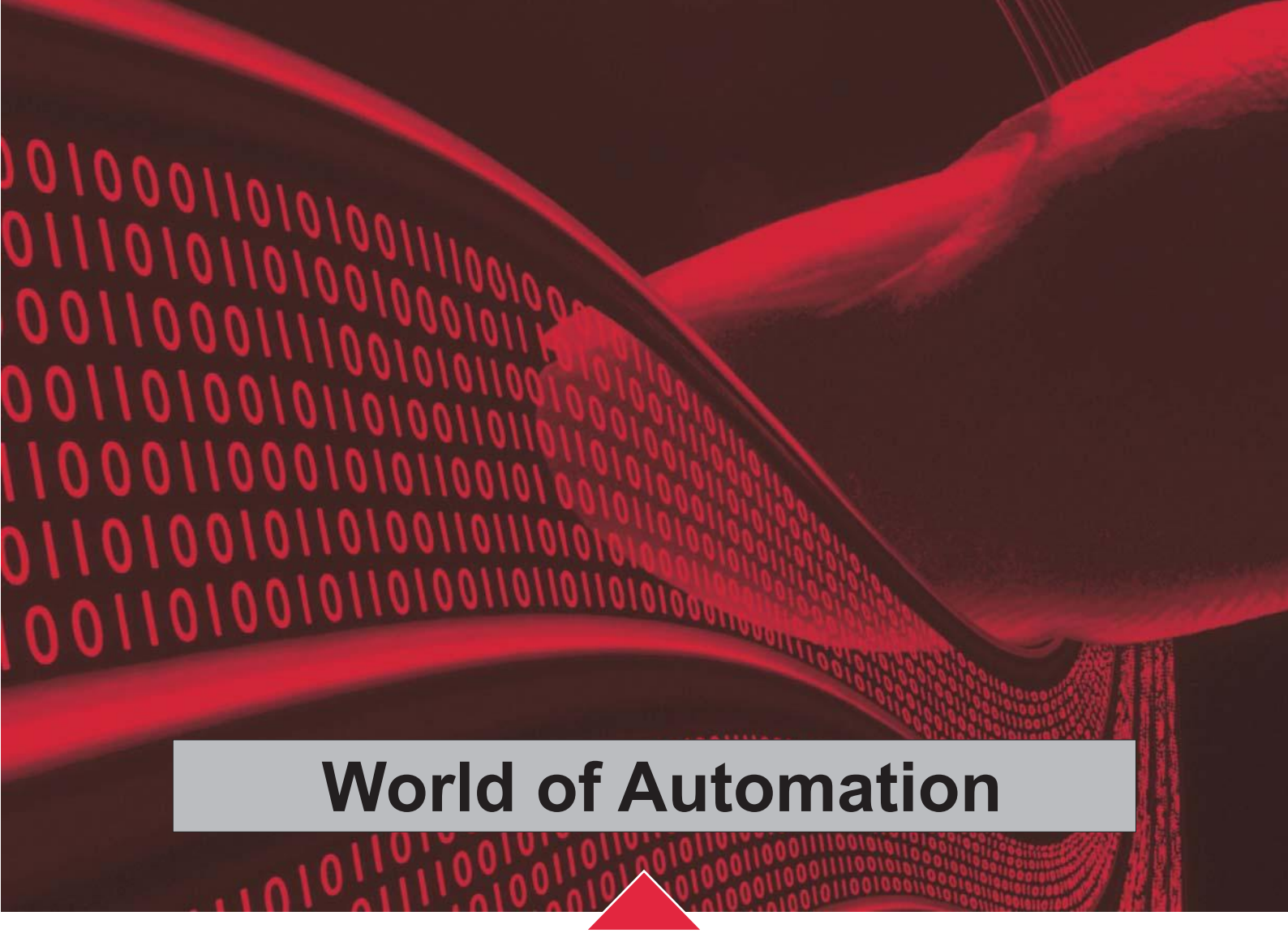


World of Automation

Chapter 3: Timing relays

Index

3 Chapter 3: Timing relays

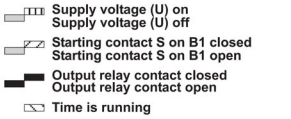
HIQUEL® HIGH QUALITY ELECTRONICS

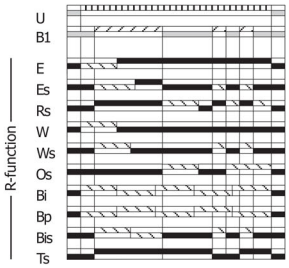
ITM16

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



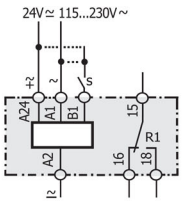


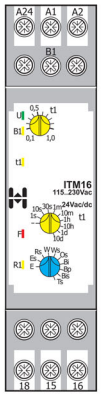
Functions:
E...On delay
Es...On delay with external control input
Rs...Off delay with external control input
W...On pulse single shot
Ws...On pulse single shot with external control input
Os...Off pulse with external control input
Bi...Symmetrical recycler pulse first
Bp...Symmetrical recycler pause 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	SPCO
mechanical	10 x 10^6 operations
electrical	1 x 10^5 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	cULus	housing types
ITM16	24V~= / 115..230V~ 6VA / 1W	SPCO	-	-	L

* The measurement input is galvanically isolated from the power supply

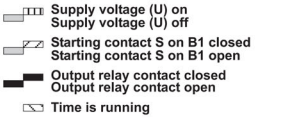
HIQUEL® HIGH QUALITY ELECTRONICS

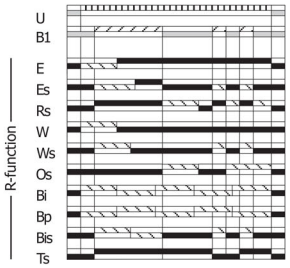
ITM216

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



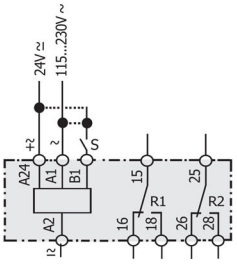


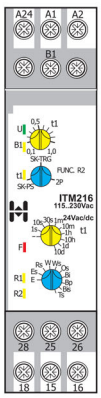
Functions:
E...On delay
Es...On delay with external control input
Rs...Off delay with external control input
W...On pulse single shot
Ws...On pulse single shot with external control input
Os...Off pulse with external control input
Bi...Symmetrical recycler pulse first
Bp...Symmetrical recycler pause 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 10^6 operations
electrical	1 x 10^5 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	cULus	housing types
ITM216	24V~= / 115..230V~ 6VA / 1W	2x SPCO	-	-	L

