Product Highlights

Overview of our timing- and monitoring relays, load monitors, grid and system protection and complementary products

Technology for More Time and Greater Security

Tele Haase was founded in 1963 and is Austria's market leader in developing state-of-the-art monitoring, control and automation technology.

Tele relays function dependably in water treatment plants, transformer stations and industrial plants and are used during renewable energy generation in wind, hydroelectric and solar power plants.

Tele developments meet international quality standards and contribute to environmentally friendly generation of renewable energy using water, wind and the sun.

Tele Haase, as a company of the future, has set out to help actively shape social change toward sustainability over the long term by obtaining maximum energy and using this energy as carefully and effectively as possible.

Our some 80 highly qualified employees fulfill the high requirements and requests of our customers day in, day out.

We are the Austrian market leader for timing and monitoring relays. Our relays might be small but they pack a punch.

- **Wide range of timing relay products**
- **Monitoring devices for physical quantities such as current, voltage, temperature, frequency, level, power factor, active power …**
- **Provider of high-quality industrial switching relays and power electronics**
- **Extensive technical expertise thanks to 50 years of experience**
- **Global sales network**

TELE Haase produces one-hundred percent of its core products in Austria. Research and development as well as production at our head office in Vienna are our core areas of expertise. Our sales team and more than 50 international trade partners make up our global sales network.

Your Smart Factory

We make the world better with what we do best
- clever technology

But as „smart implementers“, we are not necessarily the „inventors“. By collaborating with customers, partners and innovators, we turn sustainable ideas into practical solutions.

For us, our „Smart Factory“ is a playground where we can take action in accordance with our values and create new things together.

So what exactly is the Smart Factory?

TELE is a laboratory of innovation. With a lot of technical know-how and people who enjoy their work. TELE combinnes technologies. Cooperates with others. Free of traditional hierarchies. With plenty of room for independent thinking and extraordinary ideas. TELE develops and produces solutions for a better world.

We develop clever technologies with solid engineering know-how

Our relays and electronics can be found throughout the world, wherever reliability is important. In large wind turbines. At sensitive locations on machines and systems. In every corner of smart cities. And wherever things simply must work correctly.

As a specialist in high-quality industrial electronics, covering everything from monitoring technology and time relays through power electronics to grid and system protection, our solutions help boost safety wherever they are used. For greater reliability. And more efficiency and sustainability.

If you are looking for a real partner, you will find one in us

We have the experience and desire to explore new possibilities, so we collaborate with startups, partners and customers to develop monitoring and control solutions for special problems. Thanks to our modular developer's platform, we can find the magical formula for just about any problem in a very short period of time.

How do you benefit from this?

- Short development and realization times
- Proven modular components
- Ability to integrate into the customer's system
- Scalable in price and performance
- In-house development and production with optimised batch sizes

We are ready for your challenge!

What we are good at

Because we are committed to making the world better together, we are especially interested in technology that is sustainable and improves our living conditions or production environment.

- Renewable energies
- Water & Waste
- Industrial systems & mechanical engineering
- Building management
- Traffic engineering
- Smart cities

Autonomous organisation is better

Hierarchies are rigid and prevent growth and flexibility. So we left traditional corporate structures behind and brought our processes and employees to the forefront. This gives them the freedom they need for personal commitment and exceptional ideas. The focus is on individual responsibility, cooperation, transparency, esteem and fun. Every employee contributes and helps shape the company.

VEO
Bluetooth relay

Coming soon! The VEO relay series from TELE now also communicates via Bluetooth.
What does this mean for the user?
Above all, a great deal of convenience.

Smart configuration and read out

In the future, the user will be able to read out the data on the relay using an app on any mobile device. All device parameters can also be adjusted via Bluetooth - and from a distance of up to 20 meters from the control cabinet.

In contrast to near field communication (NFC), which requires the user to be no further than 10 centimetres away from the device and which may require some serious contortions with hard-to-access systems, the VEO with Bluetooth interface facilitates easy operation from up to 20 meters away. Actuation does not require an expensive device, only a smartphone or tablet.

Safe and universally applicable

The TELE-VEO Bluetooth already exists as a fully functioning prototype and can be tested for different applications. Its integrated 4.1 Bluetooth module is CE-, FCC-, IC- and KC-certified and is thus permitted for use in Europe, the USA, Canada, Japan and South Korea. The Bluetooth low energy standard ensures a long range, low power consumption and thus lower costs. It can also be password-protected for added security. It is also possible for the connection to be deactivated after a defined period in order to reduce the possibility of misuse to a minimum.

Comfortably read out data using the app

The app currently functions for the VEO-Bluetooth relay with all Android-5.0 end devices; an Apple IOS app is in the works. When the user starts the app on an end device and activates the Bluetooth connection, all VEO Bluetooth devices within range are listed. As soon as a device is selected, the app connects with the device and changes to the display of device values. It displays the measured values as well as the software version number and configuration IDs. This view is especially practical during commissioning and for troubleshooting. Measured values (marked with a graph symbol in the list of values) are also displayed as a variable curve. For easier reading, the user can scroll and zoom in the graphs as desired.

Easy remote configuration

If a device name is selected directly, the VEO Bluetooth app switches to the configuration view for the relay. With Bluetooth, all parameters of the respective device, such as function, start time, minimum/maximum values or can nowbe adjusted from up to 20 meters away. For documentation purposes, the „remote“ settings are saved failure-free in the device every time. For safety reasons, Bluetooth is deactivated on the device as soon as the connection is lost.

DO YOU HAVE ANY QUESTIONS REGARDING THE VEO BLUETOOTH-RELAIS? **info@tele-online.com**

Meet Werner

Coming soon! A relay is made communication-ready

- High-precision, quick voltage monitoring (for example, 0.1%, 50 ms)
- Highly accurate rapid rate monitoring (for example, 2mHz, 50ms)
- Phase detection (Phase Shift)
- Frequency ramp detection (ROCOF)
- Monitoring of the feedback contacts of the connected contactor
- Measuring the response time
- Event logging
- Password protection + sealable

TELE's communication-capable monitoring technology

Industry 4.0 needs modular, interconnected and compact switching units that can communicate with a superior system. For this task TELE developed its multifunctional monitoring relay Werner with an interface for Modbus RTU and Home2Net gateway. The communication-capable relay transmits the measured data encrypted into the cloud and provides the data via an app and offline through an integrated web server. Through a smartphone app or a web solution, the user can retrieve its data directly on the device or in the cloud. For control and analysis purposes all historical data is retained. Additionally the relay's measured parameters and variables can be converted, for example via a cloud portal, to a OPC UA (Unified Architecture Open Platform Communications) format and thus made automatic for further processing.

Werner combines approved and high quality monitoring technology with the latest communication technology. The communication-capable monitoring relay therewith for the first time offers the possibility to realize intelligent and interconnected monitoring solutions for a wide variety of applications for different branches.

Each monitoring component of a plant can be connected to the control center and can provide data continuously. This not only opens a channel for the prompt read-out of measured values, parameter settings, event memories and switching times, but the user is also able to actively communicate with the relay and to intervene as necessary by dynamically adjusting the threshold values, delay times or selection of preconfigured parameter settings or update the software.

Application:
Grid disconnection device for an increased grid stability

Communication-capable monitoring technology from TELE brings, for example, decisive advantages in the grid and system protection. A grid and system protection device is connected between a decentralized energy unit such as a photovoltaic plant and the network of the public utilities (EVU) and continuously monitors the grid quality. If the voltage or frequency in the public grid rises or falls to impermissible values, the power plant is disconnected immediately. Thereby an unwanted islanded operation is prevented, which can be dangerous for maintenance personnel.

With a communication-capable grid and system protection device, the EVU firstly can get an idea of the local grid situation with the distributed generators. Errors in the system are detected early and it is possible to immediately take countermeasures. In this way, the EVU is able to not only monitor the grid but also stabilize it actively by adapting thresholds and by connecting and disconnecting generators.

Quality made in Austria

The new Werner can not only communicate, it is fast, accurate, and able to measure all necessary electrically detectable physical sizes depending on the requirements. Manufactured in Vienna TELE solutions convince with exception-ally high quality.

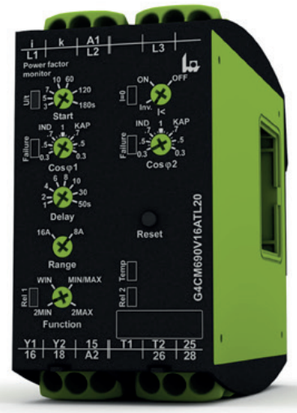
DO YOU HAVE ANY QUESTIONS REGARDING WERNER? **info@tele-online.com**

Our specialists

Voltage drop detector V2UF230V10
Detects voltage drop / short interruptions of at least 10 ms (refer to page 28)

Timer COM3T
Multifunctional, combinable to industrial relays with socket (refer to page 42)

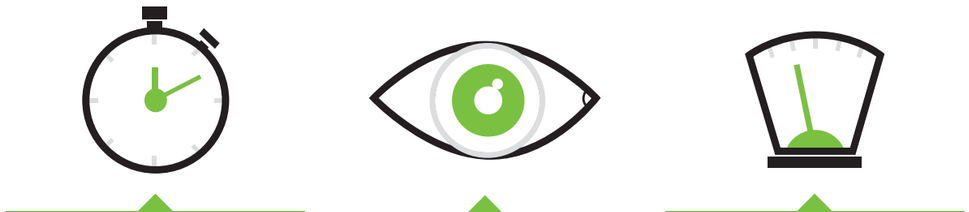
Current monitoring relays V4IM100AL20, V4IM35AL20
with built-in current transformer
(refer to page 29)

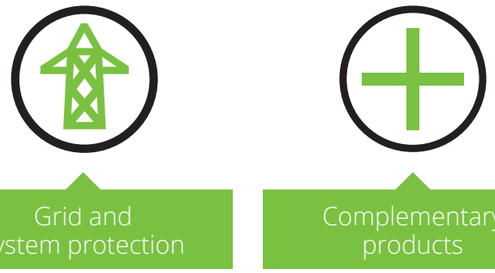


Lastwächter G4CM690V16ATL20
für induktive und kapazitive Verbaucher
(siehe Seite 33)

Product classes

Our product range consists
of the following high quality products:





Timing relays can make system and machine operation even more efficient. They check the time for you, for example if wind turbines need to be switched off or if it's time to fertilize your grapevines for a specified length of time. Your production is never thrown off its rhythm, which saves you money.

Monitoring relays measure and monitor current, voltage, temperature, frequency, level, power factor and active power. A variety of different enclosures for control technology, industrial systems, machinery and building installations allow for flexible use of relays. The rugged design offers excellent usability and installability.

Load monitors measure such variables as the power factor of a motor or the true power of a pump or fan. These measurements provide indications and important information about the state and functioning of machinery and installations, which reduces maintenance costs, service and downtime.

Grid and system protection An automatic disconnection device monitors the feed-in of energy to the 230/400V grid. In case of a power failure or disruptions by the energy supplier it is vital for small power plants to be disconnected within a few milliseconds to avoid any danger to people and equipment.

Complementary products:

- Coupling units and signal converter
- Switching relays + sockets
- Current transformers
- Softstarter, Thyristor control units and braking units
- Hour meters and timers
- Switching power supplies

Product series

Our large and small quartet:
ENYA, VEO, GAMMA and KAPPA – play it safe!

