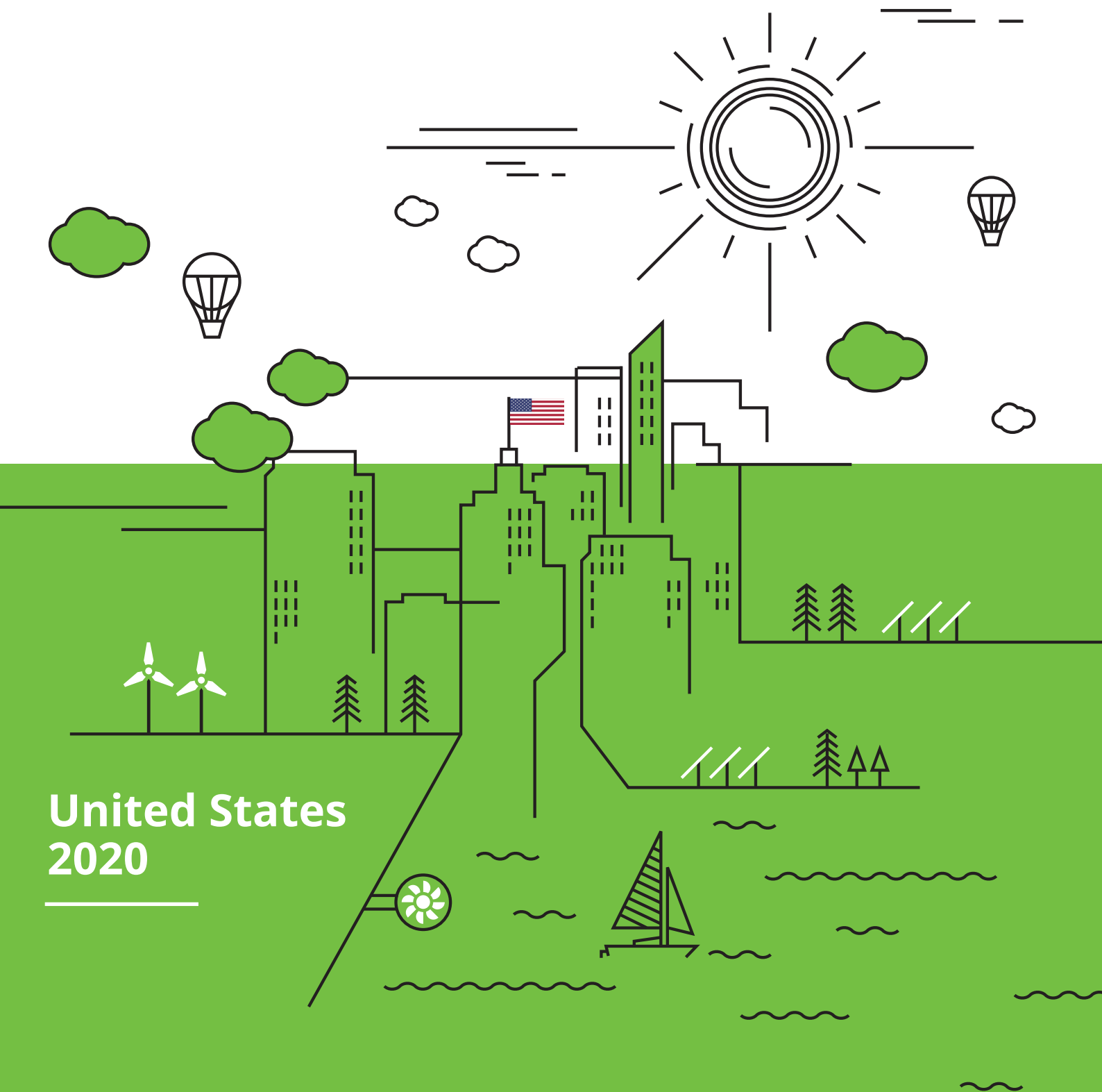


# Product Catalog



**United States  
2020**

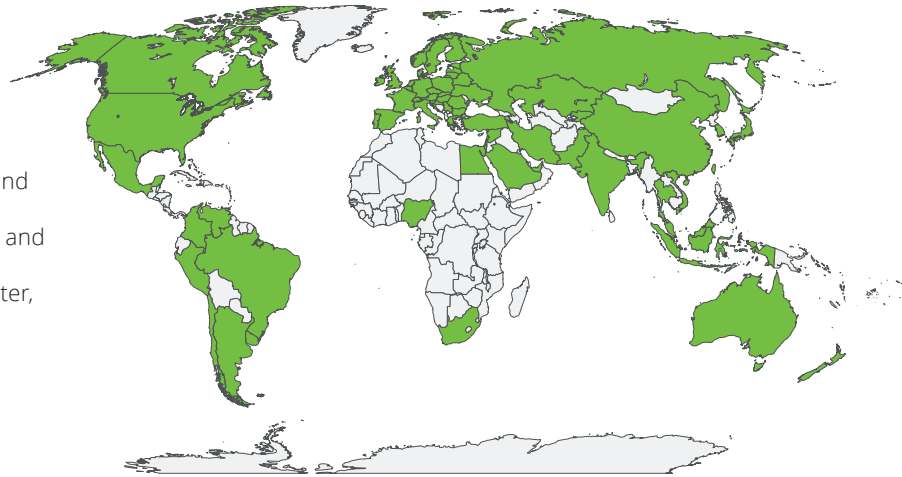
# Made in Austria

TELE Haase Steuergeraete GesmbH

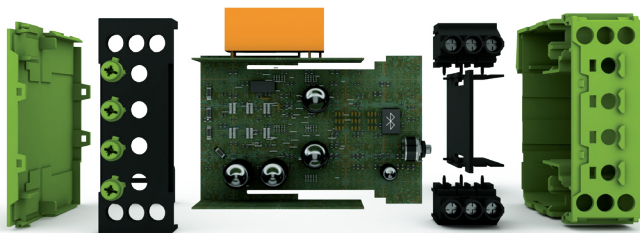


**PAST** TELE Haase Steuergeraete is an Austrian based, family owned technology company that is passionate about hiring the best in the business to develop and manufacture control and monitoring solutions for both, the energy and industrial sector.

Founded in 1963, TELE Haase has been a market leader for time and monitoring relays and has been developing customized solutions and components for the industrial and energy sectors for more than five decades.



**PRESENT** TELE products are being used the world over and are most often used in control cabinets, industrial plants and transformer stations, as well as being utilized in wind, water, and solar energy power plants.



**FUTURE** In the coming years, our technology is poised to integrate seamlessly into the industrial landscape by learning to communicate and deliver its data across different interfaces in the network to the people and places that the data is needed. This is going to pave the way for the factory of the future and, even better, will allow industries to be more efficient, green, and worker friendly.

# Serving the USA

## TELE Controls Inc.

All of TELE Haase's industrial electronic technology products are developed and manufactured in Vienna, Austria. Our products are designed to protect, monitor and automate systems for a wide range of industries.

Since 2018, TELE Controls Inc. has been based out of Arlington, Virginia, fulfilling and exceeding the local sourcing needs of OEMs to resellers, and distributors all throughout North America. We are able to provide excellent on-demand project support as well as personal sales assistance.



- ✓ **Headquartered in Vienna, Austria**
- ✓ **Offices in the UK and USA**
- ✓ **Production facility in Austria since 1963**
- ✓ **55+ years of experience**
- ✓ **Global sales network serving 50+ countries**
- ✓ **Reliable and green automation components**

# Product Portfolio



## Time Delay Relays

- Single Function Timers
- ON and OFF delay
- Multi-Function Timers
- Timer Modules for Industrial Switching Relays
- Star-Delta Timers
- Digital Timers
- Staircase Timers
- Impulse Encoders
- Alternating Function Timers
- Pump/Load Alternators

## Monitoring Relays

- Phase Failure/Loss
- Phase Sequence
- Phase Unbalance/Asymmetry
- Voltage up to 900V AC
- Current up to 100A AC/DC direct or higher via external CTs
- Effective Frequency from 40–70Hz
- Temperature via PTC, NTC or PT100
- Conductive Liquid Level

## Power Meters

- 1~ Power Meter up to 50A and 1000V with ModbusRTU Interface
- 1~ Power Meter up to 300A and 1000V with ModbusRTU Interface
- Real Power Monitor up to 11kW/15hp direct or higher via external CTs
- Power Factor Monitor up to 11kW/15hp direct or higher via external CTs



## Switching Relays

- RM/RA, Miniature "Ice Cube" Relays
- RT, Industrial Relays RP, PCB Relays
- STKR, PLC Coupling Relays
- Sockets and Modules

## Power Supplies

- Industrial Power Supplies
- Power Supplies for Back-Up Systems
- Compact Power Supplies

## Soft Starters and Braking Units

- 2-ph controlled Soft Starters up to 4kW / 5.5hp
- 3-ph controlled Soft Starters up to 22kW / 30hp

## Thyristor Stacks

- Thyristor Stacks, 1- & 3-phase SCRs
- Semiconductor Fuses
- Fuse Holders

## Accessories

- TR Power Modules
- DIN-Rail Mounting Plates
- Sealable Front Covers
- Conductive Probes
- USB to RS485 Converters

# Product Series

Different designs for different needs:  
ENYA, VEO, and GAMMA – play it safe!



ENYA



VEO



GAMMA

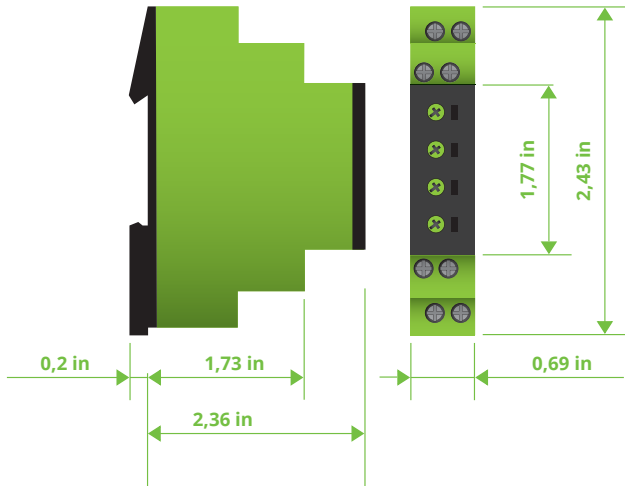
	ENYA	VEO	GAMMA
Product	Time Delay and Monitoring Relays	Time Delay and Monitoring Relays	Time Delay Relays, Monitoring Relays, and Power Monitors
Dimensions (w x h x d)	0.69 / 1.38 x 2.43 x 2.56 in (17.5 / 35 x 87 x 65 mm)	0.88 / 1.76 x 2.64 x 2.99 in (22.5 / 45 x 67 x 76 mm)	0.88 / 1.76 x 3.54 x 4.25 in (22.5 / 45 x 90 x 108 mm)
Design	Economical Design	Compact Industrial Design	Advanced Industrial Design
Marking area	-	Flexible or Fixed	Fixed
Product standards	EN 61812-1 EN 60947	EN 61812-1 EN 60947	EN 61812-1 EN 50178 EN 60947
Energy consumption	0.8 – 1.3W	extra low: 0.35 – 0.6W	1 – 1.5W
Electrical connection	Screw Terminals	Screw or Push-In Terminals	Screw Terminals
Overvoltage category	III / 4kV	III / 4/6kV	III / 4/6kV
Accuracy	≤ 5%	≤ 2.5%	≤ 3%

FOR THE ENTIRE PRODUCT RANGE PLEASE VISIT

[www.tele-controls.com](http://www.tele-controls.com)

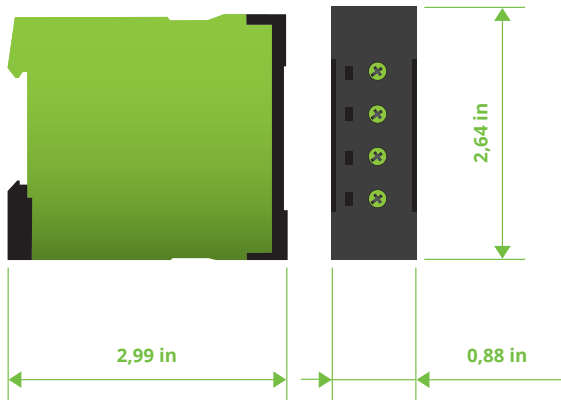
# Product Features

## ENYA



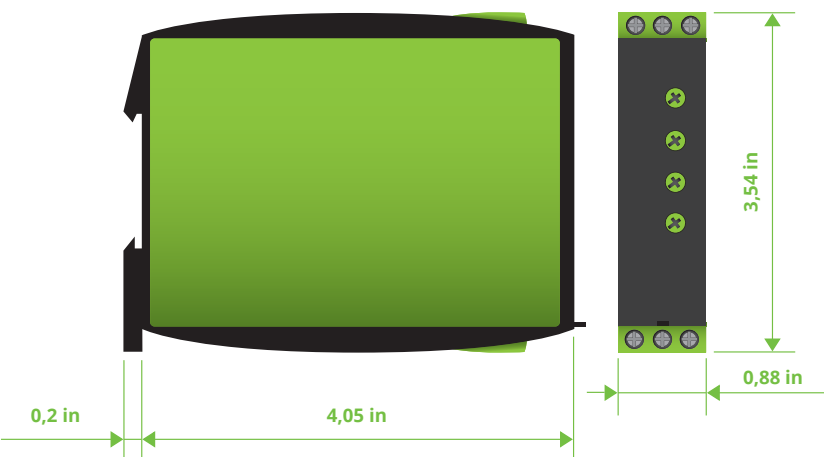
- Economical design
- Time delay and monitoring relays
- Single and Multifunction versions
- Fully adjustable
- SPDT or DPDT outputs
- Operating temperature -13 to +131°F (-25 to +55°C)
- LED indicators
- 12 to 240V AC/DC, power supply
- cULus listed
- CE compliant
- RoHS compliant