* The measurement input is galvanically isolated from the power supply

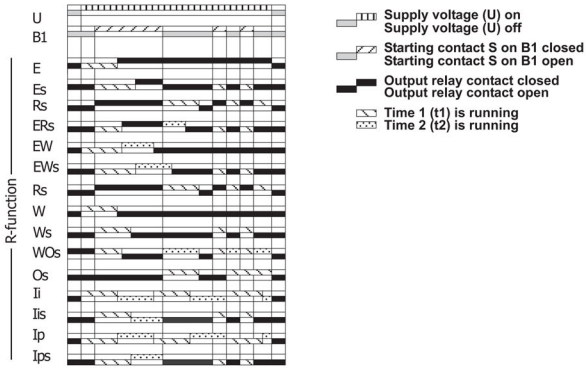
HIQUEL® HIGH QUALITY ELECTRONICS

ITM17

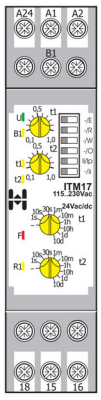
overview

- 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



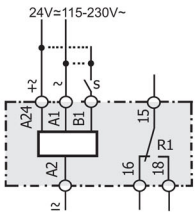
Functions
E...On delay
Es...On delay with external control input
Rs...Off delay with with external control input
ERs...On delay and off delay with external control input
EW...On delay and on pulse / delayed single shot
EWs...On delay and on pulse / delayed single shot with external control input
W...On 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 pulse 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 10^6 operations
electrical	1 x 10^5 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	cULus	housing types
ITM17	24V~= / 115..230V~	6VA / 1W	SPCO	-	-	L

* The measurement input is galvanically isolated from the power supply

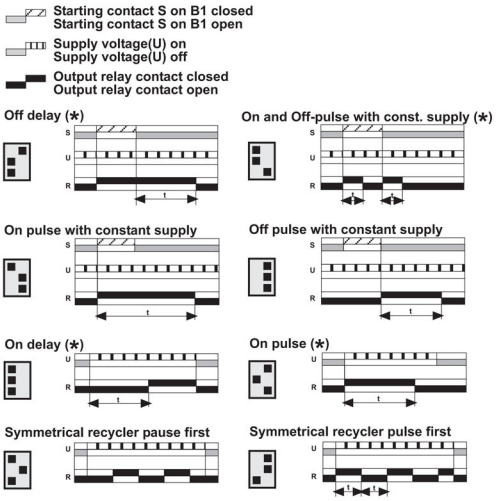
HIQUEL® HIGH QUALITY ELECTRONICS

TM

overview

- **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



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

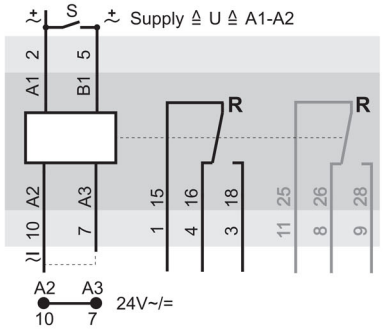
(*) available T3F functions

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

Time ranges

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%		
		TM16 +10% / -10%		
		TM20,TM21,TM81,TM82 +5% / -10%		
supply selection		TM16/T3F selectable by a switch		
frequency range		48 - 63 Hz		
duty cycle		100%		
repeat accuracy		< 1% of the selected range		
relay type		1	2	3
output relay spec	230V~	6A	12A	10A
Ie AC-15*	120V~	4A	2,5A	5A
Ie AC-15*	240V~	3A	2,5A	4A
Ie DC-13*	24V=	2A	2,0A	4A
expected life time		DPCO	SPCO	
mechanical		2 x 10^6 resp.	1 x 10^7 operations	
electrical		1 x 10^5 resp.	1 x 10^5 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	cULus	housing type
TM01	230V~ / 24V~=	6VA / 1VA	DPCO	1	yes	B
TM16	115 - 230V~ / 24V~=	6VA / 1VA	SPCO	2	yes	A
TM20	24 - 240V~=	2VA	SPCO	3	yes	A
TM21	24 - 240V~=	2VA	DPCO	1	yes	B
TM41	230V~ / 24V~=	6VA / 1VA	DPCO	1	no	G
TM42	230V~ / 24V~=	6VA / 1VA	SPCO	1	no	G
TM71	230V~ w. transformer	1,5VA	DPCO	1	no	G
TM72	230V~ w. transformer	1,5VA	SPCO	1	no	G
TM81	24 - 240 V~=	2VA	DPCO	1	no	G
TM82	24 - 240 V~=	2VA	SPCO	1	no	G
T3F*	115 - 230V~ / 24V~=	6VA / 1VA	SPCO	2	yes	A

other voltages on request

HIQUEL® HIGH QUALITY ELECTRONICS

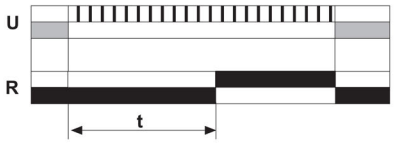
TE/DER

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

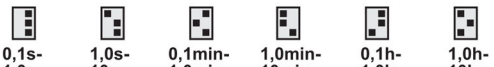
Supply voltage on
Supply voltage off
Output relay contact closed
Output relay contact open



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

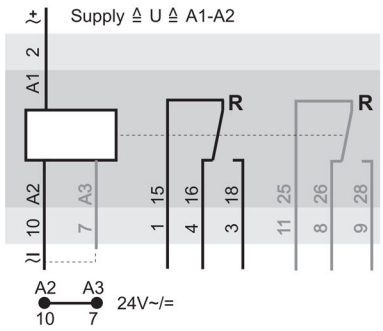
On the application of the supply voltage, time delay ***t*** commences. At the end of the time delay the output relay pulls in. When the supply voltage is removed the output relay drops out and the time relay resets ready for the next timing cycle.
If the supply voltage ist removed during time ***t***,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

Time ranges



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

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

supply voltage variation		nominal voltage +10% / -15%	
frequency range		48 - 63 Hz	
max. delay time		100%	
repeat accuracy		< 1% of the selected range	
relay type		1	2
output relay spec	230V~	6A	10A
Ie AC-15*	120V~	4A	5A
Ie AC-15*	240V~	3A	4A
Ie DC-13*	24V=	2A	4A
expected life time		DPCO	SPCO
mechanical		2×10^6 resp.	1×10^7 operations
electrical		1×10^5 resp.	1×10^5 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	cULus	housing types
TE01	230V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
TE04	115V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
DER230	230V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
DER115	115V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
TE12	230V~	6VA	SPCO	2	yes	A
TE13	24V~=	1W	SPCO	2	yes	A
TE15	115V~	6VA	SPCO	2	yes	A
TE41	230V~ / 24V~=	6VA / 1W	DPCO	1	no	G
TE42	230V~ / 24V~=	6VA / 1W	SPCO	1	no	G
TE71	230V~ w. transf.	2VA	DPCO	1	no	G

other voltages on request

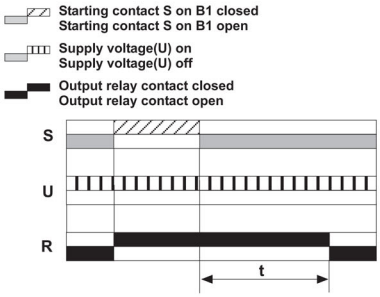
HIQUEL® HIGH QUALITY ELECTRONICS

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

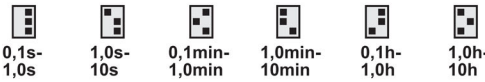


Remove supply voltage before making any changes to either time range or timing function.

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.