ENYA VEO GAMMA KAPPA

	ENYA	VEO	GAMMA	KAPPA
Product category	**Timing & monitoring relays, coupling units**	**Timing & monitoring relays**	**Timing & monitoring relays, load monitors, grid and system protection**	**Timing & monitoring relays**
Dimensions (w x h x d)	17.5 / 35 x 87 x 65 mm	22.5 / 45 x 67 x 76 mm	22.5 / 45 × 90 × 108 mm	38 x 51 × 80 mm
Design	Installation design	Compact industrial design	Industrial design	Industrial Plug-In design, 11-poles
Labelling area	-	Freely positionable or fixed	Fixed	Fixed
Product standards	EN 61812-1 EN 60947	EN 61812-1 EN 60947	EN 61812-1 EN 50178 EN 60947	EN 61812-1 EN 50178
Energy consumption	0.8 – 1.3W	extra low: 0.35 – 0.6W	1 – 1.5W	0.8 – 2W
Electrical connection	Screw terminal	Push-in terminal or Screw terminal	Screw terminal	Plug-in Housing mounted on screw terminal socket
Overvoltage category / Rated impulse withstanding voltage	III / 4kV	III / 4/6kV (protective separation)	III / 4/6kV	III / 4kV
Application field	Building	Industrial automation	Industrial automation	Building
Base accuracy	≤ 5%	≤ 2.5%	≤ 3%	≤ 5%

FOR THE ENTIRE PRODUCT RANGE PLEASE VISIT www.tele-online.com

Product features

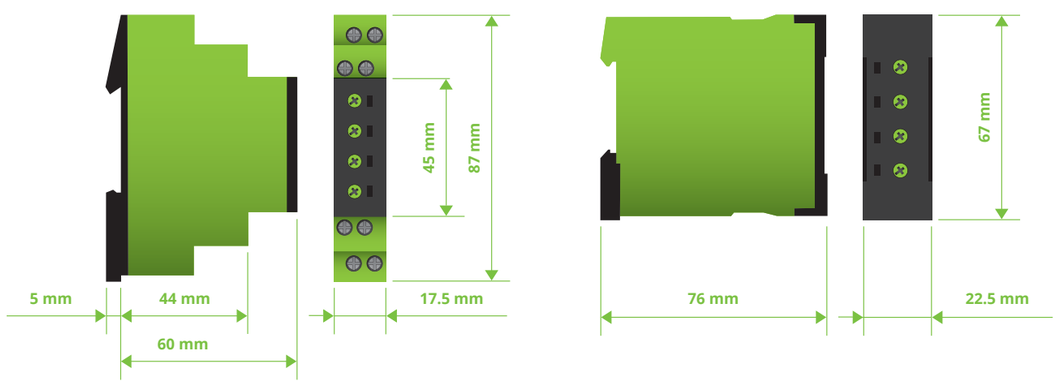
Each of our products is characterized
by special product features:

ENYA

- **Installation design (45 mm standard front dimension)**
- **Timing and monitoring relays, Single and Multifunction**
- **Width 17.5 mm and 35 mm, 1 or 2 changeover contacts (CO)**
- **UL listed, CE conformity marking**
- **Temperature range -25 to +55°C**
- **Recessed potentiometer buttons, analog indication by means of LED**
- **12 to 240V AC/DC, powered by measuring circuit**

VEO

- **Industrial design for mounting plate and cable channels**
- **Timing and monitoring relays, Single and Multifunction**
- **Width 22.5 mm and 45 mm, 1 or 2 changeover contacts (CO)**
- **Low profile**
- **UL listed, CE conformity marking**
- **Temperature range -25 to +60°C**
- **Recessed potentiometer buttons, analog indication by means of LED**
- **12 to 240V AC/DC, powered by measuring circuit**



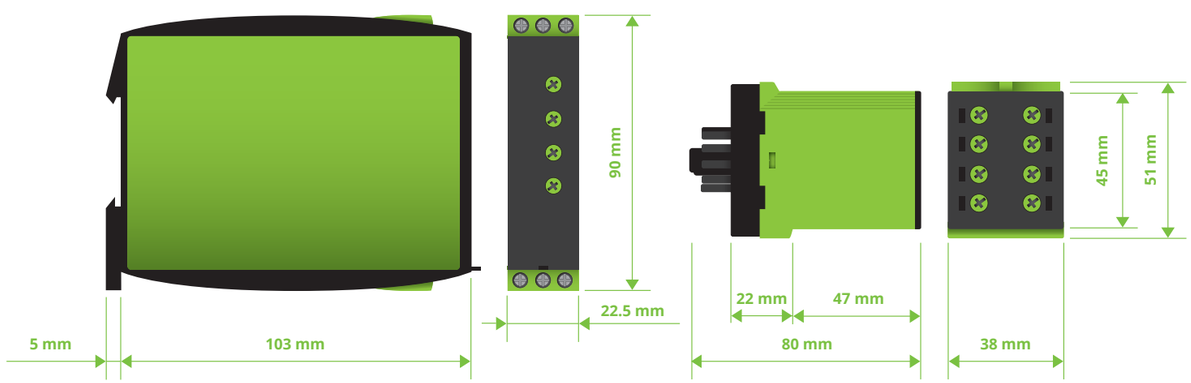
GAMMA

- **Industrial design**
- **Timing and monitoring relays, Single and Multifunction**
- **Width 22.5 mm and 45 mm, 1 or 2 changeover contacts (CO)**
- **UL listed, CE conformity marking**
- **Temperature range -25 to +55°C**
- **Recessed potentiometer buttons, analog indication by means of LED, digital indication by means of LCD-Display**
- **12 to 240V AC/DC, powermodules 12 to 500V AC; 24V DC**

KAPPA

- **Industrial Plug-In housing (45 mm standard front dimension)**
- **Timing and monitoring relays, Single and Multifunction**
- **Width 35 mm, 2 changeover contacts (2CO) or 1 changeover and 1 normally open contact (1CO + 1NO)**
- **CE conformity marking**
- **Temperature range -25 to +55°C**
- **Recessed potentiometer buttons, analog indication by means of LED**
- **12 to 240V AC/DC, powered by measuring circuit**

MORE PRODUCT INFOS www.tele-online.com



Function overview timing relays

Our timing relays have a variety of functions – here they are in detail:

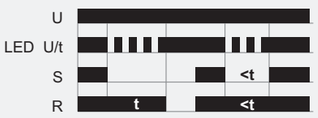
E ON delay

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.

A OFF delay without auxiliary voltage

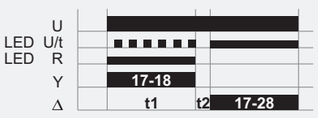
When the supply voltage U is supplied, the output relay R swiches into on-position. If the supply voltage is interrupted, the set interval t begins. After the set interval t has expired the output relay R switches into off-position. If the supply voltage is reconnected before the interval t has expired the interval already is erased and is restarted with the next cycle.

R OFF delay



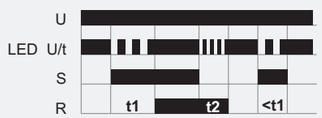
The supply voltage U must be constantly applied to the device. When the control contact S is closed, the output relay R switches into on-position. If the control contact is opened, the set interval t begins. After the interval t has expired the output relay switches into off-position. If the control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

S Star-Delta Start-up



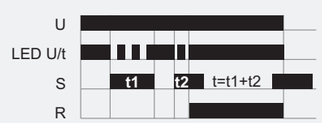
When the supply voltage U is applied, the star-contact switches into on-position and the set star-time t1 begins. After the interval t1 has expired the star-contact switches into off-position and the set transit-time t2 begins. After the interval t2 has expired the delta-contact switches into on-position. To restart the function the supply voltage must be interrupted and re-applied.

ER ON delay and OFF delay 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. 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.

Ec Additive ON Delay

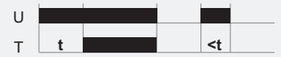


When the supply voltage U is applied, the release for the interval starts. When the control contact S is closed, the set interval t begins. If the control contact S is opened during the set interval t, the interval stops, and the already expired interval is stored. During the lapse of time the control 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

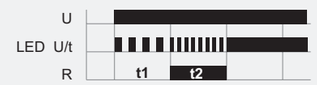


When the supply voltage U is applied, the set interval t begins. After the interval has expired the thyristor switches on. This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the expiry of the interval, the interval already expired is erased and is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

Wu Single shot leading edge voltage controlled

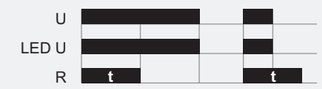
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the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



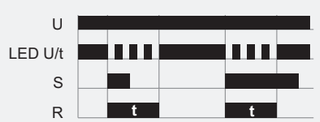
When the supply voltage U is applied, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. If the supply voltage is interrupted before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



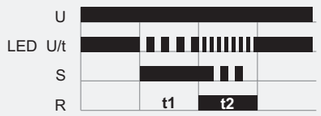
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. This status remains until the supply voltage is interrupted. If the supply voltage is reconnected before the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

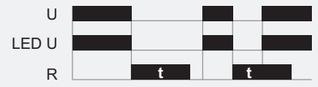


The supply voltage U must be constantly applied to the device. When the control contact S is closed, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into offposition. 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

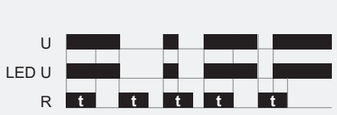
The supply voltage U must be constantly applied to the device. Closing the control contact S has no influence on the condition of the output R. When the control contact is opened, the output relay switches into on-position and the set interval t begins. After the set interval has expired, the ouput relay 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



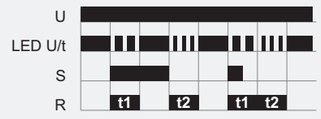
When the supply voltage U is supplied, the output relay R remains into off-position. As soon as the supply voltage is interrupted the output relay switches into on-position and the set interval t begins. After the set interval t has expired the output relay switches into off-position. When the supply 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



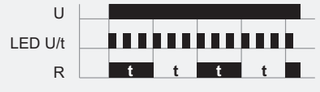
When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired the output relay switches into off-position. As soon as the supply voltage is interrupted the output relay switches into on-position again and the set interval 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

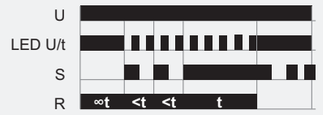


When the supply voltage U is applied, the output relay R switches into on-position and the set interval t begins. After the interval t has expired, the output relay R switches into off-position and the set interval t begins again. The output relay is triggered at a ratio of 1:1 until the supply voltage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

Bp Flasher pause first

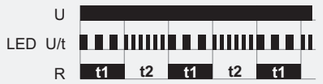
When the supply voltage U is applied, the set interval t begins. After the interval t has expired, the output relay R switches into on-position and the set interval t begins again. After the interval t has expired, the output relay switches into off-position. The output relay is triggered at a ratio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

Ii Asymmetric flasher pulse first

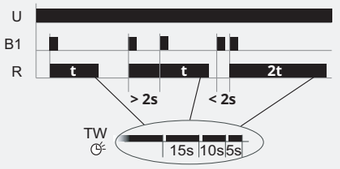


When the supply voltage U is applied, the output relay R switches into on-position and the set interval t1 begins. After the interval t1 has expired, the output relay switches into off-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into on-position.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

Ip Asymmetric flasher pause first

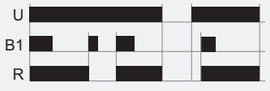
When the supply voltage U is applied, the set interval t1 begins. After the interval t1 has expired, the output relay R switches into on-position and the set interval t2 begins. After the interval t2 has expired, the output relay switches into off-position. The output relay is triggered at the ratio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

TYPE DESIGNATION	E1ZM10	E1ZM20	E1ZMQ10	E1ZMW10	E3ZM20
					
ORDER INFORMATION					
Art. No. single package	110100 (12-240V) 110200 (24-240V)	110210	110202	-	111100
Art. No. package 10 pcs.	110100A (12-240V) 110200A (24-240V)	-	110202A	110206A	-
FUNCTIONALITY	**MULTIFUNCTION**	**MULTIFUNCTION**	**MULTIFUNCTION**	**MULTIFUNCTION**	**MULTIFUNCTION**
E On delay	■	■	■	■	■
R Off delay	■	■	■	■	■
Es On delay with control contact	■	■	■		■
Wu Single shot leading edge, voltage-controlled	■	■	■	■	■
Ws Single shot leading edge with control contact	■	■		■	■
Wa Single shot trailing edge with control contact	■	■		■	■
Bp Flasher pause first	■	■			■
Wt Pulse repetition analysis				■	
WsWa 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	24 – 240V AC/DC	12 – 240V AC/DC
Setting range	48 – 63 Hz				
TIME CIRCUITS					
Time ranges	7				
Setting range	0.05 s – 100 h				
INPUT CIRCUIT					
Control signal	■	■	■	■	■
OUTPUT CIRCUIT					
Number of switch contacts	1 CO contact	1 CO, 1 NO contact	1 CO contact	1 CO contact	1 CO contact
Max. switching capacity	2000VA (8A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	17.5 x 87 x 65 mm				35 x 87 x 65 mm
Certificates	CE, cULus, EAC	CE, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