## VEO



- Compact industrial design
- Time delay and monitoring relays
- Single and multifunction versions
- Fully adjustable
- SPDT or DPDT outputs
- Low profile
- Extra efficient
- Operating temperature -13 to +140°F (-25 to +60°C)
- LED indicators
- 12 to 240V AC/DC, power supply
- cULus listed
- CE compliant
- RoHS compliant

## GAMMA



- Advanced industrial design
- Time delay and monitoring relays
- Power monitors
- Single and multifunction versions
- Fully Adjustable
- SPDT or DPDT outputs
- Operating temperature -13 to +131°F (-25 to +55°C)
- LED indicators or LCD display
- 12 to 240V AC/DC, power supply
- 12 to 500 VAC, 24V DC power supply via Power Modules
- cULus listed
- CE compliant
- RoHS compliant

# Our Heroes



E1ZM10 12-240 V AC/DC

Extra compact and multifunctional time delay relay for operating voltages from 12-240V AC/DC.  
See page 12



Timer Module COM3T

Transform your regular switching relay into a multifunctional super time delay relay and contactor.  
See page 33



V4PF480V/277VSY02

The ultimate motor protection: Phase and temperature monitor in one compact device.  
See page 22



G4BM480V12ADTL20

The real power monitor that does not require software skills for set-up.  
See page 27



# Function Overview

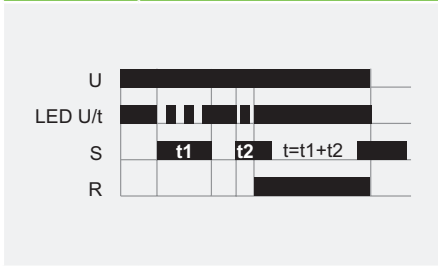
## Time Delay Relays

Our Functions In Detail:

<b>E</b>	<b>ON DELAY</b>
	<p>When the supply voltage U is applied, the set interval t begins. After the interval t has expired the output relay R switches into on-position. This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the expiry of the set interval, the interval t already expired is erased and is restarted when the supply voltage is next applied.</p>
<b>A</b>	<b>OFF DELAY WITHOUT AUXILIARY VOLTAGE</b>
	<p>When the supply voltage U is supplied, the output relay R switches into on-position. If the supply voltage is interrupted, the set interval t begins. After the set interval t has expired the output relay R switches into off-position. If the supply voltage is reconnected before the interval t has expired the interval already is erased and is restarted with the next cycle.</p>
<b>R</b>	<b>OFF DELAY</b>
	<p>The supply voltage U must be constantly applied to the device. When the control contact S is closed, the output relay R switches into on-position. If the control contact is opened, the set interval t begins. After the interval t has expired the output relay switches into off-position. If the control contact is closed again before the set interval has expired, the interval already expired is erased and is restarted.</p>
<b>S</b>	<b>STAR-DELTA START-UP</b>
	<p>When the supply voltage U is applied, the star-contact switches into on-position and the set star-time t1 begins. After the interval t1 has expired the star-contact switches into off-position and the set transit-time t2 begins. After the interval t2 has expired the delta-contact switches into on-position. To restart the function the supply voltage must be interrupted and re-applied.</p>
<b>ER</b>	<b>ON DELAY AND OFF DELAY WITH CONTROL CONTACT</b>
	<p>The supply voltage U must be constantly applied to the device. When the control contact S is closed, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position. If the control contact is opened, the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. If the control contact is opened before the interval t1 has expired, the interval already expired is erased and is restarted with the next cycle.</p>

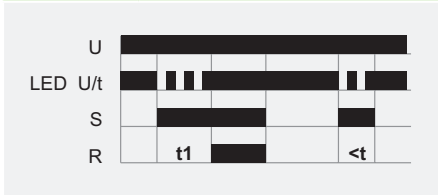


**Ec ADDITIVE ON DELAY**



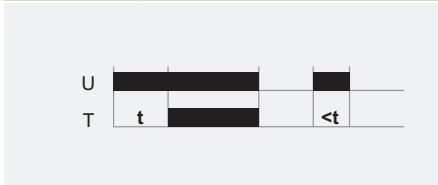
When the supply voltage U is applied, the release for the interval starts. When the control contact S is closed, the set interval t begins. If the control contact S is opened during the set interval t, the interval stops, and the already expired interval is stored. During the lapse of time the control contact can be opened or closed as often as required. If the sum of the periods, in which the control contact S is closed reaches the set interval t the output relay R switches into on-position. The interval is stopped and a further activation of the control contact S remains without effect. By interrupting the supply voltage, the device will be reset. A possibly expired time t is deleted.

**Es ON DELAY WITH CONTROL INPUT**



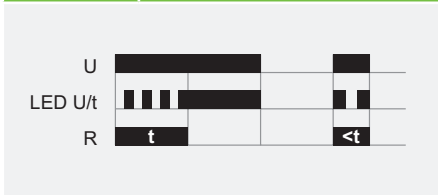
The supply voltage U must be constantly applied to the device. When the control contact S is closed, the set interval t begins. After the interval t has expired the output relay R switches into on-position. This status remains until the control contact is opened again. If the control contact is opened before the interval t has expired, the interval already expired is erased and is restarted with the next cycle.

**ET ON DELAY TWO WIRE CONNECTED**



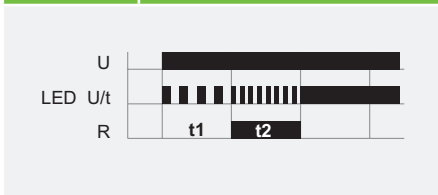
When the supply voltage U is applied, the set interval t begins. After the interval has expired the thyristor switches on. This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the expiry of the interval, the interval already expired is erased and is restarted when the supply voltage is next applied.

**Wu SINGLE SHOT LEADING EDGE VOLTAGE CONTROLLED**



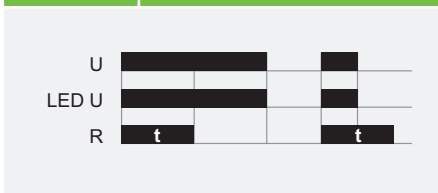
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the interval t has expired, the output relay switches into off-position. The interval already is erased and is restarted when the supply voltage is next applied.

**EWu ON DELAY SINGLE SHOT LEADING EDGE WITH CONTROL CONTACT**



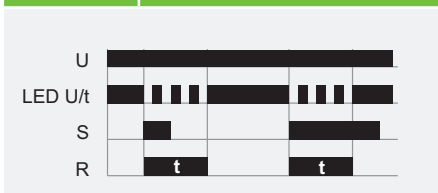
When the supply voltage U is applied, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. If the supply voltage is interrupted before the interval t1+t2 has expired, the interval already expired is erased and is restarted when the supply voltage is next applied.

**nWu MAINTAINED SINGLE SHOT LEADING EDGE**



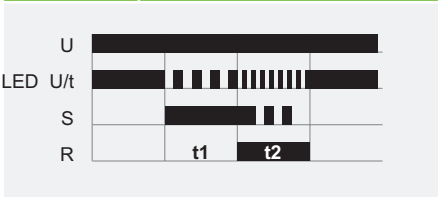
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. This status remains until the supply voltage is interrupted. If the supply voltage is reconnected before the interval t has expired, the unit continues to perform the actual single shot.

**Ws SINGLE SHOT LEADING EDGE WITH CONTROL INPUT**



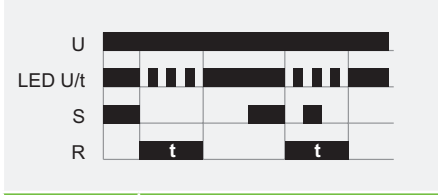
The supply voltage U must be constantly applied to the device. When the control contact S is closed, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

**EWs ON DELAY SINGLE SHOT LEADING EDGE WITH CONTROL CONTACT**



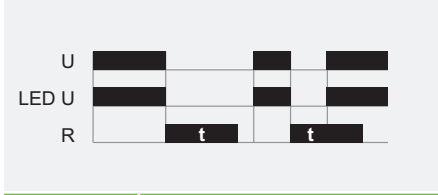
The supply voltage U must be constantly applied to the device. When the control contact S is closed, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

**Wa SINGLE SHOT TRAILING EDGE WITH CONTROL INPUT**



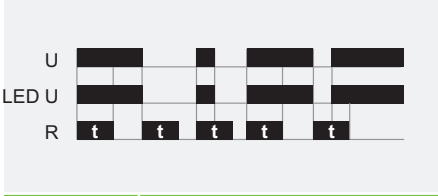
The supply voltage U must be constantly applied to the device. Closing the control contact S has no influence on the condition of the output R. When the control contact is opened, the output relay switches into on-position and the set interval t begins. After the set interval has expired, the output relay switches into off-position. During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

**nWa MAINTAINED SINGLE SHOT TRAILING EDGE**



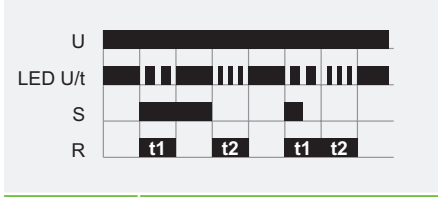
When the supply voltage U is supplied, the output relay R remains into off-position. As soon as the supply voltage is interrupted the output relay switches into on-position and the set interval t begins. After the set interval t has expired the output relay switches into off-position. When the supply voltage is reconnected before the interval t has expired, the unit continues to perform the actual single shot.

**nWuWa MAINTAINED SINGLE SHOT LEADING AND TRAILING EDGE**



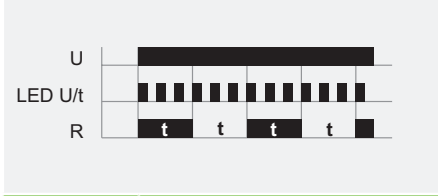
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. As soon as the supply voltage is interrupted the output relay switches into on-position again and the set interval t begins. After the set interval t has expired the output relay switches into off-position. If the supply voltage is interrupted (nWu) or reconnected (nWa) before the interval t has expired the unit continues to perform the actual single shot

**WsWa SINGLE SHOT LEADING AND SINGLE SHOT TRAILING EDGE WITH CONTROL CONTACT**



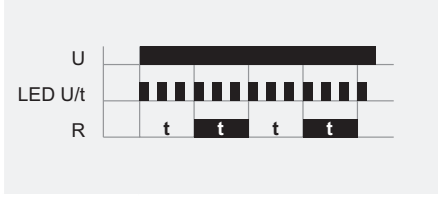
The supply voltage U must be constantly applied to the device. When the control contact S is closed, the output relay R switches into on-position and the set interval t1 begins. After the interval t1 has expired, the output relay R switches into off-position. If the control contact is opened, the output relay again switches into on-position and the set interval t2 begins. After the interval t2 has expired the output relay switches into off-position. During the interval, the control contact can be operated any number of times.

**Bi FLASHER PULSE FIRST**



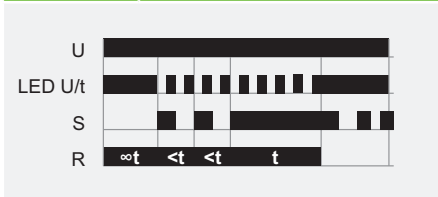
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired, the output relay R switches into off-position and the set interval t begins again. The output relay is triggered at a ratio of 1:1 until the supply voltage is interrupted.

**Bp FLASHER PAUSE FIRST**



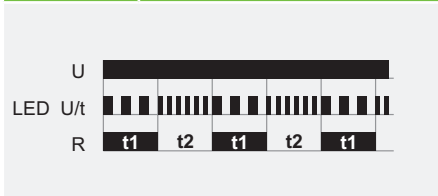
When the supply voltage U is applied, the set interval t begins. After the interval t has expired, the output relay R switches into on-position and the set interval t begins again. After the interval t has expired, the output relay switches into off-position. The output relay is triggered at a ratio of 1:1 until the supply voltage is interrupted.