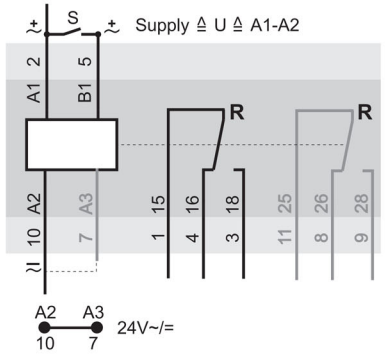
Important application note:
*On types **TR12,13 & 15** only, small inductive devices (relays etc..), can be connected between the B1 terminal and ground (-ve) such that they energise when the A1-B1 start contact is made. A snubber circuit should be included for larger devices. **Do not do this on types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

Time ranges



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

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

supply voltage variation		nominal voltage +10% / -15%	
frequency range		48 - 63 Hz	
max. delay time		100%	
repeat accuracy		< 1% of the selected range	
relay type		1	2
output relay spec	230V~	6A	10A
Ie AC-15*	120V~	4A	5A
Ie AC-15*	240V~	3A	4A
Ie DC-13*	24V=	2A	4A
expected life time		DPCO	SPCO
mechanical		2×10^6 resp.	1×10^7 operations
electrical		1×10^5 resp.	1×10^5 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	cULus	housing type
TR01	230V~/24V~=	6VA / 1W	DPCO	1	yes	B
TR04	115V~/24V~=	6VA / 1W	DPCO	1	yes	B
TR12	230V~	6VA	SPCO	2	yes	A
TR13	24V~=	1W	SPCO	2	yes	A
TR15	115V~	6VA	SPCO	2	yes	A
TR41	230V~ / 24V~=	6VA / 1W	DPCO	1	no	G
TR42	230V~ / 24V~=	6VA / 1W	SPCO	1	no	G
TR71	230V~ w. transf.	2VA	DPCO	1	no	G
TR72	230V~ w. transf.	2VA	SPCO	1	no	G

other voltages on request

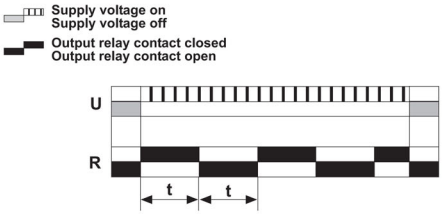
HIQUEL® HIGH QUALITY ELECTRONICS

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**

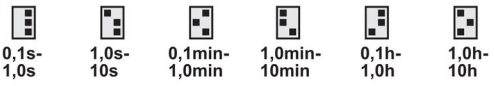
Symmetrical recycler



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

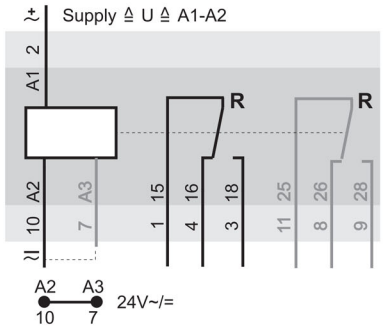
On the application of the supply voltage the output relay pulls in and timing period ***t*** starts.
At the end of time ***t*** the output relay drops out and remains dropped out for a period equal to time ***t.***
An on-off action with a 1:1 time ratio continues until the supply voltage is removed when 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



specification

supply voltage variation		nominal voltage +10% / -15%	
frequency range		48 - 63 Hz	
max. delay time		100%	
repeat accuracy		< 1% of the selected range	
relay type		1	2
output relay spec	230V~	6A	10A
Ie AC-15*	120V~	4A	5A
Ie AC-15*	240V~	3A	4A
Ie DC-13*	24V=	2A	4A
expected life time		DPCO	SPCO
mechanical		2×10^6 resp.	1×10^7 operations
electrical		1×10^5 resp.	1×10^5 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	cULus	housing types
TB01	230V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
TB04	115V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
DBR230	230V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
DBR115	115V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
TB12	230V~	6VA	SPCO	2	yes	A
TB13	24V~=	1W	SPCO	2	yes	A
TB15	115V~	6VA	SPCO	2	yes	A
TB41	230V~ / 24V~=	6VA / 1W	DPCO	1	no	G
TB42	230V~ / 24V~=	6VA / 1W	SPCO	1	no	G
TB71	230V~ w. transf.	2VA	DPCO	1	no	G

other voltages on request

HIQUEL® HIGH QUALITY ELECTRONICS

TW

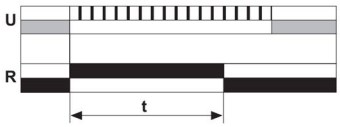
overview

- **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**

On pulse

Supply voltage on
Supply voltage off

Output relay contact closed
Output relay contact open



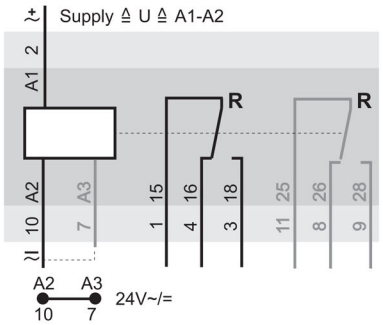
Remove supply voltage before making any changes to either time range or timing function.

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

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		48 - 63 Hz	
max. delay time		100%	
repeat accuracy		< 1% of the selected range	
relay type		1	2
output relay spec	230V~	6A	10A
Ie AC-15*	120V~	4A	5A
Ie AC-15*	240V~	3A	4A
Ie DC-13*	24V=	2A	4A
expected life time		DPCO	SPCO
mechanical		2×10^6 resp.	1×10^7 operations
electrical		1×10^5 resp.	1×10^5 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	cULus	housing type
TW01	230V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
TW04	115V~ / 24V~=	6VA / 1W	DPCO	1	yes	B
DWR230	230V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
DWR115	115V~ / 24V~=	6VA / 1W	SPCO	2	yes	A
TW12	230V~	6VA	SPCO	2	yes	A
TW13	24V~=	1W	SPCO	2	yes	A
TW15	115V~	6VA	SPCO	2	yes	A
TW41	230V~ / 24V~=	6VA / 1W	DPCO	1	no	G
TW42	230V~ / 24V~=	6VA / 1W	SPCO	1	no	G
TW71	230V~ w. transf.	2VA	DPCO	1	no	G

other voltages on request

HIQUEL® HIGH QUALITY ELECTRONICS

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**

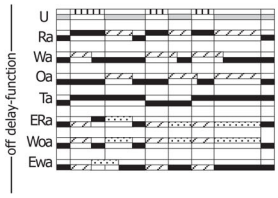
Multifunction of true off delay

Supply voltage (U) on
Supply voltage (U) off

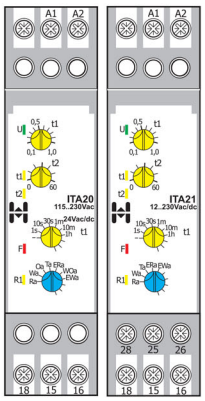
Starting contact S on B1 closed
Starting contact S on B1 open

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



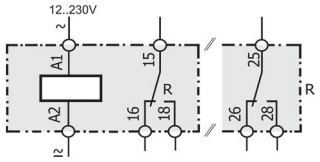
Time range t1

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
Ie AC-15*	120V~	2,5A
Ie AC-15*	240V~	2,5A
Ie DC-13*	24V=	2,5A
expected life time		
mechanical	5×10^6 operations	
electrical	1×10^4 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	cULus	housing types
ITA20	12..230V~=	0,2W	SPCO	-	L
ITA21	12..230V~=	0,2W	DPCO	-	L

HIQUEL® HIGH QUALITY ELECTRONICS

TA

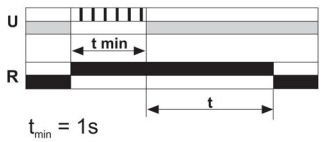
overview

- **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



t_{min} = 1s

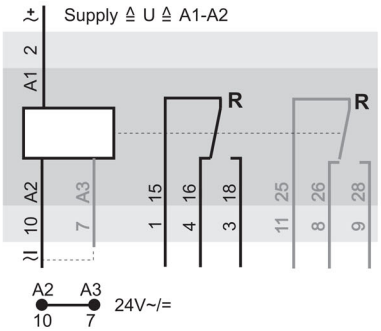
Remove supply voltage before making any changes to either time range or timing function.