TYPE DESIGNATION	E1ZNT	E1Z1E10	E1ZI10	E3ZI20	E3ZS20
					
ORDER INFORMATION					
Art. No. single package	110500	-	110101	111101	111300
Art. No. package 10 pcs.	-	110204A	-	-	-
FUNCTIONALITY	**EMERGENCY LIGHT TESTER**	**ON DELAY**	**ASYMMETRIC FLASHER**	**ASYMMETRIC FLASHER**	**STAR DELTA**
E On delay		■			
ER On delay and off delay with control contact				■	
EWu On delay single shot leading edge, voltage-controlled				■	
Ws Single shot leading edge with testkey	■				
EWs On delay single shot leading edge with control contact				■	
Ip Asymmetric flasher pause first			■	■	
Ii Asymmetric flasher pulse first			■	■	
Wt Pulse repetition analysis				■	
WsWa Single shot leading and trailing edge with control contact				■	
S Star-Delta start-up					■
POWER SUPPLY CIRCUIT					
Supply voltage	230V AC	24 to 240V AC/DC	12 to 240V AC/DC	12 – 240V AC/DC	12 – 240V AC/DC
Frequency range	48 – 63 Hz				
TIME CIRCUITS					
Time ranges	1	7	7	7	4
Setting range	10 min – 3 h	0.05 s – 100 h	1 s – 100 h	1 s – 100 h	0.5 s – 3 min
INPUT CIRCUIT					
Control signal	Integrated test key		■	■	
OUTPUT CIRCUIT					
Number of switch contacts	1 CO contact	1 CO contact	1 CO contact	2 CO contacts	2 CO contacts
Max. switching capacity	NC: 4000VA (10A / 250V AC) NO: 1250VA (5A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)	2000VA (8A / 250V AC)
DESIGN					
Dimensions (w x h x d)	17.5 x 87 x 65 mm			35 x 87 x 65 mm	
Certificates	CE, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

TYPE DESIGNATION	V2ZM10	V2ZM10-A	V2ZQ10	V2ZI10	V2ZE10
					
ORDER INFORMATION					
Art. No. Screw terminal	125100	-	125150	125200	125110
Art. No. Push-in terminal	125600	-	125650	125210	125610
Art. No. Packaging unit 10 pcs.	125100A	125101A	125150A	-	125110A
FUNCTIONALITY	**MULTIFUNCTION**	**MULTIFUNCTION**	**MULTIFUNCTION**	**2-TIME MULTIFUNCTION**	**ON DELAY**
E On delay	■	■	■		■
R Off delay	■	■	■		
Es On delay with control contact	■	■			
Wu Single shot leading edge, voltage-controlled	■		■		
EWu ON delay single shot leading edge, voltage-controlled		■			
Ws Single shot leading edge with control contact	■	■			
Wa Single shot trailing edge with control contact	■	■			
Bi Flasher pulse first	■	■			
Bp Flasher pause first	■	■	■		
Wt Pulse repetition analysis	■	■			
Ec Additive ON Delay	■	■			
Ii Asymmetric flasher pulse first				■	
Ip Asymmetric flasher pause first				■	
SUPPLY CIRCUIT					
Supply voltage AC/DC	12 to 240V	12 to 240V	24 to 240V	12 to 240V	12 to 240V
Frequency range	48 – 63 Hz				
TIME CIRCUITS					
Time ranges	10				
Setting range	0.05 s – 100 h				
INPUT CIRCUIT					
Control signal	■	■	■	■	
OUTPUT CIRCUIT					
Anzahl der Schaltkontakte	1 CO contact				
Max. Schaltleistung	2000VA (8A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	22.5 x 67 x 76 mm				
Certificates	CE, cULus, EAC				

TYPE DESIGNATION	V2ZR10	V2ZA10	V2ZS20	V2ZET
				
ORDER INFORMATION				
Art. No. Screw terminal	125120	125500	125300	125130 (12-240V AC/DC) 125132 (50ms 230V AC) 125133 (50ms 110V AC)
Art. No. Push-in terminal	125620	125510	125310	
Art. No. Packaging unit 10 pcs.	125120A	-	-	
FUNCTIONALITY	**OFF DELAY**	**MULTIFUNKTION**	**STAR DELTA**	**2-WIRE ON DELAY**
E On delay		■		
ET On delay, two wire connected				■
R Off delay	■			
A Off delay without auxiliary voltage		■		
nWu Maintained single shot leading edge		■		
nWa Maintained single shot trailing edge		■		
nWuWa Maintained single shot leading and trailing edge		■		
S Star-delta start-up			■	
POWER SUPPLY CIRCUIT				
Supply voltage	12 to 240V AC/DC	12 to 240V AC/DC	12 to 240V AC/DC	12 to 240V AC/DC (125130) 230V AC (125132) 110V AC (125133)
Frequency range	48 – 63 Hz			
TIME CIRCUITS				
Time ranges	10	4	4	5 (125130) 1 (125132, 125133)
Setting range	0.05 s – 100 h	0.1 s – 3 min	0.05 s – 3 min	0,05 s – 1 h (125130) 50 ms (125132, 125133)
INPUT CIRCUIT				
Control signal	■			
OUTPUT CIRCUIT				
Number of switch contacts	1 CO contact	1 CO contact	2 NO contacts	1 Thyristor output
Max. switching capacity	2000VA (8A / 250V AC)	1250VA (5A / 250V AC)	750VA (3A / 250V AC)	125VA / 250V AC
DESIGN				
Dimensions (w x h x d)	22.5 x 67 x 76 mm			
Certificates	CE, cULus, EAC			CE, EAC

TYPE DESIGNATION	G2ZM20	G2ZMF11	G2ZI20	G2ZIF20	G2ZS20
					
ORDER INFORMATION					
Art. No. (with power module)	-	120100	-	120200	120300
Art. No. (Zoom voltage)	120401	120103	120501	120201	120301
FUNCTIONALITY	**MULTIFUNCTION**	**MULTIFUNCTION**	**2-TIME MULTIFUNCTION**	**2-TIME MULTIFUNCTION**	**STAR-DELTA**
E On delay	■	■			
R Off delay	■	■			
ER On delay and off delay with control contact			■	■	
Es On delay with control contact	■	■			
Wu Single shot leading edge, voltage-controlled	■	■			
Ws Single shot leading edge with control contact	■	■			
Wa Single shot trailing edge with control contact	■	■			
EWu ON delay single shot leading edge, voltage-controlled			■	■	
EWs ON delay single shot leading edge with control contact			■	■	
WsWa Single shot leading and trailing edge with control contact			■	■	
Bi Flasher pulse first	■	■			
Bp Flasher pause first	■	■			
Ii Asymmetric flasher pulse first			■	■	
Ip Asymmetric flasher pause first			■	■	
S Star-delta start-up					■
SUPPLY CIRCUIT					
Supply voltage AC/DC	12 to 240V	24 to 240V or selectable via power modules TR2, SNT2	12 to 240V	24 to 240V or selectable via power modules TR2, SNT2	24 to 240V or selectable via power modules TR2, SNT2
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					
Control signal	■	■	■	■	
Remote potentiometer		■		■	
OUTPUT CIRCUIT					
Number of switch contacts	2 CO contacts	1 delayed / 1 instantaneous CO contact	2 CO contacts	2 CO contacts	2 CO contacts
Max. switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	22.5 x 90 x 108 mm				
Certificates	CE, cULus, EAC				

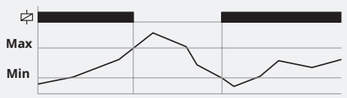
Please refer to the chapter accessories for detailed information and ordering data of remote potentiometers and to the chapter accessories for detailed information and ordering data of power modules TR2, TR3 and SNT2

TYPE DESIGNATION	K3ZM20 K3ZM20P	K3ZA20 3MIN	K3ZI20	K3ZS20
				
ORDER INFORMATION				
Art. No.	135100 135200	135400	135101	135300
FUNCTIONALITY	**MULTIFUNCTION**	**MULTIFUNCTION**	**2-TIME MULTIFUNCTION**	**STAR-DELTA**
E On delay	■	■		
R Off delay	■			
ER On delay and off delay with control contact			■	
Es On delay with control contact	■			
Wu Single shot leading edge, voltage-controlled	■			
Ws Single shot leading edge with control contact	■			
Wa Single shot trailing edge with control contact	■			
nWu Maintained single shot leading edge		■		
nWa Maintained single shot trailing edge		■		
EWu ON delay single shot leading edge, voltage-controlled			■	
EWs ON delay single shot leading edge with control contact			■	
WsWa Single shot leading and trailing edge with control contact			■	
nWuWa Maintained single shot leading and trailing edge		■		
Bp Flasher pause first	■			
Ii Asymmetric flasher pulse first			■	
Ip Asymmetric flasher pause first			■	
Wt Pulse sequence monitoring			■	
A Off delay without auxiliary voltage		■		
S Star-delta start-up				■
SUPPLY CIRCUIT				
Supply voltage AC/DC	12 to 240V	24 to 240V	12 to 240V	12 to 240V
Frequency range	48 – 63 Hz			
TIME CIRCUITS				
Time ranges	7	4	7	4
Setting range	0.05 s – 100 h	0.1 s – 3 min	0.05 s – 100 h	0.05 s – 3 min
INPUT CIRCUIT				
Control signal	■ (K3ZM20P potential free)		■	
OUTPUT CIRCUIT				
Number of switch contacts	2 CO contacts			
Max. switching capacity	2000VA (8A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	38 x 51 x 80 mm			
Certificates	CE, EAC			

R11X	PF-113BE/M (ES12)
ACCESSORIES FOR KAPPA RELAYS	
180055	180136
SOCKETS	
11-pols socket for mounting KAPPA relays on DIN-Rail TS 35	
Depends on selcted KAPPA relays	
Depends on selcted KAPPA relays	
38 x 61,5 x 26 mm	38 x 75 x 26 mm
CE, cRUus	CE, cRUus, CSA

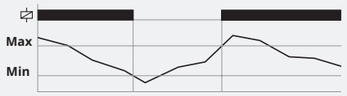
Function overview monitoring relays

O OVER



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.

U UNDER

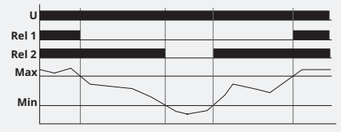


If the measured value falls below the adjusted MIN threshold, the output relay switches into off-position.
The output relay switches into on-position again, as soon as the measured value exceeds the adjusted MAX threshold.

W WINDOW

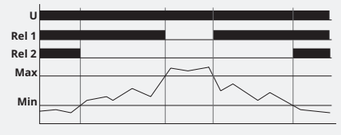
If the measured value falls below the adjusted MIN threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value exceeds the adjusted MIN threshold.
If the measured value exceeds the adjusted MAX threshold, the output relay switches into off-position. The output relay switches into on-position again, as soon as the measured value falls below the adjusted MAX threshold.

2MIN MINIMUM MONITORING



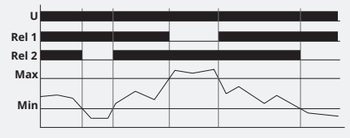
If the measured value falls below the adjusted MAX threshold, the output relay Rel1 switches into off-position.
If the measured value falls below the adjusted MIN threshold, the output relay Rel2 switches into off-position.
The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured value exceeds the according adjusted threshold (MAX or MIN).

2MAX MAXIMUM MONITORING



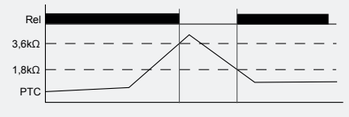
If the measured value exceeds the adjusted MIN threshold, the output relay Rel2 switches into off-position. If the measured value exceeds the adjusted MAX threshold, the output relay Rel1 switches into off-position.
The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured value falls below the according adjusted threshold (MAX or MIN).

MM MINIMUM AND MAXIMUM MONITORING (MIN/MAX)



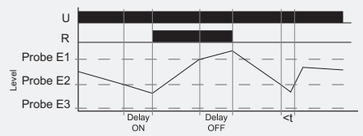
If the measured value falls below the adjusted MIN threshold, the output relay Rel2 switches into off-position. The output relay Rel2 switches into on-position again, as soon as the measured value exceeds the adjusted MIN threshold. If the measured value exceeds the adjusted MAX threshold, the output 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.

TEMP TEMPERATURE MONITORING



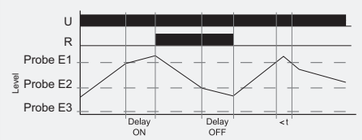
If the supply voltage U is applied and the cumulative resistance of the PTC-circuit is less than 3.6kΩ (standard temperature of the motor), the output relay R switches into on-position. When the cumulative resistance of the PTC-circuit exceeds 3.6kΩ, the output relay switches into off-position. The output relay switches into on-position again after the cumulative resistance falls below 1.6kΩ.

PUMP UP PUMP UP



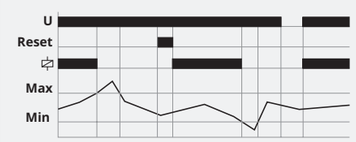
Connection of the probe rods E1, E2 and E3. When the air-fluid level falls below the minimum probe E2 the set interval of tripping delay begins. After the expiration of the interval, the output relay R switches into on-position. When the air-fluid level again rises above the maximum probe E1, the set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

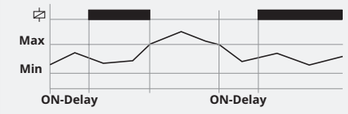


If the device detects a fault, the output relay only switches on again when the fault latch has been reset. The fault latch can be reset by means of an internal or external reset button or by interrupting the supply voltage.

