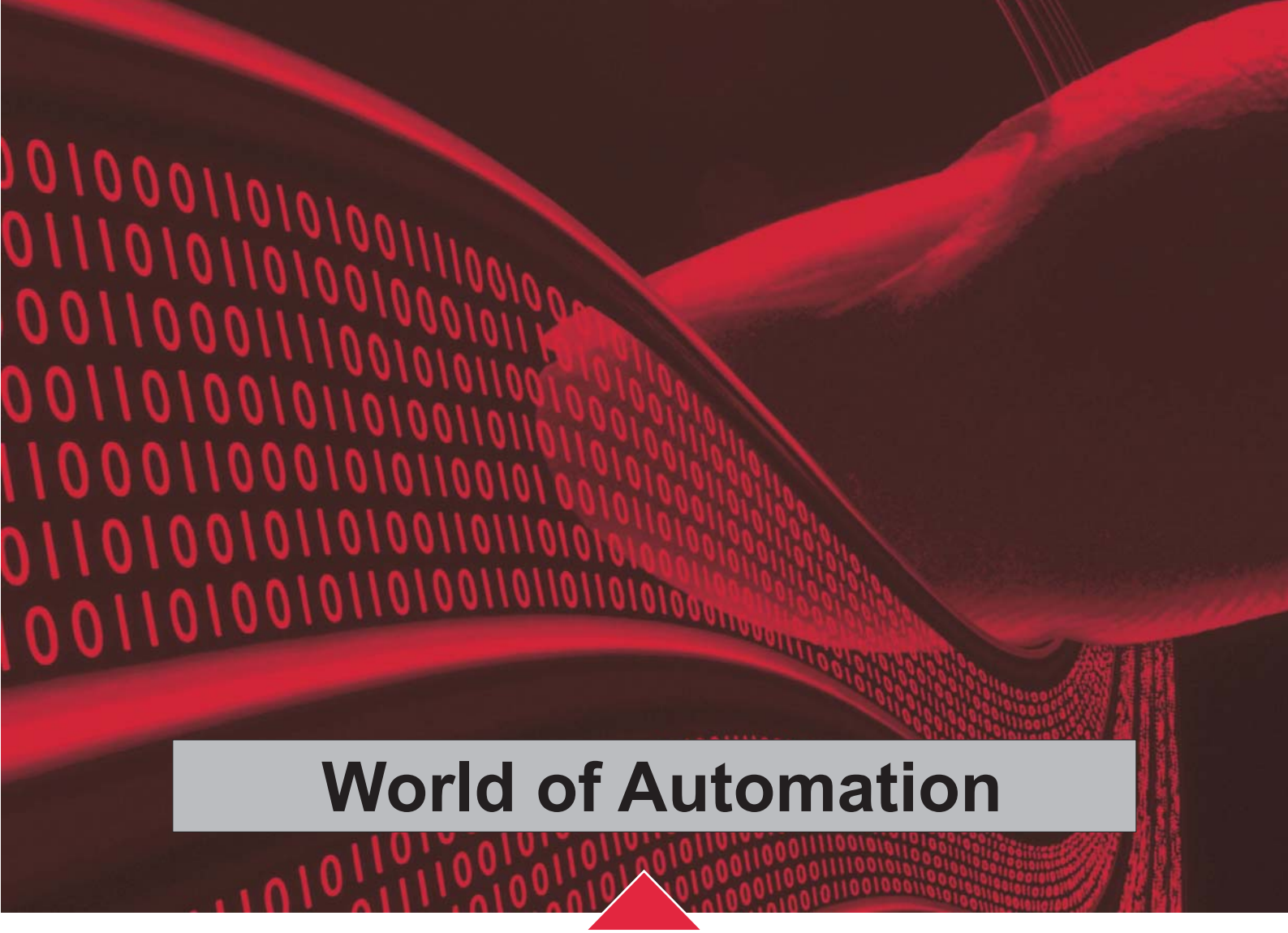

World of Automation

Chapter 3: Timing relays

HIQUEL®
HIGH QUALITY ELECTRONICS

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Index

3 Chapter 3: Timing relays

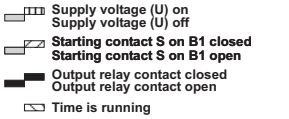
HIQUEL® HIGH QUALITY ELECTRONICS

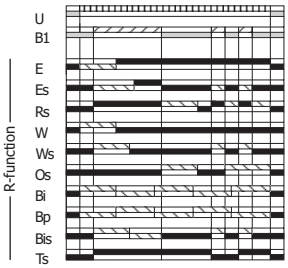
ITM16

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



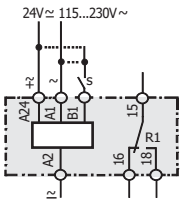


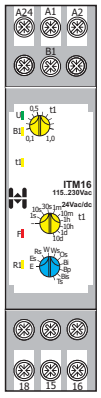
Functions:
E...On delay
Es...On delay with external control input
Rs...Off delay with external control input
W...On pulse single shot
Ws...On pulse single shot with external control input
Os...Off pulse with external control input
Bi...Symmetrical recycler pulse first
Bp...Symmetrical recycler pause 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

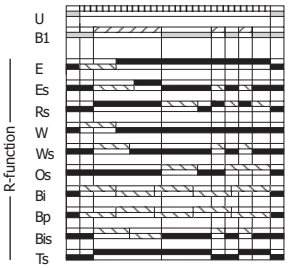
Multifunction

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

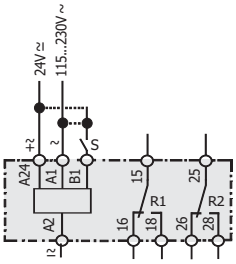


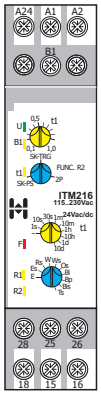
Functions:
E...On delay
Es...On delay with external control input
Rs...Off delay with external control input
W...On pulse single shot
Ws...On pulse single shot with external control input