**Wt PULSE SEQUENCE MONITORING**



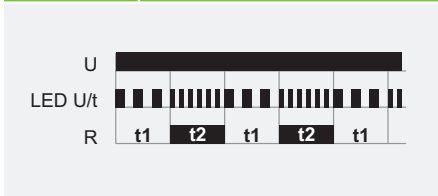
When the supply voltage U is applied, the set interval t1 begins and the output relay R switches into on-position. After the interval t1 has expired, the set interval t2 begins. So that the output relay R remains in on-position, the control contact S must be closed and opened again within the set interval t2. If this does not happen, the output relay R switches into off-position and all further pulses at the control contact are ignored. To restart the function the supply voltage must be interrupted and reapplied.

**li ASYMMETRIC FLASHER PULSE FIRST**



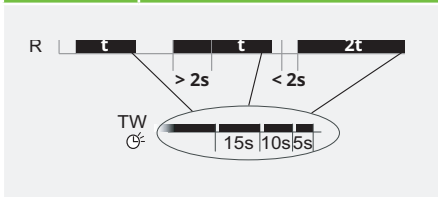
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t1 begins. After the interval t1 has expired, the output relay switches into off-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into on-position. The output relay is triggered at the ratio of t1:t2 until the supply voltage is interrupted.

**lp ASYMMETRIC FLASHER PAUSE FIRST**



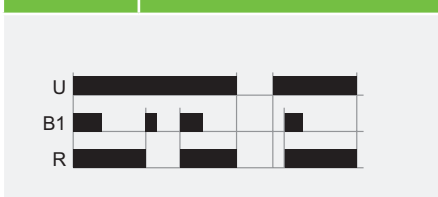
When the supply voltage U is applied, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. The output relay is triggered at the ratio of t1:t2 until the supply voltage is interrupted.

**T, TW FUNCTION AUTOMATIC TIMER WITH (TW) OR WITHOUT (T) SWITCH-OFF WARNING**



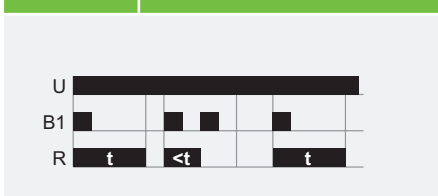
After the pushbutton (control input) has been pressed, the output relay R closes and the set interval t begins. If the pushbutton is pressed again before the interval has expired, the interval begins again (restart function complies with EN 60669-2-3). Rapid, multiple pressing of the pushbutton (pumping) adds 2, 3 or more time intervals to extend the time up to 60 min. Prolonged pressure on the button (> 2 s) aborts the interval running and switches the relay off (energy saving function). In the TW mode the device provides a switch-off warning (in accordance with DIN 180-158-2) by generating short pulses (flashing) at 30s, 15s and 5s prior to switch-off.

**P, PN IMPULSE SWITCH MODE**



In this mode, every keypress of the pushbutton (control input) toggles the output relay R (flip-flop). In function P, the output relay remains in off-position, whenever the supply voltage is applied. In function PN, the output relay switches into on-position after applying the supply voltage U, if the output relay was in on-position last before power failure. In both functions the output relay switches into on-position, if a short voltage impulse (< 2s) is applied to the additional control input (central ON). A longer voltage impulse (> 2s) opens the output relay (central OFF).

**P ( R ) IMPULSE SWITCH MODE WITH OFF DELAY**

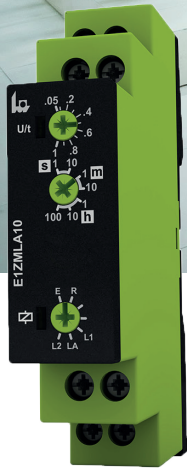


In this mode, every keypress toggles the output relay R (flip-flop). After the pushbutton (control input) has been pressed, the output relay closes and the set interval t begins. After the interval has expired the output relay switches into off-position. If the pushbutton is pressed again before the interval has expired, the interval will be canceled and the output relay switches into off-position.

**LA LOAD ALTERNATOR - PUMP CHANGER**



In this mode, every falling edge toggles the output relay R (flip-flop) from L1 to L2 or L2 to L1 whatever position is defined by the previous status. On Power-Up the relay R stays in off condition until the first falling edge is detected on S Terminal B1. To ensure a safe and optimal function, please turn both timing controllers on the front to the most left position (CCW), which equals 50 msec. In this operation mode, a minimum delay/de-bump time of 50 msec is applied from the falling edge of the control input until relay R is changing its state. Is a longer delay time as 50 msec is set, a short pulse on the „S“ input resets the times. The timer is restarted with the next falling edge signal on „S“ input again. If you wish to apply longer delay times, set the according time selectors to the required values or contact your application engineer.



# E1ZMLA10



Our 3in1 pump alternating relay offers the most capability in the industry's most compact and space-saving DIN-Rail enclosure style. TELE's duplexer controls two loads simultaneously while enhancing the regular alternating function through integrated ON and OFF Delay functionality. The selector switch allows the user to lock in one sequence while the relay works with a wide range control voltage of 24 – 240V AC/DC.

Our E1ZMLA is commonly used in special applications where the optimization of load usage is required by equalizing the run time of two loads. Identical loads are used for the same job—one or more standby units are available in case the first load fails. However, an idle load might deteriorate due to lack of use and provide no safety margin. Alternating relays prevent this by assuring that multiple loads get equal run time. In addition, there are situations where a need arises to have multiple loads on at the same time for additional capacity if one load cannot keep up with demand.

This alternating functionality "LA" is initiated by a control switch, such as a float switch, manual switch, timing relay, pressure switch, or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LED indicators show the status of the output relay, control voltage and timing function.

### Advantages

- 3in1 Duplex Control of Two Loads
- Integrated OFF and ON Delay
- Load Alternator w/ Selector Switch to lock Loads manually
- Control Voltage 24 – 240V AC/DC
- 8A@250VAC SPDT Output
- Low Profile Selector Switch
- 2 LEDs for relay status, timing and operating voltage indication
- cULus, CE, EAC, RoHs
- Rugged Design for Industrial Applications
- Improved Inventory Maintenance


TYPE DESIGNATION	FUNCTIONALITY	DIMENSIONS (W X H X D)	ART.NO.
E1ZMLA10 24-240V AC/DC	Load Alternator (LA), ON (E) and OFF (R) Delay	0.69 x 2.43 x 2.56 in (17,5 x 87 x 65 mm)	110218

TYPE DESIGNATION	E1Z1E10	E1Z1R10	E1Z110	E3Z120	E3ZS20
					
ORDER INFORMATION					
Art. No. single package	-	-	110101	111101	111300
Art. No. package 10 pcs.	110204A	110205A	-	-	-
FUNCTIONALITY	ON DELAY	OFF DELAY	ASYMMETRIC FLASHER	ASYMMETRIC FLASHER	STAR DELTA
<b>E</b> On delay	■				
<b>R</b> Off delay		■			
<b>ER</b> On delay and off delay with control contact				■	
<b>EWu</b> On delay single shot leading edge, voltage-controlled				■	
<b>W<sub>s</sub></b> Single shot leading edge with testkey					
<b>EW<sub>s</sub></b> On delay single shot leading edge with control contact				■	
<b>lp</b> Asymmetric flasher pause first			■	■	
<b>li</b> Asymmetric flasher pulse first			■	■	
<b>W<sub>t</sub></b> Pulse repetition analysis				■	
<b>W<sub>s</sub>W<sub>a</sub></b> Single shot leading and trailing edge with control contact				■	
<b>S</b> Star-Delta start-up					■
POWER SUPPLY CIRCUIT					
Supply voltage	24 - 240V AC/DC		12 - 240V AC/DC	12 - 240V AC/DC	12 - 240V AC/DC
Frequency range	48 - 63 Hz				
TIME CIRCUITS					
Time ranges	7	7	7	7	4
Setting range	0.05 s - 100 h		1 s - 100 h	1 s - 100 h	0.5 s - 3 min
INPUT CIRCUIT					
Trigger input		■	■	■	
OUTPUT CIRCUIT					
Contacts	SPDT	SPDT	SPDT	DPDT	DPDT
Switching capacity	2000VA (8A / 250V AC)		2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)
DESIGN					
Dimensions (w x h x d)	0.69 x 2.43 x 2.56 in (17.5 x 87 x 65 mm)			1.38 x 2.43 x 2.56 in (35 x 87 x 65 mm)	
Certificates	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

## ENYA series time delay relays

TYPE DESIGNATION	E1ZM10 12-240V	E1ZM10 24-240V	E1ZMQ10	E1ZMW10	E3ZM20
					
ORDER INFORMATION					
Art. No. single package	110100	110200	110202	-	111100
Art. No. package 10 pcs.	110100A	110200A	110202A	110206A	-
FUNCTIONALITY	MULTIFUNCTION		4-FUNCTION	MULTIFUNCTION	MULTIFUNCTION
<b>E</b> On delay	■	■	■	■	■
<b>R</b> Off delay	■	■	■	■	■
<b>Es</b> On delay with control contact	■	■	■		■
<b>Wu</b> Single shot leading edge, voltage-controlled	■	■	■	■	■
<b>Ws</b> Single shot leading edge with control contact	■	■		■	■
<b>Wa</b> Single shot trailing edge with control contact	■	■		■	■
<b>Bp</b> Flasher pause first	■	■			■
<b>Wt</b> Pulse repetition analysis				■	
<b>WsWa</b> Single shot leading and trailing edge with control contact				■	
POWER SUPPLY CIRCUIT					
Supply voltage	12 - 240V AC/DC	24 - 240V AC/DC	24 - 240V AC/DC	24 - 240V AC/DC	12 - 240V AC/DC
Frequency	48 - 63 Hz				
TIME CIRCUITS					
Time ranges	7				
Setting range	0.05 s - 100 h				
INPUT CIRCUIT					
Trigger input	■	■	■	■	■
OUTPUT CIRCUIT					
Contacts	SPDT	SPDT	SPDT	SPDT	DPDT
Switching capacity	2000VA (8A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	0.69 x 2.43 x 2.56 in (17.5 x 87 x 65 mm)				1.38 x 2.43 x 2.56 in (35 x 87 x 65 mm)
Certificates	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

## VEO series time delay relays

TYPE DESIGNATION	V2ZM10	V2ZQ10	V2Z110	V2ZE10	V2ZR10	V2ZA10	V2ZS20
							
ORDER INFORMATION							
Art. No.	125100	125150	125200	125110	125120	125500	125300
Art. No. 10 pcs packaging unit	125100A	125150A	-	125110A	125120A	-	-
FUNCTIONALITY	10-FUNCTION	4-FUNCTION	FLASHER	ON DELAY	OFF DELAY	5-FUNCTION	STAR DELTA
<b>E</b> On delay	■	■		■		■	
<b>R</b> Off delay	■	■			■		
<b>A</b> Off delay without auxiliary voltage						■	
<b>Es</b> On delay with control contact	■						
<b>Wu</b> Single shot leading edge, voltage-controlled	■	■					
<b>nWu</b> Maintained single shot leading edge						■	
<b>Ws</b> Single shot leading edge with control contact	■						
<b>Wa</b> Single shot trailing edge with control contact	■						
<b>nWa</b> Maintained single shot trailing edge						■	
<b>nWuWa</b> Maintained single shot leading and trailing edge						■	
<b>Bi</b> Flasher pulse first	■						
<b>Bp</b> Flasher pause first	■	■					
<b>Wt</b> Pulse repetition analysis	■						
<b>Ec</b> Additive ON Delay	■						
<b>li</b> Asymmetric flasher pulse first			■				
<b>lp</b> Asymmetric flasher pause first			■				
<b>S</b> Star-delta start-up							■
SUPPLY CIRCUIT							
Supply voltage	12 - 240V AC/DC	24 - 240V AC/DC	12 - 240V AC/DC	12 - 240V AC/DC	12 - 240V AC/DC	12 - 240V AC/DC	12 - 240V AC/DC
Frequency range	48 - 63 Hz						
TIME CIRCUITS							
Time ranges	10					4	
Setting range	0.05 s - 100 h					0.1 s - 3 min	
						0.05 s - 3 min	
INPUT CIRCUIT							
Trigger input	■	■	■		■		
OUTPUT CIRCUIT							
Contacts	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT
Switching capacity	2000VA (8A / 250V AC)		1250VA (5A / 250V AC)		1250VA (5A / 250V AC)		750VA (3A / 250V AC)
DESIGN							
Dimensions (w x h x d)	0.88 x 2.64 x 2.99 in (22.5 x 67 x 76 mm)						
Certificates	CE, cULus, EAC						