ASYM ASYMMETRY MONITORING

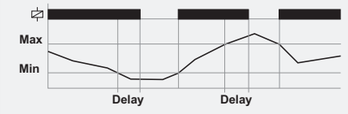
If the asymmetry of the phase-to-phase voltages exceeds the value set at the ASYM-regulator, the output relay switches into off-position. If the neutral wire is connected to the device, the asymmetry of the phase voltages referred to the neutral wire (Y-voltage) is monitored also. In that case both values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



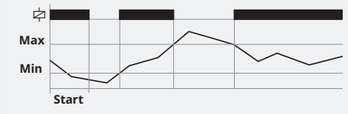
The output relay switches on if the monitored value is within the selected range during the defined time period.

DELAY DELAY



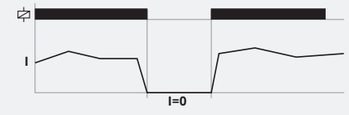
If the monitored value leaves the selected range, the output relay only switches into off-position following expiry of the trip delay.

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 supression.

TYPE DESIGNATION	K3PF400VSY02	K3YM400VSY20	K3IM5AACL20	K3UM230VAC02	K3UM24VDC02
					
ORDER INFORMATION					
Art. No.	1380301	1380402	1380202	1380106	1380107
FUNCTIONALITY	**3-phase AC voltage monitoring**	**3- and 1-phase AC voltage monitoring**	**1-phase AC current monitoring**	**1-phase AC voltage monitoring**	**1-phase AC voltage monitoring**
O ... Over			■		
U ... Under		■	■	■	■
W ... Window		■	■	■	■
SEQ ... Phase sequence	■	■			
Phase failure	■				
ASYM ... Asymmetry	■	■			
+LATCH ... Error memory			■		
SWITCHING THRESHOLD					
Maximum	-	80 to 130% of U_N	10 to 100% of U_N	80 to 120% of U_N	80 to 130% of U_N
Minimum	-	70 to 120% of U_N	5 to 95% of U_N	70 to 110% of U_N	75 to 125% of U_N
Asymmetry	5 to 30%, OFF	5 to 30%, OFF	-	-	-
MEASURING CIRCUIT					
Measuring variable	3(N)~ AC Sinus	3(N)~ AC Sinus	Current AC Sinus	Voltage AC AC Sinus	Voltage AC AC Sinus
Measuring input	U_N= 400/230V AC	U_N= 400/230V AC	5A AC	U_N= 230V AC	U_N= 24V DC
SUPPLY CIRCUIT					
Supply voltage	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	230V AC -15% to +10%	= Measuring voltage 3(N)~ 400/230V AC -30% to +20%	= Measuring voltage 24V DC -25% to +30%
Frequency range	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz	-
TIME CIRCUITS					
Start-up surpression time (START)	-	-	0 – 10 s	-	-
Tripping delay (DELAY)	fixed, approx. 100 ms	0.1 – 10 s	0.1 – 10 s	-	-
OUTPUT CIRCUIT					
Number of switch contacts	2 CO contacts				
Max. switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	38 x 51 x 80 mm				
Certificates	CE, EAC				

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TYPE DESIGNATION	E1IM10AACL10 230VAC	E3IM10AL20 230V AC	E3IF500MAAC20	E3YF400VE20 0.85	E3YF400VT02 0.85
					
ORDER INFORMATION					
Art. No. single package	1340200	1341200	1341201	1341404	1341402
FUNCTIONALITY	**1-phase AC current monitoring**	**1-phase AC/DC current monitoring**	**1-phase AC current monitoring**	**3-phase AC voltage monitoring**	**3-phase AC voltage monitoring**
O ... Over	■	■			
U ... Under	■	■	■	■	■
W ... Window	■	■			
Test function					■
SWITCHING THRESHOLD					
Maximum	10 to 100% of I_N	10 to 100% of I_N	-	-	-
Minimum	5 to 95% of I_N	5 to 95% of I_N	50mA to 500mA	fixed, 195.5V (0.85)	fixed, 195.5V (0.85)
Asymmetry	-	-	-	-	-
MEASURING CIRCUIT					
Measuring variable	Current AC Sinus	Current AC/DC AC Sinus	Current AC Sinus	3(N)~ AC Sinus	3(N)~ AC Sinus
Measuring input	10A AC	100mA / 1A / 10A AC/DC	500mA	U_N= 400/230V AC	U_N= 400/230V AC
SUPPLY CIRCUIT					
Supply voltage	230V AC -15% to +15%	230V AC	230V AC	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%
Frequency range	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz
TIME CIRCUITS					
Start-up surpression time (START)	-	0 - 10 s	0 - 20 min	-	
Tripping delay (DELAY)	0,1 – 10 s	0,1 – 10 s	0 – 20 min	-	fixed, approx. 200 ms
ON DELAY	-	-	-	fixed, 1 min	-
OUTPUT CIRCUIT					
Number of switch contacts	1 CO contact	2 CO contact	2 CO contact	2 CO contact	2 CO contact
Max. switching capacity	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)
DESIGN					
Dimensions (w x h x d)	17,5 x 87 x 65 mm	35 x 87 x 65 mm			
Certificates	CE, cULus, EAC	CE, EAC	CE, EAC	CE, cULus, EAC	

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TYPE DESIGNATION	E1PF400VSY01	E1PF400VS01	E1PF480Y/277VSY01	E1YF400V01	E3YF400V02
					
ORDER INFORMATION					
Art. No. single package	1340300	-	1340306	1340402 (0.85) 1340410 (0.70)	1341401
Art. No. package 10 pcs.	1340300A	1340301A	-	1340402A (0.85)	-
FUNCTIONALITY	**3-phase AC voltage monitoring**				
U ... Under				■	■
W ... Window					
SEQ ... Phase sequence	■	■	■		
Phase failure	■	■	■		
ASYM ... Asymmetry	■		■		
SWITCHING THRESHOLD					
Minimum	-	-	-	fixed, 195.5V (0.85) fixed, 161V (0.70)	fixed, 195.5V
Asymmetry	5 to 25%, OFF	5 to 25%, OFF	5 to 25%, OFF	-	-
MEASURING CIRCUIT					
Measuring variable	3(N)~ AC Sinus	3(N)~ AC Sinus	3~ AC Sinus	3(N)~ AC Sinus	3(N)~ AC Sinus
Measuring input	U_N= 400/230V AC	U_N= 400/230V AC	U_N= 208/120V to 480/277V AC	U_N= 400/230V AC	U_N= 400/230V AC
SUPPLY CIRCUIT					
Supply voltage	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3~ 208/120V to 480/277V AC -10% to +10%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%
Frequency range	48 – 63 Hz				
TIME CIRCUITS					
Tripping delay (DELAY)	fixed, approx. 100ms	fixed, approx. 100ms	fixed, approx. 100ms	fixed, approx. 200ms	fixed, approx. 200ms
OUTPUT CIRCUIT					
Number of switch contacts	1 CO contact	1 CO contact	1 CO contact	1 CO contact	2 CO contacts
Max. switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	17.5 x 87 x 65 mm	17.5 x 87 x 65 mm	17.5 x 87 x 65 mm	17.5 x 87 x 65 mm	35 x 87 x 65 mm
Certificates	CE, EAC	CE, EAC	CE, cULus, EAC	CE, EAC	CE, cULus, EAC

TYPE DESIGNATION	E1YM400VS10	E3YM230VS20	E1UM230V01	E3LM10 230VAC
				
ORDER INFORMATION				
Art. No. single package	1340405	1341406	1340101	1341500
FUNCTIONALITY	**3- and 1-phase AC voltage monitoring**	**3- and 1-phase AC voltage monitoring**	**1-phase AC/DC voltage monitoring**	**Level monitoring of conductive liquids**
O ... Over				
U ... Under	■	■	■	
W ... Window	■	■	■	
SEQ ... Phase sequence	■	■		
Phase failure		■		
Pump up				■
Pump down				■
SWITCHING THRESHOLD				
Maximum	80 to 130% of U_N	80 to 130% of U_N	80 to 120% of U_N	-
Minimum	70 to 120% of U_N	70 to 120% of U_N	75 to 115% of U_N	-
Asymmetry	5 to 25%, OFF	-	-	-
MEASURING CIRCUIT				
Measuring variable	3(N)~ AC Sinus	3(N)~ AC Sinus	Voltage AC/DC AC Sinus	Liquid level via conductive probes
Measuring input	U_N= 400/230V AC	U_N=230/132V AC	24V AC/DC; 230V AC	0.25 to 100kΩ
SUPPLY CIRCUIT				
Supply voltage	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -30% to +30%	= Measuring voltage 3(N)~ 400/230V AC -25% to +20%	230V AC -15% to +10%
Frequency range	48 – 63 Hz	48 – 63 Hz	48 – 63 Hz or DC	48 – 63 Hz
TIME CIRCUITS				
Tripping delay (DELAY)	0.1 – 10 s	0 – 30 s	-	0.5 – 10 s
OFF DELAY	-	-	-	0.5 – 10 s
OUTPUT CIRCUIT				
Number of switch contacts	1 CO contact	2 CO contacts	1 CO contact	1 CO contact
Max. switching capacity	1250VA (5A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	17.5 x 87 x 65 mm	35 x 87 x 65 mm	17.5 x 87 x 65 mm	35 x 87 x 65 mm
Certificates	CE, EAC	CE, EAC	CE, cULus, EAC	CE, cULus, EAC

TYPE DESIGNATION	V2PF480Y/277VSY01	V2PM400Y/230VS10	V2UM230V10	V2UF230V10	V4PF480Y/277VSYTK02
					
ORDER INFORMATION					
Art. No. screw terminal	2100000	2100500	2100300	2100600	2104200
Art. No. push-in terminal	2100010	2100510	2100310	-	2104210
Art. No. package 10 pcs.	2100000A	-	-	-	-
FUNCTIONALITY	**3- phase AC voltage monitoring**	**3- phase AC voltage monitoring**	**1- phase AC/DC voltage monitoring**	**1- phase undervoltage voltage drop detector**	**3- phase AC voltage monitoring**
O ... Over					
U ... Under		■	■	■	
W ... Window		■	■		
SEQ ... Phase sequence	■	■			■
Phase failure	■	■			■
ASYM ... Asymmetrie	■				■
Voltage interruptions (fast detection)				■	
Temperature monitoring (PTC)					■
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	165V AC	-
Asymmetry	5 to 25%, OFF	-	-		5 to 25%, OFF
MEASURING CIRCUIT					
Measuring variable	3~ AC Sinus	3~ AC Sinus	Voltage AC/DC AC Sinus	Voltage AC	Temperature, Voltage 3~ AC Sinus
Measuring input	U_N= 208/120V to 480/277V AC	U_N= 400/230V AC	24V AC/DC; 230V AC	U_N= 180 to 230V AC	U_N= 208/120V to 480/277V AC
SUPPLY CIRCUIT					
Supply voltage	= Measuring voltage 3~ 208/120V to 480/277V AC -10% to +10%	= Measuring voltage 3(N)~ 400/230V AC -35% to +35%	= Measuring voltage 24V AC/DC; 230V AC 24V: -30% to +30% 230V: -30% to +20%	= Measuring voltage 230V AC	= Measuring voltage 3~ 208/120V to 480/277V AC -10% to +10%
Frequency range	48 – 63 Hz	16.6 – 400 Hz	16.6 – 400 Hz or DC	48 – 63 Hz	48 – 63 Hz
TIME CIRCUITS					
ON DELAY	approx. 400 ms	approx. 200 ms	approx. 300 ms	0.5 – 10 s	approx. 500 ms
Tripping delay (DELAY)	< 250 ms	0.1 – 10 s	0.1 – 10 s	-	approx. 250 ms
Response time short voltage interruptions	-	-	-	10 – 40 ms	-
OUTPUT CIRCUIT					
Number of switch contacts	1 CO contact	1 CO contact	1 CO contact	1 CO contact	2 CO contacts
Max. switching capacity	2000VA (8A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	22.5 x 67 x 76 mm	22.5 x 67 x 76 mm	22.5 x 67 x 76 mm	22.5 x 67 x 76 mm	45 x 67 x 76 mm
Certificates	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, EAC	CE, cULus, EAC