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 wil remain pulled in until the supply voltage is removed for a time longer than ***t***.

Time ranges

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

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	
duty cycle		100%	
repeat accuracy		< 1% of the selected range	
relay type		4	5
output relay spec.	230V~	8A	5A
Ie AC-15*	120V~	5A	4A
Ie AC-15*	240V~	5A	3A
Ie DC-13*	24V=	4A	3A
expected life time		DPCO	SPCO
mechanical		2 x 10^6 resp.	1 x 10^7 operations
electrical		1 x 10^5 resp.	1 x 10^5 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	cULus	housing types
TA01	230V~ / 24V~=	6VA / 1W	DPCO	5	yes	B
TA02	230V~	6VA	SPCO	4	yes	A
TA03	24V~=	1W	SPCO	4	yes	A
TA04	115V~ / 24V~=	6VA / 1W	DPCO	5	yes	B
TA05	115V~	6VA	SPCO	4	yes	A
TA41	230V~ / 24V~=	6VA / 1W	DPCO	5	yes	G
TA42	230V~ / 24V~=	6VA / 1W	SPCO	5	yes	G
TA71	230V~ w. transf.	2VA	DPCO	5	yes	G
TA72	230V~ w. transf.	2VA	SPCO	5	yes	G

other voltages on request

true off delay (without supply voltage)

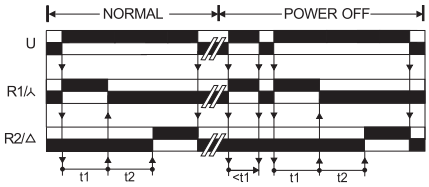
HIQUEL® HIGH QUALITY ELECTRONICS

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**

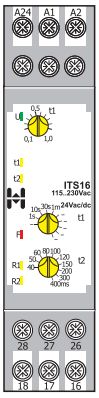
Star-Delta-Timer



specification

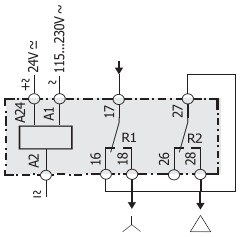
supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	<1%
output relay specification	max. 6A 230V~
Ue/Ie AC-15	24V/1,5A 115V/1,5A 230V/1,5A
Ue/Ie DC-13	24V/1,5A
expected life time	2 x SPCO
mechanical	10 x 10^6 operations
electrical	1 x 10^5 operations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

* EN 60947-5-1 VDE 0435



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.



ordering information

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

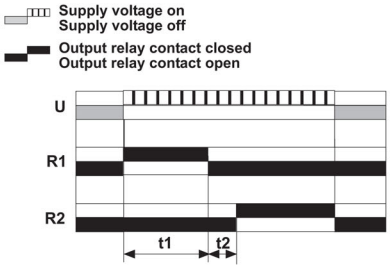
HIQUEL® HIGH QUALITY ELECTRONICS

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

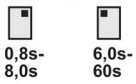


Remove supply voltage before making any changes to either time range or timing function.

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

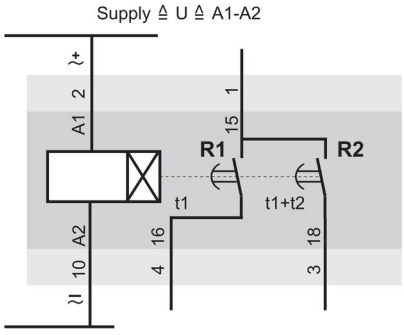


0,8s-8,0s **6,0s-60s**

dwell time (=t2)

40ms **60ms** **80ms** **100ms**

Supply ≙ U ≙ A1-A2



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
output relay specification	max. 10A 230V~
Ue/Ie AC-15*	120V/5A 240V/4A
Ue/Ie DC-13*	24V/4A
expected life time	SPNO
mechanical	1 x 10^7 operations
electrical	1 x 10^5 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	cULus	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

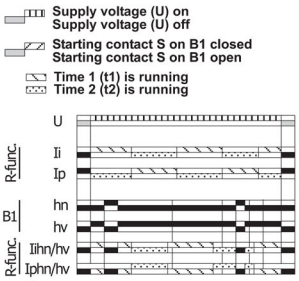
HIQUEL® HIGH QUALITY ELECTRONICS

ITI16

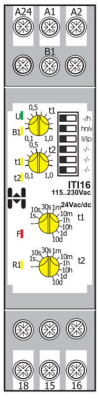
overview

- 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

Asymmetrical recycler



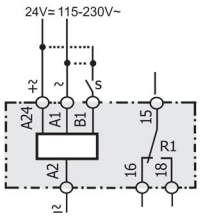
Functions:
Ii...Asymmetrical recycler pulse first
Ip...Asymmetrical recycler pause first
Iihn...Asymmetrical recycler pulse first with normal inhibit
Iphn...Asymmetrical recycler pause first with normal inhibit
Iihv...Asymmetrical recycler pulse first with inverse inhibit
Iphv...Asymmetrical recycler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



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	10×10^6 operations
electrical	1×10^5 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	cULus	housing types
ITI16	24V~= / 115..230V~	6VA / 1W	SPCO	-	-	L

HIQUEL® HIGH QUALITY ELECTRONICS

TI

overview

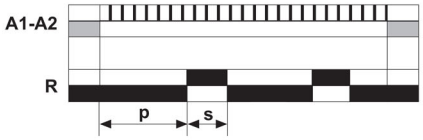
- **“pulse first” or “pause first” adjustable**
- **single, dual or zoom supply voltage options**
- **SPCO or DPCO output relay**
- **2 x 6 selectable time ranges 0.1sec - 30Hrs**
- **LED indicators for power supply and relay status**
- **22.5mm DIN rail mount housing or 11pin plug in housing**

Asymmetrical recycler

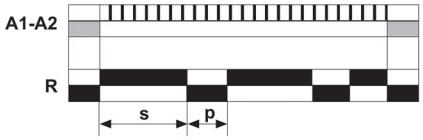
Supply voltage on
Supply voltage off

Output relay contact closed
Output relay contact open

asymmetrical recycler pause first



asymmetrical recycler signal first



specification

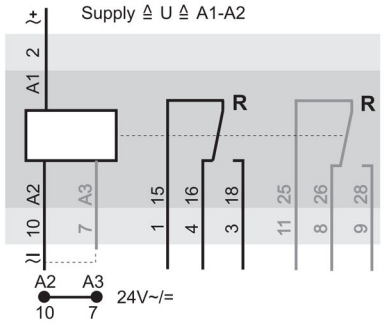
supply voltage variation		nominal voltage +10% / -15%			
frequency range		48 - 63 Hz			
max. delay time		100%			
repeat accuracy		< 1% of the selected range			
relay type		1	2	3	4
output relay spec. R_{TH}		10A	10A	8A	6A
Ie AC-15*	115Vac	2,5A	1,5A	1,5A	3,5A
Ie AC-15*	230Vac	2,5A	1,5A	1,5A	3A
Ie DC-13*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

