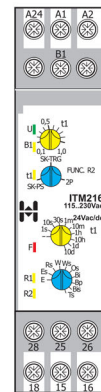
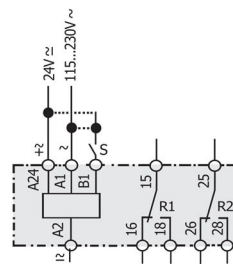
### Functions:

- E...On delay
- Es...On delay with external control input
- Rs...Off delay with external control input
- W...On pulse single shot
- Ws...On pulse single shot with external control input
- Os...Off pulse with external control input
- Bi...Symmetrical recycler pulse first
- Bp...Symmetrical recycler pause first
- Bis...Symmetrical recycler pulse first with external control input
- Ts...Bistable

### Time ranges

1s, 10s, 30s, 1m, 10m, 1h, 10h, 1d, 10d

The required delay time within the range selected is set using the potentiometer on the front.



## specification

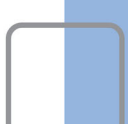
supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	<1%
output relay specification	max. 6A 230V~
Ue/Ie AC-15	24V/1,5A 115V/1,5A 230V/1,5A
Ue/Ie DC-13	24V/1,5A
expected life time	2 SPCO
mechanical	10 x 10 <sup>6</sup> operations
electrical	1 x 10 <sup>5</sup> operations
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20°C bis +60 °C non condensing * EN 60947-5-1 VDE 0435

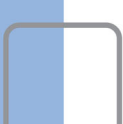
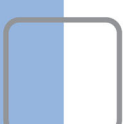
## ordering information

part no	supply	output	relay type	housing types
ITM216	24V~ = / 115..230V~	6VA / 1W	2x SPCO	L

\* The measurement input is galvanically isolated from the power supply

multi-function





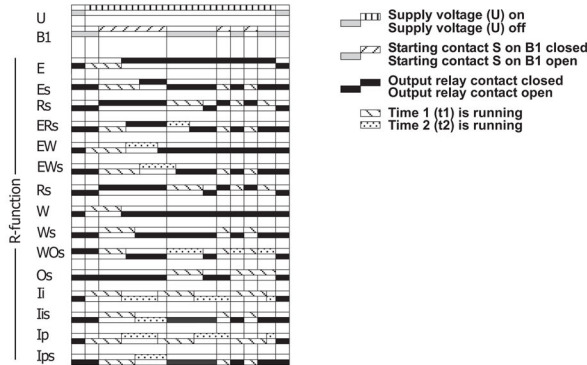
# ITM17

## overview



- ◆ multi-function timing relay
- ◆ all common supply voltages on one unit
- ◆ 2 separate timers
- ◆ 9 selectable time ranges
- ◆ 14 selectable timing functions
- ◆ SPCO configuration
- ◆ LED indicators for power supply, failure, status of the output relay, control contact and timers
- ◆ 22.5mm DIN rail mount housing

### Multifunction



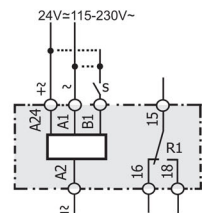
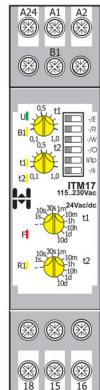
### Functions

- E...On delay
- Es...On delay with external control input
- Rs...Off delay with with external control input
- ERs...On delay and off delay with external control input
- EW...On delay and on pulse / delayed single shot
- EWs...On delay and on pulse / delayed single shot with external control input
- W...On pulse single shot
- Ws...On pulse single shot with external control input
- WOs...On pulse and off pulse with external control input
- Os...Off pulse with external control input
- Ii...Asymmetrical recycler pulse first
- Iis...Asymmetrical recycler pulse first with external control input
- Ip...Asymmetrical recycler pause first
- Ips...Asymmetrical recycler pause first with external control input

### Time ranges

1s, 10s, 30s, 1m, 10m, 1h, 10h, 1d, 10d

The required delay time within the range selected is set using the potentiometer on the front plate.



## specification

supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	< 1%
output relay specification	max. 6A 230V~
	Ue/Ie AC-15 24V/1,5A 115V/1,5A 230V/1,5A
	Ue/Ie DC-13 24V/1,5A
expected life time	SPCO
	mechanical 10 x 10 <sup>6</sup> operations
	electrical 1 x 10 <sup>5</sup> operations
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20°C .. +60 °C non condensing
	* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	housing types
ITM17	24V~= / 115..230V~	6VA / 1W	SPCO	L

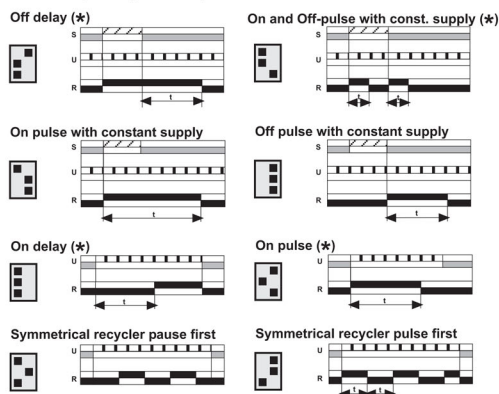
\* The measurement input is galvanically isolated from the power supply

- ◆ single, dual, multi & zoom supply voltage options
- ◆ 8 timing functions selected by DIP switch
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges 0.1sec - 10 Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



### Multifunction

- Starting contact S on B1 closed
- Starting contact S on B1 open
- Supply voltage(U) on
- Supply voltage(U) off
- Output relay contact closed
- Output relay contact open



Remove supply voltage before making any changes to either time range or timing function.

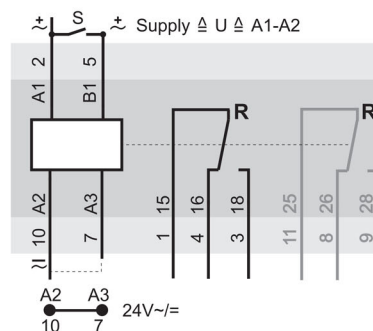
(\*) available T3F functions

A detailed description of each of the timing functions will be found on the following 'single function' type pages.

### Time ranges



The required delay time within the range selected is set using the potentiometer on the front plate.



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%				
	TM16 +10% / -10%				
	TM20, TM21, TM81, TM82 +5% / -10%				
<b>supply selection</b>	TM16/T3F selectable by a switch				
<b>frequency range</b>	48 - 63 Hz				
<b>duty cycle</b>	100%				
<b>repeat accuracy</b>	< 1% of the selected range				
<b>relay type</b>	1	2	3		
<b>output relay spec</b>	230V~	6A	12A	10A	
le AC-15*	120V~	4A	2,5A	5A	
le AC-15*	240V~	3A	2,5A	4A	
le DC-13*	24V=	2A	2,0A	4A	
<b>expected life time</b>	DPCO	SPCO			
mechanical	2 x 10 <sup>6</sup>		resp. 1 x 10 <sup>7</sup> operations		
electrical	1 x 10 <sup>5</sup>		resp. 1 x 10 <sup>5</sup> operations		
<b>screws</b>	pozidrive 1				
<b>screw tightening torque</b>	0,6..0,8Nm				
<b>operating conditions</b>	-20 to +60°C non condensing				
	* EN 60947-5-1 VDE 0435				

## ordering information

part no	supply	output	relay type		housing type
TM01	230V~ / 24V~=	6VA / 1VA	DPCO	yes	B
TM16	115 - 230V~ / 24V~=	6VA / 1VA	SPCO	yes	A
TM20	24 - 240V~=	2VA	SPCO	yes	A
TM21	24 - 240V~=	2VA	DPCO	yes	B
TM41	230V~ / 24V~=	6VA / 1VA	DPCO	no	G
TM42	230V~ / 24V~=	6VA / 1VA	SPCO	no	G
TM71	230V~ w. transformer	1,5VA	DPCO	no	G
TM72	230V~ w. transformer	1,5VA	SPCO	no	G
TM81	24 - 240 V~=	2VA	DPCO	no	G
TM82	24 - 240 V~=	2VA	SPCO	no	G
T3F*	115 - 230V~ / 24V~=	6VA / 1VA	SPCO	yes	A

other voltages on request





# TE/DER

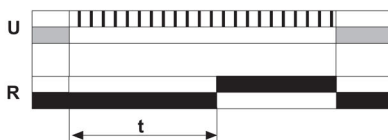
## overview



- ◆ single or dual supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges
- ◆ LED indicators for power supply and contact
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing

### On delay

Supply voltage on  
 Supply voltage off  
 Output relay contact closed  
 Output relay contact open



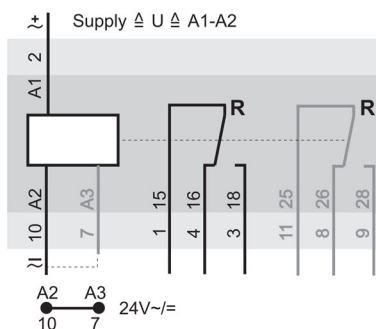
Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage, time delay  $t$  commences. At the end of the time delay the output relay pulls in. When the supply voltage is removed the output relay drops out and the time relay resets ready for the next timing cycle. If the supply voltage is removed during time  $t$ , the output relay will drop out, the unexpired time will be cancelled and the time relay will reset.

### Time ranges



The time ranges are selected using the DIP switch settings illustrated left, and the required delay time is set using the potentiometer on the front plate.