Os...Off pulse with external control input
Bi...Symmetrical recycler pulse first
Bp...Symmetrical recycler pause 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 10^6 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

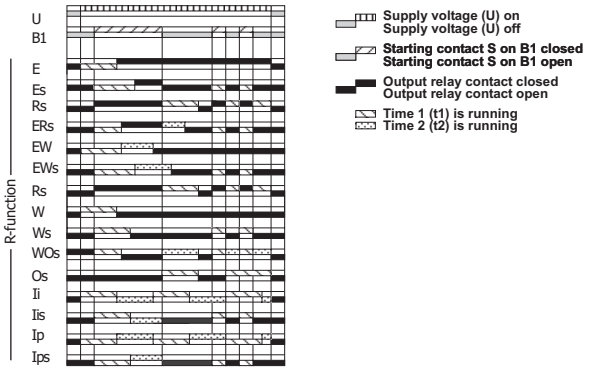
HIQUEL® HIGH QUALITY ELECTRONICS

ITM17

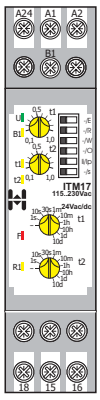
overview

- 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



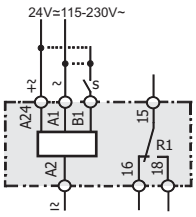
Functions
E...On delay
Es...On delay with external control input
Rs...Off delay with with external control input
ERs...On delay and off delay with external control input
EW...On delay and on pulse / delayed single shot
EWs...On delay and on pulse / delayed single shot with external control input
W...On 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 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

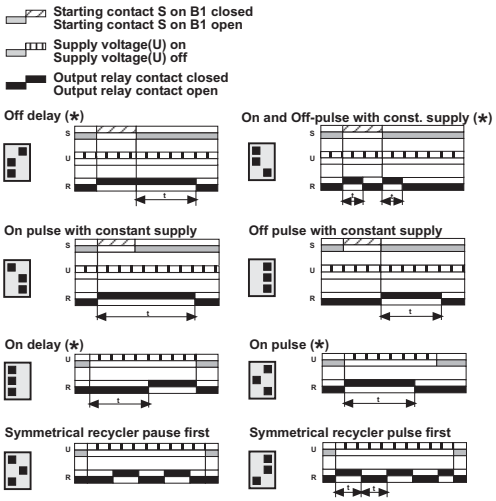
* The measurement input is galvanically isolated from the power supply

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

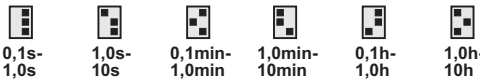


Remove supply voltage before making any changes to either time range or timing function.