TYPE DESIGNATION	G2ZM20	G2ZMF11	G2ZI20	G2ZIF20	G2ZS20
					
ORDER INFORMATION					
Art. No.	120401	120103	120501	120201	120301
FUNCTIONALITY	MULTIFUNCTION	MULTIFUNCTION	2-TIME MULTIFUNCTION	2-TIME MULTIFUNCTION	STAR-DELTA
<b>E</b> On delay	■	■			
<b>R</b> Off delay	■	■			
<b>ER</b> On delay and off delay with control contact			■	■	
<b>Es</b> On delay with control contact	■	■			
<b>Wu</b> Single shot leading edge, voltage-controlled	■	■			
<b>Ws</b> Single shot leading edge with control contact	■	■			
<b>Wa</b> Single shot trailing edge with control contact	■	■			
<b>EWu</b> ON delay single shot leading edge, voltage-controlled			■	■	
<b>EWs</b> ON delay single shot leading edge with control contact			■	■	
<b>Wswa</b> Single shot leading and trailing edge with control contact			■	■	
<b>Bi</b> Flasher pulse first	■	■			
<b>Bp</b> Flasher pause first	■	■			
<b>li</b> Asymmetric flasher pulse first			■	■	
<b>lp</b> Asymmetric flasher pause first			■	■	
<b>S</b> Star-delta start-up					■
SUPPLY CIRCUIT					
Supply voltage	12 - 240V AC/DC	24 - 240V AC/DC	12 - 240V AC/DC	24 - 240V AC/DC	24 - 240V AC/DC
Frequency range	48 - 63 Hz				
TIME CIRCUITS					
Time ranges	7	16	7	10	4
Setting range	0.05 s - 100 h	0.05 s - 30 d	0.05 s - 100 h	0.05 s - 10 h	0.05 s - 3 min
INPUT CIRCUIT					
Trigger input	■	■	■	■	
Remote potentiometer input		■		■	
OUTPUT CIRCUIT					
Contacts	DPDT	2x SPDT	DPDT	DPDT	DPDT
Switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)				
Certificates	CE, cULus, EAC				



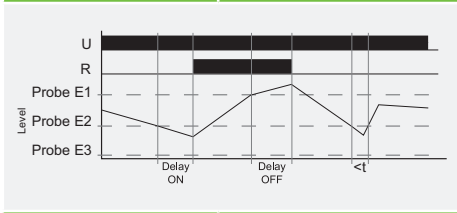


# Function Overview

## Monitoring Relays

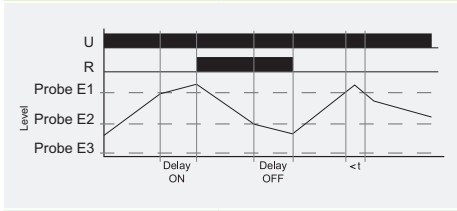
<b>O</b>	<b>OVER</b>
	<p>If the measured value exceeds the adjusted MAX threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value falls below the adjusted MIN threshold.</p>
<b>U</b>	<b>UNDER</b>
	<p>If the measured value falls below the adjusted MIN threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value exceeds the adjusted MAX threshold.</p>
<b>W</b>	<b>WINDOW</b>
	<p>If the measured value falls below the adjusted MIN threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value exceeds the adjusted MIN threshold. If the measured value exceeds the adjusted MAX threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value falls below the adjusted MAX threshold.</p>
<b>2MIN</b>	<b>MINIMUM MONITORING</b>
	<p>If the measured value falls below the adjusted MAX threshold, the output relay Rel1 switches into off-position. If the measured value falls below the adjusted MIN threshold, the output relay Rel2 switches into off-position. The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured value exceeds the according adjusted threshold (MAX or MIN).</p>
<b>2MAX</b>	<b>MAXIMUM MONITORING</b>
	<p>If the measured value exceeds the adjusted MIN threshold, the output relay Rel2 switches into off-position. If the measured value exceeds the adjusted MAX threshold, the output relay Rel1 switches into off-position. The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured value falls below the according adjusted threshold (MAX or MIN).</p>
<b>MM</b>	<b>MINIMUM AND MAXIMUM MONITORING (MIN/MAX)</b>
	<p>If the measured value falls below the adjusted MIN threshold, the output relay Rel2 switches into off-position. The output relay Rel2 switches into on-position again, as soon as the measured value exceeds the adjusted MIN threshold. If the measured value exceeds the adjusted MAX threshold, the output relay Rel1 switches into off-position. The output relay Rel1 switches into on-position again, as soon as the measured value exceeds the adjusted MIN threshold.</p>
<b>TEMP</b>	<b>TEMPERATURE MONITORING</b>
	<p>If the supply voltage U is applied and the cumulative resistance of the PTC-circuit is less than 3.6kΩ (standard temperature of the motor), the output relay R switches into on-position. When the cumulative resistance of the PTC-circuit exceeds 3.6kΩ, the output relay switches into off-position. The output relay switches into on-position again after the cumulative resistance falls below 1.6kΩ.</p>

**PUMP UP PUMP UP**



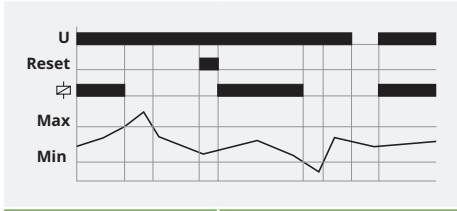
Connection of the probe rods E1, E2 and E3. When the air-fluid level falls below the minimum probe E2 the set interval of tripping delay begins. After the expiration of the interval, the output relay R switches into on-position. When the air-fluid level again rises above the maximum probe E1, the set interval of turn-off delay begins. After the expiration of the interval the output relay switches into off-position.

**PUMP DOWN PUMP DOWN**



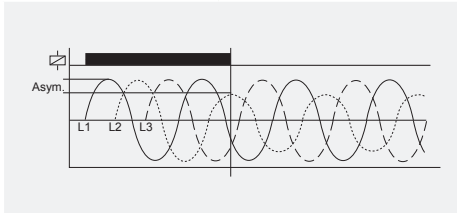
Connection of the probe rods E1, E2 and E3. When the maximum probe E1 gets moistened the set interval of tripping delay begins. After the expiration of the interval the output relay R switches into on-position. When the airfluid level falls below the minimum probe E2, the set interval of turn-off delay begins. After the expiration of the interval, the output relay switches into off-position.

**LATCH LATCH (ERROR MEMORY)**



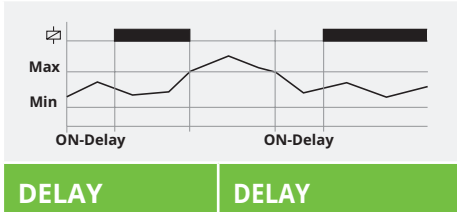
If the device detects a fault, the output relay only switches on again when the fault latch has been reset. The fault latch can be reset by means of an internal or external reset button or by interrupting the supply voltage.

**ASYM ASYMMETRY MONITORING**



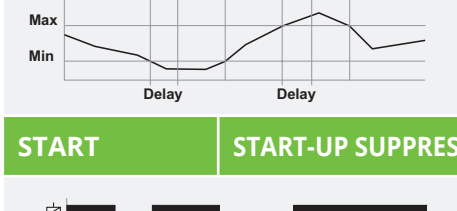
If the asymmetry of the phase-to-phase voltages exceeds the value set at the ASYM-regulator, the output relay switches into off-position. If the neutral wire is connected to the device, the asymmetry of the phase voltages referred to the neutral wire (Y-voltage) is monitored also. In that case both values of the asymmetry are evaluated and if one of the values exceeds the value set at the ASYM-regulator, the output relay switches into off-position.

**ON DELAY ON DELAY**



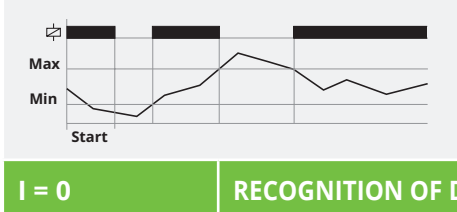
The output relay switches on if the monitored value is within the selected range during the defined time period.

**DELAY DELAY**



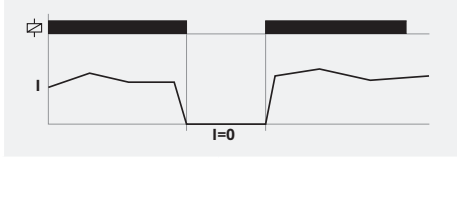
If the monitored value leaves the selected range, the output relay only switches into off-position following expiry of the trip delay.

**START START-UP SUPPRESSION**

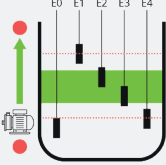
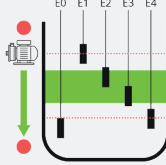
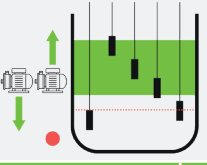
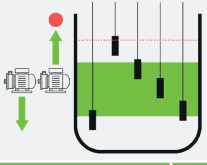
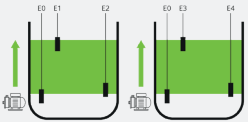
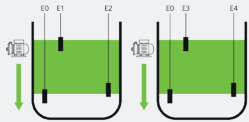
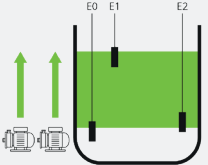
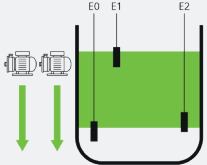
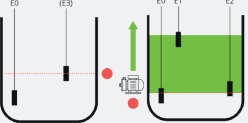
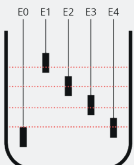


The output relay switches on when the supply voltage is applied. Changes to measured variables have no impact on the setting of the output relay during start up suppression.

**I = 0 RECOGNITION OF DISCONNECTED CONSUMERS**









When the current flow between i and k is interrupted the output relay switches into off-position. When the current flow is restored, the measuring cycle is restarted with the set interval of the start-up suppression.

<p><b>Function 1</b></p>	<p><b>PUMP UP WITH MIN-/MAX- ALARM</b> (2uA) 1 container, 4 probes, 1 pump</p>		<p>Level control between probes E2 and E3 by pumping up. The probes E1 and E4 serve as overflow- resp. dry running alarm and may be used to control alarm devices, valves or additional pumps.</p>
<p><b>Function 2</b></p>	<p><b>PUMP DOWN WITH MIN-/MAX- ALARM</b> (2dA) 1 container, 4 probes, 1 pump</p>		<p>Level control between probes E2 and E3 by pumping down. The probes E1 and E4 serve as overflow- resp. dry running alarm and may be used to control alarm devices, valves or additional pumps.</p>
<p><b>Function 3</b></p>	<p><b>PUMP UP AND DOWN (bidirectional) WITH MINIMUM ALARM</b> (3b-) 1 container, 4 probes, 2 pumps</p>		<p>The level is controlled around probe E2 by pumping up and down. The right function if a dry running alarm (probe E4) is needed and the application requires emptying and filling up of the container.</p>
<p><b>Function 4</b></p>	<p><b>PUMP UP AND DOWN (bidirectional) WITH MAXIMUM ALARM</b> (3b+) 1 container, 4 probes, 2 pumps</p>		<p>The level is controlled around probe E3 by pumping up and down. The right function if a overflow alarm (probe E1) is needed and the application requires emptying and filling up of the container.</p>
<p><b>Function 5</b></p>	<p><b>TWO INDEPENDENT CONTAINERS - PUMP UP</b> (2u2) 1-2 container, 1-2 probes each , 1 pump each</p>		<p>Pump up between the probes E1-E2 resp. E3-E4. (alternatively control around one probe). This feature allows level control in two separate containers with only one device. It is also possible to control cascades.</p>
<p><b>Function 6</b></p>	<p><b>TWO INDEPENDENT CONTAINERS - PUMP DOWN</b> (2d2) 1-2 container, 1-2 probes each , 1 pump each</p>		<p>Pump down between the probes E1-E2 resp. E3-E4. (alternatively control around one probe). This feature allows level control in two separate containers with only one device. It is also possible to control cascades.</p>
<p><b>Function 7</b></p>	<p><b>PUMP UP WITH INTEGRATED PUMP CHANGE</b> (2uc) 1 container, 2 probes, 2 pumps</p>		<p>Pump up between the control probes E1 and E2. The V4LM acts as an intelligent pump changer (for even use) with pump monitoring (feedback inputs E3 &amp; E4). If a pump fails, the remaining pump is permanently prioritized and an alarm is issued. For maximum availability and uninterrupted operation through full redundancy.</p>
<p><b>Function 8</b></p>	<p><b>PUMP DOWN WITH INTEGRATED PUMP CHANGE</b> (2dc) 1 container, 2 probes, 2 pumps</p>		<p>Pump down between the control probes E1 and E2. The V4LM acts as an intelligent pump changer (for even use) with pump monitoring (feedback inputs E3 &amp; E4). If a pump fails, the remaining pump is permanently prioritized and an alarm is issued. For maximum availability and uninterrupted operation through full redundancy.</p>
<p><b>Function 9</b></p>	<p><b>WELL CONTROL (3w-) WITH WELL AND DRY ALARM</b> 1 well, 1 high tank, 3 probes, 1 pump</p>		<p>The function serves to ensure the water supply by means of a high tank and a well (pump up into the high tank from the well). Alarm functions: well alarm and dry alarm (high tank and well without water). The pump is protected against dry running in case the well (or feeding container) is below sufficient liquid levels.</p>
<p><b>Function 10</b></p>	<p><b>CODE OUTPUT FOR PLC CONNECTION</b> (4ce) 1 container, 4 probes</p>		<p>The probe states are coded via the 3 output relays. Therefore up to 4 liquid levels can be evaluated for one container. By means of a connection to an external PLC it is thus possible to respond to individual application conditions. Simple connection without external control unit can also protect up to four containers, each with a probe against overflow or dry running and switch on a collective alarm by using simple interconnection.</p>