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%		
<b>frequency range</b>	48 - 63 Hz		
<b>max. delay time</b>	100%		
<b>repeat accuracy</b>	< 1% of the selected range		
<b>relay type</b>	1	2	
<b>output relay spec</b>	230V~	6A	10A
le AC-15*	120V~	4A	5A
le AC-15*	240V~	3A	4A
le DC-13*	24V=	2A	4A
<b>expected life time</b>	DPCO	SPCO	
mechanical	2 x 10 <sup>6</sup>	resp. 1 x 10 <sup>7</sup> operations	
electrical	1 x 10 <sup>5</sup>	resp. 1 x 10 <sup>5</sup> operations	
<b>screws</b>	pozidrive 1		
<b>screw tightening torque</b>	0,6..0,8Nm		
<b>operating conditions</b>	-20 to +60°C non condensing		

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type		housing types
<b>TE01</b>	230V~ / 24V~=	6VA / 1W	DPCO	1	yes B
<b>TE04</b>	115V~ / 24V~=	6VA / 1W	DPCO	1	yes B
<b>DER230</b>	230V~ / 24V~=	6VA / 1W	SPCO	2	yes A
<b>DER115</b>	115V~ / 24V~=	6VA / 1W	SPCO	2	yes A
<b>TE12</b>	230V~	6VA	SPCO	2	yes A
<b>TE13</b>	24V~=	1W	SPCO	2	yes A
<b>TE15</b>	115V~	6VA	SPCO	2	yes A
<b>TE41</b>	230V~ / 24V~=	6VA / 1W	DPCO	1	no G
<b>TE42</b>	230V~ / 24V~=	6VA / 1W	SPCO	1	no G
<b>TE71</b>	230V~ w. transf.	2VA	DPCO	1	no G

other voltages on request

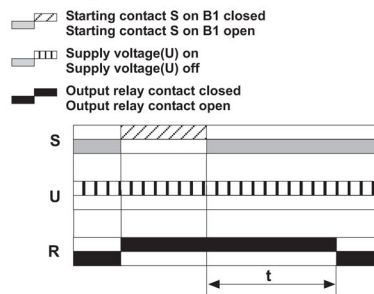
# TR

## overview

- ◆ single or dual supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges 0.1sec - 10Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



### Off delay



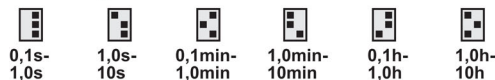
Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage the time relay energises ready for the timing cycle. When the starting contact **S** is closed the output relay pulls in immediately. Time delay **t** starts when the starting contact is opened and the output relay drops out at the end of the time delay. If the supply voltage is removed before, or during time **t**, the output relay will drop out immediately and the time relay will reset ready for the next timing cycle.

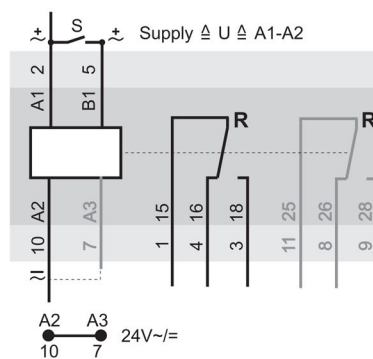
### Important application note:

On types **TR12,13 & 15** only, small inductive devices (relays etc.), can be connected between the **B1** terminal and ground (-ve) such that they energise when the **A1-B1** start contact is made. A snubber circuit should be included for larger devices. **Do not do this on types TR01 & 04.**

### Time ranges



The time ranges are selected using the DIP switch settings illustrated left, and the required delay time is set using the potentiometer on the front plate.



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%	
<b>frequency range</b>	48 - 63 Hz	
<b>max. delay time</b>	100%	
<b>repeat accuracy</b>	< 1% of the selected range	
<b>relay type</b>	1	2
<b>output relay spec</b>	230V~	6A 10A
le AC-15*	120V~	4A 5A
le AC-15*	240V~	3A 4A
le DC-13*	24V=	2A 4A
<b>expected life time</b>	DPCO	SPCO
mechanical	2 x 10 <sup>6</sup>	resp. 1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup>	resp. 1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1	
<b>screw tightening torque</b>	0,6..0,8Nm	
<b>operating conditions</b>	-20 to +60°C non condensing	

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	CS	housing type
<b>TR01</b>	230V~/24V~=	6VA / 1W	DPCO	yes	B
<b>TR04</b>	115V~/24V~=	6VA / 1W	DPCO	yes	B
<b>TR12</b>	230V~	6VA	SPCO	yes	A
<b>TR13</b>	24V~=	1W	SPCO	yes	A
<b>TR15</b>	115V~	6VA	SPCO	yes	A
<b>TR41</b>	230V~/24V~=	6VA / 1W	DPCO	no	G
<b>TR42</b>	230V~/24V~=	6VA / 1W	SPCO	no	G
<b>TR71</b>	230V~ w. transf.	2VA	DPCO	no	G
<b>TR72</b>	230V~ w. transf.	2VA	SPCO	no	G

other voltages on request

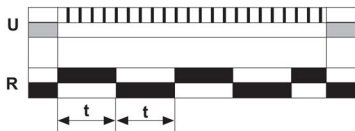






**Symmetrical recycler**

- Supply voltage on
- Supply voltage off
- Output relay contact closed
- Output relay contact open



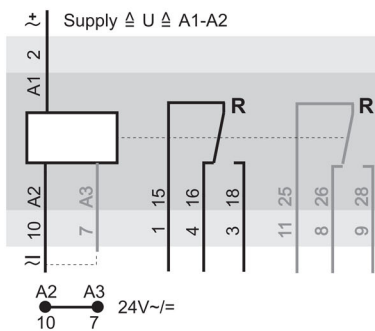
Remove supply voltage before making any changes together time range or timing function.

On the application of the supply voltage the output relay pulls in and timing period *t* starts.  
 At the end of time *t* the output relay drops out and remains dropped out for a period equal to time *t*.  
 An on-off action with a 1:1 time ratio continues until the supply voltage is removed when the time relay will reset ready for the next timing cycle.  
 If the supply voltage is removed during an 'On' period the output relay will drop out immediately, the remaining time will be cancelled and the time relay resets ready for the next timing cycle.

**Time ranges**

- 0,1s-1,0s
- 1,0s-10s
- 0,1min-1,0min
- 1,0min-10min
- 0,1h-1,0h
- 1,0h-10h

The required delay time within the range selected is set using the potentiometer on the front plate



# TB

## overview

- ◆ single or dual supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges 0.1 sec - 10Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing

## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%	
<b>frequency range</b>	48 - 63 Hz	
<b>max. delay time</b>	100%	
<b>repeat accuracy</b>	< 1% of the selected range	
<b>relay type</b>	1	2
<b>output relay spec</b>	230V~	6A 10A
le AC-15*	120V~	4A 5A
le AC-15*	240V~	3A 4A
le DC-13*	24V=	2A 4A
<b>expected life time</b>	DPCO	SPCO
mechanical	2 x 10 <sup>6</sup>	resp. 1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup>	resp. 1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1	
<b>screw tightening torque</b>	0,6..0,8Nm	
<b>operating conditions</b>	-20 to +60°C non condensing	

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type		housing types
<b>TB01</b>	230V~ / 24V~=	6VA / 1W	DPCO	1	yes B
<b>TB04</b>	115V~ / 24V~=	6VA / 1W	DPCO	1	yes B
<b>DBR230</b>	230V~ / 24V~=	6VA / 1W	SPCO	2	yes A
<b>DBR115</b>	115V~ / 24V~=	6VA / 1W	SPCO	2	yes A
<b>TB12</b>	230V~	6VA	SPCO	2	yes A
<b>TB13</b>	24V~=	1W	SPCO	2	yes A
<b>TB15</b>	115V~	6VA	SPCO	2	yes A
<b>TB41</b>	230V~ / 24V~=	6VA / 1W	DPCO	1	no G
<b>TB42</b>	230V~ / 24V~=	6VA / 1W	SPCO	1	no G
<b>TB71</b>	230V~ w. transf.	2VA	DPCO	1	no G

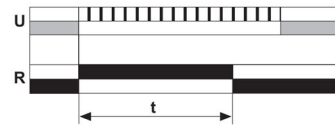
other voltages on request

- ◆ single or dual supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges 0.1sec - 10Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



### On pulse

- ▬ Supply voltage on
- ▬ Supply voltage off
- ▬ Output relay contact closed
- ▬ Output relay contact open

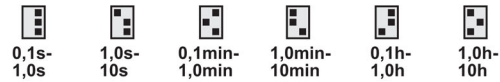


Remove supply voltage before making any changes to either time range or timing function.

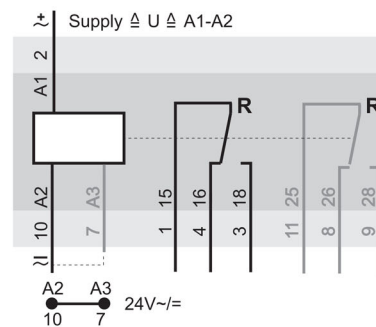
On the application of the supply voltage the output relay pulls in for the duration of time  $t$  and then drops out. The time relay resets ready for the next timing cycle when the supply voltage is removed.

If the supply voltage is removed during time  $t$  the output relay drops out, the remaining time is cancelled and the time relay resets.

### Time ranges



The required delay time within the range selected is set using the potentiometer on the front plate.