TYPE DESIGNATION	V2IM10AL10	V4IM100AL20	V4IM35AL20	V2TF01
				
ORDER INFORMATION				
Art. No. screw terminal	2100400	2104401	2104402	2100100
Art. No. push-in terminal	2100410	2404410	-	2100110
FUNCTIONALITY	**1-phase AC/DC current monitoring**	**1-phase AC/DC current monitoring**	**1-phase AC/DC current monitoring**	**Temperature monitoring (PTC)**
O ... Over	■	■	■	
U ... Under	■	■	■	
W ... Window	■	■	■	
2MAX ... Maximum monitoring		■	■	
MM ... Minimum and maximum monitoring		■	■	
+LATCH ... Error memory		■	■	
Temperature monitoring (PTC)				■
Short circuit monitoring (PTC)				■
SWITCHING THRESHOLD				
Maximum	10 to 100% of I_N	10 to 100% of I_N	10 to 100% of I_N	≥ 3.6kΩ (switch-off resistance)
Minimum	5 to 95% of I_N	5 to 95% of I_N	5 to 95% of I_N	≤ 1.6kΩ (switch-on resistance)
MEASURING CIRCUIT				
Measuring variable	Current AC/DC AC Sinus	Current AC/DC AC Sinus	Current AC/DC AC Sinus	Temperature
Measuring input	10A AC/DC	100A AC/DC Built-in current transformer	35A AC/DC Built-in current transformer	-
SUPPLY CIRCUIT				
Supply voltage	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 -15% to +10%
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
TIME CIRCUITS				
ON DELAY	approx. 300 ms	approx. 300 ms	approx. 300 ms	approx. 50 ms
Start-up surpression time (START)	-	0 – 10 s	0 – 10 s	-
Tripping delay (DELAY)	0.1 – 10 s	0.1 – 10 s	0.1 – 10 s	-
OUTPUT CIRCUIT				
Number of switch contacts	1 CO contact	2 CO contacts	2 CO contacts	1 NO contact
Max. switching capacity	2000VA (8A / 250V AC)			
DESIGN				
Dimensions (w x h x d)	22.5 x 67 x 76 mm	45 x 67 x 76 mm	45 x 67 x 76 mm	22.5 x 67 x 76 mm
Certificates	CE, cULus, EAC			

TYPE DESIGNATION	G2PF400VS02	G2PM400VSY10 G2PM400VSY20	G2TF01 G2TF02	G2TFKN02	G2LM20
					
ORDER INFORMATION					
Art. No. 1 CO contact	-	2390500	2390102 (230V AC) 2390103	-	-
Art. No. 2 CO contacts	2390000	2390504 2390505	2390100 2390104 (230V AC) 2390111	2390101 2390110	2390201 (24V AC) 2390202 (110V AC) 2390200 (230V AC)
FUNCTIONALITY	**3 – phase AC voltage monitoring**	**3 – phase AC voltage monitoring**	**Temperature monitoring (PTC)**	**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	-	-20 to +30% of U_N	≥ 3.6kΩ (switch-off resistance)	≥ 3.6kΩ (switch-off resistance)	-
Minimum	-	-30 to +20% of U_N	≤ 1.6kΩ (switch-on resistance)	≤ 1.6kΩ (switch-on resistance)	-
Asymmetry	fixed, typ. 30%	5 to 25%, OFF	-	-	-
MEASURING CIRCUIT					
Measuring variable	3(N)~ AC Sinus	3(N)~ AC Sinus	Temperature	Temperature	Liquid level via conductive probes
Measuring input	U_N= 400/230V AC	3(N)~ 400/230V	-	-	0.25 to 100kΩ
SUPPLY CIRCUIT					
Supply voltage	= Measuring voltage 3(N)~ 342V to 457V AC	24 to 240V AC/DC or selectable via power modules TR2, SNT2	24 to 240V AC/DC; 230V fixed or selectable via power modules TR2, SNT2	24 to 240V AC/DC or selectable via power modules TR2, SNT2	24V AC 110V AC 230V AC
TIME CIRCUITS					
Start-up surpression time (START)	fixed, max. 500ms	-	-	-	-
Tripping delay (DELAY)	fixed, max. 350ms	0.1 – 10 s	-	-	0.5 – 10 s
OFF DELAY	-	-	-	-	0.5 – 10 s
OUTPUT CIRCUIT					
Number of switch contacts	2 CO contacts	1 or 2 CO contacts	1 or 2 CO contacts	2 CO contacts	2 CO contacts
Max. switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	22.5 x 90 x 108 mm				
Certificates	CE, cULus, EAC				

Please refer to the chapter accessories for detailed information and ordering data of power modules TR2, TR3 and SNT2

TYPE DESIGNATION	G2PU690VS20	G2UM300VL20	G2IM5AL10 G2IM5AL20	G2IM10AL10 G2IM10AL20	G2FW400VL20
					
ORDER INFORMATION					
Art. No. 1 CO contact	-	-	2390401	2390400	-
Art. No. 2 CO contacts	2390507	2390303 2390304	2390405 2390411	2390406 2390410	2390900
FUNCTIONALITY	**3- phase AC voltage monitoring**	**1- phase AC/DC voltage monitoring**	**1- phase AC/DC current monitoring**	**1- phase AC/DC current monitoring**	**Frequency monitoring**
O ... Over		■	■	■	
U ... Under	■	■	■	■	
W ... Window		■	■	■	■
SEQ ... Phase sequence	■				
Phase failure	■				
ASYM ... Asymmetry	■				
+LATCH ... Error memory		■	■	■	■
SWITCHING THRESHOLD					
Maximum	-	10 to 100% of U_N	10 to 100% of I_N	10 to 100% of I_N	F_N = 50Hz: 49 to 60Hz F_N = 60Hz: 59 to 70Hz
Minimum	180 to 690V	5 to 95% of U_N	5 to 95% of I_N	5 to 95% of I_N	F_N = 50Hz: 40 to 51Hz F_N = 60Hz: 50 to 61Hz
Asymmetry	fixed, 25%	-	-	-	-
MEASURING CIRCUIT					
Measuring variable	3~ AC Sinus	Voltage AC/DC AC Sinus	Current AC/DC AC Sinus	Current AC/DC AC Sinus	Frequency, 1-phase
Measuring input	U_N= 208V bis 690V	30 / 60 / 300V AC/DC	20mA / 1A / 5A AC/DC	100mA / 1A / 10A AC/DC	110 - 400V AC
SUPPLY CIRCUIT					
Supply voltage	= Measuring voltage 3~ 177V to 794V	24 to 240V AC/DC or selectable via power modules TR2, SNT2	24 to 240V AC/DC or selectable via power modules TR2, SNT2	24 to 240V AC/DC or selectable via power modules TR2, SNT2	24 to 240V AC/DC
TIME CIRCUITS					
ON DELAY	-	-	-	-	0 – 10 s
Start-up surpression time (START)	-	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	0.1 – 10 s
OUTPUT CIRCUIT					
Number of switch contacts	2 CO contacts	2 CO contacts	1 or 2 CO contacts	1 or 2 CO contacts	2 CO contacts
Max. switching capacity	1250VA (5A / 250V AC)				
DESIGN					
Dimensions (w x h x d)	22.5 x 90 x 108 mm				
Certificates	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, EAC

Please refer to the chapter accessories for detailed information and ordering data of power modules TR2, TR3 and SNT2

Load monitors

Monitoring of electronic motors

TELE load 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.

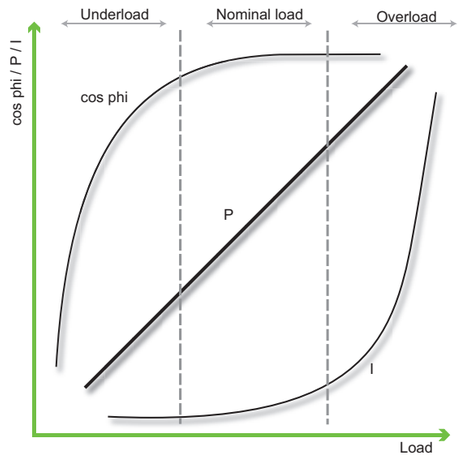
Load monitoring systems with power factor measurement (cos φ)

The power factor cos φ 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 φ monitor is extremely significant because the proportion of losses at a lower load increases dramatically and results in a cos φ 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 φ.

Load 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 Load Monitor-Usage:

- Trash Compactor: Under- and overload monitoring of motor drives of screw compactor or hydraulic pumps and control of refilling.
- Crusher: Under- and overload monitoring of motor drives and control of refilling.
- Mixers: Under- and overload monitoring of motor drives.
- Conveyor belts: Under- and overload monitoring of motor drives of conveyor belts and control of refilling.
- Ventilation systems: Under- and overload monitoring of motor drives of ventilators.
- Machine tools: Under- and overload monitoring of motor drives of machining tools, coolant pumps, swarf conveyors and control option of feed unit.
- Bridge and portal cranes: Overload monitoring of hoist motors.
- Centrifugal and piston pumps: Under- and overload monitoring of pump motors and control of flow rate.

TYPE DESIGNATION	G2CM400V10AL20	G2BA400V12A 4-20MA G2BA400V12A 0-10V	G2BM400V12AL10 G2BM400V12AFL10	G4CM690V16ATL20	G4BM480V12ADTL20
Art. No.	2390602	2390705 2390708	2390700 2390702	2394600	2394706
FUNCTIONALITY	**cos φ power factor in 1- or 3-phase mains**	**Active power transducer in 1- or 3-phase mains**	**True power monitoring in 1- or 3-phase mains**	**cos φ power factor in 1- or 3-phase mains**	**True power monitoring in 1- or 3-phase mains**
O ... Overload monitoring	■		■		■
U ... Underload monitoring	■		■		■
W ... Window	■				■
2MIN ... Minimum monitoring				■	■
2MAX ... Maximum monitoring				■	■
MIN/MAX ... Minimum- and maximum monitoring				■	■
+LATCH ... Error memory	■		■	■	■
I = 0 DETECTION ... Recognition of disconnected consumers			■	■	■
Temp ... Temperature monitoring of the motor winding			■	■	■
SWITCHING THRESHOLD					
Zero ... Zero point	-	0%, 25%, 50% and 75% of nominal value	-	-	-
Zero Fine ... Fine setting zero point	-	0 - 25% of nominal value	-	-	-
Span ... Measuring span	-	100%, 75%, 50% and 25% of nominal value	-	-	-
Threshold P / P1	cos ϕ Max: 0.2 - 1.0	-	5 to 120% of P_N	cos ϕ 1: 0,3 – 1 (inductive) 1 – 0,3 (capacitive)	2.5kW: 120W to 2490W 10kW: 480W to 9960W
Threshold P2	cos ϕ Min: 0.1 - 0.99	-	-	cos ϕ 1: 0,3 – 1 (inductive) 1 – 0,3 (capacitive)	-
MEASURING CIRCUIT					
Measuring variable	Power factor (cos ϕ), 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	Power factor (cos ϕ), 1- or 3-phase loads AC Sinus	True power, 1- or 3-phase loads AC Sinus
Measuring range	0.1 to 1	0.75kW • 1.5kW • 3kW • 6kW	0.5kW • 1kW • 2kW • 4kW	0.3 to 1	2.5kW • 10kW
Measuring input voltage	40 to 415V AC (single-phase) 40/23 to 415/240V (3 ~)	0 to 480V AC (single-phase) 0 to 480/277V (3 ~)	0 to 230V AC (single-phase) 0 to 415/240V (3 ~)	85 to 690V AC (single-phase) 85 to 690/400V (3 ~)	0 to 480V AC (single-phase) 0 to 480/277V (3 ~)
Overload capacity voltage	500V AC (single-phase) 500/289V (3 ~)	550V AC (single-phase) 550/318V (3 ~)	300V AC (single-phase) 500/289V (3 ~)	796V AC (single-phase) 796/460V (3 ~)	550V AC (single-phase) 550/318V (3 ~)
Measuring input current	0.5 to 10A	0 to 6A (0.6 and 1.2kW) 0 to 12A (2.4 and 4.8kW)	0 to 6A (0.5 and 1kW) 0 to 12A (2 and 4kW)	1 to 16A	0.15 to 6A (2.5kW) 0.3 to 12A (10kW)
Overload capacity current	11A permanent	12A permanent	12A permanent	20A permanent	12A permanent
SUPPLY CIRCUIT					
Supply voltage	Selectable via power module TR2	24 – 240V DC; 48 – 240V AC	Selectable via power module TR2	Selectable via power module TR3	24 – 240V AC/DC
TIME CIRCUITS					
Start-up surpression time (START)	1 – 100 s	-	1 – 100 s (AL10) 0.1 – 2 s (AFL10)	3 – 180 s	0 – 100 s
Tripping delay (DELAY)	0.1 – 40 s	-	0.1 – 50 s (AL10) 0.1 – 2 s (AFL10)	1 – 50 s	0.1 – 50 s
INPUT CIRCUIT					
Control input	-	-	Y1-Y2 (Latch)	Y1-Y2 (Latch)	Y1-Y2 (Latch)
OUTPUT CIRCUIT					
Analog output	-	4 - 20mA (Burden: max. 500Ω) 0-10V (Burden: min. 3kΩ)	-	-	-
Number of switch contacts	2 CO contacts	-	1 CO contact	2 CO contacts	2 CO contacts
Max. switching capacity	1250VA (5A / 250V AC)	-	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)	1250VA (5A / 250V AC)
DESIGN					
Dimensions (w x h x d)	22.5 x 90 x 108 mm	22.5 x 90 x 108 mm	22.5 x 90 x 108 mm	45 x 90 x 108 mm	45 x 90 x 125 mm
Certificates	CE, cULus, EAC	CE, EAC	CE, cULus, EAC	CE, cULus, EAC	CE, cULus, EAC

Please refer to the chapter accessories for detailed information and ordering data of power modules TR2, TR3 and SNT2

Grid and system protection

Autonomously working disconnecting point for private small power plants

Why? Small power plants must be disconnected from the grid immediately in the event of a network shutdown or network disruption to avoid any danger to people and equipment.