FOR TECHNICAL SPECIFICATIONS

please refer to page 23


## ENYA series monitoring relays

TYPE DESIGNATION	E1PF480Y/277VSY01	E1PF480Y/277VSY10	E1YM480/277VS10	E1UM230V01	E1IM10AACL10
					
<b>ORDER INFORMATION</b>					
Art. No. single package	1340406	1340405	1340409	1340101	1340200
<b>FUNCTIONALITY</b>	<b>Phase Monitor</b>	<b>Phase Monitor</b>	<b>3-phase Voltage Monitor</b>	<b>1-phase Voltage Monitor</b>	<b>1-phase Current Monitor</b>
<b>Phase failure</b>	■	■			
<b>SEQ ...</b> Phase sequence	■	■	■		
<b>ASYM ...</b> Asymmetry	■	■			
<b>O ...</b> Over					■
<b>U ...</b> Under			■	■	■
<b>W ...</b> Window			■	■	■
<b>SWITCHING THRESHOLD</b>					
Maximum			75 to 110% of $U_N$	80 to 120% of $U_N$	10 to 100% of $I_N$
Minimum			65 to 100% of $U_N$	75 to 115% of $U_N$	5 to 95% of $I_N$
Asymmetry	5 to 25%, OFF	5 to 25%, OFF	-	-	-
<b>MEASURING CIRCUIT</b>					
Measuring variable	3~ Voltage AC Sinus	3~ Voltage AC Sinus	3~ Voltage AC Sinus	1~ Voltage AC/DC Sinus	1~ Current AC Sinus
Measuring input	$U_N = 480/277V$ AC	$U_N = 480/277V$ AC	$U_N = 480/277V$ AC	24V AC/DC and 230V AC	10A AC
<b>SUPPLY CIRCUIT</b>					
Supply voltage	-10% to +10% of $U_N$ 432V to 528V AC	-10% to +10% of $U_N$ 432V to 528V AC	-35% to +10% of $U_N$ 312V to 528V AC	-25% to +20% of $U_N$ 18 to 29V AC/DC; 173 to 276V AC	-15% to +15% of 230V AC 195V to 265V AC
Frequency range	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz or DC	48 – 63 Hz
<b>TIME CIRCUITS</b>					
Tripping delay (DELAY)	fixed, approx. 100ms	0.1 – 20 s	0.1 – 10 s	-	0,1 – 10 s
<b>OUTPUT CIRCUIT</b>					
Contact	SPDT	SPDT	SPDT	SPDT	SPDT
Switching capacity	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)
<b>DESIGN</b>					
Dimensions (w x h x d)	0.69 x 2.43 x 2.56 in (17.5 x 87 x 65 mm)				
Certificates	CE, cULus, EAC				






## GAMMA series monitoring relays

TYPE DESIGNATION	G2PF400VS02	G2PF230VS02	G2PF115VS02	G2PM400VSY20	G2PM230VSY20	G2PM115VSY20
						
ORDER INFORMATION						
Art. No.	2390000	2390001	2390002	2390505	2390512	2390506
FUNCTIONALITY	Phase Monitor			3-phase Voltage Monitor		
U ... Under				■	■	■
W ... Window				■	■	■
SEQ ... Phase sequence	■	■	■	■	■	■
Phase failure	■	■	■	■	■	■
ASYM ... Asymmetry	■	■	■	■	■	■
SWITCHING THRESHOLD						
Maximum	-			-20 to +30% of $U_N$		
Minimum	-			-30 to +20% of $U_N$		
Asymmetry	fixed, typ. 30%			5 to 25%, OFF		
MEASURING CIRCUIT						
Measuring variable	3(N)- Voltage AC Sinus			3(N)- Voltage AC Sinus		
Measuring input	$U_N= 400/230V$ AC	$U_N= 230/132V$ AC	$U_N= 115/66V$ AC	$U_N= 400/230V$ AC	$U_N= 230/132V$ AC	$U_N= 115/66V$ AC
Frequency Range	48-63 Hz			48-63 Hz		
SUPPLY CIRCUIT						
Supply voltage	$= U_N$			24 to 240V AC/DC		
TIME CIRCUITS						
Start-up suppression time (START)	fixed, max. 500ms			-		
Tripping delay (DELAY)	fixed, max. 350ms			0.1 - 10 s		
OUTPUT CIRCUIT						
Contacts	DPDT			DPDT		
Switching capacity	1250VA (5A / 250V AC)					
DESIGN						
Dimensions (w x h x d)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)					
Certificates	CE, cULus, EAC					

## VEO series monitoring relays






TYPE DESIGNATION	V2PF480Y/277VSY01	V2PM400Y/230VS10	V2UM230V10	V4PF480Y/277VSYTK02
				
ORDER INFORMATION				
Art. No. screw terminal	2100000	2100500	2100300	2104200
Art. No. package 10 pcs.	2100000A	-	-	-
FUNCTIONALITY	Phase Monitor	3- phase Voltage Monitor	1- phase Voltage Monitor	Phase and Temperature Monitor
<b>Phase failure</b>	■	■		■
<b>SEQ ...</b> Phase sequence	■	■		■
<b>ASYM ...</b> Asymmetry	■			■
<b>U ...</b> Under		■	■	
<b>W ...</b> Window		■	■	
<b>Temperature monitoring (PTC)</b>				■
SWITCHING THRESHOLD				
Maximum	-	75 to 130% of $U_N$	80 to 115% of $U_N$	-
Minimum	-	70 to 125% of $U_N$	75 to 110% of $U_N$	-
Asymmetry	5 to 25%, OFF	-	-	5 to 25%, OFF
MEASURING CIRCUIT				
Measuring variable	3~ Voltage AC Sinus	3~ Voltage AC Sinus	1~ Voltage AC/DC AC Sinus	3~ Voltage AC Sinus Temperature
Measuring input	$U_N = 480/277V$ AC	$U_N = 400/230V$ AC	$U_N = 24V$ AC/DC or 230V AC	$U_N = 480/277V$ AC
SUPPLY CIRCUIT				
Supply voltage	-10% to +10% of $U_N$ 432/250V to 528/305V AC	-35% to +35% of $U_N$ 260/250V to 540/310V AC	-30% to +30% of $U_N$ 17V to 31V AC/DC; 161V to 299V AC	-10% to +10% of $U_N$ 432/250V to 528/305V AC
Frequency range	48 – 63 Hz	16.6 – 400 Hz	16.6 – 400 Hz or DC	48 – 63 Hz
TIME CIRCUITS				
ON DELAY	approx. 400 ms	approx. 200 ms	approx. 300 ms	approx. 500 ms
Tripping delay (DELAY)	< 250 ms	0.1 – 10 s	0.1 – 10 s	approx. 250 ms
OUTPUT CIRCUIT				
Contact	SPDT	SPDT	SPDT	DPDT
Switching capacity	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)
DESIGN				
Dimensions (w x h x d)	0.88 x 2.64 x 2.99 in (22.5 x 67 x 76 mm)			1.76 x 2.64 x 2.99 in (45 x 67 x 76 mm)
Certificates	CE, cULus, EAC			

TYPE DESIGNATION	V2TF01	V2IM10AL10	V4IM100AL20	V4IM35AL20	V4LM4S30
					
ORDER INFORMATION					
Art. No. screw terminal	2100100	2100400	2104401(100A)	2104402 (35A)	2104500
FUNCTIONALITY	Temperature Monitor	1-phase Current Monitor	1-phase Current Monitor	1-phase Current Monitor	Liquid Level Monitor
O ... Over		■	■		10 functions selectable via rotary switch - function overview refer to page 7
U ... Under		■	■	■	
W ... Window		■	■	■	
2MAX ... Maximum monitoring			■	■	
MM ... Min. and max. monitoring			■	■	
+LATCH ... Error memory			■	■	
Temperature monitoring (PTC)	■			■	
Short circuit monitoring (PTC)	■				
SWITCHING THRESHOLD					
Maximum	≥ 3.6kΩ (switch-off resistance)	10 to 100% of I <sub>N</sub>	10 to 100% of I <sub>N</sub>	10 to 100% of I <sub>N</sub>	Sensitivity: 10kΩ - 500kΩ V <sub>sense</sub> : 20, 40, 60, 80, 100% Sensitivity: 250Ω - 12.5kΩ V <sub>sense</sub> : 20, 40, 60, 80, 100%
Minimum	≤ 1.6kΩ (switch-on resistance)	5 to 95% of I <sub>N</sub>	5 to 95% of I <sub>N</sub>	5 to 95% of I <sub>N</sub>	
MEASURING CIRCUIT					
Measuring variable	Temperature	1- Current AC/DC AC Sinus	1- Current AC/DC AC Sinus	1- Current AC/DC AC Sinus	Level via conductive probes
Measuring input	PTC	10A AC/DC	100A AC/DC	35A AC/DC	Low (L): 250Ω - 12.5kΩ High (H): 10kΩ - 500kΩ
SUPPLY CIRCUIT					
Supply voltage	24 - 240V AC/DC -15% to +10%	AC: 110 - 240V; DC: 24 - 240V AC: -15% to +15% DC: -30% to +30%	24 - 240V AC/DC AC: -15% to +10% DC: -30% to +30%	24 - 240V AC/DC AC: -15% to +10% DC: -30% to +30%	24-240V AC/DC AC: -10% to +10% DC: -25% to +25%
Frequency range	16.6 to 400Hz or DC	16.6 to 400Hz or DC	16.6 to 400Hz or DC	16.6 to 400Hz or DC	16.6 to 400Hz or DC
TIME CIRCUITS					
ON DELAY	approx. 50 ms	approx. 300 ms	approx. 300 ms	approx. 300 ms	-
Start-up suppression time (START)	-	-	0 - 10 s	0 - 10 s	-
Tripping delay (DELAY)	-	0.1 - 10 s	0.1 - 10 s	0.1 - 10 s	-
Delay (Measuring Filter)	-	-	-	-	1-10s
OUTPUT CIRCUIT					
Contact	SPNO	SPDT	2 x SPDT	2x SPDT	3 x SPNO
Switching capacity	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	1250VA (5A / 250V AC)
DESIGN					
Dimensions (w x h x d)	0.88 x 2.64 x 2.99 in (22.5 x 67 x 76 mm)			1.76 x 2.64 x 2.99 in (45 x 67 x 76 mm)	
Certificates	CE, cULus, EAC				

TYPE DESIGNATION	G2UM300VL20	G2IM5AL20	G2IM10AL20	G2JM5AL20
				
ORDER INFORMATION				
Art. No.	2390304	2390411	2390410	2390801
FUNCTIONALITY	1- phase Voltage Monitor	1-phase Current Monitor	1-phase Current Monitor	3-phase Current Monitor
<b>O ... Over</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>U ... Under</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>W ... Window</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>SEQ ... Phase sequence</b>				
<b>Phase failure</b>				
<b>ASYM ... Asymmetry</b>				
<b>+LATCH ... Error memory</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SWITCHING THRESHOLD				
Maximum	10 to 100% of $U_N$	10 to 100% of $I_N$	10 to 100% of $I_N$	10 to 100% of $I_N$
Minimum	5 to 95% of $U_N$	5 to 95% of $I_N$	5 to 95% of $I_N$	5 to 95% of $I_N$
Asymmetry	-	-	-	-
MEASURING CIRCUIT				
Measuring variable	Voltage AC/DC AC Sinus	Current AC/DC AC Sinus	Current AC/DC AC Sinus	Current AC AC Sinus
Measuring input	30 / 60 / 300V AC/DC	20mA / 1A / 5A AC/DC or CT	100mA / 1A / 10A AC/DC or CT	5A AC or CT
Frequency Range	16,6 - 400Hz or DC	16,6 - 400Hz or DC		16,6 - 400Hz
SUPPLY CIRCUIT				
Supply voltage	24 to 240V AC/DC	24 to 240V AC/DC	24 to 240V AC/DC	24 to 240V AC/DC
TIME CIRCUITS				
ON DELAY	-	-	-	-
Start-up suppression time (START)	0 - 10 s	0 - 10 s	0 - 10 s	0 - 10 s
Tripping delay (DELAY)	0.1 - 10 s	0.1 - 10 s	0.1 - 10 s	0.1 - 10 s
OUTPUT CIRCUIT				
Number of switch contacts	DPDT	DPDT	DPDT	DPDT
Switching Capacity	1250VA (5A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)			
Certificates	CE, cULus, EAC			