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%		
<b>frequency range</b>	48 - 63 Hz		
<b>max. delay time</b>	100%		
<b>repeat accuracy</b>	< 1% of the selected range		
<b>relay type</b>	1	2	
<b>output relay spec</b>	230V~	6A	10A
le AC-15*	120V~	4A	5A
le AC-15*	240V~	3A	4A
le DC-13*	24V=	2A	4A
<b>expected life time</b>	DPCO	SPCO	
mechanical	2 x 10 <sup>6</sup> resp. 1 x 10 <sup>7</sup> operations		
electrical	1 x 10 <sup>5</sup> resp. 1 x 10 <sup>5</sup> operations		
<b>screws</b>	pozidrive 1		
<b>screw tightening torque</b>	0,6..0,8Nm		
<b>operating conditions</b>	-20 to +60°C non condensing		

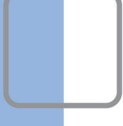
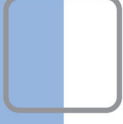
\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	c RL US	housing type
<b>TW01</b>	230V~ / 24V~=	6VA / 1W	DPCO	yes	B
<b>TW04</b>	115V~ / 24V~=	6VA / 1W	DPCO	yes	B
<b>DWR230</b>	230V~ / 24V~=	6VA / 1W	SPCO	yes	A
<b>DWR115</b>	115V~ / 24V~=	6VA / 1W	SPCO	yes	A
<b>TW12</b>	230V~	6VA	SPCO	yes	A
<b>TW13</b>	24V~=	1W	SPCO	yes	A
<b>TW15</b>	115V~	6VA	SPCO	yes	A
<b>TW41</b>	230V~ / 24V~=	6VA / 1W	DPCO	no	G
<b>TW42</b>	230V~ / 24V~=	6VA / 1W	SPCO	no	G
<b>TW71</b>	230V~ w. transf.	2VA	DPCO	no	G

other voltages on request





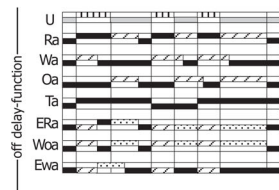
# ITA

## overview

- ◆ zoom supply voltage
- ◆ SPCO or DPCO output relay
- ◆ 6 selectable time ranges (up to 1hrs)
- ◆ LED indicators for power supply, failure, relay status and timer
- ◆ 22.5mm DIN rail mount housing

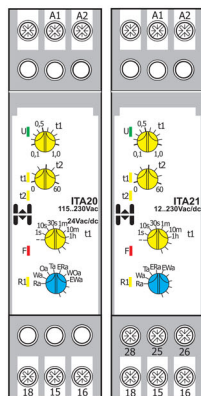
### Multifunction of true off delay

- ▬ Supply voltage (U) on
- ▬ Supply voltage (U) off
- ▬ Starting contact S on B1 closed
- ▬ Starting contact S on B1 open
- ▬ Output relay contact closed
- ▬ Output relay contact open
- ▬ Time 1 (t1) is running
- ▬ Time 2 (t2) is running



### Functions:

- Ra...Off delay without auxiliary voltage
- Wa...On pulse single shot without auxiliary voltage
- Oa...Off pulse without auxiliary voltage
- Ta...Bistable without auxiliary voltage
- ERa...On- and off delay without auxiliary voltage
- WOa...On pulse single shot and off pulse without auxiliary voltage
- Ewa...On delay and on pulse single shot without auxiliary voltage



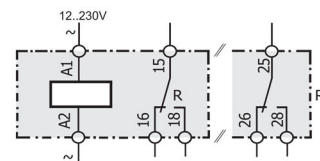
### Time range t1

1s, 10s, 30s, 1m, 10m, 1h

The required delay time within the range selected is set using the potentiometer on the front plate.

### Time range t2

fixed 60s



## specification

supply voltage variation	nominal voltage +10% / -15%
frequency range	43-63 Hz
duty cycle	100%
repeat accuracy	< 1% of the selected range
output relay specification	230V~ 10A
	le AC-15* 120V~ 2,5A
	le AC-15* 240V~ 2,5A
	le DC-13* 24V= 2,5A
expected life time	mechanical 5 x 10 <sup>6</sup> operations
	electrical 1 x 10 <sup>4</sup> operations
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20 to +60 °C non condensing
	* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	housing types
ITA20	12..230V~ =	0,2W SPCO	L
ITA21	12..230V~ =	0,2W DPCO	L

# TA

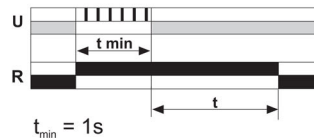
## overview

- ◆ single or dual supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 4 selectable time ranges 1s - 3m
- ◆ LED indicators for supply voltage and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



### True off delay

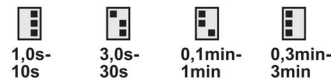
Supply voltage on  
 Supply voltage off  
 Output relay contact closed  
 Output relay contact open



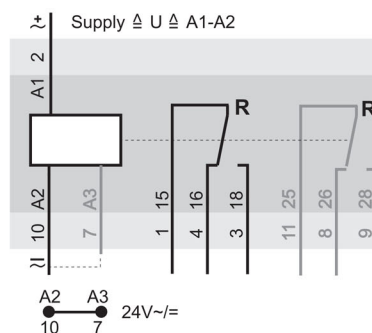
Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage the output relay pulls in. When the supply voltage is removed the output relay remains pulled in and time delay  $t$  commences. At the end of the time delay the output relay drops out and the time relay resets ready for the next timing cycle. If the supply voltage is reapplied during time  $t$ , time  $t$  will not time out and the output relay will remain pulled in until the supply voltage is removed for a time longer than  $t$ .

### Time ranges



The required delay time within the range selected is set using the potentiometer on the front plate



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%		
<b>frequency range</b>	48 - 63 Hz		
<b>duty cycle</b>	100%		
<b>repeat accuracy</b>	< 1% of the selected range		
<b>relay type</b>	4	5	
<b>output relay spec.</b>	230V~	8A	5A
le AC-15*	120V~	5A	4A
le AC-15*	240V~	5A	3A
le DC-13*	24V=	4A	3A
<b>expected life time</b>	DPCO	SPCO	
mechanical	2 x 10 <sup>6</sup> resp. 1 x 10 <sup>7</sup> operations		
electrical	1 x 10 <sup>5</sup> resp. 1 x 10 <sup>5</sup> operations		
<b>screws</b>	pozidrive 1		
<b>screw tightening torque</b>	0,6..0,8Nm		
<b>operating conditions</b>	-20 to +60°C non condensing		
	* EN 60947-5-1 VDE 0435		

## ordering information

part no	supply	output	relay type	CS	housing types
TA01	230V~/ 24V~=	6VA / 1W	DPCO	yes	B
TA02	230V~	6VA	SPCO	yes	A
TA03	24V~=	1W	SPCO	yes	A
TA04	115V~/ 24V~=	6VA / 1W	DPCO	yes	B
TA05	115V~	6VA	SPCO	yes	A
TA41	230V~/ 24V~=	6VA / 1W	DPCO	yes	G
TA42	230V~/ 24V~=	6VA / 1W	SPCO	yes	G
TA71	230V~ w. transf.	2VA	DPCO	yes	G
TA72	230V~ w. transf.	2VA	SPCO	yes	G

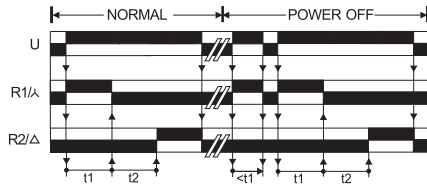
other voltages on request

true off delay (without supply voltage)





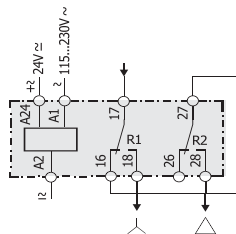
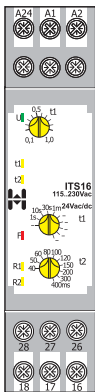
Star-Delta-Timer



**Time ranges**

1s, 10s, 30s, 1m, 10m, 1h, 10h, 1d, 10d and 40, 50, 60, 80, 100, 120, 150, 200, 300, 400ms

The required delay time within the range selected is set using the potentiometer on the front plate.



# ITS16

## overview

- ◆ **Star-Delta-Start**
- ◆ **All common supply voltages on one unit**
- ◆ **4 selectable time ranges**
- ◆ **10 selectable dwell times**
- ◆ **2 x SPCO configuration**
- ◆ **LED indicators for power supply, failure, status of the output relay and timers**
- ◆ **22.5mm DIN rail mount housing**

## specification

<b>supply voltage variation</b>	nominal voltage -20%..+10%
<b>frequency range</b>	48 - 63 Hz
<b>duty cycle</b>	100%
<b>repeat accuracy</b>	<1%
<b>output relay specification</b>	max. 6A 230V~
Ue/Ie AC-15	24V/1,5A 115V/1,5A 230V/1,5A
Ue/Ie DC-13	24V/1,5A
<b>expected life time</b>	2 x SPCO
mechanical	10 x 10 <sup>6</sup> operations
electrical	1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to +60 °C non condensing

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	housing types
ITS16	24V~ = / 115..230V~	6VA / 1W	2x SPCO	L

# TS

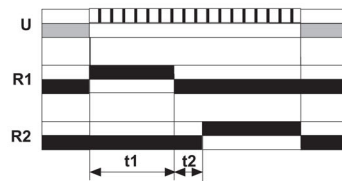
## overview

- ◆ single or dual supply voltage options
- ◆ 2 x SPNO output relay
- ◆ 2 star period time ranges
- ◆ 4 dwell times selected by dip switch
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



### Star-delta start timer

- ▬ Supply voltage on
- ▬ Supply voltage off
- ▬ Output relay contact closed
- ▬ Output relay contact open

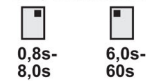


Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage the star relay pulls in immediately for the duration of the star time set. When the star time expires the star relay drops out and the dwell time begins. At the end of the dwell time the delta relay pulls in. When the supply voltage is removed the delta relay drops out and the time relay resets ready for the next timing cycle.

### Time ranges

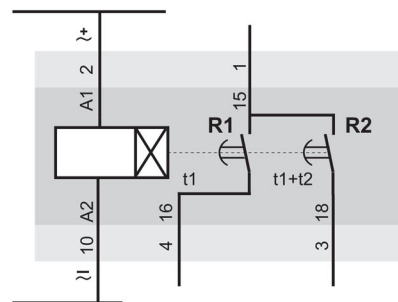
star time (=t1) required delay time is set using the potentiometer on the front plate



dwell time (=t2)



Supply  $\Delta$  U  $\Delta$  A1-A2



## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%
<b>frequency range</b>	48 - 63 Hz
<b>max. delay time</b>	100% of the selected range
<b>repeat accuracy</b>	< 1% of the selected range
<b>output relay specification</b>	max. 10A 230V~
Ue/Ie AC-15*	120V/5A 240V/4A
Ue/Ie DC-13*	24V/4A
<b>expected life time</b>	SPNO
mechanical	1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>8</sup> operations
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to +60°C non condensing