* EN 60947-5-1 VDE 0435

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



ordering information

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

other voltages on request

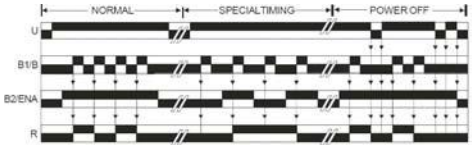
HIQUEL®
HIGH QUALITY ELECTRONICS

ITT16

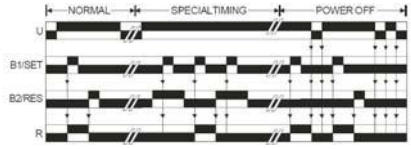
overview

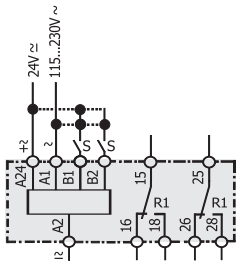
- zoom supply voltage
- 3 toggle functions
- 4 flip-flop functions
- 3 timerelay functions
- DPCO output relay
- LED Indicators for power supply, failure, output relay, control contacts and timer
- 22.5mm DIN rail mount housing

Tse – Toggle with starting contact and enable



Fsc - Flip-Flop with starting contact and prior reset





specification

supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	<1%
output relay specification	max. 6A 230V~
	24V/1,5A 115V/1,5A 230V/1,5A
	24V/1,5A
expected life time	DPCO
mechanical	10 x 10^6 operations
electrical	1 x 10^5 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	sup.galv.iso*	cULus	housing types
ITT16	24V~= / 115..230V~	6VA / 1W	DPCO	yes	-	L

* The measurement input is galvanically isolated from the power supply

HIQUEL® HIGH QUALITY ELECTRONICS

DES/PES/TES

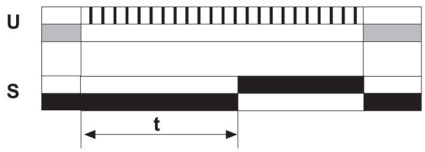
overview

- **supply voltage 12-240V~= or 200-440V~**
- **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.

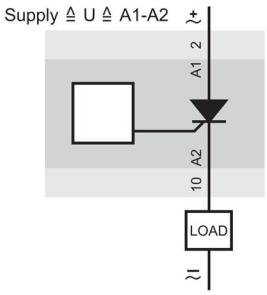
On the application of the supply voltage, time delay ***t*** commences. At the end of the time delay the thyristor switches the full supply voltage through to the load connected to the A2 terminal (max. load 700mA continuous, 20A <10mS).
If the supply voltage is removed during time ***t***, the unexpired 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	≤ 100% of the selected range
thyristor output	I_{max} = 700mA
	I_{min} = 5mA
	I_{peak} = 20A (<10ms)
	$I_{leakage}$ = 2,5mA~ 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~=	2,5mA	thyristor	6/0,1s...10h	A
PES	12-240V~=	2,5mA	thyristor	6/0,1s...10h	G
TES	200-440V~	1mA	thyristor	1/1...10s	O

DER-M

overview

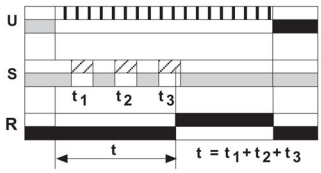
- supply voltage 24-240V~=
- SPCO output relay
- 7 selectable time ranges 0.1sec - 30Hrs
- LED indicators for power supply and relay status
- 22.5mm DIN rail mount housing

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



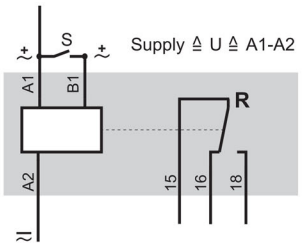
Remove supply voltage before making any changes to either time range or timing function.

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

supply voltage variation	nominal voltage +5% / -10%
frequency range	0-150 Hz
max. delay time	100% of the selected time range
repeat accuracy	< 1% of the selected range
output relay specification	max. 10A 230V~
Ue/Ie AC-15	120V/5A 240V/4A
Ue/Ie DC-13	24V/4A
expected life time	SPCO
mechanical	1 x 10^7 operations
electrical	1 x 10^5 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	cULus	housing types
DER-M	24 - 240V~= 2VA	SPCO	-	-	A

HIQUEL® HIGH QUALITY ELECTRONICS

PRER2/TOE/TOR

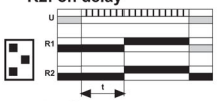
overview

- 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

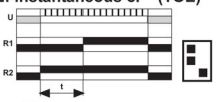
on / off delay - instantaneous contact (PRER2)

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

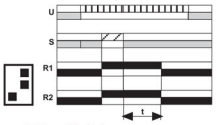
R1: on delay
R2: on delay



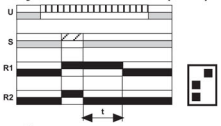
R1: on delay
R2: instantaneous c. (TOE)



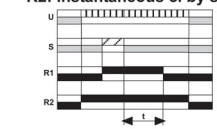
R1: off delay
R2: off delay



R1: off delay
R2: instantaneous c. by start contact (TOR)

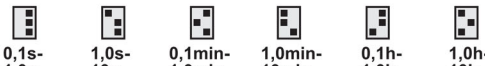


R1: off delay
R2: instantaneous c. by supply voltage



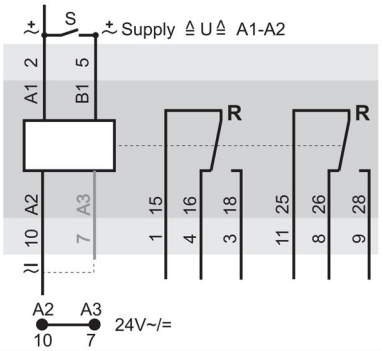
Remove supply voltage before making any changes to either time range or timing function.

Time ranges (PRER2, TOE, TOR)