## GAMMA series monitoring relays

TYPE DESIGNATION	G2PM690VSY20	G2PU690VS20	G2TFKN02	G2LM20
				
ORDER INFORMATION				
Art. No.	2390517	2390507	2390110	2390201 (24V AC) 2390202 (110V AC) 2390200 (230V AC)
FUNCTIONALITY	3- phase Voltage Monitor	3- phase Voltage Monitor	Temperature monitoring (PTC)	Level monitoring of conductive liquids
U ... Under	■	■		
W ... Window	■			
SEQ ... Phase sequence	■	■		
Phase failure	■	■		
ASYM ... Asymmetry	■	■		
Temperature monitoring (PTC)			■	
Short circuit monitoring (PTC)			■	
Zero-voltage latch (PTC)			■	
Test function (PTC)			■	
Pump up				■
Pump down				■
SWITCHING THRESHOLD				
Maximum	55 to 115% of $U_N$	-	$\geq 3.6k\Omega$ (switch-off resistance)	-
Minimum	50 to 110% of $U_N$	180 to 690V AC	$\leq 1.6k\Omega$ (switch-on resistance)	-
Asymmetry	5 to 25%, OFF	fixed, 25%	-	-
MEASURING CIRCUIT				
Measuring variable	3~ Voltage AC Sinus	3~ Voltage AC Sinus	Temperature	Liquid level via conductive probes
Measuring input	3~ 208-690V AC	180-690V AC	-	0.25 to 100k $\Omega$
SUPPLY CIRCUIT				
Supply voltage	= Measuring voltage 177V to 794V AC	= Measuring voltage 177V to 794V AC	24 to 240V AC/DC	24V AC 110V AC 230V AC
Frequency Range	20-70 Hz	20-70 Hz	-	-
TIME CIRCUITS				
Start-up suppression time (START)	-	-	-	-
Tripping delay (DELAY)	0.1 – 10 s	0.1 – 10 s	-	0.5 – 10 s
OFF DELAY	-	-	-	0.5 – 10 s
OUTPUT CIRCUIT				
Contacts	DPDT	DPDT	DPDT	DPDT
Switching capacity	1250VA (5A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)			
Certificates	CE, cULus, EAC			

# Power Monitors



## Monitoring of electronic motors

TELE power monitoring systems offer significant advantages, particularly in situations in which monitoring tasks are usually carried out by sensors:

- No problems due to contamination and any decalibration of the sensors
- No maintenance and cleaning costs
- Easy to use, even in charged air or volatile substances
- Savings in terms of cabling
- No use of explosion-proof barriers necessary
- Reduction in error sources
- Simple retrofitting

### Current monitoring relays

Pure current measurements in the supply to motors can only be used in an extremely restricted capacity to monitor loads. This is due to three essential factors:

- 1) In alternating current circuits, the measured current is apparent current. This total current comprises the sum of reactive and active current components. However, when generating mechanical power it is the active current that is exclusively decisive. The reactive current merely causes losses and does not contribute to the shaft power delivered.
- 2) In an underload range the current does not reduce in a linear manner with the load but instead remains relatively high due to the necessary magnetisation current. Therefore, no relevant correlation exists between current and load.
- 3) The current is dependent on the supply voltage. An undervoltage condition with a constant load can result in an increased current draw. This therefore eliminates monitoring the pure active current too.

Thus, monitoring pure current is only applicable in extreme operating conditions, such as a drive blockage, because the current rises dramatically in such cases.

### Power monitoring systems with power factor measurement ( $\cos \varphi$ )

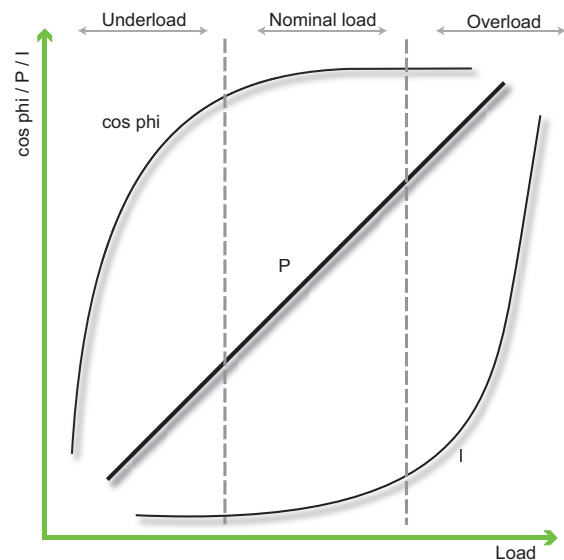
The power factor  $\cos \varphi$  is the cosine of the phase shift angle between the current drawn and the voltage applied. In electrical motors this is dependent on the loading and theoretically equals 1 in an ideal case. However, due to induction it effectively lies within a range of 0.85 to 0.95 with a nominal load.

In an underload range, the  $\cos \varphi$  monitor is extremely significant because the proportion of losses at a lower load increases dramatically and results in a  $\cos \varphi$  of up to  $<0.5$  in an idle state. This is not applicable around the zero point and in an overload range because load changes only result in minimal changes to the phase shift angle  $\varphi$ .





### Power monitoring systems with effective power measurements

The effective power measurement facilitates obtaining the most precise feedback regarding the state of an electrical motor because the effective power is proportional to the shaft power. A direct correlation exists between the effective power supplied and the motor loading (torque with constant rotational speed) across the entire working range.



### Examples for power monitor-usage:

- Agitators
- Crushers
- Grinders
- Shredders
- Compactors
- Ventilation units
- Machinery tools
- Conveyor systems
- Screening machinery
- Bridge and portal cranes
- Centrifugal and piston pumps

TYPE DESIGNATION	G2CM400V10AL20	G4CM690V16ATL20	G2BM480V12AFL10	G4BM480V12ADTL20
				
Art. No.	2390602	2394600	2390700	2394706
FUNCTIONALITY	Power factor $\cos \varphi$ in 1- or 3-phase mains	Power factor $\cos \varphi$ in 1- or 3-phase mains	True power monitoring in 1- or 3-phase mains	True power monitoring in 1- or 3-phase mains
<b>O</b> ... Overload monitoring	■		■	■
<b>U</b> ... Underload monitoring	■		■	■
<b>W</b> ... Window	■			■
<b>2MIN</b> ... Minimum monitoring		■		■
<b>2MAX</b> ... Maximum monitoring		■		■
<b>MIN/MAX</b> ... Minimum- and maximum monitoring		■		■
<b>+LATCH</b> ... Error memory	■	■	■	■
<b>I = 0 DETECTION</b> ... Recognition of disconnected consumers		■	■	■
<b>Temp</b> ... Temperature monitoring of the motor winding		■		■
SWITCHING THRESHOLD				
Threshold P / P1	$\cos \varphi$ Max: 0.2 - 1.0	$\cos \varphi$ 1: 0,3 – 1 (inductive) 1 – 0,3 (capacitive)	5 to 120% of $P_N$	2.5kW: 120W to 2.5W 10kW: 480W to 10kW
Threshold P2	$\cos \varphi$ Min: 0.1 - 0.99	$\cos \varphi$ 1: 0,3 – 1 (inductive) 1 – 0,3 (capacitive)	-	2.5kW: 120W to 2.5W 10kW: 480W to 10kW
MEASURING CIRCUIT				
Measuring variable	Power factor ( $\cos \varphi$ ), 1- or 3-phase loads AC Sinus	Power factor ( $\cos \varphi$ ), 1- or 3-phase loads AC Sinus	True power, 1- or 3-phase loads AC Sinus	True power, 1- or 3-phase loads AC Sinus
Measuring range	0.1 to 1	0.3 to 1	0.75kW • 1.5kW • 3kW • 6kW 1hp • 2hp • 4hp • 8hp	2.5kW • 10kW 3.4 hp • 13.6hp
Measuring input voltage	40 to 415V AC (1-ph) 40/23 to 415/240V AC (3-ph)	85 to 690V AC (1-ph) 85 to 690/400V AC (3-ph)	0 to 480V AC (1-ph) 0 to 480/277V AC (3-ph)	0 to 480V AC (1-ph) 0 to 480/277V AC (3-ph)
Overload capacity voltage	500V AC (1-ph) 500/289V AC (3-ph)	796V AC (1-ph) 796/460V AC (3-ph)	550V AC (1-ph) 550/318V AC (3-ph)	550V AC (1-ph) 550/318V AC (3-ph)
Measuring input current	0.5 to 10A	1 to 8A (4.8kW) 2 to 16A (19.6kW)	0 to 6A (1.5kW) 0 to 12A (6kW)	0.15 to 6A (2.5kW) 0.3 to 12A (10kW)
Overload capacity current	11A permanent	20A permanent	12A permanent	12A permanent
SUPPLY CIRCUIT				
Supply voltage	Selectable via power module TR2	Selectable via power module TR3	Selectable via power module TR2	24 – 240V AC/DC
TIME CIRCUITS				
Start-up suppression time (START)	1 – 100 s	3 – 180 s	0.1 - 2 s	0 – 100 s
Tripping delay (DELAY)	0.1 – 40 s	1 – 50 s	0.1 - 2 s	0.1 – 50 s
INPUT CIRCUIT				
Trigger Input	-	Y1-Y2 (Latch)	Y1-Y2 (Latch)	Y1-Y2 (Latch)
OUTPUT CIRCUIT				
Contacts	DPDT	2x SPDT	SPDT	2x SPDT
Switching capacity	1250VA (5A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)	1.76 x 3.54 x 4.25 in (45 x 90 x 108 mm)	0.88 x 3.54 x 4.25 in (22.5 x 90 x 108 mm)	1.76 x 3.54 x 4.25 in (45 x 90 x 108 mm)
Certificates	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

# TELE SENS

The new, compact power metering modules with ModBus RTU interface, for highly accurate, flexible and reliable measurements.

TELE introduces a new range of communication-capable monitoring devices with ModBus RTU interface with the focus on electric energy applications and monitoring of key electrical values in industrial plants.

The modules may look like regular current transformers but they reliably measure current / voltage / power / energy and various other electrical values in single-phase networks. These values are provided to any kind of control unit, datalogger or PLC unit via the established industrial standard ModBus RTU.

The fast measurement cycles and data transmission gives the plant operator a clear view of the condition of his installation. This accurate process data enables specialists and engineers to adapt maintenance intervals accordingly, and help to avoid costly unscheduled downtimes.

## 1-phase power meter AC/DC with ModBus RTU

### Converter design

AC up to 50A or up to 300A and DC up to 50A or up to 400A with ModBus RTU/RS485 interface, DIN rail or panel mount, Frequency range DC or 1 to 400Hz

### Integrated Measurements

Irms, Vrms, Watt, VAr, VA, Vpk, Ipk, frequency, Cos $\phi$ , energy bidirectional, THD: 800V AC / 1000V DC



## Serial converter USB-RS485

(isolated up to 5kV)

### USB

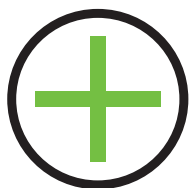
The S-USB485 is a serial converter and galvanically isolated up to 5 kV, based on chip USB FTDI. Windows validated drivers download automatically when your PC is online. This device connects safely to any ModBus devices on RS485.