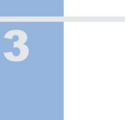
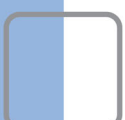
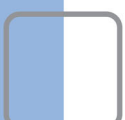
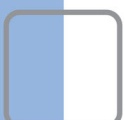
\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	HIQUEL <sup>®</sup> US	housing type
TS02	230V~	6VA	2 SPNO	yes	A
TS03	24V~=	1W	2 SPNO	yes	A
TS05	115V~	6VA	2 SPNO	yes	A
TS06	415V~	6VA	2 SPNO	yes	A
TS42	230V~ / 24V~=	6VA / 1W	2 SPNO	no	G
TS44	115V~ / 24V~=	6VA / 1W	2 SPNO	no	G
TS72	230V~ w. transf.	2VA	2 SPNO	no	G
TS74	115V~ w. transf.	2VA	2 SPNO	no	G

other voltages on request





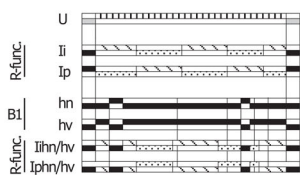
# ITI16

## overview



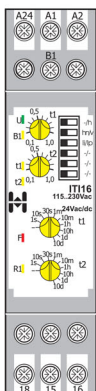
### Asymmetrical recycler

- Supply voltage (U) on
- Supply voltage (U) off
- Starting contact S on B1 closed
- Starting contact S on B1 open
- Time 1 (t1) is running
- Time 2 (t2) is running



### Functions:

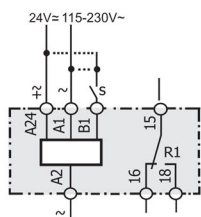
- Ii...Asymmetrical recycler pulse first
- Ip...Asymmetrical recycler pause first
- Iihn...Asymmetrical recycler pulse first with normal inhibit
- Iphn...Asymmetrical recycler pause first with normal inhibit
- Iihv...Asymmetrical recycler pulse first with inverse inhibit
- Iphv...Asymmetrical recycler pause first with inverse inhibit



### Time ranges

1s, 10s, 30s, 1m, 10m, 1h, 10h, 1d, 10d

The required delay time within the range selected is set using the potentiometer on the front plate.



- ◆ asymmetrical recycler
- ◆ all common supply voltages on one unit
- ◆ 6 different asymmetrical functions
- ◆ 2 separate timers
- ◆ 9 selectable time ranges
- ◆ 'pulse first' or 'pause first' selectable function
- ◆ real pause function
- ◆ SPCO configuration
- ◆ LED indicators for power supply, failure, status of output relay, control contact & timer
- ◆ 22.5mm DIN rail mount housing

## specification

supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	<1%
output relay specification	max. 6A 230V~
Ue/Ie AC-15	24V/1,5A 115V/1,5A 230V/1,5A
Ue/Ie DC-13	24V/1,5A
expected life time	SPCO
mechanical	10 x 10 <sup>6</sup> operations
electrical	1 x 10 <sup>5</sup> operations
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20°C to +60 °C non condensing * EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	UL US	housing types
ITI16	24V~ = / 115..230V~	6VA / 1W	SPCO	-	L

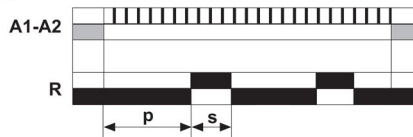
- ◆ “pulse first” or “pause first” adjustable
- ◆ single, dual or zoom supply voltage options
- ◆ SPCO or DPCO output relay
- ◆ 2 x 6 selectable time ranges 0.1sec - 30Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



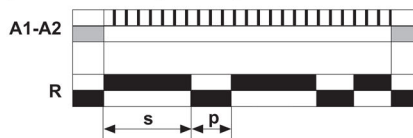
### Asymmetrical recycler

- ▬ Supply voltage on
- ▬ Supply voltage off
- ▬ Output relay contact closed
- ▬ Output relay contact open

### asymmetrical recycler pause first



### asymmetrical recycler signal first



## specification

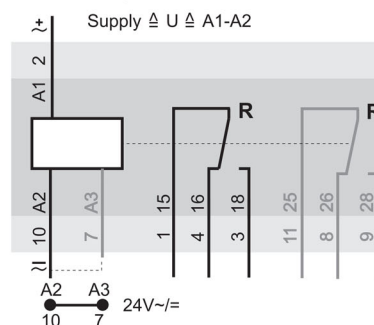
<b>supply voltage variation</b>	nominal voltage +10% / -15%				
<b>frequency range</b>	48 - 63 Hz				
<b>max. delay time</b>	100%				
<b>repeat accuracy</b>	< 1% of the selected range				
<b>relay type</b>	1	2	3	4	
<b>output relay spec. R<sub>TH</sub></b>	10A	10A	8A	6A	
le AC-15*	115Vac	2,5A	1,5A	1,5A	3,5A
le AC-15*	230Vac	2,5A	1,5A	1,5A	3A
le DC-13*	24Vdc	2,5A	1,5A	1,5A	2,5A
<b>expected life time</b>	SPCO	SPCO	DPCO	DPCO	
mechanical	1 x 10 <sup>7</sup>	1 x 10 <sup>7</sup>	1 x 10 <sup>7</sup>	5 x 10 <sup>6</sup>	
electrical	15 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>	8 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>	
<b>screws</b>	pozidrive 1				
<b>screw tightening torque</b>	0,6...0,8Nm				
<b>operating conditions</b>	-20 to +60°C non condensing				

\* EN 60947-5-1 VDE 0435

### Time ranges



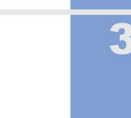
The required delay time within the range selected is set using the potentiometer on the front plate



## ordering information

part no	supply	output	relay type	c	RL US	housing types
<b>TI01</b>	230V~/24V~	6VA / 1W	DPCO	3	No	B
<b>TI04</b>	115V~/24V~	6VA / 1W	DPCO	3	No	B
<b>TI06</b>	400V~	6VA	SPCO	1	No	A
<b>TI08</b>	12V~	6VA / 1W	SPCO	2	No	A
<b>TI09</b>	12V~	6VA / 1W	DPCO	3	No	B
<b>TI16</b>	115V..230V~/24V~	6VA / 1W	SPCO	2	No	A
<b>TI41</b>	230V~/24V~	6VA / 1W	DPCO	4	No	G
<b>TI42</b>	230V~/24V~	6VA / 1W	SPCO	4	No	G
<b>TI71</b>	230V~ w. Trafo	2VA	DPCO	4	No	G
<b>TI72</b>	230V~ w. Trafo	2VA	SPCO	4	No	G

other voltages on request





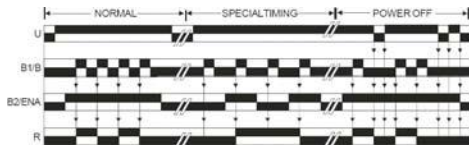


# ITT16

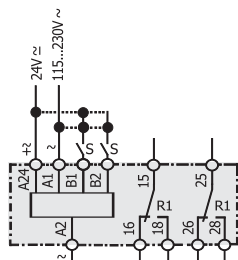
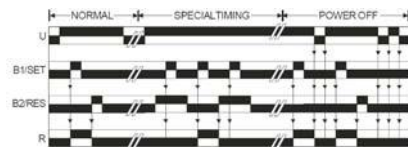
## overview

- ◆ zoom supply voltage
- ◆ 3 toggle functions
- ◆ 4 flip-flop functions
- ◆ 3 timerelay functions
- ◆ DPCO output relay
- ◆ LED Indicators for power supply, failure, output relay, control contacts and timer
- ◆ 22.5mm DIN rail mount housing

Tse – Toggle with starting contact and enable



Fsc - Flip-Flop with starting contact and prior reset



## specification

<b>supply voltage variation</b>	nominal voltage -20%..+10%
<b>frequency range</b>	48 - 63 Hz
<b>duty cycle</b>	100%
<b>repeat accuracy</b>	< 1%
<b>output relay specification</b>	max. 6A 230V~ 24V/1,5A 115V/1,5A 230V/1,5A 24V/1,5A
<b>expected life time</b>	DPCO mechanical 10 x 10 <sup>6</sup> operations electrical 1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6...0,8Nm
<b>operating conditions</b>	-20 to +60 °C non condensing

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	sup.galv.iso*	UL	housing types
ITT16	24V~ / 115...230V~	6VA / 1W DPCO	yes	-	L

\* The measurement input is galvanically isolated from the power supply

# DES/PES/TES

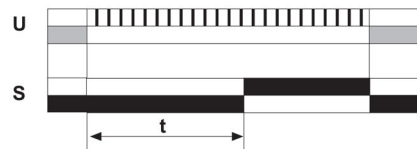
## overview

- ◆ supply voltage 12-240V $\sim$  or 200-440V $\sim$
- ◆ thyristor output 700mA max.
- ◆ 6 selectable time ranges (DES/PES) 0.1sec - 10Hrs
- ◆ 11.25mm or 22.5mm rail mount housing or 11pin plug in housing



### On delay with thyristor output

Supply voltage on  
 Supply voltage off  
 Thyristor open  
 Thyristor closed



Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage, time delay  $t$  commences. At the end of the time delay the thyristor switches the full supply voltage through to the load connected to the A2 terminal (max. load 700mA continuous, 20A <10mS). If the supply voltage is removed during time  $t$ , the unexpired time will be cancelled and the timer will reset.

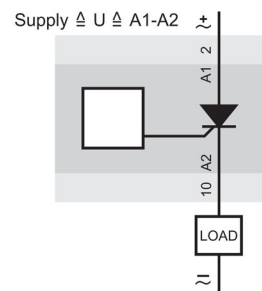
#### Note:

A small leakage current (2 - 2.5mA) passes through the thyristor during the timing period. Care should be taken to ensure that very sensitive devices connected to the A2 terminal are not affected.

### Time ranges (DES/PES)

0,1s-1,0s   
 1,0s-10s   
 0,1min-1,0min   
 1,0min-10min   
 0,1h-1,0h   
 1,0h-10h

The required delay time within the range selected is set using the potentiometer on the front plate.