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

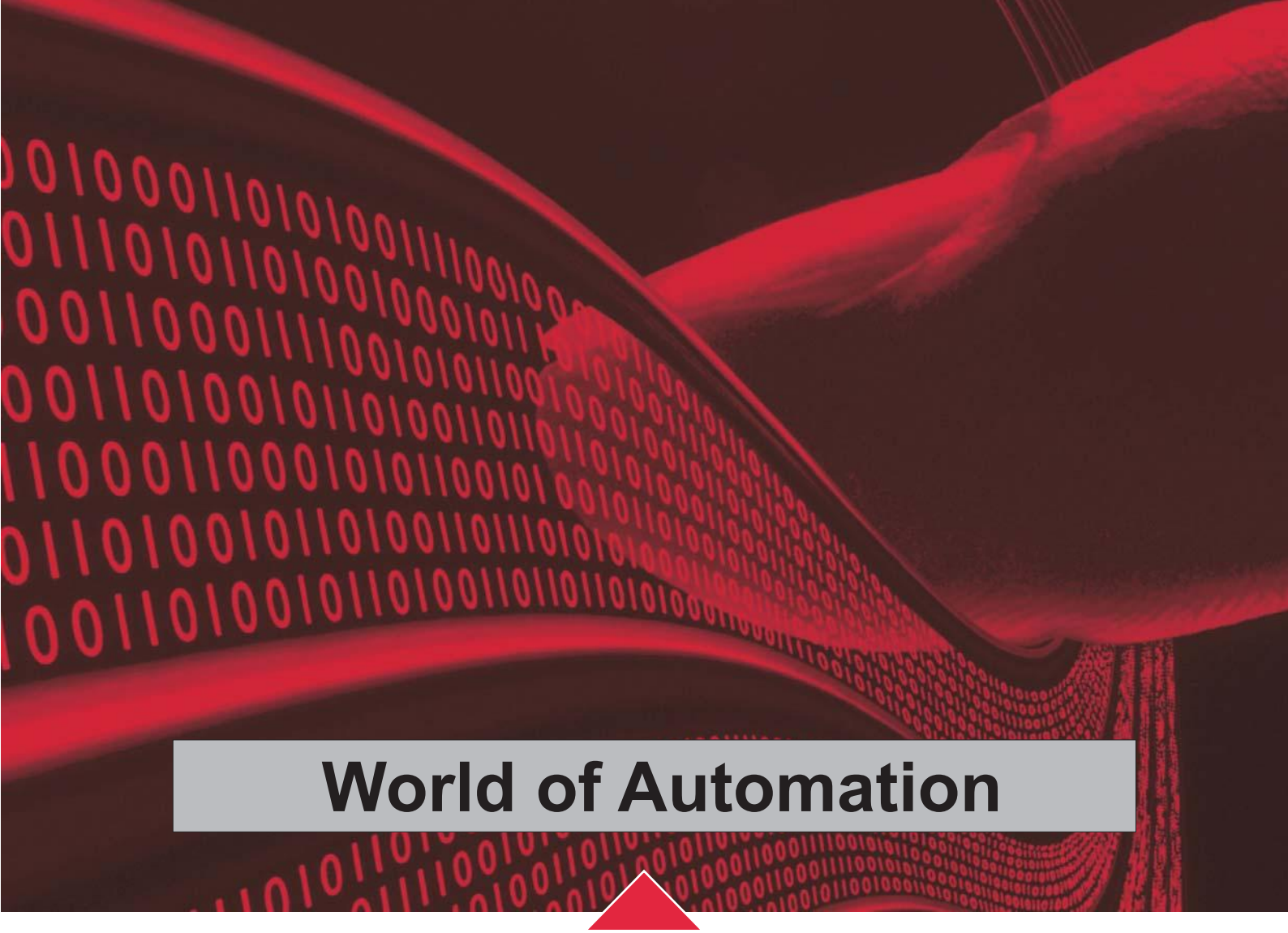
supply voltage variation	nominal voltage +10% / -15%		
frequency range	48 - 63 Hz		
max. delay time	100% of the selected range		
repeat accuracy	< 1% of the selected range		
relaytype		1	2
output relay specification			
Ie AC-15*	250V~	6A	1A
Ie DC-13*	30V=	4A	1,5A
expected life time			
mechanical		1 x 10^7 resp.	1 x 10^7 operations
electrical		1 x 10^5 resp.	1 x 10^5 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	cULus	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

HIQUEL® HIGH QUALITY ELECTRONICS



World of Automation

Chapter 4: Signal converting relays

HIQUEL®
HIGH QUALITY ELECTRONICS

www.hiquel.com

Index

4 Chapter 4: signal converting relays

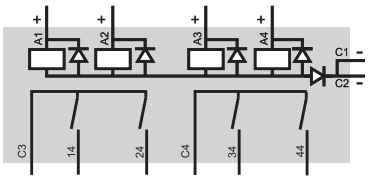
HIQUEL® HIGH QUALITY ELECTRONICS

K4S/K2W

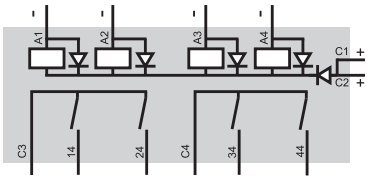
overview

- **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**

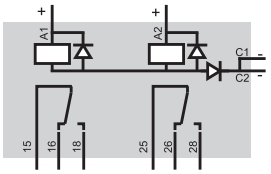
K4S-24P, K4S-12P



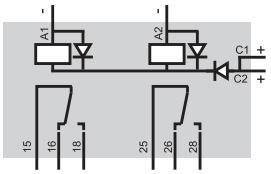
K4S-24N, K4S-12N



K2W-24P, K2W-12P



K2W-24N, K2W-12N



specification

coil voltage		nominal voltage +10% / -15%
duty cycle		100%
output relay specification		max. 6A 230V~
relay type		1
le AC-15*	120V~	5A
le AC-15*	240V~	4A
le DC-13*	24V=	4A
expected life time		DPCO SPCO
mechanical		2 x 10^6 resp. 1 x 10^7 operations
electrical		1 x 10^5 resp. 1 x 10^5 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	cULus	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

HIQUEL® HIGH QUALITY ELECTRONICS

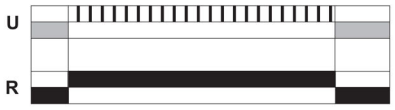
DMVR

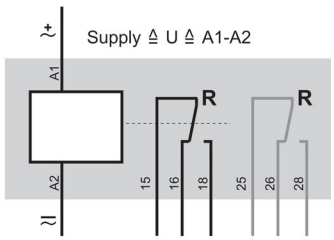
overview

- **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**

PLC interface relay 24-240Vac/dc

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





specification

coil voltage		nominal voltage +10% / -15%	
duty cycle		100%	
relay type		1	3
output relay spec	230V~	6A	10A
Ie AC-15*	120V~	4A	5A
Ie AC-15*	240V~	3A	4A
Ie DC-13*	24V=	2A	4A
expected life time		DPCO	SPCO
mechanical		2×10^6 resp.	1×10^7 operations
electrical		1×10^5 resp.	1×10^5 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 UL us	housing types
DMVR	24 - 240V~=	2VA	SPCO	3	-	A
DMVR2	24 - 240V~=	2VA	DPCO	1	-	B

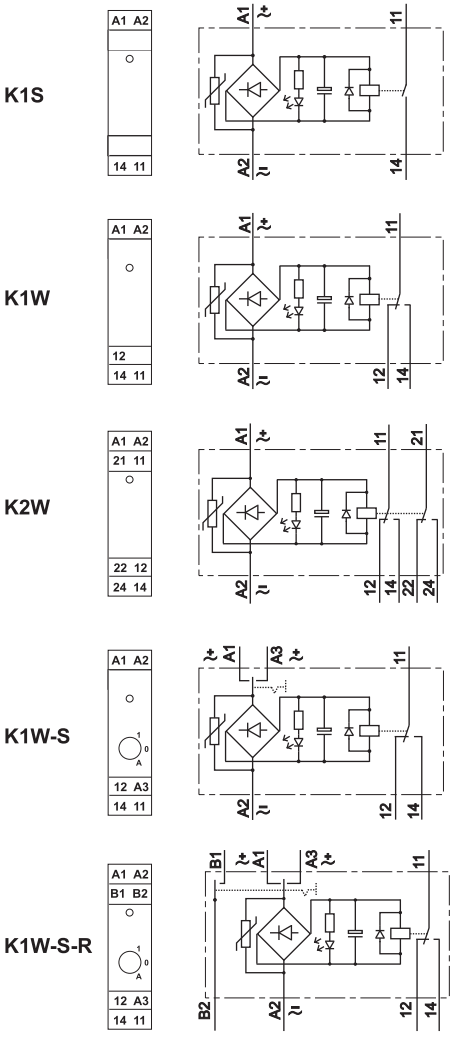
other voltages on request

HIQUEL® HIGH QUALITY ELECTRONICS

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

coil voltage		nominal voltage +10% / -15%	
duty cycle		100%	
nominal current		15mA	
suppressor circuit		freewheeling diode and varistor	
relay type		1	2
output relay spec.	230V~	10A	2A
Ie AC-15*	120V~	1,5A	-
Ie AC-15*	240V~	1,5A	-
Ie 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		2×10^6	resp. 1×10^7 operations
electrical		1×10^5	resp. 1×10^5 operations
screw tightening torque		0,5Nm	
operating conditions		-20 to +60°C non condensing	