TYPE DESIGNATION	S6XM50A1000V	S9XM300A1000VM	S9IA300AM	S-USB485
Art. No.	2800200	2800220	2800030	498513
FUNCTIONALITY	Power Meter 1-ph	Power Meter 1-ph	Current Transducer 1-ph	USB to RS485 Converter
INTERFACE				
ModBus RTU	■	■	■	■
Analog out 0-10V			■	
USB				■
INPUTS				
Current AC	50 A	300 A	300 A	-
Current DC	50 A	400 A	300 A	-
Voltage AC	800 V	800 V	-	-
Voltage DC	1000 V	1000 V	-	-
Frequency	DC and 1-400 Hz	DC and 1-400 Hz	DC and 20-2000 Hz	-
VALUES				
Irms	■	■	■	
Idc	■	■		
Vrms	■	■		
Vdc	■	■		
Ah on Irms			■	
Power/reactive/apparent power	■	■		
CosPhi	■	■		
Active energy bidirectional	■	■		
Ipeak	■	■		
Vpeak	■	■		
Frequency	■	■		
Min Values	■	■		
Max Values	■	■		
THD	■	■		
SUPPLY CIRCUIT				
Supply voltage	9 - 30 V DC	9 - 30 V DC	9 - 30 V DC	12 - 30 V DC
DESIGN				
Dimensions (w x h x d)	46,1 x 63 x 26,4 mm (1.8 x 2.48 x 1 in)	89,1 x 99,3 x 28,5 mm (3.5 x 3.9 x 1.12 in)		-
Compliance	EN61000-6-4/2006+A1 2011 EN64000-6-2/2005 EN61010-1/2010			
Certificates	CE, cURus	CE, cURus	CE, cURus	CE

# Add-Ons

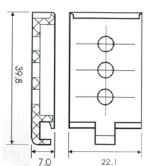


In addition to our core products we are glad to be offering the **green** extra:

<b>Accessoires</b>	<ul style="list-style-type: none"> <li>- DIN-rail mounting plates: MP</li> <li>- Probes: SK</li> <li>- Sealable frontcovers: FA-G2</li> <li>- Power modules: TR2 and TR3</li> </ul>	Page 30 Page 31 Page 31 Page 31
<b>Switching Relays Relay Sockets Accessoires</b>	<ul style="list-style-type: none"> <li>- Slim Interface Relays series: STKR</li> <li>- Miniature Ice Cube Relays series: RA and RM</li> <li>- PCB/Slim Ice Cube Relays series: RP</li> <li>- 8-/11-pin Ice Cube Relays series: RT</li> <li>- Multifunctional timer module series: COMBI</li> <li>- Accessories, Sockets</li> </ul>	Page 32 Page 32 Page 32 Page 32 Page 33 Page 33
<b>Soft Starters</b>	<ul style="list-style-type: none"> <li>- Motor starter series: P4.0</li> </ul>	Page 34
<b>Thyristor Control Units</b>	<ul style="list-style-type: none"> <li>- Thyristor control units series: GTF</li> <li>- Thyristor switch (SSR) series: GTS</li> <li>- Fuse and fuse holders</li> </ul>	Page 35 Page 35 Page 35
<b>DC Power Supplies</b>	<ul style="list-style-type: none"> <li>- Switching power supplies</li> </ul>	Page 36

## Mounting plates MP

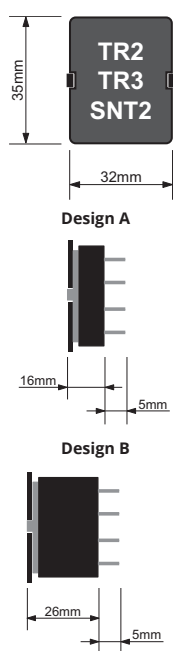
easily attach any DIN-rail device to every kind of surface, panel and backplate



MP

TYPE DESIGNATION	FITS	ATTACHMENT	DIMENSIONS (W X H X D)	ART. NO.
MP-UNIVERSAL	ENYA, GAMMA, VEO	Ø 0.16 in (4 mm)	0.87 x 1.57 x 0.28 in 22.1 x 39.8 x 7.0 mm	075574

## TR2, TR3, SNT series power modules for transforming the supply voltage to the internal operating voltage of GAMMA relays



TYPE DESIGNATION	SUPPLY VOLTAGE	TOLERANCE	POWER INPUT P <sub>IN</sub>	POWER OUTPUT P <sub>OUT</sub>	DESIGN	ART. NO.
SNT2 - 24V DC	24V DC	20.4 - 26.4V	2VA	0.5VA	A	282050
TR2 - 24V AC	24V AC	20.2 - 26.4V	2VA	0.5VA	A	282110
TR3 - 24V AC	24V AC	20.4 - 26.4V	4VA	1.5VA	B	285010
TR2 - 110V AC	110V AC	94 - 121V	2VA	0.5VA	A	282113
TR3 - 110V AC	110V AC	94 - 121V	4VA	1.5VA	B	285013
TR2 - 127V AC	127V AC	108 - 140V	2VA	0.5VA	A	282114
TR3 - 127V AC	127V AC	108 - 140V	4VA	1.5VA	B	285014
TR2 - 230V AC	230V AC	195 - 264V	2VA	0.5VA	A	282120
TR3 - 230V AC	230V AC	184 - 264V	4VA	1.5VA	B	285025
TR2 - 400V AC	400V AC	340 - 456V	2VA	0.5VA	A	282117
TR3 - 400V AC	400V AC	323 - 456V	4VA	1.5VA	B	285017
TR3 - 440V AC	440V AC	374 - 484V	4VA	1.5VA	B	285019
TR3 - 500V AC	500V AC*	425 - 550V	4VA	1.5VA	B	285026

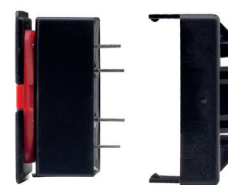
\* may only be used with types G4PM and G4BM!



TR2 - 42V AC



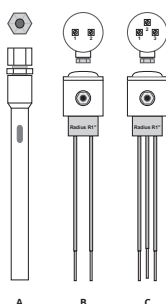
TR3 - 400V AC



Remove protective cover before use

## Probes - SK series

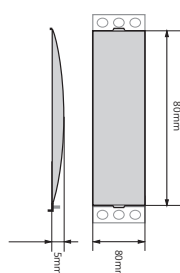
for monitoring level of conductive liquids



TYPE DESIGNATION	MAX. VOLTAGE	MAX. TEMPERATURE	NUMBER OF ELECTRODES	LENGTH	DESIGN	ART. NO.
SK1	24V AC	60°C (140°F)	1	140 mm (5.5 in)	A	190107
SK2		90°C (194°F)	2	500 mm (19.7 in)	B	190108
SK3-500		90°C (194°F)	3	500 mm (19.7 in)	C	190109
SK3-1000		90°C (194°F)	3	1000 mm (39.4 in)	C	190110

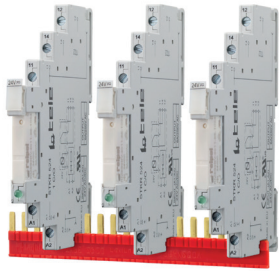
## Front cover FA-G2

for GAMMA monitoring relays (width 22.5 mm)



TYPE DESIGNATION	DESCRIPTION	DIMENSIONS (W X H X D)	ART. NO.
FA-G2	Sealable front cover for protecting GAMMA devices against unintended or unauthorized changes in setup parameters.	22.5 x 80 x 5 mm	070160

**STKR series and accessories** Slim Interface Relays



STKR + PB-B SKR

TYPE DESIGNATION	RATED VOLTAGE		RATED CURRENT	RELAY VOLTAGE	CONTACTS	PACKAGING UNIT	ART. NO.
	AC/DC						
STKR 524	24V	AC/DC	6A	24V DC	SPDT	10 pcs	180504
STKR 024	24V	DC		24V DC	SPDT		180503
STKR 615	115V	AC/DC		24V DC	SPDT		180506
STKR 730	230V	AC		60V DC	SPDT		180505
ACCESSORIES	FUNCTION		RATED CURRENT	DETAILS	CONTACTS	PACKAGING UNIT	ART. NO.
PB-B SKR	Jumper Link		-	Blue	20	10 pcs	180535
PB-R SKR			-	Red			180536
RM699V-3011-85-1024	Replacement relay for STKR		6A	24V DC	SPDT	20 pcs	100660
RM699V-3011-85-1060				60V DC	SPDT		100661

**RA, RM series** Miniature Ice Cube Relays



RA



RM

TYPE DESIGNATION	RATED VOLTAGE		RATED CURRENT	LED	CONTACTS	PACKAGING UNIT	ART. NO.
RA 524L-N	24V	AC	12A	■	DPDT	10 pcs	100623LD-N
RA 615L-N	115V			■			100621LD-N
RA 730L-N	230V	■		100624LD-N			
RA 012L-N	12V	DC		■			100625LD-N
RA 024L-N	24V	DC	■	100622LD-N			
RM 512L-N	12V	AC	7A	■	4PDT		100612LD-N
RM 524L-N	24V			■			100613LD-N
RM 548L-N	48V	■		100614LD-N			
RM 615L-N	115V	■		100618LD-N			
RM 730L-N	230V	DC	7A	■	4PDT		100619LD-N
RM 012L-N	12V			■		100601LD-N	
RM 024L-N	24V	■		100603LD-N			
RM 048L-N	48V	■		100602LD-N			
RM 060L-N	60V	DC	■	100616LD-N			
RM110L-N	110V	DC	■	100617LD-N			
RM 220L-N	220V	DC	■	100620LD-N			

\* RA and RM relays with gold plating and integrated suppression diode available upon request

**RP series** PCB/Slim Ice Cube Relays



RP

TYPE DESIGNATION	RATED VOLTAGE		RATED CURRENT	CONTACTS	PACKAGING UNIT	ART. NO.
RP 512-2	12V	AC	8A	DPDT	20 pcs	100424
RP 524-2	24V					100417
RP 730-2	230V					100418
RP 615-2	115V					100421
RP 012-2	12V	DC	8A	DPDT	20 pcs	100420
RP 024-2	24V					100416

**RT series** 8- and 11-pin Ice Cube Relays



RT

TYPE DESIGNATION	RATED VOLTAGE		RATED CURRENT	LED	CONTACTS	PACKAGING UNIT	ART. NO.			
RT 1.2.012L	12V	AC	10A	■	DPDT	10 pcs	100508LD			
RT 1.2.024L	24V			■			100507LD			
RT 1.2.110L	110V			■			100505LD			
RT 1.2.230L	230V			■			100502LD			
RT 2.2.012L	12V	DC	10A	■	3PDT	10 pcs	100517LD			
RT 2.2.024L	24V			■			100516LD			
RT 1.3.024L	24V	AC		10A			■	3PDT	10 pcs	100526LD
RT 1.3.048L	48V						■			100524LD
RT 1.3.110L	110V		■		100522LD					
RT 1.3.230L	230V	DC	■		100521LD					
RT 2.3.012L	12V	DC	10A	■	3PDT	10 pcs	100536LD			
RT 2.3.024L	24V			■			100535LD			
RT 2.3.048L	48V			■			100533LD			
RT 2.3.060L	60V			■			100532LD			
RT 2.3.110	110V	DC	■	100531						
RT 2.3.220	220V	DC	■	100530						

\* RT relays with gold plating and integrated suppression diode available upon request



**COMBI series** multifunction timer module for industrial relays (RT) with socket ES9 and PF-113BEM (ES12)

TYPE DESIGNATION	FUNCTIONS	TIME RANGES	SUPPLY VOLTAGE	NUMBER OF SWITCHING CONTACTS	DIMENSIONS (W X H X D)	CERTIFICATES	ART. NO.
COM3T	8 E, R, Ws, Wa, Wu, Es, Bp, Bi	8 (0.05 s - 10 d)	24 - 240V AC/DC	DPDT or 3PDT (according to industrial relay)	35 x 12 x 47 mm	CE, cURus	237010

**Relay Sockets** for switching relays

TYPE DESIGNATION	FOR USE WITH MODULES	TERMINALS	FOR SERIES	RATED VOLTAGE	MOUNTING	PACKAGING UNIT	ART. NO.
PYF14BE (ES 15/4N)	Yes	Screw Terminals	RA, RM	300V AC	DIN Rail	10 pcs	180134
PYF14BE3 (ES 15/4S)	Yes	Screw Terminals	RA, RM	300V AC	DIN Rail	10 pcs	180145
PYF14BE3CC (ES 15/4G)	Yes	Push-In Terminals	RA, RM	300V AC	DIN Rail	10 pcs	180148
CST-B14F2-L (ES 15/4B)	Yes	Screw Terminals	RA, RM	300V AC	DIN Rail	10 pcs	180146
PI50BE/3R (ES 50/3)	Yes	Screw Terminals	RP	300V AC	DIN Rail	20 pcs	180150
PI50BE/3-CC (ES50/3G)	Yes	Push-In Terminals	RP	300V AC	DIN Rail	20 pcs	180149
PI50BE (ES50)	Yes	Screw Terminals	RP	300V AC	DIN Rail	20 pcs	180137
ES 9	Yes	Screw Terminals	RT 8-pin	300V AC	DIN Rail, Surface	10 pcs	180041
PF113BEM (ES12)	Yes	Screw Terminals	RT 11-pin	300V AC	DIN Rail, Surface	10 pcs	180136
PF113BE (R11X)	No	Screw Terminals		300V AC	DIN Rail, Surface	10 pcs	180155



COM3T + ES9 + RT1.2.012L



Socket PYF14BE (ES15/4N)



Socket PYF14BE3CC (ES15/4G)



Socket PI50BE (ES50)



Socket PF113BE (R11X)

**Modules and accessories** for switching relays

TYPE DESIGNATION	TYPE DESCRIPTION	FOR SOCKETS SERIES	FOR SWITCHING RELAYS SERIES	RATED VOLTAGE	PACKAGING UNIT	ART. NO.
M21N	Diode	PYF, CST, PI	RA, RM, RP	6 - 230V DC (+A1)	20 pcs	180261
M41R	LED (red) + Diode			6 - 24V DC (+A1)		180263
M53	RC-Element	PYF, CST	RT	110-230V AC		180264
M71	Varistor			24V AC/DC		180266
M73	Varistor			230 AC/DC		180230
TYPE21 (TVD1)	Diode	PF113BE, ES9	RT	6 - 24V DC (+A1)		180230
TYPE41 (TVL1)	LED + Diode			6 - 24V DC (+A1)		180232
HB/RM-RA	Retaining Clip (metal)	PYF, CST	RA, RM	-	180032	
HB/ES15	Retaining Clip (plastic)			-	180153	
HB/RP16	Retaining Clip (plastic)			PI	RP	-
HB/RT	Retaining Clip (metal)	PF, ES9	RT	-	10 pcs	180043



# Motor Starter P4.0

The 0.88in smart motor starter that that makes your MCBs obsolete!