## specification

supply voltage variation	nominal voltage +10% / -15%
frequency range	50 - 60 Hz
duty cycle	100%
repeat accuracy	$\leq 100\%$ of the selected range
thyristor output	$I_{max} = 700mA$ $I_{min} = 5mA$ $I_{peak} = 20A (<10ms)$ $I_{leakage} = 2,5mA \sim 2mA =$
drop out voltage	5V
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20 to +60 °C non condensing
	* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	consumption	output	time ranges	housing type
DES	12-240V $\sim$	2,5mA	thyristor	6/0,1s...10h	A
PES	12-240V $\sim$	2,5mA	thyristor	6/0,1s...10h	G
TES	200-440V $\sim$	1mA	thyristor	1/1...10s	O

on delay with thyristor output





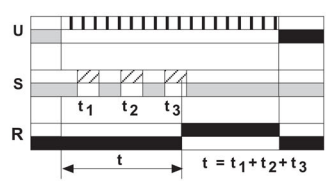
# DER-M

## overview

- ◆ supply voltage 24-240V~
- ◆ SPCO output relay
- ◆ 7 selectable time ranges 0.1sec - 30Hrs
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing

### On delay with constant supply, contact start, contact interruptible

- Starting contact S at B1 closed  
Starting contact S at B1 open
- Supply voltage(U) on  
Supply voltage(U) off
- Output relay contact closed  
Output relay contact open



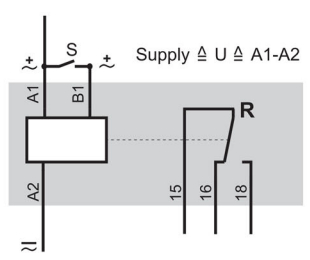
Remove supply voltage before making any changes to either time range or timing function.

On the application of the supply voltage the time relay energises ready for the timing cycle.  
When the starting contact **S** is closed the time delay starts.  
At the end of the time delay the output relay pulls in.  
If the start contact is opened during time **t** the time delay pauses and recommences when the start contact is closed.  
When the supply voltage is removed the output relay drops out and the time relay resets ready for the next timing cycle.  
If the supply voltage is removed during time **t**, the output relay will drop out, the unexpired time will be cancelled and the time relay will reset.  
This time relay can be energised with the start contact closed in which case the on-delay time period will start immediately in the same way.

#### Time ranges

- 0,1s-1,0s
- 1,0s-10s
- 0,1min-1,0min
- 1,0min-10min
- 0,1h-1,0h
- 1,0h-10h
- 3,0h-30h

The required delay time within the range selected is set using the potentiometer on the front plate.



## specification

<b>supply voltage variation</b>	nominal voltage +5% / -10%
<b>frequency range</b>	0-150 Hz
<b>max. delay time</b>	100% of the selected time range
<b>repeat accuracy</b>	< 1% of the selected range
<b>output relay specification</b>	max. 10A 230V~
Ue/Ie AC-15	120V/5A 240V/4A
Ue/Ie DC-13	24V/4A
<b>expected life time</b>	SPCO
mechanical	1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to +60°C non condensing
	* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type		housing types
DER-M	24 - 240V~	2VA	SPCO	-	A

# PRER2/TOE/TOR

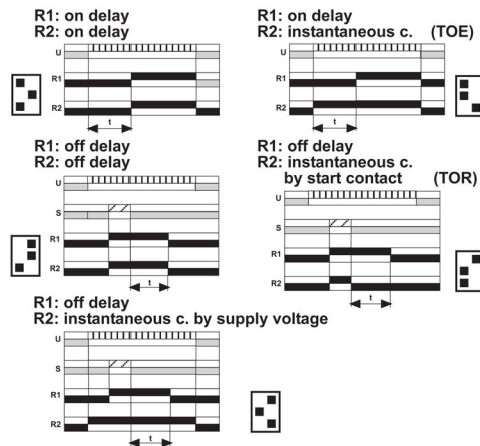
## overview

- ◆ dual voltage supply
- ◆ 2 x SPCO output relay
- ◆ 6 selectable time ranges 0.1sec - 10Hrs
- ◆ PRER2: 5 timing functions selected by dip switch
- TOE: on delay - instantaneous contact
- TOR: off delay - instantaneous contact
- ◆ LED indicators for power supply and relay status
- ◆ 22.5mm DIN rail mount housing or 11pin plug in housing



on / off delay - instantaneous contact (PRER2)

- Starting contact S on Pin 5 closed
- Starting contact S on Pin 5 open
- Supply voltage (U) on
- Supply voltage (U) off
- Output relay contact closed
- Output relay contact open

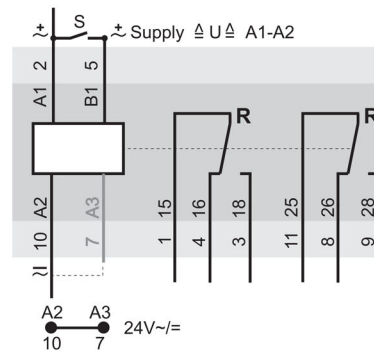


Remove supply voltage before making any changes to either time range or timing function.

Time ranges (PRER2, TOE, TOR)



The required delay time within the range selected is set using the potentiometer on the front plate



## specification

supply voltage variation	nominal voltage +10% / -15%		
frequency range	48 - 63 Hz		
max. delay time	100% of the selected range		
repeat accuracy	< 1% of the selected range		
relaytype	1	2	
output relay specification			
le AC-15*	250V~	6A	1A
le DC-13*	30V=	4A	1,5A
expected life time			
mechanical	1 x 10 <sup>7</sup>	resp.	1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup>	resp.	1 x 10 <sup>5</sup> operations
screws	pozidrive 1		
screw tightening torque	0,6..0,8Nm		
operating conditions	-20 to +60°C non condensing		

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	c  us	housing type
PRER2 230V/24V	230V~/24V~	6VA/1W	2 SPCO	1	G
PRER2 115V/24V	115V~/24V~	6VA/1W	2 SPCO	1	G
TOE 230V/24V	230V~/24V~	6VA/1W	2 SPCO	2	B
TOE 115V/24V	115V~/24V~	6VA/1W	2 SPCO	2	B
TOR 230V/24V	230V~/24V~	6VA/1W	2 SPCO	2	B
TOR 115V/24V	115V~/24V~	6VA/1W	2 SPCO	2	B

time relays with times & instantaneous contact





# World of Automation

## Chapter 4: Signal converting relays

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## 4 Chapter 4: signal converting relays

- .01 K4S/K2W**
- .02 DMVR**
- .03 K1S/K1W**
- .04 SW1/SW2/SW3**
- .05 ANU/ANI**
- .06 LSM**
- .07 MU-PT100/MU-PT1000**
- .08 MU-TC**
- .09 MU-UI**
- .10 MU-DMS**
- .11 K1T/K2T**
- .12 TV../TD..**

# K4S/K2W

## overview

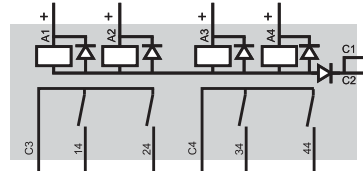
- ◆ PLC transistor output to power switching converter
- ◆ relay output max. 6A
- ◆ coil voltage 24V= or 12V=
- ◆ common positive or negative
- ◆ LED indicators for output relays
- ◆ 22.5mm DIN rail mount housing



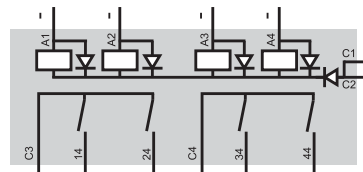
## specification

<b>coil voltage</b>	nominal voltage +10% / -15%	
<b>duty cycle</b>	100%	
<b>output relay specification</b>	max. 6A 230V~	
<b>relay type</b>	1	
le AC-15*	120V~	5A
le AC-15*	240V~	4A
le DC-13*	24V=	4A
<b>expected life time</b>	DPCO	SPCO
mechanical	2 x 10 <sup>6</sup>	resp. 1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup>	resp. 1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1	
<b>screw tightening torque</b>	0,6..0,8Nm	
<b>operating conditions</b>	-20 to +60°C non condensing	
	* EN 60947-5-1 VDE 0435	

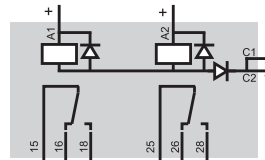
K4S-24P, K4S-12P



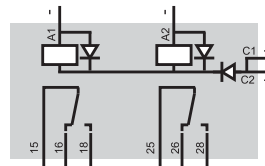
K4S-24N, K4S-12N



K2W-24P, K2W-12P

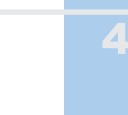


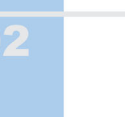
K2W-24N, K2W-12N



## ordering information

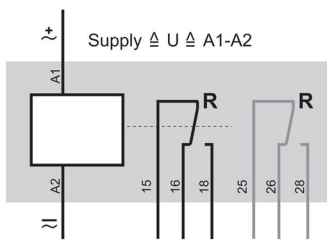
part no	supply	output	relay type	CE	housing type
K4S-24P	24V= 360mW	4 x SPNO	1	-	B
K4S-24N	24V= 360mW	4 x SPNO	1	-	B
K4S-12P	12V= 360mW	4 x SPNO	1	-	B
K4S-12N	12V= 360mW	4 x SPNO	1	-	B
K2W-24P	24V= 360mW	2 x SPCO	1	-	B
K2W-24N	24V= 360mW	2 x SPCO	1	-	B
K2W-12P	12V= 360mW	2 x SPCO	1	-	B
K2W-12N	12V= 360mW	2 x SPCO	1	-	B





PLC interface relay 24-240Vac/dc

Supply voltage on  
 Supply voltage off  
 Output relay contact closed  
 Output relay contact open



# DMVR

## overview

- ◆ multi-voltage relay
- ◆ SPCO or DPCO output max. 6A
- ◆ coil voltage 24-240V~=  
◆ LED indicators for supply voltage and output relay
- ◆ 22.5mm DIN rail mount housing

## specification

<b>coil voltage</b>	nominal voltage +10% / -15%		
<b>duty cycle</b>	100%		
<b>relay type</b>	1	3	
<b>output relay spec</b>	230V~	6A	10A
le AC-15*	120V~	4A	5A
le AC-15*	240V~	3A	4A
le DC-13*	24V=	2A	4A
<b>expected life time</b>	DPCO	SPCO	
mechanical	2 x 10 <sup>6</sup>	resp.	1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup>	resp.	1 x 10 <sup>5</sup> operations
<b>screws</b>	pozidrive 1		
<b>screw tightening torque</b>	0,6..0,8Nm		
<b>operating conditions</b>	-20 to +60°C non condensing		