Function: An automatic disconnection device monitors the feed-in of energy to the 230/400V grid. In case of a power failure or disruptions by the energy supplier it is vital for small power plants to be disconnected within a few milliseconds. Monitoring the voltage and frequency and recognizing isolated (off-grid) operation are essential requirements for any automatic disconnection device.

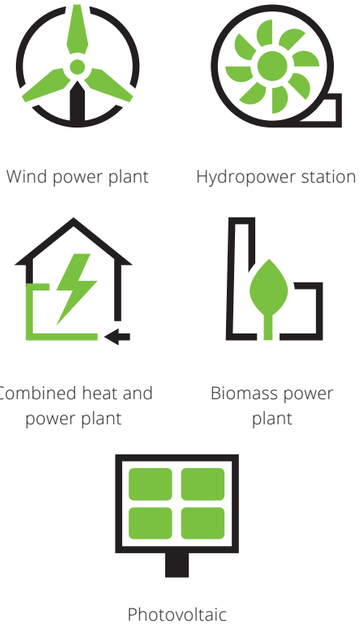
Requirement: Converting renewable energy into electricity is a key element of stabilising the global climate. In the context of small and micro power plants we mainly see photovoltaic installations, small wind power generators, cogeneration plants or small hydropower plants being used. The energy produced in this way is used to cover own consumption needs, or fed into the public grid to generate a profit. To ensure network safety, an automatic interface monitors the transfer between small power plants and the grid of the energy supplier (ES). Large power plants are managed and monitored directly by the ES using telecontrol engineering. This is too expensive and therefore uneconomical for the many private producers of electricity.

In the event of a power cut or a disruption in the grid of the energy supplier, small private power plants immediately have to be disconnected from the public grid to prevent unwanted feed-in.

Failure to disconnect from the grid without delay puts maintenance personnel at risk, while consumers can also be exposed to improper voltages and frequencies. The monitoring and the automatic disconnection are carried out by an automated interface. Small power plants have to be equipped with an automatic isolation unit that is checked and permitted by an accredited body. Country-specific norms define how the interface should be realised and checked in detail.

To meet the requirements of the standards and of the energy supply companies, the market offers solutions as individual components, multinational components as well as integrated solutions. The thresholds can even be adjusted outside the standard values if required by the network operator. Functionally safe devices also fulfil the monitoring function in the event of faults, recognise these faults and ensure a safe operating condition.

TELE's NA003 offers an optimal solution for any country and any requirement.

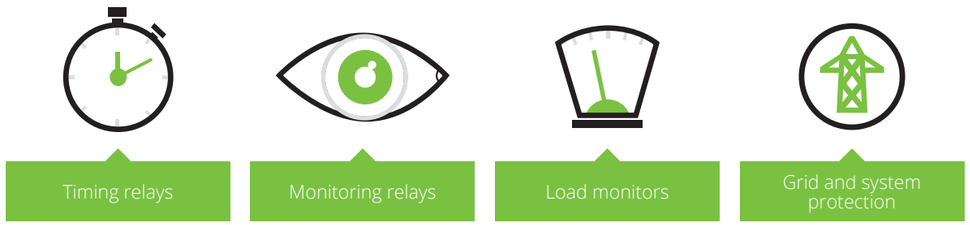


- **Multifunctional device**
- **Open setup, fully configurable without any limitations**
- **One device for low and medium voltage grid**

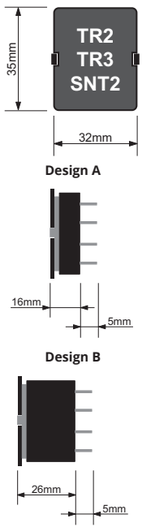
TYPE DESIGNATION	NA003
ORDER INFORMATION	
Art. No.	2700000
FUNCTIONALITY	
Implemented standards	CEI 0-21 (Italy) VDE V 0126-1-1 (Turkey, Belgium, France, Greece, ...) VDE-AR-N 4105 - tested in accordance with VDE V 0124-100 (Germany, ...) G59/3 (Great Britain - low voltage) G59/3 (Great Britain - medium voltage) G83/2 (Great Britain) C10-11 (Belgium - low voltage) C10-11 (Belgium - medium voltage) TR3, TR8 - certified in accordance with BDEW 2008 (Germany - medium voltage) OENorm E 8001-4-712 (Austria) EN50438 (Europe) EN50438 Denmark Open setup
Measuring variable	phase to phase voltage, phase to neutral voltage, 10 minute voltage average, frequency, frequency change (RoCoF), Phase shift (PShift)
Measuring range	phase to phase voltage: 0 ... 560VAC, phase to neutral voltage: 0 ... 325VAC frequency: 40 ... 60Hz, RoCoF 100mHz/s ... 2.000mHz/s, Pshift 1 ... 15°
Monitoring functions	2 x phase to neutral overvoltage, 2 x phase to neutral undervoltage 2 x phase to phase overvoltage, 2 x phase to phase undervoltage 1 x 10 minutes voltage average (over) 4 x overfrequency, 4 x underfrequency, 1 x random overfrequency 1 x RoCoF (over), 1 x PShift (over)
Features	Each turn-off threshold is associated with its own turn-off time Fixed turn-on time, random turn-on time Configurable evaluation of the feedback contact Enable / Disable functions via digital inputs Enable / Disable functions via selectable operational mode 4 different connection and measuring modes: 2 wire (single phase L1, N), 3 wire (3 phase without N), 4 wire (3 phase LL only), 4 wire (3 phase LL + LN) Configurable nominal voltage Functional safety Password protection and ability to seal Error memory with time stamp (entries)
Supply voltage	24V DC ± 10%, 110 ... 240V AC ± 30%,
Rated frequency	50/60Hz or DC
Tolerance of rated frequency	48...63Hz
Output circuit	3 CO contacts 5A, 250V AC (1250VA)
Digital inputs	5 inputs for potential free contacts (24V / 5mA)
DESIGN	
Dimensions (w x h x d)	106.3 x 90.5 x 62mm
Certificates	CE, EAC

Accessories

For our timing- and monitoring relays as well as our load monitors and grid and system protection we offer the following accessories.



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



TYPE DESIGNATION	SUPPLY VOLTAGE	TOLERANCE	POWER INPUT P_{IN}	POWER OUTPUT P_{OUT}	DESIGN	ART. NO.
SNT2 - 24V DC	24V DC	20.4 – 26.4V			A	282050
TR2 - 12V AC	12V AC	10.2 – 13.2V	2VA	0.5VA	A	282121
TR3 - 12V AC	12V AC	10.2 – 13.2V	4VA	1.5VA	B	285021
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 - 42V AC	42V AC	36 – 46V	2VA	0.5VA	A	282111
TR3 - 42V AC	42V AC	36 – 46V	4VA	1.5VA	B	285011
TR2 - 48V AC	48V AC	41 – 53V	2VA	0.5VA	A	282112
TR3 - 48V AC	48V AC	41 – 53V	4VA	1.5VA	B	285012
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

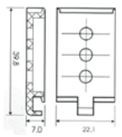
* may only be used in connection with types G4PM and G4BM!

Remote potentiometer RONDO series
Front panel mounting.
Adjusting values of intended timers and thyristor control units from distance.

TYPE DESIGNATION	SCALE	DIMENSIONS (W X H X D)	CONNECTIONS	ART. NO.
R2 1MΩ 0.1	0,1 - 1	Ø 28 (Ø 22*) x 53 mm	1 = First 2= Wiper 3 = Finish	282130
R2 1MΩ 0.3	0,3 - 3			282133
R20 10KΩ	0 - 10			282131

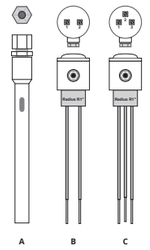
* Diameter front panel mounting

Mounting plate MP
for fixing TELE devices on a mounting plate or wall



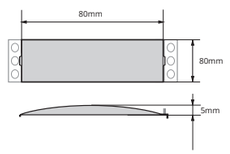
TYPE DESIGNATION	Ø DRILL HOLES	DIMENSIONS (W X H X D)	ART. NO.
MP	Ø 4 mm	22.1 x 39.8 x 7.0 mm	075474
MP GAMMA			075574

Probes - SK series
for monitoring level of conductive liquids



TYPE DESIGNATION	MEASURING VOLTAGE	MAX. TEMPERATURE	NUMBER OF ELECTRODES	LENGTH	DESIGN	ART. NO.
SK1	max. 24V AC	60° C	1	140 mm	A	190107
SK2		90° C	2	500 mm	B	190108
SK3-500		90° C	3	500 mm	C	190109
SK3-1000		90° C	3	1000 mm	C	190110

Front cover FA-G2
for GAMMA monitoring relays (width 22.5 mm)



TYPE DESIGNATION	Ø DRILL HOLES	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

Complementary products

In addition to our product range we also offer the following complementary products:

Signal converter	- Signalamplifier series: M1 - Loop-powered isolator series: M1	Page 35
Current transformers	- Baffle-type current transformer series: WSW - Bar-type current transformer series: DSW	Page 35
Coupling units	- Coupling relays series: ENYA - Automatic-Manual-OFF relay series: OCTO - Analogue data encoder series: OCTO - Levelswitch series: OCTO	Page 36
Switching relays **Sets** **Accessoires**	- Interface Relays series: STKR and SKR - Multifunction time modul series: COMBI - Miniature Relays series: RA and RM - Industrial Relays series: RT - PCB Relays series: RP	Page 37 Page 38
Softstarter **Braking units** **Thyristor control units**	- Softstarter series: TSG/MSG, EUROSTART and ESG - Braking units series: MBG, BG - Thyristor control units series: TST, ESGT	Page 39 Page 40 Page 41
Hour meters **Digital time switches** **Countdown timer**	- Hour meters series: TBG and TBW - Digital time switches series: TSC - Countdown timers series: TTC	Page 42
Safety relays	- Safety relays series: S^2	Page 43
DC power supplies	- Switching power supplies	Page 44

WSW 60

DSW 60

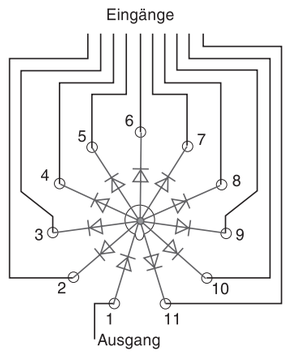
TYPE DESIGNATION	RATED POWER	RATED PRIMARY CURRENT	SECONDARY CURRENT	DIMENSIONS	CLASS	ART. NO.
WSW 60 10A/5A 2,5VA	2.5VA	10A	5A	80 x 60 x 30 mm	1	498063
WSW 60 15A/5A 2,5VA	2.5VA	15A		80 x 60 x 30 mm		498064
WSW 60 20A/5A 2,5VA	2.5VA	20A		80 x 60 x 30 mm		498065
WSW 60 25A/5A 2,5VA	2.5VA	25A		80 x 60 x 30 mm		498066
WSW 60 30A/5A 2,5VA	2.5VA	30A		80 x 60 x 30 mm		498067
WSW 60 40A/5A 2,5VA	2.5VA	40A		80 x 60 x 30 mm		498068
DSW 60 50A/5A 1,25VA	1.25VA	50A		50.5 x 50.5 x 85 mm	3	498069
DSW 60 60A/5A 1,25VA	1.25VA	60A		33 x 33 x 50 mm	1	498070
DSW 60 75A/5A 2,5VA	2.5VA	75A		50.5 x 50.5 x 85 mm	3	498071
DSW 60 100A/5A 2,5VA	2.5VA	100A		33 x 33 x 50 mm	1	498073
DSW 60 150A/5A 3,75VA	3.75VA	150A		33 x 33 x 50 mm		498075
DSW 60 200A/5A 5VA	5VA	200A		33 x 33 x 50 mm		498076
DSW 60 250A/5A 5VA	5VA	250A		33 x 33 x 50 mm		498077
DSW 60 300A/5A 5VA	5VA	300A		33 x 33 x 50 mm		498078
DSW 80 400A/5A	10VA	400A		50.5 x 50.5 x 85 mm		498081
DSW 80 800A/5A	10VA	800A		50.5 x 50.5 x 85 mm		498084