(*) available T3F functions

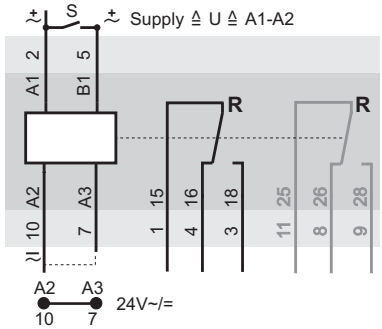
A detailed description of each of the timing functions will be found on the following 'single function' type pages.

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

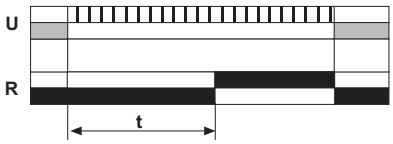
TE/DER

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

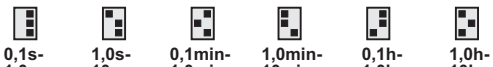
Supply voltage on
Supply voltage off
Output relay contact closed
Output relay contact open



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

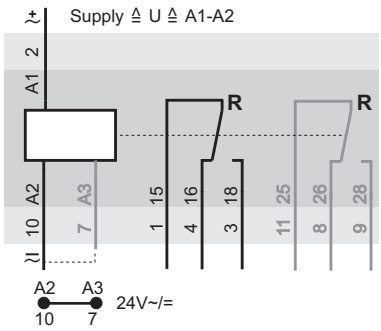
On the application of the supply voltage, time delay ***t*** commences. At the end of the time delay the output relay pulls in. When the supply voltage is removed the output relay drops out and the time relay resets ready for the next timing cycle.
If the supply voltage ist removed during time ***t***, 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
le AC-15*	120V~	4A	5A
le AC-15*	240V~	3A	4A
le 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

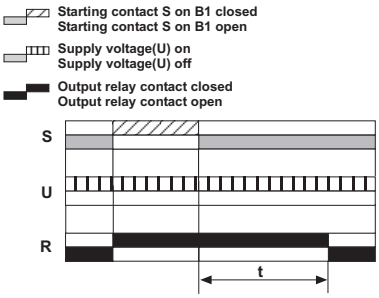
HIQUEL® HIGH QUALITY ELECTRONICS

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

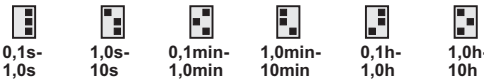


Remove supply voltage before making any changes to either time range or timing function.

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.

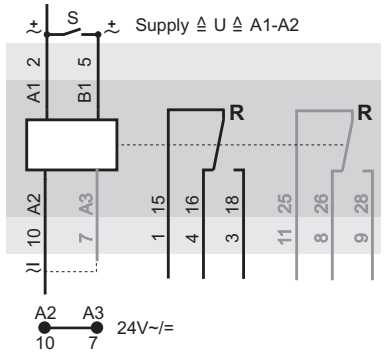
Important application note:
*On types **TR12,13 & 15** only, small inductive devices (relays etc..), can be connected between the B1 terminal and ground (-ve) such that they energise when the A1-B1 start contact is made. A snubber circuit should be included for larger devices. **Do not do this on types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