* EN 60947-5-1 VDE 0435

ordering information

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

other voltages on request

PLC interface relay in 11.25mm housing

HIQUEL® HIGH QUALITY ELECTRONICS

SW1/SW2/SW3

overview

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

SW1	**3,0V ON**	**2,5V OFF**
SW2	**7,0V ON**	**6,5V OFF**
SW3	**2,0V ON**	**1.5V OFF**

- **LED indicators for output**
- **11.25mm DIN rail mount housing**

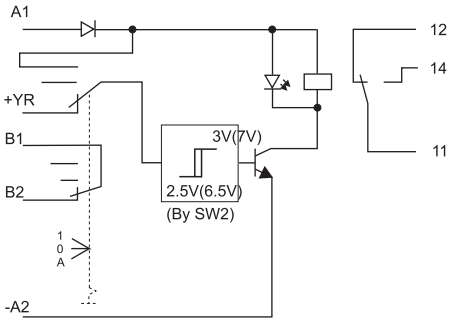
SW1/SW2/SW3:

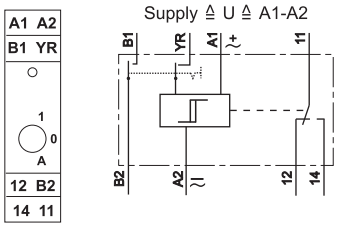
The SW triggers are designed to control pumps, fans, burners etc. They are also designed to operate with an analogue 0-10VDC control signal.

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

coil voltage		nominal voltage +10% / -15%
duty cycle		100%
nominal current		15mA
suppressor circuit		freewheeling diode and varistor
relay type		1
output relay spec	230V~	10A
Ie AC-15*	120V~	5A
Ie AC-15*	240V~	4A
Ie 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		2×10^6 resp. 1×10^7 operations
electrical		1×10^5 resp. 1×10^5 operations
screw tightening torque		0,5Nm
operating conditions		-20 to +60 °C non condensing

* EN 60947-5-1 VDE 0435

ordering information

part no	supply		output	relay type	cULus	housing types
SW1 24Vac/dc	24V~=	600mW	SPCO	1	-	O
SW2 24Vac/dc	24V~=	600mW	SPCO	1	-	O
SW3 24Vac/dc	24V~=	600mW	SPCO	1	-	O

HIQUEL® HIGH QUALITY ELECTRONICS

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 & ⊥) 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).

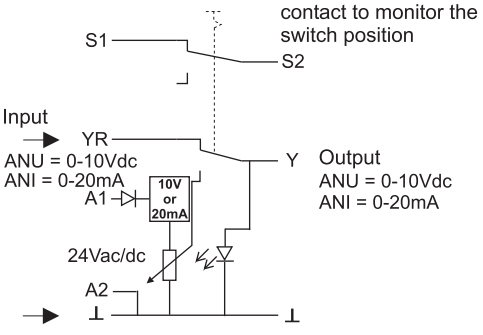
The brightness of the LED “Y” is proportional to the output signal level.

The output is short circuit protected.

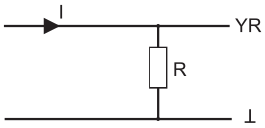
specification

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

ANU



A1 - A2: Supply voltage



Application with ANU: Input 0-20mA; Output 0-10Vdc

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

ordering information

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

analogue voltage simulator

HIQUEL® HIGH QUALITY ELECTRONICS

LSM

overview

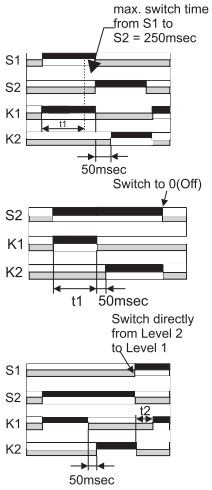
- **power supply 230V~**
- **2 adjustable timers**
- **2 relay outputs 230V~**
- **LED indicators for level 1+2**
- **22.5mm DIN rail mount housing**

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.

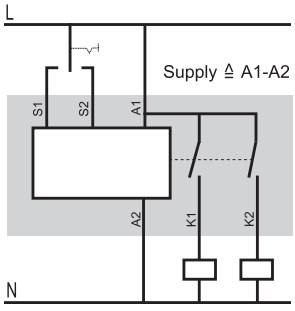
The 3 functions are:

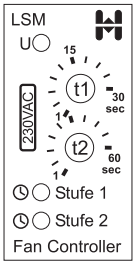


1.) In switch position 1 the motor will run in low speed during the set time t1. After the time t1 has expired it is possible to switch over to position 2 for high speed.
The switch over time is max. 250 msec. If this is exceeded the LSM goes to function 2.

2.) If switch position 2 (high speed) is selected before switch position 1, the motor will be forced to run for the time t1(low speed).
After t1 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 t2 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.





specification

supply voltage varation		nominal voltage +10% / -15%
frequency range		48-63Hz
duty cycle		100%
repeat accuracy		<1% of the selected range
output relay specification		max. 6A 230V~
relay type		1
le AC-15*	120V~	5A
le AC-15*	240V~	4A
le DC-13*	24V=	4A
expected life time		DPCO SPCO
mechanical		2 x 10^6 resp. 1 x 10^7 operations
electrical		1 x 10^5 resp. 1 x 10^5 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	cULus	housing types
LSM 230Vac	230V~ 8VA	2 x SPNO	1	-	A
				-	

HIQUEL® HIGH QUALITY ELECTRONICS

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.

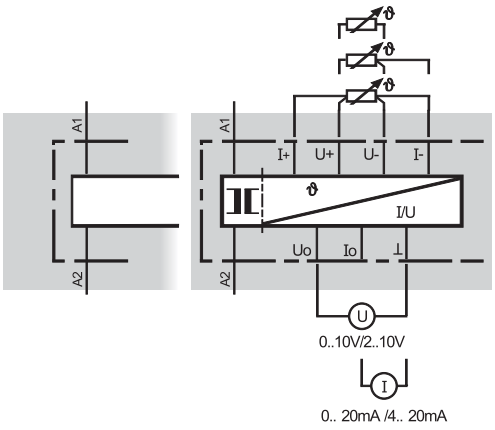
The different probe connection types are detected automatically.