ACCESSORIES	DESCRIPTION	ART. NO.
MC-SW (2 pieces)	Mounting clip required for mounting the current transformer on DIN-Rail TS 35	498100

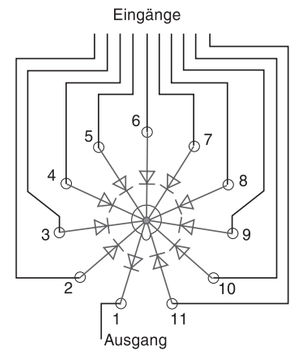
TREND series Plug-in diode gate (11-poles)

TYPE DESIGNATION	INPUT / OUTPUT	SUPPLY VOLTAGE	PEAK INVERSE VOLTAGE	REVERSE CURRENT	DURCHLASSS-PANNUNG	FORWARD VOLTAGE	ART. NO.
TD1	Input: 10 diodes Output: 1 diodes (Type 1N4007)	max. 250V	1000V	5µA	ca. 0,8V	Input: 0,7A per channel 0,1A at simultaneous load Output: max. 1A	2490000
TD2							2490001

TD1



Connections TD1



Connections TD2

ENYA series coupling units / **OCTO series** coupling units

TYPE DESIGNATION	E1K	E3K	HAR1	OVP1	OCP1	OVL1	OCL1
							
ORDER INFORMATION							
Art. No.	110700	111700	170010	170012	170018	170015	170017
FUNCTIONALITY	**COUPLING RELAYS**	**COUPLING RELAYS**	**AUTOMATIC-MANUAL-OFF RELAY**	**ANALOGUE DATA ENCODER**	**ANALOGUE DATA ENCODER**	**LEVELSWITCH**	**LEVELSWITCH**
Coupling unit	■	■					
AUTO ... Automatic			■	■	■	■	■
0 ... OFF			■	■	■	■	■
HAND ... Manual			■	■	■	■	■
SUPPLY CIRCUIT							
Supply voltage	24 – 240V AC/DC	12 – 240V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC	24V AC/DC
Rated frequency	48 – 63 Hz						
INPUT CIRCUIT							
Control voltage	-	-	24V AC/DC	-	-	-	-
Analogue input DC	-	-	-	0 – 10V	0 – 20mA	0 – 10V	0 – 20mA
Trigger level DC	-	-	-	0 – 10V	0 – 20mA	1 – 10V	2 – 20mA
CHECKBACK							
Number of checkback contacts	-	-	1 NO contact	1 NO contact	1 NO contact	1 NO contact	1 NO contact
Min. switching capacity	-	-	5mVA (1mA / 5V)	5mVA (1mA / 5V)	5mVA (1mA / 5V)	5mVA (1mA / 5V)	5mVA (1mA / 5V)
Max. switching capacity	-	-	24VA (500mA / 48V)	56VA (2A / 28V)	56VA (2A / 28V)	56VA (2A / 28V)	56VA (2A / 28V)
OUTPUT CIRCUIT							
Number of switching contacts	1 CO contact	2 CO contacts	1 CO contact	-	-	1 CO contact	1 CO contact
Max. switching capacity AC	2000VA (8A / 250V)	2000VA (8A / 250V)	2000VA (8A / 250V)	-	-	2000VA (8A / 250V)	2000VA (8A / 250V)
Analogue output	-	-	-	0 – 10V DC	0 – 20mA	-	-
DESIGN							
Dimensions (w x h x d)	17.5 x 87 x 65 mm	35 x 87 x 65 mm	17.5 x 87 x 70 mm	17.5 x 87 x 70 mm	17.5 x 87 x 70 mm	17.5 x 87 x 70 mm	17.5 x 87 x 70 mm
Certificates	CE, EAC						

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SKR, STKR series and accessories coupling relays - PLC applications

STKR

TYPE DESIGNATION	FUNCTION	RATED VOLTAGE		RELAY VOLTAGE	NUMBER OF SWITCHING CONTACTS	ART. NO.
SKR 524	Coupling relay for PLC applications	24V	AC/DC		1 CO contact	180501
SKR 024		24V	DC			180500
SKR 730		230V	AC			180502
STKR 524	Coupling relay for PLC applications with pluggable changeover relay	24V	AC/DC	24V DC		180504
STKR 024		24V	DC	24V DC		180503
STKR 730		230V	AC	60V DC		180505
RM699V-3011-85-1024	Pluggable changeover relay	24V	DC			100660
RM699V-3011-85-1060		48V	DC			100661
ACCESSORIES	**FUNCTION**			**COLOUR**	**NUMBER OF POLES**	
PB-B SKR	Jumper link			Blue	20	180535
PB-R SKR				Red		180536

RA, RM series miniature relays / **RP series** PCB relays

RA

RM

RP

TYPE DESIGNATION	RATED VOLTAGE		LED	GOLD-PLATED CONTACTS	NUMBER OF SWITCHING CONTACTS	ART. NO.
RA 524L-N	24V	AC	■		2 CO contacts	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		■			100622LD-N
RM 512L-N	12V	AC	■		4 CO contacts	100612LD-N
RM 524L-N	24V		■			100613LD-N
RM 615L-N	115V		■			100618LD-N
RM 730L-N	230V		■			100619LD-N
RM 012L-N	12V	DC	■			100601LD-N
RM 024L-N	24V		■			100603LD-N
RM 048L-N	48V		■			100602LD-N
RM 220L-N	220V		■			100620LD-N
RP 524-1	24V	AC			1 CO contacts	100431
RP 730-1	230V					100432
RP 024-1	24V	DC				100430
RP 524-2	24V	AC			2 CO contacts	100417
RP 730-2	230V					100418
RP 012-2	12V	DC				100420
RP 024-2	24V					100416
RP 024-hv	24V			■		100416H

RT series industrial relays

RT

TYPE DESIGNATION	RATED VOLTAGE		LED	RECOVERY DIODE	GOLD-PLATED CONTACTS	NUMBER OF SWITCHING CONTACTS	ART. NO.
RT 1.2.012L	12V	AC	■			2 CO contacts	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	■				100517LD
RT 2.2.024L	24V		■				100516LD
RT 1.3.024L	24V	AC	■			3 CO contacts	100526LD
RT 1.3.048L	48V		■				100524LD
RT 1.3.110L	110V		■				100522LD
RT 1.3.230	230V						100521
RT 1.3.230L	230V		■				100521LD
RT 1.3.230.02L	230V		■		■		100521H
RT 2.3.012L	12V	DC	■				100536LD
RT 2.3.024	24V						100535
RT 2.3.024L	24V		■				100535LD
RT 2.3.024LD	24V		■	■			100535FD
RT 2.3.024.02LD	24V		■	■	■		100535H
RT 2.3.048L	48V		■				100533LD
RT 2.3.110	110V						100531
RT 2.3.220	220V						100530

COMBI series multifunction timing module (combinable to industrial relays with socket type ES9 and PF-113BEM)

TYPE DESIGNATION	FUNCTIONS	TIME RANGES	SUPPLY VOLTAGE	NUMBER OF SWITCHING CONTACTS	DIMENSIONS (W X H X D)	ART. NO.
COM3T	8 E, R, Ws, Wa, Wu, Es, Bp, Bi	8 (0.05 s – 10 d)	24 – 240V AC/DC	2 or 3 CO contacts (according to selected industrial relay)	35 x 12 x 47 mm	237010

Sockets for switching relays

TYPE DESIGNATION	FOR SERIES	RATED VOLTAGE		ART. NO.
PYF14BE (ES 15/4N)	RA, RM	300V	AC	180134
PYF14BE3 (ES 15/4S)				180145
PYF14BE3CC (ES 15/4G)				180148
CST-B14F2-L (ES 15/4B)				180146
RSS214	RM			180050
PI50BE/3R (ES 50/3)	RP			180150
PI50BE/3-CC (ES50/3G)				180149
PI50BE (ES 50)				180137
PSS8/3				180056
PF083BE (ES8)	RT 8-pin			180139
ES 9				180041
PF113BEM (ES12)	RT 11-pin			180136
R11X				180055

COM3T + ES9 + RT1.2.012L

Sockel ES15/4N

Sockel ES15/4G

Sockel PSS8

Sockel R11X

Modules and accessories for switching relays

TYPE DESIGNATION	TYPE DESCRIPION	FOR SOCKETS SERIES	FOR SWITCHING RELAYS SERIES	RATED VOLTAGE	ART. NO.
M21N	Diode	PYF	RA, RM	6 - 230V DC (+A1)	180261
M41R	LED (red) + Diode	PYF	RA, RM	6 - 24V DC (+A1)	180263
EM 12	LED (green) + Diode	RSS214	RM	6 - 24V DC (+A1)	180309
EM 03	RC-link	RSS214	RM	110 - 230V AC	180300
TYPE41 (TVL1)	LED + Diode	PF113BEM	RT	6 - 24V DC (+A1)	180232
HB/RM-RA	Retaining Clip (metal)	RSS214, ES15, PYF	RA, RM		180032
HB/ES15	Retaining Clip (plastic)	ES15, PYF	RA, RM		180153
HB/RT	Retaining Clip (metal)	PF083BE, PF113BEM, ES9, R11X	RT		180043
HB/RP 16	Retaining Clip (plastic)	PI50	RP		180029
HB/PSS	Retaining Clip (plastic)	PSS8/3	RP		180060
BS/PSS	Front cover (label field)	PSS8/3	RP		180057

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MS3 softstarter (2.2 up to 22kW with internal current control and bypass)

TYPE DESIGNATION	MOTOR CONTROL	NOMINAL CURRENT	NOMINAL MOTOR POWER	DIMENSIONS (W X H X D)	ART.NO.
MS3 2,2	3-phase	4.5A	2.2kW	42 x 128 x 130 mm	490460
MS3 3,0		6.6A	3.0kW	42 x 128 x 130 mm	490461
MS3 4,0		8.5A	4.0kW	42 x 128 x 130 mm	490462
MS3 5,5		12A	5.5kW	42 x 128 x 130 mm	490463
MS3 7,5		18A	7.5kW	51 x 141 x 181 mm	490464
MS3 11,0		25A	11kW	51 x 141 x 181 mm	490465
MS3 15,0		30A	15kW	51 x 224 x 179 mm	490466
MS3 18,5		37A	18.5kW	51 x 224 x 179 mm	490467
MS3 22,0		45A	22kW	51 x 224 x 179 mm	490468

TST01 series thyristor control unit (compact design)

TYPE DESIGNATION	P_{HEATER}	AUXILIARY VOLTAGE	I_{MAX} 100% DUTY CYCLE	I_{MAX} 10ms	DIMENSIONS (W X H X D)	ART.NO.
TST01-08/230	1,8kW	230V / Internal	8A	200A	45 x 97 x 126 mm	499015
TST01-12/230	2,7kW		12A	200A		499016
TST01-16/230	3,6kW		16A	300A		499017
TST01-20/230	4,6kW		20A	400A		499018
TST01-25/230	5,75kW		25A	400A		499019

MS3
2,2-5,5 kW

MS3
7,5-11 kW

MS3
15-22 kW

TST01

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 fuse (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 holder (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