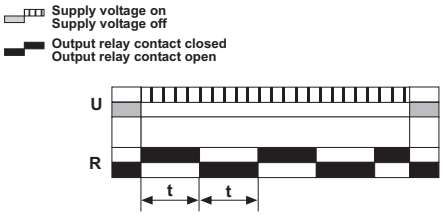
HIQUEL® HIGH QUALITY ELECTRONICS

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**

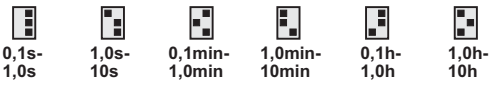
Symmetrical recycler



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

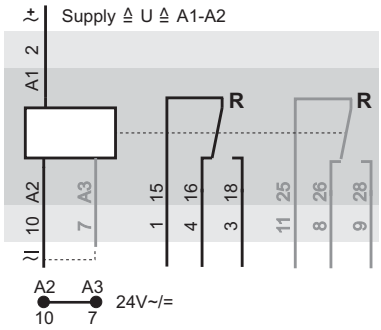
On the application of the supply voltage the output relay pulls in and timing period ***t*** starts.
At the end of time ***t*** the output relay drops out and remains dropped out for a period equal to time ***t***.
An on-off action with a 1:1 time ratio continues until the supply voltage is removed when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

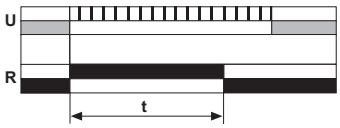
overview

- **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

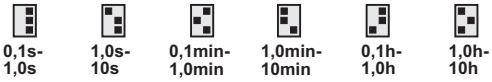
Output relay contact closed
Output relay contact open



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

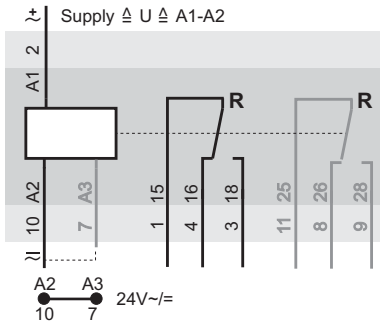
On the application of the supply voltage the output relay pulls in for the duration of time ***t*** and then drops out.
The time relay resets ready for the next timing cycle when the supply voltage is removed.
If the supply voltage is removed during time ***t*** the output relay drops out, the remaining 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
le AC-15*	120V~	4A	5A
le AC-15*	240V~	3A	4A
le 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

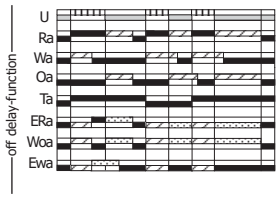
ITA

overview

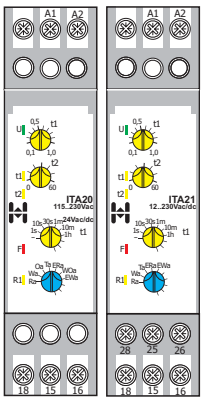
- **zoom supply voltage**
- **SPCO or DPCO output relay**
- **6 selectable time ranges (up to 1hrs)**
- **LED indicators for power supply,failure , relay status and timer**
- **22.5mm DIN rail mount housing**

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



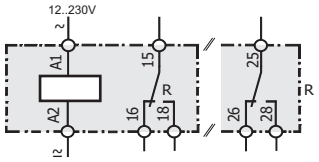
Time range t1

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 x 10^6 operations	
electrical	1 x 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

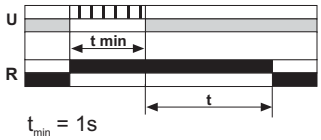
TA

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

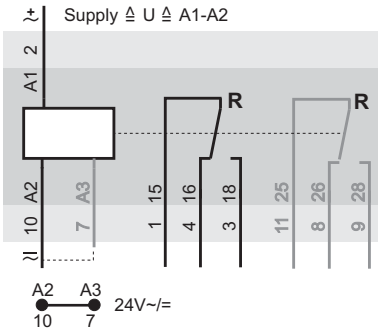
Remove supply voltage before making any changes to either time range or timing function.

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
le AC-15*	120V~	5A	4A
le AC-15*	240V~	5A	3A
le 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

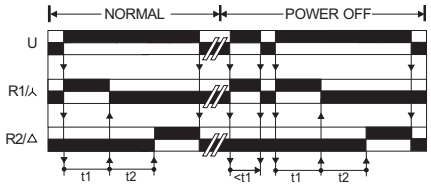
HIQUEL®
HIGH QUALITY ELECTRONICS

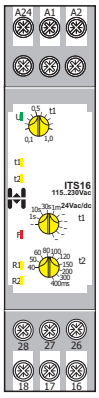
ITS16

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**

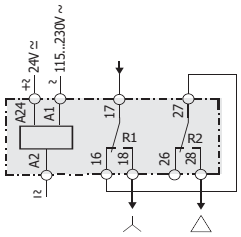
Star-Delta-Timer





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.