## Functionality

Today's drive solutions require powerful and flexible instruments. The compact motor starter P-4.0 from TELE can be used for motors up to 4.0kW @ 400V and includes 5 functions in one compact unit, requiring only 22,5mm width. This intelligent instrument offers soft start, soft stop, forward/reverse, current protection and an electronic motor protection.

Offering the integrated motor protection plus isolation relays the use of an MCB is no longer necessary. A simple circuit breaker protects the installation against short circuit and faulty wiring. The soft start and stop function is performed by semiconductors (thyristors) and the reversing function by internal relays, operated in the standstill phase. After performing the start/stop function the semiconductors are bypassed by integrated relays to minimize power dissipation. The intelligent combination of semiconductors and relays increases lifetime and efficiency of the product. The integrated current limit protects motors, shafts and plants from mechanical stress and reduces maintenance and standstill times.

## Technical features

- Forward/Reverse of 3-ph ac motors 3 AC 480 V / 9 A, equals 4.0kW/5.5hp @ 400VAC
- Integrated reversing unit (forward/reverse)
- 2-ph control for softstart and stop
- Integrated bypass relays
- 3 pots for adjustment of torque, time and max. current
- 4 LEDs indicate status and error
- Reset button on front and external reset available
- Article number: 490800 (F/R + blocking protection)  
490801 (F/R + motor protection + isolation contactor)

## Your advantages

- Up to 5 functions in one instrument:
- Forward/Reverse, soft start, current limit, motor protection, soft stop.
- Minimized space consumption, only 22.5mm width
- Simple commissioning and easy operation
- Robust semiconductors with 1500V max. isolation voltage
- Increased system availability by motor protection function
- Increased lifetime by hybrid design compared to relay solution
- Energy saving by bumpless soft start/stop function and bypass relay

## Applications

- Doors, lifting and transport applications
- Transport systems (belts and rollers)
- Motorized valves in process applications (chemical and petrochemical, power generation plants)
- Pumps and fans
- Switching of 3 ph transformers
- ... and a lot of other applications that require sophisticated drive solutions



P4.0

TYPE DESIGNATION	FUNCTIONALITY	MOTOR CONTROL	NOMINAL CURRENT	NOMINAL MOTOR POWER	DIMENSIONS (W X H X D)	CERTIFICATES	ART.NO.
CHRISTIAN P-4.0/RL/OL	Forward/Reverse, soft start, current limit, blocking protection, soft stop	2-phase	9A	4kW / 5.5hp	0.88 x 4.13 x 47.4in (22.5 x 105 x 120.3mm)	CE, cULus	490800
CHRISTIAN P-4.0/RL/TP/IC	Forward/Reverse, soft start, soft stop, motor protection + isolation contactor	2-phase	9A	4kW / 5.5hp		CE, cULus	490801

**GTF series** digital thyristor control unit (compact design, digital configurable)

TYPE DESIGNATION	AUXILIARY VOLTAGE	NOMINAL VOLTAGE	NOMINAL CURRENT	FAN	INTERNAL FUSE	OPERATING MODE	DIMENSIONS (W X H X D)	ART. NO.
GTF-25-480-0-0-0-0 1-P-M	24V AC/DC	480V AC *	25A			Phase clipping control (other operating modes configurable)	60 x 136,5 x 143 mm	493100
GTF-40-480-0-0-0-0 1-P-M			40A				60 x 136,5 x 143 mm	493105
GTF-50-480-0-0-0-0 1-P-M			50A				80 x 136,5 x 143 mm	493108
GTF-60-480-0-0-0-0 1-P-M			60A				80 x 136,5 x 143 mm	493111
GTF-75-480-0-0-0-0 1-P-M			75A				127 x 136,5 x 143 mm	493121
GTF-90-480-0-0-0-0 1-P-M			90A				127 x 136,5 x 143 mm	493131
GTF-120-480-0-0-0-0 1-P-M			120A	■			127 x 150,5 x 143 mm	493141
GTF-150-480-0-0-1-0 1-P-M			150A	■	■			493152
GTF-200-480-0-0-1-0 1-P-M			200A	■	■		108,3 x 302 x 170,4 mm	493161
GTF-250-480-0-0-1-0 1-P-M			250A	■	■			493171
Configuration cable + software								493090

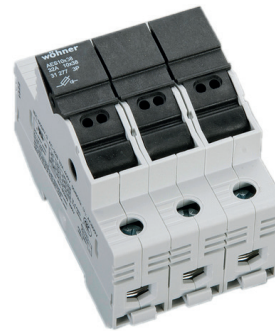
\* other nominal voltages upon request



GTF



GTS



Fuse holder

**GTS series** Thyristor switch (compact design, operating mode zero point switch)

TYPE DESIGNATION	NOMINAL VOLTAGE	NOMINAL CURRENT	CONTROL INPUT	FAN	DIMENSIONS (W X H X D)	ART. NO.
GTS-15/48-D-0	480V AC *	15A	6 - 32V DC		24 x 100 x 107 mm	493010
GTS-25/48-D-0		25A			24 x 100 x 107 mm	493005
GTS-40/48-D-0		40A			35 x 100 x 142 mm	493003
GTS-50/48-D-0		50A			60 x 100 x 142 mm	493001
GTS-60/48-D-0		60A			80 x 100 x 142 mm	493020
GTS-75/48-D-0		75A			127 x 100 x 142 mm	493021
GTS-90/48-D-0		90A			127 x 100 x 142 mm	493022
GTS-120/48-D-0 VEN92		120A		■	127 x 100 x 142 mm	493023

\* other nominal voltages upon request

**Semiconductor fuses** (capsule fuse)

TYPE DESIGNATION	NOMINAL CURRENT	NOMINAL CURRENT THYRISTOR CONTROL	FUSE SIZE	ART. NO.
HL-Fuse 5A	10A	5A	10 x 38 mm	490971
HL-Fuse 15A	25A	15A	10 x 38 mm	490975
HL-Fuse 25A	30A	25A	10 x 38 mm	490972
HL-Fuse 35A	40A	35A	41 x 51 mm	490973
HL-Fuse 50A	63A	50A	22 x 58 mm	490974
HL-Fuse 50A GTF	50A	50A	22 x 58 mm	490986

**Fuse holders** (capsule fuse)

TYPE DESIGNATION	RATED CURRENT (IEC)	POLES	FUSE SIZE	ART. NO.
Fuse holder 1-P 10x38	32A	1-Poles	10 x 38 mm	490976
Fuse holder 3-P 10x38	32A	3-Poles	10 x 38 mm	490977
Fuse holder 1-P 14x51	50A	1-Poles	14 x 51 mm	490978
Fuse holder 3-P 14x51	50A	3-Poles	14 x 51 mm	490979
Fuse holder 1-P 22x58	100A	1-Poles	22 x 58 mm	490987
Fuse holder 3-P 22x58	100A	3-Poles	22 x 58 mm	490988

**Power Supplies** – DC Power Supplies, Compact Design



HDR-15-24

HDR-30-24

HDR-60-24



HDR-100-24

	TYPE	INPUT VOLTAGE	SIZE (WxHxD)	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER	ART. NO.
<b>COMPACT POWER SUPPLIES</b>	HDR-15-24	85-264V AC	17.5x90x54.5 mm	24V DC (adj. 21.6-29V DC)	0.63A	15W	491701
	HDR-30-24		35.0x90x54.5 mm		1.50A	30W	491702
	HDR-60-24		52.5x90x54.5 mm		2.50A	60W	491703
	HDR-100-24		70.0x90x54.5 mm		3.83A	100W	491704

**Power Supplies** – DC Power Supplies, Industrial Design



NDR-480-24

NDR-240-24

NDR-120-24



DRAN60/30

	TYPE	INPUT VOLTAGE	SIZE (WxHxD)	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER	ART. NO.
<b>INDUSTRIAL POWER SUPPLIES</b>	DRAN30-12A	85-264V AC	40.5x90x114 mm	12V DC (adj. 12-14V DC)	2.50A	30W	491572
	DRAN60-12A				5.00A	60W	491587
	DRAN120-12A		64.0x124.5x116.6 mm		10.0A	36W	491568
	DRAN30-24A		40.5x90x114 mm		1.25A	30W	491476
	DRAN60-24A	2.50A		60W	491575		
	NDR-120-24	90-264V AC	40.0x125.2x113.5 mm	24V DC (adj. 24-28V DC)	5.00A	120W	491601
	NDR-240-24				63.0x125.2x113.5 mm	10.0A	240W
	NDR-480-24		85.5x125.2x113.5 mm		5.00A	120W	491601
20.0A					480W	491619	

MORE INFOS ABOUT DC POWER SUPPLIES



[www.tele-controls.com](http://www.tele-controls.com)



## E1ZM10 12-240V AC/DC Example product code time delay relay

ENYA series, in a 0.69in wide housing, multifunctional timer with a SPDT relay output and a supply voltage of 12-240V AC/DC.

E	1	Z	M	-	10	12-240V AC/DC
PRODUCT SERIES	WIDTH	MEASURED VALUE	FUNCTION	ADDITIONAL FUNCTION	RELAY OUTPUT	SUPPLY VOLTAGE
<b>E</b> ENYA	<b>1</b> 0.69in / 17.5mm	<b>Z</b> Time	<b>M</b> Multifunction	<b>F</b> Remote potentiometer	delayed <b>10</b> SPDT <b>20</b> DPDT	12-240V AC/DC 24-240V AC/DC 230V AC 24V DC and others
<b>V</b> VEO	<b>2</b> 0.88in / 22.5mm		<b>Q</b> Quattro (4 funct.)		instantaneous <b>01</b> SPDT <b>02</b> DPDT	
<b>G</b> GAMMA	<b>4</b> 1.76in / 45.0 mm		<b>E</b> ON Delay <b>R</b> OFF Delay <b>I</b> 2 time function <b>S</b> Star-delta <b>A</b> OFF Delay without auxiliary voltage		delayed and instantaneous <b>11</b> 2x SPDT	
			<b>WI</b> Impulse switch mode <b>LA</b> Load Alternator			



## G2PU690VS20 Example product code monitoring relay

Gamma series, in a 0.88in wide housing, measures 3-ph voltage, under voltage detection for a nominal voltage of 690V, includes phase sequence monitoring and DPDT output

G	2	P	U	690V	S	20	-
PRODUCT SERIES	WIDTH	MEASURED VALUE	FUNCTION	NOMINAL VALUE	ADDITIONAL FUNCTION	RELAY OUTPUT	SUPPLY VOLTAGE
<b>E</b> ENYA	<b>1</b> 0.69in / 17.5mm	<b>U</b> Voltage 1~	<b>U</b> Under	115V	<b>L</b> Latch	delayed	12-240V AC/DC 24-240V AC/DC 230V AC 24V DC and others
<b>V</b> VEO	<b>2</b> 0.88in / 22.5mm	<b>P</b> Voltage 3~Δ	<b>O</b> Over	230V	<b>D</b> Digital	<b>10</b> SPDT	
<b>G</b> GAMMA	<b>4</b> 1.76in / 45.0 mm	<b>Y</b> Voltage 3~Y	<b>W</b> Window	400V	<b>T</b> Thermistor	<b>20</b> DPDT	
		<b>I</b> Current 1~ <b>J</b> Current 3~ <b>F</b> Frequency <b>T</b> Temperature <b>L</b> Liquid Level <b>B</b> Real power <b>C</b> cos φ	<b>F</b> Error <b>M</b> Multi-function <b>A</b> Analog output	480V 690V 5A 10A 480V 12A 400V 12A PT100 etc.	<b>Y</b> Asymmetry <b>S</b> Phase sequence <b>F</b> Quick action release <b>T</b> Test function <b>K</b> Short circuit monitoring <b>N</b> Zero voltage safe	instantaneous <b>01</b> SPDT <b>02</b> DPDT	







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