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	US	housing types
<b>DMVR</b>	24 - 240V~= 2VA	SPCO	3	-	A
<b>DMVR2</b>	24 - 240V~= 2VA	DPCO	1	-	B

other voltages on request



# K1S/K1W

## overview

- ◆ PLC transistor output to power switching converter
- ◆ relay output max. 10A SP relay  
1.25A DP relay
- ◆ coil voltage 230V~ or 24V~
- ◆ common positive or negative
- ◆ LED indicator for relay status
- ◆ 11.25mm DIN rail mount housing



## specification

<b>coil voltage</b>	nominal voltage +10% / -15%		
<b>duty cycle</b>	100%		
<b>nominal current</b>	15mA		
<b>suppressor circuit</b>	freewheeling diode and varistor		
<b>relay type</b>	1	2	
<b>output relay spec.</b>	230V~	10A	2A
le AC-15*	120V~	1,5A	-
le AC-15*	240V~	1,5A	-
le DC-13*	24V=	1,5A	-
on delay	<8ms	<12ms	
off delay	<25ms	<25ms	
contact material	AgCdO	AgNi+Au (5µm)	
switching voltage	250V~	250V~	
input current	15A	2A	
continuous current	10A	1,25A	
min. switching capacity	>5mA	>1mA	
max. switching frequency	600/h	360/h	
mechanical	2 x 10 <sup>6</sup>	resp. 1 x 10 <sup>7</sup> operations	
electrical	1 x 10 <sup>5</sup>	resp. 1 x 10 <sup>5</sup> operations	
<b>screw tightening torque</b>	0,5Nm		
<b>operating conditions</b>	-20 to +60°C non condensing		

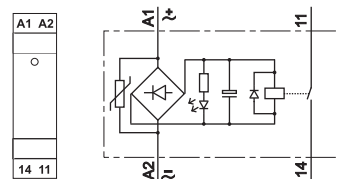
\* EN 60947-5-1 VDE 0435

## ordering information

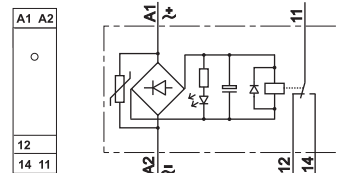
part no	supply	output	relay type	cFLi	housing type
<b>K1S 24Vac/dc</b>	24V~ 355mW	1 x SPNO	1	-	○
<b>K1S 230Vac/dc</b>	230V~ < 1,2W	1 x SPNO	1	-	○
<b>K1W 24Vac/dc</b>	24V~ 355mW	SPCO	1	-	○
<b>K1W 230Vac/dc</b>	230V~ < 1,2W	SPCO	1	-	○
<b>K2W 24Vac/dc</b>	24V~ 355mW	DPCO	2	-	○
<b>K1W-S</b>	24V~ 355mW	SPCO	1	-	○
<b>K1W-S-R</b>	24V~ 355mW	SPCO	1	-	○

other voltages on request

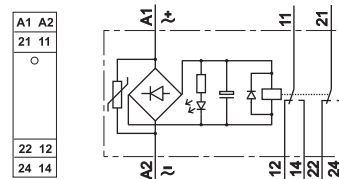
K1S



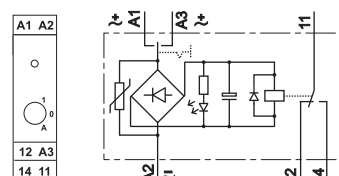
K1W



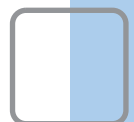
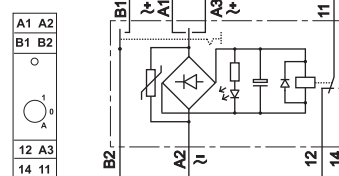
K2W



K1W-S



K1W-S-R



PLC interface relay in 11.25mm housing

# SW1/SW2/SW3

## overview



- ◆ coil voltage 24V~=
- ◆ SPCO output max. 10A
- ◆ trigger input with 1/0/Auto switch
 

<b>SW1</b>	<b>3,0V ON</b>	<b>2,5V OFF</b>
<b>SW2</b>	<b>7,0V ON</b>	<b>6,5V OFF</b>
<b>SW3</b>	<b>2,0V ON</b>	<b>1.5V OFF</b>
- ◆ LED indicators for output
- ◆ 11.25mm DIN rail mount housing

### SW1/SW2/SW3:

The SW triggers are designed to control pumps, fans, burners etc. They are also designed to operate with an analogue 0-10VDC control signal.

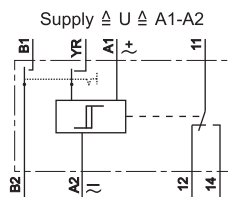
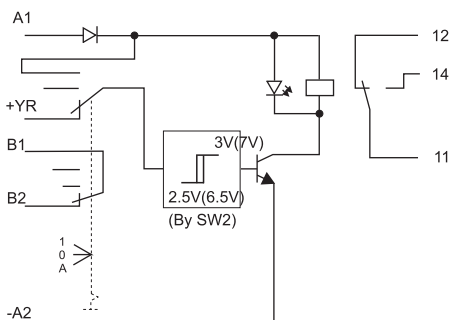
#### Trigger Function

As soon as the input voltage reaches the operating threshold (ON), in AUTO Mode, the relay pulls in. If the input voltage falls below the cut off threshold (OFF), the relay drops out again.

A manual control facility with feedback contact, (mode 1) is incorporated for manual operation

The module can be operated in two modes which can be selected by the three-position switch (Auto, 0, 1).

1. Switch position "1": The output relay is controlled via terminals A1, A2
2. Switch position "Auto": The output relay is controlled by the trigger through terminals YR. The operating voltage must be available continuously at terminal A1.
3. Switch position "0": The relay is switched off. Input signals at terminals A1 or YR are ineffective.



## specification

<b>coil voltage</b>	nominal voltage +10% / -15%
<b>duty cycle</b>	100%
<b>nominal current</b>	15mA
<b>suppressor circuit</b>	freewheeling diode and varistor
<b>relay type</b>	1
<b>output relay spec</b>	230V~ 10A
le AC-15*	120V~ 5A
le AC-15*	240V~ 4A
le DC-13*	24V= 4A
on delay	<8ms
off delay	<25ms
contact material	AgCdO
switching voltage	250V~
input current	16A
continuous current	10A
min. switching capacity	5mA
max. switching frequency	600/h
mechanical	2 x 10 <sup>6</sup> resp. 1 x 10 <sup>7</sup> operations
electrical	1 x 10 <sup>5</sup> resp. 1 x 10 <sup>5</sup> operations
<b>screw tightening torque</b>	0,5Nm
<b>operating conditions</b>	-20 to +60 °C non condensing

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	certification	housing types
<b>SW1 24Vac/dc</b>	24V~= 600mW	SPCO	1	-	○
<b>SW2 24Vac/dc</b>	24V~= 600mW	SPCO	1	-	○
<b>SW3 24Vac/dc</b>	24V~= 600mW	SPCO	1	-	○

# ANU/ANI

## overview

- ◆ supply voltage 24V~
- ◆ feedback contact for manual or automatic mode
- ◆ protection against incorrect connection
- ◆ short circuit protection
- ◆ LED indicator proportional to output level
- ◆ 22.5mm DIN rail mount housing



### Description:

ANU/ANI are used with automatic control systems (BMS, PLC, PC) that provide a 0-10V or 0-20mA signal for controlling variables such as temperature, speed, position etc.

In automatic mode ("Auto") the analogue signal from the control system (terminals YR & L) is re-transmitted to the controlled device (ratio 1:1).

In manual mode ("Manu") the analogue signal from the control system is isolated and the ANU/ANI inject a signal (terminals Y & ) which can be adjusted from 0 to 10V or 0-20mA by the potentiometer.

The switch position (mode) can be monitored externally on terminals S1 - S2 (feed-back contact).

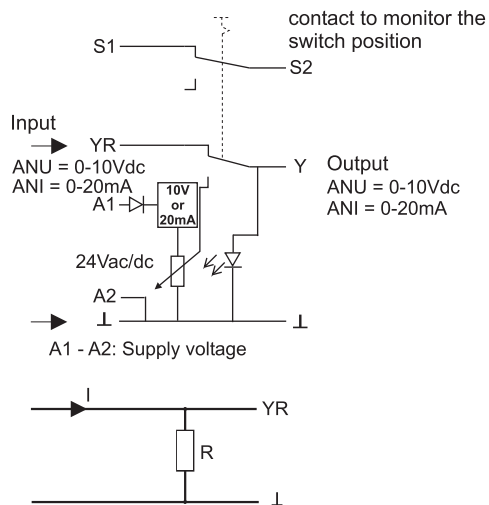
The brightness of the LED "Y" is proportional to the output signal level.

The output is short circuit protected.

## specification

<b>supply voltage variation</b>	nominal voltage +20% / -15%
<b>frequency range</b>	48 - 63 Hz
<b>duty cycle</b>	100%
<b>nominal current</b>	24V~/35mA    24V=/11mA
<b>contact material</b>	silver alloy
<b>switch</b>	S1-S2    28V~/2A
<b>current consumption</b>	max. $I_r$ 10V <sub>DC</sub> 2mA
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to +60°C non condensing

### ANU

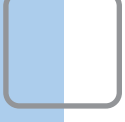
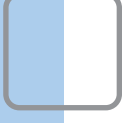
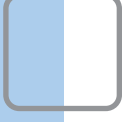


Current input with external resistor is possible.  
z.B.: 0-20mA and R = 500 Ohm  
terminal YR to terminal L = 0 - 10V

## ordering information

part no	supply	output	relay type	HIQUEL	housing type
ANU	24V~ < 1VA	0-10V=	-	-	B
ANI	24V~ < 1VA	0-20mA=	-	-	B



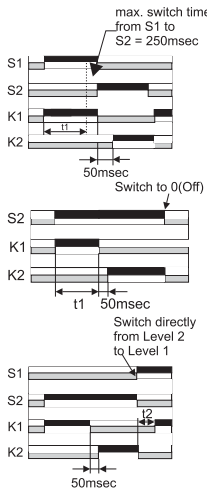


### Description:

The LSM was designed specifically to control two-speed fan motors. The LSM is controlled by a two-position switch, which is connected directly to the LSM (S1, S2). The motor contactors are controlled by the two outputs (K1, K2).