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

ordering information

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

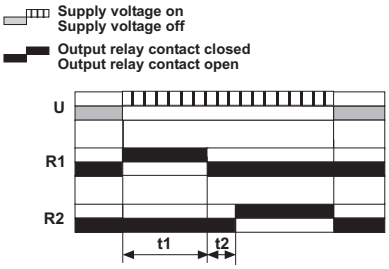
HIQUEL® HIGH QUALITY ELECTRONICS

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

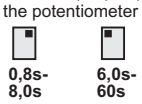


Remove supply voltage before making any changes to either time range or timing function.

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.

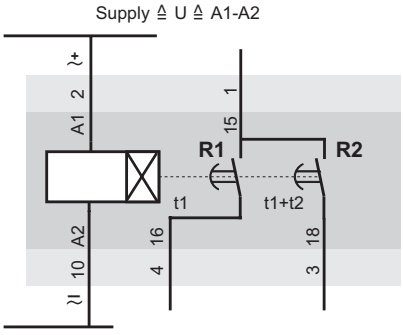
Time ranges

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



dwell time (=t2)

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

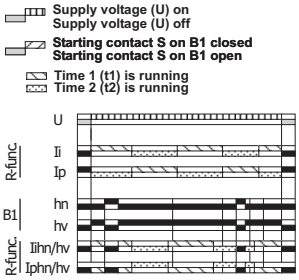
HIQUEL® HIGH QUALITY ELECTRONICS

ITI16

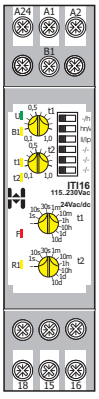
overview

- 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



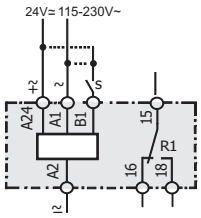
Functions:
Ii...Asymmetrical recycler pulse first
Ip...Asymmetrical recycler pause first
Iihn...Asymmetrical recycler pulse first with normal inhibit
Iphn...Asymmetrical recycler pause first with normal inhibit
Iihv...Asymmetrical recycler pulse first with inverse inhibit
Iphv...Asymmetrical recycler 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 x 10^6 operations
electrical	1 x 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

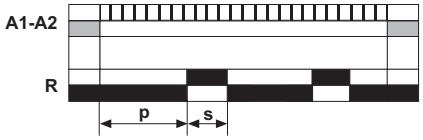
- **“pulse first” or “pause first” adjustable**
- **single, dual or zoom supply voltage options**
- **SPCO or DPCO output relay**
- **2 x 6 selectable time ranges 0.1sec - 30Hrs**
- **LED indicators for power supply and relay status**
- **22.5mm DIN rail mount housing or 11pin plug in housing**

Asymmetrical recycler

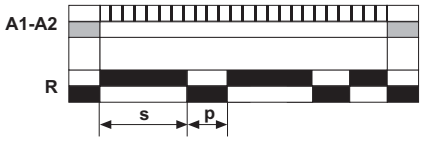
Supply voltage on
Supply voltage off

Output relay contact closed
Output relay contact open

asymmetrical recycler pause first



asymmetrical recycler signal first



specification

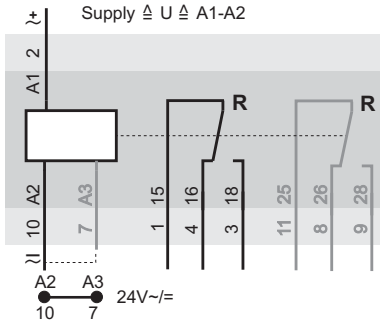
supply voltage variation		nominal voltage +10% / -15%			
frequency range		48 - 63 Hz			
max. delay time		100%			
repeat accuracy		< 1% of the selected range			
relay type		1	2	3	4
output relay spec. R_{TH}		10A	10A	8A	6A
Ie AC-15*	115Vac	2,5A	1,5A	1,5A	3,5A
Ie AC-15*	230Vac	2,5A	1,5A	1,5A	3A
Ie DC-13*	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