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

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



ordering information

part no	supply		sup. galv. iso.*	cULus	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

HIQUEL® HIGH QUALITY ELECTRONICS

MU-TC

overview

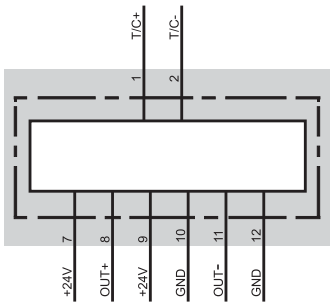
- thermocouple to analogue signal transducer
- supply voltage 24Vdc
- high linearity, long term stability
  high temperature stability
- selectable thermocouple input
- 23mm DIN rail mount housing

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	



specification

supply voltage	24V= ±10%	
power consumption	1.4W	
input	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
output	0-10V	0.5 Ohm
temperature drift	±2°C	
isolation	1.000V=	
screw tightening torque	0,5Nm	
operating conditions	0 to +50°C non condesning	

ordering information

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

HIQUEL® HIGH QUALITY ELECTRONICS

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**

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								
+/-10V	0~10V								
+?-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, 0~100mV, 0~0.5V, 0~1V,	ON		ON		ON			ON
0~20mA	-10mV, -50mV, -100mV, 0.5V, -1V, -5V, -20mA		ON		ON			ON	
	0~10mV, 0~50mV, 0~100mV, 0~0.5V, 0~1V,		ON		ON				
	0~10V		ON		ON				ON
-10V	-10mV, -50mV, -100mV, 0.5V, -1V, -5V, -20mA	ON		ON					
	0~10V	ON		ON					ON
0~10V	-10mV, -50mV, -100mV, 0.5V, -1V, -5V, -20mA	ON		ON				ON	
	0~10mV, 0~50mV, 0~100mV, 0~0.5V, 0~1V,	ON		ON					
	0~10V	ON		ON					ON

Table 2: switch positions of output

Specification

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

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.

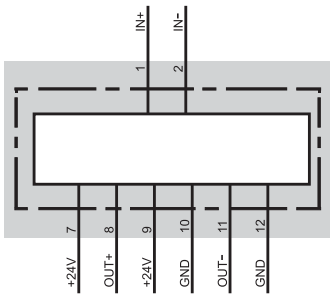


Figure 1. terminal wiring of MU-UI

ordering information

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

transducer for strain gauge sensors

0-10V

4-20mA

DIN

HIQUEL® HIGH QUALITY ELECTRONICS

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.

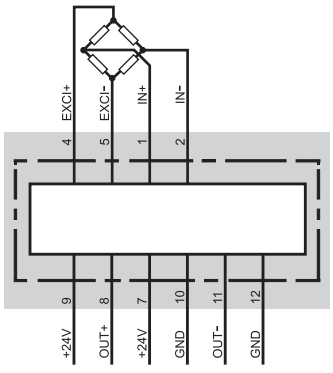


Figure 1. Terminal wiring of MU-DMS

specification

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

ordering information

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

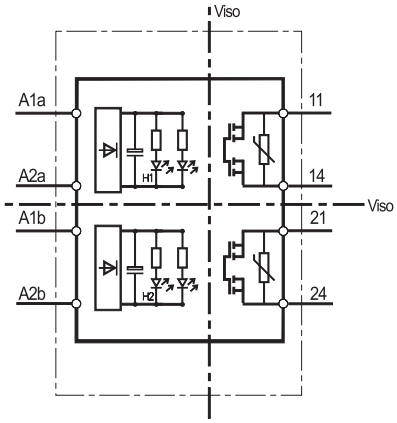
HIQUEL® HIGH QUALITY ELECTRONICS

K1T/K2T

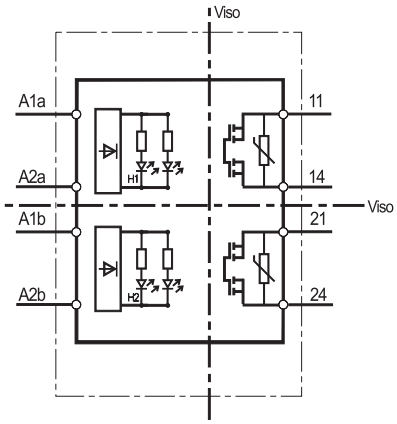
overview

- **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**

K2T xxac/dc



K2T xxdc



specification

supply voltage	nominal voltage ±10%
duty cycle	100%
protection circuit	VDR
voltage deviation	±20%
	(duration of deviation less
	than 5s,
	no output change)
turn-on time	
DC-version	<10µs
AC/DC-version	<20ms
turn-off time	
DC-version	<40µs
AC/DC-version	<40ms
isolation voltage	2,5kV
on-state voltage	<3V
output voltage range	24Vac/dc.. 230Vac/dc
max. load current	500mA ac/dc
output	photomos
screws	pozidrive 1
screw tightening torque	0,6..0,8Nm
operating conditions	-20 to +60°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
K1T 12Vdc..30Vdc	12V=..30V=	1,5kΩ	<8mA	(230V*500mA)@1Hz	10.000Hz@(230V*40mA)	B
K1T 12Vac/dc..30Vac/dc	12V~/=..30V~/=	1,5kΩ	<8mA	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
K1T 24Vac/dc..230Vac/dc	24V~/=..230~/=	6,0kΩ	<21mA	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
K2T 12Vdc..30Vdc	12V=..30V=	1,5kΩ	<8mA	(230V*500mA)@1Hz	10.000Hz@(230V*40mA)	B
K2T 12Vac/dc..30Vac/dc	12V~/=..30V~/=	1,5kΩ	<8mA	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B
K2T 24Vac/dc..230Vac/dc	24V~/=..230V~/=	6,0kΩ	<21mA	(230V*500mA)@1Hz	5Hz@(230V*100mA)	B

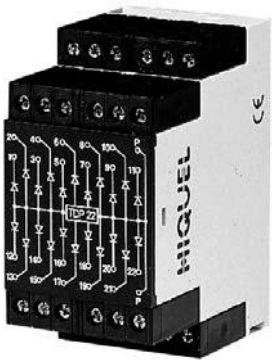
other voltage on request

* Ri = power-on input resistance
* Icont = current through input pin after 5 sec

HIQUEL® HIGH QUALITY ELECTRONICS

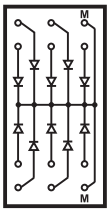
TV../TD..

overview

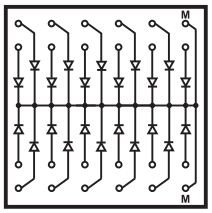


- multi way diode boxes
- common cathode for alarm integration
- common anode for lamp testing
- up to 34 1000v diodes in one housing
- 22.5/45/67.5mm DIN rail housing or 11pin plug in housing

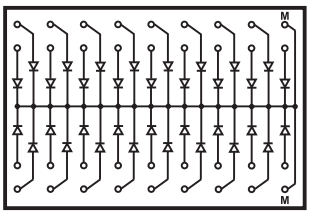
TDM 10



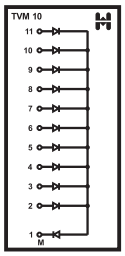
TDM 22



TDM 34

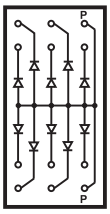


TVM 10

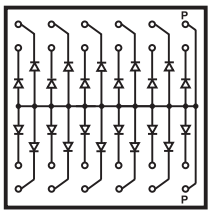


Multi-way diode box for the integration of multiple alarm circuits where any one of a number of alarm signals will activate an output.

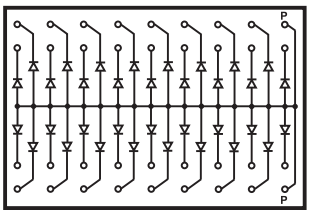
TDP 10



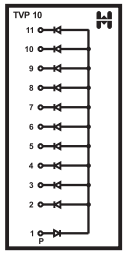
TDP 22



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	cULus	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

HIQUEL® HIGH QUALITY ELECTRONICS