The LSM will automatically control the speed selection so that the operator cannot switch the fan on from stand-still to high speed, or off when running in high speed.

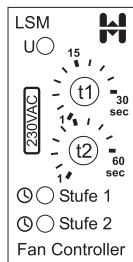
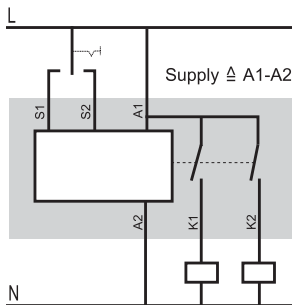
The 3 functions are:



1.) In switch position 1 the motor will run in low speed during the set time  $t_1$ . After the time  $t_1$  has expired it is possible to switch over to position 2 for high speed. The switch over time is max. 250 msec. If this is exceeded the LSM goes to function 2.

2.) If switch position 2 (high speed) is selected before switch position 1, the motor will be forced to run for the time  $t_1$  (low speed). After  $t_1$  there will be an interval of 50 msec before the motor goes into high speed.

3.) Once in high speed, if the input is switched from position 2 to position 1 Or 0 (=stop), the high speed contact will switch off and the motor will be free wheel for the duration of timer  $t_2$  after which the low speed contact will switch on if the switch is in position 1, or will coast to a stop if switch position 0 is selected.



# LSM

## overview

- ◆ power supply 230V~
- ◆ 2 adjustable timers
- ◆ 2 relay outputs 230V~
- ◆ LED indicators for level 1+2
- ◆ 22.5mm DIN rail mount housing

## specification

<b>supply voltage variation</b>	nominal voltage +10% / -15%	
<b>frequency range</b>	48-63Hz	
<b>duty cycle</b>	100%	
<b>repeat accuracy</b>	< 1% of the selected range	
<b>output relay specification</b>	max. 6A 230V~	
<b>relay type</b>	1	
le AC-15*	120V~	5A
le AC-15*	240V~	4A
le DC-13*	24V=	4A
<b>expected life time</b>	DPCO	SPCO
mechanical	$2 \times 10^6$	resp. $1 \times 10^7$ operations
electrical	$1 \times 10^5$	resp. $1 \times 10^5$ operations
<b>screws</b>	pozidrive 1	
<b>screw tightening torque</b>	0,6..0,8Nm	
<b>operating conditions</b>	-20 to +60 °C non condensing	

\* EN 60947-5-1 VDE 0435

## ordering information

part no	supply	output	relay type	housing types
LSM 230Vacc	230V~ 8VA	2 x SPNO	1	A

# MU-PT100/PT1000

## overview

- ◆ temperature to analogue signal transducer
- ◆ high linearity, long term stability, high accuracy
- ◆ 4 selectable temperature ranges
- ◆ current and voltage outputs
- ◆ 2, 3 or 4 wire PT sensor connections
- ◆ 22.5 or 45mm DIN rail mount housing



## Description

The offset of the output signal is selected with the first DIP switch, the measurement range is selected with the other two DIP switches.

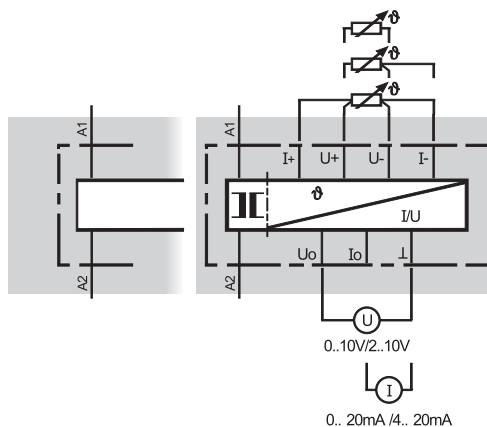
The different probe connection types are detected automatically.

The use of shielded and twisted-pair cable is recommended. Connect the shield of the cable (if used) to the connector "I-". "U+"/"U-" and "I+"/"I-" are twisted together (if twisted cable used).

Do not lay the PT probe cable close to supply voltage cables.

## specification

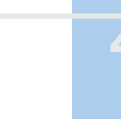
<b>supply voltage variation</b>	nominal voltage +10% / -10%
<b>input</b>	PT100/PT1000
<b>connection</b>	2, 3 or 4 wire
<b>temperature ranges</b>	-30°C to 100°C 0°C to 100°C 0°C to 200°C 0°C to 300°C
<b>current output</b>	
accuracy	<0,1%
max. output load	550 Ohm
temperature coefficient	<0,01%/K
<b>voltage output</b>	
accuracy	<0,3%
max. output current	<5mA
temperature coefficient	<0,01%/K
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to +60°C non condensing



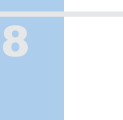
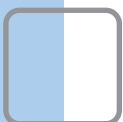
## ordering information

part no	supply	sup. galv. iso.*	FAUS	housing type
MU-PT100/24Vdc	24V= 1,5W	no	-	B
MU-PT100/24Vac	24V~ 2,5VA	yes	-	B
MU-PT100/115Vac	115V~ 2,5VA	yes	-	C
MU-PT100/230Vac	230V~ 2,5VA	yes	-	C
MU-PT1000/24Vdc	24V= 1,5VA	no	-	B
MU-PT1000/24Vac	24V~ 2,5VA	yes	-	B
MU-PT1000/115Vac	115V~ 2,5VA	yes	-	C
MU-PT1000/230Vac	230V~ 2,5VA	yes	-	C

\* PT100/PT1000 and the output signals are galvanically isolated from the power supply



temperature transducer PT100/PT1000

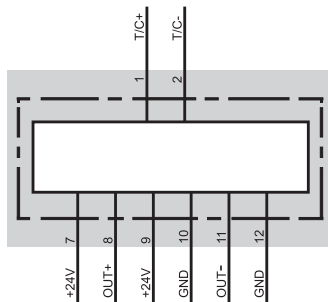


**Description:**

MU-TC uses microprocessor-controlled high resolution 16-bit dual-slope, integrating A/D converter to acquire a thermocouple signal and cold junction compensation input.

The configurable input offers a wide range of J, K, T, R, S, E, B type thermocouples and the output is linear to temperature. Therefore, stock investment for spare parts can be reduced and the highest system flexibility can be achieved.

Thermoelements			
Type	1	2	3
J	ON	ON	ON
K		ON	ON
T	ON		ON
R			ON
S	ON	ON	
E		ON	



# MU-TC

## overview

- ◆ thermocouple to analogue signal transducer
- ◆ supply voltage 24Vdc
- ◆ high linearity, long term stability
- ◆ high temperature stability
- ◆ selectable thermocouple input
- ◆ 23mm DIN rail mount housing

## specification

<b>supply voltage</b>	24V=	±10%
<b>power consumption</b>	1.4W	
<b>input</b>	Type "J"	-40°C...760°C
	Type "K"	0°C...1000°C
	Type "T"	-100°C...400°C
	Type "E"	0°C...1000°C
	Type "S"	500°C...1750°C
	Type "R"	500°C...1750°C
	Type "B"	500°C...1800°C
<b>output</b>	0-10V	0.5 Ohm
<b>temperature drift</b>	±2°C	
<b>isolation</b>	1.000V=	
<b>screw tightening torque</b>	0,5Nm	
<b>operating conditions</b>	0 to +50°C	non condensing

## ordering information

part no	supply	output	relay type	RIIS	housing types
MU-TC	24V=	0-10V=	-	-	I

# MU-UI

## overview

- ◆ strain-gauge to analogue signal transducer
- ◆ supply voltage 24V=
- ◆ high linearity, long term stability
- ◆ high temperature stability
- ◆ selectable input and output signal
- ◆ 23mm DIN rail mount housing



transducer for strain gauge sensors

## Specification

<b>supply voltage</b>	24V= 10%
<b>power consumption</b>	0,85 Watt voltage output 1,2 Watt current output
<b>input</b>	
Bipolar	+/-10mV, 0/-50mV, +/-100mV, +/-0,5V, +/-1V, +/-5V, +/-10V; +/-20mA
Unipolar	0-10mV, 0-50mV, 0-100mV, 0-500mV, 0-1V, 5-5V, 0-10V; 0-20mA
<b>output</b>	
Bipolar	+/-5V, +/-10V
Unipolar	0-10V 0-20mA
<b>accuracy</b>	+/- 0,1% FSR (typ.)
<b>temperature drift</b>	150ppm typ
<b>screw tightening torque</b>	0,5Nm
<b>operating conditions</b>	0 to +50°C non condensing

		Input Range (SW2)							
Bipolar	Unipolar	1	2	3	4	5	6	7	8
+/-10mV	0-10mV	ON							
+/-50mV	0-50mV		ON						
+/-100mV	0-100mV			ON					
+/-0,5mV	0-0,5V					ON			
+/-1V	0-1V						ON		
+/-5V	0-5V							ON	
+/-10V	0-10V								ON
+/-20mA	0-20mA								ON

Table 1: switch positions of input

		Output Range (SW1)							
Output Range	Input Range	1	2	3	4	5	6	7	8
-5V	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA	ON			ON				ON
	0-10mV, 0-50mV, 0-1V	ON			ON		ON		ON
	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA		ON		ON			ON	
0-20mA	0-10mV, 0-50mV, 0-100mV, 0-500mV, 0-1V, 5-5V, 0-10V; 0-20mA		ON		ON				ON
	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA	ON			ON				ON
	0-10mV, 0-50mV, 0-1V	ON			ON				ON
-10V	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA	ON			ON				ON
	0-10mV, 0-50mV, 0-1V	ON			ON				ON
	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA	ON			ON				ON
0-10V	0-10mV, 0-50mV, 0-1V	ON			ON				ON
	-10mV, -50mV, -100mV, 0,5V, -1V, -5V, -20mA	ON			ON				ON
	0-10mV, 0-50mV, 0-1V	ON			ON				ON

Table 2: switch positions of output

## Configuration

Figure 1 shows the terminal wiring of MU-UI. Positive power terminals 9 and 7 are internally connected, as are negative terminals 12 and 10. MU-UI uses single 24V=.