TSC series digital time switches

TSC18.10EASY

DAILY-, WEEKLY- OR YEARLY PROGRAM, DIN-RAIL MOUNTING								
TYPE DESIGNATION	SUPPLY VOLTAGE	CHANNELS	NUMBER OF SWITCHING CONTACTS		ASTRO FUNCTION	SWITCHING CAPACITY	RATED CONSUMPTION	DIMENSIONS	ART. NO.
			CO	NO					
TSC18.10EASY*	230V AC	1		1		4000VA	1.5VA	35.8 x 90 x 60 mm	711149
TSC28.11	230V AC	1	1			4000VA	1.5VA	35.8 x 90 x 60 mm	711142
TSC28.21	230V AC	2	2			4000VA	1.5VA	35.8 x 90 x 60 mm	711143
TSC28.23	230V AC	2	2		■	4000VA	1.5VA	35.8 x 90 x 60 mm	711147
TSC98.20	230V AC	2	2			2500VA	2VA	71.5 x 120 x 60 mm	711132
TSC98.40	230V AC	4	3	1		2500VA	2VA	71.5 x 120 x 60 mm	711131

*EASY ... programmable via smartphone (NFC)

TSC44.21PRO

DAILY-, WEEKLY- OR YEARLY PROGRAM, FRONT PANEL MOUNTING								
TYPE DESIGNATION	SUPPLY VOLTAGE	CHANNELS	NUMBER OF SWITCHING CONTACTS		SWITCHING CAPACITY	RATED CONSUMPTION	DIMENSIONS	ART. NO.
			CO	NO				
TSC44.12	24V AC	1	1		4000VA	0.9VA	72 x 94.5 x 53 mm	711676
TSC44.11PRO	115V AC	1	1		4000VA	2.8VA	72 x 94.5 x 53 mm	711576
TSC44.11	230V AC	1	1		4000VA	1.5VA	72 x 94.5 x 53 mm	711587
TSC44.22	24V AC	2	1	1	4000VA	1.3VA	72 x 94.5 x 53 mm	711679
TSC44.21	230V AC	2	1	1	4000VA	1.5VA	72 x 94.5 x 53 mm	711579

TTC series digital time switches

TTC24.21

COUNTDOWN TIMER, FRONT PANEL MOUNTING					
TYPE DESIGNATION	SUPPLY VOLTAGE	TIME RANGE	NUMBER OF SWITCHING CONTACTS	DIMENSIONS	ART. NO.
TTC24.21	230V AC	99 h 59 min 59 s	1 CO contact	48 x 48 x 41 mm	711450

TBG, TBW series analogue hour meters

TBG/TBW30

TBG SERIES, DC VOLTAGE					
TYPE DESIGNATION	SUPPLY VOLTAGE	COUNTING CAPACITY	ACCURACY OF READING	DIMENSIONS	ART. NO.
TBG30.18	12 – 48V DC	999 999 h	0.1 h	53.2 x 28.2 x 63 mm	711056
TBG40.17				48 x 48 x 38 mm	711025
TBG70.18		99 999 h		17.5 x 85 x 61.5 mm	711435
TBG70.29				35 x 90 x 60 mm	711408

TBG/TBW40

TBW SERIES, AC VOLTAGE						
TYPE DESIGNATION	SUPPLY VOLTAGE	RATED FREQUENCY	COUNTING CAPACITY	ACCURACY OF READING	DIMENSIONS	ART. NO.
TBW40.18	24V AC	50 Hz	99 999 h	0.01 h	48 x 48 x 38 mm	711045
TBW40.18	115V AC				48 x 48 x 38 mm	711042
TBW70.18	115V AC				17.5 x 85 x 61.5 mm	711434
TBW30.18	230V AC				53.2 x 28.2 x 63 mm	711050
TBW40.18	230V AC				48 x 45 x 38 mm	711040
TBW70.18	230V AC				17.5 x 85 x 61.5 mm	711430
TBW70.29	24V AC	50/60 Hz		0.1 h	35 x 90 x 60 mm	711355
TBW70.89	48V AC				35 x 105 x 60 mm	711139
TBW70.89	115V AC				35 x 105 x 60 mm	711140
TBW70.89	230V AC				35 x 105 x 60 mm	711141
TBW70.29	230V AC				17.5 x 85 x 61.5 mm	711350

ACCESSORIES TBG, TBW	DESCRIPTION	ART. NO.
SB-TBX30	Tension bracket for TBG/TBW30	711809
B55-TBX40	Shutter for TBG/TBW40 (55 x 55mm)	711800
ME72-TBX40	Screen for TBG/TBW40 (72 x 72mm)	711801
SB-TBX40	Retaining clip for TBG/TBW40	711807
DR-TBW40	Sealing ring for TBW40 (IP54)	711813
KA-TBX70.29	Terminal cover for TBG/TBW70.29 (sealable)	711812

TBG/TBW70.18

TBG/TBW70.29

MDR-20-24

DRAN30-12A

DRA 480-24A* (Backup)

AMR1-24

INDUSTRIAL HOUSING FOR SWITCH CABINET AND PLANT CONSTRUCTION

- **Output voltage 5 - 48V DC**
- **Output power 5 - 960W**
- **Overload and short circuit protection**

Output voltage	Output power	Output current
5V DC	5W	1A
	10W	2A
	15W	3A
	30W	6A
	50W	10A
12V DC	10W	0.8A
	18W	1.5A
	30W	2.5A
	42W	3.5A
	60W	5A
	76W	6.3A
	120W	10A
15V DC	5W	0.3A
	18W	1.2A
	42W	2.8A
24V DC	5W	0.2A
	10W	0.4A
	18W	0.8A
	30W	1.25A
	48W	2A
	60W	2.5A
	75W	3.2A
	120W	5A
	240W	10A
	300W	12.5A
	480W	20A
	960W	40A
48V DC	120W	2.5A
	240W	5A
	480W	10A

INDUSTRIAL HOUSING FOR BACK-UP SYSTEMS

- **Power supply units with total discharge**
- **For back-up systems (e.g. batteries)**
- **Output voltage 12 - 28.5V DC**
- **Output power 30 - 480W**

Output voltage	Output power	Output current
12V DC	30W	2.2A
	60W	4.4A
	120W	8.8A
24V DC	30W	1.1A
	60W	2.2A
	120W	4.4A
	240W	8.8A
	480W	17.6A

INSTALLATION HOUSING FOR BUILDING AND PLANT ENGINEERING

- **Output voltage 12 - 24V DC**
- **Output power 10 - 100W**
- **Overload and short circuit protection**

Output voltage	Output power	Output current
12V DC	10W	0.8A
	24W	2A
	54W	4.5A
	90W	7.5A
24V DC	10W	0.4A
	24W	1A
	36W	1.5A
	60W	2.5A
	100W	4.2A

ARTICLE NUMBERS AND MORE INFOS ABOUT DC POWER SUPPLIES

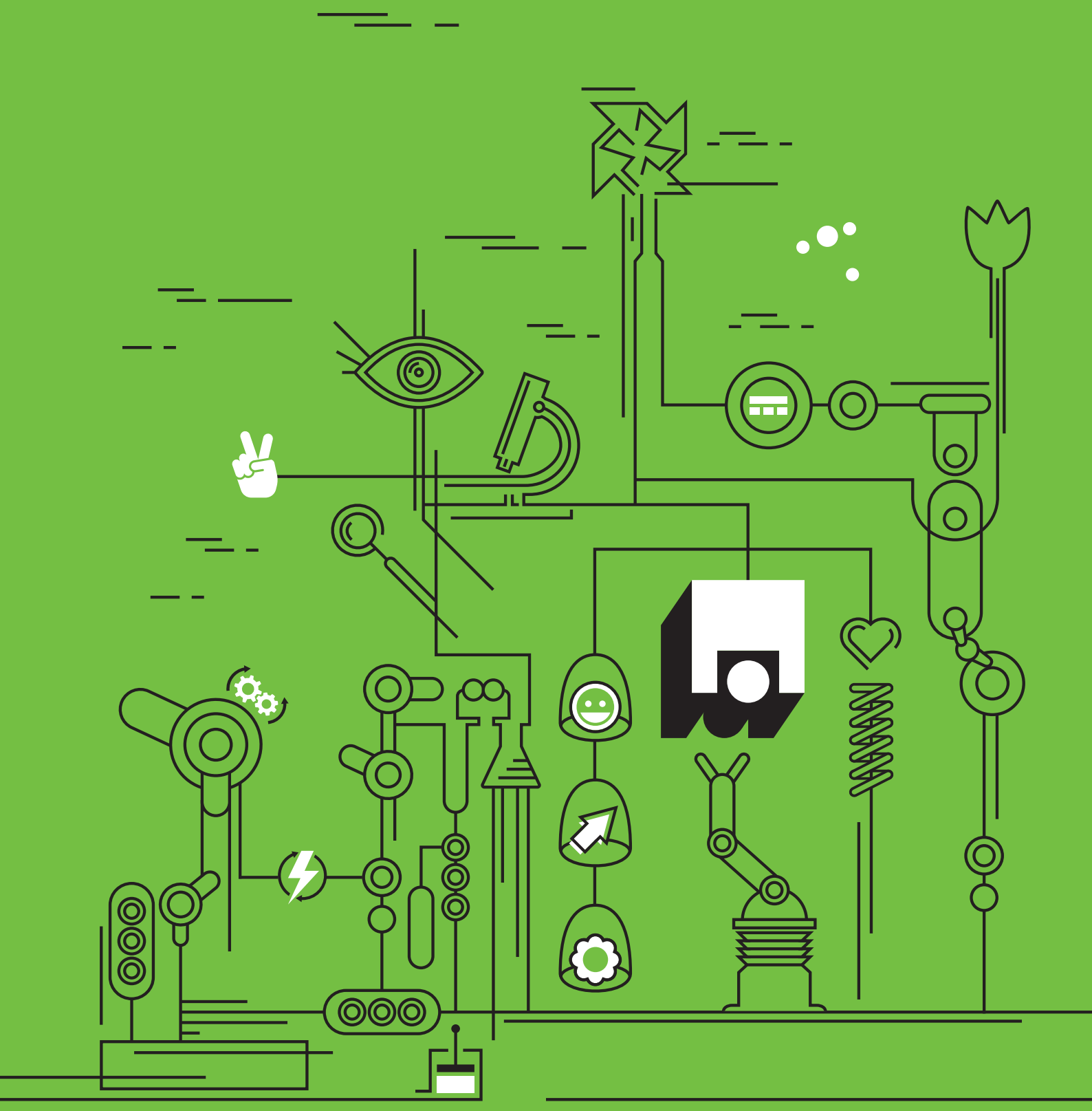
www.tele-online.com

Type code timers

E	1	Z	M	F	20	P	24–240 V AC/DC
PRODUCT SERIES	**HOUSING**	**MEASUREMENT PARAMETER**	**FUNCTION**	**ADDITIONAL FUNCTION**	**OUTPUT**	**TERMINAL**	**SUPPLY VOLTAGE**
E ENYA **V** VEO **G** GAMMA **K** KAPPA	**1** 17,5 mm **2** 22,5 mm **3** 35,0 mm **4** 45,0 mm	**Z** Timer	**M** Multifunction **Q** Quattro (4 funct.) **E** ON Delay **R** OFF Delay **I** 2 time function **S** Star-delta **A** OFF Delay without auxiliary voltage **NT** Emergency light tester **TP** Staircase timer **WI** Impulse switch mode **ET** ON Delay 2-wire connected	**F** Remote potentio-meter	delayed **10** 1 contact **20** 2 contacts instantaneous **01** 1 contact **02** 2 contacts delayed/ instantaneous **11** 1 delayed contact 1 instantane-ous contact	**P**ush-in terminal (VEO) **P**otential free contact (KAPPA)	230 V AC 24 V DC 24–240 V AC/DC etc.

Type code monitoring relays

V	4	I	M	100 A	L	20	P	24–240 V AC/DC
PRODUCT SERIES	**HOUSING**	**MEASUREMENT PARAMETER**	**FUNCTION**	**MEASUREMENT RANGE**	**ADDITIONAL FUNCTION**	**OUTPUT**	**TERMINAL**	**SUPPLY VOLTAGE**
E ENYA **V** VEO **G** GAMMA **K** KAPPA	**1** 17,5 mm **2** 22,5 mm **3** 35,0 mm **4** 45,0 mm	**U** Voltage 1~ **P** Voltage 3~ Δ **Y** Voltage 3~ Y **I** Current 1~ **J** Current 3~ **F** Frequency **T** Temperature **L** Level **B** Effective power **C** cos φ	**U** Under **O** Over **W** Window **F** Error **M** Multi **A** Analog output	230 V 10 A 400 V12 A PT100 etc.	**L** Latch **D** Digital **T** Thermistor **Y** Asymmetry **S** Phase sequence **F** Quick action release **T** Test function **K** Short circuit monitoring **N** Zero voltage safe	delayed **10** 1 contact **20** 2 contacts instantaneous **01** 1 contact **02** 2 contacts	**P**ush-in terminal	230 V AC 24 V DC 24–240 V AC/DC etc.



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