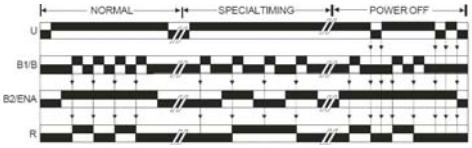
HIQUEL®
HIGH QUALITY ELECTRONICS

ITT16

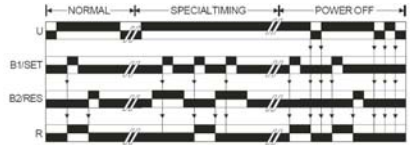
overview

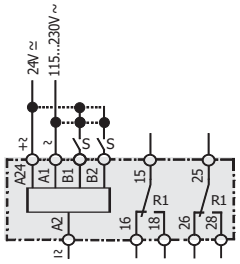
- zoom supply voltage
- 3 toggle functions
- 4 flip-flop functions
- 3 timerelay functions
- DPCO output relay
- LED Indicators for power supply, failure, output relay, control contacts and timer
- 22.5mm DIN rail mount housing

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

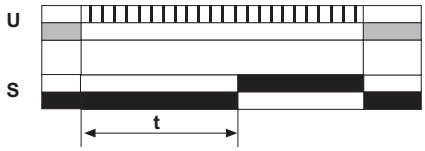
DES/PES/TES

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.

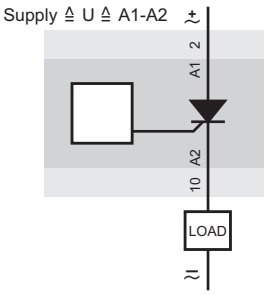
On the application of the supply voltage, time delay ***t*** commences. At the end of the time delay the thyristor switches the full supply voltage through to the load connected to the A2 terminal (max. load 700mA continuous, 20A <10mS).
If the supply voltage is removed during time ***t***, the unexpired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

HIQUEL® HIGH QUALITY ELECTRONICS

DER-M

overview

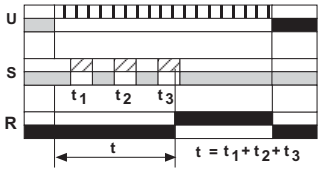
- supply voltage 24-240V~=
- SPCO output relay
- 7 selectable time ranges 0.1sec - 30Hrs
- LED indicators for power supply and relay status
- 22.5mm DIN rail mount housing

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



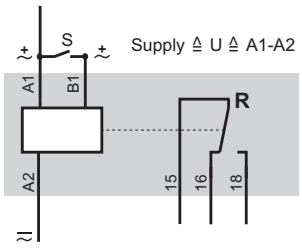
Remove supply voltage before making any changes to either time range or timing function.

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

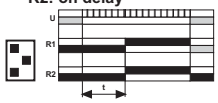
overview

- **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**

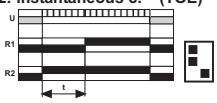
on / off delay - instantaneous contact (PRER2)

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

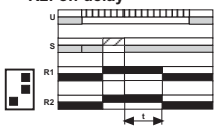
R1: on delay
R2: on delay



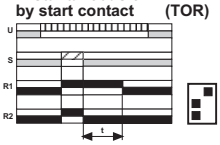
R1: on delay
R2: instantaneous c. (TOE)



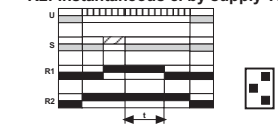
R1: off delay
R2: off delay



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



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

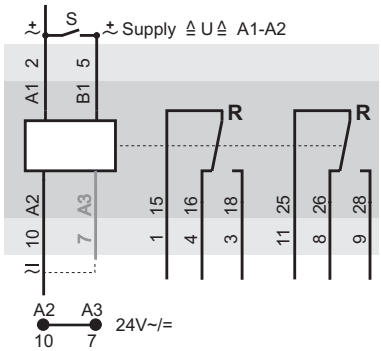


Remove supply voltage before making any changes to either time range or timing function.

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