Tables 1 and 2 above show the switch positions to configure input and output range. The I/O configuration switches are located inside the module. To reach the switches, you need to remove the DIN-rail bracket by sliding it down.

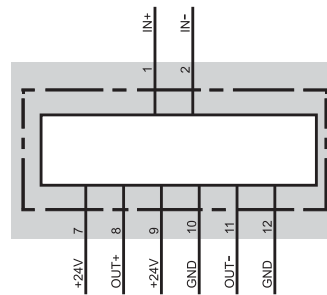
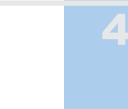
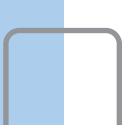
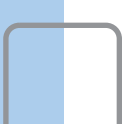
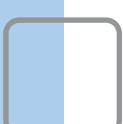
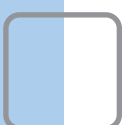


Figure 1. terminal wiring of MU-UI

## ordering information

part no	supply	output	relay type	HIQUEL	housing type
MU-UI	24V=	+/-5V, +/-10V, 0-10V, 0-20mA	-	-	I





# MU-DMS

## overview



- ◆ isolated strain-gauge to analogue signal transducer
- ◆ supply voltage 24V=
- ◆ high linearity, long term stability
- ◆ high temperature stability
- ◆ selectable output signal
- ◆ adjustment of user specified signals
- ◆ 23mm DIN rail mount housing

Input Range (SW2)					
Range	1	2	3	4	5
+/-10mV	ON				
+/-20mV		ON			
+/-30mV			ON		
+/-50mV				ON	
+/-100mV					ON

Table 1: switch positions of input

Output Range (SW1)								
Range	1	2	3	4	5	6	7	8
+/- 5V	ON		ON					ON
+/- 10V	ON		ON					
0-10V	ON		ON				ON	
0-20mA		ON		ON			ON	

Table 2: switch positions of output

### Configuration

Figure 1 shows the terminal wiring of MU-DMS. Positive power terminals 9 and 7 are internally connected, as are negative terminals 12 and 10. MU-DMS uses single 24V=.

Tables 1 and 2 above show the switch positions to configure input and output range. The I/O configuration switches are located inside the module. To reach the switches, you need to remove the DIN-rail bracket by sliding it down.

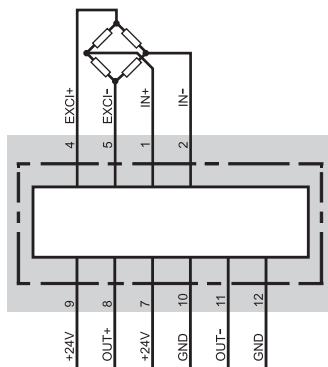


Figure 1. Terminal wiring of MU-DMS

## specification

<b>supply voltage</b>	24V= ± 10%
<b>power consumption</b>	1,85 Watt at voltage output 2,15 Watt at current output
<b>input</b>	+/-10mV, +/-20mV, +/-30mV, +/-50mV, +/-100mV max. 60mA
<b>output</b>	Bipolar +/-5V, +/-10V Unipolar 0-10V 0-20mA 0-500Ohm (load.)
<b>accuracy</b>	+/- 0,1% FSR (typ.)
<b>temperature drift</b>	150ppm typ
<b>screw tightening torque</b>	0,5Nm
<b>operating conditions</b>	-10 to +70°C non condensing

## ordering information

part no	supply	output	relay type	certification	housing types
MU-DMS	24V= 2W	+/-5V, +/-10V, 0-10V, 0-20mA	-	-	I



# K1T/K2T

## overview

- ◆ interface relay with photomos output
- ◆ wide voltage range (different ranges)
- ◆ 10kHz bandwidth
- ◆ LED indicators
- ◆ protected against incorrect polarity
- ◆ K1T - one line coupler
- ◆ K2T - two line couplers
- ◆ 22.5mm DIN rail mount housing



## specification

<b>supply voltage</b>	nominal voltage $\pm 10\%$
<b>duty cycle</b>	100%
<b>protection circuit</b>	VDR
<b>voltage deviation</b>	$\pm 20\%$ (duration of deviation less than 5s, no output change)
<b>turn-on time</b>	
DC-version	$< 10\mu\text{s}$
AC/DC-version	$< 20\text{ms}$
<b>turn-off time</b>	
DC-version	$< 40\mu\text{s}$
AC/DC-version	$< 40\text{ms}$
<b>isolation voltage</b>	2,5kV
<b>on-state voltage</b>	$< 3\text{V}$
<b>output voltage range</b>	24Vac/dc.. 230Vac/dc
<b>max. load current</b>	500mA ac/dc
<b>output</b>	photomos
<b>screws</b>	pozidrive 1
<b>screw tightening torque</b>	0,6..0,8Nm
<b>operating conditions</b>	-20 to $+60^\circ\text{C}$ no condensing

\* EN 60947-5-1 VDE 0435

## ordering information

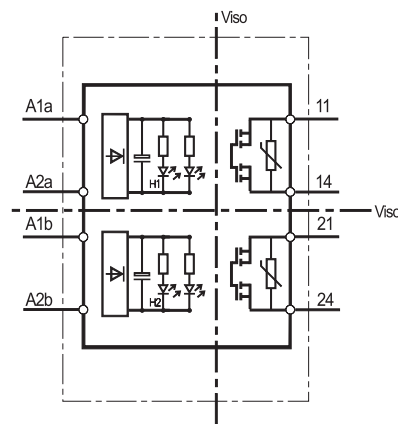
part no	input	Ri*	Icont*	(Uout · Iout)MAX@f	f@MAX(Uout · Iout)	housing type
<b>K1T 12Vdc..30Vdc</b>	12V~..30V=	1,5k $\Omega$	$< 8\text{mA}$	(230V*500mA)@1Hz	10.000Hz@(230V*40mA)	B
<b>K1T 12Vac/dc..30Vac/dc</b>	12V~/=..30V~/=	1,5k $\Omega$	$< 8\text{mA}$	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
<b>K1T 24Vac/dc..230Vac/dc</b>	24V~/=..230~/=	6,0k $\Omega$	$< 21\text{mA}$	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
<b>K2T 12Vdc..30Vdc</b>	12V~..30V=	1,5k $\Omega$	$< 8\text{mA}$	(230V*500mA)@1Hz	10.000Hz@(230V*40mA)	B
<b>K2T 12Vac/dc..30Vac/dc</b>	12V~/=..30V~/=	1,5k $\Omega$	$< 8\text{mA}$	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
<b>K2T 24Vac/dc..230Vac/dc</b>	24V~/=..230V~/=	6,0k $\Omega$	$< 21\text{mA}$	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B

other voltage on request

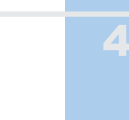
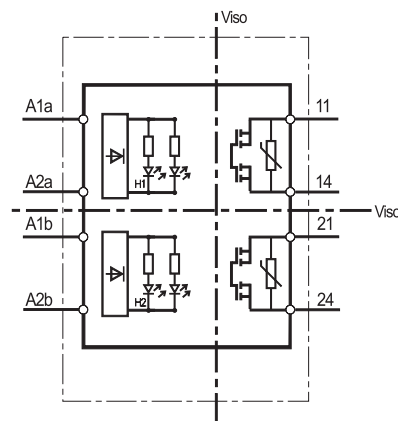
\* Ri = power-on input resistance

\* Icont = current through input pin after 5 sec

K2T xxac/dc



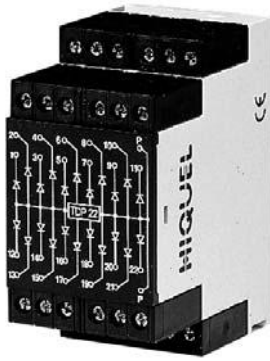
K2T xxdc





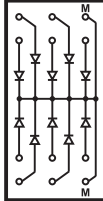
# TV../TD..

## overview

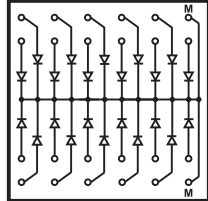


- ◆ multi way diode boxes
- ◆ common cathode for alarm integration
- ◆ common anode for lamp testing
- ◆ up to 34 1000v diodes in one housing
- ◆ 22.5/45/67.5mm DIN rail housing or 11pin plug in housing

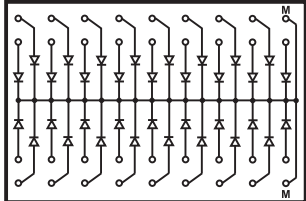
TDM 10



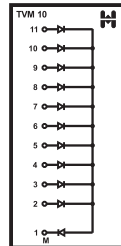
TDM 22



TDM 34

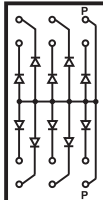


TVM 10

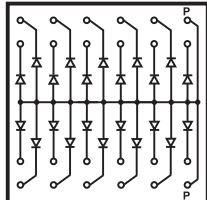


Multi-way diode box for the integration of multiple alarm circuits where any one of a number of alarm signals will activate an output.

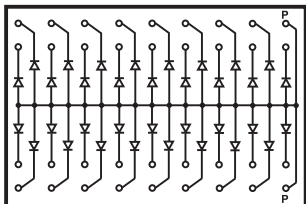
TDP 10



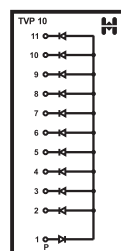
TDP 22



TDP 34



TVP 10



Multi-way diode box for lamp testing where one switch connected to the diode box input will test the continuity of lamp circuits.

## specification

diode max current	1,0 A
diode max voltage	1000 V
diode voltage drop	0,7 V
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20 to +60°C non condensing

## ordering information

part no	supply	output	relay type	RL	housing type
TVM 10	10	1	-	-	G
TVP 10	1	10	-	-	G
TDM 10	10	2	-	-	B
TDP 10	2	10	-	-	B
TDM 22	22	2	-	-	D
TDP 22	2	22	-	-	D
TDM 34	34	2	-	-	F
TDP 34	2	34	-	-	F